Comparing Foraging Behaviors of Bird Species in High-Impervious and Low-Impervious Areas

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CISA Student Showcase

Introduction and Objectives

The influence of human activity on bird foraging behavior, particularly in urban environments, is a significant focus of research. Some urban birds exhibit neophilia, while some non-urban birds display neophobia, impacting their exploration of novel stimuli and food sources. The instability of urban settings desensitizes birds to perceived dangers, leading to riskier foraging behavior (1). Anthropogenic waste in urban areas attracts diverse bird species (2), and smaller generalist bird species often exploit opportunities first during larger competitor downtimes in these areas, shaping competitive interactions among species (3).

Research Question: Is there a significant difference in the time it takes for the first bird to visit a site with anthropogenic waste and the species of the bird in a high-impervious area compared to a low-impervious area?

Hypotheses: It is hypothesized that birds will make a visit in a shorter amount of time in the high-impervious area compared to the low-impervious area. Additionally, smaller species such as the House Sparrow (*Passer domesticus*) are expected to visit the site first in the high-impervious area, while slightly larger species like the Great-Tailed Grackle (*Quiscalus mexicanus*) are anticipated to visit first in the low-impervious area.

Methods

- 10 feeding stations set up in a high-impervious area and 10 in a low-impervious area.
- Each station set up near a trash bin, to simulate anthropogenic waste.
- 15 pieces of minimally processed popcorn deployed per station and a 25-minute (1500 seconds) data collection period per station.
- Stations set up at variable distances away from each bin, measured with a stride length of one meter.
- The time at which the first individual bird landed at or approached the feeding station recorded in seconds as well as the species of the bird.
- Direction determined by mapping out the area, setting up a clockwise map with divided quadrants around each bin, numbering the divided quadrants, and using a random number generator to determine the direction of the station, as pictured in Figure 1.

Study Sites

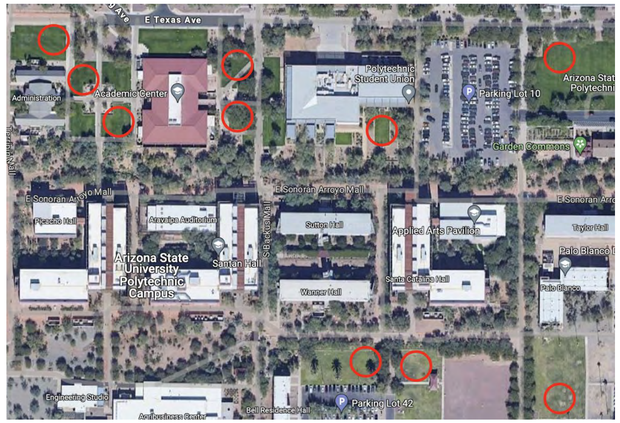


Fig 2. Shows the 10 Low-Impervious feeding station sites on the ASU Polytechnic Campus highlighted by the red circles.

Fig 3. Shows the 10 High-Impervious feeding station sites at Tempe Marketplace, an outdoor shopping center. Sites highlighted by the red circles.

Results

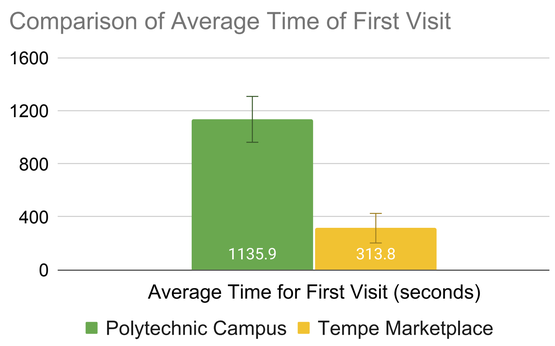
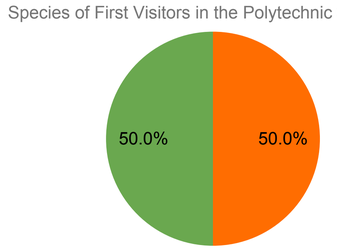


Fig 4. Compares the average times of the first visits in each area with a mean ($\bar{x}$) of 1135.9 seconds in the Polytechnic Campus and a SE of ±173.08, compared to a mean ($\bar{x}$) of 313.8 seconds in Tempe Marketplace with a SE of ±111.8. In cases where no birds visited within the 25-minute period, a full time of 1500 seconds was assumed for the site.

Results



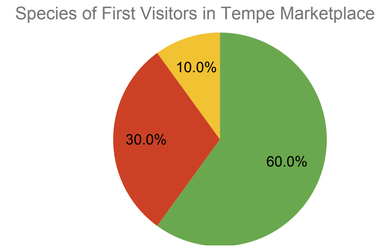


Fig 5 and 6. Compare the species of birds that made the first visitation in the Polytechnic Campus and Tempe Marketplace.

Conclusions

The experiment confirms the first hypothesis, showing shorter visitation times in high-impervious areas compared to low-impervious areas, supported by significantly shorter average times and non-overlapping standard error bars. However, the second hypothesis lacks conclusive support, as high-impervious sites received visitors of predominantly larger species like Great-Tailed Grackles instead of smaller generalist species as expected. This highlights the complex factors shaping initial bird visitation in urban areas. Understanding these dynamics informs urban planning to mitigate negative impacts on bird populations by emphasizing habitat preservation for both smaller and larger species, maintaining urban biodiversity.

Literature Cited & Acknowledgements

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