Improved screening of apple maggot *Rhagoletis pomonella* (Walsh) using the red sphere trap in apple orchards in Québec, Canada.

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Introduction

The apple maggot (*Rhagoletis pomonella* (Walsh)) is a significant pest of apple orchards in North America. For effective control, residual insecticide treatments are used in commercial apple orchards when catch thresholds are reached. In addition to the harmful effects on human health, summer insecticidal treatments against this pest can negatively affect the auxiliary fauna and natural pollinators found in apple orchards. The hotter summers that we have experienced in recent decades have increased pest pressure. Thus, we observed more insect damage, and this early in the growing season. The recommended scouting method uses sticky red spheres to attract the female when she’s ready to lay. In the last two decades, as several new apple varieties (eg.: Honeycrisp, Prime Gold) have been planted in Quebec's orchards, the effectiveness of the trap has never been evaluated with these varieties. Moreover, we noted that this scouting technique was less efficient in the last five years.

Objective

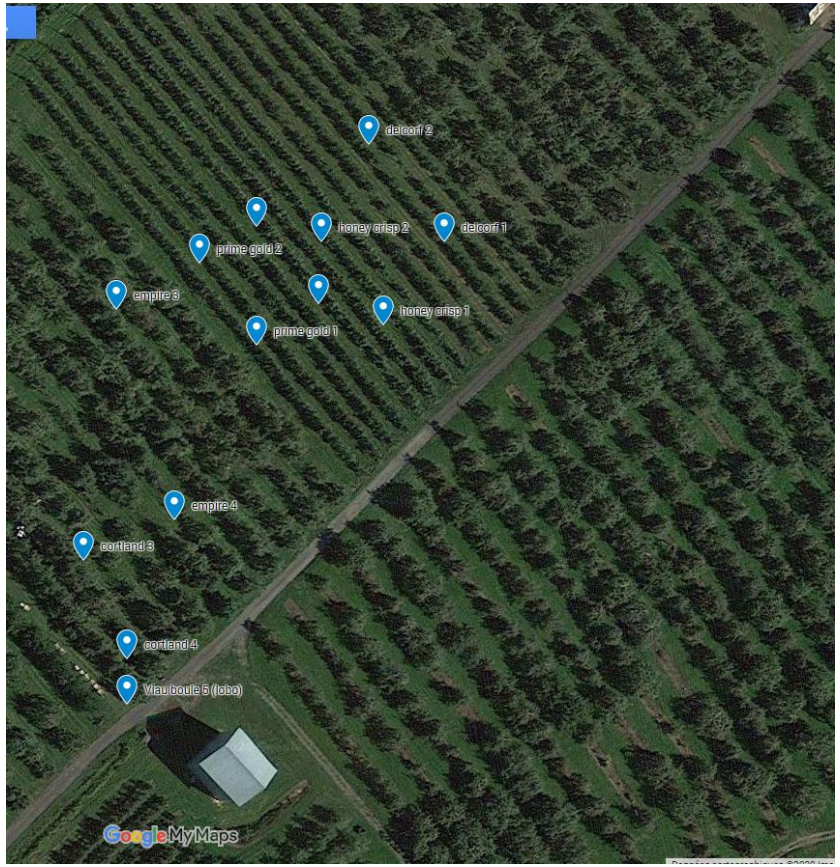
Increase the efficiency of red sticky sphere traps in detecting the apple maggot (*Rhagoletis pomonella* (Walsh)) in apple orchards with new apple varieties. This project will also identify if other stimuli can affect the current attractive power of red sphere traps.

