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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** are best transmitted as attachments to e-mails, but can be submitted on floppy disks. The editor prefers MS DOS based files, preferably written in Word, Word for Windows, WordPerfect, or WordStar. **All files should be submitted unformatted and without paragraph indents.** Line drawings are acceptable as illustrations.

T. Donnelly (address above) and Jim Johnson are the editors 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 as e-mail attachments or on floppy disk, 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 \$20 US for regular membership and \$25 US for institutions or contributing membership, payable annually on or before 1 March of membership year. Dues for members in the Old World are \$30 US.

Dues should be mailed to Jerrell Daigle, 2067 Little River Lane, Tallahassee, FL 32311

The **Bulletin Of American Odonatology** is available by a separate subscription at \$20 US for North Americans and \$25 US for non-North Americans and institutions.

Front cover: A gorgeous sight in the New World tropics: *Protoneura amatoria*, photographed by Dennis Paulson in Costa Rica.

In This Issue

This has not been a kind winter, made all the miserable for those of us in the north by those little cheery notes from the southern crowd that started something like, “It was warm and sunny today, and there were lots of dragonflies on the lawn”

We have updates on the DSA Annual Meeting at Arnprior, Ontario, and for the GLOM meeting in Fort Frances, Ontario. Additionally, Dragonfly Days will attract a huge crowd down in the Valley of the Rio Grande.

A very sad note is the passing of Curt Williams, who became known to most of us at the SIO meeting in Gainesville, Florida. Not only were Curt and Lunelle, his late wife, among the kindest people on the planet, but his dragonfly (and other wildlife photography) was outstanding. Ailsa and I have fond memories of drinking coffee with them not too many years ago in their kitchen, in Marlin, Texas.

Paul Johnson tells us of an Odonata survey in the Pinnacles National Monument, California. Especially interesting are his wonderful observations of interactions between dragonflies and other critters.

We have lots of new records in this issue. Philip deMaynadier tells of the first capture of *Leucorrhinia patricia* (Canada Whiteface) in the northeastern US, and John Hudson of its almost simultaneous first capture in Alaska. Jason Bried and Steve Krotzer blow our socks off with the first capture of *Lestes forficula* (Rainpool Spreadwing) beyond the Valley in Texas—in Mississippi, no less. Especially intriguing is the timing of this find and the landfall of Hurricane Ivan. The story grows . . . Almost as an afterthought, they also mention the first Mississippi record of *Arigomphus lentulus* (Stillwater Clubtail).

David Bree tells a fascinating tale of a small crab spider catching a *Ladona julia* (Chalk-fronted Corporal), surely one of the smallest predators recorded on a robust dragonfly. And Jim Markowich and Sandy Mayer recount kayak trips through ponds with lily pads, on which *Arigomphus furcifer* (Lily pad Clubtail) were emerging.

Steve Roble tells of an aggregation of *Gomphaeschna furcillata* (Harlequin Darner) in eastern Virginia, and Jerrell Daigle recounts a quick but productive trip to the Florida Keys. Jason Bried summarizes some information


from his master’s work in Mississippi with an account of the odonates at three natural areas in the state. Hmmm . . . Mississippi is looking more and more interesting.

Bob Behrstock had some productive trips to eastern Mexico with lots of new state records. Pam Hunt took some time during a trip to the Caymans to add some species to the list for these islands. How do other people get to such neat places? And speaking of nice places, Roy Beckemeyer takes us all long to visit southern Africa, as he and Pat did recently. They get the prize this time for furthest and most exotic trip.

I have added some notes myself. During a brief trip to Chiapas, I explored alternative ways to preserve odonate specimens without acetone, which is strongly associated now with the drug trade in Latin America. I recommend my desiccation technique. And finally I decided to write an article about the supremo toy of all time—the GPS. Having spent years being involved in all sorts of older navigation techniques, I must say that GPS is one of the major advances of the 20th century.

Kathy Bigg’s dragonfly pond has been selected for a wild-life garden tour. Are there many of you out there with dragonfly ponds? Perhaps we should collect articles for a future issue. And Kathy also contributes a short note on a damselfly slyly inserting itself into the National Geographic.

We finish the regular part of the issue with meeting announcements, a very attractive offer from Steve Valley to archive DSA photos, the minutes of the Decorah meeting, a notice of the current BAO, and a reminder to send in your dues, if you haven’t done so.

TRAMEA (Odonata on the web) has a really major contribution this time—by John Abbott announcing OdonataCentral, whose centerpiece is a dot map display for all North American species. Wow, is this ever impressive! There are additional announcements from Mark O’Brien, and a note on the ESA web site for members with broader entomological interests. 

Curtis “Curt” Williams

James Laswell

Regrettably, we lost a good friend and colleague, Curtis “Curt” Williams, in February of this year. Curt passed away on 19 February 2005 at the age of 87 years. His wife Lunell preceded him in death on 27 February 2004 after a marriage of over 67 years.

Curt was born 5 September 1917 in Talco, Texas and moved with his parents, William Christian and Jewel May (Elliot) Williams to Marlin, Texas in 1930. He married Lunell Stanley on 14 August 1936 just short of his 19th birthday.

Curt was a veteran of WW II, serving in the US Navy as a radar and sonar technician in the Pacific. After his discharge from the navy he worked for the United States Postal Service and retired after 30 years of service as a mail carrier in Marlin. Following this, he was employed by the Falls County Sheriff’s Department for ten years as a night jailer/dispatcher, crime scene photographer, and Spanish language interpreter.


Curt was an extraordinarily intelligent and talented person. He said the smartest thing he ever did, however, was to marry Lunell. He was an inventor, designer, master woodworker, photographer, teacher, a terrific naturalist, and a friend to all who knew him. He loved to work with his hands and could often be found in his workshop working on a design or actually building something. He built the cabinets he used to house his huge slide collection. He designed and built a fantastic hand-held slide viewer that is far superior to any commercially made slide viewer on the market today. His pride and joy, however, was a photo rig that Robert Behrstock said looked (and felt) like a cross between the roll bar on a Jeep and the front bumper of an 18-wheeler. Dr. Forrest Mitchell dubbed it “Curt’s Assault Camera.” It was heavy and somewhat cumbersome to carry in the field, but the photos he took with it were outstanding.

Photography, particularly nature photography, and nature studies were the things that brought him the most joy and

recognition. He often collected butterfly caterpillars and fed them until they pupated, and then emerged as adults. He took photographs throughout this process and could tell you within a day or so how long it took a particular butterfly species to emerge from the chrysalis. He took many of his fantastic photos of butterflies and birds in his back yard at Marlin, but he also liked to venture out into the woods to find new plants and animals to photograph. Curt’s favorite subject was dragonflies, and he studied them to the extent of writing research papers on the behavior of certain species—papers which were subsequently published in scientific journals such as *Odonatologica*.

Dr. M.B. Kiauta, in a recent e-mail, pointed out that Curt had been a member of the International Odonatological Society (SIO) from the very first hour and that many connected with the SIO often met him at symposia or at his (more than hospitable) home in Marlin, Texas. Dr. Kiauta also pointed out that Curt was indeed a pioneer in dragonfly photography and one of the kindest people he had ever met. Those of us who knew him well would certainly agree with this assessment.

Curt was honored as a Research Associate of Baylor’s Strecker Museum, and a large collection of his nature photographs toured the nation’s universities. In addition, more than 450 of his nature photographs have been published in magazines, books, and other publications worldwide. Many of these are now featured on the Stephenville TAES Digital Dragonflies web site (see <www.dragonflies.org>).

Curt’s son Larry Williams and his wife Maryann of Fuquay Varina, North Carolina and his daughter Angele Griffith of Waco, Texas are allowing Dr. Mitchell and me to maintain Curt’s collection of nature slides here at the Texas Agricultural Experiment Station in Stephenville. We all want to make sure that these beautiful images continue to be enjoyed by everyone who appreciates the beauty of nature. That is surely what Curt would have wanted. 

Rainy River Valley Field Naturalists to Host Dragonfly Symposium

Bill Morgenstern

The Rainy River Valley Field Naturalists (RRVFN) will host the fifth annual Great Lakes Odonata Meeting—GLOM 2005—this 15–18 July. The symposium will draw up to 40

participants from at least five states and two provinces to Fort Frances and the Rainy River District to survey surrounding habitat for dragonfly and damselfly species.

Home to about 80 species of dragonflies and 10+ species of damselflies, the Rainy River District from Atikokan to Rainy River boasts more species than all of Europe. Second only to birding, dragonfly watching is a fast growing pastime and draws on many of the same skills. Dragonflies and damselflies or “odies”, short for their scientific name “Odonata”, are everywhere and serve as key indicators of a healthy environment. Certain species are limited to very specific habitats. The Rainy River District, with its large lakes, rivers and peatlands located amongst a variety of topography and forest types offers diverse odie habitat yet remains under surveyed due to our limited local resources, isolation and the large area to cover.


GLOM 2005 aims to change this by bringing both experts and novice dragonfly watchers to the district to join in field surveys and discussions. At the end of four days participants will have contributed to a more complete survey of our critical habitats and, it is anticipated, new species records for the district.

The first Great Lakes Odonata Meeting, organized by zoologist Colin Jones of the Ontario Natural Heritage Information Centre, was held near Elliot Lake in 2001. Since then, GLOM has been held in Michigan, Minnesota, and Ohio. Coming back to Ontario this year, GLOM 2005 will feature speakers Kurt Mead, biologist and Minnesota author of the award winning field guide, “Dragonflies of the North Woods”; Bob DuBois, aquatic ecologist for the Wisconsin DNR and author of the soon to be released

“Damselflies of the North Woods”; and Colin Jones, zoologist, editor of Ontario Odonata and coauthor of “A Field Guide to Dragonflies and Damselflies of Algonquin Provincial Park and the Surrounding Area”.

Registration for GLOM 2005 is \$75.00 with a cutoff date of 1 June 2005. The symposium will include a social with opening speaker on 15 July in Fort Frances; a field day, banquet and speaker on 16 July near Emo; a community “Dragonfly Day” on 17 July in Emo; a short afternoon field trip on 17 July and a field day to key locations in the center and west end of the district on 18 July.


The Rainy River Valley Field Naturalists thank FedNor Canada and the Rainy River Future Development Corp for supporting this event. For further information contact RRVFN at P.O. Box 253, Fort Frances, Ontario P9A 3M6, or Bill Morgenstern at 807-274-7314.

The web site is <<http://rainyriverfieldnaturalists.org>> 

DSA Annual Meeting in Ontario: Information on Post-conference trip.

Paul M. Catling <catlingp@agr.gc.ca>, (613-759-1373)

The trip will depart on 12 July. There will be a drive north of 200–250 miles to the Lake Timiskaming—Lake Abitibi region. It is expected that inexpensive accommodation will be available. Time will be devoted to biodiversity study, surveys of bogs and fens in the arctic drainage and search for two Emeralds (*S. bineana* and *S. brevicincta*) not previously recorded in Ontario. The post conference

party will return on 15 July arriving in Arnprior by supper. Specifics on areas to be visited will be decided by the party and participants may leave or join the party at any time. Transportation will be organized by the participants. 

Calendar of Events for 2005

Event	Date	Location	Contact
Dragonfly Days	20–22 May	Weslaco, Texas	Valley Nature Center; info@valleynaturecenter.org
SE Regional	27–29 May	Yazoo, Mississippi	Steve Krotzer; rskrotze@southernco.com
NE Regional	9–12 June	State College, Penn.	Hal White; http://www.udel.edu/chem/white/TAP.html
DSA Annual	8–12 July	Arnprior, Ontario	Paul Catling; catlingp@agr.gc.ca
GLOM	15–18 July	Fort Frances, Ontario	Bill Morgenstern; rrvalley@rainyriverfieldnaturalist.org
WDA Symposium	26–30 July	Vigo, Spain	http://webs.uvigo.es/c04/webc04/WDA/index.htm

Odonata survey of Pinnacles National Monument, California

Paul G. Johnson II <paul_johnson@nps.gov>

Pinnacles National Monument is located in San Benito and Monterey Counties in the Inner Coast Range of Central California. Although it was originally set aside in 1908 to preserve unique rock formations and caves, it is now recognized for its biotic features as well.

Terrestrial vegetation is dominated by chaparral, and riparian areas are lined with willows, live oaks, and occasionally sycamores and cottonwoods. Aquatic habitats are dominated by intermittent streams, with some perennial stream reaches and several artificial ponds and reservoirs. Stream substrates tend toward sand, gravel, and cobble, but some silt is present, especially in ponds. A few small springs are scattered across the landscape.

In 2001, the National Park Service Inventory and Monitoring Program funded a two-year inventory of the aquatic vertebrate and invertebrate species of Pinnacles National Monument. In consideration of the role of odonates as the charismatic macrofauna of the aquatic invertebrate world, I chose to devote extra effort to this group. I carried an aerial net with me whenever I went out into the field, and I made trips to particular habitats and locations where I expected to find new species.


