STUDIES ON THE EFFECT OF INTERCROPPING SYSTEMS OF NEW COWPEA GENOTYPES WITH COTTON

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ABSTRACT

This work was carried out at Disuq District, Kafr El-Sheikh governorate during two successive summer seasons of 2001 and 2002. It aimed to study the effect of intercropping system between two new genotypes of cowpea (Kaha-1 cv. and A7 line) and cotton (Giza 86 cultivar) on the growth, yield and yield components as well as the economic value. Intercropping system between cowpea and cotton plants were as follows: Cowpea on one side and cotton on the other side of row (65 cm), one row of cowpea plants in middle ridge of cotton (130 cm) and two rows of cowpea plants in middle ridge of cotton (130 cm). There were three control treatments for pure stand planting for cotton and each genotype of cowpea.

The results could be summarized as follows:

1. Intercropping the cowpea with cotton increased cowpea plant height and stem length, but caused a depression in the number of leaves, branches, poduncle pods and leaf area per plant compared to cowpea sole cropping. The highest seed yield of intercropped cowpea was obtained from cowpea plants grown on one side and cotton on the other side which gave 787.6 and 737.5 kg/fed. in the two seasons, respectively. The lowest seed yield of cowpea was obtained when cowpea was planted on one row in middle ridge of cotton which gave 466.8 and 456.4 kg/fed. in the two seasons, respectively. Under intercropping system, A7 line was superior than Kaha-1 cv in seed yield, which gave 885.5 and 868.0 kg/fed. in both seasons, respectively.
2. The seed cotton yield k/fed. was decreased significantly by intercropping compared to cotton sole cropping. The reduction in seed cotton yield due to the three intercropping systems with cowpea was 7.6, 4.6 and 5.6% in the first season and 7.0, 4.3 and 7.8% in the second season, respectively. However,

Intercropping the cowpea with cotton did not affect cotton studied traits i.e., plant height, (cm) boll weight (g), seed index (g), lint percentage (%) micronaire reading, presly index, 2.5% and 50% (span length) and length uniformity ratio.

Intercropping cowpea with studied cotton cultivar (Giza 86) where cowpea grew in one side and cotton in the other side or two rows of cowpea in middle ridge of cotton gave high or economic values. These two intercropping systems exceeded the solid planting of cotton by 27 and 21% in the first season and by 29.7 and 20.7% in the second season, respectively.

INTRODUCTION

Cowpea [*Vigna unguiculata* (L.) Walp] is one of the important vegetable legumes due to its high protein content, heat tolerant, low fertilizer requirements and it can grow easily in the new reclaimed lands. The new cowpea cultivar Kaha-1 is short growth period, an erect and determinate growth habit and resistance to lodging (Metwally *et al.*, 1998 and Masoud, 2002) and A7 line is similar to Kaha-1 in these characters. These characteristics gave the chance for intercropping with other crops (Fig. 1).

