

Character association and path analysis for seed yield in sunflower (*Helianthus annuus* L.)

V.K. KALUKHE, M.K. MOON, N.M. MAGAR AND S.S. PATIL

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SUMMARY

The character association and path coefficient analysis was studied in sunflower (*Helianthus annuus*) comprising 26 germplasm lines and one check (TAS-82) for 13 different yield contributing characters, grown during *Kharif* 2007. The seed yield per plant showed highly significant and positive association with volume weight, oil content, head diameter, 100 seed weight, hull content, number of seeds per head, number of filled seeds per head, days to maturity and plant height both at genotypic and phenotypic levels. The path analysis indicated that 100 seed weight had the highest positive direct effect on seed yield per plant followed by number of seeds per head, number of filled seeds per head, plant height, volume weight, days to maturity, head diameter and hull content. The indirect effect revealed that most of the characters had maximum positive indirect effect on seed yield per plant through 100 seed weight followed by number of seeds per head. As such improvement of sunflower crop through yield component traits would be rewarding.

Key words : Sunflower, *Helianthus annuus*, Genotypic and phenotypic association, Path analysis

Sunflower which was used as an ornamental plant in India, but in recent times has become an important source of edible oil. Sunflower crop is one of the important in four major edible oilseed crops in world, others being soybean, rapeseed and groundnut. In most of the breeding program, yield is ultimate object which has highly variable expression. The yield is determined by the interaction of a number of characters among themselves and with the environment. Thus, a knowledge of association of various characters with yield and among themselves would provide criteria for indirect selection through components for improvement in yield. Therefore, genotypic and phenotypic associations among important quantitative characters were analyzed. The path coefficient analysis of Wright (1921) was also undertaken to understand the direct and indirect effect of various traits on seed yield.

Sunflower being a newer commercial out breeding crop, where seed yield is the effect of even more complex characters, lack of such information in this respect. This is why, the present investigation was undertaken to study the character association and path analysis for seed yield and yield contributing characters in sunflower.

MATERIALS AND METHODS

The material for present study consisted of 26 germplasm lines and one check *i.e.* TAS-82. These were sown during July 2007 in a randomized block design with three replications. A distance of 60 cm between rows and 30 cm between plants was maintained. Each plot comprised of four rows, each of 3 meters length. Five random plants were taken from the two central rows of each plot to record observations on different quantitative characters except for days to 50% flowering and days to maturity, where the plant population in two central rows of each plot was considered. The various quantitative characters were studied namely days to 50% flowering, days to maturity, plant height (cm), head diameter (cm), number of filled seeds per head, number of unfilled seeds per head, number of seeds per head, 100 seed weight (g), volume weight (g/100 ml), hull content (%), oil content (%), autogamy (%) and seed yield per plant (g). The data obtained in respect of above characters has been first subjected to analysis of variance as per standard method (Panse and Sukhatme, 1954). Then data were analyzed by using variance-covariance technique. In order to determine the association between two or more quantitative characters, the phenotypic and genotypic association coefficients were worked out as per the formulae given by Al-Jibouri *et al.* (1958). The path coefficient analysis were calculated from genotypic correlation coefficient by solving simultaneous equations as given by Dewey *et al.* (1959).

Correspondence to:

V.K. KALUKHE, M.P.K.V., Agriculture Research Station, JALGAON (M.S.) INDIA

Authors' affiliations:

M.K. MOON, Oilseeds Research Unit, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, AKOLA (M.S.) INDIA
N.M. MAGAR AND S.S. PATIL, Agriculture Research Unit, Mahatma Phule Krishi Vidyapeeth, JALGAON(M.S.) INDIA