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NP FERTILIZATION RATES REQUIRED TO MAXIMIZE THE PRODUCTIVITY OF SOME HUNGARIAN AND EGYPTIAN MAIZE HYBRIDS IN SANDY SOIL

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ABSTRACT

The effects of NP fertilization at four rates (60 kg N + 15.5 kg P_2O_5, 60 kg N + 31.0 kg P_2O_5, 120 kg N + 15.5 kg P_2O_5 and 120 kg N +31.0 kg P_2O_5/fad) on productivity of five maize hybrids : four Hungarian hybrids namely, KESKUN 4244 (FAO* 200), KESKUN 4344 (FAO300), KESKUN 4444 (FAO 400) and KESKUN 4515 (FAO 500) and one Egyptian hybrid i.e. SC10 under Egyptian sandy soil conditions were studied at the farm of the International Company for Agricultural Development (ICAD) on Cairo-Alexandria desert road (92 km from Cairo) during summer seasons of 2005 and 2006.

The obtained results indicate highly significant differences among the tested maize hybrids in all studied yield characteristics either in both growing seasons or in the combined analysis. Compared with the other two maize hybrids, each of KESKUN 4444, KESKUN 4515 and SC10 produced the highest grain yield/ fad and this could be attributed to the superiority of KESKUN 4444 in each of ear length, number of rows/ ear, 100-grain weight and grain yield per day (gm /plant); the superiority of KESKUN 4515 in each of number of rows/ ear, number of grains /ear, 100- grain weight and shelling percentage and the superiority of SC10 in each of ear length, number of grains / ear, 100- grain weight and shelling percentage. As expected, data indicated that Egyptian hybrid SC10 gave the highest number of days to maturity followed by KESKUN 4515, 4444, 4344 and 4244 in a descending order.

Maize plants fertilized with 120 kg N + 31.0 kg P_2O_5/fad produced longest ears, highest number of grains /ear and highest grain yield gm/day/plant. Adding 120 kg N + 15.5 kg P_2O_5/fad significantly increased number of rows /ear, number of grains/row, 100-grain weight, grain yield/fad and number of days to maturity. However, shelling percentage was the highest when 60 kg N + 31.0 kg P_2O_5/fad was added.

INTRODUCTION

Maize (*Zea mays*, L.) is the third world wide cultivated crop after wheat and rice (Eagles and Lothrop, 1994). In Egypt, maize is a major cereal crop and it is play an important role in human and animal feeding. Also maize grains are used as a row material for many industrial products. For that reasons, it is occupies the second rank after wheat, as far as, the cultivated area, but the production still does not meet consumption, due to the over-growing population. Therefore, efforts devoted to increase the maize productivity per unit area, through the use of high yielding maize crosses and following the proper agricultural practices such as NP fertilization under newly sandy soils.

Previous studies showed significant differences in yield and yield attributes among maize hybrids. El-Bana (2001) revealed that SC 10 had better yield attributes especially number of grains /row and ear grain weight

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*Food and Agriculture Organization.

compared with TWC 310. Oraby and Sarhan (2002) observed that SC 10 and SC 13 were superior in ear length, shelling percentage as well as grain yield/fad compared with TWC310. However, TWC 310 exhibited the highest grain number /ear, in a reclaimed sandy soil. Similar results were observed by Oraby *et al.* (2005), Hans (2006), Abd El-Maksoud and Sarhan (2008) and Thiraporn *et al.* (2008).

