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Front cover: *Caledopteryx maculata*, a very large endemic damselfly from New Caledonia. Photo by Nick Donnelly.

Final Notice—2013 DSA Annual Meeting

David Halstead <halstead@siast.sk.ca>

The 2013 DSA Annual meeting will be held 12–14 July in Prince Albert, Saskatchewan. Registration and meeting details are available at <www.sspb.ca> or you can access the website through a link on OdonataCentral. Your host for the event will be David Halstead <halstead@siast.sk.ca> and the Prince Albert Organizing Committee.

The business meeting will be held 13 July at the Saskatchewan Institute of Applied Science and Technology (SIAST) Woodland Campus. Numerous presentations are currently scheduled but there's still room for one or two more before reaching capacity. Please register on the DSA Annual Meeting website as soon as possible if you're planning on giving a presentation. The meeting room is fully outfitted with a computer, large screen projector, and audio system. We also plan to carry on the tradition of a silent auction. Please give some thought to auction items you might be willing to donate in support of OdonataCentral.

The Prince Albert Travelodge (3551 2nd Avenue West, 1-800-578-7878) will serve as headquarters for most non-survey activities. The hotel offers wi-fi and an in-house restaurant. Twenty five rooms have been set aside for the "Dragonfly Society" until 30 June 2013. The best rate is $95.00 plus tax ($11.40). In addition, twenty five rooms are booked, also until 30 June, at the Prince Albert Super 8 Motel (444 2nd Avenue West, 1-306-953-0088) located about 1.6 kilometers (1 mile) down the road. The rate for the Super 8 is $104.50 plus tax ($12.35). This rate includes WiFi and a continental breakfast. Please book early.

Survey activities will be centered on Prince Albert National Park. The park comprises an area larger than the state of Rhode Island and includes some of the most pristine aquatic systems in western Canada with bogs, fens, swamps, marshes, lakes and streams all represented. Attendees will be supplied with maps and collecting permits along with some precautions for working in protected areas. The town of Waskesiu, at the heart of the park, provides a convenient location for a mid-day rendezvous with other participants to share significant finds.

The pre-meeting, also headquartered in Prince Albert, will take place 10–11 July. Attendees will have an opportunity to sample a wide range of transitional habitat between aspen parkland to the south and boreal forest to the north. Possible sampling locations include MacDowall Bog, which should be buzzing with newly emerged darners, and the Gem Lakes, which are usually rich in emeralds. The pre-meeting also provides an opportunity to scout out Prince Albert National Park and adjacent wetlands for preferred sampling locations.

The post-meeting is scheduled for 15–17 July in Missinipe, Saskatchewan. Missinipe is situated on the Canadian Shield and is truly the jumping-off point for high adventure. You can rent a floatplane to take you to one of 100,000

Prince Albert National Park, Andy Lake. Dave Halstead.

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Calendar of Events

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

Event	Date	Location	Contact
MOSP Gathering	14–16 June 2013	Red Lake WMA, Minnesota	Mitch Haag <hami0108@yahoo.com>
DSA NE Regional Meeting	20–23 June 2013	Griswold, Connecticut	Ginger Brown <vbrown@fullchannel.net>
DSA Annual Meeting	12–15 July 2013	Prince Albert, Saskatchewan	Dave Halstead <halstead@siast.sk.ca>
CalOdes Annual Blitz	Sept./Oct. 2013	Imperial Co., Colorado River	Kathy Biggs <bigsnest@sonic.net>

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lakes in the region, float a kayak on one of the many rivers, or simply follow the road to Churchill River, Stanley Mission, Nemeiben Lake, LaRonge Provincial Park or any one of a number of other northern destinations.

In an effort to reduce costs and encourage camaraderie among attendees, six group cabins have been booked with Thompson Cabins in Missinipe. The cabins are featured on the post-meeting link of the DSA Annual Meeting webpage. They are $440.00/night, tax included, and are appointed with full kitchen facilities, a barbecue, two bathrooms, washer and dryer and two bedrooms with double beds, one bedroom with three single beds, and a hide-a-bed in the common area. The cabins will accommodate five individuals comfortably and as many as six or more if necessary. Bookings are being handled through the Prince Albert DSA Committee; see the post-meeting link at <www.sspb.ca>. Five of the six cabins originally reserved have been already been rented. There's still limited opportunity for a few more individuals to commit to the sixth cabin. We are asking for a 50% deposit in the amount of $172.50 for a bedroom (i.e. $345.00 total for the three nights—ideal for individuals wishing to guard their privacy or couples wishing to reduce costs) or $105.00 for a bed (i.e. $210.00 total for the three nights) with the deposit originally due by 15 May but now extended to 5 June. Note these deposits are non-refundable after the deadline date.

Please keep in mind you don't have to stay at Thompson Cabins to partake in the post-meeting. There are campgrounds in the immediate vicinity and more conventional hotel accommodations 80 kilometers (50 miles) south of Missinipe in LaRonge. Please see the webpage for more information on booking your campsites or staying in LaRonge.

Part of Saskatchewan's attraction has to be the allure of the unknown (see my accompanying article in this issue on new and noteworthy gomphids). The province is just shy of Texas in terms of size and most likely the least surveyed state or provincial jurisdiction in North America, especially in the northern boreal forest region. With a concentration of DSA Annual Meeting participants, many discoveries are likely to be made during the summer of 2013.

Prince Albert National Park, Boundary Bog. Dave Halstead.

Saskatchewan also has an extremely favorable summer climate. Average daily temperatures for mid-July are 23°C (73°F), but temperatures can exceed 29°C (84°F) one day in ten. That's not to say it won't rain. There's a better than 50% chance of a thunderstorm on any given day, but recent trends have seen drier than normal climate in the north. Most importantly for dragonfly aficionados, the days are much longer (almost 17 hours of daylight in July), leading to greater capture opportunities for netters and photographers alike.

Finally, you have to witness the summer explosion of dragonflies and damselflies in Saskatchewan to believe it. The flight season is just over four months long, so every hour of those extended days is critical for feeding and development of larvae and adults alike. Saskatchewan has a motto on their license plates, "Land of the Living Skies". For local residents this motto refers to the spectacular drama of colour and cloud that plays out in our prairie sky. For odonate enthusiasts, it refers to the large swarms of darners, emeralds, and baskettails that amass in the evenings as they chase the dying rays of sunlight at the end of another perfect summer day.

Dragonflies that may be of interest include darners such as Canada Darner (*Aeshna canadensis*), Lake Darner (*A. eremita*), Variable Darner (*A. interrupta*), Sedge Darner (*A. juncea*), Azure Darner (*A. septentrionalis*), Zigzag Darner (*A. sitchensis*), Subarctic Darner (*A. subarctica*), Black-tipped Darner (*A. tuberculifera*), and Shadow Darner (*A. umbrosa*). In addition, there should be ample representation from the emeralds including, but not limited to, American Emerald (*Cordulia shurtleffii*), Ringed Emerald (*Somatochlora albicincta*), Lake Emerald (*S. cingulata*), Delicate Emerald (*S. franklini*), Hudsonian Emerald (*S. hudsonica*), Kennedy's Emerald (*S. kennedyi*), Ocellated Emerald (*S. minor*), Brush-tipped Emerald (*S. walshii*), Whitehouse's Emerald (*S. whitehousei*) and Williamson's Emerald (*S. williamsoni*). There's also a good chance that Muskeg (*S. septentrionalis*) and Quebec Emerald (*S. brevicincta*) are present in the region, though they've yet to be seen in the province. Expect also to see representatives of the gomphid and libellulid clans including Pale (*Ophiogomphus severus*) and Boreal Snaketails (*O. colubrinus*); Boreal, Crimson-ringed, Hudsonian, Canada, and Belted Whitefaces (*Leucorrhinea borealis*, *L. glacialis*, *L. hudsonica*, *L. patricia*, and *L. proxima*); Black Meadowhawks (*Sympetrum danae*); and Chalk-fronted Corporals (*Ladona julia*).

Among damselflies, expect to see River Jewelwings (*Calopteryx aequabilis*); Prairie, Subarctic, and Taiga Bluets (*Coenagrion angulatum*, *C. interrogatum*, and *C. resolutum*); Northern, Boreal, Marsh, and Hagen's Bluets (*Enallagma annexum*, *E. boreale*, *E. ebrium*, and *E. hageni*); Sedge Sprites (*Nehalennia irene*); Plains Forktails (*Ischnura damula*); and Emerald, Spotted, Northern, Sweetflag, and Lyre-tipped Spreadwings (*Lestes dryas*, *L. congener*, *L. disjunctus*, *L. forcipatus*, and *L. unguiculatus*). Most of all, expect to see the unexpected.

Extra DSA Meeting Buttons

There are extra buttons available from previous DSA annual meetings. If you are interested in obtaining some, please contact Jerrell Daigle <jdaigle@nettally.com>.

New and Noteworthy Records of Gomphidae for Saskatchewan

David Halstead <halstead@sasktel.net>

I recently received an e-mail, followed by a package with two males and one female specimen of Pronghorn Clubtails (*Gomphus graslinellus* Walsh) from John Kozial, a farmer and amateur entomologist living near Bjorkdale, Saskatchewan. John shared a number of finds he's made within the province including a few that are pretty rare across northern Saskatchewan. However, the Pronghorns stand out for being a new provincial record and quite possibly a northern range extension for the species. Several were collected 27 June 2004 and 29 June 2006 on a silica sand road NNE of Armit, Saskatchewan (52° 50' 00" N, 101° 46' 42" W). The area where they were collected is approximately 5–8 kilometers south of the Red Deer River. The Pronghorns were also observed flying along the banks of this same river. John mentioned they seemed abundant in 2004, with low numbers in 2005, and then appeared to be more common in 2006. In terms of behavior, they were found basking on low shrubs and on the road. Habitat consisted of thick stands of younger trembling aspen/jack pine forest with water filled ditches on either side of the road.

A second find, considered noteworthy for the province, relates to a discovery by one of my students (Nicole Pillipow) while working on benthic samples collected by myself and Scott Lipsit during a pre-disturbance assessment of a local pulp mill on the North Saskatchewan River last fall. The larvae were identified as Elusive Clubtails, *Stylurus notatus* (Rambur), an identification later verified by Ken Tennessen. A total of 37 of these larvae were collected inside the Prince Albert city limits (53° 12' 27" N, 101° 40' 35" W) as well as in adjacent sections of the river. The Elusive Clubtail has been found in the province before: Catling and Kostiuk (2004) reported finding exuviae around Maidstone, Saskatchewan and Hutchings (2004) reported on a specimen from the Royal Regina Museum that was captured by Ron Hooper in the Frenchman Butte region of the province in 1971. However, the Elusive Clubtail has never been described in Saskatchewan with this level of abundance. Since Walker (1958) reported Elusive Clubtail emergence to be 9 and 10 July at approximately the same latitude in The Pas, Manitoba, it seems reasonable to assume that participants in this year's DSA Annual Meeting might be in for a real treat. Morning forays to the river during the pre-meeting and meeting dates of 10–15 July are likely to reveal a very rare glimpse of these "elusive" dragonflies.

References

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Walker, E.M. 1958. The Odonata of Canada and Alaska, Vol. 2. Part III: The Anisoptera—Four Families. University of Toronto Press, Toronto, Ontario.

Don't Forget to Renew Your DSA Membership!

Still haven't renewed your DSA membership? Visit OdonataCentral and click on the "Societies" link in the top banner, or go directly to <http://www.odonatacentral.org/index.php/PageAction.get/name/DSA_Membership>.

2013 Southeast Regional Meeting report, and a New Species for Virginia!

Steve Roble <steve.roble@dcr.virginia.gov>; **Paul Bedell** <pbedell@richmond.edu>

The 2013 Southeast Regional Meeting of the DSA was held in Richmond, Virginia, from 26–28 April. The meeting hosts were Paul Bedell, Anne Wright, Steve Roble, and Richard Groover. Our headquarters motel was the Hyatt Place Richmond Arboretum, which was centrally located to many good sampling sites and practically adjacent to the requisite Mexican restaurant for Jerrell Daigle. Thirty-one participants from 10 states were in attendance for one or more days. Besides the hosts, they included Bob Blakney, Jim Childress, Donna Finnegan and Marty Wright, Ollie Flint, Chris and Betsy Foster, Ken Larsen, Tom Pendleton, Mike Ready, and James Shelton (Virginia); Kathy and Dave Biggs (California); Jerrell Daigle (Florida); Mary Gene Cotten, Christian Cotten-Dixon, and Fred Williams (Georgia); Gene Scarpulla and Marcia Watson (Maryland); Dave Small (Massachusetts); Tim Vogt (Missouri); Donna Schulman (New York); Ken Lebo and Tony "Doc" Schoch (Pennsylvania); and Sherry Daubert, Robin Biggs Gann, and Jim Johnson (Washington).

The month preceding the meeting was somewhat colder than normal for eastern Virginia, delaying the emergence of some species, especially in comparison to the numerous early emergence dates documented in 2012. Weather during the meeting was cooperative on Friday and Saturday, somewhat less so on Sunday.

The focus of the meeting was the St. Croix Snaketail (*Ophiogomphus susbehcha*), an early-emerging dragonfly that was recently discovered (2006) to occur in the James River, with lesser numbers on the Potomac River (Roble and Orr, in prep.). Field trip locations included parks and boat landings on the James River in Richmond and points west, as well as Pocahontas State Park, Harrison Lake National Fish Hatchery, Virginia Commonwealth University's Rice Environmental Center, and the Nottoway River and other habitats at Chub Sandhill Natural Area Preserve south of Richmond. A total of 24 species was found during the weekend, including one new state record.

St. Croix Snaketail (*Ophiogomphus susbehcha*) teneral female, James River, Maidens, Powhatan County, Virginia. Photo by Ken Larsen.

