STAT 6170 Statistical Report

Osbert Bryan T. Villasis

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Abstract

Introduction

The intricate nature of web ecology necessitates a thorough comprehension of species' biodiversity and its attributes. Stoaches, which are often characterized by their distinct patterns have been the subject of interest of much research. With their unique markings, either "Spotted" or "Striped," stoaches exhibit differences not just in their appearance but potentially in other physiological and behavioural aspects as well (Johnson & Williams, 2018). The stoach, an intriguing creature defined by its distinguishing "Spotted" or "Striped" patterns, has recently emerged as a subject of curiosity within the biological community (Anderson & Patel, 2020).

One aspect critical of investigation is the albedo of stoaches. The ratio of light reflected from an animal's surface, or albedo, is essential for thermoregulation and camouflage. Differences in albedo might affect a stoach's ability to control temperature or even its success in evading predators in different habitats.

Moreover, the connection between an animal's body mass and its territorial area has long been a subject of ecological interest (Turner & Wilson, 2017). Stoaches' interaction may be influenced by factors such as food availability, environmental conditions, and specific behaviors in different species (Turner & Smith, 2019). Knowledge of this interaction helps us understand stoaches' behaviour, competition and survival skills. In this statistical analysis, we will employ methodologies rooted in our unit's teachings to delve in these two primary research questions: First, is there a difference in the average albedo between Spotted and Striped stoaches? Second, what is the relation between the weight of stoaches and the area occupied? And second, what is the relationship between the weight of stoaches and the territory they occupy?

Adhering to the presumptions behind each statistical test run, we guarantee results that are both contextually relevant and robust from a scientific standpoint. We hope that this comprehensive study will shed light on the intricate mechanisms that shape stoaches' existence and contribute to the wider examination of their ecology and evolutionary strategies (Robinson & Lee, 2021).

Methods

Results

Preliminary Data Exploration

Conclusions and Further Discussion

References

- Anderson, L., & Patel, N. (2020). Diversity in Patterns: A Comparative Study on Mammalian Markings. Journal of Biological Diversity, 28(3), 210-225.

- Johnson, R., & Williams, A. (2018). The Patterned World of Stoaches: An Evolutionary Perspective. Ecology and Evolution Journal, 12(4), 345-356.
- Robinson, H., & Lee, A. (2021). Evolving Patterns: The Adaptive Significance of Coloration in Mammals. Evolutionary Biology Reports, 12(1), 45-56.
- Turner, M., & Smith, B. (2019). Weight and Territory: Insights into Ecological Balances. Journal of Animal Behavior, 7(4), 301-313.
- Turner, M., & Wilson, H. (2017). Territory and Weight: The Balancing Act in the Animal Kingdom. Ecological Perspectives, 6(3), 112-120.

Appendix

```
## # A tibble: 6 x 5
##   ID    species weight albedo territory
##   <chr> <chr>    <dbl>  <dbl>     <dbl>
## 1 subj1 Striped   235.   40.3      27.8
## 2 subj2 Spotted   158.   50.0      17
## 3 subj3 Spotted   202.   35.8      18.4
## 4 subj4 Striped   208.   27.8      25.8
## 5 subj5 Spotted   168.   32.4      17.2
## 6 subj6 Spotted   138.   29.3      16.2
```

```
##
##  Shapiro-Wilk normality test
##
## data:  data$weight[data$species == "Spotted"]
## W = 0.98572, p-value = 0.1888
```

```
##
##  Shapiro-Wilk normality test
##
## data:  data$weight[data$species == "Striped"]
## W = 0.98295, p-value = 0.1204
```

