Refined Management of Late-Season Insects in California Cotton to Protect Lint Quality

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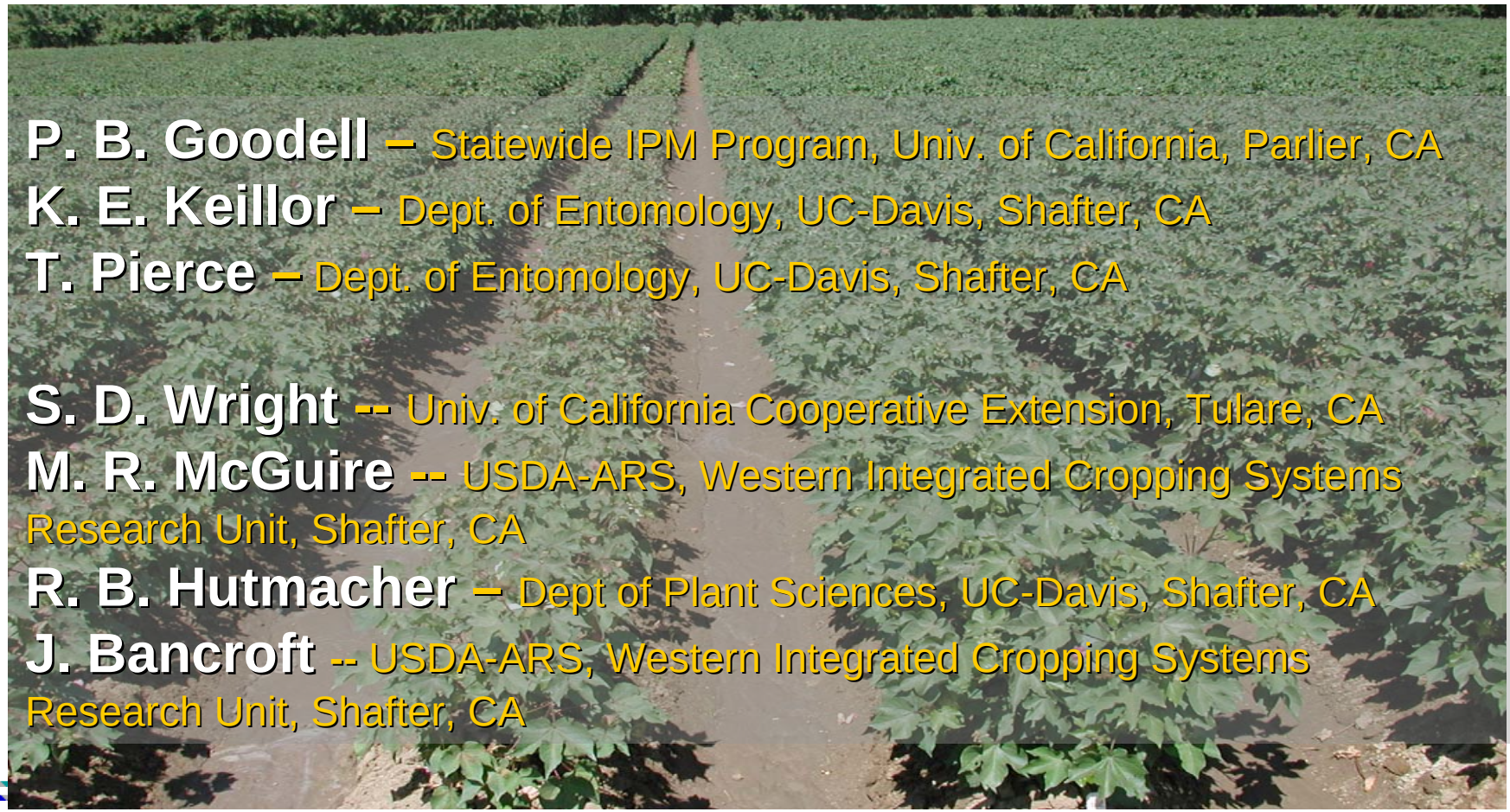
Late-Season Insect Pests and Cotton Lint Quality

- **Sticky cotton became an issue in the SJV with the 2001 crop**
- combination of late-season cotton aphid and silverleaf whitefly infestations

Late-Season Insect Pests and Cotton Lint Quality



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Late-Season Insect Pests and Cotton Lint Quality

- Reports from mills of 2001 SJV crop being sticky
- combination of late-season cotton aphid and silverleaf whitefly infestations
- not unprecedented but fairly rare for SJV cotton
- set of conducive conditions in 2001
  - long warm fall with no rainfall
  - much of the planting was delayed until late April
  - delayed harvest which placed exposed lint during the period of highest insect pressure
  - cotton economics

Late-Season Insect Pests and Cotton Lint Quality

- for a production region to be implicated for producing sticky cotton is very serious
- other commodities are assessed at the point of sale for "quality" and the grower paid accordingly
- cotton is not

Why?

- stickiness is difficult and expensive to quantify
- meaning of data unclear

Late-Season Insect Pests and Cotton Lint Quality

- if a production region gains the reputation for producing sticky cotton the merchants pursue that cotton less aggressively
- less demand = lower price
- much of the cotton is sold and utilized internationally and the information flow is far from perfect

Late-Season Insect Pests and Cotton Lint Quality

- Unique challenge for the grower
  - Spend money ≠ yield and immediate return
  - Spend money = protect quality and long-term returns
- Challenge for industry
  - Deny presence of sticky cotton?
  - Accept responsibility

Late-Season Insect Pests and Cotton Lint Quality

- Industry-wide meeting to discuss situation – Feb. 2002
- Growers, ginners, brokers
  - Unified in response that sticky cotton unacceptable and penalties will be applied
- Extension & Research
  - Production meetings, information developed, re-education
  - Emphasizing the risk and discussing the solution
- CA Cotton Growers and Ginners Assn.
- Crop protection companies
  - PCA education on use of products

Late-Season Insect Pests and Cotton Lint Quality

Cotton Aphids

Late-Season Insect Pests and Cotton Lint Quality

mid-season pest

early-season pest

late-season pest

occasional pest at worst

1980

1990

2000

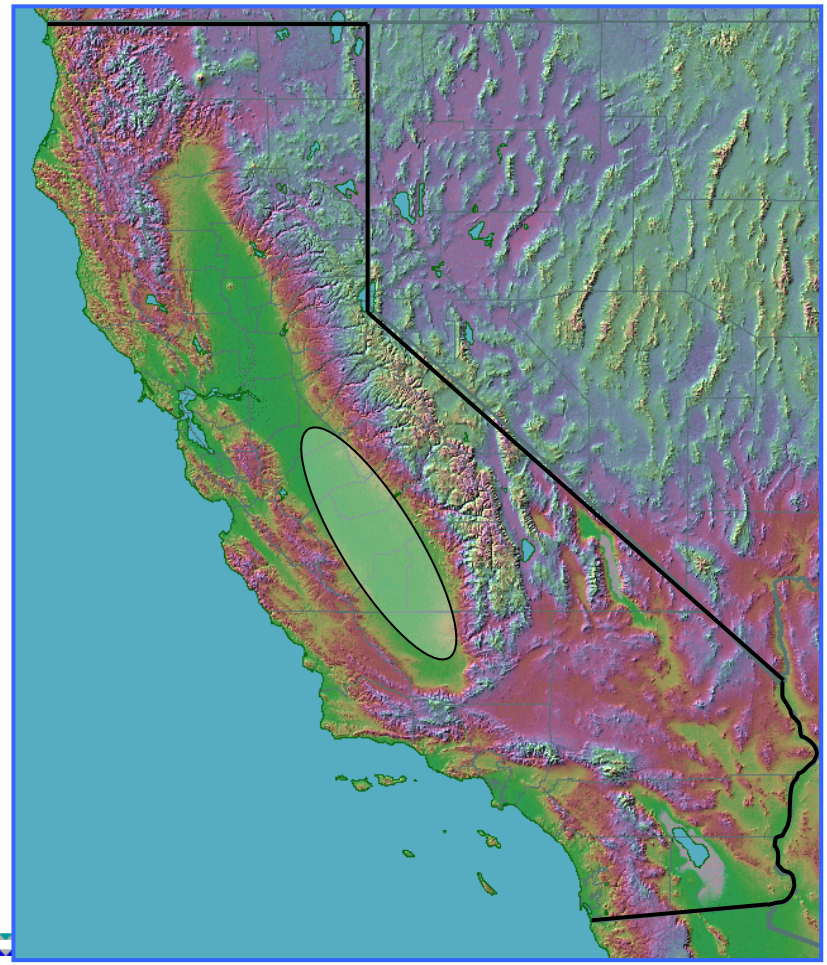
Late-Season Insect Pests and Cotton Lint Quality

Silverleaf Whitefly, Sweet Potato Whitefly – Biotype B

Late-Season Insect Pests and Cotton Lint Quality

Silverleaf Whitefly

- first found in SJV in 1992
- southern end and eastern side of SJV had highest levels
- in recent years populations have developed earlier and are more widespread



