

FABA BEAN PATHOLOGY
PROGRESS REPORT
1984/1985

FOOD LEGUME IMPROVEMENT PROGRAM
International Center for Agricultural Research in the Dry Areas
(ICARDA)
P. O. Box 5466, Aleppo, Syria

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

This fifth progress report is a compilation of results from the faba bean pathology work carried out during the 1984/85 cropping season at ICARDA's sub-site in Lattakia, Syria. This work was conducted by Dr. Salim Hanounik, faba bean pathologist, in collaboration with Dr. Larry Robertson, faba bean breeder under the overall supervision of the Leader of the Food Legume Improvement Program. The information contained herein is for the purpose of informing collaborators, colleagues, and others interested in the faba bean pathology research at ICARDA.

The help of Mr. N.Maliha, Research Assistant, and Mr. Elias Zed, Research Technician, in the field and laboratory work is gratefully appreciated. Assistance of the support staff of the faba bean breeding sub-program is also acknowledged.

This document has been prepared for restricted circulation and hence it should not be cited.

1. Introduction:

This faba bean pathology progress report focuses on chocolate spot (Botrytis fabae), Ascochyta blight (Ascochyta fabae), and rust (Uromyces fabae). Important aspects of these diseases include disease resistance, integrated control and, epidemiology.

Efforts in the area of disease resistance resulted in the identification of new sources for chocolate spot resistance. Studies concerning integrated disease management were continued to improve present disease control strategies. Considerable evidence is available on the presence of pathogenic variations in B.fabae. Therefore, attention was directed towards the development of durable resistance by gene recombination.

2. Screening for Disease Resistance:

General procedures and techniques adopted for the identification of resistant sources for major faba bean diseases are presented in the 1982/1983 Faba Bean Pathology Progress Report. These procedures consisted of local as well as multilocational testing of promising material.

All nurseries were inoculated artificially under cages, disease readings were recorded 3 weeks later on the following 1-9 rating scales.

Chocolate Spot (B.fabae): Chocolate spot nurseries were evaluated employing 2 scales, one for field evaluations and the other for detached leaf tests.

A. Field evaluation:

- | | |
|---|------------------------|
| 1 = No disease symptoms, or very small specks | (Highly resistant) |
| 3 = Few small discrete lesions | (Resistant) |
| 5 = Some coalesced lesions with some defoliation | (Moderately Resistant) |
| 7 = Large coalesced sporulating lesions with moderate defoliation, some plants dead | (Susceptible) |

- 9 = Extensive lesions on leaves, stems and flower parts, severe defoliation, heavy sporulation stem girdling, blackening and death of more than 80% of the plants. (Highly susceptible)

B. Detached leaf:

- 1 = No infection or very few necrotic specks covering 1-25% of the area contacting the inoculum droplet (Highly resistant)
- 3 = Necrotic specks covering 26-50% of the area contacting the inoculum droplet. (Resistant)
- 5 = Necrotic specks coalesced and covering 51-75% of the area contacting the inoculum droplet. (Moderately resistant)
- 7 = Necrosis covering 76-100% of the area contacting the inoculum droplet. (Susceptible)
- 9 = Necrosis spreading beyond inoculum site (Highly susceptible)

Ascochyta blight (A.fabae)

- 1 = No lesions, or very small non-sporulating flecks, less than 0.5 mm in diameter (Highly resistant)
- 3 = Few small, discrete, dark, nonsporulating lesions on leaves (1-2 mm in diameter), sometimes with hypersensitive reaction (Resistant)
- 5 = Some discrete, circular lesions with moderate number of pycnidia on leaves and pods. (Moderately resistant)
- 7 = Many large, coalesced irregular lesions with many pycnidia on leaves pods and stems with some defoliation. (Susceptible)
- 9 = Extensive large coalesced irregular lesions with many pycnidia on leaves, stems and pods, stem constrictions girdling, severe defoliation, and many plants dead. (Highly susceptible)

Rust (U.fabae)

- 1 = No pustules or very small non-sporulating flecks (Highly resistant)
- 3 = Few scattered pustules covering less than 1% of leaf area, few or no pustules on stem. (Resistant)

- 5 = Pustules common on leaves covering 1-4% of leaf area, little defoliation and some pustules on stem. (Moderately resistant)
- 7 = Pustules very common on leaves covering 4-8% of leaf area, some defoliation and many pustules on stem. (Susceptible)
- 9 = Extensive pustules on leaves petioles and stems, covering 8-10% of leaf area, many leaves dead and severe defoliation. (Highly susceptible)

2.1. Germplasm Screening:

Germplasm screening included the Broad Bean Pure Line-Botrytis Nursery (BPL-Botrytis) only. Of the 253 entries tested in this nursery 38 were rated 3, 38 were rated 5, and 177 were rated 7 and 9 (Table 1). In this nursery 241 single plant selections were made. Seeds from these selections are being increased at Bab-Janneh site during the 1985 off-season, for further evaluation in 1986.

It should be noted that all of the 38 chocolate spot-resistant sources rated 3 in this nursery, originated from Ecuador.

2.2. Segregating Populations:

Screening of segregating populations included the following nurseries:

2.2.1. Chocolate Spot:

F₂-Progeny - Botrytis

This nursery consisted of F₂ progenies of 13 different crosses (Table 2). Progenies of each cross were planted in 25 rows, 2 m long, and 50 cm apart. Plants were inoculated artificially with B.fabae to create enough disease pressure for effective screening. In this nursery 265 single plant selections were made. However, seeds from the best 68 single plant selections only were planted at Bab-Janneh during the 1985 off-season to produce enough seeds for further evaluation in 1986.

Table 1. Chocolate spot reaction of certain faba bean germplasm lines.

Sel. 85-Lat.	ILB	Origin	Disease ⁶ readings ¹	No. of single plant selections
1002	3025	Ecuador	3	2
1005	3026	"	3	4
1008	3026	"	3	3
1011	3027	"	3	2
1012	3028	"	5	2
1015	3029	"	3	2
1017	3030	"	3	4
1018	3031	"	3	4
1020	3031	"	5	2
1021	3032	"	3	2
1023	3033	"	3	7
1024	3034	"	3	4
1026	3034	"	3	2
1027	3035	"	3	7
1029	3036	"	3	6
1030	3036	"	3	2
1032	3038	"	5	1
1033	3046	"	3	4
1035	3047	"	5	1
1036	3047	"	3	3
1041	3056	"	3	4
1042	3056	"	3	3
1044	3057	"	3	4
1047	3058	"	3	7
1048	3058	"	3	3
1050	3059	"	5	2
1051	3060	"	3	4
1053	3060	"	3	3
1054	3060	"	3	3
1057	3061	"	7	1
1059	3061	"	5	1
1062	3063	"	3	3
1063	3064	"	3	2
1065	3066	"	5	2
1069	3068	"	5	1
1071	3068	"	3	3
1072	3069	"	7	1
1074	3070	"	3	6
1075	3070	"	7	1
1077	3071	"	5	1
1078	3071	"	3	2
1081	3072	"	5	3
1083	3073	"	5	1
1084	3073	"	5	1

...Cont'd 2/

Sel. 85-Lat	ILB	Origin	Disease readings ¹	No. of single plant selections
1086	3074	Ecuador	3	2
1087	3074	"	5	1
1090	3075	"	5	1
1093	3075	"	5	2
1095	3075	"	5	2
1096	3076	"	7	1
1098	3077	"	5	2
1104	3077	"	5	1
1105	3078	"	5	1
1110	3079	"	7	1
1111	3079	"	5	1
1106	Local	"	5	1
1107	3078	"	5	3
1109	Local	"	3	2
1120	3085	"	5	3
1122	3087	"	3	3
1125	3089	"	3	5
1128	3091	"	5	2
1129	3093	"	5	1
1131	3093	"	5	3
1132	3094	"	3	5
1134	3095	"	5	1
1135	3098	"	5	2
1138	3101	"	7	2
1140	3101	"	5	1
1141	3104	"	5	1
1143	3105	"	3	7
1144	3106	"	3	8
1146	3107	"	3	5
1147	3107	"	3	6
1150	3111	"	5	3
1158	2268	-	7	2
1159	2269	-	7	2
1164	2272	-	7	1
1165	2273	-	7	1
1172	ILB 1814	Syria	7	1
1179	2282	-	7	2
1181	ILB 1814	Syria	7	1
1189	2289	-	7	2
1207	2302	-	9	1
1228	2316	-	7	1
1234	2320	-	7	1
1249	2332	-	7	2
1266	2378	-	7	2
1267	2381	-	7	1
1272	2392	-	7	1
1275	2395	-	7	1

...Cont'd 3/

Sel. 85-Lat.	ILB	Origin	Disease readings ¹	No. of single plant selections
1276	2398	-	7	1
1279	2401	-	7	1
1281	2402	-	7	1
1291	2418	-	7	1
1293	2419	-	7	1
1296	2424	-	5	2
1317	2469	-	5	1
1375	2521	-	7	1
1376	2522	-	7	3

¹ = Disease readings were made on ICARDA's 1-9 ratings scale.

Table 2. Segregation of 13 F₂ populations for resistance to chocolate spot in faba beans.

Plot No.	Cross No.	Parents		Observed segregation ¹	
		Female	Male	Resistant	Susceptible
1	S84 055	ILB 1813	BPL 1179	14	236
2	S84 056	ILB 444	BPL 1179	17	233
3	S84 085	ILB 1266	BPL 1179	21	189
4	S84 089	77TA 88	BPL 1179	32	218
5	S84 090	ILB 285	BPL 1179	39	211
6	S84 107	ILB 23	BPL 1179	23	227
7	S84 108	ILB 29	BPL 1179	4	226
8	S84 119	79S 171	BPL 710	11	239
9	S84 120	ILB 1814	BPL 710	17	233
10	S84 125	ILB 1817	BPL 1179	15	235
11	S84 126	77TA 48	BPL 1179	7	243
12	S84 139	77TA 72	BPL 710	16	244
13	S84 140	ILB 1816	BPL 710	45	205

1) Resistance is indicated by 1, 3 or 5 reading and susceptibility by 7 or 9 reading on ICARDA's 1-9 rating scale.

F4 Progeny - Botrytis

This nursery consisted of 45 test entries selected from 14 crosses in 1984 (Table 3). These entries were planted in rows 2 m long and 50 cm apart. The local susceptible cultivar Rebaya-40 was repeated every third row. Of the 45 test entries included in this nursery, 41 were rated 3, with the remaining 4 entries rated 5. Spreader rows were rated 9. In this nursery seeds from 27 single plant selections and 36 uniform bulk rows were harvested. These seeds were planted at Bab-Janneh in the 1985 off-season to obtain enough seeds for further evaluation for disease resistance, and also to provide seeds for an F6 preliminary screening and yield trials.

F6 Progeny - Botrytis

This nursery included a population of one test entry (S 81077-1) selected from a cross between BPL 18 (chocolate spot resistant) and Reina Blanca (large seeded). Plants with best yield and resistance were bulked and planted at Bab-Janneh in 1985 to produce enough seeds for multilocation testing and an advanced yield trial.

