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# ARGIA

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# THE DRAGONFLY SOCIETY OF THE AMERICAS

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## JOURNALS PUBLISHED BY THE SOCIETY

**ARGIA**, the quarterly news journal of the **DSA**, is devoted to non-technical papers and news items relating to nearly every aspect of the study of Odonata and the people who are interested in them. The editor especially welcomes reports of studies in progress, news of forthcoming meetings, commentaries on species, habitat conservation, noteworthy occurrences, personal news items, accounts of meetings and collecting trips, and reviews of technical and non-technical publications. Articles for publication in **ARGIA** should preferably be submitted as hard copy and (if over 500 words) also on floppy disk (3.5" or 5.25"). The editor prefers MS DOS based files, preferably written in WORD, WORD for WINDOWS, WordPerfect, or WordStar. Macintosh WORD disks can be handled. All files should be submitted **unformatted and without paragraph indents**. Each submission should be accompanied by a text (=ASCII) file. Other languages should be submitted only as text (=ASCII) files. Line drawings are acceptable as illustrations.

T. Donnelly (address below) is the interim editor of **ARGIA**.

**BULLETIN OF AMERICAN ODONATOLOGY** is devoted to studies of Odonata of the New World. This journal considers a wide range of topics for publication, including faunal synopses, behavioral studies, ecological studies, etc. The **BAO** publishes taxonomic studies but will not consider the publication of new names at any taxonomic level. Enquiries and submission of manuscripts should be made to **BAO** editor T. Donnelly, 2091 Partridge Lane, Binghamton NY 13903. Final submissions (after review) should be made on floppy disk, as above, with illustrations in final form and preferably adjusted to final size.

## MEMBERSHIP IN THE DRAGONFLY SOCIETY OF THE AMERICAS

Membership in the **DSA** is open to any person in any country. Dues for individuals in the US, Canada, or Latin America are \$15 for regular membership and \$20 for contributing membership, payable annually on or before 1 March of membership year. Dues for members in the Old World are \$20. **ARGIA** is mailed Air Mail outside of the US and Mexico, and First Class in those countries.

The **BULLETIN OF AMERICAN ODONATOLOGY** is available by a separate subscription at \$15 for members and \$18.75 for non-members and institutions.

Cover: Photograph retrieved from the dumpster behind the Super 8 Motel in Valentine, Nebraska, following the highly successful meeting in July, 1998. The dragonfly is *Somatochlora semicircularis*. I have no idea who the people are.

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

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## IN THIS ISSUE

Winter's reluctance to visit Binghamton ended a few weeks ago. Now I find myself watching the snow blow and reading e-mails from people like Steve Krotzer, who reported his first *Ischnura posita* for the season. There is a down side to living in New York.

We start off with a large number of meeting announcements. The announcement of the DSA annual meeting in July in the Adirondacks has already attracted many respondents, and many participants will segue to the Hamilton Symposium. If you haven't registered by now for that Hamilton meeting, they will still accept your registration, even though their deadline has passed. For those who can't wait, there are winter meetings in Ohio, Michigan, and Rhode Island. For early birds, the Southeastern DSA meeting will be in Bolivar TN.

In May there will be the first of the two Eagle Hill ME one-week-courses taught by Paul Brunelle. The second will be in August. These promise to be superb introductions to Odonata study.

Dennis Paulson leads off our customary foreign trip series with an account of his trip to Australia. Our own less ambitious trip to Borneo points out once again that bird and mammal watching combines nicely with dragonfly study.

Ethan Bright provides a change of pace with the description of a highly unusual damselfly larva that he found in the old fish collections at Ann Arbor. When he showed me this beast last Spring I was really stumped. Bet you will be too.

What is more appropriate for a winter issue than two articles about winter life in the Odonata world? Fred Sibley tells how the late arrival of winter affected dragonflies in CT and Dave Westover wonders about over-wintering *Anax junius* larvae in Wisconsin. The problem of two larval populations of this insect may turn out to have far-reaching implications. A few years ago we didn't even know there might be a problem.

The Caribbean figures big in this issue (once again the influence of winter?) José Ramos tells us of an

astonishing (to me) toll of odonates killed by passing cars on a highway in Cuba. Though there has been study of road kill in the US, this seems to surpass our experiences. Fred Sibley recounts an unusual "invasion" of odonates to a relatively arid island in the British Virgin Islands.

I'll bet you never even heard of Navassa, which may well be the most obscure possession of the United States. It is a tiny, barren island western Caribbean island closer to Haiti than Jamaica upon which the US built a light house in the last century. Amazingly it has Odonata, which Warren Steiner and Oliver Flint tell us about. Fred Sibley gives us an account of odonate collecting in Guadeloupe.

Moving back to the US, Roy Beckemeyer summarizes information about *Ischnura barberi*, which seems to occur mainly in saline localities. On the same vein (almost) Sid Dunkle brought a nostalgic tear to my eye by finding a publication summarizing the Odonata of Pyramid Lake, Nevada. Kennedy visited it in 1914, noted the salinity, and reported, "The only conspicuous life is that of the grotesque pelicans which wade solemnly in single file along its beaches." Making an effort to revisit the great man's localities in the west I stopped by there in 1955 and found little except for abundant *Enallagma clausum*. Sid reports that there is much more of a fauna than either of us had found. [Ira LaRivers, by the way, was a hemipterist who wrote several papers on Nevada Odonata. he tried but failed to introduce several common names for western damselflies: Common Gimp (*Lestes congener*), Western Wamble (*Argia vivida*), Common Whiffet (*Amphiagrion saucium*). Sic transit gloria mundi.]

I continue my series on the history of dragonfly study with an account (and some old file photos) of James Needham. His life was a change of pace from the giants of taxonomy who preceded him, but his influence on our field was immense.

Paul Catling summarizes information on *Enallagma traviatum westfalli*, which is either moving north in the mid west, or is only now being discovered there. [It has just turned up in western New York.] We have several other new state

records (from MS, LA, SD) and some other notes on state and provincial faunal studies.

A series of notes from Steve Walter, Roy Beckemeyer, Jim Johnson, and Dennis Paulson give us some food for thought. Bill Mauffray brings us up to date on the North American Anisoptera check list, which is adding species every season.

The Dot-Map project is making impressive progress, and I am down to the point of seeking information on some poorly surveyed areas. Thanks to all of you for your magnificent assistance.

Janet Rith has organized another state survey - for Minnesota. This is a much-needed effort in a marvelous but very little studied state.

Hal White's article on the collecting (or non-collecting) ethic has elicited a response from Fred Sibley, to which Hal responds in turn. Both have brought out several pertinent points, and a careful reading will reveal more agreement than disagreement on this topic.

Brief notes tell us of recognition that Steve Valley's excellent Odonata photos have received; of a late

date for *Telebasis byersi*, of the probable identity of dragonfly catching falcons, and more information on back-yard ponds for dragonflies.

This is book-anticipation time. We do not yet have specific information on the Corbet book, for which we have waited for years, but we have a price, which means the book can't be far behind. Wilson's Hong Kong book I raved about is now available domestically. Also about to appear (and also with a price) is the Needham, Westfall, & May's Anisoptera Manual, which will be an update of the 1955 Needham & Westfall manual. Finally, we have a price for yet-unprinted (or yet-unreprinted) Walker *Aeshna* and *Somatochlora* volumes, two books which are among the most important North American Odonata studies.

Out **TRAMEA** column has only a few brief entries. The new Odonata information e-mail service has already told me far more than I wanted to know about pronouncing the names of dragonflies. I always make a point of asking of asking the dragonflies themselves, but their responses are difficult to hear. I think they prefer ANN - axe, but then again I could be wrong.

Calendar of upcoming events

event, place	date	contact (see also accompanying article)
Ohio Meeting; Columbus OH	20 March	Bob Glotzhober; bglotzhober@ohiohistory.org
Michigan Meeting; Ann Arbor MI	27 March	Mark O'Brien; mfobrien@umich.edu
Rhode Island Meeting; Providence RI	27 March	Ginger Carpenter; gcarpenter@tnc.org
Southeast DSA; Bolivar TN	15-17 May	Ken Tennesen; ktennessen@aol.com
Eagle Hill field seminar; Steuben ME; first session: larvae	16-22 May	Humboldt Field Research Institute; humboldt@nemaine.com
National DSA; Paul Smiths NY	8-11 July	Nick Donnelly; tdonnel@binghamton.edu
1999 International Congress, Hamilton NY	12-16 July	Vicky McMillan; vmcmillan@mail.colgate.edu
Eagle Hill field seminar; Steuben ME; second session: adults	15-21 August	Humboldt Field Research Institute; humboldt@nemaine.com

**ADIRONDACK D.S.A. ANNUAL MEETING MEETING - 8 to 11 JULY 1999**

**Nick Donnelly**

[If you are one of the many that have contacted me and enquired whether there is a place for you at the conference, there is. Read on. We will need a

prepayment of the \$135 (per person) fee for the use of College facilities.]

**Place:** The 1999 DSA Annual Meeting will be in the Adirondacks, at Paul Smiths College, which is located on Lower St. Regis Lake near the village of Saranac Lake. The small campus is very attractive and occupies one of the prettiest settings of any

college. There is an auditorium available for evening sessions.

We have been fortunate to secure lodging and meals at the college, which hosts many events each summer, such as the annual wooden canoe meeting in August, and numerous hiking events. The facilities at the college will cost considerably less than motel prices in the area, and the college is located right in the heart of great dragonfly country.

**Dates:** Check in **Thursday**, 8 July, after 5 P.M. Evening meal will be served from 6 - 7 PM. There will be an evening get together.

**Friday**, 9 July: Field day, with several options available for field trips. The major collecting places will be the Ausable River and the Bloomingdale Bog. There will be additional sites.

Breakfast 7 to 8 AM; lunch to be scavenged individually in the field (there are snack shops, etc., in the area, or you can bring some groceries, according to your tastes.); dinner will be 6 - 7 PM: Evening meeting in the auditorium..

**Saturday**, 10 July. Same as Friday schedule.

**Sunday**, 11 July. Breakfast 7 - 8 AM. Vacate college by 8 AM. There are several options available. (1) For those continuing to Hamilton for the Dragonfly Symposium, collecting field trips will be available in the morning, and we can proceed to Hamilton after lunch. It is less than a three hour drive to Hamilton. (2) Others not going on to Hamilton can arrange a variety of trips on their own.

**Early arrival:** Several people have indicated that they might like to come early. We have no guarantee that facilities will be available before 8 July; however, we can play that by ear or make separate arrangements in local motels.

**Camping:** There are camping facilities at nearby new York State parks, as announced in the last **ARGIA**. Fish Creek Pond (about 15 miles south) is the only one I have camped in, and it is very attractive. To reserve a camp site, call 1-800-456-CAMP, which is the number for all New York State camping facilities.

**Costs:** Fees for those staying in the college are as follows:

Lodging: \$22 per person per night.

2 meals per day per person: \$16.50  
Use of facilities: \$10 per person  
Insurance: \$10 per person  
Total, three days, two meals per day: \$135.50.

**Reservations for College space:** I will accept reservations on a first-come first-serve basis. Payment will have to be made in advance. Your money secures your place.

We have estimated 50 persons to the College. There will probably be additional space available, but this is not guaranteed. Reserve early!

**Evening Sessions:** I invite two types of presentations for the evening sessions: (1) Slide shows, and (2) short papers discussing work in progress or otht topics of interest. Please contact me with tentative titles and time needed for presentation. At present we plan only to have 35mm slide capability, and there will be blackboards and places to display posters.

**PLEASE NOTE:** People staying at the college will have to furnish linen: single bed sheets, pillow cases, and towels. The reason is that as soon as we leave, the college orientation begins, and there will be no time for the college to launder linen. Blankets and pillows are provided.

Many previous visitors have advised me that although the rooms are comfortable, if there is hot weather, people might want to bring a small electric fan. Also, there are ceiling lights in the rooms, but no table lamps. Thus, a small table lamp will be desirable.

If you are flying to the meeting and renting a car, I advise coming to Syracuse, which is about a three hours drive from the College. If you will find it difficult to bring linen, Ailsa and I can supply some linen to a few people.

**Footnote:** Is there Canadian vehicle space available? I have received an enquiry from Gordon Hutchings, who is coming from British on a limited budget. He will probably fly to an eastern Canadian airport and is looking for a lift to the conference. Can someone up there help him out?

I will doubtless receive similar enquiries as the date for the meeting approaches. I will try to accommodate as many people as I can.

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# UPDATE ON THE 1999 INTERNATIONAL CONGRESS OF ODONATOLOGY - JULY 1999

Vicky McMillan

Although the official deadline has passed, it's still *not* too late to register! Janet Rith and I welcome all DSA members to stop by Colgate on their way home from the annual meeting in the Adirondacks. We've planned a week of paper and poster sessions (July 12-16), along with informal presentations, field trips, a banquet, and other events, including activities for accompanying family members. On Sunday, July 11, the IUCN Odonata Specialists Group will be holding a brunch meeting; later that day is a welcome reception for all Congress participants at Taylor Lake. Inexpensive on-campus lodging and meals may still be available, either for the week or on a per diem basis. If you're interested or have questions, please contact me at [vmcmillan@mail.colgate.edu](mailto:vmcmillan@mail.colgate.edu) or by phone (315-228-7713) or fax (315-228-7045).

