

REPUBLIC OF TUNISIA  
MINISTRY OF AGRICULTURE

INTERNATIONAL CENTER  
FOR AGRICULTURAL RESEARCH  
IN THE DRY AREAS (ICARDA)

**TUNISIA/ICARDA**  
Cooperative Projects

**REPORT OF THE FIFTH ANNUAL**  
Coordination Meeting

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## PREFACE

The Fifth Tunisia/ICARDA Coordination Meeting was held at the Institut National de la Recherche Agronomique de Tunisie (INRAT), Tunis, Tunisia during the period September 17 to 19, 1987.

This report presents an abstract of this meeting and includes the summary of 1986/87 results of the collaborative projects on Cereal Improvement, Food Legume Improvement and Farming Systems as well as the work plans for 1987/88 crop season. The training needs, consultancies, staff education and budget by project are also given.

The Annual Progress Reports for these projects are produced separately and are available on request.

## FIFTH TUNISIA/ICARDA COORDINATION MEETING

SEPTEMBER 17 TO 19, 1987

The Fifth Coordination Meeting between Tunisia and ICARDA was held at the Institut National de la Recherche Agronomique de Tunisie (INRAT) during the period September 17 to 19, 1987.

The program of the meeting and list of participants are presented at the end of this document (Annex 1 and 2).

The meeting went as follows:

- |              |   |
|--------------|---|
| September 17 | - Opening session<br>- Concurrent sessions of the projects;<br>review of 1986/87 results  |
| September 18 | - Continuation review of 1986/87 results<br>- Research plans for 1987/88 crop season  |
| September 19 | - Continuation of research plans for<br>1987/88 crop season<br>- Presentation summary 1987 results<br>and 1988 plans<br>- Closing session |

### OPENING SESSION

Dr. M. Lasram; Director of INRAT chaired this session. He welcomed ICARDA scientists from the various programs and indicated that this is the first year such a large number of scientists from all the programs of ICARDA attended. He also welcomed Dr. Eglal Rashed from IDRC who replaced Dr. G. Potts and attends this meeting for the first time and also welcomed the national collaborators and researchers. He said the 1986/87 season was very fruitful for the collaborative projects as well as the other activities of ICARDA in Tunisia and briefly reviewed the developments in the various projects.

For Cereals the season was favourable for a good yield and production essentially in the northern region. The new barley and wheat varieties proposed for release are in the process of inscription and seed multiplication. The barley variety recommended is Rihane-03 and has good yield advantage over the three varieties released in 1985 and is a 6-rowed type which makes it more acceptable to farmers. The bread wheat variety Byrsa and the durum wheat Razzak (selected from a cross made in Tunisia) are also at the same stage of release. This year yields of 7.0 Tons/ha and sometimes 10.0 Tons/ha were obtained in some locations. In Food legumes he said that the national program suffers from the limited

number of scientific personnel of INRAT and the departure of ICARDA expatriate staff. In spite of that, good results were obtained since three chickpea varieties are released, two of which are for winter planting and have good resistance to ascochyta blight in addition to two lentil varieties. The credit for that goes to the germplasm provided by ICARDA and the dedication of the national team. The Farming Systems project he said is more complex since it comprises various disciplines and institutions. At the start the project suffered from the unavailability of the required disciplines but now all disciplines needed are available to the project. The first phase of the project is completed but the analysis of the data need to be done.

He said that cooperation with ICARDA is going very well and as a result improved germplasm with high yield potential is available. He appreciated that ICARDA did not decrease its financial support to the projects in 1987 as promised and assured that the budget allocated by ICARDA was very efficiently used.

He indicated that the major constraint in all the projects is the insufficiency of the national staff but now with the new statute for the organization and remuneration of the national research staff, the chances of INRAT attracting and keeping the researchers are better and it is expected that INRAT slowly will be able to develop the research capabilities required.

He also urged ICARDA to get the PDP-11 computer functional although the Farming Systems group used the IBM PC installed at the computer room very efficiently.

He stressed that the Seventh Plan gives very high priority to cereals and food legumes and it is the aim of the government to reach self sufficiency in both cereals and meat by the end of this plan; 1991.

He also commended ICARDA initiatives in conducting in Tunisia a survey for cereal and food legume diseases in May 1987 and requested this survey be conducted systematically every year.

He mentioned that the recommendations of the external evaluation team for the Farming System projects were very useful, constructive, clear and frank. He received a letter from Dr. Tchamitchian, the livestock scientist in the review team commending the work done in the project on sheep and also a letter from Dr. H. Zandstra of IDRC supporting the work. He said that the extension of the Farming Systems project for two more years using the funds saved from the original budget will help synthesize and analyse the data obtained so that concrete recommendations could be given to farmers in the project area.

He also indicated that the visits of ICARDA scientists to the projects in Tunisia were better coordinated this year and commended ICARDA support post graduate research for INRAT staff and requested this support be continued and strengthened if possible.

He said that cereal production is very variable from one year to the other depending on rainfall. 1984/85 production was about 21.0 Million quintals while 1985/86 was about 7.0 Million and this year is expected to be about 17.0 Million. He emphasized that INRAT will continue selection under stress conditions for varieties with high yield potential that give a good yield under stress but if the rain is good give a high yield. For food legumes, the group will continue to generate genetic material and production technologies. He added that what needs to be strengthened is to diffuse and extend the results obtained to the farming community. The project proposal for food legumes submitted to IDRC for funding concentrates on these aspects.

Dr. M. Lasram said that in last year's coordination meeting he recommended that a document be produced synthesizing the work done in Tunisia/ICARDA collaborative projects. He said that the production of such a document is very important for the national program as well as for ICARDA and also to the Ministry of Agriculture as it increases the credibility of ICARDA and the national team. He urged this document be produced. He also mentioned that in last year's coordination meeting Mr. H. Hafsia requested ICARDA to post more scientists in Tunisia. ICARDA recruited two scientists this year for North Africa one a pasture/forage specialist and the second a pathologist for Food Legumes. The two should have regional responsibilities like Dr. M.S. Mekni and Dr. M. Solh posted in Morocco who in addition to their obligation to the Moroccan national program have a regional task toward the other Maghreb countries. He added that he would like to see a clear strategy for ICARDA for the Maghreb countries.

He stated that after three years of negotiations with the government of Tunisia on an agreement to enable ICARDA work for the Maghreb countries from Tunisia as a base, the agreement was prepared along the lines of ICARDA agreement with Morocco giving ICARDA staff posted in Tunisia the same privileges as UNDP staff. This agreement was sent to ICARDA few month back and no feedback received yet from ICARDA.

He concluded by thanking ICARDA administration and research programs for their support to Tunisia and requested that collaboration between Tunisia and ICARDA develops to more scientific areas that will be better both for the national program as well as for ICARDA.

Dr. J.P. Srivastava thanked Dr. M. Lasram for his statement and conveyed the regret of Dr. M. A. Nour and Ir. G.J. Koopman who could not attend due to various other commitments. He said that Tunisia has a special place in ICARDA collaboration with countries and the presence of four Program Leaders from ICARDA in this meeting in addition to a number of senior researchers from the various programs reflects that and indicates the commitment of ICARDA towards Tunisia. He also welcomed Dr. Eglal Rashed to this meeting, and the national researchers.

