Canola Flower Midge Monitoring Protocol
(*Contarinia brassicola* Sinclair)

Protocol and information adapted from Vankosky *et al.* (2022)

Use this protocol to estimate the population density, based on galled flowers, of canola flower midge in canola and mustard fields.

General Protocol:

1. Monitor population densities of canola flower midge in the late flowering stage (approximately the third week of July), when pods near the bottom of the raceme are starting to ripen.
2. At each field to be sampled:
   a. Select the first sampling location in the field. Selecting sampling locations along the field edge will be easiest and do the least damage to the stand of canola plants in the field.
   b. Randomly select 10 racemes at the first sampling location. Count and record the number of galled flowers (Figure 1) on the 10 racemes at that location in Table 1.
   c. Move to a second sampling location in the field, at least 20 m from the first location and repeat step 2b.
   d. Repeat step 2c until 10 locations in the field (or along the field edge) have been sampled and the datasheet for that field is completed (Table 1).

For monitoring population densities based on damage to canola flowers, only a datasheet is needed. A counter may be helpful if many damaged flowers are present. Counting the total number of damaged flowers is sufficient, but each galled flower can be carefully pulled open to determine if larvae are present inside the galled flowers or not.

Table 1. Sample datasheet for recording data from one canola field (full datasheet for printing on last page).

Field location (GPS coordinates):					
Date:		**RM:**	**Surveyor:**		
Canola Stage:			**Previous crop:**		
Weather conditions:					
Location	#with symptoms	#with larvae	**Location**	#with symptoms	#with larvae
1			**6**		
2			**7**		
3			**8**		
4			**9**		
5			**10**		

Meghan Vankosky and Boyd Mori, 2024

Figure 1. Galled canola flowers on a canola raceme as observed in mid- to late July. Picture by Boyd Mori, University of Alberta.

Canola flower midge: biology and impact on host plants

The canola flower midge (*Contarinia brassicola*) is a small bodied midge (approximately 2mm long) that lays eggs on developing canola flowers, resulting in flower galls that fail to produce pods or harvestable canola seeds (Figure 1). In a survey of the distribution and relative abundance of canola flower midge in western Canada, conducted in 2017, 2018, and 2019, researchers found that canola flower midge generally damaged to low numbers of canola flowers (<2 damaged flowers per raceme) in the majority of fields where canola flower midge was present. However, some fields with higher numbers of damaged flowers per raceme were found, especially in northeast Saskatchewan. Annual monitoring of some fields across western Canada each year will help researchers monitor the situation and assess the potential impact of canola flower midge on canola yields.

Adult canola flower midge begin emerging from overwintering sites in the soil in mid-June. Low numbers of adults were found in emergence cages throughout the growing season, suggesting continued emergence of adult midge throughout the season. In 2017, 2018, and 2019, peaks of adult emergence were observed in early July and again in early August, suggesting that at least two generations of adults emerge each year. After adults emerge, they mate, and females lay eggs on developing canola flowers and multiple larvae develop together inside the flowers, resulting in galled flowers (Figure 2). Female midge may also take advantage of damage caused by hail or other insects to lay eggs into other plant structures, like canola

pods (Figure 3). Multiple larvae develop together inside each galled flower. Once the larvae are mature, they drop to the soil, where they pupate in cocoons. The canola flower midge overwinters in the soil, likely in the pupal stage or inside a larval cocoon, similar to wheat midge.

Figure 2. A galled canola flower with larvae developing inside. Picture by Jon Williams, AAFC-Saskatoon.

Figure 3. A canola pod with canola flower midge larvae inside. Picture by Jonathon Williams, AAFC-Saskatoon.

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