Tarnished Plant Bug, *Lygus lineolaris,* a Potential Biotype Difference in the Mississippi Delta

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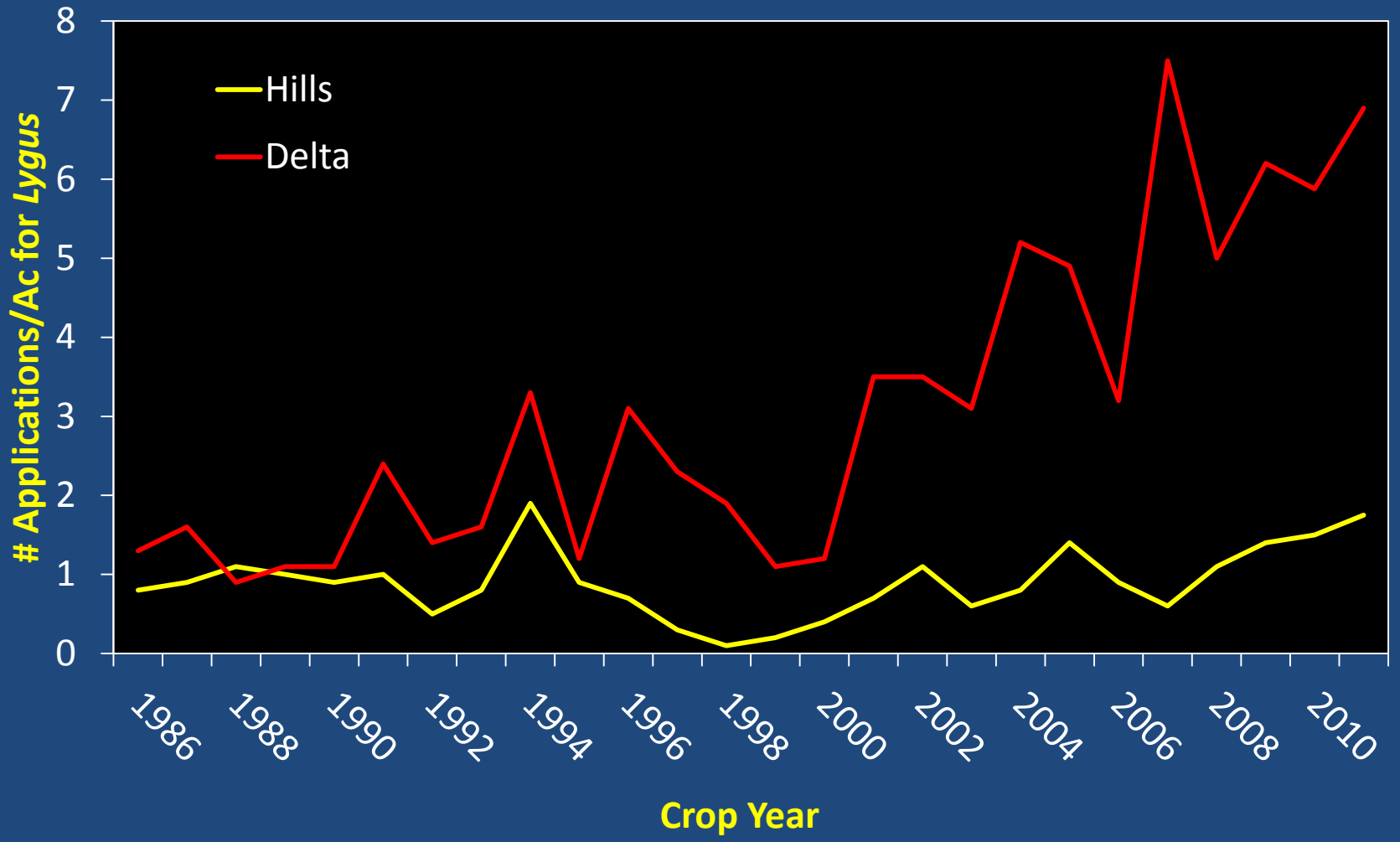
Mississippi's Agricultural Regions

