

WHEN TO SOW BEANS?

Beans have a wide window for drilling but yield is significantly reduced when drilled after mid April.

Drilling too early increases the risk of rook and crow damage – this can be alleviated by deeper drilling depth (e.g. to 10 cm or 4”) but crows will ‘improvise’ and pull up emerging beans if food is scarce.

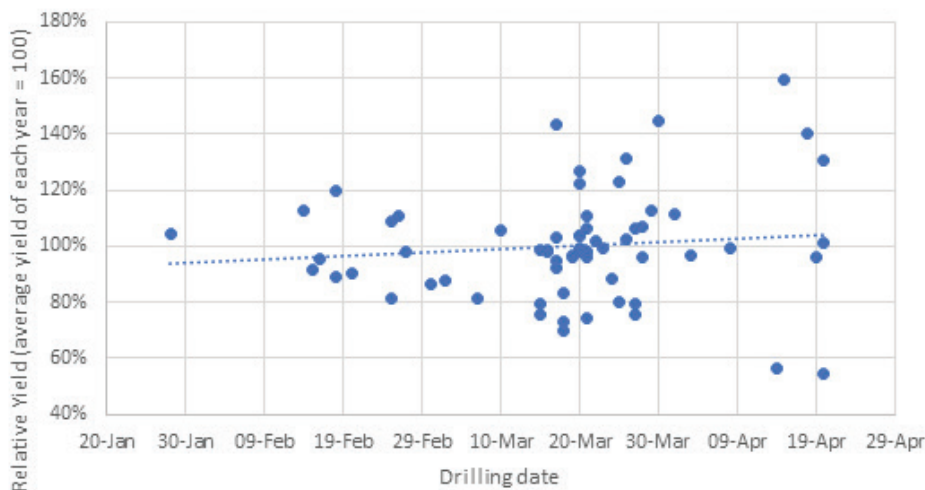


Emerging Bean Plants uprooted by Rooks

Date of sowing spring beans is often quoted as a limit on yield.

In this graph, we compared the yield of Seedtech seed bean crops (2016-2020, 66 crops, 1090 ha) to the average yield for that year and charted it against sowing date. The trends are clear – sowing date is not the absolute determinant of yield but there is a trend of more variable yields, the later you drill.

Seedtech Spring Bean Seed Crops 2016-2020
66 crops; 1090 ha



SOIL TYPE

Soils with good water retentive characteristics suit beans due to their high water demands in mid-season. Beans don't like compacted soils (40 % yield reduction, PGRO research) as they do not have a fibrous root system.

$$\frac{\text{T.S.W} \times \text{Target Plant Population/m}^2}{\% \text{ establishment}} = \text{Seed Rate (kg/ha)}$$

SOWING RATE

Teagasc research has shown that the optimum plant population for spring beans is 30-35 plants/m².

To achieve this, you should drill 35-40 seeds/m² assuming 90% germination and 5% field losses.

These figures should be adjusted to reflect seed lots and soil conditions.

To calculate an appropriate seeding rate follow the calculator here.

SEED RATE

TSW* (g)	ASSUMING 85% kg/ha	ESTABLISHMENT Stone/Acre
450	185	11.8
500	206	13.1
550	226	14.4
600	247	15.7
650	268	17.1
700	288	18.4

*TSW = Thousand Seed Weight in grams

All Seedtech Beans will have the TSW on big bags and on each 2 tonne pallet of small bags

FERTILISER

The optimum pH for beans is between 6.5–7, however if the pH reading drops below 6.0 then an application of lime is needed. Medium soils allow good root development and will usually retain enough moisture to meet the needs of the crop. Incorporate P & K to the seedbed as per soil test. Beans can suffer yield losses in low fertility situations, irrespective of fertiliser applied (PGRO & Teagasc research). The most common trace element deficiencies are of manganese (Mn), magnesium (Mg) boron (B) and sulphur (S).

P & K REQUIREMENTS (KG/HA) FOR BEANS:

SOIL INDEX	N	P	K
Index 1	0	50	125
Index 2	0	40	60
Index 3	0	20	40
Index 4	0	None	None

Source: Teagasc Green Book

Seedbed nitrogen may boost early season growth and colour but does not give any yield benefit

(Teagasc & PGRO research).

TYPICAL APPLICATION RATE BASED ON SOIL INDEX 2

DATE APPLIED	PRODUCT	RATE/ha
Pre-sowing	0-7-30 or 0-10-20	375 kg/ha

CROP PROTECTION

WEED CONTROL

Beans are very susceptible to weed competition, especially in their early stages of growth, therefore a good weed control program is essential.

