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EFFECT OF NITROGEN FERTILIZATION AND PLANT DENSITY ON INFECTION WITH *Helminthosporium* LEAF SPOT IN SOME MAIZE GENOTYPES.

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ABSTRACT

Three maize single crosses, one three way cross and their parents were evaluated against *Helminthosporium maydis*, which cause corn leaf spot, under three levels of both nitrogen fertilizers and plant densities. Results showed an increase in disease incidence under high level of nitrogen fertilizer (160 unit/fedden) and under highest plant density (30000 plant/feddan), however its magnitude varied considerably among genotypes. Moreover, resistance response of hybrids may be due to resistance of one parent only or due to complementary effects for resistance in both parents. Dominance was also obtained in the direction of resistant parent and led to resistance response of hybrids. These results provide important information to any breeding program for developing maize hybrids resistant to leaf spot disease. On the other hand, the disease severity was affected by the climatic conditions during the period of disease development (on September) in two tested seasons, here, the climatic conditions during September 2001 were less suitable for disease infection and its equerries was determined as recorded moderate temperature (25.5 °C in mean) and relative humidity (71.5% in mean), while, during September 2002, the climatic conditions were suitable for disease infection and recorded high temperature (27.0 °C in mean) and relative humidity (74 8 % in mean). Grain yield was greatly reduced during 2002 growing season (the climatic condition was suitable for high disease severity) especially with susceptible maize genotypes. These results indicated that the disease severity varied from year to year due to the in variation climatic conditions.

INTRODUCTION

Leaf spot caused by *Helminthosporium maydis* is an important foliar disease of maize *(Zea mays* L.) in temperate areas of the world including Egypt. The disease sporadic and occurrence, depend on the environmental conditions. High temperature stress caused an increase in sporulation of *H. maydis* in *vitro* (Garraway *el al.,* 1989). The optimum temperature for the growth of *H. maydis* was high (30°C) while it was low (24°C) in case of *H. turcicum* (Gouda 1996). On the other hand, Hooker (1974) showed that, 87 hybrids in the seedling stage varied in reaction to *Helminthosporium* leaf spot. Small lesion size inbred parents tended to be dominant to large lesion size in hybrids. Some three way or double cross hybrids were mixed for disease reaction. Sugawara *et al.* (1987) added that, *Helminthosporium maydis* produces a series of phytotoxic ophiobolin sesteiteipenoids. All the ophiobolins studied produce characteristic lesions on host plants. Wei *et al.* (1988) found that, out of 116 isolates of *H. maydis* collected from diseased maize leaves in 12 provinces in China, 5 included significantly larger lesions on leaves of inbred lines of maize cytoplasmic male strility-C than on leaves of the same lines with normal cytoplasm. Anger *et al.*(1990) showed that, green islands/infection sites by *H. maydis* on maize leaves, had higher cytokimin activity than surrounding tissue and non-inoculated tissue. Moreover, Mandahar *et al.* (1990) added that, carbohydrate content of infected maize leaves by *H. maydis* was much less than the green leaves. Byrnes (1989) found that, leaf spot caused by race o of *H. maydis,* adversely affected yield in 3 tested maize hybrids, evaluated at 9 locations in Illinois and Ohie, U.S.A. Severity of the disease in mid-to late Aug. ranged from 0-5 % in first location. This indicated that, the effects of leaf spot on yield of maize varied by location. Kucharek (1990) showed that, leaf spot caused by *H. maydis* was epidemic in 1970 and caused 40 % yield loss on a state wide basis. Khan and Ahmed (1992) evaluated 10 maize genotypes for resistance to maize leaf spot, caused by *H. maydis* under natural conditions in Pashawar, Pakistan. None of the tested genotypes showed complete resistance. Diab *et al.* (1993) studied the susceptibility of leaf spot caused by *H. maydis.* They found that the tested maize genotypes exhibited resistant response except the inbred lines Giza 4, 63, 221 and B73y which were susceptible. Hybrid reaction tended to be more resistant to *H. maydis* than their parents. The resistance of the single crosses 10, 103, 104, and 107 was correlated with the resistance of the material parents, Giza 58 and Giza 7, while the resistance of double crosses 204, 215 and TWC 310 may be related to either the parental or the material parents. Badr *el al.*(1999) showed that, increasing plant density from 24000 to 30000 plant/feddan at lower level of phosphorus fertilization, has significantly increased the disease severity with maize leaf blight caused by *H. turcicum* . Khalifa and Zein El-Abedeen (2000) indicated that, developing maize hybrids resistant to leaf blight caused by *H. turcicum* is of major importance to reduce yield losses in areas where weather conditions favor disease infection.

