Friend or Foe: Blueberry Pollinators as Mummy Berry Vectors

Matthew Grieshop1, Krista Buehrer1, Annemiek Schilder2, Rufus Isaacs1

1 Department of Entomology, Michigan State University, East Lansing, MI 48824, 2 Department of Plant Pathology, Michigan State University, East Lansing, MI 48824

Introduction

- Mummy berry, Monilinia vaccinii-cybsosi, is a significant fungal pathogen of MI highbush blueberries (Fig. 1).
- Primary spores, released by overwintering mummies cause shoot strikes on young blueberry tissue.
- Secondary spores produced by shoot strikes infect flowers, and result in mummy berries.
- Primary spores are thought to be wind vectored, while secondary spores may be vectored by insect pollinators.
- The identity of pollinators most responsible for transmitting secondary spores is unknown.
- Identifying pollinators most likely to vector mummy berry may open new avenues for disease management.

Objective:
- Determine what insects are involved in transferring secondary mummy berry spores to blueberry flowers.

Materials and Methods

- Digital video recorders (DVR) set up at 3 blueberry fields in SE MI during spring 2008.
- Eight cameras per site: 3 cameras on shoot strikes, 3 cameras on flowers, and 2 cameras on healthy leaves.
- Approximately 5,400 hrs of video footage was recorded and reviewed in the laboratory.
- Insects visiting shoot strikes, flowers, or healthy leaves were identified to “morpho” species.

Results

- Mummy berry was present at all 3 sites (Fig. 3).
- Insects interacted with flowers much more frequently than with shoot strikes or leaves (Fig. 4).
- A greater diversity of “morpha” species visited shoot strikes as compared to either flowers or leaves (Fig. 5).
- Bees, wasps, ants, beetles and flies were all observed interacting with flowers and shoot strikes with bees and flies predominating (Figs. 6 and 7).
- Insects other than bees and flies (e.g. ants, beetles) typically did not fly to shoot strikes or flowers so approaches were very infrequent (Fig. 7).
- Bees approached (85%) and contacted (68%) flowers in more of the recorded instances than other insects (Fig. 7).
- Bees approached shoot strikes in more of the recorded instances than other insects (38%), but rarely contacted them (3%) (Fig. 7).
- Flies contacted shoot strikes the most (49%) and contacted flowers in (28%) of recorded incidences (Fig. 7).

Conclusions:
- While bees approach shoot strikes they rarely contact them, thus they may not be important mummy berry vectors.
- Flies are the most likely vectors of mummy berry as they frequently contact shoot strikes and flowers.
- Commercial pollinators are less likely to contribute to mummy berry outbreaks.
- Flies may be providing pollination services for blueberry.

Discussion

- Flies may be providing pollination services for blueberry.

Acknowledgements

We thank Beth Kenyon, Brenda Satterthwaite, and James Tsung for assistance in the field and laboratory. We also thank our grower-cooperators for use of their blueberry fields. Funding provided by Project GREENE