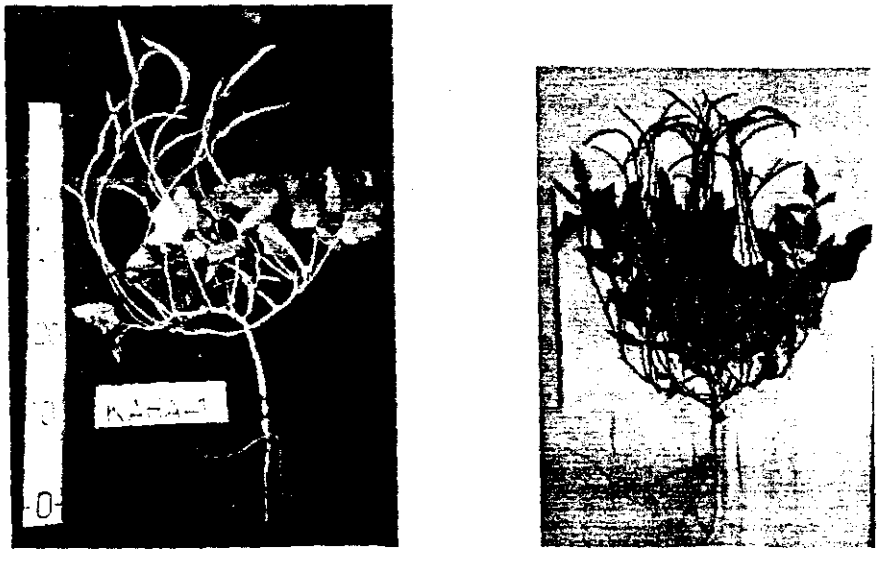

Fig. (1): Plants from Kaha-1 cv. (left) and A7 line (right) showing determinate, growth habit.

Intercropping or growing two or more crops stimulaneously on the same area, is a farming practice that has recently received attention for agronomists as a mean of improving land use efficiency. Many investigators found that the yield advantage was produced, land usage and net profit from unit area were increased by intercropping cotton with other crops, i.e. groundnut (Swamy and Hosmani, 1978), Kenaf (El-Akaad and Momtaz, 1980), Onion (El-Habbak, 1980) and Soybean (Abdel-Aal, 1983).

Therefore, cowpea plants when intercropped with cotton plants in a certain system of intercropping may be more profitable for growers. The competition between plants could be regulated by many practices as plant population and intercropping systems.

Thus, the main objective of this investigation was to study the effect of intercropping cowpea with cotton on the growth, yield and yield components of the two crops as well as land use efficiency in Kafr El-Sheikh Governorate and similar regions.

MATERIALS AND METHODS

This work was carried out at Disuq district during two growing seasons of 2001 and 2002.The experiment in each season included two genotypes of cowpea (Kaha-1 and A7 line) with one cultivar of cotton (Giza 86) which gave the combination of three intercropping systems between cowpea and cotton plants in addition to three control treatments of a pure stand planting of each crop and genotype. The treatments were arranged in the two growing seasons as a split plot in a randomized complete blocks design with four replications. The area of each experimental unit (sub-plot) was 13 m^2.

In this study, cotton was planted as common, on 65 cm wide rows or 130 cm wide ridges at 25 cm spacing between hills with two plants per hill on the northern side of the rows or on both ridge sides. Cowpea plants were allowed to grow with cotton in three intercropping systems: (1) Planting cowpea on one side of the row (southern side) with two plants/hill, 15 cm apart and cotton on the other side (northern side) of the same row with two plants/hill, 25 cm. apart. This provides 150% total population (50% for cowpea and 100% for cotton). (2) One row of cowpea plants in the middle of cotton ridge with two plants/hill, 15 cm apart and cotton on both

sides of ridge, two plants/hill, 25 cm apart. This provides 125% total population (25% for cowpea and 100% for cotton). (3) Two rows of cowpea plants in the middle of cotton ridge with two plants/hill, 15 cm. a part and cotton on both ridge sides, two plants/hill, 25 cm. apart. This provides 150% total population (50% for cowpea and 100% for cotton).

In addition, three control treatments were sown, i.e., 1- Solid planting of cotton on one side of row, two plants/hill, 25 cm apart (100% cotton population), 2- solid planting of two cowpea genotypes on both sides of row, two plants/hill, 15 cm. apart (100% cowpea population).

Seeds of cotton (Giza 86 cultivar) were planted on April 12th in both seasons, while cowpea (Kaha-1 cv and A7 line) planted on 20th April in two seasons. The common cultural practices were done whenever needed and as usually conducted by commercial growers. However, the common fertilizer rates for cotton plants only were added for both intercropped crops.

At flowering, the following data were recorded:

A. Cowpea plants: Stem length (cm), plant height (cm), number of leaves, number of branches, leaf area (dm^2) and number of poduncle pods/plant. At harvest, the following data were recorded, number of pods/plant, pod length (cm), number of seeds/pod, seed index (g/100 seeds) and seed yield (kg/fed.).