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## OHIO ODONATA SOCIETY ANNUAL MEETING

e-mail from **Bob Glotzhofer**  
[bglotzhofer@ohiohistory.org](mailto:bglotzhofer@ohiohistory.org)  
Ph. 614/297-2633

**SPRING INTO SPRING AT SPRING HOLLOW** - The annual meeting of the Ohio Odonata Society will be on the first day of spring, March 20, 1999 at the Spring Hollow Education Center in Sharon Woods Metro Park in Westerville (just north of Columbus). The Columbus Metro Parks have just recently remodeled this center and I am told it is better than ever. The program will begin at 10:00 am and run until about 12:30. After lunch our authors' group on "The Dragonflies and Damselflies of Ohio" will meet to move that project forward. If you are interested, contact Bob Glotzhofer for a full agenda and map.

Annual Meeting Agenda  
Date: Saturday, March 20, 1999  
Time: 10:00 a.m. to 12:30 or 1:00 p.m.?  
Place: Spring Hollow Environmental Education Center, Sharon Wood Metro Park

Tentative Agenda (in no specific order)

1. Progress Update on Dragonflies & Damselflies of Ohio, Bob Glotzhofer
2. Screening of potential photos for the book
3. Using GPS in making Collections. Dave McShaffrey
4. History of Odonata in Ohio, Dave McShaffrey
5. Damselfly Coloration, Ave Hauck, Denison University
6. New Finds of Seepage Dancer, *Argia bipunctulata*, Erik Pilgrim.
7. Rare Ohio Species, Eric Chapman
8. Future Directions for the Newsletter, Discussion led by Bob Glotzhofer
9. Hints for Identifying Damselflies, Bob Restifo

Also, we hope to be able to distribute draft copies for testing of the "Keys to Odonata from Ohio and Adjacent States" which (when finalized) will be part of the new book. Program chairs Dave McShaffrey and Dwight Moody have proposed our business meeting will be placed somewhere in the middle of this agenda to assure everyone has arrived and no one has needed to leave yet.

The thought is that the above agenda will finish about 12:30 to 1:00, allowing folks to group together for lunch nearby. The authors group will resume after lunch with a meeting to discuss current developments and progress on the Ohio book.

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## MICHIGAN ODONATA SURVEY SPRING MEETING

**Mark O'Brien**  
[mfbrien@umich.edu](mailto:mfbrien@umich.edu)  
734/647-2199

The Spring meeting of the Michigan Odonata Survey will be Saturday, 27 March, 2 - 5 PM, in the museum of Zoology, 1009 Geddes Ave., Ann Arbor. For information contact Mark O'Brien.

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**RHODE ISLAND ODONATA ATLAS ORGANIZATIONAL MEETING**

**Ginger Carpenter**  
gcarpenter@tnc.org  
The Nature Conservancy  
159 Waterman Ave.  
Providence RI 02906.

Ginger Carpenter has announced the date for an organizational meeting for the Rhode Island Odonata Atlas project: Saturday 27 March in Providence. Persons interested this meeting should contact her to find the location.

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**SOUTHEAST DSA MEETING IN WESTERN TENNESSEE**

**Ken Tennessen**  
ktennessen@aol.com  
256/766-6970

The 1999 Southeast regional meeting of DSA will be held in western Tennessee on the weekend of May 15-17. We will meet in Bolivar on Friday afternoon, May 15. This small town is west of Memphis and south of Jackson. There are several motels in town:

- The Bolivar Inn**, 626 W. Market St., (901 658-3372)
- Super 8**, 916 W. Market St., (901 658-7888)
- Aristocrat Inn**, , 108 Porter St., (901 658-6451)

I have talked to the managers of these motels, but have not reserved a block of rooms. Please call to find out rates and reserve a room at your convenience. I recommend that we make The Bolivar Inn our initial meeting place. There are a few fast food restaurants in town.

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**DRAGONFLIES DOWN UNDER**

**Dennis Paulson**

Although highly civilized and English-speaking, Australia represents the ultimate in exotica to an

American biologist, in fact to a naturalist from almost anywhere else in the world. Its long

Bolivar is near the Hatchie River, which is a muddy bottom stream that is still wooded and typical of the rivers in this area before the land was cleared. This river has many channels in Hardeman County, and it can be somewhat difficult to find access for collecting. I have talked with David Withers in the Tennessee Natural Heritage Program, and he may have a canoe available for us. We can collect also at the Wolf River, which is west of Bolivar in Fayette County. The riparian vegetation along this river has been little disturbed and the outlook for collecting in several localities is good. There are numerous ponds, most man-made, in the area. I think this is a great opportunity to add much to the knowledge of Odonata distributions in this neglected area.

Please email me or give me a call if you plan to attend.

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**TWO MORE EAGLE HILL (MAINE) FIELD SEMINARS ON ODONATA**

Last year's one-week course in Odonata by Paul Brunelle was so successful that the Humboldt Field Research Institute, Steuben ME., is running two seminars this year, both run again by Brunelle.

The first is 16 - 22 May and deals with larva (ecology, life stages, morphology, behavior, temporal and geographic distribution, sampling and rearing techniques, etc).

On 15-21 August there is a week-long course on adult Odonata, presumably along the lines of the course last year, which emphasized ecology, field study, and identification.

These courses should appeal to a wide spectrum of people developing an interest in the Odonata. For further information please contact the Humboldt Field Research Institute, PO Box 9, Steuben ME 04880-0009. They can be reached also at 107-546-2821, or by FAX at 207-546-3042. Their e-mail is [humboldt@nemaine.com](mailto:humboldt@nemaine.com)  
Their web site is at <http://maine.maine.edu/~eaghill>

geographic isolation has endowed it with a unique flora and fauna that makes itself known as soon as the first Sulfur-crested Cockatoo flies over your taxi on the way from the Sydney airport. And Australian Odonata are as exotic as they come.

On the down side, collecting permits are difficult to acquire in Australia. You can legally collect dragonflies outside protected areas (with landowner permission where necessary), and fortunately there are plenty of good dragonfly habitats (many of them at recreational sites) outside the parks and refuges. But you have to have an export permit to get them out of the country, and they must be intended for an institution recognized by CSIRO.

My wife Netta Smith and I spent a month in Australia in 1988, enjoying all aspects of nature but, because the primary purpose of the trip was to study shorebirds, not paying a whole lot of attention to odonates. Ten years later, with enough mileage acquired for another 2 free tickets, it was time for a dragonfly expedition, and we spent another month (Dec 1998 - Jan 1999) with the intent of seeing as many of Australia's odonates as possible. We decided to concentrate on the wet eastern edge of the driest continent, in and east of the Great Dividing Range.

We succeeded well beyond my expectations. With plenty of time for birding and photography and several scuba-diving trips, we still looked for odonates almost every day and acquired 770 specimens of 136 species. Netta got into competitive collecting and several times came back with the most interesting species when we compared our catches. We also spent much time photographing as many species as possible.

The export permit for which I applied was not forthcoming in a timely way, alas, and we left the specimens with Günther Theischinger, who will check my identifications and then mail them to me when the permit is granted. It was very difficult to part with them in Sydney! The keys in the 1991 Australian book by Watson, Theischinger, and Abbey are terrific because they are so well illustrated, and I was able to identify almost everything we collected as we went along. Would that books such as this existed for any other tropical country!

The first week was spent around Sydney, in the Blue Mountains and the open country to the south. Just a few hours out of Sydney, the Blue Mountains

are spectacular, with a justifiably named Grand Canyon with rugged cliffs and waterfalls. The waterfalls have their own odonates, in particular the primitive dotted-winged *Austropetalia patricia* (Austropetaliidae), of which we saw a half-dozen perched in shrubs right at the cliff edge.

In the same area, several genera of aeshnids and *Eusynthemis tillyardi* (Synthemistidae) floated over clearings in the eucalyptus woodland. "Floating" is the best word for the flight of synthemistids, which rapidly became some of my favorite Aussie dragonflies. With big green eyes and very slender abdomens, these dragonflies show corduliid relationships but are a very distinct group. *Choristhemis flavoterminalata*, common everywhere, is like a wraith, its yellow abdominal tip seeming to hang in the air independent of its fluttering wings and yellow-striped thorax.

The streams to the south, through both wet forest and dry woodland, had their own collections of species. Small gomphids were abundant on Megalong Creek, and we took a few each of an *Austrogomphus* and a *Hemigomphus*; later examination showed two species of each genus, and I wondered if there would have been more if we had taken a still larger series. I have never seen gomphids so abundant as on some of the little rocky streams of Australia. At some places, they were so common (especially *Hemigomphus comitatus* in North Queensland) that every rock in the stream had its own male, and they were ridiculously easy to catch as they spent most of their time chasing each other rather than watching for nets swooping from the sky.

One of the most striking aspects of odonate diversity in New South Wales was the scarcity of libellulids. A few individuals of a few species of *Diplacodes* and *Orthetrum* were usually all we saw at a locality, whether pond or stream, and they were outnumbered by aeshnids, gomphids, corduliids, and synthemistids at most localities. Of the aeshnids, *Aeshna brevistyla* and *Hemianax papuensis* are common almost everywhere, and of the corduliids one or more species of *Hemicordulia* were usually to be seen, seemingly ecological equivalents of our North American *Epitheca*. Corduliids of southern-hemisphere origin are very diverse in Australia, and I was tickled to see *Cordulephya*, one of the very few Anisoptera that perches with wings over its abdomen; the brightly



banded *Pentathemis*; and the tiny, slender *Austrophya*.

We spent a week in the Brisbane area, visiting nearby mountains and North Stradbroke Island just off the coast. The Mt. Tamborine area proved great for dragonflies, and we continued to add species at almost every stop. O'Reilly's, in Lamington National Park, is a must, if for no other reason than the diversity of birds that want to share your lunch with you. Odonates were sparse but interesting in the forest streams and more diverse in the open streams of this area. A wide, rocky stream with dense aquatic vegetation at Canungra was a hotbed for damselflies, with 3 abundant species of *Pseudagrion* (Coenagrionidae), including the gorgeous *P. aureofrons* with yellow face and thoracic dorsum, the red-faced gray *P. ignifer*, and the blue and black *P. microcephalum*; the red-orange and black protoneurid *Nososticta solida* hovering virtually in swarms; and the big blue *Diphlebia nymphoides* (Diphlebiidae) bombing through the picture at intervals.

I would be remiss if I didn't discuss *Diphlebia*. Species of this genus, restricted to Australia and problematically related to other genera that have been loosely included in the Amphipterygidae over the years, are among Australia's most spectacular odonates. Picture your first sighting of a large, robust, vivid blue damselfly perched with outspread wings on a rock in midstream; then a blue streak coming at you and a swing and a miss (strike one)! Your first impression might be that you'd seen a bright blue gomphid. These damselflies are bigger than the great majority of Anisoptera with which they occur (gomphids and synthemistids and a few libellulids), the thorax about twice the volume of an *Archilestes grandis* of similar measurements. In southern Australia they are clear-winged (*D. nymphoides*), in northern Australia black-winged (*D. euphaeoides*) and even more spectacular. All up and down the Great Dividing Range there seems to be a more robust, warier species (*nymphoides*, *euphaeoides*) on the larger, more open streams and a slenderer, longer-abdomened and -winged, easier to catch species (*lestoides*, *hybridoides*) on the smaller, more forested streams.

Those with experience on other tropical continents will be amazed to learn that sometimes *Diphlebia* were the only Zygoptera visible on a forest stream, a very unusual group to represent the entire suborder! The other damselflies most likely to be

seen on these streams were *Austroargiolestes* (Megapodagrionidae). These are mostly dull-colored and, perching with wide-open wings, somewhat like *Philogenia* of the New World, although a few have bright orange markings. Oddly, in both of the orange-marked species we saw, females were much more common than males at the water. At slower streams, 1-2 species of *Nososticta* and 1-2 species of *Pseudagrion* were often present. Both synlestids and isostictids were occasionally encountered, the former like big, metallic lestids (the very elongate *Episynlestes* more like a perilestid) and the latter much like protoneurids.

We usually found 2-3 damselfly species at a forest stream, all up and down the country, in striking contrast with the 10-12 species of Zygoptera typical of a visit to a forest stream in tropical America or Asia. In fact, notwithstanding the excitement of seeing so many new dragonflies, I was struck early on by the generally low diversity of species, and a fabulously rich-looking pond or stream might have no more than a dozen species (fewer than in Washington state, not exactly a bastion of megadiversity).

I should add that I was equally impressed with some other differences. Australian pond dragonflies seemed perfectly happy to remain active on cloudy days, and at one lake we found numerous species, even mating pairs, during a light rain. I've seen cloudy-day activity as well in southeast Asia, but I can't imagine seeing the same thing in the New World tropics, where most odonates disappear with the sun.

One of our best pond localities was Brown Lake on North Stradbroke Island. A so-called "dune lake," with acid water and clean sand bottom, Brown Lake was alive with dragonflies on our two visits. Both of the endemic dune-lake odonates, *Austrolestes minjerriba* and *Orthetrum boumiera*, were common, as was *Tramea eurybia*, a Papuan species found in Australia only in this area. *Austrolestes* are fascinating examples of convergent evolution, lestids (spreadwings) that look like *Enallagma*: they don't spread their wings, and they are patterned blue and black. They seem the equivalent of northern-hemisphere coenagrionids, although that family is represented as well. The tiny *Ischnura aurora* with green-striped thorax and blue-tipped orange abdomen is especially delightful. I was amazed to see male *aurora* mating with just-

emerged females, then recalled Richard Rowe had described this 2 decades ago.

Brown Lake's other claim to odonatological fame is the large colony of *Petalura gigantea* in dry sedge beds near the lake, a very different habitat than those frequented by North American petalurids. Rosser Garrison found the species common there 12 years earlier, one of the reasons for our visit. We did not find them as common as Rosser did, but there were enough to furnish a considerable thrill, and I gasped at my first sighting of this huge dragonfly. They perched low in the marsh and proved extremely difficult to approach, but I finally caught one, and I think the photo Netta took will show me grinning from ear to ear.

