



Eupithecia sp. Photo: W. Haines.

Terrestrial Invertebrates

Moths and Butterflies Order Lepidoptera

ORDER INCLUDES:
23 Native Families
66 Native Genera
>1013 Native Species
>1010 Endemic Species

GENERAL INFORMATION: The beauty and popularity of many species of butterflies and moths makes Lepidoptera perhaps the best known insect order. Hawai‘i supports over 1013 described native species of moths, but only two native butterfly species: Blackburn’s blue (*Udara blackburni*; Lycaenidae), and Kamehameha butterfly (*Vanessa tameamea*; Nymphalidae). The latter is Hawai‘i’s state insect. This disparity in numbers is likely the result of the fact that many moths are generalists, while most butterflies are dependent on specific host plants, making it unlikely that they would establish in the islands unless their host plant was already here. Most native moths are very small, with most only having a wingspan of one centimeter (0.4 inches) or less, and most are poorly known. Approximately 363 species of native moths are in the genus *Hypsmocoma*, and many more are likely undescribed. *Hypsmocoma* is the second most diverse animal lineage in Hawai‘i (after flies in the family Drosophilidae). These moths inhabit a wide range of habitats, although some species are restricted to single stream or river drainages. As a genus they are mostly herbivorous, feeding on plant debris and lichens, though some species are carnivorous, feeding on snails. Less than one percent of the world’s known moths and butterflies are predaceous, but in Hawai‘i, predaceous behavior has evolved independently in two lineages (*Hypsmocoma* and *Eupithecia*).

DISTRIBUTION: Lepidopterans are known from all the MHI and the NWHI.

ABUNDANCE: As a group unknown. A lack of systematic surveys prevents accurate population estimates. However, the loss of native habitats likely means that species within the order are declining. Recent surveys and reviews of museum specimens estimated that about a third of native Lepidopterans have not been collected in over 50 years and are likely extinct.

LOCATION AND CONDITION OF KEY HABITAT: Butterflies and moths occur in all native habitats from sea level to alpine deserts. Host material is widely varied and includes native plants, lichens, algae, and fungi. Some species feed only in the decaying wood of particular plant species.

THREATS:

- Habitat loss and degradation due to conversion for agriculture, logging, grazing, and soil disturbance by a suite of non-native ungulates, and the introduction of invasive plants.

- Loss of obligate native host plants.
- Insufficient information, especially for rare species, hampers conservation efforts.
- Predation by non-native species, such as ants (Formicidae), especially the big-headed ant (*Pheidole megacephala*), and social wasps (Vespidae), especially *Vespula* spp.
- Parasitism by non-native flies (Diptera) and wasps (Hymenoptera).

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 moths and butterflies should include:

- Improve commercial shipment inspections to prevent further introduction of alien invertebrates harmful to native species.
- Initiate studies on life history, distribution, and critical habitats to better direct conservation measures.
- Conduct surveys to determine the distribution and abundance of known moths and butterflies and to document and identify new species.
- Preserve, maintain, and restore habitats supporting existing populations.

MONITORING:

- Support and expand existing monitoring efforts.
- Establish new monitoring for priority species that are not currently monitored.

RESEARCH PRIORITIES:

- Initiate targeted searches for species not recently collected or observed.
- Initiate studies to determine species' distributions to locate areas supporting large numbers of native species.
- Initiate efforts to locate and identify new species to science.
- Systematic review of the order.
- Conduct studies to document the biology, habitat requirements, and life history of native species.

References:

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