

INTERNATIONAL NURSERY REPORT NO. 14

# FOOD LEGUME NURSERIES

1989-90



INTERNATIONAL CENTER FOR AGRICULTURAL RESEARCH IN THE DRY AREAS

Established in 1977, the International Center for Agricultural Research in the Dry Areas (ICARDA) is governed by an independent Board of Trustees. Based at Aleppo, Syria, it is one of 18 centers supported by the Consultative Group on International Agricultural Research (CGIAR), which is an international group of representatives of donor agencies, eminent agricultural scientists, and institutional administrators from developed and developing countries who guide and support its work.

The CGIAR seeks to enhance and sustain food production and, at the same time, improve socioeconomic conditions of people, through strengthening national research systems in developing countries.

ICARDA focuses its research efforts on areas with a dry summer and where precipitation in winter ranges from 200 to 600 mm. The Center has a world responsibility for the improvement of barley, lentil, and faba bean, and a regional responsibility—in West Asia and North Africa—for the improvement of wheat, chickpea, and pasture and forage crops and the associated farming systems.

Much of ICARDA's research is carried out on a 948-hectare farm at its headquarters at Tel Hadya, about 35 km southwest of Aleppo. ICARDA also manages other sites where it tests material under a variety of agroecological conditions in Syria and Lebanon. However, the full scope of ICARDA's activities can be appreciated only when account is taken of the cooperative research carried out with many countries in West Asia and North Africa.

The results of research are transferred through ICARDA's cooperation with national and regional research institutions, with universities and ministries of agriculture, and through the technical assistance and training that the Center provides. A range of training programs are offered extending from residential courses for groups to advanced research opportunities for individuals. These efforts are supported by seminars, publications, and by specialized information services.

**INTERNATIONAL NURSERY REPORT NO. 14  
FOOD LEGUME NURSERIES 1989/90**

**LEGUME IMPROVEMENT PROGRAM  
THE INTERNATIONAL CENTER FOR AGRICULTURAL RESEARCH  
IN THE DRY AREAS  
(ICARDA), P.O. BOX 5466, ALEPPO - SYRIA**

**DECEMBER 1992**

## PREFACE

A number of trials and nurseries were supplied by the Food Legume Improvement Program to cooperating scientists within and outside the ICARDA region for 1989/90 growing season. Many of these were also grown at ICARDA sites in Syria and Lebanon. This report summarizes the data obtained at ICARDA sites from these trials and nurseries and those returned by the cooperating scientists. The results received from the cooperators till October 30, 1992 have been included.

The report has been prepared by Dr. R.S. Malhotra, International Trials Scientist of the Legume Improvement Program. The assistance of Ms. Suhaila Arslan and Mr. Murhaf Kharboutly in computerization of data is sincerely acknowledged.

It is hoped that the information contained in this report will be of interest and use to the cooperating scientists. Any comments on the report and suggestions for future improvement are most welcome.

M.C. Saxena  
Leader,  
Legume Program

## CONTENTS

	Pages
<b>1. INTRODUCTION</b>	<b>1</b>
<b>2. ICARDA INTERNATIONAL TRIALS AND NURSERIES FOR THE 1989/90 SEASON</b>	<b>1</b>
2.1. DESCRIPTION	1
2.1.1. International Yield Trials (IYT)	1
2.1.2. International Screening Nurseries (ISN)	2
2.1.3. International F <sub>3</sub> /F <sub>4</sub> Nurseries (IF <sub>3</sub> /F <sub>4</sub> N)	2
2.1.4. International Stress Nurseries (I-N)	3
2.1.5. International Agronomy Trials	3
2.2. DISTRIBUTION	4
2.3. DESIGN, ANALYSIS AND MANAGEMENT	4
2.3.1 Design and Analysis	4
2.3.2. Management	5
<b>3. CHICKPEA INTERNATIONAL TRIALS AND NURSERIES</b>	<b>6</b>
3.1. Chickpea International Yield Trial-Spring (CIYT-SP)	6
3.2. Chickpea International Yield Trial-Winter-Mediterranean Region (CIYT-W-MR)	20
3.3. Chickpea International Yield Trial-Southern Latitudes-1 (CIYT-SL1)	43
3.4. Chickpea International Yield Trial-Southern Latitudes-2 (CIYT-SL2)	53
3.5. Chickpea International Yield Trial-Latin American (CIYT-LA)	59
3.6. Chickpea International Screening Nursery-Winter (CISN-W)	66
3.7. Chickpea International Screening Nursery-Spring (CISN-SP)	83
3.8. Chickpea International Screening Nursery-Southernly Latitudes-1 (CISN-SL1)	96
3.9. Chickpea International Screening Nursery-Southernly Latitudes-2 (CISN-SL2)	99
3.10. Chickpea International Screening Nursery-Latin American (CISN-LA)	103
3.11. Chickpea International F <sub>4</sub> Nursery (CIF <sub>4</sub> N)	109
3.12. Chickpea International Ascochyta Blight Nursery (CIABN)	109
3.13. Chickpea International Leaf Miner Nursery (CILMN)	117
3.14. Chickpea International Cold Tolerance Nursery (CICIN)	119
<b>4. FABA BEAN INTERNATIONAL NURSERIES</b>	<b>122</b>
4.1. Faba Bean International Screening Nursery-Determinate (FBISN-D)	122
4.2. FABA BEAN INTERNATIONAL DISEASE NURSERIES	122
4.2.1. Faba Bean International Ascochyta Blight Nursery (FBIABN)	135

4.2.2.	Faba Bean International Chocolate Spot Nursery (FBICSN)	135
4.2.3.	Faba Bean International Rust Nursery (FBIRN)	138
<b>5.</b>	<b>LENTIL INTERNATIONAL TRIALS AND NURSERIES</b>	<b>140</b>
5.1.	Lentil International Yield Trial-Large Seed (LIYT-L)	140
5.2.	Lentil International Yield Trial-Small Seed (LIYT-S)	154
5.3.	Lentil International Yield Trial-Early (LIYT-E)	167
5.4.	Lentil International Screening Nursery-Large Seed (LISN-L)	178
5.5.	Lentil International Screening Nursery-Small Seed (LISN-S)	191
5.6.	Lentil International Screening Nursery-Early (LISN-E)	210
5.7.	Lentil International Screening Nursery-Tall (LISN-T)	222
5.8.	Lentil International F <sub>n</sub> Nurseries (LIF <sub>n</sub> )	235
5.9.	Lentil International Ascochyta Blight Nursery (LIABN)	235
5.10.	Lentil International Fusarium Wilt Nursery (LIFWN)	240
5.11.	Lentil International Cold Tolerance Nursery (LICTN)	242
<b>6.</b>	<b>PEA INTERNATIONAL ADAPTATION TRIAL (PIAT)</b>	<b>243</b>
<b>7.</b>	<b>INTERNATIONAL AGRONOMY TRIALS</b>	<b>256</b>
7.1.	INTERNATIONAL NEED FOR INOCULATION TRIAL (NIT)	256
7.2.	INTERNATIONAL RHIZOBIUM INOCULATION RESPONSE TRIAL (IRT)	257
7.2.1.	Chickpea International Rhizobium Inoculation Response Trial (CIRT)	258
7.2.2.	Faba Bean International Rhizobium Inoculation Response Trial (FBIRT)	260
7.2.3.	Lentil International Rhizobium Inoculation Response Trial (LIRT)	260
7.3.	INTERNATIONAL WEED CONTROL TRIAL (WCT)	260
7.3.1.	Chickpea International Weed Control Trial (CWCT)	262
7.3.2.	Faba Bean International Weed Control Trial (FBWCT)	266
7.3.3.	Lentil International Weed Control Trial (CWCT)	269
7.4.	Faba Bean International Orobanche Chemical Control Trial (FBOCCT)	272
<b>8.</b>	<b>ACKNOWLEDGEMENT</b>	<b>276</b>
<b>APPENDICES</b>		
<b>I.</b>	<b>Distribution of Internatioanl Nurseries and Trials</b>	<b>276</b>
<b>II.</b>	<b>National Scientists Cooperating in Food Legume International Testing Program</b>	<b>280</b>
<b>III.</b>	<b>ICARDA Scientists Cooperating in Food Legume International Testing Program</b>	<b>289</b>
<b>IV.</b>	<b>Geographical Details for the Locations</b>	<b>290</b>
<b>V.</b>	<b>Meterological Details for the Locations</b>	<b>292</b>

## **INTRODUCTION**

The International Cooperative Testing Program on Food Legumes namely faba bean, lentil, kabuli chickpea and peas is co-ordinated by the International Center for Agricultural Research in the Dry Areas (ICARDA). The main objective of the program is to provide the improved genetic materials and production practices to the national programs for testing and use under their local conditions.

The testing aims at evaluating genotypic performance for both seed yield and reaction to biotic and abiotic stresses. It is hoped that through such testing, it will be possible to identify both superior genotypes which are adapted to specific environments, and genotypes which have a wide adaptation. The performance data from a number of widely differing environments will further help the breeder to reduce the number of seasons required for evaluation prior to cultivar release. In addition the program will permit the dissemination of elite germplasm and segregating populations to interested scientists, who can exercise their own selection to develop superior cultivars well adapted to their conditions.

Through the distribution of agronomic trials it is hoped that agronomic research on these legumes will be encouraged and the information on optimum agronomic practices for different agro-ecological conditions would become available.

## **2. INTERNATIONAL TRIALS AND NURSERIES FOR THE 1989/90 SEASON**

### **2.1. DESCRIPTION**

#### **2.1.1. INTERNATIONAL YIELD TRIALS (IYT)**

In order to identify heavy yielding genotypes, with either specific or wide adaptation, it is essential to test genetic material emerging from ICARDA and other national breeding programs in a wide range of environments, encompassing the major production zones in different countries.

The IYTs are replicated trials which test advanced materials that have previously shown above average performance. These trials allow the national programs to identify genotypes best adapted to their local conditions, and provide ICARDA with information that will rationalize crossing programs for different countries.

As in the past there were separate large-seeded and small seeded trials of lentil. The large seeded yield trials comprised entries with a minimum seed size 4.5 g/100 seeds. To satisfy the need of cooperators in southern latitudes in South Asia and Africa a Lentil International Yield Trial - Early was distributed.

The kabuli chickpea international yield trials were reorganized. The large seeded and tall entries are not being distributed as separate trials any more; they are incorporated in other trials. The yield trial for subtropical region (STR) has been renamed as CIYT-SL1 (Southernly Latitude-1). Two new trials, viz. (1) CIYT-LA (Latin American) having extra large seed size (greater than 50g/100 seeds) and (2) CIYT-SL2 (Southernly Latitude-2) having extra early maturity were made available this year. For

the Mediterranean region, the two trials, namely CIYT-SP and CIYT-W-MR, continued. The seed size in these trials was upgraded and is in the range of 35 to 45g/100 seeds and many entries have tall stature. Most of the entries included in the yield trials possess resistance to *Ascochyta* blight and cold except those included in CIYT-LA and CIYT-SL2. A trial on peas with improved cultivars from different parts of world was supplied to cooperators to observe their adaptation under their local conditions.

In view of the reduction in the emphasis of faba bean research at ICARDA headquarters, all international yield trials have been dropped from this year.

Breeders desiring to enter lines into an IYT were requested to send to ICARDA, by early October approximately 4 kg of chickpea or peas and/or 2 kg of lentil.

#### **2.1.2. INTERNATIONAL SCREENING NURSERIES (ISN)**

The ISNs form an adjunct to the IYTs by providing an initial evaluation of a large number of advanced lines ( $F_3/F_6$ ) and elite germplasm, encompassing a wide range of genetic diversity, in non-replicated trials in the environments utilized for the IYTs. The results thus provide to the national programs the opportunity to practice selection in a greater range of material than provided in the IYTs and to ICARDA provide a basis on which genotypes can be advanced to the IYTs.

As with the IYT's, Lentil International Screening Nurseries were divided into large and small seeded types. There was also a screening nursery of early lentil lines (LISN-E) available particularly for those countries of a more southern latitude in South Asia and Africa and a nursery of lentil with tall and erect growth habit (LISN-T) which can be harvested with a cutter-bar. A new nursery of early chickpea lines (CISN-E) was available for more southernly latitudes with short season. Another new nursery of extra large seed size for Latin America (CISN-LA) was also available. Based on winter (W) and spring (S) seasons, the Chickpea International Screening Nursery (CISN) for the Mediterranean Region was divided into two, CISN-W and CISN-SP.

In view of the reduction in the emphasis of faba bean research, at ICARDA headquarters, all screening nurseries except a nursery of determinate type of faba bean (FBISN-D) were stopped.

Cooperators who wished to enter material into an ISN were requested to send to ICARDA for each entry approximately 1000 seeds of lentil and chickpea for increase and inclusion in the next year's nursery.

#### **2.1.3. INTERNATIONAL $F_3/F_4$ NURSERIES ( $IF_3/F_4N$ )**

Genotypes tested in the IYTs and in the ISNs tend to be relatively advanced breeding material that are approaching homozygosity, so nullifying any chances for re-selection in superior performing genotypes. In contrast the



F<sub>3</sub>/F<sub>4</sub> bulk nurseries comprise early generation segregating material, thus permitting breeders in the national programs the chance to practice their own selection in the populations best adapted to the local environment.

The F<sub>4</sub> nurseries in chickpeas were split this year into two nurseries, Chickpea International F<sub>4</sub> Nursery - Mediterranean Region (CIF<sub>4</sub>N-MR) and Chickpea International F<sub>4</sub> Nursery - Southern Latitudes (CIF<sub>4</sub>N-SL). Similarly in lentils, three new F<sub>4</sub> nurseries, namely F<sub>4</sub> Nursery Large Seed (LIF<sub>4</sub>N-L), F<sub>4</sub> Nursery Small (LIF<sub>4</sub>N-S) and F<sub>4</sub> Nursery Cold Tolerance (LIF<sub>4</sub>N-CT) were added this year.

#### 2.1.4. INTERNATIONAL STRESS NURSERIES (I-N)

The development of cultivars resistant to biotic and abiotic stresses prevalent in the main legume growing areas is essential if stable seed yields are to be achieved. However, there is presently little information available on the incidence and severity of various stresses in different areas. The International Disease and Insect-Pest Nurseries and Cold Tolerance Nursery have been formulated to rectify this situation. The aim of these nurseries is to test a relatively large number of genotypes, in replicated design, in a range of locations covering a number of countries. The nursery results thus furnish information on the incidence and severity of the stress in differing geographic areas, and provide a means for the identification of resistant genotypes. These together should greatly assist the plant breeder in developing genotypes that combine heavy seed yield with relatively stable resistance to these stresses.

Realizing the importance of different stresses in the region, three nurseries in faba bean (*Ascochyta* blight, rust, and chocolate spot), four nurseries in chickpea (*Ascochyta* blight, *Fusarium* wilt, leaf-miner and cold tolerance) and two nurseries in lentil (*Ascochyta* blight and cold tolerance) have been developed and were supplied. One new nursery namely Lentil International *Fusarium* Wilt Nursery (LIFW-N) was added this year. The entries in these nurseries are initially selected on the basis of their resistance/tolerance to the respective stresses at experimental sites of ICARDA. The cooperators desirous to enter lines in stress tolerance nurseries were requested to send to ICARDA, by early October approximately 1000 seeds for each entry of chickpea and lentil, and 1500 seeds per entry of faba bean for increase and inclusion in the next year nursery.

#### 2.1.5. INTERNATIONAL AGRONOMY TRIALS

In many countries the legume crops tend to be neglected in favor of other crops, resulting in poorer management and fewer agronomic inputs. To combat this trend it is essential to develop suitable agronomic management practices for legumes that, if adopted, would increase both yields, and a farmer's income, and hence improve economic well-being in a country. Also the use of such practices should permit the full benefit to be gained from the cultivation of the potentially heavy yielding cultivars that emerge from plant breeding programs.

Realizing the need for developing information on suitable agronomic management of the legumes in the region a program of international agronomic trials has been in operation. These trials included, Weed Control Trials, Need for Inoculation Trial (INIT) and Rhizobium Inoculation Response Trial (IRT). In this program the cooperators are provided with information on design and conduct of the trial, and the necessary experimental material such as fertilizers, inoculum and pesticides. No seed is, however, sent as these trials are to be conducted with the best locally-adapted genotypes. A trial for the chemical control of Orobanche in faba bean has also been available.

For proper analysis of data from these trials it is essential that the soil and environmental conditions of the location are properly characterized. Suggestions for the characterization of these conditions were provided in the write-up on experimental details.

## 2.2. DISTRIBUTION

The list of the trials and nurseries distributed from ICARDA to the different countries; lists of food legume scientists in the national programs and at ICARDA cooperating in international testing program; and details of latitude, longitude, altitude and rainfall data of the locations at which the trials were conducted are given in appendices I, II, III and IV, respectively. Weather conditions during the cropping season for the locations reporting data are given in Figures as Appendix V. In total, 1031 sets of trials were distributed to the cooperators. Data were returned for 496 trials and nurseries, representing 48.1% of the total distributed nurseries. It is worth mentioning that out of 163 agronomy trials sent to various cooperators only 46 (28.22%) locations returned the data.

## 2.3. DESIGN, ANALYSIS AND MANAGEMENT

### 2.3.1. DESIGN AND ANALYSIS

The design used for the individual trials and nurseries are given in the crop reports.

The data on seed yield, time to flowering, time to maturity, plant height and 100-seed weight have been analyzed statistically, and the term 'significant' has been used to denote a probability level (P) equal or less than 0.05. The co-efficient of variation (CV) given in different tables were calculated using an error mean square (EMS) from the relevant analysis of variance. The mean square due to error was also used to calculate the appropriate standard error of mean and least significant difference (LSD). The LSD was used to test whether the performance of a genotype differed significantly from that of the control/local check. The LSD is not appropriate for testing differences between any pair of genotypes in a trial. The abbreviations ENI> and TEST> were used respectively, for number of entries significantly greater than, and number of test entries significantly greater than the local check.

### 2.3.2. MANAGEMENT

For all except the agronomic trials it was emphasized that the material should be planted at the farmer's normal planting date, and that the locally recommended practices should be used with respect to fertilizer, pesticides, herbicides and irrigation.

For each yield trial or screening nursery, observations were requested on plant stand (1-5; rating 1 = perfect), time to 50% flowering (days), time to maturity (days), plant height (cm) and seed yield (kg/ha). Other characters were optional e.g. plant width (cm), plant type (erect, semi-erect or prostrate), height of lowest pods (cm), disease damage rating (1-5; 1 = free from disease), insect damage rating (1-5; 1 = free from insect damage), lodging (1-5; 1 = no lodging), vigor rating a visual estimate of yield potential (1-5; 1 = very vigorous), shattering (1-5; 1 = no shattering), branching (1-5; 1 = very few branches) and virus (1-5; 1 = free of virus). For stress nurseries, the data on reaction to stress was requested.

In addition, cooperators were requested to send information on the altitude, latitude, longitude, temperature, rainfall, number and dates of irrigations, dates of planting and harvest, herbicides, pesticides and fertilizers applied (indicating type, rate and date of application), names and titles of people conducting the nursery and any other relevant information which could be of value in interpreting the data.

### **3. CHICKPEA INTERNATIONAL TRIALS AND NURSERIES**

Eighteen chickpea international trials and nurseries were available to the cooperators in 1989/90 season. These included yield trials, screening nurseries, segregating populations, stress nurseries including disease, insect-pest, and cold tolerance nurseries, and agronomic trials. All nurseries and trials except the agronomic trials are discussed in this section. Cooperators were free to use these materials directly or indirectly for the improvement of chickpea in their own national programs.

#### **3.1. CHICKPEA INTERNATIONAL YIELD TRIAL - SPRING (CIYT-SP)**

##### **Material**

The Chickpea International Yield Trial - Spring comprised 23 test entries and one local check to be supplied by the cooperator. Twenty two of the test entries were the advanced breeding lines developed through hybridization at ICARDA and one originated from Turkey. These entries were selected on the basis of their superior performance either in international, regional, or local trials.

##### **Methods and Management**

The trial design was a randomized complete block with three replications. The suggested plot size was 4 rows, each 4 m long. Thirty five sets were sent to cooperators in 12 countries. The results were, however, received for 25 trials from 10 countries. The agronomic information received from the cooperators is given in Table 3.1.1.

##### **Results and Discussion**

On an average over locations, the entry means ranged from 64 to 75 days for time to flowering (Table 3.1.2), 107 to 119 days for time to maturity (Table 3.1.3), and 31 to 39 cm for plant height (Table 3.1.4). The overall mean for the entries for 100-seed weight, varied from 29 to 45 g, and the entries FLIP 86-90C, FLIP 87-6C, FLIP 87-2C and FLIP 87-8C had the largest seed size (Table 3.1.5). The location means for 100-seed weight varied from 29 g for Tel Hadya in Syria to 43 g for Amasya and Izmir-II in Turkey.

The highest mean seed yield (Table 3.1.6) was obtained at Papiano in Italy (2613 kg/ha) and was followed by Montboucher in France (2480 kg/ha), Badajoz in Spain (1816 kg/ha), and Amasya in Turkey (1650 kg/ha). The seed yields at Mushagar in Jordan and Tel Hadya in Syria were very poor (<200 kg/ha). On an average over locations ILC 482 gave the highest seed yield (1121 kg/ha) and was closely followed by FLIP 84-164C, FLIP 87-85C, FLIP 87-74C and FLIP 87-8C with seed yields of 1068, 1045, 1030 and 1012 kg/ha, respectively.

The ANOVA for seed yield revealed that the local check was excelled by 6, 8, 7, and 4 entries by a significant margin at Montboucher in France, Papiano in Italy, Tartus in Syria, and Eskisehir in Turkey, respectively.

Table 3.1.1. Agronomic data for different locations in the CIYT-SP during 1989/90.

Country	Location	Planting Date	Harvesting Date	Fertilizer (kg/ha)			Irrigation	Insecticide/Fungicide/Herbicide	Local Check
				N	P	K			
Algeria	Guelma	24.02.90	12.12.90	200			-	-	
Algeria	Sidi Bel Abbes	10.03.90	07.07.90	46			-	Sabdou	
France	Montboucher	08.03.90	24.07.90	100			-	CASCARI	
Italy	Papiano	14.03.90	11.07.90	80			-	N.N.	
Jordan	Mushagar	27.02.90		20	40		-	Jubeiha-1	
Lebanon	Terbol	13.03.90	00.07.90	50			-	Lebanese local	
Portugal	Elvas	15.03.90	25.07.90	60	60		-	Chk 510-Elvar	
Spain	Badajoz	15.02.90	05.07.90	-			-	Pedrosillano	
Syria	Gelline	26.03.90	15.07.90	20	50		-		
Syria	Heimo	20.03.90	30.06.90	50			-		
Syria	Homs	24.02.90		50			-		
Syria	Jindiress	01.03.90	22.06.90	50			-	ILC 1929	
Syria	Tartus	07.04.90	04.08.90	-			-	Local	
Syria	Tel Hadya	05.03.90	07.90	50			-	ILC 1929	
Tunisia	Beja-W	NA							
Tunisia	Beja-Sp	NA							
Tunisia	El Kef	NA							
Tunisia	Oued Meliz	NA							
Turkey	Amasya	12.04.90	15.08.90	50			-	Tasova-89	
Turkey	Diyarbakir	08.02.90		30	60		-	Yerli Nnohut	
Turkey	Eskisehir	18.03.90	04.08.90	40	70		-	Canitez - 87	
Turkey	Izmir-I	01.03.90	05.07.90	30	60		-	Canitez - 87	
Turkey	Izmir-II	12.03.90	05.07.90	30	60		-	Canitez - 87	
Turkey	Sunliurfa	07.11.89		30	60		-	Yerli Nohut	

NA = Not available

Table 3.1.2. Time to flowering (days) of entries at different locations in the CIYT-SP during 1989/90.

Entry Name	Pedigree	Origin	ALGERIA		ITALY	JORDAN	LEBANON
			Guelma	Sidi Bel-Abbes	Papiano	Mushagar	Terbol
FLIP 84- 19C	X 79 TH 221/ILC 72XILC 1922	ICARDA/ICRISAT	63	88	65	83	50
FLIP 84-164C	X 82 TH 101/ILC 215(WH)XILC 195(WH)	ICARDA/ICRISAT	57	88	66	73	47
FLIP 85- 13C	X 83 TH 19/FLIP 82-65CXFLIP82-69C	ICARDA/ICRISAT	61	88	73	83	57
FLIP 85- 54C	X 83 TH 19/FLIP 82-65CXFLIP 82-69C	ICARDA/ICRISAT	61	87	73	85	53
FLIP 85- 75C	X 83 TH 19/FLIP 82-65CXFLIP 82-69C	ICARDA/ICRISAT	61	88	74	83	53
FLIP 86- 11C	X 83 TH 23/FLIP 82-69CXFLIP 82-72C	ICARDA/ICRISAT	63	88	74	81	53
FLIP 86- 13C	X 83 TH 56/ILC3346XILC 604	ICARDA/ICRISAT	65	87	68	73	47
FLIP 86- 41C	X 83 TH 23/FLIP 82-69CXFLIP 82-72C	ICARDA/ICRISAT	63	89	67	80	51
FLIP 86- 60C	X 83 TH 22/FLIP 81-65CXFLIP 82-81C	ICARDA/ICRISAT	65	87	75	86	53
FLIP 86- 90C	X 82 TH 147/(ILC445XILC484)XILC3279	ICARDA/ICRISAT	63	88	70	74	54
FLIP 86- 99C	X 83 TH 19/FLIP 82-65CXFLIP 82-69C	ICARDA/ICRISAT	61	88	71	83	53
FLIP 86-109C	X 83 TH 121/FLIP 82-69CXFLIP 82-92C	ICARDA/ICRISAT	63	87	74	78	54
FLIP 87- 2C	X 85 TH 162/ILC3488XFLIP 83-13C	ICARDA/ICRISAT	57	85	71	73	45
FLIP 87- 3C	X 85 TH 184/ILC3853XFLIP 82-127C	ICARDA/ICRISAT	61	88	69	86	55
FLIP 87- 6C	X 85 TH 246/ILC3398XFLIP 83-13C	ICARDA/ICRISAT	49	88	70	79	43
FLIP 87- 8C	X 85 TH 246/ILC3398XFLIP 83-13C	ICARDA/ICRISAT	57	88	65	73	43
FLIP 87- 58C	X 85 TH 264/ILC3777XFLIP 83-46C	ICARDA/ICRISAT	47	86	66	74	40
FLIP 87- 59C	X 85 TH 274/ILC3843XFLIP 82-130C	ICARDA/ICRISAT	57	87	66	72	40
FLIP 87- 72C	X 83 TH 115/FLIP 82-81CXILC3326	ICARDA/ICRISAT	57	88	65	79	45
FLIP 87- 74C	X 83 TH 20/FLIP 81-65CXFLIP 82-72C	ICARDA/ICRISAT	57	87	66	80	41
FLIP 87- 85C	X 85 TH 248/ILC3398XFLIP 83-46C	ICARDA/ICRISAT	57	87	65	71	42
FLIP 81-293C	X 79 TH 8/ILC 191XILC 496	ICARDA/ICRISAT	61	87	72	85	54
ILC 482	Long term check	Turkey	-	88	67	71	48
Local check			63	88	73	80	45
Location Mean			60	87	69	79	49
S.E. of Mean			#	0.32	0.57	3.04	0.72
L.S.D. at 5%			#	0.95	1.66	8.88	2.11
C.V. %			#	0.52	1.16	5.48	2.10
Error d.f.			#	23	23	23	23
Significance				*	*	*	*

Table 3.1.2. Cont'd. ...

Table 3.1.2. Cont'd. ...

Entry Name	PORTUGAL SPAIN		SYRIA					TURKEY				(1)	
	Elvas	Badajoz	Gelline	Heimo	Homs	Jindi- ress	Tartus	Tel- Hadya	Diyar- Bakir	Eski- sehir	Izmir- II	Sunli- urfa	Overall Mean
FLIP 84- 19C	73	82	56	59	77	67	51	61	96	85	76	176	71
FLIP 84-164C	65	70	52	57	79	63	53	57	91	84	71	174	68
FLIP 85- 13C	76	84	60	60	82	74	57	68	95	89	81	184	75
FLIP 85- 54C	76	84	59	59	81	73	53	67	95	86	81	181	74
FLIP 85- 75C	74	82	58	58	82	74	53	66	93	91	81	180	74
FLIP 86- 11C	75	84	58	59	84	72	53	66	92	94	71	180	73
FLIP 86- 13C	66	81	55	60	74	68	57	60	91	85	81	174	70
FLIP 86- 41C	74	81	56	58	79	67	52	60	91	85	71	178	71
FLIP 86- 60C	74	83	57	61	82	73	52	66	92	89	81	178	74
FLIP 86- 90C	74	77	56	60	80	64	56	60	94	91	71	178	71
FLIP 86- 99C	76	83	57	61	83	71	62	66	94	89	81	180	74
FLIP 86-109C	77	82	61	60	82	74	54	67	93	89	81	181	74
FLIP 87- 2C	64	66	50	55	74	59	52	56	85	83	71	173	66
FLIP 87- 3C	75	82	59	60	79	70	51	65	94	86	81	175	73
FLIP 87- 6C	64	66	50	55	74	54	57	50	84	83	76	167	66
FLIP 87- 8C	64	67	51	56	71	58	57	52	85	85	71	167	66
FLIP 87- 58C	67	63	49	56	68	52	53	50	82	82	71	168	64
FLIP 87- 59C	64	64	49	54	73	54	51	52	84	80	76	163	64
FLIP 87- 72C	64	68	50	57	71	57	59	52	86	85	76	169	67
FLIP 87- 74C	64	66	49	55	73	60	52	53	80	87	76	165	66
FLIP 87- 85C	64	66	49	56	69	58	53	53	85	86	76	169	65
FLIP 81-293C	74	82	58	62	79	73	48	66	93	88	81	179	73
ILC 482	67	71	52	57	71	63	43	58	89	86	71	178	67
Local check	75	72	50	57	73	59	46	53	86	84	71	173	
Location Mean	70	75	54	58	77	65	53	59	89	86	76	174	
S.E. of Mean	1.14	1.81	0.94	1.26	0.90	0.57	0.44	0.77	1.03	2.75	2.52	1.96	
L.S.D. at 5%	3.34	5.29	2.75	3.67	2.64	1.67	1.29	2.25	3.01	8.04	7.37	5.72	
C.V. %	2.30	3.41	2.46	3.08	1.67	1.25	1.18	1.84	1.63	4.51	4.69	1.59	
Error d.f.	23	23	23	23	23	23	23	23	23	23	23	23	
Significance	*	*	*	*	*	*	*	*	*	NS	*	*	

(1) Guelma and Sunliurfa were excluded from the overall mean.\* = Significant at  $P < 0.05$ , NS = not significant.

# Not analysed due to incomplete data set or other reasons.

Table 3.1.3. Time to maturity (days) of entries at different locations in the CIYT-SP during 1989/90.

Entry Name	ALGRETA	FRANCE	ITALY	JORDAN	LEBANON	PORTUGAL	SPAIN	SYRIA	
	Sidi Bel- Abbes	Montboucher	Papiano	Mushagar	Terbol	Elvas	Badajoz	Gelline	Heimo
FLIP 84- 19C	117	133	106	-	91	102	130	98	90
FLIP 84-164C	115	131	105	117	86	103	122	89	82
FLIP 85- 13C	117	134	109	-	102	114	131	101	89
FLIP 85- 54C	113	132	108	-	100	113	131	102	91
FLIP 85- 75C	115	133	107	117	106	111	132	99	90
FLIP 86- 11C	115	135	108	-	106	114	142	98	91
FLIP 86- 13C	113	133	107	118	97	106	132	98	90
FLIP 86- 41C	117	132	107	-	92	111	129	97	91
FLIP 86- 60C	114	134	109	-	98	108	134	102	91
FLIP 86- 90C	115	136	110	-	106	110	133	103	89
FLIP 86- 99C	117	134	108	-	99	108	131	102	91
FLIP 86-109C	113	133	108	117	104	115	132	102	91
FLIP 87- 2C	117	135	111	-	88	102	131	90	83
FLIP 87- 3C	116	135	111	-	100	111	127	98	88
FLIP 87- 6C	117	136	110	-	88	102	133	91	82
FLIP 87- 8C	115	138	112	119	84	103	132	97	82
FLIP 87- 58C	117	129	105	-	78	101	120	83	81
FLIP 87- 59C	114	129	105	119	78	102	119	82	80
FLIP 87- 72C	116	134	105	117	85	102	134	89	82
FLIP 87- 74C	113	132	107	117	86	102	122	87	80
FLIP 87- 85C	113	134	105	118	80	102	123	86	80
FLIP 81-293C	113	131	109	-	95	109	122	97	90
ILC 482	115	129	105	117	84	102	121	89	82
Local check	116	131	109	-	84	111	123	88	79
<b>Location Mean</b>	<b>115</b>	<b>133</b>	<b>108</b>	<b>118</b>	<b>92</b>	<b>107</b>	<b>128</b>	<b>94</b>	<b>86</b>
S.E. of Mean	0.53	1.10	0.73	#	2.09	2.17	1.05	2.46	0.60
L.S.D. at 5%	1.55	3.23	2.13	#	6.12	6.34	3.08	7.20	1.76
C.V. %	0.65	1.17	0.96	#	3.20	2.87	1.16	3.69	0.99
Error d.f.	23	23	23		23	23	23	23	23
Significance	*	*	*		*	*	*	*	*

Table 3.1.3. Cont'd. ...



Table 3.1.3. Cont'd. ...

Entry Name	SYRIA				TURKEY			(1) Overall Mean
	Homs	Jindiress	Tartus	Tel Hadya	Amasya	Diyarbakir	Eskisehir	
FLIP 84- 19C	142	104	112	95	118	130	130	114
FLIP 84-164C	139	104	115	91	109	129	132	111
FLIP 85- 13C	146	110	117	97	120	131	135	118
FLIP 85- 54C	144	110	115	97	115	131	133	117
FLIP 85- 75C	146	110	115	-	115	132	136	118
FLIP 86- 11C	147	112	114	-	118	132	136	119
FLIP 86- 13C	144	105	116	94	118	131	130	116
FLIP 86- 41C	147	104	113	97	117	132	131	116
FLIP 86- 60C	144	108	115	97	120	131	134	117
FLIP 86- 90C	149	110	116	97	121	132	136	119
FLIP 86- 99C	146	110	119	96	115	132	134	117
FLIP 86-109C	143	110	116	97	115	131	134	117
FLIP 87- 2C	132	101	114	94	120	131	131	113
FLIP 87- 3C	146	108	114	97	115	130	134	116
FLIP 87- 6C	137	102	117	92	118	131	131	114
FLIP 87- 8C	135	100	117	94	115	131	132	114
FLIP 87- 58C	111	94	115	86	106	129	132	107
FLIP 87- 59C	111	94	115	88	105	129	130	107
FLIP 87- 72C	124	101	117	90	115	132	133	112
FLIP 87- 74C	131	101	113	91	118	129	136	111
FLIP 87- 85C	116	96	114	89	113	130	134	109
FLIP 81-293C	138	106	114	94	115	129	135	114
ILC 482	122	103	115	93	108	129	134	110
Local check	120	101	111	88	119	129	131	
<b>Location Mean</b>	<b>136</b>	<b>104</b>	<b>115</b>	<b>93</b>	<b>115</b>	<b>130</b>	<b>133</b>	
S.E. of Mean	2.60	1.15	0.31	1.03	1.21	0.44	1.78	
L.S.D. at 5%	7.59	3.37	0.91	3.02	3.55	1.29	5.21	
C.V. %	2.70	1.56	0.39	1.56	1.59	0.48	1.89	
Error d.f.	23	23	23	21	23	23	23	
Significance	*	*	*	*	*	*	NS	

(1) Mushagar and Tel Hadya were excluded from the overall mean.

\* = Significant at  $P < 0.05$ , NS = not significant. # Not analysed due to incomplete data set or other reasons.

Table 3.1.4. Plant height (cm) of entries at different locations in the CIYT-SP during 1989/90.

Entry Name	ALGERIA	ITALY	LEBANON	PORTUGAL	SPAIN	SYRIA		
	Sidi Bel Abbas	Papiano	Terbol	Elvas	Badajoz	Gelline	Heimo	Homs
FLIP 84- 19C	33	48	35	32	56	26	30	30
FLIP 84-164C	33	45	35	33	50	28	30	27
FLIP 85- 13C	33	55	41	32	60	34	29	35
FLIP 85- 54C	30	55	40	33	58	35	29	33
FLIP 85- 75C	33	55	41	36	59	33	30	33
FLIP 86- 11C	30	53	43	31	56	35	30	38
FLIP 86- 13C	35	48	32	34	63	33	30	32
FLIP 86- 41C	35	50	37	31	47	30	30	32
FLIP 86- 60C	35	58	42	33	61	35	30	37
FLIP 86- 90C	33	53	38	29	50	33	30	34
FLIP 86- 99C	33	53	42	32	60	35	30	34
FLIP 86-109C	38	50	42	29	60	35	30	35
FLIP 87- 2C	35	45	32	27	41	33	30	28
FLIP 87- 3C	33	45	36	30	48	30	29	31
FLIP 87- 6C	30	40	34	26	35	29	29	30
FLIP 87- 8C	33	50	37	36	43	27	30	27
FLIP 87- 58C	38	40	29	30	36	29	30	30
FLIP 87- 59C	35	40	29	25	41	29	29	24
FLIP 87- 72C	33	50	38	37	51	34	28	34
FLIP 87- 74C	35	43	31	26	39	27	30	30
FLIP 87- 85C	35	40	28	31	43	28	29	30
FLIP 81-293C	35	50	35	29	53	33	30	30
ILC 482	33	43	33	29	49	28	32	27
Local check	28	50	34	32	51	26	27	25
<b>Location Mean</b>	<b>33</b>	<b>48</b>	<b>36</b>	<b>31</b>	<b>50</b>	<b>31</b>	<b>29</b>	<b>31</b>
S.E. of Mean	2.08	2.29	2.97	2.13	2.48	1.13	0.68	1.01
L.S.D. at 5%	6.09	6.71	8.69	6.24	7.25	3.31	1.98	2.96
C.V. %	8.86	6.74	11.75	9.83	6.96	5.19	3.25	4.63
Error d.f.	23	23	23	23	23	23	23	23
Significance	NS	*	*	*	*	*	NS	*

Table 3.1.4. Cont'd. ...

Table 3.1.4. Cont'd. ...

Entry Name	SYRIA			TURKEY				Overall Mean
	Jindiress	Tartus	Tel Hadya	Amasya	Diyarbakir	Eskisehir	Izmir-I	
FLIP 84- 19C	30	35	25	41	52	26	34	35
FLIP 84-164C	29	40	25	36	46	27	31	34
FLIP 85- 13C	36	35	31	46	50	29	33	38
FLIP 85- 54C	35	35	27	43	54	28	33	38
FLIP 85- 75C	32	35	31	41	50	27	28	37
FLIP 86- 11C	36	35	27	52	53	32	33	39
FLIP 86- 13C	34	30	27	45	50	29	33	37
FLIP 86- 41C	31	35	25	39	41	24	30	34
FLIP 86- 60C	36	30	30	45	50	30	36	39
FLIP 86- 90C	28	35	27	43	47	32	34	36
FLIP 86- 99C	33	35	29	43	53	30	41	39
FLIP 86-109C	36	30	31	44	51	27	36	38
FLIP 87- 2C	32	35	25	38	43	26	30	33
FLIP 87- 3C	32	30	25	41	49	27	33	34
FLIP 87- 6C	28	35	26	34	44	25	27	31
FLIP 87- 8C	30	30	25	36	48	26	29	34
FLIP 87- 58C	29	30	25	43	43	23	37	32
FLIP 87- 59C	28	35	22	34	41	24	30	31
FLIP 87- 72C	32	35	30	41	54	32	44	38
FLIP 87- 74C	27	35	24	35	41	28	30	32
FLIP 87- 85C	24	30	23	36	45	25	31	32
FLIP 81-293C	32	40	26	45	47	26	30	36
ILC 482	25	35	23	33	42	26	29	32
Local check	24	30	21	40	43	26	37	
<b>Location Mean</b>	<b>31</b>	<b>34</b>	<b>26</b>	<b>47</b>	<b>47</b>	<b>27</b>	<b>33</b>	
S.E. of Mean	1.35	#	1.12	1.82	2.06	1.70	2.77	
L.S.D. at 5%	3.95	#	3.29	5.33	6.03	4.96	8.10	
C.V. %	6.24	#	6.11	6.43	6.17	8.90	11.93	
Error d.f.	23		23	23	23	23	23	
Significance	*		*	*	*	*	*	

# Not analysed due to incomplete data set or other reasons.

Table 3.1.5. 100-Seed weight (g) of entries at different locations in the CVYT-SP during 1989/90.

Entry Name	FRANCE	ITALY	LEBANON	PORTUGAL	SPAIN	SYRIA		
	Montboucher	Papiano	Terbol	Elvas	Badajoz	Gelline	Heimo	Homs
FLIP 84- 19C	46	41	39	40	47	36	36	34
FLIP 84-164C	34	33	31	35	35	30	32	30
FLIP 85- 13C	37	38	41	40	38	34	42	36
FLIP 85- 54C	41	42	40	40	44	34	36	38
FLIP 85- 75C	41	42	36	40	44	32	39	38
FLIP 86- 11C	41	39	33	40	42	36	34	38
FLIP 86- 13C	42	42	42	41	46	32	40	38
FLIP 86- 41C	37	40	34	37	37	31	38	31
FLIP 86- 60C	40	39	38	41	41	34	40	35
FLIP 86- 90C	46	45	43	46	49	32	45	44
FLIP 86- 99C	39	42	33	42	42	29	38	37
FLIP 86-109C	40	41	38	41	41	32	36	35
FLIP 87- 2C	46	42	41	41	45	32	40	38
FLIP 87- 3C	42	39	38	41	39	33	43	36
FLIP 87- 6C	45	43	43	43	45	34	46	41
FLIP 87- 8C	45	43	37	45	39	31	41	38
FLIP 87- 58C	36	35	31	36	36	36	36	34
FLIP 87- 59C	39	38	36	35	39	27	35	34
FLIP 87- 72C	43	39	35	39	49	33	39	35
FLIP 87- 74C	42	38	36	37	38	35	39	34
FLIP 87- 85C	41	34	36	38	38	36	39	34
FLIP 81-293C	30	30	30	30	28	33	30	27
ILC 482	32	30	27	30	31	25	30	25
Local check	27	48	28	43	29	20	38	32
<b>Location Mean</b>	<b>40</b>	<b>39</b>	<b>36</b>	<b>39</b>	<b>40</b>	<b>32</b>	<b>38</b>	<b>35</b>
S.E. of Mean	0.50	0.89	1.48	0.76	1.49	0.78	2.16	0.91
L.S.D. at 5%	1.47	2.61	4.32	2.24	4.37	2.28	6.31	2.67
C.V. %	1.79	3.21	5.81	2.76	5.26	3.45	8.06	3.70
Error d.f.	23	23	23	23	23	23	23	23
Significance	*	*	*	*	*	*	*	*

Cont'd. ...

Table 3.1.5. Cont'd. ...

Entry Name	SYRIA		TURKEY				Overall Mean
	Tel Hadya	Amasya	Diyarbakir	Eskisehir	Izmir-I	Izmir-II	
FLIP 84- 19C	23	49	41	42	39	47	40
FLIP 84-164C	24	32	33	34	36	37	32
FLIP 85- 13C	24	42	33	42	38	40	38
FLIP 85- 54C	27	45	35	42	42	44	40
FLIP 85- 75C	24	48	38	43	41	47	40
FLIP 86- 11C	25	46	37	44	36	43	38
FLIP 86- 13C	31	44	36	43	41	45	40
FLIP 86- 41C	25	37	36	38	35	38	35
FLIP 86- 60C	25	46	35	41	36	42	38
FLIP 86- 90C	35	56	44	51	40	48	45
FLIP 86- 99C	28	41	37	44	40	45	38
FLIP 86-109C	31	41	36	43	39	45	39
FLIP 87- 2C	31	50	36	47	39	46	41
FLIP 87- 3C	25	44	35	43	39	43	39
FLIP 87- 6C	38	48	43	48	41	46	43
FLIP 87- 8C	33	47	38	47	39	47	41
FLIP 87- 58C	37	42	34	40	34	39	36
FLIP 87- 59C	35	42	33	39	34	40	36
FLIP 87- 72C	31	44	37	42	35	42	39
FLIP 87- 74C	33	44	35	44	40	43	39
FLIP 87- 85C	34	39	36	43	39	43	38
FLIP 81-293C	22	32	27	31	31	34	30
ILC 482	24	30	29	30	30	33	29
Local check	29	47	32	51	45	51	
<b>Location Mean</b>	<b>29</b>	<b>43</b>	<b>36</b>	<b>42</b>	<b>38</b>	<b>43</b>	
S.E. of Mean	1.85	2.28	#	0.90	1.60	1.06	
L.S.D. at 5%	5.41	6.68	#	2.64	4.68	3.09	
C.V. %	9.07	7.47	#	3.23	5.96	3.49	
Error d.f.	23	23		23	23	23	
Significance	*	*		*	*	*	

15

# Not analysed due to incomplete data set or other reasons.

Table 3.1.6. Seed yield (Y=kg/ha) and rank (R) of entries at different locations in the CIYT-SP during 1989/90.

Entry Name	ALGERIA		FRANCE		ITALY		JORDAN		LEBANON		PORTUGAL		SPAIN			
	Guelma		Sidi Bel Abbas		Montboucher		Papiano		Mushagar		Terbol		Elvas		Badajoz	
	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R
FLIP 84- 19C	711	6	496	12	2878	4	2918	5	216	7	655	11	784	1	1986	7
FLIP 84-164C	375	19	500	11	2892	2	2888	6	438	1	701	8	711	3	2033	6
FLIP 85- 13C	359	20	438	15	2577	8	2530	13	61	19	305	20	428	14	1748	16
FLIP 85- 54C	750	5	323	22	2476	12	2837	8	93	15	288	21	389	17	1569	22
FLIP 85- 75C	430	16	514	8	2408	16	2459	17	68	18	312	18	419	15	1790	14
FLIP 86- 11C	453	15	324	21	2060	23	2327	22	55	20	146	24	308	24	1648	19
FLIP 86- 13C	609	8	660	4	2237	21	2464	16	160	9	412	15	414	16	1813	13
FLIP 86- 41C	664	7	345	20	2582	7	2622	10	69	16	552	13	388	18	1617	21
FLIP 86- 60C	125	23	434	16	2277	20	2260	23	105	14	406	16	579	7	1771	15
FLIP 86- 90C	516	12	247	24	2084	22	2548	12	130	13	321	17	353	23	896	24
FLIP 86- 99C	773	4	406	18	2430	14	2228	24	340	2	310	19	546	10	1940	8
FLIP 86-109C	406	17	624	5	2324	17	2406	18	69	17	230	22	358	22	2067	5
FLIP 87- 2C	1125	1	468	13	2295	18	2363	21	147	10	632	12	373	19	1636	20
FLIP 87- 3C	547	11	418	17	2569	9	2382	19	143	12	152	23	563	8	1701	18
FLIP 87- 6C	922	3	298	23	1884	24	2496	14	34	22	717	6	536	12	1333	23
FLIP 87- 8C	602	9	548	7	2526	10	2550	11	243	4	876	1	780	2	1876	12
FLIP 87- 58C	1063	2	729	2	2882	3	3086	1	-	-	699	9	667	5	1705	17
FLIP 87- 59C	148	22	565	6	2764	6	2845	7	146	11	661	10	363	21	1915	9
FLIP 87- 72C	484	14	511	9	2838	5	2675	9	179	8	737	5	542	11	1912	10
FLIP 87- 74C	578	10	445	14	2480	11	2976	3	216	6	713	7	590	6	2243	2
FLIP 87- 85C	406	18	686	3	2413	15	3035	2	236	5	774	2	529	13	2138	3
FLIP 81-293C	313	21	367	19	2434	13	2368	20	42	21	510	14	372	20	1890	11
ILC 482	-	-	832	1	2916	1	2967	4	339	3	761	3	679	4	2250	1
Local check	500	13	502	10	2293	19	2474	15	31	23	743	4	560	9	2114	4
<b>Location Mean</b>	<b>559</b>		<b>487</b>		<b>2480</b>		<b>2613</b>		<b>155</b>		<b>526</b>		<b>510</b>		<b>1816</b>	
S.E. of Mean	278.144		123.26		152.76		74.48		113.64		70.70		102.90		185.84	
L.S.D. at 5%	-		-		446.98		218.94		-		168.91		-		543.77	
C.V. %	70.36		35.82		8.71		4.03		103.85		19.02		28.56		14.47	
Error d.f.	22		23		23		23		22		23		23		23	
Significance	NS		NS		*		*		NS		*		NS		*	
Test > L. Check	-		-		6		8		-		0		-		0	

Cont'd. ....

Table 3.1.6. Cont'd. ...

Entry Name	SYRIA										TUNISIA					
	Gelline		Heimo		Homs		Jindiress		Tartus		Tel Hadya		Beja-W		Beja-Sp	
	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R
FLIP 84- 19C	164	15	176	14	244	13	808	10	548	19	164	12	1194	2	514	11
FLIP 84-164C	487	8	427	4	213	14	872	5	603	12	251	9	1139	6	347	23
FLIP 85- 13C	59	23	112	21	176	18	807	11	587	14	55	21	1000	15	389	17
FLIP 85- 54C	76	20	151	16	198	15	835	6	619	11	33	23	1188	3	375	20
FLIP 85- 75C	72	21	126	18	171	19	690	21	627	9	31	24	958	18	417	15
FLIP 86- 11C	80	19	113	20	160	20	617	23	706	2	56	20	861	23	299	24
FLIP 86- 13C	107	18	143	17	194	16	769	15	627	10	140	14	1069	10	465	12
FLIP 86- 41C	243	12	177	13	357	6	657	22	532	22	98	16	1181	4	528	10
FLIP 86- 60C	149	17	122	19	313	9	615	24	563	17	63	18	1000	16	354	22
FLIP 86- 90C	207	14	90	23	111	22	762	16	571	15	144	13	1007	14	382	18
FLIP 86- 99C	155	16	165	15	156	21	758	18	571	16	56	19	1125	7	354	21
FLIP 86-109C	67	22	112	22	52	24	760	17	548	20	64	17	951	21	375	19
FLIP 87- 2C	504	7	395	8	178	17	770	14	659	3	235	10	924	22	597	4
FLIP 87- 3C	55	24	55	24	98	23	702	20	476	24	44	22	819	24	424	14
FLIP 87- 6C	534	6	434	2	286	11	875	3	643	4	230	11	958	19	528	9
FLIP 87- 8C	337	11	405	7	310	10	948	1	627	8	291	7	951	20	639	2
FLIP 87- 58C	674	3	359	10	556	1	797	13	524	23	463	1	1056	12	542	8
FLIP 87- 59C	601	5	343	11	362	5	821	8	559	18	457	2	1146	5	451	13
FLIP 87- 72C	471	10	392	9	270	12	882	2	635	6	308	6	1063	11	576	5
FLIP 87- 74C	680	2	413	6	314	8	874	4	635	5	356	5	1368	1	729	1
FLIP 87- 85C	714	1	421	5	529	2	829	7	595	13	417	3	1111	9	569	6
FLIP 81-293C	238	13	185	12	337	7	706	19	635	7	110	15	1007	13	396	16
ILC 482	473	9	466	1	492	3	798	12	714	1	269	8	979	17	563	7
Local check	618	4	427	3	452	4	817	9	532	21	398	4	1118	8	611	3
<b>Location Mean</b>	<b>324</b>		<b>259</b>		<b>272</b>		<b>782</b>		<b>597</b>		<b>197</b>		<b>1049</b>		<b>476</b>	
S.E. of Mean	85.63		25.85		87.12		78.66		32.77		46.56		118.69		75.27	
L.S.D. at 5%	250.55		75.62		255.90		-		95.89		111.23		-		220.24	
C.V. %	37.42		14.14		45.29		14.22		7.76		33.37		16.00		22.36	
Error d.f.	23		23		23		23		23		23		23		23	
Significance	*		*		*		NS		*		*		NS		*	
Test > L. Check	0		0		0		-		7		0		-		0	

Cont'd. ...

Table 3.1.6. Cont'd. ...

Entry Name	TUNISIA				TURKEY								(1)			
	El Kef-W		Oued Meliz-W		Amasya		Diyarbakir		Eskisehir		Izmir-I		Izmir-II		Overall Mean	
	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R
FLIP 84- 19C	347	11	701	13	1757	8	1014	7	1372	4	481	5	1093	4	1002	7
FLIP 84-164C	278	17	924	2	1733	10	1250	3	1500	1	481	6	1333	1	1068	2
FLIP 85- 13C	410	8	681	15	1783	5	611	24	1289	8	343	10	648	17	838	16
FLIP 85- 54C	208	24	764	11	1651	15	799	18	1250	13	278	17	611	20	820	18
FLIP 85- 75C	257	21	840	6	1594	19	771	19	1172	17	204	24	1083	5	826	17
FLIP 86- 11C	285	15	764	10	1086	24	854	15	1294	7	278	16	630	18	721	23
FLIP 86- 13C	292	14	799	8	1603	17	875	14	1250	14	222	22	843	11	846	14
FLIP 86- 41C	306	12	1014	1	1651	14	847	16	1161	18	556	1	1231	2	897	11
FLIP 86- 60C	229	23	833	7	1595	18	667	23	1156	20	269	18	713	15	794	21
FLIP 86- 90C	361	10	507	23	1325	22	743	20	1367	5	287	15	1009	7	748	22
FLIP 86- 99C	299	13	847	5	1719	11	938	9	1144	22	315	12	917	9	840	15
FLIP 86-109C	243	22	590	19	1565	20	917	11	1278	10	204	23	778	12	818	19
FLIP 87- 2C	271	18	694	14	1692	12	736	22	1189	16	231	20	991	8	886	12
FLIP 87- 3C	278	16	660	18	1792	4	736	21	1150	21	333	11	676	16	796	20
FLIP 87- 6C	271	19	493	24	1778	6	1125	6	1067	24	241	19	583	23	866	13
FLIP 87- 8C	431	7	674	16	1841	2	903	12	1433	2	426	9	889	10	1012	5
FLIP 87- 58C	458	5	556	22	1540	21	1007	8	1083	23	444	8	389	24	1009	6
FLIP 87- 59C	528	3	563	21	1773	7	896	13	1228	15	306	13	593	21	972	9
FLIP 87- 72C	375	9	576	20	1305	23	1146	5	1267	11	481	4	769	13	985	8
FLIP 87- 74C	431	6	785	9	1687	13	1306	2	1283	9	231	21	593	22	1030	4
FLIP 87- 85C	563	2	750	12	1813	3	917	10	1267	12	556	3	611	19	1045	3
FLIP 81-293C	257	20	861	4	1946	1	847	17	1356	6	454	7	1056	6	900	10
ILC 482	472	4	674	17	1629	16	1188	4	1383	3	556	2	1231	3	1121	1
Local check	611	1	896	3	1744	9	1326	1	1161	19	296	14	769	14		
<b>Location Mean</b>	<b>352</b>		<b>727</b>		<b>1650</b>		<b>934</b>		<b>1254</b>		<b>353</b>		<b>835</b>			
S.E. of Mean	68.19		92.20		166.89		179.58		71.88		95.82		208.46			
L.S.D. at 5%	199.53		269.76		-		-		210.32		-		-			
C.V. %	27.36		17.94		14.30		27.19		8.11		38.39		35.31			
Error d.f.	23		23		23		23		23		23		23			
Significance	*		*		NS		NS		*		NS		NS			
Test > L. Check	0		0		-		-		4		-		-			

(1) Guelma, Mushagar, Beja-W, El Kef-W, and Oued Meliz-W were excluded from the overall mean.  
 \* = Significant at  $P \leq 0.05$ , NS = not significant.



Table 3.1.7. The five heaviest seed yielding entries at the individual locations in the CIYT-SP during 1989/90.

Rank	ALGERIA		FRANCE	ITALY	JORDAN	LEBANON	PORTUGAL	SPAIN
	Guelma	Sidi Bel Abbas	Montboucher	Papiano	Mushagar	Terbol	Elvas	Badajoz
1	FLIP 87- 2C	ILC 482	ILC 482	FLIP 87- 58C	FLIP 84-164C	FLIP 87- 9C	FLIP 84- 19C	ILC 482
2	FLIP 87- 58C	FLIP 87- 58C	FLIP 87-164C	FLIP 87- 85C	FLIP 86- 99C	FLIP 87- 85C	FLIP 87- 8C	FLIP 87- 74C
3	FLIP 87- 6C	FLIP 87- 85C	FLIP 87- 58C	FLIP 87- 74C	ILC 482	ILC 482	FLIP 84-164C	FLIP 87- 85C
4	FLIP 86- 99C	FLIP 86- 13C	FLIP 84- 19C	ILC 482	FLIP 87- 8C	Local check	ILC 482	Local check
5	FLIP 85- 54C	FLIP 86-109C	FLIP 87- 72C	FLIP 84- 19C	FLIP 87- 85C	FLIP 87- 72C	FLIP 87- 58C	FLIP 87-109C

Cont'd. ...

Rank	SYRIA					TUNISIA		
	Gelline	Heimo	Homs	Jindiress	Tartus	Tel Hadya	Beja-W	Beja-Sp
1	FLIP 87- 85C	ILC 482	FLIP 87- 58C	FLIP 87- 8C	ILC 482	FLIP 87- 58C	FLIP 87- 74C	FLIP 87- 74C
2	FLIP 87- 74C	FLIP 87- 6C	FLIP 87- 85C	FLIP 87- 72C	FLIP 86- 11C	FLIP 87- 59C	FLIP 84- 19C	FLIP 87- 8C
3	FLIP 87- 58C	local check	ILC 482	FLIP 87- 6C	FLIP 87- 2C	FLIP 87- 85C	FLIP 85- 54C	Local check
4	Local check	FLIP 84-164C	Local check	FLIP 87- 74C	FLIP 87- 6C	local check	FLIP 86- 41C	FLIP 87- 2C
5	FLIP 87- 59C	FLIP 87- 85C	FLIP 87- 59C	FLIP 84-164C	FLIP 87- 74C	FLIP 87- 74C	FLIP 87- 59C	FLIP 87- 72C

Cont'd. ...

Rank	TUNISIA			TURKEY			
	El Kef-W	Oued Meliz-W	Amasya	Diyarbakir	Eskisehir	Izmir-I	Izmir-II
1	Local check	FLIP 86- 41C	FLIP 81-293C	Local check	FLIP 84-164C	FLIP 86- 41C	FLIP 84-164C
2	FLIP 87- 85C	FLIP 84-164C	FLIP 87- 8C	FLIP 87- 74C	FLIP 87- 8C	ILC 482	FLIP 86- 41C
3	FLIP 87- 59C	Local check	FLIP 87- 85C	FLIP 84-164C	ILC 482	FLIP 87- 85C	ILC 482
4	ILC 482	FLIP 81-293C	FLIP 87- 3C	ILC 482	FLIP 84- 19C	FLIP 87- 72C	FLIP 84- 19C
5	FLIP 87- 58C	FLIP 86- 99C	FLIP 85- 13C	FLIP 87- 72C	FLIP 86- 90C	FLIP 84- 19C	FLIP 85- 75C

The brackets indicate entries having the same rank, W = Winter sowing, Sp = Spring sowing.

The five heaviest seed yielders at each location are given in Table 3.1.7. The entries ILC 482 and FLIP 87-85C occurred most frequently among the top five and seemed more adaptable than others.

On the basis of average seed yield of common entries over two years (1988/89 and 1989/90), ILC 482 ranked number 1 and was followed by FLIP 84-164C, FLIP 81-293C, FLIP 86-41C and FLIP 86-60C with respective seed yields of 1293, 1290, 1132, 1079, and 977 kg/ha (Table 3.1.8).

Table 3.1.8. The mean seed yield (Y = kg/ha) and rank (R) of the common entries in CIYT-SP conducted during 1988/89 and 1989/90.

Entry Name	1988/89		1989/90		Mean	
	Y	R	Y	R	Y	R
FLIP 84-164C	1511	1	1068	2	1290	2
FLIP 86- 41C	1261	4	897	4	1079	4
FLIP 86- 60C	1159	5	794	5	977	5
FLIP 81-293C	1364	3	900	3	1132	3
ILC 482	1464	2	1121	1	1293	1

### 3.2. CHICKPEA INTERNATIONAL YIELD TRIAL-WINTER-MEDITERRANEAN REGION (CIYT-W-MR)

#### Material

The Chickpea International Yield Trial Winter Mediterranean Region (CIYT-W-MR) comprised 23 test entries and one local check to be supplied by the cooperator. Twenty-two entries from these were the advanced breeding lines developed through hybridization at ICARDA. All these lines were selected on the basis of their superior performance at least once either in local, regional or international trials.

#### Methods and Management

The trial design was a randomized complete block with three replications. The suggested plot size was four rows, each 4 m long with an inter row spacing of 45 cm. Sixty one sets of trial were distributed to cooperators in 15 countries. Results were returned from 41 sets covering 13 countries. The agronomic practices employed at different locations are given in Table 3.2.1.

#### Results and Discussion

The entry means for time to flowering, time to maturity, plant height and 100-seed weight at various locations are given in Tables 3.2.2, 3.2.3, 3.2.4 and 3.2.5, respectively. The entry means across locations for time to flowering ranged from 129 days to 138 days. ILC 482 took the minimum time to flower. In general, early flowering entries were also earlier in maturity. The plant height varied from 44 cm for ILC 482 to 63 cm for FLIP 85-60C.

Table 3.2.1. Agronomic data for different locations in the CIYT-W-MR during 1989/90.

Country	Location	Planting Date	Harvesting Date	Fertilizer (kg/ha)			Irrigation	Insecticide/Fungicide/Herbicide	Local Check
				N	P	K			
Algeria	Guelma	16.12.89		200			-	-	
Algeria	Khroub	17.12.89	30.06.90	45			-	Treflan	
Algeria	Setif	16.12.89	12.07.90	100			-	Trifluralin	
Algeria	Sidi Bel Abbes	07.12.89	12.06.90	46			-	Igran, Kerb	
Algeria	Tiaret	24.12.89	07.07.90	-			-	-	
Cyprus	Athalassa	28.11.89	12.06.90	32	54		-	-	
France	Montboucher	16.11.89	10.07.90	100			-	Trifluralin, Linuron, Kosaben	
Greece	Iarissa	24.11.89	10.07.90	60			-	-	
Italy	Papiano	15.11.89	10.07.90	80			-	Linuron	
Italy	Tolentino	14.12.89	26.06.90	-			-	-	
Jordan	Maru	29.11.89		20	40		-	-	
Jordan	Rabba	17.01.90		20	40		-	-	
Lebanon	Terbol	30.11.89	06.90	50			-	Kerb, Igran	
Libya	Sarir	16.10.89	28.04.90	200	150	50	+	Malathion, Anthio33, SUV	
Portugal	Elvas	13.11.89	29.06.90	60		60	-	Terbutryn	
Spain	Badajoz	15.02.90	05.07.90	-			-	Terbutryn, Kerb	
Spain	Cordoba-I	08.01.90	07.06.90	84			-	Hand weeding	
Spain	Crodoba-II	19.01.90	06.07.90	-			-	Bladex, Fusilade	
Spain	Sevilla	18.01.90	10.06.90	84			-	Topogard	
Syria	Al Ghab	06.12.89		-			-	-	
Syria	Gelline	16.01.90	11.07.90	20	50		-	-	
Syria	Hama	27.11.89	29.05.90	50			-	-	
Syria	Heimo	29.11.89	05.06.90	50			-	-	
Syria	Homs	28.11.89	09.06.90	50			-	-	
Syria	Idleb	23.11.89		60			-	-	
Syria	Izra'a	11.12.89		50			-	-	
Syria	Jableh	28.01.90	15.06.90	-			-	-	
Syria	Jindiress	28.11.89	08.06.90	50			-	-	
Syria	Tartus	28.12.89	15.06.90	-			-	-	
Syria	Tel Hadya	04.12.89	04.06.90	50			-	Kerb, Igran, Bravo	
Tunisia	Beja-W	NA							
Tunisia	Beja-Sp	NA							
Tunisia	El Kef-W	NA							
Tunisia	Oued Meliz-W	NA							
Turkey	Diyrbakir	05.12.89		30	60		-	-	
Turkey	Erzurum	15.05.90	13.09.90	30	60		-	-	
Turkey	Izmir-I	30.11.89	05.07.90	30	60		-	Igran	
Turkey	Izmir-II	05.12.89	11.07.90	30	60		-	Igran	
Turkey	Samsun-I	01.11.89	06.08.90	-			-	-	
Turkey	Samsun-II	24.10.89	24.07.90	50			-	-	
Turkey	Sunliurfa	07.11.89		-			-	-	

NA= Not available, + = Number and quantity not given.

Table 3.2.2. Time to flowering (days) of entries at different locations in the CIYT-W-MR during 1989/90.

Entry Name	Pedigree	Origin	ALGERIA			
			Guelma	Khroub	Setif	Sidi Bel Abbas
FLIP 84- 15C	X 81 TH 199/ILC 202(WH)XILC3355	ICARDA/ICRISAT	152	148	126	127
FLIP 84- 17C	X 79 TH 221/ILC 72XILC1922	ICARDA/ICRISAT	169	144	131	132
FLIP 84- 18C	X 79 TH 221/ILC 72XILC1922	ICARDA/ICRISAT	166	149	131	131
FLIP 85- 4C	X 82 TH 66/ILC2593XILC3279	ICARDA/ICRISAT	166	151	126	130
FLIP 85- 5C	X 81 TH 199/ILC 202(WH)XILC3355	ICARDA/ICRISAT	159	148	116	126
FLIP 85- 18C	X 83 TH 23/FLIP 82-69CXFLIP 82-72C	ICARDA/ICRISAT	154	153	132	132
FLIP 85- 42C	X 82 TH 66/ILC2593XILC3279	ICARDA/ICRISAT	162	154	126	130
FLIP 85- 44C	X 82 TH 77/ILC3346XILC 464	ICARDA/ICRISAT	166	154	128	127
FLIP 85- 48C	X 83 TH 19/FLIP 82-65CXFLIP 82-69C	ICARDA/ICRISAT	161	151	113	126
FLIP 85- 56C	X 83 TH 19/FLIP 82-65CXFLIP 82-69C	ICARDA/ICRISAT	152	151	126	130
FLIP 85- 60C	X 83 TH 25/FLIP 82-69CXFLIP 82-81C	ICARDA/ICRISAT	152	148	128	133
FLIP 85- 74C	X 83 TH 19/FLIP 82-65CXFLIP 82-69C	ICARDA/ICRISAT	152	149	128	133
FLIP 85- 93C	X 83 TH 23/FLIP 82-69CXFLIP 82-72C	ICARDA/ICRISAT	152	148	113	127
FLIP 85-119C	X 82 TH 137/(ILC 97XILC194)XILC2956	ICARDA/ICRISAT	152	150	113	128
FLIP 85-134C	X 83 TH 23/FLIP 82-69CXFLIP 82-72C	ICARDA/ICRISAT	161	148	131	128
FLIP 85-148C	X 80 TH 176/ILC 72XILC 215	ICARDA/ICRISAT	152	147	136	132
FLIP 86- 2C	X 81 TH 179/ILC 112XILC 191	ICARDA/ICRISAT	159	152	127	127
FLIP 86- 5C	X 81 TH 199/ILC 202(WH)XILC3355	ICARDA/ICRISAT	159	151	113	126
FLIP 86- 6C	X 81 TH 203/ILC3279(WH)XILC3355	ICARDA/ICRISAT	154	147	113	126
FLIP 86- 10C	X 83 TH 22/FLIP 81-65CXFLIP 82-81C	ICARDA/ICRISAT	159	149	131	134
FLIP 86- 42C	X 83 TH 80/ILC2593XFLIP 81-59C	ICARDA/ICRISAT	152	145	113	134
FLIP 81-293C	X 79 TH 8/ILC 191XILC 496	ICARDA/ICRISAT	154	149	126	130
ILC 482	Long term check	Turkey	152	147	106	122
Local check			162	152	113	126
<b>Location Mean</b>			<b>157</b>	<b>149</b>	<b>123</b>	<b>129</b>
S.E. of Mean			#	#	#	1.02
L.S.D. at 5%			#	#	#	2.99
C.V. %			#	#	#	1.12
Error d.f.						23
Significance						*

Cont'd. ...

Table 3.2.2. Cont'd. ...

Entry Name	ALGERIA	CYPRUS	GREECE	ITALY		JORDAN	LEBANON	LIBYA	PORTUGAL	SPAIN	
	Tiaret	Athalassa	Larissa	Papiano	Tolentino	Maru	Rabba	Terbol	Sarir	Elvas	Badajoz
FLIP 84- 15C	127	111	139	180	147	135	82	143	96	133	76
FLIP 84- 17C	126	112	146	182	156	138	79	150	113	136	83
FLIP 84- 18C	126	112	145	180	152	137	79	148	117	135	76
FLIP 85- 4C	126	115	147	181	152	137	82	148	138	141	84
FLIP 85- 5C	128	111	140	179	149	137	79	146	111	135	83
FLIP 85- 18C	127	113	143	179	155	137	79	146	100	141	84
FLIP 85- 42C	127	114	143	177	149	138	82	146	98	137	83
FLIP 85- 44C	127	115	147	181	154	138	82	148	99	138	83
FLIP 85- 48C	127	112	138	176	152	134	82	144	97	134	83
FLIP 85- 56C	127	111	137	176	152	135	82	142	95	135	83
FLIP 85- 60C	128	113	139	177	147	134	79	143	99	135	83
FLIP 85- 74C	126	111	138	177	147	133	83	142	99	136	78
FLIP 85- 93C	126	112	136	177	150	134	83	142	99	135	82
FLIP 85-119C	127	113	137	176	148	136	79	147	94	136	82
FLIP 85-134C	125	115	148	181	153	137	82	146	116	135	83
FLIP 85-148C	127	108	136	176	148	137	82	144	84	134	74
FLIP 86- 2C	126	113	143	177	146	138	79	146	104	135	83
FLIP 86- 5C	126	114	143	180	150	138	79	146	113	133	83
FLIP 86- 6C	128	112	139	176	146	134	82	142	95	134	74
FLIP 86- 10C	127	111	139	176	150	137	78	145	78	135	84
FLIP 86- 42C	124	109	136	176	147	134	79	142	89	134	74
FLIP 81-293C	126	111	139	182	146	135	83	143	97	135	82
ILC 482	125	108	134	174	144	135	82	139	84	131	74
Local check	126	115	137	177	-	132	83	143	117	130	71
<b>Location Mean</b>	<b>126</b>	<b>112</b>	<b>140</b>	<b>178</b>	<b>149</b>	<b>136</b>	<b>81</b>	<b>145</b>	<b>101</b>	<b>135</b>	<b>80</b>
S.E. of Mean	0.85	1.09	0.58	0.59	1.51	0.64	2.37	0.54	9.69	1.35	2.01
L.S.D. at 5%	-	3.20	1.70	1.73	4.43	1.88	-	1.57	-	3.95	5.89
C.V. %	0.95	1.38	0.59	0.47	1.43	0.67	4.15	0.53	13.56	1.41	3.56
Error d.f.	23	23	23	23	22	23	23	23	23	23	23
Significance	NS	*	*	*	*	*	NS	*	NS	*	*

Cont'd. ...

Table 3.2.2. Cont'd. ...

Entry Name	SPAIN				SYRIA						
	Cordoba-I	Cordoba-II	Sevilla	Al Ghab	Gelline	Hama	Heimo	Homs	Idleb	Izra'a	Jableh
FLIP 84- 15C	104	91	-	126	97	120	146	141	148	125	86
FLIP 84- 17C	110	107	100	134	101	126	152	147	151	129	90
FLIP 84- 18C	110	107	90	134	100	123	152	139	151	126	90
FLIP 85- 4C	98	115	99	134	100	128	152	144	150	128	93
FLIP 85- 5C	100	95	90	130	98	121	150	139	148	126	84
FLIP 85- 18C	108	105	101	130	100	127	150	136	145	127	88
FLIP 85- 42C	108	101	92	129	100	124	150	144	148	125	92
FLIP 85- 44C	98	107	99	134	101	128	151	145	148	129	93
FLIP 85- 48C	104	95	90	125	98	122	148	137	145	127	89
FLIP 85- 56C	105	91	98	126	98	123	146	137	144	126	86
FLIP 85- 60C	102	96	93	127	98	122	147	138	144	127	85
FLIP 85- 74C	106	96	93	128	99	123	147	139	144	128	91
FLIP 85- 93C	107	100	90	124	98	120	147	135	143	124	85
FLIP 85-119C	106	95	92	129	97	122	150	141	147	126	86
FLIP 85-134C	98	103	98	129	99	125	151	145	147	127	92
FLIP 85-148C	104	97	90	127	97	126	152	147	148	122	85
FLIP 86- 2C	104	100	94	130	99	126	150	145	148	128	83
FLIP 86- 5C	105	100	91	129	99	124	151	149	146	127	88
FLIP 86- 6C	100	92	-	127	97	128	147	147	148	123	88
FLIP 86- 10C	108	100	96	127	98	124	148	140	146	129	88
FLIP 86- 42C	103	90	92	123	96	121	145	139	144	123	82
FLIP 81-293C	106	93	96	128	99	123	149	142	146	124	90
ILC 482	103	89	-	123	94	124	146	139	145	122	84
Local check	112	89	92	136	101	128	150	140	148	127	92
<b>Location Mean</b>	<b>104</b>	<b>98</b>	<b>94</b>	<b>129</b>	<b>98</b>	<b>124</b>	<b>149</b>	<b>141</b>	<b>147</b>	<b>126</b>	<b>88</b>
S.E. of Mean	5.36	0.53	1.17	0.72	0.69	1.16	0.75	2.37	1.27	1.02	2.35
L.S.D. at 5%	-	1.54	3.44	2.10	2.02	3.40	2.20	6.92	3.70	2.98	-
C.V. %	7.27	0.76	1.76	0.79	0.99	1.33	0.71	2.24	1.22	1.14	3.79
Error d.f.	23	23	20	23	23	23	23	23	23	23	23
Significance	NS	*	*	*	*	*	*	*	*	*	NS

Cont'd. ...

Table 3.2.2. Cont'd. ...

Entry Name	SYRIA			TURKEY					(1) Overall	
	Jindiress	Tartus	Tel Hadya	Diyarbakir	Erzurum	Izmir-I	Izmir-II	Samsun-I	Samsun-II	Mean
FLIP 84- 15C	135	101	137	147	51	126	139	216	208	132
FLIP 84- 17C	143	108	140	-	54	130	150	220	217	138
FLIP 84- 18C	143	105	138	148	54	132	148	219	214	137
FLIP 85- 4C	142	107	137	-	59	130	146	220	211	138
FLIP 85- 5C	138	103	133	149	58	129	146	219	214	133
FLIP 85- 18C	143	107	134	149	55	130	146	219	214	135
FLIP 85- 42C	138	104	133	147	59	132	146	214	214	135
FLIP 85- 44C	143	108	137	147	59	130	146	217	214	136
FLIP 85- 48C	136	102	132	147	54	127	141	214	214	132
FLIP 85- 56C	135	102	131	146	51	129	146	214	214	132
FLIP 85- 60C	135	101	134	147	54	127	136	214	211	132
FLIP 85- 74C	136	101	130	147	53	127	136	218	211	133
FLIP 85- 93C	134	101	129	146	52	126	135	216	208	131
FLIP 85-119C	137	103	134	146	52	127	146	215	214	132
FLIP 85-134C	137	105	135	149	54	129	148	218	214	136
FLIP 85-148C	135	102	137	146	51	126	148	218	214	133
FLIP 86- 2C	143	103	137	146	55	130	141	215	211	134
FLIP 86- 5C	136	102	139	-	59	129	136	217	214	134
FLIP 86- 6C	135	102	136	146	53	124	132	215	211	131
FLIP 86- 10C	136	107	133	148	54	130	146	216	214	133
FLIP 86- 42C	134	101	132	145	51	124	135	214	208	130
FLIP 81-293C	135	103	135	146	54	127	134	211	208	132
ILC 482	135	99	136	145	51	124	136	209	204	129
Local check	142	104	134	146	51	130	132	210	208	
<b>Location Mean</b>	<b>138</b>	<b>103</b>	<b>134</b>	<b>147</b>	<b>54</b>	<b>128</b>	<b>141</b>	<b>216</b>	<b>212</b>	
S.E. of Mean	0.91	1.80	1.08	0.52	0.94	1.13	2.32	0.93		
L.S.D. at 5%	2.65	-	3.17	1.52	2.76	3.29	6.78	2.73		
C.V. %	0.93	2.46	1.14	0.50	2.48	1.25	2.32	0.61		
Error d.f.	23	23	23	20	23	23	23	23		
Significance	*	NS	*	*	*	*	*	*		

(1) Sevilla and Diyarbakir were excluded from the overall mean. \* = Significant at  $P \leq 0.05$ , NS = Not significant. Badajoz and Erzurum excluded from overall mean as not planted in winter.

# Not analysed due to incomplete data set or other reasons.

Table 3.2.3. Time to maturity (days) of entries at different locations in the CIYT-W-MR during 1989/90.

Entry Name	ALGERIA					FRANCE	GREECE	ITALY	JORDAN		LEBANON
	Guelma	Khroub	Setif	Sidi Bel-Abbes	Tiaret	Montboucher	Larissa	Papiano	Maru	Rabba	Terbol
FLIP 84- 15C	186	177	165	148	150	227	188	225	171	140	188
FLIP 84- 17C	186	180	177	149	151	236	191	227	176	140	202
FLIP 84- 18C	186	175	173	148	151	234	191	230	176	140	202
FLIP 85- 4C	186	179	173	150	153	230	191	226	176	140	199
FLIP 85- 5C	186	181	169	147	150	229	191	227	175	140	194
FLIP 85- 18C	186	177	173	151	151	231	191	228	176	140	193
FLIP 85- 42C	186	178	173	148	151	230	191	225	175	140	194
FLIP 85- 44C	186	177	177	151	152	230	191	230	175	140	196
FLIP 85- 48C	186	179	166	151	150	226	184	225	172	140	190
FLIP 85- 56C	186	177	170	150	152	228	184	222	171	140	191
FLIP 85- 60C	186	183	169	149	152	228	189	224	172	140	196
FLIP 85- 74C	186	180	149	150	151	226	184	226	172	140	192
FLIP 85- 93C	186	176	169	148	150	227	184	225	171	140	190
FLIP 85-119C	186	179	170	149	151	232	191	221	173	140	202
FLIP 85-134C	186	178	170	147	153	230	191	230	176	140	200
FLIP 85-148C	186	179	177	151	150	233	184	225	176	140	202
FLIP 86- 2C	186	177	164	148	150	230	191	225	175	140	190
FLIP 86- 5C	186	178	164	147	151	229	191	226	174	140	192
FLIP 86- 6C	186	178	163	148	150	228	191	225	175	140	190
FLIP 86- 10C	186	180	173	148	152	230	191	225	175	140	200
FLIP 86- 42C	186	179	164	148	155	228	183	224	173	140	188
FLIP 81-293C	186	179	163	149	153	227	188	230	173	140	189
ILC 482	186	176	155	149	153	228	180	223	169	140	192
Local check	186	177	173	151	151	227	183	225	168	140	191
<b>Location Mean</b>	<b>186</b>	<b>178</b>	<b>168</b>	<b>149</b>	<b>151</b>	<b>229</b>	<b>188</b>	<b>226</b>	<b>173</b>	<b>140</b>	<b>194</b>
S.E. of Mean	#	#	4.08	1.10	1.21	0.93	1.11	0.61	0.79	#	1.08
L.S.D. at 5%	#	#	11.95	-	-	2.72	3.24	1.78	2.30	#	3.17
C.V. %	#	#	3.43	1.05	1.14	0.57	0.83	0.38	0.64	#	0.79
Error d.f.	#	#	23	23	23	23	23	23	23	#	23
Significance			*	NS	NS	*	*	*	*		*

Cont'd. ...



Table 3.2.3. Cont'd. ...

Entry Name	LIBYA		SPAIN				SYRIA				
	Sarir	Elvas	Badajoz	Cordoba-I	Cordoba-II	Sevilla	Al Ghab	Gelline	Hama	Heimo	Homs
FLIP 84- 15C	181	199	128	144	144	-	174	139	167	183	189
FLIP 84- 17C	188	209	137	146	154	161	185	144	171	187	190
FLIP 84- 18C	188	207	139	148	155	162	183	139	169	188	186
FLIP 85- 4C	195	198	143	148	158	161	185	141	171	188	193
FLIP 85- 5C	188	202	134	149	154	162	176	141	171	185	190
FLIP 85- 18C	185	204	142	147	151	163	176	139	168	185	188
FLIP 85- 42C	185	196	142	146	154	158	179	139	170	185	192
FLIP 85- 44C	183	208	139	150	155	159	184	140	171	187	190
FLIP 85- 48C	183	194	137	145	148	162	174	138	168	185	188
FLIP 85- 56C	183	200	129	144	149	162	174	136	169	185	187
FLIP 85- 60C	183	196	136	148	148	161	174	139	168	186	190
FLIP 85- 74C	183	197	130	145	148	162	175	137	170	184	187
FLIP 85- 93C	183	203	129	145	151	160	173	136	168	184	187
FLIP 85-119C	180	202	142	148	153	-	175	137	170	187	186
FLIP 85-134C	190	203	142	149	156	159	176	142	169	187	192
FLIP 85-148C	176	199	136	143	154	158	174	140	169	187	193
FLIP 86- 2C	185	197	133	147	153	160	176	145	170	186	186
FLIP 86- 5C	190	196	137	150	151	-	179	141	170	187	187
FLIP 86- 6C	180	196	130	146	151	-	175	137	169	186	188
FLIP 86- 10C	176	206	142	147	155	160	176	140	170	186	190
FLIP 86- 42C	180	201	137	145	149	158	173	133	167	184	187
FLIP 81-293C	183	197	122	145	148	162	174	136	168	185	184
ILC 482	178	193	125	144	144	-	172	132	165	180	186
Local check	188	194	122	148	144	156	179	140	170	185	188
<b>Location Mean</b>	<b>184</b>	<b>200</b>	<b>135</b>	<b>146</b>	<b>151</b>	<b>160</b>	<b>177</b>	<b>139</b>	<b>169</b>	<b>185</b>	<b>188</b>
S.E. of Mean	3.94	2.92	2.90	2.22	0.21	1.41	0.98	1.24	0.89	0.78	1.02
L.S.D. at 5%	-	8.53	8.50	-	0.61	-	2.88	3.64	2.61	2.27	2.99
C.V. %	3.03	2.07	3.05	2.14	0.19	1.25	0.79	1.27	0.75	0.59	0.77
Error d.f.	23	23	23	23	23	18	23	23	23	23	23
Significance	NS	*	*	NS	*	NS	*	*	*	*	*

Cont'd. ...

Table 3.2.3. Cont'd. ...

Entry Name	SYRIA					TURKEY					(1)
	Idleb	Izra'a	Jableh	Jindiress	Tartus	Tel Hadya	Diyarbakir	Erzurum	Samsun-I	Samsun-II	Overall Mean
FLIP 84- 15C	176	168	122	182	153	180	191	117	267	269	179
FLIP 84- 17C	181	164	131	186	166	181	195	117	272	269	184
FLIP 84- 18C	181	166	130	186	165	179	193	120	275	269	183
FLIP 85- 4C	180	177	133	187	165	179	195	120	273	269	184
FLIP 85- 5C	180	173	124	185	160	176	193	120	271	269	182
FLIP 85- 18C	177	167	127	186	163	175	192	119	272	272	182
FLIP 85- 42C	181	176	132	186	161	175	192	119	270	269	182
FLIP 85- 44C	181	177	133	187	163	179	193	120	273	269	184
FLIP 85- 48C	175	167	126	183	153	174	189	119	269	266	179
FLIP 85- 56C	176	169	120	181	155	172	191	119	270	269	180
FLIP 85- 60C	174	168	119	182	153	180	193	120	268	266	180
FLIP 85- 74C	175	168	127	183	155	172	190	120	271	266	179
FLIP 85- 93C	175	166	127	181	155	171	192	118	269	266	179
FLIP 85-119C	179	171	126	185	164	177	195	119	267	268	181
FLIP 85-134C	180	167	134	183	164	175	195	119	273	266	183
FLIP 85-148C	181	164	128	186	154	178	190	118	274	269	182
FLIP 86- 2C	179	174	130	187	155	179	193	120	273	269	181
FLIP 86- 5C	176	176	129	183	155	183	193	120	273	269	182
FLIP 86- 6C	178	164	126	184	154	180	191	120	274	269	180
FLIP 86- 10C	178	169	125	185	164	173	192	119	272	266	182
FLIP 86- 42C	177	165	123	181	153	173	188	117	268	263	179
FLIP 81-293C	176	164	124	179	155	176	190	118	268	266	179
ILC 482	177	164	123	183	153	178	187	116	270	266	178
Local check	178	173	132	186	163	175	189	119	269	265	
<b>Location Mean</b>	<b>178</b>	<b>169</b>	<b>127</b>	<b>184</b>	<b>158</b>	<b>176</b>	<b>191</b>	<b>119</b>	<b>271</b>	<b>268</b>	
S.E. of Mean	1.32	2.53	2.61	0.88	0.83	2.14	0.99	0.71	1.47	0.42	
L.S.D. at 5%	3.88	7.40	7.64	2.57	2.43	6.25	2.89	2.08	4.31	1.24	
C.V. %	1.05	2.12	2.91	0.68	0.74	1.71	0.73	0.85	0.77	0.22	
Error d.f.	23	23	23	23	23	23	23	23	23	23	
Significance	*	*	*	*	*	*	*	*	*	*	

(1) Sevilla was excluded from the overall mean. \* = Significant at  $P < 0.05$ , NS = Not significant. Badajoz and Erzurum excluded from overall mean as not planted in winter.

# Not analysed due to incomplete data set or other reasons.

Table 3.2.4. Plant height (cm) of entries at different locations in the CIYT-W-MR during 1989/90.

Entry Name	ALGERIA				CYPRUS	GREECE	ITALY		JORDAN	LEBANON		
	Guelma	Khroub	Setif	Sidi Bel- Abbes	Tiaret	Athalassa	Larissa	Papiano Tolentino	Maru	Rabba	Terbol	
FLIP 84- 15C	45	35	30	50	43	53	41	73	80	41	48	51
FLIP 84- 17C	50	36	30	55	43	50	37	80	65	85	45	48
FLIP 84- 18C	50	30	37	53	45	45	34	75	78	77	45	46
FLIP 85- 4C	60	36	36	53	44	53	42	83	87	78	48	53
FLIP 85- 5C	55	39	41	50	48	48	40	80	79	81	48	52
FLIP 85- 18C	55	42	31	53	44	53	46	80	78	86	45	60
FLIP 85- 42C	55	46	35	55	44	50	38	80	80	74	40	53
FLIP 85- 44C	50	43	34	53	47	53	42	78	73	85	50	58
FLIP 85- 48C	50	41	41	55	46	55	39	80	79	83	48	52
FLIP 85- 56C	50	37	37	53	43	55	41	80	69	76	50	51
FLIP 85- 60C	60	38	31	53	45	55	43	78	75	67	45	54
FLIP 85- 74C	55	38	30	53	43	55	40	78	77	72	50	55
FLIP 85- 93C	45	27	29	50	46	45	32	65	68	64	43	44
FLIP 85-119C	50	38	37	50	45	53	36	75	80	64	48	50
FLIP 85-134C	50	41	36	53	44	50	46	65	83	71	45	55
FLIP 85-148C	40	27	27	50	44	45	31	63	72	54	40	47
FLIP 86- 2C	50	33	31	53	48	48	42	70	76	60	43	50
FLIP 86- 5C	55	34	32	53	43	50	40	78	77	72	45	50
FLIP 86- 6C	50	36	38	53	44	55	42	75	82	42	48	53
FLIP 86- 10C	50	40	42	53	45	53	42	83	86	66	43	56
FLIP 86- 42C	35	32	33	45	47	45	34	55	70	59	48	48
FLIP 81-293C	35	35	33	55	44	48	33	70	75	76	48	45
ILC 482	35	27	35	53	44	43	32	68	70	61	38	45
Local check	60	47	21	65	49	58	33	58	-	62	55	42
Location Mean	50	37	33	53	45	51	38	74	76	69	46	51
S.E. of Mean	#	#	1.87	1.80	2.60	2.85	2.62	5.74	3.08	1.56	4.15	2.26
L.S.D. at 5%	#	#	5.46	5.28	-	8.35	7.66	-	9.03	4.56	-	6.60
C.V. %	#	#	7.90	4.85	8.25	7.99	9.65	11.04	5.71	3.21	12.80	6.31
Error d.f.			23	23	23	23	23	23	22	23	23	23
Significance			*	*	NS	*	*	NS	*	*	NS	*

Cont'd. ...

Table 3.2.4. Cont'd. ...

Entry Name	LIBYA	PORTUGAL	SPAIN			SYRIA						
	Sarir	Elvas	Badajoz	Cordoba-I	Sevilla	Al Ghab	Gelline	Hama	Heimo	Homs	Idleb	Izra'a
FLIP 84- 15C	96	81	55	52	-	45	51	33	54	39	43	44
FLIP 84- 17C	87	87	55	59	53	43	49	23	47	39	41	30
FLIP 84- 18C	91	88	59	59	53	43	46	20	50	35	45	37
FLIP 85- 4C	85	84	59	58	45	48	52	30	57	47	48	47
FLIP 85- 5C	92	81	54	53	40	48	47	30	56	42	44	46
FLIP 85- 18C	109	93	64	66	54	53	57	30	68	43	55	49
FLIP 85- 42C	106	88	57	61	58	48	50	30	56	43	42	46
FLIP 85- 44C	88	86	64	57	50	50	51	28	60	39	51	45
FLIP 85- 48C	103	86	62	66	55	48	54	30	56	49	49	48
FLIP 85- 56C	107	76	60	61	48	48	58	23	55	41	47	48
FLIP 85- 60C	108	82	66	61	55	45	57	30	54	48	52	49
FLIP 85- 74C	107	80	60	57	53	43	54	30	61	41	49	45
FLIP 85- 93C	88	78	60	49	48	38	39	25	48	40	46	35
FLIP 85-119C	103	83	55	56	43	43	58	28	50	42	47	42
FLIP 85-134C	83	89	58	48	58	50	54	33	62	39	48	51
FLIP 85-148C	78	80	49	47	49	40	41	25	43	36	37	37
FLIP 86- 2C	85	69	54	47	45	43	46	25	48	28	43	49
FLIP 86- 5C	94	82	55	48	-	48	52	30	56	42	51	44
FLIP 86- 6C	97	78	62	61	-	48	58	30	55	34	47	50
FLIP 86- 10C	105	96	65	59	58	50	55	30	56	43	53	41
FLIP 86- 42C	82	79	50	50	44	40	50	28	48	36	44	38
FLIP 81-293C	79	74	55	49	39	40	45	23	42	32	45	43
ILC 482	85	66	53	45	-	38	47	20	39	31	32	38
Local check	73	84	50	55	55	50	63	40	60	43	60	55
Location Mean	93	82	57	55	50	45	51	28	53	39	46	44
S.E. of Mean	5.78	5.76	3.26	3.05	3.71	1.99	2.29	2.92	2.92	1.70	2.67	2.14
L.S.D. at 5%	16.91	-	9.55	8.94	10.99	5.83	6.71	8.54	8.55	4.98	7.81	6.25
C.V. %	8.82	9.86	8..03	7.83	10.53	6.25	6.35	14.78	7.78	6.09	8.15	6.90
Error d.f.	23	23	23	23	19	23	23	23	23	23	23	23
Significance	*	NS	*	*	*	*	*	*	*	*	*	*

Cont'd. ...

Table 3.2.4. Cont'd. ...

Entry Name	SYRIA					TURKEY					(1) Overall
	Jableh	Jindiress	Tartus	Tel Hadya	Diyarbakir	Erzurum	Izmir-I	Izmir-II	Samsun-I	Samsun-II	Mean
FLIP 84- 15C	62	40	65	26	51	42	65	54	27	87	52
FLIP 84- 17C	68	37	65	27	51	38	61	55	27	91	52
FLIP 84- 18C	63	34	60	26	51	38	65	49	28	98	52
FLIP 85- 4C	68	45	73	29	59	42	62	57	27	87	56
FLIP 85- 5C	60	39	55	30	52	40	62	59	30	90	54
FLIP 85- 18C	78	48	78	37	61	51	66	67	35	96	60
FLIP 85- 42C	67	43	63	27	50	45	67	62	33	93	55
FLIP 85- 44C	73	44	65	33	54	44	78	57	31	94	56
FLIP 85- 48C	68	45	65	30	58	46	59	62	31	93	57
FLIP 85- 56C	68	40	60	31	52	44	64	59	29	91	55
FLIP 85- 60C	70	40	73	35	57	44	63	62	29	94	63
FLIP 85- 74C	70	44	63	31	60	45	59	50	28	88	55
FLIP 85- 93C	55	36	63	27	49	36	55	48	26	74	47
FLIP 85-119C	56	42	68	31	58	43	61	58	31	82	54
FLIP 85-134C	68	42	65	28	54	44	66	59	30	95	55
FLIP 85-148C	56	29	63	22	46	36	49	54	22	69	45
FLIP 86- 2C	49	35	65	28	50	39	60	52	31	91	50
FLIP 86- 5C	63	44	70	32	57	41	66	57	29	87	54
FLIP 86- 6C	70	42	65	30	52	44	63	54	28	87	54
FLIP 86- 10C	74	45	68	33	55	44	64	68	28	84	57
FLIP 86- 42C	53	35	60	23	49	32	57	53	26	69	47
FLIP 81-293C	59	37	53	26	47	34	59	50	29	74	48
ILC 482	51	26	50	19	41	32	49	52	25	70	44
Local check	67	46	70	36	44	39	69	52	24	80	
Location Mean	64	40	64	29	52	41	62	56	29	86	
S.E. of Mean	3.73	2.11	3.51	1.41	1.77	1.94	3.43	3.15	1.80	3.99	
L.S.D. at 5%	10.92	6.19	10.27	4.12	5.16	5.67	10.03	9.22	5.25	11.68	
C.V. %	8.30	7.54	7.74	6.92	4.77	6.73	7.83	7.94	8.87	6.58	
Error d.f.	23	23	23	23	23	23	23	23	23	23	
Significance	*	*	*	*	*	*	*	*	*	*	

(1) Sevilla was excluded from the overall mean. \* = Significant at  $P < 0.05$ , NS = Not significant.

Badajoz and Erzurum excluded from overall mean as not planted in winter.

# Not analysed due to incomplete data set or other reasons.

Table 3.2.5. 100-Seed weight (g) of entries at different locations in the CIYT-W-MR during 1989/90.

Entry Name	ALGERIA		CYPRUS		FRANCE	GREECE	ITALY		LEBANON	PORTUGAL
	Setif	Tiaret	Athalassa	Montboucher		Larissa	Papiano	Tolentino	Terbol	Elvas
FLIP 84- 15C	41	33	44	46		41	47	42	40	40
FLIP 84- 17C	38	32	37	49		36	47	42	39	46
FLIP 84- 18C	38	35	36	46		35	45	42	34	45
FLIP 85- 4C	43	39	44	50		43	51	50	43	45
FLIP 85- 5C	45	37	45	54		44	52	50	44	45
FLIP 85- 18C	35	31	35	39		35	40	38	32	34
FLIP 85- 42C	39	28	40	41		38	44	43	37	34
FLIP 85- 44C	39	34	39	47		37	46	43	36	41
FLIP 85- 48C	37	33	39	39		37	43	40	36	37
FLIP 85- 56C	37	34	36	44		40	46	42	37	40
FLIP 85- 60C	36	30	39	40		38	44	35	37	43
FLIP 85- 74C	37	28	38	42		38	44	39	37	39
FLIP 85- 93C	37	31	39	40		35	43	39	34	35
FLIP 85-119C	36	28	37	38		36	39	36	33	32
FLIP 85-134C	40	34	39	42		37	40	38	36	39
FLIP 85-148C	33	28	36	39		34	38	40	34	38
FLIP 86- 2C	41	36	42	47		42	50	42	40	42
FLIP 86- 5C	43	38	43	50		44	55	48	43	46
FLIP 86- 6C	42	24	41	45		39	47	45	39	38
FLIP 86- 10C	38	33	40	41		39	45	40	37	40
FLIP 86- 42C	35	29	37	38		37	38	39	36	32
FLIP 81-293C	26	25	31	32		30	31	30	26	27
ILC 482	28	28	31	34		27	31	31	27	24
Local check	34	24	29	28		37	35	-	27	44
Location Mean	37	31	38	42		37	43	40	36	39
S.E. of Mean	1.33	2.30	1.24	1.58		0.89	1.12	1.71	0.80	1.75
L.S.D. at 5%	3.88	6.74	3.63	4.63		2.59	3.28	5.01	2.33	5.11
C.V. %	5.02	10.42	4.60	5.33		3.35	3.65	5.97	3.12	6.37
Error d.f.	23	23	23	23		23	23	22	23	23
Significance	*	*	*	*		*	*	*	*	*

Cont'd. ...

Table 3.2.5. Cont'd. ...

Entry Name	SPAIN				SYRIA				
	Badajoz	Cordoba-II	Al Ghab	Heimo	Homs	Idleb	Jableh	Jindiress	Tartus
FLIP 84- 15C	45	40	45	36	41	33	43	41	50
FLIP 84- 17C	41	44	43	34	32	36	45	38	51
FLIP 84- 18C	42	43	44	34	37	40	33	37	52
FLIP 85- 4C	48	47	45	40	46	40	39	42	47
FLIP 85- 5C	51	45	49	37	45	38	51	44	49
FLIP 85- 18C	39	39	35	29	31	31	40	34	38
FLIP 85- 42C	44	39	38	32	30	33	34	37	43
FLIP 85- 44C	44	43	40	33	34	36	37	37	42
FLIP 85- 48C	40	38	41	31	35	32	35	37	43
FLIP 85- 56C	43	39	41	34	40	37	38	38	42
FLIP 85- 60C	42	39	40	35	34	35	49	38	48
FLIP 85- 74C	44	39	40	34	37	35	43	39	43
FLIP 85- 93C	38	38	39	31	37	30	39	37	42
FLIP 85-119C	39	35	37	32	34	30	35	35	40
FLIP 85-134C	41	43	40	33	41	34	41	39	46
FLIP 85-148C	37	38	36	33	32	32	36	35	44
FLIP 86- 2C	49	45	43	38	38	40	45	41	41
FLIP 86- 5C	44	48	40	40	40	41	41	42	59
FLIP 86- 6C	45	41	45	37	35	35	46	40	47
FLIP 86- 10C	41	41	41	34	35	35	36	37	43
FLIP 86- 42C	40	33	38	31	32	29	35	36	46
FLIP 81-293C	28	28	26	23	27	23	32	26	32
ILC 482	30	27	26	24	23	22	33	25	31
Local check	29	27	25	24	25	23	31	25	30
<b>Location Mean</b>	<b>41</b>	<b>39</b>	<b>39</b>	<b>33</b>	<b>35</b>	<b>33</b>	<b>39</b>	<b>37</b>	<b>44</b>
S.E. of Mean	1.44	1.10	0.91	1.05	0.97	1.83	3.62	0.92	3.06
L.S.D. at 5%	4.22	3.21	2.66	3.07	2.85	5.35	10.60	2.69	8.97
C.V. %	4.97	3.97	3.30	4.51	3.95	7.79	13.13	3.55	9.93
Error d.f.	23	23	23	23	23	23	23	23	23
Significance	*	*	*	*	*	*	*	*	*

Cont'd. ...

Table 3.2.5. Cont'd. ...

Entry Name	SYRIA			TURKEY				(1)	
	Tel Hadya	Diyarbakir	Erzurum	Izmir-I	Izmir-II	Samsun-I	Samsun-II	Sunliurfa	Overall Mean
FLIP 84- 15C	47	39	50	42	47	48	43	36	42
FLIP 84- 17C	40	38	44	44	45	43	49	31	41
FLIP 84- 18C	37	36	45	47	44	45	48	28	40
FLIP 85- 4C	45	43	44	42	52	48	46	37	44
FLIP 85- 5C	44	43	53	50	52	50	52	35	46
FLIP 85- 18C	38	35	41	37	43	36	40	29	35
FLIP 85- 42C	40	37	49	40	42	42	47	34	38
FLIP 85- 44C	40	38	47	44	45	45	46	31	40
FLIP 85- 48C	40	37	45	24	42	35	41	30	37
FLIP 85- 56C	42	39	41	34	46	38	44	31	39
FLIP 85- 60C	44	39	45	42	43	41	45	34	39
FLIP 85- 74C	40	39	41	39	45	42	45	33	39
FLIP 85- 93C	39	38	42	35	42	40	44	29	37
FLIP 85-119C	37	35	40	32	41	39	38	28	35
FLIP 85-134C	43	40	44	41	44	45	46	31	40
FLIP 85-148C	45	37	38	36	39	37	46	28	36
FLIP 86- 2C	43	40	53	48	48	53	43	37	43
FLIP 86- 5C	45	42	53	50	51	52	51	40	45
FLIP 86- 6C	44	42	48	39	48	45	46	36	41
FLIP 86- 10C	43	39	47	40	44	44	46	26	39
FLIP 86- 42C	38	36	41	36	42	41	39	26	36
FLIP 81-293C	32	27	32	31	32	31	32	25	29
ILC 482	37	29	34	30	30	34	36	22	29
Local check	28	33	51	38	44	41	35	28	
<b>Location Mean</b>	<b>41</b>	<b>37</b>	<b>45</b>	<b>39</b>	<b>44</b>	<b>42</b>	<b>44</b>	<b>31</b>	
S.E. of Mean	3.43	#	#	3.59	0.96	1.18	1.43		
L.S.D. at 5%	-	#	#	10.51	2.81	3.44	4.17		
C.V. %	11.94	#	#	12.97	3.11	3.93	4.62		
Error d.f.	23			23	23	23	23		
Significance	NS			*	*	*	*		

\* = Significant at  $P < 0.05$ , NS = Not significant. # Not analysed due to incomplete data set or other reasons. Badajoz and Erzurum excluded from overall mean as not planted in winter.



Table 3.2.6. Seed yield (Y=kg/ha) and rank (R) of entries at different locations in the CIYT-W-MR during 1989/90.

