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25th Annual Meeting of the DSA in Northern Wisconsin

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The 25th annual meeting of the society was held during 13–15 June 2014 at the Rusk County Community Library (RCCL) in Ladysmith, Wisconsin. Add to that two days of pre-meeting trips near Eau Claire and three days of post-meeting trips near Woodruff and the group hit an impressive kaleidoscope of aquatic habitats during eight days through a sizeable swath of the forested landscape of northern Wisconsin. This area of the state is regionally recognized as being “clubtail heaven”, so the field trips were designed to showcase magnificent reaches of the Eau Claire, Chippewa, and Flambeau rivers.

The approximately 90 participants from 25 US states and one Canadian province could hardly have been disappointed by the weather (just two days of partial rain), the outstanding opportunities for collecting and photography, or by the clubtails themselves, with 24 species recorded in that family alone. Hopes were initially slim that two of Wisconsin’s gem snaketails, the Sioux Snaketail (*Ophiogomphus smithi*)

and St. Croix Snaketail (*O. susbechcha*), both relatively newly named to science and both with highly restricted ranges, could be seen at the same event because of differences in their flight periods. However, as luck would have it, with a later than average spring and thus later than average flight period of *O. susbechcha*, both species were observed and photographed.

Other habitats visited included smaller streams, peatlands, ponds, and lakes, each with its own suite of species. Biting insects had been promised to be in good supply, and that certainly proved to be the case, but folks were well prepared with bug spray and head nets, and nary a complaint was to be heard. When a fair-sized event comes to a small town, the intruders do not go unnoticed by the local populace. Many of us were welcomed with smiles and the friendly greeting “you must be with the dragonfly group” as we entered local businesses. The event received excellent media coverage, with two local newspapers giving front-page articles and the Associated Press picking us up for a short piece that was widely distributed. The recently established Wisconsin Dragonfly Society (WDS) held its 3rd annual meeting in conjunction with the DSA main meeting, which gave some newly-minted Wisconsin odonatists a wonderful opportunity to rub shoulders with seasoned experts from around North America!

This meeting was hosted by the WDS, and many of its members provided significant assistance. Ken Tennessen ably led the way with sustained help from steering committee members Bob DuBois, Denny Johnson, Joanne Kline, Ryan Chrouser, and Carey Chrouser. Bill Smith, Dan Jackson, Bob, Denny, Ken, and Ryan led field trips. We all appreciated the thoughtful assistance of Arlene Knops of the Greater Ladysmith Area Chamber of Commerce and Hollis Helmecki, Director of the RCCL. Arlene

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Female *Ophiogomphus smithi* (Sioux Snaketail), 12 June 2014. Photo by Ken Tennessen.

Calendar of Events

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

Event	Date	Location	Contact
DSA Central America	31 May–9 June 2015	Costa Rica	Marla Garrison <mgarrison@mchenry.edu>
2015 Annual DSA Meeting	late June 2015	Pennsylvania	Contact person to be determined

continued from previous page...

was extremely helpful during the planning phase and also provided about 100 packets of local information for our participants.

The formal DSA annual meeting was held on the morning of the 14 June in a conference room of the RCCL (the WDS annual meeting was held concurrently in an adjacent room). All participants received attractive folders with inserts that included the Business Meeting Agenda and Scientific Program, as well as abstracts of all the presentations. These materials were printed with funds provided by the Wisconsin Department of Natural Resources. The impressive artwork on the folders (and t-shirts) was done by Ken Tennessen.

The business meeting was chaired by President Elect Chris Hill, who did an admirably efficient job of keeping things on schedule. Arlene Knops gave an introductory welcome to start the meeting. Minutes of the business meeting follow this article (see pg. 5) in ARGIA. Two awards for outstanding service were presented at the end of the business meeting. Marion Dobbs was recognized for her outstanding contribution to the society in preparing websites for DSA meetings for the last three years. Wisconsin's Bill Smith (in whose honor *O. smithi* was named) received a well-deserved lifetime appreciation award—a framed photograph of a mating pair of *O. smithi*—from the WDS for his longtime contribution to odonatology in Wisconsin.

The afternoon of the 14th saw an impressive slate of 16 scientific presentations that covered topics in life history, migration, phylogeny, systematics and biology, and the landowner/odonate landscape. Many comments were heard about the overall strength of the scientific program. Presentation titles and abstracts are posted on OdonataCentral <<http://www.odonatacentral.org/index.php/PageAction.get/name/DSA2014Meeting>>. That evening a wonderful banquet was delivered by a local caterer (The Recipe Box, Bruce, Wisconsin) that made special efforts to ensure that a fine meal was enjoyed by all. The caterer went so far as to prepare several delicious gluten-free desserts for the few participants having that diet restriction. A silent auction organized by Joanne Kline netted \$1,426.25 for OdonataCentral, the website of the society. Wow!

The pre-meeting phase was held 11–12 June at Beaver Creek Nature Center near Fall Creek. Ami Thompson, an environmental educator from Minnesota who specializes in teaching about odonates, started off the morning with an attention-grabbing program for beginners. About 60 people attended the program, some of whom were folks from Wisconsin who had only recently gotten interested in Odonata. Being “beginner-friendly” was definitely a primary theme of the pre-meeting phase. The large group of

participants was split into a number of smaller groups for the field trips, which focused primarily on several sections of the Eau Claire River and its storied array of gomphids. Participants were treated to an abundant population of *O. smithi* and many folks were able to get nice photographs. Other sites visited included a number of state wildlife areas and county parks with small ponds, streams, or marshes, and one wet sedge meadow. A total of 53 species of odonates was recorded at these Eau Claire County sites.

During the main event, the large group of participants was split into a number of smaller groups for field trips on 13 and 15 June (except for the morning of the 15th when we were interrupted by one of the few periods of rain). One center of field trip activity was located to the west of Ladysmith near and northwest of the town of Bruce, where Bill Smith, Ken Tennessen, Ryan Chrouser, and Denny Johnson led trips. The area near where the Chippewa River crosses Hwy. 8 at Bruce is widely regarded as being one of the best river reaches for gomphids in the state. This area is home to the rare St. Croix Snaketail (*Ophiogomphus susbebecha*), which was seen by a number of participants despite its seasonally early flight period. Many of us were thoroughly impressed by clouds of Swift River Cruiser (*Macromia illinoensis illinoensis*) hawking over the river and mating and resting in clearings along it, at this site and further downstream. Virtually all of the anticipated gomphids were seen in some number, with Splendid Clubtail (*Gomphus lineatifrons*) appearing to be especially numerous this year, and the tiny and elusive Pygmy Snaketail (*Ophiogomphus howei*) there to thrill observers as they always seem to do.

Other trips to the northwest of Bruce in the Blue Hills region of Rusk County included beautiful spots at Audie and Perch lakes, with a diverse array of lentic species at these sites, and to Devil's Creek, where featured species included Riffle Snaketail (*O. carolus*) and the Twin-spotted Spiketail (*Cordulegaster maculata*). Bill Smith took small groups out in a work boat at the lakes and at the Chippewa River near the



Steve Hummel swinging a mean net in the Eau Claire River. Photo by Celeste Mazzacano.



Nancy McIntyre demonstrates the proper way to release a captured clubtail. Photo by Celeste Mazzacano.

confluence of the Flambeau River to bring folks to especially promising areas.

A 2nd center of main-event field activity was northeast of Ladysmith in the Flambeau River State Forest in Sawyer County, where Dan Jackson

and Bob DuBois led trips to sections of the North Fork and South Fork of the Flambeau River and to a marvelous peatland site appropriately named “Ken’s Fen” after its discoverer. Gomphids at both forks of the Flambeau were plentiful (as were the mosquitoes), with highlights being two species of *Hylogomphus* (*H. adelphus* [Mustached Clubtail] and *H. viridifrons* [Green-faced Clubtail]), as well as Rapids Clubtail (*Gomphus quadricolor*), Cobra Clubtail (*G. vastus*) and Skillet Clubtail (*G. ventricosus*).

Ken’s Fen proved to host a somewhat unexpected treasure trove of peatland species including the highly sought Ebony Boghaunter (*Williamsonia fletcheri*), five species of striped emerald (genus *Somatochlora*), and a number of specimens of the regionally rare Harlequin Darner (*Gomphaeschna furcillata*). Many of the more interesting species were found perched and sometimes mating around the periphery of the parking area and near an adjacent gravel pit, creating great photo opportunities for those fortunate enough to be “at the right place at the right time.” The serenity of a relaxed lunch break at the picturesque Connors Lake Park was briefly shattered when Dan Jackson netted yet another unexpected specimen of *G. furcillata*!

The post-meeting phase was headquartered out of Kemp Natural Resource Station southeast of Woodruff in Oneida County during 16–18 June. The setting at Kemp simply must be seen to be appreciated—it is located on a bluff of a peninsula of old-growth forest that juts out into Tomahawk Lake. About 50 people attended at least some part of the post-meeting event. On the evening of the 16th, Bob DuBois gave an Odonata program for the public which drew about 80 attendees, some of whom were with the DSA group. The Outreach Director at Kemp mentioned that it was one of the largest public attendances they had recorded at an outreach event. Field trips featured repeated visits to

Jyme Lake (pronounced Jimmy Lake), a beautiful small bog pond nestled in a hemlock forest setting just a short distance from the lodging and kitchen facilities. Delicate little Elfin Skimmers (*Nannothemis bella*) were abundant there (and at Wind Pudding Lake), thrilling all who watched them. Jyme Lake also has a population of Sphagnum Sprite (*Nehalennia gracilis*), which is uncommon in Wisconsin. Though tiny, delicate, and outnumbered about 50 to one by the much more common Sedge Sprite (*N. irene*), enough *N. gracilis* were seen to excite their human admirers. We were anxious to see Subarctic Bluet (*Coenagrion interrogatum*) there as well. We were initially disappointed by their absence during the late afternoon of the 15th and early morning of the following day, but by late morning many suddenly arrived from undisclosed locations. Jyme Lake was simply buzzing with odonate life. It was easy to spend hours there forgetting all worldly distractions.

Many other sites at the post-meeting venue are worthy of mention including Plum Creek in Vilas County, a storybook little forest stream that features the Boreal Snaketail (*Ophiogomphus colubrinus*) and Zebra Clubtail (*Stylurus scudderi*) among other notable species. Vilas County’s Lynx Lake, home to the Lake Emerald (*Somatochlora cingulata*), was visited by a small group on the last day. Although too early in the season for the adults of that species to be flying, the folks there were excited to sample for the large and strikingly patterned nymphs in water as deep as their waders would allow them to go. Participants also visited habitats at Clear Lake, Hemlock Lake, Tomahawk Lake, and the Wisconsin River below Rainbow Flowage (all in Oneida County).

In sum, it was an enjoyable, successful, and productive meeting. A number of new county records were set that will help the organizers of the Wisconsin Odonata Survey <<http://wiatri.net/inventory/odonata>> better understand statewide distributions and critical habitats for several species. Harlequin Darner (*Gomphaeschna furcillata*), previously known from just a few scattered sites in the state, was collected at two new sites and seen flying at a third, perhaps indicating that it is more widely distributed in the state than previously thought. During the eight day event, a grand total of 84 species was recorded (see below)—an impressive list indeed!

Acknowledgments

I thank Ryan Chrouser, Mark Donnelly, Dan Jackson, Cary Kerst, Bill Mauffray, Kurt Mead, Dennis Paulson, Bill Smith, Brenda Smith-Patten, and Ken Tennesen for sending me species lists from their field notes at various sites visited during the meeting.

Species list for the DSA 2014 meeting. Pr = pre-meeting;
Ma = main meeting; Po = post-meeting

Calopterygidae (Broad-winged Damsels)

Calopteryx aequabilis, River Jewelwing (Pr, Ma, Po)
C. maculata, Ebony Jewelwing (Pr, Ma, Po)

Lestidae (Spreadwings)

Lestes dryas, Emerald Spreadwing (Pr, Ma)
L. inaequalis, Elegant Spreadwing (Pr)
L. unguiculatus, Lyre-tipped Spreadwing (Pr)

Coenagrionidae (Pond Damsels)

Chromagrion conditum, Aurora Damsel (Pr, Po)
Coenagrion interrogatum, Subarctic Bluet (Po)
C. resolutum, Taiga Bluet (Pr, Ma, Po)
Enallagma annexum, Northern Bluet (Pr, Ma, Po)
E. boreale, Boreal Bluet (Pr, Ma, Po)
E. carunculatum, Tule Bluet (Pr)
E. civile, Familiar Bluet (Po)
E. ebrium, Marsh Bluet (Pr, Ma, Po)
E. exsulans, Stream Bluet (Pr)
E. hageni, Hagen's Bluet (Pr, Ma, Po)
E. signatum, Orange Bluet (Pr)
E. vernale, Vernal Bluet (Ma)
E. vesperum, Vesper Bluet (Po)
Ischnura verticalis, Eastern Forktail (Pr, Ma, Po)
Nehalennia gracilis, Sphagnum Sprite (Po)
N. irene, Sedge Sprite (Pr, Ma, Po)

Aeshnidae (Darners)

Aeshna canadensis, Canada Darner (Ma)
A. umbrosa, Shadow Darner (Ma)
A. verticalis, Green-striped darner (Ma)
Anax junius, Common Green Darner (Pr, Ma, Po)
Basiaeschna janata, Springtime Darner (Pr, Ma, Po)
Boyeria vinosa, Fawn Darner (Pr, Ma)
Gomphaeschna furcillata, Harlequin Darner (Ma)
Nasiaeschna pentacantha, Cyrano Darner (Ma)

Gomphidae (Clubtails)

Arigomphus cornutus, Horned Clubtail (Pr)
A. furcifer, Lilypad Clubtail (Pr, Ma)
Dromogomphus spinosus, Black-shouldered Spinyleg (Pr, Ma, Po)
Gomphus adelphus, Mustached Clubtail (Pr, Ma, Po)
G. exilis, Lancet Clubtail (Pr, Po)
G. fraternus, Midland Clubtail (Pr, Ma, Po)
G. lineatifrons, Splendid Clubtail (Pr, Ma, Po)
G. lividus, Ashy Clubtail (Pr, Ma, Po)
G. quadricolor, Rapids Clubtail (Pr, Ma)
G. spicatus, Dusky Clubtail (Pr, Ma, Po)
G. vastus, Cobra Clubtail (Ma, Po)

G. ventricosus, Skillet Clubtail (Pr, Ma)
G. viridifrons, Green-faced Clubtail (Pr, Ma)
Hagenius brevistylus, Dragonhunter (Pr, Ma, Po)
Ophiogomphus anomalus, Extra-striped Snaketail (Ma)
O. carolus, Riffle Snaketail (Ma)
O. colubrinus, Boreal Snaketail (Po)
O. howei, Pygmy Snaketail (Ma)
O. rupinsulensis, Rusty Snaketail (Pr, Ma, Po)
O. smithi, Sioux Snaketail (Pr, Ma)
O. susbehcha, St. Croix Snaketail (Ma)
Progomphus obscurus, Common Sanddragon (Pr)
Stylurus scudderii, Zebra Clubtail (Po)
S. spiniceps, Arrow Clubtail (Ma)

Cordulegastridae (Spiketails)

Cordulegaster maculata, Twin-spotted Spiketail (Pr, Ma, Po)
C. obliqua, Arrowhead Spiketail (Ma)

Macromiidae (Cruisers)

Didymops transversa, Stream Cruiser (Pr, Ma, Po)
Macromia illinoensis illinoensis, Swift River Cruiser (Pr, Ma, Po)

Corduliidae (Emeralds)

Cordulia shurtleffii, American Emerald (Pr, Ma, Po)
Dorocordulia libera, Racket-tailed Emerald (Pr, Ma, Po)
Epithecica canis, Beaverpond Baskettail (Pr, Ma, Po)
E. cynosura, Common Baskettail (Pr, Ma, Po)
E. princeps, Prince Baskettail (Ma, Po)
E. spinigera, Spiny Baskettail (Pr, Ma, Po)
Neurocordulia yamaskanensis, Stygian Shadowdragon (Pr, Ma)
Somatoclora cingulata, Lake Emerald (Po)
S. elongata, Ski-tipped Emerald (Ma)
S. forcipata, Forcinate Emerald (Ma)
S. franklini, Delicate Emerald (Ma)
S. kennedyi, Kennedy's Emerald (Ma)
S. minor, Ocellated Emerald (Pr, Ma)
Williamsonia fletcheri, Ebony Boghaunter (Ma)

Libellulidae (Skimmers)

Celithemis elisa, Calico Pennant (Ma, Po)
Ladona julia, Chalk-fronted Corporal (Pr, Ma, Po)
Leucorrhinia frigida, Frosted Whiteface (Pr, Ma, Po)
L. glacialis, Crimson-ringed Whiteface (Po)
L. hudsonica, Hudsonian Whiteface (Pr, Ma, Po)
L. intacta, Dot-tailed Whiteface (Pr, Ma, Po)
L. proxima, Belted Whiteface (Pr, Ma)
Libellula pulchella, Twelve-spotted Skimmer (Pr, Ma, Po)
L. quadrimaculata, Four-spotted Skimmer (Pr, Ma, Po)
Nannothemis bella, Elfin Skimmer (Po)
Plathemis lydia, Common Whitetail (Pr, Ma, Po)
Tramea carolina, Carolina Saddlebags (Po)
T. lacerata, Black Saddlebags (Po)





Attendees of the Business Meeting of the 2014 Annual Meeting of the DSA. Photo by Steve Valley

Minutes of the 2014 DSA Annual Meeting

Steve Valley, Secretary <svalley2@comcast.net>

The 2014 Annual Meeting of the DSA was held at the Ladysmith Public Library in Ladysmith, Rusk County, Wisconsin on 14 June. Ken Tennessen opened the meeting at 8:30 a.m. and welcomed all. He heralded our 25th year and continuing growth.

