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EFFECT OF IRRIGATION SYSTEMS (SURFACE AND SPRINKLER) ON DEVELOPMENT OF EAR AND KERNEL ROTS DISEASE AND GRAIN COMPONENT IN MAIZE

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ABSTRACT

Thirty eight maize genotypes were planted under surface and sprinkler irrigation in Nubaria and under only surface irrigation in Sakha, and were evaluated to ear and kernel rots diseases. The results showed the highest infections by *F. moniliforme* and *A. flavus* were under sprinkler irrigation comparing with surface irrigation in Nubaria and Sakha locations. While, the infections by saprophytic fungi i.e. *Penicillium* spp. and *Aspergillus flavus* were high under surface irrigation system in Sakha comparing with Nubaria location. The maize grains with infected by *Botryodiplodia theobromae* was found only at Nubaria under two tested irrigation systems, the infection percentage by this fungus was high under sprinkler comparing with surface irrigations. In general, *Fusarium moniliforme* was the common invader for all kernels examined under two tested irrigation systems and two tested locations, it has proved to be the most prevalent fungus which incited the disease, specially under sprinkler irrigation. Results provide information to be known the effect of irrigation system on the activity of causal organisms of maize grain rots disease. On the other hand, most of the tested hybrid had lower level of infection comparing with inbred lines and varieties. The resistance response of hybrids may be due to resistance of one parent only or due to complementary effects for resistance in both parents, its importance to any breeding program for developing maize hybrids resistant to ear and kernel rot disease of maize. Under surface irrigation system, the free fatty acid, moisture and protein in the grains were decreased. While, the fat and the acidity were increased under surface irrigation system. The reverse was true under sprinkler irrigation system.

INTRODUCTION

Maize (*Zea mays* L.) is subject to attack of kernel and ear rots in both field and store. These diseases are caused by *Fusarium moniliforme, Penicillium* spp., *Aspergillus flavus and Botryodiplodia theobromae*. These pathogens play an active role in the deterioration of the kernels and there influence will extend to human and animal who depend on maize grains in their food or feed, Tolba (1991). *Fusarium moniliforme* is a better competitor in preharvest maize than *Penicillium* (Caldwell *et al.* 1981). Initial kernel infection of *F. moniliforme* may serve as an important deterrent to subsequent kernel invasion by other seed-infection molds, as suggested by Wicklow (1989) and Amer *et al.* (2002).

Moreover, Diab *et al.* (1984) found that, maize grains infection by *Botryodiplodia theobromae* was most extensive when spore suspension was injected through the husks or sprayed on the ear top and onto the silk and/or the ear shank. Kawashina *et al.* (1988) found that, maize grains which were sun dried, immediately after mechanical shelling, on concrete drying floor with moisture content 15% was able to be stored with contamination of *A. flavus* (1.5-8.0%) for 56 days in middlemen's storages. In grain which was not dried after mechanical shelling, *A. flavus* contamination prevailed if moisture content was > 20%. However, if moisture content was < 17% the spread of *A. flavus* was suppressed. Diab *et al.* (1989) showed that, maize grains obtained from early sown plants showed the maximum germination because of it's maturity and lowest moisture content. Increasing grain moisture content led to increased grain rot infection specially *F. moniliforme*. Rheeder *et al.* (1990) found that, significant negative association between *F. moniliforme* and *Diplodia maydis*. Maize seed germination was negatively associated with *Diplodia* spp., where there was relatively little influence on germination by *Fusarium* spp. Headrick and Pataky (1991) showed that, the breeding for resistance to grain infection by *F. moniliforme* are attained by selecting inbred parents for delayed senescence of silks and by use identified sources of resistance, as the ear parent in seed production. Tolba and Soad El-Sayed (2002) found that, *F. moniliforme* appeared to be an early colonist of preharvested maize ears, infecting the kernels before *Penicillium* spp., *A. niger*, *A. flavus* and other molds. It has proved to be the most prevalent fungus in grains which have high level of moisture content. The objectives of this study were (a) to study the response of 38 genotypes to infection with grain molds under surface and sprinkler irrigation, (b) to investigate if any of the three tested populations can be used as a direct source of development inbred lines resistant to the disease and (c) to identify new sources of resistant to disease.

