



Drosophila digressa. Photo: Karl Magnacca.

Terrestrial Invertebrates

Picture wing *Drosophila* *Drosophila digressa*

SPECIES STATUS:
Federally Listed as Endangered
State Listed as Endangered

GENERAL INFORMATION: *Drosophila digressa* Hardy & Kaneshiro, 1968 is a medium-sized picture wing fly endemic to Hawai‘i Island. It is a member of the *lanaiensis* species subgroup, which consists of five species, all being rare. All members of this subgroup breed primarily in decaying branches and trunks of *Charpentiera* spp. (pāpala), and usually secondarily in *Pisonia* spp. (pāpala kēpau). Both of these have highly restricted distributions on Hawai‘i. The species occurs in mesic to wet forests where its host plants are found. Although always uncommon and sporadic, it was historically found at sites across the southern and western portions of the island.

DISTRIBUTION: *Drosophila digressa* is historically known from six sites: Moanuaiea on Hualālai, Pāpā and Manukā in South Kona, Kīpuka 9 along the Saddle Road, and Kīpuka Puaulu and ‘Ōla‘a in Hawai‘i Volcanoes National Park. Recent collections and observations have come only from Manukā, the nearby site of Honomalino, and ‘Ōla‘a; there are no host plants remaining at Moanuaiea or Kīpuka 9, and all picture wing flies disappeared from Kīpuka Puaulu several years ago (Pāpā has not been accessible for several years).

ABUNDANCE: Unknown. Based on repeated visits to the two known populations, numbers at the ‘Ōla‘a site appear to be low but consistent while rarely detectable at Manukā but may experience large booms. Both conditions are vulnerable to stochastic events, especially at Manukā where the forest is drying out and many canopy trees are dying.

LOCATION AND CONDITION OF KEY HABITAT: All picture wing *Drosophila* live in rotting bark or sap fluxes of native trees as larvae and are generally host-specific. The known host of *D. digressa* is *Charpentiera* (Montgomery 1975, Kaneshiro and Kaneshiro 1995). Many species that typically use this tree can also utilize the more abundant *Pisonia* (Magnacca et al., 2008), and *D. digressa* has been found in areas of Manukā where only *Pisonia* is present. However, the long-term survival of the flies is unclear when *Charpentiera* is almost completely absent. ‘Ōla‘a and other wet forest areas formerly had very large *Charpentiera* trees that served as important hosts for *D. digressa* and other species, but most of these were dead by the late 1990s. The population at Honomalino occurs in a rare forest type with only a very small number of host plants and may not be viable.

THREATS:

- Habitat loss and degradation due to invasive plants, disturbance by non-native ungulates, and fire from nearby agricultural and residential activity.
- Non-native predators, including ants and wasps (*Vespula pensylvanica*).

CONSERVATION ACTIONS: Conservation of *Drosophila* requires 1) knowledge of the current sites occupied by the species; 2) conservation of a steady supply of breeding hosts at multiple sites; and 3) mitigation of ongoing threats, such as habitat destruction by feral ungulates and the presence of destructive alien arthropod predators. A general understanding of life history and habitat requirements is a prerequisite for management actions, though not for determining endangered status. The goals of conservation actions are not only to protect current populations and key breeding habitats but also to establish additional populations and maintain sustainable populations of host plants, thereby reducing the risk of extinction. For *Drosophila digressa* specifically, management needs include:

- Conduct surveys to determine distribution and abundance.
- Continue and expand fencing to protect habitat from ungulate disturbance.
- Conduct studies on life history and essential habitats to better direct conservation measures, including determining habitat requirements such as microclimate.

MONITORING:

- Continue surveys to identify populations in order to assess their stability and trends.

RESEARCH PRIORITIES:

- Survey for new populations, in both historic and novel sites.
- Determine major threats and limiting factors.
- Conduct studies to determine if restoration of *Charpentiera* is possible or feasible.

References:

- Kaneshiro, KY, Kaneshiro, K. 1995. Draft listing proposal for 18 species of Hawaiian picture-wing *Drosophila*. Document submitted to the Pacific Islands Office, U.S. Fish and Wildlife Service, Honolulu, Hawaii.
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- Magnacca, KN, Price, DK. In press. Rapid adaptive radiation and host plant conservation in the Hawaiian picture wing *Drosophila* (Diptera: Drosophilidae). *Molecular Phylogenetics and Evolution*.
- Montgomery, SL 1975. Comparative breeding site ecology and the adaptive radiation of picture-winged *Drosophila* (Diptera: Drosophilidae) in Hawaii. *Proceedings of the Hawaiian Entomological Society* 22(1): 65–103.
- U.S. Fish and Wildlife Service. 2013. Endangered and threatened wildlife and plants; determination of endangered species status for 15 species on Hawaii Island. *Federal Register* 78: 64638–64690.