But this experience was eclipsed by our encounters with what has been called the largest of all dragonflies, *Petalura ingentissima*. We spent the last 2 weeks of our trip in northeastern Queensland, in the general vicinity of Cairns. *P. ingentissima* was one of our reasons for spending so much time in this area of lush tropical rain forest, and we were fortunate to see 3 of them. I didn't even get a swing at the female I saw, but Netta encountered 2 males at close range and caught one of them. I had just fallen on slippery rocks in a tiny rain-forest stream and hurt my hand (broke a carpal bone, and my hand is splinted as I type this), submerged a brand-new camera (amazingly, it dried out with intact electronics), and was an unhappy camper when I met her back at the car. She said she had only a few specimens, so I looked through her box of envelopes and there, at the bottom, was the Holy Grail, looking as if it could not only chew its way out of the envelope but break out of the cardboard box and give us both nasty injuries as it made its escape. Wow! Although it may not in fact be the world's largest dragonfly (our own *Anax walsinghami* is just as long), it certainly gave that impression at the time.

Some of my favorites were at the other end of the size range, however. *Nannophya australis* is a tiny libellulid, smaller than our American *Nannothemis*, with a pruinose blue thorax and black abdomen with

expanded red tip. The first ones I saw were right at my feet, and I had to take a second look to be sure they were actually odonates. The same was true with my first *Austrocnemis*. This coenagrionid genus is among the smallest, if not the smallest, of all damselflies. Very long-legged, they perch flat on lily pads, often with the tip of the abdomen bent upward (can any other odonate do this?), and seem to dart rather than fly from pad to pad. Small and dull-colored but awesome! And I never got tired of seeing little white needles cruising through the grass, the completely pruinose males of *Agriocnemis argentea*.

It's not as easy to find new species in Australia as in the tropics of other continents, but the isolated 1,000-meter Mt. Lewis keeps rewarding its visitors. (Mt. Lewis is just a few kilometers from the Kingfisher Park Lodge in Julatten, which has my highest recommendation as a place to stay in order to survey the surrounding countryside.) Rosser discovered a new corduliid there in 1986, and it has not been found since. We didn't find it but instead found an undescribed *Eusynthemis*. Günther, who has done much with synthemistid taxonomy, was especially pleased with this species, as well as our collection of the third known specimen of *Choristhemis olivei* (or perhaps another new species) and the first female of *Tonyosynthemis ofarrelli* at other localities. The interesting fauna on Mt. Lewis may be the tip of the iceberg, as the mountain ranges to the north are virtually inaccessible and quite unsampled for odonates.

We were still adding to our species list right up to our last afternoon. Males of *Camacinia othello*, a huge, black-winged libellulid, were flying over grassy rain puddles among the tall trees of the Cairns Botanic Garden after a deluge earlier in the day, perhaps just beginning their breeding season as we were leaving Australia. Did we leave too soon?

I realize again that my dragonfly expeditions just aren't very exciting! Nothing but good roads, dependable cars, comfortable accommodations, tasty food, ice-cold Foster's, and fabulous odonates. Oh well, maybe I'll try Bolivia next time.

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## BACK TO BORNEO

Nick Donnelly

Ailsa got me this very useful book for Christmas. It is Fodor's "World Weather Guide". Are you contemplating a trip somewhere and want to know

what sort of weather to expect? This is just what you need. Naturally, I opened the book immediately to Borneo, because we had booked a

trip there just after the New Year. The nearest place listed was Kuching, which was close to our destinations (in Sabah and Sarawak). "How much rain is there in January?" she asked. "It looks like - surely these must be millimeters - whoops they are inches - 24 inches. Now we know why it was so easy to make reservations." [Further perusal of the guide showed that there are very few places in the world with more rainfall than this in a single month.]

Our last trip to Borneo (ARGIA 9-3) was one of the highlights of our tropical experiences, so Ailsa and I thought we would repeat the experience this winter, and, anyway, January is a great month to leave Binghamton. Little did we know that it would be so darn wet. But, tickets purchased, we were locked in.

When I checked in at the office for Kinabalu National Park office my contact, Mr Liew, said, "So you came back in the rainy season!" "Yes," I responded lamely, "we really need to see what is here at a different time of the year..." The bad news, it turned out, was that a portion of the highway to the park had been removed by a giant landslide during tropical storm Hilda just a few days previously. "They've bulldozed a rough detour, but you will need a four-wheel drive vehicle to get through," I was told. Getting the vehicle was the easy part. Do you know how to say "trepidation?" Actually, getting through the landslide was almost anticlimactic.

We stayed for a few days in the low-elevation part of the park (Poring Hot Springs) and a few more at the high-elevation part of the park. In both places we stayed in park accommodations, which were very comfortable. The main feature of the park is the 4000-meter-plus Mount Kinabalu, which is climbed daily by dozens of people, mainly eager foreigners. There is a competition each year for the fastest climb, and the previous year's winners have their names painted on a huge sign board. I noted that of the first three men finished with times about 2 hours and forty minutes. The first three women - all Malaysians - finished in just over two hours. I opined to Ailsa that the women must have a shorter course. So naturally she sought out a woman in the park office and was told, "No, it is the same course." She emerged from the park office beaming like a beacon. "Yessss!"

What is collecting in the rainy season like? Actually, for us it was little different than the dry

season. Oddly, we lost virtually no time to rain, and we experienced some lovely sunny days. The odonates are not as abundant in the rainy season however. Certainly they cope with all that rain; one of their favorite ways is to choose to emerge and fly at other times of the year. And those that do fly seem to stay up in the canopy or who-knows-where for all but a few sunny hours in the middle of the day. As a result there are fewer odonates visible at this time of the year.

Kinabalu National Park had limited odonate diversity and very few dragonflies at all (There were *Macromia euterpe* on the streams). However, we did very well with the damselflies. At the higher elevation we found that the most conspicuous damselfly was *Neurobasis cyanipennis*, a very large, very dark wing *Calopteryx* relative which lives at high elevations. I took photos of this bug both with and without flash in hopes of recording the brilliant colored reflections of the dark wings. I think I almost succeeded, but this visual texture is really difficult to record on film.

The real delight at the Park was the damselfly *Rhinoneura villosipes*. The bug belongs to the Chlorocyphidae, a family that includes *Rhinocypha* and is otherwise noted for their very short abdomens. *Rhinoneura* has very narrow wings and a very long, black abdomen which is marked with bright yellow. Seeing two males dancing in front of your eyes doing a territorial display is one of the real treats in the odonate world!

There were other treats at Kinabalu. My favorite was a Whitehead's pygmy squirrel, which is an furry, tiny animal (smaller than a chipmunk) with tufted ears. One came down a tree to look me over while I waded in the Liwagu River. This odd and curious beast looked like nothing so much as an animated swab for a gun barrel.

The next place we visited was Danum Valley, a wildlife preserve in south-central Sabah, reached by a flight to Lahad Datu and a two-hour ride on a dirt road. We had in mind seeing some more of the mammals that we had enjoyed so much in our earlier visit to Sabah. In this we were wildly successful, seeing all sorts of neat beasts when we least expected it. One day I was photographing a *Vestalis* when I heard a tree trunk bend noisily. I looked up and saw a large female orangutan in a nearby tree. I radioed Ailsa and she came to watch it with me a for nearly an hour as it moved from tree to tree in search of fruit. When night falls,

orangutans make a next of branches and the next day set forth out again. This was not our first orangutan, but every one is a major thrill.

Our next monkey - a red leaf monkey - was a first. These are bright orange languirs and are smaller and more elongate than orangutans (which are more of a henna color). These monkeys were also looking for fruit and somewhat curious about the people that were gaping at them. What one notices about tropical animals is that they are often just as curious as the people looking at them. There is a lot of mutual watching.

But the memorable animals at Danum Valley were not monkeys. There were four kinds of deer, one of them large (sambar) one small (red barking deer) and two tiny (mouse deer species). These last two we saw at night. Imagine a deer transformed into a dachshund and you have the approximate idea. And what dines on mouse deer? One night we saw a python stretched completely across the dirt road in front of our vehicle. It was in no hurry to slither across the road (I stroked its magnificent back) and had the remnants of a bulge, probably from a mouse deer eaten recently.

Other memorable animals were three species of large flying squirrels seen at night by light, and a black squirrel with a red belly seen during the day. There is a wild pig which has a much higher forehead than our boar. And - best of all in many ways - were wild elephants. Going down the road our driver noticed that the elephant dropping looked very fresh and he cautioned us to be on the lookout. A minute later Ailsa shouted that they were just ahead. A lovely pair scrambled out of our way trumpeting their displeasure at having been disturbed.

Yes, there were odonates too. Not very many, but very choice, and almost all damselflies. One of the most interesting genera was *Vestalis*, another calopterygid. I once noted that Lieftinck had named several new *Vestalis* from Borneo in one of his papers and given them all names starting with "a". Thus, in addition to the two known species *amoena* and *berrylae*, he added *amabilis*, *anacolosia*, *amnicola*, *amaryllis*, and *atropa* (as well as *amethystina* from nearby Malaysia). Of these seven Borneo species we found all but *amabilis*. One *Vestalis* stands out - the wondrous *berrylae*, which is very elongate - like a stretch version of our southern *Calopteryx angustipennis*. We found

them on paths in the forest far from streams. I wonder where they breed?

But all those other *Vestalis* look nearly identical, at least to the human observer. And generally there would be two nearly identical species side by side. How do they sort themselves out? This is a good question. The collector is hard pressed to name one of them without nabbing it and having a close look with a hand lens. Even then it ain't easy to name them. But they know how.

On of the other damselfly genera - *Euphaea* - has in Borneo a similar case of nearly identical species. In this case, *subcostalis*, *laidlawi*, *subnodalis*, and *tricolor* are all essentially identical. ( We found all but *subnodalis*). They sit on low branches displaying bright blue reflections on their wings that undoubtedly drive the females wild. But, again, they are all very similar to each other. What trick of evolution produced these nearly identical damselflies?

In addition to these genera, there were bright red *Rhinagrion elopuriae*, blue and black *Rhinocypha humeralis*, and the lovely *Rhinocypha cucullata* with golden flashes on the dark wing markings. I watched a *Heliocypha biseriata* male guarding four ovipositing females (quite a harem!) and darting to chase away other males with his white legs extended in front of him like four little prods.

After Sabah we went to Kuching to experience some of those 24 inches of rain. Again, we were pretty lucky, but we didn't try to leave our sneakers outside to dry. Our destination this year was a luxurious Hotel built on a reservoir about four road hours from Kuching. The buildings are built in the traditional "long house" style; one block of rooms occupied a single wooden building 450 feet long.

At this hotel we rented a boat each day to inspect small streams tributary to the reservoir. One tiny stream with many small waterfalls was especially rewarding. Here we took the blue and black Borneo endemic coenagrionid *Stenagrion dubium*, which sits inconspicuously next to these waterfalls. There were also species of both *Protosticta* and *Drepanosticta*, the Old World relatives of *Palaemnema*, which are very obscure and perch in shaded places. One has to get one's eye tuned in to these bugs - they are easy to overlook. The very small *Amphicnemis* (possibly a new species) is even more inconspicuous. We each took a male,

and wondered how we ever spotted them. The real oddity here was a lovely dark damselfly with yellow markings, about the size of an *Argia translata*. It is apparently a genus of platycnemidids, a strange Old World damselfly family that looks to most of us like another coenagrionid. I don't know what genus this is, or if it is new. It is very like Lieftinck's *Asthenocnemis*, but mainly in its very simplicity of characters. At the moment it is a major mystery, but what good tropical trip does not yield at least one major mystery?

Our trip ended as most of our tropical trips ended - with lots of damselflies and few dragonflies. We almost never take aeshnids and only gomphids

(except for the ubiquitous *Ictinogomphus*) at the right season. We found the huge *Epophthalmia vittigera* again, and the usual cast of libellulids in sunny places - the familiar *Orthetrum* species, *Neurothemis*, *Diplacodes* and *Rhodothemis*. The "night fliers" tend to be libellulids - *Tholymis* and *Zyomma* - instead of *Gynacantha*. We did find an interesting *Gynacantha* (species unknown) the last evening. It was a female perched on a wall. What attracted our attention to it was the display it made of its paddle-shaped cerci, which were splayed out at the rear of the end of the abdomen in a come-hither pose. If it is a new species, then I will have to find a Latin word for "Hello, sailor".

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### AN INTERESTING NEW LARVAL MORPHOLOGY OF *ARGIA*

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INTRODUCTION - Dr. Carl L. Hubbs and other well-known researchers in the University of Michigan Fish Division were quite active in researching the fish fauna of the southwestern United States and most of Mexico for over 50 years. These researchers often saved many of the aquatic insects caught in their fishing seines, thus contributing thousands of specimens (including many odonate larvae) which are now deposited in the UMMZ-Insect Division. We have just begun to sort through and identify this large but somewhat unorganized treasure. One such specimen is a unique and fascinating larval specimen of *Argia* that had been in unsorted storage for over 60 years (Figure 1). I have been unable to associate this specimen with recent larval keys (Westfall and May 1996) and descriptions (Westfall 1990, Novelo-Gutierrez 1992) appropriate for collection area.

