CORRELATION AND PATH COEFFICIENT OF METRIC TRAITS CONTRIBUTING TOWARDS OIL YIELD IN INDIAN MUSTARD

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Abstract

Genotypic and phenotypic correlations and path coefficients were worked out in 51 diverse strains/varieties of Indian mustard /Brassica juncea L. Coss./. Harvest index, oil percentage and seed yield had positive correlations with oil yield both at genotypic and phenotypic levels. In general genotypic correlations were higher in magnitude than phenotypic correlations. Genotypic correlations of different characters were partitioned to find out the direct and indirect effect on oil yield. The seed yield and oil percentage had high direct effect on oil yield. Days to 50 per cent flowering, harvest index and oil percentage affected oil yield through seed yield.

Introduction

The economic value of a genotype in oilseed crops is generally judged by the seed yield and oil content of the seed. However, these two traits may often be negatively correlated. This limits the scope of exploitation of the real economic value of the plant type. It therefore becomes imperative to study the total oil yield rather than seed yield and oil percentage of the seed as two separate traits. Practically no literature is available on the genetic evaluation in Indian mustard on the basis of economic worth of genotypes as judged by total oil yield. It is, therefore, proposed to take up the present investigation on some selected genotypes of Indian mustard with an objective to evaluate the variation for oil yield.

Material and methods

The experimental material comprised fifty one diverse strains/varieties of Indian mustard /B.juncea/L./Coss./. The experiment was laid out in a randomized complete block design with three replications at Oilseeds Research Farm, Department of Plant Breeding, Punjab Agricultural University, Ludhiana during Rabi 1984-85. The inter and intra - -row spacing was maintained at 30 and 15 cm, respectively. Observations were recorded on randomly selected 10 plants, on days to 50 per cent flowering, 1000-seed weight /g/, harvest index, oil percentage, seed yield per plant /g/ and oil yield per plant /g/. Correlation and path coefficient analysis was conducted as suggested by Dewey and Lu /1959/.

Results and discussion

Genotypic and phenotypic correlation coefficients amongst different characters presented in Table 1, show that harvest index, oil percent and seed yield per plant had significant positive phenotypic association with oil yield per plant. Days to 50 per cent flowering had significant negative association with 1000-seed weight but had significant positive association with oil percentage. Harvest index had significant positive association with seed yield per plant.

Genotypic correlations in general were higher than the phenotypic correlations as reported by Gupta et al /1983/. The low phenotypic correlations could result due to modifying effect of environment on the association of the characters at the genetic level.

An examination of the path coefficient analysis at genotypic level /Table 2/ revealed that seed yield per plant had the highest positive direct effect on oil yield followed by oil percentage. Harvest index had high positive correlation with oil yield but had negative direct effect on oil yield.

High positive association was because of its positive indirect effect through seed yield per plant.

References

Dewey J.R. and K.H.Lu /1959/. A correlation and path coefficients of creasted wheat-grass seed production. Agron. J., 51. 515-518.

Gupta M.L., Gupta V.P. and K.S.Labana /1983/. Path coefficients analysis in Indian mustard. Proc. 6th International Rapeseed Conference, Paris, France,pp:193-196.

Table 1: Genotypic /G/ and phenotypic /P/ correlation coefficients among different traits in Indian mustard.

	1000-seed weight	Harvest index	Oil percentage	Seed yield per plant	Oil yield per plant
Days to 50% flowering	G -0,496 P -0,434^{xx}	-0,232 -0,165	0,547^{xx} 0,362^{xx}	0,245 0,207	0,267 0,221
1000-Seed weight		G 0,316 P 0,215	-0,219 -0,157	0,034 0,046	0,028 0,029
Harvest index			G 0,191 P 0,055	0,462^{xx} 0,463^{xx}	0,448^{xx} 0,441^{xx}
Oil percentage				G 0,450 P 0,210	0,533^{x} 0,290^{x}
Seed yield					G 0,997 P 0,955^{xx}

x, xx Significant at 5 per cent and 1 per cent levels respectively.

Table 2: Direct and indirect effects of different traits on oil yield in Indian mustard

	Days to 50% flowering	1000-seed weight	Harvest index	Oil percentage	Seed yield	Genotypic correlations with oil yield
Days to 50% flowering	-0,044	-0,007	0,009	0,073	0,236	0,267
1000-seed weight	0,022	0,015	-0,012	-0,029	0,033	0,028
Harvest index	0,010	0,005	-0,037	0,025	0,445	0,448
Oil percentage	-0,024	-0,003	-0,007	0,134	0,454	0,555
Seed yield	-0,011	0,005	-0,017	0,060	0,964	0,997

Values underlined denote direct effects.