Flight Distance in Lizards: Assessing the Influences of Environmental Temperature and Substrate Variability

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Abstract

For numerous organisms, escaping predators is a crucial factor that can be influenced by a variety of elements. Therefore, we observed flight distances of S*celoporus* occidentalis at different temperatures and on several substrates. We found that temperature did not affect lizard's flight distances, but lizards ran further on vertical surfaces rather than horizontal surfaces.

Introduction

Escaping predators is important to the survival of many animals. Many lizards rely on running to escape predators, but a variety of factors can affect how a lizard runs to escape. For example, lizards are ectotherms, and research has shown that temperature affects both their running abilities and escape behavior. Furthermore, variation in the substrates over which lizards run can play a significant role in determining escape speeds, distances, and behavior. Here we examine how temperature and substrate affect escape distances (how far an individual runs from a predator) in the western fence lizard. Specifically, we are examining how the flight distance of *S. occidentalis* is influenced by temperature and substrate. We predict that as temperature increases, lizards will have greater escape distances. We also predict that escape distance will vary based on the substrate a lizard runs on.

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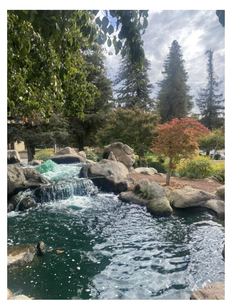
Methods

•To examine how temperature and substrate affects escape distance in lizards, two observers watched the escape behavior of 26 *Sceloporus occidentalis* on the Stan State University campus.

•One observer (the predator) directly approached a lizard walking at about 1 m/s. A second observer noted where the lizard initially sat and where the lizard fled to after the approach of the "predator".

•After the lizard ran, we recorded the distance (in cm) it fled, noting behaviors such as brief pauses or stops. For each escape observation we recorded temperature, time, location, and substrates.

•We used linear regression to examine the relationship between temperature and escape distance. We compared how substrate affects escape distance using a two-sample t-test. Due to low sample size we pooled substrates into two categories, vertical or horizontal for the t-test.



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Results

Figure 1: Flight Distance versus Temperature

We found that temperature did not affect escape distance in *S. occidentalis* on our campus (Figure 1) .

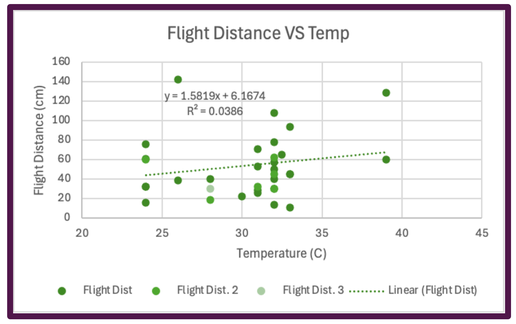

Figure 1. The relationship between temperature and flight distance. Temperature had no effect on how far lizards fled (slope =1.5819 , r2 =.0386).

Figure 2: Flight Distance versus Substrate

We found that substrate type affected how far lizards fled from predators (Figure 2). Lizards ran significantly further on vertical substrates (mean = 63.3 cm) compared to horizontal substrates (mean= 42.5 cm, p-value= 0.04).

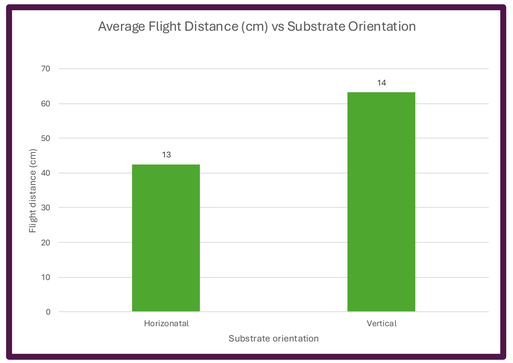

Figure 2. The relationship between flight distance and substrate. Lizards had greater escape distances on vertical surfaces versus horizontal surfaces.

Conclusion

Temperature

Based on previous studies, we expected lizards to run further at higher temperatures. However, we found that there was no effect of temperature on the lizard's flight distances. Factors that may explain a lack of temperature effect could be that 1) we only collected data at a narrow range of high temperatures, 2) Lizard's body temperature may not match the environmental temperature, 3) The lizards on campus may be acclimated to humans and not see us as predators, 4) we have an insufficient sample size.

Substrate

We found that lizards on vertical substrates fled further than lizards on horizontal surfaces. Why might this be? We think that lizards on horizontal surfaces may be closer to their refuge compared to lizards on a vertical surface.

In conclusion, we believe future studies should observe larger groups of individuals. Additionally, a wider range of temperatures should be included when collecting flight distances. By increasing sample size, this allows a yield of more accurate results between the correlation of flight distances and temperature and substrate orientation.

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