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GENETIC PARAMETERS AND THEIR ASSOCIATION WITH YIELD AND ITS COMPONENTS IN PEANUT (*Arachis hypogaea. L*)

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ABSTRACT

Three field expriments were carried out at Ismailia Agricultural Research Station, during 2003, 2004 and 2005 summer seasons to study genetic parameter i-e. phenotypic, genotypic coefficient of variability, heritability and simple correlation coefficients for some yield components for twenty genotypes of peanut.

Significant differences were detected for genotypes either through three seasons and combined analysis for all characters studied, except number of branches/plant. The results showed that Introduced (1) recorded the highest pod yield/fed, seed yield/ fed and seed weight/plant, plant height and number of pods/plant,. Introduced No.(5) gave the heighest seed yield/plant, 100–seed weight, shelling percentage, pod yield/fed, number of branches/plant, number of pods/plant and pod weight/plant.

Genotype No. (16) gave the highest values for seed weight/plant, pod yield/plant, plant height, number of pods/plant and pod yield/plant.Also Introduced No.(19), was the highest in seed weight/plant, 100– pod weight, 100–seed weight, shelling percentage and number of branches/plant.

phenotypic, genotypic and environmental variances were observed for 100-pod weight during the three summer seasons, whereas the lowest values were estimated for number of branches/plant.

Estimates of phenotypic (PCV), genotypic (GCV) and environmental (ECV) coefficients of variability for all studied characters varied from season to season and from character to another. The highest values of phenotypic, genotypic and environmental were recorded for number of pods/plant, pod yield/fed and seed yield/fed, while the lowest values were obtained for 100-seed weight and shelling percentage during the three successive seasons.

High values of heritability (> 50%) were recorded for seed weight/plant and 100-pod weight during 2004 and 2005 seasons. Whereas low to moderate values of heritability were obtained in the remaining characters.

Simple correlation coefficients (r) between seed yield/fed and its components revealed positively and significantly correlation coefficient (r) between seed yield/fed and each of, number of pods/plant, 100-seed weight, shelling % and seed weight/plant.

These obtained results are of great interest for peanut breeder when planning effective and correct breeding program to improve seed yield and other important characters

INTRODUCTION

Peanut (*Arachis hypogaea.L*) is one of the most important edible oil crops in the world. The cultivated area in Egypt was 149127 feddan and produced 278420 million tonnes in 2005 season. Introducing new Accession orgenotypes and testing their adaptability and potentiality under local conditions are one of the methods for developing new high yielding genotypes with stable yield and good quality characters. Peanut is grown in Egypt for oil production, fresh human consumption or for export.

Feddan = 4200 m2
Ardab = 75 kg

For the producers, it is considered a profitable crop due to its high net income. Moreover, it is useful to reclaime sandy soils in East Delta of Egypt and also, the desert soils due to fixing nitrogen and improving its physical and chemical characteristics.

Breeding peanut for high yielding ability and stable genotypes has always been an important objective of all plant breeding programs. Plant breeders make all efforts to produce high yielding and stable genotypes of peanuts through assessment different breeding parameters which help the breeder in peanut breeding programs of phenotypic, genotypic and environmental coefficients of variations and heritability for different traits of peanut have been studied by several invesigators [El-Ahmer and El-Mandoh, 1983 and 1990], El Ahmer *et al.*, 1995; Ayub, *et al.*, 2000 and Nazaar *et al.*, 2000.

The main targets of the present investigation are to study phenotypic, genotypic and environmental variation, heritability and correlation coefficients among yield and yield components in 20 genotypes of peanut under newly reclaimed sandy soils at Ismailia Agriculture Research Station, Agriculture Research Center (ARC).

MATERIALS AND METHODS

Twenty genotypes of peanut included one local cultivare Giza4 were grown in 2003,2004 and 2005 summer seasons. The pedigree and origin of the studied materials are shown in Table 1.

Three field experiments were carried out at the farm of Ismailia Agricultural Research Station, Agriculture Research Center (ARC), Giza Egypt. The soil type is sandy in texture with pH value of 7.9. Seeds of peanut were sown on 18^{th}, 23^{rd} and 26^{th} May in 2003, 2004 and 2005 summer growing seasons, respectively.

Table (1) : Name, Pedigree and origin of peanut genotypes .

