Edible Lupins

Background


Ghislain own work

Most of us have seen decorative lupins growing but not considered them as a food crop. Lupins have been grown for consumption since the Egyptian times and were also grown by the Romans. They are also popular as a snack in South America and the Mediterranean.

Most lupins are of the 'bitter' type that have a high concentration of a toxic alkaloid called 'lupanine'. The symptoms of poisoning are numerous including dilated pupils, diziness and confusion. To prepare these lupins, it is necessary to boil and soak the lupin seeds before cooking to leach out the toxins. Research has shown that it is essential to soak them for 5 days, otherwise there is the danger that significant quantities of the alkaloid will remain. It wasn't until the 1920s that low-alkaloid 'sweet' varieties, that did not need to be treated before cooking, became available.

The lupin is a nitrogen-fixing legume, so can be grown on low fertility soils in a range of climates. They have small nodules on the roots that harbour the *Rhizobium* nitrogen-fixing bactiera. Lupins can grow at lower temperatures than the soya bean, so could one day become a viable source of UK home-grown protein. The two most common species for consumption are the white lupin (*Lupinus albus*) and the narrow-leafed blue lupin (*Lupinus angustifolias*). White lupins produce larger flatter beans and are best suited to growing in the drier warmer south eastern regions of the UK. Blue lupins produce smaller slightly darker speckled beans and can be grown in the colder and wetter north and western areas of the country.

Sweet lupins are an excellent source of nutrition. They constitute around 30 – 40% protein and contain all the essential amino acids. Like other legumes, lupins should be soaked overnight, then boiled for an hour before using them in a recipe. They can then be used in stews, salads, burgers or ground up into 'lupin hummus'. Lupins can also be ground into a flour which can be made into cakes and pancakes . The flour is already used as an alternative to soya in many food products. You can find many recipes at www.lupinfood.eu/en/recepten.

Garden Organic last tried growing edible Lupins in 1979, but came to the conclusion that the varieties tried were not very well suited to the UK climate. Things have moved on since then, and new low alkaloid, earlier maturing varieties have been developed. More information about the latest varieties can be found at www.soya-uk.com/crops/

Note to seed savers – sweet lupins will cross with bitter lupins within 50m so the seed saved will give rise to plants containing toxic alkaloids. It is safer to buy fresh seed each year.

Aims of this experiment

The aim of this experiment was to assess the feasibility of growing lupins as a food crop on a garden scale. We also wanted to evaluate and compare two modern low alkaloid varieties at a range of locations.

Varieties

Dieta is a very popular variety. It is a white lupin (*Lupinus albus*) with a branching habit that is more often grown in warmer south eastern regions of the country.

Haags Blue is a blue variety (*Lupinus angustifolias*) that is determinate and early maturing, suited for growing in a wide range of areas of the country.

Methods

Two 1m x 1m plots were raked over and a seedbed prepared. Seeds were sown directly in early April. In each plot, three rows of seeds were sown in rows 25 cm apart. In one plot, Dieta was sown at a seed rate of 60 seeds / m^2 and in the other, Haags Blue was sown at a seed rate of 120 seeds / m^2 as recommended by the Institute of Biological, Environmental and Rural Science at Aberystwyth.
https://www.aber.ac.uk/en/media/departmental/ibers/research/lukaaproject/agronomy_guide_web_pdf.pdf
Plants were assessed and monitored regularly for emergence, flowering and pod set. A yield assessment was taken when the pods were dry on the plant, by harvesting all the plants in the centre row of each plot.
A total of 98 people returned results from the trial and these were grouped together and mean values taken.

Results

Weather

After a cool start in April, the weather started to warm up considerably in May, giving rise to a long hot and very dry period throughout June and July. Some areas of the country had very little rainfall, and many had less than half the seasonal average amount. The dry weather continued for some areas of the country in August, whereas others experienced stormy rainfall. Overall, many participants found it difficult to supply sufficient water to the plants throughout the unusually dry growing season.

Growth of the plants

Both varieties took 11 days to emerge, and on average, only 43% of the plants emerged. At Ryton, there were already signs of slug damage as the plants emerged, which more than likely accounted for the loss of plants.

