PRACTICE ABSTRACT

Intercropping of lupin for weed control and complementary grain production in organic farming

Problem

Lupin crops (white lupin, narrow-leafed lupin) fix nitrogen, produce protein-rich seeds and can diversify crop rotations. However, the low competitive ability of lupin towards weeds and its high yield variability is a barrier to increase its cultivation with no or reduced herbicide use.

Solution

A cereal (winter or spring) or camelina (spring) crop can be grown with lupin at a low density. The intercrop can compensate the low utilisation of soil nitrogen and light interception by lupin helping to reduce weed burden for lupin during the early stages of growth.

Outcome

Intercrops often contain around half the weed biomass of lupin sole crops. The crop grown together with lupin provides a complementary grain production that can compensate for low productivity of lupin in some years. The grains of the two species are easy to separate after threshing. An additional benefit is that the protein concentration of the intercropped cereal is often increased compared to a sole-cropped cereal.

Applicability box

Theme
Intercropping, Organic, Barriers and Enablers, Cropping system

Geographical coverage
Western France, Central and Northern Europe

Application time
Sowing at the optimal time of winter or spring lupin

Required time
Mixing the seeds before sowing or sowing in two passes

Period of impact
Weed management for lupin, nitrogen and weed pre-crop effect for the subsequent crop in rotation

Equipment
Specific equipment needed to sort and clean harvested grains, either on-farm or downstream in the value chain

Best in
Organic and low input cropping systems, conventional systems with herbicide use constraints

Picture 1: Winter white lupin and triticale *vs*. sole-cropped winter white lupin at lupin flowering, near Angers (France) (Photo: Nicolas Carton, SLU)**. Picture 2: winter white lupin and triticale at maturity** (Photo: Nicolas Carton, SLU).

Practical recommendation

- Use the full sowing density of lupin and add 20 to 30% of the sole crop density of a cereal or brassica; do not fertilise with N.
- If a high soil N availability is expected, the companion crop can be too competitive for the lupin so reduce the companion crop sowing density or choose a species/variety with a low competitive ability to lupin.
- Criteria for the choice of species to intercrop with lupin is the compatibility with lupin regarding sowing and harvest dates, strong early competitive ability for N and light, moderate shading of the lupin in later growth stages, ability to grow in low N input situations and tolerate competition by lupin.
- If you usually grow lupin as sole crop and consider trying this practice, we recommend you to sow one or several strips of lupin with intercrops, possibly different species or varieties and sowing densities, and compare weed growth, lupin growth and yields.

Further information

Video

- YouTube video- Lupins (Danish)

Further readings

- Nicolas Carton's PhD Thesis: (English and French)

Weblinks

- Terres Inovia- association-du-lupin (French)

- Use the comment section on the DiverIMPACTS discussion forum to share your experiences with other farmers, advisors and scientists! If you have any questions concerning the method, please contact the author of the practice abstract by e-mail.

About this practice abstract and DiverIMPACTS

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Project website: www.diverimpacts.net

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