

Stark, B.P. & H.A. Rhodes. 1997. *Perlesta xube*, a new stonefly species from Nebraska (Plecoptera: Perlidae). Entomological News, 108: 92–96.

## MEMBER NEWS

### **DeWalt Laboratory Work conducted in 2019 and proposed in the future.**

#### **Plecoptera of Indiana: using museum data to determine spatial distribution patterns and conservation need**

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Additional authors R. Edward DeWalt and Scott A. Grubbs

Stoneflies (Plecoptera) are indicators of water quality and have been lost in dramatic numbers from Midwest states, including Indiana. For this study, we are using over 5000 records of Plecoptera from more than 2000 unique collection events to build a list of known species from the state of Indiana. We intend to answer four questions: First, how many species are native to Indiana? Second, what is the conservation status of each native species (using NatureServe criteria)? Third, do patterns exist in stonefly species assemblages across unique HUC8 watersheds? Fourth, what are the causal agents of differences in diversity across HUC8s? Results include 1,050 positive locality records that yielded 92 species. Among these is one recently described species, a new species not yet described, and three species previously unknown to Indiana. We have also found additional locations for rare species and confirmed the presence of a few species thought to be extirpated. Eleven species were rated as extirpated or presumed extirpated, leaving 81 extant species. Of these, 17 were rated as critically imperiled (S1), 26 imperiled (S2), 25 vulnerable (S3), while only 13 species were rated as secure (S4 & S5). Watersheds and specific streams were discussed for their ability to support individual species or rich assemblages. Regarding distribution patterns, southern unglaciated drainages supported the most species-rich assemblages. Watersheds that were most recently glaciated (Wisconsinan) held fewer species. Deep ravine systems act as cold water refugia where glaciated and unglaciated areas meet. The East Fork of the White River, Tippecanoe River, and the St. Joseph River drainage (a tributary to Lake Michigan) harbor several large river species. The next step in this project is to determine which factors are most important to Plecoptera species richness and to gather data on rare species and under-collected drainages.

#### **Molecular phylogeny of the North American Plecoptera**

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The primary objective of this study is to develop a well-supported and fully-resolved phylogeny of the North American Plecoptera using multiple genes selected from transcriptomes. A total of 373 live adult specimens across 132 species and 92 genera representing all North American families, subfamilies, and tribes were collected and

processed for RNA transcript assembly. A preliminary coalescent-based species tree estimation for 51 taxa was generated using 1,715 identified orthologous genes. The remaining 41 taxa have been sequenced and the data are being cleaned and modified for inclusion in a complete concatenated nucleotide transcriptome data set to be used to construct a Randomized Axelerated Maximum Likelihood (RAxML) analysis. Preliminary analyses demonstrate highly supported family groups with a few surprises to be announced later. This analysis will provide a strong backbone for higher taxa through to the genus in the Nearctic. It is hoped then that this analysis, with the help of significant collaboration, to build a phylogeny of Plecoptera at the global level. Having a stable backbone phylogeny will support other analyses focusing on more specific relationships such as barcoding of species.

