



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

Sustaining Membership
\$20 annually

Life Membership
\$300 single payment

Sustaining Life Membership
\$400

Annual memberships span a calendar year. Dues can be paid online at our website: www.dragonflysocietyamericas.org. To pay by check or money order contact the DSA treasurer at treasurer@dragonflysocietyamericas.com.



Events Calendar

To include your event here in *ARGIA* or on the DSA website, please send information to our editor (editor@dragonflysocietyamericas.org) and to the webmaster (webmaster@dragonflysocietyamericas.org).

Workshop – Dragonfly Biodiversity: From the Field to the Lab

16–20 June 2022

National Natural Park Tatamá in Colombia

[Click for more information and to apply on-line](#)

Open to students and professionals in the Americas or the Caribbean

2022 DSA Annual Meeting

21–24 June 2022

National Natural Park Tatamá in Colombia

[Click here for more information](#) (en español)

For updates on events visit the “Meetings” page on the [DSA website](#).

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The Vocal Representatives include the DSA Executive Council along with other non-voting representatives and constitutes the DSA leadership, some of whose members serve indefinitely and others on staggered terms.

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Cover: Best Overall Odolympics Photograph: *Celithemis eponina* (Halloween Pennant); Little Mulberry Park, Gwinnett County, Georgia; 21 August 2017; photograph by John Deitsch.

Left: *Aphylla williamsoni* (Two-striped Forceptail); Duluth, Georgia; 5 August 2020; photograph by John Deitsch.

CONTENTS

DSA News

President's Report: DSA news flying south!.....	4
Melissa Sanchez-Herrera	
Informe del Presidente: La noticias de la DSA vuelan hacia el sur!	5
Melissa Sanchez-Herrera	
Note from the Editor: Ready for spring and some citizen science	6
Amanda Whispell	
Nota de la Editora: Listo para la primavera y la ciencia ciudadana	6
Amanda Whispell	

Eclosion

To <i>Nannothemis</i>	7
Ken Tennessen	
Dispatches from a Specimen Collection.....	8
John Deitsch	
Random Tales from a New Dragonfly Chaser	10
Linda Taylor	
Rodolfo Novelo-Gutiérrez: a prominent researcher, professor, and friend	12
Rodolfo's Grateful Students	
Semblanza al profesor Rodolfo Novelo-Gutiérrez	13
Sus agradecidos estudiantes	

Nymph Cove: Preserving and Storing Odonata Nymphs and Exuviae	14
Marla C. Garrison and Ken J. Tennessen	

New Records

First Record of Autumn Meadowhawk, <i>Sympetrum vicinum</i> , for Nevada	16
T. Will Richardson	
New Record of <i>Neurocordulia xanthosoma</i> in Crosby County, Texas.....	18
Joe Girgente and Hannah Wojtysiak	
<i>Micrathyria ocellata</i> in Sonora, Mexico	19
David F. Smith, Doug Danforth, and Pierre Deviche	
First two records of Great Pondhawk (<i>Erythemis vesiculosa</i>) for Canada	20
Robert Tymstra	
First record for North Carolina of <i>Rhionaeschna multicolor</i> (Blue-eyed Darner).....	23
Brian Bockhahn	

OdoNews

Two very significant collections of Odonata donated to FSCA last year.....	25
Bill Mauffray	
New Mexico State Dragonfly Drive	29
Wayne Steffens	
<i>Selysia</i> Now Available On-line	30
John Abbott	
World Odonata List Now Hosted in TaxonWorks.....	30
John Abbott	
Recent Research and Other Investigations	31

Odolympics Parting Shots	34
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PRESIDENT'S REPORT

DSA News Flying South!

By Melissa Sanchez-Herrera

Now that 2022 is here, the DSA has a new set of goals to accomplish. After a lot of back and forth and after receiving feedback from the organizers of the DSA Annual Meeting in Oklahoma, we have decided to postpone holding the meeting in Oklahoma until 2023. That does not, however, mean that we will not be able to gather and share our observations of damselflies and dragons. We will have our 2022 Odolympics in June and in December and we are announcing that the DSA Annual Meeting for 2022 will be held in Colombia.

During 2020, we planned a DSA Latin American Meeting which was going to be held near the National Natural Park Tatamá in Colombia. Our plan was to support local enthusiasts and students with a five-day workshop on Neotropical odonates, but COVID-19 came through and put our plans on hold. This year we decided to revisit the possibility of doing our annual meeting in this wonderful rainforest, and contacted the ecolodge that was going to be hosting our 2020 meeting. They say yes to hosting us for 21–24 June 2022! In order to maintain safe biosecurity measures for everyone, spots are limited to only 27 attendees. If you are interested in coming along, you can visit our website here, to read all about the meeting, the location, and how to register. We will have our Annual Business Meeting virtually via Zoom on the first Saturday of June to encourage member participation.