Dieta


Haags Blue

Both varieties started to flower just under 40 days after emergence, with Dieta producing white to pale blue flowers, and Haags Blue producing deep blue flowers:

Both varieties set pods 55 days after emergence. Dieta had a much more indeterminate (taller and branching) growth habit, growing on average to 60 cm tall. Haags Blue was much more compact, only growing to 42 cm tall.

Haags Blue matured more quickly (mean harvest date 12 August), and was, on average, ready to harvest, 15 days earlier than Dieta (mean harvest date 27 August).

As lupins are legumes, and can be used as a green manure to increase the nitrogen fertility of the soil, we were interested to see how well the lupins formed nodules. Only 50% of people found any nodules on roots, with only 15 – 16% stating that there many nodules. The degree of nodulation legumes depends on the types of *Rhizobium* bacteria naturally present in the soil so can often prove variable. The lupin seed provided was pre - inoculated with *Rhizobium* bacteria to promote nodulation, but despite this, nodulation was not reliable. The dry weather may not have helped.


Anton Rosenfeld

Problems with plants


Anton Rosenfeld

Over 50% of respondents reported problems with slugs, many commenting that they were completely decimated. Lupin aphids (*Macrosiphum albifrons*) were also a common problem, which was likely to have been exacerbated by the long hot dry period. These large grey green aphids (up to 4 mm long) form large colonies on the stems below the flowers, interfering with pod formation, and can cause plants to wilt.

Harvest

In this trial, lupins proved to be an unreliable crop. Only 60% of people managed to harvest anything at all, and on average only 10% of plants survived to harvest. Slugs are the most likely reason for the low survival rate of plants, and the lupin aphids may have also reduced pod formation.


Neil Spence

It is also likely that participants were not able to supply enough water to the plants, in this unusually dry season.

Average yields of those people who had plants surviving to harvest was 200g / m^2 for Dieta and 137g / m^2 for Haags Blue. The highest yield was 638g / m^2 from Dieta.
These yields are on the low side when compared to the typical range of commercial yields of 200 – 400 g/m^2, but showed that some people managed to achieve comparable yields despite the difficulties encountered.

Eating quality

Lupins have been touted as the next health craze, containing high amounts of protein, and soluble fibre which is good for gut bacteria. They are often processed into flakes or flour. However, despite their health benefits, the eating qualities of the beans were not generally met with enthusiasm.

Eating quality (% respondents)

	Dieta	Haags Blue	
Very unpleasant	4.2	2.6	
Quite unpleasant	10.4	9.0	
Neutral	52.1	61.5	
Quite pleasant	29.2	24.4	
Very pleasant	4.2	2.6	

Flavour (% respondents)

	Dieta	Haags Blue	
Sweet	9.1	6.3	
Bitter	20.5	16.7	
Bland	36.4	50.0	
Nutty	52.3	56.3	

Texture (% respondents)

	Dieta	Haags Blue	
Floury	22.6	20.7	
Soft	22.6	20.7	
Tough	64.5	75.9	
Slimy	6.5	6.9	

Participants cooked lupins in stews or made them into hummus or falafels. Around half of participants rated them as neutral, and a further 25—35% rated them as pleasant. Around half also rated the flavour as nutty. More people rated Haags Blue (50%) as bland than Dieta (36%). Almost 20% rated them as bitter. Even sweet lupins can have a slightly bitter flavour, but this may have been exacerbated by drought stress.

A high proportion (65% Dieta, 76% Haags Blue) of respondents thought that the texture of the lupins were hard or tough. Again this could have been elicited by the dry weather. It may also be worth trying them as a fresh crop rather than a dried crop, which has been tried elsewhere.

Verdict

The verdict was that 47% of respondents would definitely not grow lupins again and 38% would possibly grow them. Only 15% said they were quite likely or would definitely grow them again. Similarly, only 14% would recommend growing them to others, with 31% saying they would definitely not recommend them.

Conclusions

Over the years, Garden Organic has had an interest in home-grown protein, trialling pulses and grains such as soya, lentils, chickpeas, quinoa and field beans. Lupins are grown commercially in the UK, and this trial wanted investigate the feasibility of gardeners growing them in their back gardens.

Although this trial demonstrated that it was possible to achieve a reasonable yield, they were not reliable. Their extreme susceptibility to slugs could make them difficult to grow organically, and other legumes would be a better choice. Also, their bland flavour and tough texture makes them more suitable for processing into other foods, allowing the consumers to take advantage of their nutritional benefits this way.