The objectives of this research were: (a) to clarify response of three maize single crosses, one maize 3-way cross and their parents to infection with leaf spot disease, (b) study the effect of plant density and nitrogen fertilization at different levels on disease severity, and (c) study the effect of weather conditions differences from year to year on disease developing.

MATERIALS AND METHODS

This experiment was carried out to study the effect of various levels of nitrogen fertilizer at different plant densities on the development of maize leaf spot disease, during 2001 and 2002 seasons, under natural infection conditions. Split plot design with three replicates was used in this experiment. The main plots were cultivated with maize cultivars i.e. Sc 10, 127, 107: three way cross 310; lines 63, 7. 603, 628, 62. 58 and 34. While, sub plots were planted at three different distances i.e. 20, 25 and 30 cm apart, to give the three tested plant densities of 30000, 240 00 and 20000 plant/feddan, respectively, the sub-sub plots included three levels of N application in the form of urea 47 %, at rate of

80, 120 and 160 unit/feddan, the recommended doses of other fertilizer (phosphorus and potassium) were used. The experimental plot consisted of 2 rows of 6 m. long and 70 cm apart. All the cultural practices were applied at the proper time. Maize leaf spot caused by *H. maydis* was determined 90 days after sowing, using the scale of Elliott and Jenkins (1946)as recorded in Table (1). The yield was estimated as kg/plot for each treatment.

Table (1): Modified scale of estimating *Helminthosporium* leaf spot infection on maize plants.

Acting scale	Infection intensity	Severity of infection	Host response
0.0	No visible lesions	0.0	
0.5	Very slight infection: one or two restricted lesion on lower leaves.	0-5	Highly resistant
1.0	Slight infection: a few scattered lesions on lower leaves.	6-10	Resistant
2.0	Slight infection: moderate number of lesions on lower leaves.	11-25	Moderately resistant
3.0	Moderate infection: abundant lesions on middle leaves.	26-50	Moderately susceptible
4.0	Heavy infection: abundant lesions on higher leaves	51-75	Susceptible
5.0	Very heavy infection: abundant lesions	76-100	Highly susceptible

Severity of infection = (% of the infected leaf area)

Meteorological records were kindly supported by the Soil Research Division, Sakha Agric. Res. Station. (A.R.C.) Table (5).

RESULTS AND DISCUSSION

Data presented in Table (2) show that, under lowest plant density and N fertilizer (D1N1) all the tested maize genotypes were ranged from highly resistant to resistant during 2001 season, while, they ranged from highly resistant to moderately susceptible during 2002 growing season. On the other hand, the disease severity was increased by increasing level of nitrogen fertilizer, since, under the lowest plant density and moderate level of N fertilizer (DI N2), the host response ranged from highly resistant to moderate resistant to moderate susceptible during 2001 and 2002 seasons, respectively. While, under the lowest plant density and the highest level of N fertilizer (DI N3), the host response ranged from resistant to moderate susceptible and from moderate resistant and susceptible during 2001 and 2002 seasons, respectively. Moreover, the inbred lines 62.63 and 34 had the highest level of infection, while the inbred lines 7, 603, 628 and 58 suitable level of resistance especially under the lowest (Nl) and moderate (N2) levels of fertilization. The single crosses (Sc) 10, 122 and 107, and three way cross (TWC) 310 also suitable level of resistance. These results were in the same line with the findings of Diab *et al.* (1993), who found that, the resistance of the single crosses or the three way crosses may be due to either parental or complementary effect of the resistance of both parents.

