J. Agric. Sci. Mansoura Univ., 29 (10): 5421 - 5429, 2004

EFFECT OF SOIL AND FOLIAR APPLICATION OF POTASSIUM ON YIELD AND YIELD COMPONENTS OF TWO CORN CROSSES.

Amal G. Ahmed and B.B. Mekki
Field Crops Research Department, National Research Center, Dokki, Giza, Egypt.

ABSTRACT

Two field trials were carried out during the summer seasons of 2000 and 2001at Abshawai , El- Fayoum Governorate , Egypt in order to study the response of grains yield and yield components of two corn crosses (Single cross Bashaier-13 and Three way cross-310) to soil potassium fertilization (Zero, 50 , 75 kg K_2O / fad.) and foliar fertilization with 1 liter and 2 liter / fad of liquid solution of potassium 36 % K_2O. The results indicated that the two maize hybrids were significantly different in their growth and some growth parameters and also yield and yield components .Single cross Bashaier-13 gave the highest grains yield and other yield components compared to the Three way cross-310. Application of K fertilization either soil or foliar application increased the plant height, dry weight / plant, leaf area and leaf area index at all growth stages. Grains yield and yield components were also significantly affected due to K fertilization. In both maize hybrids increasing K fertilizer rate either soil (75kg. / fad) or foliar (2L / fad) increased the grains yield and yield components in comparison to other K treatments. Single cross Bashaier-13 recorded the highest grain and straw yields / fad. Such increases estimated by 1.02 and 0.91 ton / fad when K fertilizer was added at high rate of foliar application in the first and second seasons, respectively. However, the treatment Bashaier- 13 + 75 kg. K_2O gave the greatest yield and its components.

Keywords: corn crosses, potassium fertilization, yield components.

INTRODUCTION

Maize *(Zea mays L.)* is a major crop in summer season in Egypt. The reports on the responses of maize to foliar fertilization were inconsistent (Barel and Black, 1979). Among the different methods of k-application, foliar application has attracted considerable attention in recent years become it insures quick and adequate k-supply for plants at yield formation. Montanee (1989) concluded that through k-supply in the soil was adequate, a single foliar k-application during tasseling stage increased yield and sweetness of super sweet corn. Application of potassium nutrition improved grains setting and increased the yield and yield quality of wheat (Beringeer, 1980 and Abou- El- Defan et al, 1999), consequently insurance of adequate supply of potassium during flowering and ear formation of wheat in sandy soil leads to increasing crop and quality of grains. Oosterhuis et al (1990) reported that the plants receiving both soil and foliar k-application or applied k alone gave higher seed yields than untreated plants. Therefore, the purpose of this study is to investigate the effect of methods and a rate of potassium application on yield and yield components of two maize hybrids.

MATERIALS AND METHODS

A field trials were carried out during the two summer seasons of 2000 and 2001 at Abshawai region, El-Fayoum Governorate in order to studying the response of two maize crosses to soil and foliar k-application on yield and yield components. Split-plot design with four replications was used. Maize crosses were arranged in the main plots. The following two maize crosses were obtained from El-Fayoum Agricultural Administration (Extension sector):

1. Single cross Bashaier-13 (SC. Bashaier-13).
2. Three way cross –310 (TWC-310).

Potassium treatments were randomly distributed in the sub plots, soil application was added before sowing and the foliar application was done twice at 35 days plant age and before tasseling stage. The experimental unit area was 10.5 m^2 (3.5 m length and 3.0 m width). The potassium treatments were as follows:

1. Without potassium application (control).
2. Foliar potassium application at a rate of 1 liter / faddan (Foliar-1).
3. Foliar potassium application at a rate of 2 liter / faddan (Foliar-2).
4. Soil potassium application at a rate of 50 kg. K_2O / faddan (Soil-1).
5. Soil potassium application at a rate of 75 kg. K_2O / faddan (Soil-2).

Soil and foliar potassium fertilization supplied from Potassium sulphate (50% K_2O), meanwhile, foliar potassium was applied as commercial aqueous solution of potassium (36% k_2O).

