The Great Lakes Entomologist

Volume 33
Number 3 & 4 - Fall/Winter 2000 *Number 3 & 4 - Fall/Winter 2000*

Article 1

October 2000

New Distribution Record for the Endangered Crawling Water Beetle Brychius Hungerfordi (Coleoptera: Haliplidae) and Notes on Seasonal Abundance and Food Preferences

Michael Grant
University of Michigan Biological Station

Robert Vande Kopple
University of Michigan Biological Station

Bert Ebbers
Great Lakes Ecosystems

NEW DISTRIBUTION RECORD FOR THE ENDANGERED CRAWLING WATER BEETLE BRYCHIUS HUNGERFORDI (COLEOPTERA: HALIPLIDAE) AND NOTES ON SEASONAL ABUNDANCE AND FOOD PREFERENCES

Michael Grant[1], Robert Vande Kopple[1], and Bert Ebbers[2]

ABSTRACT

The Federally endangered beetle, *Brychius hungerfordi*, has been discovered at a new location in the Northern Lower Peninsula of Michigan. We also report preliminary data on a seasonal variation in relative abundance and on its possible food plants.

The crawling water beetle, *Brychius hungerfordi* Spangler, is known from only three sites in Michigan and from one in Ontario (Spangler 1954, Wilsmann and Strand 1990, Roughly 1991, Strand and Spangler 1994, Keller et al. 1998). We report the discovery of a fourth location in the Northern Lower Peninsula of Michigan. We can only speculate about the beetle's natural history since it is so rare, but details concerning its abundance and food preferences are beginning to emerge.

MATERIALS AND METHODS

Beetle collecting occurred in Van Hetton Creek, Montmorency County, Michigan (Twp. 31N, Rge. 2E, Sec. 5, SW ¼. Beetles were collected with a long handled D-net (30-cm diameter) using a sweeping motion across the current with the lip of the net held slightly above the bottom of the creek. After the initial pass the net was quickly moved back over the same area in a downstream direction, to catch beetles dislodged from the bottom during the first pass.

Collecting also occurred at a large pool, located on the East Branch of the Maple River, Emmet County, known to support a *B. hungerfordi* population. In order to assess the temporal variation in beetle abundance, we sampled the pool monthly from March through December, 1999, at the middle of the month. We divided the pool into three sections, head, midsection, and tail, and sampled each section equally for a total of one hour sampling. Immediately after counting the beetles were released back into the pool from which they had been collected. Sample removal error was considered insignificant given the length of time between sampling dates.

Algal samples were collected in the field and preserved in 4% formalin for later identification in the lab.

---

[1]University of Michigan Biological Station, Pellston, MI 49769.
[2]Great Lakes Ecosystems, P. O. Box 156, Indian River, MI 49749.

RESULTS AND DISCUSSION

In July 1999, six adult beetles were captured). The creek drains wetlands, but also receives some groundwater based upon water temperature measurements made at the time of collection. The beetles were found dispersed along a stretch of creek several hundred meters in length and downstream from a pool, formed as the creek flowed from a culvert beneath a county road. This site differs from previously described locations in that the creek channel is composed of sand overlain with a thin layer of detritus (Roughley 1991, Wilsmann and Strand 1990, Strand 1989).

In addition to searching for new beetle locations, we have begun study of its basic biology and natural history. Initial observations suggest a seasonal component to its relative abundance and that its preferred food source may be filamentous green or blue-green algae.

The relative abundance of beetles in the pool, expressed as the number of adults captured per hour of sampling, is summarized in Figure 1. The relative abundance in November is probably underestimated due to partial ice cover, which prevented a complete search of the pool. The ice was gone by December, allowing a normal search pattern to resume. The data suggest that some *B. hungerfordi* adults may survive through the winter, which was confirmed on 10 February 2000 when five adults were captured from the pool beneath a 24 cm cover of ice. This is consistent with study of other haliplids. Hickman (1931) in laboratory studies reported that some adult haliplids survived as long as 18 months in captivity. He also reported finding some lentic species beneath ice cover. Our preliminary data also suggest that several generations may be present during a single season. The increase in relative abundance in May followed by a second increase in October suggest that a second brood of adults may emerge late in the season. If these observations are confirmed in additional studies, then an optimal period may exist in which to conduct survey work. Searching during less than optimal times would make the beetle that much more difficult to detect.

