COMPARATIVE STUDY FOR SEED YIELD AND ITS COMPONENTS OF CHICKPEA COLLECTIONS GROWN IN NEW RECLAIMED SOIL

Sharaan, A.N., Ekram, A. Migawer and K.H. Ghallab
Agron. Dept., Fac. Agric. Fayoum Univ.

ABSTRACT

Thirty one chickpea genotypes including four check varieties (from ARC, Egypt) were evaluated under newly reclaimed soil at the experimental Farm of Fac. Agric. at Fayoum, during two successive seasons (2003/2004 and 2004/2005), using a randomized complete block design with three replications. The plot size was 10.5m^2 including five ridges, 3.5m long and 60cm apart. Sowing date was Nov. 3 and 8 in the first and second season, respectively.

The tested genotypes differed significantly in all studied traits indicating that they are genetically varied and traced back from diverse origin. Significant seasonal effects and genotypes x seasons interactions were recorded for most traits. Phenotypic variances (σ^2ph) were much higher than the corresponding genotypic ones (σ^2g) for all traits, except flowering date which showed small difference between both parameters, due to the relative magnitude of heritable and non- heritable effects. Heritability values were high for flowering date (91.39), moderate for pods/plant (57.5) and seed index (62.17%) and low for other traits. Phenotypic coefficients of variation (PCV) were higher than genotypic ones (GCV) for all traits, but the least difference between both (4.40) was recorded by flowering date followed by seed index (21.15) and pods/plant (24.17).

Seed yield/plant was positively and significantly correlated with pods/plant (0.81), seed index (0.61) and branches/plant (0.51). Other valuable associations among yield components were detected. Number of pods/ plant had the highest direct effect contributing to seed yield/ plant (0.669) followed by seed index (0.394). While the highest indirect effect was recorded by branches/plant via pods/plant (0.361) followed by seed index via pods/ plant (0.221). Mean performance results showed that the tested ICARDA lines were mostly of higher trait means than those of Egyptian check varieties. Among these collections, genotypes No.15, 13, 7, 12, 21 and 11 are considered promising lines and suitable for growing under the conditions of newly reclaimed soil.

Keywords: Chickpea (Cicer Arietinum L.), Genotypes, New Reclaimed Soil, Genetic Parameters, Correlation, Path Analysis.

INTRODUCTION

Chickpea (*Cicer arietinum* L.) is a native of North West Asia. It is cultivated widely as a nutritive crop in different countries within Mediterranean region particularly Span, Turkey, Syria, and Morocco. But, in Egypt its acreage is relatively limited where it reaches 14950 feddan in

2004/2005 season concentrated at Menia, Assiut and Behera with productivity of 6.5 ardab/fed. The crop area is expected to decrease in the future because of strong competition with other crops occupied the old land. Consequently, the newly reclaimed land proved to be the opportunity for the crop expansion. The crop importance may be ascribed to its value for soil fertility (biological N_2 fixation) at newly reclaimed area, in addition to its nutritive quality where it is considered as a source of rich protein which could compensate the shortage of animal protein.

Several investigators worked on different chickpea genotypes in normal soil and found significant differences for plant height, number of branches, pods per plant, seed index, seed yield per plant and seed yield/ha (**Dahiya *et al*., 1993; Mokhtar, 1993; Onkar *et al.*, 1994; Khattab *et al.*, 1995; Siag, 1995; Migawer, 1998; Shagarodsky *et al*., 2001; Abdalla *et al*., 2003 and Sawsan *et al.*, 2005)**). However, under the condition of new reclaimed land the published data are limited. Only **Yakout *et al.* (2000)** evaluated two varieties (Giza 2 and Giza 88) and concluded that Giza 88 was better for growing under new reclaimed sandy soil conditions and **Omar (2004)** studied stability and selection for yield and drought susceptibility index of exotic chickpea genotypes under stress conditions .

