



Campsicnemus penicillatus. Photo: Karl Magnacca.

Terrestrial Invertebrates

True flies
Order Diptera

ORDER INCLUDES:
26 Native Families
77 Native Genera
1,500+ Native Species
1,500+ Endemic Species

GENERAL INFORMATION: All flies, except wingless species, have two pairs of wings; one pair is functional, the other (known as halteres) is highly modified. Because of their importance in genetic research, Dipterans are well-studied. The initial founders of Hawaiian populations are believed to have reached the islands on birds or by being caught in wind currents. Numerous adaptive shifts and unusual evolutionary developments characterize the species found in Hawai‘i, making the Hawaiian fauna globally significant. These include the freshwater canacids *Procanace* and the enigmatic coastal asteiid *Bryania bipunctata*. The most speciose genera include *Campsicnemus*, *Drosophila*, *Scaptomyza*, *Tylparua*, and *Lispocephala*. Species in the genus *Drosophila* are perhaps the best-known native dipterans 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.

DISTRIBUTION: Native flies are known from all the Main Hawaiian Islands and many of the Northwestern Hawaiian Islands.

ABUNDANCE: Unknown. A lack of systematic surveys prevents any population estimate. However, the loss of native habitats likely means that species within the order are declining.

LOCATION AND CONDITION OF KEY HABITAT: Flies occur in a variety of freshwater and terrestrial habitats.

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.
- Predation. Non-native species, including ants, wasps, crustaceans, and fish prey on flies.
- 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 flies should include the following:

- Conduct surveys to determine the distribution and abundance of known fly 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.

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