# **SPECIES FACT SHEET**

#### <u>Common Name</u>: Malheur Pseudoscorpion <u>Scientific Name</u>: *Apochthonius malheuri* Benedict and Malcolm 1973

Phylum: Chelicerata Class: Arachnida Order: Pseudoscorpiones Family: Chthoniidae

Type Locality: OREGON, Harney County, Malheur Cave, 13 miles southeast of Princeton. Elevation 4,000 feet.

#### OR/WA BLM and FS Region 6 Units where Suspected or Documented: BLM: Andrews Resource Area.

BLM: Andrews Resource Area. Burns District.

#### **Description**:

Moderately large (male 1.66-1.90 mm, female unknown) two-eyed cavernous species; derm of adults mostly reticulate throughout; carapace, chelicerae, and palps very pale red, abdomen pale tan, legs almost translucent.

## Life History:

Adults of *Apochthonius malheuri* were collected in August, deutonymphs and adults in September, and three nymphal stages and adults in late October. All specimens were collected 700-1,000 feet from the cave entrance. Obligatory cavernicoles (troglobites) usually complete their entire life cycle within a cave and do not occur in ecologically suitable habitats outside of caves (Barr 1960, 1963, 1968). This appears to be true of *Apochthonius malheuri* which has never been found in epigean habitats. Individuals of closely related species live for as long as five years.

Food: Most Pseudoscorpions are predators and are known to feed on insects, mites, and other small invertebrates. Although food habits are not reported specifically for this species, they probably are similar.

Phenology: Possibly present all year but collections have only been made in the summer and early fall, so conclusions are limited.



Habitus of adult Apochthonius malheuri Benedict and Malcolm 1973.

## Range, Distribution, and Abundance:

*Apochthonius malheuri* appears in low frequency, at least during August through October. Malheur Cave is in the relatively xeric Northern Great Basin of Oregon, but the cave itself is moderate in temperature, fairly humid and dark. The habitats inside the cave are mesic.

Collected only from Malheur Care, Harney County, Oregon. Several other caves have been examined but the species was not found. Species may still be present in Malheur Cave.

Collected from Malheur Cave only. Males and immatures collected. Females not known. Cave is 13 miles southeast of New Princeton, Oregon (SE <sup>1</sup>/<sub>4</sub> Sec18 T27S R36E) (Benedict and Malcolm 1973). Limited collections. Population status not known. Last survey reported in 1995 (Benedict and McEvoy). Only one adult and one nymph were observed and the authors suggested that assessing the status of the population would have been difficult from the information they collected. Individuals exist in low numbers.

## <u>Habitat Associations</u>:

Known only from Malheur Cave, Oregon. In the cave they were found under the surfaces of flat rocks, and in well-rotted wood chips and debris lodged in cool damp cracks and crevices of the cave floor between 213-300 meters inside the cave, in the twilight zone of the cave (Benedict and Malcolm 1973). The wood chips supported a rich fungal growth and numerous mites, springtails, spiders, and other invertebrates.

## <u>Threats</u>:

The most significant threat for cavern wildlife can be disturbance and alteration of the habitat. Human visitation from tourism to spelunking can alter temperature, disturb hibernating bats, and introduce pollutants. Closure of entrances or further opening of a cave can affect wildlife use and the air circulation patterns and air temperatures. Vandalism or intentional destruction has been noted at Malheur Cave as well. Other threats include pollution or depletion of aquatic systems that maintain the humidity of the cave environment.

Loss of above ground vegetation can lead to increased erosion and water runoff. Polluted runoff washes into waterways, which drain into underground areas, affecting both the cave environment and the creatures that live within it.

The most inappropriate activities with the highest impact are those that destroy or alter cave resources, such as: acts of vandalism, graffiti and spray painting, dumping garbage or litter, removal or damage of cave resources, or other such destructive behaviors or activities. Conversion of sagebrush to agricultural production of grasses and alfalfa in the vicinity of Malhuer Cave could be a threat to the Malheur scorpion (Bebedict and McEvoy 1995). The drawdown of ground water is another potential threat, possibly altering the microhabitats within the cave. Pesticide drift from nearby cultivated fields and other chemical contamination could have deleterious impacts on this species.