Information on the relative magnitude of the different sources of variation particularity among different genotypes for several traits help in measurement of their range of genetic diversity and may provide evidence for identification of their relationship. Several efforts were paid for evaluation of different chickpea genotypes and exploring their variation, as a key for its utilization in crop improvement as currently performed by many authors (**Khattab, 1987; Khattab *et al*., 1993 and 1999; Chander *et al*., 2001 and Abdalla, *et al*., 2003**). Estimation of correlation coefficients among yield and its attributes, as a complex relation due to its influence by heritable, non heritable effects and their interactions are needed to identify the nature of trait association and help for further improvement programs. But, correlation do not provide the causal basis of association. This could be achieved by path coefficient technique, which allows for partitioning the correlation coefficient into direct and indirect effects. Several investigators studied the correlation and path coefficient analysis in chickpea (**Khattab *et al.*, 1990; Kharrat *et al*., 1991; Akdag and Sehirali, 1992; Mokhtar, 1993; Vuayalakshmi *et al*., 2000 and Saleem *et al*., 2002**).

The present investigation aimed to study the variation among different exotic chickpea genotypes and their performance compared with some local varieties to select the highest yielding and well adapted one(s) for growing under the condition of newly reclaimed soil. Genetic parameters i.e. σ^2_g, σ^2_{ph}, PCV %, GCV % and broad sense heritability as well as correlation and path analysis were estimated.

MATERIALS AND METHODS

Thirty one chickpea genotypes including 27 introduced lines from ICARDA and 4 Egyptian varieties (Table1) were used in the present study. These genotypes were arranged in a complete randomized block design with three replications in newly reclaimed soil (sandy loam texture with PH 7.8 and ECe 3.1 dSm^{-1}) at the Experimental Farm of Fac. Agric. at Fayoum during 2003/2004 and 2004/2005 seasons. Seeds of each genotype were planted in hills within five rows, 3.5 m long and 60 cm apart, on November 3 and 8 in first and second seasons, respectively. Thinning for two plant/hill was done one month after emergence. Other cultural practices were executed according to the recommendations. During the growing season, number of days to 50 % flowering was recorded on plot basis in both seasons. At harvest, ten guarded plants were randomly sampled from each plot and the following traits were measured; plant height, number of branches/plant, number of pods/plant, and seed yield per plant. Seed index and yield per feddan were determined on plot basis.

Table (1): The pedigree and origin of 27chickpea genotypes and four check varieties.

Entry NO.	Cross No./ Entry Name	Pedigree	Origin
1	× 2000TH 14	FLIP 98-14C x FLIP 98-64C	ICARDA/ICRI
2	× 2000TH 15	FILP 97-28C x FLIP 98-129C	ICARDA/ICRI
3	× 2000TH 17	FILP 97-25C x S 98588	ICARDA/ICRI
4	× 2000TH 19	FLIP 98-64C x FLIP 98-10C	ICARDA/ICRI
5	× 2000TH 21	FILP 98-64C x FLIP 98-47C	ICARDA/ICRI
6	× 2000TH 31	FILP 98-29CxS 99093	ICARDA/ICRI
7	× 2000TH35	FILP 98-29CxS 99442	ICARDA/ICRI
8	× 2000TH 39	FILP 98-29Cx S 99001	ICARDA/ICRI
9	× 2000TH 43	FLIP 98-138C x Sel 99TER 85035	ICARDA/ICRI
10	× 2000TH 59	ILC 3843 x FLIP 98-52C	ICARDA/ICRI
11	× 2000TH 73	(FLIP 84-11C x FLIP 88-32C) xFLIP 98-	ICARDA/ICRI
12	× 2000TH 74	(FLIP 91-61C x FLIP 87-90C) xFLIP 98-	ICARDA/ICRI
13	× 2000TH 77	(FLIP 84-14C x ILC 2398) xFLIP 98-29C	ICARDA/ICRI
14	× 2000TH 86	(FLIP 93-2C x FLIP 90-137) xFLIP 98-10C	ICARDA/ICRI
15	× 2000TH 88	(FLIP 84-92C x FLIP 90-172C) xFLIP 98-	ICARDA/ICRI
16	× 2000TH 90	(FLIP 84-145C x S 95338) xFLIP 98-10C	ICARDA/ICRI
17	×2000TH	(FLIP 93-62C x FLIP 93-259C) xFLIP 98-	ICARDA/ICRI
18	×2000TH	(FLIP 91-14C x ICCV 6) xFLIP 98-47C	ICARDA/ICRI
19	×2000TH	GLK 95069 x FILP 98-132C	ICARDA/ICRI
20	×2000TH	GLK 95075 x FILP 98-52C	ICARDA/ICRI
21	×2000TH	GLK 95075 x FILP 98132C	ICARDA/ICRI
22	×2000TH	GLK 95072 x FILP 98-52C	ICARDA/ICRI
23	×2000TH	GLK 95072 x S 98588C	ICARDA/ICRI
24	×2000TH	L 551x FLIP 98-52C	ICARDA/ICRI
25	×2000TH	L 551x FLIP 98-129C	ICARDA/ICRI
26	×2000TH	Lebanese market sample-1 x Sel 99TER	ICARDA/ICRI
27	X230 TH 85	ILC 3395 x FLIP 38-13C	ICARDA
28	Giza 1	Local variety	ARC, Egypt
29	Giza 88	Local variety	ARC, Egypt
30	Giza 195	Local variety	ARC, Egypt
31	Giza 531	Local variety	ARC, Egypt

