Evaluation of Germplasm for Some Quantitative Characters in Opium Poppy (*Papaver somniferum* L.)

OP Singh

Department of Horticulture, Narendra Dev University of Agriculture and Technology, Kumarganj, Faizabad-224229, Uttar Pradesh

Key Words: Opium poppy, Characterization, Alkaloids, Seed oil yield, Genetic variability

Opium poppy (*Papaver somniferum* L) is one of the most important medicinal plant. This plant is well known for its medicinal value and is frequently used in different systems of medicine for the treatment of various diseases. It is cultivated in U.P., M.P. and Rajasthan in India. The latex of opium poppy contains about 40 alkaloids. These alkaloids are used by pharmaceutical industries for preparing various medicines. The seed of opium poppy is equally important. The seed contains about 60-65% oil. In European countries it is cultivated as oil seed crop. In India, seeds are used as a spice.

Now-a-days due to very narrow genetic base its latex yield potential is almost at plateau stage. There is need to introduce new genetic variability to break down the yield barrier. The present investigation was undertaken with the objective to know the genetic variability for different characters in 58 genotypes of poppy.

The 58 germplasm lines were sown in randomized block design with two replications in a plot size of 4.0 x 0.3 m at a spacing of 30 cm row to row and 10 cm plant to plant in November 1999. Normal cultural practices were followed. The observations were recorded for plant height (cm), stem diameter (cm), peduncle length (cm), days to first flowering, capsule length (cm), capsule breadth, seed yield (g/plot), husk yield (g/plot) and latex yield (g/plot) (Table 1).

Table 1. Evaluation of germplasm of opium poppy for various quantitative and qualitative characters in opium poppy

S.No	Genotype	Plant height (cm)	Stem dia (cm)	Peduncle length (cm)	Day to 1st flowering	Capsule length (cm)	Capsule breadth (cm)	No. of Stigmatic rays	Seed yield/ plot (gms)	Husk yield /plot (gms)	Latex yield /plot (g)
1.	ND-4	110.7	1.12	21.70	102.0	3.18	3.65	13.3	240.0	167.5	8.51
2.	ND-6	109.7	1.11	22.50	101.0	3.15	3.84	13.0	195.0	155.0	10.66
3.	ND-7	103.4	1.07	19.70	101.5	3.02	3.71	13.5	240.0	272.5	10.75
4.	ND-8	101.9	1.06	24.50	103.0	3.11	3.65	13.0	210.0	190.0	11.73
5.	ND-9	109.9	1.24	21.40	105.0	2.47	3.81	13.3	122.5	127.5	11.69
6.	ND-10	106.3	0.91	23.90	102.0	2.52	3.53	12.4	197.5	127.5	6.84
7.	ND-11	118.2	1.08	26.00	97.5	2.97	3.88	13.2	265.0	247.5	12.10
8.	ND-12	107.2	1.09	23.00	98.5	3.08	3.90	13.3	247.5	265.0	12.63
9.	ND-16	116.0	1.07	24.00	101.0	3.15	3.83	13.9	177.5	260.0	10.05
10.	ND-17	102.6	0.90	22.50	101.5	3.07	3.76	13.6	232.5	217.5	7.06
11.	ND-20	111.3	1.10	23.40	105.5	3.16	4.01	13.9	217.5	195.0	6.03
12.	ND-21	114.1	1.06	24.00	102.5	3.09	3.81	14.3	185.0	215.0	7.60
13.	ND-22	123.6	1.19	27.00	103.0	2.49	4.03	14.0	227.5	272.5	9.6
14.	ND-23	109.2	1.04	26.00	102.5	2.70	4.12	15.8	220.0	257.5	9.7
15.	ND-24	121.3	1.21	28.00	100.5	3.40	4.25	13.5	170.0	223.0	9.2
16.	ND-25	118.4	1.37	22.80	99.5	3.32	3.81	13.5	167.5	245.0	6.96
17.	ND-26	107.8	1.22	22.10	99.5	3.24	4.16	14.0	220.0	255.0	12.55
18.	ND-28	114.8	1.12	24.00	100.0	3.39	3.90	14.3	182.5	242.5	7.19
19.	ND-29	105.7	1.05	23.30	101.5	3.32	4.21	14.5	265.0	192.5	6.55
20.	ND-31	110.5	1.03	23.70	103.0	3.23	4.04	13.5	287.5	252.5	11.21
21.	ND-35	105.2	1.16	23.60	102.0	3.65	3.95	13.2	287.5	237.5	11.83
22.	ND-36	107.0	1.05	23.50	98.5	3.86	3.70	12.4	100.0	187.5	8.09
23.	ND-37	119.0	1.17	25.10	99.5	3.73	4.13	13.4	222.5	165.0	7.75
24.	ND-38	120.2	1.22	24.90	101.5	3.64	3.71	13.8	197.5	190.0	8.30
25.	ND-40	107.6	0.99	23.70	99.0	2.92	3.64	12.9	260.0	255.0	10.44
26.	ND-41	121.4	1.04	24.30	99.5	2.51	3.36	13.5	205.0	242.5	18.90

Contd.

Table 1. Contd.