Late-Season Insect Pests and Cotton Lint Quality

Cotton Aphid

- Rosenheim suggested a threshold of 15 aphids per leaf in CA for sticky cotton
- Slosser in TX found the threshold ranged from 11 to 50 aphids per leaf

Silverleaf Whitefly

- Considerable research showing relationships between populations and yield loss
- Firm relationships to cotton quality less well defined

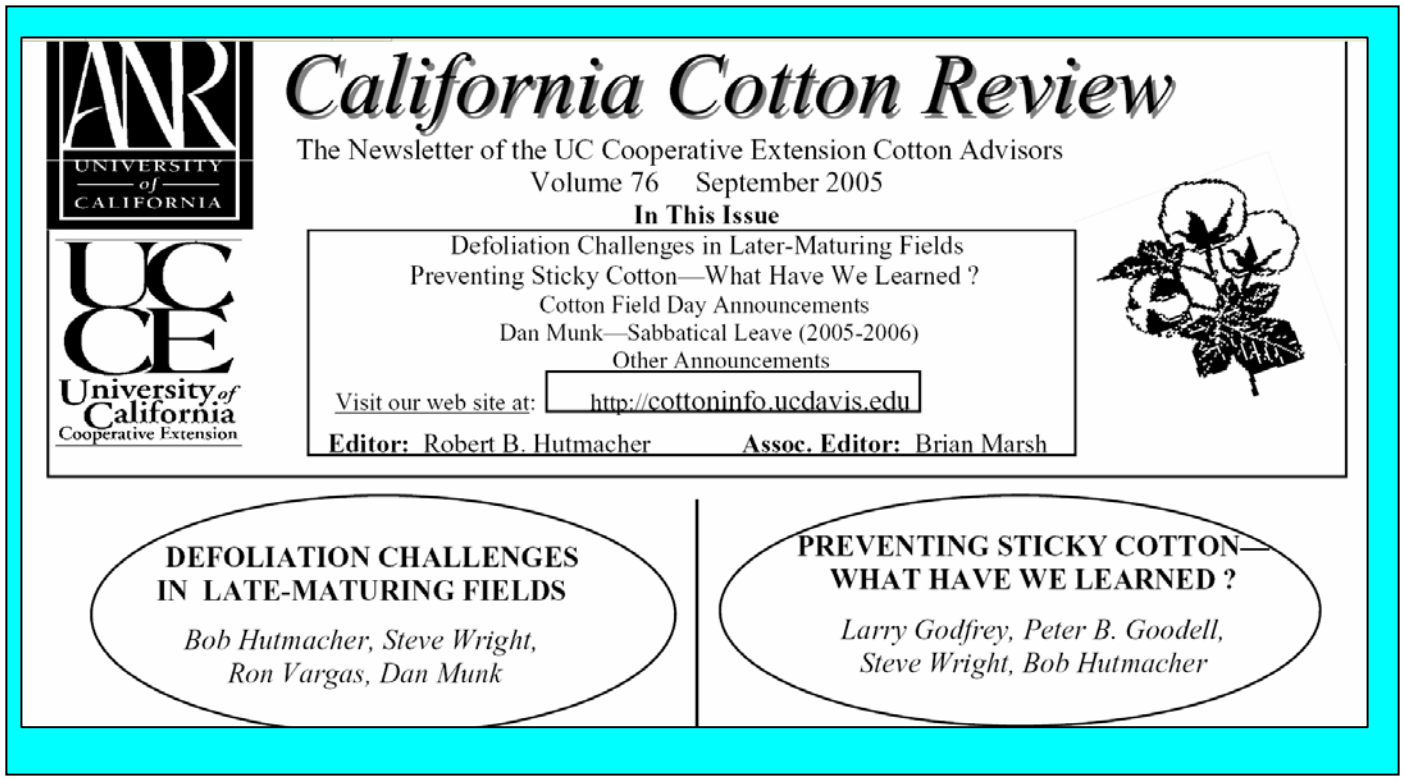
Late-Season Insects -- California Situation

- Cotton aphid and silverleaf whitefly infestations often occur in same field
- Populations can develop very rapidly
- Period immediately before harvest most important
- Insecticide approaches differ for two pests
- Falls are typically warm with little to no rain
- Cotton crop is matured by stopping irrigation and drought-stressing the plants
- Pima cotton

Late-Season Insect Pests and Cotton Lint Quality

- Four years of research (2002-2005)
- Efficacy of registered and experimental insecticides on cotton aphid and whitefly
- Treatment thresholds for cotton aphids and whiteflies to minimize sticky cotton
- Role of harvest aid materials (defoliants) in minimizing sticky cotton

Late-Season Insect Pests and Cotton Lint Quality



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In This Issue

Defoliation Challenges in Later-Maturing Fields
Preventing Sticky Cotton—What Have We Learned ?
Cotton Field Day Announcements
Dan Munk—Sabbatical Leave (2005-2006)
Other Announcements

Visit our web site at: http://cottoninfo.ucdavis.edu

Editor: Robert B. Hutmacher **Assoc. Editor:** Brian Marsh

DEFOLIATION CHALLENGES IN LATE-MATURING FIELDS

Bob Hutmacher, Steve Wright, Ron Vargas, Dan Munk

PREVENTING STICKY COTTON— WHAT HAVE WE LEARNED ?

Larry Godfrey, Peter B. Goodell, Steve Wright, Bob Hutmacher

Late-Season Insect Pests and Cotton Lint Quality

- Insecticide use increased
  - 2.7 applications per acre in 2001
  - 2.9 applications per acre in 2002
  - 3.5 applications per acre in 2003
- thiamethoxam and endosulfan (aphid controls) and pyriproxyfen and buprofezin (whitefly materials) were primary products with increased use in 2002
- acetamiprid use increased by over 500% from 2002 to 2003

Late-Season Insect Pests and Cotton Lint Quality

Sustainability??

Late-Season Insect Pests and Cotton Lint Quality

- Four year study (2002-2005)
- naturally-occurring aphid populations
- study utilized insecticide treatments for aphid control made at different timings following initiation of boll opening
- aphid (and whitefly) populations were monitored weekly
- cotton lint was hand-harvested and stickiness quantified at ITC

Late-Season Insect Pests and Cotton Lint Quality

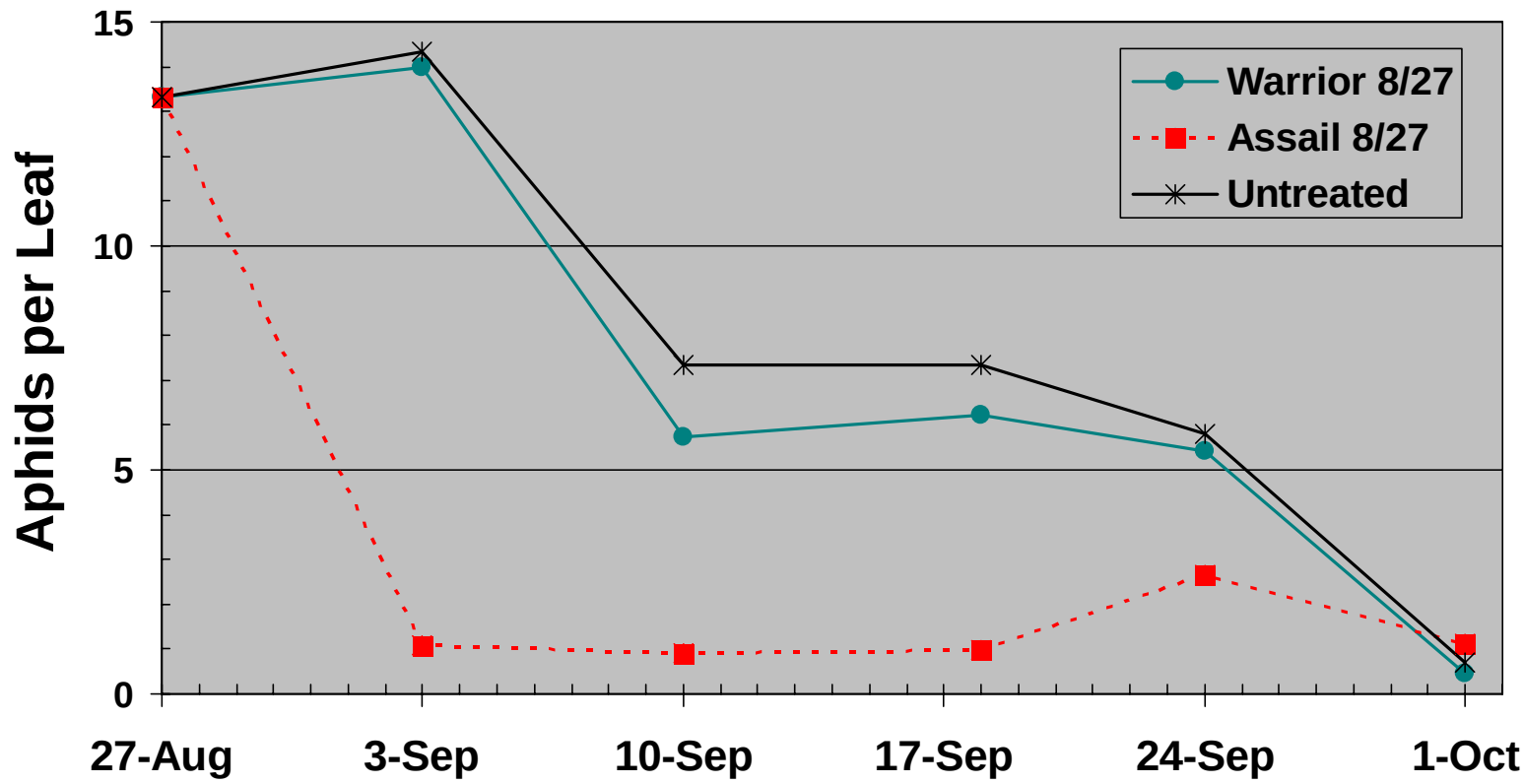
Applied insecticide treatments at weekly intervals to manipulate aphid populations

