Wheat Blossom Midge
The Threat to Cereal Crops

DURSBAN WG

THE PROBLEM – Conditions for a major increase in the Wheat Blossom midge population are very specific and require exactly the right conditions. Wheat Blossom midge is a sporadic pest which occurs in some crops in the UK every year. Two species of Wheat Blossom midge are pests of cereal crops: the Orange Wheat Blossom midge *(Sitodiplosis mosellana)* and the Yellow, or Lemon, Wheat Blossom midge *(Contarinia tritici)*. The larvae of both species feed within the floret and can be distinguished by their colour. Both species are able to attack wheat, barley, oats and rye, although significant damage in the UK has only been reported in wheat and rye.

Damage Caused

Orange Wheat Blossom midge larvae feed on developing grain causing a depression and loosening of the seed coat. This often leads to cracking of the seed coat during the ripening process. The plant tissue is broken down by enzymes secreted by the larvae, which then feed by absorbing the resulting fluid. This feeding results in smaller grains, reduced germination capacity and poorer milling and baking qualities. If more than two larvae feed on a grain only a husk remains. **Yellow Wheat Blossom midge** larvae feed on the flower, killing the stigmata and preventing pollination.

Other Factors

- Seed wheat – attacked grain will have a low germination.
- Milling wheat – reduction in Hagberg Falling Number.
- Secondary attack by *Fusarium* and other fungi.
- Premature sprouting in the ear.

Treatment Threshold

Seed/milling wheat:	1 or more adult midges per 6 ears
Feed wheat:	1 or more adult midges per 3 ears

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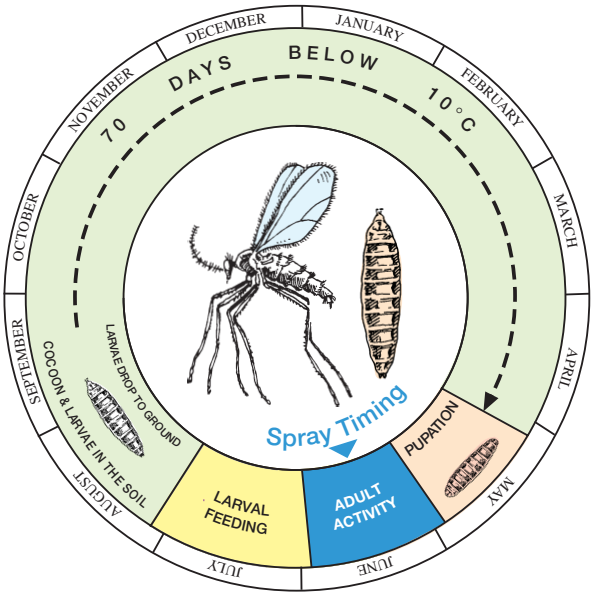
Wheat Blossom Midge Life Cycle



Wheat Blossom Midge Life-cycle

Orange Wheat Blossom Midge

All life cycle stages are orange in colour. The adult is a typical midge; slender and approximately 3 mm in length. Adults mate close to the emergence site and the males then die. Females spend most of the day within the crop, but at dusk they can travel up to 3 kilometres, just above or within cereal crops, seeking those at the correct growth stage.

Eggs are laid on emerged ears, before flowering, in crops between GS 53 and GS 59. Females normally begin laying eggs at dusk on the lower ears and work upwards as night falls. Female flight activity is stimulated when light levels fall below 18,000 lux. Eggs are laid on the glume or within the floret in batches of about four per grain. Egg hatch is temperature-dependent, taking four days at 20˚C. One or two larvae from each egg batch survive and feed for between two and four weeks until, when fully fed, they drop to the ground.

Larvae burrow a few centimetres in to the soil and spin a cocoon which is buried further by subsequent cultivations. In the following year larvae may emerge from cocoons, pupate and finally emerge as an adult in late May or early June. However, cocooned larvae can survive in the soil for more than 10 years.

Yellow Wheat Blossom Midge

All life cycle stages are pale yellow in colour. Adults are broadly similar to Orange Wheat Blossom midges, but emerge earlier. The life cycles are also similar but with a few important differences.

Eggs are laid earlier, at around GS 51-55, and will not be laid once the floret has hardened. This timing is usually the day after emergence from the ‘boot’. Each female lays a few batches of around 15 eggs, of which 4-15 survive.

The temperature-dependence of egg hatch in this species is important. The eggs must hatch before pollination occurs in order that flower development can be arrested. The flower then retains its anthers, allowing the larvae to feed. If pollination succeeds the grain develops normally. Persistence of populations is shorter than for Orange Wheat Blossom midge as survival in the soil is only up to 3 years.

