

Intercropping can reduce the weed pressure of winter crops

Problem

The increase of the world population caused the widespread application of pesticides and created the need to develop management approaches which can reduce the need for application of pesticides and especially of herbicides. In addition, weeds compete with the crop for light, water and nutrients and in order to control them there is an extensive use of chemicals and to a lesser degree, mechanical treatments.

Solution

Intercropping different species can increase the weed pressure and increase the need to apply herbicides. However, using appropriate crop species and with high density, can suppress the development of weeds and improve the weed management in a sustainable way (Verret et al., 2017; Gu et al., 2021).

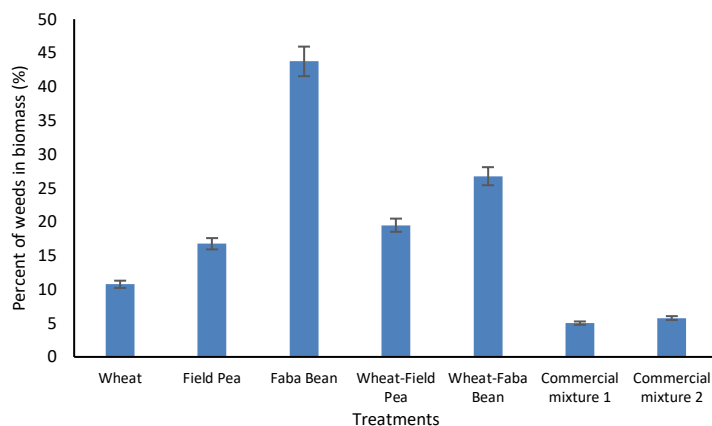


Figure 1: Effect of intercropping and increased in biodiversity on reducing the weed pressure.

Applicability box

Geographical coverage

Mediterranean climate

Application period

Autumn

Required time

No additional time during cultivation. The harvested crop needs to be separated at a collection point.

Period of impact

Duration of crop

Equipment

Standard machinery used for wheat cultivation

Outcome

Use of appropriate crop species and at right density can suppress the development of weeds and improve the sustainability of the cropping system. Also mixed cropping systems can achieve higher yield and can increase protein content of bread wheat with no need to include N fertilizers. Although, the control of weeds is difficult to be achieved, ongoing experiments show that some mixtures with oat, triticale, field pea, common vetch and bread wheat can suppress the development of weeds up to 95%.

Practical recommendations

- The seed bed should not be too fine-grained after cultivation.
- Test soil samples and amend P and K levels if it is necessary.
- Select cultivars (wheat and grain legume) with the same maturity time according to local seed costs and availability on the market.
- Mix the seeds 70% grain legume and 30% wheat (comparing to the standard sowing quantities of the two crops) in the seed tank (check that the mixture is homogenous) and sow with a conventional seeder.
- Use same row spacing as for cereals.
- Adjust height of harvester to pick up grain legumes close to ground.
- They suppress weeds but also tend to suppress their mixture partner. Matching seed depth and homogeneity of the mixture should be checked.

Practical testing/ Farmers' experiences

- If this crop system seems suitable for you, we recommend to test it under your conditions.
- Separate a part of your field before sowing and apply the mixture.
- Cultivate the rest of the field as usual and compare the intercrop to the sole cereals and /or legumes.
- Wheat mixed with peas give good weed control and nitrogen use. Mixtures with different crop species gave even better weed suppression.
- We recommend that you test this method under your own farm conditions. You can communicate your experience with us and also with other farmers, advisors, and scientists.



Figure 2: Mixture of different intercropping systems where in some areas there is high weed pressure and in other very low.



Figure 3: Mixture of different intercropping systems where in some areas there is high weed pressure and in other very low.

Further Information

- Webpage: <https://www1.montpellier.inra.fr/wp-inra/biodiversify/>
- Scientific Journal:
 - Gu, C., Bastiaans, L., Anten, N. P., Makowski, D., & van der Werf, W. (2021). Annual intercropping suppresses weeds: A meta-analysis. *Agriculture, Ecosystems & Environment*, 322, 107658.
 - Verret, V., Gardarin, A., Pelzer, E., Médiène, S., Makowski, D., & Valantin-Morison, M. (2017). Can legume companion plants control weeds without decreasing crop yield? A meta-analysis. *Field Crops Research*, 204, 158-168.

About this practice abstract and Biodiversify

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Biodiversify is a PRIMA 2019 project (<https://www1.montpellier.inra.fr/wp-inra/biodiversify/>) investigating how agricultural biodiversity (i.e. mixed cropping, cover cropping and agroforestry) can increase ecosystem services, sustainability and resilience of Mediterranean agriculture.



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