Impact of *Lygus* spp. on damage, yield and quality of lesquerella (*Physaria fendleri*), a potential new oil-seed crop

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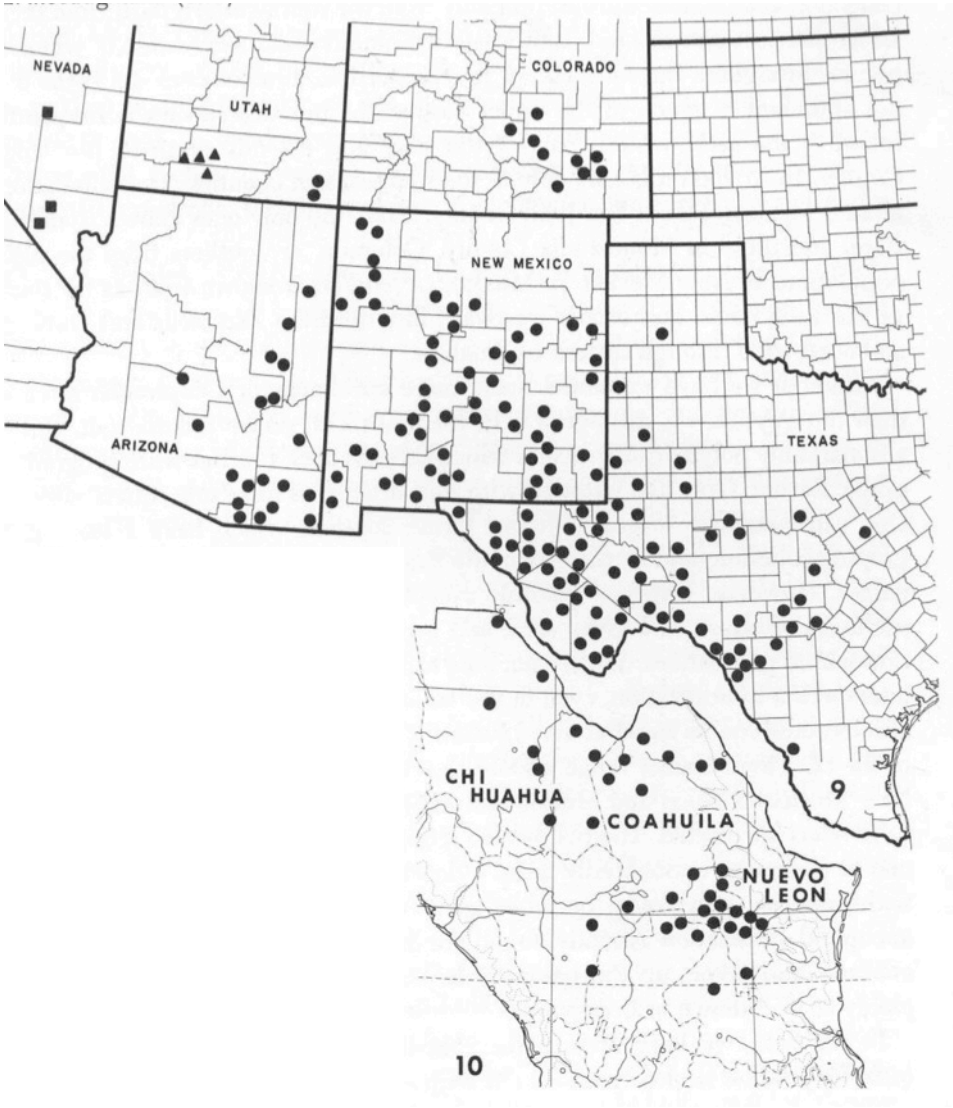
Lesquerella - *Physaria fendleri*

- **Family Brassicaceae**
- **Perennial, native to North America**
- ***Physaria fendleri* native to southwestern US and cultivated as an annual Oct through May**
- **Seeds contain industrially-valuable hydroxy fatty acids**
- **Commercial production pending**

Native P. fendleri Range



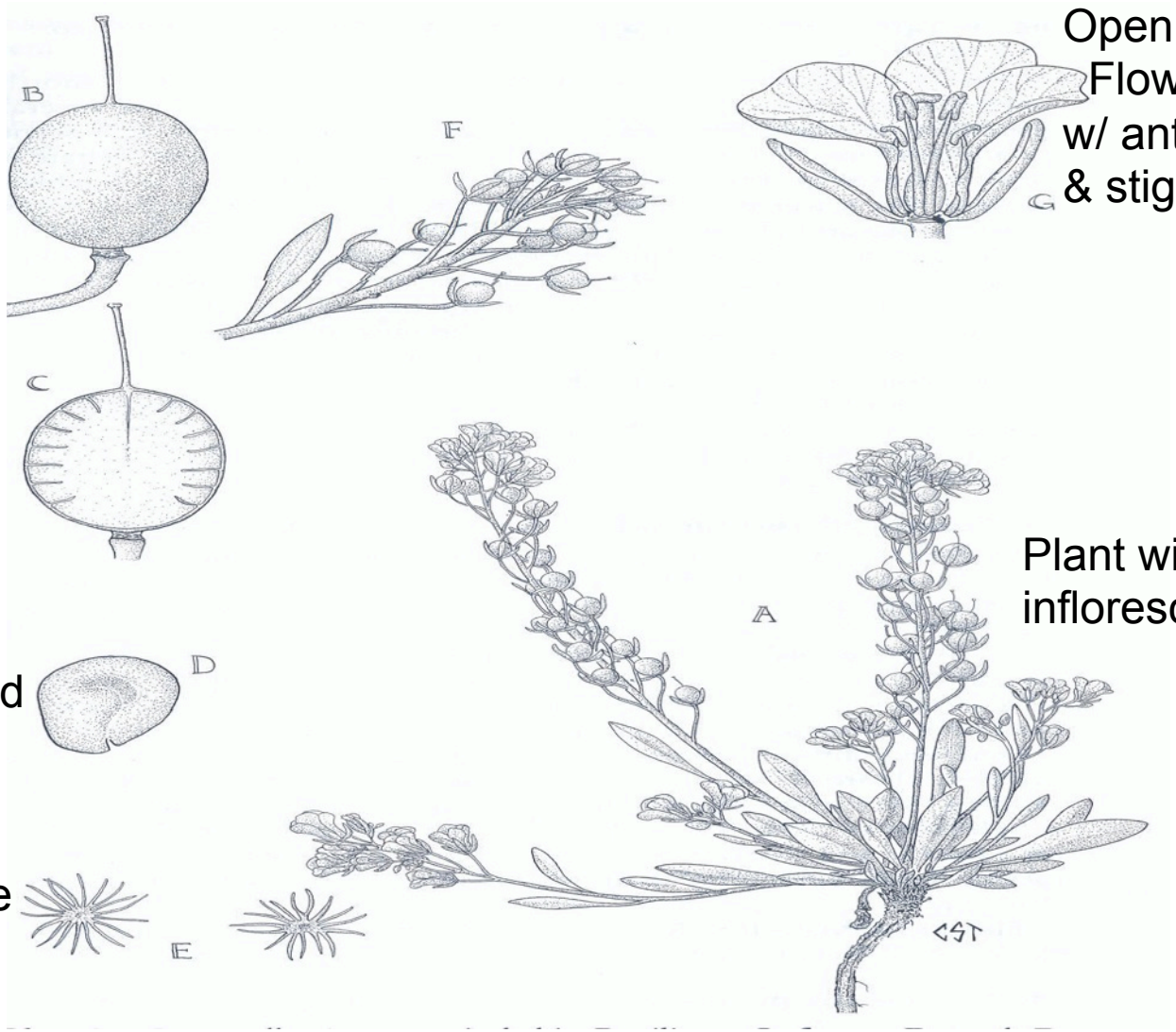
The Lesquerella Plant

Silique
(seed pod)