Regarding Hungarian hybrids, Hegyi *et al.* (2005) found varietal differences among twelve Hungarian hybrids in number of ears/plant, 1000-grain weight, number of kernels/row, ear length and shelling percentage. Furthermore, Nagy and Honti (2005) tested eight Hungarian hybrids i.e. Sze Sc 271 (FAO 290), Dama (FAO 300) and Mv 277 (FAO 320) from the very early maturity group; Sze Sc 352 (FAO 340), Hunor (FAO 370) and Norma (FAO 380) from the early maturity group and Marton (FAO 450) and Sze Sc 463 R (FAO 490) from the medium maturity group under 20 different locations and found that the tested maize hybrids significantly differed in yield of grains/ha. Finally Hegyi *et al.* (2007) found significant differences among 24 Hungarian maize hybrids from each of four maturity groups (FAO 200, FAO 300, FAO 400 and FAO 500) in number of kernels/row, ear length, 1000- kernel weight, shelling percentage and kernel yield/ha.

Many investigators concluded that nitrogen fertilizer is important in controlling yield and its components of maize under both clay and sandy soil conditions. Plant height, ear height of maize were significantly increased by increasing nitrogen fertilizer rate up to 140 kg N/ fad. (Ahmed and El-Sheikh, 2002; Oraby and Sarhan, 2002 and Abd El-Maksoud *et al.* 2008). Grain yield/fad, ear length, number of ears/plant, number of grains/row, number of grains/ear, 100-grain weight and ear grain weight, were significantly increased by increasing nitrogen levels up to 150 kg N/ fad. These results were recorded by Abd El-Hamid and Saleem (2001), Oraby and Sarhan (2002), Oraby *et al.* (2005) and Abd El-Maksoud and Sarhan (2008). With Hungarian hybrids, Berzseng and Lap (2005) reported that maize grain yield was highest when N rates were increased up to 160 kg N/ha and then declined when 240 kg N/ha was applied. Moreover, Sarvari (2005) found that the optimal nitrogen fertilizer rate for the maize hybrids was 40-120 kg N/ ha. Finally, Alfoldi *et al.* (2006) stated that grain yield of maize was more responded to nitrogen than phosphorus fertilization in two maize hybrids grown in Hungary.

Not only the nitrogen fertilization, but also the phosphorus fertilization is considered among the important agricultural practices used to increase maize productivity. Iftikhar Saeed *et al.* (2001) reported that maize yield and its components increased significantly when N alone or NP together was applied. Also, they found that grain yield increased from 1350 kg / ha with no fertilization to 4583 kg /ha when 120 kg N + 90 kg P_2O_5/ha were applied. Venkatesh et al. (2002) found that application of 60 kg P_2O_5/ha resulted in a significant increase in maize grain yield. Bukvic *et al.* (2003) found that phosphorus in the rate of 61 kg P_2O_5/ha significantly increased plant height of maize. Moreover, Kogbe and Adediran (2003) reported that maize plants fertilized with 100 kg N + 40 kg P_2O_5/ha gave the highest grain yield. Muhammad *et al.* (2005) concluded that adding 75 kg P_2O_5/ha significantly increased number of grains/ear and 1000-grain weight, while the highest plant height and number of ears/plant were recorded when 100 kg P_2O_5/ha was applied. Finally, they found that the highest number of grains per row was attained with using 50 kg P_2O_5/ha.

This study was conducted in order to determine the response of some Hungarian and Egyptian maize hybrids to various levels of NP fertilization under Egyptian sandy soil conditions.

MATERIALS AND METHODS

Two field experiments were conducted at the farm of the International Company for Agricultural Development (ICAD) on Cairo-Alexandria desert road (92 km from Cairo) during 2005 and 2006 summer seasons. This investigation aimed to study the response of five maize hybrids : four Hungarian hybrids namely, KESKUN 4244 (FAO 200), KESKUN 4344 (FAO300), KESKUN 4444 (FAO 400) and KESKUN 4515 (FAO 500) and one Egyptian hybrid i.e. SC10 to four levels of NP fertilization (60 kg N + 15.5 kg P_2O_5, 60 kg N + 31.0 kg P_2O_5, 120 kg N + 15.5 kg P_2O_5 and 120 kg N + 31.0 kg P_2O_5/fad). The Hungarian hybrids classified to FAO 200, 300, 400 and 500 by FAO system according to the date of maturity for each group, since FAO 200 is very early, FAO 300 is early, FAO 400 is medium and FAO 500 is late in maturity.

