Field Treatments for Fuller Rose Beetle

Fuller Rose Beetle Workshop

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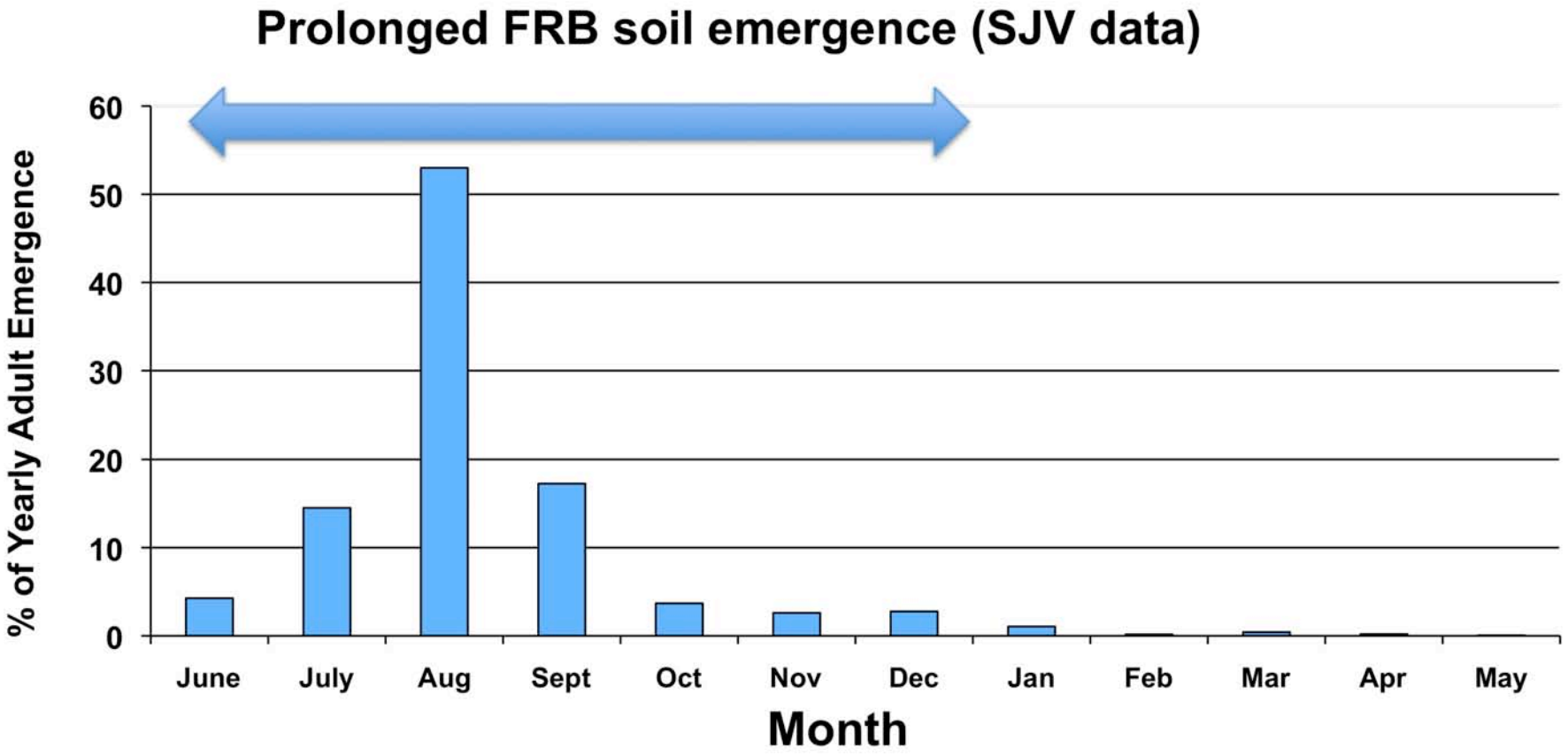
Significant adult emergence out of the soil June – Dec. (7 months)



