Williamsonia

A Newsletter of the Michigan Odonata Survey

Williamsonia Vol. 5, No. 2&3 Spring & Summer, 2001

Year 2001 Goals

The Michigan Odonata Survey has certainly been instrumental in finding new state records, getting people excited about Odonata, and collecting and organizing specimen/collection data. I think as a group, we have achieved quite a bit with only a few volunteers and very limited funding. If I could, I would love to have 3 or 4 people funded to do nothing but fieldwork at various areas across the state, and then employ a data entry/ and identifier during the non-summer months. Unfortunately, my position at the University doesn't really allow me to get grants directly, and UM doesn't like those small grants from various agencies that don't pay overhead. So, in order for us to expand, we will need continued inlux of new volunteer/collectors as well as continued cooperation from other agencies/groups for access to specimens/data that would be useful to us.

I will help in any way I can for those of you that wish to apply for small non-game wildlife grants from the Michigan DNR, or any other agencies. There are many useful projects and surveys that can be conducted by a single person that has freedom to pursue such topics.

I believe one of our goals should be to keep on collecting specimens from as many different areas as possible and to monitor sites for arrivals of species new to Michigan.

Another goal for this year is for me to finish the MOS handbook, which I admit, has taken a back seat to other demands for my time, as well as how I spend my "free" time. I am transferring the text over to Pagemaker, which will alleviate the many problems I have endured in Microsft Word, when constructing a complex document with many illustrations.

Another goal of the MOS should be for us to hold an annual meeting somewhere different each year, perhaps rotating from N to S or E to W, and it should be a social gathering as well as a learning experience. I did not put one on last year, perhaps because the meeting the previous year did not attract many attendees. So, whattaya say? Should we hold an annual gathering in late summer this year? If so, where, and who would like to organize it?

Two really great things have happened this year– one is the great job that Mike Ebinger did with our MOS databases. He really did some useful scripting that allows easier/faster data entry as well as some new features that enhance the utility of the MOS Master Database. The web versions were customized by him, and I have gotten good comments on the Dragonfly Sightings database. I think we are the first survey to do something like that.

Second, Colin Jones of Ontario has organized the first Great Lakes Odonata meeting in Ontario, and I encourage you to attend what will not only be a great gathering of like-minded people, but also to explore the Canadian fauna/flora. It's only an hour east of Sault Ste. Marie, and you can make the July 4th holiday last a little longer (and you dollar buys more in Canada!).

Now that Summer is HERE (believe it or not!) I know we'll all be doing what we can to collect/observe/photograph Odonata. Here are just a few pointers on sites and habitats to visit:

1. Bog/Fen habitats - always worth looking at, especially farther North. However, even southern sites may turn up some new *Somatochlora* records.

2. Seeps/Springs - Try to repeatedly visit any seeps throughout the summer. This is a good place tp watch for *Tachopteryx thoreyi, Cordulegaster* and other interesting and less-common Odonata.

3. Streams - Small streams are often overlooked. One with abundant riffle areas may just be harboring some *Stylogomphus, Ophiogomphus*, or maybe *Hetaerina titia*.

4. Ponds bordering transport routes, agricultural areas or airports. These may be good places to look for new arrivals in the state. Although I doubt that it will occur here, *Archilestes grandis* would turn up at such places. Also good places to search for additional records of *Enallagma basidens*, the double-striped bluet.

5. Bridge abutments along rivers and streams.

These are excellent places to search for larval exuviae, and one can search many segments of a river system just by collecting exuviae off such structures.

So, instead of trying to collect in 20 counties in 20 days, you'll be better off looking at specific habitats in a few counties. The common species will always turn up just about anywhere. At this point, we need to concentrate on finding the less-collected species, and even then, it pays to visit a site repeatedly. Data on succession of species is also valuable, as are phenology records.