Entry Name	ALGERIA										CYPRUS		FRANCE	
	Guelma		Khroub		Setif		Sidi Bel Abbes		Tiaret		Athalassa		Montboucher	
	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R
FLIP 84- 15C	1438	14	1684	6	1673	9	2163	1	713	1	939	1	2853	7
FLIP 84- 17C	1891	8	1030	18	1352	20	1028	22	497	15	579	14	1739	21
FLIP 84- 18C	1441	13	933	20	1368	19	1303	14	259	24	349	23	1721	22
FLIP 85- 4C	2031	7	798	24	1095	23	1062	19	530	12	388	19	1715	23
FLIP 85- 5C	875	22	1709	4	1949	5	1317	12	447	19	493	18	2546	17
FLIP 85- 18C	1313	16	1397	9	1625	12	1642	5	487	17	589	11	2798	11
FLIP 85- 42C	984	18	1690	5	1603	13	1437	8	467	18	547	15	2620	13
FLIP 85- 44C	891	21	1129	16	1660	11	1548	6	687	3	377	21	2462	19
FLIP 85- 48C	1453	12	2007	1	1546	15	1219	18	549	9	714	6	2842	8
FLIP 85- 56C	2156	6	915	21	1194	22	1293	15	700	2	646	8	3033	4
FLIP 85- 60C	3250	1	988	19	1756	7	968	23	411	22	623	9	2802	10
FLIP 85- 74C	2391	4	1269	12	1448	16	1046	21	531	11	729	5	2683	12
FLIP 85- 93C	2219	5	1214	13	1692	8	1317	11	515	14	760	4	2482	18
FLIP 85-119C	1188	17	1043	17	2010	4	1275	17	580	5	356	22	3271	2
FLIP 85-134C	1484	11	1208	14	1432	17	1359	10	311	23	328	24	2587	15
FLIP 85-148C	2609	2	1280	11	1670	10	1540	7	544	10	658	7	2305	20
FLIP 86- 2C	1629	10	809	23	1562	14	1825	2	520	13	580	13	1464	24
FLIP 86- 5C	2453	3	1616	7	2229	2	1311	13	568	7	385	20	2859	6
FLIP 86- 6C	953	19	1311	10	1425	18	1062	20	560	8	844	2	2585	16
FLIP 86- 10C	1344	15	823	22	1079	24	939	24	431	20	583	12	2598	14
FLIP 86- 42C	594	24	1751	3	2076	3	1673	4	412	21	831	3	2809	9
FLIP 81-293C	813	23	1208	15	1794	6	1278	16	492	16	531	17	3018	5
ILC 482	891	20	1808	2	2851	1	1768	3	602	4	545	16	3397	1
Local check	1691	9	1513	8	1232	21	1391	9	573	6	593	10	3230	3
<b>Location Mean</b>	<b>1583</b>		<b>1297</b>		<b>1638</b>		<b>1365</b>		<b>516</b>		<b>582</b>		<b>2601</b>	
S.E. of Mean	421.68		227.00		231.54		17.77		101.31		114.48		318.36	
L.S.D. at 5%	1233.83		664.21		677.47		51.99		-		-		931.53	
C.V. %	37.68		24.75		19.99		1.84		27.76		27.82		17.31	
Error d.f.	23		23		23		23		23		23		23	
Significance	*		*		*		*		NS		NS		*	
Test > L. Check	1		0		5		7		-		-		0	

Cont'd. ...

Table 3.2.6. Cont'd. ...

Entry Name	GREECE		ITALY				JORDAN				LEBANON		LIBYA	
	Larissa		Papiano		Tolentino		Maru		Rabba		Terbol		Sarir	
	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R
FLIP 84- 15C	956	23	3502	9	1177	15	1300	10	420	17	2151	2	1311	3
FLIP 84- 17C	1088	19	1776	24	663	23	1085	15	395	20	1230	23	704	14
FLIP 84- 18C	1050	21	2183	22	1156	16	676	24	435	14	1000	24	540	18
FLIP 85- 4C	1219	13	3233	17	952	21	1066	16	545	1	1833	11	1110	5
FLIP 85- 5C	1269	10	3313	15	1608	5	1659	5	420	18	1579	20	997	6
FLIP 85- 18C	1194	15	3662	5	1276	12	923	21	485	4	1952	6	249	24
FLIP 85- 42C	1125	17	3008	18	1502	7	993	19	405	19	1738	14	1210	4
FLIP 85- 44C	1231	12	3438	11	1297	11	788	23	440	10	1722	15	546	17
FLIP 85- 48C	1375	5	3605	6	1227	13	1330	9	440	12	1787	12	875	7
FLIP 85- 56C	1400	4	3706	4	1192	14	1221	12	460	7	2032	4	678	15
FLIP 85- 60C	1425	3	3330	13	1079	18	1786	4	380	21	1913	8	658	16
FLIP 85- 74C	1356	6	3522	7	1594	6	1115	13	450	8	1929	7	722	12
FLIP 85- 93C	1281	9	3510	8	2050	2	1019	17	445	9	1786	13	708	13
FLIP 85-119C	1206	14	3327	14	1650	4	867	22	540	2	1646	19	1728	2
FLIP 85-134C	863	24	2045	23	1086	17	956	20	440	11	1683	16	390	22
FLIP 85-148C	1444	1	2955	19	987	19	1953	2	430	16	1651	18	532	20
FLIP 86- 2C	1119	18	2826	20	888	22	1424	8	435	13	1873	9	793	10
FLIP 86- 5C	1088	20	3483	10	1488	8	1962	1	370	22	2032	5	865	8
FLIP 86- 6C	1288	8	3260	16	959	20	1886	3	515	3	1873	10	532	19
FLIP 86- 10C	1438	2	3384	12	1461	9	1230	11	355	23	1667	17	275	23
FLIP 86- 42C	1031	22	2394	21	1960	3	1108	14	435	15	2183	1	432	21
FLIP 81-293C	1150	16	3781	2	2228	1	1515	7	465	6	1571	21	726	11
ILC 482	1319	7	3763	3	1375	10	1635	6	320	24	2087	3	1822	1
Local check	1244	11	3842	1	-	-	1018	18	475	5	1270	22	800	9
Location Mean	1215		3202		1341		1271		438		1758		800	
S.E. of Mean	114.60		321.81		169.63		293.27		57.22		112.00		267.01	
L.S.D. at 5%	-		941.61		497.54		-		-		327.72		-	
C.V. %	13.34		14.21		17.88		32.62		18.50		9.01		47.19	
Error d.f.	23		23		22		23		23		23		23	
Significance	NS		*		*		NS		NS		*		NS	
Test > L. Check	-		0		-		-		-		19		-	

Cont'd. ...

Table 3.2.6. Cont'd. ...

Entry Name	PORTUGAL		SPAIN						SYRIA					
	Elvas		Badajoz		Cordoba-I		Cordoba-II		Sevilla		Al Ghab		Gelline	
	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R
FLIP 84- 15C	407	24	2229	4	3174	1	1809	14	108	19	1944	4	1615	2
FLIP 84- 17C	1852	8	1957	9	2260	15	1859	11	729	11	1635	15	595	24
FLIP 84- 18C	1630	10	1940	11	2307	10	1891	10	300	17	1667	14	795	20
FLIP 85- 4C	1570	11	1631	21	2228	17	1678	17	375	15	1762	10	795	19
FLIP 85- 5C	1455	14	1739	19	2232	16	1810	13	103	20	1937	5	1143	10
FLIP 85- 18C	1709	9	1576	23	2216	19	1391	21	613	13	1492	18	669	23
FLIP 85- 42C	3030	2	1957	10	2466	3	1311	23	739	10	1690	12	1025	16
FLIP 85- 44C	925	20	1890	13	2298	11	2085	7	473	14	1873	7	670	22
FLIP 85- 48C	2480	4	1669	20	2290	12	2265	5	650	12	1960	3	1420	3
FLIP 85- 56C	1484	13	1829	15	2374	8	1989	9	1150	4	1881	6	1342	5
FLIP 85- 60C	2163	6	1756	18	2542	2	2349	2	758	8	1675	13	1074	12
FLIP 85- 74C	1264	16	2050	7	2288	13	2279	4	806	7	865	24	1196	7
FLIP 85- 93C	1174	18	1757	17	1934	20	2285	3	851	6	1619	16	921	18
FLIP 85-119C	800	21	1829	14	1862	22	1318	22	-	-	1373	21	1127	11
FLIP 85-134C	638	23	1486	24	1538	24	1426	20	874	5	1429	20	929	17
FLIP 85-148C	2296	5	1890	12	2218	18	2374	1	1418	1	1571	17	1212	6
FLIP 86- 2C	1411	15	2210	5	1836	23	1803	15	316	16	1984	1	1041	15
FLIP 86- 5C	2482	3	1802	16	2458	4	1633	18	-	-	1849	8	1158	9
FLIP 86- 6C	2034	7	2262	3	2422	6	1691	16	-	-	1976	2	1072	13
FLIP 86- 10C	1498	12	1612	22	2274	14	2011	8	1189	2	1492	19	1167	8
FLIP 86- 42C	1245	17	2014	8	2348	9	1478	19	1160	3	1786	9	1404	4
FLIP 81-293C	1137	19	2174	6	2406	7	1849	12	235	18	1325	22	1070	14
ILC 482	752	22	2286	2	2440	5	1106	24	-	-	1746	11	1788	1
Local check	3741	1	2579	1	1928	21	2106	6	740	9	1119	23	744	21
Location Mean	1632		1922		2264		1825		679		1652		1082	
S.E. of Mean	590.23		222.56		220.49		239.05		223.11		180.04		120.45	
L.S.D. at 5%	-		-		-		699.45		660.40		526.80		352.44	
C.V. %	51.13		16.38		13.77		18.53		46.46		15.41		15.74	
Error d.f.	23		23		23		23		19		23		23	
Significance	NS		NS		NS		*		*		*		*	
Test > L. Check	-		-		-		0		1		14		11	

Cont'd. ...

Table 3.2.6. Cont'd. ...

Entry Name	SYRIA													
	Hama		Heimo		Homs		Idleb		Izra'a		Jableh		Jindiress	
	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R
FLIP 84- 15C	1056	1	3878	14	1800	7	2838	1	738	5	2271	2	1524	4
FLIP 84- 17C	508	17	2817	23	1752	9	821	24	619	12	886	22	1099	19
FLIP 84- 18C	127	24	3141	21	778	23	1567	18	643	10	529	23	1028	21
FLIP 85- 4C	675	9	3986	12	1992	4	2003	9	556	16	1114	16	1776	1
FLIP 85- 5C	540	16	4435	5	1587	12	1713	15	548	17	1029	19	1456	8
FLIP 85- 18C	540	15	3389	18	1690	11	1903	12	413	22	1914	7	1283	12
FLIP 85- 42C	905	4	4419	7	1722	10	1816	13	405	23	2014	5	1614	3
FLIP 85- 44C	381	22	3732	17	1246	19	2217	6	302	24	1786	8	1471	7
FLIP 85- 48C	722	7	4179	10	1413	14	1489	20	651	9	957	20	1621	2
FLIP 85- 56C	754	6	4573	3	2056	3	1921	11	421	21	2129	4	1330	11
FLIP 85- 60C	690	8	3770	15	2540	1	2084	8	683	7	1771	9	1119	18
FLIP 85- 74C	921	3	4433	6	1778	8	2262	5	595	15	1686	11	1336	10
FLIP 85- 93C	992	2	4805	2	2190	2	2670	2	484	19	2143	3	1497	5
FLIP 85-119C	460	20	3246	20	1479	13	956	23	619	13	1400	14	1188	15
FLIP 85-134C	667	10	3981	13	1379	16	1562	19	516	18	1071	18	1135	17
FLIP 85-148C	563	14	2744	24	841	22	1425	21	611	14	2371	1	1217	14
FLIP 86- 2C	492	18	4006	11	579	24	1962	10	730	6	929	21	760	24
FLIP 86- 5C	794	5	4532	4	1817	5	2329	4	881	1	386	24	1092	20
FLIP 86- 6C	603	12	4203	9	905	21	1637	17	667	8	1543	12	1496	6
FLIP 86- 10C	587	13	3738	16	1389	15	1659	16	429	20	1071	17	1256	13
FLIP 86- 42C	476	19	4348	8	1810	6	1808	14	754	3	1957	6	1158	16
FLIP 81-293C	421	21	3135	22	1317	17	2329	3	746	4	1757	10	1350	9
ILC 482	357	23	4881	1	1143	20	1037	22	794	2	1471	13	948	23
Local check	651	11	3273	19	1270	18	2106	7	635	11	1257	15	998	22
<b>Location Mean</b>	<b>620</b>		<b>3902</b>		<b>1520</b>		<b>1838</b>		<b>602</b>		<b>1477</b>		<b>1281</b>	
S.E. of Mean	206.60		509.23		330.17		427.32		104.72		504.92		188.29	
L.S.D. at 5%	-		-		966.08		-		-		-		-	
C.V. %	47.12		18.46		30.72		32.88		24.62		48.35		20.78	
Error d.f.	23		23		23		23		23		23		23	
Significance	NS		NS		*		NS		NS		NS		NS	
Test > L. Check	-		-		1		-		-		-		-	

Cont'd. ...

Table 3.2.6. Cont'd. ...

Entry Name	SYRIA				TUNISIA						TURKEY			
	Tartus		Tel Hadya		Beja-W		Beja-Sp		El Kef-W		Oued meliz-W		Diyarbakir	
	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R
FLIP 84- 15C	3127	2	513	18	1236	4	646	6	514	7	1229	1	1403	2
FLIP 84- 17C	1849	23	420	21	1250	2	819	2	486	9	931	12	715	21
FLIP 84- 18C	1698	24	418	23	875	19	597	8	347	21	674	22	701	22
FLIP 85- 4C	2611	9	595	12	958	15	292	23	396	18	958	10	1056	9
FLIP 85- 5C	2048	20	619	7	931	17	486	12	465	13	896	15	938	12
FLIP 85- 18C	2016	21	625	6	1042	8	465	14	306	24	903	14	889	17
FLIP 85- 42C	3095	3	697	5	1000	12	368	19	528	5	965	9	764	20
FLIP 85- 44C	2460	11	587	14	694	24	375	18	368	19	674	21	986	11
FLIP 85- 48C	2683	7	616	8	833	20	403	17	479	10	1104	2	1299	3
FLIP 85- 56C	2159	18	706	4	1042	8	535	10	444	15	813	19	861	18
FLIP 85- 60C	1897	22	1105	2	1333	1	576	9	451	14	986	8	1611	1
FLIP 85- 74C	2619	8	586	15	1000	12	417	16	438	16	715	20	1174	5
FLIP 85- 93C	2706	6	606	10	1236	4	660	5	479	11	1014	6	1028	10
FLIP 85-119C	2405	13	448	19	1014	11	479	13	486	8	931	13	632	23
FLIP 85-134C	2357	14	601	11	819	21	340	21	319	22	826	17	389	24
FLIP 85-148C	3667	1	428	20	1042	8	819	1	424	17	646	24	1097	8
FLIP 86- 2C	2159	19	890	3	972	14	507	11	528	4	861	16	778	19
FLIP 86- 5C	2730	4	1209	1	1139	6	354	20	472	12	993	7	1132	7
FLIP 86- 6C	2421	12	523	16	1097	7	604	7	569	3	951	11	924	15
FLIP 86- 10C	2730	5	610	9	903	18	271	24	306	23	826	18	917	16
FLIP 86- 42C	2540	10	520	17	958	15	681	3	521	6	1021	4	931	13
FLIP 81-293C	2317	15	419	22	792	22	438	15	354	20	1028	3	924	14
ILC 482	2238	16	411	24	1250	3	340	22	806	1	660	23	1160	6
Local check	2222	17	587	13	770	23	681	4	778	2	1014	5	1215	4
<b>Location Mean</b>	<b>2448</b>		<b>614</b>		<b>1008</b>		<b>506</b>		<b>469</b>		<b>901</b>		<b>980</b>	
S.E. of Mean	351.35		107.11		#		127.32		45.16		141.73		201.64	
L.S.D. at 5%	-		313.41		#		-		132.13		-		-	
C.V. %	20.30		24.67		#		35.56		13.61		22.25		29.10	
Error d.f.	23		23				23		23		23		23	
Significance	NS		*				NS		*		NS		NS	
Test > L. Check	-		2				-		0		-		-	

Cont'd. ...

Table 3.2.6. Cont'd. ...

Entry Name	TURKEY												(1)	
	Erzurum		Izmir-I		Izmir-II		Samsun-I		Samsun-II		Sanliurfa		Overall Mean	
	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R
FLIP 84- 15C	2082	12	343	18	2046	3	415	15	949	22	235	8	1550	2
FLIP 84- 17C	2197	7	444	17	1176	22	448	12	1156	18	77	23	1100	22
FLIP 84- 18C	2254	6	1537	1	1241	21	388	16	1460	14	97	20	1080	23
FLIP 85- 4C	1681	21	157	23	1389	19	415	14	1016	20	79	22	1279	17
FLIP 85- 5C	2325	3	593	11	1685	13	559	5	1794	11	113	19	1370	12
FLIP 85- 18C	2133	10	231	21	1639	15	299	20	2479	4	140	13	1318	15
FLIP 85- 42C	2100	11	537	12	1843	9	525	8	1398	15	194	9	1440	8
FLIP 85- 44C	2179	8	769	8	1963	5	520	9	1579	13	127	16	1295	16
FLIP 85- 48C	2060	14	157	24	1750	11	422	13	2297	7	114	18	1465	5
FLIP 85- 56C	2137	9	324	19	1843	10	295	21	2452	6	265	5	1462	6
FLIP 85- 60C	1838	18	833	7	2037	4	334	18	2460	5	339	1	1546	3
FLIP 85- 74C	1969	16	491	15	1241	20	269	22	2516	3	128	15	1429	9
FLIP 85- 93C	1695	19	269	20	1963	6	605	3	2540	2	249	6	1525	4
FLIP 85-119C	2064	13	213	22	1574	17	619	1	713	23	184	10	1236	19
FLIP 85-134C	1680	22	602	10	907	24	303	19	2087	10	175	11	1131	21
FLIP 85-148C	1691	20	463	16	1074	23	120	24	1305	16	95	21	1361	14
FLIP 86- 2C	1855	17	1213	4	1676	14	474	11	243	24	147	12	1222	20
FLIP 86- 5C	2322	4	1111	5	2241	1	539	6	2271	8	310	2	1575	1
FLIP 86- 6C	2432	2	981	6	1731	12	162	23	1590	12	238	7	1365	13
FLIP 86- 10C	1540	23	722	9	1537	18	368	17	2178	9	55	24	1279	18
FLIP 86- 42C	1423	24	528	13	2074	2	611	2	1292	17	278	4	1393	11
FLIP 81-293C	1974	15	1250	3	1593	16	535	7	2956	1	290	3	1402	10
ILC 482	2476	1	519	14	1917	8	585	4	1152	19	133	14	1445	7
Local check	2316	5	1287	2	1935	7	518	10	987	21	124	17		
<b>Location Mean</b>	<b>2018</b>		<b>649</b>		<b>1670</b>		<b>430</b>		<b>1703</b>		<b>174</b>			
S.E. of Mean	345.63		234.06		230.34		82.09		321.28		61.64			
L.S.D. at 5%	-		684.87		673.97		240.19		940.07		-			
C.V. %	24.23		51.01		19.51		26.98		26.68		49.97			
Error d.f.	23		23		23		23		23		23			
Significance	NS		*		*		*		*		NS			
Test > L. Check	-		0		0		0		10		-			

(1) Sevilla and Beja-Sp were excluded from the overall mean. \* = Significant at  $P < 0.05$ , NS = Not significant. Badajoz and Erzurum excluded from overall mean as not planted in winter. # Not analysed due to incomplete data set or other reasons.

Table 3.2.7. The five heaviest seed yielding entries at the individual locations in the CIYT-MR during 1989/90.

Rank	ALGERIA					CYPRUS	FRANCE	GREECE
	Guelma	Khroub	Setif	Sidi Bel Abbas	Tiaret	Athalassa	Montboucher	Larissa
1	FLIP 85- 60C	FLIP 85- 48C	ILC 482	FLIP 84- 15C	FLIP 84- 15C	FLIP 84- 15C	ILC 482	FLIP 85-148C
2	FLIP 85-148C	ILC 482	FLIP 86- 5C	FLIP 86- 2C	FLIP 85- 56C	FLIP 86- 6C	FLIP 85-119C	FLIP 86- 10C
3	FLIP 86- 5C	FLIP 86- 42C	FLIP 86- 42C	ILC 482	FLIP 85- 44C	FLIP 86- 42C	Local check	FLIP 85- 60C
4	FLIP 85- 74C	FLIP 85- 5C	FLIP 85-119C	FLIP 86- 42C	ILC 482	FLIP 85- 93C	FLIP 85- 56C	FLIP 85- 56C
5	FLIP 85- 93C	FLIP 85- 42C	FLIP 85- 5C	FLIP 85- 18C	FLIP 85-119C	FLIP 85- 74C	FLIP 81-293C	FLIP 85- 48C

Cont'd. ...

Rank	ITALY		JORDAN	LEBANON	LIBYA	PORTUGAL	SPAIN	
	Papiano	Tolento	Marow	Raba'a	Terbol	Sarir	Elvas	Badajoz
1	Local check	FLIP 81-293C	FLIP 86- 5C	FLIP 85- 4C	FLIP 86- 42C	ILC 482	Local check	Local check
2	FLIP 81-293C	FLIP 82- 93C	FLIP 85-148C	FLIP 85-119C	FLIP 84- 15C	FLIP 85-119C	FLIP 85- 42C	ILC 482
3	ILC 482	FLIP 86- 42C	FLIP 86- 6C	FLIP 86- 6C	ILC 482	FLIP 84- 15C	FLIP 86- 5C	FLIP 86- 6C
4	FLIP 85- 56C	FLIP 85-119C	FLIP 85- 60C	FLIP 85- 18C	FLIP 85- 56C	FLIP 85- 42C	FLIP 85- 48C	FLIP 84- 15C
5	FLIP 85- 18C	FLIP 85- 5C	FLIP 85- 5C	Local check	FLIP 86- 5C	FLIP 85- 4C	FLIP 85-148C	FLIP 86- 2C

Cont'd. ...

Rank	SPAIN			SYRIA				
	Cordoba-I	Cordoba-II	Sevilla	Al Ghab	Gelline	Hama	Heimo	Homs
1	FLIP 84- 15C	FLIP 85-148C	FLIP 85-148C	FLIP 86- 2C	ILC 482	FLIP 84- 15C	ILC 482	FLIP 85- 60C
2	FLIP 85- 60C	FLIP 85- 60C	FLIP 86- 10C	FLIP 86- 6C	FLIP 84- 15C	FLIP 85- 93C	FLIP 85- 93C	FLIP 85- 93C
3	FLIP 85- 42C	FLIP 85- 93C	FLIP 86- 42C	FLIP 85- 48C	FLIP 85- 48C	FLIP 85- 74C	FLIP 85- 56C	FLIP 85- 56C
4	FLIP 86- 5C	FLIP 85- 74C	FLIP 85- 56C	FLIP 84- 15C	FLIP 86- 42C	FLIP 85- 42C	FLIP 86- 5C	FLIP 85- 4C
5	ILC 482	FLIP 85- 48C	FLIP 85-134C	FLIP 85- 5C	FLIP 85- 56C	FLIP 86- 5C	FLIP 85- 5C	FLIP 86- 5C

Cont'd. ...

Table 3.2.7. Cont'd. ...

SYRIA						
Rank	Idelb	Izra'a	Jableh	Jindiress	Tartus	Tel Hadya
1	FLIP 84- 15C	FLIP 86- 5C	FLIP 85-148C	FLIP 85- 4C	FLIP 85-148C	FLIP 86- 5C
2	FLIP 85- 93C	ILC 482	FLIP 84- 15C	FLIP 85- 48C	FLIP 84- 15C	FLIP 85- 60C
3	FLIP 81-293C	FLIP 86- 42C	FLIP 85- 93C	FLIP 85- 42C	FLIP 85- 42C	FLIP 86- 2C
4	FLIP 86- 5C	FLIP 81-293C	FLIP 85- 56C	FLIP 84- 15C	FLIP 86- 5C	FLIP 85- 56C
5	FLIP 85- 74C	FLIP 84- 15C	FLIP 85- 42C	FLIP 85- 93C	FLIP 86- 10C	FLIP 85- 42C

Cont'd. ...

TUNISIA				TURKEY		
Rank	Beja-W	Beja-Sp	El Kef	Oued Meliz	Diyarbakir	Erzurum *
1	FLIP 85- 60C	FLIP 85-148C	ILC 482	FLIP 84- 15C	FLIP 85- 60C	ILC 482
2	FLIP 84- 17C	FLIP 84- 17C	Local check	FLIP 85- 48C	FLIP 84- 15C	FLIP 86- 6C
3	ILC 482	FLIP 86- 42C	FLIP 86- 6C	FLIP 81-293C	FLIP 85- 48C	FLIP 85- 5C
4	FLIP 84- 15C	Local check	FLIP 86- 2C	FLIP 86- 42C	Local check	FLIP 86- 5C
5	FLIP 85- 93C	FLIP 85- 93C	FLIP 85- 42C	Local check	FLIP 85- 74C	local check

Cont'd. ...

TURKEY					
Rank	Izmir-I	Izmir-II	Samsun-I	Samsun-II	Sunliurfa
1	FLIP 84- 18C	FLIP 86- 5C	FLIP 85-119C	FLIP 81-293C	FLIP 85- 60C
2	Local check	FLIP 86- 42C	FLIP 86- 42C	FLIP 85- 42C	FLIP 86- 5C
3	FLIP 81-293C	FLIP 84- 15C	FLIP 85- 93C	FLIP 85- 74C	FLIP 81-293C
4	FLIP 86- 2C	FLIP 85- 60C	ILC 482	FLIP 85- 18C	FLIP 86- 42C
5	FLIP 86- 5C	[ FLIP 85- 44C FLIP 85- 93C	FLIP 85- 5C	FLIP 85- 60C	FLIP 85- 56C

\* Not planted in spring; The bracket indicate entries having the same rank,  
W = Winter sowing, Sp = Spring sowing.



The location means for 100-seed weight (Table 3.2.5) varied from 31 g (for Tiaret in Algeria and Sunli Urfa in Turkey), to 45 g (for Erzurum in Turkey). The overall mean for 100-seed weight for entries ranged between 29 and 46 g, and the entry FLIP 85-5C had the largest seed size.

The ANOVA for seed yield revealed that at 10 locations some of the test entries exceeded the respective local check by a significant margin (Table 3.2.6). Across locations, the highest seed yield was recorded for FLIP 86-5C (1575 kg/ha) which was closely followed by FLIP 84-15C, FLIP 85-60C, FLIP 85-93C and FLIP 85-48C with respective yields of 1550, 1546, 1525, and 1465 kg/ha. The top five high yielding lines at each location are given in Table 3.2.7. FLIP 84-15C occurred most frequently among the top five and was closely followed by FLIP 86-5C, ILC 482, FLIP 86-42C, and FLIP 85-93C, and these lines were comparatively more adaptable.

On the basis of average over two years for the 10 common entries (Table 3.2.8.), FLIP 85-93C (1514 kg/ha) ranked number 1 in seed yield and was closely followed by FLIP 85-42C (1497 kg/ha), ILC 482 (1488 kg/ha), FLIP 85-48C (1482 kg/ha) and FLIP 81-293C (1473 kg/ha), respectively.

Table 3.2.8. The mean seed yield (Y = kg/ha) and rank (R) of the common entries in CIYT-W-MR during 1988/89 and 1989/90.

Entry Name	1988/89		1989/90		Mean	
	Y	R	Y	R	Y	R
FLIP 85- 42C	1554	1	1440	4	1497	2
FLIP 85- 48C	1499	5	1465	2	1482	4
FLIP 85- 74C	1398	8	1429	5	1414	7
FLIP 85- 93C	1502	4	1525	1	1514	1
FLIP 85-119C	1293	10	1236	10	1265	10
FLIP 85-148C	1418	7	1361	8	1390	8
FLIP 86- 10C	1309	9	1279	9	1294	9
FLIP 86- 42C	1450	6	1393	7	1422	6
FLIP 81-293C	1543	2	1402	6	1473	5
ILC 482	1530	3	1445	3	1488	3

### 3.3. CHICKPEA INTERNATIONAL YIELD TRIAL-SOUTHERNLY LATITUDES 1 (CIYT-SL1)

#### Material

The material for the Chickpea International Yield Trial-Southernly Latitudes 1 comprised 23 test entries, and one local check to be supplied by the cooperator. Nineteen test entries from these were the advanced breeding lines developed through hybridization and three through mutation at ICARDA. These test entries were resistant to ascochyta blight and were selected from the local and regional yield trials based on their superior yield performance.

## Methods and Management

The trial design was a randomized complete block with three replications. The suggested plot size was four rows each 4 m long with an inter- and intra row spacing of 30- and 10 cm, respectively.

Fifteen sets of trial were distributed to cooperators in 8 countries and the results were returned from 10 sets covering 6 countries. The agronomic practices employed at different locations are shown in Table 3.3.1.

## Results and Discussion

Mean for time to flowering, time to maturity, plant height, and 100-seed weight are compiled in Tables 3.3.2, 3.3.3, 3.3.4 and 3.3.5, respectively. The mean of entries over locations for time to flowering ranged from 82-102 days. A large number of entries flowered earlier than ILC 482. The earliest entries included FLIP 86-24C and FLIP 86-22C which flowered in 82 and 83 days respectively.

The mean plant height for the entries over locations revealed that the entry FLIP 81-293C (57 cm) was the tallest and was closely followed by FLIP 86-18C (55 cm). The 100-seed weight for entries varied from 21 g to 32 g.

Table 3.3.1. Agronomic data for different locations in the CIYT-SLI during 1989/90.

Country/ Location	Planting Date	Harvesting Date	Fertilizer (kg/ha)			Irri- gation	Insecticide/ Herbicide/ Fungicide	Local Check
			N	P	K			
<b>ETHIOPIA</b>								
Ghinchi	07.09.90	-	-	-	-	-	-	Mareye
<b>LIBYA</b>								
Elsafsaf	28.11.89	-	-	-	-	-	Tecto, Actellic	ILC 484
<b>OMAN</b>								
Rumais	19.11.89	30.03.90	20	100	*	-	-	Local White S
Wadi Vargat	21.11.89	-	100	100	3	-	-	ILC 237
<b>PAKISTAN</b>								
Faisalabad	12.11.89	05.05.90	80	75	1	Malathion	-	1343
Mingora	21.11.89	05.90	25	50	1	-	-	NA
<b>SAUDI ARABIA</b>								
Tabuk	19.11.89	06.90	150	276	995mm	-	-	Egyptian var
<b>SYRIA</b>								
Tel Hadya	04.02.90	04.06.90	-	50	-	-	-	ILC 3270

NA=Not Available, \*=Number and quantity not given, +=Unexpectedly high value

Table 3.3.2. Time to flowering (days) of entries at different locations in the CIYT-SL1 during 1989/90.

Entry Name	Pedigree	Origin	ETHIOPIA	
			Ghinchi	El Safsaf
ILC 482- 147	Mutant from ILC 482	Syria	69	99
ILC 482- 406	Mutant from ILC 482	Syria	64	105
ILC 482- 441	Mutant from ILC 482	Syria	65	104
FLIP 86- 18C	X 82 TH 127/ILC 482XILC 196	ICARDA/ICRISAT	74	107
FLIP 86- 22C	X 83 TH 87/ILC3395XFLIP 81-67C	ICARDA/ICRISAT	51	110
FLIP 86- 24C	X 83 TH 160/ILC4296XFLIP 81-49C	ICARDA/ICRISAT	61	100
FLIP 86- 52C	X 83 TH 165/ILC4090XILC 482	ICARDA/ICRISAT	57	102
FLIP 86- 53C	X 83 TH 177/ILC4090XILC2912	ICARDA/ICRISAT	67	106
FLIP 87- 4C	X 85 TH 199/ILC4293XFLIP 82-243C	ICARDA/ICRISAT	50	96
FLIP 87- 27C	X 84 TH 168/ILC1931XFLIP 82-64C	ICARDA/ICRISAT	68	107
FLIP 87- 42C	X 84 TH 68/ILC 484XFLIP 82-80C	ICARDA/ICRISAT	66	105
FLIP 87- 43C	X 84 TH 68/ILC 484XFLIP 82-80C	ICARDA/ICRISAT	65	105
FLIP 87- 45C	X 84 TH 74/ILC 482XFLIP 82-80C	ICARDA/ICRISAT	71	103
FLIP 87- 48C	X 85 TH 218/ILC2375XILC2380	ICARDA/ICRISAT	57	105
FLIP 87- 55C	X 85 TH 217/ILC2375XILC 187	ICARDA/ICRISAT	61	106
FLIP 87- 56C	X 85 TH 242/ILC3397XFLIP 82-130C	ICARDA/ICRISAT	63	100
FLIP 87- 57C	X 85 TH 246/ILC3398XFLIP 83-13C	ICARDA/ICRISAT	50	100
FLIP 87- 60C	X 85 TH 276/ILC3843XFLIP 82-191C	ICARDA/ICRISAT	52	107
FLIP 87- 61C	X 85 TH 294/ILC4293XFLIP 83-13C	ICARDA/ICRISAT	69	99
FLIP 87- 77C	X 83 TH 77/ILC1250XFLIP 81-59W	ICARDA/ICRISAT	50	99
FLIP 87- 89C	X 85 TH 294/ILC4293XFLIP 83-13C	ICARDA/ICRISAT	54	100
FLIP 81-293C	X 79 TH 8/ILC 191XILC 496	-	82	110
ILC 482	Long term check	Turkey	65	105
Local check	-	-	56	107
<b>Location Mean</b>			<b>62</b>	<b>103</b>
S.E. of Mean			5.22	2.20
L.S.D. at 5%			15.27	6.44
C.V. %			11.95	3.01
Error d.f.			23	23
Significance			*	*

Cont'd. ...

Table 3.3.2. Cont'd. ...

Entry Name	OMAN		PAKISTAN		SAUDI ARABIA	SYRIA	(1) Overall Mean
	Rumais	Wadi Vargat	Faisalabad	Mingora	Tabuk	Tel Hadya	
ILC 482- 147	45	92	95	151	108	133	94
ILC 482- 406	48	93	97	153	111	134	96
ILC 482- 441	48	90	99	141	110	135	94
FLIP 86- 18C	49	92	99	151	111	135	97
FLIP 86- 22C	55	51	98	125	91	-	83
FLIP 86- 24C	55	37	96	141	87	-	82
FLIP 86- 52C	55	86	98	160	107	134	95
FLIP 86- 53C	55	88	99	153	107	138	96
FLIP 87- 4C	55	56	97	153	87	-	85
FLIP 87- 27C	66	92	97	142	105	134	97
FLIP 87- 42C	66	65	98	143	112	133	93
FLIP 87- 43C	66	88	98	151	107	128	97
FLIP 87- 45C	66	90	99	141	110	131	97
FLIP 87- 48C	73	75	97	163	104	-	96
FLIP 87- 55C	73	102	99	151	100	129	99
FLIP 87- 56C	76	65	98	142	87	130	90
FLIP 87- 57C	76	56	97	141	85	-	86
FLIP 87- 60C	76	75	98	140	101	129	93
FLIP 87- 61C	73	44	98	140	94	130	88
FLIP 87- 77C	76	56	99	158	87	135	89
FLIP 87- 89C	73	38	96	151	87	133	86
FLIP 81-293C	73	88	97	151	115	134	102
ILC 482	73	85	98	125	110	136	94
Local check	78	102	99	-	120	136	
<b>Location Mean</b>	<b>65</b>	<b>75</b>	<b>97</b>	<b>146</b>	<b>102</b>	<b>133</b>	
S.E. of Mean	#	#	1.09	0.59	1.93	0.95	
L.S.D. at 5%	#	#	-	1.73	5.65	2.82	
C.V. %	#	#	1.58	0.57	2.69	1.01	
Error d.f.			23	22	23	18	
Significance			NS	*	*	*	

(1) Tel Hadya was excluded from the overall mean. \* = Significant at  $P < 0.05$ ,  
 NS = Not significant. #. Not analysed due to incomplete data set or other reasons.

Table 3.3.3. Time to maturity (days) of entries at different locations in the CIYT-SL1 during 1989/90.

Entry Name	ETHIOPIA		OMAN		PAKISTAN	SAUDI ARABIA	SYRIA	(1)
	Ghinchi	Rumais	Wadi Vargat	Mingora	Tabuk	Tel Hadya	Overall Mean	
ILC 482- 147	139	133	145	185	190	175	173	
ILC 482- 406	137	133	142	187	190	176	173	
ILC 482- 441	138	132	141	186	190	176	172	
FLIP 86- 18C	139	130	141	185	188	176	171	
FLIP 86- 22C	139	127	144	188	188	-	173	
FLIP 86- 24C	-	127	145	189	184	-	173	
FLIP 86- 52C	137	130	165	187	190	177	181	
FLIP 86- 53C	141	129	145	184	190	179	173	
FLIP 87- 4C	136	130	135	190	190	-	172	
FLIP 87- 27C	137	132	135	186	190	173	170	
FLIP 87- 42C	136	130	133	185	188	173	169	
FLIP 87- 43C	136	130	134	184	190	173	169	
FLIP 87- 45C	139	133	144	189	188	170	174	
FLIP 87- 48C	136	132	145	190	186	-	174	
FLIP 87- 55C	137	133	145	186	190	173	174	
FLIP 87- 56C	-	132	145	190	186	173	174	
FLIP 87- 57C	132	127	134	187	188	-	170	
FLIP 87- 60C	132	130	138	185	186	175	170	
FLIP 87- 61C	137	130	139	187	190	172	172	
FLIP 87- 77C	141	-	142	186	190	178	173	
FLIP 87- 89C	136	129	135	190	188	178	171	
FLIP 81-293C	141	132	136	185	188	176	170	
ILC 482	141	130	136	191	186	177	171	
Local check	128	133	145	-	188	178		
<b>Location Mean</b>	<b>137</b>	<b>130</b>	<b>141</b>	<b>187</b>	<b>188</b>	<b>175</b>		
S.E. of Mean	1.85	0.78	#	0.66	1.94	1.94		
L.S.D. at 5%	5.44	2.28	#	1.93	-	-		
C.V. %	1.91	0.84	#	0.50	1.46	1.57		
Error d.f.	21	22		22	23	18		
Significance	*	*		*	NS	NS		

(1) Ghinchi, Rumais and Tel Hadya were excluded from the overall mean.

\* = Significant at  $P < 0.05$ , NS = Not significant. # Not analysed due to incomplete data set or other reasons.

Table 3.3.4. Plant height (cm) of entries at different locations in the CIYT-SLI during 1989/90.

Entry Name	ETHIOPIA	LIBYA	OMAN	PAKISTAN	SAUDI ARABIA	SYRIA	(1)
	Ghinchi	El Safsaf	Rumais	Mingora	Tabuk	Tel Hadya	Overall Mean
ILC 482- 147	30	43	57	48	53	20	50
ILC 482- 406	29	37	52	48	58	19	49
ILC 482- 441	34	35	55	53	58	22	50
FLIP 86- 18C	30	42	59	58	62	22	55
FLIP 86- 22C	24	28	62	48	66	-	51
FLIP 86- 24C	-	40	49	53	57	-	49
FLIP 86- 52C	30	40	57	55	54	20	51
FLIP 86- 53C	31	34	63	50	61	16	52
FLIP 87- 4C	25	32	54	50	49	-	46
FLIP 87- 27C	37	31	70	50	52	23	51
FLIP 87- 42C	29	47	62	45	64	20	54
FLIP 87- 43C	27	31	55	48	50	22	46
FLIP 87- 45C	26	39	55	53	52	22	49
FLIP 87- 48C	32	27	57	53	57	-	48
FLIP 87- 55C	23	36	58	58	39	20	47
FLIP 87- 56C	-	35	59	53	64	21	52
FLIP 87- 57C	27	26	55	45	56	-	45
FLIP 87- 60C	34	31	62	50	61	22	51
FLIP 87- 61C	27	30	58	58	62	20	52
FLIP 87- 77C	30	44	60	48	56	19	52
FLIP 87- 89C	27	32	59	48	59	21	49
FLIP 81-293C	34	45	64	55	65	25	57
ILC 482	27	32	58	53	56	19	50
Local check	26	38	62	-	72	38	
<b>Location Mean</b>	<b>29</b>	<b>35</b>	<b>58</b>	<b>51</b>	<b>57</b>	<b>21</b>	
S.E. of Mean	2.59	3.63	1.64	2.19	4.80	1.90	
L.S.D. at 5%	-	10.62	4.81	6.42	-	5.65	
C.V. %	12.70	14.51	3.98	6.07	11.83	12.57	
Error d.f.	21	23	23	22	23	18	
Significance	NS	*	*	*	NS	*	

(1) Ghinchi and Tel Hadya were excluded from the overall mean. \* = Significant at  $P \leq 0.05$ , NS = Not significant.

Table 3.3.5. 100-Seed weight (g) of entries at different locations in the CIYT-SL1 during 1989/90.

Entry Name	OMAN	SAUDI ARABIA	SYRIA	(1)
	Rumais	Tabuk	Tel Hadya	Overall Mean
ILC 482- 147	16	30	26	23
ILC 482- 406	17	25	27	21
ILC 482- 441	18	27	25	23
FLIP 86- 18C	15	29	28	22
FLIP 86- 22C	25	34	30	30
FLIP 86- 24C	20	31	27	25
FLIP 86- 52C	19	26	27	22
FLIP 86- 53C	19	33	27	26
FLIP 87- 4C	22	35	32	29
FLIP 87- 27C	24	40	40	32
FLIP 87- 42C	18	30	32	24
FLIP 87- 43C	19	29	35	24
FLIP 87- 45C	18	27	29	22
FLIP 87- 48C	19	32	34	26
FLIP 87- 55C	20	36	39	28
FLIP 87- 56C	21	33	34	27
FLIP 87- 57C	25	31	-	28
FLIP 87- 60C	22	30	32	26
FLIP 87- 61C	21	37	36	29
FLIP 87- 77C	20	35	34	28
FLIP 87- 89C	22	29	31	25
FLIP 81-293C	19	29	29	24
ILC 482	17	26	27	22
Local check	21	28	29	
<b>Location Mean</b>	<b>20</b>	<b>31</b>	<b>31</b>	
S.E. of Mean	1.18	1.81	1.22	
L.S.D. at 5%	3.45	5.30	3.57	
C.V. %	8.43	8.30	5.61	
Error d.f.	23	23	22	
Significance	*	*	*	

(1) Tel Hadya was excluded from the overall mean

\* = Significant at  $P \leq 0.05$

Table 3.3.6. Seed yield (Y=kg/ha) and rank (R) of entries at different locations in the CIYT-SLI during 1989/90.

Entry Name	ETHIOPIA		LIBYA		OMAN				PAKISTAN	
	Ghinchi		El Safsaf		Rumais	Wadi Vargat		Faisalabad		
ILC 482- 147	95	14	1335	8	40	15	266	11	24	18
ILC 482- 406	65	21	936	15	27	20	297	7	7	20
ILC 482- 441	277	3	778	18	24	23	304	6	38	15
FLIP 86- 18C	171	8	596	21	58	7	250	14	14	19
FLIP 86- 22C	8	22	161	24	82	3	333	5	76	11
FLIP 86- 24C	-	-	544	22	9	24	91	23	24	17
FLIP 86- 52C	148	11	849	17	35	16	190	17	52	13
FLIP 86- 53C	127	12	425	23	49	11	458	2	4	22
FLIP 87- 4C	92	15	743	20	60	6	258	13	264	3
FLIP 87- 27C	150	9	1686	4	56	8	271	9	705	1
FLIP 87- 42C	279	2	1267	9	43	14	135	21	250	4
FLIP 87- 43C	244	6	1617	5	33	17	130	22	90	10
FLIP 87- 45C	148	10	1586	6	24	22	354	4	160	8
FLIP 87- 48C	175	7	1710	3	54	9	266	12	-	-
FLIP 87- 55C	79	20	1947	1	30	19	271	10	181	6
FLIP 87- 56C	-	-	1203	10	52	10	284	8	188	5
FLIP 87- 57C	88	17	1067	12	83	2	232	16	-	-
FLIP 87- 60C	250	4	979	14	44	13	151	19	111	9
FLIP 87- 61C	92	16	1729	2	76	4	190	18	76	12
FLIP 87- 77C	85	18	1344	7	26	21	234	15	24	16
FLIP 87- 89C	83	19	1042	13	63	5	42	24	42	14
FLIP 81-293C	248	5	901	16	87	1	518	1	181	7
ILC 482	108	13	746	19	45	12	388	3	7	21
Local check	998	1	1129	11	33	18	135	20	667	2
<b>Location Mean</b>	<b>182</b>		<b>1097</b>		<b>47</b>		<b>252</b>		<b>145</b>	
S.E. of Mean	107.33		321.38		19.68		65.98		47.38	
L.S.D. at 5%	315.72		940.37		-		193.06		139.38	
C.V. %	83.22		41.45		58.87		37.03		46.32	
Error d.f.	21		23		23		23		21	
Significance	*		*		NS		*		*	
Test > L. Check	0		0		-		5		0	

Cont'd. ...



Table 3.3.6. Cont'd. ...

Entry Name	PAKISTAN		SAUDI ARABIA		SYRIA		(1)	
	Mingora		Tabuk		Tel Hadya		Overall Mean	
ILC 482- 147	615	11	2250	19	304	18	802	18
ILC 482- 406	539	16	2813	16	369	15	830	15
ILC 482- 441	1325	3	3219	11	448	9	1016	9
FLIP 86- 18C	514	20	3094	14	624	5	856	14
FLIP 86- 22C	738	7	3469	8	98	21	813	17
FLIP 86- 24C	558	15	1750	23	48	23	500	23
FLIP 86- 52C	1222	4	4469	3	363	17	1188	4
FLIP 86- 53C	375	23	1906	21	289	19	584	22
FLIP 87- 4C	575	12	2688	17	115	20	740	19
FLIP 87- 27C	700	9	3594	6	640	4	1158	5
FLIP 87- 42C	1349	2	4938	1	575	6	1384	1
FLIP 87- 43C	811	6	4469	2	442	10	1250	3
FLIP 87- 45C	564	13	3469	7	643	3	1107	6
FLIP 87- 48C	717	8	1563	24	68	22	729	20
FLIP 87- 55C	539	17	3313	9	436	11	1089	7
FLIP 87- 56C	696	10	2938	15	675	2	975	11
FLIP 87- 57C	510	21	2125	20	-	-	653	21
FLIP 87- 60C	1513	1	4313	4	556	7	1259	2
FLIP 87- 61C	563	14	3219	10	525	8	1050	8
FLIP 87- 77C	388	22	3156	13	363	16	919	12
FLIP 87- 89C	531	18	3188	12	372	14	873	13
FLIP 81-293C	525	19	3688	5	372	13	1015	10
ILC 482	953	5	2450	18	392	12	829	16
Local check	-	-	1906	22	855	1		
<b>Location Mean</b>	<b>731</b>		<b>3083</b>		<b>416</b>			
S.E. of Mean	61.57		784.62		108.68			
L.S.D. at 5%	180.58		-		318.78			
C.V. %	11.91		36.00		36.93			
Error d.f.	22		23		22			
Significance	*		NS		*			
Test > L. Check	4		-		0			

(1) Ghinchi, Faisalabad and Tel Hadya were excluded from the overall mean  
 \* = Significant at  $P < 0.05$ , NS = Not significant.

Table 3.3.7. The five heaviest seed yielding entries at the individual locations in the CIYT-SL1 during 1989/90.

Rank	<u>ETHIOPIA</u>	<u>LIBYA</u>	<u>OMAN</u>	
	Ghinchi	El Safsaf	Rumais	Wadi Vargat
1	Local check	FLIP 87- 55C	FLIP 81-293C	FLIP 81-293C
2	FLIP 87- 42C	FLIP 87- 61C	FLIP 87- 57C	FLIP 86- 53C
3	ILC 482-441	FLIP 87- 48C	FLIP 86- 22C	ILC 482
4	FLIP 87- 60C	FLIP 87- 27C	FLIP 87- 61C	FLIP 87- 45C
5	FLIP 81-293C	FLIP 86- 43C	FLIP 87- 89C	FLIP 86- 22C

  

Rank	<u>PAKISTAN</u>		<u>SAUDI ARABIA</u>	<u>SYRIA</u>
	Faisalabad	Mingora	Tabuk	Tel Hadya
1	FLIP 87- 27C	FLIP 87- 60C	FLIP 87- 42C	Local check
2	local check	FLIP 87- 42C	FLIP 87- 43C	FLIP 87- 56C
3	FLIP 87- 4C	ILC 482-441	FLIP 86- 52C	FLIP 87- 45C
4	FLIP 87- 42C	FLIP 86- 52C	FLIP 87- 60C	FLIP 87- 27C
5	FLIP 87- 56C	ILC 482	FLIP 81-293C	FLIP 86- 18C

The ANOVA of the seed yield revealed that at Wadi Vargat in Oman and Mingora in Pakistan, 5 and 4 entries, respectively, excelled the respective local check in seed yield by a significant margin (Table 3.3.6). The five heaviest yielders at different locations are given in Table 3.3.7. The entries FLIP 87-42C, and FLIP 87-27C occurred most frequently among the top five heaviest yielders and were relatively more stable.

### 3.4. CHICKPEA INTERNATIONAL YIELD TRIAL-SOUTHERNLY LATITUDES 2 (CIYT-SL2)

#### Material

The material for CIYT-SL2 comprised of 22 test entries and two checks. The test entries were resistant to ascochyta blight and were selected from the local and regional yield trials based on their superior yield performance.

#### Methods and Management

The trial design was randomized complete block with three replications. The suggested plot size was four rows 4 meter long with an inter- and intra row spacing of 30- and 10 cm, respectively.

Sixteen sets of trials were distributed to cooperators in 9 countries and the results were returned from 5 sets covering 4 countries. The agronomic practices employed at different locations are shown in Table 3.4.1.

Table 3.4.1. Agronomic data for different locations in the CIYT-SL2 during 1989/90.

Country/ Location	Planting Date	Harvesting Date	Fertilizer (kg/ha)			Irri- gation	Insecticide/ Herbicide/ Fungicide	Local Check
			N	P	K			
<b>ETHIOPIA</b>								
Ghinchi	07.09.90	-	-	-	-	-	-	-
<b>MEXICO</b>								
Sonora	02.12.89	06.90	80		3	Trifluralin	Tubutama-80	
<b>SUDAN</b>								
Hudeiba	08.11.89	03.90	43		9	Hand Weeding	Shendi	
<b>SYRIA</b>								
Breda	26.11.89	31.05.90	50		-	-	IIC 1929	
Tel Hadya	05.03.90	07.90	50		-	Kerb, Bravo	IIC 1929	

#### Results and Discussion

Mean for time to flowering, time to maturity, plant height, and 100-seed weight are compiled in Tables 3.4.2, 3.4.3, 3.4.4 and 3.4.5, respectively. For entry means the time to flowering ranged from 59 days (for IIC 3116) to 82 days (for FLIP 81-293C), for the time to maturity from 127 days to 138

Table 3.4.2. Time to flowering (days) of entries at different locations in the CIYT-SL2 during 1989/90.

Entry Name	Origin	ETHIOPIA	MEXICO	SUDAN	SYRIA		(1)
		Ghinchi	Hermosillo	Hudeiba	Breda	Tel Hadya	Overall Mean
ILC 295	Iran	62	80	81	142	58	74
ILC 856	Iran	69	87	83	142	60	80
ILC 1539	Afghanistan	70	72	58	142	52	67
ILC 1687	Afghanistan	56	80	61	139	53	65
ILC 2293	Iran	66	80	82	145	55	76
ILC 2357	Iran	71	72	82	142	56	75
ILC 2375	Spain	68	80	62	140	48	70
ILC 2400	Turkey	61	80	78	142	54	73
ILC 2565	Turkey	58	80	81	138	58	73
ILC 2566	Turkey	65	87	82	139	58	78
ILC 2659	USSR	76	80	81	142	58	79
ILC 2694	Afghanistan	56	72	59	141	52	62
ILC 2824	Afghanistan	55	80	48	141	52	61
ILC 2825	Afghanistan	54	80	56	142	50	63
ILC 2876	Afghanistan	69	80	41	160	51	63
ILC 2877	Afghanistan	70	72	56	142	52	66
ILC 2904	Afghanistan	56	72	61	141	52	63
ILC 2910	Afghanistan	57	72	59	142	53	62
ILC 3116	Turkey	64	72	42	141	54	59
ILC 3218	Turkey	63	80	78	140	56	73
ILC 3777	U.S.A.	66	72	72	137	52	70
FLIP 81-293C (Improved Check)	ICARDA/ICRISAT	73	91	82	143	60	82
ILC 482 (Long Term Check)		70	91	83	142	57	81
Local Check		58	80	42	143	54	
<b>Location Mean</b>		<b>64</b>	<b>79</b>	<b>67</b>	<b>142</b>	<b>54</b>	
S.E. of Mean		6.87	5.46	1.30	1.22	0.38	
L.S.D. at 5%		-	-	3.80	3.56	1.10	
C.V. %		15.26	9.82	2.75	1.21	0.98	
Error d.f.		23	23	23	23	23	
Significance		NS	NS	*	*	*	

(1) Breda and Tel Hadya were excluded from the overall mean as these do not represent southern latitudes  
 \* = Significant at  $P < 0.05$ , NS = Not significant

Table 3.4.3. Time to maturity (days) of entries at different locations in the CIYT-SL2 during 1989/90.

Entry Name	ETHIOPIA	MEXICO	SUDAN	SYRIA		(1) Overall Mean
	Ghinchi	Hermosillo	Hudeiba	Breda	Tel Hadya	
ILC 295	138	135	129	180	91	134
ILC 856	136	135	130	180	90	134
ILC 1539	131	135	122	181	85	129
ILC 1687	131	146	127	179	86	135
ILC 2293	137	135	130	-	89	134
ILC 2357	137	135	128	181	90	133
ILC 2375	142	135	128	180	90	135
ILC 2400	133	135	125	181	92	131
ILC 2565	143	135	126	181	96	135
ILC 2566	137	135	128	178	91	133
ILC 2659	141	135	130	180	94	135
ILC 2694	132	135	123	180	87	130
ILC 2824	132	135	122	180	86	130
ILC 2825	133	135	123	180	86	130
ILC 2876	131	146	120	-	86	132
ILC 2877	130	128	122	180	86	127
ILC 2904	132	135	123	180	86	130
ILC 2910	131	135	125	181	88	130
ILC 3116	136	135	129	180	87	133
ILC 3218	138	146	128	181	91	137
ILC 3777	142	135	129	178	96	135
FLIP 81-293C	141	146	128	181	97	138
ILC 482	137	146	127	181	92	137
Local Check	126	121	121	182	88	
<b>Location Mean</b>	<b>135</b>	<b>136</b>	<b>126</b>	<b>157</b>	<b>89</b>	
S.E. of Mean	2.13	#	#	0.93	0.62	
L.S.D. at 5%	6.24	#	#	2.71	1.80	
C.V. %	2.23	#	#	0.84	0.98	
Error d.f.	23			23	23	
Significance	*			*	*	

(1) Breda and Tel Hadya were excluded from the overall mean as these do not represent southern latitudes. \* = Significant at  $P < 0.05$ .

# Not analysed due to incomplete data set or other reasons.

Table 3.4.4. Plant height (cm) of entries at different locations in the CIYT-SL2 during 1989/90.

Entry Name	ETHIOPIA	MEXICO	SUDAN	SYRIA		(1) Overall Mean
	Ghinchi	Hermosillo	Hudeiba	Breda	Tel Hadya	
ILC 295	32	55	63	12	25	50
ILC 856	34	55	68	10	19	52
ILC 1539	29	53	78	12	18	53
ILC 1687	37	60	56	11	21	51
ILC 2293	34	53	65	11	20	51
ILC 2357	35	50	63	13	21	49
ILC 2375	28	58	65	15	24	50
ILC 2400	36	55	68	12	25	53
ILC 2565	30	53	69	14	23	51
ILC 2566	32	55	60	15	23	49
ILC 2659	40	63	65	13	25	56
ILC 2694	32	45	56	12	21	44
ILC 2824	30	53	67	10	19	50
ILC 2825	35	60	62	10	21	52
ILC 2876	30	50	62	9	21	47
ILC 2877	30	53	74	15	22	52
ILC 2904	33	50	75	11	21	53
ILC 2910	31	53	63	12	22	49
ILC 3116	30	53	63	12	21	49
ILC 3218	32	53	63	13	23	49
ILC 3777	29	50	72	17	26	50
FLIP 81-293C	32	65	59	15	24	52
ILC 482	33	53	63	11	22	50
Local Check	28	50	61	24	20	
Location Mean	32	54	65	13	22	
S.E. of Mean	1.58	3.90	3.12	1.01	1.05	
L.S.D. at 5%	4.63	-	9.14	2.97	3.08	
C.V. %	7.02	10.24	6.81	11.34	6.83	
Error d.f.	23	23	23	23	23	
Significance	*	NS	*	*	*	

(1) Breda and Tel Hadya were excluded from the overall mean as these do not represent southern latitudes. \* = Significant at  $P \leq 0.05$ , NS = Not significant.

Table 3.4.5. 100-seed weight (g) of entries at different locations in the CIYT-SL2 during 1989/90.

Entry Name	MEXICO	SUDAN	SYRIA	(1) Overall
	Hermosillo	Hudeiba	Tel Hadya	Mean
ILC 295	36	24	24	30
ILC 856	25	18	18	21
ILC 1539	19	14	16	16
ILC 1687	19	16	17	17
ILC 2293	27	20	22	24
ILC 2357	26	18	20	22
ILC 2375	39	35	36	37
ILC 2400	35	25	24	30
ILC 2565	35	27	24	31
ILC 2566	32	26	25	29
ILC 2659	23	15	18	19
ILC 2694	19	14	21	17
ILC 2824	19	16	18	17
ILC 2825	18	15	16	17
ILC 2876	18	15	17	16
ILC 2877	19	15	16	17
ILC 2904	18	16	19	17
ILC 2910	23	16	24	19
ILC 3116	20	19	21	20
ILC 3218	29	22	22	26
ILC 3777	49	34	36	41
FLIP 81-293C	29	25	20	27
ILC 482	29	23	23	26
Local Check	40	18	30	
<b>Location Mean</b>	<b>27</b>	<b>20</b>	<b>22</b>	
S.E. of Mean	2.99	0.82	2.33	
L.S.D. at 5%	8.75	2.40	6.82	
C.V. %	15.78	5.78	15.01	
Error d.f.	23	23	23	
Significance	*	*	*	

(1) Tel Hadya was excluded from the overall mean as this does not represent southern latitudes. \* = Significant at  $P < 0.05$

Table 3.4.6. Seed yield (Y=kg/ha) and rank (R) of entries at different locations in the CIYT-SL2 during 1989/90.

Entry Name	ETHIOPIA		MEXICO		SUDAN		SYRIA				(1) Overall Mean	
	Ghinchi		Hermosillo		Hudeiba		Breda		Tel Hadya		Overall Mean	
	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R
ILC 295	427	13	3604	2	430	21	73	2	398	14	1955	10
ILC 856	558	5	2354	21	501	20	51	13	290	20	1470	19
ILC 1539	546	6	4063	1	2302	10	56	9	538	2	3051	1
ILC 1687	469	9	3271	5	2596	3	48	14	427	12	2795	3
ILC 2293	650	3	2875	16	740	15	104	1	456	10	1839	12
ILC 2357	271	17	1938	23	560	18	66	5	368	17	1219	21
ILC 2375	77	23	2927	14	1095	11	45	15	357	18	1838	13
ILC 2400	129	21	1708	24	580	17	32	20	413	13	1095	23
ILC 2565	427	12	2979	10	863	13	38	18	165	23	1856	11
ILC 2566	256	19	3500	3	400	22	73	3	384	15	1837	14
ILC 2659	306	16	2729	17	608	16	39	17	267	21	1602	17
ILC 2694	465	10	3042	8	2478	6	31	21	490	7	2652	6
ILC 2824	398	14	2979	11	2450	8	22	22	445	11	2588	7
ILC 2825	679	2	3490	4	2737	2	58	8	523	4	3032	2
ILC 2876	542	7	2604	20	2474	7	15	24	542	1	2492	8
ILC 2877	531	8	3042	7	2500	4	19	23	510	5	2690	4
ILC 2904	558	4	3146	6	2341	9	44	16	494	6	2665	5
ILC 2910	221	20	2604	19	2482	5	52	11	484	8	2370	9
ILC 3116	338	15	2971	12	178	23	34	19	529	3	1559	18
ILC 3218	444	11	2938	13	827	14	60	7	292	19	1833	15
ILC 3777	52	24	2708	18	547	19	52	10	210	22	1470	20
FLIP 81-293C	100	22	2896	15	1031	12	61	6	106	24	1770	16
ILC 482	265	18	2354	22	71	24	72	4	375	16	1183	22
Local Check	790	1	3031	9	3140	1	52	12	471	9		
<b>Location Mean</b>	<b>396</b>		<b>2906</b>		<b>1413</b>		<b>50</b>		<b>397</b>			
S.E. of Mean	145.49		425.75		190.52		22.18		23.01			
L.S.D. at 5%	425.70		-		557.47		-		67.31			
C.V. %	51.99		20.72		19.06		62.86		8.19			
Error d.f.	23		23		23		23		23			
Significance	NS		NS		*		NS		*			
Test > L. Check	-		-		0		-		2			

(1) Breda and Tel Hadya were excluded from the overall mean as these do not represent southern latitudes.

\* = Significant at  $P \leq 0.05$ , NS = Not significant.



days, for plant height 44 cm to 56 cm, and for 100-seed weight from 16 g to 41 g.

The seed yields for different locations are given in Table 3.4.6. On an average over locations the five best entries included ILC 1539, ILC 2825, ILC 1687, ILC 2877, and ILC 2904.

### 3.5. CHICKPEA INTERNATIONAL YIELD TRIAL-LATIN AMERICAN (CIYT-LA)

#### Material

The Chickpea International Yield Trial-Latin American comprised of 23 test entries and one local check to be supplied by the cooperator. Eight of the test entries were derived through hybridization at ICARDA and the remaining were selections from germplasm accessions selected on the basis of their superior performance in regional, or local trials.

#### Methods and Management

The trial design was randomized complete block with three replications. The suggested plot size was 4 rows, each 4 meter long with inter row spacings of 45 cm.

Ten sets of trial were sent to cooperators in 7 countries. The results were, however, received for six trials from 5 countries. The agronomic information received from the cooperators is given in Table 3.5.1.

Table 3.5.1. Agronomic data for different locations in the CIYT-LA during 1989/90.

Country/ Location	Planting Date	Harvesting Date	Fertilizer (kg/ha)			Irri- gation	Insecticide/ Herbicide/ Fungicide	Local Check
			N	P	K			
<b>COSTA RICA</b>								
Santa Lucia	20.10.89	-	25	75		-	Metribuzin	FLIP 85-17C
<b>MEXICO</b>								
Sonora I	NA	NA	80			3	Trifluraline	Tubutama-88
Sonora II	02.12.89	06.90	-			-	-	-
<b>NEW ZEALAND</b>								
Lincoln	22.09.90	05.03.91	-			-	Treflan, Gardoprim	ILC 134
<b>SPAIN</b>								
Badajoz	NA	NA	NA			NA	NA	NA
<b>SYRIA</b>								
Tel Hadya	04.02.90	04.06.90	50			-	Kerb, Bravo	ILC 1929

NA = Not available, I = Wilt sick plot, II = Wilt free plot.

Table 3.5.2. Time to flowering (days) of entries at different locations in the CIYT-LA during 1989/90.

Entry Name	Pedigree	Origin	COSTA RICA		MEXICO		SPAIN	SYRIA	(1)
			Santa Lucia	Sonora I	Sonora II	Badajoz	Tel Hadya	Overall Mean	
ILC 95	-	Iraq	80	93	85	86	137	86	
ILC 100	-	Spain	81	93	85	80	139	85	
ILC 114	-	Spain	71	72	78	71	132	73	
ILC 136	-	Spain	69	72	72	75	134	72	
ILC 445	-	U.S.A.	70	72	72	72	-	71	
ILC 464	-	Turkey	57	93	85	78	135	78	
ILC 2591	-	Turkey	77	72	72	74	136	74	
ILC 2593	-	Turkey	75	93	85	79	137	83	
ILC 3357	-	Spain	69	93	85	78	-	81	
ILC 3367	-	Spain	75	93	78	78	137	81	
ILC 3503	-	Spain	74	93	78	74	136	80	
ILC 3520	-	Spain	68	93	72	69	-	75	
ILC 3780	-	U.S.A.	70	72	72	81	140	74	
ILC 4183	-	Tunisia	59	93	85	73	133	78	
ILC 4445	-	Spain	65	83	72	71	-	73	
FLIP 85- 1C	X82TH 60/ILC 95XILC2956	ICARDA/ICRISAT	41	93	85	86	136	76	
FLIP 85- 2C	X82TH 60/ILC 95XILC2956	ICARDA/ICRISAT	41	93	78	80	137	73	
FLIP 85-68C	X82TH 67/ILC2593XILC191	ICARDA/ICRISAT	45	95	78	83	140	75	
FLIP 86- 9C	X83TH 19/FLIP81-65CXFLIP82-69C	ICARDA/ICRISAT	80	93	78	84	131	84	
FLIP 86-12C	X83TH 23/FLIP82-69CXFLIP82-72C	ICARDA/ICRISAT	70	93	85	80	136	82	
FLIP 86-88C	X81TH179/ILC 112XILC 191	ICARDA/ICRISAT	45	93	78	91	140	77	
FLIP 87- 5C	X85TH230/ILC3395XFLIP83-13C	ICARDA/ICRISAT	61	83	72	74	-	72	
FLIP 87- 7C	X85TH246/ILC3398XFLIP83-13C	ICARDA/ICRISAT	66	72	72	69	-	70	
Local Check	-	-	63	95	72	72	136		
<b>Location Mean</b>			<b>65</b>	<b>87</b>	<b>78</b>	<b>77</b>	<b>136</b>		
S.E. of Mean			2.95	#	#	3.32	1.14		
L.S.D. at 5%			8.64	#	#	9.70	3.39		
C.V. %			6.39	#	#	6.08	1.18		
Error d.f.			23			23	17		
Significance			*			*	*		

(1) Tel Hadya was excluded from the overall mean. \* = Significant at  $P < 0.5$ , NS = Not significant.

# Not analysed due to incomplete data set or other reasons.

Table 3.5.3. Time to maturity (days) of entries at different locations in the CIYT-LA during 1989/90.

Entry Name	COSTA RICA		MEXICO		SPAIN	SYRIA	Overall Mean
	Santa Lucia	Sonora I	Sonora II	Badajoz	Tel Hadya		
ILC 95	137	121	135	140	181	133	
ILC 100	145	135	146	137	181	141	
ILC 114	131	135	135	136	183	134	
ILC 136	129	135	135	137	180	134	
ILC 445	134	135	135	134	-	134	
ILC 464	140	121	146	142	179	137	
ILC 2591	137	135	146	134	179	138	
ILC 2593	136	121	146	141	181	136	
ILC 3357	136	135	146	143	-	140	
ILC 3367	135	135	146	137	183	138	
ILC 3503	136	121	146	138	180	135	
ILC 3520	143	121	146	140	-	137	
ILC 3780	129	121	135	134	183	130	
ILC 4183	145	135	146	135	178	140	
ILC 4445	127	135	135	138	-	134	
FLIP 85- 1C	124	121	135	142	179	130	
FLIP 85- 2C	137	135	135	135	181	136	
FLIP 85-68C	135	135	135	127	183	133	
FLIP 86- 9C	123	135	135	137	174	132	
FLIP 86-12C	130	135	146	141	179	138	
FLIP 86-88C	133	135	146	142	183	139	
FLIP 87- 5C	157	121	128	134	-	135	
FLIP 87- 7C	157	121	135	133	-	137	
Local Check	147	121	121	127	179		
Location Mean	137	129	139	137	180		
S.E. of Mean	6.42	#	#	3.21	1.53		
L.S.D. at 5%	-	#	#	-	4.56		
C.V. %	6.65	#	#	3.32	1.20		
Error d.f.	23			23	17		
Significance	NS			NS	*		

(1) Tel Hadya was excluded from the overall mean, \* = Significant at  $P < 0.05$ .

NS = Not significant. # Not analysed due to incomplete data set or other reasons.

Table 3.5.4. Plant height (cm) of entries at different locations in the CIYT-LA during 1989/90.

Entry Name	COSTA RICA		MEXICO		NEW ZEALAND	SPAIN	SYRIA	(1) Overall Mean
	Santa Lucia	Sonora I	Sonora II	Lincoln	Badajoz	Tel Hadya		
ILC 95	57	45	65	24	47	25	48	
ILC 100	65	40	58	23	55	24	48	
ILC 114	53	40	50	25	52	23	44	
ILC 136	55	45	55	23	51	24	46	
ILC 445	52	43	50	22	58	-	45	
ILC 464	57	45	58	28	36	23	45	
ILC 2591	58	43	55	24	49	19	46	
ILC 2593	54	48	65	23	46	24	47	
ILC 3357	57	43	55	22	53	-	46	
ILC 3367	57	43	45	22	49	22	43	
ILC 3503	56	40	58	22	55	23	46	
ILC 3520	57	40	55	22	48	-	44	
ILC 3780	75	40	55	24	41	21	47	
ILC 4183	62	45	53	22	45	24	45	
ILC 4445	67	40	55	25	43	-	46	
FLIP 85- 1C	64	48	55	21	53	26	48	
FLIP 85- 2C	75	43	53	25	58	27	50	
FLIP 85-68C	63	45	55	22	56	29	48	
FLIP 86- 9C	60	45	60	22	43	31	46	
FLIP 86-12C	68	50	73	22	68	34	56	
FLIP 86-88C	68	53	68	29	49	26	53	
FLIP 87- 5C	57	43	53	22	46	-	44	
FLIP 87- 7C	56	43	45	22	36	-	40	
Local Check	54	40	48	22	50	35		
<b>Location Mean</b>	<b>60</b>	<b>44</b>	<b>56</b>	<b>23</b>	<b>49</b>	<b>25</b>		
S.E. of Mean	1.36	3.38	3.71	1.97	4.20	0.99		
L.S.D. at 5%	3.97	-	10.85	-	12.28	2.96		
C.V. %	3.18	10.97	9.41	12.08	12.05	5.55		
Error d.f.	23	23	23	23	23	17		
Significance	*	NS	*	NS	*	*		

(1) Tel Hadya was excluded from the overall mean, \* = Significant at  $P < 0.05$   
 NS = Not significant.

Table 3.5.5. 100-Seed weight (g) of entries at different locations in the CIYT-LA during 1989/90.

Entry Name	MEXICO		NEW ZEALAND	SPAIN	SYRIA	(1)
	Sonora I	Sonora II	Lincoln	Badajoz	Tel Hadya	Overall Mean
ILC 95	52	48	53	57	53	53
ILC 100	42	49	54	51	53	49
ILC 114	43	50	53	52	51	50
ILC 136	44	53	54	51	48	50
ILC 445	48	49	59	59	-	54
ILC 464	42	44	51	50	46	47
ILC 2591	39	43	51	47	46	45
ILC 2593	42	50	47	53	49	48
ILC 3357	45	48	54	63	37	52
ILC 3367	28	51	50	42	44	43
ILC 3503	39	44	38	48	45	42
ILC 3520	40	65	60	60	-	56
ILC 3780	42	47	52	51	42	48
ILC 4183	38	46	47	47	52	44
ILC 4445	39	53	59	56	31	52
FLIP 85- 1C	42	48	53	58	44	50
FLIP 85- 2C	39	50	57	52	48	49
FLIP 85-68C	29	35	40	32	31	34
FLIP 86- 9C	38	43	46	47	43	43
FLIP 86-12C	31	46	40	51	46	42
FLIP 86-88C	40	53	55	57	36	51
FLIP 87- 5C	47	46	53	47	43	48
FLIP 87- 7C	39	36	50	46	38	43
Local Check	50	53	52	29	30	
<b>Location Mean</b>	<b>41</b>	<b>48</b>	<b>51</b>	<b>50</b>	<b>43</b>	
S.E. of Mean	1.90	3.63	#	1.63	2.24	
L.S.D. at 5%	5.55	10.61	#	4.76	6.57	
C.V. %	6.61	10.76	#	4.59	7.42	
Error d.f.	23	23		23	22	
Significance	*	*		*	*	

(1) Tel Hadya was excluded from the overall mean, \* = Significant at  $P < 0.05$ .  
 # Not analysed due to incomplete data set or other reasons.

Table 3.5.6. Seed yield (Y=kg/ha) and rank (R) of entries at different locations in the CIYT-LA during 1989/90.

Entry Name	COSTA RICA		MEXICO				NEW ZEALAND		SPAIN		SYRIA		Overall Mean	
	Santa Lucia		Sonora I		Sonora II		Lincoln		Badajoz		Tel Hadya			
	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R
ILC 95	1000	9	325	24	2135	20	2700	6	1936	16	462	11	1619	15
ILC 100	963	10	579	11	2135	19	1984	14	2710	2	429	12	1674	12
ILC 114	931	13	587	10	2135	18	3665	2	2093	11	257	15	1882	6
ILC 136	953	11	698	7	3104	4	2713	5	2231	6	503	8	1940	2
ILC 445	875	16	1357	1	3781	1	1441	22	2162	9	-	-	1923	4
ILC 464	1023	8	365	23	2719	9	3802	1	1777	21	488	9	1937	3
ILC 2591	1155	5	563	13	2208	16	2525	8	2143	10	333	14	1719	10
ILC 2593	629	20	429	20	2344	12	2030	13	2079	12	472	10	1502	20
ILC 3357	719	19	1151	2	2427	11	1440	23	1902	18	40	21	1528	18
ILC 3367	625	21	373	22	1979	23	2906	4	2221	8	402	13	1621	14
ILC 3503	453	23	500	17	1958	24	2402	10	2880	1	674	2	1638	13
ILC 3520	950	12	484	19	2781	6	1287	24	1667	23	8	23	1434	21
ILC 3780	1891	2	595	9	3729	2	1906	15	1748	22	205	17	1974	1
ILC 4183	1215	4	563	14	2740	8	2583	7	2260	5	560	5	1872	7
ILC 4445	1313	3	500	16	2969	5	1852	17	2064	13	82	19	1740	9
FLIP 85- 1C	1078	7	500	18	3146	3	2349	11	1929	17	607	4	1800	8
FLIP 85- 2C	1094	6	516	15	2135	21	2148	12	2590	4	690	1	1697	11
FLIP 85-68C	875	15	635	8	2177	17	1792	18	2229	7	136	18	1542	17
FLIP 86- 9C	844	17	746	6	2292	14	1714	19	2017	15	613	3	1522	19
FLIP 86-12C	569	22	429	21	2458	10	1587	20	2030	14	530	6	1415	22
FLIP 86-88C	781	18	579	12	2302	13	2462	9	1831	20	213	16	1591	16
FLIP 87- 5C	1913	1	1127	3	2760	7	1881	16	1863	19	60	20	1909	5
FLIP 87- 7C	888	14	982	5	2250	15	1495	21	1407	24	18	22	1404	23
Local Check	-	-	1040	4	2031	22	2925	3	2650	3	510	7		
<b>Location Mean</b>	<b>988</b>		<b>651</b>		<b>2529</b>		<b>2233</b>		<b>2101</b>		<b>360</b>			
S.E. of Mean	129.43		146.14		524.88		433.71		336.96		70.14			
L.S.D. at 5%	379.63		427.59		-		1269.04		-		205.72			
C.V. %	18.52		31.74		29.35		27.47		22.69		27.52			
Error d.f.	22		23		23		23		23		22			
Significance	*		*		NS		*		NS		*			
Test > L. Check	3		0		-		0		-		0			

(1) Tel Hadya was excluded from the overall mean, \* = Significant at  $P < 0.05$ , NS = Not significant.

Table 3.5.7. The five heaviest seed yielding entries at the individual locations in the CIYT-LA during 1989/90.

	<u>COSTA RICA</u>	<u>MEXICO</u>		<u>NEW ZEALAND</u>	<u>SPAIN</u>	<u>SYRIA</u>
Rank	Santa Lucia	Sonora I (wilt sick)	Sonora II (wilt free)	Lincoln	Badajoz	Tel Hadya
1	FLIP 87-5C	ILC 445	ILC 445	ILC 464	ILC 3503	FLIP 85-2C
2	ILC 3790	ILC 3357	ILC 3780	ILC 114	ILC 100	ILC 3503
3	ILC 4445	FLIP 87-5C	FLIP 85-1C	Local check	Local check	FLIP 86-9C
4	ILC 4183	Local check	ILC 136	ILC 3367	FLIP 85-2C	FLIP 85-1C
5	ILC 2591	FLIP 87-7C	ILC 4445	ILC 136	ILC 4183	ILC 4183

## **Results and Discussion**

The entry means for time to flowering (Table 3.5.2.), time to maturity (Table 3.5.3), and plant height (Table 3.5.4) ranged from 70 days (for FLIP 87-7C) to 86 days (for ILC 95), 130 days (for ILC 3780) to 141 days (for ILC 100), and 40 cm (for FLIP 87-7C) to 56 cm (for FLIP 86-12C), respectively. The overall mean for the entries for 100-seed weight, varied from 34 to 56 g, the largest being for ILC 3520 (Table 3.5.5.). The ANOVA for seed yield revealed that the local check was excelled by a significant margin ( $P \leq 0.05$ ) by three entries only at Santa Lucia in Costa Rica (Table 3.5.6). On an average over locations, the five best yielding entries included ILC 3780, ILC 136, ILC 464, ILC 445, FLIP 87-5C with respective seed yields of 1974, 1940, 1937, 1923 and 1909 kg/ha (Table 3.5.6).

### **3.6. CHICKPEA INTERNATIONAL SCREENING NURSERY-WINTER (CISN-W)**

#### **Material**

The Chickpea International Screening Nursery-Winter comprised 27 test entries which originated from the materials developed through hybridization at ICARDA. The nursery also included three checks namely FLIP 81-293C, ILC 482 and one local check to be supplied by the cooperator. All the test entries were almost homozygous and had shown superior performance in local or regional trials at ICARDA.

#### **Methods and Management**

The entries were sown in single row non-replicated plots of 4m length in an augmented block design. The three checks were repeatedly sown in each block with 10 test entries. The suggested spacings between and within rows were 45- and 10 cm, respectively.

Forty nine sets of nursery were distributed to cooperators in 16 countries and the results were received from 36 locations in 13 countries. The agronomic details received from the cooperators are given in Table 3.6.1.

#### **Results and Discussion**

The data on time to flowering, time to maturity, plant height and 100-seed weight are given in Tables 3.6.2, 3.6.3, 3.6.4, and 3.6.5, respectively. On the basis of average over locations, the entries ILC 482, FLIP 88-26C, FLIP 87-92C, FLIP 88-41C and FLIP 88-49C were among the earliest to flower, and FLIP 88-26C and ILC 482 were among the earliest to mature. The entries FLIP 87-95C, FLIP 88-1C, FLIP 88-2C, FLIP 88-14C, and FLIP 88-15C were among the tallest; and entries FLIP 88-4C, FLIP 87-90C, FLIP 87-92C, and FLIP 88-7C had the largest seed size ( $\geq 43\text{g}/100\text{-seed}$ ).

The adjusted seed yields of entries are presented in Table 3.6.6. The ANOVA for seed yield revealed that at 7 locations, some of the test entries excelled the respective local check by a significant margin. The five heaviest seed yielding entries across locations included FLIP 88-15C, FLIP 88-2C, FLIP 88-20C, FLIP 88-7C, and FLIP 88-5C. The entries FLIP 88-2C and



Table 3.6.1. Agronomic data for different locations in the CISN-W during 1989/90.

Country	Location	Planting Date	Harvesting Date	Fertilizer (kg/ha)			Irrigation	Insecticide/Fungicide/Herbicide	Local Check
				N	P	K			
Algeria	Guelma	16.12.89	11.10.90	200			-	ILC 3279	
Algeria	Khroub	17.12.89	30.06.90	45			-	ILC 3279	
Algeria	Setif	16.12.89	12.07.90	100			-	Rabat-9	
Cyprus	Athalassa	28.11.89	-	32	54		-	Yialosa	
France	Montboucher	16.11.89	10.07.90	100			-	CASCARI	
Italy	Caltagirone	06.02.90	19.06.90	100			-	Sultano	
Jordan	Maru	29.11.89		20	40		-	Jubeiha-2	
Jordan	Mushagar	02.12.89		20	40		-	Jubeiha-2	
Lebanon	Terbol	30.11.89	00.06.90		50		-		
Libya	Kufra	22.10.89	04.05.90	120	150		+	Maroccan Variety	
Libya	Zahra	29.10.89		80	60		-	Commercial Variety from Turkey	
Pakistan	Faisalabad	12.11.89	07.05.90	80	57		2	1434	
Portugal	Elvas	10.11.89	26.06.90	60	60	60	-	Chk 510-Elvar	
Portugal	Oeiras	07.02.90	02.07.90	21	63	63	-	Ochinhas	
Spain	Badajoz	17.02.90	05.07.90	-			-	Pedrosillano	
Spain	Cordoba	09.01.90	16.06.90		84		-	Fardan	
Spain	Sevilla-I	19.01.90	16.06.90		84		-	TARDO	
Spain	Sevilla-II	08.11.89	01.07.90	60			-	ILC 202	
Syria	Aleppo	23.11.89	03.06.90	10			-	Ghab 2	
Syria	Al Ghab	28.02.89					-	Ghab 2	
Syria	Gelline	18.01.90	10.07.90	20	50		-	Ghab 2	
Syria	Hama	27.11.89	29.05.90		50		-	Ghab 2	
Syria	Izra'a	11.12.89			50		-	Ghab 2	
Syria	Jableh	28.01.90					-	Ghab 2	
Syria	Jindiress	28.11.89	08.06.90		50		-	Ghab 2	
Syria	Tartus	28.12.89	15.06.90	-			-	Ghab 2	
Syria	Tel Hadya	04.12.89	04.06.90		50		-	Ghab 2	
Tunisia	Beja-W-I	NA							
Tunisia	Beja-W-II	NA							
Tunisia	Beja-Sp-I	NA							
Tunisia	Beja-Sp-II	NA							
Tunisia	El Kef-W	NA							
Tunisia	Oued Meliz-W	NA							
Turkey	Diyarbakir	05.12.89		30	60		-	Yerli Nohut	
Turkey	Erzurum	15.05.90	13.09.90	30	60		3	Canitez-87	
Turkey	Izmir	30.11.89	03.07.90	30	60		2	Canitez-87	

NA = Not available, + = Number and quantity not given

Table 3.6.2. Adjusted time to flowering (days) of entries at different locations in the CISE-W during 1989/90.

Entry Name	Pedigree	Origin	ALGERIA			CYPRUS	ITALY	JORDAN
			Guelma	Khroub	Setif	Athalassa	Calta-girone	Maru
FLIP 87- 90C	X83 TH 124/FLIP 82-64CXILC72	ICARDA/ICRISAT	131	150	126	112	93	135
FLIP 87- 91C	X85 TH 178/ILC3683XFLIP 83-13C	ICARDA/ICRISAT	114	143	139	110	87	133
FLIP 87- 92C	X85 TH 179/ILC3683XFLIP 83-15C	ICARDA/ICRISAT	-	147	124	107	91	134
FLIP 87- 93C	X85 TH 230/ILC3395XFLIP 83-13C	ICARDA/ICRISAT	137	142	139	108	87	134
FLIP 87- 94C	X83 TH 85/ILC3395XFLIP 81-41C	ICARDA/ICRISAT	116	148	136	109	81	133
FLIP 87- 95C	X83 TH 22/FLIP 81-65CXFLIP82-81C	ICARDA/ICRISAT	-	150	133	111	90	135
FLIP 87- 96C	X83 TH 124/FLIP 82-64CXILC72	ICARDA/ICRISAT	-	154	129	111	92	133
FLIP 87- 97C	X83 TH 3/FLIP 81-41CXFLIP 82-65C	ICARDA/ICRISAT	-	151	138	114	92	134
FLIP 88- 1C	X83 TH 22/FLIP 81-65CXFLIP 82-81C	ICARDA/ICRISAT	113	149	126	111	91	135
FLIP 88- 2C	X83 TH 25/FLIP 82-69C/FLIP 82-81C	ICARDA/ICRISAT	-	150	129	108	93	133
FLIP 88- 3C	X84 TH332/(FLIP82-69CXFLIP82-81C)XILC384	ICARDA/ICRISAT	-	153	127	111	91	134
FLIP 88- 4C	X84 TH332/(FLIP82-69CXFLIP82-81C)XILC384	ICARDA/ICRISAT	116	149	136	111	90	135
FLIP 88- 5C	X83 TH 25/FLIP 82-69CXFLIP 82-81C	ICARDA/ICRISAT	-	149	127	109	96	134
FLIP 88- 7C	X84 TH 26/FLIP 82-225CXILC3651	ICARDA/ICRISAT	-	149	129	111	94	136
FLIP 88- 8C	X85 TH 240/ILC3397XFLIP 82-93C	ICARDA/ICRISAT	111	150	139	109	92	135
FLIP 88- 9C	X85 TH 263/ILC3777XFLIP 83-15C	ICARDA/ICRISAT	113	143	116	110	87	133
FLIP 88- 10C	X85 TH 263/ILC3777XFLIP 83-15C	ICARDA/ICRISAT	113	152	121	111	87	133
FLIP 88- 11C	X85 TH 51/(FLIP81-293CXILC165)XILC482	ICARDA/ICRISAT	111	148	133	113	91	134
FLIP 88- 12C	X85 TH 215/ILC2375XFLIP 83-15C	ICARDA/ICRISAT	-	148	138	106	86	135
FLIP 88- 14C	X83 TH 25/FLIP 82-69CXFLIP 82-81C	ICARDA/ICRISAT	-	150	127	111	93	134
FLIP 88- 15C	X83 TH 25/FLIP 82-69CXFLIP 82-81C	ICARDA/ICRISAT	-	149	129	108	95	136
FLIP 88- 16C	X83 TH 25/FLIP 82-69CXFLIP 82-81C	ICARDA/ICRISAT	-	152	127	112	96	134
FLIP 88- 20C	X84 TH 73/ILC 482XFLIP 82-73C	ICARDA/ICRISAT	-	148	133	108	86	133
FLIP 88- 22C	X84 TH 113/FLIP 82-80CXILC1929	ICARDA/ICRISAT	114	148	136	108	90	134
FLIP 88- 26C	X85 TH 214/ILC2375XFLIP 83-13C	ICARDA/ICRISAT	113	148	116	107	80	135
FLIP 88- 41C	X85 TH 230/ILC3395XFLIP 83-13C	ICARDA/ICRISAT	114	148	123	106	86	134
FLIP 88- 49C	X85 TH 238/ILC3397XFLIP 81-293C	ICARDA/ICRISAT	-	148	136	108	79	134
FLIP 81-293C	X79 TH 8/ILC191XILC496M (Improved ChocK)	ICARDA/ICRISAT	111	148	130	113	93	134
ILC 482	Long Term Check	Turkey	113	147	116	106	85	134
Local Check			121	154	137	115	98	133
<b>Location Mean</b>			<b>116</b>	<b>149</b>	<b>129</b>	<b>110</b>	<b>90</b>	<b>134</b>
S.E. of Mean			#	0.561	5.56	0.53	1.05	1.02
L.S.D. at 5% for checks			#	2.20	21.83	2.07	4.10	4.00
Test entries in the same block			#	3.82	37.81	3.58	7.11	6.92
Test entries in different blocks			#	4.41	43.66	4.14	8.21	8.00
Checks Vs Test entries				3.60	35.65	3.38	6.70	6.53
C.V. %				0.65	7.44	0.83	2.02	1.32

Table 3.6.2. Cont'd. ...

Table 3.6.2. Cont'd. ...

Entry Name	JORDAN	LEBANON	LIBYA	PORTUGAL		SPAIN			SYRIA		
	Mushagar	Terbol	Kufra	Elvas	Oieras	Badajoz	Cordoba	Sevilla-I	Sevilla-II	Aleppo	Al Ghab
FLIP 87- 90C	147	145	55	140	65	83	109	-	128	140	115
FLIP 87- 91C	143	145	67	137	65	71	109	-	127	141	108
FLIP 87- 92C	145	147	70	137	61	66	107	110	125	140	104
FLIP 87- 93C	147	145	43	142	65	70	109	114	128	142	108
FLIP 87- 94C	143	145	63	137	65	75	109	111	127	145	109
FLIP 87- 95C	143	146	55	140	64	81	115	111	128	135	110
FLIP 87- 96C	143	145	60	131	67	80	113	116	131	136	114
FLIP 87- 97C	143	146	65	137	63	83	115	-	125	136	115
FLIP 88- 1C	147	145	70	140	65	79	116	111	126	139	111
FLIP 88- 2C	143	145	58	141	67	81	113	111	129	137	110
FLIP 88- 3C	145	147	60	137	67	83	113	-	130	139	110
FLIP 88- 4C	143	144	60	143	69	86	110	111	132	133	110
FLIP 88- 5C	145	145	70	137	67	81	113	116	129	141	109
FLIP 88- 7C	143	147	60	137	67	80	113	-	128	140	115
FLIP 88- 8C	143	147	73	143	65	83	109	111	125	138	113
FLIP 88- 9C	147	145	75	135	66	79	105	-	126	143	113
FLIP 88- 10C	143	145	63	136	66	83	105	-	125	138	114
FLIP 88- 11C	143	146	60	136	69	83	110	-	140	131	111
FLIP 88- 12C	143	148	65	142	64	68	116	-	128	133	108
FLIP 88- 14C	143	145	55	137	67	81	113	111	127	139	113
FLIP 88- 15C	143	147	52	135	67	79	113	111	128	138	109
FLIP 88- 16C	145	143	58	138	61	80	107	116	128	136	109
FLIP 88- 20C	143	142	59	140	64	81	110	111	129	135	107
FLIP 88- 22C	147	146	70	143	69	80	110	-	130	135	112
FLIP 88- 26C	143	141	55	134	66	78	105	-	128	138	108
FLIP 88- 41C	143	142	60	135	63	69	110	-	124	138	107
FLIP 88- 49C	147	142	48	136	63	65	110	-	126	133	110
FLIP 81-293C	143	145	62	140	65	82	110	-	127	141	110
ILC 482	143	141	66	133	67	77	109	-	121	137	106
Local Check	143	145	65	136	63	77	116	114	134	137	114
Location Mean	144	145	62	138	65	78	111	112	128	138	110
S.E. of Mean	#	1.05	3.70	1.33	1.31	1.79	1.77	#	0.39	2.69	0.39
L.S.D. at 5%	#	4.14	14.53	5.23	5.12	7.03	6.97	#	1.51	10.58	1.51
T.E. in S.B.	#	7.17	25.17	9.07	8.87	12.17	12.06	#	2.62	18.32	2.62
T.E. in D.B.	#	8.28	29.06	10.47	10.25	14.05	13.93	#	3.02	21.15	3.02
Checks Vs T.E.		6.76	23.73	8.55	8.37	11.48	11.38		2.47	17.27	2.47
C.V. %		1.26	10.31	1.68	3.46	3.97	2.77		0.52	3.38	0.60

Cont'd. ...

Table 3.6.2. Cont'd. ...

Entry Name	SYRIA							TURKEY			(1)
	Galline	Hama	Izra'a	Jableh	Jindireess	Tartus	Tel Hadya	Diyarbakir	Erzurum	Izmir	Overall Mean
FLIP 87- 90C	97	129	129	94	132	103	132	150	51	131	115
FLIP 87- 91C	92	136	123	81	138	101	142	149	54	125	113
FLIP 87- 92C	95	128	121	87	137	101	-	144	52	123	112
FLIP 87- 93C	94	129	121	81	139	103	138	150	53	125	113
FLIP 87- 94C	94	134	125	81	139	103	135	149	53	128	114
FLIP 87- 95C	96	121	129	92	136	104	134	148	50	130	114
FLIP 87- 96C	95	124	129	90	140	104	135	155	52	129	115
FLIP 87- 97C	98	124	131	94	137	104	136	150	52	133	116
FLIP 88- 1C	96	136	128	86	140	104	136	152	54	131	116
FLIP 88- 2C	95	124	129	90	138	103	134	147	54	126	114
FLIP 88- 3C	96	124	126	92	138	105	135	147	54	129	115
FLIP 88- 4C	96	123	130	90	139	104	138	147	52	130	115
FLIP 88- 5C	97	123	126	92	139	105	135	155	55	140	116
FLIP 88- 7C	95	127	129	87	138	105	134	146	52	129	115
FLIP 88- 8C	96	129	129	92	132	105	135	150	53	131	116
FLIP 88- 9C	93	130	128	90	133	101	135	146	51	128	113
FLIP 88- 10C	93	129	126	91	139	101	134	152	51	128	114
FLIP 88- 11C	96	121	124	86	136	106	134	152	52	130	115
FLIP 88- 12C	95	130	128	87	136	104	-	147	53	127	114
FLIP 88- 14C	96	123	130	90	138	103	135	150	54	129	114
FLIP 88- 15C	96	121	126	90	138	104	136	147	52	129	114
FLIP 88- 16C	95	121	130	92	139	103	132	150	52	129	114
FLIP 88- 20C	95	123	126	88	136	104	134	146	50	130	113
FLIP 88- 22C	96	127	127	90	138	104	135	148	50	130	115
FLIP 88- 26C	92	132	128	88	130	99	132	144	51	125	111
FLIP 88- 41C	94	128	127	85	138	104	136	144	53	127	112
FLIP 88- 49C	95	127	123	83	136	104	-	147	50	127	112
FLIP 81-293C	96	129	129	91	137	104	134	148	55	134	115
ILC 482	93	127	123	88	136	99	135	145	51	125	111
Local Check	99	129	130	91	143	107	137	144	53	126	
Location Mean	95	127	127	89	137	103	138	148	52	129	
S.E. of Mean	0.56	0.33	1.69	1.12	1.64	0.65	0.91	0.81	0.99	2.54	
L.S.D. at 5%	2.20	1.31	6.65	4.41	6.45	2.56	3.58	3.16	3.89	9.87	
T.E. in S.B.	3.82	2.27	11.52	7.63	11.18	4.44	6.21	5.47	6.74	17.26	
T.E. in D.B.	4.41	2.62	13.30	8.81	12.91	5.12	7.17	6.32	7.78	19.93	
Checks Vs T.E.	3.60	2.14	10.86	7.19	10.54	4.18	5.85	5.16	6.35	16.28	
C.V. %	1.02	0.45	2.31	2.19	2.07	1.10	1.27	0.94	3.28	3.42	

(1) Guelma and Sevilla-I were excluded from the overall mean. T.E. = Test entries, S.B. = Same block, D.B. = Different blocks.  $\beta$  Not analysed due to incomplete data set or other reasons.

Table 3.6.3. Adjusted time to maturity (days) of entries at different locations in the CISN-W during 1989/90.

Entry Name	ALGERIA		FRANCE		JORDAN		LEBANON		LIBYA		PORTUGAL		SPAIN	
	Khroub	Setif	Mont- boucher	Maru	Musha- gar	Terbol	Kufra	Zahra	Elvas	Oieras	Badajoz	Cordoba	Sevi- lla-I	
FLIP 87- 90C	176	174	227	170	185	192	115	203	203	154	131	147	-	
FLIP 87- 91C	179	174	225	173	189	202	109	203	211	156	135	144	-	
FLIP 87- 92C	179	170	231	174	188	193	117	203	205	154	118	148	177	
FLIP 87- 93C	180	174	229	172	189	202	107	203	211	156	128	147	177	
FLIP 87- 94C	179	172	233	175	189	202	111	203	209	156	135	144	177	
FLIP 87- 95C	178	176	226	170	184	198	108	203	214	155	130	144	177	
FLIP 87- 96C	177	176	227	171	188	187	109	203	205	150	129	145	177	
FLIP 87- 97C	182	174	230	174	186	202	112	203	209	155	138	147	-	
FLIP 88- 1C	178	172	233	174	189	202	115	203	211	156	128	144	177	
FLIP 88- 2C	177	176	227	171	188	193	109	203	207	154	128	145	177	
FLIP 88- 3C	181	176	229	172	185	189	115	203	205	154	129	145	-	
FLIP 88- 4C	182	176	228	171	186	190	110	203	200	153	130	147	177	
FLIP 88- 5C	183	176	227	171	188	197	111	203	205	154	131	145	180	
FLIP 88- 7C	177	170	229	171	185	189	117	203	203	154	128	145	-	
FLIP 88- 8C	177	174	229	174	187	196	111	203	203	156	131	147	177	
FLIP 88- 9C	175	166	227	171	180	194	111	203	203	154	132	147	-	
FLIP 88- 10C	177	166	227	171	-	192	114	203	203	154	131	147	-	
FLIP 88- 11C	182	176	230	171	186	194	115	203	201	155	122	144	-	
FLIP 88- 12C	176	174	228	171	182	192	116	203	205	155	118	144	-	
FLIP 88- 14C	182	176	227	174	188	193	111	203	205	154	128	145	177	
FLIP 88- 15C	179	176	229	171	192	197	107	203	205	154	128	145	180	
FLIP 88- 16C	178	176	227	171	188	193	111	203	205	154	129	145	177	
FLIP 88- 20C	178	172	226	171	184	192	116	203	201	155	126	144	172	
FLIP 88- 22C	176	172	228	172	186	192	112	203	206	158	125	147	-	
FLIP 88- 26C	176	166	227	171	-	192	103	203	203	154	120	147	-	
FLIP 88- 41C	175	174	230	170	186	190	116	203	206	155	129	147	-	
FLIP 88- 49C	182	176	230	170	182	202	111	203	216	155	118	144	-	
FLIP 81-293C	177	172	227	171	184	192	114	203	206	154	120	145	-	
ILC 482	177	167	228	171	187	189	113	203	203	153	123	146	-	
Local Check	182	174	227	170	186	192	113	203	206	157	122	146	177	
Location Mean	179	173	228	172	186	194	112	203	206	155	126	145	177	
S.E. of Mean	1.03	1.33	0.94	0.39	1.11	0.77	2.69	#	2.47	0.84	1.58	1.16		
L.S.D. at 5%	4.03	5.23	3.70	1.51	4.34	3.02	10.58	#	9.70	3.29	6.18	4.53		
T.E. in S.B.	6.99	9.07	6.41	2.62	7.52	5.23	18.32	#	16.81	5.70	10.71	7.85		
T.E. in D.B.	8.07	10.47	7.40	3.02	8.68	6.04	21.15	#	19.41	6.59	12.37	9.07		
Checks Vs T.E.	6.59	8.55	6.04	2.47	7.09	4.94	17.27		15.85	5.38	10.10	7.40		
C.V. %	1.00	1.34	0.72	0.39	1.03	0.69	4.16		2.08	0.94	2.16	1.38		

Cont'd. ...

Table 3.6.3. Cont'd. ...

Entry Name	SPAIN			SYRIA					TURKEY			(1)	
	Sevilla-II	Aloppo	Al Ghab	Gelli- na	Hama	Isra'a	Jableh	Jindi- ross	Tartus	Tel - Hadya	Diyar- bakir	Izmir	Overall Mean
FLIP 87- 90C	199	179	154	138	171	169	127	183	152	179	193	118	167
FLIP 87- 91C	208	181	153	138	171	167	119	187	153	179	195	120	168
FLIP 87- 92C	194	178	153	134	170	164	127	186	156	-	190	119	167
FLIP 87- 93C	198	182	153	139	171	163	117	188	164	179	196	120	168
FLIP 87- 94C	201	182	153	134	171	164	117	188	164	179	194	120	168
FLIP 87- 95C	205	178	154	138	168	170	125	185	170	179	193	119	169
FLIP 87- 96C	200	179	153	137	169	165	126	184	156	177	191	117	166
FLIP 87- 97C	200	183	161	142	171	172	128	187	154	179	192	119	170
FLIP 88- 1C	199	179	154	136	171	162	128	186	164	179	194	118	168
FLIP 88- 2C	200	179	154	134	170	162	126	184	154	181	191	120	167
FLIP 88- 3C	201	178	153	135	169	168	123	185	154	180	191	121	167
FLIP 88- 4C	202	174	153	135	167	169	124	183	154	178	191	119	166
FLIP 88- 5C	198	177	153	133	169	162	123	186	154	179	192	121	167
FLIP 88- 7C	198	179	153	135	169	160	123	183	156	176	188	116	166
FLIP 88- 8C	197	178	153	134	171	163	128	185	157	179	194	119	167
FLIP 88- 9C	197	181	152	133	171	163	126	185	150	179	192	120	166
FLIP 88- 10C	198	176	153	133	170	168	126	183	150	179	193	118	166
FLIP 88- 11C	200	178	153	141	170	174	123	185	156	179	192	118	167
FLIP 88- 12C	208	177	151	132	166	164	124	185	152	-	191	116	166
FLIP 88- 14C	195	180	154	132	170	163	126	184	152	181	191	121	167
FLIP 88- 15C	201	181	154	138	169	163	128	185	157	180	191	119	167
FLIP 88- 16C	198	174	154	134	169	162	127	185	154	177	192	121	166
FLIP 88- 20C	196	174	153	132	167	166	124	185	154	179	191	115	166
FLIP 88- 22C	205	176	154	137	168	164	124	184	154	177	192	117	167
FLIP 88- 26C	194	178	151	130	171	166	112	182	150	175	192	120	164
FLIP 88- 41C	207	176	153	132	169	165	123	185	154	178	191	119	167
FLIP 88- 49C	199	177	152	138	167	165	119	186	154	-	193	119	167
FLIP 81-293C	200	177	153	135	170	163	125	182	153	175	191	119	166
ILC 482	197	175	151	130	168	165	124	183	152	176	188	116	165
Local Check	207	179	154	139	170	172	126	186	158	179	190	120	
Location Mean	200	178	153	135	169	166	124	185	155	178	192	119	
S.E. of Mean	1.27	0.93	0.24	0.88	1.24	2.40	1.49	0.19	2.79	1.41	1.07	0.94	
L.S.D. at 5%	4.98	3.66	0.93	3.46	4.87	9.42	5.85	0.76	10.95	5.53	4.21	3.70	
T.E. in S.B.	8.63	6.34	1.60	6.00	8.43	16.32	10.14	1.31	18.96	9.57	7.29	6.41	
T.E. in D.B.	9.97	7.32	1.85	6.92	9.73	18.84	11.70	1.51	21.89	11.05	8.41	7.40	
Checks Vs T.E.	8.14	5.98	1.51	5.65	7.95	15.39	9.56	1.23	17.88	9.02	6.87	6.04	
C.V. %	1.10	0.91	0.27	1.13	1.27	2.51	2.08	0.18	3.11	1.49	0.97	1.38	

(1) Mushagar and Sevilla-I were excluded from the overall mean.

