

Pimprapa Sinkumkoon 2014: Effect of Green Manure Crop and N-fertilizer Management for Cassava-Sweet Corn Sequential Cropping in Warin Soil. Master of Science (Soil Science), Major Field: Soil Science, Department of Soil Science. Thesis Advisor: Assistant Professor Suphicha Thanachit, Ph.D. 127 pages.

Cassava, Huay Bong 80 variety, and sweet corn, Hybrix 39 variety were grown, sequentially in Warin soil at Ban Krissana, Sikhiu district, Nakhon Ratchasima province to study the effects of three green manures, sun hemp, ruzi grass, and local weeds mainly jungle rice (*Echinochloa colana* (L.) Link), crabgrass (*Digitaria biformis* Willd), and coatbuttons (*Tridox procumbens*) and four rates of nitrogen fertilizer (0, 0.5, 1.0 and 1.5 times of the rate recommended by Department of Agriculture on cassava and sweet corn. The green manures were incorporated into the soil at the age of 50 days and left for two weeks before growing cassava. After harvesting cassava at 10 months of age, plant residue correcting of branches, leaf and stem base was incorporated into the soil and left for three weeks before planting sweet corn, which was harvested at day 80 after planting date. Fertilization was equally split into two times. In all treatments, phosphorus and potassium fertilizers were applied at the rate of 15 kg/rai for cassava and 7.5 kg for sweet corn.

Ruzi grass biomass before being incorporated was 2.96 t/rai, which was higher than that of sun hemp (1.98 t/rai) and local weeds (2.25 t/rai). Sun hemp decomposed slightly slower than did ruzi grass. Both plants decomposed slowly at the early stage until week 7th that sun hemp started to decompose more rapidly whereas ruzi grass took nine weeks to have the same decomposition rate. Both plants released higher ammonium nitrogen than nitrate nitrogen with the ranges of 4.32-7.27 and 2.17-4.35 mg/kg, respectively. The incorporation of local weeds resulted in the soil containing the highest ammonium nitrogen (3.78 mg/kg) in the soil but with the lowest nitrate nitrogen (0.28 mg/kg) while other green manures gave indifferent amount of both available forms of nitrogen with the content ranging between 6.63-8.62 mg/kg. The incorporation of green manures statistically differently increased yields of cassava and sweet corn grown sequentially. Use of sun hemp gave the highest cassava yield of 4.01 t/rai, which coincided with the greatest amounts of nitrogen in fresh tuber and stem base at 1.71 and 2.07%, respectively. This subsequently resulted in giving the highest peeled sweet corn yield (701 kg/rai). Ruzi grass incorporation adversely gave the lowest yield of cassava and sweet corn. Rates of nitrogen fertilizer had no impact on yield of both plants but the addition at the rate of 1.5 time of the recommended rate tended to give the highest yield of cassava, including the uptake of nitrogen in tuber, stem and stem base. The higher rate of nitrogen application together with the incorporation of green manure tended to increase yield of cassava but the use of sun hemp with recommended rate of nitrogen significantly gave the highest amount of fresh tuber yield (4.35 t/rai). In the case of sweet corn, the use of nitrogen at low rate with the incorporations of local weeds and ruzi grass tended to increase plant yield rather than the use of nitrogen fertilizer alone with the exception of sun hemp incorporation.

Student's signature

Thesis Advisor's signature