

Root pattern studies in acid lime in silt clay soils

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ABSTRACT

The slow decline in the acid lime (*Citrus aurantifolia* swingle) resulted in reduction in the area and production of the crop especially in Tamil Nadu. Though many theories were postulated for this decline, it still remains as a complex problem. Hence a study was undertaken to find out whether the orchards with silt clay soil type have any effect on the productivity of acid lime. The problem was approached from an angle viz., studying the rooting pattern of acid lime trees in this soil. The results revealed that the fibrous root spread was restricted to 0 – 30 cm from the ground level.

Key words : Acidlime, Silt clay soil, Root studies.

Citrus is one of the important fruit crops grown in India. It is raised in 244,000 ha in tropical and warm humid tropics. Among different species of citrus, acidlime (*Citrus aurantifolia* swingle) is grown in large areas of Maharashtra, Andhra Pradesh, Karnataka and Tamil Nadu.

In recent years, a slow decline in productivity of acidlime trees was observed in Tamil Nadu and elsewhere. The slow decline was generally identified by symptoms like severe chlorosis and mottling in leaves and the roots become brittle. Many theories were put forward for the slow decline. Sahasrabudhe (1927) observed the poor aeration in heavy soils to be the reason for the decline. Kanwar and Randhawa (1960) observed that quality of water and type of soil played a role in citrus decline. Molanaar (1962) reported that citrus grown in porous soils showed decline suddenly. Chapman (1952) and Marloth *et al.* (1965) indicated the difficulty of establishing citrus orchards on heavy soils because of the microflora and decomposable toxic substance. In Andhra Pradesh, the presence of hard pan due to the calcium carbonate was found to be the main reason for the citrus decline (Kanwar and Randhawa, 1960).

However, no definite cause for the same was indicated and citrus decline appeared to be a complex problem and as stated by Chadha (1970), it could be due to more than one factor.

To find out the causes for the citrus decline in Tamil Nadu and to evolve ways and means to improve the situations, a study was undertaken to find out the influence of silt clay of its role on rooting pattern and soil type on its growth and production of acid lime.

MATERIALS AND METHODS

The investigation was undertaken to study the role of siltyclay soil in cultivation of acid lime viz., the rooting pattern of acid lime trees raised in siltyclay soils sampling orchards were selected in six different agro ecological situation with siltyclay soil type and were divided into healthy and declining based on the crop stand. The trees which exhibited deficiency and chlorotic leaves up to 25 per cent were grouped into vigorous and upto 50 per cent and above 50 per cent were grouped as declining-1 and declining-2, respectively. The boundary (border) line of the tree canopy on four sides was pegged. Then the soil within this boundary was excavated in a constant circular distance in stages 30 cm wide towards the tree trunk. Roots at earlier stage were collected both laterally and vertically downwards. The soil was excavated deep till the maximum length of the root has been located. Collected roots were dried and dry weight was recorded.

As suggested by Aiyappa *et al.* (1968), the roots were classified as follows: fibrous roots below 0.2 cm; thin 0.5 cm ; medium roots 0.5 cm to 1.5 cm ; and thick 1.5 cm and above in diameter. The number of roots found at constant lateral distance in a constant depth was computed as percentage of the total roots available in each type separately. The dry weight of roots was expressed in percentage by weight (laterally and vertically). The datum collected from the orchards of silt clay soil type was analyzed statistically through factorial completely blocked randomized design as suggested by Panse and Sukhatme (1961).

RESULTS AND DISCUSSION

The root system plays an essential role in plant growth and development. Roots are sensitive indicators of soil