EFFECT OF SOIL COMPACTION AND SEED-BED PREPARATION ON ROOT TUBER FORMATION OF SWEET POTATO

by

MUDANNAYAKE APPUHAMILLAGE KULARATNE

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ABSTRACT

The effect of soil compaction and different width of raised flat beds on the growth and yield of sweet potato was investigated in field trials. A greenhouse pot experiment was also conducted to observe the effect of soil bulk density on vegetative growth and tuber yield of sweet potato. Young cuttings of variety "Wariyapola" were used as the planting material. The field study was conducted on Alluvial soils of variable drainage and texture at Makandura, and on a Red-Yellow podzolic soil with soft or hard laterite at Walpita during Maha 1987-88 and Yala 1988 to compare the effect of broad bed (BB) 2.00 m wide, narrow bed (NB) 0.80 m wide, very narrow bed (VNB) 0.20 m wide, under two compaction levels, on tuber yield. The experimental design was a split plot with four replicates in each locations. Compaction, showed adverse effects on shoot dry matter weight (SDW), and leaf area index (LAI) in early part of the growing season. Among compaction levels, a trend of increasing tuber yield with better tuber enlargement was observed in non-compacted plots. Both BB and NB performed better than VNB during drier growing seasons, and VNB produced better tuber yields, that do not significantly differ from NB under wet conditions. In contrast, the vine length, SDW, and LAI increased with increasing rainfall during later part of

the growing season.

A pot study was established with using the same test soils in 1989. For the pot study, air-dried and sieved soil samples were uniformly packed in 25 l concrete containers to obtain seven different bulk densities varying from 1.2 to 1.8 g cm^{-3}. Single young cutting of variety "Wariyapola" was planted in each container. The experimental design was a CRD with three replicates. The highest tuber yields were obtained at bulk densities of 1.3 to 1.5 g cm^{-3}. Yield differences were due largely to differences in tuber size than tuber number. Compaction did not show significant adverse effect on maximum leaf number, however, the leaf area tended to decrease with increasing compaction. The results showed that soil with low bulk density (bellow 1.2 g cm^{-3}) enhances vegetative growth at the expense of tuber formation. Alternatively, high bulk density (above 1.6 g cm^{-3}) reduced tuber yield, vegetative growth and tuber enlargement. The best vegetative growth was obtained at the lowest test soil bulk density. These results illustrate that the favourable bulk density of soil should be considered in attempting to obtain high yields of sweet potato having better market preference.