



***Hetaerina titia* IS in Michigan!**

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Although *Hetaerina titia* (Drury) was listed in Kormondy (1958) from Oakland Co., apparently no recent records were deposited in the collections of the UMMZ. Mark O'Brien (1998) mentioned that there were no verified records of *H. titia* for Michigan at the time of his writing. After reading that issue of *Williamsonia*, I realized that observations of *H. titia* not included in my dissertation should be reported here.

While conducting field work for my dissertation on *Hetaerina americana* (Fabr.) in 1982, 1983 and 1984 (Weichsel 1987), I observed *Hetaerina titia* (Drury) adults at my study site. The site was located in Green Oak Township, Livingston County, Michigan, along a north-flowing stream emptying into the Huron River just upstream of the US-23 bridge. Most of my observations were made in a 200 ft. sunny section with shaded sections at either end, about 1000 yards upstream from the point the stream empties into the river.

I looked for and counted individuals of *H. americana* and *H. titia* from June to early October in 1982 and 1984, and from June to mid-September in 1983. *Hetaerina titia* were observed in the shaded sections at the ends of the site. They tended to be most apparent silhouetted against the sky and were very difficult to approach, flying to a higher perch rather than one further along the bank (as was the case with *H. americana*). The number of *H. titia* counted did not indicate the absolute size of the population, but gave an idea of the length of the season and the change in population size over time.

H. titia had a much shorter flight season than *H. americana* at this site, with *H. americana* first appearing from early to late June, while *H. titia* was first recorded at the end of July or first week of August. Counts of both species declined around the time of my final observations each year, in late September or early October. In both 1983 and 1984, the population of *H. americana* displayed two peaks in adult abundance, with the first and largest in the second or third week of July, and the second in mid to late August. The *H. titia* population peak coincided with the second *H. americana* peak. In 1982 the data were less clear, but were consistent with a similar underlying pattern. These patterns suggest that *H. americana* nymphs may

be able to tolerate a wider range of conditions than those of *H. titia*.

The site was revisited on August 4, 1998 by myself, Mark O'Brien and Ethan Bright to see if the population of *H. titia* is still extant. Although it was not an ideal day for collecting (overcast), we managed to collect a male *H. titia* on a branch about 6 feet above the stream. Other similar streams should also be examined for more populations of this species.

I have deposited a single adult male specimen of *H. titia* from this site (Aug. 10, 1984) at the UMMZ. It bears MOS #0016962. The 1998 specimen will be incorporated into the UMMZ collection later this year.

LITERATURE CITED

- Kormondy, E.J. 1958. A catalogue of the Odonata of Michigan. Misc. Publication Museum of Zoology, Univ. Michigan. 104:1-43.
- O'Brien, M.F. 1998. 1998 Species Search. *Williamsonia* 2(1):2-5.
- Weichsel, J. I. 1987. The life history and behavior of *Hetaerina americana* (Fabricius) (Odonata: Calopterygidae). Ph. D. thesis, Univ. of Michigan, Ann Arbor. 193 pp.

MOS Field Trip – 24 May 1998

Ethan Bright

Clouds and the approach of afternoon rain did not put a damper on a successful day collecting in the Pickney Recreational Area in Washtenaw County, southern Michigan. This area is characterized by a heterogeneous collection of wetlands, ponds, bogs, lakes and small streams in hilly morainal topography. Embury Rd. crosses several of these habitats, including a tamarack bog/fen (watch out for the poison sumac!) surrounded by northern hardwoods forest, and several small, groundwater-fed brooks. This combination of habitat made for very productive collecting. *Plathemis lydia* appeared very curious of our presence, and made for an easy catch. Closer inspection of the vegetation along the road yielded other odonates, including *Celithemis elisa*, *Ladona julia*, and *Enallagma boreale*. Where a stream cuts through the tamarack wetland, our attention was soon drawn toward *Aeshna mutata*, and about a half hour was spent trying to snag one of these powerful flyers. These were hawking along the road, their activity excited by the movement of insect prey

caused by the disturbance of roadside vegetation by passing cars and resulting road dust.

