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Effect of mixed sowing treatment of green manure crops on the change of soil nitrogen amount and yield production of corn

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Abstract

This study was conducted to find optimum mixed sowing ratio of green manure crops to reduce the use of chemical fertilizer as well as to increase the crop yield potential which will foster the utilization of green manure crops in the upland field in view of environment friendly agriculture. According to the study, the mixed ratio, 50:50, of hairy vetch and green barley showed highest nitrogen production yield in the soil due to the relatively higher organic nitrogen supply from the hairy vetch plant as well as nitrogen fixation from the air rather than other mixed ratio. In the 50:50 mixed ratio of hairy vetch and green barely total nitrogen amount in the soil showed 17.2kg per 10a, but in the other treatment ratio such as 75:25, 25:75. total nitrogen fixation amount were 16.7, 16.9 respectively. We also conducted the experiment to compare the effect of the mixed sowing treatment of green manure crops on the production of corn cultivated as a succeeding plant of hairy vetch. According to the result, the mixed ratio, 50:50, of hairy vetch and green barley treatment showed highest yield potential of corn as 153kg per 10a in seed weight which is due to the relatively higher organic nitrogen supply from the hairy vetch plant as well as nitrogen fixation from the air rather than other mixed ratio. In the mixed sowing treatment of hairy vetch 100 and barley 0 ratio, the corn production showed 148kg per 10a which is 5kg lower than that of hairy vetch 50 and barley 50 ratio, but showed statistically no difference between those two treatment. Otherwise, different treatments, such as hairy vetch 75 and barley 25, 25 and 75, 0 and 100 showed statistically different each other. Therefore, it was concluded that green manure crops, such as hairy vetch, green barley and rye were very effective crops to increase the soil fertility and gave the positive effect to the crops to give vegetative and propagative growth condition and, in turn, increased the yield potential. We have to make policy to enhance the utility of green manure crops in the upland crops as well as faddy field for the soil fertility and crop yield production which will guarantee prominent quality of environment friendly agriculture products. This work was supported by a grant from development of optimum utilization technology of organic resource for soil fertility improvement in upland soil (No. PJ0112272017), Rural Development Administration of Korea.

Keywords: sowing, green manure crop, environment friendly agriculture

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