

ISSN 1061-8503

ARGIA

The News Journal of the Dragonfly Society of the Americas

Volume 21

18 June 2009

Number 2



Published by the Dragonfly Society of the Americas

<http://www.DragonflySocietyAmericas.org/>

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Front cover: Red-tipped Swampdamsel (*Leptobasis vacillans*). A young male photographed at Santa Ana National Wildlife Refuge in the Lower Rio Grande Valley of Texas on 22 May 2009 just before the Dragonfly Days Festival. This represents a new species for the US. Photo by John C. Abbott, <www.abbottnature-photography.com>.

In This Issue

This issue comes out as the odonate season really starts to take off and a summer full of meetings has already begun. Note the calendar of events for some of the meetings still planned, including the 6th Worldwide Dragonfly Association's International Congress in Xalapa, Mexico and the DSA's Annual Meeting in Sullivan, Missouri. You'll find titles and abstracts of the talks to be presented at the DSA meeting printed within this issue.

I just returned from the Dragonfly Days festival held annually in the Lower Rio Grande Valley of Texas. This is always a fun festival where participants get to see lots of Texas and North American rarities and almost invariably at least one new US species (this time was no different). See the front cover of this issue and read Josh Rose's account of the festival for details.

Those of us who have traveled in the tropics are certainly familiar with seeing insects taken over by fungi, but Jim Johnson provides an account of a dragonfly enduring such a demise. I wonder if anyone else has encountered this?


Jeremy Deeds updates the growing Pennsylvania list with no less than six new records for the state. Pennsylvania still has a way to go to catch up to Texas, but given the size of the state, it boasts an impressive diversity of species.

Nick and Ailsa Donnelly have been traveling again. This time they account recent trips to Malawi and Peru. On both trips they managed to find some interesting and unusual things, though the trips were not without the occasional hair-raising moment. Be sure to read how they negotiated the sheer cliffs in Peru!

Jessica Ware and Jerry Louton have been working with the Encyclopedia of Life group. They detail a useful way for quickly producing larval images that many will find informative.


Dennis Paulson comments on the Odonata of Baja California Sur list that he and Steve Mlodinow published in 2007. Dennis also reports on an unusual (or is it?) moment in odonate natural history where they become the prey of beetle larvae.

Naoya Ishizawa of Japan provides a YouTube video link to the famous Akatombo song.

Finally, we end with two new books recently published. Both have been eagerly awaited for and are reviewed in this issue. 

Calendar of Events

For additional information, see <<http://www.odonatacentral.org/index.php/PageAction.get/name/DSAOtherMeetings>>.

Event	Date	Location	Contact
6th WDA Internat. Congress	7–12 June	Xalapa, Mexico	< http://www.ecologia.unam.mx/odonatology2009/ >
DSA Annual Meeting	19–21 June	Sullivan, Missouri	Paul McKenzie < paul_mckenzie@fws.gov >
Great Lakes Odonata Meeting	10–12 July	Portage, Indiana	Deb Mikasser < dmikasser@hotmail.com >
Bitter Lake Dragonfly Festival	12–13 Sep	Roswell, New Mexico	< http://www.friendsofbitterlake.com/ > 

Abstracts of Talks to be Presented at the Sullivan, Missouri DSA Annual Meeting

National Review of State Wildlife Action Plans for Odonata SGCN—Jason Bried and Celeste Mazzacano

The overarching goal of the US Comprehensive Wildlife Conservation Strategy is to prevent wildlife from becoming endangered or declining to levels where recovery becomes impossible. Success of this campaign depends

on establishing Species of Greatest Conservation Need (SGCN) in a wildlife action plan specific to each state. Insects and other invertebrates are underrepresented as SGCN in many of these plans, including even the charismatic microfauna like Odonata. Although two-thirds of distinct Odonata species known from the US (ca. 2005) were appointed as SGCN, over a third were assigned in just

one state and exactly half the states neglected to assign dragonfly SGCN, damselfly SGCN, or both. To improve the situation, some states may need to recast their SGCN selection process, which was meant to be non-regulatory, highly adaptive, and permissibly imperfect (allow uncertainty). We encourage greater solicitation of and participation by odonatists, and compile some key literature and conservation lists that may help with choosing SGCN. Other recommendations include species distribution modeling and more focus on endemism and core range. A plea of “not enough information” is often used to help justify perfunctory invertebrate conservation. But with regards to the Odonata, we think rapidly expanding information on species distributions, combined with local field experience and knowledge of pertinent threats, should enable reasonable working hypotheses about the state-level conservation status of many species.

Some Chalcidoid Parasites of *Aeshna tuberculifera* Walker (Black-tipped Darner)—Burton Cebulski

Almost two decades of collecting and rearing of *A. tuberculifera* Walker eggs has led to the discovery of a number of chalcidoid parasites for this species. Observations on habitat, methods of egg collection, and rearing as well as problems that were encountered will be discussed. In conclusion, anomalies and points of interest that have been noted over the study will be mentioned.

Status and Distribution of *Orthemis schmidtii* Buchholz and the Odonata of Grenada—Jerrell J. Daigle, Erik Pilgrim, and François Meurgey

The status and distribution of *Orthemis schmidtii* Buchholz is examined with photos, DNA tree, and specimens from Bolivia to Florida. The Odonata of Grenada is examined with an intensive survey of existing habitats and a current species list.

Live Culturing of Dragonflies from Larvae to Adults—Richard Groover

As a continuation of Carl Cook’s work in growing dragonflies in a vivarium, I am perfecting the outdoor culturing of dragonfly larvae to result in successful emergence of adult individuals. Cannibalism and nutritional needs are addressed. Reduction of algae is also covered. The working vivarium is 16 feet long × 4 feet wide × 9 feet tall, with 6–7 inches of circulating water and individual compartments for the individual larvae. This work is a portion of my doctoral dissertation research: Temporal and Spatial Aspects of the Colonization and Re-colonization of Dragonflies in lentic habitats, at George Mason University. The dragonflies are being cultured for several mark and recapture experiments.

Population genetics of Hine’s Emerald Dragonfly (*Somatochlora hineana*) in Missouri—Meredith J. Mahoney and E.D. Cashatt

Genetic studies are a component of the Recovery Plan for Hine’s Emerald Dragonfly (HED). During population surveys from 2002–2008, 45 samples were collected from 15 localities in Missouri for genetic analysis. DNA sequence data from these samples was combined with data from previous genetic research on HED populations throughout the species’ range. Analyses of the mitochondrial protein-coding gene ND3 found genetic variability within populations as well as genetic variants shared among populations suggesting both historic and more recent movement among sites by HED. Previous genetic research indicated hybridization among *Somatochlora* species in Missouri. Nuclear ITS-1 and ITS-2 regions were sequenced to confirm identities based on morphology and mtDNA data and to examine the frequency of hybridization among co-occurring HED, Clamp-tipped Emerald (*S. tenebrosa*), and Mocha Emerald (*S. linearis*). Preliminary results suggest hybridization at more than one site in Missouri.

