

# Home grown lentils

## Summary

Lentils are already grown commercially in the UK on a small scale, amongst a group of farmers spearheaded by the company Hodmedods. We wanted to investigate the feasibility of growing them in the garden.

Lentils grew quite easily in most people's gardens with few problems. They are a low growing, sprawling plant with small pea like flowers. These give rise to large numbers of pods.

Although it was possible to grow the plants and produce a crop, the process of harvesting was extremely time consuming.

It was encouraging that the yields achieved were similar to those from commercial growers in the UK. But growing on a small scale, meant it was a great deal of work to achieve a small amount of produce, when the land could be more productively used to grow something else.

Many people observed nodules on the roots of the lentils, and it has been suggested that perhaps the plants could more usefully be used as a green manure to fix nitrogen and add organic matter to the soil. This is an idea that deserves to be explored further.

## Background



Most of us have eaten lentils, but have not thought much about the plant itself. The lentil is a low growing bushy plant, producing pods, which most commonly contain two lentils. Lentils are legumes so will form nodules that harbour the nitrogen-fixing *Rhizobia* bacteria. They will grow on a range of soil types. They are reasonably cold tolerant but their ability to tolerate frost varies with variety and the stage of growth.

The lentil is cultivated in many parts of the world, including Canada, much of Asia, Australia and Southern Europe. Canada is by far the biggest exporter of lentils, followed by India.

Lentils come in a range of types and varieties, including green and brown lentils which are sold with the coats, and red and yellow types which are sold de-hulled, with the coats removed. There are also speciality types such as 'Puy', which have to be grown in a specific region of France if they are to given the 'Puy' label.

Lentils are a good source of protein, containing about 25% when uncooked, decreasing to about 10% when cooked, due to the extra water absorbed. They are also a very good source of folate and B vitamins.

### Lentil growing in the UK

The humble lentil was once a common staple peasant food and there is evidence that it was cultivated in the UK, before it became less popular as a food. Unfortunately it is difficult to find records of it being grown, because it was rarely traded, and more likely to be only grown for home consumption. More recently, Hodmedods, a company specialising in producing UK grown legumes and grains have tried a number of varieties, obtained from Sweden and France, and

managed to produce several commercial crops in the UK. We wanted to test the feasibility of growing them on a garden scale.

### **Varieties in this trial**

**Flora** - produces pale brown round lentils. They have protected Designation of Origin status, and are the only varieties that are allowed to be grown for the Red Label Blond lentils de Saint Flour. The volcanic soils of La Planèze, give them their characteristic taste.

**Anicia** - are small green 'puy' lentils. Again, they have protected status, and are the only varieties which are allowed to have the label 'Green lentils du Berry' or 'Green lentils du Puy'. They have a unique peppery taste and retain their shape after cooking.

We are grateful to Hodmedods for donating the seed for this trial. If you would like to find out more about their innovative venture to promote UK grown pulses and grains visit [www.hodmedods.co.uk](http://www.hodmedods.co.uk).

### **Aims of this experiment**

- Assess the feasibility of growing lentils as a food crop on a garden scale.
- Compare the performance of two varieties at a range of locations
- Compare the performance of the varieties sown at 2 planting dates – we are interested in how early you can sow them to give them a better head start and a longer growing season.

### **Methods**

Lentils were sown at a rate of 10g in 1 square metre plots in 3 rows 30 cm apart.

2 varieties, Anicia and Flora were sown in different plots, at 2 different planting dates in early April, and one in early May.

### **Measurements**

The following measurements were taken

1. Date of first emergence
2. Number of plants emerged
3. Date of first flowering
4. Date of first pod set
5. Number of pods
6. Weight of dried beans
7. The presence of root nodules

### **Results**

#### **Growth of the plants**

Both Flora and Anicia took around 10 days on average to emerge for both the early and the later sowing dates. Typically, we would expect seeds to emerge more quickly when sown later, when the soil is warmer, but in 2019, April was unusually warm followed by a cooler May. There was little difference between Flora and Anicia in time to first flowering and time to first pod set. However, the later sown plants first flowered c. 15 days more quickly after sowing and set pods c. 17 days more quickly.