Increasing plant density from 20000 (DI) to 24000 (D2) plant/feddan under the three tested levels of nitrogen fertilization, as presented in Table (3) indicate that, in general, the disease severity was slightly high under the three tested levels of N fertilization, in all of the tested maize genotypes comparing with low density in Table (2). The results in Table (3) also show that, the increasing level of N fertilizer under 24000 plant/feddan (D2) led to an increasing of disease severity, it ranged from 4.0 to 25,0, 7.0 to 45.0 and 9.3 to 55.3 under the three levels of nitrogen fertilizer i.e. N1, N2 and N3, respectively, during 2001 growing season. While, during 2002 season, the disease severity ranged from 7.6 to 50.0, 13.0 to 60.6 and 20.0 to 72.0 % under level N1. N2 and N of nitrogen fertilization, respectively. On the other hand, increasing plant density up to 30000 plant/feddan, as presented in Table (4) led to increasing disease severity at all of tested levels of nitrogen fertilization, here, the disease severity ranged from 8.3 to 30.6, 9.3 to 55.3 and 10.0 to 55.3 under N1, N2 and N3 levels of nitrogen fertilization, respectively, during 2001 growing season, while, during 2002 growing season, the disease severity was very high and ranged from 10.0 to 70.0, 20.3 to 80.3 and 25.0 to 87.3 under Nl, N2 and N3 levels of N fertilization, respectively. These results agree with those reported by Badr *el al.* (1999) which showed that, increasing plant density from 24000 to 30000 plant/ feddan significantly increased the disease severity with maize leaf blight. These results (in Tables 2,3 and 4) also showed dominant in direction of resistant parent. Since, the reaction of Fl hybrid to the infection with the disease appeared to be in the same reaction of resistance in any breeding program for production hybrids have suitable level of resistance to the tested disease as regard to the effect of climatic condition on severity of infection with the tested disease. The results in Table (5) showed that, average of temperature centigrade and relative humidity during September 2001 were 25.5 °C and 71.5 %, respectively, while, during September 2002, they were 27.0 °C and 74.8 %, respectively. The disease development was conspicuous 90 days after sowing, this period was during September 2001 and 2002 growing seasons. The temperature centigrade and the relative humidity during September 2001 (25.5 °C and 71.5 %) was unsuitable for development of disease and led to reducing the disease severity during this season (2001). While, during September 2002, the temperature centigrade and the relative humidity were high (27.0 °C and 74.8 %) and very suitable for development of infection and high disease severity. These findings were in the same line with those reported by Shurtleff (198).Garraway *et al.* (1989) and Gouda (1999) who reported that, high temperature stress (27-30 °C) and humidity caused an increase in sporulation of *H. maydis* and favored the disease development. These results summarized that, the environmental conditions and some agricultural practices (level of nitrogen fertilization) played an important role in the development and severity of maize leaf spot disease caused by *H. maydis.*

Table (2): Response of some maize genotypes to infection with leaf spot disease under density of 2000 plant/feddan and under three different level of nitrogen fertilizer during two successive years (2001 and 2002).

