



## Technical Update 28

### Notes on growing broad beans

January 2023

Broad beans (*Vicia faba* L.) are grown in the UK for freezing, canning and for the fresh market. Although the area grown for processing has declined over recent years, there remains a demand for high quality beans. PGRO continues to monitor developments in the UK crop and carry out experimental work aimed at achieving maximum yield of good quality produce.

#### VARIETIES

Varieties of broad beans can be divided into two groups; those with white flowers, which may be used for both canning and quick-freezing, and those with coloured flowers which can only be used for quick-freezing. Coloured flowers indicate the presence of leucoanthocyanins, which give the beans a brownish discolouration upon canning or cooking; white-flowered varieties have to be "rogued" to remove the small percentage of plants with coloured flowers found in many stocks.

Currently, white flowered varieties are used for both canning and quick freezing and product diversity is obtained through the use of standard and small seeded types.

The selection of the correct variety for specific agronomic and marketing requirements has a great bearing on the ultimate success of the crop.

#### SOWING TIME

Broad beans are generally sown so that the first crops reach optimum maturity immediately after the last crops of vining peas. However, some factories process broad beans over the same period as vining peas. The continuity of supply of raw material for the factory is of prime importance. To achieve this, successional plantings must be made, and sowing time is determined by factory requirements.

PGRO trials have shown that processors who require young beans suitable for freezing in August should commence sowing in late April. Alternatively, if more mature beans suitable for canning are required, sowing can commence in early April. Successional sowings will then give a regular supply of beans of the correct maturity throughout the season. Processors and growers are invited to discuss their sowing programmes with the technical staff.

#### PLACE IN THE ROTATION

Broad beans form a valuable break crop in predominantly cereal rotations. The root nodules fix atmospheric nitrogen and this together with organic matter provided from the ploughed-in haulm enriches the soil for the following crops. Effective herbicides are available.

Broad beans, together with peas, vetches and field beans are host to the pea cyst nematode (*Heterodera gottingiana*) and are host to some of the same soil-borne diseases as field beans, peas and green beans. Therefore, not more than one of these legume crops should be grown on any one field in five years. If the previous crop of beans, peas or green beans was diseased, it may be advisable to increase this interval, and in such circumstances further advice should be sought from PGRO.

#### MANURING

The roots of broad beans produce nodules where bacteria (*Rhizobium leguminosarum* bv *viciae*) provide nitrogen for the plant and artificial nitrogen is generally unnecessary. Phosphate and potash recommendations (AHDB Nutrient Management Guide RB209) are given below.

<b>Soil nutrient index (ADAS) for P or K</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4 or Over</b>
Kg/ha – Phosphate (P <sub>2</sub> O <sub>5</sub> )	200	150	100	50	0
Kg/ha – Potash (K <sub>2</sub> O)	200	150	100(2-) 50(2+)	0	0
Kg/ha – Magnesium (MgO)	100	50	0	0	0

## POPULATIONS

Experimental work has shown that the optimum population for broad beans is 18 plants per sq. metre. At this population the plants will be approximately 13cm apart in 45cm rows. Seed size and germination can vary considerably, and the seed rate required to achieve this population can be calculated by using the following formula:

$$\text{Seed rate kg/ha} = \frac{\text{Thousand seed weight} \times \text{Target population/m}^2}{\% \text{ germination}} \times \frac{100}{100 - \text{seedbed loss}}$$

seedbed loss = 5%

Experiments have shown that with the varieties currently in use there is no benefit in using narrower rows.

## SOWING

While broad beans may seem to be more capable than other legumes of forming healthy plants when sown under adverse conditions, an open seedbed is preferable to a very fine and overworked one. Excessive consolidation should be avoided, and the minimum of cultivations should be used to produce such a seedbed. Seed should be sown into moisture, and this will generally mean drilling to a depth of approximately 5cm.

Due to some varieties having a large seed size, it is important to ensure that the drill can cope with the variety of choice. While some drills may be capable of sowing small-seeded broad beans, excessive seed damage and irregular spacing may occur with larger-seeded varieties.

## BROAD-LEAVED WEED CONTROL

Annual broad-leaved weeds are usually controlled by herbicides, the most popular being pre-emergence residual materials, although since the crop is grown in wide rows inter-row cultivations can be used.

### Pre-emergence

It is vital to use a pre-emergence herbicide because there are only two broad-leaved post-emergence options.

The use of clomazone (Gamit, Cleancrop Covert), pendimethalin + imazamox (Nirvana) and pendimethalin (Stomp Aqua + others) is permitted via EAMU's but are used at the grower's risk.

### Post-emergence

Bentazone (Basagran SG, Benta 480, Clayton Baritone) can be used as a post-emergence follow up treatment. It should be applied as a split dose at 2 – 6 leaf pairs, or a full dose at 3 – 4 leaf pairs. It is effective on charlock and useful (at full dose) for control of small cleavers, volunteer oilseed rape and black bindweed. Please note, there have been changes to the Basagran SG label and rates of application altered. There is also advisory information regarding water stewardship with the aim of maximising product longevity.

Isoxaben (Flexidor) can be used up to growth stage 14 in broad beans and will control Chickweed, Speedwell, Hemp-nettle, Poppy, Fat Hen, Redshank, Mayweed, small nettle and many others.