Before sowing a representative surface soil sample (0-30 cm depth) was taken and the physical and chemical characteristics were determined (Table 1).

Table (1): Physical and chemical analysis of the experimental site.

Parameter	Value	Parameter	Value
Particle size distribution			
Coarse sand %	20.0	Organic matter %	0.84
Fine sand %	32.5	Calcium carbonate %	20.9
Silt %	20.0	Available N (ppm)	74.0
Clay %	27.5	Available P (ppm)	4.0
Texture: Sandy- clay-loam		Available K (ppm)	0.10
E.C dSm^{-1} at 25 °C (1:5)	2.9	pH (1:2.5)	8.02
Anions (meq / l) 1:5		Cations (meq / l) 1:5	
CO_3^{--}	-	Ca^{++}	7.50
HCO_3^-	4.04	Mg^{++}	6.64
Cl^-	13.0	Na^+	15.62
SO_4^{--}	13.0	K^+	0.28

Grains of maize hybrids were sown at June 15 in the two successive seasons at 25 cm between hills. After 21 days from sowing, hoeing was practiced and the plants were thinned to secure one plant / hill till harvest.Phosphorus fertilizers were added to soil before sowing at a rate of 200 kg. / faddan of calcium superphosphate (15.5% P_2O_5). Nitrogen fertilizer was added at a rate of 120 kg. N / faddan supplied from ammonium nitrate (33.5 % N) in three equal doses, the 1st at 21 days from sowing, the 2 nd after 3 weeks later and the 3rd before flowering stage

The foliar application of potassium fertilization was applied twice, the 1st at 35 days from sowing and the 2nd before tasseling stage. At 50, 65 , 80

and 95 days stage representative samples were taken to determine some growth and growth parameters as follows:
* Plant height (cm.).
* Dry weight / plant (gm.).
* Leaf area / plant (cm.).
* Leaf area index.

Plants were harvested at 110 days from sowing in the two successive seasons and the following data were estimated:
* Grains yield / plant (gm.)
* Ear length (cm.)
* Ear diameter (cm.)
* Number of rows / ear
* 100- grains weight (gm.)
* Straw yield (ton / fad)
* Biological yield (ton / fad).
* Harvest index.

The obtained data were subjected to statistical analysis of variance according to Snedecor and Chocran (1967), and the combined analysis of the results of two seasons were done according to Steel and Torrie (1960), treatments means were compared using LSD test at 5% of probability.

RESULTS AND DISCUSSION

I. Growth and growth parameters

Data in Table (2) show that maize hybrids were significantly differed in their plant height, dry matter accumulation, leaf area / plant and leaf area index at 50,65,80 and 95 days after planting. The single cross Bashaier- 13 recorded taller plants at different growth stages than Three way cross –310. Such increases in plant height in single cross estimated by 29.85 cm. as average of all growth phases. The superiority of single cross plant in plant height mainly attributed to their genetic constituents. The differences between corn varieties were reported by Kumar et al (2002), they found that the early composite variety produced significantly taller plants compared to other corn hybrids.

Dry matter accumulation was also significantly increased in single cross plants at all growth stages, the increase in dry matter estimated by 9.0 % as average of all growth stages. The increase in dry matter production in single cross plants at different growth stages may be due to the increase in plant height and in photosynthetic surface single cross compared with the Three way cross i.e leaves area / plant and LAI (Table 2).

Data also cleared that in both corn crosses leaf area / plant (LA) was gradually increased up to 80 days after sowing, but at later stage (95 days) the LA was depressed in the two corn hybrids. The reduction in leaf area / plant at later phase mainly due to the reduction in number of leaves an dry weight / plant at later growth phase. However, the single cross Bashaier-13 recorded more LA at different growth stages than other corn cross (TWC-310), and the differences among them were significant. Leaf area index (LAI) was also increased significantly in single and Three way cross at all growth phases, but the single cross recorded the highest values at all growth stages compared to the Three way cross-310. The superiority in LAI of single cross variety attributed to the increase in their leaf area at different growth phases (Table 2).