FRB Soil Emergence is Different in Southern / Coastal CA

- As in the SJV, some adults emerge every month of the year
- Peak southern CA soil emergence is July – Nov. (SJV >50% in August, SJV tighter peak emergence over July – Sept.)
- Percent soil emergence by month **in interior southern California** (means - 4 field sites over 2 years, 40 traps per site):

  June – 1.0 %

  July – 8.3 %

  August – 26.4 %

  September – 29.2 %

  October – 22.3 %

  November – 10.1 %

  December – 2.1 %

  Jan – May – 0.5% total over 5 months

Longevity & Oviposition of FRB

- Study with 20 beetles; fed grapefruit leaves + water

  Lived 7-242 days (**average = 111 days**) in the lab (77°F)

  Laid an average of 5 egg masses, **88 total eggs per beetle**

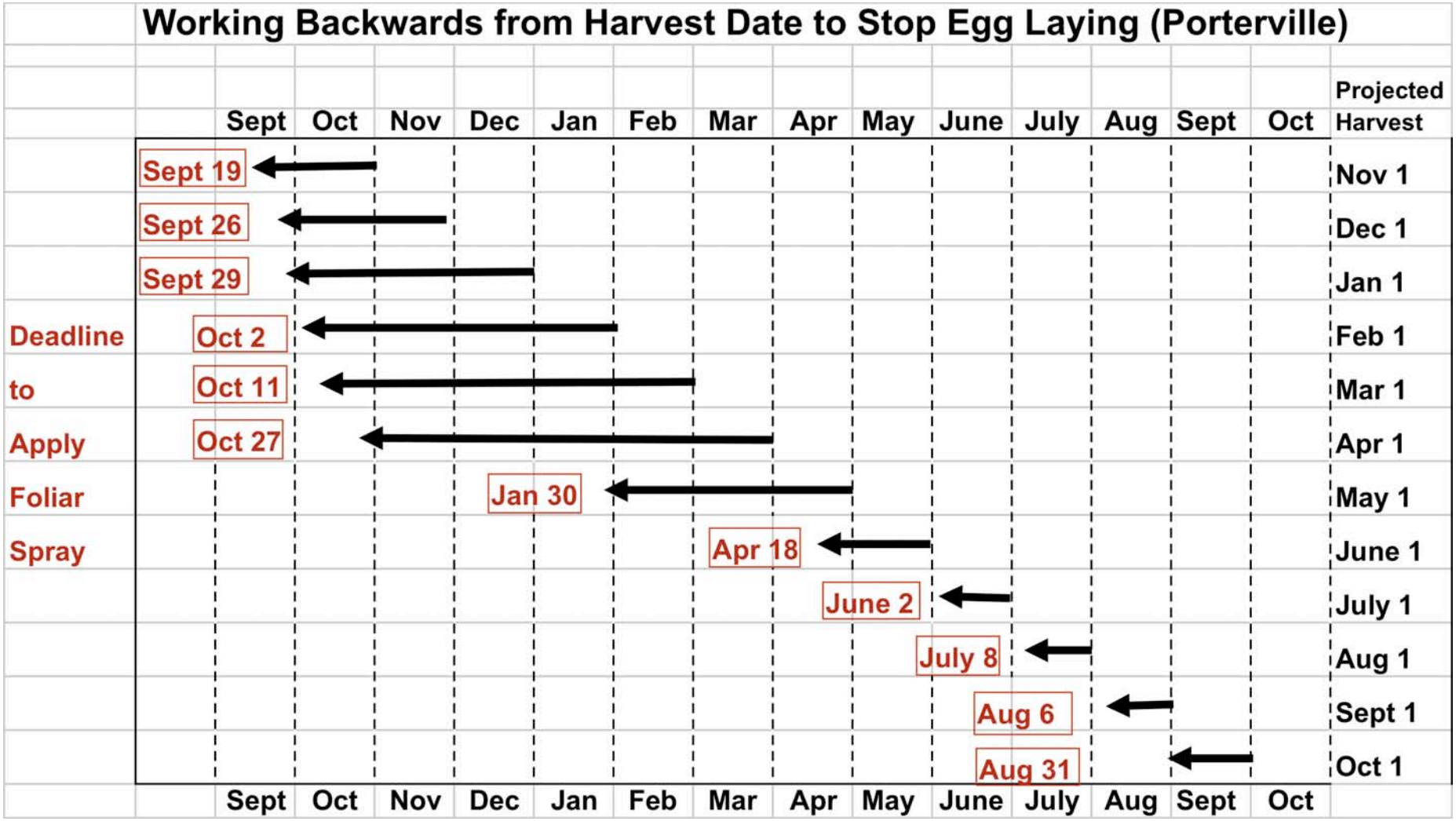
  Last beetle died on day 242

- Given FRB adult emergence year round and how long adults live (especially if cold), unhatched egg masses can be found all year

- In SJV, expect highest % unhatched egg masses September – late March (by late March, most egg masses laid in fall have hatched)

- In SJV, expect few unhatched egg masses May– June, numbers build slowly July – September

Timing foliar sprays in relation to harvest (see degree-day handout or Online citrus Pest Management Guidelines under FRB)

