

INFLUENCE OF N, P AND K ON THE SEED YIELD AND YIELD ATTRIBUTES OF C H. 1. MAIZE HYBRID

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Field experiments conducted with the parental lines of CO. H. 1 maize hybrid revealed that (i) the application of significantly influenced the plant height, length of cob, width of cob, number of seeds per row of cob, total number of seeds per cob, seed weight per cob, shelling percentage and seed yield. However, application of P and K significantly increased the seed weight per cob and seed yield only.

Among the main factors for stepping up of production of hybrid seeds, optimum plant population and fertilization are more important (Austin, 1972). Fertilization is the important operation which has to receive special attention while attempting to raise the hybrid seed yield. Though the response of maize raised on a commercial purpose to the application of N, P and K have been reported by earlier workers like Ring Mesawat (1966) little attention has been paid to this aspect in hybrid maize seed production. Therefore, it becomes imperative to undertake studies on the influence of N, P and K on the growth of parental lines and seed yield of CO H. 1 hybrid maize and make available the useful information obtainable from the study to the seed growers.

MATERIALS AND METHODS

A field trial was carried out adopting split-plot design replicated three times during June, 1983 to find out the influence of application of N at 0, 100 and 200 kg/ha and P and K each at 0, 50 and 100 kg/ha in different combinations on the growth, yield and quality of CO H. 1. hybrid seed. Application of N and P was taken as the main plot treatment and K was the sub-plot treatment.

Full doses of P and K and one third of N were applied as basal dressing and the remaining one third was applied on 25th day and the balance on 50th day. The experimental area was surrounded by four rows of male lines as border rows.

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The planting ratio adopted was 4:2 (4 rows of female: 2 rows of male). The two rows of male line were dibbled 3 days after sowing of female line to avoid non-synchronous flowering. The recommended cultivation practices and the plant protection measures were followed throughout the crop growth period.

In five randomly marked plants of the female rows, observation on the height of plant was recorded, when the crop reached harvestable maturity. The crop was harvested on 95th day after sowing when the seed moisture content was varying between 30-35 per cent. The cobs in the male lines were harvested first and removed from the field. Then the cobs in the five randomly marked plants of the female line were harvested individually, labelled and dried to bring down the moisture content around 15 per cent. When the observations on the length of cob, girth of cob, weight of cob, seed weight and shelling percentage were made. After cleaning, the seeds were dried to a uniform moisture content of 10 ± 0.5 per cent and weighed. The seed yield of the plots was converted to hectare and expressed as kilograms.

RESULTS AND DISCUSSION (Table 1, 2, 3, 4, & 5)

NITROGEN

Highly significant differences were observed between levels of nitrogen for plant height, length and

firth of cob, number of seeds per row of cob, total number of seeds per cob, seed weight per cob, cob weight, shelling percentage and seed yield. The maximum height of 12.6 cm was recorded by the application of 200 kg of N/ha, whereas the no nitrogen record only 96.9 cm. Similar results were reported by Rudha and Younis (1978) in maize. Application of 200 kg N/ha increased the maximum length and girth of cob, number of seeds per row of cob, total number of seeds per cob, shelling percentage and seed yield. Whereas weight of cob as well as the seed weight per cob was maximum at 100 kg of N/ha itself. The results of the present investigation are in line with the findings of Singh *et al.* (1966).

PHOSPHORUS

The differences between the level of phosphorus were significant for seed weight per cob and seed yield only. Application of 100 kg P_2O_5 / ha recorded the maximum seed weight per cob. Rathore *et al.*, (1976) in maize reported similar results. Similarly the application of 100 kg of P_2O_5 / ha also recorded the highest seed yield of 2184 kg when compared to 1832 kg/ha recorded under no phosphorus. Nair *et al.*, (1966) in maize recorded increased yield due to increase in application of P_2O_5 . Kaishik and Gupta (1970) reported lack of response of P on seed yield.

