



Received : August, 2010; Accepted : September, 2010

Research
Paper

Role of organic sources in enhancing the productivity *per se* of cotton genotypes under organic production systems in Karnataka

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ABSTRACT

The *per se* Performance of cotton genotypes Sahana (*G. hirsutum*) and Jayadhar (*G. herbaceum*) under different manurial treatments viz., farmyard manure (FYM), vermicompost (VC), glyricidia, neemcake (NC), recommended dose of fertilizers (RDF) alone and in combination with FYM was analyzed under rainfed condition of Northern Karnataka. Jayadhar recorded significantly higher kapas yield (1326 kg/ha) under integrated application of RDF (45:25:25 kg NPK/ha) and FYM (7.5 t/ha). This increase was 12% higher than the kapas yield obtained after treatment with RDF alone. Additionally, genetic responses of agronomically important parameters such as yield, plant height, TDMP, LAI, number of monopodial branches, number of sympodial branches and number of bolls were significantly higher with RDF + FYM treatment. The net returns were significantly higher with Jayadhar (Rs.10992.00/ha). Among organic manurial treatments, application of FYM 100% (equivalent to 45 kg nitrogen) + glyricidia 100% (equivalent to 45 kg nitrogen) recorded significantly higher net returns (Rs. 8357.00/ha) when compared to treatments treated with VC and NC. Irrespective of manurial treatments, Jayadhar recorded significantly higher benefit cost (B:C) ratio (2.20) as compared to Sahana. Among manurial treatments, RDF alone and integrated application of RDF+FYM showed significantly higher B:C (2.16 and 2.15, respectively) ratio over rest of the treatments.

Sangshetty and Babalad, H.B. (2010). Role of organic sources in enhancing the productivity *per se* of cotton genotypes under organic production systems in Karnataka. *Adv. Res. J. Crop Improv.*, 1 (2) : 114-119.

Key words : Cotton, Genotypes, Organic manures, Kapas yield, Economics

INTRODUCTION

India has a unique place among the cotton growing countries of the world. Of the four species that are grown commercially in India, two are diploid (*Gossypium arboreum* and *G. herbaceum*) and the other two tetraploid (*G. hirsutum* and *G. barbadense*). Additionally, many hybrid varieties derived from crossing the tetraploid species are grown in the central and southern cotton growing zones of India (Chaudhary and Laroia, 2001). In 2008-09, it occupied an area of 93.73 lakh ha. Fertilizer use on irrigated cotton (153.5 kg/ha) was higher than on rainfed cotton (97.7 kg/ha). The share of irrigated and rainfed cotton in total fertilizer consumption were 2.7 and 3.3 per cent, respectively accounting for 6.0 per cent (1.01 million tonnes) of total fertilizer consumed in India on cotton alone (FAO 2003/04). The average per-hectare use of fertilizer on cotton was 116.8 kg (89.5 kg/ha N, 22.6 kg/ha P₂O₅ and 4.8 kg/ha K₂O). With introduction of high-yielding variety (HYV) seeds, there was acceleration in the growth

of fertilizers consumption. Apart from fertilizers, cotton is a crop to which 45% of the pesticides and 58% of insecticides also used in India (Chaudhary and Laroia, 2001). This indiscriminate use of fertilizers and pesticides by farmers, the faulty marketing strategies by Indian and multinational companies is leading to build-up of pesticide resistance, resurgence of secondary pests and loss in soil fertility. This has further paid way for limitation in consumption of non-renewable form of energy (*i.e.*, chemical fertilizer and pesticides) mainly due to increase in cost of energy, chemical fertilizers and pesticides, which are not available at an affordable price to small and marginal farmers of India. The growing concerns over the environmental pollution, soil health, agro-ecology and poor profitability for cotton growers has further necessitated the demand for organically cultivated eco-friendly green cotton. The present investigations opened new approaches to answer some of these issues in cotton production.