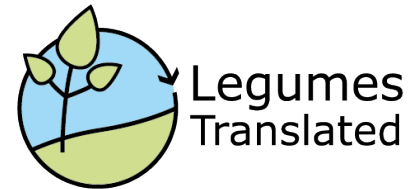


# The bean seed beetle in faba bean

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*Bruchus rufimanus* (Boheman), commonly referred to as the bruchid beetle or bean seed beetle, is an economically important pest of faba bean throughout Europe, Asia, North America and Africa. Its principal hosts are spring- and autumn-sown faba bean, (*Vicia faba* var. *minor*) although, more recently, high levels of infestation have been recorded in broad beans (*Vicia faba* var. *major*). The larvae of the beetle cause significant economic losses inside forming seeds. There has been extensive research on the biology and chemical ecology of *B. rufimanus*, but reliable control options are limited.

## The lifecycle

An understanding of the lifecycle is the foundation of control strategies and risk assessments. The beetle has one generation per year. Adults hibernate overwinter in leaf litter and under bark before emerging in April/May. Diapausing adults leave overwintering sites to colonise crops when spring temperatures reach 15°C. Females lay eggs on the outside of developing pods, particularly the lower pods from the earliest flowers. Hatched larvae bore through pod walls and develop within the seed. This concealed position in the seed makes them difficult to control with the insecticides that are currently available. Consequently, the adults are the main target of current control attempts. When fully grown, larvae pupate and young adult beetles emerge around harvest time, leaving a round hole in the bean. These holes are the main source of damage to the crop. Some adults stay within the seed and emerge in store, but there is no subsequent infestation of stored beans.

## Damage and thresholds

Infestation damages the seed. The weight of individual seeds is reduced by the feeding of the developing larvae within the seed, the nutritional value decreases, and the holes in the seed



Bean seed beetle adults. Photograph: Teagasc

greatly reduce the quality of the seed. Seed with holes is devalued or rejected due to strict quality standards in both the food (2%) and feed markets (10%). In crops grown for seed multiplication, infestation reduces seed germination and vigour. Furthermore, the presence of live adult beetles in the grain bulk affects access to domestic and international markets.

## Control

Peak daily temperature is a reliable indicator of the risk of the pest doing damage. Two consecutive days of sunny weather at the time of first pod setting with maximum temperatures above 20°C is an indicator of risk. Pyrethroid insecticides are typically sprayed during the flowering and first pod setting stages targeting adults before egg laying. However, successful control depends on overcoming numerous challenges:

- 1) Active substances and number of treatments are limited in the EU.
- 2) Treatment must target the adults and reduce egg laying.
- 3) Control of larvae as they hatch from eggs is difficult because they penetrate the pod immediately beneath the egg case.
- 4) The dense crop canopy can reduce the efficiency of spraying by preventing a proper penetration onto the target plant-organs. Research suggests that angled nozzles gives better control than conventional flat fan nozzles.

There is an increasing need for new integrated pest management solutions because faba bean cultivation is expected to increase across Europe. An integrated approach to developing control strategies includes the use of cultivar resistance and tolerance, and adjustments to sowing time. Past research suggests that cultivar choice, plant density and sowing date play a role with a reduction in damage seen with later sowing.

### **Bean seed beetle is an emerging pest of faba bean crops in Ireland**

Samples of grain from 48 commercial faba bean crops grown across Ireland in 2018-2020 were assessed by Teagasc for damage associated with bean weevils (holes were adults emerged) to ascertain whether this emerging pest is reaching economically significant levels in Ireland when the crop to be sold for human consumption. The majority of crops (69%) had no seed damage. 17% were damaged with less than 2% of seed affected, 6.3% presented seed damage between 2-5%, and 8.3% presented more than 5% of seed damaged.



Damage to seeds by the bean seed beetle. Photograph: Teagasc

## Key practice points

- There is no threshold for beetle numbers in the crop, however the presence of the pest in the crop should be established prior to insecticide application. This can be done by examining flowers, either by opening the flowers to expose the beetles, or by tapping out the flower heads onto a plastic tray.
- Insecticide applications should take place only when max. daily temperature has reached/exceeded 20°C for two days in a row, and only when the crop has reached the first pod formation stage. Egg laying begins when temperature reaches this threshold, and beetles lay eggs only on pods.
- Insecticides should be used when beneficial insects are not foraging in the crop. As such, applications should take place late in the evening, very early in the morning or at night time.
- Use angled nozzles for applying insecticides.
- More reliable integrated pest management options for this pest are needed.

## Further information

PGRO, 2021 CB2104 - CROP UPDATE 4 - 28th May 2021 [www.pgro.org/cb2104/](http://www.pgro.org/cb2104/)

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