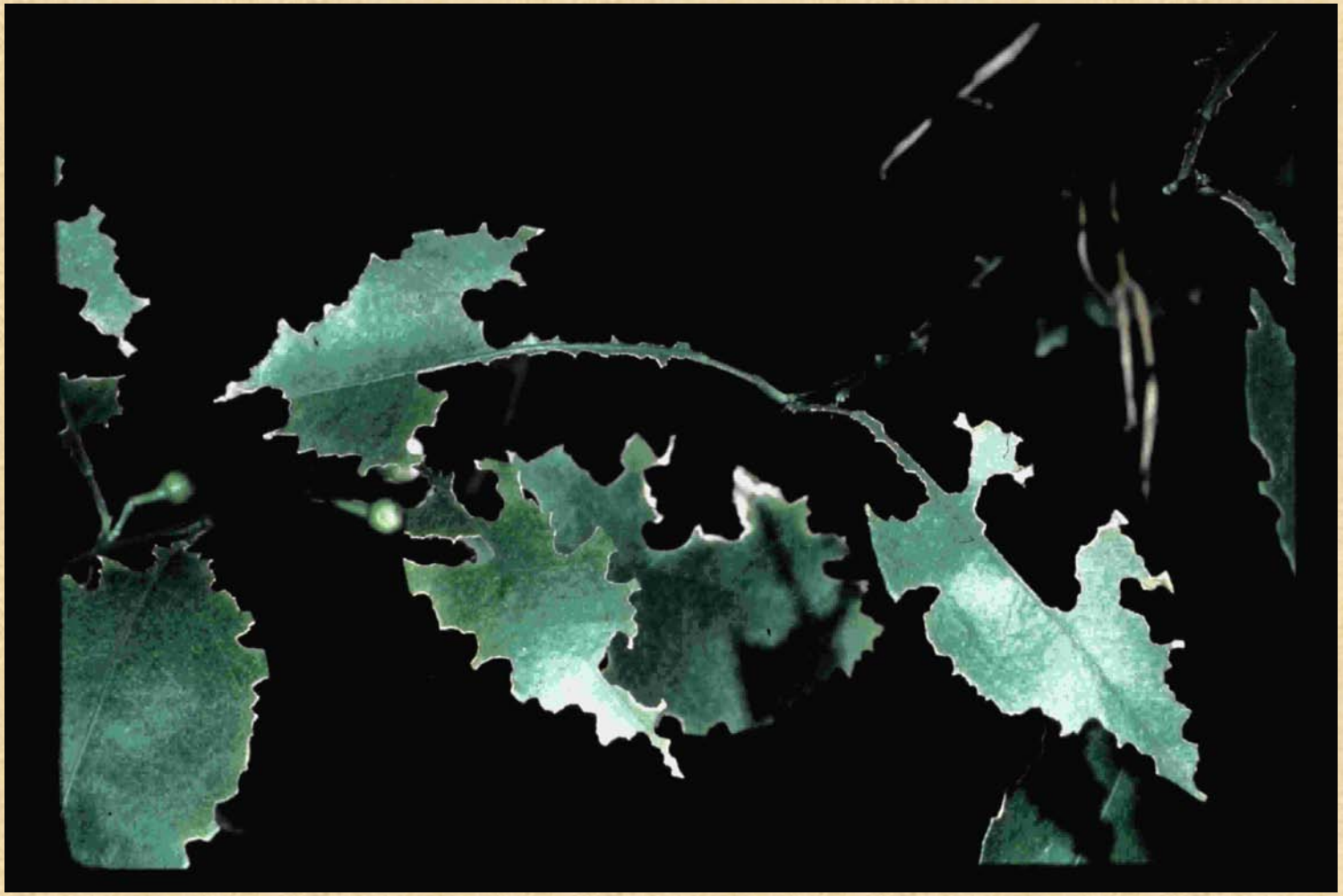


2014 Strategies for Dealing with FRB – Korea (Navels)

- Select groves with the lowest levels of FRB for possible shipment to Korea (FRB treatments during 2013)
  - Based on levels of FRB last year / last year's egg mass sampling
  - Or look inside the tree now at the level of last year's adult FRB feeding on leaves
- Skirt prune trees in "Korean groves" by early June to a level at least 2 feet off the ground (higher – less touch up later)
- Maintain weed control and check grove periodically once the weight of fruit could bend some limbs down (check suckers)
- Long-term, use aggressive muli-year control in Korean groves to knock FRB levels down (remember slow population build up)

Adult Feeding Damage

- Adult FRB cause characteristic jagged notching of leaves
- Adults are nocturnal, feeding occurs at night, largely inside the tree
- Differentiate from other leaf feeding (rounder) – snails, orangeworms



Prune tree to at least 24” off the ground (lower – wastes time/ effort)

2013 Field Trials with FRB

- Trials on navel oranges at Lindcove by Grafton-Cardwell & Scott – only moderately high FRB levels (1.7% of fruit w/ egg masses)
  - Skirt pruning alone reduced FRB egg mass levels by 53%
