Thrips Management in Blueberries

Blueberry Day, UC Kearney Agricultural Center, May 2008

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Thrips

- “fringe wings”
- small, narrow
- gradual metamorphosis
- rasping/sucking mouthparts
- 4 wings- both pairs narrow straps fringed with hairs
- mostly plant pests, some beneficial

Thysanoptera

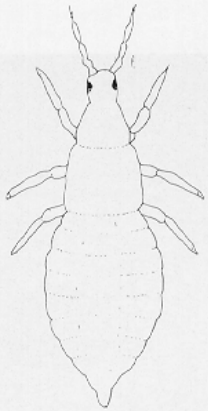
Citrus thrips life cycle

- Eggs deposited in leaf tissue
- Eggs become larvae
- Larvae feed on new flush
- Prepupae
- Adult
  - Male smaller than female
  - Have wings

Citrus thrips vs. Flower thrips

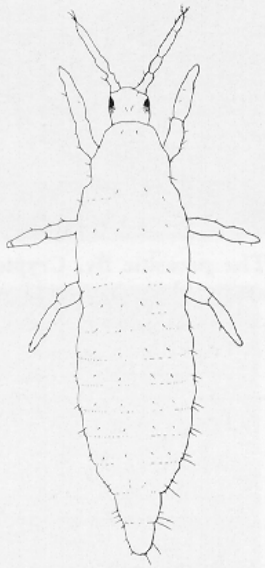
CITRUS THRIPS LARVA

- about 99% on new leaves and small fruit
- maturing larvae broadly oval shaped, light amber in color, very active; very small spines or hairs, hardly visible with hand lens
- adults extremely active; abdomen rounded, light orange yellow



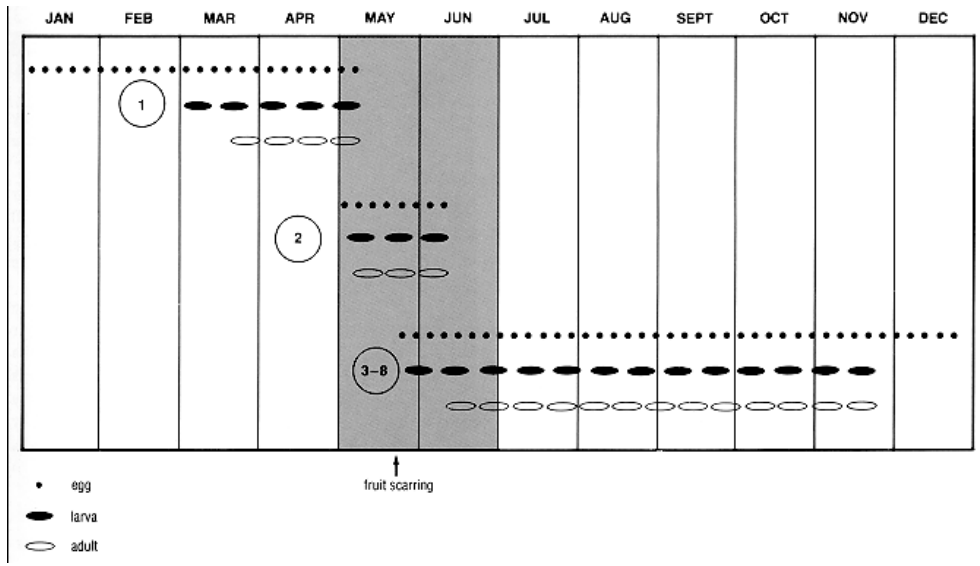
FLOWER THRIPS LARVA

- about 99% in blossoms, disperse after petal fall
- larvae slender, cigar shaped; pale yellowish to white, slow moving; spines or hairs visible with hand lens
- adults relatively sluggish; abdomen straight, cigar-shaped; straw colored or dark brown

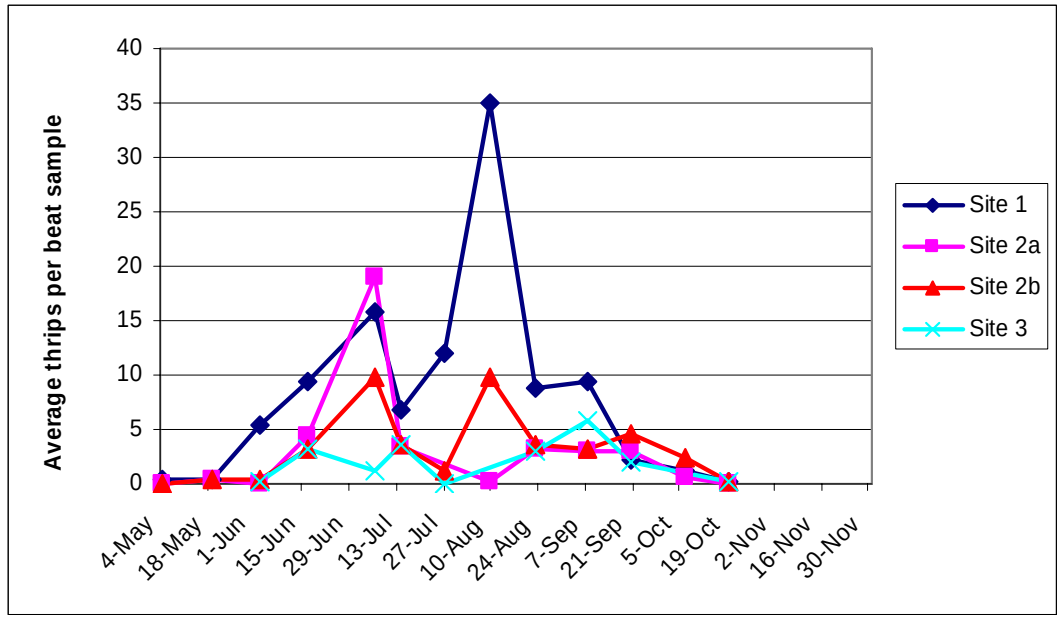


Seasonal Biology

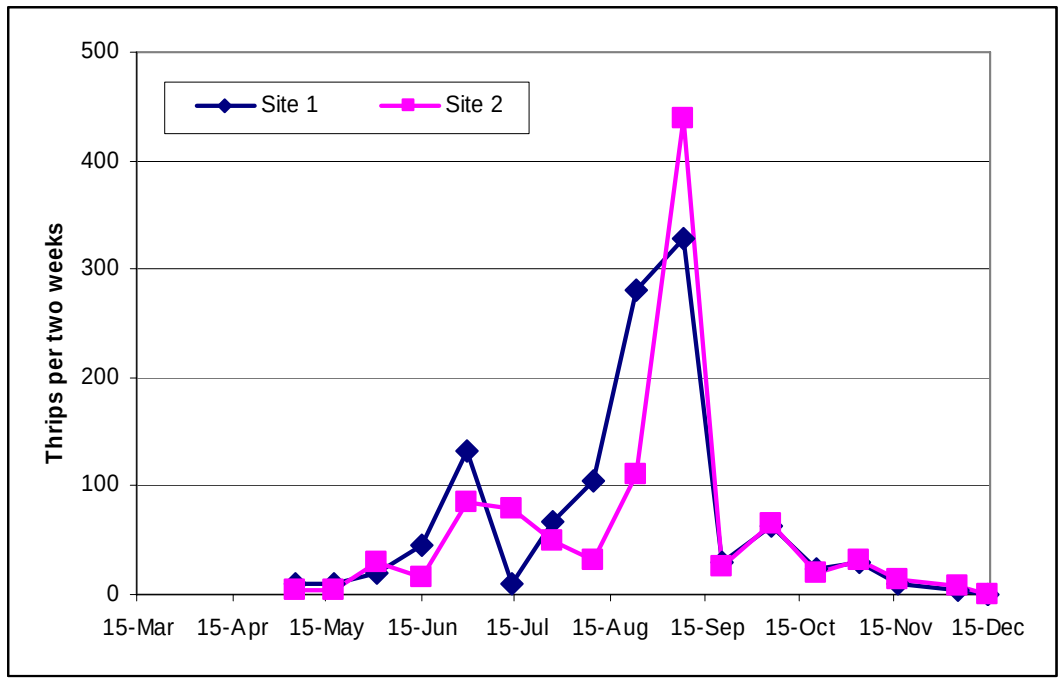
- Navel Orange
- Up to 8 generations per year
- First appear in March
- May/June (small fruit) critical in citrus
- 3rd generation begins around June 1
- Multiple pesticide applications in non-bearing citrus



