Scales found in Walnut: Identification, Life Cycles, & Management Timing

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February 6, 2015

Scale populations are increasing

Botryosphaeria lesions under walnut scale

Photos: T. Michailides

Outline:

1. Scale species common in walnut

2. Scale lifecycles

3. Management timings and options

Most common scale species: walnut scale

Daisy-like scalloped margins

Most common scale species: walnut scale

Tree symptoms with high populations:

- Branch dieback
- Splitting bark
- May appear water stressed

Frequently encountered scale species:

European fruit lecanium

Frosted scale

Rounded, army-helmet shape

European fruit lecanium versus frosted scale:

Identical most of the year

White waxy coating on Frosted scale only during March-April

Lesser common scale species:

San Jose Scale

Circular with raised ‘nipple’

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San Jose Scale

Circular with raised ‘nipple’

Italian Pear Scale

Associated with Lichens

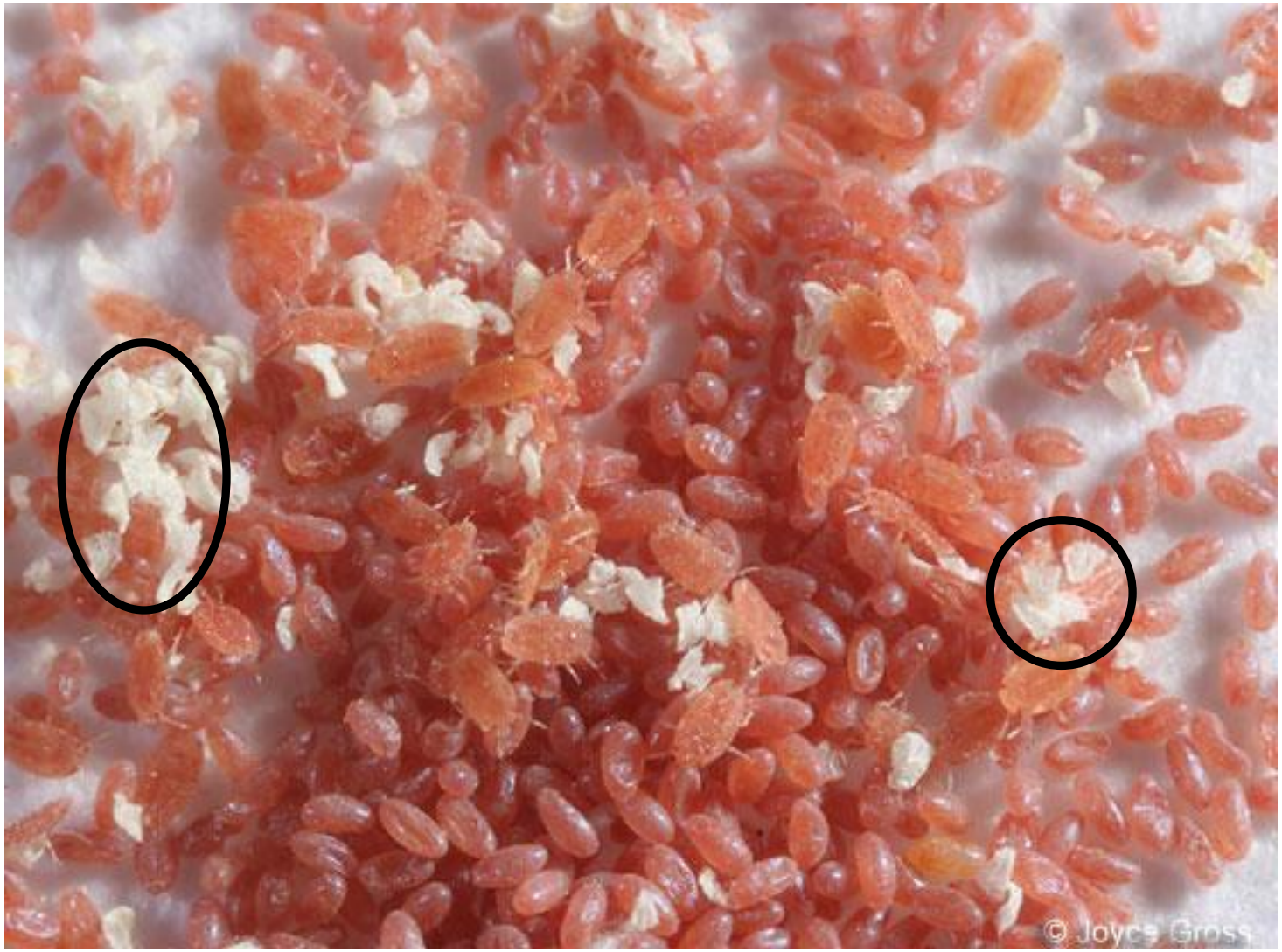
Generic scale lifecycle: eggs

Generic scale lifecycle

Unhatched eggs

Generic scale lifecycle

Eggshells



Generic scale lifecycle

Crawlers

Generic scale lifecycle: crawlers

Scale crawler

Adult spider mite

Generic scale lifecycle: nymph development

Lose:
- Legs
- Eyes
- Antennae

Gain:
+ Scale cover
+ Rudimentary eye spots (if male)

