

IMPACT OF INTRODUCED ARTHROPODS
ON ENDEMIC TERRESTRIAL ORGANISMS IN HAWAI'I*

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Approximately 1500 species of exotic terrestrial Arthropods have become established in Hawai'i during historic times, and new immigrants continue to become established at a rate of about 20 species per year. The majority of these exotics are associated primarily with agricultural and urban ecosystems, but a significant minority have entered wildland ecosystems where they appear to have profoundly affected the abundance and distribution of certain elements of the endemic biota.

Endemic plants have been directly affected by serious outbreaks of a succession of invading exotic herbivorous insects. Most such herbivores have been successfully controlled by means of purposely introduced predators and parasitoids, but one species, the black twig borer, Xylosandrus compactus (Eichhoff), remains uncontrolled and constitutes a serious threat in certain dryland forest areas.

The effects of introduced arthropods on the distribution and abundance of endemic forest birds may be severe, but these have not yet been thoroughly documented. Exotic arthropods affect birds by acting as external parasites, serving as vectors of bird diseases, and parasitoids which may decimate endemic insects which birds depend upon for food.

Endemic terrestrial arthropods have suffered major reductions in distribution and numbers due to the activities of exotic species. Ants, particularly aggressive polydomous species such as Pheidole megacephala (Fabricius) and Iridomyrmex humilis (Mayr), have had major impacts. Many groups of endemic insects apparently have been extirpated from areas occupied by these ants, and P. megacephala probably has caused the extinction of numerous lowland endemic insects. The more recently introduced I. humilis and Anoplolepis longipes (Jerdon) are still extending their ranges into wildland areas of Hawai'i and may be adversely affecting endemic arthropod populations. Attempts should be made to control these invasive ants in critical areas, such as parts of Haleakala National Park.

Introduced parasitoid insects, such as Trichogramma spp., various braconid and ichneumonid wasps, and tachinid flies, appear to have caused severe reductions in populations of certain elements of the endemic insect fauna, particularly among the Lepidoptera (moths and butterflies) and in endemic predatory wasps, such as Odynerus spp., which depend upon lepidopterous larvae as prey. The spread of the aggressive social vespid wasp, Vespula pennsylvanica (Saussure), which has greatly expanded its range in Hawai'i during the past several years, appears to constitute an additional serious threat to elements of the endemic insect fauna such as the Lepidoptera.

Efforts should be made to limit introductions of predatory and parasitoid arthropods made purposely for biological control of agricultural pests to species which are sufficiently host and/or habitat specific that they pose no serious threat to endemic non-target species.