Ecology and management of tomato psyllids:
A research update

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Tomato psyllid, *Bactericera cockerelli*

- Naturalized in California since 1890s
- Generalist herbivore
  - Feeds on 40+ host plant species
  - Prefers Solanaceae: potato, tomato, peppers
Sources of yield loss

- Facilitates sooty molds
- Causes psyllid yellows
- Transmits a bacterial pathogen *Candidatus Liberibacter solanacearum* (Lso)
  - Zebra Chip Disease
Lso is a new pathogen

Zebra Chip Disease described in 1995
Lso described in 2008

Causes yield loss in Texas, Mexico, Washington, Oregon, California, New Zealand
On-going research

Psyllid host selection

Management
  • Chemical control
  • Crop resistance
  • Biological control

Risks from future climate change
Psyllid host selection

On which crop host do psyllids prefer to feed and lay eggs?

Does psyllid preference depend on which host they are most familiar with?
Psyllid host selection

Psyllids prefer tomato plants

Prager et al. (in press) PLoS One
Psyllid host selection

Psyllids prefer the host species they are most familiar with (Prager et al., 2019, PLoS One).

Mean eggs

- Pepper
- Potato
- Tomato

Rearing plant

Prager et al. (in press)
Psyllid host selection

Do psyllids prefer tomato plants infected with Lso?

Does preference depend on psyllid being infected with Lso?
Psyllid host selection

Infected psyllids prefer to feed on uninfected plants.
Psyllid host selection

Why does host selection matter?

Pepper field  Psyllid movement  Tomato field
Psyllid host selection

Why does host selection matter?

Pepper field

Psyllid movement

Tomato field
Psyllid host selection

Future research

Test wild hosts as potential trap crops.

Develop spray thresholds to reduce disease spread.
Psyllid management – chemical control

**IPM Trials in Pepper**

1. Untreated control

2. Low input treatment
   - **Torac 15 EC 21 oz/Ac** 2 sprays
   - **Lannate 2.4 LV 48 oz/AC +**
     - **Pounce 3.2 EC 8 oz/Ac** 2 sprays
   - **Vydate L 48 oz/Ac** 2 sprays

3. Chemical standard
   - **Lannate + Pounce** 6 sprays
Psyllid management – chemical control

Carbamates should be used with care. They can promote psyllid growth.
Psyllid management

Crop resistance

*Mi*-*1.2* gene in tomatoes confers resistance

Future research to quantify resistance and tolerance in tomatoes

Cultural control

Preliminary evidence of late plantings to reduce damage

Wild hosts as sources or sinks?
Psyllid management – biological control

Key predators
Minute pirate bugs (*Orius tristicolor*)
Big-eyed bugs (*Geocoris pallens*)
Lady beetles (*Hippodamia convergens*)
Green lacewings (*Chrysoperla* spp.)

Parasitoids
*Tamarixia triozae*
California is predicted to get hotter and drier

Tomato psyllids recently overwintering in California, Oregon, and Washington

Future studies
Using historical data to investigate the relationships between psyllid populations and climate change
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