‡ Not analysed due to incomplete data set or other reasons.

Table 3.6.4. Adjusted plant height (cm) of ontries at different locations in the CISR-W during 1989/90.

Entry Name	ALGERIA		CYPRUS	ITALY	JORDAN	LEBANON	LIBYA		PORTUGAL		SPAIN		
	Khroub	Setif	Atha- lassa	Calta- girone	Mush- giron	Torbol	Kufra	Zahra	Elvas	Oeiras	Badajoz	Cordoba	Sevi- lla-I
FLIP 87- 90C	39	41	46	63	36	49	87	56	87	52	48	55	-
FLIP 87- 91C	38	30	46	55	43	47	87	66	89	64	42	61	-
FLIP 87- 92C	33	35	36	53	31	51	75	38	116	44	35	66	35
FLIP 87- 93C	33	31	46	61	38	47	67	46	99	69	41	48	30
FLIP 87- 94C	33	31	41	54	28	44	77	46	83	45	35	59	35
FLIP 87- 95C	36	33	49	58	44	50	78	56	102	67	44	64	40
FLIP 87- 96C	36	39	41	58	36	53	85	38	111	60	53	67	55
FLIP 87- 97C	44	28	49	63	49	52	83	41	101	62	46	50	-
FLIP 88- 1C	39	37	51	63	38	51	102	36	87	73	51	67	45
FLIP 88- 2C	32	39	36	60	43	56	90	58	111	61	48	55	45
FLIP 88- 3C	36	33	36	58	44	51	70	58	115	60	50	55	-
FLIP 88- 4C	36	30	39	59	39	50	103	36	86	61	41	52	38
FLIP 88- 5C	43	33	36	59	43	51	70	53	102	53	46	63	35
FLIP 88- 7C	40	39	36	58	53	51	75	68	99	66	47	52	-
FLIP 88- 8C	28	27	41	48	34	43	82	36	79	46	23	64	33
FLIP 88- 9C	35	40	46	58	43	49	92	41	72	58	44	62	-
FLIP 88- 10C	34	43	46	55	40	44	92	56	83	49	44	60	-
FLIP 88- 11C	37	36	39	58	44	42	68	56	79	59	51	61	-
FLIP 88- 12C	31	34	44	47	37	50	73	46	87	59	35	54	-
FLIP 88- 14C	35	39	41	57	52	51	95	58	121	56	42	56	40
FLIP 88- 15C	33	35	46	63	58	51	70	58	108	64	51	60	50
FLIP 88- 16C	33	35	36	60	45	53	85	58	102	61	47	48	40
FLIP 88- 20C	35	28	44	59	55	50	83	61	80	75	51	80	40
FLIP 88- 22C	29	28	49	58	44	50	83	56	86	61	42	62	-
FLIP 88- 26C	38	35	46	51	36	41	87	56	78	48	39	60	-
FLIP 88- 41C	26	26	49	56	49	45	83	56	78	50	39	61	-
FLIP 88- 49C	39	23	54	48	49	40	58	36	91	58	36	47	-
FLIP 81-293C	36	34	42	54	41	46	78	50	91	54	42	55	-
ILC 482	31	30	42	52	36	43	83	43	85	48	44	58	-
Local Check	56	30	48	64	37	42	73	45	78	62	40	60	43
Location Mean	37	33	43	57	41	47	81	50	91	58	43	59	40
S.E. of Mean	2.62	1.35	3.47	1.33	3.09	1.07	5.27	4.03	6.55	3.86	2.50	3.19	
L.S.D. at 5%	10.29	5.29	13.62	5.21	12.13	4.21	20.69	15.81	25.70	15.14	9.81	12.53	
T.E. in S.B.	17.82	9.16	23.59	9.02	21.02	7.29	35.83	27.37	44.52	26.22	17.00	21.71	
T.E. in D.B.	20.58	10.58	27.24	10.41	24.27	8.41	41.38	31.60	51.40	30.27	19.63	25.07	
Checks Vs T.E.	16.80	8.64	22.24	8.50	19.82	6.87	33.79	25.81	41.98	24.72	16.03	20.47	
C.V. %	12.37	7.07	13.91	4.03	12.91	3.92	11.31	14.06	12.40	11.61	10.06	9.43	

Cont'd. ...

Table 3.6.4. Cont'd. ...

Entry Name	SYRIA								TURKEY		(1)	
	Aleppo	Al Ghab	Gelline	Hama	Isra'a	Jableh	Jindiress	Tartus	Tel Hadya	Diyar- bakir	Erzurum	Overall Mean
FLIP 87- 90C	25	46	44	34	46	65	48	64	30	49	41	51
FLIP 87- 91C	34	41	48	24	41	53	32	69	41	44	41	50
FLIP 87- 92C	29	41	55	21	42	56	27	73	-	56	42	48
FLIP 87- 93C	25	41	52	29	41	53	35	69	28	58	36	48
FLIP 87- 94C	22	36	40	24	39	46	33	49	22	40	37	43
FLIP 87- 95C	25	54	52	39	49	59	44	63	29	55	53	53
FLIP 87- 96C	26	51	52	26	58	54	39	73	26	56	42	52
FLIP 87- 97C	26	44	44	34	49	53	38	68	32	41	51	51
FLIP 88- 1C	33	51	55	29	43	53	42	64	30	52	47	53
FLIP 88- 2C	28	51	52	31	48	56	39	78	32	55	45	53
FLIP 88- 3C	31	51	52	25	43	61	38	68	29	53	42	51
FLIP 88- 4C	35	44	48	19	41	66	35	58	31	45	49	49
FLIP 88- 5C	30	51	53	26	50	64	37	63	29	59	49	51
FLIP 88- 7C	29	51	52	26	42	54	39	68	30	57	43	52
FLIP 88- 8C	25	41	40	34	41	48	33	49	24	50	43	44
FLIP 88- 9C	30	41	50	24	41	58	36	64	25	52	43	49
FLIP 88- 10C	40	46	52	29	46	65	40	64	31	46	45	51
FLIP 88- 11C	27	44	48	29	44	59	32	58	26	49	49	49
FLIP 88- 12C	29	34	38	14	34	51	28	63	-	47	34	44
FLIP 88- 14C	27	46	50	26	45	64	40	78	30	57	42	53
FLIP 88- 15C	32	51	58	31	44	54	37	63	28	59	47	53
FLIP 88- 16C	32	51	53	31	50	54	39	73	31	56	45	52
FLIP 88- 20C	26	49	49	29	49	59	35	53	29	51	46	52
FLIP 88- 22C	33	49	48	29	49	64	39	68	33	47	41	51
FLIP 88- 26C	32	41	43	24	29	60	33	69	32	44	36	47
FLIP 88- 41C	27	39	43	24	37	45	30	63	23	43	38	46
FLIP 88- 49C	33	39	50	9	34	54	26	68	-	49	41	45
FLIP 81-293C	29	40	43	28	40	54	34	63	27	49	41	47
ILC 482	30	35	43	22	37	48	30	55	22	45	33	44
Local Check	30	52	60	38	52	58	40	70	34	43	41	
Location Mean	29	44	49	28	43	56	36	65	29	49	42	
S.E. of Mean	3.04	0.96	0.97	2.03	1.67	3.19	2.28	2.55	2.67	2.47	2.39	
L.S.D. at 5%	11.94	3.78	3.82	7.96	6.54	12.50	8.95	9.99	10.50	9.69	9.37	
T.E. in S.B.	20.69	6.54	6.61	13.79	11.33	21.66	15.51	17.31	18.18	16.78	16.24	
T.E. in D.B.	23.89	7.55	7.63	15.92	13.08	25.01	17.91	19.99	20.99	19.38	18.75	
Checks Vs T.E.	19.51	6.17	6.23	13.00	10.69	20.42	14.62	16.32	17.14	15.82	15.31	
C.V. %	17.95	3.76	3.45	12.73	6.67	9.93	11.05	6.83	17.62	8.65	9.78	

(1) Sevilla-I and Tel Hadya were excluded from the overall mean.



Table 3.6.5. Adjusted 100-seed weight (g) of entries at different locations in the CISH-W during 1989/90.

Entry Name	ALGERIA	FRANCE	ITALY	LEBANON	LIBYA		PORTUGAL		SPAIN	
	Setif	Mont-boucher	Calta-girone	Torbol	Kufra	Zahra	Elvas	Oeiras	Badajoz	Sevilla-II
FLIP 87- 90C	44	51	38	42	28	44	46	54	52	40
FLIP 87- 91C	40	47	49	38	26	34	39	44	48	35
FLIP 87- 92C	41	46	48	41	31	33	41	49	39	26
FLIP 87- 93C	33	46	40	39	30	34	40	54	43	51
FLIP 87- 94C	38	38	40	36	26	29	37	39	40	-
FLIP 87- 95C	37	42	47	37	29	33	40	62	43	31
FLIP 87- 96C	37	44	45	36	30	38	45	39	45	37
FLIP 87- 97C	31	38	37	31	26	28	38	37	45	31
FLIP 88- 1C	34	39	37	29	22	24	37	44	38	29
FLIP 88- 2C	37	39	40	35	26	28	37	54	45	33
FLIP 88- 3C	39	44	44	39	21	28	35	54	45	35
FLIP 88- 4C	39	47	52	42	27	38	44	92 *	49	36
FLIP 88- 5C	37	38	40	36	24	28	33	54	43	33
FLIP 88- 7C	41	48	45	39	28	38	43	34	47	41
FLIP 88- 8C	38	39	44	38	31	29	33	39	39	28
FLIP 88- 9C	38	44	42	37	25	34	38	49	41	35
FLIP 88- 10C	40	41	41	37	27	34	40	44	42	31
FLIP 88- 11C	37	39	45	30	24	43	39	62	46	33
FLIP 88- 12C	39	45	42	35	26	33	39	62	40	34
FLIP 88- 14C	37	40	38	36	26	23	36	59	41	32
FLIP 88- 15C	37	41	39	36	-	28	37	54	44	35
FLIP 88- 16C	35	41	42	37	22	33	39	54	44	32
FLIP 88- 20C	39	43	45	36	29	33	39	62	43	36
FLIP 88- 22C	35	43	43	34	26	38	40	57	40	31
FLIP 88- 26C	34	39	38	32	23	29	33	39	37	24
FLIP 88- 41C	33	37	38	30	23	38	33	52	35	31
FLIP 88- 49C	37	45	45	34	31	36	41	62	42	39
FLIP 81-293C	28	31	30	27	20	23	28	45	30	24
ILC 482	30	33	30	27	21	25	26	52	31	22
Local Check	33	27	28	29	24	30	39	45	29	26
<b>Location Mean</b>	<b>36</b>	<b>39</b>	<b>39</b>	<b>34</b>	<b>26</b>	<b>31</b>	<b>37</b>	<b>51</b>	<b>40</b>	<b>27</b>
S.E. of Mean	0.61	0.20	1.15	0.44	0.69	1.52	0.28	10.59	0.85	4.13
L.S.D. at 5%	2.39	0.80	4.53	1.73	2.72	5.97	1.10	41.55	3.32	16.22
T.E. in S.B.	4.14	1.39	7.84	3.00	4.72	10.34	1.91	71.96	5.75	28.09
T.E. in D.B.	4.78	1.60	9.05	3.47	5.45	11.94	2.20	83.10	6.63	32.44
Checks Vs T.E.	3.90	1.31	7.39	2.83	4.45	9.75	1.80	67.86	5.42	26.49
C.V. %	2.96	0.90	5.13	2.25	4.91	8.45	1.32	36.07	3.70	27.84

Cont'd. ...

Table 3.6.5. Cont'd. ...

Entry Name	SYRIA						TURKEY			Overall Mean
	Aleppo	Al Ghab	Jableh	Jindiress	Tartus	Tel Hadya	Diyarbakir	Erzurum	Izmir	
FLIP 87- 90C	31	38	32	41	47	49	41	49	47	44
FLIP 87- 91C	-	38	39	37	50	27	37	45	51	42
FLIP 87- 92C	-	42	34	43	56	-	42	48	44	43
FLIP 87- 93C	-	42	38	47	44	46	43	47	48	41
FLIP 87- 94C	-	35	48	32	38	36	36	43	47	38
FLIP 87- 95C	31	38	48	37	45	42	42	43	36	41
FLIP 87- 96C	34	37	33	37	45	39	40	46	46	41
FLIP 87- 97C	30	38	42	37	30	42	36	46	32	37
FLIP 88- 1C	-	33	44	30	37	34	33	39	42	35
FLIP 88- 2C	38	37	41	33	43	40	38	43	44	38
FLIP 88- 3C	-	44	34	37	50	39	39	46	53	40
FLIP 88- 4C	37	47	47	41	53	45	41	51	42	45
FLIP 88- 5C	-	42	43	36	41	40	35	40	46	38
FLIP 88- 7C	28	42	43	41	46	44	43	48	50	43
FLIP 88- 8C	31	34	46	35	40	35	39	42	48	38
FLIP 88- 9C	-	33	33	35	42	39	35	41	41	38
FLIP 88- 10C	21	44	41	37	39	40	34	40	49	39
FLIP 88- 11C	34	40	34	40	51	44	36	48	38	41
FLIP 88- 12C	-	35	43	41	53	-	38	43	35	40
FLIP 88- 14C	40	36	41	35	42	35	38	40	40	37
FLIP 88- 15C	-	36	39	36	42	40	37	44	41	38
FLIP 88- 16C	-	41	40	37	46	40	39	42	44	40
FLIP 88- 20C	34	35	47	36	48	41	39	43	34	41
FLIP 88- 22C	38	36	33	35	48	35	36	41	37	39
FLIP 88- 26C	29	35	41	35	38	38	33	41	41	36
FLIP 88- 41C	28	33	44	33	45	34	34	42	-	37
FLIP 88- 49C	-	40	39	41	55	-	42	48	39	42
FLIP 81-293C	29	25	30	25	34	30	27	33	28	29
ILC 482	32	25	29	25	32	29	30	34	30	29
Local Check	34	25	25	24	36	28	33	51	60	
Location Mean	32	35	37	34	42	38	36	43	43	
S.E. of Mean	0.64	1.84	3.50	0.27	1.92	0.93	0.40	0.75	6.43	
L.S.D. at 5%	2.51	7.21	13.73	1.07	7.52	3.65	1.56	2.94	25.23	
T.E. in S.B.	4.35	12.48	23.78	1.86	13.03	6.32	2.70	5.09	43.70	
T.E. in D.B.	5.02	14.41	27.46	2.15	15.05	7.30	3.11	5.87	50.46	
Checks Vs T.E.	4.10	11.77	22.42	1.75	12.29	5.96	2.54	4.80	41.21	
C.V. †	5.17	9.11	16.31	1.39	7.85	4.82	1.90	3.02	27.39	

(1) Kufra, Ceiras, Sevilla-II, Aleppo, Tel Hadya and Izmir were excluded from the overall mean.

\* Unexpected exceptionally high value, location not included in the overall mean.

Table 3.6.6. Adjusted seed yield (Y=kg/ha) and rank (R) of entries at different locations in the CISN-W during 1989/90.

Entry Name	ALGERIA		FRANCE		ITALY		JORDAN				LEBANON		LIBYA	
	Setif		Montboucher		Caltagirone		Marow		Mushagar		Terbol		Kufra	
	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R
FLIP 87- 90C	601	9	2819	23	3666	2	1296	13	877	25	1897	14	1099	16
FLIP 87- 91C	207	29	5194	7	2361	14	1301	12	2736	2	1770	18	1043	20
FLIP 87- 92C	309	23	3361	19	2190	17	1425	7	898	24	1226	28	1127	14
FLIP 87- 93C	182	30	4332	11	1489	25	1168	16	1589	7	1579	21	1432	9
FLIP 87- 94C	423	18	1919	26	1241	27	398	30	949	22	1166	29	765	26
FLIP 87- 95C	588	10	3482	16	2919	7	668	26	1070	18	2337	1	1719	3
FLIP 87- 96C	284	25	2761	24	1741	23	1113	18	-	-	1544	25	1488	7
FLIP 87- 97C	563	13	2913	22	2094	18	547	28	551	27	1576	22	802	23
FLIP 88- 1C	474	17	3413	17	1391	26	464	29	994	21	1236	27	1099	17
FLIP 88- 2C	258	27	5211	6	2519	11	1227	15	1500	9	1988	9	1710	4
FLIP 88- 3C	271	26	3267	20	2957	6	941	22	1629	5	1925	11	765	25
FLIP 88- 4C	207	28	163	30	2241	15	604	27	1219	15	1830	16	1080	19
FLIP 88- 5C	550	14	6149	1	2651	10	1318	11	2249	4	1925	12	1099	15
FLIP 88- 7C	665	8	5017	8	2080	19	1389	9	2823	1	1925	10	654	28
FLIP 88- 8C	309	24	3694	15	608	30	1003	20	2260	3	2150	4	710	27
FLIP 88- 9C	779	6	6032	2	1227	28	1319	10	1462	11	1918	13	1377	10
FLIP 88- 10C	944	1	5976	4	1945	21	1951	5	1106	17	1547	23	1265	11
FLIP 88- 11C	741	7	1419	27	2875	8	2562	1	287	28	2031	7	2358	2
FLIP 88- 12C	919	3	2244	25	2442	12	1093	19	1326	12	1639	19	802	24
FLIP 88- 14C	512	15	3799	14	3308	3	1513	6	-	-	1544	24	1654	5
FLIP 88- 15C	842	5	4786	10	4043	1	2199	2	1154	16	1798	17	-	-
FLIP 88- 16C	360	20	5005	9	1717	24	1576	4	1579	8	1861	15	1432	8
FLIP 88- 20C	588	11	5682	5	2211	16	946	21	1622	6	2274	2	2608	1
FLIP 88- 22C	385	19	4263	12	3301	4	859	23	1042	19	2147	6	914	21
FLIP 88- 26C	512	16	3382	18	1167	29	1294	14	1011	20	2150	5	1654	6
FLIP 88- 41C	931	2	1051	28	3104	5	728	24	927	23	2274	3	1080	18
FLIP 88- 49C	322	22	969	29	2430	13	711	25	814	26	941	30	636	29
FLIP 81-293C	576	12	3071	21	1767	22	1152	17	1307	13	1429	26	1241	12
ILC 482	851	4	4054	13	2050	20	1416	8	1255	14	2018	8	1167	13
Local Check	351	21	5977	3	2687	9	1630	3	1477	10	1630	20	833	22
Location Mean	529		3823		2262		1217		1347		1762		1166	
S.E. of Mean	161.18		380.03		96.71		364.39		250.43		137.58		193.63	
L.S.D. at 5%	632.68		1491.70		379.61		1430.34		983.01		540.04		760.07	
T.E. in S.B.	1095.83		2583.71		657.50		2477.42		1702.62		935.38		1316.47	
T.E. in D.B.	1265.35		2983.41		759.21		2860.68		1966.02		1080.09		1520.13	
Checks Vs T.E.	1033.31		2436.31		619.99		2336.09		1605.49		882.02		1241.37	
C.V. %	52.73		17.22		7.41		51.87		34.34		13.53		28.77	
T.E. > L. Check	0		0		3		0		0		0		2	

Cont'd. ...

Table 3.6.6. Cont'd. ...

Entry Name	LIBYA		PAKISTAN		PORTUGAL				SPAIN					
	Zahra		Faisalabad		Elvas		Oeiras		Badajoz		Cordoba		Sevilla-I	
	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R
FLIP 87- 90C	152	27	248	17	1131	20	1905	24	1126	8	2378	17	-	-
FLIP 87- 91C	267	23	1181	1	288	29	3048	9	1075	12	2128	23	-	-
FLIP 87- 92C	495	12	749	7	427	28	2628	14	669	29	2258	19	180	13
FLIP 87- 93C	210	26	190	21	1594	16	1733	25	1189	5	1048	28	280	10
FLIP 87- 94C	467	16	0	28	1119	21	1733	26	618	30	2458	16	485	3
FLIP 87- 95C	610	4	229	18	2217	8	3810	4	948	20	1314	27	325	8
FLIP 87- 96C	238	25	622	9	965	25	1600	28	974	18	2868	12	1505	1
FLIP 87- 97C	610	5	203	20	1942	11	1353	29	821	26	2994	9	-	-
FLIP 88- 1C	38	30	749	6	2825	5	2362	17	1101	10	2948	10	1335	2
FLIP 88- 2C	438	19	851	5	2052	10	3257	7	897	23	3758	2	435	4
FLIP 88- 3C	381	20	267	16	1096	22	5285	1	834	25	3118	7	-	-
FLIP 88- 4C	467	15	13	27	542	27	2210	18	1012	16	504	29	180	14
FLIP 88- 5C	467	17	432	13	3008	4	1085	30	1075	11	3598	4	155	15
FLIP 88- 7C	667	3	432	12	2121	9	3600	5	923	22	2318	18	-	-
FLIP 88- 8C	124	28	324	14	1306	18	2590	15	1024	14	1548	26	415	5
FLIP 88- 9C	124	29	-	-	1669	13	2476	16	1329	2	3248	6	-	-
FLIP 88- 10C	438	18	38	26	1856	12	2019	22	1050	13	2188	20	-	-
FLIP 88- 11C	1095	1	292	15	860	26	3581	6	1456	1	1584	25	-	-
FLIP 88- 12C	238	24	63	23	1054	23	1924	23	1126	9	2134	22	-	-
FLIP 88- 14C	524	10	648	8	1608	15	2057	21	783	27	3788	1	375	6
FLIP 88- 15C	381	21	883	4	4071	1	4142	2	986	17	3048	8	215	11
FLIP 88- 16C	524	11	533	11	3021	3	2914	11	923	21	3278	5	360	7
FLIP 88- 20C	581	7	57	24	2379	6	3810	3	1329	3	2914	11	195	12
FLIP 88- 22C	524	9	114	22	1554	17	2781	13	961	19	2184	21	-	-
FLIP 88- 26C	952	2	51	25	1194	19	1676	27	1139	7	2518	15	-	-
FLIP 88- 41C	467	14	571	10	1023	24	2781	12	1189	6	1794	24	-	-
FLIP 88- 49C	324	22	222	19	285	30	2210	20	745	28	0	30	-	-
FLIP 81-293C	600	6	982	3	1625	14	2210	19	876	24	2543	14	-	-
ILC 482	486	13	-	-	2315	7	2933	10	1020	15	2577	13	-	-
Local Check	543	8	1126	2	3467	2	3143	8	1240	4	3663	3	327	9
Location Mean	463		493		1817		2651		1020		2503		483	
S.E. of Mean	135.02		15.84		184.41		341.42		28.24		440.39		#	
L.S.D. at 5%	530.00		96.36		723.85		1340.15		110.84		1728.64		#	
T.E. in S.B.	917.99		166.91		1253.74		2321.21		191.97		2994.10		#	
T.E. in D.B.	1060.00		204.42		1447.70		2680.30		221.67		3457.29		#	
Checks Vs T.E.	865.62		166.93		1182.22		2188.79		181.02		2823.29		#	
C.V. %	50.46		5.57		17.58		22.31		4.80		30.47			
T.E. > L. Check	0		0		0		0		1		0			

Cont'd. ...

Table 3.6.6. Cont'd. ...

Entry Name	SPAIN		SYRIA											
	Sevilla-II		Aleppo		Al Ghab		Gelline		Hama		Isra'a		Jableh	
	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R
FLIP 87- 90C	1017	18	495	2	1351	18	1096	24	667	13	1153	1	1223	23
FLIP 87- 91C	2032	4	148	21	780	28	1375	18	95	27	836	10	767	29
FLIP 87- 92C	655	22	227	17	2071	2	2179	3	381	21	804	13	2722	4
FLIP 87- 93C	574	24	128	24	1478	13	1134	23	349	23	899	7	762	30
FLIP 87- 94C	492	27	91	26	1542	11	696	29	349	22	582	22	1159	25
FLIP 87- 95C	1238	15	285	12	1340	19	1411	16	2000	1	709	17	2024	8
FLIP 87- 96C	2070	2	442	6	1055	26	1201	22	540	15	836	11	1960	10
FLIP 87- 97C	538	25	86	28	1340	20	1297	19	794	6	582	24	2024	9
FLIP 88- 1C	1037	17	143	22	1256	22	670	30	95	28	677	18	1159	26
FLIP 88- 2C	1835	8	487	3	1817	4	1525	13	825	5	677	19	2531	5
FLIP 88- 3C	790	20	186	20	1563	10	1709	8	698	12	550	28	1897	11
FLIP 88- 4C	265	29	209	19	1023	27	1620	10	476	16	582	23	1643	17
FLIP 88- 5C	1945	5	274	14	2356	1	1087	25	825	4	550	27	1452	18
FLIP 88- 7C	2055	3	285	11	1086	25	1227	21	794	8	646	20	1770	15
FLIP 88- 8C	1697	10	289	10	1732	5	892	27	762	9	995	3	1667	16
FLIP 88- 9C	1177	16	142	23	1414	16	816	28	190	25	550	26	1794	14
FLIP 88- 10C	1267	14	318	8	1415	15	905	26	444	18	963	4	1286	21
FLIP 88- 11C	1833	9	456	5	1308	21	1493	14	794	7	836	12	881	28
FLIP 88- 12C	903	19	-	-	451	29	1608	11	32	29	772	14	1262	22
FLIP 88- 14C	1645	11	460	4	1499	12	1386	17	1683	2	328	30	2214	6
FLIP 88- 15C	1595	12	107	25	1626	8	2433	1	730	11	614	21	1452	19
FLIP 88- 16C	505	26	230	16	1944	3	1728	7	952	3	868	9	1897	12
FLIP 88- 20C	223	30	305	9	1594	9	1690	9	603	14	899	8	2087	7
FLIP 88- 22C	698	21	498	1	1118	24	1455	15	730	10	931	5	2785	2
FLIP 88- 26C	582	23	338	7	1129	23	1229	20	190	26	741	15	1032	27
FLIP 88- 41C	1888	7	90	27	1467	14	2357	2	444	17	931	6	1833	13
FLIP 88- 49C	1428	13	-	-	324	30	2014	4	32	30	741	16	2785	3
FLIP 81-293C	2402	1	281	13	1651	6	1560	12	402	19	550	25	1333	20
ILC 482	370	28	225	18	1651	7	1799	6	328	24	1016	2	2878	1
Local Check	1888	6	237	15	1355	17	1839	5	381	20	529	29	1161	24
Location Mean	1277		267		1418		1495		550		737		1727	
S.E. of Mean	351.34		74.59		74.43		260.65		58.92		121.35		283.78	
L.S.D. at 5%	1379.10		292.79		292.17		1023.11		231.27		476.32		1113.91	
T.E. in S.B.	2388.67		507.12		506.06		1772.08		400.57		825.01		1929.34	
T.E. in D.B.	2758.19		585.57		584.35		2046.22		462.54		952.64		2227.81	
Checks Vs T.E.	2252.40		478.19		477.19		1670.98		377.72		777.95		1819.27	
C.V. %	47.66		52.76		9.09		30.19		18.55		28.51		28.46	
T.E. > L. Check	0		0		3		0		9		0		0	

Cont'd. ...

Table 3.6.6. Cont'd. ...

Entry Name	SYRIA						TUNISIA							
	Jindiress		Tartus		Tel Hadya		Boja-I		Boja-II		Boja-S-I		Boja-S-II	
	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R
FLIP 87- 90C	2674	1	3284	1	1153	3	2889	6	2889	7	1679	10	2461	1
FLIP 87- 91C	1417	12	1728	29	239	27	2519	12	2519	19	1753	6	1646	6
FLIP 87- 92C	943	22	2575	10	23	29	2938	5	2568	18	1951	5	1152	18
FLIP 87- 93C	1036	20	2744	6	728	13	2074	23	2667	14	1531	12	1794	3
FLIP 87- 94C	916	23	2490	12	760	10	2296	19	2741	12	1753	7	1350	12
FLIP 87- 95C	1601	5	2459	13	734	12	2247	21	2914	5	1111	22	1276	13
FLIP 87- 96C	1477	10	2448	14	715	15	3679	1	2568	17	1506	14	412	30
FLIP 87- 97C	890	25	2840	4	563	21	1358	29	2765	11	963	25	683	26
FLIP 88- 1C	890	24	1665	30	633	19	1630	27	2148	27	1309	20	1053	22
FLIP 88- 2C	1648	4	2321	19	823	8	3383	2	2346	23	1728	9	1226	15
FLIP 88- 3C	1534	8	1877	25	525	24	2642	11	2049	28	1432	16	782	25
FLIP 88- 4C	1233	13	2332	18	677	16	2099	22	2617	16	741	29	1128	19
FLIP 88- 5C	1527	9	2607	9	747	11	2790	8	1901	30	1506	13	560	28
FLIP 88- 7C	1794	3	2257	22	988	5	2049	24	2198	26	2025	3	634	27
FLIP 88- 8C	1843	2	1951	24	1160	2	2370	16	2889	6	2198	2	1202	16
FLIP 88- 9C	1093	16	2427	15	398	26	2444	14	2296	24	1383	17	1498	11
FLIP 88- 10C	1062	18	1760	27	715	14	2444	13	2815	9	1753	8	1128	20
FLIP 88- 11C	1125	14	1824	26	652	18	2840	7	3136	2	1185	21	1498	8
FLIP 88- 12C	763	29	2713	7	0	30	2321	18	3210	1	1111	23	905	24
FLIP 88- 14C	1546	7	2988	3	658	17	2716	10	2272	25	1358	18	1152	17
FLIP 88- 15C	988	21	1972	23	538	23	2346	17	2346	22	840	28	930	23
FLIP 88- 16C	1470	11	2670	8	830	7	3012	3	2494	20	2025	4	560	29
FLIP 88- 20C	1119	15	2554	11	1033	4	2247	20	2617	15	741	30	1720	4
FLIP 88- 22C	1087	17	3284	2	1280	1	2395	15	2765	10	889	26	1498	9
FLIP 88- 26C	1576	6	2808	5	772	9	2741	9	2370	21	2494	1	1498	10
FLIP 88- 41C	795	28	2332	17	550	22	1877	25	2988	4	889	27	1572	7
FLIP 88- 49C	40	30	2300	20	150	28	1136	30	2840	8	1333	19	1720	5
FLIP 81-293C	830	27	2286	21	472	25	1531	28	2000	29	1062	24	1111	21
ILC 482	861	26	2413	16	631	20	1728	26	2667	13	1432	15	1259	14
Local Check	1050	19	1757	28	859	6	2963	4	3111	3	1654	11	1827	2
Location Mean	1175		2349		665		2337		2591		1434		1267	
S.E. of Mean	236.26		408.11		78.83		761.04		243.18		284.76		291.46	
L.S.D. at 5%	927.36		1601.92		309.45		2987.28		954.55		1117.74		1144.04	
T.E. in S.B.	1606.24		2774.61		535.98		5174.12		1653.33		1935.98		1981.54	
T.E. in D.B.	1854.72		3203.84		618.89		5974.56		1909.11		2235.47		2288.08	
Checks Vs T.E.	1514.61		2616.32		505.40		4878.94		1559.01		1825.53		1868.49	
C.V. %	34.82		30.09		20.54		56.39		16.26		34.39		39.83	
T.E. > L. Check	1		0		0		0		0		0		0	

Cont'd. ...

Table 3.6.6. Cont'd. ...

Entry Name	TUNISIA				TURKEY						Overall Mean		(1)
	El Kef		Ouod Meliz		Diyarbakir		Erzurum		Izmir				
	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R	
FLIP 87- 90C	955	11	2436	13	552	28	1656	23	840	19	1647	11	
FLIP 87- 91C	1325	3	3103	2	664	21	2172	5	1145	8	1553	15	
FLIP 87- 92C	1350	2	2979	4	969	12	1771	18	284	29	1547	17	
FLIP 87- 93C	1251	5	1918	20	636	24	1814	16	367	28	1344	25	
FLIP 87- 94C	362	30	1177	28	525	29	1642	24	395	27	1141	28	
FLIP 87- 95C	733	18	2510	10	895	15	1797	17	1071	12	1714	7	
FLIP 87- 96C	905	14	2461	12	1080	9	1386	28	867	18	1513	18	
FLIP 87- 97C	658	23	2288	16	895	14	1626	25	1349	2	1431	22	
FLIP 88- 1C	658	24	510	30	664	23	1741	22	1062	13	1260	26	
FLIP 88- 2C	831	16	2609	8	1386	1	1482	27	1090	11	1874	2	
FLIP 88- 3C	905	13	2461	11	1108	6	1108	30	1284	4	1645	12	
FLIP 88- 4C	733	19	2881	5	478	30	1761	20	1238	5	1209	27	
FLIP 88- 5C	683	21	1794	21	1219	3	1767	19	951	16	1771	5	
FLIP 88- 7C	1276	4	2979	3	1191	5	1880	15	1228	7	1774	4	
FLIP 88- 8C	658	25	2214	17	969	13	2042	12	673	22	1495	20	
FLIP 88- 9C	955	10	1770	22	1025	10	1372	29	506	26	1552	16	
FLIP 88- 10C	955	12	3177	1	830	18	1755	21	590	25	1611	13	
FLIP 88- 11C	955	9	1621	24	867	16	2157	6	1349	3	1610	14	
FLIP 88- 12C	510	28	1992	19	840	17	2071	10	1127	9	1361	24	
FLIP 88- 14C	609	27	1646	23	1080	8	1573	26	840	20	1697	9	
FLIP 88- 15C	461	29	2757	6	664	22	2437	1	1006	14	1933	1	
FLIP 88- 16C	683	22	1128	29	1275	2	1942	14	617	24	1738	6	
FLIP 88- 20C	881	15	2584	9	1006	11	2153	7	2099	1	1850	3	
FLIP 88- 22C	733	20	2658	7	617	26	2270	3	738	21	1712	8	
FLIP 88- 26C	1103	6	1325	27	1080	7	2050	11	923	17	1448	21	
FLIP 88- 41C	807	17	2214	18	701	20	2208	4	265	30	1500	19	
FLIP 88- 49C	1029	8	1473	26	562	27	2153	8	1099	10	1117	29	
FLIP 81-293C	617	26	1506	25	620	25	1951	13	1000	15	1406	23	
ILC 482	1086	7	2370	14	787	19	2278	2	1231	6	1685	10	
Local Check	1901	1	2321	15	1194	4	2083	9	620	23			
<b>Location Mean</b>	<b>938</b>		<b>2146</b>		<b>877</b>		<b>1909</b>		<b>932</b>				
S.E. of Mean	183.67		190.19		139.61		176.17		170.94				
L.S.D. at 5%	720.95		746.56		548.00		691.50		670.99				
T.E. in S.B.	1248.73		1293.08		949.16		1197.71		1162.19				
T.E. in D.B.	1441.91		1493.12		1095.99		1383.00		1341.98				
Checks Vs T.E.	1177.49		1219.31		895.01		1129.38		1095.89				
C.V. %	33.91		15.35		27.56		15.98		31.77				
T.E. > L. Check	0		0		0		0		1				

(1) Mushagar, Kufra, Faisalabad, Sevilla-I, Aleppo and Beja-spring I and Beja-spring II were excluded from the overall mean. † Not analysed due to incomplete data set or other reasons.

Table 3.6.7. The five heaviest seed yielding entries at the individual locations in the CISN-W during 1989/90.

Rank	ALGERIA	FRANCE	ITALY	JORDAN		LEBANOM	LIBYA		PAKISTAN
	Setif	Montboucher	Caltagirone	Maru	Mushagar	Terbol	Kufra	Zahra	Faisalabad
1	FLIP 88- 10C	FLIP 88- 5C	FLIP 88- 15C	FLIP 88- 11C	FLIP 88- 7C	FLIP 87- 95C	FLIP 85- 20C	FLIP 88- 11C	FLIP 87- 91C
2	FLIP 88- 41C	FLIP 88- 9C	FLIP 87- 90C	FLIP 88- 15C	FLIP 87- 91C	FLIP 88- 20C	FLIP 88- 11C	FLIP 86- 26C	ILC 482
3	FLIP 88- 12C	Local check	FLIP 88- 14C	Local check	FLIP 88- 8C	FLIP 88- 41c	FLIP 87- 95C	FLIP 88- 7C	FLIP 81-293C
4	ILC 482	FLIP 88- 10C	FLIP 88- 22C	FLIP 88- 16C	FLIP 88- 5C	FLIP 88- 8C	FLIP 88- 2C	FLIP 87- 95C	FLIP 88- 15C
5	FLIP 88- 15C	FLIP 88- 20C	FLIP 88- 41C	FLIP 88- 10C	FLIP 88- 3C	FLIP 88- 26C	FLIP 88- 14C	FLIP 87- 97C	FLIP 88- 2C

Cont'd. ...

Rank	PORTUGAL		SPAIN			SYRIA		
	Elvas	Oeiras	Badajoz	Cordoba	Sevilla-I	Sevilla-II	Aleppo	Al Ghab
1	FLIP 88- 15C	FLIP 88- 3C	FLIP 88- 11C	FLIP 88- 14C	FLIP 87- 96C	FLIP 81-293C	FLIP 88- 22C	FLIP 88- 5C
2	Local check	FLIP 88- 15C	FLIP 88- 9C	FLIP 88- 2C	FLIP 88- 1C	FLIP 87- 96C	FLIP 87- 90C	FLIP 87- 92C
3	FLIP 88- 16C	FLIP 88- 20C	FLIP 88- 20C	Local check	FLIP 87- 94C	FLIP 88- 7C	FLIP 88- 2C	FLIP 88- 16C
4	FLIP 88- 5C	FLIP 87- 95C	Local check	FLIP 88- 5C	FLIP 88- 2C	FLIP 87- 91C	FLIP 88- 14C	FLIP 88- 2C
5	FLIP 88- 1C	FLIP 88- 7C	FLIP 87- 93C	FLIP 88- 16C	FLIP 88- 8C	FLIP 88- 5C	FLIP 88- 11C	FLIP 88- 8C

Cont'd. ...

Rank	SYRIA						TUNISIA	
	Gelline	Hama	Izra'a	Jindiress	Tartus	Tel Hadya	Jableh	Beja-W-I
1	FLIP 88- 15C	FLIP 87- 95C	FLIP 87- 90C	FLIP 87- 90C	FLIP 87- 90C	FLIP 88- 22C	ILC 482	FLIP 87- 96C
2	FLIP 88- 41C	FLIP 88- 14C	ILC 482	FLIP 88- 8C	FLIP 88- 22C	FLIP 88- 8C	FLIP 88- 22C	FLIP 88- 2C
3	FLIP 87- 92C	FLIP 88- 16C	FLIP 88- 8C	FLIP 88- 7C	FLIP 88- 14C	FLIP 87- 90C	FLIP 88- 49C	FLIP 88- 16C
4	FLIP 88- 49C	FLIP 88- 5C	FLIP 88- 10C	FLIP 88- 2C	FLIP 87- 97C	FLIP 88- 20C	FLIP 87- 92C	Local check
5	Local check	FLIP 88- 2C	FLIP 88- 22C	FLIP 87- 95C	FLIP 88- 26C	FLIP 88- 7C	FLIP 88- 2C	FLIP 87- 92C

Cont'd. ...

Rank	TUNISIA			TURKEY				
	Beja-W-II	Beja-Sp-I	Beja-Sp-II	El Kef	Oued Meliz	Diyarbakir	Erzurum	Izmir
1	FLIP 88- 12C	FLIP 88- 26C	FLIP 87- 90C	Local check	FLIP 88- 10C	FLIP 88- 2C	FLIP 88- 15C	FLIP 88- 20C
2	FLIP 88- 11C	FLIP 88- 8C	Local check	FLIP 87- 92C	FLIP 87- 91C	FLIP 88- 16C	ILC 482	FLIP 87- 97C
3	Local check	FLIP 88- 7C	FLIP 87- 93C	FLIP 87- 91C	FLIP 88- 7C	FLIP 88- 7C	FLIP 88- 22C	FLIP 88- 11C
4	FLIP 88- 41C	FLIP 88- 16C	FLIP 88- 20C	FLIP 88- 7C	FLIP 87- 92C	Local check	FLIP 88- 41C	FLIP 88- 3C
5	FLIP 87- 95C	FLIP 87- 92C	FLIP 88- 49C	FLIP 87- 93C	FLIP 88- 4C	FLIP 88- 7C	FLIP 87- 91C	FLIP 88- 4C



FLIP 88-7C occurred most frequently among the top five heaviest yielders and were relatively more adaptable across locations. The top five yielders at each location are presented in Table 3.6.7.

### **3.7. CHICKPEA INTERNATIONAL SCREENING NURSERY-SPRING (CISN-SP)**

#### **Material**

The Chickpea International Screening Nursery-Spring comprised of 27 test entries which originated from the materials developed through hybridization at ICARDA. The nursery also included three checks namely ILC 482, FLIP 81-293C and one local check to be supplied by the cooperator. All these entries were almost homozygous and had shown superior performance in local or regional trials.

#### **Methods and Management**

The entries were planted in single row non-replicated plots of 4m length. The three checks were repeatedly grown in blocks of 15 test entries in an augmented block design. The spacings between and within rows were 45- and 10 cm, respectively.

Thirty five sets of nursery were distributed to cooperators in 15 countries and the results were received from 26 locations in 11 countries. The agronomic details received from the cooperators are given in Table 3.7.1.

#### **Results and Discussion**

At most of the locations some of the entries were earlier in flowering (Table 3.7.2) and maturity (Table 3.7.3) when compared with the local check. The variation in plant height (Table 3.7.4) among entries was little (26 to 30 cm). At most of the locations the local check entry was excelled in 100-seed weight by other test entries (Table 3.7.5).

The adjusted seed yields for the entries are given in Table 3.7.6. On the basis of overall mean, FLIP 88-75C gave the highest yield (2268 kg/ha) and was followed by FLIP 88-74C (2061 kg/ha), ILC 482 (1937 kg/ha), FLIP 88-67C (1808 kg/ha), and FLIP 88-77C (1739 kg/ha). At none of the locations the test entries exceeded the respective local check by a significant margin. The five heaviest seed yielding entries at different locations are given in Table 3.7.7. The entries FLIP 88-56C and FLIP 88-75C occurred most frequently among the top five heaviest yielders at varying locations and were relatively more adaptable.

Table 3.7.1. Agronomic data for different locations in the CISN-SP during 1989/90.

Country	Location	Planting Date	Harvesting Date	Fertilizer (kg/ha)			Irrigation	Insecticide/Fungicide/Herbicide	Local Check
				N	P	K			
Algeria	Guelma	24.02.90	-	-	-	-	-	-	
Algeria	Sidi Bel Abbes	10.03.90	07.07.90	-	46	-	-	Sebdou	
Bangladesh	Mymensingh	23.11.89	02.05.90	-	-	-	-	BC2/L	
Ethiopia	Ghinch	-	-	-	-	-	-	-	
France	Montboucher	08.03.90	24.07.90	-	100	-	Benfluralin, Kosaben	CASCARI	
Jordan	Mushagar	27.02.90	-	20	40	-	-	Jubeiha 1	
Lebanon	Terbol	17.03.90	00.07.90	-	50	-	Kerb, Igran	Lebanese Local	
Portugal	Elvas	15.03.90	27.07.90	-	60	80	-	Chk 510-Elvar	
Spain	Cordoba	08.03.90	11.06.90	-	84	-	-	Pochero	
Spain	Sevilla-2	08.11.89	30.06.90	-	60	-	Alachlor, Linuron, dimetoate	BG-1350	
Syria	Gelline	26.03.90	05.07.90	20	50	-	-	-	
Syria	Heimo	19.03.90	18.06.90	-	50	-	-	-	
Syria	Homs	24.02.90	-	-	50	-	-	-	
Syria	Idleb	14.03.90	-	-	60	-	-	-	
Syria	Jindiress	01.03.90	22.06.90	-	50	-	-	ILC 1929	
Syria	Tartus	07.04.90	04.08.90	-	-	-	-	Local	
Syria	Tel Hadya	05.03.90	07.90	-	50	-	Kerb, Igran, Bravo	ILC 1929	
Tunisia	Beja-W-I	NA	-	-	-	-	-	-	
Tunisia	Beja-W-II	NA	-	-	-	-	-	-	
Tunisia	Beja-Sp-I	NA	-	-	-	-	-	-	
Tunisia	Beja-Sp-II	NA	-	-	-	-	-	-	
Tunisia	El Kef-W	NA	-	-	-	-	-	-	
Tunisia	Oued Meliz-W	NA	-	-	-	-	-	-	
Turkey	Diyarbakir	05.12.89	-	30	60	-	-	-	
Turkey	Eskisehir	18.03.90	-	-	-	-	-	Canitez-87	

NA = Not available

Table 3.7.2. Adjusted time to flowering (days) of ontries at different locations in the CISN-SP during 1989/90.

Entry Name	Pedigree	Origin	ALGERIA		BANG-	ETHIOPIA	JORDAN	LEBANON
			Guelma	Sidi-	LADESH	Ghinchi	Musha-	Terbol
			Bel	Abbes	singh	gar		
FLIP 88- 17C	X83 TH 89/ILC3396XFLIP81-59C	ICARDA/ICRISAT	-	64	103	54	68	45
FLIP 88- 18C	X83 TH115/FLIP 82-81CXILC3326	ICARDA/ICRISAT	87	63	89	64	64	45
FLIP 88- 28C	X85 TH216/ILC2375XFLIP 83-46C	ICARDA/ICRISAT	-	64	115	53	68	41
FLIP 88- 30C	X85 TH230/ILC3395XFLIP 83-13C	ICARDA/ICRISAT	75	64	102	46	71	43
FLIP 88- 32C	X85 TH246/ILC3398XFLIP 83-13C	ICARDA/ICRISAT	-	64	99	61	67	41
FLIP 88- 33C	X85 TH246/ILC3398XFLIP 83-13C	ICARDA/ICRISAT	77	64	103	-	68	41
FLIP 88- 34C	X85 TH246/ILC3398XFLIP 83-13C	ICARDA/ICRISAT	-	63	87	51	71	41
FLIP 88- 35C	X85 TH246/ILC3398XFLIP 83-13C	ICARDA/ICRISAT	-	64	99	55	67	43
FLIP 88- 36C	X85 TH247/ILC3398XFLIP 83-15C	ICARDA/ICRISAT	-	63	88	66	-	45
FLIP 88- 37C	X85 TH255/ILC3713XFLIP 82-59C	ICARDA/ICRISAT	77	64	98	48	71	47
FLIP 88- 38C	X85 TH255/ILC3713XFLIP 82-59C	ICARDA/ICRISAT	87	64	85	56	-	47
FLIP 88- 42C	X85 TH230/ILC3395XFLIP 83-13C	ICARDA/ICRISAT	79	64	128	53	68	45
FLIP 88- 44C	X85 TH230/ILC3395XFLIP 83-13C	ICARDA/ICRISAT	75	63	87	55	-	43
FLIP 88- 46C	X85 TH231/ILC3396XFLIP 83-15C	ICARDA/ICRISAT	-	64	103	52	68	41
FLIP 88- 47C	X85 TH233/ILC3396XILC187	ICARDA/ICRISAT	-	62	87	49	-	45
FLIP 88- 48C	X85 TH233/ILC3396XILC187	ICARDA/ICRISAT	-	63	92	50	74	45
FLIP 88- 50C	X85 TH162/ILC3488XFLIP 83-13C	ICARDA/ICRISAT	87	63	98	56	-	47
FLIP 88- 56C	X85 TH229/ILC3395XFLIP 82-243C	ICARDA/ICRISAT	79	64	97	52	71	45
FLIP 88- 58C	X85 TH230/ILC3395XFLIP 83-13C	ICARDA/ICRISAT	91	64	92	63	81	45
FLIP 88- 60C	X85 TH230/ILC3395XFLIP 83-13C	ICARDA/ICRISAT	87	64	100	56	77	43
FLIP 88- 61C	X85 TH230/ILC3395XFLIP 83-13C	ICARDA/ICRISAT	-	63	97	54	77	43
FLIP 88- 63C	X85 TH245/ILC3398XFLIP 82-243C	ICARDA/ICRISAT	-	63	97	55	77	45
FLIP 88- 66C	X85 TH246/ILC3398XFLIP 83-13C	ICARDA/ICRISAT	87	65	98	48	79	43
FLIP 88- 67C	X85 TH248/ILC3398XFLIP 83-46C	ICARDA/ICRISAT	77	63	88	56	74	45
FLIP 88- 74C	X85 TH278/ILC3843XFLIP 83-13C	ICARDA/ICRISAT	75	64	101	52	68	45
FLIP 88- 75C	X85 TH297/ILC142XFLIP 81-293C	ICARDA/ICRISAT	87	65	100	56	77	47
FLIP 88- 77C	X85 TH298/ILC142XFLIP 82-59C	ICARDA/ICRISAT	-	62	84	64	71	47
FLIP 81-293C	X79 TH 8/ILC191XILC496 (Improved Check)	ICARDA/ICRISAT	-	65	109	61	78	56
ILC 482	Long Term Check	Turkey	-	64	101	64	72	47
Local Check	-	-	90	64	89	59	71	48
<b>Location Mean</b>			<b>82</b>	<b>64</b>	<b>98</b>	<b>55</b>	<b>72</b>	<b>46</b>
S.E. of Mean			#	0.45	5.08	1.20	3.03	0.67
L.S.D. at 5% for checks			#	1.77	19.93	4.72	11.91	2.62
T.E. in S.B.			#	3.07	34.52	8.17	20.63	4.53
T.E. in D.B.			#	3.54	39.86	9.44	23.82	5.23
Checks Vs T.E.				2.89	32.55	7.71	19.45	4.27
C.V. %				1.23	9.01	3.78	8.42	2.53

Cont'd. ...

Table 3.7.2. Cont'd. ...

Entry Name	PORTUGAL		SPAIN		SYRIA					TURKEY		Overall Mean	(1)	
	Elvas		Cordoba	Sevilla	Golline	Heimo	Homs	Idleb	Jindiress	Tartus	Tol-Hadya			Diyarbakir
FLIP 88- 17C	73		75	129	50	45	69	53	55	48	51	152	86	60
FLIP 88- 18C	70		76	125	54	48	73	56	58	46	55	155	86	61
FLIP 88- 28C	74		75	127	49	42	67	57	57	48	53	151	86	59
FLIP 88- 30C	73		62	125	49	45	72	54	53	46	52	152	86	58
FLIP 88- 32C	69		58	127	50	42	73	46	53	43	48	149	83	56
FLIP 88- 33C	70		62	128	50	45	72	54	52	48	51	154	86	58
FLIP 88- 34C	74		64	127	49	44	68	59	54	48	52	154	83	58
FLIP 88- 35C	74		59	125	49	42	75	46	54	43	49	154	81	57
FLIP 88- 36C	70		76	126	49	45	73	56	53	46	51	151	86	59
FLIP 88- 37C	70		74	126	49	45	67	62	58	48	54	151	86	60
FLIP 88- 38C	76		60	124	53	45	75	50	56	48	52	152	85	59
FLIP 88- 42C	69		73	127	50	44	72	58	55	46	52	154	86	60
FLIP 88- 44C	73		73	125	49	45	73	53	53	48	51	152	86	59
FLIP 88- 46C	70		62	126	48	42	72	56	53	48	52	150	86	58
FLIP 88- 46C	70		62	126	48	42	72	56	53	48	52	152	87	61
FLIP 88- 47C	71		74	126	50	45	73	65	54	48	52	152	86	59
FLIP 88- 48C	76		64	126	49	45	70	52	55	48	52	152	86	59
FLIP 88- 50C	73		71	128	51	45	80	60	59	46	56	150	89	62
FLIP 88- 56C	70		61	124	50	44	74	65	55	48	51	151	86	59
FLIP 88- 58C	73		75	125	51	45	73	56	55	46	51	153	85	60
FLIP 88- 60C	73		60	126	50	42	73	46	54	46	49	149	83	57
FLIP 88- 61C	70		60	128	50	45	73	52	56	46	51	154	85	58
FLIP 88- 61C	70		60	128	50	45	73	52	56	46	51	151	85	57
FLIP 88- 63C	69		59	126	50	45	73	46	55	43	51	151	85	57
FLIP 88- 66C	72		59	126	49	42	73	57	53	56	49	152	81	58
FLIP 88- 67C	73		76	124	49	45	70	52	55	46	53	153	85	59
FLIP 88- 74C	70		71	126	48	44	74	57	54	46	52	151	86	59
FLIP 88- 75C	74		70	128	51	47	73	49	59	48	55	152	83	60
FLIP 88- 75C	74		70	128	51	47	73	49	59	48	55	152	83	60
FLIP 88- 77C	72		74	127	50	45	68	63	59	46	53	155	85	60
FLIP 81-293C	71		72	127	58	55	76	59	73	48	62	164	91	65
ILC 482	72		70	123	53	45	78	53	62	46	58	157	88	61
Local Check	74		73	134	52	45	74	55	59	51	53	152	86	
Location Mean	72		69	126	51	45	73	55	57	47	53	153	86	
S.E. of Mean	1.31		2.79	1.20	0.56	0.19	1.98	3.15	0.61	#	0.19	0.94	0.97	
L.S.D. at 5%	5.15		10.93	4.72	2.20	0.76	7.78	12.37	2.39	#	0.76	3.70	3.82	
T.E. in S.B.	8.92		18.94	8.17	3.82	1.31	13.47	21.42	4.14	#	1.31	6.41	6.61	
T.E. in D.B.	10.30		21.87	9.44	4.41	1.51	15.56	24.73	4.78	#	1.51	7.40	7.63	
Checks Vs T.E.	8.41		17.86	7.71	3.60	1.23	12.70	20.20	3.90		1.23	6.04	6.23	
C.V. %	3.16		7.04	1.65	1.90	0.73	4.68	9.97	1.84		0.63	1.06	1.96	

(1) Guelma, Mymensingh, Ghinchi, Mushagar, Sevilla and Diyarbakir were excluded from the overall mean.

# Not analysed due to incomplete data set or other reasons.

Table 3.7.3. Adjusted time to maturity (days) of entries at different locations in the CISW-SP during 1989/90.

Entry Name	ALGERIA	BANGLADESH	ETHIOPIA	FRANCE	JORDAN	LEBANON	PORTUGAL	SPAIN	
	Sidi Bel- Abbes	Mymonsingh	Ghinchi	Montboucher	Mushagar	Torbol	Elvas	Cordoba	Sevilla
FLIP 88- 17C	124	157	-	131	116	81	111	95	206
FLIP 88- 18C	123	-	129	137	113	82	107	86	205
FLIP 88- 28C	124	-	-	131	116	79	111	97	208
FLIP 88- 30C	129	-	129	135	113	83	109	95	199
FLIP 88- 32C	122	-	-	135	-	80	105	91	197
FLIP 88- 33C	121	-	-	135	112	79	98	91	201
FLIP 88- 34C	123	-	129	133	113	80	118	88	208
FLIP 88- 35C	122	-	130	133	116	80	107	88	198
FLIP 88- 36C	123	-	-	133	-	80	104	85	198
FLIP 88- 37C	122	157	-	135	116	81	110	93	199
FLIP 88- 38C	122	159	131	129	-	82	118	89	196
FLIP 88- 42C	121	-	130	135	116	81	97	92	200
FLIP 88- 44C	123	-	130	135	-	82	117	86	199
FLIP 88- 46C	122	-	-	137	112	81	112	94	196
FLIP 88- 47C	123	-	129	129	-	80	107	88	194
FLIP 88- 48C	123	-	-	133	113	80	121	88	194
FLIP 88- 50C	125	158	-	133	-	84	119	92	204
FLIP 88- 56C	122	-	129	133	112	83	96	91	195
FLIP 88- 58C	123	-	-	135	-	84	118	88	200
FLIP 88- 60C	122	-	131	133	116	80	107	88	197
FLIP 88- 61C	125	-	130	135	116	84	120	87	206
FLIP 88- 63C	125	-	131	133	-	82	119	89	208
FLIP 88- 66C	122	-	128	135	-	84	113	87	204
FLIP 88- 67C	123	-	130	137	116	84	117	86	209
FLIP 88- 74C	122	-	130	133	112	83	96	93	198
FLIP 88- 75C	125	-	130	133	-	80	119	89	203
FLIP 88- 77C	123	156	-	139	116	84	120	90	200
FLIP 81-293C	123	158	-	134	113	88	112	91	204
ILC 482	122	159	134	130	-	83	111	92	197
Local Check	123	157	129	132	116	85	115	92	208
Location Mean	123	158	130	134	114	83	111	90	201
S.E. of Mean	0.77	#	#	0.77	#	0.39	2.87	0.61	1.10
L.S.D. at 5%	3.02	#	#	3.02	#	1.52	11.26	2.39	4.31
T.E. in S.B.	5.23	#	#	5.23	#	2.62	19.50	4.14	7.46
T.E. in D.B.	6.04	#	#	6.04	#	3.03	22.51	4.78	8.13
Checks Vs T.E.	4.94			4.94		2.47	18.38	3.90	7.03
C.V. %	1.09			1.00		0.81	4.46	1.17	0.94

Cont'd. ...

Table 3.7.3. Cont'd. ...

Entry Name	SYRIA							TURKEY	(1)
	Gellino	Heimo	Homs	Idleb	Jindiress	Tartus	Tel Hadya	Eskisehir	Overall Mean
FLIP 88- 17C	84	67	112	93	99	109	88	134	102
FLIP 88- 18C	90	69	114	99	101	107	92	133	103
FLIP 88- 28C	86	65	115	100	101	110	87	134	103
FLIP 88- 30C	86	67	115	93	99	109	88	134	103
FLIP 88- 32C	85	65	116	91	98	108	89	132	101
FLIP 88- 33C	90	68	115	98	99	109	91	134	102
FLIP 88- 34C	88	68	114	99	96	110	87	133	103
FLIP 88- 35C	83	65	111	94	98	109	87	132	101
FLIP 88- 36C	81	66	111	99	96	109	87	133	101
FLIP 88- 37C	90	67	110	107	96	102	89	134	103
FLIP 88- 38C	88	65	111	95	100	115	91	134	103
FLIP 88- 42C	90	68	113	100	99	102	89	134	102
FLIP 88- 44C	83	68	121	95	101	107	90	133	103
FLIP 88- 46C	91	68	115	99	99	107	88	134	104
FLIP 88- 47C	84	65	111	105	94	109	89	135	101
FLIP 88- 48C	84	68	116	94	100	107	90	133	103
FLIP 88- 50C	89	68	121	99	101	109	93	136	105
FLIP 88- 56C	90	66	115	106	100	107	87	134	102
FLIP 88- 58C	90	68	111	97	101	109	92	133	104
FLIP 88- 60C	84	65	113	94	99	109	92	132	101
FLIP 88- 61C	83	66	126	94	99	107	93	132	104
FLIP 88- 63C	86	67	114	90	98	107	90	132	102
FLIP 88- 66C	83	65	116	95	98	117	89	132	103
FLIP 88- 67C	89	68	114	97	101	107	91	133	104
FLIP 88- 74C	87	67	115	100	100	110	88	134	102
FLIP 88- 75C	82	67	111	93	98	106	89	132	102
FLIP 88- 77C	90	68	116	103	101	109	92	133	105
FLIP 81-293C	94	84	132	98	106	112	96	137	108
ILC 482	90	69	125	98	102	111	92	135	105
Local Check	91	67	121	95	102	113	89	135	
<b>Location Mean</b>	<b>88</b>	<b>68</b>	<b>118</b>	<b>97</b>	<b>100</b>	<b>109</b>	<b>90</b>	<b>134</b>	
S.E. of Mean	1.58	0.24	2.64	1.10	0.30		0.33	0.67	
L.S.D. at 5%	6.18	0.93	10.34	4.31	1.19	#	1.31	2.62	
T.E. in S.B.	10.71	1.60	17.92	7.46	2.07	#	2.27	4.53	
T.E. in D.B.	12.37	1.85	20.69	8.61	2.39	#	2.62	5.23	
Checks Vs T.E.	10.10	1.51	16.89	7.03	1.95		2.14	4.27	
C.V. †	3.10	0.60	3.88	1.95	0.53		0.64	0.86	

(1) Mymensingh, Ghinchi, Mushagar and Sevilla were excluded from the overall mean.

# Not analysed due to incomplete data set or other reasons.

Table 3.7.4. Adjusted plant height (cm) of entries at different locations in the CISE-SP during 1989/90.

Entry Name	ALGERIA	BANGLADESH	ETHIOPIA	LEBANON	PORTUGAL	SYRIA	
	Sidi Bol- Abbes	Mymensingh	Ghinchi	Terbol	Elvas	Gelline	Heimo
FLIP 88- 17C	36	52	-	34	25	25	22
FLIP 88- 18C	36	-	22	38	30	42	26
FLIP 88- 28C	31	-	-	29	29	24	23
FLIP 88- 30C	36	-	22	36	26	26	23
FLIP 88- 32C	28	-	-	30	23	27	25
FLIP 88- 33C	36	-	-	39	26	26	23
FLIP 88- 34C	31	-	25	33	30	34	22
FLIP 88- 35C	28	-	21	32	28	28	25
FLIP 88- 36C	31	-	-	29	30	36	24
FLIP 88- 37C	31	51	-	36	27	27	23
FLIP 88- 38C	28	55	25	30	34	33	22
FLIP 88- 42C	31	-	26	35	26	25	23
FLIP 88- 44C	31	-	32	30	30	33	23
FLIP 88- 46C	31	-	-	38	29	24	23
FLIP 88- 47C	31	-	21	29	31	30	25
FLIP 88- 48C	31	-	-	29	34	32	25
FLIP 88- 50C	28	62	-	34	29	33	24
FLIP 88- 56C	31	-	21	38	26	24	21
FLIP 88- 58C	26	-	-	35	31	33	24
FLIP 88- 60C	28	-	21	33	26	29	27
FLIP 88- 61C	28	-	26	32	33	33	22
FLIP 88- 63C	33	-	21	36	29	25	24
FLIP 88- 66C	33	-	30	31	29	29	26
FLIP 88- 67C	31	-	26	37	35	35	24
FLIP 88- 74C	36	-	22	35	26	20	22
FLIP 88- 75C	33	-	25	22	26	29	23
FLIP 88- 77C	31	64	-	29	27	35	24
FLIP 81-293C	32	56	-	37	30	32	23
ILC 482	30	58	26	33	30	27	20
Local Check	32	54	24	35	33	29	23
<b>Location Mean</b>	<b>31</b>	<b>57</b>	<b>24</b>	<b>33</b>	<b>29</b>	<b>29</b>	<b>23</b>
S.E. of Mean	3.04	#	#	1.63	1.33	2.49	1.85
L.S.D. at 5%	11.94	#	#	6.39	5.23	9.79	7.27
T.E. in S.B.	20.69	#	#	11.06	9.07	16.96	12.58
T.E. in D.B.	23.89	#	#	12.78	10.47	19.58	14.53
Checks Vs T.E.	19.51			10.43	8.55	15.99	11.87
C.V. %	16.87			8.42	7.89	14.66	13.79

Cont'd. ...

Table 3.7.4. Cont'd. ...

Entry Name	SYRIA					TURKEY		(1)
	Homs	Idleb	Jindiress	Tartus	Tel Hadya	Diyarbakir	Eskisehir	Overall Mean
FLIP 88- 17C	24	34	22	36	23	31	19	27
FLIP 88- 18C	28	25	25	34	21	45	28	30
FLIP 88- 28C	21	33	21	36	17	28	21	26
FLIP 88- 30C	22	30	19	31	24	34	24	27
FLIP 88- 32C	22	29	25	31	25	43	26	26
FLIP 88- 33C	27	34	22	36	24	35	26	29
FLIP 88- 34C	25	29	27	34	21	40	24	28
FLIP 88- 35C	20	34	22	36	26	38	25	27
FLIP 88- 36C	22	27	26	29	25	34	24	28
FLIP 88- 37C	27	31	28	36	19	37	24	28
FLIP 88- 38C	22	27	21	36	26	37	25	27
FLIP 88- 42C	27	33	25	36	23	28	24	28
FLIP 88- 44C	22	28	24	34	24	34	24	28
FLIP 88- 46C	24	29	21	36	25	34	29	28
FLIP 88- 47C	25	30	25	34	20	35	28	28
FLIP 88- 48C	25	28	27	34	22	30	26	29
FLIP 88- 50C	20	25	25	31	25	35	25	27
FLIP 88- 56C	24	27	24	36	23	35	30	28
FLIP 88- 58C	22	29	27	34	21	34	26	28
FLIP 88- 60C	25	35	24	36	24	38	27	28
FLIP 88- 61C	28	28	26	36	24	32	26	29
FLIP 88- 63C	25	32	30	31	24	41	30	29
FLIP 88- 66C	22	34	28	36	24	38	25	29
FLIP 88- 67C	25	30	27	34	20	40	23	29
FLIP 88- 74C	24	29	22	31	24	38	26	27
FLIP 88- 75C	25	32	26	36	26	39	25	27
FLIP 88- 77C	22	29	30	34	25	33	27	29
FLIP 81-293C	28	29	26	30	28	41	29	29
ILC 482	23	31	24	30	20	34	23	26
Local Check	22	31	23	32	20	36	29	
<b>Location Mean</b>	<b>24</b>	<b>30</b>	<b>25</b>	<b>33</b>	<b>23</b>	<b>36</b>	<b>26</b>	
S.E. of Mean	1.22	1.29	0.51	0.96	1.02	2.49	1.45	
L.S.D. at 5%	4.78	5.07	2.00	3.78	4.00	9.79	5.68	
T.E. in S.B.	8.28	8.78	3.46	6.54	6.92	16.96	9.84	
T.E. in D.B.	9.56	10.14	4.00	7.55	8.00	19.58	11.36	
Checks Vs T.E.	7.80	8.28	3.26	6.17	6.53	15.99	9.27	
C.V. %	8.71	7.39	3.58	5.04	7.67	11.97	9.69	

(1) Mymensingh, Ghinchi and Diyarbakir were excluded from the overall mean.

# Not analysed due to incomplete data set or other reasons.



Table 3.7.5. Adjusted 100-Seed weight (g) of ontries at different locations in the CISN-SP during 1989/90.

Entry Name	FRANCE	LEBANON	PORTUGAL	SPAIN		SYRIA			TURKEY			(1)
	Mont- boucher	Terbol	Elvas	Sevilla	Heimo	Homs	Idlob	Jindiress	Tel- Hadya	Diyar- bakir	Eski- sehir	Overall Mean
FLIP 88- 17C	40	34	-	36	31	34	37	32	31	36	-	35
FLIP 88- 18C	42	35	46	35	34	41	29	37	31	38	-	35
FLIP 88- 28C	42	28	52	37	27	34	35	-	32	35	-	33
FLIP 88- 30C	41	36	-	34	36	41	42	38	36	39	46	39
FLIP 88- 32C	43	39	40	34	35	40	39	34	37	36	-	39
FLIP 88- 33C	47	37	47	46	41	44	45	41	37	45	47	42
FLIP 88- 34C	34	34	30	33	31	33	38	33	34	34	37	34
FLIP 88- 35C	41	35	49	35	35	42	47	-	37	37	-	39
FLIP 88- 36C	43	37	29	38	37	49	41	40	38	39	-	41
FLIP 88- 37C	37	33	-	35	30	44	36	37	31	36	-	35
FLIP 88- 38C	38	45	43	28	34	40	32	35	34	36	-	37
FLIP 88- 42C	38	29	-	30	28	35	35	30	33	35	-	33
FLIP 88- 44C	39	37	35	36	33	50	39	39	36	35	-	39
FLIP 88- 46C	47	35	49	43	32	39	23	37	34	39	-	35
FLIP 88- 47C	33	33	48	29	31	36	31	33	35	36	-	33
FLIP 88- 48C	38	35	39	27	33	41	37	-	37	-	-	37
FLIP 88- 50C	44	40	31	33	35	40	39	37	29	37	-	38
FLIP 88- 56C	40	35	-	39	31	39	39	31	35	35	39	36
FLIP 88- 58C	44	36	44	34	35	46	38	40	35	37	43	39
FLIP 88- 60C	43	39	29	36	37	40	39	40	36	39	-	39
FLIP 88- 61C	43	44	50	34	38	45	41	35	39	39	-	42
FLIP 88- 63C	41	39	53	34	33	38	41	32	35	36	-	38
FLIP 88- 66C	40	40	56	32	37	40	41	33	33	33	-	38
FLIP 88- 67C	37	35	54	35	30	36	32	35	34	34	-	34
FLIP 88- 74C	43	36	27	37	32	44	39	41	42	41	46	39
FLIP 88- 75C	44	39	47	36	33	40	37	34	37	37	-	38
FLIP 88- 77C	44	38	48	36	33	36	38	40	32	36	-	37
FLIP 81-293C	30	31	49	24	24	33	26	27	20	25	-	27
ILC 482	31	25	49	25	24	30	29	26	24	30	-	27
Local Check	27	29	42	26	22	47	39	33	31	32	50	
Location Mean	38	34	43	32	31	39	36	35	32	36	44	
S.E. of Mean	0.11	2.90	1.46	1.92	1.06	2.72	1.02	1.04	1.61	0.46	#	
L.S.D. at 5%	0.42	11.39	5.72	7.54	4.14	10.66	4.00	4.08	6.32	1.80	#	
T.E. in S.B.	0.73	19.73	9.91	13.07	7.17	18.46	6.92	7.07	10.95	3.11	#	
T.E. in D.B.	0.85	22.78	11.45	15.09	8.28	21.31	8.00	8.16	12.64	3.59	#	
Checks Vs T.E.	0.69	18.61	9.35	12.32	6.76	17.41	6.53	6.66	10.32	2.93		
C.V. %	0.49	14.60	6.68	10.25	5.93	11.96	4.95	5.79	8.61	2.34		

(1) Elvas, Sevilla, Jindiress, Diyarbakir and Eskisehir were excluded from the overall mean.

# Not analysed due to incomplete data set or other reasons.

Table 3.7.6. Adjusted seed yield (Y=kg/ha) and rank (R) of entries at different locations in the CISN-SP during 1989/90.

Entry Name	ALGERIA		BANGLADESH		ETHIOPIA		FRANCE		JORDAN		LEBANON		PORTUGAL		SPAIN			
	Sidi Bel Abbes		Mymensingh		Ghinchi		Montboucher		Mushagar		Terbol		Elvas		Cordoba		Sevilla	
	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R
FLIP 88- 17C	144	4	44	3	-	-	2558	28	336	7	84	14	363	10	998	15	209	23
FLIP 88- 18C	85	20	-	-	15	14	4033	13	409	6	92	9	238	17	1438	2	487	4
FLIP 88- 28C	96	16	-	-	-	-	2015	29	196	14	66	27	430	3	768	26	540	2
FLIP 88- 30C	102	13	-	-	19	12	2758	27	163	16	84	12	276	14	988	17	298	16
FLIP 88- 32C	119	8	-	-	-	-	4421	6	305	9	79	18	127	28	1624	1	241	20
FLIP 88- 33C	140	5	-	-	-	-	2958	22	260	10	76	22	409	6	918	20	495	3
FLIP 88- 34C	62	26	-	-	25	6	1890	30	656	4	104	4	72	30	788	25	366	10
FLIP 88- 35C	110	12	-	-	25	6	2865	25	43	21	76	21	140	26	1144	12	404	8
FLIP 88- 36C	71	23	-	-	-	-	4383	7	3	25	85	11	422	5	1018	14	149	25
FLIP 88- 37C	112	10	32	6	-	-	2790	26	320	8	101	5	368	9	898	21	290	18
FLIP 88- 38C	35	30	32	6	31	3	3446	15	58	20	65	28	219	21	494	30	113	28
FLIP 88- 42C	83	21	-	-	31	3	3152	21	38	22	84	13	330	13	1158	11	337	11
FLIP 88- 44C	56	28	-	-	13	14	3327	16	249	11	66	25	130	27	998	16	315	15
FLIP 88- 46C	115	9	-	-	-	-	3233	20	436	5	155	1	409	7	1168	10	298	17
FLIP 88- 47C	129	6	-	-	25	6	2921	24	-	-	60	30	451	1	1098	13	122	26
FLIP 88- 48C	58	27	-	-	-	-	3315	18	0	26	98	7	88	29	568	29	105	29
FLIP 88- 50C	102	14	25	8	-	-	3321	17	225	12	100	6	165	24	654	28	334	12
FLIP 88- 56C	110	11	-	-	19	12	4183	11	856	3	139	2	359	11	1388	3	118	27
FLIP 88- 58C	65	24	-	-	-	-	4471	4	119	18	98	8	272	15	928	19	326	13
FLIP 88- 60C	227	1	-	-	13	14	4240	9	11	24	76	20	219	19	1284	7	79	30
FLIP 88- 61C	187	3	-	-	31	3	3290	19	-	-	79	16	219	20	1314	6	223	22
FLIP 88- 63C	202	2	-	-	25	6	4471	5	-	-	106	3	140	25	1324	5	241	21
FLIP 88- 66C	125	7	-	-	50	2	4302	8	35	23	79	17	202	23	854	23	382	9
FLIP 88- 67C	79	22	-	-	13	14	3546	14	209	13	60	29	438	2	978	18	441	6
FLIP 88- 74C	87	19	-	-	25	6	4221	10	996	1	77	19	426	4	858	22	320	14
FLIP 88- 75C	65	25	-	-	13	14	4927	1	-	-	72	24	211	22	1194	9	417	7
FLIP 88- 77C	92	17	44	3	-	-	4121	12	919	2	74	23	343	12	1378	4	164	24
FLIP 81-293C	38	29	40	5	-	-	2944	23	164	15	66	26	397	8	803	24	596	1
ILC 482	101	15	85	2	25	6	4485	3	86	19	83	15	253	16	1197	8	241	19
Local Check	90	18	142	1	402	1	4527	2	142	17	89	10	232	18	673	27	449	5
Location Mean	99		56		44		3640		278		85		281		1007		324	
S.E. of Mean	27.53		#		#		251.89		77.07		10.40		48.31		169.93		38.49	
L.S.D. at 5%	108.08		#		#		988.73		302.51		40.83		189.63		667.02		151.08	
T.E. in S.B.	187.20		#		#		1712.54		523.96		70.72		328.44		1155.31		261.67	
T.E. in D.B.	216.15		#		#		1977.47		605.01		81.66		379.25		1334.03		302.16	
Checks Vs T.E.	176.52						1614.84		494.07		66.69		309.71		1089.40		246.75	
C.V. %	48.39						11.99		59.99		21.29		29.79		29.24		20.57	
T.E. > L. Check	0						0		4		0		0		0		0	

Cont'd. ...

Table 3.7.6. Cont'd. ...

Entry Name	SYRIA														TUNISIA	
	Gellino		Heimo		Homs		Idlob		Jindiress		Tartus		Tel Hadya		Boja-W-I	
	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R
FLIP 88- 17C	856	6	1219	17	334	20	545	25	572	17	607	19	525	9	2807	8
FLIP 88- 18C	777	14	1467	9	393	12	1205	4	458	25	120	30	161	30	2757	10
FLIP 88- 28C	827	9	1213	18	442	10	513	26	20	28	543	27	455	12	2362	25
FLIP 88- 30C	505	20	1188	21	232	28	697	20	515	21	575	24	385	19	2584	16
FLIP 88- 32C	239	28	1477	8	181	29	854	14	481	23	638	13	527	7	2658	12
FLIP 88- 33C	804	10	1536	5	346	19	621	23	788	2	734	6	334	25	2584	17
FLIP 88- 34C	1625	1	1881	2	469	7	1173	5	718	4	596	21	447	14	2535	20
FLIP 88- 35C	395	25	1384	14	391	14	796	16	-	-	765	1	527	8	2658	14
FLIP 88- 36C	850	7	1390	12	361	17	507	27	629	11	755	4	637	3	2535	21
FLIP 88- 37C	962	3	1515	6	537	3	621	22	636	10	765	3	366	22	2140	29
FLIP 88- 38C	220	29	1045	25	454	9	765	18	532	19	607	16	413	16	3103	2
FLIP 88- 42C	639	18	1388	13	435	11	1141	7	528	20	702	8	544	4	3399	1
FLIP 88- 44C	661	17	915	28	520	5	1173	6	394	27	691	9	269	27	2683	11
FLIP 88- 46C	783	11	941	27	346	18	0	30	566	18	670	12	411	17	2066	30
FLIP 88- 47C	842	8	1112	23	558	1	1141	8	629	12	755	5	389	18	2239	28
FLIP 88- 48C	910	5	1066	24	317	23	741	19	13	29	596	20	447	13	2979	5
FLIP 88- 50C	464	21	1983	1	99	30	1412	2	659	9	543	26	432	15	2881	6
FLIP 88- 56C	781	12	1416	10	283	25	786	17	737	3	765	2	684	1	2658	13
FLIP 88- 58C	725	15	1042	26	329	21	297	29	699	6	564	25	313	26	2387	24
FLIP 88- 60C	423	22	1326	15	391	15	1089	9	703	5	670	11	540	5	2807	9
FLIP 88- 61C	152	30	1202	19	372	16	911	13	481	22	607	17	368	21	2658	15
FLIP 88- 63C	413	24	1243	16	264	27	1241	3	608	13	511	28	502	10	2510	22
FLIP 88- 66C	422	23	1751	3	264	26	1508	1	481	24	670	10	533	6	2584	18
FLIP 88- 67C	780	13	1180	22	393	13	665	21	578	16	628	14	339	24	2239	26
FLIP 88- 74C	944	4	1194	20	321	22	1034	11	693	8	511	29	639	2	2584	19
FLIP 88- 75C	377	26	1582	4	531	4	358	28	602	14	607	18	375	20	3103	3
FLIP 88- 77C	694	16	785	29	552	2	919	12	585	15	723	7	180	29	2239	27
FLIP 81-293C	314	27	237	30	311	24	804	15	415	26	582	23	184	28	2395	23
ILC 482	585	19	1404	11	455	8	620	24	694	7	593	22	343	23	2815	7
Local Check	1422	2	1505	7	476	6	1054	10	823	1	614	15	483	11	2988	4
<b>Location Mean</b>	<b>695</b>		<b>1247</b>		<b>384</b>		<b>833</b>		<b>560</b>		<b>804</b>		<b>410</b>		<b>2648</b>	
S.E. of Mean	91.82		176.67		22.83		175.79		66.59		47.72		41.45		167.16	
L.S.D. at 5%	360.42		693.49		89.60		690.01		261.37		187.30		162.69		656.15	
T.E. in S.B.	624.27		1201.15		155.20		1195.13		452.70		324.42		281.78		1136.49	
T.E. in D.B.	720.85		1386.97		179.21		1380.02		522.73		374.60		325.37		1312.30	
Checks Vs T.E.	588.66		1133.63		146.34		1127.95		426.87		305.91		265.71		1071.65	
C.V. %	22.87		24.55		10.28		36.54		20.69		10.28		17.50		10.93	
T.E. > L. Check	0		0		0		0		0		0		0		0	

Cont'd. ...

Table 3.7.6. Cont'd. ...

Entry Name	TUNISIA										TURKEY				(1)	
	Beja-W-II		Beja-S-I		Beja-S-II		El Kof-W		Oued Meliz-W		Diyarbakir		Eskisehir		Overall Mean	
	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R
FLIP 88- 17C	2617	22	988	27	872	30	1144	14	2387	20	483	27	-	-	921	29
FLIP 88- 18C	3333	5	1802	5	2156	4	1292	12	2658	11	896	15	-	-	1276	9
FLIP 88- 28C	2691	17	1728	6	1835	14	1440	7	2535	12	1055	8	-	-	1003	25
FLIP 88- 30C	2543	24	1951	2	2206	3	1144	15	2313	22	1055	7	1150	7	1087	22
FLIP 88- 32C	2938	13	1284	21	1860	12	1119	16	2510	15	1034	11	-	-	1221	12
FLIP 88- 33C	2247	28	1432	15	1984	6	848	26	2905	7	483	26	1350	5	1117	19
FLIP 88- 34C	2963	12	1062	25	1119	26	996	20	2288	23	642	24	1700	2	1032	23
FLIP 88- 35C	3012	9	2025	1	1934	11	1638	4	2436	18	1034	10	-	-	1148	16
FLIP 88- 36C	2667	19	1432	17	1490	21	922	23	1621	29	1213	1	-	-	1214	13
FLIP 88- 37C	1506	30	1506	14	1761	16	848	27	3646	2	1023	13	-	-	1114	20
FLIP 88- 38C	3012	8	1432	18	1638	18	1416	9	2510	16	716	19	-	-	1003	26
FLIP 88- 42C	3358	4	1654	9	1835	13	848	28	2313	21	420	29	-	-	1203	14
FLIP 88- 44C	2889	14	1580	11	2305	1	700	29	2510	13	1118	3	-	-	1160	15
FLIP 88- 46C	2247	29	1062	24	1021	29	996	22	2239	25	1118	2	-	-	930	28
FLIP 88- 47C	2519	25	1062	26	1934	9	848	25	2955	5	769	16	-	-	1131	17
FLIP 88- 48C	2963	11	988	28	1564	19	922	24	2955	6	-	-	-	-	990	27
FLIP 88- 50C	3383	3	1136	22	1638	17	1342	11	2288	24	938	14	-	-	1102	21
FLIP 88- 56C	2988	10	1728	7	1984	7	1440	8	3128	3	705	20	1425	4	1325	7
FLIP 88- 58C	3630	1	1951	3	1342	24	1070	17	1695	27	578	25	1450	3	1131	18
FLIP 88- 60C	2568	23	1654	10	2008	5	1416	10	2214	26	1034	12	-	-	1273	10
FLIP 88- 61C	2642	21	914	30	1490	23	1490	5	1695	28	653	22	-	-	1005	24
FLIP 88- 63C	3160	7	1580	12	1934	10	1712	3	2510	17	748	17	-	-	1259	11
FLIP 88- 66C	2790	16	1580	13	1786	15	1267	13	2733	9	1065	5	-	-	1279	8
FLIP 88- 67C	2667	18	1432	16	1490	22	700	30	2510	14	1086	4	-	-	1808	4
FLIP 88- 74C	2469	27	1284	20	1539	20	1070	18	3868	1	1055	6	1200	6	2061	2
FLIP 88- 75C	3531	2	1877	4	2230	2	1860	1	2436	19	684	21	-	-	2268	1
FLIP 88- 77C	2815	15	1358	19	1119	27	996	21	1251	30	642	23	-	-	1739	5
FLIP 81-293C	2642	20	938	29	1136	25	1012	19	2741	8	466	28	-	-	1597	6
ILC 482	2494	26	1111	23	1086	28	1481	6	2716	10	741	18	-	-	1937	3
Local Check	3160	6	1728	8	1951	8	1753	2	2963	4	1037	9	2050	1		
Location Mean	2807		1412		1628		1228		2566		845		1475			
S.E. of Mean	161.91		248.76		221.99		150.87		324.61		47.72		#			
L.S.D. at 5%	635.55		976.44		871.38		592.19		1274.17		187.30		#			
T.E. in S.B.	1100.80		1691.25		1509.28		1025.71		2206.93		324.42		#			
T.E. in D.B.	1271.10		1952.89		1742.77		1184.38		2548.34		374.60		#			
Checks Vs T.E.	1038.00		1594.77		1423.18		967.19		2081.03		305.91					
C.V. %	9.99		30.53		23.62		21.27		21.91		10.28					
T.E. > L. Check	0		0		0		0		0		0					

(1) Sidi Bel Abbas, Mymensingh, Mushagar, Terbol, Jindiross, Diyarbakir and Eskisehir were excluded from the overall mean as there were missing values. Mymensingh, Beja-I, Beja-II, El Kof and Oued Meliz were excluded from the overall mean as these trials were winter sown. S.B. = Same Block, D.B. = Different Blocks, T.E. = Test Entries.

# Not analysed due to incomplete data set or other reasons.

Table 3.7.7. The five heaviest seed yielding entries at the individual locations in the CISN-SP during 1989/90.

	ALGERIA		BANGLADESH		ETHIOPIA		FRANCE		JORDAN		LEBANON		PORTUGAL		SPAIN	
Rank	Sidi	Bel Abbes	Mymensingh		Ghinchi		Montboucher		Mushagar		Terbol		Elvas		Cordoba	
1	FLIP 88- 60C		Local check		Local check		FLIP 88- 75C		FLIP 88- 74C		FLIP 88- 46C		FLIP 88- 47C		FLIP 88- 32C	
2	FLIP 88- 63C		ILC 482		FLIP 88- 66C		Local check		FLIP 88- 77C		FLIP 88- 56C		FLIP 88- 67C		FLIP 88- 18C	
3	FLIP 88- 61C		FLIP 88- 17C	}	FLIP 88- 61C		ILC 482		FLIP 88- 56C		FLIP 88- 63C		FLIP 88- 28C		FLIP 88- 56C	
4	FLIP 88- 17C		FLIP 88- 77C		FLIP 88- 38C		FLIP 88- 58C		FLIP 88- 34C		FLIP 88- 34C		FLIP 88- 74C		FLIP 88- 77C	
5	FLIP 88- 33C		FLIP 81-293C		FLIP 88- 61C		FLIP 88- 63C		FLIP 88- 46C		FLIP 88- 37C		FLIP 88- 36C		FLIP 88- 63C	
Cont'd. ...																
	SPAIN				SYRIA											
Rank	Sevilla	Gelline	Heimo		Homs		Idleb		Jindiress-Sp		Tartus		Tel Hadya			
1	FLIP 81-293C	FLIP 88- 34C	FLIP 88- 50C		FLIP 87- 47C		FLIP 88- 66C		Local check		FLIP 88- 35C		FLIP 88- 56C			
2	FLIP 88- 28C	Local check	FLIP 88- 34C		FLIP 88- 77C		FLIP 88- 50C		FLIP 88- 33C		FLIP 88- 56C		FLIP 88- 74C			
3	FLIP 88- 33C	FLIP 88- 37C	FLIP 88- 66C		FLIP 88- 37C		FLIP 88- 63C		FLIP 88- 56C		FLIP 88- 37C		FLIP 88- 36C			
4	FLIP 88- 18C	FLIP 88- 74C	FLIP 88- 75C		FLIP 88- 75C		FLIP 88- 18C		FLIP 88- 34C		FLIP 88- 36C		FLIP 88- 42C			
5	Local check	FLIP 88- 48C	FLIP 88- 33C		FLIP 88- 44C	}	FLIP 88- 34C		FLIP 88- 60C		FLIP 88- 47C		FLIP 88- 60C			
							FLIP 88- 44C									
Cont'd. ...																
	TUNISIA						TURKEY									
Rank	Beja-W-I	Beja-W-II	Beja-Sp-I	Beja-Sp-II	El Kef		Oued Meliz		Diyarbakir		Eskisehir					
1	FLIP 88- 42C	FLIP 88- 58C	FLIP 88- 35C	FLIP 88- 44C	FLIP 88- 75C		FLIP 88- 74C		FLIP 88- 36C		Local check					
2	FLIP 88- 38C	FLIP 88- 75C	FLIP 88- 30C	FLIP 88- 75C	Local check		FLIP 88- 37C	}	FLIP 88- 46C		FLIP 88- 34C					
3	FLIP 88- 75C	FLIP 88- 50C	FLIP 88- 58C	FLIP 88- 30C	FLIP 88- 63C		FLIP 88- 56C		FLIP 88- 44C			FLIP 88- 58C				
4	Local check	FLIP 88- 42C	FLIP 88- 75C	FLIP 88- 18C	FLIP 88- 35C		Local check		FLIP 88- 67C		FLIP 88- 56C					
5	FLIP 88- 48C	FLIP 88- 18C	FLIP 88- 18C	FLIP 88- 60C	FLIP 88- 61C	}	FLIP 88- 47C		FLIP 88- 66C		FLIP 88- 33C					
							FLIP 88- 48C									

The brackets indicate entries having the same rank

### 3.8. CHICKPEA INTERNATIONAL SCREENING NURSERY - SOUTHERNLY LATITUDES 1 (CISN-SL1)

The Chickpea International Screening Nursery - Southernly Latitudes 1 comprised 27 test entries and three checks, namely FLIP 81-293C, ILC 482, and one local check to be supplied by the cooperator.

#### Methods and Management

The entries were planted in single row plots of 4 m length. The three checks were repeatedly grown in blocks of 10 test entries in an augmented block design. The spacing between and within rows were 45- and 10 cm, respectively. Eleven sets of nursery were distributed to cooperators in 9 countries and the results were received from 4 locations in 4 countries. The agronomic details received from the cooperators are presented in Table 3.8.1.

#### Results and Discussion

The mean time to flowering, time to maturity, plant height, 100-seed weight, and seed yield are given in Table 3.8.2. The entry FLIP 88-70C flowered earlier at Ghinchi in Ethiopia and was followed by FLIP 88-39C, FLIP 88-69C, FLIP 88-29C, FLIP 88-62C, FLIP 88-68C, and FLIP 88-76C. The seed yields at Ghinchi were very low. At Faisalabad in Pakistan, FLIP 88-19C gave the highest seed yield (1289 kg/ha) and was followed by FLIP 88-39C (1130 kg/ha), and Local check (984 kg/ha). The seed yields at Tabuk in Saudi Arabia were very high. The entry FLIP 88-19C ranked number 1 and was followed by FLIP 88-72C, FLIP 88-29C, FLIP 88-69C, FLIP 88-45C and FLIP 88-40C.

Table 3.8.1. Agronomic data for different locations in the CISN-SL1 during 1989/90.

Country/ Location	Planting Date	Harvesting Date	Fertilizer (kg/ha)			Irri- gation	Insecticide/ Herbicide/ Fungicide	Local Check
			N	P	K			
<b>Ethiopia</b>								
Ghinchi	08.09.90	NA	NA			NA	NA	NA
<b>Pakistan</b>								
Faisalabad	12.11.89	05.05.90	80	57		1	Malathion	1434
<b>Saudi Arabia</b>								
Tabuk	19.11.89	00.05.90	150	276	*	995 mm	-	Egyptian Chickpea
<b>Syria</b>								
Tel Hadya	01.12.89	05.06.90		50		-	Kerb, Igran, Bravo	ILC 3279

NA = Not available, \* = Very high values

Table 3.8.2. Adjusted time to flowering (DPLR), time to maturity (DMAT), plant height (PTHT), 100-seed weight (100SW) and seed yield (YLD) and rank (R) of entries at different locations in the CISN-SLI during 1989/90.

Entry Name	Pedigree	Origin	ETHIOPIA-Ghinch				
			DPLR	DMAT	PTHT	YLD *	R
FLIP 88- 13C	X 84 TH 71/ILC 482XFLIP 82-65C	ICARDA/ICRISAT	62	131	27	56	4
FLIP 88- 19C	X 84 TH 5/FLIP 81-293CXILC3841	ICARDA/ICRISAT	85	133	31	19	12
FLIP 88- 21C	X 84 TH 75/ILC 482XFLIP 82-81C	ICARDA/ICRISAT	86	-	1	-	-
FLIP 88- 24C	X 85 TH 214/ILC2375XFLIP 83-13C	ICARDA/ICRISAT	61	132	28	-	-
FLIP 88- 25C	X 85 TH 214/ILC2375XFLIP 83-13C	ICARDA/ICRISAT	77	130	24	13	14
FLIP 88- 29C	X 85 TH 230/ILC3395XFLIP 83-13C	ICARDA/ICRISAT	52	-	-	-	-
FLIP 88- 31C	X 85 TH 238/ILC3397XFLIP 81-293C	ICARDA/ICRISAT	55	-	-	-	-
FLIP 88- 39C	X 85 TH 255/ILC3713XFLIP 82-59C	ICARDA/ICRISAT	49	-	-	-	-
FLIP 88- 40C	X 85 TH 262/ILC3777XFLIP 83-13C	ICARDA/ICRISAT	55	-	-	-	-
FLIP 88- 45C	X 85 TH 231/ILC3396XFLIP 83-15C	ICARDA/ICRISAT	80	-	-	-	-
FLIP 88- 51C	X 85 TH 213/ILC2375XFLIP 82-243C	ICARDA/ICRISAT	55	130	30	13	14
FLIP 88- 53C	X 85 TH 214/ILC2375XFLIP 83-13C	ICARDA/ICRISAT	62	-	-	-	-
FLIP 88- 54C	X 85 TH 215/ILC2375XFLIP 83-15C	ICARDA/ICRISAT	61	130	31	13	14
FLIP 88- 57C	X 85 TH 230/ILC3395XFLIP 83-13C	ICARDA/ICRISAT	61	130	26	13	14
FLIP 88- 62C	X 85 TH 230/ILC3395XFLIP 83-13C	ICARDA/ICRISAT	53	130	26	25	9
FLIP 88- 68C	X 85 TH 262/ILC3777XFLIP 83-13C	ICARDA/ICRISAT	53	133	28	13	14
FLIP 88- 69C	X 85 TH 262/ILC3777XFLIP 83-13C	ICARDA/ICRISAT	51	-	-	-	-
FLIP 88- 70C	X 85 TH 262/ILC3777XFLIP 83-13C	ICARDA/ICRISAT	48	130	25	50	6
FLIP 88- 72C	X 85 TH 264/ILC3777XFLIP 83-46C	ICARDA/ICRISAT	56	130	27	25	9
FLIP 88- 73C	X 85 TH 269/ILC3779XILC3856	ICARDA/ICRISAT	56	-	-	-	-
FLIP 88- 76C	X 85 TH 298/ILC 142XFLIP 82-59C	ICARDA/ICRISAT	54	130	35	19	12
FLIP 88- 78C	X 85 TH 235/ILC3396XILC2506	ICARDA/ICRISAT	55	131	32	25	9
FLIP 88- 82C	X 84 TH 68/ILC 484XFLIP 82-80C	ICARDA/ICRISAT	83	130	38	56	4
FLIP 88- 83C	X 84 TH 15/FLIP 82-100CXILC200	ICARDA/ICRISAT	69	130	35	81	3
FLIP 88- 84C	X 85 TH 211/ILC2371XFLIP 82-144C	ICARDA/ICRISAT	64	130	24	38	7
FLIP 88- 85C	X 85 TH 143/ILC 629XFLIP 82-144C	ICARDA/ICRISAT	70	132	28	13	14
FLIP 88- 86C	X 86 TH 79/ILC 493XFLIP 82-150C	ICARDA/ICRISAT	73	131	38	156	2
FLIP 81-293C	X 79 TH 8/ILC 191XILC496 (Improved check)	ICARDA/ICRISAT	88	-	-	-	-
ILC 482	Long Term Check	Turkey	66	131	30	29	8
Local check		-	57	126	26	248	1
Location Mean			64	131	29	48	
S.E. of Mean			1.58	0.47	1.31	#	
L.S.D. at 5% for: Checks			6.18	2.87	7.99	#	
Checks vs test entries			10.71	4.97	13.83	#	
Test entries in the same block			12.37	6.08	16.94	#	
Test entries in different blocks			10.01	4.97	13.83		
C.V. %			4.23	0.86	10.10		

Cont'd. ...

Table 3.8.2. Cont'd. ...

Entry Name	PAKISTAN-FAISALABAD					SAUDI ARABIA-Tabuk				SYRIA-Tel Hadya				
	YLD	R	DFLR	DMAT	PTHT	YLD	R	100SW	DFLR	DMAT	PTHT	YLD	R	100SW
FLIP 88- 13C	-	-	109	189	61	4306	13	25	125	172	28	1172	2	35
FLIP 88- 19C	1289	1	119	186	62	13241	1	29	130	174	29	607	12	30
FLIP 88- 21C	239	20	108	187	61	6065	7	29	135	174	18	703	9	26
FLIP 88- 24C	282	18	110	189	48	1528	29	39	130	172	23	944	5	37
FLIP 88- 25C	177	21	111	186	52	2824	24	37	134	176	22	353	21	30
FLIP 88- 29C	302	17	88	183	63	7731	3	34	-	-	-	112	27	31
FLIP 88- 31C	429	13	92	187	61	6065	8	32	-	-	-	11	30	0
FLIP 88- 39C	1130	2	123	182	47	3796	18	42	134	177	23	449	17	36
FLIP 88- 40C	620	8	88	187	41	6204	6	28	133	0	14	277	24	36
FLIP 88- 45C	969	4	108	187	63	6204	5	36	130	170	21	1096	4	38
FLIP 88- 51C	368	15	111	186	52	3519	20	30	-	-	-	106	28	35
FLIP 88- 53C	778	6	98	187	56	5509	9	32	134	-	-	144	26	31
FLIP 88- 54C	450	12	121	190	62	3519	21	30	136	176	22	341	22	35
FLIP 88- 57C	0	27	107	185	55	1250	30	34	136	176	23	423	20	41
FLIP 88- 62C	155	22	94	181	48	2500	26	33	130	174	22	760	8	37
FLIP 88- 68C	812	5	95	186	52	2407	28	34	134	174	22	633	11	38
FLIP 88- 69C	461	11	88	183	51	6898	4	31	134	-	-	150	25	32
FLIP 88- 70C	54	25	94	185	68	5000	11	35	129	172	23	912	6	37
FLIP 88- 72C	410	14	92	183	63	7731	2	37	130	170	19	538	15	27
FLIP 88- 73C	0	28	94	185	58	3194	23	26	-	-	-	30	29	38
FLIP 88- 76C	536	10	100	185	73	5278	10	35	129	174	25	531	16	34
FLIP 88- 78C	309	16	92	183	56	3843	17	28	130	174	18	442	19	29
FLIP 88- 82C	273	19	119	186	62	4074	15	32	132	170	28	1426	1	31
FLIP 88- 83C	-	-	110	189	68	2500	27	22	135	175	20	303	23	21
FLIP 88- 84C	-	-	111	190	49	2685	25	29	136	175	24	544	14	30
FLIP 88- 85C	654	7	119	190	52	3241	22	32	133	176	25	1141	3	31
FLIP 88- 86C	92	23	110	185	61	4167	14	27	132	174	26	595	13	27
FLIP 81-293C	563	9	115	187	52	3704	19	28	133	175	26	646	10	29
ILC 482	71	24	115	189	53	4907	12	29	135	173	20	447	18	27
Local check	984	3	119	186	65	3889	16	33	136	176	37	762	7	27
Location Mean	496		107	186	57	4522		31	133	174	23	564		32
S.E. of Mean	144.46		2.52	0.94	3.49	1118.80		0.76	1.60	1.02	0.39	84.82		0.61
L.S.D. at 5% for:														
Checks	567.03		9.91	3.70	13.68	4391.59		2.97	6.28	4.00	1.51	332.92		2.39
Checks Vs T.E.	982.13		17.16	6.41	23.70	7606.45		5.14	10.87	6.92	2.62	576.63		4.14
T.E. in S.B.	1134.06		19.81	7.40	27.36	8783.18		5.94	12.55	8.00	3.02	665.84		4.78
T.E. in D.B.	926.01		16.18	6.04	22.35	7172.52		4.85	10.25	6.53	2.47	543.74		3.90
C.V. %	59.75		4.07	0.88	10.61	42.86		4.19	2.34	1.26	3.34	26.05		3.44
Error d.f.	4					4						4		
T.E. > L. Check	0					1						1		

\* Location data are not analysed thus mean values are unadjusted. T.E. = Test entries. S.B. = Same block, D.B. = different blocks. # Not analysed due to incomplete data set or other reasons.



### 3.9. CHICKPEA INTERNATIONAL SCREENING NURSERY - SOUTHERNLY LATITUDES 2 (CISN-SL2)

The Chickpea International Screening Nursery - Southernly Latitudes 2 comprised 27 test entries and three checks, namely FLIP 81-293C, ILC 482, and one local check to be supplied by the cooperator.

#### Methods and Management

The entries were planted in single row plots of 4 m length. The three checks were repeatedly grown in blocks of 10 test entries in an augmented block design. The spacing between and within rows were 45- and 10 cm respectively. Eleven sets of nursery were distributed to cooperators in 9 countries and the results were received from 7 locations from 5 countries. The agronomic details received from the cooperators are presented in Table 3.9.1.

#### Results and Discussion

The mean time to flowering, time to maturity, plant height, 100-seed weight, and seed yield are given in Table 3.9.2. The seed yields at Mymensingh in Bangladesh, and Breda and Tel Hadya in Syria were very poor. Two entries namely ILC 4386, and ILC 733 at Lincoln in New Zealand; and five entries namely ILC 1726, ILC 1396, ILC 2858, ILC 1681, and ILC 1671 at Hudeiba in Sudan gave numerically higher yields than the respective local check but were statistically non significant.

Table 3.9.1. Agronomic data for different locations in the CISN-SL2 during 1989/90.

Country/ Location	Planting Date	Harvesting Date	Fertilizer (kg/ha)			Irri- gation	Insecticide/ Herbicide/ Fungicide	Local Check
			N	P	K			
<b>Bangladesh</b>								
Mymensingh	23.11.89	28.04.90	-	-	-	-	-	BC2/L
<b>Ethiopia</b>								
Debre Zeit	23.08.90		-	-	-	-	-	DZ-10-4
Ghinchi	08.09.90		-	-	-	-	-	K850- 3/27xF378
<b>New Zealand</b>								
Lincoln	21.09.90	00.03.91	-	-	-	-	Treflan, Gardoprim	FLIP 84-92C
<b>Sudan</b>								
Hudeiba	11.11.89	00.03.90	43	-	-	9	Hand weeding	Shendi
<b>Syria</b>								
Breda	26.11.89	31.05.90	-	50	-	-	-	ILC 3279
Tel Hadya	05.03.90	07.90	-	50	-	-	Kerb, Igran, Bravo	ILC 1929

Table 3.9.2. Adjusted time to flowering (DFLR), time to maturity (DMAT), plant height (PHT), 100-seed weight (100SW) and Seed yield (YLD) and rank (R) of entries at different locations in the CISH-SL2 during 1989/90.