2.2.2. Ascochyta Blight:

F2 Progeny - Ascochyta

This nursery included F2 progenies of 8 different crosses (Table 4). Progenies of each cross were planted in 25 rows, 2 m long and 50 cm apart. The nursery was inoculated artificially with A.fabae to create enough disease pressure for effective screening. In this nursery 314 single plant selections were made. However, seeds from the best 76 single plant selections were saved for further evaluation in the 1985/1986 season.

Table 3. Chocolate spot reaction of promising entries in the F₄-Progeny-Botrytis nursery.

Sel. 84-Lat	Cross No.	Parents		Disease reaction ¹⁾
		Female	Male	
1-1	S83 059	ILB 1269	ILB 438	3
1-2	"	"	"	3
1-3	"	"	"	3
1-4	"	"	"	3
2-1	S83 060	ILB 1822	ILB 438	3
2-2	"	"	"	3
2-3	"	"	"	3
2-4	"	"	"	3
3-1	S83 061	ILB 1269	ILB 938	3
3-2	"	"	"	3
4-1	S83 062	ILB 1822	ILB 938	5
4-2	"	"	"	3
4-3	"	"	"	5
6-1	S83 065	ILB 0024	ILB 438	3
6-2	"	ILB 0024	"	3
8-1	S83 067	ILB 0024	ILB 938	3
10-1	S83 069	ILB 2776	BPL 266	3
10-2	"	"	"	3
12-1	S83 071	ILB 2776	ILB 438	3
12-2	"	"	"	3
12-3	"	"	"	3
15-1	S83 075	ILB 2577	BPL 266	3
15-2	"	"	"	3
15-3	"	"	"	3
15-4	"	"	"	3
15-5	"	"	"	3
16-1	S83 077	ILB 2577	ILB 438	3
16-2	"	"	"	5
16-3	"	"	"	3
16-4	"	"	"	3
17-1	S83 078	ILB 2611	ILB 438	3
17-2	"	"	"	3
17-3	"	"	"	3
18-1	S83 079	ILB 2577	ILB 938	5
18-2	"	"	"	3
18-3	"	"	"	3
20-1	S83 081	ILB 2615	BPL 266	3
20-2	"	"	"	3
20-3	"	"	"	3
20-4	"	"	"	3
20-5	"	"	"	3
20-6	"	"	"	3
20-7	"	"	"	3
21-1	S83 083	ILB 2615	ILB 938	3
21-2	"	"	"	3
Local check (Rebaya-40)				9

1) Disease readings were made on ICARDA's 1-9 rating scale.

F4 Progeny - Ascochyta

This nursery consisted of 9 test entries, selected from one cross made between BPL 460 and ILB 37. Of the 9 entries, 7 were rated 1, and 2 were rated 3. Plants in local check rows were rated 9 (Table 5). Seeds from different entries will be bulked for purification and a preliminary yield trial in 1985/1986.

2.3. Durable Disease Resistance:

Considerable evidence is available today on the presence of great pathogenic variability in B.fabae and A.fabae. Therefore, the program continued to focus on the development of durable sources for resistance to these major pathogens. Combination of genes from plants with different mechanisms for resistance should result in lines having more durable resistance than those having simply one mechanism for resistance. In our program, genotypes were observed that had different mechanisms for resistance such as hypersensitivity, tolerance, disease escape, and others. Therefore, several crosses were made in 1983 to combine genes for such mechanisms into one cultivar with durable resistance.

2.3.1. F4 Botrytis x Botrytis

This nursery included 31 test entries selected from F2 progenies of 17 crosses made in 1983 between several chocolate spot-resistant sources (Table 6). F4 plants were grown in rows 2 m long and 50 cm apart. In this nursery 4 entries were rated 1, and 27 rated 3. Plants in spreader rows were rated 9. Seeds from 21 single plant selections, and also from 21 uniform bulk rows were planted at Bab-Janneh during the 1985 off-season to provide enough seeds for multilocation evaluation, purification, and preliminary screening and yield trials in 1985/1986.

2.3.2. F4 Ascochyta x Ascochyta

This nursery consisted of 68 test entries selected from F2 progenies of 31 crosses made in 1983 between several Ascochyta blight - resistant sources (Table 7). F4 plants were grown in rows 2 m long and 50 cm apart.

Table 4. Segregation of 8 F₂ populations for resistance to Ascochyta blight in faba beans.

Plot No.	Cross No.	Parents		Observed segregation ¹⁾	
		Female	Male	Resistant	Susceptible
1	S84 142	ILB 444	ILB 37	34	216
2	S84 149	ILB 371	ILB 37	12	178
3	S84 157	ILB 12	ILB 37	68	182
4	S84 168	79S 103	ILB 37	41	209
5	S84 169	ILB 29	ILB 37	65	185
6	S84 172	77TA 48	BPL 460	26	224
7	S84 173	ILB 277	BPL 471	27	223
8	S84 176	77TA 88	BPL 472	41	209

1) Resistance is denoted by a reading of 1, 3, or 5 and susceptibility by 7 or 9, reading on ICARDA's 1-9 rating scale.

Table 5. Ascochyta blight reaction of entries in the F₄-progeny-Ascochyta nursery.

Sel. 84-Lat.	Cross No.	Parents		Disease reaction ¹⁾
		Female	Male	
10-1	S83 135	BPL 460	ILB 37	3
10-2	"	"	"	3
10-3	"	"	"	1
10-4	"	"	"	1
10-5	"	"	"	1
10-6	"	"	"	1
10-7	"	"	"	1
10-8	"	"	"	1
10-9	"	"	"	1
Local check (Giza-4)		-	-	9

1) Disease readings were made on ICARDA's 1-9 rating scale.

Table 6. Chocolate spot reaction of entries in the F₄ Botrytis x Botrytis nursery for durable resistance.

Sel. 85-Lat.	Cross No.	Parents		Disease Reaction (1)
		Female	Male	
2	L83101	BPL 710-2	BPL 1179	3
3	L83102-1	BPL 710-1	BPL 1179	3
4	L83102-2	BPL 710-1	BPL 1179	3
6	L83103-1	BPL 1278	BPL 1179	3
7	L83103-2	BPL 1278	BPL 1179	3
8	L83103-3	BPL 1278	RPL 1179	3
10	L83104	BPL 1821	BPL 1179	3
11	L83105	BPL 1821	BPL 710-1	3
12	L83106-1	BPL 710-2	BPL 261	1
14	L83106-2	BPL 710-2	RPL 261	3
15	L83107-1	BPL 1179	BPL 261	1
16	L83107-2	BPL 1179	BPL 261	3
18	L83108	BPL 261	BPL 266	1
19	L83109	BPL 1196	BPL 266	1
20	L83110-1	BPL 1278	BPL 266	3
22	L83110-2	BPL 1278	RPL 266	3
23	L83111	BPL 1821	BPL 266	3
24	L83112-1	BPL 1179	BPL 1196	3
26	L83112-2	BPL 1179	RPL 1196	3
27	L83113-1	BPL 1179	BPL 1278	3
28	L83113-2	BPL 1179	RPL 1278	3
30	L83114-1	BPL 1179	BPL 1390	3
31	L83114-2	BPL 1179	RPL 1390	3
32	L83114-3	BPL 1179	RPL 1390	3
34	L83114-4	BPL 1179	RPL 1390	3
35	L83114-5	BPL 1179	BPL 1390	3
36	L83115-1	BPL 1196	BPL 1390	3
38	L83115-2	BPL 1196	BPL 1390	3
39	L83116-1	BPL 1278	BPL 1390	3
40	L83116-2	RPL 1278	BPL 1390	3
42	L83117-1	BPL 1179	RPL 1821	3
-	Local Check R-40)			9

(1) Disease readings were made on ICARDA's 1-9 rating scale.

Table 7. Ascochyta blight reaction of entries in the F₄-Ascochyta x Ascochyta nursery for durable resistance.

Sel. 85-Lat.	Cross No.	Parents		Disease reaction ⁽¹⁾
		Female	Male	
2	L83118-1	ILB 37	BPL 2485	5
3	L83118-2	ILB 37	BPL 2485	3
5	L83118-3	ILB 37	BPL 2485	1
6	L83118-4	ILB 37	BPL 2485	1
8	L83119	ILB 37	BPL 435	3
9	L83120	ILB 37	BPL 460	3
11	L83122-1	ILB 37	BPL 472	3
12	L83122-2	ILB 37	BPL 472	3
14	L83123-1	ILB 37	Se1.80.15563-3	3
15	L83123-2	ILB 37	Se1.80.15563-3	3
17	L83124-1	BPL 2485	ILB 37	3
18	L83124-2	BPL 2485	ILB 37	3
20	L83125	BPL 2485	BPL 460	3
21	L83126	BPL 2485	BPL 471	3
23	L83127-1	BPL 2485	BPL 472	3
24	L83127-2	BPL 2485	BPL 472	3
26	L83127-3	BPL 2485	BPL 472	1
27	L83127-4	BPL 2485	BPL 472	1
29	L83129-1	BPL 2485	BPL 818	1
30	L83129-2	BPL 2485	BPL 818	3
32	L83129-3	BPL 2485	BPL 818	3
33	L83131-1	BPL 435	BPL 2485	3
35	L83131-2	BPL 435	BPL 2485	3
36	L83132	BPL 435	ILB 37	3
38	L83133	BPL 435	BPL 472	3
39	L83135-1	BPL 460	BPL 2485	1
41	L83135-2	BPL 460	BPL 2485	3
42	L83135-3	BPL 460	BPL 2485	1
44	L83136-1	BPL 460	ILB 37	3
45	L83136-2	BPL 460	ILB 37	3
47	L83136-3	BPL 460	ILB 37	3
48	L83136-4	BPL 460	ILB 37	3
50	L83138	BPL 460	BPL 471	3
51	L83140	BPL 460	BPL 87	3
53	L83141-1	BPL 460	Se1.80.15563-3	3
54	L83141-2	BPL 460	Se1.80.15563-3	3
56	L83142-1	BPL 471	BPL 2485	3
57	L83142-2	BPL 471	BPL 2485	3
59	L83143-1	BPL 471	ILB 37	3
60	L83143-2	BPL 471	ILB 37	3
62	L83145-1	BPL 471	BPL 460	3
63	L83145-2	BPL 471	BPL 460	3
65	L83146-1	BPL 471	BPL 472	3
66	L83146-2	BPL 471	BPL 472	3

...Cont'd 2/

Sel. 85-Lat.	Cross No.	Parents		Disease reaction(1)
		Female	Male	
68	L83149-1	BPL 472	BPL 2485	3
69	L83149-2	BPL 472	BPL 2485	3
71	L83149-3	BPL 472	BPL 2485	3
72	L83149-4	BPL 472	BPL 2485	3
74	L83149-5	BPL 472	BPL 2485	3
75	L83149-6	BPL 472	BPL 2485	3
77	L83150-1	BPL 472	BPL 471	3
78	L83150-2	BPL 472	BPL 471	3
80	L83151-1	BPL 472	BPL 435	3
81	L83151-2	BPL 472	BPL 435	3
83	L83151-3	BPL 472	BPL 435	3
84	L83151-4	BPL 472	BPL 435	3
86	L83152-1	BPL 472	BPL 87	3
87	L83152-2	BPL 472	BPL 87	3
89	L83152-3	BPL 472	BPL 87	3
90	L83153	BPL 87	BPL 2485	3
92	L83155-1	BPL 87	BPL 471	3
93	L83155-2	BPL 87	BPL 471	3
95	L83155-3	BPL 87	BPL 471	3
96	L83156	Sel.80.15563-3 ILB 37		3
98	L83158-1	BPL 818	BPL 2485	3
99	L83158-2	BPL 818	BPL 2485	3
101	L83159	BPL 818	BPL 471	3
102	L83165	Giza-4	Sel.80.15563-3	3
-	Local Check (Giza-4)			9

(1) Disease readings were made on ICARDA's 1-9 rating scale.

