

Short communication

**COMBINING ABILITY STUDIES FOR ECONOMIC ATTRIBUTES IN MUSKMELON  
(CUCUMIS MELO L.)**

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All the desirable economic characters are rarely met within a single individual in nature. Therefore, the breeders often face with problem of selecting parents and crosses while breeding high yielding varieties. Combining ability analysis is one of the powerful tools available which gives the estimate of combining ability effect and aids in selecting desirable parents and crosses for further exploitation (Nandpuri *et al.*, (1983); Randhawa and Singh, (1990). The common approach of selecting the parents on the basis of *per se* performance does not necessarily lead. To fruitful results (Allard, 1963). The knowledge of combining ability plays a decisive role at this juncture whether it would be better to make use of F<sub>1</sub> hybrids to develop the true breeding lines from such crosses.

The present investigation was carried out at Horticulture Farm, S.K.N. College of Agriculture, Jobner during summer season of 2000 and 2001. Eight genetically diverse inbred of muskmelon *viz.*, MS<sub>1</sub>, RM-43, MHY-3, Punjab Sunehri, Jobner Local, Hara Madhu, Tonk Local and Durgapura Madhu were crossed in a diallel fashion excluding reciprocals, and 28 F<sub>1</sub>'s along with eight parental lines were grown in a RBD with three replications. The crop was sown in rows of 180 cm apart with spacing 60 cm between the plants. Recommended cultural practices were followed to raise a good crop. Observations were recorded on five randomly selected plants on 11 economically important traits *viz.*, days to first female flower and fruit harvest, average fruits weight (kg), number of marketable fruits per plant, yield per plant

(kg), harvest duration (days), size of seed cavity (cm), rind thickness (cm), flesh thickness (cm), soluble solids (TSS), shelf-life (days). The combining ability estimates were calculated by using Griffing's model (1956).

A perusal of the data (Table 1) indicated that Jobner Local and Hara Madhu were the best general combiner for vine length while MS<sub>1</sub> showed the highest *gca* effects for days to first female flower, days to first fruit harvest and size of seed cavity. Punjab Sunehri had the highest *gca* effects for number of vines per plant and average weight of first three harvested fruits. As far as the number of fruits and TSS is concerned Durgapura Madhu depicted the best *gca* effects. The maximum *gca* for harvest duration was shown by Hara Madhu followed by Punjab Sunehri. Tonk Local had the maximum *gca* effects for fruit yield, rind thickness, shelf-life and incidence of fruit fly with respect to severity of downy mildew and powdery mildew, MHY-3 and RM-43 exhibited the highest *gca* effects, respectively.

The *sca* effects (Table 1) indicates that MS<sub>1</sub> x Tonk Local and MS<sub>1</sub> x MHY-3 are the best cross combinations for vine length. MS<sub>1</sub> x Hara Madhu and Tonk Local x Durgapura Madhu showed good *sca* effects for number of vines. Significant *sca* estimates for days to first female flower and first fruit harvest were exhibited by the crosses MS<sub>1</sub> x Hara Madhu and Punjab Sunehri x Jobner Local. The best SCA effects for average weight of first three harvested fruits were shown by the cross MS<sub>1</sub> x Tonk Local. The cross combinations Hara Madhu x Tonk Local and MS<sub>1</sub> x

Table 1. Best general combiners and specific combiners for economic attributes

Characters	General combiners	Specific combiners
Days to first female flower	MS <sub>1</sub> (-1.7*), RM-43(-1.09*)	MS <sub>1</sub> x Hara Madhu(-2.84*), Punjab Sunehri x Jobner Local (-2.03*)
Days to first fruit harvest	MS <sub>1</sub> (-2.93*), RM-43 (-1.09*)	MS <sub>1</sub> x Hara Madhu (-5.86*), Punjab Sunehri x Jobner Local (-4.85*)
Fruit weight (kg)	Punjab Sunehri (0.08*), MHY-3 (0.03*)	MS <sub>1</sub> x Jobner Local (0.19*), MS <sub>1</sub> x Tonk Local (0.12*)
Fruits per Plant	Durgapur Madhu (0.07*), MHY-3 (0.06*)	MS <sub>1</sub> x Jobner Local (0.26*), Hara Madhu x Tonk Local (0.22*)
Yield per plant (kg)	Punjab Sunehri (0.17*), MHY-3 (0.10*)	MS <sub>1</sub> x Jobner Local (1.39*), MS <sub>1</sub> x Punjab Sunehri (0.26*)
Harvest duration (days)	Jobner Local (-1.07*), Tonk Local (-0.83*), MHY-3(-0.40*),	Hara Madhu x Durgapur Madhu (-1.65*)
Size of seed cavity (cm)	MS <sub>1</sub> (-0.25*), Punjab Sunehri (-0.15*)	RM 43 x Jobner Local (-0.47*)
Rind thickness (cm)	Tonk Local (0.13*), Jobner Local (0.06*)	Hara Madhu x Tonk Local (0.1*), Tonk Local x Durgapur Madhu (0.08*)
Flesh thick-ness (cm)	Punjab Sunehri (0.09), Hara Madhu (0.09),	MHY 3 x Hara Madhu (0.36*), MHY3 x Tonk Local (0.33*)
TSS (%)	Durgapur Madhu (0.76*), MHY-3 (0.29*)	Punjab Sunehri x Tonk Local (1.03*), Jobner Local x Tonk Local (0.75*)
Shelf life (days)	Jobner Local (0.32*), Tonk Local (0.60*)	Hara Madhu x Tonk Local (0.48*), MHY 3 x Tonk Local (0.47*)

\* Significant at 5 % level of significance

Punjab Sunehri showed high *sca* effects for number of fruits. For fruit yield MS<sub>1</sub> x Punjab Sunehri and MS<sub>1</sub> x Hara Madhu had maximum *sca* effects.

The cross MHY-3 x Hara Madhu exhibited the significant positive *sca* effects for flesh thickness. Jobner Local x Durgapura Madhu and Hara Madhu x Tonk Local depicted significant positive *sca* effects for rind thickness. High estimates of *sca* for TSS were shown by Punjab Sunehri x Tonk Local and Jobner Local x Tonk Local. The crosses *viz.*, Hara Madhu x Tonk Local and MHY-3 x Tonk Local were the best combinations for better shelf-life. The study further indicates that each genotype possesses its specific genetic architecture and capacity to transmit characteristics to the offspring. As all the superior combinations involved at least one parent with high *gca*, therefore, the combining ability of the parents may be considered a reliable guide to the prediction of the yield potential and improvement of other economic traits. The crosses obtained from the parents having high *gca* effects hold promise for achieving true breeding lines with better performance. However,

majority of the crosses was resulted from poor x good and good x poor general combiner parents showing dominance x additive and additive x dominance type of gene interaction. These findings are in line with those of Lippert and Legg, 1972; Chadha and Nandpuri, 1980; Mishra and Seshadri, 1988; Munshi and Verma 1999.

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