This issue has an insert on Hine's Emerald that you can use as a reference. Remember, if you think you have spotted a Somatochlora hineana, please contact me as soon as possible. There are very likely many new sites to be found in the Upper Peninsula and the E side of the tip of the mitt in the lower peninsula. Likewise, Drummond Island MAY have a population, but it has not been verified.

Spring Sightings

This year's emergence of Odonata has already been well underway here in southeastern Michigan. As I write this in mid-May, the spring species have been seen in abundance here in Washtenaw Co. On May 10, I visited Embury Road in Lyndon Twp., and was rewarded with a parade of spring dragons. You'll recall that I wrote about the shallow pond that dried up nearly completely last spring. The pond now appears to be back at the level it was a few years ago. I found many *Enallagma boreale* there as well as *Libellula quadrimaculata* and *Leucorrhinia intacta* in great abundance. Several green darners were patrolling over the water. A few *Ischnura verticalis* were amongst the grass at the pond's edge. All of the L. quadrimaculata had perches, and many of the *L. intacta* were sitting on *Nuphar* leaves and chasing off the larger dragonflies.

On the upland part of the site where many of the dragonflies feed, I saw *A. junius, Libellula quadrimaculata, Ladona julia, Plathemis lydia, L. intacta, Epitheca cynosura,* and *Gomphus spicatus. Enallagma boreale* and *Chromagrion conditum* were flying in the woods leading up to the hill. Most of the individuals seen on the hillside were teneral, whereas the ones by the water were sexually mature.

On April 27, Mike Ebinger and I visited the E.S. George Reserve to collect some larvae for my presentation at the River Rouge Water Festival. I wanted to also sample and see what species were in the big pond on the North end of the Reserve where we had first seen A*nax longipes* 4 years ago. After a few minutes of dragging a net through the pond, Mike pulled in a big *Anax longipes* larva. It was a monster, dwarfing all of the *A. junius* larvae that we collected there. Ethan Bright and I both think it was one molt away from being a mature larva. So, it was gratifying to know that not only is A. longipes still there, it is pretty well advanced in it development in late April. We also collected about a dozen *A. junius* larvae, all of which were no bigger than 1/3 the size of the *longipes* larva.

Two of the *junius* larvae were very green – almost as if theye were harboring algae under their cuticle. One of them later molted and still retained the green color afterwards.

Mike Ebinger visited Lefurge wetland in Superior Twp., on May 1, and brought back a lot of *Leucorrhinia intacta* larvae and several *Libellula pulchella* larvae. He also sighted about half a dozen green darners there. It looks like the ponds there are quickly developing a resident fauna.

NEW MICHIGAN COUNTY RECORD FOR THE RINGED BOGHAUNTER

During the first week of May I received an exciting phone call from Greg Swanson, as he felt that he had found Williamsonia lintneri at the Howard Christensen Nature Center. As he described it, I felt that he was right on, but I needed more confirmation. A few hours later, he sent some photos of the specimens via email, and I knew we had a winner of the new county record contest! I reproduce here some excerpts from Greg's emails.

LOCALITY DATA FOR *W. LINTNERI*

Kent County, MI, Howard Christensen Nature Center, Tyrone Township, T10N R12W Section 13; 02-May-2001; Basking on sphagnum swamp boardwalk; Collected by Gregory B. Swanson

Thus far I have seen one more *W. lintneri*, sex unknown, on May 3, 2001, for a total of 3 for the season. I have been working with our staff of a dozen Interpretive Teachers to help them to be able to ID the dragonfly. There are many Beaverpond Baskettails on the wing right now and I'm afraid they may be confused. (Most staff are from teaching backgrounds and not scientific backgrounds.) The weather on the 2nd and 3rd of May, the days that I saw/collected *W. lintneri*, were very hot around 80° F. The 4th cooled off to the 60's. I understand from searching the net that *W. lintneri* is known from perhaps 40 or less sites and is never numerous so I won't be collecting any more of them as I have a voucher for you and for our center. (One was found that had been stepped on while on a bridge, that's HCNC's specimen...).