The obtained data were subjected to combined analysis of variance, after seasonal homogeneity "F test", as outlined by **Gomez and Gomez (1984)**. Duncan's multiple range test was used to verify the significance of mean performance for all traits (Duncan, 1955). Genotypic (σ^2g) and phenotypic (σ^2ph) variances as well as genotypic (GCV) and phenotypic (PCV) coefficients of variation in addition to simple correlation coefficient were calculated according to **Johnson *et al* (1955).** Path coefficients analysis (**Dewey and Lu 1959**) was used for partitioning the total correlation coefficient between different trait-pairs into direct and indirect effects.

RESULTS AND DISCUSSION

Variability and genetic parameters :

The data listed in Table (2) show that the tested chickpea genotypes were significantly different for all studied traits in each season and over the two seasons. The magnitude of mean squares due to genotypes were higher for number of branches and pods/plant, seed index as well as seed yield/plant and seed yield/feddan in the first season than those of the second one, and the reverse was true for flowering date and plant height. This indicated that these traits were relatively sensitive to environmental effects and reflected in significant mean squares due to seasons in combined data. These results are in line with those obtained by **Sawsan *et al* (2005)** who detected significant seasonal effects on most chickpea traits. The above results were confirmed by the significant genotypes x seasons interaction exhibited by all investigated traits, except flowering date and seed index (Table 2) .

Phenotypic variances (σ^2ph) were much higher than the respective genotypic ones (σ^2g) for all studied traits, except flowering date which showed small difference between both. The present results indicated that most of variation in these traits was attributed to non-heritable influences, but the reverse was true for flowering date. In this concern, **Khattab *et al.* (1990)** reported that genotypic variance was more than non-genetic one for most studied traits. Consequently, high broad sense heritability was detected for flowering (91.39%). While number of pods/plant and seed index showed moderate heritability values (57.51 and 62.17%, respectively) the remainder four traits recorded low values ranged from 46.04 for plant height to 27.71% for number of branches/plant. These results are in agreement with **Abdalla *et al.* (2003)** who reported that flowering date recorded much higher heritability value than all other traits studied by them. Genotypic (GCV) and phenotypic (PCV) coefficients of variation varied from trait to another due to their relative affect by heritable and non-heritable influences. GCV percentages were less than PCV for all studied traits and ranged from 8.02 for plant height to 24.11% for seed yield/plant. The later trait recorded the highest PCV percentage (45.27%) whereas flowering date showed the lowest value (10.03 %). It is worth to note that flowering date had the lowest percentage of difference (4.40) between GCV and PCV values, followed by seed index (21.15) and number of pods/plant (24.17), indicating the sizable genetic effect influencing these traits. This is confirmed by high and moderate heritability percentages recorded for these three traits. These results provide an evidence for improving chickpea yield by selection for high number of pods and heavy seed weight as well as early flowering genotypes.

Table (2): Mean squares due to sources of variation for recorded chickpea traits in both seasons and combined over them, as well as some genetic parameters measured from combined data.