Average number of citrus thrips per beat sample

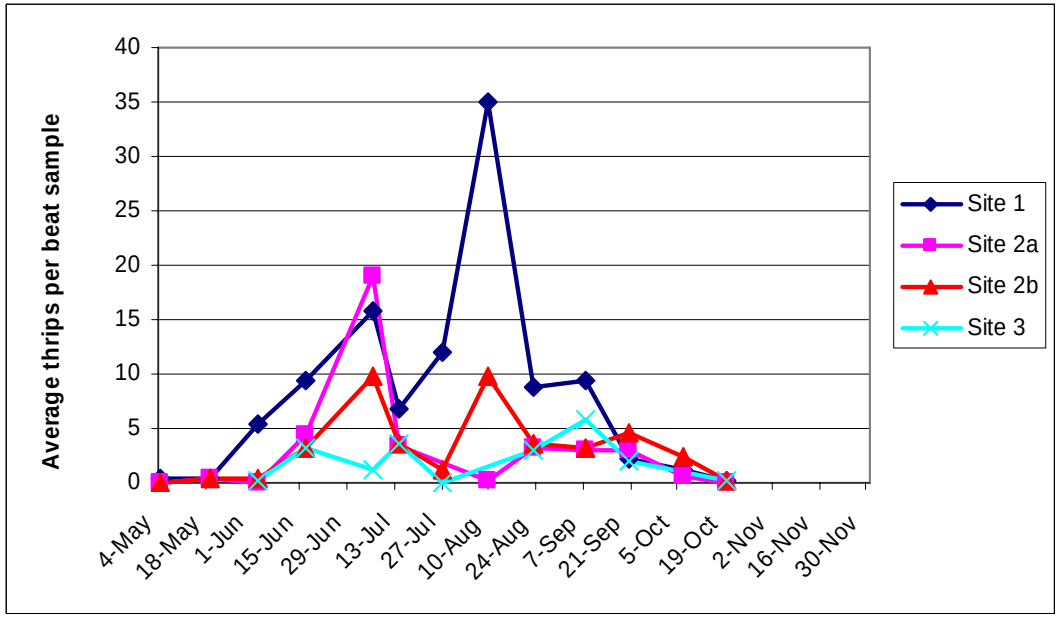


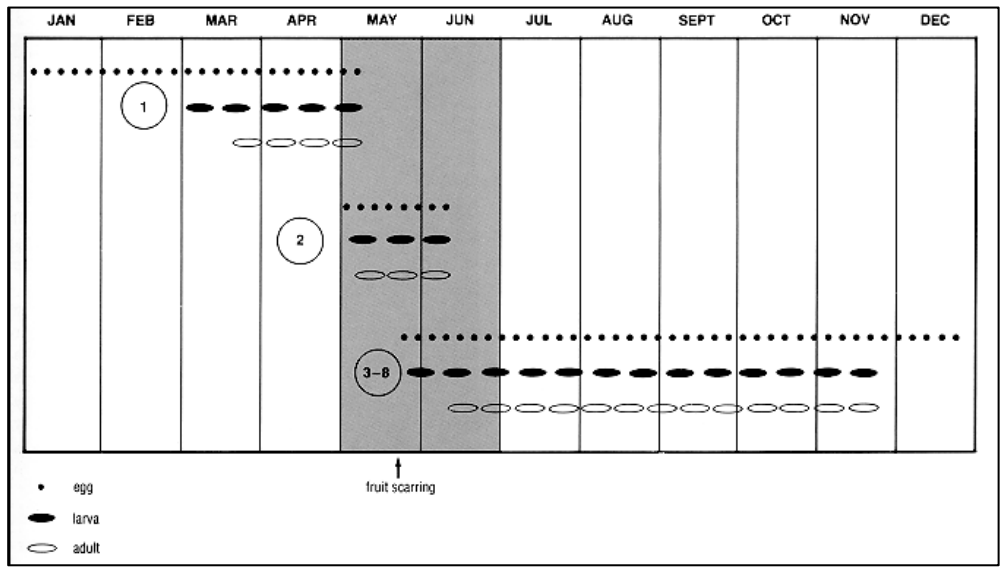
Average number of citrus thrips per yellow sticky cards



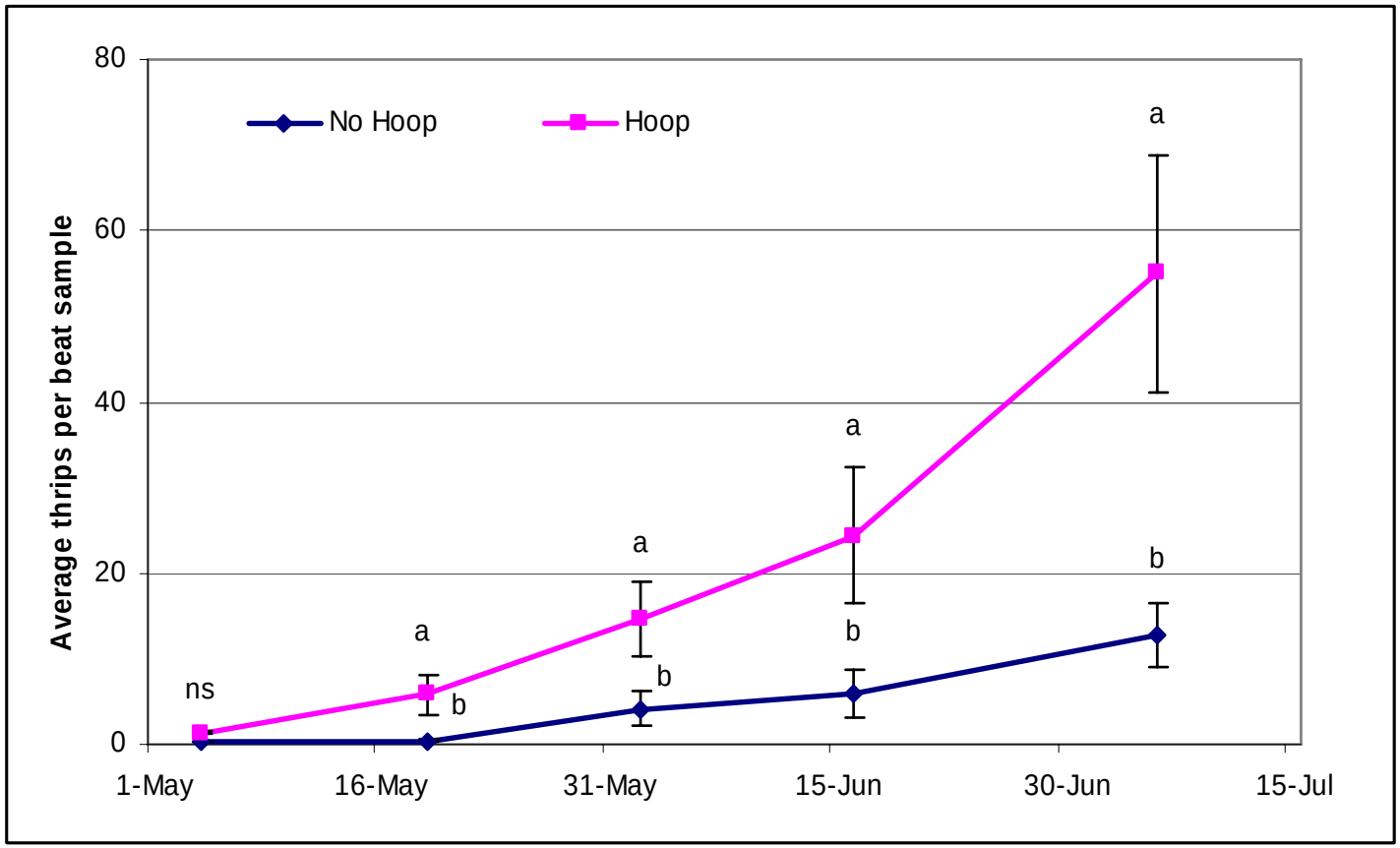
Notes:

- Samples taken in the canopy
- Probably miss the entire first, and possibly second generations on the suckers from March through May
- In the upper canopy by mid June
- Natural cycling out by late September (no more egg hatch)
- Populations crash by mid October





