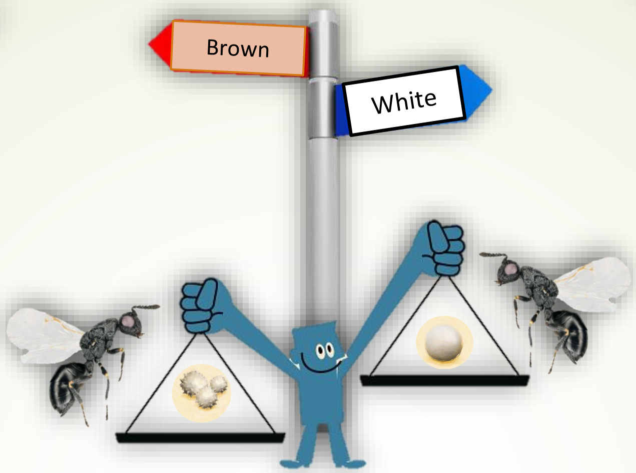
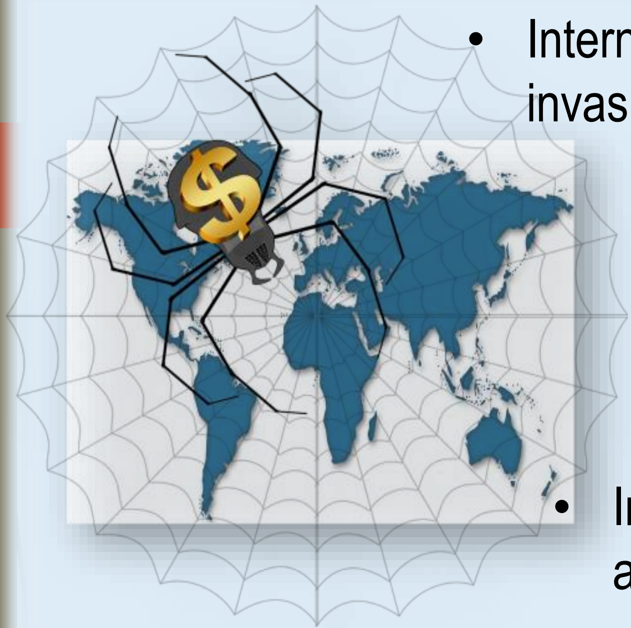


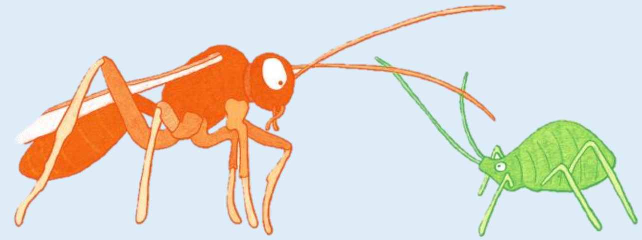
Which is a better host? The native white widow or the invasive brown widow spider? - A parasitoid perspective

Alfred Daniel J

Mitrani Department of Desert Ecology, Ben-Gurion University of the Negev, Sede Boqer, Israel