This project resulted in the documentation of 38 odonate species at Pinnacles National Monument, with numerous new county records. All species were collected as adults, and 12 species were also collected as larvae. Many of these were expected species that had not been recorded simply because the area is so understudied. But some records represented range extensions. Notably, *Lestes stultus* was found about 75 miles south of the southern extent of its previously known range. An *Erpetogomphus compositus* adult was recorded from Monterey County, west of its recorded range. Larvae of this species were found just a few miles outside the Monterey County line. And another point was added to the spotty distribution of *Anax walsinghami* in California.

During the inventory I observed a couple of failed attempts at predation on odonates. On one occasion I watched a Western fence lizard flinging itself into the air repeatedly at coenagrionids, like a dog leaping after a Frisbee. Another time, I was conducting a survey in an area in which California red-legged frogs commonly breed, but I had rarely seen the adults after the breeding season. As I watched a *Cordulegaster dorsalis* oviposit in a shallow stream pool, a huge red-legged frog leapt out from under a root on the bank. The frog narrowly missed her mark in

midair, then splashed into the pool below. For a moment we stared at each other in surprise, and then she turned around and bounded back into her crevice beneath the root.

While conducting a separate project, the re-establishment of a population of California red-legged frogs, I stumbled upon a great method for obtaining large, fast-flying species. I built a pen for rearing tadpoles, which consisted of an outer cage of ¼-inch hardware cloth and an inner pen of fine polyester netting. The outer cage kept out vertebrates, and the inner pen kept out aquatic invertebrate predators. Numerous libellulid and aeshnid adults emerged and were trapped between the outer cage and inner pen. I would periodically open the lid to catch specimens and release the rest. My only specimens of *Anax walsinghami* were obtained in this manner.

Visitors to the popular Bear Gulch Reservoir often return with questions and stories about the odonates they saw there. At times, I have stood with visitors and watched *Libellula saturata* larvae crawl out of the reservoir, across the trail, and onto a rock wall to emerge. With tens of thousands of people hiking to the reservoir each year, we have an excellent opportunity to help people appreciate just what wonderful creatures odonates are, and what they can do to help them. I have created an interpretive web page about the odonates of Pinnacles, with a link to a printable checklist <<http://www.nps.gov/pinn>>. And I hope to convince the interpretive staff to offer dragonfly talks for the public at the reservoir.

Considering that an inventory is never complete, and that I have continued to add a species or two to the list each year, I hope to be delighted with new discoveries for years to come. I am grateful to Kathy Biggs for providing county records and other helpful information, to Andy Rehn for identifying specimens and offering suggestions about target species and habitats, and to the NPS I&M Program for funding this project. 

First National Records for Canada Whiteface (*Leucorrhinia patricia*) in the USA

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John Hudson, 16445 Point Lena Loop Road, Juneau, AK 99801; <jhudson@alaska.net>

Until recently, the diminutive *Leucorrhinia patricia* (Canada Whiteface) was known only from the country of its namesake where the species has been recorded at 51 locales in Quebec, Ontario, Manitoba, British Columbia, Yukon Territory, and Northwest Territories (Donnelly 2004). In June of 2003, *L. patricia* was collected for the first time in the USA—although not exactly south-of-the-border—in Maine (Somerset Co.) and Alaska (Southeast Fairbanks Borough).

During the course of peatland invertebrate surveys in northwestern Maine, P. deMaynadier collected a mature female *L. patricia* on 18 June from an acidic, ribbed fen. The sphagnum-dominated fen had well-developed strings (dominated by heath shrubs, dwarf larch and black spruce) and flarks (mostly sphagnum-based depressions of variable depth, from saturated to ~10" depth). The specimen was collected while ovipositing in one of the shallow flark pools. Few other adult odonates were collected from the site including *L. glacialis* (Crimson-winged Whiteface), *L. hudsonica* (Hudsonian Whiteface), *Coenagrion interrogatum* (Subarctic Bluet), and *Cordulia shurtleffii* (American Emerald), the latter likely having strayed from an adjacent beaver flowage. *Boloria eunomia* (Bog Fritillary), a specialist of open moss-lawn and ribbed fen peatlands, was present in abundance and should be considered as a potential butterfly indicator for *L. patricia* in the Northeast. Hopefully unique to this locale, and not indicative, was the scent of commercial hog farms traveling on the prevailing NW winds from Quebec!

Remarkably, only five days later and fully 8,000 km to the northwest, *L. patricia* was collected in Alaska. J. Hudson and three other Alaskan ode enthusiasts had set out from their rainforest home in Juneau on a collecting/photography trip to interior Alaska in search of boreal species. On 23 June, while camped on Deadman Lake in the Tetlin National Wildlife Refuge, a male *L. patricia* was collected and photographed. Deadman Lake is a 200 hectare lake surrounded by a thick margin of sedges and horsetail. Bog habitat more typical of *L. patricia* was present less than 1 km from the lake. Other odonates collected at Deadman Lake included: *Coenagrion resolutum* (Taiga Bluet), *Enallagma boreale* (Boreal Bluet), *E. cyathigerum* (Northern Bluet), *Aeshna eremita* (Lake Darner), *A. interrupta* (Variable Darner), *A. juncea* (Sedge Darner), *A. sitchensis* (Zigzag

Darner), *Cordulia shurtleffii*, *Somatochlora hudsonica* (Hudsonian Emerald), *Leucorrhinia borealis* (Boreal Whiteface), *L. hudsonica*, *L. proxima* (Belted Whiteface), and Alaska's official state insect, *Libellula quadrimaculata* (Four-spotted Skimmer). Later in the trip (27 June), two male and two female *L. patricia* were collected in a bog near the eastern border of the refuge. Also collected at this bog were *C. resolutum*, *C. interrogatum* (a new state record), *Nehalennia irene* (Sedge Sprite), *A. interrupta*, *A. septentrionalis* (Azure Darner), *A. sitchensis*, *A. subarctica* (Subarctic Darner), *C. shurtleffii*, *Somatochlora franklini* (Delicate Emerald), *S. semicircularis* (Mountain Emerald), and *L. proxima*.


Only 24 to 29 mm long, the Canada Whiteface is the smallest of its genus and distinguished in appearance from *L. hudsonica*, its closest resembling congener, by reduction of dorsal spots on the middle abdominal segments to short linear dashes in the male, and absence of dorsal markings beyond segment 6 in the female (Needham *et al.* 2000, Dunkle 2000). Likewise, the larvae of these species are very similar. Kenner *et al.* (2000) provides several larval characters to separate *L. patricia* from *L. hudsonica* based on specimens collected in northern British Columbia. The species is believed to be restricted to peat bogs and fens, often with aquatic moss floating on or near the surface (Walker and Corbet 1975, Cannings and Cannings 1997). Females at a fen in the Yukon Territory oviposited in open water near the edge of floating moss (Cannings and Cannings 1994). This most boreal species of *Leucorrhinia* flies from 31 May (NB; Tingley 1999) to 6 August (ONT; Walker 1940), but possibly only for two weeks at any given locale (Dunkle 2000).

Until 2003, *L. patricia* was among only five North American odonates yet to be documented in the lower 48 states, along with *Somatochlora whitehousei* (Whitehouse's Emerald), *S. septentrionalis* (Muskeg Emerald), *S. sablbergi* (Treeline Emerald), and *Aeshna septentrionalis*. Superficially similar in appearance to *L. hudsonica* and other congeners with peatland habitat affinities, *L. patricia* is probably easily overlooked. It is our hope that documentation of this species in Maine and Alaska will help stimulate further survey for the species at the edge of its range where, undoubtedly, new records await discovery.

Acknowledgements

We thank Paul M. Brunelle and Dennis Paulson for confirming the identity of *L. patricia* specimens from Maine and Alaska, respectively. Funding for invertebrate surveys in Maine is made possible by contributions to the state's Nongame and Endangered Wildlife Fund, supported by proceeds from the Loon License Plate and Chickadee Check-off.

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New Species Records for Mississippi: An Expected Dragonfly and an Unexpected Damselfly

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The list of Odonata for Mississippi has grown considerably, from 114 species at the start of 2002 (Donnelly 2002) to 130 species by the end of 2004 (Abbott 2005). In this article we report details surrounding the addition of *Arigomphus lentulus* (Stillwater Clubtail) and *Lestes forficula* (Rainpool Spreadwing) to the Mississippi fauna.

Previous records for *A. lentulus* are concentrated mostly west of the Mississippi River in eastern Oklahoma and Texas and in western Arkansas. Additional records exist north of Mississippi and stretch into Illinois and Indiana (Donnelly 2004a). Like other members of the genus, *A. lentulus* often breeds in ponds, lakes and slow areas of streams, often with mud or clay substrate (Abbott 2005).

The first author collected *A. lentulus* on farm property off Rt. 389 in northern Oktibbeha Co., east-central Missis-

issippi (N 33° 31.008', W 88° 52.167'). Several pond impoundments dot active or former pastures within a 2.5 km radius on the property. Four of these ponds were surveyed for one hour on each of 8–11 dates between mid-May and mid-September 2004. The *A. lentulus* was observed at only one of these, a small pond (perimeter = 0.28 km) set in a large hay field and cow pasture. The field is mowed yearly and livestock herds trampled the pond margin for over a month during the survey period. Banks are steep and in some places nearly 1 m above water. Forty-six vascular plant species were recorded in 50 plots (mean = 4.2 spp per 0.5 m² plot); dominants included *Eleocharis obtusa*, *Hydrolea uniflora*, *Ludwigia peploides*, *Paspalum dilatatum*, and *Polygonum hydropiper*.

Arigomphus lentulus was first seen on 17 May and during subsequent visits on 22 May, 26 May, and 09 June.

It was gone by the next visit on 04 July (the first author was in New York for his wedding during much of June). Surveys at the site lasted one hour between 1345–1510 hrs on each date. Average air temperature, wind speed, and relative humidity were 32.6°C, 1.2 m/s, and 55.2%, respectively, over the four dates. *A. lentulus* was rare to moderately abundant (5 to 15 individuals) relative to 24 co-occurring odonate species that were accumulated over ten sample days. Common species at the site included *Enallagma civile*, *E. signatum*, *Erythemis simplicicollis*, *Ischnura posita*, and *Perithemis tenera*. The predominance of these opportunists and the intensive land use suggest a low quality breeding site for odonates, and that *A. lentulus* may be prolific under such conditions.

Whereas *A. lentulus* was expected to occur in Mississippi, *L. forficula* was not. This damselfly was previously documented only in south-central and southeastern Texas (Donnelly 2004b). As its name implies, the breeding habitat usually includes pools or small ponds, usually with abundant emergent vegetation (Abbott 2005).

The first author collected two individuals of *L. forficula* on separate dates in different locations. The first was taken 17 September 2004 on the same farm property but different pond (N 33.5328°, W 88.8649°) as the *A. lentulus*. This pond was larger (perimeter = 0.64 km) and surrounded by inactive pasture with wooded areas ~100 m from the pond edge. Sixty-three vascular plant species were recorded in 50 plots (mean = 4.3 spp per 0.5 m² plot); dominants included *Diodia virginiana*, *Hydrolea uniflora*, *Panicum rigidulum*, and *Polygonum hydropiperoides*. The following water quality data are averages of three readings taken on one date in July 2004: pH = 6.3, D.O. = 4.5mg/L, water temp = 29.4°C, conductivity = 28.7mS. Weather on 17 September was sunny (>95% of survey time without cloud cover) and warm (29.3°C), with 63.4% average humidity and 3.0 m/s maximum wind speed. Two *L. forficula* were spotted at 1125 hrs. Both were perched atop *Hydrolea uniflora*, a succulent low emerged forb. Thirty-four additional odonate species were detected at this site, of which 19 were possible or probable residents based on abundance, presence of teneral, and reproductive behaviors; examples include *Celithemis eponina*, *Enallagma traviatum*, *Libellula incesta*, *Tramea carolina*, and those listed above at the *A. lentulus* site.

The second record was taken 24 September 2004 from a beaver wetland complex (N 33° 13.814', W 89° 03.726') in the Tombigbee National Forest, Winston Co., east-central Mississippi. This location is about 36 km from the farm site. It was surveyed 20 times during the early (calendar days 1–10), middle (11–20), and late (21–30/31) thirds of each month from late March to early October. Each census lasted 45 min or more. The marsh complex includes a

series of impoundments with at least 40 to 50 non-woody species (mean = 4.1 spp per 0.5 m² plot). Dry woodland borders the corridor on both sides. The impoundment with *L. forficula* was created at least 30 years ago based on aerial photographs. This site is now blanketed by the tussock rush, *Juncus effusus*, which over time builds a large, raised substratum for other plants to exploit. Mean depth of surface water varied from 55.2 to 72.4 cm over the flight season. Weather at the time of census on 24 September was mostly sunny and 29.7°C, with 52.9% average humidity and 2.0 m/s maximum wind speed. A single mature *L. forficula* was perched on *Juncus culms* about half a meter above water at ~1410 hrs. Thirty additional odonate species were observed in the beaver complex over the six-month study period (e.g., *Enallagma daeckii*, *E. dubium*, *E. geminatum*, *Lestes vigilax*, *Nehalennia integricollis*).

