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# ARGIA

THE NEWS JOURNAL OF THE DRAGONFLY SOCIETY OF AMERICA

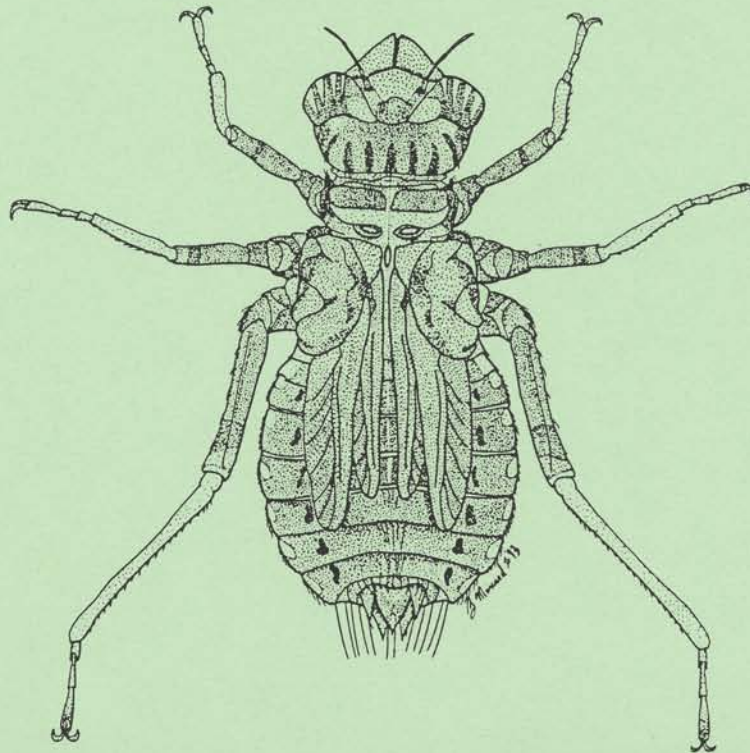
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# ARGIA - The News Journal of the D.S.A.

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## IN THIS ISSUE

At Bend the presidency passed on the George Harp, who has our best wishes for the next two years. The election of president elect was won by Ken Tennesen. Rosser Garrison and Enrique Gonzalez received many votes, and we appreciate their allowing their names to be placed in nomination. Bob Glotzhober was elected to the Council.

The most exciting news this summer was Ken Soltesz's exciting find of an apparently new species of *Gomphus* not very far from New York City. This brings to five (according to my count) currently undescribed species from the U.S. which are in some state of description. This underlines the exciting part of odonate study: there are still many new things to find out about these insects!

We thought that 1992 was the year of rain and cold. 1993 might go down in the history books as an even wetter and colder summer. The Pinatubo effect still lives. I can't imagine what happened to the odonates that live in the main stem of the Mississippi. Even if they emerged safely, could they find a place to harden up in the sun, mate, and lay viable eggs in the swollen river? Has anyone looked into this problem?

Our two DSA meetings tested the mettle of our members, and our members met adversity cheerfully. The Adirondack trip saw almost unrelenting rain which, however, crushed no spirits. We salvaged this trip by collecting a few remarkable specimens during brief breaks in the rain, and by turning to larval collecting with a vengeance.

At Bend we had to put on our woollies just to survive the brisk temperatures of the Cascades, which had one of their latest "summers" ever. The Bend meeting had an interesting "first": we were accompanied by a reporter and photographer from the Nature Conservancy magazine, who are preparing an article which should appear in early 1994.

Again larvae ruled the day - in this case a soggy hillside with several emerging *Tanypteryx hageni*. Many of us had read about the burrows of petalurid larvae; few of us had seen them, and even fewer had witnessed an emergence at these remarkable localities. It is with considerable humility that I recall that it was Will Stolzenberger, our accompanying Nature Conservancy author, who found the first one.

Two of us escaped the wet summer in the "Lower 48" by visiting the 49th and 50th states. These states have interesting odonates, too.

Ken Tennesen writes of an interesting experiment with eggs of *Libellula lydia*, one of most common odonates. His results go a long way to explain why this species seems to be one of the most pollution-resistant odonates in the U.S.

Carl Cook contributes his first articles in a long time - welcome back Carl. Anyone discovering an article about odonates is urged to send along a notice for ARGIA -share the news with the rest of us!

Bill Mauffray reminds us that rare odonates may have an influence on suburban planning decisions - which is a euphemism for habitat destruction. We should all keep our eyes open for potential negative impacts of wetlands destruction or modification.

I have included with this issue a list of all members (and immediate past members). I have arranged the list according to geography (it is sorted by state, and by country). I thought that it would be especially useful for persons to learn of the existence of other people interested in odonates who live in the same area.

## CONTRIBUTIONS TO ARGIA

All of you are urged to contribute articles to ARGIA, or simply to send along interesting news items that I can fashion into a story. Tell us about your recent field experiences or anything else that strikes you as potentially interesting.





It rained hard all night so the next morning we headed for the Yakima River in Washington where we planned to meet Ailsa and Nick Donnelly, Jerrell Daigle and Bill Mauffray to hunt for *Gomphurus lynnae*. We made a short stop at a pond along I84 eight miles east of The Dalles where we picked up a few *Pachydiplax longipennis*, *Erythemis collocata* and *Libellula pulchella*. The wind always blows strongly in the Columbia River Gorge so collecting is difficult. We were supposed to meet the rest of our party at noon and we had 150 miles to go, so we put the pedal to the metal and made it by 12.30. They were already there when we arrived at Horn Rapids Park and had bagged a few *G. lynnae*, *Ophiogomphus occidentis*, and Jerrell had one *Stylurus olivaceus*. The sun was hidden by a large thunder cloud most of the afternoon and only a few more dragonflies were collected. While Ken and Gord and I set up camp that evening we were treated to a feeding swarm of post-teneral *Aeshna multicolor*. We decided to practice some net swings while dinner was cooking. Their rapid zigzag flight through clouds of midges made them almost impossible to bag but Ken showed us how it should be done with an incredible overhead backhand swing.

The next morning, July 15, we hit the brush early to search for *G. lynnae* along the network of sandy roads. They were widely scattered and very hard to approach. At 10:00 a.m. Gord discovered a narrow grassy area along the river where many *G. lynnae* of both sexes were perching on patches of matted vegetation and small pieces of wood. They were well camouflaged when perched but usually flew only a short distance when disturbed. Occasionally one would make a long swift flight over the river only a few inches above the surface. Two hours of collecting netted us a good bag of *G. lynnae*, *O. occidentis*, a few *Libellula forensis* and *Sympetrum occidentale*, *Anax junius*, and one *S. olivaceus*. We all missed shots at *Libellula lydia*. We also collected a few *G. lynnae* eggs that I will attempt to rear.

The Donnellys, Bill and Jerrell spent the morning on the Touchet River east of Richland where Jerrell had found *Macromia magnifica* and *Ophiogomphus severus* in great numbers several years ago. Bill and Jerrell returned to Horn Rapids about noon to report poor collecting mostly due to bad weather. Gord, Ken and I decided to try our luck there that afternoon and found many

*Calopteryx aequabilis*, *Argia vivida*, *A. emma* and other damselflies I have not had time to key out yet. We also saw a few *O. severus* and one *M. magnifica*. On the way back to Horn Rapids we made a brief stop at a small lake on the east side of the Snake River where Hwy 12 crosses the river. We saw a few *A. multicolor* and Gord netted four *Tramea lacerata* in 10 minutes! He is incredibly adept with his net!

Back at Horn Rapids that evening our anticipated *A. multicolor* feeding swarm was terminated by thunder showers. Once when the rain interrupted our dinner preparations Gord invoked a higher power to intercede in a manner I cannot repeat here, but it was repeated by the three of us numerous times on the rainy days to follow.

