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RESPONSE OF TWO EGYPTIAN MAIZE HYBRIDS TO NITROGEN FERTILIZATION UNDER SUB-TROPICAL CONDITION

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ABSTRACT

Two field experimental were carried out at Republic of Niger (Sub-tropical climatic condition) at Farm Agriculture cooperation between Niger and Egypt at Tiagurire in zone Say (Ferme Agricole Commune Niger -Egypte). during (1998/1999) and (1999/2000) seasons . This study props to determined the response of two Egyptian crosses were adapted on Niger climatic conditions to three nitrogen levels (80 ,100 ,120 kg N/fad).

Significant differences were detected between the two years for plant and ear height ,ear length and ear diameter. Significant between two crosses were appear for all traits except ear height and ear diameter .The interaction between crosses x years were significant for ear length, ear diameter and number of kernels /ear. Single cross 124 tended to produce higher grain yield than T.W.C 352 and the differences between them amounted to about two ardabs per faddan (ard/fad) in favor of S.C 124.

The nitrogen levels were significant for grain yield, ear length, number of kernels /row and number of kernels/ear. While the interactions between nitrogen x years, nitrogen x hybrids and nitrogen x hybrids x years were not significant for all traits except ear length for nitrogen x crosses. The highest mean performances were obtained with 120 kg N/ fad for all study traits except silking date.

INTROUDACTION

Maize is the third most important food crop after millet and rice in Niger. All grain yield of maize were imported from another country to Niger. The first time maize were planted in large area at Egyptian farm in Niger at farm cooperation between Niger and Egypt (Farme Agricol Commun Niger - Egypte).This farm started in 1996, before this time maize were planted as few places (in garden for fried only (green maize)). From previous study choosing two hybrids, single cross 124 and three way cross 352were more adapted and good yielding props testing under three nitrogen levels. The means of humidity through period growth were ranged from 41% to 33% from December to March; also temperatures were ranged from 33 to 39^0 C at the same period.

Nitrogen fertilization is among the most important cultural practices which control maize production. Many investigators reported the grain yield per Faddan of maize increased by increasing nitrogen fertilizer up to the recommended rates which could be arranged in the following descending order : 280kgN/ha ,Nunez and Kamprath (1969) ;90 kg N/fad ,Galal *et.al.* (1979) and 120 kgN/fad ,Katta *et.al.*(1976)and Abou-Khdrah (1984).Mohamed (1999) studied the response of 8 crosses to nitrogen levels (100,130 and 160 kgN /fad) genotypes were significant for grain yield ,ear

length and number of kernels per ear . Also, Esmail and EL-Sheikh (1994) applied nitrogen fertilizer levels (60, 90 ,120 and 150 kg N/fad) in fourteen maize varieties, maize received 150 or 120 kgN/fad increased in grain yield /fad.Nawar *et.al.* (1992) they found that increasing nitrogen level to 120 kg N/fad led to increased ear length and number of kernels per row. Mosa (2001) found that increasing nitrogen level from 90to 130 kgN/fad increased grain yield ,ear length and number of kernels/row.

This study aimed to determined best doses of nitrogen fertilizer for two Egyptian hybrids under new land at Niger condition.

MATERIALS AND METHODS

Two field experiments were carried out at farm agriculture cooperation between Niger and Egypt (Ferme Agricole Commune Niger - Egypte) under Niger climatic conditions during (1998/1999) and (1999/2000) seasons. Every experiment included six treatments which were the combinations of two Egyptian hybrids (White single cross124 and yellow three way cross 352) and three levels of nitrogen fertilizer (80,100 and 120 kg N /fad) .A split plot design with four replicates was used in both seasons. Crosses were arranged in main plots, nitrogen levels were applied in the sub plots. Each sub plots contained four rows,6 m. long , 80 cm. apart and 25 cm. between hills. The outer rows (1 *st* and 4 *th*) left borders and the rest two rows were used for data. Planting date were first December .The above nitrogen levels were added in two equal parts, half amount before the first irrigation and another half before second irrigation. Data were calculated on grain yield per Faddan as grains containing 15.5% moisture(ard/fad), number of days from planting to 50% silking, plant and ear height (cm) ,number of rows per ear, number of kernels /row and number of kernels/ear. Data were statistically analyzed according to Snedecor and Cochran (1967) .