No.	Name.	Pedigree.	Origin.(source)
1	Introduced 182	Florigiant.	U.S.A
2	.. 220	Florispan runner.	U.S.A
3	.. 222	Ga.119-20.	U.S.A
4	.. 242	Shullamitt	F.A.O
5	.. 249	C-148.	India
6	.. 256	756.A.	Senegal
7	.. 339	Sir of Bizapur.	ICRISAT
8	.. 342	Nc-7.	U.S.A
9	.. 343	Nc-6.	U.S.A
10	.. 356	ICGM 337.	Malawi
11	.. 405	(Ah65× Robut 33-1)F13 B1.	ICRISAT
12	.. 420	(Dh 3-20 × NC A C17090) ×(Robut 33-1-7-6 F7 B1).	ICRISAT
13	.. 425	(Robut 33-1×NC AC 316)× (53-68 ×Robut 33-1F7 B1).	ICRISAT
14	.. 444	ICGV 87165.	India
15	.. 450	ICGV 87171.	India
16	.. 455	ICGV 87176.	India
17	.. 456	ICGV 87177.	India
18	.. 506	AH.	Indonesia
19	.. 510	Virginia bunch.	Australia
20	Giza4	Commercial variety (Check)	Egypt.

$$\text{Shelling percentage} = \frac{\text{Seed weight / plant (gm)}}{\text{Pod weight / plant (gm)}} \times 100$$

The experimental design was randomized complete blocks with four replicates. Each plot contains five rows 60 – cm apart and 3 m length. Hill spacing was 15 cm. All recommended agricultural practices for peanut production at Ismalia location were applied at the proper time.

Recorded data:

At harvest time, a random sample of ten guarded and competitive plants were taken from the inner rows of each plot to determine, plant height (cm), number of branches /plant, numder of pods / plant, pod weight / plant (gm), seed weight / plant (gm), 100 – pod weight (gm), 100 – seed weight (gm) and shelling percentage

Pod and seed yield/feddan (ardab) were estimated from the two inner rows. Data were subjected to statistical analysis according to Snedecor and Cochran (1967) .The means of genotypes characters were compared with each others using Duncan's multiple range test (Duncan,. 1955).

Phenotypic (δ^2P), genotypic (δ^2G)and environmental (δ^2E) variances were calculated in each season from analysis of variance as follows :

Source of variation	Degree of freedom	Mean squares	Expected mean squares
Replications	(r – 1)		
Genotypes	(g – 1)	M 1	$\delta^2e + r\delta^2G$
Error	(r - 1) (g - 1)	M 2	δ^2e

Thereafter, phenotypic, genotypic and environmental variances were calculated as follows :

$$\delta^2G = (M1 - M2) / r,\ \delta^2P = \delta^2G + \delta^2e$$

where : $\delta^2E = \delta^2e$

Thereafter, the follwing parameters were calcuated :

1– Heritability in broad sense was calculated according to Hanson, Robinson and Comstock (1956) using the following formulae : $T(b) = \delta^2G / \delta^2P \times 100$.

2–Genotypic coefficient of variability (G.C.V), phenotypic coefficient of variability (P.C.V) and environmental coefficient of variability (E.C.V) of studied characters were calculated according to the method suggested by Burton (1952) as follows:

$$\text{G. C.V.} = \frac{\sqrt{\delta^2G}}{\bar{X}} \times 100 \quad , \quad \text{P. C. V.} = \frac{\sqrt{\delta^2P}}{\bar{X}} \times 100$$

$$\text{E.C.V.} = \frac{\sqrt{\delta^2E}}{\bar{X}} \times 100$$

3 – Also, simple correlation coefficients between all characters were estimated according to svab (1973).

RESULE AND DISCUSSION

1- Mean performance and their combined analysis of twenty peanut genotypes :

Mean performance of yield and its attributes of peanut genotypes are presented in Tables (2,3 and 4).

