

Controlling pollen beetle and combating insecticide resistance in oilseed rape

Biology

Pollen beetles start to fly at a temperature of 15°C, migrating into crops in April to feed on pollen and lay eggs. If flowers are not yet open, beetles bite into and kill buds. Damage to buds declines as flowers begin to open and pollen becomes more easily obtainable.

Beetles lay their eggs in closed buds. On hatching, larvae feed on flowers throughout May before dropping to the soil to pupate.

Adults emerge in July. They can disperse over long distances, feeding on pollen from a wide range of flowers. Adults then hibernate in leaf litter, mainly in deciduous woodland.

Control thresholds

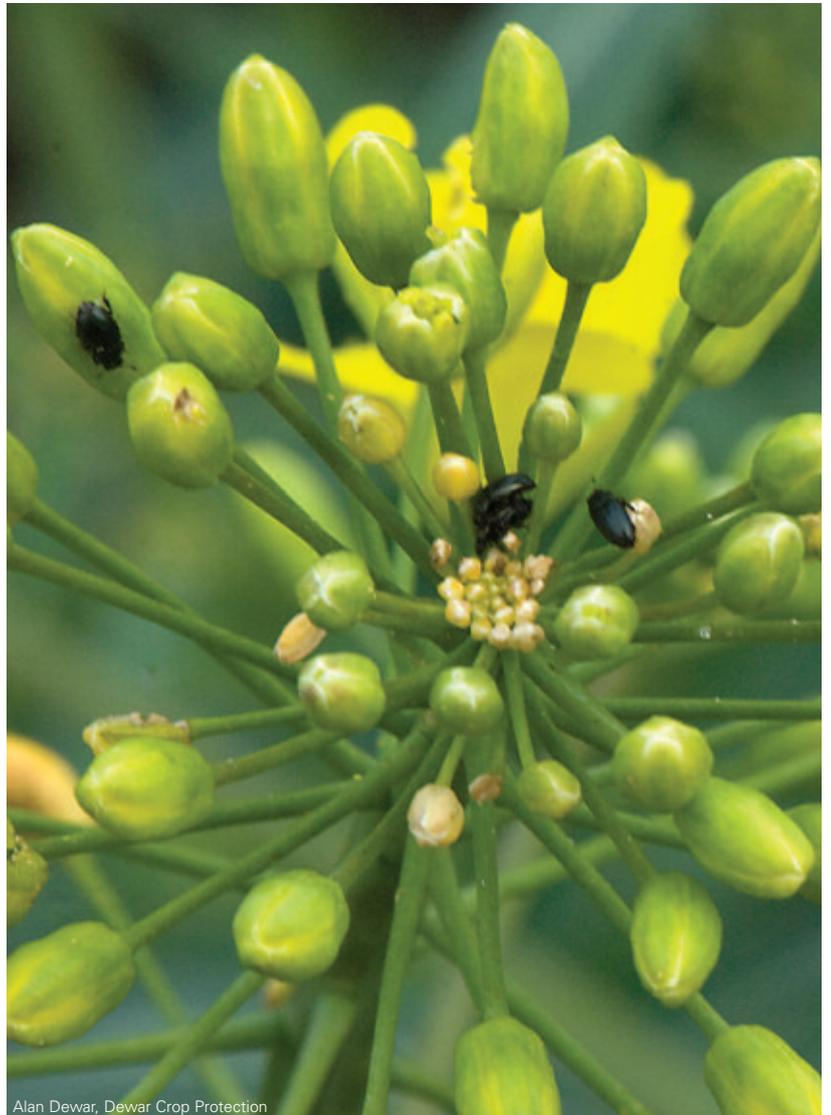
Winter oilseed rape:

- 15 pollen beetles per main shoot in well-grown crops that can compensate for damage by producing more and larger seeds in lower pods
- 5 pollen beetles per main shoot in very small or very backward crops. Even these crops can tolerate pollen beetle attack

Spring oilseed rape:

- 3 pollen beetles per main shoot

The thresholds for hybrid varieties are the same as for conventional varieties.



