



ARGLIA

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The **Dragonfly Society of the Americas** (DSA) advances the discovery, conservation, and knowledge of Odonata through observation, collection, research, publication, and education.

Membership is open to any person in any country. Member benefits include digital subscriptions to *ARGIA* and the *Bulletin of American Odonatology*, voting rights, membership rates for attending meetings, and access to our full publication archives. (We do not distribute print editions of our publications.) Dues for individuals or institutions are as follows (in \$US):

Basic Membership

\$15 annually

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\$300 single payment

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\$400

Annual memberships span a calendar year.

Dues can be paid online at our website:

www.dragonflysocietyamericas.org.

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the DSA treasurer at [treasurer@](mailto:treasurer@dragonflysocietyamericas.com)

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Progomphus obscurus (Common Sanddragon); Desert River, Maniwaki, Quebec; 16 September 2017; Photograph by Benoit Menard.

Call for Calendar Events

If you have an in-person or online event that you would like to have included in the December issue of *ARGIA* or on the DSA website, please send information to our editor (editor@dragonflysocietyamericas.org) and to the webmaster (webmaster@dragonflysocietyamericas.org).

For updates on events visit the “Meetings” page on the [DSA website](http://www.dragonflysocietyamericas.org).

The DSA Executive Council

The Executive Council constitutes the DSA leadership, some of whose members serve indefinitely and others on staggered terms.

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Cover Image: *Telebasis byersi* (Duckweed Firetail); Gainesville, Florida; 14 April 2014; Photograph by Stephen Krotzer.

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PRESIDENT’S REPORT

Perseverance

By Bryan Pfeiffer

More than two decades ago, I was balancing on a boulder in Bailey Pond here in Vermont, net in hand, leaning in to an *Anax junius* (Common Green Darner) patrolling the shoreline. Paul-Michael Brunelle, himself leaning on his net and rolling a cigarette, looked on from dry land.

As the AJ drifted past, I made a half-ass swing, missed the ode, and promptly fell into the pond. Paul offered his advice — and admonishment.

“Follow-through! Follow-through!” he ordered. “You’ll never learn to catch dragonflies if you keep swinging like that.”

No one deserves more credit for introducing me to dragonflies than Paul. Back then, when a group of us invited him to Vermont to offer us a weekend workshop, I was a mere birder flirting with one of the lesser insect orders, Lepidoptera. But Paul forever changed that.

It wasn’t enough for us to learn to catch and identify dragonflies. It wasn’t enough to keep careful location data. As anyone who knew him knows, Paul had an uncompromising attention to all the details in the lives of these audacious insects. No nuance of habitat or behavior was insignificant. And that kind of formidable passion for the way dragonflies go about their business made a lasting impression on me — and on many others who knew Paul and now lament his death earlier this year.

Paul’s eagerness to discover, to teach, and to portray these insects with the craftsmanship of an artist are worthy traditions as the DSA strives to attract more and more people to our insect order. It is in that tradition that the DSA’s Executive Council continues with plans to expand interest in Odonata and broaden our membership and influence.

Yes, the pandemic has slowed us down. But we shall persevere because, after all, what’s good for the DSA is good for Odonata. Now that the field season will be winding down for many of us here in North America, I’m hopeful that we can continue with the membership and regional growth

“As the AJ drifted past, I made a half-ass swing, missed the ode, and promptly fell into the pond.”

initiatives I’ve outlined for you in earlier president’s messages. And we’ll make plans again to meet in Oklahoma and in Colombia in 2021.

Although Paul had slowed down in recent years, he never lost the drive. A couple years ago, when I posted to Facebook a photo of a copulating pair of *Somatochlora franklini* (Delicate Emeralds) in Maine, Paul sent me a three-word message: “Date and location?”

If you did not know him, you’ll see more of this passion, particularly for *Somatochlora* and *Neurocordulia*, in the article Paul wrote for my own newsletter back in 2007, which we’ve reprinted here in *ARGIA*. And you’ll read of even more passion—and wonderful idiosyncrasies—in the other tributes to Paul in this issue.

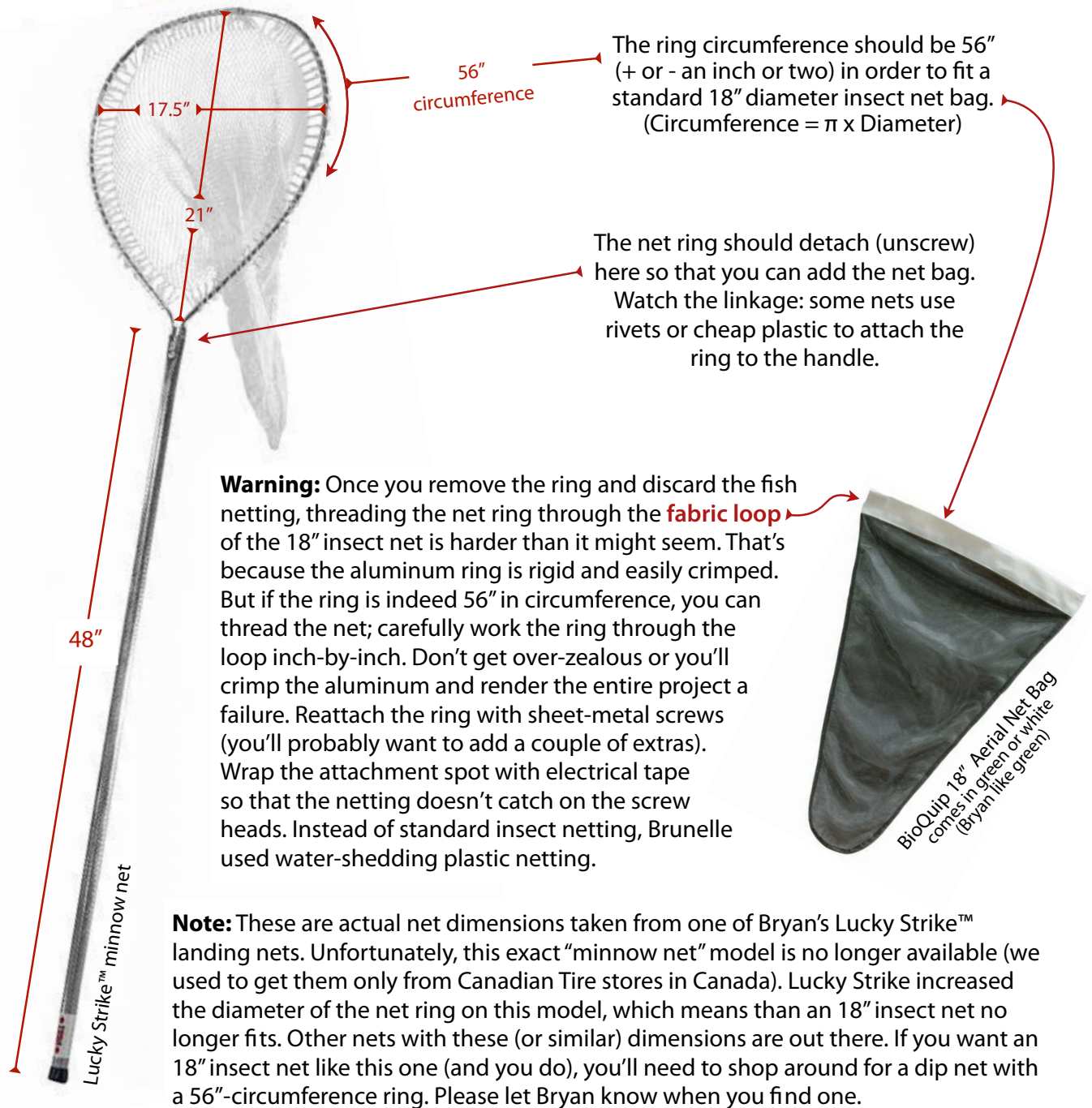
One other memory from that first outing with Paul was that he must have sensed my frustration with the pea-shooter net I was equipped with at the time. At the outlet of another pond, Paul also must have noticed a *Hagenius brevistylus* (Dragonhunter) patrolling an adjacent wood’s road. He handed me his homemade “Lucky Strike” net. “Walk that road a bit,” he advised. “See what you might find over there.”

Minutes later, beaming, I returned with a *Hagenius* in hand — hooked for good on Odonata. And I had landed it with an exaggerated follow-through, among the many gifts from Paul that I retain in every swing of my own Lucky Strike net (described on the next page) to this very day.

Bryan Pfeiffer, the DSA president until 2021, is a consulting naturalist and a retired educator who lives in Montpelier, Vermont. Contact him at president@dragonflysocietyamericas.org or find him online at www.bryanpfeiffer.com.

The Perfect Dragonfly Net (As Pioneered by Paul-Michael Brunelle)

This net is made from an ordinary aluminum fishing landing net. Detach the ring, remove the fish netting, *carefully* work an 18" insect net around the ring, and rescrew it to the handle. These nets are lightweight and swing fast — great for landing Odonata (instead of fish, which eat Odonata, anyway).



NOTE FROM THE EDITOR

By Amanda Whispell

The DSA's Executive Council and our Diversity, Inclusion, and Equity Committee have been discussing how we can foster greater overall inclusivity within our society. We're working to present our website in all major languages spoken across the Americas, for example. And as our president elect, Melissa Sanchez, discusses in the next article, we have partnered with the organization Entomologists of Color to offer free memberships to people underrepresented within the DSA.

As the editor-in-chief of *ARGIA*, I have decided to devote a section in subsequent issues to submissions from individuals

who identify as a member of an underrepresented group within this publication. I am seeking contributions from all of the Black, Indigenous, People of Color, and LGBTQ2AI+ odonate-lovers out there. We want to read your articles, see your artwork and photographs, and make this a space dedicated to you. We kick off this new section with an article written by a group of Black odonatologists from around the globe who came together to share a bit about how being Black has impacted their careers. I'm so appreciative of the work these individuals put into this piece and I encourage you to read it.

*Amanda Whispell, the editor-in-chief of ARGIA, is busy writing manuscripts related to her work on color change in *Argia apicalis* (Blue-fronted Dancer). She can be reached at editor@dragonflysocietyamericas.org or on Twitter at [@AmandaWhispell](https://twitter.com/AmandaWhispell). For more information about Amanda's research visit www.amandawhispell.com.*

DSA is Partnering with the EntoPOC Fund

By Melissa Sánchez Herrera

Our newly created DSA Diversity, Inclusion, and Equity Committee has partnered with the organization Entomologists of Color (EntoPOC), whose mission is to increase the participation of underrepresented groups in scientific societies (www.entopoc.org). DSA has donated to the EntoPOC Fund, offering 50 two-year memberships for students or enthusiasts who are interested in joining our society. If you are a student or enthusiast from an underrepresented group who is interested in applying for a free membership, please visit the following link to apply: www.entopoc.org/apply. The application forms are available in English, Spanish, Portuguese, and French. If you are interested in donating towards fostering more memberships, please donate to: www.entopoc.org/donate.



Melissa Sánchez Herrera, the DSA president-elect, is an associate researcher in the biology program at El Rosario University in Bogotá, Colombia. She is currently writing manuscripts related to her work among the Neotropical banner damselflies (Polythoridae), and going out to the field to perform eDNA protocols for Neotropical odonates. She can be reached at melsanc@gmail.com or on Twitter at [@melsanc](https://twitter.com/melsanc). For more information about Melissa's research, please visit www.polythore.com.

In Memory: Paul-Michael Brunelle

7 November 1952–18 January 2020

By Donald F. McAlpine

Paul-Michael Brunelle, 67, Atlantic Canadian odonatologist and notable graphic designer, passed away unexpectedly at his cabin-laboratory in rural Middle New Cornwall, Nova Scotia, on 18 January 2020.

Paul was born 7 November 1952 in Halifax, Nova Scotia. He graduated from Dartmouth High School in the then city of Dartmouth, Nova Scotia, since absorbed into the Halifax Regional Municipality. A talented artist, Paul attended the Nova Scotia College of Art and Design (since 2003 NSCAD University) at a period when NSCAD was recognized internationally as “the best art school in North America.” Graduating, with a Bachelor of Design in Communication Design in 1976, he founded Graphic Design Associates (GDA) in Halifax, with partner Dereck Day. A variety of significant regional and national design projects followed, including the Nova Scotia Health card featuring Kejimikujik National Park and a series of fishing fly stamps for Canada Post. From 1992–1994 Paul served as president of the Graphic Designers of Canada (GDC), an organization of design professionals in media and design-related fields and Canada’s national certification body for graphic and communication design. In 1999 Paul was awarded designation as a fellow of GDC, a mark of his accomplishments and influence on the design profession in Canada. A first-rate natural history illustrator, Paul was also a member of the Guild of Natural Science Illustrators, a North American organization concerned with



Paul-Michael Brunelle at dusk in the Canoose Stream, Charlotte County, New Brunswick, circa 2000, the site of his discovery of *Neurocordulia michaeli* (Broad-tailed Shadowdragon). Photograph by Jamie Steeves.

communicating and clarifying scientific ideas visually.

The late 1980s to early 1990s was a time of tumultuous change in Paul’s life. His only child, Michael, was born

(1991), and Paul, then in his late-30s, abandoned a successful commercial career in graphic design to pursue life as a free-lance odonatologist. Ultimately, this proved to be a financially precarious

In Memoriam

move. So much so, that in the decades that followed it left Paul lurching from debt (much of the time) to occasional plenty (when project or contract money was available). Nonetheless, Paul managed to pay the rent on a small apartment in Halifax (until he moved out of the city in 2017), supported a more-than-modest smoking habit with his own rolled, loose leaf tobacco cigarettes, and when times were especially tight, subsisted on a staple of beans and rice.

Throughout Paul's life he had a passion for natural history and the outdoors, and like so many notable natural historians through the ages, was self-taught. This led him to devote the latter half of his life to the study of the dragonflies and damselflies of the northeast, at the time relatively poorly known. In the 90 years prior to 1990, only about 4700 records of Odonata had accumulated for the entire Acadian region (Maine and Maritime Canada), with these collected mainly incidental to other studies undertaken largely by professional entomologists. In Canada this included, most notably, Edmund M. Walker of the University of Toronto and founder of the Royal Ontario Museum invertebrate collections. In 1993, Paul established the Atlantic Dragonfly Inventory Program (ADIP), an unfunded, volunteer survey to which interested persons were encouraged to submit specimens and data to given standards. From 1999 to 2003 Paul was contracted by the State of Maine Department of Inland Fisheries and Wildlife to help coordinate (with wildlife biologist Dr. Philip deMaynadier) the Maine Damselfly and Dragonfly Survey (MDDS) for the same purpose. At the time of Paul's death, as result of his own efforts, his oversight of organized surveys (undertaken largely by amateurs), and his enthusiastic encouragement of anyone who could hold an insect net, he had meticulously databased in excess of 67,000 odonate records from Maine and the Maritimes. During the course of his entomological career Paul produced about 80 journal



Paul Brunelle (1952–2020) and his customized “Odemobile” jeep on the search for Odonata in the Jacquet River Gorge Protected Natural Area in August 2010, during a New Brunswick museum-organized biodiversity survey. Photograph by

papers, consulting and species status reports, and newsletter contributions dealing with odonates. This included, with Paul Catling and the Royal British Columbia Museum's Rob Cannings (one of Paul's early mentors), an annotated checklist of the Odonata of Canada.