More Bog-Haunters from Mecosta Co.

Stephen B. Ross

Due to the lingering winter and cool spring this year, *Williamsonia lintneri* (Ringed Boghaunter) and *W. fletcheri* (Ebony Boghaunter) emerged more than a week later than in 2000 at the state 'type' site in Mecosta County. First appearance last year was on April 28 while this year it was May 6. The first sighting this year was on a sandy two-track road (almost stepped upon the dragonfly) about a quarter mile north of all previously sited specimens at this site, but still within the general habitat of the original sightings in 1999 and 2000. One W. fletcheri was seen on the same day, almost on the same board the species was first sighted in 1999. A total of two *W. fletcheri* were sighted

On May 8, I was scouting another site approximately 1.25 mile west of the original location, an area I often walk through, but later in the season. Here, two of us observed 7 *W. lintneri* and an equal number of *W. fletcheri*. Two *W. lintneri* were observed in wheel on a sunlit log and flying briefly about when disturbed before I lost sight of them. This habitat is very similar to the original site in its upland character - maturing aspen woods with much floor litter and fallen logs. However, the wetland adjoining is distinctly different, being an open Sphagnum-Chamaedaphne bog as opposed to the shrub-carr on the original site. About 10 minutes was spent searching the low vegetation, grasses, twigs and Sphagnum of the adjoining bog edge for exuviae.

On may , I returned to look for an interesting plant found during the previous trip. This time, we found three *W. lintneri* and three *W. fletcheri*. About forty minutes was spent looking for exuviae, again with no success, plus photographing and observing the activity of the two species. Activity generally centered around basking on sunlit logs and brief foraging flights with return to same, or nearly the same, location on a fallen log or leaf litter. One *W. fletcheri* was observed on a tree trunk, but I have never observed W. lintneri resting on anything but a horizontal surface, such as bare ground, leaves or logs.

It appears the new site is more appealing to both species as the two sightings exceeded all the individuals seen in 1999-2001at the original shrub-carr site. It should be noted that at the original site there is a Sphagnum-Chamaedaphne bog grading into the shrub-carr, but this bog is fully filled with vegetation and the only open water is in animal trails within the bog. Searches for exuviae in the shrub-carr in the past have been unsuccessful. There is also an extensive Sphagnum-Chamaedaphne-Tamarack bog near the original site that is contiguous with the second site but with many peninsulas and islands of dry aspen upland interveining. It is not known for certain if the two *Williamsonias* come from the shrub-carr or tamarack related bog portion of the original site, but both *Williamsonias* have been associated with the shrub-carr through observation.

Sites like these should be searched early in the season, late April to mid-May for these two species. Their flight period begins and ends before most of us are out looking for dragonflies.

MOS at the Blue Bird Festival

Several hundred people were on hand to hear one of four talks by Mark O'Brien at the annual Blue Bird Festival in Jackson. In addition, we had a free booth at the festival, and answered questions about dragonflies to many festival attendees. Bev Shepard and Mike Ebinger worked at the booth on Saturday, April 7 while Mark was giving his presentation of "A Peek at Michigan Dragonflies." One highlight that Mike recalls was the amazement by many people that the dragonflies have an aquatic larval stage. We had many examples in alcohol to show people, and it was a successful teaching tool. One child asked why we didn't use white wine for the larvae! Numerous 1-sheet fact pages were also eagerly snatched up by attendees.

The BlueBird Festival is sponsored by the Dahlem Environmental Education Center in Jackson, and features a variety of wildlife artists and educational displays from all over Michigan and NW Ohio. Of course, it's mainly oriented towards birders, but anyone interested in various aspects of wildlife and natural history would find something to his/her taste. Many artists' booths featured dragonfly art this year, with color photography being the predominant medium. Myles Willard

from Tuscola Co., exhibits his excellent nature photography there, and he spent some time conversing with us about Odonata.

