

Bean Thrips Detection in Navel Oranges / Post-harvest Treatments

Australia Citrus Preseason Meeting
29 September 2011, Tulare, CA

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Presentation Outline

- Review of bean thrips basic biology
- How to optimize fruit cutting to find adult bean thrips in the navel of navel oranges
- Factors affecting when bean thrips will fly into citrus in the fall
- Systems approach for dealing with bean thrips
- Postharvest research with bean thrips

Bean Thrips Basic Biology

Egg laying ceases ca. early October and larvae disappear by ca. the middle of October

Late October to November, adults seek out overwintering sites, moving mainly to plants which are still green, on which they spend the winter in "hibernation", feeding a little whenever the weather warms up

Exposed overwintering adults appear to suffer mortality as a result of heavy rains; thus, they have evolved to seek out well protected areas in which to overwinter (e.g., the navels of navel oranges)

Bean Thrips Host Plants

Wide host range - Crop plants reported as hosts (those that carry egg, larval, and adult stages) include **alfalfa**, **almond**, apple, asparagus, avocado, **bean**, beet, cabbage, cantaloupe, carrot, cauliflower, clover, corn, **cotton**, fig, garlic, grape, hops, kale, leek, lettuce, melon, olive, onion, orange, peach, **pear**, pea, pepper, persimmon, plum, potato, prune, radish, Swiss chard, tangerine, tomato, turnip, and **walnut**

Not generally considered a pest on any of the above crops

Many native or uncultivated plants are also known to support bean thrips-- most common are buckeye, morning-glory, poppy, **prickly lettuce**, bur clover, white melilot, **common sow thistle**, **tree tobacco**, and wild vetch

Bean Thrips - Fruit Cutting

To maximize the likelihood of finding bean thrips if present:

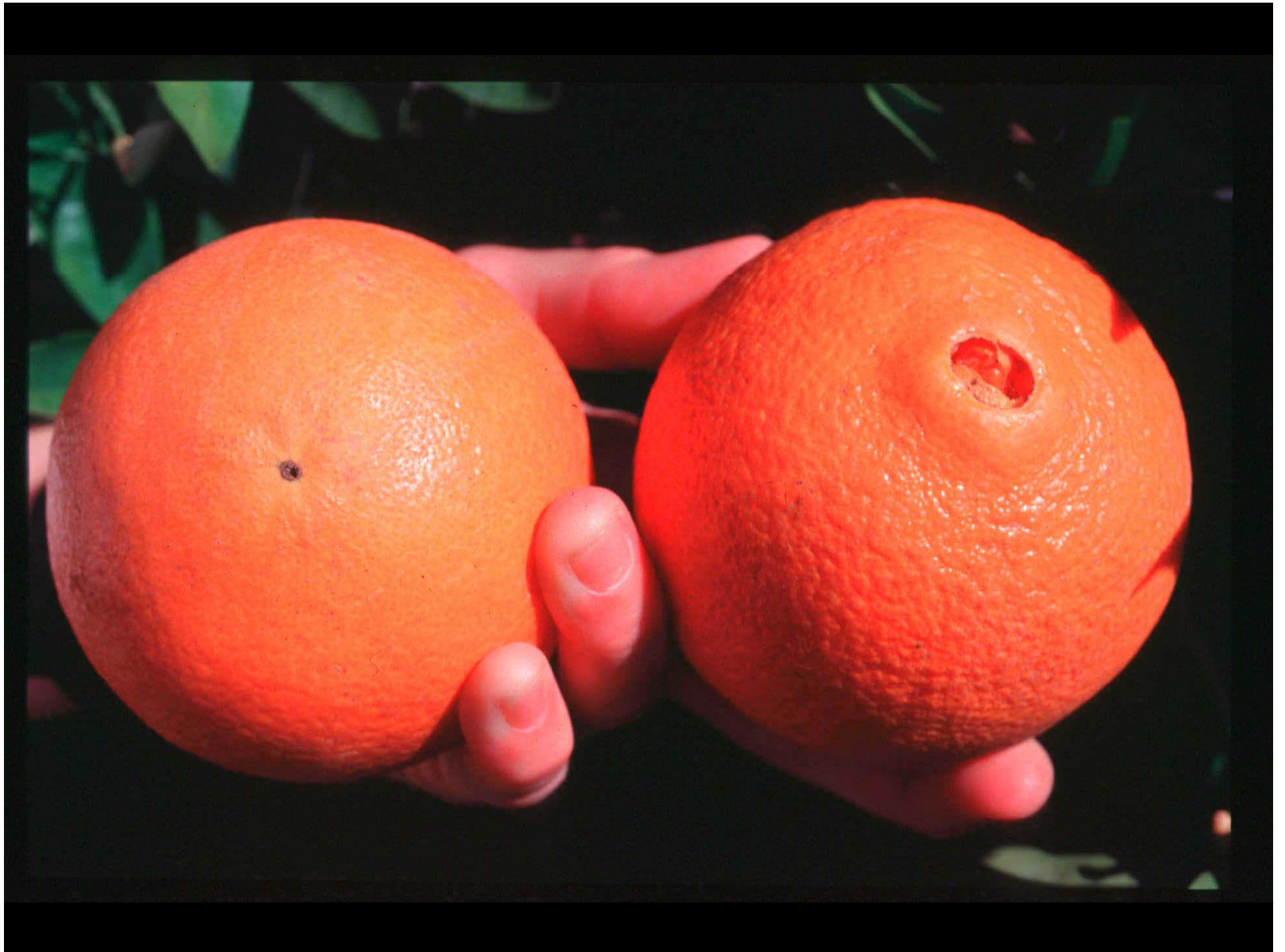
Select fruit from the outside of the block facing likely sources of bean thrips fly-ins (creek bed, weeds, nut crops, or other crops likely to harbor bean thrips in late summer)

