

February, 1992 (compiled by Shelley Sparhawk)

Blind Cave Beetles:

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Background:

Collecting permit issued in 1986 for a research study on blind leodid cave beetles at CRMO. Permit states that specimens are to be placed in the Smithsonian Museum and the U. of Idaho or College of Idaho museums. This violates NPS policy on collecting and should not have been on the permit.

They had no funding for the study, so they worked on it slowly on their own time. Then Paul Johnson transferred to U. of Wisconsin and the work stopped.

In 1990, when I took over handling collecting permits, no record existed at CRMO of what was actually done, what was actually collected, etc. All we had was the original permit (which expired in 1988) and the original proposal. Annual reports had not been filed on this work either.

I contacted both Blom and Johnson...

2/91 phone call with Johnson:

They had established transects "in a number of caves" and read them a couple of times a year. Looking at temperature and feeding. They tried to rear beetles in captivity.

Paul Johnson has 8-10 specimens of Glacicavicola bathyscioides pickled in alcohol. Also has 2 or 3 specimens of millipedes collected at CRMO - have not been ID'd yet. Also, some photographs of beetles at CRMO. He is willing to send us copies of photos, some of the beetle/millipede specimens... once he finds them in his lab! He has no museum record cards, etc.

I left it that he would look for the specimens and we would get back to him about how many of the specimens we wanted. I felt we could be a little flexible on the number of specimens to go in our collection and number to be loaned to Smithsonian, etc. since the permit was issued incorrectly and they are trying to cooperate with us.

1/91 phone call with Blom:

They made a few collections (5-10?) and dissected them?. Neil King told him CRMO didn't want the specimens and they should give them to a regional museum.

They surveyed the caves for presence of beetles and then wanted to estimate

population, but didn't find enough beetles to estimate population. They think that the beetles probably exist through out all of the caves and porous substrate. In the winter, they come to the surface of the snow.

Arco Tunnel - found flies locally abundant - hanging in silk webbing in pockets on the walls. Also found albino daddy long legs, cave crickets, and lots of mites.

Said they had sent Neil a 2 page summary on what they did and observed. (I have never found it anywhere in the CRMO files).

Said that Mike Ivey at the University in Boseman has done a lot of work on this beetle. Found they are very sensitive to vibrations... a hard vibration can kill the beetles... thats how they find the millipede prey.

ACTION NEEDED:

Resource Management and Interp. personnel need to decide what they want from Johnson and we need to contact him again to arrange to have specimens, photos sent. Also need to address paperwork questions: does he have information on specimens for cataloging? Can he find (or redo) some kind of final report on what they did and found?

United States Department of the Interior
National Park Service

APPLICATION FOR PERMISSION TO COLLECT
SPECIMENS OF PLANTS, ROCKS, MINERALS, AND ANIMALS

Name of Area	Date
Craters of the Moon National Monument	
Name of Applicant	Home Address
Paul J. Johnson & Paul E. Blom	University of Idaho, Dept. of Plant, Soil & Entomological Sciences, College of Agric., Moscow, ID
Representing (Name of Institution)	
University of Idaho	

83843-4196

Type of Specimens to be Collected	Class of Collecting*	Check for Class B Permit	Period of Collecting
Glacivacicola bathyscioides and directly associated species	☐ Class A ☐ Class B	☐ Paid Employee ☐ WOC Collaborator	From 07/24/86 To 12/31/88

Reason for Collecting
Establish voucher specimens; to determine ecological behavior under lab conditions (fecundity, rare larva stage, etc.)

Place Where Specimens are to be Deposited
U.S. National Museum, Washington, D.C. and/or University of Idaho, College of Idaho

I, the applicant, having read the conditions on the reverse of the permit relating to collections in areas administered by the National Park Service, agree that, if the permit is granted, I will comply with all the conditions stated therein.

