

Effect of plant growth regulators on total dry matter production, leaf area and yield components in hybrid cotton

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ABSTRACT

Field experiments were conducted at Agricultural Research Station, Dharwad, University of Agricultural Sciences, Dharwad during *Kharif* 2005-06 and 2006-07 to find out the effect of plant growth regulators on total dry matter production, leaf area and yield components in hybrid cotton. Significant differences were observed in all parameters studied during two years. Among the growth regulators, naphthalene acetic acid (NAA 10, 20 30 ppm) recorded significantly higher dry matter and leaf area as compared to other treatments. Yield in these treatments was also more because of the retention of more bolls and diversion of higher proportion of photosynthates to reproductive parts. Among the treatments, growth retardant treatments recorded the lowest of these values.

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INTRODUCTION

It is the oldest among the commercial crops of the world and is regarded as white gold. Presently, India is the second largest producer of cotton in the world having largest acreage. Cotton growing areas in India fall within 8° – 32° N latitude and 70° – 80° E longitude with an elevation ranging from 0 – 950 m above mean sea level. The physiological efficiency of plant can be improved by prolonging photosynthesis, reducing photorespiration, better partitioning of photo assimilates, improving mineral ions uptake and stimulating nitrogen metabolism. All these processes are inter-linked through several interactions and influence growth and productivity. Plant growth regulators have been found to influence these processes in one way or the other. Plant growth regulators are substances when added in small amounts modify the growth of plant usually by stimulating or inhibiting the natural growth regulation. Cotton often produces more vegetative growth than is needed for maximum boll production and yield especially when climatic conditions favour vegetative growth, thereby directing the photo-assimilates towards the vegetative growth rather than reproductive growth. However, in the recent past, different workers have emphasized the use of various growth regulating chemicals for the control of vegetative growth in cotton. Derrick *et al.* (2000) suggested that mepiquate chloride application to cotton reduces plant height, vegetative growth by shortening internodal length. Cotton yield depends not only on total dry matter production but also

its distribution into reproductive parts. In cotton it may happen that there may be too much of vegetative growth resulting in lesser cotton yield under certain adverse conditions.

Total dry matter production and supply of required photosynthates for the developing bolls largely depends on leaf area and leaf area index. The photosynthetic efficiency of crop plants as measured by net assimilation rate is dependent upon photosynthetic capacity expressed as leaf area index (Watson, 1952).

MATERIALS AND METHODS

Field experiments were conducted during *Kharif* 2005-06 and 2006-07 to evaluate the effect of plant growth regulators on total dry matter, leaf area and yield components of hybrid cotton. Five plants from each treatment were selected randomly and tagged for recording various observations. The design adopted for the experiment was Randomized Block Design with three replications. The genotype used for the experiment was DHB-290. Various treatments given were cycocel (40, 60, 80 ppm), mepiquat chloride (50, 100 ppm), naphthalene acetic acid (10, 20, 30 ppm) and sprayed at 70, 90 and 70 + 90 days after sowing. But, all naphthalene acetic acid concentrations sprayed at 60 days after sowing.

RESULTS AND DISCUSSION

The results obtained from the present investigation

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