## GRASS WEEDS

Wild-oats can be a serious problem in broad beans, reducing yields and harvesting efficiency and may be controlled by treatment with the following:-

### Post-emergence

Fusilade Max (fluazifop-P-butyl) has authorisation in broad beans. Providing the wild oats are actively growing, good control of well tillered plants is possible. Beans may be treated from second node stage onwards. Latest application stage is before bean flower buds visible. Check product labels for dose rates. Fusilade Max requires no additional wetter.

Other graminicide materials available for use in broad beans via EAMU are cycloxydim (Laser), clethodim (Centurion Max and others) and propaquizafop (Falcon + others).

## PESTS, DISEASES & DISORDERS

### Pests

The principal pest of broad beans is the black bean aphid (*Aphis fabae*) which has sugar beet, mangolds, docks and thistles as alternative summer hosts, and the spindle tree as a winter host. There are some materials approved for the control of aphids in broad beans. Care must be taken that they are not applied later than indicated by the manufacturers and that all the necessary precautions are taken to prevent bees being harmed.

Although pea and bean weevils (*Sitona* spp.) often attack broad beans, cutting "U"-shaped notches around the leaf margins, the amount of vegetation present and the vigour of growth ensure that little or no real damage is done, although there is evidence that certain virus diseases, notably broad bean stain virus, are spread through the crop by weevil vectors. Where weevil is noted as a regularly occurring pest, a spray should be applied as soon as leaf notching becomes apparent. A second spray, 14 days later, may be beneficial if leaf damage re-occurs.

Wireworms, leatherjackets, cutworms and slugs are pests which will sometimes attack seeds and seedlings and growers should examine crops for their presence. If they are known to be present in large numbers, the necessary treatment should be carried out before sowing the crop.

Stem and bulb nematode (*Ditylenchus* spp.) is a pest of many crops, but its effect on broad beans varies. In severe cases, the primary shoot may be killed, but branching can occur. Infested stems show reddish brown discolouration with associated twisting and blistering symptoms. The produce of infested plants may display small necrotic spotting which could lead to the crop being rejected for processing. Although soils can be infested with nematodes, seed-borne transmission is an important factor in causing crop damage. The use of infested seed lots should be avoided and PGRO offers a laboratory test for the detection of nematodes in the seed.

Another cause of produce spoilage is the result of feeding damage by capsids (*Lygus* spp.). Damage is more common in hot dry summers. It is likely that insecticides used for bruchid beetle control help reduce the damage by controlling capsids if present in low numbers.

Similarly, attacks by bruchid beetle (*Bruchus rufimanus*) have become more severe in recent years. The larvae feed inside the developing bean seed, and crops where this has occurred have been rejected by the processing companies. The beetle has become widespread in areas where field beans are grown on a regular basis, as the dry crop supports the completion of the life cycle. Broad beans growing in these areas are at risk from infestation. Flowering crops attract the adults, and some insecticides may be applied at 1<sup>st</sup> pod when temperature reaches 20°C for 2 consecutive days to prevent eggs being laid on the young pods. A second spray is recommended 7 days later.

### Diseases

Chocolate spot is the most common fungal disease of broad beans. Symptoms are typically small reddish-brown spots on the leaves and pods, and often streaks appear on the stems. The spots coalesce under conducive conditions to form aggressive lesions. Large, greyish coloured areas of the leaves develop, and infected leaves may senesce prematurely. Often two fungi are involved, *Botrytis cinerea* and *Botrytis fabae*. The disease is encouraged by high humidity and low light intensity. Crops with an adequate supply of phosphate and potash are less likely to be severely infected. Where the disease is experienced frequently, preventative sprays will help reduce yield loss in most years.

A fungicide should be applied from early flowering onward, when the first chocolate spot lesions can be seen on the leaves. A second spray can be made 14 days later if necessary, but care must be taken to observe the harvest interval.

Rust (*Uromyces fabae*) can also infect crops later in the season. Tebuconazole is available for rust control and should be applied as soon as rust is seen during late flowering.

Downy mildew (*Peronospora viciae*) also results in yield loss in some seasons. The foliar product SL 567A is available as an EAMU to control foliar downy mildew. There are no longer any seed treatments in broad beans for control of downy mildew.

The aphid-transmitted bean leaf roll virus is quite common in broad beans. The foliage becomes thickened and brittle and the leaves roll inwards. Other leaves may become generally chlorotic or show interveinal yellowing. Efficient control of aphid will help to contain serious attacks.

## HARVESTING

Both PMC and Ploeger offer a direct cutting bean header that can be used on a pea viner. Losses are nil but careful attention should be given to the settings of the harvester cleaning systems as extraneous vegetable matter levels tend to be higher than with the wilting method.

Pod, leaf or plant debris left in contact with the beans will cause discolouration of the produce. **Efficient vining and cleaning coupled with minimal delay before processing should be the aim to avoid a stained product.**

## FURTHER INFORMATION AND ADVICE

These brief notes are intended merely to provide an outline of broad bean growing. Members concerned with this crop, or indeed with any crop dealt with by PGRO, are invited to discuss their cropping plans with members of the Organisation's team of specialists in advance, as well as using its services in a "trouble-shooting" capacity.

In addition, your attention is drawn to the following PGRO publications:

PGRO Technical Update 37 - Tenderometer standardisation and maintenance

PGRO Technical Update 08 - Pea and bean weevil (*Sitona lineatus*)

PGRO Technical Update 17 - Checklist of fungicides & insecticides for broad, green & runner beans

PGRO Technical Update 21 - The choice of herbicides for broad beans

PGRO Technical Update 25 - Checklist of herbicides for broad and dwarf green beans

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