EFFECT OF INTERCROPPING SYSTEMS AND SOWING DATES ON PRODUCTIVITY OF SESAME CROP INTERCROPPED WITH MAIZE UNDER NEWLY PLANTED SANDY SOIL CONDITIONS.

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ABSTRACT

Two field experiments were conducted in newly sandy soil during the two successive summer seasons, 2004 and 2005, at the Experimental Farm of the Faculty of Agriculture, Damanhour, Alexandria, University, at El-Boustan Region, El-Behera Governorate, Egypt. The main objective of this investigation aimed to study the effect of intercropped sesame / maize by two combinations of sowing dates for each crop under three intercropping systems on seed yield and its components of sesame crop.

Data indicated that the same ridge of intercropping system had an insignificant reduction for sesame seed yield, percentage of survived plants, number of fruiting branches / plant and seed yield / plant, compared with the two other studied alternating ridges of intercropping systems. The two intercropping systems of alternating ridges were statistically similar for sesame seed yield and its components.

Intercropping sesame with maize highly significantly reduced sesame seed yield and all studied traits of seed yield components, except for the percentage of survived plants and seed index in the second season, compared with solid planted sesame. The early sowing of solid planted sesame on April 20th significantly surpassed the late sowing on May 20th in seed yield and its components, except for percentage of survived plants in both seasons and seed yield/plant in the first season. Intercropping sesame with maize, by sowing sesame early on April 20th at the same time as maize (S_1M_1) or thirty days before maize sowing (S_1M_2), gave a highly significant seed yield, number of fruiting branches / plant, seed yield / plant, seed index and number of capsules /plant in both seasons. Meanwhile, the differences were significant for percentage of survived plants in the first season, but were insignificant in the second season, compared to the other intercropping sowing sequences; i.e., (S_2M_1) and (S_2M_2).

There was a significant interaction between intercropping systems and sowing times for number of fruiting branches / plant, number of capsules / plant, in both seasons, and seed yield / plant in the first season.

It could be stated that intercropping sesame with maize by using the same ridge system and sowing both crops simultaneously in the same time (20th of April) might give a good sesame seed yield under newly sandy soil conditions.

INTRODUCTION

Production of oil crops in Egypt is insufficient for local consumption (Badran, 2002b; El-Keredy et al., 2004 and Abd-Alla, 2004). The oil production meets about 30% of the local consumption (El-Serogy, 1998) and reached 13.13% in 2003 (El-Sadek et al., 2004). Sesame is one of the most important oil crops, which is sown under sandy soil conditions. So, it is of great importance to increase sesame's area by intercropping with summer crops, which are planted under similar conditions in Egypt. As far as it is known, no previous studies were done in this direction, with the exception of few reports on groundnut (Gabr N.B. et al.,1993 and Badran, 2002 a,b,c).

Both intercropping systems and sowing times for sesame, as intercropped with other crops, appeared to affect sesame production. Badran (2002a) noted that early sowing of sesame on April, either solely or intercropped with groundnut by the same ridge of intercropping system, produced higher seed yield/ha and its components, compared with the same treatments, but sown on May under sandy soil conditions.

Hence, the objective of the present investigation was to study the effect of three different intercropping systems on productivity of sesame, intercropped with maize by two sequences of sowing dates for both crops under newly sandy soil conditions.

MATERIALS AND METHODS

Two field experiments were carried out at the Experimental Farm of El-Boustan, El-Behera Governorate, Faculty of Agriculture, Damanhour, Alexandria University, Egypt, during 2004 and 2005 summer seasons. The main objective was to study the effect of intercropping sesame with the maize cultivar, Three Way Cross 310 (TWC 310), by different three intercropping systems and six sequences of sowing times for both crops on some agronomic traits, seed yield and its components of sesame under newly sandy soil conditions.