Lessons Learned from the First Eight Years of Conducting Hine’s Emerald Dragonfly Surveys in Missouri—P.M. McKenzie, T. Vogt, J.C. Walker, J.H. Smentowski, R. Gillespie, R. Day, E.D. Cashatt and M.J. Mahoney

Hine’s emerald dragonfly (*Somatochlora hineana*) (HED) was initially discovered in Missouri in 1999. Adult and larval surveys conducted for the species between 2001 and 2008 have yielded an additional 29 sites. New sites and population levels of HED in Missouri are generally much smaller than those in the northern part of the species’ range. All Missouri sites but one are associated with high quality fens with an abundance of crawfish burrows. Low numbers of HED at some Missouri sites and failure to observe adults may be due to predation pressure from *Hagenius brevistylus* and *Tachopteryx thoreyi*. HED and Clamp-tipped Emerald (*S. tenebrosa*) are sympatric at some sites and larvae of both species have been collected out of crawfish burrows. Based on initial genetic studies, introgression is apparently a problem between HED, *S. tenebrosa* and even Mocha Emerald (*S. linearis*). US Fish and Wildlife Service national wetland inventory maps have been successfully used in Missouri to identify potential new HED sites.

West Indian Odonata—Constraints and Opportunities—Dennis Paulson

The known Odonata fauna of the West Indies at present stands at 112 species. These species comprise many wide-ranging Neotropical species, a set of endemics (including five endemic genera), and a few visitors from North

America. Present-day biogeography indicates that the fauna reached the islands from either northern South America, the Yucatan Peninsula, or Florida, with subsequent endemics evolving from these invasions.

A proposal: Incorporating Odonates into Stream Bioassessments Using DNA Barcodes—Erik Pilgrim

Bioassessment/biomonitoring uses the species found in an ecosystem as a way to measure the health of that ecosystem. Current methods rely mainly on mayflies, stoneflies, and caddisflies as indicators for streams and rivers. Odonate larvae are also collected during sampling for bioassessment

but are not part of any bioassessment metric possibly due to the difficulty of identifying larvae to species. Recent advances using DNA barcoding for identifying odonate larvae to species could be utilized to incorporate odonate species into biomonitoring programs. In this talk I will outline how such work could begin. Then I would like to have some discussion with everyone if this kind of work sounds feasible and if so, how to go about such a project.

Somatochlora Phylogeny—T.E. Vogt, Meredith Mahoney, Everett Cashatt, and James Purdue

[no description]



Dragonfly Days 2009

Joshua S. Rose <opihi@rgv.rr.com>

Dragonfly Days 2008 was a memorable affair, with an entertaining array of talks and sightings of *Erythemis attala*, *Micrathyria didyma*, and *Rhionaeschna psilus*. It promised to be a hard act to follow. But the 2009 edition not only blew the seven previous incarnations of the festival away, it proved to be a literally historic occasion.

The excitement peaked early. On Friday 22 May, Bob Behrstock and Martin Reid were leading the pre-fest trek to Santa Ana National Wildlife Refuge, and came across a staggering collection of the normally very rare damselfly *Leptobasis melinogaster* (Cream-tipped Swampdamselfly). John Abbott and Greg Lasley were not far away and came to witness the spectacle for themselves. But the best was still to come; amid the 20-plus *L. melinogaster*, John noticed a few other damselflies, similar in shape but with a distinctive orange color. They turned out to be *Leptobasis vacillans* (Red-tipped Swampdamselfly), a first US record!

As if two species of *Leptobasis* were not exciting enough, the Friday morning trip also tallied *Idiataphe cubensis* (Metallic Pennant) and *Lestes tenuatus* (Blue-striped Spreadwing), two species who less than a year ago were documented in Texas for the first time.

The talks kicked off that evening with Bob's irreplaceable "Dragonflies 101" opening slide show. The next morning, Greg Lasley dazzled the crowd with his travelogue from South Africa, including a few birds and mammals among the exotic odonates.

Then the field trips continued, and kept on racking up the rarities. Two trips in the Weslaco area tallied south Texas specialties like *Orthemis discolor* (Carmine Skimmer) at Frontera Audubon and *Perithemis domitia* (Slough

Amberwing) at the Valley Nature Center. The Brownsville group ran into *Coryphaeschna adnexa* (Blue-faced Darner) on Torres Road and *Brachymesia herbida* (Tawny Pennant) at Resaca de la Palma State Park. All of that, though, paled by comparison to the results from Bentsen-Rio Grande Valley State Park, where the *Planiplax sanguiniventris* (Mexican Scarlet-tail) and *Tauriphila argo* (Arch-tipped Glider) that had been found by Martin Reid before the festival both continued their daily appearances! *Enallagma novaehispaniae* (Neotropical Bluet) also appeared at Bentsen, along with the customary *Neoerythromma cultellatum* (Caribbean Yellowface).

The action returned indoors for an overview of ecological communities and biodiversity along the entire length of the Rio Grande by legendary Texas naturalist Ro Wauer. After a break, everyone relocated to Estero Llano Grande State Park for the festival banquet, followed by John Abbott's keynote address, which set up with a fascinating account of the achievements and personalities of the major figures in the history of Texas odonate research, and then blew everyone away with sneak peeks at both John's upcoming field guide to Texas damselflies, and some unbelievable new capabilities coming soon to OdonataCentral! The next morning, Martin Reid followed up with a talk on the predators and prey of odonates that unveiled a sense of humor unsuspected by many fest participants.

After all of that, Sunday's field trips had a number of tough acts to follow. But follow they did! The Brownsville trip struck pay dirt in a big way, discovering an *Anax concolor* (Blue-spotted Comet Darner) hanging in the woods, and crossing paths with the weekend's only cruiser—a likely *Macromia annulata* (Bronzed River Cruiser), west of Brownsville along Torres Road. The day's


Bentsen trip contributed *Neoneura aaroni* (Coral-fronted Threadtail) amid the usual crowd of *N. amelia* (Amelia's Threadtail). Ro and Betty Wauer, taking a break from the fest's organized field trips, visited Santa Ana on their own and found a *Gynacantha mexicana* (Bar-sided Darner) for themselves.

The festival concluded with a talk by me as the outgoing Bentsen-RGV park biologist. I gave festival participants a rundown of the LRGV's best places to see the full variety of subtropical odonate species, for those who wanted to continue exploring after the festival was over.

All told, the festival's complete species list included 60 odonate species, 39 Anisoptera and 21 Zygoptera, of 9 families, including 4 aeshnids, 7 gomphids, 4 *Lestes*, and 6 *Argia* species.

And, just in case this year's participants thought they had seen it all, the day after the festival ended Martin Reid returned to Santa Ana NWR and documented the second US record of *Tramea abdominalis* (Vermilion Saddlebags)!

Many thanks are due to Jennifer Owen-White and Martin Hagne, and the staffs of Estero Llano Grande State Park and the Valley Nature Center for making it all happen. The speakers all gave excellent talks, most of all keynote speaker John Abbott. Thanks also to Tom Langscheid, John Yochum, and Kyle O'Haver who all helped lead a truly unforgettable set of field trips.

[Editor's note: As a Texas resident, I would personally like to thank Josh for all he has done to popularize and publicize odonates in Texas, especially the Lower Rio Grande Valley. He will be missed, but I trust he will make his way back to Texas now and then.] 

Ophiocordyceps odonatae—An Odonate-specific Fungal Pathogen

Jim Johnson, <jt_johnson@comcast.net>

I have a recollection of watching a nature television show as a kid—it might have been Nature. I think it was set in a west African rainforest, and one segment was about a fungus that infects ants. There was a clip of an ant crawling along the forest floor that was said to be inhaling fungus spores. The narrator explained that the spores “took root” in the ant's body and began to grow within. The ant was then shown climbing up the trunk of a small tree or shrub—an activity this species of ant never does normally, until it reached some height where it clamped its claws into the bark and died. The next segment showed fungal hyphae growing out of the ant's head to spread more spores and begin the process all over again.

