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Additional Records of Wisconsin Freshwater Isopods (Asellidae)

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About 30 species of the isopod family Asellidae occur in North American freshwater habitats where they are primarily bottom-dwelling, omnivorous scavengers. These arthropods provide a significant food source for predatory fishes and are used to gauge water quality. In spite of this importance, relatively little has been published about this group in Wisconsin waters. Jass and Klausmeier (1990, 1997) described the size range, habitat characteristics, distribution, and life history traits of Wisconsin asellids based on their fieldwork in southeastern counties, specimens in the Milwaukee Public Museum (MPM) collection, and the published literature. They documented four species in 23 counties, primarily in the southern part of the state, and provided a provisional key for their identification. Since then, Wisconsin Department of Natural Resources (DNR) biologists have collected macroinvertebrates, including isopods, at numerous sites throughout the state and submitted samples to the macroinvertebrate laboratory at the University of Wisconsin-Stevens Point for identification and enumeration. Records from this work are maintained in the DNR's Surface Water Integrated Monitoring System (SWIMS) database[1] and are used for various water quality assessment purposes. To date, only limited efforts have used SWIMS data for species conservation planning purposes. Recently, I downloaded and analyzed the 1,968 isopod records included in SWIMS, covering the period 2005 through 2016, and updated Jass and Klausmeier's (1997) distribution maps for species found in Wisconsin[2]. I also identified additional literature reports and specimen records from the Smithsonian Institution's National Museum of Natural History and Harvard University's Museum of Comparative Zoology. These data reveal the presence of three additional species in the state.

Species Accounts

County records for each species are summarized in the accompanying maps. Shaded counties reflect SWIMS data and may represent a single collection record, records from multiple collections, or collections from multiple waterbodies within the county. Dots centered in counties depict all available literature records; squares represent additional museum specimens. Collection information is provided in the species accounts for those species newly documented from the state. Specific

[1] SWIMS holds chemical, physical, and biological data and serves as the DNR's data repository for Clean Water Act-related work. For more information regarding SWIMS, see http://dnr.wi.gov/topic/surfacewater/swims/.

[2] Four hundred ninety-seven of the SWIMS records include identification to the genus level only and are therefore omitted from the maps.

collection information and literature records for all species are available upon request.

***Caecidotea brevicauda brevicauda* (Forbes, 1876)** – Williams (1976) reported *Caecidotea b. brevicauda* from springs and spring-fed streams in Arkansas, Illinois, Kentucky, and Missouri. The SWIMS database records represent the first reported from Wisconsin: **Grant Co.** – Grant River, collected by James Amerhein on 27 October 2008; unnamed creek, collected by J. Amerhein on 21 October 2010; unnamed creek, collected by Jean Unmuth on 15 November 2010; Castle Rock Creek, collected by J. Unmuth on 07 October 2015; **Kenosha Co.** – Pike River, collected by Craig Helker on 02 November 2010; **Richland Co.** – unnamed creek, collected by Bradd Simms on 04 October 2006; Little Willow Creek, collected by Mike Gillbertson on 15 November 2006, and by J. Unmuth on 16 September 2015; Center Creek, collected by J. Unmuth on 03 October 2007, 27 September 2013, and 23 September 2014; Ash Creek, collected by J. Unmuth on 19 October 2009; unnamed creek, collected by J. Unmuth on 09 November 2010; Melancthon Creek, collected by J. Unmuth on 01 November 2010 and 10 October 2011; Pine River, collected by J. Unmuth on 23 October 2012; unnamed creek, collected by J. Unmuth on 19 September 2014. All of the collection locations are cool or cold-water streams. The Kenosha County record and two records from Richland County were identified only to the species level, but are included here as they almost certainly represent this subspecies.

***Caecidotea communis* (Say, 1818)** – Jass and Klausmeier (1997) first reported *C. communis* from three counties. SWIMS includes collection information from eight additional counties. In Wisconsin, *C. communis* occurs in warm, cool, and cold-water streams, primarily headwaters. Most specimens were collected in October or November, but a small number were taken in April.