The Wisconsin Dragonfly Society met concurrently in an adjacent room. Their current president is Bob DuBois; President-elect is Dan Jackson.

The weather was rainy, leading Ken Tennessen to observe "Rainy nights an odonatologist delight, rainy day puts odonatologist away!"

Arlene Knops from Ladysmith Chamber of Commerce welcomed us and thanked us for coming. She offered five private properties along the Chippewa River for surveying. Alan Christianson from the Downtown Ladysmith Main Street Program welcomed us next and brought post cards from the Historical Society. Phil Regis of the Fine Arts Gallery and Center, told us that one of the gallery's 33 artists had painted a snaketail for us; ad for the gallery.

President Elect Chris Hill opened the business meeting. He thanked Ken Tennessen, Bob DuBois and other organizers. Noted it looked like a great scientific program and we welcome this. He kept his intro short and stressed keeping on schedule. Jerrell handed out buttons with Ken Tennessen's drawings of three dragonflies around the Wisconsin map.

Attendees introduced themselves:

Steve and Mary Jane Krotzer from Alabama.

Ann Cooper from Colorado.

Michael Thomas from Connecticut.

Jerrell Daigle, Buck Snelson, and Bill Mauffray from Florida.

Steve and Marcia Hummel from Iowa.

Yvette Liautaud, Kathy Kozacky, John and Cindy McKee, Joe Roti Roti, Laura Brown, Mark Donnelly, Veta Bonnewell, Paul Dacko, Negin Almassi, and Marla Garrison from Illinois.

George Smolka from Indiana.

Darrin O'Brien from Michigan.

Scott King, Curt Oien, Rachel MaKarrall, Mitchell Haag, Ron Lawrenz, Jeff Fischer, John Arthur, Pamela Deewood, Carl Bubnitz, Kurt Mead, and Jacki Morrison from Minnesota.

Tim Vogt from Missouri.

Karen Gaines from New Mexico.

Melissa Sanchez and Will Kuhn from New Jersey.

Ailsa and Nick Donnelly, Fred and Peggy Sibley, and Barlow Rhodes from New York.

Brenda Smith-Patten from Oklahoma.

Cary Kerst, Celeste Mazzacano, and Steve Valley from Oregon.

Mike May, Ken Lebo, and Dan Bogar from Pennsylvania.

Ginger and Charlie Brown from Rhode Island.

David Halstead from Saskatchewan, Canada.

Chris Hill from South Carolina.

Mike Dillon, Greg Lasley, John and Kendra Abbott, and Nancy McIntyre from Texas.

Bryan Pfeiffer and Mike Blust from Vermont.

Steve Roble from Virginia.

Dennis Paulson from Washington.

Ken Tennessen, Freda van den Brook, Denny Johnson, Sopia Koch, April Brooks, Pat McKearn, Margy Balwierz, Jennifer Callaghan, Caroljean Coventree, Ryan Chrouser, Dan Jackson, Joanne Kline, Bob DuBois and Bill Smith from Wisconsin.

Introduction of attending Executive Council members: Steve Valley, Bryan Pfeiffer, Steve Hummel, Jerrell Daigle, Celeste Mazzacano, Marla Garrison, and Michael May.

Introduction of attending Founding Members: Ken Tennessen, Steve Valley, Dennis Paulson, Jerrell Daigle, and Nick Donnelly.

Steve Valley moved to approve minutes of the 2013 Annual Meeting as published in *ARGIA* 26(1). Jerrell Daigle seconded and the motion passed unanimously.

Steve Valley talked about *ARGIA* being online and encouraged members to log on and download a copy that can then be printed. Election year is coming up and voting is now done online. There was not a good turnout for the last election and we would like to see an increase in the voting numbers. There is a presidentially-appointed nominating committee (can be anyone, not just EC) and Jim Johnson will let us know.

Jerrell Daigle gave the preliminary 2014 Treasurer's Report, we began 2014 year with a balance forward of \$23,652.59. Currently we have a membership of 289 people, 20 of whom have lifetime memberships. Dues collected as of 1 June 2014 equalled \$3,337.67. Expenses are: incorporation fee, \$61.25; a SE Regional Meeting expense, \$83.00; DSA award for Bill Smith, \$126.27; DSA meeting buttons, \$363.47; loan for the meeting t-shirts, \$1,182.23; 2014 Donnelly Travel Grant to Tim Vogt \$500; TACC Odonata Central computer storage space, \$1,032.00. Future expenses must be approved by two EC members other than the Treasurer. The Treasurer will be providing more detailed quarterly reports. He anticipated we will finish the year with about \$25,000 in the DSA account. Cindy McKee is performing an audit of the account.

Jerrell talked about future annual meeting proposals. Bryan Pfeiffer spoke of State College, Pennsylvania, 25–28 June 2015. There was a regional meeting there in 2005. *Rhionaeschna mutata* (Spatterdock Darner) and *Anax longipes* (Comet Darner) would be target species. Other species include *Tachopteryx* (Petalails), *Gomphus*

fraternus (Midland Clubtail), *G. rogersi* (Sable Clubtail), and potentially also *G. viridifrons* (Green-faced Clubtail), *G. abbreviatus* (Spine-crowned Clubtail), and *Calopteryx angustipennis* (Appalachian Jewelwing). He showed a picture of the last regional meeting in front of the Dragonfly Therapeutic Massage & Day Spa! There will be a pre- and post-meeting. Hal White has found close to 100 species at one pond. Betty Leppo is in the process of organizing the meeting. Dan Bogar discussed the area where the meeting will be, which has bogs, shale streams, and larger streams. Show of hands to agree that Pennsylvania will be next year's annual meeting indicated overwhelming approval.

Marla Garrison talked about the Central American Regional Meeting planned in Costa Rica in 2015 (see callout on pg. 12 of this issue for details and registration). There is room for 35 participants. We have booked with the Organization for Tropical Studies (OTS) for 31 May–8 June 2015. Dennis said it is a good time for gomphids. Will be at La Selva (well known) and Palo Verde (not surveyed, very different habitat). OTS has minimal accommodations at one site, and we have to go with guides. Permits will be expedited, but need to start six months in advance.

Future regional meetings: Nick Donnelly talked about the Binghamton, New York meeting in two weeks. His concerns with logistics were discussed; hoping for good weather and open rest rooms! It is a prime time for many species, expecting a very good meeting.

Jerrell Daigle talked about the 2015 SE meeting proposal from Steve Krotzer, Larry Everett, and Richard Connors, in eastern Tennessee (Erwin) on 24–26 July, with weeks before and after for back up. *Somatochlora elongata* (Ski-tipped Emerald), *Tachopteryx thoreyi* (Gray Petaltail), *Cordulegaster* (Spiketails), and *Macromia margarita* (Mountain River Cruiser) are target species. They are working on permits.

Steve Valley discussed the DSA Mission Statement proposed by the Executive Council: "The Dragonfly Society of the Americas advances the discovery, conservation and knowledge of Odonata through observation, collection, research, publication, and education." This was put up on the screen for all to mull over. Mary Jane Krotzer said add a comma, but Ken Tennessen said Needham says "if in doubt take it out". Richard Groover moved to accept as presented, Steve Krotzer seconded. The motion passed unanimously.

Bill Mauffray gave an update on the International Odonata Research Institute (IORI) in Gainesville Florida. He is the director of this institute, which was formed as a North American arm of the Societas Internationalis Odonatologica (SIO). It was supposed to be the library and official collection of that organization, but in the mid-

1990s there was a rift in SIO resulting in the foundation of the Worldwide Dragonfly Association (WDA). He single-handedly ran IORI, and he merged this collection with the Florida State Collection of Arthropods (FSCA) collection. It's the largest, best collection in the world, but he is working by himself. He went to the collection and agreed to help Minter Westfall at the time, and he needs help now and called for anyone interested. Nick Donnelly asked if the McGuire Center for Lepidoptera & Biodiversity has a relationship with IORI. It was proposed that they bring over the aquatic insect collection to the McGuire Center; because it is a quasi-state funded project (\$80 million) it may be done in about two years. The collection space will be ten times what it is right now and include a separate wing for odonates! Chris Hill mentioned that Bill hosted the SE meeting this year down there and participants got to view the amazing collection.

Celeste Mazzacano spoke on the editorial situation of ARGIA and thanked Jim Johnson for being proofreader. She was disappointed that not all hands went up when Steve Valley asked who had downloaded the last issue. Spoke of how she became a DSA member after attending a meeting and encouraged non-members to join because of benefits such as ARGIA, which comes out four times a year with reminders for submissions through e-mails and DSA Facebook. She thanked regular and sporadic contributors. It is not a peer-reviewed publication, and although it may be daunting when you see authors like Dennis Paulson, Ken Tennessen, and Nick Donnelly, this is a great venue for getting observations, range extensions, etc. out there. Think about submitting advice columns, trip reports, cool behaviors, etc. She has an open door, is easy to talk to, send her an e-mail. Next issue will be out on next Monday at the latest. George Smolka asked what the situation is with ARGIA citations. Celeste said she would do a citation scan and see how many articles in ARGIA are being cited in other papers. Nick said that when we set up the BAO we decided not to allow the introduction of new names....we have revised things with subspecies, but no one has proposed introducing new names. They used to go into the Zoological Record Database, but doesn't know if they still do. Cary Kerst said that those of us that have done books have cited ARGIA. Bryan Pfeiffer said NatureServe cites ARGIA regularly. Richard Groover said that you might need a callout to check dissertations.

John Abbott asked where BAO stands. Steve Hummel (BAO editor) said not exactly sure but that Jim has received a couple of articles from him. John Abbott asked how the interest level was—enough to sustain? Steve Roble asked how many submissions a year; Steve Hummel said about six, not all reviewed yet. Steve Valley acknowledged Celeste's exceptional work and the improvements she

has made, applause all around. Chris Hill mentioned the archived issues that John Abbott and Jim Johnson put online—check it out.

Checklist Committe: Dennis Paulson reported no new species and no name or taxonomic changes for last year. So different than other groups which are in tremendous flux; in odonates, taxonomy and names are pretty stable. Some changes in old world Zygoptera, but not New World, except that Protoneuridae is now Coenagrionidae.

OdonataCentral (OC): John Abbott introduced what it is and what it does. Mostly North American but would really like to see Latin American records. There have not been a lot of changes seen in the foreground of the OC webpage, but in the background there have been major changes. It was moved onto a new server and a lightning strike took it out in the spring, but now it should have less downtime. Thanks to Greg Lasley, vetting has been more organized and timely. The big change is re-done schema; the architecture behind the scenes was a 10 year old platform, and they've been working on moving everything into the new architecture over the last year and a half.

Celeste Mazzacano will discuss Migratory Dragonfly Partnership (MDP) and Pond Watch, which share the same data entry portal. OC will become a part of this schema, so a record submitted to OC will be available on the MDP site and vice versa. OC continues to grow, with over 2,600 registered users. Ken Tennessen said that to accomplish all of this takes some money, and money from the silent auctions, begun by Chris Hill as the annual meeting in South Carolina, supports OC. OC is hosted at University of Texas—Austin through the Texas Advanced Computing Center. We get 25% of a computer programmer's time and pay this with donations, silent auction, and our yearly DSA payment. Despite John Abbott's departure from UT, everything is still sound there.

John Abbott discussed designing a mobile app for record submission and talked about money, a major investment to do it right. Discussed with David Bell, who did eBird for over \$1 million, but thinks now it can be done for about \$400,000. Bell has an interest in dragonflies and this is an opportunity to take advantage of what he has already done, and he can create an odonate app for about \$6,000. MDP money is mostly federal and this has restrictions associated with it, and they are still searching for funds through the MDP. Celeste Mazzacano demonstrated what this app might look like. She said David Bell has been fairly aggressive pursuing this since he can take BirdLog and simply put in new taxa. Differences between bird data and dragonfly data was addressed at a meeting she attended. She showed BirdsEye NA app from her smartphone on the screen. We

were short on time so the demo was cut short. John Abbott called for show of interest in those of us who would be interested in using an app like this, with both identification and data submission in real time. Other possible benefits: Latin American users are using the bird apps extensively, so this might be an opportunity for OC to bring in and engage that demographic. It is an opportunity to submit real-time data which might bring more records in. We proposed that the Executive Council decide if DSA would be interested in matching funds. Ken Tennesen suggested putting it in ARGIA for discussion. Mike May added that fostering interest in Latin America is important; we could really make a difference in recognition and conservation of the fauna and we need involvement of the people down there given our limited ability to get there. The new phone technologies encourage young people to participate. Jerrell Daigle asked who is going to vet the Latin American records? Chris Hill ended the discussion with the comment that the subject will be discussed further by the Executive Council and John Abbott and reported back to the membership.

Award Presentation by Ken Tennesen to Marion Dobbs: For the last three to four years DSA has had luxury of a website for registration etc. for the annual meeting. Marion has taken it upon herself to develop these websites. Chris Hill and Dave Halstead can attest to what a large amount of time this takes. She stepped up and has really helped out the organizers of these meetings. Ken framed one of his drawings of a *Tramea lacerata* (Black Saddlebags) nymph as a thank-you gift. Marion was not there to receive it but will arrive for the post-meeting. Applause was shared.

Bob DuBois spoke of the new Wisconsin Dragonfly Society. They will be giving occasional awards for meritorious service and whenever they feel it is appropriate. The lifetime membership award was given to someone who is absolutely invaluable and a lifetime of service—he has been instrumental in discovery (two species of *Ophiogomphus* [snaketails]) and surveying, a great naturalist, way beyond just odonates and has done a tremendous amount of work in taxonomy. He mentored Bob and helps and cares for others. In recognition and appreciation, Bill Smith received a Lifetime Appreciation award, a framed photograph of *Ophiogomphus smithi* (Sioux Snaketail) *in copula*, taken and signed by Ken Tennesen. The EC of WDS all shook this hand.



Bill Smith receives a Lifetime Appreciation Award from the Wisconsin Dragonfly Society. Photo by Celeste Mazzacano.

New business:

Steve Valley thanked Ken Tennesen and his helpful meeting committee for a fantastic job in organizing the meeting.

Nick Donnelly asked if the DSA would consider circulating a membership list with contact information. John Abbott said that OC has the membership online, but nobody seems to opt in. Called for people to fill that in if they so wish.

Chris Hill adjourned the meeting.

Update added post-meeting

The Executive Council discussed the proposal from John Abbott and Celeste Mazzacano that DSA help fund the development of two odonate apps by David Bell (one app to input new records into the OdonataCentral database and the other to review previous entries in the database). These apps would allow members to access the database from handheld “smart” devices like cellphones and tablets. Each app would cost \$6,000 to develop for a total of \$12,000. There would be an additional \$2000 each for annual maintenance. The Executive Council voted to pledge \$3,000 that will be pooled with other contributions to finance the development of these apps, and \$500 annually toward maintenance.



