

## Variability, heritability and genetic advance studies in amaranthus (*Amaranthus* spp.)

S. ANUJA AND M. KADER MOHIDEEN

See end of article for authors' affiliations

Correspondence to :  
S. Anuja  
Department of Horticulture,  
Faculty of Agriculture,  
Annamalai University,  
ANNAMALAINAGAR (T.N.)  
INDIA

Accepted : November, 2006

### ABSTRACT

Genetic variability and heritability studies involving 100 genotypes of amaranthus germplasm in summer and monsoon seasons indicated that there were highly significant differences between the genotypes for green yield and thirteen other characters. Comparison of genotypic and phenotypic co-efficient variation for different traits indicated that the values of PCV were higher as compared to GCV due to the influence of environment. High genotypic co-efficient of variation was observed for number of leaves, yield of greens, root weight, leaf weight, stem weight and leaf area. Heritability estimates in general were high for most of the characters studied. High heritability coupled with high genetic advance (as per cent of mean) was observed for number of leaves, root length, root weight, leaf weight and stem weight. Hence, these characters need to be given more importance in selection as these are expected to be controlled by additive genes.

**Key words:** Amaranthus, Variability, Genetic advance.

**A**maranthus is a vitamin rich, protein and mineral packed nutritious leafy vegetable of tropical and subtropical centre of crop origin, which gives the largest yield of edible matter per unit area. The word "Amaranth" in Greek means "everlasting". According to Sankaran (1943), *Amaranthus tricolor* is an important amaranth cultivated in South India. In India, a number of domesticated forms are available especially in Tamil Nadu, Andhra Pradesh, Karnataka and Kerala states. Though amaranthus is in cultivation throughout the world, concentrated efforts have not been made adequately to categorize the variability. The present study was aimed to identify the genetic parameters that control the green yield and other yield attributing factors in order to identify the best genotypes of amaranthus, which can be further exploited for increased yield of greens.

### MATERIALS AND METHODS

The 100 genotypes of amaranthus maintained in the Department of Horticulture, Faculty of Agriculture, Annamalai University were raised in two seasons viz., summer (March – May, 2001) and monsoon (July – September, 2002) in randomized block design with three replications. The 100 amaranthus genotypes belonging to the following four species viz., (i) *Amaranthus tricolor* – 78 accessions; (ii) *A. blitum* L. - 11 accessions (iii) *A. tricolor* var. *tristis* – 10 accessions; (iv) *A. dubius* Mart. Ex. Thellung – 1 accession.

The genotypes were raised in flat beds of size 2.0 m

(length) 1.5 m (breadth). Uniform cultural operations were followed. Observations were recorded on ten plants selected at random in each genotype per replication at 30 days after sowing. Observations were recorded on plant height (cm), stem girth (cm), number of leaves, leaf length (cm), leaf width (cm), petiole length (cm), leaf area (sq cm), yield per plant (g), root length (cm), root weight (g), leaf weight (g), stem weight (g), leaf/ stem ratio and dry matter content (g). The phenotypic and genotypic co-efficient of variation were estimated by the formulae given by Burton (1952). Heritability in broad sense was calculated according to Robinson (1966).

### RESULTS AND DISCUSSION

A major portion of the total variation was accounted by both the genotypic and phenotypic variance for all the characters (Table 1). There was a close correspondence between the phenotypic and genotypic variances with only a minor difference between the two and this indicated that the characters were stable yet influenced by the environment a little. Yield per plant recorded the highest values for both genotypic and phenotypic variation, followed by leaf area and stem weight in both summer and monsoon seasons. The phenotypic and genotypic co-efficient of variability were high for as many as five characters namely number of leaves, leaf area, yield per plant, root weight and stem weight in both seasons and as such there is enough scope for improvement of these five characters through selection or an appropriate breeding method. The existence of such high genetic variation in amaranthus has been reported earlier by Devadas *et al.* (1989), Pan *et al.* (1991)