Maize Geno- Type	D1N1					
	2001			2002		
	Infec.	Reac.	Y/p	Infec.	Reac.	Y/p
Line 63	8.6	R	5.1	25.0	MR	5.1
Line 7	4.3	HR	6.2	7.3	R	6.1
S.L.	5.0	HR	12.0	9.3	R	11.9
L. 603	5.0	HR	6.2	4.0	HR	6.3
L. 628	4.0	HR	5.2	5.0	HR	6.2
S.L. 122	4.6	HR	11.6	4.6	HR	11.5
L. 62	9.3	R	6.1	30.0	MS	5.9
L. 58	5.0	HR	6.2	4.0	MR	6.2
S.L. 107	4.3	HR	10.3	5.0	HR	10.1
L. 34	9.0	R	6.2	15.3	MR	6.0
S.L. 107	5.0	HR	12.0	7.0	R	11.9
TWC310	6.0	R	11.2	9.6	R	11.0
LSD 0.05		1.3			1.2	
0.01		1.8			1.6	
	D1N2					
Line 63	20.0	MR	5.2	40.3	MS	5.11
Line 7	5.0	HR	6.1	8.0	R	6.10
S.L.	4.0	HR	12.1	9.6	R	11.90
L. 603	8.3	R	6.3	7.0	R	6.20
L. 628	4.0	HR	5.3	9.6	R	5.95
S.L. 122	4.6	HR	11.7	8.6	R	11.61
L. 62	20.0	MR	6.1	45.0	MS	6.05
L. 58	4.3	HR	6.3	7.0	R	6.28
S.L. 107	5.0	HR	10.4	9.0	R	10.21
L. 34	9.6	R	6.2	25.0	MR	6.13
S.L. 107	7.0	R	12.1	15.3	MR	11.90
TWC310	8.3	R	11.3	20.0	MR	11.05
LSD 0.05		1.3			1.00	
0.01		1.8			1.56	
	D1N3					
Line 63	35.6	MS	5.12	60.3	S	5.00
Line 7	8.0	R	6.14	20.4	MR	6.05
S.L.	9.6	R	11.92	23.6	MR	11.83
L. 603	9.6	R	6.21	15.0	MR	6.10
L. 628	7.0	R	6.14	25.0	MR	6.05
S.L. 122	7.6	R	11.23	20.0	MR	11.10
L. 62	30.3	MS	5.72	60.6	S	5.65
L. 58	9.0	R	6.13	20.0	MR	6.00
S.L. 107	15.3	MR	10.10	25.0	MR	9.96
L. 34	15.0	MR	5.93	35.3	MS	5.85
S.L. 107	8.6	R	11.92	20.3	MR	11.83
TWC310	12.6	MR	10.93	25.3	MR	10.80
LSD 0.05		1.15			1.21	
0.01		1.63			1.72	

D (1,2 and 3) = Plant densities .**N (1,2 and 3)** = Levels of N fertilizer.
Inf. = Severity of infection,. **Reac.** = Host reaction and Y/P = yield/plot.

Table (3): Response of some maize genotypes to infection with leaf spot disease under density of 24000 plant/feddan and under three different levels of nitrogen fertilizer during two successive years (2001 and 2002).

Maize Geno- Type	D2N1					
	2001			2002		
	Infec.	Reac.	Y/p	Infec.	Reac.	Y/p
Line 63	25.5	MR	5.05	50.0	MS	5.00
Line 7	9.3	R	6.06	23.3	MR	6.03
S.L.	8.6	R	11.72	25.0	MR	11.71
L. 603	7.3	R	6.00	9.6	R	6.18
L. 628	4.0	HR	5.00	7.6	R	6.07
S.L. 122	5.0	HR	11.45	8.0	R	11.34
L. 62	20.3	MR	5.95	63.0	S	5.80
L. 58	9.0	R	6.10	9.0	R	6.05
S.L. 107	10.0	R	10.10	10.0	R	10.00
L. 34	20.0	MR	6.00	35.0	MS	5.85
S.L. 107	9.0	R	11.72	20.3	MR	11.71
TWC310	9.6	R	11.05	25.0	MR	10.93
LSD 0.05	1.16			1.21		
0.01	1.71			1.67		
	D2N2					
Line 63	45.3	MS	6.05	60.6	S	5.08
Line 7	20.6	MR	6.13	25.0	MR	6.05
S.L.	25.0	MR	12.00	25.0	MR	11.82
L. 603	15.0	MR	6.05	20.3	MR	6.11
L. 628	7.0	R	5.95	13.0	MR	5.82
S.L. 122	9.3	R	11.65	15.6	MR	11.50
L. 62	50.0	MS	6.05	70.3	S	5.96
L. 58	7.0	R	6.34	15.0	MR	6.20
S.L. 107	10.0	R	10.28	20.0	MR	10.16
L. 34	25.0	MR	6.27	45.0	MS	60.12
S.L. 107	8.0	R	12.00	23.0	MR	11.28
TWC310	10.0	R	11.13	25.0	MR	11.00
LSD 0.05	1.18			1.32		
0.01	1.73			1.71		
	D2N3					
Line 63	55.3	S	5.05	72.0	S	4.85
Line 7	20.0	MS	6.05	34.0	MS	5.98
S.L.	25.0	MR	11.83	40.3	MS	11.75
L. 603	15.6	MR	6.60	35.6	MS	5.95
L. 628	9.3	R	6.10	20.0	MR	5.93
S.L. 122	10.0	R	11.20	25.6	MR	11.00
L. 62	45.0	MS	5.62	80.3	HS	5.52
L. 58	15.0	MR	5.93	20.0	MR	5.85
S.L. 107	20.0	MR	9.98	25.0	MR	5.83
L. 34	30.0	MS	5.84	65.0	S	5.72
S.L. 107	15.3	MR	11.91	40.3	MS	11.71
TWC310	20.0	MR	10.81	45.0	MS	10.71
LSD 0.05	1.21			1.32		
0.01	1.701			1.81		

