Utility of black light traps for monitoring spread and population growth of BMSB in NJ

Anne L. Nielsen & George C. Hamilton

Rutgers University

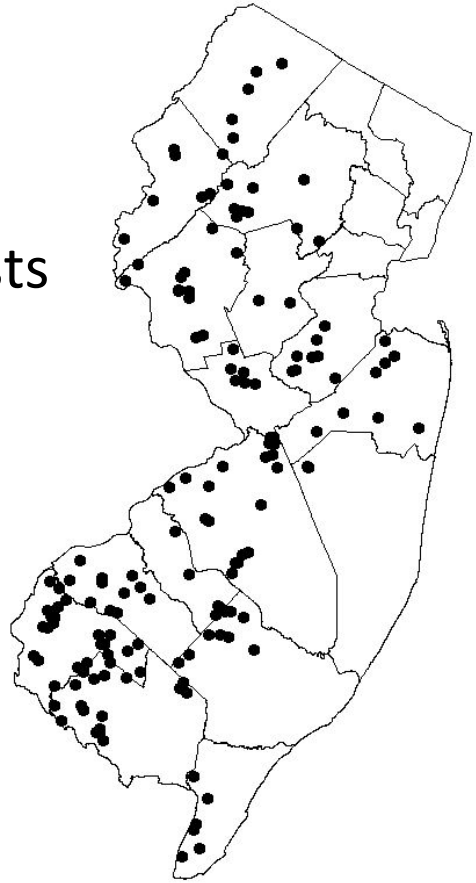
Dept. of Entomology

Monitoring Invasive Species

- During early establishment and spread
- Utilize species-specific tools
  - Biology and chemical ecology are understood
  - "Slow the Spread" program
- Utilize non-specific tools
  - Landscape pests
  - Polyphagous pests
  - Biology and chemical ecology are NOT understood
  - Ethanol traps for bark beetles
  - Black light traps for Lepidoptera

Potential Use of Black Light Traps

- Non-specific monitoring tool
- Documented attractiveness to pentatomids and BMSB
  - 45-70 traps throughout NJ
  - Monitored May – October for key pests