Signed

TO BE FILLED IN BY ISSUING OFFICE ONLY--DO NOT WRITE BELOW THIS LINE

Approved for Collecting Following Specimens	Class
Glacivacicola bathyscioides and directly associated species	
Locality of Collecting Limited to	Expiration Date
Lava Tubes	12/31/88

Special Conditions or Restrictions
Comply with NSS standards and avoid sensitive resource areas

Recommended by (Signature and Title)	Approved By (Signature and Title)	Date Approved
<i>Ned King</i> Chief Ranger	<i>Robert E. Platt</i>	7-28-86

United States Department of the Interior
National Park Service

COLLECTING PERMIT

CLASS ☐

In Accordance with the Conditions and Restrictions Appearing on the Back Permission is Granted

Name of Collector	Area	Date Issued

To Collect the Following Specimens	Expiration Date
Glacivacicola bathyscioides and directly associated species	
Locality of Collecting Limited to	
Lava Tubes	

Special Conditions or Restrictions
Comply with NSS standards and avoid sensitive resource areas

Approved (Signature)	Title
<i>Robert E. Platt</i>	7-28-86

* Two classes of collecting may be conducted under this permit:

- Class A - That required for public exhibits and for research undertaken by persons who can establish their connection with public museums or other scientific or educational institutions. Specimens collected may be insects (Hexapoda), spiders (Araneida), plants, rocks, or minerals, as designated in the permit.
- Class B - That undertaken by Federal employees only for scientific or educational purposes. Specimens collected may be plants, rocks, minerals or animal life as designated in the permit.

The collecting of endangered or vanishing species of animals, if permitted at all, will be allowed only where the required approval has been obtained from the Director of the National Park Service

THIS PERMIT MUST BE CARRIED AT ALL TIMES WHILE COLLECTING. SEE REVERSE FOR CONDITIONS AND RESTRICTIONS.

A Proposal to Conduct Biological Studies
on the Blind Cave Leiodid Beetle,
Glacivivicola bathyscioides Westcott,
at Craters of the Moon National Monument

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and
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Introduction

Do we have it?

Glacicavicola bathyscioides Westcott was discovered in 1965 at Crystal Falls Cave, Clark County, Idaho. A formal taxonomic description along with brief biological notes was published by R.L. Westcott (1968, Los Angeles Co. Nat. Hist. Mus., Contr. Sci., 141: 1-14). Westcott designated Crystal Falls Cave as the type locality and reported additional Idaho finds of the species from Crystal Ice Cave, Power County, and Boy Scout Cave, Craters of the Moon National Monument, Butte County. Peck (1970, Ann. Speolol., 25(1): 235-237) reported the beetle from Beauty Cave, close to Boy Scout Cave; apparently an extension of a single lava tube now divided by roof collapse. These cold lava tube caves remained the only known localities for this phylogenetically anomalous species until Peck (1981, Coleopts. Bull., 35(4): 451-452) reported a 1978 collection from Fossil Mountain Ice Cave, a limestone formation in Teton County, Wyoming.

Glacicavicola is apparently an obligate troglophile requiring cool (0-4°C), humid conditions. Westcott, along with the description, reported congregations of the beetle at Crystal Falls Cave in areas where dead arthropods concentrated, and an observation from Boy Scout Cave of feeding on a dead Glacicavicola. Peck (1974, Nat. Speolol. Soc. Bull., 36(1): 1-3) reviewed Westcott's comments on bionomics and provided a theoretical evolution of the species, but provided little new information on its biology other than noting an attraction to beef liver and human dung, and providing cave temperatures at the time of collection. Peck further noted the need for larvae to help establish the species' relationships. Naseath (1974, J. Idaho Acad. Sci., 10(2): 76-81) provided a few new comments on the habitat at Crystal Falls Cave (reporting it as "Civil Defense Cave"), and suggested that a Myxobacteriales may provide a food source. However, this suggestion was based only on assumption through association.

One investigator (Johnson) has personally discussed this species with Westcott, Peck, and other interested scientists, and has concluded that much remains to be learned about this unique species, with regard to its evolution, immature anatomy, biology, and distribution. Thus, we would like to collect data to further the available knowledge of this species, and possibly provide real data answers to questions regarding its biology and evolution.

Justification

Two scientific and two management needs along with several peripheral factors have come together for us to propose this study at Craters of the Moon National Monument:

1) A need exists for specimens of the immature stages to complete anatomical, morphological, and subsequent phylogenetic studies by the principal investigators and specialist colleagues.