  - Ground sprays of 0.5 lb ai/a Brigade WSB (edge of drip line to base of trunk, 200 psi, 25 gpa) were effective
  - Foliar sprays of 5.5 oz Actara 25 WG and 20 lb Kryocide were also effective
  - Two treatments (mid June – mid Sept or early Oct) were more effective than a single treatment

2013 Field Trials with FRB

- Trials in the Pauma Valley by the Morse lab
  - Remember FRB soil emergence in southern CA more spread out (high July-Nov., highest Aug-Oct.) than in the SJV (high July-Sept, highest Aug.)
  - Extremely high FRB levels at this field site (52% of fruit with hatched or unhatched egg masses)
  - June 28 or Sept 13 Admire Pro soil application at maximum label rate reduced egg mass levels by ca. 35%
  - Foliar sprays of 5.5 oz/a Actara or 20 lbs/a were fairly effective treatments
  - 3 treatments (July 25, Sept. 12, Oct. 17) were more effective than two

Fuller Rose Beetle Pesticide Efficacy Trials

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Kearney Ag Center and Lindcove REC

University of California
Agriculture and Natural Resources

Fuller rose beetle adult bioassay Plants sprayed with insecticides and adults placed on plants. Two plants/container, 3 containers per treatment. Adult survival and percentage leaf feeding assessed after 2 weeks.