Further up the road, at another stream cutting through hardwoods forest, is a site where *Cordulegaster maculata* was previously caught. Though no spiketails were found on this day, *Calopteryx maculata* and *Enallagma* spp. were plentiful at this site. After lunch we walked along a forest path and came upon a grassy clearing that provided us with a bonafide cornucopia of adult odonates. These were apparently feeding or taking sheltering from the rain that soon increased in intensity. The biggest surprise was *Nanothemis bella*, apparently about three weeks earlier than the previous early date in Michigan. Other specimens captured included another *Aeshna mutata*, *Celithemis elisa*, and *Enallagma boreale*.

After the bonanza of the forest clearing, we ventured to a nearby unnamed pond with an abundance of emergent aquatic plants and, in the middle, an apparent vegetative mat (source of larval *N. bella*?). Careful examination of reeds, grasses, cattails (*Typha latifolia*) and yellow water-lily (*Nuphar* sp.) soon revealed many exuviae of *Aeshna mutata* and *Lestes eurinus*, the latter from which several general adults clung nearby their larval cast skins. Both species apparently emerge about 3-6 cm above the water surface from areas of the water whose depth ranged from 20-70 cm. A careful search also revealed an exuviae of *Anax junius* (wow – that is early! – ed) and *Dorocordulia libera*. Regretting not having brought my aquatic net, I used my aerial net to sample underneath some grassy clumps in the water. Several apparently mature specimens of *Libellula quadrimaculata*, *Pachydiplax longipennis*, *Symptetrum costiferum* and *Nehalennia irene* were netted.

(Editor's Note: The wetlands around Embury Rd. are worthy of extensive study, and I believe that a detailed study of the Odonata fauna there over a several-year period will reveal some new Washtenaw County records and extend the range of some species more typically associated with habitats farther north.)



URGENT APPEAL FOR SUPPORT

To: All members of the Dragonfly Society of the Americas
From: Mike May, on behalf of the DSA Executive Council
Subject: Financial subsidy for publication of Philip Corbet's "Encyclopedia of Dragonfly Behavior and Ecology".

Many of you are probably familiar with Philip Corbet's classic book, "A Biology of Dragonflies", first published in 1962. Although now badly out of date, it has long set the standard for literature on the ecology and behavior of our favorite organisms and continues to be a valuable source of information. Now, however, Philip has completed an entirely new work that, besides being up-to-date, is much more comprehensive than the earlier book (projected at nearly 1000 pp., 16 color plates, and a remarkable bibliography). It is being published by Cornell University Press and, according to their editor in charge of the project, is ready to go to production; they hope to have it in print by

Spring 1999. I have reviewed most of the manuscript for the Press and can assure you that it is a monumental accomplishment. Besides providing a definitive summary and synthesis of odonate biology, it is a rich source of questions and ideas for future research and observation.

Because of the size of the book and its relatively small potential market, production costs are very high, and the Press has estimated that the sale price of the book would be on the order of \$200 unless it is subsidized in some way. The total subsidy needed from all sources is about \$15,000; this would make it possible to keep the price down to around \$100 or less. They have approached a number of national dragonfly societies, and most have agreed to try to contribute toward this subsidy. The effort is being spearheaded by Georg Ruppell of the German Dragonfly Society.

At the meeting in Valentine last week, we decided during the Business Meeting that, because of anticipated expenses of uncertain magnitude, it would be unwise to make a contribution from our regular operating funds, although the Constitution does permit this. Nevertheless, there was a strong feeling that the project is an extremely worthwhile one that does deserve our support as odonatologists. That is the reason for this appeal. We hope that as many DSA members as possible can make a financial contribution to this effort. Our treasurer, Jerrell Daigle, is setting up a special account for contributions. We hope to be able to raise approximately \$2000 by the end of August. Contributions of \$20 from 100 members would take us to that goal, and \$20 is thus the suggested amount for contributions, but whatever you feel you can give will be very welcome. We especially urge U.S. and Canadian members to consider contributing, because members from outside the Americas may already have contributed via other national organizations, and those in Latin America may find that economic conditions make contributions more difficult. Please send all contributions to

