Weed Control in Organic Soybean Field Using Cover Crop

B.M. Lee[1*], H.J. Jee, C.S. Kim, S.B. Lee, H.S. Nam, C.K. Kang, J.H. Lee and M.K. Hong

[1]Organic Agriculture Div., National Academy of Agricultural Science, RDA, Suwon City, 441-707, Republic of Korea

Keywords: Cover Crop, Organic, Soybean, Weed Control

Abstrats

In organic farming agriculture, integration of cover crop into cropping system is recommended to improve the soil quality, prevent soil erosion, and control weeds. The aim of this study was to control weeds in soybean fields by integration of cover crops such as hairy vetch and rye. Due to cover crop mulching, weeds occurrence and growth were radically decreased. One month later after transplanting, weed growth inhibition rate of hairy vetch and rye treatment were 98% and 89% respectively, while crimson clover treatment were 50%. These effects last long over two month. The soybean yield of hairy vetch treatment was best. Therefore using hairy vetch as cover crop was highly recommended in organic soybean field.

Introduction

In organic farming agriculture, integration of cover crop into cropping system is recommended to improve the soil quality, prevent soil erosion, and control weeds. The aim of this study was to control weeds in soybean fields by integration of cover crops such as hairy vetch and rye. Hairy vetch is well known as green manure crop. Its high biomass and high nitrogen content is good for green manure. Rye is well known as allelopathic effect – inhibition of weed germination and growth. In this study, we developed cover crop system for weed control in organic soybean field.

Materials and methods

Cover crops (hairy vetch, rye and crimson clover) were sown on October 2nd 2008. After overwintering, cover crops were cut and mulched in whole fields on June 3rd 2009. Soybean was transplanted on June 4th 2009. Weed population densities and composition were investigated in May, July and August by counting the number of weeds in 3 quadrats(50cm x 50cm) that were randomly placed within each plot at each sampling time.

Results and discussion

Due to cover crop mulching, weeds occurrence and growth were radically decreased. One month later after transplanting, weed growth inhibition rate of hairy vetch and rye treatment were 98% and 89% respectively, while crimson clover treatment were 50%. These effects last long over two month. The soybean yield of hairy vetch treatment was best. Therefore using hairy vetch as cover crop was highly recommended in organic soybean field.

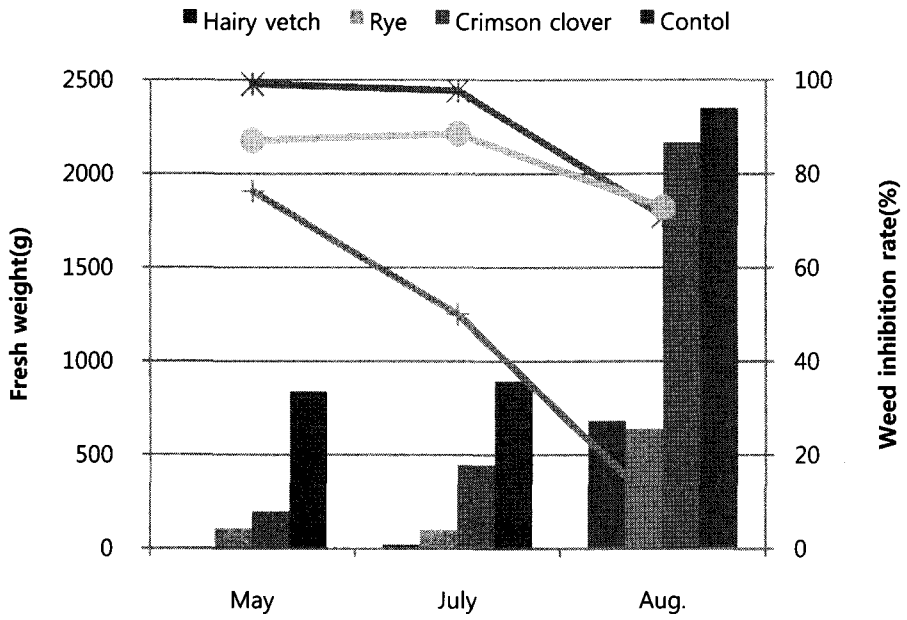

Fig. 1. Seasonal changes of weed occurrence and inhibition rate as influenced by cover crops in organic soybean field.

Conclusion

Cover crop is effective way to control weeds in organic agriculture. But how to use cover crop is still need to be studied in various crops. In soybean, hairy vetch mulching was optimal way to control weeds. But killing hairy vetch before cropping is still troublesome matter.

References

Barnes, J. P. and A. R. Putnam. 1986. Evidence for allelopathy by residues and aqueous extracts of rye (Secale cereale). Weed Sci. 34 : 384-390.

Creamer, N. G., M. A. Bennett, B. R. Stinner, J. Cardina and E. E. Regnier. 1996. Mechanisms of weed suppression in cover crop-based production systems. Hortscience 31 : 410-413.

Shipley, P. R, J. J. Messinger and A. M. Decker. 1992. Conserving residual corn fertilizer nitrogen with winter cover crops. Agron. J. 84 : 869-876.

Teasdale, J. R., C. E. Beste and W. E. Potts. 1991. Response of weeds to tillage and cover crop residue. Weed Sci. 39 : 195-199.