In this nursery 7 entries were rated 1, and 60 rated 3. Plants in spreader rows were rated 9.

Seeds from 90 single plant selections were planted at Bab-Janneh during the 1985 off-season to produce enough seeds for multilocation evaluation, and also for purification and a preliminary yield trial in 1985/1986.

2.4. Development of Disease Resistant Inbred lines:

Attempts to improve homozygosity for disease reaction among chocolate spot-, Ascochyta blight-, and rust-resistant sources were continued. In this study, 44 chocolate spot, 25 Ascochyta blight, and 30 rust-resistant sources (Tables 8, 9, and 10) were grown, and inoculated artificially under cages to prevent outcrossing. When disease readings were made, susceptible plants were uprooted. Then seeds from the remaining resistant plants were harvested and increased during the 1985 off-season at Bab-Janneh for further purification, and also to provide inbred seeds for crossing and multilocation testing.

2.5. Multilocation Testing of Promising Materials:

Seeds of several sources for chocolate spot-, Ascochyta blight-, and rust- resistance, identified in the screening program at Lattakia, were included in the Faba Bean International Disease Screening Nurseries (Table 11). However, results concerning the reaction of entries in these nurseries were not received from all locations so-far. Therefore, results obtained by end of June 1985 have only been presented. Remaining results will be presented in the 1985/1986 report.

2.5.1. Faba Bean International Chocolate Spot Nursery (FBICSN-85):

Results on the reaction of entries in this nursery were obtained from The Netherlands, Egypt, U.K., and Syria only (Table 12). Of the 26 entries included in this nursery only 3 (BPL 710, 1179, and 1196)

Table 8. Disease reaction on chocolate spot resistant inbred lines.

Sel. 81-Lat.	BPL	Disease rating ¹⁾	Sel. 81-Lat.	BPL	Disease rating ¹⁾
24638-1	110	3	24948-1B	1179	3
24640-1	112	3	24948-6	1179	3
24640-2A	112	3	24950-2	1196	5
24640-2B	112	3	24950-3	1196	5
24640-2C	112	3	24957	1278	3
24694-1A	261	3	24996	1538	3
24694-1B	261	3	25001	1544	5
24694-1C	261	3	25003	1546	5
24694-2A	261	3	25004	1547	5
24694-2B	261	3	25005-2	1548	3
24694-3	261	3	25011	1556	5
24698-1	266	3	25075	1689	3
24698-2	266	3	25087	1749	5
24698-3	266	3	25090	1752	3
24701-1	274	3	25099	1763	3
24701-2	274	3	25100	1764	3
24799	461	3	25111	1802	3
24833	658	3	25114-1	1821	3
24857-1	710	3	25114-2A	1821	3
24857-2	710	3	25117	1832	3
24857-2	1056	3	25117-1	1832	3
24902	1058	3	Local Check	R-40	9
24948-1A	1179	3			

1) Disease readings were made on ICARDA's 1-9 rating scale.

Table 9. Disease reaction on Ascochyta blight-resistant inbred lines.

Se1. 80-Lat.	BPL	Disease rating ¹⁾
70015-1	74	3
70015-2	74	1
70015-3	74	3
70015-4	74	3
14200-1	230	3
14336	365	3
14399	436	3
14422-1	460	3
14427	465	1
14434-1	471	3
14434-2A	471	3
14434-2B	471	3
14434-3	471	3
14435-1	472	3
14435-2	472	3
14435-3	472	3
14435-4	472	3
14986-1	266	3
14998-2	646	3
14998-3	646	3
15025	ILB 752	3
15035-1	818	3
15035-2	818	3
A ₂	F ₆ x75TA 46	1
Se1. 82. 10026	2485	3
Local check (Giza-4)		9

1) Disease readings were made on ICARDA's 1-9 rating scale.

Table 10. Disease reaction on rust resistant inbred lines.

Sel. 83-Lat.	BPL	Disease rating	Sel. 83-Lat.	BPL	Disease rating
30008	7	3	30320-1	484	3
30010	8	3	30320-2	484	3
30094	150	3	30328	490	3
30164-1	260	3	30374	522	3
30164-2	260	3	30378-1	524	3
30168-1	263	3	30378-2	524	3
30168-2	263	3	30384-1	530	3
30192	309	3	30384-2	530	3
30244	406	3	30386	533	3
30258	417	3	30388-1	536	3
30268-1	427	3	30388-2	536	3
30268-2	427	3	30394	539	3
30268-3	427	3	Sel.80.15563-1A	-	3
30273	ILB 1814	3	sel.80.15563-1B	-	3
30310	476	3	Local Check		3
30318	481	3			

1) Disease readings were made on ICARDA's 1-9 rating scale.

Table 11. Faba bean international disease screening nurseries and their distribution in 1984-85.

Countries	NURSERIES		
	FBIABN	FBICSN	FBIRN
Argentina	+	+	+
France	+	+	+
Poland	+		
Spain	+		+
Turkey	+		+
U.K.	+	+	
Morocco	+	+	+
Tunisia	+	+	+
China		+	+
Ethiopia		+	+
Egypt		+	+
Qatar		+	
Syria	+	+	+
Total	9	10	10

Table 12. Chocolate spot reaction on 26 entries of Vicia faba in different countries.

Sel. Lat.	BPL	Origin	DISEASE REACTION ⁽¹⁾								
			Syria			Egypt			Netherlands	U.K.	
			1983	1984	1985	1983	1984	1985	1984	1983	1984
Sel.81-24638-1	110	U.K.	R	R	R	R	N.T.	R	N.T.	S	N.T.
Sel.81-24640-2	112	U.K.	R	R	R	R	N.T.	R	N.T.	R	N.T.
Sel.81-24694-1	261	Greece	R	R	R	R	R	R	S	R	S
Sel.81-24698-1	266	Greece	R	R	R	R	R	R	S	S	S
Sel.81-24698-2	266	Greece	R	R	R	N.T.	N.T.	R	N.T.	N.T.	N.T.
Sel.81-24857-1	710	Ecuador	R	R	R	R	R	R	R	R	R
Sel.81-24857-2	710	Ecuador	R	R	R	N.T.	N.T.	R	N.T.	N.T.	N.T.
Sel.81-24948-3	ILB 938	Ecuador	R	R	R	R	R	R	R	R	R
Sel.81-24948-6	1179	Ecuador	R	R	R	N.T.	N.T.	R	N.T.	N.T.	N.T.
Sel.81-24902	1058	Turkey	R	R	R	N.T.	N.T.	R	N.T.	N.T.	N.T.
Sel.81-24950-1	1196	Spain	R	R	R	N.T.	R	S	S	N.T.	S
Sel.81-24950-2	1196	Spain	R	R	R	R	R	R	R	R	R
Sel.81-24964	1390	Turkey	R	R	R	N.T.	N.T.	R	N.T.	N.T.	N.T.
Sel.81-24996-1	1538	Unknown	R	R	R	R	R	R	N.T.	S	S
Sel.81-25003	1546	Unknown	R	R	R	R	N.T.	R	N.T.	R	N.T.
Sel.81-25007	1550	Unknown	R	R	R	N.T.	N.T.	S	N.T.	N.T.	N.T.
Sel.81-25096	1758	Ethiopia	R	R	R	R	R	R	S	S	S
Sel.81-25099	1763	Ethiopia	R	R	R	N.T.	N.T.	S	N.T.	N.T.	N.T.
Sel.81-25114-2	1821	Ethiopia	R	R	R	N.T.	R	S	S	N.T.	S
Sel.84-L82003	-	ICARDA	N.T.	R	R	R	R	R	S	R	S
Sel.84-L82009	-	ICARDA	N.T.	R	R	N.T.	N.T.	R	N.T.	N.T.	N.T.
Sel.84-L82010	-	ICARDA	N.T.	R	R	N.T.	N.T.	R	N.T.	N.T.	N.T.
Sel.84-L82011	-	ICARDA	N.T.	R	R	N.T.	N.T.	R	N.T.	N.T.	N.T.
Sel.84-L81077	-	ICARDA	N.T.	R	R	N.T.	N.T.	R	N.T.	N.T.	N.T.
Rebaya-40	-	Egypt	S	S	S	N.T.	N.T.	R	N.T.	N.T.	N.T.
Syr.Local Large	ILB 1814	Syria	R	S	S	S	S	S	N.T.	N.T.	S
Local check (not supplied)	-	-	N.T.	N.T.	N.T.	R	R	S	S	S	S

(1) Disease readings were made on ICARDA's 1-9 rating scale.
R = Resistant; S = susceptible; N.T. = Not tested.

were rated resistant across all locations. However, disease reaction on the remaining entries varied considerably among different locations, indicating location differences in virulence among populations of B.fabae.

B. Faba Bean International Ascochyta Blight Nursery (FBIABN-85):

Results concerning the reaction of entries in this nursery were received from Canada, U.K., and Syria only. These results (Table 13), indicated the presence of a location-none-specific- and a location-specific resistance to A.fabae. Of the 23 entries tested at all locations 12 only (BPL 74-1, 74-3, 365,460, 465, 471-1, 471-2, 471-3, 472-2, 472-3, 818, and BPL 2485) were resistant at all the locations (location-non-specific-resistance) with the remaining 9 entries resistant at some locations and susceptible at other (location-specific-resistance).

C. Faba Bean International Rust Nursery (FBIRN-85):

Results concerning the reaction of entries in this nursery were received from Syria, Egypt and Canada only. These results (Table 14) indicated the presence of a location-specific-resistance only. However, the chocolate spot-resistant entries BPL 710, and 1179 (Table 12), seemed to carry genes for rust-resistance as well (Table 14).

Seeds from all promising entries in the three Faba Bean International Disease Screening Nurseries, are being increased during the 1985 off-season at Bab-Janneh to provide enough seeds for further evaluation and also for the breeding program.

2.6. Evaluation of Entries in the Faba Bean International Yield Trials for Disease Resistance:

A total of 413 faba bean entries from the following Faba Bean International and Advanced Yield Trials for 1984/85 were evaluated for chocolate spot and Ascochyta blight:

Table 13. Ascochyta blight reaction on 24 entries of Vicia faba in different countries.

