

The Effect of Green Manure Crops as Alternative Fertilizer for Substitution of Organic Fertilizer on the Corn Cultivation

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[Introduction]

Green manure crop is an environmentally friendly and labor saving organic fertilizer by soil fertility improvement and chemical fertilizer or composts application reduction. Legume crops (as green manure) is effective to reduce chemical nitrogen fertilizer requirement for the following crop due to atmospheric nitrogen fixation and releasing nitrogen into the soil. We developed alternative crop fertilizer using green manure crops instead of organic fertilizer. This research was conducted to find optimum mixed sowing rate of green manure crops as alternative fertilizer to substitute organic fertilizer. We also surveyed the corn production as a succeeding crop.

[Materials and Methods]

Hairy vetch (Chungpoong Bora), green barley (Yeongyang), rye (Seedgreen), mixed oil cake, livestock manure, corn (Ilmichal) were used for the experiment and sowed according to the standard cultivation method in 2016~2017. Total mixing rate were 100:0, 50:50 of hairy vetch and barley or rye. Other treatment were organic fertilizers such as mixed oil cake and livestock manure. We compared soil organic concentration, soil nitrogen amount depending on the treatments. We surveyed general growth characteristics and yield components such as stem length, plant height, stem diameter, ear length, ear diameter and total ear weight etc.

[Results and Discussions]

According to the results, mixed sowing treatment showed relatively higher soil nitrogen and soil organic concentration increase rather than those of single sowing treatment and organic fertilizer treatments. Succeeding crop also showed higher production potential in the mixed sowing treatment than other treatments. And in turn, the gross profit showed about 23% increase in the mixed treatments. In detail, mixed sowing treatment 50:50 of hairy vetch and barley showed average 20g of soil organic content per kg which is higher than other treatments, such as the control(non fertilizer) of 12g and the 100:0 treatment of 16g, the 50:50(rye) treatment of 18g, mixed oil cake of 14g and livestock manure 14g. In the comparison of soil nitrogen amounts depending on the treatments, mixed sowing treatment 50:50 of hairy vetch and barley showed 17.1kg per 10a which is also higher than other treatments. Those results also affected the production potential of the succeeding crop. The ear yield of corn was highest in the 50:50 treatment of hairy vetch and barley. It's yield was 1,149kg per 10a which is 23% higher compared to the control treatment.

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