Later, weeds can cause serious harvesting difficulties especially if harvesting occurs in broken weather. Uncontrolled grass weeds such as scutch and volunteer cereals can carry over take-all, reducing the benefits of beans as a break crop.

Almost all broad-leaved weed control options in beans are residual herbicides which need a level, reasonably fine seed bed for optimum efficacy. These products should be applied before the crop emerges (>13 mm soil cover).



BROAD-LEAVED WEED CONTROL OPTIONS INCLUDE:

- Defy 4.0 l/ha + Nirvana 2.5 l/ha
- Nirvana 4.5 l/ha
- Stallion 3.0 l/ha
- Basagran SG is the only option as a post emergence spray but is restricted to a narrow timing window



GRASS-WEED CONTROL OPTIONS INCLUDE:

Stratos Ultra @ 1.5-4 l/ha applied from 3 node stage of the crop until before the crop canopy prevents adequate spray penetration

Fusilade Max @ 1 – 1.5 l/ha which can be applied from the four true leaf stage to before flower buds visible

Falcon which can be applied before the flower buds are visible at 1.5 l/ha

APPLICATION DATE	REASON	HERBICIDE OPTION
Pre - emergence	Broadleaved weeds	Nirvana Stallion Defy
Post - emergence	Grass Weeds	Stratos Ultra
Before first flower buds visible	Wild Oats	Fusilade Max Falcon

DISEASE MANAGEMENT

- Fungal diseases can reduce bean yields by up to 50%
- Rotation can help predict Downy Mildew and Ascochyta problems
- Bean fungicides should be applied preventively for best effect

The main diseases which attack beans are:

Chocolate Spot (*Botrytis fabae*, *B. cinerea*)

Symptoms appear as brown spots, which enlarge to give a more damaging aggressive phase in cool, wet or damp weather.

Autumn sown beans are more likely to suffer yield losses, especially where the plant population is high and the crop becomes tall.



Chocolate Spot lesions merging – note the flower infection and abortion

Ascochyta (Leaf and Pod Spot)

This disease is easily preventable by using disease free seed and good rotations. Volunteer beans (in a following cereal crop) will almost always display the characteristic symptoms on their leaves and later, their stems. The main yield effect is from lodging as the disease weakens the stem. Control with fungicides is rarely warranted in spring beans, but is quite common in autumn drilled crops. **All Seedtech beans are certified Ascochyta free by DAFM.**



Ascochyta lesion with 'target' and black pycnidia

Cercospora leaf spot (CLS)

An occasional disease in cool, dry springs. Cercospora was common in Ireland in 2020 but it is probably under-reported due to its similarity to Chocolate Spot lesions and Ascochyta lesions.

It is caused by the fungus *Cercospora zonata* and is soil-borne. Cercospora spread is limited in warmer weather (May/June) and specific fungicides may not be warranted. Cercospora lesions are more angular and darker than Chocolate Spot and often have concentric circles, whereas Chocolate Spot does not. It differs from Ascochyta lesions in that Cercospora does not have pycnidia (dots) in the lesion. Generally, Cercospora lesions develop early in the season, Chocolate spot is later. Herbicide and frost damage can be confused with fungal diseases.



Cercospora leaf spot (CLS)

Downy Mildew (*Peronospora viciae*)

Beans grown in tight rotations are often the first affected by this disease, however all crops are at risk given warm, humid weather. As it is related to Potato blight, it's symptoms are similar with a brown/grey growth on the underside of leaves. This makes its early detection and extent in a crop difficult to see, early in its disease cycle.

Varietal resistance is important. Lynx and Fanfare have good mildew resistance on the DAFM list 2021. NIAB/PGRO recommend a fungicide should be applied if Downy Mildew is seen on >20% of plants especially if present before flowering.



Early Downy Mildew symptoms – brown/grey fungal growth

Rust (*Uromyces fabae*)

Rust is characterised by numerous small reddish-brown pustules on the leaves.

Usually, rust infection occurs too late for serious damage to occur. Infection during flowering and pod set is more damaging.