Selys' Sundragon (*Helocordulia selysii*) adult male, near James River, Maidens, Powhatan County, Virginia. Photo by Ken Lebo.

The meeting got off to an unofficial early start on Thursday 25 April, when Dave Small, Paul Bedell, and Anne Wright made a short visit in mid-afternoon to the James River Park "Wetlands". Almost immediately they saw an adult *Ophiogomphus susbehcha* perched on the ground, but it flew before photos or netting could take place, and it could not be relocated despite repeated searching. A Common Green Darner (*Anax junius*) seen that day was possibly the only one observed during the entire weekend.

The focus of field trips on Friday was the James River and our featured *Ophiogomphus*. Early spring dragonflies found along and near the river were Spine-crowned Clubtail (*Gomphus abbreviatus*), Ashy Clubtail (*G. lividus*), Green-faced Clubtail (*G. viridifrons*), St. Croix Snaketail (*Ophiogomphus susbehcha*), Springtime Darner (*Basiaeschna janata*), and Stream Cruiser (*Didymops transversa*). Nearly everyone who visited the river saw at least one teneral St. Croix Snaketail (seven individuals were observed during the weekend, including the mature adult seen on Thursday). Ken Lebo and Doc Schoch arrived at the Maid-

ens boat landing in Powhatan County first and found a teneral *Ophiogomphus* near the river, the only one seen there despite much searching. It was observed and photographed by the large group of attendees that arrived shortly thereafter. Ken and Doc also found and photographed a male *Helocordulia selysii* (Selys' Sundragon) in a nearby field.

Meanwhile, directly across the river at Tucker Park in Goochland County, Ollie Flint netted an *Ophiogomphus* for the Smithsonian collection, and Paul Bedell netted a *Gomphus lividus* for a county record. At West View, the next stop on the James, Jim Childress and Steve Roble both captured two *Ophiogomphus* (all tenerals). Steve also collected a Green-faced Clubtail (*G. viridifrons*), apparently the only one found during the meeting (county record). Other dragonflies seen in fields or along roads near the river during the weekend included Common Baskettail (*Epitheca cynosura*), Eastern Pondhawk (*Erythemis simplicicollis*), Blue Dasher (*Pachydiplax longipennis*), Blue Corporal (*Ladona deplanata*), and Common Whitetail (*Plathemis lydia*). Damselflies were scarce near the river, with the usual fauna (various species of *Argia*, *Calopteryx*, *Enallagma*, and *Hetaerina*) still in the larval stage. Observations were limited to small numbers of three species:

Cocoa Clubtail (*Gomphus hybridus*), Nottoway River, Sussex County, Virginia. **Top**: Teneral female. Photo by Jim Johnson. **Bottom**: Teneral male. Photo by Ken Lebo.

Fragile Forktail (*Ischnura posita*), Citrine Forktail (*I. hastata*), and Familiar Bluet (*Enallagma civile*).

On Saturday the group went in different directions, with some returning to the James River and another contingent heading to Pocahontas State Park in Chesterfield County and then farther south to Chub Sandhill Natural Area Preserve and the Nottoway River in Sussex County. Only one *Ophiogomphus* was seen at several stops along the James River that day, that being a freshly emerged teneral standing on its exuvia that was found by Steve Roble at Cartersville. A different variety of early species was present at Pocahontas State Park, including Selys' Sundragon, Blue Corporal, Lancet Clubtail (*Gomphus exilis*), Twin-spotted Spiketail (*Cordulegaster maculata*), Brown Spiketail (*C. bilineata*; county record), and Skimming Bluet (*Enallagma geminatum*).

The Nottoway River in Sussex County provided some real excitement! Here Jim Johnson collected a Brown Spiketail (*Cordulegaster bilineata*; county record) and photographed a teneral female gomphid. His excellent photos, including one of the subgenital plate, were sent to Dennis Paulson who identified it as a likely Cocoa Clubtail (*Gomphus hybridus*)! At the same location later that day, Ken Lebo and Doc Schoch photographed a teneral male *G. hybridus*. These photographs, which were submitted to Odonata Central, represent a NEW STATE RECORD for Virginia! Whether this represents a range expansion or is the result of greater observer effort is conjectural, but this addition to Virginia's odonate fauna joins a long list of southern species being recorded farther north, as compared to a very short list of northern species being added to the state list in recent years. This species may be expanding its range northward because it has been found farther north in North Carolina in the past few years as compared to historical collection records (mostly by the late Duncan Cuyler) in that state (H. E. LeGrand, Jr. *et al.*, 2013. The Dragonflies and Damselflies of North Carolina, 4th Approximation. <http://ncparks.gov/odes/4th.pdf>). Virginia now has an impressive odonate species list total of 194 (excluding subspecies). It just goes to show you that it is worth hosting a DSA meeting!

On Sunday, our delightful cool, sunny weather which had prevailed for Friday and Saturday turned cloudy with a threat of rain. Steve Roble and Tim Vogt returned to the James River and went farther west, but were met with overcast or rainy conditions. The rest of the group opted to go east to Charles City County and visit the Rice Center of Virginia Commonwealth University and the nearby Harrison Lake National Fish Hatchery. They enjoyed seeing the insect collection at the Rice Center, and when the sun would occasionally poke through the clouds, the

odonates would start flying, including Harlequin Darner (*Gomphaeschna furcillata*). Species seen at the fish hatchery ponds included Eastern Forktail (*Ischnura verticalis*), an uncommon species in eastern Virginia, and numerous teneral Calico Pennants (*Celithemis elisa*).

The meeting was a great success, a good time to meet old and new friends, share tales of each day's adventures and discoveries, and a good start to the 2013 field season!

Southeast regional DSA meeting group photo (attendees still remaining on Sunday morning). Photo by Dave Biggs.

Winter Habits of *Cordulegaster* Larvae in Central New York

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The winter habits of *Cordulgaster* (spiketail) larvae were studied in a small stream in the Finger Lakes Highlands of New York State. Multi-year sampling included collection, examination and return of live larvae of three species of *Cordulegaster*. Of identifiable late instar larvae, the majority were *C. maculata* (Selys, 1854), Twin-spotted Spiketail, followed by *C. obliqua* (Say, 1840), Arrowhead Spiketail, then *C. diastatops* (Selys, 1854), Delta-spotted Spiketail. Adult *C. erronea* (Tiger Spiketail) were observed flying near the study area, but no mature larvae were found.

My objective was to unveil winter life history and specific microhabitat use by larvae. Due to variations in weather, water flow and other conditions in the study area, I determined the project should cover at least four winters to ensure adequate coverage of environmental conditions. Each year sampling began after autumn leaves were washed away by a flooding event and continued throughout the winter and early spring until vegetative growth or the flight season began in mid-May. The study ran from November 2004 through May 2010, with some time off in 2008 and 2009 due to drought. The following is a synopsis of my findings.

Location of Study

The study area is located in the Finger Lakes Highlands of New York State, 0.8 km E of the watershed divide between Seneca and Cayuga Lakes, with water from the site draining east into Cayuga Lake. Coordinates: 42° 26' 47" N, 76° 45' 12" W, elevation 463 m.

Along 360 m of a wooded secondary stream the elevation drops by less than 3 m, allowing sediment to gather at slow points along the banks. There are few obstacles such as waterfalls to impede movement of larvae upstream. Logjams and debris piles are transitory, sediment banks shift and relocate with flushing events, and flow rates vary throughout the seasons.

The stream is shrouded by a canopy of deciduous secondary forest of young trees growing since the formerly

farmed fields were allowed to go fallow in the 1930s. Natural succession has produced a mesophytic forest of Sugar Maple (*Acer saccharum*), Ash (*Fraxinus* spp.), Hickory (*Carya* spp.), etc. with a rapidly growing encroachment of European Buckthorn (*Rhamunus carthatica*). Average height of mature trees is 9 m with a groundcover of mixed-age, deer-browsed young trees. Ground vegetation near the stream consists of a variety of mixed vegetation dominated by Spotted Jewelweed (*Impatiens capensis*), Skunk Cabbage (*Symplocarpus foetidus*), ferns, Multiflora Rose (*Rosa multiflora*) and a recent introduction of non-native Garlic Mustard (*Alliaria petiolata*). While in winter all but the ferns and the rose are absent, during the summer months canopy cover is nearly complete, with small beams of sunshine filtering through leafy branches.

The streambed is clay-based Erie and Marden silt loam scattered with mixed rocks typical of glacial till. It supports a healthy prey base of stonefly (Plecoptera), mayfly (Ephemeroptera) and fly (Diptera) larvae and is home to Two-lined Salamander (*Eurycea bislineata*), Black-nosed Dace (*Rhinichthys atratulus*) and crayfish (*Orconectes* sp.). During the winter the Dace retreat downstream but are present during the warmer months.

Most of the year the stream maintains a width of around 2 m and a depth of 1 to 2.5 cm. In severe drought most water disappears from many areas but seeps continue to flow, providing small pools and a thin trickle of water. At the opposite extreme are the many flushing events that rearrange the entire landscape. This occurs during snowmelt and occasionally during spring or fall rains.

Water quality appears to be overall very good despite the heavy use of liquid manure slurry laced with farmyard chemicals spread on the fields surrounding the area. There have been several occasions where the stream has developed mounds of brown foam during runoff events, but the water has not been tested for contaminants.

Winter habitat of *Cordulegaster* larvae. Photo by Sue Gregoire.

General Biology of *Cordulegaster* Larvae

Cordulegaster larvae prefer slow to medium-flowing streams within a wooded landscape and are well equipped for shallow burrowing into loose sediment within the streambed. All parts of the larvae, except the eyes, antennae and anal opening, are densely covered with hairy setae that attract and hold allochthonous particles which aid in camouflage. The antennae and legs are short, aiding in burial and reducing the chances of breakage during flooding events.

They are efficient predators with deep irregular interlocking teeth on the distal margin of the labial palps (Needham *et al*., 2000), well designed for capturing and holding prey. Prey species consist mostly of Ephemeroptera, Plecoptera, Trichoptera, Odonata, Diptera and others (Burcher and Smock, 2002). F-0 larvae can reach up to 42 mm in overall length, depending on species. Females possess a rudimentary ovipositor.

Sediment banks of primary and secondary forested streams are known to be the preferred habitat of *Cordulegaster* larvae during their multi-year long life cycle. These larvae hunt prey by burrowing into the sediment and covering their bodies with loose grains while leaving their eyes, antennae and terminal abdominal appendages above level. In this manner they lie hidden, watching for passing prey, while breathing through the anal openings to their internal gills.

The length of the larval life cycle varies between two to five years (Silsby, 2001), depending on latitude. Past studies of *Cordulegaster* larvae have indicated that they go through somewhere between 12 to as many as 15 or 16 molts (summarized in Glotzhober, 2006).

For the most part cordulegastrids are "spring species" (Corbet, 1999), which emerge early in the flight season. Such is the case for *C. diastatops*, *C. maculata* and *C. obliqua*, the most common species in this area. The exception is *C. erronea,* which emerges a bit later and has a flight season into September (Dunkle, 2000; Glotzhober, 2006). There are only five veri-

fied records of *C. erronea* in New York State (White *et al*., 2010), one of which was a female found in one of our avian mistnets in 2007. A male was found nearby in 2011.

Methodology

Sampling began at the furthest point downstream and progressed upstream so as not to cloud the area being worked. Wading upstream, at each deposit of sediment a dipnet was used to collect a fist-sized sample of the top 3 cm of mud which was carefully emptied into a white tray and visually scanned for movement. Any larvae within the sample were lifted out and placed in a vial containing at-temperature stream water. The tray of sediment was then gently emptied back into the area from which it came and the site marked with an upright stick.

With each survey water temperature was recorded and with each specimen collected, behavior and habitat notes were made. Vials of larvae were taken to the lab for brief mensuration and examination then returned to the exact location of discovery. Care was taken not to injure live larvae.

Results

In the Lab

All keys carry the caveat "to mature larvae". Most are based on Walker (1958), with updated illustrations and/or added comments. With larvae of three and possibly four species co-inhabiting a stretch of stream, problems recognizing species and stadium were considerable, except in late instar. No young larvae had all the requisite characteristics to define them to species and there was size overlap until about F-3, when morphological differences developed. Thus I confirmed that young larvae could not be positively separated to species or assigned a stadium.

Field Results

Preferred microhabitat of larvae

There were seven distinct combinations of sediment and debris in which larvae were found. In order of larval preference they were:

1. Base of plant: single hummocks of grass and sedges scattered along the bottom of the rocky stream and exposed roots of streamside vegetation were overwhelmingly preferred by *Cordulegaster* larvae (34%) in the winter months. Prey base is abundant.

2. Clean sediment: at 24%, deposits of sediment with no debris and few prey were second in rank of preference. No prey.

3. Bank overhang: most overhangs occur at bends where rushing water scoured and excavated the bank. The majority of overhangs have little to no soft sediment left for burrowing, but some of the more long-standing overhangs have small deposits of sediment at their base. Despite being unstable and low in prey this microhabitat was favored by 20% in winter.

4. Lee of rock or log: some of the largest larvae were hiding in deposits created on the downstream side of rocks and logs. Water flow here was usually strong and variable, and not particularly hospitable, especially in winter (11%), and was low in prey.

5. Debris dam: in constant reconstruction, debris dams were not highly favored even though the prey base was comparatively high, particularly in caddisfly (Tricoptera) larvae. Few larvae (only 4%) were found here.

6. Sediment with debris: litter is especially attractive to caddisfly (Tricoptera) larvae but was very low in *Cordulegaster* larvae, also only 4%.

7. Pool with sediment: previous researchers mention pools as ideal *Cordulegaster* larval habitat (Silsby, 2002; Marczak *et al*., 2006) but only 3% were located in pools, despite an abundance of prey species.

There was no size class preference to a particular microhabitat. All seven categories held larvae of all sizes, sometimes large and small together.