Although the particular details of that television show escape me, the visual sequence of the ant climbing up a tree, dying, then birthing alien-like growths from the head is something that I've never forgotten. It came back to me most vividly during a visit to the Oregon State Arthropod Collection (OSAC) at Oregon State University this winter. Steve Valley and I were there to image some odonate specimens when Dr. Joey Spatafora, a professor of

botany and plant pathology at OSU, wandered in to visit. When he saw that we were working on odonates he said, “I've got something to show you.” He returned a minute later with a little specimen box which contained a dragonfly clinging to part of a small branch with numerous fungal hyphae sticking out of the thorax and from sutures between several of the abdominal segments.

I had never heard of a fungal pathogen which specializes on odonates, although I guess it shouldn't be surprising; at



A *Sympetrum* infected with *Ophiocordyceps odonatae* from Japan. Specimen courtesy of Dr. Joey Spatafora; photo courtesy of Steve Valley/Oregon State Arthropod Collection, Oregon State University.

any rate I was quite mesmerized with the notion. Dr. Spatafora explained that the fungus, *Cordyceps odonatae*, and its host were found in Japan. He suggested that we check out a web site devoted to these fungi, <<http://cordyceps.us/>> for more information. The infected odonate was missing its wings and the head was largely obliterated—presumably by the fungus, but it appeared to be a *Sympetrum* or some similar libellulid genus. I'm not familiar with the Asian odonate fauna, so I sent an image to Dennis Paulson who thought it was probably *Sympetrum infuscatum*. See the image included with this note, which was acquired on the OSAC imaging system.


Dr. Spatafora also explained that this fungus is not known from the New World although the American tropics are severely undersurveyed for such things. It seems quite likely that this or some related species of odonate-specific fungal pathogen is present. I'll certainly keep it in mind the next time I'm wandering through a jungle somewhere.

A visit to the <<http://cordyceps.us/>> web site reveals that the genus *Cordyceps* has recently been split into four genera, with *C. odonatae* placed in *Ophiocordyceps*. The site has a lot of information on these genera, including biology and systematics, but virtually nothing on *Ophiocordyceps odonatae* (and most other species) specifically. Most of these arthropod pathogens are restricted to a single host species or a set of closely related species, so it wouldn't be surprising to find fungal pathogens other than *O. odonatae* infecting odonates (especially in the New World), although it seems likely that they would be undescribed species.

I'm sure Dr. Spatafora would be happy to hear of additional cases of odonates infected with these fungi, par-

ticularly in the Americas, and I predict that he would be even happier to receive specimens (of fungus and host—preferably air-dried). He can be reached at <spatafoj@science.oregonstate.edu>.

Postscript: Shortly after I had written the above note, a photo taken by Steve Latta was forwarded to me via Fred Sibley and Dennis Paulson. This was of a dead *Gynacantha nervosa* (Twilight Darner) in the Dominican Republic with fungal hyphae growing from its thorax and abdomen, not unlike the *Sympetrum* I wrote about above. This individual was perching vertically (as is typical of most aeshnids) on a green stem of some plant, and its head and wings were largely intact. With Steve Latta's permission, I forwarded the image to Dr. Spatafora who was quite interested. I asked him to verify again that there are no known species of odonate-specific fungal pathogens in the Americas, which he confirmed with the caveat that surveys for these organisms in the Neotropics were conducted largely by two people around the turn of the twentieth century and their records have not been compiled into any form that makes it easy to peruse. At any rate, Dr. Spatafora doesn't know of any Neotropical records and this case from the Dominican Republic is very likely an undescribed species. Unfortunately, that specimen was not collected.

Post-postscript: Amazingly, Steve Latta got his hands on another *Gynacantha nervosa* infected by a fungal pathogen from the Dominican Republic. This likely undescribed fungus is now in the hands of Dr. Spatafora at OSU, but continue to keep your eyes open for fungal-infected odonates in the tropics since those infecting other odonates are likely undescribed as well. 

Six New Odonata State Records in Pennsylvania

Jeremy Deeds <JDeeds@paconserve.org>, Dan Bogar, Rick Koval, Jerry McWilliams and Clark Shiffer

Six species of Odonata have been discovered new to Pennsylvania in the last five years, bringing the total number of documented species in the state to 177. These additions to Pennsylvania's already impressive list of Odonata are important for the documentation and conservation of habitat for these extraordinary animals. The state list is maintained by the Pennsylvania Natural Heritage Program, with input from volunteer collectors and the Pennsylvania Biological Survey.

Enallagma anna (Williamson, 1900; River Bluet)—First collected by Clark Shiffer on 29 June 2006; Beaver Dam Meadow near Pine Swamp Road, Rothrock State Forest; Huntingdon County, PA: 41.7114° N, 077.8808° W. Six

males and one tandem pair were collected on this first observation date, and both male and female *Enallagma anna* were encountered at this site through 31 July 2006. The habitat in this location is a spring-fed boggy meadow, with the headwaters of Shaver Creek running through it. The population was found to still be there in June and July of both years 2007 and 2008, with most individuals encountered along the stream channel. The specimen is now in Clark's private collection.

Ischnura kellicotti (Williamson, 1898; Lilypad Forktail)—First collected by Rick Koval on 24 August 2004; Lily Lake; Luzerne County, PA; 41.1393° N, 076.0830° W. Several adults, both males and females, were collected from


the littoral area of this state-owned 160-acre glacial lake on this date. The southern side of the lake has a littoral zone that is vegetated with a variety of emergent and submergent aquatic plants species, including various sedges and rushes, wool-grass, water loosestrife, fragrant water lily, spatterdock, water-shield, grasses, bladderworts, waterweeds, duckweed, *Sphagnum* mosses, and shrubs. The first male *Ischnura kellicotti* was seen flying among water lilies (*Nymphaea* spp.) and water-shield (*Brasenia* spp.) in approximately 30 inches of water. At first glance, it was assumed to be one of the abundant *Enallagma geminatum* (Skimming Bluet); however, the abdominal tip of this particular damselfly was rested in a downward curled position. After capturing the damselfly and examining the abdominal appendages with a 10× magnification lens, Rick determined it to be *Ischnura kellicotti*. He immediately vouchered the specimen and continued to search for more. Several *I. kellicotti* were collected that day including: vivid black and blue colored males, powdery blue (pruinose) females, and vibrant orange juvenile females. Rick has also encountered *I. kellicotti* at two nearby ponds: Cranberry Pond, a small kettle bog with sections of open water and a small amount of spatterdock located ½ mile east of Lily Lake; and Mud Pond, a 30-acre glacial pond approximately 3 miles northeast of Lily Lake with suitable habitat and abundant aquatic vegetation. Rick deposited these *I. kellicotti* specimens in Clark Shiffer's private collection.

