Productions: ☑ Grains for Food ☐ Grains for Feed ☐ Forage ☑ Crop benefits

Altamura Lentil: a PGI consortium renew the tradition

Authors:
Lorenzetti E., Antichi D., Tramacere L.

Credits: https://www.lenticchiadialtamura.it/

Objectives: improve agronomic techniques

- **Identification of treatments that are less harmful to health and approved for lentil**
- **Collaboration with other members of the consortium for field trials on innovative crop management**

Murge (Apulia), ITALY

- **200 hectares of arable land devoted to grains (legumes and cereals)**
- **Calcareous soils, many stones**
- **Previously growing forage legumes**

Tillage

- No tillage management
- Preparation to sowing with 1 kg/ha Glyphosate 1 week before the due time

Sowing

- Mid January
- Rate 90 kg/ha.
- ESTON variety
- Fertilizers are applied during wheat cycle

Weeding and pest management

- No weed control
- FUNGICIDE S-Cu once in April at a rate of 1 kg/ha
- INSECTICIDE Nuprid once in April at a rate of 800 g/ha

Harvest

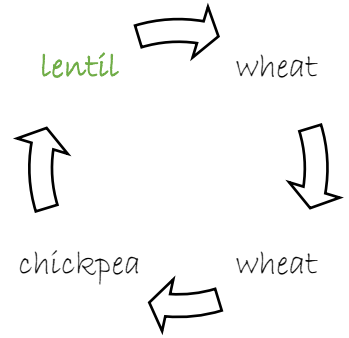
- 1 to 1,5 t/ha on average in July.
- Better yields if the lentils are grown on the same field at maximum once every 3 years

Sorting and storage

- Sorting and storage are prerogative of the consortium's collectors
- such collectors are farms' cooperatives that act as collectors

Outlets

- Large-Scale Retail Trade is the main customer of the consortium collectors.
- Lentil grain sold in 500gr/1kg bags or in cans (in this case wholesalers are involved)



Benefits for the rotation:

- To ensure a valid production of wheat, legumes are a crucial component of the crop rotation.
- Wheat requires less fertilizer when grain legumes are in the rotation.

Evaluation by the farmer:

☺ The improvement of soil nutrient cycle is slight but visible (effect in wheat).

☺ Lentil performs as expected.

😐 Lack of appropriate products for crop management.

☹ Prices on the market does not reflect production costs.

Success conditions and risks:

- Spring frost are a challenge for crop success.
- The lack of authorized herbicides is a limit to weed management.
- The support of an advisor and consortium is crucial.
- Lentil production took advantage of the new market niche opened by the PGI consortium and of the traditional fame of Murge area.

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Credits: https://www.aziendabiofloriddia.com/

Grain legumes: valorize crop rotation in organic multifunctional farm

Authors:
Lorenzetti E., Antichi D., Tramacere L.

Objectives: virtuous economy in the territory

- Maximization of positive externalities (care for the land, fair employment, health protection)
- Collaboration with other local farms for product supply
- Self-sustainability, independence from the market

Tuscany, ITALY

- 130 ha of organic arable land (since 1985)
- Clay soils on the hills
- 11 people working in the different facilities of the enterprise

Tillage

- Minimum tillage: hydraulic subsoiler in summer 20 cm deep, disk harrow
- 2/3 weeks before sowing

Sowing

- From mid February to beginning of April
- Sowing rate: lentil 80 kg/ha - chickpea and vetchling 140 kg/ha - pea 110 kg/ha
- Robin variety (lentil) and Sultano variety (chickpea)

Weeding and pest management

- Mechanical weed control: hydraulic subsoiler for crops sown in rows, harrow for crops with broadcasted sowing
- No pest management

Harvest

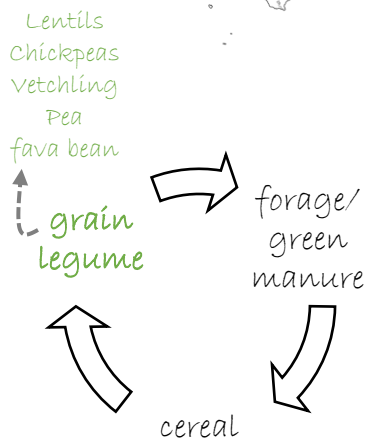
- July/August
- Chickpea, vetchling and lentil 0,5 to 1 t/ha, peas 0,7 to 1,2 t/ha, fava 0,5 to 2 t/ha on average