He then presented a general overview of the changes in ICARDA, with Dr. M. A. Nour leaving ICARDA end of September and Ir. G.J. Koopman (DDG-IC) Acting Director General till a new Director General is recruited. Dr. Aart von Schoonhoven has been recruited and is now in ICARDA as Deputy Director General for Research. The Nomination Committee of ICARDA Board of Trustees received many applications from candidates for the position of Director General for ICARDA and a short list will be prepared soon.

He also mentioned that the second External Program Review (EPR) for ICARDA is scheduled for coming spring since the donors need to know how their money is spent. The EPR committee is expected to come to Tunisia to visit the collaborative projects. At the same time the External Management Review (EMR) is also scheduled for next spring. He mentioned that ICARDA now is ten years old and is more known and has proven its credibility in the region therefore more requests come from national programs, universities and also centers in the developed countries for having agreements with ICARDA. He added that ICARDA now works in most of the countries of the region where ICARDA carries responsibility to improve research and recently signed agreements with China, Ethiopia, countries in Sub Saharan Africa and many others.

Dr. Srivastava indicated that he is very pleased to know that the durum variety recommended for release is a Tunisian cross and wondered if international centers should continue providing elite germplasm to the national programs or should now concentrate on developing more specialized germplasm for biotic and abiotic stresses and work on methodologies of breeding.

He gave tribute to Tunisia and said that ICARDA learned from the collaboration with Tunisia. ICARDA learned about the problems in collaborative activities and gained experience. As a result of the successful involvement of ICARDA in Tunisia, Morocco requested ICARDA support and now Algeria follows. He indicated that now national programs more and more are taking the lead in crop improvement and ICARDA providing back stopping.

He said that ICARDA has submitted a project proposal to IFAD (International Fund for Agricultural Development) for financing. The project aims at improving production and research of cereals, food legumes and livestock in the Maghreb countries and there are good chances of IFAD financing the project.

Dr. Srivastava also indicated that ICARDA is glad to see the developments in the three collaborative projects and congratulated the Cereal and Food Legume researchers for the Medals of Merit they received from President Habib Bourguiba. He said that this is not only a recognition to the researchers who got the Medals but goes to the whole research in general and to all researchers. He also congratulated the INRAT group for the new status and said that with this new development INRAT will be able to keep the researchers and also attract some more.

He mentioned that the Cereal Program has drafted a document on its collaborative project with Tunisia and will pass copies to Dr. M. Lasram and Mr. A. Maamouri for their comments.

He also indicated that Dr. A. von Schoonhoven is looking forward to see impact studies conducted in various countries where ICARDA has a special involvement.

He concluded by thanking all who attended this session, wished the researchers good meetings, good programs for Tunisia and the region and looks forward to see more and more ICARDA activities to help national programs.

Dr. M. Lasram thanked Dr. J. Srivastava for his statement and also wished the various national and ICARDA researchers successful meetings.

With this, the opening session came to an end and scientists of the projects met concurrently to review and discuss the 1987 results and prepare the 1988 plans of work. The second part of the last day; September 19 was devoted to the presentation of the summaries of the 1987 results and future 1988 plans of each project. These are presented in the following pages.



## CEREAL IMPROVEMENT PROJECT

### 1. Participants

The cereal researchers met on September 17 to 19. Researchers from all institutions working in the project made commendable contributions and actively participated in the discussions.

The meeting was attended by the following:

- Mr. A.R. Maamouri	INRAT	Dr. A. Daaloul	INAT
- Mr. M. Deghais	INRAT	Dr. M. Harrabi	INAT
- Mr. M. El Falah	INRAT	Dr. J.P.Srivastava	ICARDA
- Mr. M. Mosbahi	INRAT	Dr. M.S. Mekni	ICARDA
- Mr. M. Ben Salem	INRAT	Dr. A.H. Kamel	ICARDA
- Mr. S. Rezgui	Office des Céréales		

### 2. Introduction

The assessment of the cereal project 1986/87 program of work and its achievements started by a review of the general conditions that prevailed during the season and the resulting production situation. The season was characterized by adequate weather conditions in the north and drought in the center and south, particularly after heading.

Cereals have covered over 1.6 million hectares out of which 781.000 ha were in the north and 857.000 ha in the center and south. Durum wheat was the leading cereal crop covering about 840.000 ha with equivalent areas in both the north and the south. Only 150.000 ha were grown to bread wheat, primarily on favourable environments, while barley cultivation occupied about 640.000 ha, out of which 2/3 were in the lower rainfall areas of central and southern Tunisia. Triticale, not included in the project, was confined to about 14.000 ha on wetter areas of the north.

A total of 150,000 quintals of certified seeds were used by farmers. Herbicides and Fertilizers were used almost exclusively in the northern areas. 336.000 ha were sprayed by herbicides and an average of 32.8 kg of nitrogen and 36.5 kg of  $P_{25}^{O_5}$  were used per hectare in the northern areas.

Production figures are the following: Total cereal production 19.300.000 quintals of which 10.650.000 quintals are durum , 2.947.000 quintals Bread wheat and 5.365.000 quintals of barley.

In spite of the drought in the lower rainfall areas which have prevented setting new records for production over the entire country, yield levels in Northern Tunisia compare favorably with the better rainfall record crop year of 1984/85.

Average yields have shown gains over 1984-85 crop season amounting to 21.9% for durum wheat, 0.6% for bread wheat and 15.2% for barley.

The average yield over the entire North exceeded 20.0 qx/ha which is 15.9% over 1984/85 average and is an all time record. Yields of 50.0 qx/ha have been obtained by a large number of farmers and yields of 60.0 and 70.0 qx/ha have also been recorded. Some of these record high yields were partly attributed by agronomists and farmers to the use of potash. This feedback information from the farm, should be verified by researchers and taken into consideration by agronomists when planning next season's experiments.

The general feeling is that varieties are available that can increase production significantly, however, there is a need to identify yield limiting practices and set newer and more appropriate recommendations in light of the technological advances acquired by farmers.

### **3. Highlights of 1986/87 Crop Season**

#### **3.1. Durum Wheat**

Project goals and planned research work during the 1986/87 coordination meeting were entirely achieved.

The highlights of the research work on durum improvement is the proposal for release of the new line Razzak. Under large scale multiplication, this line yielded up to 100 qx/ha. It has 6% yield advantage over Karim, higher kernel weight and produces good seed even under stress conditions. It has also better lodging resistance than Karim. These characteristics give it an edge over Karim, both under stress as well as when irrigation is provided. This line gives an indication of the level of competence reached in the National Program as Razzak is derived from a cross made locally and selected all the way in Tunisia.

In addition to Razzak, 3 lines were identified from the advance yield trials as very promising and 5 more from the first year of yield testing.

The 1986/87 crop season was a favourable year for durum wheat and disease pressures on farmer fields were generally low.