Split-plot design with four replicates was used in the two growing seasons. Maize hybrids were allotted in the main plots while, the NP fertilizer levels were arranged at random in the sub-plots. The soil was sandy in texture with a pH average of 7.79 and organic matter of 0.61 %. The average of available N, P and K contents in the two growing seasons for the upper 30 cm soil depth were 13.25, 5.69 and 61.12 ppm, respectively. The plot (16.8 m^2) included 6 rows of 4m long and 70 cm apart. Maize was sown in June 1st in the first and second seasons, in hills 25 cm apart, so the planting density achieved was 24000 plants/fad. Twenty one days after planting, thinning to one plant/hill was done. The preceding crop was wheat in the two growing seasons. Ammonium sulphate (20.5 % N) as a source of nitrogen and calcium super phosphate (15.5 % P_2O_5) as a source of phosphorus were used. Furthermore, a dose of 24 kg K_2O/fad in the form of potassium sulphate (48 % K_2O) was added. These levels were applied at sowing, 7, 14 and 21 days after sowing. Experimental fields were drip irrigated using ground water two times weekly. The other cultural practices of growing maize were followed. Maize was harvested on 25 Aug., 5 Sept., 15 Sept., 25 Sept. and 30 Sept. for KESKUN 4244 (earliest hybrid), KESKUN 4344, KESKUN 4444, KESKUN 4515 and SC 10 (latest hybrid) in both seasons, respectively.

At harvest, the second two inner rows and the two central rows were used for recording yield components and for grain yield determination, respectively. Ten guarded plants from the 2nd and 5th rows in each plot were taken, then ear length (cm), number of rows/ ear, number of grains/row, shelling percentage and 100- grain weight (gm) were recorded. Grain yield (ardab/fad.) at 15.5 % moisture content was determined from the two central rows. Grain yield (gm/plant/day) was calculated from dividing grain yield (gm/fad) by the land area of plant (0.175 m^2). Number of days to maturity was measured in each experimental plot.

The proper statistical analysis of split –plot design was used. Combined analysis was performed for the characters recorded in both seasons. Differences among treatments were judged according to Duncan multiple range test (Duncan, 1955). Means followed by different letters were statistically significant.

RESULTS AND DISCUSSION

Data presented in Tables (1), (2) and (3) indicate the effect of NP fertilization levels on grain yield and its components and other characters of tested maize hybrids in the two growing seasons and their combined analysis.

a- Varietal differences:

In general, all studied characters of grain yield and its attributes were significantly differed among the investigated maize hybrids and this was true in the two growing seasons and their combined. Data in Table (1) revealed that Egyptian SC 10 and KESKUN 4444 (FAO 400) Hungarian hybrids produced the longest ears, whereas KESKUN 4244 (FAO 200) gave the shortest ones and this was true in both two seasons and the combined. However the other two studied hybrids gave the medium values in this respect. Similar results were obtained by Oraby and Sarhan (2002), Oraby *et al.* (2005) and Hegyi *et al.* (2007).

Regarding number of rows/ ear, it can be observed that both KESKUN 4515 and KESKUN 4444 maize hybrids were produced ears with highest number of rows followed by the SC10 whereas, KESKUN 4244 gave the lowest number of rows/ ear, also these results had the same patterns in both growing seasons and the combined.

With respect to number of grains/row, data clearly indicated that SC10 maize hybrid had the most highest number of grains/row in the two growing seasons and the combined followed by KESKUN 4515, while KESKUN 4244 gave the lowest number of grains/row. Also, El-Sheikh (1998) found that SC 10 surpassed TWC 310 and SC 156 in number of kernels /row.