Sorting and storage

- Sorting takes place on farm before packing
- Storage facilities are available on farm as well

Outlets

- In the farm shop are sold most of the products
- An online shop is available only for domestic consumption
- Local shops and restaurants in the surroundings are weekly supplied



Benefits for the rotation:

- The presence of legumes in the rotation allows the production of wheat without external inputs
- Water dynamics improve with a better soil structure (higher OM and better C/N ratio)
- Consumers are attracted in the farm shop thanks to the diversification of the offer

Evaluation by the farmer:

☺ The 3 years rotation (2 years legumes and 1 year cereal) proved high sustainability

☺ Better soil structure

☺ Local legumes are attractive for consumers

😐 Grain legumes are very delicate and their yield not predictable.

Success conditions and risks:

- Sowing time is often critical due to the frequent rain that makes it difficult to get access to the field due to the very fragile soil structure
- Wild animals are a challenge
- Yield fluctuation is a source of uncertainty but it may be improved by research
- Self processing and direct sale are the key of success

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Credits: iniav

Benefits of growing grain legumes in the crop rotation in Alto Alentejo

Authors:
Duarte I.[1], Bourdin L.[2]
[1] INIAV ; [2] INRAe

This sheet is based on information collected by Isabel Duarte (INIAV) on feedback from several farmers in the Elvas region who are satisfied with their legume crops: dry pea, lupine, faba bean and chickpea

Alto Alentejo, PORTUGAL

- Farms with an average of 200 ha, with and without irrigation, in conventional farming, with clay and lime soils
- Most common rotation: Legumes - Rapeseed - Cereals - Forage

Main reasons to grow legumes

- Good for **fixing nitrogen in the soil.**
- The cultivation of legumes is very important, not only for the **benefits of the product itself**, but also for **reducing the application of fertilizers**.
- Crops of **ecological interest**.
- They are considered a **good precedent for the next crop**.

Sowing and variety

- From November to January depending on the culture (chickpeas are in January)
- **Density**: dry pea = 150 kg/ha, faba bean = 200 kg/ha, lupine and chickpea = 120 kg/ha; **Depth**: 2-4cm.
- **Tillage**: without plowing only harrows.
- **Varietal choices**: certified seed of Portuguese varieties, for chickpeas (Elvar).
- **Always use certified seed**

Inputs

- **Fertilization** that dependent on soil analysis, with N only at sowing.
- **herbicide** in pre/post emergence + mechanical weeding.
- **Against diseases**, only in chickpea, use of a products with chlortalonil, with the recommended dose and whenever rainy episode is expected (preventive treatment).
- **Against pest**, use of products with **deltamethrin** and **management on a rotation scale** with succession of different species.

Harvest and outlets

- The harvest, when carried out before most of the cereals, **allows a better distribution of labor on the farm**.
- In this region, some companies that technically supports and buys production.
- **Chickpea: Self-consumption** and **sale to the company Agroinovação** (food industry - for human consumption or other uses such as flour).
- **Faba bean, dry pea and lupine for feed**.

ℹ
- Some farmers have their own equipment and are self-sufficient; however, others rent services, usually for sowing and harvesting.

Benefits for the rotation:

- Increase soil fertility through symbiotic nitrogen fixation with reduction of N application and environmental impact ; phosphorus mobilization increases.
- Management of weed control and can contribute to reducing the incidence of weeds and diseases in cultural systems (efficiency in rotation).
- Improvement of the soil structure: The root system upright and extensive that develop and the volume of waste they leave in the soil after harvest can help to improve the porosity and increase the content of soil organic matter

Evaluation by the farmers:

☺ Easy to generalize, they are not very demanding in specialized machinery, and the same equipment as cereals can be used, with some adaptations.

☺ They have great adaptability to a wide range of soils and environmental conditions.

😐 Irregular production and lack of economic sustainability.

😐 Occurrence of weeds at harvest.

Other comments:

- Despite big demand of these crops in this region (widely consumed for food and feed), there are many difficulties in the organization of these crops' chains.