Data in Table (2) show that, in general increasing K- application rate either foliar or soil application increased the plant height, dry weight and leaf area / plant, as well as, leaf area index at all growth stages. The increase in plant height due to K- fertilizer either foliar or soil application estimated by 18.28 and 33.43% at foliar-I (1L /fad.) and foliar-2 (2L / fad.) and by 11.21, 18.92% at soil-1 (50kg / fad.) and soil-2 (75kg./ fad.) in comparison to untreated plants as average of all growth phases, respectively. However, the plants received K fertilizer at a rate of foliar-2 recorded the highest increment of plant height followed by adding K fertilizer at a rate of soil-2.

Data also show that the dry matter production at different growth phases were significantly increased due to K fertilizer either foliar or soil application. Such increment in dry weight / plant estimated by 36.99, 53.66 gm in foliar-1 and foliar-2 and by 25.62, 37.38 gm in soil-1 and soil-2 compared to the treatment had no K fertilizer as average of all growth stages, respectively. However, the lowest increment in dry matter was recorded when soil K fertilizer was added as soil application at low rate (50 kg. / fad.) compared with 75 kg. K_2O / fad and a rate of 1L / fad compared with 2L / fad as foliar application. Such enhancing effect may be attributed to the influence of K on some physiological functions such as carbohydrate metabolism and formation, breakdown of starch and translocation of sugars. In addition, potassium may control and regulate the activities of various essential elements and activate many enzymes which in turn affects plant growth and yield (Deb et al, 1976 and Zhunusov and Baimaganova, 1976). These results were also supported by Hogh- Jensen and Pedersen (2003).

Leaf area / plant and leaf area index were also significantly affected by K fertilization, further increment in K fertilizer at a rate of foliar and / or soil application resulted in an increase in leaf area and leaf area index at all growth stages. However, addition of K at a rate of foliar or soil-2 recorded the highest values of LA and LAI in comparison to untreated plants and also to other K treatments. Such increases in LA / plant may be attributed to the increase in plant height and dry matter production at the same K treatments (Table 2). These results are in line with those obtained by Ling and Silberbush (2002). However, other studies reported that through K- supply as foliar affected maize by stimulating chlorophyll synthesis and not by increasing leaf area.

Data in Table (3) revealed that the studied growth and growth parameters were significantly affected by the interaction between corn crosses and K fertilization at all growth phases. Plant height and dry matter accumulation recorded the highest increment at 95 days stage when both maize hybrids received either K foliar or soil-2 application. These results were confirmed by the results obtained by Hogh- Jensen and Pedersen (2003), they reported that the increase of dry matter accumulation depends on species under moderate K-soil condition of barley.

Table (2): Effect of corn crosses and potassium fertilization on growth and some growth parameters. (pooled data)

Treatments	Plant height (cm.)				Dry weight (gm. / plant)				Leaf area (cm^2 / \plant)				Leaf area index (LAI)			
	50	65	80	95	50	65	80	95	50	65	80	95	50	65	80	95
V1	155.06	207.84	233.85	293.23	81.68	110.49	253.92	319.99	2253.05	4248.26	6222.30	4358.97	1.25	1.36	3.46	2.42
V2	146.02	178.17	202.36	244.03	70.91	102.10	227.63	305.72	2074.80	3154.64	5168.11	3597.70	1.15	1.75	2.87	2.00
K0	143.20	180.20	202.16	240.46	61.15	97.54	177.90	277.71	2015.69	3537.69	5337.17	3607.45	1.12	1.57	2.92	2.00
K1	148.86	198.82	220.24	271.22	76.87	109.43	258.49	317.48	2218.06	3790.91	5823.22	4078.67	1.23	2.11	3.24	2.28
K2	159.66	211.17	237.78	291.13	92.36	120.75	275.32	340.51	2330.64	3901.49	5949.77	4348.89	1.29	2.12	3.31	2.42
K3	146.22	185.69	212.49	266.48	69.19	99.36	239.34	308.92	2078.88	3582.12	5623.92	3847.04	1.15	1.99	3.12	2.14
K4	154.79	195.17	217.87	273.88	81.92	109.39	252.84	319.67	2176.39	3695.11	5741.94	3987.14	1.21	2.05	3.19	2.22
LSD 5%	2.37	3.07	4.22	2.11	3.07	4.43	5.11	1.73	55.22	40.24	95.01	123.17	0.02	0.02	0.05	0.08