% Open Bolls	5%	20%	50%	75%	90%	defoliation
2002		27 Aug.	3 Sept.	10 Sept.	17 Sept.	24 Sept.
2003		4 Sept.	11 Sept.	18 Sept.	25 Sept.	1 Oct.
2004	4 Aug.	11 Aug.	18 Aug.	25 Aug.	1 Sept.	8 Sept.

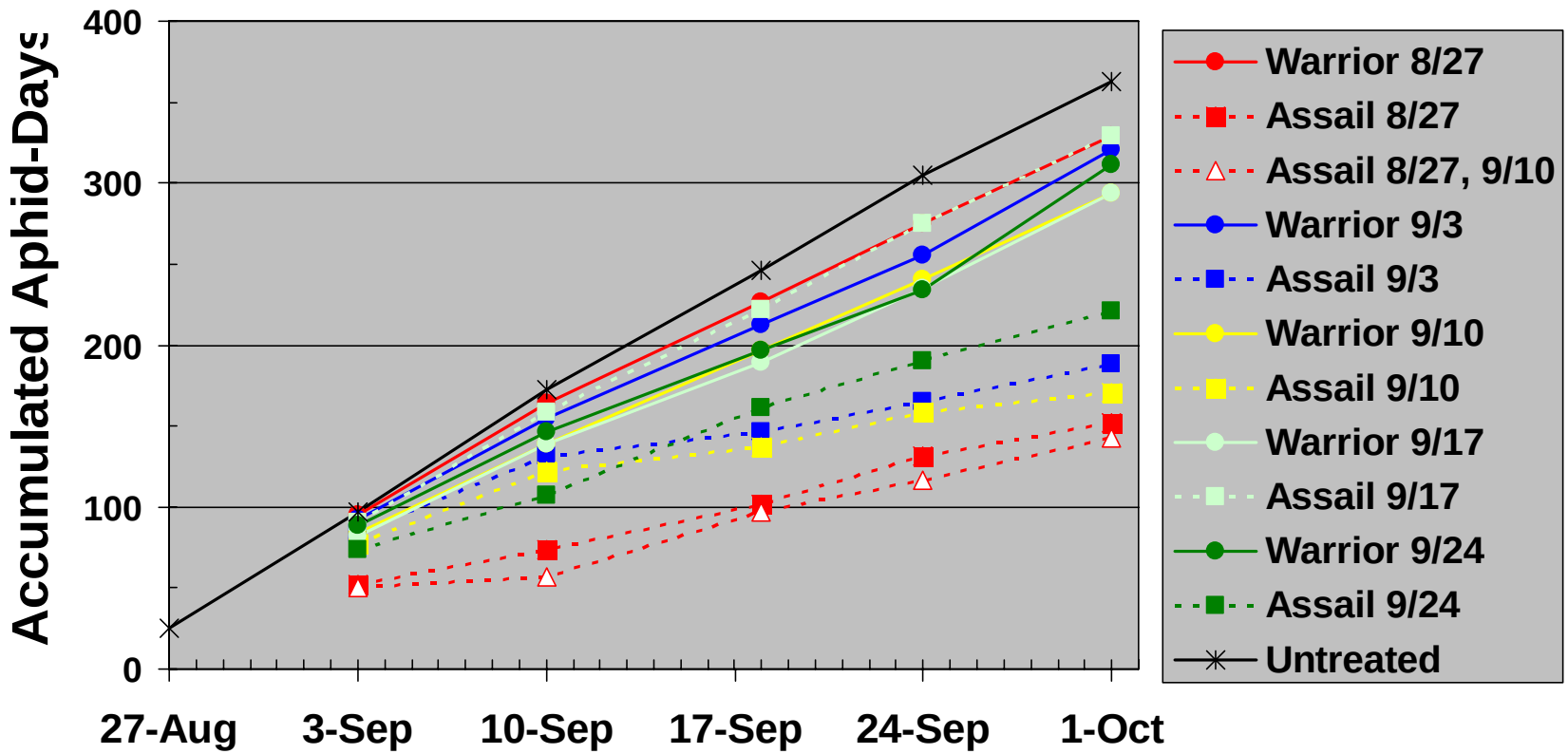
Late-Season Insect Pests and Cotton Lint Quality

- Assail (acetamiprid), 1.15 oz./A, applied by ground to control aphids (and whiteflies)
- also applied Warrior (lambda-cyhalothrin), 3.84 oz./A, on each date to flare aphid levels
- untreated plots