Justification for Research



Source: http://www.entomology.msstate.edu/resources/tips/cotton-losses/data/

Justification for Research

- Resistance to pyrethroids in 1992 (Snodgrass 1996)
- Resistance to OP's in 2006 (Snodgrass et al. 2009)
- Less diverse ecosystems in the Delta (NASS 2007)

Objective

- To determine the factors associated with the ecology and biology of Tarnished Plant Bug that potentially impacts their pest status between Mississippi's two agricultural regions

Materials and Methods

- Adults were collected from the Hills and Delta regions from *Amaranthus palmeri* (2 per region)

- Populations were reared in the MSU rearing facility at 26.7°C and 60% relative humidity with a photoperiod of 16:8 (Light:Dark)

Materials and Methods

- Initial populations separated into RubberMaid® containers with the center of the lid modified so that only a fine mesh screen remained

- One artificial diet pack (Cohen 2000) and two egg packs were placed on top of the screen for feeding and oviposition

Materials and Methods

- Egg packs were removed every two days, and split into two cohorts within a colony
- Prior to 3rd instar, all cohorts were fed diet, at 3rd instar, the feeding treatments were initiated
- One cohort was fed artificial diet
- The other cohort was fed fresh cotton squares

Materials and Methods

- Each cohort was monitored daily for development times, and twice weekly for survivorship

- Once cohorts reached adulthood, they remained separate and were placed in cages at a 1:1 sex ratio of up to 10 insects per gender and allowed to mate unhindered

Materials and Methods

- Egg packs were removed every 2-3 days and eggs were counted to measure eggs/female/day

- Egg packs remained separate and were monitored for hatch rate expressed as nymphs/female/day

Data Analysis

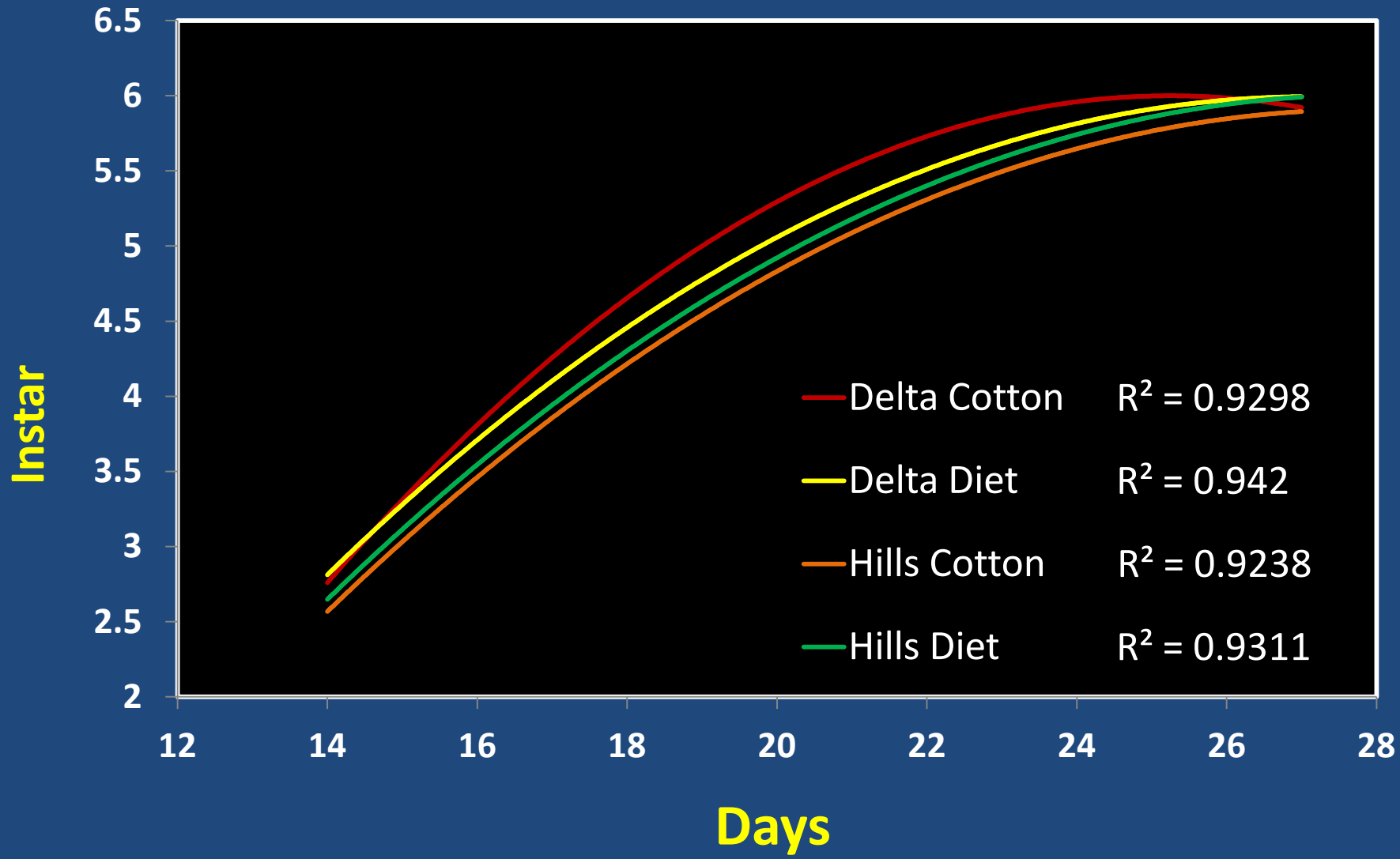
- Development curves calculated through regression analysis
- All other data were analyzed using analysis of variance (Proc Mixed in SAS)
- Date of oviposition served as blocks/reps in a RCB design
- Fixed Effects
  - Region of Collection
  - Food Source
  - Region*Food
- Random Effects
  - Replications

