

Intercropping of cereals and grain legumes in European organic farming systems - INTERCROP



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Introduction

Intercropping is defined as the growth of two or more crops simultaneously in the same field during a growing season and is the practical application of ecological principles such as diversity, crop interaction and other natural regulation mechanisms. This technique has been found to have many advantages, mainly related to the complementary use of environmental resources by the component crops. Nitrogen fixing legumes can be included to a greater extent in arable cropping systems via intercrops. Legumes contribute to maintaining the soil fertility via nitrogen fixation, which is increased in intercrops due to the more competitive character of the cereal for soil inorganic N. Intercropping of grain legumes and cereals therefore offers an opportunity to increase the input of fixed nitrogen into agroecosystems without compromising cereal N use, yield level and stability.



Main project aims

- Identify benefits and obstacles for the use of intercropping of arable crops in the EU in order to resolve both the technical and socio-economic aspects.
- Increase the knowledge on the multifunctional role of intercropping: production level and stability, resource use, environmental impacts, and product quality of intercrops.
- To develop a simulation model for modelling grain legume-cereal intercrops, which can be used in the design of intercrops and strategic planning of cropping systems with intercrops.

INTERCROP Workpackages

- 1. Survey and demonstration on-farm.** Almost 100 organic farmers across Europe have been interviewed on matters related to their use of intercropping. On-farm demonstrations will be carried out in the last year of the project.
- 2. Agronomic performance and yield stability.** The agronomic performance of cereal-grain legume intercrops in terms of yield advantage and yield stability is determined in comparison to sole crops. New intercropping designs are being evaluated.
- 3. Nutrient acquisition, nitrogen (N) loss and N in the following crop.** Total N acquisition and soil N are determined in order to estimate N balances, effects of intercropping on post-harvest N dynamics in the soil and the potential risks of N leaching. The N_2 fixed from the atmosphere and taken up from the soil are also estimated using ^{15}N isotope techniques. The acquisition of other nutrients (phosphorous, potassium and sulphur) is also investigated.
- 4. Intercropping for weed, pest and disease management.** Pests, diseases and weed infestation are monitored at the key physiological stages of the crops. A glasshouse study on root elongation has been conducted in order to evaluate root competition for nutrients.
- 5. Quality parameters in intercropped components and following crops.** The effects of intercropping on the protein quality of wheat for breadmaking as well as on the feeding value of barley, wheat, pea and faba beans for livestock are being studied.
- 6. Modelling.** An existing simulation model (STICS) has been adapted for its use in pea-barley intercropping with special emphasis on N uptake by the crops. The parameterisation of the model is based on a data set obtained from a pea-barley intercrop. The model is validated with a set of data collected annually by all partners.

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Visit the INTERCROP Website:

www.intercrop.dk



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