STUDIES ON VEGETATIVE PROPAGATION AND EARLY GROWTH OF TEA

(CAMELLIA SINENSIS (L.) O. KUNTZE)

By

ANANDASUNDARAM KATHIRAVETPILLAI

Thesis

Submitted in partial fulfilment of the requirements

for the degree of

DOCTOR OF PHILOSOPHY

In

Agriculture

in the

POSTGRADUATE INSTITUTE OF AGRICULTURE

of the

UNIVERSITY OF SRI LANKA

217

Balasubramaniam

Examination Committee.

1977

ABSTRACT

In this study an attempt was made to investigate some of the factors which influence and are likely to cause variation in propagation and growth of young tea plants, particularly in relation to shoot growth. The physiological basis for the variation has been examined.

Differences in the pattern of growth of central (erect) and peripheral (inclined) shoots of pruned mother bushes observed early in their growth continued to be seen over a period of time. The growth of the shoots could be changed by altering their inclination. The greater terminal extension growth of central shoots was associated with greater amounts of mineral nutrients, organic acids, endogenous auxins and gibberellins and low amounts of sugars and amino acids. The peripheral shoots had greater amounts of inhibitors and therefore, remained dormant over a longer period and showed slower growth. There is some evidence to indicate that this is due to abscisic acid. The peripheral shoots had more kinins and less gibberellins which was reflected in more lateral shoots. Analysis of equal volumes of the xylem sap from the central and peripheral shoots confirmed this. However, the rate of flow of xylem exudate was faster in central shoot

Best shoots, suitable cuttings and best plant growth were obtained from 6 - 8-month-old central shoots of mature healthy bushes pruned at 40 cm.

Best plant growth was obtained by propagating single and multi-nodal cuttings under a sealed polyethylene tent. This technique also effected greater economy in the use of water and of labour.

The vigorous clones showed improved growth to higher levels of fertilizer while the slow growing clones responded only to the recommended rate of fertilizer application.

Operations like disbudding and thumb-nailing encouraged the spread of the plant by producing more and longer side shoots. On slower growing clones it is advantageous to delay the operation of thumb-nailing until the plants produce sufficient leaves. With defoliated plants the quantity of fertilizer should be reduced until the plants produce more foliage.

Analysis of changes in dry matter accumulation showed that net assimilation rate was greater in clone DT 1 than in TRI 2025. Howeve clone TRI 2025 showed greater leaf area and leaf area duration which contributed to more dry matter accumulation than DT 1.

Exogenous application of IAA in lanolin (0.05%) to the cut end of shoots suppressed side shoot production compared to decapitated plants receiving plain lanolin. BA increased the number and length side shoots. Both ethrel (800 and 1600 ppm) and CCC (3000 and 6000 gave a lesser increase in plant height; both concentrations of CCC produced more side shoots. GA_3 at 200 ppm increased plant height. When combinations of GA_3 and CCC were sprayed the rate of increase i height due to GA_3 was soon reversed by CCC. GA_3 reduced the N and chlorophyll content of leaves while CCC increased them.

This study also served to examine some of the current cultura practices. Improvements have been suggested wherever there was evid for effecting changes from existing practices.

ABSTRACT

Agronomic studies on Sorghum (*Sorghum bicolor* (L.) Moench) with particular reference to ratoom crops

The growth of the sorghum plant in relation to plant population e and time of fertilizer application and cutting height was reviewed. was hypothesized that varying the plant population, fertilizer levels l time of nitrogen application might alter the growth characteristics and ain yield of sorghum variety IS 2941. The above hypothesis was tested the technique of growth analysis. High levels of fertilizer (125:120:80 N:P:K/ha) and plant population (25 plants/m^2) increased tillers per it area in ratoon crops and leaf area index and duration in main and toon crops resulting in increased total and grain dry matter yields. population of 25 plants/m^2 with one plant/hill arrangement appeared to e optimum for the variety used under conditions of present series of xperiments. Although split applied nitrogen increased grain yield over asally applied nitrogen, the differences between them were significant m one experiment only. The effect of tiller thinning on grain yield as significant and higher grain yield was given by unthinned crop. The ifferences in tiller number and grain yield due to differences in cutting height were not significant. However, 2-3 node cutting height increased productive tillers and final grain yield over one node cutting height. Main and first ratoon crops had higher grain yields than subsequent ratoons. Grain yield declined beyond first ratoon crop indicating that an economic yield could be obtained only upto the first ratoon crop. The incidence of pests and diseases increased with an advance in the age of ratooning and this was the major factor that decreased growth of plant and grain yield.