Throughout the early 1990s and until his death Paul's interest in damselflies and dragonflies never flagged and became his primary vocation. Funded by a number of agencies, his insect survey work took him to some of the most remote bogs, streams and marshes of the Maritimes and the northeastern USA, usually alone, and often at risk of sinking into a quagmire. An early highlight was his 1995 discovery of a new species of dragonfly, the Broad-tailed Shadowdragon (*Neurocordulia michaeli*), which he described in the scientific literature and named for his son in 2000. Paul discovered larvae in the Canoose, a cool, clear, rocky stream in Charlotte County, New Brunswick. The find was

significant (it had been nearly half a century since anyone had discovered a new shadowdragon in North America) and led to dragonfly specialists from across the continent making the trek to southeastern New Brunswick when the 1996 annual meeting of the Dragonfly Society of the Americas was held in St. Stephen, New Brunswick, to mark the discovery. The same year Paul was awarded the Entomological Society of Canada's Norman Criddle Award, which recognizes the contributions of an outstanding non-professional entomologist to entomology in Canada.

Reprinted with permission from the *Bulletin of the Canadian Entomological Society*

Dr. Donald F. McAlpine is Curator of Zoology and Head of the Department of Natural History at the New Brunswick Museum, Saint John, New Brunswick (Canada). A close colleague of the late Paul Brunelle, he oversees one of the larger odonate collections in Canada (100,000+ specimens).

Tributes to Paul-Michael Brunelle

Paul played an important role in my career by introducing me to the world of Odonata, a fascinating group of organisms that I went on to study and conserve as a wildlife biologist in Maine. I hired Paul to conduct surveys for damselflies and dragonflies in Maine over 20 years ago, and we maintained a rewarding relationship ever since. I learned much of what I know about Odonata from Paul — all the more remarkable given that I was supposedly the “professional” and he, the self-taught “amateur,” which Paul humbly reminded me of on numerous occasions. Notably, Paul came to be known as one of northeastern North America’s foremost authorities on the subject of Odonata, a fact which speaks to his qualities of insatiable curiosity, keen focus and intellect, and love for the natural world.

I have fond memories of adventures in the field with Paul, slogging through north woods bogs and swamps in pursuit of “winged jewels” of the rarest sort. By the end of a long

day together, bug-bitten and bedraggled, I felt a special bond with Paul. In addition to sharing stories of the day’s near misses and rare finds, our conversation often drifted to history, politics, and personal matters. I was raising a spirited young boy at the time (my son Emmett is about his son Michael’s age) and valued Paul’s advice on fatherhood. Paul made it clear just how important family was to him; I can still picture him sharing loving anecdotes of Michael, his father (Paul Joseph), and Michael’s mother (Meredith Bell), while preparing black tea (triple-bagged) on his jeep’s built-in camp stove amidst a cloud of unfiltered cigarette smoke. For me, Paul was a unique combination of mentor, colleague, free-spirit, and friend. I hold Paul’s memory dear, and remain inspired by him to this day, both for his devotion to craft and his high personal and professional standards.

Phillip deMaynadier



Paul patrols the shoreline of yet another bog in northern Maine (circa 2000) in search of elusive Darners, Emeralds, and other sub-boreal specialties to add to the Maine Damselfly and Dragonfly Atlas.

In Memoriam

Paul was one of my first ode teachers. It was at Eagle Hill Labs in Maine where he coached a small group of us through the fun and frustrating challenges of collecting and identifying ode nymphs and skins. A consummate field biologist, he lived with the dragons in the fields, forests, and fens of the northeast for days or weeks at a time. Driving around in his distinctive jeep with a “dragon-catcher” on the front instead of a cow-catcher, he developed a quirky efficiency to his rural routine. Perhaps it stemmed from working in a state known for dropping live arthropods into boiling water. Paul would drop his nymphal catch-of-the-day into the boiling water as part of his preservation technique. Since cooking fuel was precious, the boiling water (sans nymphs) was then further flavored with his evening tea. I don’t know if an educated palate could detect a zestiness to *Somatocholora* stock, but those are secrets he took with him. I frequently think of Paul when I make a cup of tea, and thank him for the foundation of nymphal identification he patiently dispensed to numerous classes.

Mike Blust

Ailsa and I were saddened to hear of the death of Paul Brunelle, who was a good friend for many years. After two grand summers spent in Nova Scotia during the war, my recent memories include dragonfly trips around Nova Scotia and New Brunswick with Paul and several of his Canadian friends.

One hot day we were forced to change a tire on a secondary road in northern Maine, with hungry deer flies making a sieve of my sweaty shirt. While I dismounted the tire we noticed a jeep parked about half a mile up the road. Later that day, when our group assembled in Canada, I discovered that we had been close to a small tabanid-infested bog that Paul was exploring with enthusiasm.

Paul and I once contracted to prepare a dragonfly manual, using his impressive artistic abilities. The manual was never completed, but his excellent dragonfly drawings can still be enjoyed here and there on the Web, especially on pamphlets about odes of the Maritime Provinces of Canada and the state of Maine, which was Paul's beloved turf.

Field trips with Paul were memorable; he took us out on really tough terrain, and as a restorative during the day he offered us the world's strongest tea, brewed on the back ledge of his jeep. He was easy to spot, since his jeep was equipped with a “cow catcher,” placed there to catch clubtails patrolling the back roads of the Atlantic provinces.

As a retired geologist, I have managed to bring back from many trips especially attractive and heavy rocks. Right by our front door is the Cape Breton granite boulder that Paul helped me load into our vehicle one sunny afternoon. I always think of Paul when I walk by.

Nick Donnelly



Gomphus descriptus Banks 1896

Mature male, 250%, illustration by Paul-Michael Brunelle, February 1998
Dennis Stream at Highway 1, St. Stephen, Charlotte County, New Brunswick, Canada, June 23rd, 1995, P.M. Brunelle

While a fine natural history illustrator, Paul also understood the scientific importance of carefully recording the data associated with each of his illustrations.

I met Paul at a workshop 22 years ago, and we had a long collaboration on the Maine Damselfly and Dragonfly Survey and on other ode research that included frequent exchanges concerning species biology, database management, papers we were working on, new or rare species records, etc. Paul always impressed with his meticulous attention to detail, his incredible artistic talent, and his willingness to share his extensive and largely self-taught expertise. In our last emails in late November, Paul covered a variety of topics ranging from papers we had exchanged, speculation on species range expansions, his dry, witty observations about “lazy naturalists,” his laments concerning image vouchers and the rise of iNaturalist and similar sites, and his recognition that if he retired to “drink rum on a Bahamas’ beach” — he would still have to “collect all the sea-shells first and curate them properly” because he wouldn’t be able to help himself (and as he wrote, “I can live with that”). And wasn’t that just Paul? He was—in a very real sense—my sensei (*the one who comes before*), as my research ‘path’ diverged in 1995 from seabirds toward insects. I will miss our conversations and always gratefully remember Paul as a consummate professional, teacher, and friend.

Ron Butler

In Memoriam

I met Paul over 20 years ago. Since we both lived in Halifax he enlightened and encouraged my then developing interest in dragonflies.

I just returned today, 18 August 2020, from a road trip through the Cape Breton Highlands in Nova Scotia, Canada. My friend and I left on Sunday, 16 August, to drive to the Cheticamp Flowage in search of *Somatochlora septentrionalis* (Muskeg Emerald) and the elusive *Somatochlora albicincta* (Ringed Emerald). Both species are denizens of highland bogs and streams.

Yesterday, Monday 17 August 2020, we drove to the Highlands via the dirt roads from Wreck Cove to the Cheticamp Flowage, Victoria County, Cape Breton, Nova Scotia, where Paul had collected both species of emerald in the past.

We parked the car at the dam and started our trek on the road towards the bog complex that Paul called Everlasting Barrens. Paul had collected and surveyed the Highland bogs in August 1997 and July 1998. On the left side of the road, in a small sheltered ravine off a small secondary road, was a parked RV. A gentleman named Ralph Timmons and his wife saw us walking carrying our nets and collecting gear. He hollered in a Cape Breton accent and asked, “are you looking

for dragonflies?” I answered back and said, “in fact we are!”

We noticed that there were four anglers fishing trout in the flowage waters, so I was curious as to why he asked such a specific question thinking we could have passed as anglers. I asked Ralph, “why do you think we are looking for dragonflies?” He answered that the last guy that came through there—20 or so years ago—was looking for dragonflies and had a big net on the front of his Jeep! I said, “Paul Brunelle !?” Ralph replied, “yeah ... Paul ... that was his name!” “He came by for tea after he finished and he was a nice fellow.”

I regretfully informed Ralph of Paul’s passing this past winter. He then in turn said we too could stop by for tea anytime.

Unfortunately, we did not see or collect the elusive Muskeg or Ringed Emerald due to the changing weather conditions and rain during the 2-km hike following the GPS coordinates Paul supplied. It was serendipitous to have been a part of Paul Brunelle’s history as he was remembered at his “Everlasting Barrens” in the Cape Breton Highlands after 20+ years.

Derek Bridgehouse

In December 1993, Paul Brunelle introduced himself to me with a letter, a copy of his “*Collecting Dragonflies and Damselflies in Atlantic Canada*,” and a request to include my work on New England Odonata in a larger regional project. That initiated several years of correspondence and exchanges primarily associated with the Maine Dragonfly and Damselfly Survey.

In 1995, while camping with my family in coastal Maine, Paul showed up unannounced at our campsite. First impressions are lasting impressions—Paul’s passion for dragonflies, a deep resonant voice, him chain smoking hand-rolled cigarettes, and his mud-splattered jeep with insect netting spanning the grill and beyond. The latter he called a “bownet,” which he described in his distinctively colorful humor in an *ARGIA* 7(3), 21-22 (1995) article, “A 2.5-liter 4WD collecting net for insects and pedestrians.” At the time I did not know that Paul was a graphic artist of considerable talent; skills revealed in his professionally decorated stationary, gorgeous color posters, and field guides. Undoubtedly, the attention to detail required for his professional work carried over into his serious avocational interests. Each of his specimens had labels equivalent to a page from his field notebook, noting habitat, weather conditions, behavior, and associated species, in addition to the expected name, date, and location.

In his 1993 letter, Paul lamented that in five years of collecting, he was unable to add a single species to the Nova Scotia or New Brunswick Odonata lists, because species that he had found and thought were new to the

Collection		Aeshna umbrosa u. Walker 1908		150		
Date	Day Date	Time Collected	Lifestages Observed This Date	Event Type	#Col.	Rel. #
9 13 92	9 13	16 - 17:30	Adult Males		3m	2.5
LHR 16:00 - 17:30 LHR/Sky: Sunny and hot/Wind: light						
NS-14c5 LaHave River (at Sherbrooke Lake) /CODE: LHR/TYPE: Lotic (fast), River (small), Rocky, some silt, some mud (Spartanium sp. (sparse)), Rocky shoreline (Ferns)/Lunenburg Co., Nova Scotia, Canada/NORTH:4944000, EAST:373500/ROAD: Viennot Rd/FEATURE: Headwaters Park, Newburn/REGION: 400 Atlantic Interior						
By	Collector	Confirmed By	Deposited With	Correspondence Date	Preservation (unless otherwise indicated, standard, see below)	See Below
PMB			1 to H. White	12 20 93		
Three males of the number collected patrolling the bank of the river, sometimes <10 cm of the bank, either looking for females or prey at the water interface.						
Specimen Reference 150-LHR-9.13(3)				Relative No. Codes: 1=one 2=few 3=many 4=great many		
Paul-Michael Brunelle Nova Scotia, Canada				Standard preservation of adults in cold kill, followed by 24hrs or more in acetone. Standard preservation of nymphs is hot water kill, 24hrs or more in females and maintenance in 70% alcohol.		

Provinces kept turning up as prior unpublished records in museums—“always the bridesmaid, never the bride,” as he said. Of course that all changed with his amazing discovery of an undescribed species, new to the world, *Neurocordulia michaeli*, which he named after his son. Paul organized the 1996 DSA meeting in New Brunswick [*ARGIA* 8(2) 9-13 (1996)] where many of us were introduced to the new species and had the excitement of balancing thigh deep in the boulder-strewn Canoose Stream rapids, wildly swinging our nets at Broad-tailed Shadowdragons silhouetted by the fading twilight, while being exsanguinated by clouds of mosquitoes — truly a memorable, once-in-a-lifetime experience thanks to Paul.

Hal White

The Black Odonatologist's Working Group

By Babasola Williams Adu, Owolabi Bibitayo Ayobami, Alafia Azeezat, Judicaël Fomekong-Lontchi, Kehinde Kemabonta, Ken Knapp, Sylvester S. Ogbogu, Ekpah Ojonugwa, Sévérin Tchibozo, Nene Ugbah, Gavin Campbell, Rhema Uche-Dike, Erasme Uyizeye, Jessica L. Ware, and Damion Whyte

We are a group of odonatologists from across the globe (Benin, Canada, Cameroon, Ghana, Jamaica, Nigeria, Rwanda, United States) who were invited to write about our perspectives as Black members of the odonatology community. We thank the editor of *ARGIA* for the opportunity to highlight the challenges and successes we have experienced in this field.

Studying odonatology while Black

Studying dragonflies and damselflies in nature allows us to travel to (often) remote areas to collect our favorite species. Collecting in the field has perils, from encounters with bears in northern New Jersey and the Yukon of Canada, large reptiles in Florida and Guyana, and snakes in Arizona, Namibia, and Nigeria, to scorpions in Costa Rica. Danger at field sites can be near universal in some countries, where the cause of danger is, for example in Nigeria, the fear of being kidnapped or robbed (Punch.com 2020). In many countries, however, including the United States, one of the perils faced by Black entomologists is anti-Black racism (this is an issue across nature disciplines [Tsents *et al.* 2020; Schell *et al.* 2020;



Jessica Ware, Nene Ugbah, Ken Knapp, Kehinde Kemabonta, and Melissa Sánchez Herrera at the World Dragonfly Association International Congress of Odonatology in 2019.



Erasme Uyizeye samples along the edge of the water in Akagera National Park. Photograph by Jens Kipping.

Samayoa 2020]). Collecting data at a river or stream often results in frequent stops by police or border patrols, either for being in a neighborhood that is mostly white or for looking suspicious for carrying nets or other collecting equipment. It is hard to know how often this happens, but each of us has experienced this, and it is likely a common phenomenon that other odonatologists may not experience, or at least not as frequently. When white odonatologists do get stopped at their field sites, they may not experience the same associated risk or fear that comes with these interactions as their Black (or other people of color) counterparts.

Another issue Black odonatologists in parts of Africa face is that some sites that hold great biodiversity may be inaccessible due to cultural rituals. Across Africa, many towns and villages have forests that are separated (i.e., protected) for rituals and spiritists' activities (they are called evil forests or "Igbo oro" in Yoruba dialect); this is not common in western world, except those forests termed to be 'dangerous' because of the presence of wild animals. Most Africans believe in spirits and ghosts (evil or holy), and the majority of scientists in western world do not believe in such order (which they may refer to as superstitious). While these forests may be rich in odonate diversity—since human disturbance is restricted—these cultural activities prevent one from collecting there. Cultural belief of some Black scientists in Africa could be a challenge since they will not want to face the wrath of the 'gods' for violating the laid down order.