The results presented in Table (2) illustrated that KESKUN 4515 maize hybrid (FAO 500) had the highest number of grains/ear followed by KESKUN 4444 and this was the trend in both seasons and their combined, while KESKUN 4244 always had the lowest number of grains/ear. These results are in agreement with those recorded by Hygyi *et al.* (2007). However, Abd El-Maksoud and Sarhan (2008) found that SC10 gave the lowest number of grains /ear compared with TWC310 maize hybrid. Data show that SC10, KESKUN 4444 and 4515 maize hybrids had the heaviest 100-grain weight in the two growing seasons and in the combined followed by KESKUN 4344 and 4244 in a descending order. Similar results were given by Mowafy (2003), Mohamed (2004) and Hegyi *et al.* (2007).

Table (1): Effect of maize hybrids and NP fertilization levels on ear length (cm), number of rows/ear and number of grains/row in the two growing seasons as well as their combined.

Main effects and interaction	Ear length (cm)			Number of rows/ear			Number of grains/row		
	1st season	2nd season	*Combined*	1st season	2nd season	*Combined*	1st season	2nd season	*Combined*
Maize hybrids (H):									
KESKUN 4244-FAO 200	17.71c	18.66c	18.19c	11.77d	11.89d	11.83d	31.84d	32.15d	31.99d
KESKUN 4344-FAO 300	19.52b	20.40b	19.96b	12.10c	12.25c	12.18c	32.15c	32.65c	32.40c
KESKUN 4444-FAO 400	21.11a	21.98a	21.55a	14.47a	14.67a	14.57a	32.45c	32.85c	32.65c
KESKUN 4515-FAO 500	19.69b	20.53b	20.11b	13.35a	13.95a	14.15a	34.15b	35.00b	34.58b
SC10	21.73a	22.02a	21.70a	12.65b	12.45b	12.55b	35.97a	36.45a	36.21a
F-test	**	*	**	**	**	**	**	**	**
NP-fertilization levels (NP) :									
60 kg N + 15.5 kg P_2O_5/fad.	16.45d	18.75c	17.60d	12.35c	12.41c	12.38b	32.15c	32.45c	32.30b
60 kg N + 31.0 kg P_2O_5/fad.	18.19c	20.34b	19.27c	12.31c	12.65c	12.48b	32.95c	32.85c	32.90b
120 kg N + 15.5 kg P_2O_5/fad.	21.21b	21.63a	21.42b	13.10b	13.95a	13.53a	34.85a	33.99b	34.42a
120 kg N + 31.0 kg P_2O_5/fad.	23.67a	22.15a	22.91a	14.51a	13.16b	13.48a	33.30b	35.99a	34.65a
F-test	**	**	**	*	**	**	*	**	**
Interactions :									
H x NP	**N.S**	*	**N.S.**	**N.S**	*	**N.S**	**N.S**	**N.S**	**N.S**

Table (2): Effect of maize hybrids and NP fertilization levels on number of grains/ear, 100-grain weight (gm) and Shelling (%) in the two growing seasons as well as their combined.