S.No	Genotype	Plant height (cm)	Stem dia (cm)	Peduncle length (cm)	Day to 1st flowering	Capsule length (cm)	Capsule breadth (cm)	No. of Stigmatic rays	Seed yield/ plot (gms)	Husk yield /plot (gms)	Latex yield /plot (g)
27.	ND-42	117.0	1.00	23.00	103.0	2.66	4.40	13.7	287.5	187.5	8.14
28.	ND-43	106.7	1.06	23.70	102.5	2.66	3.82	13.5	282.5	242.5	8.35
29.	ND-44	105.6	0.99	24.40	102.0	2.79	3.31	13.1	180.0	220.0	7.86
30.	ND-45	103.0	1.02	25.00	100.5	2.98	3.74	13.3	175.0	212.5	8.93
31.	ND-47	104.4	0.97	21.60	99.5	2.76	3.80	13.1	212.5	225.0	10.49
32.	*ND-48*	*114.8*	*1.07*	*24.90*	*99.5*	*2.71*	*3.98*	*13.4*	223.0	242.5	11.32
33.	*ND-89*	*108.0*	*0.98*	*24.10*	*99.5*	*2.90*	*3.58*	*13.0*	*167.5*	*220.0*	*7.58*
34.	ND208	112.3	0.92	24.80	100.5	3.00	4.02	14.0	187.5	275.0	10.61
35.	NC-57915	102.7	0.96	23.90	101.5	2.70	3.80	12.5	020.50	207.5	9.51
36.	NC-57923	98.4	0.94	21.00	102.0	3.76	3.78	13.8	160.0	215.0	9.42
37.	NC-57928	109.5	1.11	22.80	100.5	3.08	4.26	13.4	182.5	230.0	9.54
38.	NC-57936	117.7	0.92	24.80	100.5	3.79	3.66	14.3	190.0	155.0	7.54
39.	NC-57948	104.9	0.99	20.90	102.0	3.06	3.94	13.3	230.0	257.5	7.84
40.	NC-57950	120.2	1.21	24.60	103.5	2.83	3.69	13.9	242.5	272.5	8.55
41.	NC-57951	97.7	1.05	21.90	102.0	2.66	3.70	14.2	225.0	187.5	8.89
42.	NC-57955	103.9	0.99	26.10	58.5	2.03	3.51	13.3	150.0	192.5	7.34
43.	U.O-390	114.5	0.95	22.20	99.5	3.58	3.47	13.1	232.5	205.0	9.67
44.	U.O-285	109.3	1.14	23.10	101.5	3.80	4.04	13.9	235.0	215.0	8.75
45.	U.O-790	113.4	1.03	21.90	101.5	2.98	3.57	13.4	222.5	215.0	9.7
46.	U.O-1185	112.6	1.06	26.60	99.5	3.57	3.91	14.5	180.0	135.0	8.46
47.	U.O-1285	104.1	0.93	21.80	100.5	3.35	3.56	13.8	135.0	165.0	7.89
48.	U.O-1385	109.8	1.16	21.10	102.0	3.10	4.06	14.0	237.5	250.0	13.53
49.	U.O-1495	106.2	1.05	23.80	101.0	3.26	3.75	14.2	140.0	185.0	6.52
50.	U.O-1585	109.0	0.71	23.30	102.0	3.34	3.46	13.4	170.0	155.0	9.55
51.	U.0-1985	115.3	1.28	24.00	102.5	3.97	3.70	14.2	240.0	260.0	6.83
52.	MOP-217	109.5	1.09	21.70	100.5	3.52	3.96	13.9	160.0	190.0	10.31
53.	MOP-539	107.0	0.99	24.10	98.0	3.03	3.71	11.8	225.0	300.0	7.69
54.	NBPGR-2	107.4	0.94	25.80	100.5	2.86	3.70	14.4	132.5	155.0	7.38
55.	NBPGR-3	103.7	0.99	22.70	104.0	3.30	3.48	13.1	117.5	162.5	6.53
56.	NBRI-1	109.5	1.06	22.30	102.0	2.37	3.69	13.8	272.5	190.0	17.50
57.	Telia	106.7	0.98	22.60	100.5	3.64	3.91	13.9	190.0	172.5	7.45
58.	IC-15-2	106.1	0.99	24.60	101.5	3.19	4.08	14.0	140.0	172.5	6.22

Plant height varied from 97.7 cm to 123.6 cm. The maximum plant height was recorded for the genotype ND-22 and minimum for NC-57951. The variation in plant height indicates that there is enough scope for selection. The ideal plant height for cultivation is 100-110 cm. The maximum stem diameter was recorded for the genotype ND-37 (1.37 cm) and minimum for the genotype UO-1585 (0.71 cm). Peduncle length ranged from 19.7 cm to 28.0 cm. However, the longest peduncle was observed in genotype ND-24 and shortest in genotype ND-7. Earliest flowering took place in genotype ND-11 (97.5 days) and latest in genotype ND-9 (105.0 days). The capsule length ranged from 2.03 cm to 3.97 cm for the genotype NC-57935 and UO 1985 respectively. The capsule width varied from 3.31 cm (ND-44) to 4.40 cm (ND-42). The maximum number of stigmatic rays was recorded for the genotype ND-23 (15.8/capsule) and minimum for MOP-539 (11.8/capsule).

The seed yield varied from 100.00 g/plot to 287.5 g/plot for the genotype ND-36 and ND-31, respectively. The variation for seed yield indicates that there is enough scope for selection. The latex yield, which is the most important character ranged from 6.22 g/plot to 18.9 g/plot. The maximum latex yield was recorded for the genotype ND-41 and the minimum in genotype ND-20. The variation for latex yield in present set of germplasm indicates that the chance of selection is quite fair.