B. Cotton plant: At harvest, the following data were recorded plant height (cm), boll weight (g), seed index (g/100 seeds), lint percentage (%), presly index, mic. red., L.U.R., S.L. 2.5%, S.L. 50% and cotton seed yield (kentar/fed.).

These studied cotton characters were: Seed cotton yield (S.C.Y. K/f) = estimated as the weight of seed cotton yield in kentar per feddan.

- Boll weight (B.W/g.) = The average boll weight in grams of 50 sound bolls picked at random from each plot.
- Lint percentage (L %) = The weight of lint obtained from a seed cotton sample = $\frac{\text{Weight of lint in 50 bolls}}{\text{Weight of seed cotton yield in 50 bolls}} \times 100$
- Seed index (S.I.) = The average weight of 100 seeds in grams.

- 2.5% and 50% span length was measured by means of the digital fibrograph 530, according to the standard methods of (A.S.T.M.D. 1447.67).
- The length uniformity ratio calculated (L.U.R.) = $\frac{\text{50\% span length}}{\text{2.5\% span length}} \times 100$
- Micronaire reading was carried out using micronaire apparatus (A.S.T.M.D. 1448).
- Fiber strength, measured by presly strength tester at zero gauge length expressed as presly index (P.I.) according to (ASTM, D. 1445 and D 3818-79).

Economic value of combined intercrop yields:

It was calculated by expressing the yield of the unit land area in monotary terms. This does, of course, put different crops on a comparable basis. The sale prices used in computing cash values were 3.0 and 3.5 L.E., for each kg of cowpea seed yield and seed cotton yield, respectively.

The data were statistically analysed according to the procedures outlined by Snedecor and Cochran (1967). The mean values were compared at the 5% level of significance by the Duncan's multiple range test (Duncan, 1955). The values within each column followed by the same alphabetical letter(s) are not statistically different.

RESULTS AND DISCUSSION

1. Effect of intercropping system on vegetative traits of cowpea plants:

Data presented in Table (1) show generally that solid cowpea plants (I_0) gave the lowest values of stem length and plant height in both seasons, while the tallest cowpea plants were obtained from intercropping systems I_1, I_2 and I_3. This may be due to that cotton, plants caused some shading on cowpea plants and competition between them on light. On the other hand, number of leaves, branches and poduncle pods and leaf area per plant were decreased by intercropping systems when compared to solid plants. This may be due to the higher number of plants (cowpea and cotton) per feddan that caused higher inter and intra competition between

Table (1): Effect of intercropping system and cowpea genotypes on vegetative traits of cowpea plants in 2001 and 2002 seasons.

Treatments	2001season						2002 season					
	Stem length (cm)	Plant height (cm)	No. of leaves/ plant	No. of branches/ plant	Leaves area/plant (dm^2)	No. of poduncle pods/plant	Stem length (cm)	Plant height (cm)	No. of leaves/ plant	No. of branches/ plant	Leaves area/plant (dm^2)	No. of poduncle pods/plant
1- Intercropping system												
Solid cowpea I_0	21.3 b	44.4	21.7 a	2.9 a	1362.7 a	10.4 a	20.2 c	40.5 c	19.5 a	2.7 a	1274.4 a	12.4 a
Cowpea in one side and cotton in other side I_1	26.1 a	52.2	18.9 b	2.6 b	1046.7 c	7.7 cd	22.9 bc	47.1 ab	15.3 b	2.7 a	997.3 c	7.1 c
One row of cowpea plants in middle ridge of cotton I_2	28.3 a	49.1	17.9 b	2.4 b	1208.4 b	7.9 bc	28.6 a	50.2 a	14.0 b	2.2 a	1032.9 b	7.3 bc
Two rows of cowpea plants in middle ridge of cotton I_3	27.3 a	47.1	13.4 c	1.8 b	878.4 d	6.5 d	25.6 b	44.6 b	12.6 c	1.7 b	822.4 d	5.9 d
F-test	*	N.S	*	*	*	*	*	*	*	*	*	*
2- Cowpea genotypes												
1- Kaha -1	23.9 b	46.8	18.4	2.8 a	1215.6 a	8.9 a	24.1	43.3 b	16.7 a	2.7 a	1195.6 a	7.9 a
2- A7 line	27.6 a	49.6	17.5	2.1 b	1032.2 b	7.3 b	25.6	47.9 a	13.9 b	1.9 b	904.6 b	6.9 b
F-test	*	N.S	N.S	*	*	*	N.S	*	*	*	*	*