In addition, the DSA has teamed up with the GEODE project leaders, John Abbott, Seth Bybee, Rob Gualnirk, Paul Frandsen, Vincent Kalman, and Jessica Ware to create a new workshop tailored specifically to students, teachers and academics interested in proposing and developing research questions for our favorite insects anywhere in the Americas and the Caribbean. Both the DSA and GEODE will sponsor the lodging and meals for 20 participants at this pre-meeting 5-day workshop entitled: *Dragonfly Biodiversity: from the field to the lab*. It will be held at the same location and with the same accommodations as our DSA Annual Meeting in the National Natural Park Tatamá. We expect that workshop participants will be able to design and develop independent projects on Odonata diversity using traditional nymph and adult sampling, in addition to genetic and photographic data. If you are interested, please apply online here or use the QR code in the image. We are very excited to be supporting and teaching local communities and students about our beloved bugs!

Finally, I just wanted to say goodbye and thank you to our webmaster Aaron Goodman, who has to leave his position due to his academic commitments. But we also welcome

Curso: Biodiversidad de libélulas: Del campo al laboratorio.

Workshop: Dragonfly biodiversity: From the field to the lab.

Fecha/Date: Jun 15-20

Lugar/Place: PNN Tatamá, Colombia

Instructores/Instructors:

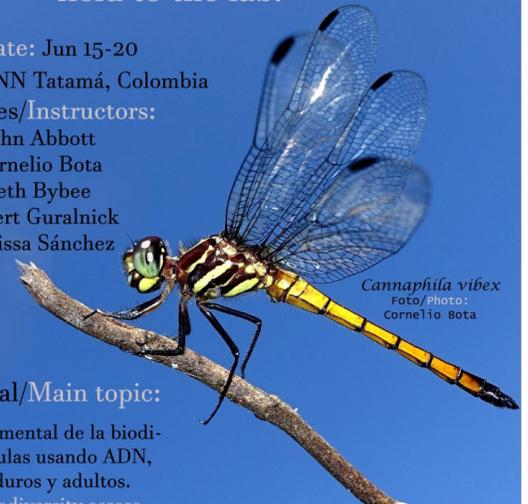
Dr. John Abbott

Dr. Cornelio Bota

Dr. Seth Bybee

Dr. Robert Guralnick

Dr. Melissa Sánchez



Cannaphila vibex
Foto/Photo:
Cornelio Bota

Tema principal/Main topic:

Evaluación experimental de la biodiversidad de libélulas usando ADN, estadios inmaduros y adultos.

Experimental biodiversity assessment using DNA, immature stages, and adults.

Si te interesa aplicar sigue el QR:

If you want to apply follow the QR:



Juliana Sandoval from Colombia and Emmy Fiorella Medina from Peru, who will be our new webmaster and social media coordinator, respectively. Thank you very much for your support of the DSA—we look forward to seeing all the wonderful website updates and new content that we will share on our website and social media platforms this year.

And like Serena Williams once said “Every woman's success should be an inspiration to another. We are stronger when we cheer each other on”. Happy International Women’s Day!

Melissa Sánchez Herrera, the DSA president, 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. For more information about Melissa’s research, please visit www.polythore.com.

INFORME DEL PRESIDENTE

¡Las noticias de la DSA vuelan hacia el sur!

Por Melissa Sanchez-Herrera

Llegó el año 2022, y la DSA tiene nuevos objetivos que cumplir. Después de muchas idas y venidas, tras recibir la respuesta de los organizadores del Encuentro Anual de la DSA en Oklahoma, hemos decidido posponer la celebración de la reunión hasta 2023. Sin embargo, eso no significa que no podamos reunirnos y compartir nuestras observaciones de damiselas y libélulas. Tendremos nuestras Odolimpiadas de 2022 en junio y en diciembre, y anunciamos que el Encuentro Anual de la DSA para 2022 se celebrará en Colombia.

Durante el 2020, planeamos un Encuentro Latinoamericano de la DSA que se iba a realizar en cercanías del Parque Nacional Natural Tatamá en Colombia. Nuestro plan era apoyar a los entusiastas y estudiantes locales con un taller de cinco días de odonatos neotropicales, pero el COVID-19 llegó y puso nuestros planes en espera. Este año decidimos volver a considerar la posibilidad de realizar nuestra reunión anual en esta maravillosa selva tropical, y nos pusimos en contacto con el ecolodge que iba a acoger nuestra reunión de 2020. Dijeron que sí a hospedarnos del 21 al 24 de junio de 2022. Para mantener las medidas de bioseguridad para todos, las plazas están limitadas a sólo 27 asistentes. Si está interesado en venir, puede [visitar nuestro sitio web aquí](#), para leer todo sobre el encuentro, la ubicación y cómo registrarse. El primer sábado de junio celebraremos nuestra Asamblea General Anual de forma virtual a través de Zoom para fomentar la participación de los miembros.