### **3.2. Bread Wheat**

In bread wheat improvement, as in the case of durum wheat, the major highlight is the proposal for release of the line BT 2703 under the name of Byrsa. It is derived from the cross G11/Cuc"S"//Kvz/Sx. Selection since 1982/83 season as well as yield testing have been carried out in Tunisia. The line is 90-100 cm tall, has medium size white seed and is a week to 10 days later heading than the improved check Tanit. It has an excellent resistance to lodging, good resistance to yellow rust and septoria but is susceptible to smut. Over 3 years and 5 stations it exceeded the yield of Tanit by 11.6%. Though similar to Tanit in seed quality characteristics, Byrsa with higher kernel weight, better lodging, septoria and yellow rust resistance, is expected to contribute additional gains in higher yield conditions.

Another achievement in the research is the identification of 22 promising lines from the advanced yield testing in addition to 56 from the first year yield testing.

### **3.3. Barley**

In barley improvement all the planned research work in 1986 coordination meeting has been carried out. This work was implemented at 6 stations ranging from favourable at Beja to the stressed environment of Hindi Zitoun.

Rihane "S" continued to show its superiority over most genotypes at all stations and is therefore proposed for release. When compared to the improved checks Roho and Taj, Rihane gave an average yield of 50.34 qx/ha over five trials in drier areas compared to 41.69 and 43.51 qx/ha for Taj and Roho respectively. Under higher yield environments it gave a mean yield of 47.32 qx/ha over 5 trials while the improved check Faiz gave 38.69 qx/ha and the local check gave 31.02 qx/ha. Because it is 6-rowed, Rihane is preferred by farmers and is expected to cover significant areas actually grown to other cultivars.

Additional achievements are the selection of 68 promising lines from international nurseries and the identification of several lines for both good rainfall and dry areas.

### **3.4. Cereal Pathology**

All germplasm included in the disease nurseries was planted at Beja station and subjected to artificial inoculation.

Wheat germplasm was inoculated repeatedly by yellow rust and septoria while barley was inoculated by scald and net blotch.

Yellow rust development on wheat was generally seen on later developing material and very susceptible lines. Barley scald was devastating and prevented other diseases from developing.

### 3.5. Cereal Quality

Quality characteristics are important factors in acceptance of newly developed germplasm. In this respect the Cereal Technology Laboratory at INRAT plays a leading role. In this area, seed samples of 1359 genotypes have been provided to the laboratory for their characterization for the major quality parameters. 6000 tests have been carried out on this germplasm. Major characteristics for durum wheats are: Kernel weight, Yellow berry, Protein percent, Test weight and Pigmentation. For the bread wheat the same tests were carried out except pigmentation and vitreousness tests, however, tests on alveographic characteristics were done. For barley quality the kernel weight, test weight and % protein were evaluated.

The quality characteristics of the durum wheat, bread wheat and barley lines proposed for release were investigated thoroughly. Razzak (Durum wheat) was generally equivalent to the improved checks Karim and Ben Bechir in quality characteristics however, it is superior to these two checks in kernel weight and vitreousness. Byrsa (Bread wheat) though its average alveographic characteristics are comparable to those of Tanit and Salambo it has better test weight, percentage protein and kernel weight than Tanit. For Bread wheat genotypes, it appears that a 1000 kernel weight of 40 grams, seems to be the minimum weight not to go below if seed filling capacity under drought is not to be impaired. Rihane (Barley) has shown higher protein content (11.3%) than the local check Ceres (10.7%) or the improved high yielding check; Faiz (9.9%).

### 3.6. On Farm Verification/Demonstration Trials

#### 3.6.1. Variety Performance Trials

To test the yielding ability of newly released and promising cultivars, trials were conducted at 11 sites for durum wheat and bread wheats and 3 sites for Barley. Major results are as follows:

Razzak (Durum wheat), outyielded INRAT 69 by 32.13%, Byrsa (Bread wheat), outyielded Dougga 74 by 9.67% and Rihane (Barley) over 3 environments mean yield was the highest among varieties tested. It yielded 33.54 qx/ha while the local cultivar yielded 22.0 qx/ha.

**3.6.2. Nitrogen Response Trials:** All varieties of durum and bread wheats responded to increased rates of nitrogen fertilizer.

**3.6.3. Seed Rate Trials:** Optimum rates were 140 kg/ha for Salambo (Bread wheat) and 155 kg/ha for Karim (Durum wheat).

**3.6.4. Weed Control Trials:** 8 herbicides available to farmers have been tested in these trials. Results show that 7 to 8 qx/ha can be gained on average when weed control is applied.

### **3.7. Cereal Pathology-INAT**

Since 1985 ICARDA has enlarged its collaborative research programs to include INAT. An emphasis was made to strengthen all components of the national cereal research program. Among the components that are essential to improve cereal production is the disease research which includes all of its facets (i.e. virulence surveys, sources of resistance, etc...).

#### **3.7.1. Virulence Survey:**

During last year twenty isolates of scald and twelve of net blotch isolated from the region (Tunisia, Syria, Turkey and Spain) were tested for their virulences on a set of scald differentials consisting of 21 varieties. For net blotch a set of differential varieties was selected from screening the original barley disease nursery containing 300 lines. The results of this work was communicated to ICARDA to diffuse it to the researchers concerned.

The continuation of the virulence survey for scald and net blotch is being done this year. Scald and net blotch samples are being investigated in terms of their virulence spectrum. The origin of the isolates is as follows:

<u>Scald</u>	<u>Net Blotch</u>	<u>Septoria</u>	<u>Tan Spot</u>	
2 Algeria	5 Algeria	5 Tunisia	8 Morocco	1 Algeria
4 Cyprus	4 Cyprus	1 Turkey	4 Tunisia	1 Morocco
4 Morocco	5 Egypt			1 Tunisia
1 Syria	9 Morocco			
5 Tunisia	2 S. Arabia			
1 Turkey	2 Syria			

A special scald disease nursery assembled by ICARDA was evaluated for resistance to one Tunisian isolate in the field and at the seedling stage. Only few entries were susceptible indicating the possible existence of resistant germplasm, at least to the Tunisian isolate, in this nursery.

In addition this same nursery was inoculated with a Tunisian net blotch isolate but only few entries were resistant. This emphasises the need to develop special disease nurseries with multiple disease resistance especially for net blotch and scald considered to be the predominant diseases in humid and sub-humid areas. A possible way to achieve this is by intensive screening in multilocation testing with the aim to build into the germplasm non-specific type of resistance effective against a wide array of virulences.

### 3.7.2. Screening of the durum world collection to Septoria tritici

This aspect is a continuation of the work started last year where the first set of about 6000 lines were tested at seedling stage for septoria resistance. A new set was tested this year at the seedling stage. The adult screening for septoria this year was not successful in spite of repeated artificial inoculations.

### 3.7.3. Disease Survey

The 1986/87 growing season was marked by a high rainfall which aided in the expression of some foliar diseases. For this reason a disease survey was arranged with ICARDA to cover all the country. The purpose was to identify and classify the cereal diseases according to their prevalence, orient the breeding programs to cover those diseases found to be important and monitor possible changes in disease prevalence or shifts in virulences.

This survey, although based on only one year, showed to our surprise that flag smut is an important disease in the semi-arid areas possibly because farmers tend to keep their seed and do not grow certified seeds. A joint paper between ICARDA and national scientists is now ready for publication.

### 3.7.4. Thesis Research

a. Minor gene resistance to net blotch. (Ms Majda Cherif).