Generic scale lifecycle: females versus males

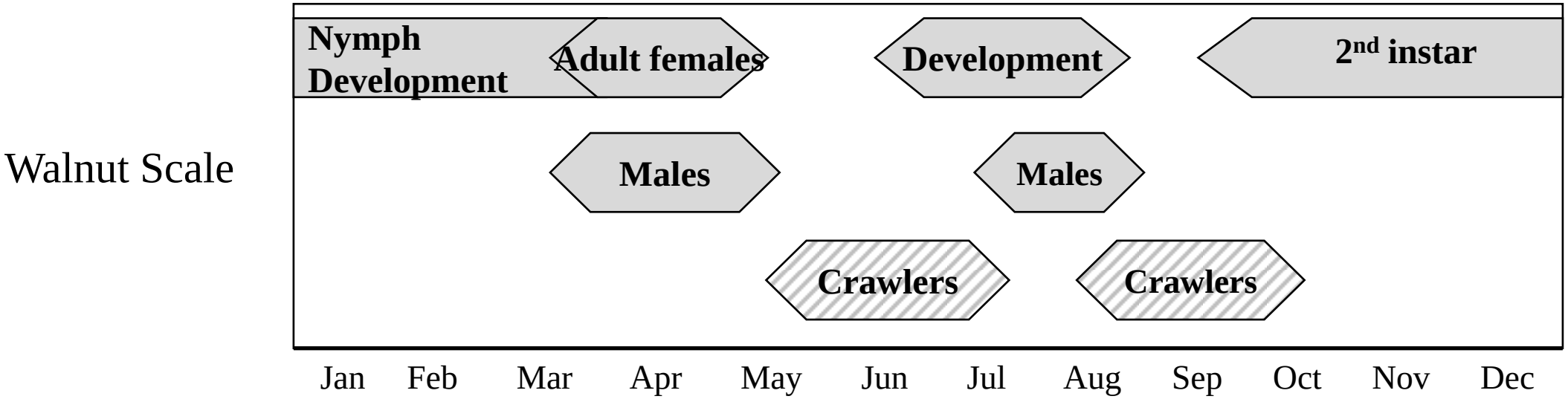
Female: no eye spots, legs, or antennae

Male: eye spots, penile sheath

Generic scale lifecycle: females versus males

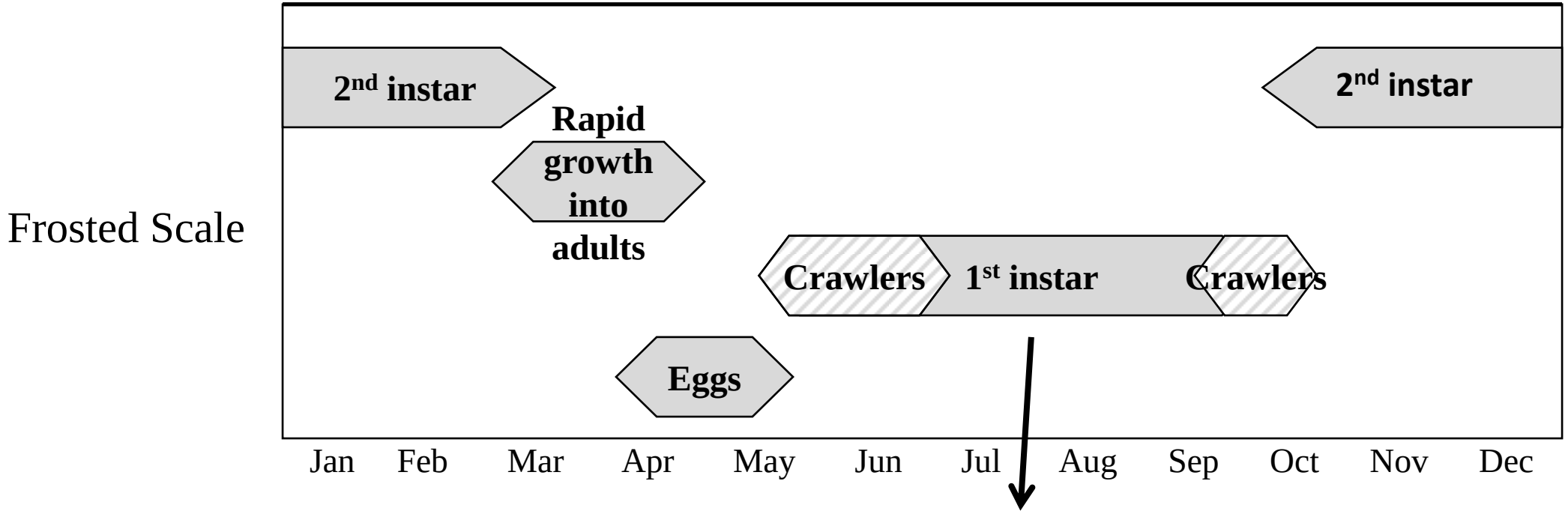
Adult male: Winged, flies to females

Walnut Scale Lifecycle



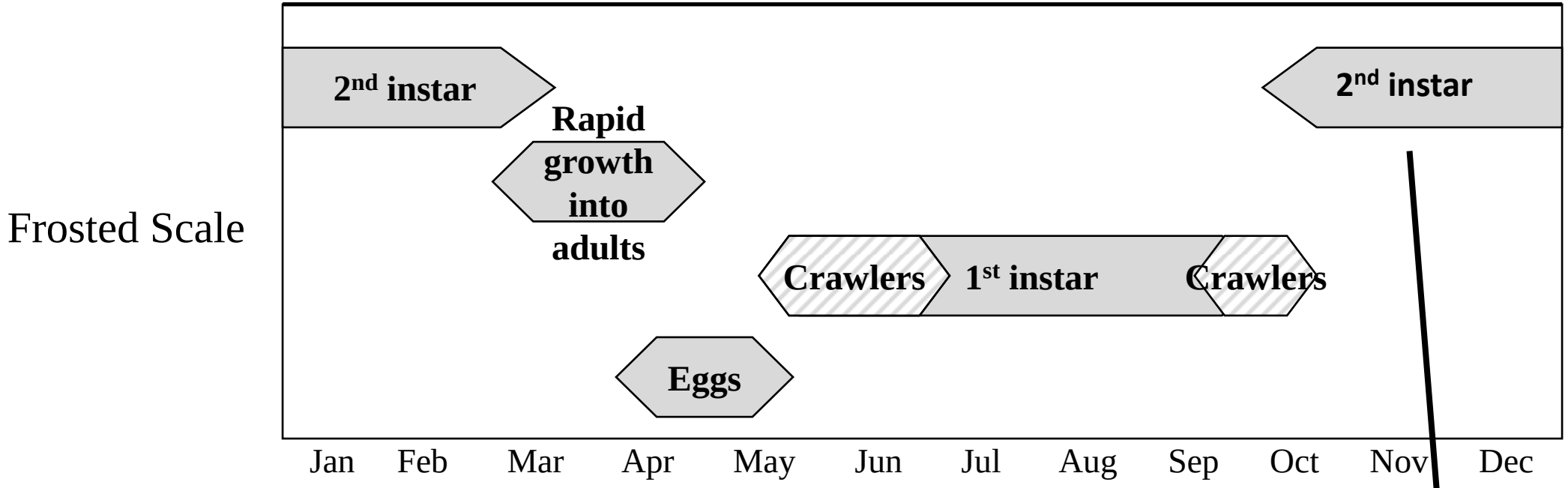
- 2 generations per year
- Overwinter as 2nd instar nymph

Frosted Scale / European Fruit Lecanium Lifecycle



- 1 generation per year

Frosted Scale / European Fruit Lecanium Lifecycle



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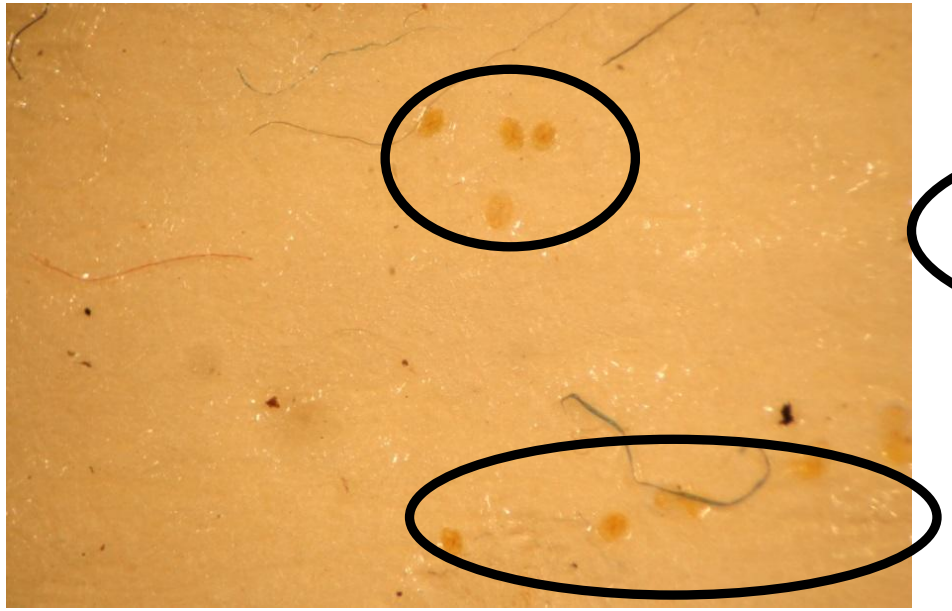
Managing scale: in-season monitoring