Entry Name	Origin	BANGLADESH-Mymensingh					ETHIOPIA-Debre Zeit	
		DFLR	DMAT	PHT	YLD	R	DFLR	DMAT
ILC 731	Iran	-	-	-	-	-	57	113
ILC 733	Iran	124	160	50	65	6	58	115
ILC 1395	Afghanistan	105	155	37	52	10	53	108
ILC 1396	Afghanistan	102	-	-	-	-	50	95
ILC 1620	Afghanistan	99	158	44	20	17	50	92
ILC 1641	Afghanistan	132	-	-	-	-	51	102
ILC 1653	Afghanistan	92	-	-	-	-	51	98
ILC 1671	Afghanistan	123	159	40	52	8	52	99
ILC 1681	Afghanistan	100	155	32	20	18	51	103
ILC 1711	Afghanistan	86	-	-	-	-	49	95
ILC 1726	Afghanistan	87	-	-	-	-	52	103
ILC 1817	-	94	158	46	33	13	50	96
ILC 1852	Iran	92	160	41	26	14	51	98
ILC 1894	Turkey	107	158	41	106	3	54	111
ILC 2090	Iran	104	160	49	74	5	57	109
ILC 2295	Iran	105	157	37	39	12	49	103
ILC 2507	Iran	104	157	45	20	16	54	107
ILC 2546	U.S.A.	101	158	44	20	15	54	107
ILC 2699	Afghanistan	119	-	-	-	-	54	109
ILC 2858	Afghanistan	89	-	-	-	-	52	101
ILC 3739	Mexico	87	-	-	-	-	57	113
ILC 3741	Mexico	123	161	49	96	4	60	115
ILC 4385	Jordan	119	158	46	42	11	53	103
ILC 4386	Jordan	138	-	-	-	-	54	113
ILC 7393	Jordan	133	-	-	-	-	54	110
ILC 4429	Spain	124	160	43	52	9	59	117
ILC 4511	Syria	89	157	47	106	2	49	101
FLIP 81-293C (Improved check)	ICARDA/ICRISAT	126	-	-	-	-	68	120
ILC 482 (Long term check)	Turkey	112	158	52	63	7	57	109
Local check	-	105	158	43	116	1	45	95
Location mean		108	158	44	56		54	106
S.E. of Mean		7.40	0.85	3.47	9.10		1.19	1.76
L.S.D. AT 5% for: Checks		29.06	5.17	21.09	55.39		4.69	6.92
Checks Vs T.E.		50.34	8.96	36.53	95.93		8.12	11.99
T.E. in S.B.		58.12	10.97	44.74	117.49		9.37	13.85
T.E. in D.B.		47.46	8.96	36.54	95.95		7.66	11.31
C.V. %		12.13	1.40	20.21	37.59		3.82	2.89
T.E. > L. Check		-	-	-	0		-	-

Cont'd. ...

Table 3.9.2. Cont'd. ...

Entry Name	ETHIOPIA-Ghinchí					NEW ZEALAND-Lincoln			SUDAN-Hudeiba		
	DPLR	DMAT	PTHT	YLD	R	PTHT	YLD	R	100SW	YLD	R
ILC 731	-	-	-	-	-	18	1357	4	26	796	21
ILC 733	-	-	-	-	-	18	1802	2	27	271	26
ILC 1395	61	130	28	163	4	11	284	20	22	2193	14
ILC 1396	55	130	37	206	3	12	100	29	28	6618	2
ILC 1620	55	130	36	144	6	12	214	25	15	1210	19
ILC 1641	56	132	26	31	14	11	100	28	23	4160	8
ILC 1653	-	-	-	-	-	18	564	16	24	3071	12
ILC 1671	-	-	-	-	-	18	595	14	21	5588	5
ILC 1681	55	130	32	1350	1	12	164	27	25	5593	4
ILC 1711	63	128	31	163	4	17	276	21	18	5094	7
ILC 1726	56	129	28	119	9	15	390	19	23	6760	1
ILC 1817	-	-	-	-	-	13	646	12	19	-	-
ILC 1852	-	-	-	-	-	16	481	17	19	788	23
ILC 1894	-	-	-	-	-	13	409	18	26	1177	20
ILC 2090	77	130	30	63	13	15	225	24	19	1760	17
ILC 2295	70	129	32	131	7	17	1294	6	19	793	22
ILC 2507	68	131	28	94	10	16	576	15	21	110	27
ILC 2546	63	130	30	125	8	14	214	26	25	610	24
ILC 2699	-	-	-	-	-	18	843	10	29	1796	16
ILC 2858	-	-	-	-	-	13	-	-	20	5719	3
ILC 3739	-	-	-	-	-	17	257	23	21	1552	18
ILC 3741	-	-	-	-	-	15	1027	9	22	-	-
ILC 4385	-	-	-	-	-	14	600	13	22	3644	10
ILC 4386	69	129	32	75	12	17	2117	1	21	2285	13
ILC 7393	63	130	26	88	11	12	1319	5	26	-	-
ILC 4429	-	-	-	-	-	20	1180	7	23	2021	15
ILC 4511	-	-	-	-	-	17	263	22	20	3760	9
FLIP 81-293C	57	133	37	13	16	21	743	11	31	3247	11
ILC 482	65	130	27	31	14	18	1031	8	29	317	25
Local check	65	126	28	425	2	20	1517	3	36	5567	6
Location mean	62	130	31	301		16	710		25	2833	
S.E. of Mean	#	#	#	#		1.64	408.01		0.45	472.85	
L.S.D. at 5% for:	#	#	#	#							
Checks	#	#	#	#		6.45	1601.53		1.77	1856.06	
Checks Vs T.E.	#	#	#	#		11.18	2773.94		3.07	3214.78	
T.E. in S.B.						12.91	3203.07		3.54	3712.11	
T.E. in D.B.						10.54	2615.69		2.89	3031.38	
C.V. %						17.80	94.02		3.16	31.28	
T.E. > L. Check						-	0		-	0	

Cont'd. ...

Table 3.9.2. Cont'd. ...

Entry Name	SYRIA-Breda					SYRIA-Tel Hadya					100SW
	DPLR	DMAT	PTHT	YLD	R	DPLR	DMAT	PTHT	YLD	R	
ILC 731	142	180	12	162	1	57	85	16	58	22	12
ILC 733	143	181	10	86	4	50	83	16	133	1	15
ILC 1395	-	-	10	8	21	57	-	23	69	18	40
ILC 1396	-	-	9	8	25	52	89	15	103	8	20
ILC 1620	-	-	7	8	23	56	92	16	107	7	17
ILC 1641	-	-	6	8	22	61	97	20	60	20	20
ILC 1653	144	180	5	4	27	53	89	21	95	10	19
ILC 1671	142	178	11	35	13	58	88	19	88	11	20
ILC 1681	-	-	-	8	24	55	92	17	122	3	23
ILC 1711	141	180	11	1	28	63	92	21	53	25	23
ILC 1726	142	180	10	27	16	60	91	16	60	21	17
ILC 1817	145	180	8	10	18	57	87	16	87	12	17
ILC 1852	142	179	9	92	3	52	83	20	122	4	14
ILC 1894	-	-	10	1	29	60	91	18	71	17	19
ILC 2090	141	180	12	33	15	57	91	18	85	13	29
ILC 2295	-	-	8	8	26	61	99	26	53	24	24
ILC 2507	-	-	-	8	20	61	97	20	49	27	20
ILC 2546	141	180	9	78	6	61	-	22	14	29	-
ILC 2699	142	180	9	73	7	55	84	15	101	9	13
ILC 2858	-	-	9	14	17	55	87	19	85	14	18
ILC 3739	135	179	15	84	5	60	93	19	50	26	22
ILC 3741	137	178	11	99	2	57	87	20	119	5	14
ILC 4385	-	-	14	71	8	55	87	16	68	19	19
ILC 4386	-	-	10	33	14	55	88	17	80	15	21
ILC 7393	-	-	-	8	19	61	-	24	15	28	-
ILC 4429	142	179	14	54	11	49	82	16	130	2	15
ILC 4511	-	-	10	1	30	64	98	25	7	30	23
FLIP 81-293C	143	181	12	57	10	57	87	20	76	16	21
ILC 482 (Long)	142	182	10	49	12	54	88	18	108	6	18
Local check	141	182	18	63	9	58	91	21	57	23	18
Location mean	141	180	10	43		57	90	19	78		20
S.E. of Mean	0.61	0.39	0.96	13.93		2.24	1.52	2.40	28.74		1.30
L.S.D. AT 5% for:											
Checks	2.39	1.51	3.78	54.69		8.81	5.97	9.44	112.80		5.11
Checks Vs T.E.	4.14	2.62	6.54	94.72		15.26	10.34	16.34	195.38		8.85
T.E. in S.B.	4.78	3.02	7.55	109.37		17.62	11.94	18.87	225.61		10.22
T.E. in D.B.	3.90	2.47	6.17	89.32		14.39	9.75	15.41	184.23		8.34
C.V. %	1.17	0.58	16.26	56.77		6.82	3.21	21.50	63.82		12.09
T.E. > L. Check	-	-	-	1		-	-	-	0		-

\* Location data are not analysed thus mean values are unadjusted. T.E. = Test entries, S.B. = Same block, D.B. = Different blocks. † Not analysed due to incomplete data set or other reasons.

### 3.10. CHICKPEA INTERNATIONAL SCREENING NURSERY LATIN AMERICAN (CISN-LA)

The Chickpea International Screening Nursery Latin American comprised 27 test entries and three checks, namely FLIP 81-293C, ILC 482, and one local check to be supplied by the cooperator.

#### Methods and Management

The entries were planted in single row plots of 4 m length. The three checks were repeatedly sown in blocks of 10 entries in an augmented block design. The spacing between and within rows were 45- and 10 cm respectively. Nine sets of nursery were distributed to cooperators in 5 countries and the results were received from 6 locations from 5 countries. The agronomic details received from the cooperators are presented in Table 3.10.1.

#### Results and Discussion:

The adjusted time to flowering, time to maturity, plant height, 100-seed weight and seed yield are given in Tables 3.10.2, 3.10.3, 3.10.4, 3.10.5, and 3.10.6 respectively. The entry means for time to flowering, time to maturity, plant height, 100-seed weight and seed yield ranged between 63 to 87 days, 107 to 130 days, 27 to 43 cm, 32 to 49g, and 1197 to 2135 kg/ha, respectively. The five heaviest yielding entries based on mean over locations included ILC 6074, ILC 3808, FLIP 87-1C, ILC 4178, and FLIP 81-293C, respectively.

Table 3.10.1. Agronomic data for different locations in the CISN-LA during 1989/90.

Country/ Location	Planting Date	Harvesting Date	Fertilizer (kg/ha)			Irri- gation	Insecticide/ Herbicide/ Fungicide	Local Check
			N	P	K			
<b>Canada</b>								
Saskatoon	11.05.90	00.09.90	-			-	Trifluralin	Pakasura
<b>Mexico</b>								
Sonora-I	24.11.89	15.05.90	80			3	Trifluralin	Tubutama-88
Sonora-II	28.11.89	00.05.90	80			3	Trifluralin	Tubutama-88
<b>New Zealand</b>								
Lincoln	21.09.90	04.03.91	-			-	Treflan, Gardoprim	FLIP 84-92C
<b>Portugal</b>								
Elvas	16.03.90	25.07.90	60	60		-	Thiram, Carbendazim	Chk510- Elvas
<b>Syria</b>								
Tel Hadya	04.12.89	05.06.90	50			-	Kerb, Igran, Bravo	ILC 3279

Table 3.10.2. Adjusted time to flowering (days) of entries at different locations in the CISH-LA during 1989/90.

Entry Name	Pedigree	Origin	CANADA		MEXICO		PORTUGAL	SYRIA	(1)
			Saskatoon	Sonora-I	Sonora-II	Elvas	Tel Hadya	Overall Mean	
ILC 97	-	Iraq	-	59	95	63	-	72	
ILC 99	-	Iraq	46	101	69	62	137	77	
ILC 149	-	Spain	49	70	97	62	-	76	
ILC 169	-	Tunisia	-	80	97	65	140	81	
ILC 613	-	Tunisia	51	73	95	63	138	77	
ILC 1272	-	Turkey	-	70	97	65	-	77	
ILC 2397	-	Turkey	-	70	69	63	-	67	
ILC 2575	-	Turkey	-	97	95	61	136	84	
ILC 3356	-	Spain	50	83	95	67	136	82	
ILC 3363	-	Spain	51	70	70	63	-	68	
ILC 3367	-	Spain	-	94	81	63	138	79	
ILC 3377	-	Spain	50	83	74	63	140	73	
ILC 3546	-	U.S.A.	51	56	70	62	-	63	
ILC 3808	Pch 9	Morocco	50	94	81	63	139	79	
ILC 3847	Pch 106	Morocco	-	94	69	63	140	75	
ILC 3930	-	Chile	50	80	69	63	137	71	
ILC 4152	-	Tunisia	51	80	81	61	136	74	
ILC 4178	-	Tunisia	51	80	74	63	133	72	
ILC 4184	-	Tunisia	50	83	74	65	132	74	
ILC 6074	-	U.S.A.	-	94	97	63	139	85	
FLIP 85- 11C	X83 TH 19/FLIP 82-65CXFLIP 82-69C	ICARDA/ICRISAT	-	97	95	63	132	85	
FLIP 85-133C	X83 TH 23/FLIP 82-69CXFLIP 82-72C	ICARDA/ICRISAT	51	94	81	67	139	81	
FLIP 85-142C	X83 TH 23/FLIP 82-69CXFLIP 82-72C	ICARDA/ICRISAT	-	97	95	63	138	85	
FLIP 86-100C	X82 TH 137/(ILC 97XILC194)XILC2956	ICARDA/ICRISAT	-	59	95	63	136	72	
FLIP 86-110C	X82 TH 91/ILC 202XILC 464	ICARDA/ICRISAT	-	94	102	64	140	87	
FLIP 87- 1C	X85 TH 139/ILC 620XFLIP 82-59C	ICARDA/ICRISAT	53	80	81	63	142	75	
FLIP 87- 24C	X83 TH 23/FLIP 82-69CXFLIP 82-72C	ICARDA/ICRISAT	51	70	76	63	140	70	
FLIP 81-293C	X79 TH 8/ILC 191XILC496	ICARDA/ICRISAT	50	81	84	63	137	76	
(Improved check)									
ILC 482 (Long term check)		Turkey	45	78	82	63	137	74	
Local check			47	60	66	66	138		
Location Mean			50	79	82	63	138		
S.E. of Mean			0.65	1.93	7.32	0.51	0.81		
L.S.D. at 5% for Checks			2.56	7.55	28.72	2.00	3.16		
Checks Vs T.E.			4.44	13.08	49.75	3.46	5.47		
T.E. in S.B.			5.12	15.11	57.44	4.00	6.32		
T.E. in D.B.			4.18	12.34	46.91	3.26	5.16		
C.V. %			3.45	4.20	15.37	1.39	1.22		

(1) Saskatoon and Tel Hadya were excluded from the overall mean

Table 3.10.3. Adjusted time to maturity (days) of entries at different locations in the CISH-LA during 1989/90.

Entry Name	CANADA		MEXICO		PORTUGAL	SYRIA		(1)
	Saskatoon	Sonora-I	Sonora-II	Elvas	Tel Hadya	Overall Mean		
ILC 97	-	114	112	102	-	108		
ILC 99	124	147	112	99	182	123		
ILC 149	127	132	112	98	182	115		
ILC 169	-	140	112	101	182	121		
ILC 613	93	135	112	104	183	119		
ILC 1272	-	132	112	109	182	121		
ILC 2397	-	132	112	100	182	116		
ILC 2575	-	150	112	107	183	128		
ILC 3356	90	143	112	111	183	127		
ILC 3363	93	132	-	102	184	117		
ILC 3367	-	147	-	101	184	124		
ILC 3377	-	143	-	103	183	123		
ILC 3546	94	111	-	103	184	107		
ILC 3808	-	147	-	102	184	125		
ILC 3847	-	147	112	102	182	125		
ILC 3930	127	140	112	101	182	121		
ILC 4152	94	140	-	102	184	121		
ILC 4178	94	140	-	100	177	120		
ILC 4184	-	143	-	104	179	123		
ILC 6074	22	147	112	98	182	123		
FLIP 85- 11C	-	150	112	102	175	126		
FLIP 85-133C	92	147	-	112	184	130		
FLIP 85-142C	-	150	112	104	179	127		
FLIP 86-100C	-	114	112	103	183	108		
FLIP 86-110C	-	147	-	112	184	130		
FLIP 87- 1C	-	140	-	101	184	121		
FLIP 87- 24C	127	132	-	98	182	115		
FLIP 81-293C	103	141	112	100	183	121		
ILC 482	65	138	112	100	183	119		
Local check	101	120	95	110	180			
Location Mean	96	137	112	103	182			
S.E. of Mean	18.72	1.54	0.00	0.56	1.02			
L.S.D. at 5% for:								
Checks	73.49	6.04	0.01	2.20	4.00			
Checks Vs T.E.	127.28	10.47	0.02	3.82	6.92			
T.E. in S.B.	146.97	12.09	0.03	4.41	8.00			
T.E. in D.B.	120.02	9.87	0.02	3.60	6.53			
C.V. %	59.89	1.94	0.01	0.94	1.00			

(1) Saskatoon, Sonora-II and Tel Hadya were excluded from the overall mean

Table 3.10.4. Adjusted plant height (cm) of entries at different loations in the CISH-LA during 1989/90.

Entry Name	MEXICO		PORTUGAL	NEW ZEALAND	SYRIA	Overall Mean
	Sonora-I	Sonora-II	Elvas	Lincoln	Tel Hadya	
ILC 97	43	37	21	27	20	32
ILC 99	43	32	21	26	24	31
ILC 149	43	37	24	35	-	35
ILC 169	33	32	22	22	22	27
ILC 613	53	42	25	27	21	37
ILC 1272	38	37	20	27	-	31
ILC 2397	43	32	14	22	-	28
ILC 2575	38	37	21	30	23	32
ILC 3356	53	37	21	29	20	35
ILC 3363	58	31	20	24	-	33
ILC 3367	53	36	22	25	26	34
ILC 3377	58	27	24	22	20	33
ILC 3546	63	26	15	22	-	31
ILC 3808	48	31	19	27	23	31
ILC 3847	48	42	25	27	25	36
ILC 3930	48	37	25	25	22	34
ILC 4152	38	31	17	26	18	28
ILC 4178	53	36	21	29	26	35
ILC 4184	48	37	24	28	21	35
ILC 6074	48	32	23	21	15	31
FLIP 85- 11C	63	52	19	25	32	40
FLIP 85-133C	63	41	17	27	29	37
FLIP 85-142C	58	57	24	29	34	42
FLIP 86-100C	53	52	23	25	26	39
FLIP 86-110C	73	51	30	25	27	45
FLIP 87- 1C	48	26	20	26	23	30
FLIP 87- 24C	68	52	25	25	40	43
FLIP 81-293C	52	37	21	27	26	34
ILC 482	45	33	18	27	19	31
Local check	43	37	22	27	39	
Location Mean	50	37	21	26	25	
S.E. of Mean	3.33	0.96	0.94	0.94	1.21	
L.S.D. at 5% for:						
Checks	13.08	3.78	3.70	3.70	4.73	
Checks Vs T.E.	22.66	6.54	6.41	6.41	8.20	
T.E. in S.B.	26.17	7.55	7.40	7.40	9.47	
T.E. in D.B.	21.37	6.17	6.04	6.04	7.73	
C.V. %	11.52	4.48	7.69	6.21	9.63	

(1) Tel Hadya was excluded from the overall mean



Table 3.10.5. Adjusted 100-seed weight (g) of entries at different locations in the CISN-LA during 1989/90.

Entry Name	MEXICO		PORTUGAL	NEW ZEALAND	SYRIA	(1)
	Sonora-I	Sonora-II	Elvas	Lincoln	Tel Hadya	Overall Mean
ILC 97	38	51	50	39	48	42
ILC 99	38	44	28	38	43	35
ILC 149	33	49	44	37	-	38
ILC 169	28	45	43	28	42	33
ILC 613	43	40	42	43	49	43
ILC 1272	38	39	40	28	-	36
ILC 2397	28	43	45	37	-	37
ILC 2575	33	46	41	43	45	39
ILC 3356	28	49	44	29	50	34
ILC 3363	53	-	59	33	-	49
ILC 3367	43	-	53	34	52	44
ILC 3377	28	-	49	39	37	39
ILC 3546	53	-	49	37	-	46
ILC 3808	33	-	56	32	50	40
ILC 3847	38	49	51	42	51	44
ILC 3930	38	39	47	37	49	41
ILC 4152	38	-	47	41	48	42
ILC 4178	43	31	45	42	49	43
ILC 4184	42	40	51	30	48	41
ILC 6074	43	51	53	37	37	45
FLIP 85- 11C	28	37	37	43	40	36
FLIP 85-133C	33	-	40	37	40	37
FLIP 85-142C	38	43	40	39	45	39
FLIP 86-100C	38	38	37	42	42	39
FLIP 86-110C	43	46	46	26	39	38
FLIP 87- 1C	33	-	39	34	33	36
FLIP 87- 24C	38	-	32	37	36	36
FLIP 81-293C	30	27	28	39	26	32
ILC 482	27	31	32	43	28	34
Local check	48	53	38	39	27	
Location Mean	37	42	42	37	42	
S.E. of Mean	1.67	1.22	0.48	0.51	2.48	
L.S.D. at 5% for:						
Checks	6.54	4.79	1.87	1.99	9.73	
Checks Vs T.E.	11.33	8.29	3.24	3.45	16.85	
T.E. in S.B.	13.08	9.57	3.74	3.98	19.45	
T.E. in D.B.	10.69	7.82	3.06	3.25	15.89	
C.V. %	7.79	6.82	1.98	2.34	12.83	

(1) Sonora-II and Tel Hadya were excluded from the overall mean

Table 3.10.6. Adjusted seed yield (Y=kg/ha) and rank (R) of entries at different locations in the CISE-LA during 1989/90.

Entry Name	CANADA		MEXICO				NEW ZEALAND		PORTUGAL		SYRIA		(1) Overall Mean	
	Saskatoon		Sonora-I		Sonora-II		Lincoln		Elvas		Tel Hadya		Y	R
	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R		
ILC 97	-	-	1991	15	358	14	2036	13	381	9	521	22	1469	10
ILC 99	7825	1	2685	7	218	17	1670	18	293	17	195	26	1549	6
ILC 149	7607	2	1602	21	1011	3	2044	12	430	4	-	-	1359	18
ILC 169	-	-	1769	16	202	18	2089	10	268	23	722	12	1375	15
ILC 613	95	21	1657	19	280	15	1972	14	427	5	781	10	1352	19
ILC 1272	-	-	1435	26	404	11	2387	6	405	7	-	-	1409	13
ILC 2397	-	-	1602	22	1898	1	1733	16	184	29	-	-	1173	25
ILC 2575	-	-	303	30	467	9	1528	20	406	6	813	7	746	29
ILC 3356	5831	5	1574	23	591	6	2150	9	448	3	1003	2	1391	14
ILC 3363	2398	9	1657	20	0	25	637	28	272	21	193	27	855	28
ILC 3367	-	-	1282	27	0	24	2339	7	288	18	669	17	1303	21
ILC 3377	113	19	1199	28	109	20	2938	2	302	15	711	13	1480	9
ILC 3546	398	18	2616	8	-	28	510	29	197	28	199	25	1108	26
ILC 3808	107	20	3074	3	-	29	2885	3	351	12	675	16	2103	2
ILC 3847	-	-	1519	25	389	12	2311	8	263	24	512	23	1364	17
ILC 3930	6907	3	1560	24	-	22	2063	11	172	30	684	14	1265	22
ILC 4152	525	16	2907	6	-	27	942	27	268	22	542	21	1372	16
ILC 4178	498	17	3366	2	109	21	1170	25	234	26	917	5	1590	4
ILC 4184	595	15	1074	29	545	7	2747	5	544	1	984	4	1455	11
ILC 6074	-	-	4227	1	1727	2	1943	15	234	27	557	20	2135	1
FLIP 85- 11C	-	-	3032	4	700	4	1312	24	273	20	1117	1	1539	8
FLIP 85-133C	1429	22	2157	13	-	23	440	30	322	14	808	8	973	27
FLIP 85-142C	-	-	1741	18	482	8	1414	22	369	11	984	3	1174	24
FLIP 86-100C	-	-	2449	10	625	5	1369	23	477	2	941	18	1432	12
FLIP 86-110C	-	-	2532	9	467	10	1716	17	393	8	624	19	1547	7
FLIP 87- 1C	-	-	2366	11	-	26	2789	4	284	19	675	15	1813	3
FLIP 87- 24C	4071	7	2352	12	109	30	997	26	243	25	804	9	1197	23
FLIP 81-293C	3512	8	2986	5	150	19	1422	21	332	13	218	24	1580	5
ILC 482	4876	6	2097	14	249	16	1663	19	293	16	779	11	1351	20
Local check	6224	4	1764	17	379	13	2952	1	378	10	889	6		
Location Mean	3118		2119		521		1840		326		686			
S.E. of Mean	1121.25		562.00		57.05		334.53		50.68		294.80			
L.S.D. at 5% for:														
Checks	4401.22		2206.00		223.94		1313.13		198.92		1157.18			
Checks Vs T.E.	7623.14		3820.90		387.87		2274.40		344.54		2004.30			
T.E. in S.B.	8802.44		4411.99		447.87		2626.25		397.84		2314.36			
T.E. in D.B.	7188.25		3602.92		365.74		2144.65		324.89		1889.96			
C.V. %	85.30		45.95		27.78		31.49		26.92		90.08			
T.E. > L. Check	0		0		3		0		0		0			

(1) Saskatoon, Sonora-II and Tel Hadya were excluded from the overall mean.

### 3.11. CHICKPEA INTERNATIONAL F<sub>4</sub> NURSERY

There were two Chickpea International F<sub>4</sub> Nurseries namely Chickpea International F<sub>4</sub> Nursery - Mediterranean Region (CIF<sub>4</sub>N-MR) and Chickpea International F<sub>4</sub> Nursery - Southernly Latitudes (CIF<sub>4</sub>N-SL).

#### Material

The material for both of the Chickpea International F<sub>4</sub> Nurseries comprised 24 F<sub>4</sub> populations which were derived from different crosses, and two checks, namely ILC 482 (which was supplied by ICARDA) and the local check (which was to be added by the cooperator). The populations were assumed to provide a wide range of variation within which the cooperators were free to practice their own selection.

#### Methods and Management

The nursery was planted in a systematic block design. The suggested plot size was 4 rows, 4 meter long with an inter- and intra row spacings of 30 - and 10 cm, respectively. Twenty six sets of CIF<sub>4</sub>N-MR and 17 sets of CIF<sub>4</sub>N-SL were distributed to cooperators in 12 and 8 countries, respectively. The results were, however, received back for 12 locations for CIF<sub>4</sub>N-MR and one location for CIF<sub>4</sub>N-SL.

#### Results and Discussion

The locations reporting the usefulness of these materials with number of plant selections made from CIF<sub>4</sub>N-MR and CIF<sub>4</sub>N-SL are given in Tables 3.11.1 and 3.11.2 respectively.

### 3.12. CHICKPEA INTERNATIONAL ASCOCHYTA BLIGHT NURSERY (CIAEN)

#### Material

Two Chickpea International Ascochyta Blight Nurseries CIAEN-A (for kabuli types) and CIAEN-B (for kabuli and desi types) were developed. CIAEN-A included 40 test entries which were all kabuli types; and CIAEN-B included 60 entries out of which 40 entries were same as that of CIAEN-A and 20 entries were of desi types. In these nurseries 43 test entries were from the materials developed through hybridization at ICARDA. The susceptible check was ILC 263.

#### Methods and Management

The suggested experimental design was randomized complete block with two replications. The suggested plot size was one row 4 m long accommodating 40 plants. The susceptible check was repeatedly sown after every two test entries/rows to serve as an indicator cum spreader row. The cooperators in the Mediterranean region were advised to sow the nursery in the winter season instead of the usual spring season to get high disease pressure. Otherwise the nurseries were managed as per the local agronomic practices. In the absence of natural infestation, the cooperators were advised to do the artificial inoculation of the nursery with the blight disease either by scattering the diseased debris collected from the previous season or by supplementing the natural infection by spraying the spore suspension prepared from the freshly infected plants in the fields. A 1-9 scale (where 1 = highly resistant, 3 = resistant, 5 = tolerant, 7 = susceptible, and 9 = highly susceptible) was recommended for scoring the disease severity at

Table 3.11.1. Number of plants selected by cooperators in the CIF4N-MR during 1989/90

Cross No.	Pedigree	Origin	ALGERIA		PORTUGAL	SPAIN		SYRIA		TURKEY	
			Setif	Elvas	Bada- joz	Al- Ghab	Homs	Tel- Hadya	Ama- sya	Diyar- bakir	
87TH 2	ILC 482 X FLIP83- 72C	ICARDA/ICRISAT	10	5	-	2	4	3	18	2	
87TH 3	ILC 482 X FLIP84- 78C	ICARDA/ICRISAT	9	2	-	5	3	6	1	2	
87TH 13	ILC 295 X FLIP83- 48C	ICARDA/ICRISAT	10	2	-	6	3	5	1	-	
87TH 18	ILC 493 X FLIP84- 78C	ICARDA/ICRISAT	11	5	-	6	4	7	4	4	
87TH 20	ILC 576 X FLIP84- 93C	ICARDA/ICRISAT	8	2	-	5	5	4	4	3	
87TH 31	FIP83- 7C X FLIP84- 92C	ICARDA/ICRISAT	9	1	5	8	5	3	6	8	
87TH 33	FLIP83-15C X FLIP84- 92C	ICARDA/ICRISAT	10	2	-	7	6	4	2	5	
87TH 35	FLIP83-47C X FLIP84-143C	ICARDA/ICRISAT	7	3	-	-	4	3	9	3	
87TH 54	ILC5342 X FLIP84- 81C	ICARDA/ICRISAT	10	2	-	3	5	3	-	-	
87TH 86	FLIP84- 78C X ILC4921	ICARDA/ICRISAT	9	2	-	8	4	6	11	3	
87TH 94	FLIP84-164C X ILC4921	ICARDA/ICRISAT	8	3	-	5	5	4	1	-	
87TH101	FLIP85- 1C X FLIP83- 47C	ICARDA/ICRISAT	11	2	4	5	4	5	15	4	
87TH106	FLIP85- 1C X FLIP84- 78C	ICARDA/ICRISAT	10	3	2	-	4	6	19	2	
87TH107	FLIP85- 1C X FLIP84- 81C	ICARDA/ICRISAT	10	5	5	6	3	3	6	16	
87TH111	FLIP85- 2C X FLIP84- 81C	ICARDA/ICRISAT	6	0	-	5	4	4	20	4	
87TH112	FLIP85- 2C X FLIP84- 91C	ICARDA/ICRISAT	11	1	-	8	5	5	8	4	
87TH167	ILC1919 X FLIP83- 47C	ICARDA/ICRISAT	10	2	-	6	6	5	5	-	
87TH175	ILC 482 X FLIP83- 47C	ICARDA/ICRISAT	10	3	-	3	5	3	1	-	
87TH184	ICC14197X FLIP83- 48C	ICARDA/ICRISAT	10	4	-	5	5	5	1	-	
87TH211	ILC 237 X FLIP83- 72C	ICARDA/ICRISAT	9	0	-	-	5	3	1	-	
87TH214	ILC4296 X FLIP83- 72C	ICARDA/ICRISAT	7	1	2	5	5	3	6	2	
87TH217	Be-Se-81-48 X FLIP83- 72C	ICARDA/ICRISAT	9	5	-	6	5	4	16	3	
87TH296	(ILC 116XFLIP81-65C)XILC116	ICARDA/ICRISAT	8	1	-	0	4	5	9	3	
87TH320	(PL-Se- (PL-Se-Be-81-125X FLIP83-97C)XFLIP85-62C	ICARDA/ICRISAT	8	6	-	6	5	3	11	1	
ILC 482	-	Turkey	-	-	-	-	-	-	-	-	
Local check	-	-	-	-	-	-	-	-	-	-	

Table 3.11.2. Number of plants selected by cooperators in the CIF4N-SL during 1989/90

Cross No	Pedigree	Origin	PAKISTAN
			Faisalabad
87TH 4	ILC 482 X FLIP84- 79C	ICARDA/ICRISAT	-
87TH 5	ILC 482 X FLIP84- 93C	ICARDA/ICRISAT	-
87TH 6	FLIP81-293C X FLIP83- 47C	ICARDA/ICRISAT	5
87TH 7	FLIP81-293C X FLIP83- 72C	ICARDA/ICRISAT	-
87TH 9	FLIP81-293C X FLIP84- 79C	ICARDA/ICRISAT	5
87TH 10	FLIP81-293C X FLIP84- 93C	ICARDA/ICRISAT	5
87TH 19	ILC 576 X FLIP83- 48C	ICARDA/ICRISAT	-
87TH 21	ILC 610 X FLIP83- 48C	ICARDA/ICRISAT	-
87TH 30	FLIP82-150C X FLIP84-155C	ICARDA/ICRISAT	-
87TH 34	FLIP83- 15C X FLIP84-109C	ICARDA/ICRISAT	-
87TH 36	FLIP83- 47C X FLIP84-145C	ICARDA/ICRISAT	-
87TH 37	FLIP83- 48C X FLIP84-143C	ICARDA/ICRISAT	-
87TH 38	FLIP83- 48C X FLIP84-145C	ICARDA/ICRISAT	-
87TH 61	FLIP82-189C X FLIP84- 78C	ICARDA/ICRISAT	-
87TH 62	FLIP82-189C X FLIP84- 99C	ICARDA/ICRISAT	-
87TH125	FLIP84- 22C X ICC14218	ICARDA/ICRISAT	-
87TH136	FLIP84- 46C X FLIP82- 78C	ICARDA/ICRISAT	5
87TH176	ILC 482 X FLIP83- 48C	ICARDA/ICRISAT	-
87TH212	ILC 237 X FLIP84- 79C	ICARDA/ICRISAT	-
87TH213	ILC 237 X FLIP84- 93C	ICARDA/ICRISAT	-
87TH276	(ILC1919XFLIP84-18C)XFLIP83-47C	ICARDA/ICRISAT	-
87TH282	(ILC 237XFLIP84-18C)XFLIP84-99C	ICARDA/ICRISAT	-
87TH285	(ILC 482XFLIP81-293C)XILC 482	ICARDA/ICRISAT	-
87TH308	(ILC 493XFLIP82-150C)XILC 493	ICARDA/ICRISAT	-
ILC 482	-	Turkey	-
Local check	-	-	5

least at two times, first at the vegetative stage and the second at the podding stage.

Thirty two sets of CIABN-A and 20 sets of CIABN-B were distributed to cooperators in 10 countries each. The results were, however, received for 18 sets for CIABN-A and 9 sets for CIABN-B.

## Results and Discussion

The disease scores of the entries in each location are presented in Table 3.12.1. and discussed as under:

Algeria: The nursery was conducted at Guelma, Sidi Bel Abbes and Setif. All the Kabuli entries at Guelma were rated at 1 except the susceptible check which took rating of 9.

At Sidi Bel Abbes, the susceptible check took 9 rating and five more entries namely ILC 5902, FLIP 84-158C, FLIP 85-133C, FLIP 87-35C, and FLIP 87-76C also showed susceptible reaction. All other entries were tolerant or resistant.

At Setif, six entries namely FLIP 83-21C, FLIP 84-17C, FLIP 84-87C, FLIP 84-92C, FLIP 85-118C and FLIP 87-76C rated at 4 and were tolerant and the susceptible check took rating of 1.

Italy: The nursery was conducted at Avellino and Torrelama.

At Avellino, the susceptible check alongwith 11 other test entries took 5 rating and all others were rated 1 or 3.

At Torrelama the susceptible check took 9 rating and all other entries except FLIP 84-137C (which took rating of 7) were tolerant with 1 to 5 rating.

Pakistan: The nursery was sown at Faisalabad and Islamabad. Twenty entries each at Faisalabad and Islamabad showed tolerant reaction (rating between 1 and 5) but only two of these namely ILC 6043 and FLIP 84-182C were tolerant at both the sites.

Portugal: The nursery was sown at Elvas. Thirty one kabuli and 6 desi lines were rated as resistant or tolerant (between 1 and 5 rating) and others as susceptible.

Spain: The nursery was conducted at Badajoz. The susceptible check took the rating of 5. Thirteen, Forty and Seven took rating of 2, 3 and 5 respectively.

Syria: The nursery was sown at Al-Ghab, Tartus, Jableh and Tel Hadya. There was no disease development at Al Ghab, Jableh and Tartus. At Tel Hadya 15 entries were tolerant (rating between 1 and 5).

Turkey: The nursery was sown at Ankara and Amasya. At Ankara all the entries except the susceptible check (which took rating of 9) took rating between 1 and 5.

At Amasya all the entries except ILC 5924, FLIP 84-91C, FLIP 84-137C, FLIP 84-158C, FLIP 85-94C, FLIP 87-69C were rated at 3. The susceptible check was rated as 8.

Table 3.12.1. Reaction of chickpea entries to Ascochyta blight in CIABN during 1989/90

Entry Name	Pedigree	Origin	Seed Type	ALGERIA			ITALY	
				Guelma	Sidi-Bel Abbes	Setif	Ave-llino	Torre-lama
ILC 3279	-	USSR	Kabuli	1	1	6	3	3
ILC 5902	K - 1171	USSR	"	1	9	5	1	3
ILC 5918	K - 1286	USSR	"	1	1	6	3	3
ILC 5924	-	Bulgaria	"	1	1	6	5	1
ILC 6043	-	Tunisia	"	1	1	6	3	5
ILC 6090	K - 980	USSR	"	1	1	5	1	3
ILC 6188	E 36 H	France	"	1	1	6	1	3
FLIP 83- 7C	X80 TH 264/(ILC480XILC72)XILC263	ICARDA/ICRISAT	"	1	1	5	1	3
FLIP 83- 21C	X80 TH 176/ILC 72XILC 215	ICARDA/ICRISAT	"	1	3	4	3	3
FLIP 83- 48C	X80 TH 176/ILC 72XILC 215	ICARDA/ICRISAT	"	1	1	6	3	3
FLIP 83- 71C	X80 TH 176/ILC 72XILC 215	ICARDA/ICRISAT	"	1	1	6	5	5
FLIP 83- 97C	X80 TH 176/ILC 72XILC 215	ICARDA/ICRISAT	"	1	1	5	5	5
FLIP 84- 17C	X79 TH 221/ILC 72XILC1922	ICARDA/ICRISAT	"	1	1	4	5	5
FLIP 84- 78C	X80 TH 176/ILC 72XILC 215	ICARDA/ICRISAT	"	1	1	5	5	5
FLIP 84- 79C	X80 TH 176/ILC 72XILC 215	ICARDA/ICRISAT	"	1	1	6	3	3
FLIP 84- 80C	X80 TH 176/ILC 72XILC 215	ICARDA/ICRISAT	"	1	1	6	1	5
FLIP 84- 81C	X80 TH 176/ILC 72XILC 215	ICARDA/ICRISAT	"	1	1	5	5	3
FLIP 84- 83C	X80 TH 176/ILC 72XILC 215	ICARDA/ICRISAT	"	1	1	5	3	1
FLIP 84- 87C	X80 TH 176/ILC 72XILC 215	ICARDA/ICRISAT	"	1	1	4	5	5
FLIP 84- 91C	X80 TH 176/ILC 72XILC 215	ICARDA/ICRISAT	"	1	1	6	3	3
FLIP 84- 92C	X80 TH 176/ILC 72XILC 215	ICARDA/ICRISAT	"	1	1	4	3	5
FLIP 84- 93C	X80 TH 176/ILC 72XILC 215	ICARDA/ICRSIAT	"	1	1	5	3	3
FLIP 84- 99C	X80 TH 176/ILC 72XILC 215	ICARDA/ICRISAT	"	1	1	6	3	3
FLIP 84-102C	X80 TH 176/ILC 72XILC 215	ICARDA/ICRISAT	"	1	3	5	3	3
FLIP 84-112C	X81 TH 53/ILC1920XILC2506	ICARDA/ICRISAT	"	1	3	5	3	3
FLIP 84-133C	X81 TH 129/ILC 202XILC 262	ICARDA/ICRISAT	"	1	1	5	3	3
FLIP 84-137C	X81 TH 241/ILC 482XILC 201	ICARDA/ICRISAT	"	1	1	5	5	7
FLIP 84-158C	X81 TH 247/ILC 482XILC2956	ICARDA/ICRISAT	"	1	7	5	5	5
FLIP 84-182C	X80 TH 176/ILC 72XILC 215	ICARDA/ICRISAT	"	1	1	6	3	5
FLIP 85- 79C	X83 TH 81/ILC2593XFLIP 81-67C	ICARDA/ICRISAT	"	1	1	6	3	5

Cont'd. ...

Table 3.12.1. Cont'd. ...

Entry Name	Pedigree	Origin	Seed Type	ALGERIA			ITALY	
				Guelma	Sidi-Bel Abbes	Setif	Ave-llino	Torre-lama
FLIP 85- 94C	X81 TH 248/ILC 482XILC3279	ICARDA/ICRISAT	Kabuli	1	1	7	3	5
FLIP 85-114C	X80 TH 176/ILC 72XILC 215	ICARDA/ICRISAT	"	1	1	6	5	5
FLIP 85-116C	X80 TH 176/ILC 72XILC 215	ICARDA/ICRISAT	"	1	1	5	1	5
FLIP 85-118C	X82 TH 146/ILC 72XILC 73	ICARDA/ICRISAT	"	1	1	4	5	5
FLIP 85-133C	X83 TH 23/FLIP 82-69CXFLIP 82-72C	ICARDA/ICRISAT	"	1	7	6	1	5
FLIP 85-151C	L 550 X ILC 72	ICARDA/ICRISAT	"	1	1	6	3	5
FLIP 87- 35C	X83 TH 159/UC 5XFLIP 81-59W	ICARDA/ICRISAT	"	1	9	5	3	5
FLIP 87- 36C	X83 TH 121/FLIP 82-69CXFLIP 82-92C	ICARDA/ICRISAT	"	1	1	6	3	5
FLIP 87- 69C	X83 TH 15/FLIP 81-57CXFLIP 82-69C	ICARDA/ICRISAT	"	1	1	7	3	5
FLIP 87- 76C	X83 TH 19/FLIP 81-65CXFLIP 82-69C	ICARDA/ICRISAT	"	1	7	4	3	5
FLIP 87-501C	X82 TH 170/RC32XICC1772	ICARDA/ICRISAT	Desi	-	-	-	-	-
FLIP 87-502C	X82 TH 171/C44XICC1772	ICARDA/ICRISAT	"	-	-	-	-	-
FLIP 87-503C	H208XE100Y-1	ICARDA/ICRISAT	"	-	-	-	-	-
FLIP 87-504C	H208XE100Y-1	ICARDA/ICRISAT	"	-	-	-	-	-
FLIP 87-505C	H208XE100Y-1	ICARDA/ICRISAT	"	-	-	-	-	-
FLIP 87-506C	H208XE100Y-1	ICARDA/ICRISAT	"	-	-	-	-	-
FLIP 87-507C	H208XE100Y-2	ICARDA/ICRISAT	"	-	-	-	-	-
FLIP 87-508C	H208XE100Y-2	ICARDA/ICRISAT	"	-	-	-	-	-
FLIP 87-509C	ILC3279XH75-35	ICARDA/ICRISAT	"	-	-	-	-	-
FLIP 87-510C	ILC3279XH75-35	ICARDA/ICRISAT	"	-	-	-	-	-
ICC 13251	-	-	"	-	-	-	-	-
ICC 13266	-	-	"	-	-	-	-	-
ICC 13269	-	-	"	-	-	-	-	-
ICC 13301	-	-	"	-	-	-	-	-
ICC 13416	-	-	"	-	-	-	-	-
ICC 13497	-	-	"	-	-	-	-	-
ICC 13508	-	-	"	-	-	-	-	-
ICC 13528	-	-	"	-	-	-	-	-
ICC 13555	-	-	"	-	-	-	-	-
ICC 13728	-	-	"	-	-	-	-	-
ILC 263	Susceptible repeated check	-	"	9	9	1	5	9



Table 3.12.1. Cont'd. ...

Entry Name	PAKISTAN		PORTUGAL	SPAIN	SYRIA			TURKEY	
	Faisal- abad	Isl- amabad	Elvas	Bada- joz	Al - Ghab	Tartus	Tel- Hadya	Ankara	Amasya
ILC 3279	5	6	3	2	3	1	7	3	3
ILC 5902	9	4	6	5	3	1	6	3	3
ILC 5918	5	7	4	3	3	1	8	3	3
ILC 5924	9	6	6	3	1	1	6	5	6
ILC 6043	3	5	2	3	3	1	6	3	3
ILC 6090	9	5	3	5	3	1	6	3	3
ILC 6188	7	7	2	3	3	1	8	3	3
FLIP 83- 7C	5	9	6	5	3	1	6	3	3
FLIP 83- 21C	9	8	5	2	3	1	5	3	3
FLIP 83- 48C	7	4	5	3	3	1	5	3	3
FLIP 83- 71C	9	6	5	3	3	1	6	3	3
FLIP 83- 97C	5	6	2	3	3	1	7	3	3
FLIP 84- 17C	7	9	7	2	3	1	8	5	3
FLIP 84- 78C	7	7	4	3	3	1	9	3	3
FLIP 84- 79C	7	3	3	3	3	1	5	3	3
FLIP 84- 80C	7	5	4	3	3	1	6	3	3
FLIP 84- 81C	9	5	4	3	1	1	5	3	3
FLIP 84- 83C	7	7	4	2	3	1	5	3	3
FLIP 84- 87C	7	8	6	3	3	1	6	3	3
FLIP 84- 91C	7	7	4	3	3	1	5	3	6
FLIP 84- 92C	9	5	3	2	3	1	7	3	3
FLIP 84- 93C	7	4	3	3	3	1	5	3	3
FLIP 84- 99C	3	8	3	3	3	1	8	3	3
FLIP 84-102C	9	5	4	2	3	1	6	3	3
FLIP 84-112C	7	7	4	3	1	1	3	3	3
FLIP 84-133C	7	3	7	3	3	1	4	3	3
FLIP 84-137C	9	6	5	2	3	1	5	3	6
FLIP 84-158C	9	8	6	3	3	1	6	3	6
FLIP 84-182C	5	5	3	3	3	1	6	3	3
FLIP 85- 79C	7	8	4	3	3	1	8	3	3

Cont'd. ...

Table 3.12.1. Cont'd. ...

Entry Name	PAKISTAN		PORTUGAL	SPAIN	SYRIA			TURKEY	
	Faisal- abad	Isl- amabad	Elvas	Bada- joz	Al - Ghab	Tartus	Tel- Hadya	Ankara	Amasya
FLIP 85- 94C	9	8	5	2	3	1	8	3	6
FLIP 85-114C	7	5	3	3	1	1	7	3	3
FLIP 85-116C	7	8	5	3	3	1	8	3	3
FLIP 85-118C	9	8	4	5	1	1	7	3	3
FLIP 85-133C	7	9	4	2	3	1	6	3	3
FLIP 85-151C	5	9	3	3	3	1	6	3	3
FLIP 87- 35C	9	9	7	5	3	1	7	3	3
FLIP 87- 36C	7	9	4	3	3	1	8	3	3
FLIP 87- 69C	5	8	5	5	3	1	6	3	6
FLIP 87- 76C	9	9	7	3	3	1	6	3	3
FLIP 87-501C	3	9	4	3	-	-	6	3	-
FLIP 87-502C	3	9	5	3	-	-	5	3	-
FLIP 87-503C	3	9	6	3	-	-	3	5	-
FLIP 87-504C	3	9	7	3	-	-	6	5	-
FLIP 87-505C	5	9	6	3	-	-	6	3	-
FLIP 87-506C	3	9	7	2	-	-	5	3	-
FLIP 87-507C	5	6	6	3	-	-	7	3	-
FLIP 87-508C	3	7	6	5	-	-	6	5	-
FLIP 87-509C	3	7	5	3	-	-	3	3	-
FLIP 87-510C	3	8	3	3	-	-	4	3	-
ICC 13251	5	9	7	2	-	-	7	-	-
ICC 13266	9	5	6	3	-	-	8	3	-
ICC 13269	9	4	6	2	-	-	6	3	-
ICC 13301	9	3	5	3	-	-	7	1	-
ICC 13416	9	3	6	3	-	-	7	1	-
ICC 13497	9	5	6	3	-	-	7	3	-
ICC 13508	9	3	6	3	-	-	6	3	-
ICC 13528	9	9	5	3	-	-	7	3	-
ICC 13555	9	7	6	3	-	-	6	3	-
ICC 13728	9	5	7	2	-	-	6	3	-
ILC 263	9	9	9	5	3	1	9	9	8

Out of 14 locations reporting the data for Ascochyta reaction of kabuli lines, and six locations reporting the data on desi lines, none of the desi or kabuli lines was tolerant across all locations. The entries, ILL 6043, ILL 6090, FLIP 83-21C, FLIP 83-48C, FLIP 83-97C, FLIP 84-79C, FLIP 84-81C, FLIP 84-83C, FLIP 84-92C, FLIP 84-93C, FLIP 84-102C, FLIP 84-112C, FLIP 84-133C, FLIP 84-182C, FLIP 87-502C, FLIP 87-509C, and FLIP 87-510C exhibited tolerant reaction at more than 80% locations where the evaluation were done and were thus better sources of tolerance to Ascochyta blight.

### 3.13. CHICKPEA INTERNATIONAL LEAF MINER NURSERY (CILMN)

#### Material

The Chickpea International Leaf Miner Nursery comprised 30 test entries and one susceptible check, ILC 3397.

#### Methods and Management

The suggested experimental design was randomized complete block with two replications. The suggested plot size was one row 4 m long accommodating 40 plants. The susceptible check was repeatedly sown after every two test entries to serve as an indicator row. A 1-9 scale (where 1 = highly resistant; 3 = resistant; 5 = tolerant; 7 = susceptible; and 9 = highly susceptible) was recommended for scoring the severity of infestation at the vegetative, flowering and mid podding stage.

Twenty two sets of leaf miner nursery were distributed to cooperators in 9 countries and the results were received for 10 sets from 6 countries.

#### Results and Discussion

Out of 10 locations returning the data books, the leaf miner tolerance reaction was recorded only at six locations (Table 3.13.1) and the results are discussed as under:

Algeria: This nursery was conducted at Guelma and Setif. There was no leaf miner infestation at Setif, so no inferences were possible.

At Guelma, the susceptible check was rated at 9. All the entries except ILC 992, ILC 5351 and ILC 5621 were rated as resistance or tolerant (rating between 1 and 5).

Italy: At Avellino in Italy, except two entries (namely ILC 5600, and ILC 5664) all others were tolerant. The susceptible check took the rating of 7. Similarly at Torrelama, except two entries namely ILC 5616, ILC 5901 (which took rating of 9 alongwith susceptible check) all others were tolerant (rating  $\leq$  5).

Lebanon: At Terbol, the susceptible check took 8 rating. Nine genotypes showed tolerant reaction (4 or 5).

Syria: At Tel Hadya, there was not much natural infestation of leaf miner and thus no conclusive inferences could be made.

Table 3.13.1. Reaction of chickpea entries to leaf miner in CILMN during 1989/90.

Entry Name	Pedigree	Origin	ALGERIA		ITALY		LEBANON	SYRIA
			Guelma	Setif	Ave-llino	Torre-lama	Terbol	Tel-Hadya
ILC 316	-	Iran	3	1	3	4	5	3
ILC 394	-	Iran	3	1	1	3	6	3
ILC 655	-	Iran	3	1	3	4	5	3
ILC 822	-	Iran	5	1	3	3	5	3
ILC 992	-	Iran	7	1	3	3	5	3
ILC 1003	-	Iran	5	1	3	3	5	3
ILC 1009	-	Iran	3	1	3	4	4	3
ILC 1048	-	Iran	3	1	5	3	6	3
ILC 1216	-	Iran	3	1	3	3	5	3
ILC 1334	-	Afghanistan	3	1	5	4	7	3
ILC 3800	L-1852	Mexico	1	1	1	3	8	3
ILC 3828	Pch 65	Morocco	3	1	5	5	6	3
ILC 5351	PRT 82-A-140-B	Portugal	7	1	5	3	5	3
ILC 5580	ARI 00379	Cyprus	3	1	5	4	6	3
ILC 5591	PARC 1030-1	Pakistan	5	1	5	3	6	3
ILC 5600	PARC 1041-1	Pakistan	3	1	7	5	8	3
ILC 5609	PARC 1042-3	Pakistan	5	1	5	5	7	3
ILC 5614	PARC 1045-1	Pakistan	5	1	5	3	7	3
ILC 5615	PARC 1046-1	Pakistan	5	1	5	4	7	3
ILC 5616	PARC 1046-2	Pakistan	3	1	5	9	7	3
ILC 5621	PARC 1049-2	Pakistan	7	1	5	3	7	3
ILC 5624	PARC 1051-2	Pakistan	5	1	5	4	7	3
ILC 5641	PARC 1060-3	Pakistan	3	1	5	4	7	3
ILC 5648	PARC 1062-5	Pakistan	5	1	5	4	6	3
ILC 5655	PARC 1067-2	Pakistan	3	1	5	4	7	3
ILC 5664	PARC 1071-4	Pakistan	3	1	7	4	7	3
ILC 5665	PARC 1071-5	Pakistan	5	1	5	4	7	3
ILC 5667	PARC 1071-7	Pakistan	3	1	5	4	7	3
ILC 5682	PARC 1079-2	Pakistan	3	1	5	3	7	3
ILC 5901	K-1154	USSR	1	1	1	9	4	3
ILC 3397	(Repeated susceptible check)	-	9	1	7	9	8	4

Only six genotypes ILC 316, ILC 655, ILC 822, ILC 1003, ILC 1009 and ILC 1216 were tolerant to leaf miner across all the locations.

### **3.14. CHICKPEA INTERNATIONAL COLD TOLERANCE NURSERY (CICIN)**

#### **Material**

The Chickpea International Cold Tolerance Nursery (CICIN) comprised 40 test entries and one susceptible check, ILC 533. These test entries were selected on the basis of their reaction to cold under Tel Hadya conditions.

#### **Methods and Management**

The suggested experimental design was randomized complete block with two replications. The suggested plot size was one row 2 m long accommodating 20 plants. The susceptible check was repeatedly sown after every two test entries/rows to serve as an indicator row. The cooperators in the Mediterranean region were advised to sow the nursery early in to the winter or autumn instead of the usual spring season to get better expression of cold. Otherwise the nurseries were managed as per the local agronomic practices. It was suggested to record the number of plants germinated before the onset of severe winter.

A 1-9 scale was recommended for scoring the cold severity at different stages of cold occurrence where 1 = highly resistant; 3 = resistant; 5 = tolerant; 7 = susceptible; and 9 = highly susceptible.

Thirty-one sets of CICIN were distributed to cooperators in thirteen countries, however, the results were received for 16 sets from 9 countries.

#### **Results and Discussion**

Out of 16 locations returning the data books, the cold tolerance reaction was recorded only at seven locations (Table 3.14.1) and the results for these locations are discussed as under:

At Setif in Algeria, the susceptible check took 9 rating and 27 test entries were rated between 2 and 5 and were tolerant.

At Terbol in Lebanon the susceptible check took 9 rating and 28 entries exhibited rating between 3 and 5 and were tolerant.

At Tabuk in Saudi Arabia all the test entries except ILC 5638 and FLIP 85-83C took rating between 1 and 5; and the susceptible check took a rating of 7.

At Breda and Tel Hadya in Syria, only one entry ILC 3470 was rated as tolerant and all others were rated between 7 and 9.

At Erzurum in Turkey, six entries ILC 668, ILC 1467, ILC 3465, ILC 3468, FLIP 85-83C and FLIP 86-86C showed tolerant reaction (rating  $\leq$  5). However, at Diyarbakir all the entries except ILC 794 were tolerant. The susceptible check was rated at 9 at Erzurum and 8 at Diyarbakir.

The data on tolerance reaction across locations indicated that the entries ILC 1467, ILC 3468, ILC 3470, and FLIP 86-6C had relatively broad based tolerance to cold.

Table 3.14.1. Reaction of chickpea entries to cold in CICTN during 1989/90

Entry Name	Pedigree	Origin	ALGERIA	LEB-	SAUDI-	SYRIA		TURKEY	
			Setif	ANON	ARABIA	Breda	Tel-	Erzu-	Diy-
				bol	Tabuk	Hadya	rum	bakir	
ILC 668	-	Iran	8	5	3	8	7	3	3
ILC 794	-	Iran	3	9	3	9	8	7	7
ILC 1455	-	Afghanistan	3	5	3	9	9	6	2
ILC 1463	-	Afghanistan	5	3	3	9	8	7	2
ILC 1464	-	Afghanistan	6	5	3	8	9	7	2
ILC 1467	-	Afghanistan	2	5	3	9	8	5	3
ILC 1982	-	Iran	6	6	5	9	9	8	4
ILC 2772	-	Afghanistan	5	5	3	9	8	6	1
ILC 3287	-	Pakistan	7	5	3	9	9	7	2
ILC 3465	-	Spain	9	3	3	8	7	3	3
ILC 3468	-	Spain	1	5	3	8	8	5	3
ILC 3470	-	Spain	5	3	1	4	4	9	3
ILC 3861	-	Morocco	1	6	1	9	9	6	3
ILC 5600	-	Pakistan	9	7	3	8	9	9	3
ILC 5609	-	Pakistan	5	6	3	9	9	8	2
ILC 5615	-	Pakistan	4	3	3	9	8	6	2
ILC 5619	-	Pakistan	5	3	3	9	8	7	2
ILC 5638	-	Pakistan	3	3	7	9	8	9	2
ILC 5658	-	Pakistan	3	3	5	9	8	9	2
ILC 5668	-	Pakistan	4	3	3	9	8	6	2

Cont'd ...

Table 3.14.1 Cont'd ...

Entry Name	Pedigree	Origin	ALGERIA	LEB- ANON	SAUDI- ARABIA	SYRIA		TURKEY	
			Setif	Ter- boi	Tabuk	Breda	Tel- Hadya	Erzu- rum	Diy- bakir
ILC 5683	-	Pakistan	8	8	5	8	9	7	2
ILC 5702	-	Pakistan	5	5	3	8	8	7	3
ILC 5948	-	Pakistan	7	3	3	9	8	7	2
ILC 5950	-	Pakistan	9	5	3	8	8	9	1
ILC 482-205	ILC 482	Turkey	5	-	3	8	9	9	4
FLIP 82-114 C	X79TH123/ILC1929XILC200	ICARDA/ICRISAT	5	5	3	9	9	8	4
FLIP 82-204 C	X79TH 1/ILC118XILC183	ICARDA/ICRISAT	1	6	3	9	9	7	2
FLIP 83- 66 C	X80TH113/ILC1920XILC202	ICARDA/ICRISAT	4	5	3	8	9	7	2
FLIP 84-176 C	X80TH199/ILC3279XIC78184	ICARDA/ICRISAT	5	3	3	9	9	6	3
FLIP 84-188 C	X81TH 48/ILC1920XILC201	ICARDA/ICRISAT	5	9	3	9	8	9	2
FLIP 85- 4 C	X82TH 66/ILC2593XILC3279	ICARDA/ICRISAT	9	3	1	9	9	9	3
FLIP 85- 49 C	X83TH 23/FLIP82-69CXFLIP82-72C	ICARDA/ICRISAT	4	7	3	9	9	8	2
FLIP 85- 81 C	X83TH 81/ILC2593XFLIP81-67C	ICARDA/ICRISAT	1	6	1	9	8	9	2
FLIP 85- 83 C	X80TH113/ILC1920XILC202	ICARDA/ICRISAT	6	3	7	9	8	5	2
FLIP 85- 84 C	X80TH113/ILC1920XILC202	ICARDA/ICRISAT	6	5	3	8	8	9	2
FLIP 85- 93 C	X83TH 23/FLIP82-69CXFLIP82-72C	ICARDA/ICRISAT	1	3	3	8	9	8	1
FLIP 85-133 C	X83TH 23/FLIP82-69CXFLIP82-72C	ICARDA/ICRISAT	6	5	3	9	9	9	2
FLIP 86- 85 C	X83TH132/ILC195XFLIP82-78C	ICARDA/ICRISAT	1	6	5	9	9	9	1
FLIP 86- 86 C	X83TH 18/FLIP81-57CXFLIP82-72C	ICARDA/ICRISAT	5	5	3	9	9	3	4
FLIP 86- 87 C	X83TH 20/FLIP82-65CXFLIP82-72C	ICARDA/ICRISAT	1	3	3	9	9	7	2
ILC 533	(Repeated Susceptible check)	Egypt	9	9	7	9	9	9	8

#### **4. FABA BEAN INTERNATIONAL NURSERIES**

##### **Introduction**

Eight different types of trials/nurseries were available to cooperators. These included screening nursery for determinate types, disease nurseries, and agronomy trials. Except for agronomy trials all other nurseries are discussed in this section. The cooperators were free to use these materials in their breeding programs or for release as cultivars. The results reported by the cooperators are presented in the following pages.

##### **4.1. FABA BEAN INTERNATIONAL SCREENING NURSERY-DETERMINATE (FBISN-D)**

###### **Material**

The Faba Bean International Screening Nursery Determinate comprised 34 test entries and two checks. One of the checks namely IIB 1814 (an indeterminate check) was provided and the other was to be added by the cooperator. The entries in this nursery were selected on the basis of their superior performance in local trials.

###### **Methods and Management**

The test entries and two checks were suggested to be sown in single row plots of 4 m length with inter- and intra-row spacings of 50- and 10 cm, respectively, in a simple 6x6 lattice design with two replications. Fifty one sets of the nursery were distributed to the cooperators in 23 countries. The results were, however, received for 27 sets from 13 countries. The agronomic data received from the cooperators are presented in Table 4.1.1.

###### **Results and Discussion**

The entry means over all locations ranged between 88 to 92 days for time to flowering (Table 4.1.2), 160 to 164 for time to maturity (Table 4.1.3), 44 to 60 cm for plant height (Table 4.1.4), and 877 to 2615 kg/ha for seed yield (Table 4.1.5).

Among the entries, indeterminate entry IIB 1814 with seed yield of 2615 kg/ha ranked number one and was closely followed by determinate entries FLIP 86-107 FB (2171 kg/ha), FLIP 86-115 FB (1986 kg/ha), FLIP 86-114 FB (1964 kg/ha) and FLIP 86-145 FB (1961 kg/ha). The five heaviest yielders at each location are presented in Table 4.1.6.

##### **4.2. FABA BEAN INTERNATIONAL DISEASE SCREENING NURSERIES**

Faba bean entries having a moderate to a high level of resistance to ascochyta blight, chocolate spot and rust were identified at ICARDA's research sub-station at Lattakia in Syria. Seeds from these resistant sources were multiplied and used to form the Faba Bean International Ascochyta Blight, Chocolate Spot and Rust Screening Nurseries.



Table 4.1.1. Agronomic data for different locations in the FBISN-D during 1989/90.

Country	Location	Planting Date	Harvesting Date	Fertilizer (kg/ha)			Irrigation	Insecticide/Fungicide/Herbicide	Local Check
				N	P	K			
Algeria	Guelma	20.10.89	-		200		-		
Bangladesh	Mymensingh	26.11.89	24.03.90	-			-	FB 4	
Cyprus	Dromolaxia	12.12.89	24.05.90	100	100		-	ARI 000139	
Cyprus	Paphos	20.12.89	30.05.90	100	100		-	ARI 000139	
Ethiopia	Holetta	28.06.90					-	CS 20 DK	
Italy	Caltagirone	06.02.90	20.07.90	100	60		-	Sikelia	
Italy	Tolentino	11.12.89	20.07.90	-			-	Land Race without name (V Faba sb sp Equina)	
Italy	Valguarnera	19.12.89	26.05.90		100		-	SICANIA	
Lebanon	Terbol	30.11.89	00.06.90		50	2	-	Lebanese Local	
Libya	Tajoura	05.11.89		30	60		-	Aquadulce	
Libya	Zahra	19.10.89	10.05.90	30	60		-	Aquadulce	
Portugal	Elvas	10.11.89	01.06.90		60	60	-	Ebm 395	
Portugal	Oeiras	06.02.90	26.06.90	21	63	63	-	156556	
Saudi Arabia	Tabuk	19.11.89	00.05.90	150	276		+	NA	
Spain	Cordoba-I	10.01.90	06.06.90		84		-	Dimecron, Hand weeding	
Spain	Cordoba-II	09.01.90	06.06.90	-			-	Bladex, Fusilade	
Spain	Sevilla	17.01.90	19.07.90		42		-	Topogard, Dimethoate-40	
Syria	Hama	13.12.89	28.05.90	25	80	5	-	NA	
Syria	Homs	28.11.89	04.06.90	25	80	2	-	-	
Syria	Tartus	28.12.89	20.05.90	-			-	Roxion, hand weeding	
Syria	Tel Hadya	18.11.89	07.90		50		-	Tribunil, Fusilade, Lancer	
Tunisia	Beja-I	NA							
Tunisia	Beja-II	NA							
Tunisia	Oued Meliz-I	NA							
Tunisia	Oued Meliz-II	NA							
Turkey	Samsun	31.11.89		-			-		
Turkey	Izmir	27.11.89	09.07.90	30	60		-	Metasystox	

NA = Not available, + = Number and quantity not given

Table 4.1.2. Adjusted time to flowering (days) of entries at different locations in the FBISN-D during 1989/90.

Entry Name	Cross No.	ALGERIA	BANGLADESH	CYPRUS	ETHIOPIA		ITALY		LEBANON	LIBYA		
		Guelma	Mymensingh	Dromo-laxia	Paphos+	Holetta+	Calta-girone+	Tolentino+ Valguarnera+	Torbol	Tajoura	Zahra+	
FLIP 84-230 FB	S82226	130	90	91	87	63	73	100	87	114	74	78
FLIP 84-233 FB	S82231	130	99	94	84	65	72	101	87	114	72	76
FLIP 84-237 FB	S82237	-	90	90	87	63	70	99	87	113	73	78
FLIP 84-240 FB	S82238	130	89	88	83	64	76	98	85	115	71	76
FLIP 84-243 FB	S82239	130	93	95	85	65	73	99	86	117	76	76
FLIP 84-244 FB	S82241	141	91	90	81	66	73	98	86	116	74	76
FLIP 84-246 FB	S82229	130	88	91	84	63	68	101	86	114	73	76
FLIP 85-171 FB	S82238	130	100	94	85	71	68	101	85	115	75	78
FLIP 85-172 FB	S82238	128	100	93	83	61	75	103	86	116	74	76
FLIP 86-105 FB	S82221	133	94	90	82	60	72	99	86	112	72	76
FLIP 86-107 FB	S82229	130	94	90	85	61	73	99	85	115	74	76
FLIP 86-109 FB	S82238	130	91	90	82	64	76	101	86	117	80	78
FLIP 86-114 FB	S82244	130	82	93	83	61	76	103	86	117	75	76
FLIP 86-115 FB	S82244	130	103	96	80	61	75	104	86	115	78	76
FLIP 86-116 FB	S82252	130	96	93	83	59	70	99	87	112	71	76
FLIP 86-117 FB	S82221	130	100	93	81	64	85	103	86	117	79	81
FLIP 86-118 FB	S82232	128	89	91	80	62	73	102	87	113	76	76
FLIP 86-119 FB	S82238	141	86	90	86	63	73	101	85	115	71	76
FLIP 86-122 FB	S82238	130	110	94	84	72	76	101	86	116	81	76
FLIP 86-123 FB	S82238	129	89	93	83	64	76	100	86	116	75	76
FLIP 86-124 FB	S82238	130	86	93	79	70	78	102	85	116	80	76
FLIP 86-125 FB	S82238	120	92	93	88	63	78	104	86	121	76	76
FLIP 86-135 FB	D83033	130	86	90	81	59	72	99	86	113	71	76
FLIP 86-136 FB	D83063	127	91	94	90	61	72	99	86	118	73	76
FLIP 86-139 FB	D83164	133	83	91	83	59	70	98	86	112	73	76
FLIP 86-143 FB	D83279	-	88	95	83	63	73	100	87	116	74	76
FLIP 86-144 FB	D83279	141	97	90	85	62	70	104	87	117	74	76
FLIP 86-145 FB	D83032	141	88	93	84	64	76	103	87	118	76	76
FLIP 86-146 FB	D83066	130	102	98	82	62	78	106	86	119	81	76
FLIP 86-147 FB	D83104	128	87	93	83	65	76	101	87	117	78	78
FLIP 87- 94 FB	D83002	141	109	97	78	63	79	105	86	121	80	82
FLIP 88- 8 FB	D84264	130	88	90	81	62	73	104	86	119	76	76
FLIP 88- 10 FB	D84250	130	86	93	85	65	80	105	87	125	81	76
Ti.Sj.Dij. 1-85		128	91	98	80	65	76	109	86	122	74	76
ILB 1814		141	97	91	85	69	77	103	86	115	80	79
Local check		130	62	79	89	59	83	99	85	111	70	79
Location Mean		131	92	92	83	63	75	101	86	116	75	77
S.E. of Mean		0.17	4.71	0.56	2.26	1.44	2.66	1.07	0.59	1.15	1.99	0.94
L.S.D. at 5%		0.49	13.72	1.63	6.49	4.13	7.63	3.06	1.69	3.34	5.80	2.69
C.V. %		0.18	7.26	0.86	3.83	3.22	5.05	1.49	0.97	1.40	3.74	1.73
Error d.f.		25	25	25	35	35	35	35	35	25	25	35
Significance		*	*	*	NS	*	*	*	NS	*	*	*
Efficiency		100	118	108	-	-	-	-	-	104	113	-

Cont'd. ...

Table 4.1.2. Cont'd. ...

Entry Name	PORTUGAL		SAUDI ARABIA	SPAIN			SYRIA			TURKEY		Overall Mean	
	Elvas	Oeiras	Tabuk	Cordoba-I	Cordoba-II	Sevilla+	Hama	Homs	Tartus	Tel-Hadya	Samsun		Isair
FLIP 84-230 PB	100	58	95	68	77	66	92	119	80	116	128	109	89
FLIP 84-233 PB	101	55	91	67	75	66	91	118	79	116	128	109	89
FLIP 84-237 PB	96	55	95	68	78	68	92	119	79	115	124	106	88
FLIP 84-240 PB	96	55	94	71	78	69	95	118	78	116	127	112	89
FLIP 84-243 PB	101	56	97	71	81	67	96	119	80	117	127	109	90
FLIP 84-244 PB	99	55	94	72	77	66	94	119	80	118	126	109	89
FLIP 84-246 PB	101	56	94	68	77	66	97	119	79	117	128	109	89
FLIP 85-171 PB	96	55	90	68	74	67	93	118	79	116	131	112	90
FLIP 85-172 PB	101	53	94	71	78	66	96	120	79	117	128	109	90
FLIP 86-105 PB	96	57	97	69	76	66	92	118	78	116	124	109	88
FLIP 86-107 PB	97	57	91	67	75	67	94	120	80	118	127	109	89
FLIP 86-109 PB	104	56	97	67	77	66	97	118	82	117	128	115	90
FLIP 86-114 PB	101	56	88	70	77	66	95	119	82	117	129	115	89
FLIP 86-115 PB	99	59	93	70	81	69	97	120	81	118	130	112	91
FLIP 86-116 PB	95	54	95	69	74	67	94	119	78	116	127	109	88
FLIP 86-117 PB	98	53	97	71	77	70	94	118	79	117	126	109	91
FLIP 86-118 PB	100	57	96	69	79	66	93	118	79	113	128	109	89
FLIP 86-119 PB	95	53	97	70	76	66	94	118	80	114	127	112	88
FLIP 86-122 PB	102	51	93	69	80	72	97	118	84	119	126	116	92
FLIP 86-123 PB	97	57	91	70	74	66	93	119	81	115	125	112	89
FLIP 86-124 PB	100	56	91	68	80	66	96	118	82	118	129	115	90
FLIP 86-125 PB	101	57	96	70	79	71	99	119	82	121	126	112	91
FLIP 86-135 PB	95	52	98	69	76	65	89	119	78	117	128	109	88
FLIP 86-136 PB	96	57	90	67	78	67	94	119	80	114	130	106	89
FLIP 86-139 PB	98	58	95	66	76	67	95	119	78	114	131	106	88
FLIP 86-143 PB	97	53	97	69	77	67	95	118	81	117	131	109	89
FLIP 86-144 PB	99	51	90	70	80	66	95	119	82	119	131	112	90
FLIP 86-145 PB	99	59	94	70	78	68	94	118	80	116	128	115	90
FLIP 86-146 PB	102	53	93	71	80	67	100	119	83	119	126	119	92
FLIP 86-147 PB	103	57	97	69	78	66	94	119	78	116	126	109	90
FLIP 87- 94 PB	101	54	87	70	82	70	96	119	84	119	125	115	92
FLIP 88- 8 PB	98	55	95	73	79	66	97	119	83	119	129	112	90
FLIP 88- 10 PB	104	54	93	68	79	68	102	120	84	120	133	116	92
Ti.Sj.Dij. 1-85	109	57	93	69	83	71	102	120	84	120	132	115	92
ILB 1814	101	52	96	71	77	66	93	119	80	113	133	112	91
Local check	107	60	95	68	80	66	90	119	79	115	126	106	-
Location Mean	100	55	94	69	78	67	95	119	80	117	128	111	
S.E. of Mean	2.03	2.32	2.46	1.23	1.10	0.49	1.61	0.40	1.17	0.89	1.51	2.51	
L.S.D. at 5%	5.92	-	7.18	3.58	3.22	1.39	4.68	1.15	3.40	2.60	4.38	7.30	
C.V. %	2.88	5.93	3.71	2.51	2.01	1.02	2.39	0.47	2.06	1.08	1.66	3.19	
Error d.f.	25	25	25	25	25	35	25	25	25	25	25	25	
Significance	*	NS	*	*	*	*	*	*	*	*	*	*	
Efficiency	101	-	109	144	105	-	114	110	101	102	101	101	

+ Since the blocks (adjusted) MS is less than intra block MS, the RCBS analysis is performed on the data and the means are unadjusted. (1) Guelma was excluded from the overall mean.

Table 4.1.3. Adjusted time to maturity (days) of entries at different locations in the FBISE-D during 1989/90.

Entry Name	ALGERIA	ETHIOPIA	ITALY	LEBANON	PORTUGAL		SAUDI ARABIA	SPAIN
	Guelma	Holetta	Valguarnera+	Terbol	Elvas+	Oeiras	Tabuk	Cordoba-I
FLIP 84-230 FB	222	156	158	189	189	108	178	133
FLIP 84-233 FB	222	157	158	189	187	107	180	134
FLIP 84-237 FB	222	157	158	190	189	108	178	135
FLIP 84-240 FB	222	159	157	188	187	109	178	136
FLIP 84-243 FB	222	156	158	188	189	107	178	134
FLIP 84-244 FB	222	158	158	189	189	109	179	136
FLIP 84-246 FB	222	156	158	188	187	109	178	133
FLIP 85-171 FB	222	159	158	190	187	107	171	135
FLIP 85-172 FB	222	157	158	188	187	107	178	133
FLIP 86-105 FB	222	157	158	189	185	109	178	135
FLIP 86-107 FB	222	156	158	188	189	108	179	134
FLIP 86-109 FB	222	157	158	189	188	108	178	133
FLIP 86-114 FB	222	157	157	190	189	107	176	136
FLIP 86-115 FB	222	159	158	189	188	109	178	134
FLIP 86-116 FB	222	157	158	188	187	108	177	133
FLIP 86-117 FB	222	158	158	190	189	107	178	135
FLIP 86-118 FB	222	157	158	188	189	108	172	135
FLIP 86-119 FB	222	160	158	188	185	106	173	134
FLIP 86-122 FB	222	163	158	188	187	107	177	133
FLIP 86-123 FB	222	155	158	188	188	108	177	133
FLIP 86-124 FB	222	161	157	188	189	107	175	133
FLIP 86-125 FB	227	157	158	191	189	108	179	134
FLIP 86-135 FB	222	157	158	188	184	106	178	134
FLIP 86-136 FB	222	154	158	189	187	108	174	133
FLIP 86-139 FB	222	157	158	188	187	109	180	136
FLIP 86-143 FB	222	159	158	190	189	108	177	134
FLIP 86-144 FB	222	157	158	190	187	106	173	134
FLIP 86-145 FB	222	158	158	189	185	109	177	134
FLIP 86-146 FB	222	159	158	191	188	108	178	133
FLIP 86-147 FB	222	158	158	190	189	107	172	134
FLIP 87- 94 FB	222	158	158	188	187	106	173	133
FLIP 88- 8 FB	222	159	158	191	187	105	180	135
FLIP 88- 10 FB	222	161	158	191	189	109	177	135
Ti.Sj.Dij. 1-85	222	159	158	192	188	108	178	137
ILB 1814	222	161	158	188	189	107	175	133
Local check	222	154	157	188	189	108	174	135
Location Mean	222	158	158	189	188	108	177	134
S.E. of Mean	#	1.33	0.32	0.73	0.99	0.97	1.98	0.86
L.S.D. at 5%	#	3.88	-	2.13	2.85	-	5.76	2.50
C.V. %	#	1.19	0.29	0.55	0.75	1.27	1.58	0.90
Error d.f.	#	25	35	25	35	25	25	25
Significance		*	NS	*	*	NS	*	*
Efficiency		118	-	101	-	-	119	104

Cont'd. ...

Table 4.1.3. Cont'd. ...

Entry Name	SPAIN		SYRIA				TURKEY		(1) Overall
	Cordoba-II	Sevilla+	Hama	Homs	Tartus	Tel Hadya	Samsun+	Izmir+	Mean
FLIP 84-230 FB	141	131	159	181	140	184	197	173	161
FLIP 84-233 FB	141	131	159	181	140	184	200	173	161
FLIP 84-237 FB	142	131	161	182	139	185	201	173	162
FLIP 84-240 FB	141	136	159	181	140	184	203	173	162
FLIP 84-243 FB	142	131	162	180	139	184	201	173	161
FLIP 84-244 FB	140	127	158	182	138	183	200	173	161
FLIP 84-246 FB	141	131	160	183	140	185	197	173	161
FLIP 85-171 FB	142	131	158	182	141	183	200	173	161
FLIP 85-172 FB	141	131	160	181	140	180	201	173	161
FLIP 86-105 FB	141	123	162	180	139	184	200	173	161
FLIP 86-107 FB	142	126	161	181	139	186	197	173	161
FLIP 86-109 FB	141	133	160	181	141	179	197	173	161
FLIP 86-114 FB	140	123	162	181	139	187	204	173	161
FLIP 86-115 FB	142	131	163	182	139	187	197	173	162
FLIP 86-116 FB	140	124	158	182	139	178	200	173	160
FLIP 86-117 FB	142	133	160	180	139	185	202	173	161
FLIP 86-118 FB	142	129	161	181	139	183	199	173	161
FLIP 86-119 FB	141	131	160	182	140	180	202	173	161
FLIP 86-122 FB	141	139	162	182	139	183	198	173	162
FLIP 86-123 FB	142	131	162	182	139	182	197	173	161
FLIP 86-124 FB	142	131	158	182	139	181	200	173	161
FLIP 86-125 FB	141	137	162	181	138	184	202	173	162
FLIP 86-135 FB	140	123	160	180	139	181	202	173	160
FLIP 86-136 FB	142	131	160	181	140	178	197	173	160
FLIP 86-139 FB	142	131	160	181	141	181	199	173	161
FLIP 86-143 FB	140	131	162	182	141	184	196	173	162
FLIP 86-144 FB	142	131	164	180	139	185	205	173	162
FLIP 86-145 FB	140	131	162	182	138	185	203	173	162
FLIP 86-146 FB	142	131	163	183	141	187	195	173	162
FLIP 86-147 FB	141	129	159	181	140	184	197	173	161
FLIP 87- 94 FB	140	132	162	181	140	185	202	173	161
FLIP 88- 8 FB	141	131	161	181	139	184	201	173	162
FLIP 88- 10 FB	141	131	164	183	140	187	205	173	163
Ti.Sj.Dij. 1-85	148	131	164	182	142	190	208	173	164
ILB 1814	141	131	162	182	139	189	203	173	162
Local check	143	130	157	181	141	188	206	176	-
Location Mean	141	130	161	181	140	184	200	173	
S.E. of Mean	0.52	0.56	1.18	0.58	0.73	1.61	1.71	0.00	
L.S.D. at 5%	1.52	1.60	3.44	1.69	2.12	4.70	4.91	0.00	
C.V. †	0.52	0.61	1.04	0.45	0.74	1.24	1.21	0.00	
Error d.f.	25	35	25	25	25	25	35	35	
Significance	*	*	*	*	*	*	*	*	
Efficiency	187	-	136	121	101	123	-	-	

+ Since the blocks (adjusted) MS is less than intra block MS, the RCB analysis is performed on the data and the means are unadjusted. (1) Guolma was excluded from the overall mean. † Not analysed due to incomplete data set or other reasons.

Table 4.1.4. Adjusted plant height (cm) of entries at different locations in the FBISW-D during 1989/90.

Entry Name	ALGERIA		CYPRUS		ETHIOPIA		ITALY		LEBAEON		LIBYA		PORTUGAL	
	Guelma+	Dromo-laxia+	Paphos+	Holetta	Tolen-tino	Valgu-arnera+	Terbol	Tajura	Zahra	Elvas	Oeiras			
FLIP 84-230 FB	58	46	42	60	51	17	38	68	57	65	49			
FLIP 84-233 FB	48	40	41	52	53	19	42	69	60	56	66			
FLIP 84-237 FB	-	41	41	63	58	17	42	68	58	54	59			
FLIP 84-240 FB	60	47	39	64	58	18	44	54	56	57	61			
FLIP 84-243 FB	50	42	39	66	57	20	42	61	59	65	54			
FLIP 84-244 FB	60	45	41	53	56	18	38	59	62	62	53			
FLIP 84-246 FB	53	44	41	67	53	20	44	70	57	59	49			
FLIP 85-171 FB	47	43	38	58	53	19	48	70	52	51	56			
FLIP 85-172 FB	60	45	38	61	57	22	41	70	66	67	53			
FLIP 86-105 FB	46	38	42	57	55	19	45	72	45	54	61			
FLIP 86-107 FB	50	40	38	62	61	22	42	57	48	58	50			
FLIP 86-109 FB	55	42	39	55	49	18	42	54	54	58	68			
FLIP 86-114 FB	55	44	44	56	59	21	43	62	51	55	61			
FLIP 86-115 FB	45	46	38	66	58	20	46	69	57	65	47			
FLIP 86-116 FB	52	46	43	55	44	20	40	66	45	58	65			
FLIP 86-117 FB	51	40	39	60	60	22	41	68	54	61	68			
FLIP 86-118 FB	50	40	37	56	54	19	42	59	61	55	49			
FLIP 86-119 FB	61	44	38	57	49	19	42	63	49	58	56			
FLIP 86-122 FB	50	46	42	72	63	22	43	71	64	69	56			
FLIP 86-123 FB	50	43	41	55	48	18	42	70	59	59	54			
FLIP 86-124 FB	50	46	43	62	54	18	45	73	49	70	69			
FLIP 86-125 FB	46	40	44	55	52	19	42	69	64	52	73			
FLIP 86-135 FB	60	45	38	51	41	16	46	60	49	51	65			
FLIP 86-136 FB	70	40	41	54	49	20	36	64	46	54	51			
FLIP 86-139 FB	40	40	39	63	57	19	45	70	55	65	50			
FLIP 86-143 FB	-	43	45	104	57	21	42	77	50	56	59			
FLIP 86-144 FB	56	42	38	63	59	21	46	66	49	60	66			
FLIP 86-145 FB	55	43	39	63	56	20	47	67	51	66	57			
FLIP 86-146 FB	50	37	39	68	52	22	47	66	63	56	60			
FLIP 86-147 FB	59	46	42	57	58	21	45	62	59	72	58			
FLIP 87- 94 FB	53	44	41	54	59	18	48	68	46	62	63			
FLIP 88- 8 FB	54	43	39	51	50	16	40	70	59	59	58			
FLIP 88- 10 FB	75	43	42	54	62	19	41	67	56	61	45			
Ti.Sj.Dij. 1-85	58	40	36	66	68	22	46	63	61	60	51			
ILB 1814	38	45	40	75	86	22	70	69	92	85	62			
Local check	60	47	40	76	92	21	71	59	76	100	58			
Location Mean	54	43	40	62	57	20	45	66	57	61	58			
S.E. of Mean	1.33	2.72	2.32	9.79	3.26	1.58	3.40	5.65	5.91	3.29	5.81			
L.S.D. at 5%	3.83	-	-	-	9.50	-	9.89	-	17.20	9.59	16.93			
C.V. %	3.72	9.03	8.24	22.50	8.11	11.49	10.77	12.14	14.74	7.57	14.25			
Error d.f.	35	35	35	25	25	35	25	25	25	25	25			
Significance	*	NS	NS	NS	*	NS	*	NS	*	*	*			
Efficiency	-	-	-	-	109	-	100	-	108	106	114			

Cont'd. ...

Table 4.1.4. Cont'd. ...

Entry Name	SAUDI ARABIA		SPAIN			SYRIA			TURKEY		(1)
	Tabuk		Cordoba-I	Cordoba-II	Sevilla+	Hama	Homs	Tartus Tel Hadya	Samsun+	Iznir	Overall Mean
FLIP 84-230 FB	79	45	55	54	33	27	49	31	36	35	47
FLIP 84-233 FB	82	40	56	61	33	29	46	36	30	37	47
FLIP 84-237 FB	79	44	56	59	35	37	44	34	38	33	48
FLIP 84-240 FB	93	40	61	63	35	31	48	37	37	40	49
FLIP 84-243 FB	69	36	56	71	38	33	45	35	35	46	48
FLIP 84-244 FB	86	43	53	60	33	32	42	29	34	35	47
FLIP 84-246 FB	70	42	56	65	37	34	44	37	39	34	48
FLIP 85-171 FB	64	46	56	57	35	34	48	37	31	27	46
FLIP 85-172 FB	68	42	57	66	39	34	51	35	34	31	49
FLIP 86-105 FB	83	41	55	60	33	32	38	31	41	22	46
FLIP 86-107 FB	100	38	59	64	41	35	46	34	38	40	49
FLIP 86-109 FB	92	44	50	67	29	32	46	32	29	26	46
FLIP 86-114 FB	88	42	59	67	38	34	51	39	31	36	49
FLIP 86-115 FB	70	45	67	67	46	35	43	35	30	32	49
FLIP 86-116 FB	67	41	47	58	34	34	48	29	25	38	45
FLIP 86-117 FB	75	44	63	59	38	35	44	31	36	35	49
FLIP 86-118 FB	75	43	66	60	35	32	51	41	49	32	48
FLIP 86-119 FB	79	40	55	60	42	35	49	35	39	32	47
FLIP 86-122 FB	86	45	62	71	36	30	43	36	29	42	51
FLIP 86-123 FB	80	46	53	66	36	29	45	31	33	34	47
FLIP 86-124 FB	97	48	62	62	33	35	45	35	40	35	51
FLIP 86-125 FB	87	43	64	59	41	28	41	38	37	38	49
FLIP 86-135 FB	80	41	50	63	33	28	44	31	33	25	44
FLIP 86-136 FB	86	45	59	56	36	29	45	29	51	38	46
FLIP 86-139 FB	75	43	61	59	36	30	42	29	26	29	47
FLIP 86-143 FB	86	32	56	54	41	35	45	33	28	37	50
FLIP 86-144 FB	65	39	62	59	50	32	50	39	39	42	49
FLIP 86-145 FB	81	44	58	56	36	33	49	36	36	46	49
FLIP 86-146 FB	78	44	70	65	43	36	44	40	33	45	50
FLIP 86-147 FB	58	42	66	68	37	35	44	37	40	38	49
FLIP 87- 94 FB	68	43	56	60	39	29	41	35	27	37	47
FLIP 88- 8 FB	87	42	57	61	36	34	40	39	29	30	47
FLIP 88- 10 FB	82	44	60	65	38	32	48	36	41	36	49
Ti.Sj.Dij. 1-85	75	44	68	81	41	35	53	35	51	47	52
ILB 1814	67	42	76	71	50	40	58	41	57	55	60
Local check	79	45	84	78	41	30	59	42	68	70	-
Location Mean	79	43	60	63	38	33	46	35	37	37	
S.E. of Mean	9.47	3.29	3.43	1.72	3.54	2.70	3.45	2.25	5.60	5.18	
L.S.D. at 5%	-	-	9.99	4.95	10.30	7.86	10.05	6.56	16.08	15.07	
C.V. %	17.01	10.94	8.13	3.87	13.28	11.71	10.53	9.10	21.52	19.75	
Error d.f.	25	25	25	35	25	25	25	25	35	25	
Significance	NS	NS	*	*	*	*	*	*	*	*	
Efficiency	-	-	114	-	144	135	176	119	-	100	

+ Since the blocks (adjusted) MS is less than intra block MS, the RCB analysis is performed on the data and the means are unadjusted. (1) Guelma was excluded from the overall mean.

Table 4.1.5. Adjusted seed yield (Y=kg/ha) and rank (R) of entries at different locations in the FBISN-D during 1989/90.

Entry Name	ALGERIA		CYPRUS				ETHIOPIA		ITALY					
	Guelma		Paphos		Dromolaxia		Holetta		Caltagirone+		Tolentino		Valguarnera	
	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R
FLIP 84-230 FB	2077	15	544	30	1305	6	528	7	896	5	4360	21	720	22
FLIP 84-233 FB	1780	21	789	9	1113	15	378	15	402	22	4741	16	540	33
FLIP 84-237 FB	-	-	598	24	1030	21	567	3	375	25	4640	17	760	18
FLIP 84-240 FB	1593	24	1015	2	1417	3	307	21	387	23	4111	25	720	20
FLIP 84-243 FB	2841	6	614	23	789	32	334	19	277	31	4383	20	940	7
FLIP 84-244 FB	2577	10	561	28	1048	19	263	25	529	17	5105	11	700	23
FLIP 84-246 FB	2428	11	466	33	855	28	481	9	412	21	3856	28	570	31
FLIP 85-171 FB	1403	27	534	31	845	30	528	6	330	29	3296	35	690	25
FLIP 85-172 FB	2938	5	697	19	1283	8	391	13	558	16	3770	29	860	12
FLIP 86-105 FB	1675	22	642	21	760	34	376	16	610	13	4293	22	680	26
FLIP 86-107 FB	1564	25	502	32	1258	9	916	2	662	10	6075	3	1130	3
FLIP 86-109 FB	1562	26	548	29	1145	14	256	27	930	4	3405	34	840	13
FLIP 86-114 FB	1931	19	571	26	914	25	456	11	362	26	5893	4	790	15
FLIP 86-115 FB	3264	2	776	11	1007	22	474	10	653	11	6369	2	650	28
FLIP 86-116 FB	2259	13	617	22	1072	17	253	29	520	18	4170	23	430	35
FLIP 86-117 FB	2688	8	780	10	1243	10	349	18	648	12	4491	19	760	19
FLIP 86-118 FB	1956	18	760	12	1217	11	565	4	839	6	5357	6	700	24
FLIP 86-119 FB	3164	3	655	20	1346	4	222	32	609	14	5055	12	720	21
FLIP 86-122 FB	1997	16	994	3	1301	7	391	14	687	8	3885	27	600	29
FLIP 86-123 FB	1395	28	712	17	1112	16	551	5	684	9	4612	18	570	32
FLIP 86-124 FB	1034	31	584	25	1180	12	125	35	949	3	5644	5	460	34
FLIP 86-125 FB	734	33	791	8	957	23	317	20	357	27	4976	13	780	17
FLIP 86-135 FB	877	32	739	13	877	26	261	26	347	28	3765	30	930	8
FLIP 86-136 FB	4184	1	915	4	1035	20	291	22	502	20	3634	32	780	16
FLIP 86-139 FB	508	34	819	7	747	35	516	8	585	15	4026	26	900	9
FLIP 86-143 FB	-	-	737	14	845	29	219	34	260	32	4835	14	880	10
FLIP 86-144 FB	2128	14	430	34	955	24	240	30	224	33	4823	15	820	14
FLIP 86-145 FB	2664	9	700	18	1072	18	360	17	383	24	5283	8	880	11
FLIP 86-146 FB	2700	7	732	15	856	27	265	24	503	19	5121	10	1080	5
FLIP 86-147 FB	1962	17	397	36	1162	13	219	33	687	7	4122	24	1130	2
FLIP 87- 94 FB	1618	23	724	16	803	31	289	23	221	34	3608	33	960	6
FLIP 88- 8 FB	1241	30	832	5	768	33	421	12	284	30	3677	31	590	30
FLIP 88- 10 FB	3141	4	1039	1	1337	5	256	28	146	36	5349	7	1080	4
Ti.Sj.Dij. 1-85	2341	12	570	27	226	36	111	36	193	35	2970	36	660	27
ILB 1814	1284	29	426	35	1820	2	232	31	1441	2	74351	1	350	36
Local check	1798	20	820	6	3015	1	1293	1	2168	1	52658	9	1540	1
Location Mean	2038		684		1103		389		573		4622		783	
S.E. of Mean	707.28		189.90		143.23		112.19		32.81		459.13		147.41	
L.S.D. at 5%	2060.19		553.16		417.22		326.78		94.17		1337.37		423.12	
C.V. %	51.86		39.26		18.36		40.80		8.10		14.05		26.62	
Error d.f.	25		25		25		25		35		25		35	
Significance	NS		NS		*		*		*		*		*	
Efficiency	110		103		134		113		-		101		-	
Test > Check	1		0		0		0		0		1		0	

Cont'd. ...



Table 4.1.5. Cont'd. ...

Entry Name	LEBANON		LIBYA				PORTUGAL				SAUDI ARABIA		SPAIN	
	Torbol		Tajura		Zahra+		Elvas		Ceiras		Tabuk		Cordoba-I	
	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R
FLIP 84-230 FB	2776	24	984	25	767	23	2915	5	736	23	4625	34	1798	13
FLIP 84-233 FB	2358	31	894	29	1150	5	2132	28	702	27	7251	11	1356	27
FLIP 84-237 FB	2844	22	1468	5	867	14	2194	22	2019	1	5859	24	1253	30
FLIP 84-240 FB	2591	29	1140	21	1100	7	3298	3	473	35	6213	19	1447	25
FLIP 84-243 FB	3733	3	1287	11	1150	4	2592	12	787	21	5958	22	1653	17
FLIP 84-244 FB	2705	25	1217	15	917	13	2817	7	704	26	4812	33	1511	23
FLIP 84-246 FB	2899	20	1193	17	833	19	2582	13	898	17	4895	32	678	35
FLIP 85-171 FB	1947	35	1426	8	1167	3	2128	29	669	30	6575	15	1797	14
FLIP 85-172 FB	3632	4	1279	12	933	12	2801	9	1013	12	8117	4	1428	26
FLIP 86-105 FB	3317	11	1041	24	733	25	2143	27	1096	8	5199	31	1777	15
FLIP 86-107 FB	3602	5	1448	7	967	10	2270	20	1459	3	9443	1	1921	10
FLIP 86-109 FB	2544	30	896	28	583	33	2299	19	899	16	6456	17	1936	9
FLIP 86-114 FB	3460	6	1189	19	700	28	2443	17	1074	9	7921	7	2197	4
FLIP 86-115 FB	3407	7	672	33	717	26	3135	4	1010	13	5486	27	1884	12
FLIP 86-116 FB	3016	16	1157	20	633	30	2147	26	565	33	5360	28	2029	6
FLIP 86-117 FB	2357	32	1237	14	867	15	2163	25	464	36	5299	29	1693	16
FLIP 86-118 FB	2989	17	1332	10	850	17	2184	23	873	18	6395	18	1627	19
FLIP 86-119 FB	3335	10	2528	2	850	16	2559	14	1314	5	5874	23	1195	31
FLIP 86-122 FB	2871	21	934	27	1100	6	2255	21	1036	10	5276	30	1959	8
FLIP 86-123 FB	3019	15	1066	23	717	27	2807	8	1034	11	5666	25	1566	21
FLIP 86-124 FB	2614	28	461	35	450	35	2900	6	784	22	9276	2	2141	5
FLIP 86-125 FB	3385	8	1454	6	783	22	2033	30	820	20	8486	3	1165	32
FLIP 86-135 FB	2945	18	1068	22	617	31	1697	34	717	25	7771	8	1982	7
FLIP 86-136 FB	2108	34	1190	18	850	18	1886	32	909	15	7610	10	1904	11
FLIP 86-139 FB	3199	12	1724	3	750	24	2673	11	573	32	7721	9	1614	20
FLIP 86-143 FB	2925	19	1361	9	1033	8	2508	16	1107	7	8026	6	1529	22
FLIP 86-144 FB	3049	14	777	32	367	36	1063	35	1222	6	5998	21	982	33
FLIP 86-145 FB	3368	9	1608	4	950	11	1885	33	499	34	7024	13	1647	18
FLIP 86-146 FB	3079	13	828	31	967	9	2023	31	696	28	7028	12	2263	3
FLIP 86-147 FB	2837	23	1257	13	667	29	2519	15	971	14	6715	14	1500	24
FLIP 87- 94 FB	2295	33	625	34	500	34	2164	24	684	29	5524	26	960	34
FLIP 88- 8 FB	2621	27	862	30	800	21	2797	10	730	24	6056	20	1293	29
FLIP 88- 10 FB	2641	26	957	26	833	20	2415	18	850	19	6498	16	1323	28
Ti.Sj.Dij. 1-85	1634	36	291	36	600	32	944	36	632	31	3826	36	629	36
ILB 1814	4464	2	1202	16	1800	1	5653	1	1408	4	4589	35	3692	2
Local check	5065	1	2857	1	1443	2	5390	2	1509	2	8109	5	4869	1
Location Mean	2990		1192		861		2511		915		6470		1728	
S.E. of Mean	534.58		231.71		200.12		436.40		289.46		1191.89		170.61	
L.S.D. at 5%	1557.14		674.92		574.42		1271.16		-		3468.86		496.95	
C.V. %	25.29		27.49		32.86		24.57		44.74		26		13.97	
Error d.f.	25		25		35		25		25		25		25	
Significance	*		*		*		*		NS		*		*	
Efficiency	105		113		-		100		-		155		243	
Test > Check	0		0		0		0		-		0		0	

Cont'd. ...

Table 4.1.5. Cont'd. ...

Entry Name	SPAIN				SYRIA								TUNISIA	
	Cordoba-II		Sevilla		Hama		Homs		Tartus		Tel Hadya		Beja-I	
	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R
FLIP 84-230 FB	1495	7	2969	11	1932	10	980	4	1168	11	1363	11	1481	35
FLIP 84-233 FB	1128	21	2212	31	1517	22	620	13	1099	26	1336	12	1576	32
FLIP 84-237 FB	1143	20	2397	28	1807	12	1086	2	1117	17	1189	20	2505	3
FLIP 84-240 FB	1352	12	2649	17	1578	20	504	25	1083	29	1525	5	2233	12
FLIP 84-243 FB	820	34	2572	22	1488	24	546	21	1219	3	1296	14	1954	26
FLIP 84-244 FB	1432	10	2489	26	1601	19	552	20	1216	5	1079	27	2059	23
FLIP 84-246 FB	804	35	2502	25	1406	27	497	26	1185	9	1034	33	2073	21
FLIP 85-171 FB	1157	19	2731	16	1611	17	310	33	1116	18	1315	13	1944	28
FLIP 85-172 FB	1080	25	2844	12	1801	13	429	31	1168	10	1148	23	2353	10
FLIP 86-105 FB	745	36	2753	15	1621	16	564	18	1048	35	1105	26	2409	7
FLIP 86-107 FB	1402	11	2991	9	2228	3	521	23	1200	7	789	35	1976	25
FLIP 86-109 FB	1099	23	2390	29	839	35	724	8	1114	19	1503	7	2237	11
FLIP 86-114 FB	1212	15	3462	5	1526	21	874	5	1099	25	1381	10	1563	33
FLIP 86-115 FB	1085	24	3364	6	2177	4	447	29	1103	21	1538	3	2374	9
FLIP 86-116 FB	1160	18	2619	18	1467	25	1104	1	1101	24	1049	31	2223	14
FLIP 86-117 FB	1117	22	2614	19	1400	28	459	27	1015	36	965	34	1844	29
FLIP 86-118 FB	1682	5	2981	10	1413	26	454	28	1049	32	1527	4	2071	22
FLIP 86-119 FB	1446	9	2548	23	1968	9	784	7	1067	31	1179	21	2477	4
FLIP 86-122 FB	1491	8	3174	8	1355	29	613	14	1101	22	1138	24	2185	15
FLIP 86-123 FB	1004	27	3333	7	1158	32	638	12	1049	33	1047	32	2225	13
FLIP 86-124 FB	1806	4	3709	3	1504	23	642	11	1131	15	1199	19	2165	17
FLIP 86-125 FB	1020	26	2384	30	1906	11	709	9	1082	30	2053	1	2404	8
FLIP 86-135 FB	865	32	2599	21	1973	8	852	6	1230	2	1275	16	1948	27
FLIP 86-136 FB	1233	14	1967	33	1332	31	585	17	1101	23	1066	28	2475	5
FLIP 86-139 FB	939	29	2009	32	1606	18	561	19	1216	6	1122	25	2097	19
FLIP 86-143 FB	1351	13	1712	35	1978	7	436	30	1084	28	1159	22	2101	18
FLIP 86-144 FB	835	33	2802	13	2450	2	595	16	1186	8	1463	8	2058	24
FLIP 86-145 FB	1534	6	2612	20	1738	15	541	22	1114	20	1218	18	2449	6
FLIP 86-146 FB	1850	3	3477	4	887	34	281	34	1118	16	1507	6	2176	16
FLIP 86-147 FB	1203	16	2536	24	1344	30	505	24	1149	13	1058	30	2075	20
FLIP 87- 94 FB	909	30	1891	34	1755	14	406	32	1049	34	1065	29	1817	30
FLIP 88- 8 FB	1161	17	2424	27	1102	33	269	35	1132	14	1291	15	1497	34
FLIP 88- 10 FB	876	31	2776	14	2117	5	613	15	1085	27	1259	17	1690	31
Ti.Sj.Dij. 1-85	978	28	1122	36	54	36	220	36	1218	4	575	36	720	36
ILB 1814	2200	2	4070	2	2072	6	1045	3	1152	12	1456	9	3378	2
Local check	3304	1	7205	1	2640	1	668	10	1232	1	1637	2	3812	1
Location Mean	1275		2803		1621		601		1128		1247		2128	
S.E. of Mean	219.00		310.86		295.69		208.57		33.59		160.50		253.33	
L.S.D. at 5%	637.91		905.50		861.28		607.54		97.84		467.50		737.91	
C.V. %	24.28		15.69		25.80		49.09		4.21		18.20		16.83	
Error d.f.	25		25		25		25		25		25		25	
Significance	*		*		*		*		*		*		*	
Efficiency	121		104		140		125		100		112		105	
Test > Check	0		0		0		0		0		0		0	

Cont'd. ...