Jerrell Daigle
DSA Treasurer
2166 Kimberley Lane
Tallahassee, FL 32311

Also, please mark all checks for "**Corbet Book Fund**". If you are able to give something, please don't delay - because of the publication schedule, all funds will have to be passed on to Dr. Ruppell by August 31. Also note that we are uncertain whether these contributions are tax deductible in the U.S.; please consult with your tax advisor if you plan to take a deduction.

Thanks to everyone for their help.
Mike May

BERRIEN/CASS COUNTY MOS FIELD TRIP

Mark O'Brien

On Sunday, June 21, Laura Krueger and I left sunny Ann Arbor at 6 a.m. for the MOS collecting trip to Warren Woods Natural Area and other points of interest for the day. The trip from Ann Arbor to Berrien Co. zipped by and as we got closer to Warren Woods, the sun kept getting obscured for longer periods as clouds moved in from the

west. However, it was very warm and humid, and we hoped that the day would still be a good one. Recalling the May MOS field trip and last year's spring workshop, it seemed to me that the rain gods have it in for me.

Laura and I arrived at Warren Woods around 9:20 after having been confused by a street sign calling Elm Valley Rd another name on the west side of the main highway. We waited at the parking area for a few minutes and talked to a birder about what species were active and what we were up to. Warren Woods is a very popular spot with birders (warbler heaven, I am told), botanizers and mosquitoes. Warren Woods was spared the lumberman's axe in the 1870s when the purchaser, E.K. Warren, bought the 200 acres to preserve the wonderful hardwood stands for posterity. Large beech trees, sweet gum, and many other hardwoods more typical of southern areas makes this a special area not to be missed. The area has been studied for arthropods, but those studies were made back before 1930. T. H. Hubbell spent a summer there working on the Orthoptera of the area in 1916, and there is a legend that his initials are carved on a large beech tree somewhere. It's probably fallen over by now!

At about 9:30, Bill Westrate joined us, and the three of us began exploring the area for signs of *Tachopteryx thoreyi* and other seep/stream species. The Galien River was pretty muddy from recent rains, and its banks too slick to trust. The river moves quite slowly through Warren Woods, and although there are gravelly areas, they seemed to be pretty mucky. Several minutes of kick-sampling yielded lots of crayfish and other aquatics, but no odonates. The sky kept to its overcast tone with a few brief periods of sun, so we abandoned the river (all we saw there were lots of *Calopteryx maculata*). The foot-bridge over the river was also out, making us stay on the south side of the park. We walked along the edge of the woods where it turns into a flood plain forest with numerous seepy/mucky areas and lots of pools that are probably permanent. Hardly anything was flying except for a couple of *Lestes* and lots of *Calopteryx*. We saw some seepy areas that might have been possible *Tachopteryx* habitat, but nothing was flying. Nothing, that is, except for a female of *Epiaeschna heros* that I netted as she was looking for oviposition sites amongst the pools with mucky edges. What a monster! I had hoped for seeing a *Tachopteryx*, but this is only the second time I have seen an *Epiaeschna*, and we were all duly impressed. We then checked out a really nice "typical" seep that one might associate with *Tachopteryx* on the east side of the trail back towards the parking area. At the bottom of the hillside, was a small stream emerging from the seep. The "stream" was about 1-2 feet wide and a couple of inches deep at most, with a sandy bottom, but with deep muck on either side (as I found out when I stepped off and sank nearly to my knee). The seep above the stream was substantial, and it looks like an excellent candidate for *Tachopteryx* larval habitat. Undoubtedly, there are more sites like that scattered about in Warren Woods.