Table (2): Mean Performance of the various studied peanut genotypes during three summer successive seasons for plant height (cm), number of branches / plant , number of pods/ plant and pod weight (gm)/ plant

No.	Plant height (cm)				Number of branches/plant				Number of pods/plant.				Pod weight/plant (gm)			
	2003	2004	2005	Comb.	2003	2004	2005	Comb.	2003	2004	2005	Comb.	2003	2004	2005	Comb.
1	38.5a-c	31 6ab	35.0b-g	35.0ab	3.15	3.55	4.65	3.78	23.4a-e	31.9ab	17.1ef	24.1a-c	52.25a	40.00b-e	43.00bc	45.08a
2	33 1c-e	33 0a	39.0bc	35.0ab	3.65	3.78	4 75	4.06	18.3ef	31.7ab	18.7c-f	22.9a-c	39.25bc	41.50b-d	36.06c-e	38.94ab
3	38.3a-c	28.8ab	40.9ab	36.0ab	4.30	4.28	4.85	4 48	21.6b-f	27.8a-e	21.6a-f	23.7a-c	36.50bc	41.25b-d	37.84b-d	38.53ab
4	35.1b-e	26 7b	33.4c-h	31.7a-c	4.15	4.18	4.43	4.25	21.6 b-f	25.3de	22.1a-i	23.0a-c	43.50b	42.00b-d	29.93 ef	38.48ab
5	30.7de	28.1ab	32.5d-h	30.4bc	4.30	4.53	4.40	4.41	25.2 a-c	25.6c-e	22 2a-e	24.3a-c	41.00bc	43.50a-d	36.38c-e	40.29ab
6	30 3de	28.1ab	33.4c-h	30.6bc	4.60	3.93	4.95	4.49	22.8a-f	26.6b-e	22.3a-e	23.9a-c	40.00bc	38.50c-e	33.54d-f	37.35ab
7	35.5b-d	30.1ab	28.0hi	31.2a-c	4.10	4.20	4.30	4.20	18.8d-f	25.5c-e	21.3a-f	21.8bc	33.25c	51.00a	34.64de	39.63ab
8	33 3b-e	33.8a	29.3g-i	32.1a-c	4.00	3.60	4.48	4.03	20.6 c-f	23.1de	16.7f	20.1c	38.50bc	42.25b-d	32.51d-f	37.75ab
9	34 5b-e	30.4ab	27.9hi	30.9a-c	4.30	3.95	4.28	4.18	25.9a-c	25.2de	23.7a-d	24.9a-c	41.75bc	44.25a-d	32.92d-f	39.64ab
10	28.2e	29.1ab	27.3hi	28.2c	3.90	4.13	4.35	4.13	17.2f	22.5e	18.3d-f	19.3c	40.00bc	26.75f	50.12a	38.96ab
11	42.6a	28.8ab	25.4i	32.3a-c	3.50	3.55	3.83	3.63	28.3a	15.5f	23.9a-c	22.6bc	35.50bc	32.00ef	36.47c-e	34.66b
12	34.2b-e	32.2ab	37.1b-e	34.5a-c	4.05	3 95	4.90	4.30	24.9a-d	31.2ab	23.9a-c	26.6ab	40.25bc	42.50b-d	34.82de	39.12ab
13	29 7de	33.7a	30 8e-i	31.4a-c	3.70	3.65	4.55	3.97	20.7b-f	24.3de	19.8b-f	21.6bc	40.50bc	39.25c-e	38.58b-d	39.44ab
14	36.2a-d	31.8ab	30.7f-i	32.9a-c	3.70	4.13	4.95	4.26	22.4a-f	30.7a-c	22.4a-e	25.2a-c	37.50bc	45.75a-d	43.88ab	42.38ab
15	38.1a-c	29.7ab	28.0hi	31.9a-c	4.00	4.40	4.70	4.37	18.8 d-f	22.5e	18.7c-f	20.0c	39.25bc	38 25de	26.66f	34.72b
16	38.3a-c	33.9a	35.9b-f	36.0ab	3.60	3 68	4 75	4.01	27.9a	32.7a	25.3ab	28.6a	40.50bc	40.75b-d	43.25bc	41.50ab
17	38.8a-c	28.3ab	36.3b-f	34.5a-c	4.00	4.40	4.93	4.44	26.9ab	22.6e	25.4a	24.9a-c	36.75bc	36.00de	37.94b-d	37.56ab
18	35.0b-e	26.3b	38.3b-d	33.2a-c.	4.40	4.45	4 83	4.56	21.0b-f	28.1a-e	22.2a-e	23.7a-c	37.75bc	41.00b-d	31.23d-f	36.66ab
19	34.1b-e	28.0ab	31.4e-i	31.2a-c	4.35	4.50	4.40	4.42	20.7b-f	23.4de	21.9a-f	22.0bc	38.75bc	48.50ab	33.45d-f	40.23ab
20	29 5de	26.6b	30.2g-i	28.8c	3.5	3.6	3.75	3.62	18.6d-f	20.5e	19.4b-f	19.5c	33.22e	32.00ef	34.77de	33.33b
F-test	**	*	**	**	N .S	N. S	N S	N. S	**	**	**	**	**	**	**	**