Sel. Lat.	BPL	Origin	Disease Reaction (1)						
			Syria			U.K.		Canada(2)	
			1983	1984	1985	1983	1984	1983	1984
Sel. 79 70015-1	74	Iraq	R	R	R	R	R	R	R
Sel. 79 70015-3	74	Iraq	R	R	R	N.T	R	N.T	R
Sel. 80 14200-1	230	Morocco	R	R	R	R	R	S	R
Sel. 80 14336	365	Turkey	R	R	R	R	R	R	R
Sel. 80 14422-1	460	Lebanon	R	R	R	R	R	R	R
Sel. 80 14427	465	Lebanon	R	R	R	R	N.T	R	N.T
Sel. 80 14434-1	471	Lebanon	R	R	R	R	R	R	R
Sel. 80 14434-2	471	Lebanon	R	R	R	N.T	R	N.T	R
Sel. 80 14434-3	471	Lebanon	R	R	R	N.T	R	N.T	R
Sel. 80 14435-1	472	Lebanon	R	R	R	R	R	S	R
Sel. 80 14435-2	472	Lebanon	R	R	R	N.T	R	N.T	R
Sel. 80 4435-3	472	Lebanon	R	R	R	N.T	R	N.T	R
Sel. 80 14998-2	238	USSR	R	R	R	R	R	S	R
Sel. 80 15025	ILB 752	Unknown	R	R	R	N.T	N.T	N.T	N.T
Sel. 80 15035-1	818	Ethiopia	R	R	R	R	N.T	S	N.T
Sel. 80 15035-2	818	Ethiopia	R	R	R	N.T	R	N.T	R
Sel. 82 10026	2485	Spain	R	R	R	R	R	R	R
Sel. 84 L82003	-	ICARDA	N.T	R	R	N.T	N.T	N.T	N.T
Sel. 84 L82009	-	ICARDA	N.T	R	R	N.T	N.T	N.T	N.T
Sel. 84 L82012	-	ICARDA	N.T	R	R	N.T	N.T	N.T	N.T
Sel. 84 L82013	-	ICARDA	N.T	R	R	N.T	N.T	N.T	N.T
Giza 4	-	Egypt	S	S	S	S	S	S	S
Syrian L. Large	ILB 1814	Syria	S	S	S	R	R	S	R
Local check (not supplied)			N.T	N.T	N.T	S	S	S	S

(1) Disease readings were made on ICARDA's 1-9 rating scale.

(2) Reaction in Canada were recorded for isolate 'A' only.

Table 14. Rust reaction on 15 entries of Vicia faba in different countries.

Sel. Lat.	BPL	Origin	Disease Reaction (1)								
			Syria			Egypt			Canada 1984		
			1983	1984	1985	1983	1984	1985	SP-51	SP-82	SP-121
Sel. 84 L82011	-	ICARDA	N.T.	R	R	N.T.	N.T.	R	N.T.	N.T.	N.T.
Sel. 84 L82012	-	ICARDA	N.T.	R	R	N.T.	N.T.	R	N.T.	N.T.	N.T.
Sel. 84 L82013	-	ICARDA	N.T.	R	R	N.T.	N.T.	R	N.T.	N.T.	N.T.
Sel. 84 L82014	-	ICARDA	N.T.	R	R	N.T.	N.T.	S	N.T.	N.T.	N.T.
Sel. 82 70002	ILB 2760	Syria	R	R	R	R	S	S	R	R	S
Sel. 81 24948-1	1179	Ecuador	R	R	R	S	R	R	R	R	R
Sel. 81 24948-4	1179	Ecuador	N.T.	R	R	N.T.	R	R	R	R	S
Sel. 81 24857	710	Ecuador	R	R	R	R	R	R	R	R	S
Sel. 80 14336	365	Turkey	N.T.	N.T.	R	N.T.	N.T.	R	N.T.	N.T.	N.T.
Sel. 80 14434-1	471	Lebanon	S	R	R	S	N.T.	S	N.T.	N.T.	N.T.
Sel. 80 14435-2	472	Lebanon	R	R	R	R	N.T.	S	N.T.	N.T.	N.T.
Sel. 80 15025	ILB 752	Sweden	N.T.	R	R	N.T.	N.T.	R	N.T.	N.T.	N.T.
Sel. 80 15035-1	818	Ethiopia	N.T.	R	R	N.T.	N.T.	S	N.T.	N.T.	N.T.
Sel. 80 15035-2	818	Ethiopia	N.T.	N.T.	R	N.T.	N.T.	S	N.T.	N.T.	N.T.
Syrian Local Large	ILB 1814	Syria	S	S	S	S	S	S	R	R	R
Local Check (not supplied)			N.T.	N.T.	N.T.	S	S	S	R	S	N.T.

(1) Disease readings were recorded on ICARDA's 1-9 rating scale.

Table 15. Ascochyta blight (AB) and chocolate spot (CS) reaction of certain faba bean breeding materials included in FBIYT-L, FBIYT-S, FBISN-L, FBISN-S, FBEYT-L-1, FBEYT-S-1, FBAYT-L-1, FBAYT-S-1, and FBAYT-S-2 1984/85.

Entry	Disease Reaction (1)	
	A.B.	C.S.
1005	5	5
1007	7	7
1010	7	7
1011	5	7
1012	7	7
1013	7	7
1015	7	5
1016	7	9
1017	7	5
R.B.	7	5
1019	5	9
1021	7	5
1022	5	7
1053	5	7
1033	7	9
1054	7	7
1056	7	5
1002	7	9
1004	7	7
1032	7	7
1045	5	7
1050	5	7
1018	7	7
1067	7	7
5057	7	9
5059	7	9
5061	7	9
1065	7	7
1068	7	7
5066	7	7
5067	7	5
5068	5	9
5069	7	7
5006	7	9
5032	7	7
5025	7	5
5027	7	7
5040	7	9
5014	7	9
5015	7	9
5046	7	9
5001	7	9
5011	7	7

Entry		Disease Reaction (1)	
		A.B.	
		C.S.	
5007	7	7	9
1031	7	7	9
1027	7	7	9
1035	7	7	9
1036	7	7	3
1030	7	7	9
1049	7	7	7
1046	7	7	9
1039	7	7	7
1042	7	7	9
1047	5	7	9
1059	7	7	7
1040	7	7	5
1044	7	7	7
1037	7	7	9
1025	7	7	9
1055	7	7	7
1041	7	7	9
3003	7	7	9
3006	5	7	7
3008	7	7	9
3009	7	7	7
3012	7	7	9
3019	7	7	7
3021	5	7	9
3025	7	7	7
1072	7	7	7
1071	7	7	7
3027	7	7	9
3036	7	7	9
741A 63	7	7	7
741A 109	7	7	7
1020	7	7	7
1034	7	7	7
1051	7	7	9
1026	7	7	7
1038	7	7	7
5210	7	7	5
1027	7	7	5
1048	7	7	7
1057	7	7	5
1028	7	7	9
1024	7	7	9
1043	7	7	7
1052	7	7	7
1023	7	7	7
1003	7	7	9
1004	7	7	7
5036	7	7	9
5017	7	7	7

...Cont'd 3/

Entry	Disease Reaction (1)	
	A.B.	C.S.
1065	7	9
5044	7	7
5008	7	9
5012	7	7
5023	7	9
5038	7	9
5020	7	9
5003	7	7
5029	7	7
5034	7	7
5037	7	7
5030	7	7
5021	7	9
5043	7	9
1066	7	9
5060	7	9
5045	7	9
5070	7	7
5071-A	7	9
5085-A	5	7
5076-A	5	9
5079	5	9
5082	7	5
5083-B	7	7
5101-A	7	7
5101-B	7	9
5088-A	7	9
5088-B	7	7
5091-A	7	7
5091-B	7	9
5092-A	7	9
5092-B	7	7
5099-A1	7	7
5099-B1	7	7
5086-B1	7	9
5100-A	7	9
5100-B	7	9
2006	5	7
2018	7	9
2022	7	9
2023	7	5
2024	7	9
5042	7	9
5063	7	7
5053	7	9
5063	7	7
5010	7	7
1062	9	7
5048	7	7
5009	7	7
5013	7	7

...Cont'd 4/

Entry	Disease Reaction (1)	
	A.B.	C.S.
5002	7	9
5065	7	7
5047	7	9
100073	7	5
100072	9	-
100074	9	7
100076	9	-
S8277061-8	7	7
S82 447-1	7	9
S82 100-16	5	9
S82 146-30	7	9
S82 107-43	7	9
S82 106-3	7	7
S82 082-9	7	9
S82 150-26	9	9
S82 439-6	7	7
S82 154-4	7	5
S82 033-6	7	7
S82 412-2	7	7
S82 135-2	5	7
S82 018-3	7	7
S82 448-1	7	7
S82 009-16	7	5
S82 353-3	7	7
S82 106-12	7	7
S82 412-3	7	5
S82 099-2	7	5
S82 107-17	7	9
FLIP84 66FB	7	9
S82 004-10	7	9
S82 002-2	7	7
FLIP84 44FB	7	7
S82 146-30	7	9
S82 130-12	7	7
S82 150-26	7	5
S82 097-48	9	7
BPL 380	7	7
S81 051-21	7	9
S82 106-8	7	7
FLIP84-42FB	5	3
S81012-14	7	9
S82061-4	7	9
S81033-1	9	7
S82009-16	7	7
FLIP84-50FB	7	7
FLIP-27FB	7	5
FLIP84-20FB	7	7
FLIP84-32FB	7	5
FLIP84-34FB	7	7

...Cont'd 5/

Entry	Disease Reaction (1)	
	A.B.	C.S.
FLIP84 19FB	7	7
FLIP84 15FB	7	9
FLIP84 7FB	7	7
FLIP84 33FB	7	9
FLIP84 25FB	7	7
FLIP84 11FB	9	7
FLIP84 31FB	7	9
FLIP84 6FB	5	7
FLIP84 13FB	7	9
FLIP84 4FB	7	7
FLIP84 9FB	7	9
FLIP84 17FB	5	7
FLIP84 2FB	7	7
FLIP84 14FB	7	9
FLIP84 23FB	7	5
FLIP84 28FB	7	7
FLIP84 12FB	9	7
FLIP84 21FB	7	9
FLIP84 16FB	9	7
FLIP84 39FB	9	9
FLIP84 8FB	7	7
FLIP84 1FB	7	7
FLIP84 18FB	7	7
FLIP84 24FB	9	9
FLIP84 30FB	7	9
FLIP84 5FB	7	9
FLIP84 26FB	9	7
FLIP84 3FB	7	7
FLIP84 10FB	7	9
FLIP84 22FB	7	9
FLIP83 13FB	7	9
FLIP83 16FB	7	9
FLIP83 27FB	7	9
FLIP83 30FB	7	9
FLIP83 3FB	7	9
FLIP83 40FB	7	9
FLIP83 42FB	7	7
S82 002-2	7	7
S82 008-2	7	9
S82 008-9	7	5
S82 009-1	7	7
S82 010-6	7	7
S82 010-9	7	9
S82 010-11	7	9
S81 013-19	5	9
S82 018-3	7	7
S82 020-4	7	5
S81 021-1	7	7
S82 028-33	7	7
S81 053-2	7	7