MATERIALS AND METHODS

Two experiments were performed at Nubaria Agric. Res. Station under surface and sprinkler irrigation systems. One experiment was carried out at Sakha Agric. Res. Station under only surface irrigation system.

A randomized complete block design, with three replicates, was used in these experiments. The plot size was 8.4m2, each plot contained 2 rows 6m. long with 70 cm row spacing. The plants were thinned to one plant per hill at 25 cm between hills. All agricultural practices were applied as recommended. Thirty eight maize inbred lines, hybrids and populations were used for the screening of maize breeding materials i.e. the inbred lines 7, 34, 63, 602, 603, 612, 628, 629, 62, 73, 1001, 1002, 1004, 1021, Gem.4 and Gem.18; the single crosses (S.C.) 10, 21, 23, 24, 122, 123, 124, 129, 155 and 161; The three way crosses (T.W.C.) 310, 320, 321, 323, 324, 351 and 352 and the populations Giza 2, Comp. 5 and Tep.5.

The basic concept of selection of these inbreds was dependent upon the genetic relationship between these inbred and their F1 hybrids as follows:

A- Single crosses (SC)	Parental inbreds
S.C 10 W	L. 7 × L. 63
S.C 21 W	L. 2 × L. 63
S.C 23 W	L. 4 × L. 63
S.C 24 W	L. 18 × L. 63
S.C 122 W	L. 628 × L. 603
S.C 123 W	L. 628 × L. 602
S.C 124 W	L. 629 × L. 603
S.C 129 W	L. 612 × L. 628
S.C 155 W	L. 1002 × L. 1021
B- Three way crosses (TWC)	**Parental inbreds and hybrids**
TWC 310	SC 10 × L. 7
TWC 321	SC 21 × L. 7
TWC 323	SC 23 × L. 7
TWC 324	SC 24 × L. 7

C-Populations:

Giza 2, Composite-5 (Comp.5) and Tepalsing-5 (Tep. 5)

D- Inbred Lines:

1- White inbreds 2, 4, 7, 18, 34, 62, 63, 602, 603, 612, 628 and 629

2- Yellow inbreds 1001, 1002, 1021, 1004 and 73

At harvest randomized samples of 6 ears/plot were collected from each treatment to determine ear and kernel rot disease as a percentage of infection per plot in each treatment for each entry, sing Petri- plates containing PDA medium.

All recorded data were subjected to the statistical analysis according to Snedecor and Cochran (1980).

Chemical composition of seeds:

Seed samples were taken at random from each plot and grounded to fine powder to pass through 2 mm mesh for chemical analysis i.e. moisture content, crude protein (N%×5.75), ash % as well as oil content by the Soxhlet extraction method were determined according to the procedures of AS.O.A.C. (1990) and expressed as a percentage of the dry weight of the sample.

RESULTS AND DISCUSSION

Data presented in Tables 1 and 2 show that, the tested maize genotypes were contaminated with different fungal species i.e. *Fusarium moniliforme, Penicillium* spp., *Aspergillus niger and Aspergillus flavus*, these results were in the same line with that recorded by Tolba (1991). In few cases, *Botryodiplodia theobromae* contaminated some grains of some tested maize genotypes only in Nubaria location, specially under sprinkler irrigation system (Table-3), these may be due to the high moisture content in grain under sprinkler irrigation. Moreover, under two tested locations and irrigation system (Tables 1, 2 and 3), *Fusarium moniliforme* was the common invader for all examined kernels. It was recovered in highest percentage from tested kernels. This finding is in accordance with that of Caldwell *et al.* (1981), Diab *et al.* (1984), Headrick and Pataky (1991), Tolba (1991) and Amer *et al.* (2002).

Table (1): Effect of surface irrigation system on development of ear and kernel rot disease (%) in 38 maize genotypes at Nubaria location.