Alan Dewar, Dewar Crop Protection



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Natural control

Pollen beetle larvae are attacked by three major species of wasp-like parasitoids. Generally, 25–50% of larvae are killed by parasitoids on unsprayed crops in the UK. Where insecticides are used extensively, levels of parasitism can be considerably lower.

Parasitoids may not be affected by insecticides applied against pollen beetle adults at green bud as they arrive in crops during flowering. Opportunities for enhancing natural control through agronomic practices such as trap cropping and soil management are being investigated.

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Insecticide resistance

In many parts of Europe, pollen beetles have become resistant to pyrethroid insecticides. For example, in Germany in 2006, beetles that couldn't be controlled with pyrethroids destroyed 30,000 ha and seriously damaged 200,000 ha of winter oilseed rape. Resistance is well established over much of central and eastern Europe, as well as Scandinavia.

Resistant individuals were found in Kent in 2006, and in other parts of southern and eastern England in 2007 and 2008. In 2009 and 2010, resistant insects were also found in the Midlands, northern England and Scotland. Results collected by the Insecticide Resistance Action Committee (IRAC) indicate that only 37% of samples in 2010 were susceptible to pyrethroids, compared to 85% and 54% in 2008 and 2009, respectively.

Recent CropMonitor surveys (www.cropmonitor.co.uk) showed that insecticides are often applied to fields below the pollen beetle threshold. The presence of resistance means that the continued use of pyrethroids for control of pollen beetles or other spring and summer pests will cause resistance to intensify and spread even further. A strategy for overcoming pyrethroid resistance needs to cover all spring and early summer insecticide applications, regardless of their intended target.

In light of these risks the UK Insecticide Resistance Action Group (IRAG-UK) has developed advice based on reducing use of pyrethroids and on exploiting other insecticide groups, which should in turn be used cautiously to preserve their effectiveness.

Agronomic advice from IRAG, updated for 2011

Based on 2010 findings, IRAG has amended its advice to include newly available insecticides. The key message however is to monitor crops and to ONLY treat if current thresholds are reached.

Do NOT be tempted to apply insecticides purely for insurance purposes.

Do NOT spray after flowering starts: the pollen beetles migrate to open flowers away from the buds and become pollinators rather than pests.

2011: IRAG advice

- Inspect crops
 - Inspect the midfield and headland
 - Spray only where above the current threshold
 - **In recent years, pollen beetles have rarely been numerous enough to warrant treatment in most fields**

- If treatment is necessary
 - Consider neonicotinoids, indoxacarb or pymetrozine (see table) as alternatives to pyrethroids, since control with the latter may no longer be effective
 - Do NOT use more than one neonicotinoid spray
 - Do NOT use more than one indoxacarb spray

- Do NOT use more than one pymetrozine spray
- Use a non-pyrethroid if above threshold numbers of beetles survive a pyrethroid treatment
- Seed weevil and summer aphids rarely need treatment



Further information

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European pollen beetle meeting website
http://archives.eppo.org/MEETINGS/2007_meetings/meligethes/meligaretes_workshop.htm

Master Project website
<http://www.rothamsted.ac.uk/pie/master/master.htm>

IRAC website
www.IRAC-online.org

- For aphids, use a suitable aphicide (depending on the presence of other pests); consult an agronomist

Chemical group	Active substance	Example products
Pyrethroid	Alpha-cypermethrin	Alert, Contest
	Bifenthrin	Starion Flo, Brigade 80 SC
	Cypermethrin	Permasect C, Sherpa 100EC, Toppel 100EC
	Deltamethrin	Decis, Delta-M 2.5EC, Landgold Deltaland
	Lambda-cyhalothrin	Clayton Sparta, Hallmark with zeon technology
	Tau-fluvalinate	Klartan, Mavrik
Neonicotinoid	Zeta-Cypermethrin	Fury 10EW, Angri, Symphony
	Thiacloprid	Biscaya, Standon Zero tolerance
Indoxacarb	Acetamiprid	InSyst
	Indoxacarb	Rumo
Pymetrozine	Pymetrozine	Plenum

No endorsement of named products is intended, nor any criticism implied of other alternative but unnamed products.

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