

## CARP Project 2017.12

**Title: Assessing the impact of *Contarinia* sp. on canola production across the Prairies**

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### Research Abstract

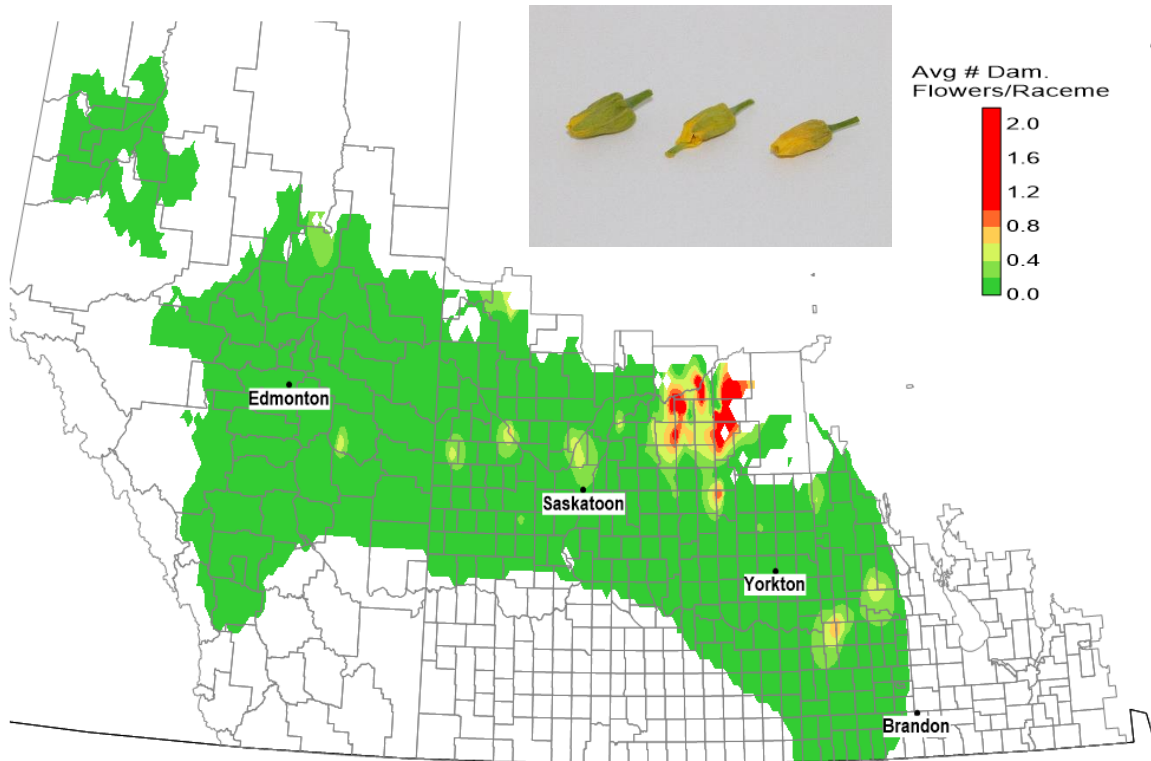
In 2016, a new species of midge, *Contarinia brassicola* Sinclair (Diptera: Cecidomyiidae), that develops on canola (*Brassica napus* L., Brassicaceae) was discovered in Saskatchewan and Alberta (Mori et al. 2019). At the time, nothing was known about its biology or potential impact on canola production. The discovery of *C. brassicola* also raised questions about the presence of swede midge (*Contarinia nasturtii* (Kieffer), Diptera: Cecidomyiidae) on the Prairies. This project was initiated to: (1) to determine the distribution of *C. brassicola* and swede midge, (2) to describe the life history of *C. brassicola* and estimate its potential impact on canola yield, (3) to use population genetics to determine the source of *Contarinia* sp. midges on the Prairies, and (4) to identify parasitoids of *Contarinia* sp. for biocontrol.

A survey of randomly selected canola fields was conducted in late July of 2017, 2018, and 2019. To establish the range of *C. brassicola* across the prairies, 10 canola racemes at 10 locations in each field were examined for symptoms of *C. brassicola* infestation (*i.e.*, galled flowers, Figure 1) (Objective 1). All galled flowers were collected and returned to the laboratory. A portion of the flowers were used to collect larvae for population genetics analyses (Objective 3) and larvae in the remaining flowers were reared to determine if they were parasitized (Objective 4). Plants were examined for symptoms of swede midge damage and a network of swede midge pheromone traps was deployed across the prairies in all three years of the project (Objective 1). Plant samples were collected during the growing season and examined for *C. brassicola* eggs and larvae and emergence cages were used to determine the timing of adult midge emergence (Objective 2).

*Contarinia brassicola* is widely distributed across the Prairies (Figure 1), including the Peace River Region of Alberta. Its distribution appears to be correlated to the dark grey, black, and dark brown soil zones. In all three years of the project, the population density of *C. brassicola* was relatively low, and unlikely to have a significant impact on canola yield. However, at least two fields in 2019 had damage that likely resulted in economic loss of yield. Eggs are laid on or very close to canola flower buds. Larvae were only detected inside canola flowers. Based on emergence patterns observed in cages in all three years of the study, we believe that there are at least two generations of *C. brassicola* per year. This species may be able to prolong its diapause and pupal development in the soil, similar to swede midge (Hallett *et al.* 2009). Additional research is required to address this hypothesis. There are at least two species of parasitoid that attack *C. brassicola* on the prairies, however, parasitism rates were low and variable across the host's range. Population genetics analyses revealed high genetic diversity across the known range of *C. brassicola*, suggesting that this may be a species native to the Prairies.

Overall, this project contributed to our knowledge of a new and potentially important pest of canola in western Canada. It also confirmed that there are presently no established populations of swede midge on the Prairies.

Canola midge survey - 2017-2019  
n=703 survey locations



**Figure 1.** The distribution of *Contarinia brassicola* (canola flower midge) across western Canada, based on surveys conducted in 2017, 2018, and 2019. Inset: canola flowers infested by midge larvae. Map produced by R.M. Weiss (AAFC); image by J. Williams.

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### References

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