Values having the same alphabetical letter within each column are not significantly different at the 0.05 level, according to Duncan's Multiple Range Test.

plants. In both seasons, the data had a similar trend and the differences were significant. In this connection, Kassem (1991) found that growing cucumber plants on the ridges of cowpea depressed the growth parameters of cowpea such as number of branches and leaves/plant.

Also, these results are harmony with the results of Gawish *et al.* (1992) and El-Waraky (1996).

2. Effect of cowpea genotypes on vegetative traits of cowpea plants:

Data presented in Table (1) show that vegetative traits were affected with cowpea genotypes. The tallest cowpea plants were obtained from A7 line plants in both seasons. On the other hand, Kaha-1 cultivar gave the highest number of leaves, branches and poduncle pods and leaf area per plant in both seasons and the differences were significant.

3. Effect of intercropping system-cowpea genotypes interaction on vegetative traits of cowpea plants:

Data presented in Table (2) show that, all vegetative traits under study, i.e., stem length, plant height and number of leaves, branches, and poduncle pods per plant were not significantly affected by the interaction between intercropping system and cowpea genotypes in both seasons. On the other hand, the interaction had a significant effect on leaf area per plant in both seasons. The highest leaf area per plant was resulted form solid cowpea plants (Kaha-1 cv. and A7 line), whereas, the lowest one was obtained from cowpea plants (Kaha-1 cv. and A7 line) that planted on two rows in middle ridge of cotton in both seasons (I_3).

4. Effect of intercropping system on seed yield and its components of cowpea:

Data in Table (3) indicate that, in both seasons, the highest seed yield was obtained from the plants grown on one side and cotton in other side (I_1) which gave 787.6 and 737.5 kg/fed. in the two seasons, respectively. This increase in seed yield per feddan related to the increase in total number of plants per unit arrangement of cowpea with cotton in both sides of row.

Table (2): Effect of intercropping system-cowpea genotypes interaction on vegetative traits of cowpea plants in 2001 and 2002 seasons.

Cowpea genotypes	Intercropping system	2001 season						2002 season					
		Stem length (cm)	Plant height (cm)	No. of leaves/ plant	No. of branches/ plant	Leaves area/plant (dm^2)	No. of poduncle pods/plant	Stem length (cm)	Plant height (cm)	No. of leaves/ plant	No. of branches/ plant	Leaves area/plant (dm^2)	No. of poduncle pods/plant
Kaha-1 cv.	Solid crop I_0	17.9	40.3	22.4	3.3	1494.79 a	12.0	17.0 c	40.6	21.9	3.3	1407.53 a	10.4
	Cowpea in one side and cotton in other side I_1	23.9	49.4	17.1	3.2	1176.28 d	8.5	23.4 b	49.3	16.0	3.1	1175.39 c	7.5
	One row of cowpea plants in middle ridge of cotton I_2	27.1	51.4	16.9	2.7	1327.59 c	8.7	28.8 a	52.5	15.6	2.6	1246.51 b	8.0
	Two rows of cowpea in middle ridge of cotton I_3	26.8	46.2	13.1	2.0	976.17 f	6.4	27.1 a	46.5	13.3	1.8	953.08 f	5.9
A7 line	Solid crop I_0	24.8	48.6	21.0	2.6	1343.04 b	8.8	23.3 b	40.5	17.1	2.0	1141.31 d	8.5
	Cowpea in one side and cotton in other side I_1	28.2	55.1	20.7	2.1	917.14 g	7.0	22.3 b	45.0	14.5	2.3	819.19 g	6.8
	One row of cowpea in middle ridge of cotton I_2	29.6	46.9	18.8	2.1	1089.16 e	7.0	28.5 a	47.8	12.5	1.8	966.32 e	6.7
	Two rows of cowpea plants in middle ridge of cotton I_3	27.8	47.9	13.6	1.5	780.66 h	6.6	24.1 b	32.5	11.8	1.7	691.60 h	6.0
	F-test	N.S	N.S	N.S	N.S	*	N.S	*	N.S	N.S	N.S	*	N.S

Values having the same alphabetical letter within each column are not significantly different at the 0.05 level, according to Duncan's Multiple Range Test.

