Artificially Induced Frugivory by Birds: A Management Tool for Rare Plants?

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Objective

Question
Can frugivorous birds be enticed to consume fruit in a selected area or from a target plant species via broadcasting vocalizations?

Hypotheses

H1: Non-native frugivorous birds on the Island of O‘ahu exhibit behavioral responses to prerecorded conspecific and heterospecific vocalizations with a stronger response exhibited towards conspecific tracks.

H2: Interactions of non-native frugivorous birds with fruits, including direct fruit consumption, are increased near fruiting plants where conspecific and heterospecific vocalizations are broadcast.

H3: Non-native frugivorous birds exhibit stronger responses to vocalizations during the non-breeding season (Sep – Jan) due to increased gregariousness and flocking outside of the breeding season (Feb-Aug).

Discussion

Summary

- The focal species’ response to the stimulus was extremely variable with the Japanese white-eye comprising some 540 of the 996 fruit-eating birds attracted, suggesting that efficacy may be bird species-dependent.
- Birds consumed focal fruit in 5% of control periods, which grew to almost 30% during treatment periods, indicating that birds may rely heavily on social info when making foraging decisions.
- Māmaki (Pipturus albidus) comprised more than half of all observed frugivory events, suggesting that fruit familiarity may be a driver of frugivory.
- There is very little difference in behavioral response between breeding and non-breeding seasons, demonstrating that fruiting phenology may be the only temporal limitation for this tool.

Management Implications

This experiment was designed to establish proof of concept and is narrow in scope. More research is needed to determine feasibility in other systems. However, preliminary evidence suggests that audio lures may be a practical tool for land managers to foster seed dispersal mutualisms between bird and plant taxa.

Methods

Study Species

- Red-billed leiothrix (Zosterops lateralis)
  - Introduced 1918 from SE Asia
  - Widespread and abundant; fruiting populations
  - Habitats: Dense understory in forest/highlands
  - Behavior: gregarious and cacique
- Japanese white-eye (Zosterops japonicus)
  - Introduced 1929 from East Asia
  - Most abundant and widespread passerine in HI
  - Habitats: All vegetation types and densities
  - Behavior: bird and cacique
- Red-whiskered bulbul (Pycnonotus jocosus)
  - Introduced 1965 from SE Asia
  - Large population growth and range expansion
  - Habitats: Upper canopy in forest/highlands
  - Behavior: cautious, but highly gregarious
- Red-whiskered bulbul (Pycnonotus sinensis)
  - Introduced 1960 from India
  - Large population growth and range expansion
  - Habitats: All vegetation types and densities
  - Behavior: wary, but gregarious

Results

Average # of Birds that Consumed Focal Fruit

- Control
- Treatment

Consumed Fruit per Species

- Control
- Treatment

Consumption of Rare vs. Common Fruit

- Control
- Treatment

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