Call for Papers for BAO

Bulletin of American Odonatology needs your manuscript submissions. Help us keep BAO the vehicle for timely reporting of research on Odonata of the New World. If you have questions about BAO guidelines, please see the last page of this issue of ARGIA or contact Steve Hummel, BAO Editor, at <mshummel@iowatelecom.net>.

Epitheca semiaquea (Mantled Baskettail) Confirmed for New Hampshire

Paul Bedell <ppedell@richmond.edu>

On 9 July 2014, while visiting relatives near Antrim in Hillsborough County, New Hampshire, I went to nearby Gregg Lake to look for dragonflies. While approaching the lake, I noticed a swarm of several dozen odonates just below the small dam spillway called White Birch Point and stopped to have a look. The swarm consisted almost entirely of *Epitheca princeps* (Prince Baskettail), but there were a few smaller individuals mixed in. Occasionally one would perch vertically and I could see extensive dark markings at the base of the hindwings, so I knew I had something of interest. After much effort, I managed to secure some photos (Figure 1), and netted specimens of one each of a male and female.

I sent the photos to Pam Hunt and to Nick Donnelly asking whether these were suggestive enough of *E. semiaquea* (Mantled Baskettail) to follow up on the specimens. I then mailed the specimens to Nick and he identified them as indeed *E. semiaquea*! Nick retained one specimen for his collection and sent the other to Pam. This species is considered a coastal species in the northeast (Paulson, 2011), so this location, well inland and at about 1000 ft. elevation, is atypical.

The New Hampshire Dragonfly Survey (Hunt, 2012) ran for five years from 2007–2011 and did not record Mantled Baskettail, but it was included on the state list based on three poorly documented older records with no voucher specimens available. Interestingly, all were also from locations in Hillsborough County (P. Hunt, pers. comm.). I am glad to have added something to the data on this difficult species.



Figure 1. *Epitheca semiaquea* (Mantled Baskettail) at Gregg Lake, Hillsborough County, New Hampshire. Photo by Paul Bedell.

The moral of this story is: Bring your net on family visits!

References

- Hunt, P.D. 2012. The New Hampshire dragonfly survey: a final report. Report to the New Hampshire Fish and Game Department. Audubon Society of New Hampshire, Concord. 49 pp.
- Paulson, D. 2011. Dragonflies and Damselflies of the East. Princeton University Press, Princeton, New Jersey. 538 pp.

Don't Forget to Renew Your DSA Membership for 2015!

Fall is almost here and it will be winter before you know it, so now is a good time to put a reminder in your calendar to renew your DSA membership for 2015. Annual dues are only \$15 USD, and include online access to all issues of ARGIA. Your membership fees help support the society, its meetings, and the critically important and useful website, OdonataCentral. To become a Sustaining Member, just add \$5 to your regular dues. For more information about DSA membership and to download a membership form, visit <http://www.odonatacentral.org/index.php/PageAction.get/name/DSA_Membership>.

Advice Column

Recent attendance at DSA meetings and new participants on Facebook pages suggest that there are a lot of newly-minted odonate enthusiasts out there who could benefit from the knowledge of more seasoned dragonfly hunters. If you have any words of wisdom about the many aspects of odonate life and life with odonates that you would like to pass on to your fellow enthusiasts, newcomers and experts alike, please don't hesitate to share! Send submissions for the Advice Column to the Editor at <celeste@xerces.org> and do your part to help make the world of odonates a better place.

The Reappearance of Black-winged Dragonlet (*Erythrodiplax funerea*) in Arizona

Douglas Danforth <dougofbis@yahoo.com> and Rich Bailowitz <raberg2@q.com>


After an absence of this species in Arizona of over 60 years, on 29 July 2014 Rich Bailowitz discovered several Black-winged Dragonlets (*Erythrodiplax funerea*) in shallow rain-filled swales on the Buenos Aires National Wildlife Refuge's Arivaca Cienega in Pima County, Arizona. A local store owner had reported to Bailowitz that the town experienced a four-inch rain the previous week.

Black-winged Dragonlet occurs commonly in seasonally filled coastal wetlands of southern Sonora in Mexico, from the Sinaloa border north to just west of the town of San Carlos (more than 250 miles south of the Arivaca Cienega in Arizona). They have been found sparingly inland to as high as 530 meters near the town of Tepoca. A single old Arizona record from July 1953 contains complete specific data and was taken in the vicinity of Sabino Canyon just outside of Tucson; several other Arizona reports with scant or sketchy data exist. At 850 meters, the 1953 record is significantly higher in elevation than any of the locations in Sonora. But the latest records from the Arivaca Cienega are higher yet, having been found at an altitude of 1,074 meters.

A single male was collected by Bailowitz on 29 July 2014 as a voucher. On 30 July, Danforth and fellow odonatist Pierre Deviche of Phoenix revisited the site and photographed six individuals. This is another example of the phenomenon of



Black-winged Dragonlet (*Erythrodiplax funerea*) at Arivaca Cienega, Pima County, Arizona, 30 July 2014.

multiple-individual influxes into Arizona from the south. There are no fewer than nine subtropical species that have now been recorded in Arizona in clusters. Oddly, with the exception of the two species invading this year, *Aphylla protracta* (Narrow-striped Forceptail; see article on pg. 11 of this issue) and *E. funerea*, for which we don't have subsequent follow-up data, none of these nine species has been able to establish itself in the state. 

Celithemis bertha (Red-veined Pennant), New for Virginia

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On 15 July 2014, I visited a nearby county park that has a several acre pond (Midlothian Mines in Chesterfield County, Virginia) with the idea of trying to use my Canon SX40 camera to photograph odonates in flight. The pond has a paved walk around it which is commonly used by local residents walking their dogs or jogging. There is a buffer of several feet around the edge which is unmowed, with some emergent grass plus woody vegetation such as alders around the pond edge. I expected to see only the typical species associated with a suburban pond.


While standing on the shore trying to photograph a *Tramea carolina* (Carolina Saddlebags), I noticed a small, unfamiliar, bright red dragonfly perched on some emergent grass about eight feet out from shore, and I was able to obtain some photos through the zoom lens. After a few minutes I went back to my car to retrieve a net, but when I returned the small dragonfly was gone. I submitted a photograph to

OdonataCentral (OC #424631) where it was confirmed as *Celithemis bertha* (Red-veined Pennant). Several attempts were made in the following days to confirm the sighting without success, but finally on 16 August, Steve Roble observed two males at the same location, and on 20 August he obtained a specimen. We have only observed males, and the high count so far is just two, so additional monitoring will need to be done to check for the presence of females and assess whether there is a sustained population. I was also surprised by the presence here of at least two male *Anax longipes* (Comet Darner), an uncommon and local species in Virginia, and my first observation for Chesterfield County.

This location is in the eastern Piedmont physiographic province of Virginia. In North Carolina, *C. bertha* is considered "rare in the northern half of the coastal plain and the extreme eastern Piedmont" (LeGrand and Corey, 2014). The nearest known location is in Granville County, North

Carolina, about 140 miles south-southwest of my observation. This record is the latest in a trend of southern species being discovered in Virginia, the most recent being *Gomphus hybridus* (Cocoa Clubtail), found during the 2013 DSA southeast regional meeting (Roble and Bedell, 2013). The Virginia state list of odonates is now at 195 and is creeping towards the 200 mark.

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- LeGrand, H. and E. Corey. 2014. The Dragonflies and Damselflies of North Carolina, Fifth Approximation. Available at <<http://www.dpr.ncparks.gov/odes/a/accounts.php>>. Accessed 14 July 2014.
- Roble, S. and P. Bedell. 2013. 2013 Southeast Regional Meeting Report, and a new species for Virginia! ARGIA 25(2): 4–6. 



Celithemis bertha (Red-veined Pennant) male, Chesterfield County, Virginia, 15 July 2014. Photo by Paul Bedell.

Narrow-striped Forceptail (*Aphylla protracta*) on the Increase in Arizona

Rich Bailowitz <raberg2@q.com> and Douglas Danforth <dougofbis@yahoo.com>

Although there had been tentative reports, confirmed forceptail records for Arizona were lacking until the summer of 2008. That year, on 16 and 22 July, Bob Behrstock of Hereford, Arizona visited the San Bernardino National Wildlife Refuge in Cochise County east of Douglas and recorded and photographed as many as two individuals of *Aphylla protracta* (Narrow-striped Forceptail). At least one individual remained at the Refuge through 31 July.

A. protracta is a large, common, subtropical species that occurs regularly in the Mexican state of Sonora as far north as the Rio Bavispe in the north-central portion of the state. It is sometimes found along slow-moving streams, especially those with a modicum of emergent vegetation, but is also common at small to mid-sized ponds. At these ponds, which are often mud-bottomed, it is nearly always the only gomphid present. *A. protracta* is also present in central and southern Texas, sometimes flying with its congener, *A. angustifolia* (Broad-striped Forceptail).

On 7 August 2012, a young visiting nature enthusiast documented another occurrence of *A. protracta* in Cochise County, Arizona along the San Pedro River, some 80 km west-northwest of Behrstock's records at San Bernardino National Wildlife Refuge. Most central stretches of this Arizona river are both scoured out and then mud- and sand-filled during the mid-summer monsoons. Although this scenario may not be productive to most odonates, for an expanding *A. protracta*'s mud-loving range, this may be exactly what is necessary.

The following year, on 18 August 2013, a single specimen of *A. protracta* was collected by Bailowitz at the Whitewater Draw Wildlife Area, just to the west-southwest of MacNeal, also in Cochise County. Very heavy rains during the previous six weeks had flooded the south end of this broad valley several times, leaving large shallow mud pools. Some shrubs, e.g., seep willows, had managed to hold on but the terrain was largely caked with mud. And here again was this single forceptail, perching and flying slowly along the edges of the ponds.

But most astounding is this year's phenomenon. Bailowitz has been doing a permitted odonate survey at a private pond owned by the mines and located near the town of



Narrow-striped Forceptail (*Aphylla protracta*), San Manuel Pond, Pinal County, Arizona, 25 July 2014. Photo by Rich Bailowitz.

Mammoth in Pinal County. This pond appears on maps as far back as the year 1935 and so is close to 80 years old (if not more) and is fed by artesian springs at a temperature of nearly 80°F. There are several impoundments in this complex but the largest appears to be mud-bottomed, fish-filled, and populated by, among other things, a thriving colony of *A. protracta*! On two visits in the latter half of July, more than 10 adults were seen around the circumference of the 2–3 acre pond. The 2013–2014 winter in southern Arizona was extremely mild with no killing frosts in Tucson (at my house in Tucson, the winter low was 30.5°F).

Three scenarios seem possible. The first scenario is that *A. protracta* has been making serious inroads northward or westward into Arizona during the past seven years. This



Narrow-striped Forceptail (*Aphylla protracta*), San Manuel Pond, Pinal County, Arizona, 25 July 2014. Photo by Rich Bailowitz.

would explain its discovery in the state during four of the past seven years, but would not explain its absence from other seemingly suitable and colonizeable mud-bottomed locations. A second and perhaps more likely scenario is that *A. protracta* has always been a wanderer but perhaps more so recently. But this year, due to the comparative lack of serious subfreezing temperatures, a female, or perhaps more than one, has succeeded in finding this pond at Mammoth with the right blend of vegetational components, temperature regimes, pond substrates, etc. to allow breeding to flourish. And a final scenario is that this pond, strategically, topographically, and climatologically located where it is, houses a permanent colony of *A. protracta*.

A number of stray dragonflies from the south have made appearances in Arizona, usually as singletons. But some tropically-linked odonates have reached southern Arizona in numbers, sometimes significant numbers. At least six individuals of *Micrathyria hagenii* (Thornbush Dasher) were confirmed in 2005 at two southern Arizona ponds; none has been seen since. In 2007, five specimens of *Micrathyria aequalis* (Spot-tailed Dasher) were discovered on a Tucson pond; none has been found since. And impressively, *Tramea insularis* (Antillean Saddlebags) was first reported in the state in 2005 and was regularly recorded (with as many as 30 individuals in a day) until 2011. However, there are no *T. insularis* records for the past three seasons.

Of course, we can only speculate as to what might occur with the present *Aphylla* population. Whether this colony continues to exist, perhaps even expand, or fizzles out as many of its predecessors have done remains to be seen.



Register Now for the 2015 DSA Central American Regional Meeting!

DSA will host its first-ever Central American Regional Meeting in Costa Rica from 31 May–9 June 2015. This is an eight day/nine night meeting in the land of Pseudostigmatidae, resplendent quetzels, and poison dart frogs. The meeting will involve field excursions through the Organization of Tropical Studies (OTS) at two of their field stations in different ecoregions: La Selva, in the Caribbean Lowlands of northern Costa Rica in an area of tropical and premontane wet forest; and Palo Verde, an area in northwestern Costa Rica with deciduous dry forest, and freshwater marshes and wetlands bordering the Tempisque River. Dennis Paulson will be our keynote speaker and main guide, and Ken Tennessen will also present and lead guided field excursions. Don't miss a rare opportunity to learn from an A-team of odonatologists (and two of DSA's "Founding Fathers"!) in a gorgeous tropical setting in one of the most biodiverse counties on Earth!

Seats are limited, so don't delay. Full details regarding the daily itinerary, costs, registration, and more can be found on the meeting web site at <<https://sites.google.com/site/2015dsacostarica/>>. You can also contact Marla Garrison at <mgarrison@mchenry.edu> with additional questions.

Gomphus lynnae (Columbia Clubtail), a New Species for Nevada

Douglas Danforth <dougofbis@yahoo.com>

I had just driven to the Owyhee River in Eastern Oregon to successfully see and photograph Columbia Clubtail (*Gomphus lynnae*) and afterward ended up staying overnight in Winnemucca, Nevada. While at the motel I perused Google Earth to see if there were some likely locations for this species in Nevada on my route to Reno. I decided I would try the Humboldt River below the dam of Rye Patch Reservoir in Pershing County. It was very accessible from a day use area and appeared to be good habitat. In just five minutes of looking on 29 June 2014, I spotted a large gomphid fly up and down a path and then land on the ground. I got my binoculars on it and determined it was *Gomphus lynnae*, but after a few steps toward it to get grass stems out of the way of the camera lens, it spooked.

I searched for another 30 minutes and finally spotted one on a sandy spot next to the river. I managed to get a distant photo of it before it flew off. I travelled back and forth in this general area again before seeing it alight in a large ash circle from a slash burn. There, although the background of charcoal bits was not the best background, I obtained diagnostic photos of the species. In trying to get a better sun angle, I



Gomphus lynnae (Columbia Clubtail) habitat on the Humboldt River below Rye Patch Dam, Pershing County, Nevada, 29 June 2014. Photo by Douglas Danforth.



Gomphus lynnae (Columbia Clubtail) feeding on Western Pondhawk (*Erythemis collocata*), 29 June 2014. Photo by Douglas Danforth.

spooked it and could not relocate it. About an hour later I decided to see if others were around, and as I was wading downstream I scared up a female Western Pondhawk (*Erythemis collocata*). Immediately a big gomphid grabbed her and flew up into a streamside tree. This turned out to be another *G. lynnae*! It proceeded to consume the pondhawk and I obtained good photos of this interesting interaction. I left it there to look for more but to no success.

The Humboldt River flows through extensive sagebrush hills much like the habitat found around the Owyhee River, although it has quite a few more riparian trees than the spot on the Owyhee at the Rome boat launch site. Later I searched two areas along the Truckee River above Pyramid Lake but was unable to turn up the clubtail.

This Nevada state record follows closely the discovery of the first Columbia Clubtail for New Mexico by Ken Tennessen in 2013.



Photo Submissions for ARGIA

If you would like to contribute a photo as a possible front or back cover “glamor shot” for ARGIA, please contact the Editor at <celeste@xerces.org>. Submitted photos may be saved for later issues. We need high-quality images in TIFF or JPEG format with a resolution of 300 ppi at about 6.5 inches in width; please check the resolution before sending. Photos can be sent as e-mail attachments (up to 15 Mb), via a file transfer service, or in GoogleDrive.