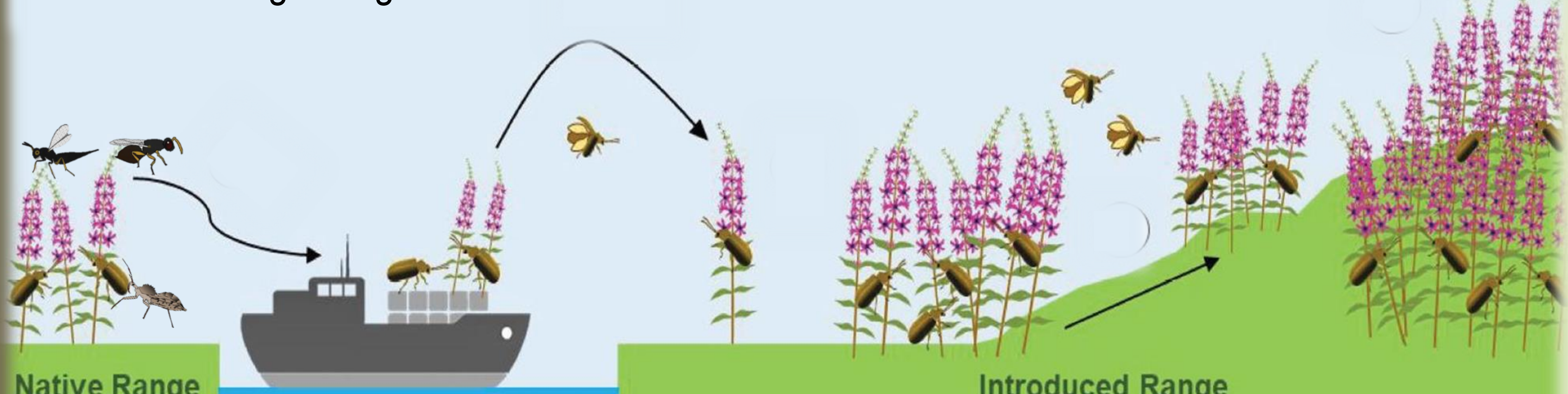


- International trade leaves our planet highly vulnerable to biological invasions



- Interactions with natural enemies may play a crucial role in the ability of a species to invade

- Enemy release hypothesis
- Pre-adaptations of invasive species
- Comparing parasitism success on invasive vs. native species has high importance in understanding biological invasions