The next morning, Friday, July 16, 23 headed for Bend, Oregon, where the DSA meeting was to be held. A stop along the John Day River at the junction of highways 19 and 207 yielded numerous exuvia of *M. magnifica*, *O. occidentis*, and a larger gomphid. Gord also found an emerging *Erpetogomphus compositus*. We decided to return there after the DSA meeting in the hope that better weather would see adults flying. We were all excited at the prospect of a Gomphid new to Oregon! The next brief stop was at Wolf Creek in the Ochoco Mountains where *Cordulegaster dorsalis* should have been flying, but thunder showers and cool temperature spoiled our chances of seeing anything except a few damselflies. Bill collected an *Amphiagrion abbreviatum*.

When we arrived in Bend that evening the rest of the attendees were already there. Those attending the meeting were Phoebe and George Harp, Duncan Cuyler, Ailsa and Nick Donnelly, George Smolka, Jerrell Daigle, Bill Mauffray, Ken Tennesen, Gord Hutchings, Dennis Paulson, Bud Anderson, Robin and Steve Valley. Unfortunately we were unable to get connected with Jeffrey Cole and I offer my sincerest apologies to him and hope he will be able to attend meetings in the future! Will Stolzenburg, a reporter from The Nature Conservancy, and Bill MacDonald, a photographer, were there to cover our activities and discussions for an article that will appear in the February or March issue of Nature Conservancy Magazine.

The DSA collector's meetings are usually quite informal and this one was no exception. We usually crowded into the room Ken, Gord and I shared and carried on numerous small discussions about what we had all been doing the past year, the next day's collecting trip, and a hundred other subjects until the motel manager came over and told us to pipe down. Two issues that were discussed at great length were the use of so-called "common names" and the adoption of a set of "collecting guidelines". No consensus was reached on these topics and I am sure there will be much future discussion in the pages of ARGIA on these issues.

We should all remember that DSA was founded at the SIO symposium in Johnson City, Tennessee by collectors who are all involved in valid scientific surveys and research. I do not believe any of us are trophy hunters, and I know the only way to understand the seasonal and geographic distribution and population dynamics of an Odonate community is through careful collecting and record keeping. Taxonomy and the recognition of threatened populations and habitats is impossible without collecting! Habitat destruction, not collecting, is what endangers wildlife communities and restrictions on collecting will not save any species but will play right into the hands of the developers and despoilers who do not want to know what is there! I certainly do agree that we should always conduct ourselves in an ethical manner. We should also strive to preserve habitat and educate the public and our elected officials on the importance and beauty of our wetlands and the remarkable plants and animals that inhabit them.

Enough of that! Collecting was severely restricted in Oregon so far this year, by the weather! Seven years of drought was broken by record winter snow and rainfall. The Spring was the wettest on record for the Pacific Northwest. June and July also set new records for precipitation and the average temperatures are 10-15 degrees F below normal.

On Saturday, June 17, the DSA caravan headed optimistically into the Cascade Mountains. Our first stop was Todd Lake, where we were greeted by a temperature of 40 degrees and heavy, damp, overcast skies. Obviously no *Tanypteryx hageni* were flying, so after dredging up a few *Aeshna* and

*Libellula* nymphs we vowed to return in the afternoon, and continued along the Cascade Lakes highway to Sparks Lake and then Devils Lake where we saw hummingbirds but no dragonflies. Finally at Hosmer Lake and Little Lava Lake we found a few *Leucorrhinia hudsonica* and *glacialis* and many Zygoptera. The sun stayed hidden most of the time, but by mid-afternoon we decided to try Todd Lake again. When we arrived at the *T. hageni* site at the north end of the lake not a dragonfly was to be seen. The suggestion was made to look for exuvia and almost immediately Will Stolzenburg, the reporter, asked "Hey, what's this little thing?" Sure enough, it was a *Tanypteryx* exuvium! Within a minute he spotted one in mid-emergence. We suddenly realized they were emerging all around us. We discovered four more, and quite a few exuvia. Then we discovered their burrows all over the hillside seep. Robin and I had searched this site on our hands and knees for the past four summers only finding one nymph and no exuvia, and suddenly there were hundreds of burrows in plain view. It was an exhilarating experience that partly made up for the total lack of *Aeshnas* and *Somatochloras* that should have been swarming on every lake in the Cascades!

On Sunday morning, July 18, the sun was shining as the great DSA expedition caravan headed east toward the Crooked River. Finally we might get a chance to swing our nets. The first stop was at milepost 19, 5.8 miles west of Post, "the center of Oregon". We saw several golden eagles soaring and an occasional *Aeshna multicolor*, and Ken Tennessen bagged a *Macromia magnifica*. After an hour we moved on to where the North Fork joins the Crooked River. While the rest of us spread out along the banks of the river Ailsa Donnelly went to the nearby ranch to ask for permission to collect on their land, which was generously granted. The next several hours were spent doing what we had all come so far for, matching wits and reflexes with dragonflies in the company of good friends. *M. magnifica*, *A. multicolor*, *Ophiogomphus severus*, *Sympetrum illotum* and *Sympetrum corruptum* were captured as well as *Calopteryx aquabilis* and many other Zygoptera. Our final stop of the day was over 100 miles from Bend at Wolf Creek Forest Camp where we found *Cordulegaster dorsalis*, *O. severus*, *M. magnifica* and *Aeshna californica*. By the time we got back to Bend we were all tired and still had specimens to process so we did not have much in the way of a meeting.

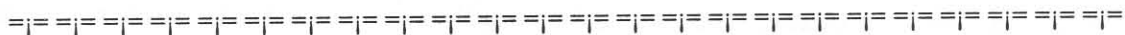
The morning of Monday, July 19, after bidding all our friends farewell, Robin, Ken and I headed back to the John Day River to search for our mystery Gomphid. Duncan Cuyler and George Smolka were each following us and we planned to meet Ailsa and Nick Donnelly at the junction of highways 19 and 207 where they meet the John Day. When we arrived the Donnellys were already there with a flat tire! While we were considering the options, Duncan bagged a Gomphid. It proved to be *Gomphurus lynnae* previously only known from the Horn Rapids area of the Yakima River in Washington. While Ailsa borrowed George's car and took the tire to the nearest town, Spray, the rest of us scattered in search of *G. lynnae*. The population was large and we all soon had a good bag. *Macromia magnifica* and *Aeshna multicolor* were flying over the river but were very hard to net. We also got *Ophiogomphus occidentis* and a teneral *Eperigmomphus compositus*. Our collecting was cut short by a thunderstorm and we moved to higher ground because this region is famous for intense flash floods. Later that afternoon we bid farewell to Duncan who was driving back to North Carolina via Texas. Ailsa and Nick spent the night at the motel in Spray, while George, Ken, Robin and I camped at Mule Shoe Creek Camp. The next day the river level was about two feet higher and very muddy due to some heavy rain overnight. The sun was out and despite the rain *G. lynnae* were out in numbers. The specimens from the John Day were less mature than the ones from the Yakima which were all pruinose, many with battered wings. The John Day elevation is 1000-2000 ft. higher and lies in a deep canyon while the Yakima is in fairly open scrub land.

That morning Ken, Robin and I said farewell to the Donnellys and George Smolka and headed out to survey along part of the North Fork of the John Day River. We found *Gomphurus lynnae* in Grant Co., 3 miles east of Kimberly, where we collected 2 adults and an exuvia. We now have records of a breeding population in both Wheeler and Grant Counties. We continued on a loop through Monument, Long Creek, Mt. Vernon, Dayville and Mitchell, but found no more *G. lynnae* adults or exuvia - possibly because it was raining and high water was washing them away. From there we headed home to Albany because Ken had to fly home the next day.