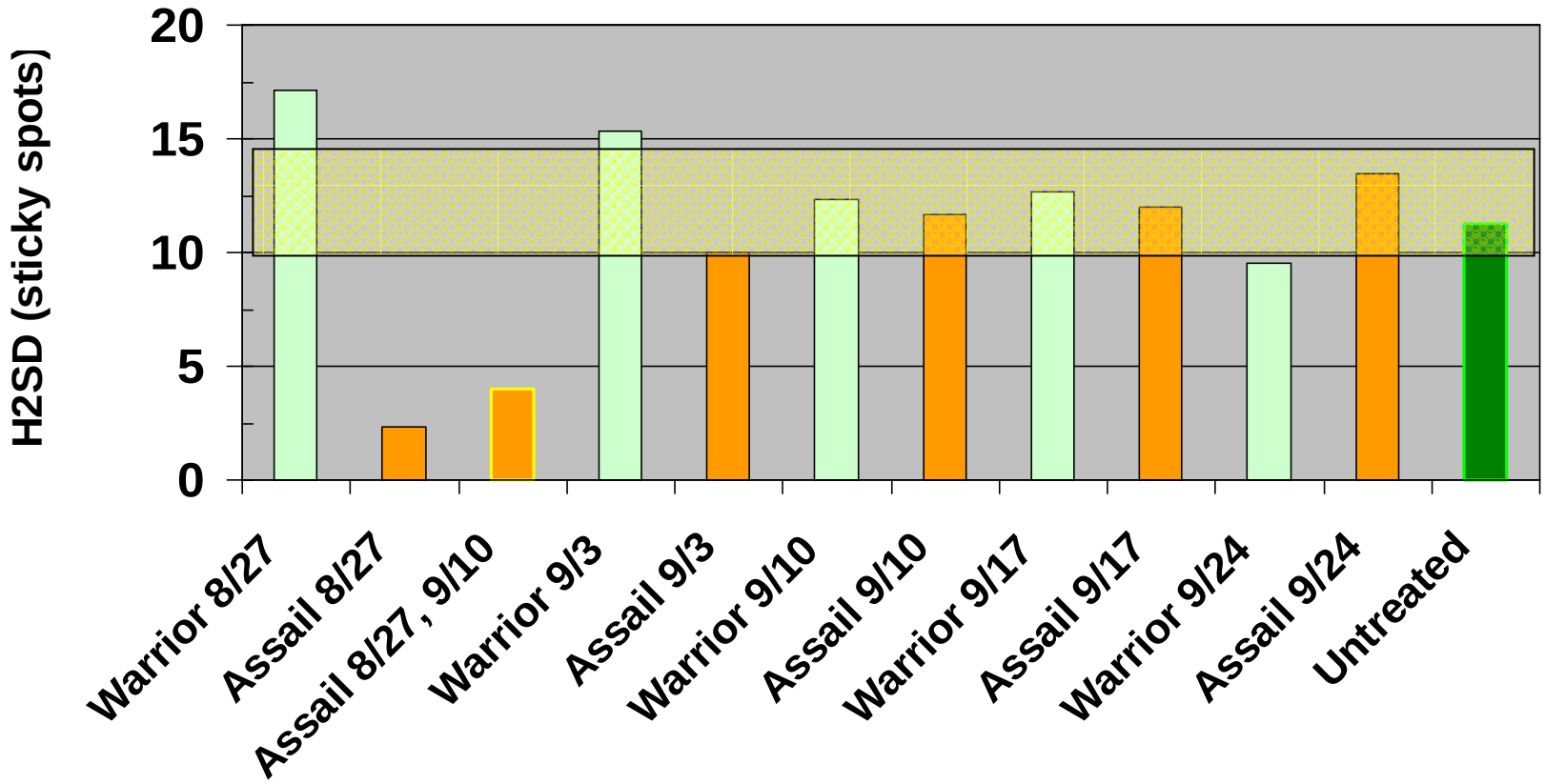
Aphid Population - 2002



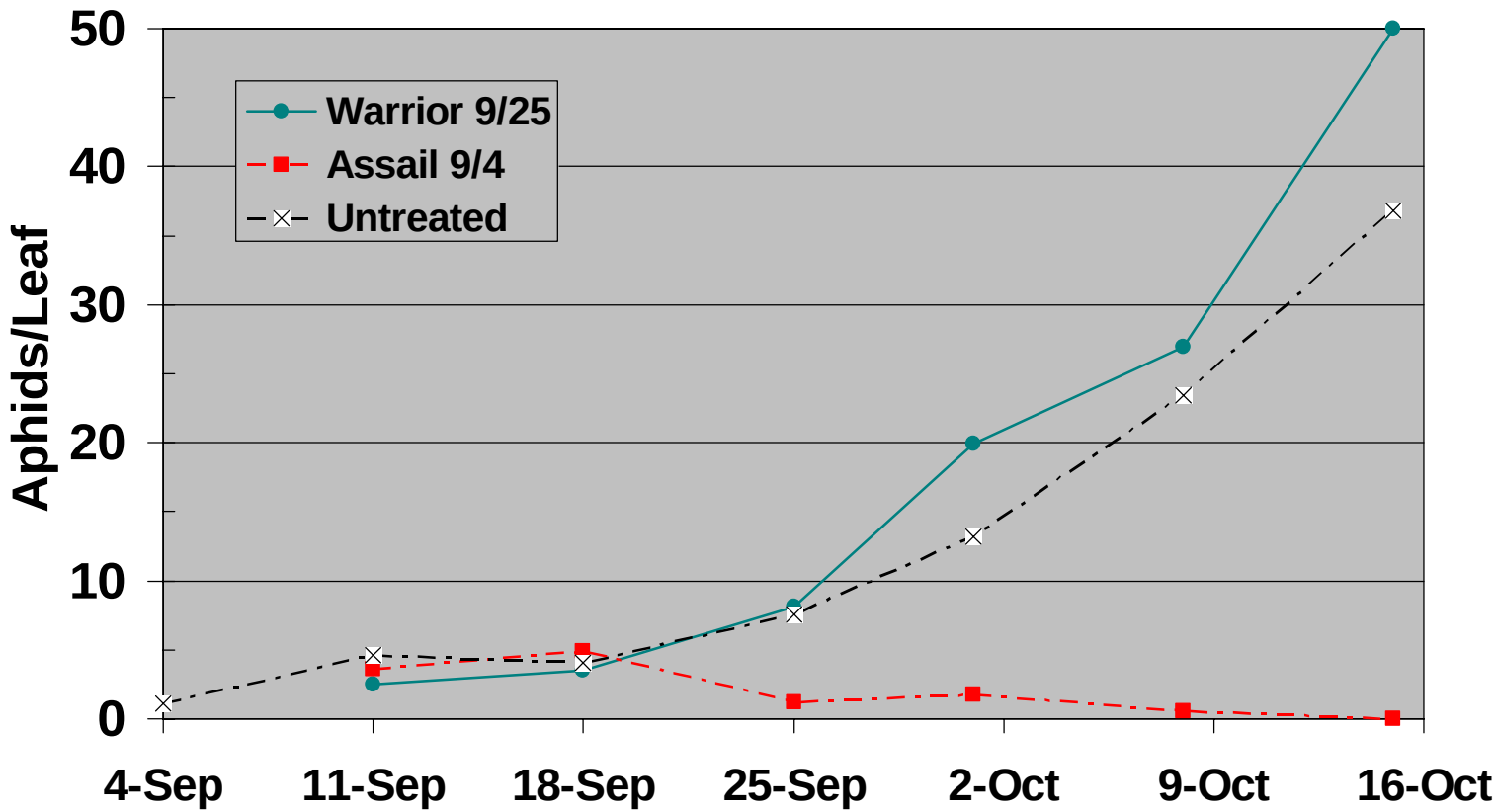
Aphid Population - 2002



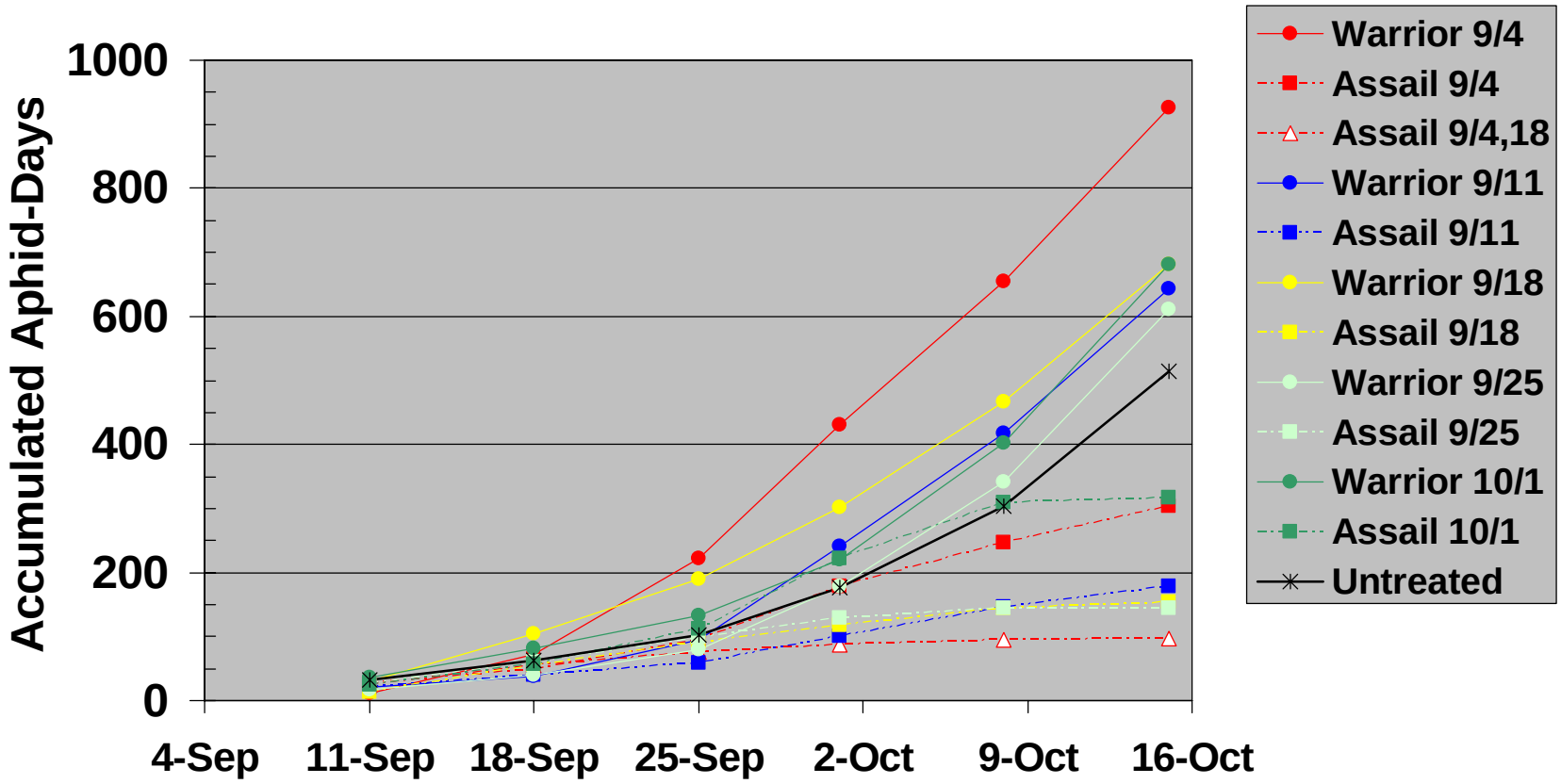
Stickiness - 2002



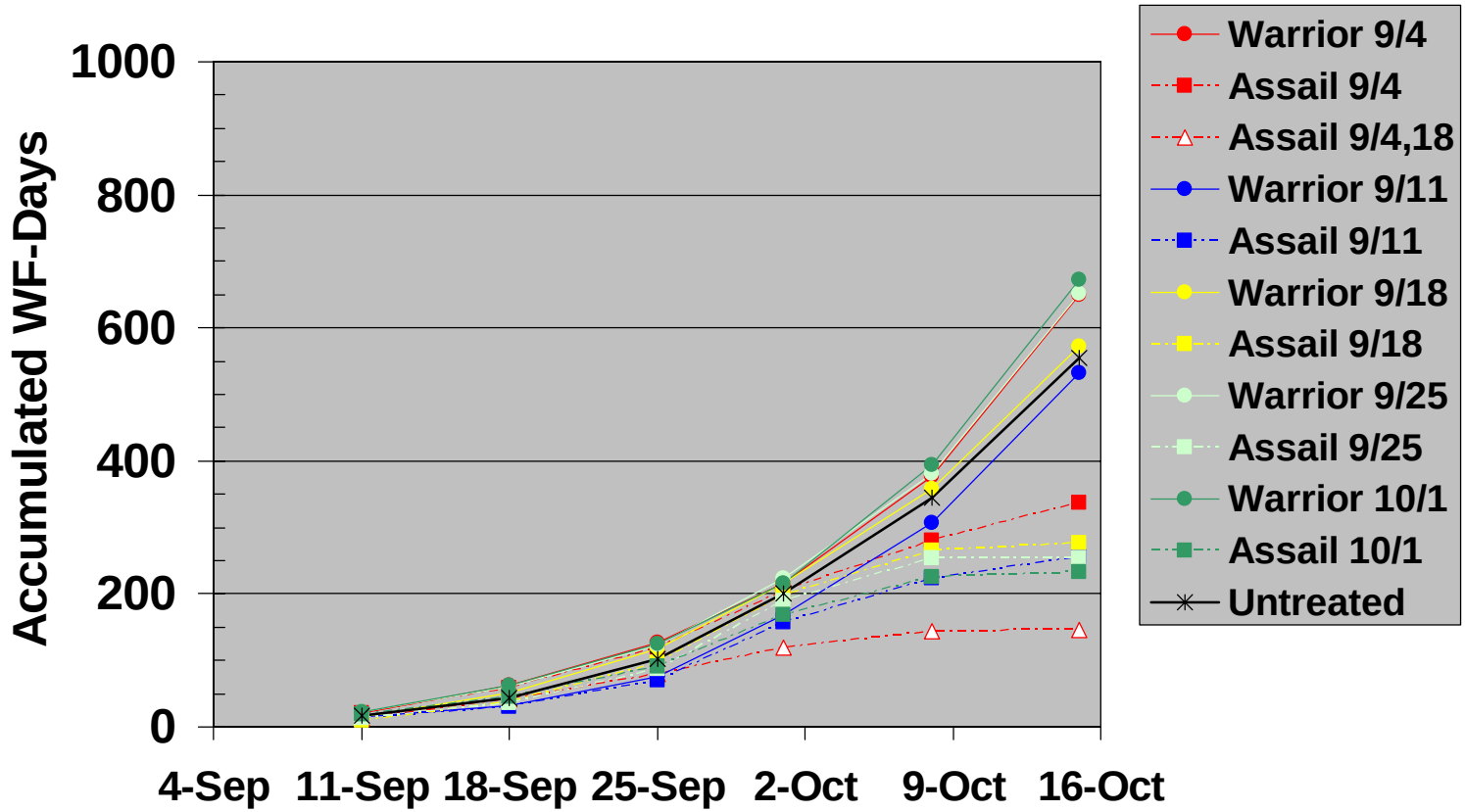
Aphid Population - 2003



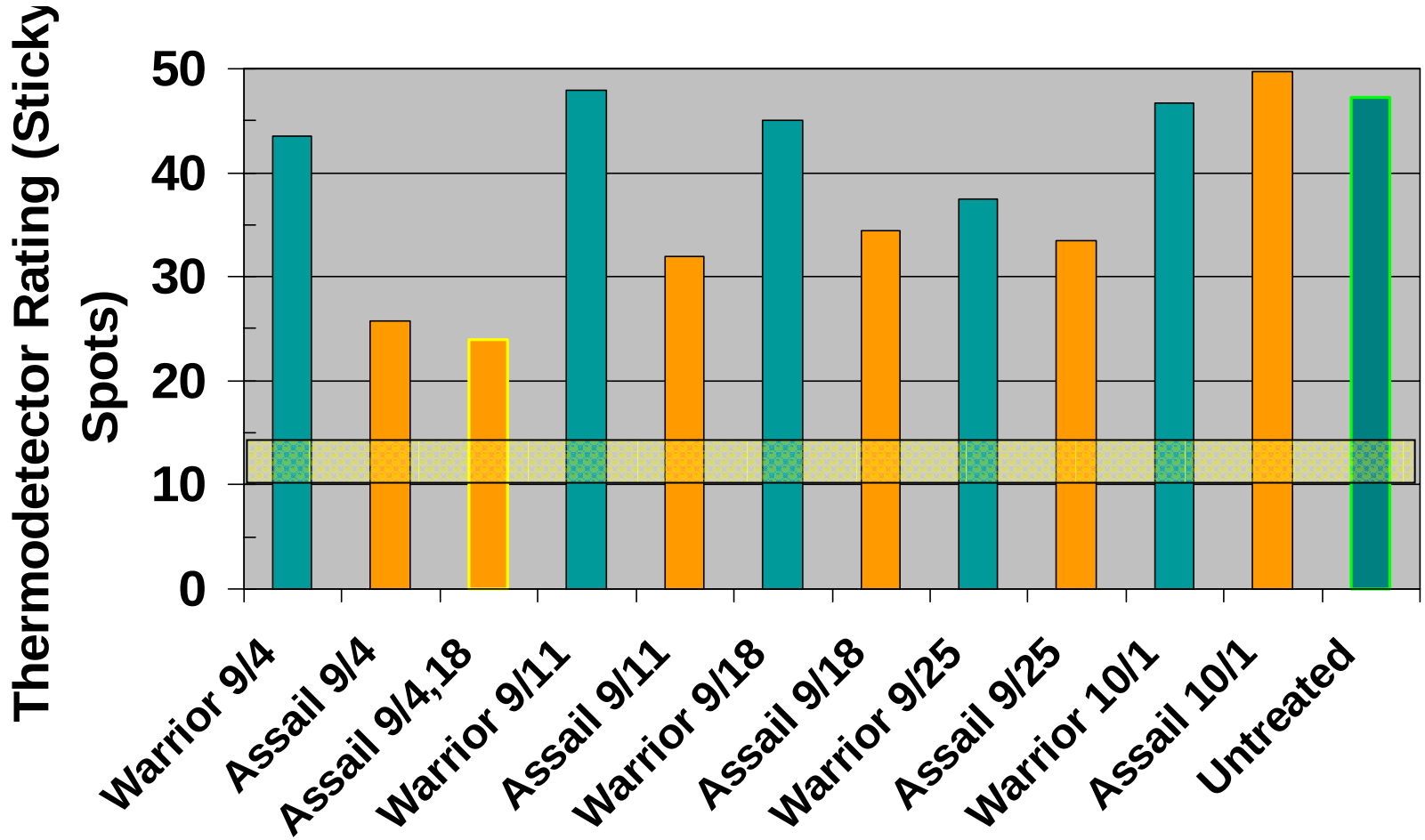