K0: Without K – fertilization. K1: Foliar K – application (1 liter \ fad.). K2: Foliar K – application (2liter / fad.).
K3:Soil application (50 kg. K_2O / fad.). K4:Soil application (75 kg. K_2O / fad.).

Table (3): Effect of potassium fertilization on growth and some growth parameters of two corn crosses (pooled data)

Cultivars	K levels	Plant height (cm.)				Dry weight (gm. / plant)				Leaf area (cm^2 / plant)				Leaf area index (LAI)			
		50	65	80	95	50	65	80	95	50	65	80	95	50	65	80	95
SC. Bashaier 13	K0	148.22	195.30	219.18	257.30	63.47	99.27	183.36	295.16	2027.76	4068.25	6002.11	4001.25	1.43	2.26	3.33	2.22
	K1	153.31	205.42	235.17	298.22	85.11	114.78	277.26	322.42	2362.60	4345.67	6325.22	4472.12	1.31	2.41	3.51	2.48
	K2	165.17	223.11	257.19	316.62	96.54	126.26	298.32	349.46	2493.96	4486.21	6437.42	4732.56	1.39	2.49	3.58	2.63
	K3	150.27	203.18	225.51	292.72	74.26	101.61	248.16	310.72	2134.65	4127.52	6124.12	4231.22	1.19	2.29	3.46	2.35
	K4	158.32	212.19	232.22	301.31	89.53	110.52	262.51	322.51	2246.21	4213.65	6222.63	4352.71	1.25	1.34	3.46	2.42
TWC. 310	K0	138.18	165.09	185.14	223.62	59.13	85.81	172.43	260.26	2003.62	3007.13	4672.23	3213.23	1.11	1.67	2.60	1.79
	K1	144.41	180.21	205.31	244.21	68.62	104.07	239.71	312.53	2073.52	3236.14	5321.22	3725.22	1.15	1.80	2.96	2.07
	K2	154.15	199.23	218.37	265.64	88.18	115.23	252.31	331.56	2167.31	3316.67	5462.11	3965.21	1.20	1.84	3.03	2.26
	K3	142.17	168.19	199.46	240.24	64.11	97.11	230.52	307.12	2023.11	3036.72	5123.72	3462.86	1.12	1.69	2.85	1.37
	K4	151.25	178.15	203.52	246.45	74.51	108.26	243.17	317.13	2106.42	3176.56	5261.25	3621.56	1.17	1.76	2.92	2.01
LSD 5%		2.07	2.01	1.27	1.87	3.46	1.22	2.52	1.18	7.40	32.32	120.37	136.17	0.01	0.02	0.03	0.04

Leaf area / plant and leaf area index were significantly increased at different growth stages due to the interaction between two maize hybrids and potassium treatments. In general, LA and LAI were gradually increased up to 80 days stage, whereas it declined at 95 days stage (Table 3). In both corn crosses application of K fertilization either foliar or soil-2 resulted in an increase of leaf area and leaf area index at 80 and 95 days stages, however the highest leaf area and leaf area index were recorded at 80 days stage with the single cross Bashaier-13 under the soil fertilization at a rate of 75 kg.K_2O / faddan.

