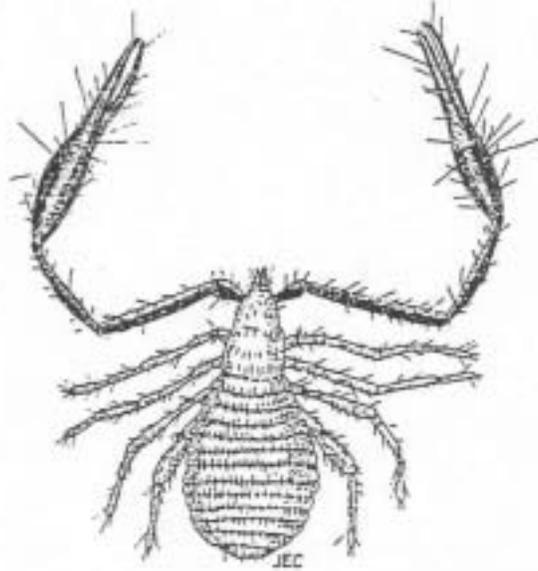


***Conservation Assessment
for
Dry Fork Valley Cave Pseudoscorpion
(Apochthonius paucispinosus)***



(Franz and Slifer, 1971)

USDA Forest Service, Eastern Region
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This Conservation Assessment was prepared to compile the published and unpublished information on Apochthonius paucispinosus. It does not represent a management decision by the U.S. Forest Service. Though the best scientific information available was used and subject experts were consulted in preparation of this document, it is expected that new information will arise. In the spirit of continuous learning and adaptive management, if you have information that will assist in conserving the subject community and associated taxa, please contact the Eastern Region of the Forest Service Threatened and Endangered Species Program at 310 Wisconsin Avenue, Milwaukee, Wisconsin 53203.

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EXECUTIVE SUMMARY

The Dry Fork Valley cave pseudoscorpion is designated as a Regional Forester Sensitive Species on the Monongahela National Forest in the Eastern Region of the Forest Service. The purpose of this document is to provide the background information necessary to prepare a Conservation Strategy, which will include management actions to conserve the species.

Apochthonius paucispinosus is an extremely rare troglobitic pseudoscorpion known only from Bennett Cave, Tucker County, West Virginia.

NOMENCLATURE AND TAXONOMY

Classification:	Class Arachnida Order Pseudoscorpiones Family Chthoniidae
Scientific name:	<u><i>Apochthonius paucispinosus</i></u>
Common name:	Dry Fork Valley cave pseudoscorpion
Synonyms:	none

This description by Muchmore (1967) included a detailed verbal description accompanied by an illustration of the right palp chaetotaxy. The taxonomy of the species has remained stable since its description..

DESCRIPTION OF SPECIES

This is a 4-eyed pseudoscorpion, described from a single female less than 2 millimeters in length. Identification of this animal requires microscopic examination and dissection of appendages by a specialist in pseudoscorpion taxonomy.

LIFE HISTORY

Nothing is known of the life history of *Apochthonius paucispinosus*. No male of the species is known. General information on the life history of pseudoscorpions was provided by Muchmore (1990). Pseudoscorpions are predators and in caves are presumed to feed on springtail insects and mites. The life cycle of pseudoscorpions consists of adults mating, often preceded by courtship of the female by the male. Various dancing steps, posturing and grasping with the palps. The male produces a complex stalked spermatophore, which is attached to the substrate. The female takes up the sperm from the spermatophore. The fertilized eggs are passed from the female's body, but retained in a secreted pouch attached to the genital opercula. The eggs develop, nourished by their own yolk and by secretions of the female. The young are retained in the brood pouch until they reach the protonymphal stage, in which they are quite recognizable as pseudoscorpions. Three molts produce deutonymphs, tritonymphs and then adults. In some pseudoscorpions females protect themselves during

brooding by spinning a silken chamber with the spinnerets on the chelicerae. Nymphs also sometimes produce silken chambers during molting.

HABITAT

This species is known only from its initial collection from damp leaf litter in a cave (Holsinger, et. al. 1976). It was classified by Holsinger, et. al. (1976) as a troglobite, and Muchmore (1967) specified its troglomorphisms in the description of the species.

DISTRIBUTION

This species is known from a single specimen taken at the type-locality, Bennett Cave, Tucker County, West Virginia.

RANGEWIDE STATUS

Global Rank: G1 critically imperiled; The global rank of G1 is assigned to species that are known from five or fewer localities. *Apochthonius paucispinosus* is known only from the type-locality.