Table 4.1.5. Cont'd. ...

Entry Name	TUNISIA						TURKEY				(1)	
	Beja-II		Oued Melis-I+		Oued Melis-II		Samsun+		Izmir		Overall Mean	
	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R
FLIP 84-230 FB	1481	35	800	33	1284	24	1017	17	4264	12	1727	23
FLIP 84-233 FB	1576	32	1775	10	1157	28	733	31	3486	19	1681	28
FLIP 84-237 FB	2505	3	1650	13	1173	27	1008	19	3360	21	1817	12
FLIP 84-240 FB	2233	12	1650	14	1580	11	1217	4	3915	14	1830	11
FLIP 84-243 FB	1954	26	1425	20	1011	32	1183	8	3466	20	1737	21
FLIP 84-244 FB	2059	23	1900	6	1428	19	1033	16	3895	15	1745	20
FLIP 84-246 FB	2073	21	1500	18	1205	26	750	30	2976	27	1545	32
FLIP 85-171 FB	1944	28	1725	11	1675	8	1000	21	2947	28	1656	30
FLIP 85-172 FB	2353	10	1575	15	1545	13	1167	10	4599	8	1953	6
FLIP 86-105 FB	2409	7	800	32	1101	30	1300	3	3166	25	1667	29
FLIP 86-107 FB	1976	25	2000	4	2068	2	1150	11	4310	11	2171	2
FLIP 86-109 FB	2237	11	2075	3	2021	3	700	33	3228	24	1716	25
FLIP 86-114 FB	1563	33	1225	25	1111	29	850	27	5262	4	1964	4
FLIP 86-115 FB	2374	9	1825	9	1295	23	825	28	5010	6	1986	3
FLIP 86-116 FB	2223	14	1925	5	1661	9	1150	12	4450	9	1764	16
FLIP 86-117 FB	1844	29	1275	22	1473	15	1017	18	5037	5	1696	26
FLIP 86-118 FB	2071	22	1450	19	1870	6	1367	2	4935	7	1942	8
FLIP 86-119 FB	2477	4	1875	8	1989	4	858	26	3869	16	1952	7
FLIP 86-122 FB	2185	15	1700	12	1764	7	683	34	3124	26	1752	18
FLIP 86-123 FB	2225	13	1875	7	1477	14	758	29	4443	10	1814	13
FLIP 86-124 FB	2165	17	1100	29	1410	20	908	24	2708	32	1921	9
FLIP 86-125 FB	2404	8	1400	21	1616	10	1217	5	3774	22	1911	19
FLIP 86-135 FB	1948	27	1225	24	1334	22	967	22	3744	17	1747	19
FLIP 86-136 FB	2475	5	1200	26	1550	12	933	23	3593	18	1725	24
FLIP 86-139 FB	2097	19	1575	16	1407	21	633	36	2825	30	1757	17
FLIP 86-143 FB	2101	18	1500	17	1466	16	650	35	2908	29	1788	15
FLIP 86-144 FB	2058	24	750	34	991	33	1125	15	4072	13	1653	31
FLIP 86-145 FB	2449	6	1250	23	1430	18	1150	13	5875	2	1961	5
FLIP 86-146 FB	2176	16	1200	27	943	34	1167	9	2697	33	1797	14
FLIP 86-147 FB	2075	20	1150	28	1434	17	1142	14	2396	34	1690	27
FLIP 87- 94 FB	1817	30	725	35	891	35	717	32	2035	35	1377	34
FLIP 88- 8 FB	1497	34	1050	30	1218	25	900	25	2748	31	1521	33
FLIP 88- 10 FB	1690	31	975	31	1055	31	1200	6	3265	23	1733	25
Ti.Sj.Dij. 1-85	720	36	275	36	409	36	1000	20	1340	36	877	35
ILB 1814	3378	2	3600	1	1950	5	1192	7	5375	3	2615	1
Local check	3812	1	2725	2	3562	1	2067	1	10312	1	-	-
Location Mean	2128		1492		1460		1020		3859			
S.E. of Mean	253.33		261.55		281.90		166.00		533.46			
L.S.D. at 5%	737.91		750.77		821.13		476.49		1553.87			
C.V. %	16.83		24.79		27.31		23.01		19.55			
Error d.f.	25		35		25		35		25			
Significance	*		*		*		*		*			
Efficiency	105		-		104		-		100			
Test > Check	0		1		0		0		0			

+ Since the blocks (adjusted) MS is less than intra block MS, the RCB analysis is performed on the data and the means are unadjusted. (1) Guelma was excluded from the overall mean.

Table 4.1.6. The five heaviest seed yielding entries at the individual locations in the FBISN-D during 1989/90.

Rank	ALGERIA		CYPRUS		ETHIOPIA		ITALY			LEBANON		LIBYA
	Guelma		Paphos	Dromolaxia	Holetta		Caltagirone	Tolentino	Valguarnera	Terbol		Tajura
1	FLIP 86-136FB	FLIP 88- 10FB	Local check	ILB 1814	Local check	ILB 1814	Local check	ILB 1814	Local check	Local check	Local check	Local check
2	FLIP 86-115FB	FLIP 84-240FB	ILB 1814	FLIP 86-107FB	ILB 1814	FLIP 86-115FB	FLIP 86-147FB	ILB 1814	FLIP 86-119FB	FLIP 86-119FB	FLIP 86-119FB	FLIP 86-119FB
3	FLIP 86-119FB	FLIP 86-122FB	FLIP 85-240FB	FLIP 84-237FB	FLIP 86-124FB	FLIP 86-107FB	FLIP 86-107FB	FLIP 86-107FB	FLIP 84-243FB	FLIP 86-139FB	FLIP 86-139FB	FLIP 86-139FB
4	FLIP 88- 10FB	FLIP 86-136FB	FLIP 86-119FB	FLIP 86-118FB	FLIP 86-109FB	FLIP 86-114FB	FLIP 88- 10FB	FLIP 85-172FB	FLIP 86-145FB	FLIP 86-145FB	FLIP 86-145FB	FLIP 86-145FB
5	FLIP 85-172FB	FLIP 88- 8FB	FLIP 88- 10FB	FLIP 86-123FB	FLIP 84-230FB	FLIP 86-124FB	FLIP 86-146FB	FLIP 86-107FB	FLIP 84-237FB	FLIP 84-237FB	FLIP 84-237FB	FLIP 84-237FB

Cont'd. ...

Rank	LIBYA		PORTUGAL		SAUDI ARABIA		SPAIN			SYRIA	
	Zahra		Elvas	Oeiras	Tabuk		Cordoba-I	Cordoba-II	Sevilla	Hama	Homs
1	ILB 1814	ILB 1814	FLIP 84-237FB	FLIP 86-107FB	Local check	Local check	Local check	Local check	Local check	Local check	FLIP 86-116FB
2	Local check	Local check	Local check	FLIP 86-124FB	ILB 1814	ILB 1814	ILB 1814	ILB 1814	FLIP 86-144FB	FLIP 84-237FB	FLIP 84-237FB
3	FLIP 85-171FB	FLIP 84-240FB	FLIP 86-107FB	FLIP 86-125FB	FLIP 86-146FB	FLIP 86-146FB	FLIP 86-124FB	FLIP 86-107FB	ILB 1814	ILB 1814	ILB 1814
4	FLIP 84-243FB	FLIP 86-115FB	ILB 1814	FLIP 85-172FB	FLIP 86-114FB	FLIP 86-124FB	FLIP 86-146FB	FLIP 86-115FB	FLIP 84-230FB	FLIP 84-230FB	FLIP 84-230FB
5	FLIP 84-233FB	FLIP 84-230FB	FLIP 86-119FB	Local check	FLIP 86-124FB	FLIP 86-118FB	FLIP 86-114FB	FLIP 88- 10FB	FLIP 86-114FB	FLIP 86-114FB	FLIP 86-114FB

Cont'd. ...

Rank	SYRIA		TUNISIA				TURKEY	
	Tartus	Tel Hadya	Beja-I	Beja-II	Oued Meliz-I	Oued Meliz-II	Samsun	Izmir
1	Local check	FLIP 86-125FB	Local check	Local check	ILB 1814	Local check	Local check	Local check
2	FLIP 86-135FB	Local check	ILB 1814	ILB 1814	Local check	FLIP 86-107FB	FLIP 86-118FB	FLIP 86-145FB
3	FLIP 84-243FB	FLIP 86-115FB	FLIP 84-237FB	FLIP 84-237FB	FLIP 86-109FB	FLIP 86-109FB	FLIP 86-105FB	ILB 1814
4	Ti.Sj.Dijl-85	FLIP 86-118FB	FLIP 86-119FB	FLIP 86-119FB	FLIP 86-107FB	FLIP 86-119FB	FLIP 84-240FB	FLIP 86-114FB
5	[ FLIP 84-244FB	FLIP 84-240FB	FLIP 86-136FB	FLIP 86-136FB	FLIP 86-116FB	ILB 1814	FLIP 86-125FB	FLIP 86-117FB
	FLIP 86-139FB							

The bracket indicates entries having the same rank.

## **Methods and Management**

The suggested experimental design for these nurseries was randomized complete block with two replications. The suggested plot size was one row 1 m long accomodating 10 plants. The susceptible check was repeatedly sown after every two test entries/rows to serve as an indicator cum spreader row. In the absence of natural infestation the cooperators were advised to do the artificial inoculation as detailed in the instruction sheet provided. A 1-9 scale was recommended for scoring the disease severity.

### **4.2.1. FABA BEAN INTERNATIONAL ASCOCHYTA BLIGHT NURSERY (FBIABN)**

#### **Material**

The Faba bean International Ascochyta Blight Nursery included 16 test entries. The susceptible check was the local land race from the location where the nursery was to be grown.

#### **Results and Discussion**

FBIABN was distributed to 18 cooperators in 12 countries. The results were, however, received from 8 locations in 7 countries. The results from locations reporting disease scores are presented here (Table 4.2.1).

At Guelma in Algeria, Paphos in Cyprus and Tartus in Syria, there was no disease infestation; At Hangzhou in China, Tabuk in Saudi Arabia, Al Ghab in Syria and Izmir in Turkey, all the test entries including the respective local check at all locations were tolerant with rating  $\leq 5$ .

At Ariana in Tunisia, however, lines A8817 (A2), A88304 (3181-1) took 3 or 4 rating, and lines A8812 (BPL 472), A8815 (BPL 818), A8835 (L83129), A8859 (L82001) and A88175 (S83135) took 5 rating and were tolerant.

Across locations, six entries namely A87175, A8721, A8759, A87218, A87245 and A87304 showed tolerant reactions.

### **4.2.2. FABA BEAN INTERNATIONAL CHOCOLATE SPOT NURSERY (FBICSN)**

#### **Material**

The Faba Bean International Chocolate Spot Nursery included 16 test entries. The susceptible check was the local land race from the location where the nursery was to be grown.

Table 4.2.1. Reaction of faba bean entries to *Ascochyta* blight (*Ascochyta fabae*) in FBIABN at different locations during 1989/90.

Line	BPL/Cross No.	ALGERIA	CHINA	CYPRUS	SAUDI- ARABIA	SYRIA	TUNISIA	TURKEY	
		Guelma	Hang- zhou	Paphos	Tabuk	Al - Tartus Ghab	Ariana	Izmir	
A886	BPL 365	1	3	1	1	3	1	7	2
A8812	BPL 472	1	2	1	1	1	1	5	3
A8815	BPL 818	NE	2	1	5	3	1	5	3
A8817	A2	1	3	1	1	5	1	3	4
A8835	L83129	1	3	1	5	3	1	5	3
A8859	L82001	1	3	1	5	1	1	5	3
A88175	S83135	1	4	1	5	3	1	5	3
A88187	S83135	1	3	1	3	1	1	6	3
A88215	BPL 2139	1	5	1	3	3	1	7	3
A88218	BPL 2144	1	5	1	5	3	1	7	3
A88233	BPL 2148	1	4	1	1	3	1	6	3
A88245	BPL 2148	1	4	1	3	3	1	6	3
A88253	BPL 2152	1	5	1	3	3	1	6	3
A88304	3181-1	1	3	1	5	1	1	4	2
ILB 1814	-	1	4	1	3	3	1	6	3
Giza 4	-	NE	3	1	5	3	1	7	3
Local susc. check		1	NE	3	5	3	1	6	4

NE = Not evaluated

Table 4.2.2. Reaction of faba bean entries to chocolate spot (*Botrytis fabae*) in FBICSN during 1989/90.

Line	ILB/BPL/ Cross No.	ALGERIA	CHINA	LIBYA	PORTU- GAL	SAUDI- ARABIA	SYRIA		TUNISIA	
		Guelma	Hang- zhou	Tajoura	Elvas	Tabuk	Al- Ghab	Tartus	Ariana	Ras- Rajel
B8811	BPL1179	1	2	5	1	5	1	9	5	5
B8822	L83106	5	1	7	3	1	1	9	5	6
B8827	L83114	1	2	5	3	3	1	9	7	6
B88100	S83059	6	3	7	1	5	1	9	7	6
B88103	S83061	3	NE	5	1	1	1	9	6	6
B88111	S83075	3	3	5	1	5	3	9	7	5
B88118	S83081	6	2	5	1	3	3	9	6	5
B88140	ILB 3025	3	1	5	1	1	1	3	9	5
B88142	ILB 3026	3	2	7	1	3	3	9	7	5
B88158	ILB 3026	6	5	3	1	1	NE	9	6	6
B88175	ILB 3027	NE	1	5	3	1	3	9	6	5
B88201	ILB 3036	2	4	5	3	5	1	9	6	6
B88247	ILB 2282	6	1	5	3	5	1	9	7	5
B88248	ILB 2282	1	2	7	1	5	5	9	6	5
ILB 1814	-	3	4	7	3	1	1	9	6	5
Rebaya-40	-	2	4	3	3	5	3	9	7	6
Local Susceptib Check		6	6	7	3	5	5	9	7	7

NE = Not evaluated

## Results and Discussion

FBICSN was distributed to 20 cooperators in 16 countries, but the results were received back from 9 locations covering 10 countries.

Except at Tartus in Syria, at no other locations the susceptible check took rating of 9, so the results from Tartus (Syria) are discussed. At Tartus only one entry BPL 88140 (ILB 3025) with rating 3 was resistant and all others were susceptible (Table 4.2.2).

### 4.2.3. FABA BEAN INTERNATIONAL RUST NURSERY (FBIRN)

#### Material

The Faba Bean International Rust Nursery included 13 test entries. The susceptible check was the local land race from the location where the nursery was to be grown.

#### Results and Discussion

FBIRN was distributed to 20 cooperators in 15 countries. The results were received from 8 locations in 7 countries and are presented.

The disease reaction of the entries to rust (Uromyces fabae) at different locations is given in Table 4.2.3.

The susceptible local check was rated at three locations and the results for these are discussed below:

Algeria: The nursery was conducted at Guelma. Only one entry R8827 (L82014), showed tolerant reaction.

Syria: The nursery was conducted at Tartus. All the lines were susceptible with 9 rating.

Tunisia: The nursery was conducted at Ras Rajel. All the lines were susceptible.



Table 4.2.3. Rust reaction of faba bean lines at different locations in FBIRN during 1989/90.

Line	BPL/ Cross No.	ALGERIA	CHINA	LIBYA	SAUDI- ARABIA	SPAIN	SYRIA	TUNISIA
		Guelma	Hang- zhou	Ben- ghazi	Tabuk	Cordoba	Tartus	Ras- Rajel
R888	BPL 263	7	4	3	1	7	9	9
R8810	BPL 406	8	4	3	1	7	9	9
R8815	BPL 1179	8	3	3	1	7	9	9
R8817	BPL 484	8	4	3	5	6	9	9
R8824	15563-2	8	3	5	1	5	9	9
R8827	L82014	5	3	5	5	6	9	9
R8835	BPL 552	8	3	7	5	6	9	9
R8846	BPL 588	8	4	5	5	7	9	9
R8854	BPL 627	8	4	3	5	7	9	9
R8859	BPL 663	8	3	5	1	2	9	9
R8861	BPL 665	8	2	3	5	7	9	9
ILB 1814		8	4	5	3	7	9	9
REBAYA-40		NE	4	3	5	7	9	9
Local susc. check		9	NE	7	7	7	9	9

NE = Not evaluated

## **5. LENTIL INTERNATIONAL TRIALS AND NURSERIES**

Seventeen lentil international trials and nurseries were available to cooperators in 1989/90 season. These included yield trials, screening nurseries, stress nurseries, segregating populations and agronomy trials. Except the agronomy trials all other trials and nurseries are discussed in this section. Cooperators were free to use these materials directly or indirectly for the improvement of lentils in their own national programs.

### **5.1. LENTIL INTERNATIONAL YIELD TRIAL - LARGE SEED (LIYT-L)**

#### **Material**

The Lentil International Yield Trial - Large Seed comprised 23 test entries which were supplied and one local check to be added by the cooperator. The test entries were selections with seed size more than 4.5g/100-seed. The test entries were selected on the basis of their superior performance in international screening nursery.

#### **Methods and Management**

The suggested trial design was a randomized complete block design with 3 replications. The recommended plot size was four rows, each 4 m long with inter row spacing of 25 cm. Eight hundred seeds per plot were supplied.

Forty nine sets of the trial were sent to cooperators in 22 countries. The results were, however, returned from 27 trials from 12 countries. The agronomic information received from cooperators is given in Table 5.1.1.

#### **Results and Discussion**

The data on time to flowering, time to maturity and plant height are given in Tables 5.1.2, 5.1.3 and 5.1.4, respectively. The location means for time to flowering, time to maturity and plant height ranged from 52 days (for Erzurum in Turkey) to 135 days (for Beni Slimani in Algeria); 88 days (for Erzurum in Turkey) to 226 days (for Beni Slimani in Algeria); 16 cm (for Beni Slimani in Algeria) to 52 cm (for Sarir in Libya and Lincoln in New Zealand), respectively.

The seed yields and rank of entries at different locations are given in Table 5.1.5. The ANOVA revealed that the differences among the entries were significant for 20 out of 26 locations reporting the yield data. The seed yields varied from 58 kg/ha at Zidane-II in Algeria to 2060 kg/ha at Setif in Algeria. Among significant locations, at 12 locations some of the entries exceeded the local check by a significant margin. On the basis of average over locations the top five entries included FLIP 88-8L, FLIP 87-16L, FLIP 87-17L, FLIP 88-6L, and FLIP 87-2L with seed yields of 1001, 979, 976, 956, and 954 kg/ha, respectively.

The five best entries at different locations are given in Table 5.1.6. Some of the lines, namely, FLIP 88-8L, FLIP 86-10L, FLIP 87-17L, and FLIP

Table 5.1.1. Agronomic data for different locations in the LIYT-L during 1989/90.

Country	Location	Planting Date	Harvesting Date	Fertilizer (kg/ha)			Irrigation	Insecticide/Fungicide Herbicide	Local check
				N	P	K			
ALGERIA	Beni Slimane	29.10.1989	15.06.1990	-	46	-	-	Treflan	LBC
ALGERIA	Guelma	18.11.1989	11.06.1990	-	200	-	-	-	Syrie 229
ALGERIA	Khroub	17.12.1989	27.06.1990	-	45	-	-	Treflan	Syrie 229
ALGERIA	Setif	18.12.1989	16.06.1990	-	100	-	-	Trifluralin	Setif 618
ALGERIA	Sidi Bel Abbas	07.12.1989	06.07.1990	-	46	-	-	Igran & Kerb	Syrie 229
ALGERIA	Tiaret	24.12.1989	05.06.1990	-	46	-	-	-	Metropole
ALGERIA	Zidane-I	11.12.1989	30.06.1990	-	46	-	-	Igran, Kerb	Syrie 229
ALGERIA	Zidane-II	17.12.1989	23.06.1990	-	46	-	-	Igran, Kerb	Syrie 229
ETHIOPIA	Ghinchi	16.08.1990	06.12.1990	-	-	-	-	-	NEL 358
ITALY	Tolentino	14.01.1990	25.07.1990	-	-	-	2	-	Colfiorito
JORDAN	Marow	04.12.1989	NA	20	40	-	-	-	Jordan -1
JORDAN	Mushager	02.12.1989	NA	20	40	-	-	-	Jordan -1
LEBANON	Terbol	30.11.1989	15.05.1990	-	50	-	-	Fortrol, Kerb	L.L.
LIBYA	Sarir	17.10.1989	28.04.1990	200	150	50	+	Malathion	S-1
NEW ZEALAND	Lincoln	11.07.1990	03.01.1991	-	-	-	-	Bladex, Mesural, Metasystox	Olympic
PAKISTAN	Faisalabad (NIAB)	06.11.1989	05.05.1990	20	60	-	-	-	Mascor 85
PORTUGAL	Elvas	09.01.1990	01.06.1990	-	60	60	-	-	L -211
SYRIA	Breda	22.11.1989	NA	-	50	-	-	Fortrol, Kerb	NA
SYRIA	Gelline	30.12.1989	17.05.1990	20	50	-	-	-	NA
SYRIA	Heimo	06.12.1989	27.05.1990	-	50	-	-	-	NA
SYRIA	Idleb	06.12.1989	21.05.1990	-	60	-	-	-	NA
SYRIA	Izra'a	05.12.1989	05.06.1990	-	50	-	-	-	NA
SYRIA	Tel Hadya	29.12.1989	05.06.1990	-	50	-	-	Fortrol, Kerb	Kurdi
TUNISIA	Beja	NA	NA	-	-	-	-	-	NA
TUNISIA	El Kef	NA	NA	-	-	-	-	-	NA
TURKEY	Erzurum	15.05.1990	13.08.1990	30	70	-	-	-	-
TURKEY	Eskisehir	NA	NA	NA	-	-	NA	NA	Sultan -1

NA = Not available, + = Number and quantity not given.

Table 5.1.2. Time to flowering (days) of entries at different locations in the LIYT-L during 1989/90.

Entry Name	Pedigree	Origin	ALGERIA			
			Beni Sliman	Guelma	Khroub	Setif
Local Large	-	Syria	133	123	120	85
Idleb - 1	-	Jordan	139	119	112	85
81 S 38326	-	Syria	148	126	119	65
FLIP84- 27L	ILL 20 X ILLW1	ICARDA	133	119	110	62
FLIP84-145L	ILL 102 X ILL 866	ICARDA	117	119	108	62
FLIP84-147L	ILL 889 X ILL 588	ICARDA	148	123	114	65
FLIP85- 35L	ILL 466 X ILL 212	ICARDA	136	119	111	85
FLIP85- 38L	ILL 466 X ILL 212	ICARDA	137	121	116	65
FLIP86- 2L	ILL 466 X ILL 212	ICARDA	133	119	112	85
FLIP86- 3L	ILL 466 X ILL 212	ICARDA	136	119	111	85
FLIP86- 8L	ILL 466 X ILL 212	ICARDA	129	121	112	62
FLIP86- 10L	ILL 466 X ILL 212	ICARDA	133	119	111	65
FLIP86- 16L	ILL4349 X ILL4605	ICARDA	119	119	108	62
FLIP87- 2L	ILL 262 X ILL 350	ICARDA	148	123	115	65
FLIP87- 3L	ILL 262 X ILL 784	ICARDA	137	121	116	62
FLIP87- 5L	ILL2126 X ILL 643	ICARDA	139	123	118	62
FLIP87- 8L	ILL2129 X ILL 262	ICARDA	140	126	117	85
FLIP87- 13L	ILL1880 X ILL 253	ICARDA	140	123	114	85
FLIP87- 16L	ILL 8 X ILL 212	ICARDA	136	119	112	85
FLIP87- 17L	ILL 8 X ILL 212	ICARDA	129	119	111	65
FLIP88- 6L	ILL4402 X ILL4400	ICARDA	129	119	111	65
FLIP88- 8L	ILL5582 X ILL5520	ICARDA	133	119	111	85
FLIP88- 11L	ILL4401 X ILL5513	ICARDA	133	119	114	62
LOCAL CHECK	-		133	119	114	62
<b>Location Mean</b>			<b>135</b>	<b>121</b>	<b>117</b>	<b>72</b>
S.E. of Mean			0.94	0.08	#	0.10
L.S.D. at 5%			2.68	0.23	#	0.30
C.V. (%)			1.21	0.12	#	0.25
Error d.f.			46	46	#	46
Significance			*	*		*

142

Cont'd. ...

Table 5.1.2. Cont'd. ...

Entry name	ALGERIA				ETHIOPIA	ITALY	JORDAN		LEBANON	LIBYA
	Sidi Bel Abbes	Zidan-I	Zidan-II	Tiaret	Ghinchi	Tolentino	Marow	Mushager	Terbol	Sarir
Local Large	124	106	115	113	105	86	133	135	136	108
Idleb - 1	121	104	106	114	75	82	129	129	131	94
81 S 38326	122	107	106	113	109	88	133	137	140	118
FLIP84- 27L	117	102	106	106	73	84	133	130	132	111
FLIP84-145L	113	89	101	106	55	83	128	132	132	89
FLIP84-147L	121	105	106	112	89	89	133	137	136	111
FLIP85- 35L	114	104	107	104	73	82	129	128	131	130
FLIP85- 38L	120	109	106	104	79	85	128	132	136	113
FLIP86- 2L	117	105	119	104	72	83	129	129	132	91
FLIP86- 3L	117	99	121	111	71	82	129	129	131	96
FLIP86- 8L	118	101	106	114	69	82	128	130	132	118
FLIP86- 10L	118	102	106	111	69	82	127	128	132	108
FLIP86- 16L	110	92	90	114	60	85	121	131	131	99
FLIP87- 2L	114	106	123	111	92	86	133	134	135	113
FLIP87- 3L	123	108	120	112	95	86	128	136	135	121
FLIP87- 5L	120	108	101	114	88	87	133	132	134	102
FLIP87- 8L	119	105	115	115	95	88	129	134	135	104
FLIP87- 13L	123	106	108	105	79	84	132	132	134	90
FLIP87- 16L	114	105	104	104	78	83	128	131	132	77
FLIP87- 17L	120	101	108	109	85	82	129	129	131	77
FLIP88- 6L	114	106	120	104	75	82	132	129	131	92
FLIP88- 8L	123	103	121	111	75	83	128	129	131	113
FLIP88- 11L	121	106	123	106	95	84	129	132	132	108
LOCAL CHECK	117	109	101	115	70	94	128	132	142	92
<b>Location Mean</b>	<b>118</b>	<b>104</b>	<b>110</b>	<b>110</b>	<b>80</b>	<b>85</b>	<b>130</b>	<b>132</b>	<b>134</b>	<b>103</b>
S.E. of Mean	1.54	1.72	2.99	#	3.97	1.08	0.36	1.13	0.49	12.48
L.S.D. at 5%	4.38	4.88	8.52	#	11.31	3.08	1.03	3.21	1.40	-
C.V. (%)	2.25	2.86	4.71	#	8.59	2.21	0.48	1.49	0.64	20.98
Error d.f.	46	46	46		46	46	46	46	46	46
Significance	*	*	*		*	*	*	*	*	NS

Cont'd. ...

Table 5.1.2. Cont'd. ...

Entry name	NEW ZEALAND	PAKISTAN	PORTUGAL	SYRIA			TURKEY	Overall Mean		
	Lincoln	Faisalabad	Elvas	Gelline	Heimo	Idleb	Izra'a		Tel Hadya	Erzurum
Local Large	114	127	98	109	122	123	127	112	56	113
Idleb - 1	112	110	92	101	120	119	123	106	51	108
81 S 38326	110	125	100	108	124	127	128	113	53	114
FLIP84- 27L	110	122	91	101	120	116	124	109	52	107
FLIP84-145L	110	79	81	94	109	120	123	105	54	100
FLIP84-147L	110	120	97	104	122	123	127	110	52	111
FLIP85- 35L	110	122	89	101	118	116	124	104	52	108
FLIP85- 38L	110	113	98	104	123	125	126	110	52	109
FLIP86- 2L	109	113	90	101	120	117	125	108	54	107
FLIP86- 3L	110	113	88	100	116	115	124	109	52	107
FLIP86- 8L	112	110	92	100	120	116	124	106	52	107
FLIP86- 10L	110	113	87	101	117	116	124	105	52	106
FLIP86- 16L	114	76	80	92	109	117	124	108	53	101
FLIP87- 2L	110	124	95	105	121	124	129	111	53	112
FLIP87- 3L	110	125	96	104	122	123	127	110	53	112
FLIP87- 5L	112	120	98	105	122	123	128	110	52	110
FLIP87- 8L	109	125	98	105	122	128	127	110	52	112
FLIP87- 13L	109	123	97	102	122	123	126	108	52	110
FLIP87- 16L	109	113	96	101	121	119	123	107	52	107
FLIP87- 17L	110	113	93	100	118	119	124	108	51	106
FLIP88- 6L	110	110	91	100	118	117	122	106	53	106
FLIP88- 8L	114	110	92	101	117	119	123	106	51	109
FLIP88- 11L	112	120	93	104	122	120	124	108	51	109
LOCAL CHECK	117	96	92	108	122	127	130	109	-	
Location Mean	111	113	93	102	119	120	125	108	52	
S.E. of Mean	0.08	0.62	0.62	0.60	0.84	0.80	0.83	0.92	0.88	
L.S.D. at 5%	0.24	1.78	1.78	1.72	2.40	2.28	2.37	2.61	-	
C.V. (%)	0.13	0.95	1.17	1.02	1.22	1.15	1.15	1.47	2.90	
Error d.f.	46	46	46	46	46	46	46	46	44	
Significance	*	*	*	*	*	*	*	*	NS	

\* = Significant at  $P \leq 0.05$ , NS = Not significant. # Not analysed due to incomplete data set or other reasons.

Table 5.1.3. Time to maturity (days) of entries at different locations in the LIYT-L during 1989/90.

Entry name	ALGERIA								ETHIOPIA	JORDAN	
	Beni Sliman	Guelma	Khroub	Setif	Sidi Bel Abbas	Zidane-I	Zidane-II	Tiaret	Ghinchi	Marow	Mushager
Local Large	224	175	172	128	170	165	157	163	163	168	171
Idleb - 1	227	175	175	132	169	164	156	167	140	163	186
81 S 38326	229	175	172	128	168	164	156	167	159	170	189
FLIP84- 27L	224	171	172	121	166	163	157	163	135	166	185
FLIP84-145L	219	175	172	128	164	162	153	162	119	168	189
FLIP84-147L	229	174	173	126	170	165	157	164	149	166	189
FLIP85- 35L	227	175	174	115	165	162	157	167	139	164	186
FLIP85- 38L	227	175	172	115	168	162	157	163	142	167	190
FLIP86- 2L	224	172	169	121	166	165	157	163	141	165	187
FLIP86- 3L	227	175	167	115	167	161	157	162	138	162	183
FLIP86- 8L	224	175	172	115	167	160	156	167	134	164	187
FLIP86- 10L	224	173	171	115	167	163	155	161	148	164	188
FLIP86- 16L	219	175	160	110	164	160	156	167	115	170	187
FLIP87- 2L	229	172	169	121	164	163	156	163	154	168	188
FLIP87- 3L	227	175	172	115	170	164	157	162	152	165	187
FLIP87- 5L	231	175	172	126	168	162	156	162	154	167	189
FLIP87- 8L	227	175	169	126	168	164	156	164	154	166	189
FLIP87- 13L	228	172	169	131	169	166	156	161	150	166	185
FLIP87- 16L	227	171	171	128	166	164	156	161	138	165	185
FLIP87- 17L	224	175	172	126	168	161	156	161	139	163	184
FLIP88- 6L	224	171	169	126	165	164	155	163	138	164	186
FLIP88- 8L	224	171	169	121	170	163	155	162	144	164	184
FLIP88- 11L	224	175	172	128	169	166	156	162	156	165	189
LOCAL CHECK	224	175	171	132	167	163	156	163	111	164	187
Location Mean	226	174	170	123	167	163	156	163	142	166	186
S.E. of Mean	0.84	0.56	#	0.09	1.00	1.14	0.59	#	3.62	0.90	1.77
L.S.D. at 5%	2.38	1.60	#	0.24	2.84	3.25	1.68	#	10.31	2.56	5.03
C.V. (%)	0.64	0.56	#	0.12	1.03	1.21	0.66	#	4.41	0.94	1.64
Error d.f.	46	46		46	46	46	46		46	46	46
Significance	*	*		*	*	*	*		*	*	*

Cont'd. ...

Table 5.1.3. Cont'd. ...

Entry Name	LEBANON	LIBYA	PAKISTAN	PORTUGAL	SYRIA					TURKEY	Overall Mean
	Terbol	Sarir	Faisalabad	Elvas	Gelline	Heimo	Idleb	Izra'a	Tel Hadya	Erzurum	
Local Large	180	178	169	137	142	164	169	172	155	87	162
Idleb - 1	172	165	162	130	137	161	165	162	141	88	159
81 S 38326	179	169	171	137	142	164	168	172	152	88	163
FLIP84- 27L	173	170	169	132	136	167	166	166	147	88	159
FLIP84-145L	178	162	139	134	135	164	169	172	145	87	157
FLIP84-147L	178	174	169	135	138	161	167	167	147	89	161
FLIP85- 35L	173	166	169	132	136	165	166	170	140	89	159
FLIP85- 38L	177	169	164	135	139	165	169	168	152	88	160
FLIP86- 2L	175	162	165	132	137	167	168	168	149	88	159
FLIP86- 3L	174	174	168	131	135	165	165	167	145	89	159
FLIP86- 8L	173	169	164	133	138	164	167	164	145	88	158
FLIP86- 10L	173	163	167	131	137	164	166	166	143	90	158
FLIP86- 16L	173	166	140	130	133	163	167	171	146	88	155
FLIP87- 2L	178	174	169	134	139	162	169	167	145	88	161
FLIP87- 3L	178	171	169	134	139	162	168	166	143	86	160
FLIP87- 5L	178	171	169	135	140	162	168	168	146	89	161
FLIP87- 8L	178	168	171	137	139	162	171	168	148	90	161
FLIP87- 13L	178	162	170	134	138	162	165	168	146	88	160
FLIP87- 16L	172	167	169	132	137	162	163	163	143	89	159
FLIP87- 17L	173	170	168	129	135	160	165	165	144	88	158
FLIP88- 6L	174	163	167	131	137	161	165	163	141	89	158
FLIP88- 8L	173	167	166	131	136	161	163	163	139	86	158
FLIP88- 11L	178	170	167	134	138	163	167	167	148	88	161
LOCAL CHECK	180	163	157	131	141	163	170	170	148	-	
<b>Location Mean</b>	<b>176</b>	<b>168</b>	<b>165</b>	<b>133</b>	<b>138</b>	<b>163</b>	<b>167</b>	<b>167</b>	<b>146</b>	<b>88</b>	
S.E. of Mean	0.66	4.66	0.81	0.74	1.10	0.47	1.24	1.44	2.27	0.85	
L.S.D. at 5%	1.89	-	2.29	2.12	3.13	1.34	3.54	4.09	6.47	-	
C.V. (%)	0.66	4.80	0.84	0.97	1.38	0.50	1.29	1.49	2.70	1.66	
Error d.f.	46	46	46	46	46	46	46	46	46	44	
Significance	*	NS	*	*	*	*	*	*	*	NS	

\* = Significant at  $P \leq 0.05$ , NS = Not significant. # Not analysed due to incomplete data set or other reasons.



Table 5.1.4. Plant height (cm) of entries at different locations in the LIYT-L during 1989/90.

Entry Name	ALGERIA									ETHIOPIA	ITALY	JORDAN
	Beni Sliman	Guelma	Khroub	Setif	Sidi Bel Abbas	Zidane-I	Zidane-II	Tiaret	Ghinchi	Tolentino	Marow	
Local Large	14	36	17	27	33	33	17	27	22	39	28	
Idleb - 1	15	36	22	22	33	32	17	24	22	35	29	
81 S 38326	14	43	20	25	33	32	22	27	22	35	30	
FLIP84- 27L	17	36	23	22	30	32	13	23	24	32	28	
FLIP84-145L	21	40	31	28	32	32	20	29	23	37	27	
FLIP84-147L	15	39	18	22	32	32	18	22	24	30	26	
FLIP85- 35L	12	46	20	23	32	32	17	23	23	31	31	
FLIP85- 38L	12	43	23	25	35	32	18	25	22	32	28	
FLIP86- 2L	14	43	23	22	35	33	22	24	22	36	29	
FLIP86- 3L	14	43	19	18	32	33	17	23	25	34	31	
FLIP86- 8L	17	44	22	22	33	33	20	22	26	34	32	
FLIP86- 10L	15	39	24	20	30	33	15	24	23	35	31	
FLIP86- 16L	19	43	27	28	40	33	17	26	23	40	25	
FLIP87- 2L	16	36	22	23	35	32	15	23	23	31	20	
FLIP87- 3L	18	39	26	27	33	32	18	25	24	30	26	
FLIP87- 5L	18	40	18	23	30	32	25	25	24	35	27	
FLIP87- 8L	15	40	23	23	33	32	18	23	24	33	29	
FLIP87- 13L	13	41	23	23	30	32	17	24	26	36	32	
FLIP87- 16L	15	35	23	27	33	30	18	26	24	35	29	
FLIP87- 17L	15	43	20	27	32	32	23	24	19	34	30	
FLIP88- 6L	16	38	22	23	38	32	15	26	22	35	33	
FLIP88- 8L	15	44	24	23	37	33	17	24	22	33	31	
FLIP88- 11L	17	45	22	22	33	33	20	28	23	38	29	
LOCAL CHECK	15	36	15	28	32	32	22	30	22	51	28	
Location Mean	16	40	22	24	33	32	18	25	23	35	29	
S.E. of Mean	0.97	0.11	#	1.48	1.38	1.66	1.47	1.32	1.27	2.10	1.81	
L.S.D. at 5%	2.77	0.33	#	4.22	3.92	-	4.20	3.76	-	5.98	5.15	
C.V. (%)	10.82	0.49	#	10.75	7.19	8.92	13.93	9.20	9.48	10.39	10.90	
Error d.f.	46	46		46	46	46	46	46	46	46	46	
Significance	*	*		*	*	NS	*	*	NS	*	*	

Cont'd. ...

Table 5.1.4. Cont'd. ...

Entry Name	JORDAN	LEBANON	LIBYA	NEW ZEALAND	PAKISTAN	PORTUGAL	SYRIA				TURKEY	Overall Mean
	Mushager	Terbol	Sarir	Lincoln	Faisalabad	Elvas	Gelline	Heimo	Idleb	Izra'a	Erzurum	
Local Large	25	34	53	59	46	32	33	38	25	27	24	29
Idleb - 1	21	35	56	57	48	31	33	37	30	27	23	29
81 S 38326	23	34	44	51	46	33	32	35	23	24	25	28
FLIP84- 27L	26	31	55	45	50	30	29	32	23	27	25	27
FLIP84-145L	26	35	55	51	46	30	34	35	26	30	22	29
FLIP84-147L	22	33	54	46	46	30	32	34	23	26	24	27
FLIP85- 35L	23	33	50	49	53	33	32	33	24	29	23	28
FLIP85- 38L	24	33	57	48	49	31	31	32	23	24	22	27
FLIP86- 2L	26	31	55	45	50	29	32	32	23	26	24	28
FLIP86- 3L	27	30	56	46	46	32	33	34	29	27	22	28
FLIP86- 8L	26	31	62	55	45	31	32	35	25	26	26	29
FLIP86- 10L	23	33	52	51	44	29	31	34	29	28	25	27
FLIP86- 16L	25	38	52	59	48	34	37	37	27	30	27	30
FLIP87- 2L	24	33	52	47	47	31	32	36	24	25	27	27
FLIP87- 3L	23	32	51	50	50	30	30	35	24	26	26	28
FLIP87- 5L	25	33	53	55	48	30	36	33	26	26	22	29
FLIP87- 8L	24	33	47	49	61	29	32	36	21	26	26	28
FLIP87- 13L	29	34	50	48	42	29	34	33	26	26	25	28
FLIP87- 16L	24	34	54	51	47	30	36	35	29	28	25	29
FLIP87- 17L	24	31	49	57	46	31	35	34	28	28	24	28
FLIP88- 6L	24	33	54	51	44	30	35	36	27	26	22	28
FLIP88- 8L	24	35	49	59	44	32	32	36	26	26	23	28
FLIP88- 11L	26	34	48	54	48	31	37	36	28	28	22	29
LOCAL CHECK	23	40	50	55	64	33	35	39	29	27	-	
Location Mean	24	33	52	52	48	31	33	35	26	27	24	
S.E. of Mean	1.72	1.14	3.46	2.09	1.06	1.11	1.40	1.18	2.24	1.18	1.31	
L.S.D. at 5%	-	3.26	-	6.00	3.01	-	4.00	3.35	-	3.36	-	
C.V. (%)	12.23	5.92	11.44	7.03	3.80	6.25	7.34	5.85	15.04	7.63	9.42	
Error d.f.	46	46	46	46	46	46	46	46	46	46	44	
Significance	NS	*	NS	*	*	NS	*	*	NS	*	NS	

\* = Significant at  $P < 0.05$ , NS = Not significant. # Not analysed due to incomplete data set or other reasons.

Table 5.1.5. Seed yield (Y=kg/ha) and rank (R) of entries at different locations in LIYT-L during 1989/90.

Entry Name	ALGERIA													
	Beni Slimane		Guelma		Khroub		Setif		Sidi Bel Abbas		Zidane-I		Zidane-II	
	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R
Local Large	1211	13	420	18	736	23	2164	9	734	12	969	2	49	14
Idleb - 1	1033	17	873	2	1195	10	2138	11	992	3	281	18	60	8
81 S 38326	844	23	373	20	903	18	1716	20	881	7	1117	1	128	2
FLIP84- 27L	1189	15	617	11	874	20	1364	24	528	18	172	23	15	22
FLIP84-145L	1489	4	567	13	659	24	1893	16	862	8	445	14	73	6
FLIP84-147L	1378	9	330	22	956	16	2298	8	755	11	660	10	42	15
FLIP85- 35L	1522	2	820	4	1077	13	1996	14	951	5	188	22	29	20
FLIP85- 38L	1489	3	627	10	1248	8	1813	17	465	21	667	9	109	4
FLIP86- 2L	622	24	740	6	805	22	1480	23	769	10	151	24	51	11
FLIP86- 3L	1011	18	497	16	980	15	1716	19	598	16	195	21	39	16
FLIP86- 8L	1433	7	927	1	1314	6	1764	18	539	17	681	8	13	24
FLIP86- 10L	1456	5	660	8	1086	12	1538	22	681	15	271	19	143	1
FLIP86- 16L	1200	14	700	7	988	14	2147	10	703	14	254	20	67	7
FLIP87- 2L	911	22	287	23	898	19	2698	1	717	13	760	6	97	5
FLIP87- 3L	933	21	547	14	846	21	2591	3	377	24	724	7	35	18
FLIP87- 5L	1711	1	450	17	1200	9	2071	12	510	19	884	4	53	10
FLIP87- 8L	1344	11	240	24	1171	11	2578	4	481	20	786	5	26	21
FLIP87- 13L	978	20	397	19	1330	5	1964	15	385	23	482	13	38	17
FLIP87- 16L	1456	6	827	3	1485	2	2631	2	1056	2	407	15	54	9
FLIP87- 17L	1011	19	807	5	1424	3	2418	6	963	4	331	16	30	19
FLIP88- 6L	1378	10	510	15	1334	4	2009	13	806	9	508	11	13	23
FLIP88- 8L	1322	12	573	12	1533	1	2569	5	1108	1	315	17	50	12
FLIP88- 11L	1189	16	347	21	943	17	1564	21	883	6	889	3	119	3
LOCAL CHECK	1411	8	657	9	1285	7	2320	7	453	22	502	12	50	13
Location Mean	1230		575		1095		2060		716		527		58	
S.E. of Mean	247.18		116.08		168.27		250.41		36.26		22.35		4.48	
L.S.D. at 5%	-		330.42		478.99		712.80		103.22		63.61		12.76	
C.V. (%)	34.81		34.99		26.63		21.05		8.77		7.35		13.46	
Error d.f.	46		46		46		46		46		46		46	
Significance	NS		*		*		*		*		*		*	
Test > L. Check	-		0		0		0		16		10		7	

Cont'd. ...

Table 5.1.5. Cont'd. ...

Entry Name	ALGERIA		ETHIOPIA		ITALY		JORDAN				LEBANON		LIBYA	
	Tiaret		Ghinchi		Tolentino		Marou		Mushagar		Terbol		Sarir	
	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R
Local Large	561	21	94	20	1023	12	329	17	303	21	1481	23	597	16
Idleb - 1	652	14	133	14	832	23	775	2	462	15	1926	3	588	17
81 S 38326	830	4	81	23	969	17	188	22	597	8	1556	19	320	22
FLIP84- 27L	714	10	235	9	973	16	375	16	603	7	1704	11	910	6
FLIP84-145L	889	2	381	1	1059	11	233	21	466	13	1472	24	726	12
FLIP84-147L	542	23	88	21	1325	5	499	7	644	4	1630	16	962	5
FLIP85- 35L	612	18	121	17	1009	13	511	6	459	16	1806	10	760	11
FLIP85- 38L	780	6	225	10	941	19	487	8	579	9	1852	7	711	13
FLIP86- 2L	598	19	113	19	788	24	286	19	438	18	1667	13	313	23
FLIP86- 3L	532	24	242	7	1084	10	513	5	463	14	1630	15	1195	3
FLIP86- 8L	618	17	219	11	1350	3	427	13	366	19	1889	4	708	14
FLIP86- 10L	973	1	235	8	968	18	531	3	730	2	1852	6	222	24
FLIP86- 16L	816	5	129	15	980	15	123	24	235	23	1852	5	899	7
FLIP87- 2L	558	22	160	12	1620	2	1348	1	538	11	1657	14	669	15
FLIP87- 3L	730	9	117	18	1290	6	405	15	677	3	1685	12	407	21
FLIP87- 5L	762	8	317	2	1349	4	461	10	455	17	1491	22	820	8
FLIP87- 8L	768	7	125	16	1228	7	329	18	307	20	1556	20	449	19
FLIP87- 13L	587	20	85	22	873	20	528	4	603	6	1528	21	501	18
FLIP87- 16L	693	12	244	6	1173	8	441	11	529	12	1833	9	791	9
FLIP87- 17L	629	16	142	13	1146	9	483	9	556	10	2046	2	1245	1
FLIP88- 6L	673	13	279	3	850	22	419	14	842	1	1843	8	1226	2
FLIP88- 8L	872	3	248	5	859	21	439	12	622	5	2083	1	968	4
FLIP88- 11L	712	11	52	24	989	14	236	20	215	24	1583	18	442	20
LOCAL CHECK	648	15	275	4	1816	1	175	23	265	22	1593	17	781	10
Location Mean	698		181		1104		439		498		1717		717	
S.E. of Mean	133.07		69.40		133.98		146.27		94.24		81.76		296.34	
L.S.D. at 5%	-		-		381.38		416.35		268.26		232.74		-	
C.V. (%)	33.03		66.48		21.02		57.68		32.77		8.25		71.57	
Error d.f.	46		46		46		46		46		46		46	
Significance	NS		NS		*		*		*		*		NS	
Test > L. Check	-		-		0		2		11		9		-	

Cont'd. ...

Table 5.1.5. Cont'd. ...

Entry Name	NEW ZEALAND		PAKISTAN		PORTUGAL		SYRIA							
	Lincoln		Faisalabad		Elvas		Gelline		Heimo		Idleb		Izra'a	
	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R
Local Large	576	3	590	16	1238	21	1164	22	1542	12	991	5	913	19
Idleb - 1	311	11	1326	3	1417	12	1700	14	1434	13	986	6	1200	9
81 S 38326	382	7	285	24	1358	17	1104	23	1119	24	838	13	967	18
FLIP84- 27L	231	18	792	11	1246	20	1864	4	1341	18	764	16	1229	8
FLIP84-145L	341	9	646	15	1007	23	909	24	1250	22	741	18	533	23
FLIP84-147L	218	20	528	19	2106	1	1853	6	1945	1	918	9	1050	14
FLIP85- 35L	286	15	833	10	1546	10	1871	3	1368	16	477	24	1279	1
FLIP85- 38L	497	4	764	13	1572	8	1502	19	1642	8	760	17	1029	15
FLIP86- 2L	130	24	889	8	988	24	1773	8	1689	7	784	14	1158	13
FLIP86- 3L	192	21	715	14	1657	6	1709	12	1596	10	928	8	1267	4
FLIP86- 8L	423	6	882	9	1217	22	1742	9	1845	3	878	12	1029	16
FLIP86- 10L	156	22	903	7	1374	16	1731	10	1328	19	1074	4	1254	6
FLIP86- 16L	223	19	1201	5	1407	14	1693	15	1432	14	530	23	429	24
FLIP87- 2L	364	8	500	21	1696	4	1960	2	1351	17	1204	1	1279	2
FLIP87- 3L	303	13	542	18	1871	2	1580	17	1742	6	701	19	1175	12
FLIP87- 5L	641	2	569	17	1410	13	1778	7	1222	23	878	11	1175	11
FLIP87- 8L	146	23	438	22	1386	15	1360	20	1637	9	674	20	804	22
FLIP87- 13L	309	12	368	23	1326	18	1862	5	1399	15	593	21	883	20
FLIP87- 16L	258	16	938	6	1710	3	1731	11	1320	20	930	7	1254	5
FLIP87- 17L	286	14	785	12	1546	9	2011	1	1836	4	566	22	1271	3
FLIP88- 6L	254	17	1236	4	1607	7	1538	18	1590	11	778	15	1183	10
FLIP88- 8L	330	10	1333	2	1665	5	1664	16	1894	2	882	10	979	17
FLIP88- 11L	473	5	521	20	1269	19	1709	13	1267	21	1093	3	1233	7
LOCAL CHECK	657	1	1722	1	1504	11	1349	21	1835	5	1180	2	858	21
<b>Location Mean</b>	<b>333</b>		<b>804</b>		<b>1463</b>		<b>1632</b>		<b>1526</b>		<b>839</b>		<b>1060</b>	
S.E. of Mean	80.22		80.84		187.45		178.11		239.69		203.58		108.68	
L.S.D. at 5%	228.34		230.12		533.59		506.98		-		-		309.35	
C.V. (%)	41.75		17.41		22.18		18.91		27.21		42.00		17.76	
Error d.f.	46		46		46		46		46		46		46	
Significance	*		*		*		*		NS		NS		*	
Test > Check	0		0		1		5		-		-		12	

Cont'd. ...

Table 5.1.5. Cont'd. ...

Entry Name	SYRIA		TUNISIA				TURKEY				Overall Mean	
	Tel Hadya		Beja		El Kef		Erzurum		Eskisehir		Y	R
	Y	R	Y	R	Y	R	Y	R	Y	R		
Local Large	403	19	303	22	753	23	524	23	433	19	773	20
Idleb - 1	635	8	583	6	1335	2	598	19	679	6	929	7
81 S 38326	285	23	450	18	523	24	602	18	413	21	724	23
FLIP84- 27L	371	21	603	5	1243	6	812	4	733	5	827	15
FLIP84-145L	371	22	167	24	757	22	716	9	392	22	732	22
FLIP84-147L	591	10	550	11	1263	5	660	14	567	14	937	6
FLIP85- 35L	680	4	493	15	1067	15	645	15	583	11	884	11
FLIP85- 38L	214	24	554	8	1133	12	624	17	563	15	879	13
FLIP86- 2L	461	18	500	14	997	18	688	12	458	18	744	21
FLIP86- 3L	559	13	553	9	977	20	815	3	738	4	861	14
FLIP86- 8L	533	14	447	19	1083	14	741	7	750	3	916	8
FLIP86- 10L	679	5	620	3	1307	3	707	10	813	1	896	10
FLIP86- 16L	386	20	510	13	1217	7	624	16	583	10	820	16
FLIP87- 2L	590	11	477	16	1093	13	954	1	421	20	954	5
FLIP87- 3L	722	1	550	10	1167	10	811	5	379	23	881	12
FLIP87- 5L	491	17	510	12	1185	8	739	8	492	17	909	9
FLIP87- 8L	663	6	367	21	1000	17	742	6	379	24	807	17
FLIP87- 13L	617	9	427	20	1177	9	596	21	529	16	783	19
FLIP87- 16L	719	2	643	2	1057	16	697	11	592	9	979	2
FLIP87- 17L	517	16	610	4	1267	4	892	2	567	13	976	3
FLIP88- 6L	640	7	663	1	1495	1	596	20	583	12	956	4
FLIP88- 8L	700	3	577	7	1167	11	688	13	596	8	1001	1
FLIP88- 11L	518	15	460	17	990	19	578	22	621	7	804	18
LOCAL CHECK	580	12	253	23	947	21	-	-	792	2		
Location Mean	539		495		1092		698		569			
S.E. of Mean	84.89		75.43		126.28		76.76		91.77			
L.S.D. at 5%	241.64		214.70		359.46		218.77		261.22			
C.V. (%)	27.30		26.41		20.04		19.05		27.94			
Error d.f.	46		46		46		44		46			
Significance	*		*		*		*		*			
Test > Check	0		16		3		-		-			

\* = Significant at  $P < 0.05$ , NS = Not significant.

Table 5.1.6. The five heaviest seed yielding entries at the individual locations in the LIYT-L during 1989/90.

Rank	ALGERIA								ETHIOPIA
	Beni Slimane	Guelma	Khroub	Setif	Sidi Bel Abbas	Zidane-I	Zidane-II	Tiaret	Ghinch
1	FLIP 87- 5L	FLIP 86- 8L	FLIP 88- 8L	FLIP 87- 2L	FLIP 88- 8L	81 S 38326	FLIP 86-10L	FLIP 86- 10L	FLIP 84-145L
2	FLIP 85- 35L	Idleb -1	FLIP 87-16L	FLIP 87-16L	FLIP 87-16L	Local Large	81 S 38326	FLIP 84-145L	FLIP 87- 5L
3	FLIP 85- 38L	FLIP 87-16L	FLIP 87-17L	FLIP 87- 3L	Idleb -1	FLIP 88-11L	FLIP 88-11L	FLIP 88- 8L	FLIP 88- 6L
4	FLIP 84-145L	FLIP 85-35L	FLIP 88- 6L	FLIP 87- 8L	FLIP 87-17L	FLIP 87- 5L	FLIP 85-38L	81 S 38326	Local check
5	FLIP 86- 10L FLIP 87- 16L FLIP 86- 8L	FLIP 87-17L	FLIP 87-13L	FLIP 88- 8L	FLIP 85-35L	FLIP 87- 7L	FLIP 87- 2L	FLIP 86- 16L	FLIP 88- 8L FLIP 87- 16L FLIP 86- 3L FLIP 86- 10L

Cont'd. ...

Rank	ITALY	JORDAN		LEBANON	LIBYA	NEW ZEALAND	PAKISTAN	PORTUGAL	SYRIA
	Tolentino	Marow	Mushagar	Terbol	Sarir	Lincoln	Faisalabad	Elvas	Gelline
1	Local check	FLIP 87- 2L	FLIP 88- 6L	FLIP 88- 8L	FLIP 87- 17L	Local check	Local check	FLIP 84-147L	FLIP 87-17L
2	FLIP 87- 2L	Idleb -1	FLIP 86-10L	FLIP 87-17L	FLIP 88- 6L	FLIP 87- 5L	FLIP 88- 8L	FLIP 87- 3L	FLIP 87- 2L
3	FLIP 86- 8L	FLIP 86-10L	FLIP 87- 3L	Idleb -1	FLIP 86- 3L	Local Large	Idleb -1	FLIP 87- 16L	FLIP 85-35L
4	FLIP 87- 5L	FLIP 87-13L	FLIP 84-14L	FLIP 86- 8L	FLIP 88- 8L	FLIP 85-38L	FLIP 88- 6L	FLIP 87- 2L	FLIP 84-27L
5	FLIP 84-147L	FLIP 86- 3L	FLIP 88- 8L	FLIP 86-16L	FLIP 84-147L	FLIP 88-11L	FLIP 86-16L	FLIP 88- 8L	FLIP 87-13L

Cont'd. ...

Rank	SYRIA			TUNISIA			TURKEY	
	Heimo	Idleb	Izra'a	Tel Hadya	Beja	El Kef	Erzurum	Eskisehir
1	FLIP 84-147L	FLIP 87- 2L	FLIP 85-35L	FLIP 87- 3L	FLIP 88- 6L	FLIP 88- 6L	FLIP 87- 2L	FLIP 86-10L
2	FLIP 88- 8L	Local check	FLIP 87- 2L	FLIP 87-16L	FLIP 87-16L	Idleb -1	FLIP 87-17L	Local Check
3	FLIP 86- 8L	FLIP 88-11L	FLIP 87-17L	FLIP 88- 8L	FLIP 86-10L	FLIP 86- 10L	FLIP 86- 3L	FLIP 86- 8L
4	FLIP 87- 17L	FLIP 86-10L	FLIP 86- 3L	FLIP 85-35L	FLIP 87-17L	FLIP 87- 17L	FLIP 84-27L	FLIP 86- 3L
5	Local check	Local Large	FLIP 87-16L FLIP 86-10L FLIP 88-11L	FLIP 86-10L	FLIP 84-27L	FLIP 84-147L FLIP 84-27L	FLIP 87- 3L FLIP 87- 8L	FLIP 84-27L

The brackets indicate entries having the same rank.

87-16L, occurred most frequently among the top five heaviest yielders and were thus comparatively widely adapted.

On the basis of average over two years for the common entries (Table 5.1.7.), FLIP 87-16L ranked number 1 and was followed by FLIP 87-17L, FLIP 86-8L, FLIP 87-5L, and FLIP 87-2L with seed yields of 1116, 1098, 1035, 1021, and 1016 kg/ha, respectively.

Table 5.1.7. The mean seed yield (Y=kg/ha) and rank (R) of the common entries in LIYT-L during 1988/89 and 1989/90.

Entry Name	1988/89		1989/90		Mean	
	Y	R	Y	R	Y	R
Syrian local large	1030	15	773	15	902	15
81S 38326	1217	3	724	18	971	10
FLIP 84- 27L	1106	10	827	11	967	11
FLIP 84- 145L	797	18	732	17	765	18
FLIP 85- 35L	1129	7	884	7	1007	6
FLIP 85- 38L	1115	8	879	9	997	7
FLIP 86- 2L	1172	4	744	16	958	13
FLIP 86- 3L	1111	9	861	10	986	9
FLIP 86- 8L	1154	5	916	4	1035	3
FLIP 86- 10L	1090	11	896	6	993	8
FLIP 86- 16L	976	17	820	12	898	16
FLIP 87- 2L	1077	12	954	3	1016	5
FLIP 87- 3L	1042	14	881	8	962	12
FLIP 87- 5L	1132	6	909	5	1021	4
FLIP 87- 8L	1066	13	807	13	937	14
FLIP 87- 13L	997	16	783	13	890	17
FLIP 87- 16L	1253	1	979	1	1116	1
FLIP 87- 17L	1219	2	976	2	1098	2

## 5.2. LENTIL INTERNATIONAL YIELD TRIAL-SMALL SEED (LIYT-S)

### Material

The material for the Lentil International Yield Trial-Small Seed comprised of 23 test entries and one local check to be supplied by the cooperator. The test entries were selections with seed size less than 4.5 g/100-seeds and were selected from the international screening nurseries based on their superior yield performance. Out of 23 test entries, 21 were developed at ICARDA through hybridization.

### Methods and Management

The trial design was a randomized complete block with three replications. The suggested plot size was four rows each 4 m long with an inter row spacing of 25 cm. Thirty four sets of trial were distributed to cooperators in 19 countries. The results were received for 18 trials from 11 countries and are reported. The agronomic practices employed at different locations are given in Table 5.2.1.



Table 5.2.1. Agronomic data for different locations in the LIYT-S during 1989/90.

Country	Location	Planting Date	Harvesting Date	Fertilizer (kg/ha)			Irrigation	Insecticide/Fungicide Herbicide	Local check
				N	P	K			
ALGERIA	Beni Slimane	29.10.1989	15.06.1990	-	100	-	-	Treflan	Syrie 229
ALGERIA	Guelma	18.11.1989	11.06.1990	-	200	-	-	-	Syrie 229
ETHIOPIA	Ghinchi	16.08.1990	10.01.1991	-	-	-	-	-	NA
ITALY	Leonessa	22.10.1989	-	-	80	-	-	-	-
JORDAN	Marow	04.12.1989	NA	20	40	-	-	-	Jordan -1
JORDAN	Mushager	02.12.1989	NA	20	40	-	-	-	Jordan -1
LEBANON	Terbol	30.11.1989	15.05.1990	-	50	-	-	Fortrol, Kerb	L.L.
LIBYA	Sarir	17.10.1989	28.04.1990	200	150	-	+	Malathion	S -1
PAKISTAN	Faisalabad (NIAB)	07.11.1989	05.05.1990	20	60	-	-	-	Masoor 85
PORTUGAL	Elvas	10.01.1990	31.05.1990	-	60	60	-	-	L -188
SYRIA	Breda	29.11.1989	NA	-	50	-	-	Fortrol, Kerb	NA
SYRIA	Gelline	30.12.1989	17.05.1990	20	50	-	-	-	NA
SYRIA	Heimo	06.12.1989	28.05.1990	-	50	-	-	-	NA
SYRIA	Idleb	06.12.1989	21.05.1990	-	60	-	-	-	NA
SYRIA	Izra'a	05.12.1989	NA	-	50	-	-	-	NA
SYRIA	Tel Hadya	29.12.1989	05.06.1990	-	50	-	-	Fortrol, Kerb	Hurani
TUNISIA	Beja	NA	NA	NA			NA	NA	NA
TUNISIA	El Kef	NA	NA	NA			NA	NA	NA
TURKEY	Diyarbakir	04.11.1989	NA	NA			NA	NA	Yerli Kirmizi

NA = Not available, + = Number and quantity not given.

Table 5.2.2. Time to flowering (days) of entries at different locations in the LIYT-S during 1989/90.

Entry Name	Pedigree	Origin	ALGERIA		ETHIOPIA	JORDAN	
			Beni Slimane	Guelma	Ghinchi	Marow	Mushager
Local Small	-	Syria	134	125	98	128	132
78S 26013	-	Jordan	127	127	103	129	134
FLIP84- 29L	ILL 20 X ILLWL1	ICARDA	133	123	69	129	131
FLIP84- 51L	ILL 883 X ILL 470	ICARDA	129	118	63	128	133
FLIP84- 58L	ILL 39 X ILL 479	ICARDA	133	124	98	129	132
FLIP84- 59L	ILL 39 X ILL 784	ICARDA	134	127	104	130	140
FLIP86- 29L	ILL 501 X ILL 2	ICARDA	134	127	98	129	134
FLIP86- 32L	(ILL176 X ILL226)X(ILL345 X ILL217)	ICARDA	133	123	92	129	138
FLIP87- 26L	ILL 223 X ILL 2669	ICARDA	134	127	106	129	132
FLIP87- 27L	ILL 223 X ILL 2669	ICARDA	134	127	105	128	133
FLIP87- 30L	ILL 223 X ILL 2669	ICARDA	129	128	106	131	132
FLIP87- 36L	ILL 223 X ILL 2669	ICARDA	138	127	106	128	132
FLIP87- 39L	ILL 223 X ILL 2669	ICARDA	134	128	105	129	132
FLIP87- 42L	ILL 223 X ILL 2669	ICARDA	134	125	104	129	133
FLIP87- 48L	ILL 4354 X ILL 922	ICARDA	126	125	87	129	132
FLIP87- 49L	ILL 24 X ILL 1719	ICARDA	134	125	106	130	135
FLIP87- 53L	ILL 4400 X ILL 703	ICARDA	133	130	97	129	137
FLIP87- 55L	ILL 4400 X ILL 703	ICARDA	133	125	88	129	134
FLIP87- 56L	ILL 2129 X ILL 13	ICARDA	129	125	98	129	132
FLIP87- 57L	ILL 2129 X ILL 13	ICARDA	133	123	91	130	131
FLIP88- 18L	ILL 4402 X ILL 4354	ICARDA	133	123	92	128	131
FLIP88- 24L	ILL 4401 X ILL 5574	ICARDA	134	125	102	128	132
FLIP88- 27L	ILL 5564 X ILL 5521	ICARDA	138	123	97	128	131
Local check	-	-	134	123	68	128	131
Location Mean			133	125	95	129	133
S.E. of Mean			0.52	0.28	3.39	0.60	1.61
L.S.D. at 5%			1.47	0.80	9.92	-	4.59
C.V. %			0.68	0.39	5.05	0.81	2.10
Error d.f.			46	46	23	46	46
Significance			*	*	*	NS	*

Cont'd. ...

Table 5.2.2. Cont'd. ...

Entry Name	LEBANON	LIBYA	PAKISTAN	PORTUGAL	SYRIA					TURKEY	Overall Mean
	Terbol	Sarir	Faisalabad	Elvas	Gelline	Heimo	Idleb	Izra'a	Tel Hadya	Diyarbakir	
Local Small	134	138	124	95	105	121	118	126	110	162	123
78S 26013	136	119	131	92	105	129	122	130	112	165	124
FLIP84- 29L	131	123	121	87	100	123	115	125	104	162	118
FLIP84- 51L	135	87	93	86	101	127	117	128	112	164	115
FLIP84- 58L	130	122	122	84	100	122	116	125	108	162	120
FLIP84- 59L	138	134	131	96	107	128	126	131	115	168	127
FLIP86- 29L	135	136	129	95	105	125	123	129	108	164	125
FLIP86- 32L	136	123	123	93	102	127	123	128	112	167	123
FLIP87- 26L	131	134	126	89	100	126	118	127	109	164	123
FLIP87- 27L	132	146	129	90	102	126	118	127	111	165	125
FLIP87- 30L	132	116	133	90	101	125	118	128	109	163	123
FLIP87- 36L	132	146	130	90	101	125	118	127	110	163	125
FLIP87- 39L	132	140	130	90	101	129	118	128	110	164	125
FLIP87- 42L	132	133	132	90	103	126	117	128	110	165	124
FLIP87- 48L	136	127	121	89	102	126	125	129	109	165	122
FLIP87- 49L	134	130	132	93	103	127	122	130	112	165	125
FLIP87- 53L	138	146	129	96	107	127	124	129	112	169	127
FLIP87- 55L	134	133	125	96	103	125	122	127	108	165	123
FLIP87- 56L	130	134	124	89	99	122	115	127	107	163	122
FLIP87- 57L	132	145	122	90	101	126	118	126	107	163	123
FLIP88- 18L	130	131	123	89	99	122	117	127	107	162	121
FLIP88- 24L	134	143	131	92	105	122	119	127	109	163	124
FLIP88- 27L	131	130	122	89	100	123	115	126	106	163	121
Local check	142	126	97	83	105	127	120	129	109	178	
<b>Location Mean</b>	<b>134</b>	<b>131</b>	<b>124</b>	<b>91</b>	<b>102</b>	<b>125</b>	<b>119</b>	<b>128</b>	<b>109</b>	<b>165</b>	
S.E. of Mean	0.37	6.01	0.52	0.67	0.81	0.76	0.96	0.69	0.97	0.61	
L.S.D. at 5%	1.06	17.12	1.48	1.90	2.31	2.16	2.73	1.95	2.77	1.73	
C.V. %	0.48	7.95	0.72	1.28	1.37	1.05	1.39	0.93	1.54	0.64	
Error d.f.	46	46	46	46	46	46	46	46	46	46	
Significance	*	*	*	*	*	*	*	*	*	*	

\* = Significant at  $P \leq 0.05$ , NS = Not significant.

Table 5.2.3. Time to maturity (days) of entries at different locations in the LIYT-S during 1989/90.

Entry Name	ALGERIA	ETHIOPIA	JORDAN		LEBANON	LIBYA	PAKISTAN
	Beni Slimane	Ghinchi	Marow	Mushager	Terbol	Sarir	Faisalabad
Local Small	225	143	165	184	174	175	164
78S 26013	223	150	165	184	172	185	167
FLIP84- 29L	225	124	166	187	174	180	164
FLIP84- 51L	224	121	167	189	176	155	156
FLIP84- 58L	224	144	164	184	170	175	168
FLIP84- 59L	225	148	163	185	176	177	170
FLIP86- 29L	226	147	165	183	172	175	168
FLIP86- 32L	224	140	166	184	175	177	165
FLIP87- 26L	225	150	163	180	169	177	165
FLIP87- 27L	225	144	164	182	169	175	168
FLIP87- 30L	224	149	164	178	170	180	169
FLIP87- 36L	227	144	164	184	169	180	167
FLIP87- 39L	225	153	163	179	170	180	168
FLIP87- 42L	225	147	165	179	170	175	169
FLIP87- 48L	223	142	164	188	175	175	168
FLIP87- 49L	225	148	163	180	172	180	169
FLIP87- 53L	224	154	166	187	175	180	168
FLIP87- 55L	224	154	166	190	176	175	169
FLIP87- 56L	224	140	167	186	170	175	164
FLIP87- 57L	224	142	163	185	172	172	163
FLIP88- 18L	224	141	164	182	169	177	161
FLIP88- 24L	225	148	164	183	174	182	169
FLIP88- 27L	225	142	161	179	170	175	164
Local check	225	124	164	185	179	175	156
<b>Location Mean</b>	<b>225</b>	<b>143</b>	<b>164</b>	<b>184</b>	<b>172</b>	<b>176</b>	<b>166</b>
S.E. of Mean	0.65	4.96	0.76	1..96	0.83	1.94	0.76
L.S.D. at 5%	1.85	14.52	2.17	65.57	2.35	5.52	.17
C.V. %	0.50	4.90	0.80	21.85	0.83	1.91	0.80
Error d.f.	46	23	46	46	46	46	46
Significance	*	*	*	*	*	*	*

Cont'd. ...

Table 5.2.3. Cont'd. ...

Entry Name	PORTUGAL			SYRIA			Overall Mean
	Elvas	Gelline	Heimo	Idleb	Izra'a	Tel Hadya	
Local Small	135	137	163	165	162	148	165
78S 26013	131	138	166	165	164	148	166
FLIP84- 29L	135	137	163	168	163	145	164
FLIP84- 51L	135	139	163	171	165	155	163
FLIP84- 58L	132	136	163	168	163	151	165
FLIP84- 59L	135	138	163	171	173	155	168
FLIP86- 29L	132	138	160	161	164	144	164
FLIP86- 32L	134	134	162	166	163	149	164
FLIP87- 26L	134	134	163	163	161	148	164
FLIP87- 27L	134	134	164	165	161	149	164
FLIP87- 30L	134	136	164	165	162	147	165
FLIP87- 36L	135	136	164	166	161	148	165
FLIP87- 39L	131	134	165	167	161	147	165
FLIP87- 42L	134	133	164	163	161	147	164
FLIP87- 48L	131	138	163	170	163	149	165
FLIP87- 49L	132	137	164	164	163	149	165
FLIP87- 53L	136	139	163	172	164	149	167
FLIP87- 55L	134	134	163	171	163	142	166
FLIP87- 56L	131	136	163	166	161	147	164
FLIP87- 57L	131	131	165	171	161	144	163
FLIP88- 18L	133	132	164	165	162	144	163
FLIP88- 24L	133	136	163	160	162	144	165
FLIP88- 27L	134	133	163	163	161	143	163
Local check	134	138	163	164	163	148	
<b>Location Mean</b>	<b>133</b>	<b>136</b>	<b>163</b>	<b>166</b>	<b>163</b>	<b>148</b>	
S.E. of Mean	0.66	1.31	0.63	1.75	1.68	1.24	
L.S.D. at 5%	1.87	3.73	1.80	4.97	4.79	3.53	
C.V. %	0.85	1.67	0.67	1.82	1.79	1.46	
Error d.f.	46	46	46	46	46	46	
Significance	*	*	*	*	*	*	

\* = Significant at  $P \leq 0.05$ , NS = Not significant.

Table 5.2.4. Plant height (cm) of entries at different locations in the LIYT-S during 1989/90.

Entry Name	ALGERIA		ETHIOPIA	JORDAN		LEBANON	LIBYA
	Beni Slimane	Guelma	Ghinchi	Marow	Mushager	Terbol	Sarir
Local Small	12	41	24	27	29	34	37
78S 26013	15	38	18	32	26	34	42
FLIP84- 29L	14	46	27	31	28	31	36
FLIP84- 51L	15	40	24	30	23	33	45
FLIP84- 58L	14	52	24	33	30	31	39
FLIP84- 59L	15	45	21	26	29	33	57
FLIP86- 29L	12	47	24	33	27	36	37
FLIP86- 32L	14	48	24	31	29	35	40
FLIP87- 26L	16	50	28	39	26	33	55
FLIP87- 27L	15	50	23	33	29	32	35
FLIP87- 30L	15	45	23	32	25	32	37
FLIP87- 36L	17	40	23	31	26	33	39
FLIP87- 39L	13	47	22	33	24	32	32
FLIP87- 42L	15	45	22	34	29	33	45
FLIP87- 48L	16	42	25	35	27	37	40
FLIP87- 49L	13	44	26	32	26	35	40
FLIP87- 53L	16	43	25	31	26	39	42
FLIP87- 55L	15	42	25	33	22	35	30
FLIP87- 56L	15	44	17	26	28	34	41
FLIP87- 57L	16	44	20	35	26	32	40
FLIP88- 18L	14	42	25	36	26	38	35
FLIP88- 24L	14	39	17	31	26	32	47
FLIP88- 27L	15	42	25	32	30	36	47
Local check	16	40	24	36	27	36	42
Location Mean	14	43	23	32	27	34	40
S.E of Mean	0.79	0.51	2.41	1.36	2.03	1.33	4.35
L.S.D. at 5%	2.24	1.44	-	3.86	-	3.78	12.39
C.V. %	9.27	2.00	14.83	7.32	13.14	6.76	18.48
Error d.f.	46	46	23	46	46	46	46
Significance	*	*	NS	*	NS	*	*

Cont'd. ...

Table 5.2.4. Cont'd. ...

Entry Name	PAKISTAN		PORTUGAL		SYRIA			TURKEY	Overall Mean
	Faisalabad	Elvas	Gelline	Heimo	Idleb	Izra'a	Tel Hadya	Diyarbakir	
Local Small	43	30	33	30	29	24	21	35	30
78S 26013	50	29	34	29	25	24	21	35	30
FLIP84- 29L	62	31	33	31	25	28	24	37	32
FLIP84- 51L	70	31	33	33	25	27	20	39	33
FLIP84- 58L	52	33	35	30	23	26	22	38	32
FLIP84- 59L	55	29	36	31	26	26	19	40	32
FLIP86- 29L	56	30	35	30	31	26	21	37	32
FLIP86- 32L	62	35	36	29	25	26	22	41	33
FLIP87- 26L	63	33	35	32	30	26	22	33	35
FLIP87- 27L	57	31	34	34	26	26	21	37	32
FLIP87- 30L	58	29	39	31	30	26	21	37	32
FLIP87- 36L	72	32	35	31	26	25	19	37	32
FLIP87- 39L	50	31	35	31	25	26	20	37	31
FLIP87- 42L	53	31	34	33	27	26	21	35	32
FLIP87- 48L	50	32	34	30	24	28	21	34	32
FLIP87- 49L	53	30	36	30	30	26	22	38	32
FLIP87- 53L	52	31	34	32	23	28	23	40	32
FLIP87- 55L	54	29	33	31	23	27	23	39	31
FLIP87- 56L	54	28	32	31	29	26	20	36	31
FLIP87- 57L	57	29	34	31	21	26	21	38	31
FLIP88- 18L	54	31	39	30	32	27	22	38	33
FLIP88- 24L	47	30	32	30	25	26	21	35	30
FLIP88- 27L	48	33	32	31	29	27	22	38	33
Local check	66	32	34	30	30	24	23	42	
Location Mean	56	31	35	31	27	26	21	37	
S.E. of Mean	1.28	0.73	1.53	1.02	1.73	0.84	1.12	1.40	
L.S.D. at 5%	3.65	2.06	-	-	4.91	2.40	-	3.98	
C.V. %	3.98	4.06	7.70	5.68	11.22	5.59	9.03	6.49	
Error d.f.	46	46	46	46	46	46	46	46	
Significance	*	*	NS	NS	*	*	NS	*	

\* = Significant at  $P < 0.05$ , NS = Not significant.

Table 5.2.5. Seed yield (Y=kg/ha) and rank (R) of entries at different locations in the LIYT-S during 1989/90.

Entry Name	ALGERIA				ETHIOPIA		JORDAN				LEBANON	
	Beni Slimane		Guelma		Ghinchi		Marow		Mushger		Terbol	
	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R
Local Small	1600	6	1007	19	63	11	318	23	473	20	1593	22
78S 26013	1556	7	1320	3	25	20	624	14	701	10	1852	17
FLIP84- 29L	1489	8	1033	18	313	3	830	7	426	22	1880	16
FLIP84- 51L	1911	2	1490	1	566	1	436	21	399	23	2009	10
FLIP84- 58L	1111	18	1280	4	30	16	447	20	828	3	2120	1
FLIP84- 59L	1422	10	1077	15	19	22	268	24	658	11	2056	6
FLIP86- 29L	1222	14	1177	7	266	4	628	13	815	4	2083	3
FLIP86- 32L	1667	4	1167	8	38	15	562	17	329	24	1806	18
FLIP87- 26L	1844	3	1130	12	28	17	1145	1	842	2	2093	2
FLIP87- 27L	1144	16	970	23	47	14	689	12	770	6	2083	4
FLIP87- 30L	1089	19	1147	10	14	23	401	22	567	14	1778	20
FLIP87- 36L	1133	17	1003	21	59	13	614	15	632	13	1972	12
FLIP87- 39L	1089	20	1237	5	12	24	953	4	894	1	2046	7
FLIP87- 42L	1444	9	1153	9	19	21	588	16	714	8	1889	15
FLIP87- 48L	2000	1	1377	2	61	12	846	6	550	16	2037	8
FLIP87- 49L	1289	11	1200	6	66	10	777	8	720	7	1926	14
FLIP87- 53L	1200	15	1133	11	97	7	697	11	456	21	1796	19
FLIP87- 55L	1022	22	1037	17	75	8	744	9	532	17	1713	21
FLIP87- 56L	711	24	960	24	27	19	556	18	488	19	2028	9
FLIP87- 57L	1644	5	1063	16	119	5	986	3	649	12	2009	11
FLIP88- 18L	933	23	1120	13	109	6	715	10	565	15	1944	13
FLIP88- 24L	1267	12	1007	20	28	18	510	19	704	9	1556	23
FLIP88- 27L	1044	21	1003	22	73	9	1011	2	780	5	2065	5
Local check	1222	13	1097	14	553	2	919	5	514	18	1472	24
<b>Location Mean</b>	<b>1336</b>		<b>1133</b>		<b>113</b>		<b>678</b>		<b>625</b>		<b>1909</b>	
S.E. of Mean	194.66		85.75		48.98		144.53		147.69		74.96	
L.S.D. at 5%	554.11		244.08		143.31		411.42		-		213.37	
C.V. %	25.24		13.11		61.48		36.95		40.91		6.80	
Error d.f.	46		46		23		46		46		46	
Significance	*		*		*		*		NS		*	
Test > Check	3		2		0		0		-		21	

Cont'd. ...



Table 5.2.5. Cont'd. ...

Entry Name	LIBYA		PAKISTAN		PORTUGAL		SYRIA					
	Sarir		Faisalabad		Elvas		Gelline		Heimo		Idleb	
	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R
Local Small	30	22	300	19	1250	18	1626	10	1397	10	701	4
78S 26013	35	20	575	10	1419	13	1355	20	793	23	305	19
FLIP84- 29L	66	17	542	11	1511	8	1446	17	1323	13	367	15
FLIP84- 51L	523	4	2150	2	1693	4	1624	11	1609	4	450	10
FLIP84- 58L	592	1	667	7	1999	2	1312	22	1413	9	393	13
FLIP84- 59L	197	11	417	16	1540	7	1375	19	1367	11	619	5
FLIP86- 29L	317	9	617	9	1631	5	1533	15	1618	3	904	2
FLIP86- 32L	-	-	867	3	2194	1	1346	21	909	22	351	16
FLIP87- 26L	548	2	250	20	1300	15	1484	16	1332	12	765	3
FLIP87- 27L	188	12	175	22	1193	19	1620	12	1302	15	322	17
FLIP87- 30L	184	13	167	23	904	23	1739	5	1281	16	487	8
FLIP87- 36L	100	15	225	21	1256	17	1414	18	1272	17	543	7
FLIP87- 39L	96	16	300	18	1078	22	1656	9	1099	20	251	23
FLIP87- 42L	167	14	383	17	1110	21	1835	3	949	21	315	18
FLIP87- 48L	221	10	717	5	1829	3	1718	6	1504	5	369	14
FLIP87- 49L	532	3	442	14	1450	11	1567	13	1669	2	429	12
FLIP87- 53L	63	18	650	8	1283	16	1666	8	1443	8	276	22
FLIP87- 55L	369	7	750	4	1506	9	1548	14	1499	6	588	6
FLIP87- 56L	33	21	525	12	864	24	2007	1	1486	7	481	9
FLIP87- 57L	-	-	425	15	1500	10	1685	7	1225	19	278	21
FLIP88- 18L	503	5	58	24	1317	14	1752	4	1319	14	291	20
FLIP88- 24L	411	6	708	6	1439	12	1260	24	1967	1	941	1
FLIP88- 27L	354	8	525	13	1610	6	1923	2	750	24	438	11
Local check	37	19	2258	1	1121	20	1270	23	1254	18	223	24
<b>Location Mean</b>	<b>253</b>		<b>612</b>		<b>1416</b>		<b>1573</b>		<b>1324</b>		<b>462</b>	
S.E. of Mean	156.87		57.02		208.92		161.53		182.37		105.51	
L.S.D. at 5%	-		162.30		594.69		-		519.13		300.35	
C.V. %	107.38		16.13		25.55		17.78		23.86		39.57	
Error d.f.	42		46		46		46		46		46	
Significance	NS		*		*		NS		*		*	
Test > Check	-		0		3		-		1		7	

Cont'd. ...

Table 5.2.5. Cont'd. ...

Entry Name	SYRIA				TUNISIA				TURKEY		(1) Overall Mean	
	Izra'a		Tel Hadya		Beja		El Kef		Diyarbakir		Y	R
	Y	R	Y	R	Y	R	Y	R	Y	R		
Local Small	1154	19	385	20	467	8	824	22	1078	13	890	21
78S 26013	1183	18	567	9	513	4	1319	4	822	21	933	16
FLIP84- 29L	1204	17	711	2	407	11	976	14	1328	3	986	7
FLIP84- 51L	1096	23	279	23	630	1	1157	9	1177	10	1167	1
FLIP84- 58L	1417	2	435	13	200	24	902	18	1044	15	975	10
FLIP84- 59L	1346	7	196	24	370	16	764	24	1208	8	919	19
FLIP86- 29L	1229	16	670	3	310	21	935	15	1505	2	1071	3
FLIP86- 32L	1113	22	399	19	387	14	1119	11	1219	7	967	12
FLIP87- 26L	1317	11	575	8	477	7	874	19	844	18	1019	5
FLIP87- 27L	1271	13	425	16	493	6	1395	2	839	19	921	17
FLIP87- 30L	1396	3	415	18	360	19	1026	13	812	22	849	23
FLIP87- 36L	1254	14	294	22	400	13	1042	12	839	20	872	22
FLIP87- 39L	1317	12	481	12	413	9	1395	3	745	23	935	14
FLIP87- 42L	1338	8	428	15	500	5	827	21	891	17	899	20
FLIP87- 48L	1525	1	433	14	363	18	1194	7	984	16	1094	2
FLIP87- 49L	1375	5	338	21	407	12	807	23	1320	4	986	8
FLIP87- 53L	1117	21	488	11	413	10	1269	6	1279	5	954	13
FLIP87- 55L	1092	24	729	1	357	20	828	20	1561	1	974	11
FLIP87- 56L	1333	9	557	10	370	17	1491	1	1063	14	934	15
FLIP87- 57L	1375	4	633	5	520	3	1149	10	1206	9	1029	4
FLIP88- 18L	1250	15	616	6	383	15	1169	8	1173	11	920	18
FLIP88- 24L	1150	20	422	17	297	22	1319	5	1229	6	988	6
FLIP88- 27L	1354	6	590	7	533	2	924	17	1151	12	956	9
Local check	1329	10	649	4	287	23	932	16	313	24		
Location Mean	1272		488		411		1068		1068			
S.E. of Mean	81.25		76.98		68.29		139.16		204.98			
L.S.D. at 5%	231.28		219.13		194.38		396.13		-			
C.V. %	11.06		27.32		28.80		22.57		27.15			
Error d.f.	46		46		46		46		23			
Significance	*		*		*		*		NS			
Test > Check	0		0		6		3		-			

(1) Sarir was excluded from the overall mean. \* = Significant at  $P \leq 0.05$ , NS = Not significant.

Table 5.2.6. The five heaviest seed yielding entries at the individual locations in the LIYT-S during 1989/90.

Rank	ALGERIA		ETHIOPIA	JORDAN		LEBANON	LIBYA	PAKISTAN	PORTUGAL
	Beni-Slimane	Guelma	Ghinchi	Marow	Mushager	Terbol	Sarir	Faisalabad	Elvas
1	FLIP 87-48L	FLIP 84-51L	FLIP 84-51L	FLIP 87-26L	FLIP 87-39L	FLIP 84-58L	FLIP 84-58L	Local check	FLIP 86-32L
2	FLIP 84-51L	FLIP 87-48L	Local check	FLIP 88-27L	FLIP 87-26L	FLIP 87-26L	FLIP 87-26L	FLIP 84-51L	FLIP 84-58L
3	FLIP 87-26L	78 S 26013	FLIP 84-29L	FLIP 87-57L	FLIP 84-58L	FLIP 86-29L	FLIP 87-49L	FLIP 86-32L	FLIP 87-48L
4	FLIP 86-32L	FLIP 84-58L	FLIP 86-29L	FLIP 87-39L	FLIP 86-29L	FLIP 87-27L	FLIP 84-51L	FLIP 87-55L	FLIP 84-51L
5	FLIP 87-57L	FLIP 87-39L	FLIP 87-57L	Local check	FLIP 88-27L	FLIP 88-27L	FLIP 88-18L	FLIP 87-48L	FLIP 86-29L

Cont'd. ...

Rank	SYRIA					TUNISIA		TURKEY
	Gelline	Heimo	Idleb	Izra'a	Tel Hadya	Beja	El Kef	Diyarbakir
1	FLIP 87-56L	FLIP 88-24L	FLIP 88-24L	FLIP 87-48L	FLIP 87-55L	FLIP 84-51L	FLIP 87-56L	FLIP 87-55L
2	FLIP 88-27L	FLIP 87-49L	FLIP 86-29L	FLIP 84-58L	FLIP 84-29L	FLIP 88-27L	FLIP 87-27L	FLIP 86-29L
3	FLIP 87-42L	FLIP 86-29L	FLIP 87-26L	FLIP 87-30L	FLIP 86-29L	FLIP 87-57L	FLIP 87-39L	FLIP 84-29L
4	FLIP 88-18L	FLIP 84-51L	Local Small	FLIP 87-57L	Local Small	78 S 26013	78 S 26013	FLIP 87-49L
5	FLIP 87-30L	FLIP 87-48L	FLIP 84-59L	FLIP 87-49L	FLIP 87-57L	FLIP 87-42L	FLIP 88-24L	FLIP 87-53L
				FLIP 88-27L		FLIP 87-27L	FLIP 87-53L	
						FLIP 87-26L	FLIP 87-48L	

The brackets indicate entries having the same rank.

## Results and Discussion

The data on time to flowering, time to maturity and plant height are given in Tables 5.2.2, 5.2.3, and 5.2.4, respectively. The location means for time to flowering, time to maturity and plant height ranged from 91 days for Elvas in Portugal to 165 days for Diyarbakir in Turkey; 133 days for Elvas in Portugal to 225 days for Beni Slimane in Algeria; and 14 cm for Beni Slimane in Algeria to 56 cm for Faisalabad in Pakistan, respectively. The entry FLIP 87-26L with plant height of 35 cm was the tallest.

The seed yields and rank of entries at different locations are given in Table 5.2.5. The ANOVA revealed that the differences among the entries were significant for 13 out of 17 locations reporting data. The seed yields varied from 113 kg/ha at Ghinchi in Ethiopia to 1909 kg/ha at Terbol in Lebanon. At 8 locations some of the entries exceeded the local check by a significant margin. On the basis of average over locations the top five entries included FLIP 84- 51L, FLIP 87- 48L, FLIP 86-29L, FLIP 87-57L, and FLIP 87-26L with seed yields of 1167, 1094, 1071, 1029, and 1019 kg/ha, respectively.

The five best entries at different locations are given in Table 5.2.6. The lines, FLIP 84- 51L, FLIP 86-29L, and FLIP 87-48L occurred most frequently than others among the top five and were thus comparatively widely adapted.

On the basis of average over two years for the common entries (Table 5.2.7), FLIP 84- 51L ranked number 1 and was closely followed by FLIP 87-57L, FLIP 87-48L, FLIP 87-53L, and FLIP 87-56L with seed yields of 1294, 1190, 1174, 1141 and 1101 kg/ha, respectively.

Table 5.2.7. The mean seed yield (Y=kg/ha) and rank (R) of the common entries in LIYT-S during 1988/89 and 1989/90.

Entry Name	1988/89		1989/90		Mean	
	Y	R	Y	R	Y	R
Syrian Local Small	1057	17	890	17	974	17
78S 26013	1175	9	933	12	1054	10
FLIP 84- 29L	1183	8	986	5	1085	9
FLIP 84- 51L	1420	1	1167	1	1294	1
FLIP 84- 58L	1067	16	975	6	1021	13
FLIP 84- 59L	1265	5	919	14	1092	7
FLIP 86- 29L	1120	13	1071	3	1096	6
FLIP 86- 32L	1099	15	967	8	1033	12
FLIP 87- 27L	1106	14	921	13	1014	15
FLIP 87- 30L	1156	12	849	16	1003	16
FLIP 87- 36L	1163	11	872	15	1018	14
FLIP 87- 39L	1163	10	935	10	1049	11
FLIP 87- 48L	1253	6	1094	2	1174	3
FLIP 87- 53L	1327	3	954	9	1141	4
FLIP 87- 55L	1204	7	974	7	1089	8
FLIP 87- 56L	1268	4	934	11	1101	5
FLIP 87- 57L	1350	2	1029	4	1190	2

### 5.3. LENTIL INTERNATIONAL YIELD TRIAL - EARLY (LIYT-E)

#### Material

The material for the Lentil International Yield Trial - Early comprised of 23 test entries and one local check to be supplied by the cooperator. The test entries were selections with earliness. These were selected from the international screening nurseries based on their superior yield performance. Out of 23 test entries, 11 were developed at ICARDA through hybridization.

#### Methods and Management

The trial design was a randomised complete block with 3 replications. The suggested plot size was four rows each 4 m long with an inter row spacing of 25 cm. Forty one sets of trials were distributed to cooperators in 17 countries. The results were received for 16 trials from 10 countries and are reported. The agronomic practices employed at different locations are given in Table 5.3.1.

#### Results and Discussion

The location means for time to flowering (Table 5.3.2), time to maturity (Table 5.3.3), and plant height (Table 5.3.4) ranged from 45 days for Debre Zeit in Ethiopia to 125 days for Beni Slimane in Algeria; 89 days for Erzurum in Turkey to 222 days for Beni Slimane in Algeria; and 15 cm for Beni Slimane in Algeria to 59 cm for Faisalabad (NIAB) in Pakistan, respectively. On an average over locations, the entry means ranged from 80 to 90 days for time to flowering, 146 to 152 days for time to maturity, and 27 to 32 cm for plant height. The highest seed yields (Table 5.3.5) were obtained at Faisalabad in Pakistan (1763 and 3876 kg/ha at NIAB and UAF, respectively). The seed yield at New Delhi in India was, however, extremely poor (320 kg/ha).

On an average over locations, the five best yielding entries included FLIP 88-45L, FLIP 84-112L, FLIP 86-39L, FLIP 84-60L and FLIP 88-48L with respective seed yields of 1148, 1131, 1121, 1119, 1082 kg/ha.

The ANOVA for seed yield revealed that at 9 locations the local check was excelled by some entries by a significant margin ( $P \leq 0.05$ ). The five best entries in each of the locations are given in Table 5.3.6. The entries, FLIP 86-38L, FLIP 87-76L, and FLIP 88-48L occurred most frequently among the five heaviest yielders and were thus comparatively better in adaptation.

On the basis of average performance of common entries over two years (Table 5.3.7), FLIP 84-112L ranked number 1 and was closely followed by FLIP 86-38L, Pant L 406, Precoz, and Pant L 639 with seed yields of 993, 934, 925, 923, and 916 kg/ha, respectively.

Table 5.3.1. Agronomic data for different locations in the LIYT-E during 1989/90.

Country	Location	Planting Date	Harvesting Date	Fertilizer (kg/ha)			Irrigation	Insecticide/Fungicide Herbicide	Local check
				N	P	K			
ALGERIA	Beni-Slimane	29.10.1989	10.06.1990	-	46	-	-	Triflan	Syrie 229
ALGERIA	Sidi Bel Abbes	29.11.1989	23.06.1990	-	46	-	-	Igran, Kerb	Syrie 229
ALGERIA	Tiaret	24.12.1989	05.06.1990	-	46	-	-	-	Metropole
BANGLADESH	Mymensingh	25.11.1989	22.04.1990	-	-	-	-	-	Bm 502
ETHIOPIA	Debre Zeit	19.07.1990	NA	-	-	-	-	-	EL -142
ETHIOPIA	Ghinchi	16.08.1990	10.01.1991	-	-	-	-	-	NA
INDIA	New Delhi	07.12.1989	10.04.1990	20	40	-	2	Stomp, Metasystox	Lens -830
LIBYA	El Safsaf	27.11.1989	25.05.1990	-	-	-	-	-	78 S 26002
PAKISTAN	Faisalabad (NIAB)	07.11.1989	05.05.1990	20	60	-	-	-	Masoor 85
PAKISTAN	Faisalabad (UAF)	10.11.1989	25.04.1990	80	57	-	2	Malathion	V 25
PORTUGAL	Elvas	10.01.1990	29.05.1990	-	60	-	-	-	L -188
SYRIA	Tel Hadya	29.12.1989	05.06.1990	-	50	-	-	Fortrol, Kerb	ILL 4401
TUNISIA	Beja	NA	NA	NA	-	-	NA	NA	NA
TUNISIA	El Kef	NA	NA	NA	-	-	NA	NA	NA
TURKEY	Erzurum	15.05.1990	13.08.1990	30	70	-	-	-	-
TURKEY	Eskisehir	NA	NA	NA	-	-	NA	NA	Sultan -1

NA = Not available

Tabel 5.3.2. Time to flowering (days) of entries at different locations in the LIYT-E during 1989/90.

Entry Name	Acc. No. (ILL)	Pedigree	Origin	ALGERIA			BANGLADESH
				Beni Slimane	Sidi Bell Abbes	Tiaret	Mymensingh
ILL 1983	1983	-	Ethiopia	136	116	109	85
L 1057	2022	-	Ethiopia	133	119	107	75
Pant L 406	2501	-	India	133	119	104	81
Pant L 639	2573	-	India	129	118	107	81
L 1278	2580	-	India	126	114	105	81
L 1282	2581	-	India	126	107	104	81
LL 1	2582	-	India	129	119	104	82
LL 37	3601	-	India	136	112	104	81
162	4403	-	Pakistan	129	114	104	80
Precoz	4605	-	Argentina	117	106	105	73
Fam 370	5486	-	Egypt	117	108	105	66
FLIP84- 60L	5730	ILL 500 X ILL 254	ICARDA	126	109	105	97
FLIP84-112L	5782	ILL 883 X ILL 470	ICARDA	126	105	109	73
L 5	5888	-	Banladesh	122	118	109	58
FLIP86- 38L	6024	ILL 262 X ILL3458	ICARDA	122	105	105	100
FLIP86- 39L	6025	ILL 1 X ILL 936	ICARDA	126	107	108	85
FLIP86- 50L	6036	ILL4349 X ILL4605	ICARDA	117	105	105	83
FLIP87- 75L	6265	ILL4380 X ILL 99	ICARDA	122	116	104	82
FLIP87- 76L	6266	ILL4353 X ILL4354	ICARDA	117	107	104	107
FLIP88- 39L	6463	ILL5562 X ILL2573	ICARDA	122	107	106	72
FLIP88- 43L	6467	ILL4605 X ILL2582	ICARDA	117	107	106	66
FLIP88- 45L	6469	ILL4605 X ILL2578	ICARDA	122	108	104	69
FLIP88- 48L	6472	ILL4605 X ILL 15	ICARDA	117	112	107	67
Local check				133	110	109	53
<b>Location Mean</b>				<b>125</b>	<b>111</b>	<b>106</b>	<b>78</b>
S.E. of Mean				1.36	2.43	1.29	2.91
L.S.D. at 5%				3.87	6.93	3.68	8.29
C.V. %				1.89	3.79	2.11	6.44
Error df				46	46	46	46
Significance				*	*	*	*

Cont'd. ...

Table 5.3.2. Cont'd. ...

Entry Name	ETHIOPIA		INDIA	LIBYA	PAKISTAN	PORTUGAL	TURKEY	Overall Mean
	Debre Zeit	Ghinchi	New Delhi	El Safsaf	Faisalabad-NIAB	Elvas	Erzurum	
ILL 1983	43	62	82	100	103	85	52	88
L 1057	43	59	84	94	107	84	52	87
Pant L 406	45	61	76	96	97	84	52	86
Pant L 639	43	58	84	95	96	84	52	86
L 1278	43	57	85	96	97	84	52	85
L 1282	39	57	83	93	98	84	52	84
LL 1	43	59	86	94	105	84	52	87
LL 37	45	61	77	96	102	84	50	86
162	44	60	77	97	102	84	52	86
Precoz	50	58	83	98	81	81	54	82
Fam 370	44	62	84	99	79	84	52	82
FLIP84- 60L	52	67	78	101	112	88	51	90
FLIP84-112L	46	63	79	97	95	84	51	84
L 5	38	55	81	95	94	81	53	82
FLIP86- 38L	46	60	74	94	96	82	52	85
FLIP86- 39L	40	57	85	94	95	82	52	85
FLIP86- 50L	48	59	76	98	81	81	53	83
FLIP87- 75L	44	62	74	94	99	82	51	85
FLIP87- 76L	46	63	85	96	93	82	53	87
FLIP88- 39L	39	54	71	92	96	82	51	81
FLIP88- 43L	46	56	77	98	81	80	52	80
FLIP88- 45L	50	61	80	96	82	80	52	82
FLIP88- 48L	49	60	80	98	81	80	52	82
Local check	49	70	83	102	96	84	-	
<b>Location Mean</b>	<b>45</b>	<b>60</b>	<b>80</b>	<b>96</b>	<b>95</b>	<b>83</b>	<b>52</b>	
S.E. of Mean	0.89	1.25	#	2.21	1.04	0.36	0.84	
L.S.D. at 5%	2.53	3.56	#	-	2.97	1.03	-	
C.V. %	3.44	3.61	#	3.97	1.91	0.75	2.82	
Error df	46	46	#	46	46	46	44	
Significance	*	*		NS	*	*	NS	

\* = Significant at  $P < 0.05$ , NS = Not significant. # Not analysed due to incomplete data set or other reasons.



Table 5.3.3. Time to maturity (days) of entries at different locations in the LIYT-E during 1989/90.

Entry name	ALGERIA			BANGLADESH	ETHIOPIA	INDIA
	Beni Slimane	Sidi Bell Abbes	Tiaret	Mymensingh	Ghinchi	New Delhi
ILL 1983	223	174	163	128	112	130
L 1057	223	176	163	129	111	135
Pant L 406	223	174	162	133	120	122
Pant L 639	224	174	164	131	120	135
L 1278	222	173	165	127	110	134
L 1282	223	176	166	127	111	135
LL 1	224	174	163	131	114	138
LL 37	223	174	160	134	120	122
162	224	175	162	129	117	132
Precoz	220	175	164	135	107	130
Fam 370	220	176	161	149	129	136
FLIP84- 60L	222	175	162	141	140	125
FLIP84-112L	222	175	161	149	124	125
L 5	220	175	163	127	109	136
FLIP86- 38L	220	175	165	145	109	122
FLIP86- 39L	222	177	161	137	119	135
FLIP86- 50L	220	175	160	138	114	125
FLIP87- 75L	220	175	163	136	121	120
FLIP87- 76L	220	175	164	148	114	135
FLIP88- 39L	220	175	165	136	119	118
FLIP88- 43L	220	177	166	135	110	127
FLIP88- 45L	221	175	161	134	98	130
FLIP88- 48L	220	176	166	130	107	130
Local check	223	175	169	104	115	130
<b>Location Mean</b>	<b>222</b>	<b>175</b>	<b>163</b>	<b>134</b>	<b>115</b>	<b>130</b>
S.E. of Mean	0.63	1.04	#	2.14	2.82	#
L.S.D. at 5%	1.81	-	#	6.09	8.03	#
C.V. %	0.50	1.03	#	2.77	4.24	#
Error df	46	46		46	46	
Significance	*	NS		*	*	

Cont'd. ...

Table 5.3.3. Cont'd. ...

Entry Name	LIBYA		PAKISTAN		PORTUGAL	TURKEY	Overall Mean
	El Safsaf	Faisalabad (NIAB)	FAISALABAD (UAF)	Elvas	Erzurum		
ILL 1983	168	161	154	133	89	149	
L 1057	168	161	154	134	89	149	
Pant L 406	168	158	150	134	88	148	
Pant L 639	168	158	154	132	88	150	
L 1278	168	157	147	132	89	148	
L 1282	168	159	152	133	90	149	
LL 1	168	161	148	133	90	149	
LL 37	167	162	152	133	88	149	
162	168	159	147	131	89	148	
Precoz	168	139	150	130	89	146	
Fam 370	169	152	154	134	90	152	
FLIP84- 60L	168	163	152	136	90	152	
FLIP84-112L	168	160	150	135	87	151	
L 5	168	158	148	134	89	148	
FLIP86- 38L	169	160	152	130	89	149	
FLIP86- 39L	168	160	150	135	90	150	
FLIP86- 50L	168	137	152	135	89	147	
FLIP87- 75L	168	157	150	133	89	148	
FLIP87- 76L	169	156	150	133	89	150	
FLIP88- 39L	168	157	150	130	87	148	
FLIP88- 43L	168	150	150	131	88	147	
FLIP88- 45L	168	141	154	130	89	146	
FLIP88- 48L	168	140	152	130	90	146	
Local check	167	156	148	134	-		
Location Mean	168	155	150	133	89		
S.E. of Mean	#	0.95	#	0.55	0.94		
L.S.D. at 5%	#	2.71	#	1.57	-		
C.V. %	#	1.06	#	0.72	1.83		
Error df		46		46	44		
Significance		*		*	NS		

\* = Significant at  $P < 0.05$ , NS = Not significant. # Not analysed due to incomplete data set or other reasons.