Replum

Seed

Trichome



Open pollinated
Flower
w/ anthers
& stigma

Plant with
inflorescences

Products from Lesquerella

Other New Crops

Guayule

Source of hypoallergenic latex and domestic rubber

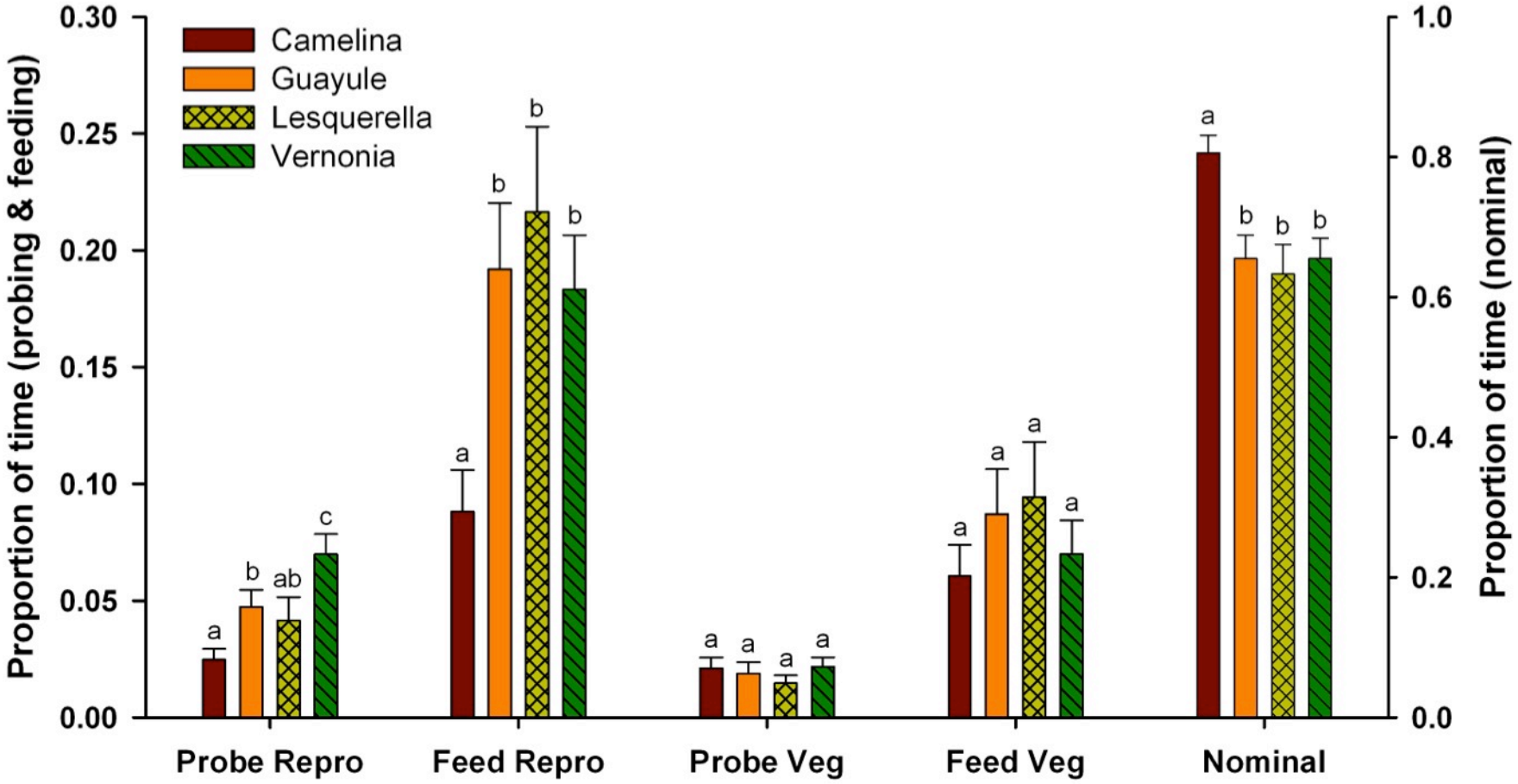
Vernonia

Source of epoxy fatty acids

Camelina

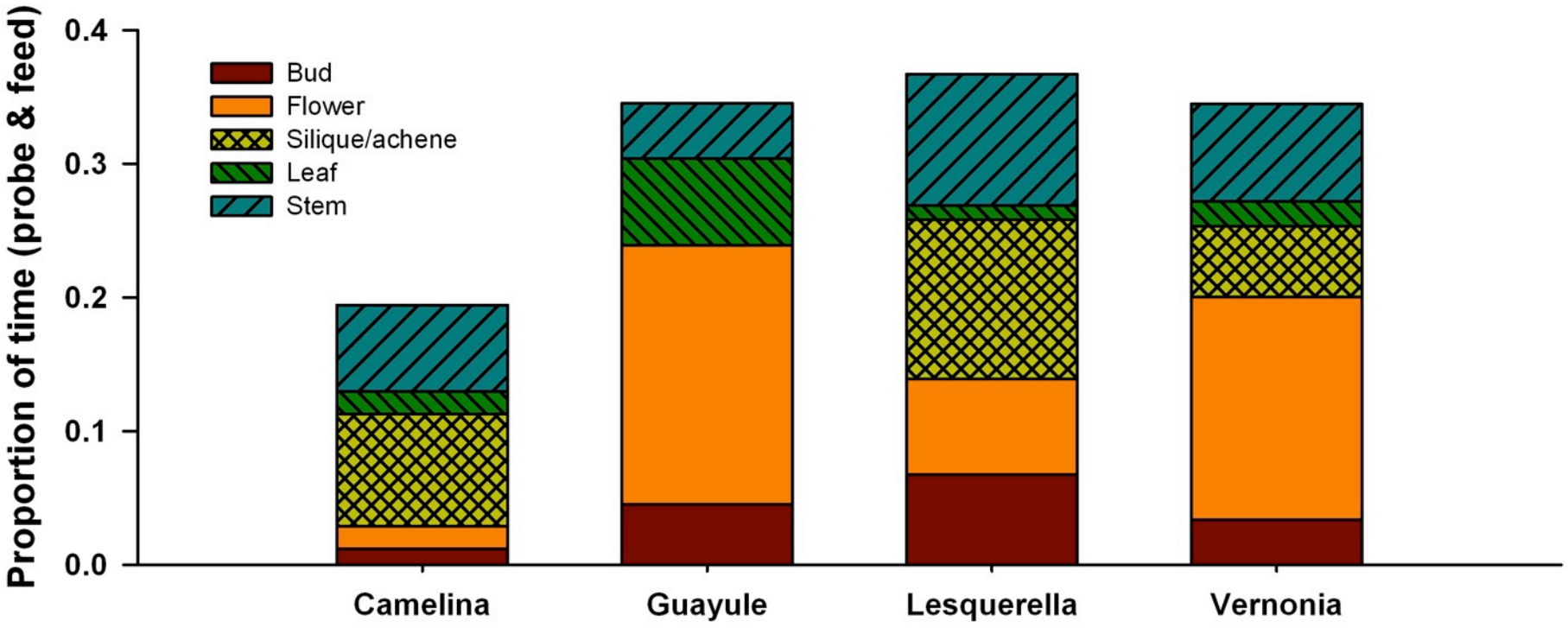
Biofuel feedstock and source of omega3 fatty acids