***Caecidotea forbesi* (Williams, 1970)** – The only available Wisconsin records for *C. forbesi* are those reported by Jass and Klausmeier (1990, 1997).

***Caecidotea intermedia* (Forbes, 1876)** – First reported from the state by Bundy (1882), literature records and MPM specimens (summarized in Jass and Klausmeier 1997) document the occurrence of *C. intermedia* in 17 Wisconsin counties. The SWIMS database includes records from 33 additional counties. Additional museum records are available for four counties. The literature record for Door County comes from Szczytko and Dimick (2005). This species' occurrence in additional northcentral and northwest counties can be anticipated. The species occurs in Lake Superior (Barton and Hynes 1976), and Amin (1978) reported collecting a single juvenile in southwestern Lake Michigan. Collection sites include warm, cool, and cold-water habitats, both headwater streams and main stem rivers. Most SWIMS specimens were collected from September through November, with a smaller number taken in March through May.

***Caecidotea racovitzai racovitzai* (Williams, 1970)** – Williams (1976) described *C. r. racovitzai* as "the dominant Great Lakes species," but noted that it had yet to be reported from Lake Michigan. Jass and Klausmeier (1990, 1997) documented *C. r. racovitzai* from eight Wisconsin counties. The SWIMS database includes records from 46 additional counties, but with the exception of Marinette, Oconto, and Brown counties along Green Bay, none of the

counties abuts the Lake Michigan coast. The literature records for Bayfield and Sawyer counties come from Clamp (1988). Collection sites include warm, cool, and cold-water habitats, both headwater streams and main stem rivers. Most specimens were collected in October or November, with a smaller number taken in March and April.

***Lirceus fontinalis* Rafinesque, 1820** – Williams (1976) found *Lirceus fontinalis* typically in springs but also in drain outlets, seeps, and streams in Georgia, Illinois, Indiana, Kentucky, Ohio, and Tennessee. The SWIMS database includes a single Wisconsin record attributable to *L.* cf *fontinalis*: **Grant Co.** – Furnace Branch, collected by J. Amerhein on 21 October 2010. Furnace Branch is a cold-water stream. Marilyn Schotte at the National Museum of Natural History confirmed the species identification in 2012, and eight specimens are now in the NMNH collection (accession no. 2059249).

***Lirceus lineatus* (Say, 1818)** – Bundy (1882) listed *L. lineatus* from Wisconsin, but did not provide a specific location. Jass and Klausmeier (1990) found no specimens in the MPM collection and failed to find this species in their field searches in southeastern Wisconsin, but speculated that it likely would be found in the state. SWIMS includes records from three counties: **Door Co.** – Geisel Creek, collected by Mary Gansberg on 15 April 2016; **Fond du Lac Co.** – unnamed creek, collected by John Masterson on 03 November 2010; **Marinette Co.** – Mud Brook, collected by Andrew Hudak on 07 October 2014. The literature record for Bayfield County comes from Clamp (1988). The species occurs in Lake Superior as well (Barton and Hynes 1976). Collection sites included warm and cold-water habitats.

Conclusion

Successful biological diversity conservation efforts rely on knowledge of what species occupy a given area, where the species occur within the area, and the factors that influence observed distributions. The above records and accompanying maps illustrate that aquatic isopods are more diverse and widely distributed in Wisconsin than previously published records suggest. Additional fieldwork, evaluation of museum collections, and further analyses of SWIMS data will allow a better understanding of what is needed for conservation purposes. Publication of these updated maps will hopefully stimulate interest in such work.

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Distribution of *Caecidotea communis* in Wisconsin

Distribution of *Caecidotea brevicauda brevicauda* in Wisconsin

Distribution of *Caecidotea forbesi* in Wisconsin

Distribution of *Caecidotea intermedia* in Wisconsin

Distribution of *Lirceus fontinalis* in Wisconsin

Distribution of *Caecidotea racovitzai racovitzai* in Wisconsin

Distribution of *Lirceus lineatus* in Wisconsin

A Possible Wisconsin Type Locality for the Centipede *Taiyuna opita*

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The type localities of at least two centipede species, *Sonibius numius* (Chamberlin 1911) and *Tidabius opiphilus* Chamberlin 1913 (both Order Lithobiomorpha, Family Lithobiidae), are located in Wisconsin. The types of a third species, *Taiyuna opita* Chamberlin 1912 (Order Geophilomorpha, Family Chilenophilidae), may also have been collected in Wisconsin.

