

Narissara Suksawat 2011: Effect of Tillage and Soil Amendments on Alleviating Pan Bearing Soils Problem. Master of Science (Soil Science), Major Field: Soil Science, Department of Soil Science. Thesis Advisor: Miss Suphicha Thanachit, Ph.D. 128 pages.

A study on the effect of ripping and soil amendments on the alleviation of plough pan problem undertaken using cassava Huai Bong 80 variety grown on Warin soil series (Typic Kandiuult) that plough pan was found at depths between 20-45 cm. The experiment was carried out in farmer field at Sikhiu district, Nakhon Ratchasima province from May 2009 to March 2011. Split-plot in Randomized Complete Block design was employed with the main plot comprising ripping and no ripping before normal land preparation (disk plow followed by disk harrow and ridging across the slope) and subplot comprising no soil amendment, gypsum (200 kg rai⁻¹), limestone dust (grinded CaCO₃ 200 kg rai⁻¹) and chicken manure (1,000 kg rai⁻¹). Application of 15-15-15 fertilizer at the rate of 100 kg rai⁻¹ (split at 50 kg each time) was done when cassava was two and four months old. Cassava was harvested at 10 months of age and soil samples were collected one month before harvesting time. In second year, there was no ripping but soil amendments at the same rates with that in the first year were applied to subplots.

Ripping method gave fresh tuber yield of 5.43 ton rai⁻¹, which was significantly higher than that without ripping (4.63 ton rai⁻¹) but there was no statistical difference between yields obtained from the main plots (4.41 compared to 4.84 ton rai⁻¹, respectively) in the second year. The application of chicken manure gave the highest fresh tuber yield of 6.17 ton rai⁻¹, while the uses of gypsum, limestone dust (grinded CaCO₃ 200 kg rai⁻¹) and no soil amendment gave the yields ranging between 4.60-4.75 ton rai⁻¹. Similar result was obtained in the second year where the yield of 5.39 ton rai⁻¹ was obtained from the treatment using chicken manure. In addition, a combination between ripping and chicken manure application tentatively gave the highest tuber yields in both years.

Ripping together with continued soil amendment application in both years rarely showed the effect on soil properties changes. The ripping did not show trend to improve soil physical properties. Moreover, bulk density and soil strength tended to increase while organic matter and aggregate stability tended to decrease when compared to that of no ripping. It is possible that ripping can last for only one season and then the plough pan can reoccur again. Using of gypsum increased available water capacity but tended to decrease soil pH. Application of limestone dust (grinded CaCO₃ 200 kg rai⁻¹) tended to lower bulk density, improve aggregate stability and increase soil organic matter content.

Student's signature

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