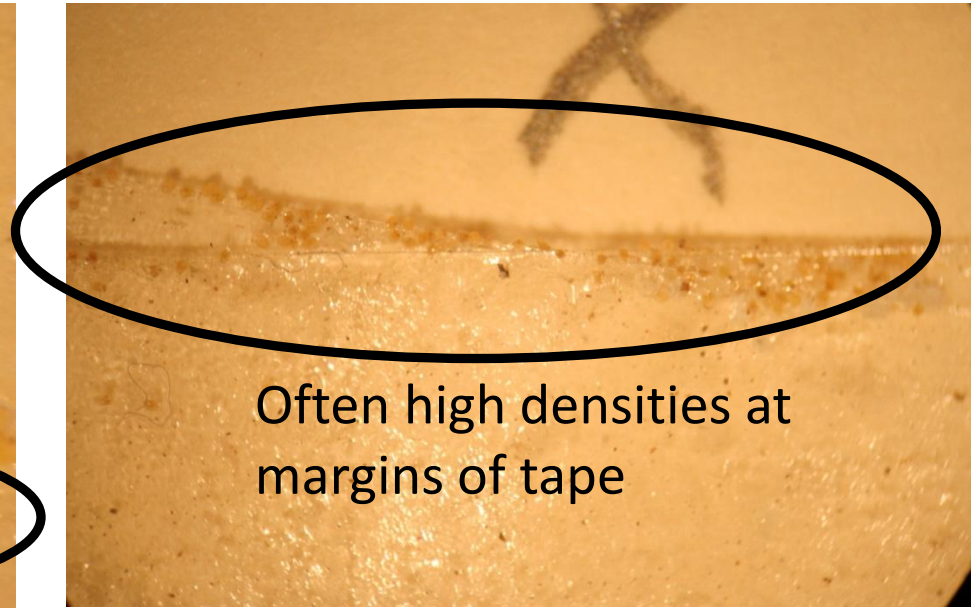
Have monitoring tapes out by early May

Double-sided tape

Managing scale: in-season monitoring

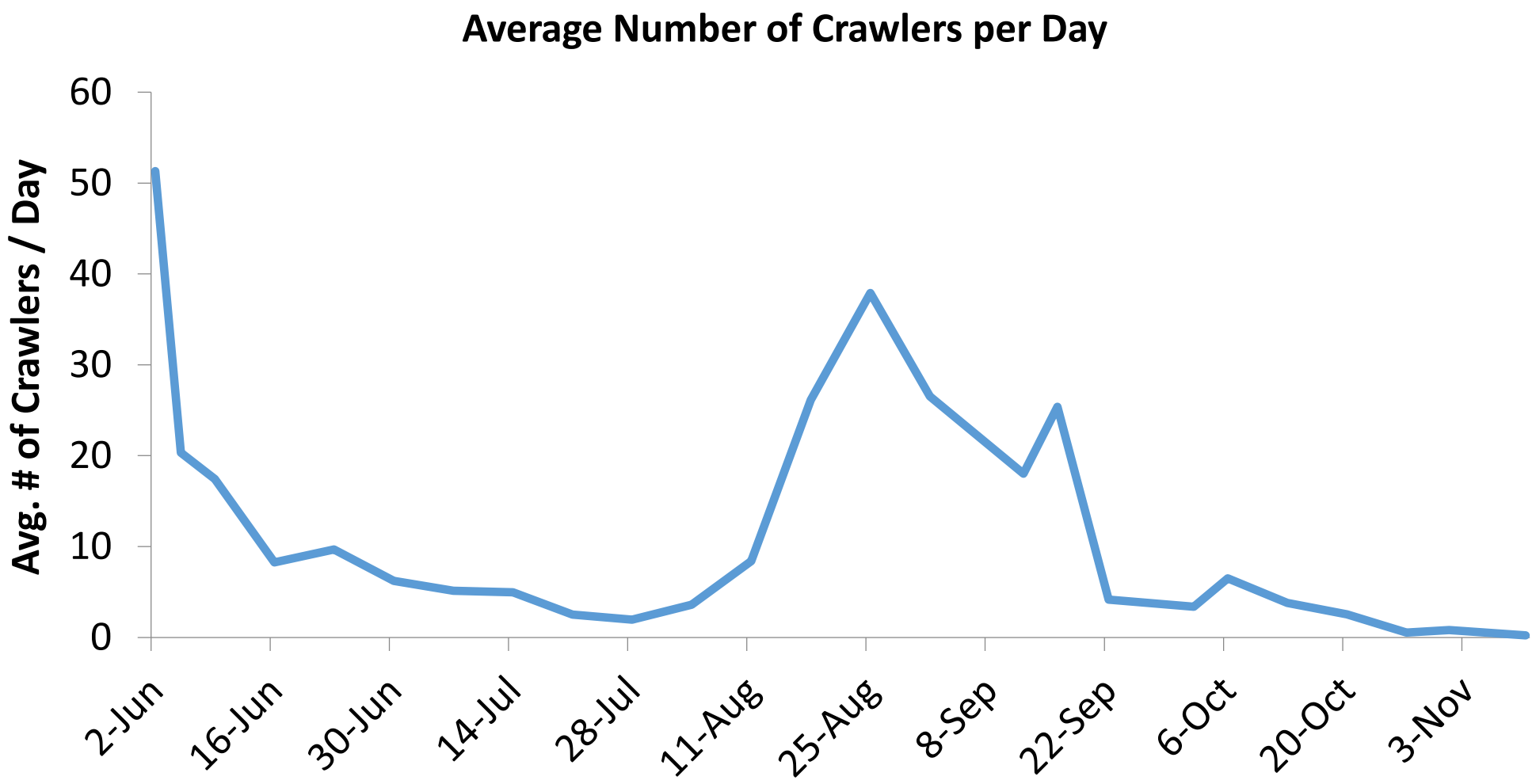
Check regularly with a hand lens





Scale tape under more powerful magnification