Ophiogomphus incurvatus (Carle, 1982; Appalachian Snaketail)—First collected by Dan Bogar on 19 June 2004; East Branch Codorus Creek, Spring Valley Park; York County, PA: 39.8425° N, 076.6492° W. In 2003, Steve Collins took a photograph of a dragonfly that was later identified as *Ophiogomphus incurvatus*. Unfortunately, no voucher specimen was collected at this time. Dan Bogar returned to the observation location, Spring Valley Park in York Co., PA, in June of 2004 in an attempt to voucher an *O. incurvatus* specimen. Dan was able to collect two male *O. incurvatus* between 9:30 and 11:00 AM. No other *O. incurvatus* were encountered at this time. The two specimens found by Dan were perched near the ground about 30 yards from the stream in a sparsely vegetated grassy opening. East Branch Codorus Creek is a small to medium-sized stream with a sand and gravel substrate in the Piedmont Uplands physiographic province. These 2 voucher specimens were deposited at the Carnegie Museum of Natural History.

Macromia taeniolata (Rambur, 1842; Royal River Cruiser)—First collected by Jeremy Deeds on 12 June 2008; Muddy Creek below Lake Arthur outlet, Moraine State Park; Butler County, PA: 40.9631° N, 080.1304° W. One mature *Macromia taeniolata* nymph was found on this date during a survey for Odonata nymphs using a ¾-

inch mesh dip net. This individual was found in a depositional area along the stream margins in a pocket of packed leaves and woody debris. The specimen was strikingly large for a nymph, about 1¼-inch long. Muddy Creek is 15–20 feet wide in this location, and is largely shaded by a dense forest canopy. The stream has a mixed substrate of boulders, cobblestones, gravel and sand, and is approximately 2 feet deep at the thalweg where this specimen was collected. The sampling site is downstream of a large impounded lake; there have been anecdotal reports of adult *M. taeniolata* sightings at the lakeshore, but this is the first confirmed collection of the species in Pennsylvania. Other nymphs collected from Muddy Creek on this day included *Cordulegaster maculata* (Twin-spotted Spiketail) and *Stylogomphus albistylus* (Eastern Least Clubtail). The specimen will be deposited at the Carnegie Museum of Natural History.

Ladona deplanata (Rambur, 1842; Blue Corporal)—First collected by Clark Shiffer on 4 June 2004; Ten Acre Pond, State Game Lands #176; Centre County, PA: 40.8008° N, 077.9444° W. In the years 2004 through 2007, Clark has observed *Ladona deplanata* males and females at Ten Acre Pond over a range of dates—from as early as 21 May to as late as 7 June. However, he did not encounter *L. deplanata* at this location at any time during the entire flight season of 2008. Jerry McWilliams found several *L. deplanata* males at McPhersen Lake, Nottingham Park, Chester County, PA (39.7375° N, 078.0469° W) on 7 May 2008, more than 100 miles away from Clark's Ten Acre Pond site in Centre County. The specimen is now in Clark's private collection.

Celithemis fasciata (Kirby, 1889; Banded Pennant)—First collected by Jerry McWilliams on 1 August 2005 at State Game Lands #179 (South Tract); Greene County, PA: 39.7593° N, 080.3429° W. Two *C. fasciata* males were collected on this date at approximately 3:00 PM as they were patrolling along a small pond. The weather was mostly clear that day, with temperatures around 85°F. The specimen is now held in Jerry's private collection. 

Results of the Dragonfly Society of the Americas 2009 Election

From Steve Valley, DSA Secretary

President Elect: Steve Hummel 42 votes
Regular Member: Greg Lasley 42 votes

There were no write in votes.

Malawi in February—Sure Beats New York

Nick and Ailsa Donnelly <tdonnelly@binghamton.edu>

We spent the month of February on our fourth trip to Africa. This time we visited Malawi, which lies between Uganda (trips in 2000 and 2002, the latter with Fred and Peg Sibley), and South Africa (2006, with John Abbott and Greg Lasley). We had previously found that the equatorial (Uganda) and temperate (South Africa) odonate faunas were very similar, so we could identify most of what we saw immediately.

We traveled on a John Heppner-led Lepidoptera expedition, but with fewer participants than in Peru the previous November. Whereas the Peruvian expedition took us to a single collecting locality fairly high in the Andes, this trip was a “movable feast” (the second word is stunningly inappropriate), covering essentially the southern half of this elongate, fairly small country. Malawi was formerly the British colony of Nyasaland, and it never really had much in the way of resources. Today it exports tobacco, mainly to Asia, and some tea, but it lacks the mineral resources and agricultural potential that have enriched other African countries. Thus it is the poorest and most densely populated African country. The people are very friendly but also ubiquitous, as you discover both when you drive down decrepit highways or creep through crowded villages. For the entire trip we were guided by Ray Murphy, a well-known Brit who has lived here donkey’s years, and who is an expert on Malawi insects, especially Lepidoptera. Ray’s ancient Toyota van served as our heavy lifter for the electrical generators, etc., which are an essential part of Lepidoptera collecting. Ray and his native assistant Sidney were delightful companions and got us out of many a tight spot.

Our modus operandi was to stay a few days at a lodge and walk from there to collecting spots. Some of the lodges were designed for high-end tourists and featured really good food. Others were “forestry lodges” which had once been residences of colonial forestry officials and were now available for rental by arrangement. For these we had to take our own food to be cooked by the personnel at the lodge. The food we bought along the road, and the quality of its preparation ranged from inspired to barely edible.

Like most African countries, Malawi is losing its forest fairly rapidly. We visited a few patches of rain forest (guess what: it rained!), and more extensive *Brachystegia* forest. This habitat is named for the dominant attractive leguminous tree which happens to be the fuel of choice for the natives, and one of the most constant sounds in these rather open forests is a constant “thunk thunk”,

which you quickly realize is the sound made by machetes as they cut the trees down. As we wandered, nets in hand, along dirt roads, one of the most constant sights was of women, mainly in pairs, each carrying a large branch on their heads. Although both pine and eucalyptus have been planted for fire wood, the natives recognize the superior properties of the native hard woods and cut it by choice. I wouldn’t be astonished if the last of these forests disappeared during my lifetime.

Our first locality was a rain forest remnant near Ntchisi, which is not far north of the capital Lilongwe, where we stayed in great comfort at a lodge (lacking in electricity but well equipped with hurricane lamps and solar heated hot water) run by a young couple from Europe—she is Danish and a talented cook, he is from the UK and can fix almost anything that breaks. The eponymous rain put a damper on our collecting, but it did introduce us to the most common forest damselfly in the country: *Chlorocnemis marshalli*. I had seen other species of this brightly colored (yellow wings; blue and black patterned body) damselfly in Uganda. It never really seemed to fit comfortably in its designated position among the protoneturids and has recently been proposed as belonging to the Platycnemididae.

From Ntchisi we drove down to the shores of Lake Malawi by way of a mud-infested hill on which we got stuck, possibly forever, until Ray saw a tiny, tottery tree on a distant bank and devised a winch which mercifully pulled us out of the mud and not the tree out of the ground. Lake Malawi used to be Lake Nyasa, and is famous for countless species of cichlid fish. Senga Bay was probably the most scenic of all our localities, and from our small personal lodge on the rocks we could look out over the lake at night and see the lights of hundreds of tiny fishing boats. I don’t know the taxonomic status of the fish we ate each evening, but they were delicious. Around our rocky lodge there were numerous monkeys (vervets and yellow baboons), against which we were advised to keep our door closed and locked at all times! We could sit on our veranda and watch these, along with the tame and slow moving rock hyraxes, which browsed on some sort of flowering plant in the rocks right in front of us. *Paragomphus nyassicus*, a very pretty, small, very clubby dragonfly with long cerci, lived around the lodge, appearing mainly on bushes or in the lower limbs of trees in the afternoon.