Table (3): Effect of intercropping system-cowpea genotypes interaction on seed yield and its components of cowpea plants in 2001 and 2002 seasons.

Treatments	2001 season					2002 season				
	Seed yield kg/fed.	No. of pods/plant	Pod length (cm)	No. of seeds/pod	Seed index g/100 seeds	Seed yield kg/fed.	No. of pods/plant	Pod length (cm)	No. of seeds/pod	Seed index g/100 seeds
1- Intercropping system:										
Solid cowpea I_0	1601.1 a	14.9 a	13.1 a	10.9	16.99 a	1571.1 a	14.2 a	13.0 a	10.7	16.7
Cowpea in one side and cotton in other side I_1	787.6 b	10.1 c	12.9 a	10.9	16.64 a	737.5 b	9.3 c	12.9 b	10.6	16.7
One row of cowpea plants in middle ridge of cotton I_2	466.8 d	11.8 b	12.8 a	10.9	16.84 a	456.4 d	10.9 b	12.7 b	.10.8	16.6
Two rows of cowpea plants in middle ridge of cotton I_3	605.4 c	8.6 d	12.3 b	10.3	16.23 b	572.7 c	7.9 d	12.9 b	10.5	16.5
F-test	*	*	*	N.S	*	*	*	*	N.S	N.S
2- Cowpea genotypes										
1- Kaha-1 cv.	844.9 b	13.7	12.8	10.2 b	15.4 b	800.5 b	12.9	12.9	10.3 b	15.4 b
2- A7 line	885.5 a	13.2	12.8	11.2 a	18.0 a	868 a	12.8	13.0	11.0 a	17.8 a
F-test	*	N.S	N.S	*	*	*	N.s	N.S	*	*

Values having the same alphabetical letter within each column are not significantly different at the 0.05 level, according to Duncan's Multiple Range Test.

This result is due to increase in number of pods per plant (10.1 and 9.3), pod length (12.9 and 12.9 cm per pod) and seed index (16.6 and 16.7 g) in the two seasons, respectively.

The lowest seed yield was obtained from cowpea plants that planted on one row in the middle ridge of cotton (I_2) which gave 466.8 and 456.4 kg/fed. in the two seasons, respectively. This decrease in seed yield per feddan is due to the reduction in number of plants per unit area. On the other hand, such system of intercropping (I_2) might cause the lowest competition between cotton and cowpea plants. So, this system of intercropping produced the highest values of number of pods per plants (11.8 and 10.9), pod length (12.8 and 12.7 cm) and seed index (16.8 and 16.6 g) in the two seasons, respectively.

5. Effect of cowpea genotypes on seed yield and its components of cowpea:

Data presented in Table (3) show that seed yield/fed. was increased significantly by cowpea genotypes in both seasons. A7 line produced the highest seed yield of 885.5 and 868.0 kg/fed. in both seasons, respectively. This may be due to that A7 line produced higher number of seeds per pod (11.2 and 11.0) and seed index (18 and 17.8) in both seasons, respectively than Kaha-1 cv.

