

Improving crop yield stability by intercropping

Problem

Extreme weather, biotic stresses and field-scale variability in soil quality increase the risk of losses in global sole crop production systems.

Outcome

Pea and oat in sole and intercrop were exposed to severe drought in 2018. Pea did not survive, but the oat harvest in the inter-crop was 86 % of the oat sole crop yield.

Practical recommendations

- Intercropping is highly relevant in grain legume production of organic farming systems and other low input systems, but also in conventional systems. Figure 1 shows the yield variation (expressed as % CV; the higher the %CV the higher the variation) over three years in a conventional field experiment. Pea sole crop variability was more than twice that of barley, and N-fertilization reduced the yield variation in barley. The variation of the intercrop yield was intermediate to the two sole crops. A larger analysis of 33 international studies showed the similar result (Raseduzzaman and Jensen, 2017). Ensuring a certain amount of production in stressed environment by intercrop will have major economic impact at the farm scale, while benefitting from additional inter-cropping advantages.
- Several practise abstracts are available on how to design and manage intercrops of different species, especially of grain legumes and cereals (see reference list).

Solution

Intercropping is the simultaneous cultivation of more than one species. Components in a mixture may compensate the eventual loss of other components.

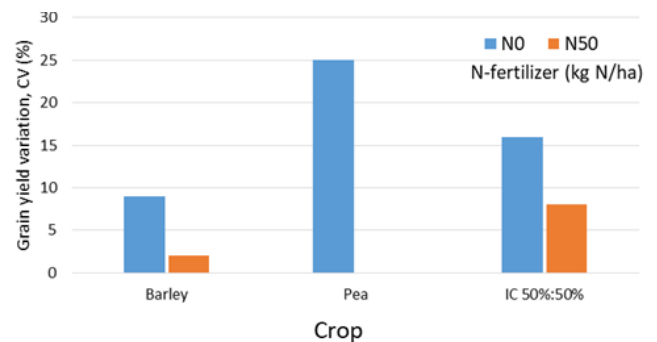


Figure 1: Variation in total grain yield (pea + barley in an 50 %:50% IC) of spring barley and pea as sole and intercrop (IC) over three experimental years with and without N-fertilization (Jensen ES, unpublished).



Photo 1 Alternate row intercropping of spring pea and barley. Photo by ES Jensen.

Practical testing/ Farmers' experiences

Farmers or advisory organizations having the interest in determining the stabilising effect of intercropping in stressful environments can monitor grain yields of sole crops and intercrop of the sole crops over at least three years and determine the variation.



Further information

- Article: Raseduzzaman, MD and Jensen, ES. 2017. Does intercropping enhance yield stability in arable crop production? A meta-analysis. *European Journal of Agronomy* 91, 25-33. <https://doi.org/10.1016/j.apsoil.2017.08.011>
- Watson C., Dordas C. Intercropping grain-legumes and cereals for improved protein concentration in the cereal
- Bedoussac L., Principles of design of intercropping
- Check the [Organic Farm Knowledge Platform](#) for more practical recommendations by searching the word: "Inter-cropping".

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

