

# Winter field peas as green manure before nitrogen-demanding crops

## Problem

On arable farms without livestock, nitrogen insufficiency can occur when cultivating nutrient-demanding crops like maize. This can lead to yield losses and weed infestation.

## Solution

Use a green manure of winter field peas before growing crops that have a high nitrogen demand in the rotation.

## Benefits

Ploughing in winter field peas in spring can provide more than 100 kg of nitrogen to the following crop and increase yield. The improved development of the crop also leads to improved weed control. Possible disadvantages are growing costs and restrictions when cultivating peas as a main crop in the rotation.

## Applicability box

### Theme

Nutrient supply, weed control

### Geographical coverage

Temperate climate

### Application time

In autumn, after late crops, and before cultivating nitrogen-demanding crops like maize or field vegetables.

### Required time

Sowing and treatment of green manure.

### Period of impact

Succeeding crop

### Equipment

Plough, disk harrow, rotary harrow, mulching device

### Best in

Arable farms without livestock

## Practical recommendations

### Position of green manure in the crop rotation

- After late crops like potatoes, sunflowers and field vegetables. After grain crops, green manure is possible after repeated stubble treatment against root weeds.
- Possible following crops are maize, potatoes or field vegetables (e.g., spinach) that require a lot of nitrogen. Grain legumes are not suitable as a following crop.
- The minimum time period before repeating pea cultivation on the same field is 6 years. During this period, pea must not be cultivated as a main crop.

### Cultivation of winter field peas

- In case of soil compaction, primary soil tillage should be carried out. Seedbed preparation with a rotary harrow or a tined rotor.
- Ideal seeding period: Beginning of October to middle of November. Sowing depth: 3-5 cm.
- Quantity of seeds: End of September/beginning of October: about 1.5 kg a<sup>-1</sup> (100 seeds m<sup>-2</sup>), middle to end of October: 2 kg a<sup>-1</sup>, frost seeding in winter: max. 4 kg a<sup>-1</sup>



Breaking the field peas with a roller-crimper.  
(Photo: Hansueli Dierauer, FiBL)



Direct sowing into field pea mulch.  
(Photo: Hansueli Dierauer, FiBL)

## Mulching

- Do not incorporate the peas too early, as N fixation of the peas does not start until April.
- Ideally, use a mulcher mounted at the front end to ensure the shredding of all stems.
- After 1-3 days, mix dried-in green matter into the soil surface (10 cm deep). On light and medium soils, use a disk harrow or a flat cultivator. On heavy and smooth soils, use a skim plough.
- In no-till farming of maize, compress the peas during blooming in May with a crimper-roller and allow them to dry before sowing the maize right through the mulch (see photo above).

## Precautions

- Green manuring is less suitable before sunflowers, flax and millet, as they do not require as much nitrogen and more than 60 kg N ha<sup>-1</sup> from the winter peas could be lost. The seeding rate varies depending on the weight of a thousand seeds of field peas.
- Before grain maize, field peas often do not have enough time to properly develop.
- Cultivating carrots after a green manure with field peas is not recommended due to the increased risk of sooty mould (Chalara). Carrots also cannot fully utilise all available nitrogen.

## Practical testing

If this method seems to be suitable for your farm, we recommend that you test it under your own farm conditions applying it only on a part of the field. Treat the remaining land as usual.

## Evaluation and sharing of results

**Visual evaluation:** In order to evaluate the method's effectiveness, compare the development of the following crop at various stages. With the help of photographs, you can document the result and consult it later on for analysis. Compare the development of weeds and the condition of the soil (humidity, structure, activity of earthworms) in both the standard and trial plot.

**Quantitative evaluation:** Compare yields from standard and trial plots by weighing 10-20 plants per plot or the whole yield and convert it to unit per standard area.

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.



## Further information

- Practice abstract on [direct sowing of maize in forage peas](#)
- The [Organic Farm Knowledge](#) tool database offers practical follow-up information on the cultivation of green manure.

## About this practice abstract and DiverIMPACTS

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DiverIMPACTS: The project is running from June 2017 to May 2022. The overall goal of DiverIMPACTS - Diversification through Rotation, Intercropping, Multiple Cropping, Promoted with Actors and value-Chains towards Sustainability - is to achieve the full potential of diversification of cropping systems for improved productivity, delivery of ecosystem services and resource-efficient and sustainable value chains.

**Project website:** [www.diverimpacts.net](http://www.diverimpacts.net)

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