Scale Monitoring: Red Bluff 2014 – Walnut Scale



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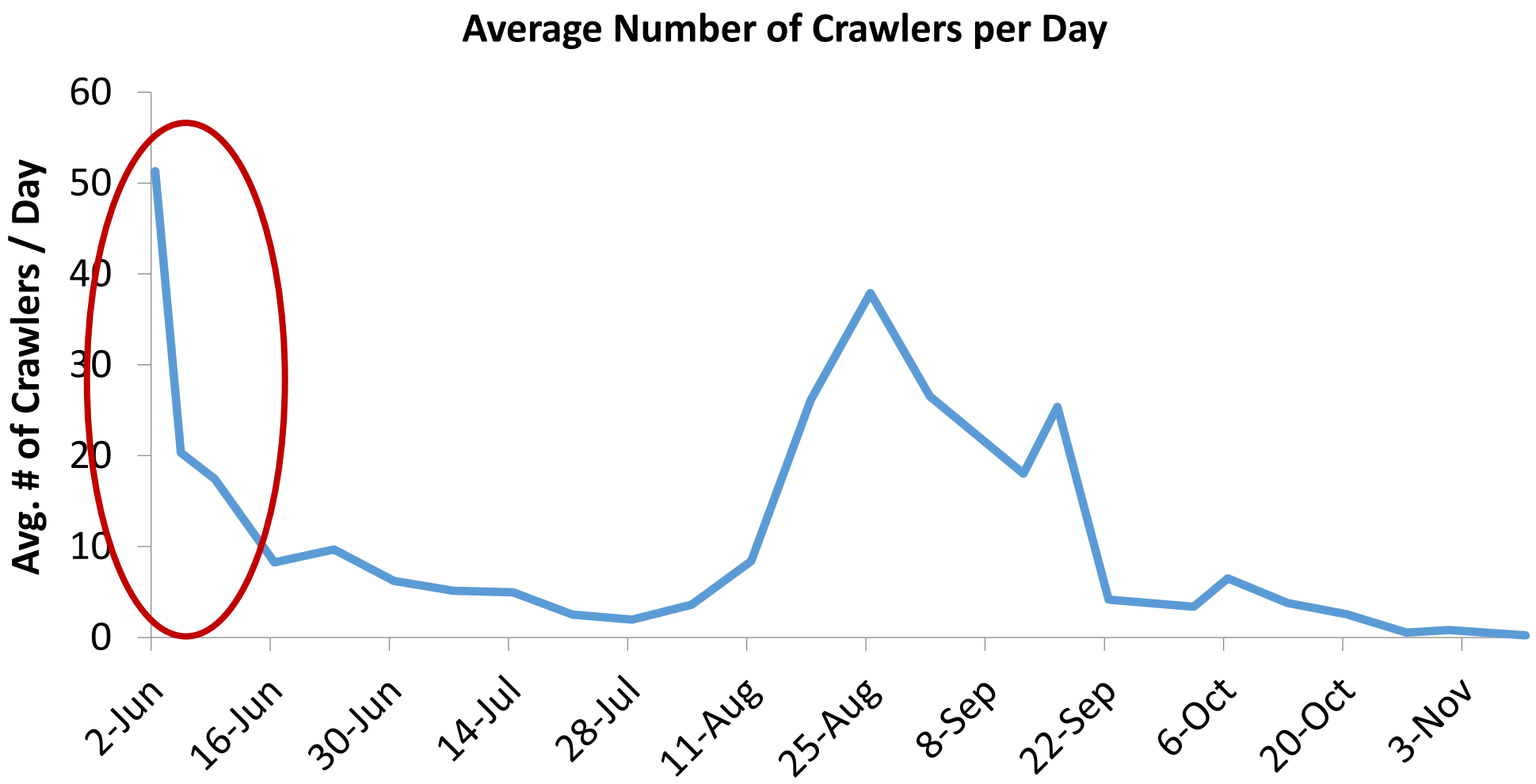

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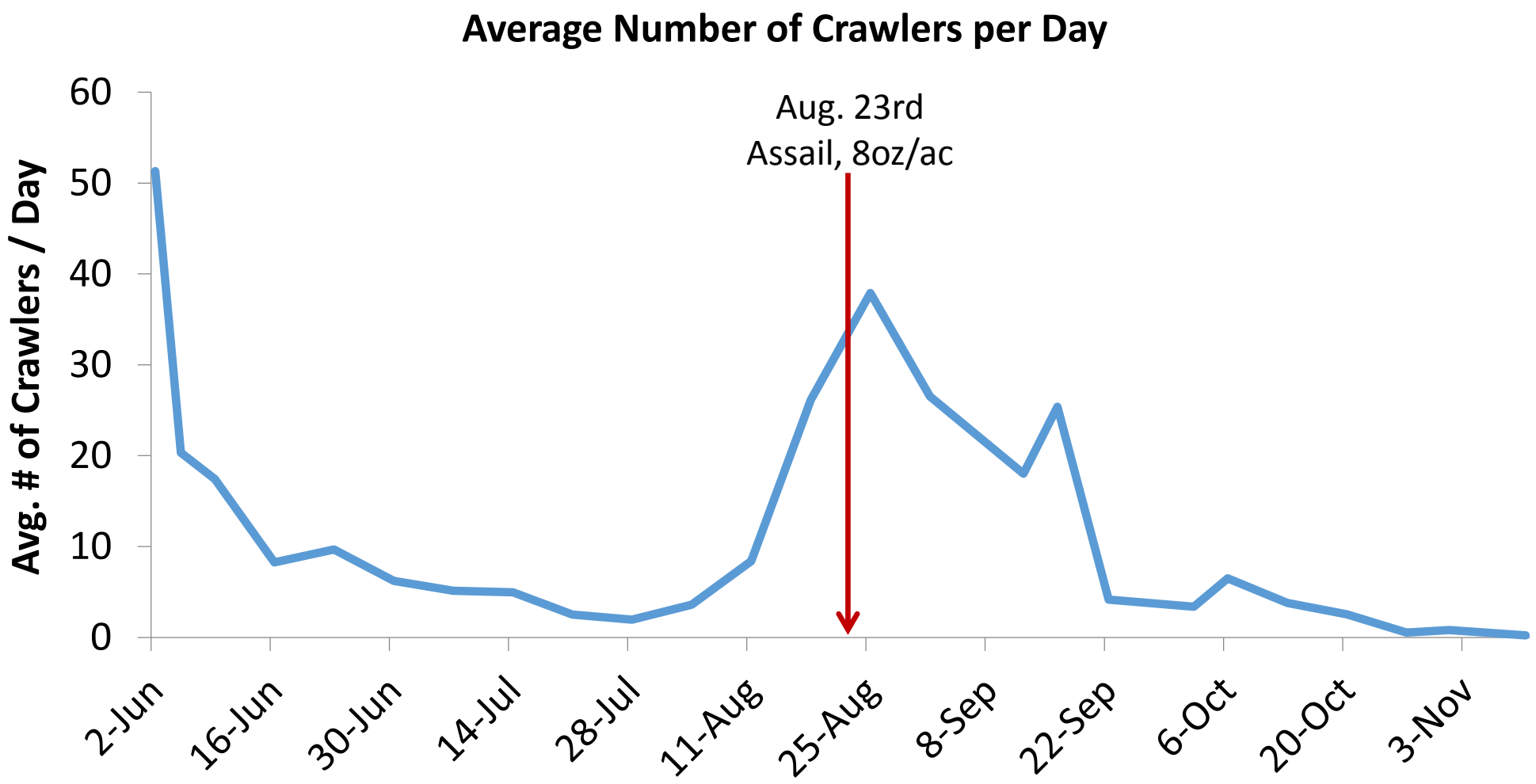

