Wheat bulb fly: risk assessment and control

**Life cycle and symptoms**
Eggs are laid from August until early September and remain dormant throughout late autumn and early winter.

Larvae hatch between January and March and invade cereal plants. The attacked tiller eventually dies back to show the classic ‘deadheart’ symptoms.

**Risk factors**

**Crop:** All cereals except oats can be attacked by wheat bulb fly, although damage is most frequently reported in wheat. Winter wheat crops sown from November onwards, or crops sown in spring before the end of March, are particularly vulnerable as they may have only a single tiller at the time that wheat bulb fly larvae hatch.

**Location:** Wheat bulb fly is most prevalent in eastern England, the East Midlands and north-eastern England.

**Rotation:** Wheat bulb fly likes to lay its eggs in bare soil. Freshly cultivated soil is particularly favourable. Eggs are laid:

- Following fallows or crops that are harvested early, such as vining peas
- In between rows of crops such as potatoes, sugar beet and onions

**Season:** The level of risk fluctuates each season, mainly due to July and August rainfall and harvest dates of the previous wheat crops. The longer crops remain unharvested, the longer adult flies have to feed on fungi on the cereal ears and mature their eggs. Incidence generally increases following a wet harvest period (e.g. 2004, Figure 1) and is lowest after a hot, dry summer (e.g. 1995, Figure 1).

Avoid confusion with larvae of other flies. Frit fly damage may be seen from September to January – generally earlier than wheat bulb fly.

Larvae of the yellow cereal fly can be found from February to April (similar to wheat bulb fly larvae), particularly in wheat sown before mid-October. They are thinner and invade through the top of the shoot, leaving a characteristic brown incision spiralling down the tiller. Unlike wheat bulb fly larvae, they only attack one tiller.

**Action**

Visit www.hgca.com/pests in September for the latest egg populations from the HGCA survey.

Assess treatment need from survey results and recommendations for your area.

Consider cultural control measures:

- Drill as early as practical
- Avoid deep drilling
- Increase the seed rate to compensate for attack (especially for late drilling)
- Early top dressing will aid recovery in the spring

Consider using a seed treatment for late autumn or winter-sown, high-risk crops, especially those grown after potatoes, sugar beet or other root crops.

Consider an egg-hatch spray, before peak egg hatch, for autumn-drilled crops in high-risk fields.

Consider a deadheart spray as a follow-up and to control existing infestations. Treatment thresholds vary with crop growth stages.

Always consider your local conditions and consult a professional agronomist if necessary.

Figure 1. The proportion of fields sampled each year exceeding the threshold of 250 eggs/m².
Thresholds
Egg populations above 250 eggs/m² present a risk of economic damage to autumn-drilled wheat crops. Egg numbers above 100 eggs/m² justify the use of seed treatment on the latest-drilled crops of wheat or barley. See www.hgca.com/pests to see which regions and rotations have reached threshold levels.

Control strategies

Table 1. Strategies for control in relation to egg numbers in the soil (from the survey) and sowing date of the crop

<table>
<thead>
<tr>
<th>Risk category</th>
<th>Sowing date</th>
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<tbody>
<tr>
<td></td>
<td>Sep-Nov</td>
<td>Nov-Dec</td>
<td>Jan-Mar</td>
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<tr>
<td>Low (&lt;100 eggs/m²)</td>
<td>Economic damage unlikely</td>
<td>No treatment</td>
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<tr>
<td>Moderate (100-250 eggs/m²)</td>
<td>No treatment</td>
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<tr>
<td>High (250-500 eggs/m²)</td>
<td>Optional ▲</td>
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<tr>
<td>Very high (&gt;500 eggs/m²)</td>
<td>Optional ▲</td>
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Seed treatment
Fludioxinil + tefluthrin (Austral Plus) is effective on late-sown crops (November onwards) and is the recommended treatment for late-autumn/winter sowings made before the end of egg hatch in areas and rotations at risk from wheat bulb fly.

Egg-hatch sprays
Egg-hatch sprays of chlorpyrifos* are applied between the start of egg hatch in January and its peak in February or March. If attack is particularly severe a follow-up deadheart spray may be necessary.

If plants are well-tillered by the time that wheat bulb fly larvae hatch, it is possible that they will be able to tolerate some pest attack and an insecticide spray may not be required.

Deadheart sprays
Deadheart sprays of dimethoate*,** are applied at peak invasion of first instar larvae when deadhearts start to appear on cereal shoots (yellowing of newest leaf), a small entry hole confirms that a larva has entered.

Thresholds vary with growth stage:
- 10% of tillers attacked at GS20
- 15% of tillers attacked at GS21
- 20% of tillers attacked from GS22 onwards

*Check buffer zone reductions before using chlorpyrifos and dimethoate products approved for control of wheat bulb fly. www.saynotodrift.co.uk

**Dimethoate is currently undergoing re-registration evaluation

Further information
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HGCA wheat bulb fly survey
The HGCA-funded wheat bulb fly survey is done by ADAS to aid decision making on seed treatments. The information is published every year in September.

The survey measures the annual incidence of wheat bulb fly in the autumn by taking samples of wheat bulb fly eggs from high risk fields.

See www.hgca.com/pests for more information.