Methods

- The trials were carried out in 5 orchards with a history of apple maggot infestations on six apple varieties

Apple variety	Fruit colour	Type of variety
Cortland	Red	Traditionnal
Delcorf	Yellow	New
Empire	Red	Traditionnal
Honey crisp	Orange	New
Primegold	Yellow	New
Spartan	Red	Traditionnal

- Two growing seasons: 2019 and 2020
- Sticky red spheres were placed at the border and in the center of the orchard (4 replicates/variety/orchard)
- Parameters (from June to September):
  - Apple maggot individuals on red spheres
  - Apple maggot damage on apples
  - Apple fruit colour
  - Yield and fruit damage at harvest



Results

- Apple variety attractiveness in 2020 was comparable to 2019.
- The most attractive varieties were Spartan (2020), Honeycrisp, Primegold and Delcorf. The traditional red varieties Cortland and Empire captured less apple maggots (Fig.1, 2).
- Apple maggot catches tended to be slightly higher early in the season in border plots.
- Varieties with yellow and orange fruit capture more apple maggots than varieties with red fruit (Fig. 3).
- At the start of the season, varieties with orange apples were the most attractive, while varieties with yellow apples caught more apple maggots from mid-August onward (Fig. 4).

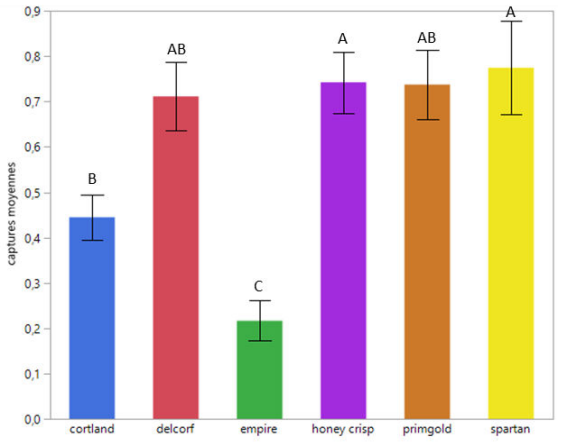


Figure 1: Apple maggot catches according to the varieties of apples.

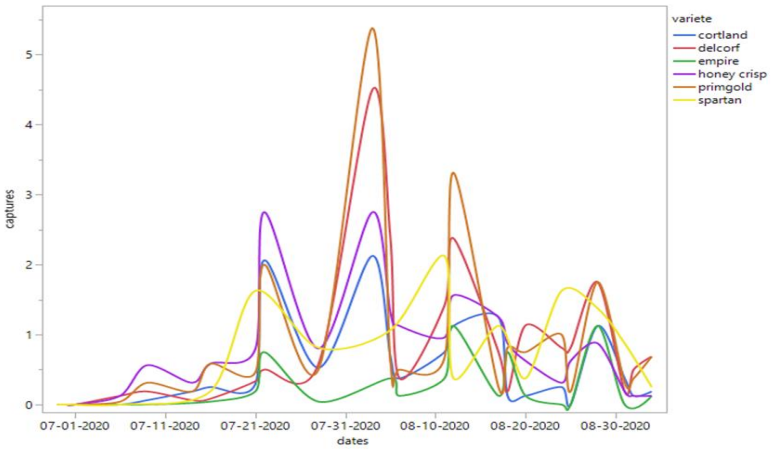


Figure 2: Apple maggot catches throughout the growing season depending on the apple variety.

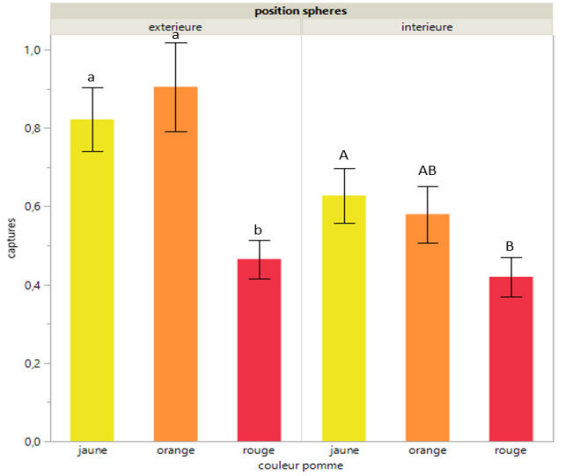


Figure 3: Apple maggot catches according to the color of the fruit.

