Effect of Organic Fertilizers in Reducing Chemical Agriculture on Sweet Corn in Chiang Rai Province

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Abstract

The research project on the effect of organic fertilizers in reducing chemical fertilizers on sweet corn of Sugar 75 variety was conducted on Ban Chong soil series, soil group 29 at farmer field, Wiang Chai district, Chiang Rai province, during 2006-2008. Randomized complete block was used in the experiment, totally 8 treatments in 3 replications which consisted of farmer practices (T1) chemical fertilizer based on soil analysis; 20-10-5 kg N-P_2O_5-K_2O per rai (T2) green manure + liquid organic fertilizer (T3) compost 2 tons per rai + liquid organic fertilizer (T4) green manure + chemical fertilizer ½ NPK based on soil analysis (T5) compost 2 tons per rai + chemical fertilizer ½ NPK based on soil analysis (T6) green manure + chemical fertilizer ½ NPK based on soil analysis + liquid organic fertilizer (T7) and compost 2 tons per rai + chemical fertilizer ½ NPK based on soil analysis + liquid organic matter fertilizer (T8) for comparing efficiency of each treatment on sweet corn yield, soil properties and economic return.

The result indicated that plant height showed high significant difference in every time of collecting data, in 2008, it was found that yield content (ear with husk) of compost 2 tons per rai + chemical fertilizer ½ NPK based on soil analysis + liquid organic matter fertilizer (T8) and compost 2 tons per rai + chemical fertilizer ½ NPK based on soil analysis (T6) were the highest 2,278 and 2,228 kg/rai respectively, but insignificant difference when compared with farmer practices (T1) chemical fertilizer based on soil analysis; 20-10-5 kg N-P_2O_5-K_2O per rai (T2) and green manure + chemical fertilizer ½ NPK based on soil analysis (T5) which gave 1,962, 1,952 and 1,828 kg/rai respectively, but showed high significant difference when compared with green manure + liquid organic fertilizer (T3) and compost 2 tons per rai + liquid organic fertilizer (T4) which gave the lowest yield 1,406 and 1,550 kg/rai respectively.

In 2009, it was found that ear with husk yield less than the first year because of heavy rain happened, the compost 2 tons per rai + chemical fertilizer ½ NPK based on soil analysis + liquid organic matter fertilizer (T8) still gave the highest yield 1,152 kg/rai, but insignificant difference when compared with the compost 2 tons per rai + chemical fertilizer ½ NPK based on soil analysis (T6), green manure + chemical fertilizer ½ NPK based on soil analysis + liquid organic fertilizer (T7), chemical fertilizer based on soil analysis; 20-10-5 kg N-P_2O_5-K_2O per rai (T2) and farmer practices (T1) which gave 1,051, 1,044, 1,044 and 1,043 kg/rai respectively. Consideration the yield of both years was found that the compost 2 tons per rai + chemical fertilizer ½ NPK based on soil analysis + liquid organic matter fertilizer (T8) was the highest 1,715 kg/rai, while the green manure + liquid organic fertilizer (T3) was the lowest 895 kg/rai. Sweetness was found that it was insignificant difference in

every treatments, in 2008 and 2009 sweetness were in range of 13.2-14.0 and 12.7-13.5 degree Brix respectively.

Soil properties changed after harvesting showed that soil pH was led to high in range of 5.17-5.77, organic matter raised to 2.46-2.82%, C.E.C. raised to 8.58-9.81 meq/100 g soil, phosphorus raised to 21.0-33.0 mg/kg, calcium and magnesium also raised except potassium was decreased 67.7-125 mg/kg. Consideration in return income was found that in 2008 the treatment of chemical fertilizer based on soil analysis; 20-10-5 kg N-P_2O_5-K_2O per rai (T2) gave the highest net income 5,488.5 Baht/rai, farmer practices (T1) and green manure + chemical fertilizer ½ NPK based on soil analysis (T5) gave the net income 4,671.5 and 4,780.0 Baht/rai respectively, but treatments of green manure + liquid organic fertilizer (T3) and compost 2 tons per rai + liquid organic fertilizer (T4) gave the lowest net income 2,732.7 and 671.2 Baht/rai respectively. In 2009, it was found that the treatment of chemical fertilizer based on soil analysis; 20-10-5 kg N-P_2O_5-K_2O per rai (T2) gave the highest net income, followed with farmer practices (T1) and green manure + chemical fertilizer ½ NPK based on soil analysis + liquid organic fertilizer (T7) but other treatments lost income. Therefore, it was concluded that application of the single organic fertilizer gave the lowest yield and return net income, while organic fertilizer with chemical fertilizer increased yield and income. The best treatment was the chemical fertilizer based on soil analysis, which gave the highest yield and income.

Keywords: Sweet corn, Sweet corn of Sugar 75 variety, Organic Fertilizer, Chemical Fertilizer, Chiang Rai Province