Chamberlin (1912a) described *Taiyuna opita* based on specimens collected at "Posers and Kimball's, Mich." during his fieldwork in Iowa and adjoining regions during the early summer of 1910. Snider (1991) was unable to ascertain the whereabouts of these places when he updated the checklist of Michigan centipedes. Subsequent examination of Michigan maps and atlases failed to turn up localities with either of these names in Michigan's Upper Peninsula. My work to update the Wisconsin checklist (Watermolen 1997) provided an opportunity to re-examine this question and revealed that a place named Kimball actually occurs in Iron County, Wisconsin, just south of the Upper Peninsula border (T-46-N, R-1-E, Sec. 12). Maps contemporaneous with Chamberlin's visit to the region clearly show this Kimball (e.g., see Reid 1903, 1912).

Chamberlin likely visited Kimball on his trip through the Upper Midwest. He visited several other localities in the area: Menominee, Saunders [likely Saunders Point in Delta County], and Watersmeet in the Upper Peninsula and Ashland, Haugen, and Marinette in northern Wisconsin (Chamberlin 1911, 1912a). The old Chicago and Northwestern railroad line ran directly through Kimball, as well as several of these other communities, and would have been a likely travel route for Chamberlin. This contention is supported by the fact that Chamberlin (1911) collected another centipede, *Lithobius forficatus* (Linnaeus 1758), at "Kimball's, Wisconsin." As such, it is possible that the publication of Michigan as the location may have been in error, and the type locality of *T. opita* might actually be Kimball, Wisconsin. The location of Posers, however, remains a mystery. One possibility is that this is a misspelling of Powers, a village along the Chicago and Northwestern line further to the east in Menominee County, where Chamberlin (1911, 1912b) collected other centipede species.

Wisconsin records of *T. opita* do exist. In addition to Chamberlin's (1912a) possible record, Crabill (1958) reported *T. opita* from Buffalo, Columbia, Dane, Grant, Iowa, and Sauk counties. The Milwaukee Public Museum collection includes a Forest County specimen from 1995, and I collected an additional specimen in that county in 1998. Careful searching will likely show *T. opita* is more widespread in Wisconsin than these records indicate; it should be expected from additional northern and southern counties. Snider (1991) collected numerous specimens from the litter and A-horizon in maple-basswood (*Acer saccharum-Tilia americana*) forests in Dickinson County, Michigan. He found *T. opita* present in May through October and believed it to be "probably common in mesic forests." Summers et al. (1980, 1981) reported *T. opita* from Jo Davies County in northwest Illinois, without further details.

The mystery regarding *T. opita*'s type location illustrates how opportunities still abound to add to our knowledge of this

interesting group of arthropods. It is my hope that reports like this will stimulate the interest of others in making additional contributions.

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The *Wisconsin Entomological Society Newsletter* is published three times per year. The newsletter is provided to encourage and facilitate the exchange of information by the membership, and to keep members informed of the activities of the organization. Members are encouraged to contribute items for inclusion in the newsletter. Please send all news items, notes, new or interesting insect records, seasonal summaries, and research reports or requests to the editor.

Dues notices for 2017 were mailed in early January. Prompt payment will be most appreciated. Members already paid for 2017 or ahead will not receive notices. Dues status appears after your name on address labels of all mailings. Please contact Les Ferge at lesferge@gmail.com with any questions.

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New Extinct Insect Order Recognized

Oregon State University (OSU) researchers have found the fossils of a 100-million-year-old insect preserved in amber with an almost alien-looking triangular head that has been placed into a new scientific order. The findings were published in the journal, *Cretaceous Research*, which describes this small, wingless, female insect. It probably lived in fissures in the bark of trees and fed on mites, worms, or fungi that were contemporaneous with the dinosaurs.