The specimen, collected by the family of Dr. Hubbs and Earl Mangum, on 22 August 1938, came from a tributary of Murray Creek, in White Pine Co., Nevada. An entry from Dr. Hubb's field notebook states that the specimen was collected from "springs on Georgetown Ranch, in meadows immediately north of [the] railroad yards of East Ely. The water was clear and cool, the creek generally choked with cress and Potamogeton." The stream was characterized as a series of minute pools and riffles, with depth up to 2 feet in some head springs. Murray Creek was characterized as "the open sewer of Ely", and is said to irrigate Georgetown Ranch which is owned by The Water Co. The largest

spring, on the south side of the railroad tracks was the largest and is reported to have contained many of the minnows before it was drained out, cemented in and used in the water supply of Ely (most of which comes from above town)." The specimen was originally preserved in 10% formalin, then transferred to 70% ethanol.

DESCRIPTION - Color (in preservative) tan-yellow, body stout and short. Length (excluding gills) 9.05 mm; abdomen (without gills) 4.8 mm; hind femur 3.0 mm; hindwing pad 2.5 mm; gills missing.

Head: fairly uniform in color, except for a dark brown transverse marking between the eye that almost touches medially, posteriorly to this a lighter band, and posterior to that a slightly darker brownish band to the posterior margin of the head. Occipital lobe with prominent posterolateral tubercles, thickly covered on dorsal and ventral surface with approximately 20 thick setae on each tubercle. Eye ventrally surrounded by a line of smaller thick setae. Dorsal surface of head covered with thin hairs. Width across eyes 7.0 mm, width behind eyes narrower ( 6.0 mm), and then considerably wider across cephalic tubercles (7.1 mm). Antennae uniform in color, total length 1.65 mm, slightly shorter than middorsal length of head, ratio of lengths of antennomeres: 0.55, 0.73, 1.00, 0.52, 0.39, 0.30, 0.18, seventh antennomere not strongly differentiated from the sixth. Length of head from frontal shelf to back of head 3.4 mm.

Labium tan- to yellow-brown, prementum-postmentum articulation extending posteriorly slightly past the base of anterior margin of mesocoxae. Prementum broad, sides divergent apically, middorsal length in dorsal view of extended hinge 2.2 mm, width across palpal lobes 2.0 mm, and basal width 1.15 mm (0.58x its apical width). Ligula moderately convex (Figure 2), strongly denticulate with small setae at near apical margin of each minute denticle, lateral margin with 14 stout setae along the apical 2/5, no premental raptorial or basal setae. Palpal lobes with 4 palpal setae, posterior 4th small, movable hook about 0.68 mm, two pointed hooks slightly incurved and slightly darker than base color at their tips, lateral one shorter (0.61mm) and slightly a bit less than 3x the length of the mesal one (0.21 mm).

Thorax: yellow brown, anterodorsum of pronotum with spiniform setae, inferior margin of proepisternum evenly rounded with thickly spinulose setae interspersed with long thin hairs; this margin, in lateral view, slanted at a posterior-to-anterior angle of approximately 80 degrees. Synthorax somewhat robust, evenly colored, with wing sheaths somewhat translucent, extending roughly to middle of abdominal segment 4. Legs yellow, apparently unbanded, although the apical portion of tibia slightly testaceous. Meso- and metafemur flattened (Figure 3), somewhat arcuate, anterior margin with single, regular row of small spinulose setae interspersed with thin hairs, posterior side with double row of longer spinulose setae interspersed with longer, thin hairs. Meso- and metatibiae arcuate, with spiniform setae on apical, ventral side. Tarsi straight to slightly arcuate, ventrally with double row of spiniform setae, dorsal side with scattered, thin hairs. Right mesotarsal claw apparently malformed.

Abdomen: segments generally uniform in color, except for a middorsal light longitudinal line, very thin in basal segments and considerably thicker at 8-10, almost like a middorsal light triangle. Posterior margin of each segment with 1 even row of thick setae, elsewhere segments with scattered setae interspersed with thin hairs, and with very long hairs centered mesally on tergites. Female gonapophyses extending to posterior margin of 10, in ventral view tips somewhat sharp and slightly divergent. Gills missing.

COMMENTS - The well-developed wing pads indicate a fairly mature specimen, and the

combination of the following characters would indicate more likely a new and unusual larval form of an undescribed species, rather than an aberrant form of a known species:

1. Cephalic lobes with hypertrophied tubercles
2. Lack of obscure leg rings
3. Transverse band on the head between compound eyes

The first characteristic is especially amazing because it has not been previously recorded in any other member of the genus. This specimen reflects similarities to the *Argia extranea - vivida* group, with the antenna slightly shorter than the head and slightly flattened femora, to *A. anceps* Garrison and perhaps *A. fissa* Selys (ligua moderately prominent, palpal setae 4, basal setae shorter than the remainder, and shape of female gonapophyses) (Novelo-Gutierrez 1992, and pers. comm.).

This specimen has been deposited in the Museum of Zoology - Insect Division, University of Michigan, with the database number UMMZODO-2144.

Unfortunately, this author will not be able to travel to this collection area in the next year to search for additional larvae and/or adults. I therefore urge other researchers to do so, and I would be able to rear larvae if the researcher is not able to. It should be noted that the probable dramatic changes in many southwestern watersheds in the US over the past 60 years may also make recollection of this species more difficult.

ACKNOWLEDGMENTS - I graciously thank Dr. R. Novelo-Gutierrez for examining this specimen and bringing to my attention minute details not previously noticed, and John Megahan, staff artist for the Museum of Zoology, University of Michigan, for executing the drawings, and Dr. Novelo and Mr. Mark O'Brien for reviewing this paper and making suggestions for its improvement.

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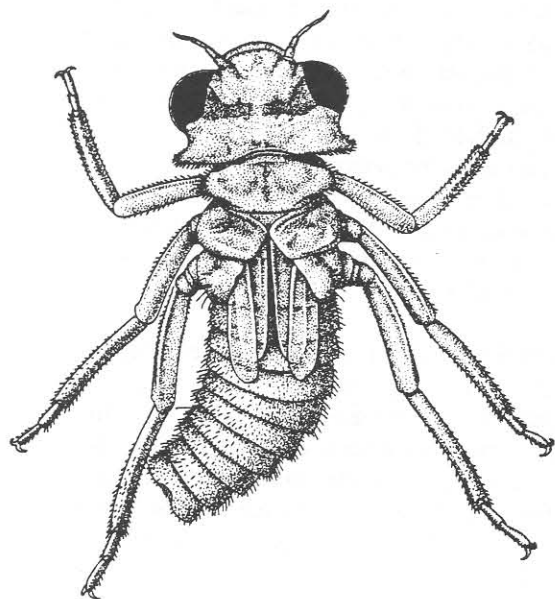


Figure 1: Dorsal view of *Argia* sp. specimen.

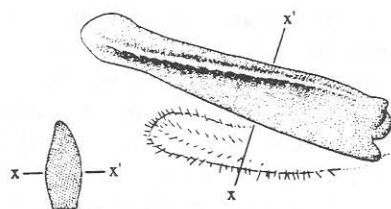


Figure 3: Dorsal view of right metathoracic femur (upper right), with cross-sectional aspect (lower left).

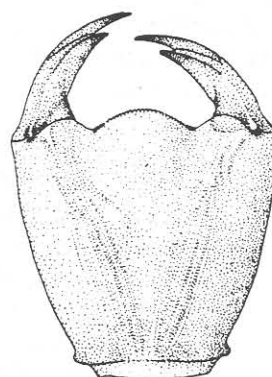


Figure 2: Dorsal view of prementum.

**A BEGINNERS RANDOM OBSERVATIONS ON WINTER DRAGONFLIES**

**Fred Sibley**

Having just returned from the tropics in late October I was depressed by the 50 degree temperature and cold wind and went looking for late lingering dragonflies. Naugatuck, CT is about 20 miles from the shore and by this date in 1998 had not yet experienced a hard killing frost. Behind our house is a large rock with one shallow cattail edged pond [150x40 feet and 12-18 inches deep] that is home to a small variety of dragonflies. Today there were still two pairs of *Sympetrum vicinum*? laying eggs. The first tandem pair had been sitting on a warm rock and flushed to another warm rock when I approached and then stayed on the second rock for 4 minutes until the sun came out from the clouds. Then they lifted up a few inches and settled back for another 10 seconds or so before making a successful takeoff. They proceeded along the edge of the water with the female touching the surface

12-13 times before they settled again on another rock facing the sun. The next time they flew out to lay eggs a second tandem pair came by and both pairs were laying eggs within an inch of each other.

With that encouragement I decided to come back on sunny days and see how long they survived. Temperatures went into the low 20's several nights during November and day time temperatures barely to 50. However with diligent searching along the south facing walls of the quarry I kept finding *Sympetrum vicinum*. One day I got back to house and found a dragonfly had gotten on my jacket and ridden the quarter mile back. None of the individuals were very active and all were perched on rocks facing the afternoon sun. Only one [a female] was found next to the main pond but two males had picked sunning rocks overhanging a water filled cattail ditch. After each cold night I expected to draw a blank and on November 29 I picked up my last one at the quarry - a male. For a total record of 4 males and 3 females from 4 visits.

Realizing that our interior locality was colder than the coast I had started checking a small pond [about 100 ft across and 6 in to 3 ft deep] associated with the Birdcraft Museum in Fairfield, CT. This is only a mile or so from the coast and 30 yards from I-95. The number of *Sympetrum* had been high here throughout November with up to 40 males sitting on the railings of the wooden bridge crossing the pond. On December 2 at the beginning of an amazing warm spell *Sympetrum vicinum* were flying by 9:30 and by noon there were swirls of 6-8 over the pond, evidently all males. An *Anax junius* was picked up the same day in a near by phragmites patch. Unfortunately I had to go to upstate New York the next day and missed December 8 when temperatures went into the 70's and a friend reported seeing damselflies. Did females appear that day? Since early November I had seen nothing but males on the Fairfield pond.

On December 9, the first cold day after this heat wave, I was not surprised to find lots of *Sympetrum vicinum* flying by 11 despite temperatures below 50. Starting at noon I caught and marked individuals until 2:30 when the sun was too low and everything had gone to roost. Caught a total of 70 individuals - all males and all with slightly to massively worn wings. This represented the bulk of the population as it was hard to find unmarked individuals by 2. There were never more than 30 individuals found in any 15 minute sweep of the area. They seemed to prefer the wood railings of the bridge over the leaf covered pond edge. If you got between the sun and the dragonfly it would sit for about 10 seconds and then go to a sunny spot. This seemed to be the scenario as the sun disappeared - the one individual watched shifted perches several times as the sun vanished, first to the last sunny spot on the bridge rail, then to a series of light colored trees - all evidently unsatisfactory as it abandoned each in quick succession finally flying down into the bushes and presumably roosting on the ground. In the 15 minutes between catching and marking, individuals in their envelopes became chilled enough that they would have to sit in the sun for 10-20 seconds before being able to fly.

After the 9th there were a series of cold nights and overcast days. On December 16 a light skim of ice covered the pond and the temperature was in the mid 40's with weak hazy sunlight. One marked individual was found at 12:30 barely able to fly. It was relocated at 1:30 - my last sighting of 1998.

DISCUSSION - It appears that the Naugatuck pond and the Fairfield pond represent totally different situations and are treated separately in the discussion.

Calvert (1926 - Ecology 7:185-190 ) observed *S. vicinum* at a pond near Philadelphia not dissimilar to my Naugatuck quarry pond. He also had very few individuals on any visit and about equal numbers of males and females. With 25 years of observations and a more southerly location I would have expected his late dates to exceed mine. He has several later dates for ovipositing, his latest of Nov. 13 exceeding mine by 2 weeks. However his latest observation of species, Nov. 23, falls a week short of mine and in many years his latest observation were much earlier.

He recorded the coldest temperature preceding his last sighting but in only one year was that temperature below freezing. He hints that the temperature might have been several degrees colder at the pond since the vegetation had experienced a killing frost. By contrast there were several nights in November, 1998 when temperatures went into the low 20's.

Calvert says it could not have been temperature alone that doomed his dragonflies since he could find no correlation between low temperatures, average temperatures or hours of sunlight and the last date one could find dragonflies. This is probably true. My thought would be that the dragonfly continually loses energy reserves as the season progresses. There were days when it was too cloudy or too cold for the insects to be out and even on the best of the sunny days feeding time was severely limited. Probably most days resulted in a net loss of energy and eventually the dragonfly died from a combination of starvation, old age, and temperature.

That brings us to the Fairfield pond - another shallow, muddy bottomed pond but surrounded by trees. Although warmer than the Naugatuck Pond it was not that much warmer - it also experienced killing frosts in November and both ponds froze up within days of each other in mid- December. At Fairfield the population after November 1 was exclusively male. The population was huge with sightings of 40 plus individuals easily seen in late November compared to 2 found with diligent searching at Naugatuck. The population continued huge to the last decent day and even when the pond froze and flying conditions were miserable, 40's and



partly cloudy, one individual was out and about. Observations starting earlier and carried out more consistently in another year may explain this difference between the ponds.

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#### OBSERVATIONS ON THE POSSIBILITY OF OVERWINTERING LARVAE OF *ANAX JUNIUS* IN WISCONSIN

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There has been a good deal of discussion recently as to whether there is a population of *Anax junius* that overwinter as larvae in Wisconsin, as well as other states, rather than migrating south as the weather cools in early autumn. I've made some observations dating back to 1995 that may shed some light on the subject.

All of these observations were made at the Rocky Run Creek State Fishery Area in western Columbia County in southern Wisconsin. In the state owned portion the creek is dammed to form a pond of several acres with a water control structure which allows the overflow to continue on its course. Rocky Run Creek eventually empties into the Wisconsin River. This area is of particular interest to me because of its relative proximity to my home and because of its abundant Odonate population, which includes some interesting Wisconsin species which seem to be far south of their normally accepted range.

