

Swede Midge: *Contarinia nasturtii*

Monitoring Protocol

Host Plants: Plants belong to the family Brassicaceae such as canola, mustard, cabbage, cauliflower and Brassica weeds.

Identification, Life Cycle and Damage:

Adults: Adults are small (1.5-2 mm in size), light brown flies. They have long filiform antennae (Figure 1). Male antennae have 12 flagellomeres; each is divided into two separate nodes surrounded by a looped sensillum. Female antennal segments are cylindrical. Wing venation is reduced. Cross veins are absent, radial vein is straight or nearly so and cubital fork is present. **Adults appear in the spring from pupae which have spent the winter in the soil.** Eggs are laid in clusters of about 2-50 on the growing point of the plant.

Eggs: Eggs are very small (0.3 mm), transparent in color when first laid, but change to creamy white color as they mature (Figure 2).



Figure 1: Adults- 1-5 days

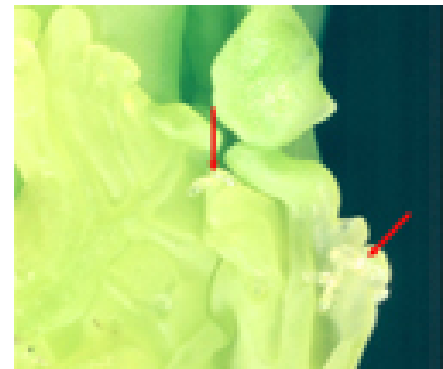


Figure 2: Eggs- 3 days



Figure 3: Larva- 14 days



Figure 4: Pupa-14 days

Larvae: Small maggots can be found feeding in groups near the growing points of the plant. Initially the larva is 0.3 mm in length and transparent. At maturity, it is 3-4 mm in length and lemon yellow in color (Figure 3). Larva spins a cocoon and pupate in the ground

Pupae: Pupation takes place approximately 2" deep in soil near the host plant. Prepupae can go into a state of diapause, overwintering in silken ovoid cocoons in the soil and pupating in the following spring (Figure 4). However, some pupae may overwinter a second season before becoming adults. Larvae and pupae require moist environments to mature. In Ontario, 3-4 overlapping generations have been reported.

Monitoring

Site Selection:

Swede midge adults are not strong fliers and prefer areas of low wind movement, resulting in **more damage in sheltered areas, along field edges and buildings.**

Because swede midge may be moved in soil, care must be taken when working within a block/field. To prevent the inadvertent movement of swede midge, footwear must be cleaned thoroughly before moving to a new address. Disposable "booties" or rubber boots are recommended.

Pheromone Traps for Adult Monitoring:

Timing:

The first emergence of adults in the province of Ontario occurs in mid May. Traps should be set by **May 15 and retrieved just prior to crop harvest.**

Two (2) traps will be placed at each field. **Place traps in locations that gives you best coverage, incorporates microhabitats such as those adjacent to shelterbelts and areas of higher humidity,** and has good accessibility. Label all traps using a "wax pencil" and / or lead pencil. Do not use a marker or any other writing device that will emit a volatile chemical. These chemicals may interfere with the pheromone.