S.V / Traits	d.f	Flowering date (day)	Plant height (cm)	Number of branches /plant	Number of pods/plant	Seed yield/ plant (g)	Seed index (g)	Seed yield/ feddan (ardab)
2003/2004								
Rep's	2	32.33	113.22	0.31	16.08	17.92	13.21	2.77
Genotype	30	157.14^{**}	112.89^{**}	3.19^{**}	646.32^{**}	107.68^{**}	36.35^{**}	3.34^{**}
Error	60	12.78	26.45	0.54	31.43	23.34	4.98	0.65
2004/2005								
Rep's	2	7.50	36.71	0.11	23.61	15.70	9.78	1.76
Genotype	30	166.65^{**}	134.67^{**}	1.22^{**}	508.03^{**}	44.99^{**}	34.42^{**}	1.49^{**}
Error	60	1.79	13.82	0.50	26.21	7.13	7.67	0.46
Combined								
Rep's	2	26.718	61.47	0.268	36.189	7.834	21.163	0.059
Season (S)	1	0.024	701.816	31.852^{**}	12821.8^{**}	2512.86^{**}	273.39^{**}	3.986
Error(a)	2	13.012	87.91	0.149	3.655	27.03	1.866	4.461
Genotype (G)	30	323.585^{**}	188.885^{**}	2.658^{**}	892.959^{**}	89.747^{**}	65.432^{**}	2.929^{**}
S x G	30	0.336	58.637^{**}	1.755^{**}	261.645^{**}	63.637^{**}	5.332	1.902^{**}
Error(b)	120	7.284	20.121	0.518	28.802	15.227	6.326	0.557
Genetic parameters for combined								
σ^2g		52.72	28.13	0.36	144.03	12.42	9.85	0.40
σ^2Ph		57.68	61.09	1.29	250.44	43.78	15.85	1.40
h^2%		91.39	46.04	27.71	57.51	28.37	62.17	28.22
GCV%		9.59	8.02	10.56	22.98	24.11	11.78	13.66
PCV%		10.03	11.81	20.06	30.31	45.27	14.95	25.72
RD%		4.40	32.14	47.36	24.17	46.74	21.15	46.87

σ^2g, σ^2Ph and h^2 :denote genotypic, phenotypic and heritability, respectively.

GCV, PCV% and RD%: denote coefficient of genotypic ,phenotypic variability and relative difference between PCV and GCV%, respectively.

Mean performance

Trait means of 27 exotic lines together with 4 Egyptian improved varieties as checks, in combined data over the two seasons, are presented in Table (3). The tested genotypes were significantly different in all studied traits. This result indicated that genotypes are genetically diverse and descended from different genetic backgrounds. Several chickpea investigations recorded significant genotypic differences among the crop collections studied by them (**Khattab *et al.*, 1990; Chander *et al.*, 2001; Abdalla *et al.*, 2003 and Sawsan *et al.*, 2005).**

In regard to flowering date, Giza 1 variety was the earliest flowering genotype (61.37days) and not significantly different from Giza 88 (62.87), line No.20 (62.67) and line No.16 (64.25 days). Whereas, line No. 2 was the latest flowering genotype (86.25 days) flowered at date similar to that of other lines (i.e. No. 5,6,7,8,10,24 and 26) .

Table (3): Mean performance of the studied chickpea traits (combined data over two seasons)