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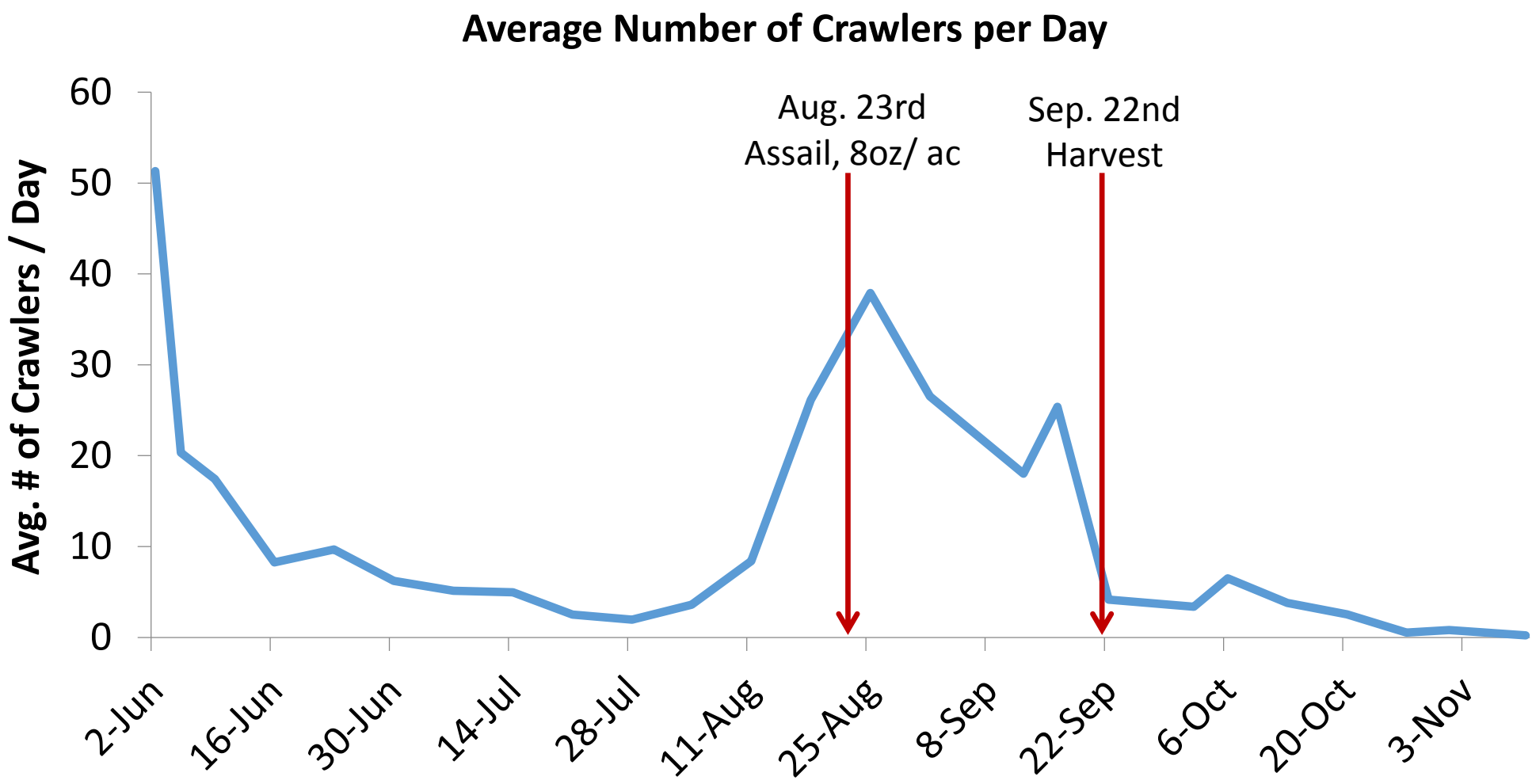

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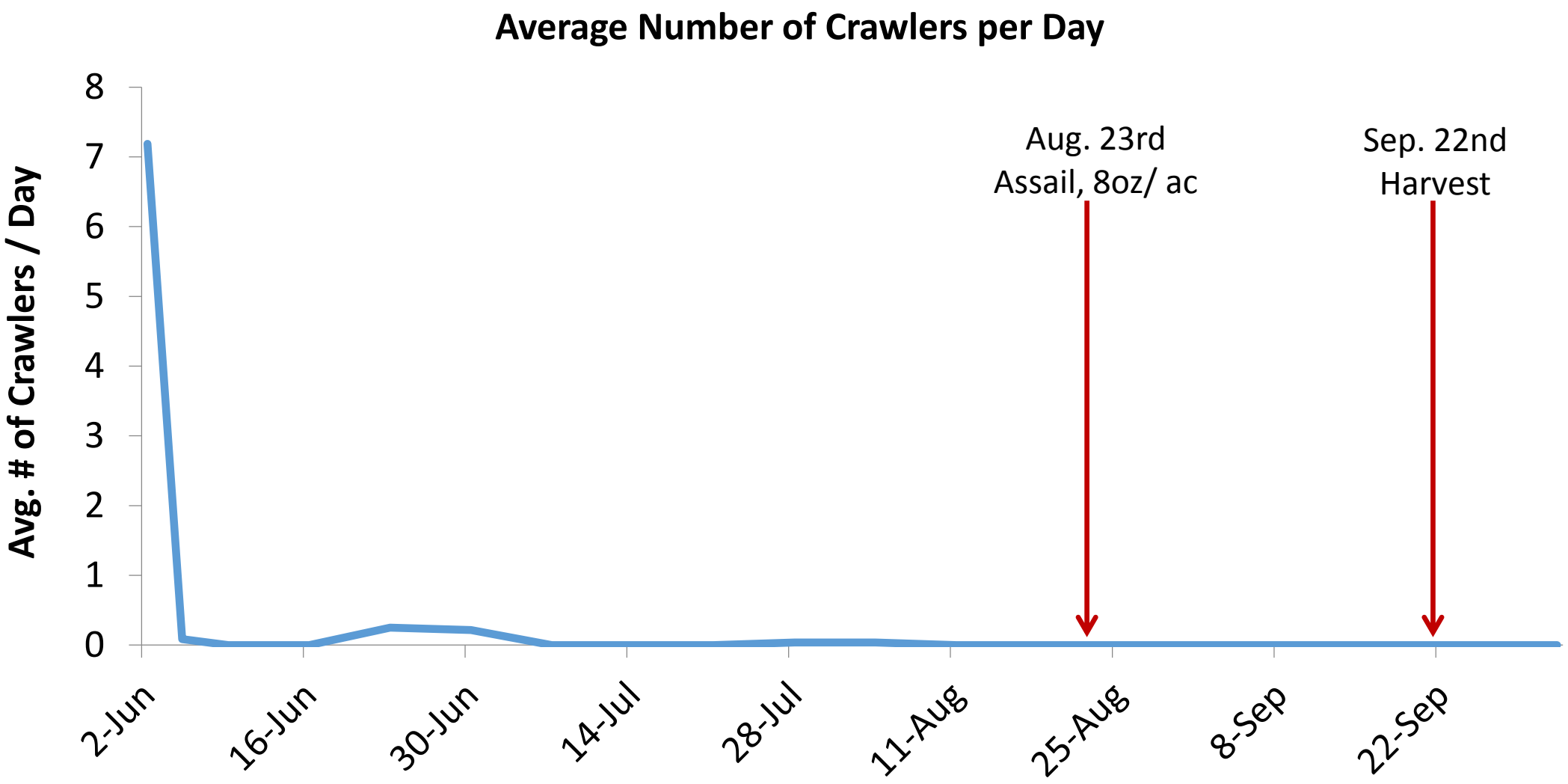

Managing scale: treatment timings & options

Timings:

Delayed dormant (bud swell until flowering)

Crawler stage

- research suggests may be more effective timing

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Organic treatment options:

Organic option: oils

-Don’t apply when dormant!