On Sunday, April 8, Adrienne and Marjorie O'Brien operated the booth with some assistance from Anneka Goss. Amazing that some people didn't think a 13 yr.-old could possibly know far more about dragonflies than they did. The crowds were smaller on Sunday, both on the exhibition floor as well as at the presentations. Beautiful, warm, sunny weather probably had something to do with it.

Overall, our first appearance at the Blue Bird Festival was a success, and it's something that we should do again. We received many positive comments from attendees and the BBF organizers. Perhaps next year we can have a more elaborate display for the Festival.

Other assistance in the form of 2x2 Odonata slides was provided by Carl Freeman and Myles Willard, and people really enjoyed seeing the images on the screen.

Beverly Shepard answers questions at the booth.

Mark grinning it up at the table.

NEW BOOK ANNOUNCEMENT

ANNOUNCING

The publication of

THE NATURAL HISTORY OF MECOSTA COUNTY, MI.

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Hine's Emerald Dragonfly

A federally-endangered species

Somatochlora hineana Williamson

by Mark F. O'Brien

HISTORY

Hine's Emerald Dragonfly is a member of the family Corduliidae, the emeralds and baskettails. This species was first described by E.B. Williamson from a site in northern Ohio in 1931. Subsequently, the species was virtually unknown to most people and few specialists. It was not until the 1990s that attention was given to refinding this species and associating it with the proper habitats. As a result of preliminary surveys, in 1995 it was given protection under the Endangered Species Act, and is now on the Federal Endangered Species List. This listing spurred an effort to document the existing sites for *Somatochlora hineana* and to search for new populations. As a result of the efforts by a few Odonata researchers, we now have a much better idea of the range and biology of Hine's Emerald. This note presents a summary of its biology and distribution with aids to identification.

BIOLOGY & HABITAT

Somatochlora hineana is a species restricted to calcareous areas where limestone lies close to, or at the surface, often overlain by a sandy or marly soil type. Larvae (= nymphs) are found in cool, shallow slowly-moving waters, which consist of spring-fed marshes, alkaline fens (= seepage sedge meadows), mineral-rich fens with shallow creeks, springs, small pools, and marl deposits and calcareous marshy streams. Many of these areas have small channels where the water moves very slowly through cattails and sedges. Recent work has shown that larvae often spend considerable periods of time within crayfish burrows (*Cambarus diogenes*) during the day, and these same burrows provide refuge for larvae during droughts. Once the adults emerge, they may be found within a kilometer of the breeding sites. Males establish small breeding territories which they defend against other males and sometimes even other species of dragonflies. They typically hover within 1-3 meters above the ground and slowly fly back and forth across their territory. Males will quickly dart out to challange another dragonfly. Females flying into the male's territory are pursued by males and eventually mate with them. Females lay eggs by repeatedly plunging the rear end of their abdomen into the water. Larvae may take 2 to 4 years to fully mature, depending upon food resources, water levels, and temperature. Once a larva is mature, it crawls up the stem of a cattail or other support, the skin splits on the back, and the adult emerges from the now lifeless larval skin. Within a few hours, the adult's wings and body have hardened enough for it to fly off and feed. Adult emergence is a critical time and adults are susceptible to predation by birds. Adults are usually found flying from late June to late July.

IMPORTANT! If you believe you have found a population of Hine's Emerald, DO NOT ATTEMPT TO COLLECT SPECIMENS. Take photographs if possible, and contact one of the people listed at the end of this document so that the sighting may be verified by a qualified individual with a U.S. Fish and Wildlife permit.

Once adults are on the wing, they are characterized by their emerald green eyes, two yellow thoracic stripes and large size (6.5 cm long, 9 cm wingspan) in comparison to other emeralds. The males also have very distinctive terminal appendages. Without proper training, it is very doubftful that one can identify the larvae.

