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# Invasive species influence migration rates in a facultatively migratory fish

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## Abstract

Invasive species are a global threat to native assemblages on tropical islands where their effects on depauperate native species communities can be profound. Across the Hawaiian archipelago, species invasions are a key factor in the degradation of stream conditions; dozens of aquatic invasive species affect the five endemic freshwater fishes, all of which are considered imperiled despite their capacity to disperse via a migratory life-history. These invaders threaten native fishes through predation and may affect the demography of native fishes by influencing migration behavior, which may directly or indirectly influence the fitness consequences of alternative life-histories. Some of the native species exhibit partial migration; one subset of individuals within a population migrate to the ocean as larvae and return to a stream to mature, while another remains as a lifelong resident of the natal stream. We hypothesized that the proportion of migratory contingents of adults in a stream would be affected by the abundance of invasive species through predation on hatchlings and returning post-larvae and competition of resources. We tested this hypothesis by comparing migration rates in populations of an endemic stream goby (*Awaous stamineus*) across an invasive species gradient on the Hawaiian island of Oahu. We found that the proportion of stream-residents was significantly lower when invasive live-bearing fish (Poeciliidae) were abundant, when both live-bearers and armoured catfishes (Loricariidae) were abundant, and when stream flows were more stable. These findings underscore the importance of understanding invasive species effects to conserve imperiled native species in Hawaiian streams.

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