6. Effect of intercropping system-cowpea genotypes interaction on seed yield and its components of cowpea:

Data presented in Table (4) show that, pod length and number of seeds per pod were not significantly affected by the interaction between intercropping system and cowpea genotypes in both seasons. On the other hand, number of pods/plant, seed index and seed yield per feddan were significantly affected by the interaction in both season. The highest seed yield was resulted from cowpea (Kaha-1 cv. and A7 line) as a solid crop in both seasons. Whereas, the lowest seed yield was obtained from cowpea Kaha-1 cv. and A7 line planted on one row of cowpea plants in middle ridge of cotton (I_2). On the other hand, the suitable intercropping system was obtained from cowpea plants that planted on one side and cotton in other side (I_1) in both genotypes of cowpea, which gave 845.8 and 760.0 kg/fed. for Kaha-1 and 729 and 714.9/fed. for A7 line in the first and second season, respectively.

Table (4): Effect of intercropping system-cowpea genotypes interaction on seed yield and its components of cowpea plants in 2001 and 2002 seasons.

Cowpea genotypes	Intercropping system	2001 season					2002 season				
		Seed yield kg/fed.	No. of pods/plant	Pod length (cm)	No. of seeds/pod	Seed index g/100 seeds	Seed yield kg/fed.	No. of pods/plant	Pod length (cm)	No. of seeds/pod	Seed index g/100 seeds
Kaha-1 cv.	Solid cowpea I_0	1599.6 a	18.7 a	13.2	10.3	15.58 de	1576.6 a	18.4 a	12.9	10.1	15.58 de
	Cowpea in one side and cotton in other side I_1	845.8 b	11.3 cd	13.0	10.4	15.05 ef	760.0 b	10.5 cd	12.9	10.2	15.05 ef
	One row of cowpea plants in middle ridge of cotton I_2	388.8 g	14.4 b	12.9	10.5	15.86 cd	376.3 g	13.6 b	12.7	10.4	15.86 cd
	Two rows of cowpea plants in middle ridge of cotton I_3	545.4 ef	10.3 ef	12.1	9.7	14.99 f	489.2 f	9.3 ef	13.4	10.4	14.99 f
A7 line	Solid cowpea I_0	1602.6 a	11.1 d	13.0	11.5	18.4 a	1565.5 a	10.0 de	12.9	11.4	18.40 a
	Cowpea in one side and cotton in other side I_1	729.4 c	8.9 g	12.9	11.3	18.24 a	714.9 c	8.1 g	12.8	11.0	18.24 a
	One row of cowpea plants in middle ridge of cotton I_2	544.9 f	9.2 fg	12.8	11.3	17.83 ab	536.6 e	8.3 fg	12.8	11.1	17.83 ab
	Two rows of cowpea plants in middle ridge of cotton I_3	665.3 d	6.9 h	12.6	10.9	17.47 b	656.3 d	6.7 g	12.6	10.7	17.47 b
	F-test	*	*	N.S	N.S	*	*	*	N.S	N.S	*

Values having the same alphabetical letter within each column are not significantly different at the 0.05 level, according to Duncan's Multiple Range Test.

7. Effect of intercropping system and cowpea genotypes on some cotton characters and its yield:

Data in Table (5) reveal that intercropping cowpea plants with cotton did not affect most of studied cotton traits, plant height, boll weight, seed index, micronaire reading, presly index 2.5% and 50% span length and length uniformity ratio as compared with cotton sole cropping. This is may be due to that cowpea plants, Kaha-1 cv. and A7 line, have determinate growth habit, therefore they are short growth period. The data in Table (5) indicate also that seed cotton yield k/fed. decreased significantly by intercropping cotton with cowpea plants compared to cotton sole cropping. Meanwhile, all intercropping systems did not show any significant effect of each other in both seasons.

The decrease in seed cotton yield/fed. was 7.6, 4.6 and 5.6% in the first season and 7.0, 4.3 and 7.8% in the second season by the three intercropping systems, respectively compared to cotton sole cropping. These results agree with those of Hosny *et al.* (1989) and Abdel-Aal (1990) who found that cotton seed yield/fed. was significantly reduced by intercropping maize with cotton.

Data presented in Table (5) show also that all the studied cotton characters as well as seed cotton yield K/fed. did not show any significant effect by intercropping systems, with two studied cowpea genotypes, in the two seasons of study.

Data also show that, the interaction between intercropping system and the two studied cowpa genotypes in both seasons had no effect on the studied cotton characters.

