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Association analysis, genetic variability and genetic diversity studies in soybean [*Glycine max* (L.) Merrill]

B.K. ATHONI AND G.T. BASAVARAJA

All India Coordinated Research Project on Sunflower, University of Agricultural Sciences, G.K.V.K., BENGALURU (KARNATAKA) INDIA
Email : athonibk@gmail.com

To study the genetic variability, association analysis and genetic diversity for productivity in soybean, a field experiment was conducted during *Kharif* 2005 at University of Agricultural Sciences, Dharwad, India. The experiment comprised of 84 genotypes of which, most of the cultivars were released in India, along with some indigenous and exotic lines. Observations on 11 productivity traits of soybean were recorded. The data were subjected to variability and multivariate analysis. The analysis of variance revealed the prevalence of significant difference among the genotypes for all the 11 characters studied. Plant height was the only character which showed high phenotypic and genotypic co-efficient of variation while days to maturity, number of nodes per plant and oil content recorded a low phenotypic and genotypic coefficient of variation and rest of characters recorded moderate phenotypic and genotypic coefficient of variation. Number of pods per plant, pod weight per plant, 100 seed weight and oil content showed positive and significant correlation with seed yield per plant. Path coefficient analysis revealed maximum positive direct effect of pod weight on seed yield per plant followed by 100 seed weight and its indirect effect through other characters were also considerably high. Therefore, emphasis may be laid on this character for improving seed yield. There was not much amount of diversity was obtained in the material representing diverse eco-geographical regions of the country revealed no relationship between geographic diversity and genetic diversity.

Key words : Genetic variabilty, Genetic diversity, Soybean, Co-efficient of variation

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INTRODUCTION

Soybean [*Glycine max* (L.) Merrill] is known as 'Golden bean' and miracle crop of 20th century. Soybean is a native of North China, Asia belongs to family Fabaceae. It is a versatile and fascinating crop with innumerable possibilities of not only improving agriculture but also supporting industries. Soybean besides having high yielding potential (40-45 q/ha) also provides cholesterol free oil (20%) and high quality protein (40%). It is a rich source of lysine (6.4%) in addition to other essential amino acids, vitamins and minerals. Its oil is also used as a raw material in manufacturing antibiotics, paints, varnishes, adhesives and lubricants etc.

Soybean occupies a premier position among crops, being the most important source of both protein concentrates and vegetable oil. As a legume it is capable of utilizing atmospheric nitrogen through biological nitrogen fixation and is, therefore, much less dependent on synthetic nitrogenous fertilizers than most non-legume crops. In addition, since the introduction of soybean into crop rotations often breaks the building up of pests and diseases in cereals.

Soybean tops in the world production of both oil seeds and edible oil. World harvest of soybean is more than 50 per cent of the total world oilseed production. United States of America (USA), the world leader in soybean production produces 40 per cent of world output with highest productivity of 2.5 t/ha. Apart from USA, China and Brazil are the leading soybean producers, while India ranks fifth in the world soybean production (Anonymous, 2005).

The feasibility for large scale cultivation of soybean in India could be demonstrated with yellow seeded, high yielding varieties introduced from USA in mid sixties (Paroda, 1991). Major soybean producing states in India are Madhya Pradesh, Maharashtra, Rajasthan, Karnataka and Andhra Pradesh. In Karnataka, it is being grown in an area of 1.78 lakh hectares during the year 2004-05 with the production of about 1.14 lakh tonnes with productivity level of 642 kg/ha.