Parental Investment at the Nest in Wild Maui Parrotbill
(*Pseudonestor xanthophrys*): Implications for Captive Propagation and Recovery Efforts

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Maui Parrotbill

(*Pseudonestor xanthophrys*)

- Critically Endangered
- Long term monogamy between pairs
- Insectivorous
- Clutch size of 1
- Juvenile dependency of 5-17 months
Maui Parrotbill Population and Range

Population estimate:
502 ± 116
[1980]

Area of Occupancy:
1 population in 50 km²
Recovery Strategy

- Forest restoration
- Protection and management
- Research on disease and predation threats
- Captive propagation

Re-establishment of a second population on leeward Haleakala (2012?)
Possible Known Population Limitations Include...

- Restriction to suboptimal habitat by disease
- Low Fecundity
- Small population size
- Predation
- Severe weather
- Egg inviability

Parental Investment???
Why Study Wild Behaviors?

Complex social and foraging behavior
In order to develop and implement recovery techniques

- What are the major factors limiting nest success?
- Does parental behavior predict nest success or failure?

Nest Studies
2006-2008
Study Area

- Frisbee Meadows (FSB) ~70 ha without predator control
- HR3 ~35 ha with predator control
Methods

- Nests located January-May
- Monitored 3 hours/day 0600-1800
- Data included:
  - Weather
  - Female time spent on or near nest
  - Time spent away from nest
  - Male provisioning rates
  - Frequency of male vocalizations
If Parental Behavior Indeed Predicts Nest Success or Failure....

- We predicted the following all to be lower at failed nests:
  - Time spent on nest by female
  - Provisioning visit rates by the male
  - Combined parental feeding rates
  - Vocalizations by male
    (male attentiveness)
Nest Fate Results

• 17 nests found
  • 5 - no egg laid
  • 5 - failed during incubation
  • 3 - failed when chick was less than 1wk
• 4 nests produced a fledgling

• 2 eggs were confirmed as never hatching and 2 were depredated* at chick and egg stage

* Pueo confirmed at one depredated nest; rat suspected as predator of other one
**Significant Variables**

1) Female Investment During Incubation

\[(\text{ANOVA}_{2,105} \ F=4.7, \ p=0.011)\]

Failed nests received less incubation \((t=2.9, \ d.f.=96, \ p=0.004)\)

2) Parental Feeding of Chicks

\[(\text{ANOVA}_{2,98} \ F=5.67, \ p<0.005)\]

Failed nests received lower feeding rates of chick during week 1

\[(\text{Fisher’s PLSD, } p<0.001)\]
Non-significant Variables

- No difference in provision rates between successful and failed nests
  - Meal quality?

- No difference in male song rates
  - Song function?
Hanawi Weather

- Weather severity significant for early chick mortalities
- Early nests had a higher failure rate than later in the year when the weather improves
Conclusions

• Possible to collect eggs or chicks under 1 week of age without population effects

• Not a reliable recovery option because of logistics and safety issues

• Prompted 2 areas in need of future research
Future Research

1) Supplemental Feeding

2) Genetic Variation
   2/7 (28.5%) egg inviability
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- Haleakala National Park
- Haleakala Ranch
- MFBRP Field Teams