D (1,2 and 3) = Plant densities. **N (1,2 and 3)** = Levels of N fertilizer.
Inf. = Severity of infection. **Reac.** = Host reaction and Y/P = yield/plot.

Table (4): Response of some maize genotypes to infection with leaf spot disease under density of 3000 plant/feddan and under three different level of nitrogen fertilizer during two successive years (2001 and 2002).

Maize Geno- Type	D3N1					
	2001			2002		
	Infec.	Reac.	Y/p	Infec.	Reac.	Y/p
Line 63	25.5	MR	4.65	65.6	S	4.35
Line 7	9.0	R	5.90	23.0	MR	5.72
S.L.	10.0	R	11.04	25.0	MR	11.32
L. 603	15.6	MR	5.70	15.0	MR	5.95
L. 628	8.0	R	4.81	10.0	R	5.81
S.L. 122	9.0	R	11.20	11.6	MR	11.00
L. 62	30.6	MS	5.73	70.0	S	5.53
L. 58	9.3	R	5.92	15.0	MR	5.72
S.L. 107	15.0	MR	9.75	23.0	MR	9.35
L. 34	15.0	MR	5.71	40.3	MS	5.45
S.L. 107	8.3	R	11.43	23.0	MR	11.32
TWC310	9.0	R	10.85	25.0	MR	10.74
LSD 0.05	1.01			1.01		
0.01	1.62			1.72		
	D3N2					
Line 63	55.3	MS	5.92	75.0	S	4.10
Line 7	20.6	MR	6.03	40.0	MS	5.32
S.L.	25.0	MR	11.68	45.0	MS	11.12
L. 603	25.0	MR	5.85	30.0	MS	5.52
L. 628	15.6	MR	5.70	20.6	MR	5.60
S.L. 122	17.3	MR	11.30	22.6	MR	10.50
L. 62	30.0	MS	5.85	80.0	HS	5.41
L. 58	10.6	MR	6.15	20.3	MR	5.40
S.L. 107	15.0	MR	10.00	25.0	MR	9.05
L. 34	35.0	MS	6.05	65.6	S	5.10
S.L. 107	9.0	R	11.58	25.0	MR	11.12
TWC310	15.6	MR	10.85	53.3	MS	10.55
LSD 0.05	1.21			1.18		
0.01	1.78			1.65		
	D3N3					
Line 63	55.0	S	4.88	87.3	HS	4.00
Line 7	30.0	MS	5.90	42.0	MS	5.10
S.L.	35.0	MS	11.30	46.3	MS	10.95
L. 603	35.0	MS	5.65	45.0	MS	5.35
L. 628	20.0	MR	6.70	25.0	MR	5.50
S.L. 122	25.0	MR	10.72	25.0	MR	10.33
L. 62	55.3	S	5.10	85.0	HS	5.30
L. 58	30.0	MS	5.25	26.6	MS	5.28
S.L. 107	35.0	MS	9.30	25.0	MR	8.95
L. 34	55.0	S	5.35	80.0	HS	4.93
S.L. 107	10.0	R	11.30	25.0	MR	10.95
TWC310	15.3	MR	10.20	44.6	MS	10.36
LSD 0.05	1.21			1.21		
0.01	1.73			1.68		