Odonate Diversity at an Acid Mine Drainage Remediation Site in Cambria County, Pennsylvania

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Acid mine drainage (AMD) poses a serious environmental problem in many areas of Pennsylvania, with thousands of miles of metal-contaminated streams occurring in the state. However, the construction of passive treatment systems to mitigate this mining waste not only serves to improve water quality, but creates valuable new wetland habitat for organisms in the process. From 2009 to 2014, we intermittently surveyed adult Odonata inhabiting such a location in south-central Pennsylvania that treats acidic discharge from an abandoned clay mine. Our goal was to better understand the biodiversity-enhancing benefits of acid mine drainage remediation and to contribute to the sparse record of odonate diversity and distribution in the Laurel Highlands region of the state.

The treatment site is located near Lilly, Pennsylvania in the Allegheny Mountains at an elevation of about 2300 feet above sea level (N 40.41933°, W 78.58257°). The treatment system, which was constructed in 1994, occupies only about an acre of land and is surrounded by forests on all sides. It consists of three shallow oxidation ponds and a fourth limestone-filled finishing pond, all vegetated with cattails (*Typha latifolia*) and connected by limestone channels (Figures 1, 2 and 2). As water passively flows downhill through



Figure 2. Bear Rock Run AMD remediation site, looking northwest. The 1st oxidation pond is visible in the foreground. Photo by Lane Loya.

the system, iron oxides are removed and the overall quality of the water improves. The remediated water eventually flows into Bear Rock Run, which is a small tributary of the Little Conemaugh River and part of the headwaters of the Ohio River Watershed.

We documented a total of 45 species of odonates (18 Zygoptera, 27 Anisoptera) in and around this small AMD-treatment site (Table 1). This number of species represents 62% of the 73 documented species inhabiting Cambria County and 25% of the 182 species inhabiting Pennsylvania, as listed on OdonataCentral (Abbott, J.C., 2006–2014). Eleven of those observed species were new Cambria County records, as reported in Table 1 (Abbott, J.C., 2006–2014). Additionally, we recorded 12 species at this site (Table 1) that we have not observed elsewhere during our surveys of odonates in Cambria County.

Of note at the site were 10 species of odonates that are of conservation interest in Pennsylvania (i.e., have a conservation status of less than “secure” in the state; Pennsylvania Natural Heritage Program, 2014). This list appears in Table 1 and includes *Libellula auripennis* (Golden-winged Skimmer) and *Anax longipes* (Comet Darner), which are listed as “critically-imperiled” in Pennsylvania, and *Rhionaeschna mutata* (Spatterdock Darner), which is listed as “imperiled” in the state. *A. longipes* was particularly common at the site, having been observed frequently in each year of the survey. We speculate that this species is breeding at the site because both males and females have been observed at the site, oviposition in the third treatment pond has been observed

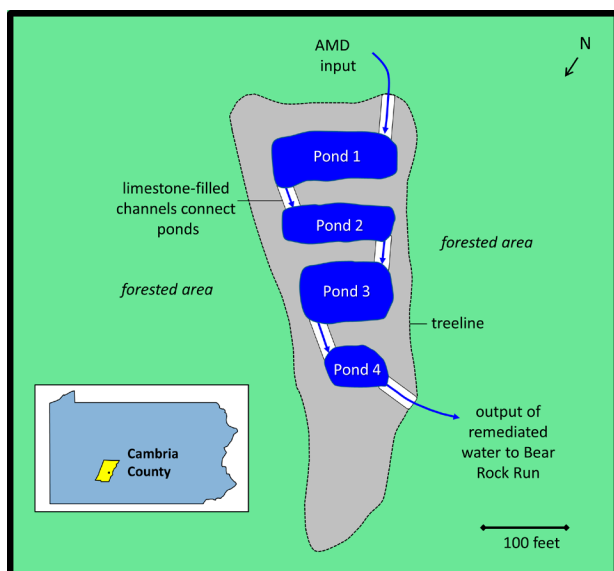


Figure 1. Schematic map of the Bear Rock Run acid mine drainage remediation site near Lilly, Pennsylvania. Arrows indicate the flow of water through the treatment system.

on a number of occasions, and larvae were collected from the third pond in 2011. Interestingly, the only other recorded observation of *A. longipes* in Cambria County (by PMH in 2010) was at another AMD passive treatment system located near the town of Dysart, Pennsylvania, approximately 12 miles away (N 40.58192°, W 78.58257°).

The surprisingly diverse odonate community at this location suggests that it has some unique ecological properties in comparison to other odonate habitats of similar size in the Cambria County area. Although the reasons are unclear, we provide three observations that likely contribute to the species richness of the site. First, forests enclose the site on all sides and mature trees are in very close proximity (i.e. a few yards) to the ponds. This can provide suitable habitat for odonates to avoid predators, perch to consume prey, or to shelter in unsuitable weather. Dragonflies have frequently been observed actively moving between the ponds and the trees at the site, so it is clear that some of the larger species such as the aeshnids make use of the forested surroundings. Second, no fish species appear to permanently reside in any of the four treatment ponds, which may promote the presence of those odonate species whose larvae are unable to coexist with insectivorous fish. Lastly, there are a variety of microhabitats available within the entirety of the treatment system, some of which may provide a good match for more specialist odonate species. The four main treatment ponds each differ slightly in size, pH levels, metal concentrations, substrate, depth and aquatic vegetation (ranging from sparse cattails in the top pond to more diverse plant species in the lower ponds). There is also flowing water in the channels between the ponds, and at the input and output locations, that varies in flow rate and chemistry. These many factors likely add to the site's overall habitat complexity.

In general, odonate diversity increased with increasing water quality of the ponds, with more species observed in ponds 3 and 4, which are cleaner and more vegetated. How-



Figure 3. The 3rd pond in the AMD treatment system. Photo by Lane Loya.



Figure 4. *Aeshna tuberculifera* (Black-tipped Darner) at the 3rd AMD remediation pond, August 2014., looking northwest. Photo by Lane Loya.

ever, some species, such as *Amphiagrion saucium* (Eastern Red Damsel), were associated with the more acidic habitats of ponds 1 and 2. Exploring the relationship between these microhabitats and odonate diversity is just one of the future projects that could be conducted at this odonate “hot spot”.

We should note that three species on the list in Table 1 were observed in close proximity of the site but not directly at the AMD treatment ponds. *Somatochlora tenebrosa* (Clamp-tipped Emerald) and *Cordulegaster diastatops* (Delta-spotted Spiketail) were observed at a small woodland seep approximately 500 yards west of the site, while *Lanthus parvulus* (Northern Pygmy Clubtail) was observed where the treatment system discharge flows into Bear Rock Run, about a third of a mile west of the site itself.

Overall, our survey results reinforce the positive effects of AMD remediation on biological diversity. The tremendous dragonfly and damselfly richness found at this site demonstrates that in addition to the primary goal of reducing mining pollution in our streams and rivers, the newly created wetlands can also serve as valuable reservoirs of odonate diversity. We encourage other odonatists to survey similar treatment systems and to support efforts to mitigate abandoned mine waste in their area.

Acknowledgements

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ogy Department, for their advice and collaboration on the project.

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Table 1. Species of Odonata observed at Bear Rock Run acid mine drainage remediation site, Cambria County, Pennsylvania, 2009–2014. ¹ Accepted species record submission and OC# at <www.odonatacentral.org>. ² Only species of conservation interest are noted. Others are considered Secure (S5) in Pennsylvania. S1 = Critically Imperiled, S2 = Imperiled, S3 = Vulnerable, S4 = Apparently Secure (uncommon but not rare), S5 = Secure.

Species (Common Name)	Cambria County, PA Record ¹	PA State Conservation Rank ²	Species unique to this site in Cambria Co.
Calopterygidae (Broad-winged Damselflies)			
<i>Calopteryx maculata</i> (Ebony Jewelwing)			
Lestidae (Spreadwings)			
<i>Lestes congener</i> (Spotted Spreadwing)			
<i>L. eurinus</i> (Amber-Winged Spreadwing)	● 320712	S3	
<i>L. rectangularis</i> (Slender Spreadwing)			
<i>L. vigilax</i> (Swamp Spreadwing)			
Coenagrionidae (Pond Damselflies)			
<i>Amphiagrion saucium</i> (Eastern Red Damselfly)			
<i>Argia fumipennis violacea</i> (Violet Dancer)			
<i>Chromagrion conditum</i> (Aurora Damselfly)			
<i>Enallagma annexum</i> (Northern Bluet)	● 320577	S3	
<i>E. aspersum</i> (Azure Bluet)		S3/S4	
<i>E. civile</i> (Familiar Bluet)			
<i>E. geminatum</i> (Skimming Bluet)			
<i>E. hageni</i> (Hagen's Bluet)			
<i>Ischnura hastata</i> (Citrine Forktail)			●
<i>I. posita</i> (Fragile Forktail)			
<i>I. verticalis</i> (Eastern Forktail)			
<i>Nehalennia gracilis</i> (Sphagnum Sprite)	● 320763		●
<i>N. irene</i> (Sedge Sprite)			●
Aeshnidae (Darners)			
<i>Aeshna canadensis</i> (Canada Darner)			
<i>A. tuberculifera</i> (Black-tipped Darner)		S3	●
<i>A. umbrosa</i> (Shadow Darner)			●
<i>A. verticalis</i> (Green-striped Darner)		S3/S4	
<i>Anax junius</i> (Common Green Darner)			
<i>A. longipes</i> (Comet Darner)	● 320576	S1/S2	
<i>Rhionaeschna mutata</i> (Spatterdock Darner)		S2	●
Gomphidae (Clubtails)			
<i>Arigomphus villosipes</i> (Unicorn Clubtail)			
<i>Gomphus exilis</i> (Lancet Clubtail)			
<i>Lanthus parvulus</i> (Northern Pygmy Clubtail)	● 425076	S3	●

Table 1, continued. Species of Odonata observed at Bear Rock Run acid mine drainage remediation site, Cambria County, Pennsylvania, 2009–2014.

Species (Common Name)	Cambria County, PA Record ¹	PA State Conservation Rank ²	Species unique to this site in Cambria Co.
Spiketails (Cordulegastridae)			
<i>Cordulegaster diastatops</i> (Delta-spotted Spiketail)			
Corduliidae (Emeralds)			
<i>Cordulia shurtleffii</i> (American Emerald)	● 320761	S3/S4	●
<i>Somatochlora tenebrosa</i> (Clamp-tipped Emerald)			●
Libellulidae (Skimmers)			
<i>Celithemis elisa</i> (Calico Pennant)			
<i>Epitheca cynosura</i> (Common Baskettail)			
<i>Erythemis simplicicollis</i> (Eastern Pondhawk)			
<i>Ladona julia</i> (Chalk-Fronted Corporal)	● 320711		●
<i>Leucorrhinia frigida</i> (Frosted Whiteface)	● 320760		
<i>L. intacta</i> (Dot-tailed Whiteface)			
<i>Libellula auripennis</i> (Golden-winged Skimmer)	● 425380	S1	●
<i>L. pulchella</i> (Twelve-spotted Skimmer)			
<i>L. semifasciata</i> (Painted Skimmer)	● 320713		
<i>Pachydiplax longipennis</i> (Blue Dasher)			
<i>Plathemis lydia</i> (Common Whitetail)			
<i>Sympetrum vicinum</i> (Autumn Meadowhawk)			
<i>Tramea carolina</i> (Carolina Saddlebags)	● 320762		●
<i>T. lacerata</i> (Black Saddlebags)			



First Record of the Seaside Dragonlet (*Erythrodiplax berenice*) for Oklahoma

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Soils in southwestern Oklahoma are characterized by high salinity, as are many of the creeks and pools, where water can be found (Achelle *et al.*, 1972; Koch, 1975). This environmental setting facilitates formation of saline marshes dominated by *Distichlis spicata* (saltgrass) and other salt-tolerant plants (Barber, 2008). One such marsh occupies an area of perhaps several hectares along a permanent tributary of Sandy Creek roughly six kilometers south of Eldorado (34°25'05"N, 99°38'20"W), Jackson County, Oklahoma. Habitat at this marsh intrigued us so that several years ago we predicted one day a Seaside Dragonlet (*Erythrodiplax berenice*) would occur there, if there was not already a small population at the marsh. In hindsight this prediction was overly bold, yet it bore fruit nonetheless when on 3 August 2014 MAP spotted a single adult male of the species perched on a low, shaded branch of *Tamarix gallica* (salt cedar), a branch mere centimeters above a mat of saltgrass. BS-P secured an identifiable photograph despite the extreme backlit conditions of the late after-

noon (OC #425536) before MAP netted the male. That male now resides in the Smith-Patten/Patten collection (SP1377; Figure 1) housed at the Oklahoma Biological Survey. This raised the Oklahoma state list to 165 species.



Figure 1. Male Seaside Dragonlet (*Erythrodiplax berenice*) collected in southwestern Oklahoma on 3 August 2014. Specimen SP1377 in Smith-Patten/Patten Collection.

We searched the marsh as best we could, although parts could not be accessed readily because of private property concerns, but we located no other dragonlets. Given the excessive heat (near 100°F) it may be that we missed additional individuals hidden in shaded locales. Hence, it will remain for future surveys to discover whether a small population occurs at this or a nearby salt marsh or whether the individual we discovered was a mere vagrant.

The question of vagrant vs. population also applies to some inland records for Texas, but those along the Pecos River in New Mexico and Texas are clear-cut records of a population in and around that drainage north to the Bottomless Lakes and Bitter Lake region of eastern New Mexico. It is unclear if increased salinity in the Pecos over the past few decades (Miyamoto *et al.*, 2008) encouraged the Seaside Dragonlet's range expansion inland, away from its more "normal" coastal range. This species is the only North American dragonfly considered truly marine, with strong associations with saline areas (Dunson, 1980; Paulson, 2009), including waters more saline than seawater, as along reaches of the Pecos River valley. Seaside Dragonlet was not discovered in New Mexico until three males and a teneral female were collected at Bottomless Lakes State Park, Chaves County, on 11 June 1974 (Dunkle, 1975). It may be that the species was overlooked until 1974, but it may also be that the species expanded its range in response to altered salinity. Saline wetlands are scattered throughout Texas and Oklahoma, especially in areas associated with gypsum- and salt-laden soils (gypsic, natric, and salic). Such soils may prove to be the key to inland distri-

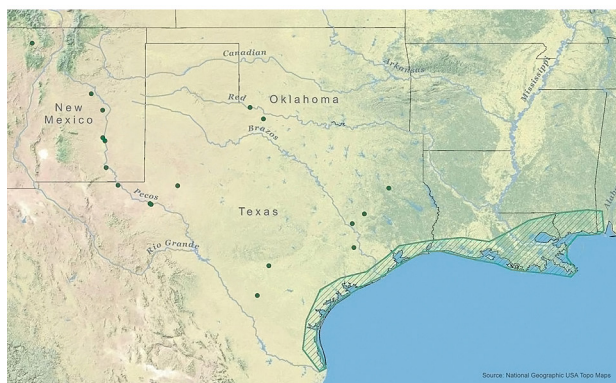


Figure 2. Inland records (green dots) of Seaside Dragonlet (*Erythrodiplax berenice*) west of the Mississippi River; cross-hatched area shows coastal range. Some localities are county centroids for records that do not have specific locality data associated. Data are from OdonataCentral <www.odonatacentral.org> and Abbott (2001, 2005).

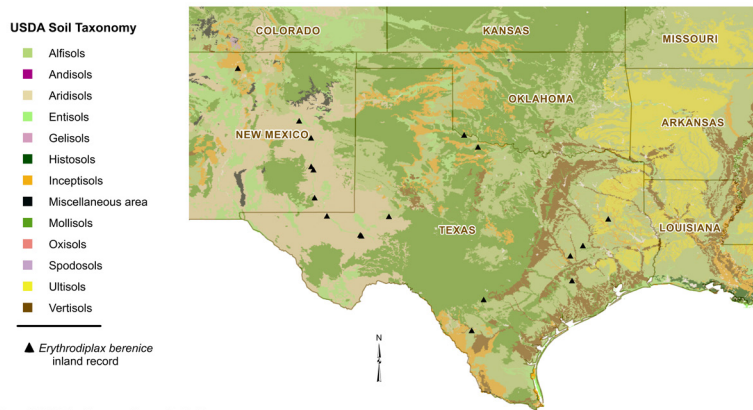


Figure 3. Dominant soil types and inland records of the Seaside Dragonlet (*Erythrodiplax berenice*) west of the Mississippi River. Note the correlation of the species' inland distribution to alfisols and aridisols; both are low leaching and tend to have high accumulations of salts, and are often associated with areas of salt grass (*Distichlis spicata*) marshes.

bution of *E. berenice* in the south-central US (Figure 3).