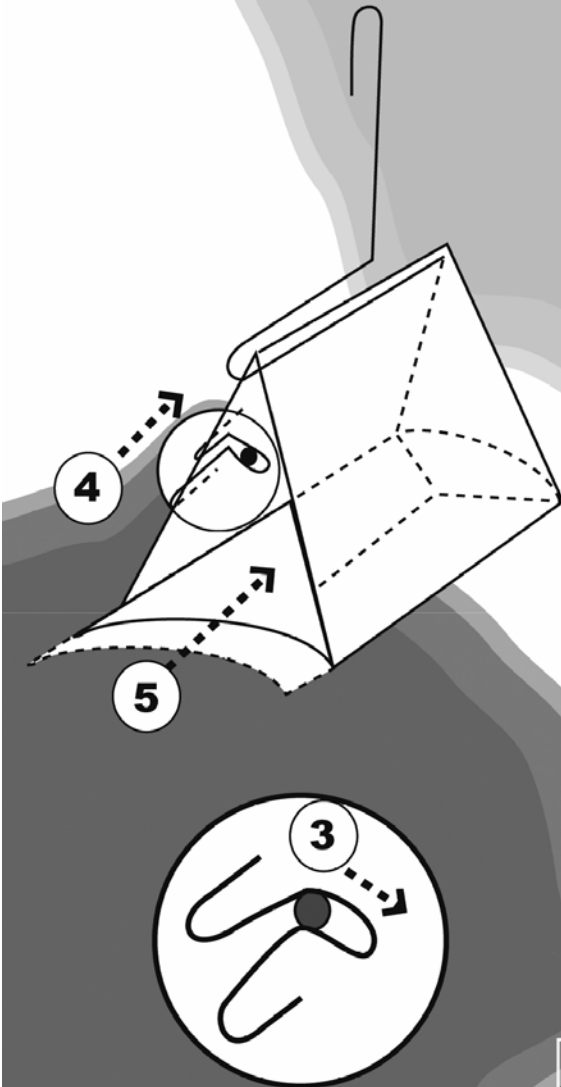
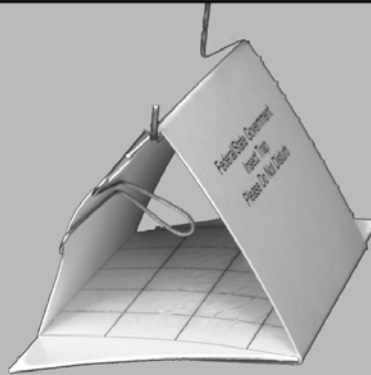
Trap: "Jackson Trap" with removable sticky liners and lures containing swede midge sex pheromone. Trap assembly instructions are given below.

All lures should be stored in sealed containers at temperatures below 0°C. Store only one type of lure per container. Wear disposable gloves when handling lures and use a new pair of gloves between handling lures of different types. This will avoid cross-contamination of the pheromones and possible interference with their attractiveness.

JACKSON TRAP ASSEMBLY INSTRUCTIONS

Components:

- 1 Jackson trap
- Sticky insert (packed in pairs)
- 1 wire hanger
- 1 dispenser holder



How to assemble:

- 1 Fold open Jackson trap to form a tent shape.
- 2 Remove lure from foil pack (Avoid touching dispenser surface with fingers.).
- 3 Insert plastic or rubber dispenser only into the middle notch of the dispenser holder.
- 4 Slide dispenser holder onto side of trap so that the lure is on the inside and the two legs are on the outside.
- 5 Peel apart face-to-face sticky liners and slide one insert into trap.
- 6 Attach metal hanger as illustrated and hang trap in desired location.
- 7 Replace inserts as required.

NOTE TO USER:

To prolong storage life, refrigerate or freeze unused dispensers in their foil packets.
To avoid contamination, use tweezers or rubber gloves when handling dispensers.



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Trap

Trap Placement:

The stake or rod height should be above the predicted final height of the crop and should be flagged to allow easy detection in the field for the inspector and grower. When placed in a field, the **trap should always be within the crop canopy**, therefore, as the crop height increases during the growing period, adjust the trap height accordingly during each servicing. The traps must be attached to the stake or rod in such a manner to keep it from twisting or moving. The trap placed within the field must be orientated in such a way so that the pheromone plume is dispersed down the row. This will maximize its effectiveness. **Note that swede midge adults prefer to fly within the canopy of the crop or just above it.**

Due to the small size of the trap and the dusty/dirty conditions of the fields the traps have to be checked every week during the growing season. Sticky liners covered in field debris make it almost impossible to see the very tiny swede midge. During the weekly visit to the traps remove and replace the sticky liner. **Replace the lure after 28 days.** Replace damaged or missing traps as necessary. Make sure you replace traps when they become compromised or when badly weathered. Ensure the entrance to the trap remains clear and open.

Instructions for Shipping Sticky Inserts:

Ship sticky inserts every 28 days (when you change the lures) for identification of the swede midge. Fold each trap carefully with the sticky surface inside; hold it with a rubber band (Figure 5). Place them in a box as shown in Figure 6 and ship to Dr. Julie Soroka, AAFC-AAC (address is in the data recording sheet).



Figure 5: Folding



Figure 6: Packing

Checking the Crop Damage:

Damage caused by feeding of swede midge larvae results in changes in the physiology of the plant. The growing tip may become distorted and produce several growing tips or none at all, young leaves may become swollen, crinkled or crumpled and brown scarring caused by larval feeding may be seen on the leaf petioles and stems. **Young plants that show unusual growth habits should be examined carefully for damage and larvae. Larvae can be seen with a hand lens.**