Every spring since 1995 I've tried to be there on the first day that *Epitheca canis*, the earliest emerging species of the season at Rocky Run, begins to emerge. From that point on I spend at least 3 or 4 days a week there tracking the progression of different species' emergences and doing a lot of dragonfly photography.

I first became interested in Odonates in the summer of 1994 but because of a lack of generally available field guides and because I knew of no one who shared my interest, a lot of things went unnoticed until my knowledge and contacts increased to the point that I was able to put 2 and 2 together and realize that I might have some useful information to share.

*Anax junius* first appear in Wisconsin as migrants in very late March to mid April depending on the early or late arrival of warmer temperatures. Mating

occurs very shortly after their arrival. Assuming an average larval stage as lasting approximately 3 months, the first resident emergence of adults would take place in late June at the very earliest with early to mid July being more likely. The greatest numbers of emergences of adult *A. junius* at Rocky Run begin in late July and begin to taper off about the end of August.

I've always collected exuviae, even when I first got interested in Odonates and had no way of identifying what I had collected. I preserve them in alcohol and always label and date them on the same day that I collect them to minimize later mistakes as to time and location.

To my surprise, when I began keying out exuviae in the winter of 1997, I came upon a bottle containing 2 male *A. junius* dated 17 June 1995. There could be no mistake as to the dates as the date on the bottle label and the dates on my field notes from the same day coincided.

I also had confirming records on a microcassette recorder, which I always carry with me. I find my comments, taped at the moment of observation, are much more accurate than my memory, even within a few hours of returning home. In the interests of accurate field notes, a recorder is worth its weight in gold.

After realizing that these larvae would have had to have hatched in mid March to emerge by 17 June, I decided to keep my eyes open in 1998 and see if this were just a fluke or if I might be on to something.

In the spring of 1998 at Rocky Run I first observed migrant adult *Anax junius* in early April. But on 25 May, while observing an emergence of *Libellula luctuosa*, I spotted a teneral *Anax junius* perched on an emergent cattail. I later looked for the exuvia with no success. The teneral apparently had crawled away from its exuvia because its wings were still folded over its back. As I tried to approach close enough for a photo it spread its wings to the horizontal and as I focused it took off on its maiden flight. Luckily, I never lost sight of it and it only flew about 10 meters before clumsily landing (crashing ) in some tall grass. I was able to get 6 Kodachromes of it before it gathered its strength and took flight, whereupon I lost sight of it.

This could hardly be the offspring of a pair of migrants, as the 3 months of larval development

would take it back to late February. Late February is not by any stretch of the imagination suitable weather for Odonate mating activity in Wisconsin.

The next instance occurred on 7 June 1998, also at Rocky Run. I collected an exuvia of a female *A. junius* off an emergent cattail. I spent the next 15 to 20 minutes attempting to find more exuviae but had no success. 7 June would also make this unlikely to be the offspring of adults that migrated into Wisconsin in the spring of 1998.

The next exuviae and juvenile adults I saw in 1998 were in July, almost certainly the result of mating between adult migrants in April 1998.

What do these early sightings mean? Is there a small group of *A. junius* that somehow manages to overwinter in Wisconsin? Do they breed with the migrant population and if so, how long is the larval stage for their progeny? Do they only breed with other overwintering individuals? A lot of questions and not enough data to draw any conclusions. This is an area that needs much more research. If anyone has any comments please e-mail me at westy@gdinet.com and in the spring of 1999 keep your eyes open for *A. junius* exuviae or tenerals in May and early June in climates comparable to southern Wisconsin.

[Dave added this note a few days later: "If enough people would go out in April and early May and try to collect full grown *A. junius* larvae in the northern states, it would provide some much needed data on this question. If you can make a mention of this in ARGIA it would be much appreciated or if you know of anyone with an interest in this subject would you pass along my e-mail address to them? I'd like to try to get something organized for this spring. Cabin fever's setting in already!"]

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## DEVELOPMENT VS DRAGONFLIES

José M. Ramos Hernandez

C # 9 e/ Algerdo Ferrer y Agramonte  
Cabaiguán, Sancti-Spíritus, CUBA 62400

Recently, in October, on several dragonfly collecting trips, along the "Autopista Nacional", between Cabaiguán and Taguasco, I came to appreciate the large number of dragonflies that fall victim to automobile traffic. I recovered along the sides of the highway 22 species, which are listed below:

*Enallagma civile*, *E. coecum*, *Ischnura hastata*, *I. ramburii*, *Anax junius*, *Coryphaeschna adnexa*, *Gynacantha nervosa*, *Brachymesia herbida*, *Crocothemis servilia*, *Dythemis rufinervis*, *Erythrodiplax fervida*, *E. justiniana*, *E. umbrata*, *Erythemis vesiculosa*, *Miathyria marcella*, *Micrathyria dissocians*, *Orthemis ferruginea*, *Pantala flavescens*, *Tholymis citrina*, *Tramea abdominalis*, *T. calverti*, and *T. insularis*.

The most commonly found species were *Enallagma coecum*, *Anax junius*, *Erythrodiplax umbrata*, *Miathyria marcella*, *Orthemis ferruginea*, *Pantala flavescens*, *Tramea abdominalis*, and *Tramea calverti*. I also found many diurnal lepidoptera and hymenoptera. This gives us a vivid look at the impact of human development on natural ecosystems.

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## UNUSUAL INVASION OF DRAGONFLIES ON GUANA ISLAND, BRITISH VIRGIN ISLANDS

Fred Sibley

The dragonflies of the British Virgin Islands [BVI hereafter] have never been well studied - probably because there are very few species and very little habitat on this essentially arid group of islands. We found published records only for *Orthemis ferruginea* (Klots, E.B. 1932. Insects of Puerto Rico and the Virgin Islands. Vol. 14, part 1. NY Academy of Science.) and specimens for 3 others at the USNM [*Pantala flavescens* - Jose Van Dyke, *Ischnura ramburii* - Guana Island; *Erythrodiplax umbrata* - Tortola]. During October 1997 we recorded 10 species of odonates on Guana Island and Anegada Island although we could only find 3 species in 1998.

This paper reports on the unusual weather conditions in 1997 that brought so many species and so many hundreds of dragonflies to the BVI. Tentative speculations are made on the importance of such invasions in speciation.

Guana Island is a small arid island [about average precipitation for an BVI island] located about 2 miles north of the east end of Tortola [the major island of the group]. It is a little over a square mile in size with a maximum elevation of 850 ft. A small flat area on the sw side supports a brackish salt pond of several acres and two small freshwater seeps. These seeps do not have standing water during the dry season and in

some dry years may not have water for more than a few weeks. The brackish pond is always present and normally has a 1-3ft wide acres of bare ground between the water and the grass and scattered mangroves on edge. The pond was never used by dragonflies in 1997 or 1998. In 1997 dragonflies were frequently observed egg laying over the flooded lawn or in the flooded pond edge vegetation, but never on the pond side of the vegetation line. Flights over the pond were infrequent and even then individuals only ventured a few feet out from the vegetation before turning parallel to the shoreline. We were also on the island in Octobers of 1994-1996 but were not observing dragonflies. We returned in October 1998 and collected "normal year" data for comparison to the unusual events of 1997.

1997 OBSERVATIONS - During the period October 10 to 19, 1997 four of us were doing bird banding on Guana Island and casually tracking the dragonfly population. On October 10 there were an estimated 10-12 *Orthemis ferruginea*, 12-15 *Erythrodiplax umbrata* and one *Ischnura ramburii* around or over the two seep areas - both seeps were already several times larger than in a normal year due to heavy rains before our arrival. These would appear to be the normal "residents" as the same three species were regular in October 1998. On October 12 the wind shifted to the SW as part of a major storm system bringing moisture out of the Pacific across Panama to the Caribbean. The wind continued out of the SW through the 15th with about 15 inches of rain occurring during the 4 day period. The salt pond doubled its size and overflowed onto the lawn. The seeps also increased dramatically in size and went from 3 inches deep to 3 feet deep. The maximum flooding occurred on the 14th with a continuous body of water from the dump seep at the SE end of the "flat" to the salt pond on the NE end. The two seeps receded fairly quickly to about twice their normal depth by the 18th. The salt pond only lost about 1/4 of the depth gained and continued to cover extensive areas of lawn.

Between the 10th and 14th there did not seem to be much change in numbers. The island list went from 3 to 5 with the addition of one *Erythemis versiculosa* and a few *Tramea abdominalis*, but the total number of dragonflies did not change much. *Ischnura ramburii*, seen on the 10th, was not re-found until the 14th when a female was present.

On the 15th *Ischnura* became fairly common and easily found, and several *Tramea* and *Pantala* were

seen over the lawn. Two individual *Perthemis domitia* were found the 16th and the numbers of *Tramea abdominalis*, *Tramea calverti*, and *Pantala hymenaea* shot up dramatically with further increases on the 17th (estimated several hundred individuals). Unfortunately there were no "dragonfly people" on the island and we failed to separate these three species adequately in the field. Based on collecting, *T. calverti* was the most common with 6 collected compared to 2 each for the other species. We collected a *Pantala flavescens* on Aneгада Island and since we could easily separate it in the field from the *Tramea calverti* and *Pantala hymenaea* also present on Aneгада felt that it must have been rare if not absent on Guana Island. A one-day visit was made to Aneгада Island on the 19th. This is a flat coral island several miles wide and 15 miles long. We visited the major permanent fresh water pond on the island, The Slob. This is reported to be a hole dug down below the water table and normally about 10 feet across and a foot or so deep. When we were there it was several acres in size and knee deep within a few feet of the edge. *Orthemis*, *Tramea calvertii*, *Pantala hymenaea*, and *P. flavescens* were all present in that order of abundance [we did not differentiate *Tramea* and *P. hymenaea* at this time]. An *Anax junius*? flew over the pond briefly. There were water puddles everywhere but the only concentration of dragonflies was at The Slob although dragonflies were present in all the areas visited. No males were seen guarding the outlying puddles and most individuals seen away from The Slob were cruising at 3-8 feet and probably *Tramea* or *Pantala*. Aneгада Island was not revisited in 1998 so we have no idea what a normal dragonfly population is.

DISCUSSION There is essentially no baseline data for the BVI so it is difficult to sort out the true importance of this invasion. *Orthemis ferruginea*, *Erythrodiplax umbrata*, and *Ischnura ramburii* were also present in 1998. A large healthy populations of all three were found on nearby Beef Island in a roadside ditch with permanent water. Only a few male *Orthemis ferruginea* were seen on Tortola. Since these three species were present on Guana Island before the SW winds arrived they are not considered as part of the unusual invasion. In a normal year we do not believe the fresh water seeps persist long enough to allow larvae to mature. Thus these species must be constantly recolonizing the island. If not on an annual basis then after every really dry year. *Erythemis vesiculosa* was not found in 1998 suggesting this species is a less regular

wanderer and recolonizer from the American Virgin islands or Puerto Rico. Although at least one individual was present before the 1997 storm later arrivals must also have been aided by the winds. All the rest of the species undoubtedly came from the west and arrived on Guana Island as a direct result of the unusual sw winds. *Perithemis domitia* is regular in the American Virgin Islands but no further east and *Tramea calverti* has not been recorded east of Puerto Rico. All the species could have come from Puerto Rico but, since they didn't start arriving in numbers until 3 days after the winds started must have come from further away or not started out until late in the storm. The continued increase in numbers after the winds shifted would suggest many individuals went past the island and then came back on the ne trades.

All species except *Perithemis* [only two males found] probably laid eggs on the island although, because of failure to separate some species, neither *Tramea abdominalis* or *Pantala hymenaea* were positively documented egg laying. We feel certain that none of the freshwater sources where egg laying was observed remained long enough for larvae to mature. In a normal year at least three species recolonize Guana Island. In the 1997 invasion of Guana Island, and presumably the whole BVI chain, 5 additional species attempted to colonize. All would have been successful if suitable habitat had been available. A 9th species attempted to colonize but only 2 males made it to the island. The *Anax* may be just a vagrant as one was seen in 1995.

We estimated, and probably severely underestimated, several hundred individuals of the 3 major invading species came to Guana Island. These were driven by the wind and presumably had little control over their destination so we must assume that other BVI islands with flooded fields were also visited by hundreds of individuals. Unless they were able to return to Puerto Rico or other islands to the west the reproductive potential of thousands of dragonflies was wasted on this attempt to colonize the BVI. This suggests there is always a huge surplus of individuals and that they are motivated to move by overcrowding. The dragonflies by their sheer numbers would guarantee a successful colonization with suitable habitat. The numbers would also insure the influencing of the resident gene pool on islands where the species was already present.

This just leaves lots of unanswered questions. Did this mass movement go far enough east to result in colonization of some of the Lesser Antilles by

*Tramea calverti*? Are these mass movements from the west a common thing? Are mass movements from the east - much easier to imagine with the regular hurricanes and NE trades - also a regular phenomena? Is there reduced variation in Caribbean dragonfly populations because of the regular invasion or recolonization from a permanent source? If I hadn't been on Guana Island when this invasion occurred is there any way to infer its existence a year later?

Peck, 1992 [The dragonflies and damselflies of the Galapagos Islands, Ecuador. *Psyche* 99:309-321] reports on another group of arid islands and some interesting comparisons can be made to the BVI. The list of 8 species includes only one endemic. The author comments that the aridity of the islands and not the 1000 mile water gap is the reason for the limited fauna. This implies that invasions are easily possible. He also mentions that hawking dragonflies were exceptionally abundant along the coast after the unusual rainy conditions of the El Niño of January-May 1992. Suggesting what? An undetected invasion? A massive emergence? A swarming in response to storm conditions and a resultant invasion as the insects are carried by the wind? Certainly in the BVI there was no source for a massive emergence and the abundance with the El Niño rains had to be invasion. Despite the large number of scientist who have worked on the Galapagos Islands Peck is also plagued by lack of baseline data. He comments that *Brachynmesia herbida* had not been recorded since 1901 but was abundant during his visit in 1989.