## **Conservation Considerations**:

- (1) Tread slowly and softly at all times. Take care where you place your hands and feet.
- (2) Be aware of sensitive features, including fauna and their habitats. Walk carefully around waterways, tree roots, sediment banks and organic deposits (leaf litter, wood, dead animals). Look but don't disturb spider webs and other nests.
- (3) Protect water quality in the area.
- (4) Maintaining the natural surface vegetation is vital to the survival of cave ecosystems.

#### **ATTACHMENTS:**

- (1) Map of Range and Distribution
- (2) BLM Distribution Maps
- (3) Digital Images (CD)
- (4) List of Pertinent References/Literature
- (5) Original Published Description with Key to Identification of the Species

Benedict, E. M., and D.R. Malcolm. 1973. A new cavernicolous species of Apochthonius (Chelonethida: Chthoniidae) from the western United States with special reference to troglobitic tendencies in the genus. Transactions of the American Microscopical Society 92(4)620-628.

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Distribution Map of Apochthonius malheuri Benedict and Malcolm 1973.

# **BLM Distribution Maps**



BLM Resource Areas in Oregon where Apochthonius malheuri Benedict and Malcolm has been found.



BLM Districts in Oregon where Apochthonius malheuri Benedict and Malcolm has been found.

**Digital Images on CD** 



Apochthonius malheuri Benedict and Malcolm adult Drawing from Benedict and Malcolm 1973.



Apochthonius malheuri Benedict and Malcolm taxonomy Drawing from Benedict and Malcolm 1973.

#### References

Barr, T.C. 1960. Speciation and raciation in cavernicoles. American Midland Naturalist 64:1-9.

Barr, T.C. 1963. Ecological classification of cavernicoles. Cave Notes 5(2):9-12.

Barr, T.C. 1968. Cave ecology and the evolution of troglobites. Pages 35-102 *in* Dobzhansky, T., M.K. Hecht, and W.C. Steere (eds.). Evolutionary Biology Volume 2. Appleton-Century Crofts, New York.

Benedict, E.M. 1979. A new species of apochthonius Chamberlin from Oregon (Pseudoscorpionida, Chthoniidae). Journal of Arachnology 7(1):79-83.

Benedict, E. M. and D.R. Malcolm. 1973. A new cavernicolous species of Apochthonius (Chelonethida: Chthoniidae) from the western United States with special reference to troglobitic tendencies in the genus. Transactions of the American Microscopical Society 92(4)620-628.

Benedict, E. M. and E.G. McEvoy. 1995. Malheur Cave Status Survey. The Distribution, Habitat, and Status of the Malheur Isopod *Amerigoniscus malheurensis* Schultz and the Malheur Scorpion *Apochthonius malheuri* Benedict and Malcolm with notes on Special Species. Final Report. Submitted to the Heritage Program of the Nature Conservancy, Portland, Oregon.

Muchmore, W.B. 1994. Some pseudoscorpions (Arachnida: Pseudoscorpionida) from caves in Ohio and Indiana, U.S.A. Transactions of the American Microscopical Society 113(3): 316-324

Muchmore, W.B. 1980. A new cavernicolous Apochthonius from California (Pseudoscorpionida, Chthoniidae). Journal of Arachnology 8 (1): 93-95.

U.S. Fish and Wildlife Service. 1989. Endangered and threatened wildlife and plants; animal notice of review. Federal Register, Department of the Interior. 54(4):554-579.

## **Technical Description:**

Holotype is deposited in the American Museum of Natural History, New York, NY.

**Male:** Carapace markedly narrow posteriorly, anterior margin minutely denticulate dorsal to chelicerae, small dentate epistomal process; derm reticulate laterally, smooth dorsally; one pair very small and weakly corneate eyes, 2 ocular diameters from anterior carapacal margin; chaetotaxy m8m-4, setae of anterior margin shorter than femur width.

Abdomen with tergal and sternal scuta entire; pleural membrane minutely spinose; genital area (see figures). Chaetotaxy (see Benedict and Malcolm 1973). At least one pair of enlarged areoles on each of tergites VIII, IX, X, and sternites IX, X, XI indicating semitactile setae.