Most of our collecting was away from the main lake, where we could walk to somewhat open land (transla-

tion: deforested) with small ponds and brooks. There were lots of libellulid dragonflies in these ponds, with *Tramea basilare* being the most common. We also found many *Diplacodes luminans* (I learned this as *Philonomon* and am not yet used to its new generic assignment) and three species of *Crocothemis*. Here, and elsewhere on our trip, we found numerous species of *Trithemis* (five species in all) and *Orthetrum* (at least five species)—two of the most common genera of African libellulids. Even after the fine work of the late Elliot Pinhey, these dragonflies are still miserable to identify.

Around Senga Bay we were also treated to the common sight of the huge, high flying *Anax tristis*, which we saw once previously in South Africa. I finally caught this species, which rarely flew low enough to net. What a giant! Another common sight was a large yellow-marked *Phyllomacromia* which appeared from time to time along the dirt roads. It was the same thing we had seen in South Africa (as *bifasciata*) and caught in Uganda (as *nyanzana*). Now these species are united and given yet another name—*contumax*. My only specimen here was one found recently deceased next to the lodge swimming pool. Although macromiids are fairly common in central Africa, they seem to wander over land far more than their counterparts in North America. But with their green eyes and beautiful black with yellow markings, they are every bit as enticing.

Tourists do not go to Malawi to see the big game animals which attract so many visitors to other African countries. Having seen a wide variety previously in Uganda and South Africa, our list of “desired animals” was fairly short. After Senga Bay we drove south and stayed briefly in the only real animal park in the country (Liwonde National Park). We were informed by the guards at the gate that we must confine our activities to the immediate vicinity of the tourist lodge and could not wander around. This restricted space was fine for moth and butterfly trapping, but not very satisfying for dragonflies. Nick chaffed at this restriction and asked the lodge manager to assign one of his employees to walk several kilometers with him down to the Shire River to look for dragonflies. The “shore” of the river was simply where the walking in the long grass became wet, and where, remembering a similar experience in Uganda, I knew crocodiles tended to lurk. But the walk down to the river was memorable in that we strolled through herds of impala, water bucks, and kudus, and occasional wart hogs, all of which I had previously seen only from a vehicle. Walking through the herds was an experience I will not soon forget. Dragonflies? I don’t remember, but there were probably some.

Dissatisfied with the insect fauna of this lodge, we left

a day early and decided to spend the extra day at the Zomba Plateau, high above the colonial capital of Zomba. Although we had only a brief time, we spent it at a fish hatchery, which had a variety of aquatic habitats. It was an odonate treasure and brought us our first damselflies of the genus *Pseudagrion* for the trip. Although in both Uganda and South Africa this genus had been so conspicuous that we encountered them at our first localities, they did not appear in Malawi until the end of the second week! We only took six species ultimately in Malawi, but one was new for the country (*makabusiense*). This locality also featured damselflies of the genus *Proischnura*, which name Mike May recently revived for several African “*Enallagma*”. A thin gomphid, *Notogomphus praetorius*, was emerging in numbers, and Ailsa took a specimen of the libellulid *Ataconeura biordinata*. This was a nice, but brief, collecting interlude amid views to die for.

Our most comfortable stay, and one of the most rewarding odonate places, was at a tea plantation (Lujeri) at the south edge of the Mulanje massif in the southern part of the country. The rivers draining the massif passed through the plantation and had a few of the beautiful *Chlorocypha consueta*, which we had seen in Uganda. This red-abdomened, fat damselfly is one of the really beautiful African odonates. We also found, in a moth trap of all places, the small gomphid dragonfly *Nepogomphoides stublmanni*, which is a notable endemic of the rocky massifs of southern Malawi. This, like the *Paragomphus*, belong to a large Old World gomphid group usually referred to as the *Onychogomphus* group, notable for their long, curved cerci, and looking somewhat like the New World *Ophiogomphus* and *Erpetogomphus*.


After Lujeri, we made a brief visit to another forestry lodge on the edge of the massif, at Likhubula. This was not a great entomological success, but Ailsa found a mating pair of *Phyllomacromia monoceros*, which we had found previously in Uganda. As implied by the species name, males of this colorful species sport a prominent horn on the dorsum of their abdomen tip. We also got a fine, close look at a green mamba, a lovely and non-aggressive poisonous snake which likes to inhabit bushes, about chest height. And there were tons more *Chlorocnemis marshalli*.

As we headed back to Lilongwe and our planes to our various homes we had one more stop to make, a forestry lodge described as “around 10 km. off the highway”. Now anyone who has travelled in Malawi will know that this means an unpaved 10 km. of gigantic potholes, some filled with water from the rain and some full of mud, and a very narrow track with no shoulders. Due to circumstances beyond our control, after witnessing what started out to be a riot, and after encountering several police road blocks

which managed to fine us twice for various sins such as lacking reflecting tape on our rear bumper, we headed down what we hoped devoutly was the “road” we needed in the black dark. Since there is little electric power in Malawi once one is out in the countryside, there were no welcoming glimmers of light from local homes—if indeed there were any around. The road was as bad as we expected. We took the wrong fork at one point, and had to turn around, about which time Ailsa confessed to feeling carsick. We stopped so that she could take the front seat and Dan moved to the back, and we went on our way again. Several minutes later Dan said “Where is John?”, and indeed John was no longer with us. He had got out of the car in search of a convenient bush, and we had left him behind in the black dark in dense jungle. We turned around again (see description of “road” and “shoulders” above) and shot back down the road to rescue him.

We finally reached the lodge around 9, absolutely exhausted and thinking “Beer!!” as we had heard that the lodge had a bar. Well, it did. And when we got there we found around 20 happy and contented Peace Corps kids drinking every last drop of it, for their training college was in the same

compound and they love to party. This was to have been our last insect hunting location, but we had some time to kill at the end of the trip. Along the highway back to Lilongwe we stopped at a dull looking meadow with a slow stream. Here we found three species of *Pseudagrion*, which would have been a big yawn on any other African trip, and several interesting libellulid dragonflies. *Aethiothemis solitaria* is a small, fairly inconspicuous dragonfly looking like a small *Erythrodiplax*. There were also two of the nicely marked *Palpopleura*: the widespread *lucia* and the much less common *jucunda*, neatly filling the niche assigned in the New World to their close relative *Perithemis*.

On our very last day in the country we decided to mount a hasty trip to a forestry reserve just west of the capital. Dzalanyana is not particularly spectacular, but we did find a nice stream and forest. We spent much time unsuccessfully trying to net a *Phyllomacromia contumax*, which was patrolling the road. One of the butterfly people came over with his net bag clutched in his hand, saying, “I found this just flying in the woods.” You’ll never guess what he had netted! It is always nice to leave a country on an upbeat note. 

Peru in November—Not to Every Odonatist’s Taste

Nick and Ailsa Donnelly <tdonnelly@binghamton.edu>

Ailsa and I set off for Peru at the end of November, to meet a group of what Ailsa calls “the moth people” (sounds like extraterrestrials of some sort but they were in fact a dedicated group of lepidopterists) in Lima and then head up over the Andes to Pampa Hermosa, a lodge at the end of an impossible one-lane dirt track at about 3,500 ft. in the Andes foothills. Our leader was John Hepner, of the Florida State Collection of Arthropods and a leader of tropical collecting expeditions. We were there well into the rainy season, and, at an elevation of 1,200 meters, odonates were sparse, to say the least.

