



Photo: Bill Mull; *Theridion grallator* or Happy-face spider

Terrestrial Invertebrates

Spiders Order Araneae

ORDER INCLUDES:

Kaua'i Cave Wolf Spider, Federally Endangered
16 Native Families
36+ Native Genera
132+ Native Species
128+ Endemic Species

GENERAL INFORMATION: Spiders have four pairs of legs and no antennae, and they are predaceous. Worldwide there are over 75,000 species. Hawai'i has at least 132 native species which are believed to have originated from 34 founder species. Most Hawaiian spiders are believed to have dispersed to Hawai'i by ballooning, a method of travel where a spider is carried by the wind on a strand of web. Eighty percent of the known Hawaiian native spider species belong to ten genera in seven families: *Cyclosa* (Araneidae), *Orsonwelles* (Linyphiidae), *Pagiopalus* and *Pedinopistha* (Philodromidae), *Havaika* (Salticidae), *Tetragnatha* (Tetragnathidae), *Argyrodes* and *Theridion* (Theridiidae), and *Mecaphesa* and *Misumenops* (Thomisidae). However, many more species remain to be described, particularly in the genera *Tetragnatha* and *Argyrodes*, and perhaps also in *Cyclosa*, *Havaika*, and *Theridion*. Common and widespread native species include *Tetragnatha quasimodo*, *Misumenops anguliventris*, *M. facundus*, and *Pagiopalus* spp. The happy-face spider (pictured above) also is a well-known species that comes in a variety of color morphs. This variation may have evolved to reduce predation by preventing birds from establishing a reliable search image. Like many invertebrates found in Hawai'i, some taxa of spiders have undergone extensive adaptive radiations. For example, the 50 or so species in the genus *Tetragnatha* (long-jawed spiders), occur on all of the MHI and are found in most habitats. The constituent species encompasses a huge spectrum of colors, shapes, sizes, ecological affinities, and behaviors. They reach their highest diversity in montane wet and mesic forests, dry forests, high and low shrublands and scrub. There are likely many species yet to be discovered in this genus. Due to the fact that most species are nocturnal, Hawaiian native spiders remain poorly known.

DISTRIBUTION: Spiders are known from all of the MHI.

ABUNDANCE: As a group unknown. A lack of systematic surveys hampers population estimates. However, the loss of native habitats likely means that species within the order are declining. Of the known species, *Adelocosa anops* (limited to a single cave on Kaua'i) and *Doryonychus raptor* (largely restricted to low elevation habitats on Kaua'i) appear to be the most threatened.

LOCATION AND CONDITION OF KEY HABITAT: Spiders occur in all habitats in Hawai'i including caves, lava flows, forests, and shrublands. Key habitat requirements are poorly known.

THREATS:

- Predation by invasive, non-native species, especially social insects such as ants and wasps, and perhaps also other spiders.
- Loss or degradation of habitat. *Adelocosa anops* (Lycosidae) is known from a single cave on Kaua'i that is threatened by development.
- Insufficient information for species assessments.

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 spiders should include:

- Forest restoration. Spider populations have responded positively to reforestation efforts at Auwahi on East Maui.
- Control of invasive non-native invertebrates.
- Conduct surveys to determine the distribution and abundance of known spiders and to document and identify new species.
- Preserve, maintain, and restore habitats supporting existing populations.

MONITORING:

- Monitor known populations to assess trends in abundance.

RESEARCH PRIORITIES:

- Conduct systematic and taxonomic assessments of poorly known taxa, including radiations from the following families and genera: Lycosidae, Theridiidae (*Argyroides* and *Theridion*), Araneidae (*Cyclosa*), Linyphiidae, Philodromidae, Oonopidae, Salticidae (*Havaika*), Thomisidae, Tetragnathidae (*Tetragnatha*).
- Conduct studies to document the biology, habitat requirements, and life history of native species.

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