Holden et al., 2022; Elton, 1958; Enders et al., 2019

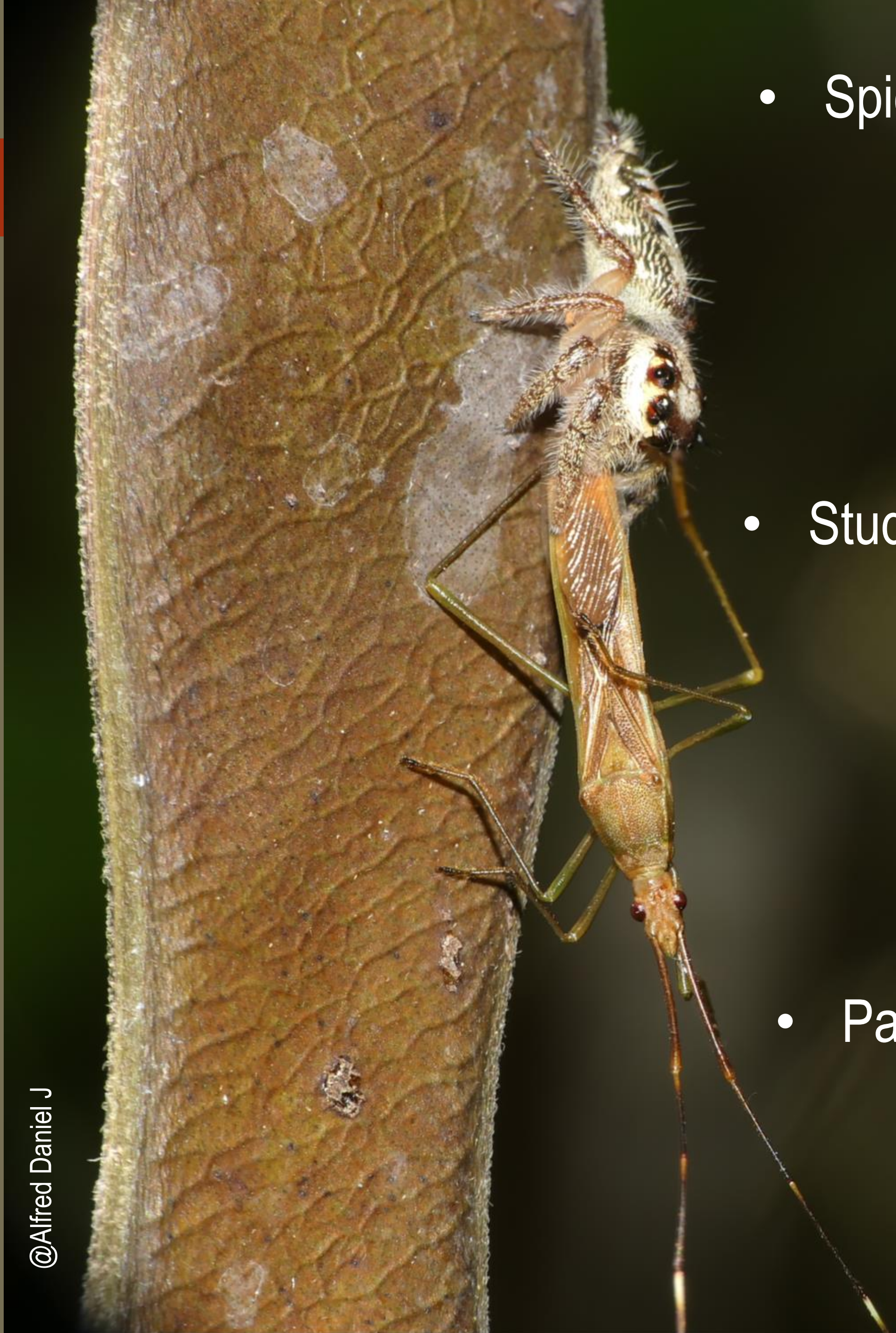




Studies of invasive species are biased towards relatively few taxonomic groups, with over 60% on insects and plants

Pysek et al 2008





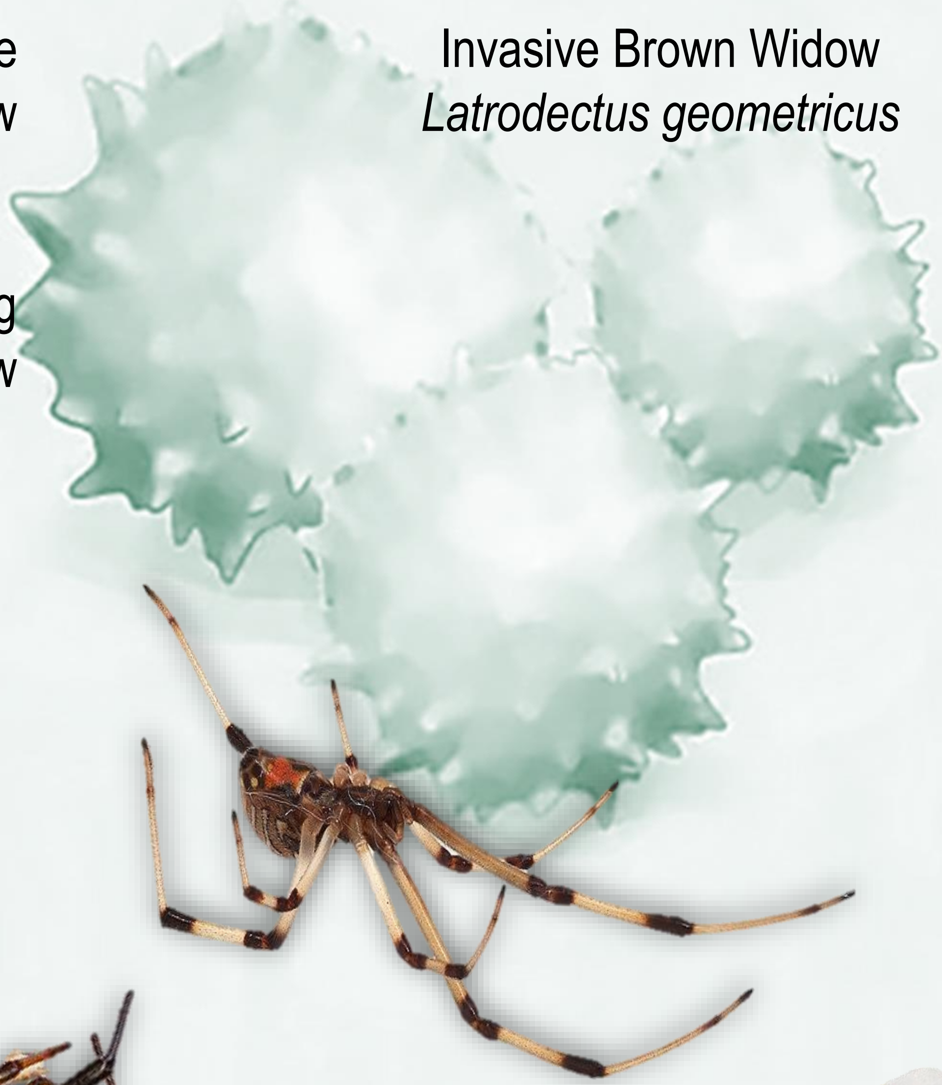
- Spiders are estimated to consume up to 800 million tons of prey annually
- Studies related to invasive spider species received attention very recently
- Parasitism and predation on native vs. invasive spiders have rarely been compared

Nyffeler & Birkhofer, 2017

- We described the development of the parasitoid wasp *P. latrodecti* in widow spider egg sacs.

