Recent Advances in Insect Control Research in Rice

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Insect problems - 2006

- Early-season pests
  -- Rice water weevil
  -- Fall armyworm
  -- South American rice miner
- Late-season pests
  -- Rice stink bug
  -- Stem borers (no Mexican rice borers reported in LA in 2006)

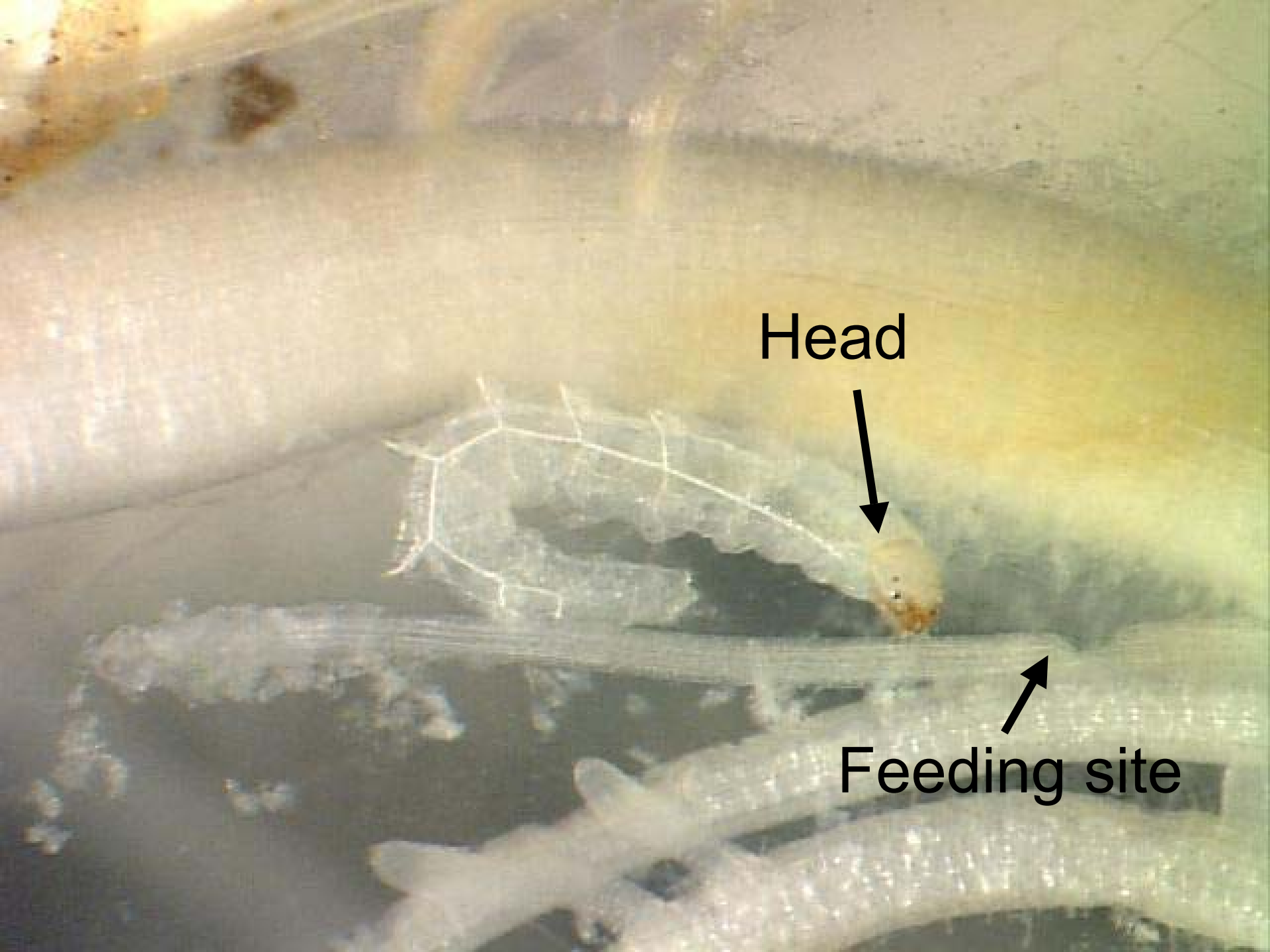
Rice water weevil

Adult overwintering

Adult feeding

Larval feeding

Mating and oviposition


Head
Feeding site

Root pruning by weevil larvae

10% yield loss X 6000 lbs/acre X $10/cwt =
- $60 /acre

Use of insecticides against the rice water weevil - 2007

- Karate Z
- Mustang Max (EW for fertilizer)
- Prolex
- Trebon (Section 18; tentative)
- Dimilin

Pyrethroids act by killing adults, thereby preventing egg-laying

Timing of insecticide applications for weevil management

- Many adult weevils are present before flooding and additional weevils fly in after flooding
- Females lay eggs in standing water
- Females prefer young rice plants for egg-laying

Therefore, most egg-laying occurs shortly after flooding!!!

