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Low cost drip as a precision irrigation tool in Bt cotton *{Gossypium hirsutum)* cultivation

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ABSTRACT

Adoption of drip system in ha land of cotton is higher. In view of this it was proposed to develop/standardize a low cost drip system through rigorous testing procedures for optimum efficacy under farm situation and higher profitability. Therefore a field trial was conducted consecutively for three years from 2004 to 2007 at CICR, Coimbatore for comparisons of microtube and polytube - 150, 300 and 450 micron (u) thickness - against the existing drip/conventional ridges-furrow irrigation. The experiment was laid out in completely randomized block design replicated five times. Results showed that the existing drip system resulted in maximum seed cotton yield (2.71 t/ha) and economics being at par with those obtained under low cost microtube drip systems and poly-tube systems (150, 300 and 450 u thickness) found significantly superior to ridge-furrow irrigation with respect to seed cotton yield. Existing drip system has high annual irrigation cost (Rs.12,594/ha) and it was the least in polytube of 150 u (Rs 7, 273/ha). Moderately higher yield (2.62 t/ha) with all the positive effects (of drip) along with lower cultivation cost (Rs 27,190/ha) were incurred in poly tube drip system with 150 u and ultimately resulted into higher net return (Rs 38,310/ha) and B:C ratio (2.41).

Key words: Bt cotton, B:C ratio, Low cost drip, Micro-tube

Cotton *(Gossypium hirsutum* L.), being the most important commercial crop of India (9.4 million ha with a production of 29 million bales of lint in 2008-09) contributes to around 80% of the raw material to the textile industry and provides employment to nearly 60 million people. Further impetus to cotton productivity i.e to the world average of 767 kg/ha is possible through efficient and optimal use of precious on farm inputs i.e., water and nutrient. Management of water and nutrients plays a key role in breaking of the undesired tempo in productivity plateau reached after major enhancement by introduction of Bt cotton that is occupying more than 80% area. In this context, micro-irrigation could play a key role in enhancing of productivity and increasing water use efficiency (WUE) and nutrient use efficiency (NUE) in addition to bringing additional area under irrigation. Since indiscriminate use of water through conventional one with only 60% application efficiency is causing serious threat to available ground water resources. Drip-fertigation, where fertilizer is also applied through an efficient (drip) irrigation system, NUE could reach as high as 90% besides achieving > 95% application efficiency. Therefore, the amount of fertilizer lost through leaching could be as low as 10% in drip fertigation as compared to 50% in the traditional one. Drip fertigation study in Israel indicated that realization of highest yield of seed cotton (6.3 t/ha) was possible, and the projected area of drip irrigation in India would be about 10 m ha by 2025.

Although drip irrigation is an acceptable technology to the Indians farmers, its rate of adoption is Limited in annual crops due to involvement of initial high capital cost. Nevertheless, the area under drip irrigation has increased manifolds from 1,500 ha (1989) to 5, 89,251 ha (2005). While devising appropriate reason for this poor growth of this technology through adoption of *Gomar Garetts ranking technique*, Palanisamy and Venkatasa Palanisamy (2000) identified the high initial cost as one of the major constraints hindering its rapid adoption. However, whatever little developments and adoption of drip technology have taken place so far, it is mainly concentrated in acute water scarcity areas and in high value crops like perennial and horticultural crops, but not in annual crops Like cotton.

Since cotton is one of the identified crops for adoption of drip irrigation commonly known for its response, accommodating higher plant population (associated with

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formed better with higher seed cotton yield, water use efficiency and economics. Thus, the trial showed the suitability and viability of the use of low cost polytube drip of 150 u thickness for an efficient on farm irrigation scheduling in Bt cotton.

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