II. Yield and yield components

Data in Table (4) revealed that the two maize hybrids were significantly different in their yield and yield components. Single cross Bashaier-13 produced more grains yield / fad. than the Three way cross-310. Also within single and Three way crosses, yield attributes such as ear length and diameter, number of rows and grains / ear, as well as, 100- grain weight. Straw and biological yield and also the harvest index were significantly different in the two maize crosses. Single cross Bashaier-13 was superior in grains yield the other cultivar TWC-310 by 0.33 ton / fad. Such superiority in grains yield of single cross cultivar may be due to the increase of some yield components such as grains / ear and 100- grains weight (Table 4). As these two corn hybrids were grown under the same agronomic practices, it can deduce that variations between cultivars in yield and yield attributes are genetic dependent and dependent on the productivity of the parents of each cultivar. In this connection several investigators reported that maize cultivars are greatly differed in their yield and yield components (Bedeer et al, 1986; Ahmed, 1989; Basha, 1994; Mekki and El- Sayed, 1998 and Kumar et al, 2002).

Table (4):Effect of con crosses and potassium fertilization on yield and yield components of two corn crosses(pooled data).

Treatments	Ear length cm.	Ear diameter cm.	No. of rows / ear	Grains yield / ear gm.	Grains yield (ton / fad.)	100 – grain wt. gm.	Straw yield (ton / fad.)	Biological yield (ton / fad.)	Harvest index
SC. Bashaier 13	26.46	6.02	16.15	142.34	3.13	37.34	6.65	9.78	31.95
TWC. 310	23.81	5.39	15.11	127.36	2.80	30.56	6.38	9.18	30.48
K0	23.26	4.85	14.11	114.38	2.52	26.00	5.99	8.51	29.58
K1	25.20	6.00	15.98	132.21	3.03	33.16	6.60	9.63	31.46
K2	27.63	6.57	16.82	152.55	3.36	40.57	7.03	10.39	32.31
K3	24.26	5.34	15.13	132.22	2.92	32.67	6.93	9.35	31.23
K4	25.35	5.79	16.10	136.89	3.01	35.37	6.59	9.55	31.51
LSD 5%	1.30	0.72	0.88	1.37	0.03	2.06	0.02	0.20	0.10

Data in Table (4) also show that, in general, increasing foliar or soil K application rate significantly increased grains and straw yields, as well as, yield components. Also biological yield and harvest index were significantly increased due to increasing the rate of foliar or soil K application compared to the treatments had no K fertilizer. Using the high rate of foliar K application resulted in an increase of grains yield and yield components compared to other K treatments, except 75 kg. K_2O / fad. treatment. Such increases in straw and grain yields estimated by 0.84 and 1.04 ton / fad in comparison to untreated plants and by 0.44 and 0.10 ton / fad compared to the treatments received low soil K fertilizer (50kg.). However, increasing soil K fertilization up to 75 kg / fad significantly increased the grains yield / fad, grains / ear as well as , number of rows / ear, therefore the other yield components were not significant. The increase in these traits may be attributed to the role of K on some physiological functions such as carbohydrates metabolism and formation, breakdown of starch and translocation of sugars. In addition potassium may control and regulate the activities of various essential elements and activate many enzymes, which in turn affects yield (Zhunusov and Baimaganova, 1976). These results are in agreement with those obtained by Montanee (1989); Suwanerit and Sestopukdee (1989); Bordoli and Mallarino (1998); Abu El- Defan et al (1999) and Borges and Mallarino (2001).

Data in Table (5) revealed that the grains yield and yield components were significantly affected by the interaction between maize hybrids and potassium fertilization, except harvest index (HI), it was not significant. In both maize crosses increasing K foliar application rate resulted in an increase in grains yield and yield components compared to the treatment had no K fertilizer. The single cross Bashaier-13 recorded the highest values of grains, straw and biological yields, as well as, the other yield components. Such increases in grains and straw yields in single cross cultivar estimated by 1.02 and 0.91 ton / fad when K fertilization was added at high rate of foliar application, in the first and second seasons, respectively.

Table (5): Yield and yield components of two corn crosses in response to potassium fertilization (pooled data).