Narrow range oils during summer:

-Watch for phytotoxicity

Managing scale: Current Research into Control Options

Lead researchers: B. Van Steenwyk, C. Wise, J. Hasey

Methods:

- 4 replicates in Vina walnuts

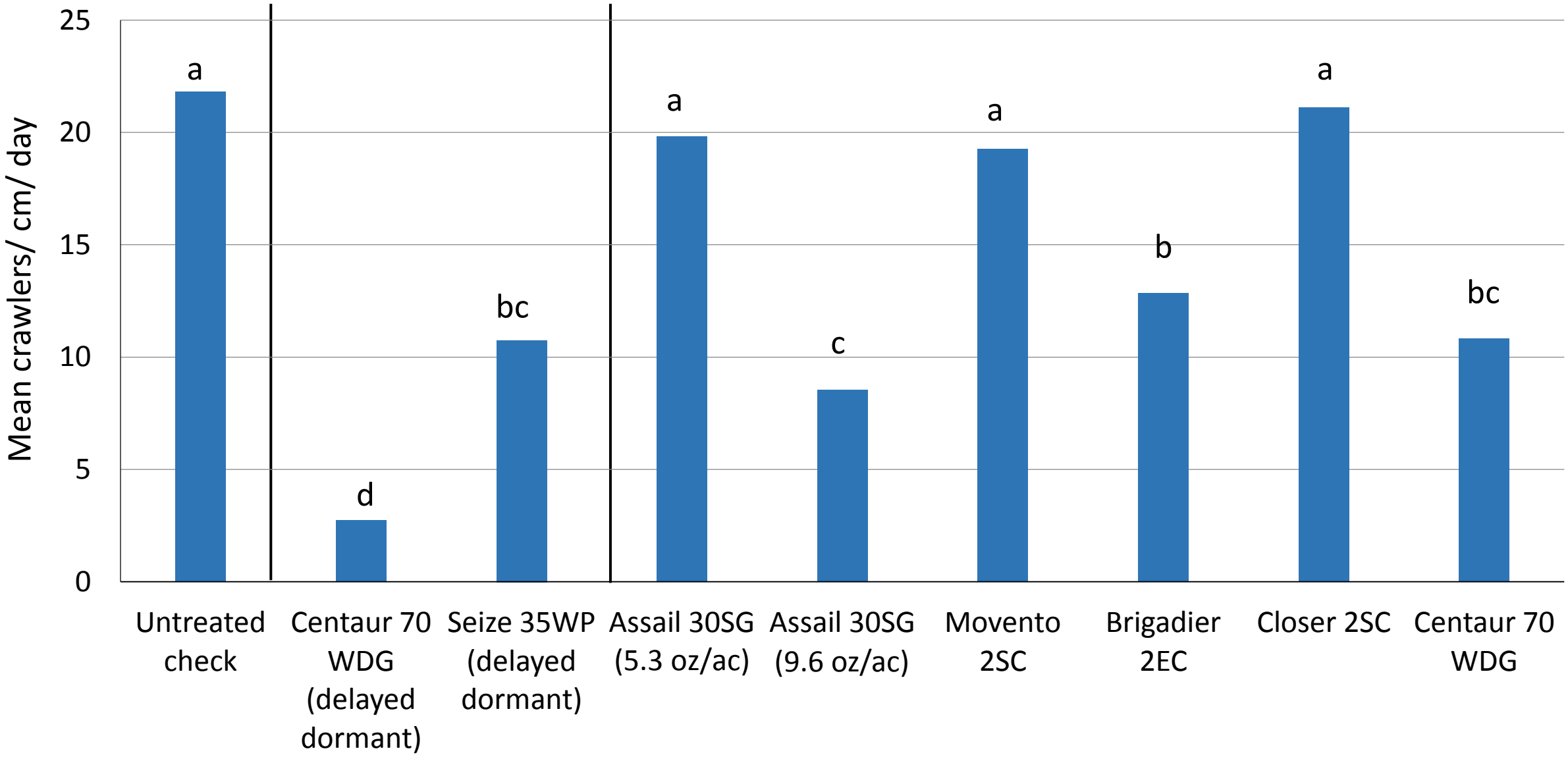
- Each tree monitored with sticky tape -- March 25th – June 2nd
  - First crawlers: April 23rd

- Treatments applied:
  - Post Delayed Dormant – April 8
  - Crawler stage: May 6