Lygus feed on variety of new crops



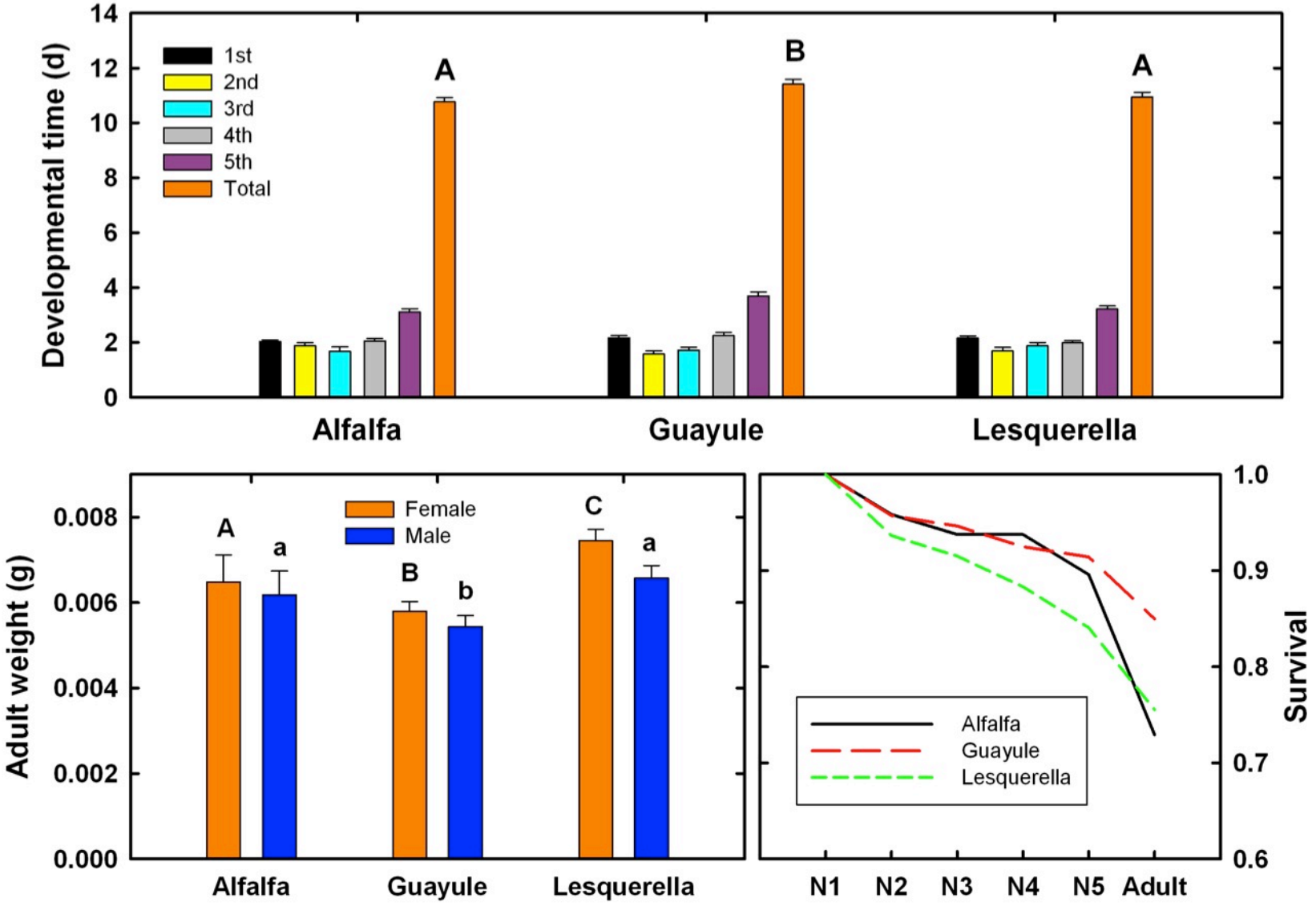
Naranjo and Stefanek, *Indus. Crop Prod.* 2012

Lygus preferentially feed on reproductive tissues



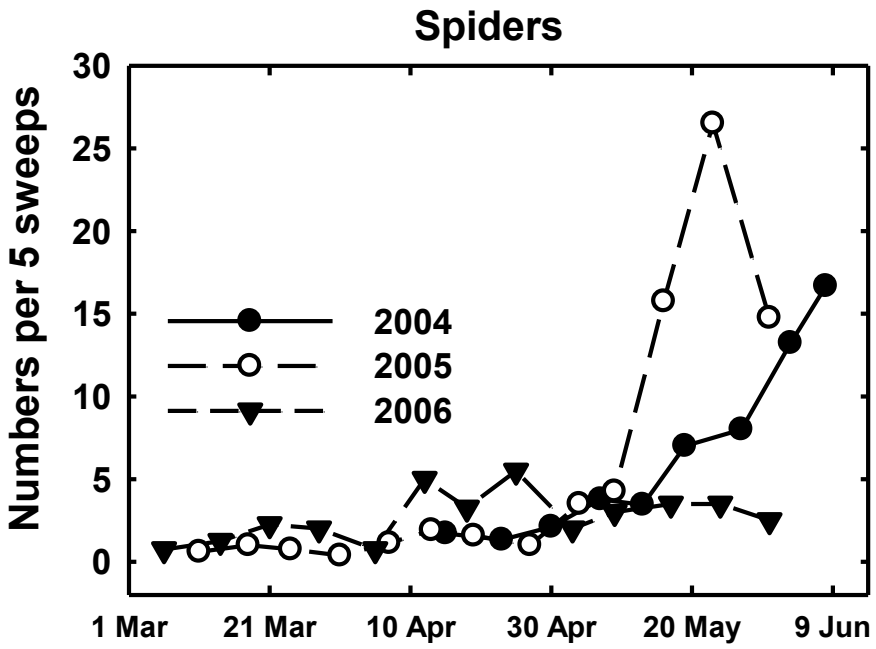
Naranjo and Stefanek, *Indus. Crop Prod.* 2012

