Peach Twig Borer Biology and Management in Utah

Shawn Steffan
Dept. of Biology
Utah State University
Logan, UT
Peach Twig Borer Biology

- Overwinters as a larva (caterpillar).
- Overwintering sites are small “galleries” created within the tree cambium.
- In spring, as leaf and flower buds open, the PTB larvae emerge to feed on young leaves and flower petals.
• Having fed and completed their development, larvae (now measuring up to ½-inch) look for protected sites to pupate.
• The adult moths emerge to mate and lay eggs (in Washington Co., the flight should begin mid-April to early May).
Peach Twig Borer Flights

- In Washington County, there are usually 5 generations per year.
- In northern Utah, there are usually 3 generations per year.
Degree-Days (DDs) for Each Stage

- Total required for a generation: 1,092.6 DDs
  - Pre-ovipositing Adult: 50.4
  - Ovipositing Adult: 124.2
  - Egg: 165.6
  - Larva: 464.4
  - Pupa: 288.0
PTB Shoot Strikes

Peach twig borer larvae generally require 3 to 5 shoots to complete their development.
Typical Fruit Damage
PTB Feeding Patterns

• In the **early to mid-season**, twig borer is more interested in *new shoots* than fruit.

• By mid- to late-season, most shoots form a terminal bud, and the tree puts its resources into fruit production.

• Fewer succulent shoots and ripening fruit => fruit is increasingly targeted by hungry larvae.
Scouting for PTB

- Management begins with monitoring.
- Adult moths are easily monitored using pheromone-baited traps.
- **Shoot strike counts** measure population density, as well as provide spray efficacy info.
- Examining shoot strikes often reveals a larva (which shows developmental status).
- Scouting for fruit entries also indicates infestation levels.
Timing and Coverage

• If a spray is necessary, timing and coverage are critical.

• PTB larvae are only intermittently accessible to sprays.

• Shoots and fruit grow (!), thus presenting lots of unprotected substrate and food for the larvae.
Effective Materials for PTB Control

COMMERCIAL

- Azinphosmethyl (*Guthion*, can buy until Aug 31st, use through 2005)
- Bt (*DiPel, Crymax*)
- Carbaryl (*Sevin*)
- Cyhalothrin (*Warrior*)
- Diazinon
- Diflubenzuron (*Dimilin*)
- Endosulfan (*Thiodan*)
- Esfenvalerate (*Asana*)
- Malathion
- Methoxyfenozide (*Intrepid*)
- Permethrin (*Pounce, Ambush*)
- Pheromone Mating Disruption (*Checkmate* or *Isomate* dispensers)
- Spinosad (*Success, Entrust, Conserve*)
- Phosmet (*Imidan*)

HOME USE

- Bt (*Safer’s Caterpillar Killer*)
- Carbaryl (*Sevin*)
- Esfenvalerate (*Ortho Bug B Gon*)
- Malathion
- Permethrin (*many formulations*)
- Spinosad (*Ferti-lome’s Borer, Bagworm, and Caterpillar Spray*)
Control Strategies and Spray Timings

- Delayed-dormant*
- Bloom*
- Post-bloom
  - Mating disruption
  - Peak egg-hatch periods for each generation
  - Manual removal of shoot strikes with pruner
  - Removal/destruction of infested fruit
The Delayed-Dormant Spray

• Dormant Oil (Volck Supreme, Orchex, Sunspray Ultrafine) applied at 2% by volume (spray to drip).

• Insecticide, if necessary, tank-mixed with fungicide/bactericide (copper, typically).
  – Insecticide usually Asana/Lorsban in CA

• Delayed-dormant app made from bud-swell to early popcorn (flowers not yet open).
Bloom Sprays for PTB

- Bt, spinosad, or diflubenzuron are all good for this timing.
- Two (2) Bt or spinosad (Success/Entrust/Ferti-lome) sprays at bloom
  - 1\textsuperscript{st} shot at early bloom (10-20\% bloom)
  - 2\textsuperscript{nd} shot at full bloom (before petal fall)
- Or, one (1) application of diflubenzuron (Dimilin) around mid-bloom (20-50\% bloom).
- For backyard growers, these sprays may be the most important because of the lack of in-season materials and issues with canopy coverage.
In-Season PTB Sprays

• A variety of materials is available for commercial growers (commonly used: Imidan, Success, Asana, DiPel, and Guthion).

• Backyard growers can purchase and use the same active ingredients in Success, Asana, and DiPel.

• Using degree-day totals (post-biofix), sprays are generally made at 300-400 DD, and if pest pressure is high, again 10-14 days later.

• If you “reset” your biofix for each flight, you can maintain the precision in your spray timings. Mating disruption, however, precludes growers from resetting a biofix.

• Be careful and read all label information. Bear in mind that Asana can flare mites mid-season, and Guthion residues probably won’t be tolerated on peaches after 2005)
Some Important In-Season Numbers

(Degree-Days post-biofix)

1\textsuperscript{st} Generation
- 60 DD $\Rightarrow$ egg-laying begins
- 220 DD $\Rightarrow$ egg-hatch begins
- 320 DD $\Rightarrow$ peak egg-hatch starts
- 600 DD $\Rightarrow$ peak egg-hatch winds down
- 740 DD $\Rightarrow$ egg-hatch essentially over

2\textsuperscript{nd} Generation
- 920 DD $\Rightarrow$ egg-laying begins
- 1080 DD $\Rightarrow$ egg-hatch begins
- 1260 DD $\Rightarrow$ peak egg-hatch starts
- 1660 DD $\Rightarrow$ peak egg-hatch winds down
- 1840 DD $\Rightarrow$ egg-hatch essentially over
General PTB Egg-hatch

![Graph showing the relationship between Degree-Days and % Egg-hatch for different generations (1st Gen, 2nd Gen, and 3rd Gen).]
Egg-Hatch Relative to Flight

![Graph showing egg-hatch percentage and moths per night over time, with dates for the start of each generation of moths.]
In-Season Sprays

• If trapping is maintained throughout the season, applications can be made 7-14 days following each flight’s biofix.

• Alternatively, spraying at or soon after the peak flight will likely provide fresh insecticide residue as peak egg-hatch begins.

• Continue to monitor traps and new shoot strikes.
Thank You

• Shawn Steffan
  – IPM Project Leader
  – steffan@biology.usu.edu
  – 435-797-0776

  – www.extension.usu.edu/cooperative/ipd
  – www.extension.usu.edu/cooperative/ipm