I hope that everyone will send me their collecting records so that I can put a complete list in the next issue of ARGIA. The 1993 DSA Collector's Meeting was a great success and one of the most memorable events of my life. My thanks to everyone for participating and helping make it possible! I would also like to express my thanks to Nick's friend Bruce Nolf for arranging a meeting room for us at Central Oregon Community College.

#### NOTEWORTHY RECORDS OF OREGON ODONATA

The DSA meeting provided one very interesting record: *Argia agrioides* on the Crooked River, 14 miles east of Post. Several participants caught specimens of this small, pale blue damselfly. This marks its most northerly record.



#### DSA BUSINESS MEETING IN BEND

**Election of officers:** Ken Tennesen was chosen as President Elect, to begin his term in 1995. Bob Glotzhober was elected to the Council.

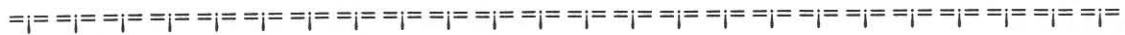
**Name of the Organization:** The group discussed the organization's name, which should reflect an interest in the entire New World. The consensus was that a slight alteration, to **DRAGONFLY SOCIETY OF THE AMERICAS**, would reflect our intent more accurately than the present name.

We invite members to contact George Harp with their comments on this proposed change.

**Site of the 1994 meeting.** There was a considerable discussion of a site for next year's meeting, but no decision was reached. **WE NEED A SITE FOR THIS MEETING AND WE SOLICIT OFFERS FOR SUCH A SITE.** Anybody with an idea or an offer is urged to contact president George Harp.

**DSA Collector's Ethical Guidelines.** The vigorous discussion launched by Richard Orr was reviewed. President George Harp will appoint a

commit to review the comments and contributions and to make a recommendation to the society.



## NORTHEASTERN GROUP DEVELOPS CHARACTER IN THE RAIN

Nick Donnelly

The sun shone beautifully as our hopeful group converged on the Adirondacks for the annual Northeastern gathering on 19-20 June. Sadly, this was the last we would see of the sun until we all drove away again! While our group mingled, talked, dredged for nymphs, talked, and huddled under their umbrellas -- you guessed it -- the rain fell constantly. The miracle was that we got 31 species in spite of the rain.

The group represented a broader geographic area than has been the case for our three earlier meetings: 15 people, ranging in distance of travel from Charles Bridges (Illinois) to Judy Cameron, who was just a short motor boat ride from the meeting place, which was Camp Regis on Upper St. Regis Lake. Judy had arranged with Mike Hume, the camp owner, for the use of part of his camp before hordes of juvenile campers arrived for the summer. This provided us with a superb gathering place, for which we were all grateful. Also attending, in approximate descending order of distance, were Bernie Counts, Richard Orr, Allen Barlow, John Michalkski, Hal White, Nick and Ailsa Donnelly, and Paul Novak. A special treat was the first-time-ever attendance of Canadians: Raymond Hutchinson, Benoit Menard, and Eric Soucie from Gatineau, Quebec, and Rob Cannings and his wife Hannah Nadel from Guelph (When you read this they will be back in Victoria, however).

The first morning we poked our noses out in the mist and headed tentatively to Bloomingdale Bog, which was at least close, if not sunny. Comforting themselves with tales of odonates which just loved to fly in the rain, the collectors filed bravely down the wet sandy path, sodden nets drooping from their arms. Miracle of miracles - a *Williamsonia fletcheri* sacrificed itself for Richard Orr, and a number of libellulids actually did fly in the rain. Not a huge number however.

That afternoon most of the group went, dredges in hand, to the Ausable River near Lake Placid. We reasoned that larval collecting is just as good in the rain as in the sun. We were rewarded with a rich haul of gomphid larvae, but the real treat was a huge emergence of *Ophiogomphus aspersus* and *mainensis*. Some rocks in the river had several specimens on them, and cameras flashed repeatedly as we all recorded this event on film. We also took larvae of *Boyeria grafiana*, *Stylurus scudderi*, and *Cordulegaster maculata* and found some adults of two species of *Calopteryx* (*amata*, *aequabilis*). Not bad for a rainy day. We then proceeded to another branch of the same river, but the gloomy afternoon was passing into the gloomy evening, and we only succeeded in taking a few more of the same larvae.

While most of us were collecting larvae, John Michalski and friends headed in another direction and found a nearby lake with a specimen of *Coenagrion interrogatum*! This is only the second New York record for this species.

On Sunday, several people started home, but a diehard core headed to another bog. This would be the sunny day that we all were promised! We drove down a long sandy road (following an esker), and walked the last half mile into the invitingly named, huge and mouth-watering Massewepie Mire. What a name for a bog! Would you believe that it started to rain again? Well, that is just what it did. We did bag a few odonates, including a black-winged female of *Leucorrhinia glacialis*. When Hal White and I spotted this critter, we really couldn't believe our eyes.

We only took 31 species, but there were a few gems for some of us. For those of us interested in other aspects of natural history (a necessity when it rains) the trip was rewarding in many ways. Rob and Hannah watched a bear cross the road right in front of their car, for example. On a Friday trip before the group gathered I got a very



close look at two snowshoe hares. But, hey, the bugs *were* good and the trip was a success.

#### ADDITIONAL NEW YORK RECORDS OF INTEREST

The New York list grows and grows; this year we have added 3 species:

(1) *Coenagrion interrogatum*, hitherto known from Maine, Vermont, Michigan and Wisconsin. Walker remarked that this was the North American damselfly with the northernmost southern limit (did you follow that?). The first specimen was taken at the Visitors Interpretive Center, near Paul Smiths, Franklin Co. I found a juvenile male far from water, on 12 June, while walking in the woods with Ailsa and Judy Cameron. The following week John Michalski took another male on Chain Lake, about 6 miles north of this locality. The Visitors Center (known locally as the VIC) is the place where Judy Cameron last year, and again this year, took a *Williamsonia fletcheri*.

(2) *Gomphus* new sp. near *septima*. This single male was taken by Ken Soltesz on the Delaware River at Minisink Ford on 13 June and is discussed elsewhere in this issue. Ken also found exuvia at Port Jervis and Callicoon, on the same river. This

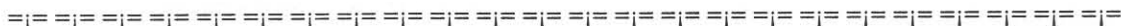
is the most exciting eastern odonate found in several decades.

(3) *Somatochlora incurvata*, known from Maine, Pennsylvania, Michigan, and eastern Canada. I found a good population of these at Massewepie Mire, in St. Lawrence Co., on August 13, when collecting with Ailsa, Dan Spada, and Judy Cameron.

In addition to these records, there are now four Adirondack records for *Williamsonia fletcheri*, two from the VIC and two from Bloomingdale Bog, which is about 8 miles away.

An additional record for *Neurocordulia obsoleta* is of interest both because it comes from the Susquehanna River (at Sidney, Otsego Co.) rather than a lake, and because the record was established on the basis of wings left by a bird which had consumed the body of an emerging adult! At the same locality Ken Soltesz found exuvia of *N. yamaskanensis*.

Several finds of *Enallagma antennatum* (Steuben, Broome, Otsego Cos.) show that this species is widely established in modest numbers on big rivers, where marginal emerging grass and sedges are found on slow reaches.



#### MAUI NO KA OI (Maui is the Best!) or ZOWIE! IT'S MAUI!

Jerrell Daigle

That's where I decided to go the week before the Oregon DSA meeting, hoping to catch the giant bomber, *Anax strenuus*, and the Darwinian *Megalagrion* damselfly group. I chose the island of Maui because it is tied with Kauai with 10 *Megalagrion* species. There are 28 recorded species and subspecies of *Megalagrion* from the Hawaiian Islands, according to Dan Polhemus, the resident odonatist.