2) There is a clear deficit of data concerning the species' autecology and its role in an ice cave ecosystem. Specifically, data is needed on the species' life cycle and food resources, but data on in-cave distribution patterns, population size, activity patterns, thermal requirements, and substrate preference are also desirable.

3) A need exists for detailed biological data on this species to allow for the implementation of management policies by the National Park Service, for the preservation of an apparently rare and unique species which may require relatively undisturbed environments for survival.

4) Biological data is needed by the United States Fish and Wildlife Service for further evaluation of the species' endangered or threatened status. This species was placed in category 2 in a review (Fed. Reg. 50 CFR Part 17, May 22, 1984, p. 21669) of candidate species for consideration as endangered and threatened wildlife. Category 2 states the need for more species specific information before a final evaluation can be made for listing.

This study is proposed for Craters of the Moon National Monument for the following reasons:

1) Due to vandalism, visitor impact, and apparent subsequent closing or restriction of access to Crystal Falls and Crystal Ice caves (Westcott, oral communication).

2) General inaccessibility to habitats at Fossil Mountain Ice Cave due to dangerous exploration conditions (Peck 1981).

3) A suggestion of potential extirpation of the beetle from Boy Scout Cave due to human visitor impact (Westcott and A. Allen, oral communications).

4) The generally protected status of National Park lands, and the probable (but unknown) occurrence of this species in other lava

tube ice caves on Craters of the Moon National Monument, a situation in which to study a relatively undisturbed population appears to be optimally available.

Study Methods

In-cave aspects of this study will not involve sampling techniques destructive to the cave environment. Initially, a general survey of potential habitat providing lava tube caves will be made. This survey should provide local distribution information and allow for a preliminary assessment of available habitat.

A population or populations selected for study will be initially censused to provide a rough estimate of the local population size. Live trapping using attractive bait and specimen marking will be used for a catch-and-release method to estimate a particular cave population size through the course of the study. All discovered populations will be observed on site for behavioural traits or activity patterns which would provide suggestions leading to the discovery of life cycle or food resource determinations.

Randomly through the study period, live specimens will be collected and returned to a laboratory for feeding studies using specimens of potential food resources found in the caves as test items. If the laboratory study is successful, information on individual longevity, courtship behaviour, food resources, oviposition behaviour, and egg and immature stage specimens would be available. Several female specimens will be dissected in order to establish fecundity potential through ovariole numbers and/or actual egg production. Mortality of laboratory specimens will provide material for deposit at the U.S. National Museum; Craters of the Moon National Monument; the W.F. Barr Museum, University of Idaho; and the Museum of Natural History, College of Idaho.

Periodically through each cave visit air, rock, soil and ice temperatures will be taken to assess variations. This information will be taken in a manner to help establish any temperature limitations on the distribution of the species within a cave. Notes will be kept to correlate substrate preferences for the beetles, as well as documenting any additional, spontaneous, observations.

When immature specimens are identified, a detailed anatomical and morphological study will be done. This study aspect will describe the general anatomy of the specimens and provide an initial comparison of this species anatomy with that of its

closest relatives. Detailed phylogenetic studies will be conducted in conjunction with specialists more familiar with other leioid beetles and their relatives from throughout the world.

Duration

We would like to commence this study as soon as practically possible during the early summer of 1986. Cave visitations are planned to occur at least twice a month during the summer. Thereafter, visitations would probably be limited to one a month through late autumn. At this time, no winter visitations are planned, although we would like to reserve this possibility depending upon phenological results obtained earlier in the season. Recommencement of the study in the spring of 1987 may be needed to gain any early season data inferred from the summer study. The field study is expected to terminate by early summer of 1987, unless unanticipated additional fieldwork is required.

Budget

No financial support for this study is being solicited in this proposal from the National Park Service. Research costs will be borne by the investigators.

Conclusion

Due to the variety of scientific and management needs and desires regarding this species, we will provide written research summaries to Craters of the Moon National Monument, National Park Service, and the Office of Endangered Species, Fish and Wildlife Service. Professional publication of all data is anticipated. Copies of raw data will be deposited at Craters of the Moon National Monument, the W.F. Barr Entomological Museum, and the personal files of the investigators.