

Females lead population collapse of the endangered Hawaii creeper

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Hawaii creeper.

(Phys.org) —Only 22 to 28 percent of the remaining adult population of the endangered Hawai'i creeper (*Oreomystis mana*) found in the southern portion of the Hakalau Forest National Wildlife Refuge is female, raising concerns about the birds' ability to continue to propagate the species, according to new research published by University of Hawai'i at Mānoa scientists Leonard Freed and Rebecca Cann.

"Nesting is an energetically expensive activity, and females can incur more risks under increasingly challenging conditions," said Biology Professor Freed.

Both male and female Hawai'i creepers are olive green and have a short,

straight gray bill and black mask. The birds are endemic to the Island of Hawai'i. Creeping up and down koa and 'ohi'a [tree trunks](#) and along the underside of larger branches, they feed on insects living under loose bark.

From 2001 to 2007, Hawai'i [creeper](#) population declined by 63 percent throughout a 3,400-hectare open forest area at Hakalau Refuge on the windward slope of Mauna Kea, according to trend analyses by Freed and Cann. The scientists observed the male-biased sex ratio along the elevation gradient in a formerly high density section of the forest, including a closed forest area study site that is considered more pristine, and found that it was associated with the [population decline](#) in the refuge's open forest areas. Hakalau formerly had the best population of creepers on the island.

Freed and Cann pin the sudden and [rapid decline](#) of Hawai'i creepers on food limitation associated with a surge in local numbers of the Japanese white eye (*Zosterops japonicus*), an introduced bird that competes with the creeper. By 2006 to 2007, Freed and Cann found that the white-eye was replacing the creeper throughout both the disturbed and the pristine areas of the refuge.

Food limitation was indicated by lower mass, stunted bill growth, and shorter legs of young creepers, as well as changes in the timing and duration of molt of both hatch-year birds and adults. These changes, along with lower fat and loss of fledglings, point to starvation as the cause of the Hawai'i creeper collapse.

Generally Hawai'i creepers have a single two-egg clutch each year, and only the females incubate eggs and brood nestlings, while both parents feed the nestlings and fledglings. The birds have long-term pair bonds, with males providing food to their mates through regurgitation during egg-laying, incubation, and brooding.

Sexual conflict over parental care in nesting birds is widely known, and may have played a role in the cost of reproduction experienced by female creepers.

"When one parent does not contribute its share, the other parent partially compensates," Freed said. "Males might have adequately subsidized females during incubation and brooding to maintain the breeding attempt, but may not have fully participated during feeding of nestlings and fledglings."

Understanding the differential vulnerability of the sexes to environmental change is important because the resulting adult sex ratio changes may become more severe without management.

"We know the creeper is in serious trouble, and we urgently need to increase adult female survival," Freed said. "At a minimum, this will include controlling Japanese white-eyes. Also, captive breeding may be necessary to produce females that can be released into the wild to restore the adult [sex ratio](#)."

More information: Freed, L. and Cann, R. 2013. Females lead population collapse of the endangered Hawaii'i creeper. *PLOS ONE*. [dx.plos.org/10.1371/journal.pone.0067914](https://doi.org/10.1371/journal.pone.0067914)

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