Select fruit with a small exterior navel opening

Take thin slices across the navel and inspect for infestation; a head or hand lens is needed to confirm identification

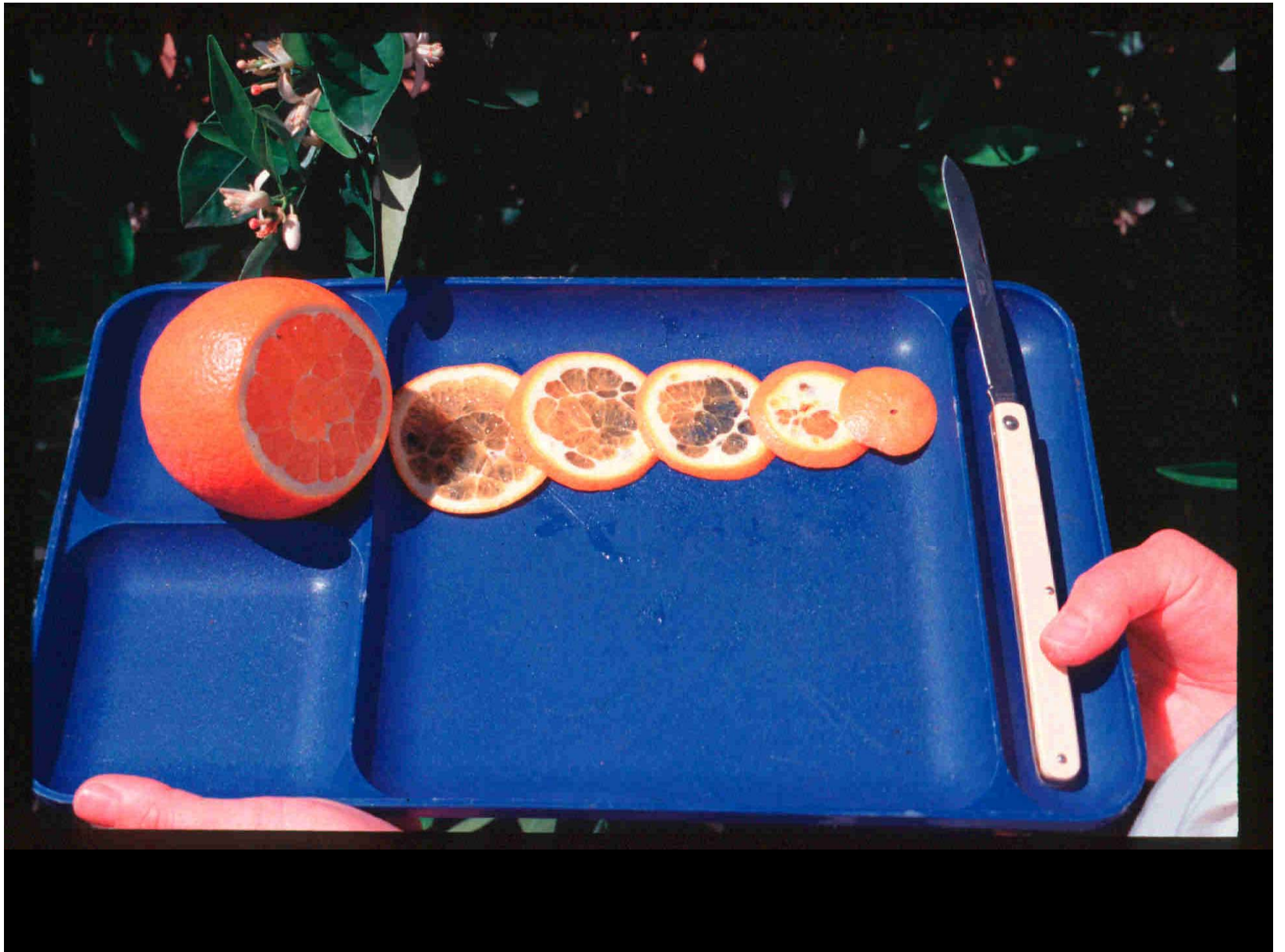
Some navels can go very deep into the fruit

