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

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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?

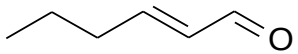
Parasitoids Home-in on Host Pheromones

Telenomus calvus on a female spined soldier bug, *Podisus maculiventris*

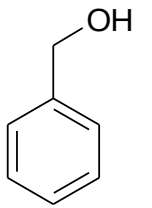
Rescue® Stink Bug Trap
(Sterling International, Inc., Spokane Valley, WA)

Lures:

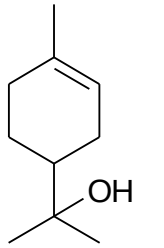
Podisus manucliventris pheromone



(*E*)-2-hexenal

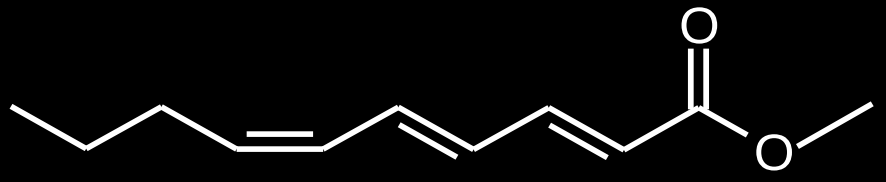


Benzyl alcohol



α-terpineol

Plautia stali pheromone



2E,4E,6Z-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*

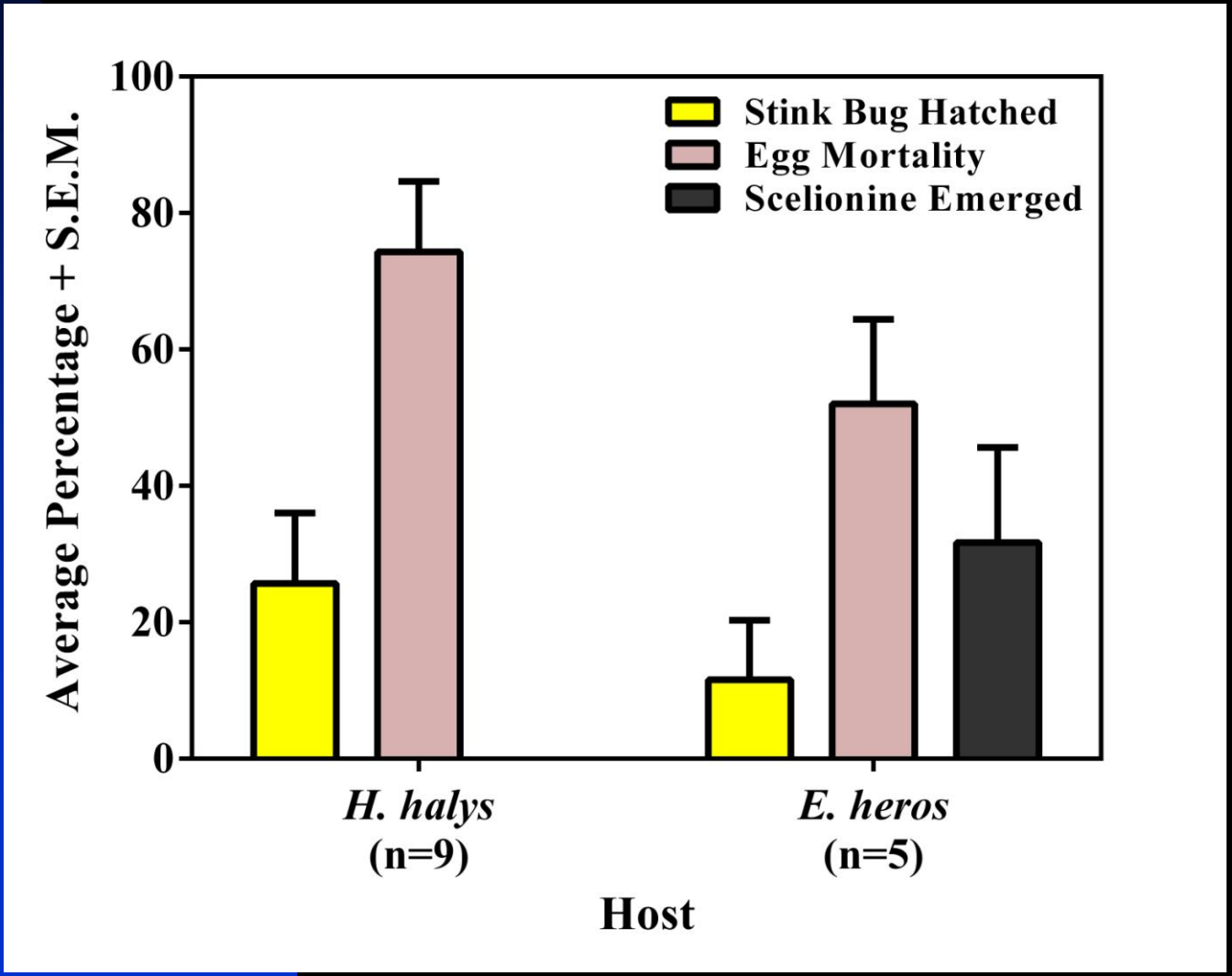
1 *Telenomus podisi*

1 *Gryon obesus*

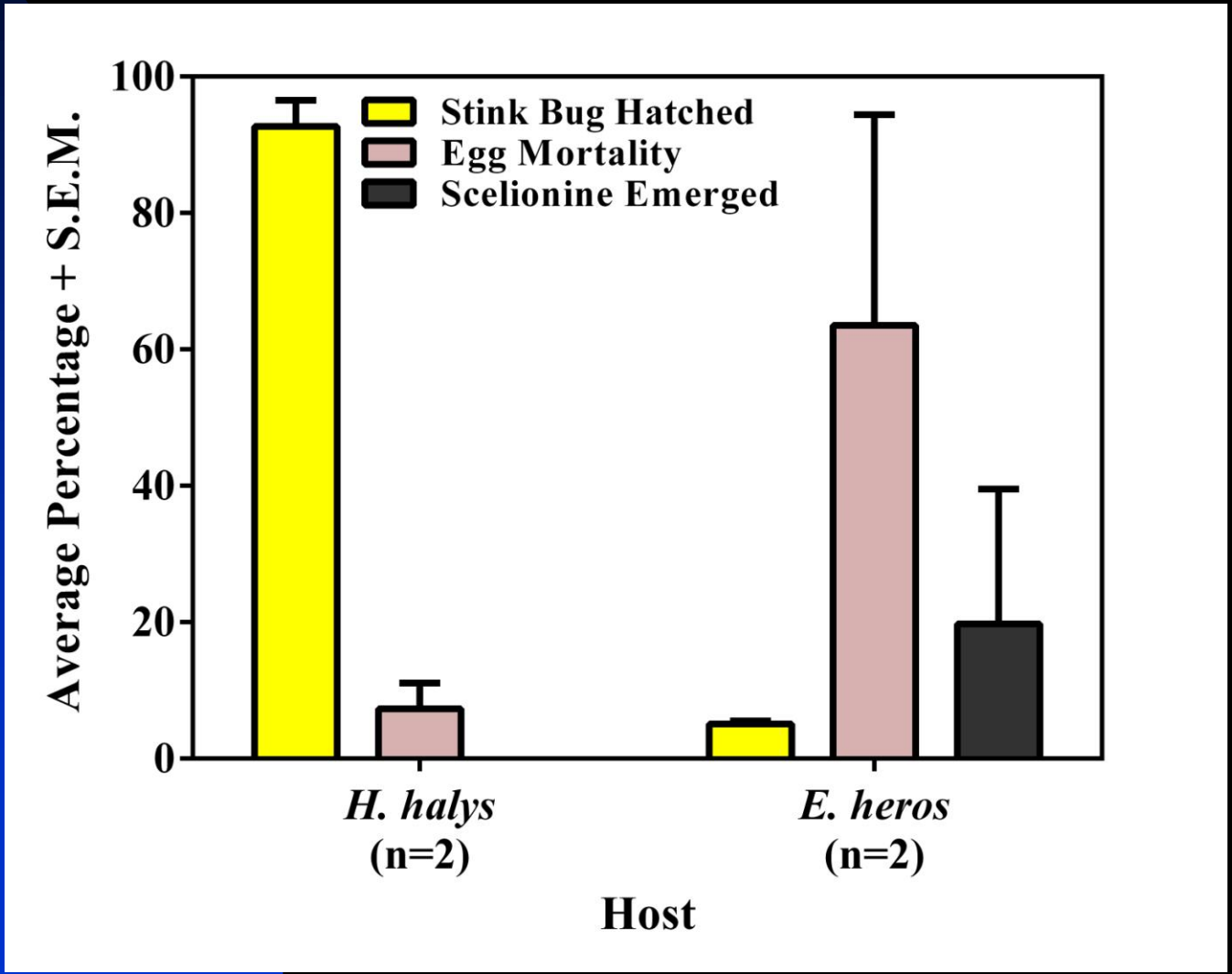
Then tested offspring from each colony against *Halyomorpha halys* eggs

