

Half diallel analysis in restorer lines of sunflower (*Helianthus annuus* L.)

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SUMMARY

Eight restorer lines of sunflower viz. J/6, DMLT-1Y, MR-1, LR-3322, LR-451, 6D-1R, NDR-1 and NDR-856 were crossed in half diallel fashion excluding reciprocals. The F₁'s, parents along with 2 checks were evaluated for days to 50% flowering, days to maturity, plant height, head diameter, pollen productivity, seed yield per plant, 100 seed weight, filled seeds per head, husk content. Both additive and non additive gene action were important and preponderance of non-additive gene action was observed for all characters. The crosses which exhibited high *per se* performance, high heterosis, high SCA in addition to high GCA in both or at least in one parents were J/6 x NDR-1 (seed yield), 6D-1R x DMLT-1Y (oil content), NDR-1 X LR-451 (head diameter), NDR- 856 x 6D-1R (pollen productivity) and MR-1 X NDR-1(dwarf plant height) could be recommended for transgressive segregation to evolve superior restorer lines / hybrids.

Key words : Half diallel, Sunflower, Restorer lines.

Sunflower (*Helianthus annuus* L.) is an important oilseed crop in India as well as world. It is the fourth largest oil crop, after soybean, oil palm and rape seed (Fernandez-Martinez *et al.*, 2004). Evolution of high yielding hybrids requires identification of good combining restorer lines. The combining ability analysis like diallel helps the breeder to assess the combining ability and heterosis of restorer lines and also identification of superior hybrids. With this background, the present investigation was under taken.

MATERIALS AND METHODS

The experimental material comprised of 8 diverse restorer lines of sunflower, their 28 F₁'s and two checks were utilized for the present study. The crossing technique described by Putt (1941) was used for attempting crosses. Each genotype was sown in 2 rows. One row kept for emasculating of flower and for making crosses in that emasculated flower. Other row kept for collection of pollen grain in Petridish and pollination was done in

selected emasculated flower. Hand emasculation was done prior to opening of flower by removing the anther tube with the help of forceps early in morning (8.00-10.00 a.m.) after emasculation on the same day.

All these genotypes were crossed in half diallel fashion without reciprocal. The complete set of experimental material comprised of 38 genotypes *i.e.* 8 restorer lines (R lines), 28 crosses and 2 checks were sown in randomized block design with 3 replication in *rabi* 2006-2007. The total plot size was 1.20 x 4.5 m. Recommended cultural practices were followed to raise the crop. Observations were recorded for days to 50 per cent flowering, days to maturity, plant height (cm.), head diameter (cm.) Pollen productivity per plant (g), seed yield (g), 100 seed weight per plant (g), filled seeds per head (%), hull content (%) and oil content (%) on five plants per entry per replication. The analysis was carried out by Griffings (1956) for diallel analysis. The hybrids LSFH-35 and KBSH-1 were considered as standard checks for the estimation of standard heterosis.

Table 1 : Analysis of variance for combining ability in 8 x 8 Diallel Design

Source of Variation	df.	Mean sum of square									
		Days to 50% Flowe-ring	Days to Maturity	Plant Height (cm.)	Head Diame-ter (cm.)	Pollen Productivity/ plant (g)	Yield /plant (g)	100 seed weight (g)	Filling (%)	Husk Content (%)	Oil Content (%)
GCA	7	91.71**	39.51**	382.27**	11.55**	0.049**	208.12**	2.18**	85.33**	329.07**	22.76**
SCA	28	4.96**	5.93**	254.42**	6.47**	0.048**	72.86**	0.89**	75.48**	139.38**	5.91**
Error	70	1.51	2.69	7.88	0.50	0.001	1.97	0.04	7.43	7.76	1.01

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