DISTRIBUTION

So far, Hine's Emerald appears to be restricted to an arc of populations centered around Illinois, Wisconsin, Michigan, and Ohio. No recent populations have been found in Ohio, and it is considered extirpated there. The Illinois populations are small and threatened by encroaching industrial and residential development. The Door Co. Wisconsin populations appear to be quite large and not in immediate danger. The populations in

northern Michigan were discovered in 1998, and may yet represent the largest number of localities where this species is found. As of 2000, new records have been added from some other states not in the Great Lakes region, so it is possible that this species may be more widespread than previously thought.

In Michigan, *S. hineana* populations have been found in Mackinac, Alpena, and Presque Isle Counties. Additional sites may be anywhere with calcareous soils and/or mineral-rich fens. It is also possible that this species will be found in Canada. It is possible that the species occurs in Delta Co. where there is an abundance of limestone at the surface of the ground -- however, the proper combination of hydrology and terrain hasn't yet been seen. It remains a place to search for new populations, though. Also, Drummond Island and Mackinac Island could harbor Hine's Emerald.

DANGERS TO HINE'S EMERALD

Although predation on this species by other organisms constitutes a factor on population density, it is more likely that human-induced changes to the landscape and water quality have had a bigger impact upon it. Non-point pollution from golf courses and roadways certainly affect its habitat. Disruption of water flow to seepage fens and impoundment of slow-moving streams would certainly have a detrimental effect on this species. Since many populations are small and localized, a single catastrophic event at a marsh or breeding area could wipe out a local population.

MONITORING

The U.S. Fish and Wildlife Service is sponsoring efforts to monitor known populations of Hine's Emerald as well as to seek out new populations. If you believe you have seen Hine's Emerald Dragonflies, please contact any of the following people:

MICHIGAN: Mark O'Brien — Michigan Odonata Survey Coordinator, Museum of Zoology, University of Michigan, Ann Arbor, MI 48109. email: mfobrien@umich.edu; telephone: (734) 647-2199

ILLINOIS & WISCONSIN: Tim Cashatt — Dept. of Entomology, Illinois State Museum, Spring & Edwards Streets, Springfield IL 62706. email: cashatt@museum.state.il.us

OHIO: Bob Glotzhober — c/o Ohio Historical Society, 1982 Velma Avenue, Columbus OH 43211-2497. email: bglotzhober@ohiohistory.org

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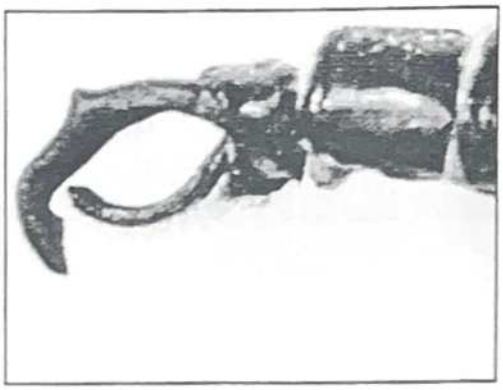

Hine's Emerald -male terminal appendages

Hine's Emerald Dragonfly at the Ridges Sanctuary — http://hinesdragonfly.org/

Illinois State Museum - Hine's Emerald Dragonfly Homepage - www.museum.state.il.us/research/entomology/mainpage.html.

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June 10 Field Trip

On Sunday, June 10, five of us met at the Leelanau School following the Saturday Michigan entomological Society Annual Meeting. Carl Freeman led the group consisting of Mark O'Brien, Jody Clark, John Douglass and George Balogh. By shortly after 9 am we were at the Crystal River upstream from the school, and were treated to a rash of Gomphids. Dozens of *Gomphus lividus* were flying and landing on the pathway and open sunny areas. Of course, Mark O'Brien made the statement that we should find exuviae, and we did find many on logs and sandy spots along the bank of the river. The treat of the day though, was the collection of *Hylogomphus adelphus*, the moustached lubtail. This attractive little gomphid was flying up to the trees near the path and to low shrubs. We found three, but saw no more for the rest of the morning. The early morning (before 10 a.m.) behavior could explain why the adults of this species seem to be elusive.