Aphid Population - 2003



Whitefly Population - 2003



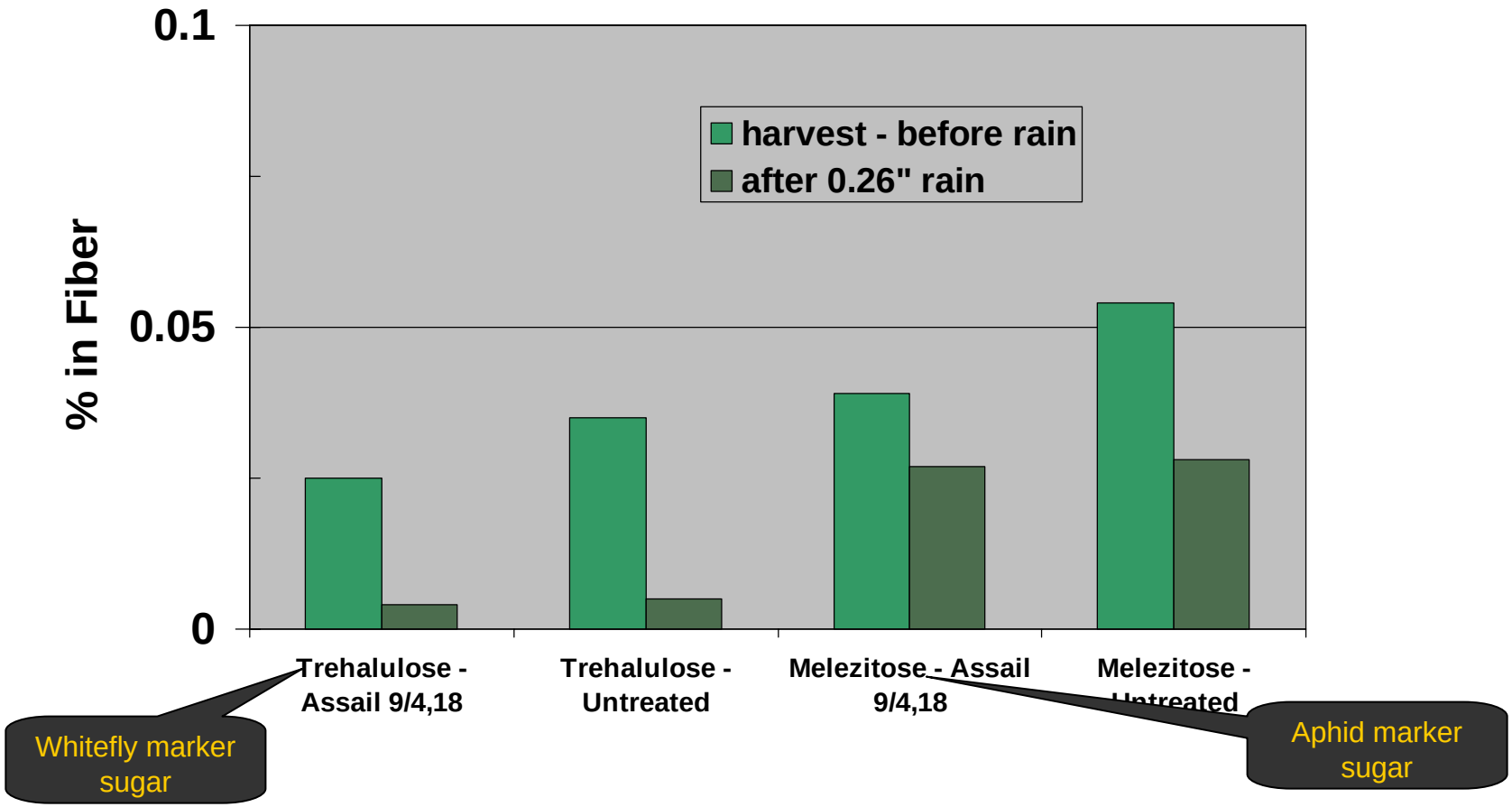
Stickiness - 2003



Late-Season Insect Pests and Cotton Lint Quality - 2003

- hand harvested plots on Oct. 28
- hand-harvested selected treatments on 4 Nov. following 0.26” rainfall on 1 Nov.