We took a break at the picnic table near the parking area and enjoyed Laura's chocolate-chip cookies. A couple (from Ann Arbor, no less) about to go for a walk in the woods asked about the mosquito conditions. We didn't think they were too bad, but shorts and sandals were out. Bill arranged for us to meet him at his farm in Cass

County, and Laura and I got there about 12:30. Again, it was mostly cloudy with some brief periods of sun. Unless it rained (we did get a very brief shower), I felt it could only get better - but would it clear at 6 PM or 2 PM?

Bill Westrate farms several hundred acres in northern Cass Co., and has a large chunk of land that he's kept natural. He is, by my definition, a renaissance man. He's not your dad's farmer, that's for certain. He's an excellent nature photographer, a herpetologist, a versatile and extremely knowledgeable naturalist, a wood worker, a creator of entomological exhibits, and probably has lots of other interesting facets to his life as well. I first met Bill about 12 years ago, when he came to the Museum of Zoology to ask Dolly Gloyd for some help with Odonata identifications. I didn't get to know him until about 6 years ago, and have visited his farm a couple of times. Bill has some very interesting natural areas on his property - a fen, Dowagiac Creek, and a pond. All interesting areas for Odonata. Of course, he has *Nannothemis bella* in his "back yard." Carl Freeman in Benzie County is the only other person I know that can make that claim.

Laura, Bill and I sampled along and in the Dowagiac Creek. There are some very nice riffle areas where we found *Ophiogomphus rupinsulensis*. In the vegetated margins we found *Boyeria vinosa* (some of the larvae were almost ready to emerge) and *Calopteryx maculata*. It was still cloudy, and not much was flying. We did find an *Argia apicalis* along the bank, as well as *Ischnura verticalis* and *Enallagma sp.*

The sun finally blazed hot and strong when we visited the pond (lots of nice bass in there, Bill!). By this time, the dragons were out in force, and we saw the typical pond species: *Anax junius*, *Libellula lydia*, *L. luctuosa*, *L. pulchella*, *Erythemis simplicicollis*, and *Pachydiplax longipennis*.

Our next stop was Lawless County Park in the southeast part of Cass Co. Bill led us through some nice moraines to a marl-bottomed pond, where Laura caught *Libellula incesta*. We then walked a nice sandy-bottomed stream where Bill had previously taken *Cordulegaster diastatops*. There was a lot of arrow arum growing out of the stream, so walking it (with the heat and humidity) made it seem like we were in the jungle somewhere. The highlight here was that Bill caught a *Hagenius brevistylus* that was waiting for something juicy to fly by. *Hagenius brevistylus* tends to perch on overhanging branches above the water, and are typically quite fearless, only flying away reluctantly.

By this time, it was approaching 5 PM, and Laura and I had one more stop to make. We said good-bye to Bill, and made our way to Three Rivers State Game Area. This area is another known collection site for *T. thoreyi*, as there are several seeps in the woods there. The edge of the game area is fed by a stream from Little Wood Lake, and the stream is a great place to see lots of *Hetaerina americana*, *Calopteryx maculata*, *Argia fumipennis* and *A. sedula*. The day was getting along, so Laura and I scouted around a bit and then headed home to Ann Arbor. I got home around 9 PM, and put the day's catch into acetone. It was perhaps not as successful a day as we had hoped, but it wasn't bad, either. We saw some excellent

habitat, and know that *T. thoreyi* will show up again. It's just a matter of having good weather, proper timing, and finding more seeps like the one at Warren Woods will also aid in its location.

1998 Schedule of Michigan Odonata Survey Trips

Subject to Change

Field Trips are scheduled to expose MOS participants to sampling techniques for aquatic and aerial stages of Odonata. Protocols for data recording and sampling can be demonstrated, and participants can share observations. Field trips are also a way for us to explore interesting habitats and to search for new records and validate old ones. It's a good chance to meet others with similar interests, and renew acquaintances.

Note: If it is raining the day listed, the field trip is off. There are no alternate days scheduled.

