BARLEY DISEASE IN EGYPT WITH SPECIAL EMPHASIS ON POWDERY MILDEW

RIZK A.RIZK[1], M.M. NOAMAN[2], AND E.E. MOSTAFA[1]

1 Plant Pathology Research Institute, Agric. Res. Centre, Giza, Egypt.

2 Barley Res Dept., Field Crops Research Institute, ARC, Giza, Egypt.

(Manuscript received 19 March 1997)

Abstract

Resistance of barley to powdery mildew has been studied using 20 near-isogenic lines to identify gene (s) conditioning resistance. The data indicated that the genes ML-a+?, ML-a6, ML-a14, ML-a7+?, and ML-(La) are effective against powdery mildew in Egypt. Screening harley genotypes revealed that three genotypes showed resistance at both seedling and adult stages. About 59 genotypes (local material) and 182 (exotic material) were selected as powdery mildew resistant under field conditions. Leaf rust resistance was 44 genotypes from the local material and found in 53 from the exotic material. Net blotch-resistant genotypes selected under field conditions, were 24 from the local material and 68 from the exotic material.

INTRODUCTION

Barley (*Hordeum vulgare* L) in contrast to other cereal crops can be grown and give production under several stress conditions. In spite of the adverse conditions in which barley is grown, diseases are still an important factor affecting the crop. Powdery mildew (PM) (Erysiphe graminis f.sp. hordei), leaf rust (LR) (Puccinia hordei), net blotch (NB) (Helminthosporium teres),and leaf stripe (H.graminium) are the most important diseases of barley in Egypt. The best method for controlling these diseases is the use of resistant genotypes.

Host-parasite interaction has been studied in barley/powdery mikdew system using nearisogenic lines with different specific resistance genes. Near-isogenic lines with different specific resistance genes. Near-isogenic lines with genes conditioning resistance to PM, which are useful for studies of host-parasite interactions (Johson, 1876) have been developed in barley. Moseman (1972) developed 10 pairs of near-isogenic barley lines carrying genes condi-

tioning resistance or susceptibility to PM. Kolster et al. (1986) developed 24 near-isogenic lines of barley cultivar Pallas. These lines comprised 14 lines single resistance gene and 10 lines with two or more resistance genes. Screening for resistant genotypes was carried out in Egypt by many workers (Ghobrial *et al.*, 1977, 1984, and 1990, Rizk *et al.*, 1994, and El-Sayed *et al.*, 1991). The main objectives of this research were to identify gene (s) conditioning resistance to PM and to select resistant barley genotypes to PM, LR, and NB, which can be used in the breeding program.

MATERIALS AND METHODS

Genes conditioning resistance to PM

Genes conditioning resistance to PM were studied using a set of 20 near-isogenic lines with the cv Pallas background during 1995/96 growing season Table1. These materials were tested at the seedling stage under greenhouse conditions.

Table 1. The recurrent parent Pallas and 20 near-isogenic barley lines with genes conditioning reaction to PM, their donor varieties, and resistance genes.

Near-isogenic line	Donor varieties	Resistance gene
Pallas	Pallas	ML-a8
PO1	ISO 1R	ML-a+?
PO2	Ricardo	ML-3
PO3	ISO 20R	ML-a6, ML-a14
PO4A	Nordal	ML-a7, ML-K
PO4B	Nordal	ML-a7+?
PO6	ISo 10R	ML-a7,ML-(LG)
PO7	Mona	ML-a9, ML-K
PO8B	Senat	ML-ag
PO9	Iso 12R	ML-a10, ML-(D42)
O10	Emir	ML-a12
P11	Rupal	ML-13, ML-(R43)
P12	Hor 1657	ML-c
P13	Hor 1402	ML-(1402)
P14	Weihonstephan	ML-(41/145)
P15	Rupee gene 2	ML-(RU2)
P17	MC gene 2	ML-K
P18	Nigrinudum	ML-nn
P19	Iso 5R	ML-P
P23	Lofa	ML-(La)
P24	ISo 3R	ML-h

? = Unknown gene.