I would like to speculate that all of the dragonflies on the Galapagos Islands [with the exception of an endemic *Aeshna*] invade from the mainland in large numbers on a regular basis. Even once every 100 years would be enough to prevent speciation. Perhaps some of the species do not maintain a continuous presence on the island.

Barnett & Emms 1997 [Notulae Odonatologicae 4:153-155] reporting on the Chagos Archipelago. mention that *Diplacodes trivialis* is regularly found on islands in the groups which have no water. This would be similar to the situation I propose for the three "resident" species on Guana Island. The large number of individuals present may not include any individuals raised on the island and they may not produce any descendants. The 3 most common species on Guana Island in 1997 were not even present in 1998 and it is likely the total number of individuals emerging on the island in most years is



Navassa is surrounded by abrupt cliffs undercut by the sea and because of the reported absence of fresh water on the 5.2 square km island, the discovery of dragonflies there was unexpected. Specimens were netted by hand on mostly sunny days and at temperatures of 31-35 C. The 5 specimens, deposited in the U.S. National Museum of Natural History, Smithsonian Institution, are identified below. Label data are given for each record, followed by notes on observations of each.

**MATERIAL EXAMINED** - *Erythrodiplax umbrata* (Linnaeus): NAVASSA ISLAND: ruins near Lulu Bay, 22 m., 18 23.75'N, 75 01.07'W, 2 August 1998, Collrs. W. E. Steiner, J. M. Swearingen, et al. / In flight over open weedy flats of lower terrace, near lime grove and coastal cliff; limestone and red oolitic soil (1 male).

The specimen, somewhat teneral, was netted during late afternoon in full sun as it flew slowly and hovered low over patches of bare dry soil among grass tufts and herbaceous plants, and it was seen perching on low grass stems for short periods. Other individuals of *E. umbrata* were seen elsewhere on the island but the species was never abundant.

*Pantala flavescens* (Fabricius): NAVASSA ISLAND: ruins near Lulu Bay, 22 m., 18 23.75'N, 75 01.07'W, 24 July 1998, Collrs. W. E. Steiner, J. M. Swearingen, et al. / In flight over open weedy flats of lower terrace, near lime grove and coastal cliff; limestone and red oolitic soil (1 male).

Several individuals at a time were seen actively patrolling the lower terrace, mostly about 3 to 6 m. above ground, and were most abundant on days following heavy rains. The specimen is teneral and was netted in flight. Other single *P. flavescens* were seen crossing open areas of the island interior.

*Orthemis* sp. cf. *ferruginea* (Fabricius) [Note: Antillean specimens belong to a yet undescribed species. ed.]: NAVASSA ISLAND: south part of RR trench, 72 m., 18 23.78'N, 75 00.85'W, 29 July 1998, Collrs. W. E. Steiner, J. M. Swearingen, et al. / In open mixed forest with exposed rock and patchy leaf litter (2 females); same data except 30 July 1998 (1 female).

These were netted as they perched on the tops of tall dead stems above dry, rocky, weedy, sunlit gaps of broken forest. They would take flight to briefly patrol the immediate area, then return to the same or similar perch nearby. Two of the specimens appear somewhat teneral. No males of *O. ferruginea* were observed.

**GENERAL OBSERVATIONS** - All three of these species are widespread throughout the Americas and known from all of the greater Antillean islands and a number of smaller ones (Needham and Westfall 1954; Dunkle 1989); *Pantala flavescens* is nearly cosmopolitan and large migrations following storms have been reported. Navassa is a dolomite island of ancient origin (R. Halley, personal communication) and has not been part of a larger land mass (e.g. the Haitian southwestern peninsula, 62 km to the east) but this isolation and the lack of beach landings apparently is no barrier to colonization by these vagile insects, which may occur regularly. However, the fact that most specimens were teneral when taken indicates that these odonates are breeding residents on Navassa.

The three species are known to breed in small temporary water sources. On Navassa, fresh water in which dragonflies could breed is evidently limited to rain-filled pools in the pitted karst surface of the island. Heavy rains fell on the morning of 24 July and through the night of 27 July. None of the pools found were much larger than 1 square meter and 15 cm deep, and they became dry after only a few days of no rain. They supported populations of mosquito larvae, but no larvae of dragonflies were found. Likewise, a small open cistern with emergent vegetation was present near the site where *E. umbrata* and *P. flavescens* were taken, but sampling with a dip net and other search techniques here yielded no larvae. Adults were never observed hovering near or visiting these sites. Confirmation of dragonfly breeding sites on Navassa remains to be done, but it is very likely that larger pools in the rugged karst fields remain to be discovered as the source of Odonata on this otherwise dry rocky land.

**ACKNOWLEDGMENTS** - Support for travel and equipment was provided by the Smithsonian Office of Biodiversity Programs (grant to W. N. Mathis for Caribbean aquatic insect surveys) and by the Center for Marine Conservation, Washington, D.C. The U.S. Coast Guard provided logistical support and transportation. Jil M. Swearingen, U.S. National Park Service, assisted in fieldwork, as did the other members of the Navassa "Dry Team".

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**LIST OF DRAGONFLIES FROM GUADELOUPE, WEST INDIES**

**Fred Sibley**

From 23-30 July, 1998 the Caribbean Ornithological Society held their annual meeting at Fort Royal, Deshaies on the Basse-Terre portion of Guadeloupe. While there my wife and I was able to spend a few days looking at dragonflies. The resultant list is incomplete and the observations rather basic but so little is published on the odonates of the Lesser Antilles that it should be useful.

Sites Visited Fort Royal area [NE end of island]. A freshwater pond just behind beach road 2 miles NE of Fort Royal, and a mountain stream running through the town were the major sites visited on portions of three days. Guadeloupe National Park: River Bras David picnic area near Park HQ [center of island] and Grand Etang [a large freshwater lake at 400m near southern end of island] were each visited for a few hours. Heavy clouds were present most of time reducing odonate activity greatly. Page de Viard near Petit Borog [east side of island] and La Grande Anse [west side of island south of Fort Royal] were also briefly visited.

ACKNOWLEDGEMENTS - This work would not have been possible without L. Redaud who provided assistance before the trip and many invaluable suggestions on supplies and localities once we arrived. My appreciation also to Parc National de La Guadeloupe for permission to collect in the park and for the kindness of employees in addition to L. Redaud. Thanks also to Nick Donnelly for checking and correcting identifications.

SPECIES LIST - Unknown species: At Grand Etang an *Aeshna* sp and a large red dragonfly - both flying over the deeper water of the lake.

At the freshwater pond a *Tramea* sp over the pond and a small dark dragonfly repeatedly flushed from shaded areas under trees at margin between road and marsh.

*Lestes tenuatus* Male and female collected in small [6x6ft] dug pond in bare cow pasture near Grand Anse. No others seen and no other odonates in the pond.

*Argia concinna* Adults common on tiny, slow moving, sandy bottomed, side stream from River Bras David and numerous teneral individuals on main river. One adult also found in dense lake side vegetation at Grand Etang where *Ischnura ramburii* was the dominate damselfly. On small stream running out of the brush covered hillside at Fort Royal the species was also common with numerous pairs and teneral individuals. Here, 1000 feet lower, the mottled sunlight was more consistent than in the mountains and several pairs were observed laying eggs. This tiny stream was fairly steep with rock bottom and numerous riffles, falls and still pools. Egg laying was always in the riffles in either tree rootlets or leaf litter. The pairs perched at right angles to the flow with the male usually "standing" vertically. The flow in riffles was little more than a coating of water over the rocks and, although, the species was absent in the more polluted portions of the stream the areas where they were abundant were not pristine. 4 pairs, 4 males, 1 female and 5 teneral individuals collected

*Enallagma coecum* One male collected in sandy stream off River Bras David. Only one seen.

*Ischnura hastata* Probably common in the dense short grass around the freshwater pond near Fort Royal. Not seen on the first visit, but on the second visit a single individuals appeared briefly and vanished. A few sweeps of the grass produced 4 males.

*Ischnura ramburii* Common at all sites except the River. 4 pairs, 2 males, and 6 females collected.

*Brachymesia furcata* Four to six males occupied perches around edge of the 70 x 300ft freshwater pond. Perches were a foot or so out at edge of open water. No females seen at pond. 4 males collected.

*Brachymesia herbida* One individual caught at freshwater pond as it went to roost? late in day.

*Dythemis sterilis* Several individuals seen and one collected on sandy stream off river. More common and conspicuous in the tall dense fern vegetation around Grand Etang. Two males and a female collected here. Observations and collecting at both sites terminated by arrival of heavy clouds.

*Erythemis vesiculosa* Regular in disturbed habitat at low elevations. Two males and a female caught at Grand Anse. One when it tried to catch insects landing on my trousers the other two perched on palm logs in a cow pasture.





creek..." Janice Simpkin "... caught a few at a spring in central Nevada. It was heavily used by cattle and very alkaline (pH around 9.5 ...)" Finally, Dennis Paulson had collected the species from a range of water types. He "... found *I. barberi* common on a number of occasions in sedges at drainage ditches and canals in Imperial and Riverside counties, California...These water bodies were certainly alkaline but probably not extremely so, from the diversity of species present (including several gomphids)." He also "...found it at Bitter Lake National Wildlife Refuge, Chaves Co., New Mexico, very alkaline waters. Another common species there was *Erythrodiplax berenice*, normally a saltwater dragonfly...the only place I have seen *E. berenice* away from salt water..." Finally, he had "...found it common at Newport Bay, Orange Co., California, in what was surely salt marsh."

Dennis's comment about having collected *I. barberi* with *E. berenice* was quite interesting to me. E.M. Walker in "The Odonata of Canada and Alaska, Vol. 3", (1975, p 198) had this to say: "*E. berenice* is typically an inhabitant of brackish water. On the central Gulf Coast Wright (1943) found adults and nymphs in both fresh and brackish parts of the coastal marshes, but their abundance increased with the salinity. Females have been seen ovipositing in ponds with a salinity of 24 to 37 and 55 to 68 percent sea water, and nymphs have been obtained from those where the corresponding salinity values were 55 to 68, 64 to 77 and 157 to 170 [% sea water]..." There thus appears to be some pretty good circumstantial evidence that *I. barberi* may be able to tolerate a range of salinities, possibly up to quite high levels.

The plot thickens. I called Dave Hilley, manager of Quivira National Wildlife Refuge to inquire about whether he had any salinity data from Big Salt Marsh. He informed me that they took measurements on a fairly regular basis. Since the refuge is a prime bird-watching spot in Kansas, it wasn't too hard to convince myself that I needed to grab my binoculars and make the trip west. The folks at the refuge very obligingly made a copy of some of the water quality measurements for me. Though there were holes in the record, there were pretty complete data for at least 19 years of the period from 1970 through 1998 (I am missing some data from the early 1980's).

With this information we can start doing some detective work. The first record of *I. barberi* from

Big Salt Marsh was an adult collected by Don Huggins in July, 1976. I collected specimens in July 1994 and again in early September, 1996 (including tandem and copulating pairs). We can probably assume that the species was resident in the marsh for that period of twenty years. The data on salinity over that time span showed an average value of about 4.3 parts per thousand (ppt) through the year, the monthly average being fairly consistent from month to month, but with an increase occurring in late summer to fall to average levels of 6.4-7.3 from August through October. Sea water has a salinity of about 35 ppt, so these values are 12-27 percent those of sea water. This indicates that *I. barberi* can tolerate a fairly high average salinity.

But the Big Salt Marsh salinity levels have taken some mighty swings over the years. In 1991 there was a severe drought in Kansas. In August of that year, Big Salt Marsh was almost sea water, with a salinity of 33.5 ppt (96% sea water); by October the level was 77.4 ppt (220% the salinity of sea water). 1993, on the other hand, was the year of the big floods in the midwestern US, and salinity levels in the marsh were measured as low as 0.8 ppt (2% of sea water). It would thus appear that *I. barberi* can tolerate some very large swings in salinity, and we can certainly speculate that at the high end of the range it may be every bit as salt-tolerant as *E. berenice*.

Of course, this remains an observation backed up only by circumstantial evidence - what we really need are data matching up specimens with salinity levels taken at the time of collection. It might also be interesting to raise some larvae in water with different salt levels.

Any observations that others who have collected this species would care to report would certainly be of interest. In the mean time, I'll be adding another item to my list of "odonatological things to do" this summer, and scheduling more visits to the local salt marshes to investigate the "salty" *Ischnura barberi* and its habitat.

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## ODONATA OF PYRAMID LAKE, NEVADA

e-mail from Sid Dunkle

Looking through an interesting book by Ira LaRivers, Fishes and fisheries of Nevada, 1962, Univ. Nevada Press, I found a reference on

odonates that any ordinary literature search would miss. In chapter 7, appendix I, page 674, he lists the odonates he found at the alkaline Pyramid Lake in western Nevada. He knew of only 3 species breeding in the lake (*Ophiogomphus morrisoni*, *Sympetrum corruptum*, and *Enallagma clausum*), while the others probably came mostly from the inlet, the Truckee River, namely: *Erpetogomphus compositus*, *Anax junius*, *Aeshna multicolor*, *A. constricta*, *Macromia magnifica*, *Libellula saturata*, *L. forensis*, *L. pulchella*, *L. composita*, *L. subornata*, *Pachydiplax longipennis*, *Erythemis collocata* (as *simplicicollis*), *Pantala flavescens*, *Tramea onusta*, *Lestes congener*, *Argia emma*, *Amphiagrion abbreviatum* (as *saucium*), *Enallagma carunculatum*, *Ischnura denticollis*, and *I. cervula*.

