



Photo: Gordon Smith, USFWS

## Terrestrial Invertebrates

**Kaua'i Cave Arthropods**  
*Adelocosa anops*  
(Kaua'i Cave Wolf Spider)

*Spelaeorchestia koloana*  
(Kaua'i Cave Amphipod)

### **SPECIES STATUS:**

Federally listed as Endangered

State listed as Endangered

NatureServe Heritage Rank G1 - Critically imperiled

Draft Recovery Plan for the Kaua'i Cave Arthropods: the Kaua'i Cave Wolf Spider (*Adelocosa anops*) and the Kaua'i Cave Amphipod (*Spelaeorchestia koloana*) – USFWS 2004

Final Rule: Designation of Critical Habitat for the Kaua'i Cave Wolf Spider and Kaua'i Cave Amphipod Critical Habitat – USFWS 2003

**SPECIES INFORMATION:** Both the Kaua'i cave wolf spider and the Kaua'i cave amphipod were discovered in 1971, and both are known from less than a dozen caves on the island of Kaua'i. Although a few wolf spider species (order Araneae, family Lycosidae) have reduced eyes, the Kaua'i cave wolf spider has completely lost all vestiges of eyes; this trait justifies the species placement in the monotypic genus *Adelocosa*. Adult spiders are between 12 and 19 millimeters (0.5 to 0.75 inches) in length and are overall reddish brown in color. The species' life history is poorly known. Like all spiders, the Kaua'i cave wolf spider is a predator and actively stalks its prey using its sense of touch or chemoreceptors. The species likely feeds on the Kaua'i cave amphipod and non-native arthropods. Unlike other wolf spiders, the fecundity of the Kaua'i cave wolf spider is low.

Compared to other terrestrial amphipods (order Amphipoda, family Talitridae), the Kaua'i cave amphipod has unusual morphological attributes which justifies its placement in the monotypic genus *Spelaeorchestia*. Like the Kaua'i cave wolf spider, the Kaua'i cave amphipod is blind, although it does possess eyes. Adults are seven to ten millimeters (0.25 to 0.4 inches) in length and have a translucent appearance. The species is a detritivore and has been observed feeding on rotting roots, plant material washed into the caves, and frass (i.e., arthropod fecal material). Little is definitively known about the species' life history.

**DISTRIBUTION:** Found only on Kaua'i. Both are restricted to caves found in a 10.5 square kilometer (four square mile) lava flow. The Kaua'i cave wolf spider has been documented in six caves, but only regularly observed in one. The Kaua'i cave amphipod has been documented in nine caves, but only regularly observed in two. The amphipod also occurs in a limestone cave formed on top of the lava flow.

**ABUNDANCE:** Unknown. Currently, no survey methods exist to accurately estimate the population of either species. However, counts have never documented more than 30 spiders or 80 amphipods.

**LOCATION AND CONDITION OF KEY HABITAT:** Caves in a single exposed lava flow in the Koloa Basin with very rocky to extremely rocky soils, and free from erosional sediments. Both species are restricted to dark, moist areas of larger caverns and smaller subterranean spaces. The latter may be the primary habitat for both the spider and amphipod. Both species appear to require very high humidity.

**THREATS:**

- All the land supporting these species is privately owned. Activities associated with development and agriculture (e.g., removal of native vegetation, filling, and grading) degrade the delicate environments supporting the Kaua‘i cave wolf spider and Kaua‘i cave amphipod. Removal of vegetation results in a reduction of organic material that the amphipod feeds on and affects the humidity levels in the caves. Filling and grading increase the rate at which sediments fill the caves.
- Non-native competitors and predators.
- Droughts could alter the high-humidity environment that is required by the species and that also limits the establishment of non-native cave fauna.
- Human disturbance or visitation to the caves and the use of pesticides are serious threats to both species.

**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. Both species were listed as endangered in 2000. In 2003, the USFWS designated 106 hectares (272 acres) as critical habitat for both species. In addition to common statewide and island conservation actions, specific management directed toward Kaua‘i cave arthropods should include:

- Protect habitat from further loss or degradation, including above-cave habitats.
- Habitat enhancement or restoration including outplanting with native species to stabilize cave environments and increase food resources for cave fauna.
- Prevent the establishment of additional non-native invertebrate species and control existing non-native species that potentially limit cave arthropod populations.
- Conduct public outreach to increase public understanding of and support for both species.

**MONITORING:**

- Continue monitoring the status of known populations to better understand the abundance and distribution of both species.

**RESEARCH PRIORITIES:**

- Develop methods to survey populations that are accurate and minimize damage to fragile cave environments.
- Conduct surveys or initiate studies to determine local population sizes and movements of individuals.
- Identify additional populations of both species.

- Conduct studies to determine the most appropriate plants to restore above-cave habitats.
- Conduct studies to determine the factors that regulate cave humidity levels and how variation in humidity affects both species.
- Assess the feasibility of translocating individuals to suitable, but unoccupied caves.

**References:**

U.S. Fish and Wildlife Service. 2003. Final Rule: designation of Critical Habitat for the Kauai cave wolf spider and Kauai cave amphipod. Federal Register 68(68): 17430–17470.

U.S. Fish and Wildlife Service. 2004. Draft recovery plan for the Kaua‘i cave arthropods: the Kaua‘i cave wolf spider (*Adelocosa anops*) and the Kaua‘i cave amphipod (*Spelaeorchestia koloana*). Portland, (OR): U.S. Fish and Wildlife Service. 55 pp.