Maize genotypes	*F. mon.*	*Pen. spp.*	*B. theob*	*A. niger*	*A. flavus*
S.C. 10	28.70	0.63	0.01	1.20	3.66
S.C. 21	20.53	0.96	0.01	1.46	1.83
S.C. 23	30.46	1.26	0.01	2.30	3.96
S.C. 24	20.43	0.37	0.01	1.10	2.63
S.C. 122	29.56	0.93	0.01	1.60	4.53
S.C. 123	28.73	1.36	1.67	2.00	4.40
S.C. 124	23.10	1.10	0.01	1.00	3.16
S.C. 129	25.60	0.93	0.01	1.30	3.73
TWC 310	30.10	0.50	0.01	2.03	3.30
TWC 320	22.76	1.30	2.33	2.03	3.90
TWC 321	22.88	1.17	0.01	1.30	3.03
TWC 322	31.63	0.46	0.01	1.93	3.35
TWC 323	30.36	1.60	0.01	1.90	3.56
TWC 324	25.30	1.93	0.01	1.43	3.36
S.C. 155	25.60	0.37	0.01	1.43	2.10
S.C. 161	28.76	0.06	2.33	1.56	2.20
TWC 351	33.83	1.56	2.00	2.16	3.30
TWC 352	30.56	1.30	1.67	250	3.40
Giza 2	45.46	2.80	0.01	4.66	5.80
L.S.D. 0.05	2.98	1.23	1.16	1.41	0.48
0.01	3.47	1.76	1.93	1.98	0.96
Comp. 5	30.83	1.73	0.01	2.200	2.06
Tep. 5	40.00	2.96	0.01	3.80	5.40
Line 7	30.60	2.16	0.10	2.00	2.06
Line 34	40.66	3.06	0.01	3.06	5.50
Line 63	20.20	1.30	2.00	1.70	4.26
Line 602	38.50	1.26	0.01	1.70	3.76
Line 603	30.73	1.80	0.01	2.20	4.70
Line 612	35.26	1.80	2.33	2.20	4.93
Line 628	25.30	1.50	0.01	1.90	3.63
Line 629	30.60	1.80	0.01	1.90	4.26
Line 617	35.60	2.15	0.01	1.96	4.96
Line 650	31.50	1.90	0.01	1.63	4.36
Line 1001	25.93	1.16	0.01	1.10	3.83
Line 1002	30.00	1.60	1.00	1.80	4.56
Line 1004	27.00	1.16	1.66	1.40	3.93
Line 1021	27.50	0.90	2.00	1.60	3.56
Gem. 2	20.05	0.60	0.01	1.20	3.56
Gem. 4	33.56	0.70	0.01	1.20	3.53
Gem. 18	24.0	0.83	0.01	1.46	3.70
L.S.D. 0.05	2.98	1.23	1.16	1.41	0.48
0.01	3.47	1.76	1.93	1.98	0.96

F. mon = Fusarium moniliforme, Pen. Spp., *B. Theob. = Botryodiplodia theobromae, A. = Aspergillus.*

Table (2): Effect of surface irrigation system on development of ear and kernel rot disease (%) in 38 maize genotypes at Sakha location.