No. of Genotypes	Flowering date (day)	Plant height (cm)	Number of branches /plant	Number of pods/plant	Seed yield/ plant (g)	Seed index (g)	Seed yield/ feddan (ardab)
1	76.42e-g	64.53f-i	6.50a-c	57.50c-e	16.08c-h	26.77d-j	4.57b-g
2	86.25a	72.08a-d	7.22a	60.13b-d	14.55e-j	25.78e-k	4.19d-g
3	79.92cd	68.97c-f	5.50d-g	45.85g-k	13.65e-k	28.43b-g	5.25a-c
4	70.70j	57.65j-l	5.78bc-f	49.47f-h	11.17f-k	27.38c-i	4.40c-g
5	82.58bc	68.03c-g	7.17a	56.80c-e	16.32c-h	27.25c-i	4.21d-g
6	82.25bc	63.42f-j	5.33d-g	44.78g-l	15.24d-i	31.93a	4.03e-g
7	82.25bc	66.37d-i	6.0b-f	60.42b-d	16.90c-e	25.12g-k	5.51ab
8	71.78ij	60.80ij-l	5.05fg	44.40g-l	14.19e-j	24.92h-k	3.54g
9	80.58cd	73.92a-c	5.22e-g	47.80g-j	13.86e-k	28.42b-g	3.76fg
10	82.75bc	70.75b-e	5.67c-g	41.95i-l	11.83e-k	26.75d-j	4.95a-e
11	74.58f-i	67.18d-h	5.45d-g	55.35d-f	14.98d-j	28.73a-f	5.53ab
12	79.42c-e	76.97a	6.33a-d	58.03cd	16.45c-g	29.55a-d	5.09a-d
13	81.67c	76.80a	5.56c-g	63.30bc	20.60bc	28.60a-g	5.52ab
14	81.33c	68.03c-g	6.06b-f	60.38b-d	16.48c-g	27.38c-i	3.57g
15	77.33d-f	61.87g-l	6.11b-e	62.95bc	22.73ab	29.60a-d	5.66a
16	64.25k-m	57.52j-l	6.06b-f	66.52ab	19.88b-d	27.88b-i	4.18d-g
17	65.75kl	67.87c-g	5.72c-f	59.97b-d	15.78c-h	31.17ab	4.06d-g
18	80.50cd	68.92c-f	4.67gh	56.52c-e	16.65c-f	28.60a-g	4.74a-f
19	79.58c-e	64.37f-i	5.34d-g	62.70bc	14.17e-j	28.07b-h	4.33c-g
20	62.67lm	60.67i-l	5.78b-f	39.92kl	12.70e-k	29.25a-e	3.99e-g
21	73.37g-j	57.18kl	6.72ab	70.70a	26.15a	30.68a-c	4.53b-g
22	74.28f-i	75.90ab	5.17e-g	42.25h-l	13.62e-k	30.52a-c	5.02a-e
23	81.75c	70.85b-e	5.45d-g	48.65g-i	11.34f-k	25.35f-k	4.97a-e
24	82.17bc	63.07f-k	5.45d-g	48.18g-j	12.51e-k	23.07k-m	4.13d-g
25	72.67h-j	56.85l	5.67c-g	38.23l	10.01i-k	23.80j-l	4.60b-f
26	85.58ab	61.48h-l	5.45d-g	42.35h-l	10.87h-k	24.58i-k	4.24c-g
27	75.87f-h	64.07f-i	4.06h	40.98j-l	8.66k	23.03k-m	5.09a-d
G.1	61.37m	65.30e-i	5.28e-g	42.73h-l	11.06g-k	21.17lm	4.97a-e
G.88	62.87lm	65.82e-i	5.22e-g	50.85e-g	14.10e-j	23.65j-l	5.55ab
G.195	67.58k	64.40f-i	5.11e-g	42.13i-l	9.68jk	20.15mn	4.16d-g
G.531	66.25k	69.30c-f	5.22e-g	56.85c-e	10.90h-k	18.10n	4.11d-g

Lines No. 12 (76.97) and No. 13 (76.80 cm) were the tallest genotypes followed by lines No. 22, 9 and 2 with insignificant differences. It is worth to note that, there was no genotype that combined between tallness and earliness, indicating negative relationship between the two traits. This result supports that reported by **Saleem *et al.* (2002).** On the other hand, line No. 25 possessed the shortest plant (56.85 cm) similar to those of lines No. 4,8 , 15 , 16, 20 , 21 and 26 .

Highest number of branches/plant (7.22) was obtained by line No. 2 which had tallest plants. Lines No. 1, 5, 12 and 21 gave number of branches/plant similar to that of line No. 2. Whereas, line No. 27 had the lowest number of branches (4.06) which was insignificantly different from those of line No.18 (4.67).