9 August- Lapeer Co. Ortonville S.R.A. - Big Fish Lake and nearby marshes & streams. Meet at Big Boy in Fenton off US 23 at 9:30 am., and we will collect in Lapeer Co. until we poop out. We'll coordinate & car pool from the Big Boy parking lot.

13 Sept. Washtenaw Co., Chelsea S.G.A. and Waterloo S.R.A. 10 am - meet at parking lot for Chelsea SGA.

18 Oct. - MOS Fall Business Meeting/workshop - place TBA. (Any offers to host the meeting?)

The MOS has aquatic and aerial nets that can be shared on a field trip, so don't worry if you don't have a net.

If you have questions, give Mark O'Brien a call at 734-647-2199 (day) or 971-6033 (home); or e-mail at mfobrien@umich.edu

METAMORPHOSIS

Laura Krueger is moving on to LaLa land, as she's taken a position with a pest management company in Los Angeles. She received her B.S. from UM in May, and has been a nearly continuous presence at the Insect Division since her freshman year. Laura has been one of the stalwart "bug mounters" over the last few years, and has also entered a lot of data into the MOS database. This summer, she has been monitoring various sites for the Nature Conservancy in Michigan, and has also been sampling for Odonata. We will miss her cheery presence at the museum, and wish her the best of luck in California. Come back and visit us, Laura!

Mike Kielb started work as the Adult Education Coordinator at Nichols Arboretum in Ann Arbor earlier this year, and will probably be very busy getting various aspects of their programs up and running. Mike will continue his pursuit of birds and dragons, and we wish him the best in his new position at the School of Natural Resources. You can reach him via his new email address: mkielb@umich.edu.

PRESERVING ADULT SPECIMENS FOR THE MOS

Mark O'Brien

A number of MOS members have asked me about the proper procedures for preserving adult Odonata for the MOS. This is one of those topics that is near and dear to my heart as a collections manager. I try to make specimens last as long as possible with a minimum amount of intervention. Once any insect specimen has been properly preserved, it should last indefinitely. However, the hard part is getting the specimen preserved in a fashion that will provide maximum usefulness and the best longevity. Mold and insect pests are problems that I have to contend with. Encasing something in acrylic plastic will certainly protect it, but the specimen is pretty much useless for anything but a cursory examination. What is important for the preservation of adult odonates is to observe the following for best results:

1. Kill the specimen as quickly as possible.
2. Dry the specimen as rapidly and completely as is practical.
3. Keep the specimen in a dry place protected against pests.

I have had specimens come in from several sources that were moldy. In each case, the specimens were not quite dry and were stored inside the clear plastic envelopes that we use for permanent storage. The specimens had been killed via other methods instead of with Acetone. If you are not using Acetone, I'd rather that you left the specimens in glassine envelopes or paper triangles.

Acetone has become the choice method for killing adult odonates and for assisting in the rapid desiccation necessary for good preservation. Acetone dissolves the fats and absorbs the water from specimens, and prevents the specimens from rotting, as is typical for other methods. Acetone is also readily available at hardware stores, and a gallon will last for a season's heavy collecting. I don't recommend freezing specimens, because the colors become muted, and the specimens will give off that rotten smell unless quickly and thoroughly dried. The fats also stay with the specimen, which causes the specimen to darken. Some people still use ethyl acetate or cyanide for killing specimens. There is a problem with the specimens dying with the wings in strange positions using those killing agents, and again, fats are not dissolved from the body, and color preservation is not as good.

Here is the procedure that you should follow:

1. After capturing the specimen, place it in a glassine envelope (translucent paper, not clear plastic) (these are provided free of charge by the MOS) with the wings folded OVER the back, so that the specimen slides into the glassine envelope head-first. If you have a band-aid box, you can store the specimens in that until you are ready to preserve them. Make sure each envelope has a collection number so that you can match up the specimen with your notebook. In lieu of a number, the complete data can be written on the glassine envelope, or penciled in on a small card that is left in the envelope.