Productions: ☑ Grains for Food ☑ Grains for Feed ☐ Forage ☑ Crop benefits

Faba bean: successful weed control in advanced crop rotations

Authors:
Toleikiene M, Gecaite V.,
LAMMC

Objectives: effective weed control when minimising use of herbicides

- Introduce good management practices such as harrowing and strip tillage
- Introduce well diversified long crop rotation

Andrius, LITHUANIA

- Conventional farm of 280 ha
- Main cash crops : winter rape, winter wheat
- Included beneficial crops: fababean and oat
- Sandy loam and loam soils

Tillage

- usual ploughing was applied before
- we changed it to **strip tillage**, which is about 12 cm depth

Sowing

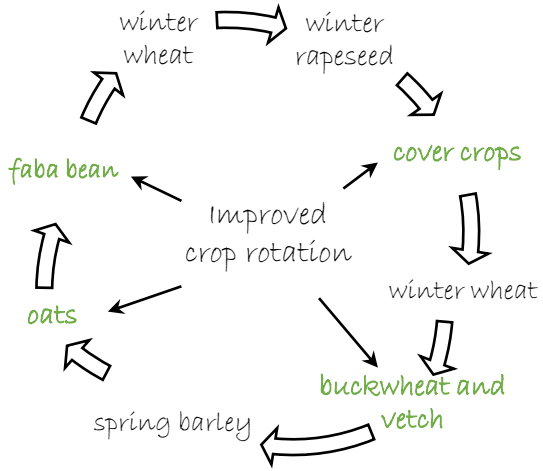
- 2nd half of April.
- Sowing faba bean at **400 000 plants/ha**.
- 12,5 cm row spacing to **make dense crop** to establish shading and competition for weeds .
- We use **disc sower** to incorporate seeds into 4 cm depth.

Weeding and pest management

- **harrowing** 2 days before sowing.
- apply herbicides only if harrowing and faba bean competition is ineffective
- Contact **pesticide than flower buds present** and systemic wright before their flowering

Harvest

- In the end of August
- Seeds dry, do not need to ventilate
- Quality checked: **faba bean needs good pest and desease control**
- **Seeds are of good quality if pesticides applied on time.**
- Storage very short before selling



Outlet

- Valuation for human food or animal feed **depending on the quality**
- Trades with cooperative is able.
- Faba bean price is relatively high last years so worth to cultivate
- **Many farmers are not able to grow good quality faba bean because of pests,** so the market conditions are good

Benefits for the rotation:

- Always higher yields of winter wheat and winter rape cultivated after faba bean.
- Good competition with weeds, when long rotation is established. Oat and faba bean in rotation helps to control weeds.
- Longer rotation helps to decrease pests and disease on faba bean and get good quality seeds.

Evaluation by the farmer:

☺ Very good gross margins
☺ Strip tillage machine could be rented.
☺ More information on faba bean cultivation provided by scientists and on internet, no need to invest on specialised agronomists.
😐 Strict timing of pesticide use.

Success conditions and risks:

- Review your crop rotation and diversify it.
- In conventional farm, use organic weed control ways and only after that use herbicides.
- Be aware of pests on faba bean and apply pesticides before spread.
- Strip tillage recommended.

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Peas: from crop in rotation to organic seeds

Authors:
Ž. Kadžiulienė,
LAMMC

Objectives: growing pulses and forage legumes for soil fertility and organic seeds

- **Diversified rotation to break out disease and pest**
- **Improvement of soil fertility**
- **Higher selling price for organic seeds**

Kestutis, Lithuania

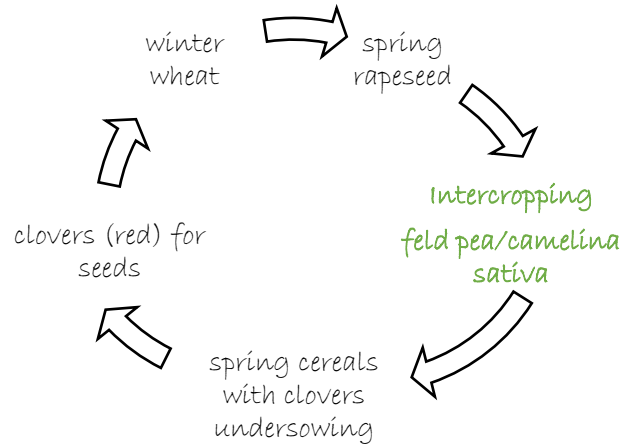
- **Organic farm of 200 ha**
- **Loam soils**
- **Temperate climate**

Tillage and Sowing

- Disc harrow before sowing.
- 0,8 mln seeds ha.
- Sowing middle of April.
- Seeds in 4-5 cm depth.