Coxae with elongate, non-setose apical process and with three acute, "seta-like" coxal spines, each arising from oblique hillock or ridge with heavily sclerotized anterior projection approximately one-third length of "seta"; intercoxal tubercle lacking.

Chelicera robust; fine scale-like hispid tuberacles medially and laterally on hand; galea angular elevation; serrula exterior of about 20 blades; serrula interior with number of blades indeterminable; flagellum of 7-8 unilaterally pinnate setae; fixed finger with about 14 small acute teeth decreasing in size basally; movable finger with a single distal tooth separated from about nine nearly equally-spaced teeth decreasing in size basally; hand with *is, es, sb, b,* and 3-4 accessory setae (total of 7-8).

Palp similar to epigean species but more slender, vestitural setae simple acuminate. Papal proportions: trochanter 2.0, femur 5.6, and tibia 1.7 times as long as broad; chela 5.6-5.9 times as long as deep; fingers 1.9 times as long as hand. Both fingers with occasional longer, wider teeth interspersed between majority of teeth; fixed finger with 81-86 teeth, tall quadrangular distally, gradually becoming triangular medially, and lower basally, merging into acute serrations; movable finger with 72-75 teeth, distally tall quadrangular, gradually more rounded and lower near finger base.

Measurements: Body length 1.66-1.90 mm; abdominal breadth 0.41-0.51 mm; carapace length 0.47-0.52 mm; ocular breadth 0.41-0.46 mm; posterior breadth 0.31-0.32 mm; eye diameter 0.026 mm, Chelicera 0.44-0.47 mm long by 0.23-0.26 mm broad. Palp: trochanter 0.23-0.26 mm by 0.12-0.13 mm; femur 0.58-0.69 mm by 0.11-0.13 mm; tibia 0.31 by 0.14-0.16 mm; chela 0.91-1.05 mm by 0.16-0.18 mm deep; hand 0.29-0.36 mm long; fingers 0.62-0.68 mm long. Leg I: basifemur 0.35 by 0.07 mm; telofemur 0.17 by 0.07 mm; tibia 0.23 by 0.06 mm; miotarsus

0.38 by 0.05 mm. Leg IV: miofemur 0.53 by 0.20 mm; tibia 0.42 by 0.09 mm; metatarsus 0.19 by 0.07 mm; telotarsus 0.35 by 0.05 mm.



Figures 2-6. Apochthonius malheuri Benedict and Malcolm 1973. Figure 2. External aspect of right chela. Figure 3. Male genital area showing chaetotaxy. Figure 4. Coxal spine series from coxa I.

Figure 5. First medial spine from left coxa I. Figure 6. Epistomal area.

This species can be distinguished from other western species of *Apochthonius* by its larger body size, reduced eyes, slightly attenuate appendages, and tendency toward pale and lightly scleritized derm.

**Tritonymph:** Similar to adult, paler and smaller. Body length 1.10 mm; abdominal breadth 0.33 mm; carapace length 0.38 mm; ocular breadth 0.34 mm; posterior breadth 0.27 mm; eye diameter 0.015 mm; chelicera 0.32 mm long by 0.16 broad; palp femur 0.40 mm by 0.09 mm; tibia 0.18 mm by 0.11 mm; hand 0.23 mm long; fingers 0.40 mm long.

**Deutonymph:** Similar to adult, much smaller, derm less scleritized. Body length 1.02 mm; abdominal breadth 0.36 mm; carapace 0.33 mm; ocular breadth 0.32 mm; posterior breadth 0.26 mm; eye diameter 0.015 mm; chelicera 0.23 mm long; palp trochanter 0.15 mm by 0.10 mm; femur 0.33 mm by 0.09 mm; tibia 0.16 mm by 0.10 mm; chela 0.52 mm by 0.11 mm; hand 0.16 mm long; fingers 0.36 mm long. **Protonymph:** Similar to adult, very much smaller, derm only faintly reticulate, almost white except for pale reddish-tan chelae and chelicerae. Body length 0.77 mm; carapace length 0.24 mm; papal femur length 0.20 mm; chela length 0.33 mm. The protonymph lacks coxal spines.

The nymphal stages of this species follow the typical progressive increase in the number of tactile setae found on the chela, and an increase in the number of coxal spines and quantity of vestitural setae on the abdomen, coxae, and chelicerae.

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