The three encountered individuals of *L. forficula* were probably strays rather than constituents of resident populations, although we can not rule out a substantial range expansion that went unnoticed. It is interesting to note that a major tropical storm, Hurricane Ivan, swept through the southeastern United States in mid-September 2004, making landfall near Mobile, Alabama on 16 September. Sustained winds associated with this storm were measured at over 50 mph at Starkville, Mississippi, with gusts well in excess of 60 mph. It is certainly conceivable that winds associated with this system resulted in a few individuals of *Lestes forficula* being displaced outside of their usual range.

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Predation of *Ladona julia* by Crab-Spider (Thomisidae)

David Bree


[photo on rear cover]

At Petroglyphs Provincial Park, near Peterborough, Ontario Canada on 26 May 2004 a young adult Chalk-fronted Skimmer (*Ladona julia*) was noted on one of the park's walkways. Unlike the dozens of other individuals resting there this one did not fly away when approached. A closer inspection revealed that this individual was caught by a species of Crab Spider, possibly *Xysticus elegans*. The spider had managed to grasp the dragonfly on the head at the bottom edge of the eye. The body was quite still, but flaccid and plump, so the dragonfly had probably been captured fairly recently.

While the predation of odonates by spiders is quite common I have witnessed few examples where the difference in size between predator and prey was so pronounced. The dragonfly was about 5× longer than the spider, and probably massed over 7× greater. *Ladona julia* is a heavy bodied species and they emerge in this part of Ontario in profusion in late May and I can't recall ever seeing one

caught and held in a spider web. Yet here was a spider that had managed to capture and subdue the skimmer without even the help of a web.

Such a capture leads to speculation as to how it was accomplished. Was the spider able to get a hold of the dragonfly because it was still slightly teneral and hadn't hardened enough? Did the dragonfly land next to the spider for immediate capture or did the spider actively stalk its prey? Was the capture made at the point the pair was discovered or was the spider carried some distance by the much larger dragonfly in its death throws? While impossible to know for sure, the presence of a brown spider on grey concrete, where they are rarely seen (and I do look here frequently) would suggest that the original strike was made on a nearby tree trunk where *Ladona* often rest.

The pair stayed on the path for at least an hour but when checked several hours later both were gone. One can only assume the spider was well satiated. 

Observations on an Aggregation of *Gomphaeschna furcillata* in Southeastern Virginia

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Gomphaeschna furcillata (Harlequin Darner) often perches on tree trunks or (rarely) the ground, both atypical perch sites for aeshnids (Dunkle 1991). Dunkle (1991) also remarked that this species is unusual because it is more readily observed on windy days, noting that swarms consisting mostly of males "... gather to feed in the lee of trees and bushes."

My family spent the weekend of 16–17 April 2003 at First Landing (formerly Seashore) State Park, City of Virginia Beach, Virginia, U.S.A. The park lies at the northern tip of the Cape Henry Peninsula along the southern boundary of the mouth of the Chesapeake Bay. On the morning of 16 April, we rode our bicycles into the campground area at the west end (bayside) of the park. We quickly realized that about half of the campground area was flooded, including most of the northern portion, but several roads were passable. Water depths exceeded one meter in some areas and many picnic tables were partially to nearly submerged. The dominant trees in the mostly forested campground

are live oak (*Quercus virginiana*) and loblolly pine (*Pinus taeda*); *Acer* and *Nyssa* are present in swampy depressions. Weather conditions at 1100 hrs included an air temperature of approximately 80°F (27°C), clear skies, and a light (emphasis) breeze.

We soon began to observe numerous adults of *Gomphaeschna furcillata* in sunlit areas of the largely deserted campground. For example, more than 20 adults were swarming over each of two, small sunlit openings along a campground loop road. We also noted many adults perching low on the sunlit sides of tree trunks. Eight adults were observed on a red maple (*Acer rubrum*), all perched within 2–4 meters of the ground. Still more adults were noted on loblolly pine trees, mostly at heights of 1–3 meters. Counts that I made of *G. furcillata* adults on five of the pines were 5, 10, 12, 13, and 42. The high density of adults on the latter tree was especially noteworthy. Forty of the 42 adults were in sunlit areas at heights of 0.5–2 meters on the east-facing side of the tree trunk. The other two adults

were in shaded areas on the same side of the tree, but at heights of approximately 3.5 and 4 meters, respectively. The wings or abdomens of some of the individuals on this tree were in contact, but no aggressive interactions were noted. Occasionally, groups of 1–5 adults would fly away from the tree briefly but they (or in some cases perhaps other adults) would return within 1–2 minutes. Adults of both sexes were present in roughly equal numbers (not quantified in detail) on this tree. Individuals perched on tree trunks were easily approached and captured by hand. Judging from their wing and body condition, they were not teneral. I captured about 20 specimens in this manner, releasing all but a few that were retained as vouchers. My wife and two sons also captured and released several dragonflies each. During the period from 1100–1130 hrs, we observed hundreds of adults of *G. fuscillata*, yet not a single mating pair or aggressive interaction was detected. Also of note is the fact that no adults of any other species of Odonata were observed in the campground area. Based on my previous observations, species such as *Pachydiplax longipennis*, *Libellula axilena*, *L. incesta*, and *L. vibrans* are common in this area later in the spring.

Observations made later that same day revealed that adults of *G. fuscillata* were common in many areas of the park. In total, I may have observed 500–1,000 individuals. The last adult that I noted was a male seen perched at 1825 hrs on a pine tree trunk beside a picnic area parking lot, about 300 meters southeast of the campground area. Weather conditions changed dramatically overnight. The following day was cloudy and windy, with a high temperature in the low-mid 50s F (about 12°C), and no adult Odonata were noted.

The origin of the aggregation of *G. fuscillata* at First Landing State Park is unknown. Were these local residents from a mass emergence that were swarming in a manner comparable to that described by Dunkle (1991) or might they have been “local” migrants? Carle (1982) reported that adults of *G. fuscillata* have been recorded in Virginia as early as 8 April, only a week earlier than my observations. This species is common in the park during spring based on the collections of several individuals (Virginia Division of Natural Heritage, unpubl. data). Numerous interdunal, bald cypress-dominated (*Taxodium distichum*) ponds and swamps are present in other portions of the park and likely provide suitable breeding habitat for *G. fuscillata*. I did not have an opportunity to search for exuviae at these ponds or in the campground area on the date of my observations.

With one exception, previous reports of dragonfly migration in eastern North America have not mentioned *G. fuscillata* as a possible migratory species (Soltesz *et al.* 1995; Sones 1995; Russell *et al.* 1998), although Nikula *et*

al. (2003) noted that small numbers of *G. antilope* have been observed in coastal Massachusetts among known migratory species. Taber (2002) reported his observations of an estimated 4,500 dragonflies of nine species on 27 May 2000 along a 13 km section of the Chesapeake Bay Bridge-Tunnel near the mouth of the Chesapeake Bay. Among more than 500 adult dragonflies that he observed on a 10 × 10 meter brick wall on one of the bridge-tunnel’s man-made islands (ca. 8 km northwest of First Landing State Park), *G. fuscillata* comprised an estimated 10% of the individuals. This island is far removed from the nearest potential breeding site (most likely the state park). I am aware of another report from the 1990s of large numbers of dragonflies on this same island in the late spring or early summer (K.H. Clark pers. comm.), but the species composition on that date was not documented and my visit the next day yielded very few Odonata. I am also aware of a previous collection of *G. fuscillata* from one of the bridge-tunnel islands (C.M. Stinson, unpubl. data), suggesting that this species regularly disperses long distances from breeding sites.

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A SUPER BOWL Weekend or The Hunt for Red October: Part II.

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In early February, while visiting my brother and sister-in-law down in Deltona, Florida, I was struck by an overwhelming desire to get a tan and take a quick look for the strange red *Orthemis* sp. in the sunny Florida Keys. I arrived there in time for the Super Bowl, but I had to spend time looking for a motel room. Almost all the rooms were full because the local Mardi Gras, a Boy Scout convention, and a kayak regatta. I finally got a room at the Sea Dell in Marathon. Settling in, I drifted off to sleep during halftime, awaiting a sunny day full of dragonflies!


After a quick breakfast, I drove over to the National Key Deer Refuge ranger station on Big Pine Key. I met William Miller who processed my research and collecting permit. He told me that all freshwater sites on Big Pine Key were protected by the refuge to insure drinking water for the endangered Key Deer. He mentioned a new site that they bulldozed out of the limestone bedrock on the north end of the island. With permit in hand, I headed out for that site and the other sites that Ken Tennesen and I looked at last year (See *Argia* 16: 1).

At the first site in the town of Big Pine, I saw a single odd looking *Orthemis* patrolling over the small limestone borrow pit. After a spirited battle, I managed to corral it for closer examination. This old, frayed male was mostly dark red, but the upper thorax had a bluish cast. I wondered if this was just due to the earlier morning hours, and if this would hold up for specimens caught later in day when it becomes hotter and sunnier. At the end of the day, I could say that this was not the case. Specimens caught later in the day were younger and without any bluish cast on the upper thorax. Andy Rabin, a new DSA member, told me he thought the overall coloration was burgundy in those *Orthemis* he saw here in January. This specimen and the others that I collected appear to be very close to the red *Orthemis schmidti* that I got in Bolivia and Ecuador. By the way, I did not see any pruinose pink *Orthemis ferruginea* on this trip like last year.

I visited two more sites in town and collected the red *Orthemis* sp. Then, I went to the new site at the north end of Big Pine Key. Outside of the Blue Hole tourist attraction, this site is the biggest freshwater borrow pit I saw. It lacked shoreline vegetation, but was filled with algae and *Chara*. It was loaded with red dragonflies and the site was easy to work! I was somewhat surprised at the diversity, even though there were no damselflies. There were lots of wary red *Orthemis* sp., furtive and even redder *Brachymesia furcata*, a few *Pantala flavescens*, lots of *Tramea onusta*, a couple *T. lacerata*, and a few *Tramea* that looked like both *T. abdominalis* and *T. insularis*. However, I missed the latter two species and they got away. This looks like a good site to survey and inventory the odonate diversity. I suspect that other Caribbean species may get a foothold here and that we could see some new USA records before long.

While red dragonflies were common, I did not see any damselflies on this trip. I spent considerable time at the nature trails looking at lots of nice pools for the *Lestes (spumarius)* and *tenuatus* might be here), and the *Nehalennia minuta* that Bob Behrstock found a few years ago. No such luck! I suspect that the tiny key deer browsed out the *Eleocharis*, *Carex*, and other sedges that these endophytic damselflies require. Oh well, maybe next time.

It was getting late in the day and I stopped at the Blue Hole scenic attraction. Many of the friendly tourists were curious as to what I was up to. When I told them, almost all the girls asked if I saw the movie, "Dragonfly" with Kevin Costner. I have just got to see this movie and see why it is so popular with the ladies!

While two giant black alligators prevented any waders from disturbing the peace, I was able to collect a single red *Orthemis* sp. male. With the help of a nice couple who alerted me to a perching red dragonfly, I was able to catch a nice male *Tramea insularis*, only the second specimen I ever seen! A fitting touch to the end of this sunny Super Bowl weekend! 

Species of Adult Odonata from Three Natural Areas in Mississippi

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During 2003–04, most of my time in the field was spent in three places: Noxubee National Wildlife Refuge (NNWR) in Noxubee, Winston, and Oktibehha Counties; Strawberry Plains Audubon Center (SPAC) in Marshall Co.;

and Tombigbee National Forest (TNF) in Winston and Choctaw Counties.

The NNWR and TNF are adjacent and spread over four

counties in east-central Mississippi. The Noxubee River flows through both areas and supports numerous beaver impoundments. These wetlands are typically less than a meter deep and dominated by soft rush (*Juncus effusus*), bur-reed (*Sparganium americanum*), and tag alder (*Alnus serrulata*). Other lentic sources of odonates in these areas include bottomland swamps, reservoir lakes, and ponds.

SPAC is a 2,500 acre former plantation near Holly Springs in northern Mississippi. This mixed woodland and ex-pasture landscape is interspersed with farm ponds, moist-soil wetlands, and a *Nuphar* dominated beaver impoundment. Much of the fallow open space is under fire restoration to warm-grass prairie.

Most of the following records are culled from research outings to wetlands, so the lists are weak on lotic breeders. And because I mainly stuck to my project sites and sampled mostly in summer, the coverage is incomplete and the lists really represent a minimum species set for each natural area. The research topics relate to community and conservation ecology of wetland odonates, and details of projects and survey methods will slowly become available in forthcoming publications (e.g., Bried and Ervin 2005).

Altogether, 75 species were caught or seen among the natural areas in 2003–04. Sight records are marked with an asterisk (*).