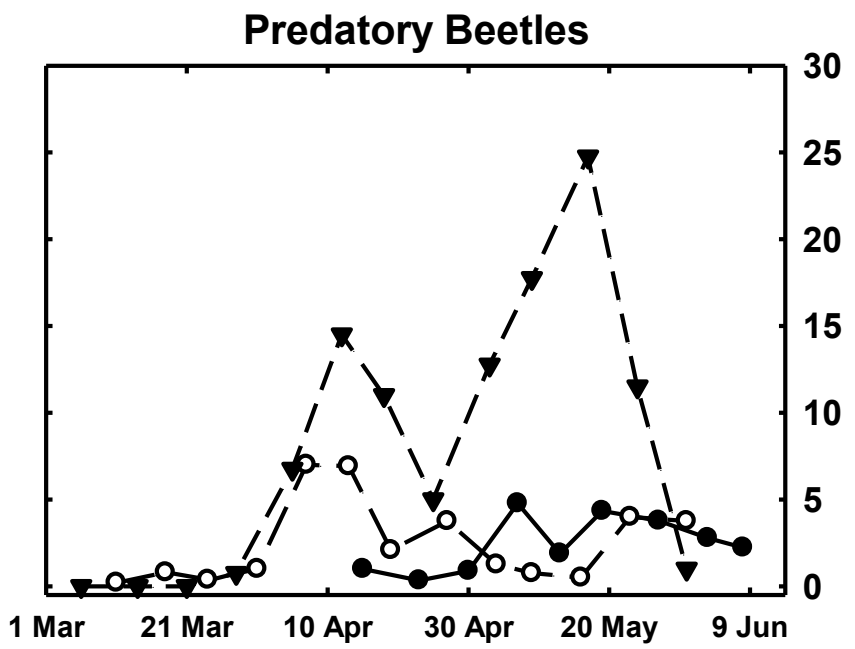
Lesquerella is a suitable host



Naranjo, unpublished

Lesquerella is a potential source crop for natural enemies





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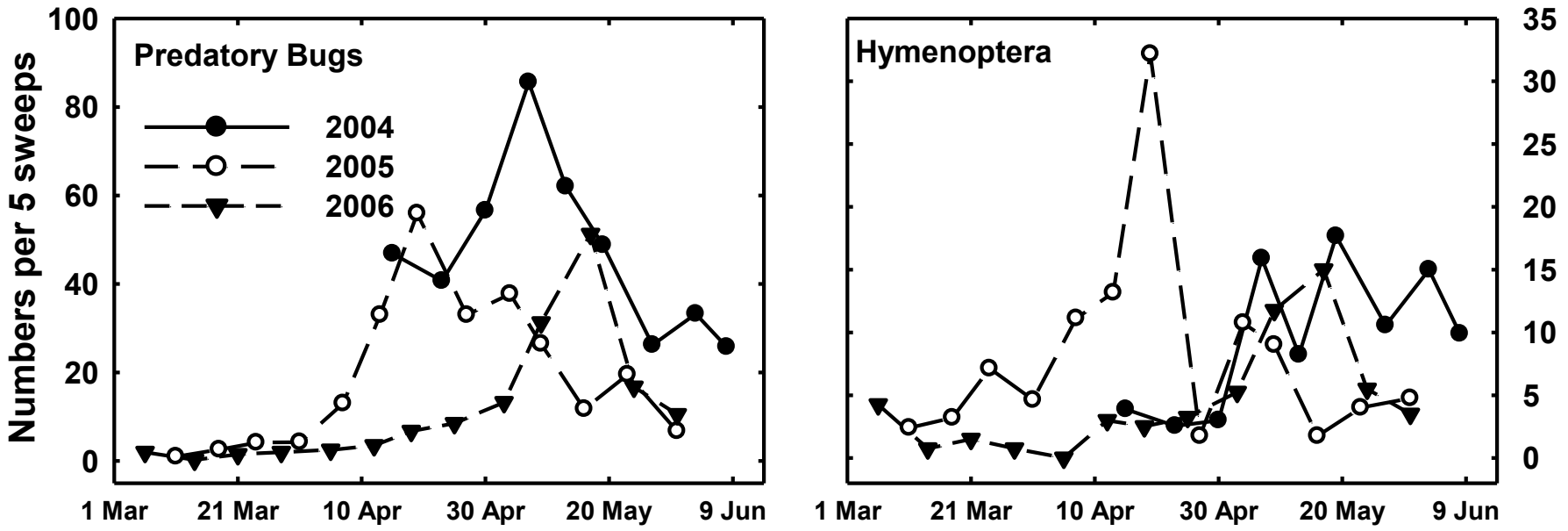
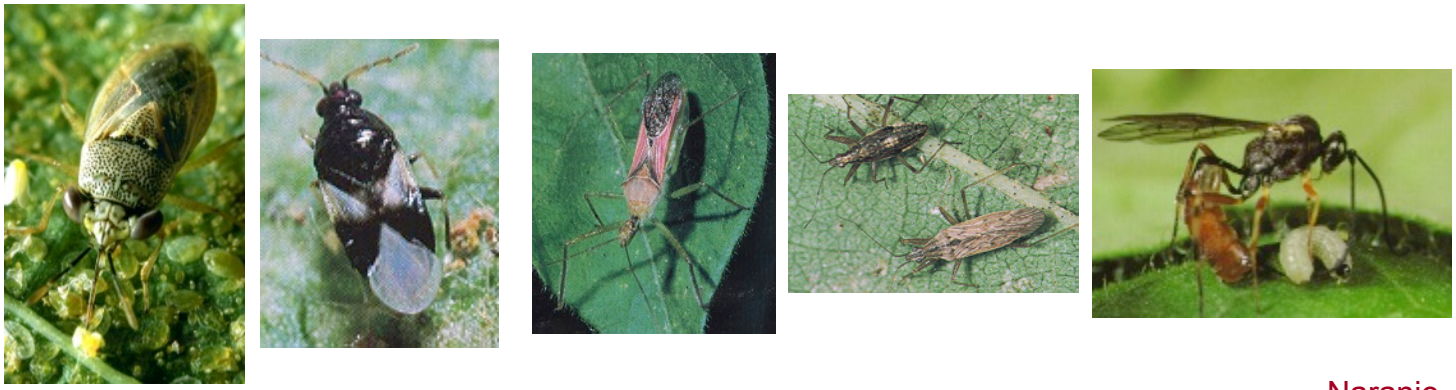
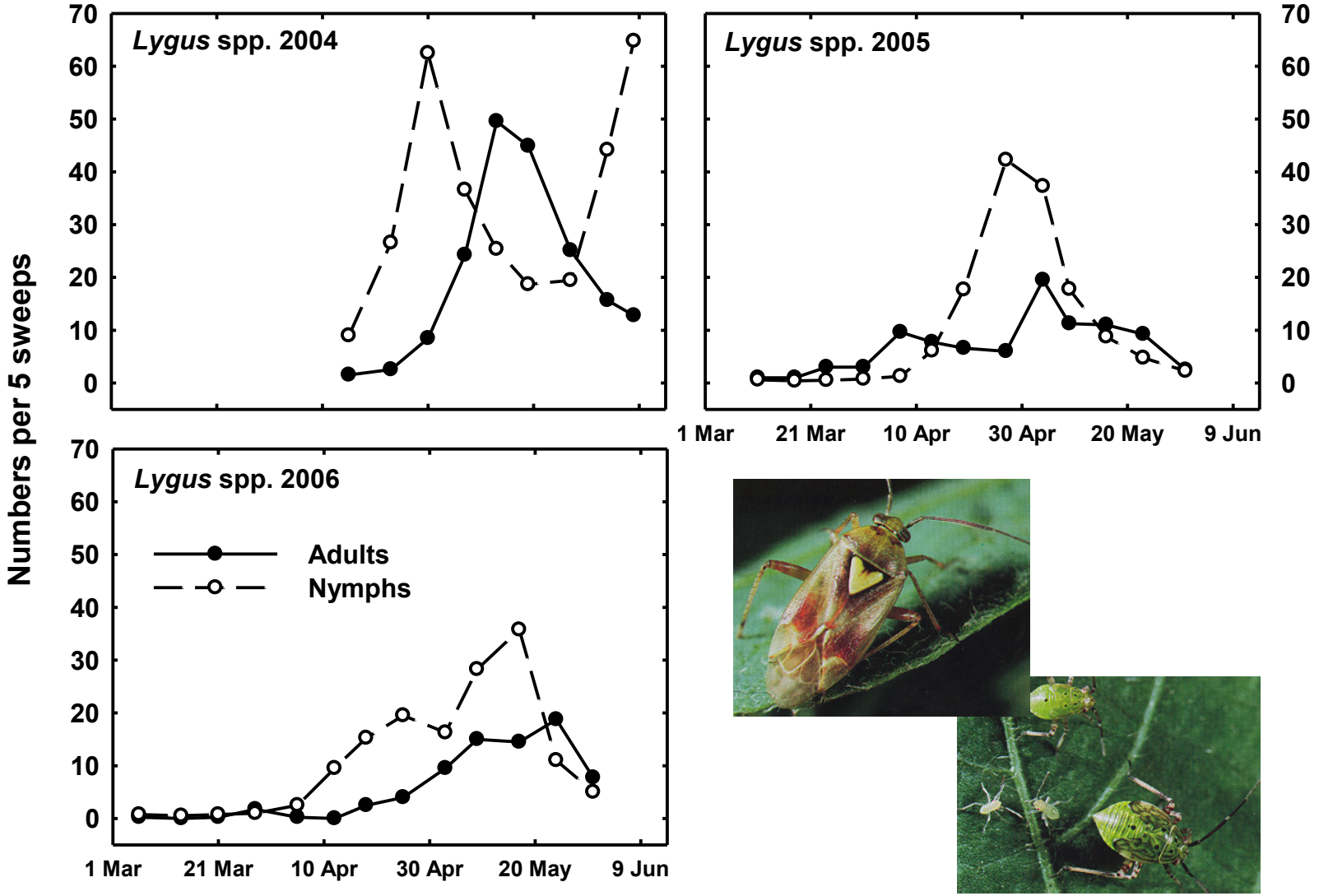