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An Intergeneric Gomphid Tandem

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On 12 June 2014, while talking dragonfly photography with Ken Lebo along the Eau Claire River in Wisconsin during the pre-meeting trip of the DSA annual meeting, I saw a tandem pair of dragonflies fly by. It appeared they were not flying smoothly like most tandem pairs do. Instead, the flight path was a bit herky-jerky. I suggested to Ken that it might be an interspecific pairing. We saw them land not too far from us on a sparsely vegetated sand bank and went over to inspect. What we saw was a male of *Ophiogomphus smithi* (Sioux Snaketail) with a female of *Gomphus quadricolor* (Rapids Clubtail) in tandem (Fig.1).

The male *O. smithi* was perched at an angle on the sand bank with a firm grasp, by all appearances, on the head of the female *G. quadricolor*. She was clinging tightly to a very short clump of grass. He attempted several times to pull the female forward, but she held on to the grass stems and did not curl her abdomen forward (her abdomen was straight to the rear). It appeared she was resisting his attempts, refusing to form the wheel position.




Figure 1. Tandem pair of *Ophiogomphus smithi* (Sioux Snaketail) male (upper) and *Gomphus quadricolor* (Rapids Clubtail) female (lower), Eau Claire River, Wisconsin, 12 June 2014. Photo by Ken Tennessen (Nikon D700, 105 mm Micro Nikkor, 1/250 sec., f/18, ISO 640, pop-up flash fired).



Figure 2. Close-up of tandem pair of *Ophiogomphus smithi* (Sioux Snaketail) male (upper) and *Gomphus quadricolor* (Rapids Clubtail) female (lower), Eau Claire River, Wisconsin, 12 June 2014. Photo by Ken Tennessen (Nikon D700, 105 mm Micro Nikkor, 1/160 sec., f/22, ISO 640, pop-up flash fired).

After taking a number of photographs, I left the pair to go photograph other dragonflies for a few minutes, but then returned to see how things were going with the intergeneric pair. They had shifted position to some taller grass, but the female was still not cooperating (Fig. 2). The male finally let go his grip on her head and feebly flew away. The female tried to fly, but she flopped over and was unable to orient herself. She appeared to me to be worn out, and I assume this was from the amount of energy she expended resisting the male. I neglected to stay long enough to see if she recovered and was able to fly—another lesson learned the hard way.

When Ken and I first saw the tandem pair fly, it was about 2:34 p.m. I took my last photo at 2:55 p.m. I don't know how long they were in tandem before they flew by us, but assuming the male had just taken hold of the female, they were in tandem for a little more than 20 min. It was clear that the male *O. smithi* had no problem holding onto the female *G. quadricolor* with his anal appendages (claspers). That the female was not cooperating indicates that she was able to somehow detect that this male was not her conspecific. An obvious mechanism would be the shape of his appendages, which are markedly different from the appendages of male *G. quadricolor*. This observation fits the tactile theory of reproductive isolation. 

One-and-a-Half Damselflies: An Example of Darner Predation

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Dragonflies and damselflies are subject to predation from a number of sources, including other dragonflies and damselflies. In this report I describe a situation, which I refer to as one-and-a-half damselflies, in which an intact female damselfly has the snipped-off abdomen of a male still attached to her body. This situation could be attributed to a bird attack, but the observations reported below show that an attack by a darner can be the cause—in fact, darner predation may be more common.

A Darner Attacks

The observations described here occurred at Cranberry Lake in Anacortes, Washington. It was a warm, sunny day in mid-July. As I walked along the shore I noticed a male California Darner (*Rhionaeschna californica*) on the ground—a favored perching location for this species.

After a few seconds, the darner took off and flew low over the water. When it was about 20 feet from shore it intercepted a prey item and a violent struggle ensued. I couldn't tell what the darner had snared, but it was rather large and putting up a good fight.

The darner was having trouble with its catch, but it maintained its grip. It flew slowly and awkwardly toward the shore, and approached some bushes where it looked like it might land to process its catch. The darner came close to me at this point, and I could see that it had caught a pair of damselflies in tandem. As I followed the darner's flight, it suddenly dropped something into a bush. The darner kept on flying, gaining speed and altitude as it flew more freely.

I quickly went to the bush and looked in the area where the object had been dropped. Immediately I saw the scene shown in Figure 1. The abdomen of this unfortunate male bluet was still twitching, so it took a few seconds to process the scene and realize that I was looking at one-and-a-half damselflies. Apparently the darner snipped off the abdomen of the male and made off with the thorax, a meal it could handle easily. The female bluet seemed unharmed, but was left with an attached male abdomen.

Even though the darner dropped most of its catch, it still had a favorable outcome. After all, the bluets in tandem

presented an attractive target that was both larger and less maneuverable than an individual bluet. This made the capture relatively easy. After biting off the abdomen of the male bluet, the darner was able to depart the scene with the thorax for a nice snack.

Conclusion

It is not uncommon to encounter examples of one-and-a-half damselflies in the bushes where dragonflies and damselflies are active. In the past I would chalk up a situation like this to a bird attack, though it would beg the question of why the bird didn't complete the attack, especially since the encumbered female damselfly would be easy prey. In the future I will consider the possibility that a darner is the responsible party, and with a little luck I may be able to see the entire process unfold again.

Acknowledgements

I would like to thank Betsy Walker for help with the observations.



Figure 1. The scene left behind after a darner attack on a pair of Tule Bluets (*Enallagma carunculatum*) in tandem. Photo by James Walker.

Ohio Adds New Dragonfly Species to List

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A number of the members of the DSA are familiar with the famed Cedar Bog Nature Preserve near Urbana in Champaign County in west-central Ohio. It preserves the highest diversity of rare flora in Ohio, along with a number of interesting Odonata and other animals. It is owned and operated by the Ohio History Connection, with day-to-day help of our support group, the Cedar Bog Association. While it has fantastic odonate diversity, this new discovery did not come from Cedar Bog.

Cedar Bog volunteer Jim Lemon recently started assisting another volunteer, Rob Liptak, with butterfly monitoring at Cedar Bog, which Rob established about five years ago. Both Rob and Jim have started expanding into dragonflies and damselflies as they walk the Cedar Bog property in a systematic fashion and Rob has become an active member of the Ohio Odonata Society (and is planning our annual meeting for 2015 centered at Cedar Bog).

Recently Jim got permission to survey lake shore areas on a nearby piece of private property. On 25 July 2014, he found a dragonfly he could not identify. Jim took several photos of it in the wild, then captured it and took several photos in hand before releasing it. The photos were sent to me to help with identification. While the initial photos were pretty good, I could not see all the features I wanted to, and could not come up with a match for any dragonfly I knew from Ohio.

I sent the photos to Dennis Paulson, who at once recognized it as a Swift Setwing (*Dythemis velox*). Dennis indicated that he believes this southern species seems to have

been expanding northward. I had seen this species once, back in 2001 at the Texas DSA meetings—and was embarrassed that I had not recognized it—but I guess I have not been traveling enough recently!



Swift Setwing (*Dythemis velox*), Champaign County, Ohio, 3 August 2014. Photo by Jim Lemon.

There are four species of setwings (genus *Dythemis*) in the US; the other three are southwestern in their distribution. The Swift Setwing reaches eastward in the southern states, reaching all the way to southern Virginia. The closest known populations to Ohio are in extreme southern Illinois and southwestern Indiana, more than 200 miles away from the Ohio site!

The setwings are an interesting group of dragonflies. They spend a lot of time perched, typically on the tip of branches and frequently with their wings angled down and forward and their abdomen slightly raised. Sid Dunkle and Dennis Paulson came up with their English name of “setwings” from this posture, which reminded them of a sprinter at a track meet on the blocks in the “ready, set, go” position.

Despite the excitement over a new dragonfly in Ohio, there is a bit of a mystery around the discovery of the Swift Setwing in Champaign County. Paulson describes their habitat as “Streams and rivers with slow to moderate current, less often ponds and lake shores. Usually wooded or shrubby banks.” (Paulson, 2011). The Ohio location is along a lake which has some shrubby areas, but mostly with mowed lawn surrounding it. The lakes (four of them) are all 40-plus year-old abandoned gravel pits which are spring fed from a coldwater aquifer that empties directly from the lakes into the Mad River. The Mad River is also spring-fed and is one of the few coldwater (i.e. trout) streams in Ohio. The shallow, gravel substrate of the lake shorelines drops off within four to 10 feet of the shore to a steep slope, with depths up to 40 feet. If this is a brand-new expansion of range for the Swift Setwing, would it not be more likely to first establish itself along its preferred habitat of streams and rivers?



Swift Setwing (*Dythemis velox*), Champaign County, Ohio, 25 July 2014. Photo by Jim Lemon.

I met with Jim and between us we have made several visits to the site. After his initial sighting and photos on 25 July, additional visits took place on 2, 3, 7, 9, and 16 August. On all of these visits we had never seen more than one male on one day, but two of the sightings were at least 200 yards away from the other sightings. We wondered if we were seeing a single male that was wandering a bit or multiple males with separate territories along the lake shore. Would it be likely for a single specimen to survive predation and storms over a period of two weeks? We doubted it, but we never saw a single female either. The other bit of evidence that made us wonder if there was not a population was that Jim's first photos were of a teneral individual with shimmering, wavy wings—not likely something brought north on a summer storm.

On 14 August, Jim and I hit the field again, starting with three stops along the Mad River itself, which showed other interesting Odonata, but no setwings. We also visited a commercial aquaculture site about four miles northeast of the lakes, known as Freshwater Farms of Ohio. They raise trout, shrimp, koi, and a variety of backyard pond plants to sell to the public, and we figured it might be possible that along with the shrimp, fathead minnows, or plants brought up from further south, perhaps they had accidentally introduced the Swift Setwing. Their ponds are also along the Mad River, and several are also spring fed. We ended the day there, and did not make an exhaustive search, but we saw no setwings.

Between our visits on 14 August to the Mad River and Freshwater Farms, we also returned to the gravel-pit lake-shores where Jim made his initial discovery. This time we had success! We saw five males in two different locations, three at one spot and two at the other. All the males were perching on twig tips on floating snags hung up in the shallow edges of the shore. They were in two separate but adjacent

lakes, separated by a tree-lined gravel drive and perhaps 100 yards apart.

I was able to wade in to the edge of the drop-off

and just barely reach one male with my net. As luck would have it, the tip of the branch and the Swift Setwing were in my net! That specimen will be deposited in the natural history collections of the Ohio History Connection (formerly Ohio Historical Society) in Columbus, and Jim's photo will be vetted by the Ohio Odonata Society's Photo Records Committee and become the first state record of the Swift Setwing in Ohio. Ohio has now officially recorded 164 species of Odonata.

Jim and I still wonder, did this population get established from introductions at Freshwater Farms? Are they a two or three season "flash in the pan" (or should that be "flash in the pond"?), or will they continue to thrive in these gravel-pit lakes? We plan to keep an eye on them and continue to explore other aquatic habitats nearby to see if they show up elsewhere.



Swift Setwing (*Dythemis velox*), Champaign County, Ohio, 3 August 2014. Photo by Jim Lemon.

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Odonates Are All Over Facebook!

Those of you who enjoy staying connected via social media will be happy to know that the number of odonate-specific Facebook Group pages is burgeoning. In addition to the DSA Facebook page, you can connect with fellow ode enthusiasts via FB groups with broad regional coverage, such as Western Odonata, Northeast Odonata, Southeastern Odes, and the Migratory Dragonfly Partnership, as well as more regionally-focused groups such as the Minnesota Dragonfly Society, Odonata Ohio, and the Wisconsin Dragonfly Society. Another FB group simply called Dragonflies has world-wide coverage and provides the opportunity to see species from Africa, Europe, and Thailand.

To find these groups, just type the name into the search bar at the top of your Facebook page. The discussions are lively, friendly, and highly educational! If I have missed any Facebook sites you would like to see included in further announcements, please let me know at <celeste@xerces.org>.

Dromogomphus spoliatus (Flag-tailed Spinyleg) Confirmed in Nebraska

Brian Peterson, Omaha, Nebraska <gordilly@gmail.com>

Dromogomphus spoliatus (Flag-tailed Spinyleg) is a species whose distribution seems to wrap around the southeast corner of the state of Nebraska, occurring in eastern Kansas, all of Missouri, and southern Iowa. Outlying records in western Kansas and northwest Iowa suggest that the range may be more extensive, or perhaps suggests a history of vagrancy to this amateur ode enthusiast. Fred Sibley has mentioned to me the possibility of Nebraska hosting this species, and on 3 August 2014 I collected a specimen.

On 26 July 2006, Fred collected a single exuvia at Mahoney State Park in Cass County, Nebraska (Sibley, pers. comm., 2014). It was found on the concrete boat ramp of a small fishing lake. Later keyed out to *Dromogomphus*, it was unfortunately misplaced before an expert could identify it to species. Fred has revisited the site on several subsequent years, but no further specimens have turned up. This park is situated along the Platte River, 50 miles northwest of the nearest *Dromogomphus* record in Atchison County, Missouri.

On 2 August 2014, I joined Fred and his wife at the Dodge County farmstead of Don and Janis Paseka. Fred and I went solo that first day, journeying 90 miles west to Hamilton County to check out the ponds on a restored prairie. It only took an hour or so to cover the area, so we stopped at various sites on the way back to Dodge County, picking up a county record here and there. We saw two *Pantala* on the day, a *P. flavescens* (Wandering Glider) at the prairie,

and later a *P. hymenaea* (Spot-winged Glider) along the Platte River in Platte County. Uncharacteristically for me, I managed to snag both of them with my net. I joked with Fred that I had my net set to “*Pantala*” and it was no problem catching them. In reality, I’ve always thought them difficult to catch. It’s been a good year for them in Nebraska, at least along the eastern counties adjacent to the Missouri River, so I’ve had some recent practice.

On the following morning, Don and Janis joined us for a tour of Dodge County sites. We started at Fremont Lakes State Recreation Area just west of Fremont, arriving around 11 am. This site is 80 miles northwest of Atchison Co., Missouri, and is a popular campground just off the Platte River, containing a number of sandpit lakes. We were hoping to pick up some county records like *Perithemis tenera* (Eastern Amberwing) or *Pantala flavescens* (Wandering Glider), and look for the resident population of *Enallagma traviatum* (Slender Bluet). Although sunny and fair, the temperature was still a bit below the setting of “broiling” it would reach several hours later, and not many odes were initially evident. Eventually Janis caught a *Perithemis*, but things were still slow and we were speculating in which direction Fred had wandered off.

Janis then reported that she thought she saw a *P. flavescens* fly by, and a minute later I saw a large yellow/orange/white dragonfly pass which I took for *Pantala*. Boasting again about my net being set to “*Pantala*”, I stationed myself at water’s edge, but for several minutes nothing seemed to be flying. As we were enjoying a bit of schadenfreude watching a nearby motorist trying to re-hitch his jet-ski trailer in the middle of the road, I glanced back to the water to see the same dragonfly coming straight at me, flying low towards the vegetation just to my left. I swung and twirled the net, unsure if I had captured it. As I pulled the net closer, I saw that I had connected and that the ode was a female clubtail.

Unsure of the identity, we retreated away from the water and rendezvoused with Fred. A few quick glances through field guide produced no close matches, so we speculated that it was a *Stylurus* (hanging clubtail) due to the lateness of the season. We failed to notice the large spines on the hind femur, and I decided to identify it later lest I accidentally drop it.

A short while later, I encountered a *P. flavescens* and managed to capture it, suggesting that the “*Pantala*” setting was still working correctly. I decided to quit at three



Dromogomphus spoliatus, Fremont Lakes State Recreation Area, Nebraska, 3 August 2014. Photo by Brian Peterson.

for three at that point, and ignored a couple of others encountered later. We visited several other locales that day, including a tiny stream that hosted a population of *Ariga plana* (Springwater Dancer), before returning to the Paseka home to wrap up the weekend.