Effects of using tunnels on thrips densities in the spring



Damage to blueberries

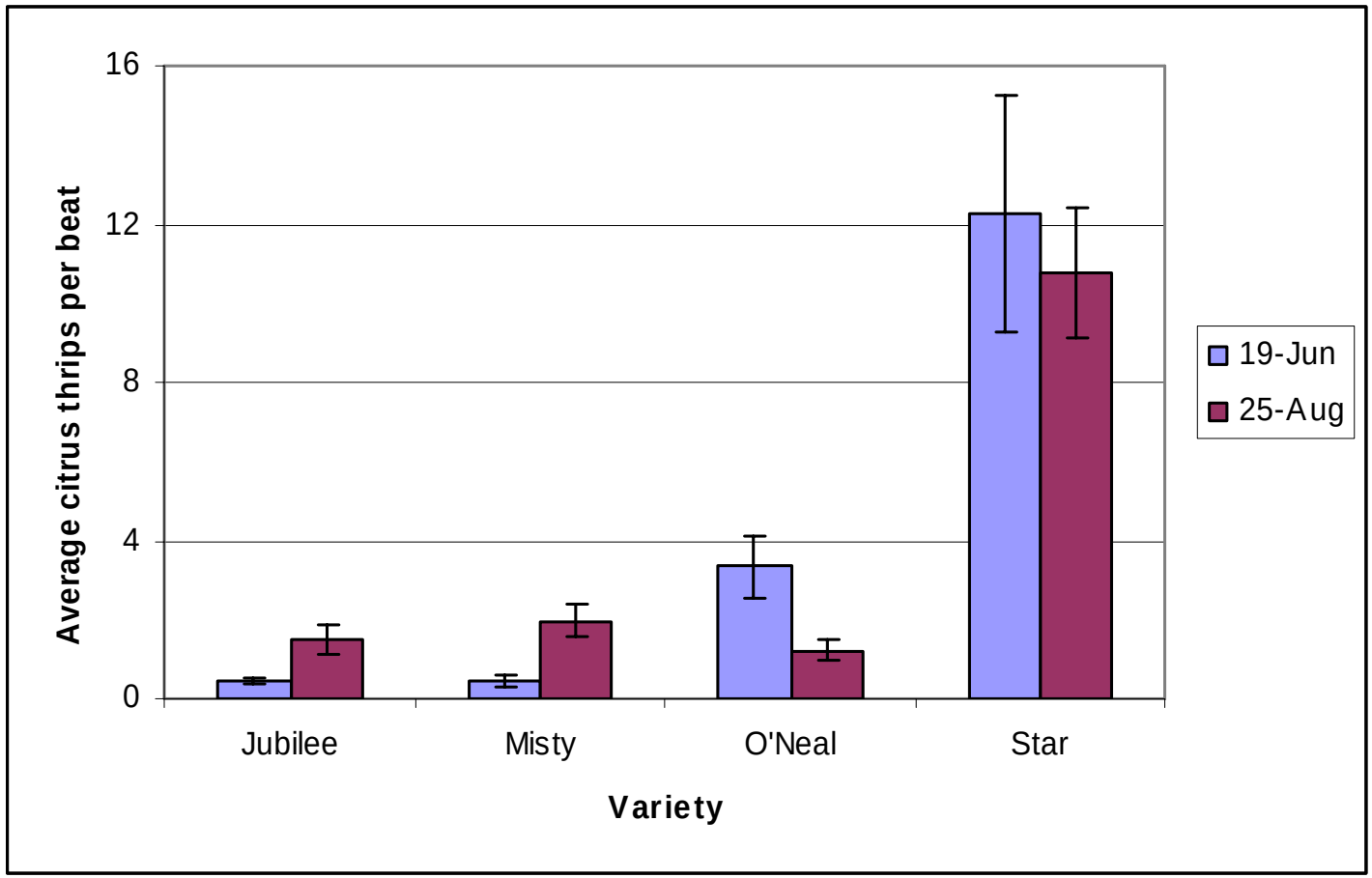
- Do not appear to directly damage fruit
  - Down on suckers, not near fruit
- Feed on new flush
  all summer
  - Shoot stunting
  - Leaf deformation
  - Shortened internodes
  - Stem scarring
  - Varies by variety

Damage to blueberries

Beat samples

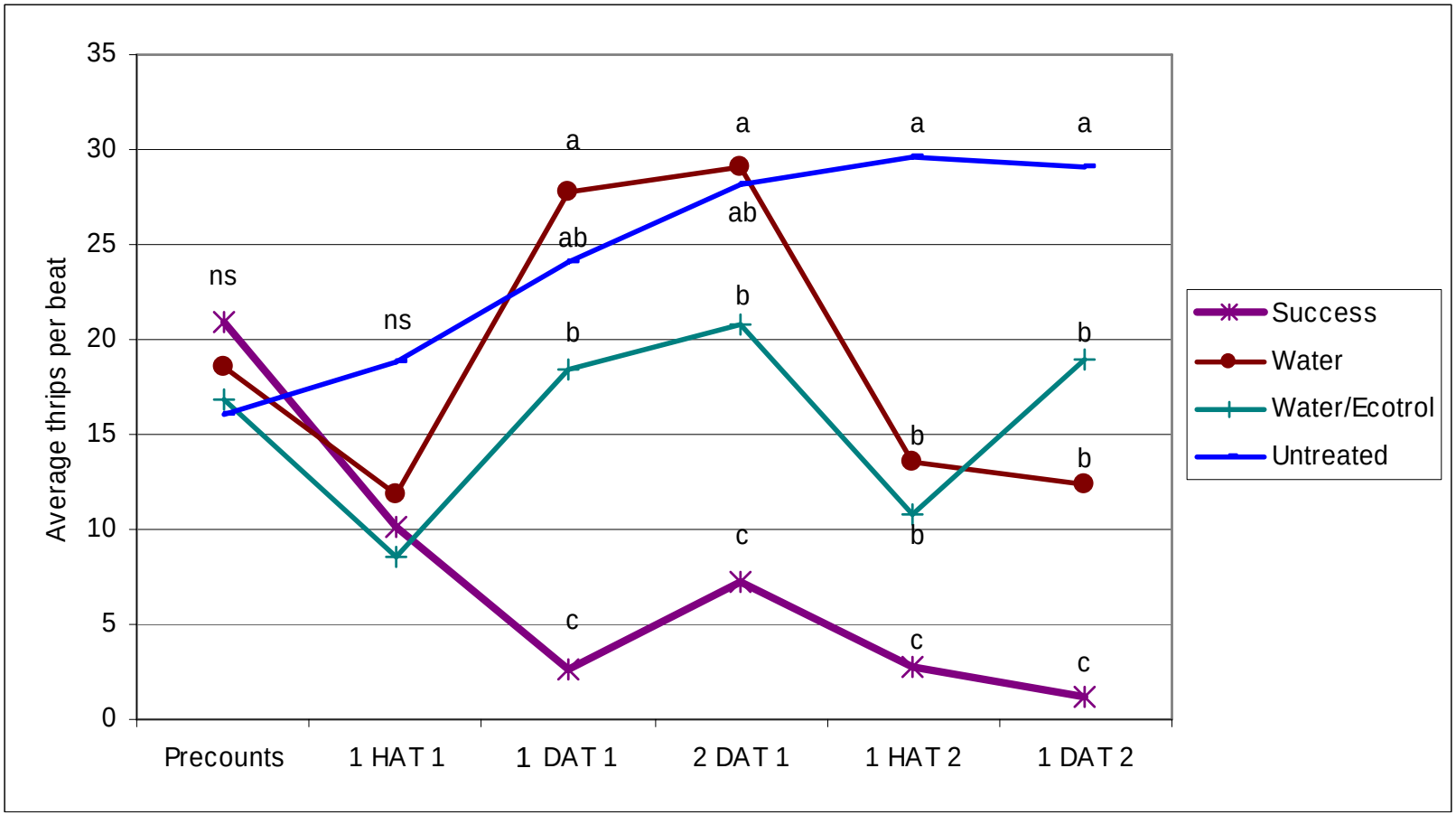
- 10 shoots per sampling area
- Sample most sensitive variety
- Select top 6-8 inches of new flush
- Choose new shoots with few laterals
  - Make sure terminal is alive (try to standardize sampling)
- Beat onto a black acrylic card
  - Also clipboard, notepad, your hand
- Count thrips
  - On hot days, count adults quickly, then nymphs
  - Best if done in the morning
  - Problematic when fruit is present
    - Solution could be to sample suckers