Rust pustules breaking through the leaf epidermis in beans

SUGGESTED BEAN FUNGICIDE PROGRAMME

TIMING	DISEASE THREAT	FUNGICIDE OPTIONS
Start of flower buds opening (or earlier if Chocolate Spot visible)	Chocolate Spot, Downy Mildew, Rust	Signum, Amistar, Tebuconazole
Mid to end flowering (2 to 3 weeks after first spray)	Chocolate Spot, Downy Mildew, Rust	Downy Mildew specific: Metalaxyl (curative),

PEST MANAGEMENT

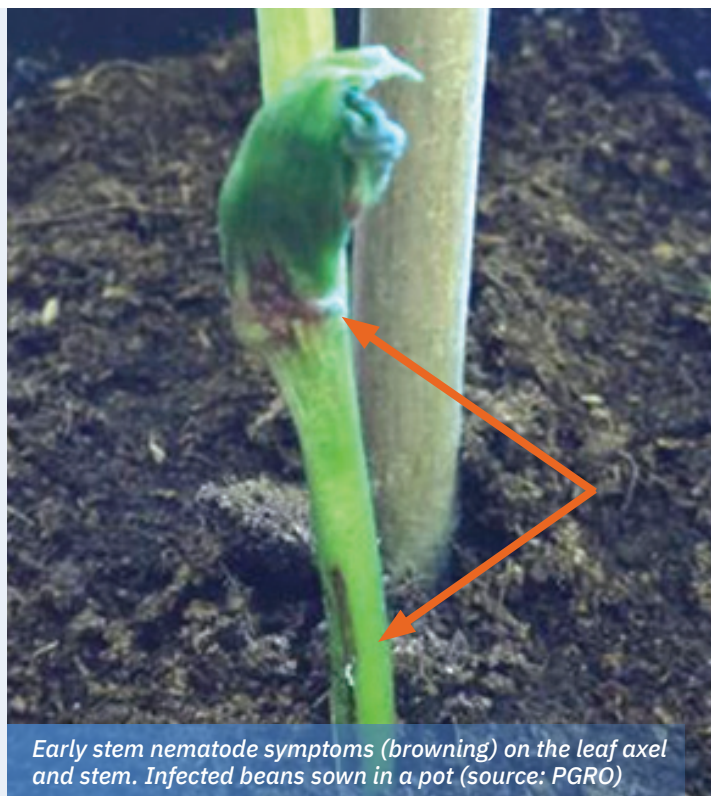
Stem Nematode

This is a microscopic 'worm' (nematode) that will become a more important pest in beans as the area increases and bean rotations tighten. Visual symptoms include stunted, twisted stems with a brown or rust colour on the leaves and stems.

Pods are poorly formed and seeds are dark brown and shrivelled in the pods. Losses can be severe (up to 50%) so every effort should be made to keep this pest out of Irish bean crops.

Stem nematodes can survive drying (in seed) and can live in soil for many years even, if beans are not grown. So **the key point is to prevent clean land from becoming infected through seed spread.**

There is no compulsory testing program for stem nematodes in UK or Irish certified seed, **All Seedtech beans are certified Stem Nematode free by DAFM.**



Early stem nematode symptoms (browning) on the leaf axel and stem. Infected beans sown in a pot (source: PGRO)

Bean Weevil

The Bean Weevil is a tiny insect that is best known by its characteristic feeding damage on young bean leaves (Ushaped notches). The adult beetle feeds on the leaves and lays its eggs that hatch into larvae. These larvae burrow through the soil and into the developing nitrogen 'making' nodules on the bean roots, thus reducing the plants ability to produce nitrogen.

Control is simply based on disrupting adult feeding and egg laying. This can be achieved by applying an approved insecticide, such as Karate Zeon, once leaf notching is noticeable across the field and the bean plants have at least 2 open leaves.

Pyrethroids work by direct contact onto the target pest with limited (5-7 days) residual effect. Pyrethroids bind tightly to soil so will have limited effect on pest control. Adult weevils migrate from their over-wintering sites, mainly around field margins, especially if previously cropped with peas or beans.

Migration occurs early in the spring and this often coincides with short periods where the maximum air temperature exceeds 15°C.

Look out for fields where peas or beans have been grown in the past as they are most likely to have high populations of the weevils surviving in hedges etc. Pheromone traps can be placed along hedgerows to give an indication of adult numbers.



Badly damaged bean roots (black scars) being eaten by bean weevil larvae

Black Bean Aphids

Black bean aphids are a late season pest and can be visually striking.

However, it is rarely economic to spray unless you see > 5% of plants colonised with aphids evenly across the field.

Black bean aphids generally target a few isolated plants so walk crops well before deciding to spray and give due notice to bee-hive owners and take appropriate precautions to limit pollinator damage.



APPLICATION DATE	REASON	CHEMICAL
Start of significant leaf notching	Bean Weevil	Decis Karate Zeon etc
If 5% of the crop is infected with aphids	Black Bean Aphid	Aphox

DESICCANT AT HARVESTING OPTIONS

Bean crops can be desiccated 7 – 14 days prior to harvest with Roundup (only if weeds are present, obey label).

If a crop has a high level of weeds present or has a few small late set pods which are still green, a desiccant can aid harvesting.

It should be applied when at least 90% of pods are dry and black and most of the beans are dry.



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Disclaimer

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