The main objective of this thesis stemmed from previous work on the cereal rust research. The approach used was different from the classical models used in qualitative genetics. A generation mean analysis was used to estimate genetic parameters mainly additive, dominance and epistasis of the first order interaction (additive x additive, dominance x additive and dominance w dominance) using F1, F2, BC1 and BC2. All parents used in the study do not carry any major gene for resistance since they were very susceptible to the isolates used. The preliminary results show that in some combinations a buildup of resistance was observed at the F3 generation indicating transgressive segregation for quantitative resistance. This thesis is expected to be defended in October-November with ICARDA being in the exam committee.

b. Yield loss estimate to net blotch, scald and septoria (Kamel Cherif).

Under local conditions yield losses to scald, net blotch and septoria were always estimated visually. This work was designed to accurately evaluate yield losses and to study the major yield component(s) that are mostly affected by these diseases. The objectives of this study are to quantify losses caused by these diseases, develop breeding strategies to alleviate these losses and to classify these diseases according to the yield loss they cause.

This thesis is also to be defended in November with ICARDA at the exam committee.

### **3.8. Wheat Genetics and Breeding-INAT**

Since 1985 the Tunisia/ICARDA Collaborative Cereal Research Program has included the wheat genetics and breeding program of INAT. This was in an aim to establish links between the INAT program and the Durum Wheat Germplasm Evaluation Network (ICARDA/Italy), to continue the cooperation with ICARDA and CIMMYT on the evaluation of Regional and International Wheat Nurseries in the sites where the INAT program is operating and to strengthen the graduate research program conducted for Msc theses at INAT dealing with wheat genetics and breeding.

#### **3.8.1. Durum Wheat Germplasm Evaluation**

During the year 1986/87 the evaluation has concerned 3680 lines of durum wheat from the world collection. These lines were evaluated at the INAT experimental farm at Mornag.

The agronomic traits measured were growth type, resistance to lodging, plant height, yield components (number of kernels per head and 1000 kernel weight), and septoria resistance.

The results of this evaluation are being compiled and the detailed report will be submitted to ICARDA soon.

#### **3.8.2. Evaluation of Regional and International Wheat Nurseries and Trials**

Since the main goal of the wheat breeding program at INAT is the development of material adapted to semi-arid conditions, the international yield trials and screening nurseries were grown in two stations; Mornag farm (INAT) and Siliana (Furna site for Agriculture Research Project GOT-USAID/MIAC).

The lines selected from these nurseries will be included in the yield trial system of our program and some will be used for crosses with local cultivars.

### 3.8.3. Thesis Research

a. Genetic and Environmental Factors influencing yellow-berry in durum wheat (Mr. Ali Latifi).

The major results were:

The resistance to yellow-berry is not simply inherited and has an important non-additive component.

There is a significant Genotype by Environment interaction specially under no Nitrogen regime.

The qualitative study using electrophoresis showed differences between resistant and susceptible lines and also within susceptible lines for vitrous kernels.

b. Evaluation of Crosses between Local and High Yielding Varieties (Mr. Salah Rezgui).

The main results were:

The yield building process has been different from one environment to the other therefor different selection criteria should be used.

High x Low crosses showed an excellent genetic pool for selection.

c. Use of tissue culture for durum breeding purposes

Two theses were initiated in 1987 (Mr. F. Ben Ammar and Mrs. M. Bargougui)

The aim is to

Screen for regeneration ability among local and high yielding varieties.

Study the inheritance for initiation and regeneration ability.

Use tissue culture for screening for salt resistance.

## 4. Workplans for 1987/88 Crop Season

4.1. Cooperation between ICARDA, INRAT, INAT and Office des Céréales will continue. Moreover, ICARDA will continue its support to the National Program to increase production of all cereal crops in the major production areas. However, special efforts and attention will be given to the drier areas where adoption of improved production technology is lagging.



4.2. Research work in the areas of breeding, pathology, agronomy and cereal quality will continue as in previous years.

4.3. Major reorientations and recommendations are:

4.3.1. Breeding

- The lower rainfall site of Tajerouine will be more heavily used to screen wheat germplasm developed for stress environments.

- Barley will use the second low rainfall site of Hindi Zitoun for screening the most advanced germplasm.

- Yield testing of early generation bulks will be adopted to speed the selection process and permit the screening and testing of a larger number of lines.

4.3.2. Pathology

- Additional efforts on screening barley for net blotch and wheat for yellow rust will be made.

- A disease monitoring nursery will be initiated to determine disease prevalence and detect shifts in virulences.

- Work on Fusarium root rot will be initiated in INAT laboratory for seedling tests and in a FUSARIUM SICK PLOT for adult plant testing.

- A thesis research work will be carried out to assess the effect of diseases on seed quality.

- The cereal disease survey report will be submitted for publication in the FAO Plant Protection Bulletin and its highlights in RACHIS.

4.3.3. Agronomy and On-Farm Trials

- Additional seed rate by seeding date trials should be carried out for the newer varieties.

- Soil analyses tests for fertilizer recommendations should be initiated.

- The validity of present recommendations on nitrogen use will be verified for very high yield environments using increased rates of nitrogen fertilizer.

- K<sub>2</sub>O trials will be added.
- Diammonium phosphate fertilizer trials will be carried out.
- Improved recommendations on agricultural practices will be extended to barley cultivation. Special efforts should be made on weed control in barley fields in the northern areas.

#### 4.3.4. Training

- Support to Mr. Deghaies and Mr. M. Ben Salem post graduate thesis research will continue.
- Provision is also made for:
  - One individual short term training in technology
  - One individual short term training in pathology
  - One long term residential training in ON-FARM TRIALS.

#### 4.3.5. Visits

- Two senior Tunisian scientists will visit Morocco.
- One or two Tunisian scientists will visit ICARDA Base Program at Aleppo.

#### 4.3.6. Workshops

A Regional Travelling Workshop in Algeria and Tunisia will be organized.

#### 4.3.7. Other Recommendations

The cereal researchers recommend the following for 1987/88:

- A study of the impact of cereal crop improvement research on production in Tunisia be undertaken.
- A meeting of the Directors of Agricultural Research Institutions in the MAGHREB countries be organized. Its objective is to further facilitate scientific exchange and strengthen regional cooperation.

4.3.8. The operational budget will be maintained at the same level as that of the previous season.

## FOOD LEGUME IMPROVEMENT PROJECT

### 1. Participants

The food legume group met at INRAT and the following were present:

- Mr. H. Halila	INRAT	Dr. K.B. Singh	ICARDA
- Mr. H. Ben Salah	INRAT	Dr. M. Solh	ICARDA
- Mr. M. Laabidi	INRAT	Dr. W. Erskine	ICARDA
- Dr. M. Harrabi	INAT	Dr. L. Robertson	ICARDA
- Mr. A. Haddad	Office des Céréales		

### 2. Introduction

Mr. H. Halila welcomed all participants and expressed his appreciation to the good attendance of ICARDA-FLIP group. An overall view of the 1986/87 program was given. It was noticed that the implementation of the program had progressed satisfactorily and the field research program was fully executed. The active and significant contributions of INAT and Office des Céréales were acknowledged.

Dr. K.B. Singh assured the national program of continued full support.