Conditions Favouring Population Build-up

Optimal conditions are required by Wheat Blossom midges to permit egg laying and development. This makes predictions of when adults will attack very difficult to predict. However, once a large population has been established, generally it will be maintained for 2-3 years. The conditions that favour build-up are:

Winter At least 70 days with soil temperature less than 10˚C.

May Soil temperature rising above 13˚C, with sufficient rainfall to wet the top 10 mm of soil.

June Rainfall/moist soil.
Air temperature > 15˚C during the day.
Wind speed < 11 km/h at dusk.
Ear emergence, but before flowering.

NOTE This need only be for **one** night.

Risk Assessment

The conditions outlined above will provide at least some indication of a possible risk. These, along with the factors listed below will determine the risk:

- Damaged grain found at previous harvest. The higher the proportion of damaged grain, the greater the number of larvae carried over in the soil.
- Soil sampling. Cocoons and larvae can be identified and counted in soil samples to assess the potential population.

Number of Cocoons and Larvae/kg Soil	Number/Ha	Risk/Action
<11	<6 million	No further action
11-40	22 million	Damage likely if conditions favourable for adult midge emergence
>40	>22 million	Damage likely unless conditions very unfavourable for adult midge emergence

- Seed or milling wheat is more susceptible to economic damage than feed wheat.
- Variety. Some winter wheat varieties are confirmed as having genetic resistance to Orange Wheat Blossom midge. Such varieties will not need an insecticide treatment to protect them. Check with your seed supplier for the resistance status of each variety drilled. Varietal susceptibility can also vary in some years as a consequence of the timing of ear emergence.

Risk Assessment Chart for Orange Wheat Blossom Midge

This identifies those fields at most risk, and these are the ones on which to focus most attention. Be careful not to assume that a high risk means there will be a problem or that a low risk means no risk.

Category		Risk
Continuous cereals		***
Second year wheat		***
First wheat		**
History of problem on farm?	YES	***
	NO	*
Were effective control measures applied?	YES	*
	NO	***
Proportion of farm in wheat	> 50%	***
	25-50%	**
	< 25%	*

Economic Risk		Risk
Intended wheat market for this crop?	Seed	***
	Milling	***
	Feed	*
	Total:	

Risk:

12-15 *	Damage likely unless conditions very unfavourable for midge emergence
8-11 *	Damage likely if conditions favourable for midge emergence
< 8 *	No further action

Control

Appropriate Product

To control Wheat Blossom midge an insecticide must have the following characteristics:

- High knockdown kill of adults.
- Persistence of 7-10 days to control further flights of adults.
- Persistence and vapour action to control larvae emerging from eggs laid by the first flight of adults.

Dursban* WG (75% w/w chlorpyrifos) displays all these characteristics. Independent trials consistently prove that chlorpyrifos is the best treatment.

What Else Can Be Used?

Chlorpyrifos is the only active ingredient with approval for use to control Wheat Blossom midge.

- Standard systemic aphicides (e.g. dimethoate) will give some control of adults but have no effect on larvae. Since adults do not feed, control relies upon contact action, which is effective for only 2-3 days.
- Pirimicarb is ineffective.
- Pyrethroids will control adults, but persistence is only approximately 2 days. This is insufficient to give control over the whole of the flight period. Pyrethroids do not control larvae.
- No product yet exists that will control larvae once they have entered the floret.

Benefits of Dursban WG

- Gives effective and persistent control of both adults **and** larvae as they hatch from eggs.
- **Dursban WG** is backed by the Pestwatch monitoring and prediction scheme to enable risks to be assessed and control measures timed correctly.
- Dow AgroSciences issue safe spray guidelines to minimise environmental impact.
- **Dursban WG** is solvent-free which improves crop safety.

Summary of Recommendations

- Fields at risk should be examined daily at dusk during ear emergence.
- Where the numbers of adult midges found are at or above the threshold, **Dursban WG** should be applied within 24 hours.
- Water volume should be maintained to ensure good coverage and contact with the pest.

Rate of Use

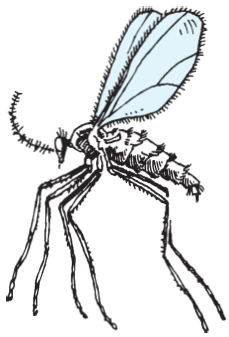
- Apply 0.6 kg of **Dursban WG** in 200 to 1000 litres of water per hectare.

Timing

- Between ear emergence and the start of flowering.

Note

- Once the crop has reached the flowering stage it is too late.
- Care should be taken to avoid spraying conservation headlands.



Summary

- Normally a sporadic pest, but can be devastating when it does occur.
- The main wheat growing areas of the country are at risk.
- Damage caused will affect yield, quality and milling capability.
- No insecticide will kill larvae once they have entered the floret.

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ALWAYS READ THE LABEL. USE PESTICIDES SAFELY.

Dursban WG contains chlorpyrifos.