The mechanical and chemical analyses for the experimental sites (Black, et al.,1965) are presented in Table (1). The experiments were conducted in a split-plot design, with four replications. Intercropping systems were randomly allocated to the main plots, while the sub- plots were assigned to the sequences of sowing times. The experimental unit consisted of eight ridges, spaced at 60cm and three meters long. Sesame seeds of Giza 32 (G32) cultivar were mixed with sand during sowing for better seed distribution. The studied intercropping systems were: the same ridge, as well as alternate ridges 1:1 and 2:2 between maize and sesame. The sowing times were combinations of April 20th and May 20th sowing dates, for both crops, as fallows:

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1- Sesame and maize were simultaneously sown in the same day, on April 20th (S_1M_1).
2-The two crops were simultaneously sown in the same day, on May 20th (S_2M_2).
3- Early sowing of sesame, on April 20th, was followed by sowing of maize on May 20th (S_1M_2)
4- Early sowing of maize, on April 20th, was followed by sowing of sesame on May 20th ($S_2 M_1$).
5- Solid planting of sesame on April 20th (S_1).
6- - Solid planting of sesame on May 20th (S_2)

Regarding the same ridge intercropping system, sesame seeds were sown on the southern side of the ridge, while, maize grains occupied the northern side. However, in the two other intercropping systems, both crops were sown on both sides of ridges. The plant population / ha of sesame and maize were about 222,222 and 41,666, respectively. The two respective plant populations were maintained through thinning sesame seedlings to two plants/hill, spaced at 15 cm, and maize to one plant /hill, spaced at 40 cm.

Phosphorus fertilizer, in the form of ordinary calcium super phosphate (15.5%P_2O_5), was broadcasted during soil preparation, at a rate of 74 kg P_2O_5 /ha. Both nitrogen fertilizer, as ammonium sulphate (20.6%N), and potassium fertilizer, as potassium sulphate (48%K_2O), were side –dressed at two equal doses at the rates of 216.0 and 115.5kg/ha, respectively. One -half of the amount was added at the first irrigation time and the other half was applied at the second irrigation time in both solid-cropping and simultaneous intercropping. While, for the sequential intercropping treatments, the first application was added at sowing irrigation of the latest planted crop, while, the second dose was applied at the subsequent irrigation. All other cultural practices, as those recommended for El-Boustan Region, were applied for both crops.

At harvest, number of survived plants in the four middle ridges of each sub-plot was counted, then, the percentage of recorded plants was calculated, as follows :

$$\text{Survived plants (\%)} = \frac{\text{Number of plants at harvest}}{\text{Number of plants at thinning}} \times 100$$

Ten surrounded sesame plants were randomly taken from the survived plants of each sub- plot to determine the seed yield components; i.e, number of fruiting branches / plant, number of capsules / plant, seed yield / plant (g) and weight of 1000-seeds (seed index). Seed yield (ton/ha) was estimated from the four middle ridges of each sub-plot.

Two orthogonal comparisons were done for intercropping systems; i.e., C_1 : the same ridge of intercropping system vs. the two alternate ridges of intercropping systems and C_2 : (1:1) vs (2:2) alternating ridges of intercropping systems. Also, three other orthogonal comparisons were done among the six treatments of sequences of sowing times; i.e., solid vs. intercropped sesame plantings ; sowing patterns of sesame (C_3); April vs. May plantings of solid sesame (C_4); and intercropped sesame with maize at different sequences of sowing times (C_5). On the other hand, three other orthogonal comparisons were done for the interactions; i.e., I × (C_3, C_4 and C_5). Data were statistically analyzed, according to Steel and Torrie (1980).

Table (1) : Mechanical and chemical analyses of the experimental field sites at El-Boustan Farm in 2004 and 2005 summer seasons.