Before discussing the results of the 1986/87 season, Mr. Halila briefly talked about the main features of the growing season. Climatically, it was observed that the amount of rainfall received has exceeded the long term average in almost all stations and was characterized by a good distribution during the growing season. The cool temperature which prevailed during the spring has, however, delayed the maturity of the crop by 7 to 10 days. Diseases were sporadically observed on research stations and farmers fields. The main highlights were as follows:

### 3. Highlights of 1986/87 Crop Season

#### 3.1. Breeding

##### 3.1.1. Faba Bean

- Although many exotic large and small seeded lines have been yield tested across locations, there were few which significantly yielded more than the local check. However, three exotic lines (FLIP 83-89 FB, 75 TA 10, 74 TA 22) with high and stable yields over years and locations were identified for further testing. The emphasis will be on selection within crosses of local x exotic material and on selection within local populations.

- One thousand single plant selections were made in  $F_3$  segregating populations of crosses of local x exotic lines with disease resistance from ICARDA.

### 3.1.2. Chickpea

- More than 300 lines of winter chickpea were tested for disease reaction and yield, and many were found to possess high yield, disease resistance, good seed quality and attributes for a mechanical harvest.

- Two winter chickpea lines (FLIP 82-239 C and FLIP 84-182 C) were preselected for release but will be tested for a further season.

- The three chickpea lines identified for release in 1986 have continued to perform well.

- Progeny tests of selections made for wilt resistance revealed some selections with Ascochyta blight resistance. However, in general the level of resistance to Ascochyta needs to be improved.

- Using the only wilt-sick plot in N. Africa and W. Asia, systematic screening of 1000 germplasm accessions and 363 advanced lines from the breeding program was undertaken, and 18 germplasm accessions and 23 breeding lines were identified as resistant. A total of 604 progeny rows were also tested for wilt reaction.

### 3.1.3. Lentil

Testing of lines in preliminary, advanced and international trials continued with emphasis on selection for yield and pod indehiscence. Few lines yielded significantly more than the local check, however, one line (FLIP 84-103 L) was preselected for release on the basis of its stable yield over several years and locations.

## 3.2. Pathology

- A disease survey on food legumes was undertaken nationwide; Botrytis fabae was the most prevalent disease on faba bean, followed by Alternaria leaf spot and Ascochyta blight. B. fabae was found from the North to the South and even in the oasis while Ascochyta blight was confined to the high rainfall areas.

- Difficulty was encountered in creating artificial epiphytotics of B. fabae and A. fabae.

- Field application of Agrobacterium rhizogenus increased nodulation in faba bean, but not in chickpea.

- A reliable pot technique to screen for reaction to both Fusarium and Verticillium wilt separately has been developed for chickpea. The results of previous field screening were confirmed for early wilters, medium wilters and resistant material.

### **3.3. Agronomy and On-Farm Trials**

- No significant response to the foliar application of hormones and the chemical control of bruchids and Orobanche was found in any of the three food legumes.

- On-farm trials conducted by the D.A.P. of the Office des Céréales, confirmed the recommendations on cultural practices and the performance of the new varieties. In faba bean and lentil early sowing and high plant density resulted in high yields. In chickpea winter sowing tripled the yield for all tested varieties, amongst which FLIP 83-46 C was the best. The use of recommended herbicides resulted in yield increases in faba bean and spring chickpea.

### **3.4. Training and Visits**

- The training and consultancy programs scheduled this year were completed. Two technicians were trained at ICARDA Aleppo in the fields of breeding and quality and one attended a course on Biological Nitrogen Fixation at Aleppo.

- Five Tunisian scientists participated in the Moroccan Food Legume Workshop, where discussions occurred on the development of North Africa food legume activities.

## **4. Work Plan for 1987/88 Crop Season**

### **4.1. Breeding**

#### **4.1.1. Faba bean**

The breeding program will continue within the framework of the priorities identified as follows:

- High yield and adaptation
- Resistance to diseases

- ICARDA will supply disease resistant, (Botrytis and Ascochyta), segregating populations and fixed lines developed for the North African program for single plant and line selection in Tunisia.

- Single-plant progenies, selected during 1987 in Tunisia from F<sub>3</sub> segregating populations of crosses made at ICARDA specifically for the Tunisian program, will be evaluated.

- Screening of advanced material for Botrytis, Ascochyta and rust resistance will be done under natural infection conditions at Ras Rajel.

- Yield testing of preliminary, advanced and international trials and nurseries will continue in appropriate research stations.

- Selection within local populations will be expanded.

#### 4.1.2. Chickpea

The breeding program will continue with the following objectives:

- High yield with acceptable seed quality
- Resistance to diseases

- Selections made at Beja for wilt resistance at F<sub>3</sub> generation and then at F<sub>4</sub> and F<sub>5</sub> for Ascochyta blight resistance originating from ICARDA crosses<sup>5</sup> targetted for Tunisia will be further evaluated for both diseases. Additional segregating populations from crosses made at ICARDA for Tunisia will be furnished for selection particularly for resistance to blight and wilt.

- Field screening for resistance to Ascochyta blight and both Fusarium and Verticillium wilt will continue amongst germplasm and advanced lines.

- Targetted crosses will be made at ICARDA to combine increased resistance to Ascochyta blight and both Fusarium and Verticillium wilt and F<sub>2</sub> seeds will be supplied for evaluation in the 1988/89 season in Tunisian disease nurseries.

- Yield testing of preliminary, advanced and international trials and nurseries will continue in appropriate research stations.

- A North-African dual-season trial will be tested in both spring and winter seasons to identify dual-season entries.

#### 4.1.3. Lentil

Breeding will continue with the objective of high yield and stability through the yield testing of preliminary, advanced and international trials and nurseries in appropriate research stations.

#### 4.2. Quality

Advanced lines of faba bean, chickpea and lentil will be monitored for seed quality characters (protein content, cooking time, and hydration capacity).

#### 4.3. Pathology

- Survey of the diseases on faba bean, chickpea and lentil on farmers' fields in Tunisia will be continued.

- An investigation will be made to resolve problems facing the creation of artificial epiphytotic conditions to screen for Ascochyta fabae and Botrytis fabae of faba bean.

- The collaboration with INRA, France on the pathogenic variability in Botrytis fabae will be continued.

- Studies on the pathogenic variability within Ascochyta rabiei of chickpea will be initiated.

- The efficient and reliable pot technique for screening for resistance to both Verticillium and Fusarium wilt separately will be further developed for large-scale screening.

- An ICARDA North Africa wilt and root rot nursery in chickpea has been initiated and a set will be screened in the wilt-sick plot at Beja.

- Screening for resistance to A. rabiei will be continued with a mixture of isolates under laboratory conditions.

- Special topics on diseases of food legumes such as B. fabae and A. rabiei could be assigned to students for further studies.

#### 4.4. Agronomy

- Resumption of agronomic trials on newly released chickpea and lentil varieties to identify appropriate cultural practices.

- Resumption of weed control research to identify an effective integrated system to control weeds.

- Collection of native Rhizobium strains from farmers' fields in all three food legumes will be made. Their efficiency in nitrogen fixation will be evaluated at ICARDA.

- On-farm trials will be organized at selected sites by Office des Céréales to further evaluate the potential of newly released chickpea and lentil varieties.