- We compared parasitism success in egg sacs of one native and one invasive widow spider host species

Invasive Brown Widow
Latrodectus geometricus



Native White Widow
Latrodectus pallidus

Which is a better host?

Philolema latrodecti

The suitability and quality of hosts to parasitoids are often tested under unrealistic conditions, where a single host is exposed to a single parasitoid.

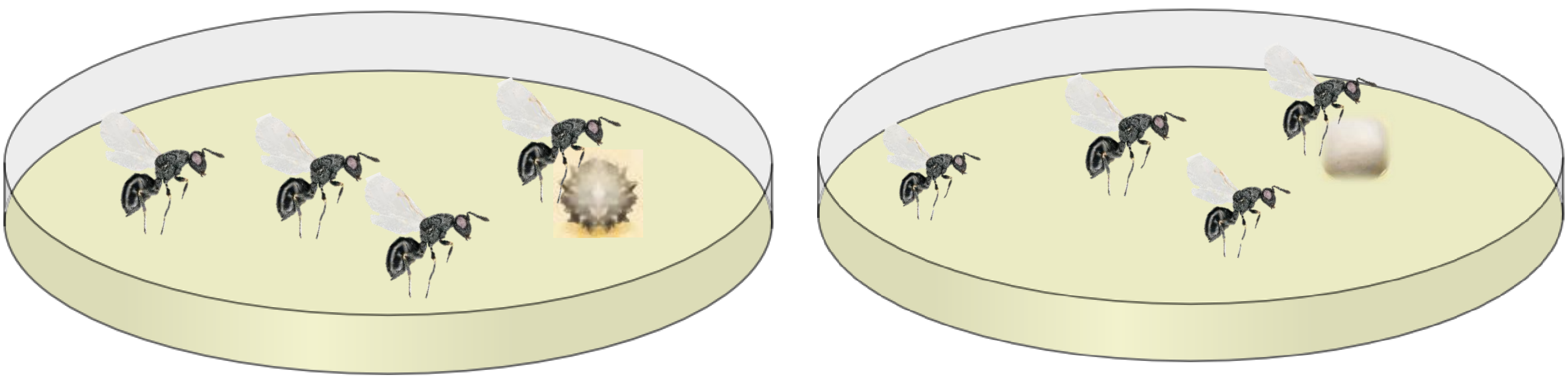
David Vs Goliath

In nature, several females may compete for a host, with more than one female parasitizing the same host (superparasitism)

(Van Alphen and Visser 1990, Godfray 1994)