Behavior

During the study the stream was subjected to dozens of flushing events and two severe droughts. Despite this the number of larvae per season remained steady until the last year. After a drought in 2008 the density of larvae fell and during the flight season of 2009 no adults were seen. Another drought befell the region that year so the surveying came to a halt. A minimal survey took place in 2010 but the numbers were so low that fieldwork ended.

Larvae sharing microhabitat

Some inter-specific predation occurs amongst odonate larvae, especially if there is high larval density and/or a size difference between individuals (Corbet, 1999). Intraspecific predation by *Cordulegaster* larvae was noted by Glotzhober (2006) in the laboratory environment, and in their field work Marczak *et al*. (2006) noted it was unusual

to find different-sized larvae together.

In the current study, coexistence took place throughout the year and in most microhabitats. Coexistence was noted only when two or more larvae were within the same single scoop of the dipnet. There was a large disparity in size between some of the larvae. The largest difference in length was between an 8 mm larva alongside one that was 27 mm and a third at 12 mm. Larvae of the gomphid *Lanthus parvulus* (Northern Pygmy Clubtail) also shared space with assorted sizes of *Cordulegaster* larvae on three occasions.

Drought

After a five month drought in 2005, two small torpid larvae were found in rigid sediment under a bank overhang in December; another was found in January, also under a bank overhang but above the waterline. Presumably these larvae sought refuge as the stream dried and conditions had not improved enough to stimulate them into activity. Remaining in aestivation well into winter would indicate that at this latitude, some *Cordulegaster* larvae can go into a facultative aestivation/diapause during periods of environmental stress.

Freshly molted larvae and early instars

Despite conditions that might have induced diapause during very cold weather, a number of larvae were found to have recently molted. For a short time after a molt the chitin is clean and greenish-yellow and appears quite thin, allowing movement of the internal organs to be observed through the exoskeleton. Chitin of an older instar is thick and opaque, and covered in silt. Discovery of several freshly molted larvae during the very coldest and darkest time of winter indicated larvae at this latitude do not enter winter diapause.

On the other hand, very early instar larvae were found throughout the winter. The smallest larvae found within the cold months, including the month of May and close to the emergence season, were a mere 4 mm in length. The very small size of these larvae found just before the reproductive period would indicate a very slow rate of growth from the previous summer when the eggs were laid. At almost a year old but only 4 mm in length, a small larva in May has taken one of two routes in development. Either it overwintered in a state of diapause or it developed as the slower component of a split cohort.

Cordulegaster larvae of three sizes. Photo by Sue Gregoire.

Development

Seasonal regulation included a high level of molt activity at the end of May. The search along the shoreline for exuviae left by emerging adults was unsuccessful but I found six interstadial exuviae among debris at the bottom of small pools and eddies in the stream. These all took place between 24 May and 5 June, which corresponds with the emergence season for the spring species. In addition to those, five freshly molted larvae were found within this time frame.

Photoperiod within these dates hovers around 15 hours. When Norling (in Corbet, 1999) looked at the larvae of *Leucorrhinia dubia* (Small Whiteface) from two different latitudes in Sweden, he found the critical photoperiod for response for larval development at latitude 58° to be 16 to 17 hours, while at 67° it was close to 24 hours. At the higher latitudes larvae employed a winter diapause, and it took this amount of light to stimulate the growth cycle.

Studies performed at different latitudes have revealed a typical larval cycle to take two to five years. This would make the genus partivoltine at the higher latitudes and includes diapause in the winter while at the lower latitudes growth continues throughout the winter, allowing the larva to adopt a semivoltine life cycle.

Since *Cordulegaster* larvae at this latitude (42°) continue growth throughout the winter, except in cases of environmental stress, it appears that 15 hours of daylight is the critical photoperiodic cue to stimulate a response for growth and emergence. While I have no proof, I suspect that during the winter months larval growth may be running at a slower pace than in the warmer time of the year; that they eat less and grow at an advantageous but unpredictable rate. The synchronized molt at the end of May could indicate the hormonal switch to a more active and rapid rate of development.

As indicated earlier, the population has suffered a great deal from recurring drought conditions. As of 2012, only a few adults of *C. diastatops*, *C. maculata* and *C. obliqua* were seen and no *C. erronea* were located. The habitat and water quality remains constant, so there is hope the popu-

lation recovers. Since this genus takes multiple years for the larvae to mature, only time will tell.

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Cerulean Dancer, *Argia anceps*, a New Species for the United States

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On 28 March 2013, Bailowitz and Danforth discovered a Cerulean Dancer (*Argia anceps*) along the San Pedro River about 16 miles north of Benson, Cochise County, Arizona. The late March date was surprising as well as the location, which is close to 200 miles north of the northernmost record for the species in Mexico. This is a mid- to large-sized blue damsel with all abdominal segments bright blue except for apical black rings on the abdomen. It has strongly amber-tinted wings (Westfall and May, 2006). This individual was a light blue color with gold bordering each side of a black mid-dorsal stripe, suggesting it was a slightly immature male. Danforth took photos of the damselfly and Bailowitz collected the specimen. *Argia anceps* is a species very well known to both men, as it occurs regularly in southern Sonora where the two have investigated for odonates for more than 10 years.

Argia anceps (Cerulean Dancer), Muleshoe Ranch, Cochise County, Arizona. Photo by Pierre Deviche.

The two field workers discussed the possible origins of this damselfly. Fewer than 15 miles NNE of this San Pedro River location lies Muleshoe Ranch, and Hot Springs Canyon at the heart of the Ranch empties into the San Pedro River less than 10 miles downstream. Might this lone individual have come from Muleshoe Ranch, that hotbed of subtropical species? This actually seemed reasonable, as other odonatists had found so many subtropical species just this past October in several locations at the Ranch. These species included White-tailed Sylph (*Macrothemis pseudimitans*), Carmine Skimmer (*Orthemis discolor*), and Mayan Setwing (*Dythemis maya*) (Bailowitz *et al.*, 2013). Maybe there was also an undiscovered population of *A. anceps* in that canyon.

Danforth put the discovery out on the Southwest Odes discussion site with a short descrip-

tion. Being completely unfamiliar with Cerulean Dancer, Deviche went to his 13–14 October 2012 photos from Bass Canyon to look at the shots he had thought were another almost entirely bright blue species, the Sierra Madre Dancer (*Argia lacrimans*); that species had been verified only once before at Muleshoe Ranch. Sure enough, instead these were Cerulean Dancer, a species unknown to him at the time. They were bright sky blue, the top of the head was uniform blue, S7 was all blue dorsally except for the black apical ring, and the wings were amber.

Deviche then checked his 23 September 2012 photos of a mature male that he had also identified as Sierra Madre Dancer from Sycamore Canyon west of Nogales, Santa Cruz County, Arizona, and found that this individual, too, showed the characteristics of the Cerulean Dancer! He was able to capture the dancer and photographed the appendages, which proved to be a solidifying factor for the identification. A second Sierra Madre-type male was briefly observed that day, but as true *A. lacrimans* is also known from that canyon, no exact determination of that individual can be made.

Argia anceps (Cerulean Dancer) immature male, San Pedro River 16 mi N of Benson, Arizona. Photo by Doug Danforth.

So, in the space of seven months a previously unknown species for the United States has been recorded in southern Arizona three times and in two different counties.

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Perch Persistence in a Megapodagrionid Damselfly

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As so little is known about the biology of neotropical odonates, especially damselflies, we put this on record.

On 1 September 2012, one of the participants on a dragonfly nature tour discovered a male *Heteragrion mitratum atroterminatum* Donnelly, 1992 (Megapodagrionidae), at the Canopy Lodge (elevation 590 m) at El Valle de Antón, Cocle, Panama.

The damselfly was perched on a rock in a river that runs through the grounds of the lodge. The river was about 5 m in width, with a moderate gradient and many exposed rocks, creating a long, tumultuous riffle. The rock used by the damselfly was about 30 cm in diameter, close to one bank, barely protruding above the water and sheltered above by overhanging shrubby vegetation.

The *Heteragrion* was first seen at midday perched in the sun on the downstream edge of the rock, only a few centimeters above the water. It was photographed by numerous people on the tour, remaining on the rock well into the afternoon.

Later that afternoon a light rain began, and we were sur-

Heteragrion mitratum female, Cocle, Panama, Canopy Lodge, El Valle de Anton, 1 September 2012. Photo by Dennis Paulson.

prised to see the *Heteragrion* persist on the rock during it. Dinner called, and by the next morning the river was in flood, all but the biggest rocks covered by a torrent. The flood waters subsided that day, and the male was back on the same rock when it became exposed.

It was seen in exactly the same position again on 2 and 3 September, but on the afternoon of 3 September, a heavy rain fell that flooded the river again through 4 and 5 September. The rock became exposed again on 6 September, and the male was back on it, also on 7 and 8 September, when we departed. It was reported seen throughout the day, easily visible from a bridge over the river.

Thus this single male, surely the same one, remained (at least much of the time) in the same position on the same rock for at least eight days, and, lacking studies on marked individuals, this may be the only such record of what might be megapodagrionid territoriality. A single female was seen nearby on a narrow, quiet tributary of the river on 1 September.

Heteragrion mitratum male, Cocle, Panama, Canopy Lodge, El Valle de Anton, 1 September 2012. Photo by Netta Smith.

Other males were seen on another river in the area, possibly the Rio Indio, on 6 September. Their perch sites were on rocks or vegetation, very close to or over the river, suggesting that the Canopy Lodge individual was typical.

First Record of the White-faced Meadowhawk (*Sympetrum obtrusum*) for Oklahoma, and a Review of the Status of the Cherry-faced Meadowhawk (*S. internum*) in the state

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During a routine stop at Lake Elmer, Kingfisher County, Oklahoma, on 22 September 2012, we came upon five small, red meadowhawks of the RuWhiChe [ru-WEE-chee] persuasion, the closely related and highly similar (see Pilgrim and Von Dohlen, 2007) Ruby, White-faced, and Cherry-faced Meadowhawks (*Sympetrum rubicundulum*, *S. obtrusum*, and *S. internum*, respectively). We were intrigued, as the Cherry-faced Meadowhawk is rare in Oklahoma, where fewer than a dozen had been recorded prior to autumn 2012. Not long after we moved to Oklahoma from New Hampshire, we failed to appreciate just how rare these meadowhawks were in the southern Great Plains. We were accustomed to seeing RuWhiChes in New England, so when we saw a lovely male Cherry-faced Meadowhawk at the Salt Plains National Wildlife Refuge, Alfalfa County, on 23 October 2004, we did not think to capture it. It was not until years later, after we had begun to compile the state's records in earnest, that we realized the magnitude of our blunder. And we had encountered no RuWhiChes again until the five at Lake Elmer.

An 1877 specimen (USNM 487037; see end of article for abbreviations), with the vague locality of "Red River," provided the first record of *Sympetrum internum* for Oklahoma. The species was not recorded again until October 1950, and this despite all of the Odonata work done in the 1920s and 1930s by Ralph D. Bird, A. Earl Pritchard, A. I. Ortenburger, and colleagues. That October, the venerable George H. Bick noted an influx of *S. internum* into the state (Bick and Bick 1957; G. H. Bick personal notes, housed at IORI). Between 8 and 15 October, six people ("The Baumgartners," Coats, F. E. Stuart, H. T. Russell, and H. S. Hervey) collected 16 specimens in Cleveland and Payne Counties that Bick examined (and later discarded or lost, as per his notes). Bick's notes for this species indicated that the only other record for Oklahoma known to him was of a female, now an IORI specimen, collected on 24 September 1967 by L. Alleman in Oklahoma City, Oklahoma County.

Hence, our 2004 sight record marked the first *S. internum* recorded in the state in 37 years. Five years later, on 2 October 2009, Mark Dreiling photographed a male at Oxley Nature Center, Tulsa County (OC 315323). Two years after, James W. Arterburn and Ken Williams photographed a male RuWhiChe (OC 374661) in Nowata County that was likely *S. internum*, but it could not be

confirmed by the photos. But a few days later, on 23 October at 7.5 km east of Lenapah, Williams collected three males that he sent to Dennis R. Paulson, who confirmed them as *S. internum* (DRP 29). And then there was the autumn of 2012; during September and October there were 14 confirmed records of *S. internum*, including five new county records: Custer (1♂; Washita National Wildlife Refuge; 5 Oct.; Bill Carrell; OC 382079), Garfield (2♂; Drummond Flats Wildlife Management Area; 2 Oct.; Jason R. Heinen; OC 382025, SP 502, 503), Grant (1♂; Three Lakes, 14 km SW of Medford; 11 Oct.; Jason R. Heinen; OC 382089, SP 504), Kay (2♂; Legion Park, Blackwell; 15 Oct.; Jason R. Heinen; OC 382108, SP 505, 506), and Kingfisher (details below).

Our botched opportunity in 2004 was remarkably fresh in our minds, enough so that when we spotted the first RuWhiChe at Lake Elmer on 22 September we were determined to collect it. We did just that, along with two of the four others. The first and last individuals we saw that day were definitely *S. internum*, with the frons deep red. One (OC 381934, SP 429) we confirmed by examination of the hamules. Two others had the frons yellowish, whereas one had the frons a gleaming white, something that caught our eye and captured our imagination instantly. We caught the white-faced individual first because we suspected we had Oklahoma's first White-faced Meadowhawk, which we confirmed in hand and later in the lab (Fig. 1; OC 381935, SP 431). After a fair bit of effort—all of these males were skittish and active—we captured one of the yellow-faced individuals (SP 430).