Main effects and interaction	Number of grains/ear			100-grain weight (gm)			Shelling (%)		
	1st season	2nd season	*Combined*	1st season	2nd season	*Combined*	1st season	2nd season	*Combined*
Maize hybrids (H):									
KESKUN 4244-FAO 200	374.76e	382.26e	378.51e	24.94c	26.11c	25.53c	81.15c	79.95c	80.55c
KESKUN 4344-FAO 300	389.02d	399.96d	394.49d	26.15b	28.51b	27.33b	84.40b	83.51b	83.95b
KESKUN 4444-FAO 400	469.55b	478.62b	474.09b	31.75a	32.05a	31.90a	84.33b	83.75b	84.04b
KESKUN 4515-FAO 500	490.05a	495.25a	492.65a	31.61a	31.95a	31.78a	86.15a	85.48a	85.82a
SC10	455.02c	453.80c	454.41c	31.59a	31.75a	31.67a	85.91a	85.35a	85.63a
F-test	**	**	**	**	**	**	**	*	*
NP-fertilization levels (NP):									
60 kg N + 15.5 kg P_2O_5/fad.	405.73d	411.36d	408.55d	26.58c	27.84c	27.21c	83.95b	81.68b	82.82b
60 kg N + 31.0 kg P_2O_5/fad.	427.45c	431.45c	429.45c	28.15b	28.91b	28.53b	84.75a	83.65a	84.20a
120 kg N + 15.5 kg P_2O_5/fad.	437.11b	450.65b	443.88b	30.94a	31.45a	31.20a	84.45a	84.15a	84.30a
120 kg N + 31.0 kg P_2O_5/fad.	472.43a	474.45a	473.44a	31.16a	32.10a	31.63a	84.40a	84.95a	84.68a
F-test	**	**	**	**	**	**	*	**	**
Interactions :									
H x NP	*	N.S	N.S	N.S	*	N.S	N.S	*	N.S

Table (3): Effect of maize hybrids and NP fertilization levels on grain yield (ardab/fad), number of days to maturity and grain yield (gm/day/plant) in the two growing seasons as well as their combined.

Main effects and interaction	Grain yield (ardab/fad)			Number of days to maturity			Grain yield (gm/day/plant)		
	1st season	2nd season	*Combined*	1st season	2nd season	*Combined*	1st season	2nd season	*Combined*
Maize hybrids (H):									
KESKUN 4244-FAO 200	16.54c	17.95c	17.25c	85.11e	85.01e	85.06e	1.134c	1.312c	1.223c
KESKUN 4344-FAO 300	18.69b	19.45b	19.07b	95.07d	94.21d	94.64d	1.157c	1.212d	1.185d
KESKUN 4444-FAO 400	25.88a	26.75a	26.32a	105.38c	103.70c	104.54c	1.431a	1.503a	1.467a
KESKUN 4515-FAO 500	26.11a	26.95a	26.53a	114.64b	113.16b	113.90b	1.329b	1.388b	1.359b
SC10	26.91a	27.29a	27.10a	120.86a	120.69a	120.78a	1.299b	1.319c	1.309b
F-test	**	**	**	**	**	**	*	**	**
NP-fertilization levels (NP):									
60 kg N + 15.5 kg P_2O_5/fad.	20.45c	21.01c	20.73c	101.63c	102.31b	101.97c	1.220c	1.245c	1.233c
60 kg N + 31.0 kg P_2O_5/fad.	22.15b	22.85b	22.50b	103.49b	102.75b	103.12b	1.225c	1.295c	1.260c
120 kg N + 15.5 kg P_2O_5/fad.	24.00a	25.00a	24.50a	104.58b	103.65ab	104.12ab	1.284b	1.338b	1.336b
120 kg N + 31.0 kg P_2O_5/fad.	24.70a	25.85a	25.28a	107.15a	104.71a	105.93a	1.351a	1.459a	1.405a
F-test	**	**	**	**	**	**	**	**	**
Interactions :									
H x NP	**N.S**	**N.S**	**N.S**	*	**N.S**	**N.S**	*	**N.S**	**N.S**

Data of the two seasons and their combined in Table (2) illustrated that SC10 and KESKUN 4515 gave the highest shelling percentage followed by both KESKUN 4344 and 4444 whereas, KESKUN 4244 recorded the lowest shelling percentage. Similar results were found by El-Bana (2001), Mowafy (2003) and Hegyi *et al.* (2007).

Data presented in Table (3) revealed that the SC10, KESKUN 4444 and 4515 produced the highest grain yield/fad followed by KESKUN 4344 and 4244 in a descending order and this was true in the two growing seasons and their combined. This might be due to that the three hybrids had the longest ears, highest number of rows/ear, highest number of grains/row, highest number of grains/ear, heaviest 100-grain weight and highest shelling percentage (Tables 1 and 2). It is worthy to observe that maize hybrids with low grain yield had the lowest values of yield attributes. Again, as mentioned before the Hungarian hybrid KESKUN 4244 (FAO 200) which produced the lowest grain yield also, it had the lowest yield attributes values. Nagy and Honti (2005) and Hegyi *et al.* (2007) gave similar results.