The Hawaiian word for dragonfly is "*pinao*" and the word for damselfly is "*pinao-ula*". Larvae are called "*olopelope*". Most of the native Hawaiians I chatted with use these names quite often.

Northwest and United Airlines fly directly into the Kahului airport on Maui. I highly recommend staying at the cheap Northshore Inn or the Banana Bungalow in Wailuku near the Iao Valley State Park when exploring Maui's windward or east side. On the leeward side or west side, stay at the Coconut Inn in Napili and the Sunseeker Resort in Kihei. Rent an inexpensive car from the "Word of Mouth Rent a Used Car" company. Be prepared to pay \$1.61 for regular gas in Maui. Food is relatively inexpensive with Hawaiian, American and international cuisine readily available.

Maui is composed of two islands joined together by a narrow isthmus covered with pineapple and sugarcane fields. On West Maui, the best place to collect is the Iao Valley at the Maui Nature Center and Kepani'wai Park Heritage Gardens. On the big, rocky Iao Stream, I corraled several patrolling

males of the gigantic *Anax strenuus*. The huge tandem pair I caught dragged me along the boulders. Continuously scraping my shins, it was all I could do to hang on for dear life!! *Anax strenuus* resembles a gigantic *A. junius* but with a longer and thicker blackish abdomen.



The *Megalagrion* damselflies were much easier to catch. Diana King and Lorelei Elkins of the Maui Nature Center showed me several nearby tributaries where the giant, red *M. blackburni* and the greenish-yellow *M. nigrohamatum* were perching on streamside vegetation like red or white ginger fronds. On two tiny seepage streams flowing through a shady, wild banana grove, I found several males of the red and blue *M. hawaiiense*.

*Megalagrion hawaiiense* appears to be a complex group. The Maui / Molokai form is different from the Oahu and Hawaii (Big Island) forms. According to Dan Polhemus, these 3 forms may soon be classified as separate species. The Maui form has a red abdomen with a black annulation on each abdominal segment. There even appears to be a red color form on West Maui and a black color form on East Maui!

Many of the lowland streams on West Maui were dry because the Hawaiian Islands have been recently suffering from a long drought. However, at Makamaka'ole Stream on Hwy. 340 about 7.9 miles north of Wailuku, I was surprised by a huge *A. strenuus* that unexpectedly flew into my net when I turned quickly around a sharp bend. Talk about dumb luck!

The only other odonate on this stream was a patrolling *Orthemis ferruginea* male which I caught as a Maui record. It has been previously recorded from Kauai and Oahu. This is not good news for the native species, competitively. I never saw the endemic, black *Sympetrum*-like *Nesogonia blackburni* during my stay on Maui. Also, the introduction of the Tahitian prawn, *Macrobranchium lar*, and various exotic freshwater fishes have pushed several Hawaiian species of *Megalagrion* towards extinction.

At Makamaka'ole Stream I found many larvae of the introduced caddisfly, *Cheumatopsyche analis*. Two other accidentally introduced species, *Hydroptila arctica* and *Oxyethira maya* are found on the other islands. The Hawaiian Islands contain no native species of alderflies, caddisflies, dobsonflies, mayflies, or stoneflies. An introduced species of mayfly, *Caenodes nigropunctatus*, has been recorded from Oahu.

The best way to collect *Megalagrion* is to travel the long, winding, cliffside road to Hana called the Hana Highway (SR 360). There are at least 54 bridges, all crossing beautiful streams with precipitous waterfalls that are usually visible from the road. I stopped at the workable streams and found some of the best collecting spots on Maui!

*Megalagrion hawaiiense* can be found flying over the mossy walls or seepages at any waterfall site. The best spot was East Wailua Iki Stream at milepoint 21.4 or 1.2 miles north of the Pua'aka'a State Wayside Park. I found it common along seepages at several other streams and I believe this unwary species can be collected at all the streams along the Hana Highway, especially if you hike upstream to a waterfall.

The gigantic red *Megalagrion blackburni* is a warier species found at most streams but in much smaller numbers. I usually saw a few jittery males at each locality, perching up high in the

overhanging branches of wild guava, koa, or ohia trees. If you can catch a red cardinal bird with your net, you can catch *Megalagrion blackburni*! The best spot is Kopili'ula Stream (milepoint 22.3) 0.3 miles north of the Pua'aka'a State Wayside Park where several tandem pairs were ovipositing among the mossy stones in the stream. They seemed to fly just about the time I finished my picnic lunch of macadamia nuts and fresh pineapple juice. *M. nigrohamatum* and *A. strenuus* were also flying up and down the stream, making this one of the best spots on Maui!

*Megalagrion nigrohamatum* is a large, beautiful greenish-yellow damselfly with a yellowish-orange tipped black abdomen. The yellow legs have black knees, probably making it distinct from *M. nigrolineatum* from Oahu, according to Dan Polhemus. It prefers shady streams where it continuously jumps from mossy stones to fallen branches amidst the dappled sunlight. Again, the best spot is Kopili'ula Stream, although I collected several from Kuhiwa Stream (milepoint 25.1) or 2.5 miles south of the Pua'aka'a State Wayside Park and the Iao Stream tributaries on West Maui.

The slender, red eyed, red legged *Megalagrion calliphya* has only black humeral stripes contrasting its startling blood-red appearance! I collected this scarce species on only two streams along the Hana Highway. The best spot is Kuhiwa Stream mentioned earlier. I also collected a few males at East Wailua Iki Stream (milepoint 21.4) 1.2 miles north of the Pua'aka'a State Wayside Park. *M. calliphya* has specific streamside habitat requirements. Look for shady volcanic pools about three feet in diameter along the forest margin. The stagnant tannic pool water must be warm, with filamentous algae, sedges, and bordering grasses.

When this same type of habitat is in the open sun and closer to the main current, I usually found a single patrolling *Megalagrion pacificum* male. *M. calliphya* is strongly territorial with just one male per pool. You must hike a long way upstream, checking each shady pool to see if it is occupied. They are few and far between! Same thing with *M. pacificum*!

*Megalagrion pacificum* is a widespread but rare species found on several islands. It is a beautiful, small black species with a few purplish-red spots on the lower thorax and a purple-tipped black

abdomen. The purple color reminds me of the American Beauty Rose. It prefers stagnant, sunny streamside pools with grasses and filamentous algae. *M. pacificum* was the only *Megalagrion* species that actually perched on stones in the stream like an Argia! All the other species perched in overhanging trees, grasses, or on streamside shrubbery like red or white banana-like ginger plants. The best spot is Haipua'ena Stream below the Haipua'ena Falls 0.8 miles north of the Kaumahina State Wayside Park. At noon, I even collected two tandem pairs while picnicking under the bridge! I did catch single males near Keanae and at Kuhiwa Stream. At the Ke'anae Arboretum, it was flying over a taro patch with *O. ferruginea*, *Pantala flavescens* and *Ischnura ramburii*.

The biggest surprise on the trip was the incredibly lucky catch of a pair of *Megalagrion nesiotus*! Earlier, I had been looking for this rare species at all the known locations along the Hana Highway such as the Keanae, Haipua'ena, and Honomanu Streams with no luck. I was climbing a steep hillside trying to get around a 40-foot waterfall at the East Wailua Iki Stream. I paused briefly to pick and eat some thimbleberries when I suddenly spied a brown damselfly perching at the base of an uprooted tree. I quickly scooped it up and with trembling fingers, transferred it to a cellophane envelope. My heart skipped a few beats - no, it stopped completely as I noticed the bluish pruinosity on the brown thorax, the brown abdomen, and the very long superior appendages. My gosh! It looked like *Lestes scalaris*! Quickly, I glanced around for others and saw the nearby female. Within seconds, I had a pair of the rare *M. nesiotus*! Despite several more days of collecting along the hillsides here and elsewhere, I did not see any more.