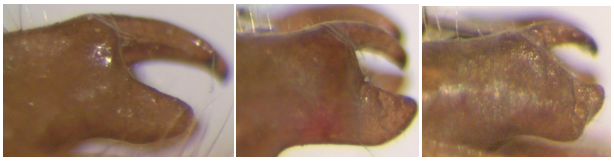

Figure 1. Comparison of hamules of three *Sympetrum* collected at Lake Elmer, Kingfisher County, Oklahoma, 22 September 2012. Left: *S. internum* (SP 429), middle: undetermined yellow-faced (SP 430), right: *S. obtrusum* (SP 431).

Its identification still eludes us. Discussions with Dennis Paulson, John C. Abbott, and Thomas W. "Nick" Donnelly have leaned towards calling it *S. obtrusum*, but it may be a hybrid (to be determined when Donnelly has a chance to examine the specimen) or perhaps even *S. rubicundulum*.

A record of a White-faced Meadowhawk for Oklahoma was not entirely surprising, yet the Lake Elmer record extended the southern record on the Plains by at least 240 km, from the former southern-most in Stafford (Beckemeyer, 1995) and Crawford (Beckemeyer and Todd, 1996) Counties, Kansas. That this male (and perhaps a second and third one, if the yellow-faced males prove to be *S. obtrusum* and not hybrids) occurred during Oklahoma's second influx of Cherry-faced Meadowhawks emphasizes the importance of studying every RuWhiChe carefully.

Abbreviations:

IORI, International Odonata Research Institute, Gainesville, Florida; OC, OdonataCentral <http://www.odonatacentral.org/>; SP, Smith-Patten/Patten Collection, Oklahoma Biological Survey, University of Oklahoma, Norman; DRP, Dennis R. Paulson Collection, soon to be at IORI; USNM, National Museum of Natural History, Smithsonian Institution, Washington, DC.

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Photos Needed for Argia

Do you have high-quality photos of odonates that you'd like to showcase? We are always looking for great photos to use on the front and back covers of Argia. Contact Celeste Mazzacano <celeste@xerces.org> if you'd like to make a contribution. Please note that even though Argia is now digital only, we still strive for high-quality images that will have good resolution when printed. Images in TIFF format are best, but JPEGs work too as long as they are high quality and compression artifacts are limited. Resolution must be 300 ppi at about the sizes you see printed in this issue (no more than 6.5 inches in width).

An Excursion to Açude da Concórdia, Valença municipality, Rio de Janeiro, Brazil, with a short note on the Behavior of *Coryphaeschna perrensi* and *Aphylla theodorina*

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Shortly before the beginning of the famous carnival festivity in Rio de Janeiro, returning to my home after the end of a workday at the Museu Nacional, in line at the train station ticket office, I received an unexpected invitation from a friend about an excursion collection to the Parque Natural Municipal do Açude da Concórdia (PANAMAC), Valença, Rio de Janeiro, Brazil (22° 20.885' S, 43° 45.756' W, 765 m above sea level), between 1–3 February 2013. The excursion was planned by a doctoral student at the Museu Nacional who does research on plants at that location, and she was looking for teammates to help her in her field activities. I promptly accepted the invitation, very excited.

On 1 February we left the Museu Nacional, which is located in the neighborhood of São Cristóvão, in the northern area of the Rio de Janeiro municipality, bound to PANAMAC, located in the Serra da Concórdia, Valença municipality, southern part of Rio de Janeiro state. Housing the PANAMAC, the Serra da Concórdia is a well known sightseeing region (Valença, 2011). We hit the road in the morning, and after a journey of about three hours, we finally arrived in the expected location. As soon as we entered through the main gate, we were amazed with the fascinating surrounding landscape. The scenery is surrounded by the rounded hilltops of the Serra da Concórdia, with predominance of a dense vegetation over few isolated pasture locations. PANAMAC has permanent environmental protection for its remaining native Atlantic Forest (Baffa, 1994; Oldrini and Mascarenhas, 2005).

After stowing the luggage in our accommodations, I immediately got my collection equipment and went looking for dragonflies. I was equipped with an aerial net, triangular entomological envelopes and a box to store them, and dressed with a sleeveless shirt, light trousers and a pair of wellies. On that day I remained next to the accommodation and explored about 60 m along the dam's marginal vegetation. During the collection, through the reflection of the sun, I observed an Aeshnidae with robust aspect stained red-orange flying over the locality. It was a male *Coryphaeschna perrensi*. Their strict territorial behavior was impressive; it seemed to be "king of the dam", with agile and dominating flight. When the areas bounded by specimens of *C. perrensi* were invaded by other large Anisoptera, they were immediately expelled. This hostile and aggressive behavior was also observed by Carvalho (1992).

Although the excursion afforded me only three days in the field, I observed many adult *C. perrensi*, which is not common, because aside from its territorial behavior contributing to the distribution of only a few specimens in an area, adults are not usually abundant in the field, which seems to be part of their biology. However, February is marked as the period of greatest abundance of this species (Carvalho, 1992), therefore the countless specimens that I observed were in a favorable month and high season. Although *C. perrensi* belongs to a family group of "fliers", sometimes patrolling at a height of several meters (Corbet, 1962) and going toward the treetops, I managed to collect two specimens of this species in similar situations, unlike any other capture: I noticed that during some of his patrols it came to meet me at different points and remained hovering in the air, as if it was staring at me and wondering at my presence. I walked slowly towards him and gave a "sharp burst" with my aerial net, which was so accurate it slashed the head off one of the specimens.

In that place I observed also a male *Aphylla theodorina*. These clubtails, black with greenish spots distributed over the thorax and abdomen, spent most of their time perched on the grass that camouflaged them, and hardly interacted with flying skimmers as *Planiplax phoenicura* and *Oligoclada abreviata*. Their flight is usually gliding and not fast or swift; they rarely stay hovering in the air (Belle, 1992a).

Açude da Concórdia. Photo by Barbara Proença.

A few times I could spot it when I was walking down the marginal vegetation, because it perceived my presence and flew further off, as reported in Belle (1992a). Collectors generally only detect it after causing some nuisance in the environment that makes them leave the site, and it was precisely in one of those "nuisances" in the vegetation that I captured the unique example of this species of the trip.

In the second collection day I decided to explore the entire margin of the dam through the Trilha do Açude; it was a pretty bold choice, since the surroundings are approximately 4.2 km. In the early morning I started a journey that would last almost all day, therefore I took some sandwiches, cookies and juice with me and moved on. Along the way it was possible to find sites with grassy vegetation nearby and dense forest. The first stop I made was in a kind of water outlet which lies between the points named "San Francisco" and "Mirante". The site was quite shaded by trees; however, there was an intense flow of dragonflies, and it was in this region that I collected the single male of *Gomphoides infumata* of the trip. This species rarely patrolled the water body and their appearances were usually unexpected and between considerable time intervals, so to capture it I had to wait patiently for some minutes near the marginal vegetation.

Continuing on the trail, I stopped at two more points that caught my attention: the "Mirante", where I collected some libellulid exuviae and observed specimens of *P. phoenicura*, which were very abundant,: and the "Trilha Cova da Onça", an open area about 10 m long. In that place I observed some of the possible specimens of *Erythrodiplax fusca* (Red-faced Dragonlet), *Tramea binotata* (Sooty Saddlebags), and *C. perrensi*, besides collecting many *Acanthagrion lancea* and some exuviae, two of which were from gomphids. I caught sight of them on macrophytes relatively distant from the edge where I was; therewith, I immediately looked for a branch large enough to be able to drive them close to the edge. After examining them in the laboratory I had no doubt that these were exuviae of *Aphylla* (Belle, 1992b), having their life cycle associated most often in lentic environments. In the revision of the genus, Belle (1992a) commented that the projection of the tenth abdominal segment functions as a sort of snorkel, reaching the clean water above the mud.

The last day of the trip was very short, lasting about twenty minutes, since our departure from PANAMAC was scheduled for 10 AM. Therefore I stowed my luggage and immediately headed towards the edge of the dam. As I approached the site I recognized some yellowish skimmers flying quickly on marginal vegetation. They were males of *Idiataphe longipes*, that during the preceding days had remained distant from the margin, actively flying and without presenting any possibility of landing. After a few minutes of concentrated effort I managed to collect two specimens.

During the three days of the trip I collected a total of 39 adult specimens, belonging to four families, 12 genera and 13 species, as follows:

Acanthagrion lancea, 19; *Oxyagrion microstigma,* 1; *Telebasis corallina,* 1; *T. filiola* (Striped Firetail), 2; *Coryphaeschna perrensi,* 2; *Aphylla theodorina* (Ringed Forceptail), 1; *Gomphoides infumata,* 1; *Dythemis nigra* (Blue-eyed Setwing), 1; *Idiataphe longipes,* 2; *Micrathyria artemis* (Artemis Dasher), 1; *Oligoclada abbreviata,* 4; *Planiplax phoenicura,* 3*;* and *Tramea binotata* (Sooty Saddlebags), 1.

In addition to adults, 15 exuviae were also collected, of which two are probably *A. theodorina* and the remaining 13 libellulids.

Acknowledgements

Thanks to Barbara Proença for the invitation to an excursion in the PANAMAC and the photograph of the collecting place. To the colleague and fellow field worker Thiago Xisto, for inviting me on the excursion and help in the field. I am grateful to Dr. Ângelo P. Pinto for help with identification of material, to Dr. Alcimar L. Carvalho for suggestions and critical reading of the manuscript, and to PANAMAC administrators for all the support offered.

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Some Odonata From Belize

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We recently took two trips to Belize and we thought it would be fun and interesting to share information on the dragonflies and damselflies we encountered. During these trips, which included spots in five of the country's six districts, we observed 51 species of the 174 known from the country.

On 30 December 2012 we flew to Belize for another round of our ornithological research, with some oding on the side, of course. Our late arrival left us with little option but to go directly to our favorite hotel, the Orchid Garden Eco-Village, Belize District, where we enjoyed a scrumptious dinner and then promptly went to bed. The next morning we had a brief excursion to the hotel's "Iguana Sanctuary," a wetland behind the hotel. We noted *Argia pulla* (12♂, 1♀), *Ischnura capreolus* (10♀, 1 in hand), *Neoerythromma cultellatum* (Caribbean Yellowface; 3♂), *Telebasis boomsmae* (1♂; new district record), *Neoneura amelia* (Amelia's Threadtail; 2♂), and *Neoneura paya* (1♂), the last one of the odd "pink-orange" types Donnelly (in Boomsma and Dunkle, 1996) reported from neighboring Cayo District. We then headed to Belmopan to collect our research permits before proceeding south to our bird banding field site near Big Falls, Toledo District.

We spent the next week (1–9 January 2013) in the Big Falls area trying to stay out of the rain but failing miserably. Between trudging through what felt like knee-high mud to get to our mist nets, where we were then bloodied up by disgruntled birds, we had a chance to do a little oding. We often had at least an hour or two after the day's bird work to find and try to catch some odes. The main sites we were able to work were an abandoned orange grove and a couple of streams near our field site and the area around our lodging south of Big Falls town. The grove, located along the edge of a patch of regenerated (50+ years) moist forest, was overgrown with grass, which we kicked through on occasion to pick up *Argia pulla/frequentula* females, *Hetaerina titia* (Smoky Rubyspot; 1♂ in hand, 4 January), *Dythemis sterilis* (2♂, 1 January; 2 others, 2 January), and *Erythrodiplax fervida* (Red-mantled Dragonlet; 5♀, 1 in hand, 3–4 January). In the forest we unexpectedly caught a male *Gynacantha nervosa* (Twilight Darner) in one of our mist nets on 4 January.

The two streams that crossed the road to our field site provided us with more odes. When the site was not being flooded by heavy rains these streams were filled with crystal clear water 10 cm to 1 m deep. There was low, moist forest on either side of the road. The streams produced *Argia oenea* (Fiery-eyed Dancer; 5♂, 2♀[2 pairs], 1 January), *A. pulla/frequentula*, *Acanthagrion quadratum* (Mexican Wedgetail; 1♂, 1–3 January), and *Perithemis domitia* (Slough Amberwing; 3♂, 1 in hand, 2 January). At one of the streams we had an odd *Psaironeura* (2–3♂, 2–3 January) that we have yet to confirm to species. The only *Psaironeura* species known from Belize is *P. remissa* (Boomsma and Dunkle, 1996). Unlike *remissa*, the individuals we had did not have red eyes, were dark on the underside of the thorax, and were pruinose on S9 and S10, all potentially artifacts of age, but whereas the appendages are near to those of *remissa*, they do not fully match. Equally puzzling is that the habitat for *Psaironeura* is described as "swamps and margins of grassy ponds surrounded by primary forest" (Garrison *et al*., 2010; similarly described by Förster, 2001), a description that did not fit this site.

At our lodging, provided by Francisca Bardalez and her family, we had few species, but we did get a nightly (rather at dusk) show of 20–25 aeshnids zipping around the cottage and the surrounding *Heliconia* patch. We managed to capture a few of those fast-flying critters: *Triacanthagyna septima* (Pale-Green Darner; 1♂, 1♀, both in hand, 1–2 January), *Gynacantha nervosa* (Twilight Darner; 1♂ in hand, 1 January), and *G. mexicana* (Bar-sided Darner; 1♂ in hand, a first for the district). The only other notable catch at the cottage was a female *Orthemis discolor* (Carmine Skimmer; 1 January). We were surprised when we consulted Boomsma and Dunkle (1996), Förster (2001), and Dennis Paulson's "Middle American Odonata" list <http://www.pugetsound.edu/academics/academic-resources/slater-museum/biodiversity-resources/dragonflies/middle-american-odonata> and found that only *Orthemis ferruginea* had been recorded in the country. After discussing this with John Abbott, we realized this is a taxonomic issue, and we were not in fact the first to record the species in the country (there are even specimens in the University of Texas Insect Collection).