The trip to the lodge was somewhat arduous. Most of us had never driven quite this high (the summit crossing the Andes was in excess of 4,800 meters), and the cold temperatures and very thin air made for a subdued group. After an overnight in San Ramon we had to endure 23 kilometers of spectacularly bad mountain road to reach the lodge. We spent ten days there, which is of course on the Amazon drainage. It took two hours to drive those 23 km, which will give you a clue about the quality of that track. The high point was on the way out, when our three vehicles met the local minibús and someone—mercifully the minibús, not us—had to perch on the edge of the precipice and let the rest of us creep past on the inside.

Once at the end of the track and safely installed at the lodge—which is supervised by two scarlet macaws which fly free all day but return to snag fruit and French fries and even sips of beer when anyone is in the dining area, we found that in order to reach the local streams we had a considerable amount of hiking to do. These hikes were on narrow—very narrow, steep—very steep, slippery paths with huge drops on one side and dense, steep rock faces on the other side. And the streams were all of the waterfall persuasion. Our hosts told us that the paths were pre-Inca, and for all we knew they could have been right.


We returned to Lima with the fewest specimens we have ever collected, about 40 in all, and that is specimens, not species. Half of them were collected for us by the lepidopterists as they journeyed through the jungle. But we enjoyed every minute, the jungle was wonderfully varied, the lodge was comfortable and provided solar-heated water, beer was available, and our companions were interesting and fun. We took a grand total of thirteen species, mainly one of this and one of that. The most interesting and also the most common thing was a large *Polythore* which I finally figured out was the species *ornata*. At first I thought I was collecting two species—a large and a small. When I examined the series I found that

they were all in fact the same species. The most mature specimens were the largest, and the most juvenile were smaller. Evidently the biggest larvae emerged earlier and the runts stumbled along later. The streams had little else. On a few sunny days two species of *Argia*—*nigrrior* and *variegata*, appeared briefly. The *variegata* landed on the wet face of the falls and quickly developed a gray fuzzy appearance from crystallizing calcium carbonate in the saturated spray. The streams produced few other odonates: a few *Brechmorhoga vivax*, *Progomphus phyllochromus*, and *Cora irene*, and that's all.

As to the 40 bugs, I have finally seen and collected a *Gomphomacromia*. This strange little dragonfly loved to hover over the face of one particular waterfall, where the water seeped down over a rock face. They were almost impossible to focus on, with very long, thin abdomens. They visited the face of the falls infrequently and only when the sun fell on the falls just right. They flew like ghosts and stayed largely out of reach above us. I finally netted a few and found they were an undescribed species.

The lepidopterists had the time of their lives, mostly manning baited traps around the lodge. We discovered that lepidopterists go to extreme and even bizarre lengths devising really disgusting baits for their traps. This group specialized in very dead fish, with some rotted fruit and concoctions that do not bear discussing in a family newspaper. We could literally smell them before we rounded the corner of a jungle path. They were enchanted, of course, with the occasional *Megaloprepus coerulatus*, but

the world's largest damselfly tends to get everyone's attention as it "helicopters" though the forest.

And there is another "plus" for this trip. Ailsa, who suffers greatly from motion sickness as we travel around the world, has discovered the total cure for this ailment, unfortunately not available in any form in the US. Coca leaves, in the form of coca tea, which the locals use to prevent altitude sickness—it worked like a dream, cured her in five minutes as we drove over that 4800 meter pass enjoying the spectacular scenery. Pity we can't get this stuff in the United States! 

Free Odonata Boxes Available

We recently put all our Odonata into those elongate card board boxes that fit nicely in a upright cabinet. Unfortunately, we had to buy the minimum order and therefore we have lots of extras (without the smaller inside boxes). I can make these available to you or whomever wants them just for shipping costs. Please contact me if you are interested.

Dr. Boris C. Kondratieff
Colorado State University
Dept. of Bioagricultural Sci. and Pest Manag.
Fort Collins, Colorado 80523
E-mail: Boris.Kondratieff@Colostate.edu
Phone: 970-491-7314

A Larva Worth a Thousand Words: Imaging Preserved Dragonfly Nymphs Using a Digital Camera

Jessica L. Ware, Division of Invertebrate Zoology, American Museum of Natural History, 79th and Central Park West, New York, NY, 10024, USA <jware@amnh.org>; **Jerry Louton**, Department of Entomology, Smithsonian Institution, National Museum of Natural History, PO Box 37012, NHB MRC 105, Washington, DC 20013-7012

Adult dragonflies are a favorite subject of amateur and professional photographers alike. Although there are many images of adult dragonflies, dragonfly larvae are rarely photographed. A cursory examination of current web-based and printed literature reveals a dearth of high-quality photo-images of Odonata larvae. In fact, a thorough internet search of "Odonata" or "dragonfly" + "larva" or "nymph" returned, with exceptions, mostly poor-quality photographs. Problems with many larval images include poor cleaning, poor specimen positioning and bad photographic methods, all of which prevent most images from being used for identification purposes or in morphological study. We used some simple techniques to overcome

these difficulties during imaging of larval specimens at the National Museum of Natural History and American Museum of Natural History in connection with the production of Encyclopedia of Life Pages (eol.org).

Our goal was to produce a large number of useful images in a reasonable amount of time, rather than obtaining a small number of calendar-quality images. The amazing capability of digital photography has caused a trend in biological imaging toward photographs rather than line drawings with stippling for habitus illustration. Of course, much fine structure remains firmly within the domain of traditional biological illustrators. Still, high-quality web-



Figure 1. Image of *Cordulegaster obliqua* labial mask.

based digital images may be useful for larval identification, and to provide the public with images of an aspect of dragonfly life-history that is not as commonly encountered.

For each specimen, we took photos of dorsal and ventral full-body and dorsal of the labial mask. We used a basic “semi-professional” ten mega-pixel, digital, single-lens reflex (DSLR) camera mounted on an inexpensive copy stand. We used the on-camera popup flash unit with folded sheets of white bond paper as reflectors for softening shadows. Although a ring light and other flash units were available, the built-in flash worked well enough at close range with small f-stops. The lens we used was an inexpensive aftermarket zoom macro that was adequate because other quality-limiting factors (bubbles, debris, etc.) meant that the images would not approach the limits imposed by any lack of lens sharpness (all zoom lenses are less sharp at the focal length of any quality fixed focal length lens). The only special equipment that we used was a magnified right angle finder attached to the camera to prevent straining our necks when repeatedly looking in the camera. Because we used high-speed flash exposures, remote release was not necessary. The camera settings used were raw mode, f-stop 16 or 22, camera default ISO and flash synchronization speed. The duration of flash controlled the exposure and adjustments to lighten or darken the image were by exposure compensation settings. In general, we tried to use the simplest combination of methods possible to produce acceptable results at the highest rate.

Cleaning the larvae was not time-consuming, and it proved to be an important step in creating useful images. Most larvae had debris or algae covering them, despite having been in alcohol for, in some cases, decades. Larvae or exuviae were gently cleaned of any debris or fibers with camel-hair brushes. We attempted to raise any patches of hairs to make them more visible, taking care to ensure that fine hairs were not rubbed off accidentally.