Table 1. Influence of application of N, P and K at different levels on plant height (cm) and cob length (cm) in inbred UMI-29

	P ₀			P ₁			P ₂			K ₀	K ₁	K ₂
	K ₀	K ₁	K ₂	K ₀	K ₁	K ₂	K ₀	K ₁	K ₂			
Plant height												
N ₀	91.2	91.4	96.5	106.7	93.6	97.3	95.8	102.2	98.3	97.9	95.7	97.3
N ₁	105.2	107.0	113.0	105.5	122.6	101.2	107.1	111.3	111.6	105.9	113.6	108.9
N ₂	123.1	122.4	128.3	124.1	125.3	121.6	131.9	132.4	130.9	126.4	126.7	126.9
Mean	106.5	106.9	112.6	112.1	113.8	106.7	111.6	115.3	113.6	110.0	112.0	110.9
Length of cob												
N ₀	13.0	14.3	15.4	14.7	14.3	14.5	14.3	15.8	14.1	14.0	14.8	14.6
N ₁	14.1	15.0	14.3	14.1	15.2	14.3	15.3	14.3	14.4	14.5	14.8	14.3
N ₂	17.5	16.5	17.3	16.5	16.4	15.3	16.8	16.1	16.3	16.9	16.4	16.3
Mean	14.8	15.2	15.6	15.1	15.3	14.7	15.4	15.4	14.9	15.1	15.3	15.0

CD (P=0.05)	NP			NK			PK
	N	P	K	N in P	P in N	N in K	
Plant height	5.204**	NS	NS	NS	NS	NS	NS
Cob length	0.51**	NS	NS	NS	NS	NS	NS

Table 2. Influence of application of N, P and K at different levels on cob girth (cm) and total number of seeds per cob in inbred UMI-29

	P ₀			P ₁			P ₂			K ₀	K ₁	K ₂
	K ₀	K ₁	K ₂	K ₀	K ₁	K ₂	K ₀	K ₁	K ₂			
Cob girth												
N ₀	11.0	12.2	10.6	12.7	11.4	11.1	8.6	11.4	10.3	10.7	11.6	10.6
N ₁	11.4	10.5	11.9	10.5	12.2	11.9	11.1	11.7	11.1	11.0	11.4	11.6
N ₂	12.4	11.1	11.7	11.1	12.0	11.1	11.8	12.2	12.5	11.7	11.7	11.7
Mean	11.6	11.2	11.4	11.4	11.8	11.3	10.5	11.7	11.3	11.2	11.6	11.3
Number of seeds per cob												
N ₀	253	291	310	337	304	292	327	293	311	306	296	304
N ₁	317	344	363	339	366	370	356	280	284	337	330	339
N ₂	345	359	356	321	341	343	302	368	366	323	356	355

CD [p=0.05]	NP			NK			PK
	N	P	K	N in P	P in N	N in K	
Cob girth	0.527**	NS	NS	NS	NS	NS	NS
Number of seeds per cob	23.34**	NS	NS	NS	NS	NS	NS

Table 3 Influence of application of N, P and K at different levels on cob weight (g) and seed weight per cob (g) in inbred UMI-29

	P ₀			P ₁			P ₂			K ₀	K ₁	K ₂
	K ₀	K ₁	K ₂	K ₀	K ₁	K ₂	K ₀	K ₁	K ₂			
Cob weight												
N ₀	58.9	74.3	69.2	78	83.7	77.7	104.5	97.7	94.9	80.5	85.2	80.6
N ₁	86.6	85.8	80.0	87	97.7	89.1	88.2	92.3	96.3	87.3	91.9	88.5
N ₂	85.9	79.7	89.2	95.2	86.1	92.7	81.9	94.0	94.4	87.7	86.6	92.1
Mean	77.1	79.9	79.5	86.7	89.2	86.5	91.5	94.7	95.2	85.2	87.9	87.1
Seed weight per cob												
N ₀	66.5	66.6	70.1	69.2	72.3	73.2	69.7	68.2	67.9	68.4	69.0	70.4
N ₁	67.3	69.2	70.8	72.3	71.8	72.8	77.3	76.8	74.8	72.3	72.8	72.8
N ₂	70.1	68.8	69.8	67.1	72.7	73.0	72.1	76.6	77.5	69.7	72.7	73.4
Mean	68.0	68.2	70.2	69.5	72.3	73.0	73.0	73.9	73.4	70.1	71.5	72.2