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

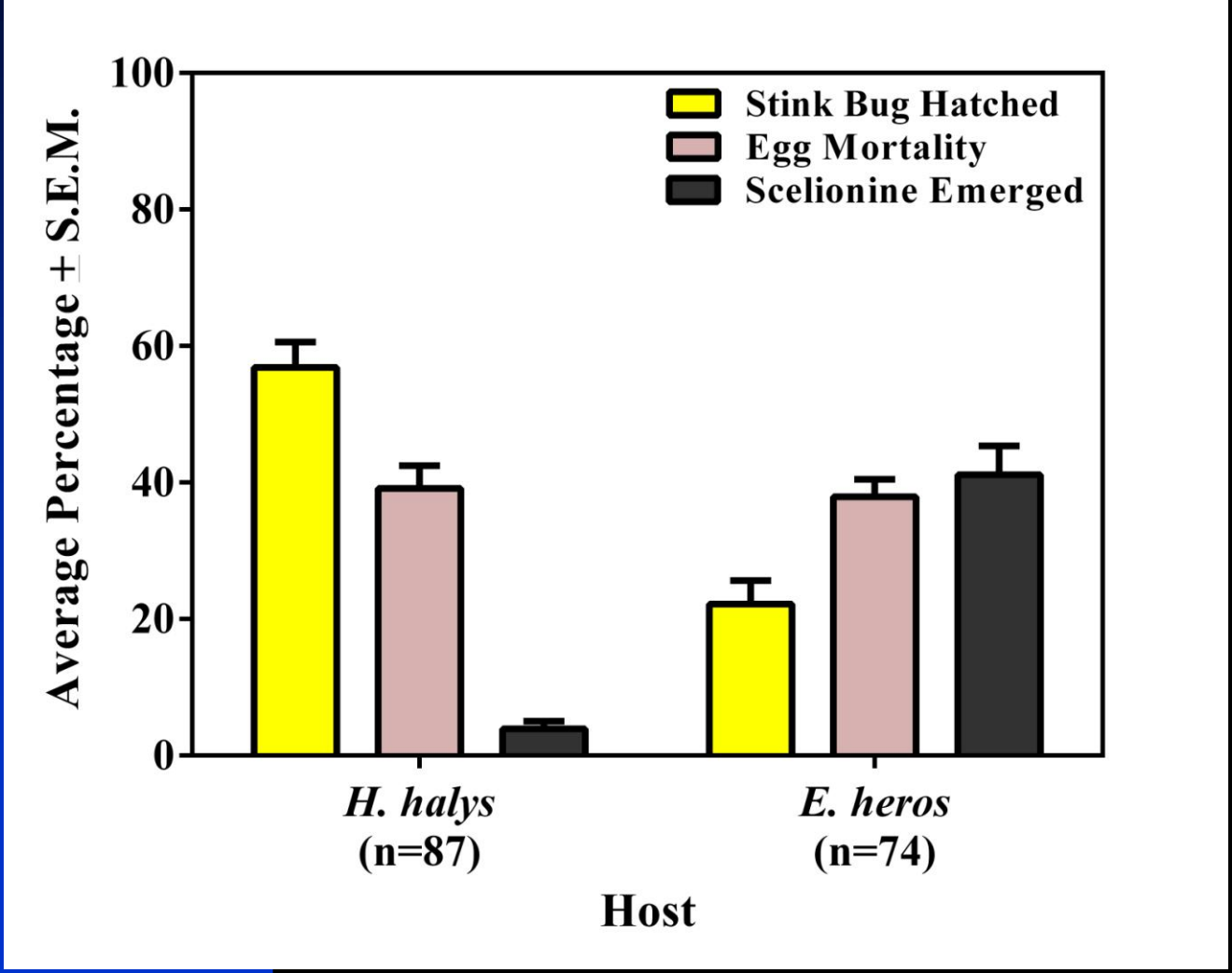
Comparative parasitism by *Gryon obesus* on *H. halys* versus *E. heros* eggs



