

Introduction

- Invasive and urban pests can both alter ecosystems, but we know little of the interaction between these disturbances.
- Black widows (BLW, Latrodectus hesperus) are a common, native urban pest of Western North America [1].
- Brown widows (BRW, L. geometricus) are native to Africa, but have invaded North America multiple times, sometimes outperforming native widow species [2].
- Here we compare the laboratory behavior of native BLWs that are pests of urban Phoenix habitat with a BRW population that invaded urban San Diego within the last 15 years.
 - We took repeated measures of web building and foraging voracity.
- We hypothesized that differences in mean behavior, or behavioral consistency, among species may provide insight into BRW invasive success, and their potential replacement of the native BLW.

Methodology

- BRWs were collected 10/22 from the San Diego St. Univ. campus; BLWs were collected 11/22 from Scottsdale, AZ.
- All spiders were returned to the laboratory, weighed (mg), placed in clear acrylic boxes (5 x 4") and housed under reverse photo period.
- Web building trials were conducted in clean acrylic boxes, documenting activity every minute for the first 5 minutes, and then every 5 minutes until 60 minutes.
- Prey trials were conducted by placing two 2-week old crickets (Acheta domesticus) into a spider's home box and recording latency to subdue.



Urban pest and invasive species behavioral differences: the web building and foraging aggression of two widow spiders

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Results

- Both species showed a high level of individual consistency in web-building activity across repeated measures.
- Figure 1: Intraclass correlation coefficient= 0.67; p<0.0001.
- Neither species showed individual consistency in foraging voracity across repeated measures. Intraclass correlation coefficient= 0.107; P=0.32
- On average, BLWs were 4x more active web building than BRWs. • Figure 2: p<0.0001.
- Foraging voracity (measured as time to subdue) was similar for both species (p=0.445).
- We found no evidence that a spider's web building activity was correlated with either its foraging voracity.
- Neither behavioral measures were predicted by the spider's body mass on the day of the trial.

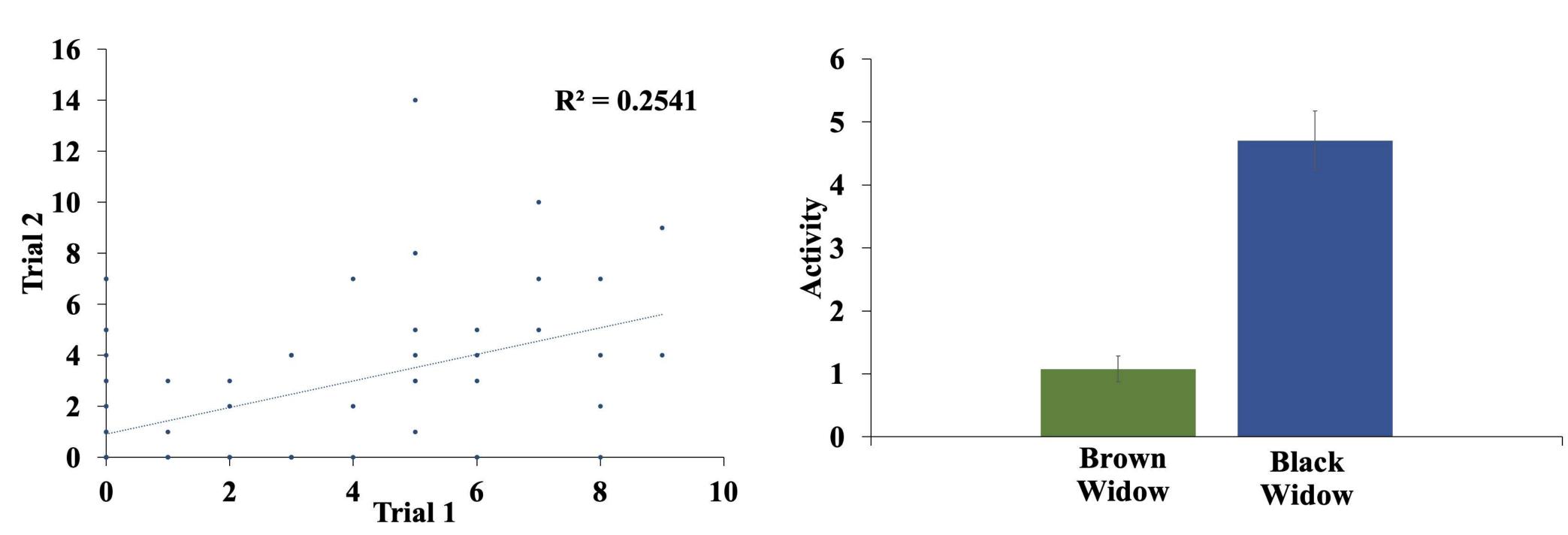


Figure 1: Spiders (both species) show strong intraindividual consistency between web building repeated measures.



Figure 2: BRWs show almost 4x less web building activity compared to BLWs.



- than their native counterparts [3]. • Urban and invasive success may sometimes derive from a reduced response to stimulus (e.g. urban BLW spiderlings show reduced siblicide and increased social tolerance [4]).

 - These adult trials (and ongoing siblicide trials) will further establish if BRWs show reduced





Discussion

Behavioral analysis of invasive and urban pests can provide us with clues as to how and why pests are so successful.

BRWs are successfully invading non-native urban areas and appear to be replacing the native BLW urban pest.

• Yet, we find that BRWs are significantly **LESS** active in their web building.

• This is a surprising finding given other invasive pests thrive by being more active and aggressive

• Thus, BRWs may enjoy invasive success because they are less reactive in the urban environment and more amenable to group-living.

- Future studies will test the prediction that BRWs share web space, potentially capturing more prey than they would with a larger single web.
- cannibalism.

• Understanding the behavior and ecology of urban and invasive pests has the potential to support urban development practices that promote native biological diversity.



Literature Cited

1. Trubl et al. (2012). Urban Ecosystems, 15, 599-609 2. Mowery, M. A., Lubin, Y., Harari, A., Mason, A. C., & Andrade, M. C. B. (2022). Animal Behaviour, 186, 207–217. 3. Pintor et al. (2008). *Oikos*, 117, 1629-1636. 4. deTranaltes & Johnson (2021). Urban Ecosystems, 25, 305-312