At home later, using the keys in *Dragonflies of North America* (Needham *et al.*, 2014), my clubtail was quickly identified as a *Dromogomphus spoliatus* (Flag-tailed Spinyleg). It remains to be proven that a resident population is present along the lower Platte River. In both this case and Fred's exuvia, only a single specimen was observed, but I plan to be out looking again next year.

Acknowledgements

Thanks to Don and Janis Paseka for their hospitality in opening up their Dodge County farmstead for the Sibleys

and myself. As Fred mentions in his article on pg. 24 of this issue, the concluding brunch at the Paseka home was excellent.

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Notes from Wyoming and Nebraska 2014

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Wyoming

State borders are rather arbitrary and, one assumes, bear no relationship to odonate distribution. Numerous species found in western Nebraska are rare or unrecorded in Wyoming and one might assume this is from lack of collecting. George Sims reinforced this idea by assuring me there were tons of county records to be amassed and numerous opportunities to add state records. This year we took the bait and did some collecting in five Wyoming counties bordering western Nebraska. It was not the easy pickings predicted. You work for your odonates, even in the counties where there has been little previous collecting.

In hindsight, a comparison of Dot Map records for Wyoming vs. Nebraska would have warned us. In 2005, when the Dot Maps were published, Wyoming had an average of 27 species per county and Nebraska had an average of 8.5; Wyoming had zero counties with less than 10 records compared to 70% of Nebraska counties; and Wyoming had 19 species in half or more of the counties, and no Nebraska counties had as many as 19 species. Today, in 2014, after 10 years of survey work, Nebraska's figures are only slightly better than Wyoming.

Hindsight was too late. Fred Sibley and Barlow Rhodes made a fast exploratory trip 3-4 June 2014 prior to the Wisconsin DSA meeting, and Fred and Peggy Sibley made a more relaxed trip 23-26 July. We started in the south near Cheyenne (Laramie County) and worked

north through Fort Laramie (Goshen County), Guernsey (Platte County) and finally to the Black Hills, checking the Cheyenne River (Niobrara County) just south of there.

Despite numerous trips through Iowa on the way to Nebraska, we are still startled by the rapid change in dragonfly habitat when we cross the Missouri. The habitat change is even more marked in the transition to Wyoming. Almost immediately one is tempted to curse George Sims, but maybe he was right and we're just incompetent collectors.

The dragonfly habitat is different—few if any borrow pits and actually very few places for dragonflies despite this being the wettest year in a decade. Streams, marshes, and ponds when found are often permanent rather than seasonal. The reverse is true in Nebraska. We only visited five counties bordering western Nebraska so this is the blind man being expert.

Jerrell Daigle always enlivens his articles with dining digressions but I can't match his reviews. I would just ask him to check out Crazy Tony's in Guernsey, Wyoming some time. Seemingly the most popular restaurant in town, it may now hand out gift fly swatters.

Despite my bitching there are a lot of delightful collecting sites in the state and we had a wonderful time. The trip list was 40 species (half the state list) with 30 county records, including two new for Wyoming.

New to the State

Lestes australis (Southern Spreadwing) was fairly common on 3 June at a marshy area along Horse Creek near Hawk Springs State Park, Goshen County; and on 4 June at a cattle pond east of Manville, Niobrara County.

Epithecina cynosura (Common Baskettail) were spaced out on territory every 30 feet or so along the Fish Ponds, Guernsey, Platte County on 4 June.

Noteworthy County Records

Argia apicalis (Blue-fronted Dancer): Uncommon on 26 July on the Cheyenne River, Niobrara County. Previously recorded from Crook County in northeast.

Argia moesta (Powdered Dancer): Common on 25 July on the Laramie River, Platte County and 26 July on the Cheyenne River, Niobrara County. Previously recorded from Crook County in northeast.

Enallagma antennatum (Rainbow Bluet): Several on 26 July on the Cheyenne River, Niobrara County. Previously recorded from Campbell and Crook Counties in the northeast.

Libellula luctuosa (Widow Skimmer): Common at Fish Ponds in Guernsey, Platte County and seen but not caught along the Laramie River, Goshen County. Previously recorded from Carbon County. Probably more widespread than the two county records would indicate but not a species most collectors would target. Except for the Fish Ponds sightings we only saw very nervous single individuals that vanished at the sight of a net. The same remarks apply to *Plathemis lydia* (Common Whitetail), with only five county records, two of which are from this trip.

Plathemis subornata (Desert Whitetail): Very common on 3 June along Horse Creek near Hawk Springs State Park. Previously recorded from Platte County.

Tramea lacerata (Black Saddlebags): This would have been a new state record and was a species near top of our list. One flew around a marshy pond on 23 July just northwest of Curt Gowdy State Park, Laramie County for a short period, but we had no chance to swing at it.

Nebraska

The two trips this year were more to tie up loose odds and ends, revisit some favorite areas, and become more familiar with the early and late seasons odonates of Nebraska

than to pile up county records.

Argia nahuana (Apache Dancer): Several found on 29 July at Facus Springs, nine miles west of Bridgeport, Morrill County. This is slightly further west and north than any previous record.

Epithecina designatus (Eastern Ringtail): A single individual below the Red Willow Dam, Red Willow County on 21 July represents the 4th county record and most northerly record in Nebraska.

Epithecina cynosura (Common Baskettail): The spring trip from June 6–11 hit emergence time and we captured this species in nine counties.

Sympetrum internum (Cherry-faced Meadowhawk): A number of teneral individuals were found on 1 June (an exceptionally early date) at Red Willow Diversion Dam, seven miles west-northwest of Indianola, Red Willow County, at the base of a dam in a small pool evidently maintained by ground water level.

Tramea onusta (Red Saddlebags): It was a good year for this species, which was almost as abundant as *T. lacerata*. Unfortunately we only visited four counties where it was needed as a county record.

Rhionaeschna californica (California Darner): A new Nebraska species for Fred, found on 5 June at a small spring-fed lake on Gilbert-Baker Wildlife Area north of Harrison in Sioux County. The species has rarely been recorded in the state but this pond is evidently a reliable early season site. There was a late spring in 2013 and we missed it in early June of that year. Fred thanks Matt Brust and Steve Spomer for documenting the species at the pond a week or so later. In 2013, Brian Peterson and Fred checked Hot Springs, South Dakota on 3 June and found only *R. californica*. On a return visit on 6 June the *R. californica* were slightly outnumbered by *R. multicolor* (Blue-eyed Darner). I expect the same thing happens at Gilbert-Baker, as *R. multicolor* was abundant in late July of 2013.

Counties checked as they seemed undercollected

Gosper County turned out to be limited in habitat, not collecting effort, but Fred did manage to fall and crack a rib. Give the Gosper County reservoirs a pass.

McPherson County was a welcome contrast. After 26 miles of one to one-and-a-half lane sand roads we ended up at Birdwater Creek, a crystal-clear rushing stream surrounded by endless sandhills. Six stream species were

added to the county list despite the lateness of the season (31 July).


Hamilton County turned out to be another county whose list was severely limited by available habitat. But we spent some quality time on a huge area of restored prairie thanks to Prairie Plains Resource Institute in Aurora. The same organization also has a large prairie in Sioux County along the Niobrara River. Odonates are just not prairie animals, although the river portion of that prairie has potential for *Somatochlora ensigera* (Plains Emerald).

Tracking Dwight Moody

In 1967, Dwight Moody turned in a masters thesis at Chadron State College titled "A Study of the Odonata in Northwestern Nebraska". This contained numerous records of Anisoptera from Sioux, Dawes, and Sheridan Counties that were subsequently used in the Dot Map Project. On a previous trip Fred had tried to track the original specimens with limited success. On the spring 2014 trip, Matt Brust and Randy Lawton helped us go through the collection, and in a back corner of a drawer we found a cigar box labeled Dwight Moore with a mass of enveloped specimens. After sorting and curating these at home, the box was found to contain all but one of the 1966 records. The smaller number of 1964 and 1965 specimens were presumed (correctly) to be in the pinned collection. On the late summer trip Matt and Randy again opened the collection and we checked the pinned specimens—only a *Perithemis tenera* (Eastern Amberwing) Dawes County record was missing. But the one missing 1966 specimen took more searching.

Rhionaeschna mutata (Spatterdock Darner): In his thesis, Dwight Moody reports one *Aeschna* (now *Rhionaeschna*) *mutata* collected 15 miles south of Hay Springs, Sheridan County, on 17 August 1966. This did not turn up in the cigar box, so I asked Matt and Randy if we could go through all the trays and drawers again, and Matt finally found a lone envelope sliding around under the pinned specimens with an *A. mutata* label inside. Mystery solved or just started? The rest of Dwight's material contained no mis-identifications but here was an *Aeshna umbrosa* (Shadow Darner) clearly labeled *A. mutata*. Moore not drinking enough coffee? *A. mutata* was put on the rejected records list before it ever made it onto the state list. Neither Roy Beckemeyer, who used the thesis in compiling his list of Nebraska odonates, or Neva Pruess, one of his thesis advisors, mention this specimen. It's a totally improbable record so it's not surprising to find it ignored by these two researchers, but how did it get so badly misidentified and how did it get included in the thesis?

Finish

On the last two days of the summer trip (2–3 August), we were joined by Brian Peterson from Omaha, and on the last day our group consisted of him plus Don and Janis Paseka from Ames. Brian picked up a new state record at Fremont Lakes, Dodge County (see preceeding article) and the Pasekas led us to several county records. Forty-some Nebraska county records were achieved with these late additions. A perfect last day with an excellent brunch at the highly recommended Paseka home kitchen and still enough time to drive the 200 miles toward home. 

Mass Mortality of Common Baskettails (*Epithecya cynosura*) Due to Motor Vehicle Traffic

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Mortality associated with motor vehicle collisions has been studied far more extensively for vertebrates than invertebrates. In one of the first studies to quantify this type of mortality in insects, Seibert and Conover (1991) surveyed all animal roadkills along a one mile (1.6 km) section of an Ohio highway at approximately weekly intervals over a 14 month period. Their collection of 1,069 insects included only 22 Odonata specimens representing four families (species identifications were not provided). In a more focused study, Riffell (1999) conducted 26 daily surveys for Odonata carcasses over a six-week, mid-summer period along a 0.5 km section of road separating a

marsh and forest in the Upper Peninsula of Michigan. His extensive data (1,140 specimens of 25 species and 7 families) revealed that sex ratios among road-killed specimens tended to be male-biased (but were highly variable between species and female-biased in some) and daily mortality rates (all species combined) ranged from 10 to 256 casualties/km (mean = 87.7). The two most frequently collected species, *Libellula quadrimaculata* (Four-spotted Skimmer) and *Epithecya spinigera* (Spiny Baskettail), accounted for almost half of all records, with average daily mortality rates of 24 and 15 specimens/km, respectively.

More recently, Soluk *et al.* (2011) studied the relationship between roads and dragonfly behavior and mortality at four sites near Chicago, Illinois that varied greatly in mean motor vehicle traffic volume. Forty-nine dead dragonflies of nine species were collected during the course of their one month study, yielding daily mortality estimates (2–35 casualties/km) that were considerably lower than those of Riffell (1999). Species varied greatly in their susceptibility to vehicle collisions, with low-flying species such as *Plathemis lydia* (Common Whitetail) and *Libellula luctuosa* (Widow Skimmer) being disproportionately represented among the casualties compared to their abundance at the study sites, whereas *Tramea lacerata* (Black Saddlebags), another low-flying species, experienced lower than expected mortality, perhaps due to its greater flight maneuverability.

The following account summarizes my fortuitous observations of extensive dragonfly mortality associated with motor vehicle collisions that I witnessed recently. In late afternoon (17:45 h, ca. 65°F, mostly sunny with a light breeze) on 20 June 2014, I encountered the first of numerous dragonfly swarms present along State Route 27 in northern Wisconsin. While travelling south at a speed of 55–60 mph (88–96 km/h), I suddenly noticed that multiple dragonflies, believed to be corduliids, hit the windshield of my car in rapid succession over a span of 100–200 meters near a stream crossing (Ounce River). This area is in Bayfield County about 2 miles (3 km) north of the junction with 43rd Street, or 5 miles (8 km) north of the Sawyer County line.

Curious to determine the identity of the dragonflies, I turned my vehicle around after crossing the bridge and parked along the road shoulder near the site of the initial collisions (300–400 meters north of the bridge). Hundreds of corduliids were flying near and over the road, typically 1–3 meters above ground level, with most appearing to be Common Baskettails (*Epithecya cynosura*). I netted two males to confirm their identification. When I looked more closely at the roadbed, I noticed numerous dead (mostly) or stunned (few) adult dragonflies and decided to briefly assess their abundance and species composition. I quickly determined that this would be a relatively safe endeavor because it appeared to be a rather lightly travelled highway at that time (early Friday evening), with cars passing in both directions at a combined rate of perhaps 15–20 per hour. After every 1–3 cars had passed the section of road under study, I found still more fresh (as well as some older and/or crushed) corduliid carcasses or stunned adults on the pavement or adjacent gravel shoulder.

Between 18:00 and 18:30 h, I collected 52 vehicle-hit specimens of four species of corduliids from an approximately

25 meter section (visual estimate) of this two-lane asphalt road, 49 of which were identified as *E. cynosura* (Table 1). Five other *E. cynosura* carcasses were too crushed to salvage. Single dead specimens of *E. spinigera* (Spiny Baskettail), *E. canis* (Beaverpond Baskettail), and *Dorocordulia libera* (Racket-tailed Emerald) also were found within my survey area.

Table 1. Summary of *Epithecya cynosura* adults hit by vehicles on 20 June 2014 along a 25 m section of State Route 27 near the Ounce River crossing in Bayfield County, Wisconsin.

Body Condition	Male	Female	Sex undetermined	Total
Head Present	18	5	1	24
Head partially detached	1	0	0	1
Head absent	21	2	1	24
Total	40	7	2	49

As was acknowledged by Soluk *et al.* (2011) for the data in their study, my total excludes any specimens that may have been hit by vehicles but landed beyond the road shoulder or that may have been carried off-site on the windshields or front grills of vehicles. Furthermore, I did not systematically survey this section of road as carefully as was done in the more formal studies by Seibert and Conover (1991), Riffell (1999), and Soluk *et al.* (2011). Rather, I picked up most of the specimens opportunistically. On the other hand, my survey was more of an instantaneous assessment of road mortality, whereas the studies by Riffell (1999) and Soluk *et al.* (2011) attempted to determine casualty rates over a 24-hour period. The latter authors experimentally attempted to correct for losses due to scavengers, wind, and other factors by placing a known number of carcasses (marked) on a section of road and then “recapturing” their specimens the following day (only about one-third of the carcasses were recovered). Neither scavengers nor wind appeared to be reducing my capture rate.

Forty of the 47 (85%) specimens of *E. cynosura* for which gender could be determined were males. Half of the *E. cynosura* specimens had been decapitated, but at least a third of them were still moving their legs when collected (four continued to do so for at least two more hours), indicating the recent nature of their collision events. Several live specimens appeared to be merely stunned and capable of flying if released, but all others had injuries (e.g., partially detached head, damaged or severed abdomens) that would soon be fatal.

Following the completion of my foot surveys, I conducted a quick census of readily visible carcasses present along the first 0.25 mile section of State Route 27 south of the Ounce River bridge while driving at a speed of 40 mph (64 km/h). I counted a minimum of 50 carcasses, which is


probably less than half of the actual number present. At this speed, most dragonflies were able to avoid hitting my windshield by making evasive flight maneuvers. However, when my speed later increased to 55–60 mph, many hit the windshield and were presumably killed or seriously injured.

As I continued to drive south on State Route 27 toward the resort town of Hayward, I encountered more swarms of dragonflies, the vast majority presumably being *E. cynosura*; they were abundant in the reach between miles 1.1 and 3.1 south of the Bayfield-Sawyer county line, as well as around mile 4.7, and rather common at mile 6.7. After passing through Hayward, I continued south on State Route 27 toward Ojibwa. Approximately two miles west of Couderay in the Lac Courte Oreilles Indian Reservation, at least five more *Epiptera* hit my windshield in rapid succession, but I did not have time to stop and count or retrieve carcasses in this area. Large numbers of *Epiptera* also were encountered in a two mile section of State Route 27 between Couderay and Radisson (approximately 1–3 miles east of Radisson), where still more dragonflies collided with my windshield between 19:45 and 19:50 h, again presumably consisting mostly of *E. cynosura*.

