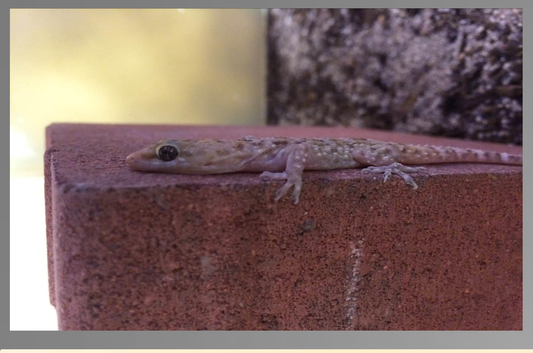
Relative Behavioral Plasticity in an Invasive, Urban-Exploiting Gecko



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INTRODUCTION

- Urbanization offers a chance to study how some organisms, termed urban exploiters [1], thrive in the face of human disturbance.
- Behavioral plasticity, the ability for organisms to rapidly adjust behavior in response to a new environment, has been identified as one potential way urban exploiters may thrive [2].
- Thus, behavioral plasticity may help us predict which populations will grow/decline in urbanized habitats.
- The House Gecko, *Hemidactylus turcicus*, is an invasive species residing in urban habitat throughout the southern U.S., including Phoenix, AZ [3].
- Here we test relative behavioral plasticity within and between the anti-predator and foraging contexts—predicting that this invasive urban exploiter will show a high degree of plasticity in both behavioral contexts.

MATERIALS AND METHODS

- We collected 26 geckos from 6 distinct sites within the city of Phoenix.
- Geckos were housed individually in 10 gallon tanks with a 13.5x13.5x4.5 (cm) brick for refuge.
- Behavioral assays were performed multiple times to quantify the repeatability of each behavior.
- Body condition was calculated as mass (mg) / snout-vent length (mm) [4].
- Anti-predator boldness was measured as the latency to leave a transparent vial after being captured.
- Each gecko was fed 5 crickets after two distinct starvation treatments: S+ where geckos were starved 7 days and S- where geckos were starved 2 days.
- We measured foraging voracity as the number of crickets killed 3 hours after feeding.

RESULTS

- Repeated measures ANOVA showed no effect of repeated measures ($F_{3,19}$=2.864, p=0.064) or body condition ($F_{3,19}$=0.801, p=0.509) on anti-predator behavior.
- Instead, gecko anti-predator behavior was highly repeatable (low plasticity) (Fig. 1).
- Geckos were significantly more voracious after longer periods of starvation (Fig. 2).
- Despite these mean differences across treatments, individual geckos still exhibit a significant correlation in foraging voracity across starvation treatments (Fig. 3).
- Indeed, this individual behavioral consistency is also seen within treatments, as
  1) We found no effect of repeated measures on voracity in either treatment, and
  2) Geckos were significantly repeatable within both starvation treatments, S+ (ICC=0.641, $F_{25,25=}$3.444, p=0.001), S- (ICC=0.627, $F_{25,25}$=3.068, p=0.003).
- Body condition showed no relationship with foraging voracity in the S+ ($F_{1,25}$=0.66, p=0.425) or S- ($F_{1,25}$=1.88, p=0.222) treatments.

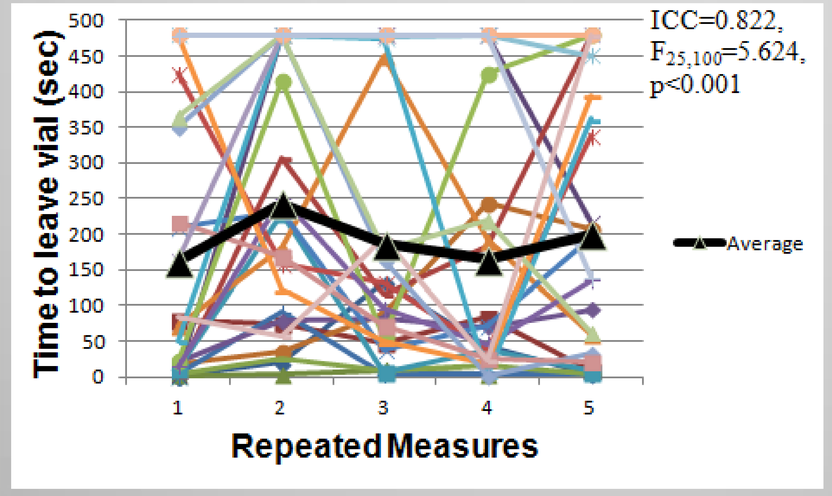

Figure 1. Individuals showed a high level of repeatability (low level of plasticity) within the anti-predator context.

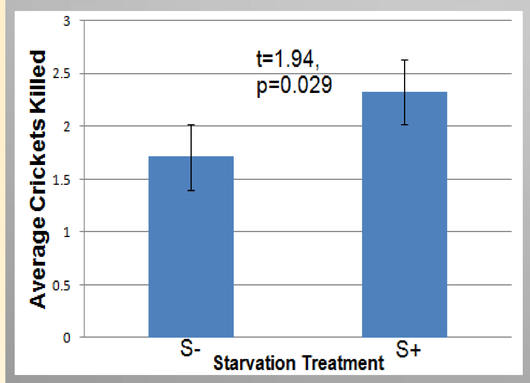

Figure 2. Foraging voracity significantly differed between starvation treatments.

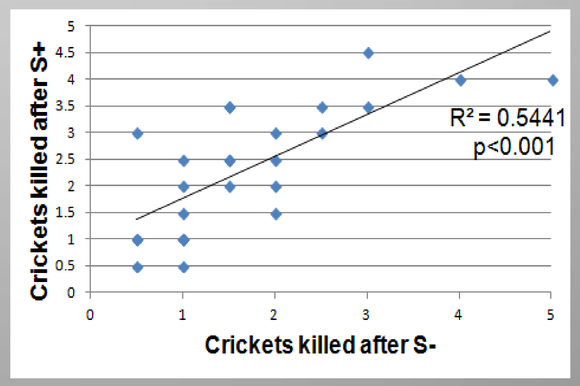

Figure 3. Correlation between crickets killed in each starvation treatment.

DISCUSSION

- Gecko anti-predator behavior showed high repeatability, suggesting enemy response may be a canalized trait that is too costly to exhibit plastically.
- Our starvation manipulation did yield the predicted plasticity in foraging voracity (Fig 2).
- However, we were struck by how repeatable foraging behavior was, both within and across starvation treatments.
- For example, geckos exhibited consistent individual variation resulting in some taking fewer prey than others in all conditions (see Fig. 3).
- Also, this individual variation was not dependent on a gecko's body condition as a plasticity hypothesis might predict.
- Instead, geckos appear to have behavioral types [5] that dictate their performance, and which is likely to have implications for their success in urban habitat.

LITERATURE CITED

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