Survivorship

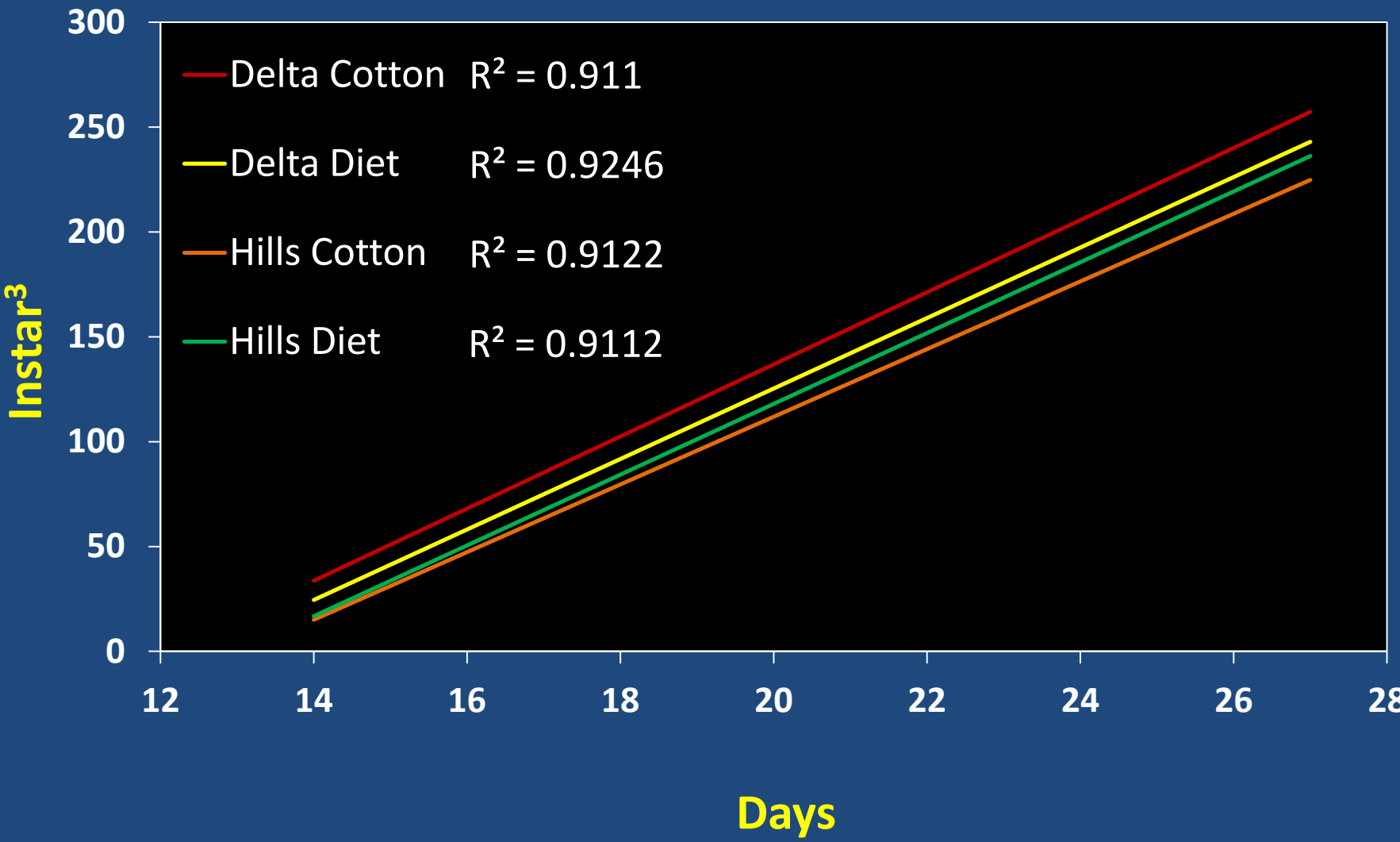
	Cotton	Diet	Mean
	Mean (SEM)	Mean (SEM)	Mean (SEM)
Hills	61.92 (6.94)	81.2 (2.97)	71.56 (4.2)
Delta	58.62 (5.76)	73.59 (4.02)	66.11 (3.78)
Mean	60.27 (4.42) b	77.4 (2.57) a	

