

## 35. Blueberry Maggot

**Latin name:** *Rhagoletis mendax* Curran

**French name:** La mouche du bleuet

The blueberry maggot is a menace to Québec's wild blueberry industry. Its larvae damage the fruit, rendering them unsalable. The circulation of blueberry plants and fresh fruit is regulated under the *Plant Protection Act* to prevent propagation of the maggot from infested areas to uninfested areas. When an infestation is detected, insecticide must be applied. Across Canada, matters concerning the blueberry maggot fall under the authority of the Canadian Food Inspection Agency (CFIA). A complete list of regulated sites and municipalities is available from the CFIA online (see below).



Figure 1. Blueberry maggot in the adult stage

Source: Kelvin Lynch, NBDAAF

### DESCRIPTION

In the adult stage, the blueberry maggot is about 4.5 mm long, with black markings on its wings (Figure 1). It is easily confused with both the apple maggot *Rhagoletis pomonella* (Walsh) and the black cherry fruit fly *Rhagoletis fausta* (O.S.); distinguishing them with certainty requires identification by a specialist (Figure 2).

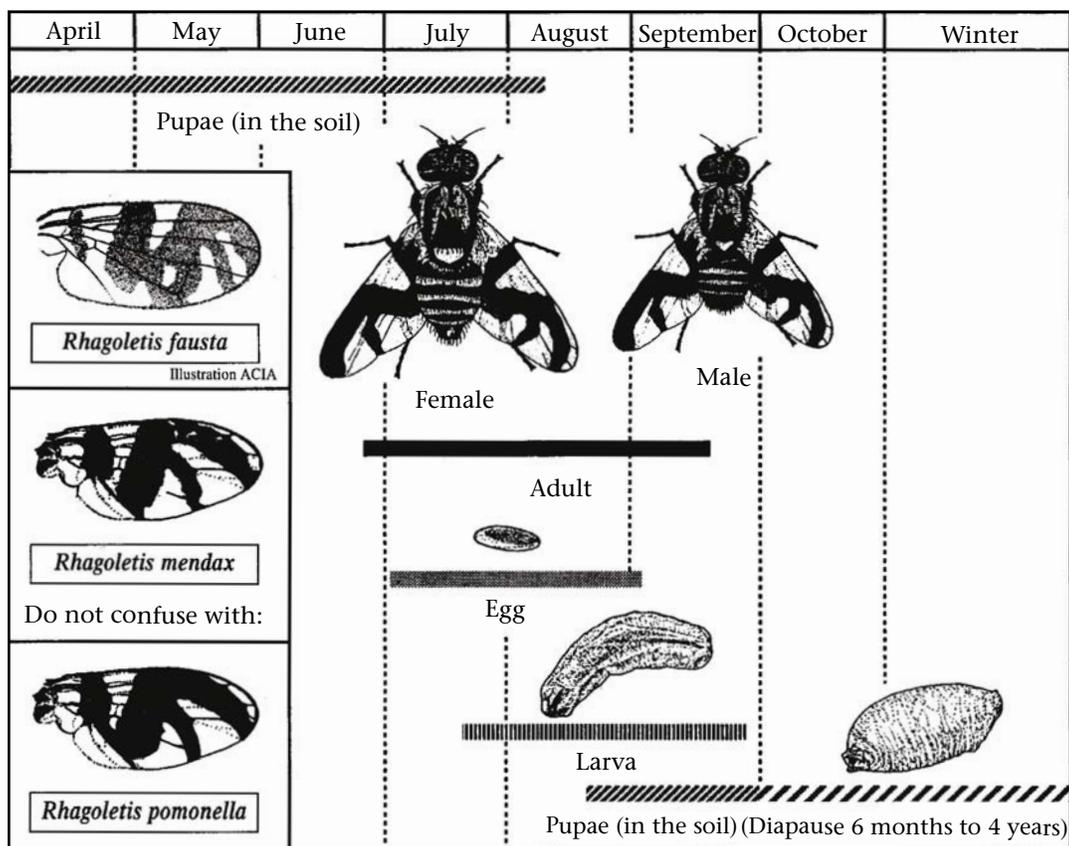


Figure 2. Blueberry maggot cycle and wing pattern

From Garneau et al., 2006

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The wings of blueberry maggots display a striking, roughly F-shaped pattern. Identification is validated by four criteria: 1) the size of the sclerosed part of the ovipositor (aculeus) on the female; 2) the ratio between the width of the median and subapical bands on the wings; 3) the colour of the posterior face of the anterior femurs, which are completely yellow only on the blueberry maggot; and 4) the host plant – other *Rhagoletis* species do not infest blueberries.

The eggs of the blueberry maggot are white and minuscule. The whitish larvae grow up to 8 mm in length and are pointed at one end, blunt at the other (Figure 3).

The pupae are oval, yellowish-brown and about 6 mm long (Figure 4).