2. Snip a corner off the envelope to allow the acetone to rush in and drain out easily. Then, drop the enveloped specimen into the jar of acetone. A 32 oz wide-mouth jar works fine for this. I recommend leaving the jar inside a coffee can that is just slightly larger to protect it. Drop the specimens in at the end of the collecting period - or end of the day.

3. Store the specimen in acetone for about 12 hr and then remove and let dry completely. Make sure that you work with the acetone in a well-ventilated area. Use rubber gloves if you are handling the envelopes without the aid of forceps. Leave the specimens in the glassine envelopes for shipment to the MOS.

4. Dry the specimens in a well-ventilated area. DON'T use the oven, and do not microwave! Leaving them in the sunlight for a couple of hours will work fine. DO NOT transfer them to the clear plastic 3 x 5 envelopes at this time.

5. Store the specimens (after they are completely dried) in a plastic shoe box or similar container. If you are unsure if they are fully dried -- a week should suffice to fully dry them out. If you are undecided on what to do, just keep them in glassine envelopes, and we'll transfer them to 3 x 5 envelopes.

6. When you are ready to ship the specimens to the UMMZ, place them in one of the small 3 x 5 boxes furnished by the MOS and make sure nothing is rattling around by cushioning the specimens with tissues or toilet paper. Tape the box closed, and enclose it inside a larger box that leaves about 2" of padding on each side. Use whatever cushioning material that you have available.

MINIMUM INFORMATION TO PROVIDE: STATE (MICHIGAN), COUNTY, TOWNSHIP, FEATURE (lake, creek, precise locality), DATE, COLLECTOR. Of course, you can add other information.

By following the above methods you should be able to preserve specimens with good color retention that will not mold or turn dark with body fats.

EDITORIAL EXUVIAE

1998 SEASON SUMMARY

We will attempt to summarize the many new records and range extensions from this summer in the fall issue of *Williamsonia*. If you have specimens and/or records to contribute, please mail them in before the end of October. This has been quite a busy year with specimens and records coming from a number of MOS participants. Your assistance has really helped our effort!

HINE'S EMERALD PERMIT GRANTED

A permit for taking samples of Hine's emerald, *So-matochlora hineana*, was issued to Mark O'Brien and Ethan Bright by the U.S. Fish & Wildlife Service in early

August. It probably won't be used this year, but if it gets renewed for next year, it will facilitate our work and allow for salvage of specimens, exuviae, and adults from new localities. Since incidental take was our main concern, the permit is a welcome addition to our files!

IN THE NEWS

The MOS trip to Hudson Mills Metropark was featured on the front of the July 6th *Ann Arbor News*. About 20 participants were led on a "dragonfly walk" along the Huron River on the 5th, by Mark O'Brien with assistance from Beverly Shepard and Marjorie O'Brien. It was a good day for *Hetaerina americana*, *Argia moesta*, *Libellula luctuosa*, and *Stylurus spiniceps*. The adults and kids really enjoyed the "tour" and the weather cooperated for a change, making for a very hot, but fun afternoon.

Identifying Michigan *Sympetrum*

We have reprinted Mike Kielb's key that appeared in 1996: Occurrence of libellulid dragonflies (Odonata: Libellulidae) in southeastern Michigan and adjacent Essex County, Ontario. *Great Lakes Entomol* 29(1):1-9. Many MOS members have asked how to identify the meadow-hawks that start showing up in midsummer.

Mike Kielb's *Sympetrum* ID from GLE 29(1) [1996].

Identification criteria of dragonflies of the genus *Sympetrum* occurring in Michigan.