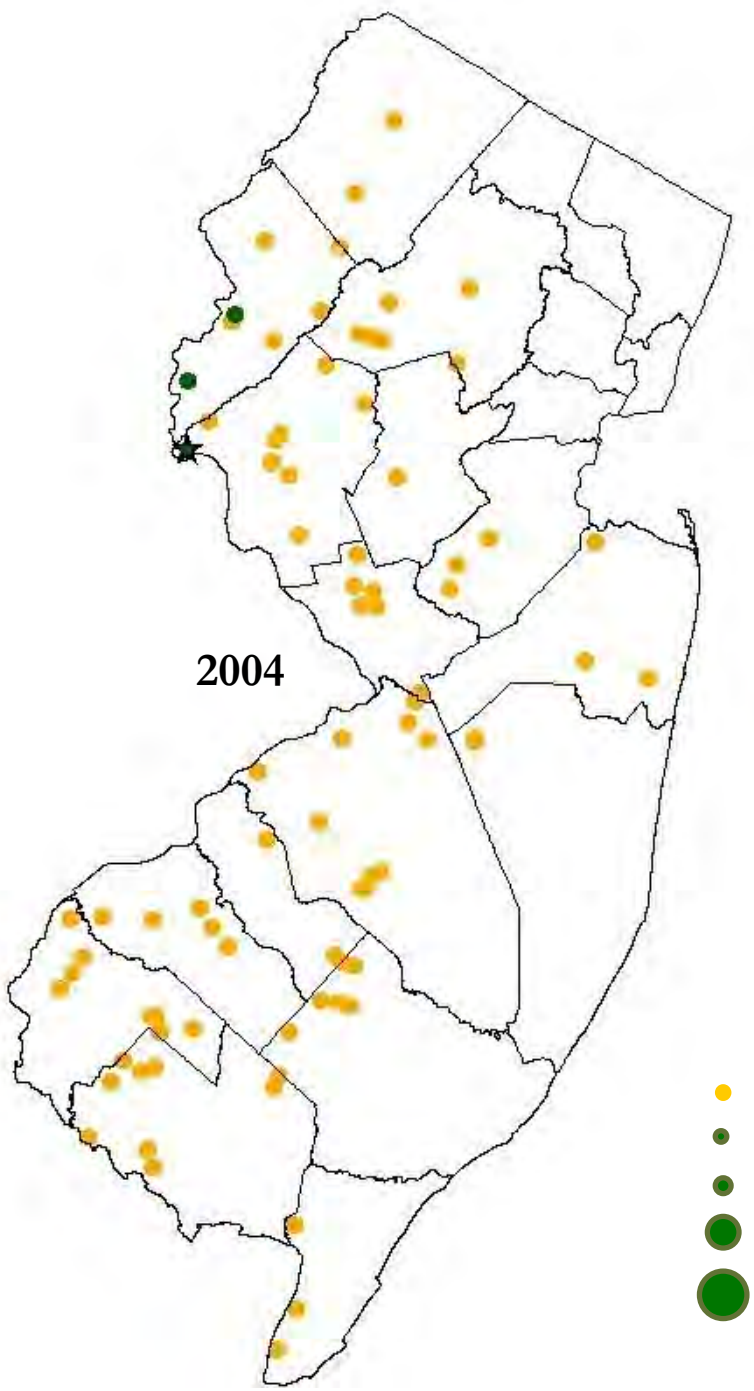
Black Light versus Pheromone

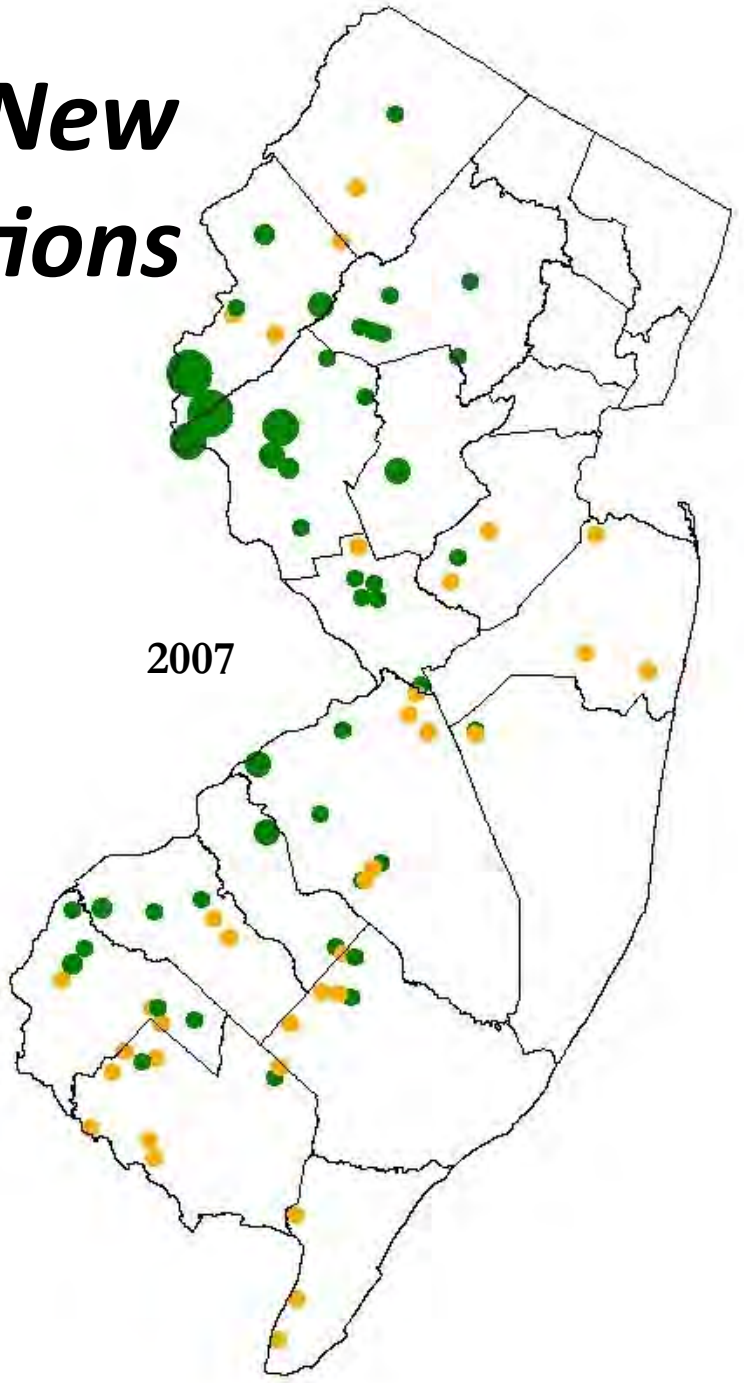
- 2004
  - Low populations of BMSB in NJ
  - 2,4,6 EEZ methyl decatrienoate (2.5mg lures)
  - Black light traps detected BMSB 2 years before kairomone
- 2012
  - High populations of BMSB in mid-Atlantic
  - 2,4,6 EEZ methyl decatrienoate (50mg+ lures) are not attractive in the early season
  - #10 compound
  - Effective at low population densities?

Use of Blacklight Traps

- Detect new populations
- Rate of spread
- Ecological impact
- IPM tool
  - Identify movement into crops
  - Early season monitoring
  - Identify background population pressure