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

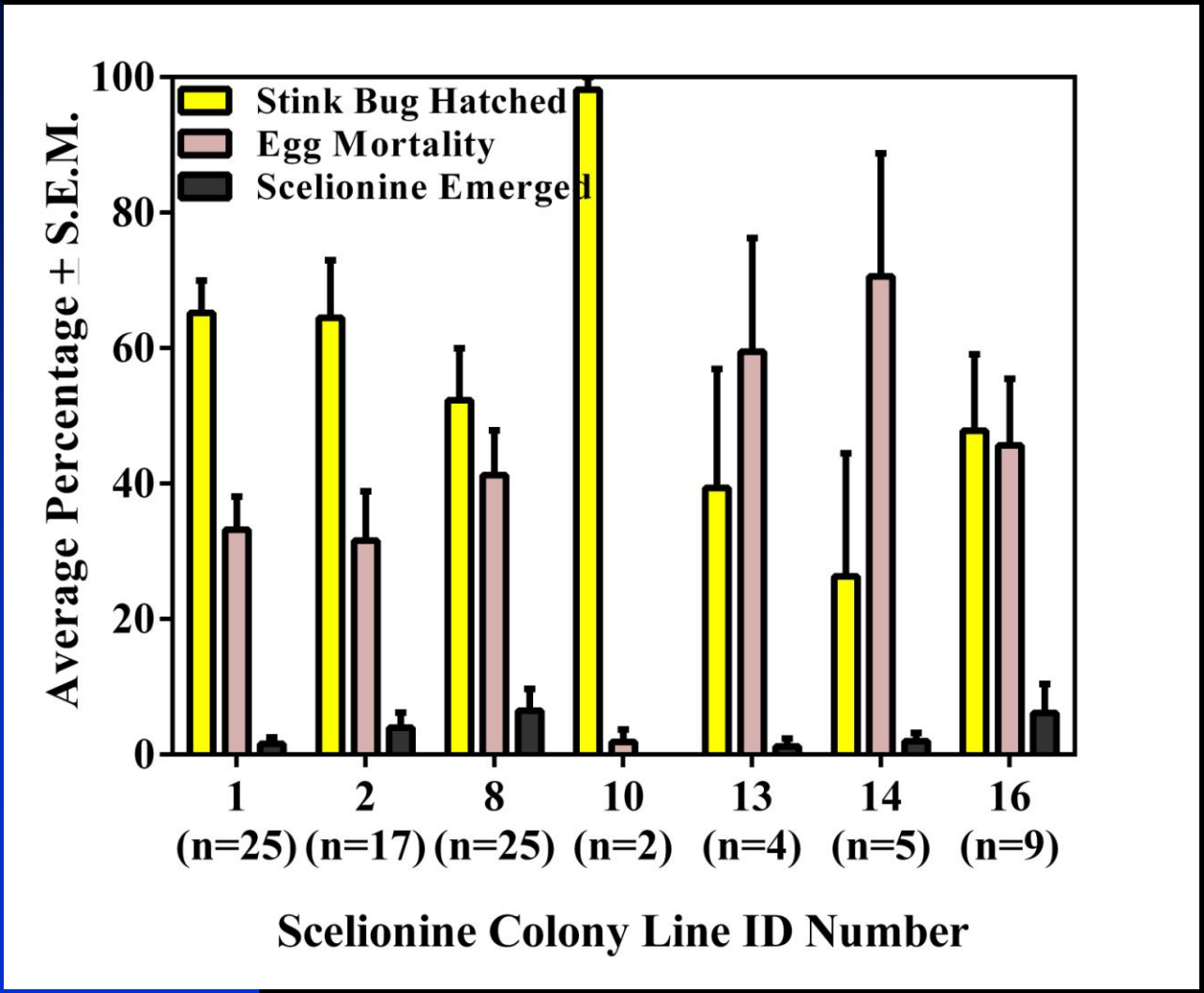


Comparative parasitism by *Trissolcus euschisti* on *H. halys* versus *E. heros* eggs

