

tillage

Bounteous benefits from growing beans

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Beans are good for soil structure and fertility. The bean tap root can be up to 45cm (18 inches) deep leading to a beneficial disturbance of the soil for subsequent crops. As bean straw is routinely chopped and incorporated, the crop helps to improve soil structure and organic matter.

As a leguminous (nitrogen fixing) crop, there is no need to apply nitrogen to beans. In fact, they will leave a legacy of up to 40 kg/ha of N for the following crop.

Reduce disease

The definition of a “break crop” is one which “breaks” the cycle of disease. In rotation with cereals, beans offer control of take-all giving a yield boost of 5% to 30% to first wheats compared with second or subsequent wheat or barley crops.

Boost your rotation profits

Beans boost rotation profits. It is important to take into account the

value of the break crop to the entire rotation's profitability rather than looking at each crop in the rotation individually.

Supply high quality Irish protein

With over one million tonnes of protein imported annually and a shortage of protein throughout Europe, it is important to produce native protein sources.

Beans are a high-protein (28%) grain, which can be included both in coarse rations and pelleted feed for ruminants and non-ruminants as a replacement for imported soya/distillers grains. With this goal in mind, a €250/ha protein payment for growing protein crops, including beans, is currently in place.

Meet EU requirements

With the greening “three-crop rule” forcing many farmers to think about alternatives to cereal monoculture, beans can be seen as a very viable option. The fact that beans can contribute 0.6ha of ecological focus area for each hectare sown is another major positive on farms where hedgerows alone will not meet the EFA requirements.

RESEARCH PROJECTS

In the past three months, two new research projects focusing on faba bean agronomy and physiology have commenced at Oak Park.

1 “Opti-BC: Optimising production technology in Ireland for break crops.” funded through the DAFM Research Stimulus Fund aims to develop an understanding of the factors affecting the performance of bean and OSR

crops in Ireland and to develop crop management practices that will improve performance in our climate. For beans, it focuses specifically on soils and establishment systems.

2 “Optimising canopy size and structure in field beans grown in a temperate climate.” This Walsh Fellow postgraduate research aims to study the physiology of field beans to gain a better understanding of the effect of variety, seed rate and sowing date on their growth, development and yield.

The Teagasc Break Crop Agronomy Programme is funded through the IFA grain levy.



5 STEPS TO GROWING BEANS IN IRELAND

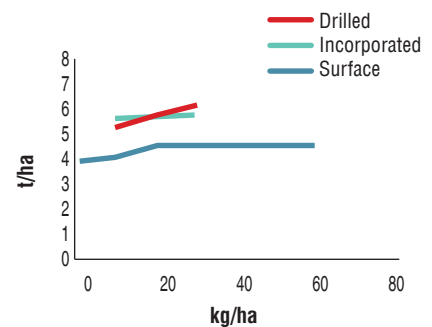


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1 Select the best sites >> As beans produce large crops, with dense foliage, drought stress, especially during pod fill, can be a limiting factor in yield. Choose fields with medium to heavy soils with good moisture retention capacity. A pH of 6.5 to 7 is ideal. As mentioned earlier, no fertiliser N is needed. However, P and K should be applied according to soil analysis. Phosphorus placement is especially important on low index soils where Teagasc research has shown yield benefits of up to 30% where P is placed with the seed (drilled or incorporated) as compared with broadcast (Figure 1).

Figure 1

Effect of phosphorus placement method on bean yield (index 1)



2 Sow a good variety, at the right rate, at the right time >>

2016 saw the release of the first bean recommended list in over 20 years. It contained three varieties: Fuego, Fanfare and Boxer. Fuego has been in use in Irish conditions for a number of years and is by far the most common with over 75% of sowings in 2016. However, yield improvements have been shown in both Fanfare and Boxer and more seed of each is likely to be available in 2017.

Spring beans can be sown any-time from early February to late March, with earlier sowing giving slightly increased yields (2016 trial data shown in Table 1). However, earlier sowings will be very susceptible to crow damage and sowing in

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good soil conditions is more important than calendar date.

Teagasc Oak Park trials have shown that increasing seed rate can increase yield in the absence of disease pressure but the economic optimum is usually 35 to 40 seeds/m². As beans vary hugely in size and weight, it is vital to know the thousand grain weight (TGW). This can vary from 450g to 750g giving optimum seeding rates of 150kg to 250kg/ha (9st to 16.5st/ac).

Table 1: Effect of sowing date on yield (2016)

Sowing date	Yield (t/ha)
28 January	7.99
20 February	7.58
16 March	7.37
10 April	5.98

3 Control weeds >> Early season weed control in beans using pre-emergence herbicides is vital. Pendimethalin, imazamox and clomazone-based products are the most common and are most effective on fine, moist seed beds. Products containing clomazone can cause a bleaching effect after emergence but this will have no adverse yield effect. Post-emergence options are limited and have a narrow window of application. To get good season-long weed control, it is important to have a good, even plant stand through sowing in good conditions.

Bean-growing offers a good opportunity to control challenging grass weeds. A number of graminicides are available for wild oats, scutch, sterile brome and other grass weeds.

4 Control pests and diseases >> Serious damage to bean root nodules can be caused by the larvae of the bean weevil. Adult weevils migrate from their over-wintering sites, mainly around field margins, especially if the field or neighbouring fields have been previously cropped with peas or beans. Migration occurs early in the spring and this often coincides with short periods where the maximum air temperatures exceed 15°C.

The pest can cause damage to spring beans if large numbers appear when plants are small. Leaves of attacked plants show characteristic U-shaped notches around the edges (Figure 2), but the main damage is caused by the larvae. Once crops emerge, monitor crops for leaf-notching and if seen across the crop, apply a suitable insecticide.

Black bean aphid colonisation of individual plants can occur in late summer. Heavily infested individual plants will be badly damaged but



Leona Murphy is pursuing research into optimising canopy size and structure in field beans grown in a temperate climate.

treatment is not necessary unless more than 5% (one in 20) of plants are heavily colonised, as more damage may be caused by the spraying operation in the maturing crop.

Chocolate spot (*Botrytis Fabae*) is the main disease threat to beans (Figure 3) but its occurrence can vary greatly across the country depending on location and weather conditions. Symptoms appear as brown spots which eventually enlarge to a more aggressive phase in cool, wet or damp weather.

Yield losses of up to 50% can be seen in high disease years. High-density plant stands will lead to increased pressure and disease spread. Usually, a two-spray programme is recommended and early spraying is

critical to achieve good control as no curative chemistry is available. Spray at first signs of infection, which will usually occur at the start of flowering (or earlier in coastal areas) and repeat two to three weeks later. Options include strob plus chlorothalonil/tebuconazole or Boscalid plus strob. These products will also give control of *Ascochyta*.

Downey mildew can be common on spring beans, where it causes greyish-brown, felted growth on the under-surface of the leaves. Some varieties have resistance to the disease.

Treat with mancozeb at the start of flowering. This has mainly protective properties. Earlier treatment was not beneficial in NIAB trials but early infection should be monitored. Products containing metylaxyl offer some curative control. Some bean rust was seen in 2016 but will be well controlled by products applied for chocolate spot.

5 Harvest at the correct stage >> Spring bean harvest is late, normally from mid-September. Crops must be allowed to ripen naturally – patience is required. Neither diquat nor glyphosate will speed the ripening process. However, once 90% of pods are black, diquat can help to dry up stems and small late-fill pods.

In crops with large weed populations, glyphosate applied pre-harvest provides an excellent opportunity for control of problem perennial broad-leaved species, but must not be used in crops for seed or human consumption.



Figure 2.



Figure 3.