Seedling test

Seedling test for PM was carried out in the greenhouse at Giza. Inoculation was carried out with a mixture of the dominant physiologic races of the PM fungus. Mildew reaction was recorded after 8 days using a scale of 0-4 suggested by Moseman (1956), in which 0 is resistant and 4 being susceptible. Three barley collections were evaluated for resistance to PM at both seedling and adult plants. These barley collections are:

a) Barley germplasm pool for PM resistance (ICARDA), 18 entries.
b) EMBSN (CIMMYT), 42 entries.
c) EBLR (Egyptian Barley Landraces), 16 entries.

Adult stage test

Barley lines and cultivars from local and exotic sources were evaluated for resistance to PM, LR, and NB at Giza, Nubaria, Sakha, Gemmeiza, and Ismailia Res. Staations during the 1995/96 growing seasons. These barley collections are:

1 Local material

Six-rowed barley:

1. A-6R yield trial, 64 entries.
2. B-6R yield trial, 32 entries.
3. D-6R yield trial, 16 entries.
4. Demonstration 6R, 10 entries.

Two - rowed barley:

1. A-2R yield trial, 64 entries.
2. B-2R yield trial, 32 entries.
3. D-2R yield trial, 16 entries.
4. Demonstration 2R, 10 entries.

Naked barley :

1. A-NBYT, 20 entries.
2. B-NBYT, 16 entries.
3. D-NBYT, 10 entries.
4. Demonstration naked, 10 entries.

2. Exotic material :

1. Barley Nursery for Egypt	50 entries
2. BCB ICARDA	151entries
3. PM Resistance Nursery	18 entries
4. NB Resistance Nursery	9 entries
5. Egypt BYT	91 entries
6. Naked Barley Germplasm Pool	50 entries
7. BYT (ACSAD)	192 entries
8. IBON	161 entries
9. HBSN	56 entries
10. EMBSN	42 entries
11. EBLR	16 entries

Field test was carried out under natural inoculation. Checks of the local and susceptible cultivars were included throughout the nurseries and as borders (spreaders) to ensure fungal infection. Disease assessment was carried out at the growth stage 10.5 on Feek's Scale (Large 1954). PM and NB reaction was recorded as percent disease, and 00-99 double-digit scale (Saari and Prescott 1975) was used. Leaf rust reaction was recorded as severity and response according to the modified Cobb scale (Peterson *et al.* 1948).

RESULTS AND DISCUSSION

I. Resistance to powdery mildew

a. Genes conditioning resistance to powdery mildew

The host-pathogen interaction of PM has been studied using 20 near-isogenic lines of Pallas background to identify gene (s) conditioning resistance to PM. These isogenic lines were tested in the seedling stage using a culture of E.graminis f.sp. hordei. The inoculum was a mixture of the most dominant physiologic races in Egypt. Data presented in Table 2 indicated that the isogenic lines P01, PO2, PO3, P04B and P23 exhibited resistance reation against E.graminins f.sp. hordei. The remaining isogenic lines were compatible with the fungus (susceptible reaction).

The behavior of the isogenic lines and the recurrent parent Pallas to natural

2. Exotic material :

1. Barley Nursery for Egypt	50 entries
2. BCB ICARDA	151entries
3. PM Resistance Nursery	18 entries
4. NB Resistance Nursery	9 entries
5. Egypt BYT	91 entries
6. Naked Barley Germplasm Pool	50 entries
7. BYT (ACSAD)	192 entries
8. IBON	161 entries
9. HBSN	56 entries
10. EMBSN	42 entries
11. EBLR	16 entries

Field test was carried out under natural inoculation. Checks of the local and susceptible cultivars were included throughout the nurseries and as borders (spreaders) to ensure fungal infection. Disease assessment was carried out at the growth stage 10.5 on Feek's Scale (Large 1954). PM and NB reaction was recorded as percent disease, and 00-99 double-digit scale (Saari and Prescott 1975) was used. Leaf rust reaction was recorded as severity and response according to the modified Cobb scale (Peterson *et al.* 1948).

