Research Paper :

Yield response of Bt cotton under different irrigation schedules and fertilizer levels

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ABSTRACT

The field experiment was conducted at the experimental farm of AICRP on Water Management, Marathwada Agricultural University Parbhani during *Kharif* season of 2009-10 on cotton. Field experiment was planned comprising of irrigation as the main factor and fertilizer as sub factor in split plot design with three replications. Irrigation treatments consisted of I_1 (Drip irrigation of 0.3 PE), I_2 (Drip irrigation of 0.5 PE), I_3 (Drip irrigation of 0.7 PE), I_4 (Drip irrigation of 0.5 PE through drip only during critical growth stages), I_5 (Drip irrigation of 0.5 PE through drip + green gram as intercrop), I_6 (Irrigation through furrow at 150 CPE during dry spell).The fertilizer treatments included F_1 (75%RDF), F_2 (100%RDF), F_3 (125% RDF). The drip irrigation scheduled at 0.5 PE was better in regards with the growth attributes of Bt Cotton *viz.*, plant height, number of functional leaves, leaf area, number of squares per plant, number of green balls per plant. On the other hand, application of 125% RDF improved growth characteristics of Bt cotton. Drip irrigation scheduled at 0. 5 PE with green gram as inter crop gave highest water use efficiency whereas drip of 0.5 PE depth with green gram as intercrop and 75% of RDF gave highest fertilizer use efficiency. RVI and NDVI at 60DAS show that, RVI and NDVI were higher in 0.5PE (I_2). Drip irrigation of 0.5 PE with green gram as intercrop produced significantly higher seed cotton equivalent yield. However, the highest GMR, NMR and comparatively higher B: C ratio was obtained if drip irrigation was scheduled at 0.5 PE with75% RDF.

Key words : Irrigation schedule, Fertilizer doses, Yield response, Bt cotton

Cotton (*Gossypium* spp.) is one of the most important commercial crops playing a key role in economics and social affairs of the World. Many times it is also called "White Gold". Bt Cotton (*Bacillus thuringiensis*) is becoming popular now days throughout the country. Almost 95% of total area under cotton is converted to Bt Cotton. Although the problem of balls has been eliminated by induction of cry toxin gene, there are other problems with the cultivation practices of Bt Cotton. The most important is irrigation and fertilizer management of Bt Cotton. Water and fertilizer stress during critical growth stages of crop affects the cotton yield tremendously. Looking to the optimization of irrigation water and fertilizer doses through drip, the research project entitled "Yield response of Bt cotton under different irrigation schedules and fertilizer levels" was undertaken, to study the effect of drip irrigation schedules and fertilizer levels on growth and yield of Bt cotton,to study soil moisture distribution in Bt cotton under different irrigation schedules, to assess the effect of drip irrigation schedules and fertilizer levels on spectral reflectance of Bt cotton,to assess the water use efficiency and economic feasibility of drip irrigation system for Bt cotton.

METHODOLOGY
Treatment details:
– Irrigation schedules (3 days based PE for drip)
I_1= Irrigation of 0.3 PE through drip.
I_2= Irrigation of 0.5 PE through drip.
I_3= Irrigation of 0.7 PE through drip.
I_4= Irrigation of 0.5PE through drip only during critical stages.
I_5=Irrigation of 0.5 PE through drip + green gram as intercrop.
I_6= Irrigation through furrow at 150 CPE during dry spell (one pre sowing and one post sowing irrigation).

– Fertilizer levels
F_1 = 75% RDF
F_2 = 100% RDF