



## Terrestrial Invertebrates

### Picture wing *Drosophila* *Drosophila neoclavisetae*

#### 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 neoclavisetae* Perreira & Kaneshiro, 1990 is a member of the *adiastola* species group. The species is endemic to West Maui, occurring in montane wet forest. It is part of a closely related complex of species including *D. clavisetae* of East Maui and *D. neogrimshawi* of O‘ahu which all have an extra crossvein in the wing, a convergent character with the *planitibia* species group. Among these, *D. neoclavisetae* is distinguished by its wing pattern and details of the setation. The breeding host of *D. neoclavisetae* is not known for certain, but almost all other members of the *adiastola* group, including close relatives, breed in rotting bark of lobeliads, primarily *Clermontia* and *Cyanea*.

**DISTRIBUTION:** *Drosophila neoclavisetae* was historically known from only two collections, from 1969 and 1975, at upper elevation sites on West Maui along the Pu‘u Kukui Trail. Surveys in the same area in 2007 and 2009 failed to recover it there. Its true range is probably greater, but much of the West Maui mountain region is extremely difficult to access.

**ABUNDANCE:** Unknown. The lack of any records for the past 50 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. The sampling effort in the area has been relatively low for detecting rare species.

**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. Like its close relatives, *D. neoclavisetae* probably primarily breeds in *Clermontia*, which continues to occur in the area where these flies have been found in moderate abundance. The other lobeliad genera *Cyanea* and *Trematolobelia* also occur relatively frequently in the area, and it is likely that *D. neoclavisetae* breeds in these as well. Overall the habitat at Pu‘u Kukui is largely intact, and the reasons for the absence of *D. neoclavisetae* are not clear.

#### 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 neoclavisetae* 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 critical 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, 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.

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.

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