RESULTS AND DISCUSSION

I. Resistance to powdery mildew

a. Genes conditioning resistance to powdery mildew

The host-pathogen interaction of PM has been studied using 20 near-isogenic lines of Pallas background to identify gene (s) conditioning resistance to PM. These isogenic lines were tested in the seedling stage using a culture of E.graminis f.sp. hordei. The inoculum was a mixture of the most dominant physiologic races in Egypt. Data presented in Table 2 indicated that the isogenic lines P01, PO2, PO3, P04B and P23 exhibited resistance reation against E.graminins f.sp. hordei. The remaining isogenic lines were compatible with the fungus (susceptible reaction).

The behavior of the isogenic lines and the recurrent parent Pallas to natural

PM population at the adult stage under field conditions is presented in Table 2. Five isogenic lines, i.e., P01, P03, P04B, P18, and P23 were resistant to the different pathogen genotypes at Gemmeiza and Sakha. The other isogenic lines, in addition to Pallas variety, were susceptible.

The near-isogenic lines P01, P02, P03, P04B, P18, and P23, which carry the resistance genes ML-a+?, ML-a6, ML-a14, ML-a7+?, ML-nn, and ML-(La), respectively, showed resistant reaction against PM in both seedling and adult stages.

Table 2. Resistance reaction of Erysiphe graminis f.sp. hordei on 20 barley near-isogenic lines of Pallas background in both seedling and adult plants during 1995/96.

Near-isogenic line	Resistance gene (s)	Seedling reaction (0-4)	Adult reaction (00-99)
Pallas	Pallas	4	74
P01	ISO 1R	1	0
P02	Ricardo	1	75
P03	ISO 20R	0	0
P04A	Nordal	4	64
P04B	Nordal	0	0
P06	ISo 10R	4	64
P07	Mona	4	65
P08B	Senat	4	98
P09	Iso 12R	4	75
O10	Emir	4	77
P11	Rupal	4	74
P12	Hor 1657	4	74
P13	Hor 1402	2	74
P14	Weihonstephan	2	74
P15	Rupee gene 2	3	85
P17	MC gene 2	4	64
P18	Nigrinudum	4	0
P19	Iso 5R	4	75
P23	Lofa	0	0
P24	ISo 3R	4	74

2. Screening for resistance to powdery mildew

Screening for resistance to PM was carried out at the seedling stage under the greenhouse conditions at adult stage under field conditions. A total of 59 barley genotypes including two collections; PM Resistance Nursery (17 entries) and EMBSN (42 entries) were tested. Those entries showing resistant reaction to PM at both the seedling and adult stage are listed in Table 3. Resistance to PM was exhibited by three barley cultivars and lines from the PM pool for resistance (ICARDA) and eight genotypes from EMBSN.

Table 3. Barley cultivars and lines showing resistant reaction to PM at seedling and adult stages during 1995/96.

Entry no.	Entry no.
	1- PM nursery
12	Arar/PI 386540 ICB 84-1739-2AP-OAP-22APH-OAP
14	ER/Apm/AC253 ICB 82-0707-2AP-OAP-9AP-OTR
15	ER/Apm/AC253 ICB 82-0707-2AP-OAP
	2- EMBSN
16	RUTH/6/HLLA/CI14032/5/GLORIA-BAR/3/ CMB 90A 939-L-1M-1Y 1B-DY
17	MD-B/ATL//CMB-4-2-1-B-B/3/4/CMB90-701-D-3Y-1M-1Y-1Y-2M-2Y-DB
18	MD-B/ATL//CMB-4-2-1-B-B/3/JRE/4/CMB90-701-D-3Y-1M-1Y-2M-2Y-DM
27	GOB/ALELI//MORA CMB90-610-S-2Y-1M-1Y-2M-4Y-DB
30	GOB/ALELI//MORA CMB90-610-S-2Y-1M-1Y-2M-1T-DB
31	HLLA/CI14032/5/SLORIA-BAR/3/PI14116-2D CMB 90-637-J-1B-2Y-1B-1Y-DB
32	HLLA/GO3//HLLA/3/FINGAL/F784-70/4/ALELICMB90-744-3-1M-3Y-2M-3Y-DB
41	MARCO/SEN//CARDO CMB90A-724-N-5M-3Y-1B-DY

