(*Pisum sativum* L.)

(3)   (2)   (1)

(6)

.   (4)

.

– 0.42)

(0.91 – 0.42)   (0.90

.

Dasargelo x Nassra   (% 25.95) Mutant-3 x Dasargelo
(% 37.31) Dasargelo x Oterlo   (% 25.11)

Dasargelo x Oterlo

.

F_2 :

.

(2)   (1)

(3)

.

.

Estimation of Coefficient of Variance, Heritability and Expected Genetic Advance for Earliness Indices in Garden Pea Crop (*Pisum sativum* **L.**)

F. Al-Aysh[1]**; B. Abo-Trabi**[2]

and S. Makhool[3]

ABSTRACT

Genotypic and phenotypic coefficient of variance, broad and narrow-sense heritability, expected genetic advance and relative genetic advance of earliness characteristics in six pea hybrids produced by 4 x 4 half-diallel crossing scheme were estimated. The results, in general, showed low values of phenotypic coefficient of variance (in all crosses) of days to beginning of flowering and days to marketable maturity; which may indicates to a low effect of environmental variation on the expression of both these characters, but were medium to high for number of low internodes and internode's length. Estimates of heritability in broad sense were medium to high for days to beginning of flowering (0.42 – 0.90) and days to marketable maturity (0.42 – 0.91), and biased estimates of narrow-sense heritability have been recorded in most of the crosses and in majority of the parameters studied; so we can't adopt them as reliable data. The highest estimates of relative expected genetic advance of number for low internodes have been observed in Mutant-3 x Dasargelo (25.95%) and Dasargelo x Nassra (25.11 %) and for internode's length in Dasargelo x Oterlo (37.31 %). The selection procedure can be effectively made for achievement further improvement of internode's length in early segregating generations of Dasargelo x Oterlo hybrid; because it has high values of genotypic coefficient of variance, broad-sense heritability and relative expected genetic advance.

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(*Pisum sativum* L.)

$(2n = 14)$

.(McPhee, 2003)

(1964) Rowlands
(1996) Graham and Welch .

(1997) John and Thangavelu

.

(1998) Sardana
(% 15.59) (% 79.37)

.

(1999) Zitelli and Mariani

.

(2000) Sureja and Sharma

(2004) Anu
Khan
(2006)

.

325

(Singh and Singh, 2006). (2006)

(81%)

(31%) 50% F_1

.

50 %

(90.62%) (Nawab *et al*., 2008).

.

.

2009/11/9

(6) F_1

(Dasargelo:

Quadrisem Oterlo:

Asgrow Nassra:

Sativa

326

10533   Mutant-3:

(

F$_2$ (6)   (12)

F$_1$

2008/8/17   4×4   2007/11/26

F$_2$ F$_1$

F$_1$ 2009/2/10

.

(F$_1$ P$_2$ P$_1$)   (F$_2$ BC$_2$ BC$_1$)

70   4.8

20

.

:

.

Mstat-c

:   Angarawai *et al*.(2008)

$$V_{Ph} = V_{F2}$$
$$V_E = (V_{P1} + V_{P2} + 2\, V_{F1}) / 4$$
$$V_G = V_{F2} - V_E$$
$$V_A = 2\, V_{F2} - V_{B1} - V_{B2}$$
$$V_D = V_{B1} + V_{B2} - V_{F2} - V_E$$

:

:V_D :V_A :V_G :V_E :V_{Ph}

.   :V_{F2}

.   :V_{F1} V_{P2} V_{P1}

.   :V_{B2} V_{B1}

:

Francis and   (P.C.V.)   (G.C.V.)   -1

:   (1978) Kannenberg

G.C.V. = σ $_G$ / X * 100
P.C.V. = σ $_{Ph}$ / X * 100

:

σ $_G$ σ $_{Ph}$:   X: F$_2$.

2- (H) Allard (1960) :

H = V$_G$ / V$_{Ph}$

:

V$_G$:   V$_{Ph}$: .