Table (3): Mean performance of the various studied peanut genotypes during three summer successive seasons for seed weight / plant (gm) , 100- pod weight (gm), 100-seed weight (gm) and shelling percentage

No.	Seed weight/plant (gm)				100- pod weight (gm)				100- seed weight(gm)				Shelling %			
	2003	2004	2005	Comb.	2003	2004	2005	Comb.	2003	2004	2005	Comb.	2003	2004	2005	Comb.
1	34.25a	25.15cd	30.70bc	30.03a	142.0fg	172.0b-f	186.0 bc	166.7f	74 0b-e	76.5 a-e	80.3d-f	76.9bc	65.75a-d	62.75c-e	72.00a-c	66.83ab
2	24.32bc	25.91cd	25.29d-f	25.17ab	175.5a-c	169.5c-g	185.8 bc	176.9c	74.5b-e	73.5b-f	82.3b-f	76.8bc	61.50b-e	62.25c-e	70.25a-d	64.67ab
3	24.02bc	27.02cd	22.16d-f	24.40ab	178.8ab	164.5d-g	181.5b-d	174.9c	78.3a-d	79.5a-d	85.5b-e	81.1bc	65.50a-e	65.25a-d	59.00ef	63.25ab
4	28.03b	25.73cd	21.48d-f	25.08ab	180.0ab	190.8a-c	187.5b	186.1a	79.0a-d	79.5a-d	76.3f	78.3bc	64.50a-e	61.75c-e	72.25a-c	66.17ab
5	28.80ab	30.93a-c	25.53d-f	28.42ab	173.3a-d	191.0a-c	190.0a	184.8ab	81.0a-c	82.3a	80.3d-f	81.2bc	70.00ab	71.00a	69.75a-d	70.25a
6	28.72ab	23.53de	25.43d-f	25.89ab	181.5ab	160.0e-g	175.5c	172.3c-e	81.3ab	67.8f	86.3b-e	78.4bc	71.25a	61.25c-e	75.75ab	69.42a
7	22.44bc	34 29a	21.50d-f	26.08ab	182.0ab	190.3a-c	189.5b	187.3a	82.0a	82.8a	81.8c-f	82.2a-c	67.50a-d	67.00a-c	62.25de	65.58ab
8	24.85bc	23.78de	21.60d-f	23.41b	172.8a-d	163.0e-g	175.8c	170.5c-e	78.3a-d	68.3f	88.5b-d	78.3bc	64.50a-e	56.50e	67.25b-e	62.75ab
9	26.79bc	29.40a-d	23.01d-f	26.40ab	167.5a-d	148.8g-i	174.5c	163.6f	72.8de	70.3ef	82.3b-f	75.1c	64.00a-e	66.75a-c	70.00a-d	66.92ab
10	25.94bc	17.51f	38.12a	27.19ab	136.5g	137.5hi	169.0e	147.7h	75.0a-e	75.0b-f	87.3b-e	79.1bc	64.75a-e	65.75a-d	76.00ab	68.83ab
11	24.48bc	18.96ef	26.66cd	23.37b	140.5fg	133.0i	191.8a	155.1g	76.3a-e	68.3f	83.0b-f	75.8c	69.00a-c	59.00de	73.00a-c	67.00ab
12	24.74bc	26.26cd	24.43d-f	25.11ab	174.0a-c	174.3b-f	180.8b-d	176.4c	80.8a-c	72.5d-f	85.5b-e	79.6bc	61.25c-e	62.00c-e	73.75a-d	64.67ab
13	26.62bc	24.58de	20.44f	23.88ab	171.3a-d	162.0e-g	186.5bc	173.3cd	78.8a-d	74.8b-f	78.8ef	77.4bc	66.25a-d	62.75c-e	53.00f	60.67b
14	24.43bc	28.36b-d	31.90b	28.23ab	162.0b-f	173.0b-f	176.5c	170.5e	75.8a-e	74.5b-f	91.3b	80.5bc	65.00a-e	62.00c-e	72.75a-c	66.58ab
15	23.69bc	25.16cd	20.68ef	23.18b	145.3e-g	157.3f-h	169.0e	157.2g	71.0e	74.8b-f	88.3b-d	78.0bc	59.75de	65.25a-d	77.50a	67.50ab
16	25.29bc	26.24cd	31.16bc	27.56ab	153.8c-g	180.3b-e	169.3e	167.8f	73.8c-e	77.0a-e	79.8d-f	76.8bc	62.75a-e	64.50a-d	72.00a-c	66.42ab
17	21.00c	24.16de	26.22c-e	23.79ab	150.8d-g	161.5e-g	161.0d	157.8g	75.3a-e	72.8c-f	85.5b-e	77.8bc	57.00e	63.75b-d	69.00a-d	63.25ab
18	26.47bc	28.60a-d	20.38f	25.15ab	186.3a	193.5ab	181.3b-d	187.0a	82.0a	80.8ab	90.5bc	84.4ab	70.75a	69.75ab	65.25c-e	68.58ab
19	25.38bc	33.63ab	22.73d-f	27.25ab	173.0a-d	186.0a-d	185.3bc	181.4b	79.3a-d	80.0a-c	89.1a	82.8a	65.50a-e	67.00a-c	68.00b-d	66.83ab
20	19.74c	20 00d-f	23.38d-f	21.02ab	167.0a-e	161.5e-g	191.7a	173.4cd	76.3a-e	78.5a-d	75.0f	76.6bc	59.73de	62.5c-e	67.25b-e	63.06ab
F-test	*	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**