Table 5.3.4. Plant height (cm) of entries at different locations in the LIYT-E during 1989/90.

Entry Name	ALGERIA			BANGLADESH	ETHIOPIA	LIBYA	PAKISTAN	PORTUGAL	TURKEY	Overall Mean
	Beni-Slimane	Sidi-Bel Abbas	Tiaret	Mymen-singh	Ghinchi	El-Safsaf	Faisal-abad (NIAB)	Elvas	Erzurum	
ILL 1983	11	20	22	49	21	23	55	24	25	28
L 1057	11	20	22	52	18	23	54	26	23	28
Part L 406	10	22	23	45	18	30	60	25	21	28
Part L 639	11	18	22	49	23	25	62	24	24	29
L 1278	13	18	21	53	21	23	55	26	24	28
L 1282	12	20	20	49	19	25	65	25	22	29
LL 1	13	23	26	52	20	25	64	26	20	30
LL 37	11	23	24	51	24	27	54	24	20	29
162	9	18	20	59	21	27	57	23	22	29
Precoz	18	20	21	39	22	29	52	27	21	28
Fam 370	21	28	24	46	22	30	60	24	26	31
FLIP 84- 60L	16	23	24	38	25	32	60	29	23	30
FLIP 84-112L	18	23	24	57	24	32	53	25	24	31
L 5	11	20	19	50	19	25	56	26	23	28
FLIP 86-38L	13	18	20	39	21	34	62	26	21	28
FLIP 86-39L	12	20	24	50	19	33	66	26	19	30
FLIP 86-50L	24	30	27	43	23	28	65	27	22	32
FLIP 87-75L	17	22	19	45	22	26	48	27	23	28
FLIP 87-76L	21	20	23	38	23	32	66	29	24	31
FLIP 88-39L	14	22	19	43	20	32	63	25	22	29
FLIP 88-43L	24	22	23	43	22	33	72	28	23	32
FLIP 88-45L	19	18	21	41	24	28	45	29	22	27
FLIP 88-48L	19	20	23	40	21	32	59	29	23	30
Local check	15	20	30	37	23	32	64	28	-	
<b>Location Mean</b>	<b>15</b>	<b>21</b>	<b>23</b>	<b>46</b>	<b>21</b>	<b>29</b>	<b>59</b>	<b>26</b>	<b>23</b>	
S.E. of Mean	0.72	2.01	1.50	2.58	1.37	1.96	1.08	0.74	1.66	
L.S.D. at 5%	2.03	5.72	4.27	7.34	3.91	5.57	3.07	2.11	-	
C.V. %	8.20	16.36	11.52	9.68	11.11	11.87	3.16	4.89	12.78	
Error df	46	46	46	46	46	46	46	46	44	
Significance	*	*	*	*	*	*	*	*	NS	

\* = Significant at P < 0.05, NS = Not Significant.

Table 5.3.5. Seed yield (Y=kg/ha) and rank (R) of entries at different locations in the LIYT-E during 1989/90.

Entry Name	ALGERIA						BANGLADESH		ETHIOPIA	
	Beni Slimane		Sidi Bell Abbas		Tiaret		Mymensingh		Ghinchi	
	Y	R	Y	R	Y	R	Y	R	Y	R
ILL 1983	844	14	109	17	308	16	311	14	417	12
L 1057	978	9	139	9	595	6	344	13	388	14
Pant L 406	800	18	93	21	394	12	656	5	254	23
Pant L 639	967	10	193	6	367	14	811	4	338	16
L 1278	811	16	131	11	203	20	444	10	525	6
L 1282	811	17	135	10	155	22	378	12	267	22
LL 1	733	22	172	7	128	24	878	2	279	21
LL 37	756	20	106	19	400	11	567	7	323	18
162	1189	5	285	3	201	21	944	1	442	11
Precoz	789	19	78	22	594	7	222	18	488	8
Fam 370	756	21	265	4	312	15	167	19	169	24
FLIP84- 60L	1389	3	69	23	951	2	33	24	292	20
FLIP84-112L	833	15	128	12	987	1	256	17	410	13
L 5	1322	4	98	20	146	23	856	3	333	17
FLIP86- 38L	1400	2	163	8	487	9	56	22	671	2
FLIP86- 39L	989	8	126	13	701	5	533	8	463	10
FLIP86- 50L	656	23	109	18	739	4	44	23	350	15
FLIP87- 75L	1056	6	472	1	214	19	600	6	488	7
FLIP87- 76L	644	24	120	15	262	18	89	21	800	1
FLIP88- 39L	989	7	346	2	290	17	489	9	617	4
FLIP88- 43L	944	11	122	14	376	13	156	20	479	9
FLIP88- 45L	2022	1	54	24	575	8	289	15	667	3
FLIP88- 48L	889	13	120	16	907	3	289	16	588	5
Local check	902	12	211	5	482	10	444	11	304	19
<b>Location Mean</b>	<b>978</b>		<b>160</b>		<b>449</b>		<b>411</b>		<b>431</b>	
S.E. of Mean	73.83		16.80		139.02		60.85		85.90	
L.S.D. at 5%	210.15		47.83		395.72		173.20		244.52	
C.V. %	13.08		18.17		53.64		25.66		34.51	
Error df	46		46		46		46		46	
Significance	*		*		*		*		*	
Test > Check	5		4		3		5		5	

Cont'd. ...

Table 5.3.5. Cont'd. ...

Entry Name	INDIA		LIBYA		PAKISTAN *				PORTUGAL	
	New Delhi		El Safsaf		Faisalabad (NIAB)		Faisalabad (UAF)		Elvas	
	Y	R	Y	R	Y	R	Y	R	Y	R
ILL 1983	198	18	930	21	1924	8	3578	15	629	23
L 1057	208	17	1148	17	1813	11	3756	13	800	17
Pant L 406	125	23	1277	10	2125	3	4356	7	863	14
Pant L 639	146	21	1203	14	2132	2	2889	24	771	18
L 1278	396	9	1080	18	1646	17	3178	22	661	22
L 1282	219	16	1230	12	1674	15	3422	19	864	13
LL 1	177	19	978	20	1701	13	3044	23	817	16
LL 37	229	15	1347	8	1625	18	3911	11	749	20
162	417	8	1188	15	1951	6	3844	12	665	21
Precoz	521	4	1223	13	1542	21	5378	1	925	10
Fam 370	365	10	1355	7	1667	16	4489	4	471	24
FLIP84- 60L	250	13	2248	4	1285	23	4067	10	2078	1
FLIP84-112L	302	11	1980	5	1944	7	4533	3	1424	3
L 5	438	6	842	23	2319	1	3311	21	831	15
FLIP86- 38L	625	2	2332	2	1465	22	3378	20	1218	5
FLIP86- 39L	469	5	2265	3	1688	14	4111	9	1357	4
FLIP86- 50L	260	12	735	24	1222	24	3444	17	901	12
FLIP87- 75L	240	14	1012	19	1549	20	4378	6	911	11
FLIP87- 76L	833	1	2685	1	1569	19	3444	16	1115	7
FLIP88- 39L	135	22	1158	16	1965	5	3733	14	1067	8
FLIP88- 43L	10	24	852	22	1729	12	4733	2	760	19
FLIP88- 45L	438	7	1290	9	1847	10	4400	5	1169	6
FLIP88- 48L	521	3	1245	11	2014	4	4200	8	1008	9
Local check	156	20	1867	6	1924	9	3444	18	1644	2
<b>Location Mean</b>	<b>320</b>		<b>1395</b>		<b>1763</b>		<b>3876</b>		<b>987</b>	
S.E. of Mean	#		186.51		102.63		510.05		159.90	
L.S.D. at 5%	#		530.20		292.15		-		455.17	
C.V. %	#		23.17		10.08		22.79		28.05	
Error df			46		46		46		46	
Significance			*		*		NS		*	
Test > Check			1		1		-		0	

Cont'd. ...

Table 5.3.5. Cont'd. ...

Entry Name	TUNISIA				TURKEY				(1) Overall Mean	
	Beja		El Kef		Erzurum		Eskiseher		Y	R
	Y	R	Y	R	Y	R	Y	R		
ILL 1983	313	22	840	18	760	1	375	18	824	19
L 1057	397	18	1008	11	532	15	375	19	891	17
Pant L 406	497	12	957	14	288	23	538	10	944	11
Pant L 639	533	11	970	13	665	5	275	23	876	18
L 1278	317	21	423	24	570	11	529	12	780	21
L 1282	387	19	760	22	393	20	350	21	789	20
LL 1	403	16	805	20	399	19	383	17	779	22
LL 37	543	9	997	12	721	3	563	7	917	13
162	540	10	1025	10	552	12	433	16	977	10
Precoz	360	20	933	15	357	21	638	4	1003	8
Fam 370	587	7	763	21	734	2	521	13	901	16
FLIP84- 60L	470	13	1268	7	588	9	683	3	1119	4
FLIP84-112L	647	5	875	16	620	8	896	1	1131	2
L 5	417	15	1102	9	412	18	271	24	907	14
FLIP86- 38L	640	6	1415	2	585	10	546	9	1070	6
FLIP86- 39L	693	4	1388	4	316	22	596	6	1121	3
FLIP86- 50L	297	23	732	23	470	17	367	20	738	23
FLIP87- 75L	403	17	853	17	528	16	446	15	939	12
FLIP87- 76L	703	3	1428	1	659	6	600	5	1068	7
FLIP88- 39L	583	8	1292	6	534	14	488	14	978	9
FLIP88- 43L	453	14	1177	8	541	13	325	22	904	15
FLIP88- 45L	723	2	1403	3	645	7	546	8	1148	1
FLIP88- 48L	753	1	1383	5	698	4	533	11	1082	5
Local check	277	24	805	19	-	-	792	2		
<b>Location Mean</b>	<b>497</b>		<b>1025</b>		<b>546</b>		<b>503</b>			
S.E. of Mean	77.09		169.22		145.06		71.28			
L.S.D. at 5%	219.45		481.68		-		202.90			
C.V. %	26.85		28.59		45.99		24.56			
Error df	46		46		44		46			
Significance	*		*		NS		*			
Test > Check	12		6		-		0			

\* = Significant at  $P < 0.05$ , NS = Not significant, (1) Faisalabad (UAF) was excluded from the overall mean.

# Not analysed due to incomplete data set or other reasons.

Table 5.3.6. The five heaviest seed yielding entries at the individual locations in the LIYT-E during 1989/90.

Rank	ALGERIA			BANGLADESH	ETHIOPIA	INDIA	LIBYA
	Beni-Slimane	Sidi Bel Abbas	Tiaret	Mymensingh	Ghinchi	New Delhi	El Safsaf
1	FLIP 88-45L	FLIP 87-75L	FLIP 84-112L	162	FLIP 87-76L	FLIP 87-76L	FLIP 87- 76L
2	FLIP 86-38L	FLIP 88-39L	FLIP 84- 60L	LL -1	FLIP 86-38L	FLIP 86-38L	FLIP 86- 38L
3	FLIP 84-60L	162	FLIP 88- 48L	L -5	FLIP 88-45L	FLIP 88-48L	FLIP 86- 39L
4	L -5	Fam 370	FLIP 86- 50L	Pant L 639	FLIP 88-39L	Precoz	FLIP 84- 60L
5	162	Local check	FLIP 86- 39L	Pant L 406	FLIP 88-48L	FLIP 86-39L	FLIP 84-112L
						L -5	
						FLIP 88-45L	

Cont'd. ...

Rank	PAKISTAN		PORTUGAL	TUNISIA		TURKEY	
	Faisalabad (NIAB)	Faisalabad (UAF)	Elvas	Beja	El Kef	Erzurum	Eskisehir
1	L -5	Precoz	FLIP 84- 60L	FLIP 88- 48L	FLIP 87-76L	ILL 1983	FLIP 84-112L
2	Pant L 639	FLIP 88- 43L	Local check	FLIP 88- 45L	FLIP 86-38L	Fam -370	Local check
3	Pant L 406	FLIP 84-112L	FLIP 84-112L	FLIP 87- 76L	FLIP 88-45L	LL -37	FLIP 84- 60L
4	FLIP 88-48L	Fam -370	FLIP 86- 39L	FLIP 86- 39L	FLIP 86-39L	FLIP 88-48L	Precoz
5	FLIP 88-39L	FLIP 88- 45L	FLIP 86- 38L	FLIP 84-112L	FLIP 88-48L	Pant L 639	FLIP 87- 76L
				FLIP 86- 38L	FLIP 88-39L	FLIP 87-76L	

The brackets indicate entries having the same rank.

Table 5.3.7. The mean seed yield (Y=kg/ha) and rank (R) of the common entries in LIYT-E during 1988/89 and 1989/90.

Entry Name	1988/89		1989/90		Mean	
	Y	R	Y	R	Y	R
L 1057	837	5	891	11	864	9
Pant L 406	906	2	944	8	925	3
Pant L 639	956	1	876	12	916	5
L 1278	739	11	780	14	760	16
L 1282	748	10	789	13	769	14
LL 1	825	6	779	15	802	12
LL 37	699	13	917	10	808	11
162	783	9	977	7	880	7
Precoz	843	4	1003	6	923	4
FLIP 84- 60L	585	16	1119	3	852	10
FLIP 84-112L	854	3	1131	1	993	1
FLIP 86- 38L	797	7	1070	4	934	2
FLIP 86- 39L	618	15	1121	2	870	8
FLIP 86- 50L	790	8	738	16	764	15
FLIP 87- 75L	639	14	939	9	789	13
FLIP 87- 76L	706	12	1068	5	887	6

#### 5.4. LENTIL INTERNATIONAL SCREENING NURSERY-LARGE SEED (LISN-L)

##### Material

The material for the Lentil International Screening Nursery-Large Seed comprised of 35 test entries and one local check which was to be used by the cooperator. Twenty two entries were selected from the materials developed through hybridization and tested at ICARDA sites in Syria and Lebanon.

##### Methods and Management

The material was sown in a 6X6 simple lattice design with two replications. The suggested plot size was single row 4 m long with inter row spacing of 25 cm. Thirty sets of screening nursery were sent to cooperators in 14 countries and the results were received from 23 locations from 11 countries. The agronomic data received from cooperators are given in Table 5.4.1.

##### Results and Discussion

The data on time to flowering (Table 5.4.2) showed that flowering was earliest at Portag in Canada (39 days) and latest at Khroub in Algeria (145 days). The entry means over all locations revealed that FLIP 86-13L was the earliest to flower in 104 days, and FLIP 88-144L was the latest to flower in 114 days. The entry mean for time to maturity ranged from 157 to 162 days (Table 5.4.3). The entry means overall locations for plant height revealed that the entries FLIP 85-7L, FLIP 90-7L, and FLIP 90-10L, were the tallest with 32 cm plant height (Table 5.4.4).



Table 5.4.1. Agronomic data for different locations in the LISN-L during 1989/90.

Country	Location	Planting Date	Harvesting Date	Fertilizer (kg/ha)			Irrigation	Insecticide/Fungicide Herbicide	Local check
				N	P	K			
ALGERIA	Guelma	18.11.1989	11.06.1990	-	200	-	-	Syrie 229	
ALGERIA	Khroub	17.12.1989	27.06.1990	-	45	-	Triflan	Syrie 229	
ALGERIA	Setif	18.12.1989	16.06.1990	-	100	-	Trifluralin	Setif 618	
CANADA	Portage	22.05.1990	05.08.1990	-	-	-	-	Eston	
CANADA	Watrous	28.05.1990	29.08.1990	-	-	-	-	Eston	
ETHIOPIA	Debre Zeit	16.07.1990	NA	-	-	-	-	NEL -358	
ETHIOPIA	Ghinchi	17.08.1990	10.01.1991	NA	-	-	NA	NA	
INDIA	New Delhi	07.12.1989	10.05.1990	20	40	-	1	Stomp, Metasystox	
JORDAN	Jubeiha	29.11.1989	NA	20	40	-	-	Jordan -1	
JORDAN	Ramtha	05.11.1989	NA	20	40	-	-	Jordan -1	
LEBANON	Terbol	30.11.1989	05.05.1990	-	50	-	-	L.L.	
PAKISTAN	Faisalabad (UAF)	10.11.1989	24.04.1990	80	57	-	2	Malathion	
PAKISTAN	Peshawar	30.10.1989	05.05.1990	-	-	-	-	Vm -25	
PORTUGAL	Elvas	10.11.1989	25.05.1990	-	60	60	-	L -211	
SYRIA	Aleppo	29.11.1989	NA	-	-	-	-	NA	
SYRIA	Gelline	11.01.1990	20.05.1990	20	50	-	-	NA	
SYRIA	Heimo	06.12.1989	28.05.1990	-	50	-	-	NA	
SYRIA	Idleb	06.12.1989	21.05.1990	-	60	-	-	NA	
SYRIA	Izra'a	06.12.1989	05.06.1990	-	-	-	-	NA	
SYRIA	Tel Hadya	29.12.1989	05.06.1990	-	50	-	-	Fortrol & Kerb	
TUNISIA	Beja -I	NA	NA	NA	-	-	NA	NA	
TUNISIA	Beja -II	NA	NA	NA	-	-	NA	NA	
TUNISIA	El Kef	NA	NA	NA	-	-	NA	NA	
TURKEY	Ankara	NA	NA	NA	-	-	NA	NA	

NA = Not available.

Table 5.4.2. Adjusted time to flowering (days) of entries at different locations in the LISN-L during 1989/90.

Selection	ILL	ALGERIA			CANADA		ETHIOPIA		JORDAN	
		Guelma	Khroub	Setif	Portage	Watrous	Ghinchi	Debro Zeit	Jubeiha	Rantha
Local largo	4400	121	149	85	39	41	99	-	139	139
FLIP84-144L	5814	121	151	85	43	42	105	-	139	137
FLIP84-156L	5825	121	149	85	38	44	98	66	140	137
FLIP85- 7L	5845	121	148	85	43	40	94	-	139	138
FLIP86- 13L	5999	130	141	61	43	40	57	53	131	136
FLIP87- 4L	6194	121	147	85	39	44	91	-	139	139
FLIP87- 11L	6201	119	149	85	36	41	87	65	137	139
FLIP87- 12L	6202	119	149	85	36	40	86	64	137	136
FLIP87- 15L	6205	119	142	85	36	39	76	64	136	137
FLIP88- 1L	6425	119	142	61	38	42	75	65	136	136
FLIP88- 3L	6427	119	148	85	36	41	87	68	139	138
FLIP88- 4L	6428	119	147	85	38	42	87	65	137	137
FLIP88- 5L	6429	119	147	85	43	41	91	65	136	139
FLIP88- 7L	6431	119	141	85	36	38	70	54	134	137
FLIP88- 10L	6434	121	148	85	43	42	91	-	140	141
FLIP88- 12L	6436	119	142	65	36	40	76	63	135	140
FLIP88- 13L	6437	119	142	85	38	44	97	-	134	139
FLIP88- 14L	6438	121	143	85	39	42	80	-	135	137
FLIP88- 32L	6456	119	140	65	36	40	70	51	133	138
FLIP89- 5L	6763	119	143	85	36	40	97	-	137	139
FLIP89- 7L	6765	119	142	85	40	41	95	48	138	139
FLIP90- 1L	6970	119	146	85	36	41	76	64	137	137
FLIP90- 2L	6971	119	140	85	36	40	76	63	138	137
FLIP90- 3L	6972	119	142	65	39	41	86	53	138	137
FLIP90- 4L	6973	121	147	85	43	42	98	-	138	137
FLIP90- 5L	6974	121	149	85	38	43	87	56	139	140
FLIP90- 6L	6975	119	142	85	38	44	97	56	138	137
FLIP90- 7L	6976	121	149	85	40	43	99	-	138	139
FLIP90- 8L	6977	123	148	85	43	41	94	-	138	137
FLIP90- 9L	6978	119	142	85	39	44	94	74	137	137
FLIP90- 10L	6979	119	144	72	43	44	87	65	135	138
FLIP90- 11L	6980	123	148	85	39	41	92	73	137	140
FLIP90- 12L	6981	119	142	85	36	40	78	65	137	138
FLIP90- 13L	6982	123	149	85	38	44	87	64	140	139
FLIP90- 14L	6983	114	143	85	36	40	69	56	137	139
Local check		119	143	61	43	43	70	54	137	137
Location Mean		120	145	81	39	42	86	61	137	138
S.E. of Mean									0.96	1.45
L.S.D. at 5%		#	#	#	#	#	#	#	2.79	-
C.V. %		#	#	#	#	#	#	#	0.99	1.49
Error df		#	#	#	#	#	#	#	25	25
Significance									*	NS

Cont'd. ...

Table 5.4.2. Cont'd. ...

Selection	LEBANON		PAKISTAN	PORTUGAL		SYRIA			(1)	
	Torbol		Poshawer	Elvas+	Aleppo+	Gellino	Heimo	Idleb+	Izra'a+	Overall Mean
Local large	138		120	130	129	98	131	124	125	113
FLIP84-144L	137		113	131	131	98	131	127	129	114
FLIP84-156L	137		110	133	128	97	131	124	126	112
FLIP85- 7L	138		115	130	129	98	132	125	129	113
FLIP86- 13L	132		80	113	128	95	126	122	125	104
FLIP87- 4L	137		115	130	131	97	130	125	127	112
FLIP87- 11L	139		120	131	132	97	132	125	126	112
FLIP87- 12L	134		115	130	130	98	126	121	126	110
FLIP87- 15L	133		109	129	125	93	124	121	124	108
FLIP88- 1L	132		105	127	125	94	124	121	123	106
FLIP88- 3L	140		117	131	129	97	132	127	126	112
FLIP88- 4L	134		117	130	125	94	126	126	124	111
FLIP88- 5L	135		120	130	125	95	125	123	125	111
FLIP88- 7L	132		107	128	125	92	124	121	124	107
FLIP88- 10L	137		118	130	129	96	126	123	125	112
FLIP88- 12L	131		107	129	125	95	126	120	124	107
FLIP88- 13L	130		108	127	127	93	124	121	124	109
FLIP88- 14L	131		120	130	130	96	126	125	125	110
FLIP88- 32L	130		120	125	126	93	124	115	123	106
FLIP89- 5L	134		113	130	127	95	125	121	125	110
FLIP89- 7L	134		120	130	129	98	124	124	126	111
FLIP90- 1L	134		103	130	127	96	128	124	125	109
FLIP90- 2L	133		105	130	129	93	126	121	125	108
FLIP90- 3L	134		110	130	129	95	125	122	125	109
FLIP90- 4L	136		120	130	131	98	128	128	126	113
FLIP90- 5L	137		105	130	129	98	126	124	128	111
FLIP90- 6L	131		112	130	128	94	124	122	125	110
FLIP90- 7L	136		107	132	132	99	129	123	126	112
FLIP90- 8L	135		103	130	127	96	124	123	125	111
FLIP90- 9L	133		123	126	130	95	133	122	126	112
FLIP90- 10L	134		120	131	127	95	126	122	126	110
FLIP90- 11L	138		100	133	130	97	132	124	126	112
FLIP90- 12L	133		107	130	126	93	124	120	124	108
FLIP90- 13L	138		118	133	130	96	130	125	127	113
FLIP90- 14L	134		120	130	126	95	124	120	125	108
Local check	142		102	127	125	95	125	122	124	
Location Mean	135		112	129	128	96	127	123	125	
S.E. of Mean	0.76		2.92	0.61	1.56	0.86	1.67	0.92	1.12	
L.S.D. at 5%	2.22		8.51	1.75	4.47	2.49	4.86	2.65	3.21	
C.V. %	0.80		3.70	0.67	1.72	1.27	1.86	1.07	1.26	
Error df	25		25	35	35	25	25	35	35	
Significance	*		*	*	*	*	*	*	*	

+ Since the blocks (adjusted) MS is less than intra block MS, the RCB analysis is performed on the data and the means are unadjusted. (1) Debre Zeit was excluded from the overall mean. \* = Significant at  $P < 0.05$ , NS = Not significant.

‡ Not analysed due to incomplete data set or other reasons.

Table 5.4.3. Adjusted time to maturity (days) of entries at different locations in the LISN-L during 1989/90.

Selection	ALGERIA		CANADA	ETHIOPIA	JORDAN		LEBANON	PAKISTAN
	Khroub	Setif	Watrous	Ghinchi	Jubeiha+	Ramtha	Terbol	Faisalabad
Local large	169	127	76	163	178	185	179	160
FLIP84-144L	176	130	76	163	180	187	179	162
FLIP84-156L	168	131	76	166	180	185	179	158
FLIP85- 7L	169	131	76	163	178	183	179	160
FLIP86- 13L	171	131	76	138	175	184	179	158
FLIP87- 4L	171	121	76	154	179	183	179	160
FLIP87- 11L	169	127	74	152	179	184	179	160
FLIP87- 12L	169	128	74	152	178	186	176	159
FLIP87- 15L	170	120	69	140	176	187	174	158
FLIP88- 1L	176	126	74	138	178	188	174	160
FLIP88- 3L	169	117	76	153	179	185	179	161
FLIP88- 4L	171	125	72	140	177	187	179	160
FLIP88- 5L	171	126	76	154	177	185	179	160
FLIP88- 7L	173	124	69	137	174	186	173	158
FLIP88- 10L	173	120	75	154	179	186	179	160
FLIP88- 12L	172	130	74	154	179	186	178	161
FLIP88- 13L	170	126	74	152	175	186	174	162
FLIP88- 14L	168	126	76	164	179	184	174	160
FLIP88- 32L	168	122	73	137	176	187	174	161
FLIP89- 5L	175	120	74	162	177	185	178	162
FLIP89- 7L	169	125	71	158	178	187	178	158
FLIP90- 1L	170	107	74	138	178	185	174	158
FLIP90- 2L	172	126	73	139	177	186	177	156
FLIP90- 3L	177	127	76	142	178	186	179	160
FLIP90- 4L	171	124	74	164	178	184	179	160
FLIP90- 5L	172	117	80	154	179	187	178	157
FLIP90- 6L	175	128	80	162	178	185	178	162
FLIP90- 7L	175	129	75	166	177	185	179	161
FLIP90- 8L	172	111	73	154	176	186	176	156
FLIP90- 9L	170	128	79	152	178	185	174	158
FLIP90- 10L	173	126	76	152	179	187	180	161
FLIP90- 11L	170	128	75	155	177	184	179	158
FLIP90- 12L	170	131	74	142	178	186	179	162
FLIP90- 13L	177	131	75	154	179	185	181	162
FLIP90- 14L	170	120	72	138	178	185	174	160
Local check	176	130	73	142	176	187	179	156
Location Mean	172	125	75	151	177	186	177	160
S.E. of Mean	#	4.99	#	#	1.09	1.47	0.72	0.03
L.S.D. at 5%	#	-	#	#	-	4.28	2.09	0.10
C.V. %	#	5.65	#	#	0.87	1.12	0.57	0.03
Error df	#	25	#	#	35	25	25	25
Significance		NS			NS	*	*	*

Cont'd. ...

Table 5.4.3. Cont'd. ...

Selection	PAKISTAN		SYRIA				Overall Mean	
	Peshawar+	Elvas	Aleppo+	Gellino	Hoimo	Idlob		Izra'a
Local large	179	193	179	130	164	167	162	161
FLIP84-144L	185	192	179	130	166	166	166	162
FLIP84-156L	180	192	179	131	164	165	166	161
FLIP85- 7L	185	196	178	129	165	166	162	161
FLIP86- 13L	185	191	179	128	164	166	164	159
FLIP87- 4L	179	192	179	131	163	166	156	159
FLIP87- 11L	185	190	179	131	164	166	162	160
FLIP87- 12L	185	190	177	133	165	166	161	160
FLIP87- 15L	179	194	175	126	161	164	159	157
FLIP88- 1L	185	194	178	126	162	164	161	159
FLIP88- 3L	178	193	179	129	164	166	160	159
FLIP88- 4L	180	192	178	128	164	167	162	159
FLIP88- 5L	190	192	177	128	164	166	161	160
FLIP88- 7L	178	189	175	127	163	163	159	157
FLIP88- 10L	180	193	179	131	164	166	162	160
FLIP88- 12L	182	194	179	129	164	167	160	161
FLIP88- 13L	185	193	179	126	162	166	158	159
FLIP88- 14L	185	192	179	128	165	166	164	161
FLIP88- 32L	182	193	179	128	164	166	159	158
FLIP89- 5L	180	187	179	128	164	166	160	160
FLIP89- 7L	190	191	179	132	164	166	164	161
FLIP90- 1L	182	189	177	129	164	166	162	157
FLIP90- 2L	178	192	178	127	164	166	159	158
FLIP90- 3L	180	193	179	129	162	167	162	160
FLIP90- 4L	181	188	179	131	163	167	162	160
FLIP90- 5L	185	194	179	131	164	166	165	160
FLIP90- 6L	185	192	179	129	162	166	162	161
FLIP90- 7L	180	193	179	132	164	166	163	162
FLIP90- 8L	179	194	178	128	164	166	161	158
FLIP90- 9L	179	193	178	130	163	167	166	160
FLIP90- 10L	183	191	179	129	166	168	166	161
FLIP90- 11L	179	197	179	129	163	166	163	160
FLIP90- 12L	178	192	179	129	164	165	162	159
FLIP90- 13L	180	189	179	131	166	166	167	161
FLIP90- 14L	185	190	177	129	164	166	159	158
Local check	176	193	178	128	165	165	161	
Location Mean	182	192	178	129	164	166	162	
S.E. of Mean	0.12	0.82	0.74	0.78	1.09	0.83	1.45	
L.S.D. at 5%	0.33	2.38	2.13	2.27	3.17	2.41	4.17	
C.V. %	0.09	1.60	0.59	0.85	0.94	0.71	1.27	
Error df	35	25	35	25	25	25	35	
Significance	*	*	*	*	*	*	*	

+ Since the blocks (adjusted) MS is less than intra block MS, the RCBD analysis is performed on the data and the means are unadjusted. \* = Significant at  $P < 0.05$ , NS = Not significant. # Not analysed due to incomplete data set or other reasons.

Table 5.4.4. Adjusted plant height (cm) of entries at different locations in the LISN-L during 1989/90.

Selection	ALGERIA			CANADA	ETHIOPIA	JORDAN		LEBANON
	Guelma	Khroub	Setif	Watrous	Ghinchi	Jubeiha	Ramtha	Terbol+
Local large	35	23	18	30	23	44	29	37
FLIP84-144L	43	20	19	29	24	44	29	35
FLIP84-156L	35	26	19	30	23	45	29	38
FLIP85- 7L	40	27	19	25	27	47	27	40
FLIP86- 13L	34	28	23	30	21	40	30	39
FLIP87- 4L	37	24	21	26	26	40	29	36
FLIP87- 11L	32	22	18	24	23	37	26	37
FLIP87- 12L	36	22	18	23	23	52	31	36
FLIP87- 15L	36	26	17	23	26	38	28	36
FLIP88- 1L	35	21	18	20	23	39	31	37
FLIP88- 3L	38	21	20	25	26	42	28	35
FLIP88- 4L	38	22	18	24	21	43	29	37
FLIP88- 5L	32	24	18	29	24	39	28	37
FLIP88- 7L	35	24	19	26	25	39	31	37
FLIP88- 10L	37	22	19	26	22	44	30	40
FLIP88- 12L	38	21	19	24	29	43	29	39
FLIP88- 13L	36	22	17	22	23	45	30	37
FLIP88- 14L	34	26	22	27	29	45	27	37
FLIP88- 32L	50	21	17	21	26	40	35	36
FLIP89- 5L	38	17	16	22	30	40	30	37
FLIP89- 7L	36	24	18	27	21	49	31	39
FLIP90- 1L	42	32	22	21	23	40	29	36
FLIP90- 2L	30	16	14	24	27	41	26	34
FLIP90- 3L	40	24	17	28	29	40	31	38
FLIP90- 4L	33	30	21	30	25	40	30	36
FLIP90- 5L	39	22	17	24	27	46	28	38
FLIP90- 6L	38	23	18	27	26	47	26	38
FLIP90- 7L	43	23	21	29	25	41	32	42
FLIP90- 8L	40	26	19	23	28	41	30	36
FLIP90- 9L	40	28	20	30	29	39	30	35
FLIP90- 10L	44	18	24	27	29	43	31	39
FLIP90- 11L	37	34	19	26	25	41	28	39
FLIP90- 12L	29	21	14	20	24	37	27	36
FLIP90- 13L	39	27	18	23	27	34	30	38
FLIP90- 14L	30	22	18	25	27	44	27	36
Local check	36	23	17	28	18	39	28	39
Location Mean	37	24	19	26	24	42	29	37
S.E. of Mean	#	#	1.75	#	#	2.48	1.73	1.71
L.S.D. at 5%	#	#	5.10	#	#	7.23	-	4.92
C.V. %	#	#	13.31	#	#	8.39	8.40	6.54
Error df	#	#	25	#	#	25	25	35
Significance			*			*	NS	*

Cont'd. ...

Table 5.4.4. Cont'd. ...

Selection	PAKISTAN		PORTUGAL		SYRIA			Overall Mean
	Poshawar	Eivas	Aleppo	Gellino	Hoimo	Idleb	Izra'a	
Local large	31	41	26	33	26	28	27	30
FLIP84-144L	27	38	26	30	35	31	31	31
FLIP84-156L	35	42	24	30	36	23	27	31
FLIP85- 7L	32	43	26	35	33	29	27	32
FLIP86- 13L	28	36	22	30	35	30	28	30
FLIP87- 4L	35	37	24	30	38	26	27	30
FLIP87- 11L	36	34	24	30	31	29	26	29
FLIP87- 12L	35	39	21	29	34	26	27	30
FLIP87- 15L	35	38	26	31	38	24	29	30
FLIP88- 1L	31	40	25	30	33	26	26	29
FLIP88- 3L	35	37	22	30	31	27	25	29
FLIP88- 4L	33	42	26	30	31	29	27	30
FLIP88- 5L	27	42	28	28	34	28	28	30
FLIP88- 7L	27	43	23	32	34	27	26	30
FLIP88- 10L	36	40	28	31	31	28	29	31
FLIP88- 12L	30	38	24	30	29	31	29	30
FLIP88- 13L	33	42	22	30	33	28	27	30
FLIP88- 14L	31	42	22	32	33	25	28	31
FLIP88- 32L	33	41	23	29	31	29	27	31
FLIP89- 5L	33	35	27	32	36	30	25	30
FLIP89- 7L	32	44	23	30	33	23	30	31
FLIP90- 1L	32	41	24	34	32	27	27	31
FLIP90- 2L	32	36	22	31	28	27	27	28
FLIP90- 3L	31	42	24	34	29	28	29	31
FLIP90- 4L	35	40	26	33	33	25	29	31
FLIP90- 5L	32	40	26	31	30	27	27	30
FLIP90- 6L	35	41	23	33	32	25	27	31
FLIP90- 7L	31	44	24	31	38	27	30	32
FLIP90- 8L	29	44	24	31	36	29	27	31
FLIP90- 9L	34	38	26	32	31	26	26	31
FLIP90- 10L	39	37	22	33	31	30	33	32
FLIP90- 11L	31	39	26	33	36	30	26	31
FLIP90- 12L	34	38	25	30	30	27	26	28
FLIP90- 13L	36	40	26	29	29	29	28	30
FLIP90- 14L	31	38	23	32	33	32	30	30
Local check	34	41	26	31	31	22	25	
Location Mean	32	40	24	31	33	27	28	
S.E. of Mean	2.30	1.38	1.52	1.91	2.53	1.59	1.42	
L.S.D. at 5%	6.70	4.02	4.43	-	-	4.64	-	
C.V. %	10.01	4.90	8.81	8.65	10.98	8.20	7.30	
Error df	25	25	25	25	25	25	25	
Significance	*	*	*	NS	NS	*	NS	

+ Since the blocks (adjusted) MS is less than intra block MS, the RCB analysis is performed on the data and the means are unadjusted. \* = Significant at  $P \leq 0.05$ , NS = Not significant. # Not analysed due to incomplete data set or other reasons.

Table 5.4.5. Adjusted seed yield (Y=kg/ha) and rank (R) of entries at different locations in the LISN-L during 1989/90.

Selection	ALGERIA				CANADA				ETHIOPIA	
	Guelma+		Setif		Portage		Watrous		Ghinchi +	
	Y	R	Y	R	Y	R	Y	R	Y	R
Local large	2000	29	89	11	680	15	1840	7	50	27
FLIP84-144L	1875	35	83	20	180	35	1480	13	38	29
FLIP84-156L	2417	18	75	31	880	9	1460	14	25	31
FLIP85- 7L	2583	15	112	1	740	13	1520	12	156	11
FLIP86- 13L	2292	24	76	29	1240	4	3000	2	138	17
FLIP87- 4L	2083	27	88	13	900	8	2200	3	75	22
FLIP87- 11L	1917	32	82	24	800	12	1900	5	0	36
FLIP87- 12L	2667	9	87	14	1620	2	3800	1	144	14
FLIP87- 15L	2917	6	102	4	1300	3	1280	21	294	5
FLIP88- 1L	2333	23	78	26	600	18	1280	20	219	7
FLIP88- 3L	2667	11	89	12	680	16	1720	9	44	28
FLIP88- 4L	2104	26	86	17	520	21	1160	24	144	15
FLIP88- 5L	2500	16	78	27	420	28	1900	6	1100	1
FLIP88- 7L	3667	1	70	32	820	10	1560	11	375	4
FLIP88- 10L	2417	19	99	6	700	14	1820	8	144	16
FLIP88- 12L	2000	30	93	8	1020	7	1360	16	131	18
FLIP88- 13L	3333	2	76	30	300	33	1080	27	188	9
FLIP88- 14L	2333	21	86	16	440	27	1260	22	25	32
FLIP88- 32L	2000	31	55	36	540	20	900	35	0	34
FLIP89- 5L	2750	8	86	15	340	32	940	34	144	13
FLIP89- 7L	2917	5	65	35	1020	6	1020	31	50	26
FLIP90- 1L	3167	3	82	23	340	31	860	36	206	8
FLIP90- 2L	2625	14	92	10	500	23	1340	18	519	2
FLIP90- 3L	2917	4	82	22	160	36	1380	15	0	33
FLIP90- 4L	2333	22	68	34	360	30	1040	30	63	23
FLIP90- 5L	1583	36	99	5	800	11	1640	10	56	24
FLIP90- 6L	2333	20	92	9	480	24	1060	28	256	6
FLIP90- 7L	1917	33	84	18	540	19	1040	29	38	30
FLIP90- 8L	1896	34	77	28	520	22	1160	25	150	12
FLIP90- 9L	2250	25	68	33	460	25	1340	19	181	10
FLIP90- 10L	2417	17	83	21	200	34	1000	33	81	20
FLIP90- 11L	2083	28	95	7	1040	5	1220	23	0	35
FLIP90- 12L	2667	12	81	25	460	26	1020	32	50	25
FLIP90- 13L	2667	13	83	19	420	29	1120	26	75	21
FLIP90- 14L	2667	10	102	3	660	17	1340	17	431	3
Local check	2792	7	102	2	2660	1	1940	4	94	19
Location Mean	2447		85		704		1472		178	
S.E. of Mean	327.79		7.87		#		#		#	
L.S.D. at 5%	940.88		22.94		#		#		#	
C.V. %	18.95		13.18		#		#		#	
Error df	35		25		#		#		#	
Significance	*		*		#		#		#	
Efficiency	-		125.09							
Test > Check	0		0							

Cont'd. ...



Table 5.4.5. Cont'd. ...

Selection	JORDAN				LEBANON		PAKISTAN			
	Jubeiha		Ramtha+		Terbol		Faisalabad+		Peshawar+	
	Y	R	Y	R	Y	R	Y	R	Y	R
Local large	1229	14	1766	2	2124	22	440	32	1458	13
FLIP84-144L	1032	21	844	27	2125	21	360	35	1500	10
FLIP84-156L	1464	6	1496	6	2151	20	573	26	1375	17
FLIP85- 7L	1451	7	752	28	2390	8	833	18	1292	23
FLIP86- 13L	752	34	909	21	2058	28	540	28	1375	16
FLIP87- 4L	982	22	608	30	2274	11	620	24	1042	36
FLIP87- 11L	1335	8	1739	3	1834	34	1080	8	1167	29
FLIP87- 12L	1106	18	1113	11	2267	12	847	16	1417	15
FLIP87- 15L	1331	9	1009	14	2284	10	1733	1	1583	5
FLIP88- 1L	969	23	1499	5	2076	25	1173	6	1292	21
FLIP88- 3L	491	36	1030	13	1680	36	1300	4	1125	33
FLIP88- 4L	932	25	953	18	1745	35	993	11	1250	27
FLIP88- 5L	866	28	1816	1	1853	32	433	33	1583	4
FLIP88- 7L	1576	4	1223	9	2678	2	827	19	1583	7
FLIP88- 10L	960	24	881	23	2334	9	813	20	1417	14
FLIP88- 12L	825	32	861	25	2224	15	513	30	1375	18
FLIP88- 13L	905	26	849	26	2563	3	867	14	1167	30
FLIP88- 14L	1270	13	338	36	2158	19	187	36	1083	34
FLIP88- 32L	845	30	516	34	1961	29	1240	5	1333	19
FLIP89- 5L	1191	15	1089	12	1852	33	613	25	1042	35
FLIP89- 7L	1292	11	964	16	2116	23	747	23	1458	11
FLIP90- 1L	1185	17	870	24	2186	17	1347	3	2083	2
FLIP90- 2L	558	35	559	33	2166	18	1167	7	1583	6
FLIP90- 3L	1045	19	889	22	2752	1	960	12	1167	32
FLIP90- 4L	1044	20	1271	8	1960	30	847	17	1167	31
FLIP90- 5L	838	31	691	29	1893	31	1033	10	1625	3
FLIP90- 6L	1712	2	1511	4	2530	5	487	31	1292	22
FLIP90- 7L	1603	3	411	35	2459	6	853	15	1292	25
FLIP90- 8L	1470	5	963	17	2455	7	520	29	1333	20
FLIP90- 9L	812	33	568	32	2110	24	567	27	1292	24
FLIP90- 10L	1896	1	1117	10	2059	27	1400	2	1542	8
FLIP90- 11L	1318	10	920	20	2238	14	940	13	1542	9
FLIP90- 12L	1272	12	946	19	2065	26	800	22	1250	26
FLIP90- 13L	853	29	1316	7	2550	4	400	34	1208	28
FLIP90- 14L	1189	16	968	15	2241	13	800	21	1458	12
Local check	877	27	583	31	2200	16	1067	9	2208	1
Location Mean	1124		995		2184		831		1388	
S.E. of Mean	232.57		320.59		215.87		295.94		192.06	
L.S.D. at 5%	677.45		-		-		-		-	
C.V. %	29.26		45.55		13.98		50.36		19.57	
Error df	25		35		25		35		35	
Significance	*		NS		NS		NS		NS	
Efficiency	106.76		-		-		-		-	
Test > Check	4		-		-		-		-	

Cont'd. ...

Table 5.4.5. Cont'd. ...

Selection	PORTUGAL		SYRIA							
	Elvas		Aleppo+		Galline		Hoimo		Idleb	
	Y	R	Y	R	Y	R	Y	R	Y	R
Local large	1977	20	399	19	444	36	1801	11	227	31
FLIP84-144L	2968	5	456	15	507	34	1546	24	109	34
FLIP84-156L	2997	4	553	8	629	31	2214	3	319	24
FLIP85- 7L	3168	2	468	13	601	32	1418	29	476	15
FLIP86- 13L	1910	21	190	35	798	27	1416	30	220	32
FLIP87- 4L	1855	26	380	20	725	30	1671	19	481	13
FLIP87- 11L	1877	24	609	3	1209	16	1851	9	645	4
FLIP87- 12L	1643	30	416	18	1539	6	1563	23	661	3
FLIP87- 15L	2271	13	588	6	1591	5	1844	10	376	18
FLIP88- 1L	1404	33	596	4	1319	14	1427	28	298	28
FLIP88- 3L	1743	28	320	26	1075	19	1524	25	295	29
FLIP88- 4L	2241	14	615	2	872	24	1627	20	395	17
FLIP88- 5L	2732	8	481	12	894	23	1936	6	575	9
FLIP88- 7L	1979	19	588	7	1494	8	1706	17	663	2
FLIP88- 10L	2322	12	491	11	841	26	2347	1	635	5
FLIP88- 12L	1885	22	371	21	772	28	1693	18	368	19
FLIP88- 13L	1711	29	226	30	1344	13	1501	26	514	12
FLIP88- 14L	1745	27	221	31	1035	20	1399	31	249	30
FLIP88- 32L	1190	36	178	36	1437	10	1907	7	531	10
FLIP89- 5L	2840	7	324	25	904	22	1604	21	517	11
FLIP89- 7L	1882	23	314	27	1645	3	1144	35	352	20
FLIP90- 1L	2183	16	353	23	1639	4	2124	4	206	33
FLIP90- 2L	2033	17	200	33	1516	7	1499	27	480	14
FLIP90- 3L	2920	6	281	28	1100	18	1335	32	345	23
FLIP90- 4L	2328	11	519	10	1148	17	1737	15	100	35
FLIP90- 5L	2373	10	593	5	909	21	1870	8	612	6
FLIP90- 6L	1873	25	236	29	1462	9	1251	34	446	16
FLIP90- 7L	2197	15	427	16	444	35	2045	5	98	36
FLIP90- 8L	2021	18	334	24	1348	12	1766	12	349	21
FLIP90- 9L	1602	32	217	32	766	29	1292	33	581	8
FLIP90- 10L	1640	31	190	34	1710	2	1755	13	318	25
FLIP90- 11L	3198	1	681	1	856	25	2289	2	610	7
FLIP90- 12L	2487	9	369	22	1318	15	1739	14	313	27
FLIP90- 13L	3053	3	458	14	580	33	1574	22	314	26
FLIP90- 14L	1395	34	421	17	2179	1	1706	16	674	1
Local check	1216	35	520	9	1389	11	1100	36	346	22
Location Mean	2135		405		1112		1673		408	
S.E. of Mean	311.61		85.67		314.05		207.81		106.19	
L.S.D. at 5%	907.67		245.91		-		605.31		309.31	
C.V. %	20.64		29.91		39.93		17.57		36.78	
Error df	25		35		25		25		25	
Significance	*		*		NS		*		*	
Efficiency	120.03		-		-		118.05		213.91	
Test > Check	16		0		-		17		3	

Cont'd. ...

Table 5.4.5. Cont'd. ...

Selection	SYRIA		TUNISIA						TURKEY		Overall Mean	
	Isra'a		Boja-I		Boja-II		El Kef		Ankara		Y	R
	Y	R	Y	R	Y	R	Y	R	Y	R		
Local large	576	34	101	36	145	33	315	30	640	6	915	25
FLIP84-144L	1452	2	148	32	170	30	340	23	810	2	901	26
FLIP84-156L	793	26	137	34	195	28	421	2	870	1	1052	5
FLIP85- 7L	687	30	217	18	285	10	358	14	360	16	993	12
FLIP86- 13L	698	29	190	23	230	18	370	8	425	14	941	16
FLIP87- 4L	1112	8	184	28	260	11	354	17	485	8	919	23
FLIP87- 11L	982	14	194	21	245	16	367	10	180	24	1001	11
FLIP87- 12L	1120	7	244	11	345	3	364	11	385	15	1167	1
FLIP87- 15L	1092	10	225	15	155	32	319	29	135	29	1121	3
FLIP88- 1L	909	17	226	14	250	13	303	31	95	31	917	24
FLIP88- 3L	731	28	249	9	340	5	411	4	340	18	893	30
FLIP88- 4L	667	32	185	27	220	23	370	9	260	21	867	32
FLIP88- 5L	968	15	125	35	240	17	357	16	465	11	1066	4
FLIP88- 7L	1069	12	222	17	295	9	321	27	0	36	1136	2
FLIP88- 10L	764	27	191	22	205	26	342	22	655	5	1019	8
FLIP88- 12L	1106	9	316	5	200	27	417	3	340	17	893	29
FLIP88- 13L	1125	6	257	7	245	14	358	15	70	34	934	19
FLIP88- 14L	1149	5	181	30	190	29	344	20	470	10	808	34
FLIP88- 32L	805	24	394	1	410	1	359	13	75	33	834	33
FLIP89- 5L	829	22	214	19	210	25	343	21	170	26	900	27
FLIP89- 7L	686	31	187	26	230	21	346	19	135	28	928	21
FLIP90- 1L	454	35	247	10	255	12	262	35	105	30	1008	9
FLIP90- 2L	876	20	339	3	245	15	337	24	0	35	932	20
FLIP90- 3L	391	36	235	13	230	19	362	12	140	27	934	18
FLIP90- 4L	900	19	184	29	210	24	333	26	335	19	897	28
FLIP90- 5L	1563	1	223	16	225	22	320	28	435	13	969	13
FLIP90- 6L	922	16	263	6	340	4	397	5	175	25	956	14
FLIP90- 7L	817	23	202	20	320	7	204	36	685	4	884	31
FLIP90- 8L	988	13	254	8	310	8	291	32	185	23	920	22
FLIP90- 9L	611	33	337	4	350	2	282	33	450	12	807	35
FLIP90- 10L	1268	3	237	12	90	36	446	1	695	3	1007	10
FLIP90- 11L	830	21	157	31	230	20	354	18	275	20	1044	6
FLIP90- 12L	905	18	189	24	165	31	377	7	260	22	937	17
FLIP90- 13L	1074	11	142	33	140	34	334	25	480	9	942	15
FLIP90- 14L	1262	4	347	2	330	6	396	6	75	32	1032	7
Local check	795	25	188	25	130	35	280	34	520	7	265	36
Location Mean	916		220		240		346		338			
S.E. of Mean	152.72		34.79		42.30		35.88		87.99			
L.S.D. at 5%	444.86		101.35		121.41		104.51		252.58			
C.V. %	23.58		22.34		24.94		14.67		36.78			
Error df	25		25		35		25		35			
Significance	*		*		*		*		*			
Efficiency	112.98		192.80		-		112.90		-			
Test > Check	4		5		12		6		2			

+ Since the blocks (adjusted) MS is less than intra block MS, the RCB analysis is performed on the data and the means are unadjusted. \* = Significant at  $p \leq 0.05$ , NS = Not significant.  $\beta$  Not analysed due to incomplete data set or other reasons.

Table 5.4.6. The five heaviest seed yielding entries at the individual locations in the LISN-L during 1989/90.

Rank	ALGERIA		CANADA		ETHIOPIA	JORDAN	
	Guelma	Setif	Portage	Watrous	Ghinchi	Jubeiha	Ramtha
1	FLIP 88- 7L	FLIP 85- 7L	Local check	FLIP 87-12L	FLIP 88- 5L	FLIP 90- 10L	FLIP 88- 5L
2	FLIP 88-13L	Local check	FLIP 87-12L	FLIP 86-13L	FLIP 90- 2L	FLIP 90- 6L	Local check
3	FLIP 90- 1L	FLIP 90-14L	FLIP 87-15L	FLIP 87- 4L	FLIP 90-14L	FLIP 90- 7L	FLIP 87- 11L
4	FLIP 90- 3L	FLIP 87-15L	FLIP 86-13L	Local check	FLIP 88- 7L	FLIP 88- 7L	FLIP 90- 6L
5	FLIP 89- 7L	FLIP 90- 5L	FLIP 90-11L	FLIP 87-11L	FLIP 87-15L	FLIP 90- 8L	FLIP 88- 1L
	FLIP 87-15L	FLIP 88-10L		FLIP 88- 5L		FLIP 84-156L	FLIP 84-156L
	Local check						

Cont'd. ...

Rank	LEBANON	PAKISTAN		PORTUGAL	SYRIA		
	Terbol	Faisalabad	Peshawar	Elvas	Aleppo	Gelline	Heimo
1	FLIP 90- 3L	FLIP 87-15L	Local check	FLIP 90- 11L	FLIP 90-11L	FLIP 90-14L	FLIP 90- 14L
2	FLIP 88- 7L	FLIP 90-10L	FLIP 90- 1L	FLIP 85- 7L	FLIP 88- 4L	FLIP 90-10L	FLIP 90- 11L
3	FLIP 88-13L	FLIP 90- 1L	FLIP 90- 5L	FLIP 90- 13L	FLIP 87-11L	FLIP 89- 7L	FLIP 84-156L
4	FLIP 90-13L	FLIP 88- 3L	FLIP 88- 5L	FLIP 84-156L	FLIP 88- 1L	FLIP 90- 1L	FLIP 90- 1L
5	FLIP 90- 6L	FLIP 88-32L	FLIP 87-15L	FLIP 84-144L	FLIP 90- 5L	FLIP 87-15L	FLIP 90- 7L
			FLIP 90- 2L		FLIP 87-15L		
			FLIP 88- 7L		FLIP 88- 7L		
			FLIP 90-10L				
			FLIP 90-11L				

Cont'd. ...

Rank	SYRIA		TUNISIA		TURKEY	
	Idleb	Izra'a	Beja -I	Beja -II	El Kef	Ankara
1	FLIP 90-14L	FLIP 90- 5L	FLIP 88-32L	FLIP 88-32L	FLIP 90- 10L	FLIP 84-156L
2	FLIP 88- 7L	FLIP 84-144L	FLIP 90-14L	FLIP 90- 9L	FLIP 84-156L	FLIP 84-144L
3	FLIP 87-12L	FLIP 90- 10L	FLIP 90- 2L	FLIP 87-12L	FLIP 88- 12L	FLIP 90- 10L
4	FLIP 87-11L	FLIP 90- 14L	FLIP 90- 9L	FLIP 90- 6L	FLIP 88- 3L	FLIP 90- 7L
5	FLIP 88-10L	FLIP 88- 14L	FLIP 88-12L	FLIP 88- 3L	FLIP 90- 6L	FLIP 88- 10L
	FLIP 90- 5L	FLIP 88- 13L	FLIP 90- 6L	FLIP 90-14L	FLIP 90- 14L	
	FLIP 90-11L					

The brackets indicate entries having the same rank.

Adjusted seed yields of different entries at various locations are given in Table 5.4.5. The location mean was highest at Guelma in Algeria (2447 kg/ha) and lowest at Setif (85 kg/ha) in Algeria. The ANOVA of the experimental design revealed that at Jubeiha in Jordan; Elvas in Portugal; Heimo, Idleb, and Izra'a in Syria; and Beja-I, Beja II and El Kef in Tunisia; and Ankara in Turkey; 4, 16, 17, 3, 4, 5, 12, 6, and 2 test entries, respectively exceeded the local check by a significant margin. The five heaviest yielders across locations included FLIP 87-12L, FLIP 88-7L, FLIP 87-15L, FLIP 88-5L and FLIP 84-156L and yielded 1167, 1136, 1121, 1066, and 1052 kg/ha, respectively.

The five heaviest yielders at each location are given in Table 5.4.6. It was noticed that FLIP 87-15L, FLIP 90-14L, FLIP 88-7L, FLIP 90-10L and FLIP 90-11L occurred most frequently among the top five heaviest yielders and were relatively more adaptable.

## **5.5. LENTIL INTERNATIONAL SCREENING NURSERY-SMALL SEED (LISN-S)**

### **Material**

The Lentil International Screening Nursery-Small Seed comprised 63 test entries and one local check which was to be added by the cooperator. All the test entries in this nursery were developed at ICARDA through hybridization and were selected based on their superior performance at ICARDA sites in Syria and Lebanon.

### **Methods and Management**

The material comprising 63 test entries and one check was sown in a 8x8 simple lattice design in two replications. The suggested plot size was single row 4 m long accomodating 200 plants with between-row spacing of 25 cm.

Twenty six sets of the nursery were supplied to different cooperators in 13 countries but the results were received from 18 locations in 9 countries. The agronomic data received from the cooperators are presented in Table 5.5.1.

### **Results and Discussion**

The data on time to flowering (Table 5.5.2.) revealed that flowering was earliest at Debre Zeit in Ethiopia (in 71 days), and latest at Diyarbakir in Turkey (in 166 days). The entries namely, FLIP 90-37L, FLIP 89-16L, FLIP 90-28L, FLIP 90-30L, FLIP 90-34L, and FLIP 90-41L were earliest to flower in 121 or 122 days. The data on time to maturity (Table 5.5.3.) revealed that the lines FLIP 88-21L, FLIP 88-29L, FLIP 89-13L, FLIP 89-36L, FLIP 90-17L, and FLIP 90-28L matured in 155 days and were earlier in maturity.

The plant height data (Table 5.5.4) revealed that the entry means ranged between 27 cm (for FLIP 89-17L, FLIP 89-31L, FLIP 89-38L, and FLIP 90-15L) and 31 cm (for FLIP 89-24L).

Table 5.5.1. Agronomic data for different locations in the LISN-S during 1989/90.

Country	Location	Planting Date	Harvesting Date	Fertilizer (kg/ha)			Irrigation	Insecticide/Fungicide Herbicide	Local check
				N	P	K			
BANGLADESH	Mymensingh	28.11.1989	08.03.1990	-	-	-	-	-	Bm 502
ETHIOPIA	Debre Zeit	19.07.1990	NA	-	-	-	-	-	NEL 358
ETHIOPIA	Ghinchi	17.08.1990	10.01.1991	-	-	-	-	-	NEL 358
JORDAN	Jubeiha	29.11.1989	NA	20	40	-	-	-	Jordan -1
JORDAN	Ramtha	05.11.1989	NA	20	40	-	-	-	Jordan -1
LEBANON	Terbol	30.11.1989	15.05.1990	-	50	-	-	Fortrol, Kerb	L.L.
PORTUGAL	Elvas	09.11.1989	22.05.1990	-	60	60	-	-	L -188
PAKISTAN	Faisalabad (UAF)	10.11.1989	25.04.1990	80	57	-	2	Malathion	V 25
SYRIA	Aleppo	29.11.1989	NA	-	-	-	-	-	NA
SYRIA	Gelline	03.01.1990	20.05.1990	20	50	-	-	-	NA
SYRIA	Heimo	06.12.1989	27.05.1990	-	50	-	-	-	NA
SYRIA	Idleb	06.12.1989	21.05.1990	-	60	-	-	NA	NA
SYRIA	Izra'a	06.12.1989	05.06.1990	-	50	-	-	Fortrol & Kerb	Hurani
SYRIA	Tel Hadya	29.12.1989	05.06.1990	-	50	-	-	-	NA
TUNISIA	Beja -I	NA	NA	NA	NA	NA	NA	NA	NA
TUNISIA	Beja -II	NA	NA	NA	NA	NA	NA	NA	NA
TUNISIA	El Kef	NA	NA	NA	NA	NA	NA	NA	NA
TURKEY	Diyarbakir	08.11.1989	NA	NA	NA	NA	NA	NA	Yerli Kirmizi
TURKEY	Diyarbakir	08.11.1989	NA	NA	NA	NA	NA	NA	NA

NA = Not available.

Table 5.5.2. Adjusted time to flowering (days) of entries at different locations in the LISN-S during 1989/90.

Selection	ILL	Origin	ETHIOPIA		JORDAN		LEBANON
			Debre Zeit	Ghinchi	Jubeiha+	Rantha	Torbol+
Local Small	4401	Syria	72	92	135	139	134
FLIP87-43L	6233	ICARDA	-	109	138	140	132
FLIP88-21L	6445	ICARDA	64	76	138	139	135
FLIP88-29L	6453	ICARDA	-	93	132	139	130
FLIP88-51L	6475	ICARDA	-	94	131	137	130
FLIP89-11L	6769	ICARDA	73	108	139	139	133
FLIP89-12L	6770	ICARDA	78	101	139	138	134
FLIP89-13L	6771	ICARDA	73	85	138	138	130
FLIP89-14L	6772	ICARDA	85	102	138	138	130
FLIP89-15L	6773	ICARDA	70	98	136	138	132
FLIP89-16L	6774	ICARDA	70	85	135	141	130
FLIP89-17L	6775	ICARDA	-	97	137	139	130
FLIP89-18L	6776	ICARDA	-	106	135	138	131
FLIP89-19L	6777	ICARDA	-	105	137	139	132
FLIP89-20L	6778	ICARDA	83	108	139	139	134
FLIP89-21L	6779	ICARDA	75	100	137	140	134
FLIP89-22L	6780	ICARDA	-	108	140	137	135
FLIP89-23L	6781	ICARDA	-	97	135	139	130
FLIP89-24L	6782	ICARDA	-	93	137	140	130
FLIP89-25L	6783	ICARDA	65	86	136	139	130
FLIP89-26L	6784	ICARDA	-	106	138	140	133
FLIP89-27L	6785	ICARDA	70	105	135	137	130
FLIP89-28L	6786	ICARDA	-	105	140	140	135
FLIP89-29L	6787	ICARDA	-	99	136	138	132
FLIP89-30L	6788	ICARDA	70	86	138	139	133
FLIP89-31L	6789	ICARDA	83	101	139	139	134
FLIP89-32L	6790	ICARDA	84	103	133	138	130
FLIP89-33L	6791	ICARDA	-	135	139	138	132
FLIP89-34L	6792	ICARDA	-	96	-	139	130
FLIP89-35L	6793	ICARDA	-	105	136	139	134
FLIP89-36L	6794	ICARDA	57	76	137	139	134
FLIP89-37L	6795	ICARDA	-	98	138	140	134
FLIP89-38L	6796	ICARDA	-	106	136	137	132
FLIP90-15L	6984	ICARDA	-	104	135	139	130
FLIP90-16L	6985	ICARDA	80	106	137	134	132
FLIP90-17L	6986	ICARDA	64	89	133	138	131
FLIP90-18L	6987	ICARDA	0	97	136	138	131

Cont'd. ...

Table 5.5.2. Cont'd. ...

Selection	ILL	Origin	ETHIOPIA		JORDAN		LEBANON
			Debre Zeit	Ghinchi	Jubeiha	Ramtha	Terbol
FLIP90-19L	6988	ICARDA	50	99	139	133	132
FLIP90-20L	6989	ICARDA	79	97	133	139	130
FLIP90-21L	6990	ICARDA	-	108	136	138	131
FLIP90-22L	6991	ICARDA	-	100	139	139	134
FLIP90-23L	6992	ICARDA	-	95	135	138	131
FLIP90-24L	6993	ICARDA	-	94	135	139	131
FLIP90-24L	6993	ICARDA	-	96	135	139	131
FLIP90-25L	6994	ICARDA	68	96	136	138	129
FLIP90-26L	6995	ICARDA	74	96	136	140	130
FLIP90-27L	6996	ICARDA	75	88	133	138	128
FLIP90-28L	6997	ICARDA	53	93	132	138	132
FLIP90-29L	6998	ICARDA	-	97	135	138	132
FLIP90-29L	6998	ICARDA	-	78	135	139	130
FLIP90-30L	6999	ICARDA	67	78	135	139	130
FLIP90-30L	6999	ICARDA	77	93	139	138	133
FLIP90-31L	7000	ICARDA	77	93	139	138	133
FLIP90-31L	7001	ICARDA	-	97	133	138	131
FLIP90-32L	7001	ICARDA	-	96	133	138	130
FLIP90-33L	7002	ICARDA	-	96	133	138	130
FLIP90-33L	7002	ICARDA	-	87	136	136	130
FLIP90-34L	7003	ICARDA	53	87	136	136	130
FLIP90-34L	7003	ICARDA	-	97	138	139	134
FLIP90-35L	7004	ICARDA	-	97	138	139	134
FLIP90-35L	7004	ICARDA	-	95	139	139	134
FLIP90-36L	7005	ICARDA	-	95	139	139	134
FLIP90-36L	7005	ICARDA	-	87	130	135	128
FLIP90-37L	7006	ICARDA	65	87	130	135	128
FLIP90-37L	7006	ICARDA	-	123	133	137	131
FLIP90-38L	7007	ICARDA	-	107	135	139	130
FLIP90-39L	7008	ICARDA	-	94	135	138	132
FLIP90-39L	7008	ICARDA	-	94	135	138	132
FLIP90-40L	7009	ICARDA	77	94	135	138	132
FLIP90-40L	7009	ICARDA	74	91	133	139	130
FLIP90-41L	7910	ICARDA	74	91	133	139	130
FLIP90-41L	7910	ICARDA	-	98	138	137	134
FLIP90-42L	7911	ICARDA	-	98	138	137	134
FLIP90-42L	7911	ICARDA	-	98	138	137	134
FLIP90-43L	7912	ICARDA	85	106	138	136	133
FLIP90-43L	7912	ICARDA	-	97	139	140	134
FLIP90-44L	7913	ICARDA	-	97	139	140	134
FLIP90-44L	7913	ICARDA	62	70	139	139	142
LOCAL CHECK	-	-	-	-	-	-	-
Location Mean			71	97	134	138	132
S.E. of Mean			#	#	14.44	1.36	0.59
L.S.D. at 5%			#	#	-	3.85	1.66
C.V. %			#	#	15.23	0.04	0.63
Error df			#	#	63	49	63
Significance					NS	*	*

Cont'd. ...



Table S.5.2. Cont'd. ...

Selection	PORTUGAL			SYRIA			TURKEY	Overall
	Elvas	Aloppo	Gellino	Heimo	Idleb	Isra'a	Diyarbakir	Mean
Local Small	136	125	100	121	121	125	165	125
FLIP87-43L	133	128	98	121	120	125	167	127
FLIP88-21L	133	125	98	124	126	125	163	123
FLIP88-29L	131	125	94	116	119	124	160	123
FLIP88-51L	129	125	95	117	119	125	163	123
FLIP89-11L	136	129	100	122	122	130	168	129
FLIP89-12L	136	126	101	124	119	129	166	127
FLIP89-13L	132	124	101	122	123	126	165	124
FLIP89-14L	132	127	99	120	118	124	168	126
FLIP89-15L	132	125	98	122	125	125	166	126
FLIP89-16L	131	123	97	116	122	124	162	122
FLIP89-17L	132	127	99	122	124	124	166	126
FLIP89-18L	133	128	98	121	121	126	166	127
FLIP89-19L	131	125	101	121	121	125	165	127
FLIP89-20L	136	125	100	125	122	126	167	128
FLIP89-21L	134	123	99	121	117	124	164	126
FLIP89-22L	135	128	102	125	126	126	168	129
FLIP89-23L	131	124	97	117	118	123	165	124
FLIP89-24L	129	124	97	118	119	125	166	124
FLIP89-25L	128	124	96	118	123	124	165	123
FLIP89-26L	136	127	98	122	120	128	167	128
FLIP89-27L	134	127	97	121	122	125	166	126
FLIP89-28L	137	130	101	122	120	126	167	128
FLIP89-29L	131	126	99	121	122	126	167	126
FLIP89-30L	131	127	100	125	124	124	167	125
FLIP89-31L	131	127	101	125	123	129	170	128
FLIP89-32L	131	124	96	112	118	123	167	124
FLIP89-33L	132	127	97	119	119	126	168	130
FLIP89-34L	132	125	98	122	116	126	166	125
FLIP89-35L	-	127	100	124	-	121	167	127
FLIP89-36L	132	126	99	121	125	125	164	123
FLIP89-37L	131	125	101	122	120	125	165	126
FLIP89-38L	133	125	99	118	122	125	166	126
FLIP90-15L	135	126	98	122	117	124	167	126
FLIP90-16L	131	125	96	119	121	126	164	125
FLIP90-17L	131	127	96	123	124	124	165	124
FLIP90-18L	131	125	96	124	122	124	165	125

Cont'd. ...

Table S.5.2. Cont'd. ...

Selection	PORTUGAL			SYRIA			TURKEY	Overall (1)
	Elvas	Aleppo	Gelline	Heimo	Idleb	Isra'a	Diyarbakir	Mean
FLIP90-19L	131	127	97	121	117	125	165	125
FLIP90-20L	131	125	98	117	122	125	163	124
FLIP90-21L	131	126	98	122	121	125	166	127
FLIP90-22L	-	128	100	125	121	127	167	128
FLIP90-23L	135	126	97	122	122	125	164	125
FLIP90-24L	131	124	98	122	-	125	165	125
FLIP90-25L	131	127	96	122	120	124	165	125
FLIP90-26L	132	128	96	116	124	125	164	124
FLIP90-27L	131	125	97	117	119	125	164	123
FLIP90-28L	125	125	93	114	121	122	162	122
FLIP90-29L	131	124	98	121	121	125	164	125
FLIP90-30L	131	124	98	118	122	124	166	122
FLIP90-31L	132	127	97	121	120	126	168	125
FLIP90-32L	129	126	96	125	118	123	164	125
FLIP90-33L	132	125	97	119	118	125	164	124
FLIP90-34L	132	125	95	114	118	125	164	122
FLIP90-35L	136	131	100	122	123	126	169	127
FLIP90-36L	137	126	100	124	121	126	168	126
FLIP90-37L	125	127	90	109	126	124	167	121
FLIP90-38L	132	128	97	122	115	125	167	129
FLIP90-39L	131	126	98	121	121	125	167	127
FLIP90-40L	131	125	95	122	120	125	165	125
FLIP90-41L	124	125	94	112	118	124	164	122
FLIP90-42L	135	130	100	122	124	129	169	127
FLIP90-43L	136	128	100	125	124	127	169	128
FLIP90-44L	133	127	100	122	126	126	167	126
LOCAL CHECK	127	128	102	122	123	124	173	
Location Mean	128	126	98	120	118	125	166	
S.E. of Mean	20.81	1.24	0.80	1.81	19.64	1.32	1.32	
L.S.D. at 5%	-	3.52	2.26	5.12	-	-	3.75	
C.V. %	22.96	1.39	1.15	2.13	23.61	1.49	1.13	
Error df	63	49	49	63	49	49	49	
Significance	NS	*	*	*	NS	NS	*	

+ Since the blocks (adjusted) MS is less than intra block MS, the RCB analysis is performed on the data and the means are unadjusted. (1) Debre Zeit, Jubeiha, Elvas and Idleb were excluded from the overall mean.

\* = Significant at  $P < 0.05$ , NS = Not significant. ‡ Not analysed due to incomplete data set or other reasons.

Table 5.5.3. Adjusted time to maturity (days) of entries at different locations in the LISN-S during 1989/90.

Selection	ETHIOPIA	JORDAN		LEBANON	PAKISTAN	SYRIA				(1)	
	Ghinchi	Jubeiha	Ramtha	Terbol	Faisalabad (UAF)+	Aleppo+	Gelline	Heimo	Idleb	Izra'a+	Overall Mean
Local Small	164	177	187	174	158	174	128	161	169	160	160
FLIP87-43L	154	177	183	170	152	179	128	160	166	157	157
FLIP88-21L	138	177	185	174	152	178	127	161	162	160	155
FLIP88-29L	138	173	186	173	157	178	127	160	165	156	155
FLIP88-51L	152	173	185	169	152	179	127	161	157	157	157
FLIP89-11L	154	168	186	170	158	179	122	160	162	160	157
FLIP89-12L	154	178	187	171	157	176	127	161	164	158	158
FLIP89-13L	140	175	185	169	154	176	128	160	169	157	155
FLIP89-14L	164	175	185	170	152	179	127	161	158	158	159
FLIP89-15L	154	176	186	169	154	174	128	159	168	157	156
FLIP89-16L	142	176	187	175	156	178	130	162	169	160	157
FLIP89-17L	152	175	188	169	157	178	128	161	161	158	157
FLIP89-18L	162	175	184	172	158	179	127	160	165	158	159
FLIP89-19L	164	176	184	172	158	176	128	160	166	160	160
FLIP89-20L	162	175	185	170	156	179	127	160	166	157	159
FLIP89-21L	154	176	187	174	158	176	129	161	163	161	159
FLIP89-22L	154	178	189	171	156	179	129	160	168	158	158
FLIP89-23L	152	176	187	169	158	178	128	160	161	158	157
FLIP89-24L	154	176	182	172	156	179	128	162	163	160	159
FLIP89-25L	153	175	186	169	154	172	128	161	165	159	156
FLIP89-26L	163	176	184	172	158	179	129	162	165	159	160
FLIP89-27L	164	177	186	171	156	178	127	161	160	158	159
FLIP89-28L	164	177	184	173	159	179	129	161	162	158	160
FLIP89-29L	162	174	184	172	156	179	128	161	166	162	160
FLIP89-30L	139	176	189	171	157	178	127	160	166	159	156
FLIP89-31L	164	176	187	169	158	179	127	160	166	158	159
FLIP89-32L	162	176	187	169	152	180	127	161	161	159	159
FLIP89-33L	163	177	184	172	156	179	127	161	166	157	159
FLIP89-34L	154	-	184	170	152	180	129	161	164	159	158
FLIP89-35L	154	175	188	172	156	180	130	160	-	156	158
FLIP89-36L	138	176	186	169	154	172	129	161	160	159	155
FLIP89-37L	142	177	186	172	155	176	129	161	163	159	156
FLIP89-38L	142	175	187	172	156	178	127	161	166	158	156
FLIP90-15L	154	175	188	169	159	178	129	161	157	158	158
FLIP90-16L	162	177	188	170	156	178	128	160	167	161	159
FLIP90-17L	138	173	186	171	157	172	129	161	160	156	155
FLIP90-18L	154	174	186	172	156	178	127	161	163	158	158

Cont'd. ...

Table 5.5.3. Cont'd. ...

Selection	ETHIOPIA		JORDAN		LEBANON	PAKISTAN	SYRIA				(1) Overall
	Ghinchi	Jubeiha	Rantha	Terbol	Faisalabad (UAF)+	Aleppo+	Gelline	Heimo	Idleb	Isra'a+	Mean
FLIP90-19L	144	178	184	175	159	178	130	162	163	161	158
FLIP90-20L	154	176	185	174	152	178	127	160	160	157	157
FLIP90-21L	164	175	184	170	157	179	128	160	167	156	159
FLIP90-22L	160	175	186	170	156	179	129	162	163	159	159
FLIP90-23L	154	175	185	172	154	178	127	161	166	158	158
FLIP90-24L	152	176	184	171	156	178	129	160	-	160	158
FLIP90-25L	142	179	186	172	156	179	129	162	163	159	157
FLIP90-26L	153	175	186	170	156	178	129	161	160	159	158
FLIP90-27L	152	174	183	170	157	178	128	160	166	158	157
FLIP90-28L	139	175	184	173	154	178	127	159	159	154	155
FLIP90-29L	164	174	186	172	156	174	128	160	160	159	159
FLIP90-30L	152	178	186	173	154	176	128	161	166	158	157
FLIP90-31L	154	174	187	173	154	178	126	160	165	158	157
FLIP90-32L	152	174	187	171	152	176	128	161	157	156	157
FLIP90-33L	152	174	186	170	154	176	129	159	166	158	157
FLIP90-34L	142	174	184	173	158	176	126	160	160	159	156
FLIP90-35L	154	176	184	171	152	176	127	162	163	159	157
FLIP90-36L	154	176	186	170	152	179	129	161	169	158	158
FLIP90-37L	140	174	-	174	155	179	127	161	168	158	156
FLIP90-38L	164	176	184	170	156	179	129	162	161	159	160
FLIP90-39L	162	177	184	169	159	177	126	160	166	159	159
FLIP90-40L	141	174	184	172	154	179	127	161	166	159	156
FLIP90-41L	141	175	189	171	156	179	127	161	166	159	156
FLIP90-42L	154	174	187	172	152	178	128	161	168	158	157
FLIP90-43L	163	175	186	171	158	179	128	160	166	156	159
FLIP90-44L	152	175	185	169	154	176	127	160	168	158	157
LOCAL CHECK	117	176	184	179	154	176	128	161	163	160	160
Location Mean		173	183	171	156	177	128	161	160	158	
S.E. of Mean		17.21	18.05	0.91	0.06	1.70	1.12	0.60	23.25	1.19	
L.S.D. at 5%		-	-	2.59	0.18	4.80	-	1.69	-	-	
C.V. %		14.04	13.92	0.75	0.06	1.35	1.24	0.52	20.58	1.06	
Error df		49	49	49	63	63	49	49	49	63	
Significance		NS	NS	*	*	*	NS	*	NS	NS	

+ Since the blocks (adjusted) MS is less than intra block MS, the RCB analysis is performed on the data and the means are unadjusted. (1) Jubeiha, Rantha and Idleb were excluded from the overall mean. \* = Significant at  $P < 0.05$ , NS = Not significant.

Table 5.5.4. Adjusted plant height (cm) of entries at different locations in the LISN-S during 1989/90.

Selection	ETHIOPIA	JORDAN		LEBANON	PORTUGAL	SYRIA
	Ghinchi	Jubeiha+	Rantha+	Torbol+	Elvas+	Aleppo
Local Small	22	43	26	35	38	20
FLIP87-43L	-	45	27	33	44	21
FLIP88-21L	27	42	25	36	41	24
FLIP88-29L	34	45	29	36	43	21
FLIP88-51L	24	41	25	36	38	21
FLIP89-11L	-	41	28	38	45	21
FLIP89-12L	22	44	30	36	41	23
FLIP89-13L	25	39	26	32	43	21
FLIP89-14L	28	44	31	34	46	20
FLIP89-15L	29	43	30	33	44	24
FLIP89-16L	24	36	26	34	43	23
FLIP89-17L	28	40	24	34	42	18
FLIP89-18L	-	44	29	35	44	17
FLIP89-19L	-	43	27	37	39	25
FLIP89-20L	-	41	28	33	39	19
FLIP89-21L	-	38	31	36	39	23
FLIP89-22L	-	43	26	33	43	24
FLIP89-23L	-	38	30	35	45	22
FLIP89-24L	28	46	27	39	52	24
FLIP89-25L	26	43	29	34	41	26
FLIP89-26L	-	44	31	34	43	18
FLIP89-27L	-	43	27	34	45	23
FLIP89-28L	-	44	29	34	43	19
FLIP89-29L	-	43	26	38	42	22
FLIP89-30L	35	40	30	37	42	23
FLIP89-31L	24	39	26	35	44	19
FLIP89-32L	23	40	26	36	48	24
FLIP89-33L	23	41	27	38	43	19
FLIP89-34L	29	-	28	31	46	21
FLIP89-35L	-	38	28	35	-	20
FLIP89-36L	28	40	28	32	48	22
FLIP89-37L	26	42	28	33	44	22
FLIP89-38L	24	38	28	32	46	21
FLIP90-15L	-	38	23	35	49	20
FLIP90-16L	-	44	27	34	45	21
FLIP90-17L	25	36	30	36	44	21
FLIP90-18L	28	40	28	35	44	19

Cont'd. ...

Table S.5.4. Cont'd. ...

Selection	ETHIOPIA	JORDAN		LEBANON	PORTUGAL	SYRIA
	Ghinchi	Jubeiha+	Rantha+	Terbol+	Elvas+	Aleppo
FLIP90-19L	-	45	31	35	46	22
FLIP90-20L	26	40	29	34	45	20
FLIP90-21L	23	40	30	34	44	22
FLIP90-22L	-	40	26	36	-	16
FLIP90-23L	26	42	29	34	45	18
FLIP90-24L	29	40	30	31	43	20
FLIP90-25L	-	35	24	31	51	19
FLIP90-26L	31	40	27	34	45	19
FLIP90-27L	28	44	27	32	42	22
FLIP90-28L	29	40	27	34	41	20
FLIP90-29L	30	45	29	38	44	24
FLIP90-30L	27	41	32	36	47	23
FLIP90-31L	28	43	26	34	41	21
FLIP90-32L	27	44	30	32	45	21
FLIP90-33L	27	39	30	36	47	21
FLIP90-34L	26	40	31	36	48	19
FLIP90-35L	28	39	27	33	45	19
FLIP90-36L	28	44	26	33	42	22
FLIP90-37L	-	40	29	38	43	17
FLIP90-38L	-	45	29	35	43	22
FLIP90-39L	-	43	27	36	44	19
FLIP90-40L	31	41	27	37	46	23
FLIP90-41L	26	43	31	34	40	21
FLIP90-42L	30	45	28	34	43	19
FLIP90-43L	21	44	30	35	45	17
FLIP90-44L	27	44	27	37	44	23
LOCAL CHECK	-	43	24	38	45	19
Location Mean	27	40	28	34	41	21
S.E. of Mean	#	9.25	1.83	1.47	12.79	2.04
L.S.D. at 5%	#	-	-	4.14	-	5.81
C.V. %	#	32.49	9.35	6.02	43.72	13.84
Error df	#	63	63	63	63	49
Significance		NS	NS	*	NS	*

Cont'd. ...

Table 5.5.4. Cont'd. ...

Selection	SYRIA				TURKEY	(1) Overall
	Gollino	Heimo	Idleb	Izra'a	Diyarbakir	Mean
Local Small	31	30	25	26	31	28
FLIP87-43L	32	29	23	26	-	28
FLIP88-21L	31	30	27	28	25	29
FLIP88-29L	36	29	25	27	24	30
FLIP88-51L	33	28	24	28	20	29
FLIP89-11L	34	30	27	28	23	30
FLIP89-12L	29	30	23	28	29	29
FLIP89-13L	30	31	19	26	19	28
FLIP89-14L	30	30	20	29	32	29
FLIP89-15L	29	29	24	25	36	28
FLIP89-16L	30	30	27	28	26	28
FLIP89-17L	31	30	22	24	31	27
FLIP89-18L	31	30	25	26	-	28
FLIP89-19L	32	31	25	28	-	30
FLIP89-20L	31	31	24	25	-	28
FLIP89-21L	28	31	22	27	23	29
FLIP89-22L	32	29	29	26	-	28
FLIP89-23L	30	30	24	27	-	29
FLIP89-24L	34	34	18	28	29	31
FLIP89-25L	30	31	28	27	32	29
FLIP89-26L	31	27	25	27	61	28
FLIP89-27L	32	28	24	27	58	29
FLIP89-28L	28	29	23	28	22	28
FLIP89-29L	31	34	24	26	-	29
FLIP89-30L	32	28	20	27	24	29
FLIP89-31L	29	28	23	28	25	27
FLIP89-32L	29	31	24	27	33	29
FLIP89-33L	30	30	24	26	24	28
FLIP89-34L	31	30	22	28	30	28
FLIP89-35L	31	29	-	25	30	28
FLIP89-36L	30	30	22	28	37	28
FLIP89-37L	32	29	19	26	26	28
FLIP89-38L	28	29	23	27	37	27
FLIP90-15L	30	29	23	24	27	27
FLIP90-16L	33	31	28	29	-	29
FLIP90-17L	28	26	25	25	73	28
FLIP90-18L	30	29	24	26	28	28

Cont'd. ...

Table 5.5.4. Cont'd. ...

Selection	SYRIA				TURKEY	(1)
	Gelline	Heimo	Idleb	Izra'a	Diyarbakir	Overall Mean
FLIP90-19L	36	29	22	28	62	30
FLIP90-20L	32	29	20	27	23	28
FLIP90-21L	31	30	26	26	82	29
FLIP90-22L	30	29	21	27	33	27
FLIP90-23L	28	28	21	26	38	27
FLIP90-24L	32	30	-	28	31	28
FLIP90-25L	31	26	20	25	31	26
FLIP90-26L	30	32	19	29	28	28
FLIP90-27L	33	29	24	28	24	28
FLIP90-28L	29	28	17	25	22	27
FLIP90-29L	32	32	22	28	40	30
FLIP90-30L	29	31	23	25	20	29
FLIP90-31L	33	31	24	26	27	29
FLIP90-32L	30	29	16	26	31	28
FLIP90-33L	26	29	22	26	28	28
FLIP90-34L	32	29	25	27	31	29
FLIP90-35L	33	29	22	25	29	28
FLIP90-36L	29	30	25	27	31	28
FLIP90-37L	29	27	24	25	55	28
FLIP90-38L	33	29	23	26	26	29
FLIP90-39L	31	30	26	30	-	29
FLIP90-40L	34	30	22	30	25	30
FLIP90-41L	34	30	23	28	39	30
FLIP90-42L	31	30	25	25	32	28
FLIP90-43L	29	28	24	26	26	27
FLIP90-44L	29	29	20	28	27	29
LOCAL CHECK	30	31	21	28	10	
Location Mean	31	30	21	27	27	
S.E. of Mean	1.64	1.18	11.30	1.14	18.15	
L.S.D. at 5%	4.65	3.35	-	-	51.57	
C.V. ‡	7.50	5.63	75.37	5.98	95.97	
Error df	49	49	49	49	49	
Significance	*	*	NS	NS	*	

+ Since the blocks (adjusted) MS is less than intra block MS, the RCB analysis is performed on the data and the means are unadjusted. (1) Ghinchi, Jubeiha, Elvas, Idleb and Diyarbakir were excluded from the overall mean.

\* = Significant at  $P < 0.05$ , NS = Not significant. ‡ Not analysed due to incomplete data set or other reasons.



Table 5.5.5. Adjusted seed yield (Y=kg/ha) and rank (R) of entries at different locations in the LISN-S during 1989/90.

Selection	ETHIOPIA		JORDAN				LEBANON		PAKISTAN	
	Ghinchi		Jubeiha		Ramtha		Terbol		Faisalabad (UAP)	
	Y	R	Y	R	Y	R	Y	R	Y	R
Local Small	81	39	905	45	519	59	1067	64	249	64
FLIP87-43L	75	44	896	47	738	41	1767	49	363	57
FLIP88-21L	325	6	1188	24	1570	1	1847	38	761	24
FLIP88-29L	463	2	851	51	723	44	1651	54	661	33
FLIP88-51L	144	25	993	39	545	56	2074	15	422	54
FLIP89-11L	25	59	858	50	1217	6	1869	32	648	34
FLIP89-12L	88	36	1885	4	829	29	2019	21	388	55
FLIP89-13L	0	-	1227	22	705	46	1930	25	775	23
FLIP89-14L	125	29	1125	27	588	51	1934	24	298	61
FLIP89-15L	281	8	780	55	847	28	1863	34	585	42
FLIP89-16L	263	9	1563	6	1181	8	1818	43	979	10
FLIP89-17L	131	26	994	38	630	49	2133	8	458	51
FLIP89-18L	50	50	954	43	1014	16	1863	35	294	62
FLIP89-19L	31	55	1074	31	1318	4	1797	46	753	27
FLIP89-20L	75	45	1621	5	738	40	2048	19	579	43
FLIP89-21L	0	-	826	52	1466	3	1618	56	642	35
FLIP89-22L	44	51	1070	32	916	22	1909	27	597	39
FLIP89-23L	100	34	421	63	909	23	2067	16	710	30
FLIP89-24L	200	16	1055	33	978	17	2104	13	921	12
FLIP89-25L	413	3	1270	18	1041	13	2208	6	1126	4
FLIP89-26L	44	52	1088	29	857	27	1715	51	344	59
FLIP89-27L	50	49	1044	37	641	48	1904	28	507	47
FLIP89-28L	88	37	1197	23	703	47	1699	52	439	52
FLIP89-29L	150	24	1514	9	735	42	1866	33	577	45
FLIP89-30L	381	4	712	58	552	54	1844	39	896	16
FLIP89-31L	81	42	1129	26	792	32	2067	17	904	14
FLIP89-32L	125	28	1100	28	499	62	2300	4	867	18
FLIP89-33L	113	32	561	61	535	58	1873	31	330	60
FLIP89-34L	69	46	1525	7	580	52	1805	45	552	46
FLIP89-35L	106	33	955	42	947	20	2340	2	486	49
FLIP89-36L	700	1	449	62	621	50	2049	18	981	8
FLIP89-37L	25	58	2045	1	454	63	1823	42	716	29
FLIP89-38L	19	61	592	60	789	33	1833	40	688	32
FLIP90-15L	31	56	1050	35	796	31	1851	37	591	41
FLIP90-16L	56	48	1268	20	900	25	1920	26	362	58
FLIP90-17L	113	31	1053	34	930	21	1528	59	1199	2
FLIP90-18L	169	20	1375	14	799	30	2048	20	483	50

Cont'd. ...

Table 5.5.5. Cont'd. ...

Selection	ETHIOPIA		JORDAN				LEBANON		PAKISTAN	
	Ghinchi		Jubeiha		Ramtha		Terbol		Faisalabad (UAF)	
	Y	R	Y	R	Y	R	Y	R	Y	R
FLIP90-19L	44	53	1249	21	971	18	1482	61	438	53
FLIP90-20L	256	11	820	54	724	43	1537	58	506	48
FLIP90-21L	31	57	1313	15	786	35	1953	22	376	56
FLIP90-22L	100	35	756	56	1252	5	1829	41	799	21
FLIP90-23L	131	27	993	40	1149	10	1537	57	689	31
FLIP90-24L	175	19	1269	19	547	55	1409	62	602	38
FLIP90-25L	38	54	950	44	782	36	1792	47	795	22
FLIP90-26L	313	7	1050	36	1017	15	2162	7	1004	7
FLIP90-27L	200	15	420	64	1034	14	2344	1	725	28
FLIP90-28L	369	5	1392	13	907	24	1493	60	1139	3
FLIP90-29L	169	22	1504	11	1472	2	2111	12	952	11
FLIP90-30L	188	18	1513	10	757	38	1874	30	802	20
FLIP90-31L	188	17	740	57	544	57	2124	9	907	13
FLIP90-32L	81	41	1518	8	1098	12	1723	50	758	25
FLIP90-33L	206	14	2028	2	766	37	2115	10	868	17
FLIP90-34L	69	47	882	49	1137	11	1630	55	617	36
FLIP90-35L	231	13	1074	30	1184	7	1852	36	755	26
FLIP90-36L	119	30	883	48	719	45	1941	23	898	15
FLIP90-37L	169	21	897	46	554	53	1670	53	1095	5
FLIP90-38L	19	60	1284	16	511	61	2263	5	256	63
FLIP90-39L	75	43	606	59	746	39	2115	11	611	37
FLIP90-40L	81	38	1409	12	948	19	2077	14	831	19
FLIP90-41L	263	10	2016	3	514	60	2307	3	1091	6
FLIP90-42L	0	-	826	53	427	64	1789	48	980	9
FLIP90-43L	81	40	1277	17	1153	9	1814	44	594	40
FLIP90-44L	163	23	1174	25	890	26	1900	29	578	44
LOCAL CHECK	244	12	988	41	789	34	1332	63	1433	1
Location Mean	151		1110		843		1878		691	
S.E. of Mean	#		248.20		225.74		182.09		156.22	
L.S.D. at 5%	#		705.14		-		517.33		433.82	
C.V. %	#		31.62		37.85		13.71		31.98	
Error df	#		49		49		49		49	
Significance			*		NS		*		*	
Efficiency			120.91		-		111.66		107.76	
Test > Check			4		-		37		0	

Cont'd. ...

Table 5.5.5. Cont'd. ...

Selection	PORTUGAL		SYRIA							
	Elvas		Aleppo+		Gelline		Heimo		Idlob	
	Y	R	Y	R	Y	R	Y	R	Y	R
Local Small	487	59	185	13	881	63	1127	49	344	5
FLIP87-43L	697	38	55	63	849	64	1294	36	185	19
FLIP88-21L	1337	5	240	8	1289	45	1568	17	12	64
FLIP88-29L	478	60	80	46	1228	51	1308	35	128	39
FLIP88-51L	496	56	118	27	1147	57	1127	48	103	43
FLIP89-11L	1069	11	70	55	1703	6	1546	19	70	54
FLIP89-12L	701	37	110	34	1660	8	1454	23	164	25
FLIP89-13L	886	24	260	4	1491	21	1449	24	167	23
FLIP89-14L	639	44	93	40	1412	32	1602	16	147	32
FLIP89-15L	860	27	110	32	889	62	1040	53	150	31
FLIP89-16L	554	50	110	33	1553	14	1282	37	117	41
FLIP89-17L	867	26	80	48	1632	10	1090	50	98	46
FLIP89-18L	510	54	70	54	1628	11	1191	43	184	20
FLIP89-19L	901	22	140	22	1265	48	1691	13	216	12
FLIP89-20L	1156	7	70	53	1411	33	1003	54	243	10
FLIP89-21L	696	40	320	3	1077	60	2167	2	475	1
FLIP89-22L	896	23	60	62	1387	39	878	60	130	37
FLIP89-23L	1114	9	257	5	1059	61	2019	4	220	11
FLIP89-24L	1392	4	250	6	1487	22	2044	3	47	60
FLIP89-25L	752	33	520	1	1517	16	1906	5	136	35
FLIP89-26L	688	41	75	49	1389	38	1209	41	316	6
FLIP89-27L	487	58	85	44	1364	41	1310	34	162	26
FLIP89-28L	943	16	75	51	1263	49	1485	22	144	33
FLIP89-29L	1078	10	75	50	1684	7	2352	1	200	14
FLIP89-30L	627	45	180	15	1282	46	740	64	99	44
FLIP89-31L	779	30	115	29	1396	37	1362	29	155	29
FLIP89-32L	1064	12	168	16	1654	9	1878	6	165	24
FLIP89-33L	984	13	65	59	1478	23	1145	46	200	13
FLIP89-34L	553	51	80	47	1512	18	933	57	191	17
FLIP89-35L	1470	2	105	35	1536	15	1509	21	377	2
FLIP89-36L	1466	3	380	2	1425	29	1771	9	92	47
FLIP89-37L	783	29	250	7	1874	3	1440	25	120	40
FLIP89-38L	586	48	165	17	1404	36	1612	14	98	45
FLIP90-15L	678	42	85	43	1154	55	1370	28	195	15
FLIP90-16L	1637	1	115	30	1878	2	1563	18	371	3
FLIP90-17L	934	19	210	11	1181	52	801	62	76	51
FLIP90-18L	475	62	120	25	1411	35	877	61	133	36

Cont'd. ...

Table 5.5.5. Cont'd. ...

Selection	PORTUGAL		SYRIA							
	Elvas		Aleppo+		Golline		Heimo		Idleb	
	Y	R	Y	R	Y	R	Y	R	Y	R
FLIP90-19L	579	49	60	60	1250	50	957	56	82	48
FLIP90-20L	715	36	150	21	1150	56	1353	31	30	62
FLIP90-21L	717	35	70	56	1430	26	1333	33	184	21
FLIP90-22L	921	21	150	20	1514	17	1152	45	188	18
FLIP90-23L	541	52	100	37	1429	27	1072	51	152	30
FLIP90-24L	697	39	80	45	1167	53	895	59	53	59
FLIP90-25L	1138	8	105	36	1423	30	1256	39	25	63
FLIP90-26L	1256	6	90	42	1775	5	1226	40	42	61
FLIP90-27L	488	57	100	38	1564	12	1519	20	66	56
FLIP90-28L	334	64	75	52	1455	25	793	63	139	34
FLIP90-29L	939	17	120	26	1348	42	1611	15	161	28
FLIP90-30L	596	46	220	9	1562	13	1870	7	267	7
FLIP90-31L	739	34	193	12	1426	28	1068	52	252	8
FLIP90-32L	767	31	155	18	1293	44	1166	44	82	49
FLIP90-33L	590	47	133	23	1411	34	968	55	194	16
FLIP90-34L	795	28	93	39	1131	58	1201	42	70	55
FLIP90-35L	760	32	110	31	1158	54	1144	47	63	57
FLIP90-36L	976	14	180	14	1371	40	1434	26	161	27
FLIP90-37L	530	53	45	64	1492	20	933	58	74	52
FLIP90-38L	674	43	65	57	1274	47	1344	32	177	22
FLIP90-39L	476	61	60	61	1457	24	1711	12	252	9
FLIP90-40L	510	55	115	28	1944	1	1358	30	129	38
FLIP90-41L	441	63	155	19	1860	4	1789	8	350	4
FLIP90-42L	935	18	65	58	1508	19	1274	38	115	42
FLIP90-43L	958	15	90	41	1422	31	1712	11	77	50
FLIP90-44L	932	20	125	24	1297	43	1384	27	56	58
LOCAL CHECK	882	25	215	10	1080	59	1767	10	73	53
Location Mean	806		135		1401		1366		155	
S.E. of Mean	168.13		58.61		175.36		213.52		72.52	
L.S.D. at 5%	477.65		165.59		498.20		606.61		206.04	
C.V. %	29.49		61.24		17.71		22.10		66.02	
Error df	49		63		49		49		49	
Significance	*		*		*		*		*	
Efficiency	121.77		-		101.50		194.31		160.96	
Test > Check	4		1		11		-		6	

Cont'd. ...

Table 5.5.5. Cont'd. ...

Selection	SYRIA		TUNISIA						TURKEY		(1) Overall Mean	
	Izra'a		Beja-I		Beja-II		El Kef		Diyarbakir+		Y	R
	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R
Local Small	550	63	185	61	160	57	236	53	1171	47	576	63
FLIP87-43L	1112	38	279	30	320	11	233	55	1141	49	709	60
FLIP88-21L	371	64	261	36	156	59	52	64	1751	5	886	17
FLIP88-29L	985	48	242	48	176	55	239	52	1263	37	715	58
FLIP88-51L	1273	23	330	9	364	4	308	32	807	62	722	56
FLIP89-11L	1238	27	195	59	329	8	110	63	843	61	840	29
FLIP89-12L	1253	25	280	29	242	38	327	28	1788	4	936	11
FLIP89-13L	1320	15	322	12	274	22	199	60	1353	27	883	18
FLIP89-14L	1160	33	309	19	318	13	316	30	1366	25	808	35
FLIP89-15L	1071	41	313	16	328	10	363	16	921	56	723	55
FLIP89-16L	1393	10	211	56	329	9	362	17	1271	35	909	16
FLIP89-17L	828	57	239	52	212	45	398	5	1350	28	786	41
FLIP89-18L	850	55	305	20	357	5	232	56	901	58	740	53
FLIP89-19L	1122	37	278	31	186	53	272	47	1216	43	873	21
FLIP89-20L	1073	40	207	58	288	17	257	50	908	57	829	31
FLIP89-21L	762	58	187	60	233	40	219	58	1602	11	878	20
FLIP89-22L	998	47	259	38	264	26	287	39	863	60	751	52
FLIP89-23L	1290	20	249	42	193	48	328	27	1299	34	867	22
FLIP89-24L	1397	9	300	22	300	15	489	1	1896	3	1047	1
FLIP89-25L	1296	18	252	40	242	39	379	13	1434	22	1006	4
FLIP89-26L	1211	29	261	35	282	18	281	43	928	54	760	51
FLIP89-27L	1303	16	315	14	231	41	335	26	1633	8	809	33
FLIP89-28L	952	50	242	47	197	47	306	34	1362	26	786	42
FLIP89-29L	735	60	168	62	290	16	367	14	1328	31	926	13
FLIP89-30L	909	52	234	53	190	52	270	48	1464	20	714	59
FLIP89-31L	1224	28	309	18	67	64	221	57	973	53	821	32
FLIP89-32L	1193	31	385	1	274	21	394	7	1561	13	964	7
FLIP89-33L	1350	13	268	33	273	24	351	20	1519	16	781	45
FLIP89-34L	970	49	209	57	192	49	397	6	1334	29	774	48
FLIP89-35L	888	54	242	49	156	58	429	3	1420	23	919	14
FLIP89-36L	1125	36	271	32	259	27	401	4	1914	2	943	10
FLIP89-37L	1771	1	243	46	256	32	465	2	1261	38	964	8
FLIP89-38L	1250	26	335	7	225	43	380	12	1011	52	784	43
FLIP90-15L	1406	8	217	55	356	6	284	42	927	55	783	44
FLIP90-16L	1590	2	314	15	399	1	385	11	1493	18	1014	2
FLIP90-17L	1052	44	288	27	176	56	349	24	1483	19	804	38
FLIP90-18L	1034	46	295	24	318	12	272	46	1193	46	774	47

Cont'd. ...

Table 5.5.5. Cont'd. ...

Selection	SYRIA		TUNISIA				TURKEY		Overall Mean (1)			
	Izra'a		Beja-I		Beja-II		El Kef				Diyarbakir+	
	Y	R	Y	R	Y	R	Y	R	Y	R		
FLIP90-19L	596	62	164	63	135	61	196	61	1121	50	663	62
FLIP90-20L	950	51	350	6	258	28	290	38	1218	42	718	57
FLIP90-21L	1048	45	260	37	275	20	351	21	1164	48	804	37
FLIP90-22L	1413	5	293	25	247	34	363	15	1222	41	864	23
FLIP90-23L	1159	34	361	5	374	3	297	37	1259	39	794	39
FLIP90-24L	1356	12	241	50	225	44	359	18	1316	33	730	54
FLIP90-25L	1293	19	241	51	258	29	321	29	1539	14	851	27
FLIP90-26L	1410	6	361	4	388	2	345	25	1674	6	986	6
FLIP90-27L	1406	7	361	3	244	35	387	9	1320	32	856	26
FLIP90-28L	833	56	250	41	310	14	307	33	1442	21	776	46
FLIP90-29L	1286	22	300	23	228	42	299	35	1653	7	999	5
FLIP90-30L	1266	24	321	13	346	7	387	10	1265	36	932	12
FLIP90-31L	1067	42	289	26	282	19	392	8	2028	1	861	24
FLIP90-32L	1064	43	244	45	190	51	349	23	1618	10	859	25
FLIP90-33L	1077	39	245	44	243	36	351	22	897	59	849	28
FLIP90-34L	1205	30	253	39	191	50	278	44	1259	40	827	50
FLIP90-35L	1165	32	248	43	269	25	312	31	1205	45	807	36
FLIP90-36L	1288	21	262	34	257	31	352	19	1620	9	882	19
FLIP90-37L	736	59	305	21	127	62	176	62	698	63	667	61
FLIP90-38L	1299	17	286	28	205	46	299	36	1376	24	808	34
FLIP90-39L	1359	11	324	11	274	23	216	59	1506	17	837	30
FLIP90-40L	1559	3	328	10	257	30	233	54	1572	12	948	9
FLIP90-41L	1343	14	367	2	254	33	276	45	1328	30	1007	3
FLIP90-42L	1136	35	224	54	118	63	260	49	1109	51	769	49
FLIP90-43L	1439	4	310	17	180	54	286	40	1526	15	917	15
FLIP90-44L	610	61	333	8	243	37	284	41	1213	44	787	40
LOCAL CHECK	908	53	88	64	143	60	242	51	670	64		
Location Mean	1134		272		249		308		1309			
S.E. of Mean	210.33		41.93		49.26		55.76		203.52			
L.S.D. at 5%	5987.54		119.11		139.96		158.42		575.05			
C.V. %	26.23		21.80		27.98		25.62		21.99			
Error df	49		49		49		49		63			
Significance	*		*		*		*		*			
Efficiency	100.64		155.41		152.81		116.34		-			
Test > Check	3		58		17		4		40			

+ Since the blocks (adjusted) MS is less than intra block MS, the RCB analysis is performed on the data and the means are unadjusted. (1) Ghinchi is excluded from the overall mean., \* = Significant at  $P < 0.05$ , NS = Not significant.  
 ‡ Not analysed due to incomplete data set or other reasons.