Soil properties	Season	
	2004	2005
Sand (%)	88.22	87.81
Silt (%)	08.67	08.09
Clay (%)	03.11	04.10
Soil texture	Sand	Sand
Available N (ppm)	8.63	9.64
Available P (ppm)	3.11	4.13
Available K (ppm)	86.10	88.60
PH	8.10	8.20
Ec (ds/m)	2.91	2.82
Organic matter (%)	0.48	0.56

RESULTS AND DISCUSSION

I. Effect of intercropping systems :

The effect of intercropping systems for (maize / sesame) crops oñ sesame seed yield and its studied components during the two summer seasons (2004 and 2005) are presented in Tables (2 and 3). It is clear from the data that the three studied intercropping systems; i.e., same ridge, (1:1) and (2:2) alternating ridges, were statistically similar in both studied seasons for all studied traits; i.e., seed yield (ton/ha), percentage of survived plants, number of fruiting branches / plant, seed yield / plant, 1000 – seed weight and number of capsules / plant.

Regarding the same ridge vs. alternating ridges of intercropping systems (C_1), data in Table (3) showed that intercropped sesame with maize on the same ridge tended to insignificantly decrease seed yield (ton/ha), percentage of survived plants, number of fruiting branches / plant and seed yield /plant (g) in both seasons.

These results might be ascribed to the high inter-specific competition among maize and sesame plants for the edaphic and climatic environmental resources under the same ridge of intercropping system. Whereas, the distribution of maize plants on alternating ridges, either (1:1) or (2:2) ridges, gave sesame plants better chance to have more light and decrease the effect of maize shading for sesame plants. On the other hand, both 1000-seed weight and number of capsules / plant traits, in both studied seasons, tended to insignificantly decease under alternating ridges of intercropping systems (Table 3). These results might be due to the intra-specific competition among sesame plants under alternating system, compared to the same ridge of intercropping system.

II. Effect of sowing times :

The analysis of variance (Table 2) for (C_3), solid vs. intercropped sesame (sowing patterns) showed that the differences were highly significantly different for all studied traits of sesame in both studied seasons, except for percentage of survived plants in the second season and seed index in the first one.

The seed yield (ton/ha) of intercropped sesame planting was decreased by about 33.82 %, averaged over both seasons, compared with solid planting (Table 3). The reduction in sesame seed yield, under intercropping treatments, might be due to decreasing the studied seed yield components; i.e., percentage of survived plants, number of fruiting branches / plant, seed yield / plant, seed index and number of capsules / plant (Table 3).These results would mainly be due to the shading effect of adjacent maize plants under intercropping culture. The present results are in a general harmony with these obtained by Sayed Galal et al., (1979), Sayed Galal et al., (1983), Badran (1988), El-Mihi et al., (1990), Gabr et al., (1993), Badran (1994), Metwally (1999), Badran (2002a) and Metwally et al., (2005).

Concerning April vs May plantings of solid sesame (C_4), it was observed that the early sowing on April 20th produced significantly higher seed yield per hectare and its components, except for percentage of survived plants, in both seasons, and seed yield/plant in the first season, where, the differences did not reach the level of significance (Table3). Such effect might be attributed to that early sown crop get sufficient time for growth, before the productive phase started. Moreover, these results might, also, be due to the variation in photoperiod and total number of thermal units accumulated between the time of sowing and different physiological maturity (Daynard, 1972). These results are, in general, in agreement with the results obtained by Weiss (1971), Khidir (1980), Shalaby et al., (1981), Chambi (1988), Ali (1994), El-Serogy (1998) and Badran (2002a).

Respecting the different intercropping sowing sequences(C_5), it is quite obvious that early sesame sowing time on April 20th (S_1M_1 and S_1M_2) gave significantly higher means, compared with the two other intercropping sowing sequences; i.e., S_2M_1 and S_2M_2 (Table 3). These findings are in agreement with those obtained by Gabr et al., (1993) and Badran (2002a).

III. (Intercropping systems × sowing dates) interactions effect:

Significant interaction effect between the studied intercropping systems and sowing times of sesame on number of fruiting branches / plant, number of capsules / plant and seed yield / plant are shown in Tables (2, 4, 5 and 6).