CD (P=0.05)	N	P	K	NP		NK		PK
				N in P	P in N	N in K	K in N	
Seed weight								
per cob	0.078**	0.079**	0.079**	0.135**	0.221**	0.135**	0.221**	0.317**
Cob weight	4.114*	NS	NS	NS	NS	NS	NS	NS

Table 5 Influence of application of N, P and K at different levels on seed yield in inbred UMI 29

	P ₀			P ₁			P ₂			K ₀	K ₁	K ₂
	K ₀	K ₁	K ₂	K ₀	K ₁	K ₂	K ₀	K ₁	K ₂			
N ₀	1192	1513	1644	1668	1733	1768	1785	1789	1825	1548	1678	1746
N ₁	1846	1877	1904	1950	2003	2029	2085	2074	2139	1960	1985	2024
N ₂	2125	2161	2226	2250	2344	2425	2552	2610	2796	2309	2372	2482
Mean	1721	1850	1924	1956	2026.6	2074	2140.6	2157.6	2253.3	1939	2011.6	2084

CD	NP			NK		PK	
	N	P	K	N in P	P in N	N in K	K in N
[P:0.05]	87.00**	35.00**	NS	NS	NS	NS	NS

Table 4. Influence of application of N, P and K at different levels on the chaffing percentage in mares 1961-29

	N ₁	N ₂	N ₃
Q ₁ A	80.4 (66.60)	77.3 (61.66)	80.6 (64.07)
r	79.6 (63.88)	77.0 (61.75)	83.1 (65.80)
Q ₂	78.0 (62.76)	77.9 (62.09)	79.8 (63.33)
Mean	79.6 (64.41)	77.6 (61.83)	81.2 (64.40)
P ₁ K ₁	78.2 (64.84)	78.9 (62.72)	81.6 (64.75)
K ₁	81.2 (65.57)	81.4 (64.45)	81.0 (64.59)
K ₂	79.9 (66.13)	81.1 (64.06)	78.7 (63.01)
Mean	79.7 (65.51)	80.4 (63.74)	80.4 (64.11)
P ₂ K ₂	78.2 (62.75)	83.7 (66.20)	82.1 (65.01)
K ₃	79.4 (63.30)	83.1 (65.80)	75.3 (62.97)
K ₄	78.3 (63.16)	76.9 (64.44)	78.6 (63.25)
Mean	78.6 (63.16)	81.2 (64.44)	78.6 (63.25)
K ₅	78.9 (62.60)	79.9 (64.05)	81.5 (64.48)
K ₆	80.4 (62.18)	80.7 (64.30)	79.8 (63.51)
K ₇	78.7 (64.51)	78.6 (64.66)	79.0 (64.53)
Mean	79.3 (63.09)	79.7 (64.44)	80.1 (64.19)

CD	NP			NK		PK	
	N	P	K	N in P	P in N	N in K	K in N
	0.448**	NS	NS	0.776**	1.419**	0.776**	1.419**

[P:0.06]

POTASSIUM

The differences obtained between the levels of potassium were significant for seed weight per cob and seed yield only.

Application of 100 kg of k ha increased the seed weight and the seed yield. Highest seed yield of 2084 kg/ha was recorded at 100 kg K₂O/ha. Bojling (1976) in maize reported similar results. In contrast, Dastur *et al.* (1975) in maize reported no response for K.

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