

Terrestrial Invertebrates



Drosophila kikiko, Kauai sister species of *D. aglaia*, nearly identical in appearance. Photo: Karl Magnacca.

Picture wing *Drosophila* *Drosophila aglaia*

SPECIES STATUS:

Federally Listed as Endangered

State Listed as Endangered

State Recognized as Endemic

Designation of Critical Habitat for 12 Species of Picture-Wing Flies: Final Rule - USFWS 2008

GENERAL INFORMATION: *Drosophila aglaia* Hardy, 1965 is one of the most striking members of the *picture wing* species group of Hawaiian *Drosophila* pomace flies. The species is endemic to the Wai'anae range of O'ahu, occurring in diverse mesic forest gulches. Although always uncommon, it was historically found widely throughout the range on the eastern and northern slopes. It is the namesake of the *aglaia* species subgroup, which consists of six species, all of them extremely rare. It is nearly identical to the recently-discovered *D. kikiko* of Kaua'i (pictured above), differing only in minor details of the coloration of the side of the thorax and the front leg hairs of the male. Notably, the host plants are unknown for all members of the subgroup except one, which means the host of *D. aglaia* cannot be inferred with any certainty. This uncertainty regarding their precise habitat makes surveys specifically targeting *D. aglaia* difficult.

DISTRIBUTION: Known only from the Waianae range of O'ahu, where it has historically been found at six sites from Mokulē'ia, west of Ka'ala, to Pu'u Palikea at the southern end. The most recent record was in 1997 at Pu'u Palikea, but intensive surveys 2013–2015 have failed to recover it there. At other historic sites, it has not been seen since 1971. There are no records from the leeward side, including Wai'anae and Makaha valleys, but these were not intensively sampled during the early collecting period (1966–1975).

ABUNDANCE: Unknown. The lack of any records for the past 18 years means it is possible the species is extinct. However, several other *Drosophila* species have been rediscovered after longer absences. Even at heavily sampled sites, they may persist at low levels that are not detectable with standard survey methods, or move in only when there is suitable breeding material. Given that the most recent record was less than 20 years ago, it is presumed to be still extant.

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 host of *D. aglaia* is unknown. It was reported as *Urera glabra* (as *U. sandwicensis*) in earlier reports (Montgomery 1975, Kaneshiro and Kaneshiro 1995), but this was based on an erroneous identification of *D. kinoole*. Therefore, the precise habitat requirements of *D. aglaia* are unknown. However, at five of the six historic sites, native vegetation is declining in general (Pu'u Palikea being the exception).

THREATS:

- Habitat loss and degradation due to invasive plants and invertebrates, disturbance by non-native ungulates, and fire from nearby agriculture, residential, and military activity.
- Non-native predators, including ants and wasps (*Vespula pensylvanica*).
- Insufficient information hampers conservation efforts.

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 aglaia* specifically, management needs include:

- Conduct surveys to determine distribution and abundance.
- Conduct studies on life history and essential habitats to better direct conservation measures.
- Use these results to create a management plan for species recovery.

MONITORING:

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

RESEARCH PRIORITIES:

- Survey for extant populations, in both historic and novel sites.
- Conduct studies to document the biology, habitat requirements, and life history.

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, Hawai'i.

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. 2006. Endangered and threatened wildlife and plants; determination of status for 12 species of picture-wing flies from the Hawaiian Islands. *Federal Register* 71:26835-26852.

U.S. Fish and Wildlife Service. 2008. Endangered and threatened wildlife and plants; designation of critical habitat for 12 species of picture-wing flies from the Hawaiian Islands. *Federal Register* 73:73734-73895.