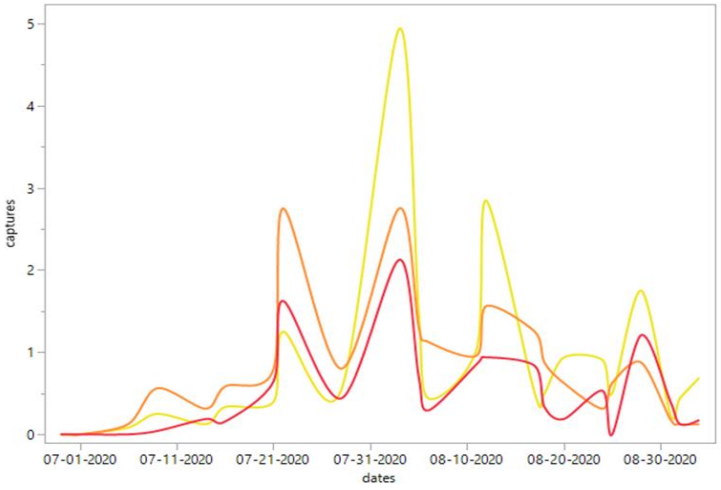
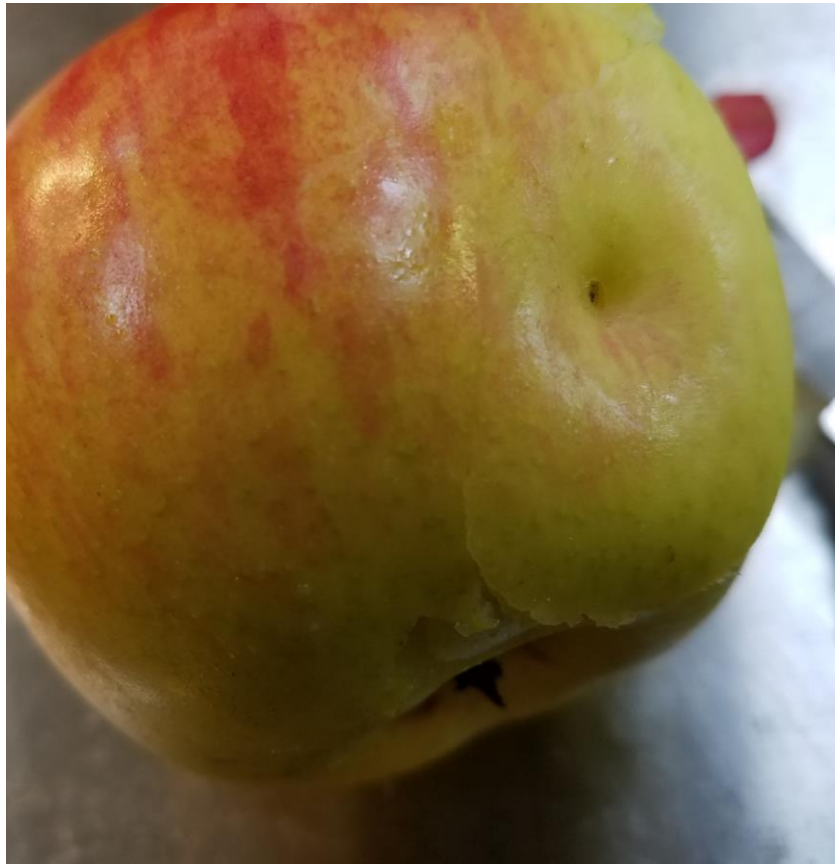


Figure 4: Apple maggot catches throughout the growing season depending on the apple color.

Discussion

- This project will help present a more efficient screening tool to reduce insecticide treatments against this pest.
- Fruit colour affects the attractiveness potential and is dependent on apple variety. Yellow and orange coloured fruit capture more apple maggots than apples with red coloured fruit.
- A better insecticide timing treatment will reduce the number of treatments during a growing season and benefit the conservation of natural enemies and pollinators.
- The use of traps according to apple variety will make it possible to propose a localized treatment strategy that will impact the use of insecticide treatments in apple orchards.



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