A 600mm Petri dish bottom was almost filled with clear, colorless, commercial hand cleaner (Purell™), which is a highly-viscous but very transparent medium composed of mostly ethyl alcohol and glycerin. Specimens were transferred to the Petri dish, gently manipulated to the bottom of the solution and their legs were positioned in a lifelike pose. We avoided placing pressure on the specimen’s abdomen in order to prevent debris from shooting out of the rectum and clouding the Purell™ solution. Any bubbles and remaining debris were pushed aside using an insect pin or small paintbrush and a thin layer of 70% ethanol was gently poured over the surface to provide an even, non-reflective surface. The high viscosity of the alcohol-Purell™ solution allowed the specimens to stay in place and not float to the surface after positioning. We took photos of both the dorsal and ventral sides of each specimen. Often, clouding of the Purell™ solution occurred




Figure 2. Processed image of *Cordulegaster obliqua*.

when we handled the specimens to flip them over; if this occurred, we simply discarded the clouded solution, rinsed the Petri dish, and refilled it with Purell™. After photography, specimens were rinsed in alcohol and returned to vials.

Images produced this way still contained bubbles, some debris, unwanted shadows and the rim of the Petri dish. These artifacts were removed in post-processing by image editing software using “clone-stamping” and “fill” features. Images were then adjusted for brightness (in our case usually + 40) and contrast (brightness/2) and rotated as necessary to produce the final version. Original and processed images were saved as TIFF files at full image sensor format. Web-ready versions of the images are 1000 pixels wide and saved as high-resolution jpeg files. In order to provide some information about size, which would make the images more useful for identification purposes, we added a scale bar to the image. Examples of pre- and post-processed images are shown in Figures 1 and 2, respectively. Image files contain metadata fields that can be edited via

the “file-info” function in image processing software. We inserted the image creator (photographer’s name) and label data into these fields and the camera automatically inserted the date of file creation and camera settings. Barcode labels were inserted into the vials and photographed specimens from multiple-specimen vials were removed to individual vials and relabeled to produce unambiguous vouchers.

There are certainly many additional steps that could be added to this process to improve even further the quality of larval images. We found, however, that following this basic protocol resulted in a good number of images in a short period of time, and these pictures were suitable for identification purposes. In addition, several commonly used larval morphology characters, such as the length of the lateral spines, presence/absence of dorsal hooks, the shape of the prothoracic epaulets, and the position of the wing pads were clearly visible in the images, suggesting that these images may be a useful web-based morphological resource. 

Additional Comments About Odonata of Baja California Sur

Dennis Paulson, Seattle, Washington <dennispaulson@comcast.net>

Steve Mlodinow and I recently compiled a list of the Odonata recorded in Baja California Sur (BCS), Mexico (Paulson & Mlodinow, 2007), and I would like to put on record some modification of that list. Some of these species were included in the tabular list of state records of Mexican odonates published by González and Novelo (1996). Thanks to Enrique González for further information about some of them.

Archilestes grandis, Great Spreadwing. Numerous records from BCS in Calvert (1895) should be attributed to *A. californicus*, California Spreadwing. More recently, Enrique González (in litt.) informed me of a specimen in his collection with locality data not clear but certainly from BCS, collected 22 November 1991 by M. Jiménez and A. Trejo. Thus this is the first record for BCS.

Ischnura hastata, Citrine Forktail. Specimen in R.W. Garrison collection from Rancho San Enrique at km 51, 51 km E Villa Insurgentes, 1–4 October 1984, R.W. Garrison. First record for BCS.

Aeshna walkeri, Walker’s Darner. This species was listed (as *Aeshna constricta*) by Calvert (1895) from La Chuparosa. I cannot find that locality on maps or gazetteers, but the specimens were collected by Eisen in October 1893, and from the records of other species in the Calvert paper,

it appears that Eisen must have been only in BCS during that time. First record for BCS.

Libellula croceipennis, Neon Skimmer. An earlier record for BCS for this species is in the R.W. Garrison collection: 7 km W hwy 1 and 6 km S Loreto at km 114, 2 October 1984, R.W. Garrison.

Tramea lacerata, Black Saddlebags. Specimens in R.W. Garrison collection from 3 mi NE of San Antonio, 13 December 1977, L. Vincent; and Rancho San Enrique at km 51, 51 km E Villa Insurgentes, 1–4 October 1984, R.W. Garrison. First record for BCS.

Four of these species are additions to the Paulson and Mlodinow (2007) list, bringing the total species known from Baja California Sur to 55.

Problematical Records


Enallagma annexum, Northern Bluet. Listed from Baja California Sur by González and Novelo (1996), but probably in error, as the only record I can find is a specimen in R.W. Garrison collection from Cañon del Tajo, Sierra de Juarez, 1 April 1953, J. Powell. This is in the more northern state of Baja California.

Ischnura denticollis, Black-fronted Forktail. This species was listed from Baja California Sur by González and Novelo (1996), but the only record I can find is in Calvert (1895), where the species was reported from San Fernando, May 1899, C.D. Haines (as *Ischnura exstriata*). The only San Fernandos I can locate in Baja California are all in the more northern state of Baja California.

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Larval Tiger Beetles Eat Dragonflies

Dennis Paulson, Seattle, Washington <dennispaulson@comcast.net>

On 9 May 2009 at Red Slough Wildlife Management Area, McCurtain County, Oklahoma, I found two mature male Eastern Pondhawks (*Erythemis simplicicollis*) that had been captured by larval tiger beetles (*Cicindela* sp.). Larval burrows were common in the sandy ground, and the dragonfly had apparently landed right on top of one of them. The beetle had grabbed it in its sharp mandibles, in one case by the abdomen tip and in the other case by a wing. The abdomen of one was pulled into the 3-mm wide hole and was being chewed up when I pulled it out. The right forewing of the other was all the way into the hole, and the dragonfly clearly could not escape. I assume the tiger beetle would have eventually started chewing on the thorax of the second pondhawk.



This was the first time I had realized that a beetle larva could be a successful predator on adult dragonflies. Only

ground-perching species such as pondhawks would be vulnerable to this predation, but seeing two cases of it in a period of a few hours indicated that it may not be rare in certain circumstances. 

Akatombo, “Red Dragonflies”

Naoya Ishizawa, Tokorozawa City, Japan <sieba4318@rivo.mediatti.net>

You may know the song of Akatombo, “Red dragonflies”, which is sung at the ceremonies of symposiums of SIO and WDA. I found the English version of it in the site of YouTube, of which URL is <<http://www.youtube.com/watch?gl=JP&hl=ja&v=sVv7eCdDVHk>>.

Singer: Greg Irwin. piano: David Chester.

The dragonflies as red as sunset
Back when I was young
In twilight skies, there on her back I'd ride
Mountain fields in late November

Long ago it seems

Mulberry trees and treasures we would gather
Was it only just a dream?
Just fifteen she went away one day
Married then so young
Like a sister lost, I loved and missed her
Letters never seemed to come

In the poem, mountain fields is not correct, but hillside fields is correct. However, the former sounds harmonious. And the season, late November seems unsuitable. *Sympetrum frequens* perch often on tips of bamboo sticks until the middle of October, however, thereafter, they perch low on stones or bushes in the sun.

Now, *Sympetrum frequens* in the song can not be seen around the birthplace of the poet, Miki, Rofu. I visited the place in late November 2005. I did not sight any of the species but a few *Sympetrum darwinianum*. This may be due to the change of way of using pesticides. We human beings have been destroying the earth and lives of other living creatures are being endangered.