3- (h ^{2}) Warner (1952):

h ^{2} = V$_A$ / V$_{Ph}$

:

V$_A$:   V$_{Ph}$: .

4- (GA) Falconer (1967):

GA = k * σ $_{Ph}$ * H

:

k: (1.76) %10 σ $_{Ph}$:
H: .

5 − (REGA) Singh (1983)
:

REGA = GA / X * 100

:

X: F$_2$ GA: .

(1)

Oterlo x
Mutant-3 x   Nassra
Oterlo Mutant-3 x Nassra Oterlo x Nassra
.

(1)   ( )

.

0.373[**]	2.346[**]	140.405[**]	150.580[**]	**Mutant-3 x Dasargelo**
0.166	11.836[**]	515.333[**]	479.822[**]	**Mutant-3 x Oterlo**
0.125	20.503[**]	570.369[**]	321.357[**]	**Mutant-3 x Nassra**
0.415[*]	10.54[**]	152.226[**]	68.259[**]	**Dasargelo x Oterlo**
0.423[**]	7.18[**]	244.476[**]	91.201[**]	**Dasargelo x Nassra**
0.270	0.762	48.75[**]	17.387[**]	**Oterlo x Nassra**

**   .%5   [*].%1   [**]

-1   :

Mutant-3   (54.15   )

Oterlo   (74.35   )

)

(Mutant-3 x Nassra   x Oterlo

Nassra F_2

) F_1(

(2   ).

x Dasargelo

Oterlo   (% 9.83   9.33)

.(3   )   (4)

Mutant-3 x Nassra   Oterlo x Dasargelo

Mutant-3 x Dasargelo   Oterlo x Nassra   Dasargelo x Nassra   (0.68 0.69 0.90 0.71)

Mutant-3 x Oterlo (0.57 0.42)

(0.00)   (-3.4)   Mutant-3 x

Dasargelo (1.00)   (1.08 1.65 1.13)   Mutant-

3 x Oterlo Dasargelo x Oterlo Dasargelo x Nassra

Robinson   Dudley and Moll (1955)

(1969)

(%15.56 ~ 4.45)   Dasargelo x Oterlo.

(σ^2) $\overline{X}$)   (2)

.

BC$_2$	BC$_1$	F$_2$	F$_1$	P$_2$	P$_1$			
67.30	59.25	57.95	53.70	68.60	54.15	$\overline{X}$	Mutant-3 x Dasargelo	
20.74	44.94	12.17	7.20	10.95	3.04	σ^2		
78.55	59.85	57.81	50.20	77.05	54.15	$\overline{X}$	Mutant-3 x Oterlo	
4.90	25.60	34.85	26.91	3.36	3.04	σ^2		
73.25	59.03	56.73	55.85	74.35	54.15	$\overline{X}$	Mutant-3 x Nassra	
10.40	28.22	27.85	12.48	4.61	3.04	σ^2		
78.98	72.88	71.96	68.50	77.05	68.60	$\overline{X}$	Dasargelo x Oterlo	
11.66	5.78	49.93	2.74	3.36	10.95	σ^2		
78.28	71.55	73.55	63.20	74.35	68.60	$\overline{X}$	Dasargelo x Nassra	
13.46	8.84	24.20	7.44	4.61	10.95	σ^2		
79.33	80.90	79.25	78.45	74.35	77.05	$\overline{X}$	Oterlo x Nassra	
16.38	13.92	19.21	8.19	4.61	3.36	σ^2		
104	98	97	90	109	98	$\overline{X}$	Mutant-3 x Dasargelo	
23.72	35.34	20	6.27	12.8	21.22	σ^2		
117	98	99	87	118	98	$\overline{X}$	Mutant-3 x Oterlo	
10.00	21.90	35.91	31.25	5.20	21.22	σ^2		
114	101	98	94	127	98	$\overline{X}$	Mutant-3 x Nassra	
12.54	43.26	34.85	22.05	4.05	21.22	σ^2		
126	118	117	108	118	109	$\overline{X}$	Dasargelo x Oterlo	
36.10	21.32	96.80	8.19	5.20	12.8	σ^2		
123	116	118	104	127	109	$\overline{X}$	Dasargelo x Nassra	
27.56	7.40	36.99	6.05	4.05	12.8	σ^2		
127	125	127	121	127	118	$\overline{X}$	Oterlo x Nassra	
30.98	23.10	45	21.63	4.05	5.20	σ^2		