The results indicated significant differences among the genotypes for all studied characters, except number of branches/plant during the three summer seasons and the combined data. This result suggest that the studied genotypes differed in genes controlling yield and its attributes

Introductions 1, 5, 16 and 19 had the highest values for most studied characters based on combined data, when compared with local cultivar Giza 4. These genotypes are of great interest for the plant breeder to be involved in breeding program aiming to improve yield and its attributes. In this respect, significant differences were reported for plant height, number of pods/plant, weight of pods/plant, weight of seeds/plant, 100-pod weight, 100-seed weight, shelling%, pod yield/fed and seed yield/fed. Similar results were reported by Attia *et al*, 2000 and EL – Sawy *et al*, 2000.

Table (4): Mean performance of the various studied peanut genotypes during three successive seasons for pod yield(ardabd/fed) and seed yield (ardab) /fed

No.	Pod yield (ardab) / fed				Seed yield (ardab) / fed			
	2003	2004	2005	Comb.	2003	2004	2005	Comb.
1	26.275 ab	17.482b-e	18.307a-c	20.688a-c	17.261ab	10.945d-g	13.190ab	13.798a-c
2	19.483d-f	15.445e	17.665b-d	17.531a-c	14.688a-d	9.599g	12.407bc	12.321c-g
3	18.308f	21.793ab	17.223b-d	19.108a-c	12.053cd	14.188a-c	10.176b-d	12.139c-g
4	27.590a	21.570ab	17.178b-d	22.173a	17.736a	13.504b-d	12.380b-d	14.540a
5	24.257a-c	21.435a-c	16.227cd	20.640a-c	16.991ab	15.123ab	11.384b-d	14.499a
6	22.085b-f	17.075b-e	13.905cd	17.688a-c	15.678a-c	10.428fg	10.563b-d	12.223c-g
7	25.040a-c	24.412a	15.098cd	21.517ab	16.935ab	16.351a	9.434b-d	14.240ab
8	23.882a-d	16.608de	15.867cd	18.786a-c	15.421a-c	9.354g	10.615b-d	11.797d-g
9	21.317c-f	15.185e	14.535cd	17.012bc	13.658b-d	10.064fg	10.138b-d	11.286g
10	21.035c-f	15.082e	21.355ab	19.158a-c	13.591b-d	9.992fg	16.305a	13.296a-f
11	19.775d-f	15.965de	13.743cd	16.494c	13.614b-d	9.433g	9.975b-d	11.007g
12	22.505b-f	15.110e	14.312cd	17.309bc	13.768b-d	9.236g	10.178b-d	11.061g
13	20.825c-f	16.930c-e	16.255cd	18.003a-c	14.007b-d	10.535e-g	8.598d	11.047g
14	19.158ef	14.813e	16.382cd	16.951bc	12.463cd	9.208g	12.322b-d	11.331fg
15	18.073a	17.068b-e	15.800cd	16.980a-c	16.799ab	11.012d-g	12.239b-d	13.350a-e
16	22.850b-e	16.390de	22.032a	20.424a-c	14.853a-d	10.533e-g	15.850a	13.745a-d
17	19.835d-f	18.555b-e	16.497cd	18.296a-c	11.315d	11.805c-g	11.502b-d	11.541e-g
18	19.555d-f	19.260b-e	14.850cd	17.888a-c	13.850b-d	13.416b-e	9.653b-d	12.306c-g
19	18.965ef	20.690a-d	13.380d	17.678a-c	12.406cd	13.843a-d	9.200cd	11.817c-g
20	16.299f	14.950e	15.425cd	15.558c	9.686e	9.344g	10.373b-d	9.801h
F-test	**	**	**	**	**	**	**	**