Table 5.5.6. The five heaviest seed yielding entries at the individual locations in the LISN-S during 1989/90.

Rank	<u>ETHIOPIA</u>	<u>JORDAN</u>		<u>LEBANON</u>	<u>PAKISTAN</u>	<u>PORTUGAL</u>	<u>SYRIA</u>
	Ghinchi	Jubeiha	Ramtha	Terbol	Faisalabad	Elvas	Aleppo
1	FLIP 89-36L	FLIP 89-37L	FLIP 88-21L	FLIP 90-27L	Local check	FLIP 90-16L	FLIP 89-25L
2	FLIP 88-29L	FLIP 90-33L	FLIP 90-29L	FLIP 89-35L	FLIP 90-17L	FLIP 89-35L	FLIP 89-36L
3	FLIP 89-25L	FLIP 90-41L	FLIP 89-21L	FLIP 90-41L	FLIP 90-28L	FLIP 89-36L	FLIP 89-21L
4	FLIP 89-30L	FLIP 89-12L	FLIP 89-19L	FLIP 89-32L	FLIP 89-25L	FLIP 89-24L	FLIP 89-13L
5	FLIP 90-28L	FLIP 89-20L	FLIP 90-22L	FLIP 90-38L	FLIP 90-37L	FLIP 88-21L	FLIP 89-23L
				FLIP 89-25L	FLIP 90-41L	FLIP 90-26L	FLIP 89-24L

Cont'd. ...

Rank	<u>SYRIA</u>				<u>TUNISIA</u>			<u>TURKEY</u>
	Gelline	Heimo	Idleb	Izra'a	Beja -I	Beja - II	El Kef	Diyarbakir
1	FLIP 90-40L	FLIP 89-29L	FLIP 89-21L	FLIP 89-37L	FLIP 89-32L	FLIP 90-16L	FLIP 89-24L	FLIP 90-31L
2	FLIP 90-16L	FLIP 89-21L	FLIP 89-35L	FLIP 90-16L	FLIP 90-41L	FLIP 90-26L	FLIP 89-37L	FLIP 89-36L
3	FLIP 89-37L	FLIP 89-24L	FLIP 90-16L	FLIP 90-40L	FLIP 90-27L	FLIP 90-23L	FLIP 89-35L	FLIP 89-24L
4	FLIP 90-41L	FLIP 89-23L	FLIP 90-41L	FLIP 90-43L	FLIP 90-26L	FLIP 88-51L	FLIP 89-36L	FLIP 89-12L
5	FLIP 90-26L	FLIP 89-25L	Local small	FLIP 90-22L	FLIP 90-23L	FLIP 89-18L	FLIP 89-17L	FLIP 88-21L
	FLIP 89-11L			FLIP 90-26L	FLIP 90-20L	FLIP 90-15L	FLIP 89-34L	
				FLIP 90-27L	FLIP 89-38L			
					FLIP 90-44L			
					FLIP 88-51L			

The brackets indicate entries having the same rank.

The performance of entries (Table 5.5.5) at Terbol in Lebanon was the best with average seed yield of 1878 kg/ha. The seed yields were very poor at Aleppo, Idleb and Tel Hadya in Syria; Ghinchi in Ethiopia, Beja and El Kef in Tunisia. The ANOVA for the experiment revealed that at 11 out of 15 locations reporting seed yield some of the test entries, outyielded the respective local checks by significant margins. The entry means over all locations revealed that FLIP 89-24L was the top yielder with an average yield of 1047 kg/ha and was followed by FLIP 90-16L, FLIP 90-41L, FLIP 89-25L, FLIP 90-29L, and FLIP 90-26L with seed yield of 1014, 1007, 1006, 999, 986 kg/ha, respectively.

The five heaviest seed yielding entries at different locations are given in Table 5.5.6. The entries FLIP 90-41L and FLIP 90-26L occurred most frequently among the top five heavy yielders.

## **5.6. LENTIL INTERNATIONAL SCREENING NURSERY - EARLY (LISN-E)**

### **Material**

The material for the Lentil International Screening Nursery - Early comprised of 35 test entries and one local check which was to be added by the cooperator. Thirty three entries originated from the hybridization and were the selections from the progenies developed at ICARDA.

### **Methods and Management**

The material comprising 36 entries was suggested to be sown in a simple 6X6 lattice design with two replications. Each entry was sown in single row plots of 4 m length. The spacings between the rows were suggested to be 25 cm.

Forty six sets of screening nursery were supplied to cooperators in 21 countries and the data were received for 20 sets from 11 countries. The data on agronomic characters received from the cooperators are presented in Table 5.6.1.

### **Results and Discussion**

The location mean for time to flowering (Table 5.6.2) ranged from 46 days for Debre Zeit in Ethiopia to 138 days for Ramtha in Jordan. At a large number of the locations the location mean for time to flowering was almost same or earlier to that of the respective local check. This revealed that a large number of the test entries supplied in this trial were earlier in flowering. Among the entries Precoz, FLIP 88-40L, and FLIP 89-60L were the earliest in flowering (92 days) and were closely followed by FLIP 88-42L, FLIP 88-41L, FLIP 88-46L, and FLIP 89-47L.

The location means for time to maturity (Table 5.6.3) ranged from 110 days at Setif in Algeria to 186 days at Ramtha in Jordan. The overall entry means revealed that the entry FLIP 89-54L was earliest in maturity (150 days) and was followed by FLIP 89-60L and FLIP 88-36L (Table 5.6.4).



Table 5.6.1. Agronomic data for different locations in the LISN-E during 1989/90.

Country	Location	Planting Date	Harvesting Date	Fertilizer (kg/ha)			Irrigation	Insecticide/Fungicide Herbicide	Local check
				N	P	K			
ALGERIA	Guelma	18.11.1989	11.06.1990	-	200	-	-	-	Syrie 229
ALGERIA	Khroub	17.12.1989	27.06.1990	-	45	-	-	Treflan	Syrie 229
ALGERIA	Setif	18.12.1989	16.06.1990	-	100	-	-	Trifluralin	Setif 618
BANGLADESH	Mymensingh	28.11.1989	22.04.1990	-	-	-	-	-	Bm 502
ETHIOPIA	Debre Zeit	17.07.1990	NA	-	-	-	-	-	EL -142
ETHIOPIA	Ghinchi	17.08.1990	10.01.1991	-	-	-	-	-	NA
GREECE	Larissa	01.12.1989	16.05.1990	-	60	-	-	Decamethrin	Dimitza
INDIA	New Delhi	07.12.1989	10.04.1990	20	40	-	1	Stomp, Metasystox	NA
JORDAN	Jubeiha	29.11.1989	NA	20	40	-	-	-	Jordan -1
JORDAN	Ramtha	05.11.1989	NA	20	40	-	-	-	Jordan -1
PAKISTAN	Faisalabad (NIAB)	06.11.1989	05.05.1990	20	60	-	-	-	Masobr 85
PAKISTAN	Faisalabad (UAF)	10.11.1989	24.04.1990	80	57	-	2	Malathion	V 25
PAKISTAN	Islamabad	22.11.1989	30.04.1990	-	-	-	-	-	Masoor 85
PORTUGAL	Elvas	09.11.1989	23.05.1990	-	60	60	-	-	L -188
SYRIA	Tel Hadya	29.11.1989	05.06.1990	-	50	-	-	Fortrol, Kerb	L.S.
TUNISIA	Beja -I	NA	NA	NA	NA	NA	NA	NA	NA
TUNISIA	Beja -II	NA	NA	NA	NA	NA	NA	NA	NA
TUNISIA	El Kef	NA	NA	NA	NA	NA	NA	NA	NA
TURKEY	Ankara	NA	NA	NA	NA	NA	NA	NA	NA
TURKEY	Eskisehir	NA	NA	NA	NA	NA	NA	NA	Sultan -1

NA = Not available

Table 5.6.2. Adjusted time to flowering (days) of entries at different locations in the LISN-E during 1989/90.

Selection	ILL	Origin	ALGERIA			BANGLADESH	ETHIOPIA	
			Guelma	Khroub	Setif+	Mymensingh+	Debre Zeit	Ghinchi
EL 42	1712	Ethiopia	112	105	85	94	45	63
Precoz	4605	Argentina	101	104	65	62	47	58
FLIP87- 66L	6256	ICARDA	119	110	91	78	45	59
FLIP87- 70L	6260	ICARDA	62	104	65	77	46	62
FLIP87- 72L	6262	ICARDA	113	108	61	91	44	57
FLIP88- 34L	6458	ICARDA	112	103	61	91	44	56
FLIP88- 35L	6459	ICARDA	112	103	63	72	40	57
FLIP88- 36L	6460	ICARDA	112	110	65	93	48	61
FLIP88- 40L	6464	ICARDA	100	106	61	59	46	60
FLIP88- 41L	6465	ICARDA	101	108	61	65	47	58
FLIP88- 42L	6466	ICARDA	99	103	72	67	46	54
FLIP88- 46L	6470	ICARDA	102	104	63	64	46	59
FLIP88- 47L	6471	ICARDA	102	104	63	68	46	59
FLIP89- 47L	6805	ICARDA	63	105	65	83	47	57
FLIP89- 49L	6807	ICARDA	113	108	65	78	49	99
FLIP89- 50L	6808	ICARDA	119	111	63	91	56	103
FLIP89- 52L	6810	ICARDA	121	106	85	88	50	88
FLIP89- 53L	6811	ICARDA	119	112	85	81	45	60
FLIP89- 54L	6812	ICARDA	112	108	65	77	48	62
FLIP89- 55L	6813	ICARDA	112	107	65	94	45	63
FLIP89- 56L	6814	ICARDA	114	109	65	85	47	65
FLIP89- 57L	6815	ICARDA	114	111	78	79	50	65
FLIP89- 58L	6816	ICARDA	120	111	65	90	41	58
FLIP89- 59L	6917	ICARDA	115	110	85	73	47	64
FLIP89- 60L	6818	ICARDA	63	107	72	67	40	54
FLIP89- 61L	6819	ICARDA	120	111	85	91	57	70
FLIP89- 62L	6820	ICARDA	114	109	85	77	46	62
FLIP89- 65L	6823	ICARDA	115	106	75	79	46	65
FLIP89- 66L	6824	ICARDA	119	110	65	94	39	62
FLIP89- 67L	6825	ICARDA	119	112	75	78	47	60
FLIP89- 68L	6826	ICARDA	112	108	85	90	50	67
FLIP89- 69L	6827	ICARDA	119	107	85	77	45	59
FLIP89- 70L	6828	ICARDA	115	110	65	77	40	60
FLIP89- 71L	6829	ICARDA	119	111	72	78	44	60
FLIP89- 72L	6830	ICARDA	114	104	65	75	41	59
Local check	-		119	113	92	49	48	99
Location Mean			109	108	72	79	46	65
S.E. of Mean			13.98	#	3.17	4.02	21.60	#
L.S.D. at 5%			-	#	9.09	11.53	4.66	#
C.V. (%)			18.20		6.24	7.23	4.90	#
Error df			25	#	35	35	25	#
Significance			NS		*	*	*	

Cont'd. ...

Table 5.6.2. Cont'd. ...

Selection	GREECE	INDIA	JORDAN		PAKISTAN ( Faisalabad)		PORTUGAL	(1)
	Larissa	New Delhi	Jubeiha	Ramtha	UAF+	HIAB	Elvas+	Overall Mean
EL 42	124	87	131	137	107	108	127	103
Precox	123	95	122	137	78	103	107	92
FLIP87- 66L	125	97	133	139	106	112	129	104
FLIP87- 70L	120	84	130	138	99	107	126	95
FLIP87- 72L	121	91	130	138	109	105	122	100
FLIP88- 34L	121	90	129	138	106	104	127	99
FLIP88- 35L	119	90	129	137	104	108	124	97
FLIP88- 36L	117	80	131	139	98	109	126	101
FLIP88- 40L	121	70	122	139	80	103	111	92
FLIP88- 41L	122	70	122	137	85	110	110	94
FLIP88- 42L	123	93	126	137	78	108	107	93
FLIP88- 46L	123	75	122	138	86	108	111	94
FLIP88- 47L	123	85	123	139	88	111	111	95
FLIP89- 47L	122	85	126	137	96	104	124	94
FLIP89- 49L	118	-	125	137	102	112	126	103
FLIP89- 50L	126	95	133	138	122	112	126	108
FLIP89- 52L	121	98	130	138	106	112	130	106
FLIP89- 53L	127	88	134	137	106	106	131	103
FLIP89- 54L	120	90	123	138	100	113	122	99
FLIP89- 55L	121	68	132	138	102	111	125	101
FLIP89- 56L	124	-	130	138	106	107	127	101
FLIP89- 57L	122	97	130	136	104	114	124	102
FLIP89- 58L	127	93	131	138	108	115	129	103
FLIP89- 59L	123	87	130	137	100	116	130	103
FLIP89- 60L	120	94	125	137	91	107	122	92
FLIP89- 61L	126	99	130	138	102	114	125	106
FLIP89- 62L	119	70	126	139	102	110	130	102
FLIP89- 65L	121	90	132	138	108	115	129	102
FLIP89- 66L	122	93	131	138	108	115	129	103
FLIP89- 67L	125	90	131	137	107	113	128	103
FLIP89- 68L	118	95	126	137	106	107	125	102
FLIP89- 69L	125	92	131	137	111	112	130	103
FLIP89- 70L	124	85	132	139	101	113	127	100
FLIP89- 71L	127	93	132	137	106	111	129	102
FLIP89- 72L	123	80	132	136	92	105	125	98
Local check	131	87	132	137	96	106	129	
Location Mean	123	88	129	138	100	110	124	
S.E. of Mean	1.10	#	1.63	0.76	0.82	2.61	0.91	
L.S.D. at 5%	3.20	#	4.76	2.21	2.35	7.61	2.62	
C.V. (%)	1.27	#	1.79	0.78	1.16	3.37	1.05	
Error df	25	#	25	25	35	25	35	
Significance	*	#	*	*	*	*	*	

+ Since the blocks (adjusted) MS is less than intra block MS, the RCB analysis is performed on the data and the means are unadjusted. (1) New Delhi was excluded from the overall mean. \* = Significant at  $p \leq 0.05$ , NS = Not significant.

# Not analysed due to incomplete data set or other reasons.

Table 5.6.3. Adjusted time to maturity (days) of entries at different locations in the LISN-E during 1989/90.

Selection	ALGERIA			BANGLADESH	ETHIOPIA	GREECE	INDIA
	Guelma	Khrub	Setif	Mynensingh	Ghinchi	Larissa	New Delhi
EL 42	171	160	121	135	116	157	130
Precox	171	154	114	135	108	163	135
FLIP87- 66L	171	162	120	133	106	161	137
FLIP87- 70L	165	154	90	134	119	159	125
FLIP87- 72L	185	162	129	140	123	164	137
FLIP88- 34L	172	163	115	132	111	158	135
FLIP88- 35L	172	166	128	133	123	160	135
FLIP88- 36L	165	159	90	135	108	154	130
FLIP88- 40L	165	156	128	131	108	162	127
FLIP88- 41L	171	161	126	131	108	163	124
FLIP88- 42L	185	157	115	133	108	164	132
FLIP88- 46L	165	155	121	131	106	162	120
FLIP88- 47L	171	155	118	133	106	161	137
FLIP89- 47L	171	171	105	131	109	159	138
FLIP89- 49L	185	163	129	134	108	162	-
FLIP89- 50L	185	162	117	140	137	163	132
FLIP89- 52L	171	160	115	147	140	157	127
FLIP89- 53L	171	163	126	134	123	161	132
FLIP89- 54L	171	160	90	120	109	156	132
FLIP89- 55L	171	160	90	135	109	156	116
FLIP89- 56L	165	159	115	139	109	156	-
FLIP89- 57L	171	158	90	135	109	158	138
FLIP89- 58L	171	162	91	135	138	160	139
FLIP89- 59L	185	171	116	133	115	158	129
FLIP89- 60L	171	159	91	121	108	158	130
FLIP89- 61L	171	159	90	133	124	160	140
FLIP89- 62L	171	161	124	135	117	161	115
FLIP89- 65L	171	159	90	135	125	162	140
FLIP89- 66L	185	162	115	134	126	161	133
FLIP89- 67L	171	163	115	135	123	162	135
FLIP89- 68L	165	159	114	140	110	157	140
FLIP89- 69L	171	161	115	135	107	162	132
FLIP89- 70L	165	159	90	131	109	161	129
FLIP89- 71L	171	161	89	133	125	162	126
FLIP89- 72L	171	160	90	132	110	162	127
Local check	185	175	132	131	110	169	125
Location Mean	173	161	110	134	115	160	128
S.E. of Mean	0.04	#	2.67	1.72	#	0.82	#
L.S.D. at 5%	0.12	#	7.79	5.01	#	2.39	#
C.V. (%)	0.03	#	3.44	1.82	#	0.72	#
Error df	25	#	25	25	#	25	#
Significance	*	#	*	*	#	*	#

Cont'd. ...

Table 5.6.3. Cont'd. ...

Selection	JORDAN		PAKISTAN			PORTUGAL	(1)
	Jubeiha	Ramtha	UAF	NIAB+	Islamabad	Elvas	Overall Mean
EL 42	176	184	156	162	150	180	156
Precoc	174	185	156	142	146	185	153
FLIP87- 66L	174	189	156	163	147	188	156
FLIP87- 70L	173	185	156	156	151	185	152
FLIP87- 72L	175	185	152	165	156	183	160
FLIP88- 34L	172	184	156	166	144	182	155
FLIP88- 35L	174	187	156	165	148	188	158
FLIP88- 36L	172	186	157	155	150	181	151
FLIP88- 40L	173	185	152	147	145	193	154
FLIP88- 41L	174	187	154	146	148	190	155
FLIP88- 42L	176	184	158	137	144	184	154
FLIP88- 46L	174	184	156	141	147	180	152
FLIP88- 47L	176	187	154	145	152	194	154
FLIP89- 47L	172	186	154	159	149	182	154
FLIP89- 49L	173	188	152	161	151	185	158
FLIP89- 50L	173	185	157	167	153	193	161
FLIP89- 52L	172	185	154	167	153	182	158
FLIP89- 53L	173	185	152	163	147	179	156
FLIP89- 54L	174	184	154	159	149	178	150
FLIP89- 55L	173	187	154	158	152	178	152
FLIP89- 56L	172	186	156	159	149	187	154
FLIP89- 57L	172	184	156	160	151	189	153
FLIP89- 58L	173	188	154	166	160	180	156
FLIP89- 59L	173	188	154	161	161	188	158
FLIP89- 60L	171	185	156	160	150	178	151
FLIP89- 61L	173	185	154	165	154	176	154
FLIP89- 62L	172	186	154	162	150	192	157
FLIP89- 65L	174	184	158	159	149	186	154
FLIP89- 66L	174	185	156	163	153	189	159
FLIP89- 67L	173	185	154	166	157	184	157
FLIP89- 68L	174	186	154	159	150	187	155
FLIP89- 69L	174	185	154	167	154	189	156
FLIP89- 70L	174	187	154	164	157	186	153
FLIP89- 71L	173	185	156	165	145	177	153
FLIP89- 72L	172	185	154	157	152	181	152
Local check	175	184	152	159	145	190	
Location Mean	173	186	155	158	151	185	
S.E. of Mean	0.91	1.19	0.04	0.83	3.00	1.48	
L.S.D. at 5%	2.65	3.48	0.13	2.39	8.75	4.30	
C.V. (%)	0.74	0.91	0.04	0.74	2.82	1.13	
Error df	25	25	25	35	25	25	
Significance	*	*	*	*	*	*	

+ Since the blocks (adjusted) MS is less than intra block MS, the RCB analysis is performed on the data and the means are unadjusted. (1) New Delhi was excluded from the overall mean. \* = Significant at  $P < 0.05$ , NS = Not significant.

‡ Not analysed due to incomplete data set or other reasons.

Table 5.6.4. Adjusted plant height (cm) of entries at different locations in the LISN-E during 1989/90.

Selection	ALGERIA			BANGLADESH	ETHIOPIA	GREECE
	Guelma	Khroub	Setif	Mymensingh	Ghinchi	Larissa
KL 42	40	21	25	44	24	23
Pracox	30	20	16	63	21	21
FLIP87- 66L	36	18	23	48	23	22
FLIP87- 70L	29	14	10	38	18	20
FLIP87- 72L	35	17	20	46	23	21
FLIP88- 34L	34	19	20	42	19	16
FLIP88- 35L	35	20	10	38	18	17
FLIP88- 36L	37	20	25	36	21	20
FLIP88- 40L	39	22	25	47	23	21
FLIP88- 41L	36	12	10	34	21	21
FLIP88- 42L	37	17	18	35	20	21
FLIP88- 46L	36	24	20	37	21	20
FLIP88- 47L	40	23	22	33	22	23
FLIP89- 47L	25	17	13	37	17	17
FLIP89- 49L	35	17	17	46	19	21
FLIP89- 50L	40	20	18	36	24	22
FLIP89- 52L	40	17	10	37	18	19
FLIP89- 53L	39	21	22	51	-	23
FLIP89- 54L	35	16	17	41	20	19
FLIP89- 55L	40	16	17	41	19	18
FLIP89- 56L	33	18	24	43	17	18
FLIP89- 57L	30	20	20	40	20	17
FLIP89- 58L	28	15	15	39	17	17
FLIP89- 59L	30	14	15	42	21	18
FLIP89- 60L	33	16	17	43	17	17
FLIP89- 61L	35	14	15	54	19	19
FLIP89- 62L	40	20	22	47	28	22
FLIP89- 65L	39	18	15	56	25	21
FLIP89- 66L	35	14	20	44	20	19
FLIP89- 67L	35	18	20	57	27	22
FLIP89- 68L	39	15	16	50	20	20
FLIP89- 69L	36	19	25	49	22	23
FLIP89- 70L	38	20	18	51	-	19
FLIP89- 71L	33	21	18	42	22	20
FLIP89- 72L	39	24	25	38	23	21
Local check	40	23	25	36	23	20
Location Mean	36	18	19	43	21	20
S.E. of Mean	0.03	#	2.60	3.12	#	1.40
L.S.D. at 5%	0.10	#	7.56	9.10	#	4.07
C.V. (%)	0.13	#	19.84	10.19	#	9.94
Error df	25	#	25	25	#	25
Significance	*		*	*		*

Cont'd. ...

Table 5.6.4. Cont'd. ...

Selection	INDIA	JORDAN		PAKISTAN	PORTUGAL	(1)
	New Delhi	Jubeiha	Ramtha	Faisalabad(NIAB)	Elvas+	Overall Mean
EL 42	37	44	25	68	45	37
Precoz	40	34	29	45	42	33
FLIP87- 66L	37	43	26	72	42	37
FLIP87- 70L	35	34	31	52	35	29
FLIP87- 72L	45	37	26	60	39	33
FLIP88- 34L	40	35	26	57	33	31
FLIP88- 35L	31	37	26	65	35	31
FLIP88- 36L	38	40	24	47	41	32
FLIP88- 40L	33	46	26	46	42	35
FLIP88- 41L	28	38	29	58	42	31
FLIP88- 42L	45	39	31	44	39	31
FLIP88- 46L	29	45	22	46	38	32
FLIP88- 47L	28	45	24	61	41	35
FLIP89- 47L	34	37	26	53	36	29
FLIP89- 49L	-	37	32	55	38	33
FLIP89- 50L	35	43	26	58	41	34
FLIP89- 52L	35	35	26	57	38	31
FLIP89- 53L	36	41	31	74	39	38
FLIP89- 54L	40	41	28	59	38	32
FLIP89- 55L	30	38	30	64	37	33
FLIP89- 56L	-	43	23	47	44	32
FLIP89- 57L	28	43	29	59	37	33
FLIP89- 58L	32	36	26	53	37	30
FLIP89- 59L	32	42	24	55	35	31
FLIP89- 60L	38	36	27	44	36	30
FLIP89- 61L	34	35	30	50	39	32
FLIP89- 62L	32	35	23	68	44	36
FLIP89- 65L	45	40	27	56	45	35
FLIP89- 66L	35	38	25	63	36	33
FLIP89- 67L	32	38	30	72	36	36
FLIP89- 68L	45	34	25	56	40	33
FLIP89- 69L	28	40	28	61	39	35
FLIP89- 70L	32	34	31	53	38	34
FLIP89- 71L	34	34	29	74	35	34
FLIP89- 72L	29	38	29	63	38	35
Local check	33	49	28	66	42	
Location Mean	35	39	27	58	39	
S.E. of Mean		3.49	2.21	1.69	1.09	
L.S.D. at 5%	#	10.18	-	4.93	-	
C.V. (%)	#	12.70	11.54	4.15	3.97	
Error df	#	25	25	25	35	
Significance		*	NS	*	NS	

+ Since the blocks (adjusted) MS is less than intra block MS, the RCB analysis is performed on the data and the means are unadjusted. (1) Ghinchi and New Delhi were excluded from the overall mean. \* = Significant at  $p \leq 0.05$ , NS = Not significant.  
# Not analysed due to incomplete data set or other reasons.

Table 5.6.5. Adjusted seed yield (Y=kg/ha) and rank (R) of entries at different locations in the LISN-E during 19989/90.

Selection	ALGERIA				BANGLADESH		ETHIOPIA		GREECE		INDIA	
	Guelma		Setif		Mymensingh		Ghinchi		Larissa		New Delhi	
	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R
BL 42	1375	33	858	13	100	29	250	20	255	24	267	22
Precox	1625	26	957	7	257	21	338	9	851	3	67	31
FLIP87- 66L	2125	8	932	9	1048	2	225	23	758	5	333	18
FLIP87- 70L	1875	16	471	32	1187	1	131	29	144	29	1067	3
FLIP87- 72L	2126	7	987	5	103	28	188	26	704	7	1067	5
FLIP88- 34L	2750	1	742	22	818	7	306	13	147	28	1333	1
FLIP88- 35L	1500	30	950	8	507	14	381	7	253	25	133	26
FLIP88- 36L	2188	6	828	15	123	24	631	3	36	36	67	32
FLIP88- 40L	1750	23	958	6	155	23	281	15	666	8	200	25
FLIP88- 41L	1500	31	818	16	57	36	125	31	898	1	67	33
FLIP88- 42L	437	36	325	36	64	35	119	33	598	12	800	8
FLIP88- 46L	1625	29	865	12	361	18	888	2	731	6	-	-
FLIP88- 47L	1750	21	800	18	88	32	313	12	655	9	133	28
FLIP89- 47L	2626	3	882	11	630	10	263	19	357	20	1067	4
FLIP89- 49L	1750	25	468	33	781	8	238	21	454	16	-	-
FLIP89- 50L	2125	10	1084	3	92	31	125	32	648	10	400	14
FLIP89- 52L	1625	28	621	26	68	34	113	34	302	21	933	7
FLIP89- 53L	2750	2	1285	2	734	9	181	27	828	4	267	21
FLIP89- 54L	1250	35	585	28	98	30	263	18	70	34	267	24
FLIP89- 55L	1750	22	797	19	78	33	350	8	121	32	133	29
FLIP89- 56L	1875	17	789	20	110	26	313	11	95	33	-	-
FLIP89- 57L	2063	12	917	10	168	22	-	-	67	35	333	17
FLIP89- 58L	2624	4	850	14	326	20	125	30	425	18	533	12
FLIP89- 59L	1750	24	515	31	543	11	294	14	130	31	133	30
FLIP89- 60L	1875	13	597	27	503	15	431	5	204	27	133	27
FLIP89- 61L	1875	14	994	4	531	12	213	25	623	11	267	23
FLIP89- 62L	1875	18	663	24	513	13	463	4	253	26	1200	2
FLIP89- 65L	1251	34	550	29	104	27	275	17	448	17	400	15
FLIP89- 66L	2125	11	535	30	465	16	100	35	270	23	533	13
FLIP89- 67L	1875	19	400	35	1045	3	413	6	501	14	400	16
FLIP89- 68L	2125	9	637	25	328	19	319	10	131	30	667	11
FLIP89- 69L	1875	15	763	21	888	4	163	28	505	13	1000	6
FLIP89- 70L	1625	27	676	23	376	17	275	16	473	15	267	19
FLIP89- 71L	1750	20	803	17	871	5	219	24	424	19	667	10
FLIP89- 72L	1375	32	467	34	111	25	238	22	296	22	267	20
Local check	2500	5	1796	1	838	6	1225	1	871	2	800	9
Location Mean	1859		782		419		308		422		491	
S.E. of Mean	0.22		3.87		108.12		#		108.27		#	
L.S.D. at 5%	0.64		448.20		314.94		#		315.38		#	
C.V. (%)	0.02		27.81		36.54		#		36.29		#	
Error df	25		25		25		#		25		#	
Significance	*		*		*		#		*		#	
Efficiency	151		128		101				100			
Test > L. Check	4		0		1				0			

Cont'd. . .



Table 5.6.5. Cont'd. ...

Selection	JORDAN				PAKISTAN						PORTUGAL	
	Jubeiha+		Ramtha		Faisalabad(UAF)		Faisalabad(NIAB)+		Islamabad		Elvas	
	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R
EL 42	1185	11	382	27	1495	20	969	34	143	32	725	16
Precox	781	27	1109	6	1787	12	1656	14	1101	7	1228	4
FLIP87- 66L	1285	8	1041	7	1300	29	1594	17	628	15	1023	7
FLIP87- 70L	989	24	608	20	1821	10	1938	10	414	23	593	23
FLIP87- 72L	1425	6	385	26	1783	13	1781	13	498	20	1564	1
FLIP88- 34L	850	26	595	22	1508	19	2188	5	1011	10	390	35
FLIP88- 35L	1115	15	1248	3	1358	25	1188	28	2108	2	580	27
FLIP88- 36L	1556	5	769	15	1369	24	1219	27	-	-	430	34
FLIP88- 40L	998	23	775	14	1902	7	1313	23	746	14	1092	5
FLIP88- 41L	1062	19	1114	5	2104	3	1313	24	1158	6	791	13
FLIP88- 42L	1071	18	1437	1	1515	18	1250	26	1036	9	440	33
FLIP88- 46L	1186	10	305	29	1641	16	1656	15	-	-	760	15
FLIP88- 47L	1177	13	854	11	1668	15	1625	16	600	18	1077	6
FLIP89- 47L	1098	16	768	16	1320	28	2156	6	420	22	584	25
FLIP89- 49L	552	33	239	33	1955	6	1469	20	870	13	889	11
FLIP89- 50L	2123	1	998	9	1335	27	1031	33	345	27	1424	2
FLIP89- 52L	1300	7	1031	8	1834	9	1188	30	1725	4	703	17
FLIP89- 53L	1703	4	803	12	1958	5	1781	12	1782	3	842	12
FLIP89- 54L	552	34	885	10	422	36	1375	22	582	19	594	22
FLIP89- 55L	762	28	629	18	1422	22	1188	29	191	30	569	29
FLIP89- 56L	316	36	716	17	1796	11	688	36	888	12	592	24
FLIP89- 57L	1281	9	293	30	1488	21	938	35	-	-	500	32
FLIP89- 58L	1179	12	593	23	1114	33	2438	3	617	16	902	10
FLIP89- 59L	1059	20	227	35	2068	4	1500	18	423	21	583	26
FLIP89- 60L	948	25	481	25	1168	32	2125	7	1037	8	579	28
FLIP89- 61L	1040	21	1350	2	1377	23	2031	9	1164	5	501	31
FLIP89- 62L	730	29	271	31	1338	26	1156	31	2369	1	911	9
FLIP89- 65L	1092	17	603	21	974	34	1250	25	359	26	665	19
FLIP89- 66L	716	30	244	32	1578	17	1500	19	607	17	530	30
FLIP89- 67L	608	32	520	24	2228	2	2125	8	205	29	692	18
FLIP89- 68L	1004	22	793	13	937	35	1125	32	166	31	614	21
FLIP89- 69L	1131	14	185	36	1270	31	1906	11	908	11	912	8
FLIP89- 70L	445	35	381	28	1781	14	2406	4	340	28	638	20
FLIP89- 71L	1882	3	227	34	2307	1	2625	2	367	25	761	14
FLIP89- 72L	654	31	619	19	1297	30	1406	21	-	-	359	36
Local check	1961	2	1177	4	1869	8	2656	1	373	24	1307	3
<b>Location Mean</b>	<b>1078</b>		<b>685</b>		<b>1558</b>		<b>1604</b>		<b>787</b>		<b>759</b>	
S.E. of Mean	324.89		247.52		315.26		102.55		221.41		248.13	
L.S. .D at 5%	-		720.99		918.29		294.35		644.91		-	
C.V. (%)	432.662		51.12		28.62		9.04		46.67		46.20	
Error df	35		25		25		35		25		25	
Significance	NS		*		*		*		*		NS	
Efficiency	-		106		107		-		359		-	
Test > L. Check	-		0		0		0		9		-	

Cont'd. ...

Table 5.6.5. Cont'd. ...

Selection	TUNISIA						TURKEY		(1) Overall Mean	
	Beja I		Beja II		El Kef+		Eskisehier		Y	R
	Y	R	Y	R	Y	R	Y	R		
EL 42	106	34	244	32	348	19	500	20	620	32
Pracoz	291	13	423	1	368	16	943	7	955	3
FLIP87- 66L	228	24	313	15	393	8	514	19	942	5
FLIP87- 70L	109	33	189	34	343	20	401	28	791	19
FLIP87- 72L	243	21	391	2	380	14	716	12	935	8
FLIP88- 34L	350	6	282	20	338	22	286	36	875	12
FLIP88- 35L	309	11	351	8	438	2	734	9	903	10
FLIP88- 36L	310	10	259	27	358	18	639	14	714	24
FLIP88- 40L	176	30	330	11	385	10	974	6	873	13
FLIP88- 41L	260	18	268	24	250	36	1059	4	904	9
FLIP88- 42L	218	26	261	26	300	33	999	5	711	25
FLIP88- 46L	411	2	387	4	383	12	722	11	765	21
FLIP88- 47L	385	3	345	9	374	15	745	8	867	14
FLIP89- 47L	190	28	271	22	393	9	408	26	864	15
FLIP89- 49L	177	29	282	19	323	30	294	34	750	22
FLIP89- 50L	383	4	389	3	430	4	1165	3	969	2
FLIP89- 52L	325	8	372	7	420	5	1659	2	941	7
FLIP89- 53L	459	1	384	5	433	3	733	10	1177	1
FLIP89- 54L	225	25	277	21	330	27	322	33	541	35
FLIP89- 55L	305	12	325	12	415	6	359	30	636	30
FLIP89- 56L	176	31	306	17	385	11	351	31	649	29
FLIP89- 57L	146	32	259	28	380	13	586	17	621	31
FLIP89- 58L	263	16	257	29	315	31	616	16	894	11
FLIP89- 59L	37	36	270	23	305	32	291	35	693	27
FLIP89- 60L	257	19	308	16	325	28	639	13	789	20
FLIP89- 61L	349	7	319	14	445	1	576	18	941	6
FLIP89- 62L	314	9	323	13	325	29	412	24	818	17
FLIP89- 65L	213	27	267	25	398	7	351	32	609	33
FLIP89- 66L	261	17	255	30	288	34	398	29	698	26
FLIP89- 67L	236	22	179	35	335	25	447	23	814	18
FLIP89- 68L	277	14	332	10	333	26	626	15	673	28
FLIP89- 69L	231	23	248	31	340	21	471	22	831	16
FLIP89- 70L	68	35	145	36	280	35	479	21	722	23
FLIP89- 71L	268	15	303	18	338	23	403	27	952	4
FLIP89- 72L	366	5	383	6	363	17	410	25	562	34
Local check	246	20	223	33	335	24	2074	1		
Location Mean	255		298		358		647			
S.E. of Mean	49.46		42.81		38.65		203.83			
L.S.D. at 5%	144.06		124.69		-		593.71			
C.V. (%)	27.46		20.33		15.27		44.54			
Error df	25		25		35		25			
Significance	*		*		NS		*			
Efficiency	103		107		-		124			
Test > L. Check	2		8		-		0			

+ Since the blocks (adjusted) MS is less than intra block MS, the RCBD analysis is performed on the data and the means are unadjusted. (1) Ghinchi and Now Delhi were excluded from the overall mean. \* = Significant at  $p < 0.05$ , NS = Not significant.  
 † Not analysed due to incomplete data set or other reasons.

Table 5.6.6. the five heaviest seed yielding entries at the individual locations in the LISN-E during 1989/90.

Rank	ALGERIA		BANGLADESH	ETHIOPIA	GREECE	INDIA	JORDAN	
	Guelma	Setif	Mymensingh	Ghinchi	Larissa	New Delhi	Jubeiha	Ramtha
1	FLIP 88-34L	Local check	FLIP 87-70L	Local check	FLIP 88-41L	FLIP 88-34L	FLIP 89-50L	FLIP 88-42L
2	FLIP 89-53L	FLIP 89-53L	FLIP 87-66L	FLIP 88-46L	Local check	FLIP 89-62L	Local check	FLIP 89-61L
3	FLIP 89-47L	FLIP 89-50L	FLIP 89-67L	FLIP 88-36L	Precoz	FLIP 87-70L	FLIP 89-71L	FLIP 88-35L
4	FLIP 89-58L	FLIP 89-61L	FLIP 89-69L	FLIP 89-62L	FLIP 89-53L	FLIP 89-47L	FLIP 89-53L	Local check
5	Local check	FLIP 87-72L	FLIP 89-71L	FLIP 89-60L	FLIP 87-66L	FLIP 87-72L	FLIP 88-36L	FLIP 88-41L
	FLIP 88-36L		Local check			FLIP 89-69L		
	FLIP 87-72L					FLIP 89-52L		

Cont'd. ...

Rank	PAKISTAN			PORTUGAL	TUNISIA		TURKEY	
	Faisalabad (UAF)	Faisalabad (NIAB)	Islamabad	Elvas	Beja -I	Beja -II	El Kef	Eskisehir
1	FLIP 89-71L	Local check	FLIP 89-62L	FLIP 87-72L	FLIP 89-53L	Precoz	FLIP 89-61L	Local check
2	FLIP 89-67L	FLIP 89-71L	FLIP 88-35L	FLIP 89-50L	FLIP 88-46L	FLIP 87-72L	FLIP 88-35L	FLIP 89-52L
3	FLIP 88-41L	FLIP 89-58L	FLIP 89-53L	Local check	FLIP 88-47L	FLIP 89-50L	FLIP 89-53L	FLIP 89-50L
4	FLIP 89-59L	FLIP 89-70L	FLIP 89-52L	Precoz	FLIP 89-50L	FLIP 88-46L	FLIP 89-50L	FLIP 88-41L
5	FLIP 89-53L	FLIP 88-34L	FLIP 89-61L	FLIP 88-40L	FLIP 89-72L	FLIP 89-53L	FLIP 89-52L	FLIP 88-42L
	FLIP 89-49L							

The brackets indicate entries having the same rank.

The tallest plant height was observed for FLIP 89-53L (38 cm), and was followed by EL42, and FLIP 87-66L.

The location mean for seed yield (Table 5.6.5) was highest at Guelma in Algeria (1859 Kg/ha) and was followed by NIAB (1604 kg/ha) and UAF (1558 kg/ha) in Faisalabad in Pakistan. Among the entries, FLIP 89-53L gave the highest seed yield of 1177 kg/ha which was closely followed by FLIP 89-50L, Precoz, FLIP 89-71L, FLIP 87-66L, FLIP 89-61L, FLIP 89-52L, and FLIP 87-72L, with seed yields of 969, 955, 952, 942, 941, 941, and 935 kg/ha, respectively. The ANOVA for the design revealed that at Guelma in Algeria, Mymensingh in Bangladesh, Islamabad in Pakistan and Beja I and Beja II in Tunisia, 4, 1, 9, 2 and 8 entries, respectively, outyielded the respective local check by a significant margin. The list of top five high yielding lines at each location is given in Table 5.6.6. The entries FLIP 89-53L and FLIP 89-50L occurred most frequently among the top five heaviest yielders.

### **5.7. LENTIL INTERNATIONAL SCREENING NURSERY - TALL (LISN-T)**

#### **Material**

The Lentil International Screening Nursery - Tall (LISN-T) specifically meant for mechanical harvesting comprised of 35 test entries and a local check, the best local cultivar, which was to be added by the cooperator. Twenty eight of the test entries supplied originated through the hybridization at ICARDA and were selected on the basis of their performance at ICARDA sites in Syria and Lebanon.

#### **Methods and Management**

The nursery was grown in a 6x6 lattice design with two replications. The suggested plot size was a single row plot, 4 m long. The cooperators were urged to use the locally recommended agronomic practices for the management of the nursery.

Thirty five sets of nursery were distributed to cooperators in 18 countries and data were returned from 25 locations in 13 countries. The details of the agronomic practices supplied by the cooperators are given in Table 5.7.1.

#### **Results and Discussion**

The adjusted means for location for entries ranged from 38 to 169 days for time to flowering (Table 5.7.2), 72 to 194 days for time to maturity (Table 5.7.3), and 22 to 54 cm for plant height (Table 5.7.4). The entries FLIP 86-38L, 81S 15, FLIP 87-52L, and FLIP 89-43L took less time to flower. The entry ILL 4349 was tallest (36 cm) and was followed by ILL 468, FLIP 85-33L, and FLIP 86-16L (with 33 cm height). At most locations some of the test entries were taller than the respective local checks.

The ANOVA for seed yields based on the design is given in Table 5.7.5. The highest mean yield was recorded at Terbol in Lebanon (1753 kg/ha) and was followed by Caltagirone in Italy (1604 kg/ha), Heimo in Syria (1579

Table 5.7.1. Agronomic data for different locations in the LISN-T during 1989/90.

Country	Location	Planting Date	Harvesting Date	Fertilizer (kg/ha)			Irrigation	Insecticide/Fungicide Herbicide	Local check
				N	P	K			
ALGERIA	Guelma	18.11.1989	11.06.1990	-	200	-	-	Syrie 229	
ALGERIA	Khroub	17.12.1989	27.06.1990	-	45	-	Treflan	Syrie 229	
ALGERIA	Setif	18.12.1989	16.06.1990	-	100	-	Trifluralin	Syrie 229	
BULGARIA	Toshevo	27.02.1990	06.07.1990	30	60	-	-	Tadjiks Kaya 95	
CANADA	Portage	22.05.1990	15.08.1990	-	-	-	-	Eston	
CANADA	Watrous	28.05.1990	29.08.1990	-	-	-	-	Eston	
ETHIOPIA	Debre Zeit	16.07.1990	NA	-	-	-	-	NEL -358	
GREECE	Larissa	01.12.1989	24.05.1990	-	60	-	Decamethrin	Samos	
ITALY	Caltagirone	07.02.1990	12.06.1990	18	20	-	-	Villalba	
JORDAN	Jubeiha	29.11.1989	NA	20	40	-	-	Jordan -1	
JORDAN	Ramtha	05.11.1989	NA	20	40	-	-	Jordan -1	
LEBANON	Terbol	30.11.1989	15.05.1990	-	50	-	Fortrol, Kerb	L.L.	
NEW ZEALAND	Lincoln	11.07.1990	03.01.1991	-	-	-	-	Titore	
PORTUGAL	Elvas	10.11.1989	25.05.1990	-	60	60	-	L -188	
SYRIA	Aleppo	29.11.1989	NA	-	-	-	-	NA	
SYRIA	Gelline	11.01.1990	20.05.1990	20	50	-	-	NA	
SYRIA	Heimo	29.11.1989	24.05.1990	-	50	-	-	NA	
SYRIA	Idleb	06.12.1989	21.05.1990	-	60	-	-	NA	
SYRIA	Izra'a	06.12.1989	05.06.1990	-	50	-	-	NA	
SYRIA	Tel Hadya	29.12.1989	05.06.1990	-	50	-	Fortrol, Kerb	Hurani	
TUNISIA	Beja -I	NA	NA	NA	NA	NA	NA	NA	
TUNISIA	Beja -II	NA	NA	NA	NA	NA	NA	NA	
TUNISIA	El Kef	NA	NA	NA	NA	NA	NA	NA	
TURKEY	Ankara	NA	NA	NA	NA	NA	NA	NA	
TURKEY	Diyarbakir	05.11.1989	NA	NA	NA	NA	NA	Sultan -1	
TURKEY	Eskisehir	NA	NA	NA	NA	NA	NA	Sultan -1	

NA = Not available

Table 5.7.2. Adjusted time to flowering (days) of entries at different locations in the LISN-T during 1989/90.

Selection	ALGERIA			BULGARIA	CANADA		ETHIOPIA	GREECE	ITALY	JORDAN	
	ILL	Guelma	Khroub	Setif	Toshevo	Portage	Watrous	Debre Zeit	Larissa	Caltagirone+	Jubeiha+
-	468	130	150	92	87	43	42	-	136	93	138
-	1939	121	144	84	79	39	42	67	129	86	140
Local small	4401	121	144	71	79	39	38	66	127	86	135
Laird	4349	126	153	87	83	40	45	65	137	89	137
Idleb-1	5582	119	141	75	79	36	39	55	125	75	136
78S 26013	5588	121	144	83	80	36	40	70	129	88	140
78S 26052	5604	121	144	87	80	38	42	-	127	89	134
FLIP 84-51L	5722	114	140	83	79	36	38	49	128	71	137
FLIP 84-58L	5728	119	142	88	80	38	44	-	125	86	136
FLIP 84-59L	5729	126	146	83	80	43	44	-	131	88	139
FLIP 85-33L	5871	126	148	84	80	36	40	68	131	86	139
81S 15	5883	128	136	65	78	39	40	46	123	69	131
FLIP 86-16L	6002	129	138	74	79	38	40	47	128	71	131
FLIP 86-24L	6010	123	147	86	81	38	40	70	131	86	130
FLIP 86-33L	6019	114	142	87	76	36	39	55	127	77	138
FLIP 86-35L	6021	121	142	83	79	39	43	66	127	78	136
FLIP 86-38L	6024	112	134	79	76	38	37	48	119	71	130
FLIP 86-56L	6042	121	147	88	84	43	44	68	131	89	138
FLIP 87- 9L	6199	126	150	85	85	39	42	-	130	89	139
FLIP 87-21L	6211	130	137	70	80	40	41	52	126	72	130
FLIP 87-45L	6235	121	141	84	80	38	41	-	126	88	138
FLIP 87-49L	6239	123	144	82	80	38	43	73	127	87	138
FLIP 87-52L	6242	112	136	67	80	39	40	62	118	79	132
FLIP 87-59L	6249	119	142	65	81	38	40	74	126	82	135
FLIP 88- 8L	6432	119	143	87	79	36	39	60	126	77	137
FLIP 88-31L	6445	119	142	83	79	38	40	52	127	78	138
FLIP 88-50L	6474	119	140	64	78	36	40	57	125	77	133
FLIP 88-51L	6475	119	140	80	79	36	40	63	120	86	131
FLIP 89-30L	6788	119	145	87	82	38	41	74	127	83	138
FLIP 89-39L	6797	121	143	74	78	36	38	53	130	77	135
FLIP 89-40L	6798	126	147	88	83	38	42	-	128	90	141
FLIP 89-41L	6799	119	141	65	79	36	40	48	126	78	140
FLIP 89-42L	6800	119	142	84	79	36	40	48	127	79	136
FLIP 89-43L	6801	112	140	79	76	36	39	39	120	76	122
FLIP 89-44L	6802	121	142	87	79	39	39	65	126	88	135
Local check	-	119	143	83	87	43	44	54	135	96	136
Location Mean		121	143	80	80	38	41	59	127	82	135
S.E. of Mean				6.27	0.91						
L.S.D. at 5%	#	#	#	18.25	2.66	#	#	#	0.54	1.50	2.59
C.V. (%)	#	#	#	11.03	1.61	#	#	#	1.56	4.32	7.42
Error df	#	#	#	25	25	#	#	#	0.60	2.59	2.70
Significance				*	*				*	*	*

Cont'd. ...

Table 5.7.2. Cont'd. ...

Selection	JORDAN		LEBANON		NEW ZEALAND		PORTUGAL		SYRIA			TURKEY		(1)
	ILL	Ramtha	Terbol	Lincoln	Elvas	Aloppo	Golline+	Heimo+	Idleb+	Izra'a	Diyarbakire+	Mean	Overall	
-	468	139	142	112	133	132	105	145	132	130	177	119		
-	1939	138	136	110	131	132	96	137	127	129	168	114		
Local small	4401	138	134	112	132	125	96	126	132	126	167	112		
Laird	4349	136	137	117	133	130	99	136	128	128	169	116		
Idleb-1	5582	139	133	110	126	126	93	133	122	125	164	110		
78S 26013	5588	138	134	112	130	130	97	136	127	128	170	114		
78S 26052	5604	138	134	114	131	129	95	134	128	127	171	114		
FLIP 84-51L	5722	139	135	112	124	129	97	134	128	126	172	112		
FLIP 84-58L	5728	140	130	110	124	125	95	126	121	126	168	112		
FLIP 84-59L	5729	140	135	114	131	127	98	137	124	132	174	115		
FLIP 85-33L	5871	140	136	117	132	129	97	136	121	132	168	115		
81S 15	5883	140	131	110	106	128	87	121	123	126	167	108		
FLIP 86-16L	6002	138	132	117	106	124	95	121	129	125	170	110		
FLIP 86-24L	6010	140	138	114	132	130	98	137	127	129	176	115		
FLIP 86-33L	6019	140	131	114	127	126	96	133	121	128	168	111		
FLIP 86-35L	6021	137	134	111	130	127	95	133	128	128	169	113		
FLIP 86-38L	6024	138	128	109	115	128	91	121	130	123	160	107		
FLIP 86-56L	6042	139	136	112	129	129	96	139	127	129	171	115		
FLIP 87- 9L	6199	140	137	110	130	128	98	134	130	133	176	116		
FLIP 87-21L	6211	138	132	117	108	127	93	121	127	125	168	110		
FLIP 87-45L	6235	140	132	110	127	129	94	128	122	124	171	112		
FLIP 87-49L	6239	138	133	117	130	130	96	134	126	129	171	114		
FLIP 87-52L	6242	138	130	115	123	127	94	121	121	124	164	108		
FLIP 87-59L	6249	137	133	114	124	126	95	126	123	126	167	110		
FLIP 88- 8L	6432	137	134	110	128	123	96	133	124	124	166	111		
FLIP 88-31L	6445	137	133	110	128	126	94	131	122	128	163	111		
FLIP 88-50L	6474	139	132	114	127	124	93	128	124	123	166	110		
FLIP 88-51L	6475	139	135	114	126	124	92	123	121	125	162	110		
FLIP 89-30L	6788	138	135	116	129	126	95	134	130	126	170	114		
FLIP 89-39L	6797	139	132	109	132	130	97	136	120	128	169	112		
FLIP 89-40L	6798	139	138	114	133	129	96	136	127	130	174	116		
FLIP 89-41L	6799	140	133	110	128	125	94	128	121	124	168	110		
FLIP 89-42L	6800	139	135	110	128	127	95	131	123	129	167	112		
FLIP 89-43L	6801	137	128	114	122	127	90	121	124	124	161	108		
FLIP 89-44L	6802	137	134	110	128	127	96	128	124	126	169	112		
Local check		136	142	110	123	129	100	135	126	129	178			
Location Mean		138	134	113	126	128	95	131	125	127	169			
S.E. of Mean		1.10	1.61	0.91	0.66	1.94	1.13	1.26	2.30	1.23	1.70			
L.S.D. at 5%		-	4.69	2.65	1.91	-	3.24	3.60	6.61	3.59	4.88			
C.V. (%)		1.13	1.70	1.14	0.73	2.15	1.68	1.36	2.61	1.37	1.43			
Error df		25	25	25	25	25	35	35	35	25	35			
Significance		NS	*	*	*	NS	*	*	*	*	*			

+ Since the blocks (adjusted) MS is less than intra block MS, the RCB analysis is performed on the data and the means are unadjusted. (1) Debre Zeit was excluded from the overall mean. \* = Significant at  $P < 0.05$ , NS = Not significant.

# Not analysed due to incomplete data set or other reasons.

Table 5.7.3. Adjusted time to maturity (days) of entries at different locations in the LISN-T during 1989/90.

Selection	ILL	ALGERIA			BULGARIA	CANADA	GREECE	ITALY	JORDAN
		Guelma	Khroub	Setif+	Toshevo	Watrous	Larissa	Caltagirone+	Jubeiha
-	468	183	173	132	126	73	171	123	178
-	1939	181	177	124	118	71	167	116	179
Local small	4401	181	162	131	118	71	164	116	177
Laird	4349	181	187	132	124	78	174	119	182
Idleb-1	5582	181	173	126	117	69	164	114	175
78S 26013	5588	181	171	124	117	70	164	111	176
78S 26052	5604	181	176	125	118	71	165	118	177
FLIP 84-51L	5722	181	177	126	121	70	167	118	180
FLIP 84-58L	5728	181	162	124	118	74	165	113	178
FLIP 84-59L	5729	181	169	126	118	73	168	118	178
FLIP 85-33L	5871	185	169	129	123	69	170	115	176
81S 15	5883	181	157	124	118	74	163	111	177
FLIP 86-16L	6002	176	160	127	118	71	164	109	177
FLIP 86-24L	6010	181	169	136	118	72	167	116	179
FLIP 86-33L	6019	181	176	127	117	72	164	116	179
FLIP 86-35L	6021	181	174	124	120	73	164	113	176
FLIP 86-38L	6024	171	174	134	118	68	157	109	175
FLIP 86-56L	6042	181	173	128	122	76	169	115	178
FLIP 87- 9L	6199	183	173	125	124	78	168	121	178
FLIP 87-21L	6211	171	158	129	120	72	163	111	175
FLIP 87-45L	6235	181	159	124	117	71	162	113	179
FLIP 87-49L	6239	181	168	126	118	71	165	118	176
FLIP 87-52L	6242	181	177	129	119	73	163	116	177
FLIP 87-59L	6249	181	161	131	121	74	164	118	177
FLIP 88- 8L	6432	181	177	121	117	69	165	113	177
FLIP 88-31L	6445	181	162	121	117	71	164	117	178
FLIP 88-50L	6474	181	171	124	117	71	164	113	174
FLIP 88-51L	6475	181	174	136	118	71	160	115	176
FLIP 89-30L	6788	181	162	124	117	72	165	119	178
FLIP 89-39L	6797	181	177	126	119	73	168	107	178
FLIP 89-40L	6798	181	172	121	123	75	165	115	179
FLIP 89-41L	6799	181	170	126	117	72	163	108	177
FLIP 89-42L	6800	177	160	121	118	71	161	109	176
FLIP 89-43L	6801	172	168	131	117	72	158	109	176
FLIP 89-44L	6802	181	160	124	117	73	164	118	176
Local check		181	175	131	126	74	171	129	177
Location Mean		180	170	127	119	72	165	115	177
S.E. of Mean		#	#	5.07	1.06	#	0.80	2.84	1.17
L.S.D. at 5%		#	#	-	3.08	#	2.32	8.15	3.40
C.V. (%)		#	#	5.67	1.25	#	0.68	3.50	0.93
Error df		#	#	35	25	#	25	35	25
Significance				NS	*		*	*	*

Cont'd. ...



Table 5.7.3. Cont'd. ...

Selection	ILL	JORDAN	LEBANON	PORTUGAL	SYRIA					Overall Mean
		Rantha	Terbol	Elvas+	Aleppo	Gelline	Heimo+	Idleb	Isra'a	
-	468	184	170	194	179	134	176	168	165	158
-	1939	184	165	196	178	127	172	165	161	155
Local small	4401	184	164	196	179	127	171	168	158	154
Laird	4349	184	171	194	180	135	174	167	171	160
Idlib-1	5582	183	164	196	176	129	175	162	166	154
78S 26013	5588	184	162	195	178	127	173	164	159	154
78S 26052	5604	186	167	195	177	127	173	158	159	155
FLIP 84-51L	5722	184	165	196	178	130	173	158	161	155
FLIP 84-58L	5728	184	163	196	179	129	174	168	161	154
FLIP 84-59L	5729	187	166	196	177	130	173	166	160	155
FLIP 85-33L	5871	185	167	195	179	130	174	167	162	156
81S 15	5883	184	161	196	179	126	172	161	161	153
FLIP 86-16L	6002	185	164	195	178	125	171	157	167	153
FLIP 86-24L	6010	184	166	196	174	128	172	160	161	155
FLIP 86-33L	6019	184	168	194	174	132	172	159	171	155
FLIP 86-35L	6021	184	166	193	179	129	172	167	163	155
FLIP 86-38L	6024	185	160	194	178	126	168	165	158	152
FLIP 86-56L	6042	186	171	194	179	127	173	167	165	157
FLIP 87- 9L	6199	185	169	195	179	131	174	167	166	157
FLIP 87-21L	6211	184	163	195	179	128	173	141	162	151
FLIP 87-45L	6235	185	162	193	179	126	172	167	159	153
FLIP 87-49L	6239	184	161	192	175	127	172	166	159	154
FLIP 87-52L	6242	183	161	190	178	127	173	155	165	154
FLIP 87-59L	6249	184	163	193	177	130	174	167	164	155
FLIP 88- 8L	6432	184	164	196	175	127	174	158	160	154
FLIP 88-31L	6445	184	164	192	176	129	172	161	162	153
FLIP 88-50L	6474	185	162	190	173	128	172	166	161	153
FLIP 88-51L	6475	185	164	196	179	127	172	167	157	155
FLIP 89-30L	6788	184	165	196	177	131	173	157	163	154
FLIP 89-39L	6797	187	164	193	179	133	173	168	163	156
FLIP 89-40L	6798	184	167	191	176	130	172	167	162	155
FLIP 89-41L	6799	185	160	193	174	126	172	163	161	153
FLIP 89-42L	6800	185	159	196	172	127	171	161	163	152
FLIP 89-43L	6801	185	160	195	171	126	170	166	164	152
FLIP 89-44L	6802	184	162	196	176	128	171	157	159	153
Local chock		189	170	189	180	134	175	167	171	
Location Mean		185	164	194	177	129	172	163	163	
S.E. of Mean		0.85	1.94	0.56	1.38	1.51	0.87	5.41	2.53	
L.S.D. at 5%		2.46	5.64	1.61	4.01	4.39	2.51	-	7.36	
C.V. (%)		0.65	1.67	0.41	1.10	1.66	0.72	4.69	2.20	
Error df		25	25	35	25	25	35	25	25	
Significance		*	*	*	*	*	*	NS	*	

+ Since the blocks (adjusted) MS is less than intra block MS, the RCB analysis is performed on the data and the means are unadjusted. \* = Significant at  $P \leq 0.05$ , NS = Not significant.

# Not analysed due to incomplete data set or other reasons.

Table 5.7.4. Adjusted plant height (cm) of entries at different locations in the LISN-T during 1989/90.

Selection	ALGERIA				BULGARIA	CANADA	GREECE	ITALY	JORDAN		LEBANON
	ILL	Guelma	Khroub	Setif+	Toshevo	Watrous	Larissa	Caltagirone+	Jubeiha+	Rantha	Terbol
-	468	44	26	19	36	30	21	32	47	25	33
-	1939	37	18	25	31	25	24	27	38	30	37
Local small	4401	38	21	15	26	24	22	22	40	29	34
Laird	4349	47	32	30	39	35	24	32	46	27	37
Idleb-1	5582	35	20	23	29	27	21	26	39	26	37
78S 26013	5588	40	19	23	29	28	22	28	47	30	34
78S 26052	5604	49	24	20	31	24	24	27	46	26	37
FLIP 84-51L	5722	45	20	23	32	24	22	25	44	28	35
FLIP 84-58L	5728	47	24	23	32	27	23	25	46	30	34
FLIP 84-59L	5729	45	23	20	29	33	21	26	50	30	38
FLIP 85-33L	5871	46	24	28	36	27	24	24	42	27	35
81S 15	5883	35	26	25	29	25	23	21	40	30	40
FLIP 86-16L	6002	42	26	30	36	30	25	26	46	28	37
FLIP 86-24L	6010	45	22	20	33	28	22	25	40	27	37
FLIP 86-33L	6019	35	21	20	26	26	22	26	40	30	36
FLIP 86-35L	6021	40	25	21	31	25	24	28	38	30	38
FLIP 86-38L	6024	35	22	15	27	22	19	26	43	27	37
FLIP 86-56L	6042	38	16	18	31	28	20	24	48	24	35
FLIP 87- 9L	6199	40	21	19	37	29	24	22	40	25	35
FLIP 87-21L	6211	40	26	26	33	29	20	27	42	25	37
FLIP 87-45L	6235	40	25	20	29	24	24	25	46	30	35
FLIP 87-49L	6239	44	22	23	28	25	22	25	52	25	38
FLIP 87-52L	6242	37	23	27	36	27	24	24	39	27	35
FLIP 87-59L	6249	46	20	25	28	26	21	26	44	26	37
FLIP 88- 8L	6432	39	19	23	28	21	23	26	42	29	36
FLIP 88-31L	6445	45	22	19	26	21	22	26	49	30	36
FLIP 88-50L	6474	38	20	23	31	18	20	27	42	31	34
FLIP 88-51L	6475	44	23	21	29	24	22	23	50	24	38
FLIP 89-30L	6788	52	23	20	30	21	21	27	42	29	38
FLIP 89-39L	6797	40	26	20	31	27	22	23	40	26	37
FLIP 89-40L	6798	45	20	23	36	27	23	24	45	31	41
FLIP 89-41L	6799	34	21	20	29	32	23	21	44	29	32
FLIP 89-42L	6800	38	21	23	32	27	21	21	39	27	35
FLIP 89-43L	6801	36	18	19	25	22	19	20	39	25	35
FLIP 89-44L	6802	37	21	25	32	26	22	26	40	27	36
Local check		40	22	23	36	29	22	27	42	32	41
Location Mean		41	22	22	31	26	22	25	43	28	36
S.E. of Mean		#	#	1.98	2.15	#	1.08	1.07	2.61	2.53	1.83
L.S.D. at 5%		#	#	5.69	6.25	#	3.16	3.06	7.49	-	-
C.V. (%)		#	#	12.79	9.79	#	6.91	5.99	8.57	12.91	7.13
Error df		#	#	35	25	#	25	35	35	25	25
Significance				*	*		*	*	*	NS	NS

Cont'd. ...

Table 5.7.4. Cont'd. ...

Selection	NEW ZEALAND PORTUGAL			SYRIA					TURKEY		Overall Mean
	ILL	Lincoln+	Elvas	Aleppo	Gellino	Heimo	Idleb	Izra'a	Diyarbakir	Eskisehir	
-	468	56	40	25	34	37	22	28	42	26	33
-	1939	52	39	23	29	34	19	29	41	24	31
Local small	4401	53	34	23	29	33	22	27	39	18	29
Laird	4349	65	42	28	29	43	26	33	45	32	36
Idlib-1	5582	51	34	19	32	34	23	27	41	21	30
78S 26013	5588	55	39	21	28	34	22	30	40	23	31
78S 26052	5604	54	39	24	32	37	18	28	41	26	32
FLIP 84-51L	5722	53	38	25	32	36	16	30	43	23	31
FLIP 84-58L	5728	52	37	25	32	35	21	29	41	22	32
FLIP 84-59L	5729	55	39	22	30	35	29	28	39	25	32
FLIP 85-33L	5871	61	40	26	30	36	28	28	46	23	33
81S 15	5883	49	29	19	30	34	19	27	40	28	30
FLIP 86-16L	6002	65	36	21	29	36	17	27	38	24	33
FLIP 86-24L	6010	55	38	21	29	38	19	32	40	27	32
FLIP 86-33L	6019	58	34	25	24	34	18	29	40	25	30
FLIP 86-35L	6021	52	41	21	35	36	25	26	43	23	32
FLIP 86-38L	6024	40	40	18	28	34	22	26	35	20	28
FLIP 86-56L	6042	53	35	20	29	33	21	26	39	23	30
FLIP 87- 9L	6199	49	36	27	29	37	27	29	37	26	31
FLIP 87-21L	6211	64	37	20	29	35	23	25	45	26	32
FLIP 87-45L	6235	42	38	21	30	33	28	26	41	25	31
FLIP 87-49L	6239	64	37	22	31	35	25	30	43	24	32
FLIP 87-52L	6242	58	37	21	31	35	22	30	38	25	31
FLIP 87-59L	6249	55	38	21	30	36	12	28	43	29	31
FLIP 88- 8L	6432	51	33	29	28	34	18	28	37	24	30
FLIP 88-31L	6445	50	38	24	31	32	24	27	44	26	31
FLIP 88-50L	6474	58	34	23	30	33	24	29	40	24	30
FLIP 88-51L	6475	56	38	22	30	34	29	28	40	24	32
FLIP 89-30L	6788	57	34	23	26	35	19	28	38	22	31
FLIP 89-39L	6797	48	30	17	36	34	27	28	42	23	30
FLIP 89-40L	6798	58	37	22	27	35	24	27	40	26	32
FLIP 89-41L	6799	51	35	18	30	31	20	25	36	21	29
FLIP 89-42L	6800	45	37	20	33	33	27	28	38	22	30
FLIP 89-43L	6801	56	34	18	25	29	21	22	34	20	27
FLIP 89-44L	6802	51	33	22	32	37	17	28	43	24	30
Local check		43	36	25	33	39	26	33	48	31	
Location Mean		54	37	22	30	35	22	28	41	24	
S.E. of Mean		0.94	0.56	2.24	1.94	1.24	3.28	1.33	1.99	1.86	
L.S.D. at 5%		2.70	1.64	-	-	3.62	9.55	3.87	5.79	5.42	
C.V. (%)		2.47	2.17	14.29	9.15	5.03	20.88	6.70	6.93	10.81	
Error df		35	25	25	25	25	25	25	25	25	
Significance		*	*	NS	NS	*	*	*	*	*	

+ Since the blocks (adjusted) MS is less than intra block MS, the RCB analysis is performed on the data and the means are unadjusted. \* = Significant at  $P < 0.05$ , NS = Not significant.  $\beta$  Not analysed due to incomplete data set or other reasons.

Table 5.7.5. Adjusted seed yield ( Y=kg/ha ) and rank (R) of entries at different locations in the LISN-T during 1989/90.

Selection	ILL	ALGERIA				BULGARIA		CANADA				GREECE	
		Guelma		Setif		Toshevo+		Portage		Watrous		Larissa	
		Y	R	Y	R	Y	R	Y	R	Y	R	Y	R
-	468	350	18	1307	9	367	33	600	27	760	35	561	31
-	1939	300	24	1162	19	867	13	680	21	840	32	1168	3
Local small	4401	363	17	1063	24	533	29	640	24	1120	20	738	23
Laird	4349	363	16	926	29	267	36	700	19	1140	19	332	35
Idlob-1	5582	550	1	1349	7	600	22	900	13	1520	7	1049	8
78S 26013	5588	375	15	1189	17	867	9	720	17	1460	10	1050	7
78S 26052	5604	463	3	1248	14	1500	1	680	22	1440	11	1170	2
FLIP 84-51L	5722	438	6	1224	15	833	14	1380	7	1840	1	756	22
FLIP 84-58L	5728	425	7	1384	6	667	20	640	25	1520	8	1100	4
FLIP 84-59L	5729	275	30	1295	11	600	23	180	36	900	30	824	17
FLIP 85-33L	5871	375	14	1807	1	867	10	2620	1	1720	4	911	14
81S 15	5883	175	36	788	32	800	16	1340	8	1640	5	621	29
FLIP 86-16L	6002	300	23	655	35	533	28	1740	4	1520	9	665	27
FLIP 86-24L	6010	275	29	1407	5	933	8	340	33	1180	18	968	11
FLIP 86-33L	6019	250	31	1064	23	533	27	520	29	980	26	908	15
FLIP 86-35L	6021	450	4	1288	12	1133	4	680	20	1380	12	613	30
FLIP 86-38L	6024	300	25	1046	25	1367	2	760	15	1100	22	431	33
FLIP 86-56L	6042	238	32	739	33	333	35	980	11	1240	15	689	26
FLIP 87- 9L	6199	213	35	831	30	333	34	480	30	-	-	806	21
FLIP 87-21L	6211	400	13	1094	22	533	26	1880	2	1720	3	391	34
FLIP 87-45L	6235	350	20	1277	13	867	12	360	32	1080	24	878	16
FLIP 87-49L	6239	238	33	1021	28	967	7	240	35	1180	17	1074	5
FLIP 87-52L	6242	338	21	1024	27	733	17	860	14	1280	14	1060	6
FLIP 87-59L	6249	300	28	1319	8	400	32	660	23	1020	25	986	10
FLIP 88- 8L	6432	413	9	1124	20	733	19	1140	9	1080	23	732	24
FLIP 88-31L	6445	400	10	1214	16	733	18	640	26	800	33	818	19
FLIP 88-50L	6474	300	26	1434	3	867	11	1040	10	940	28	1444	1
FLIP 88-51L	6475	300	27	1507	2	800	15	380	31	940	27	481	32
FLIP 89-30L	6788	400	11	815	31	567	25	740	16	940	29	807	20
FLIP 89-39L	6797	425	8	1046	26	567	24	1400	6	1120	21	700	25
FLIP 89-40L	6798	500	2	1299	10	467	31	980	12	1240	16	924	13
FLIP 89-41L	6799	350	19	1409	4	1133	5	560	28	1600	6	951	12
FLIP 89-42L	6800	325	22	725	34	1100	6	720	18	900	31	635	28
FLIP 89-43L	6801	438	5	637	36	1200	3	1520	5	780	34	34	36
FLIP 89-44L	6802	225	34	1171	18	600	21	300	34	1300	13	995	9
Local check		400	12	1115	21	500	30	1840	3	1840	2	821	18
Location Mean		349		1139		742		884		1230		808	
S.E. of Mean				173.91		127.83		#		#		156.84	
L.S.D. at 5%		#		506.58		366.93		#		#		456.86	
C.V. (%)		#		21.59		24.38		#		#		27.45	
Error df		#		25		35		#		#		25	
Significance				*		*						*	
Efficiency				107		-						103	
Test > L. Check				1		8						1	

Cont'd. ...

Table 5.7.5. Cont'd. ...

Soloection	ILL	ITALY		JORDAN				LEBANON		NEW ZEALAND		PORTUGAL	
		Caltagirone		Jubeiha+		Ramtha+		Torbol		Lincoln		Elvas	
		Y	R	Y	R	Y	R	Y	R	Y	R	Y	R
-	468	2188	7	1374	14	762	17	1375	31	2267	4	2578	1
-	1939	1859	12	1469	10	759	18	2008	8	2095	5	839	23
Local small	4401	1269	29	952	28	1027	7	1360	33	1672	13	866	22
Laird	4349	1215	30	994	25	710	21	1632	23	1634	14	2461	3
Idleb-1	5582	2310	4	1227	18	870	13	2178	2	1962	8	1024	16
78S 26013	5588	1089	31	1654	4	870	12	1921	15	1693	11	1567	6
78S 26052	5604	1274	27	913	29	626	24	2000	9	1094	25	715	29
FLIP 84-51L	5722	945	34	1177	19	909	10	1992	10	2027	6	1136	13
FLIP 84-58L	5728	1756	16	1652	5	959	8	1988	11	2673	2	880	20
FLIP 84-59L	5729	1478	21	1077	21	744	19	1792	17	1679	12	1282	10
FLIP 85-33L	5871	2049	8	990	26	636	22	1980	12	1718	10	2497	2
81S 15	5883	1270	28	959	27	821	16	1649	22	486	35	395	34
FLIP 86-16L	6002	1994	9	691	33	443	35	1405	30	981	26	364	35
FLIP 86-24L	6010	2377	2	740	32	632	23	1769	20	1137	21	1547	7
FLIP 86-33L	6019	2325	3	674	34	573	27	1941	13	980	27	813	24
FLIP 86-35L	6021	1369	24	1366	15	1056	6	2144	4	1476	17	772	26
FLIP 86-38L	6024	1498	20	783	31	594	26	1260	35	877	29	506	32
FLIP 86-56L	6042	1397	22	1012	24	900	11	1429	29	1250	19	725	28
FLIP 87- 9L	6199	1371	23	1412	12	1059	5	2029	7	3064	1	1944	4
FLIP 87-21L	6211	1805	14	524	35	542	31	1620	24	1129	22	430	33
FLIP 87-45L	6235	1304	25	2097	1	856	15	1617	25	554	34	1161	12
FLIP 87-49L	6239	1820	13	1066	23	1196	3	1574	27	1096	24	1113	14
FLIP 87-52L	6242	1722	17	1387	13	565	28	1720	21	911	28	1277	11
FLIP 87-59L	6249	1804	15	1302	17	929	9	1609	26	591	32	892	18
FLIP 88- 8L	6432	2268	6	1499	8	611	25	2073	5	757	31	1089	15
FLIP 88-31L	6445	1880	11	1531	7	859	14	1846	16	1742	9	883	19
FLIP 88-50L	6474	2275	5	1687	3	1199	2	2217	1	1469	18	974	17
FLIP 88-51L	6475	1666	18	1735	2	540	32	1781	18	1584	15	1307	9
FLIP 89-30L	6788	2588	1	1414	11	736	20	1770	19	568	33	678	31
FLIP 89-39L	6797	1279	26	1069	22	559	29	1371	32	2594	3	811	25
FLIP 89-40L	6798	1937	10	875	30	1531	1	2173	3	1538	16	1572	5
FLIP 89-41L	6799	1594	19	1475	9	1135	4	1570	28	1105	23	1358	8
FLIP 89-42L	6800	1005	33	1150	20	387	36	1281	34	310	36	700	30
FLIP 89-43L	6801	396	35	330	36	487	33	1077	36	763	30	263	36
FLIP 89-44L	6802	1008	32	1588	6	451	34	2031	6	1966	7	771	27
Local chock		354	36	1338	16	553	30	1931	14	1248	20	876	21
Location Mean		1604		1199		780		1753		1408		1085	
S.E. of Mean		320.71		355.08		177.28		175.72		423.81		255.39	
L.S.D. at 5%		934.17		-		508.87		511.84		1234.49		743.91	
C.V. (%)		28.28		41.87		32.15		14.18		42.57		33.29	
Error df		25		35		35		25		25		25	
Significance		*		NS		*		*		*		*	
Efficiency		112		-		-		127		101		107	
Test > L. Chock		25		-		4		0		3		4	

Cont'd. ...

Table 5.7.5. Cont'd. ...

Selection	ILL	SYRIA										TUNISIA	
		Aleppo+		Gelline		Heimo+		Idleb		Izra'a		Beja -I	
		Y	R	Y	R	Y	R	Y	R	Y	R	Y	R
-	468	461	3	672	31	1262	28	104	16	510	31	83	34
-	1939	277	16	582	32	1732	14	74	23	1265	7	38	36
Local small	4401	221	18	576	33	1589	18	61	26	991	16	180	20
Laird	4349	169	25	379	36	1036	32	26	33	283	34	129	30
Idlib-1	5582	403	6	1786	3	1859	9	54	29	1025	14	243	10
78S 26013	5588	135	27	1138	15	1472	24	135	12	1894	2	173	22
78S 26052	5604	206	21	938	23	1991	6	29	32	749	25	323	1
FLIP 84-51L	5722	358	10	1011	19	1770	13	29	31	836	20	187	17
FLIP 84-58L	5728	266	17	1866	1	1815	11	68	24	1714	3	226	12
FLIP 84-59L	5729	506	1	1172	13	1516	20	212	7	958	17	210	13
FLIP 85-33L	5871	418	5	1311	7	1696	16	231	6	1068	10	163	26
81S 15	5883	85	34	1174	12	1019	33	57	27	888	19	107	33
FLIP 86-16L	6002	102	32	815	28	827	36	7	35	46	36	232	11
FLIP 86-24L	6010	398	7	1089	17	1907	7	83	21	1063	12	265	5
FLIP 86-33L	6019	221	19	1125	16	1406	26	8	34	322	33	246	9
FLIP 86-35L	6021	278	15	1598	4	1719	15	110	14	1633	4	185	18
FLIP 86-38L	6024	85	35	1295	8	1503	22	133	13	537	30	169	24
FLIP 86-56L	6042	143	26	704	30	1327	27	92	18	1032	13	135	29
FLIP 87- 9L	6199	472	2	796	29	2624	1	99	17	809	23	198	14
FLIP 87-21L	6211	97	33	1231	11	878	35	62	25	480	32	113	32
FLIP 87-45L	6235	188	22	1289	9	1471	25	372	1	1241	9	182	19
FLIP 87-49L	6239	358	9	910	25	2064	4	274	3	1263	8	188	16
FLIP 87-52L	6242	120	29	960	21	1857	10	90	20	570	29	176	21
FLIP 87-59L	6249	169	24	1857	2	1552	19	91	19	829	21	268	4
FLIP 88- 8L	6432	426	4	1148	14	1662	17	107	15	1903	1	128	31
FLIP 88-31L	6445	352	11	1350	6	1802	12	199	9	620	28	197	15
FLIP 88-50L	6474	332	13	1236	10	2104	3	328	2	793	24	283	3
FLIP 88-51L	6475	116	31	1431	5	1256	29	269	4	1412	6	247	8
FLIP 89-30L	6788	180	23	873	26	1511	21	36	30	1417	5	168	25
FLIP 89-39L	6797	50	36	968	20	881	34	207	8	992	15	300	2
FLIP 89-40L	6798	306	14	571	34	2034	5	144	11	683	27	263	7
FLIP 89-41L	6799	216	20	937	24	1045	31	75	22	892	18	264	6
FLIP 89-42L	6800	126	28	865	27	1118	30	232	5	812	22	142	28
FLIP 89-43L	6801	119	30	503	35	1496	23	56	28	133	35	80	35
FLIP 89-44L	6802	380	8	1041	18	1885	8	3	36	1063	11	171	23
Local check		339	12	951	22	2184	2	186	10	741	26	151	27
Location Mean		252		1060		1579		121		930		189	
S.E. of Mean		95.68		184.64		316.29		0.03		276.73		54.79	
L.S.D. at 5%		274.63		537.84		-		4.77		806.06		159.60	
C.V. (%)		53.71		24.64		28.32		0.50		42.09		40.94	
Error df		35		25		35		25		25		25	
Significance		*		*		NS		*		*		*	
Efficiency		-		111		-		109		142		158	
Test > L. Check		0		4		-		0		4		1	

Cont'd. ...

Table 5.7.5. Cont'd. ...

election	ILL	TUNISIA				TURKEY				(1) Overall Mean	
		Beja -II		El Kef		Diyarbakir+		Eskisehir		Y	R
		Y	R	Y	R	Y	R	Y	R		
-	468	281	24	253	32	619	33	706	26	929	20
-	1939	227	29	356	22	1391	8	783	24	993	12
Local small	4401	219	30	331	26	567	36	634	29	789	28
Laird	4349	127	36	200	35	608	34	522	32	734	31
Idlib-1	5582	302	21	333	25	1062	22	957	15	1099	4
78S 26013	5588	261	25	342	24	1337	11	808	20	1028	8
78S 26052	5604	303	20	386	16	1084	21	1313	4	949	18
FLIP 84-51L	5722	290	22	398	13	1054	23	1018	10	987	13
FLIP 84-58L	5728	404	4	380	17	3873	1	922	16	1279	1
FLIP 84-59L	5729	213	31	402	12	1318	12	1078	9	930	19
FLIP 85-33L	5871	243	26	425	7	1721	3	1112	8	1230	2
81S 15	5883	180	32	239	33	676	32	699	27	719	32
FLIP 86-16L	6002	320	16	322	27	1048	24	568	31	703	33
FLIP 86-24L	6010	324	15	429	5	766	30	1352	3	986	14
FLIP 86-33L	6019	398	5	447	4	1249	15	487	33	824	26
FLIP 86-35L	6021	338	13	368	19	1030	26	1153	7	1033	6
FLIP 86-38L	6024	376	6	427	6	1456	7	628	30	795	27
FLIP 86-56L	6042	154	35	214	34	1033	25	754	25	759	30
FLIP 87- 9L	6199	347	12	311	29	1116	20	1012	11	1061	5
FLIP 87-21L	6211	430	2	311	28	908	29	806	21	780	29
FLIP 87-45L	6235	364	8	310	30	1347	10	800	23	926	21
FLIP 87-49L	6239	285	23	448	3	1302	13	1221	6	972	16
FLIP 87-52L	6242	316	18	403	11	1500	6	992	14	924	22
FLIP 87-59L	6249	361	9	424	8	1532	5	2138	1	996	10
FLIP 88- 8L	6432	360	10	359	21	1189	16	1003	12	1031	7
FLIP 88-31L	6445	324	14	392	15	942	28	676	28	960	17
FLIP 88-50L	6474	306	19	405	9	2333	2	996	13	1185	3
FLIP 88-51L	6475	371	7	488	1	1367	9	1237	5	1000	9
FLIP 89-30L	6788	411	3	461	2	982	27	818	19	895	24
FLIP 89-39L	6797	360	11	363	20	1263	14	853	18	892	25
FLIP 89-40L	6798	229	28	395	14	1180	18	463	34	996	11
FLIP 89-41L	6799	478	1	404	10	1717	4	877	17	974	15
FLIP 89-42L	6800	240	27	356	23	1121	19	411	36	676	34
FLIP 89-43L	6801	318	17	266	31	736	31	459	35	563	35
FLIP 89-44L	6802	179	33	373	18	1185	17	803	22	909	23
Local check		167	34	190	36	597	35	1693	2		
Location Mean		300		359		1228		910			
S.E. of Mean		44.39		42.06		652.21		199.71			
L.S.D. at 5%		129.31		122.51		-		581.71			
C.V. (%)		20.92		16.59		75.11		31.05			
Error df		25		25		35		25			
Significance		*		*		NS		*			
Efficiency		140		143		-		123			
Test > L. Check		21		27		-		0			

+ Since the blocks (adjusted) MS is less than intra block MS, the RCB analysis is performed on the data and the means are unadjusted. (1) Watrous and Idlib were excluded from the overall mean. \* = Significant at  $P < 0.05$ , NS = Not significant.

‡ Not analysed due to incomplete data set or other reasons.

Table 5.7.6. The five heaviest seed yielding entries at the individual locations in the LISN-T during 1989/90.

Rank	ALGERIA		BULGARIA	CANADA		GREECE	ITALY	JORDAN
	Guelma	Setif	Toshevo	Portage	Watrous	Larissa	Caltagirone	Jubeiha
1	Idleb -1	FLIP 85-33L	78 S 26052	FLIP 85-33L	[ FLIP 84-51L Local check	FLIP 88-50L	FLIP 89-30L	FLIP 87-45L
2	FLIP 89-40L	FLIP 88-51L	FLIP 86-38L	FLIP 87-21L		78 S 26052	FLIP 86-24L	FLIP 88-51L
3	78 S 26052	FLIP 88-50L	FLIP 89-43L	Local check	[ FLIP 87-21L FLIP 85-33L	ILL 1939	FLIP 86-33L	FLIP 88-50L
4	FLIP 86-35L	FLIP 89-41L	FLIP 86-35L	FLIP 86-16L		FLIP 84-58L	Idleb -1	[ 78 S 26013 FLIP 84-58L
5	[ FLIP 89-43L FLIP 84-51L	FLIP 86-24L	FLIP 89-41L	FLIP 89-43L	81 S 15	FLIP 87-49L	FLIP 88-50L	
		FLIP 84-58L	FLIP 89-42L		FLIP 89-41L	FLIP 87-52L		
					[ Idleb -1 FLIP 84-58L			

Cont'd. ...

Rank	JORDAN	LEBNON	NEW ZEALAND	PORTUGAL	SYRIA		
	Ramtha	Terbol	Lincoln	Elvas	Aleppo	Gelline	Heimo
1	FLIP 89-40L	FLIP 88-50L	FLIP 87- 9L	ILL 468	FLIP 84-59L	FLIP 84-58L	FLIP 87- 9L
2	[ FLIP 88-50L FLIP 87-49L	Idleb -1	FLIP 84-58L	FLIP 85-33L	FLIP 87- 9L	FLIP 87-59L	Local check
3		FLIP 89-40L	FLIP 89-39L	Laird	ILL 468	Idleb -1	FLIP 88-50L
4	FLIP 89-41L	FLIP 86-35L	ILL 468	FLIP 87- 9L	FLIP 88- 8L	FLIP 86-35L	FLIP 87-49L
5	[ FLIP 87- 9L FLIP 86-35L Local small	FLIP 88- 8L	ILL 1939	FLIP 89-40L	FLIP 85-33L	FLIP 88-51L	FLIP 89-40L

Cont'd. ...

Rank	SYRIA		TUNISIA			TURKEY	
	Idleb	Izra'a	Beja -I	Beja -II	EL Kef	Diyarbakir	Eskisehir
1	FLIP 87-45L	FLIP 88- 8L	78 S 26052	FLIP 89-41L	FLIP 88-51L	FLIP 84-58L	FLIP 87-59L
2	FLIP 88-50L	78 S 26013	FLIP 89-39L	FLIP 87-21L	FLIP 89-30L	FLIP 88-50L	Local check
3	FLIP 87-49L	FLIP 84-58L	FLIP 88-50L	FLIP 89-30L	[ FLIP 87-49L FLIP 86-33L	FLIP 85-33L	FLIP 86-24L
4	FLIP 88-51L	FLIP 86-35L	FLIP 87-59L	FLIP 84-58L		FLIP 89-41L	78 S 26052
5	[ FLIP 89-42L FLIP 85-33L	FLIP 89-30L	FLIP 86-24L	FLIP 86-33L	FLIP 86-24L	FLIP 87-59L	FLIP 88-51L
			FLIP 89-41L		FLIP 86-38L		
			FLIP 89-40L		FLIP 85-33L		

The brackets indicate entries having the same rank.



kg/ha), and Lincoln in New Zealand (1408 kg/ha). The LSD estimates reveal that at a large number of locations, some of the test entries, outyielded the respective local check by a significant margin. The five heaviest yielding entries at individual locations are given in Table 5.7.6. The five heaviest yielding lines across the locations included FLIP 84-58L, FLIP 85-33L, FLIP 88-50L, Idleb 1, and FLIP 87-9L and gave seed yields of 1279, 1230, 1185, 1099, and 1061 kg/ha. respectively.

#### **5.8. LENTIL INTERNATIONAL F<sub>4</sub> NURSERY - (LIF<sub>4</sub>N)**

There were four different segregating populations nurseries namely, Lentil International F<sub>3</sub> Nurseries - Large (LIF<sub>3</sub>N-L), Lentil International F<sub>3</sub> Nurseries - Small (LIF<sub>3</sub>N-S), Lentil International F<sub>3</sub> Nurseries - Early (LIF<sub>3</sub>N-E), and Lentil International F<sub>4</sub> Nurseries - Cold Tolerance (LIF<sub>4</sub>N-CT).

##### **Material**

The material for LIF<sub>3</sub>N-L, LIF<sub>3</sub>N-S, LIF<sub>3</sub>N-E, and LIF<sub>4</sub>N-CT included 31, 28, 31 and 12 populations respectively, and two checks, one supplied and the other (local check) to be added by the cooperator (Tables 5.8.1, 5.8.2, 5.8.3 and 5.8.4). These populations were derived from the divergent crosses and were expected to release a wide genetic base upon which the selection can be practiced by the cooperators under their local conditions.

##### **Methods and Management**

The augmented block design was suggested. The plot size was 8 rows, each 4 m long accommodating 800 seeds per plot. The between row spacing was suggested to be 25 cm. Eleven, 9, 19 and 9 nurseries were supplied to various countries for F<sub>3</sub>N-L, F<sub>3</sub>N-S, F<sub>3</sub>N-E and F<sub>4</sub>N-CT respectively, but information about selection of individual plants was received back from only 1, 0, 1 and 1 cooperators.

##### **Results and Discussion**

The list of entries supplied to cooperators and the individual plant selections reported by the cooperators are given in Tables 5.8.1, 5.8.2, 5.8.3 and 5.8.4 respectively.

#### **5.9. LENTIL INTERNATIONAL ASCOCHYTA BLIGHT NURSERY (LIABN)**

##### **Material**

The LIABN included 24 test entries, one local susceptible check to be supplied by the cooperator and one repeated susceptible check. The test entries have been selected on the basis of their reaction to Ascochyta blight tested at Lattakia in Syria and Islamabad in Pakistan.

Table 5.8.1. Number of plant selections made in different populations Lentil International F5 nursery - Large - 1990 at New Delhi, India.

Cross No.	Parents	Origin	India New Delhi
X84S 38	ILL5426 X ILL 8	ICARDA	-
X84S 49	ILL5741 X ILL 8	ICARDA	-
X84S 68	ILL5743 X ILL4354	ICARDA	-
X84S 72	ILL5744 X ILL 15	ICARDA	-
X84S 73	ILL5744 X ILL 28	ICARDA	-
X84S 78	ILL5744 X ILL1042	ICARDA	-
X84S 87	ILL5746 X ILL 262	ICARDA	-
X84S 89	ILL5746 X ILL1042	ICARDA	-
X84S 95	ILL5814 X ILL 28	ICARDA	-
X84S 97	ILL5814 X ILL 254	ICARDA	-
X84S 100	ILL5814 X ILL1042	ICARDA	-
X84S 106	ILL5815 X ILL 28	ICARDA	-
X84S 108	ILL5815 X ILL 254	ICARDA	-
X84S 186	ILL4354X83S4698 (LXP)	ICARDA	-
X84S 189	ILL 28 X ILL 8	ICARDA	-
X84S 190	ILL4354 X ILL 8	ICARDA	-
X85S 1	ILL 8 X ILL5698	ICARDA	-
X85S 2	ILL 8 X ILL5700	ICARDA	25
X85S 3	ILL 8 X ILL5745	ICARDA	-
X85S 4	ILL 8 X ILL5747	ICARDA	-
X85S 6	ILL 8 X ILL5753	ICARDA	-
X85S 11	ILL 28 X ILL5747	ICARDA	25
X85S 12	ILL 28 X ILL5748	ICARDA	-
X85S 16	ILL 468 X ILL5700	ICARDA	-
X85S 36	ILL5743 X ILL5698	ICARDA	-
X85S 58	ILL5748 X ILL 19	ICARDA	-
X85S 61	ILL5748 X ILL4606	ICARDA	-
X85S 73	83S 4675 (LXP) X ILL5747	ICARDA	50
X85S 94	ILL4354X83S 4674 (LXP)	ICARDA	25
X85S 95	ILL4354X83S 4675 (LXP)	ICARDA	25
X85S 107	ILL 28 X ILL5732	ICARDA	-
Local Large	(ILL 4400)	Syria	-
Local Check	-	-	-

Table 5.8.2 The list of populations in Lentil International F3 Nursery - Small- 1990.

Cross No.	Parents	Origin
213	ILL4354 X ILL5729	ICARDA
216	ILL4354 X ILL6015	ICARDA
223	ILL5700 X ILL5729	ICARDA
225	ILL5700 X ILL5860	ICARDA
226	ILL5700 X ILL6015	ICARDA
231	ILL1939 X ILL4399	ICARDA
232	ILL1939 X ILL5700	ICARDA
240	ILL1939 X ILL6243	ICARDA
241	ILL5588 X ILL 975	ICARDA
243	ILL5588 X ILL4399	ICARDA
253	ILL5604 X ILL 975	ICARDA
258	ILL5604 X ILL5729	ICARDA
260	ILL5604 X ILL5860	ICARDA
261	ILL5604 X ILL6015	ICARDA
262	ILL5604 X ILL6021	ICARDA
263	ILL5604 X ILL6238	ICARDA
264	ILL5604 X ILL6243	ICARDA
265	ILL5728 X ILL 975	ICARDA
274	ILL5728 X ILL6021	ICARDA
277	ILL5883 X ILL 975	ICARDA
279	ILL5883 X ILL4399	ICARDA
280	ILL5883 X ILL5700	ICARDA
284	ILL5883 X ILL5860	ICARDA
285	ILL5883 X ILL6015	ICARDA
303	ILL2130 X ILL6015	ICARDA
304	ILL4401 X ILL1939	ICARDA
306	ILL4401 X ILL5729	ICARDA
307	ILL4401 X ILL5883	ICARDA
ILL 4401	-	Syria
Local check	-	-

Table 5.8.3. Number of plant selections made in different populations in Lentil International F3 Nursery - EARLY - 1990 at Elvas in Portugal.

Cross No.	Parents	Origin	Portugal Elvas
2	ILL2501 X ILL1693	ICARDA	3
3	ILL2501 X ILL5480	ICARDA	2
4	ILL2501 X ILL5871	ICARDA	2
7	ILL2501 X ILL6037	ICARDA	1
15	ILL2573 X ILL 358	ICARDA	1
22	ILL3527 X ILL 358	ICARDA	1
29	ILL3529 X ILL 358	ICARDA	2
31	ILL3529 X ILL5480	ICARDA	3
32	ILL3529 X ILL5871	ICARDA	1
33	ILL3529 X ILL5989	ICARDA	2
41	ILL4405 X ILL6024	ICARDA	1
43	ILL2582 X ILL 358	ICARDA	2
44	ILL2582 X ILL2526	ICARDA	1
45	ILL2582 X ILL2573	ICARDA	-
46	ILL2582 X ILL3613	ICARDA	-
47	ILL2582 X ILL5888	ICARDA	1
48	ILL3517 X ILL 358	ICARDA	-
49	ILL3517 X ILL2526	ICARDA	-
50	ILL3517 X ILL2573	ICARDA	2
53	ILL5486 X ILL 358	ICARDA	-
55	ILL5486 X ILL2573	ICARDA	1
60	ILL5562 X ILL2573	ICARDA	1
61	ILL5562 X ILL3613	ICARDA	2
71	ILL6024 X ILL3613	ICARDA	2
72	ILL6024 X ILL5888	ICARDA	4
73	ILL1712 X ILL2582	ICARDA	2
74	ILL1712 X ILL3516	ICARDA	2
78	ILL2573 X ILL3516	ICARDA	-
79	ILL2573 X ILL3493	ICARDA	-
80	ILL2573 x ILL6000	ICARDA	-
82	ILL2578 X ILL3516	ICARDA	2
Precoz (ILL 4605)	-	Argentina	-
Local check	-	-	-

Table 5.8.4. Number of plant selections made in different populations in Lentil International F4 Cold Tolerance - 1990 at New Delhi, India.

Entry Name	Pedigree	Origin	INDIA-New Delhi
X82X 12	ILL 4965 X ILL 1880	ICARDA	-
X84S 1	ILL 45 X ILL 16	ICARDA	-
X84S 4	ILL 45 X ILL 1880	ICARDA	5
X84S 5	ILL 45 X ILL 4400	ICARDA	-
X84S 7	ILL 323 X ILL 28	ICARDA	5
X84S 8	ILL 323 X ILL 193	ICARDA	15
X84S 11	ILL 1878 X ILL 16	ICARDA	5
X84S 14	ILL 1878 X ILL 1880	ICARDA	5
X84S 15	ILL 1878 X ILL 4400	ICARDA	5
X84S 19	ILL 4965 X ILL 1880	ICARDA	5
X84S 20	ILL 4965 X ILL 4400	ICARDA	5
X87S 225	ILL 1878 X ILL 467	ICARDA	15
Local Check	-	-	-
Precoz (Susceptible Check)	-	Argentina	-

Table 5.9.1. Reaction of lentil entries to Ascochyta blight in LIAEN during 1989/90.

Entry Name	ILL	Parentage	Origin	Algeria		Pakistan		Turkey	New Zealand
				Guelma	Faisalabad	Islamabad	Erzurum	Lincoln	
-	358	-	Mexico				3	1	3
-	2439	-	Egypt	N		N	3	6	1
S 30116	2532	-	India	O		O	3	1	1
IG 14	3516	-	India				1	1	3
UWL-81129	5244	-	Jordan	D		D	1	1	5
Lenka	5480	-	Czechoslovakia	I		I	3	4	1
78S 26013	5588	-	Jordan	S		S	1	1	3
78S 26033	5597	-	Syria	E		E	3	1	3
78S 26038	5599	-	Syria	A		A	1	1	5
78S 26052	5604	-	Turkey	S		S	3	1	1
FLIP 84- 11L	5684	ILL 253 X ILL 470	ICARDA	E		E	1	4	3
FLIP 84- 43L	5714	ILL 500 X ILL1719	ICARDA				3	1	3
FLIP 84- 44L	5715	ILL 500 X ILL1719	ICARDA	S		S	7	1	3
FLIP 84- 55L	5725	ILL 610 X ILL 784	ICARDA	C		C	3	2	1
FLIP 84- 60L	5730	ILL 500 X ILL 254	ICARDA	O		O	3	5	5
FLIP 84- 80L	5750	ILL 502 X ILL1719	ICARDA	R		R	3	1	5
FLIP 84- 81L	5751	ILL 889 X ILL 588	ICARDA	E		E	1	1	3
FLIP 84- 85L	5755	ILL 445 X ILL 470	ICARDA				3	1	1
FLIP 84- 96L	5766	ILL 101 X ILL 321	ICARDA				1	1	3
FLIP 86- 12L	5998	ILL4349 X ILL4605	ICARDA				3	1	3
FLIP 86- 16L	6002	ILL4349 X ILL4605	ICARDA				5	1	7
FLIP 86- 38L	6024	ILL 262 X ILL3458	ICARDA				5	1	3
FLIP 86- 39L	6025	ILL 1 X ILL 936	ICARDA				1	3	3
FLIP 87- 68L	6258	ILL4353 X ILL4400	ICARDA				1	6	3
Local Susceptible Check		-	-				9	1	3
Part L 538	2500 (Repeated Susceptible Check)		India				9	6	3

## **Methods and Management**

The suggested experimental design was randomized complete block with two replications. The suggested plot size was one row 4 m long accommodating 200 seeds. The susceptible check was repeatedly sown after every two test entries/rows to serve as an indicator cum spreader row. The cooperators in the Mediterranean region were advised to sow the nursery in the winter season to get high disease pressure. Otherwise the nurseries were managed as per the local agronomic practices. In the absence of natural infestation, the cooperators were advised to do the artificial inoculation of the nursery with the blight disease either by scattering the diseased debris collected from the previous season or by supplementing the natural infection by spraying the spore suspension prepared from the freshly infected plants in the fields. A 1-9 scale was recommended for scoring the disease severity at least at two times, first in the vegetative stage and the second at the podding stage. The scale recommended was 1 = highly resistant; 3 = resistant; 5 = tolerant; 7 = susceptible; and 9 = highly susceptible.

Sixteen sets of LIABN were distributed to cooperators in 9 countries, and the data were, however, received for 5 sets from 5 countries.

## **Results and Discussion**

At Lincoln in New Zealand all the entries including the susceptible check (except FLIP 86-16L) exhibited rating between 1 and 5 (Table 5.9.1).

At Erzurum in Turkey, the reaction was reported for eight entries. Five of these entries took the rating between 2 and 5, and others including susceptible check took 6 rating.

At Islamabad in Pakistan, the susceptible check was rated at 9, and another entry FLIP 84-44L took rating of 7, and all others were rated between 1 and 5.

At Guelma in Algeria and Faisalabad in Pakistan, no disease infestation was noticed.

### **5.10. LENTIL INTERNATIONAL FUSARIUM WILT NURSERY (LIFWN)**

#### **Material**

The LIFWN included 12 test entries, one susceptible check and one repeated check to be added by the cooperator. The test entries have been selected on the basis of their reaction to Fusarium wilt in Addis Abbaba in Ethiopia and Tel Hadya in Syria.

#### **Methods and Management**

The suggested experimental design was randomized complete block with two replications. The suggested plot size was one row 4m long accommodating 40 plants. The susceptible check was repeatedly sown after two test entries/rows to serve as an indicator cum spreader row. A 1-9 scale was recommended for scoring disease severity. The scale recommended was 1 = highly resistant; 3 = resistant; 5 = tolerant; 7 = susceptible; and 9 = highly susceptible.

Nineteen sets of LIFWN were distributed to cooperators in 11 countries and the results were received from 7 cooperators from 5 countries.

Table 5.10.1. Reaction of lentil entries to Fusarium wilt in LIFWN during 1989/90

Entry Name	Cross No.	Parents	Origin	ALGERIA	GREECE	NEW ZEALAND	PAKISTAN	SYRIA		
				Guelma	Larissa	Lincoln	Faisalabad	Idleb	Izra'a	Heimo
-	241	-	Syria	6	N	N	N	N	2	1
-	632	-	Turkey	7	O	O	O	O	1	1
-	813	-	Egypt	-	-	-	-	-	1	1
El 42	1712	-	Ethiopia	-	D	D	D	D	1	5
-	1878	-	Turkey	6	I	I	I	I	1	1
Pant L-406	2501	-	India	-	S	S	S	S	3	1
LP 286	4377	-	India	-	E	E	E	E	3	1
FLIP 86-65L	6051	ILL 101 X ILL 262	ICARDA	3	A	A	A	A	1	1
FLIP 87-68L	6258	ILL 4353 X ILL 4400	ICARDA	7	S	S	S	S	1	1
HC - 125	6408	-	Bulgaria	-	E	E	E	E	1	1
HC - 1414	6410	-	Bulgaria	-	-	-	-	-	3	1
FLIP 88-37L	6461	ILL 1744 X ILL 2573	ICARDA	-	S	S	S	S	1	1
Local Susceptible Check	-	-	-	7	C	C	C	C	3	1
FLIP 86-45L	6031	ILL 101 x ILL 262	ICARDA	7	O	O	O	O	2	1
(Susceptible check repeated after every 2 test entries).					R	R	R	R		
					E	E	E	E		

## Results and Discussion

At Idleb in Syria, Lincoln in New Zealand, Faisalabad in Pakistan, and Larissa in Greece, there was no disease development (Table 5.10.1). At Izra'a and Heimo in Syria all the entries including the susceptible check were rated between 1 and 5. At Guelma, however, only one entry FLIP 86-65L was reported as tolerant while among other tested lines all took a rating of 6 or 7.