Maize genotypes	*F. mon.*	*Pen. spp.*	*A. niger*	*A. flavus*	Maize genotypes	*F. mon.*	*Pen. spp.*	A. niger	*A. flavus*
S.C. 10	18.27	2.70	3.83	1.60	Comp. 5	24.36	3.86	4.86	0.50
S.C. 21	18.43	3.06	3.93	1.83	Tep.5	31.96	5.26	6.56	3.23
S.C. 23	19.00	3.63	4.86	1.93	Line 7	28.46	4.60	4.66	0.50
S.C. 24	19.33	2.63	3.90	0.66	Line 34	34.16	5.10	6.10	3.33
S.C. 122	23.10	3.36	4.30	1.76	Line 63	14.20	3.23	4.53	2.26
S.C. 123	22.13	3.86	4.33	2.13	Line 602	27.36	3.33	4.40	1.80
S.C. 124	17.36	2.30	3.63	1.10	Line 603	25.43	4.03	5.03	2.60
S.C. 129	18.73	3.30	3.93	1.60	Line 612	28.40	3.66	4.93	2.66
TWC 310	29.40	3.50	4.73	1.90	Line 628	19.33	3.70	4.60	1.46
TWC 320	25.43	3.16	4.53	1.80	Line 629	25.43	3.83	4.20	1.70
TWC 321	18.83	2.20	4.00	1.10	Line 617	2946	4.16	4.60	2.10
TWC 322	27.00	3.46	4.83	1.23	Line 650	26.40	3.73	3.76	1.26
TWC 323	23.26	3.66	4.66	1.43	Line 1001	18.16	3.10	3.26	1.20
TWC 324	21.13	3.00	4.03	0.66	Line 1002	24.16	3.50	3.73	1.36
S.C. 155	18.50	2.43	4.00	0.50	Line 1004	21.23	2.93	3.03	1.20
S.C. 161	22.46	3.23	4.23	0.33	Line 1021	20.26	2.53	3.26	1.36
TWC 351	28.43	3.60	5.00	1.16	Gem. 2	18.56	2.50	3.20	1.00
TWC 352	23.30	3.40	4.66	1.36	Gem. 4	25.06	2.76	3.36	1.10
Giza 2	38.00	4.53	7.16	3.33	Gem. 18	20.16	2.83	3.53	1.43
L.S.D 0.05	3.88	0.67	0.86	0.79		3.88	0.67	0.86	0.79
0.01	5.62	1.01	1.12	1.10		5.62	1.01	1.12	1.10

F. mon = Fusarium moniliforme, Pen. Spp., *B. Theob. = Botryodiplodia theobromae, A. = Aspergillus.*

The highest infection percent by *Fusarium moniliforme* and *Aspergillus flavus* was found under sprinkler irrigation system (Table-3) comparing with surface irrigation system (Tables 1 and 2). These finding in the same line with that recorded by Diab *et al.* (1989), they found that, increasing grain moisture content led to increase grain rot infection specially by *Fusarium moniliforme*. On the other hand, the highest infection percent by *Aspergillus flavus and Penicillium* spp. Were found under surface irrigation in Sakha location (Table-2), and it was the lowest under sprinkler irrigation in Nubaria location (Table-3). The above mentioned results indicate that, the parasitic fungi i.e. *Fusarium moniliforme, A. flavus and Botryodiplodia theobromae* were dominant in Nubaria location (Table-3), specially under sprinkler irrigation system (the moisture content in grain was high), while, the infection by saprophytic fungi i.e. *A. niger* and *Penicillium* spp. was high under surface irrigation system (Table-1) specially in Sakha location (moisture content in grain was low). These results are in agreement with those reported by Diab *et al.* (1989).

The results presented in Table-1, 2 and 3 also indicate that, the grains of single crosses have lower level of infection comparing with most of the tested inbred lines, since, the level of infection of tested single crosses, can to be intermediate between level of infection, of their parents. These results show that, resistance hybrids may be attributed to resistance of one parent (parental or maternal) which indicated the presence of dominant effect for resistance in the parent. In other cases, resistance of F1 hybrid is due to complementary effects for resistance in both parents. So, its importance to any breeding program for developing maize hybrid resistant to ear and kernel rot disease was appeared.

Table (3): Effect of sprinkler irrigation system on development of ear and kernel rot disease (%) in 38 maize genotypes at Nubaria location.