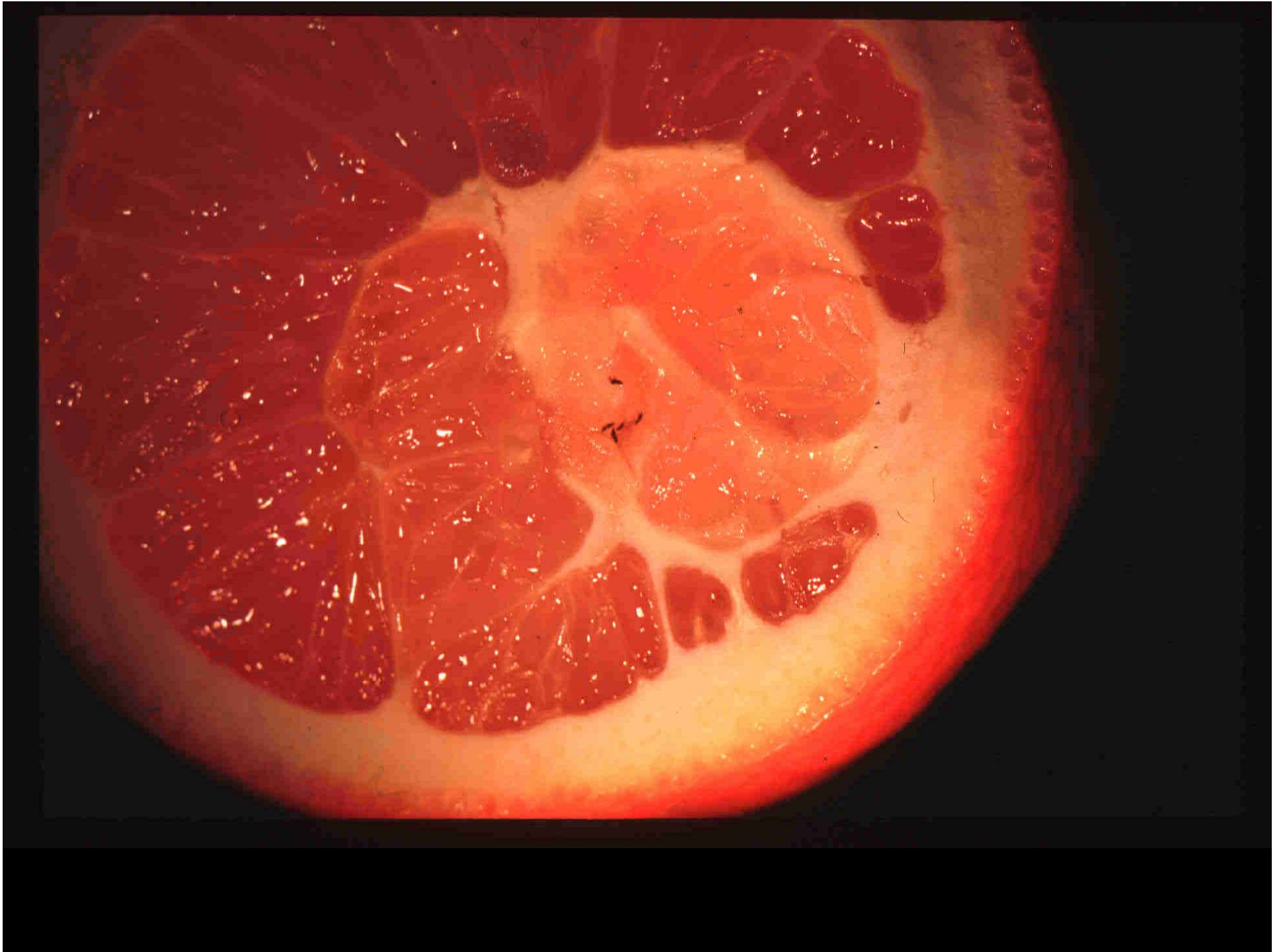
Differentiate live bean thrips from other insects or mites and from the blackened tip of a flower stigma often found in the navel (thin slices result in it often being the length of a bean thrips)











