

## Terrestrial Invertebrates



*Drosophila montgomeryi*, courtship dance. Photo: Karl Magnacca.

### Picture wing *Drosophila* *Drosophila montgomeryi*

#### 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 montgomeryi* Hardy & Kaneshiro, 1971 is a member of the *vesciseta* species subgroup, which contains seven species of relatively uniform appearance – mostly yellow-brown, with few dark markings, and a similar pattern on the wings. They are among the smallest of the picture wings, and some individuals may even be smaller than non-picture wings. Each island has one species that breeds on *Pisonia* spp. (pāpala kēpau) and one on *Urera* spp. (‘ōpuhe), except that there is no *Pisonia* breeder on Kaua‘i. The two groups appear similar, but the *Urera* breeding species can all be readily distinguished by having the median anterior mark on the wing longer than wide, rather than square. Other details of the coloration and male leg hairs, involved in courtship, serve to separate the species, all of which are rare except for the O‘ahu *Pisonia* breeder *D. ambochila*. *Drosophila montgomeryi* is endemic to O‘ahu, occurring in diverse mesic forest where it breeds in *Urera*.

**DISTRIBUTION:** *Drosophila montgomeryi* was historically known mainly from the Wai‘anae range of O‘ahu, where it was recorded from three sites: Alaiheihe, Kalua‘ā, and ‘Ēkahanui, with the majority coming from the last. There is a single historic record from the southeastern Ko‘olau range, but it has not been adequately surveyed for there. Since 2009, it has been found at a total of 10 sites in five populations, from Wai‘anae Valley, Schofield Barracks, Kalua‘ā and Hāpapa, Pualī‘i, and Pu‘u Palikea.

**ABUNDANCE:** This species is still found in nearly its full historic range as well as some additional sites. However, it is apparently no longer found at ‘Ēkahanui, where it was historically most abundant. While the Kalua‘ā/Hāpapa and Wai‘anae populations consist of multiple sites with moderate numbers of flies and host plants, the other three sites have only small and ephemeral populations, with relatively few host plants available. Two years of ongoing monthly monitoring from 2013–2014 by the O‘ahu Army Natural Resources Program (OANRP) found a strong seasonal pattern to *D. montgomeryi* abundance at Kalua‘ā and Hāpapa, with high numbers from February through June and dropping to near zero between August and November (OANRP, 2014). These observations, and the restricted distribution of *Urera*, suggest that it is primarily limited by the abundance of host plants.

**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 montgomeryi* is reported to breed in *Urera kaalae*, and is presumed to breed in *U. glabra* since it occurs at sites where only that species is present. *Urera glabra* is still found at many sites and is

long-lived and resilient, but suffers from low recruitment and few young plants are seen outside of heavily managed areas. Because broken branches root easily, many apparent individuals in a patch may actually be clones; since it is dioecious, this may result in all plants in the area being one sex. On the other hand, *U. kaalae* is a relatively short-lived tree and has undergone a catastrophic decline over the past 40 years, with only a handful of wild plants remaining. Seedlings are especially vulnerable to slug predation. The loss of *U. kaalae* as a significant breeding host is probably responsible for the absence of *D. montgomeryi* from 'Ēkahanui, where both were formerly abundant. Palikea and Kalua'ā/Hāpapa are fenced to exclude feral ungulates and intensively managed for rare plants and snails, and habitat is generally improving at both sites. The Wai'anae sites cannot be fenced due to the likelihood of damage from falling rocks, which can also directly damage the host plants.

#### **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*).

**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 montgomeryi* specifically, management needs include:

- Continue and expand fencing to protect habitat from ungulate disturbance.
- Outplant *Urera* spp. in protected areas to increase available breeding habitat, with the goal of creating self-sustaining populations of plants.
- 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, particularly limits on *Urera* reproduction.

#### **References:**

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