We were also treated to the sight of dozens of ebony jewelwings emerging from the larval skins on yellow iris and grasses along the river's edge. After a series of cool and rainy days, followed by several sunny day's it looks like the Odes are emerging en masse. We very briefly saw a large gomphid that John almost netted, but it was off before anyone could make more than a haphazard guess.

Gomphus lividus was mating over the moddle of the river and on one occasion, we witnessed two males trying to mate with one female.

We then moved on to the M-22 bog, and on the way in we saw several recently emerged *Celithemis elisa* perched on grass stems. As it was starting to cloud up, Carl moved us along to the mosquito-infested bog. Amazing how much the habitat influences the presence of mosquitoes. The water was the highest it has been since Carl started visiting the bog, which is good news for dragonflies (and mosquitoes). At the edge of the bog pond, we watched many *Cordulia shurtleffi*, and an *Anax junius*. There were many *Leucorrhinia glacialis* there, and *Enallagma boreale* was common. We caught one sphagnum sprite, *Nehallenia gracilis*.

We started back along a different route, and had to cross a small area of "open" water. Jody got her boot stuck in the muck, and became the first recipient of the "boot o' water." Wet, but not soaked, she made it to dry land.

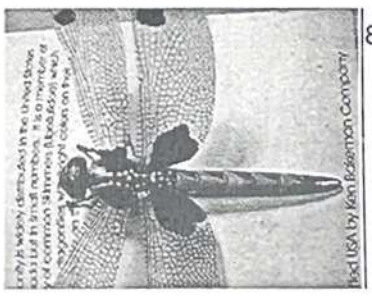
As we started back towards the parking lot, the rain began to gently fall, and by the time we split up, it was coming down enough to deter any more trips for the remainder of the day.

Our total species list for the day:
Calopterygidae:
Calopteryx maculata
Coenagrionidae:
Enallagma boreale
Nehallennia gracilis
Ischnura verticalis
Aeshnidae:
Basiaeschna janata
Anax junius
Gomphidae:
Gomphus lividus
Hylogomphus adelphus
Corduliidae:
Cordulia shurtleffi
Epitheca sp.
Libellulidae:
Ladonia julia
Plathemis lydia
Libellula pulchella
Celithemis elisa
Leucorrhinia glacialis

It was a good morning, nonetheless. For some of us, it was the first time we'd been together on a *bonafide* field trip. With so many talented and observant naturalists, a lot of other flora and fauna was pointed out amongst us. Thanks to Carl Freeman for leading the way!

REAL-LIFE DRAGONFLIES (ALMOST)

Recently, John Douglass brought some rather life-like dragonflies to my attention. The *Celithemis elisa* I received is larger than life-size, but nonetheless is quite realistic-looking. The body is hand-crafted from wood, painted, and clear plastic wings (perhaps from laser transparency material) complete the illusion. These fantastic bugs are made by the Ken Bakeman Co., right here in the good old USA. The price list includes the Green Darner, Elisa skimmer, 12-spot, western snaketail, and others. At $6.00 to $7.50 each, they are quite a bargain. You can find these dragonfly pins on the web at: creatures-kbc.com, or email Ken Bakeman Co. at orders@creatures- kbc.com. Telephone 425-806-5483.



REVIEWS

BOOK REVIEW: **Ontario Odonata Volume 1** (Including 1999 observations). Edited and compiled by Paul M. Catling, Colin Jones and Paul Pratt. June, 2000. Tronto Entomologists' Association, Toronto Canada. 154 pp., softcover, 8.5 x 11 in. ISBN# 0-921631-21-9.

There is a whirlwind of Odonata activity going on in Ontario, the likes of which even Walker would not have imagined. The group currently studying Odonata in Ontario (Gee, I have a name for them - Ontario Dragonfly Enthusiasts, or ODE) has been very active and has been publishing results of studies in a series of books, called Ontario Odonata. Published by the Toronto Entomologists' Association, these volumes provide a ready reference to recent work on the fauna of our neighbors to the East.