Maize genotypes	*F. mon.*	*Pen. spp.*	*A. niger*	*A. flavus*	*B. theob*
S.C. 10	29.66	0.37	1.26	4.83	1.67
S.C. 21	23.96	1.00	1.53	4.00	0.01
S.C. 23	26.10	1.26	2.16	4.86	1.00
S.C. 24	30.63	0.57	1.43	4.36	0.34
S.C. 122	30.10	1.16	1.70	3.20	0.01
S.C. 123	31.83	1.36	2.10	4.46	3.66
S.C. 124	28.96	0.01	1.23	4.90	0.01
S.C. 129	31.86	0.17	1.56	4.20	0.01
TWC 310	42.33	1.56	2.06	4.20	0.34
TWC 320	38.86	1.53	1.86	4.80	5.33
TWC 321	27.26	0.01	1.30	4.50	0.01
TWC 322	38.86	1.43	1.76	3.70	0.01
TWC 323	28.60	1.60	1.70	3.93	0.01
TWC 324	30.63	0.34	1.26	4.00	0.34
S.C. 155	30.86	0.34	1.20	3.16	0.01
S.C. 161	35.36	0.87	1.56	3.13	5.33
TWC 351	40.60	1.60	2.03	2.86	5.00
TWC 352	36.10	1.50	2.26	3.40	3.33
Giza 2	51.90	3.16	4.43	3.93	0.01
L.S.D.0.05	3.39	0.67	0.92	0.88	0.77
0.01	4.42	0.99	1.33	1.12	1.02
Comp. 5	38.53	1.83	2.50	5.60	0.01
Tep. 5	47.36	3.10	4.16	2.76	0.34
Line 7	35.53	2.43	2.26	5.83	0.01
Line 34	48.00	2.93	3.53	2.70	0.01
Line 63	26.43	1.60	1.70	6.83	4.33
Line 602	35.53	1.53	1.66	4.63	1.67
Line 603	36.33	2.20	2.20	4.23	0.01
Line 612	42.86	1.93	2.26	5.26	5.00
Line 628	31.70	1.70	1.86	5.43	0.01
Line 629	36.56	1.86	2.00	4.26	0.01
Line 617	41.93	2.10	1.86	5.20	0.34
Line 650	35.30	2.00	1.70	5.76	0.34
Line 1001	32.93	1.40	126	5.16	0.01
Line 1002	36.50	1.50	1.93	4.96	3.01
Line 1004	35.23	1.33	1.43	5.03	2.66
Line 1021	33.70	0.97	1.56	5.13	4.66
Gem. 2	28.50	0.83	1.26	4.50	0.01
Gem. 4	29.76	0.77	1.43	4.30	0.01
Gem. 18	33.73	1.46	1.43	450	0.01
L.S.D. 0.05	3.39	0.67	0.92	0.88	0.77
0.01	4.42	0.99	1.33	1.12	1.02

F. mon = Fusarium moniliforme, Pen. Spp., *B. Theob. = Botryodiplodia theobromae, A. = Aspergillus.*

The results in Table 4 show that, under surface irrigation system, the moisture, free fatty acid and crude protein were decreased, while, the fat and acidity were increased, comparing with sprinkler irrigation.

Table (4): Effect of irrigation system on maize grains component at Nubaria location.