...Cont'd 6/

Entry	Disease Reaction (1)	
	A.B.	C.S.
S81 053-5	7	7
S81 054-10	7	5
S81 066-8	7	9
S82 067-7	7	9
S82 067-17	7	9
S82 082-16	5	7
S82 084-38	9	7
S82 086-10	7	9
S82 087-11	7	9
S82 088-22	7	7
S82 095-16	7	7
S82 096-17	7	7
S82 097-25	7	5
S82 110-16	7	5
S82 141-13	7	7
S82 146-28	7	7
S82 149-21	7	7
S82 149-21	5	9
S82 150-27	7	7
S82 165-15	7	7
S82 165-17	7	9
S82 166-9	7	7
S82 170-10	7	9
S82 176-9	7	9
S82 212-2	7	5
S82 220-1	7	7
S82 243-10	7	5
S82 348-6	7	7
S82 350-8	7	7
S82 412-4	7	7
JS82-2783	7	7
S82 415-6	7	5
S82 427-6	7	5
S82 427-8	7	3
S82 439-10	7	7
S82 447-9	7	9
S82 477-5	7	3
S82 082-6	7	3
S82 088-10	7	5
Syr. Local Mid.	7	7
Syr. Local Mid.	7	7
Leb. Local Small	5	5
Leb. Local Small	5	7
S81 057-5	5	7
S81 056-7	7	5
S81 060-7	7	5
81S 36522	7	3
S81 064-15	7	7
S81 064-8	7	5

...Cont'd 7/

Entry	Disease Reaction (1)	
	A.B.	C.S.
F 301	7	5
S82 001-4	7	5
S82 001-7	7	7
S82 003-7	7	9
S82 007-1	7	5
S82 009-6	7	9
S82 010-4	7	9
S82 011-4	7	5
S82 011-1	7	5
S82 012-1	5	7
S82 013-6	5	7
S82 014-1	7	7
S82 014-2	7	5
S82 014-7	7	5
S82 017-19	7	5
S82 018-1	7	5
S82 018-11	7	5
S82 018-24	7	3
S82 019-15	7	5
S82 026-28	7	9
S82 019-39	7	9
S82 024-5	5	5
S82 024-19	5	3
S82 024-26	7	5
S82 024-33	7	9
S82 425-4	7	9
S82 026-41	7	3
S82 026-52	7	9
S82 029-3	7	9
S82 035-16	7	7
S82 037-23	7	7
S82 039-5	7	9
S82 041-3	7	9
S82 049-25	7	7
S82 057-2	7	7
S82 057-5	7	9
S82 061-11	7	9
S82 061-21	7	7
S81 064-17	7	5
S81 064-22	7	9
S81 065-24	7	5
S81 077-1	7	7
S82 079-15	7	5
S82 084-5	7	7
S82 088-23	7	7
S82 088-26	7	7
S82 092-2	7	5
S82 094-4	5	5
S82 096-30	7	9
S82 103-12	7	7

...Cont'd 8/

Entry	Disease Reaction (1)	
	A.B.	C.S.
S82 103-17	7	9
S82 104-2	7	7
S82 108-6	7	3
S82 110-14	7	3
S82 111-8	7	7
S82 113-10	7	9
S82 115-13	7	3
S82 116-7	7	5
S82 116-10	7	9
S82 118-5	7	9
S82 130-9	7	7
S82 155-3	7	7
S82 156-4	7	9
S82 158-8	7	7
S82 161-4	7	7
S82 161-13	7	7
S82 175-1	7	9
S82 177-5	5	7
S82 178-18	7	3
S82 415-17	7	5
S82 418-16	7	7
S82 427-10	7	9
S82 428-8	7	7
S82 431-7	7	9
S82 431-11	7	9
S82 435-2	7	9
S82 435-20	7	9
S82 437-11	7	3
S82 442-5	7	7
S82 445-3	7	5
S82 448-1	7	7
S82 470-9	7	7
S82 486-1	7	7
S82 486-3	7	7
Leb. Local Large	7	7
R.B.	7	9
Syrian Local Large	7	7
Leb. Local Large	7	9
R.B.	7	7
Syrian Local Large	7	7
FLIP84-49FB	7	7
FLIP84-64FB	5	5
FLIP84-53FB	7	9
Local Check	7	9
S82 417-10	7	9
S82 415-11	7	3
S81 051-16	5	7
S81 061-7	5	9

...Cont'd 9/

Entry	Disease Reaction (1)	
	A.B.	C.S.
S82 173-7	5	9
S82 169-1	7	7
A82 010-9	7	9
S82 082-11	7	9
S82 084-33	7	7
S82 412-2	7	7
S82 150-13	7	7
S82 149-30	7	9
S82 154-11	7	7
S82 130-6	7	7
S82 129-1	7	7
S82 142-3	5	7
S82 131-16	7	9
S82 137-11	7	9
S82 060-7	5	9
S82 110-36	7	9
S82 103-7	7	5
S82 105-23	7	7
S82 112-9	7	5
S82 103-11	7	5
S82 112-7	7	7
S82 106-17	7	7
S81 053-6	7	7
S87 7061-5	7	9
Local Check	7	9

(1) Disease readings were made on ICARDA's 1-9 rating scale.

- Faba Bean International Yield Trial-Large (FBIYT-L)
- Faba Bean International Yield Trial-Small (FBIYT-S)
- Faba Bean International Screening Nursery-Large (FBISN-L)
- Faba Bean International Screening Nursery-Small (FBISN-S)
- Faba Bean Early Yield Trial-L-1 (FBEYT-L-1)
- Faba Bean Early Yield Trial-S-1 (FBEYT-S-1)
- Faba Bean Advanced Yield Trial-L-1 (FBAYT-L-1)
- Faba Bean Advanced Yield Trial-S-1 (FBAYT-S-1)
- Faba Bean Advanced Yield Trial-S-2 (FBAYT-S-2)

These nurseries were inoculated artificially with A.fabae and evaluated 3 weeks later. However, evaluation for chocolate spot resistance was carried out employing the detached leaf technique mentioned earlier in this report.

Results from these evaluations are shown in Table 15. Of the 413 entries 37 only were rated 5 for Ascochyta blight. However, 62 were rated 5, and 16 were rated 3, for chocolate spot. Local checks were rated 7 for Ascochyta blight and 9 for chocolate spot. No entry was rated resistant for both diseases.

3. Integrated Control:

3.1. Influence of Genetic Resistance and Chemicals on Development of Ascochyta Blight:

The objective of this test was to develop integrated control strategies for Ascochyta blight through the combination of genetic resistance and chemical treatments. This study was conducted in cooperation with Dr. Ali Deebe, Mr. H.Esber and Ms. D.Kharbout from the Syrian National Program at Jable Research Station in the coastal region - Syria.

Seeds of three *Ascochyta* blight-resistant (BPL 472, 460, and 74), one moderately resistant (ILB 1814) and one susceptible (ILB 1820) faba bean genotypes were planted on 1 Oct 1984 in rows one meter long, and 50 cm apart. Four chemical treatments were tested as follows: 1) BRAVO-500 (chlorothalonil 40%), a contact fungicide, applied to the foliage once only, at the rate of 2.5 ml/L of water, one day before artificial inoculation, 2) DEROSAL-60 WP (Carbendazim 59%), a systemic fungicide, applied to the foliage once only (0.5 g/L of water), when first lesion was observed after artificial inoculation, 3) DEROSAL-60 WP, used as a seed dressing treatment at the rate of 7.5 g/kg seeds, and 4) untreated control sprayed with water only (Table 16). A split plot design with chemical treatments in the main plot, and faba bean genotypes in the sub-plot, was used with three replications. All treatments were inoculated artificially with *A. fabae* on 20 Jan 1985, employing 300,000 spores/ml of water.

The results of this test (Table 16), indicated that disease severity was affected by chemical treatments and the host resistance but more so by the combined effects of the two. Disease severity, on the *Ascochyta* blight-susceptible genotype ILB 1820, decreased significantly from a high level of 9 in untreated to a low level of 4.33 in BRAVO-treated plots (Table 16, Fig. 1). Similar trends were observed on the remaining four faba bean genotypes. One foliar application of BRAVO-500, was significantly more effective than both foliar and seed dressing treatments with DEROSAL-60 WP. The latter chemical proved ineffective in controlling disease. In untreated plots, the use of host resistance only, decreased disease severity significantly, from a high level of 9 on the *Ascochyta* blight-susceptible genotype ILB 1820, to an intermediate level of 5 on the moderately resistant genotype ILB 1814, and finally to a low level of about 3 on the remaining resistant genotypes BPL 460, 472 and 74. Although decreases in disease severity due to chemical treatments or host resistance alone were significant, such decreases were sharper when both application of an effective chemical and host resistance were combined in one treatment.

Table 16. Influence of host resistance and chemical treatments on development of Ascochyta blight in faba bean.

Fungicide and rate	Method of application	Disease Reaction (1)				
		74	472	460	1814	1820 (2)
Bravo-500 (2.5 ml/L)	Foliar	1.00a	1.00d	1.00f	1.00h	4.33K
Derosal-60WP (0.5g/L)	Foliar	2.33b	3.66e	3.66g	4.33i	9.00l
Derosal-60WP (7.5g/1kg seeds)	Seed dressing	3.56c	3.66e	4.33g	4.33i	9.00l
Untreated (Water only)	-	3.00c	3.56e	3.66g	5.00j	9.00l

(1) Disease reaction was recorded four months after planting using 1-9 rating scale.

(2) Numbers followed by different letters within a column are significantly ($P = 0.01$) different according to Duncan's Multiple Range Test.