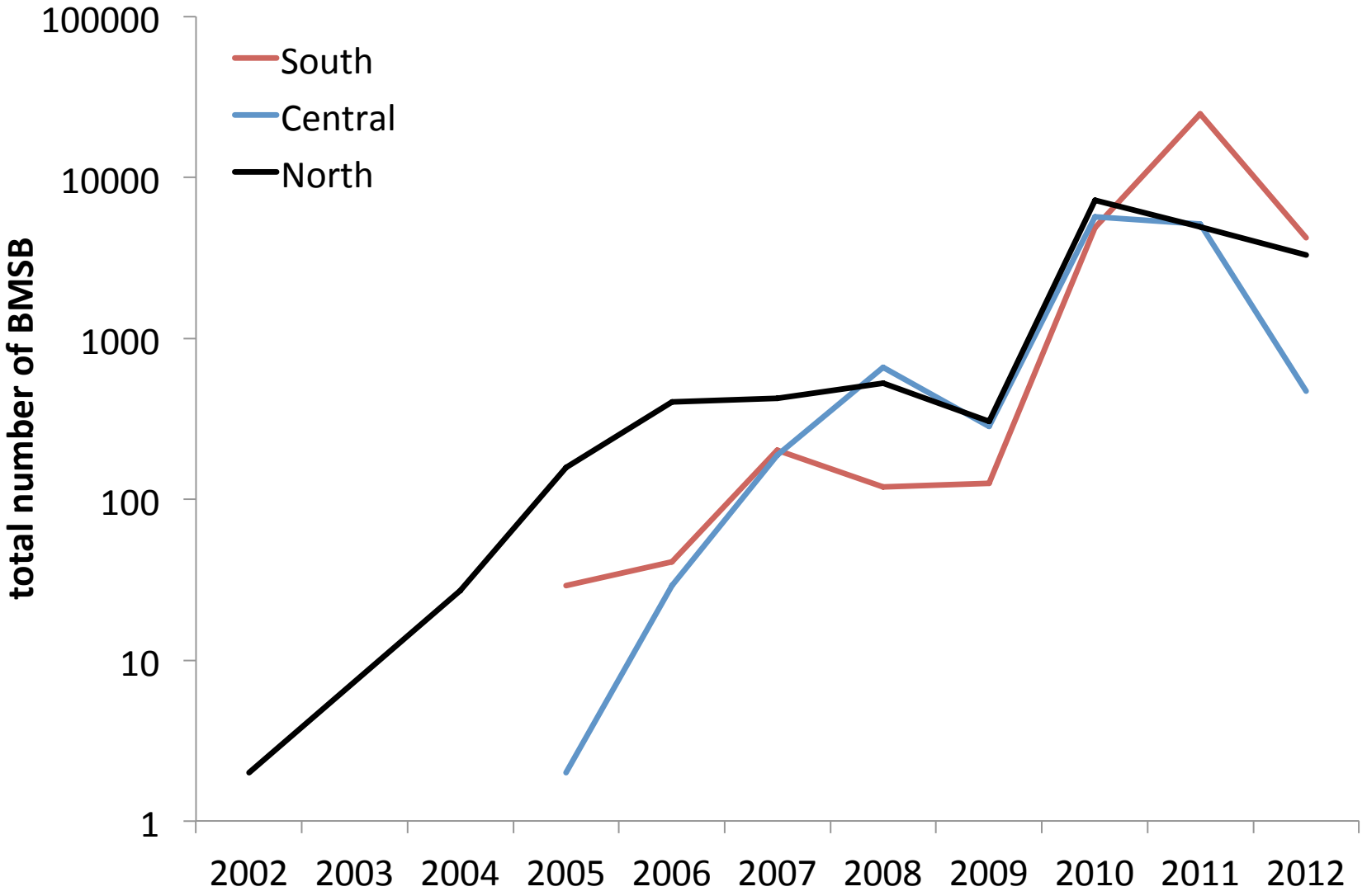
Detect New Populations



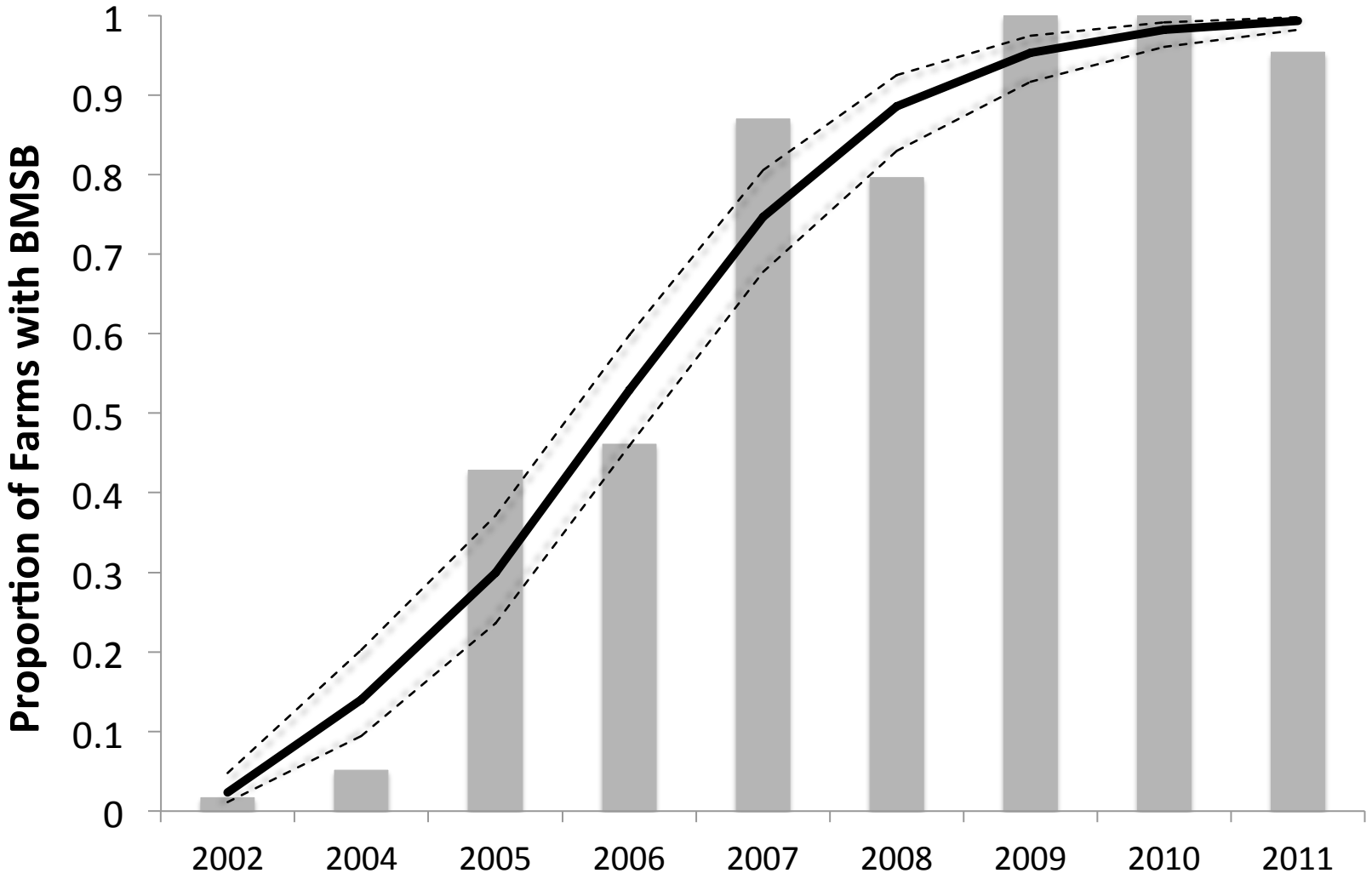


- Undetected
- 1-20 Detected
- 21-50 Detected
- 51-100 Detected
- ≥ 100 Detected

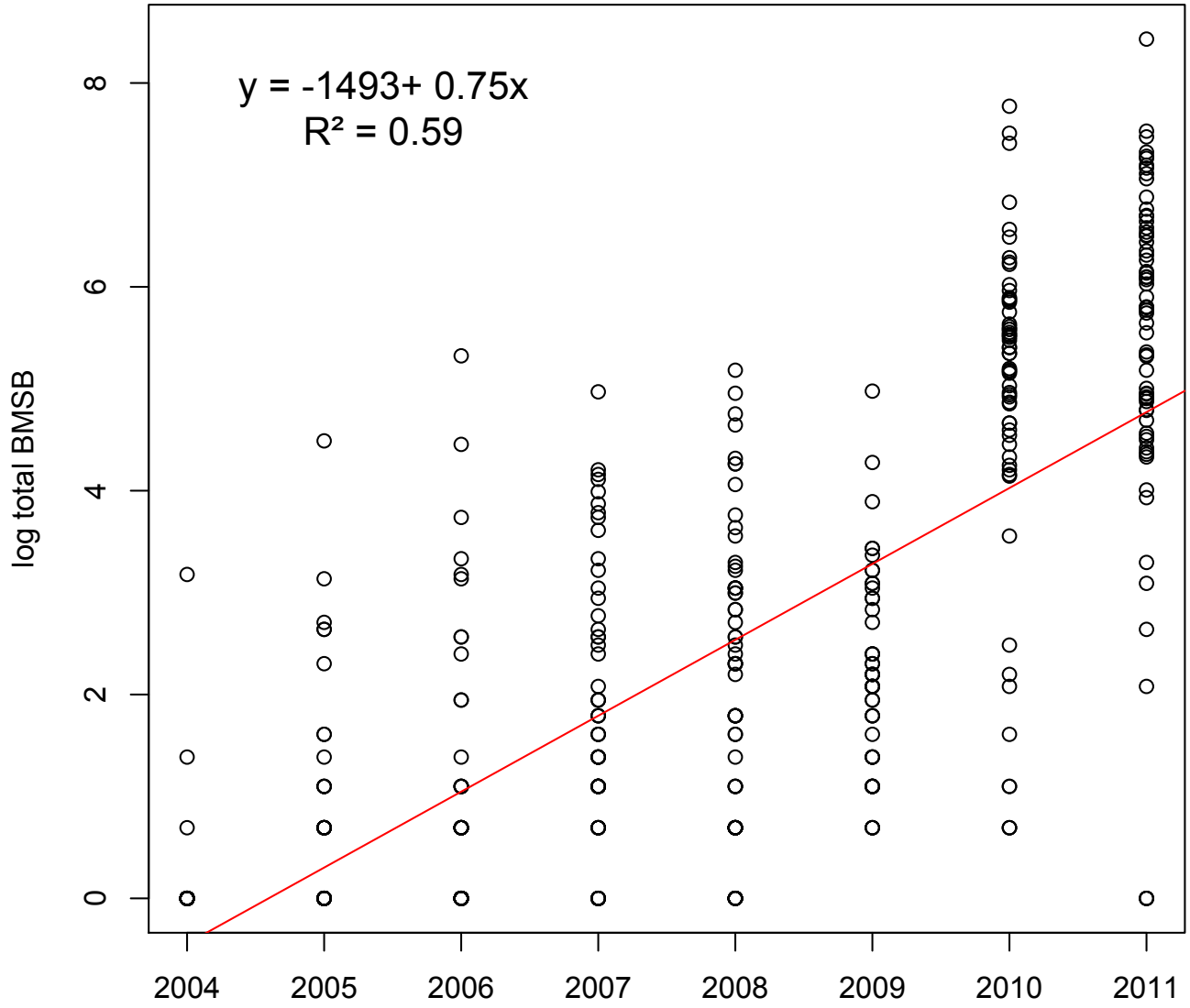
State-wide BMSB Population



