



Drosophila hemipeza. Photo: Karl Magnacca.

Terrestrial Invertebrates

Picture wing *Drosophila* *Drosophila hemipeza*

SPECIES STATUS:

Federally Listed as Endangered
State Listed as Endangered

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

GENERAL INFORMATION: *Drosophila hemipeza* (Hardy, 1965) is a member of the *planitibia* species group, which includes the largest, most charismatic, and most beautiful species of native pomace flies. This group is distinctive due to the extra crossvein in the wings of all species except the Kaua‘i representatives. The unusual wing pattern is similar to the related *D. substenoptera* and the unrelated *D. pilipa*, but is otherwise distinctive. It can be distinguished from the partially sympatric *D. substenoptera* (also endangered) by having the two crossveins nearly in line rather than widely staggered, with the marks over them creating a single dark band across the wing. Both species have an unusual habit of both sexes frequently walking with the wings spread and facing forward, even when not displaying to another fly, possibly making them more vulnerable to predators. *D. hemipeza* is endemic to O‘ahu, occurring from diverse mesic to wet forest. Historically, *D. hemipeza* was found widely throughout both of O‘ahu’s mountain ranges, but its distribution has dramatically contracted. Like other members of the *planitibia* subgroup, it breeds in rotting bark of lobeliads, including *Cyanea* and *Lobelia*, but has also been reared from *Urera kaalae* (‘ōpuhe), an unusual host for this group.

DISTRIBUTION: *Drosophila hemipeza* was historically known from both the Ko‘olau and Wai‘anae ranges of O‘ahu, but primarily the latter. However, the only two Ko‘olau sites are at the opposite ends of the island (Pūpūkea and Pauoa Flats), suggesting it had a wide distribution there. In the Wai‘anae it was found widely, from Makaleha Valley, Mākaha Valley, ‘Ēkahanui, Kalua‘ā Gulch, and several sites in the vicinity of Pu‘u Palikea. Though always uncommon, the great majority of records are from Palikea, where it can still be regularly found. The only other known site today is Pu‘u Hāpapa, above Kalua‘ā Gulch, where it is very rare and has not been seen since 2015. Lab-reared flies have been released into the wild at ‘Ēkahanui in the Wai‘anae range and Mānoa Cliff in the Ko‘olau range, but it is not yet clear if they have established self-sustaining populations.

ABUNDANCE: Unknown. During nine years of ongoing monthly monitoring from 2013–2022, the O‘ahu Army Natural Resources Program (OANRP) found a low but relatively consistent population of this species at Palikea, and only rare individual observations at Hāpapa (OANRP, 2014). While this indicates at least one stable population, it is probably also small enough to be vulnerable to stochastic events like droughts.

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. *Drosophila hemipeza* is reported to breed in *Cyanea*, *Lobelia*, and *Urera*, which all occur at both present

sites. Since there is only one rearing record from each plant, it is unknown whether there is a preferred host; however, if there is it is likely to be for the lobeliads, which related species use exclusively. Both Palikea and Hāpapa are fenced to exclude feral ungulates and intensively managed for rare plants and snails, and habitat is generally improving at both sites.

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 hemipeza* specifically, management needs include:

- 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 the primary host plant and other habitat requirements.
- Establish laboratory breeding colonies for reintroduction to sites where the species has been extirpated.

MONITORING:

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

RESEARCH PRIORITIES:

- Survey for additional populations, in both historic and novel sites.
- Determine major threats and limiting factors.

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.

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.

Oahu Army Natural Resources Program. 2014. Status Report for the Makua and Oahu Implementation Plans. Pacific Cooperative Studies Unit, Honolulu.

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.