2- Phenotypic, genotypic, environmental variances and heritability :

Data presented in Table (5) show phenotypic, genotypic and environmental variances were high for 100-pod weight during the three seasons. Meanwhile the values of phenotypic, genotypic and environmental variances were moderate for pods weight/palnt, 100-seed weight, shelling %, plant height, number of pods/plant, seed weight/plant and pod yield/fed. Whereas, low phenotypic, genotypic and environmental variances were obtained for number of branches/plant and seed yield/fed. These results are hold true in the three summer growing seasons. Similar findings were obtained by Vaddoria and Patil, 1990 and Nazaar *et al*, 2000.

Table (5): Phenotypic, genotypic and environmental variance of the studied characters in a group of genotypes of peanut during 2003,2004 and 2005 seasons.

Variable.	δ^2ph			δ^2G			δ^2E		
	2003	2004	2005	2003	2004	2005	2003	2004	2005
1- Plant height.	27.55	16.47	37.44	9.73	2.83	23.07	17.82	13.64	14.37
2- No.of branches/plant.	0.36	0.33	0.26	0.05	0.03	0.03	0.32	0.29	0.23
3-No.of pods/plant.	20.28	26.04	14.36	6.91	15.22	3.87	13.36	10.81	10.49
4-Pod weight / Plant.	34.82	47.78	44.91	7.40	22.46	24.38	27.42	25.33	20.53
5 –seed weight / plant.	19.20	27.73	30.03	3.88	14.41	18.92	15.32	13.32	11.11
6- 100 –pod weight.	381.80	493.12	798.00	189.97	309.64	586.70	191.83	183.48	211.30
7-100-Seed weight.	24.27	35.32	66.10	6.07	16.71	37.27	18.20	18.61	28.83
8-shelling % .	31.84	24.85	55.31	6.70	7.72	27.45	25.15	17.12	27.85
9-pod yield / fed .	13.69	13.88	10.96	6.72	5.56	3.29	6.97	8.32	7.68
10- seed yield /fed .	7.04	7.16	7.82	2.31	3.88	2.94	4.73	3.27	4.88

As presented in Table (6). The highest value of (P. C. V) was observed for seed yield/fed followed by seed weight/plant, pod yield/fed, and number of pod/ plant, pod weight/plant and plant height. These results were consistent with those found by Ammar *et al.* 1997.

Low values of (P. C. V) were obtained for 100-seed wight in 2003 summer season, 100-seed weight and shelling percentage in 2004 and 2005 season, respectively (Ammar *et al*, 1997).

Genotypic coefficient of variability (G. C. V) varied from (3.19%) for 100-seed weight in (2003) to (17.31%) for seed weight/plant in (2005) and was generally low.

It could be noted that the phenotypic, genotypic variance was high during the three seasons for 100-pod weight. Meanwhile, the lowest values of phenotypic, enotypic variances were, also, obtained for number of branches/plant. This was, also, true in the three growing seasons for environmental variances. Several research works reported similar findings which are accordance with our results (Yadav *et al*, 1998 and EL – Sawy, *et al* , 2000).

Heritability estimates in broad sence showed that higest values (> 50%) were obtained for seed wieght/plant (63.00%) in 3rd season (2005) and 100-pod weight (73.52%) during 2005 summer growing season.While moderate values (30-50%) for plant height , 100-seed weight, pod weight/plant, pod yield/fed, shelling % and seed yield/fed, whereas low values (<30%) for number of branches/plant These results give the peanut breeder valueable information when planning a breeding program to improve seed yield and its components in peanut. Similar results were obtained by Chauhan and Shukla, 1985; Chaudhary, 1993 , Yadav *et al,* 1998 and Al Kaddoussi , *et al* , 2003.