- Yield maximisation plots using the best variety and production technology will be established for testing and verification.

#### 4.5. Training and Visits

##### 4.5.1. Short Courses

<u>Nature</u>	<u>Duration, Location &amp; Date</u>	<u>Number</u>
Field experimentation in food legumes	1 week in Morocco in February	5-6 Technicians
Weed and pest control	2 weeks in April in Aleppo	1 Scientist
Lentil harvest mechanization	2 weeks in May in Aleppo	1 Technician
Crossing technique	1 week in April in Tunisia	5 Technicians

##### 4.5.2. Individual Training (non-degree)

Microbiology	3-4 weeks in Aleppo	1 Scientist
Pathology (inoculation techniques)	2 weeks in Lattakia (end of January)	1 Technician

##### 4.5.3. Visits

###### National Scientists

Four Tunisian scientists will visit ICARDA during selection time.

###### ICARDA Scientists

Dr. M. Solh	When required
Dr. L. Robertson	Visit in early spring
Dr. M.P. Haware	Visit in spring
Dr. S. Hanounik	Ascochyta and Botrytis inoculation
Dr. F. Weigand	Disease survey



## FARMING SYSTEMS RESEARCH PROJECT

### 1. Participants

The Farming Systems Project researchers met on September 17, 18 and 19. Representatives from several institutions were present during most meetings. The meetings were attended by the following persons:

- Mrs. R. Khaldi	INRAT	- Dr. M. Djemali	INAT
- Dr. G. Khaldi	INRAT/INAT	- Mr. L. Tounsi	Office des Céréales
- Mr. M. Chakroun	INRAT	- Mr. H. van Der Beek	OMVVM
- Mr. M. Essamet	INRAT	- Mr. M. Mejri	PV/Goubellat
- Mrs. A. Gana	INRAT	- Dr. P. Cooper	ICARDA
- Mr. M. Kaabia	INRAT	- Dr. P. Cocks	ICARDA
- Mr. H. Mellouli	INRAT	- Dr. M. Jones	ICARDA
- Mr. H. Seklani	INRAT	- Dr. A. Mattar	ICARDA
- Mr. T. Tnani	INRAT	- Dr. M.B. Said	ICARDA
- Mr. S. Baccari	INRAT/ICARDA	- Mr. A. Mazid	ICARDA
- Ms. K. Chehidi	INRAT/ICARDA	- Dr. E. Thomson	ICARDA
- Mr. A. Ghayadha	INRAT	- Dr. T. Stilwell	ICARDA
- Mrs. H. Amara	INAT		

### 2. Introduction

Mrs. R. Khaldi initiated the FSP presentation with a review of the general project areas. She noted that the 1986/87 crop season was wetter than usual having about 583.7 mm rainfall recorded in Goubellat (138 mm above average). This amount of rainfall was well distributed and affected most of the results presented.

The most significant event of 1986/87 was the evaluation of project activities by an independent review team. The details of the review were discussed during the second day. In addition to research activities all project researchers visited FSP projects in Morocco. A farmer information workshop was held in Tunis/Goubellat. Several project researchers made professional trips outside of Tunisia and various project technicians were trained at ICARDA. Two animal science students also completed their 3eme cycle thesis on sheep production practices and a 3eme cycle student from Montpellier completed his thesis on national wheat production policies in cooperation with Mrs. R. Khaldi. A course was presented by Mrs. R. Khaldi for the Cereals-Livestock project of NW Tunisia about using survey for their diagnostic phase of work. Each researcher associated with the project presented a brief summary of his activities. A summary of these reports follows:

### **3. Highlights of 1986/87 Crop Season**

#### **3.1. Socio-Economics**

##### **3.1.1. Principal results of Socio-Economic Survey**

During 1986/87 the survey continued with the same group of 45 farmers as in previous years. Since 1986/87 was a rainy year this permitted collection of farmer behaviour during a wet year following a dry year.

It was noted that large farmers tend to occupy the best soils in the plain area of Goubellat. Most small farmers are on the poor soils with a hilly topography. An average of 30% of the cultivable area is under fallow each year. This tends to be more for large farmers than small farmers since the large farmers utilize a 2 year rotation of Cereal-fallow while small farmers utilize a 3 year rotation of Cereal-Cereal-fallow.

Sheep form an important part of the system for small farmers. In spite of their importance there seems to be little relationship between sheep ownership and forage production. Much oats forage production is sold for cash income.

Results of some survey analyses were given for 1986/87. Among the many data presented it was noted that small farmers planted less Bread Wheat and had less fallow land than large farmers. Small farmers tended to use non-selected cereal seed rather than selected or improved seed. There was a correlation between total farm size and number of sheep but not between forage or fallow area and number of sheep. The average grain and straw yields of cereals tended to be higher among large farmers than small farmers. Small farmers used more manual weeding but less herbicide on cereals. Small farmers applied less Ammonium Nitrate and Phosphate on wheat but similar amounts on Barley and Oats. Small farmers tended to use less credit than large farmers.

On the basis of survey results there seem to be three major groups of farmers that are important to project activities:

Large farms (> 30 ha) with sheep and located on the plain without off-farm activity.

Small farms (< 30 ha) with sheep located on the hills.

Small farms (< 30 ha) with sheep located on the plains.

#### **3.2. Cereal Crops**

##### **3.2.1. Wheat Production Practices**

During the 1986/87 crop season the same Ammonium Nitrate x Herbicide experiment was performed as in previous years in 7 locations. During the last year there was a significant grain yield increase due to use of 2,4-D but no significant grain yield differences due to application of ammonium nitrate. The economic analysis showed that use of 2,4-D was profitable at all levels of N application.

An across year comparison of results showed the response to nitrogen and 2,4-D depended on the rainfall. Although there was a yield increase in all years the economic net benefits varied. These results reinforce the current farmer practice of applying increasing amounts of fertilizer with increasing rainfall, and using 2,4-D under good growing conditions. It was noted that these results agreed with experiments previously conducted by the Office des Céréales. It was recommended to discontinue this experiment since no new information was being gained.

### 3.2.2. Wheat Variety Trial

A new Durum Wheat variety (Razzak) and a new Bread Wheat variety (Byrsa) were tested by farmers on 0.25 ha plots. The durum variety had better yields than Karim while the Bread Wheat variety had yields similar to Florence Aurore.

### 3.2.3. Triticale Variety Trial

Four Triticale varieties were tested under farmer conditions in two locations in Goubellat. Most of the varieties were equal to or better than the farmers barley in terms of grain and straw yield.

### 3.2.4. Micronutrient trial

This trial was done in one location to attempt an explanation for poor barley growth in a farmer's field. In general Zinc had favorable effects on grain yield but both Nitrogen and Sulfur depressed grain yields.

## **3.3. Forage Crops**

### 3.3.1. Double Use Barley

A total of four varieties selected from the previous years work were tested on 2 farms. The plots of each variety were split into a non-cut portion and a portion cut before boot stage. All plots were harvested for grain and straw yield. It was observed that Aurore Esperance, Martin Universe and Taj are good for forage and grain, Mari/CM67 is a forage variety and Martin is a grain variety.