Harvest

- Harvest until middle of August
- Start to harvesting at full maturity pea stage (16-17 % grain moisture).
- Dried pea are usually sold after harvest.



Outlet

- Selling pea grain as seed adds value and income for farmer.
- The value of the legumes must be assessed throughout the crop rotation.
- The benefits of intercropping in organic farming are noticeable.

Benefits for the rotation:

- Higher yields of subsequent crops.
- Higher diversity in crop rotation.
- Biological nitrogen from roots and stubles.
- Improving of soil structure.

Evaluation by the farmer:

☺ Suitable and diverse crop rotation is key element.
☺ Intercropping protect peas from coagulation, facilitates their harvesting.
☺ Legumes, especialy forage legumes, improves the soil.
☺ Exchange of knowledge with farmers.

Success conditions and risks:

- Diversity in crop rotation.
- Need to take advantage of Intecropping in organic farming conditions.
- Evaluation of soil properties.
- Unpredictable climate conditions.

Productions: ☑ Grains for Seeds ☐ A Grains for Feed ☐ Forage ☑ Crop benefits

Peas: direct drill in the crop rotation for properly seeds

Authors:
A. Arlauskienė,
Ž. Kadžiulienė, LAMMC

Objectives: enhance productivity of peas for seeds

- Good pre-crop in rotation
- Reduction of mineral fertilizers
- Improving the availability and use of nutrients

Linas, Lithuania

- Conventional farm of 320 ha
- Light loam soils
- Temperate climate

Tillage and Sowing

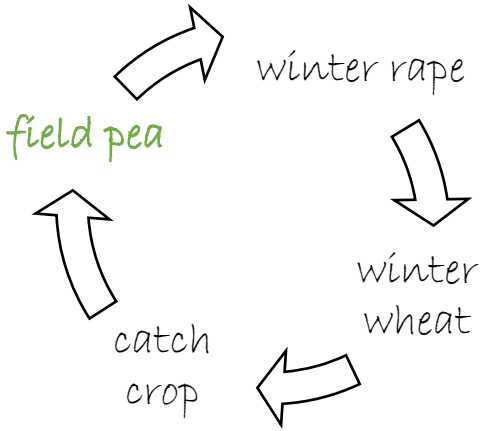
- Direct drill
- Before sowing NPK 8-20-30 fertilizers
- 0,8 mln seeds ha
- Sowing second half of April
- Seeds in **4-5 cm depth**

Inputs

- Herbicide before germination: Feniks 3.0 l/ha+PAM
- Azofix Rhizo 1.3 l/ha (BBCH 10)
- Fertilization before fowering (BBCH 50-60) – N 35 kg/ha
- Some pesticides 1 or 2 sprays depending on the spread of the pest

Harvest

- Harvest until middle of August
- Start to harvesting at full maturity pea stage (16-17 % grain moisture)
- Dried pea are usually sold after harvest



Outlet

- Field peas are profitable enough. Selling grain as seed adds value and income
- Many farmers are **not able to grow good quality field pea because of pests, so the market conditions are good**
- The benefits of legumes to soil and other crop nutrition are underestimated

Benefits for the rotation:

- Higher yields of subsequent crops
- Higher diversity in crop rotation
- Biological nitrogen from roots and stubles
- Improving of soil structure

Evaluation by the farmer:

☺ Direct drill preserves soils health.

☺ Yield of cereals after peas 0.5 t/ha higher and after fababeans 1.0 t/ha.

😐 Harvest is difficult due to ussually rainy conditions.

Success conditions and risks:

- Peas for seeds purposes lead to a higher price and incomes
- Excessive recurrence of legumes (especially of the same species) should be avoided

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Field pea: source for soil fertility and structure in crop rotations

Authors:
Sarunaite L., Ronis A.
LAMMC

Objectives: introduce a good pre-crop for cereals or oilseed rape.

