

Peas are a fast-growing herbaceous legume and among the most important legume crops. They usually grow in temperate areas and their cold-tolerance makes them suitable for Northern Europe. They are known for their nutritional value, nitrogen fixing ability and benefits when growing in rotation. They are used both as animal feed and food.

Crop Description

It is an annual crop with angular or roundish hollow stems. Its tap root can grow up to 1 m deep and their pods can contain several seeds which can vary in shape and colour.

- **Life cycle:** Approximately 4 months
- **Protein content:** Can vary from 18-36%
- **European yields:** 2586 kg/ha [1]

Market Potential

The biggest pea producers globally are Canada, Russia and China while European production represents 37% of global production.

In Denmark pea production is significant. It is mainly focused on feedstock but it is also produced for food. In 2018, more than 6000 ha of dry peas, 3000 ha of fresh peas and 6000 ha for whole seed silage were sown in Denmark [2]. Since 2015, the Danish pea production has increased by 43% of which 30% was organic in 2018 [3]. Its good quality and easily extracted protein and the absence of anti-nutrients have increase its demand as food ingredient. Pea is already used as food ingredient and pea-based products (i.e. Naturli') can be found in Danish supermarkets, and 84% of vegetarians would like peas included in more plant based foods [4].

“Great potential as a plant-based protein ingredient.”



Challenges

Diseases and pests: Main fungi are grey mold (*Botrytis spp*) and downy mildew (*Peronospora viciae*).

Aphids and pea moths (*Cydia/ Laspeyresia nigricana*) are the main pests during flowering. Early sowing can prevent damage from aphids.

There is a risk of pea root rot (*Aphanomyces*, *Phytophthora pisi* and *Sclerotinia sclerotiorum*).

Droughts: Early sowing or irrigation during flowering can reduce the damage from hot weather and drought stress, particularly in sandy soil [3].

Recommendations

Land preparation/rotation: No specific land preparation requirements. They work well under rotations with cereals for facilitating weed control, to break disease cycles and improve soil conditions (70 kg N/ha can left in the field for future utilization). False seed bed is recommended in organic production.

Soil types: Peas prefer clay soil, but not sandy otherwise irrigation may be required. Growing in clay soil can increase weed competition [3].

Sowing dates: Due to their cold-tolerance peas can be sown early and hence reduce water stress and aphid damage.

Sowing depth and distances: Sow at depths of 6-8 cm and in rows 12,5-50 cm apart; with densities of 80-90 plants/m².

Harvesting: Harvest is usually in August. Grains can shatter if harvest is delayed past maturation, therefore is important to harvest quickly to avoid losses. Pea lodging can be a problem for mechanical harvesting; therefore varieties that stand well should be selected.

Trial results

Table 1. Data from University of Copenhagen field trials under a low input production system in Taastrup, Denmark.

Cultivar	Yield (kg/ha)	Protein (%)	TSW (g)
Eso	3212	19.8	204
Atlas	2740	19.7	280
Nitouche	2504	21.7	253
Lollandske Rosiner	2288	21.5	286

The table shows average yields over 5 years in Taastrup, however maximum yields were 5.7 t/ha.

Summary of Benefits

- Well suited to the Danish soil and climate
- High yields
- Can improve N availability
- Ideal for crop rotation with cereals
- Existing market for animal feed and food

References

- [1] Food and Agriculture Organization of the United Nations. (2019). *FAOSTAT Database*.
- [2] SEGES (2019) Dyrkningsvejledning.
- [3] Heuze V. Et al., (2017) Pea seeds. Feedipedia
- [4] Dansk Vegetarisk Forening (2019) Økologi præferencer i det vegetariske forbrugersegment.

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Authors: Iason Koutroumpelas, Lucy Owens, Nes Odone, Gabriela Alandia

Contact: Gabriela Alandia: gar@plen.ku.dk

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Note: Results of Protein2Food trials at Copenhagen University are in orange.

Trials were run from 2015-2019 in Taastrup under a low-input production system.



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