Regarding the significant effect of the interaction between intercropping systems and sequences of sowing dates ($I \times C_3$) on the number of fruiting branches / plant, number of capsules / plant and seed yield / plant of sesame data, in both studied seasons, are presented in Table (4).The higher means for the number of fruiting branches/plant, number of capsules /plant and seed yield /plant were obtained by solid planting of sesame on the southern side of the ridges. While, the lower means were recorded by intercropping sesame with maize on the same ridge intercropping system, where sesame plants were sown on the southern side of the ridge and maize on the northern side for both number of fruiting branches/plant and seed yield /plant. But, the lowest mean for the number of capsules /plant was recorded by intercropping sesame with maize under alternating systems.

Data in Table (2) showed that the interaction between intercropping systems and sowing times of solid sesame plantings ($I \times C_4$) had a highly significant effect on number of fruiting branches / plant in the second season. The highest mean for number of fruiting branches/plant (Table 5) was obtained under the same ridge intercropping system at solid planting of sesame early on April 20^{th}. On the other hand, the lowest mean was recorded under (1:1) alternate ridges intercropping system at solid planting of sesame late on May 20^{th}.

Regarding the interaction between the intercropping systems and sequences of sowing times ($I \times C_5$), data in Table (2) showed a highly significant effect on number of fruiting branches / plant and seed yield / plant, in the second season, and number of capsules / plant in both seasons. Intercropping sesame with maize by (1:1) alternate ridges gave the highest number of fruiting branches / plant, being 2.9 for treatment (S_1 M_2) when sowing sesame early on April 20^{th} one month before maize. The lowest means were obtained at intercropping sesame with maize by the same ridge system, being 1.5, 2.8, 17.0 and 19.0 for number of fruiting branches / plant, seed yield / plant and number of capsules / plant, respectively, by (S_2M_1), sowing sesame late on May 20^{th} one month after maize (Table 6). These results might be ascribed to the high density of plant population for maize crop, which, in turn, negatively reflected on such traits; i.e., number of branches / plant , seed yield / plant, but positively affected the number of capsules / plant for sesame crop.

Table 2: Mean squares for the analysis of variance of sesame seed yield (ton/ha) and its components, as affected by intercropping with maize by different intercropping systems and sowing times in 2004 and 2005 summer seasons .

SOV	DF	Traits											
		Seed yield (ton/ha)		Survived plants (%)		No. of fruiting branches/plant		Seed yield / plant (g)		Seed index 1000-seed weight (g)		No. of capsules /plant	
		2004	2005	2004	2005	2004	2005	2004	2005	2004	2005	2004	2005
Replications	3	0.060	0.054	18.67	103.89	0.15	0.32	2.16	4.46	0.40	0.26	18.04	105.81
Intercropping systems (I)	2	0.085	0.058	80.5	74.00	0.28	0.17	0.69	0.047	0.75	0.98	66.89	488.22
The same ridge vs alternate ridges (c_1)	1	0.142	0.094	121.00	1.00	0.44	0.28	0.81	0.002	1.17	1.21	93.44	469.44
The alternate ridges (1:1) vs (2:2),c_2	1	0.028	0.023	40.33	147.00	0.12	0.06	0.56	0.092	0.32	0.75	40.33	507.00
Error "a"	6	0.250	0.087	43.50	61.00	0.44	0.42	3.53	5.23	0.59	0.86	61.70	213.15
Sowing times (S)	5	0.843**	0.802**	197.80**	143.47	6.15**	4.14**	53.81**	42.12**	0.32**	0.77**	964.09**	963.02**
+ c_3	1	3.435**	3.325**	625.00**	256.00	21.47**	13.44**	246.49**	179.11**	0.21	2.25**	2773.78**	3211.11**
+ + c_4	1	0.406**	0.346**	80.67	130.67	3.84**	2.41**	1.71	5.51**	0.33*	0.54**	216.00**	266.67**
+ + + c_5	3	0.125**	0.113**	94.56*	110.22	1.82**	1.61**	6.95**	8.65**	0.36**	0.35**	610.22**	445.78**
I X S	10	0.013	0.006	8.20	15.87	0.07*	0.33**	0.69	2.01**	0.01	0.02	32.49**	112.76**
I X c_3	2	0.028	0.014	30.25	64.00	0.23**	0.94**	2.54	5.80**	0.01	0.003	44.45**	148.03**
I X c_4	2	0.001	0.004	0.67	8.67	0.06	0.29**	0.01	0.17	0.01	0.02	20.00	18.67
I X c_5	6	0.012	0.004	3.36	2.22	0.03	0.15**	0.30	1.35**	0.02	0.03	38.67**	132.36**
Error " B"	45	0.021	0.013	27.18	88.63	0.03	0.03	0.80	0.39	0.06	0.04	7.90	14.21
C.V %		13.29	10.96	6.04	11.43	6.85	6.90	15.83	11.74	7.88	6.39	8.29	11.46