Noxubee National Wildlife Refuge

Total species: 17 damselflies, 40 dragonflies: *Anax junius*, *Aphylla williamsoni*, *Argia apicalis*, *A. tibialis*, *Arigomphus maxwelli*, *Calopteryx maculata*, *Celithemis elisa*, *C. eponina*, *C. fasciata*, *Cordulegaster obliqua*, *Coryphaeschna ingens**, *Dromogomphus spinosus*, *D. spoliatus*, *Enallagma basidens*, *E. civile*, *E. divigans*, *E. geminatum*, *E. signatum*, *E. travium*, *E. vesperum*, *Epiaeschna heroes*, *Epithea cynosura*, *E. princeps*, *Erythemis simplicicollis*, *Erythrodiplax minuscula*, *Gomphaeschna furcillata*, *Gomphus exilis*, *G. lividus*, *Hagenius brevistylus*, *Ischnura hastata*, *I. kellicotti*, *I. posita*, *I. ramburii*, *Ladona deplanata*, *Lestes australis*, *L. rectangularis*, *L. vigilax*, *Libellula cyanea*, *L. incesta*, *L. luctuosa*, *L. lydia*, *L. pulchella*, *L. semifasciata*, *L. vibrans*, *Macromia illinoiensis georgiana*, *M. taeniolata*, *Nasiaeschna pentacantha*, *Pachydiplax longipennis*, *Pantala flavescens*, *P. hymenaea*, *Perithemis tenera*, *Somatochlora linearis*, *Sympetrum ambiguum*, *Tramea carolina*, *T. lacerata*.

In addition, Lloyd Bennett of Mississippi State University captured specimens of *Cordulegaster bilineata* and *Gomphus vastus* at NNWR.

Strawberry Plains Audubon Center

Total species: 19 damselflies, 32 dragonflies: *Anax junius*, *A. longipes*, *Argia apicalis*, *Arigomphus villosipes*, *Calopteryx maculata*, *Celithemis elisa*, *C. eponina*, *C. fasciata*, *Enallagma aspersum*, *E. basidens*, *E. civile*, *E. daeckii*, *E. divigans*, *E. doubledayi*, *E. dubium*, *E. geminatum*, *E. signatum*, *E. vesperum*, *Epiaeschna heroes*, *Epithea cynosura*, *E. princeps*, *Erythemis simplicicollis*, *Erythrodiplax minuscula*, *Gomphaeschna furcillata*, *Gomphus exilis*, *G. lividus*, *Ischnura hastata*, *I. posita*, *I. ramburii*, *Ladona deplanata*, *Lestes australis*, *L. inaequalis*, *L. vigilax*, *Libellula auripennis*, *L. cyanea*, *L. incesta*, *L. luctuosa*, *L. lydia*, *L. pulchella*, *L. vibrans*, *Macromia taeniolata*, *Nasiaeschna pentacantha*, *Nehalennia integricollis*, *Pachydiplax longipennis*, *Pantala flavescens*, *P. hymenaea*, *Perithemis tenera*, *Sympetrum ambiguum*, *S. vicinum*, *Tramea carolina*, *T. lacerata*.

Several additional species were found nearby in Holly Springs National Forest, including *Argia fumipennis*, *A. tibialis*, *Chromagrion conditum*, and *Nehalennia gracilis*. To my knowledge, the only previous Mississippi record of *N. gracilis* is given in Westfall and May (1995). There are no county records of this species in Mississippi (Donnelly 2004).


Tombigbee National Forest

Total species: 16 damselflies, 36 dragonflies: *Anax junius*, *Aphylla williamsoni*, *Argia apicalis*, *A. fumipennis*, *A. tibialis*, *Boyeria vinosa**, *Calopteryx maculata*, *Celithemis eponina*, *C. fasciata*, *C. verna*, *Cordulegaster erronea**, *Coryphaeschna ingens**, *Dromogomphus spinosus*, *Enallagma daeckii*, *E. divigans*, *E. dubium*, *E. geminatum*, *E. signatum*, *Epiaeschna heroes*, *Epithea cynosura*, *E. princeps*, *Erythemis simplicicollis*, *Erythrodiplax minuscula*, *Gomphaeschna furcillata*, *Gomphus exilis*, *Ischnura hastata*, *I. kellicotti*, *I. posita*, *I. ramburii*, *Ladona deplanata*, *Lestes inaequalis*, *L. vigilax*, *Libellula cyanea*, *L. flavida*, *L. incesta*, *L. luctuosa*, *L. lydia*, *L. pulchella*, *L. semifasciata*, *L. vibrans*, *Macromia illinoiensis georgiana*, *M. taeniolata*, *Nasiaeschna pentacantha*, *Nehalennia integricollis*, *Pachydiplax longipennis*, *Pantala flavescens*, *Perithemis tenera*, *Progomphus obscurus*, *Sympetrum vicinum*, *Tachopteryx thoreyi**, *Tramea carolina*, *T. lacerata*.

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Birth of a Dragon

Jim Markowich and Sandy Mayer

[photo on rear cover]

“There’s another!” The first mate’s cry goes up from the front seat of the inflatable kayak. With only a moderate amount of cursing, the pilot manages to maneuver gently along the edge of a cluster of yellow pond lilies, and stop the craft entirely. Within reach off the starboard bow lies our quarry: a dragonfly, in the process of emerging from its aquatic naiad stage.

Dragonflies and damselflies are so damned extraordinary (please excuse the moderate cursing). Here are a few reasons why: many live a vast majority of their life spans in these aquatic, larval forms known as naiads. They come in an abundance of colorful packages, ranging from the subdued to the positively racy. Some investigate kayaks by hovering nearby, and often hitch a ride. Some tolerate a camera lens nudged up to a couple of centimeters from their heads, which they may cock toward it, as you might expect from a mantis or a spaniel.

Dragonflies and damselflies are both of the Order Odonata. Dragonflies comprise the Suborder Anisoptera. Damselflies are Suborder Zygoptera. The various families account for a lot of variation in coloration, shapes and behavior, but require an associate’s degree in Latin.

Dragonfly naiads may live up to five years, molting and growing. They spend much of that time wolfing down worms, snails, fly larvae, mosquito larvae and even small fish.

When ready, the naiad emerges from the water. Most dragonfly species climb up a stiff blade of reed grass. The naiad we found this day had a different method, working its way onto the flat surface of a lily pad. In its final molt, the naiad’s exoskeleton breaks open, and the insect wriggles out. That makes it sound simple, but when you watch the process, it’s obvious that a great deal of effort is expended. Slither, pause, flip over, pause, get a grip, shimmy, pause, etc. Between emergence and first flight, up to five hours can pass—enough time for an observer to catch a spectacular sunburn, if conditions are right.

The dragonfly’s wings, like those of a butterfly emerging from a chrysalis, are at first too pliant and soft to function. They require up to several hours for the hemolymph that fills their veins to drain. The draining leaves each wing as a stiff, hollow-tubed framework that, covered by a thin membrane, allows it to function as an airfoil. During this time, the insect waits on its birth pad, or its birth blade, or on any suitable, proffered surface.

The wait for wings to dry is not always a simple matter. This newly emerged adult, or teneral, has never used its legs in this new medium before. There are new and unfamiliar hazards, such as sudden breezes. One of these can sometimes pitch a new bug back into the water, for which, of course, it is no longer well-designed. With astonishment, we have observed an adult damselfly (*Enallagma civile*—the Familiar Bluet) lift a floundering newbie from the surface of a lake, and drag it quickly up a blade of reed grass, to dry off and try again.

But back to the lily pad nursery: Just what was this newly formed critter? We referred to some published material to try to figuratively nail it down.

The big, compound eyes of this dragonfly were distinctly separate. They didn’t meet at a point, or share a common border. The “Stokes Beginner’s Guide to Dragonflies” makes it clear that only two dragonfly families have separated eyes. We either had a young Clubtail (Gomphidae) or a young Petaltail (Petaluridae).


The abdomens of Clubtails flare at the tip, sort of like, well, clubs. This one distinctly did not. It looked much more like that in the photo of a Gray Petaltail (*Tachopteryx thoreyi*)—a fairly thick, slightly tapered affair that looked like it could telescope nicely, each segment fitting into the one before it. Our teneral was green, the mature Petaltail in the photo was gray, but we figured it might take a while for the color to set.

Identity solved? Of course not! Jill Silsby’s “Dragonflies of the World” indicates that the color of *T. thoreyi*, the only known eastern North American Petaltail species, is set upon emergence. Clinching it, Sidney W. Dunkle (author

of “Dragonflies Through Binoculars”) has also revealed that the larvae of this species are terrestrial. They would never be found crawling out onto a waterlily pad.

Interestingly, Silsby states that Clubtail larvae are aquatic, and may emerge onto a flat surface rather than a vertical one. The plot was thickening... Might this have been a Clubtail teneral after all? Might the tip of our dragonfly’s tail have also thickened, given a few hours more?

We didn’t find out. It was time to head back to port.

Addendum: We returned to the same part of the same pond at the same time the next year, and got some better photos. This being the 21st century, we eventually availed ourselves of the opportunities afforded by the existence of the internet and e-mail. Allen Barlow of New Jersey Odes (one state over) looked at one of our photos of a teneral, its partly-formed wings as wrinkled as a brain, and simply identified it: *Arigomphus furcifer*—the appropriately-named Lilypad Clubtail. 

New State Records of Odonata For Eastern Mexico

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Resumen

Se presenta aquí nuevos registros de 19 especies de Odonata (8 Zygoptera y 11 Anisoptera) que no habían reportadas previamente en cinco estados de México: San Luis Potosí, Tamaulipas, Hidalgo, Chiapas, y Campeche. Todas las observaciones ocurrieron durante los meses de octubre y noviembre, 2001-2004.

Introduction

Paulson and Gonzalez Soriano (2004) summarized current knowledge of the distribution of Mexican Odonata. Besides presenting updated distributional data, their list draws attention to the gaps in the known ranges of many—if not most—species. The following records address a few of these gaps. Nineteen presumed first records are presented for five Mexican states. All species were encountered while I traveled in eastern Mexico with butterflies during October and November 2001–2004. Odonata were preserved in 70% ethyl alcohol or acetoned. Specimens are deposited with Rosser W. Garrison (RWG) and Dennis R. Paulson (DRP).

Species List

Lestes forficula: SAN LUIS POTOSÍ (1 male to DRP). 22 Oct 2004. Mexico Hwy 85, seven road-miles S of Ciudad Valles. Roadside farm pond with a mostly grazed, muddy margin (21° 52.71'N 98° 56.59'W, c. 71 m elevation). Six adults were observed on emergent vegetation at pond edge. They were found alongside *Lestes sigma*, of which three or four adults and at least 40 teneral were encountered, mostly in dense, weedy vegetation near the water’s edge. *Lestes forficula* is widespread, found in the south-central U.S., Tamaulipas and Veracruz and ranging south into Argentina.

Mecistogaster ornata: SAN LUIS POTOSÍ (1–2 observed by RAB and photographed by Lee Zieger of Brownsville, Texas). 23–24 Oct 2002. El Salto (22° 35.19'N 99° 22.75'W, c. 403 m elevation), c. 12 km N of the town of El Naranjo. They were seen at trailsides in dense, low, semi-deciduous woodland near river. This large, yellow “helicoptero” is relatively common along wooded lowland rivers and foothill streams in nearby Tamaulipas (i.e., Gomez Farías vicinity), and ranges southward into Argentina.

Protoneura aurantiaca: CHIAPAS (1 male and 1 female to RWG). 29 Oct 2001. Entrance road to Bonampak ruins. Shallow, shaded rain forest stream over limestone substrate. Collected near 1200 hrs as several hovered low over the water. The species has been recorded from the state of San Luis Potosí to Panama. This record extends its known Mexican distribution eastward from Tabasco and Veracruz.

Argia oculata group: TAMAULIPAS (tandem pair to DRP). 18 Oct 2004. Rio Los Troncones, Centro Recreativo “Los Troncones,” west side of Ciudad Victoria (23° 47.06'N 99° 11.75'W, c. 296 m elevation). The species was common on emergent boulders and on vegetation along the cypress-lined stream. Also: (male to DRP). 19 Oct 2004. Parque la Florida (as per *Argia ulmeca*); and: (two males to DRP). 23 Oct 2004. Rio Sabinas N of Gomez Farías near Vicente Guerrero (23° 06.45'N 99° 08.69'W, c. 114 m elevation). These specimens, part of a widespread, polymorphic species (or species complex) that ranges south at least to Peru and Venezuela, represent what Gloyd referred to as the “*oculata* group—minimum blue.” For a discussion of this complex, see Westfall and May (1996).

Argia pulla: HIDALGO (1 male to DRP, also photographed). 23 Oct 2003. Peyula village, SE of MEX 105 and c. 12 km SW of Huejutla de Reyes. Perched about 1 m

above ground on a small bush near a partly shaded, apparently spring-fed pool. A fairly small, dark species, *pulla* is found in much of Mexico on both still and running water. It ranges south at least to Panama.

Argia ulmeca: TAMAULIPAS (2 males to DRP). 19 Oct 2004. Parque La Florida, c. 8 km. S of Gomez Farías and c. 1–2 km W of Mexico Hwy 85 (22° 59.54'N 99° 08.56'W, c. 94 m elevation). Between 1000 and 1200 hrs, males were perched on both sunny and shaded leaves and branch tips 1–4 m above a shallow, clear stream. All were quite wary, rarely returning to the same perch. This species occurs in much of Mexico including nearby Nuevo León, San Luis Potosí and Veracruz, and ranges south and east at least into Panama. Like a number of other Mexican *Argia* (including *oculata*) the northernmost limits of its range are only now being delineated.