On 5 January we participated in the Punta Gorda Christmas Bird Count. Our focus was on the birds, naturally, so we were only able to identify two species of odonates confidently: *Ischnura ramburii* (Rambur's Forktail; 2♂) and *I. capreolus* (3, 1♂ in hand). We again had *pulla/frequentula*-type *Argia*, which we will have to learn to differentiate; even the cerci are broadly similar. Two other critters captured that day included an immature male that is possibly a *Micrathyria* and a female *Macrothemis*, apparently *M. imitans* (Ivory-striped Sylph). We will continue to work on these identifications from our in-hand photographs.

After leaving Big Falls on the 9th, we had a long drive to northern Belize to reach our other field site. We had a short stop on the way at Cockscomb Basin Wildlife Sanctuary, Stann Creek District where we found little. We really did not have another chance until the 11th when we worked a bit around some of the ponds near La Milpa Field Station in the Rio Bravo Conservation and Management Area, Orange Walk District. On that day we had *Acanthagrion quadratum* (Mexican Wedgetail; 2♂), *Orthemis discolor* (Carmine Skimmer; 2♂), *O. levis* (1♂), and *Perithemis mooma* (4♂) at the open pond in the station's compound. At the aguada in the forest we had *Telebasis boomsmae* (2♂), *T. filiola* (1♂), *Rhionaeschna psilus* (Turquoise-tipped Darner; 2; new district record), *Erythemis attala* (Black Pondhawk; 2), *E. haematogastra* (2), *Erythrodiplax fusca* (Red-faced Dragonlet; 1♂), plus a furtive male *Micrathyria* whose specific identity eluded us (and our photos of it are lousy).

We left La Milpa after lunch on the 11th and headed back to the Orchid Garden for our last night in the country. A couple of hours looking for odes that afternoon and the next morning resulted in mostly the same species as our first visit, but we did add some anisopterans this time. Species recorded were *Argia pulla* (6♂, 2♀, 1♂ in hand; 11 January; 12♂, 2♀, 2♂ in hand, 12 January), an apparent *A. calida* (1♂ in hand, but still working on ID), *Ischnura capreolus* (1♂, 1♀, 11 January; 2♂, 2♀ [1 pair], 12 January), *Neoerythromma cultellatum* (Caribbean Yellowface; 3♂, 11 January; 5♂, 12 January), *Neoneura paya* (1♂, 1♀, 12 January; no *N. amelia* this time around), *Erythrodiplax fervida* (Red-mantled Dragonlet; 1♂ in hand), *E. fusca* (Red-faced Dragonlet; 1♂ in hand), and *Perithemis domitia* (Slough Amberwing; 1♂, 11 January).

Our second trip to Belize this year was in March. This trip was focused on our selective logging and deforestation research in the Rio Bravo Conservation and Management Area. We arrived on 12 March and drove straight to Belize City to meet with the research coordinator for Programme for Belize (PfB) <http://www.pfbelize.org/>, the conservation organization that manages the Rio Bravo. On the 13th, we headed out to La Milpa Field Station. On the way there we stopped for a few minutes at a marshy area near Biscayne Village, Belize District, just off the Northern Highway. We were not able to pick up much, but we did have *Ischnura ramburii* (Rambur's Forktail, 2♂), *I. capreolus* (2♂), and an unidentified *Micrathyria*. Another couple of quick stops in Orange Walk District got us an unidentified *Acanthagrion* (wedgetail), an *Argia* (probably *pulla*; 4♂), another *Ischnura ramburii* (1♂), *Neoerythromma cultellatum* (Caribbean Yellowface; 2♂), *Perithemis mooma* (4♂), *Orthemis ferruginea* (Roseate Skimmer; 2♂, 1♀), *O. levis* (1♂), *Erythemis attala* (Black Pondhawk; 5♂), *Erythrodiplax umbrata* (Band-winged Dragonlet; 1♂), and *Dythemis sterilis* (1♂).

We spent the afternoon of 13 March until the morning of 21 March at La Milpa Field Station. While there we surveyed a handful of aguadas, a large stream, and the station compound in between our bird work. We had 36 odonate species, many of which we had in hand and photographed: *Hetaerina occisa* (4♂), *Lestes* (probably *tikalus*; 1♂, beat up and quite pruinose), *Mecistogaster modesta* (1♀; new district record), *Neoneura amelia* (Amelia's Threadtail, 12), *Acanthagrion quadratum* (Mexican Wedgetail, 2♂), *Argia eliptica* (1♂), *A. frequentula* (18 total: 4♂, 2♀, 2 pairs, 12 unsexed), *Enacantha caribbea* (21♂, 3♀), *Ischnura capreolus* (1♂, 1♀), *Telebasis boomsmae* (1♀), *T. filiola* (4♂, 1♀), *Anax concolor* (Blue-spotted Comet Darner; 1♂), *Coryphaeschna adnexa* cf (Blue-faced Darner; 1), *C. diapyra*, cf (1♂), *C. viriditas*, cf (Mangrove Darner; 1♂), *Gynacantha nervosa* (Twilight Darner; 1♀), *Rhionaeschna psilus* (Turquoise-tipped Darner; 1), *Dythemis sterilis* (2♀), *Erythemis attala* (Black Pondhawk; 13♂, 2♀, 3 unsexed), *E. haematogastra* (1♂, 2♀), *E. plebeja* (Pin-tailed Pondhawk; 1♂), *E. vesiculosa* (Great Pondhawk; 5♂, 3 unsexed), *Erythrodiplax fusca* (Red-faced Dragonlet; 1♂), *E. umbrata* (Band-winged Dragonlet; 9), *Miathyria simplex* (6), *Micrathyria aequalis* (Spot-tailed Dasher; 1♂, 1♀), *M. didyma* (Three-striped Dasher; 2♂), *Orthemis discolor* (Carmine Skimmer; 1♂), *O. ferruginea* (Roseate Skimmer; 2♂, 1 unsexed), *O. levis* (2♂), *Pantala flavescens* (Wandering Glider; 18), *Perithemis domitia* (Slough Amberwing; 11), *Perithemis mooma* (4♂), *Perithemis* sp. (16♂), and *Tramea onusta* (Red Saddlebags; 1♀). The highlight of our visit to La Milpa was finding a small population of *Psaironeura* that looked just like those in Toledo district we came across in January. These individuals, 4♂ and 1♀, were found in a small, mostly dry aguada near the main dirt road through the Rio Bravo, but was tucked into some rather good forest—good enough for an Ornate Hawk-Eagle (*Spizaetus ornatus*) nest!

On 20 March we took a day off, so to speak, by participating in a "Birding Big Day" as a fundraiser for the Belize Raptor Research Institute <http://belizeraptorresearch.org/>. The day was spent looking for birds around La Milpa Field Station and the area surrounding Blue Creek Village, including the fields, hydroelectric dam, and artificial lake owned by the community. We identified the following: *Hetaerina titia* (Smoky Rubyspot; 2♂), *Ischnura capreolus* (1), *Neoerythromma cultellatum* (Caribbean Yellowface; 12♂), *Micrathyria* sp. (1♂), *Miathyria simplex* (6), *Pantala flavescens* (Wandering Glider; 2), and *Tramea binotata* (Sooty Saddlebags; 1).

On the morning of the 21st we headed down to PfB's other research station at Hill Bank. On the way there and

during our stay for a day we observed: *Hetaerina occisa* (1♂), *H. titia* (Smoky Rubyspot; 3♂), *Heteragrion alienum* (1♂), *Mecistogaster modesta* (1♂), *Neoneura amelia* (Amelia's Threadtail; 2♂), *Acanthagrion* sp. (wedgetail; 3♂), *Argia frequentula* (2♂, 2♀), *A. pulla* (4♂, 1♀), *A. translata* (Dusky Dancer; 2♂), *Dythemis nigra* (1♂), *D. sterilis* (4♂), *Erythrodiplax fusca* (Red-faced Dragonlet; 1♂), *E. umbrata* (Band-winged Dragonlet; 1♂, 1♀), *Erythrodiplax* sp. (8), *Micrathyria* sp. (1♂), *Orthemis ferruginea* (Roseate Skimmer; 2♂), *Perithemis domitia* (Slough Amberwing; 6♂), and *P. mooma* (1♂). Additionally we observed, although not until a week later, two botflies that had burrowed into Brenda's skin (extracted 13 days later as stage-2 larvae).

Between the afternoon of 22 March and the late morning of 24 March, we were in Cayo District at the Belize Botanic Gardens and the adjacent lodge, DuPlooy's Jungle Lodge. We did not have the best of luck with odes at this spot, but there was a bit of a spectacle that we enjoyed. One of the mornings we walked down to the Macal River and had at least 50 *Neoneura amelia* (Amelia's Threadtail) skimming the water. What a pretty sight! Other species identified were more or less the usual suspects: *Acanthagrion* (none in hand, so left unidentified; 8), *Argia translata* (3♂, 1♀ [1 pair]), *Brachymesia furcata* (Red-tailed Pennant; 1♂), *Dythemis sterilis* (11♂), *Erythrodiplax fusca* (Red-faced Dragonlet; 4♂), *Micrathyria aequalis* (Spot-tailed Dasher; 1♂), *Orthemis discolor* (Carmine Skimmer; 9♂, 2♀), *O. ferruginea* (Roseate Skimmer; 3♂), *O. levis* (11♂, 1♀), *Perithemis domitia* (Slough Amberwing; 7♂), and *Perithemis* sp. (5).

And finally, on 24 March we headed back to Belize District to our usual end-of-trip haunt of the Orchid Garden. On the way there we had a brief stop at the Tropical Education Center, but the heat was so oppressive (an unbelievable, for Belize, 100+°F) that we did not last but 15 minutes. The odes were hidden away or obelisking, so we only recorded six species. Later that day and early the next morning we oded a bit at the Orchid Garden, also only having six species. We added one new species, *Enallagma novaehispaniae* (Neotropical Bluet; 1♂) to our running Orchid Garden list, but otherwise we had the same species as with previous visits (*Neoneura amelia*, *Argia pulla* cf, *Ischnura capreolus*, *Neoerythromma cultellatum*, *Erythrodiplax fusca*, *Orthemis ferruginea*, *O. levis*, and *Perithemis domitia*).

We will be travelling again to Belize later in the year. Again, we will be primarily focused on birds, but we hope to start focusing more attention on Odonata. We have a proposal pending that would fund intensive surveys of the dragonflies and damselflies of the 260,000-acre Rio Bravo reserve, and eventually we hope to survey the whole country. If we receive the grant, then we will train some Belizean students and field technicians to assist us with the project that will include not only basic documentation but monitoring of populations as well. The project will provide for educational and conservation activities that will include a "Dragon Watch" program. This program will be taken to schools surrounding the Rio Bravo as a means of introducing invertebrate ecology to school children. The program will extend to older children and the general community by conveying the message UNHEALTHY DRAGONFLIES = UNHEALTHY ENVIRONMENT = UNHEALTHY HUMANS, i.e., the idea that dragonflies are indicators of ecosystem health.

If anyone has visited the Rio Bravo (La Milpa or Hill Bank field stations) or the nearby areas such as Gallon Jug or Chan Chich, please let us know if you have field notes or photographs that you would be willing to share. We will keep you updated on our visits to Belize and the progress with the project.

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Bonkers in Belize–Part 2, or "And I Eat Every Day, Too!"

Jerrell J. Daigle <jdaigle@nettally.com>

This time, I was joined by my good friends, Phoebe and George Harp of Arkansas. We flew into the airport at Ladyville, rented a car, and got our rooms at the fancy Global Village Hotel. We highly recommend this place. It is run by folks from Taiwan. Our hostess, Joyce, was most helpful and the staff was very accommodating. They served us egg sandwiches, orange juice, and tea for breakfast, did our laundry, and provided 24 hour security for vehicles inside the compound. They wished us lots of luck catching "Ching Ting" which is Chinese for dragonfly! We got our supplies at the Sky Supermarket across the street and we had lunch every day at a Chinese restaurant run by an affable guy named Benny! After several days eating lunch here, we asked him if he was open on the weekends. He said, "I am open every day, every day!" Then, George quipped, "and I eat every day, too!"

The nice thing about a rental car is that we could fix our own schedule and go where we wanted. We spent most of our time at the gated community near the hotel, collecting along the manicured canal. We found almost all the species I had gotten earlier on my previous trip here (Argia 24:4). Damselflies included the rare *Telebasis collopistes*, *T. digiticollis*, *T. filiola*, *Argia gaumeri*, *Ischnura capreolus*, and the yellow-faced *Neoerythromma cultellatum* (Caribbean Yellowface). Dragonflies included *Brachymesia herbida* (Tawny Pennant), *Erythemis peruviana* (Flame-tailed Pondhawk), *Miathyria marcella* (Hyacinth Glider), *M. simplex*, *Micrathyria aequalis* (Spot-tailed Dasher), and *Tauriphila australis* (Garnet Glider).

One day, we went past Burrell Boom to see if anything was flying at the two streams I found the last time. However, the small one was almost dry with just a couple of *Argia gaumeri*. The larger deep one was still deep with water, but it was not flowing at all and no activity. Luckily, we found a side ditch with lots of *Argia gaumeri*, *A. frequentula*, and *Eythrodiplax fusca* (Red-Faced Dragonlet), and George got a nice *Erythemis haematogastra*. On our way back to Ladyville, we stopped and collected at a small lily-pad pond. Here, we found several of the tiny *Micrathyria debilis*, a Yucatan endemic.

The next day, we went north past the Mayan ruins to a nice looking rocky outlet stream from Jones Lagoon. At the bridge, we found lots of *Argia frequentula*, a few *A. gaumeri* and a couple of *Hetaerina titia* (Smoky Rubyspot). Upstream, we found a few *Neoneura amelia* (Amelia's Threadtail) out over the deeper pools. I got a nice *Macrothemis hemiclora* male that was hovering lazily over the bridge.

