

Lupin is a grain legume that has good potential to be grown more widely in Northern Europe because of its adaptability to a range of harsh conditions and an increased interest in the crop due to a high protein content. Notable advantages are its high nutritional value, nitrogen fixing ability and use for both food and feed beside its ornamental value [1]. It can also be grown in rotation or as intercrop. Lupins can be sold and found in different forms for commercial purposes.

Crop Description

Lupin is an annual bushy crop; it grows to a height of up to 2.5 m depending on species. Roots can grow up to 70 cm. Large, fleshy pods with generally large seeds, although this varies between and within species [2]

Life cycle: 6-7 months, unbranched varieties mature earlier [3]

Protein content: 30 – 39 %

Europe yields: (1613 kg/ha) [4]

Market Potential

There is a renewed interest in Lupins worldwide, and there has been an increase in the cultivation area in Europe [5]. In 2018 lupin production was at 346 ha in Denmark, representing an increase of 53% production area since 2015 [3].

In Europe and Denmark, Lupins are mainly grown for feedstock but there is an increased demand for human consumption, and for processed food from which protein is extracted. Both markets are promising. Lupins have high commercial potential especially in markets where consumers are focused on local, healthy, protein rich and plant-based food. The crop is gaining attention in Denmark and lupin-based products such as yogurt and milk can be found in German supermarkets. In Denmark 33% of vegetarians would like more lupins to be included in plant based products [5].



“There is a renewed interest in Lupins worldwide.”

Challenges

Pests and Diseases: *L. angustifolius* can be affected by grey mould (*Botrytis spp*) under humid conditions, with considerable losses [4]. Intercropping with barley/wheat can reduce it. *L. albus* and *L. luteus* are susceptible to anthracnose. Crop rotation can reduce infection rates. **The crop is susceptible to attacks from hares and birds. This can be reduced with electric fences.** Aphids may occur but can be reduced by early sowing [1].

Weeds: High sowing densities and rotating with cereals minimises weeds [6].

Recommendations

Land preparation/rotation: Lupins can work well in rotation with cereals, as it is N fixing. Recommend two years break between cultivation of lupins and other legumes in the same plot [7].

Soil types: Sandy and clay soil are suitable for lupin cultivation with pH of 5.5-6. During dry years clay soils had higher seed quality and protein yields, while yields were approximately double compared to sandy soil [1].

Sowing dates: Beginning of April to beginning of May. Soil temperature should be at least 5°C [1]. Avoid cold or water-logged soil.

Sowing depth and distances: Sowing at 3-4 cm depth. Distance depends on cultivar and soil type. Sow non-branching at 90-100 plants/m² and 50-80 plants/m² for branched types [1][6]. Sow with 12-50 cm row distance and in organic cultivation at 50 cm for mechanical weeding [1].

Intercropping: Intercrop with cereal (i.e. wheat, barley) to reduce weed competition and increase yields [6].

Harvest: when fully ripened and dry, between late August and Mid-September [7].

Trial Results

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

Cultivar	Species	Yield (kg/ha)	Protein (%)	TKV (g)
Boregine	<i>L. angustifolius</i>	3332	32	204
Probor	<i>L. angustifolius</i>	3255	36	149
Regent	<i>L. albus</i>	3149	34	169
Dieta	<i>L. albus</i>	3140	40	341

The table shows *mean* yields over 5 years in Taastrup, however maximum yields were 4.47 t/ha.

Summary of Benefits

- Nitrogen fixing reduces the need for chemical fertilisers, improving microbial community and N availability
- Low input requirements
- Good yields and high protein content
- Existing and emerging markets

References

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Note: Results of Protein2Food trials at Copenhagen University (KU) are in **orange**. Trials were run from 2015-2019 in Taastrup under a low-input production system



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