

***Conservation Assessment
for
Cavernicolous Sheet-Web Spider (*Porrhomma cavernicolum*)***



(Emerton, 1875)

USDA Forest Service, Eastern Region

October 2002

Julian J. Lewis, Ph.D.
J. Lewis & Associates, Biological Consulting
217 W. Carter Avenue
Clarksville, IN 47129
lewisbioconsult@aol.com



This Conservation Assessment was prepared to compile the published and unpublished information on Porrhomma cavernicolum. 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.

Table of Contents

EXECUTIVE SUMMARY4
NOMENCLATURE AND TAXONOMY4
DESCRIPTION OF SPECIES.....4
LIFE HISTORY4
HABITAT5
DISTRIBUTION AND ABUNDANCE.....5
RANGEWIDE STATUS5
POPULATION BIOLOGY AND VIABILITY.....5
POTENTIAL THREATS.....5
SUMMARY OF LAND OWNERSHIP AND EXISTING HABITAT
PROTECTION6
SUMMARY OF MANAGEMENT AND CONSERVATION ACTIVITIES ..6
RESEARCH AND MONITORING7
RECOMMENDATIONS.....7
REFERENCES.....7

EXECUTIVE SUMMARY

The Cavernicolous sheet-web spider is designated as a Regional Forester Sensitive Species on the Hoosier 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.

Porrhomma caverniculum is widespread over the cave areas of the eastern United States, but is very sporadic in its occurrence. In Indiana it is known only from caves along the East Fork of the White River drainage, where it is rarely encountered despite many seemingly suitable caves.

NOMENCLATURE AND TAXONOMY

Classification:	Class Arachnida Order Araneae Family Linyphiidae
Scientific name:	<u>Porrhomma caverniculum</u>
Common name:	Cavernicolous sheet-web spider
Synonyms:	<u>Willibaldia cavernicola</u> <u>Linyphia incerta</u> <u>Troglohyphantes cavernicola</u> <u>Porrhomma emertoni</u> <u>Porrhomma cavernicola</u> <u>Porrhomma caverniculum</u>

Described by Keyserling (1886) from Reynolds Cave, Barren County, Kentucky, it has been reported by a variety of names. A list of the synonyms and references was presented by Holsinger (1963), who emended the name to Porrhomma caverniculum on the recommendation of Gertsch. The correct name for this species is still subject to interpretation.

DESCRIPTION OF SPECIES

This spider is tiny, mature at about 2mm in size. Emerton (1875) described it as having an orange-brown cephalothorax and white abdomen, with the eyes small and colorless, the front middle pair being very reduced in size or absent. Identification of this spider requires microscopic examination by a specialist familiar with spider taxonomy.

LIFE HISTORY

Although nothing is known of the life history of this species, in general the cavernicolous linyphiids lay eggs in silken sacs placed on the undersides of stones. After hatching the juveniles require multiple molts to reach sexual maturity.

HABITAT

This species is a troglobite and is restricted to caves. Emerton (1875) found it among cave formations. Gardner (1986) reported that it was usually associated with decaying organic matter such as logs, leaves, sticks or dung. On the Hoosier National Forest this species has been found in similar situations, typically on sticks or other organic debris.

DISTRIBUTION AND ABUNDANCE

In Indiana Porrhomma cavernicolum is known only from caves along the drainage of the East Fork of the White River. The range of the species was given by Holsinger (1963) as Virginia west to Missouri, and southwest into Arkansas. This was expanded by Holsinger & Culver (1988) to include an area from Pennsylvania south to Georgia and west to Missouri and Oklahoma.

Barr (1968; 1979) reported that Porrhomma cavernicolum was one of a quartet of widespread troglobitic linyphiid spiders occurring in the eastern U.S. This species was found to exist in apparently disjunct populations.

RANGEWIDE STATUS

Global Rank: G3 vulnerable; The global rank of G3 is usually assigned to species that have been recorded from between 21-100 localities. Although records are widespread in the literature (Holsinger, 1963; Holsinger and Peck, 1971; Holsinger, 1976; Holsinger, et al., 1976; Peck, 1989; Peck and Lewis, 1978; Peck and Christiansen, 1990; Gardner, 1986) the rank of G3 seems appropriate.

Indiana State Rank: S2 imperiled; The state rank of S2 is assigned to a species that has been recorded from between 6-20 localities in the state. This species has been recorded from five localities in the Hoosier National Forest, a cave in Jennings County, as well as the Donaldson Cave System (Banta, 1907).

POPULATION BIOLOGY AND VIABILITY

Nothing is known of the population biology of Porrhomma cavernicolum. In general the linyphiid spiders are predators. They construct webs consisting of horizontal sheets with vertical threads as trip lines for insects. Most are polyphagous, accepting a wide variety of prey animals. They may survive for months without feeding.

POTENTIAL THREATS

Keith (1988) discussed in general many of the potential threats that affect caves and troglobites. All of the Hoosier National Forest sites for Porrhomma cavernicolum are in relatively isolated forest service special areas with minimal human disturbance. Unless visitation increases to these caves there is little threat to this spider at present.

SUMMARY OF LAND OWNERSHIP AND EXISTING HABITAT PROTECTION

In the Hoosier National Forest Porrhomma cavernicolum is known from Fuzzy Hole, Williams Cave and Gory Hole at the Tincher Special Karst Area, Lawrence County. It is also known from Elrod and Wesley Chapel Gulf caves in the Wesley Chapel Gulf Special Area, Orange County. Wesley Chapel Gulf and Tincher were designated as special areas due to their karst features and are managed for the protection of the karst ecosystems (USDA Forest Service, 2000). Two of the three entrances to Wesley Chapel Gulf Cave are gated.

