

Establishment of Crop Rotation System for Organic Farming¹

H. S. Hsu and Y. H. Tsai²

Abstract

In order to slow down the impacts of agricultural production on environment and to produce good quality of foods, the organic farming has become a topic of great concern among the farmers and the consumers in Taiwan. At present, the main problems for organic farming including higher price of organic fertilizers, hard to control of the diseases, insect pests and weeds. Thus organic farming is facing difficulties such as low yielding capacity, poor appearance of the organic produces and higher production cost. After a long term of experiments, the results indicated that the intermediate farming, of which both of the chemical and organic materials were applied, may be more feasible than the others. However, if we can solve the problems of organic farming gradually, it is believed that there is still some rooms for organic farming to be developed. In this paper, we will discuss some techniques relating to cropping systems which can be applied in organic farming.

In the first six years of the experiment, several popular crops in Chinan area were chosen for experimental materials, some of them were infected by diseases and insects severely, such as sweet corn and radish. After a series of discussion, the crop patterns were adjusted in 1994. After 1994, the crops planted in cropping system must be adapted to the local environment, while for the cropping system , a crop pattern similar to the local farmers were planted for comparison. The experimental results showed that the crop yields obtained from the treatment of organic farming were mostly higher than that of conventional farming, indicating that the performance of the cropping system after adjustment, was better than that of the cropping system . In addition, since the cabbage and sweet corn were substituted by lettuce and corn in cropping system , the damages from diseases and insects were under control. For cropping system , rice was the main crop in this cropping pattern, it was planted both for spring and summer seasons. It was found that yield increase for the summer rice, based on the yield of organic farming over conventional farming, was higher than the spring rice. It revealed that summer season looks like a more suitable season for organic rice production. Besides, the paddy field was found to be the best way for weed

control. It is also found that the upland crop after rice is tend to have smaller weed population than others. Thus, it is important to have rice within the cropping system.

It is generally understood that monoculture may reduce the yield and quality of agricultural produces, especially the Solanum crops. For maintaining and enhancing soil fertility, it used to apply cropping system. The function of cropping system based on cropping sequences and the management of soil and fertilizer, including the nutrient uptake, root excretion and the residue of the previous crop. Studying the effect of previous crop on the yield of celery indicated that the total amount of nutrient uptake of the previous crop did affect the yield of celery. For example, lettuce, vegetable soybean and green onion had lower total amount of nutrient uptake, their following crops obtained relatively higher yield. For green manure (*Sesbania roxburghii*), however, its total amount of nutrient uptake was higher than that of celery, the yield of the following crop was still higher than others. It probably means that the return of the whole plant of the green manure to the soil may help the soil to reestablish its soil fertility. Therefore, for planning the cropping systems, in addition to the market demand, the total amount of nutrient uptake, residual parts of the previous crop, damages of diseases and insect pests, weed control etc. should be considered. In fact, the organic farming is more difficult than conventional farming at this stage, a detail planning is necessary for a successful organic farming.

Key words: Cropping system, Organic farming, Yield, Weed, Diseases and Insect pests

¹This project was supported by a grant from the Council of Agriculture, Executive Yun.

²Assistant researcher and associate researcher, Chi-Nan Branch Station of KDAIS.