+ c_3 = Solid vs. . intercropped sesame plantings (sowing patterns).
+ + c_4 = April vs. May planting of solid sesame.
+ + + c_5 = Intercropped sesame with maize at different sequences of sowing times.
* and ** : Significant at 5% and 1% levels, respectively .

Table 3 : Means of sesame seed yield (ton/ha) and its components, as affected by different intercropping systems and combination of sowing times for (sesame /maize) intercropping in 2004 and 2005 summer seasons .

Trait	Season	Comparisons among intercropping systems				Comparisons among cropping patterns								Mean
		Same ridge vs. alternate ridges (C_1)		(1:1) Alternate vs. (2:2) Alternate ridges(C_2)		Swing patterns; solid vs. intercropped sesame (C_3)		April vs. May planting of solid sesame (C_4)		Intercropped sesame with maize at two combination of sowing times (C_5)				
		Same ridge	Alternate ridges	(1:1) Alternate ridges	(2:2) Alternate ridges	Solid plantings	Inter-cropping	S_1	S_2	S_1M_1	S_1M_2	S_2M_1	S_2M_2	
Seed yield (ton/ha)	2004	1.03a[1]	1.12 a	1.10 a	1.14 a	1.40 a	0.93 b	1.53 a	1.27 b	1.06a	0.96 b	0.82 d	0.89c	1.09
	2005	0.99 a	1.07 a	1.05 a	1.09 a	1.35 a	0.89 b	1.47 a	1.23 b	1.01 a	0.92 b	.78d	0.85c	1.04
(%) of survived plants	2004	84.50 a	87.25 a	86.33 a	88.17 a	90.50 a	84.25 b	92.33 a	88.67a	87.00 a	84.67 b	80.33c	85.00 b	86.33
	2005	82.17 a	82.42 a	80.67 a	84.17 a	85.00 a	81.00a	87.33 a	82.67a	84.33a	81.00a	77.00a	81.67a	82.33
No. of fruiting branches/plant	2004	2.42 a	2.58 a	2.53 a	2.63 a	3.30 a	2.14 b	3.70 a	2.90 b	2.20	2.67	1.80	1.90	2.53
	2005	2.42 a	2.55 a	2.58 a	2.52 a	3.12 a	2.20 b	3.43 a	2.80 b	2.23	2.70	1.87	2.00	2.51
Seed yield /plant (g)	2004	5.50 a	5.73 a	5.83 a	5.62 a	8.27 a	4.34 b	8.53 a	8.00a	4.77a	5.17a	3.50 b	3.93 b	5.65
	2005	5.32 a	5.33 a	5.38 a	5.28 a	7.55 a	4.21 b	8.03 a	7.08 b	4.50	5.23	3.27	3.83	5.32
1000 – seed weight (g)	2004	3.29 a	3.02 a	3.10 a	2.94 a	3.18 a	3.07a	3.30 a	3.07 b	3.20a	3.24a	2.90 b	2.94 b	3.11
	2005	3.32 a	3.04 a	3.16 a	2.92 a	3.38 a	3.01 b	3.53 a	3.23 b	3.03b	3.23a	2.80c	2.93 bc	3.13
No. of capsules /plant	2004	35.50 a	33.08 a	34.00 a	32.16 a	42.67 a	29.50 b	45.67 a	39.67 b	37.00	32.67	20.33	28.00	33.89
	2005	36.50 a	31.08 a	34.33 a	27.83 a	42.33 a	28.17 b	45.67 a	39.00 b	36.33	29.00	22.33	25.00	32.89