Economic values of seed cotton yield and cowpea yield:

Data presented in Table (6) show that, generally, cotton crop had higher economic values than cowpea crop.

The intercropping of cowpea with studied cotton cultivar (Giza 86) whether cowpea grew in one side and cotton in other side (I_1) or two rows of cowpea in middle ridge of cotton (I_3) gave higher economic values. These two intercropping systems exceeded the solid planting of cotton by 27 and 21% in the first season and by 29.7 and 20.7% in the second season, respectively.

Table (5): Effect of intercropping system and cowpea genotypes on some cotton characters and yield of cotton.

Treatments	Seed cotton yield k/fed.	Plant height (cm)	Boll weight (g)	Seed index (g)	Lint percentage (%)	Miconaire reading	Presly index	Span length 2.5%	Span length 50%	Length uniformity ratio
2001 season										
1- Intercropping system:										
Solid cotton I_0	12.32 a	148.0	3.33	12.08	40.63	5.05	10.8	30.93	14.9	48.11
Cowpea in one side and cotton in other side I_1	11.38 c	144.4	3.19	12.3	39.27	5.19	10.76	31.85	15.19	47.7
One row of cowpea plants in middle ratio of cotton I_2	11.75 bc	143.6	3.12	11.96	39.0	5.05	10.56	31.34	15.09	48.15
Two rows of cowpea plants in middle ratio of cotton I_3	11.63 bc	144.7	3.29	11.8	38.71	4.8	10.41	31.24	14.99	47.99
F-test	*	N.S	N.S	N.S	N.S	N.S	N.S	N.S	N.S	N.S
2002 season										
Solid cotton I_0	10.91 a	132.3	2.90	11.01	40.22	4.81	10.81	30.81	14.93	48.44
Cowpea in one side and cotton in other side I_1	10.15 b	129.0	2.92	11.04	40.40	5.13	11.03	31.0	14.93	48.14
One row of cowpea plants in middle ratio of cotton I_2	10.44 b	132.3	2.92	10.89	40.31	4.96	10.36	31.23	15.08	48.28
Two rows of cowpea plants in middle ratio of cotton I_3	10.06 b	132.1	3.00	11.01	40.60	5.03	10.82	31.01	15.09	48.66
F-test	*	N.S	N.S	N.S	N.S	N.S	N.S	N.S	N.S	N.S
2- Cowpea genotypes										
2001 season										
Kaha-1 cv.	11.83	145.4	3.27	12.07	39.62	5.07	10.69	31.5	15.06	47.8
A7 line	11.71	144.9	3.19	12.00	39.49	4.98	10.60	31.2	15.03	48.18
F-test	N.S	N.S	N.S	N.S	N.S	N.S	N.S	N.S	N.S	N.S
2002 season										
Kaha-1 cv.	10.43	130.4	2.91	10.96	40.89	5.02	10.85	31.1	15.00	43.23
A7 line	10.35	132.4	2.96	11.02	39.87	4.94	10.66	31.2	15.01	48.53
F-test	N.S	N.S	N.S	N.S	N.S	N.S	N.S	N.S	N.S	N.S

Values having the same alphabetical letter within each column are not significantly different at the 0.05 level, according to Duncan's Multiple Range Test.

Table (6): Economic value of combined intercrop yield (L.E/fed.) as affected by different intercropping systems, in 2001 and 2002 seasons.