"This insect has a number of features that just don't match those of any other insect species that I know," said George Poinar, Jr., emeritus professor of entomology at the

OSU College of Science. "I had never really seen anything like it. It appears to be unique in the insect world, and after considerable discussion we decided it had to take its place in a new order."

Perhaps its most unusual feature is the triangular head with bulging eyes, having the vertex of a right triangle located at the base of the neck. This would have allowed the insect to see almost 180 degrees by turning its head to either side. It also had glands on the neck that secreted a deposit that might have served as a chemical deterrent to predators.

The insect has been assigned to the newly created order Aethiocarenodea and the species is named *Aethiocarenus burmanicus*. The amber in which the two specimens are contained is from the Hukawng Valley mines of Myanmar (formerly known as Burma).

For further details, see "Ancient, scary and alien-looking specimen forms a rarity in the insect world – a new order," at http://geologicalenterprises.com/ (accessed 20 February 2017).

[Editor's Note — I am indebted to Marci Hess for providing a copy of the article from which the following is excerpted.]

In the *Journal of Pollination Ecology* 17(21), Nov. 2015, 145-147, authors James D. Thompson and Jessica L. Zung have described a simple and inexpensive restraining device for aiding the identification of bees by digital photography. The device consists mainly of two nested plastic cylinders that hold the live insect specimen in a recessed chamber at the bottom. The smaller, inner plastic cylinder (which operates as a piston) is attached to an inexpensive 'point-and-shoot' digital camera. This piston then slides within the larger cylinder and maintains accurate alignment of the camera's lens during the photo shoot.

Multiple advantages result from adoption of this approach. First, the apparatus practically guarantees a much more successful photo than the time-consuming process of stalking a freely-foraging bee, which might not be approached closely enough (or be properly focused upon) to enable a successful photograph to be taken. Second, the captured specimen is kept alive and can be harmlessly released afterwards. There is no need to obtain a freshly-killed voucher specimen for identification purposes. Finally, the resulting digital photo(s), which might bear the time/date stamp of their exposure, may be uploaded to the citizen-science monitoring program Bumble Bee Watch (http://bumblebeewatch.org), for a professional identification to be made.

Detailed instructions and photos of the device's components may be found in the original article, "A Restraining Device to Aid Identification of Bees by Digital Photography."

[Editor's Note – The following information was communicated by Dr. Daniel K. Young of UW-Madison's Department of Entomology.]

A new digital portal is being developed that will unite a variety of natural history collections housed in various academic departments and museums across the University of Wisconsin campus. When completed, the information contained will be publicly available to constituents throughout the state and beyond for research, teaching, and outreach.

Termed the Wisconsin Integrated Biodiversity, Human, and Environmental Specimen Portal, this initiative will serve as a gateway to more than 11 million specimens from the departments of anthropology, botany, entomology, geoscience, and zoology. Such specimen collections are an important part of 'big data' repositories of immense value to the scientific community across Wisconsin and elsewhere.

This project will fund a small team to assist campus museums with establishing or improving their database infrastructures, and to design an aggregator tool that will be used to connect them all in an integrated fashion, allowing access to multiple collections and enabling discovery of shared patterns among previously unrelated organisms or objects. It should catalyze new research on global change related to plants, animals, insects, paleontological specimens, rocks and minerals, and human activities/artifacts.

UW professor of botany Dr. Kenneth Cameron has been named principal investigator, while Drs. Daniel K. Young and Craig Brabant have been named among the list of six co-principal investigators. This highly-competitive project is part of the **UW2020** research initiative designed to stimulate and support groundbreaking research at UW-Madison over the next five years. It has been underwritten in the first year by the Wisconsin Alumni Research Foundation (WARF).

For additional details, see https://research.wisc.edu/funding/uw2020/round-3-projects/development-of-the-wisconsin-integrated-biodiversity-human-and-environmental-specimen-portal-a-gateway-to-more-than-11-million-uw-natural-history-museum-specimens/.

[**Editor's Note** – The following information has been excerpted from the Spring 2017 issue of *On Call*, published by the University of Wisconsin School of Veterinary Medicine. For further details, see Terry Devitt, "CDC Awards $10 Million for Insect-Borne Disease Center at UW," on p. 6.]

