

# Farmer participation improves blue lupin-oat species mixtures for local protein production and weed control in organic farming

## Problem

Low yields and high sensitivity to weed pressure prevent the spread of blue lupin crop in organic farming despite high protein content and a widespread demand for local protein production.

## Solution

Participatory approach. Sharing farmer knowledge and experience in associated crops to develop lupin – oat mixture in on-farm experiments.

## Outcome

After adaptations of species varieties and seeding densities, blue lupin – oat mixture controls efficiently weeds and presents satisfactory yield levels for both species.

## Applicability box

### Geographical coverage

Europe

### Application period

Spring

### Required time

N/A

### Period of impact

Growing period of blue lupin

### Equipment

Standard machinery used for cereal cultivation

## Practical recommendations

- Before seeding, check soil lime content: under 5%, blue lupin can be grown without difficulties, above 10%, soil is not adapted as chlorosis can appear limiting lupin growth. Between these two values, test lupin crop in small strips to assess the potential of the field.
- Favour branched lupin cultivars (e.g., Boregine) as they have the highest yield potential. Choose the earliest oat cultivar for synchronous maturity with lupin.
- Seeding densities corresponds to 100% of standard sowing densities for lupin and 10% for oat
- Apply soil tillage to reduce weed pressure.
- Inoculate lupin seeds with rhizobium (e.g., HiStick) and mix them with oat seeds. Sow seeds in early spring with the same row spacing as for cereals at about 3 cm depth.
- If weed control by the mixture is not sufficient, apply mechanical weeding.
- Avoid all compacting operations.
- Harvest when seeds collide in the pods (like bells).



Figure 1 : Mixture of blue lupin and oat

## Practical testing/Farmers' experiences

It is also possible to sow lupin and oat in alternate rows in a single pass with a seeder with divided hopper or in double pass using a GPS. This design will improve weed control and reduce oat competition over lupin resulting in higher lupin yield. Other cereals can also replace oat, such as wheat or triticale.



## Further information

- Webpage: <https://www.remix-intercrops.eu/>
- Facebook Page: <https://www.facebook.com/RemixIntercrops/>
- Wiki: [http://vm193-134.its.uni-kassel.de/En.DiversiWiki/index.php/Mixture\\_practice\\_for\\_farmers\\_and\\_advisors](http://vm193-134.its.uni-kassel.de/En.DiversiWiki/index.php/Mixture_practice_for_farmers_and_advisors)
- Check the [Organic Farm Knowledge Platform](#) for more practical recommendations.

## About this abstract

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**ReMIX** is a H2020 multi-actor project that will allow designing cropping systems based on agro-ecology for the benefit of farmers and the whole EU agricultural community. ReMIX will exploit the benefits of species mixtures to design more diversified and resilient agro-ecological arable cropping systems. Based on a multi-actor approach, ReMIX will produce new knowledge that is both scientifically credible and socially valuable in conventional and organic agriculture. The project will tackle practical questions and co-design ready-to-use practical solutions. The project will span from the specification of end-user needs and the co-design of in-field and on-farm experiments to demonstrations with evaluation of new varieties and practices. ReMIX will contribute to the adoption of productive and resilient agricultural systems. The project is running from May 2017 to April 2021

**Website:** [www.remix-intercrops.eu](http://www.remix-intercrops.eu)