Line No. 21 which had desirable number of branches had the highest number of pods/plant (70.7) followed by lines No. 13,15,16 and 19 and all surpassed all check varieties. It is interested to note that, most of these lines possessed an acceptable means of number of branches, plant height and/or early flowering date. These lines, therefore, may be considered as promising lines with desirable means of most yield components. However, line No. 25 gave the lowest number of pods/plant (38.23) which was insignificantly different from those of lines No. 6, 8, 10, 20, 22, 26, 27 as well as Giza 195 and Giza 1varieties.

Highest seed index was obtained by line No.6(31.93g) followed by lines No.11,12,13,15,17,18,20,21 and 22 and all surpassed the four chick varieties. Whereas, line No.27 showed the lowest seed index (23.03 g).

Regarding seed yield/plant , line No. 21 produced the highest yield (26.15g) due to its superiority in number of branches, number of pods/plant and seed index as important yield components. The line No. 15 produced yield/plant (22.73g) similar to that of the promising line No. 21 followed by line No. 13(20.60g). High yield of two lines (13 and 15) may be attributed to their high means of pods/plant. These results indicated that number of pods/plant is considered the most important yield component. Similar conclusion was previously reached by other researchers (**Khattab *et al.*, 1999; Chander *et al.*, 2001and Abdalla *et al.*, 2003).** However**,** line 27 produced the lowest seed yield/plant (8.66 g) similar to those of some other genotypes including the three check varieties Giza 195, Giza 531 and Giza 1.

Highest seed yield/feddan was produced by line No. 15 (5.66 ardab) followed by lines No. 13 (5.52 ardab) and No. 7 (5.51 ardab) in addition to No. 11 (5.53 ardab) due to their advantages of most yield component which all yielded similar to that of check variety Giza 88. Whereas, line No. 8 and 14 produced the lowest seed yield (3.54 & 3.57 ardab, respectively) which was insignificantly different from those of Giza 195 and Giza 531.

In sum, the results in Table (3) showed that most of the tested ICARDA collections were mostly of higher trait averages than those of Egyptian check verities. Also, among these collections, lines No. 15, 13, 7 and 21 as well as No. 11 are considered promising genotypes and suitable for growing under the conditions of newly reclaimed land .

Correlation and path analysis:

As shown in Table (4), seed yield/plant was found to be positively and significantly correlated with number of pods/plant (0.81) seed index (0.61) and number of branches (0.51). Such important associations were previously detected by **Kharrat *et al*., (1991)**; **Akdag and Sehirali, (1992); Mokhtar, (1993) and Migawer, (1998)**. Another significant and positive relations were detected for number of branches with each of number of pods (0.54) and seed index (0.28) as well as for number of pods with seed index (0.33) and for plant height with flowering date (0.39). These results are in line with those detected by **Akdage and Sehirali, (1992); Mokhtar, (1993) and Migawer, (1998).**

Table(4): Simple correlation coefficient among the five studied traits

Traits	Seed yield	Number of branches	Number of pods/plant	Plant height	Seed index
Number of branches	0.51**				
Number of pods/plant	.81**	0.54**			
Plant height	-0.02	-0.02	0.07		
Seed index	0.61**	0.28*	0.33*	0.13	
Flowering date	0.13	0.19	0.11	0.39**	0.23

Table (5): Partitioning of simple correlation between seed yield/ plant and five of the main yield attributes

Source of variation	
1- No. of branches vs. Seed yield/plant	
Direct effect (r_{y1})	0.035
Indirect effect via No. of pods / plant	0.361
Indirect effect via plant height	0.002
Indirect effect via seed index	0.110
Indirect effect via flowering date	0.001
Total (r_{y1})	0.51
2- No. of pods / plant vs. seed yield/plant	
Direct effect (r_{y2})	0.669
Indirect effect via No. of branches	0.019
Indirect effect via plant height	-0.008
Indirect effect via seed index	0.130
Indirect effect via flowering date	0.0006
Total (r_{y2})	0.81
3- plant height vs. seed yield/plant	
Direct effect (r_{y3})	-0.120
Indirect effect via No. of branches/ plant	-0.001
Indirect effect via No. of pods / plant	0.047
Indirect effect via seed index	0.051
Indirect effect via flowering date	0.002
Total (r_{y3})	-0.02
4- seed index vs. seed yield/plant	
Direct effect (r_{y4})	0.394
Indirect effect via No. of branches/ plant	0.010
Indirect effect via No. of pods / plant	0.221
Indirect effect via plant height	-0.016
Indirect effect via flowering date	0.001
Total (r_{y4})	0.610
5- flowering date vs. seed yield/plant	
Direct effect (r_{y5})	0.006
Indirect effect via No. of branches/ plant	0.007
Indirect effect via No. of pods / plant	0.074
Indirect effect via plant height	-0.047
Indirect effect via seed index	0.091
Total (r_{y5})	0.130