Recently one of our post-graduate students went to a neighboring village for fieldwork and they were vehemently prevented from entering the forest. It took the intervention

of the village king who provided a guard that guided them into the forest.

Another issue, assuming one gains access to collect the specimens, is returning to one's home institution with the samples. For example, Erasme Uyizeye has heard stories from peers of researchers being questioned by immigration officers at the airport for lengthy periods of time, despite having transport permits for specimens — the very same permits that our white counterparts use without issue.

Lastly, an issue is invisibility. Many of us noted that Black scientists in general were considered rare, and this left us feeling invisible. In Jamaica, co-author Damion Whyte asked kids in rural areas what came to mind when they heard the term "scientist." One of the popular responses was "White people," and when asked about what they thought of scientists who were Black, they responded that it meant that the person was a foreigner. In general, those of us from outside of North America have problems getting our research published in some journals as there is a view that we do "mediocre work" if we are not from North America or the United Kingdom.

How many Black odonatologists are there?

Black entomologists have always existed, as African people have been working with insects for centuries. In the United States, African Americans have had a historical interaction with agriculture and related entomology, first as enslaved people, then as sharecroppers, and then as entomologists, farmers, doctors, amateur naturalists, and nature lovers. As Black odonatologists, we are interested in describing new species, documenting odonate ecology and evolution, and advancing the study of the over 6000 dragonfly and damselfly species.

We attempted to gather data on when the first Black odonatologists earned their degrees. In the United States, Jessica Ware was the first Black odonatologist to earn a doctorate, in 2008. Also from the United States, Nene Ugbah received a master of science in 2016. In Canada, we were unable to find data on any Black odonatologists who had earned either master of science or doctorate degrees. In Nigeria, the first professor A.T. Hassan (now retired) of the Zoology Department at the University of Ibadan, pioneered odonatology with a doctorate in zoology (Entomology) in 1974 (Hassan 1974). Hassan and J. F. Adetunji subsequently carried out further studies on the taxon in the 1970s and early 1980s. Much later, renewed interest on the taxon led to a detailed study of Akure Forest fauna in the same southwestern Nigeria by B. W. Adu, making Adu the second odonatologist to earn a doctorate with a strict focus on Odonata in Nigeria. More recently, the record of Nigerian odonatologists also includes Ekpah Ojonugwa who obtained a master of science from the University of Lagos, Nigeria in 2020. Moreover, R Uche-

Dike carried out extensive work on the Odonata of Lagos, Nigeria for his bachelor of science in 2018. Additionally, Erasme Uyizeye from Rwanda earned a doctorate in 2020 and his thesis focused on Odonata. Going forward we would like to gather data on Black odonatologists from countries beyond the four listed here, so please contact us with your information should you have names to add to this list.

We conducted a survey of Black odonatologists to assess field experiences. We had responses from several countries in Africa and from the United States (Table 1). Of the respondents, 18

Table 1. Countries from which we received survey responses

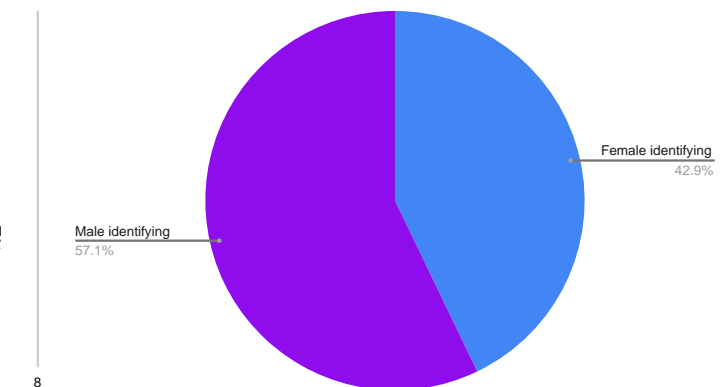
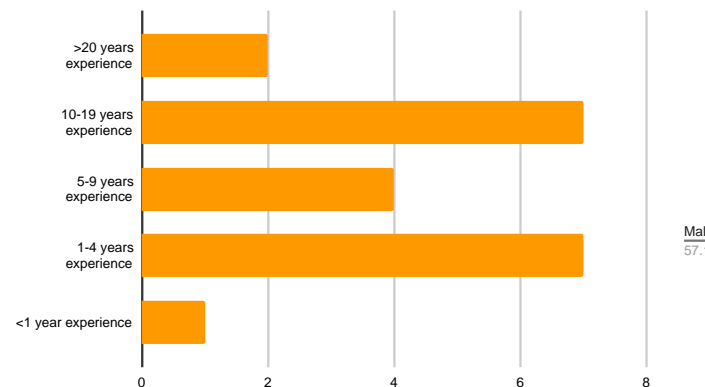
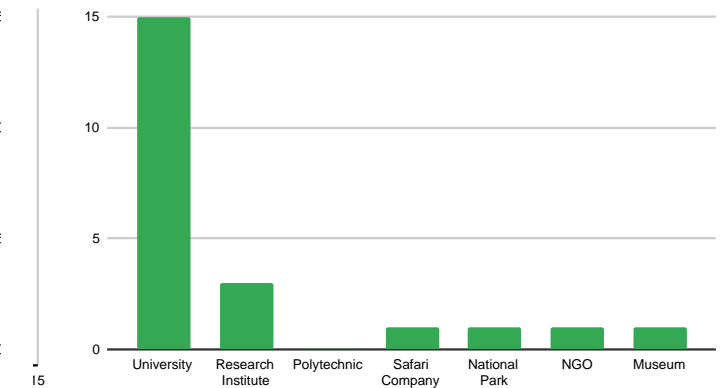
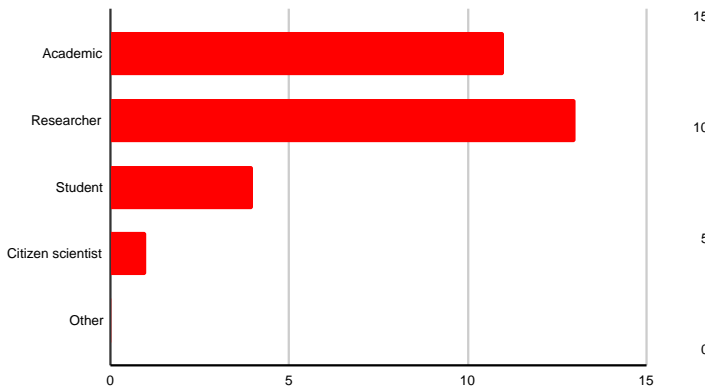
Country	Number of respondents
Ghana	1
Madagascar	1
Nigeria	13
Cameroon	1
Mozambique	1
USA	1
Kenya	1
Sudan	1
Uganda	1
Benin	1

researchers were academics working at universities or research institutes. Respondents also worked in national parks (1 person), NGOs (1 person), safari companies (1 person), and museums (1 person).

Here is a short summary of some of our results:

- 76% Experienced difficulty accessing literature for their work
- ~19% Found sample collections inadequate (48% listed them as “occasionally adequate”)
- >52% Found it more than occasionally difficult to assemble a research team
- 75% Experienced inadequate safety in the field (such as having access to security guards)
- 90% Indicated that funding is more than occasionally lacking
- 76% Indicated that field sites are often inaccessible to them
- 85% Experienced difficulty in their ability to collect specimens

Despite these potential challenges, 80% replied that they rarely or very rarely lost focus of their research goals and 52% said that they rarely or very rarely suffered from a lack of motivation or interest. Indeed, of the 22 respondents, a majority (81%) continue to conduct research on Odonata



more than occasionally. Mentorship was not something that many respondents listed as lacking (less than 40% listed this as a more than an occasional problem). Most were introduced to odonatology by a supervisor, while others listed an inherent self-interest that inspired them to join this field. This suggests that efforts for diversity, equity, and inclusion should be put toward retaining Black odonatologists, as it is not a lack of interest but rather a lack of resources for continuing to work in the field that is deficient. Indeed, 95% of people who replied indicated that they wished to continue working in odonatology if opportunities and funding were available to do so. Forty six percent of respondents had not yet been able to publish their work, while 25% had more than 10 papers published; 52% had received prior funding for their research projects.

How can we make odonatology accessible for all? Different needs on different continents

We can be mindful as odonatologists about making meetings accessible to all. Having a diversity, equity, and inclusion committee can help scientific societies with initiatives to recruit and retain a diverse cohort of members; this is especially important on continents that have undergone colonialism such as North America, Europe, and Australia. Inviting entomology students from local, historically Black colleges and universities to United States regional meetings can open doors to lifelong participation. As in our personal lives, speaking out against comments that are exclusionary or biased against minority groups can create a community that thrives.

Advocacy has the potential to help facilitate diversifying the field of odonatology—you cannot become what you do not see. Going into high schools and middle schools to give Odonata talks will definitely pique the interest of some of these inner-city children. Seeing other Black odonatologists will motivate them to be like, ‘the professor I saw at my school’ or the ‘dragonfly person’ etc.

In Africa, people are interested in odonates but there is a scarcity of opportunities to study them. Holding odonatological conferences in African countries often will help increase the number of Black odonatologists. This will connect odonatologists from around the globe with Africans who are interested in odonates — trust us, they are there. Holding a few conferences in Africa will help to make odonatology accessible to these African people and this will simply increase the Black odonatology family.

We had an interesting discussion about the experience of racism in the field when writing this article, and in trying to develop solutions to this for Black members of our community. While this is a frequent issue in North America, in Africa, (Nigeria in particular, where many of us are located) very little or no evidence exists in regards to exclusionary practices linked to gender or people of color. Indeed, in



Ekpah Ojonugwa collecting Zygotera in Nigeria. Photograph by Clifford Omonu.

most African countries, the population is predominantly Black. Even religious affiliation that is occasionally a factor in policy implementation has no noticeable negative effect in odonatology across, for example, Nigeria.

The critical issue here is the general underfunding of research institutions. What is needed is to increase public interest in the subject (for recruitment) and funding of projects (for retention). There are additional barriers that varied across continents, such as unequal access to resources which limits involvement. For example, many researchers outside of the United States and Canada have difficulty accessing proper taxonomic identification guides and publications and this limits a student’s ability to participate. This can be a more difficult challenge to tackle, given copyright laws that prevent making all papers open access, but as we are able to freely share our own author copies perhaps creative solutions exist. Mentorship was considered important by many respondents, but we could do better at providing mentorship opportunities globally. Importantly, mentorship should focus on training the next generation of researchers in an area rather than colonialistic-style mentoring that leaves little knowledge in the home country and instead works to simply benefit a researcher from a host institution in North America, or Europe, for example.

We thank the Dragonfly Society of the Americas for inspiring us to form this working group. Our first step was coming together to form the Black Odonatology Working Group, and to introduce ourselves to the community. Next, we will work to enhance participation globally by Black odonatologists, training the next generation of researchers. We look forward to continued collaboration with odonatologists globally, and are eager for the future!

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Finding *Somatochlora* (Striped Emeralds) and *Neurocordulia* (Shadowdragons) in Acadia and Beyond

Editor's Note:

Here below is priceless advice from Paul-Michael Brunelle about finding and netting two prized dragonfly genera: *Somatochlora* and *Neurocordulia*. In 2007, long before he became president of the DSA, Bryan Pfeiffer asked Paul to write an article for his newsletter at the time (*The Boghaunter*) about these genera in New England and the Canadian Maritimes. As part of our tribute to Paul, we reprint his insights here with minor edits and updates. Paul's quips in the "netting advice" sections alone make this article a fine read and a fitting tribute. We no longer have the habitat images Paul had included with the article, but you can find them with the [original version of article](#). Paul's reference of Acadia here comprises Maine and the Canadian Maritimes, a region with which he was intimately familiar.

By Paul-Michael Brunelle

The *Boghaunter* has asked me to give you some tips on finding the Striped Emeralds (*Somatochlora*) and the Shadowdragons (*Neurocordulia*). Both of these genera are challenges to encounter — the Striped Emeralds because most of the species inhabit peatlands that become progressively rarer as you move south, and which are not frequently surveyed, and the Shadowdragons because they fly in the evening when we rarely look for them.

Consequently, many of the species of these two genera are considered rare — though they may actually be common in places. *Neurocordulia michaeli* (Broad-tailed Shadowdragon), for example, is the most common dragonfly species on Canoose Stream, its type locale, but you would never know that unless you collect exuviae (the larvae are painfully difficult to find) or collect adults well after sunset.

Of particular interest would be specimens of teneral and their associated exuviae. There may well be undescribed species lurking out there, considering how few contacts we have had with some of the species, and larva (exuviae) specimens with determination guaranteed by the teneral are valuable in general. Exuviae are also very valuable, particularly if you document where you found them by photographs or detailed descriptions of the habitat.

Rearing is an excellent way of determining what you've found. I'm sure there is an intrepid bog fanatic out there who doesn't mind shifting a ton or two of peat and *Sphagnum* in search of rare larvae. Collecting in May and early June will give the best prospects for emergence-ready specimens, which should emerge shortly after being raised to room temperature.

If you find any of the following species (or any odonate) in the Atlantic Provinces, please submit your data. Bear in mind that there are no useless records of Odonata for even our most common species (*Ischnura verticalis*, natch). We have only one record per 60 square kilometers (about 23 square miles) after more than 100 years of study.

Finding the Striped Emeralds (*Somatochlora*) in the Northeast

The genus *Somatochlora* includes some of the most desirable of the Northeastern species, mostly because it contains a group of subarctic species which are rarely found below 45°N latitude (where I suspect most of you readers are): *albicincta*, *brevicincta*, *cingulata*, *forcipata*, *franklini*, *incurvata*, *kennedyi*, and *septentrionalis*. There is, however, a group of southern species which affect us frostbacks similarly: *calverti*, *filosa*, *georgiana* and *linearis*. I won't have anything to say about the latter group because I haven't seen any of them in flight.

Many of the northern Emeralds are associated with peatlands (bogs and fens), some are found at slow, running waters (*albicincta*, *cingulata*, *elongata*, *minor*, *williamsoni*). Although searching for larvae or exuviae of the running waters species is a good idea, and can give you a hint where they will be flying later on, these life stages of the peatland species are excruciatingly hard to find; seeing the adults is generally much more likely. The following general advice is based on my experiences with the genus in Acadia.

Look for woods road aligned about east to west. You can see the little devils a mile off in the early evening (also on bogs). Intersections of woods roads are excellent places, as both the sun-loving and shade-loving species end up there at one point or the other. During windy days you can find many species of dragonflies in the "wind shadows" formed by stands of trees, and particularly along the sheltered side of bogs. The flying species from all around are concentrated in these calm areas, so a really windy day can be very productive if you find the right spot.

Exuviae of the stream and lake species are usually found near the shore, but exuviae of the bog and fen species are more of a challenge. I have had the most success looking for them along animal paths in the bog, but you have to look carefully; they are usually covered in peat and quite inconspicuous.

Somatochlora albicincta (Burmeister 1839)

Ringed Emerald

Identifying: Moderate size, robust, abdomen ringed in white.

Distinctive in the hand. Resembles *brevicincta* and *walshii* on the wing in appearance and behaviour.

Range: Northern, trans-continental, rare in Acadia.

Flight Period: First week of July to mid-August.