I have a feeling that *Anax strenuus* can be found on most of the mountain streams in Maui. I collected it on the Iao, Makamaka'ole, Kuhiwa, and Kopili'ula streams. Peering down from several bridges, I saw them cruising along at the bottom of several steep unworkable gorges. This is a spectacular creature and well worth the price of admitting to Maui!

All in all, Maui is absolutely fantastic with its beautiful beaches, the awesome Haleakala Crater, and the spectacular waterfalls. Now, I am ready to go to Kauai next year! I can hardly wait! Aloha!

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## COLLECTING IN ALASKA - OR - NANICK OF THE NORTH

Nick Donnelly

When odonatists gather and discuss their next great adventure, the chances are that Alaska does not figure prominently. It wouldn't have figured prominently in our plans had it not been for a son whose company sent him to Anchorage for a ground-water project this last summer. We went there after the Oregon meeting, mainly expecting to see some whales, moose, and interesting birds. Of course, we took along a net, just in case. . .

The latest paper on Alaska known to me is Gloyd's synopsis, published in 1939, which lists 23 species. Walker's three books added no species to her list. As it turns out, I added only one species (*Aeshna subarctica*) to this unpromising total.

Carsten Ahrens collected in southern Alaska in 1938 "during the coldest and wettest summer that the territory has experienced in twenty years." He said that "the temperature never rose above 60° F. . . Collecting was frequently discouraging . . . during the five days spent at Ketchikan. . . rain rarely ceased to fall . . . only five specimens, stiffened with cold, were taken and these were "picked" from the vegetation . . ."

I can claim no such excuse. The summer of 1993 may turn out to be the warmest and driest summer ever. However, during my ten days the temperature rarely got over 70° and I only took 13 species!

A glance at any map of Alaska reveals two salient points: (1) It is very big. (2) There are very few roads. We picked the Kenai Peninsula because it was close to my son's work assignment, and because it is one of the few parts of Alaska that can be seen by car. The spectacular mountain scenery and truly amazing salmon fishing seem to attract vast numbers of older visitors, and their huge RV's crowd the roads throughout the summer. When you next plan your trip to Alaska remember that one out of every fifty-eight Alaskans owns his/her own airplane!

We started our trip at Elmendorf Air Force Base. My son was working there and there are fine ponds

in a morainal belt within the base, which is only a short drive from downtown Anchorage. The first thing we found is that *Aeshna* dominates the Alaskan odonata scene. Four species (*juncea*, *eremita*, *interrupta lineata*, and *palmata*) are abundant. *A. subarctica* and *sitchensis* were found around one especially boggy lake (Fish Lake) and in similar places on the Kenai Peninsula. Collecting at Fish Lake was especially interesting: a Pacific loon fed its chick a few yards away, and all day jet fighters flew low over the bog. Other odonates were truly scarce here and elsewhere: *Sympetrum danae*, *Lestes disjunctus*, *Enallagma cyathigerum* and *boreale* were all taken, but in small numbers.

One striking characteristic of the behavior of Alaskan *Aeshna eremita* and *interrupta* is their tendency to sit on the ground, especially gravel roads. I have never seen this tendency so well developed as here. On the back roads of Alaska these two species are among the most common flattened fauna.

The *E. cyathigerum* is greatly different from the supposedly same species I had seen a week earlier in the desert-like interior of Washington and Oregon. The profile views of the male superior appendages probably differ more than I have ever seen in a single species of odonate. This "species" is in serious need of careful taxonomic work. Perhaps *annexum* is a valid species after all.

We went down to the Kenai Peninsula to take several ocean trips (the best part of any Alaskan adventure). We had our best looks ever at sea otters and killer whales, and the Steller's sea lions and Dahl's porpoises were a great treat. The sea birds were spectacular; we enjoyed especially the tufted and horned puffins, marbled murrelets, murres, and other alcids.

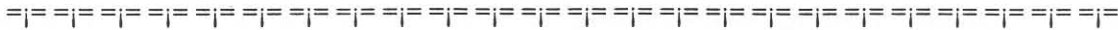
On land we discovered that many forest birds are very tame. Two boreal chickadees came so close that I realized that I needed my reading glasses to focus on them! Our most memorable sight was of sockeye and king salmon leaping up waterfalls on the Russian River. The army of fishermen downstream had snagged many but lost their lures - mainly in the body and fins of these love-crazed

fish. The fish that gathered at the top of the rivers were studded with colorful lures; they reminded me of teen-agers wearing military insignia scattered over their jackets.

On the Kenai part of our trip we added only one species to what we had taken at Elmendorf - *Somatochlora albicincta*, which we found in a small lake on the Kenai Wildlife Refuge. This beautiful place is a low forest with abundant lakes. Collecting there was delightful, but we had been warned that fierce bears lurked there and they

didn't like to be surprised. I felt foolish walking around the lakes holding my net at the ready and saying over and over, "Yo, bear . . . Yo, bear".

If you get the chance to visit Alaska, remember to take your net. Summer, such as it is, generally doesn't get started until July and Winter starts in August. However, there is a brief interval during which you can see a few really interesting odonates. Who knows, you may be the one to expand the tiny state list.



**I.O.R.I. CONTRACTED TO DO SURVEY OF POSSUM BRANCH DRAINAGE OF HOG TOWN CREEK, GAINESVILLE, FLORIDA, U.S.A.: HOME OF THE LARGEST KNOWN *CORDULEGASTER SAYI* POPULATION**

Bill Mauffray

Background: Sometime in 1992, the City of Gainesville proposed to install a flood control levee or dam to relieve the pressure on the lower Hog Town Creek which has experienced serious flooding over the past years.

It was brought to the attention of the **IORI** by the Rock Creek Homeowners' Association that the floodcontrol project would include the famous *Cordulegaster sayi* site that had been collected at for years by many odonatists. The area of greatest concern is the Possum Branch area just west of County Road 121 (NW 34th Street) in Gainesville.

The President of the Rock Creek Homeowners' Association, Nancy Williams, heard that there was a "rare" dragonfly in their subdivision. She contacted the Florida Division of Plant Industry which in turn referred her to **IORI**. Nancy provided **IORI** with some reports that were provided by the City of Gainesville, and I contacted several of the persons that were conducting the environmental impact studies to inform them of the *Cordulegaster sayi* breeding site.

In April 1993, Minter Westfall and I were approached by a representative of the a local environmental firm to assist them in marking off the breeding areas for *Cordulegaster sayi*. At first they wanted us simply to go to the sayi site and point out potential breeding areas so that they

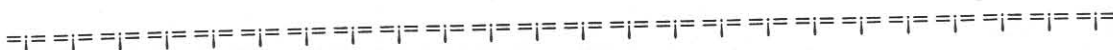
could mark and place survey stakes for a future site elevation study. The environmental firm offered to hire us as subcontractors for this survey. We felt that any money earned should go into the **IORI** fund as a starting point for some of our future fund raising projects.

After spending only 3 1/2 hours marking possible breeding sites for *C. sayi*, I suggested that collection samples of immatures be made at or near the stake locations to support the site survey. Minter and the firm's representative agreed. One July 5 Minter and I sampled several of the sites staked off. We logged in another three hours.

The report that we will present to the firm will contain not only our current collection data of immatures, but will include all known adult collections from that site as supporting data that the Possum Branch site is a unique ecosystem that should not be altered in any way. The report will discuss other localized species such as *Argia bipunctulata*, *Ischnura prognatha*, *Cordulegaster maculata*, and *Tachopteryx thoreyi*. In addition we would like to include written comments from anyone else that has collected or is familiar with the *sayi* site.