Leaf Feeding

Adult FRB Pesticide Screening (Grafton-Cardwell lab)

- Best products in 2012 (500 gpa dilution) – Kryocide 20 lbs/a, Sevin XLR Plus 5 quarts/a, Actara 25 WG 5.5 oz/a
- Best products in 2013 (500 gpa)
  - Actara 25 WG (thiamethoxam) at 5.5 oz/a
  - Kryocide at 20 lbs/a
  - Leverage 2.7 (cyfluthrin + imidacloprid) at 10 oz/a
  - Lorsban Advanced at 4 pints/a
  - Sevin XLR Plus at 5 quarts/a
  - Voliam Flexi (thiamethoxam + chlorantraniliprole) at 8.5 oz/a
- Not effective – Altacor, Assail, Baythroid, Danitol, Kryocide at 10 lbs/a (20% survival at 2 weeks), Micromite, Mustang, Provado

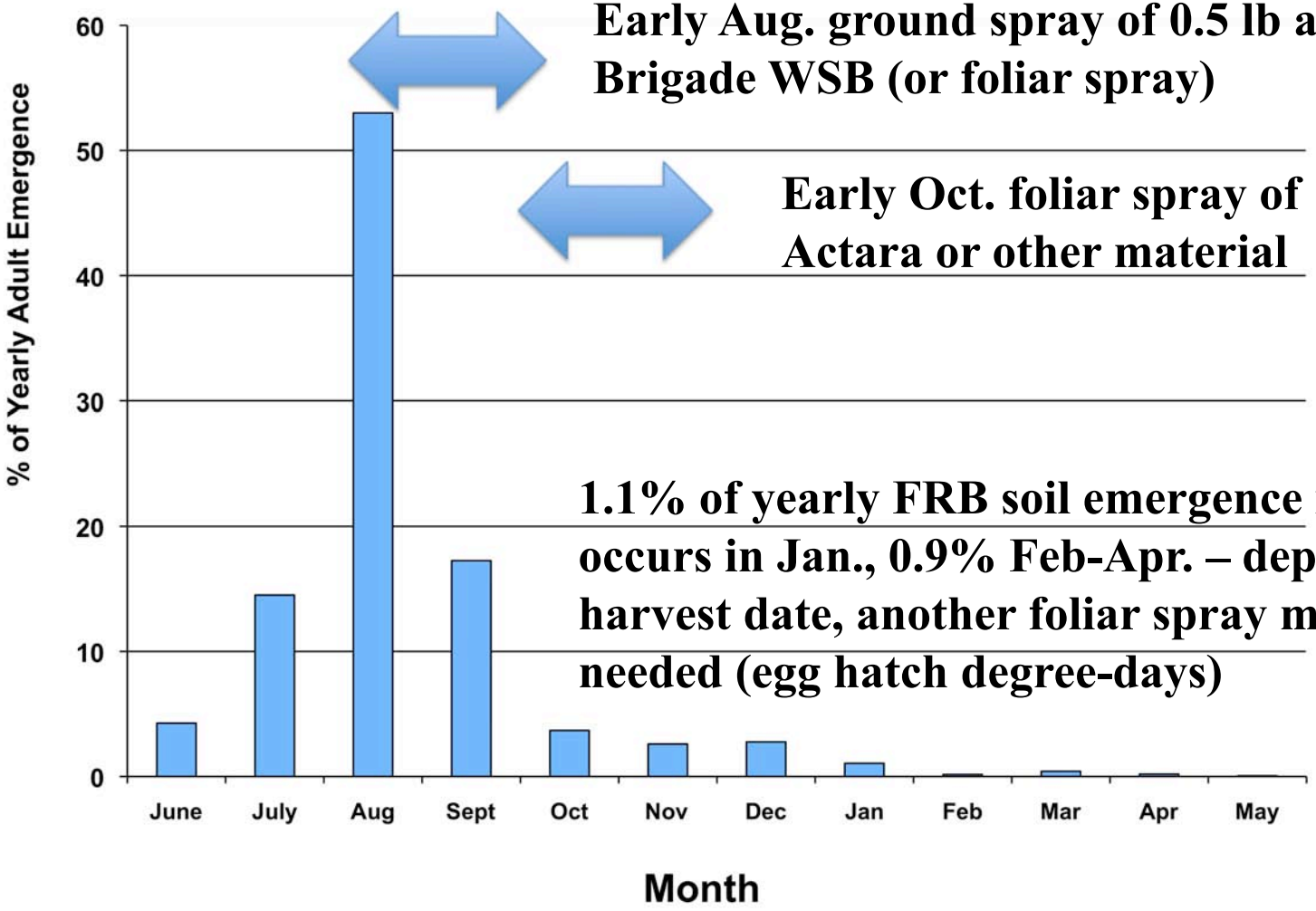
FRB Chemical Control (Biology, Field Trials, Lab Trials, MRLs)

