

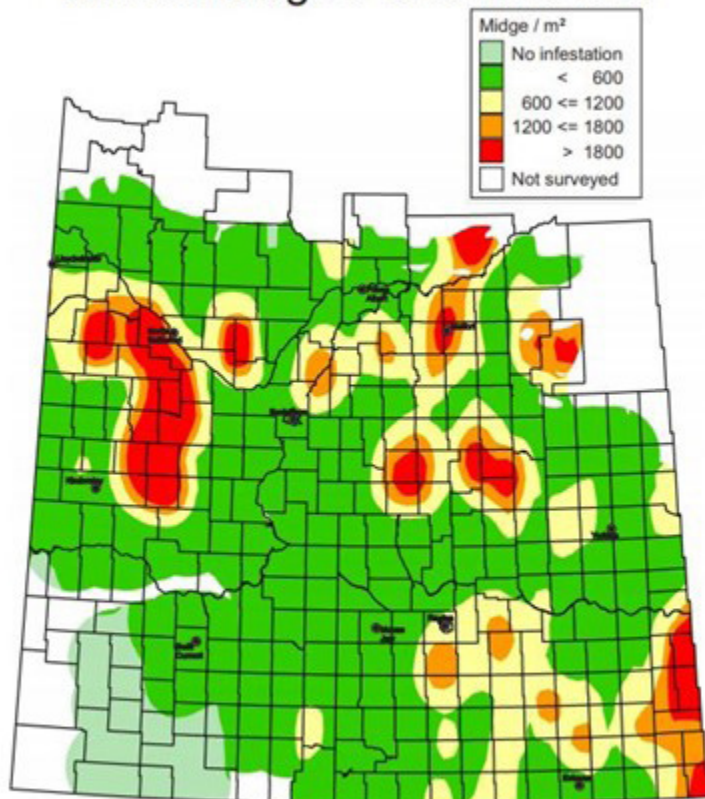


# WHEAT WATCH

## Wheat Midge

Wheat midge (*Sitodiplosis mosellana*) can cause significant damage to wheat yields and lower grade. Midge populations can remain dormant for many years, but when conditions are favourable, the population increases quickly, and significant damage can occur.

### Wheat Midge Forecast 2021



The 2021 Wheat Midge Forecast shows an increase of areas with higher-than-normal midge populations in the coming season. Areas with higher forecasted wheat midge populations generally correlate with areas that received adequate rainfall last May, which triggered a larger midge population to emerge and develop on wheat.

**Twenty-five mm of rain through May will initiate pupation, and trigger emergence of wheat midge.** If conditions are not met, then midge will not emerge and overwintering cocoons can remain dormant in soil for many years.

You can find the link to the full map here: <https://saskwheat.ca/wheat-midge-resources>

**The Wheat Midge Forecast Map** is based on the number of viable wheat midge from the previous fall. When the midge counts are conducted, any wheat midge that has been

parasitized is considered not viable, and is not included in the counts. In Saskatchewan, parasitism in wheat midge occurs from a species of beneficial wasp, *Macroglanes penetrans*. Parasitism reduces an average of 30% of the overwintering wheat midge. This forecast indicates that if ideal emergence conditions are met in the spring, wheat midge could be a significant issue in many areas across the province.





## Thresholds

The economic threshold for spraying insecticide is determined with a visual count. There are two thresholds:

- Preserving Yield: 1 adult wheat midge/5 wheat heads (equates to ~15% yield loss)
- Maintaining optimum grade: 1 adult wheat midge/10 wheat heads

Thresholds are for midge susceptible wheat varieties; there are no thresholds for midge tolerant varieties.

## Scouting



Figure 1. Adult female midge. Source: Dr. Tyler Wist



Figure 2. Adult female midge. Source: Dr. Tyler Wist

*When:* scout during calm evenings, around 8:30pm, when the weather is above 15 °C, and wind is less than 10km/hr. This is when female wheat midge are most active in the upper canopy, laying eggs in newly emerging wheat heads. During the day wheat midge stay in the crop canopy, where it is more humid.

*Stage:* Wheat is susceptible to damage from the start of head emergence to mid-anthesis. Adult wheat midge emerge in late June to early July. In the later stages flowering wheat is no longer susceptible to damage from midge.

**Pheromone traps** can be a useful tool to detect emergence of the pest. The prevalence of wheat midge in the trap will signal that the adult wheat midge are emerging, and allow for risk assessment if the crop is in a vulnerable stage. There is no direct correlation between number of wheat midge in a pheromone trap and economic threshold, however it is a useful tool to confirm emergence. Pheromone traps should be placed on the field edge of wheat stubble, as this is where the adult wheat midge will emerge from.

The adult wheat midge lives for 5 days, but emergence can be staggered, so it is important to watch for tiller staging, and staggered midge emergence.





## Control

### Variety Selection

Midge tolerant wheat is currently the best method of management for this pest. Midge tolerant varieties can be easily identified by the VB (varietal blend) after the variety name. VB means that there is a blend of 90% of a midge tolerant variety and 10% midge susceptible wheat variety (refuge), which helps to prevent the build-up of resistance. The Sm1 gene provides tolerance to wheat midge by increasing ferulic acid levels to prevent feeding of the first instar, which then cease to feed, and eventually starve to death. Midge tolerant varieties are a great tool to manage wheat midge populations, without sacrificing yield.

You can read more about midge tolerant wheat and stewardship here: <https://midgetolerantwheat.ca/>

### Cultural Control

A diverse crop rotation will help reduce the buildup of large wheat midge populations. Rotating from wheat to non-susceptible crops such as oilseeds, pulses, and other cereals, will help prevent the buildup of wheat midge populations. Barley, oats, and canary seed are cereal options that will have little to no damage from midge.

### Beneficials

*Macroglenes penetrans* is a parasitic wasp that can parasitize both egg and larval stages of wheat midge. They can reduce the following year's wheat midge population significantly (an average of 30%).

The small wasps emerge several days after the adult wheat midge. The wasps lay its eggs inside the midge eggs. Both eggs hatch around the same time and a tiny wasp will grow inside the midge larva. A wheat midge that has been parasitized will still cause damage in that season, but in the following spring the parasite grows rapidly and destroys the midge larva. Benefits of the parasitic wasp will only be seen in the following year, so other control methods may be needed if a field is at the economic threshold.





## Chemical

Daily scouting in late June to early July is essential for visual counts of midge populations. Adult wheat midge only live for 5 days, however emergence can be staggered, so vigilant scouting is needed to monitor populations. The economical threshold is 1 midge for every 5 wheat heads and this equates to about 15% yield loss.

- In Canada, Dimethoate (Cygon<sup>®</sup>, Lagon<sup>®</sup>) is registered for wheat midge control in wheat.
  - o Applications should be made in the evening when midge are most active.
  - o Maximum of 2 applications of dimethoate per season
  
- Chlorpyrifos (ex. Lorsban<sup>®</sup> 4E, Nufos<sup>®</sup>) has been deregistered in Canada, and will no longer be available for midge control.

It is important to take caution when applying insecticides, as they also cause significant damage to beneficial insect populations. If the crop is entering late flowering, it is no longer susceptible to midge damage; an insecticide application would damage the beneficial insects and would not provide control to the eggs inside the wheat head.

For more information on registered insecticides see the 2021 Guide to Crop Protection:

<https://www.saskatchewan.ca/business/agriculture-natural-resources-and-industry/agribusiness-farmers-and-ranchers/crops-and-irrigation/crop-guides-and-publications/guide-to-crop-protection>

