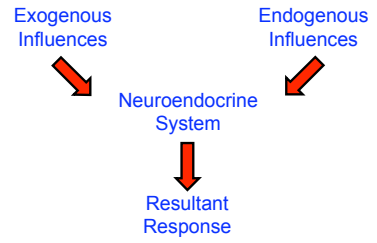


# Regulation of Development & Reproduction in *Lygus hesperus*



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# Regulation of Behavior & Physiology



My research tends to encompass a broad spectrum of related research areas in basic biology which can provide new perspectives and tools for developing novel control measures.

- Exogenous Influences
  - Conspecifics
  - Day Length (Spurgeon)
  - Population Density
  - Resource Availability
  - Temperature
- Endogenous Influences

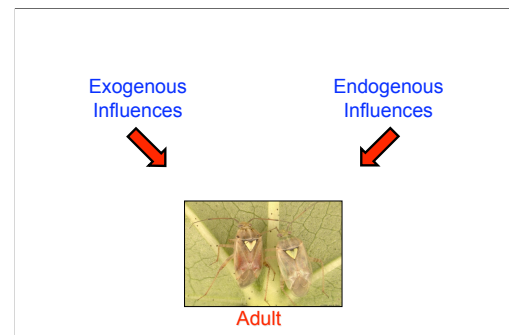
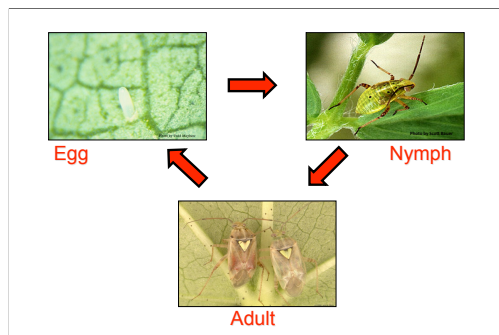
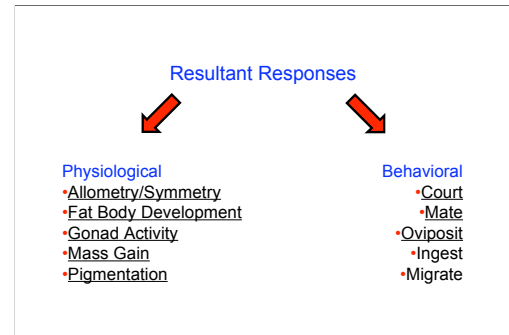
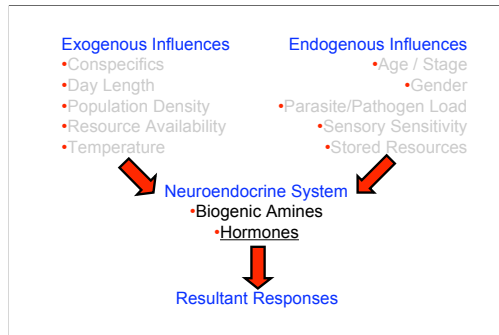


Neuroendocrine System  
↓  
Resultant Responses

- Exogenous Influences
  - Conspecifics
  - Day Length
  - Population Density
  - Resource Availability
  - Temperature
- Endogenous Influences
  - Age / Stage
  - Gender
  - Parasite/Pathogen Load
  - Sensory Sensitivity
  - Stored Resources

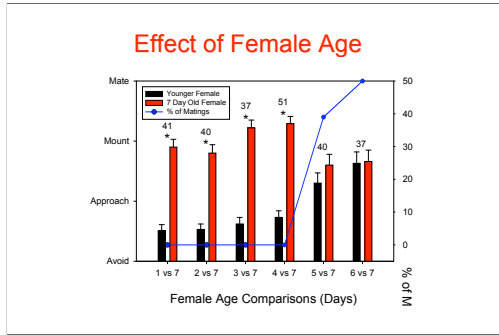


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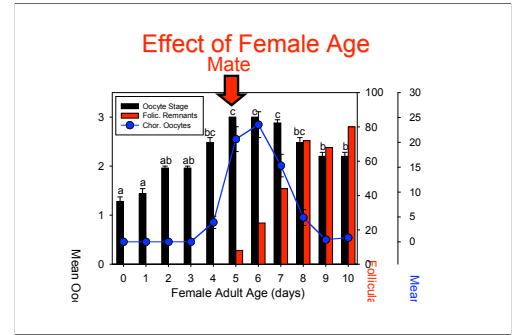


I am interested in determining how the development and reproduction of lygus is regulated during different life stages. We already find a tremendous amount of variability in the timing and extent of development and gonadal activity, indicating that it is possible to modify these systems. Clearly defining the endogenous and exogenous factors influencing Lygus will allow us to develop tools better control populations.