Cultivars	K levels	Ear length cm.	Ear diameter cm.	No. of rows / ear	Grains yield / ear gm.	Grains yield (ton / fad.)	100 – grain wt. gm.	Straw yield (ton / fad.)	Biological yield (ton / fad.)	Harvest index
SC. Bashaier 13	K0	24.30	5.20	14.50	118.15	2.60	28.83	6.24	8.84	29.41
	K1	26.22	6.30	16.75	145.23	3.20	39.12	6.75	9.95	32.16
	K2	29.94	6.92	17.23	169.36	3.62	43.52	7.15	10.77	33.61
	K3	25.90	5.75	15.75	139.43	3.07	36.23	6.51	9.58	32.04
	K4	26.94	5.95	16.50	144.51	3.18	39.01	6.60	9.28	32.52
TWC. 310	K0	22.21	4.50	13.22	110.61	2.43	23.17	5.74	8.17	29.74
	K1	24.12	5.70	15.21	130.18	2.86	31.19	6.44	9.30	30.75
	K2	25.32	6.22	16.40	140.73	3.10	37.62	6.90	10.00	31.00
	K3	23.11	4.92	14.50	126.11	2.77	29.11	6.54	9.11	30.41
	K4	24.25	5.62	15.70	129.16	2.84	31.72	6.47	9.31	30.50
LSD 5%		0.21	0.06	0.43	2.53	0.06	0.11	0.03	0.02	N.S

K0: Without K – fertilization. **K1: Foliar K – application (1 liter / fad.).**
K2: Foliar K – application (2liter / fad.).
K3:Soil application (50 kg. K_2O / fad.). **K4:Soil application (75 kg. K_2O/ fad.).**

REFERENCES

Abu El- Defan, T. A.; H. M. A El- Kholi; M. G. M. Rifaat, and A. E Abd Allah (1999). Effect of soil and foliar application of potassium on yield and mineral content of wheat grains grown in sandy soils. Egyptian J. Agric. Res. 77(2): 513- 522.

Ahmed, M. A. (1989). Effect of nitrogen fertilizer level on yield and its components of some white and yellow maize varieties grown in Egypt. Egyptian J. Argon. 14: 187- 200.

Barel, D. and C. A. Black (1979). Foliar application of P. II. Yield response of corn and soybean with various condensed phosphates and P- N compounds in greenhouse and field experiments. Argon. J. 71: 21- 24.

Basha, H. A. (1994). Effect of nitrogen fertilizer application time on growth and yield of some maize varieties. Zagazig J. Agric. Res. 2: 329- 344.

Bedeer, A.A; S.M. Amer and M.M. Ragheb (1986). Response of some maize varieties to nitrogen fertilization under different environmental conditions. Statis. Comput. Sci. Soc.and Demog. Res.,273- 286.

Beringeer, H. (1980). The role of potassium in yield formation. Proc. Int. Workshop { Role of potassium in crop production}. NRC, Cairo, 7- 12.

Bordoli, J. M. and A. P. Mallarino (1998). Deep and shallow banding of phosphorus and potassium as alternatives to broadcast fertilization for no- till corn. Argon. J. 90: 27-33

Borges, R. and A. P. Mallarino (2001). Deep banding phosphorus and potassium fertilizers for corn managed with ridge tillage. Soil Sci. Soc. Am. J, 65: 376- 384.

Deb, P. L; S. K Das; P. Chabra and S. K. Sanyal (1976). Potassium application for increased phosphorus and zinc availability crop production. Bull. Indian Soc. Sci. 10: 205-12.

Hogh- Jensen, H. and M. B. Pedersen (2003). Morphological plasticity by crop plants and potassium use efficiency. J. of Plant Nutrition 26 (5): 969- 984.

Kumar, N; K.S Thakur and S. Manuja (2002). Effect of fertility levels on promising hybrid maize *(Zea mays)* under rainfed conditions of Himachal Praesh. Indian J. of Argon. 47(4): 526-530.

Ling, F. and M. Silberbush (2002). Response of maize to foliar vs. soil application of nitrogen- phosphorus- potassium fertilizers. J. of Plant Nutrition 25(11): 2333- 2342.

