Cover Crops in Cereals

better companions than weeds?

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Introduction

The research-network PRODIVA* focuses on a better utilization of crop diversification for weed management. Cover/Catch crops have gained popularity being one of the subsidized measures in agri-environmental schemes of the EU. Cover crops are widely used to increase soil fertility as well as to minimize nutrient leaching but their applicability for weed management is less known.

Objectives and Methods

Combinations of crop and cover crops including crop sequencing are important components for weed management in organic farming. We have studied the competitiveness of cover crops against weeds in long-term field experiments in Denmark, Finland and Latvia. Weed biomass production and weed community associations with cropping factors have been investigated. We aim at understanding the main factors driving weed pressure and weed community assemblies in organic cropping systems.

Results

Oilseed turnip rape (*Brassica campestris*) was used as a model weed in Finnish field experiments with spring barley and under-sown cover crop mixtures. Cover crop establishment of clovers and grass species and their early growth was too slow to suppress the growth of early-emerging tall-growing annual weed species. Not only cover crop species but also their varieties are of interest in Northern conditions.

Grass-clover as a full season cover-crop for green manuring can reduce problems with *Cirsium arvense* (Fig.1). In Danish experiments, the effect was, however, only achieved if the grass-clover was mown 3-4 times during the season[1)]**.** *Elytrigia repens* thrives in grass-clover unless mowing is taking place frequently with short intervals. Post-harvest cover crops that do not produce a dense canopy can augment *E. repens* growth because mechanical interventions are restricted[2)] .

A two-years grass-clover phase in cereal-dominated rotations in Latvia was more suppressive against weeds than a one-year phase (Fig. 2)

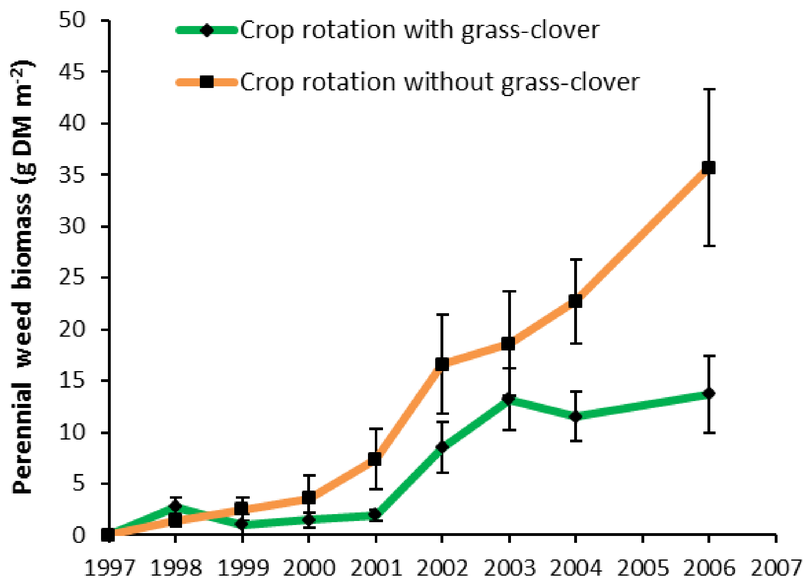

Fig. 1. Long-term effect of having grass-clover every fourth year in the crop rotation (DK)

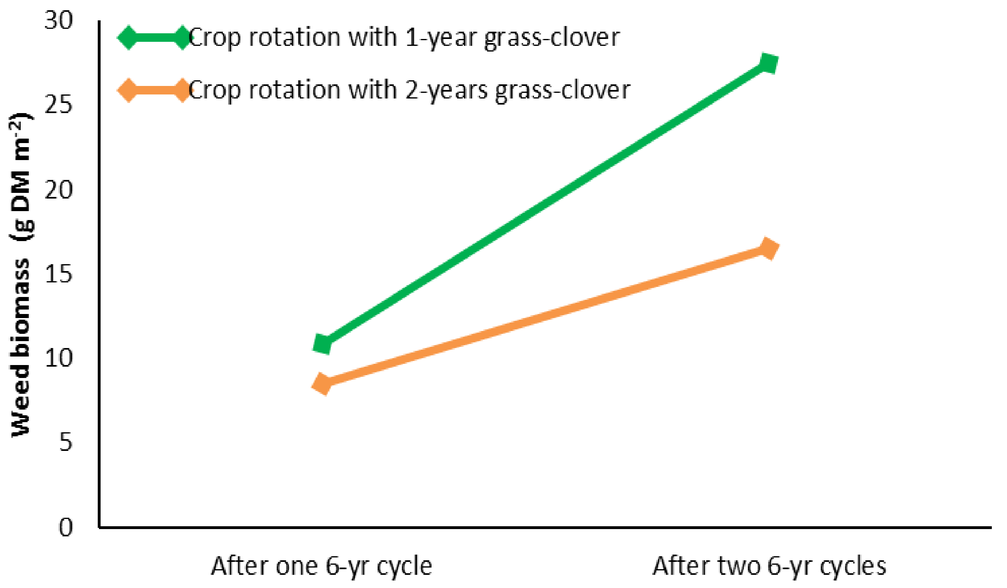

Fig. 2. Weed biomass in spring barley in long-term cereal-dominated trials. The 6-year crop rotations included a grass-clover phase either for one year or for two years.

Conclusions: Clover species (*Trifolium* spp.) are suitable for cereal-dominated crop rotations and thrive well in the Nordic/Baltic agroclimate. Cover crop establishment, their early-phase growth and management during the growing season are key factors in successful weed management.

References:

1) Melander B., Rasmussen I.A. & Olesen J.E. (2016). Incompatibility between fertility building measures and the management of perennial weeds in organic cropping systems. *Agriculture, Ecosystems and Environment* 220, 184-192.

2) Rasmussen I.A., Melander B., Askegaard M., Kristensen K. & Olesen J.E. (2014). *Elytrigia repens* population dynamics under different management schemes in organic cropping systems on coarse sand. *European Journal of Agronomy* 58, 18-27.

Perennial weeds like *Sonchus arvensis* impede cereal cropping in organic production systems. Source: J. Salonen

Red clover (left) is less aggressive companion for spring barley than Persian clover (right). Source: J. Salonen

Take a good break from cereals. Competitive catch/cover crops in crop rotation work against weeds. Source: B. Melander

Various legumes are suitable cover crops. Alsike clover (*Trifolium hybridum*) manages even in less favorable growing conditions. Source: L Zarina

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*The PRODIVA Project is funded by Core Organic Plus (ERA-Net), ID: 1381