

“Performance of Egg Parasitoids from MD on BMSB Eggs in the Laboratory”

S. M. Gal-Edd,¹ J. R. Aldrich,^{2,3} M. L. Buffington,⁴ and P. Barbosa¹

¹University of Maryland, Department of Entomology, College Park

²USDA-ARS Invasive Insect Biocontrol & Behavior Lab., Beltsville, MD

³Current affiliation; address: Associate, Department of Entomology, University of California, Davis, CA; 519 Washington Street, Santa Cruz, CA 95060

⁴USDA-ARS Systematic Entomology Laboratory, Washington, D.C. 20013

**Egg parasitoids are
the real hope for
BMSB biocontrol !**

Classical Biological Control



Trissolcus halyomorphae:
“The principle enemy of BMSB
(*Halyomorpha halys*) in China,

with parasitism rates between 50-70%” (Yang 2009)

- Problems:
- 1) Testing & establishment takes years
 - 2) *T. halyomorphae* may parasitize native bugs, including the highly beneficial predator, *Podisus maculiventris*

**Will native North American
parasitoids adapt to
BMSB eggs?**

Parasitoids Home-in on Host Pheromones

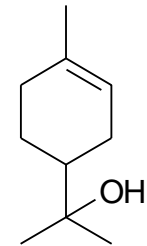
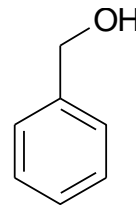
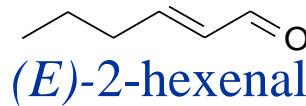
Telenomus calvus
on a female
spined
soldier
bug,
Podisus maculiventris



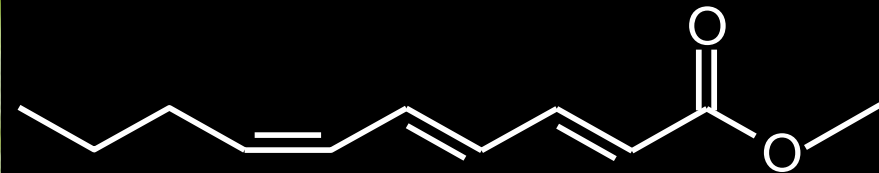
Rescue[®] Stink Bug Trap

(Sterling International, Inc., Spokane Valley, WA)

Lures: *Podisus manuciventr*
pheromone



Plautia stali pheromone



2*E*,4*E*,6*Z*-10:COOMe

Eggs of *Euschistus heros* (a Brazilian stink bug !) used in 1st phase because:

Have a prolific colony in quarantine at Beltsville

Produces many eggs

Has a pheromone similar to the cross-attractant being used for BMSB



**Established 9 colonies of native
wasps on eggs of *Euschistus heros***

7 *Trissolcus euschisti*

1 *Telenomus podisi*

1 *Gryon obesus*

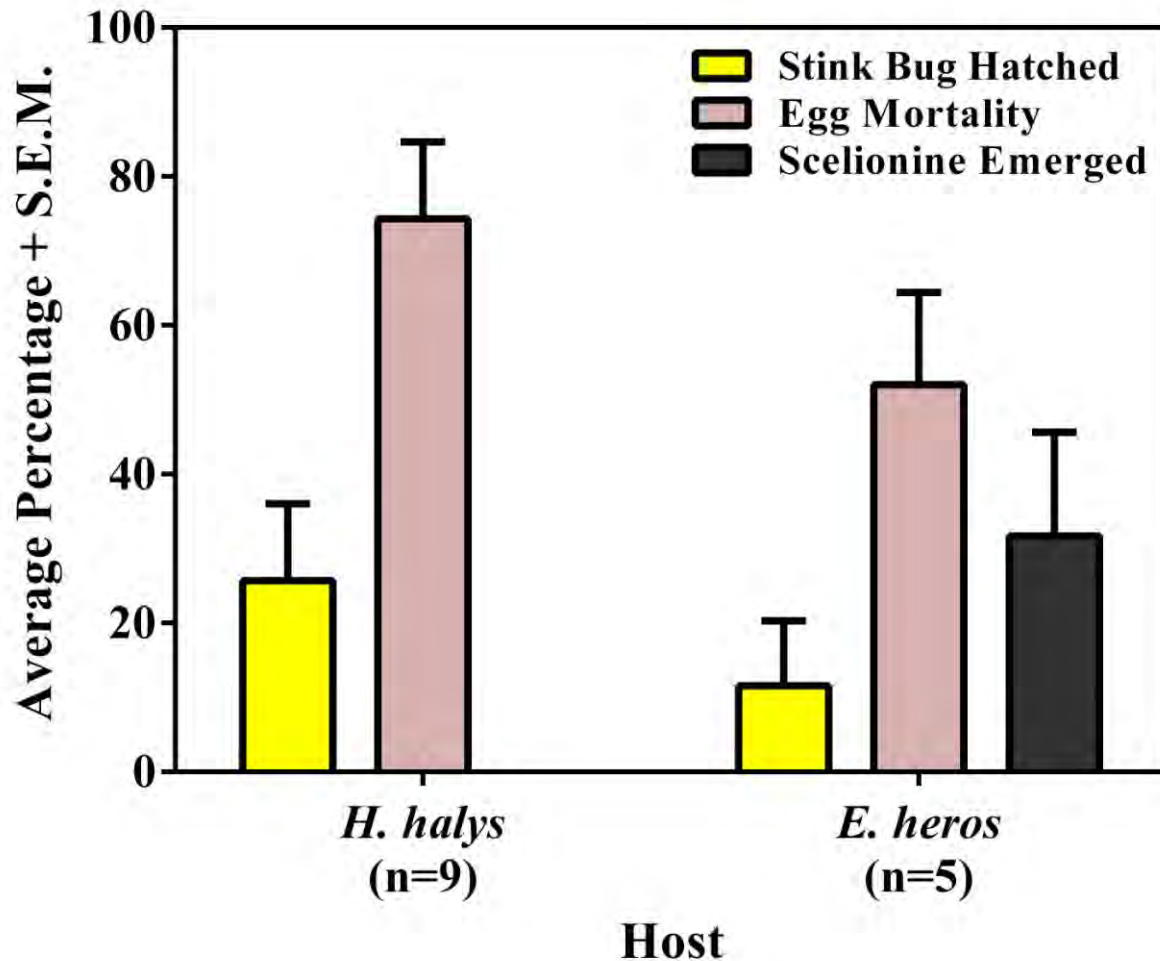