There are currently 2 volumes published, and I am reviewing the first volume here. The Ontario Odonata Vol. 1 consists of 23 articles - much like a journal. Most of the articles have annotated species lists from various parks and other areas. However, one may find articles such as "An illustrated key to the mature nymphs and exuviae of eastern Canadian hanging clubtails (*Stylurus*)" and "Dragonfly migration in western Lake Ontario area in 1999" to be quite useful elsewhere. All of the articles are fully referenced and well written. The major part of the book is taken by the 1999 summary table which provides a complete listing of the species observed, with locality information. This is useful reference material, and it is rare to see complete collection summaries for groups in printed form, so it does become a permanent record for future workers.

The body of work presented in this volume would be useful to anyone working with Odonata in the Great Lakes Region, and I encourage its purchase by anyone associated with survey work. It's wonderful to see published results in such a short span of time from the Ontario folks, and given the large and sometimes inaccessible area they have to cover, I wish them much success. I also envy the energy the group has generated, and their publications leave me impressed.

For purchase of the above volume or any other Ontario Odonata publications, contact Alan J. Hanks, 34 Seaton Drive, Aurora, Ontario, Canada L4G 2K1. email: a.hanks@aci.on.ca

...Mark O'Brien

BOOK REVIEW: **THE NATURAL HISTORY OF MECOSTA COUNTY, MICHIGAN** - A Survey of the County's Wildlife at the Beginning of the Twenty-first Century, by Stephen Ross. 2001, 8.5 x 11", 278 pp., softcover. Wood Turtle Publications, ISBN 0-9709389-0-X. $15.94.

Our very own Stephen Ross has published a body of work that I do not believe has been done by any single individual for any county in Michigan -- it is the culmination of 30+ years of tramping through the habitats of Mecosta Co. The book is really an amazing body of work, as it contains an annotated listing for nearly 1200 species of plants, 53 species of mammals, 245 species of birds, 70 species of fish, 17 amphibians and 23 reptiles, 84 species of butterflies, and finally, 93 species od Odonata.

The book is more than a checklist, as it contains an overview of the history, geomorphology and and climate of the area. Species accounts are provided for the animals, and seasonal summaries provide a useful quick reference. A guide to the many natural ares of Mecosta Co. will prove invaluable to anyone wishing to visit the sites mentioned in the book.

My primary concern was the Odonata information, and except for a few spelling errors that were not fixed prior to publication, the data is useful and accurate. Ninety-three species of Odonates for a county is pretty good, and of course, two of them happen to be both species of Williamsonia. Not bad, Steve!

Why is this book important? With the emphasis by several governmental agencies of an "All-Taxa-Biodiversity-Index" for certain areas, probably costing a fair amount of money and involving many researchers, this book points out what a talented avocational naturalist can do with limited resources and a lot of perseverance. Of course, not all insect groups are represented, but imagine how much longer it would have taken Stephen to compile a list of beetles! The fact that he stuck to species that can be readily identified with currently available guides is a plus. The book should be very useful for any nature centers and schools in the western half of the state.

I think Steve's book will become more valuable as time passes, as it becomes a written record of what was in Mecosta Co. It certainly belongs on the shelf of anyone wanting to know more about the natural history of the western part of Michigan, and it is a model for anyone contemplating a similar effort elsewhere. What impresses me most of the breadth of the book. Most other efforts will likely be collaborations by several authors, as few of us can lay claim to being knowledgeable about all things in the natural world. There

may be minor faults in the book found by experts in their respective groups. However, I have yet to see anything else like the Natural History of Mecosta County, Michigan put out by the "experts"!

Finally, you can order a copy by emailing Stephen for more details at rosssb@tucker-usa.com. See his ad elsewhere in this issue for ordering details.