Foraging: Has not been encountered in feeding swarms away from water or patrolling roads.

Aquatic Habitat: Slow-running waters, bog streams, still waters, beaver ponds, backwaters of otherwise rapid streams and rivers, and coves of lakes. Search image for the habitat is sparse emergent plants in slow water.

Flight Style: Males fly slowly during the day at about knee level along the edge of the water feature, with frequent hovers. Females fly much more quickly and oviposit in the margins.

Netting Advice: Put your net on the shore and sweep up to them when they reach the right place. Experience indicates that pitching rocks at them when you've missed a swing is an ineffective technique.

Where To Find It If You're Desperate (WTFIIYD):

See comments under *cingulata* as well. Drive along highways 108 or 180, which cross mid to northern New Brunswick, stopping at the ponds and still waters along the way. Do not take the lumber trucks casually anywhere in northern Maine or New Brunswick, park well off the road.

Somatochlora brevicincta Robert 1954

Quebec Emerald

Identifying: Moderate size, robust, abdomen with partial white rings. Distinctive in the hand. Resembles *albicincta* and *walshii* on the wing in appearance and behaviour.

Range: Northern, trans-continental, rare in Acadia (rare everywhere, even in Quebec).

Flight Period: Last week of June (thanks to Stuart Tingley for discovering this) to mid-August (but there are two records of males in September).

Foraging: Has not been encountered in feeding swarms away from water, or patrolling roads (but one teneral female was taken circling in a sunlit patch of road not far from a bog).

Aquatic Habitat: Fen areas within and bordering bogs, not at the secondary (open, firm-edged) ponds of those bogs. Search image for the habitat is bright green *Sphagnum*-filling pools (do NOT wade light-heartedly in these places). I have found that territorial male *Libellula quadrimaculata* (Four-spotted Skimmer) in a bog or fen are indicators for *brevicincta*.

Flight Style: Males fly slowly during the day at about knee level above the surface, with frequent protracted hovers. Females spend as little time as possible at the ponds, ovipositing frantically then “booking,” to use the scientific term. Very annoying to the collector and presumably to males of the species, which of course is why she does it.

Netting Advice: Slosh (carefully) over to where you suspect the insect will be when you get there, keep your net low, try not to weep or rant when you miss, unless you're alone.

WTFIIYD: Along Highway 108 in mid New Brunswick there is one bog (only one) about the size of a football field (“Stuart's Bog”). The species is there some years (it may be irruptive). Wade across the bog at the east end to the side away from the road until you find, or fall into, what appears to be a green *Sphagnum* stream. Wait for it....

“ **Netting Advice:**

Put your net on the shore and sweep up to them when they reach the right place. Experience indicates that pitching rocks at them when you've missed a swing is an ineffective technique. ”

Somatochlora cingulata Selys 1871

Lake Emerald

Identifying: Large size, robust, abdomen ringed in white.

Distinctive in the hand. Resembles *Didymops transversa* (Stream Cruiser) and *Epithecina princeps* (Prince Baskettail) in appearance on the wing, and in behaviour when feeding away from water.

Range: Northern, trans-continental, fairly common in the Maritime Provinces, sometimes abundant, uncommon in Maine.

Flight Period: Last week of June to late August.

Foraging: Commonly encountered feeding away from water but usually solo or in small numbers, often patrols roads. Flight is much like a darner's when foraging.

Aquatic Habitat: Lakes, the secondary ponds of bogs, and rivers. At water, it will generally be seen wherever it is most difficult to get to. The larvae are usually found at active lakeshores, where wave-wash and currents keep silt from forming on the bottom.

Flight Style: Males fly close to the water surface at prodigious speeds well away from shore. They tend to approach the shore most closely (but usually not closely enough) at points. These guys do not hover.

Netting Advice: Wading is the only practical solution where the bottom is firm enough to support you (not in bog ponds). Frustratingly, the insect then begins to consider you part of the shore and moves out farther. Canoes or boats are not a good idea unless you want to end up swimming. But swimming perhaps? With the net gripped in your teeth, commando style? Persist. This may be one of the species in which a “fly” is useful; something resembling a female dipping her tail might well bring the male into reach (let me know how it goes). My greatest success in capturing this species was in a moderately fast current river about calf-

deep along which the males were rocketing in a straight, uninterrupted path a few metres out from the shore.

WTFIIYD: The river I mention above is in Mt. Carleton Provincial Park in northern New Brunswick, just south of Highway 180. A bridge on North Shore Road crosses the river, and the pool downstream around the corner is happy hunting ground for a number of *Somatochlora* (one-stop shopping for *albicincta*, *cingulata*, *elongata*, *minor*, *williamsoni*). The park people are unusually friendly and helpful, but it would be a good idea to let them know that you're going to be netting when you arrive.

Somatochlora elongata (Scudder 1866)

Ski-tipped Emerald

Identifying: Large size, slim, thorax with strong white bars. Distinctive in the hand. Resembles *williamsoni* on the wing in appearance and behaviour.

Range: Southern, west to the Great Lakes region, south along the Appalachians, common for its genus in Acadia.

Flight Period: Mid-June to mid-September.

Foraging: Commonly encountered feeding away from water, sometimes in abundance, often patrols roads. Flight is much like a darner's when foraging.

Aquatic habitat: All slow waters.

Flight Style: Males fly about knee height along the shore, with frequent hovers. Females oviposit in protected areas by driving their eggs into a bank then washing their abdomen tips in the water; however, they also lay directly onto the water surface. I once saw a female laying in the small pool within a hollow standing stump. She was less than a metre from the males intently searching the shore; I could almost hear her chuckling.

Netting Advice: As with *albicincta*.

WTFIIYD: See *cingulata*, but almost any still or slow-moving water.

Somatochlora forcipata (Scudder 1861)

Forcipate Emerald

Identifying: Moderate size, slim, thorax with strong white markings. Distinctive in the hand. Resembles *franklini* on the wing in appearance and behaviour.

Range: Northern, trans-continental, south along the Appalachians, uncommon in Acadia.

Flight Period: Late May to mid-September.

Foraging: Commonly encountered patrolling roads early in the season. Flight is straight and fast along the length of the road above waist height, but usually not too high up.

Aquatic Habitat: I have seen it ovipositing into moist *Sphagnum* on an old skidder trail, and males are found protecting territories in *Sphagnum* areas surrounding bogs. Walker (1975) reports it from tiny streams.

Flight Style: Males fly straight and fast along roads, apparently somewhat slower at streams.

Netting Advice: When encountering them flying along roads, consider yourself "at bat." I have found that in this situation, trying to figure out which way the next dragonfly is going to come is counter-productive; they always come from the

direction you're not looking. Best to pick a direction and ignore those who pass you from behind.

WTFIIYD: In northern Maine and New Brunswick, during June, they appear to be flying on every lumber road. I first realized how common they were in this context when I realized that several of the dragonflies I found stuck on the net racked on the top of my Jeep were *forcipata*. I also drive with a net in front of the radiator during most years, but that does not extend more than a meter above the road, and I have not taken *forcipata* in it.

Somatochlora franklini (Selys 1861)

Delicate Emerald

Identifying: Moderate size, males are very slim, hindwings with a small dark patch beside the membranule (a suede-like membrane at the basal angle of the hindwing — often dark in whole or part — can confuse). Distinctive in the hand. Resembles *forcipata* and *incurvata* on the wing in appearance and behaviour.

Range: Northern, trans-continental, not much farther south than northern New England, uncommon in Acadia.

Flight Period: Late May to early August. At its bog habitats the species seems to be chased away later in its flight by the larger *incurvata*, which has similar habits.

Foraging: Commonly encountered foraging on roads, usually at an infuriating height. Does not often fly rapidly along the roads as does *forcipata*.

Aquatic Habitat: I have seen it ovipositing in small areas of open water between the woody stems of bog shrubs, but not in the open ponds. A good tactic with this species (and some bog darners) is to stand still and listen for the sound of wings clashing in the brush stems. Most interestingly, this species' females (in common with *incurvata*) appear to lay by preference in footprints in moss lawns of bogs. I have seen it laying in a moose print, and likely the depression of that print would have filled in shortly afterward leaving the larvae to develop in the saturated moss. See the comment under *incurvata* as well. It is interesting to speculate as to whether the extinction of the Caribou in the east affected these species, by reducing the footprints in bogs. Males patrol over moss-choked pools or moss lawns. In patterned bogs, the males will tend to patrol the length of the elongated depressions.

Flight Style: Males fly straight and at moderate speed, females are somewhat fluttery in flight when searching for laying areas.

Netting Advice: The species is not particularly wary, so it is best to note the direction in which the male is traveling and slog over to an interception point (excellent cardiac exercise), keeping your net low and about flat to the bog surface, and sweeping upwards when it comes within reach. Of course, just before the conditions are perfect, it will spot another male 30 meters away and charge off to challenge it. At this point, do not delete your expletives, but also do not pursue immediately. Annoying though it is to have it fly away, it is much more aggravating to toil along after it, only to have it return to its original patrol area, now behind you. Be patient,

there are advantages to standing still even in the austere habitats of a bog. Once, in northern Maine, when waiting for a *franklini*, I was treated to the sight of a very large bear rising up from behind the trees a stone's throw away from me in the direction I had been traveling. As the trees on this bog were only a metre or so high, it looked like a scene from a science fiction movie (Bearzilla). All participants, including, alas, the *franklini*, left the scene unscathed.

WTFIIYD: In May and June, look for them on the moss lawns of large bogs, or flying over heaths.

Somatochlora incurvata (Walker 1918) Incurvate Emerald

Identifying: Large size, slim. A bit difficult to discriminate in the hand. Resembles *forcipata* and *franklini* on the wing in appearance and behaviour.

Range: Northern, west to the Great Lakes region, south along the Appalachians to Ohio; common in Acadia; in fact one of the most common dragonflies in August in its habitat.

Flight Period: Late June to mid October, a very long flight period. At its bog habitats the species chases away the smaller *franklini*, which has similar habits.

Foraging: Commonly encountered foraging on roads, flying fast like *forcipata*, but usually lower (about waist height). A common species for road kill in Acadia.

Aquatic Habitat: As with *franklini*, particularly regarding laying in footsteps in the moss lawns. On one occasion I was surveying a bog near a good-sized pond choked with bright green *Sphagnum* and with no open water. I had seen absolutely nothing for over half an hour until I saw an *Aeshna subarctica* (Subarctic Darner) on (as usual) the other side of the pond, so I walked gingerly through the pond to bag it, but before I got there it booked (again, as usual). By the time I had turned around, there were two *incurvata* females laying in my open footsteps.

Flight Style and Netting Advice: Very similar to *franklini*

WTFIIYD: Very similar to *franklini*, but flies a little later.

Somatochlora kennedyi Walker 1918 Kennedy's Emerald

Identifying: Large size, slim. Distinctive in the hand. Resembles *forcipata* and *franklini* on the wing in appearance and behaviour.

Range: Northern, trans-continental, not much farther south than New York, uncommon in Acadia.

Flight Period: Mid May to late August, a very early emergence for the genus.

Foraging: Often encountered foraging on roads, flying fast about waist height.

Aquatic Habitat: I have seen it ovipositing in small areas of open water between the woody stems of bog shrubs as with *franklini*. Walker (1975) gives bogs and swamps as the likely habitat, but notes that it has been taken laying in ponds. I have encountered the males behaving territorially in pocket bogs with little standing water.

Flight Style and Netting Advice: Much like *franklini*.

WTFIIYD: Very similar to *franklini*, but flies a little earlier.

Somatochlora minor Calvert 1898 Ocellated Emerald

Identifying: Small size, fairly robust, thorax with strong white markings. Distinctive in the hand. Resembles *walshii* on the wing in appearance, and *elongata* and *williamsoni* in behaviour.

Range: Northern, trans-continental, not much farther south than Massachusetts, common in Acadia.

Flight Period: Early June to late August.

Foraging: Rarely encountered patrolling roads.

Aquatic Habitat: Slow streams and stillwaters, much like the habitats described for *albicincta* and *elongata*. They are abundant in the little streams that drain Everlasting Barrens Bog (see *septentrionalis* below).

Flight Style: Males fly judiciously along the stream bank, with frequent hovers, much like *elongata* and *williamsoni*.

Netting Advice: As with *elongata*.

WTFIIYD: Should be found at most slow running waters in the region.

Somatochlora septentrionalis (Hagen 1861) Muskeg Emerald

Identifying: Moderate size, fairly robust, wings with a relatively large triangular dark spot along the membranule. A bit difficult in the hand, and depending how north you are, you should keep *whitehousei* in mind. Resembles *kennedyi* on the wing in appearance, and *Cordulia shurtleffii* (American Emerald) in behaviour.

Range: Very northern, trans-continental, it does not get below northern New Brunswick and Cape Breton Island, where it is rare and confined to highlands bogs. One of the few species in North America not known from the contiguous US (is found in Alaska). I have scrutinized bogs in northern Maine with no luck for this species, though it is found in similar habitats at the same latitude and elevation in New Brunswick.

Flight Period: Mid-June to mid-August.

Foraging: Has not, in this region, been found away from water.

Aquatic Habitat: My first encounter with this species was in late August in a sloped bog in the Cape Breton Highlands. I had been in the Highlands earlier in the month, looking for *septentrionalis* and other northern species, but had no luck for this species, which I knew from a specimen in the Nova Scotia Museum that had been taken somewhere up there. Not that I didn't see Emeralds. I spent a full day chasing them from pond to pond, always a tad short, always on the wrong side of the pond. For you sailors out there, they seemed to have the lee gage on me; in the heavy winds typical over these bogs they just sailed away when spooked. By late August the male Emeralds were no longer evident at the small ponds where they were earlier in the month and I had given up on seeing the species. There is a large pond (or small lake) on this particular bog in which I had not seen the annoying Emeralds (probably because the larger darners and *cingulata* shooed them away). Late in August there were no dragonflies at this pond, and I netted a female *septentrionalis*

laying at speed while flying along its quaking margin. The following year I was in the Highlands in July, and found the males and females abundant in the smaller ponds along with *Aeshma sitchensis* (Zigzag Darner). Here the females tended to tap their eggs into the water in one small area (less than 50 cm in diameter), behaviour quite at odds with that during my first encounter. In a bog found by Stuart Tingley in northern New Brunswick, males were territorial at the downwind ends of secondary ponds (there were none of the small shallow pools) where the debris had built up around the shore in a pinkish mat under shallow water (I collected larvae in these places the next year). *Cordulia shurtleffi* was territorial along the firmer-edged shores of the pond. When a patrolling *septentrionalis* met a patrolling *shurtleffi* they clashed pro forma, their hearts just didn't seem to be in it.

Flight Style: In the sloped bogs of the Cape Breton Highlands, males fly at a moderate speed into the wind along the length of one small pond and on to the next. They are quite stately in their progress, rarely pausing, rarely speeding up. This makes not getting near them all the more aggravating. In northern New Brunswick they establish territories at the soft shorelines of secondary ponds, patrolling back and forth over their domain, in a manner typical of *shurtleffi*.

Netting Advice: Don't chase them, stand and hold your ground at the end of a pond with the wind at your back. Pick an area with the least complicated pond structure. Don't complain about the wind; in this part of the world you would be drained dry by blackflies without it.