Path analysis presented in Table (5) revealed that number of pods/ plant had the highest direct effect (0.669) on seed yield/ plant. The second contributing component that directly affected seed yield/plant was seed index (0.394). The highest indirect effect on seed yield/ plant was due to number of branches/plant via number of pods/plant (0.361) followed by seed index via number of pods/plant (0.221) and number of pods via seed index (0.130). Correlation and path analysis results detected herein supported the above mentioned conclusions concerning the superiority causes of the promising lines. These results are in general agreement with those obtained by **Saleem *et al.*, 2002**. But **Mokhtar, 1993** found that number of pods/plant ranked as the third component affecting seed yield/plant.

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دراسة مقارنة للمحصول ومكوناته للحمص النامي في اراضى حديثة الاستصلاح

عبد العزيز نصر شرعان إكرام علي مجاور كمال حسن غلاب
قسم المحاصيل – كلية الزراعة – جامعة الفيوم

تم تقييم واحد وثلاثون تركيب وراثي منهم أربعة أصناف محلية في أراضي جديدة حديثة الاستصلاح بمزرعة كلية الزراعة بالفيوم أثناء موسمي ٢٠٠٣/٢٠٠٤،٢٠٠٤/٢٠٠٥ واستخدم فيها تصميم القطاعات الكاملة العشوائية بثلاث مكررات. وكان حجم القطعة التجريبية ١٠,٥م^2 وتمت الزراعة في ٨،٣ نوفمبر في الموسم الأول و الثاني على التوالي .

وأوضحت النتائج اختلاف التراكيب المختبرة اختلافاً معنوياً في كل الصفات المدروسة، كما وجدت فروقاً معنوية راجعة للسنين وللتفاعل بين السنين والتراكيب الوراثية لمعظم الصفات.

كان الفرق بين التباين المظهري والتباين الوراثي كبيراً لكافة الصفات المدروسة عدا صفة التزهير حيث كان الفرق بينهما صغير. وكانت قيم معامل التوريث عالية لصفة التزهير(٩١,٣٩%) ومتوسطة لعدد القرون/ نبات(٥٧,٥%) ودليل البذرة (٦٢,١%) ومنخفضة في باقي الصفات. لذا كانت قيم معامل الاختلاف المظهري أعلي من معامل الاختلاف الوراثي لكل الصفات–ولكن الاختلافات بينهما كانت قليلة نسبيا لصفة التزهير (٤,٤) يليها دليل البذرة (٢١,١٥) وعدد القرون/ نبات(٢٤,١٧) .

أما بالنسبة للارتباط بين أزواج الصفات فقد أتضح أن هناك ارتباط موجب معنوي لمحصول النبات الفردي مع كل من عدد القرون/ نبات (٠,٨١) ودليل البذرة (٠,٦١) وعدد الفروع/نبات (٠,٥١). وكان التأثير المباشر لصفة عدد القرون/ نبات كبير في مساهمته لمحصول النبات الفردي (٠,٦٦٩) يليه دليل البذرة (٠,٣٩٤). بينما كان التأثير الغير مباشر كبير لعدد الفروع/ نبات من خلال عدد قرون النبات(٠,٣٦١) يليه دليل البذرة من خلال عدد قرون النبات (٠,٢٢١) أيضا.

وقد أوضحت نتائج متوسطات السلالات المختبرة أن معظم السلالات المستوردة كانت متفوقه علي الأصناف المصرية، ومن بين هذه السلالات تميزت السلالات أرقام ١٥، ١٣، ٧، ١٢، ٢١، ١١والتي تعتبر سلالات مبشرة ومناسبة للزراعة تحت ظروف الأراضي حديثة الاستصلاح.