Varietal differences

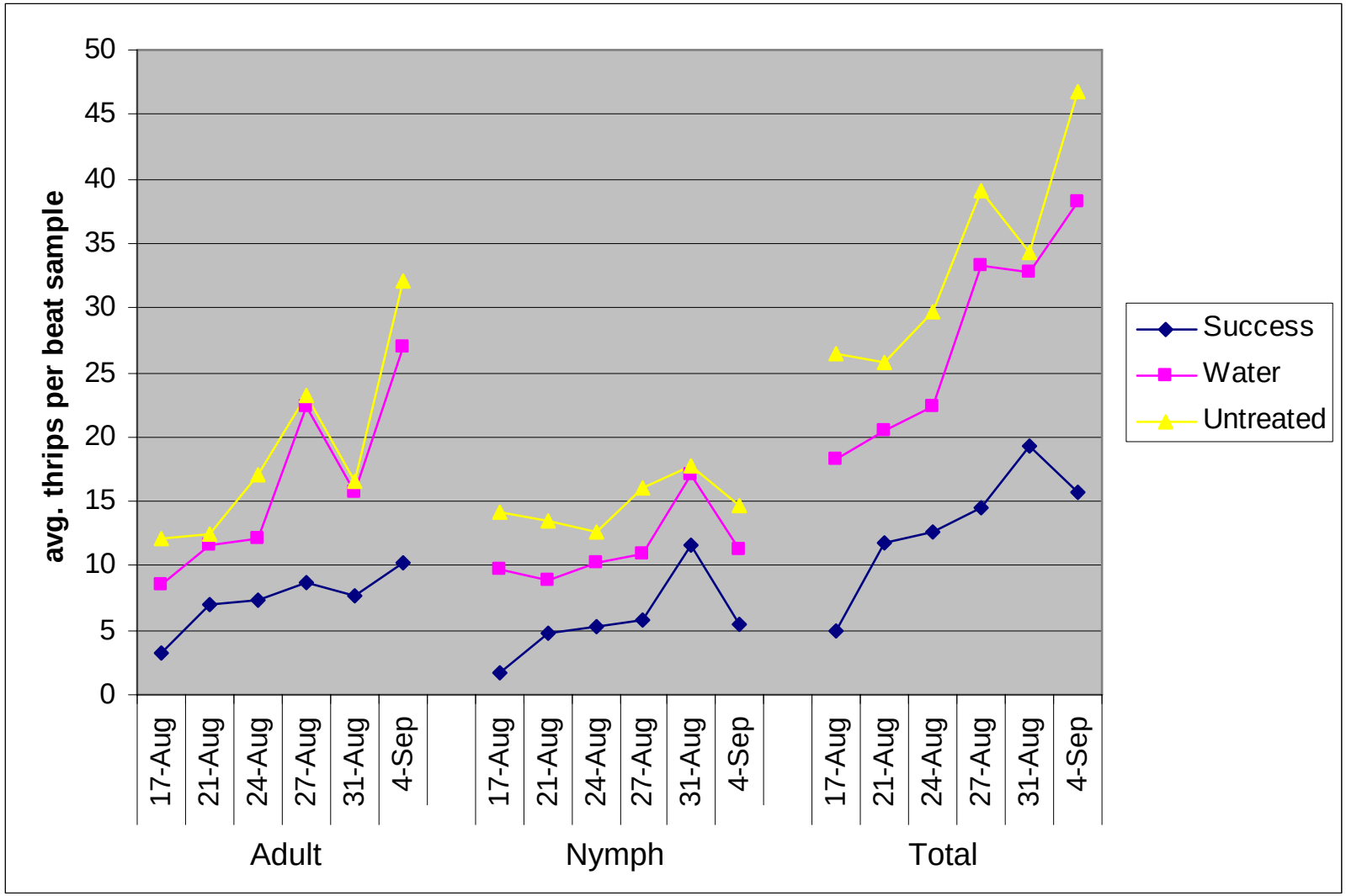


Star, Wonderful, particularly susceptible. Advisable to avoid these varieties. Mechanism of selectivity not known.

High pressure water

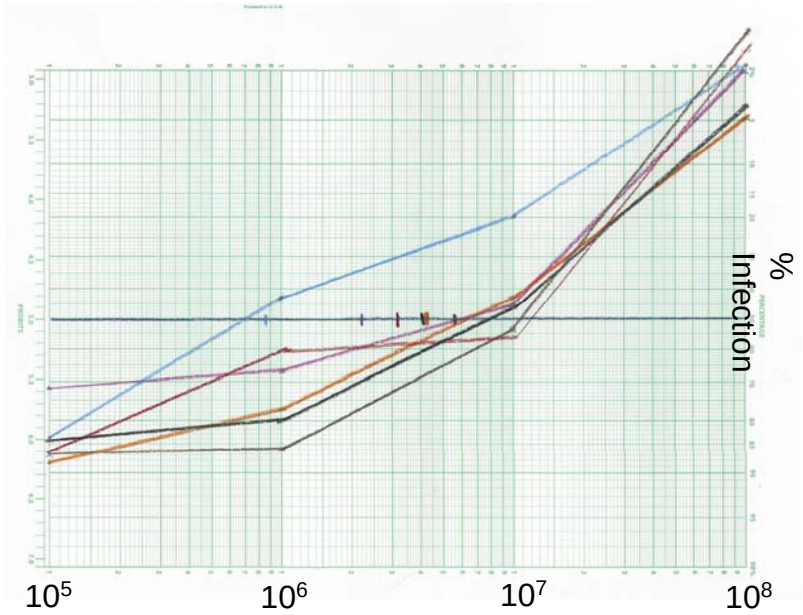


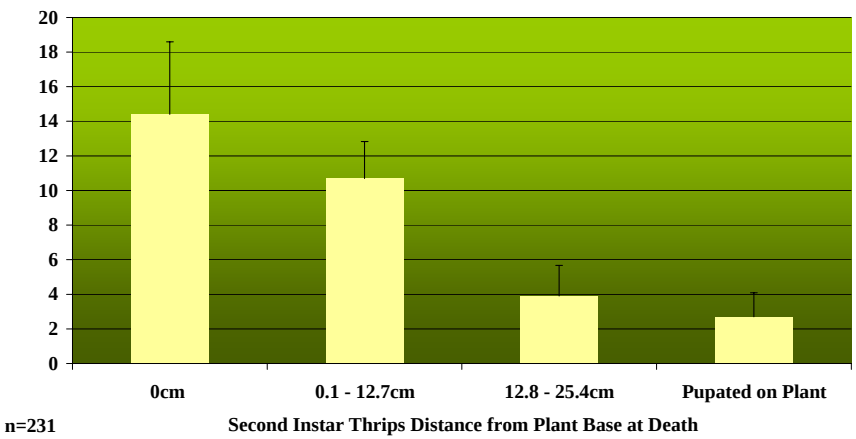
High pressure water



Biological Control

- None naturally occurring
- Insectary
  - Pred mites
  - Generalists
- Entomopathogens
  - *Beauveria* being investigated
  - Pathogen of pupal stage in soil



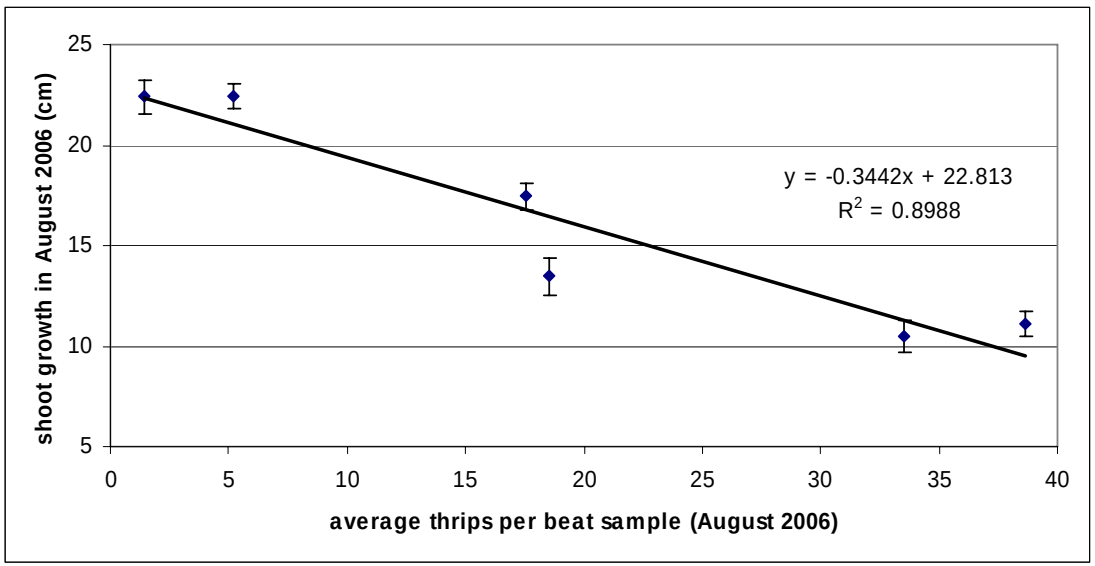


Damage Treatment Thresholds

So… how serious of an issue is this?

