

Terrestrial Invertebrates

Picture wing *Drosophila*

Drosophila differens

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 differens* Hardy & Kaneshiro, 1975 is a member of the *planitibia* species group, which includes the largest, most charismatic, and beautiful of the native pomace flies. This group is distinctive by its extra crossvein in the wing in all except the Kaua'i representatives. Within the group, *D. differens* closely resembles the other species of the *planitibia* subgroup, *D. planitibia* of Maui and *D. heteroneura* and *D. silvestris* of Hawai'i. It differs from *D. planitibia* only in having the face yellow rather than black, but laboratory experiments have shown that hybrid male offspring are sterile. The species is endemic to Moloka'i, occurring in montane wet forest. Like other members of the *planitibia* subgroup, it breeds in rotting bark of lobeliads.

DISTRIBUTION: *Drosophila differens* was historically known from several upper elevation sites on Moloka'i, all within the Nature Conservancy's current Kamakou Preserve. Its true range is probably greater, but much of the area to the east is extremely difficult to access. There have been only two collections since 1977, one in 1983 and one in 1999. Surveys in 2005, 2007, and 2010 failed to recover it.

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. *Drosophila differens* is reported to breed in *Clermontia*, which continues to occur in the area it had been found, though it is relatively uncommon. However, the other lobeliad genera *Cyanea* and *Trematolobelia* also occur in the area, the latter abundantly in places, and it is likely that *D. differens* breeds in these as well.

THREATS:

- Habitat loss and degradation due to invasive plants and rats, disturbance by non-native ungulates.
- Non-native predators, including 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 differens* 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.

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.

Montgomery, SL 1975. Comparative breeding site ecology and the adaptive radiation of picture-winged *Drosophila* (Diptera: Drosophilidae) in Hawai'i. Proceedings of the Hawaiian Entomological Society 22(1):65-103.

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