We spent the last couple of days at the Caribbean Shrimp Farm and crocodile sanctuary a couple of miles east of the hotel. Not much was flying over the brackish-water shrimp ponds, but we did get some nice things at the canals in front of the gated entrance. I met a Canadian backpacker who told me about a freshwater pool/slough behind the crocodile ponds. I checked it out, and I was really happy to see several *Orthemis schmidti* (Schmidt's Skimmer) flying around! I got a yellow-brown ovipositing female almost at my feet. It has five thoracic stripes. The males were wary, but I was able to catch one the next day. It was a real lucky catch! I was just holding my net down and it flew straight into it trying to get past me to the pond! Phoebe took photos of the hand-held male and female.

We did get one species that I did not see last time. In front of the hotel was a canal which was almost dry. At the far end, George got a few *Leptobasis vacillans* (Red-tipped Swamp-damsel) in the shaded part. Also, at several places we saw aeshnids fly by, but we could not catch them.

All in all, we had a really great time and a lot of fun! The weather was perfect, sunny on all days as to be expected during the dry season. Still, we can't wait to do it again and go Bonkers in Belize!

New Callo-*where*?! The Donnelly-Michalski Expedition to New Caledonia, 2013

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When we decided to go ahead and visit New Caledonia in April 2013, the only thing I knew was that it's a large island in the South Pacific, and that it was the location for the 1960s TV series, McHale's Navy. (You may also be familiar with the 1945 Swing hit, "Caldonia" by Louis Jordan and his Tympany Five, where he shouts to the eponymous girlfriend, "Why is your big head so hard?", but the connection is admittedly tenuous.)

Nick, Ailsa and I had seen New Caledonia among a listing of nature excursions offered by Lepidoptera Tours, but somehow the trip didn't materialize and we decided to plow ahead on our own. It was a very good decision, as we had a perfectly great time.

New Caledonia is a cigar-shaped island about 300 km long and 50 km wide, tilted northwest-to-southeast at a 45 degree angle, located about 1200 km east of Australia and a bit more north of New Zealand. Its north-western tip is just about 20 degrees below the Equator, so it's more or less tropical in climate—palm trees and bamboo, ficus and bougainvillea—but still temperate enough for extensive grazing land for cattle and horses. It is far enough away from any mainland that there are no endemic amphibians (though we saw many introduced frogs and a couple of water sirens), no native land snakes, leeches, or quadruped mammals, and not a tremendous variety of native birds either. The forests, in other words, are pretty, but almost devoid of wildlife, save the occasional parrot, pigeon, and an endless supply of Myna birds. The original human inhabitants are Melanesians who arrived several thousand years ago, but in the 1800s the French arrived and pretty much took over. Today's population is about half of each, with considerable blending between the two. It remains a French-speaking country with cuisine to match, which is not all bad.

There hadn't been much published on the Odonata of New Caledonia, just a few short descriptions of individual species, and a paper from 1975 by Lieftinck, in which he listed about 40 species in total, so we were hopeful of finding something new. Forty species for a large tropical island packed with mountains, rivers and waterfalls seemed an absurdly low number, and we entered the adventure with hopes of stumbling across all manner of oddities.

It's a long, long way to New Caledonia from the eastern USA. For me it was Newark to LAX, LAX to Auckland, and Auckland to Nouméa (the capital city), in about 32 hours. Once we had all arrived, our first order of business was to track down a local biologist with whom we had been corresponding (Jorn Theurkaft) to get some advice, directions, and hopefully a source of acetone. This was where we received two very sobering pieces of information. The first: "Well, New Caledonia has been very thoroughly surveyed—I don't think there will be any new species to find." The second: "It's too bad you came at this time of year, it's very late in the season—oh well, you'll probably still find something."

It's also an expensive place to visit. Now I'm not saying it's overpriced—this is a vigorously-maintained French former-colony (New Cal has a "special relationship" with France, something like a commonwealth, though it seems headed for complete independence in the near future), and everything except beef and dragonflies are imported from France, so prices are high. But you dine very, very well, I'll give them that. And the roads are excellent, and the population very friendly and courteous. But for tropical ecologists accustomed to the economics of staying in Thailand, Mexico, or Uganda, the patently First-World prices have to be taken into consideration when planning a visit to New Caledonia. But we ate well, slept comfortably, and thrived.

So what were we hoping to see? As previously noted, the known species list was small. Taking Jorn's research into account, there were about 52 species believed to be reliably reported from New Cal, of which around 20 were endemic to the island. Of these, five were tiny, wire-thin damselflies of the genus *Isosticta*, seven were dark, thin, fast-flying dragonflies of the genus *Synthemis* (which are something like *Somatochlora* when you see them flying ten feet high over a picnic ground, and a bit more like *Boyeria* when you encounter them cruising the margins of gravelly streams in the half-light of a shady forest or an overcast afternoon), and most of the rest were very neat megapodagrionids from such genera as *Caledopteryx*, *Caledargiolestes*, and *Trineuragrion*. We frankly thought we might handily extend the list by a couple of new discoveries in the two weeks we had available to us.

Nick and Ailsa Donnelly and John Michalski in New Caledonia.

So, we rented a tiny Peugeot, found our way north to La Foa (where we were hosted by Christian Mille, director of the Agricultural Institute) and got to work. Each day we perused the road map, outlined a direction to follow, and simply drove into the mountains, stopping at every waterfall and creek that looked promising.

And "promising" is probably the correct word for it. I've travelled a bit through the tropics, and can say that, typically, a pretty stream in unspoiled country can offer 10, 15, or even 30 species of odonates if you're collecting in Trinidad, southern Mexico, or Thailand. I've also been to New Guinea, where the same type of landscape may provide you with three species if you're lucky. New Caledonia was more like New Guinea. Many streams and waterfalls came up empty. Many more offered one or two species, and often times these were found as solitary specimens. We very quickly realized that it was going to be difficult to find the pattern in New Caledonia's odonate profile.

This quandary also extended to the weather. "Hope for sun," you'd think, but we experienced one or two fine, sunny days where we drove hundreds of kilometers, stopping at a dozen streams, and came up nearly empty. Then, the clouds would roll in, it would start drizzling, and out of nowhere the *Synthemis* and *Argiolestes* would start making their appearance.

"So that's how they play it," you'd think, and look forward to the next time it clouded over. But all for naught, as the following day's collecting would share nothing with the experience you'd had the day before. The clouds that brought them out on Tuesday would leave your collecting bag empty on Wednesday. The sunshine that disappointed you on Thursday would somehow bring them out of the woodwork on Friday. The bugs that disappeared by 2:00 pm on Saturday would wait until then to turn up on Sunday.

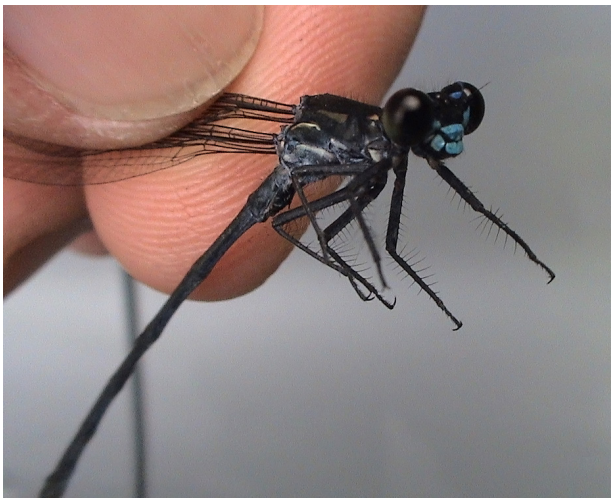
This was particularly troubling since we usually had time to visit any particular valley or river basin only once. You never knew if a poor day's collecting was due to the locality, the weather, or something else you failed to take into account. We knew this with some confidence since we specifically returned to one particular hotspot only to find the place devoid of any odonate activity at all. And we had done very well there two days before!

Our first two days were very good by the standards of this trip—eight species on the first day, every one of them endemic to the island. By the second day we had taken about 12 endemic species. In fact, we hardly spotted anything that lived anywhere else—here and there an *Orthetrum caledonicum* or a *Diplacodes haematodes*, sometimes a tiny *Agriocnemis exsudans*. Even these were highly regional, considering there were also widespread things like *Pantala flavescens* (Wandering Glider) lurking somewhere out there.

We spent the first week moseying up and down the central third of the island, along secondary roads that connected coastal towns by cutting across the central mountains. In so doing, we collected four species of *Synthemis* (*S. campioni*, *fenella*, *miranda*, and *montaguei*), three of *Isosticta* (*I. spinipes*, *tillardyi*, and *robustior*), and the Megapodes *Caledargiolestes uniseries*, *Caledopteryx sarasini*, and *Trineuragrion percostale*. Most beautiful—in fact, ravishing—was the bright iridescent gold *Argiolestes ochraceus* (renamed by Kalkman and Theischinger as *Eoargiolestes* in 2012), which we first found only singly, but later encountered in larger assemblages as the trip wore on. There were also smatterings of *Hemicordulia fidelis* (a bit like *Epitheca canis* cruising still areas of small streams), *Diplacodes haematodes* and *Orthetrum caledonicum*. At one stream we encountered our only lestid of the trip, *Indolestes cheesmani*. The tiny, tiny *Agriocnemis exsudans* also made an occasional appearance, with two color phases—one bright green with a fiery red abdomen, the other black with zinc-white pruinosity on the thorax. I captured one pair in tandem that turned out to be two males, one of each color! (You know your tropical adventure is not going too well when you take time to enthuse over minor events like these.)

We next headed all the way to the island's southeast, past Nouméa into the odd, Dr. Seussian terrain surrounding the Lac de Yaté, in and around the Parc de Riviére

Eoargiolestes ochraceus.



Caledopteryx sarracini.

Bleue. Here the ground was exposed in red, iron-rich gravel and boulders, intergrown with the most peculiar plant life any of us had ever seen. The flora is dominated by stunted, primitive endemic gymnosperms with trunks like bald cypress and leaves like cycads. There were carnivorous plants including the sundew *Drosera* and the tropical pitcher plant *Nepenthes*. Much to our delight the dragonflies were all different here as well, but once again we found them relatively thin on the ground. Among the novelties were the tiny blue *Ischnura pamelae* (very pretty), the red *Tramea liberata*, and a different *Caledopteryx*, this one *C. maculata*. We again saw *Diplacodes haematodes*, but also collected an undescribed *Diplacodes* up on the Plaine des Lacs. A sudden upward swing nabbed *Aeshna brevistyla*, which was our only aeshnid of the trip, though we once spied a large *Anax* flying out of reach over a reedy pond. We also discovered that the iron-rich sediments permanently dyed all our socks pink!

So what was the result? All told, we reckon about 25 species, one of which is probably undescribed. We drove a total of 4,723 km on an island only about 300 km long, which gives some indication of how much we travelled to get what we did. We managed to eat great food every day, sleep pretty well, and saw lots of fairly spectacular countryside. We took a day off to snorkel on one of New Cal's justly-famous coral reefs, and we spent a day visiting the museums, aquarium, and food markets in town. We had a lot of laughs, met some really kind and generous people, and came away with a handful of specimens.

Will we go back? Probably not, all things considered, being so far from where we live, for what seems like such a short species list. But what exists are mostly endemic, and I believe the new species are there, awaiting discovery for someone willing to dig deep enough. It would be an easy side-trip for anyone visiting or living in Australia or New Zealand—only a couple of hours by plane, and worth it for the food and diving alone, if you're already out that way.

If you go in search of dragonflies, we recommend January–March, though that is cyclone season. We arrived just past the cyclones, but a little late in the season for the bugs, so what's the point of waiting for the cyclones to pass? It is also worth noting that we chose to leave unexplored the entire northwestern third of the island, and the parts we did visit were, in general, given little more than an hour or two per locale. The discoveries, I think, are there, but future researchers will need to cover a lot of ground, and really explore the hidden corners of this most interesting and enjoyable destination to find them.

Request for Early Emergence Records of Anisoptera

As part of my project on the effects of climate change of dragonfly emergence dates (see Argia 24(4): 27), I am gathering information on early season emergence records of anisopterans from 2012–2015. If you have any early emeregce records for dragonflies within that range, please send them to me along with the genus and species, and the GPS coordinates for the location. If you have voucher specimens, please report them as well.

Thank you!

Richard Groover <rgroover@reynolds.edu>

Advice Column

When racing after a frustrating dragonfly that persists in just barely eluding your net, be sure to pause and look down at the ground occasionally, to avoid the inevitable and embarrassing faceplant that ensues when you trip over a hidden hole and go sprawling— especially as you will surely have an audience.

C. Mazzacano

If you have any short notes of advice relating to lessons you've learned in your experiences with odonates and would like to pass them on to fellow odonate enthusiasts, send them to the Editor at <celeste@xerces.org> and we will share your wisdom with the world.

Minutes of the 2012 Annual Meeting of the Dragonfly Society of the Americas

Steve Valley, Secretary <svalley2@comcast.net>

The annual meeting of the Dragonfly Society of the Americas was held on Saturday, 5 May 2012, at Cheraw State Park, Cheraw, South Carolina.

Chris Hill gave opening remarks and thanks to Ed Lam for the artwork on the t-shirts, coffee mugs and buttons.

The meeting buttons were handed out by Jerrell Daigle.

