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Software Tools (BINF6210) – Assignment #1

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The effect of climate on family Apodidae

Commonly known as *swifts*, the family Apodidae is composed of small birds with slender and long wings. Because of their body and wing structures, these birds are able to cruise the firmament over long distances and at high speed. Apodidae are insectivores who fascinatingly hunt swarms of flying insects as they glide through the skies. Although the family's data from the Barcode of Life Data System (BOLD) shows that swifts can be found in various parts of the world, it would be interesting to look into whether swifts prefer certain habitats depending on climate conditions. For instance, a study on common swifts suggests that unfavorable weather conditions negatively affect growth in swifts' offspring (Sicurella et al., 2015), highlighting the possibility that swifts may prefer specific weather conditions to encourage proper offspring development. Moreover, considering that these birds are insectivores, weather conditions may affect aerial insect availability, thereby pushing swifts towards certain climates. Other factors may exist to explain how swifts respond to their environment. Therefore, this project investigates the possible impact of climate on Apodidae based on the abundance of individuals across varying latitudes.

FIGURES

Histogram of Latitude for Apodidae (n = 71)

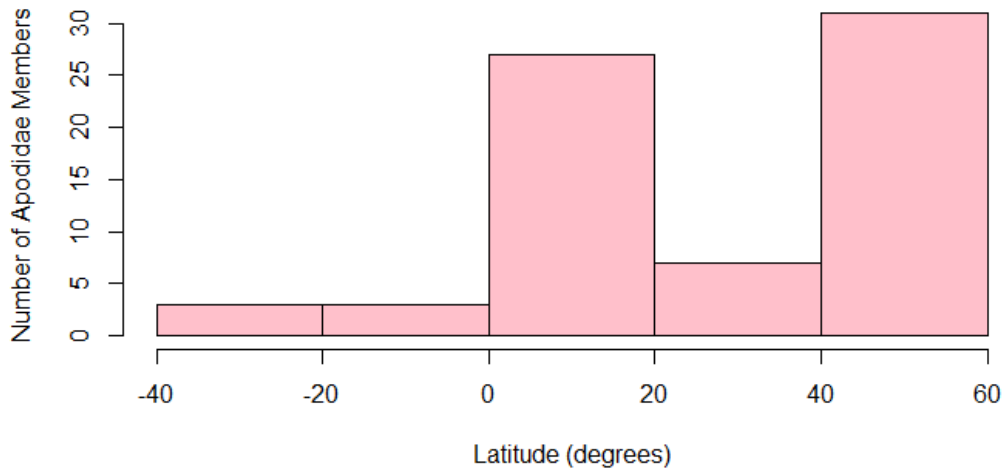


Figure 1: The number of Apodidae individuals based on latitude. Negative and positive latitude values are south and north of the equator respectively. Mean = $25.65 \pm 23.23^\circ$.

Box plot of Latitude (n = 71)

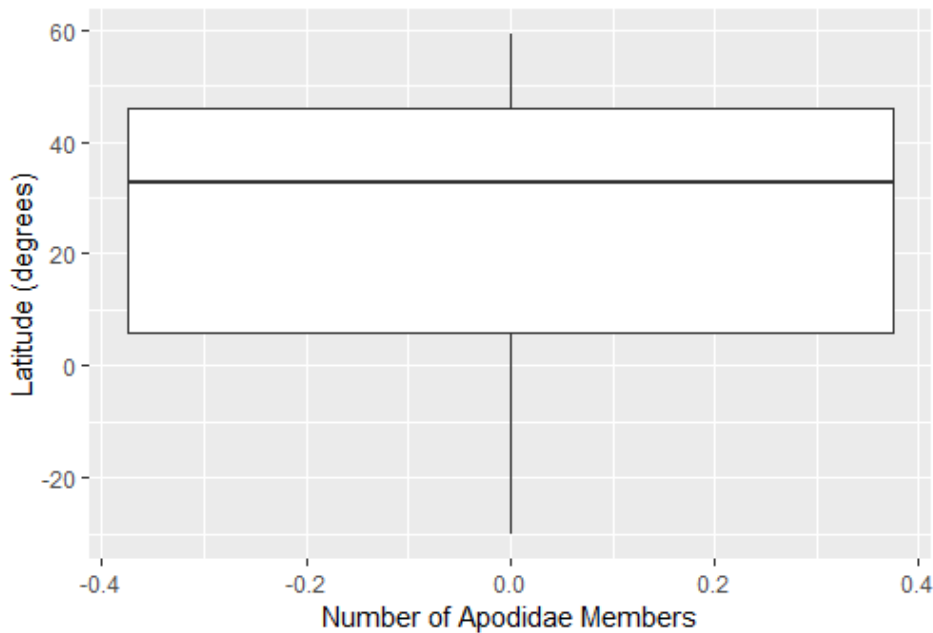


Figure 2: Box plot indicating the absence of outliers in family Apodidae's latitudes. Negative and positive latitude values are south and north of the equator respectively. Median = 32.76° .N

DISCUSSION AND CONCLUSION

As birds that spend a lot of time in the air, swifts migrate through various regions and weather conditions. The latitudes (Figure 1) obtained from BOLD for this project indicate that swifts can be found in regions between 30.19 °S (minimum) to 59.20 °N (maximum) of the equator. Meanwhile, it appears that the greatest number of swifts (~ 27 and ~ 31 in figure 1) were found in regions of latitudes 0 °N to 20 °N and 40 °N to 60°N respectively, thereby suggesting that swifts may prefer tropical and temperate regions. The left-skewed histogram (figure 1) prompted the construction of a box plot (Figure 2) to test for outliers, but none were detected. A skewed distribution also meant that the mean $25.65 \pm 23.23^\circ$ would not represent the center of the distribution i.e. the average latitude for Apodidae.

Instead, the median 32.76° .N is being taken to represent the central value for this data, thus pointing to the possibility that swifts typically prefer regions around latitude 32.76° .N - a subtropical region. Studies by Boano et al. (2020) and Åkesson et al. (2020) have also shown that swifts migrate from Africa's tropical and subtropical climates to temperate regions to breed, lasting only a few summer months. Following breeding right before winter, the birds return to various parts of Africa for warmth and more flying insects. The findings of the aforementioned studies in addition to those of this project suggest that the Apodidae family would rather inhabit subtropical-tropical regions than others. Ultimately, I think this project's sample size ($n= 71$) is too small to draw major conclusions on this subject. A suggestion for future studies would be to consider a larger data set, particularly with more sampling regions, to shed more light on this topic.

References

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