Since the Rock Creek Homeowners' Association owns a good piece of the site, and **IORI** is on their side in blocking this project, I hope to influence the organization to educate their members on the adverse effects of fertilizer and pesticide on the very ecosystem that they are trying to protect. I

have just bought a home in the adjacent subdivision, "The Valley", and hope to influence the Homeowners' Association there also.



### LITERATURE REVIEWS

Carl Cook, 469 Crailhope Road, Center, KY  
42214, USA

Beginning in this issue, it is my intention to start as a regular feature for **ARGIA**, reviews of new books and the more important papers from serial publications relating to Odonata as they come to my attention. This feature, to be successful and continue, is naturally dependent upon authors and publishers furnishing us copies of their works for review. It is hoped that review copies will be donated to the **DSA** Library, but this is not a strict requirement for being reviewed. When requested, review copies will be returned to author/publisher where return postage is provided. Copies for review should be sent to: **DSA** Review Editor, at the heading address above.

**Bridges, Charles A., 1993. Catalogue of the Family-Group, Genus- Group and Species-Group Names of the Odonata of the World (Second Edition).** Published by and available from the author: Charles A. Bridges, 502 West Main Street, #308, Urbana, IL 61801 USA. Price (including postage) \$105.00 in North America, \$110.00 elsewhere.

This is a well organized, hard-bound, volume of approximately 800 pages. It is the second edition of what has become known simply as "The Bridges Book" among odonatological users. The first edition had already become firmly established as the new standard for entomological catalogues since it first appeared in 1991. Because of the great advantage of the computer, Mr. Bridges has been able to rapidly utilize feed-back about the first edition from virtually the entire world odonatological fraternity. This has resulted in a new edition comparatively free of errors, and has enabled the author to incorporate more mainstream opinions on several matters of controversy about odonate classification.

The contents of the catalogue may be best described by quoting directly from the book's abstract: "Notes on the names of the Odonata,

including the related fossil forms, are arranged in a twelve-part catalogue. Part I is an alphabetic list of the Type- Genera of the Family-Group names. Part II is a synonymic list of the Family-Group names. Part III is an alphabetic list of the Genus-Group names, including data on authorship, place of publication, type-species, method of type-species designation and position in the classification. Part IV is a synonymic list of the Genus-Group names. Part VI is an alphabetic index to the Type-Species of the Genus-Group names. Part VII is an alphabetic list of the Species-Group names, including data on authorship, place of publication, type locality, location of type specimens and classification. Part VIII is a synonymic list of the Species- Group names. Part IX is an index to the authors and bibliography of the Species-Group names. Part X is the bibliography, including information on the author's place and date of birth and death, and on the whereabouts of their collections. Part XI is an index to the bibliography, by journal title, including the full titles of the journals and serials, and information on their places, and dates of publication. Part XII is an index to the bibliography by year of publication. Appendix I is a list of the Genus-Group names that need work. Appendix II is a list of Species-Group names that need work. Appendix III is a list of Bibliography citations that need work. The arrangement of the names (is) based entirely on bibliographic references. No specimens have been examined, and no new names are introduced."

The book treats names of 887 genera and 52 subgenera as valid, while 189 names are considered synonyms; 5,756 species and 567 subspecies are treated as valid, and 1,487 species names are considered synonyms.

In this edition is a very beautiful frontispiece in color, reproduced from a classic plate in: "Insects: vingt plances en phototype coloriees au patron, donant quatre-vingt insectes et seize compositions decoratives" done by Eugene Alian Seguy (1900-1935). This figure depicts *Neurobasis australis*, *Diphlebia nymphoides*, *Calopteryx* sp., and

neuropterans *Palpares imperator* and *Nemoptera sinuata*.

The Bridges Catalogue deserves a place on the shelf of every serious odonatologist. Even if you have the first edition, the several corrections and new listings of genera, species and bibliography make the second edition indispensable.

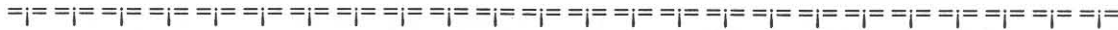
**Asahina, Syoziro, 1993. A List of the Odonata from Thailand, Parts I - XXI. (Edited by Bro. Amnuay Pinratana)** Published by and available from Bro. Amnuay Pinratana, St. Gabriel's College, Bangkok, Thailand 10300. The price is \$35.00 U.S. and an additional cost of \$5.00 applies for postage.

The book is essentially an assemblage of some two dozen separate papers about the Thai Odonata, written by Dr. S. Asahina and published in several different serials from about 1982. A total of 242 species are listed here as known from Thailand. Descriptions, figures and keys are presented for many of the species covered.

However, the book does not pretend to be a complete identification guide for all Thai species.

It has become increasingly difficult to assemble the complete set of original papers. Odonatologists owe Bro. Pinratana a debt of gratitude for reproducing this valuable series of papers in their entirety within the covers of a single book.

It is very unfortunate that Dr. Asahina did not offer descriptions and keys for every species listed; he apparently assumed that anyone working on Thai odonates had some knowledge about the common widely distributed Asiatic species. Fraser's three volumes, "Fauna of British India", does cover most of those left out by Dr. Asahina, so with only rare exceptions, having a set of both Fraser's and Asahina's books at hand the Thai species should now prove not so difficult to determine.



#### A PLEA FOR SUPPORT OF THE U.S. CLEAN WATER ACT

Carl Cook, 469 Crailhope Rd., Center, Kentucky 42214

In 1972, Congress enacted the Clean Water Act "in order to restore and maintain the chemical, physical and biological integrity of the Nation's waters." This law has had a major impact on water quality in the United States since its enactment, billions have been spent in attempting to clean up some of our most highly polluted rivers and undeniably a great measure of improvement has already been achieved, but other mandates of the Act have been largely neglected, and the over twenty years experience has shown the need for even stronger remedies in certain areas of the Act.

The Clean Water Act comes up for reauthorization in the U.S. Congress in 1993. Because of the prevailing attitude toward reducing government spending at this time, it can certainly be expected that cuts will be proposed in funding, even lobbying by the farming and industrial interests to not reauthorize the Act. On the other

hand, virtually every conservation minded organization in the country will support maintaining the integrity of the law and funding at not less than present levels. There is a good case being presented by several conservation oriented organizations for adding even stronger provisions to some areas of the 1972 bill which will come before congress for reauthorization this year.

Among the many groups supporting reauthorization are: National Wildlife Federation, Audubon Society, Ducks Unlimited, Friends of Nature, Izaak Walton League, Nature Conservancy, Trout Unlimited, Wilderness Society, Wildlife Society, and many others. With DSA's well known commitment to wetlands preservation and clean rivers, I believe we cannot fail to join in the company of these other conservation minded groups in their efforts for reauthorization.

The National Wildlife Federation has circulated an excellent proposal for strengthening the 1972 version of the Clean Water Act. I am grateful for their permission to excerpt particular paragraphs of

their statement which has been used as a guideline to construct the proposal presented here. I urge the adoption by DSA of this, or a similar, statement of policy supporting this cause, as a reaffirmation of the Society's long standing concern and support for strengthened wetlands conservation and aquatic habitat preservation:

#### **IMPROVE UTILIZATION OF PRESENT LAWS**

The goal of a Clean Water Act is to keep clean waters clean. Although EPA has established guidelines to prevent high quality waters from being degraded, little has been done to promote and employ them. Most disturbing, has been the failure of states to designate the exceptional waters within their boundaries, waters located in national or state parks, wildlife refuges, or having exceptional ecological significance, as "outstanding national resource waters." This designation provides the most stringent protection status available, but less than one-half of one percent of all U.S. river miles have been so designated. Consequently, the vast majority of America's most pristine streams and lakes are not receiving the full protection available from current statutes and they remain in peril.