Region	*P = 0.25*
Food	*P ≤ 0.01*
Food*Region	NS

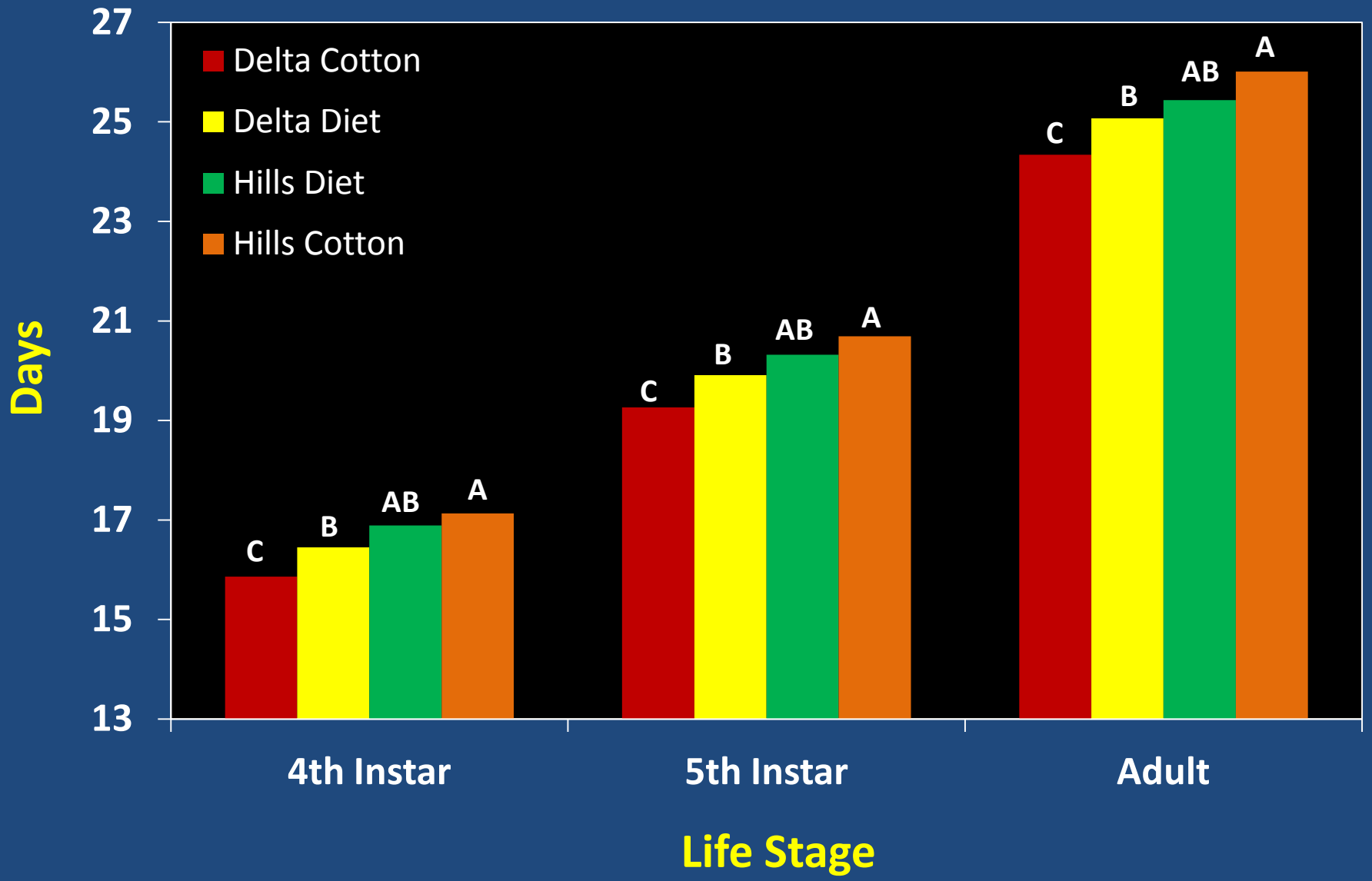
Development Curves for Tarnished Plant Bug



Cube Transformed Development Curves for Tarnished Plant Bug



Development Times



Fecundity (E/F/D)

	Cotton	Diet	Mean
	Mean (SEM)	Mean (SEM)	Mean (SEM)
Hills	2.24 (0.23)	1.35 (0.24)	1.79 (0.19) B
Delta	3.54 (0.46)	2.22 (0.25)	2.88 (0.29) A
Mean	2.89 (0.28) a	1.78 (0.19) b	

Region	*P < 0.01*
Food	*P < 0.01*
Food*Region	NS

Conclusions

- Region had no effect on survivorship of Tarnished Plant Bug
- Tarnished Plant Bug from the Delta Region reared on cotton developed significantly faster than those reared on cotton from the Hills (≈2d)
- Tarnished Plant Bug populations from the Delta Region laid significantly more eggs than those from the Hills (≈1.6 fold more)

Conclusions

- Populations of Tarnished Plant Bug reared on cotton laid significantly more eggs than those reared on diet (≈1.6 fold more)

- Validates the question of a possible biotype difference between Mississippi's two major agricultural regions

Possible Future Research

- Examine genetic make up of populations of Tarnished Plant Bug from both regions for possible differences
- Monitor performance of Tarnished Plant Bug reared on other wild hosts more suitable than cotton
- Improvements to artificial diet currently used in Tarnished Plant Bug rearing?

References

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- NASS. 2007. The Census of Agriculture. http://www.agcensus.usda.gov/.

Questions

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