Field resistance to PM was evaluated at Giza, Ismailia, and Sakha Agric. Res. Stations. A total of 300 barley genotypes (local program) including yield trials and advanced lines in the breeding program were evaluated for resistance. Fifty eight genotypes were regarded as resistant to PM (Table 4).

Eleven barley collections introduced from ICARDA, CIMMYT, and ACSAD comprising a total of 639 genotypes were evaluated for resistance to PM under field conditions. One hundred and eighty-two genotypes were selected as resistant genotypes (Table 5).

II. Resistance to leaf rust:

Screening for resistance to LR was carried out under natural infestation in the field at Nubaria and Sakha where the level of natural inoculum was high enough for selection of resistance to LR. A total of 300 local barley genotypes were evaluated where 44 entries showed resistant reaction (Table 5). These resistant genotypes are listed in Table 6. A total of 639 genotypes (exotic material) were evaluated for resistance to LR out of which 53 genotypes were selected as resistant (Table 5).

Table 4. Selected barley genotypes (local material) showing resistant reaction to PM under field conditions during 1995/96.

Ser. no.	Name/Pedigree	Source
1	L-6R-94/1	5 A-6R
2	Mari/CM67xCC 163	8 A-6R
3	Aths/Lignee 686 ICB82-0979-5AP-OPA-24AP-OTR	28 A-6R
4	Arar//2762/BC-21-2Y ICB83-0687-7AP-OTR-OAP-1AP-OTR	29 A-6R
5	Estate/4/MC1133/Fza/Tib/3/PI356456/5/Lignee 527 CMB86-0924-B-IPAP-2Y-1P-OY	32 A-6R
6	Lignee 527/NK1272 ICAB84-0323-1AP-OAP-13AP-OTR	40 A-6R
7	Campille verena//Daphne//SEN's' CMB87A-658-M-3M-3M-3Y-113-OY	64 A-6R
8	Giza 124	2 B-6R
9	Api/CM 67//Mona/3/DI//Asse/CMB 65-1W-1B x G.121// CI 06248/4/Apm/IB65//11012-213/Api/CM67//DS/Apro	17 B-6R
10	A-Att-73-337-1	21 B-6R
11	Arar/3/Cr 115/Por//G.121 ICB85-1593-6AP-OAP	22 B-6R
12	M 64-76/BOn//Jo/York/3/M5/Galt//As46/4/Hj34-90/ Astrix/5/cn42/CI07772//Fun/Tch/4/Fun/Ki ICB84-1498-1AP-4AP-1AP-OTR	23 B-6R
13	MJA 'S' CMB85A-772-S-3M-1Y-1M-OY	26 B-6R
14	80-5013/Rihane-03 ICB85-0784-4AP-OTR-5AP-OTROAP+OAP	28 B-6R
15	Lignee 527/NK 1272 ICB84-0323-4AP-1AP-1AP-OTR-1AP-OAP	29 B-6R
16	L 6 R-94/1	5 D-6R
17	Deir Alla 106/Strain 205//Rihane-03 ICB85-0669-OAP-16APH-OAP	7 D-6R
18	Harmal-02/Emir ICB82-0662-3AP-OAP	9 D-6R
19	PI 2325/Maf 102//Cossack/3/TRUMP	10 D-6R
20	12201/Aths/4/SD729/Por//72AB58	11 D+6R
21	PI 2325/Maf 102//Cossack/3/TRUMP	12 D-6R
22	Aths/Lignee 686 ICB82-0979-5AP-0AP-8AP-OTR	13 D-6R
23	Avt/Attiki//Aths ICB87-1031 OAP	14 D-6R
24	L-6R-93/2	4 Demon. 6R
25	L-6R-94/1	5 Demon. 6R
26	Arizona 5908/Aths/Lignee 640	10 Demon.6R
27	Bweet	1 B-2R
28	WI2291/WI 2269//WI2198/Lignee 131 ICB 89-0814-OAP	6 B-2R
29	Moroc 9-75-/PMB/3/Roho//iger/Ceres, 362-1-1 ICB 89-0900-OAP	7 B-2R
30	Ltd/Aths//Pyo/DL 70/3/Apm/5106/4/Mona/Ben/Cam	15 B-2R
31	ICB84-0692-4AP-1AP-1AP-OAP-OAP	20 B-2R
32	WI2291/WI2269//WI2291/Bgs ICB86-0704-2AP-OTR-2AP-OTR-OAP	32 B-2R
33	Arta//Chaaran-01/WI2291 ICB88-2080-4AP-1APH-OTR-OAP	1 D-2R
34	Bweet	10 D-2R
35	Weeah11/WI2291/Bgs ICB83-1826-1AP26-1AP-OAP	14 D-2R
36	Arar/PI 386540 ICB84-1739-2AP-OAP-3APH-OAP	1 Demon. 2R
37	Bweet	3 Demon. 2R
38	Giza 128	6 Demon.2R
39	L-2R-93/1	7 Demon. 2R
40	L-2R-93/2	9 Demon. 2R
41	CN42/CI07772//Fun/3/Fun/Tc4/Fun/Ki/5/Harmal-01 ICB 87-1456	1 A-NBYT
42		6 A-NBYT
43		13 A-NBYT