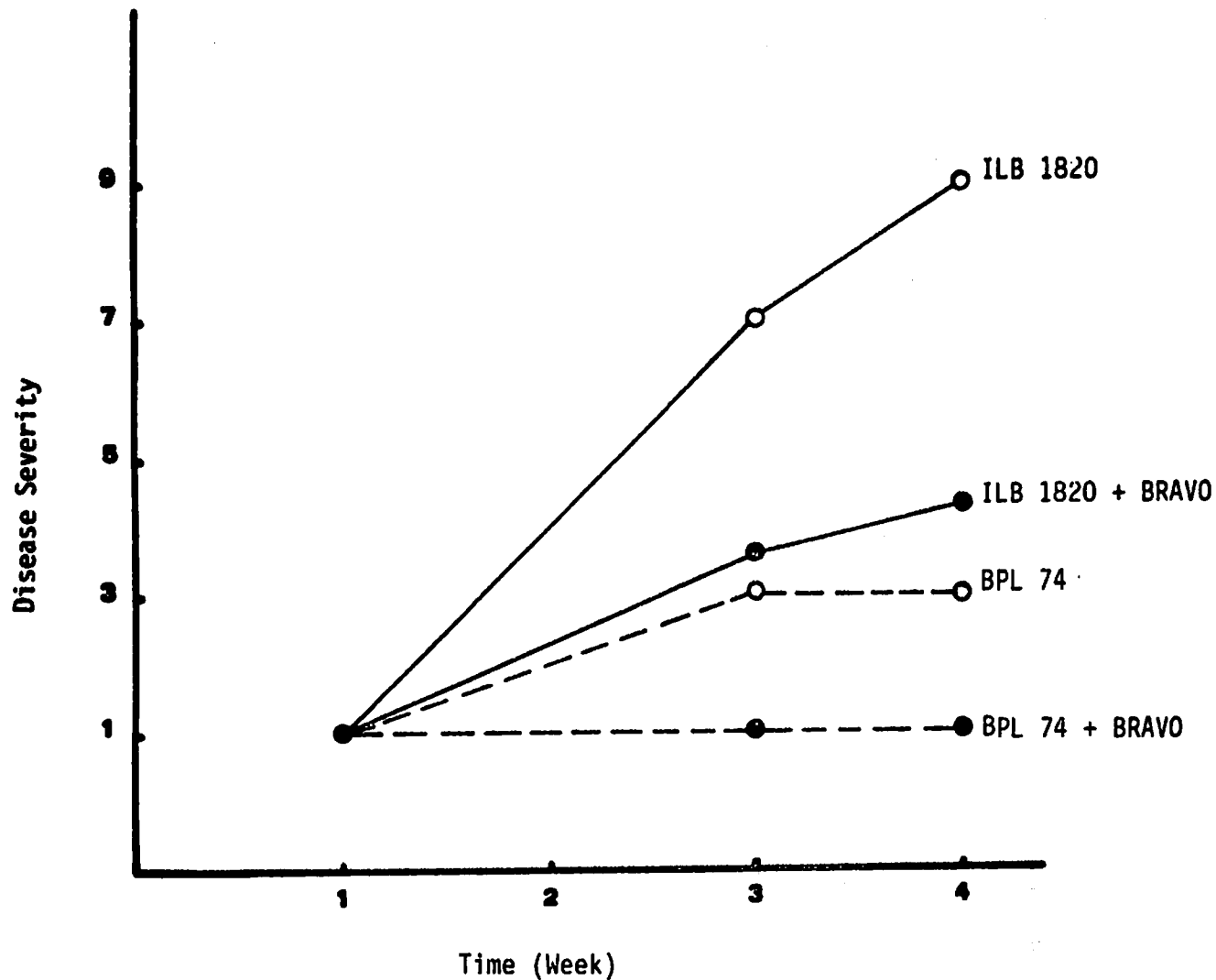


Fig. 1. Progress of Ascochyta blight on the susceptible host ILB 1820, without (○—○) and with (●—●) chemical protection, and the resistant host BPL 74 without (○----○) and with (●----●) chemical protection.

4. Epidemiology:

4.1. Relationships between Faba Bean Leaf Age and Susceptibility to *Botrytis fabae* and *Ascochyta fabae*:

Chocolate spot (*B.fabae*) and Ascochyta blight (*A.fabae*) are the most important foliar diseases in faba beans. Information on the relationships between the age of faba bean leaves and these two pathogens is limited. Results from last year indicated that, at the 100% podding stage, leaf tissue was more susceptible to *B.fabae* than pod tissue, but there were no significant differences in susceptibility to *A.fabae* among leaf, stem, or pod tissues. It is known that these pathogen first infect leaf tissue and then other plant organs. Therefore, additional information is needed on the relationships between leaf age and susceptibility to *B.fabae* and *A.fabae*, to help understand the development of these diseases, their epidemiology, and also to improve existing screening techniques and chemical control strategies.

Healthy leaves from the 2nd, 4th, 6th, 8th, 10th, and 12th node positions, of the Syrian local large faba bean cultivar ILB 1814, were collected from the field. These were layed flat on a moist, 2 cm thick sponge, linning the bottom of a 90x40x5 cm metal pan, then inoculated separately with *B.fabae*, and *A.fabae* according to procedures mentioned in the 1982/1983 Faba Bean Pathology Progress Report. After 6 days from inoculation, infections by each pathogen were rated on ICARDA's 1-9 scoring scale mentioned earlier. A split plot design with leaf-node position in the main plot, and pathogens in the sub-plot was used with 5 replications.

The results of this study indicated that disease severities caused by *B.fabae* and *A.fabae*, were significantly lower ($P = 0.05$) on younger top leaves than on older bottom leaves (Fig. 2). Although the level of leaf damage by *B.fabae* was significantly ($P = 0.05$) greater than that by *A.fabae* on leaves from node positions 2, 4, and 6, it was significantly

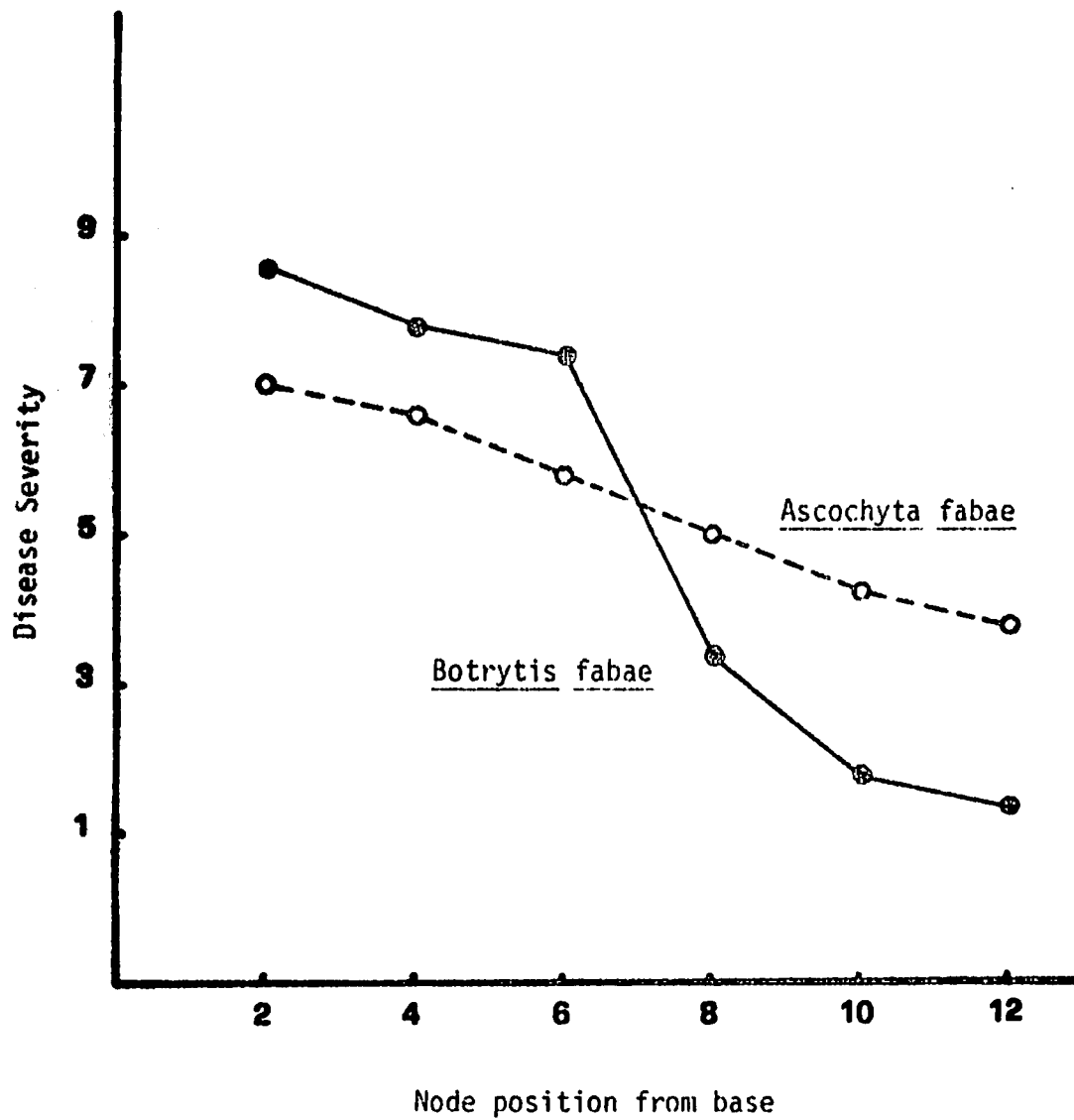


Fig. 2. Relationships between faba bean leaf age and susceptibility to Botrytis fabae and Ascochyta fabae.

($P = 0.05$) lower on leaves from node positions 8, 10, and 12. Since faba bean leaves become increasingly susceptible to B.fabae and A.fabae as they age, these diseases become more difficult to control by fungicides as the crop approaches maturity. On the other hand, results from this study indicated that artificial inoculations, done when bottom leaves approach maturity, may become more efficient for effective screening.

4.2. Chocolate Spot Progress as Related to Certain Components of Resistance in Faba Bean:

Several lines with resistance to chocolate spot have recently been identified at ICARDA. Although these lines prevented the build up of high epidemic proportion at many locations, the speed of disease progress was found to vary from one lines to another under the same field conditions. This indicated that differences among these lines can probably be due to differences in their efficiency to suppress or delay spore germination, penetration, incubation and latent periods, or sporulation. Therefore, an attempt was made to quantify some of these components on certain chocolate spot-resistant lines, so that it would be possible to identify lines that affect most the speed of disease progress. This will help also to develop lines with durable resistance by gene recombination.

Healthy leaves at the 8th node position, were collected from the chocolate spot-resistant BPL 710, 1179 and 1196, and also from the chocolate spot susceptible Rebaya-40, faba bean lines grown in the field. These leaves were inoculated separately with 2 isolates of B.fabae, employing a modification of the detached leaf technique mentioned earlier in this report. A split plot design with faba bean genotypes in the main plot and isolates of B.fabae in the sub-plot was used, with 5 replications.

Three parameters, the apparent infection rate, the incubation and the latent periods, were determined. The apparent infection rate (r) was determined to measure the speed of disease progress using the equation:

$$r = \frac{1}{t_2 - t_1} (\log X_2 - \log X_1)$$

where: r = apparent infection rate

t = time in days

X₁ = % necrosis at t₁

X₂ = % " " t₂

The incubation, and the latent periods were determined by measuring the time from the arrival of spores to leaf surface, until the appearance of the disease symptoms, and the formation of a new spore generation, respectively.

The results of this study (Table 17 and Fig. 3) indicated the followings:

1. Isolates B-9 and A-10 of B.fabae differed significantly (P = 0.05) in their apparent infection rate, incubation and latent periods across the four faba bean lines included in this test.
2. BPL 710 had the longest incubation and latent periods, followed by 1179, 1196, and Rebaya-40.
3. BPL 710 with the longest incubation and latent periods, had the lowest apparent infection rate (slow disease progress), whereas, Rebaya-40 with the shortest incubation and latent periods, had the greatest apparent infection rate (fast disease progress).
4. This means that if spores of isolate B-9 of B.fabae, land on leaves of these lines at the same time, BPL 710, 1179, and 1196 would delay the appearance of disease symptoms by 2, 1.5, and 1 day, respectively compared to Rebaya-40. It also indicates that BPL 710, 1179, and

1196 would delay the formation of a new spore generation by 7, 5, and 4 days, respectively compared to Rebaya-40.

