

Terrestrial Invertebrates



Drosophila hexachaetae, sympatric sister species of *D. tarphytrichia*, nearly identical in appearance. Photo: Karl Magnacca.

Picture wing *Drosophila*

Drosophila tarphytrichia

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 tarphytrichia* Hardy, 1965 is one of the smallest members of the *picture wing* species groups of Hawaiian *Drosophila* pomace flies. The species is endemic to O'ahu, primarily in the Wai'anae range (there is only a single record from the eastern Ko'olau range, from 1949), 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 a member of the *lanaiensis* species subgroup, which consists of five species, all of which are rare. Uniquely among picture wing species, it is nearly identical to a sympatric sibling species, *D. hexachaetae* (pictured above), differing only in the front leg morphology of the male. These two species are strikingly different from their relatives, and superficially most closely resemble members of the *vesciseta* subgroup, which are also small with an unmarked thorax. All members of the subgroup breed primarily in decaying branches and trunks of *Charpentiera* spp. (pāpala), and usually secondarily in *Pisonia* spp. (pāpala kēpau). While the latter is still abundant even in disturbed areas, the former has declined significantly since the early 1970s when most specimens were collected.

DISTRIBUTION: Known mainly from the Waianae range of O'ahu, where it has historically been found at four sites in Honouliuli Forest Reserve: Kalua'ā, Pu'u Kaua (Ēkahanui), Mauna Kāpū, and Pu'u Palikea. The type specimen was from Mānoa Falls in the Ko'olau range, but there have been no other records from that side of the islands since that one in 1949. 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 1975. It is possible that the close similarity to *D. hexachaetae*, which is uncommon but not extremely rare, has led it to be undercounted when specimens are not collected - males can only be separated by examining the front legs with a high-powered lens or microscope, and females cannot be distinguished at all. However, with increased conservation concern for this species they have been checked regularly during recent surveys (2013–15), and all have been *D. hexachaetae*.

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 known host of *D. tarphytrichia* 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), but the long-term survival of the flies is unclear when *Charpentiera* is almost completely absent. Until the early 1970s the major gulches of Honouliuli, 'Ēkahanui and Kalua'ā, were dominated by large trees of *Charpentiera tomentosa*. However, an unexplained outbreak of the native tip-boring moth *Mapsidius charpentierii* resulted in the death of most of the large trees, followed by invasion by alien canopy trees. While *Charpentiera* persists in the area, since that time the moths have kept all trees very small, reducing the amount of breeding material available.

THREATS:

- Habitat loss and degradation due to invasive plants, excessive damage by native insects, disturbance by non-native ungulates, and fire from nearby agriculture, residential, and military 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 tarphytrichia* specifically, management needs include:

- Conduct surveys to determine distribution and abundance.
- Conduct studies on life history and critical 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 determine if restoration of *Charpentiera* is possible or feasible.

References:

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