...Mark O'Brien

EXUVIAE COLLECTION CONTAINERS

Otherwise known as plastic film cans, I have accumulated hundreds of these items from my photographic work over the past year. They make great containers for exuviae collection as well as larval specimens. Now, I hate to just put them into recycling, so if you would like some (minimum of 25), please let me know and I will send them to you, free of charge. I also have a large number of Altoid tins which are useful for putting teneral adults into, as well as exuviae. If you would like some of those, let me know. A museum colleague gave the MOS about 50 of those tins, and that's far more than we can use here.

ZEBRA MUSSELS AND ODONATA LARVAE

I recently received an e-mail from Carl Freeman about someone finding quantities of Zebra Mussels on larval Odonata in Otter Lake within Sleeping Bear Dunes National Lakesore. This was just a few days after having witnessed a massive emergence of *Dromogomphus spinosus* at Burt Lake on June 16. Out of the hundreds of exuviae that I looked at on the shoreline, one had a Zebra Mussel still attached to the posterior dorsum of the abdomen. The mussel was 7.1 mm long, and the length of the *D. spinosus* exuviae was 38 mm. Obviously, it was not enough to deter the larva from emerging onto the shore - a certain death for the Zebra Mussel.

Whether or not Zebra Mussels can affect larval Odonata is not clear. Since a larva molts as it completes growth from one instar to the next, mussels would not have a lasting effect on any one larva. However, it would seem that the last instar may be the most susceptible to mussel attachement since in many instances, the larva remains in the final instar longer than than previous instars, as it waits for the "magic moment" to emerge from the lake onto the shore. Slowing down an active dragonfly larva by mussel attachment may result in it being eaten by other animals, but so far there is no evidence for that.

If you encounter more instances of Zebra mussel attachement to exuviae or live larve, please send them along to me and I'll compile the data.

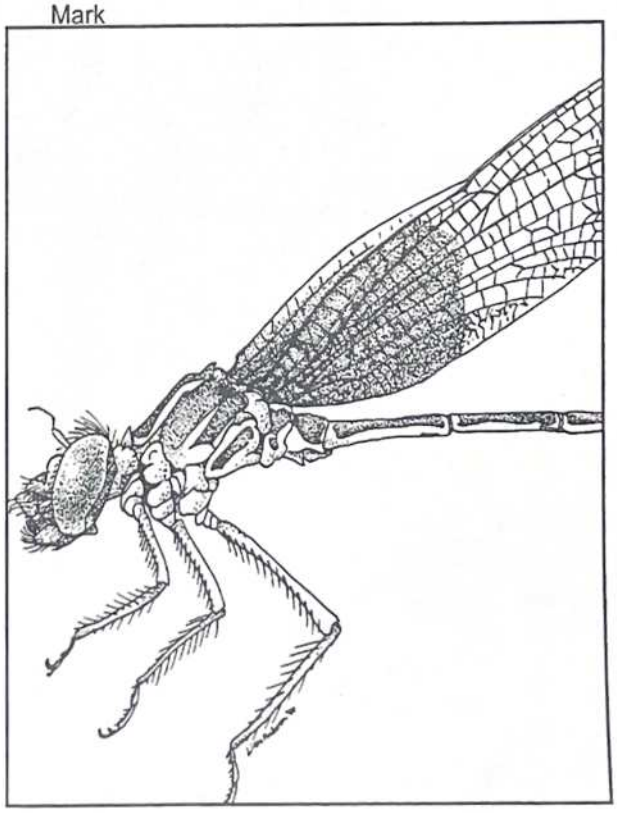
...Mark O'Brien

APOLOGIES

I apologize fore the lateness of this issue, which is a combined spring/summer number. Where did the time go? Please gather your notes from the summer for a big fall issue.

Thanks,

Mark



Williamsonia

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If you like *Williamsonia*, and would like to contribute towards its operating expenses, make your $10/year contribution payable to the University of Michigan Museum of Zoology.

Dragon Hunter T-shirts are still available.

THE DRAGON HUNTERS
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Sizes: MED, LG, XL

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