

Genetic drift caught in action in invasive birds

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Japanese Bush-Warblers are letting researchers see genetic drift in action as they spread through the Hawaiian islands. Credit: S. Price

Studies of island bird populations have taught us a lot about evolution, but it's hard to catch birds in the act of naturally colonizing new islands.

Instead, a new study from *The Auk: Ornithological Advances* examines what's happened by looking at the genetics of a species that arrived in Hawaii in the twentieth century through decidedly unnatural means—us.

Japanese Bush-Warblers were introduced to Oahu in 1929 and have since become established on all the main [islands](#) of Hawaii, providing a unique opportunity to follow post-invasion evolution on a known, recent timescale. Northern Arizona University's Jeffrey Foster and his colleagues took blood and muscle samples from 147 bush-warblers living on five islands between 2003 and 2005. Their results indicate genetic drift is occurring—Oahu's birds have higher genetic diversity than those on other islands, whose populations were founded by smaller groups of individuals, just as population genetic theory predicts. Kauai bush-warblers, however, appear to be on a distinct genetic trajectory from those on other islands. Kauai is three times as far from Oahu as the closest other islands, and appears to have received a unique subset of the overall genetic diversity found elsewhere, but it remains to be seen whether the trend on Kauai will continue in the future or if continued dispersal of birds among islands will blur these differences. "This study nicely showed genetic divergence for a very short period using the artificially introduced Japanese Bush-Warblers," according to Shoji Hamao of Japan's National Museum of Nature and Science, an expert on the species.

"I got the idea for bush-warblers as a study system due to the challenges associated with my previous work on native Hawaiian birds," says Foster. "Most of the native bird species I had worked on were exceedingly rare—several of them were endangered species, in fact—so focusing a new project on species in decline or with low numbers was a risky proposition. However, many of the introduced birds are quite common and one [species](#), the Japanese Bush-Warbler, caught my attention with its loud song.

"Bush-Warblers first arrived on the Big Island when I was living there in the 1990s. The idea that one could study this invasion in progress totally blew my mind. The genetic findings largely followed expectations, such as seeing the most [genetic diversity](#) on the island where the birds were introduced and less elsewhere. Birds on Kauai, the island just west of Oahu, appear to be more distinct than those birds on islands east of Oahu, suggesting that over time birds on the respective islands may continue to diverge genetically." But, Foster adds, many questions remain to be answered. "How much are the [birds](#) still flying between islands and potentially mixing any genetic signals of differentiation? Why did it take 50 years for the bush-warblers to colonize other islands after Oahu? How have their vocalizations changed after colonization due to new environments or random chance? We still don't know."

More information: "Population genetics of an island invasion by Japanese Bush-Warblers in Hawaii, USA" January 17, 2018, [DOI: 10.1642/AUK-17-120.1](#)

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