Naranjo, unpublished

Lesquerella is a breeding site for Lygus



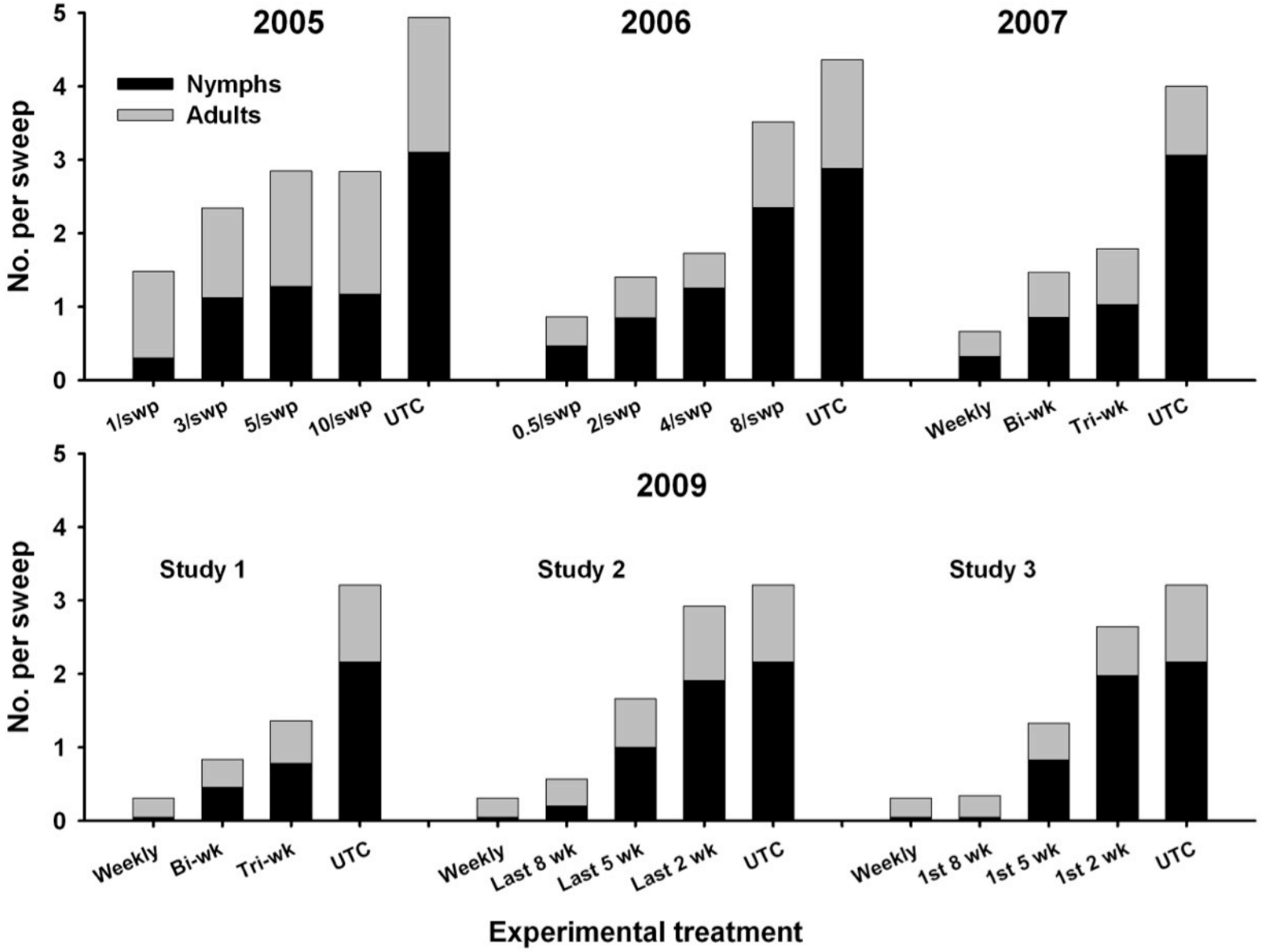
Naranjo, Ellsworth & Dierig, *J. Econ. Entomol.* 2011

Evaluation of Lygus impact on lesquerella

- **Field studies conducted in 2005, 2006, 2007 and 2009**
- **Plots 150 m^2 (2005); 300 m^2 (2006, 2007, 2009)**
- ***Lygus* spp. density manipulated by insecticides applied at**
  - **Varying nominal thresholds (e.g. 0.5, 2, 4, 8 per sweep – 2005, 2006)**
  - **Weekly, bi-weekly or tri-weekly intervals (2007, 2009)**
  - **Early, late and total season control in 2009**
- **Bi-weekly plant damage assessment**
- **Yield and quality assessment**

Lygus damage to lesquerella

Variable pest density by treatment



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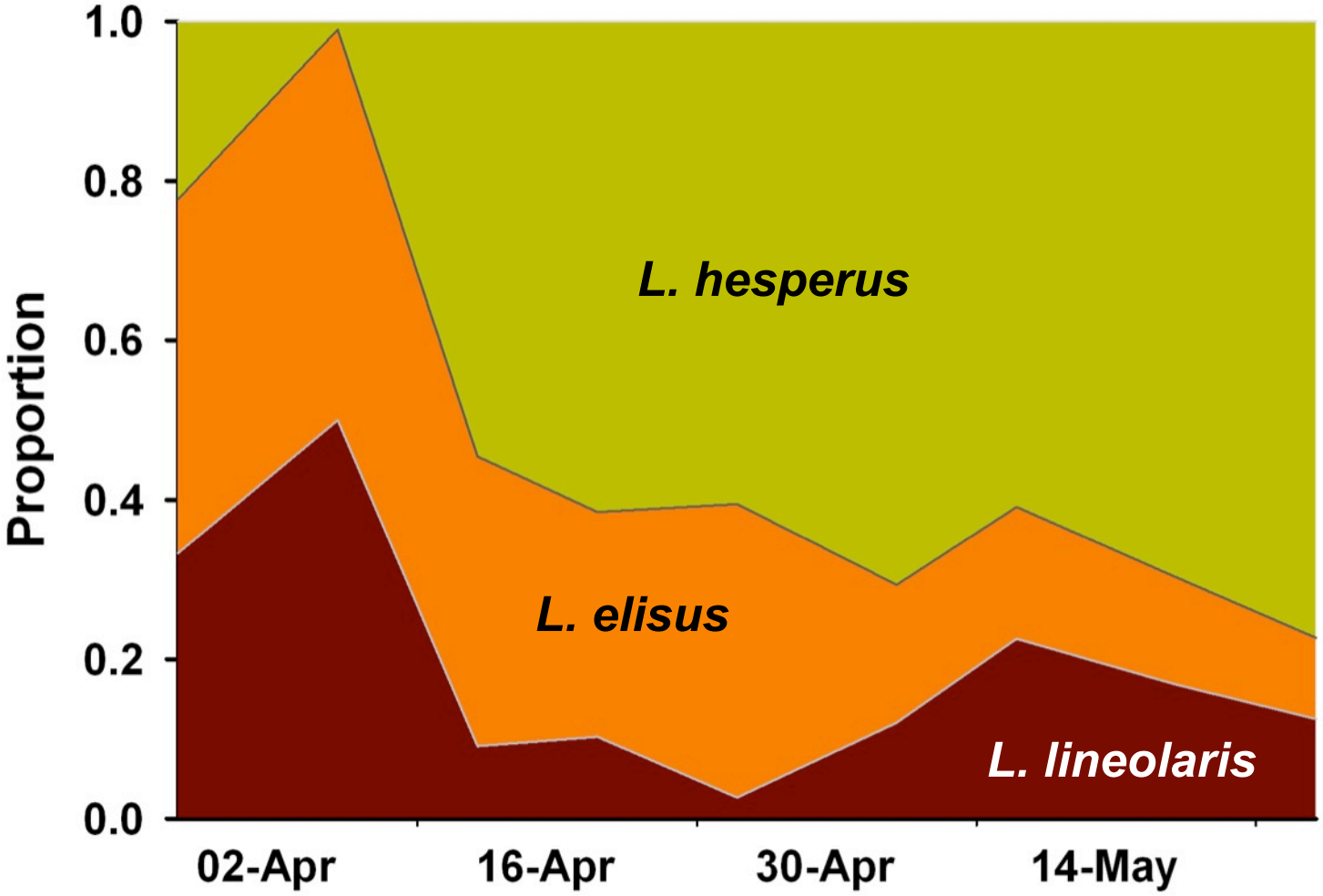
Lygus species composition