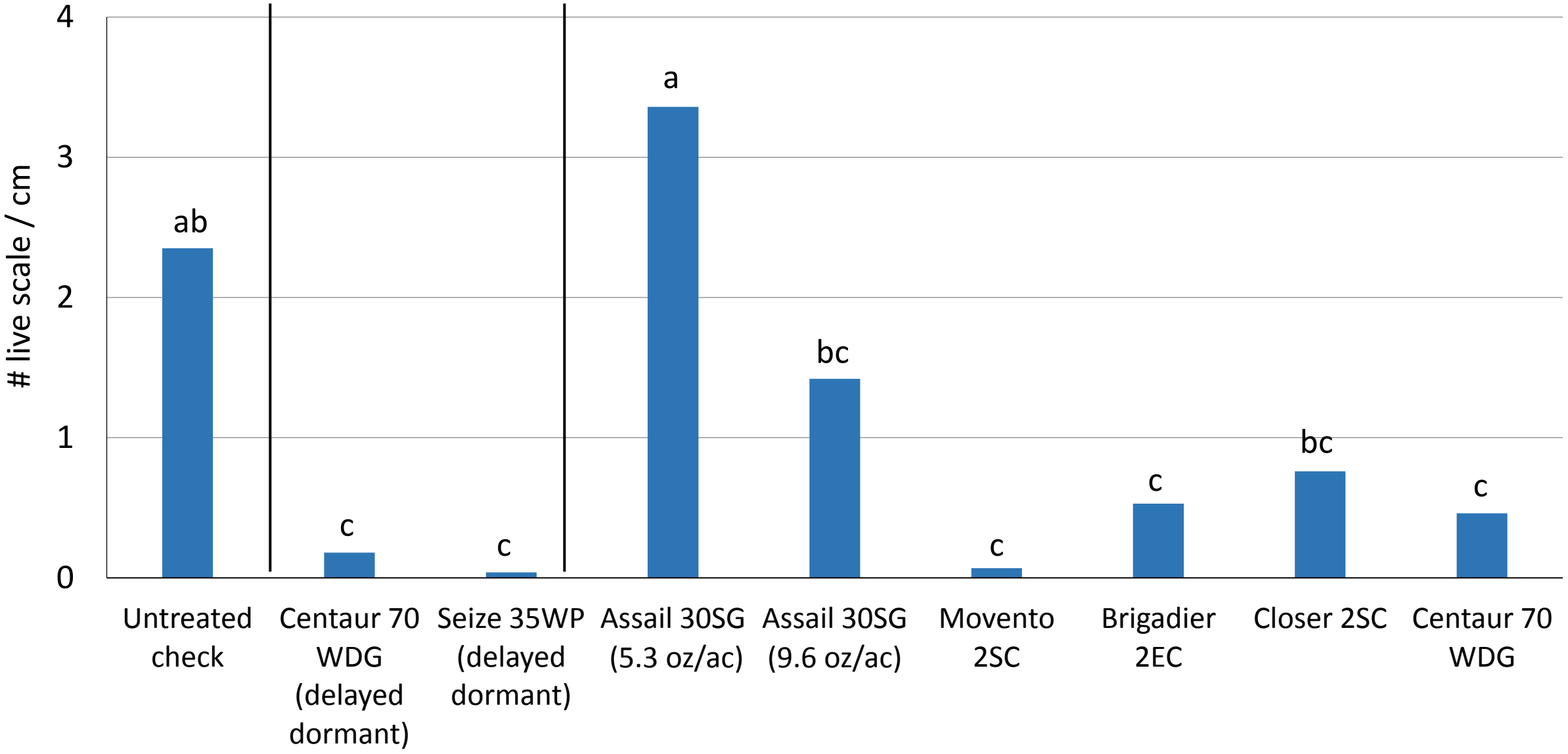
Study treatments

Treatments:	Rate Form/ ac:
Post Delayed Dormant (April 8):	
Centaur 70 WDG	46.0 oz
Seize 35 WP	5.0 oz
Crawler Stage (May 6):	
Movento 2SC	9.0 fl. oz
Assail 30SG	9.6 oz
Assail 30SG	5.3 oz
Brigadier 2EC	12.8 fl. oz
Closer 2SC	5.75 fl. oz
Centaur 70 WDG	46.0 oz
Untreated check	---

Results: Mean Crawlers / Day: May 12 – June 2, 2014



Results: Live Scale / cm: Jan 21, 2015



Questions??