3-Correlation studies :

The results of simple correlation between seed yield (ardab/fed) and its attributing characters for the twenty genotypes of peanut in combined analysis are listed in Table (7).

The associations between seed yield/fed and each of, 100-seed weight, shelling% and seeds weight/plant, were positive and highly significant,

Table (6): Phenotypic (P.C.V), genotypic (G.C.V) and environmental (E.C.V) coefficients of variability and heritabilty inbroad sence (h^2) of studied characters in a group of genotypes of peanut during 2003, 2004 and 2005 seasons.

Variable.	P . C . V %			G . C V %			E . C . V %			Heritability % (Tb)		
	2003	2004	2005	2003	2004	2005	2003	2004	2005	2003	2004	2005
1- Plant height .	14.91	13.56	18.39	8.86	5.62	14.44	11.99	12.34	11.39	35.31	17.18	61.62
2- No.of branches/plant.	15.12	14.15	11.07	5.47	4.59	3.59	14.09	13.39	10.47	13.09	10.53	10.51
3-No.of pods/plant.	20.01	19.46	17.61	11.68	14.83	9.14	16.24	12.54	15.05	34.09	58.47	26.94
4-Pod weight / Plant .	14.87	16.78	18.42	6.85	11.50	13.57	13.19	12.21	21.45	21.25	47.00	54.28
5 –seed weight / plant.	16.96	19.86	21.81	7.63	14.32	17.31	15.15	13.76	13.26	20.22	51.97	63.00
6- 100 –pod weight.	11.79	13.02	13.32	8.32	10.32	11.42	8.36	7.94	6.86	49.76	62.79	73.52
7-100-Seed weight .	6.38	7.88	9.53	3.19	5.42	7.15	5.52	5.72	6.29	25.00	47.30	56.38
8-shelling % .	8.67	7.77	10.75	3.98	4.33	7.58	7.71	6.45	7.63	21.03	31.08	49.64
9-pod yield / fed .	16.73	20.69	20.28	11.72	13.09	11.10	11.94	16.01	16.97	49.11	40.06	29.98
10- seed yield /fed .	18.23	23.13	24.69	10.45	17.04	15.13	14.94	15.64	19.50	32.87	54.29	37.58

Table (7): Simple correlation coefficients (r) among seed yield (ardab /fed) and other studied characters of peanut genotypes .

Characters .	2	3	4	5	6	7	8	9	10
1- Seed yield /fed.	- 0.163	0.012	- 0.095	*0.269	0.030	0.018	** 0 .364	** 0.814	** 0.407
2- Pod yield / fed .		**- 0.323	0.186	- 0.017	- 0.075	- 0.029	- 0.106	- 0.114	- 0.070
3-Plant height.			- 0.016	- 0.075	**0.298	0.035	0. 202	- 0.023	0.038
4- No of branches / Plant .				**0.285	- 0.202	- 0.078	- 0.001	- 0.066	* 0.244
5 – No of pods / plant					- 0.131	- 0.088	0.049	** 0.336	** 0.880
6-Weight of pods/ plant .						**0 .296	* 0.226	- 0.094	- 0.007
7-100- pod weight.							* 0.220	- 0.063	0.020
8-100- seed weight.								0.023 .	**0.509
9-Shelling % .									** 0.296
10-Weight of seeds / plant .									

Moreover possitive and significant correlation with number of pods/plant. however, the interlationships among seed yield/fed and the remaining characters ,i.e plant height, weight of pods/plant and 100-pod weight were positive.In this connection, AL- Kaddoussi *et al*, 2003 reported positive and highly significant correlation between seed yield/fed with number of pods/plant and weight of seeds/plant.