- HPLC analyses of sugar type on selected treatments

Sugar Type - 2003



Late-Season Insect Pests and Cotton Lint Quality

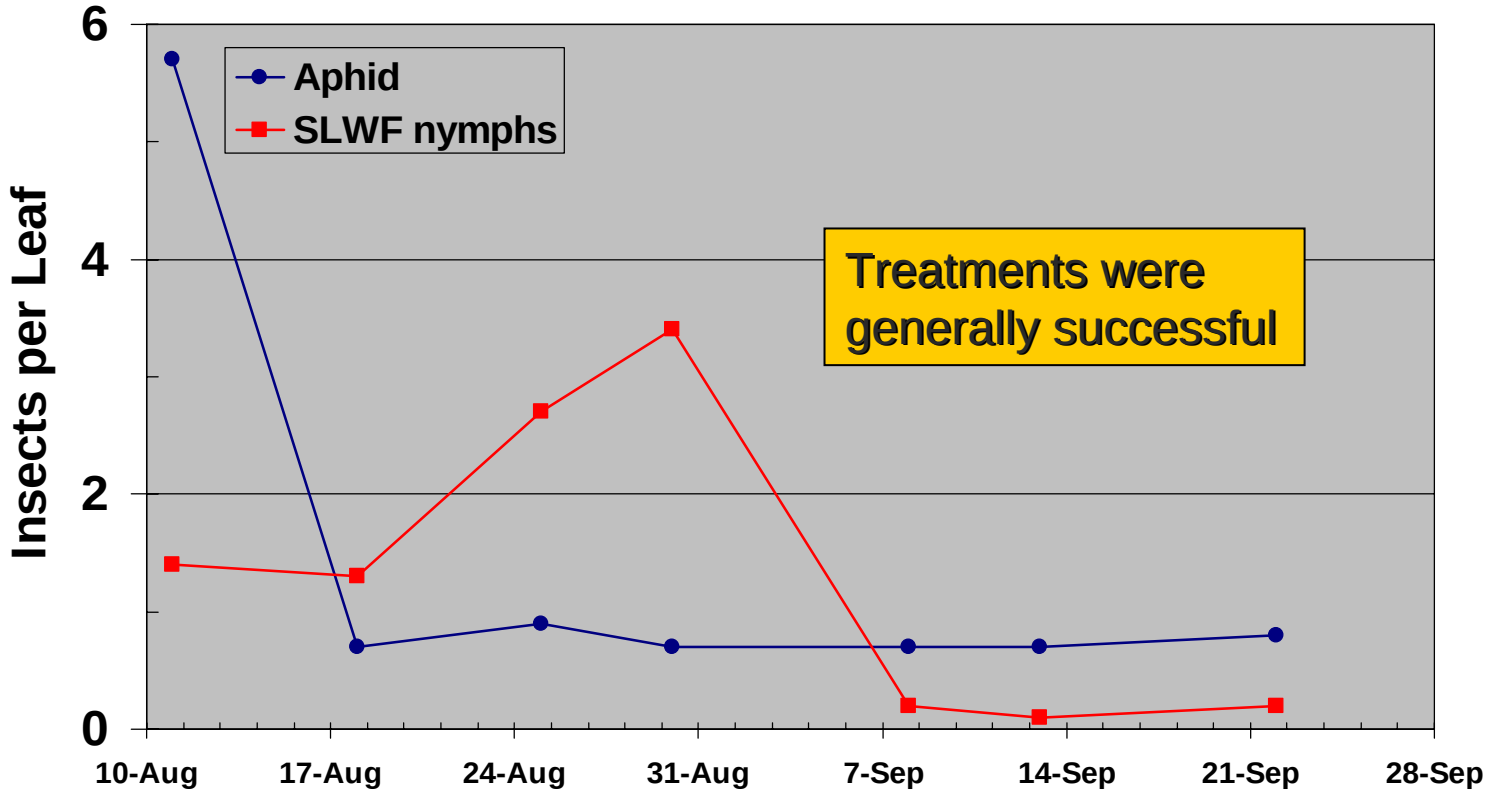
2004

- added Lorsban 4E treatment to control aphids without affecting whitefly populations
- added WF IGR treatment to control WF without affecting aphids