5. These findings were supported by field observations (Fig. 4). BPL 710, 1179, and 1196 with longer latent and incubation periods, and with lower apparent infection rates, allowed for slower disease progress, compared to Rebaya-40 with shorter incubation and latent periods, and a greater apparent infection rate.
6. The study provided a quantitative model to rank chocolate spot-resistant lines according to their increasing latent and incubation periods, and also according to their decreasing apparent infection rates. It also explained as to why some chocolate spot-resistant lines (such as BPL 710) are more efficient than others (BPL 1179 or 1196) in allowing the development of only minimum disease levels.

Further studies are needed along these lines next season.

Table 17. Apparent infection rate, incubation and latent periods in the *Botrytis fabae* - *Vicia fabae* interaction in detached leaf tests at Lattakia, 1984/85.

Lines ^{1/}	Host status ^{2/}	Apparent infection rate ^{3/}		Incubation period ^{3/}		Latent period ^{3/}	
		B-9	A-10	B-9	A-10	B-9	A-10
BPL 710	Resistant	2.250a	0.949c	3.0a	4.0d	15.0a	19.0d
BPL 1179	"	2.550a	1.200c	2.5a	3.5d	13.0a	16.0e
BPL 1196	"	2.850a	1.699c	2.0b	3.0e	12.0b	15.0f
Rebaya-40	Susceptible	7.500b	3.600d	1.0c	2.0f	8.0c	9.0g

1/ Numbers in a column followed by different letters are significantly (P=0.05) different according to Duncan's multiple range test.

2/ Resistance denotes a rating of 1, 3, or 5, and susceptibility a rating of 7 or 9 on 1-9 rating scale for the detached leaf test.

3/ See text for method of calculating apparent infection rate, incubation period and latent period.

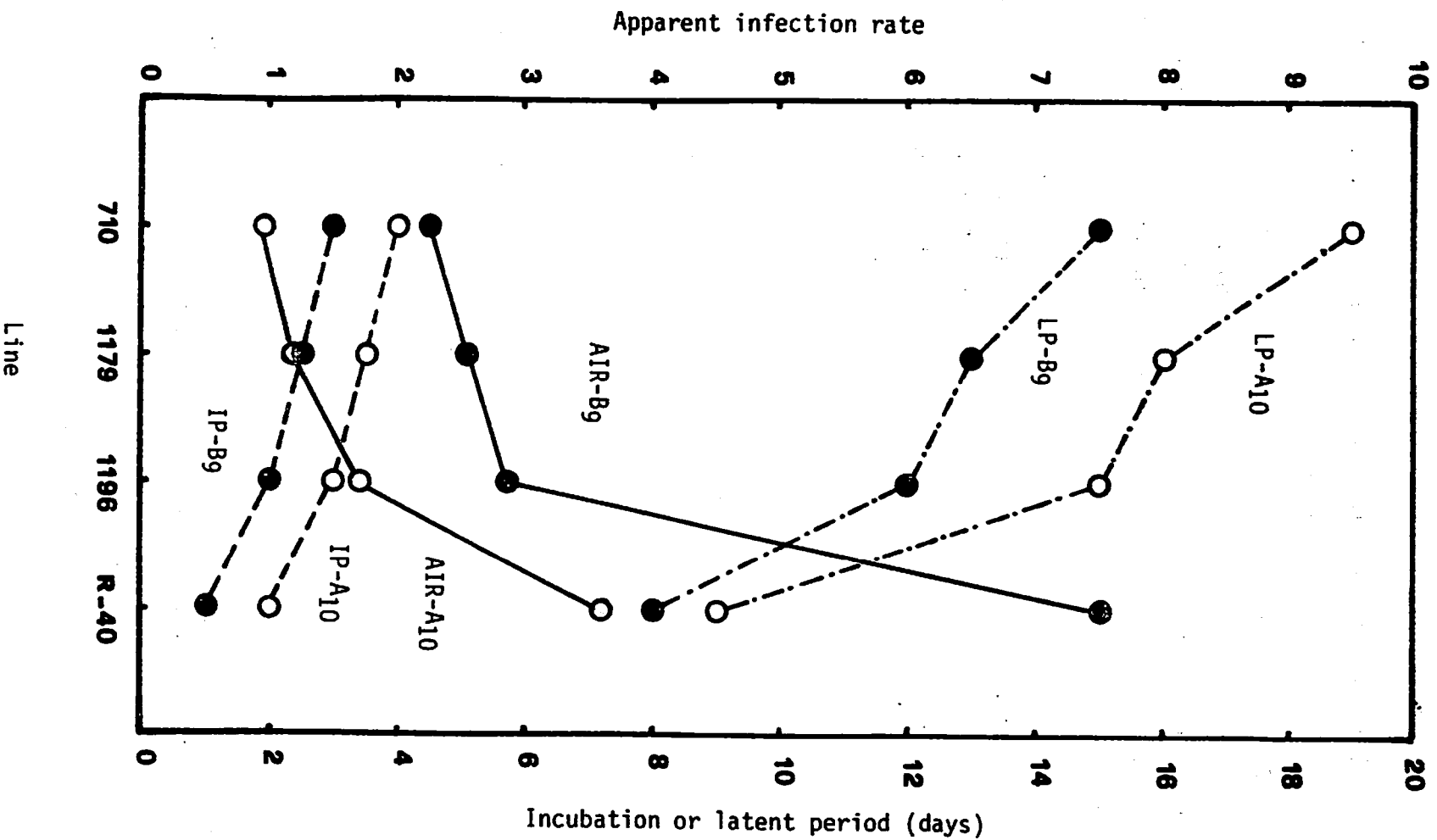


Fig. 3. The apparent infection rate (AIR) as related to the incubation (IP) and latent (LP) periods of isolates B9 (●) and A10 (○) of *Botrytis fabae* on 4 faba bean lines in detached leaf test at Latakia, 1984/85.

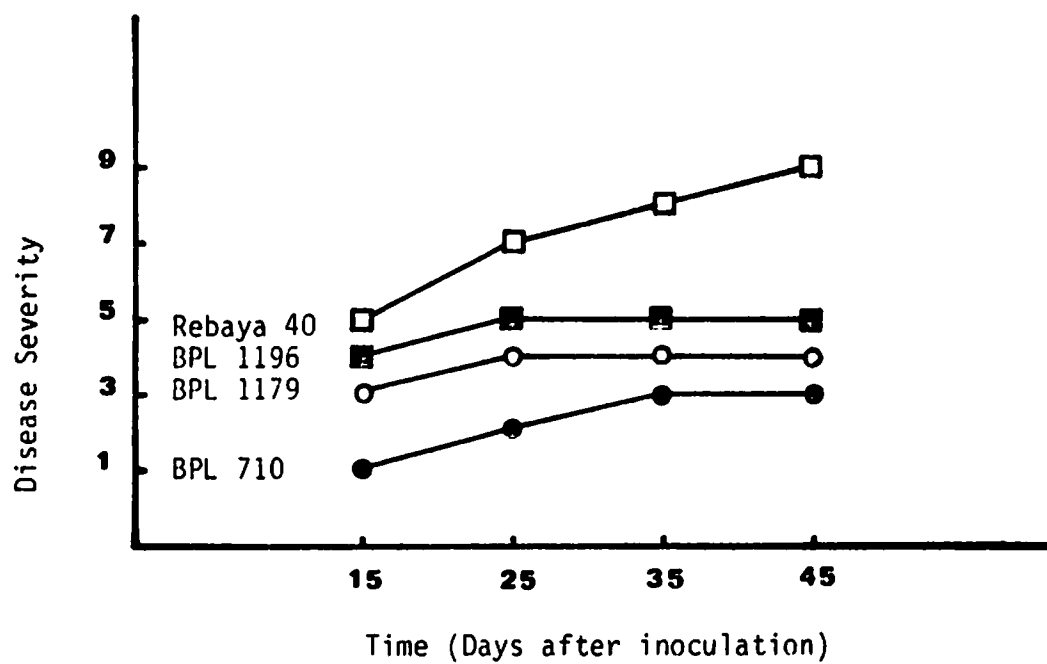


Fig. 4. Chocolate spot progress on the faba bean lines BPL 710, 1179, 1196 and Rebaya-40 in the field in Lattakia, 1984/85.

5. New Sources for Resistance:

Screening for new disease-resistant sources is an annual activity in the faba bean pathology program in Lattakia. In this 1984/1985 season 38 new sources for chocolate spot resistance have been identified. These sources came mostly from Ecuadorian origin and have been rated between 3 and 5 on ICARDA's 1-9 rating scale (Table 1). Seeds from these sources are being increased at Bab-Janneh in the 1985 off-season to provide enough seeds for a second screening cycles in 1985/86 with more virulent isolates of B.fabae.

These sources are expected to provide additional new genes for resistance to handle any possible new genes for virulence in B.fabae.

6. Summary:

- 6.1. A total of 38 new sources for resistance to chocolate spot have been identified from the 253 germplasm accessions tested in the 1984/85 season.
- 6.2. Of the 13 populations in the F₂-Progeny-Botrytis nursery, 265 single plant selections were made.
- 6.3. Of the 45 entries in the F₄-Progeny-Botrytis nursery, 41 were rated 3, with the remaining 4 entries rated 5.
- 6.4. Of the 8 populations in the F₂-Progeny-Ascochyta nursery, 314 single plant selections were made.
- 6.5. Of the 9 entries included in the F₄-Progeny-Ascochyta nursery, 7 were rated 1, and 2 were rated 3.
- 6.6. Of the 31 entries tested in the F₄-Botrytis x Botrytis nursery, 28 were rated between 1 and 3, against a wide range of isolates of B.fabae, indicating the presence of a broad-based durable resistance to the pathogen.

- 6.7. Of the 68 entries tested in the F₄-Ascochyta x Ascochyta 67 were rated between 1 and 3, against a wide range of isolates of A.fabae, indicating the presence of a broad-based-durable resistance to the pathogen.
- 6.8. A total of 44 chocolate spot-, 25 Ascochyta blight-, and 30 rust-resistant sources were grown and inoculated artificially under cages to improve homozygosity for disease reaction.
- 6.9. A total of 29 Faba Bean International Disease Screening Nurseries were provided for evaluation in 13 different countries including China, Argentina, Qatar, France and others.
- 6.10. In the Faba Bean International Chocolate Spot Nursery, 3 lines (BPL 710, 1179 and 1196) were rated resistant in Syria, Egypt, The Netherlands, and U.K. (location non-specific-resistance), with the remaining 23 entries rated resistant or susceptible depending on the location (location-specific-resistance).
- 6.11. In the Faba Bean International Ascochyta Blight Nursery, 12 lines were rated resistant in Syria, U.K., and Canada (location-non-specific-resistance), with the remaining 9 lines rated resistant at some locations and susceptible at others (location-specific-resistance).
- 6.12. In the Faba Bean International Rust Nursery, all lines revealed a location-specific resistance.
- 6.13. The chocolate spot-resistant lines BPL 710, and 1179, seemed resistant to rust also in Egypt, Syria and Canada indicating the presence of genes for multiple disease resistance.
- 6.14. Seeds from all resistant sources are being increased in the 1984/85 off-season at Bab-Janneh, to provide enough seeds for multilocation testing, and also for further testing in preliminary and advanced yield trials.