Scientific name	Common name	Hind Wing	Abdomen Length	Total Length	Face	Tibia
<i>Sympetrum ambiguum</i>	Blue-faced Meadowfly	26-28	23-25	36-38	bluish-white	yellow
<i>Sympetrum corruptum</i> ¹	Variiegated Meadowfly	29-30	29-30	39-42	red	dark
<i>Sympetrum costiferum</i>	Saffron-winged Meadowfly	25-28	21-26	31-37	pale	pale
<i>Sympetrum danae</i> ²	Black Meadowfly	20-27	18-24	21-23	black	black
<i>Sympetrum internum</i>	Cherry-faced Meadowfly	23-27	23-27	23-36	red	black
<i>Sympetrum obtrusum</i>	White-faced Meadowfly	20-29	22-26	31-39	white	black
<i>Sympetrum rubicundulum</i>	Ruby Meadowfly	24-30	21-23	33-34	yellow	black
<i>Sympetrum semicinatum</i> ³	Band-winged Meadowfly	18-23	16-20	24-31	yellow	black
<i>Sympetrum vicinum</i>	Yellow-legged Meadowfly	21-23	21-22	31-35	red	yellow

¹Distinctive abdominal color pattern mottled with reds and browns.

²Distinctive abdominal color pattern of black and yellow.

³Hind wings banded with translucent orange.

Visual key for quick tentative identification of dragonflies in the genus *Sympetrum*.
(The final separation of many specimens in groups 5&6 still requires inspection of the genitalia.)

- 1a. Abdomen mottled in red and olive/brown.....*corruptum*
- 1b. Abdomen predominantly yellow, olive, orange, or reddish.....2
- 2a. Abdomen color yellow and black..... *danae*
- 2b. Abdomen reddish, orange, or olive and black.....3
- 3a. Wings banded with transparent orange for half the length, basally..... *semicinatum*
- 3b. Wings unmarked.....4
- 4a. Tibia pale or yellow.....5
- 4b. Tibia dark or black.....6
- 5a. Face red.....*vicinum*
- 5b. Face bluish-white or white.....*ambiguum*
- 5c. Face pale..... *costiferum*
- 6a. Face red.....*internum*
- 6b. Face white.....*obtrusum*
- 6c. Face yellow..... *rubicundulum*

**CHECKLIST OF MICHIGAN
ODONATA**

August 1998

**ZYGOPTERA
Calopterygidae**

Calopteryx aequabilis Say
Calopteryx maculata (Beauvois)
Hetaerina americana (Fabr.)
Hetaerina titia (Drury)

Lestidae

Lestes congener Hagen
Lestes disjunctus disjunctus Selys
Lestes dryas Kirby
Lestes eurinus Say
Lestes forcipatus Rambur
Lestes inaequalis Walsh
Lestes rectangularis Say
Lestes unguiculatus Hagen
Lestes vigilax Hagen

Coenagrionidae

Amphiagrion saucium (Burmeister)
Argia apicalis (Say)
Argia moesta (Hagen)
Argia sedula (Hagen)
Argia tibialis (Rambur)
Argia fumipennis violacea (Hagen)
Chromagrion conditum (Hagen)
Coenagrion interrogatum (Hagen)
Coenagrion resolutum (Hagen)
Enallagma antennatum (Say)
Enallagma aspersum (Hagen)
Enallagma boreale Selys
Enallagma basidens Calvert
Enallagma carunculatum Morse
Enallagma civile (Hagen)
Enallagma cyathigerum (Charp.)
Enallagma cyathigerum vernale Gloyd
Enallagma divagans Selys
Enallagma ebrium (Hagen)
Enallagma exsulans (Hagen)
Enallagma geminatum Kellicott
Enallagma hageni (Walsh)
Enallagma signatum (Hagen)
Enallagma traviatum (Selys)
Enallagma vesperum Calvert
Ischnura kellicotti Williamson
Ischnura posita (Hagen)
Ischnura verticalis (Say)
Nehalennia gracilis Morse
Nehalennia irene (Hagen)

**ANISOPTERA
Petaluridae**

Tachopteryx thoreyi (Hagen)

Cordulegastridae

Cordulegaster erronea Hagen
Cordulegaster maculata Selys

Cordulegaster obliqua (Say)
Cordulegaster bilineata Carle
Cordulegaster diastatops (Selys)
Aeshnidae