WTFIYD: Anyone wanting to find this species in Acadia should contact me for detailed directions. Both the bogs I mention above are reachable with a normal car (leave the Ferrari at home). If you have access to Google Earth, you can see the northern New Brunswick bog (Renous Bog) at 46°54'4.97"N, 66°37'10.63"W but the imagery is not very good for that area. The Cape Breton Highlands bog (Everlasting Barrens Bog) is at 46°40'10.91"N, 60°38'50.37"W and the imagery is excellent for this area (you can nearly see the bugs). The large pond is at the north end of the bog (note how quaking bog is consuming it), the secondary ponds south of it and a little west, and the flark ponds at which *septentrionalis* is found are over at the east side of the complex. The little streams draining the bogs are generally patrolled by *minor* and *Cordulegaster diastatops* (Delta-spotted Spiketail). This bog is outside Cape Breton Highlands National Park (the smaller bog adjacent to the northwest is partially in the park) and no permission is needed to sample there.

Somatochlora tenebrosa (Say 1839)

Clamp-tipped Emerald

This is a species that I have very little experience with, its greatest abundance being south of Acadia.

Identifying: Large size, slim, male terminalia is an easy call, female ovipositor not so much, little colour on the side of the thorax. Distinctive in the hand. Resembles *elongata* and *incurvata* on the wing in size, appearance and behaviour.

Range: Southern and eastern, fairly common in Maine, rare in the Maritime Provinces.

Flight Period: Late June to early September.

Foraging: Occasionally encountered patrolling roads. Flight is fairly straight and fast along the length of the road above waist height, sometimes high up. I have seen it feeding at the intersection of dirt roads often enough to suspect that's a good place to look for it. The species is reputed to love shade, and my first encounter with it was of a male flying along a heavily shaded ditch, but all of my other encounters have been in full sunlight. Blair Nikula mentioned to me once that the species flies in powerline cuttings, and with that search image I have found it a few times since.

Aquatic Habitat: Edmund Walker characterized this as an "inhabitant of small forest streams with intermittent rapids and pools" and he was undoubtedly right, but I have never encountered it at these habitats in Acadia, and I've been to a few. The one larval collection we have was from a slow stream through a bog/fen in Maine. Students of the Humboldt (Eagle Hill) larval odonate seminar industriously dipped this stream for a morning and came up with some pretty neat stuff, most of which I stated authoritatively was *Cordulia shurtleffi* because of the dark lateral thoracic marks. Pride goeth before the fall. This particular seminar was attended by a small, stalwart band of naturalists who just loved to catch me in an error. In this case many of the *shurtleffi* proved to have dorsal hooks and to key to *tenebrosa* (some others were actually *shurtleffi*). Bronco Quick collected more the following year and they emerged as *tenebrosa*, confirming the determination, so the habitat in this case is also confirmed as being within floating *Sphagnum* moss in the slowflowing stream. And note that *shurtleffi* and *Dorocordulia* spp. are not the only Emeralds with lateral stripes on the thorax (although *tenebrosa*'s are not as long).

Flight Style: I haven't seen these at water, but suspect that they would fly similarly to *elongata*, *minor*, *williamsoni* and *C shurtleffi*. Let me know if you find out.

Netting Advice: As with the other species that patrol roads, but keep an eye out for lurkers in the shadows. I once saw a dragonfly in the deep shadows below a spruce tree but only by the glint of two green eyes, and I did not succeed in netting it.

WTFIYD: Blair's advice seems the soundest: powerline cuttings.

Somatochlora walsbii (Scudder 1866)

Brush-tipped Emerald

Identifying: Small size, fairly robust, males have hairy terminalia. Distinctive in the hand. Resembles *albicincta* and *brevicincta* on the wing in appearance and behaviour (but not habitat).

Range: Not particularly northern, trans-continental with a big gap in the prairies, south to Pennsylvania, common in Acadia.

Flight Period: Early June to mid-September, one record in mid-October.

Foraging: Commonly encountered patrolling roads, where

they fly very fast along the length of the road just above the surface, weaving from side to side. Females haunt sun-lit forest clearings and roads.

Aquatic Habitat: I have several times seen it ovipositing into the muck of the animal paths in fens and bogs, *Sphagnum*-choked ponds in bogs, and *Sphagnum*-choked brooks, scarcely more than trickles. It probably lays in the backwaters of lakes and running waters.

Flight Style: Males patrol over aquatic features at about knee height, very similar to the flight of *albicincta* and *brevicincta*.

Netting Advice: When the males are flying along roads, much the same advice as for *forcipata*, however, *walshii* is particularly difficult because it flies so low down and weaves from side to side like a drunken sailor. I've had a lot of luck collecting them on dirt roads with the net attached to the front of my Jeep.

WTFIIYD: Common, so it should be fairly easy to find, but in my experience, you get the best results at grassy fens and marshes.

Somatochlora williamsoni Walker 1907 Williamson's Emerald

Identifying: Moderate size, slim, thorax without strong white markings (except teneral have these markings and could easily be mistaken for *elongata*). Distinctive in the hand. Resembles *elongata* on the wing in appearance and behaviour.

Range: Somewhat northern, reaches west into the Prairie Provinces, south to West Virginia, common in Maine, less common in the Maritimes.

Flight Period: Mid-June to mid-September.

Foraging, Flight Style, Netting Advice: Similar to *elongata* in all respects.

Finding the Shadowdragons (*Neurocordulia*) in the Northeast

Since I first encountered exuviae of *Neurocordulia* in 1993, I have spent about 100 nights searching for adults in Acadia, and I suppose I have become quite proficient at it. Nevertheless, I have taken adults on only 35 occasions, a rather low success ratio considering I was carefully selecting the habitats for evening survey — so netting one is still a thrill.

I would encourage you to survey all sorts of aquatic habitats in the late evening, as much more occurs there when it is dusk than we know. Nick Donnelly suggested to me years ago that there was late-day gomphid activity, and subsequently Tony Thomas in New Brunswick discovered that *Stylurus scudderi* (Zebra Clubtail) is largely crepuscular in flight.

I think one reason why few of us go out at this time is that there is a prolonged period of relative inactivity at water from late afternoon until early evening. I call this the “calm before the swarm,” and during this period there are few things to see (although I have noticed that stream and river

corduliid females take advantage of the male's absence to get a little uninterrupted laying done). So, this is a good time to have dinner and dry your socks. About 8:00 p.m. EST, it is worthwhile to return to the water and start keeping your eyes open.

Flight of *Neurocordulia* in Acadia is heralded by the appearance of a particularly nasty mosquito species with striped legs (bring the bug spray), and also by a fairly sudden cooling of the air (have a sweater). Whether you're shivering or scratching, flight should begin within 15 minutes. Light overcast does not seem to discourage them.

I suggest that you find a stream or river with a bridge over it both because of simplicity of access and the fact that this will be public land, and because running waters are usually bridged at narrow sections, which means rapids, which is usually where *michaeli* and *yamaskanensis* are to be found. Also, the bridge lets you get up in the air where the initial flight occurs, rather than drooling on the bank. However, standing around on a bridge in the dark looking into the sky should not be done without caution — think road hockey and watch out for cars.

Neurocordulia michaeli Brunelle 2000 Broad-tailed Shadowdragon

Identifying: Small size for northern species of the genus, females very plump when gravid, both genders wide of abdomen compared to congeners. Distinctive in the hand. In overall form this species resembles an *Epitheca* (Baskettail) more than a Shadowdragon.

Range: Northeastern and north central, fairly common in Maine (many exuviae records), rare in the Maritime Provinces (confined to western New Brunswick). It has been taken quite high in latitude in Ontario, and appears to be the most northern of its genus.

Flight Period: Early June to mid-August.

Foraging: Has never, to my knowledge, been taken other than in the evening at its larval habitat, although teneral have sometimes been seen feeding over water earlier in the day. I believe they hang up in the shaded understory of the forest until the evenings. One evening at Canoose Stream, Nick Donnelly had directed my attention to a Turkey Vulture flying hundreds of metres up, and as I focused my binoculars I saw myriad dragonflies apparently feeding up where the sun was still shining. They flew like Emeralds, and in form could have been *N. michaeli* and/or *Epitheca*; so the lives of these species may be more complex than we know. How we will find out the truth of this I have no idea. Perhaps a helicopter-towed net?

Aquatic Habitat: *N. michaeli* is a species of medium to large rivers with coarse substrate (angular football-sized rocks) and a rapids, riffles, pool structure.

Flight Style: The species is usually abundant when mayflies are emerging, and those people with sharp eyes can usually see the swarm following the swarms of mayflies. Flight begins late in the evening, at perhaps 9:00 p.m. EST, well after the sun has gone down, and about when you can't see details in the marginal trees and brush, although the

sky is still fairly light. Initially, both genders seem to be up high, then the females go down to the water surface to oviposit. When flying up high they travel only moderately quickly in straight lines for a couple of metres then make an abrupt turn followed by another straight travel. This is fairly distinctive behavior and, combined with the comparatively small size and thick abdomen, makes it possible to recognize, at least tentatively, the species in flight. When down at the water surface, the females fly very rapidly and very close to the water surface. They fly at least until the sky is fully dark, however this is a period of only three-quarters of an hour or so. Shortly after the emergence date, teneral can sometimes be found lazily feeding on mayflies much earlier in the day.

Netting Advice: Initially, take a position on a bridge across the stream or river and try (emphasis on try) to net males and females as they rocket around. You need to see them against the sky, so stay low to the road (locals will question your sanity, but that is a small price to pay). If there is a light breeze, stay on the side of the bridge that the breeze is blowing toward. Later, when there seems to be less activity over the bridge, the best technique is to wade into the water at the foot of a pool with the current flowing down behind you, but facing upstream. Females will oviposit at high speed up the rapids, and often circle at the foot of the pool and head back down during this circle you have a reasonable chance to net them, swinging parallel to the water surface and almost touching it. Good luck. Larvae are difficult to find, but hand-checking rocks in the stream or river has yielded a few. In late May or early June (in Acadia) the emergence-sized larvae can be found in settle points along the shore; little coves or backwaters beside current in which waterlogged sticks have built up on the bottom.

WTFIYD: I have only encountered *michaeli* in abundance on three rivers, Canoose Stream and Eel River in New Brunswick, and the Northwest Saint John River in northwest Maine. During June and early July the species is present in great numbers at these sites. Exuviae collection suggests that it is fairly common in Maine and western New Brunswick.

Neurocordulia obsoleta (Say 1839)

Umber Shadowdragon

Identifying: Intermediate in size between *michaeli* and *yamaskanensis*, and slim. Distinctive in the hand. Resemble *yamaskanensis* and *Somatochlora* on the wing in size, appearance and behaviour.

Range: Southern and eastern, fairly common in Maine, not reported from the Maritime Provinces.

Flight Period: Late May to early September.

Foraging: Not to my knowledge taken except at its aquatic habitat and in the evening.

Aquatic Habitat: Lakes with rocky substrate. I mention above that it has been taken at a river, and exuviae have been taken at small fast streams, but these seem to be the exception to the rule. My only encounter with adults was at Mud Pond, near Old Town, Maine. The lake, in spite of its

name, has coarse angular substrate where I found *obsoleta*, but is elsewhere bog-margined. The water is turbid. Bronco Quick did an extensive exuviae survey at this lake, yielding many records of the species, *Helocordulia uhleri* (Uhler's Sundragon) and (interestingly) *Gomphus abbreviatus* (now *Hylogomphus abbreviatus*; Spine-crowned Clubtail).

Flight Style: At Mud Pond the adults fly at extraordinary speed just above the surface of the water, the females laying at full speed. I believe that this is the fastest dragonfly that I have ever seen. They go from shoreline prominence to prominence (much like *S. cingulata*), and I had the most luck swinging around a large emergent boulder, which they would circle at speed (this large boulder is at the coordinates I have given below).

WTFIYD: Mud Pond is located at 44°56'50.56"N, 68°46'42.75"W. This is a municipal park with good access to the water.

Neurocordulia yamaskanensis (Provancher 1875) Stygian Shadowdragon

Identifying: Large size, slim. Distinctive in the hand.

Resembles *Somatochlora* on the wing in size, appearance and behaviour.

Range: Southern and eastern, uncommon in Maine and the Maritime Provinces.

Flight Period: Early June to late July.

Foraging: Not to my knowledge taken in Acadia except at its aquatic habitat and in the evening, although Nick Donnelly tells me he has encountered it flying in sun at mid-day.

Aquatic Habitat: Much like *michaeli*, and its rarity in Acadia is strange; there should be abundant habitat and few direct competitors.

Flight Style: At the East Branch Union River, males patrol the edges of the fast water segment running under the bridge. They are found at water level much more often than is *michaeli*, and they seem associated with the shore much more than that species. Females were (contrary to *michaeli*) much harder to catch ovipositing at speed up the center of the run and out onto the stillwater.

Netting Advice: I had the most success by finding a slightly concave section of shoreline and sweeping it with a net whenever I heard wings moving.

WTFIYD: East Branch Union River, Highway 179, Hancock County, Maine.

Paul-Michael Brunelle had studied the Odonata of the Atlantic provinces of Canada and northern New England for more than three decades. He planned and helped coordinate the Maine Damselfly and Dragonfly Survey, was retained by Parks Canada to study Odonata in Cape Breton Highlands, taught Odonata seminars at the Eagle Hill Institute (Humboldt Field Research Institute, Steuben, Maine) and discovered Neurocordulia michaeli (Broadtailed Shadowdragon) in New Brunswick. He also founded the Atlantic Dragonfly Inventory Program. Paul lived in Nova Scotia.

Novel Behavioral Observations from North Carolina of The Poorly Known *Neurocordulia alabamensis* (Alabama Shadowdragon)

By Kyle D. Kittelberger and Brian Bockhahn

N*eurocordulia alabamensis* (Alabama Shadowdragon) is one of the most poorly known dragonfly species in eastern North America (Dunkle 2000, Beaton 2007, Paulson 2011, Abbott 2015). Dunkle (2000) referred to *N. alabamensis* as “one of the world’s most elusive dragonflies” due to its narrow flight window, which begins approximately 10 to 20 minutes before dusk, and ends about 40 minutes before complete darkness. Paulson (2011) stated that, beyond flying over breeding habitat at dusk, there was nothing known about *N. alabamensis* behavior. The only additional information comes from Abbott (2015) who describes the egg-laying behavior of females, which are known to fly in a rapid crisscrossing pattern over pools or areas of slow water flow when ovipositing.

Neurocordulia alabamensis inhabits small to medium-sized clear, slow-flowing forested or spring-fed streams that typically have sandy or mucky bottoms (Dunkle 2000, Beaton 2007, Paulson 2011, Abbott 2015). While the exact distribution of this species is poorly known (Paulson 2011), it occurs in the southeastern United States from central Florida north to North Carolina and west to eastern Texas (Dunkle 2000, Paulson 2011). In North Carolina, *N. alabamensis* is reported from 17 counties in the southwestern Coastal Plain (LeGrand *et al.* 2020), with most of these records collected by the late Duncan Cuyler. The known flight period of *N. alabamensis* in North Carolina is mid-May to late August, with most individuals appearing in mid-June with peak flights occurring from late-June to mid-July (LeGrand *et al.* 2020).



Figure 1: Female *Neurocordulia alabamensis* (Alabama Shadowdragon) photographed by Kyle Kittelberger on 8 June 2020 near Lake Baggett in Richmond County, North Carolina.

