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Selection indices for higher seed yield in rainfed and irrigated chickpea (*Cicer arietinum* L.)

SHUDHANSHU PANDEY, DEVENDRA PAYASI, S.K. NAIR AND R.L. PANDEY

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SUMMARY

Thirty genotypes of chickpea (*Cicer arietinum* L.) including two standard checks were laid out in randomized block design with three replications in both rainfed and irrigated situations separately, during winter 2001. Selection indices based on discriminent function was used to determine the phenotypic worth of different component characters. The selection indices clearly indicated that selection criterion for higher seed yield under rainfed and irrigated condition may be similar. Higher number of pods per plant had shown the highest relative efficiency over straight selection for seed yield. For higher selection efficiency a character combination of pods per plant, seed yield per plant and days to flowering/days to maturity had considerable genetic gain over straight selection. Days to 50 per cent flowering under rainfed and days to maturity under irrigated condition were found important trait.

Key words : Selection indices, Chickpea, Relative efficiency, Genetic advance

Chickpea (*Cicer arietinum* L.) is a native of Indian subcontinent and Central Asia. On global basis it is the third important pulse crop with an area of 9.5 million hectare with production of 8.5 million tonnes and its productivity 700 kg ha^{-1} (Kharakwal, 2002). India has a distinction of being world's largest producer of chickpea and contributes 67 per cent in area and 70 per cent of corresponding production. Amaizongly, its productivity is only 806 kg ha^{-1} (Ali and Kumar, 2001). The reason being it is cultivated under biotic and abiotic stresses, notably more than 80 per cent the crop is grown under rainfed conditions. In Chhattisgarh state cultivation of chickpea is limited. Chickpea genotypes generally show differential response to stress and non-stress conditions. Moisture stress constitutes the major production constraint in stabilizing the chickpea production. Hence, it is imperative to initiate systematic breeding programme to develop varieties suitable for rainfed and irrigated condition separately in Chhattisgarh. In view of the above, the present study was an attempt to develop suitable selection indices based on component approach for maximization of seed yield.

MATERIALS AND METHODS

The experimental material comprised of 30 genotypes including annigeri-1 and ICC-4958 as standard checks. The experiment was laid out in a randomized complete block design with three replications under two conditions *viz.*,., rainfed (stress) and irrigated (non-stress) separately. Each genotype was planted in two rows of four meter long and 30 cm apart. A light irrigation was applied to both experiments to ensure uniform seed germination and better establishment of seedlings. An additional irrigation was applied at 40 days after sowing to one set of experiment called as irrigated (non-stress). Other agronomical practices were adopted uniformly in both sets of experiment. Observations on plant and seed characters were recorded on five competitive plants randomly selected at appropriate stage. The characters observed were: days to 50 per cent flowering, plant height, primary branches plant^{-1}, secondary branches plant^{-1}, pod bearing length, days to maturity, pods plant^{-1}, seeds pod^{-1}, biological yield plant^{-1}, seed yield plant^{-1} and 100 seed weight. The selection indices were constructed by solving the equations suggested by Robinson *et al.* (1951).

The indices were developed individually for each component character as well as yield plant^{-1}, in combination with two or more characters along with seed yield plant^{-1}. The expected genetic advance of these indices was expressed as per cent of genetic advance obtained from the selection of yield only.

RESULTS AND DISCUSSION

Seed yield is a complex entity associated with many contributing traits, which are interrelated among themselves. The interdependency of contributing traits affects the selection criteria. Selection indices based on

Correspondence to:
DEVENDRA PAYASI, Barwale Foundation, HYDERABAD (A.P.) INDIA
Authors' affiliations:
SHUDHANSHU PANDEY, S.K. NAIR AND R.L. PANDEY, Indira Gandhi Krishi Vishwa Vidyalaya, RAIPUR (C.G.) INDIA