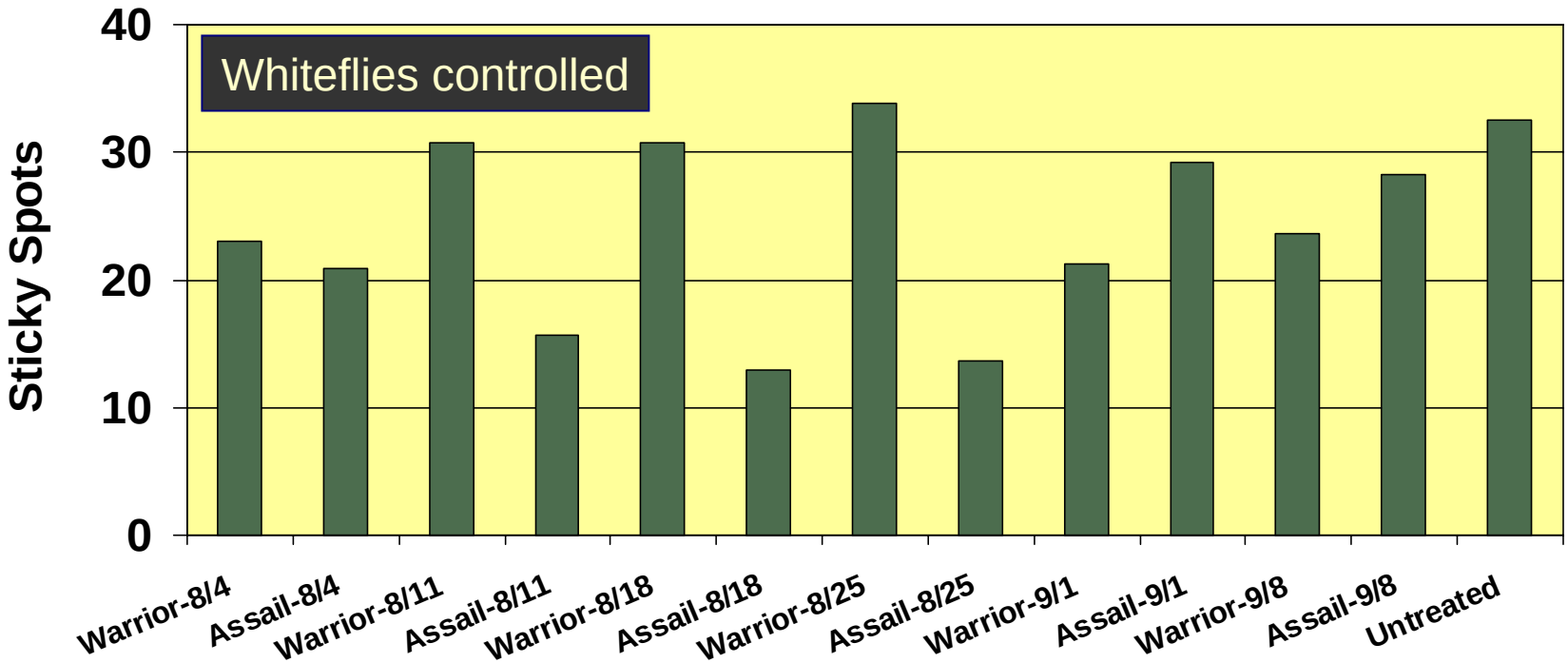
Hand-harvests

18 Aug. (50% open bolls)	8 Sept. (90% open bolls)	14 Oct. (normal harvest)	25 Oct. (0.76” rainfall)

Pest Populations in Untreated Plots - 2004



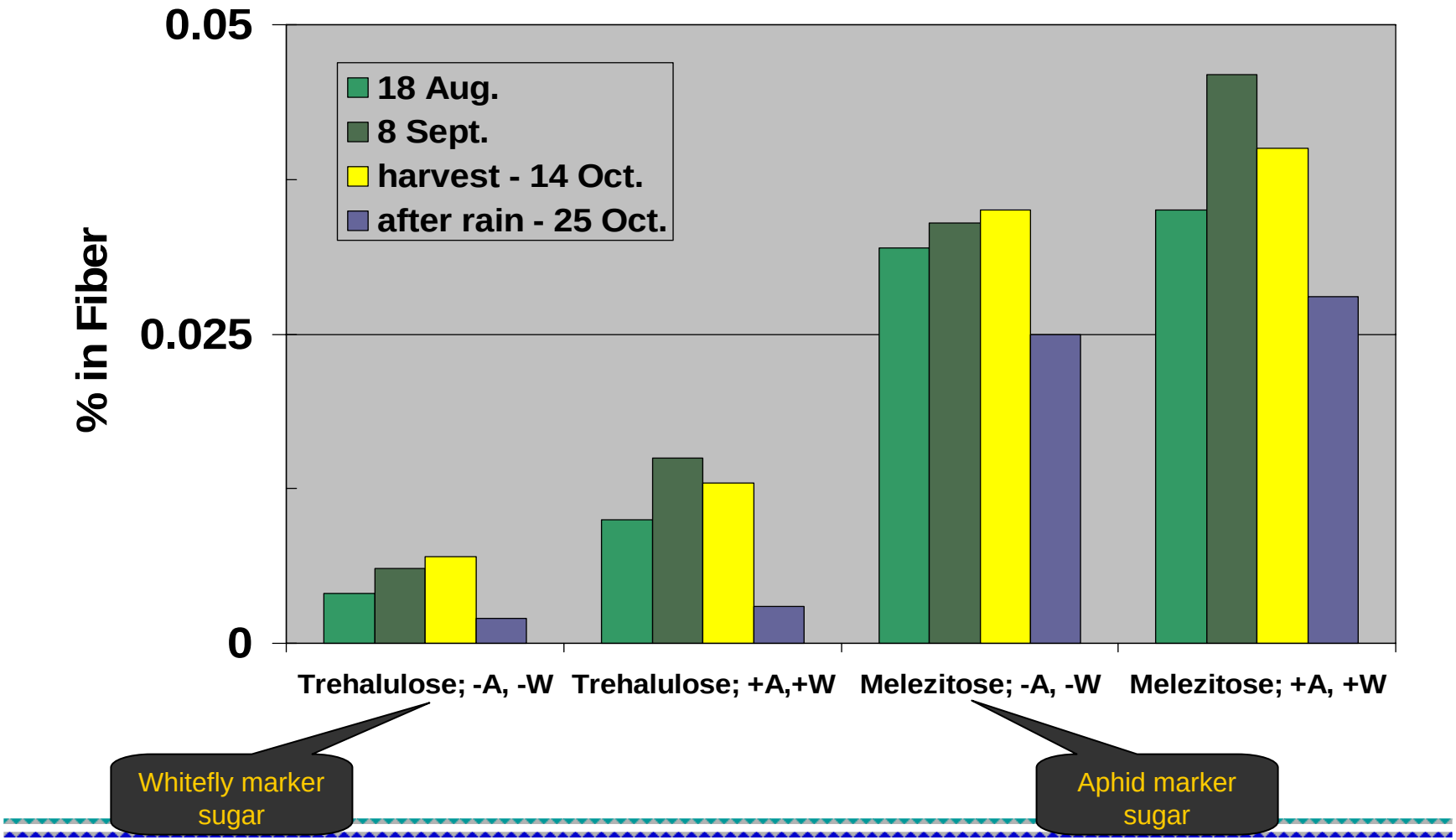
Lint Stickiness-2004



Lint Stickiness - 2004

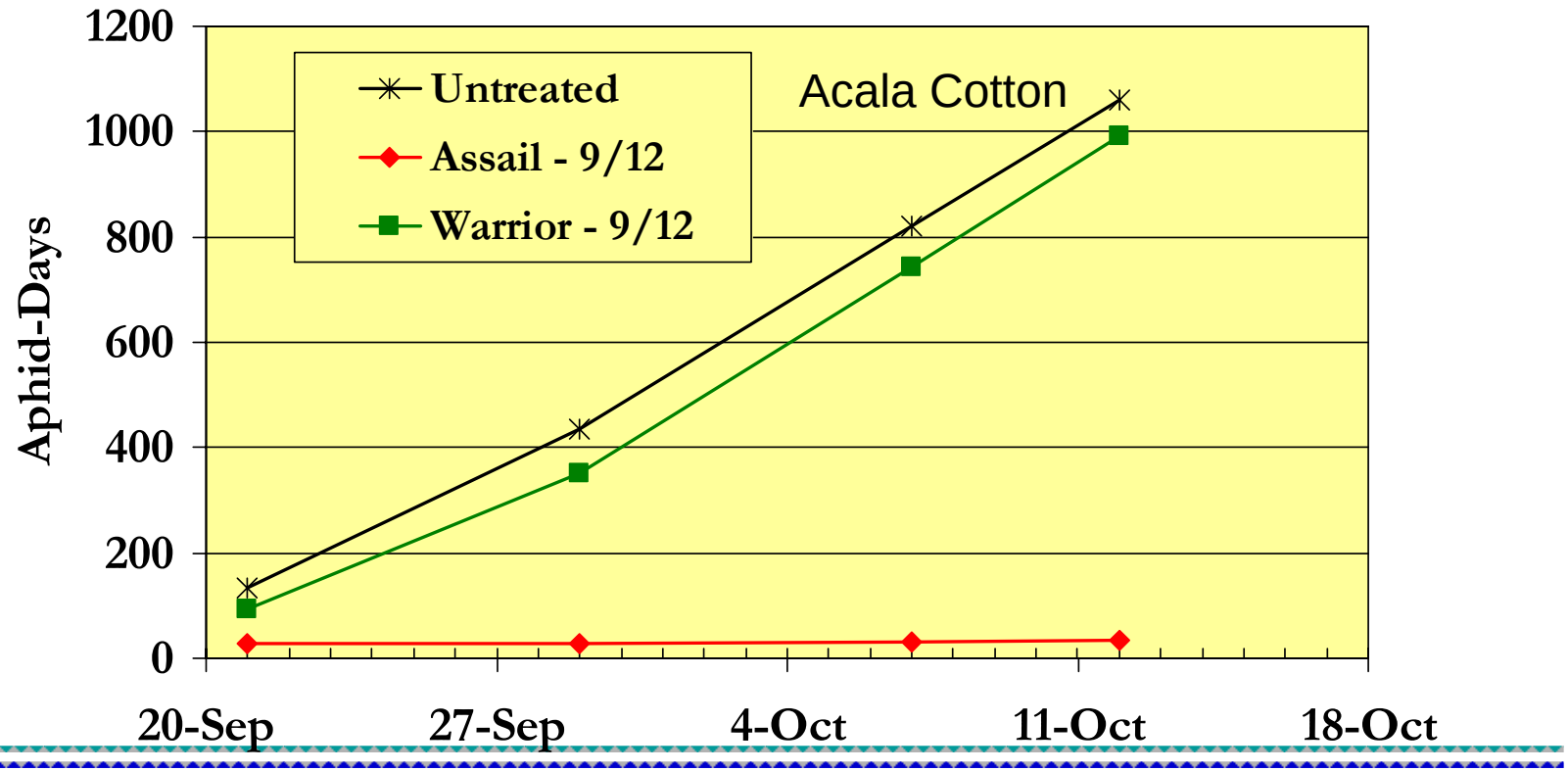
Whiteflies contributed about 10 sticky spots where left uncontrolled