Georgia

O'Neal



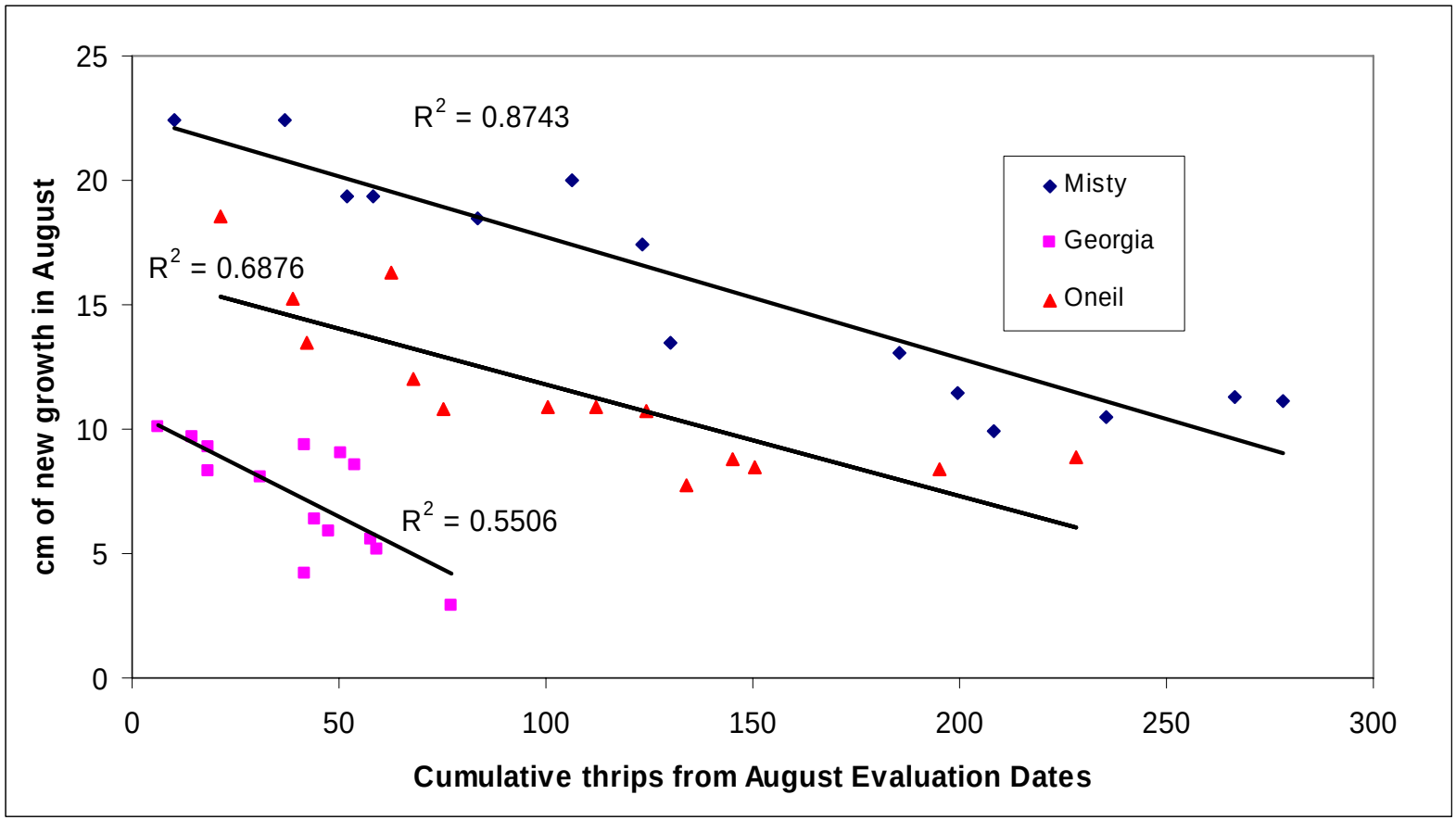
August 2007

- Thrips at/past threshold on Aug, 1
- Not treated for 1 month
- Measured thrips weekly
- Measured length of new growth

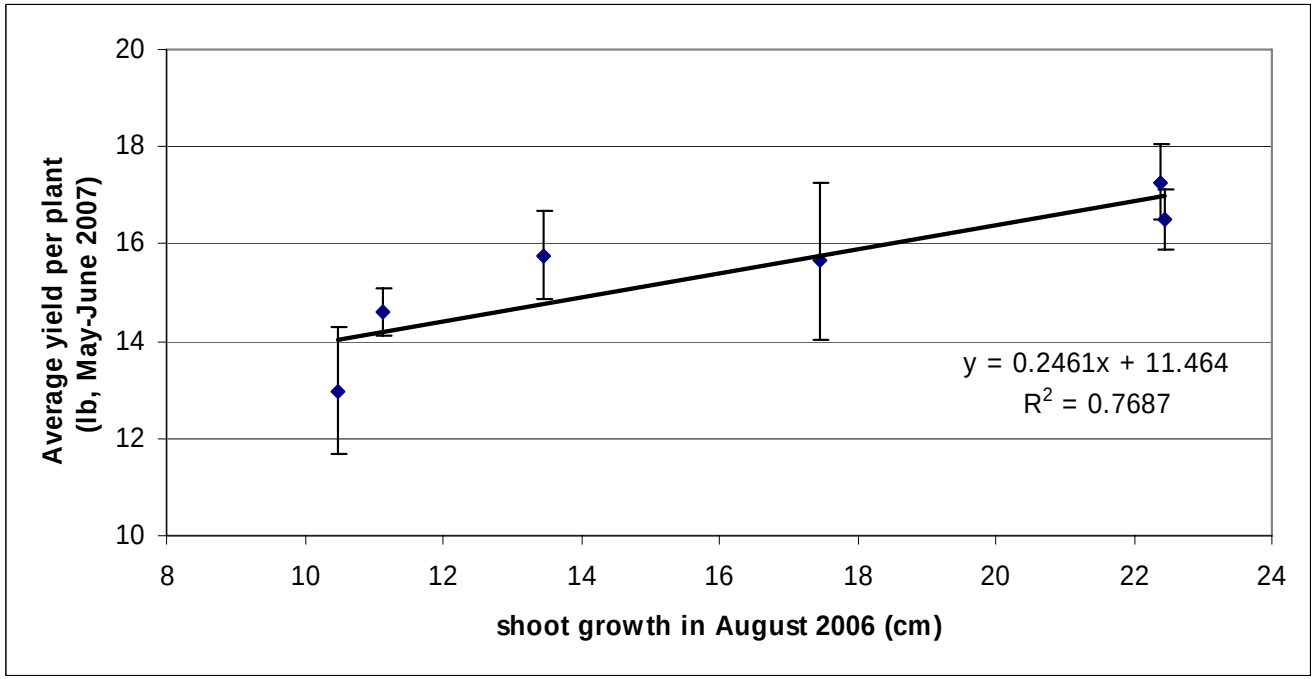
Spring 2007

- Evaluated yields and quality

Measuring thrips damage



Correlations between citrus thrips density in August and the amount of new flush growth in August for three blueberry varieties.



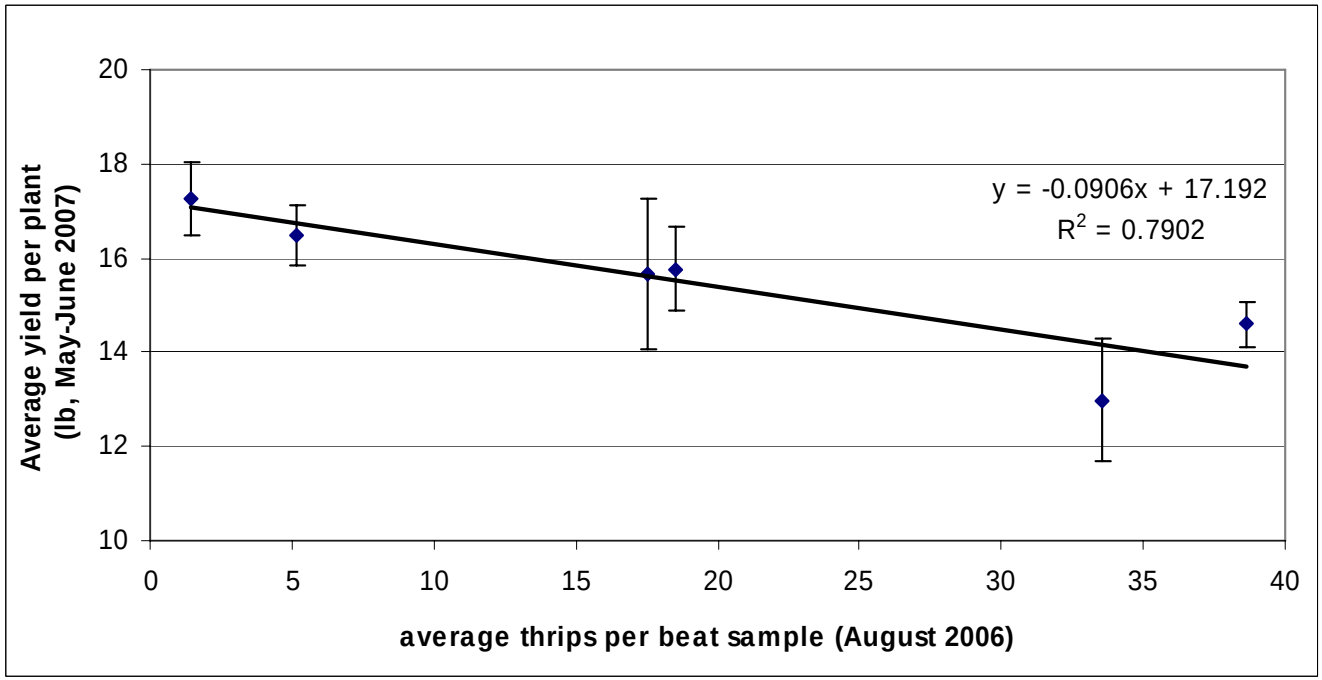
Shoot growth and Thrips vs. Yield

(based on 240 plants =1.5 million berries)