Intercropping systems	2001 season						2002 season					
	Cowpea		Cotton		Both crops		Cowpea		Cotton		Both crops	
	L.E.	%	L.E.	%	L.E.	%	L.E.	%	L.E.	%	L.E.	%
Solid crop I_0	4803.3	100	6813.1	100			4713.3	100	6033.3	100		
Cowpea in one side and cotton in other side I_1	2362.8	49.2	6293.4	92.4	8656.2	127	2212.5	46.9	5612.9	93.0	7825.4	129.7
One row of cowpea in middle ridge of cotton I_2	1400.4	29.2	6497.8	95.4	7898.2	115.9	1369.2	29.1	5773.3	95.7	7142.5	118.4
Two rows of cowpea in middle ridge of cotton I_3	1816.2	37.8	6431.3	94.4	8247.5	121.1	2401.5	51.0	5563.3	92.2	7281.4	120.7

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دراسات على تأثير نظم تحميل اصناف اللوبيا الجديدة مع القطن

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الملخص العربى

نفذت هذه التجربة فى منطقة دسوق محافظة كفرالشيخ فى موسمى ٢٠٠١/٢٠٠٢ بهدف دراسة تأثير نظم تحميل التراكيب الوراثية الجديدة من اللوبيا (قها ١ والسلالة A٧) مع القطن (جيزة ٨٦) على النمو والمحصول ومكوناته بالاضافة الى القيمة الاقتصادية الناتجة من المحصولين من وحدة المساحة المنزرعة وكان نظام التحميل من التراكيب الوراثية للوبيا والقطن كالاتى: القطن على احد جوانب الخط واللوبيا على الجانب الاخر من خطوط القطن ٦٥سم ، خط لوبيا فى وسط مصطبة القطن ١٣٠سم ، خطين لوبيا فى وسط مصطبة القطن ١٣٠ سم بالاضافة الى الكنترول من اللوبيا والقطن وتتلخص النتائج كالاتى:

١- ازداد ارتفاع نبات اللوبيا وكذلك طول الساق الرئيسى بالتحميل مع القطن فى الموسمين ولكنه تسبب فى انخفاض عدد الاوراق والافرع والحوامل الثمرية والمساحة الوقية وذلك بالمقارنة بنباتات اللوبيا المنزرعة بدون تحميل وذلك فى الموسمين.

اعطت معاملة التحميل بزراعة القطن على احد جانبى الخط واللوبيا على الجانب الاخر اعلى محصول من اللوبيا حيث اعطت ٧٨٧,٦ ، ٧٣٧,٥ كجم/ف فى الموسمين على التوالى واقل محصول لوبيا عندما زرع خط واحد لوبيا وسط مصطبة القطن حيث اعطت ٤٦٦,٨ ، ٤٥٦,٤ كجم فى الموسمين على التوالى. بالنسبة للتراكيب الوراثية للوبيا فقد

السلالة A٧ عن الصنف قها ١ فى المحصـــول البـــذرى حيـــث اعطـــت ٨٨٥,٥ ، ٨٦٨كجم/ف فى الموسمين على التوالى.

٢- انخفض محصول القطن بالتحميل مع اللوبيا بالمقارنة بـــدون تحميـــل والاختلافات بين نظم التحميل لم تكن معنوية واوضحـــت النتـــائج ان هناك تأثير معنوى لتحميل القطن مع اللوبيا على محصـــــول القطـــن الزهر بالنسب الاتية: ٧,٦ ، ٤,٦ ، ٥,٦% فى الموسـم الاول ، ٧,٠ ، ٤,٣ ، ٧,٨% فى الموسم الثانى على التوالى مقارنة بكنترول القطن ، ولم تتاثر صفات القطن معنويا بالتحميل مع اللوبيا: ارتفاع النبـــات ، وزن اللوزة بالجرام ، معامل البذرة بالجرام ، قـــراءة الميكرونيـــة ، متانة التيلة (معامل برسلى) قياسات طول التيلـــة عندنســـبتى توزيـــع ٢,٥% ، ٥٠% ودرجة انتظام طول التيلة.

كما اوضحت النتائج ان اعلى قيمة اقتصادية لتحميل اللوبيـــا مـــع القطن عند نمو اللوبيا على جانب من الخط والقطن على الجانب الاخر او خطين من اللوبيا وسط مصطبة القطن وهذين النظامين من التحميل اعطيا زيادة عن زراعة القطن فقط بدون تحميل بمقدار ٢٧ ، ٢١% فى الموسـم الاول ، ٢٩,٧ ، ٢٠,٧% فى الموسم الثانى على التوالى.