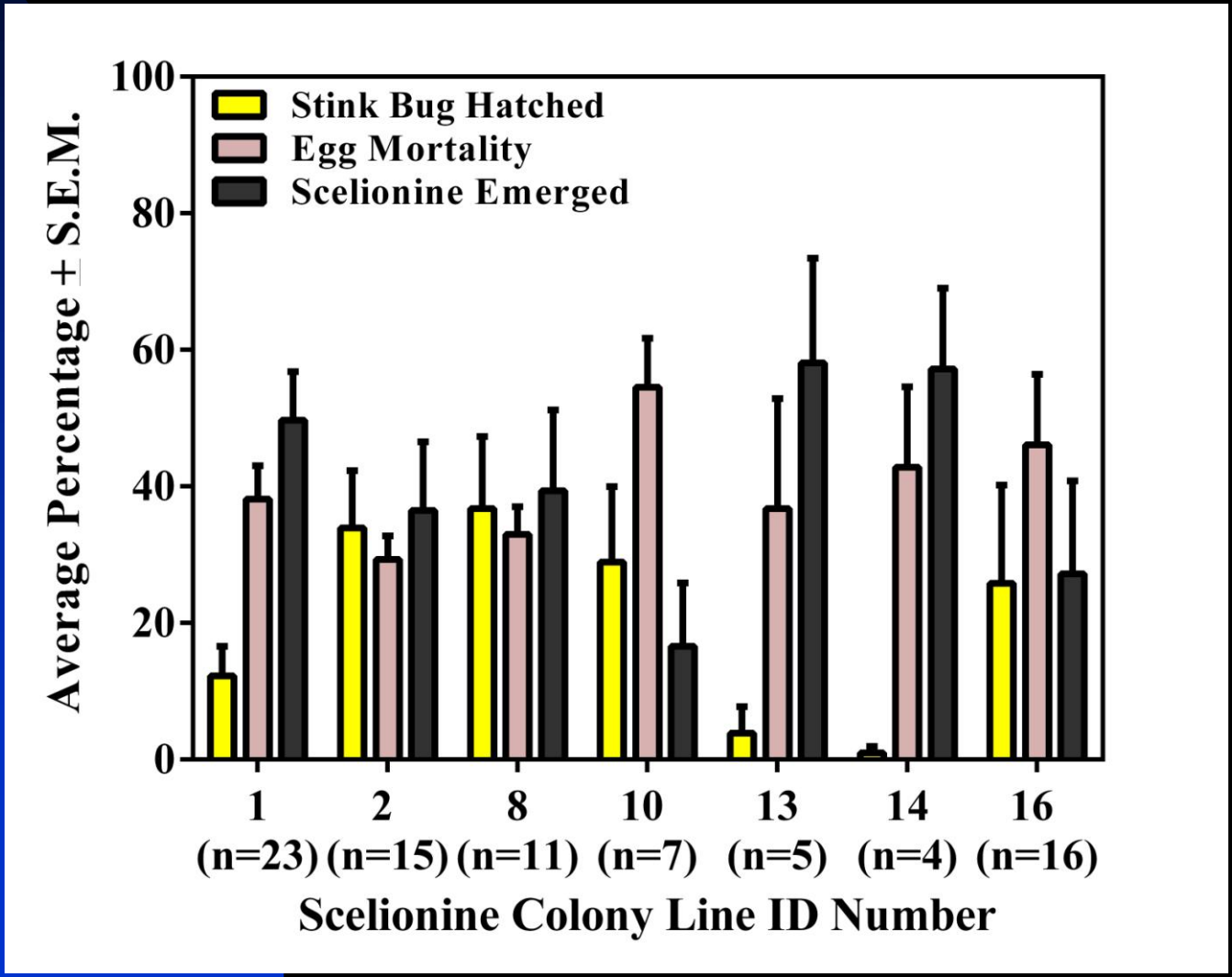


Body size of *T. euschisti* varies in size depending on host egg size