For every 10 thrips average for 1 month, 0.91lb/plant reduction in yield (5.26%)

Control plots-

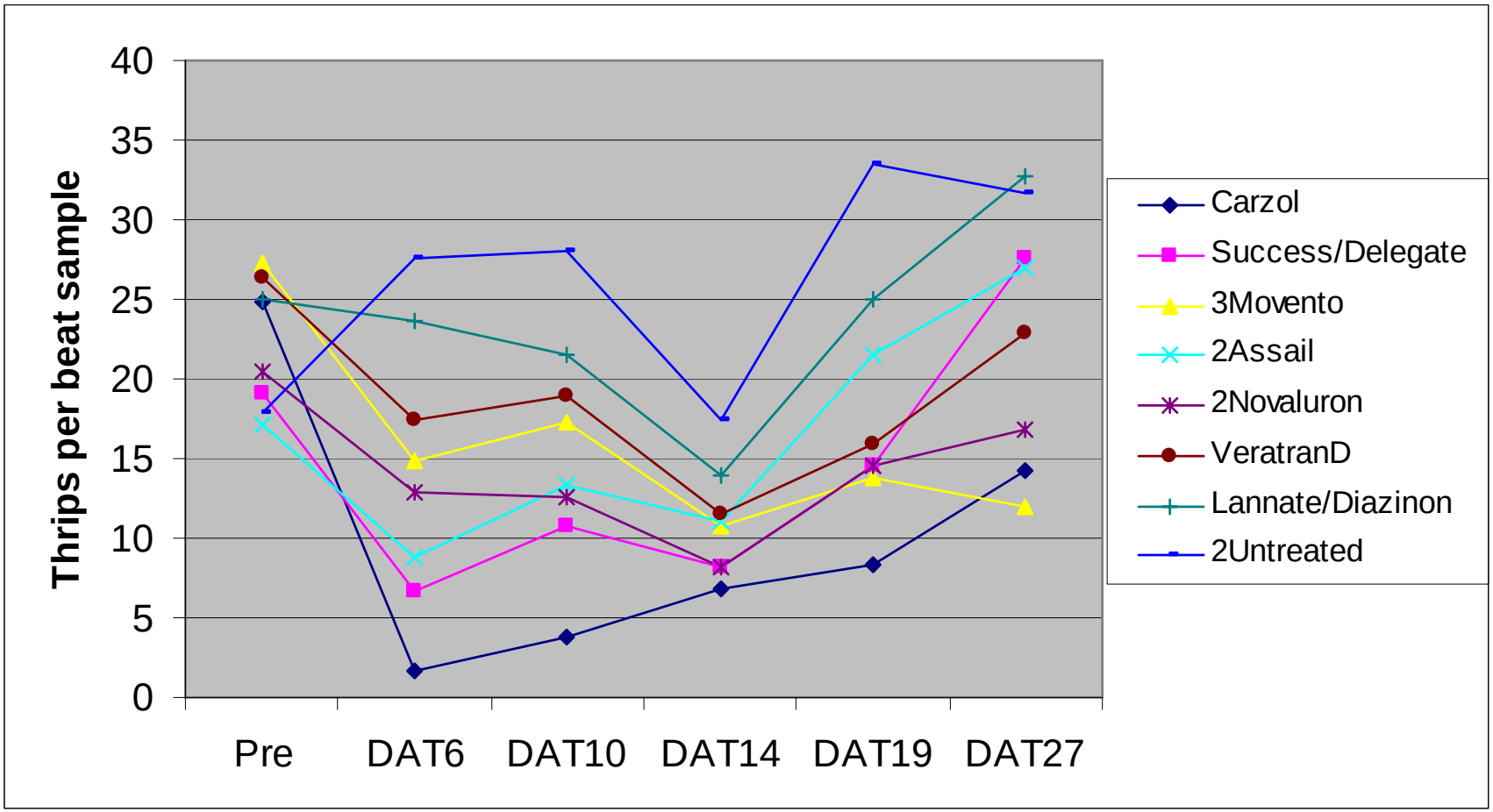
- 3.2 lb/plant reduction (18.4%)
- ~$16,000/acre in losses



Yield Studies Summary

- Impact
  - Reduced growth (2 yrs)
  - Reduced number of berries
  - Reduced yield per plant
- No impact
  - Size of berries
  - Quality of berries
  - Shift in harvest date

Conventional Insecticide Trial



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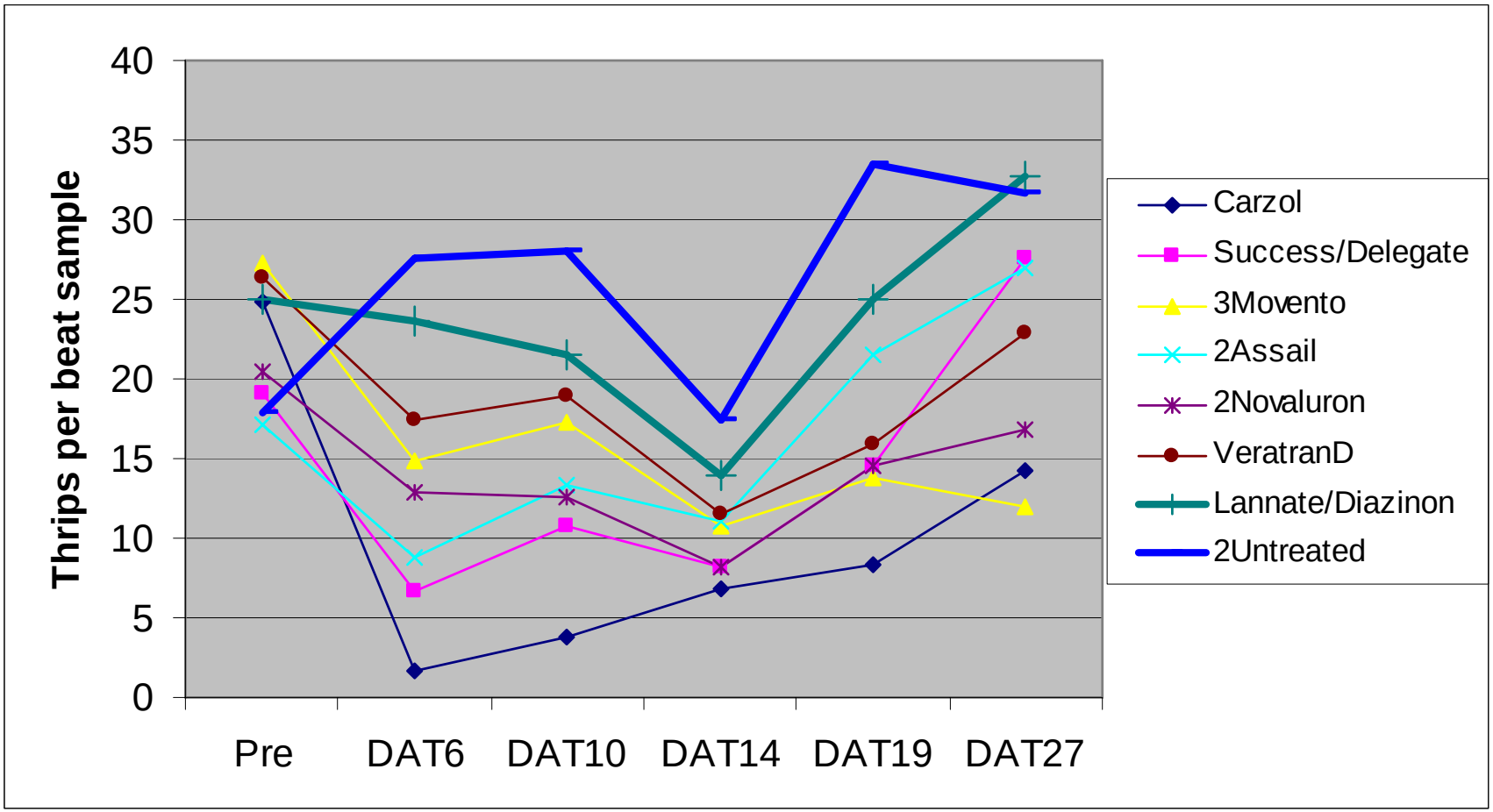