- In "Korean" groves, put on 2-3 ground/foliar sprays for FRB
- For SJV navels with Feb.-Apr. 2015 harvest, 3 sprays best
  - Early June – foliar Kryocide/Cryolite at 20 lbs/a (OR Actara, Leverage, Lorsban Advanced, Voliam Flexi)
  - Early August – ground spray of 0.5 lb ai Brigade WSB (testing other bifenthrins; could do a second foliar instead)
  - Early October – foliar Actara at 5.5 oz/a (OR Leverage, Lorsban Advanced, Voliam Flexi)
- If 2 sprays – skip the early June treatment
- Watch total imidacloprid limit of 0.5 lb ai/season (soil application, Leverage); watch total thiamethoxam limit of 0.172 lb ai (Actara, Platinum, Voliam Flexi)

Keep MRL / Label Situations in Mind

- Further residue studies are in progress but at present, we suggest not using carbaryl (Sevin) for FRB control
- Use of Kryocide/Cryolite or Lorsban Advanced June-August with Feb-April harvest the following year appears fine (residues reduced to background levels or below MRL if fruit are washed)
- No anticipated Korean MRL issues with 2014 label use / 2015 harvest with Actara, Leverage 2.7 or 360, and Voliam Flexi
- Current label for soil application of Brigade WSP allows a single application of 0.5 lb ai/acre (do not allow contact with fruit)

Adult FRB SJV soil emergence - 2 treatment strategy



Early Aug. ground spray of 0.5 lb ai/acre Brigade WSB (or foliar spray)