Argia westfalli: TAMAULIPAS (1 male, 1 female to RWG, also photographed). 23 Oct 2002. Parque La Florida (as per *Argia ulmeca*—and also common there on Oct 2003). Females oviposited on sticks projecting from the stream and roots hanging into the water. Also observed 21 Oct 2002 and 18 Oct 2004 along the cypress-lined stream at Centro Recreativo “Los Troncones” (as per *Argia oculata*). In nearby San Luis Potosí, this species inhabits both sluggish and moderately fast moving streams, and may be abundant in open fields, along sunny trails, and in sun-dappled forest understory. At sites such as El Salto, San Luis Potosí where *westfalli* is sympatric with other yellow-winged *Argias* (e.g., *rhoasii* and *sedula*) males are easily distinguished by their large size, bright blue ground color, and reduced black pigmentation. I did not encounter the similar *Argia anceps* at the above mentioned locations.

Neocythromma cultellatum: SAN LUIS POTOSÍ (photo of copulating pair, several additional males seen). 23 Oct 2002. Approx. 12 km north of El Naranjo at Rios family farm adjacent to El Salto (22° 34.95'N 99° 22.60'W, c. 395 m elevation). Large, earthen fishpond with emergent grasses. This widespread species occurs in nearby Tamaulipas, the Rio Grande Valley of Texas, and south through southern Florida, the West Indies and Central America at least to Venezuela, inhabiting a variety of habitats from weedy pond edges to the margins of large rivers.

Anax amazili: SAN LUIS POTOSÍ (1 male, sight record). 22 Oct 2004. Location as per *Lestes forficula*. On at least four occasions, one individual hovered less than two meters from the observers during which time its plain thorax and patterned abdomen were clearly visible. One of the most widespread New World odonates, *amazili* is found in the extreme southern U.S., and throughout much of Mexico,

the Caribbean, Central and South America.

Erpetogomphus elaps: TAMAULIPAS (1 male to DRP). 25 Oct 2003. West bank Rio Sabinas, several km NW of El Encino at Mexico Hwy 85. Sunny trail edge near river, where perched c. 0.3 m above ground on weedy growth. Also: (1 male to DRP) 18 Oct 2004. Centro Recreativo “Los Troncones” (as per *Argia oculata*) where perched on a low, partly flooded concrete wall alongside a shallow pool. This species was also common 23 Oct 2004 in a weedy field at Parque La Florida (see *Argia ulmeca*). During various visits to Parque La Florida *elaps* was sympatric with *E. eutainia* (several present, female photographed), and *E. constrictor* (female specimen).

Phyllogomphoides suasus: HIDALGO (2 males to DRP). 23 Oct 2002. Location as per *Argia pulla*. Males flew interrupted beats over water, hovering in the open for up to several minutes, c. 1 meter above narrow, fast moving streams. This species is widespread in Mexico, and occurs south at least to Costa Rica.

Brechmorhoga vivax: TAMAULIPAS (1 male to DRP). 25 Oct 2003. Rio Sabinas near El Encino (near *Macrothemis inequiunguis* site). Patrolled the edge of a driveway surrounded by sugarcane fields, woodland margin and mowed lawn. In Mexico, this species is known from San Luis Potosí, and southward along both slopes. Widespread throughout Central America, it ranges southward into Peru and Argentina.

Dythemis maya: TAMAULIPAS (1 male to RWG). 21 Oct 2002. “Los Troncones” (as per *Argia oculata*). Perched near the river less than 1 m above the edge of a narrow side channel shaded by large cypress trees. Only one individual was noted, and none on a visit during October 2004. This species is widespread in Mexico but seems to be local and uncommon. It occurs at least as far south as El Salvador.

Erythemis peruviana: CAMPECHE (male photographed). 28 Oct 2001. Palizada road about 5 km W of MX Hwy. 186, just north of the Tabasco–Campeche state line. Low, weedy, roadside growth adjacent to a farm pond. Another very widespread species, *peruviana* ranges from the Texas Hill Country (once) southward into Argentina.

Libellula berculea: HIDALGO (male of ovipositing pair to DRP, pair photographed). 22 Oct 2003. Location as per *Argia pulla*. Pair observed ovipositing in very shallow, narrow roadside stream. The male had very tattered wingtips. After landing, the pair remained in a wheel for less than 20 seconds. Another male was observed about 2 km down slope over a small spring-fed pool. Based upon

this specimen, the Paulson and Gonzalez Soriano 2004 list has already been updated.

Macrothemis inequiunguis: TAMAULIPAS (1 male to DRP). 25 Oct 2003. North of Gomez Farias, west bank Rio Sabinas, several km N of El Encino at Mexico Hwy 85. Sunny trail edge near river. Along this portion of the Rio Sabinas, locally sympatric with *M. pseudimitans*. Also: (2 females to DRP). 19 Oct 2004. Parque La Florida (as per *Argia ulmeca*). Flying over edge of stream. One exhibited very dark wing tips; the other one's were clear.

Orthemis discolor: HIDALGO (1 male to DRP). 23 Oct 2003. Location as per *Argia pulla*. Netted over small, spring fed pool. Others seen perched on low vegetation at roadside edge. Scattered records suggest discolor inhabits lower elevations in much of Mexico.

Perithemis mooma: CAMPECHE (female photographed). 28 Oct 2001. Palizada road (as per *Erythemis peruviana*). Perched c. 0.3 m above ground on low, weedy roadside growth. As discussed by Paulson (1984), this individual represents the very small Yucatan morph of *mooma*, one of the smallest of all dragonflies.

Tramea lacerata: SAN LUIS POTOSÍ (1 male, sight record). 22 Oct 2004. Location as per *Lestes forficula*. One male of this large, distinctive species was observed as it flew over all parts of the farm pond, occasionally very close to the observers, and always readily distinguished from the numerous *T. onusta*. Not far away in neighboring Tamaulipas, a few *lacerata* were observed as they flew over the highway among dozens of *T. onusta* and hundreds of *Pantala* spp. Although undoubtedly common and widespread, the range of *lacerata* is poorly documented in Mexico.

Acknowledgements

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ing assistance with confirmations and identifications, and to John Abbott (Austin, Texas) and Sid Dunkle (Plano, Texas), who commented on certain photos. Jim Johnson kindly drew my attention to some on-line geographic references. Lee Zieger (Brownsville, Texas), Will and Gill Carter (Weslaco, Texas), and Hank and Priscilla Brodtkin (Hereford, Arizona) provided transportation and companionship during the trips that generated these sightings.

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Dragonfly Days, 20–22 May 2005

(from an e-mail from Joshua Stuart Rose)

Valley Nature Center presents the 6th Annual “Dragonfly Days” on May 20–22, 2005 in Weslaco, Texas in the Rio Grande Valley. Field trips, seminars and presentations, keynote banquet and lectures. Pre-registration is available. Come join the fun! Contact VNC at (956) 969-2475, e-mail <info@valleynaturecenter.org> or visit <<http://www.valleynaturecenter.org>>

Speakers include Dennis Paulson, Sid Dunkle, Bob Behrstock, Forrest Mitchell, and James Laswell, plus a feature on odonates of the Guadeloupe River by Tony Gallucci.



Additional Notes on the Odonata of the Cayman Islands

Pamela Hunt

During a brief visit to the Cayman Islands 8–12 April 2004, I spent a little time seeking out and identifying Odonata in the course of general natural history observation. Most observations of Odonata were made on Grand Cayman, the largest of the three islands. There is no consistent source of fresh water on the island, so habitats capable of supporting Odonata are extremely limited, and include rain-fed pools and man-made watering holes, in addition to more common brackish and saline habitats. The bulk of my observations were made at two locations. Around George Town (the capital), at the western end of the island, I visited mangrove-lined canals and a large shallow (and perhaps semi-permanent) freshwater pond at the edge of a construction project. At the Queen Elizabeth II Botanic Park (hereafter Botanic Park) on the eastern portion of the island, habitat consisted of dry forest with scattered water filled pools, in addition to a larger brackish mangrove lagoon. Little Cayman Island was visited for part of one day. Twelve species of Odonata were recorded on this trip, and to the best of my knowledge, two of these were not previously recorded from the Cayman Islands: *Coryphaeschna adnexa* and *Micrathyria aequalis* (Askew *et al.* 1998). Both these species occur on Cuba and Jamaica, as well as in Middle America (Needham *et al.* 2000), and thus were perhaps not unexpected in the Cayman Islands. Following are brief notes on all the species recorded on the trip.

Lestes spumarius. A pair was observed in tandem at the Botanic Park on 10 April.

Ichnura ramburii. Seen in George Town, Grand Cayman, on 9 April.

Coryphaeschna adnexa. A small darner was observed patrolling a pond at the Botanic Park on 10 April. Although not netted, the small size and blue face of this individual suggested this species, rather than the previously recorded *C. viriditas*.

Brachymesia furcata. This species was common both at George Town and the Botanic Park, as noted by Askew *et al.* (1998).

Erythemis simplicicollis. A single male was observed near a shallow pond in the Botanic Park on 10 April.

Erythemis vesiculosa. This species was common at small ponds and in the nearby forest at the Botanic Park on 10 April.

Erythrodiplax berenice. A single male was observed along a mangrove channel in George Town on 9 April.

Erythrodiplax umbrata. Two individuals of this species were noted at a small pond in the Botanic Park on 10 April.

Micrathyria aequalis. A male was seen and photographed at a small pond in the Botanic Garden on 10 April. This appears to represent the first record of this species for the Cayman Islands. It frequently perched on protruding stems much in the manner of other members of this genus.

Micrathyria didyma. Two individuals of this widespread species were seen in the Botanic Park on 10 April, and another was in George Town on 9 April.

Pantala flavescens. A large swarm of this and the following species was observed south of George Town on 9 April. Of the approximately 50 individuals in the swarm, perhaps 75% were this species. Individuals were also observed on Little Cayman on 11 April.

Pantala hymenaea. Perhaps 10–15 individuals of this species were present a swarm on 9 April as described above.

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Afrikaan Anisoptera and Zulu Zygoptera: A Trip to South Africa

Roy Beckemeyer

My wife Pat and I were down to one continent missing from our travels: Africa. Then along came a set of coincidences—the third International Congress of Palaeoentomology was going to be held in South Africa in February of 2005. And February is near the end but possibly within the flowering season of one of Pat's favorite plants, the "Harebell of Africa", *Dierama*, a showy, grasslike plant with large pendulous pink flowers that reaches its greatest diversity in South Africa.

We began investigating our options and ended up choosing to use Peter Lawson's tour company to set up a two week trip prior to the meeting. We planned to do photography of birds and mammals and plants and dragonflies, and to collect the latter as well. We had a guide, a VW microbus, and lots of camera gear. And the wonderful animal and plant life of southern Africa!

We started at Durban, on the Indian Ocean in eastern South Africa (KwaZulu-Natal Province), worked our way up into the grass veld in the foothills of the Drakensberg Range, then back to the coast and the fabulous St. Lucia Wetlands, into the coastal forest and grasslands to some large game preserves, Bonamanzi, Hluhluwe and Mkhuse, then back to the high veld around Wakkerstroom in Mpumalanga Province, ending up in Johannesburg and Pretoria, site of the meeting venue at the South Africa National Biodiversity Institute at the National Botanical Gardens.

In addition to wonderful birds like the hornbills and long-claws and great mammals like zebra, wildebeast, rhinos, hippos, buffalo, all sorts of antelope, mongoose, etc., there were lots of great insects, including some huge dung beetles (*Pachylomera femoralis*) that looked like flying Tonka Trucks, really big black and white and shiny robber flies (*Lamyra gulo*) that are sphecid wasp mimics, quite large ant lions (*Palpares caffer*), and of course, lots and lots of dragonflies and damselflies.

At one of our first stops near Durban we found the great little *Brachythemis leucostigma*, the Banded Groundling that reminded me of our *Libellula lydia*, the Common Whitetail, in its behavior, the males perching on the ground displaying black bars in their wings. Common names for South African dragonflies used here are from Wearwick and Michelle Tarboton's great book, "Fieldguide to the Dragonflies of South Africa", and common names for damselflies from "Field Guide to Insects of South Africa" by Mike Picker, Charles Griffiths and Alan Weaving.

As we climbed the foothills we stopped off at a small stream to find a mating pair of small gomphids, *Paragomphus cognatus*, the Rock Hooktail, and a small blue coenagrionid that I have yet to key out.