Identifying Bean Thrips

- Thrips found in field samples -- mostly bean thrips, citrus thrips (yellow), and flower thrips adults (usually yellow but can see darker morphs)
- **Adult bean thrips are uniformly dark grayish-black and the front wings have transverse white bands with brown tips**
- Western flower thrips can also be problematic in Australia and New Zealand – mostly dead by January or so after sustained cold weather

Adult bean thrips



Color morphs of adult female western flower thrips



When during the fall / early winter do bean thrips fly to citrus?

- Two main factors appear to be important in fall and early winter
 - Winter rains keep alternate host plants succulent and delay flights to citrus (versus dry conditions)
 - Bean thrips are more active during warmer weather
 - fly less in cooler weather (60°F and below)
- Note: during winter, bean thrips will come out of the navel to feed on fruit and leaves during warm days

Systems Approach To Reducing The Likelihood Of Bean Thrips Introduction Into Australia

1. Remove nearby field weeds known to harbor bean thrips to the degree practical
2. **Sticky card monitoring with green cards - OPTIONAL**
3. Field fruit cutting
4. **Packinghouse fruit cutting / inspection**
5. Fruit warmed to 65°F for 8 h prior to fruit washing OR fumigation with Evergreen® or Turbocide Gold®
6. **Lot labeling for trace-back, phytosanitary inspection**
7. Pre-clearance in CA or inspection in AU

Post-harvest Bean Thrips Treatments

- ❖ Warm the fruit to 65°F for 8 h prior to fruit immersion/washing
- ❖ Treatment with Turbocide Gold® or Evergreen® (See June 2011 Citrograph article)
- ❖ Treatments under evaluation:
 - ❖ Ethyl formate – Beth Mitcham (UC Davis Postharvest Technology Center; see May/June 2011 Citrograph article)
 - ❖ Phosphine fumigation – Spencer Walse (USDA ARS, Parlier)
 - ❖ Irradiation (generic pest treatment) – Anuradha Prakash (Chapman Univ.) & Mary Lu Arpaia (UC Riverside)
 - ❖ HCN fumigation –Morse et al. & Washburn & Sons Citrus Pest Control (Riverside)

Acknowledgements

- Research was supported in part by the Citrus Research Board and USDA Foreign Agricultural Service, Technical Assistance for Specialty Crops Program (FAS TASC)
- Jim Cranney and CCQC helped to obtain the Turbocide Gold® SLN and in helping to design current IR-4 trials to maintain registrations
- Thanks to Julie Doctor, Marty Coert, and David Sorenson (Fruit Growers Supply) and MGK Corp. for assistance with recent Turbocide Gold® trials
- These trials would not be possible without the assistance of cooperating citrus packinghouses (Visalia Citrus Packers, Orange Cove; Porterville Citrus, Terra Bella; Yokohl Packing, Lindsay – tentative future trial)