- **Fix nitrogen and supply into the soil for the next crop.**
- **Introduce good management practices for oilseed rape such as minimal tillage.**

Antanas, LITHUANIA

- **Conventional farm of 100 ha**
- **Cropping system: winter wheat,winter oilrape, spring barley.**
- **Included beneficial crops: pea and catch crop**
- **In the near future plan to increase field pea plot to 25% in crop rotation.**

Tillage

- Two times **harrowing** of catch crop (mustard) left on surface on the field during winter.
- **Direct sowing** after harrrowing

Sowing

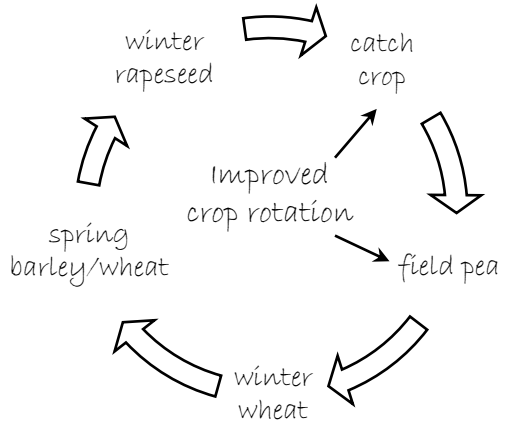
- 1st half of April.
- Sowing field pea at **280 kg/ha**.
- Seed incorporation into a depth of 4 cm as insufficiently planted seeds or even seeds remaining on the soil surface **do not need germinate** by making the crop lower density

Inputs

- Herbicide **before germination** Feniks 2.5 l/ha+PAM
- Contact **pesticide** depending on the spread of the pest, it would be **one or two sprays**
- Fertilization **before sowing** NPK 8-17-28 150 kg/ha and **before fowering**– N35 kg/ha

Harvest

- Harvest until **middle of August**
- Start to harvesting at **full maturity pea stage**
- Storing and cleaning only for seed material. Other pea are **sold immediately after harvest**



Outlet

- Field peas **are profitable enough.** Wheat always yielded higher than after other crops. The yield supplement really exceeds 0.5 t /ha.
- **Many farmers are not able to grow good quality field pea because of pests,** so the market conditions are good

Benefits for the rotation:

- Store extra nitrogen and a good pre-crop for winter wheat.
- Field pea is a great pre-crop.
- Selling field pea yield is not difficult

Evaluation by the farmer:

☺ Great success is entirely controlled properly weeds.
☺ Improves soil stucture and fixed nitrogen amount.
☺ Crop that is easy to grow and care.
😐 Higher cost of herbicides for peas.

Success conditions and risks:

- To select effective herbicides.
- More varied crop rotation and the possibility of less soil depletion.
- Problems in the realization of peas occur when grains of different colors (yellow and green) are mixed, too much moisture.

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Credits: Ina Stute

Spring faba beans in Rhineland: raising up a value chain

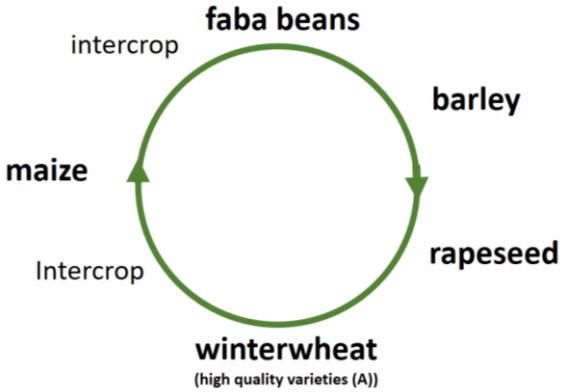
Authors: Ina Stute, Prof. Tanja Schäfer, FH-SWF

Objectives:

- Raising biodiversity
- Save CO_2
- Providing of GMO-free feed
- Providing regional food- and feedstuff

Rhineland, Germany

- Arable farming of 100 ha
- Recultivated former mining areas
- Conventional cultivation
- Silty clay



Tillage:

- In autumn
- Dry conditions: tine cultivator
- Moist soil conditions: fallow
- spring: circular harrow

Sowing:

- Between 20.02. and 25.03. depending on the weather.
- Variety: Tiffany (free of tannin, suitable for poultry feeding)

Weed and pest management:

- Stomp aqua (before plant emergence), fungicides Folicur and Ortiva against Botrytis fabae when flowering starts

Harvest:

- End of August/ beginning of September
- yields up to 6,5 t/ha

Outlets:

- Several farmers have joined forces to establish a value chain with locally grown faba beans. Various products such as pork, eggs, milk and bread produced with the homegrown faba bean are offered

Benefits for the rotation:

- 5-10 % higher yields in the subsequent cereals
- Avoidance of root diseases within the rotation
- Decrease of plant protection products within the rotation
- Enhancement of the soil structure

Evaluation by the farmer:

☺ Positive public relations work can be done with the end product. The consumer is sensitized to regional food. This creates confidence. The increased demand makes the cultivation of faba beans economically viable.