The coastal areas were full of odonates, including the neat family of damselflies, Chlorocyphidae, in which the insects have long wings and short abdomens and look totally different from any damsels we might see here in North America. At Mtunzini I collected a female *Platycypha fitzsimmonsi*, the Fitzsimmon's Jewel. Also here were a common but quite lovely platycnemidid, *Allocnemis leucostigma*, the Gold-tailed Damselfly, with his bright blue head and dazzling yellow tail spot announcing the presence of an otherwise dark and slender little damselfly. Most numerous were the Protoneuridae, *Ellatoneura glauca*, the Grey Threadtails. Along with the exotic African odonates was our old friend, *Pantala flavescens*, the Wandering Glider, which I have seen almost everywhere we have traveled (but not at Antarctica as I recall).

There are some really great RED libellulids in South Africa, including *Crocothemis erythraea*, the Broad Scarlet, *Tramea basilare*, the Keyhole Glider, and *Philonomon luminans*, the Barbet. These were all found at ponds in and around Bonamanzi Game Preserve.

At Iphira Camp near St. Lucia we encountered *Orthetrum julia*, the Julia Skimmer, defending a puddle. Nearby were *Ceriagrion glabrum*, the Common Red Damsel, and *Hemistigma albipunctum*, the Pied Spot.

A ferocious looking and quite large gomphid that is not that unusual in South Africa, but which wouldn't let me catch it, was the Tigertail, *Ictinogomphus ferox*. What a magnificent beast! The ones I saw were usually either not within net reach, or were perching on thorny bushes; I have to admit getting a shot at one which I should have netted, but by then my buck fever was up so high that I missed him by a mile! At least I got pictures.

A highlight of the trip was a visit to Lebombo Mountain Reserve, where we got smashing looks at the lovely little birds called Pink-throated Twinspots and where I saw a big emerald flying along the road. I got out of the vehicle and waited for it to turn around and come back towards me, and got it netted with my first swing—a little bit of a reward for missing the Tigertail, I guess. It was the marvelous female *Phyllomacromia bifasciata*, the Two-banded Cruiser. Also here were the Tigertail, and another nice

little gomphid (I actually caught on of these by hand): *Paragomphus genei*, the Green Hooktail.

Other odonates seen, photographed, or collected included *Orthetrum chrysostigma*, the Epaulet Skimmer, *Diplacodes lefebvreii*, the Black Percher, *Trithemis kirbyi*, Kirby's Dropwing, *Rhyothemis semihyalina*, the Phantom Flutterer, *Tramea limbata*, the Ferruginous Glider, *Anax imperator*, the Blue Emperor, *Africallagma glaucum*, the Swamp Bluet, and *Ichnura senegalensis*, the March Bluetail.

I have acquired a great deal of respect for South African dragonflies, having to deal with almost every bush or tree having thorns, and with bodies of water being full of hip-

pos and Nile Crocodiles. What a challenge! South Africa is a great place to visit, pretty reasonably priced, even with the dollar weak against the Rand. Anyone planning a trip to South Africa should definitely get a copy of Tarboton's book to take along. I should add that dragonfly tours as well as birding and safari tours are now being offered in South Africa; in fact, Warwick Tarboton will be leading a dragonfly trip for Lawson Tours in January of 2006. Anyone interested can e-mail me and I'll send an itinerary. I should note that I have no ties to the tour company, but did have a positive experience in my dealings with them.



Is There Life After Acetone? A “Cool” Method for Preserving Odonates

Nick Donnelly

There was once a time when acetone could be obtained widely, and, if packed very securely, transported on airplanes. Times have changed. The discovery that acetone could replace ether in the refining of cocaine made this useful liquid almost unobtainable in much of the world, especially my old stomping grounds in Central America. Just to ask for it, is to risk some quality time in the carcel.

What is a guy to do? The first, and most vital step, in preserving specimens is to remove the water. Acetone generally removes most of it, but not all. You are left with a moist specimen containing a mixture of acetone and water. If you heat the specimen, then you can drive these off, but I have discovered this is not a straight-forward method. Too much heat and there is a slight micro-delamination in the cuticle, resulting in an iridescent specimen.

I have found what seems to be an easier, and more satisfactory method. First, I thoroughly dry the specimen. My method is truly “cool”: instead of heat I use a desiccant. My desiccant of choice is 4-angstrom synthetic zeolite, which generally goes under the commercial name “molecular sieve”. It is non-toxic, and is also handy for drying your wallet when it falls in the river. It lowers the partial pressure of water to a lower value even than silica gel, which is itself far superior to cobalt-doped calcium sulfate (“Drierite”). The desiccant can be reused essentially infinitely by cooking it in the oven at about 300 degrees F.

When you return from the trip with your crispy specimens, then a good soak in acetone will de-grease them.

Recently I had a chance to try this out. I went on a quick trip to Chiapas with some other trustees to look into a project of our chapter of the Nature Conservancy. This was not a buggy time of the year, but I took a small net just to experiment. I brought back three species: *Erythrodiplax fervida*, *Orthemis levis*, and *Argia pulla*. The *Erythrodiplax* has little body color or pattern to preserve. The *Orthemis* was more interesting; I found sharply defined, narrow lateral thoracic stripes, certainly more vivid than in any specimen I had previously taken. And *Argia pulla*, with its deep violet “pale” stripes on the thorax is always a challenge.

So how did it all turn out? When I removed them at home from the post-trip acetone treatment and desiccated them a second time, I was delighted to find superb specimens. The thoracic lines on the *Orthemis* were vivid. The thoracic pattern of dark and darker on the *Argia* was certainly as good as I have achieved with initial acetone in the past.

This is not the first time I have done this. Anguishing over the rapid fading of the beautiful apple-green thorax of the Malaysian *Megalogomphus sumatranus*, I directly desiccated a specimen and found that it was greener than the acetoned version. And North America *Ophiogomphus* suffer from the same problem. I often take specimens of *Enallagma* that I think might be useful for DNA analysis. These I desiccate, but I do not follow-up with a later acetone treatment. These are fine, if not as vivid as acetoned specimens.

I have not tried a huge aeshnid yet, but I may never take acetone in the field again.



What Every Boy and Girl Needs to Know About GPS, and How to Locate your Position

Nick Donnelly

One of the most difficult parts of the dot-map project was locating records for specimens. Very few records were accompanied by latitude and longitude data, which was what I needed for plotting. Sometimes this task was not so difficult: “5 miles east of Chibougamou” can be placed in the proper 30' quadrangle with little difficulty. A location of “50 miles south of Chibougamou” is more difficult. Exactly south? And are these air miles or (probably) road miles? And what to do with “milepost 250 on the Dempster Highway”? We have to trash this record.

Happily a device has come into service in the last 25 years that really works. And it is not that expensive. Every field person should have and use one to measure and record their locations. I refer to the GPS (global positioning system) receiver. This is a radio receiver which receives a very low-intensity signal (3×10^{-14} watts per square meter; it doesn't get much weaker than this!) from several of a constellation of about 24 satellites (plus spares and depending on how many are “up” at a given moment.) These satellites orbit at 20,000 km above the earth, at a period of half a sidereal day. Their great elevation places them sufficiently high to minimize most of the pesky irregularities of the earth's gravity field. They are in orbits close to circular, and arranged in groups of four satellites in each of six highly inclined orbital planes. This is the difficult part; if they were not kept spaced out, the effect would be like a kiddie's soccer game where everyone converges on the ball as quickly as they can, and nothing good ensues.

The satellites all broadcast a coded signal which is identical in frequency for each satellite. This signal contains the time from an atomic clock on the satellite (synchronized to better than 1 part in 10^{13}) and the ephemeris (orbital position of the satellite). The receiver receives signals from a minimum of four satellites in order to calculate four unknowns: the positional variables X, Y (horizontal), Z (vertical), and T (time). Your GPS receiver gives you a far more accurate time signal than anything else available to you, unless you work in the Naval Observatory.

For you physics buffs, this satellite system is a triumph of Einstein's theories of relativity. Due to the velocities of the satellites relative to the earth (about 4 kilometers per second), the clocks in the satellites run just a bit slow—a few seconds a day. So their time has to be appropriately adjusted to account for this. And because the satellites are not in perfect circular orbit, they experience fluctuating

gravity, which also makes the clocks run faster or slower. This is difficult technology; when your positioning system depends on a constant velocity of a radio wave (Einstein again), and this wave travels one centimeter in only 0.03 nanoseconds, you have to sweat the small stuff. It turns out that the relativistic problems comprise the major problems to be overcome (other than purely technical).

Launched in 1977, these satellites instantly became the main navigational device of choice for air and sea navigation. You should understand that no one depends 100% on this system. If the system were to suddenly go down, there would be huge chaos. This is why the bridge officers on a ship still shoot the stars twice a day, much as they did in the days of the original arabic navigators with their astrolabes.

In their early years (roughly the first twenty years), the conservative military didn't make all of the signal available. They withheld a part of that signal that was available only to military users; civilians had to accept “epsilon dithering” of the signal. This meant that military users got an approximately plus or minus twenty meters horizontal accuracy, while the civilian user had to be content with plus or minus 200 meters. President Clinton persuaded the military to suspend epsilon dithering, and now we all have a plus or minus error of about 20 meters.

There is a scheme called differential GPS by which you have a fixed unit and a traveling unit. For this you need to record the data and process it that evening in your motel room, or wherever. This system starts at about \$10,000, so I don't recommend it, unless you need guaranteed accuracy of much less than a meter.

OK, now we come down to the nitty-gritty. “How do I use my new unit?” I prefer to mount mine within my vehicle, using velcro and an externally mounted antenna (remember how weak the signal is!). I power it with the cigarette lighter to save on batteries (which actually recharge the batteries slightly during long drives). Because I usually drive right up to my collecting places, I rarely remove it from the vehicle. Another advantage of a car-mounted device is that you can learn to navigate with it, feeding it “way points” in advance and driving to these way points, which are usually highway intersections. I get the data for the way points from one of several available mapping programs for computers; I have preferred to use the DeLorme

programs, but others work as well. This navigational part is a glorious toy, and, remember, every boy needs a toy.

Grid Systems

One decision that has to be made early on is how to record the data. Many people prefer the UTM system, invented two centuries ago by Lambert, who found that conventional mercator projections distorted areas of land at high latitude. His solution was to “abolish” high latitudes: he devised new maps in which each 6° of longitude became a new equator, which is now transverse to the real equator (UTM = universal transverse mercator). In the present usage of this system, a position is reported as a “northing”, which is basically the distance in meters to the equator, and an “easting”, which is the number of meters east or west to the reference longitude. The UTM system, and its diverse spawn, have been in popular use for a century and a half, when the military, realizing by 1850 that they now had guns that could shoot shells beyond the visible horizon, adapted a grid system so that a lieutenant of artillery could aim his guns from the map without having to use messy spherical trigonometry. The French military engineers, who invented about everything that was worth inventing in military technology, introduced this system, and rather quickly the important countries of western Europe adapted their own national grids. If you have ever traveled in Britain, every map that you may have used, from a Ordnance survey topo map to an oil company road map, uses this grid. This is truly a great system if you want to bombard someone, but the Arabs were right: nothing beats latitude and longitude.

Latitude and longitude. The alternative, and in my view much more powerful, scheme is the latitude and longitude system. Latitude and longitude are based on angular measures of the elevation of stars above the horizon (which give latitude rather quickly) combined with a time measurement of the star shot, for which a chronometer is required and longitude is obtained. One beauty of this system is that a data set with latitude and longitude can be instantly used for other purposes, such as plotting dot maps.

There is another, somewhat hidden disadvantage of UTM. The use of the UTM system requires that you select a datum for the shape of the earth (“ellipsoid”). Most older US and many Canadian topo maps were constructed using a 1927 datum. This was thought to somewhat incorrect at the time, but the need to standardize maps was considered overwhelming. The first really successful US satellite (the 1959 “gold plated soccer ball”) was immensely successful in giving us a new ellipsoid for earth (essentially the polar radius and equatorial radius, or size of the equa-

torial bulge). The results were refined endlessly and finally presented to a waiting world as the 1980 datum, which has been tweaked a bit for a 1984 datum (on most GPS units identified as WGS84). I think it will be a long time before we monkey around further with the shape of the earth!

How does the UTM system depend on the ellipsoid? Imagine a huge tape measure running from the equator to some spot in, say, Ontario. This is your “northing”. If you use the 1927 ellipsoid, you will calculate about a 200 meter difference between a similar calculation involving the 1984 ellipsoid. And your point will be 200 meters different in UTM grids based on these ellipsoids. The immediate problem (pointed out to me by Paul Catling; I didn’t believe the size of the difference at first and did the math, finding out it really is this big.) is that the province of Ontario has topo maps using either the 1927 or the 1984 datum. Happily the citizens of the province rarely have need to shell one another.

“Why use UTM at all?” If you give UTM coordinates to someone who possesses the appropriate map, then he/she can locate the point using the superimposed grid. If they don’t possess the map, then there is no chance that they can locate the point. There is a point to this exercise in Britain, where the British National Grid (not to be confused with UTM) is virtually the only locating device that appears on the elegant topo maps of that region. In the US, only a few recent topo maps have a UTM grid superimposed on them, and some of these are accompanied by a warning that the grid values have to be corrected according to an obscure procedure printed on the margins of the map.