BMSB Rate of Spread

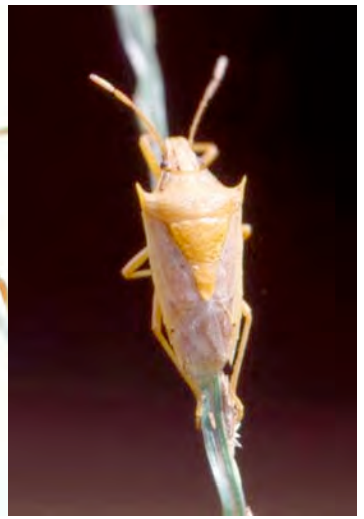


Rate of Population Increase

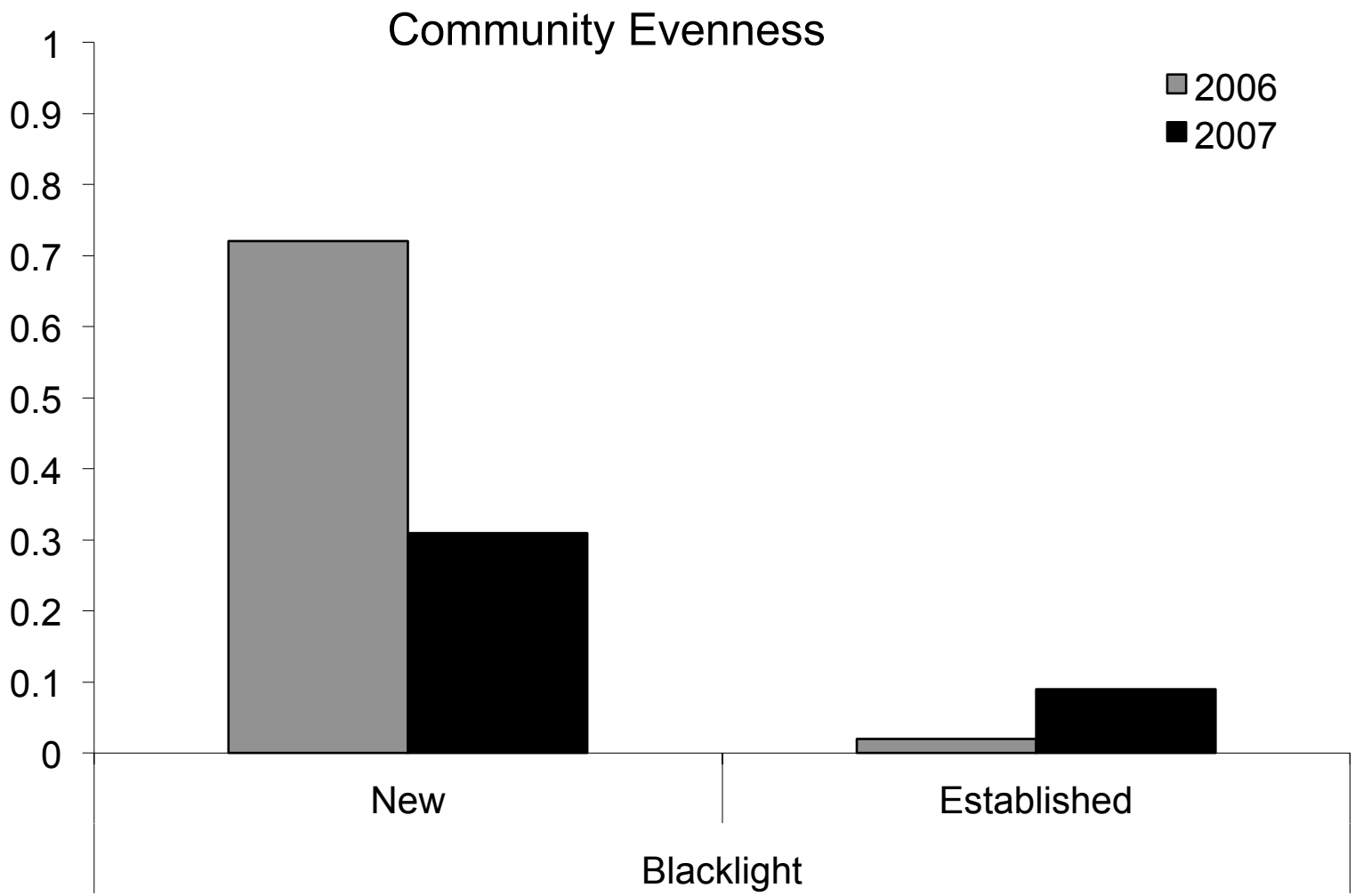


Native Stink Bug Species

- Green stink bug (*Acrosternum hilare*)
- Brown stink bugs (*Euschistus servus, E. tristigmus, E. variolarius*)
- Predatory stink bugs (Podisus spp.)
- Other (*Brochymena sp. O. pugnax, Menecles insertus, Holcostethus, Murgantia histronica, Banasa sp., Thyanta sp.*)
- Previously shown that evenness and richness decline within one year of BMSB introduction