...(2)

7.38	6.38	6.55	5.60	6.70	6.10	$\overline{X}$	Mutant-3 x Dasargelo
2.32	1.60	2.08	0.64	0.96	0.52	σ^2	
8.43	6.80	7.36	7.15	11.20	6.10	$\overline{X}$	Mutant-3 x Oterlo
3.84	2.32	1.36	2.04	1.46	0.52	σ^2	
11.88	7.33	7.86	7.20	10.95	6.10	$\overline{X}$	Mutant-3 x Nassra
2.32	0.92	2.08	1.26	0.46	0.52	σ^2	
12.00	9.98	9.89	9.70	11.20	6.70	$\overline{X}$	Dasargelo x Oterlo
1.96	1.60	2.88	1.56	1.46	0.96	σ^2	
10.28	9.25	9.40	8.70	10.95	6.70	$\overline{X}$	Dasargelo x Nassra
2.12	1.76	3.20	0.88	0.46	0.96	σ^2	
4.73	5.21	4.61	4.55	4.63	4.18	$\overline{X}$	Mutant-3 x Dasargelo
0.68	0.48	0.80	0.72	0.72	0.40	σ^2	
3.66	4.00	3.86	3.88	3.78	4.63	$\overline{X}$	Dasargelo x Oterlo
0.56	0.68	1.36	0.20	0.52	0.72	σ^2	
4.10	4.41	4.53	4.35	3.65	4.63	$\overline{X}$	Dasargelo x Nassra
0.56	0.56	0.80	0.20	0.28	0.72	σ^2	

2– :

(98) Mutant-3

(127) Nassra

Oterlo x Nassra

(2) Mutant-3 x Dasargelo F$_2$

(Quick, 1998).

.(3)

(0.91 ~ 0.38)

Dasargelo x Oterlo

Mutant-3 x Dasargelo (-0.95) (0.00)

Dasargelo x Oterlo (1.41) (1.00)

(% 13.47) Dasargelo x Oterlo

(4   )

(Paul and Wehner, 2001)

.

-3   :

Mutant-3

Oterlo   (11.2   6.1)

F_1 Mutant-3 x Dasargelo

.(2   )

Mutant-3 x Dasargelo   (% 21.99)

.(3   )

(3)

F_2 .

P.C.V.	G.C.V.	V_D	V_A	V_E		
6.02	3.88	46.41	-41.34	7.10	Mutant-3 x Dasargelo	
10.21	7.70	-19.41	39.20	15.06	Mutant-3 x Oterlo	
9.31	7.83	2.63	17.07	8.15	Mutant-3 x Nassra	
9.83	9.33	-37.44	82.42	4.95	Dasargelo x Oterlo	
6.69	5.53	-9.52	26.11	7.61	Dasargelo x Nassra	
5.53	4.57	5.01	8.11	6.09	Oterlo x Nassra	
4.61	2.98	27.42	-19.06	11.60	Mutant-3 x Dasargelo	
6.05	3.74	-26.24	39.92	22.23	Mutant-3 x Oterlo	
6.02	4.28	3.62	13.89	17.34	Mutant-3 x Nassra	
8.41	8.03	-47.98	136.18	8.60	Dasargelo x Oterlo	
5.15	4.62	-9.28	39.03	7.24	Dasargelo x Nassra	
5.28	4.45	-4.05	35.92	13.13	Oterlo x Nassra	
21.99	18.02	1.15	0.24	0.69	Mutant-3 x Dasargelo	
15.90	- [†]	3.28	-3.44	1.52	Mutant-3 x Oterlo	
18.32	14.00	0.28	0.92	0.88	Mutant-3 x Nassra	
17.19	12.34	-0.71	2.20	1.39	Dasargelo x Oterlo	
19.04	16.49	-0.12	2.52	0.80	Dasargelo x Nassra	
19.31	8.68	-0.28	0.44	0.64	Mutant-3 x Dasargelo	
30.31	25.39	-0.53	1.48	0.41	Dasargelo x Oterlo	
19.65	14.79	-0.03	0.48	0.35	Dasargelo x Nassra	