Maize genotypes	Under surface Irrigation					Under sprinkler irrigation				
	Moisture	Acidity	Fat	F.F.A.	Protein	Moisture	Acidity	Fat	F.F.A.	Protein
S.C. 10	15.320	5.932	4.290	0.322	12.520	16.320	5.342	0.390	4.112	12.762
S.C. 21	15.320	5.832	4.320	0.362	12.320	16.420	5.430	0.410	4.103	12.770
S.C. 23	14.890	5.842	4.420	0.311	12.430	15.980	5.370	0.388	4.100	12.820
S.C. 24	15.320	6.360	5.100	0.221	13.120	15.720	5.980	0.300	4.890	13.510
S.C. 122	15.620	5.120	3.940	0.401	12.320	15.820	5.010	0.475	4.000	12.731
S.C. 123	15.320	5.730	4.320	0.391	12.420	16.320	5.430	0450	4.152	12.826
S.C. 124	15.010	5.640	4.440	0.322	12.320	16.120	5.260	0.385	42.10	12.672
S.C. 129	14.930	5.721	4.510	0.361	12.220	15.210	5.341	0.400	4.280	12.422
TWC 310	14.890	5.590	4.412	0.320	12.320	16.010	5.210	0.392	4.213	12.630
TWC 320	15.120	5.120	3.980	0.400	12.420	15.980	5.000	0.475	3.671	12.785
TWC 321	15.130	5.630	4.360	0.340	12.820	15.820	5.263	0.393	4.190	13.113
TWC 322	15.020	5.730	4.410	0.333	12.817	16.130	5.284	0.388	4.100	13.000
TWC 323	14.960	5.320	4.620	0.324	12.415	16.210	5.100	0.370	4.213	12.790
TWC 324	14.990	5.620	4.320	0.323	12.320	16.070	5.320	0.375	4.170	12.685
S.C. 155	14.899	7.040	5.320	0.199	13.490	16.030	6.820	0.285	4.992	13.752
S.C. 161	15.070	6.320	4.920	0.241	12.110	15.920	6.010	0.300	4.710	12.362
TWC 351	15.125	5.430	4.320	0.330	12.120	15.920	5.110	0.380	4.103	12.342
TWC 352	15.320	5.540	4.260	0.323	12.425	16.060	5.212	0.391	4.112	12.720
Giza 2	15.220	5.090	3.860	0.498	13.130	15.880	4.890	0.491	3.632	13.332
Comp. 5	15.340	6.320	5.220	0.498	12.211	16.010	5.920	5.120	0.530	13.115
Tep. 5	15.280	6.430	5.340	0.410	13.211	15.620	6.100	5.130	0.430	13.280
Line 7	15.320	6.250	5.180	0.413	12.850	16.000	50860	5.050	0.445	13.000
Line 34	15.200	6.530	5.510	0.499	13.430	15.820	6.230	5.210	0.515	13.320
Line 63	14.920	5.630	4.430	0.385	12.630	15.630	5.500	4.400	0.410	12.830
Line 602	14.860	6.220	5.120	0.420	13.600	15.720	5.920	5.000	0.440	13.630
Line 603	15.120	6.130	5.160	0.410	12.920	15.850	5.990	5.050	0.450	13.210
Line 612	15.130	6.320	5.230	0.422	13.195	15.920	5.890	5.100	0.445	13.28.
Line 628	15.230	6.210	4.960	0.389	12.690	15.710	6.000	4.760	0.420	12.850
Line 629	14.950	6.240	5.050	0.434	12.980	15.820	6.010	4.950	0.460	13.180
Line 617	15.000	6.350	5.220	0.415	13.210	16.100	6.120	5.070	0.450	13.345
Line 650	15.300	6.145	5.000	0.388	12.820	16.000	5.930	4.900	0.423	13.050
Line 1001	15.120	6.150	4.920	0.395	12.720	15.930	5.890	4.770	0.425	12.955
Line 1002	14.890	6.145	5.100	0.420	13.000	15.820	5.920	5.000	0.435	13.210
Line 1004	15.000	6.130	5.000	0.400	12.730	16.300	5.990	4.860	0.430	12.920
Line 1021	15.320	6.110	4.830	0.380	12.800	15.920	5.890	4.780	0.410	12.990
Gem. 2	15.410	5.580	4.420	0.440	12.500	16.000	5.330	4.400	0.450	12.750
Gem. 4	15.280	5.620	4.480	0.436	13.220	15.820	5.490	4.500	0.463	13.260
Gem. 18	15.170	6.180	5.000	0.430	12.850	15.740	6.000	6.000	0.455	13.050
L.S.D.	0.624	0.598	0.398	0.128	0.612	0.711	0.628	0.132	0.434	0.711

REFERENCES

Amer, E.A.; El-Shenawy, A.A.; Tolba, S.A. and Motawi, A.A. (2002): Effect of plant density and harvesting date on ear and kernels rots in maize. J. Agric. Sci. Mansoura Univ., 27 (1): 27-32.

Anonymous. (1990): Official Analytical Chemists 15 th (edition, Published by Association of Official Analytical Chemists. Arlington, Virginia, USA).

Caldwell, A.W.; Tuite, J. and Carlton, W.W. (1981): Pathogenicity of Penicillia to corn ears. Phytopathology. 71: 175-180.

Diab,M.M.; Ikbal Khalil; Nadia Dawood, A. and El-Assiuty, E.M. (1984): Ear and grain rot of maize caused by *Botryodiplodia theobromae* in Egypt. Minufiya J. Agric. Res. 9: 129-138.