D (1,2 and 3) = Plant densities. N (1,2 and 3) = Levels of N fertilizer.
Inf. = Severity of infection. Reac. = Host reaction and Y/P = yield/plot.

Table (5): Mean of temperature centigrade, relative humidity % and sun radiation during four months in two seasons (2001 and 2002).

Month	Temperature (°C)		Relative humidity (%)		Sun radiation	
	2001	2002	2001	2002	2001	2002
June	24.8	25.1	65.3	69.4	230..6	217.5
July	27.1	27.9	74.7	72.7	210..0	193.4
Augusts	27.0	25.6	74.9	71.5	192..2	189.5
September	25.5	27.0	71.5	74.8	185.3	176.2
Average	26.1	26.4	71.6	72.1	204.5	194.15

As for grain yield production, the results presented in tables (2, 3 and 4) showed that, at three tested plant densities, the increase of nitrogen level from 120 to 160 unit/feddan, led to an increase in severity of disease infection and decrease in grain yield production. The increase of plant density from 24000 to 300000 plant/feddan led to increase in disease severity and decrease in grain yield production. These results also indicated that, the disease severity was high during 2002 season as compared to 2001 season under all tested plant densities (DI, D2 and D3) and under all the tested levels of nitrogen fertilization (NI. N2 and N3), which result in decreasing grain yield production during 2002 season as compared with 2001 season. In general, these results indicated that, the optimum plant density and nitrogen level of fertilization, which gave low disease severity and high production of grain yield were 24000 plant /feddan and 120 unit of nitrogen feddan, respectively. These results in agreement with Byrmes (1989) and Kucharek (1990) who found that, maize leaf spot caused by *H. maydis* adversely affected yield in 3 tested maize hybrids, evaluated at 9 locations in Illinois and Ohio, USA. The disease can cause 40 % yield loss in areas where weather conditions favor disease infection.

REFERENCES

Anger,R.; Mandahar, C.L. and Gulati. A. (1990): The possible involvement of cytokimns in the pathogencity of *Helminthosporium maydis* wc/u/la. Mycopathologia 109 (3) 177-182 [C.F. Maize Abstracts! 991 vol. 7 No.3].

Badr, M.M.; Tolba, SAE. and El-Wahsh, SM (1999): Response of forty maize genotypes to *Helminthosporium turcicum* and influence of phosphorus and plant densities on disease resistance. J. Agric. Res. Tanta Univ., 25 (1) 1:9.

Byrnes, K.J.; Pataky J.K. and White, D.G. (1989): Relationship between yield of three maize hybrids and severity of southern leaf blight caused by race O of *Bipolaris maydis*. Plant Disease 73 (10): 834-840.

Diab, M.S.; FJ-Mersawy, E.M. and Koriem, A.M. (1993): Response of some maize genotypes to leaf blight diseases in Egypt. J. Appl. Sci. 8 (3): 136-150.

Elliott, C. and Jenkins, M.T. (1946): *Helminthosporium turcicum* leaf blight of corn. Phytopathology 36:660-666.

Garraway, M.O.; Akhtar. M. and Wokoma, F.C. W. (1989): Effect of high temperature stress on peroxidase activity and electrolyte leakage in maize in relation to sporulation of Bipolaris maydis race T. Phytopathology\- 79 (7): 8(X)-805.

Gouda, M.I.M. (1996): Studies on maize leaf blight disease in Egypt. Ms. Sc. Thesis, Fac. Agric. Tanta Univ.