On 8 June 2020, we observed three *N. alabamensis* along Bones Fork, the outflow creek below Lake Baggett in Richmond County, North Carolina (35.0418°N, 79.62122°W). This lake and creek are at an elevation of approximately 300 feet within dominant pine savanna habitat in the North Carolina Sandhills. Bones Fork is small and relatively shallow, with an average depth of one to two feet in most places and a width of three to four feet. The creek has a low to moderate steady flow of water and a sandy bottom with detritus that is visible through the clear but tannin-colored water. There are several small eddies and slight ripples along various stretches of the creek. Other than intermittent overhanging vegetation, the creek is open for the

most part.

We spotted our first *N. alabamensis* at around 8:20 p.m. This individual foraged over the creek for roughly a minute, working a small eddy before disappearing and then reappearing at the same spot at 8:23 p.m. with a second individual for several minutes. We then observed these adults again from 8:37 until 8:39 p.m., at which time K. Kittelberger netted one, a female (Fig. 1). We continued to search from 8:45 until 9:00 p.m. but found no additional shadowdragons. Therefore, we observed the shadowdragons flying both before and after sunset — which occurred at 8:30 p.m. on this day. This supports Dunkle’s (2000) reported 10- to 20-minute duration for this species’ flight period. The relationship between

our flight times and sunset, however, does contrast with observations made in South Carolina, where the species was observed on 25 May 2014 completing its flight before the sun set (at 8:23 p.m.), flying from 7:55 to 8:14 p.m. (Chris Hill pers. communication).

From our observations of the known female, we presume the other individual we saw at the creek was also a female, as both were comparable in size and exhibited similar flight behavior. Both were dainty fliers that foraged very low over the water, mere inches above the surface. The flight was very erratic, with multiple quick movements in various directions as the females moved in a circular path above the water. As the two females foraged together, they circled around or near each other. Occasionally, one individual flew off on the side or elsewhere while the other continued to circle over the foraging area. The foraging sites were roughly one to four square foot areas of the creek, primarily over an eddy rather than faster flowing water.

This flight did not resemble that of any other dragonfly that we have encountered in North America, such that we initially mistook our first *N. alabamensis* as a crane fly (Diptera, Tipulidae) due to the similarity in flight movements with that taxon. The flight path was relatively small and concentrated on a particular section of the creek that the adults favored, and the species was easily approachable while flying and apparently foraging. Abbott (2015) noted a crisscrossing flight for egg-laying, but we observed no contact with the water and would describe the flight as short circling with jittery, erratic movements. In Alabama, this species has been observed at sunrise flying very low, fast and erratically over a dirt road (Steve Krotzer pers. communication) — flight behavior that is comparable to our observations of flying females.

K. Kittelberger also closely observed another *N. alabamensis* for about five minutes beginning around 8:30 p.m. farther downstream from where the females were foraging. Compared to the erratic and circular flight of the females, this individual slowly and methodically

patrolled back and forth across a length of the creek where there was a slight riffle. Rather than inches above the water, this flight occurred 6–12 inches above the creek surface. Based on the different flight pattern, notably larger body, and long, thin abdomen, we believe this third individual was a male. Like the females, it too was easily approachable. This flight behavior is similar to observations of this species in South Carolina, where the species was found flying low and slow back and forth along the stream edges (Chris Hill pers. communication).

To our knowledge, these observations represent some of the first descriptions of the behavior of *N. alabamensis*. The two females we observed had a fairly distinctive jittery flight that—when coupled with the apparently smaller size of the females compared to other *Neurocordulia*—may give one an initial impression of a non-odonate insect such as a crane fly. Our descriptions of the flight behavior of *N. alabamensis*, with additional information about habitat preferences and the flight times in relation to sunset, expands upon what is previously reported in the literature (Abbott 2015) for this specialized shadowdragon. We present our observations to not only contribute to the knowledge of North American Odonata, but to also aid other odonate enthusiasts with searching for and observing *N. alabamensis* in the southeastern United States.

Acknowledgements

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Nymph Cove



Aeshnidae



Gomphidae



Cordulegastridae



Petaluridae



Macromiidae



Corduliidae



Calopterygidae



Lestidae



Coenagrionidae



Libellulidae



By Marla Garrison and Ken Tennesen

Introducing *ARGIA*'s Nymph Cove, a new column focusing exclusively on odonate nymphs. Although the nymphal stage makes up the predominant part of a dragonfly's life and nymphs are superbly adapted for an aquatic existence and the challenges it poses, they have not been emphasized to the same extent as adults. Nymph Cove's mission is to highlight the amazing lives of Odonata nymphs through a series of articles explaining how to find nymphs and exuviae, how to handle and care for them, how to identify them, and ways to study their development. We hope that the information presented will provide further understanding of, and appreciation for, the complete life cycle of Odonata.

Many of us struggle with nymph identification. Upcoming educational features will include tips on how to identify nymphs first to family and then to lower levels of classification. Field characters and important microscopic morphological details will be presented and explained. Information and images will be delivered, in part, in a print-friendly format that can also be downloaded to a mobile device for easy access in the field.

We also plan to present the artistic side of dragonfly nymph pursuit using stories, poetry, photographs and videos

*striped eyes
on this darner nymph
like warpaint*

-K.J. Tennesen, 2020

*if beauty was only skin deep
there would be no exuviae
only nymphs*

-M.C. Garrison, 2019

of nymphs in action, and drawings (either technically accurate or with creative license). We invite readers to submit their writings and images to the editor of *ARGIA*.

One more note: Disturbing reports are circulating about drastic insect declines around the world. What about dragonflies? Apparently, long-term data on dragonfly populations is a rarity. Assessing future survivability and determining conservation strategies depend in large part on understanding population trends. Simple long-term studies of nymph habitats can inform us on the status of dragonfly populations. Are certain dragonfly species decreasing in some areas, increasing in others? And, what can we do to contribute to this knowledge base? One answer involves local nymph habitat surveys. Do you have a pond, lake or stream near your place of residence that you could sample for nymphs once or twice a year? We will present guidelines, including equipment and data gathering, for quick habitat surveys in the next installment of Nymph Cove. The pandemic has taken its toll this year on our health, social, and economic wellbeing. Perhaps in our required isolation there is also the opportunity to redirect our stressed attentions in pursuit of local data. As the Aggasiz quote goes "I spent the summer traveling... I got as far as halfway across my backyard." Together,



if we each take a little time, we can discover what is happening to our dragonflies.

Marla Garrison is a faculty member in the Department of Biology at McHenry County College, Crystal Lake, Illinois. She is author of Damselies of Chicagoland published online by Chicago's Field Museum <https://fieldguides.fieldmuseum.org/guides/guide/388>. She may be contacted via email at mgarrison@mchenry.edu or by phone (815)479-7627.

Ken Tennesen has published over 80 technical papers on Odonata. His recent book, Dragonflies Nymphs of North America, was published by Springer in 2019.

Return of *Sympetrum semicinctorum* (Band-winged Meadowhawk) and *S. corruptum* (Variegated Meadowhawk) to North Georgia in 2020

By Vicki DeLoach

When I discovered a Band-winged Meadowhawk (*Sympetrum semicinctorum*) in cattails at J. J. Biello Park in Cherokee County, Georgia, on 6 June 2011 it was only the fifth Georgia record for the species and it had a ranking of S2/Imperiled. I (and friends) continued to find small numbers through the summer of 2014. They may have been the southern most reliable population known.

A parking lot expansion project was completed in the park in the summer of 2014 that impacted habitat and may have removed a natural spring. I found the last Band-winged Meadowhawk there on 19 June 2015. For the next five years, we searched for them every

year and none were found. Either they were extirpated or had moved to a different area of this large park.

Then, on 31 May 2020, I spotted a male Band-winged Meadowhawk in the same general cattail sloughs where they last bred. I would find one more male there a few feet from that sighting on 29 June 2020. It gets a bit more interesting. I also found a male in Dawson County, Georgia, on 2 June 2020 — a new county record (Fig. 1). That is three individuals in one month at locations I check regularly every year.

Another rare *Sympetrum* has an interesting story. The only Variegated Meadowhawk (*Sympetrum corruptum*) I had ever seen was at J. J. Biello Park in late September 2012. To my surprise, my first dragonfly of this year was a



Figure 1. Band-winged Meadowhawk (*Sympetrum semicinctorum*); Dawson County, Georgia, new county record; 2 June 2020; photograph by Vicki DeLoach.



Figure 2. Variegated Meadowhawk (*Sympetrum corruptum*); Cherokee County, Georgia; 30 May 2020; photograph by Vicki DeLoach.

Variegated Meadowhawk on 25 March 2020, at J. J. Biello. I assumed both of these were migrants but I would see a third at this same location on 30 May 2020 that appeared to be an immature male (Fig. 2). Are they breeding here? There were other reports of Variegated Meadowhawks in Georgia this year including that of a friend, Stacy Zarpentine, who found three at J. L. Lester WMA in Polk County on 30 May 2020 and five at Arrowhead WMA in Floyd County on 14 June 2020.

Vicki DeLoach travels North Georgia hoping for odonate county records, and photographs beautiful and interesting wildlife. Contact her at vldeloach@aol.com

A New Species of Damselfly for Honduras

By Robert J. Gallardo

While conducting an ongoing butterfly study at Lake Yojoa, Honduras, my partner Olivia Diaz and I discovered a species of damselfly that had not previously been recorded for the country. On 19 and 20 April 2020 a very large damselfly was observed foraging in a shade coffee plantation on a property called Bio Parque Paradise, Dept. of Cortés (14.94858°N, 88.04469°W). The mean elevation of this 72-hectare property is 680 m. On 21 April I caught one and took a small series of photographs, then released the individual. Photographs were sent to Dennis Paulson, who confirmed it as a male *Mecistogaster linearis* (Long-tailed Helicopter). This species was not observed during a subsequent three-day visit in May.

The previously known distribution of this species is from Nicaragua to Bolivia and Brazil (D. R. Paulson, pers. comm. June 2020), so this is now the most northern record for the species.

Much of the coffee plantation



Male *Mecistogaster linearis* (Long-tailed Helicopter); Bio Parque Paradise, Lake Yojoa, Honduras; 21 April 2020; photograph by Maria Olivia Díaz.

consists of very large broadleaf trees laden with bromeliads and other epiphytic plants. The similar, but much smaller, *M. modesta* (Selys; Bromeliad Helicopter) was also photographed

there and appeared to be more abundant than *M. linearis*. *M. modesta* breeds in bromeliads and *M. linearis* in tree holes (Fincke 1984), and the complexity of the forest assures that these breeding habitats are present.

References

Fincke OM. 1984. Giant damselflies in a tropical forest: reproductive biology of *Megaloprepus coerulatus* with notes on *Mecistogaster* (Zygoptera: Pseudostigmatidae). *Adv. Odonatol.* 2: 13–27.



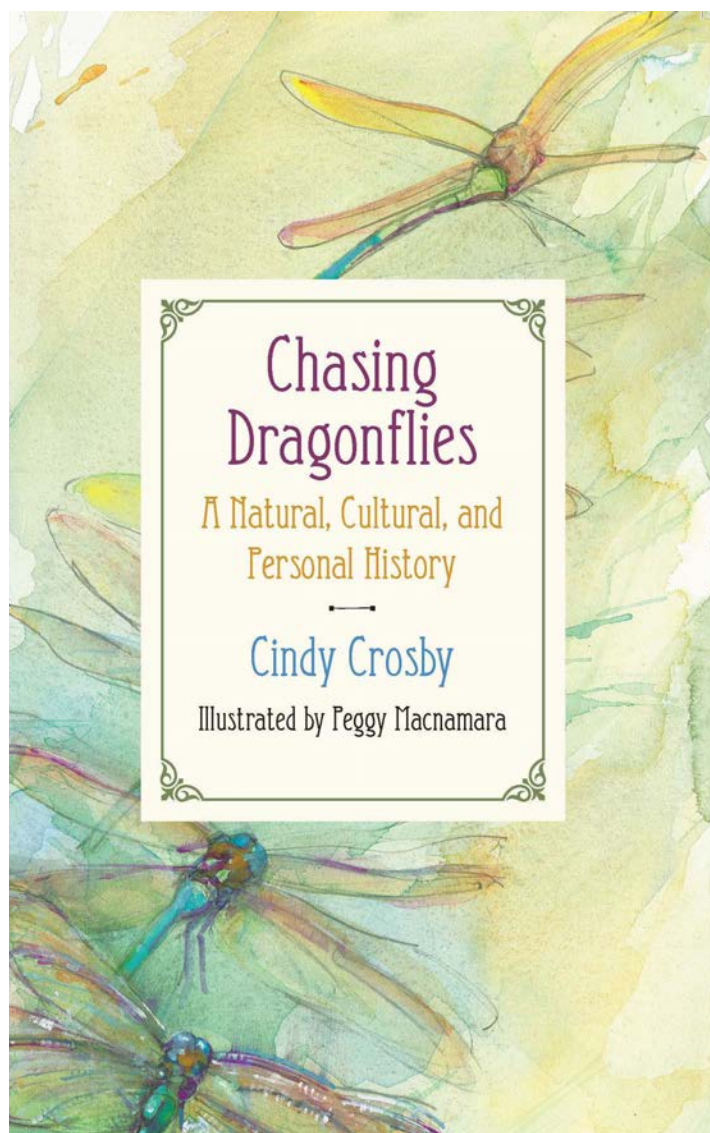
Mecistogaster modesta (Bromeliad Helicopter); Bio Parque Paradise, Lake Yojoa, Honduras; 21 April 2020; photograph by Maria Olivia Díaz.

Robert J. Gallardo has resided in Honduras since 1993 and is the author of "Guide to the Birds of Honduras." He is currently working on a future "Guide to the Butterflies of Honduras." He can be reached at rgallardo32@gmail.com.

Chasing Dragonflies: A Natural, Cultural, and Personal History

By Marianne Denton

I feel seen. Isn't that a common response on social media when you read something that reflects your life so accurately that you have a visceral response to it? From the cancer diagnosis, to solo wilderness explorations, and yes, the very topic of the book, Cindy Crosby's *Chasing Dragonflies* was like reading my own story.



Cover of *Chasing Dragonflies: A Natural, Cultural, and Personal History* by Cindy Crosby.

Chasing Dragonflies is so beautifully written that it satisfied my ecologist mind and naturalist heart. Descriptions of Odonata anatomy and behavior were scientifically accurate while still drawing the reader in with the emotional feeling of chasing dragonflies and damselflies. From the pursuit of the Hine's Emerald (*Somatochlora hineana*), to the experience of becoming aware of the world of Odonata from the seat of a kayak, Crosby conveys a sense of wonder and urgency in both monitoring and protecting the habitat of the odes. There is both a sense of peace and of purpose throughout the book that is inspiring and encouraging.

There is an ideal balance between topic and self throughout *Chasing Dragonflies*. Reading this book on the natural world, and processes therein, I definitely felt transported to the places I haven't been to and odonates I'm desperate to see: a midwestern prairie, any jewelwing, a Great Lakes island, a cooperative posing Darner, and a perfectly suitable backyard habitat. Along the way, Crosby shares others' reasonings for being a dragonfly chaser — professional and personal. Throughout the book, Crosby describes different paths enthusiasts have walked to arrive at Odonata and it is encouraging to read about the paths taken by those who are not PhDs or professional odonatologists. Both the book and the pursuit, *Chasing Dragonflies* is for everyone willing to learn the process.