RESULTS AND DISCUSSION

The combined analysis of variance for grain yield and eight traits over the two years are presented in Table (1). Differences among the two years was highly significant for plant and ear height , ear length and ear diameter. This indicated that these traits was effected by years, while grain yield, silking date, number of rows/ear, number of kernels/row and number of kernels/ear were not affected by years. These results a greed with obtained by El-Shenawy (1995) found that ear length and plant and ear height were significantly affected by years . The mean performance of grain yield ard/fad. and eight traits for two years are presented in Table (2). Mean season (1998/1999) increased than mean season (1999/2000) for all traits except silking date, number of kernels/row and number of kernels/ear , due to differ between two years for environment conditions (temperature and light).

Regarding to Table (1) appear that the mean squares for crosses was significant for all traits except ear height and ear diameter. This indicated that the crosses involved herein differed significantly from each to other for

most traits. These results are in close agreement with El-Shenawy (1995) and Mosa (1996) they concluded that the differences between crosses were highly significant for grain yield, yield components and growth traits.

The interaction between Hybrids x Years (H x Y) was not significant for most study traits except ear height, ear length, ear diameter and number of kernels /ear. El-Shenawy (1995) found that H x Y was significant for ear length and plant height.

Mean performances of grain yield and eight traits for two crosses are shown in table (3). The S.C. 124 tended to produce higher grain yield than T.W.C. 352 and the differences between them amounted to about 1.98 ard/fad in favor of S.C. 124. this trend might be attributed to differences in their ; genetic constitution, adapted in climatic condition as well as superiority of S.C. 124 in ear length, number of kernels /row and number of kernels/ear.

Date in Table (1). It is clear that the mean squares among three nitrogen levels was highly significant for grain yield, ear length, number of kernels/row and number of kernels/ear. While other study traits was not significant. These results indicated that the grain yield, ear length, number of kernels/row and number of kernels/ear were significant affected by nitrogen levels. Galal *et al.*(1979), Abou-Khadrah (1984), Younis *et al.*(1990), Esmail and El-Sheikh (1994), Mosa (1996) and Mosa (2001) revealed that increasing nitrogen levels increased grain yield.

El-Habbak (1996) found that number of rows/ear was not significant affected by nitrogen levels. Mosa (2001) stated that ear length and number of kernels/row significant increased when increased nitrogen levels, also he reported that silking date, plant and ear height were not significant affected by nitrogen levels.

The interaction between nitrogen x years, nitrogen x hybrids and nitrogen x years x hybrids were not significant for the all study traits except ear length for nitrogen x hybrids. This means that the trend obtained by nitrogen levels were not affected by change for years, hybrids and year x hybrids . Mosa (2001) found that the interaction between C x N were not significant for grain yield, ear length, number of rows/ear, number of kernels/row, plant height, ear height and silking date.

The mean performance of grain yield and eight traits over the two years are presented in table (4). The highest mean values for grain yield per faddan, plant and ear height, ear length, ear diameter, number of kernels/row and number of kernels/ear were obtained by applied 120 Kg N/Faddan. This may be due to its effects on growth characters and ear characters. This study recommended with single cross 124 and 120 Kg N/fad nitrogen level for used under Republic Niger Climatic Condition. Generally, Both S.C 124 and T.W.C 352 gave height yielding under Niger condition ; also grain yield increased gradually by increasing nitrogen levels up to 120Kg N /fed .