Ecological Index

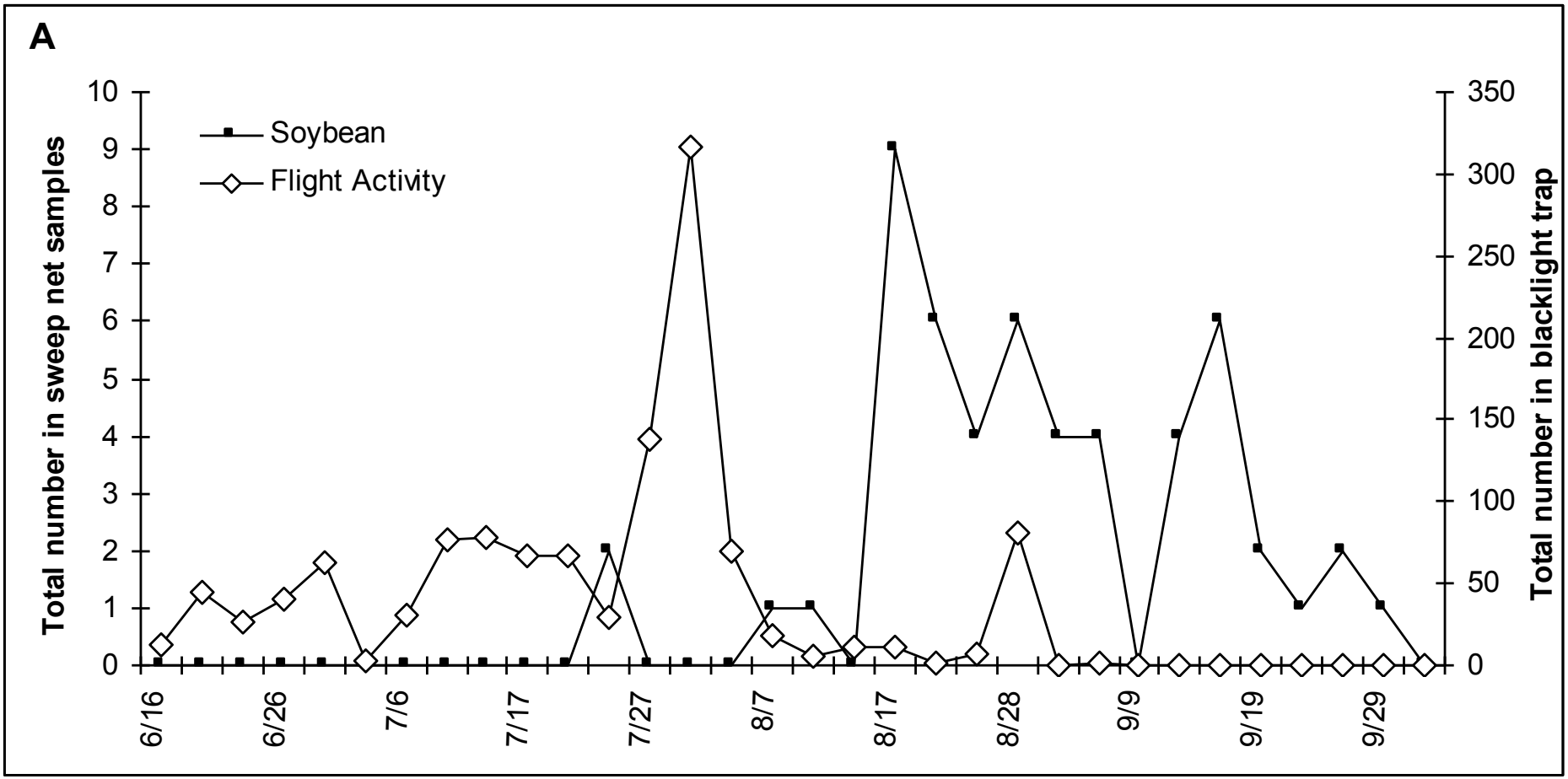


Use of Blacklight Traps

- ✓ Detect new populations
- ✓ Rate of spread
- ✓ Ecological impact
- IPM tool
  - Identify background population pressure
  - Identify movement into crops
  - Early season monitoring