### 3.3.2. Forage Associations

Pure Oats were compared with three forage mixtures Vetch-Oats, Vetch-Barley and Peas-Barley in four locations. The percentage of Vetch and Peas in the stands varied from 12% to 76%. The percentage of cereal in the mixtures varied from 10% to 85%. These variations were associated with locations. During the 1986/87 crop year the most productive mixture was Vetch-Oats but during the previous dry year this was the least productive mixture.

Considering the results of two years trials it was recommended to discontinue this trial. The Vetch-Oats mixture is highly sensitive to differences in rainfall and soil preparation. Pure Oats gives more consistent yields under these conditions. Other mixtures were less desirable under all conditions.

### **3.3.3. Fallow Fertilization**

This experiment consisted of an application of 100 kg of Super 45 phosphate with a light discing. The objective was to demonstrate the increased growth of native forage species. The experiment was repeated in three locations.

The production of dry matter on non-fertilized fallow treatments at the end of April ranged from 3.4 to 4.3 T/ha while the fertilized plots produced from 5.2 to 7.5 T/ha dry matter. This is equivalent to 18.3-38.4 kg forage/kg of  $P_2O_5$  applied. There was not a significant increase in the percentage of legumes due to fertilization.

## **3.4. Animal Science**

### **3.4.1. Medicago Stocking Rate Trial**

This trial was carried out in the Bou Rebia experiment station using INRAT sheep. Three grazing intensities were used: 20, 30 and 40 head/hectare. The gains in total live weight were 195.6, 309.0 and 424.4 Kg/ha for the three stocking rates. Because of the very favorable rainfall the best gains were observed at the 40 head/ha stocking rate. This would certainly be lower under normal rainfall.

### **3.4.2. Double Use Barley Stocking Rate Trial**

This was done on the Bou Rebia experiment station with Taj barley using INRAT sheep. Three stocking rates were tested; 5, 10 and 20 Ewes/ha. Each ewe had her lambs with her. After grazing a light application of Ammonium Nitrate was made. For the three stocking rates the live weight gains of lambs were 34.6, 63.8 and 115.0 Kg/ha while the barley grain yields were 1250, 1220 and 1050 Kg/ha respectively. The net revenue from live weight gains and grain yields were 256.700, 310.600 and 387.500 TD/ha respectively. In terms of net income the highest stocking rate gave greater income than lower stocking rates.

### 3.4.3. Use of Improved Sheep Production Practices

During the past three years flocks have been followed which used certain improved production practices. These practices were use of concentrate during critical periods, disease and parasite control, culling and use of improved rams. There was a favorable increase among flocks using the improved practices for the following criteria: fertility rate, prolificacy rate, number of lambs produced. Likewise there was a significant decrease in the following criteria: rate of sterility, abortion rate, rate of adult mortality and rate of lamb mortality.

Considering the long term gains of the flock using improved practices there were significant gains in average fertility rates and numeric productivity but little gain in the prolificacy rate.

### 3.4.4. Use of Ammonia Treated Straw

Parts of the flocks of two farmers were fed Ammonia treated straw and compared with sheep performance on normal pasture. Since this alternative is designed for use by lactating ewes the live weight gain of their lambs was measured from 10-30 days age. Ewes on treated straw had lambs gains of 188 gm/day for singles and 125 gm/day for twins. Ewes on pasture had lamb gains of 255 gm/day for singles and 200 gm/day for twins. These results were considered acceptable by the farmers considering the very favorable rainfall and abundant pasture. During a poor rainfall year the weight gains on straw would be similar but weight gains on pasture would be much lower.

### 3.4.5. Economic Analysis of Flocks

As part of thesis work by two students a study was done to evaluate the economic benefits of improved sheep production practices. This thesis was done in collaboration with Mrs. R. Khaldi and Dr. G. Khaldi. Comparisons were made between flocks using the improved practices and similar flocks not using these practices. The improved practices were use of concentrate, control of diseases and parasites, culling and improved rams. The economic costs of these practices was an average of TD 4.482/animal while the increased revenue due to these practices was TD 18.006/animal giving an average new benefit of TD 10.966/animal. The greatest increases in net benefits were among small farmers with less than 20 sheep. Estimates were also made of the costs of each type of feed source, value of the flocks, value of wool products and cost of sanitary treatments. It was found that farmers with off-farm employment had better flock performance than farmers without off-farm employment.

#### **4. Work Plan for 1987/88**

##### **4.1. Evaluation of Project Activities**

Much of the discussion concerning the project evaluation was about proposed modifications in research activities. All agreed that the independent evaluation was very useful and well received. It was agreed to reduce the number of cooperating farmers and for all researchers to work with the same farmers within one experiment. It was recognized that there has been good inter-institutional collaboration between INRAT/INAT and INRAT/ICARDA but these need to be reinforced. There is also a need for analysis of rainfall data, continued sheep research, rotation experiments, soil moisture studies and fundamental biological data.

There were several comments and discussions on possible future directions of work for the project. A brief resume of some comments follow.

Mrs. R. Khaldi proposed to concentrate project activities on three groups of farmers: large farmers with sheep on the plain without off-farm activities, small farmers with sheep on the plain and small farmers with sheep on hills. Mrs. Amara noted that work on a rotation basis necessarily links all researchers together. With respect to rotations Mr. Kaabia noted that contouring could reduce the erosion observed during the fallow and cereal phase. Mr. Mellouli offered to work with water balance studies on selected locations of a rotation study. Mrs. Amara emphasized the need to carry out all work on the same plots in order to integrate the work. Mr. Chakroun mentioned the potential for Medic in a rotation based study and its connection with the sheep production and erosion control activities. Mr. L. Tounsi noted the many problems with adoption of Medic by farmers but that work should continue on a Wheat/Medic rotation. Dr. P. Cooper suggested trials on large and small plots with a Cereal/fallow rotation having five fallow treatments and three cereal fertilizer rates. He also proposed a list of basic data to be taken in each location. Mr. M. Chakroun proposed the following fallow treatment: Medic, clean fallow, weedy fallow and weedy fallow with phosphate. Discussion of many details followed.

During the morning of 19 September there were small group meetings of each discipline to further discuss details of future work. The final plan of work for the project will consist of a cereal/fallow rotation experiment. The cereal treatment will be divided between Durum wheat and Barley. The fallow treatments will consist of Medic, contouring, phosphate plus discing and a check fallow. There will be six locations: two big farmers and four small farmers, both evenly divided among hill and plains. All farmers will have no off-farm activities and will have sheep.

The persons involved in the project and their general areas of research will be as follows:

Mrs. R. Khaldi	Agro -Economics
Mrs. H. Amara	Double Use Barley
Mr. M. Chakroun	Medic and fallow fertilization
Dr. M. Djemali	Animal Science
Mr. M. Kaabia	Contouring/Soil Conservation
Mr. H. Mellouli	Soil Water balance
Dr. T. Stilwell	Wheat/Barley and plot uniformity

In addition to the above activities Mrs. R. Khaldi and Dr. T. Stilwell will complete the analyses of the survey data collected. Dr. G. Khaldi will continue to support the livestock component.

