

## 3<sup>rd</sup> International Conference on **Agriculture & Horticulture** October 27-29, 2014 Hyderabad International Convention Centre, India

## Plant-based monitoring for yield prediction of citrus under differential irrigation

Pravukalyan Panigrahi<sup>1</sup> and R K Sharma<sup>2</sup>

<sup>1</sup>Directorate of Water Management, India <sup>2</sup>Water Technology Centre, Indian Agricultural Research Institute, India

Increasingly serious shortages of water make it imperative to improve the efficiency of irrigation in crop production in L changing climate conditions. In recent years the role of phyto-monitoring techniques based on plant physiological parameters are getting emphasized in irrigation scheduling. There is an ample scope to use physiological responses and spectral signature of the plants in irrigation scheduling. Drip irrigation is found as a potential water saving technique over traditional surface irrigation methods in citrus. Deficit irrigation (DI) is a recently proposed water saving technique in irrigated agriculture. The present study was planned with a hypothesis that drip irrigation scheduling with DI technique could save a substantial amount of water over full irrigation, without affecting the yield significantly. The experiment was conducted for 2 years during 2010 and 2011, with drip-irrigated Kinnow mandarin at IARI, New Delhi. The crop responses to DI scheduled at 50% and 75% full irrigation (FI, 100% ETc). DI at 75% ETc produced marginally lower fruit yield (8-9%), with lower vegetative growth of the plants in comparison to that under FI. However, the irrigation water use efficiency under DI at 75% ETc was observed to be 81-83% higher, over that under FI. The heavier fruits with better quality (higher TSS, ascorbic acid, total sugar and reducing sugar, and lower acidity) were harvested in DI at 75% FI compared to FI. The plant water status (relative leaf water content, leaf water concentration, leaf water potential, stem water potential) was superior with fully-irrigated plants. Likewise, under FI, the plants registered maximum rate of net-photosynthesis, stomatal conductance and transpiration in leaves. However, the plants under DI at 50% ETc exhibited the highest leaf water use efficiency (photosynthesis rate / transpiration rate). The leaf nutrient (N, P, K, Fe, Mn, Cu and Zn) analysis revealed that the concentration of all the nutrients was observed to be higher with fullyirrigated plants, which was associated with higher availability of such nutrients in soil under this treatment. Yield prediction employing principal component-regression, taking leaf-N, leaf-K, stem water potential stress index, stomatal conductance and water band index as the predictors, gave satisfactory result.

pravukalyan@rediffmail.com