Table 4. Cont'd.

Ser. no.	Name/Pedigree	Source
44		17 A-NBYT
45		8 B-NBYT
46		9 B-NBYT
47		10 B-NBYT
48		14 B-NBYT
49		1 D-NBYT
50		6 D-NBYT
51		7 D-NBYT
52		1 Demo-Naked
53		2 Demo-Naked
54		3 Demo-Naked
55		4 Demo-Naked
56		7 Demo-Naked
57		8 Demo-Naked
58		9 Demo-Naked

III. Resistance to net blotch

Screening for resistance to net blotch was carried out under natural inoculation at Nubaria and Sakha Res. Stations where the natural inoculation was enough to select resistant genotypes. A total of 300 genotypes from the local material were evaluated for NB resistance out of which 24 were selected as resistant (Table 7).

From the exotic material (639 genotypes), 68 barley genotypes were selected as resistant to net blotch in the field (Table 5).

In general, 10 barley genotypes were selected from the local and exotic materials resistant to the three major diseases PM, LR, and NB under the Egyptian environment. These genotypes (Table 8) can be used as sources of multiple resistance in the breeding program.

Table 5. Barley collections evaluated for resistance to powdery mildew (PM), leaf rust (LR), and net blotch (NB) during 1995/96.

Barley collection	Total number	No. of resistant genotypes		
		PM	LR	NB
1- Local material:				
1. Six-rowed Barley:				
a. A-6R Trial	64	7	--*	--
b. B-6R Trial	32	8	7	3
c. D-6R Trial	16	8	--	--
d. Demonstration 6R	10	3	5	6
2. Two-rowed Barley:				
a. A-2R Trial	64	--	8	2
b. B-2R Trial	32	6	9	3
c. D-2R Trial	16	3	7	3
d. Demonstration 2R	10	5	1	1
3. Naked Barley:				
a. A-NBYT	20	4	5	2
b. B-NBYT	16	4	--	--
c. D-NBYT	10	3	--	--
d. Demonstration NBYT	10	7	2	4
Total	300	58	44	24
II- Exotic material:				
1. BCB (ICARDA)	151	83	--	--
2. PM Nursery	18	3	--	--
3. NB Nursery	9	--	--	2
4. LBYT	25	6	7	1
5. Egypt BYT	91	20	13	13
6. Naked Nursery	50	2	--	--
7. BYT (ACSAD)	20	6	--	--
8. IBON	161	40	6	37
9. HBSN	56	13	25	10
10. EMBSN	42	9	--	-
11. EBLR	16	--	2	5
Total	369	182		68
* = Not tested.				