#### 4.2. Training and Visits

The following training activities were planned for 1988:

Person	Nature	Place
A. Hammami	Medic Management	Aleppo
M. Talmoudi	Barley Breeding	France
H. Ghodbane	Rotation Trials	Aleppo
M. Belgacem	Grazing Trials	Aleppo
K. Chehidi	Survey Sampling	Tunis
T. Soltani	Data Analysis, Field tech.	Rabat
S. Baccari	On Farm Workshop	Zimbabwe

The following professional travel was planned for 1988:

Person	Nature	Place
M. Chakroun	Group visit to FSP	Egypt
H. Amara	Consult with M. Mekni	Morocco
H. Amara	Consult with INRA	France
H. Amara	Group visit to FSP	Egypt
M. Kaabia	Consult INRA	France
M. Kaabia	Group visit to FSP	Egypt
M. Djemali	Sheep Impr. Seminar	France
M. Djemali	Consult INRA	France
M. Djemali	Group visit to FSP	Egypt
R. Khaldi	Consult IAM	France
R. Khaldi	Consult ICARDA	Aleppo
R. Khaldi	Group visit to FSP	Egypt
H. Mellouli	Consult INRA	France
H. Mellouli	Group visit to FSP	Egypt

#### **4.3. Project Extension**

During all meetings there were discussions about the project extension and the proposal to be submitted. It was agreed to visit Aleppo and discuss the details of the proposal before sending it to IDRC/Ottawa. The exact amount of the budget available for the two year extension was not known but sufficient will be available to continue operations at current levels.



### CLOSING SESSION

Before giving the concluding remarks, Dr. A. Kamel commended the dedication of the staff who contributed to the good results achieved and the quality work that has been presented in this last session. This applies to the various scientists from INRAT, INAT, Office des Cereales and the other collaborating Institutions.

As a follow up on Dr. M. Lasram's statement that ICARDA support to Tunisia is not confined to the three projects presented, Dr. Kamel said that an area that need not be forgotten is ICARDA's continuous support for the national program manpower needs and institution building in Tunisia either within or in addition to the current collaborative projects.

He said that during this year and from last coordination meeting the total of 22 trainees from Tunisia attended various courses conducted by ICARDA. Trainees were from INRAT, INAT, Direction des Sols, CRGR; ESAK and DPV. They attended the residential courses of the programs, short courses or had individual training. Within the specialized courses they were trained on seed testing, soil/plant analyses, biological nitrogen fixation, neutron probe usage, germplasm evaluation of cereal land races and wild relatives, cereal pathology, virology and germplasm maintenance and cataloguing. ICARDA also helped an assistant from INRAT getting a fellowship from IPO, Wageningen, Holland for training in virology for one year. He added that ICARDA and the collaborative projects sponsored 20 researchers to attend workshops, meetings or visit research programs of similar nature to their work. This number of trainees and researchers from one single country in one year shows the importance ICARDA gives in supporting this country.

ICARDA also continued its support for three post graduate researchers from INRAT in Cereal Improvement and one on Food Legume Improvement and sponsored four visits of post graduate researchers to universities or institutions in France and Italy as well as the visits of three expatriate advisors to Tunisia for the post graduate researchers.

Along with INAT, ICARDA organized in Tunisia a cereal disease meeting for key pathologists from the region. The meeting discussed the philosophy, procedure and logistics of the virulence survey of various barley diseases and was attended by cereal pathologists from Morocco, Egypt, Turkey, Tunisia as well as ICARDA.

Various other activities are also in progress. Examples are labour force and mechanization, regional soil testing and calibration, durum germplasm evaluation, the MSU/ICARDA barley disease project, the virology of cereal and food legume crops and others.

He concluded by stating that ICARDA is happy to see the national program in Tunisia evolving more and more and depending on its own expertise to increase production and solve national problems.

Dr. M. Lasram thanked Dr. A. Kamel for his statement and concluded by giving tribute to the scientists who contributed to these projects and said that these good achievements are a result of the dedication of the national and ICARDA scientists, both those posted in Tunisia and who come for short visits. He acknowledged again ICARDA continuous support to Tunisia and wished the researcher a good season to come.

By this the closing session came to an end.

**FIFTH TUNISIA/ICARDA COORDINATION MEETING**

**SEPTEMBER 17 - 19, 1987**

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**Thursday, September 17**

09.00 - 09.30

**Opening Session**

10.30 - 12.30

**Concurrent Sessions**

Review of 1986/87 Research Results

- Cereals
- Food Legumes
- Farming Systems

15.00 - 18.00

Review 1986/87 Research Results (Cont.)

**Friday, September 18**

09.00 - 13.00

Review 1986/87 Research Results (Cont.)

15.00 - 18.00

Research Plans for 1987/88 Crop Season

**Saturday, September 19**

09.00 - 11.00

Research Plans for 1987/88 Crop Season (Cont.)

11.00 - 13.00

Presentation Summary of 1987 Results  
and 1988 Work Plans

**Closing Session**

Participants to the Fifth Tunisia/ICARDA

Coordination Meeting

September 17-19, 1987

Mrs. F. Larbi	Ministry of Agriculture
Dr. M. Lasram	INRAT
Mr. T. Tnani	INRAT
Mr. A. Maamouri	INRAT
Mr. M. Deghaies	INRAT
Mr. M. El Felah	INRAT
Mr. M. Ben Salem	INRAT
Mr. M. Mosbahi	INRAT
Mr. H. Halila	INRAT
Mr. H. Ben Salah	INRAT
Mr. M. Laabidi	INRAT
Mr. M. Essamet	INRAT
Mrs. R. Khaldi	INRAT
Dr. G. Khaldi	INRAT
Mr. M. Kaabia	INRAT
Mr. H. Mellouli	INRAT
Mr. M. Chakroun	INRAT
Mrs. A. Gana	INRAT
Mr. H. Seklani	INRAT
Mr. A. Ghayadha	INRAT
Mr. S. Baccari	INRAT
Ms. K. Chehidi	INRAT
Dr. A. Daaloul	INAT
Dr. M. Harrabi	INAT
Dr. M. Djemali	INAT
Mrs. H. Amara	INAT
Mr. A. Salami	Office des Céréales
Mr. L. Tounsi	Office des Céréales
Mr. A. Haddad	Office des Céréales
Mr. S. Rezgui	Office des Céréales
Mr. M. Mejri	PV/Goubellat
Dr. J.P. Srivastava	ICARDA/Aleppo
Dr. P. Cooper	ICARDA/Aleppo
Dr. P. Cocks	ICARDA/Aleppo
Dr. K.B. Singh	ICARDA/Aleppo
Dr. E. Thomson	ICARDA/Aleppo
Dr. W. Erskine	ICARDA/Aleppo
Dr. L. Robertson	ICARDA/Aleppo
Dr. A. Mattar	ICARDA/Aleppo
Dr. M. B. Said	ICARDA/Aleppo
Dr. M. Jones	ICARDA/Aleppo
Dr. A. Mazid	ICARDA/Aleppo
Dr. M.S. Mekni	ICARDA/Morocco
Dr. M. Solh	ICARDA/Morocco
Dr. P. Beal	ICARDA/Morocco
Dr. T. Stilwell	ICARDA/Tunisia
Dr. A. H. Kamel	ICARDA/Tunisia
Dr. M. H. van Der Beek	FAO/OMVVM
Dr. E. Rashed	IDRC