(1) Means followed by the same letter (s) , within each row for each comparison, are not significantly different at 0.05 level .

Table 4 : Means of number of fruiting branches / plant., number of capsules / plant and seed yield / plant, as affected by the interaction between intercropping systems and sowing patterns of sesame planting ($I \times C_3$) in 2004 and 2005 summer seasons.

Trait	Season	Sowing patterns	Intercropping systems		Mean
			Same ridge	Alternating ridges	
No. of fruiting branches / plant	2004	Solid	3.35[1] a	3.28 b	3.30
		Intercropping	1.95d	2.24 c	2.14
		Mean	2.42	2.58	2.53
	2005	Solid	3.35 a	3.00 b	3.12
		Intercropping	1.95 d	2.33 c	2.20
		Mean	2.42	2.55	2.51
No. of capsules / plant	2004	Solid	46.50 a	40.75 b	42.67
		Intercropping	30.00 c	29.25 c	29.50
		Mean	35.50	33.08	33.89
	2005	Solid	50.00 a	38.50 b	42.33
		Intercropping	29.75 c	27.38 c	28.17
		Mean	36.50	31.08	32.89
Seed yield /plant (g)	2005	Solid	8.35 a	7.16 b	7.55
		Intercropping	3.80 c	4.41 c	4.21
		Mean	5.32	5.33	5.32

(1) Means followed by the same letter, within each season, for each trait, are not significantly different at 0.05 level.

Table 5 : Mean number of fruiting branches/ sesame plant, as affected by the intercropping systems and sowing times of solid sesame plantings ($I \times C_4$) in 2005 summer season.

Intercropping systems	Sowing times of solid sesame plantings		Mean
	April 20th	May 20th	
Same ridge intercropping system	3.80	2.90	3.35
(1:1) Alternate intercropping system	3.50	2.70	3.10
(2:2) Alternate intercropping system	3.00	2.80	2.90
Mean	3.43	2.80	3.12
L.S.D $_{(0.05)}$ for interaction	0.25		—

Table (6) : Means of sesame traits as affect by the interaction between the intercropping systems and sequences of sowing times (I×C$_5$) in 2004 and 2005 summer seasons.

Intercropping systems	Sequences of sowing times	Traits			
		No. of fruiting branches /plant	Seed yield / plant	No. of capsules / plant	
		2005 season	2005 season	2004 season	2005 season
The same ridge	S_1M_1	1.90	4.20	40.00	45.00
	S_1M_2	2.60	4.90	35.00	30.00
	S_2M_1	1.50	2.80	17.00	19.00
	S_2M_2	1.80	3.30	28.00	25.00
(1 : 1) Alternate ridges	S_1M_1	2.30	4.50	37.00	35.00
	S_1M_2	2.90	5.20	33.00	35.00
	S_2M_1	1.90	3.30	20.00	22.00
	S_2M_2	2.20	3.70	30.00	30.00
(2:2) Alternate ridges	S_1M_1	2.50	4.80	34.00	29.00
	S_1M_2	2.60	5.60	30.00	22.00
	S_2M_1	2.20	3.70	24.00	26.00
	S_2M_2	2.00	4.50	26.00	20.00
$LSD_{(0.05)}$		0.25	0.89	4.01	5.38