Apply pyrethroids when adults / feeding scars are present and fields are flooded

A second application may be needed

Influence of cultural practices for weevil management

- **“Delayed” flooding: Continuous or pinpoint flooding leads to infestation of young, vulnerable rice plants. Delaying flood until rice is at the 5-leaf stage or beyond reduces damage from weevils**
- “Early” planting
- Draining of fields with larvae
- Seeding rate
- Fertilization

Cultural practices for weevil management

- “Delayed” flooding
- **“Early” planting: planting rice in early March may allow fields to escape weevil infestation**
- Draining of fields with larvae

Cultural practices for weevil management

Planting date and use of insecticides: single applications of pyrethroids appear to be sufficient in early-planted, but not late-planted rice

Relative efficacies of a single application of Karate (0.03 lbs ai/acre) in an early-planted and a late-planted experiment.

Treatment	% control of rice water weevil larvae		
	16-19 daf	26-27 daf	34-35 daf
Experiment 1: Early season test, 1 daf	98.5%	89.9%	68.4%
Experiment 2: Late-season test, 2 daf	65.6%	32.1%	5.5%

Influence of cultural practices for weevil management

- “Delayed” flooding
- “Early” planting
- Draining of fields with larvae
- **Seeding rate**
- Fertilization

Cultural practices for weevil management

Seeding rate may affect severity of weevil infestation (thin stands have more weevils) and may affect extent of yield loss (low seeding rates suffer greater relative yield losses?)

Influence of cultural practices for weevil management

- “Delayed” flooding
- “Early” planting
- Draining of fields with larvae
- Seeding rate
- Fertilization

Cultural practices for weevil management

Additional fertilizer applied after weevil injury does not appear to help rice compensate for weevil injury

Integrating weevil management with crawfish production

- Rice and crawfish cultivated in close proximity
- Crawfish harvested in March/April/May
- Weevil insecticides very toxic to crawfish

Integrating weevil management with crawfish production

- Granular formulations of insecticides will reduce drift into neighboring fields and ponds
  - -- Mustang impregnated on fertilizer
  - -- Trebon (Section 18 anticipated): a pyrethroid-like granular insecticide, used like Karate etc.
- Draining, other cultural practices

Tools for weevil management: 2008 and beyond

Several granular insecticides and insecticidal seed treatments have shown promise in small-plot tests and may be available in the future

Future weevil management tools

Product	Use Pattern	Control
V10170 (Valent)	Seed treatment	Excellent
DPX-E2Y45 (DuPont)	Seed trtmt	Excellent
Dinotefuran (Mitsui)	Pre/post granular	Excellent
Dinotefuran (Mitsui)	Late post granular	Very good
Avicta + Cruiser (Syngenta)	Seed trtmt	Very good

Fall armyworms and other armyworms in rice can be controlled by a combination of flooding and insecticide applications

Confirm for armyworm control?

- Confirm would be safe for crawfish
- Section 18: need information on pest incidence and impact
- Yield impact of armyworms unclear
- Section 3 may be a better route

Rice stink bug: no changes in management recommendations or available insecticides in 2007 (no Orthene)

Rice Stink Bug: use of insecticides

- Bugs suck sap from developing grains
- Scout when rice is headed—50% to 75% panicle emergence
- Take 10 sweeps at 10 different areas
- Thresholds:

  First two weeks of heading:
  3-5 bugs per 10 sweeps
  After first two weeks of heading:
  10 bugs per 10 sweeps

South American Rice Miner = "whorl maggot"

- New pest in Louisiana and Texas
- Found in numerous fields in 2005 & 2006
- A pest of late-planted rice
- Primarily a pest of seedlings
- Economic impact is unknown

South American Rice Miner: damage

- Larvae feed internally on leaves before they unfurl in the whorl or stem
- Feeding causes large, elongated lesions along the leaf edge. Affected leaves become dry and tend to curl and wither
- Injured seedling look ragged and heavy infestations may kill plants, leading to reduced stands

