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EFFECTS OF DIFFERENT WATER TABLE DEPTHS AND MOISTURE REGIMES ON THE GROWTH AND YIELD OF CASSAVA *Manihot Esculenta* Cranz

Cassava tuber constitutes one of the important staple foods of Kerala, Its cultivation is largely confined to the lateritic uplands. However, considerable area is under its cultivation in the low lands and paddy fields as well, where the yields are usually poor due to flooding, water-logging high water table effects etc. So far no systematic study has been made to evaluate the effects of water logging, flooding, shallow water table etc. on the growth and other functions of the crop. Information on the water requirement of the crop is also scanty. However, data on the effects of water table depths on other crops are available in liteature (Doorenbos and Pruitt, 1977; Tovey, 1962; Rai *et al.* 1971; Panday and Sinha, 1978). An exploratory study was undertaken in CWRDM to evaluate the effects of two water table depths on the growth and yield of cassava.

Two blocks of clay loam soil differing in height by 100 cm were prepared in a paddy field in Trivandrum and an observation well was installed to monitor the water table fluctuations. Each block was longitudinally divided into three plots of one metre width by embedding polythene sheets to a depth of one metre for preventing lateral movement of soil water. The mean depth of water table was 180 cm and 80 cm respectively in the upper and lower blocks. Cuttings of cassava variety H 1687 obtained from the Central Tuber Crops Research Institute, Trivandrum were planted in single row in each plot at one metre spacing on 14th October 1978, without any soil mound. Manuring was done as per the recommended package of practices. In summer season (1st December 1 978 to 1st June 1979) three moisture regimes were exercised in each block by pot irrigation at 5 day intervals at the rates of 20, 10 and 0 litres of water per plant. Total supplementary water in the irrigated plots were 640 and 320 litres per plant in the season. Soil moisture was estimated both gravimetrically as well as with gypsum blocks. The gypsum block readings were, however, inconsistent probably due to low pH of soil. Growth parameters in terms of canopy height, number of leaves produced per plant, number of functional leaves per plant etc. were recorded at monthly intervals. The crop was harvested in the third week of August 1979 and the yield components were recorded. Each plant out of the total seven in each plot was considered as one replicate and the data were statistically analysed by split plot method.

Yield data obtained from the experim3nt are presented in Table 1. Though not statistically significant there was an overall yield reduction due to high water tabie. Yield changes caused by irrigation as well as by the interaction of water table and irrigation were highly significant. High water table caused significant yield reductions only in 10 litres/5 day irrigation and control plots. No significant difference was caused by the difference in water table depth when the plants were irrigated at the rate of 20 litres/5 day.

By gravimetric estimations (data not presented), it was found that even the plots with higher water table, the upper 15 cm layer of the soil got relatively dried up when irrigation was with held, making this region unfavourable for root growth and functioning. Only a limited depth of the soil is likely to be favourable for root functioning in this situation as deep root penetration is prevented because of high water table level. However, when irrigated at the rate of 20 litres/5 day, the upper zone also might have become available for root development which resulted in the growth and yield performance of the plants comparable to those in plots with low water table.

Table 1

Effect of different water-table depths and irrigation treatments on the yield of cassava (kg/plant)

Irrigation	20 l/5 days/plant	10 l/5 days/plant	Control
Low water table (180 cm)	6.67	4.06	4.84
High water table (80 cm)	7.11	3.09	3.49

C. D, (0.05) = 0.6912

The lower yields, in spite of better soil moisture regimes in 35 and 65 cm layers when water table was high, may be besause of the availability of only a smaller volumeof soil with favourable soil moisture status. The higher yields, in spite of the lower soil moisture regimes in the 35 and 65 cm layers, in the 10 litres/5 day irrigation and control plots with low water table might be because of the deeper penetration of the roots which is not possible when the water table is high, From the data it was found that there is severe inhibition of leaf production as a result of deficit in irrigation only when the water table was high. When the water table was low, there was slight inhibition in the summer months which was more than compensated during the monsoon. However, there was no similar compensation in the storage of photosynthates in the tubers. Further studies are in progress to estimate contributions of water table towards crop water requirements.

Effect of two water table depths and three moisture regimes on the growth and yield of cassava were studied. Irrigation resulted in significant increase in growth and yield. There was also significant interaction between water table depth and irrigation in causing yield differences. Irrigation was found to relieve the yield inhibition due to high water table.

സംഗ്രഹം

വ്യത്യസ്ത രീതിയിലുള്ള ജലവിതാനവും ഈർപ്പക്രമവും മരച്ചീനിയുടെ വളർച്ചയിലും വിളവിലും ഉണ്ടാകുന്ന പരിണാമത്തെക്കുറിച്ചു നടത്തിയ പഠനങ്ങളിൽ ജലവിതാ

നവും ജലസേചനവും തമ്മിൽ സൂചകമായ പരസ്പര പ്രവർത്തനമുണ്ടെന്നും ഈ പരസ്പര പ്രവർത്തനം വിളവിൽ ഗണ്യമായ മാറ്റമുണ്ടാക്കുന്നതായും തെളിഞ്ഞു. ജലസേചനം മൂലം വിളവിൽ ഗണ്യമായ വർദ്ധനവുണ്ടാകുമെന്നതിലുപരി, ഉയർന്ന ഭൂജല വിതാനം കൊണ്ടുണ്ടാകുന്ന വിളവുനിരോധം ഇല്ലാതാക്കുകയും ചെയ്യുന്നു.

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