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الملخص العربي

تأثير أنظمة التحميل ومواعيد الزراعة على إنتاجية محصول السمسم حال تحميله مع الذرة الشامية في الأراضي الرملية حديثة الاستزراع

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أجريت تجربتان حقليتان خلال صيف موسمي٢٠٠٤، ٢٠٠٥ م بمحطة البحوث والتجارب الزراعية لكلية الزراعة بدمنهور – جامعة الإسكندرية – بمنطقة البستان – محافظة البحيرة– مصر بهدف دراسة تأثير ثلاثة نظم مختلفة من تحميل السمسم على الذرة الشامية عند زراعتهما معا في توافيق من ميعادي الزراعة لكلا المحصولين وأثر ذلك على إنتاجية المحصول البذري ومكوناته لمحصول السمسم.

أوضحت النتائج أن زراعة السمسم والذرة الشامية محملان معا على نفس الخطوط (جانب من الخط لكل محصول) قد أدت إلى نقص غير معنوي في المحصول البذري و النسبة المئوية للنباتات المتبقية عند الحصاد وعدد الأفرع الثمرية بالنبات ومحصول البذور بالنبات وذلك مقارنة بنظامي التحميل على خطوط متبادلة (١:١، ٢:٢)، كما أن نظامي التحميل على خطوط متبادلة (١:١، ٢:٢)، قد أعطيا نتائج متساوية إحصائيا وذلك لمحصول البذور ومكوناته.

أدى تحميل السمسم على الذرة الشامية إلى إحداث نقص عالي المعنوية في المحصول البذري للسمسم ومكوناته التي تم دراستها – باستثناء صفتي نسبة النباتات المتبقية عند الحصاد و معامل البذرة في الموسم الثاني – وذلك مقارنة بالزراعة المنفردة. كما أن التبكير بزراعة السمسم منفردا في (٢٠ أبريل) قد تفوقت معنويا على تأخير زراعته منفردا في (٢٠ مايو) وذلك بالنسبة للمحصول البذري ومكوناته، باستثناء صفتي النسبة المئوية لعدد النباتات المتبقية عند الحصاد(في الموسمين) ومحصول البذور بالنبات (في الموسم الأول)، كما أن معاملتي تحميل السمسم على الذرة الشامية بزراعتهما معا مبكرا في نفس التوقيت في٢٠ أبريل(S_1M_1) أو زراعة الذرة الشامية متأخرا عن السمسم بشهر(S_1M_2) قد تفوقتا معنويا في صفات المحصول البذري بالهكتار وعدد الأفرع الثمرية بالنبات و معامل البذرة وعدد الكبسولات بالنبات (في كلا موسمي الدراسة)، بينما لم تصل الفروق إلى مستوى المعنوية لصفة النسبة المئوية لعدد النباتات المتبقية عند الحصاد(في الموسم الثاني) وذلك عند مقارنتهما بمعاملتي التحميل (S_2M_1) و (S_2M_2).

كان التفاعل معنويا بين نظم التحميل ومواعيد الزراعة وذلك بالنسبة لصفتي عدد الأفرع الثمرية بالنبات وعدد الكبسولات بالنبات في كلا موسمي الدراسة، بينما كان هذا التفاعل معنويا في الموسم الأول لصفة محصول النبات الفردي.

من نتائج هذه الدراسة يمكن توضيح أهمية زراعة محصولي السمسم والذرة الشامية محملين معا على نفس الخطوط (جانب من الخط لكل محصول) على أن تتم زراعة المحصولين معا في نفس التوقيت وذلك خلال النصف الأخير من شهر أبريل تحت ظروف الأراضي الرملية حديثة الاستزراع وذلك لضمان الحصول على محصول بذري جيد من نبات السمسم.