Table 1. Days from Sowing to Emergence, First flowering and First Pod Set

Days after sowing	April sowing date		May sowing date	
	Flora	Anicia	Flora	Anicia
Emergence	11	11	10	11
First flowering	70	72	54	56
First pod set	87	86	70	72

Plants had a sprawling growth habit, growing to a height of 40 – 50 cm and producing small pea like blue flowers that developed into large numbers of small pods.

Lentils are a legume so will form associations with nitrogen fixing *Rhizobia* bacteria in root nodules, if the right species of bacteria is present in the soil. Lentils grown in Europe are colonised by the species *Rhizobium leguminosarum* (Rashid *et al*, 2014). This species will also colonise other legumes commonly grown in the UK such as vetch and broad beans (Advanced Biological Marketing, 2020). Observations of nodules on the roots presented a mixed picture, with some noticing many nodules and others not noticing any. There are a number of different types of *Rhizobia* bacteria, and if the correct type is not present in the soil, a legume plant won't form nodules or fix nitrogen. This variability is commonly observed with other legumes grown in the UK. The difference can be quite clear in the growth and colour of the plant, with plants that have formed nodules appearing far more vigorous than those that haven't. From our experience and a members' experiment done in 2013, (Garden Organic, 2013) broad beans, field beans and vetch were the most dependable legumes for nitrogen fixation, whereas other beans such as runner beans and French beans were less reliable.

Table 2. Nodulation on roots

%Participants	No nodules	A few nodules on some roots	Many nodules on most roots
Flora	32	47	21
Anicia	33	46	22

People reported a few pests and diseases but no more than would be normally encountered growing any other crop of legumes. Pigeons ate the young seedlings in some cases, and also the pods when they appeared. Some people had slug problems as they emerged. A few people growing in damper climates reported that the plants rotted, so a crop grown at this high a density is not suited to these conditions.



*Plants from first sowing 21 May*



*Anicia flowering 2 July*





*Flora pods 16<sup>th</sup> July*

### **Yields**

The plant populations were in the range 140 – 180 plants / m<sup>2</sup>. Many people said that the plots looked crowded with plants. However, the range of populations reported on plots is only slightly higher than recommendations for growing commercial crops (120 – 150 plants / m<sup>2</sup>) (Agriculture Victoria, 2018; Fleury 2016) and it has been suggested that higher seed rates are good for increasing yield and weed competition, as long as the return justifies the extra cost of seed. Additionally, the soil must also be fertile enough to sustain the higher population of plants, and under damp conditions, the extra thick canopy might be more susceptible to fungal disease.

The plants produced a very large number of pods - over 2000 per square metre for the earlier sowings, with each pod only containing 1 -2 lentils. This made harvesting by hand incredibly time consuming. People also reported that it was difficult to judge when to harvest as pods near the top of the plant were not yet ripe, but lower pods had dried and split, spilling the lentils onto the ground. At Garden Organic, once the lentils had been extracted from the pods (which was still a time consuming task), the Heritage Seed Library seed cleaning machine was able to clean them very easily resulting in a crop almost completely free from chaff and debris. The machine works using an adjustable fan that blows away the chaff into a separate compartment from the beans. As the lentils are quite heavy compared to the chaff, they were easy to separate. A threshing machine would make the initial separation of lentils from the chaff much quicker, but even the smallest of these costs thousands of pounds, and take up considerable space, so are not a practical proposition for gardeners.