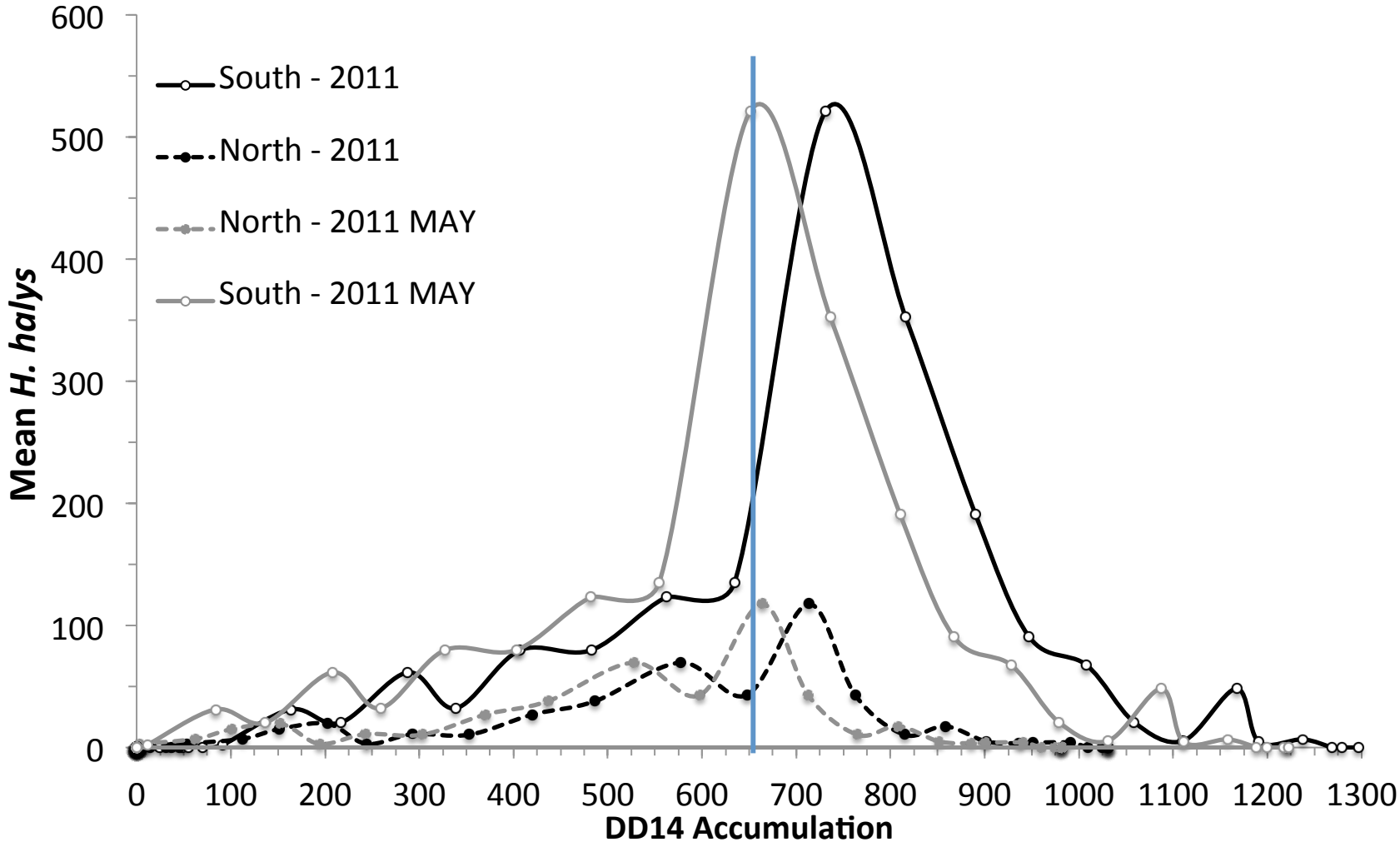
Mean Nightly Catch

Movement Into Crops



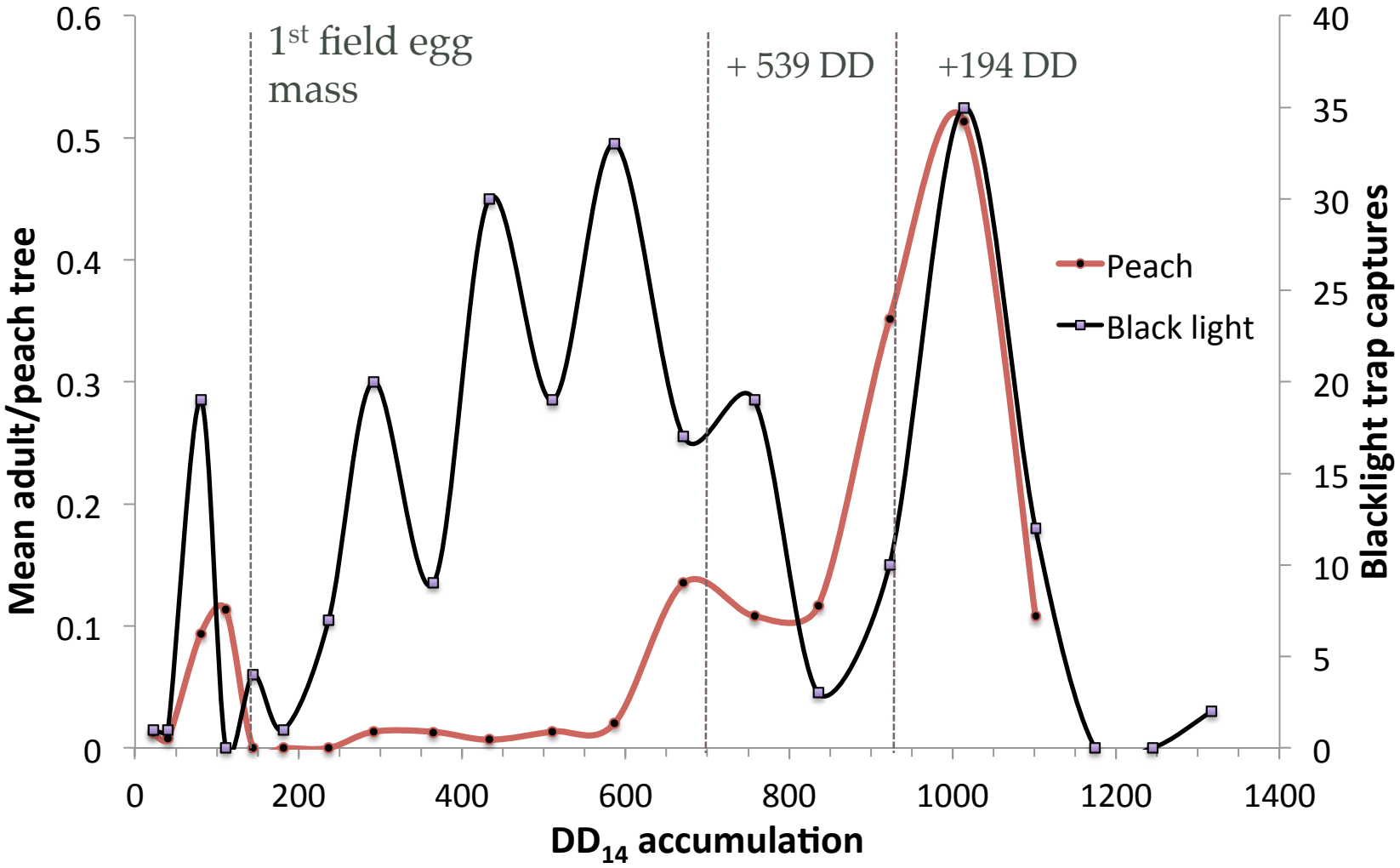
Nielsen et al., 2011 J. Env.. Entomol. 40