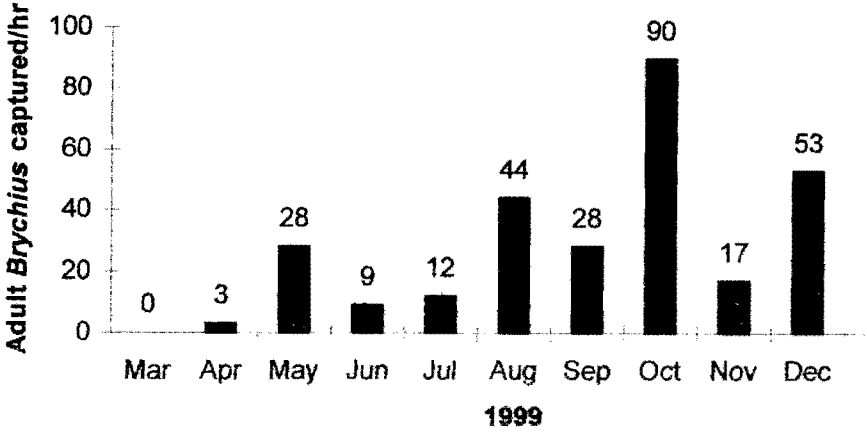

Figure 1. Seasonal distribution of *B. hungerfordi* from E. Branch Maple River, Emmet County, Michigan.

During sampling we observed that beetles were frequently found associated with dense growths of epilithic algae. Samples of cobble and rocks from areas in the pool containing beetles and from areas where they were absent were collected and brought to the lab for microscopic examination. Sites with beetles contained approximately 30% detritus with the remainder living biomass. There was no clearly dominant genus of algae, but a diverse assemblage of *Cocconeis, Oedogonium, Cymbella, Gomphonema, Navicula, Calothrix, Lyngbya, Chroococcus, Oscillatoria, Nitzschia, Frustulia, Microspora and Amphora*. Samples from sites without beetles consisted of approximately 60–70% detritus with the remainder being living biomass. The living algae were 50% *Audovinella violaceae* (a red alga), 30% *Epithemia* (a N-fixing diatom) and 20% genera similar to the beetle group.

Calothrix, Lyngbya, Microspora, Oscillatoria and *Oedogonium* are filamentous blue-green or green algae. In Hickman's feeding experiments, he reported that some larva and adults of Michigan Haliplidae did well only on *Spirogyra*, also a filamentous green alga (Hickman 1931). It is not uncommon among herbivorous insects to exhibit a limited range of foods (Matthews and Matthews 1978). Until we know the specific food plants of *Brychius* we can only surmise that they might be as restricted as for other haliplids and thereby place constraints on beetle distribution.

Successful protection of *Brychius hungerfordi* depends upon expanding our knowledge of its natural history. It is our hope that this report adds to the understanding of the beetle's distribution and begins to address more fundamental questions regarding its seasonal abundance and food preferences.

ACKNOWLEDGMENTS

The authors thank Dr. Rex Lowe and Aga Pinowska of the Department of Biological Science, Bowling Green State University, Ohio for their assistance in identifying the algal samples, and for the comments from two anonymous reviewers. The U.S. Fish and Wildlife Service (PRT 839782) and Wildlife Division of the Michigan Department of Natural Resources (PN1304) provided sampling permits.

LITERATURE CITED

Hickman, J. R. 1931. Contribution to the biology of the Haliplidae (Coleoptera). Ann. Entomol. Soc. Am. 24: 129–142.

Keller, T. A., M. Grant, B. Ebbers and R. Vande Kopple. 1998. New record for the endangered crawling water beetle, *Brychius hungerfordi* (Coleoptera: Haliplidae) in Michigan including water chemistry data. Great Lakes Entomol. 31: 137–139.

Matthews, R. W. and J. R. Matthews. 1978. Insect behavior. John Wiley and Sons, New York.

Roughley, R. E. 1991. *Brychius hungerfordi* Spangler (Coleoptera: Haliplidae), The first record from Canada with notes about habitat. Coleopterists Bull. 45: 295–296.

Spangler, P. J. 1954. A new species of water beetle from Michigan (Coleoptera: Haliplidae). Entomol. News 65: 113–117.

Strand, R. M. 1989. The status of *Brychius hungerfordi* (Coleoptera: Haliplidae) in northern Michigan. Report to the Nature Conservancy, 25 October.

Strand, R. M. and P. J. Spangler. 1994. The natural history, distribution, and larval description of *Brychius hungerfordi* Spangler (Coleoptera: Haliplidae). Proc. Entomol. Soc. Wash. 96: 208–213.

Wilsmann, L. A. and R. M. Strand. 1990. A status survey of *Brychius hungerfordi* (Coleoptera: Haliplidae) in Michigan. Report to the U.S. Fish and Wildlife Service. Region 3, Endangered Species Office. Federal Building, Fort Snelling, Twin Cities, MN, 55111. 22 August.