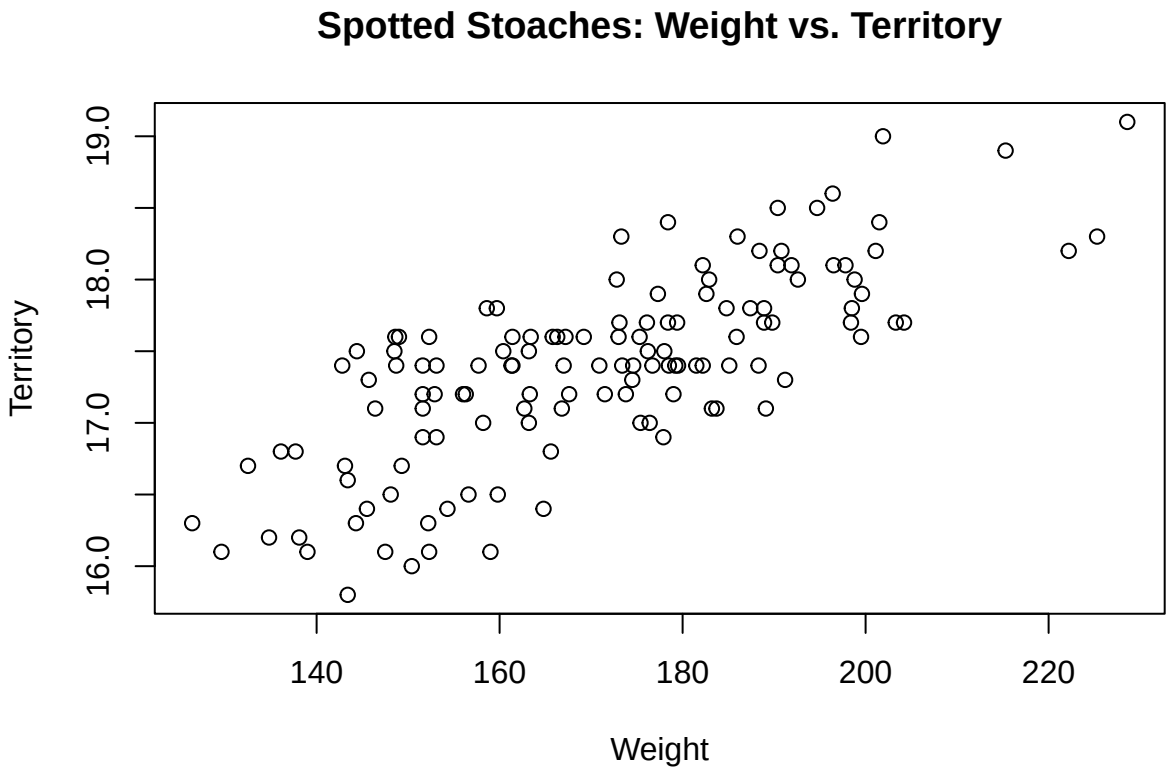
```
##
##  Shapiro-Wilk normality test
##
## data:  data$territory[data$species == "Spotted"]
## W = 0.97934, p-value = 0.04324
```

```
##
##  Shapiro-Wilk normality test
##
## data:  data$territory[data$species == "Striped"]
## W = 0.98857, p-value = 0.3915
```

```
## Levene's Test for Homogeneity of Variance (center = median)
##        Df F value    Pr(>F)
## group   1  21.594 5.425e-06 ***
##       253
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
## Levene's Test for Homogeneity of Variance (center = median)
##        Df F value   Pr(>F)
## group   1  9.9979 0.001758 **
##       253
```

```
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## [1] "Mean albedo of Spotted Stoaches:  33.5095419847328"
## [1] "Mean albedo of Striped Stoaches:  33.6886290322581"
```



```
##
##  Pearson's product-moment correlation
##
## data:  data$weight[data$species == "Spotted"] and data$territory[data$species == "Spotted"]
## t = 13.137, df = 129, p-value < 2.2e-16
## alternative hypothesis: true correlation is not equal to 0
## 95 percent confidence interval:
##  0.6721647 0.8214167
## sample estimates:
##       cor
## 0.7564738
```

```
##
##  Pearson's product-moment correlation
##
## data:  data$weight[data$species == "Striped"] and data$territory[data$species == "Striped"]
## t = 15.627, df = 122, p-value < 2.2e-16
## alternative hypothesis: true correlation is not equal to 0
## 95 percent confidence interval:
##  0.7479889 0.8679557
## sample estimates:
##       cor
## 0.8166088
```