I said that the choice of ellipsoid (datum) affects your measured position, using UTM, by about 200 meters at mid latitudes. What about latitude and longitude? Strangely enough there is a difference in latitude between the ellipsoids also, but it no more than 20 meters. You ask, “Why is there a difference at all? Aren’t latitude and longitude based on angular elevation of stars?” Sure they are, but for the calculation of this angle you have to establish the horizontal (which is the tangent to the ellipsoid of rotation of the earth). And if you change the shape of the ellipsoid, you get a slightly different angle. But happily it is very little different.

What can you anticipate from your GPS? First, you can anticipate twenty meter horizontal accuracy, as a rule. On many units radius of a circle is displayed; within this circle your point is said to lie. Does it? Remembering that this is all statistics, the answer is “yes” about two thirds of the time. For the past three years I have repeated the measurement of the post holding my mailbox in place. The average standard deviation of these measurements, from the mean

of all measurements, is about 4.5 meters N–S and about 5.5 meters E–W. I think this is the limit of accuracy, and this required a minimum of ten repetitive measurements. So 20 meters is pretty conservative.

How about vertical accuracy? This is much less accurate than horizontal. The elevation itself is the measured distance between the satellites and the center of the earth, from which is subtracted the theoretical “sea level” by computing the radius of the ellipsoid. First, notice that all the satellites you are using for this measurement are on one side of Z (above you), not on either side of X and Y as for the horizontal measurement. This means that there can be no averaging out of tiny errors. But most important is the variation in the velocity of radio propagation in the atmosphere. “Didn’t you (and, more to the point, Einstein) say that the velocity of electromagnetic radiation is constant?” Yes, but only in a vacuum. Variable moisture content of the atmosphere will give you variable velocities and variable results. You will do better to measure elevation with a good barometric system. Over the years I have found the standard deviation of my mailbox measurements somewhat more than 7.5 meters, and I am not certain I accept even that implied accuracy. Not surprisingly the vertical accuracy is superior in really dry areas, such as deserts, where dragonflies don’t live anyway. I always check the “highest point” signs along the highways as I drive around, and find that I am rarely more than 50 feet off. I still say you have to be careful.

A quick FAQ—what are all those strange “datums” listed? I already told you that elevation is not one of the strong points for this technology. Because elevation is measured as the satellite distance to the center of the earth, from which you then subtract the ellipsoidal height, your measurement depends in part on the difference between the ellipsoid (a theoretical surface) and the geoid, which is the real sea-level surface, with all its sags and bulges. In some places this is a few hundred meters, and GPS elevation measurements will be correspondingly off. Most of those strange datums refer to islands or coastal areas, and their use will help you from wondering why the local shore line elevation is really 200 meters below where it ought to be.

How do I record and report my observations? Assuming that you are reporting latitude and longitude, you can’t do better than the guys that navigate for a living: report degrees, minutes, and decimal fractions of a minute. About the only people who regularly use degrees, minutes, and seconds are surveyors, who do not use these for latitude or longitude anyway, but in reference to a state grid (you don’t want to go there.) Some people use degrees and decimal fractions of a degree, but this is much less popular. Why

minutes? It turns out that a minute of latitude (1/60 of a degree) is a nautical mile, which explains why the knot (nautical miles per hour) is the universal velocity unit for ships and planes. A minute is just an awfully handy unit. A minute of longitude is the same as latitude, but multiplied by the cosine of the latitude. For most of the US, this is approximately $\frac{3}{4}$.


How do I report accuracy? This is a vital consideration, and is very often handled poorly. Do NOT report all the figures displayed on your instrument. Given an inherent accuracy of the GPS device at about 20 meters, it makes no sense at all to report the reading to more than the second decimal place of minutes. The first decimal place implies an accuracy of 200 meters (or it implies the approximate size of the area of interest). Reporting more decimal places can imply a ridiculous level of accuracy. One position I saw recently was reported “accurate” to the nearest millimeter! Not only is this vastly more accurate than the instrument can yield, but it amusingly implies that the insect in question was quite immobile!

And now a curious result. One of the things I have heard from many GPS users is that their location does not appear quite correct on their USGS topo map. The Feds in error? Heaven forfend! But it has been for years a widely known, dirty little secret among people who use topo maps extensively, that horizontal positions of topo maps are universally in error—and in most cases the error is larger than the inherent accuracy of your instrument. My much-measured mailbox is about 35 meters from where the topo map says it is. So don’t panic. The river has not necessarily moved. Your little toy is simply more accurate than the maps! Doesn’t this give you a feeling of power?

One other problem is the weakness of that radio signal. Leaves of trees absorb most of it, and finding one’s position in tropical forest is often very challenging. The only answer is to find a clearing large enough to give your unit a fairly good look at the clear sky. In Thailand it once took a full half hour to accomplish, but I found some neat *Protostictas* while I was trying to locate a small, open area. If you drive into a forested area with your unit going, then you will find it will do an impressive job recording the track by picking up short bursts of signal as it moves through the trees. Very often I simply record the place where I stopped the car. If I were to try to find the location with a cold instrument there, it might not be possible.

What do I do now? Run, do not walk, to your nearest GPS store, or shop in a catalog. How much of the full capability of your unit you use is up to you. I never use the features that would be useful if I were navigating a small boat (But my friends love these.). And I dislike (and set

aside) the maps screens that are provided in almost all new instruments. I do love the “breadcrumb trail” left by the unit display when mounted in a car and used continually. It is devilishly handy for finding your way home when you have done some very intricate maneuvering.

Any more FAQs? A frequently asked question is, “Will excessive use of a GPS make me go blind?” The answer is, “probably”. 

Dragonfly Pond Selected for The Garden Conservancy’s Open Days Program

(from information submitted by **Kathy Biggs**)

DSA members Kathy and Dave Biggs’ Sebastopol garden’s Bigsnest Wildlife Pond, has been selected by the national organization, The Garden Conservancy, for their Open Days program. This is the very wildlife pond that started the Biggs on the road to becoming Dragonfly enthusiasts, DSA members and the authors of two popular Beginner’s Guides to Dragonflies.

The Garden Conservancy’s (TGC) Open Days program allows participants to select a non-profit organization to share a small percentage of TGC’s proceeds. The public pays \$5 to visit each garden. The proceeds then can be split between the Garden Conservancy and any other organization of the host’s choosing. The Biggs have selected DSA. This is the very first time the TGC has held an event in Sebastopol, Sonoma Co., California, and the Biggs are happy that TGC is choosing to feature only wildlife friendly gardens in this tour. Since this is the first year for the event in their area, the Biggs are not expecting a very large number of visitors, but hope that in the coming years this will change. It is their hope that the proceeds from this event and future ones could be used by the DSA towards designing a pamphlet about building ponds for dragonflies and other wildlife, which they would be happy to work on if others are willing to help.

Open Days 2005, Sebastopol

Theme: Natural Gardens in Sebastopol that support wildlife, native plants, and appropriate horticulture. The pond and other featured natural gardens will be open to registered visitors on 18 September 2005 from 10 AM to 4 PM.

The Biggs provided DSA with this informa-

tion about The Garden Conservancy and its Open Days program:

“The Garden Conservancy was founded in 1989 to provide the resources necessary to preserve many of America’s finest gardens, and to open the gates of these exceptional gardens to the public for education and enjoyment. The Open Days Program is the only national program that invites the public to visit America’s very best, rarely seen, private gardens.

“In 1995, the Garden Conservancy published the first edition of its Open Days Directory, listing 100 private gardens in New York and Connecticut. It now has events in all areas of the nation. The Open Days Directory can be purchased directly from the Garden Conservancy by calling 888-842-2442. It is also available online <www.gardenconservancy.org/opendays.html> and wherever books are sold.”

From the Open Days Directory—Gardens in the West, page 46 & 48:

The town and environs of Sebastopol in Western



Kathy Bigg’s wildlife garden.

Sonoma County retain their rural character and many of the people who garden there have chosen to do so naturally and with water conservation in mind.

Bignest Wildlife Pond 308 Bloomfield Road. This tranquil and wondrously restful garden pod, created for the native wild creatures in the area (including humans), began in 1996. Inspired by a newspaper article, Kathy and David Biggs converted their backyard swimming pool into a pond. Because they were already habitat gardening to attract birds, it was natural for them to use native plants in their new pond. The pond has attracted more than fifty-three species of birds, twenty-five species of butterflies, six reptile

and amphibian species, twelve species of mammals, and twenty-five species of dragonflies. The dragonflies became the Biggs' passion, and they have now written two beginner's guides: *Common Dragonflies of California* and *Common Dragonflies of the Southwest*. This garden will acquaint you with lots of "tails": horsetail, mare's tail, cattail, foxtail, and many native aquatic plants. Surely a cardinal meadowhawk or a blue-eyed darner (dragonflies) will greet you as you enjoy the harmony created by this very different pond. Handouts and displays about building your own pond for wildlife will be available.



Damselfly Creeps into National Geographic

Kathy Biggs

I was reading the current (Jan. 2005) issue of *National Geographic*, when a little something caught my eye—on p. 108, if you look closely, you'll see an emerging damselfly!

Those of us in the northern hemisphere have to get our dragonfly-fixes where we can!



Hine's Emerald Dragonfly Workshop

(from an e-mail from **Tim Cashatt**)

Paul McKenzie has been given the responsibility of announcing and helping coordinate the 4th Hine's Emerald Dragonfly (HED) ID workshop, to be held 13–14 July in St. Ignace, Michigan, directly north of Mackinaw City and the famous Straits of Mackinac bridge. This workshop will be a combined effort of the U.S. Fish and Wildlife Service (FWS), the Michigan Natural Features Inventory, the Missouri Department of Natural Resources, the Illinois State Museum, and the Hine's Emerald Dragonfly Recovery Team.

The HED is the only federally listed dragonfly protected under the Endangered Species Act (ESA). Historically, HED was only known from Indiana and Ohio. At the time of its listing in 1995, the species had been documented in Alabama, Illinois, and Wisconsin. In 1997 several sites were discovered in Michigan, and in 1999 HED was discovered in Missouri. In 2001, the FWS completed a Recovery Plan to guide the recovery of the species. Subsequently, identification workshops were held in Door County, Wisconsin, and in two separate years at two different sites in Missouri.

As in past workshops, the St. Ignace workshop will include an overview on dragonfly and damselfly identification, information on life history requirements of adults and larvae, how to distinguish HED from closely related species (both adults and larvae), how to conduct HED surveys for adults and larvae, and behavioral observations of HED in the field. Workshops conducted in Wisconsin and Missouri were an overwhelming success as they contributed significantly to the discovery of new sites in both states. In Missouri, no less than 19–20 new sites in 8–9 counties have been discovered since the initial workshop in Wisconsin.

New sites were also recently discovered in Michigan and there are large areas of suitable habitat yet to be surveyed. Currently, the best sites in Michigan are located in Mackinaw and Alpena counties. An identification workshop in Michigan will not only help facilitate survey efforts in this state, but will also provide an opportunity for those who could not attend the first three workshops to be trained in the identification, biology, and habitat preferences of this endangered dragonfly.

Location: Lecture/laboratory portions of the workshop will be held at the U.S. Forest Service's Office in St. Ignace. We are grateful to Christie Deloria-Sheffield of the U.S. Fish and Wildlife Service and Steve Sjogren of the U.S. Forest Service for securing access to the facilities.

We have room for a total of 40 participants (including instructors or those assisting instructors). Currently, we have five slots left. First priority was given to Michigan Odonatologists but we have now opened registration up to all interested parties.

The instructors and assistants include: Tim Vogt, Dr. Dan Soluk, Mark O'Brien, David Cuthrell, Wayne Steffins (hopefully if he can attend), Bob Glotzhober, and Paul McKenzie. All of those listed have field experience with HED and/or larvae. Unfortunately, Dr. Tim Cashatt who has been an integral part of all HED workshops to date, has a conflicting engagement and will not be able to assist with the workshop. The following individuals have also expressed a willingness to help serve as local or statewide Michigan contacts: Phyllis Higman and Mike Penskar from the Michigan Natural Features Inventory (State-wide), Christie Deloria-Sheffield (local) and Steve Sjogren (local). If you have any questions about the St. Ignace area, contact Christie at 906-226-1240 or 906-360-1811 (cell), or Steve at 906-643-7900, ext. 134. For general information on neat places to visit while in Michigan, contact Phyllis Higman at 517-373-6983 or Mike Penskar at 517-335-4582. For general information on Odonates in Michigan contact Mark O'Brien of the University of Michigan Museum of Zoology at 734-647-2199. Also see e-mail addresses below for these state and local contacts. Others not on the above list who I may have inadvertently forgot to mention should send me their phone number so I can include them as a contact in subsequent e-mails.

The registration cost is \$0.00.

WDA Symposium in Vigo, Spain, July 2005

(from **Adolfo Cordero**, organizer <wda@uvigo.es>)

In 26–30 July the World Dragonfly Association will have its 4th International Symposium of Odonatology at Pontevedra, Spain. Information on registration, a preliminary program, a list of field trips and so on, is available on the symposium web page <http://webs.uvigo.es/c04/webc04/WDA/index.htm>.