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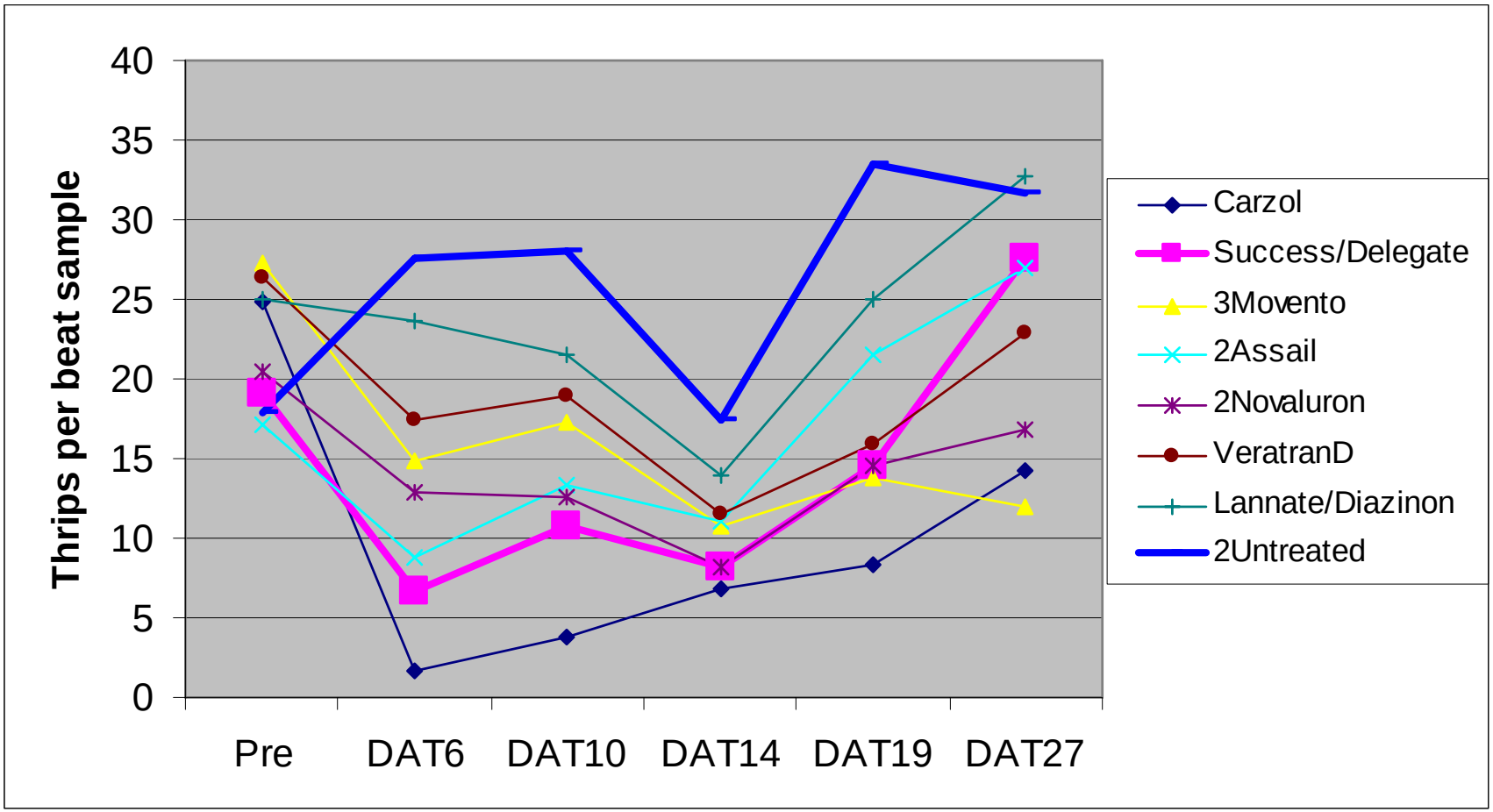

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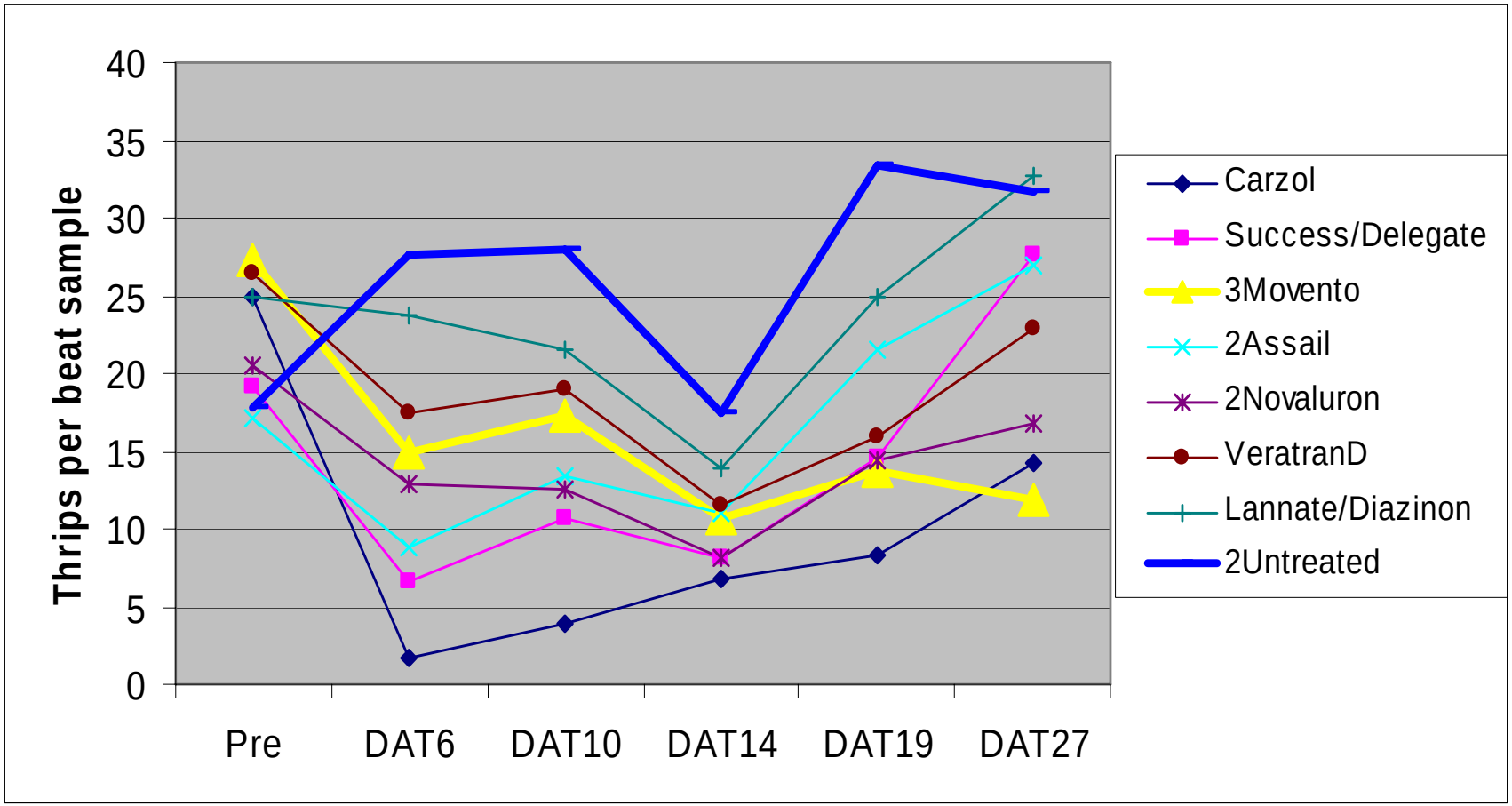