V_E: V_A: V_D: G.C.V.:

P.C.V.:   †:   .

(-0.24)　　　　　　(0.00)

Dasargelo x Nassra　　　　　(0.75)　Mutant-3 x Oterlo

(2.53)　　　　　(0.00)

Dasargelo x Nassra　　　(0.79)

(%25.11　25.95)

Dasargelo x Nassra　Mutant-3 x Dasargelo

.(4　　)

(4)

REGA	GA	h^2	H		
4.45	2.58	-3.4	0.42	Mutant-3 x Dasargelo	
10.24	5.92	1.13	0.57	Mutant-3 x Oterlo	
11.63	6.60	0.61	0.71	Mutant-3 x Nassra	
15.56	11.20	1.65	0.90	Dasargelo x Oterlo	
8.13	5.98	1.08	0.69	Dasargelo x Nassra	
6.61	5.24	0.42	0.68	Oterlo x Nassra	
3.40	3.30	-0.95	0.42	Mutant-3 x Dasargelo	
4.05	4.01	1.11	0.38	Mutant-3 x Oterlo	
5.30	5.19	0.40	0.50	Mutant-3 x Nassra	
13.47	15.76	1.41	0.91	Dasargelo x Oterlo	
7.25	8.56	1.06	0.80	Dasargelo x Nassra	
6.61	8.39	0.80	0.71	Oterlo x Nassra	
25.95	1.70	0.12	0.67	Mutant-3 x Dasargelo	
-	$-^†$	-2.53	-0.24	Mutant-3 x Oterlo	
18.70	1.47	0.44	0.58	Mutant-3 x Nassra	
15.77	1.56	0.76	0.52	Dasargelo x Oterlo	
25.11	2.36	0.79	0.75	Dasargelo x Nassra	
6.73	0.31	0.55	0.20	Mutant-3 x Dasargelo	
37.31	1.44	1.09	0.70	Dasargelo x Oterlo	
19.43	0.88	0.60	0.56	Dasargelo x Nassra	

:

REGA:　　　　　GA:　　　　h^2:　　　　H:

$†$:

.

4- : ‏
Nassra   (3.65   )   Dasargelo
(4.63   )   F₁
F₂   (2).
Dasargelo x   Mutant-3 x Dasargelo
Nassra   (19.31 19.65 %)
Dasargelo x Oterlo (30.31 %)
(3).
(0.20 ~
(0.70   Dasargelo x Oterlo
(1.00)   Mutant-3 x Dasargelo   (0.55)
(1.09)   Dasargelo x Oterlo
Dasargelo x Oterlo (37.31
(%   Dasargelo x Nassra (19.43 %)
Mutant-3 x Dasargelo (6.73 %) (4).
Ghizan and Gritton (1994)
.

: ‏

1-

.

2-
-

)
(‏
(1984)
(,Hill
Yamada
(1996; Mather, 1949).

334

3-

‑   ‑

‑   (   )

.

4-

Dasargelo x Oterlo

(% 37.37   70   25.39)

Mutant-3 x Nassra
Dasargelo x Oterlo
Dasargelo x Oterlo
.Dasargelo x Nassra   Mutant-3 x Dasargelo

1-

‑   ‑

.

2-

.

3-

×

.

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