Sugar Type - 2004

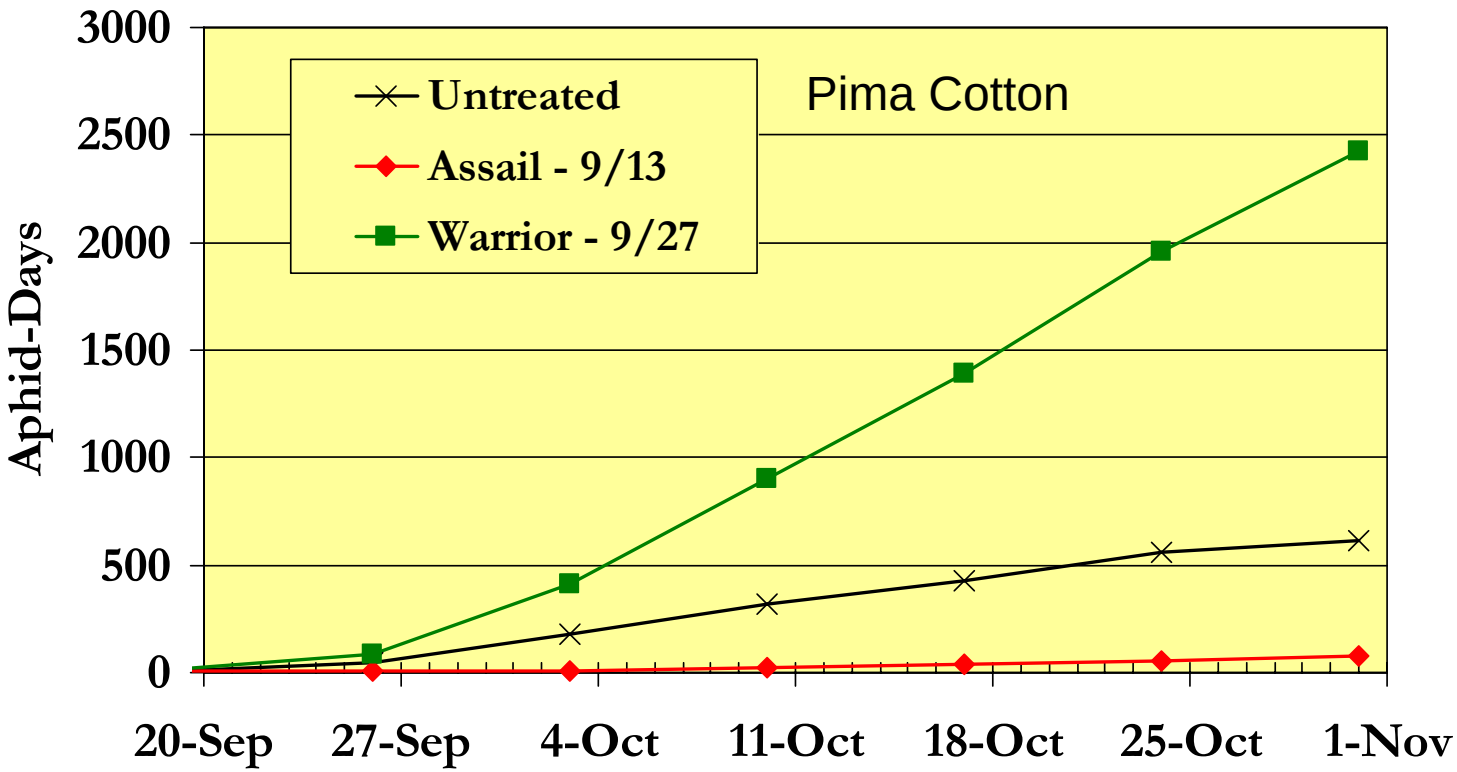


Late-Season Insect Pests and Cotton Lint Quality - 2005

- Continued to look at aphid and whitefly infestations and sticky cotton



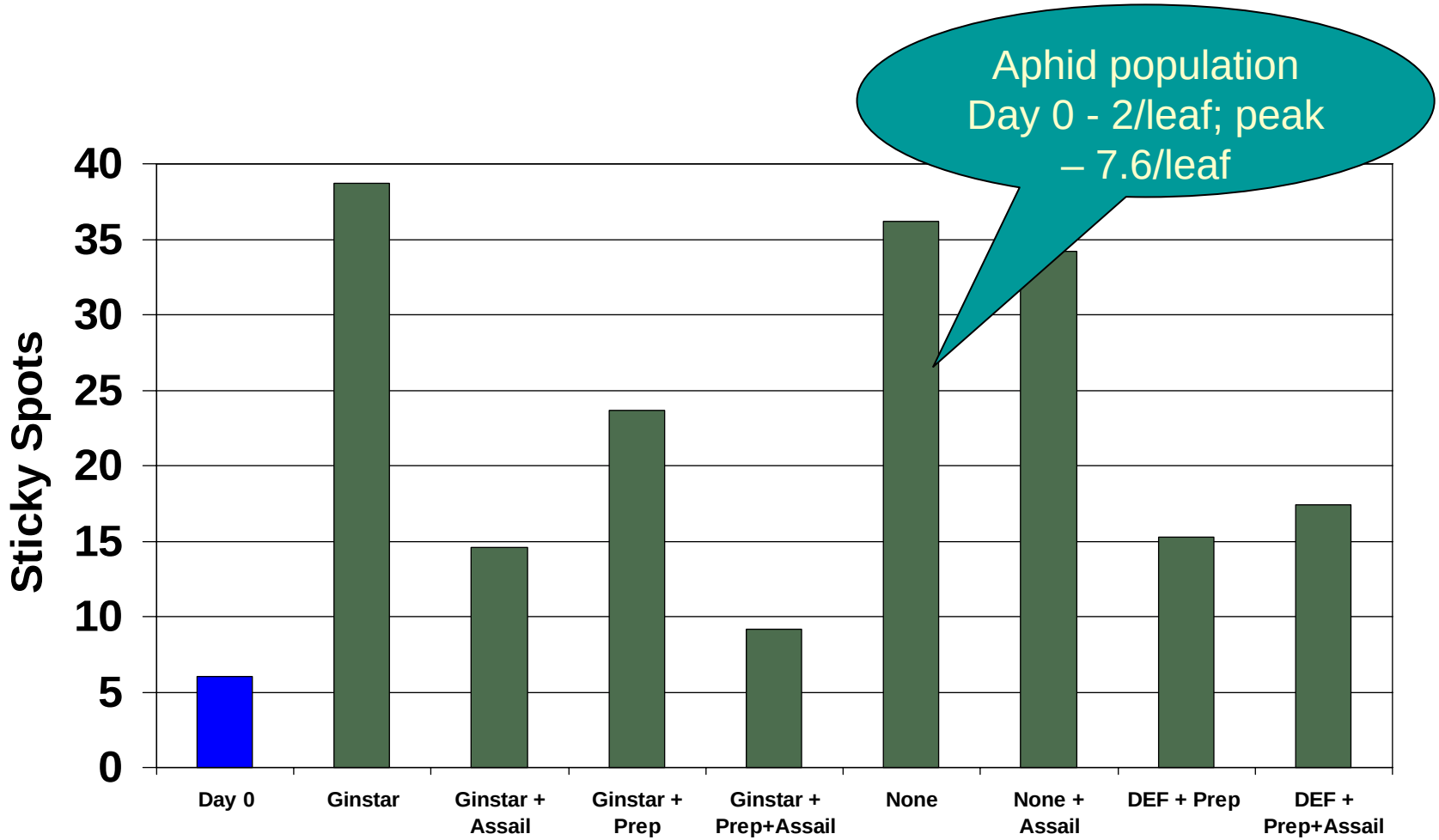
Late-Season Insect Pests and Cotton Lint Quality - 2005



Late-Season Insect Pests and Cotton Lint Quality – Defoliation to Harvest

- Previous study concentrated on period from initial boll opening until defoliation
- At defoliation – management needed?
- Do all harvest aid materials perform the same?

Late-Season Insect Pests and Cotton Lint Quality – Defoliation to Harvest



Late-Season Insect Pests and Cotton Lint Quality - 2005

Summary

- in acala cotton threshold for aphids and sticky cotton is ~5 aphids per leaf (5th MSN leaf from terminal)
- in pima cotton - ??
- rainfall as low as 0.25” can remove ~20% of the aphid honeydew and ~75% of the whitefly honeydew
- populations of aphids can develop rapidly

Summary

- an insecticide application can reduce stickiness
- at defoliation – stickiness potential still exists
- Def (+Prep) appears to aid in reducing stickiness from aphids and especially from WF
- 2002-2005 California cotton crops have mostly been free of stickiness