**Then tested offspring from each colony
against *Halyomorpha halys* eggs**

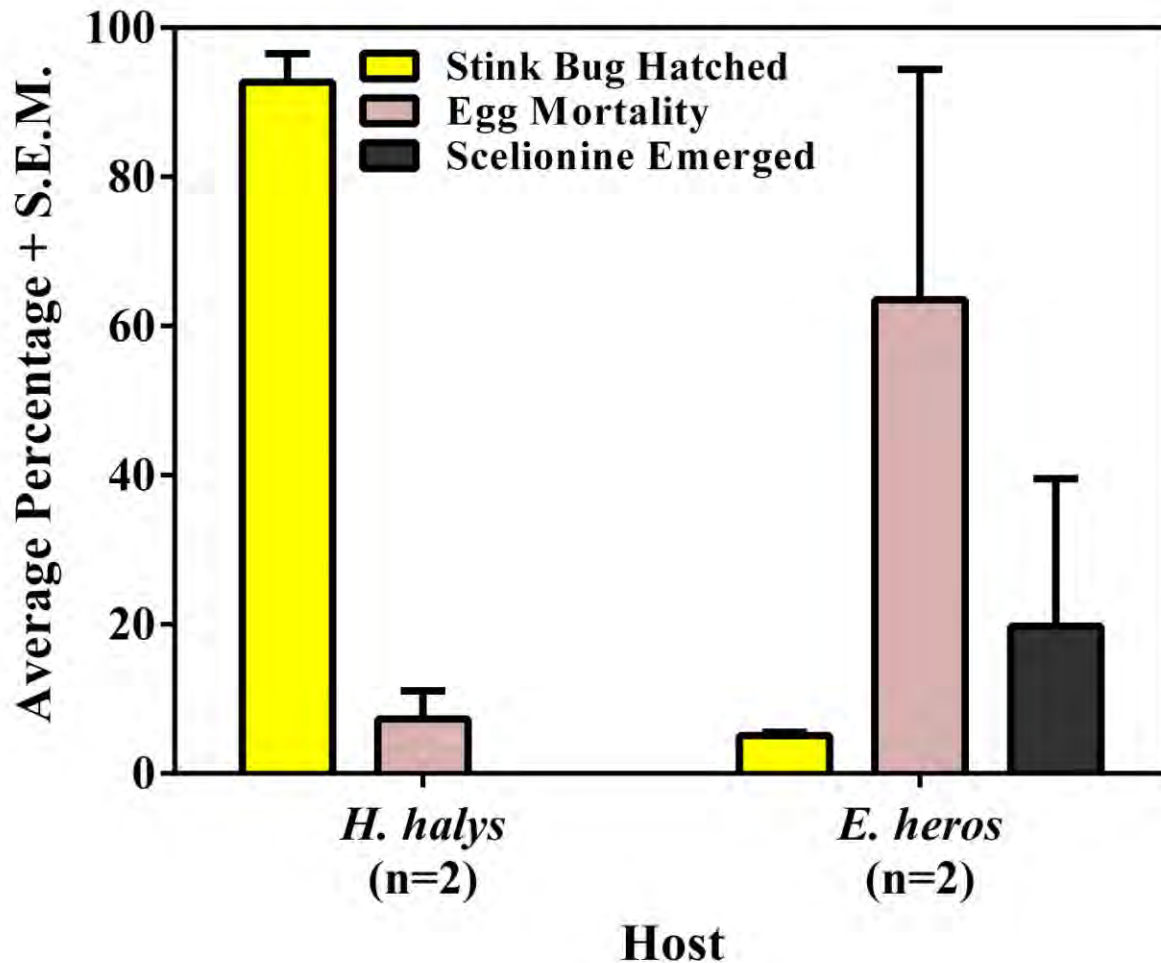


**Note: BMSB has very large eggs,
but produces fewer eggs than
most stink bugs**

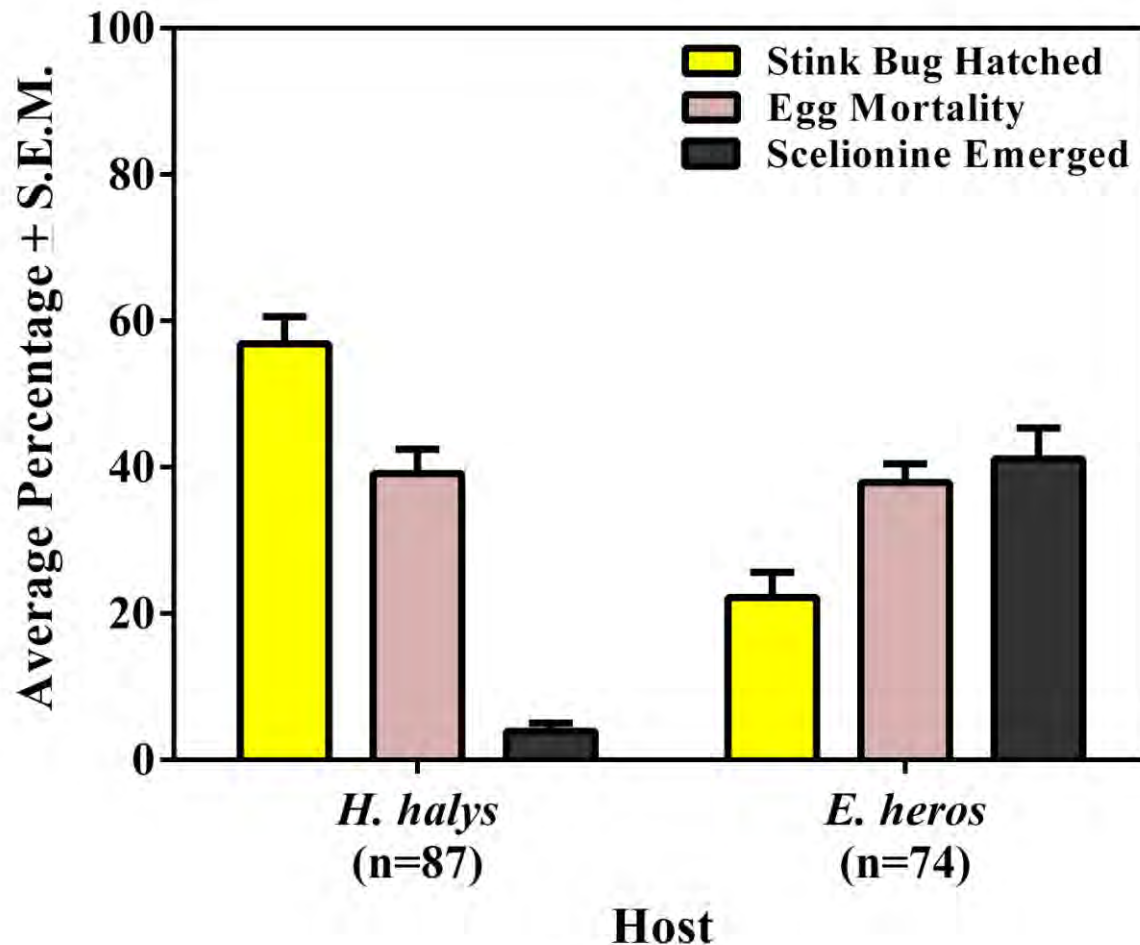
Comparative parasitism by *Gryon obesus* on *H. halys* versus *E. heros* eggs