Identifying Biofix



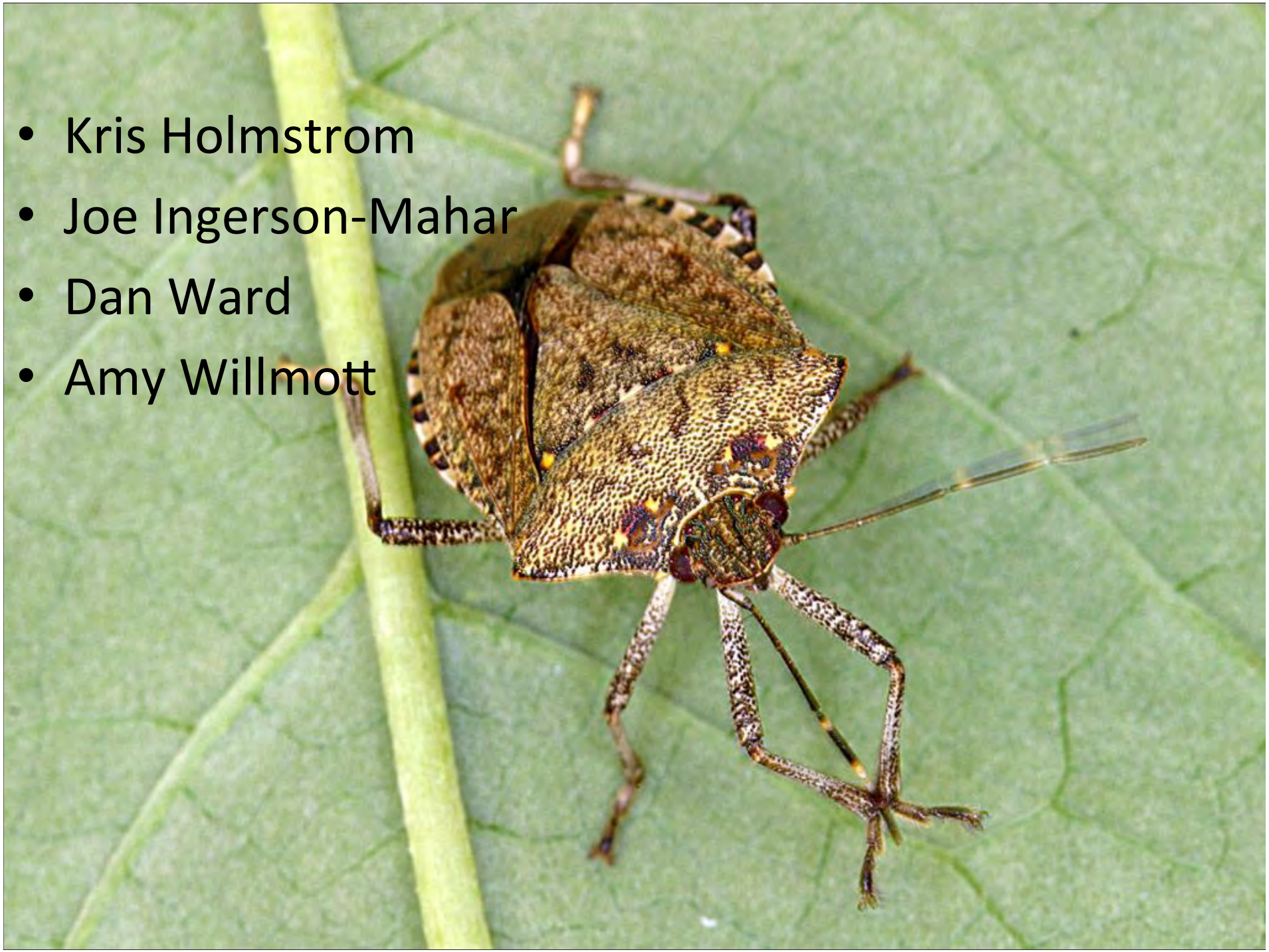
Nielsen and Hamilton. 2009 Ann. ESA 102; Nielsen et al. submitted

Phenological Model



Use of Blacklight Traps

- ✓ Detect new populations
- ✓ Track Spread
- ✓ Ecological impact
- ✓ IPM tool
  - ✓ Identify background population pressure
  - ✓ Identify movement into crops – peak populations in tree fruit; movement into soybean after population peak
  - ✓ Early season monitoring – early trap captures coincide with first adults in orchard; biofix of Jan 1


• Kris Holmstrom
• Joe Ingerson-Mahar
• Dan Ward
• Amy Willmott