Epiptera cynosura is the most common species of baskettail in most areas of the eastern United States (Paulson, 2011). Members of this genus frequently form feeding swarms and are “often the most conspicuous dragonflies over roads and clearings” (Paulson, 2011). I did not detect any obvious flights of prey insects that might have contributed to the swarming behavior on the date of my observations. Despite the fact that *E. cynosura* is considered a very agile flying insect, capable of swift vertical maneuvers (Mead, 2009; pers. obs.), my observations show that it is clearly vulnerable to collisions with vehicles travelling at high speeds, but also capable of avoiding such collisions with slower-moving vehicles. Extrapolation of my limited data to produce an estimate of the vehicular mortality rate of *E. cynosura* along a given length of State Route 27 (e.g.,

casualties/km), as was done by Riffell (1999) and Soluk *et al.* (2011), does not seem practical. Also, the density of live adults varied considerably as I drove along this road, with the highest perceived densities (mostly judged by the number of windshield collisions) being near wetland habitats bordering the highway, typically in low-lying areas. I suspect that well in excess of 250 *E. cynosura* adults were killed by vehicles within the 1 km reach extending from 0.5 km upstream to 0.5 km downstream of the Ounce River bridge on the date of my survey. Considering the abundance of this species, perhaps this level of mortality can be sustained over the short-term, but a long-term mortality rate of this magnitude may be detrimental to the local population. Riffell (1996) and Soluk *et al.* (2011) discussed conservation and management issues that may need to be addressed in regard to roads and vehicle-related mortality for Odonata, including uncommon or rare species, small or isolated populations, and the long-term impact on population dynamics. Further research into this matter is clearly needed and encouraged.

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First Record of Mocha Emerald (*Somatochlora linearis*) in Wisconsin

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On 27 July 2014 at 11:00 am, Joan Berkopec and Ron Eichhorn visited the Brown County Reforestation Camp in east-central Wisconsin and searched for odonates along a several hundred meter section of Haller Creek from near the NEW Zoo parking area off Restoration Road downstream to a wooden bridge over the creek. They observed

a male striped emerald (*Somatochlora*) they did not recognize flying over the creek and saw it perch on a dogwood branch (*Cornus stolonifera*) about 1.5 m off the ground. On 1 August from 12:00 to 1:00 pm, Joan returned to the site and saw at least six male striped emeralds patrolling the creek, but was unable to net any of them to confirm

their identity. In the late morning of 3 August, Ron and Joan returned to the site and observed at least five males patrolling over the creek and saw one female oviposit in an exposed silty bank about 30 cm away from the water's edge. They netted, photographed, and released a male and a female. They determined them to be Mocha Emerald (*S. linearis*) based on the shape of the male's cerci and the female's spout-shaped subgenital plate, lack of pale marks on the thorax, and presence of large yellow spots on the sides of abdominal segment S2 (Paulson, 2011). They reported their finding on the Wisconsin Odonata Survey (WOS) website <<http://wiatri.net/inventory/odonata>> where it caught the attention of Bob DuBois, who confirmed the determinations based on the photographs and let them know that this was a first record for that species in Wisconsin.

On 6 August from 11 am to 2 pm, Joan and Ron, along with Bob DuBois and Kathryn Corio, revisited the site. They observed a number of behaviors of adult *S. linearis*, collected one male voucher specimen, searched for exuviae, and kick-netted for nymphs throughout the reach. Eight adult males were observed patrolling the creek flying 30–40 cm above the surface. They would move forward fairly quickly for half a meter to several meters, stop to hover for a second or two, sometimes longer, and continue. Occasionally they would veer off the midline of the creek to briefly check out jewelwings (*Calopteryx*) or meadowhawks (*Sympetrum*) flitting amongst bankside vegetation, then continue on their patrol, evidently looking for females. Twice we saw males stop patrolling to perch obliquely on low-hanging branches of winterberry (*Ilex verticillata*) less than one meter above the creek. Joan also searched an approximately 200 m reach of the creek just above the primary sampling area, but she did not see any *S. linearis* along this upstream reach. A subsequent visit by Ron and Joan in the late morning of 10 August to the primary site again revealed about five male *S. linearis* patrolling the creek, but no females.

On 14 August Bob returned to the site to sample for nymphs and to make additional behavioral observations of the adults. Only three adult *S. linearis* were seen on this trip including a female that flew straight up into the tree canopy when flushed near a bank. An adult male *S. linearis* hovered extensively over a small pool area with its abdomen slightly curved, making the abdomen appear to be relatively short. Thinking it might be a different species of *Somatochlora*, Bob netted it, damaging it in the process, and therefore retained it as a second voucher. Both voucher specimens are housed in the Odonata Collection of the Wisconsin Department of Natural Resources at the WDNR Service Center in Superior, Wisconsin.

Study Site

Haller Creek flows through a mixed forested and residential watershed until it reaches the Suamico River about 3 km west of Lake Superior's Green Bay. The creek is known to be spring-fed and thus thermally moderated in the upper reaches, but the thermal effect is less pronounced below Restoration Road where the sampling occurred (S. Hogler, WDNR Fisheries Manager, pers. comm.). The reach sampled was entirely forested with red maple (*Acer rubrum*), black ash (*Fraxinus nigra*), yellow birch (*Betula alleghaniensis*), and basswood (*Tilia americana*) dominating near the creek. The creek here ranged in width from slightly over a meter to about 3 m, averaging about 2 m. Water depth averaged about 20 cm in runs, with deeper areas in pools at outside bends maxing out at about 40 cm. Current was slow (not measured) with no riffles. Substrate materials were fine sand and silt with some muck in slower areas. Instream vegetation was absent but woody debris was common (volume not measured), as was bank undercutting at outside bends (Figure 1). Undercut areas had tangled washed root zones which likely provided habitat for nymphs. Small fish sampled at the site included Central Mudminnow (*Umbra limi*) and Creek Chub (*Semotilus atromaculatus*). The area just above the reach sampled is annually stocked with catchable-size Brown Trout (*Salmo trutta*), and Northern Pike (*Esox lucius*) are known to migrate annually into the reach sampled (S. Hogler, pers. comm.). Adult dragonflies observed along the creek included Ebony Jewelwing (*Calopteryx maculata*), Fawn Darner (*Boyeria vinosa*), White-faced Meadowhawk (*Sympetrum obtrusum*) and Ruby Meadowhawk (*S. rubicundulum*). The meadowhawks were likely produced in low-lying vernal pools (dry at the time of our visit) in the surrounding forest.



Figure 1. Haller Creek, Brown County, Wisconsin, showing an undercut bank area on one side and on the other, an exposed sloping bank similar to that used by ovipositing female *Somatochlora linearis* (Mocha Emerald).

Observations of Mating Behavior

Mating was rapidly initiated with immediate wheel formation on the two occasions it was observed. One male that had been patrolling the stream for dozens of meters came around a bend and saw a female ovipositing on an exposed silt bank. He approached her directly and they immediately formed a mating wheel, flew a few meters along the stream and went straight up into the tree canopy where they were lost from view. It is not known if the flight into the tree canopy was a normal part of the mating behavior or a response of the male to seeing a human (potential threat) on the bank or in the stream (one of us was in each place).

Observations of Ovipositing Behavior

On three occasions females were observed ovipositing alone into exposed, unvegetated, gradually sloping banks 30 cm to 1 m from the water's edge. In all cases the ovipositing behavior consisted of her hovering just above the substrate and descending slightly to tap the tip of her abdomen repeatedly 3–12 times into the sandy silt. After a series of taps she would immediately and with exceptional quickness fly down to the water, tap her abdomen once or several times there, and return upslope to tap again into the same exposed bank area. This ovipositing cycle was repeated multiple times in all cases. One female was observed to repeat the cycle for at least three minutes, at which point she was grabbed by a male and they formed a mating wheel. The periodic taps into water may have enabled the female to facilitate oviposition by picking up water in her spout-shaped subgenital plate to take up the bank or simply to wash silt from the plate and genital pore.

Exuviae and Nymph Findings

Exuviae searches were focused on vertical or near-vertical banks within 75 cm of the water surface, especially above undercut banks. These areas were sought because they were above areas that may have produced nymphs and because they were often at least partially sheltered from direct wind and rain (the peak of emergence likely occurred weeks earlier, thus making exuviae difficult to find). One exuvia with structural characteristics consistent with *S. linearis* was found about 20 cm above the water surface on a root mass in a sheltered washed root zone at a semi-open area of the creek. Nymph collecting was done with a dip net in areas with undercut banks and associated tangles of roots. One part-grown nymph presumed to be *S. linearis* was found in such an area after several hours of sampling effort (nymphs of some species of *Somatochlora* are difficult to determine with certainty, particularly partly-grown nymphs). Part-grown nymphs

of *Boyeria vinosa* (Fawn Darner) and *Calopteryx maculata* (Ebony Jewelwing) were common in the areas sampled. Although finding nymphs of *S. linearis* was difficult, this is not unusual when *Somatochlora* nymphs are sampled. The undercut banks where the nymphs are thought to reside are heavily populated with tangled roots and are difficult to sample efficiently with a dip net. Based on the single, part-grown nymph we collected and on what is generally known about the life cycle of stream *Somatochlora* species at this latitude, it appears likely that *S. linearis* has at least a two-year life cycle in this creek.

S. linearis had been on the radar of odonate enthusiasts in Wisconsin since 2009, when Craig Stettner, in an email to Bob DuBois, reported seeing a male and female of this primarily southern species on 3 July in an area northwest of Chicago less than 50 km from the Wisconsin border. However, expectations were that if this species was found in Wisconsin, it would likely be in one of the southernmost counties of southeastern Wisconsin. Finding an established breeding population first in northern Brown County about 225 km north of the Illinois border was surprising. Several possibilities might explain this. First, southeastern Wisconsin has long been under-surveyed for odonates despite its relatively high human population. Recent efforts by members of the Wisconsin Dragonfly Society to recruit and train citizen scientists to survey in the southeastern counties have borne much fruit, but many areas remain under-surveyed. Odonatists in the process of developing their skills often choose to visit easily accessed pond and river habitats where a high diversity of odonates can be expected. The small forested streams required by *S. linearis* may still be largely overlooked. Second, it is possible that Haller Creek offers a regionally uncommon type of habitat for a stream-dwelling *Somatochlora*. Many of the streams in counties south of Brown County flow through largely agricultural watersheds whereas Haller Creek does not. Also, many streams in southeastern Wisconsin flow through landscapes with considerable amounts of clay, whereas the Haller Creek watershed does not contain much clay. Further, Haller Creek has a blend of spring-fed and runoff-sourced contribution (a cool water stream), whereas many of the small streams in the counties south of Brown County are predominantly runoff-based (warm-water streams). More survey effort should be directed at small, sandy, forested streams in southeastern and east-central Wisconsin to gain additional insight into the distribution of *S. linearis* in the state.

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DSA Membership Directory

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At the annual DSA meeting in Ladysmith, Wisconsin, a question was asked about the availability of a DSA Membership Directory. I thought it might be useful to remind everyone that a list of DSA members is available on <www.OdonataCentral.org>. Just navigate to Societies→Dragonfly Society of the Americas→Members and you will find a list of member names and place of residence (city, state, country). However, emails are only available if a member chooses that option. If you would like others in the society to be able to contact you, first login to OdonataCentral.org, then click on My Profile on

the top of the home page to the right of your name. Then choose Edit My Profile and select “yes” for the question “Allow others to see your email in the Membership Directory?” in the Basic Information box at the top of the page. Please note that emails are not listed directly on the web page in an effort to keep bots from grabbing your email and sending you spam. You have to click on “send email” in the membership directory to reveal the email of the person you wish to contact. As always, if anyone has questions or difficulties using OdonataCentral, please don’t hesitate to contact me at jcabbott13@gmail.com. 

Where Did They All Go?


Ron and Barbara Oriti<meteoriti@aol.com>

The Upper McNally Canal lies at the northern end of the Owens Valley, a few miles north of Bishop, California. The canal runs in a north-south direction, and is about 12 feet wide. A well-made dirt road runs along the east side of the canal; just to the west of the canal lies another dirt road, not well-maintained, and somewhat overgrown. There are river willows along the canal that are about 4-7 ft tall, and more willows on the west side of the old road up to 12 feet tall.

One of our favorite dragonfly locations is found along the taller willows. We often walk along the old road, photographing the many hundreds of dragonflies perched there. There were times in July and early August when over a distance of 150 yards we would see about two hundred Band-winged Meadowhawks (*Sympetrum semicinctum*), 75-100 Black Saddlebags (*Tramea lacerata*), 50-75 Blue-eyed Darners (*Rhionaeschna multicolor*), Paddle-tailed

Darners (*Aeshna palmata*), and Common Green Darners (*Anax junius*), along with several Spot-winged Gliders (*Pantala hymenaea*), Variegated Meadowhawks (*Sympetrum corruptum*), and earlier, several Eight-spotted Skimmers (*Libellula forensis*), along with several miscellaneous species.

There were so many hundreds of dragonflies it was paradise for a photographer. Well, I got the idea that if I returned at about 11:00 at night with a very bright wide-angle flashlight I would see hundreds of dragonflies hanging in the willows with the light glistening off their wings. So I went out on the night of 14 July 2014, and what actually happened was totally unexpected. I walked the entire 150 yards and never saw one dragonfly either perched or flying. Where did they all go?

I hope this mystery can be solved. 

Odonata in the News

Odonata in the News is compiled by the Editor. Feel free to send alerts about noteworthy items including news stories, popular articles, and scientific publications (with a focus on the Americas) to the Editor at <celeste@xerces.org>. A sampling of recent newsworthy odonata includes:

Daigle, J.J. 2014. Two new *Heteropodagrion* species from Ecuador (Odonata: Megapodagrionidae). *Odonatologica* 43(1/2): 35-42. Two new species of *Heteropodagrion* are described, bringing the total described species in the genus to five.

Van, K.D., L. Janssens, S. Debecker, and R. Stoks. 2014. Temperature- and latitude-specific individual growth rates shape the vulnerability of damselfly larvae to a widespread pesticide. *Journal of Applied Ecology* 51: 919-928. The vulnerability of nymphs of the forktail damselfly *Ischnura elegans* to the pesticide chlorpyrifos was examined at different temperatures and with nymphs collected from different latitudes to assess local thermal adaptation and the potential effects of global warming on pesticide impacts.

Feindt, W., O. Fincke, and H. Hadrys. 2014. Still a one species genus? Strong genetic diversification in the world's largest living odonate, the Neotropical damselfly *Megaloprepus caerulatus*. *Conservation Genetics* 15(2): 469–481. A study of how historical and recent fragmentation events, strong niche conservatism, and ecological conditions have affected population dynamics, viability and the species status in this evolutionarily old genus.

Rotvit, L. and D. Jacobsen. 2014. Egg development of Plecoptera, Ephemeroptera, and Odonata along latitudinal gradients. *Ecological Entomology* 39(2): 177–185. A meta-analysis of published data on the influence of temperature on the duration of egg development within these three orders, to test whether thermal adaptation is occurring.

Saha, N., G. Aditya, and G.K. Saha. 2014. Prey preferences of aquatic insects: potential implications for the regulation of wetland mosquitoes. *Medical and Veterinary Entomology* 28(1): 1–9. An examination of the ability of generalist predators including water bugs and odonate nymphs to control mosquito larvae in a lab setting in the presence of alternative prey items.

Charest, P. and M. Savard. 2014. Découverte de l'épithèque de Brunelle au Québec, une libellule secrète. *Le Naturaliste canadien* 138(2): 16–25. Records of the shadowdragons *Neurocordulia michaeli* (Broad-tailed Shadowdragon) and *N. yamaskensis* (Stygian Shadowdragon) in Quebec. Abstract in English.

Savard, M. 2014. L'anax précoce au Québec: une libellule migratrice. *Le Naturaliste canadien* 138(1): 20–31. A discussion of the migratory *Anax junius* (Common Green Darner) in Quebec. Abstract in English.


Savard, M. and A. Mochon. 2014. L'aesche majestueuse, une libellule en situation précaire au Québec. *Le Naturaliste canadien* 138(2): 8–15. A discussion of the first

specimen of Swamp Darner (*Epiaeschna heros*) to be captured in Quebec in the past 25 years and the status and causes for this species' decline. Abstract in English.

