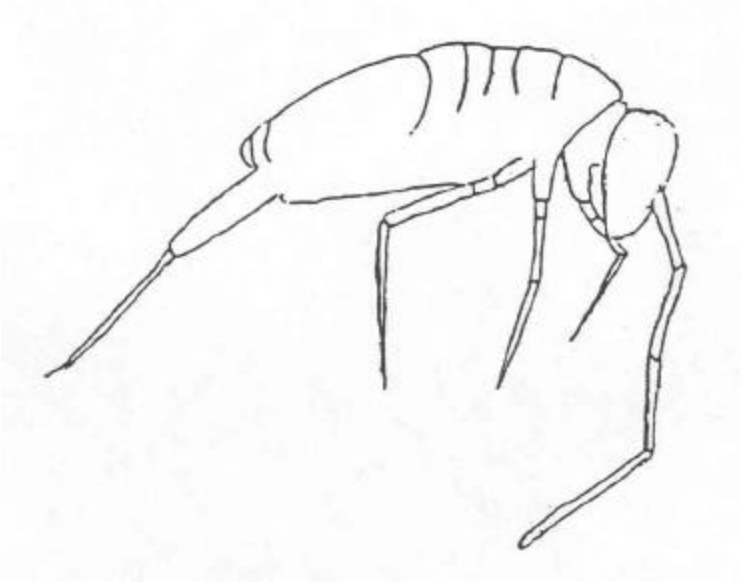
Conservation Assessment
For
Monongahela Cave Springtail (Sinella Agna)



(From Christiansen & Bellinger, 1998)

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MONONGAHELA NATIONAL FOREST

This Conservation Assessment was prepared to compile the published and unpublished information on Sinella agna. 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 Monongahela cave springtail 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.

Sinella agna is a springtail insect that is known only from caves. It is endemic to the karst of eastern West Virginia, where it has been reported from 11 caves.

NOMENCLATURE AND TAXONOMY

Classification:	Class Insecta
	Order Collembola
	Family Entomobryidae
Scientific name:	Sinella agna
Common name:	Monongahela cave springtail
Synonyms:	Sinella sp. (Holsinger, et al., 1976)

The first mention of this species was a Sinella sp. by Holsinger, et al. (1976) in their checklist of West Virginia cavernicoles. This species was subsequently described by Christiansen and Bellinger (1980) as Sinella agna and has remained taxonomically stable since that time.

DESCRIPTION OF SPECIES

Sinella agna, typical of other springtails, is a tiny insect, reaching a length of about 4.5 millimeters. The species is eyeless and unpigmented, white in appearance. Identification of this species requires a specialist knowledgeable in the taxonomy of springtails.

LIFE HISTORY

Nothing is known specifically about the life history of Sinella agna. In general springtails lay their eggs on the substrate in a concealed location. Several molts occur prior to the insect reaching its adult size, but in springtails no metamorphosis occurs and the juveniles and adults are similar except in size (Borror and DeLong, 1971).

HABITAT

This species is a troglobite, thus occurs only in caves. Holsinger, et al. (1976) reported that Sinella agna was usually found around rotting wood or damp mudbanks near water.

DISTRIBUTION AND ABUNDANCE

Sinella agna is endemic to West Virginia. Holsinger, et al. (1976) recorded it from 11 caves in Pocahontas, Randolph and Tucker counties.

RANGEWIDE STATUS

Global Rank: G2 imperiled; The global rank of G2 is assigned to species that are known from between 6-20 localities. Sinella agna has been reported from 11 localities.

West Virginia State Rank: S2 imperiled; The state rank of S2 is similarly assigned to species that are known from between 6-20 localities. All of the known caves in which Sinella agna is found are in West Virginia.

POPULATION BIOLOGY AND VIABILITY

Nothing is known specifically about Sinella agna. In general springtails feed on decaying plant material, fungi, bacteria or arthropod feces (Borror and Delong, 1971).

POTENTIAL THREATS

Due to the presence of Sinella agna 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 range of Sinella agna occurs within the area of the Monongahela National Forest and at least one entrance of the Arbogast – Cave Hollow system is on the property of the national forest.

SUMMARY OF MANAGEMENT AND CONSERVATION ACTIVITIES

No species specific management or conservation activities are being conducted concerning Sinella agna.

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

All or most of what is known of the range of Sinella agna is from the cave bioinventory by Holsinger, et al. (1976).

RECOMMENDATIONS

Retain on list of Regional Forester Sensitive Species.

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