Diab,M.M.; Awad, M.A.; Younis,S. and Mohamed, S.A. (1989): Factors affecting grain rot of maize. Minufiya J. Agric. Res. 14 (2): 1440-1452.

Headrick, J.M. and Pataky, J.K. (1991): Material influence on the resistance of sweet corn lines to kernel infection by *Fusarium moniliforme*. Phytopathology, 81 (3): 268-274.

Kawashina, K.; Kawasugi, S. and Siriacha, P. (1988): *Aspergillus flavus* contamination in maize during postharvest process. Proceeding of the Japanese Association of Mycotoxicology Supplement No. 1, 183-185.

Rheeder, J.P.; Marasas, W.F.O. and Van Wgk, P.S. (1990): Fungal associations in corn kernels and effects on germination. Phytopathology, 80: 131-134.

Snedecor, G.W. and Cochran, W.G. (1980): Statistical methods applied to experiments in agriculture and biology. 5th ed. Seventh Reprinting. The IOWA State Univ. Press Ames. OWA, U.S.A.

Tolba, S.A.E. (1991): Studies on some rot diseases of *Zea mays* in Egypt. M.Sc. Thesis, Kafr El-Sheikh, Tanta Univ. Egypt.

Tolba, S.A.E. and Soad, A. El-Sayed. (2002): Viability and chemical component of grains of six maize genotypes as affected by ear and kernel rot diseases under different agricultural practices. J. Agric. Res. Tanta Univ., 28 (1): 23-39.

Wichlow, D.T. (1989): Patterns of fungal association within maize kernel harvested in North Carolina. Plant Disease, 72: 113-115.

تأثير نظامي الري (السطحي والرش) على تكشف مرض عفن الحبوب والكيزان في الذرة الشامية

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زرع ٣٨ تركيب وراثي من الذرة الشامية تحت نظامي الري بالغمر والري بالرش في النوبارية، وتحت نظام الري بالغمر فقط في سخا، وتم تقييم هذه التراكيب الوراثية لمرض عفن الحبوب والكيزان. وأوضحت النتائج أن أعلى إصابة كانت بالفيوزاريوم مونيليفورم والأسبرجلس فلافس وكانت تحت نظام الري بالرش مقارنة بتلك تحت نظام الري بالغمر في كل من النوبارية وسخا. وعلى العكس من ذلك كانت الإصابة عالية بالفطريات المترممة وهي البنسيليوم والأسبرجلس تحت نظام الري بالغمر في سخا مقارنة بالنوبارية. وتميز ظهور إصابة الحبوب بالفطر بتريوديبلوديا ثيوبروما في النوبارية فقط تحت نظامي الري المختبرين، حيث كانت شدة الإصابة عالية على بعض الأصناف تحت نظام الري بالرش مقارنة بالغمر. وعلى العموم فإن الإصابة بالفطر فيوزاريوم مونيليفورم كانت هي السائدة على كل الحبوب المختبرة

تحت نظامي الري المختبرين وفي كلٍ من الموقعين، وكان أكثر سيادة علـــى الحبـــوب وخصوصاً تحت نظام الري بالرش.وعموماً تلقي هذه النتائج الضوء على تأثير نظـــام الري على المسببات المرضية لمرض عفن الحبوب والكيزان في الذرة الشامية.

وعلى الجانب الآخر فإن معظم الهجن المختبرة كانت ذات مستوى مـــنخفض من الإصابة بالمقارنة بالسلالات والأصناف الأخرى المختبـــرة. ويمكـــن أن تعـــزى مقاومة الهجن للمرض إلى مقاومة أحد الآباء أو كليهما، ويعتبر ذلـــك مفيـــد لبـــرامج التربية لمقاومة مرض عفن الحبوب والكيزان.

وعموماً فإنه تحت نظام الري بالغمر ينخفض محتوى الحبوب من الرطوبـــة والأحماض الدهنية الحرة والبروتين ، بينما يرتفع محتواها من الدهن ورقم الحموضـــة وذلك مقارنة بنظام الري بالرش.