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Alien reptiles and amphibians: a Pacific perspective

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Alien reptiles and amphibians have been little studied relative to other types of invasive species such as plants and mammals. Analysis of published records indicates that the rate of introduction of alien reptiles and amphibians has been increasing exponentially since 1850, with a doubling time of just over 27 years. Ten pathways have been involved in these introductions, with six accounting for the majority of introductions; included in this are a mix of both intentional and unintentional pathways. Pathway importance varies taxonomically, temporally, and geographically, and small islands appear especially prone to alien-species establishment. As a result, Pacific islands now contain a large complement of alien reptile and amphibian species, and that number continues to increase.

I discuss several impacts these species have inflicted in the Pacific. Damages include loss of native species via predation, poisoning, competition, or genetic pollution; alteration of forest nutrient-cycling dynamics; health risks to humans via envenomation or contamination of water sources; and economic damages that include power outages, loss of poultry production, loss of ecosystem services, losses to apiarists, poisoning of pets, depressed property values, and rising control costs. Additional effects have been documented elsewhere, but only a small percentage of alien reptile and amphibian populations have been investigated for impacts, so the true scope of these damages is likely to be larger than currently apparent.

Management of alien reptiles and amphibians has not often been attempted. As for other taxa, prevention is far less costly and more likely to be effective in stemming the rising tide of alien invasions than are eradication or control efforts once a pest becomes established. There are a variety of biological and social reasons why eradication and control efforts against alien reptiles and amphibians have rarely been successful. Some of these limitations are likely to be operative for almost all reptile and amphibian invasions, making development of sound prevention programs even more imperative for protecting Pacific islands and other jurisdictions. Appropriate prevention methods differ for unintentional and intentional pathways, and successful prevention will require identifying and adopting both approaches. For unintentional pathways, we need improved means of predicting risk from cargo types and sources, as well as identifying means to sterilize bulk shipments. For intentional pathways, we need development of screening models to predict potential invasiveness of those taxa proposed for introduction. Research on developing such management tools has barely begun, but I briefly discuss results from recent investigations that give an indication of the sort of tools that will be required to prevent further reptile and amphibian invasions.