Table(1):Analysis of variance for grain yield(ard/fad)and eight traits over two years.

s.o.v	D f	Grain yield(ard)	50% silking	Plant Height (cm)	Ear Height (cm)	Ear Length (cm)	Ear diameter	no.of. rows/ear	No.of kernels/ row	No.of kernels/ear
Year(Y)	1	31.01	18.8	11408**	2002**	19**	0.403**	0.48	7.36	77.2
Rep/Y	6	8.786	9.9	102.7	62	0.396	0.048	0.504	7.69	1114.4
Hybrids(H)	1	47.175*	21.3**	867**	126.8	74.5**	0.013	81.12**	1578**	48392*
H xY	1	23.174	3.0	48	396.8*	9.54**	0.120*	2.25	94.1	37502*
Error	6	5.395	2.89	52.6	52.8	0.423	0.013	0.469	29.2	4884.6
Nitrogen(N)	2	92.16**	0.81	164.4	19.8	9.17**	0.032	0.263	136.9*	34040*
N xY	2	2.031	3.94	85.3	21.5	0.006	0.056	0.310	36.1	7980
H x n	2	1.786	1.9	13.6	39.8	10.161*	0.056	0.430	11.08	3941
H xN xY	2	27.328	4.94	48.4	6.06	0.106	0.062	1.263	19.0	10142
Error	24	9.441	2.507	130.8	55.3	0.242	0.027	0.473	20.95	5557
x		25.1	61.9	227.4	113.8	19.14	5.13	14.5	39.6	566.3
c.v %		12.25	2.56	5.03	6.54	2.57	3.22	4.75	11.57	13.16

*,** significant at 0.05 and 0.01 of probability , respectively .

Table (2) Means of grain yield and eight traits at two seasons

Season	Grain yield(ard)	Silking date	Plant Height (cm)	Ear Height (cm)	Ear Length (cm)	Ear Diameter (cm)	No.of rows/ear	No.of kernels/row	No.of kernels/ear
1998/1999	25.9	61.25	243	120	19.8	5.2	14.6	39.1	565
1999/2000	24.3	62.5	212	107	18.5	5.0	14.4	40.0	567
F test	N.S	N.S	**	**	**	**	N.S	N.S	N.S

Table (3): Mean performances of grain yield and eight traits of S.C. 124 and T.W.C 352 over two years

Hybrids	Grain Yield (ard)	Silking date	Plant Height (cm)	Ear Height (cm)	Ear Length (cm)	Ear Diameter (cm)	No.of rows/ear	No.of kernels/row	No.of kernels/ear
S.C124	26.07	62.5	223	115	20.4	5.11	13.2	45.3	598
T.W.C352	24.09	61.2	232	112	17.9	5.14	15.8	33.8	535
F test	**	**	**	N.S	**	N.S	**	**	*

Table (4). Effect of nitrogen levels in grain yield (ard/fad) and eight traits over two years.

Nitrogen kg/fed	Grain yield ard/fad	50% silking	Plant Height (cm)	Ear Height (cm)	Ear Length (cm)	Ear Diameter (cm)	No.of rows/ear	No.of kernels/row	No.of kernels/ear
80	22.6	61.7	224	113	18.4	5.11	14.5	36.6	522
100	25.3	62.1	228	113	19.1	5.08	14.4	39.6	563
120	27.4	61.8	230	115	19.9	5.18	14.6	42.5	614
L.S.D 0.05	2.24	1.15	8.34	5.42	0.35	0.11	0.50	3.34	54.39
0.01	3.03	1.65	11.30	7.35	0.48	0.16	0.68	4.52	73.71

REFERENCES

Abou-Khadrah, S.(1984). Effect of plant densities and nitrogen fertilization on growth and yield of two maize cultivars. J. Agric. Res. Tanta Univ., 10(3): 891-903.

El-Habbak, K.E.(1996). Response of some maize varieties to plant density and nitrogen fertilization. Annals of Agric. Sci., Moshtohor.,34(3): 951-970.

EL-Shenawy, A.A.(1995). Breeding for disease resistance in maize .Ph. D. Thesis, Fac .Agric .Menofiya Univ., Egypt.

Esmail, S.E. and M.H. El-Sheikh (1994). Relationship between the nitrogen fertilizer levels and the yield of some maize varieties supported by response curve. Menofiya J. Agric. Res., 19(1): 139-152.