Concerning number of days to maturity, the data in Table (3) showed that Hungarian hybrid KESKUN 4244 (FAO 200) gave the lowest number of days to maturity (the earliest one), while the Egyptian SC10 hybrid gave the highest number of days to maturity (the latest one). Whereas, the other hybrids are lied between the very early and very late aforementioned two hybrids in a descending order. These results are in agreement with those reported by Nagy and Honti (2005) and Hegyi *et al.* (2007).

Data of the combined analysis in Table (3) show that KESKUN 4444 Hungarian maize hybrid plants produced the highest grain yield per plant in a day followed by both KESKUN 4515 and Egyptian SC10, while KESKUN 4344 gave the lowest plant grain yield per a day. Here, it is worthy to observe that although, KESKUN 4444 is a medium in maturity, it was superior in this trait and this may be due to its superiority in most of yield attributes and grain yield /fad.

b- NP fertilization effect:

Data presented in Tables (1), (2) and (3) illustrated that the effect of NP fertilization on maize grain yield and its attributes in both seasons as well as the combined analysis was significant.

The combined analysis of the two growing seasons revealed that ear length, number of grains/ear and grain yield per day of each plant were the highest when 120 kg N + 31.0 kg P_2O_5/fad was applied, while number of rows /ear, number of grains /row, 100- grain weight, grain yield/fad and number of days to maturity were significantly increased when 120 kg N + 15.5 kg P_2O_5/fad was applied. However, shelling percentage significantly responded to 60 kg N + 31.0 kg P_2O_5/fad. Iftikhar Saeed *et al.* (2001) found that maize grain yield increased from 1350 kg/ ha (without fertilizers) to 4583 kg/ha (with adding 120 kg N + 90 kg P_2O_5/ha). Also, Kogbi and Adediran (2003) found that NP fertilization of 100 kg N + 40 kg P_2O_5 / ha gave the highest maize grain yield. It is worthy to note that, for all maize hybrids, the increase in nitrogen level from 60 to 120 kg N/fad was accompanied by a significant increase in all studied characters, except shelling percentage which responded only to adding 60 kg N/ fad. Also, Phosphorus fertilization affected significantly all studied characters, but with different responses. Abd El-Maksoud *et al.* (2008) found that increasing nitrogen fertilizer levels from 50, 80, 110 to 140 kg N/fad increased significantly all grain yield and its attributes of some Egyptian maize hybrids. These findings agreed with the results of Ahmed and El-Sheikh (2002), Mohamed (2004), Berzseng and Lap (2005), Sarvari (2005) and Alfoldi *et al.* (2006).

From the results of this study, it could be concluded that both Hungarian KESKUN 4444, KESKUN 4515 and Egyptian SC10 maize hybrids grown under sandy soil conditions required 120 kg N+ 31.0 kg P_2O_5/fad fertilizer level to produce maximum grain yield/fad. The KESKUN 4244 is the best for early maturity character. However, Hungarian hybrids are still need more studies to confirm its adaptability degree under Egyptian sandy soil conditions.