Attending Members introduced themselves:

Steve Krotzer from Alabama.
George and Phoebe Harp from Arkansas.
Fredy Palacino from Colombia.
Boris Kondratieff and David A. Leatherman from Colorado.
Jerrell Daigle, Chris Rasmussen, Roy Morris and Dan Irizarry from Florida.
Marion Dobbs from Georgia.
Steve and Marcia Hummel from Iowa.
Yvette Liautaud, Kathy Kozacky, Joseph RotiRoti, Rick Ladenburger and Marla Garrison from Illinois
David Small, David A. Fitch and Jason Forbes from Massachusetts.
Pam Hunt from New Hampshire.
Ailsa and Nick Donnelly, Meena Haribal, Fred and Peggy Sibley, Alison Van Keuren, Linda (Stick) LaPan and Annette Oliveira from New York.
Craig and Jane Lawrence from North Carolina.
David Bree from Ontario, Canada.
Cary Kerst, Celeste Mazzacano and Steve Valley from Oregon.
Ken Lebo from Pennsylvania.
David Halstead from Saskatchewan, Canada.
Chris Hill, Lois Stacey and Hilda Flamholtz from South Carolina.
Greg Lasley, Nancy McIntyre, John Abbott and Jim Edwards from Texas.
Paul Bedell, Steve Roble, Ann Wright, Dennis Washburn, Michael Ready, Richard Groover, Kenneth Larsen and Oliver & Carol Flint from Virginia.
Dennis Paulson and Jim Johnson from Washington.
Susan Olcott from West Virginia
Ken Tennessen from Wisconsin.

President Steve Hummel announced that 2013 was an election year and appointed Greg Lasley as Nominating Committee Chair.

Jim Johnson presented a plaque honoring Dennis Paulson as one of the founding members of DSA and for all his contributions to the science of Odonatology and DSA and raising awareness and interest in dragonflies.

Jerrell Daigle gave the Treasurer's report.

Jerrell Daigle made a request for future meeting proposals. He also made a proposal that the 2013 annual meeting be held in Prince Albert, Saskatchewan, Canada. It was voted on and accepted.

John Abbott reported on the Nick and Ailsa Donnelly Fellowship. Funding was provided to Fredy Palatino from Columbia to attend this meeting and present his research.

Reading of the 2011 Annual Meeting Minutes was waived.

Dennis Paulson reported on the Checklist Committee. Discussed global warming affecting changes in odonate distribution, specifically northerly range extension for many species.

John Abbott reported that OdonataCentral had received donations online of $5500. DSA Executive Council made a donation $1000 and will continue that donation each year. OdonataCentral hosts the DSA electronic files for Argia and Bulletins of American Odonatology (BAO) and the official DSA website. Members can update their own profiles.

John Abbott gave the Editor's report. He acknowledged Jim Johnson's layouts that make Argia such a nice publication. Argia will go electronic in 2013. BAO will become an occasional publication. Ken Tennessen is retiring as BAO editor and Steve Hummel will take over. Jim Johnson is retiring as associate editor and layout specialist for Argia and BAO. John Abbott is retiring as Editor of Argia. Celeste Mazzacano has taken over as Editor and layout of Argia.

Nick Donnelly reported on the International Odonata Research Institute (IORI) housed at the Florida State Collection of Arthropods (FSCA) and managed by Bill Mauffray. The Odonata collection totals more than 500,000 specimens making it one of the largest in the world. There was a discussion of funding for curation.

Chris Hill read a letter from Adrian Trapero Quintana from Cuba.

Applied Odonata Symposium at the 2013 Society for Freshwater Science Conference

Celeste A. Mazzacano <celeste@xerces.org>

The symposium Applied Odonatology: Linking Freshwater Science and Conservation via Charasmatic Microfauna, organized by Jason Bried (Oklahoma State University), took place at the 2013 Society for Freshwater Science (formerly North American Benthological Society) annual meeting in Jacksonville, Florida on 20 May. The presentations are listed below (bold-faced type indicates the presenting author):

Soluk, D.A. Not quite dead yet: conserving the Hine's Emerald Dragonfly (*Somatochlora hineana* Williamson) 18 years after its listing as an endangered species.

DeMots, R.L. and D.A. Soluk. Establishing a successful captive rearing program for the federally endangered Hine's Emerald dragonfly (*Somatochlora hineana*).

Soluk, D.A. and **A.M. Kijowski**. High mobility in a sit-and-wait predator: examining patterens of larval movement by the endangered Hine's Emerald dragonfly (*Somatochlora hineana*).

Furness, A.N. and D.A. Soluk. Crossing on through to the other side: evaluating strategies for reducing dragonfly roadway mortality from motor vehicles.

Monroe, E.M. and **H.B. Britten**. Conservation genetics of the Hine's Emerald dragonfly (*Somatochlora hineana*) in the Chicago, Illinois area and less urbanized areas of its range.

Watanabe, M. Long-term mitigation project for the endangered brackish water damselfly *Mortonagrion hirosei.*

Kadoya, T., R. Futahashi, T. Osawa, and T. Yamanaka. Dragonfly crisis in Japan: a quantitative extinction risk assessment based on historical records.

Mazzacano, C.A. The Migratory Dragonfly Partnership: working to understand and conserve North American dragonfly migration via an international network of citizen-scientists.

Haro, R.J., S.W. Bailey, R.M. Northwick, K.R. Rolfhus, M.B. Sandheinrich, and J.G. Wiener. Larval gomphid dragonflies—efficient biosentinels for assessing mercury contamination of aquatic food webs.

Patten, M.A., B.D. Smith-Patten, and T.D. Fagin. From Dust Bowl to bread basket: land use changes and Odonata distribution in the southern Great Plains.

Sahlen, G. Long-term response of odonate communities to intensive forestry in Sweden.

Ott, J.R. Effects of global change on dragonflies—examples from Europe and Asia.

Bush, A.A., D. Nipperess, and L. Hughes. Potential impacts of climate change on Australian dragonflies and their conservation.

Collins, S.C. and N.E. McIntyre. Using niche modeling to assess the biotic potential of lotic waters as odonate habitat in a multistate region.

Presentation titles and linked abstracts are available at <https://www.sgmeet.com/sfs/sfs2013/sessionschedule.asp?SessionID=S01>.

Odonates are Taking Over Facebook!

Those of you who enjoy staying connecting via social media will be happy to know that the number of odonate-specific Facebook Groups 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, and Southeastern Odes, as well as more focused groups such as Minnesota Dragonfly Society and Odonata Ohio.

To find these groups, just type the name into the searchbar at the top of your Facebook page. If I have missed any FB sites you would like to see included in further announcements, let me know at <celeste@xerces.org>.

Obituary for Gordon Pritchard (1939–2012)

Rob Cannings <RCannings@royalbcmuseum.bc.ca>

Gordon Pritchard died in Calgary, Alberta, after a long struggle with multiple myeloma, on 23 December 2012. He was 73 years old. Gordon was a premier Canadian entomologist and educator and an expert on many subjects from the biology of crane flies to evolutionary questions associated with the development of insects, especially aquatic ones. But his overwhelming entomological love was the study of the Odonata (dragonflies and damselflies) and he was a significant force in the international research organizations that focused on this insect order.

Gordon was born on 9 February 1939 in Burton on Trent, Staffordshire, a city of breweries in the English Midlands. His wartime childhood memories were of taking shelter under the family's grand piano during air-raids and seeing his father, a quartermaster sergeant with the RAF, off at the bus stop after his leaves at home.

Gordon was fascinated by the countryside around the village of Bretby, where he spent his early years. There, he played in the cowsheds and fields at the farm of a family friend, visited a bird egg-collecting naturalist who lived down the lane, and made frequent trips by bus or foot to the Derbyshire Dales. When Gordon was nine or ten, without a net, he captured his first dragonfly, a Brown Hawker (*Aeshna grandis*)—the trick, he said, was to throw your jacket over whatever interested you. He played conkers under the chestnut trees and was awed by fields of English bluebells. Another life-long love, jazz, also evolved during those early years, as Gordon began to play the drums. He made his first set from old banjo vellums and biscuit tins but, later, a thoughtful neighbour took pity on him and presented him with his first real drum set.

Gordon had been inspired by his biology teacher at grammar school and wanted to be a biology teacher himself. But instead, in 1957 he enrolled in Imperial College, University of London, a place he later would consider the best entomology department in the world. However, all his classes couldn't have been that inspiring, because he spent much of his time immersed in jazz, rugby, drumming, and beer drinking. He received his BSc (Honours) in zoology in 1960 and after winning a Commonwealth Scholarship that year, he came to the University of Alberta in Edmonton, Alberta, Canada, where jazz concerts, rugby, drumming and beer drinking again rounded out his academic life. In those days the entomology department was a small place, with three faculty—Brian Hocking (chairman), George Evans (ecologist and Gordon's supervisor) and George Ball (systematist)—and only eight graduate students. But the place hummed with excitement and new ideas. It was a wonderful life for a young graduate student (Acorn 2004). Gordon's doctoral research focused on the life of larval dragonflies in the boreal forests of Alberta, especially how they capture their prey with their extendible labium. His first major publications on the Odonata stemmed from this work: prey organisms (Pritchard, 1964a; 1964b); the functioning of the labium (Pritchard, 1965a); and the morphology of the labium (Pritchard, 1965b) and compound eyes (Pritchard, 1966). Gordon finished the field work in only one season, a sign of his efficiency and concentration. He was awarded his Ph.D. in entomology in 1963. On 2 February that year Gordon married June Dalby in Edmonton.

After graduating, Gordon's first job was as a research scientist with CSIRO (Commonwealth Scientific and Industrial Research Organization) in Sydney, Australia, where he studied fruit flies (Pritchard, 1967; 1969; 1970). Gordon and June's daughter Tracy was born there in 1964. Although Gordon loved Australia and was offered a permanent research position, after three years the family decided to move back to Canada.

Back at the University of Alberta, in 1966, Gordon filled in for George Evans while George was on sabbatical, and the next year took up a one-year teaching appointment in insect physiology at the Calgary campus of the University of Alberta. The job was offered to him by Jim Cragg, Head of the Department of Biology, who had been Gordon's external examiner at Imperial College. In 1968 Gordon's son Darren was born and a permanent position somewhere became a priority. Luckily, one appeared in Calgary and Gordon stayed put. His appointment was initially divided between the Calgary campus and the Kananaskis Field Station in the nearby Rocky Mountains; the latter spot offered much scope for field studies and Gordon began researching the population ecology and development of local crane flies (Tipulidae), which engrossed him for the next decade (Pritchard, 1971; 1976; 1980a; 1983; Pritchard and Mutch, 1984); in [Acorn, 2004]).

Thus began a long career of solid, meticulous research. Gordon's interests were primarily in the evolutionary ecology of insects, from the evolution of individual traits, through the evolution of life-history strategies, to the evolution of communities. He worked mainly on insects with aquatic larvae and was particularly interested in the proportional allocation of time to the aquatic and terrestrial habitats and the mechanisms that determine when

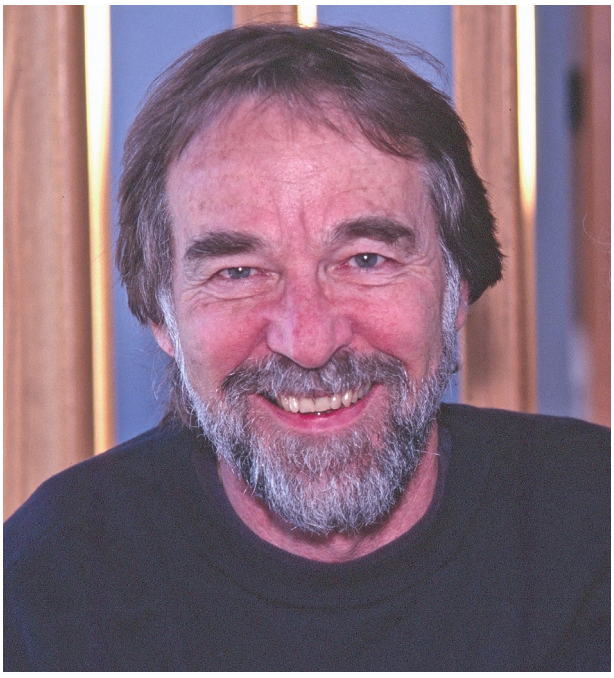
the transition from one to the other are made. Much research focused on the effects of temperature on insect development. Specifically, he studied temperature adaptations in aquatic insects (Pritchard *et al.*, 2000), insects in geothermal habitats (Pritchard, 1991), the colonization of temperate-zone latitudes by tropical taxa (Pritchard, 1982; 2008), and the relative allocation of time to different life-cycle stages. He was interested in predatory behaviour in arthropods (Pritchard and Scholefield, 1977; Proctor and Pritchard, 1990); respiratory structures and mechanisms in aquatic insects; and the colonization of aquatic and terrestrial habitats, with particular reference to the evolution of aquatic lifestyles and of flight in insects (Pritchard *et al.*, 1993). Gordon delved into the evolutionary origin of insects and the phylogeny of arthropods (Pritchard *et al.*, 1993) especially examining larval traits (Zloty *et al.*, 1993). Although he certainly did not consider himself a systematist, he did publish in this field (Zloty and Pritchard, 2001). One his last graduate students, Jack Zloty, named a newly discovered mayfly, *Ameletus pritchardi*, after Gordon (Zloty, 1996), a fitting tribute to a career of superb aquatic insect research.

By the late 1970s, Gordon returned to studying Odonata, being intrigued by Vivid Dancers (*Argia vivida*), southern damselflies living in the warm pools at Banff. With various graduate students, he studied these damselflies all over western North America, concentrating on life history, reproductive behaviour, egg development, larval growth and the effects of temperature on physiological processes (Pritchard, 1980b; Leggott and Pritchard, 1986; Conrad and Pritchard, 1988). In the late 1980s, as John Acorn (2004) described, "…when [Gordon's] work was taking him pretty far south, he realized it was time to go to the tropics, 'where dragonflies really come from'… One of Gordon's most frequently cited conclusions with respect to odonates is that they retain their tropical temperature responses and are thus 'prisoners of their tropical past'.". In Costa Rica he studied damselflies of the genera *Cora* and *Hetaerina* (Zloty *et al.*, 1993; Pritchard, 1996; Zloty and Pritchard, 2001). Some of his dragonfly work was broadly theoretical, such as his investigations into odonate mating systems and sexual selection (Conrad and Pritchard, 1992).