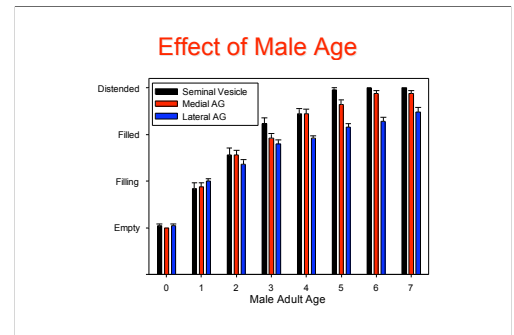
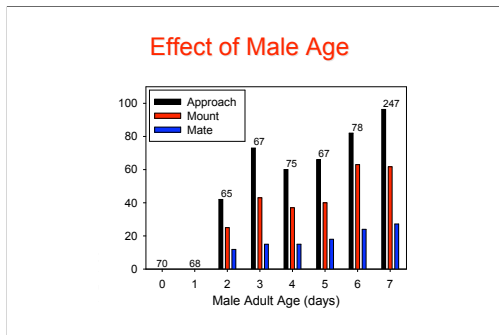
During this period the Lygus need to progress through gonadal activation, courtship and intromission before they can oviposit. My objective was to determine how physiological changes may be determining the pacing of this behavioral shift.



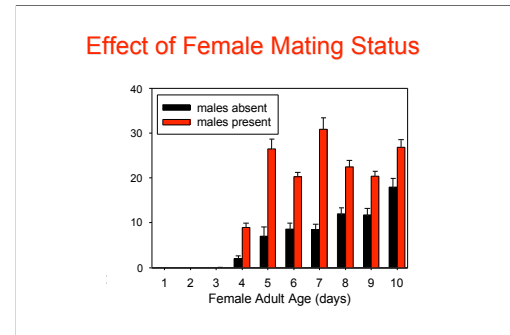
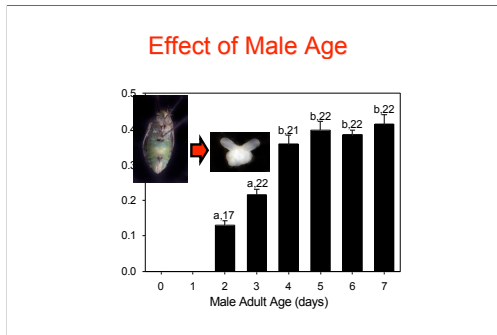
Female age has a strong effect on male behavior and in many insect age is correlated with ovarian development. Females may be producing a pheromonal signature as they mature which indicates their reproductive status, enhancing their attractiveness to males.



On average females are willing to mate 5.5 days after emergence.



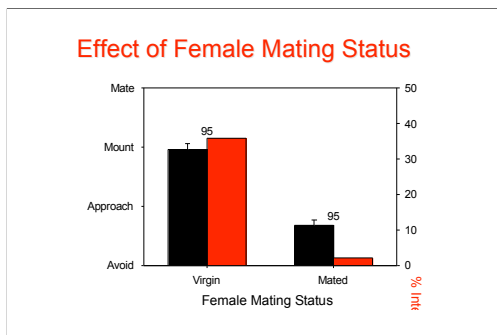
Just as with female lygus, the occurrence of male reproductive behavior was correlated with the gonadal activity.



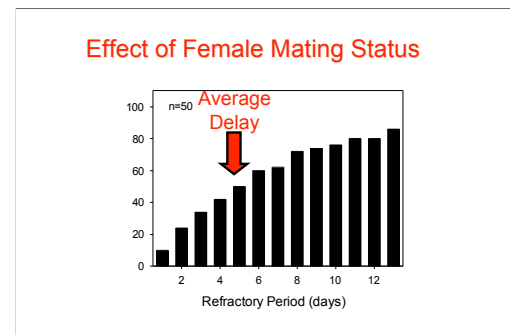
Massive increase in egg laying is actually the result of faster egg production, not just ovipositing sooner, so males are stimulating oogenesis somehow. May be transferring nutrients to females, a possibility that I am testing with Tim Judd (SE Missouri State Univ.).

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Virgins were much more attractive to males and were much more likely to mate. Mating has a pronounced inhibitory effect on female mating behavior. This may be due to the stimulus of intromission or the males may transfer suppressive factor along with their sperm. We are testing this now.



Females average 5 days before remating, which is much longer than the 1 day taken by males. One determinant may be the size of the spermatophores the females receive. This would dictate the amount of sperm and any nutrients the males make available. Females could measure how much remains by the amount of distension caused by the spermatophore. Additionally, the males may deliver a substance that inhibits females from remating for a short time. These possibilities are currently being tested.

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- Identify regulatory mechanisms of diapause
- **Identify and characterize deleterious effects of a putative sexually transmitted bacteria**