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## New Record for the Endangered Crawling Water Beetle, *Brychius Hungerfordi* (Coleoptera: Haliplidae) in Michigan Including Water Chemistry Data

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NEW RECORD FOR THE ENDANGERED CRAWLING WATER BEETLE,  
*BRYCHIUS HUNGERFORDI* (COLEOPTERA: HALIPLIDAE) IN MICHIGAN  
INCLUDING WATER CHEMISTRY DATATroy A. Keller<sup>1</sup>, Michael Grant<sup>2</sup>, Bert Ebberts<sup>3</sup> and Robert Vande Kopple<sup>2</sup>

## ABSTRACT

We report the discovery of the Federally endangered crawling water beetle, *Brychius hungerfordi* Spangler, in a new watershed in the northern lower peninsula of Michigan. The site was found on the Carp River, a lake draining first-order stream. Nine water chemistry parameters were measured from three known locations of *B. hungerfordi* and from three sites where no *B. hungerfordi* have been found. Water from sites with known populations of adult beetles showed low soluble reactive phosphorus, but were similar to other similar rivers in northern Michigan.

The status of the crawling water beetle, *Brychius hungerfordi* Spangler, is a major concern given its restricted geographical distribution (USFWS 1994). Previously, *Brychius hungerfordi* adults had been reported from Michigan only in the East Branch of the Maple River (Strand and Spangler 1994, Spangler 1954) and the East Branch of the Black River (Wilsmann and Strand 1990). *Brychius hungerfordi* has also been discovered in Ontario, Canada in the North Saugeen River (Roughly 1991). *Brychius hungerfordi* is currently listed as endangered by the U.S. Fish and Wildlife Service (USFWS 1994).

This paper documents the discovery of the Federally endangered crawling water beetle, *Brychius hungerfordi*, in a previously unreported watershed in the Northern Lower Peninsula of Michigan. A total of four *B. hungerfordi* adults were captured in the Carp River, Emmet County, Michigan (Twp. 39N, Rge. 4W, Sec. 32, s.w. 1/4) in August of 1997. The discovery of *B. hungerfordi* represents a new record for the beetle in this watershed. The Carp River is a first-order stream that drains the epilimnion of Paradise Lake. The site is located on a glacial outwash plain approximately 10 km from the source. At this site, the river bed was cobble and sand. The Carp River flows through a second growth mixed deciduous forest fragmented by agriculture.

The beetles were collected from a pool directly below a riffle. *Brychius hungerfordi* was collected using a series of sweeps across the stream bottom using D-nets (30 cm diameter). Similar sampling effort at two upstream and two downstream sites yielded no other adult *B. hungerfordi*. This finding is consistent with previous reports of *Brychius* adults captured from rocky cob-

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Table 1. Chemical composition of water collected from sites where *Brychius hungerfordi* adults have been reported and from sites where no beetles have been found.

Locations	Alkalinity mgCaCO <sub>3</sub> /l	pH	Nitrates + Nitrites mg/l	Ammonia mg/l	S.R.P. <sup>1</sup> µg/l	Silica mg/l	Chloride mg/l	Specific Cond. µS	Temp. °C
<i>B. hungerfordi</i> reported									
Carp River <sup>2</sup>	194	8.20	0.23	0.021	1.6	7.6	4.5	356	15
East Branch Maple River <sup>2</sup>	143	7.97	<0.010	0.035	1.4	6.9	2.3	261	14
East Branch Black River <sup>3</sup>	197	7.95	0.098	0.013	1.8	10.4	2.0	353	13
No <i>B. hungerfordi</i> found									
West Branch Maple River <sup>4</sup>	176	7.9	<0.010	0.021	12.4 <sup>6</sup>	7.5	1.3		16
Black River <sup>5</sup>	226	7.8	0.041	0.027	10.0 <sup>6</sup>	8.6	1.7		22
Pigeon River <sup>4</sup>	213	7.3	0.12	0.031	26.4 <sup>6</sup>	5.7	5.9		23

<sup>1</sup> Soluble reactive phosphorus<sup>2</sup> Water samples collected 11 September 1997<sup>3</sup> Water samples collected 13 September 1997<sup>4</sup> Water samples collected 9 August 1996, samples frozen before analysis<sup>5</sup> Sampled 6 August 1996, samples frozen before analysis<sup>6</sup> Data not corrected for silica interference

ble or embedded gravel habitats (Roughley 1991, Wilsmann and Strand 1990, Strand 1989, Spangler 1954). One specimen was collected and deposited as a voucher at the University of Michigan Museum of Zoology. The remaining three specimens were released unharmed. Larval abundance was not determined during this survey.

To characterize the chemistry of sites inhabited by adult *B. hungerfordi*, we analyzed water samples taken at three streams where this beetle has been reported. Physical habitat parameters, e.g. substrate embeddedness, were not quantified as part of this study. For comparison purposes, additional water chemistry data are shown representing three other northern Michigan streams where surveys have been unable to detect populations of *B. hungerfordi* (Wilsmann and Strand 1990). Water chemistry results indicate locations with reported populations of *B. hungerfordi* show rather low levels of phosphorus. However, ammonia, nitrate and nitrite, alkalinity and pH appear typical of lotic ecosystems within this portion of Michigan (Table 1).

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