Mekki, B. B. and A. A.El- Sayed (1998). Differential response of some maize hybrids to nitrogen, zinc and manganese foliar spray. J. Agric. Sci. Mansoura Univ. 23(12): 5701- 5712.

Montanee, S. (1989). Foliar application of potassium to increase yield and quality of corn.Ph.D. Thesis, Kasetsart Univ., Bangkok (Thailand) (c.f. Agris Accession No.: 42,7299).

Oosterhuis, D. M.; S. D Wullschelger; R. L. Maples and W. N. Milley (1990). Foliar feeding potassium nitrate in cotton. Better Crops with Plant Food. 74(3): 8- 9.

Snedecor, G. W and G. W. Cochran (1967). Statistical Methods.6th Ed., Iowa State Univ. Press. Iowa, USA.

Steel, R. and J. H Torrie (1960). Principles and Procedures of Statistics. McGrow, Hill Book Comp. Inc. New York, Toronto, London, 107.

Suwanerit, A. and M. Sestopukdee (1989). Stimulating effect of foliar- k fertilizer applied at the appropriate stage of development of maize : a new way to increase yield and improve quality. Plant and Soil 120(1): 111- 124.

Zhunusov, R. S. and C. H. Baimaganova (1976). Application of potassium fertilizer to irrigated maize. Agrokimiya 4: 40.

تأثير الإضافات الأرضية والورقية من البوتاسيوم علي المحصول ومكوناته في صنفين من هجن الذرة الشامية.

آمال جلال أحمد وبهاء الدين بسطاوي مكي

قسم بحوث المحاصيل الحقلية – المركز القومي للبحوث – الدقي – جيزة.

أقيمت تجربتان حقليتان في الموسم الصيفي ٢٠٠٠ ، ٢٠٠١ بمنطقة أبشواى _ محافظة الفيوم لدراسة استجابة صنفين من هجن الذرة الشامية (هجين فردي بشاير ١٣ ، هجين ثلاثي ٣١٠) للتسميد البوتاسى الأرضي والورقي (صفر، ٥٠، ٧٥ كجم بو٢ا،١ لتر، ٢ لتر/ فدان بوتاسيوم سائل ٣٦ % بو٢ا) علي المحصول ومكوناته ويمكن تلخيص أهم النتائج فيما يلي:

أظهرت النتائج وجود فروق معنوية بين صنفي هجن الذرة الشامية في طول النبات ، الوزن الجاف/ نبات ، مساحة الأوراق ودليل مساحة الأوراق وذلك خلال مراحل النمو المختلفة. أيضا كانت هناك فروقا معنوية في محصول الحبوب ، القش والمحصول البيولوجي (طن/ فدان) وكذلك بالنسبة لباقي مكونات المحصول. وقد أظهر الصنف بشاير-١٣ تفوقا ملحوظا في محصول الحبوب ومكونات المحصول الأخرى مقارنة بالصنف هجين ثلاثي -٣١٠ .

أظهرت النتائج أيضا أن إضافة التسميد البوتاسي بالمعدلات العالية سواء كانت أرضية (٧٥كجم/ فدان) أو ورقية(٢لتر/ فدان) أدى إلي زيادة معنوية في طول النبات ، الوزن الجاف/ نبات ، مساحة الأوراق ودليل مساحة الأوراق خلال مراحل النمو المختلفة وكذلك محصول الحبوب ، القش والمحصول البيولوجي وباقي مكونات المحصول. هذا وقد أعطى الصنف هجين فردي بشاير-١٣ أعلى محصول من الحبوب والقش عند إضافة البوتاسيوم إضافة ورقية بمعدل ٢ لتر/ فدان وقدرت الزيادة بـ ١,٠٢ ، ٠,١٩ طن / فدان مقارنة بعدم إضافة البوتاسيوم في كلا الموسمين علي الترتيب ، ومع هذا فإن الإضافة الأرضية بمقدار ٧٥ كجم بو٢ا / فدان إلي الصنف هجين فردي بشاير – ١٣ حقق تفوقا في المحصول ومكوناته مقارنة بجميع المعاملات الأخرى تحت الدراسة.