Comparative parasitism by *Telenomus podisi* on *H. halys* versus *E. heros* eggs



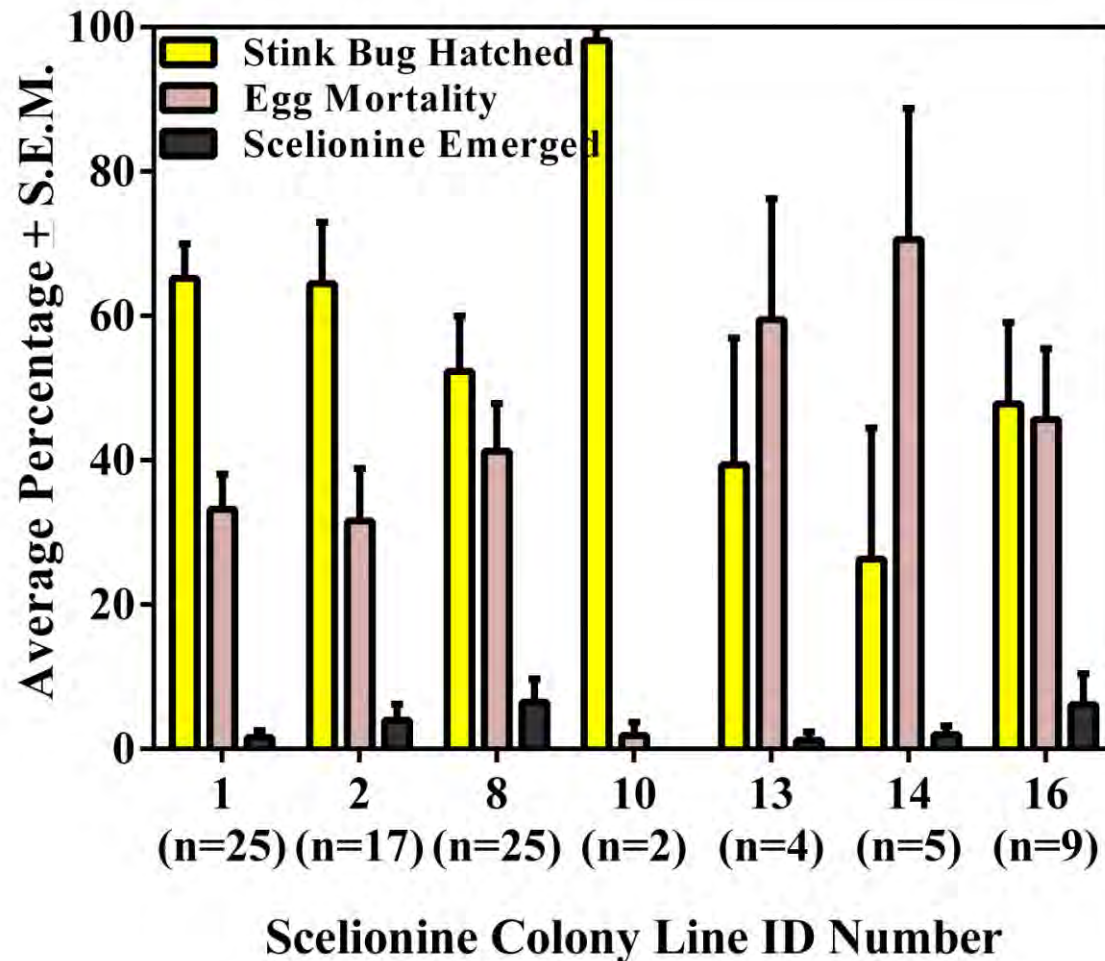
Comparative parasitism by *Trissolcus euschisti* on *H. halys* versus *E. heros* eggs