So,

Our Experimental Setup



Life Cycle

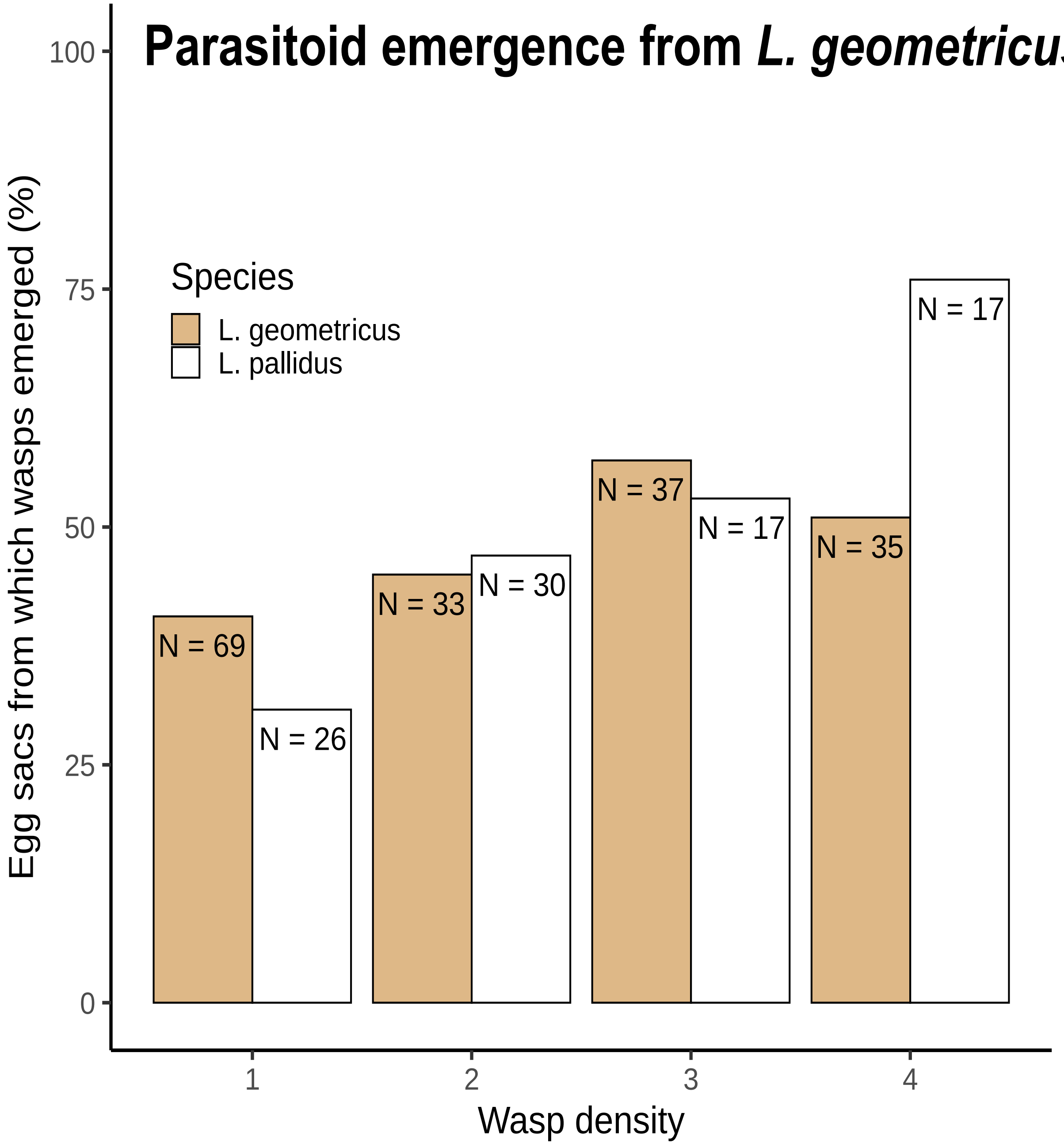
Eggs- 2-3 days

Larvae- 12-13 days

Pupated- 15th day after oviposition

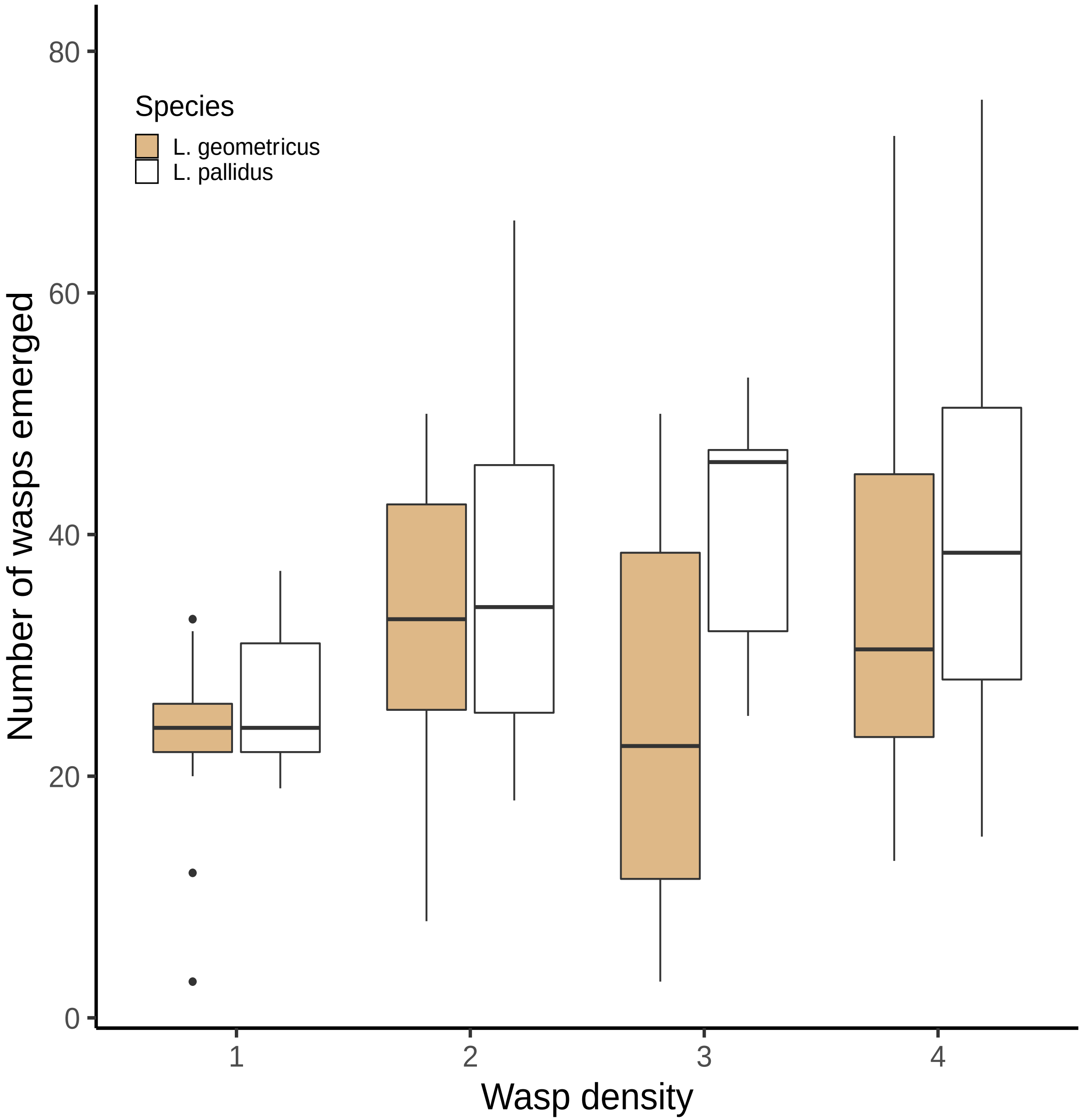
Adult - 20 days after egg laying

Parasitoid emergence from *L. geometricus* and *L. pallidus* egg sacs



- increased with wasp density (p = .006)
- no difference between the species (p = .658)
- A trend of higher success in *L. pallidus* egg sacs at the highest wasp density (p = .090)

Parasitoid brood size from *L. pallidus* and *L. geometricus* egg sacs.