Galal. A .A.; M .M .Bdel-kerim and F. A. ElShourbagy(1979) .Yield perfomance of some maize varieties and their crosses at three plant densities and tow levels of nitrogen fertilization . Jour. Agric . Res . Tanta Univ . ,5: 32- 44.

Katta, Y.S.; M.A. Bishr and R.M.M. Abdallah (1976). Grain yield of some maize varieties as influenced by population density and nitrogen fertilizer levels. J. agric. Res. Tanta Univ., 2(1): 140-151.

Mohamed, A.M. (1999). Evaluation of some yellow hybrid corn under different levels of plant densities and nitrogen fertilization. M. Sc. Thesis, Fac. of Agric., Kafr El-Sheikh, Tanta Univ., Egypt.

Mosa, H.E. (1996). Studies on corn breeding. M. Sc. Thesis, Fac. Agric., Kafr El-Sheikh, Tanta Univ., Egypt.

Mosa, H. E.(2001). A comparative study of the efficiency of some maize testers for evaluation of white maize inbred lines and their combining ability under different environmental conditions. Ph. D. Thesis, Fac. Agric., Kafer El-Sheikh, Tanta Univ., Egypt.

Nawar, A.A.; M.E. Ibrahim and M.B. Attia (1992). Grain yield, yield components and infestation rates of corn borers and aphid of maize genotypes as influenced by nitrogen fertilization. Egypt J. agron., 17: 41-58.

Nunez, R . and E . Kamprath .(1969) . Relationships between N response ,plant population and row width on growth and yield of corn . Agro . J . 68 (4) : 612-614 .

Younis, M.A.; G.M.A. Mahgoub; E.A.F. Kheder and F.M. El-Demerdash (1990). Response of some maize hybrids to plant density and nitrogen fertilizer. Egypt. J. Appl. Sci., 5(1): 125-135.

Snedecor, G.W. and W. G.Cochran (1976). Statistical methods .6th ed. Iowa state University press ,Ames, Iowa ,U S A

استجابة هجينين من الذرة الشامية المصرية للتسميد الآزوتي في المناطق تحت الاستوائية

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أجريت هذه التجربة بجمهورية النيجر بالمزرعة المشتركة بين جمهورية مصر العربية و جمهورية النيجر وذلك خلا ل موسمي١٩٩٨ / ١٩٩٩ و١٩٩٩/٢٠٠٠. كانت هذه الدراسة لتحديد مدى استجابة هجينين من الذرة الشامية(هجين فردى ١٢٤ و هجين ثلاثى ٣٥٢) لثلاثة مستويات من التسميد الآزوتي (٨٠, ١٠٠, ١٢٠كجم نيتروجين للفدان) وذلك تحت الظروف البيئية للنيجر وتتلخص أهم النتائج المتحصل عليها:

١- الاختلافات بين السنوات كانت معنوية لصفات ارتفاع النبات وارتفاع الكوز وطول وقطر الكوز.
٢- اختلف الهجينين معنويا فى جميع الصفات تحت الدراسة ماعدا ارتفاع الكوز و قطر الكوز تفوق الهجين الفردي١٢٤ فى المحصول بفارق أردبين للفدان عن الهجين الثلاثي ٣٥٢ .
٣- التفاعل بين الهجن و السنوات كان معنويا لصفات طول الكوز و قطر الكوز و عدد الحبوب للكوز.
٤- كانت مستويات التسميد معنوية لصفة محصول الحبوب وطول الكوز وعدد الحبوب للسطر و عدد الحبوب للكوز.
٥- التفاعلات بين النتروجين والسنوات ,النتروجين و الهجن , النتروجين و الهجن و السنوات كانت غير معنوية لمعظم الصفات المدروسة.
٦- كان استخدام مستوى التسميد الآزوتي ١٢٠ كجم للفدان الأفضل في زيادة متوسطات جميع الصفات تحت الدراسة تحت ظروف النيجر. ولذلك توصى الدراسة باستخدام١٢٠ كجم نيتروجين للفدان وذلك تحت ظروف النيجر.