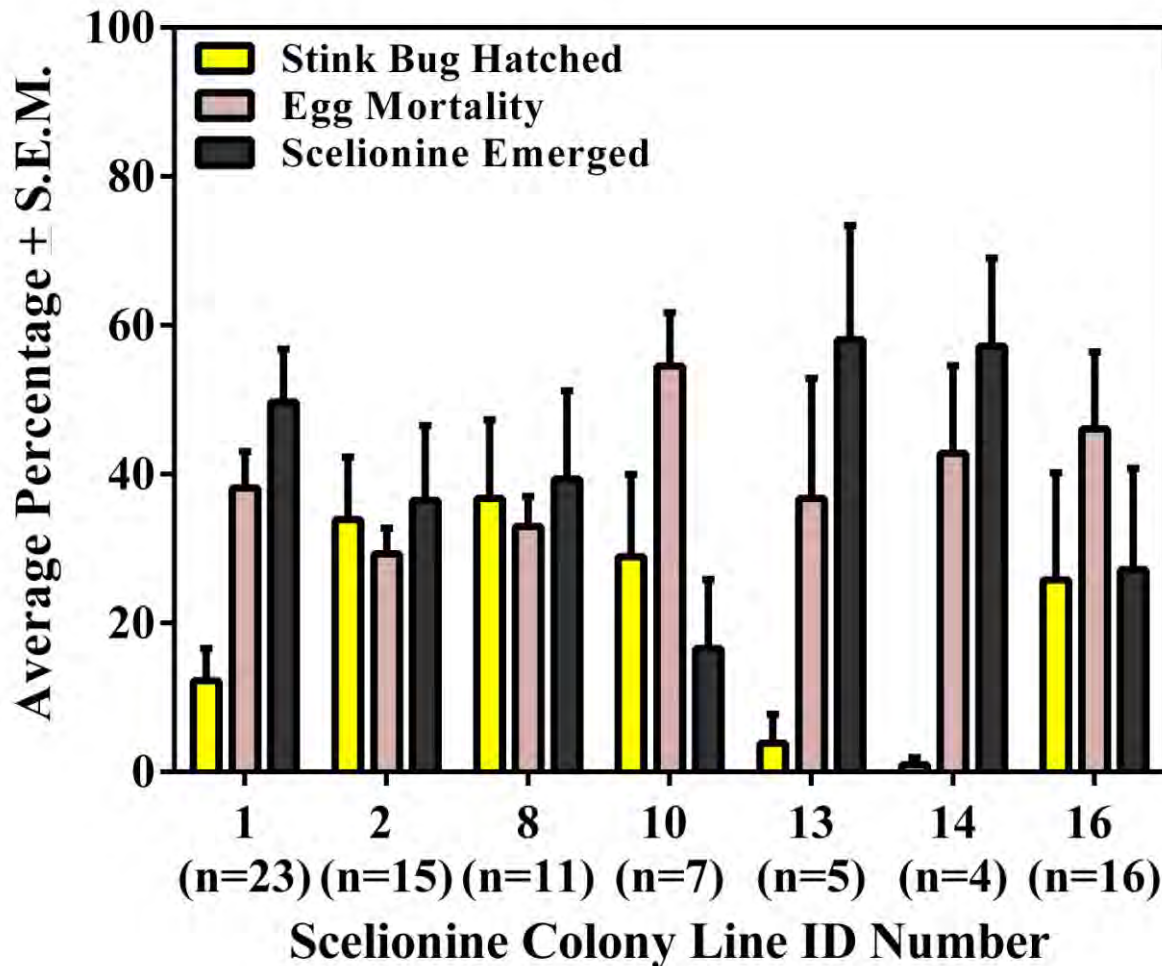
Body size of *T. euschisti* varies in size depending on host egg size