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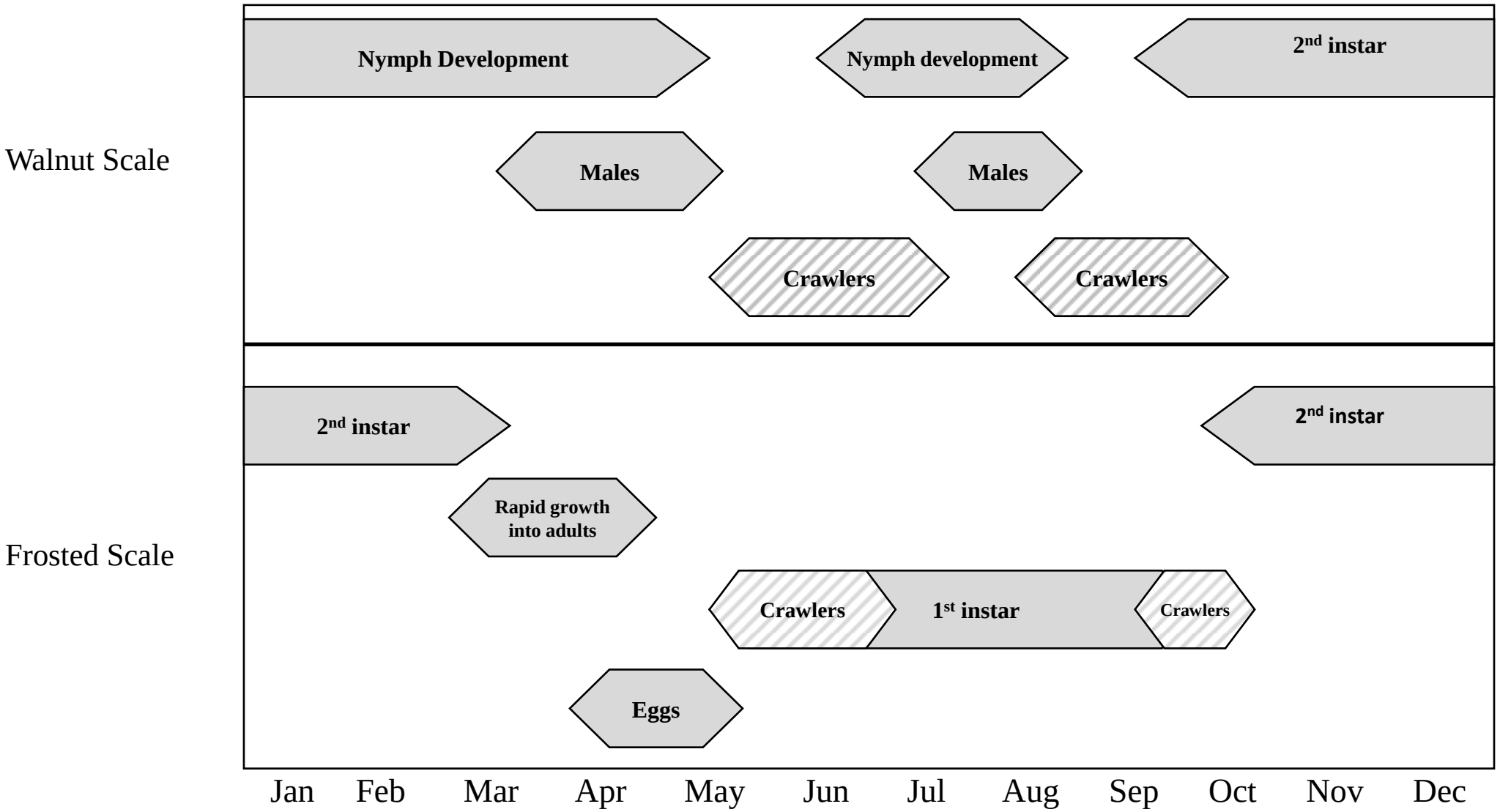
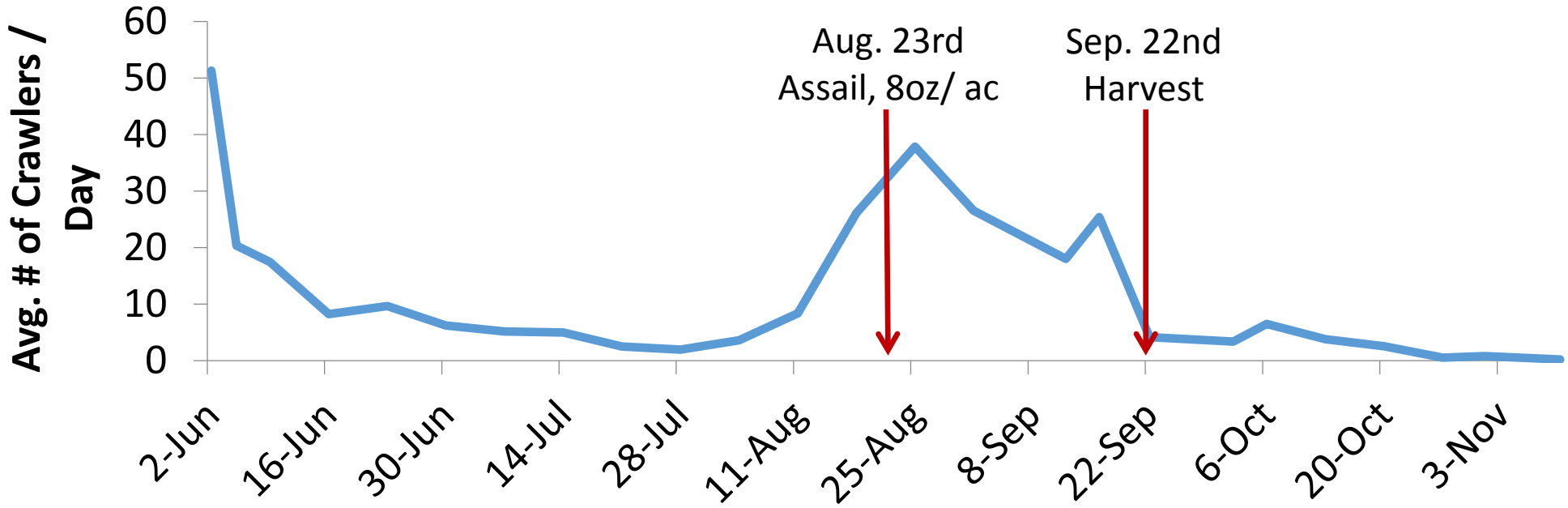
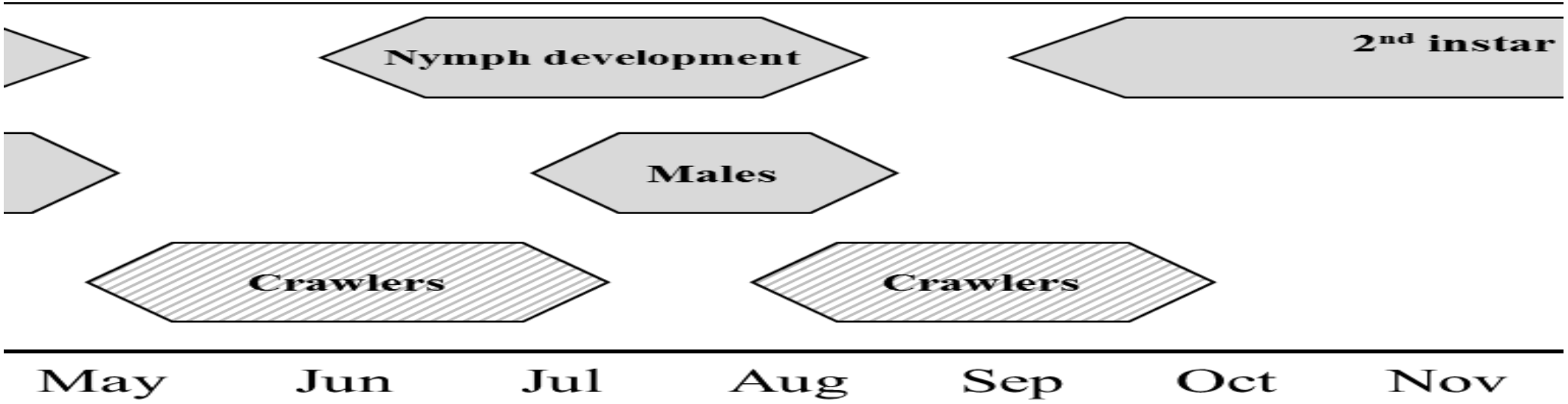
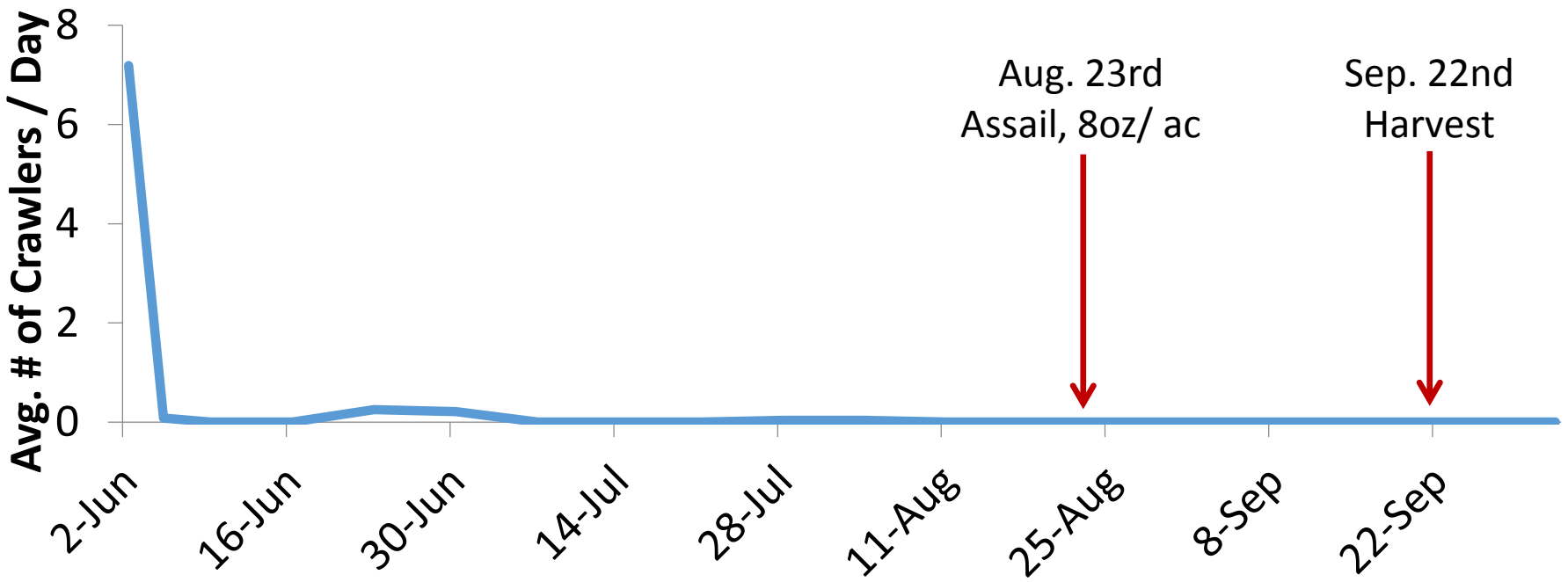
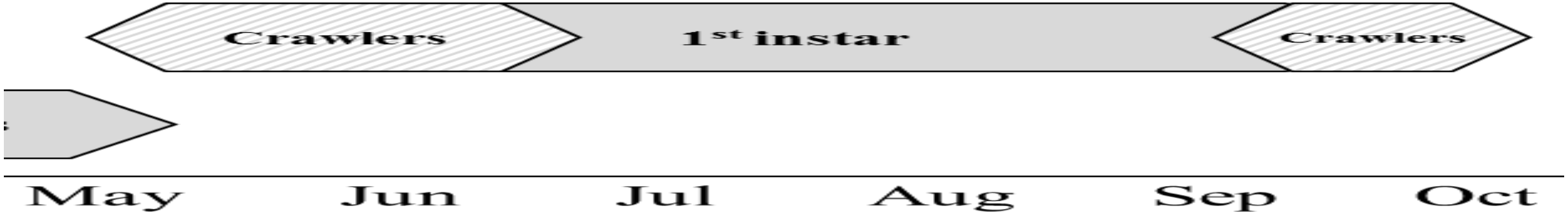
530-865-1153


Walnut Scale
Nymph Development
Nymph development
2nd instar
Males
Males
Crawlers
Crawlers
Frosted Scale
2nd instar
2nd instar
Rapid growth into adults
Crawlers
1st instar
Crawlers
Eggs
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

Scale Monitoring: Red Bluff 2014 – Walnut Scale

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