INFLUENCE OF DEPTH AND FREQUENCY OF IRRIGATION ON THE WATER MOVEMENT AND ITS DEPLETION BY COCONUT IN A RED SANDY LOAM SOIL

H.H. KHAN
O.P. JOSHI, P. MANIKANDAN, AND P. GOPALASUNDARAM
Central Plantation Crops Research Institute, Kasaragod.

SUMMARY

Moisture studies were undertaken, using Troxler Neutron Probe, in the fertilizer-cum-irrigation experiment on WCT (West Coast Tall) growing in a red sandy loam soil. The treatments consisted of three depths (quantities) of irrigation (q_1 = 20mm; q_2 = 40mm; and q_3 = 60mm) with three frequencies of irrigation (IW/CPE ratio of 1.00 (f_1); 0.75 (f_2) and 0.50 (f_3). The moisture changes were monitored only for M_2 level of fertilizers (750:670:1500:170 g N, P_2O_5, K_2O and MgO respectively per palm per year). The salient findings of the study are summarised below:

1. In drier soil, on receipt of rainfall, the initial evapotranspiration was about 4mm/day. This changed to 2.4 mm/day (mean of 7 days) and 2.2 mm/day (mean of 15 days) indicating that coconut utilises more water when the soil is comparatively wet and that equal amount of water is not available in the entire range of available water capacity of the soil.

2. The evapo-transpirative demands of coconut are largely met by 0-70 cm layer. 90-130 cm layer had little contribution

This was indicated by the measurement data wherein the moisture changes below 70 cm, more specifically below 90 cm, are static. Contribution from the lower layers may become significant when the profile is at low water content.

3. Formation of a dry layer at 30 cm depth was observed showing the self-mulching characteristic of sandy soil. This was more so for frequencies f_2 and f_3, where the crop is subjected to more stress before irrigation. The formation of this layer cuts down the loss of sub-soil water through evaporation, which subsequently becomes available to coconut.

4. The results indicated that the treatment q_1f_1 was effective in keeping the entire profile (0-130 cm) initially at field capacity and close to it in the later period. This was particularly so in the surface 0-70 cm layer. This treatment showed less fluctuation in the evapo-transpiration values and provided enough moisture to the crop. Thus it is advantageous to irrigate the crop with lower quantities of water and at a higher frequency. The results also indicated that application of water higher than q_1 and less frequently than f_1 will not be able to meet the evapo-transpirative demands of coconut. This will result in percolation losses, especially when irrigated with more than 40 mm of water. It will be preferable to keep the soil moisture between field capacity and 1 bar moisture tension.

5. The results thus suggest that water supplied at the

rate of anout 5 mm daily may prove adequate to the crop. This approximates to 35 litres of water per 1.5 m radius of the basin per day. Water supplied through drip irrigation, preferably through sub-surface irrigation, would prove the most effective. There is a possibility to reduce the quantity of water applied by providing mulches in the basins.