Table 6. Selected barley genotypes (local material) showing resistant reaction to LR under field conditions during 1995/96.

Ser. no.	Name/Pedigree	Source
1	L-6R-93/1	3 B-6R
2	As 46/Aths*2//Lignee 640/Lignee 686	9 B-6R
3	Api/CM 67//Mona/3/DI//Asse/CM 65-1W-1BxG. 121//CI 06248/4/Apm/IB65/1012-213/APi/CM67//DS/Apro	17 B-6R
4	Gloria 's'/Copal 's'//Teran 78/3/Shyri CMB87-447-B-6Y-38-1Y-2M-1Y-OM	25 B-6R
5	MJA 's' CMB85A-772-S-3M-1Y-1M-OY	26 B-6R
6	80-5013/Rihane-03 ICB85-0784-4AP-4AP-OTR-5AP-OTROAP-OAP	28 B-6R
7	Estate/4/MCU33/Fza//Tib/3/PI 3564565/5/Lignee 527 CMB 86-0924-B-1PAP-2Y-1B-OY	32 B-6R
8	L-6R-93/1	3 Demo. 6R
9	L-6R-93/2	4 Demo. 6R
10	L-6R-94/1	5 Demo. 6R
11	DL 532 (Res. to aphids)	8 Demo. 6R
12	CC89/Gloria 's'//Copal 's' CMB 81-295-30B-1Y-2M-OM	9 Demo. 6R
13	L 2R-93/2	5 A-2R
14	Pld0342//Cr. 115/Por/3/Bahtim 9/4/Ds/Apro/5/WI2291	9 A-2R
15	Roho//Alger/Ceres, 362-1-1/3/WI2291/BgsICB 86-0286-3AP-OTR-4APOTR-OAP	17 A-2R
16	WI2291/Harmal ICB86-0004-7AP-OTR-4AP-OTP-OAP	19 A-2R
17	Avt/Attiki//Aths ICB87-1031-13BO-1APH-OTR-OAP	20 A-2R
18	JLB06-33/3/Mona/Guy 63//B1/4/WI2291/WI2269 ICB87-0789-OAP	25 A-2R
19	7028/2759/3/69-82//Ds/Apro/4/WI2269ICB87-1399-12BO-1APH-OTR-OAP	29 A-2R
20	WI2291/3/CI03309/Attiki/Hja33/Harmal ICB87-1598-11BO-1APH-OTR-OAP	30 A-2R
21	Bweet	1 B-2R
22	Giza 127	2 B-2R
23	Giza 128	3B-2R
24	Pitayo/Cam//Avt/R1508/4//Ds/AproxWI2291/3/CI03309/Attiki/Hia 33	8 B-2R
2[illegible]	PID10342//Cr. 115/Por/3/Bahtim9/4/Ds/Apro/5/WI2291ICB78-0058-7 AP-2AP-1AP-4AP-OAP	9 B-2R
26	Harmal-02//WI2291/BgsICB83-1554-1AP-6AP-OAP	10 B-2R
27	WI2291*2/WI2269 ICB86-0648-0648-2AP-OAP	12 B-2R
28	Patty	28 B-2R
29	Arta//Chaaran-01/WI2291 ICB88-2080-4AP-1APH-OTR-OAP	32 B-2R
30	Bweet	1 D-2R
31	Sakha 1	4 D-2R
32	Sakha 2	5 D-2R
33	L 2R-93-1	6 D-2R
34	L 2R-93-2	7 D-2R
35	Roho/Harmal-03	9 D-2R
36	Emir/Arabi Abiad//Roho ICB82-0319-6AP-OAP-1AP-OTR	16 D-2R
37	B w e e t	1 Demo. 2R
38		1 A-NBYT
39		4 A-NBYT
40		6 A-NBYT
41		13 A-NBYT
42		20 A-NBYT
43		5Demo.Naked
44		10Demo.Naked