Hooker, A.E. (1974): Seedling reactions of corn hybrids to *Helminthosporium* leaf spot. Plant Dis. Reptr. 58(11); 975-977.

Khalifa, I. And Zein El-Abedeen, A. (2000): *Turcicum* leaf blight resistance in some Egyptian maize genotypes under surface and sprinkler irrigation systems. Egypt. J. Appl. Sci., 15(12): 410421.

Khan, A. and Shabeer Ahmed. (1992): Genotype assay of maize for resistance to *maydis* leaf blight under artificial field Epiphytotics of Peshawer region 8 (5): 547-549. [C.F. Rev. of Plant Pathology 1994 vol. 73 No. 1].

Kucharek, T. (1990): Epidemics of diseases in agronomic crops in north Florida 1970-1989.Proceeding-Soil and Crop Science Society of Florida (1990) 49,187-192 [c.f. Maize Abstracts 1993 vol. 9 No.2].

Mandahar. C.L.; Remu Angra and Nath S. (1990): Carbohydrate involvement during infection of maize by *Helminthosporium maydis*. Mycopathologia 110(3): 139-144.

Shurtleff, M.C. (1980): Compendium of corn diseases 2nd. Edition. American Phyto. Soc. P. 16-17.

Sugawara F.; Strobe, L, G.; Strange, R.N.; Siedow. J.N.; Duyne, G.D. Van and Clardy, J. (1987): Phytotoxins from the pathogenic fungi *Drechslera maydis* and *Drechslera sorghicola*. Proceeding of the national Academy of Science of United States of America (1987) 84(10): 308 F-3085. [C.F. Maize Abstracts 1989 vol. 5 No.].

Wei, J.K.; Liu K.M.: Chen, J.P.; Luo, P.C. and Stadelmamm, O.Y.L. (1988): Pathological andPhysiological identification of race C of Bipolaris maydis in China. Phytopathology 78(5): 550-554.

تأثير التسميد النيتروجيني والكثافة النباتية على إصابة بعض التراكيب الوراثية للذرة الشامية لمرض تبقع الأوراق المتسبب عن الفطر هلمنثوسبوريم

صبحي عبد العزيز السيد طلبه، إعتماد عبيد دراز، إبراهيم أحمد السلاموني
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تم تقييم ثلاثة هجن فردية وهجين ثلاثي وآبائهم للإصابة بالفطر المسبب لمرض تبقع أوراق الذرة الشامية (هلمنثوسبوريم مايديس) تحت ثلاث مستويات مختلفة من التسميد الأزوتي، وكذلك ثلاث مستويات من الكثافة النباتية. أوضحت النتائج زيادة حدوث المرض تحت كل من المستوى العالي من التسميد الأزوتي(١٦٠ وحدة للفدان)، وأيضا تحت الكثافة النباتية المرتفعة (٣٠٠٠٠ نبات للفدان). واختلفت درجة الإصابة فيما بين الأصناف، وقد ترجع مقاومة الهجن إلى مقاومة أحد الآباء أو كليهما، كذلك لوحظ مقاومة جزئية في اتجاه الأب المقاوم للمرض. لذلك فإن هذه النتائج تثري برنامج تربية لإنتاج هجن مقاومة لمرض تبقع أوراق الذرة الشامية.

وعلي الجانب الآخر فقد وجد أن الشدة المرضية قد تأثرت بالظروف المناخية خلال فترة تكشف المرض (شهر سبتمبر) في كل من موسمي الاختبار ٢٠٠١ و٢٠٠٢م. كما لوحظ انخفاض محصول الذرة الشامية خلال موسم ٢٠٠٢م وخاصة مع الأصناف القابلة للإصابة؛ حيث كانت الظروف المناخية أكثر ملائمة للإصابة بالمرض. هذا مما يوضح أن الشدة المرضية تختلف من موسم إلى آخر تبعا لاختلاف الظروف المناخية.