This winter, heavy drought attacked the southern region of Australia. More than two hundred lives were sadly lost. Probably the dragonfly fauna might have been damaged heavily there. I phoned the Australian Embassy to Japan to organize international fire-fighting team equipped with large flying boats. In Japan US-1, of which capacity is 15 tons of water, is available. The maintenance cost is not so expensive in comparison with the war cost of Iraq and Afghanistan. Probably, every year we will have heavy drought here and there in the world.

I think we must protect nature from global warming.



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Book Review: Dragonflies and Damselflies of the West. By Dennis Paulson, Princeton University Press, 2009. 535 pages, color, soft cover \$29.95. ISBN 978-0-691-12281-6

Reviewed by **T.W. Donnelly**

This attractive book will admirably serve the needs of an identification manual for odonates of the “West”, here defined as extending from Alaska and the Pacific states eastward to Nunavut, Manitoba, and the Dakotas, to Oklahoma and Texas, but excluding Mexico. The book begins, as do others of this sort, with a discussion of life history and anatomy, but including discussions of topics

often omitted from other guides, such as predators, vision, and flight mechanisms. This book exceeds other guides in the scope of such material. Even veteran odonatists will learn much from Dennis’s extensive observations.


Dennis does not use keys at any level, so the beginner will have to do considerable page turning to find the appro-

priate genus, or even family. However, the illustrations are so thorough and the text so clear that this should not be a difficult exercise. Genera with many species have an accompanying table of characters, which will assist in identification of individual species, but I found this the least attractive feature of the book.

The photographic illustrations are first rate, and the printing is attractive with what seem to me to be correct colors. Unlike other photographic guides, most species are shown in several photos, which helps give the reader an idea of the color variations that Dennis stresses repeatedly.

Dennis stresses the need for netting many specimens and urges collectors to have a good hand lens for examining details of the anatomy. In order for this guide to be completely useful, therefore, he includes numerous drawings of anatomical details. These have been prepared by Natalia

von Ellenrieder and Rosser Garrison, both known for their clear and accurate illustrations. In an age of increasing use of the camera and reluctance to take specimens (for some individuals, even to net specimens), he promotes the value of netting, and even preserving some specimens, and gives instructions for this procedure. He does not, however, give the important advice to convey the specimens ultimately to permanent collections, where their examinations may be very useful to future researchers. Having had the burden myself of identifying species from photographs, and marveling at the limited fraction of the images that can be identified positively in this way, I think Dennis's message is extremely important.

This book will be an essential guide for all western enthusiasts, and we look forward to its intended companion eastern guide. 


Book Review: Common Dragonflies of California. A Beginner's Pocket Guide

(2nd Edition). By Kathy Biggs, Azalea Creek Publishing, 2009, 128 pages (ISBN 978-0-9677934-6-7) 220 full-color photos. Still \$9.95. Available from <<http://www.sonic.net/dragonfly/>>.

Reviewed by **Rosser W. Garrison**

The present volume follows the success of the original first edition (2000) which was followed by a second printing (October, 2000). This handy (4 ½" × 5 ¾") paperback will be an easy-to-carry companion for all naturalists, entomologists and odonatologists who are interested in California's dragonflies. Most all of California's 113 species are briefly described and each is provided with a half-page color photo (most by photographer Ray Bruun) of the male and many have small illustrations of the female on the lower right-hand corner. Species are arranged by families followed by groupings according to overall predominant color (purple, red, orange, blue, etc.). All but one of the photographs are new and at about \$10.00 a copy, one will easily be able to afford the present volume which

numbers 128 pages compared to 98 in the first edition.

I heartily recommend purchase of this guide; it follows the success of the first and will continue to stimulate interest of our dragonfly fauna from the Pacific Coast. 

Is a 2,000 foot Dragonfly Coming to a Town Near You?

Check out this story that has been circulating on various news wires: <<http://bit.ly/LDLzZ>>.

ARGIA and BAO Submission Guidelines

Digital submissions of all materials (via e-mail or CD) are vastly preferred to hardcopy. If digital submissions are not possible, contact the Editor before sending anything. Material for ARGIA must be sent directly to John C. Abbott, Section of Integrative Biology, C0930, University of Texas, Austin TX, USA 78712, <jcabbott@mail.utexas.edu>; material for BAO must be sent to Ken Tennessen, P.O. Box 585, Wautoma, WI, USA 54982, <ktennessen@centurytel.net>.

Articles

All articles and notes are preferably submitted in Word or Rich Text Format, without any figures or tables, or their captions, embedded. Only minimal formatting to facilitate review is needed—single column with paragraph returns and bold/italic type where necessary. Include captions for all figures and tables in a separate document.

Begin the article with title, author name(s), and contact information (especially e-mail) with a line between each. The article or note should follow this information. Paragraphs should be separated by a line and the first line should not be indented. Where possible always refer to the scientific name of a species followed by its official common name in parentheses.

Figures

Submit figures individually as separate files, named so that each can be easily identified and matched with its caption. Requirements vary depending on the type of graphic.

Photographs and other complex (continuous tone) raster graphics should be submitted as TIFF (preferred) or JPEG files with a minimum of 300 ppi at the intended print size. If unsure about the final print size, keep in mind that over-sized graphics can be scaled down without loss of quality, but they cannot be scaled up without loss of quality. The printable area of a page of ARGIA or BAO is 6.5 × 9.0 inches, so no graphics will exceed these dimensions. Do not add any graphic features such as text, arrows, circles, etc. to photographs. If these are necessary, include a note to the Editor with the figure's caption, describing what is needed. The editorial staff will crop, scale, sample, and enhance photographs as deemed necessary and will add graphics requested by the author.

Charts, graphs, diagrams, and other vector graphics (e.g. computer-drawn maps) are best submitted in Illustrator format or EPS. If this is not possible, then submit as raster graphics (PNG or TIFF) with a minimum of 600 ppi at the intended print size. You may be asked to provide the raw data for charts and graphs if submitted graphics are deemed to be unsatisfactory. When charts and graphs are generated in Excel, please submit the Excel document with each chart or graph on a separate sheet and each sheet named appropriately (e.g. "Fig. 1", "Fig. 2", etc.)

Tables

Tables may be submitted as Word documents or Excel spreadsheets. If Excel is used, place each table on a separate sheet and name each sheet appropriately (e.g. "Table 1", "Table 2", etc.)

The Dragonfly Society Of The Americas

Business address: c/o John Abbott, Section of Integrative Biology, C0930, University of Texas, Austin TX, USA 78712

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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. Membership in DSA includes a subscription to 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.

Membership in the Dragonfly Society of the Americas

Membership in the DSA is open to any person in any country and includes a subscription to ARGIA. 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 for all who choose to receive ARGIA in PDF form are \$15. 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. Membership dues and BAO subscription fees should be mailed to Jerrell Daigle, 2067 Little River Lane, Tallahassee, FL, USA 32311. More information on joining DSA and subscribing to BAO may be found at <www.dragonflysocietyamericas.org/join>.

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Back cover: (upper) Rambur's Forktail (*Ischnura ramburii*) feeding on a female Cream-tipped Swampdamselfly (*Leptobasis melinogaster*) at Santa Ana National Wildlife Refuge in the Lower Rio Grande Valley of Texas on 22 May 2009. Photo by Greg Lasley, <www.greglasley.net>. **(lower)** *Perithemis domitia* (Slough Amberwing) at Cahuita National Park, Costa Rica on 4 May 2009. Photo by Jim Johnson, <odonata.bogfoot.net>.

