



PRACTICE ABSTRACT No. 14

Identifying cover crops for soybean organic production?

PROBLEMS:

With the increasing popularity of sustainable and organic production systems, maintaining and preserving soil fertility and health are key priorities. A major challenge in organic production is to enable optimal plant nutrition, based on the efficient use of soil nutrients (Manojlović, 2008). Ubavić and Bogdanović (2008) suggest selecting species with a well-developed root system that can use nutrients from less soluble compounds from deeper in the soil profile, with rapid growth and a short vegetation period and with the ability to fix atmospheric nitrogen e.g. legumes. Cover crops are increasingly being used as a tool to support agro-ecosystem services. Selected cover crop species differ in

the traits by which they capture resources and influence the local ecosystem.



Fig.1. Soybean after winter cover crop. Photo credit: Institute of Field and Vegetable Crops Novi Sad.

SOLUTIONS:

Integration of cover crops can have significant ecological impacts on the farming system with numerous on-farm benefits. In organic production, cover crops play an essential role in improving the physical, chemical and biological properties of soils.

COVER CROP CHALLENGES:

- Selection of the most appropriate cover crop species and mixture.
- Competitiveness for moisture and nutrients with the main crop (e.g. moisture use).
- Cost of cover crop seed, establishment and destruction.
- Termination time/practice of the cover crop.

BENEFITS AFTER THE INTRODUCTION OF COVER CROPS:

- Increased sustainability of production systems.
- Contribution to soil quality, via improved physical and chemical soil characteristics.
- If a legume is included, then N fixation is ensured thereby increasing the yield and quality of the following crop.
- Nitrogen release to the following cash crop.
- Decreased erosion.
- Decreased soil compaction.
- Conservation of soil moisture.
- Organic matter conservation.
- Weed control.
- Increased biodiversity.
- Attraction of beneficial insects.

CONSIDERATIONS:

- Agro-ecological conditions, location, soil type.
- Type of farm (plant or livestock production),
- Selection of cover crop species and mixture (in line with selection of the main crop, e.g. avoid brassica species where oilseed rape is grown).
- Time of planting and termination of the cover crop and the systems/approaches used.

Rye as cover crop

- Positive effect on soil structure.
- Good soil cover.
- Rye has deep root that helps in prevention of soil compaction in annually tilled field.
- Great in cover crop mixtures with legumes (winter pea, vetch, faba bean).



Fig. 2. Rye as winter cover crop.

- Previous crop for legumes (soybean), maize, sunflower.
- Rye has root exudates that can inhibit germination and growth of weed seeds which is very important supporting weed control in organic production.
- More disease resistant compared to barley or oat.
- Life-cycle of pests is broken.

Pea and oat as cover crop

- Oats provide support to the pea and have a positive effect on weed control, while the pea provides nitrogen.
- Adjust the sowing density to limit competition.
- Can be grazed by livestock.
- Forage peas can be grown alone or in combination with other species, especially with small grains (oats, rye).



Fig. 3. Pea and oat as cover crop.

- Mixtures provide more options for use as forage. Generally, single species cannot deliver all of these benefits, and hence planting mixtures is gaining increasing attention.
- Easy to terminate.
- Attract a wider range of beneficial insects and pollinators.

FURTHER INFORMATION:

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ECOBREED CONSORTIUM



ABOUT ECOBREED:

ECOBREED is a 5-year (2018-2023) project funded by European Union's Horizon 2020 research and innovation programme that will improve the availability of varieties and seed suitable for organic and low-input production. Activities will focus on four crop species i.e. wheat, potato, soybean and common buckwheat, selected for their potential contribution to increasing the competitiveness of the organic sector.

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