Indian J. Genet., **67**(1): 89-90 (2007)

Short Communication

Heterosis in taramira [*Eruca sativa* (Mill.)] for seed yield and oil content

J. P. Kumhar, K. C. Sharma and E. V. D. Sastry

Department of Plant Breeding and Genetics, SKN College of Agriculture, (RAU), Jobner 303 329

(Received: January 2006; Revised: July 2006; Accepted: August 2006)

Taramira [*Eruca sativa* (Mill.)] is an oilseed crop that can be successfully cultivated on poor sandy soils of north-western India with conserved moisture. During the year of severe drought, when no other crop could be successfully grown, taramira is the only alternative [1]. Taramira is a highly cross pollinated crop and has sporophytic type of self-incompatibility [2]. Most of the oilseed crops suffer from low seed yield potential as compared to cereals and taramira is no exception. Thus heterosis breeding may be a potential alternative for achieving quantum jump in production and productivity of this crop.

Eight genetically diverse parents of taramira namely, T-27, RTM-969, RTM-314, TMCN-5, RTM-910, RTM-917, RTM-885 and RTM-911 were crossed in all possible combinations (excluding reciprocals) during *rabi* season of 2000-01 (season I) and 2001-02 (season II). Eight parents along with 28 F_1s were sown in RBD with three replications having two rows each of 3 m during *rabi* 2000-01 and 2001-02. Row to row and plant to plant distance were kept at 30 cm and 10 cm, respectively and recommended agronomic practices were followed. In each of the parent and F_1s, 10 plants were randomly selected, from each plot in each replication in both the seasons to record observations on various morphological and quality traits. The mean value of ten plants for each character except for days to flowering and days to maturity (recorded on whole plot basis) in both years was computed for statistical analysis and estimation of heterosis was done as described by Fonesca and Patterson [3]. ANOVA indicated significant differences among the entries for each of the trait.

Among the twenty eight crosses, five crosses namely RTM-917 × RTM-885, RTM-969 × RTM-314, RTM-969 × RTM-910, RTM-910 × RTM-917 and TMCN-5 × RTM-885 has shown significant heterosis for seed yield per plant (Table 1). Seasonal variation was found to be prominent and only one cross RTM-969 × RTM-910 exhibited significant heterobeltiosis and economic heterosis in season II. Comparison of these crosses across the characters has shown significant desirable heterosis for primary branches per plant, fruiting branches per plant and siliquae per plant (Table 1). Thus, the characters primary branches per plant, fruiting branches per plant and siliquae per plant appear to be important seed yield components. The correlation and path coefficient analysis have also shown that these characters to be important seed yield components [4]. Few crosses have exhibited significant and desirable heterosis for oil content (Table 2).

Among the heterotic crosses for all the characters, parent RTM-885 appeared maximum times followed by RTM-917 and RTM-969 in the season I, while in the season II, parent RTM-969 followed by T-27 and RTM-910. Among top four heterotic crosses pooled over two seasons for all the characters, parent RTM-969 appeared maximum times followed by RTM-885 and RTM-917.

References

1. **Gupta A. K., Agarwal H. R. and Dahama A. K.** 1998. Taramira : A potential oilseed crop for the marginal lands of Rajasthan, India. *In*: Bassam N. *at al.* (ed.) Sustainable Agriculture for Food, Energy and Industry-Strategy Towards Achievement. James and James (Science Publishers) Ltd., London (U.K.): 687-691.
2. **Sharma N., Bajaj M. and Shivanna K. R.** 1985. Over-coming self-incompatibility through the use of lectins and sugars in petunia and Eruca. Annals of Botany, **55**: 139-141.
3. **Fonesca S. and Patterson F. L.** 1968. Hybrid vigour in seven parent diallel cross in common wheat. Crop Soc., **8**: 85-88.
4. **Nehra M. R., Sodani S. N. and Sastry E. V. D.** 1989. Correlation and path analysis in taramira. Indian Soc. Desert Techn., **14**: 149-159.

Table 1. Crosses and the characters for which they exhibited desirable and significant heterosis in taramira. Upper diagonal for season I and lower diagonal for season II

	Parents	Season-I (2001-2002)							
		T-27	RTM-969	RTM-314	TMCN-5	RTM-910	RTM-917	RTM-885	RTM-911
Session-II (2002-03)	T-27		TW***			NS/Sil.***			FB/Pt*
	RTM-969	DM***		PB/Pt**, Sil./Pt**, Sy/Pt**		Sy/Pt*	OC**, NS/Sil.***		
	RTM-314		NS/Sil.**			NS/Sil.***, Sy/Pt***		OC***	NS/Sil**, OC***
	TMCN-5	FB/Pt*, OC*, NS/Sil.***	DM***, Pt. ht***	Sy/Pt.***		OC*		PB/Pt**, FB/Pt**, Sil./Pt**, Sy/Pt***	
	RTM-910	NS/Sil.*, Sil/Pt****	Ptht**, Sy/Pt**, DM***, Sil./Pt***	NS/Sil*	OC*		PB/Pt**, FB/Pt**, Sy/Pt*	TW***	OC*
	RTM-917	FB/Pt*, Sy/Pt**, DM***, NS/Sil***	Ns/Sil.*, DM***		DF*		PB/Pt**, FB/Pt**, Sil./Pt*, Sy/Pt**		
	RTM-885	DM***	OC**, Pt.ht***, Sy/Pt***						OC*
	RTM-911	DM***, Pt.ht***, Sil/pt***, NS/Sil***		NS/Sil.*		DM***, TW***	DM***, OC*	Sil/Pt***	

*Heterobeltiosis; **Both heterobeltiosis and economic heterosis; ***Economic heterosis; DF = Days to flowering, DM = Days to maturity, Pt.ht = Plant height (cm), PB/Pt = Primary branches per plant, FB/Pt = Fruiting branches per plant, Sil./Pt = Siliquae per plant, NS/Sil. = Number of seeds per siliqua, TW = Test weight (g), Sy/Pt = Seed yield per plant (g), OC = Oil content (%)

Table 2. Heterosis in seed yield per plant and oil content in taramira

Cross	Season	Seed yield per plant (g)			Oil content (%)		
		Heterosis	Heterobeltiosis	Economic heterosis	Heterosis	Heterobeltiosis	Economic heterosis
RTM-917 × RTM-885	I	140.80**	116.22**	103.39**	−0.95	−1.04	−3.46**
	II	−6.79	−29.17	60.57	−0.52	−0.86	−2.04**
RTM-969 × RTM-314	I	132.81**	107.49**	107.49**	−1.61**	−2.28**	−2.28**
	II	100.00*	86.54	115.55**	0.73	0.09	0.09
RTM-910 × RTM-917	I	124.24**	114.72**	60.73**	1.59**	−0.69	−3.13**
	II	77.01	75.82	110.06	0.13	−1.12	−2.97**
RTM-969 × RTM-910	I	118.09**	104.51**	60.03*	2.26**	−0.58	−1.94**
	II	248.08**	242.37**	309.05**	2.44**	0.86	−0.42
TMCN-5 × RTM-885	I	132.06**	100.00**	88.14**	2.04	0.00	−2.62**
	II	2.19	0.63	135.33**	−0.13	−1.80*	−2.97**

**Significant at P = 0.01