### **Conservation status assessment of Watchlisted mayflies, stoneflies, and caddisflies of Illinois**

R. E. DeWalt, University of Illinois, Illinois Natural History Survey

Evan A. Newman, Eric J. South, Lily V. Hart, Nicole Gamble

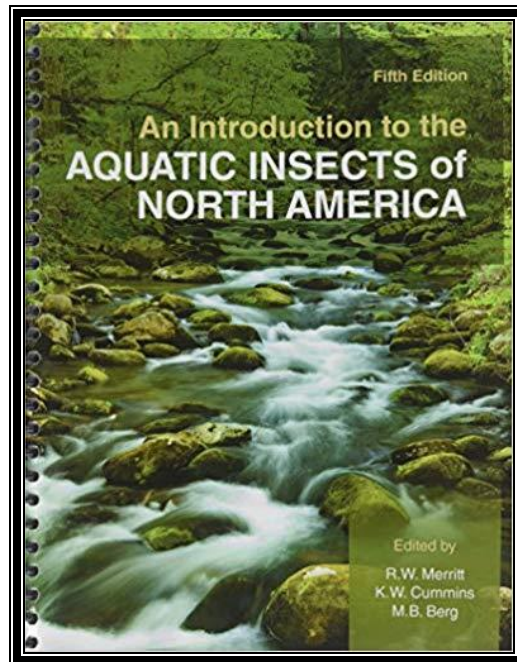
Significant funding was secured for a 3-yr project to search for 72 EPT species placed on a Watchlist within Illinois. This work will help to formally designate imperilment rankings for species. Several of the Watchlist species are thought to be extirpated; others were historically abundant and widespread, but now are rare in the state. In our first year, we conducted over 130 unique collecting events that spanned the months of January through August. Winter work in small, upland streams of the Shawnee National Forest of southern Illinois found several new locations for the rarely collected *Allocapnia smithi*, *Prostoia hallasi*, *Zealeuctra fraxina*, and *Z. narfi*. All but *Z. fraxina* can inhabit the smallest of streams that are only seasonally wet. Elsewhere on large rivers that border the east and west sides of the state, a few exuviae of *Isogenoides varians* were taken. This species was thought to have been extirpated from Illinois. At multiple locations, we examined over 60 *Hydroperla fugitans* exuviae in order to find a single exuviae of *I. varians*. Large river stoneflies are among the most imperiled in Illinois. Unfortunately, record floods on the Mississippi River limited access along the river. This often forced our team to work in adjacent states where high ground adjacent to the river was available. Despite this, two ultraviolet light trapping events at widely separated locations attracted a total of five *Attaneuria ruralis* specimens, another species thought extirpated from Illinois. With the help of our friends attending the North American Plecoptera Symposium a new state record, *Alloperla hamata*, was added to the Illinois list. Unfortunately, many large, long-lived species still appear to be absent from the interior of the state where agriculture occupies up to 95% of land cover. We were successful in recovering new specimens of several large river mayflies and several new state record mayflies from a variety of stream sizes. Several rare and one new state record caddisfly species also resulted. A big year of fieldwork is planned for 2020 with the hope of finding more ghosts from the past century.

### **DNA barcoding of North American Great Lakes Mayflies, Stoneflies, and Caddisflies**

R. E. DeWalt, Lily V. Hart, Nicole Gamble

A collaboration with the David Lodge laboratory at Cornell University has provided the opportunity to DNA barcode (COI barcode fragment) additional EPT species that are known to occur in the Great Lakes region. Because compiled databases of specimen level data are largely unavailable, we used published checklists and taxonomic papers with specimen data to build a comprehensive list of all EPT known to occur in states and provinces that border the North American Great Lakes. Published works suggest that >1200 species exist. Examination of the BOLD Systems (<http://www.boldsystems.org/>) demonstrated that many species were not represented in BOLD (which also pulls in GenBank records), many others were represented by only one or two sequences, while others were well represented but consisted of a large number of Barcode Index Numbers (BINs), which to me suggests that many specimens were misidentified. Still, others were represented by specimens from areas far removed from the Great Lakes region--who knows what they really are? To date, my laboratory has submitted over 400 stonefly specimens and another 800 mayfly and caddisfly specimens. This effort greatly improves barcode library coverage for stoneflies, mayflies, and caddisflies in the Great Lakes region.

**NEW AVAILABLE PUBLICATION**



*An Introduction to the Aquatic Insects of North America* 5<sup>th</sup> edition, 2019. Edited by by **R. W. Merritt, K. W. Cummins, and M. Berg**. Kendall Hunt Publishing Company, Dubuque, Iowa. This edition serves as a standard guide on the immature and adult stages of aquatic and semiaquatic insects of North America. It offers information on the

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