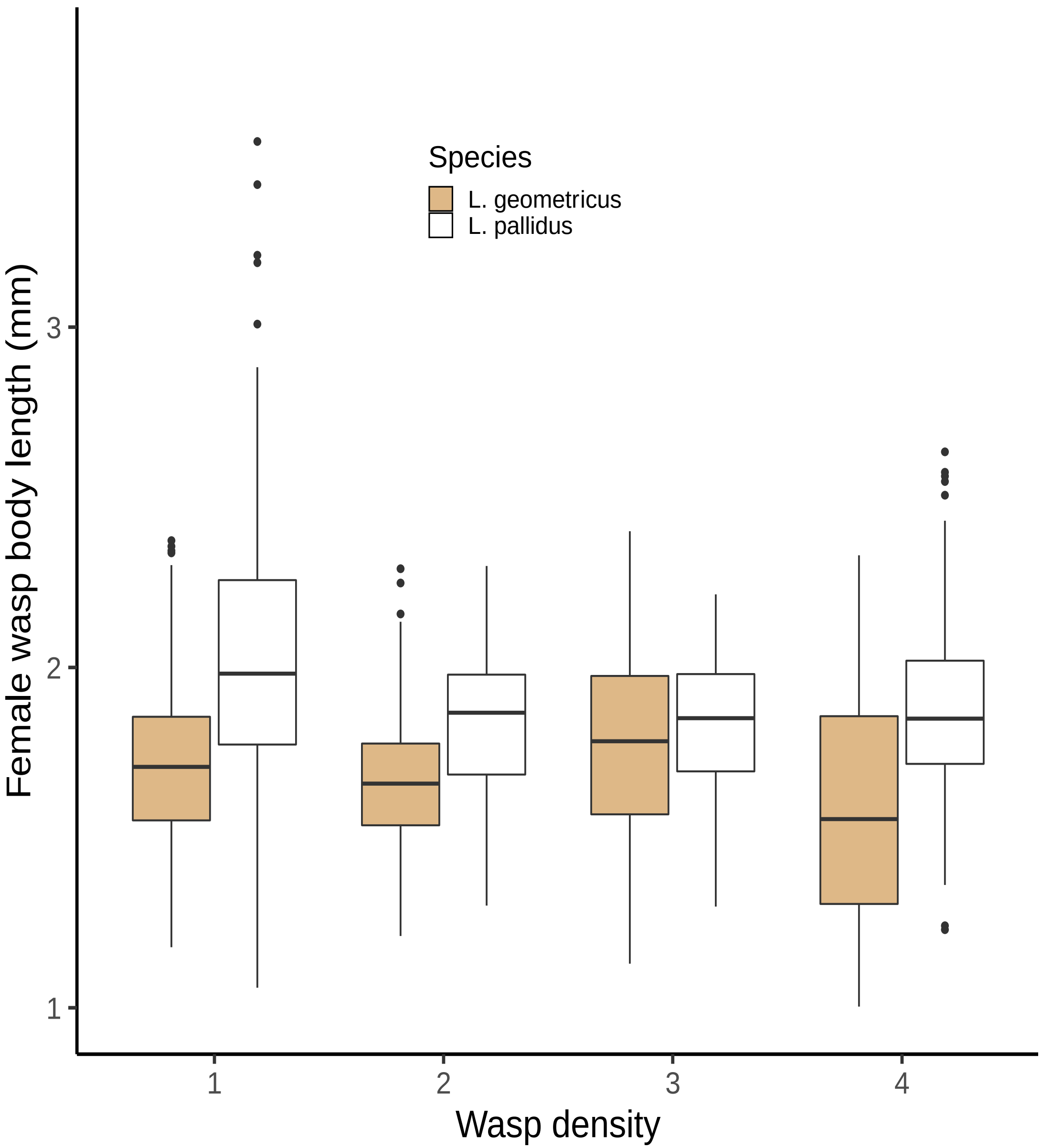


- More wasps emerged from *L. pallidus* compared to *L. geometricus* egg sacs (p = .002)

and with increasing wasp density

- two wasps (compared to one wasp): (p < .001)