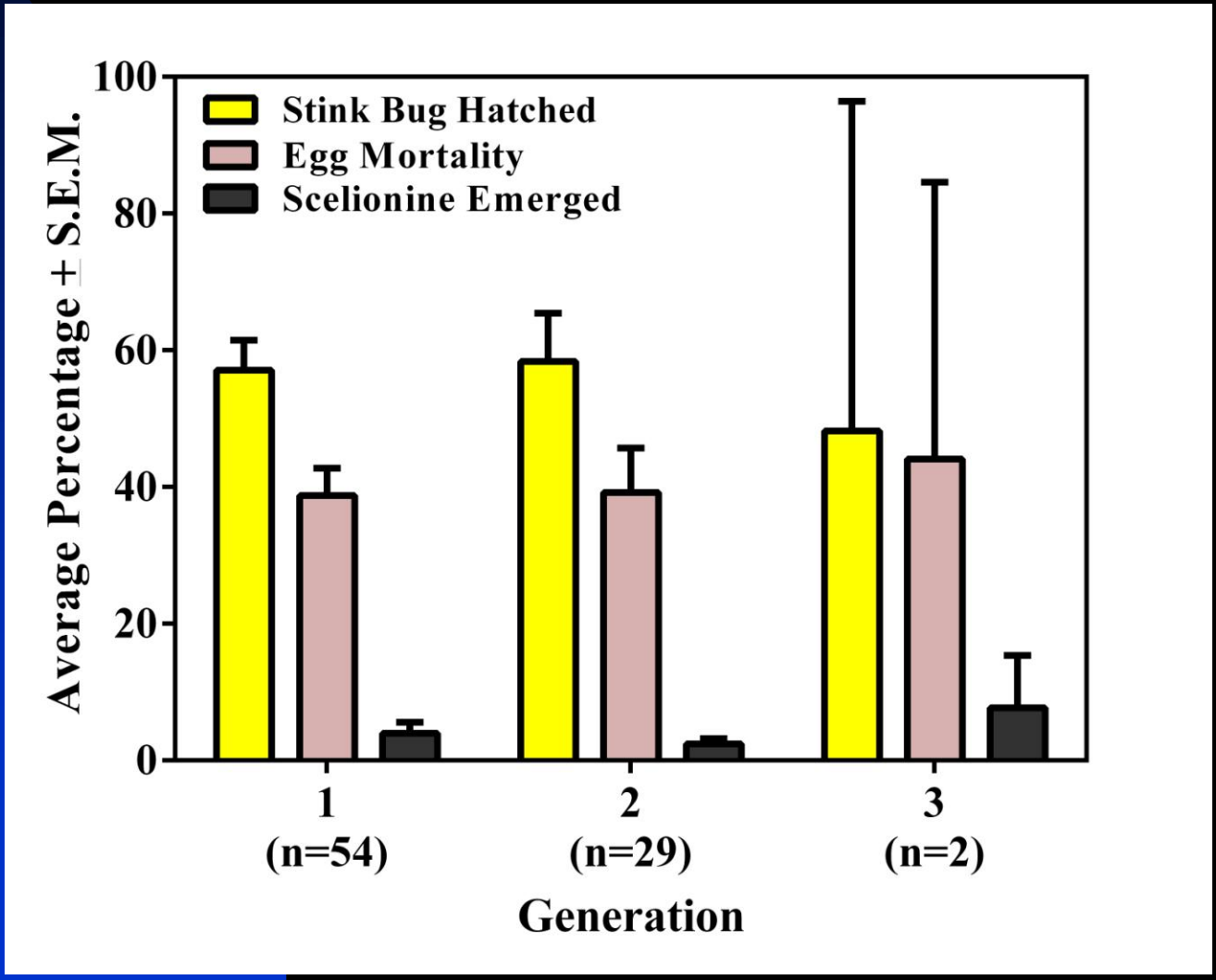
Parasitism of *H. halys* eggs by 7 different *Trissolcus euschisti* colony lines