Success conditions and risks:

- Success depends on the water supply during vegetation
- Cultivation breaks should be respected strictly
- Risk of yield variability
- Risk that there is no demand for the field bean at the trader

Productions: ☐ Grains for Food ☑ A Grains for Feed ☐ Forage ☑ Crop benefits

Credits: Ina Stute

Becoming independent of imports in pig feeding by own soybean

Authors:
Ina Stute
Prof. Tanja Schäfer
FH-SWF

Objectives:

- Break up winter grain-rich crop rotation
- Production of own protein feed
- Widening the crop rotation

Bavaria, Germany

- 41 ha farmland
- 12 ha grassland
- 1 000 pigs

A) Preparation for Sowing:

- Tillage 1 week before sowing, mechanical weeding.
- Flat seedbed (otherwise problems with harvesting).
- Seeding at beginning of April (soil temperature > 10 degrees).
- Usual cereals drill machine.
- Sowing depth: 3-4 cm.

B) Variety:

- merlin (000-variety; very early).
- Sowing density: 70 beans/m².
- Seeds inoculation with rhizobia (Product: Hi Stick)
- Attention: rhizobia do not tolerate UV light and heat, inoculate seed immediately before sowing.

C) Choice of variety:

- 0000 varieties are not recommended due to low yield performance. The later the variety is graded, the higher the yield and protein content.
- Select varieties in a way that harvesting can take place in September in any case.

D) 0,5-1 days after sowing:

Rolling the soil to ensure better seed-soil contact and to make sure that there are no stones on the soil surface, that could get into the cutterbar during harvesting.

E) Fertilization:

- No nitrogen fertilisation necessary.
- Ensure that the soil is adequately supplied with phosphorus and potassium.

F) Ready for Harvest:

- soybean is ready for harvesting when the leaves have mostly fallen, and sunny weather conditions prevail.
- The beans should rattle in the pods at harvest time.
- Optimum moisture content of the beans for harvesting 12-15%.

G) Harvest:

- Common combine harvester, without crop lifter cutterbar not too broad.
- As the lower pods of the soybean plant are already set very low, a low cutterbar position is very important < 10 cm above the ground.

H) Thermal treatment:

Necessary to inactivate the anti-nutritional ingredients and thus make them usable for animal feed.

Benefits for the rotation:

- Interruption of infection chains of diseases and pests.
- Soybean provides an optimal soil structure, which means that the effort required to cultivate the subsequent crop is very low.
- Nitrogen fertiliser saving in the rotation.

Evaluation by the farmer:

☺ High preceding crop value
☺ Work extensively
☺ Broader distribution of the cultivation risk among several crops

Success conditions and risks:

- High water demand during flowering and grain filling
- Doves picking emerging beans from the soil
- Rabbits
- Painted lady
- Sclerotinia, mildew infection

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Different legumes for better soil fertility on a large farm in eastern Germany

Authors: Ina Stute
Prof. Tanja Schäfer
FH-SWF

Credits: Ina Stute

Objectives:

- Lucerne and Faba beans: production of own protein feed for the cattle
- Lucerne: extensive cultivation of fields with low water storage capacity

Uckermark, Germany

- 2 200 ha farmland
- 1 500 heifers and bulls
- Conventional farming
- Soil: sandy loam

