



Procanace acuminata. Photo: Hawaii Biological Survey.

Terrestrial Invertebrates

Beach flies

Procanace (Diptera: Canacidae)

Genus Includes:

10 Species

9 Endemic Species

1 Introduced Species

GENERAL INFORMATION: Canacidae, or beach flies, is a relatively small family of acalyptrate Diptera found throughout coastal regions of the World. The genus *Procanace* contains nine species in Hawai'i, eight of which are endemic. These species can be found in a range of habitats, from the coastal aquatic environments to high-elevation freshwater streams (Hardy and Delfinado 1980; O'Grady and Pak 2015). The endemic Hawaiian *Procanace* are notable within the genus and the family for their adaptation to freshwater, rather than saltwater, habitats.

DISTRIBUTION: Species are found on the Main and several Northwestern Hawaiian Islands (MHI and NWHI) (Hardy and Delfinado 1980; O'Grady and Pak 2015). Endemic members of the genus *Procanace* are found in freshwater stream habitats throughout the islands. Hawai'i is the only place on earth where canacid flies have successfully colonized freshwater habitats. The Alaka'i Swamp region of Kaua'i, where five of the eight endemic species can be found, is especially diverse.

ABUNDANCE: Largely unknown for individual species. Some taxa are locally abundant and can be observed in the hundreds of individuals while others are infrequently observed and known from only a few museum specimens. Seasonal abundance may vary with flow rate and water availability.

LOCATION AND CONDITION OF KEY HABITAT: Species in this genus are found in association with coastal strand and freshwater stream habitats throughout the MHI and NWHI.

THREATS:

- Water scarcity. Extended periods of drought or human-made water diversions can threaten critical habitat by eliminating native stream ecosystems.
- Invasive species. These can have a negative impact either as predators or habitat competitors (Englund 2002; Englund and Polhemus 2002).

CONSERVATION ACTIONS: Specific management directed toward beach flies should include the following:

- Protect existing habitats in freshwater stream systems.
- Conduct surveys to determine distribution and abundance of known species and to document and identify new species.

MONITORING: Aquatic insects have been extensively used as indicators of water quality in freshwater streams and lakes (Rosenberg et al. 2008). The fauna of the Hawaiian islands has a reduced number of these indicator species because of the remote location of the archipelago and the difficulty of colonization for many freshwater aquatic groups. Native Hawaiian damselflies (*Megalagrion* spp.) have been used as bioindicators (Englund 2001; Englund et al. 2007) but populations of these species are small, difficult to monitor, and are subject to conservation action. Developing native Diptera (Canacidae, Ephydriidae, and Chironomidae) as bioindicators will provide a new management tool for native Hawaiian aquatic ecosystems and will lead to more secure sources of fresh water. Monitoring actions should thus include the following: establish new monitoring for species that are not currently monitored.

RESEARCH PRIORITIES: Link distribution and abundance data for *Procanace* with measures of water quality to create a model for aquatic ecosystem monitoring in Hawaii.

References:

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