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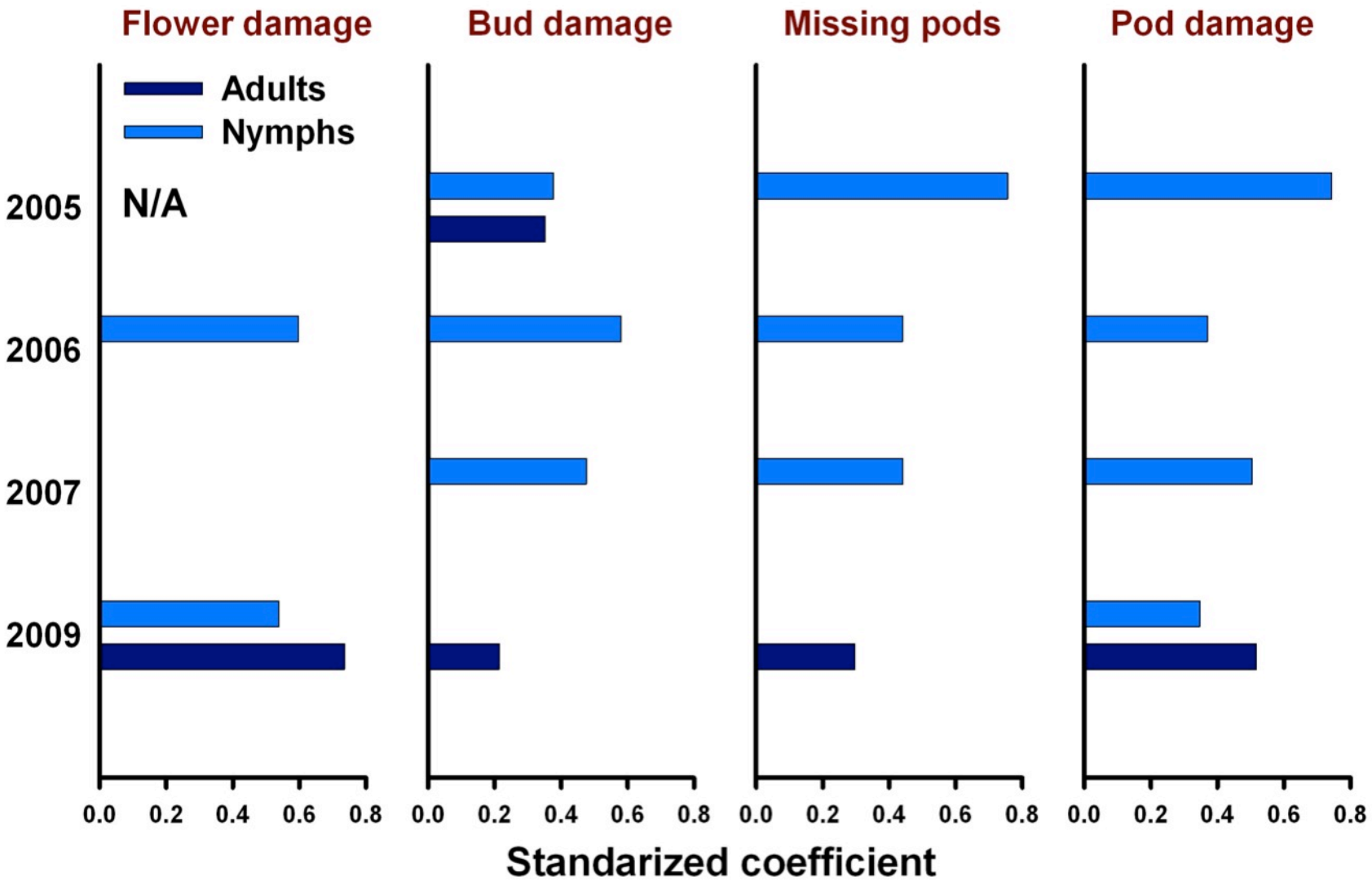
Nymphs associated with damage