Negative and highly significant correlation was recorded between pod yield/fed and plant height.On the contrary pod yield/fed gave positive osssciation with number of branches/plant – Plant height gave positive and highly significant with weight of pods/plant, while possitive and insignificant with 100-pod weight, 100-seed weight and weight of seeds/plant, of branches/plant gave positive and highly significant association with number of pods/plant and significant with weight of seeds/plant Number of pods/plant correlated positively and highly significant with shelling percentage and weight of seeds/plant.While gave possitive and insignificant with 100-seed weight, Similar results were found by AL- Kaddoussi *et al*, 2003. Weight of pods yield/plant, associated possitively and significant with 100-pod weight, 100-pod weight associated positively and significant with 100- seed weight. While gave possitive correlation with weight of seeds/plant, Alos, 100-seed weight correlated positive and highly significant with weight of seeds/plant.While possitive and insignificant with shelling %. Shelling % showed positive and highly significant corrlation with weight of seeds/plant. These results were in agreement with those obtained by Kale *et al*, 1988, Islam and Rasul, 1998, Khurram *et al*, 1998, EL-Sawy *et al*, 2000, Nazaar *et al*, 2000 and AL-Kaddoussi *et al*, 2003. These results are of great attention for peanut breeder to plan effective and correct breeding program to improve seed yield and its components.

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المقاييس الوراثية وعلاقتها بالمحصول ومكوناته فى الفول السودانى

فوزى محمد اسماعيل ، على ناصف على عبدالعال و نبيل محمود عبدالجواد
قسم بحوث المحاصيل الزيتية – معهد بحوث المحاصيل الحقلية – مركز البحوث الزراعية بالجيزة ج.م.ع

أجريت ثلاث تجارب حقلية بمحطة البحوث الزراعية بالاسماعيلية خلال الفترة من ٢٠٠٣ وحتى ٢٠٠٥ لعشرين تركيب وراثى من الفول السودانى شملت تسعة عشر سلالة مستوردة والصنف المحلى (جيزة ٤) لدراسة أداء التراكيب الوراثية المختلفة وتقدير مكونات التباين ومعامل الاختلاف المظهرى والوراثى والبيئى وكذلك معامل التوريث ومعامل الارتباط بين محصول البذور وبعض الصفات الهامة مثل : ارتفاع النبات – عدد الافرع/نبات – عدد قرون النبات– وزن قرون النبات– وزن بذور النبات– وزن ١٠٠ قرن –وزن ١٠٠بذرة– التصافى% –محصول القرون بالاردب/فدان– محصول البذور بالاردب/فدان.

أظهر تحليل التباين وجود اختلاف معنوى بين التراكيب الوراثية فى الصفات تحت الدراسة خلال المواسم الثلاثة وكذلك التحليل المشترك فيما عدا صفة عدد الافرع/نبات.

كما أظهرت النتائج تفوق التراكيب الوراثية رقم ١،٥، ١٦، ١٩المعظم الصفات تحت الدراسة فى التحليل التجميعى عند مقارنتها بالتركيب الوراثى المحلى جيزة ٤.

أظهرت النتائج أن أعلى قيم لمكونات التباين المظهرى والوراثى والبيئى تم الحصول عليها لصفة وزن الـ١٠٠ قرن فى المواسم الثلاثة تحت الدراسة وكانت أقل قيم لمكونات التباين المظهرى والوراثى والبيئى لصفة عدد الافرع /نبات

اختلفت قيم معامل الاختلاف المظهرى والوراثى والبيئى لكل الصفات تحت الدراسة من موسم إلى موسم ومن صفة إلى صفة أخرى وكانت أعلى قيم لمعامل الاختلاف المظهرى مرتفعة لصفة عدد القرون/نبات ومحصول القرون ومحصول البذور/فدان وكانت القيم المنخفضة لوزن ١٠٠ بذرة (٢٠٠٣) ووزن الـ١٠٠ بذرة ونسبة التصافى وكانت قيم معامل الاختلاف الوراثى مرتفعة فى المواسم الثلاثة كالأتى: محصول القرون/نبات (٢٠٠٤) وأخذت القيم المنخفضة نفس الاتجاه فى التباين المظهرى.

كانت أعلى قيم لكفاءة التوريث فى المعنى العام (أكبر من ٥٠%) لصفة وزن بذور النبات ووزن الـ١٠٠ قرن وكانت متوسطة إلى منخفضة فى باقى الصفات أظهرت معاملات الارتباط بين محصول البذور/فدان ومكوناته ارتباط موجب ومعنوى بين محصول البذور /فدان وكل من عدد القرون /نبات ووزن ١٠٠ بذرة ونسبة التصافى ومحصول البذور /نبات.

هذه النتائج ذات أهمية لمربى الفول السودانى عند تخطيط برنامج تربية ناجح وفعال لتحسين محصول البذور والصفات الأخرى الهامة.