Sowing

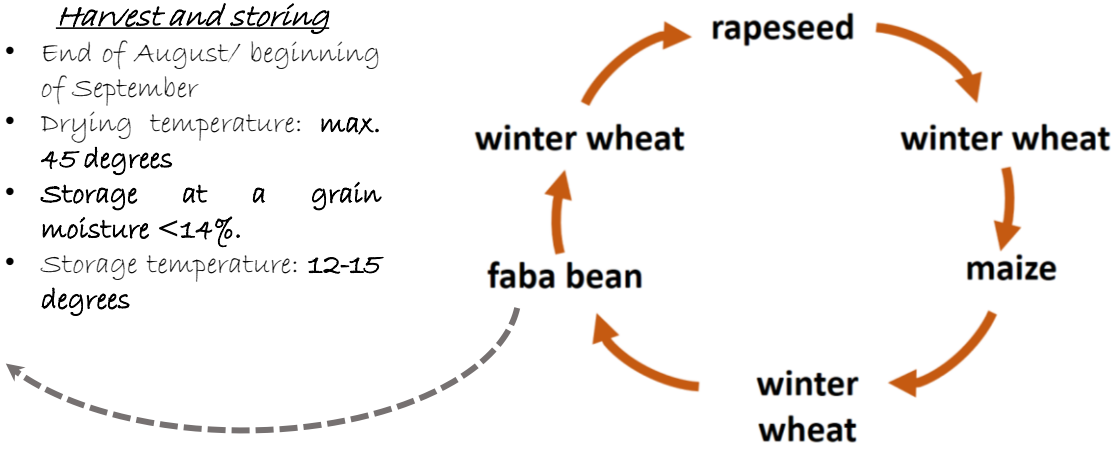
- Direct sowing in the end of January or in February.
- Sowing, when the soil has dried off.
- Sowing depth: approx. 6 cm.
- Variety: Fuego.
- Sowing density: 45 grains/m²

Inputs

- Fertilizer: cattle manure.
- Pesticides: Glyphosate before plant emergence.
- Weeding: Mechanical.
- One-time treatment with insecticide.

Harvest and storing

- End of August/ beginning of September
- Drying temperature: max. 45 degrees
- Storage at a grain moisture <14%.
- Storage temperature: 12-15 degrees



Lucerne:

- grow on 5 % of the arable land
- Fields with soil problems
- Permanently for 5 years
- No manure
- When sowing: 5-10% grass for better soil cover
- Trims: 3-5 per year

Benefits for the rotation:

- Increase of the humus content
- Nitrogen fertilizer saving
- Phytosanitary effects
- Equalising the workload in the wheat harvest

Evaluation by the farmer:

☺ Improved soil sturcture
☺ High preceding crop effect
😐 Low market performance of legumes. Profitability only given through subsidies.

Success conditions and risks:

- Cultivation of faba beans on better soils
- Insufficient water supply during flowering
- Sowing too late
- Bruchid beetle

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Credits: Ina Stute

Increasing added value through on-farm utilisation of faba bean

Authors: Ina Stute, Prof. Tanja Schäfer, FH-SWF

Objectives:

- Production of own protein feed for pigs
- Breaking up tight crop rotations
- Less effort for tillage
- Equalize workload peaks

Westphalia, Germany

- 137 ha arable land (mainly cereal production)
- Loamy clay
- 1 900 pigs

Sowing:

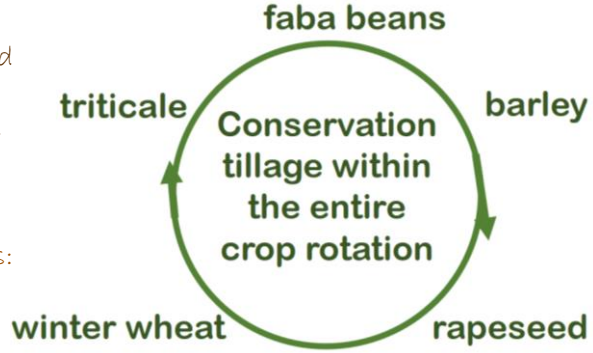
- Mid march.
- Variety: Fanfare and Fuego.
- Sowing rate: 360 kg/ha.
- Germination capacity: 85-90 %
- Direct sowing with tine sowing machine

Weed and pest management:

- Herbicides: Bandur (3 l/ha) and Centium CS 36 (0,2 l/ha).
- Fungicides: Tebuconazol 1 l/ha.

Fertilizer:

- Kiserite: 120 kg/ha (contains: 25% MgO + 50% SO3).



Yield:

- Around 3,7 – 7 t/ha, depending on the year.

Time of harvest:

- The optimum time is reached when the pods are black and the grains hard; the stems should be predominantly brown to black in colour.
- Usually: End of August/ beginning of September.

Use:

Drying of the harvested crop to 14% residual moisture content.

→ Storage
→ Milling if requested
→ Feeding to the pigs

Benefits for the rotation:

- Expanding crop rotation.
- Less effort for tillage.
- Equalize workload peaks.
- Support in control of black-grass.

Evaluation by the farmer:

☺ Legume cultivation is extensive and crop management requires little effort.

☺ Using the legumes as animal feed is much more economical than selling them to the agricultural trade.