South American Rice Miner: management

- Foliar insecticides are unlikely to do much good (adults are mobile; larvae are inside plant)
- Systemic insecticides may help?
- Avoid planting rice late
- We need to know more about the biology and economic impact of the insect!!
- Contact county agent if you suspect infestation

Sugarcane borer


Photograph by Boris Castro


Photograph by Boris Castro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ACME USA
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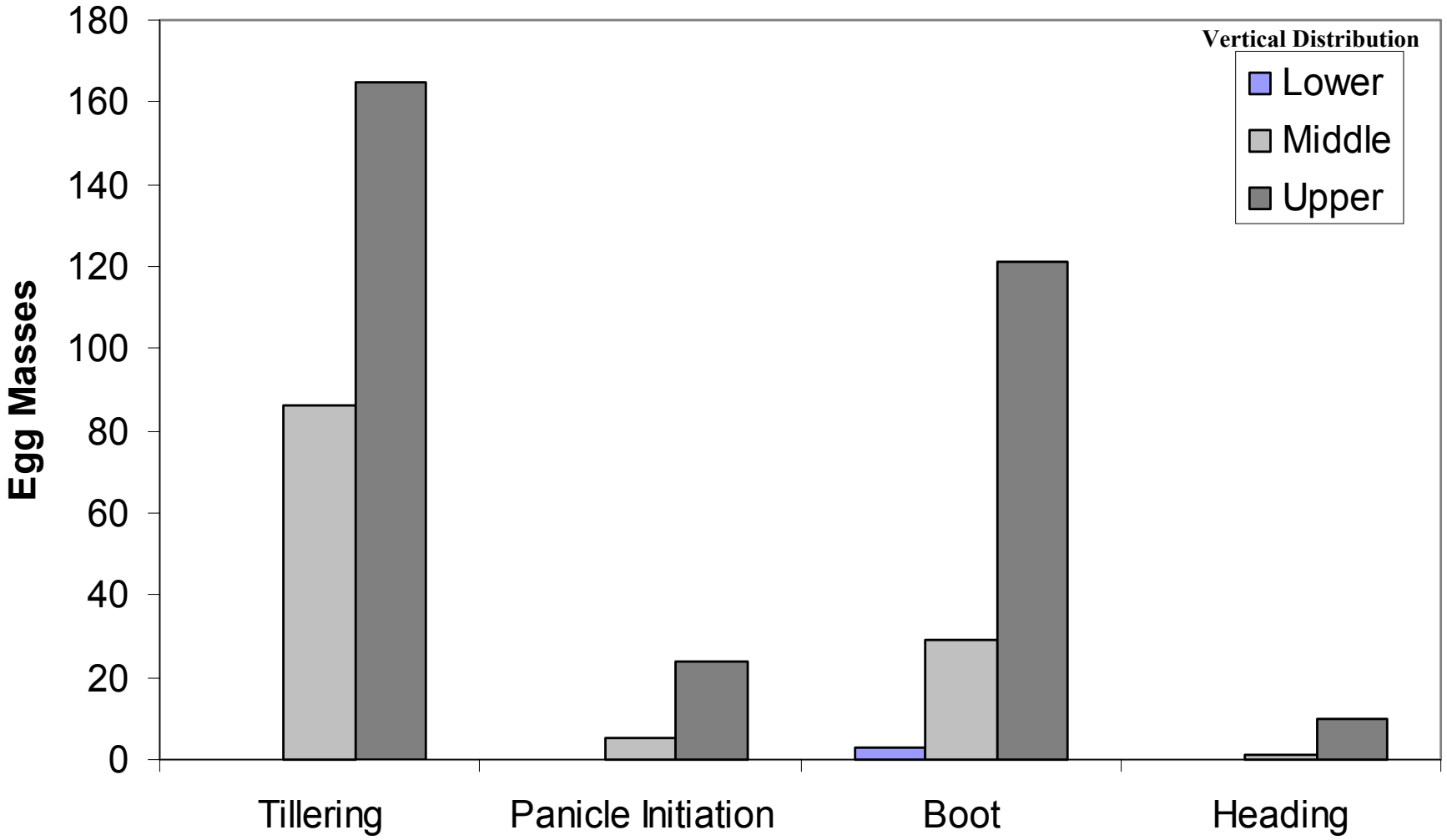
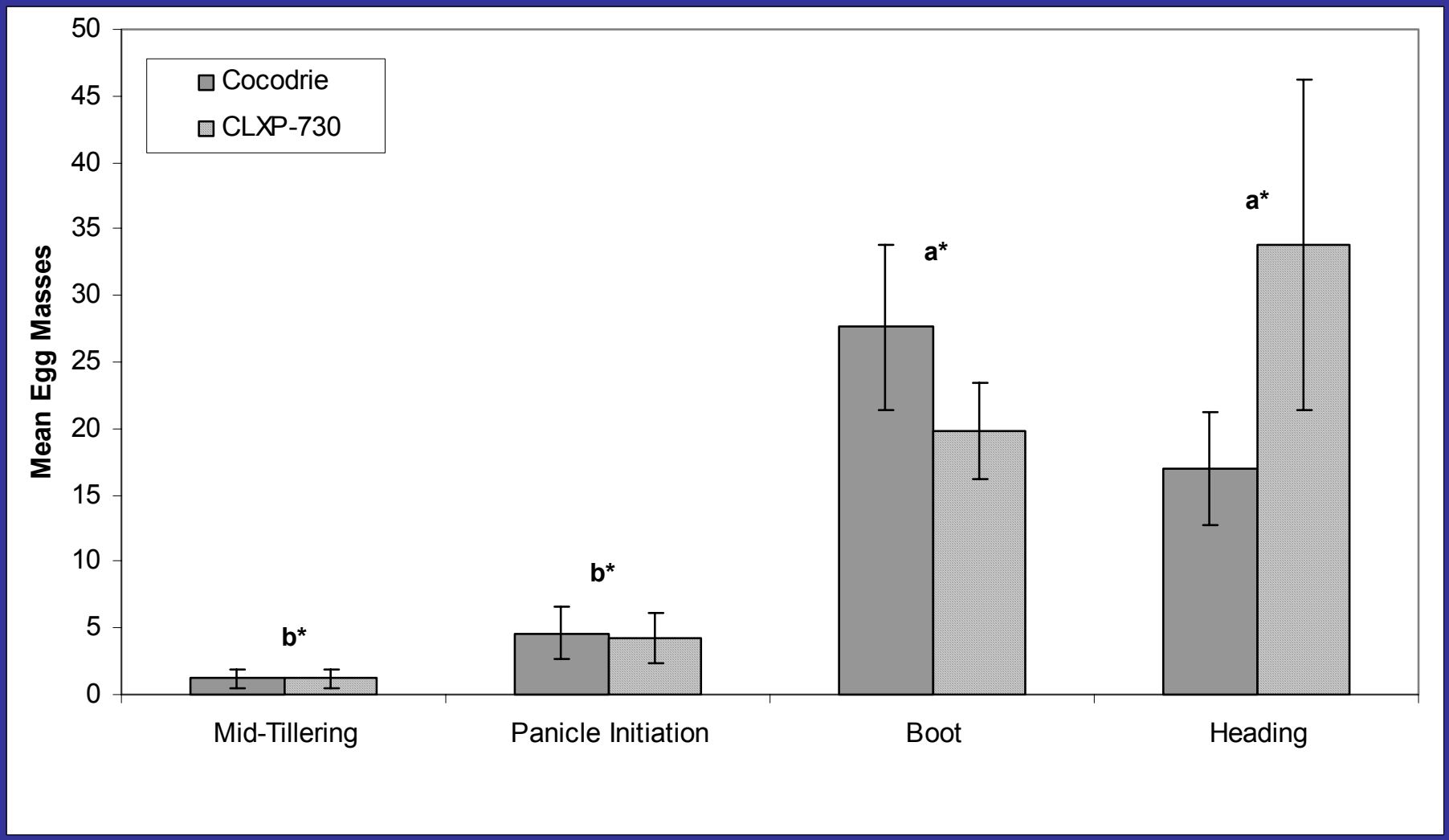
Distribution of egg massses – no choice field experiment



Effect of Age and Variety on Oviposition Preference



*Bars accompanied with different letters are significantly different ($P < 0.05$; Tukey's)

Summary

- Females primarily laid eggs on the upper third of plants
- Under no-choice conditions, females will oviposit on younger, vegetative state plants
- Females tended to lay eggs on the inner surfaces of leaves
- Given a choice, females prefer to oviposit on the larger, reproductive stages (boot and heading)
- Observations in greenhouse: feeding lesions observed within two days of egg eclosion; larvae in stems in 5-9 days

Management of stem borers

- Problems may be worse if alternate hosts nearby (sugarcane, corn, sorghum)
- Early planting
- Insecticide applications if adults or eggs observed
  - Begin scouting at PD/early boot
  - Look for adults, eggs, lesions
  - Applications of pyrethroids must be made before larvae enter stem