Native forest birds in unprecedented trouble: researchers

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Native birds at Hakalau Forest National Wildlife Refuge are in unprecedented trouble, according to a paper recently published in the journal *PLoS ONE*. The paper, titled "Changes in timing, duration, and symmetry of molt of Hawaiian forest birds," was authored by University of Hawai'i at Mānoa Zoology Professor Leonard Freed and Cell and Molecular Biology Professor Rebecca Cann.

In the paper, Freed and Cann report that birds are now so food-deprived that they take up to twice as long replace their feathers, an annual process known as molt. The authors confirmed the hypothesis that Japanese white-eye (*Zosterops japonicus*) birds are effectively competing with most species of native birds. Their research found that both young and adult birds took longer to complete their molt. Young birds normally complete their juvenile molt in five months, beginning before June and ending in October. Now it is taking the birds as late as March of the following year to finish that molt. Adults are also taking that much longer to replace their feathers. Freed and Cann propose that this change in molt matches those in studies that experimentally starve birds.

In addition, the authors report that more adults are beginning their molt early, during months when they normally breed. Some molting females even had active brood patches. Birds generally avoid this overlap in their life history because both activities require extra energy. In their study, Freed and Cann have identified that the endangered Hawai'i creeper had the greatest molting changes. The record change for an individual bird, a Hawai'i amakihi, was set by an individual that finished its juvenile molt

from the previous year in March only to begin its adult molt in May. All Hawaiian honeycreepers had significant changes.

Usually birds molt the same primary flight feathers on the two wings at the same time to maintain maneuverability. However, by 2002, all species had asymmetric molt of these feathers. This is the first time asymmetric molt has been documented throughout a community of birds. This molt was experimentally seen previously in food-limited birds. In laboratory situations, starvation of birds to 60% of normal diet leads to the changes in molt that Freed and Cann observed in nature. Native birds died at a greater rate during the months of extended molt during 2000-2004, and survival worsened each year. A control set of years in the 1990's, with fewer white-eyes, showed no trend in survival.

The authors reported that the changes in molt were associated in every detail with the increase in Japanese white-eye birds, a bird intentionally introduced to Hawai'i in 1929 to control insects. According to Freed and Cann, the molt study complements a previous 2009 Current Biology paper by the authors showing that all species of native birds have stunted growth and lower survival. The authors suggest that no section of the refuge is safe from the competitive effects of this introduced bird, especially the lower closed forest section of the refuge which had the greatest non-normal molt in 2006.

More information: To view the research paper, visit: dx.plos.org/10.1371/journal.pone.0029834

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