Table 7. Selected barley genotypes (local material) showing resistant reaction to LR under field conditions during 1995/96.

Ser. no.	Name/Pedigree	Source
1	Cr. 115/Por//BC/3/Api/CM 67/4/G.120xHarmal-01	11 B-6R
2	Mr 25-84/Attiki x G.121/CI 06248/4/Apm/IB65/1102-2/ 3/Api/CM 67//DS/Pro	15 B-6R
3	Api/CM 67//Mona/3/DI//Asse/CM 65-1W-1B x G.121//CI 06248/4/Apm/IB65/11012-213/Api/CM67//DS/Apro	17 B-6R
4	L-6R-93/1	3 Demo. 6R
5	L-6R-93/2	4 Demo. 6R
6	L-6R-94/1	5 Demo. 6R
7	Acsad 1028	6 Demo. 6R
8	CC89/Gloria 's'//S CMB81-295-308-1Y-2M-OM	9 Demo. 6R
9	Arizona 5908/Aths//Lignee 640	10 Demo. 6R
10	Bweet	1 A-2R
11	Giza 128	3 A-2R
12	Bweet	1 B-2R
13	ER/Apm/3/Arr/Esp//Alger/Ceres, 362-1-11CB83-1467- 14AP-OAP-11A P-OTR	13 B-2R
14	Arta//Chaaran-01/WI2291ICB88-2080-4AP-1APH-OTR- OAP	32 B-2R
15	Bweet	1 D-2R
16	11-GP 92/93	13 D-2R
17	Arar/PI 386540 ICB84-1739-2AP-OAP-3APH-OAP	14 D-2R
18	L-2R-93/2	7 Demo. 2R
19		14 A-NBYT
20		17 A-NBYT
		4 Demo. naked
21		Demo. naked
22		8 Demo. naked
23		9 Demo. naked
24		

Table 8. Selected barley genotypes with multiple disease resistance under Egyptian conditions during 1995/96.

Ser. no.	Name/Pedigree	Source
1	Api/CM 67//Mona/3/DI//Asse/CM 65-1W-1B x G.121//CI 06248/4/Apm/Ipm/IB65//11012-213/Api/CM67//DS/APRo	11 B-6R
2	L-6R-93/2	15 B-6R
3	L-6R-94/1	
4	Bweet	17 B-6R
5	Bweet	3 Demo. 6R
6	Arizona 5908/aths//Lignee 640/3/Arizona 5908 / Aths// Lignee 640	4 Demo. 6R 5 Demo. 6R
7	Lignee 640/Lignee 527//Mari/Aths*2-02	6 Demo. 6R
8	Aw Black/Aths //Arar/3/Giza 121/Pue	9 Demo. 6R
9	Arizona 5908/aths//Lignee 640/4/Lignee 527//Bahtim/DL71/3/Api/CM67//Mzq	10 Demo. 6R 1 A-2R
10	Gloria-BAR/COME-8//ORGE FICHEDRETT 3270/...	3 A-2R

REFERENCES

1. El-Sayed, A.A., Faten El-Nashar, Massarat El-Ghamry, E.E. Mostafa, and R.A. Rizk. 1991. Disease resistance of barley genotypes under the conditions of Northwestern Coast of Egypt. Assiut J. of Agric. Sci., Vol. 22: 127-142.