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## HISTORY OF ODONATA STUDY IN NORTH AMERICA - JAMES G. NEEDHAM

Nick Donnelly

One can't get very deep into the history of dragonfly study in North America without discovering the immense contributions of James Needham. His two major contributions were the study of larval stages of Odonata; and the popularization of dragonfly study. In other areas his work was shakier, but these two areas alone earn him a place near to the top of any list of American Odonatists.

A product of the Mid West, he was born in a tiny village in Illinois (one county west of Springfield) in 1868. His start in entomology came when the renowned Cornell entomologist J.H. Comstock noted a small publication of his entitled "Elementary Lessons in Zoology", which he had prepared while an instructor at Knox College. Comstock brought him to Cornell on a scholarship, and he stayed to earn a PhD and co-author with Comstock a seminal paper in five long sections, "The Wings of Insects". His interest in wing veins stayed with him throughout his life. Sadly, he misjudged the origin of what he took to be a branch of the radial vein (The so-called "Rs"). This mistake hounded him for decades, but the nomenclatorial system that he and Comstock developed incorporating it remains to this day the dominant one for Odonata, even among workers who firmly disagree with his conclusion.

After teaching at Lake Forest College he returned to Cornell as a professor and later chairman of the department. He built a house on Needham Place (now nestled among the fraternities), and finally retired in 1935. He remained active until his death in 1957.

Needham's serious study of Odonata larvae started with summer jobs with the New York State Conservation Department in the Adirondacks. He was part of a small team studying aquatic insects, and he was the principal author of two important book-length papers: "Aquatic Insects in the Adirondacks" (1902), and "Aquatic Insects in New York State" (1903). What we take for granted in our study of larvae really started with these detailed descriptive reports. Needham never lost his enthusiasm for larvae and continued to collect and describe them until his death half a century later.

Needham was unashamedly more of a teacher than a researcher. From his early years showing children of rural Illinois the delights of ponds, he remained devoted to teaching throughout his life. While a graduate student at Cornell he wrote "Dragonfly Babies" for a publication called "Popular Educator" (1897) - a charming article aimed at teachers of young children, but not the sort of publication usually associated with driven graduate students. A review of his writings leads to the conclusion that the teaching of biology - in fact, all teaching, remained his main life calling. I have always been struck by the number of women students and colleagues who worked with him. Elizabeth Fisher, Elsie Broughton (Klots), Hortense Butler Heywood, Ann Haver Morgan, May Gyger, and Mary Lyon, are a few of the names of female biologists taught and mentored long ago in an age when women students were often ignored.

I must include here a mention of Septima Smith, whom I met as a grand old lady in Tuscaloosa in 1957. She was the driving force for the organization in the late 1930's of a dominantly women's Odonata collecting and study group informally called the "Dragonets", for which they had shanghai'd Robert Hodges (see enclosed photo). These stalwart ladies didn't hesitate to collect the more elusive gomphids with a shotgun! *Gomphus septima* and *Neurocordulia alabamensis* sprang from this association, along with a number of other southern dragonflies. Needham, of course, was very supportive of this motley crew.



Some pictures from the Needham archives

The upper picture was taken from the National Geographic article in 1951; "Dragonflies - Rainbows on the Wing" and shows Needham in the later years of his life. It was taken at his winter home in Florida and shows him engaged in a favorite activity: showing dragonfly larvae to young people.

The smaller picture (from the UMMZ archives) shows Needham (center) flanked by Robert Hodges and Septima Smith. Left is "Miss Miles" and right "Miss Bryant", two of the "Dragonets". The picture was taken in 1936 near Tuscaloosa.



Needham's interest in the popularization of Odonata reached its climax with the publication of his "Handbook of the Dragonflies of North America (with Hortense Butler Heywood) in 1929. When I began my interest in dragonflies in 1948 the book had long been out of print, but recently I have been amazed to find how many people were influenced by it and apparently still use it. During the discussions about the Common names which the DSA adopted a few years ago, I receive any number of irate letters and e-mails from people who had been using the Needham common names all these years. "What happened to the Water Prince? To the Black Dragon?" This clearly was the first book on Odonata in the United States that reached a wide audience. Needham's last venture at popularization came with a National Geographic article in 1951, whose color photos of shamelessly posed dragonflies have now faded badly. Every few years one of my friends finds a copy at a garage sale and presents it to me. I still get a kick out of "Dragonflies - Rainbows on the Wing."

Needham will be remembered by most contemporary workers for his "Manual of the Dragonflies of North America" (1955), now also long out of print. However, the more enduring parts of this book, and its stunning photos, are the work of his junior author, Minter Westfall.

Needham tried his hand at taxonomy numerous times, often with unfortunate results. One of his first "new" species was in reality an *Ophiogomphus rupinsulensis* which he described as a new "*Herpetogomphus*". Two of his last "new" species were in reality both *Gomphus descriptus*, one of them apparently also mislocated. His large number of taxonomic misjudgments have caused some present workers to dismiss him. His pioneering studies of larvae and his popularization of Odonata, however, leave him stamped as one of the most significant North Americans in the history of the field.

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#### **NOTES ON ENALLAGMA TRAVIATUM WESTFALLI IN ONTARIO**

Paul. M. Catling, 2326 Scrivens Drive, R.R. 3 Metcalfe, Ontario K0A 2P0 Brownell@achilles.net

Donnelly (1973) indicated that *Enallagma traviatum traviatum* ranges from Massachusetts south to northern Georgia east of the Appalachians

whereas *E. traviatum westfalli* occurs west of the Appalachians from Pennsylvania and Michigan south to Louisiana. Ontario was not included in the range outlined by Westfall and May (1996), yet *E. traviatum westfalli* occurs in the southern part of the province and I have received a number of inquiries about its status in Ontario.

It was apparently first discovered in Ontario by I. Carmichael and J. Skevington in 1991 on 24 and 26 June on the east shore of Lake Huron (Pinery Park, Old Ausable Channel, Ontario). Subsequently another population was found near Port Franks. The first Ontario report of which I am aware is that of Donnelly (1995) who noted the Pinery Park collection and referred it to ssp. *westfalli*. Later *E. traviatum* was included in an Ontario list by Pratt (1996). I found another Ontario population at Spettigue's Pond in London, Ontario, on 11 July 1997. I have examined the Pinery Park material (I. Carmichael collection at CNC), material from ponds in the vicinity of Ipperwash (P. Catling collections at CNC) and from the pond at London (P. Catling collections at CNC), and all are referable to ssp. *westfalli*.

Since the pond where *E. traviatum westfalli* was found in London is a relatively well studied site (e.g. Judd 1967), the question arises as to whether or not it has recently arrived. Although abundant at this site, it could have been easily overlooked in Judd's (1967) study of the aquatic insects there because the few damselflies in his emergence traps were mostly teneral that were unidentifiable. It seems unlikely that it recently moved north because the record for Washtenaw Co., Michigan, which is on the same latitude as the northernmost Ontario records, is based on a specimen collected by Gloyd in 1932 (Donnelly 1973). With its tendency to be active over water, it is easily overlooked.

The Ontario ponds where *E. traviatum westfalli* occurred were permanent, evidently nutrient-poor, clear, and neutral and base-poor to alkaline and calcareous. Shorelines were either gradual with extensive emergent *Scirpus* spp. or abrupt with quaking boggy mats. Similar habitats exist elsewhere in southern Ontario. In Michigan it is reported from "bog lakes" (Kormondy 1958). In Ohio where *E. traviatum westfalli* is widespread, the peak flight period is July, but records exist from early June to the end of September (Glitzhober 1995).

At the Ontario locations *E. traviatum westfalli* flies

on and at the edge of the open water. It could be mistaken for *E. exsulans*, which is more often associated with rivers and streams, but appears to hover more than the latter species. The subspecies *westfalli* has the superior arm of the male superior appendage 2 times or less as long as wide, while ssp. *traviatum* has the superior arm of the male superior appendage 3 times as long as wide (Donnelly 1973).

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#### 1998 SUMMARY FOR SOUTHWESTERN ONTARIO

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Odonata were found in all months except January and February in 1998! The early spring resulted in record early emergence for many species and this trend continued into the summer. Six *Stylurus notatus* exuviae were collected on June 25 along the Detroit River shoreline at Amherstburg. Capture dates for adults are normally in August and

September. The first *Sympetrum vicinum* emerged July 11 and this species continued to fly until the very late date of December 6.

One new species for Ontario, *Enallagma anna*, was collected in Essex County on June 21, the very same day Mark O'Brien collected this species for Michigan's first record. *Enallagma traviatum* was discovered at a second location in Lambton County on July 18. New records for Kent County included *Lestes eurinus* and *Enallagma basidens*.

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#### APHYLLA ANGUSTIFOLIA GARRISON FROM MISSISSIPPI:

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During my annual Christmas trip to Louisiana, I spent some time working in the L.S.U. Entomology Collection (now officially know as the Louisiana State Collection of Arthropods). I found a specimen of *Aphylla angustifolia* Garrison from Mississippi with the following data: Wilkinson County, 4 ml E of Dolorosa, 6-Aug-1994, coll. C. F. Grymes, 1 male. This represents the first record for Mississippi. This record along with recent ones from East Baton Rouge, and West Feliciana Parishes Louisiana (Mauffray, 1997) indicates that *A. angustifolia* has extended its range eastward from Texas. This is probably due to its ability to survive in farm ponds, subdivision lakes and borrow pits.

Reference:

Mauffray, B. (1997). The Dragonflies and Damselflies (Odonata) of Louisiana. B..A.O., 5(1): 1-26.

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#### ARGIA LUGENS FROM SOUTH DAKOTA

Steve Hummel

It's been said that most discoveries of new dinosaurs are made in the basements of museums. For those of us who started collecting odonates 25 or more years ago and haven't looked back at old specimens, there could be new county or state records hiding under misidentifications, as in this case.

Last week while looking back at old collecting data for the Black Hills of South Dakota, I became curious about some specimens I had collected on July 8, 1980, from Hot Brook in the town of Hot Springs, Fall River Co. I had originally identified a couple specimens of *Argia* as *moesta* as they seemed closer to *moesta* than anything else in either Needham and Heywood or Walker. But, with Westfall and May in hand the specimens turned into *A. lugens*. The new identification has been confirmed by Rosser Garrison. This appears to represent a new species for South Dakota and a northeasterly extension of the range of this species.

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### NEW COUNTY RECORDS OF SOUTH DAKOTA ODONATA, WITH FIVE NEW SPECIES FOR THE STATE

Dennis Paulson, Molly Hukari, Steve Krotzer, and Mary Jane Krotzer

In association with the 1998 meeting of the Dragonfly Society of the Americas, we collected briefly in South Dakota and added to the list of county records from the state, based on earlier publications (G. H. Bick and L. E. Hornuff, Odonata collected in Wyoming, South Dakota and Nebraska, Proc. Ent. Soc. Wash. 74: 1-8, 1972; and G. H. Bick, J. C. Bick, and L. E. Hornuff, An annotated list of the Odonata of the Dakotas, Fla. Ent. 60: 149-165, 1977).

Our collection sites are as follows:

- 1 - Custer Co., French Creek in Custer State Park, 4900' (43°44.38'N, 103°27.77'W); 21 Jul 1998; DRP, MH; rocky, swift stream with patches of aquatic *Ranunculus* and *Scirpus acutus*
- 2 - Custer Co., Stockade Lake, 5100' (43°46.26'N, 103°30.64'W); 21 Jul 1998; DRP, MH; sedge beds, weedy meadows and scattered trees near large *Scirpus*-bordered lake
- 3 - Custer Co., Bismark Lake, Black Hills National Forest; 21 Jul 1998; SK, MJK; medium-sized lake with *Typha* beds, heavily wooded surroundings
- 4 - Custer Co., Lakota Lake Picnic Area, Black Hills National Forest; 21 Jul 1998, SK, MJK; small lake with adjacent weedy meadows
- 5 - Fall River Co., ponds at Pioneer Rest Area, 8 mi S Oelrichs on US 385, 3700' (43°03.79'N, 103°13.69'W); 21 Jul 1998; DRP, MH; *Typha*-bordered ponds
- 6 - Jones Co., slough just S Murdo on U.S. 83, 2000'; 17 Jul 1998, DRP, MH; small ponds and flowing slough, bordered by sedges and *Typha*

7 - Lawrence Co., Little Spearfish Creek, Black Hills National Forest; 22 Jul 1998; SK, MJK; cold, sandy 10-15'-wide stream meandering through weedy meadow

8 - Minnehaha Co., Beaver Creek Nature Area ca 8 mi E Sioux Falls; 26 Jul 1998; SK, MJK; shallow sandy 20-25'-wide stream with alternating riffles and pools, woods and open fields adjacent

9 - Pennington Co., Cheyenne River at I-90; 17 Jul 1998; DRP; large, shallow, muddy river bordered by cottonwood groves

10 - Pennington Co., Spring Creek at Willow Springs Bed and Breakfast, Black Hills National Forest; 21 and 23 Jul 1998; SK, MJK; cold, rocky, swift 20-25'-wide stream

This list includes all new county records and collection sites:

*Hetaerina americana* - Jones (6 sight) *Lestes disjunctus* - Fall River (5) *Lestes unguiculatus* - Jones (6) *Argia alberta* - Jones (6) *Argia fumipennis* - Custer (1) *Enallagma anna* - Pennington (10) *Enallagma antennatum* - Custer (4 sight) *Enallagma carunculatum* - Fall River (5) *Enallagma hageni* - Fall River (5) *Ischnura perparva* - Pennington (10) *Ischnura verticalis* - Jones (6) *Aeshna constricta* - Custer (2), Minnehaha (8), Pennington (10) *Aeshna multicolor* - Lawrence (7) *Anax junius* - Jones (6 sight) *Arigomphus cornutus* - Custer (2, 3, 4) *Gomphus externus* - Minnehaha (8) *Ophiogomphus severus* - Custer (1) *Stylurus amnicola* - Minnehaha (8) *Stylurus notatus* - Minnehaha (8) *Erythemis simplicicollis* - Jones (6) *Leucorrhinia hudsonica* - Custer (3) *Libellula forensis* - Custer (2) *Libellula luctuosa* - Jones (6), Pennington (9) *Libellula pulchella* - Jones (6) *Sympetrum corruptum* - Jones (6) *Sympetrum internum* - Jones (6) *Sympetrum obtrusum* - Fall River (5), Jones (6) *Sympetrum occidentale* - Jones (6), Pennington (9) *Sympetrum rubicundulum* - Jones (6) *Tramea lacerata* - Jones (6 sight), Pennington (9 sight)

*Arigomphus cornutus*, *Stylurus amnicola*, *Stylurus notatus*, *Leucorrhinia hudsonica*, and *Sympetrum rubicundulum* were not mentioned by Bick et al. (1977), and ours appear to be the first published records with locality data for the state. All but the *Leucorrhinia* are widespread farther east but are near or at the western end of their range in South Dakota. *Leucorrhinia hudsonica* is a northern species that extends south into the Central











## FURTHER COMMENTS ON COLLECTING LIMITS

Fred Sibley

In the last issue of *ARGIA* Hal White raised some question about over-collecting and the need for collecting. Having spent most of my professional career collecting birds and watching the well intentioned restrictions overwhelm and finally suffocate specimen based research in that field I would hate to see the same thing happen in the dragonfly world. As we are all aware many restrictions are already in place.

