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Genetic variability, character association and path analysis studies in *Kharif* onion (*Allium cepa* var. *cepa* L.)

M. DHOTRE, T.B. ALLOLLI, S.I. ATHANI AND L.C. HALEMANI

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See end of the article for authors' affiliations

Correspondence to :

M. DHOTRE
Department of Horticulture, University of Agricultural Sciences, DHARWAD (KARNATAKA) INDIA

ABSTRACT

Genetic variability, character association and path coefficients were studied in red onion involving 14 genotypes. High heritability with moderate to high GCV and genetic advance were recorded for double/split bulb per cent, fresh bulb weight and bulb yield as well as storage losses due to rotting, sprouting and total loss denoting their possibility of improvement with simple selection. Number of rings per bulb, TSS and dry matter content exhibited high heritability coupled with high expected genetic advance. Bulb yield exhibited positive and significant association with fresh bulb weight, equatorial diameter, TSS and number of rings per bulb and neck thickness was significantly correlated with rotting and total storage loss. Fresh bulb weight, equatorial diameter and bulb shape index exerted positive and direct effect and polar diameter and double/split bulb per cent showed negative direct effect on bulb yield. It was proposed to emphasize more on such characters to improve bulb yield.

Key words : *Kharif*, Onion, Variability, Heritability, Genetic advance, Character association, Path coefficient

Onion (*Allium cepa* var. *cepa* L.) is one of the most important vegetable crops grown in India. Karnataka is emerging as one of the major state contributing to a considerable extent to the county's production. Although many varieties have been released, the systematic crop improvement is lacking in onion when compared to other commercial vegetable crops. The present investigation was an attempt towards the improvement in onion to assess the nature and magnitude of genetic variability present in onion genotypes. Further, the extent of trait heritability in association with genetic advance was estimated. The inter-relationship among the characters was studied and correlation coefficients were partitioned into direct and indirect effects and their contribution towards bulb yield was studied.

MATERIALS AND METHODS

The present study was conducted at Main Agricultural Research Station, University of Agricultural Sciences, Dharwad during *Kharif* 2008. Totally, 14 red onion genotypes were included for the study which comprised of improved and popular varieties as well as local races from different parts of Karnataka. Randomized Block Design with 3 replications was employed for the layout of experiment and the seeds were hand dibbled at 15 cm x 7 cm spacing in 2m x 2m plots. Five randomly selected plants in each block were used to record plant height and number of leaves (at 90 days after sowing), neck thickness (measured at harvest) and bulb characters. The data on days to maturity and double/split bulb per cent were computed on plot basis and bulb yield was converted to 'per ha' based on plot yield. Observations on shelf life were recorded at 3 months after storage on PLW, rotting, sprouting and total loss on weight basis and converted to percentage. The data subjected to analysis of variance, variability pattern, association among the attributes and path coefficient analysis.

RESULTS AND DISCUSSION

Analysis of variance revealed significant variation among the genotypes for all the 17 traits indicating wide variability in the collection. The estimates of mean, range and genetic parameters are given in Table 1. The range was maximum (31.32-93.86 g) for fresh bulb weight followed by double/split bulb per cent (12.67-53.75 %) and total loss (35.95-69.89 %) and minimum (0.86-1.25 %) for bulb shape index and neck thickness (9.50-13.40 mm). The genotypic and phenotypic coefficient of variations were computed based on the estimates of genotypic and phenotypic variances (Burton and Devane, 1953). High GCV values were lower than the respective PCV values for all the characters denoting environmental factors influencing their expression to certain extent. High GCV recorded for double/split bulbs (35.50) followed by fresh bulb weight (31.32) and loss due to rotting (25.69). Number of rings per bulb, bulb yield and loss due to rotting also exhibited high GCV and PCV. Total loss, TSS, dry matter content in bulbs, physiological loss in weight, number of leaves per plant, neck thickness showed moderate GCV and PCV. The rest of the characters