2. Ghobrial, E., A.A. El-Sayed, M.M. Noaman, R.A. Rizk, and Ikhlas Shefik. 1990. Barley varieties of multiple disease resistance under Egyptian conditions. Proc. of the Sixth Cong. of Phytopathology, Cairo, Egypt, Part I. 283-293 .

3. Ghobrial, E., E. Ghanem, A.A. Bassioni, A. Gouda, M.S. Saleh, and E.E. Mostafa. 1984. Sources of resistance to powdery mildew of barley (Erysiphe graminis hordei Em. Marchal). Proceedings of EMCIP Symposium, Giza, Egypt, Vol. 2: 189-203 .

4. Ghobrial, E., A.M. Hamouda, R. Abdel-Khalek, and E.E. Mostafa. 1977. Studies on the control of powdery mildew of barley in ARE. Agric. Res. Rev. Vol. 55 (2) : 31-38.

5. Johnson, R. 1976. Development and use of some genetically controlled lines for studies of host-parasite interactions. P. 25-41. In J. Friend and D.R. Threlfall (ed.). Biochemical aspects of plant parasite relationships. Academic Press, New York .

6. Kolster, P., L. Munk, O. Stolen, and J. Lohde. 1986. Near-isogenic barley lines with genes for resistance to powdery mildew. Crop Sci. 26: 903-907.

7. Large, E.C. 1954. Growth stages of cereals. Plant Pathology. 3: 129-130 .

8. Moseman, J.G. 1956. Physiologic races of Erysiphe graminis hordei in North America. Phytopa thology, 46: 318-322.

9. Moseman, J.C. 1972. Isogenic barley lines for reaction to Erysiphe graminis f. sp. hordei. Crop Sci. 12: 681-682.

10. Peterson, R.F., A.B. Cambell, and A.E. Hanna. 1948. A diagrammatic scale for estimating rust intensity on leaves and stems of cereals. Can. J. Res. C. 26: 496-500.

11. Rizk, R.A., E.E. Mostafa, F.A. Asaad, and M.M. Noaman. 1994. Survey and determination of barley diseases in barley production areas of Egypt. NVRP Annual Meeting, 11-15 Sep., 1994.

12. Saari, E.E., and J.M. Prescott. 1975. A scale for appraising the foliar intensity of wheat diseases. Pl. Dis. Rept. 59, 377-380.

دراسة أمراض الشعير فى مصر وخاصة مرض البياض الدقيقى

رزق عبد الخالق [١]، ماهر نعمان محمد [٢]، السيد الدسوقى مصطفى [١]

١ قسم بحوث أمراض الحبوب – معهد بحوث أمراض النبات – مركز البحوث الزراعية .

٢ قسم بحوث الشعير – معهد بحوث المحاصيل الحقليه – مركز البحوث الزراعية .

تم دراسة مقاومة الشعير لمرض البياض الدقيقى بأستخدام ٢٠ سلالة وذلك للتعرف على الجينات المسببة للمقاومة . وقد أظهرت نتائج التحليل وجود خمسة جينات رئيسية تتحكم فى المقاومة وهى (La) ML-a, ML-a6, ML-a14, ML-a7, ML . هذا وقد تم غربلة واختبار بعض أصناف وسلالات الشعير ضد مرض البياض الدقيقى وأظهرت النتائج الحصول على ثلاثة تراكيب وراثية مقاومة فى مرحلة البادرة ومرحلة البلوغ. كما وجد حوالى ٥٩ تركيب وراثى من السلالات المحلية و ١٨٢ من السلالات المستوردة تحمل صفة المقاومة للمرض تحت ظروف الأصابة الطبيعية بالحقل . ومن ناحية أخرى فقد أظهرت ٤٤ تركيبا وراثيا محليا المقاومة لمرض صدا الأوراق فى الشعير وكذلك ٥٣ سلالة من المستوردات .

أما بالنسبة لمرض التبقع الشبكى فقد أظهرت النتائج وجود ٢٤ سلالة محلية و ٦٨ سلالة مستوردة تحمل صفة المقاومة لهذا المرض.