But dragonflies were far from all that Gordon studied. He examined life histories and feeding in alderflies (Pritchard and Leischner, 1973), morphology of stridulation in predaceous diving beetles (Larson and Pritchard, 1974), peritrophic membranes in ground beetles (Cheeseman and Pritchard, 1984), and development and survival in mosquitoes (Slater and Pritchard, 1979). Stoneflies in Rocky Mountain streams were a favourite subject: sampling techniques (Mutch and Pritchard, 1982); life histories (Mutch and Pritchard, 1984); and growth and development (Townsend and Pritchard, 1998). Caddisflies (Berté and Pritchard, 1986) and mayflies (Benton and Pritchard, 1988; Zloty and Pritchard, 1997) did not escape his interest and neither did water mites (Proctor and Pritchard, 1990). Having good-sized populations of the iconic Canadian insect, *Grylloblatta campodeiformis* (Northern Rock Crawler), nearby in the Rockies made the study of this fascinating subterranean species relatively straightforward (Pritchard and Scholefield, 1977). Gordon probably showed dozens of entomologists their first specimens of the Order Grylloblattodea during his frequent forays into the Kananaskis Valley.

One of Gordon's last and most intriguing entomological adventures was the discovery of a new family of flies (Diptera), the Oreoleptidae. Strange larvae unassigned to any known family had been found several times in torrential streams in the western mountains, but it wasn't until Jack Zloty and Gordon collected and reared larvae and pupae to adults that it was confirmed to be a distinctive, undescribed species in a new genus and family (Zloty *et al.*, 2005). Brad Sinclair, an expert on the phylogeny of flies, collaborated with them on the project and demonstrated that the fly had unique characteristics closely related to the Tabanidae (horse flies) and Athericidae (water snipe flies). How many entomologists these days are lucky enough to find and name a new family of insects?

By the early 1990s, Gordon's life was changing. He and June had divorced and he married Valerie Preuter (neé



Gordon Pritchard in 2000. Photo by John Acorn.

Jones) on 4 August 1991. They made a terrific and inseparable team—generous, happy, full of fun. They welcomed many visitors to their Calgary home and travelled to all corners of the world.

From 1967 to 1999 Gordon was an energetic and involved teacher, researcher and administrator at the University of Calgary. By 1976 he was made Full Professor and from 1976 to 1978 he served as an Assistant Dean of Science. In 1997 the University offered early retirement to their senior faculty; the deal was so good that many, including Gordon, couldn't refuse. The administration then discovered that there was no one to teach the senior courses, and so sessional appointments were given to those interested. Gordon continued to teach during the next two years. In his retirement he was named Professor Emeritus.

Gordon's university teaching dealt primarily with evolution, ecology and entomology, and ranged from 400-student introductory classes to small graduate student tutorials. He taught in the lecture theatre, the laboratory and the field. For many years Gordon led Educational Travel Study Programs on behalf of the University of Calgary's Faculty of Continuing Education to Costa Rica, the Galápagos Islands, and to East Africa.

Gordon supervised 19 M.Sc. and Ph.D. students, served on over 100 graduate student thesis committees, and published 84 peer-reviewed papers. He made his first trip to the Galapagos Islands in 1983; this led to what he called a "serious interest" in Charles Darwin. In 1986 Gordon established the Annual Darwin Lecture and Dinner, on a date in February close to Darwin's birthday. This was a social and intellectual gathering for the faculty and students of the Ecology Division and included the dreaded Darwin quiz. Gordon's Darwinian knowledge was staggering and he used it well in his teaching, research and entertainment. The event continues still, a wonderful legacy of Gordon's passion for science.

David Larson, a water beetle expert and an early doctoral student of Gordon's, credits Gordon's clarity and patience in his successful teaching of difficult ideas and methodologies. He remembers Gordon as "reflective and philosophical, exhorting students to understand the basics… a councillor, a person I could bring ideas to and have them seriously considered, debated and evaluated."

Larson also recalls that "Gordon could be highly focused and immersed in his studies. A feature of American universities is for faculty to keep their office door open and appear inviting. Gordon didn't—his door was shut and knocks went unanswered unless they were very persistent—then you would hear a muffled "There is nobody here" and, if you didn't believe that and still knocked, there would be an eventual "Go away!" He had time and patience for meetings but they had to be scheduled and done right." This concentration, Larson notes, can be seen in Gordon's research: "Both his morphological and experimental work is meticulous… His ecological studies are exemplary for their clear focus. He had the background of a naturalist and could see what was real and important in nature, and had the skill and care to design his studies to get to the point."

Retirement allowed Gordon to indulge his love of music. Although he had played the drums since he was a boy, he had no formal training. He loved to jam with a small group, where reading music was not required, and several nights a week were devoted to this. But when the opportunity to play with a Big Band surfaced, Gordon knew that he would have to learn to read scores, and so began the drum lessons that lasted the rest of his life. Saturday mornings were devoted to band practice and gigs took the band from seniors homes to golf and country clubs. Gordon had an encyclopedic knowledge of the jazz artists of the past and present. Hearing a piece of music, he could tell you who was playing what instrument and most times, when and where the recording had been made.

Gordon began a lot of new things late in his life. He learned to downhill ski for his 50th birthday; he took scrub diving lessons in 1997 so he could join his children underwater on the Great Barrier Reef. In 2001 he started snowshoeing to prepare for a trek to Everest Base Camp.

Travel was integral to Gordon's being. He and Valerie travelled to all the continents: trains in Russia, Mongolia, China and Australia; ships of various shapes and sizes to the Caribbean, the Mediterranean, and Antarctica; tour buses and 4x4s in Africa; and walking in England to the places Gordon remembered as a child.

Dragonflies took Gordon to many wonderful places, from the hot springs of Canada and the U.S., to tropical streams in Costa Rica and Colombian Amazonia; from conferences above the Arctic Circle in Sweden to the deserts of Namibia. For most of his career, Gordon worked tirelessly in the societies that promoted and coordinated international dragonfly research and published odonatological journals. Among much other work he organized the Seventh International Symposium of Odonatology in Calgary in 1983 (Societas Internationalis Odonatologica) and, in the Worldwide Dragonfly Association, served as a Trustee, a Coordinator of International Symposia of Odonatology, and as President from 2007 to 2009.

Gordon's cancer surfaced in 2003 with a diagnosis of

multiple myeloma, treatable but not curable. In February 2012, he wrote: "The cancer diagnosis really changed my outlook. No longer did I dwell on the past, nor did I think too much about the future. I felt really good every morning when I got up and took every day as it came, filling the day with things I wanted to do. If I didn't get everything done that I thought I might, there was always tomorrow, which would also be a great day."

Gordon was a dear friend. Although I didn't see him often, he was always there, an inspiration in the background. When I did see him, there was always something to learn. I met Gordon through our shared love of dragonflies in the late 1970s. We worked together on the organization of the 1983 International Odonatological Symposium and sat through many odonatological society meetings, some of which were surprisingly testy and turbulent (I was always impressed by Gordon's calm wisdom and negotiating skills). We collected grylloblattids in the Kananaskis Valley and watched damselflies and dragonflies along the shores of dozens of streams and ponds. We reveled in smoky Parisian nightclubs and talked into the night around campfires in the Namibian wilderness. We drank scotch and listened to jazz in the basement of his Calgary home. He was a wonderful man.

Acknowledgements

With help from John Acorn, David Larson, Rob Longair, Jack Zloty and, especially, Valerie Pritchard. John Acorn's book, Damselflies of Alberta: Flying Neon Toothpicks in the Grass, which is referred to herein, contains an excellent summary of Gordon's career and influence.

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New Atlas of Rare Butterflies, Skippers, Moths, Dragonflies & Damselflies of Virginia

The Virginia Department of Conservation and Recreation, Division of Natural Heritage, has just completed an online Atlas of Rare Butterflies, Skippers, Moths, Dragonflies and Damselflies of Virginia. This web atlas contains information on 193 species considered rare in Virginia (i.e Species of Greatest Conservation Need [SGCN] and/or tracked by the DCR-DNH); many are also rare nationally or globally. The atlas is available to the public. Users can scroll through an alphabetical list of all species, or search by insect name, type, or locality and get details about each species, including physical description, geographic range, behavior, food, threats, rarity ranks, and photos, downloaded in a printable fact sheet. The atlas is available at <www.vararespecies.org>.

New Book Announcement: Libélulas de Colombia: Una Guía de Campo Para su Identificación (Dragonflies of Colombia: A field guide for identification)

Jenilee Montes <jenileemontes@gmail.com>

This book provides the first comprehensive coverage of the dragonflies and damselflies of Colombia. This fully illustrated guide has color photos of 139 species of dragonflies and damselflies in Colombia. Each species is presented with details about habitat, wing venation, characteristics to aid in-hand identification, and a distribution map. The book's compact size and user-friendly design make it the only guide you need in the field. Details include:

• Full-color photos in the field and some structures for identification.

• Symbols to show habits of the species.

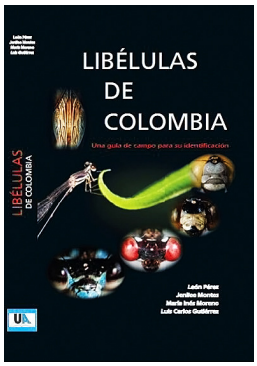
• Helpful tips for the dragonfly enthusiast.

• Synoptic key to families is illustrated and easy to understand for beginners.

• Simple language aimed at all audiences.

About the authors:

León Pérez Gutiérrez (Biologist, Universidad del Magdalena; Master Biological Sciences Universidad de los Andes) is an amateur photographer and has been engaged for nine years studying systematics, taxonomy and biogeography of dragonflies. He currently teaches at Universidad del Atlantico, Barranquilla, Colombia and is a Ph.D. student in Entomology at Universidad Central de Venezuela.



Jenilee Montes Fontalvo (Biologist, Universidad del Atlántico) is currently a graduate student in Entomology at Universidad Central de Venezuela, where she works on projects related to environmental education, reproductive biology and conservation biology prioritizing dragonflies as biological models.

María Inés Moreno (Biologist, Universidad del Atlantico; Ph.D. student at the Universidad Nacional de Colombia) has spent the last four years studying dragonflies.

Luis Carlos Gutiérrez (Graduate from the University del Magdalena, Master Biological Sciences; Universidad de los Andes, director of Biodiversity Group on the Colombian Caribbean) is currently Dean of the Faculty of Basic Sciences at Universidad del Atlantico, and has extensive experience in project research in insects and other invertebrate groups.

The guide is published under ISBN number 978-958-8123-80-6. For more information, e-mail <libelulasdecolombia@gmail.com>.

Corrections and Clarifications

In their recent article on spiders collected in odonate exuviae in Quebec, Canada (Argia 25(1): 18), authors Hutchinson and Menard state "Manolis (2008) has also reported a male *Sassacus vitis* (Jumping Spider) in a larval skin of *Macromia pacifica* (Gilded River Cruiser)". Tim Manolis would like to clarify that the exuvia was actually reported in his paper as being from *Macromia magnifica* (Western River Cruiser; see Argia 20(3): 19).

In their recent article about the Nature Conservancy's Muleshoe Ranch in southcentral Arizona (Argia 25(1): 13–15), Bailowitz *et al*. reported finding several *Argia lacrimans* (Sierra Madre Dancer) specimens. In light of recent confirmation of *Argia anceps* (Cerulean Dancer) in Arizona, just 12.24 miles SSW of Hot Springs Canyon in Muleshoe Ranch, *A. lacrimans* specimens from Muleshoe and elsewhere in southern Arizona have been re-examined. All 2012 records of "*lacrimans*" from the Muleshoe metaregion are now known, in actuality, to be *A. anceps*. Although they here report the error, see the report on page 10 in this issue of Argia that deals with this new record for the state and, in fact, the country in greater detail!

Observation of a Dragonhunter (*Hagenius brevistylus*) Feeding on a Swamp Darner (*Epiaeschna heros*)

Ryan Williamson, Free Union, Virginia <gotakeawalk@yahoo.com>

I am a beekeeper with several dozen hives in my back yard which attract various critters who like to prey on them. Birds, bears, opossums, Asian hornets, and dragonflies are the most common that I see.

The birds like to sit on top of fence posts and beehives, and they dive down to pick off bees on the ground. Asian hornets hover in front of the hives to catch the bees on the entrance, and the dragonflies tend to stay at a higher elevation, catching bees in flight.

I raise queen honeybees, and in mid- to late summer dragonflies are a real trouble as they eat many queens on their mating flights. These two dragonflies were found in the grass a few feet from a hive. I picked up the dead Swamp Darner (*Epiaeschna heros*), and the Dragonhunter (*Hagenius brevistylus*) continued eating. When released, the Dragonhunter flew off over the trees still holding the Swamp Darner with its legs.

Robotic Dragonfly Takes Flight

The company Festo has created the BionicOpter, a 17.3 in. long robotic dragonfly that can fly in any direction and even hover. The electronic insect can be piloted by a smartphone app, and an onboard microcontroller makes small adjustments to ensure stability during flight. You can see a video of BionicOpter in action at <http://www.engadget.com/2013/03/29/bionicopter-dragonfly-drone/>, though there's no report of how easy it is to net one...

Would You Like to See Anything New or Different in Argia?

If you have any creative ideas for new types of features or articles that you think could help make Argia even better, please share them with the Editor at <celeste@xerces.org>.

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 54982, <shummel@iowatelecom.net>.

Articles

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

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

Figures

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

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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

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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)** Stream damsels: Ebony Jewelwing (*Calopteryx maculata*) and American Rubyspot (*Hetaerina americana*) at Willow Way Brook, Morton Arboretum, Lisle, Illinois on 26 June 2007. Photo by Dick Todd. **(lower)** Male Common Baskettail (*Epitheca cynosura*), Angelina County, Texas, April 2013. Photo by Jim Burns.