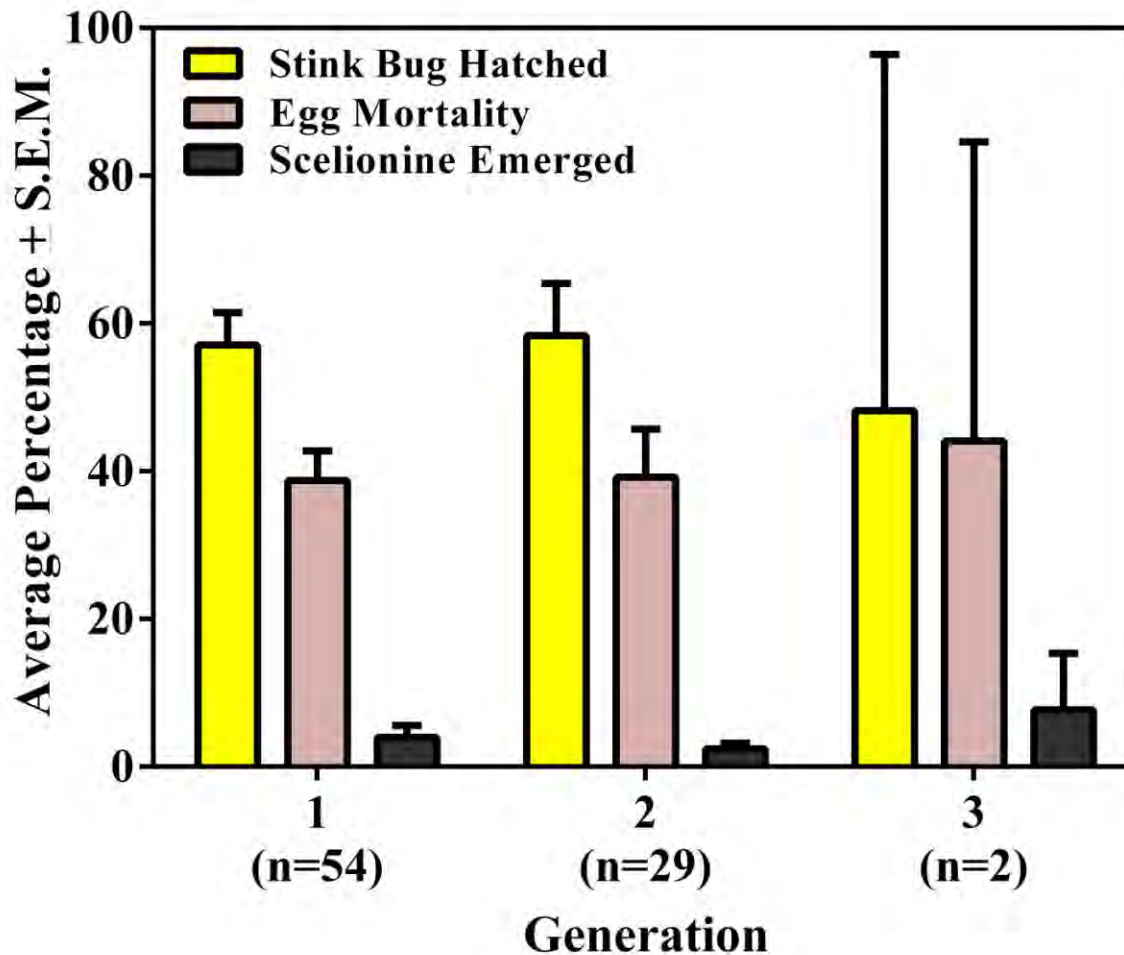
Parasitism of *H. halys* eggs by 7 different *Trissolcus euschisti* colony lines