Aeshna canadensis Walker
Aeshna clepsydra Say
Aeshna constricta Say
Aeshna eremita Scudder
Aeshna interrupta Walker
Aeshna juncea Linn.
Aeshna mutata Hagen
Aeshna sitchensis Hagen
Aeshna subarctica Walker
Aeshna tuberculifera Walker
Aeshna umbrosa Walker
Aeshna verticalis Hagen
Anax junius (Drury)
Anax longipes Hagen
Basiaeschna janata (Say)
Boyeria grafiana Williamson
Boyeria vinosa (Say)
Epiaeschna heros (Fabr.)
Gomphaeschna furcillata (Hagen)
Nasiaeschna pentacantha (Rambur)

Gomphidae

Dromogomphus spinosus Selys
Hylogomphus adelphus Selys
Arigomphus cornutus Tough
Gomphus exilis Selys
Gomphus fraternus (Say)
Arigomphus furcifer Hagen
Gomphus graslinellus Walsh
Gomphus lineatifrons Calvert
Gomphus lividus Selys
Gomphus quadricolor Walsh
Gomphus spicatus Hagen
Arigomphus submedianus Williamson
Gomphus vastus Walsh
Gomphus ventricosus Walsh
Arigomphus villosipes Selys
Gomphus viridifrons Hine
Hagenius brevistylus Selys
Ophiogomphus anomalus Harvey
Ophiogomphus aspersus Morse
Ophiogomphus carolus Needham
Ophiogomphus colubrinus Selys
Ophiogomphus howei Bromley
Ophiogomphus rupinsulensis (Walsh)
Progomphus obscurus (Rambur)
Stylogomphus albistylus (Hagen)
Stylurus amnicola Walsh
Stylurus laurae Williamson
Stylurus notatus Rambur
Stylurus plagiatus Selys
Stylurus scudderi Selys
Stylurus spiniceps (Walsh)

Macromiidae

Didymops transversa (Say)

Macromia illinoiensis Walsh
Macromia taeniolata Rambur

Corduliidae

Cordulia shurtleffi Scudder
Dorocordulia libera (Selys)
Epitheca canis MacLachlan
Epitheca cynosura (Say)
Epitheca princeps (Hagen)
Epitheca spinigera Selys
Neurocordulia yamaskanensis
(Provancher)
Somatochlora cingulata (Selys)
Somatochlora elongata (Scudder)
Somatochlora forcipata (Scudder)
Somatochlora franklini (Selys)
Somatochlora hineana Williamson
Somatochlora incurvata Walker
Somatochlora kennedyi Walker
Somatochlora linearis (Hagen)
Somatochlora minor Calvert
Somatochlora walshi (Scudder)
Somatochlora williamsoni Walker
Williamsonia fletcheri Williamson

Libellulidae

Celithemis elisa (Hagen)
Celithemis eponina (Drury)
Celithemis monomelaena Williamson
Erythemis simplicicollis (Say)
Leucorrhinia frigida (Hagen)
Leucorrhinia glacialis Hagen
Leucorrhinia hudsonica (Selys)
Leucorrhinia intacta (Hagen)
Leucorrhinia proxima Calvert
Libellula cyanea Fabr.
Libellula incesta Hagen
Libellula julia (Uhler)
Libellula luctuosa Burmeister
Libellula lydia (Drury)
Libellula pulchella Drury
Libellula quadrimaculata Linn.
Libellula semifasciata Burm.
Nannothemis bella (Uhler)
Pachydiplax longipennis (Burmeister)
Pantala flavescens (Fabr.)
Pantala hymenaea (Say)
Perithemis tenera (Say)
Sympetrum ambiguum (Rambur)
Sympetrum corruptum (Hagen)
Sympetrum costiferum (Hagen)
Sympetrum danae (Sulzer)
Sympetrum internum Montgomery
Sympetrum obtusum (Hagen)
Sympetrum occidentale Bartenev
Sympetrum rubicundulum (Say)
Sympetrum semicinctorum (Say)
Sympetrum vicinum (Hagen)
Tramea carolina (Linn.)
Tramea lacerata Hagen