The Centers for Disease Control and Prevention (CDC) have awarded $10 million to a consortium of Midwestern universities to establish a new research and training program designed to mitigate the spread of diseases carried by vectors such as ticks and mosquitoes. A faculty member from the University of Wisconsin School of Veterinary Medicine (SVM) will head the program.

Medical entomologist Dr. Lyric Bartholomay will coordinate the activities of the Upper Midwestern Center for Excellence in Vector-Borne Diseases. Assisting her will be Dr. Susan Paskewitz, chair of the UW Madison Entomology Department. The Center is designed to improve the understanding of and improve the public health response to vector-borne diseases such as Zika, West Nile, and Lyme disease. The Midwest, according to Paskewitz, has become a national hotspot for disease emergence and endemic transmission of vector-borne disease. "We're seeing invasions of new species and pathogens. It is these new things moving around."

The consortium will involve a variety of researchers, including public health entomologists, epidemiologists, virologists, and vector control experts, from UW-Madison, the University of Illinois, the University of Iowa, the University of Michigan, and the Minnesota Department of Health. The new CDC-supported Center has

three primary objectives: (1) to increase the cadre of public health entomologists through graduate training and a new certificate program that enables students to better identify vectors, conduct disease surveillance, and reduce pest populations; (2) to create a network of scientists, mosquito control experts, and public health officials who will better coordinate surveillance and responses to disease outbreaks; and (3) to conduct research to improve and devise new methods for the prediction of disease emergence and outbreaks.

"Our vision is to provide training at all levels, including the undergraduate, graduate, and professional levels," Bartholomay said. "We hope we can provide a conduit of really well-trained people who will be positioned to respond to outbreaks."

Junior Entomologist's Corner: A Puddle of Butterflies??

By Sabrina Stewart
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This past April, my family and I were taking a road trip along the Natchez Trace Parkway National Park, a 444-mile scenic drive through 3 states and 10,000 years of history. We made a pit stop at Sugar Creek. It was one of our favorite spots, not only because of the history there, but also because of nature.

As I walked down the pathway, swallowtails and red spotted purples were circling me and floating through the air like leaves in autumn. We slowly walked down to the creek and I gasped. "Look! Look!" There was a 'pile' of butterflies by the water's edge. We got so close to them — only 2 feet away! (If I could've, I would've collected some but it was a National Park, so I didn't.) I walked a little closer and they all scattered everywhere. Once we backed away from them, most of them came back and landed closer to the water.

When we had a cell phone signal, I looked up what the butterflies were doing. They were mud-puddling or puddling. Puddling is when a group of butterflies or other insects find some rotting plant matter, mud, excretions, or carrion; they land on it and

start to suck up some of the salts and minerals found there. Before I knew about this activity called puddling, I had noticed that in my yard, butterflies were landing in the chicken run and dog run areas. Very interesting!

Little is known about puddling, but it seems to be a male activity. I would like to make closer observations in the future and see if I also find mostly males puddling. In addition, not all butterflies seem to puddle. This would be interesting to observe, too. Other insects also puddle.

While we watched all of the butterflies, for a moment, it seemed that my family and I were transported to the tropics. It was pure luck that we happened to see all of the butterflies gathered in one area. We'd like to go back to the Parkway again and plan to stop at Sugar Creek. Maybe we'll see them again and I can capture it in a video. Maybe I can observe them closely and see if females are also puddling or not.

Nature is AMAZING!

Books and Websites

By Andrew Khitsun
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***Pelochrista* of the Contiguous United States and Canada (Lepidoptera: Tortricidae: Eucosmini)** by D. Wright, et al., should be available by the time you read this; technically a continuation of the series The Moths of North America (formerly called Moths of America North of Mexico) — this is Fascicle 9.5 — the book doesn't look anything like most of the predecessors. Just to remind you, the series started in 1971 and produced 28 volumes in the old format, with the last one printed in 2012. In 2015, the series switched to the new format initiated by ***Eucosma* of the Contiguous United States and Canada (Lepidoptera: Tortricidae: Eucosmini)** by the same authors — Fascicle 9.4 (but you'd be hard-pressed to find the fascicle number on the book itself). At any rate, the new format is awesome and well worth the money.
Another book for butterfly lovers is **The Large Sulphurs Of The Americas: *Anteos*, *Prestonia*, *Phoebis*, *Rhabdodryas*, & *Aphrissa*** by J. Monroe — while mostly tropical fare, southern US is in the play.

