

Sumritre Riyaphan 2010: Alleviation of Plough Pan Problem for Growing Cassava. Master of Science (Soil Science), Major Field: Soil Science, Department of Soil Science. Thesis Advisor: Miss Suphicha Thanachit, Ph.D. 122 pages.

A study on the effect of pan-breaking tillage and soil amendments on plough pan alleviation in a Typic Paleusult where plough pan occurred between depths of 20-70 cm from soil surface was carried out in Dan Khun Thod District, Nakhon Ratchasima Province using Cassava (Huay Bong 80 variety) as a major plant. Split-plot in Randomized Complete Block design with four replications was employed. The main plot consisted of subsoiling by using ripper (P1) and no subsoiling (P2) before normal land preparation (3 disc followed by 7 disc plow and contour ridging). Each main plot had four factors, no soil amendment (T1), amended with 200 kg/rai of gypsum (T2) and limestone dust (T3), and 1000 kg/rai of chicken manure (T4). Application of 100 kg/rai complete fertilizer (15-15-15) was split into 50 kg/rai and applied at two and four months of age. Yield of cassava was harvested at 10 months after planting.

Subsoiling by using ripper gave significantly higher fresh tuber yield than did the other without using ripper (2.92 compared to 2.58 ton/rai). Types of soil amendments showed no effect on tuber yield but aboveground biomass. Chicken manuring significantly gave highest aboveground biomass of 5.92 ton/rai and tended to give the highest fresh tuber yield (3.1 ton/rai) as compared to no soil amendment treatment, and application of gypsum and limestone dust both with and without subsoiling. Subsoiling combined with chicken manure addition tended to give the lowest starch percentage of 21.7. The concentration of macro-, micro- and trace- plant nutrients in leaf was below critical level for normal growth with the exception of Mn concentration, which was found to be reportedly toxic to the plant. However, using chicken manure as a soil amendment with and without subsoiling gave the lowest Mn concentration in leaf, which generally coincided with the highest fresh tuber yield.

Subsoiling and soil amendments had the effect on the change of physical and chemical properties of soil within 30 cm depth except that of available phosphorus. Subsoiling or limestone dust application gave the soil higher hydraulic conductivity and better water aggregate stability than did without subsoiling and other two soil amendments. Chicken manuring had more effect on reducing soil acidity level and increasing plant nutrients stored in soil than did gypsum, limestone dust and no soil amendment.

---

Student's signature

---

Thesis Advisor's signature