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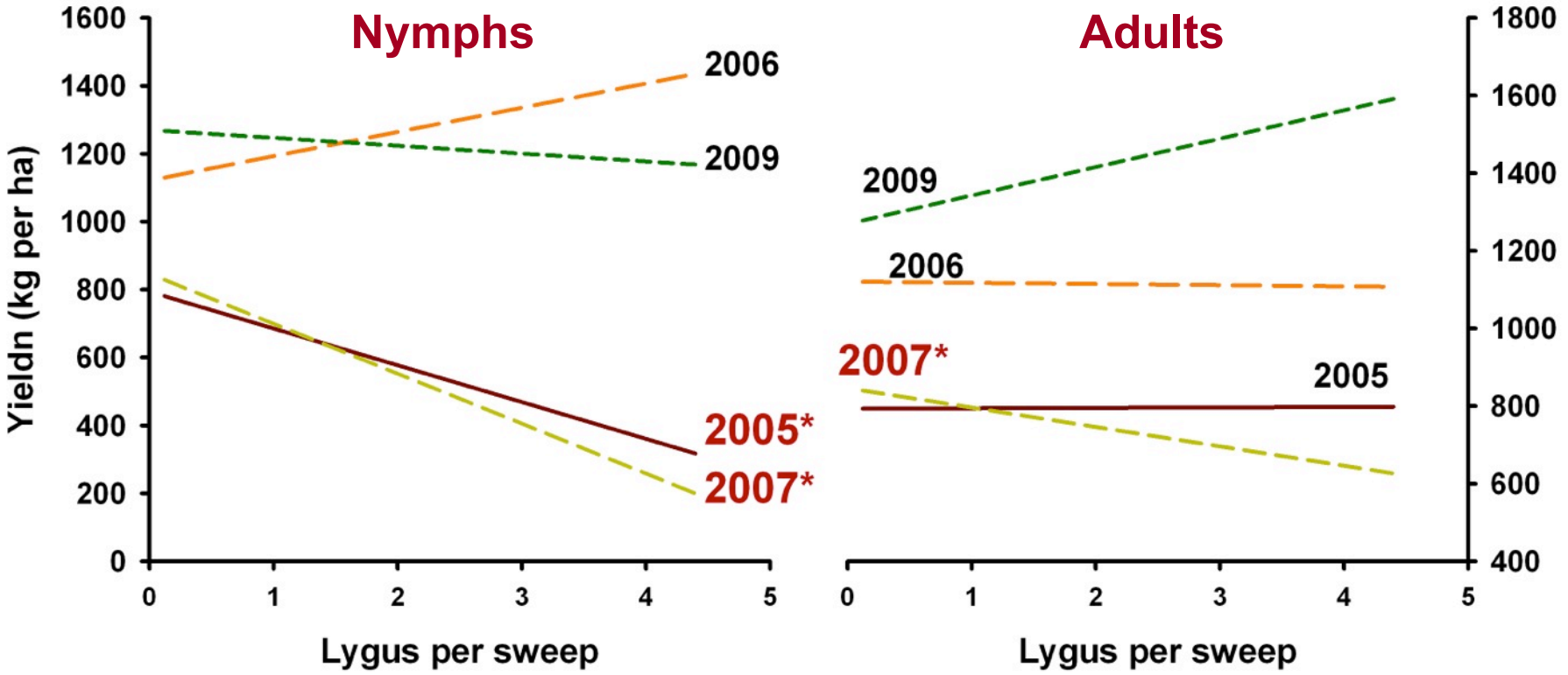
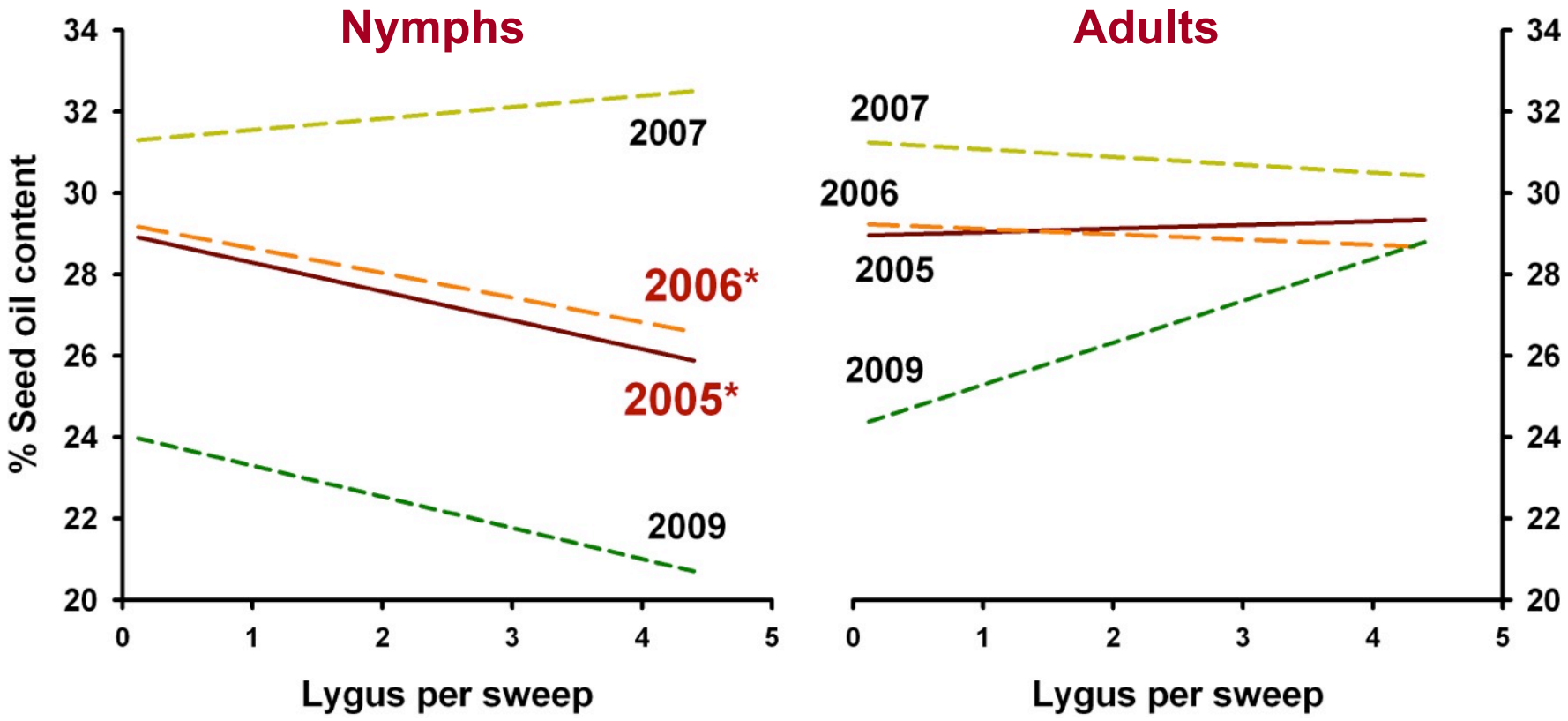
Variable impact of Lygus on lesquerella yield



Naranjo, Ellsworth & Dierig, *J. Econ. Entomol.* 2011

Variable impact of Lygus on lesquerella seed quality



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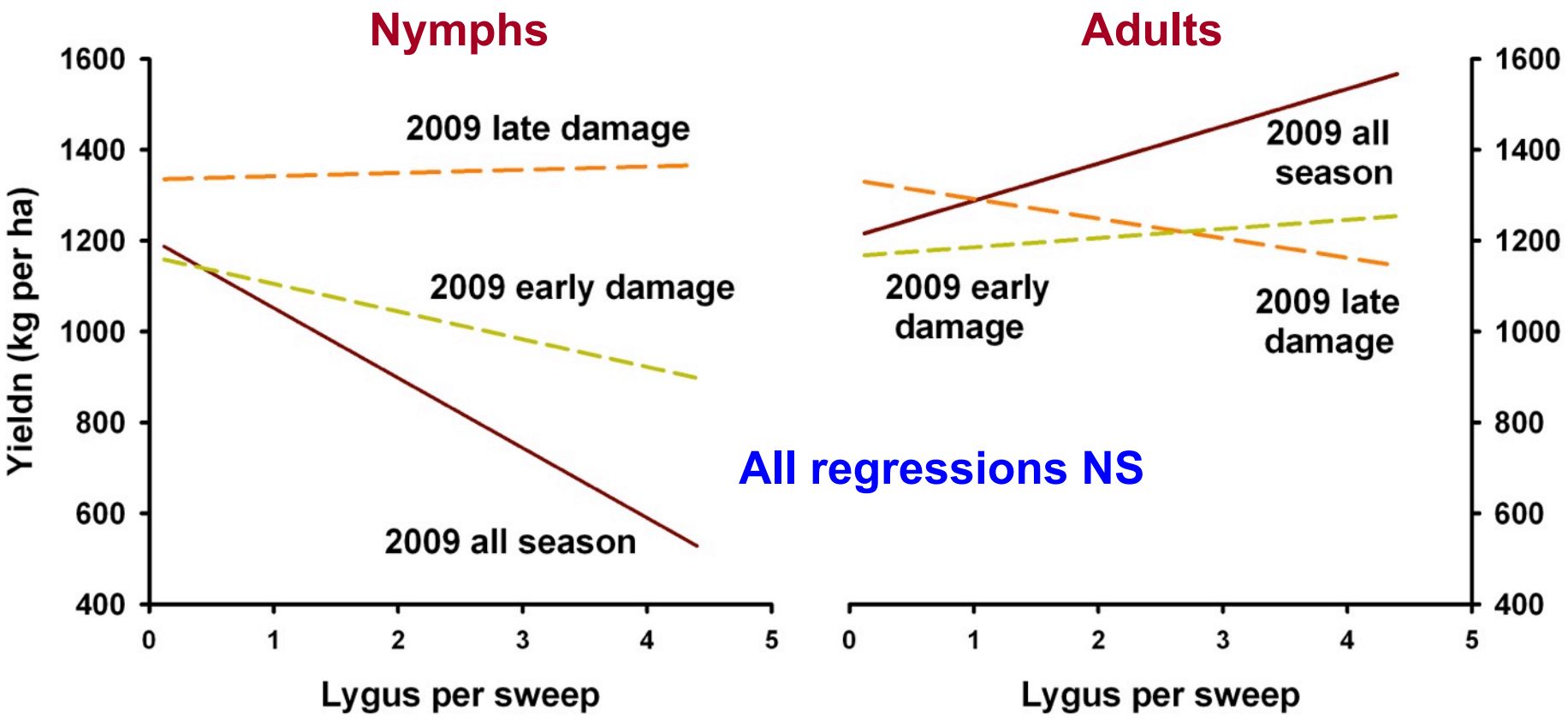
Timing of damage not important