Insects and Plants: a Living Theater by E. Ross is a collection of the author's superb photographs combined with informative text. Whether you're an amateur or professional, you will not miss out when you buy this book. If anyone finds flies disgusting (probably not in this auditory, but still . . .), then you've got to buy **The Secret Life of Flies** by E. McAlister. This is a fascinating book about everything you don't know about flies, and full of great photos, too!

Synopsis of adventive species of Coleoptera (Insecta) recorded from Canada. Part 4: Superfamilies Scarabaeoidea, Scirtoidea, Buprestoidea, Byrrhoidea, Elateroidea, Derodontoidea, Bostrichoidea, and Cleroidea by J. Klimaszewski, et al., shows invasive species of beetles in that country, but is very relevant to the US as well. **Fireflies, Glow-worms, and Lightning Bugs: Identification and Natural History of the Fireflies of the Eastern and Central United States and Canada** by L. Faust is a great new addition to that group of insect ID books — it can serve as both a good read and an ID guide. Also, there is **Insects: Evolutionary Success, Unrivaled Diversity, and World Domination** by D. Rivers — just scrape together some money

and buy it (it's a good book and is worth your while: 'nuff said). On the other hand, the super-expensive **Scarabaeoidea - Scirtoidea - Dascilloidea - Buprestoidea - Byrrhoidea (Catalogue of Palaearctic Coleoptera)** — revised and updated by D. Lobl — is better suited for Coleoptera specialists.

National Geographic, although late to the party, began issuing their own pocket guides to everything (it's hard to find who isn't doing so). One of their first offerings is **Insects Of North America: National Geographic Pocket Guide.** So, perhaps you may want to get rid of that outdated Peterson Field Guide (they are trying to up their game, but there is only so much that one can do to tweak a decades-old format) and replace it with something fresher. And since we are talking about ever-growing numbers of field guides, **A Swift Guide to Butterflies of North America** (second updated edition) by J. Glassberg is yet another one. **Butterflies of Pennsylvania** by J. Monroe, et al., is specific to that state and is more comprehensive as state guides usually are.

There is new website on **Darkling Beetles** http://tenebrioniDBase.org. We used to think of Darkling Beetles is a smallish family, but 20,000 described species argue to the contrary! Also, check out Wisconsin DNR's still-under-development webpage on **Wisconsin Rare Mayflies** at http://dnr.wi.gov/topic/endangeredresources/Animals.asp?mode=list&Grp=18 — it's not clear if the agency will develop this page further (just like it's not clear if DNR will even exist tomorrow). An interesting guide called **Collecting and Preserving Insects and Mites: Techniques and Tools** by M. Schauff can be downloaded from the USDA website at: https://www.ars.usda.gov/ARSUserFiles/80420580/CollectingandPreservingInsectsandMites/collpres.pdf. And from the West Virginia Department of Environmental Protection comes a **Guide to Aquatic Invertebrates of Upper Midwest** at: http://www.dep.wv.gov/WWE/getinvolved/sos/Pages/UMW.aspx. An unpleasant but necessary website on fleas and their bites can be found at: http://www.fleabites.net/.

Finally, continuing the North Woods series (of course!) is **Mammals of the North Woods** by R. Powell.

Meeting Reminder: Saturday, June 17, 2017

By Kyle Johnson, WES President
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Greetings. Just a friendly reminder that our summer outing is less than a month away. It will be held on Saturday, June 17, at Navarino State Wildlife Area in beautiful Shawano County. For details, see our website: http://www.wisentsoc.org/meetings-and-events/, or the February 2017 issue of this Newsletter.

Please let me know if you plan to attend, and especially **if you might consider camping overnight on site** (primitive camping with no facilities) since I need to coordinate a special use permit. I understand that weather may impact this event.

Hope to see you there!