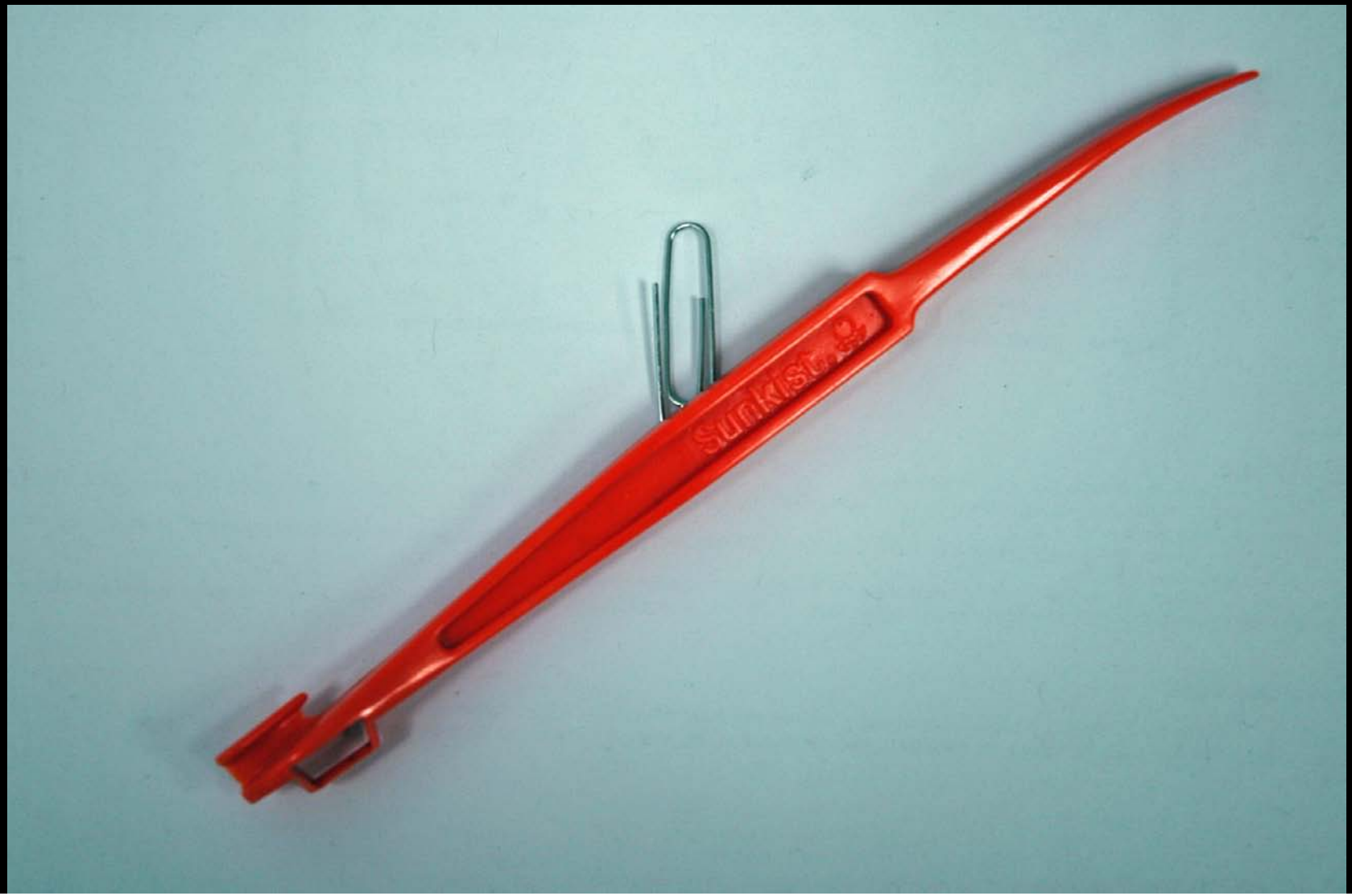
Early Oct. foliar spray of Actara or other material

1.1% of yearly FRB soil emergence in the SJV occurs in Jan., 0.9% Feb-Apr. – depending on harvest date, another foliar spray may be needed (egg hatch degree-days)

Key Differences – Japan and Korea

- Japan insisted we reduce the levels of live FRB eggs but allowed methyl bromide fumigation as a backup when live eggs were detected
- Japanese sampling protocol of 400 fruit per load EXTREMELY efficient in finding eggs if the load was infested
- Korean protocol appears to be even more stringent – 600 fruit per load
- This level of inspection requires EXTREMELY low levels of FRB to pass inspection – multiple years of control needed
- Even with 2-3 foliar/ground sprays, very likely SOME loads will be found with unhatched FRB eggs

Plastic device (Sunkist Growers, Inc.) can be used to remove the button when sampling for FRB egg masses and not injure the fruit.



Summary – Cautious Management of FRB in 2014

- Select navel groves for Korea based in part on low FRB levels – plan on multiple years of control being needed
- Skirt prune to at least 24" by early June, weed control
- Somewhat different strategies in the SJV versus others areas and depending on the date of harvest (FRB biology, emergence)
- 2-4 foliar / ground sprays to reduce FRB levels (early August and early October suggested at a minimum)
- Sample 300-600 fruit in the field – risk rejection if any unhatched FRB egg masses are found (so do not ship)
- Stay in touch on possible postharvest treatments and on updates regarding the Korean situation