Dragonflies are Dangerous Beasts. *National Wildlife Federation wildlife gardening blog* <<http://bit.ly/1ws95o6>>. A general discussion of odonate life history, with special emphasis on how to attract dragonflies to your yard. Note that there are a few inaccuracies, such as an overstatement of the number of odonate species in the world.

Several midwestern dragonfly projects and DSA members made it into the local news: "Dragonflies reveal amazing secrets to Northwoods citizen scientists" (Living on the Lake magazine <<http://tinyurl.com/mq6eepf>>; "Chaseburg citizen scientist helping catalog dragonflies in region" (LaCrosse Tribune <<http://tinyurl.com/pcpa7rg>>; and "Of Bogs and Blueberries" (Grand Forks Herald <<http://www.grandforksherald.com/content/bogs-and-blueberries>>).

Speed Limits Could Save Rarest Dragonfly, Livescience <<http://www.livescience.com/47412-driving-slow-saves-endangered-dragonfly.html>>. A description of work being done in Daniel Soluk's lab on the relationship between vehicle speed and the likelihood that a dragonfly will survive a collision with a moving vehicle, with a particular emphasis on setting speed limits that would help reduce vehicular mortality in populations of the endangered Hine's Emerald (*Somatochlora hineana*).

Open Library Project. Nick Donnelly alerted us to the availability of classic and modern texts on dragonflies available as as downloads or online reading through the Open Library project, such as Tillyard's classic "The biology of dragonflies" <https://openlibrary.org/books/OL6606338M/The_biology_of_dragonflies>. Just type "Odonata" into the searchbox on this page and a wealth of entries appears. 

How I Fell Into the Clutches of the Odonata

This feature presents essays from DSA members that describe how, when, where, and why they first became interested in Odonata. It's also a fun way for members to find out a little more about each other. If you would like to contribute, write a short essay describing your first forays into the world of Odonata and how it has affected your life since, including your most interesting ode-hunting tale, and send it to the Editor at <celeste@xerces.org>. Whether you just discovered odonates this spring or have pursued them for decades, I know there are interesting,

entertaining, and inspiring stories to tell. In this installment, Ailsa Donnelly relates the twists and turns that life with a fanatical odonatist can take.

The Bug and I, Ailsa Donnelly, Binghamton, New York <tdonelly@binghamton.edu>

It isn't easy to say this, but I really know remarkably little about odonates, even though I have been seriously exposed to them for nearly 60 years. But I do know a

whole lot about odonatologists and what makes them tick, so I suppose that makes me officially to have “fallen into the clutches of the Odonata” as our ARGIA Editor puts it.

Way back in 1955 I had emigrated from Scotland to California, sponsored by my mother’s cousin, who was a professor at CalTech. The day after I arrived I obtained a full-time job at CalTech in the graduate school office—a really nice place to work if one was 21 and unattached.

Over the course of the next few months I met Nick (a graduate student in geology), and in May of the next year we were married. We immediately packed our few possessions into his pickup truck and got ready to drive across the country to Princeton, New Jersey so that he could work on his Ph.D.

Nick’s officemate, Henry, took me aside AFTER we were married (would that it had been BEFORE, because a bit of re-thinking might have taken place) and said “Do you know what is in that large trunk Nick keeps in our office?” I had not a clue. “Well,” says the whistle-blower “it is full of dragonflies”. And it has been downhill all the way since then, the trunk has swollen and its contents and successors now take up a full-sized basement.

That trip from Pasadena to Princeton was memorable, bug-wise. The trunk lived in the back of the pickup, kept steady and comfortable by the use of my fur coat, and I caught my first-ever dragonfly in Oak Creek Canyon, Arizona (this was 1956, people, nobody protected ANYTHING in those days!).

We moved on, collecting (need I say) on the way. A brief stop at Balmorhea State Park in west Texas proved to me that collecting was not entirely without its rewards, as I lolled in their lovely spring-fed swimming pool. And then there was Garner State Park in Texas hill country.

As I waded across the river, net in hand, I was stopped by a small boy. I was by then used to the inevitable query: “Wotcherafter, minners?” But this small boy was different: “Are you collecting dragonflies or damselflies?” he asked. I told him “Both” and dashed back to find Nick and tell him about this extraordinary kid. Nick, in turn, forded the river and headed upstream to see who was out there—and there, in the river, dredge in hand, was Minter Westfall. Nick had corresponded with him but never met him. David, no longer a kid, is now a physician living in Georgia, and has attended a DSA meeting or two as an adult.

So that is how I now know a whole bunch of people interested in insects of all sorts. We tend to travel with a group Nick and I call “the moth people”—a group of entomologists of varied interests, organized by John Heppner of Gainesville, Florida. We also go to every DSA meeting we can fit into our calendar. As a result, I have learned over the decades that one gets zero sympathy if one yelps in fear upon seeing a tarantula, and have also learned to just pick off the ticks without complaining.

No more tennis, no more golf, put away the cocktail dresses and the hats, and on with whatever LL Bean has on sale. My mother was appalled at where her well-brought-up daughter went in pursuit of bugs, and I must admit there have been some low points in our travels—but I really like a good gomphine hunt, and have been known to revel in spotting and capturing some of those elusive forest damselflies in the tropics. In between times I dig out one of the dozen or so ratty paper backs that line the bottom of our suitcase (under the nets and net handles) and have a good read while Nick puts away our day’s haul—provided, of course, the “hotel” (I use the word loosely) in which we are housed has electricity.

Stiff upper lip. Don’t whine. Get used to it. Rule Britannia.



Book Review: Dragonflies of North America, 3rd edition

Thomas W. Donnelly <tdonnelly@binghamton.edu>

Dragonflies of North America, 3rd edition. Needham, J.G., M.J. Westfall, Jr., and M.L. May. 2014. Scientific Publishers, Gainesville, Florida, 658 pp. ISBN 0-945417-99-3. Price: \$165 (hard cover).

This is the 3rd edition of a book which appeared in 2000, and which was called the “Revised Edition” of an earlier book by James. G. Needham and Minter J. Westfall, Jr., which was entitled “A Manual of the Dragonflies of North America (Anisoptera)”, published by the University of

California Press in 1955. The 1955 book revolutionized the study of dragonflies, mainly by presenting excellent photographs of larvae and anatomic details of adult dragonfly species of North America and the Greater Antilles.


The 2000 “Revised Edition” used the format of the 1955 book, but the photographic illustrations were somewhat washed out. Abundant new drawings by Elyse O’Grady supplemented the figures of the 1955 book and made the 2000 edition a very useful manual, which also included

many new species described in the half century since the original publication, as well as newly recorded species.

The 3rd edition of 2014 adds several newly discovered species (I have never seen the 2nd edition) but has largely retained the features of the 1st (“Revised”) edition. A substantial change is that the 14 very attractive color plates of Anisoptera (not including the family Libellulidae) by Lawrence W. Zettler do not appear in the 3rd edition, nor the 10 pages of excellent color photographs. Instead the Zettler plates appear in individual grayscale figures dis-

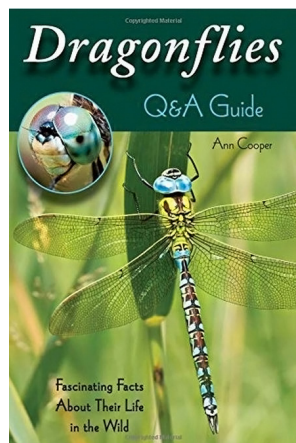
tributed throughout the text with the appropriate species. Many of these grayscale figures are useful, but some are simply unattractive.

A few genera are somewhat puzzlingly presented (i.e. *Orthemis*, *Sympetrum*), awaiting long-promised revisionary work for which this reviewer bears some responsibility.

This book remains essential to all students of Odonata, who owe Mike May much gratitude for his extensive labors. 

New Book Announcement: Dragonflies Q&A Guide; Dragonflies of the Colorado Front Range

Dragonflies Q&A Guide: Fascinating Facts About Their Life in the Wild. Ann Cooper. Stackpole Books, 112 pp. Publisher’s price: \$16.96 (paperback) or \$8.98 (eBook).




This book is aimed at enthusiasts who are newly interested in the sport of dragonflying. “The questions are a collection of topics I have wondered about, or that people have asked me on the trail,” says author Ann Cooper. From the introduction: “How do odonates eat, sleep, mate, survive the winter? What’s the gossip about them—their origins, their naming, their reputation in

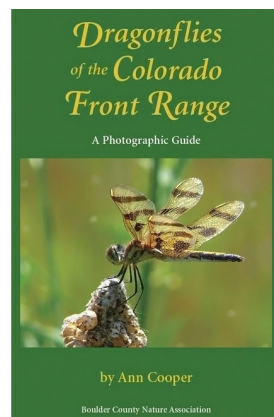
various cultures? There’s so much that is fascinating about these creatures, besides what species they happen to be.”

She hopes this book will help new dragonfly watchers to understand why the dragonflies are doing what they are doing, and what’s actually going on as they watch these fascinating and ferocious predators zip to and fro.

Dragonflies of the Colorado Front Range: a Photographic Guide. Ann Cooper. Boulder County Nature Association (BCNA), 111 pp. Price: \$10.79 (paperback).

This pocket guide was published by BCNA as a volunteer project. It highlights the species most likely to be seen in Colorado’s Front Range, and doesn’t claim to include all possible species. The idea here is to encourage new dragonfly watchers by not overwhelming them with information on the entire region until they feel ready for it.

Cooper has been a volunteer naturalist and teacher on the trail for Boulder County Parks and Open Space, Colorado, for over 35 years. She has written 10 nature books for children. With these new books for a general audience, she hopes to pique people’s curiosity about all things odonate, and expand their search image in the wild so they’ll no longer say “Oh, look, a dragonfly,” but will now be more likely to exclaim, “Mating Halloween Pennants on that reed!” or “A common Green Darner, I wonder if it’s migrating south.” 



Parting Shots

Parting Shots pays tribute to the endless diversity and interest of odonate behaviors and the skilled photographers among us, with an additional nod to the many unexpected (and sometimes downright silly) ways in which odonates can creep into daily life.

If you have photos that showcase some odd, bizarre, unusual, unexpected, or amusing aspect of odonate life (or of life with odonates), please send them to the Editor at <celeste@xerces.org>, along with a short note describing the photo and event.

Prime Cut

Ron Lawrenz <rlawrenz@smm.org>

This past June, Jim Burns (Arizona) stopped by to visit me at the Lee and Rose Warner Nature Center near Marine on St. Croix, Minnesota on his way home from the 2014 DSA meetings in Wisconsin. He was interested in getting photographs of *Arigomphus furcifer* (Lilypad Clubtail), which are relatively common at our site. We were able to locate a quite a few, and several had been cooperative, but none were “in wheel”. While we were at it, we were also keeping an eye out for any *Rhionaeschna mutata* (Spatterdock Darner) that might still be on the wing.

As we scanned the fields, my eye caught several darners as they patrolled the field a short distance away. After watching them for about 30 seconds, I observed one of them take a headlong dive into the grassy vegetation. My immediate impression was that it was a male that had located a female. As I approached, I could see the top of a goldenrod stem shaking and I figured that I would see a pair of darners fly away in tandem.

When I moved in to take a closer look, a male *Anax junius* (Common Green Darner) flew away with what appeared to be a good portion of another dragonfly in its grasp. It left behind this dramatic scene of a pair of *Arigomphus furcifer* still coupled in the usual way, except for the fact that the female was missing most of her thorax, including her wings. The male sat there holding her head by his terminal appendages like a lantern while she used the one remaining leg still attached to the front portion of



her thorax to grasp a leaf. What was left of the back portion of the thorax and abdomen still retained three legs which were grasping another leaf, thus continuing to hold the pair in the form of the wheel position. I grabbed my iPhone and snapped this shot just as the male decided to take off for other parts, dropping the female's abdomen, but flying off with her head still in tow.

I have encountered dragonflies preying on dragonflies numerous times and in most of those cases the attacking dragonfly immediately removed the head of its prey. I have interpreted this behavior as a way in which the attacker can render its prey harmless, and ensure that it won't be able to fly away.

Preferentially removing the contents of the thorax also seems to be efficacious since it contains the majority of a dragonfly's body mass, and most of that tissue is muscle protein.

Scenes from the Odonate Gym

Jim Burns <jpbaztec@aol.com>

A lot of people figure dragonflies must have been the inspiration for the helicopter, but this past summer I experienced an odd incident which made me consider them the possible genesis of a quite different, multiple use concept—bulldozer/backhoe/high loader.

We all know, as female Odonata would certainly attest, that odonate abdomens are flexible and dexterous. In July 2014, while visiting friends in Vermont, one afternoon as I was making love to a male Rusty Snaketail (*Ophiogomphus rupinsulensis*) with my macro lens, I observed something I have neither heard nor read about. Resting along the edge of a gravel path, the snaketail backed up a couple of body lengths, seemingly on purpose, then reached down with its claspers and grasped a small stick, lifted it off the ground above parallel, then dropped it. I wish I'd had video.



Rusty Snaketail (*Ophiogomphus rupinsulensis*) male exercising his claspers, Coos County, New Hampshire, July 2014. Photo by Jim Burns.



Rusty Snaketail male (same individual as on previous page) picking up a twig with his claspers. Coos County, New Hampshire, July 2014. Photo by Jim Burns.

What was the purpose? Was this practice? Or exercise? What just happened? If anyone out there has any similar observations or insights, feel free to email me.

Death By Spider

James Reber <jcreber43@gmail.com >

James sends two examples of dragonfly death by spider, showing that neither gender is safe. The first photo (below), from July 2013, shows a female Eastern Pondhawk (*Erythemis simplicicollis*) that got a little too close to a Six-spotted Fishing Spider (*Dolomedes triton*) while she was concentrating on laying her eggs.



Six-spotted Fishing Spider capturing a female Eastern Pondhawk (*Erythemis simplicicollis*), Indiana, Pennsylvania, July 2013. Photo by James Reber.


The second photo, from August 2013, shows a male Eastern Pondhawk captured by a Black and Yellow Argiope (*Argiope aurantia*). Both photos were taken in Indiana, Pennsylvania.



Male Eastern Pondhawk taken by a Black and Yellow Argiope, August 2013, Indiana, Pennsylvania. Photo by James Reber.

Robbed of Life

Ron Oriti <meteoriti@aol.com>

And in a final scene of carnage, Ron Oriti shares this photo of a damselfly that has fallen prey to a Robber Fly. Ron reports that he has taken many photos of robbers preying on damels, but this one is the sharpest he's ever gotten. 



Rawson Ponds in the Owens Valley, east of Bishop, California, 30 June 2013. Photo by Ron Oriti. Nikon D600 with a 300 mm lens at f18, 1/500 sec.

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 should be sent to Celeste Mazzacano, The Xerces Society for Invertebrate Conservation, 628 NE Broadway, Suite 200, Portland, Oregon, USA 97232, <celeste@xerces.org>. Material for BAO must be sent to Steve Hummel, Lake View, Iowa, USA 51450, <mshummel@iowatelecom.net>.

Articles

All articles and notes should be submitted in Word or Rich Text Format, without any figures or tables or their captions, embedded. Please submit all photos and figures as separate files along (see Figures below). 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 Word or Text 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 give both the scientific name of a species as well as 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: Celeste Mazzacano, The Xerces Society for Invertebrate Conservation, 628 NE Broadway, Suite 200, Portland, Oregon, USA 97232

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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 digital 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 digital subscription to **ARGIA**. Dues for individuals in the US, Canada, or Latin America are \$15 us for regular memberships (including non-North Americans), institutions, or contributing memberships, payable annually on or before 1 March of membership year. 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, Florida, USA 32311. More information on joining DSA and subscribing to BAO may be found at <www.dragonflysocietyamericas.org/join>.

Back cover: (upper) *Cordulegaster maculata* (Twin-spotted Spiketail) female, Eau Claire, Wisconsin, 11 June 2014. Photo by Jim Burns. (lower) Common Green Darner (*Anax junius*) male, Rawson Pond, Owens Valley, east of Bishop, California, 4 May 2014. Nikon D600, Sigma 150–500 mm lens at 500 mm, f8, 1/3200 sec. Photo by Ron Oriti.