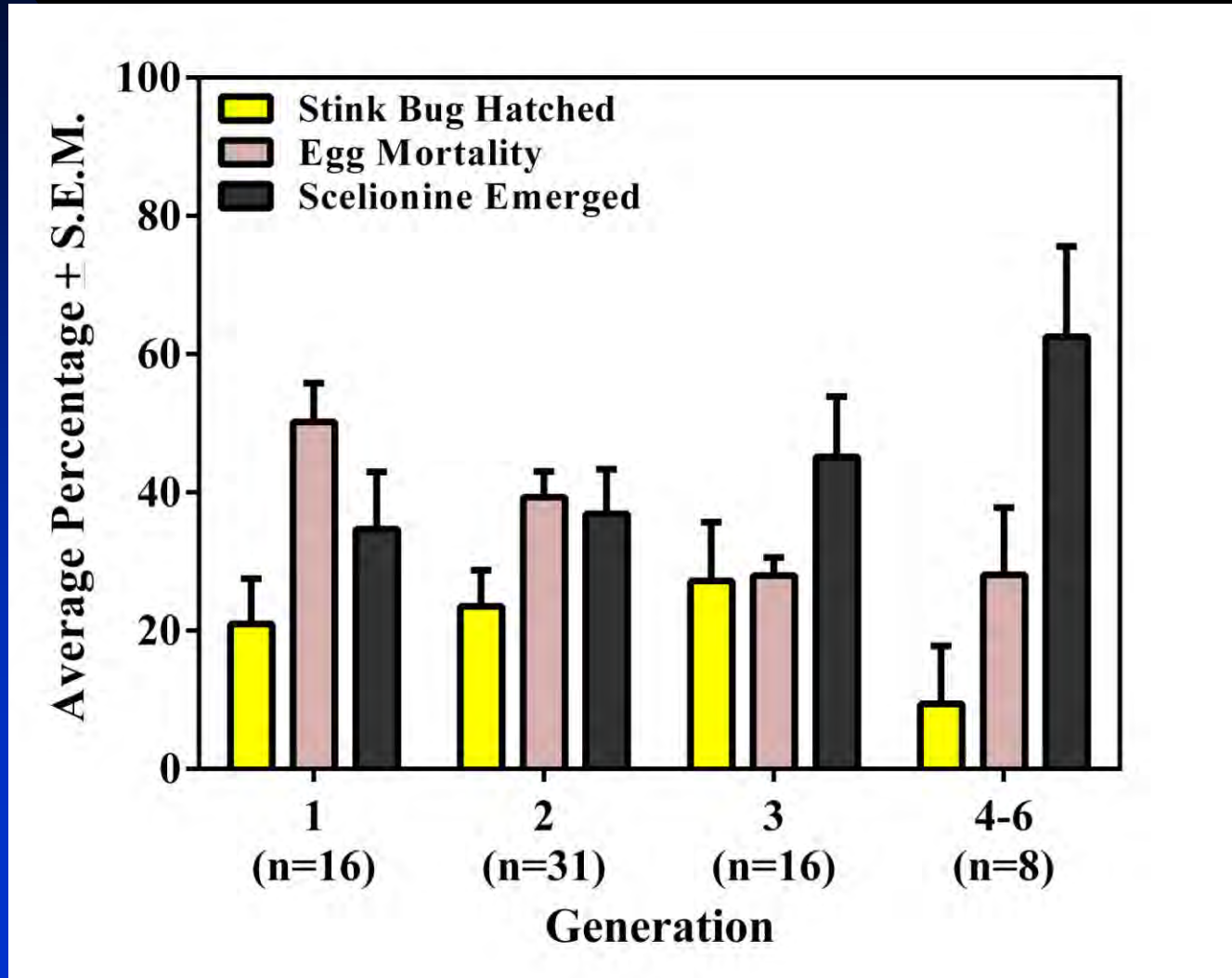
Parasitism of *E. heros* eggs by 7 different *Trissolcus euschisti* colony lines



Parasitism of *H. halys* eggs by successive generations of *T. euschisti* from *H. halys* eggs



Parasitism of *E. heros* eggs by successive generations of *T. euschisti* from *E. heros* eggs



Conclusions / Opinions

Trissolcus euschisti is physiologically competent to parasitize BMSB

Low parasitism of BMSBs is primarily due to failure to recognize host-associated chemicals

Natural selection will eventually result in “normal” parasitization



My Goal:
“Unclassical Biocontrol”

Aldrich, J. R. 1995. Testing the "new associations" biological control concept with a tachinid parasitoid (*Euclytia flava*). J. Chem. Ecol. 21: 1031-1042.

“Perhaps in the future it will be possible to accomplish biological control by ‘teaching’ physiologically competent endemic beneficials to recognize alien hosts...In other words, can artificial selection regimes be devised, based on appropriate semiochemical information, to speed up the natural process of host shifts?”

“Today, such an unclassical approach is probably more environmentally and sociologically acceptable than classical biological control.”

Thanks!

