

to be improved by maximizing yield and quality of sugarcane by adopting balanced fertilization (Bakiyathu Saliha *et al.*, 2009). In subsurface drip fertigation, nutrient use efficiency could be more than 90 per cent compared to 40-60 per cent in conventional fertilizer application methods. The amount of fertilizer lost through leaching can be less than 10 per cent in fertigation whereas it is 50 per cent in case of soil application. Adoption of subsurface drip fertigation (SSDI) system may help to increase the water use efficiency and productivity of crops.

RESOURCES AND METHODS

A field experiment was carried out at AICRP-Water Management Research Block, Department of Agronomy, Agricultural College and Research Institute, Tamil Nadu Agricultural University, Madurai during the year 2013-14. The soil of the experimental field was sandy clay loam in texture, taxonomically classified as Typic Udic Haplustalf with pH- 7.4, Organic carbon - 0.48 %, EC - 0.42 dS m⁻¹ and Soil samples were analysed initial soil samples and Post-harvest soil samples of the field. The study was designed in RBD with three replications. The treatments were F₁ surface irrigation with soil application of RDF, F₂ drip fertigation of 100 % RDF (P as basal, N and K through drip as urea and MOP), F₃ drip fertigation of 100 % RDF with urea, MAP and SOP, F₄ drip fertigation of 75 % RDF with urea, MAP and SOP up to 120 DAP + Ultrasol from 121 to 210 DAP, F₅ drip fertigation of 100 % RDF with urea, MAP and SOP up to 120 DAP + with Ultrasol from 121 to 210 DAP, F₆ drip fertigation of 75 % RDF with Ultrasol, MAP and urea, F₇ drip fertigation of 100 % RDF with Ultrasol, MAP and urea, F₈ drip fertigation of 75 % RDF (50 % NPK as basal, balance with Ultrasol, MAP and urea), F₉ drip fertigation of 100 % RDF (50% NPK as basal, balance with Ultrasol, MAP and urea). The test crop variety Co - 86032 and RDF: 275: 62.5: 112.5 kg NPK ha⁻¹. The water soluble fertilizers source as Urea. MOP (White Potash), Ultrasol (9:5:33 % NPK), MAP (Mono Ammonium Phosphate), SOP (Sulphate of Potash) and as basal for Single super phosphate. Cost of production and gross return for all the treatments were worked out on the basis of the prevailing input cost and price of sugarcane at the time of experimentation. Economics were calculated as per the standard procedure.

The water source is an open well. Water was

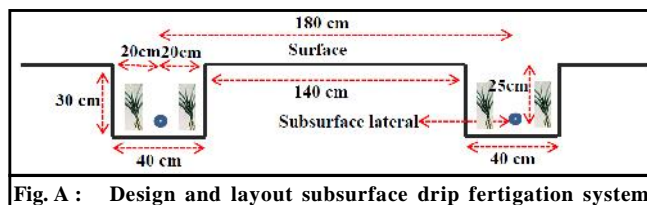


Fig. A : Design and layout subsurface drip fertigation system

pumped through 7.5 hp submersible motor and it was conveyed to field using PVC pipes of 90 mm after filtering through sand and screen filters. From the main line water was taken to the field through sub mains of 75 and 63 mm diameter PVC pipes. From the sub main, 16 mm size 15 mill low cost laterals (drip tap) with discharge rate of 1.29 lph were fixed at a spacing of 1.8 m. The laterals were placed in the center of the trenches at 25cm depth from the surface soil and the end of laterals were connected to collecting sub main PVC pipe (40mm). The operating pressure was maintained at 0.75 kg cm⁻². The subsurface drip irrigation system was well maintained by flushing and cleaning the filters.

Fertigation :

The recommended fertilizer dose of 275: 62.5: 112.5 kg NPK ha⁻¹ was followed in the experiment. Fertigation was given as per the treatment schedule. Fertigation was scheduled once in seven days starting from 15 to 210 DAP. The nutrients have supplied based on the crop growth demand.

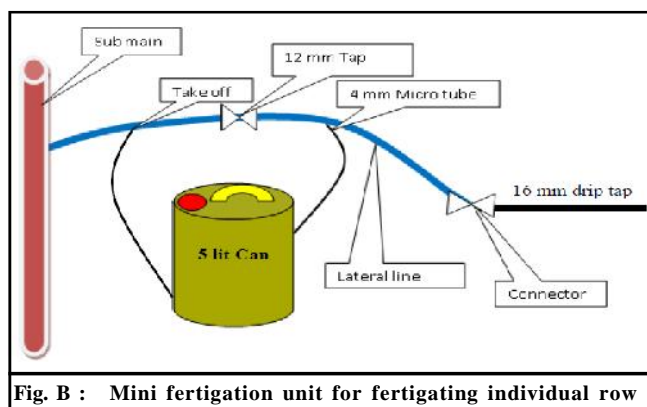


Fig. B : Mini fertigation unit for fertigating individual row

The required quantity of N, P and K fertilizers as urea, Ultrasol, MAP, SOP as per the treatments were dissolved separately in plastic buckets. Required quantity of fertilizer solution was given to each mini fertigation cane fixed with each laterals near the sub main and injected through subsurface drip system.