Finally, how I feel seen in Crosby's lovingly written book is the "instructions" from the poet Mary Oliver. When faced with mortality far too soon, we have a choice. Both Crosby and I have chosen to "Pay attention. Be astonished. Tell about it." And with that mortality, we really are asked, "what is it you plan to do with your one wild and precious life?" Just as the nymphs spend their precious life growing, and adults are wild in the wild, each of us should pay attention to both our lives and the life made better by *Chasing Dragonflies*.

Marianne Denton is the Bioassessment Program Coordinator for a western, arid state investigating water quality as reflected in benthic macroinvertebrates. In addition to her professional aquatic ecology work, she is an active naturalist leading guided hikes, photo-documenting biodiversity and community outreach. Marianne's love of odonates starts with the nymphs in their watery world through their adult flights. She's undeniably a naiad at heart and every summer day is an opportunity to chase Odonata in ponds and wetlands.

Announcing GEODE

Geneology and Ecology of Odonata:

The first resolved evolutionary history and global biogeography of an entire insect order

By John Abbott, Seth Bybee, Paul Frandsen, Robert Guralnick, Vincent Kalkman, and Jessica Ware

We are at the beginning of an exciting new dragonfly and damselfly project that has been funded by the US National Science Foundation which aims to comprehensively sample across Odonata for genomics, ecology, and morphology. This is a chance for us as a community to organize all current knowledge into an evolutionary context, all while setting up for more focused targeted research. We strongly feel that this grant will further unite our odonate community by providing us a foundation upon which we can all work to better understand these remarkable species well into the future. We are excited to work with each of you. We will be in contact with more details in the near future as we begin to build the infrastructure to generate, gather, and share data. We expect to have an update for the next issue of *ARGIA* to describe in a more extended format the goals and details of this project.

In the meantime, we wanted to let you know that over the next two years we will be seeking both PhD students and postdocs to join this effort. We also are working on a framework where students from around the world can propose phylogenetic and/or trait-based projects that focus

GEODE

Geneology and Ecology of Odonata

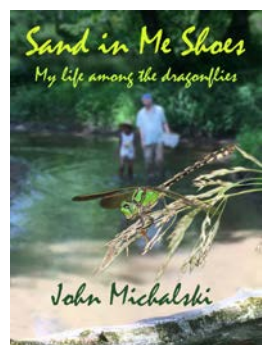
on systematic, evolutionary, and ecological questions at the species level of small to moderate sized Odonata groups (e.g., families, genera, etc). We hope that such an approach will grow the odonate community around the world and spur an exceptional amount of growth in terms of taxonomic, ecological, and morphological expertise.

Again, we are thrilled about the potential of this project for our community and hope you will join us to bring it to fruition. We view this as a truly collaborative effort, and we look forward to working with you on dragonfly and damselfly biology over the next few years and beyond!

John Abbott, University of Alabama; Seth Bybee, Brigham Young University; Paul Frandsen, Brigham Young University; Robert Guralnick, University of Florida; Vincent Kalkman, Naturalis Biodiversity Center; Jessica Ware, American Museum of Natural History.

New Book: *Sand In Me Shoes*

John Michalski started life as a kid who spent his time chasing butterflies and building tree forts, and years later found himself roughing it in the world's jungles and discovering species never before documented by science. Along the way he experienced life and love in the Caribbean; adventures in Thailand, Vietnam, and Panama; and



encountered hardship and personal revelation in the distant rainforest villages of Papua New Guinea. This is the story of one person's brush with stimulating cultures and some of the most interesting and amusing people in the world of science—all motivated by a love of dragonflies and a passion for exotic locations, fascinating characters, and unforgettable adventures.

"At once a travelogue, a biologist's collecting diary and a coming-of-age story, this delightful book follows irrepressible nature enthusiast and defier of academic science norms John Michalski from a childhood in the woods around Morristown, New Jersey, through dawning maturity and on to accomplished manhood, always in pursuit of adventure, new cultures and—above all—new dragonflies. His warmth, curiosity and humor will propel even the non-scientist through chapters that chronicle his collecting around the world, notably in America, Trinidad, and New Guinea, and introduce us to field science and scientists who, in the best tradition of their discipline, expand knowledge by offering a hand up to the generations that come behind them." – Leslie May

Paperback, 315 pp. 33 pages of photos.
Available for \$12.95 at [Amazon.com](https://www.amazon.com)

Excerpt: *Sand In Me Shoes*

By John Michalski

I was wading, about knee deep, in a splashy, gravelly river in southern Thailand, butterfly net in hand, peering to the right and left as I slowly worked my way upstream. What I was looking for was movement in the grasses and water plants along the margins of the creek—little flashes and glints of sunlight reflecting off cellophane wings, as dragonflies defended their little bankside territories, chased away intruders, and hounded after eligible females.

Coming around a sunny bend, I found myself within hailing distance of a young Thai boy, about twelve years old, sitting astride a large gray boulder in midstream about fifty feet away from me, scrubbing an old red t-shirt on the rock. Doing his wash. Scrub scrub scrub. He saw me and smiled broadly. I saw him and waved amiably, as I kept strolling gingerly in his direction, in the middle of the stream, scanning the banks for insect movement.

The boy continued scrubbing his shirt on the rock. Scrub scrub scrub. I slowly drew nearer and nearer. Eventually I was about ten feet downstream of him.

All at once, the boy whapped the boulder with the flat of his palm, smack smack smack, and the boulder rose like a living mountain out of the water—*WHORRRRRSH!*

He was sitting on the family elephant. He had been scrubbing the top of the elephant's head, not the t-shirt. The rest of the animal had been completely submerged in a pool that, had they not been there, I probably would have stepped into like Oliver Hardy—*ker-SPLOOSH*—little suspecting how deep it was.

The elephant, with the boy atop, now towered over me with water streaming down its sides in a hundred rivulets. The beast cleared its trunk with a short misty blast, the boy gave me a quick salute, and they turned and headed down a forest trail back to their village.



The author with Brother Amnuay Pinratana in a Hmong insect collecting village, 1992.



The author (center) with Mike May and Nick Donnelly, Lake Denmark, New Jersey, 1995.

Another day, another country. I was in Papua New Guinea, staying for a few days in a stilt village built along the banks of the broad and meandering Sepik River. Nothing disturbed the silence apart from the occasional crowing of a cockerel, the distant wailing of a baby, or the growling of a dog being challenged for its scraps. As the sun set behind the coconut palms and twilight approached, I gathered my towel and bar of soap, and in my shorts and flip-flops I started in the direction of my evening wash.

“Just be sure to bathe in a different spot on the river each day,” an old man cautioned me. “The crocodiles remember where you come down to the water.”

I’m an explorer of jungles and, when fortune smiles upon me, a discoverer of new species of dragonflies. It’s what I do when I’m not teaching biology to 12-year-olds back in New Jersey, and I have been pursuing this fascination for the past 35 years. It has taken me to twelve countries on three continents, resulting in books, magazine articles, newspaper entries, a few species descriptions, but most of all a life filled with fun, friends, excitement, and a passion for knowledge and adventure.

This is how I got there.

John Michalski is a public school science teacher who enjoys independent travel and has lived for extended periods in Papua New Guinea and the West Indies, and has described or co-described nine species of New Guinea damselflies. His other travel narratives include Paradise: Solo across New Guinea, Terra cognita: Return to New Guinea, and Finding Home (published under the pseudonym Chuck McAllister), all available at Amazon.com. He can be reached via email at huonia@aol.com.

Introducing Entomologists of Color, a Collective for Diversifying Entomology

By Manpreet Kohli

Scientific communities neither exist nor operate in isolation and are very much influenced by world events. The racial inequality present in our society is also prevalent in the scientific community. On 10 June 2020, my colleagues and I participated in a global movement, [#ShutDownAcademia](#) and [#ShutDownSTEM](#), in an effort to acknowledge the fact that some members in our scientific community are disenfranchised because of their race or ethnicity. Most importantly, we were motivated to take action towards diversifying our scientific communities, so everyone is fairly represented. Being that I love and study dragonflies and insects in general, as do my colleagues, we decided to specifically work on diversifying entomology. Thus, we formed the collective “[Entomologists of Color](#).” Our mission is to support Black, Indigenous, and People of Color (BIPOC) in entomology through recruitment, retention, and advocacy.

Natural science majors such as ecology and evolution have been shown to have low numbers of BIPOC, and entomology is similarly affected. The National Science Foundation reports that of all graduate students in entomology/parasitology, only 1.99% are Black, 5.4% are Hispanic/Latinx, and 0.23% are American Indian or Alaska Native ([NSF Demographic Report](#), 2016). These numbers are not representative of the general population. It is unfortunate that the community that studies the most diverse group of organisms on Earth—and therefore understands the importance of diversity—itself lacks in diversity. This is likely the result of systematic inequalities affecting access to education or a lack of institutional support that BIPOC face when pursuing a career in entomology. In recognition of these challenges, Entomologists of Color strives to make entomology a more inclusive field by removing barriers to participation.

We have started by taking some simple yet important steps that can help increase the participation of BIPOC in entomology. Being a member of professional societies is integral to career development. Memberships in such societies allow participation in networking events, provides access to publications and other member-restricted scientific content, and reduced meeting costs, but perhaps most importantly, it offers eligibility to apply for society specific research grants. As part of our recruitment and retention efforts, Entomologists of Color, provides membership fees to

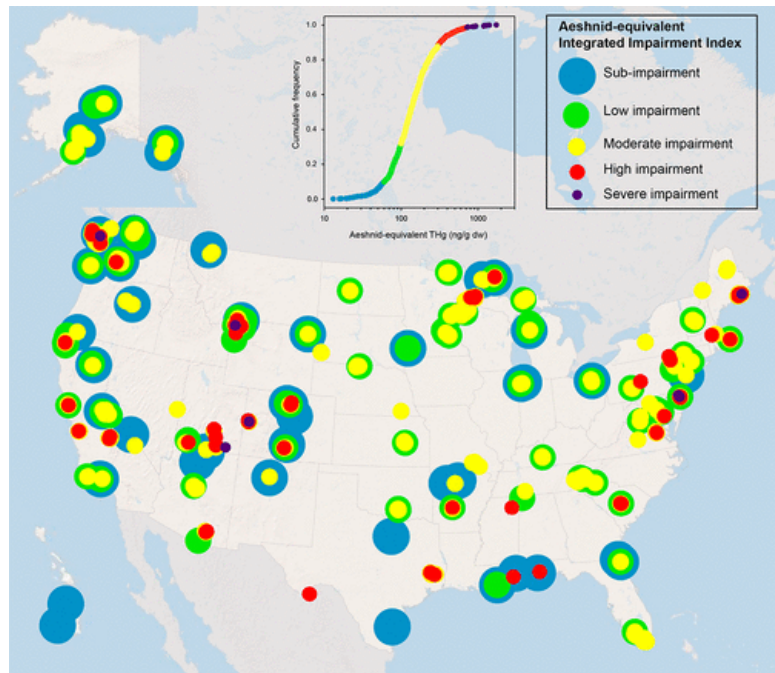
various entomological societies including Dragonfly Society of the Americas (DSA). Any student interested in getting memberships for any of the entomological societies need only fill out a simple form available in various languages (including Spanish and French) on our [website](#). So far Entomologists of Color has provided memberships to 134 students from across the world to over 14 different entomological societies. You can read about these students on our [website](#).

You can also participate and contribute to our mission in several ways. Spread the word widely within all departments, lists-serves, or organizations that you are associated with. Share and like our social media posts to reach as many students as possible who can take advantage of this opportunity. You can find and follow us on various social media platforms: [Twitter](#), [Facebook](#), and [Instagram](#). Support us by becoming a mentor for our students. We are regularly in need of mentors who can volunteer to guide our new recruits through the world of entomology. We advertise these opportunities through our website and social media. Lastly, donate to our initiative. We rely on your donations to continue providing memberships to students and supporting our mission through other activities. Donations can be made through our [website](#). If you would like to get touch and contribute in other ways, please email us at entopoc@gmail.com.

Manpreet Kohli, the DSA treasurer, has recently started as a postdoctoral assistant at the American Museum of Natural History. There she continues to pursue her research on (and love of) arctic dragonflies. Contact her at treasurer@dragonflysocietymamericas.org.

A National-Scale Assessment of Mercury Bioaccumulation in United States National Parks Using Dragonfly Larvae As Biosentinels through a Citizen-Science Framework

We conducted a national-scale assessment of mercury (Hg) bioaccumulation in aquatic ecosystems, using dragonfly larvae as biosentinels, by developing a citizen-science network to facilitate biological sampling. Implementing a carefully designed sampling methodology for citizen scientists, we developed an effective framework for a landscape-level inquiry that might otherwise be resource limited. We assessed the variation in dragonfly Hg concentrations across >450 sites spanning 100 United States National Park Service units and examined intrinsic and extrinsic factors associated with the variation in Hg concentrations. Mercury concentrations ranged between 10.4 and 1411 ng/g dry weight across sites and varied among habitat types. Dragonfly total Hg (THg) concentrations were up to 1.8-fold higher in lotic habitats than in lentic habitats and 37% higher in waterbodies with abundant wetlands along their margins than those without wetlands. Mercury concentrations in dragonflies differed among families but were correlated ($r^2 > 0.80$) with each other, enabling adjustment to a consistent family to facilitate spatial comparisons among sampling units. Dragonfly THg concentrations were positively correlated with THg concentrations in both fish and amphibians from the same locations, indicating that dragonfly larvae are effective indicators of Hg bioavailability in aquatic food webs. We used these relationships to develop an integrated impairment index of Hg risk to



Integrated impairment indices for all 457 sites sampled between 2009 and 2018. Integrated impairment indices are derived from Aeshnid-equivalent geometric mean THg concentrations for each site–year and their corresponding association with Hg exposure in fish and other wildlife. The inset for the cumulative frequency distribution illustrates the proportion of sites and years that fall into each of the five categories. Note that the map geography was altered to include Alaska and Hawaii within the map frame.

aquatic ecosystems and found that 12% of site-years exceeded high or severe benchmarks of fish, wildlife, or human health risk. Collectively, this continental-scale study demonstrates the utility of dragonfly larvae for estimating the potential mercury risk to fish and wildlife in aquatic ecosystems and provides a framework for engaging citizen science as a component of landscape Hg monitoring programs. For more information visit the [Dartmouth Superfund Dragonfly Research Project website](#) and the [National Park Service Dragonfly Mercury Project website](#).

Citation: Eagles-Smith CA, Willacker JJ, Nelson SJ, Flanagan Pritz CM, Krabbenhoft DP, Chen CY, Ackerman JT, Campbell Grant EH, Pilliod DS. 2020. A National-Scale Assessment of Mercury Bioaccumulation in United States National Parks Using Dragonfly Larvae As Biosentinels through a Citizen-Science Framework. *Environ. Sci. Technol.* 2020, 54(14): 8779–8790. doi.org/10.1021/acs.est.0c01255.