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معدلات التسميد النيتروجينى والفوسفاتى اللازمة لتعظيم إنتاجية بعض هجن الذرة المجرية والمصرية فى الأراضى الرملية

على عبد الحميد حسان و عبد الغنى عبد المعطى منصور
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تم دراسة تأثير التسميد النيتروجينى والفوسفاتى بأربعة معدلات (٦٠ كجم ن + ١٥,٥ كجم فو٢أ٥ ، ٦٠ كجم ن + ٣١,٠ كجم فو٢أ٥ ، ١٢٠ كجم ن + ١٥,٥ كجم فو٢أ٥ و ١٢٠ كجم ن + ٣١,٠ كجم فو٢أ٥/ فدان) على إنتاجية خمسة أصناف من الذرة : أربعة هجن مجرية هى كشكن ٤٢٤٤ (فاو ٢٠٠) ، كشكن ٤٣٤٤(فاو ٣٠٠) ، كشكن ٤٤٤٤ (فاو ٤٠٠) وكشكن ٤٥١٥ (فاو ٥٠٠) وصنف الذرة المصرى هجين فردى ١٠ تحت ظروف الأراضى الرملية بمزرعة الشركة الدولية للتنمية الزراعية ، طريق القاهرة –الإسكندرية الصحراوى (الكيلو ٩٢) خلال صيف عامى ٢٠٠٥، ٢٠٠٦ . استخدم تصميم القطع المنشقة مرة واحدة من أربعة مكررات فى كلا الموسمين حيث وضعت أصناف الذرة بالقطع الرئيسية بينما وزعت معدلات التسميد النيتروجينى والفوسفاتى عشوائيا على القطع المنشقة.

كانت الاختلافات معنوية جداً بين الهجن تحت الدراسة فى كل صفات المحصول سواء فى كلا الموسمين أو فى التحليل التجميعى لهما. تفوق الهجينين المجريين كشكن ٤٤٤٤، ٤٥١٥ وكذلك الهجين فردى ١٠ فى محصول الحبوب/فدان وكان ذلك راجعا لتفوق الهجين كشكن ٤٤٤٤ فى طول الكوز، عدد السطور/ الكوز، وزن الـ ١٠٠ حبة ومحصول البذور جم/ يوم/ نبات وتفوق الهجين كشكن ٤٥١٥ فى عدد السطور/ الكوز، عدد الحبوب/ الكوز، وزن الـ ١٠٠ حبة ونسبة التفريط وكذلك تفوق الهجين فردى ١٠ فى طول الكوز، عدد الحبوب/ الكوز، وزن الـ ١٠٠ حبة ونسبة التفريط. كما هو متوقع، تشير النتائج إلى أن الهجين فردى ١٠ أكثر تأخراً فى النضج حيث أعطى أكثر عدد للأيام حتى النضج يليه الهجن كشكن ٤٥١٥، ٤٤٤٤، ٤٣٤٤ و ٤٢٤٤ بالترتيب التنازلى.

أعطى معدل التسميد (١٢٠ كجم ن + ٣١,٠ كجم فو٢أ٥/ فدان) أعلى قيم لطول الكوز، عدد الحبوب/ الكوز وكذلك محصول الحبوب جم/ يوم/ نبات. وأدى التسميد بمعدل ١٢٠ كجم ن + ١٥,٥ كجم فو٢أ٥/ فدان إلى زيادة معنوية فى عدد السطور/ الكوز، عدد الحبوب/ السطر، وزن الـ ١٠٠ حبة، محصول الحبوب / فدان وكذلك عدد الأيام إلى النضج. أما التسميد بمعدل ٦٠ كجم ن + ٣١,٠ كجم فو٢أ٥/ فدان فقد أعطى أعلى نسبة تفريط.

توصى الدراسة من خلال النتائج المتحصل عليها بالتسميد بمعدل ١٢٠ كجم ن + ٣١,٠ كجم فو٢أ٥/ فدان وذلك للهجينين المجريين كشكن ٤٤٤٤، ٤٥١٥ والصنف المصرى هجين فردى ١٠ عند الزراعة بأرض رملية وأن أفضل صنف لصفة التبكير فى النضج هو الصنف كشكن ٤٢٤٤. ولا تزال الأصناف المجرية بحاجة لإجراء مزيد من الدراسات لمعرفة مدى أقلمتها تحت ظروف الأراضى الرملية بمصر.