😐 Yield volatility.

Success conditions and risks:

- Sowing conditions.
- Quality of seeds.
- Dry weather conditions.
- Virus.

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Credits: Ina Stute

Increase biodiversity through intercropping in organic farming

Authors: Ina Stute
Prof. Tanja Schäfer
FH-SWF

Objectives:

- Management of the farm according to the principles of organic farming
- Closed nitrogen cycle
- Production of protein feed for dairy sheep

North Rhine Westphalia, Germany

- 40 ha arable cropland, 15 ha grassland
- Sandy loam
- Beef cattle, mother cows and dairy sheep

A) Before sowing:

- Mustard as catch crop.
- Plough soil.
- Well dried soil.
- Optimal seedbed.

B) Date of sowing:

- Depends on the optimum sowing time of the legume component: end of march till middle of April

C) Procedure of sowing:

2 separate passages:

- 1st: peas sowing depth at 7 cm.
- 2nd: oat sowing depth at 4 cm.

D) Variety and seed rate:

- peas: Astronaute (300kg/ha).
- oat: Apollon (500 kg/ha).

E) Weed suppression:

Once mechanical weeding, then use the weed suppressing effect of the oat.

F) Fertilisation:

- Due to the nitrogen fixation of legumes, nitrogen fertilisation is not necessary.
- Keep an eye on the supply of phosphorus and potassium to the soil.

G) After harvest:

The mixture is stored in a silo after harvesting and used as the farm's own high-energy animal feed if required.

Benefits for the rotation:

- Increase of soil fertility.
- Net nitrogen input.
- Low demands on the preceding crop.
- Breaking the chain of infection of diseases.
- Better weed suppression thanks to better soil cover.

Evaluation by the farmer:

☺ Improved stability of the plants
☺ Lower yield fluctuations
☺ Nutrients, water and light are used more efficiently
☺ Biodiversity in the field is increased
☹ The risk of crop failure, for example due to extreme weather or pest infestation, is significantly reduced by mixed cropping

Success conditions and risks:

- Doves picking the sown peas out of the soil
- Spring drought and poor water supply during flowering can become a problem
- Non-respect of the cultivation breaks

Productions: ☑ Grains for Food ☐ Grains for Feed ☐ Forage ☑ Crop benefits

Credits: R.Timmer WUR Crop research

Faba beans: protein production for food ingredients

Authors:
Timmer, R., Visser, C. de
WUR Crop research

Objectives: introduce diversity in the rotation and value the economic margin rather than maximize yield

- **Circular agriculture**
- **Limit chemical inputs**
- **Legumes for N-input in the crop rotation**
- **Interact on plant protein transition**

Flevoland, NL

- **Farm with 25 ha of arable crops with strip cultivation**
- **Crops: potato, onion, carrot, faba beans, wheat, barley, grass/clover**
- **Light clay soil**
- **Maritime climate**

Tillage

- Rotary harrow + seeding in one drive
- Avoid numerous soil tillage passes **in crusting-sensitive soils**
- Using **fixed tracks**

Sowing

- 2nd half of **March**.
- Sowing at **300 000 plants/ha**.
- 50 cm row spacing **for hoeing and harrowing machines**
- LG Cartouche **variety**, high yielding and high protein content

Weeding and pest management

- **3 to 5 times harrowing**
- **2 inter-row hoeing passes** when the crop is more developed until the canopy closes.
- Pest control on base of Decision support system

Harvest

- Harvested by **own combine**. Also, on fixed tracks
- **Start harvesting** when beans have moisture content of <15% and pods are dry

Drying and storage

- **No drying**, but ventilation during storage on the farm.
- If necessary extra cleaning of seeds

Outlet

- Valuation for human food or animal feed **depending on the quality of the batches**.
- In 2020 faba beans valued at around **300 €/t for food**
- Trades with **Herba ingredients**.

Benefits for the rotation:

- N-input in the rotation.
- Early harvest gives opportunity to sow a green. manure/catch crop.

Evaluation by the farmer:

- ☺ Easy in weed-management.
- ☺ Attracts a lot of insects.
- 😐 Sensitive to pests and diseases.
- 😐 Yield and gross margin low.

Success conditions and risks:

- Early sowing is good possible, which gives an early harvest as well.
- Monitoring pests and diseases frequently to prevent crop infestation and harvest loss.
- Carefully timing applying pesticides.