



Terrestrial Invertebrates

Pomace flies
Order Diptera
Family Drosophilidae

Genera with endemic species
Drosophila: >500 spp.
Scaptomyza: >150 spp.

GENERAL INFORMATION: The Hawaiian Drosophilidae are perhaps the best-known native flies because of the scientific interest in the group's genetics and adaptive radiations. About a quarter of the world's known species of Drosophilidae are endemic to Hawai'i. Although well-separated in the rest of the world, *Scaptomyza* is the sister group to the Hawaiian *Drosophila* clade and the Hawaiian endemic subgenera are often difficult to unambiguously separate from *Drosophila*. Thus they are often treated as a single group, although it is unclear if they are derived from one or two introductions to Hawai'i. Unusually among Hawaiian taxa, *Scaptomyza* dispersed out of Hawai'i multiple times, and all non-Hawaiian groups are derived from Hawaiian ancestors. About 500 species of *Drosophila* and 150 species of *Scaptomyza* are described, hundreds more are known but not yet described, and many more await discovery. The total estimate of this group of flies is likely to be 800–1,000 species, the largest radiation of endemic species in Hawai'i. The large, conspicuous members of the Hawaiian *picture wing* species group are the most famous but represent only about 120 species.

DISTRIBUTION: Native drosophilids are known from all the Main Hawaiian Islands except Kaho'olawe and Ni'ihau.

ABUNDANCE: Unknown. A lack of systematic surveys prevents any population estimate for most species. However, the loss of native habitats likely means that many species within the family are declining. Many of the *picture wing* species can be surveyed non-lethally with fermented baits and because they can be identified by wing pattern, but most other species either are not attracted to baits, can only be identified with a microscope, or both. Members of the *modified mouthparts* species group and most *Scaptomyza* tend to be cryptic and are rarely collected except by rearing from their host material. Fourteen species of picture-wing *Drosophila* are listed as endangered, and many more are equally rare.

LOCATION AND CONDITION OF KEY HABITAT: Pomace flies occur mainly in wet to mesic forest, and breed in rotting plant material. A few species reach into subalpine areas or dry forest. Nearly all species are highly specific to one or a few host plants. The species groups of *Drosophila* are mainly divided based on host plant substrate: bark, leaves, and fungus. *Scaptomyza* often use more ephemeral substrates such as rotting flowers, and some utilize unusual breeding habitats such as decaying silversword seeds and the sticky resin of *Pisonia* seed pods. One group, subgenus *Titanochaeta*, are predators on spider eggs. The hosts of many species are unknown.

THREATS:

- Habitat loss and degradation. Habitat is lost to conversion for agriculture, logging, and grazing, and is disturbed by a suite of non-native ungulates and the introduction of invasive plants.
- Predators and parasitoids. Non-native species, including ants and wasps, prey on these flies.
- Competition. Non-native detritivores and herbivores, such as ambrosia beetles, crane flies, and isopods, use the same host substrates and can alter the environment making it unsuitable for breeding.
- Lack of data. Insufficient information, especially for rare species, hampers conservation efforts.

CONSERVATION ACTIONS: The goals of conservation actions are not only to protect current populations and key breeding habitats but also to establish additional populations, thereby reducing the risk of extinction. In addition to common statewide and island conservation actions, specific management directed toward pomace flies should include the following:

- Conduct surveys to determine the distribution and abundance of known species and to document and identify new species.
- Preserve, maintain, and restore habitats supporting existing populations.
- Initiate studies on life history, distribution, and critical habitats to better direct conservation measures.

MONITORING: Continue surveys to monitor the status of known populations in order to assess their stability and trends.

RESEARCH PRIORITIES:

- Survey for additional, new populations.
- Survey to determine the status of species believed to be extinct.
- Conduct studies to document the biology, habitat requirements, and life history of poorly known native species.
- Conduct and support systematic and taxonomic assessments of poorly known and understudied taxa. Review and revise genera in need of taxonomic scrutiny. Work to identify and describe new species to science.

References:

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