I would like to highlight that end of July is high season, and therefore advanced booking of hotels is highly advisable. We have reserved a limited number of rooms at a

Schedule: The meeting will consist of presentations on Wednesday and visits to the field on Thursday. A more detailed schedule can be obtained from the organizers.

Lodging: Attendees are responsible for securing lodging on their own—St. Ignace has a wide array of hotels, motels, and resorts but July is in the peak of tourist season so you are recommended to make your reservations ASAP. A list of available lodging is available through the Google search engine.

E-mail addresses of local and state contacts mentioned above:

Christie Deloria-Sheffield—FWS Upper Pen. suboffice Michigan: <christie_deloria@fws.gov>

Steve Sjogren, Michigan U.S. Forest Service: <ssjogren@fs.fed.us>

Phyllis Higman, Michigan Natural Features Inventory: <higmanp@michigan.gov>

Mike Penskar, Michigan Natural Features Inventory: <penskarm@michigan.gov>


Mark O'Brien, Univ. of Mich—Museum of Zoology: <mfobrien@umich.edu>

People interested in attending should contact:

Paul M. McKenzie, Ph.D.
Endangered Species Coordinator
U.S. Fish and Wildlife Service
101 Park De Ville Dr.; Suite 100
Columbia, MO 65203-0007
<Paul_McKenzie@fws.gov>



special price in one of the hotels. There are no rooms left on the hotel that has an agreement with the university.

Remember that deadline for registration and abstracts submission is 30 April. Do not leave it for the last minute! This will make easier all the organizational matters. 

Proposed Photo Archive for DSA

(from an e-mail from **Steve Valley**)

Last summer at the Iowa meeting I brought up the topic of trying to find a way to preserve or archive the history of DSA that has been captured in photographs at our meetings, various gatherings and field trips over the years. I have been thinking about this a lot and have some ideas about how this can be accomplished, but I would like to know what you think before I announce this project in *Argia*.


Objectives:

1. To collect (borrow) as many photos as possible from past DSA activities. This would include slides, negatives and digital images. I have a high resolution scanner so the film images would be returned to the owner.
2. Identify all of the people in the photos and which meetings and localities they were shot at.
3. Preserve these digital images along with data on the subjects in some sort of central archive that can be

accessed by the DSA membership. The images could be recorded on CDs and distributed to the members and/or put on a web site (maybe an official DSA web page).

Over the past 16 years we have had some really great meetings and a lot of fun together. We have had the "official" group photos, but also lots of candid shots of friends and colleagues, in the field (or parking lot) and motel rooms discussing what we all love most dragonflies. It would be a shame if we couldn't show those odonatists of the future what a wild and crazy bunch came before them.

If this project works at all, it should be fairly easy to keep adding to the archive with each year's events.

We have had a number of official photographers, Clark Shiffer and Blair Nikula are the ones who come to mind right now. Last year Greg Lasley shot the group photos and he has already sent me his digital files. 

Minutes of the Annual Meeting of the Dragonfly Society of the Americas

Ailsa Donnelly, Friday, 9 July 2004

The annual meeting of the Dragonfly Society of the Americas was held on Friday, 9 July 2004, at Luther College, Decorah, Iowa, with John Abbott presiding in the absence of President Roy Beckemeyer.

It was announced that the Biology Department at Luther College would appreciate a list of the species found during the course of the meeting.

Secretary's Report: Secretary Dunkle was not present at the meeting.

Treasurer's Report: Treasurer Daigle reported a starting balance for the year of \$6,770.05, and projected a year-end balance of \$3,000.00. (See also attached written report).

Editor's Report: Nick Donnelly, editor of *Argia* and the *Bulletin of American Odonatology*, asked for papers to be submitted to BAO. The dot map project will be completed with issues BAO 8(1&2). Color reproductions are very expensive, and so far we have not been eligible for low postal rates. Keep *Argia* articles coming. The popular

issues of BAO, judging by requests from outside our society, are the reports of the odonata of individual states.

A brief discussion followed on the merits of various forms of field boots, each species having its enthusiasts.

The matter of extension of species and elimination of species followed. It was suggested that regional coordinators be sought, and year end summaries be printed in *Argia*.

Mike May commented that it would be of use to have old and no longer obtainable literature on a web site or CD roms, and that the Cornell College of Agriculture has experience in this type of work. A discussion followed on how this might be achieved.

Jerrell Daigle announced that the DSA meeting for 2005 was to be held in the northeast, and that we had been invited to Arnprior, Ontario, on the Ottawa River, by members of the society living in the Ottawa and Toronto area. Kurt Mead had also suggested northern Minnesota as a possible location for a general meeting. In 2006 the meeting will possibly be held in Arizona.

David Fitch moved, Dennis Paulson seconded, that the invitation to Arnprior be accepted.

Steve Valley mentioned that he had started working on the archiving of photographs taken at early DSA meetings, and asked for any photographs that members might have in their files.

Mike May proposed, seconded by Steve Krotzer, that Steve Valley be requested to come up with a specific proposal for

initiation and maintenance of a DSA photographic record. This proposal will be considered at the next annual meeting.

Carried unanimously.

There being no other business Bill Mauffray proposed the meeting be adjourned, seconded by George Smolka. ✈

BAO Notice: An Annotated Checklist of the Odonata of Canada, by Paul M. Catling, Robert A. Cannings, Paul M. Brunelle, BAO vol. 9, no. 1, pp. 1–20.

The Annotated Checklist of the Odonata of Canada lists 208 species for the country, giving English and French common names. Species removed from the Canadian list are discussed. The status of subspecies of Canadian species is discussed, and *Macromia magnifica rickeri* is proposed as a new subspecies. ✈

A Reminder from the Publisher

(I just promoted myself! It feels good.) Look at the mailing label on this issue. If it says “AR05”, this means you are **not** subscribed for volume 17, and this may be your last issue. We hate to lose you; please renew your subscription. ✈

TRAMEA

OdonataCentral: A New North American Web Site

John C. Abbott, Section of Integrative Biology; Curator, Brackenridge Field Laboratory Insect Collection, Texas Memorial Museum Research Associate, 1 University Station #C0930, The University of Texas at Austin, Austin, TX 78712 USA; <jcabbott@mail.utexas.edu>

As was noted in *Argia* (Donnelly 2002), I have been working to dynamically disseminate the data that was generated through the efforts of Nick Donnelly and the North American Dot Map Project. The new “OdonataCentral”, <<http://www.odonatacentral.com>> (note the address change from the old site) is now in place and provides the odonate community with an efficient way to track our rapidly changing knowledge of odonate distributions in North America (from Mexico to Canada).

The new site currently contains nearly 3,500 photos (most of which are new to the web) of 336 species, a larval photo gallery, and an on-line field guide that covers 276 species. A comprehensive database can be queried to generate checklists and statistics for any state, province, county or 30-minute quadrant in Canada and Mexico. These checklists can then be downloaded as comma separated files and incorporated in personal databases and listing programs utilized by many palm pilots and pocket PCs. Additionally,

maps can be dynamically generated using the Distribution Viewer for any of these areas.

The Odonata Distribution Viewer allows for the dynamic generation, manipulation, interaction, and production of species distribution maps via species name, common name, or location-based queries. Maps can be zoomed to virtually any scale and users can add or remove various layers including topographical relief, political boundaries, major watersheds, cities, and roads. The viewer is an incredibly useful tool, but can be slow—with each query the database runs through over 125,000 records. The viewer has been successfully tested on dial-up connections, but to maximize its potential a broad-band connection is required. I have had some reports of longer times needed for loading and initializing the application; with subsequent queries/downloads taking an average of about 20 seconds. When using the viewer you must let the application complete each operation before you can move on to

the next. Every attempt has been made to make the viewer as user-friendly as possible; however it may be useful to read the help file before you use it the first time.

The site is designed to help us as a community, keep track of rapidly changing distribution information. This is accomplished by allowing users to enter new distribution records. These records are then vouchered by a specimen or a photo (which is uploaded through the site) and finally vetted by experts within particular states or regions. I will be asking many readers of *Argia* who have assisted with the Dot Map Project and are keepers of records in particular states or provinces for help with this process. About twice a year, the new records will then be incorporated into the main database. Nick Donnelly and I would like to encourage everyone to make use of this on-line system as it will immensely increase the efficiency of dealing with new records. However, larger datasets can be sent to me directly and I will merge them directly into the database.

Additional features have been incorporated into the web site that I hope users will find useful. Some of these are highlighted below.

1. A photo gallery of larvae.
2. The Odonata of Trinidad including photos and scans of 61 species with more to come.
3. Association of metadata (locality and source information) with records including photo vouchers when available. This content can be accessed directly through the Utilities > OC Lookup menu or the Odonata Distribution Viewer.
4. A searchable, categorized database of nearly 300 Dragonfly and Damselfly Links (please e-mail me if you don't find your site listed or think it should be categorized differently).
5. A searchable Directory of Odonatologists and enthusiasts with their specific interests and contact information. If you have not already done so, I encourage you to add your information (as little or as much as you wish) to the directory. You will be given a specific login so you can update it at anytime. The power of this resource depends upon everyone submitting their information.
6. A Names Lookup feature that allows you to quickly associate common and scientific names.

Additional features planned include a dynamic, searchable species catalog that will not only contain synonymies,


but will be linked to literature, figures and photographs. A separate searchable bibliography, currently with over 8,000 references, is also planned. My goal with both of these pursuits is to have much of the actual Odonata literature available directly through the web site.

OdonataCentral is now officially hosting the Dragonfly Society of the Americas (DSA) web site. After many years of maintaining the DSA site, Bill Mauffray has graciously agreed to have it located at OdonataCentral. Bill will still be selling books and supplies through the IORI site (<http://www.afn.org/~iori/index.html>) which can be reached through OdonataCentral. All of the information on meetings and membership for the society can be found at <http://www.odonatacentral.com/dsa1>. The Executive Council is considering the availability of *Argia* and BAO on-line, and if approved OdonataCentral will host the electronic versions of these journals.

I have done my best to make the entire site compatible across platforms and browsers. Some remaining glitches will no doubt arise. Please notify me of any difficulties you have. The site is best viewed using Internet Explorer at a minimum screen resolution of 1024 × 768. The site also makes heavy use of Java applets so if you encounter problems, please make sure your browser is configured to allow Java Scripts to run and that you are not blocking pop-up windows.

Finally, I would like to thank Nick Donnelly for allowing me to get the Dot Map Data on-line and in a readily updatable form. The site and in particular the Odonata Distribution Viewer would not have been possible without the tremendous efforts of Damon Broglie. Lastly, I appreciate all of those who have given me feedback in the beta testing of the site.

References

Donnelly, N. 2002. Dot map project—Patterns of diversity are emerging. *Argia* 14: 13–16. 

Williamsonia On-Line

Mark O'Brien

For those of you that do not receive our newsletter Williamsonia, you may not know that you can view most of the issues online by going to the MOS web site:

<http://insects.ummz.lsa.umich.edu/michodo/mospubs/williamsonia/>

They are in PDF format, so you may download them and read them with Adobe Acrobat reader, or the built-in Mac OS X PDF reader. The latest issue is at <[http://insects.ummz.lsa.umich.edu/michodo/mospubs/williamsonia/Wmsonia8\(4\).pdf](http://insects.ummz.lsa.umich.edu/michodo/mospubs/williamsonia/Wmsonia8(4).pdf)>

Thanks to Steve Ross and Julie Craves for nudging me to get the word out on this.

Enjoy the winter!



ESA Debuts New Web Site

Lanham, Md., March 2, 2005 – The web site of the Entomological Society of America (ESA) has just undergone a major overhaul. Completely new features include drop down screens with supporting navigation bars and full search capability of the entire web site. These features should help both members of ESA and other users find what they need in a faster and more logical manner. In addition, much of the text has been rewritten with an emphasis on brevity and clarity. For example, dramatic changes in content and organization can be seen in the Membership and Certification areas.

“As our web site grew in importance over the past several years, it also grew in complexity. We added sections and pages as responses to issues as they arose. Over time, that caused the site to become cluttered and fractured,” said Executive Director Paula Lettice. “We were finally able to take the time to step back, analyze entsoc.org as a comprehensive product, and make improvements from there.”

The new site now includes an e-commerce module which allows for secure, real-time, credit card payments for transactions such as new member and renewal dues, member subscriptions, and annual meeting registration fees. As part of the e-commerce functionality, members and other users will soon be able to update their own records in ESA's member and customer database.

Label Data Standards

from Mark O'Brien

This is a very well written document that should be of interest to those of you collecting:

Label Data Standards for Terrestrial Arthropods:

<<http://www.biology.ualberta.ca/bsc/briefs/brlabelstandards.htm>>



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Back Cover: (top) Lilypad Clubtail (*Arigomphus furcifer*) standing next to its exuviae, with disinterested female Common Baskettail (*Epitheca cynosura*) perched nearby. Photo by Jim Markowich and Sandy Mayer. (bottom) Crab spider with captured Chalk-fronted Corporal (*Ladona julia*). Photo by David Bree.