#### **DSA urges Congress to:**

- \* require states to strengthen the public review process for all new pollution sources involving high quality waters;
- \* establish and enforce minimum requirements for state's outstanding resource water programs;
- \* allow citizens to nominate specific rivers, lakes, or coastal waters as an outstanding national resource.

#### **FOOD CHAIN CONTAMINATION**

The Clean Water Act of 1972 mandated that our nation's waterways be safely swimmable and fishable by 1983. Ten years later, that goal has yet to be achieved. Because of a too liberal permitting process, millions of pounds of toxic pollutants continue to be discharged into our waterways. In 1988, industries discharged more than 931 million pounds of toxic chemicals. As toxic substances are consumed by plants and small animal forms, the

contamination slowly climbs in the food chain affecting higher life forms and eventually humans. In more than 4000 waterways, states have imposed advisories or bans on eating fish taken from them.

#### **DSA urges Congress to:**

- \* immediately establish a system of categories rating chemicals on their impact on the environment, immediately ban the discharge of Category I substances and set a phase-out schedule for others;
- \* require point source permits to restrict the kind, quantity and concentration of pollutants discharged into waters;
- \* shift emphasis to pollution prevention by eliminating the use and generation of highly impacting chemicals, and ban the use of substances where a less impacting substitute is available.

#### **WETLANDS PROTECTION**

Wetlands are among the richest of all life habitats and are vital for first generation food chain species, helping to control flooding, and as a purifying system for our Nation's waters. Wetlands provide irreplaceable habitats for many rare and endangered plant and animal species. The decline of our national wetlands also threatens many important industries as well as sporting and recreational activities. As much as 65-75% of all commercially harvested marine fish are dependent on wetlands for some portion of their life cycles. In 1985, wetlands-dependent recreation, such as hunting and fishing was valued at \$55 billion, providing participation or job-related opportunities for 170 million Americans. According to a 1990 U.S. Fish and Wildlife study, we have lost more than 50% of our wetlands since the nation was founded. Between the 1950's and 1970's alone, the U.S. lost an estimated 458,000 acres of wetlands each year. We continue to lose about 300,000 acres annually even at present.

#### **DSA urges Congress to:**

- \* establish a Clean Water Act goal of protecting the quantity and quality of the nation's wetland resources and restoring those that have been degraded;



\* improve and expedite the wetlands permitting program by providing better funding, better wetlands maps, better surveys for rare and endangered taxa, and better training for wetlands delineators and rare taxa surveyors;

\* ensure that all wetlands-destroying activities, including draining, dredging, and excavating, are subject to a stringent permitting process;

\* base wetlands delineation on science, not politics.

### WATER CONSERVATION

The EPA recently reported that over \$110 billion in capital investment between 1990 and 2010 would be necessary to build wastewater treatment systems to fully comply with existing requirements of the Clean Water Act. Financial resources of this magnitude are nowhere in sight at this time. However, by reducing unnecessary inflows to overburdened treatment plants, by protecting wetlands which act as catch basins for runoff and are themselves natural treatment plants, by stringent water conservation measures, we can lower the cost of existing water and sewer services and reduce expensive plant expansion. Water conservation and wetlands preservation are the most cost-effective answer while also helping to maintain a healthy aquatic ecosystem.

### DSA urges Congress to:

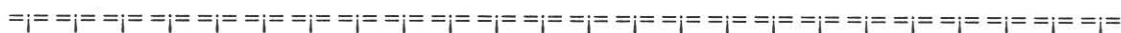
\* enact minimum standards for water conservation for water used for agricultural purposes, industrial purposes, and wastewater systems that seek permits to expand under the Clean Water Act;

\* encourage communities to integrate water conservation and wetlands preservation into their planning for new or expanded wastewater facilities proposed for funding from the State Revolving Loan established by the Clean Water Act;

\* make water conservation and wetlands preservation eligible for funding by state revolving loan funds;

\* ensure that local wastewater treatment charges are sufficient to recover costs of operation, maintenance, and replacement of treatment plants.

We perceive an abundant, clean, toxic free, water supply for the entire world as being one of the basic elements for the continued existence of all life forms on Earth. The decisions we make now concerning water quality and wetlands management, and the actions we follow, will not only determine the fate of such creatures as dragonflies but the ultimate destiny of mankind.



### THE COMMON, REMARKABLE *LYDIA*

Ken Tennesen, 1949 Hickory Ave., Florence, AL 35630

While collecting, have you ever started to go after a dark, low-darting dragonfly only to see it was a female of *Libellula lydia*? Especially during a long day of searching for elusive gomphids and all you encounter are some ubiquitous libellulids, commonness can breed indifference or even contempt for such species. Nick Donnelly recently wrote that this is one of the most often observed but least collected species we have. But I am beginning to realize that the white tail skimmer is one of the most remarkable dragonflies in the North American odonate fauna.

Classified as *Plathemis lydia* (Drury) in most references, but placed back in *Libellula* by many current workers, this species is not only wide ranging (from Nova Scotia to Florida, west to New Mexico, Arizona, California, and British Columbia), but is highly successful throughout its range, from low to high elevations, and in many types of habitat. It has a long flight season, probably from the last frost in spring to the first frost of autumn (April to October in much of its range). Males and females are sexually dimorphic, but vary in appearance amazingly little if at all from one locality to the next. The species has been used in numerous behavioral, ecological and toxicological studies. But regarding its success, do we know any more about *L. lydia* than we do about our "rare" species (or even as much)?

At least I have not found any detailed discussion on reasons for its success.

In attempting to find factors affecting the success or rarity of certain species, a look at adaptations in the nymph (larval) stage could be very helpful. Data from such studies could help also in understanding geographic distributions. As Corbet (1962) pointed out, the greatest adaptive radiation in functional morphology has occurred in the larval stage. Knowing a species' environmental requirements or its ability to tolerate certain environmental factors can tell much about its ability to inhabit various microhabitats. Based on some preliminary work I have conducted on *Libellula lydia* nymphs, I think there are many surprises in store for those who want to experiment.

Because I was working on the toxicity of iron and manganese to aquatic macroinvertebrates, I found opportunity to expose some dragonflies to various concentrations of these metals. I chose *L. lydia* for one, having seen it often in aquatic habitats where iron concentrations are high, and for comparative purposes I picked another common libellulid, *Pachydiplax longipennis* (Burmeister). I report here the findings from the iron exposures. Eggs were collected by dipping females in aged tap water in small plastic petri dishes. The eggs were allowed to adhere to the bottom of the dishes and develop for about 48 hr before experimentation began. In phase I of the experiment, eggs were exposed to one of three treatments: 0, 5, or 50 mg Fe/l (ferric solution), until hatching. Each treatment was replicated 10 times. pH values were near 7.0 in the controls and the 5 mg treatment, but the 50 mg treatment became highly acidic (pH 4.0). Number of eggs hatching was recorded after 10 days of incubation, and percentage hatch was calculated. In phase II of the experiment, hatchlings from each of the three above eggs treatments were reared for 96 hr, being exposed to one of two iron concentrations, 0 or 5 mg Fe/l, with 10 replicates. Survival was calculated as a percentage.

In the controls, hatching commenced on day 8 in *P. longipennis* and on day 9 in *L. lydia*. In both of the ferric treatments, hatching was delayed by one day in *P. longipennis* (started on day 9), but not in *L. lydia*. Hatching percentage in *L. lydia* decreased from a mean of 75% in the controls to 59% in the highest concentration of Fe (Fig. 1).