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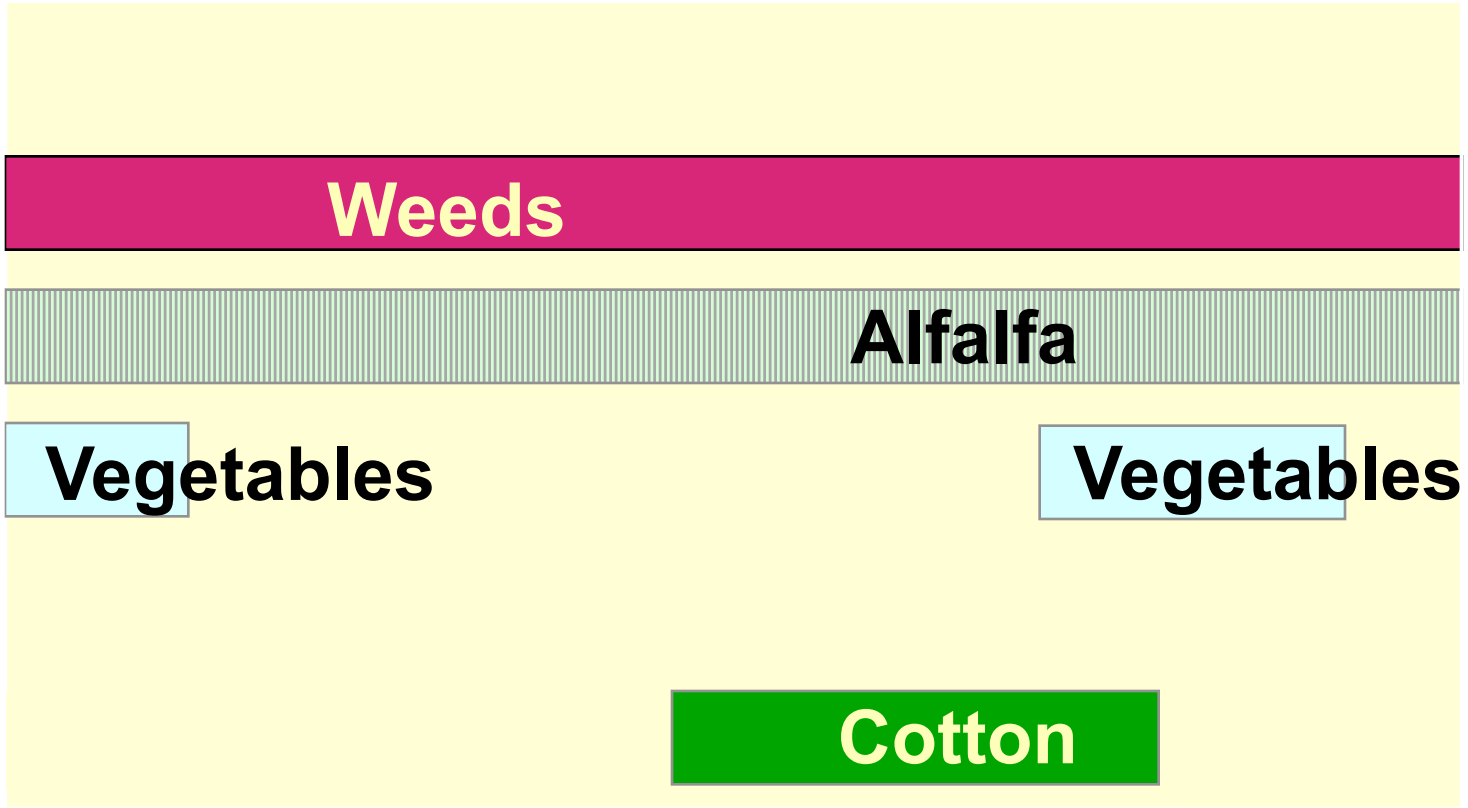
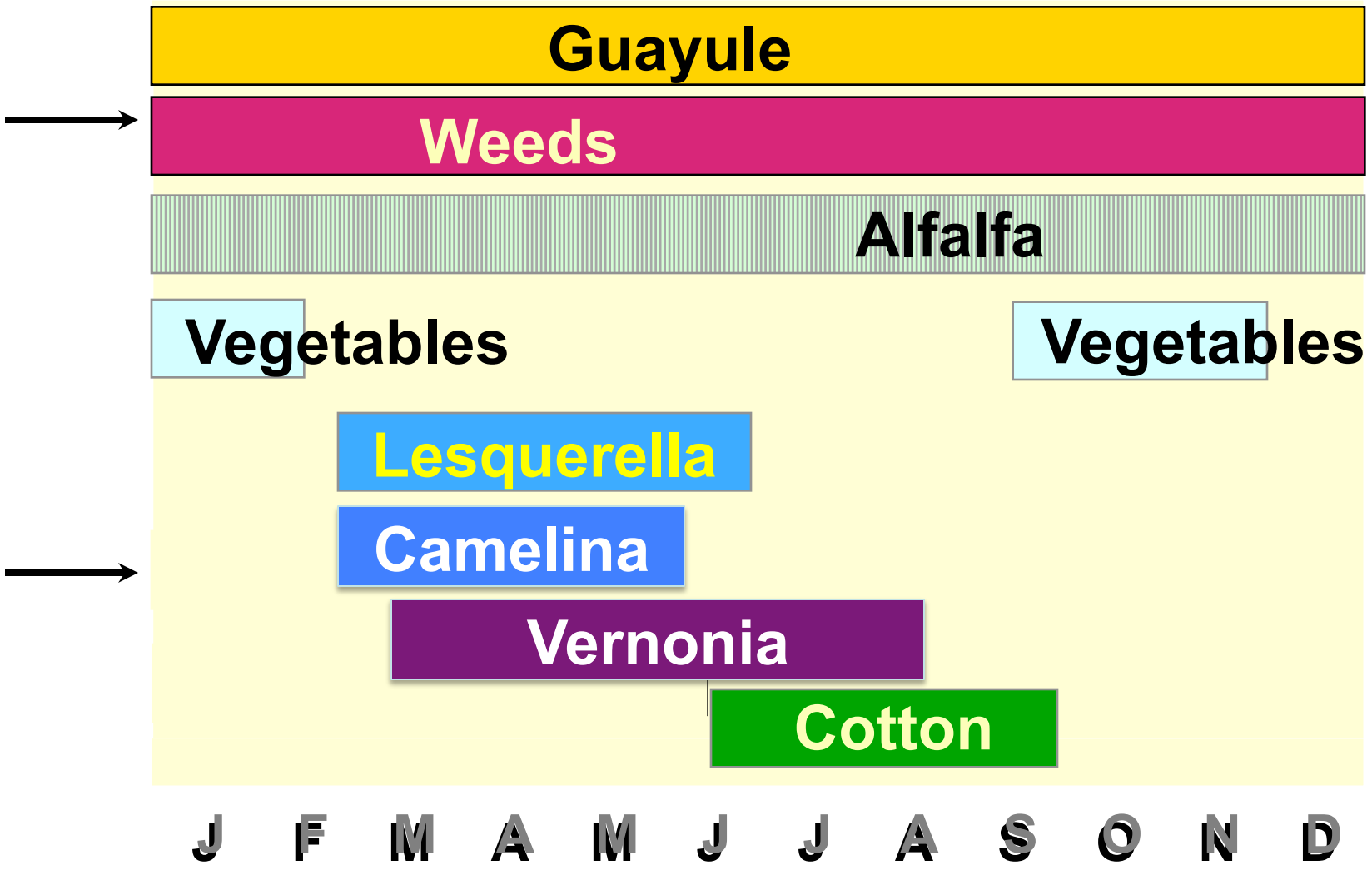
Seasonal cycle of Lygus spp.



Seasonal cycle of Lygus spp.



Summary/Conclusions

- ***Lygus hesperus* readily feeds on lesquerella and prefers the flowering structures; development is fast and mortality is low.**
- **Lesquerella harbors significant breeding populations of *Lygus* spp. (and natural enemies).**
- ***Lygus* spp. effects on lesquerella were inconsistent**
  - Nymphs were primarily associated with plant damage and with resulting effects on yield/quality
  - Yield/quality effects observed in association with agronomic issues; plant compensation to damage?
- **Lesquerella could significantly influence regional pest and natural enemy dynamics in all affected crops**

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