### LIFE CYCLE

The life cycle of the blueberry maggot is as follows:

- produces one generation per year and passes the winter in the pupal stage;
- the first adults emerge from the end of June to mid-July, depending on locality;
- as the adults complete their sexual maturation they feed on nectar, honeydew and organic debris in the vegetation bordering the blueberry field;
- 7 to 10 days after emerging, when the first blueberries have ripened, females start laying eggs in the fruit, usually one egg per fruit. Over a period of 2 to 3 weeks, each female lays from 25 to 100 eggs;
- hatching occurs 3 to 10 days after the eggs were laid. The larvae develop by boring tunnels inside the fruit over a period of 2 to 3 weeks;
- at maturity, the larvae leave the fruits and drop to the ground;
- the larvae burrow into the soil to a depth of 5 cm and transform into pupae;
- most pupae emerge as adults the following year. From 5 to 20% of pupae do not emerge until the second year. About 1% only emerge after 3 or 4 years.



Figure 3. Blueberry maggot in the larval stage

Source: Kelvin Lynch, NBDAAF



Figure 4. Blueberry maggot in the pupal stage

Source: Pierre Lemoyne, AAFC

## HOSTS

Blueberry maggots attack other types of berries found on and around blueberry fields, and may increase infestation levels:

- *Vaccinium corymbosum*, highbush blueberry; *V. angustifolium* and *V. myrtilloides*, wild blueberries; *V. oxycoccos*, cranberry; *V. vitis-idea*, mountain cranberry;
- *Gaylussacia baccata*, black huckleberry; *Gaultheria procumbens*, wintergreen.

## Symptoms

The fruits lose their firmness and become soft (Figure 5). Premature fruit drop is observed.



Figure 5. Fruit displaying symptoms of blueberry maggot  
Source: Pierre Lemoyne, AAFC

## MONITORING

### Adults

Glue traps of the Pherocon AM™ type can be used. Traps are also available that include a protein-based bait. The sticky side of the traps is yellow, which is attractive to flies. Starting in mid-June, two traps per hectare are set out where blueberries are present, ideally out of the wind. They should be installed about 9 m in from the perimeter of the blueberry field. Each trap is suspended from a metal stake, with the sticky side facing down, 10 to 15 cm over the blueberry plants. The traps must be checked at least twice a week until the end of harvest, and any that have deteriorated or become full of debris and insects must be changed. Any suspicious specimen found should be identified by an expert to make sure.

### Larvae

To check for the presence of larvae, crush some fresh blueberries and stir into a sweet solution obtained by dissolving 3.5 kg of brown sugar in 20 L of water. They will float to the surface if present. For monitoring to be worthy of confidence, two samples of 1 L of fruit per hectare should be gathered and examined, both at the start of harvest and halfway through.

Anyone who discovers or suspects the presence of blueberry maggot in a municipality that is not already regulated should inform the Canadian Food Inspection Agency.

## PREVENTION

The recommended methods of prevention are the following:

- be diligent about weed control in the blueberry field, since weeds can provide shelter for adult maggots;
- make sure the harvest is thorough, leaving as little fruit as possible on the ground;
- use only new or well-cleaned containers;
- do not compost crop wastes;
- if bee hives are used, make sure that hives, pallets, trucks and other delivery equipment are free of any traces of soil or plant debris. They could contain pupae or larvae from the last site they were at.

## CONTROL

Insecticides available for blueberry maggot control are presented in Leaflet 19 of this series, *Pesticides Used in Wild Blueberry Production*.

### Detection

Producers in non-regulated municipalities can participate in a detection program run by MAPAQ agricultural consultants. The program offers CFIA-recognized screening for blueberry maggots, and direct transfer to the CFIA's Certification Program upon discovery of maggots. For more information about the program contact your agricultural consultant.

## COMPLEMENTARY LEAFLET

### 15. Integrated Pest Management in Wild Blueberry Production

## TEXT ADAPTED FROM

Garneau, A., M. Roy and J.-P. Légaré. 2006. *Mouche du bleuët*. MAPAQ. Laboratoire de diagnostic en phytoprotection. Québec. 4 pp. [Online]. <http://www.agrireseau.qc.ca/lab/documents/Rhagoletis%20mendax.pdf> (Page consulted on March 14, 2011).

## USEFUL REFERENCES

Canadian Food Inspection Agency. *D-02-04: Phytosanitary Requirements for the Importation From the Continental United States and for Domestic Movement of Commodities Regulated for Blueberry Maggot*. [Online]. [www.inspection.gc.ca/english/plaveg/protect/dir/d-02-04e.shtml](http://www.inspection.gc.ca/english/plaveg/protect/dir/d-02-04e.shtml) (Page consulted on September 15, 2010).

Canadian Food Inspection Agency. *Blueberry Maggot Regulated Areas in Canada*. [Online]. [www.inspection.gc.ca/english/plaveg/protect/dir/blueberrye.shtml](http://www.inspection.gc.ca/english/plaveg/protect/dir/blueberrye.shtml) (Page consulted on September 15, 2010).

Maud, C., Estabrooks, E. and G. Chiasson. 1996. *Blueberry Maggot*. Fact Sheet C.2.3.0. New Brunswick Department of Agriculture, Aquaculture and Fisheries. [Online]. <http://www.gnb.ca/0171/10/0171100017-e.asp> (Page consulted on March 14, 2011).

MAPAQ. *Mouche du bleuët*. [Online]. [www.mapaq.gouv.qc.ca/Fr/Productions/Protectiondescultures/organismesnuisibles/insectes/mouchebleuet/](http://www.mapaq.gouv.qc.ca/Fr/Productions/Protectiondescultures/organismesnuisibles/insectes/mouchebleuet/) (Page consulted on September 15, 2010).

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