The Ecology and Distribution of *Stylurus spiniceps* (Walsh, 1862) (Odonata: Gomphidae)

Herein we synthesize the current understanding of the ecology and distribution of a rarely encountered but broadly distributed dragonfly, *Stylurus spiniceps* (Arrow Clubtail), and provide new larval records for Maine. Using published and unpublished sources, we

construct an account of the distribution, life history, reproductive ecology, and trophic ecology of the Arrow Clubtail, as well as review conservation concerns for the species. We provide new records for the Arrow Clubtail from an atypical habitat—tidal freshwater wetlands—and discuss the importance of these areas for the species. We highlight gaps in our basic natural history knowledge

and provide suggestions for future enquiry that could inform conservation measures for this enigmatic dragonfly.

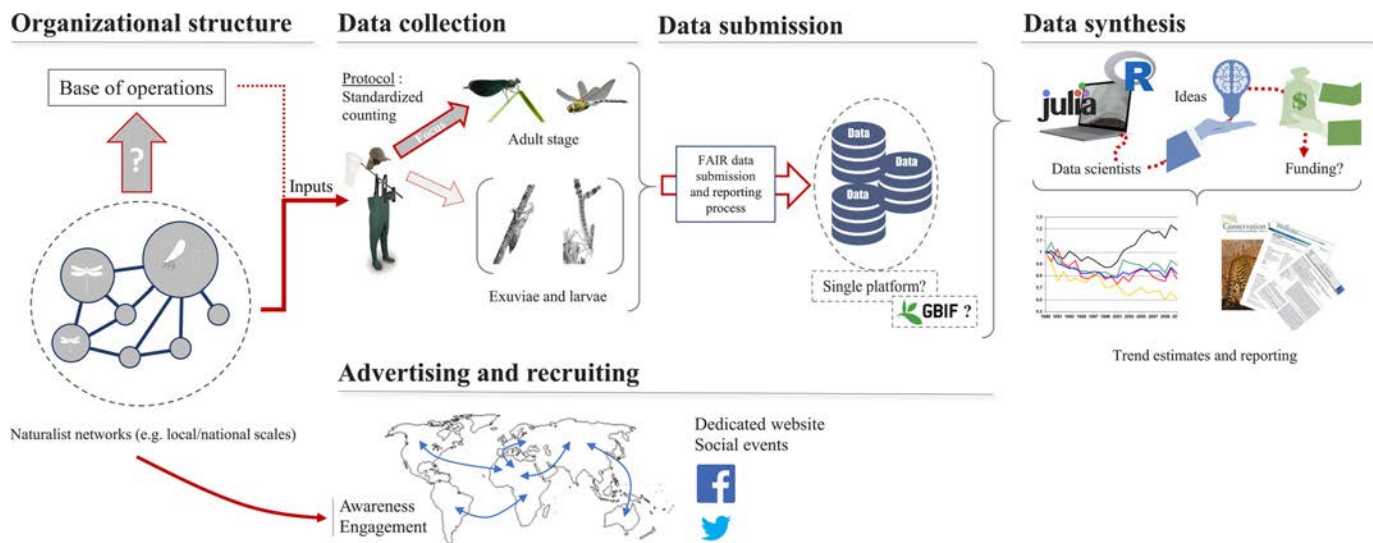
Citation: McLachlan JR, Greig HS. 2020. The Ecology and Distribution of *Stylurus spiniceps* (Walsh, 1862) (Odonata: Gomphidae). *Northeast. Nat.* 27 (3) 434–447.

Towards Global Volunteer Monitoring of Odonate Abundance

Insects are reportedly experiencing widespread declines, but we generally have sparse data on their abundance. Correcting this shortfall will take more effort than professional entomologists alone can manage. Volunteer nature enthusiasts can greatly help to monitor the abundance of dragonflies and damselflies (Odonata), iconic freshwater sentinels and one of the few nonpollinator insect groups appreciated by the public and amenable to citizen science. Although counting individual odonates is common in some locations, current data will not enable a global perspective on odonate abundance patterns and trends. Borrowing insight

from butterfly monitoring efforts, we outline basic plans for a global volunteer network to count odonates, including organizational structure, advertising and recruiting, and data collection, submission, and synthesis. We hope our proposal serves as a catalyst for richer coordinated efforts to understand population trends of odonates and other insects in the Anthropocene.

Citation: Bried J, Ries L, Smith B, Patten M, Abbott J, Ball-Damerow J, Cannings R, Cordero-Rivera A, Córdoba-Aguilar A, De Marco Jr P, *et al.* 2020. Towards Global Volunteer Monitoring of Odonate Abundance. *BioScience*. doi.org/10.1093/biosci/biaa092



Proposed infrastructure for moving forward on global volunteer monitoring of dragonfly and damselfly (Odonata) abundance.

Influence of different riparian vegetation widths and substrate types on the communities of larval Odonata (Insecta) in southern Brazilian streams.

We assessed the influence of substrate type and categories of riparian vegetation widths on the community structure of Odonata (Insecta) in southern Brazilian streams.

Sampling took place in 12 stream reaches differing in their riparian vegetation widths (from more than 40 m up to less than 5 m). Larval odonates were collected in inorganic (stone and gravel) and organic (leaf litter) substrates at each stream reach. We tested for differences in Odonata composition among substrates and categories of riparian vegetation width using PERMANOVA and visualized with ordination diagrams. In addition, we assessed the influence of riparian vegetation width taking into account two levels of resolutions: fine (four categories: >40 m, 30–15 m, 15–5 m and <5 m), and coarse (narrower and broader than 15m).

Odonata composition differed more strongly according to substrate type regardless of the level of resolution. Organic substrate (litter) had different composition and higher richness than inorganic ones. Odonata composition significantly differed between riparian vegetation widths at

the coarser level of resolution (narrower and broader than 15m); at the coarser level, the interaction between substrate and riparian widths was significant, with the composition from litter substrate in broader widths differing from stone and gravel in narrower widths.

The composition of odonate larvae responded to the major reductions in riparian widths (above >15 m), indicating that reductions above this level are enough to affect the community structure of Odonata. Additionally, the different composition of Odonata in organic substrates in broader riparian vegetation widths compared to inorganic substrates in narrower widths indicate a complex relationship between riparian vegetation and substrate in the assembly of insect communities in southern Brazilian forest streams. The interaction between riparian vegetation widths and substrate suggests that the effects of reductions in riparian widths on Odonata composition are not similar across substrate types.

Citation: Pires MM, Muller NFD, Stenert C, Maltchik L. 2020. Influence of different riparian vegetation widths and substrate types on the communities of larval Odonata (Insecta) in southern Brazilian streams. *Acta Limnol. Bras.* [online] 32(e301). doi.org/10.1590/s2179-975x2520.

Parting Shots



32(3) Caption Contest

In each issue, *ARGIA* features one photograph in need of a caption. You, the reader, can submit your caption, and the winning entry will be published in the next issue. Submit your caption for the photo on the left by 15 November 2020 for a chance to win fame and bragging rights!

Email them to:
editor@dragonflysocietyamericas.org.

Also consider submitting one of your more interesting or unusual odonate photographs for use in subsequent caption contests.

(left) Gomphidae nymph; National Park Manu, biological station Cocha Cashu (11.888210°, 71.407551°); October 2017; photograph by Diego Zavala.

32(2) Caption Winner

The winning caption:

Maverick: "Tower, this is Ghost Rider requesting a flyby."

Air Boss Johnson : "Negative, Ghost Rider, the pattern is full."



Caption submitted by:
Tony Schoch

Photograph by Peder Stenslie

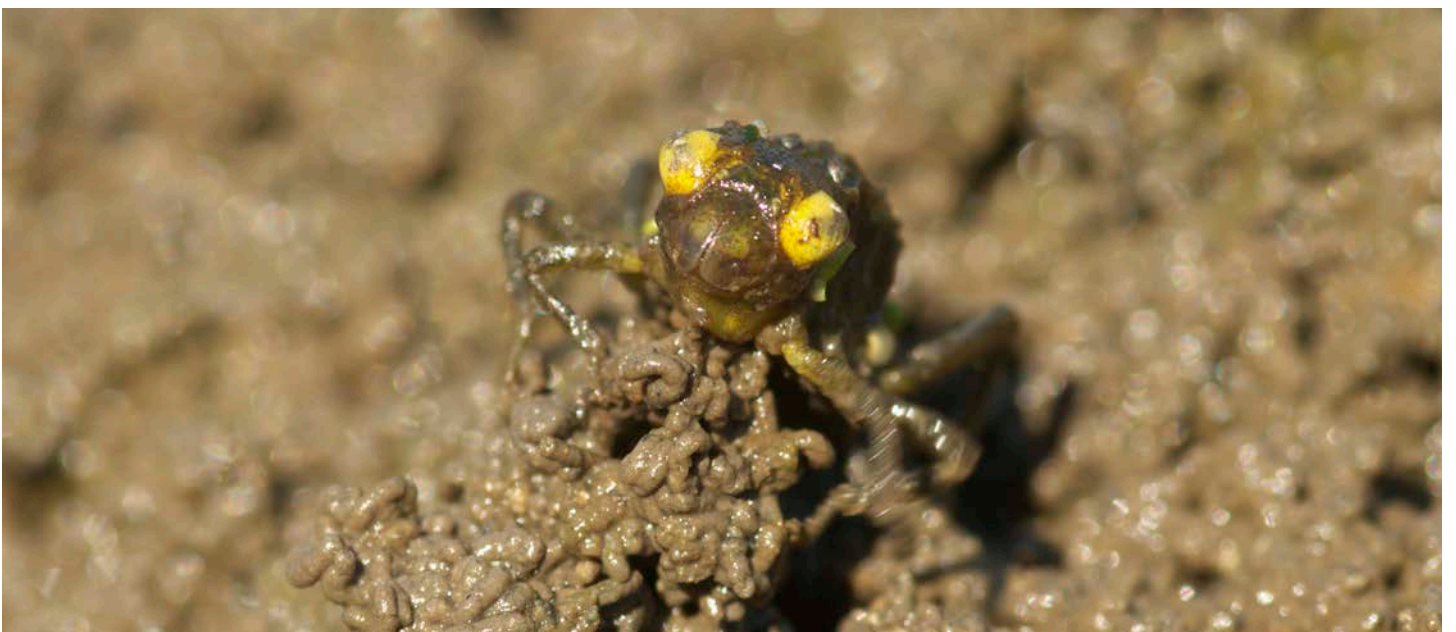


Anax junius (Common Green Darner) ; collected from Crow Hassan Park Reserve in Minnesota; Summer 2018; Photograph by Ami Thompson.

Parting Shots



Pantala flavescens (Globe Skimmer); Lancaster, Pennsylvania; 3 August 2020; Photography by Jeremy Kleinberg.



Erythemis collocata (Western Pondhawk) nymph; Sonoma County, CA; 19 July 2020; photograph by Marcia Grefsrud.

ARGIA
and
Bulletin of American
Odonatology

Call for Submissions

The DSA welcomes proposals for articles on most any topic related to Odonata for our quarterly news journal, *ARGIA*, or our occasional peer-reviewed journal, *Bulletin of American Odonatology* (BAO). Topics should be generally consistent with the DSA mission.

Inquires about *ARGIA* proposals should be directed to its editor, Amanda Whispell, at editor@dragonflysocietyamericas.org.

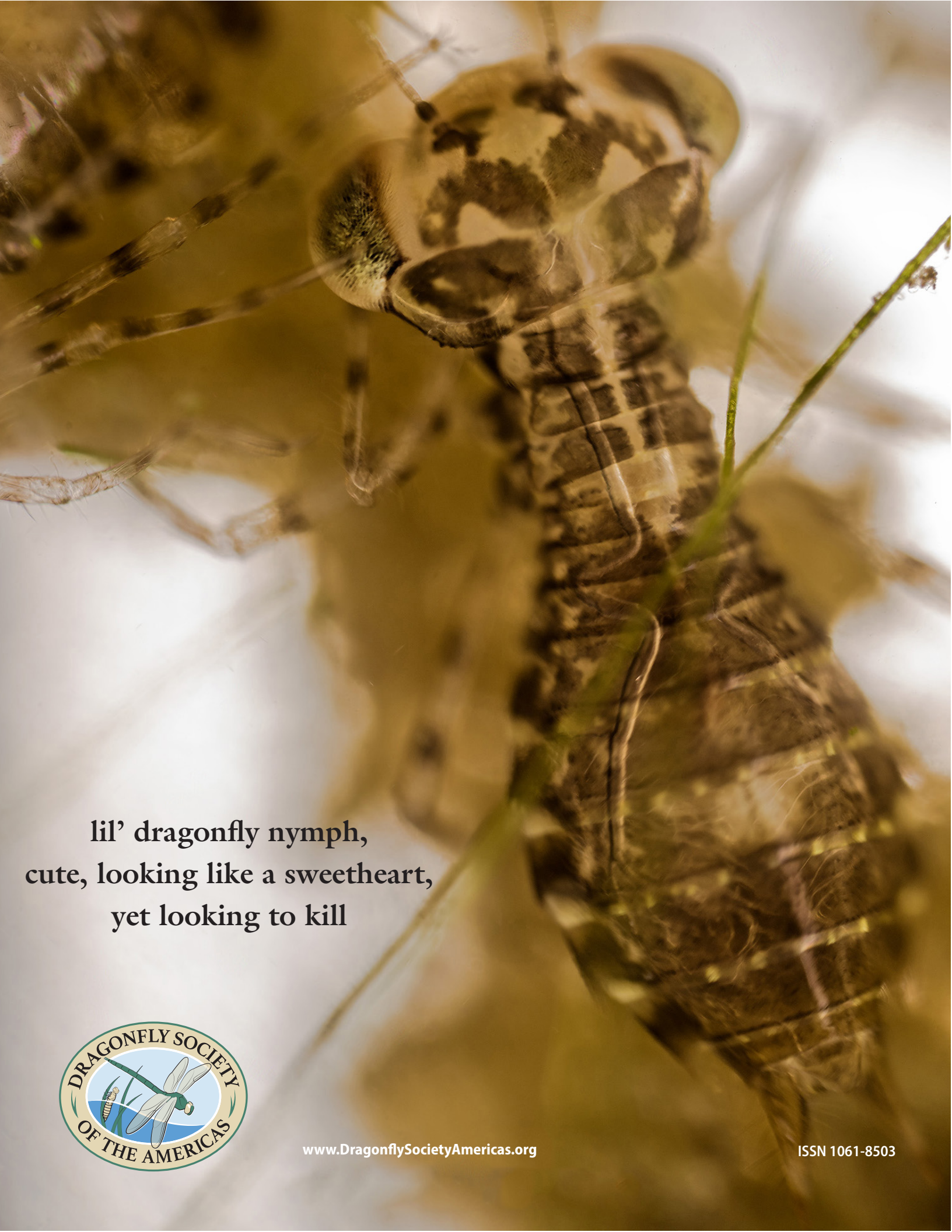
For BAO proposals, contact its editor, Steve Hummel, at editorbao@dragonflysocietyamericas.org.

Authors preparing articles should consult our [Submissions Guidelines](#) and include a completed [Submission Form](#) when submitting your articles; both are available on the DSA website: www.dragonflysocietyamericas.org/instructions-to-authors.

Back cover:

Rhionaeschna californica
(California Darner) nymph

Photograph by Steve Valley
Haiku by Ken Tennessen



**lil' dragonfly nymph,
cute, looking like a sweetheart,
yet looking to kill**



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