Hal seems to be raising the question; Should we have stricter regulations on collecting? I say "no" for many reasons. The primary one is the lack of any link between collecting and population reduction. I argue that there is no benefit to any existing dragonfly population from increased restrictions on collecting [rare and endangered species already have state and federal protection].

I'm a newcomer to dragonflies so I'm open to any correction of the following assumptions. If we total up all the dragonflies collected of each species last year the numbers for most would be infinitesimal compared to other direct effects from man such as hitting cars [I exclude here pesticide runoff and habitat destruction]. I suspect we would all be surprised at how small the total number was and how many species were not collected at all last year. If we list all the local populations that have declined or been extirpated in the last decade all will be explained by habitat destruction, habitat modification or unexplained. None will trace to collecting.

I feel we are dealing with a non-problem by talking about permits and restrictions on number of individuals collected. I also think we are taking effort away from the vital issue of habitat preservation to prosecute this non-issue. To those who have worked hard to get permits and prohibitions imposed for the rarities in each state I would ask for an honest assessment of what you have accomplished. However, does the prohibition on collecting have any direct effect on the population?

This is based on the belief that dragonflies with their population spread over adult, egg and larval stages would be very difficult if not impossible to exterminate with collecting. Even a rare species

should have a healthy population [i.e. a population larger than the existing habitat can support]. If this is not true they will go extinct with or without collecting. In a healthy population collecting the surplus each year should make no difference [i.e. basic game management]. Calculating this surplus is presumably difficult but I would assume it is many times more than the number of adults you would find flying on any given day. Thus you would need to make repeated visits to the habitat, be a skillful collector and catch all the adults flying that day. This is just to capture the surplus individuals. Long before you have exterminated the species by collecting you will have trampled the habitat to death looking for specimens.

Since many sensitive habitats would primarily be visited by collectors and not casual hikers one might argue that protection of the habitat from many footprints would justify restrictions on collecting. I would counter that collectors are not many-headed monsters. They are us, the very people who originally pointed out the rarity of the species and were instrumental in protecting the habitat. Are we really going to be extirpating the local populations that we worked so hard to protect?

There are rumors [remember I'm new to this field] that not all collectors are saints and some concentrate on rare species and take "excessive" numbers. This offends most people but I would still question the long term effect of this collecting on local populations and more importantly would question if any permitting system would change the behavior of these collectors or if any enforcement activity would actually catch them. In reality peer pressure and informal codes of ethics are the only effective tool and presumably these rogue collectors are not responding to these.

There are real values to collecting - to the individual, to the scientific community and to the conservation of dragonflies. Lets not kill all the geese that lay golden eggs in order to get the one that crapped on the bed.

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**"WHAT DO YOU DO WITH 'EM?"**

Hal White, University of Delaware  
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I must admit that I hoped my note on Odonate conservation in the last issue of *ARGIA* (White

1998) would provoke a renewed discussion of collecting ethics (Donnelly 1994). Thus I welcome Fred Sibley's vigorous defense of collecting. I should make it clear to those who do not know me that I have collected Odonata since 1958. My note was not an argument against collecting. I support the DSA (1996) and British Dragonfly Society (May 1994) collecting policies. It was an appeal for responsible collecting, an effort to have all collectors reflect on their motivations for collecting, and an attempt to have us see ourselves as others see us. I did not advocate, nor do I wish, imposition of state and federal regulations on collecting (Glotzhober 1995). Nevertheless, I have seen in myself and in others, examples of irresponsible collecting and can appreciate the conflict of interest we have in regulating ourselves.

Perhaps a personal example will help. *Tanypteryx hageni* is restricted to pristine seepage habitats in the mountains of California, Oregon, and Washington. It is not a strong flyer, stays close to its habitat, and is easy to collect when found. While not an endangered species, collectors rarely encounter it and certainly it is more vulnerable to habitat destruction than to collecting pressure as is sadly demonstrated by the status of Petalurids in Australia (Davies 1998). Nevertheless, being the only western US representative of the Petaluridae and thus a target for collectors, its behavior and restricted habitat could make populations susceptible to impact from irresponsible collecting.

Twenty years ago, I and two other collectors explored a Sierra seep with many *T. hageni*. We collected all we wanted and more. By the end of the day, we were releasing those we caught. Back in the motel, we tallied 109. The specimens, preserved and responsibly curated, remain available for study. Despite the number of specimens taken, I doubt that the population suffered noticeably considering only 4 females were captured (Paulson 1996) and the fact that the locality is not visited very often. Based on Fred's arguments, our efforts could be fully justified. I do not think so. While rational scientific principles might have been part of the motivation; greed, excitement, and sport also played a part.

To collect is to destroy and, in the case of dragonflies, to remove something of beauty as perceived by many including me. I think that aesthetic appreciation and respect for life are important values which I have attempted to cultivate in my children. These values need not

derive from religious indoctrination. To collect should never be a neutral act. I think that my daughters who watch me sweep a beautiful *Aeshna* out of the air and put it in acetone should question my motives. And, I should be prepared with an answer. Using such a standard, I collect much less than I used to. When I do take a specimen, I usually consider why I want it and whether it has identifiable scientific value, sufficient in my mind, to counterbalance criticism.

For people who do not understand or appreciate the scientific value of collecting, I find it impossible to mount a convincing argument even though they may have filled in a wetland without a second thought or doused their property with pesticides. Often the most acceptable argument for them is to simply say that I enjoy collecting and studying dragonflies just like some people enjoy fishing, hunting, or stamp collecting. Alternatively, when they ask, "What do you do with 'em?," I sometimes say, "Eat 'em!" Insanity allows one to collect dragonflies for greed, enjoyment, sport, science, or food without justification. I don't know what *T. hageni* tastes like.

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## STEVE VALLEY'S PHOTOS TO BE ON EXHIBIT

from an e-mail from Steve Valley  
svalley@skipnet.com

DSA Member Steve Valley will have seven of his Odonata photographs on exhibit in permanent display mural of the "Life History of the Dragonfly" at the Chicago Academy of Sciences Natural History Museum. The display will compare the dragonfly life history with that of a butterfly. [For those unfamiliar with his work, Steve's photos are excellent. Ed.]

## NORTH AMERICAN LATE DATE

e-mail from Steve Walter

"On 22 November 1998, I found a male and about three females of Duckweed Firetail (*Telebasis byersi*) at Loxahatchee National Wildlife Refuge in Palm Beach county, Florida. The published late date for this species in the United States in 3 November (Dunkle (1990) and May & Westfall (1996))."

## WHICH FALCON CATCHES DRAGONFLIES?

e-mail from Steve Walter

"That blurb in the last ARGIA about 18 Peregrine Falcons feasting on dragonflies at Montauk Point seems extremely improbable. Not to question to the identification skills of the person who reported this, but she must have been seeing Merlins. I've spent enough years studying hawk migration on Long Island. Most of the Peregrines come through here at the very end of September and the first half of October -- and they spend most of their time on the move. It would be unlikely to have 18 of them in one place at one time at the peak of their passage, let alone at the early date of September 9. Furthermore, insects are not a part of their diet."

## DIG YOUR OWN POND

e-mail from George Mahoney  
bds@hanslope.demon.co.uk

"The British Dragonfly Society has produced a booklet entitled "Dig a Pond for Dragonflies". This booklet can be obtained directly from the BDS Secretary, Dr. W. H. Wain, The Haywain, Hollywater Road, Borden, Hants, GU35 0AD, England. Please enclose a cheque for £1 Sterling plus 39p P&P (£1.39 in total). If ordering from overseas please allow extra for the postage as appropriate. Unfortunately the BDS cannot accept payment in anything other than sterling as the handling charges for such small amounts are disproportionately large."

## CORBET BOOK - A PRELIMINARY ANNOUNCEMENT

e-mail from Dennis Paulson

"A friend of mine who follows closely the world of natural-history book publishing just sent me this note announcing impending publication.

"Philip Corbet, **Dragonflies: behavior and ecology of Odonata**, Due Summer 1999. Price \$95.00 (Ledlie Bookseller has a pre-publication discount @\$76.95 plus shipping)."

## HONG KONG BOOK NOW AVAILABLE

e-mail from John Heppner

"**Hong Kong Dragonflies**", by Keith Wilson, is now available from Flora & Fauna Books (P. O. Box 15718, Gainesville, FL 32608). Odonata enthusiasts can purchase this book for \$39.50 (minus 10% discount to DSA members) plus \$2 postage. Prepayment is required and credit cards are accepted.

The book is full-color and large size (12 x 8 inches), with most species illustrated for the Hong Kong area. This superb book was reviewed in a previous ARGIA.

## UPDATED MANUAL OF THE DRAGONFLIES OF NORTH AMERICA: EXPECTED WINTER 1999-2000

**DRAGONFLIES OF NORTH AMERICA**  
by James G. Needham, Minter J. Westfall, Jr., and Michael L. May 1998. ca. 650+pp. ISBN: 0-945417-94-2. ca. \$75.00

The long-awaited monographic revision of the classic "Manual of the Dragonflies of North America", by Needham and Westfall (1955) is expected in Winter of 1999-2000. It will include numerous additional species described, or discovered within the area treated, since 1955. including northern Mexico and the West Indies. A total of about 360 species will be treated. Revised keys to species and revised diagnoses will allow identification of all adults and known larvae of these important aquatic insects. Revised by Westfall and May, this work is the companion volume to the new book on damselflies of North America, published in 1996. Numerous new illustrations are included for all added species, plus several pages of color plates. The work will include a revised checklist to species, an extensive bibliography, glossary and index.

The IORI, by special arrangement with the publisher, is now taking advance orders at 10% from the estimated publication price of \$75.00. That is \$67.50 plus S&H of \$5.00 US, \$7.50 Outside US. ( Total of \$72.50 in the U.S. \$75.00 outside the U.S.) There is a chance that page and production cost will drive the cost up, and postal rates may also go up; but, if you order in advance, you will be protected from the potential price increase. This offer is valid until July 31, 1999. All profits go to IORI to cover operating expenses, web site, salaries, etc. The I.O.R.I. is a not for profit organization under section 501-C-3 of the Internal Revenue Code. for more info :[www.afn.org/~iori/](http://www.afn.org/~iori/)

Make your check to I.O.R.I. and send it along with a note requesting the updated manual to:  
 Bill Mauffray  
 International Odonata Research Institute  
 % Div of Plant Industry  
 P.O. Box 147100  
 Gainesville FL 31614

Please be sure to include your mailing address, phone number and e-mail address. Your copy(s) will be shipped within a week of receiving them from the publisher.

**MORE WALKER VOLUMES TO BE MADE AVAILABLE**

The Toronto Entomologists' Association announces that it is preparing to reproduce the following out-of-print books:

1. The Cicindelidae of Canada by J.B.Wallis (1961) (approx. cost \$25 Can., \$18 US);
2. The North American Dragonflies of the Genus *Somatochlora* by E.M. Walker (1925) (approx. cost \$55 Can., \$40 US)
3. The North American Dragonflies of the Genus *Aeshna* by E.M. Walker (1912) (with color plates) (approx. cost \$65 Can., \$45 US).

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[I e-mailed Ms. VanderPoorten and enquired about the quality of the beautiful *Aeshna* plates. She replied; "Yes the *Aeshna* plates will be in color! The plates will be printed on a different stock (Hammermill) that what is used for the rest of the book. The printer says that color reproduces very well on this paper. I'm confident that the quality will be very good. The reproduction will be the same size as the original books." Ed.]

**SPECIAL OFFER FOR STUDENTS: A REDUCED RATE SUBSCRIPTION TO ODONATOLOGICA**

**Bill Mauffray**  
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 % Div of Plant Industry  
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# ARGIA

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