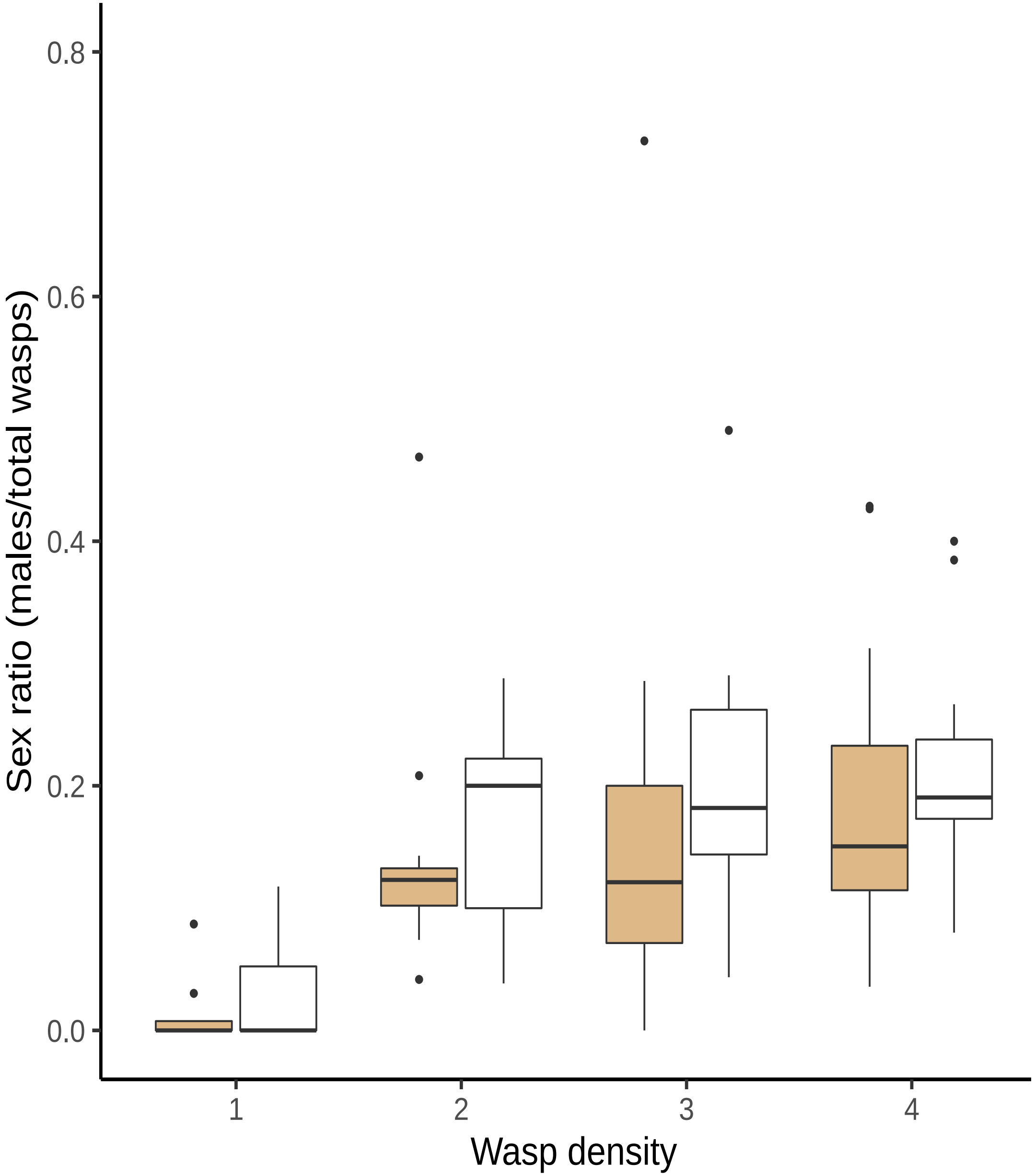
Body size of wasps emerged from *L. pallidus* and *L. geometricus* egg sacs



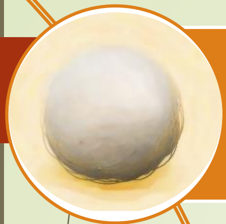
- Larger female wasps emerged from *L. pallidus* egg sacs compared to *L. geometricus* egg sacs ($p < .001$)

- in both hosts, body size decreased with wasp density ($p < .001$)

Sex ratio of wasps emerging from *L. pallidus* and *L. geometricus* egg sacs



- Sex ratio increased with increasing wasp density ($p < 0.001$)
- not affected by the host species ($p = .831$)

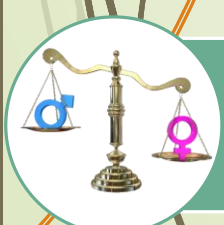


Most measures of parasitism success were higher in *L. pallidus* compared to the *L. geometricus*

Possible reasons could be the smaller size and spike-like silk structures on *L. geometricus* egg sacs

These structures might reduce parasitism especially at high wasp density

The larger wasp brood size in *L. pallidus* may be due to more eggs laid or better survival in high quality host

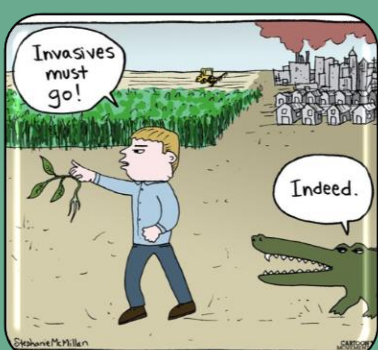


Female biased wasp sex ratio suggests local mate competition

(Mowery et al, 2022 Vetter et al., 2012)

We provide one of the first descriptions of wasp development inside a spider egg sac

Lower suitability of the invasive *L. geometricus* to parasitism, either due to their smaller size, better defenses, or other aspects may promote this species' invasion success.



Such knowledge enhances our understanding of biological invasions and may help better manage species invasions

Our Colony

Valeria Arabesky

Tamir Rozenberg

Prof. Yael Lubin

Prof. Michal Segoli

Dr. Monica Mowery

Thank You!