SUMMARY OF MANAGEMENT AND CONSERVATION ACTIVITIES

No species specific management or conservation activities are being conducted concerning Porrhomma cavernicolum, however cave and karst habitat located on the Hoosier National Forest are subject to standards and guidelines for caves and karst protection and management as outlined in the Hoosier National Forest Land and Resource Management Plan (Forest Plan) (USDA Forest Service, 1991). These standards and guidelines include the following:

- *Caves are protected and managed in accordance with the Federal Cave and Karst Resources Protection Act of 1988, Forest Service Manual 2353, Memorandums of Understanding between the forest service and the National Speleological Society, the Indiana Karst Conservancy, Inc., the Forest Cave Management Implementation Plan, and individual specific cave management plans.

- *Except where modified by an existing cave management prescription, vegetation within a 150-200 foot radius of cave entrances and infeeder drainages with slopes greater than 30 percent will generally not be cut. No surface disturbing activities will be conducted on any slopes steeper than 30 percent adjacent to cave entrances. Similar protection areas will be maintained around direct drainage inputs such as sinkholes and swallow holes known to open into a cave's drainage system of any streams flowing into a known cave.

- *Allow no sediment from erosion of access roads and drilling sites to wash into caves or karst features.

- *Seismic surveys requiring explosives shall not be conducted directly over known cave passages or conduits.

- *All caves will be managed as significant.

(USDA Forest Service, 1991)

The forest plan includes a cave and karst management implementation plan. This management plan places an emphasis on cave resource protection and mitigation. Understanding of the caves is established through mapping, bioinventory, cataloging of resources (e.g., archaeological, paleontological, speleothems, etc.), and estimating use levels and trends. Protection zones or

other mitigation measures recommended by a management prescription will be established around caves entrances, sinkholes and swallowholes. Specific criteria will include consideration for protection of entrance and cave passage microclimate, animals inhabiting the cave, physical and chemical parameters and aesthetic values associated with the cave.

RESEARCH AND MONITORING

A bioinventory of caves of the Hoosier National Forest resulted in the discovery of the populations of this spider in the Tinchel Special Area (Lewis, et al., 2002; and in progress).

RECOMMENDATIONS

Retain on list of Regional Forester Sensitive Species.

REFERENCES

- Banta, Arthur M. 1907. The fauna of Mayfield's Cave. Carnegie Institute of Washington Publications, 67: 1-114.
- Barr, Thomas C. 1968. Cave ecology and the evolution of troglobites. In Dobzhansky, T., M.K. Hecht and W.C. Steere, editors. Evolutionary Biology, volume 2, Appleton-Century Crofts, New York, 35-102.
- Barr, Thomas C. 1979. Caves and associated fauna of eastern Kentucky. Volume 3, Technical Report, Eastern Kentucky Coal Field, Preliminary investigations of natural features and cultural resources. Kentucky Nature Preserves Commission, 129 pages.
- Emerton, J.H. 1875. Notes on spiders from caves in Kentucky, Virginia and Indiana. American Naturalist, 9: 278-280.
- Gardner, James E. 1986. Invertebrate fauna from Missouri caves and springs. Missouri Department of Conservation, Natural History Series 3, 72 pages.
- Holsinger, John R. 1963. Annotated checklist of the macroscopic troglobites of Virginia, with notes on their geographic distribution. Bulletin of the National Speleological Society, 25(1): 23-36.
- Holsinger, John R. 1976. The cave fauna of Pennsylvania. Geology and biology of Pennsylvania caves. Pennsylvania Geological Survey, General Geology Report, Number 66, 103 pages.
- Holsinger, John R., Roger A. Baroody, and David C. Culver. 1976. The invertebrate cave fauna of West Virginia. West Virginia Speleological Survey, Bulletin 7, 82 pages.
- Holsinger, John R. and David C. Culver. 1988. The invertebrate cave fauna of Virginia and a part of Eastern Tennessee: Zoogeography and Ecology. Brimleyana, 14: 1-162.

- Holsinger, John R. and Stewart B. Peck. 1971. The invertebrate cave fauna of Georgia. NSS Bulletin, 33 (1): 23-44.
- Keith, J.H. 1988. Distribution of Northern cavefish, Amblyopsis spelaea DeKay, in Indiana and Kentucky and recommendations for its protection. Natural Areas Journal, 8 (2): 69-79.
- Keyserling, E.G. 1886. Die Spinnen Amerikas, Theridiidae, 2: 123.
- Lewis, Julian J., Ronnie Burns and Salisa Rafail. 2002. The subterranean fauna of the Hoosier National Forest. Unpublished report, Hoosier National Forest, 115 pages.
- Peck, Stewart B. 1989. The cave fauna of Alabama: Part I. The terrestrial invertebrates (excluding insects). NSS Bulletin, 51: 11-33.
- Peck, Stewart B. and Julian J. Lewis. 1978. Zoogeography and evolution of the subterranean faunas of Illinois and southeastern Missouri. NSS Bulletin, 40: 39- 63.
- Peck, Stewart B. and Kenneth Christiansen. 1990. Evolution and zoogeography of the invertebrate cave faunas of the Driftless Area of the Upper Mississippi River Valley of Iowa, Minnesota, Wisconsin , and Illinois, U.S.A. Canadian Journal of Zoology, 68: 73-88.
- USDA Forest Service. 1991. Land and Resource Management Plan Amendment for the Hoosier National Forest.
- USDA Forest Service. 2000. Land and Resource Management Plan, Amendment No. 5, for the Hoosier National Forest.