### 5.11. LENTIL INTERNATIONAL COLD TOLERANCE NURSERY (LICIN)

#### Material

The LICIN included 16 test entries, one local check and one susceptible repeated check. The test entries have been selected on the basis of their reaction to cold in Italy and high elevation site in Turkey.

#### Methods and Management

The suggested experimental design was randomized complete block with two replications. The suggested plot size was two rows each 4 m long accomodating 400 plants. The susceptible check was repeatedly sown after every two test entries/rows to serve as an indicator row. The cooperators in the Mediterranean region were advised to sow the nursery early into the winter to get better expression of cold. Otherwise the nurseries were managed as per the local agronomic practices. It was suggested to record the number of plants germinated before the onset of severe winter.

A 1-9 scale was recommended for scoring the cold severity at different stages of cold occurrence. The scale recommended was 1 = highly resistant; 3 = resistant; 5 = tolerant; 7 = susceptible; and 9 = highly susceptible.

Fifteen sets of LICIN were distributed to cooperators in 9 countries, however, results were received for 4 sets from 3 countries.

#### Results and Discussion

Out of four locations returning the data, two locations namely Eskisehir and Erzurum in Turkey reported 0% germination (Table 5.11.1). At the other two locations, Toshevo in Bulgaria, and Setif in Algeria there was no cold damage. The list of entries tested in this trial is given in Table 5.11.1.

Table 5.11.1. Lentil International Cold Tolerance Nursery - 1990

Entry Name	Origin	Entry Name	Origin
ILL 52	Iraq	ILL 780	Syria
ILL 298	Greece	ILL 857	Algeria
ILL 312	Greece	ILL 983	Chile
ILL 323	Yugoslavia	ILL 1878	Turkey
ILL 465	Chile	ILL 1918	Austria
ILL 468	Chile	ILL 4400	Syria
ILL 590	Turkey	Local check	-
ILL 632	Turkey	ILL 4605 (Precoz)	Argentina
ILL 662	Turkey	(Susceptible check repeated	
ILL 759	Iran	after every 2 test entries).	



## **6. PEA INTERNATIONAL ADAPTATION TRIAL (PIAT)**

### **Introduction**

This was the third year of adaptation trial on peas. The main objective of distribution of this trial was to study the adaptation of elite materials developed in various countries in international testing environments especially in West Asia and North Africa region. The cooperators were free to use these materials in their breeding programs or for release as cultivars.

### **Material**

The material for the Pea International Adaptation Trial comprised 23 test entries, and one local check to be supplied by the cooperator. The test entries were selected from the local and regional yield trials based on their superior yield performance.

### **Methods and Management**

The trial design was a randomized complete block with three replications. The suggested plot size was four rows each 4m long with an inter- and intra row spacing of 30- and 10cm, respectively.

Forty sets of trial were distributed to cooperators in 26 countries and the results were returned from 17 sets covering 12 countries. The agronomic practices employed at different locations are shown in Table 6.1.

### **Results and Discussion**

Mean for time to flowering, time to maturity, plant height, and 100-seed weight are compiled in Tables 6.2, 6.3, and 6.4, respectively. Time to flowering ranged from 88 days for PS 210688, PS 510314 and PS 510699 to 104 days for Century. The location means for time to flowering varied from 56 days at Rwerere in Rwanda to 139 days at Tel Hadya in Syria. The entries PS 510699 matured earliest in 145 days.

The plant height data revealed that the entry ILP 974 was the tallest (83 cm) and entries SV 51741, Ballet, Echo, and Kasion were among the shortest (43-46 cm).

The mean seed yield at different locations (Table 6.5) revealed that highest seed yield per hectare was obtained at Cordoba in Spain (3899 kg/ha) and was followed by Sidi Bel Abbes in Algeria (3736 kg/ha) and Temuco in Chile (3463 kg/ha). The seed yields at Idleb (217 kg/ha) and Tel Hadya (332 kg/ha) in Syria; Rwerere in Rwanda (343 kg/ha); and Mushagar in Jordan (395 kg/ha) were very low. The ANOVA of the seed yield revealed that 2, 21, 12, 12, 2, 21, 8, 7, 3, 15, 10, and 6 entries, respectively, at Sidi Bel Abbes (Algeria); Athalassa (Cyprus), Mushagar (Jordan); Terbol (Lebanon); Elvas (Portugal); Cordoba (Spain); Gelline, Heimo, Idleb, Jindiress, and Tel Hadya (Syria); and Beja (Tunisia), outyielded the respective check by a significant margin. The five heaviest yielders at different locations are given in Table 6.6. The entries, Local Selection 1690, and PS 210713

Table 6.1. Agronomic data for different locations in the PIAT during 1989/90.

Country	Location	Planting Date	Harvesting Date	Fertilizer (kg/ha)			Irrigation	Insecticide/Fungicide Herbicide	Local check
				N	P	K			
ALGERIA	Sidi Bel Abbas	07.12.1989	06.07.1990	-	46	-	-	Igran, Kerb	SBA 184
CHILE	Temuco	18.08.1990	10.01.1991	-	150	-	-	Esfenvelerate, Metribuzine	Finale
CYPRUS	Athalassa	28.11.1989	16.05.1990	48	60	-	-	-	Lythrodondas
JORDAN	Mushagar	06.12.1989	NA	20	40	-	-	-	Local
LEBANON	Terbol	30.11.1989	10.06.1990	-	50	-	-	Fortrol, Kerb	NA
LIBYA	Kufra	21.10.1989	01.04.1990	100	150	-	-	-	L.L.I.
PORTUGAL	Elvas	25.01.1990	07.06.1990	-	60	60	-	-	Gb 950
RWANDA	Rwerere	30.10.1989	NA	-	-	-	-	-	Kyondo
SPAIN	Cordoba	08.01.1990	01.06.1990	-	-	-	-	-	COCAC
SUDAN	Hudeiba	14.11.1989	18.02.1990	43	-	-	11	Folimat	Karima
SYRIA	Al Ghab	28.12.1989	26.05.1990	-	-	-	-	-	Onward
SYRIA	Gelline	NA	NA	-	-	-	-	-	NA
SYRIA	Heimo	08.11.1989	NA	-	100	-	-	-	NA
SYRIA	Idleb	28.11.1989	30.05.1990	-	60	-	-	-	NA
SYRIA	Tel Hadya	19.11.1989	05.05.1990	-	50	-	-	Bravo	S.L.
TUNISIA	Beja	NA	NA	NA	-	-	NA	NA	NA

NA = Not available.

Table 6.2. Time to flowering (days) of entries at different locations in the PIAT during 1989/90.

Entry Name	Origin	ALGERIA	CHILE	CYPRUS	JORDAN	LEBANON	LIBYA
		Sidi Bel Abbas	Temuco	Athalassa	Mushager	Terbol	Kufra
Syrian local	Syria	96	98	104	128	141	71
Local Sel 1690	Syria	96	97	104	126	141	71
Frisson	France	97	81	92	113	131	51
Consort	U.K.	98	93	96	117	133	54
SV 51741	Sweden	104	92	99	126	137	65
Scout	U.K.	98	80	91	120	139	47
Ballet	U.K.	100	91	97	119	133	59
ILP 974	ICARDA	98	90	95	125	131	54
ILP 845	ICARDA	124	94	107	121	143	75
Century	U.K.	120	97	103	127	145	72
MG 100452	Greece	101	92	93	112	132	53
MG 102583	Turkey	104	91	97	123	135	67
Collegian	Australia	102	94	98	129	132	70
Derrimut	Australia	102	92	94	114	127	52
Wirrega	Australia	116	95	99	125	136	66
Echo	U.K.	102	90	95	115	132	54
Kasion	U.K.	98	94	96	116	135	56
ILP 56	ICARDA	97	84	93	112	133	50
PS 210713	U.S.A.	98	91	96	121	132	57
PS 210688	U.S.A.	98	79	88	109	125	45
PS 510203	U.S.A.	98	91	91	117	125	51
PS 510314	U.S.A.	97	84	87	109	127	41
PS 510699	U.S.A.	97	79	87	109	127	48
Local Check	-	97	88	99	122	145	52
<b>Location Mean</b>		<b>101</b>	<b>90</b>	<b>96</b>	<b>119</b>	<b>134</b>	<b>58</b>
S.E. of Mean		1.38	1.78	0.56	2.39	0.71	0.89
L.S.D. at 5%		3.93	5.06	1.60	6.80	2.01	2.53
C.V. (%)		2.36	3.43	1.02	3.47	0.91	2.67
Error d.f.		46	46	46	46	46	46
Significance		*	*	*	*	*	*

Cont'd. ...

Table 6.2. Cont'd. ...

Entry Name	PORTUGAL	RWANDA	SPAIN	SUDAN	SYRIA				Overall	
	Elvas	Rwerere	Cordoba	Hudeiba	Al Ghab	Gelline	Heimo	Jindiress	Tel Badya	Mean
Syrian local	78	64	73	66	111	134	111	119	141	102
Local Sel 1690	78	65	73	65	110	133	108	116	142	102
Frisson	59	48	70	60	102	117	99	109	135	91
Consort	63	57	74	55	109	116	102	109	140	94
SV 51741	73	58	73	60	107	127	103	109	138	98
Scout	57	46	73	55	108	126	95	114	145	93
Ballet	66	58	71	55	107	124	103	109	140	95
ILP 974	65	57	72	57	101	120	106	107	139	94
ILP 845	65	57	74	70	114	119	106	116	146	102
Century	78	61	74	71	111	128	110	119	146	104
MG 100452	64	50	71	55	102	116	102	109	141	93
MG 102583	74	59	72	65	107	127	103	109	134	98
Collegian	74	63	74	66	104	128	108	109	139	99
Derrimut	61	55	72	55	98	118	101	107	126	92
Wirrega	75	66	73	71	105	123	108	114	134	100
Echo	64	58	73	47	102	115	100	107	137	93
Kasion	66	55	72	57	109	123	102	109	140	95
ILP 56	62	50	71	53	102	116	95	107	142	91
PS 210713	67	58	74	58	108	127	103	109	138	96
PS 210688	61	46	70	47	95	124	95	101	133	88
PS 510203	62	53	71	52	99	116	98	103	137	91
PS 510314	56	46	70	45	94	122	95	109	142	88
PS 510699	56	50	69	45	101	112	95	107	139	88
Local Check	57	60	71	55	117	127	105	120	149	
Location Mean	66	56	72	58	105	122	102	110	139	
S.E. of Mean	1.22	1.43	1.18	2.03	0.41	6.94	2.17	0.38	1.28	
L.S.D. at 5%	3.46	4.08	-	5.78	1.16	-	6.16	1.09	3.63	
C.V. (%)	3.20	4.45	2.83	6.10	0.67	9.81	3.67	0.60	1.59	
Error d.f.	46	46	46	46	46	46	46	46	46	
Significance	*	*	NS	*	*	NS	*	*	*	

\* = Significant at  $P < 0.05$ , NS = Not significant.

Table 6.3. Time to maturity (days) of entries at different locations in the PIAT during 1989/90.

Entry Name	ALGERIA	CHILE	JORDAN	LEBANON	LIBYA	PORTUGAL	RWANDA
	Sidi Bel Abbas	Temuco	Mushager	Terbol	Kufra	Elvas	Rwerere
Syrian local	188	144	180	185	156	130	90
Local Sel 1690	188	143	175	184	154	128	92
Frisson	183	140	178	182	151	128	78
Consort	182	143	174	186	151	125	82
SV 51741	182	140	177	186	150	124	83
Scout	186	139	186	184	146	123	76
Ballet	182	142	181	189	152	125	85
ILP 974	186	143	177	185	153	125	87
ILP 845	189	144	181	186	153	129	83
Century	182	144	180	188	157	129	90
MG 100452	186	143	177	187	147	127	79
MG 102583	184	142	177	185	152	127	89
Collegian	189	143	186	184	158	125	89
Derrimut	182	140	175	182	152	124	82
Wirrega	184	145	177	183	150	125	93
Echo	132	142	181	188	151	124	82
Kasion	183	141	181	189	154	125	84
ILP 56	178	142	173	184	148	126	81
PS 210713	181	142	177	189	151	125	82
PS 210688	183	143	178	183	148	129	79
PS 510203	178	141	179	187	147	125	82
PS 510314	185	143	181	187	144	125	78
PS 510699	171	141	173	184	148	124	77
Local Check	194	140	184	189	142	125	88
Location Mean	184	142	179	186	151	126	84
S.E. of Mean	1.69	0.68	1.88	1.06	3.40	1.56	1.51
L.S.D. at 5%	4.82	1.95	5.35	3.01	-	-	4.31
C.V. (%)	1.60	0.83	1.82	0.99	3.92	2.14	3.13
Error d.f.	46	46	46	46	46	46	46
Significance	*	*	*	*	NS	NS	*

Cont'd. ...

Table 6.3. Cont'd. ...

Entry Name	SPAIN	SUDAN	SYRIA				Overall Mean
	Cordoba	Hudeiba	Al Ghab	Gelline	Heimo	Tel Hadya	
Syrian local	138	93	148	176	170	176	152
Local Sel 1690	135	95	148	175	171	178	151
Frisson	137	93	142	176	161	171	148
Consort	136	81	142	173	162	176	147
SV 51741	134	90	143	177	163	175	148
Scout	136	81	146	178	160	185	148
Ballet	137	89	144	175	163	176	149
ILP 974	140	84	146	181	166	176	150
ILP 845	138	94	149	176	161	182	151
Century	136	89	148	175	165	180	151
MG 100452	134	81	144	177	164	176	148
MG 102583	135	91	144	176	162	174	149
Collegian	135	87	144	178	164	173	150
Derrimut	136	91	142	177	145	176	146
Wirrega	135	89	144	175	165	176	149
Echo	135	79	143	177	160	176	148
Kasion	136	87	143	177	162	174	149
ILP 56	136	83	142	175	161	176	147
PS 210713	137	89	144	177	164	176	149
PS 210688	139	89	143	176	162	175	148
PS 510203	138	88	144	178	163	176	148
PS 510314	136	89	142	175	161	179	148
PS 510699	139	81	138	177	161	175	145
Local Check	135	82	150	174	168	187	
Location Mean	136	87	144	176	163	177	
S.E. of Mean	1.59	1.35	0.35	1.38	4.35	0.95	
L.S.D. at 5%	-	3.86	1.00	-	-	2.71	
C.V. (%)	2.03	2.69	0.42	1.35	4.63	0.93	
Error d.f.	46	46	46	46	46	46	
Significance	NS	*	*	NS	NS	*	

\* = Significant at  $P < 0.05$ , NS = Not significant.

Table 6.4. Plant height (cm) of entries at different locations in the PIAT during 1989/90.

Entry Name	ALGERIA	CHILE	CYPRUS	JORDAN	LEBANON	LIBYA	PORTUGAL	RWANDA	SPAIN
	Sidi Bel Abbas	Temuco	Athalassa	Mushager	Terbol	Kufra	Elvas	Rwerere	Cordoba
Syrian local	48	93	47	50	69	143	76	155	62
Local Sel 1690	83	93	33	63	67	113	79	145	63
Frisson	48	47	47	31	32	63	51	59	63
Consort	60	53	35	42	33	73	48	59	60
SV 51741	50	43	37	25	30	62	44	66	62
Scout	30	53	33	28	32	87	58	62	46
Ballet	58	54	27	29	32	58	45	68	57
ILP 974	88	113	45	55	67	155	89	178	67
ILP 845	70	105	38	43	61	145	93	131	63
Century	65	95	45	49	50	142	82	149	73
MG 100452	65	115	33	50	67	145	78	134	56
MG 102583	43	56	32	27	30	102	44	102	54
Collegian	55	102	50	46	65	162	83	138	69
Derrimut	78	88	33	42	52	117	70	120	54
Wirrega	65	92	40	48	49	143	70	142	56
Echo	51	46	47	28	34	62	46	69	62
Kasion	52	53	43	21	34	65	50	64	63
ILP 56	53	102	45	41	57	155	95	122	63
PS 210713	50	41	30	38	29	82	52	60	57
PS 210688	58	83	42	43	52	143	74	137	54
PS 510203	53	93	47	45	52	115	72	126	69
PS 510314	63	100	43	49	59	150	81	127	54
PS 510699	63	95	48	36	55	117	71	142	55
Local Check	53	52	27	27	34	58	47	162	70
Location Mean	58	78	39	40	48	111	67	113	60
S.E. of Mean	1.42	4.43	6.40	4.70	3.39	9.70	4.10	5.59	7.05
L.S.D. at 5%	4.03	12.60	-	13.38	9.65	27.61	11.68	15.90	-
C.V. (%)	4.22	9.85	28.11	20.51	12.35	15.18	10.67	8.54	20.19
Error d.f.	46	46	46	46	46	46	46	46	46
Significance	*	*	NS	*	*	*	*	*	NS

Cont'd. ...

Table 6.4. Cont'd. ...

Entry Name	SUDAN			SYRIA				Overall Mean
	Hudeiba	Al Ghab	Gelline	Heimo	Idleb	Jindiress	Tel Hadya	
Syrian local	96	62	115	41	43	39	34	73
Local Sel 1690	111	62	95	36	48	40	36	73
Frisson	62	42	77	25	33	32	30	46
Consort	66	43	62	32	32	29	23	47
SV 51741	49	36	65	27	31	31	24	43
Scout	65	46	72	43	23	31	22	46
Ballet	62	41	62	29	30	30	22	44
ILP 974	142	64	108	41	47	39	34	83
ILP 845	93	61	103	40	35	46	36	73
Century	71	73	95	42	30	38	30	70
MG 100452	82	56	102	30	39	34	26	70
MG 102583	65	40	77	25	34	31	21	49
Collegian	111	59	108	35	46	36	35	75
Derrimut	98	49	90	30	42	33	33	64
Wirrega	80	50	90	29	42	40	34	67
Echo	59	49	52	34	31	34	24	45
Kasion	70	46	72	30	31	26	23	46
ILP 56	89	53	100	30	40	34	32	69
PS 210713	75	49	70	24	30	28	26	46
PS 210688	87	53	102	33	40	35	29	67
PS 510203	82	53	90	35	30	31	34	64
PS 510314	104	54	102	36	35	41	27	70
PS 510699	88	48	98	34	34	36	27	65
Local Check	90	43	68	36	28	26	19	
<b>Location Mean</b>	<b>83</b>	<b>51</b>	<b>86</b>	<b>33</b>	<b>36</b>	<b>34</b>	<b>28</b>	
S.E. of Mean	6.28	2.49	4.93	3.17	3.05	3.89	2.15	
L.S.D. at 5%	17.89	7.09	14.04	9.02	8.69	-	6.11	
C.V. (%)	13.10	8.39	9.89	16.54	14.88	19.76	13.08	
Error d.f.	46	46	46	46	46	46	46	
Significance	*	*	*	*	*	NS	*	

\* = Significant at  $P < 0.05$ , NS = Not significant.



Table 6.5. Seed yield (Y=kg/ha) and rank (R) of entries at different locations in the PIAT during 1989/90.

Entry Name	ALGERIA		CHILE		CYPRUS		JORDAN		LEBANON		LIBYA	
	Sidi Bel Abbas		Temuco		Athalassa		Mushager		Terbol		Kufra	
	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R
Syrian local	4075	7	4318	4	1112	12	465	8	2196	2	2507	16
Local Sel 1690	3842	12	4694	2	831	21	645	2	2452	1	3503	3
Frisson	2183	22	3659	10	1064	17	362	15	1535	10	3098	7
Consort	3358	16	2399	23	1243	5	490	6	825	20	2068	22
SV 51741	5204	3	2798	21	760	23	277	19	1351	12	2779	10
Scout	2225	21	2866	20	955	18	210	22	792	24	2569	14
Ballet	6692	2	3091	15	1235	6	329	17	823	21	2348	19
ILP 974	3888	11	3750	9	1125	11	363	14	1545	9	2133	21
ILP 845	4346	6	3960	8	882	19	418	10	1562	7	3242	6
Century	3942	10	3636	11	769	22	466	7	1324	13	2953	8
MG 100452	2600	18	4427	3	1275	3	664	1	1450	11	3244	5
MG 102583	2233	20	4003	7	1069	16	403	11	1109	16	3658	2
Collegian	5046	4	3008	17	840	20	309	18	1668	5	2737	11
Derrimut	3671	15	4003	6	1156	7	245	20	1975	3	2301	20
Wirrega	3954	9	4056	5	1143	9	336	16	1748	4	2538	15
Echo	1833	24	2111	24	1090	14	383	12	1102	17	1910	23
Kasion	3717	14	2525	22	1110	13	203	23	802	23	2628	13
ILP 56	2171	23	3018	16	1126	10	572	4	1559	8	2388	18
PS 210713	6925	1	2891	18	1434	2	640	3	1244	15	3464	4
PS 210688	4071	8	3500	12	1156	8	241	21	1601	6	1620	24
PS 510203	2929	17	2881	19	1087	15	373	13	978	18	2865	9
PS 510314	2546	19	3303	14	1441	1	422	9	946	19	5163	1
PS 510699	3754	13	3437	13	1250	4	530	5	1301	14	2668	12
Local Check	4458	5	4770	1	444	24	128	24	815	22	2460	17
Location Mean	3736		3463		1067		395		1363		2785	
S.E. of Mean	454.47		374.25		116.98		89.38		181.00		553.75	
L.S.D. at 5%	1085.76		1065.33		332.98		254.43		515.21		-	
C.V. (%)	17.20		18.72		19.00		39.22		23.01		34.44	
Error d.f.	23		46		46		46		46		46	
Significance	*		*		*		*		*		NS	
Test > Check	2		0		21		12		12		-	

Cont'd. ...

Table 6.5. Cont'd. ...

Entry Name	PORTUGAL		RWANDA		SPAIN		SUDAN		SYRIA			
	Elvas		Rwerere		Cordoba		Hudeiba		Al Ghab		Gelline	
	Y	R	Y	R	Y	R	Y	R	Y	R	Y	R
Syrian local	3594	5	438	9	3908	10	465	16	2722	4	2146	8
Local Sel 1690	3578	7	544	4	3779	15	380	18	2952	1	1632	17
Frison	2682	19	261	16	4113	7	593	14	2817	3	1721	14
Consort	2708	17	107	21	3868	11	947	7	2413	11	2289	5
SV 51741	3104	13	107	22	5456	2	579	15	2040	22	1695	15
Scout	1448	24	8	24	3219	21	641	12	2508	9	1668	16
Ballet	1953	23	224	18	4528	4	775	10	2381	13	1989	11
ILP 974	3411	8	466	7	3635	18	326	19	2167	18	1221	24
ILP 845	2995	14	591	2	3694	17	219	23	2135	20	1630	18
Century	3615	3	578	3	4071	8	310	20	2373	14	1602	19
MG 100452	3151	12	495	5	3796	13	269	22	2222	16	1990	10
MG 102583	2755	15	146	19	5026	3	759	11	2651	5	2432	2
Collegian	3682	2	357	14	3811	12	132	24	2000	23	1487	20
Derrimut	3724	1	464	8	2806	23	968	6	2508	8	1321	22
Wirrega	3255	10	398	11	2932	22	410	17	2294	15	1741	13
Echo	2344	22	109	20	3783	14	1069	5	2405	12	2179	6
Kasion	2396	21	240	17	4056	9	613	13	2079	21	1470	21
ILP 56	3594	6	391	12	3696	16	301	21	2881	2	1983	12
PS 210713	3292	9	18	23	5707	1	926	8	2635	6	2775	1
PS 210688	3609	4	362	13	3522	19	777	9	1643	24	2149	7
PS 510203	2682	18	424	10	3274	20	1266	3	2532	7	2111	9
PS 510314	3182	11	331	15	4276	5	1118	4	2159	19	2313	3
PS 510699	2734	16	484	6	4125	6	1400	2	2190	17	2290	4
Local Check	2526	20	690	1	2486	24	1688	1	2484	10	1295	23
Location Mean	3001		343		3899		705		2383		1880	
S.E. of Mean	383.06		67.44		238.77		156.48		301.60		294.75	
L.S.D. at 5%	1090.40		191.98		679.66		445.43		-		839.01	
C.V. (%)	22.11		34.05		10.61		38.42		21.92		27.15	
Error d.f.	46		46		46		46		46		46	
Significance	*		*		*		*		NS		*	
Test > Check	2		0		21		0		-		8	

Cont'd. ...

Table 6.5. Cont'd. ...

Entry Name	SYRIA								TUNISIA		Overall Mean	
	Heimo		Idleb		Jindiress		Tel Hadya		Beja		Y	R
	Y	R	Y	R	Y	R	Y	R	Y	R		
Syrian local	1890	1	149	15	1296	2	417	8	736	12	1908	3
Local Sel 1690	1694	4	189	12	1435	1	635	2	736	11	1972	2
Frisson	924	12	427	3	722	17	528	4	576	18	1604	16
Consort	892	14	256	6	824	12	324	11	1271	4	1546	19
SV 51741	1746	3	233	7	722	16	398	10	1257	5	1795	4
Scout	0	24	106	19	463	23	0	24	431	24	1183	23
Ballet	1541	6	110	18	778	14	213	18	1361	3	1786	5
ILP 974	702	20	368	4	935	9	204	19	694	15	1584	17
ILP 845	1637	5	217	11	1065	4	302	14	458	23	1727	8
Century	1163	8	219	9	574	20	130	21	646	16	1669	11
MG 100452	410	23	517	2	963	7	93	23	729	14	1664	12
MG 102583	943	11	710	1	861	11	630	3	882	7	1781	6
Collegian	1508	7	217	10	889	10	472	5	1049	6	1718	9
Derrimut	375	15	122	17	583	19	389	1	556	19	1645	14
Wirrega	1106	10	286	5	935	8	463	6	514	20	1653	13
Echo	1819	2	183	13	731	15	404	9	472	22	1408	22
Kasion	827	19	227	8	565	21	228	17	1681	2	1492	21
ILP 56	922	13	65	23	963	6	444	7	813	9	1581	18
PS 210713	852	17	90	21	1028	5	269	16	2007	1	2129	1
PS 210688	846	18	133	16	1111	3	306	13	778	10	1613	15
PS 510203	873	16	156	14	704	18	306	12	639	17	1534	20
PS 510314	1122	9	43	24	472	22	287	15	736	13	1756	7
PS 510699	433	22	90	22	806	13	107	22	819	8	1672	10
Local Check	654	21	97	20	296	24	130	20	479	21		
<b>Location Mean</b>	<b>1057</b>		<b>217</b>		<b>822</b>		<b>332</b>		<b>847</b>			
S.E. of Mean	225.27		115.21		152.56		89.08		151.33			
L.S.D. at 5%	641.25		327.94		434.28		253.57		430.77			
C.V. (%)	36.90		91.90		32.16		46.43		30.96			
Error d.f.	46		46		46		46		46			
Significance	*		*		*		*		*			
Test > Check	7		3		15		10		6			

\* = Significant at  $P < 0.05$ , NS = Not significant.

Table 6.6. The five heaviest seed yielding entries at the individual locations in the PIAT during 1989/90.

Rank	ALGERIA		CHILE		CYPRUS		JORDAN		LEBANON		LIBYA	
	Sidi	Bel Abbas	Temuco		Athalassa		Mushager		Terbol		Kufra	
1	PS 210713		Local check		PS 510314		MG 100452		Local Sel 1690		PS 510314	
2	Ballet		Local Sel 1690		PS 210713		Local Sel 1690		Syrian local		MG 102583	
3	SV 51741		MG 100452		MG 100452		PS 210713		Derrimut		Local Sel 1690	
4	Collegian		Syrian local		PS 510699		ILP 56		Wirrega		PS 210713	
5	Local check		Wirrega		Consort		PS 510699		Collegian		MG 100452	
											ILP 845	

Cont'd. ...

Rank	PORTUGAL		RWANDA		SPAIN		SUDAN		SYRIA	
	Elvas		Rwerere		Cordoba		Hudeiba		Al Ghab	Gelline
1	Derrimut		Local check		PS 210713		Local check		Local Sel 1690	PS 210713
2	Collegian		ILP845		SV 51741		PS 510699		ILP 56	MG 102583
3	Century		Century		MG 102583		PS 510203		Frisson	PS 510314
4	PS 210688		Local Sel 1690		Ballet		PS 510314		Syrian local	PS 510699
5	Syrian local		MG 100452		PS 510314		Echo		MG 102583	Consort
	ILP 56									Echo

Cont'd. ...

Rank	SYRIA				TUNISIA	
	Heimo	Idleb	Jindiress	Tel Hadya	Beja	
1	Syrian local	MG 102583	Local Sel 1690	Derrimut	PS 210713	
2	Echo	MG 100452	Syrian local	Local Sel 1690	Kasion	
3	SV 51741	Frisson	PS 210688	MG 102583	Ballet	
4	Local Sel 1	ILP 974	ILP 845	Frisson	Consort	
5	ILP 845	Wirrega	PS 210713	Collegian	SV 51741	

The brackets indicate entries having the same rank.

occured most frequently among the top five heaviest yielders and were comparatively more stable.

On the basis of average over two years for the common entries (Table 6.7), Local Slection 1690 ranked number 1 and was followed by SV 51741, ILP 845, Ballet, and Frisson with seed yields of 1909, 1852, 1850, 1834, and 1811 kg/ha, respectively.

Table 6.7. The mean seed yield (Y=kg/ha) and rank(R) of the common entries in PIAT during 1988/89 and 1989/90.

Entry Name	1988/89		1989/90		Mean	
	Y	R	Y	R	Y	R
Local Sel. 1690	1846	6	1972	1	1909	1
Frisson	2018	1	1604	9	1811	5
Consort	1927	3	1546	11	1737	6
SV 51741	1908	4	1795	2	1852	2
Scout	1220	13	1183	13	1202	13
Ballet	1881	5	1786	3	1834	4
ILP 974	1690	9	1584	10	1637	10
ILP 845	1973	2	1727	5	1850	3
Century	1657	10	1669	6	1663	9
MG 100452	1726	8	1664	7	1695	8
MG 102583	1636	11	1781	4	1709	7
Wirrega	1558	12	1653	8	1606	11
Echo	1728	7	1408	12	1568	12

## 7. INTERNATIONAL AGRONOMY TRIALS

### 7.1. INTERNATIONAL NEED FOR INOCULATION TRIAL (INIT)

#### Introduction

The INIT was planned to study the response of faba bean, lentil and chickpea to the application of fertilizer nutrients under different agro-ecological conditions in the region. The objectives of this trial have been to investigate:

- (i) whether there is a need for application of phosphate and potash,
- (ii) whether the naturalized Rhizobia present in the soil were effective or there was a need for artificial inoculation,
- (iii) whether the symbiotic nitrogen fixation was adequate in meeting the nitrogen need of crop,
- (iv) whether the symbiotic nitrogen fixation as reflected in terms of crop performance can be improved with starter nitrogen dressing,
- (v) whether the symbiotic nitrogen fixation is affected by the application of phosphorous and/or potassium.

#### Material and Methods

The basic set of fertility treatments was the same for all the three crops. These consisted of: (i) farm fertility (T1), (ii) farm fertility + nitrogen at 100 kg/ha (T2), (iii) farm fertility + phosphate at 80 kg/ha + potash at 60 kg/ha (T3), (iv) farm fertility + potash at 60 kg/ha + phosphate at 80 kg/ha + nitrogen at 100 kg/ha (T4).

The trial was designed as a randomized complete block with four replications. The cooperators could reduce the replications to three if land was limiting. The suggested plot size was 13.5 m<sup>2</sup> (2.7m x 5.0m). The net plot for harvesting was suggested to be comprised of the central rows leaving one row at either side of the plot and 0.5m at either end of row as border.

Two trials of Faba Bean International Need for Inoculation Trial (FBINIT) were sent to different cooperators in two countries but the results were not received from any of these.

Eight trials of Lentil International Need for Inoculation Trial (LINIT) were sent to cooperators in 5 countries and the results were not received from any of these locations.

Twelve trials of Chickpea International Need for Inoculation Trial (CINIT) were sent to cooperators in 7 countries and one of the cooperators reported the results. ANOVA for treatments for seed yield and nodule weight (g/plot) were not significant (Table 7.1.1) indicating that there were no significant differences between treatments.

## 7.2. INTERNATIONAL RHIZOBIUM INOCULATION RESPONSE TRIAL (IRT)

### Introduction

The Inoculation Response Trial was planned to be conducted where a need to inoculate exists. The purpose of the trial has been to evaluate crop yield response to inoculation with chosen superior strains of rhizobia.

### Material and Methods

The basic set of treatments was the same for all the three crops except for different Rhizobium strains for three different crops. The treatments included, i)  $T_1 = 120 \text{ kg N/ha} + 80 \text{ kg P}_2\text{O}_5/\text{ha} + 60 \text{ kg K}_2\text{O/ha}$ . ii)  $T_2 = 80 \text{ kg P}_2\text{O}_5/\text{ha} + 60 \text{ kg K}_2\text{O/ha}$ . iii)  $T_3 = \text{Same as } T_2 + \text{Inoculation of seed with strain 1}$ . iv)  $T_4 = \text{Same as } T_2 + \text{Inoculation of seed with strain 2}$ . v)  $T_5 = \text{Same as } T_2 + \text{Inoculation of seed with strain 3}$ . The details of strains for chickpea, lentil and faba bean are given as under:

Crop	Strain 1 (No.)	Strain 2 (No.)	Strain 3 (No.)
Chickpea	31	39	44
Lentil	735	719	758
Faba bean	420	414	481

The trial was designed as a randomized complete block with four replications. The cooperators could reduce the replications to three if land was limiting. The suggested plot size was  $13.5 \text{ m}^2$  ( $2.7\text{m} \times 5.0\text{m}$ ). The net plot for harvesting was suggested to be comprised of the central rows leaving one row at either side of the plot and  $0.5 \text{ m}$  at either end of row as borders.

### 7.2.1. CHICKPEA INTERNATIONAL RHIZOBIUM INOCULATION RESPONSE TRIAL (CIRT)

#### Results and Discussion

Sixteen trials were sent to cooperators in 8 countries and the results were received from six locations and are reported here (Table 7.2.1).

At Setif in Algeria, the treatment  $T_3$ , and  $T_5$  gave significantly higher yield than  $T_2$  and  $T_1$  indicating that strain Nos. 31 and 44 were more effective than the basic doses of fertilizers. There were no nodules in treatment  $T_1$  and  $T_2$ .

At Tiaret in Algeria the difference between treatments were significant both for seed yield and nodule weight. Two strains No. 39 and 31 gave significantly higher seed yield as well as nodule weight as compared to control  $T_2$ .

Table 7.1.1. Seed yield (Y=kg/ha) and nodule weight (N/W=g/plot) and ranks (R) for different fertilizer-cum inoculation treatments in CINIT at Zahra in Libya during 1989/90.

Treatment	LIBYA - Zahra			
	Y	R	N/W	R
T1 Farm fertility	679	1	0.054	3
T2 Farm fertility + Nitrogen at 100 kg/ha	567	3	0.070	2
T3 Farm fertility + Phosphate at 80 kg/ha + Potash at 60 kg/ha	598	2	0.085	1
T4 Farm fertility + Potash at 60 kg/ha + Phosphate at 80 kg/ha + Nitrogen at 100 kg/ha	429	4	0.042	4
Location Mean	568		0.06	
S.E. Of Mean	172.84		0.02	
L.S.D. at .05	-		-	
C.V. %	60.85		76.40	
Error df	9		9	
Significance	NS		NS	

\* = Significant at  $P \leq 0.05$ , NS = Not significant.

Table 7.2.1. Seed yield (Y=kg/ha) and rank (R) and nodule weight (N/W=g/plot) for different fertilizer-cum-inoculation treatments in CIRT at different locations during 1989/90.

Treatment	ALGERIA - Setif			
	Y	R	N/W	R
T1- 120 kg N/ha + 80 kg p2o5 /ha + 60 kg k20/ha	3242	5	0	4
T2- 80 kg p2o5/ha + 60 kg k20/ha	3603	4	0	5
T3- Same as at No. 2 + Inoculation of seed with Chickpea Rhizobium Strain No. 31	5714	1	4	2
T4- Same as at No. 2 + Inoculation of seed with Chickpea Rhizobium Strain No. 39	4358	3	3	3
T5- Same as at No. 2 + Inoculation of seed with Chickpea Rhizobium Strain No. 44	5103	2	5	1
Location Mean	4404		3	
S.E. Of Mean	421		1	
L.S.D. at .05	1296		4	
C.V. %	19		100	
Error df	12		12	
Significance	*		*	

Cont'd. ...



Table 7.2.1. Cont'd. ...

Treatment	ALGERIA - Tiaret				ETHIOPIA - Alemaya				ITALY - Caltagirone			
	Y	R	N/W	R	Y	R	N/W	R	Y	R	N/W	R
T1	966	4	8	5	737	4	145	5	1117	3	179	5
T2	885	5	14	4	1040	2	360	4	1057	4	323	1
T3	1150	2	35	3	910	3	461	2	1124	2	212	4
T4	1178	1	54	2	425	5	463	1	1052	5	223	3
T5	978	3	64	1	1198	1	433	3	1325	1	281	2
Location Mean	1031		35		862		372		1135		244	
S.E. Of Mean	68.24		5.46		164		112		114		102.86	
L.S.D. at .05	210.28		16.83		505		-		-		-	
C.V. %	13.24		31.04		38		60		20		84.39	
Error df	12		12		12		12		12		12	
Significance	*		*		*		NS		NS		NS	

Cont'd. ...

Table 7.2.1. Cont'd. ...

Treatment	TURKEY - Samsun-I(Univ.)				TURKEY - Samsun-II (ARI-1)				Overall Mean	
	Y	R	N/W	R	Y	R	N/W	R	Y	R
T1	2077	2	154	5	774	1	0.042	4	1485	5
T2	2202	1	203	3	542	4	0.039	5	1555	3
T3	1852	3	277	1	531	5	0.050	2	1880	1
T4	1642	4	253	2	556	3	0.045	3	1535	4
T5	1592	5	165	4	587	2	0.052	1	1797	2
Location Mean	1873		210		598		0.045			
S.E. Of Mean	186.04		26.49		73.45		0.01			
L.S.D. at .05	-		81.64		-		-			
C.V. %	19.87		25.22		24.57		25.99			
Error df	12		12		12		12			
Significance	NS		*		NS		NS			

\* = Significant at  $p \leq 0.05$ , NS = Not significant.

At Alemaya in Ethiopia, though the strain No. 44 gave numerically higher seed yield as well as higher rhizobia weight when compared to T2 but the differences were not significant.

At Caltagirone in Italy the differences between treatments were not significant for seed yield as well as nodule weight.

At Samsun I and Samsun II in Turkey the ANOVA revealed non-significant differences between treatment means for seed yield. The ANOVA for nodule weight was however, significant for Samsun I but none of the strains gave significantly higher nodule weight than the control treatment T2.

On average strain No. 31 gave the highest yield across locations and was followed by strain No. 44.

#### **7.2.2. FABA BEAN INTERNATIONAL RHIZOBIUM INOCULATION RESPONSE TRIAL (FBIRT)**

Four trials of Faba Bean Inoculation Response Trial (FBIRT) were sent to cooperators in 4 countries but the results were not returned.

#### **7.2.3. LENTIL INTERNATIONAL RHIZOBIUM INOCULATION RESPONSE TRIAL (LIRT)**

### **Results and Discussion**

Twenty trials were sent to cooperators in 9 countries out of which 4 locations reported the results. The differences between treatments were not significant for seed yield and nodule weight at all the four locations (Table 7.2.3).

#### **7.3. INTERNATIONAL WEED CONTROL TRIAL (WCT)**

### **Introduction**

The WCT aimed at finding out the magnitude of yield loss that due to the presence of weeds occurs in chickpea, faba bean, and lentil crops. It also aimed at assessing the relative merit of some selected herbicides under different agro-ecological conditions in these crops.

### **Material and Methods**

The basic treatments involved weedy check, weed free by repeated hand weeding, hand weeding twice (30-40, 70-80 days after emergence) and herbicide application treatments. The details of these treatments are given in the appropriate tables.

The trials were designed as randomized complete blocks with four replications. The plot size for each trial was 18.0 m<sup>2</sup> (3.6 m x 5.0 m). At harvest time the two outside rows and 0.5 m at either end of the central

Table 7.2.3. Seed yield (Y=kg/ha) and rank (R) and nodule weight (N/W=g/plot) for different fertilizer-cum-inoculation treatments in LIRT at different locations during 1989/90.

Treatment	ALGERIA-Tiaret		BULGARIA-Toshevo	
	Y	R	Y	R
T1- 120 kg N/ha + 80 kg p2o5 /ha + 60 kg k20/ha	652	4	707	5
T2- 80 kg P2O5 /ha + 60 kg K2O/ha	778	1	784	1
T3- Same as at No. T2 + Inoculation of seed with Lentil Rhizobium Strain No. 735	585	5	715	3
T4- Same as at No. T2 + Inoculation of seed with Lentil Rhizobium Strain No. 719	653	3	780	2
T5- Same as at No. T2 + Inoculation of seed with Lentil Rhizobium Strain No. 758	724	2	711	4
Location Mean	678		739	
S.E. Of Mean	104.69		34.65	
L.S.D. at .05	-		-	
C.V. %	30.88		9.37	
Error df	12		12	
Significance	NS		NS	

Cont'd. ...

Table 7.2.3. Cont'd. ...

Treatment	ETHIOPIA-Alemaya				IRAN-Karaj				Overall Mean	
	Y	R	N/W	R	Y	R	N/W	R	Y	R
T1	1399	2	2.00	5	1727	5	4.04	4	1121	3
T2	1443	1	6.05	1	1992	1	6.07	2	1249	1
T3	1235	4	3.18	4	1773	4	5.17	3	1077	5
T4	1346	3	4.13	2	1855	2	6.33	1	1159	2
T5	1158	5	3.50	3	1781	3	3.44	5	1094	4
Location Mean	1316		4		1826		5			
S.E. Of Mean	118.05		1.37		104.81		1.35			
L.S.D. at .05	-		-		-		-			
C.V. %	17.94		72.58		11.48		53.87			
Error df	12		12		12		12			
Significance	NS		NS		NS		NS			

\* = Significant at  $p < 0.05$ , NS = Not significant.

rows were discarded. Thus the seed yields described in this report are based on the central rows of 4 m length.

### 7.3.1. CHICKPEA INTERNATIONAL WEED CONTROL TRIAL (CWCT)

#### Results and Discussion

Twenty six trials were distributed to cooperators in 12 countries and the results were received from 8 locations in 5 countries (Table 7.3.1).

Lebanon: The trial was conducted at Terbol. The treatment T8 [Post-emergence application of dinoseb acetate (Aretit) at 1.0 kg a.i./ha plus 0.5 kg a.i./ha fluazifop butyl (Fusilade)] proved to be highly phytotoxic. None of the herbicide treatment gave complete control of weeds as is clear from weight of weeds. Three treatments T11 [Pre-emergence application of chlorobromuron (Maloran) plus 0.5 kg a.i./ha of pronamide (Kerb)], T10 [Pre-emergence application of cyanazine (Fortrol) at 0.5 kg a.i./ha plus 0.5 kg a.i./ha of pronamide (Kerb)] and T9 [Pre-emergence application of terbutryn (Igran) at 3.0 kg a.i./ha plus 0.5 kg a.i./ha of pronamide (Kerb)] gave better control of weeds and seed yields not significantly different from weed free treatments T2 [Weed free by repeated hand weeding] & T3 [Hand weeding twice].

Libya: The trial was conducted at El-Safsaf. The differences between treatments were significant for weed weight and seed yield. The treatments T11 [Pre-emergence application of chlorobromuron (Maloran) plus 0.5 kg a.i./ha of pronamide (Kerb)], T5 [Pre-emergence application of terbutryn (Igran) at 3.0 kg a.i./ha] and T9 [Pre-emergence application of terbutryn (Igran) at 3.0 kg a.i./ha plus 0.5 kg a.i./ha of pronamide (Kerb)] gave better control of weeds. The treatment T5 gave the highest seed yield/ha.

Pakistan: At Dera Ismail Khan, the ANOVA revealed the significant differences among treatment means for weed weight and seed yield. The treatment T4 [Pre-emergence application of terbutylazine+terbutryne (Topogard) at 0.75 kg a.i./ha], T12 [Pre-emergence application of methabenzthiazuron (Tribunil) at 3 kg/ha plus 0.5 kg a.i./ha of pronamide (Kerb)] and T11 [Pre-emergence application of chlorobromuron (Maloran) plus 0.5 kg a.i./ha of pronamide (Kerb)] gave the best weed control. The treatments T11 and T12 among the herbicide treatments also gave the highest yields.

Spain: At Cordoba, the differences between treatments for seed yields were not significant.

Turkey: At Amasya and Samsun, the mean squares due to treatments for seed yield were not significant. At Diyarbakir all the treatments gave significantly superior yield than the weedy check. The weeds were lowest using T11 [Pre-emergence application of chlorobromuron (Maloran) plus 0.5 kg a.i./ha of pronamide (Kerb)] and were followed by T9 [Pre-emergence application of terbutryn (Igran) at 3.0 kg a.i./ha plus 0.5 kg a.i./ha of pronamide (Kerb)], T5 [Pre-emergence application of terbutryn (Igran) at

Table 7.3.1. Seed yield (kg/ha) and rank (R), weed weight (W/W=g/plot) and phytotoxicity score (S) for different weed control treatments in the CWCT at different locations during 1989/90.

Treatment	LEBANON					LIBYA			
	Terbol					El Safsaf			
	Y	R	W	R	S	Y	R	W	R
T1- Weedy Check	505	10	15608	1	1	474	11	4200	1
T2- Weed Free by repeated hand weeding	1840	2	0	12	1	1455	1	0	12
T3- Hand weeding twice (30-40 & 70-80 days after emergence)	1915	1	0	11	1	1169	4	1731	6
T4- Pre-emergence application of terbuthylazine+terbutryne (Topogard) at 0.75 kg a.i. /ha	1154	7	2782	6	1	966	7	1875	5
T5- Pre-emergence application of terbutryn (Igran) at 3.0 kg a.i./ha	1071	9	4080	5	1	1269	2	968	10
T6- Pre-emergence application of cyanazine (Fortrol) at 0.5 kg a.i./ha	1134	8	4895	4	1	949	8	1538	7
T7- Pre-emergence application of Pyridate (Lentagran) at 1.0 kg a.i./ha	359	12	7844	2	1	886	9	2131	3
T8- Post-emergence application of dinoseb acetate (Aretit) at 1.0 kg a.i./ha plus 0.5 kg a.i./ha fluazifop butyl (Fusilade)	413	11	6096	3	5	443	12	3650	2
T9- Same as No. 5 above plus 0.5 kg a.i./ha of pronamide (Kerb)	1717	3	2012	8	1	983	6	994	9
T10- Same as No. 6 above plus pronamide as in No. 9	1454	5	1818	9	1	1236	3	1200	8
T11- Pre-emergence application of chlorbromuron (Maloran) plus pronamide as in No. 9	1475	4	630	10	1	1129	5	838	11
T12- Pre-emergence application of methabenzthiazuron (Tribunil) at 3 kg/ha plus pronamide as in No. 9	1230	6	2050	7	1	885	10	2050	4
Location Mean	1189		3984			987		1764	
S.E. Of Mean	192.87		2446.62			130.02		376	
L.S.D. at .05	555.00		7040.48			374.14		1082	
C.V. %	32.45		122.81			26.35		43	
Error df	33		33			33		33	
Significance	*		*			*		*	

Cont'd. ..

Table 7.3.1. Cont'd. ...

Treatment	PAKISTAN					SPAIN		TURKEY		
	Dera Ismail Khan					Cordoba		Amasya		
	Y	R	W	R	S	Y	R	W	R	S
T1	745	12	226	1	0	3260	6	1583	9	1
T2	2139	1	0	12	0	3309	3	1080	12	1
T3	1968	2	14	11	0	3181	10	1992	3	1
T4	1465	9	41	10	0	3299	4	1794	5	1
T5	1184	11	109	2	1	3046	12	1648	8	1
T6	1594	7	60	6	0	3409	1	1369	11	1
T7	1498	8	59	7	1	3275	5	2009	2	1
T8	1616	6	88	5	0	3058	11	1547	10	1
T9	1410	10	101	3	0	3357	2	2070	1	1
T10	1694	5	96	4	0	3200	9	1921	4	1
T11	1888	3	44	8	0	3206	8	1767	6	1
T12	1816	4	41	9	0	3250	7	1708	7	1
Location Mean	1585		73			3238		1707		
S.E. Of Mean	222.94		10.18			97.01		224.10		
L.S.D. at .05	641.53		29.29			-		-		
C.V. %	28.13		27.77			5.99		26.25		
Error df	33		33			33		33		
Significance	*		*			NS		NS		

Cont'd. ...

Table 7.3.1. Cont'd. ...

Treatment	TURKEY								Overall Mean	
	Diyarbakir				Samsun					
	Y	R	W	R	Y	R	W	R	Y	R
T1	327	12	3021	1	158	10	2799	8	1007	12
T2	1115	9	1104	6	148	11	3078	7	1584	3
T3	1644	1	417	11	238	5	2531	10	1729	1
T4	1469	2	1042	7	554	1	2262	12	1529	6
T5	1425	4	583	9	270	4	4555	1	1416	8
T6	1260	8	2052	3	131	12	3980	3	1407	9
T7	652	11	2708	2	232	6	2336	11	1273	10
T8	869	10	1313	4	330	2	3230	5	1182	11
T9	1333	6	521	10	197	8	4488	2	1581	4
T10	1446	3	1000	8	214	7	3621	4	1595	2
T11	1396	5	354	12	162	9	2719	9	1575	5
T12	1281	7	1250	5	329	3	3203	6	1500	7
Location Mean	1185		1280		247		3233			
S.E. Of Mean	187.40		483.88		118.99		892.47			
L.S.D. at .05	539.26		1392.42		-		-			
C.V. %	31.64		75.58		96.34		55.20			
Error df	33		33		33		33			
Significance	*		*		NS		NS			

3.0 kg a.i./ha], T10 [Pre-emergence application of cyanazine (Fortrol) at 0.5 kg a.i./ha plus 0.5 kg a.i./ha of pronamide (Kerb)], T4 [Pre-emergence application of terbuthylazine+terbutryne (Topogard) at 0.75 kg a.i./ha] etc.

The seed yield across locations for the weedy check and weed free check revealed that weeds caused a heavy loss (41.76%) in seed yield in chickpea. Further, pre-emergence application of Igran or Maloran or Fortrol with Kerb were effective.

### 7.3.2. FABIA BEAN INTERNATIONAL WEED CONTROL TRIAL (FBWCT)

#### Results and Discussion

Eight trials were supplied to cooperators in 7 countries and the results were received for 5 trials from 4 countries (Table 7.3.2) and are presented below:

Libya: At Misurata, the mean squares due to treatments for seed yield and weed weight/plot were significant. The treatments T12 [Pre-emergence application of methabenzthiazuron (Tribunil) at 3 kg/ha plus 0.5 kg a.i./ha of pronamide (Kerb)], T11 [Pre-emergence application of chlorobromuron (Maloran) plus 0.5 kg a.i./ha of pronamide (Kerb)], T9 [Pre-emergence application of terbutryn (Igran) at 2.5 kg a.i./ha plus 0.5 kg a.i./ha of pronamide (Kerb)], T10 [Pre-emergence application of cyanazine (Fortrol) at 0.5 kg a.i./ha plus 0.5 kg a.i./ha of pronamide (Kerb)] and T5 [Pre-emergence application of terbutryn (Igran) at 2.5 kg a.i./ha] in order of their merit controlled the weeds. The phytotoxicity score was least for treatment T10. All the treatments gave significantly higher yield than the control.

At Zahra in Libya, there were significant differences among seed yields due to various herbicide treatments. The highest seed yield was obtained with T10 [Pre-emergence application of cyanazine (Fortrol) at 0.5 kg a.i./ha plus 0.5 kg a.i./ha of pronamide (Kerb)], and was followed by T8 [Post-emergence application of dinoseb acetate (Aretit) at 1.0 kg a.i./ha plus 0.5 kg a.i./ha fluazifop butyl (Fusilade)], T7 [Pre-emergence application of Oxadiazon (Ronstar) at 1.07 kg a.i./ha], and T11 [Pre-emergence application of chlorobromuron (Maloran) plus 0.5 kg a.i./ha of pronamide (Kerb)] etc.

Spain: At Cordoba, five herbicide treatments, T4 [Pre-emergence application of terbuthylazine+terbutryne (Topogard) at 0.75 kg a.i./ha], T6 [Pre-emergence application of cyanazine (Fortrol) at 0.5 kg a.i./ha], T11 [Pre-emergence application of chlorobromuron (Maloran) plus 0.5 kg a.i./ha of pronamide (Kerb)], T9 [Pre-emergence application of terbutryn (Igran) at 2.5 kg a.i./ha plus 0.5 kg a.i./ha of pronamide (Kerb)] and T5 [Pre-emergence application of terbutryn (Igran) at 2.5 kg a.i./ha] gave significantly higher yield than the respective weedy check.

Turkey: At Samsun none of the herbicide treatments gave significantly superior yields when compared to weedy check (T1). Weeds were minimum with T11 [Pre-emergence application of chlorobromuron (Maloran) plus 0.5 kg a.i./ha of pronamide (Kerb)], T12 [Pre-emergence application of



Table 7.3.2. Seed yield (kg/ha) and rank (R), weed weight (W/W=g/plot) and phytotoxicity score (S) for different weed control treatments in the FBWCT at different locations during 1989/90.

Treatment	LIBYA - Misurata				
	Y	R	W	R	S
T1- Weedy Check	804	12	5143	1	1
T2- Weed Free by repeated hand weeding	2374	1	0	12	1
T3- Hand weeding twice (30-40 & 70-80 days after emergence)	1945	3	0	11	1
T4- Pre-emergence application of terbutylazine+terbutryne (Topogard) at 0.75 kg a.i. /ha	1536	9	297	5	4
T5- Pre-emergence application of terbutryn (Igran) at 2.5 kg a.i./ha	1508	10	158	6	4
T6- Pre-emergence application of cyanazine (Fortrol) at 0.5 kg a.i./ha	1609	8	1424	4	3
T7- Pre-emergence application of Oxadiazon (Ronstar) at 1.07 kg a.i./ha	1318	11	2806	2	5
T8- Post-emergence application of dinoseb acetate (Aretit) at 1.0 kg a.i./ha plus 0.5 kg a.i./ha fluazifop butyl (Fusilade)	1657	7	1993	3	4
T9- Same as No. 5 above plus 0.5 kg a.i./ha of pronamide (Kerb)	1802	6	85	8	3
T10- Same as No. 6 above plus pronamide as in No. 9	2347	2	151	7	2
T11- Pre-emergence application of chlorbromuron (Maloran) plus pronamide as in No. 9	1940	4	75	9	3
T12- Pre-emergence application of methabenzthiazuron (Tribunil) at 3 kg/ha plus pronamide as in No. 9	1817	5	70	10	3
Location Mean	1721		1017		
S.E. Of Mean	155.14		192.90		
L.S.D. at 5%	446.43		555.10		
C.V. %	18.02		37.95		
Error df	33		33		
Significance	*		*		

Cont'd. ...

Table 7.3.2. Cont'd. ...

Treatment	LIBYA - Zahra			SPAIN - Cordoba		TURKEY - Samsun				Overall Mean	
	Y	R	S	Y	R	Y	R	W	R	Y	R
T1	1263	9	1	3413	11	1951	7	2575	1	1858	12
T2	2205	1	1	4130	7	2238	2	0	12	2737	1
T3	2008	3	2	4310	4	2134	5	1074	8	2599	2
T4	1333	8	4	4374	1	1481	10	1313	5	2181	9
T5	981	12	5	4223	6	1833	9	1500	3	2137	10
T6	1431	7	5	4357	2	1942	8	1400	4	2335	6
T7	1604	5	5	3934	8	1975	6	1075	7	2208	8
T8	1897	4	1	3315	12	788	12	1175	6	1914	11
T9	1231	11	4	4301	5	2138	4	813	9	2368	5
T10	2111	2	1	3767	10	1405	11	1725	2	2408	4
T11	1559	6	3	4322	3	2421	1	601	11	2560	3
T12	1237	10	3	3852	9	2227	3	725	10	2283	7
Location Mean	1572			4025		1878		1165			
S.E. Of Mean	180.32			187.78		261.49		198.06			
L.S.D. at .05	518.89			540.36		752.47		569.94			
C.V. %	22.95			9.33		27.85		34.01			
Error df	33			33		33		33			
Significance	*			*		*		*			

methabenzthiazuron (Tribunil) at 3 kg/ha plus 0.5 kg a.i./ha of pronamide (Kerb)] and T9 [Pre-emergence application of terbutryn (Igran) at 2.5 kg a.i./ha plus 0.5 kg a.i./ha of pronamide (Kerb)].

The comparison of weedy check (T1) and weed free check (T2) across locations showed that weeds caused heavy losses (32.12%) in seed yield (Table 7.3.2). Across the locations, the herbicide treatment T11 (Maloran + Kerb) gave the highest yields and was followed by T10 [Pre-emergence application of cyanazine (Fortrol) at 0.5 kg a.i./ha plus 0.5 kg a.i./ha of pronamide (Kerb)], T9 [Pre-emergence application of terbutryn (Igran) at 2.5 kg a.i./ha plus 0.5 kg a.i./ha of pronamide (Kerb)], T6 [Pre-emergence application of cyanazine (Fortrol) at 0.5 kg a.i./ha], T12 [Pre-emergence application of methabenzthiazuron (Tribunil) at 3 kg/ha plus 0.5 kg a.i./ha of pronamide (Kerb)] etc.

### 7.3.3. LENTIL INTERNATIONAL WEED CONTROL TRIAL (LWCT)

#### Results and Discussion

Twenty two sets of trial were distributed to cooperators in 11 countries and the results were received for 3 sets.

The comparison of weedy check (Treatment T<sub>1</sub>) and weed free check (Treatment T<sub>2</sub>) across locations showed that weeds caused heavy losses (36.15 percent) in seed yield (Table 7.3.3).

Iran: At Karaj, three treatments T11 [Pre-emergence application of chlorobromuron (Maloran) at 1.5 kg a.i./ha plus 0.5 kg a.i./ha of pronamide (Kerb)], T12 [Pre-emergence application of prometryn (Gesagard) at 1.5 kg a.i./ha plus 0.5 kg a.i./ha of pronamide (Kerb)] and T4 [Pre-emergence application of methabenzthiazuron (Tribunil) at 2.0 kg a.i./ha] gave superior yield when compared to the weedy check. Six herbicide treatments, T11 [Pre-emergence application of chlorobromuron (Maloran) at 1.5 kg a.i./ha plus 0.5 kg a.i./ha of pronamide (Kerb)], T12 [Pre-emergence application of prometryn (Gesagard) at 1.5 kg a.i./ha plus 0.5 kg a.i./ha of pronamide (Kerb)], T7 [Pre-emergence application of prometryn (Gesagard) at 1.5 kg a.i./ha], T4 [Pre-emergence application of methabenzthiazuron (Tribunil) at 2.0 kg a.i./ha], T5 [Pre-emergence application of chlorobromuron (Maloran) at 1.5 kg a.i./ha] and T9 [Pre-emergence application of methabenzthiazuron (Tribunil) at 2.0 kg a.i./ha plus 0.5 kg a.i./ha of pronamide (Kerb)] gave significantly lower weed weight as compared to the weedy check and were effective in order of their merit. The ANOVA revealed that the differences between treatment means were significant both for seed yield and weed weight.

Lebanon: At Terbol, all the treatments except treatment T8 [Post-emergence application of dinoseb acetate (Aretit) at 1.0 kg a.i./ha plus 0.5 kg a.i./ha fluazifop butyl (Fusilade)] gave significantly higher yield as compared to the weedy check. Also all the treatments were significantly superior in controlling weeds when compared to the weedy check. The weeds

Table 7.3.3. Seed yield (kg/ha) and rank (R), weed weight (W/W=g/plot), and phytotoxicity score (S) for different weed control treatments in the LWCT at different locations during 1989/90.

Treatment	IRAN - Karaj				
	Y	R	W	R	S
T1- Weedy Check	1465	10	3845	1	-
T2- Weed Free by repeated hand weeding	2281	1	0	12	-
T3- Hand weeding twice (30-40 & 70-80 days after emergence)	2087	4	298	11	-
T4- Pre-emergence application of methabenzthiazuron (Tribunil) at 2.0 kg a.i. /ha	1956	5	2202	7	1
T5- Pre-emergence application of chlorbromuron (Maloran) at 1.5 kg a.i./ha	1912	7	2242	6	3
T6- Pre-emergence application of cyanazine (Fortrol) at 0.5 kg a.i./ha	1494	9	2829	4	2
T7- Pre-emergence application of prometryn (Gesagard) at 1.5 kg a.i./ha	1867	8	2063	8	3
T8- Post-emergence application of dinoseb acetate (Aretit) at 1.0 kg a.i./ha plus 0.5 kg a.i./ha fluazifop butyl (Fusilade)	1432	11	3468	2	3
T9- Same as No. 4 above plus 0.5 kg a.i./ha of pronamide (Kerb)	1938	6	2627	5	1
T10- Same as No. 6 above plus pronamide as in No. 9	1429	12	3290	3	1
T11- Same as No. 5 above plus pronamide as in No. 9	2112	2	1627	10	2
T12- Same as No. 7 above plus pronamide as in No. 9	2112	3	1714	9	1
Location Mean	1841		2184		
S.E. Of Mean	167.46		402.46		
L.S.D. at 5%	481.88		1158.15		
C.V. %	18.20		36.86		
Error df	33		33		
Significance	*		*		

Cont'd. ...

Table 7.3.3. Cont'd. ...

Treatment	LEBANON					TURKEY				Overall Mean	
	Terbol					Diyarbakir				Y	R
	Y	R	W	R	S	Y	R	W	R		
T1	706	12	3202	1	1	325	11	3625	1	830	12
T2	1177	7	0	12	1	443	4	2000	4	1300	2
T3	1153	9	56	10	1	546	1	469	12	1262	4
T4	1161	8	190	7	1	365	10	1313	6	1161	8
T5	1149	10	183	8	1	465	3	2354	2	1175	7
T6	1325	4	20	11	1	417	6	1875	5	1079	9
T7	1278	6	325	4	1	404	9	1000	8	1183	6
T8	728	11	2115	2	1	435	5	2302	3	865	11
T9	1371	3	73	9	1	417	7	1042	7	1242	5
T10	1290	5	198	6	1	483	2	927	9	1068	10
T11	1387	2	256	5	4	413	8	646	11	1304	1
T12	1397	1	474	3	5	297	12	906	10	1269	3
Location Mean	1177		591			417		1538			
S.E. Of Mean	100.38		223.45			94.83		503.76			
L.S.D. at .05	288.85		643.02			-		1449.64			
C.V. %	17.06		75.61			45.44		65.50			
Error df	33		33			33		33			
Significance	*		*			NS		*			

were minimum with T6 [Pre-emergence application of cyanazine (Fortrol) at 0.5 kg a.i./ha], T9 [Pre-emergence application of methabenzthiazuron (Tribunil) at 2.0 kg a.i./ha plus 0.5 kg a.i./ha of pronamide (Kerb)], T5 [Pre-emergence application of chlorobromuron (Maloran) at 1.5 kg a.i./ha], T4 [Pre-emergence application of methabenzthiazuron (Tribunil) at 2.0 kg a.i./ha], T10 [Pre-emergence application of cyanazine (Fortrol) at 0.5 kg a.i./ha plus 0.5 kg a.i./ha of pronamide (Kerb)], etc. The treatments T11 [Pre-emergence application of chlorobromuron (Maloran) at 1.5 kg a.i./ha plus 0.5 kg a.i./ha of pronamide (Kerb)] and T12 [Pre-emergence application of prometryn (Gesagard) at 1.5 kg a.i./ha plus 0.5 kg a.i./ha of pronamide (Kerb)] were highly phytotoxic.

**Turkey:** The trial was conducted at Diyarbakir. The differences between treatment means for seed yield were not significant and significant for weed weight. All the treatments except T5 [Pre-emergence application of chlorobromuron (Maloran) at 1.5 kg a.i./ha] and T8 [Post-emergence application of dinoseb acetate (Aretit) at 1.0 kg a.i./ha plus 0.5 kg a.i./ha fluazifop butyl (Fusilade)] were effective in reducing the weed weight when compared to the weedy check.

The comparison of weedy check (T1) and weed free check (T2) across locations showed that weeds caused heavy losses (36.15%) in seed yield (Table 7.3.3). Across locations, the seed yield was highest with herbicide treatment T11 [Pre-emergence application of chlorobromuron (Maloran) at 1.5 kg a.i./ha plus 0.5 kg a.i./ha of pronamide (Kerb)] and was followed with by using T12 [Pre-emergence application of prometryn (Gesagard) at 1.5 kg/ha plus 0.5 kg a.i./ha of pronamide (Kerb)], T9 [Pre-emergence application of methabenzthiazuron (Tribunil) at 2.0 kg a.i./ha plus 0.5 kg a.i./ha of pronamide (Kerb)], T7 [Pre-emergence application of prometryn (Gesagard) at 1.5 kg a.i./ha], T5 [Pre-emergence application of chlorobromuron (Maloran) at 1.5 kg a.i./ha], T4 [Pre-emergence application of methabenzthiazuron (Tribunil) at 2.0 kg a.i./ha] and T6 [Pre-emergence application of cyanazine (Fortrol) at 0.5 kg a.i./ha] etc.

#### **7.4. FABA BEAN INTERNATIONAL OROBANCHE CHEMICAL CONTROL TRIAL (FBOCCT)**

##### **Introduction**

The main objective of the Faba Bean International Orobanche Chemical Control Trial was to know the extent of loss caused by Orobanche and the possibility of controlling Orobanche spp in faba bean using glyphosate herbicide. The trial is expected to give the information on the appropriate rate of the chemical and the stage of crop growth at which it should be applied to get the best control.

## Material and Methods

The treatments included:

- T<sub>1</sub>- Control - No application of herbicide.
- T<sub>2</sub>- Fifteen days after flowering began, apply glyphosate at 0.08 kg ai/ha once.
- T<sub>3</sub>- Fifteen days after flowering began, apply glyphosate at 0.08 kg ai/ha thrice at 15 days interval.
- T<sub>4</sub>- Fifteen days after flowering began, apply imazaquin at 0.015 kg ai/ha once.
- T<sub>5</sub>- Fifteen days after flowering began, apply imazaquin at 0.015 kg ai/ha thrice at 15 days interval.

The trial was designed as randomized complete block with four replications. The suggested plot size was 8 rows, 5 m long spaced 45 cm apart (=18.0 m<sup>2</sup>). At harvesting, net area harvested was suggested to be 6 rows 4 m long spaced 45 cm apart (=10.8 m<sup>2</sup>).

## Results and Discussion

Five sets of trial were sent to cooperators in four countries but the results were received back from two locations Sira Cusa and Caltagirone and are presented below:

Italy: At Caltagirone, there was no Orobanche development. At Sira Cusa - Sicilia, the treatment mean squares were not significant for number of Orobanche and weight of Orobanche shoots (Table 7.4). Also the control plot without application of herbicides gave least number of orobanche, thus no inferences were drawn.

Table 7.4. Seed yield (SYLD=kg/ha) and rank (R), biological yield (BYLD=kg/ha), phytotoxicity score (S), no. of Orobanche shoots per plot (NOS), weight of Orobanche shoots per plot (WOS), and plant height (HT=cm) for different treatment in FBOOCT during 1989/90.

Treatment	ITALY - Sira cusa-Sicilia								
	NOS	R	WOS	R	HT	R	BYLD	SYLD	R
T1 Control, no application of herbicide	30	5	134	3	79	3	7472	1806	2
T2 15 days after flowering began, apply Glyphosate at 0.08 kg a.i./ha Once	38	3	83	5	73	5	5757	1431	3
T3 15 days after flowering began, apply Glyphosate at 0.08 kg a.i./ha thrice at 15 days interval	42	2	218	1	84	1	7083	1972	1
T4 15 days after flowering began, apply Imazaquin at 0.015 kg a.i./ha Once	32	4	102	4	73	4	3375	590	5
T5 15 days after flowering began, apply Imazaquin at 0.015 kg a.i./ha thrice at 15 days interval	52	1	161	2	82	2	4944	847	4
Location Mean	39		140		78		5726	1329	
S.E. Of Mean	14.16		47.64		4.07		637.94	269.92	
L.S.D. at .05	-		-		-		1965.85	831.77	
C.V. %	73.07		68.29		10.40		22.28	40.62	
Error df	12		12		12		12	12	
Significance	NS		NS		NS		*	*	

\* = Significant at  $P \leq 0.05$ , NS = Not significant.



## 8. ACKNOWLEDGEMENT

Our thanks are due to all donors of ICARDA, and particularly to BMZ/GTZ of Germany for restricted core funding, for making this cooperative research effort possible. We are grateful to the cooperators from different national programs for conducting the experiments and returning the data books.

APPENDIX I

Distribution of International Nurseries and Trials during 1989/90

Country	C I Y T - S P	C Y - - M R	C I Y T - S 1	C I Y T - S 2	C I Y T - S A	C I S N - S W	C I S N - S P	C I S N - S 1	C I S N - S 2	C I S N - S A	C I F N - M R	C I F N - S L	C I A B N - - B	C I A B N - - N	C I C N T - - N	F I S N - - D	F I B A C S N - - N	F I B I C S R N - - N	L I Y T - - L	L I Y T - - S	L I Y T - - E		
Algeria	4	12	0	0	0	3	2	0	0	0	2	0	4	0	11	3	1	1	1	1	10	3	3
Argentina	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1
Bangladesh	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	2
Bulgaria	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0
Canada	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
Chile	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
China	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	1	1	0	0	0
Colombia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Costa Rica	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyprus	0	1	0	0	0	1	0	0	0	0	0	0	1	0	0	0	2	1	0	0	0	0	0
Egypt	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0	2	0	1	1	2	2	2
Ethiopia	0	0	1	2	0	0	1	1	2	0	0	2	0	0	0	0	1	0	1	1	1	1	2
France	1	1	0	0	0	2	1	0	0	0	1	0	0	1	0	4	0	0	0	0	0	0	0
Germany	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0
Greece	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
India	0	0	1	0	0	0	1	1	0	0	0	1	0	2	0	0	0	0	0	0	2	0	3
Iran	1	2	0	0	0	2	1	0	0	0	0	0	0	0	0	4	3	0	0	0	3	0	0
Iraq	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0
Italy	1	3	0	0	0	2	0	0	0	0	2	1	5	0	2	5	1	0	0	1	1	1	1
Jordan	1	2	0	0	0	2	1	0	0	0	2	0	1	0	1	2	1	0	1	1	3	3	0
Kenya	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kuwait	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Libya	0	2	1	0	0	3	0	0	0	0	0	0	1	1	0	2	0	1	1	1	1	1	1

Cont'd. ...

APPENDIX I (Cont'd.)

Country	C I Y T - S M P	C Y - - L R	C I Y - S L	C I Y - S L	C I Y - S L	C I Y - S L	C I Y - S L	C I Y - S L	C I Y - S L	C I Y - S L	C I Y - S L	C I Y - S L	C I Y - S L	C I Y - S L	C I Y - S L	C I Y - S L	C I Y - S L	C I Y - S L	C I Y - S L	C I Y - S L	C I Y - S L	C I Y - S L	C I Y - S L	C I Y - S L
Mexico	0	0	0	3	4	0	0	0	0	4	0	0	0	0	0	0	0	0	0	1	1	0		
Morocco	2	4	0	0	0	2	2	0	0	0	2	3	4	0	2	0	5	3	3	3	2	2	0	
Nepal	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
New Zealand	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	
Niger	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	
Pakistan	0	0	3	2	0	1	0	1	1	0	0	5	0	9	0	0	0	0	0	3	3	14		
Peru	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Portugal	1	1	0	0	0	2	1	0	0	1	1	0	0	1	0	0	2	0	1	0	1	1	1	
Qatar	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Rwanda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Saudi Arabia	0	0	2	0	0	0	0	1	0	0	1	0	0	0	0	3	3	1	1	1	1	1		
Spain	3	7	0	0	1	5	2	0	0	0	3	2	0	2	0	0	3	0	0	1	2	0		
Sri Lanka	0	0	0	3	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0		
Sudan	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0		
Sultanate of Oman	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1		
Swaziland	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	1	1		
Syria	6	9	0	0	0	7	6	0	0	0	3	1	3	0	0	0	4	3	2	3	4	0		
Tunisia	4	4	0	0	0	9	9	0	0	0	2	0	6	0	1	0	5	3	2	2	2	3		
Turkey	8	9	0	0	0	4	3	3	0	0	5	0	6	1	1	7	2	1	1	1	4	1		
U.A. Emirates	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0		
U.S.A.	0	0	1	1	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0		
Yemen	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	1	1	1	0	1	1		
ICARDA - Terbol	1	1	0	0	0	1	1	0	0	0	0	0	0	1	1	1	0	0	0	1	1	1		
ICARDA - Syria	2	2	1	2	1	2	2	0	2	1	0	0	0	1	3	2	1	0	0	0	2	1		
<b>Total</b>	<b>35</b>	<b>61</b>	<b>15</b>	<b>16</b>	<b>10</b>	<b>49</b>	<b>35</b>	<b>10</b>	<b>11</b>	<b>9</b>	<b>26</b>	<b>17</b>	<b>32</b>	<b>20</b>	<b>22</b>	<b>31</b>	<b>51</b>	<b>18</b>	<b>20</b>	<b>20</b>	<b>49</b>	<b>34</b>	<b>41</b>	

277

Cont'd. ...

APPENDIX I (Cont'd.)

Country	L I S N - L	L I S N - S	L I S N - E	L I S N - T	L I F N - L	L I F N - S	L I F N - T	L I F N - E	L I F N - B	L I F N - W	L I F N - N	L I F N - T	L I F N - P	L I F N - A	L I F N - I	L I F N - T	L I F N - C	L I F N - B	L I F N - L	L I F N - C	L I F N - W	L I F N - C	L I F N - W	L I F N - C	L I F N - T	T o t a l
Algeria	3	0	5	3	0	0	0	0	3	2	3	1	0	0	1	3	0	2	0	0	0	0	0	0	0	87
Argentina	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	7
Bangladesh	0	1	2	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	10
Bulgaria	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	5
Canada	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
Chile	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
China	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
Colombia	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Costa Rica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Cyprus	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	7
Egypt	0	0	0	0	1	2	0	2	0	2	0	1	1	0	0	0	0	2	1	0	2	0	0	0	0	28
Ethiopia	2	2	2	2	1	1	1	2	2	1	1	1	2	1	2	2	2	1	2	0	1	1	0	0	0	46
France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
Germany	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Greece	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
India	1	0	1	1	1	0	1	2	1	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	22
Iran	5	4	4	4	0	0	0	0	0	0	3	1	0	0	0	1	0	1	1	0	1	0	1	0	0	41
Iraq	0	0	1	1	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	10
Italy	0	0	1	2	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2	34
Jordan	2	2	2	2	1	0	0	0	0	0	0	2	2	0	2	2	0	7	2	0	2	0	2	0	0	49
Kenya	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Kuwait	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Libya	0	1	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	3	2	0	0	0	0	25

278

Cont'd. ...

APPENDIX I (Cont'd.)

Country	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	F	T	
	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	L	S	E	T	L	S	T	E	N	N	N	T	A	I	I	I	I	I	R	R	I	R	
	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W
	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Total	30	26	46	35	11	9	9	19	16	19	15	40	12	2	8	16	4	20	26	8	23	5	1031

279

## APPENDIX II

National Scientists Cooperating in Food Legume International Testing Program during 1989/90.

Director General  
ITGC, Rue Pasteur  
B.P. 16  
El-Harrach  
Algiers  
ALGERIA

Mr. L. Mohammed Labdi  
ITGC, BP 59  
Sidi Bel Abbes  
ALGERIA

Ing. Rainer Kunz  
Cooperativa de  
Tabacaleros de Jujuy Ltda.  
P.O.Box No 15  
4608 - Perico (Jujuy)  
ARGENTINA

Dr M. Matiur Rahaman  
Principal Scientific  
Officer and Program Leader, Pulses  
BARI, Regional Agricultural Research  
Station, P.O. Box 6620, Ishurdi,  
Dist. Pabna  
BANGLADESH

Dr. Ashutosh Sarker  
Sr. Scientific Officer  
Pulses Breeding Section (BARI)  
P.O.BARI, Joydebpur  
Gazipur  
BANGLADESH

Dr. M.A. Newaz  
Professor  
Department of Genetics & Plant  
Breeding, BAU, Mymensingh  
BANGLADESH

Dr. M.I. Mihov  
Institute for Wheat  
and Sunflower,  
Near General Toshevo -9520  
BULGARIA

Dr. A.E. Slinkard  
Crop Science  
Department  
University of Saskatchewan  
Saskatoon S7N 0W0  
CANADA

Dr. Alberto Cubilos  
Director Production  
Vegetal, INIA Casilla, 439-3  
Santiago  
CHILE

Mr. Li Rong  
Jiangsu Academy of  
Agricultural Sciences  
Nan Jing, Jiangsu 210014  
CHINA

Ms. Lang Li Juan  
Zhejiang Academy of  
Agricultural Sciences  
Hangzhou  
CHINA

Dr. Mario Lobo A.  
Co-ordinator  
National de Hortalizas  
A.A. 100 Rionegro (Antioquia)  
Colombia, S.A.  
COLOMBIA

Dr. Maria De Los Angeles Alvarez  
Fernandez  
Escuela De Ciencias Agrarias-  
Universidad Nacional  
Apdo. 86-3000, Heredia,  
COSTA RICA

Dr. A. Hadjichristodoulou  
Head Field Crops  
Section, Agric. Research Institute  
Ministry of Agriculture and  
Natural Resources  
Nicosia  
CYPRUS

Mrs. Athena Della  
Agric. Research Office  
Agric. Research Institute  
Ministry of Agriculture and  
Natural Resources  
Nicosia  
CYPRUS

Dr. Fayek Saweris Faris  
Senior Researcher in  
Legume Res. Sec. Ministry of Agric.  
Vegetable Research Dep.  
Dokki, Giza,  
Egypt

Dr. Hailu Gabre  
Leader  
Highland Pulses Improvement Program  
Institute of Agricultural Research,  
Holetta Research Center, P.O. Box 2003  
Addis Ababa  
ETHIOPIA

Dr. Jacques Wery  
Chaire de Phytotechnie  
ENSA - INRA  
2, Place Viala  
34060 Montpellier Cedex 1  
FRANCE

Dr. E. von Kittlitz  
Universitat Hohenheim  
(720) , Landessaatzuchtanstalt  
Post fach 700 562,  
D-7000 Stuttgart 70  
Garbenstr. 9  
GERMANY

Dr. Costas Iliadis  
Director,  
Fodder Crops and Pasture Institute  
41110 Larissa  
GREECE

Dr. T.S. Sandhu  
Senior Pulse Breeder  
Regional Research Station  
Punjab Agricultural University  
Faridkot 151203, Punjab  
INDIA

Dr. A.M. Nassib  
Deputy Director  
General,  
Field Crops Research Institute  
Giza  
EGYPT

Dr. Shabaan Khalil  
Head  
Food Legume Section  
Field Crops Research Institute  
P.O. Box 12619  
Giza  
EGYPT

Mr. Abbebe Tullu  
Debre Zeit Agricultural  
Research Centre  
P.O.Box 32  
Debre Zeit  
ETHIOPIA

Mr. Fabien Relave  
TOP SEMENCE  
U.C.C.S. B.P. 2  
26160 La Batie-Rolland  
FRANCE

Dr. Christian Lehman  
Zentralinstitut fuer  
Genetik und Kulturpflanzenforschung  
DDR - 4325 Gatersleben  
GERMANY

Dr. Hector Orozco  
Leader  
Broad Bean Breeding Program  
ICTA Region VI  
Apto Postal No. 7  
Quetzaltenango  
GUATEMALA

Dr. G.C. Bajpai  
Dept. of Plant Breeding G.B.  
Pant University of Agriculture and  
Technology, Pantnagar, 263145 (U.P.)  
INDIA

Dr. B. Sharma  
Senior Scientist  
Division of Genetics  
IARI New Delhi, 110012  
INDIA

Dr. A.N. Asthana  
Directorate of Pulses  
Research, ICAR  
Kanpur - 208024  
INDIA

Mr. Behrooz Sadri  
In-Charge,  
Food Legume Research Section  
Seed & Plant Improvement Section  
Ministry of Agricultural and  
Rural Division, Mard - Abad Avenue  
Karaj  
IRAN

Prof. Luigi Stringi  
Istituto di Agronomia  
Generale E Coltivazioni Erbacee  
Viale Delle Scienze - 90128 Palermo  
Sicily  
ITALY

Dr. Prof. Salvatore Foti  
Istituto Di  
Agronomia - Universita' Via  
Valdisavoia,  
5 - 95123 Catania  
ITALY

Dr. Andrea Filippetti  
Institute of  
Plant Breeding  
Via Amendola, 165/A  
70126 Bari  
ITALY

Dr Paola Crino  
ENEA, C.R.E. Casaccia  
TECAB/BIA/GEN  
S.P. Anguillarese, 301  
00060 - Roma  
ITALY

Dr. Shankar Lal  
Project Director  
Directorate of Pulses  
Research, ICAR  
Kanpur - 208024  
INDIA

Dr. C. Abd-Mishani  
Director,  
Regional Pulse Improvement Project  
Faculty of Agriculture  
University of Tehran, Karaj  
IRAN

Dr. Awad Issa Abbas  
State Board For  
Applied Research  
Forage and Legumes Division  
Abu - Ghraib  
Baghdad  
IRAQ

Dr. Romano Raffaele  
Cattedra di  
Miglioramento Genetico Delle  
Piante Agrarie - Istituto di  
Agronomia E Coltivazioni Erbacee  
Via Universita 100 - 80055 Portici  
(NA)  
ITALY

Dr. Ciro de Pace  
Universita  
della Tuscia  
Institute di Biologia Agraria  
Via S. Camillo De Lellis  
01100 Viterbo  
ITALY

Dr. Fortinato Calcagno  
Stazione Consorziale  
Sperimentale di Granicoltura Per La  
Sicilia - Via Rossini n.1 - 95041  
Catalgirone (CT)  
ITALY

DR. Francesco Bonciarelli  
Istituto di Agronomia  
Borgo XX GIUGNO 72  
06100 Perugia  
ITALY



Prof. S. Natalini  
Centro Ricerche E  
Sperimentazione Per Il Miglioramento  
Vegetae "N. Strampelli"  
Abbadia do Fiastra, 3  
62029 TOLENTINO (Macerata)  
ITALY

Dr. Y. Rushdi  
Director,  
National Center for Agricultural  
Research and Technology Transfer  
(NCARTT)  
Ministry of Agriculture  
Amman  
JORDAN

Dr. Abdullah Jaradat  
Department of  
Plant Breeding and Genetics  
Jordan University of Science and  
Technology,  
Irbid  
JORDAN

Dr. A.L. Naqib  
Director General  
Agricultural Affairs and  
Fish Research Authority,  
P.O. Box 21422 Safat  
Kuwait  
STATE OF KUWAIT

Mr. Pierre Kiwan  
Legume Program  
ICARDA Office  
Terbol  
LEBANON

Dr. Mustafa Black  
Director General ARC,  
P.O. Box 2480, Tripoli,  
LIBYA

Mr. Khalifa Dahnous  
National Coordinator  
Food Legumes, ARC.  
P.O. Box 2480  
Tripoli  
LIBYA

Prof. B. Snobar  
Faculty of Agriculture  
University of Jordan  
Amman  
JORDAN

Dr. Nasri Haddad  
West Asian Coordinator  
Regional Office ICARDA  
P.O. Box 950764  
Amman  
JORDAN

Dr. Dunstan Malithano  
Senior Program Advisor  
Maize and Pea Program  
International Development Research  
Centre, P.O. Box 62084  
Nairobi  
KENYA

Dr. Omar El-Sawareb  
Head of Field Crops  
Agriculture Affairs and Fish Research  
Authority (P.O. Box 21422)  
Safat  
STATE OF KUWAIT

Dr. Ramadan Abdulla Khalifa  
Sarir Production Project  
Research Department  
P.O.Box 2649  
Benghazi  
LIBYA

Dr. Younis Omar Shoaib  
Agric. Research Center  
El Marj Research Station  
P.O. Box 132 El Marj  
LIBYA

Dr. Ahmed El-Abdia  
Kufra Production Project,  
P.O. Box 6324  
Benghazi, L.A.R  
LIBYA

Dr. H. Faraj  
Director INRA  
B.P. 415  
Rabat  
MOROCCO

Mr. Mohammed Kamel  
Food Legume  
Improvement Program  
Centre Regional de la Research  
Agronomique, B.P. 589  
Settat  
MOROCCO

Mr. Sakr Bouazza  
B.P. 415  
INRA  
Rabat  
MOROCCO

Dr. Ernesto Samayoa Armienta  
Director del CIANO  
Apdo Postal 515  
85000 CD. Obregon,  
Sonora  
MEXICO

Mr. Miguel Jimenez Leon  
Plant Pathologist  
A.P. No. 1031  
CIANO Research Station  
Hermosillo, Sonora  
C.P. 83000  
MEXICO

Dr. J.H. Williams  
ICRISAT Sahelian Center  
B.P. 12404  
Niamey  
NIGER

Dr. M. P. Bharati  
c/o Dr. A. John de Boer  
G.P.O. Box 1336  
WI/ARPP, Khumaltar  
KATHMANDU  
NEPAL

Dr. D.S. Goulden  
Section Leader  
DSIR, Crop Research Division  
Canterbury Agriculture & Science  
Centre, Ellesmere Junction Road,  
Lincoln. Postal: Private Bag  
Christchurch  
NEW ZEALAND

Mr. Ali Ben Seif Abdallah Al Abry  
Director of  
Agricultural Research  
P.O. Box 27502, Behla,  
Muscat  
OMAN

Dr. Bashir A. Malik  
Coordinator Pulses, PARC, National  
Agricultural Research Center  
P.O. National Health Laboratories  
Islamabad  
PAKISTAN

Dr. M. Abdullah Khan  
Associate Professor  
Dept. of Plant Breeding & Genetics,  
University of Agriculture,  
Faisalabad  
PAKISTAN

Mr. Mohammad Siddiq  
Director Agricultural  
Research N.W.F.P.  
Agri. University Peshawar  
Peshawar  
PAKISTAN

Dr. John Dyno Keatinge  
ICARDA/MART/AZRI  
c/o USAID, 1, Sindi Muslim Housing  
Society, Karachi, Quetta  
PAKISTAN

Dr. Ilyas Ahmad Malik  
Principal Scientific Officer  
Mutation Breeding Division, Nuclear  
Institute for Agriculture and Biology  
Jhang Road, P.O. Box 128, Faisalabad  
PAKISTAN

Mr. Asghar Ali  
Arid Zone Research  
Institute, Brewery Road,  
Quetta  
PAKISTAN

Prof. Dr. M.H. Bokhari  
Institute of Pure and  
Applied Biology  
Bahauddin Zakariya University  
Multan  
PAKISTAN

Dr. Mohammad Tufail  
Director Pulses,  
Ayub Agricultural Research Institute  
Faisalabad  
PAKISTAN

Ing. Agr. Enrique Tarres  
General Supervisor  
Food Legume National Program  
INIPA - Lima  
PERU

Mr. Manuel Maria Tavares de Sousa  
National Station for  
Plant Breeding  
P.O. Box 6  
7351 Elvas Codex  
PORTUGAL

Dr. Mohamed Fahd Al-Faihani  
Director  
Dept. Agr. and Water Research  
Ministry of Industry & Agriculture  
P.O. Box 1967  
Doha  
QATAR

Dr. Ahmed A. Abdelsalam  
Assistant Professor and  
Plant Breeder, Crops & Range Science  
Department, College of Agriculture and  
Food Science, King Faisal University  
Al-Hassa 31982  
P.O. Box 420  
KINGDOM OF SAUDI ARABIA

Dr. Mohammad Rahim  
Economic Botanist  
Agricultural Research Station  
(North) Mingora, Swat  
N.W.F.P.  
PAKISTAN

Dr. M. Ashraf  
Institute of Pure and  
Applied Biology  
Bahauddin Zakariya University  
Multan  
PAKISTAN

Dr. Juan Risi  
INIAA  
Apartado 248  
Lima  
PERU

Dr. Andre Mendes Dordio  
Estacao Agronomica  
National  
Quinta de Marques - 2780  
Oeiras  
PORTUGAL

Dr. Ahmed Hassan Ali  
Ministry of Industry and Agriculture  
Department of Agriculture and  
Water Research  
P.O. Box 1967  
Doha  
QATAR

Dr. Bonaventure Ukiriho  
Chef de Station  
I.S.A.R.  
Director du Project F.S.R.P.  
a Rwerere  
B.P. 73 RUHENGARI  
RWANDA

Dr. M.O. Ghandorah  
Head  
Plant Production Department  
College of Agriculture,  
King Saud University,  
Riyadh 11451  
P.O. Box 2460  
KINGDOM OF SAUDI ARABIA

Eng. Abdelsalam Elsayad  
Head  
Crop Production Department  
TADCO, Jordan Road, P.O. Box 808  
Tabuk  
**KINGDOM OF SAUDI ARABIA**

Dr. Teresa Moreno  
Instituto Nacional de  
Investigaciones Agrarias  
Finca "ALAMEDA DEL OBISPO"  
Apartado 240, 14080 Cordoba  
**SPAIN**

Dr. Manuel Obrero  
Technical Manager,  
Agrotec  
Apartado 1.021  
18327 - GRANADA  
**SPAIN**

Dr. Luis Lopez Bellido  
Department de  
Ciencias Y Recursos Agricolas  
Escuela Tecnica Superior de  
Ingenieros Agronomos  
Apartado 3048, 14080 Cordoba. Espana  
**SPAIN**

Dr. J.L. Tickoo  
Consultant Legume  
Breeder (Sri Lankan Dept. of Agric.)  
DAI/DARP, USAID  
P.O. Box 57 Royal Botanical Garden,  
Paradeniya,  
**SRI LANKA**

Dr. Sir El Khatim Ahmed  
Hudeiba Research  
Station  
P.O. Box 31  
Ed Damar  
**SUDAN**

Dr. Abdallah M. Ali  
Dept. of Horticulture  
Faculty of Agric., Univ. of Khartum  
Shambat  
**SUDAN**

Dr. M.A. Chamber  
Apdo. Oficial  
Alcala del Rio  
41200 - Sevilla  
**SPAIN**

Dr. Rafael M. Jimenez Diaz  
Departamento de  
Patologia Vegetal  
Escuela Tecnica Superior de Ing.  
Agronomos, Apdo. 3048, 14080-  
Cordoba  
**SPAIN**

Mr. Ernesto De Miguel Gordillo  
Servicia De Investi-  
gaciones Agrarias  
Finca La Orden  
Apartado 22 - 06080 Badajoz  
**SPAIN**

Mr. H.P. Ariyaratne  
Deputy Director (Res.)  
Agriculture Research Station  
Maha Illappallama  
**SRI LANKA**

Dr. Osman Ageeb  
Deputy  
Director General  
Agricultural Research Corporation  
P.O. Box 126  
Wad Medani  
**SUDAN**

Dr. Faruk Ahmed Salih  
Shambat Research  
Station  
P.O.Box 30, Khartoum North  
**SUDAN**

Dr. Gaafar H. Mohamed Ali  
Associate Professor  
c/o Dr. Farouk A. Salih  
Shambat Research Station  
P.O. Box 30, Khartum North  
**SUDAN**

Dr. Salih H. Salih  
Hudeiba Research  
Station, P.O. Box 31  
Ed Damer  
SUDAN

Dr. Abdalla Hussein Nourai  
Hudeiba Research  
Station, P.O. Box 31  
Ed Damer  
SUDAN

Dr. Hasan El-Ahmed  
Director of Research  
Ministry of Agriculture and Agrarian  
Reforms, ARC, P.O.Box 113,  
Douma, Damascus  
SYRIA

Director General  
INRAT  
Avenue de L'Independence  
2080 Ariana  
Tunis  
TUNISIA

Mr. Abdul Rahman Agsakalli  
Dogu Anadolu Tarimsal  
Arastirma Enstitusu  
Mudurkugu, P.O. Box 257  
Erzurum  
TURKEY

Dr. Dogan Sakr  
Director  
Bolge Zirai Arastirma  
Enstitusu Mudurlugu Bolge Zirai  
Arastirma, Diyarbakir  
TURKEY

Mr. Gencer Gokkan  
Seed Division Manager  
AGRO-SAN Kimya Sanayi Ve Ticaret  
A.S. Ziyapasa Bulvari  
San Apt. No.: 119, Kat: 8, Daire: 22  
Adana  
TURKEY

Dr. A.I. Sheikh Mohamed  
Hudeiba Research  
Station, P.O. Box 31  
Ed Damer  
SUDAN

Dr. Y.P. Rao  
Professor,  
Crop Production Department  
University of Swaziland  
P.O. Luyengo  
SWAZILAND

Mr. Habib Halila  
Food Legume Coordinator  
INRAT  
Avenue de L'Independence  
2080 Ariana  
TUNISIA

Dr. Aziz Karabatur  
Gunes,  
Cumhuriyet Kad. Ka Han  
No. 16 K. 4 Elmadag  
Istanbul  
TURKEY

Ing. Muammer Savas  
Dogu Anadolu Tarimsal  
Arastirma Enstitusu  
Mudurlugu, P.O. Box 257  
Erzurum  
TURKEY

Dr. Ali Gulumser  
Faculty of Agriculture  
Ondokuzmayis University  
Samsun  
TURKEY

Mr. Ali Ustun  
Blacksea Agricultural  
Research Institute  
P.O. Box 9  
Samsun  
TURKEY

Dr. Fahri Altay  
Eskisehir Agricultural  
Research Institute  
P.K. 17, Eskisehir  
**TURKEY**

Dr. Baydour Yilmez  
Director  
Central Anatolian Regional  
Agricultural Research Institute  
P.O.Box 226, Ulus,  
Ankara  
**TURKEY**

Dr. Ertug Firat  
Director  
Aegean Agricultural Research  
Institute, P.O.Box 9  
Mememen Izmir  
**TURKEY**

Dr. Abu El Hasan Salih  
Faculty of  
Agricultural Sciences  
UAE University, P.O. Box 15551  
Al Ain  
**UNITED ARAB EMIRATES**

Dr. Walter Kaiser  
Western Regional Plant  
Introduction Station  
59 Johnson Hall  
Washington State University  
Pullman, WA 99164  
**U.S.A.**

Mr. Nagi Zaid  
Program Coordinator  
Food Legumes (ARA)  
P.O. Box 87148  
Dhamar  
**YEMEN**

Dr. Mohamed Salih Faraj  
Legume Agrono. Section  
Ministry of Agric. & Agrarian Reform  
Dept. of Research & Extention  
El-Kod Agricultural Research Center  
Al-Kod 309  
**YEMEN**

Mr. Hassan Ali Bin Yahya  
Director  
Seiyun Agricultural Research Centre  
P.O. Box 9041  
Seiyun  
**YEMEN**

### APPENDIX III

#### ICARDA Scientists cooperating in Food Legume International Testing Program.

---

1. Dr. R.S. Malhotra  
International Trials Scientist
  2. Dr. Douglas P. Beck  
Microbiologist
  3. Dr. S.P.S. Beniwal  
Food Legume Pathologist/Breeder (Ethiopia)
  4. Dr. William Erskine  
Lentil Breeder
  5. Dr. S.B. Hanounik  
Faba Bean Pathologist (Morocco)
  6. Dr. L.D. Robertson  
Faba Bean Breeder (Morocco)
  7. Dr. Mohan C. Saxena  
Program Leader
  8. Dr. K.B. Singh  
Chickpea Breeder (ICRISAT)
  9. Dr. Mahmoud Solh  
Legume Scientist (North Africa Region)
  10. Dr. Sussane Weigand  
Legume Entomologist
  11. Dr. Karl H. Linke  
Orobanche Specialist
-

APPENDIX IV

Geographical Details for the Locations

COUNTRY	LOCATION	LATITUDE	LONGITUDE	ALTITUDE (m)	RAINFALL (mm)
ALGERIA	Beni-Slimane	36.14N	03.18E	550	380
ALGERIA	Guelma	36.29N	07.29E	300	313
ALGERIA	Khroub	36.16N	06.42E	640	265
ALGERIA	Setif	36.09N	05.21E	1023	253
ALGERIA	Sidi Bel Abbes	35.11N	00.38W	486	282
ALGERIA	Tiaret	34.36N	00.12W	980	242
ALGERIA	Zidane	35.11N	00.38W	486	326
BANGLADESH	Mymensingh	24.70N	90.00E	18	542
BULGARIA	Toshevo	43.40N	28.02E	236	551
CANADA	Portage	49.56N	97.17W	259	276
CANADA	Watrous	51.41N	105.22W	519	157
CHILE	Temuco	38.41S	72.25W	200	502
CHINA	Hangzhou	30.19N	120.12E	72	734
COSTA RICA	Santa Lucia	10.16N	84.71W	1250	578
CYPRUS	Athalassa	35.08N	33.24E	142	210
CYPRUS	Dromolaxia	34.52N	33.36E	25	240
CYPRUS	Paphos	34.45N	32.31E	88	265
ETHIOPIA	Alemaya	09.20N	42.03E	1980	839
ETHIOPIA	Debre Zeit	08.50N	38.58E	1900	551
ETHIOPIA	Ghinchi	NA	NA	2200	NA
ETHIOPIA	Holetta	09.30N	38.31E	2400	1146
FRANCE	Montboucher	44.33N	04.45E	130	207
GREECE	Larissa	39.07N	22.05E	70	237
INDIA	New Delhi	28.08N	77.12E	229	113
IRAN	Karaj	35.48N	54.02E	1321	198
ITALY	Avellino	41.00N	14.42E	700	626
ITALY	Caltagirone	37.01N	23.50E	500	468
ITALY	Leonessa	42.34N	13.03E	925	528
ITALY	Papiano	42.57N	12.22E	165	158
ITALY	Siracosa	37.03N	02.70E	15	72
ITALY	Tolentino	43.15N	13.30E	250	433
ITALY	Torrelama	NA	NA	NA	799
ITALY	Valguarnera	37.10N	14.28E	500	285
JORDAN	Jubeiha	32.01N	35.52E	980	421
JORDAN	Marow	32.33N	35.51E	580	442
JORDAN	Mushagar	31.42N	35.48E	785	314
JORDAN	Rabba	31.16N	35.40E	920	319
JORDAN	Ramtha	32.34N	36.01E	520	233
LEBANON	Terbol	33.49N	35.59E	890	316
LIBYA	Banghazi	26.30N	21.30E	169	NA
LIBYA	El Safsaf	32.49N	21.54E	641	315
LIBYA	Kufra	24.08N	23.23E	428	-
LIBYA	Misurata	32.45N	12.45E	32	-
LIBYA	Sarir	26.30N	21.30E	169	-
LIBYA	Tajoura	32.53N	13.24E	11	-
LIBYA	Zahra	32.40N	12.50E	50	-

Cont'd. ...



Cont'd. ...

COUNTRY	LOCATION	LATITUDE	LONGITUDE	ALTITUDE (m)	RAINFALL (mm)
MEXICO	Sonora (Hermosillo)	28.05N	111.01W	40-200	68
NEW ZEALAND	Lincoln	43.06S	172.05E	11	511
OMAN	Rumaiy	23.40N	57.50E	10	NA
OMAN	WADI Vargat	22.40N	57.20E	400	NA
PAKISTAN	Faisalabad (NIAB)	31.26N	73.06E	184	NA
PAKISTAN	Faisalabad (UAF)	31.26N	73.06E	NA	145
PAKISTAN	Islamabad (NARC)	33.43N	73.05E	600	NA
PAKISTAN	Dera Ismail Khan	34.00N	71.00E	NA	413
PAKISTAN	Mingora	34.46N	72.82E	1150	603
PAKISTAN	Peshawar	32.22N	70.71E	NA	NA
PORTUGAL	Elvas	38.53N	07.09E	208	800
PORTUGAL	Oeiras	38.40N	09.19W	50	820
RWANDA	Rwerere	02.00S	30.00E	2100	1023
SAUDI ARABIA	Tabuk	28.22N	36.35E	777	16
SPAIN	Badajoz	38.49N	06.39W	237	139
SPAIN	Cordoba -I	37.51N	04.51W	110	551
SPAIN	Cordoba -II	37.46N	04.31W	280	631
SPAIN	Sevilla -I	37.30N	05.38W	72	685
SPAIN	Sevilla -II	37.32N	05.58W	12	856
SUDAN	Hudeiba	17.34N	33.56E	351	NA
SYRIA	Al Ghab	35.23N	36.20E	170	467
SYRIA	Aleppo	36.01N	36.56E	284	NA
SYRIA	Breda	35.56N	37.10E	300	183
SYRIA	Gelline	32.80N	35.60E	421	325
SYRIA	Hama	35.08N	36.45E	316	182
SYRIA	Heimo	37.30N	41.13E	425	314
SYRIA	Homs	34.45N	36.43E	485	215
SYRIA	Idleb	36.45N	36.39E	446	333
SYRIA	Izra'a	32.51N	36.15E	757	233
SYRIA	Jableh	35.40N	35.40E	7	701
SYRIA	Jindiress	36.24N	36.44E	210	337
SYRIA	Tartus	35.40N	35.40E	7	559
SYRIA	Tel Hadya	36.01N	36.56E	284	229
TUNISIA	Ariana	36.48N	10.13E	NA	NA
TUNISIA	Beja -I	36.50N	09.13E	NA	NA
TUNISIA	Beja -II	36.50N	09.13E	NA	NA
TUNISIA	El Kef	36.10N	08.40E	NA	NA
TUNISIA	Oued Meliz	37.55N	09.00E	NA	NA
TUNISIA	Ras Rajel	NA	NA	NA	NA
TURKEY	Amasya	40.47N	36.50E	650	174
TURKEY	Ankara	39.55N	32.40E	860	NA
TURKEY	Diyarbakir	37.55N	40.12E	660	458
TURKEY	Erzurum	39.55N	41.16E	1950	394
TURKEY	Eskisehir	40.00N	30.05E	780	284
TURKEY	Izmir (Menemen)	38.40N	27.34E	10	351
TURKEY	Samsun -I	41.20N	36.15E	130	501
TURKEY	Samsun -II	40.50N	37.08E	10	318
TURKEY	Samsun -III	40.47N	36.50E	650	268
TURKEY	Sanliurfa	36.50N	39.55E	397	252

NA = Not available

## APPENDIX V

### Meterological Details for the Locations











