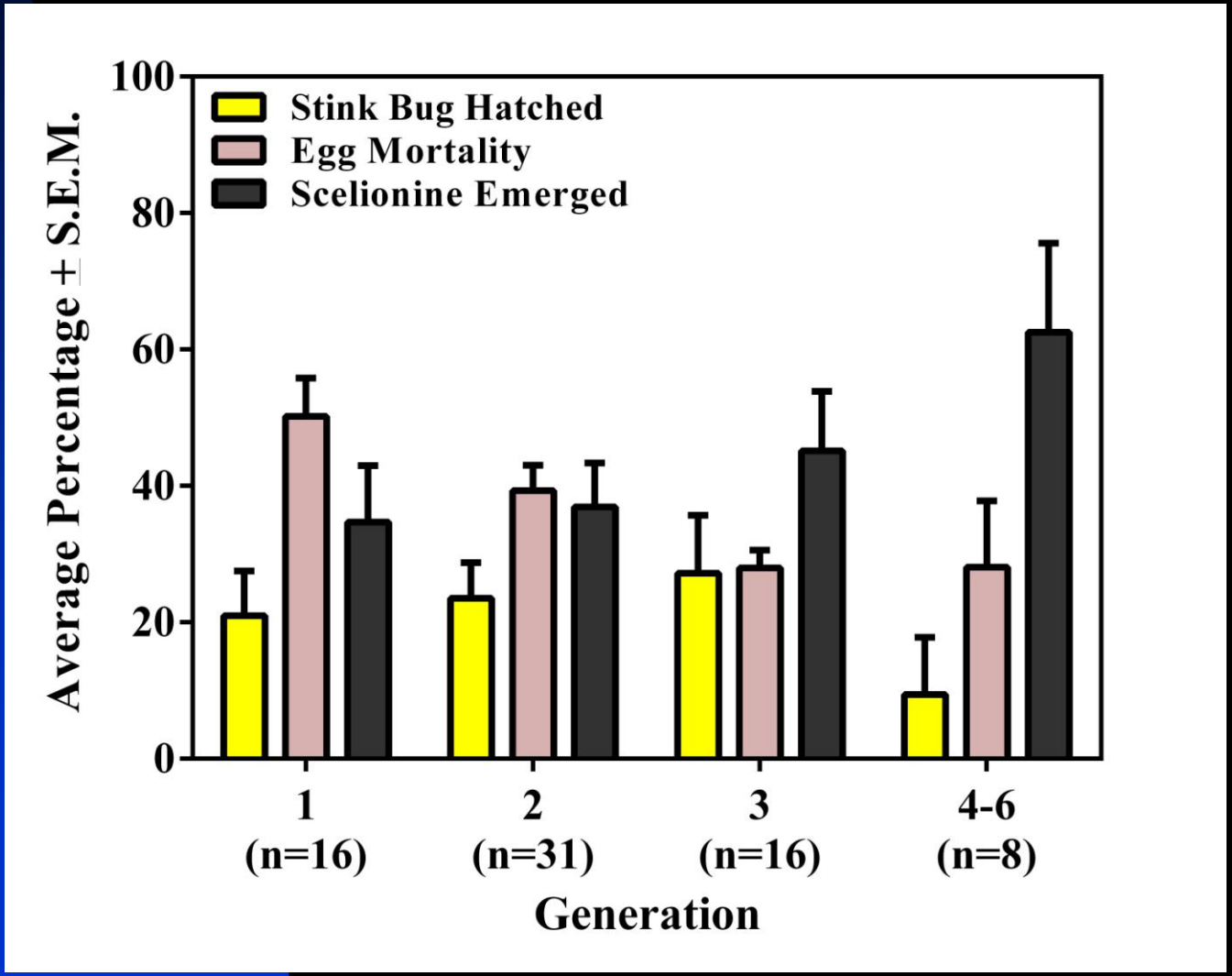
Parasitism of *E. heros* eggs by 7 different *Trissolcus euschisti* colony lines



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!