In *P. longipennis*, percentage of hatching decreased from 96% in the controls to 72% and 78% in the Fe concentrations (Fig. 2). Although egg hatching success was affected by exposure to higher iron concentrations, the effects were not as great as I expected, especially at 50 mg Fe/l.

In the nymph survival phase of the experiment, nymphs that hatched from eggs not exposed to iron (controls) did not tolerate the 5 mg Fe/l treatment (Figs. 3 and 4 - clear bars). However, nymphs of both species hatching from eggs exposed to 5 mg Fe/l had a percentage of survival in the 5 mg/l treatment as great as or greater than the controls (Figs. 3 and 4 - lightly stippled bars). Nymphs of *P. longipennis* hatching from eggs exposed to 50 mg Fe/l had a very low percentage of survival when exposed to 5 mg/l (Fig. 3 - shaded bars). But survival of *L. lydia* nymphs hatching from eggs exposed to 50 mg Fe/l was nearly equal to that in the controls (Fig. 4 - shaded bars). These results led me to conclude that 1) early life stages of *L. lydia* are more tolerant of high iron concentrations than those of *P. longipennis*, and that 2) "preconditioning" eggs of both species to iron imparts a greater tolerance of iron in subsequent nymphal life.

The capability of early life stages of *L. lydia* to withstand and even become preconditioned to relatively high concentrations of iron helps explain, at least in part, why this species is more commonly observed in "red-water" environments than *P. longipennis*. Little is known about the effects of preconditioning in insect eggs--how does exposure to certain environmental conditions during embryogenesis impart tolerance in the nymph or larval stage? As for *Libellula lydia*, one wonders what other variables might also be overcome.

ACKNOWLEDGEMENTS: I thank Sylvia Murray for helping me design and conduct the iron/manganese studies, and Rosser Garrison for helping me determine the western distribution of *Libellula lydia*.

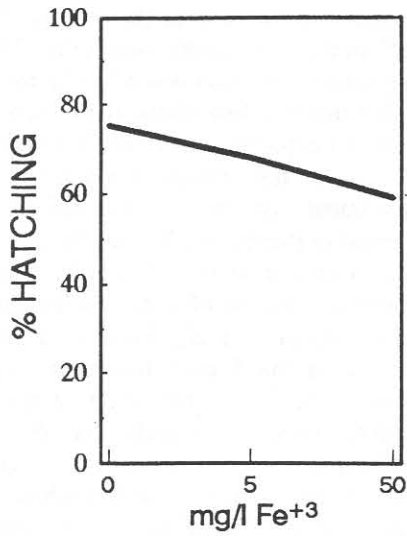


Figure 1. Hatching success (percentage) of *Libellula lydia* eggs exposed to increasing concentrations of iron.

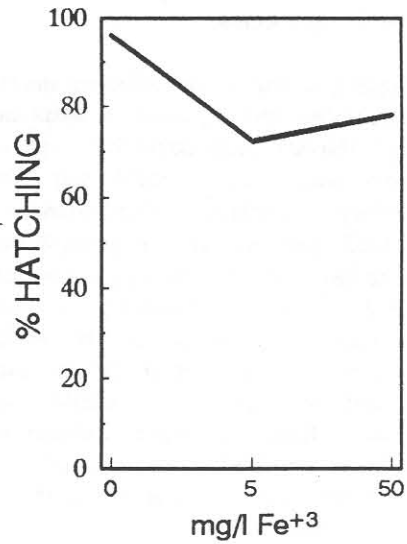


Figure 2. Hatching success (percentage) of *Pachydiplax longipennis* eggs exposed to increasing concentrations of iron.

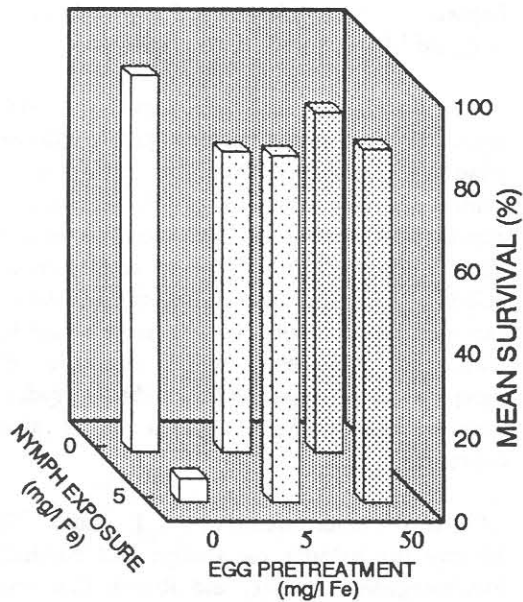


Figure 3. Survival of 2nd instar nymphs of *Libellula lydia* exposed to 0 and 5 mg Fe/L iron after pretreatment with iron in the egg stage.

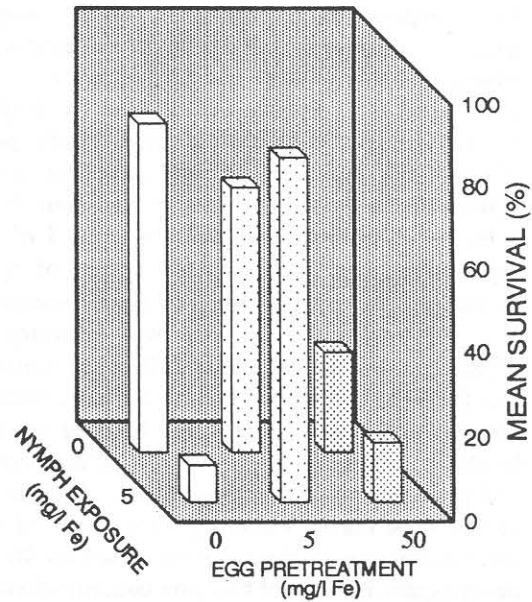


Figure 4. Survival of 2nd instar nymphs of *Pachydiplax longipennis* exposed to 0 and 5 mg Fe/L iron after pretreatment with iron in the egg stage.

## Past and Present recipients of ARGIA, sorted by location, as of Aug. 1993

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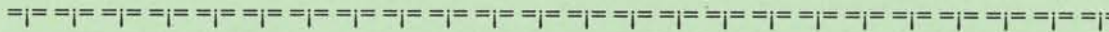
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# ARGIA

Binghamton, New York

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## **NOTICE: MANUAL FOR THE IDENTIFICATION OF ODONATA OF QUEBEC**

Raymond Hutchinson published in 1977 an excellent illustrated manual for Quebec Odonata. It takes the place of Robert's fine little book, which has been out of print for a long time. Contact: Raymond Hutchinson, 12 La Savane, Apt. #12, Gatineau, Quebec J8T 1P7 Canada.

## **BACK ISSUES OF ARGIA AND THE BAO**

The editor is able to provide back issues of **ARGIA** for the price of \$5 per volume. Back Issues of the **BULLETIN OF AMERICA ODONATOLOGY** can be furnished at \$5 per issue. Several of the issues will be xeroxed, as original copies of many issues have been

exhausted. Please contact T. Donnelly, 2091 Partridge Lane, Binghamton NY 13903.

## **DRAGONFLY BOXES**

Several people have enquired about the availability of dragonfly specimen "shoe boxes" made of heavy cardboard and with unit trays. These must be custom made, and the prices that we have had quoted recently seem prohibitively high. We have found a substitute that seems to be highly suitable. These are clear plastic boxes (4" x 6" x 13") which are made by STERILITE, Townsend MA 01469. We found packages of 6 (with lids) at Wal-Mart for \$5. A similar box is made by RUBBERMAID, but the examples we have seen are more expensive. While these boxes do not nest as tightly as the cardboard, they have the advantage that the fumigant is visible through the walls of the box.