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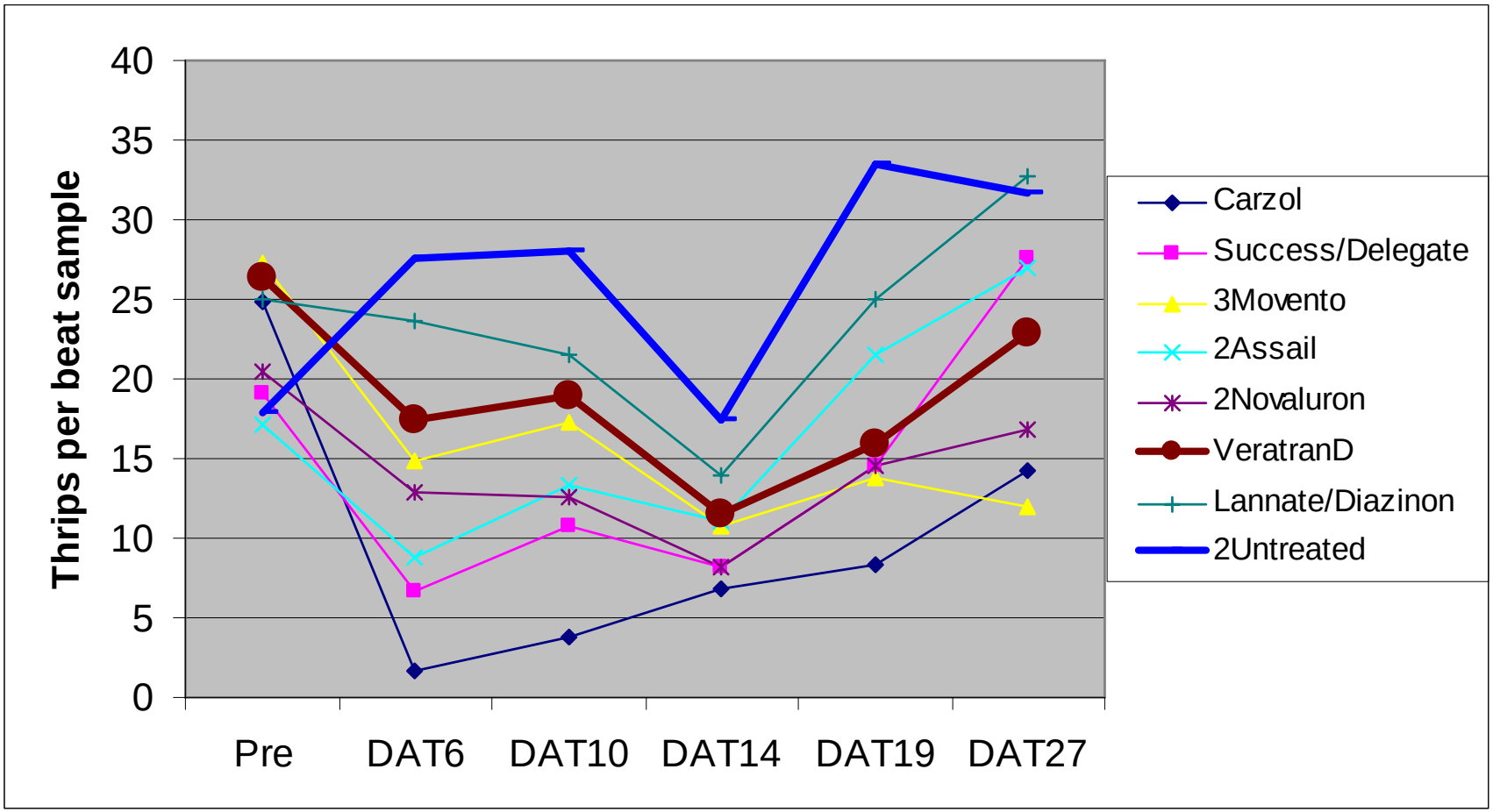
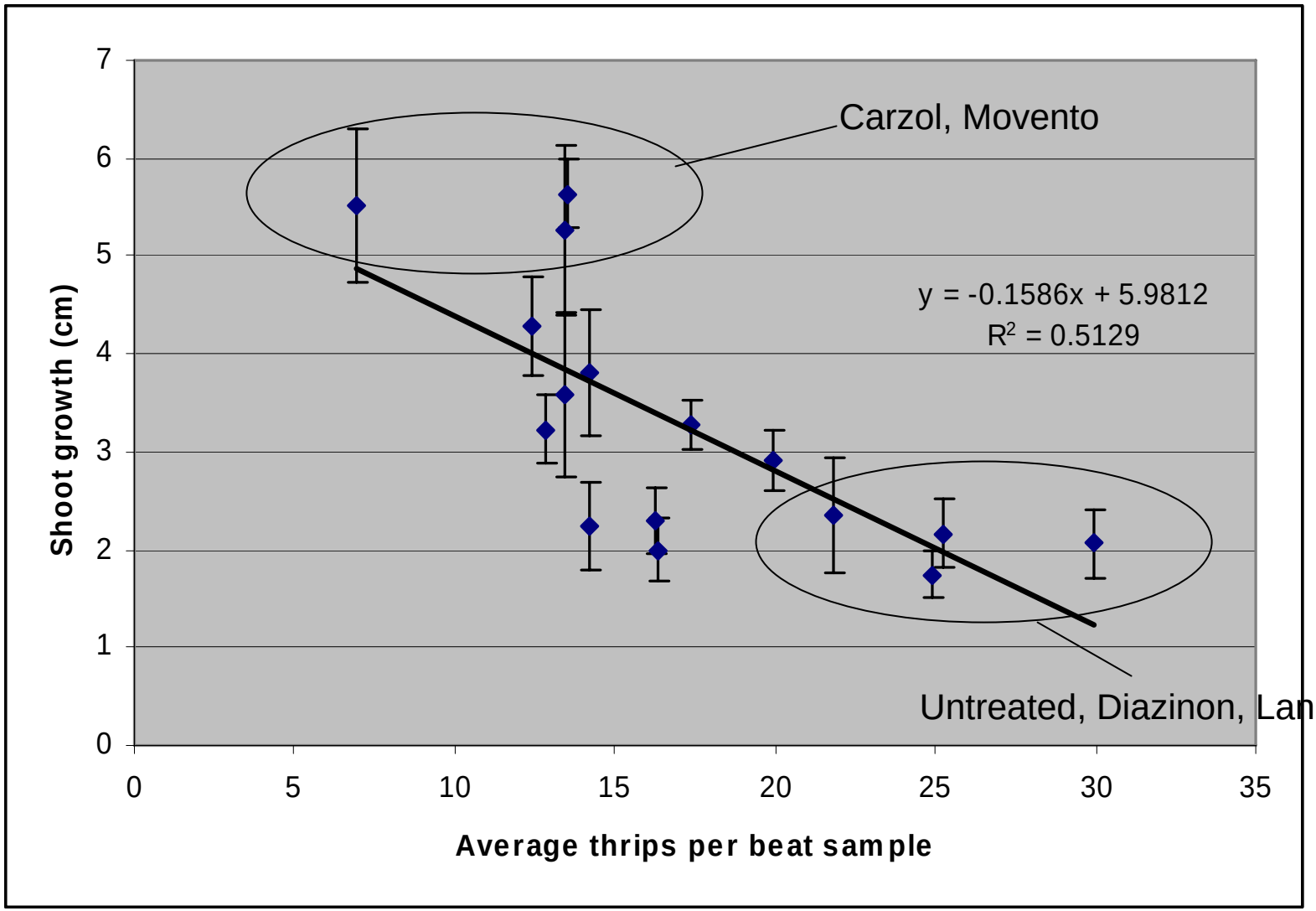


New Shoot Growth (Star)



Treatment Program Summary

- Don’t worry until harvest is over
- Monitor, treat at about 20 thrips per beat sample
- Success/Delegate
- Follow up with Movento (June? Reg,) ~2-3 wks later
- Alternate with Assail, Veratran D (NR?)
- In the clear by late September

Other Insect Pests

White Grubs

Pacific Flatheaded Borer

White Grubs (Chafers)

- May beetle, scarab, chafer, white grub, June bug, etc.
- C-shaped grub
- Brown adult (attracted to lights in the summer)
- One generation per year
- Highly polyphagus

Grub biology

- Adults present during the summer (June? to July?)
- Lay eggs on soil surface
  - Attracted to organic matter
- Grub emerges, feeds through the fall
  - Numerous host plants
  - Usually feed on feeder roots
- Overwinters as large grub
- Pupates in the spring
- Emerges as an adult

Management

- Biological Control
  - Nematodes
    - *Heterorhabditis bacteriophora*
    - *Steinernema carpocapsae*
    - Timing?, Heat/moisture sensitivity issues
- Insecticides
  - Imidacloprid (Admire)
  - Diazinon
  - Timing likely best in ~August when grubs are small

Pacific Flatheaded Borer

- Adults emerge April-July
- Lay eggs on bark
  - Usually weak or sunburned areas
- Feed within wood
- One generation per year

Pacific Flatheaded Borer

Management

- Insecticides ineffective in most crops
- Pruning
- Destroy prunings
- Sunburn prevention
  - White wash or paint
  - Avoid summer pruning