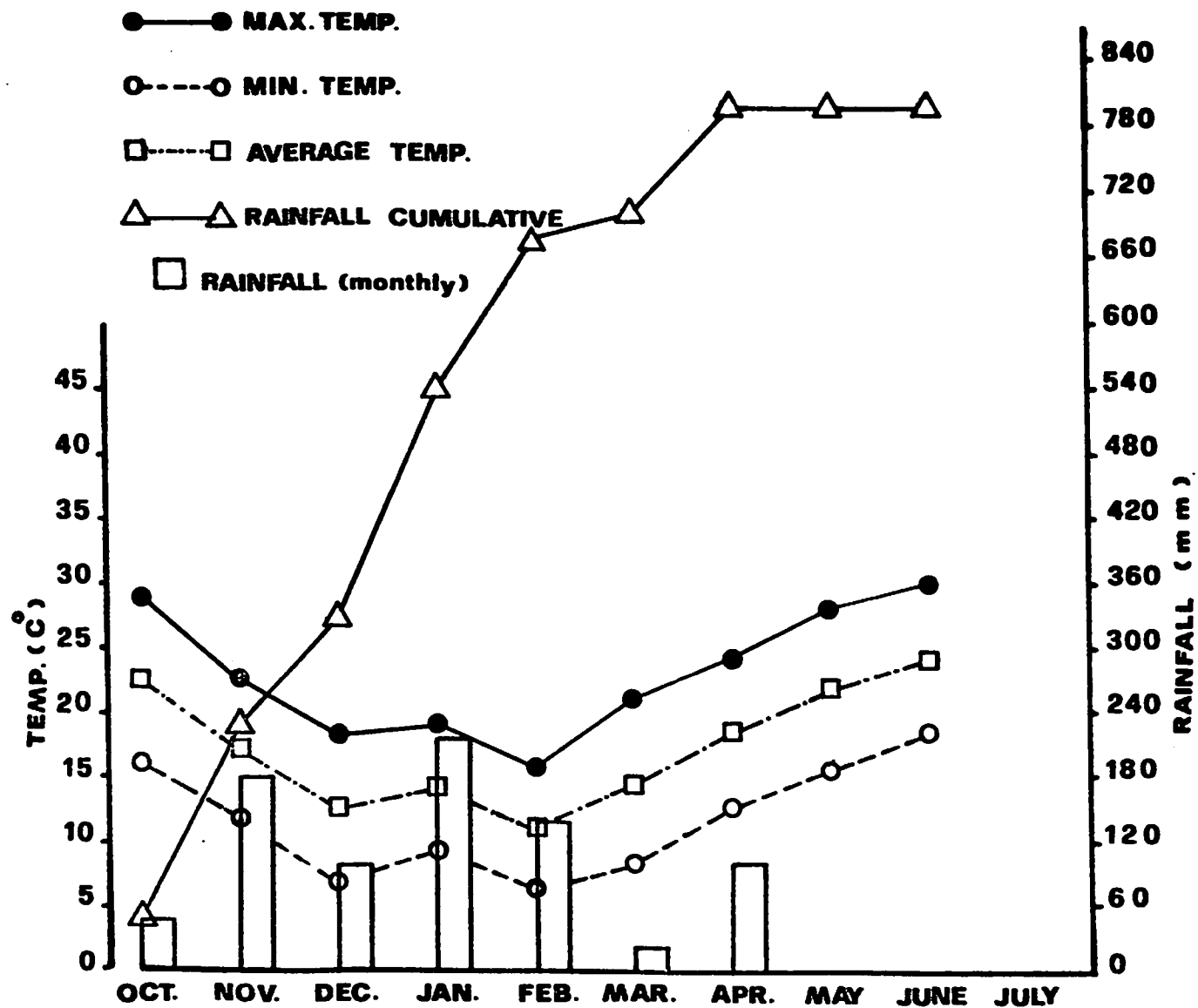
- 6.15. A total of 413 faba bean entries from the Faba Bean International and Advanced Yield Trials, were evaluated for resistance to chocolate spot and Ascochyta blight.
- 6.16. Studies in the area of integrated disease control strategies, indicated that severity of Ascochyta blight was affected by chemical treatments, host resistance and more so by the combined effects of both. These studies indicated that the combination of one foliar application of BRAVO-500 with host resistance, was sufficient to protect the crop during the entire season.
- 6.17. Epidemiological studies on the relations between faba bean leaf age and susceptibility to B.fabae and A.fabae indicated that younger top leaves were significantly less susceptible than older bottom leaves to both pathogens.
- 6.18. Epidemiological studies concerning the progress of chocolate spot on faba beans, explained as to why some chocolate spot resistant sources are more efficient than others in suppressing disease development. These studies provided also a quantitative means to rank disease-resistant sources according to their latent incubation periods, and apparent infection rates.

7. Visitors to Lattakia sub-site during 1984/1985:

During the 1984/85 season, 27 visitors from 13 different countries (Table 18), were received at Lattakia sub-site. All these visitors stayed for one day only to have an idea about our work, except Drs. S.A. Omar, S.M.Mahmoud from Egypt, Mr. W.Enyou from Ethiopia, and Mr. M.B. Ibrahim from Tunisia, spent more time with us for training in faba bean pathology. However, Mr. A.A.Tayebe of Morocco who arrived on April 15, 1985 for a six months training program under the IDRC supported cooperative project on Faba bean diseases, is still with us in Lattakia. He is scheduled to depart at the end of his training, 15 Oct 1985.

Table 18. Visitors to Lattakia sub-site during 1984/1985.

Name	Country	Date of Arrival	Time spent
Dr. Pauliana Spuveda	Chile	23 January 1985	1 day
Dr. K. Makouk	Lebanon	10 February 1985	1 day
Dr. S.A. Omar	Egypt	19 - 28 February 1985	9 days
Dr. S.M. Mahmoud	Egypt	19 - 28 February 1985	9 days
Prof. Abdel Hamid Osman	Sudan	24 March 1985	1 day
Dr. F. Niser	Syria	27 March 1985	1 day
Dr. Sayel Altal	Syria	27 March 1985	1 day
Dr. E.A. Solyman	Syria	27 March 1985	1 day
Dr. Y. Oawoody	Egypt	28 March 1985	1 day
Mr. Wudneh Enyou	Ethiopia	8 April - 8 May 1985	30 days
Mr. M.B. Ibrahim	Tunisia	15 - 25 April 1985	10 days
Mr. Abdel Aziz Tayebe	Morocco	15 April 1985	6 months
Dr. A. Ghorashi	Egypt	25 April 1985	1 day
Dr. M. El-Hur Omar	Egypt	25 April 1985	1 day
Mr. A.W. Ghobashy	Egypt	7 May 1985	1 day
Mr. A.M. Ahmed	Egypt	"	1 day
Mr. M. Azmi	Egypt	"	1 day
Mr. A.M. Abdel Monem	Egypt	"	1 day
Mr. Angelo Porta Puglia	Italy	"	1 day
Mrs. Paola Crino	Italy	"	1 day
Mr. Lagioia Nicola	Italy	"	1 day
Dr. Jaime Tola Cevallos	Ecuador	17 May 1985	1 day
Dr. J.Hernando	Spain	17 May 1985	1 day
Dr. Onkar Singh	India	23 May 1985	1 day
Dr. R.J. Diaz	Spain	2 June 1985	1 day
Dr. Trapero	Spain	2 June 1985	1 day
Dr. J. Sandoon	W.Germany	11 June 1985	1 day



**Fig. 5 . CLIMATOLOGICAL DATA OF LATTAKIA IN THE
1984_1985 SEASON**

8. Publications:

Several articles on faba bean pathology have been published during the 1984/85 season. These articles dealt mainly with screening for disease resistance and physiological specialization in B.fabae.

The following is a list of these articles:

- 8.1. Hanounik, S.B., and Maliha, N. 1984. Resistance in *Vicia faba* to Ascochyta fabae. FABIS, No. 9 (33-36).
- 8.2. Hanounik, S.B., N.Maliha, M. Solh and A.Saad. 1984. Pathogenic and cultural variability in Botrytis fabae. FABIS No. 10 (21-24).
- 8.3. Hanounik, S.B. 1985. Races of Botrytis fabae. Plant Disease, Vol. 69, No. 8 (Abstract).
- 8.4. Hanounik, S.B. 1985. Resistance in faba bean to Ascochyta blight caused by Ascochyta fabae. Plant Disease, Vol. 69 No. 8 (Abstract).
- 8.5. Hanounik, S.B. 1985. Resistance in faba bean to rust caused by Uromyces fabae. Plant Disease Vol.69 No. 8 (Abstract).
- 8.6. Hanounik, S.B. 1985. Resistance in faba bean to chocolate spot caused by Botrytis fabae. Plant Disease Vol. 69, No. 8 (Abstract).
- 8.7. Hanounik, S.B., and Maliha, N. 1985. Horizontal and vertical resistance in *Vicia faba* to chocolate spot caused by Botrytis fabae. (An article submitted for publications in Plant Disease, preliminary acceptance has been granted).

9. International Travel During 1984/1985:

The business travel undertaken by Dr. S.Hanounik is briefly described below:

9.1. Egypt (March 20-24, 1985):

This trip was conducted to assess disease situation in the faba bean nurseries of the National Program of Egypt and, also in those

provided by ICARDA. In addition, the details of the implementation of the IDRC-ICARDA project were worked out, to strengthen the National Program of Egypt in the area of screening for disease resistance.

9.2. Tunisia and Morocco (April 21-29, 1985)

This trip was made to visit the National Program in Tunisia and Morocco. Again the details of the implementation of the IDRC-ICARDA project were worked out in consultation with local scientists in Morocco to strengthen the National Program in the area of screening for disease resistance.

9.3. Italy (Sept. 9 - 14, 1985)

This trip was scheduled to attend the VIII Botrytis Conference at Alba and present a paper. A paper concerning the work on horizontal and vertical resistance in faba beans to chocolate spot, has already been submitted to the Conference.

10. ICARDA-IDRC Collaboration on Screening for Chocolate Spot-Resistance:

ICARDA and the University of Manitoba, Canada have been collaborating in carrying out research on some aspects of disease resistance in faba beans for last several years with financial support from the IDRC. As a new dimension of this project, it was proposed to strengthen the research capability of the national scientists in Egypt and Morocco on screening of faba beans for disease resistance by providing training and research facilities. The IDRC approved a grant of US\$ 210,800 for a period of three years for this activity. The major objective of this project is:

- A. To strengthen the National Programs of Egypt and Morocco through laboratory, and field facilities and training, so that epiphytotic disease conditions can be created artificially every year for efficient screening of materials from ICARDA.

- B. To identify genes for resistance to chocolate spot for specific production regions or across different regions, and
- C. To provide ICARDA's promising materials to the University of Manitoba to study their level of resistance to isolates of Botrytis from U.S.A. under high disease inducive conditions.

This pathology project is now being implemented, and Mr. A.A.Tayebe from Morocco is being trained at Lattakia on faba bean pathology. He will stay at Lattakia for 6 months. Another trainee will be received from Egypt for a 6 months training program late in 1985.

This project will continue for three years.

July 18, 1985

SBH/rb