*Table 2 – Plant populations, yields and numbers of pods*

	April sowing date		May sowing date	
	Flora	Anicia	Flora	Anicia
No. plants (/m <sup>2</sup> )	179	141	189	158
No. pods (/m <sup>2</sup> )	2617	2267	1410	1333
Lentils / pod	1.6	1.4	1.7	1.6
Yield (g/m <sup>2</sup> )	149	157	81	93

Those that persisted with their harvest, achieved yields of 149 g/m<sup>2</sup> and 157 g/m<sup>2</sup> for Flora and Anicia respectively for the earlier sowing date and 81 g/m<sup>2</sup> and 93 g/m<sup>2</sup> for the second sowing date. The earlier sowing date consistently resulted in larger yields. Although there should be some caution in scaling up the yields taken from very small plots, the yields achieved by our members are in a similar ball park to commercial yields of lentils grown in the UK from a range of organic and low input farms where they achieved an average of 170 g/m<sup>2</sup> (Hodmedods, 2020) and compares favourably to the FAO average yield of 90 g/m<sup>2</sup>



*Lentils harvested and dried – Flora left, Anicia right.*

### Culinary qualities

*Table 3 Culinary qualities*

#### Eating quality

	Very Unpleasant	Quite Unpleasant	Neutral	Quite Pleasant	Very Pleasant
Flora	0	3	22	51	24
Anicia	0	3	19	44	33

#### Flavour (more than one response allowed)

	Sweet	Bitter	Nutty	Peppery	Bland
Flora	23	0	63	13	37
Anicia	19	3	61	23	26

#### Texture (more than one response allowed)

	Floury	Soft	Tough	Slimy
Flora	52	78	0	0
Anicia	31	77	8	0

There was little difference in culinary qualities of the Flora and Anicia lentils. The majority rated them as quite pleasant or very pleasant, and ‘nutty’ was the most common flavour attributed to them (c. 62% of participants). A significant minority also said they were bland. Both of these lentils are speciality lentils given protected regional status, so might be expected to have better

culinary qualities than perhaps, some of the mass produced lentils from other parts of the world. However, it may be that the soils and climate of the protected regions also contribute significantly to their flavour and texture.

### **Verdict**

A large majority of people would not grow lentils again or recommend them to others to grow at home.

*Table 4 Participants' verdict on growing lentils*

% of participants	Definitely not	Possibly	Quite likely	Definitely
Would grow again	64	25	6	6
Would recommend to others	53	35	10	2

The most common comment was that it was far too time consuming to harvest the crop, and the low yields made it not worthwhile to grow on a small scale.

The exercise demonstrated how lentils are grown and produced. It also showed that it was possible to achieve yields similar to those produced in commercial fields in the UK. However the low yields and time to harvest, make it unlikely to be a worthwhile crop to for gardeners to grow. One person suggested that they could be grown as a green manure. This has been considered before and they might be a cheap source of seed for gardeners wishing to grow a short term green manure in the spring. This is an idea that could perhaps be investigated further.

## References

Advanced Biological Marketing (2020) retrieved from <https://www.abm1st.com/what-rhizobia-inoculates-what-crop-updated/>

Agriculture Victoria (2018) Growing Lentil retrieved from <http://agriculture.vic.gov.au/agriculture/grains-and-other-crops/crop-production/growing-lentil>

Coyne, C & McGee, R (2013) Lentil in Genetic and Genomic Resources of Grain Legume Improvement, Pages 157-180, Elsevier

Fleury, D (2016) Seeding Rates and Seeding Tips for Lentils retrieved from [https://saskpulse.com/files/general/160401\\_Tips\\_for\\_seeding\\_lentils.pdf](https://saskpulse.com/files/general/160401_Tips_for_seeding_lentils.pdf)

Garden Organic (2013) Members Experiment Report – Know your legumes.

Hodmedods (2020) Data provided from UK lentil harvest 2019

Rashid, M. H. O., Gonzalez, J., Young, J. P. W., & Wink, M. (2014). *Rhizobium leguminosarum* is the symbiont of lentils in the Middle East and Europe but not in Bangladesh. *FEMS microbiology ecology*, 87(1), 64-77.