West Virginia State Rank: S1 critically imperiled; The state rank of S1 is similarly assigned to a species that is known from five or fewer localities in the state.

POPULATION BIOLOGY AND VIABILITY

Nothing is known of the population biology of this species.

POTENTIAL THREATS

Due to the presence of *Apochthonius paucispinosus* in the restricted cave environment, it is susceptible to a wide variety of disturbances (Elliott, 1998). Caves are underground drainage conduits for surface runoff, bringing in significant quantities of nutrients for cave communities. Unfortunately, contaminants may be introduced with equal ease, with devastating effects on cave animals. Potential contaminants include (1) sewage or fecal contamination, including sewage plant effluent, septic field waste, campground outhouses, feedlots, grazing pastures or any other source of human or animal waste (Harvey and Skeleton, 1968; Quinlan and Rowe, 1977, 1978; Lewis, 1993; Panno, et al 1996, 1997, 1998); (2) pesticides or herbicides used for crops, livestock, trails, roads or other applications; fertilizers used for crops or lawns (Keith and Poulson, 1981; Panno, et al. 1998); (3) hazardous material introductions via accidental spills or deliberate dumping, including road salting (Quinlan and Rowe, 1977, 1978; Lewis, 1993, 1996).

Habitat alteration due to sedimentation is a pervasive threat potentially caused by logging, road or other construction, trail building, farming, or any other kind of development that disturbs groundcover. Sedimentation potentially changes cave habitat, blocks recharge sites, or alters flow volume and velocity. Keith (1988) reported that pesticides and other harmful

compounds like PCB's can adhere to clay and silt particles and be transported via sedimentation.

Impoundments may detrimentally affect cave species. Flooding makes terrestrial habitats unusable and creates changes in stream flow that in turn causes siltation and drastic modification of gravel riffle and pool habitats. Stream back-flooding is also another potential source of introduction of contaminants to cave ecosystems (Duchon and Lisowski, 1980; Keith, 1988).

Smoke is another potential source of airborne particulate contamination and hazardous material introduction to the cave environment. Many caves have active air currents that serve to inhale surface air from one entrance and exhale it from another. Potential smoke sources include campfires built in cave entrances, prescribed burns or trash disposal. Concerning the latter, not only may hazardous chemicals be carried into the cave environment, but the residue serves as another source of groundwater contamination.

Numerous caves have been affected by quarry activities prior to acquisition. Roadcut construction for highways passing through national forest land is a similar blasting activity and has the potential to destroy or seriously modify cave ecosystems. Indirect effects of blasting include potential destabilization of passages, collapse and destruction of stream passages, changes in water table levels and sediment transport (Keith, 1988).

Oil, gas or water exploration and development may encounter cave passages and introduce drilling mud and fluids into cave passages and streams. Brine produced by wells is extremely toxic, containing high concentrations of dissolved heavy metals, halides or hydrogen sulfide. These substances can enter cave ecosystems through breach of drilling pits, corrosion of inactive well casings, or during injection to increase production of adjacent wells (Quinlan and Rowe, 1978).

Cave ecosystems are unfortunately not immune to the introduction of exotic species. Out-competition of native cavernicoles by exotic facultative cavernicoles is becoming more common, with species such as the exotic milliped Oxidus gracilis affecting both terrestrial and aquatic habitats.

With the presence of humans in caves comes an increased risk of vandalism or littering of the habitat, disruption of habitat and trampling of fauna, introduction of microbial flora non-native to the cave or introduction of hazardous materials (e.g., spent carbide, batteries). The construction of roads or trails near cave entrances encourages entry.

SUMMARY OF LAND OWNERSHIP AND EXISTING HABITAT PROTECTION

The type-locality lies on the Monongahela National Forest.

SUMMARY OF MANAGEMENT AND CONSERVATION ACTIVITIES

No species specific management activities are being conducted concerning Apochthonius paucispinosus.

The existing (1985) Monongahela Land and Resource Management Plan does not provide management direction for caves although they are being considered in the Forest Plan revision currently underway. A Forest Plan Amendment in progress for Threatened and Endangered Species will include management for the caves on the forest.

RESEARCH AND MONITORING

No species specific research or monitoring activities are being conducted concerning Apochthonius paucispinosus.

RECOMMENDATIONS

Retain on list of Regional Forester Sensitive Species.

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