

Study on Soybean Yield affected by Green Manure Application in Hairy Vetch-Soybean Cropping System under Different Soil Textures

Jong-Seo Choi^{1*}, Jeong Hwa Park¹, Shingu Kang¹, Sook-Jin Kim¹, Woonho Yang¹

¹Dept. of Central Area Crop Science, NICS, RDA, 126, Suin-ro, Suwon, 16429, Korea

[Introduction]

Hairy vetch (*Vicia villosa* Roth) is an important green manure crop in environmental-friendly agriculture, which can biologically fix large amount of nitrogen and supply it to subsequent crops.

The incorporation of hairy vetch also contributes to organic matter accumulation which leads to improvement of soil structure. This study was conducted to investigate the effect of hairy vetch application on the soil physicochemical properties and soybean yield in different soil textures.

[Materials and Methods]

The experiment was conducted using four different types of soils; clay loam, loam, sandy loam and sand. Hairy vetch was cultivated as a winter crop and incorporated into each soil at three different rates before planting soybean. The amount of hairy vetch incorporation was calculated by total nitrogen content of the biomass at the rate of 15, 30, and 45 kg N ha⁻¹ which were equivalent to 50, 100, and 150% of the recommended N fertilization rate for soybean, respectively. In control plot, conventional NPK fertilizer was applied at the rate of 30-30-45 kg ha⁻¹.

[Results and Discussions]

The application of hairy vetch resulted in the better growth and yield than conventional fertilizer treatment in clay loam and sand, but not in loam and sandy loam. In sand, soil organic matter was significantly higher in hairy vetch plot than control plot. Hairy vetch treatment showed increased soil water content in 5~10 cm depth over conventional treatment in sand, which possibly affects the water availability to plant. In clay loam, soil water content increased in 0~5 cm depth by hairy vetch treatment while it decreased in 5~10 cm depth. Whereas, there was no significant effect of hairy vetch on soil water content in loam and sandy loam. This study shows that application of hairy vetch green manure improves soybean yield through the alteration of the soil physical property such as water holding capacity and permeability, especially in very coarse or fine-textured soils.

[Acknowledgements]

This study was supported by “Cooperative Research Program for Agricultural Science & Technology Development (Project No. PJ010164)”, Rural Development Administration, Republic of Korea.

*Corresponding author: Tel. +82-31-695-4134, E-mail. hbell7@korea.kr