Además, la DSA se ha asociado con los líderes del proyecto **GEODE**, John Abbott, Seth Bybee, Rob Gualnirk, Paul Frandsen, Vincent Kalman, y Jessica Ware para crear un nuevo taller específicamente para estudiantes, profesores y académicos interesados en proponer y desarrollar preguntas de investigación para nuestros insectos favoritos en cualquier lugar de las Américas y el Caribe. Tanto la DSA como el GEODE patrocinaron el alojamiento y las comidas de 20 participantes en este taller de 5 días de duración titulado: *Biodiversidad de las libélulas: del campo al laboratorio*. Se celebrará en el mismo lugar y con el mismo alojamiento que nuestra Reunión Anual de la DSA en el Parque Nacional Natural Tatamá. Esperamos que los participantes del taller sean capaces de diseñar y desarrollar proyectos independientes sobre la diversidad de Odonata utilizando el muestreo tradicional de ninfas y adultos, además de datos genéticos y fotográficos. Si está interesado, por favor [aplique aquí](#) o use el código QR en la imagen. ¡Estamos muy contentos de apoyar y enseñar a las comunidades locales y a los estudiantes sobre nuestros queridos bichos!

Por último, sólo quería despedirme y dar las gracias a

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nuestro webmaster Aaron Goodman, que tiene que dejar su puesto debido a sus compromisos académicos. Pero también damos la bienvenida a Juliana Sandoval, de Colombia, y a Emmy Fiorella Medina, de Perú, que serán nuestra nueva webmaster y coordinadora de redes sociales, respectivamente. Muchas gracias por su apoyo a la DSA - esperamos ver todas las maravillosas actualizaciones del sitio web y los nuevos contenidos que compartiremos en nuestro sitio web y plataformas de medios sociales este año.

Y como dijo una vez Serena Williams "El éxito de cada mujer debería ser una inspiración para otra. Somos más fuertes cuando nos animamos unas a otras". ¡Feliz Día Internacional de la Mujer!

Melissa Sánchez Herrera, presidente de la DSA, es una investigadora asociada al programa de Biología de la Universidad del Rosario en Bogotá, Colombia. Actualmente, se encuentra escribiendo manuscritos acerca de sus libélulas favoritas Polythoridae, además de salir a campo a realizar protocolos de ADN ambiental de odonatos Neotropicales. La puedes contactar en el correo electrónico melsanc@gmail.com o en Twitter en [@melsanc](https://twitter.com/melsanc). Para más información acerca de las investigaciones de Melissa visita su página web www.polythore.com.

NOTE FROM THE EDITOR

Ready for Spring and Some Citizen Science

By Amanda Whispell

I am sure that those of you who live in the temperate zone of the northern hemisphere are ready for some warmer weather and for some odes on the wing—I know I am. In general, I find winter to be a difficult time of year; the days are too short, the skies are too dark, the temperature is too cold, but most importantly—there are no bugs. My favorite pastimes almost all revolve around looking for invertebrates, so I am left flipping through the photographs of invertebrates I took during the previous summer as a seasonal survival strategy. But, as we make our way through March, I am starting to see the light at the end of the tunnel and at the end of the day too—thank you Daylight Saving Time.

I am already thinking about all of the observing and sampling I want to do this summer—some for my research on *Argia apicalis*, but (if I am honest with myself) a lot will be for fun. Before BioQuip went out of

business, I was able to make some last-minute purchases, including a fancy new aerial net. I had hoped to purchase a few aquatic nets, but it turns out a lot of that equipment is still expensive—even when a company is having a liquidation sale. In short, I am getting ready for some ode collecting in the near future.

Are you thinking about doing some collecting this year too? I certainly hope so and I also hope that 2022 is the year you try to participate in citizen science projects. Scientists rely on citizens to help collect larger amounts of data than would otherwise be possible without them. We will, of course, hold the Odolympics this year, but I still want to encourage you to seek out and participate in other citizen science projects or to work with scientists in your area to create your own. I also hope that 2022 is the year that I start to get more citizen science work published in *ARGIA*, so consider this an open

call for suggestions or inquiries about potential citizen science projects about which you would like to write an article. With insect populations on the decline all over the world and with recent assessments by the IUCN indicating that 16% of all Odonata species are at risk of extinction, now is the time to take your hobby to a whole new level. I look forward to reading more about the citizen science projects in which you all participate this year and the vital data that they generate.

*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), doing science outreach, and creating scientific art. 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.*

NOTA DE LA EDITORA

Listo para la primavera y la ciencia ciudadana

By Amanda Whispell

Estoy segura de que aquellos de ustedes que viven en la zona templada del hemisferio norte están listos para un clima más cálido y para ver algunas libélulas, yo sí que lo estoy. En general, encuentro que el invierno es una época difícil del año; los días son demasiado cortos, los cielos

demasiado oscuros, la temperatura es demasiado fría, pero lo más importante: no hay insectos. Mis pasatiempos favoritos giran en torno a la búsqueda de invertebrados, así que paso el tiempo mirando fotografías que tomé el verano pasado para sobrevivir al invierno. Pero, como estamos a mitad de marzo, empiezo a ver la luz al final del túnel y también al final del día, gracias, horario

de verano.

Ya estoy pensando en todas las observaciones y muestras que quiero hacer este verano, algunas para mi investigación sobre *Argia apicalis*, pero (si soy honesta conmigo misma) muchas serán por diversión. Antes de que BioQuip cerrara, pude hacer algunas compras de última hora, una elegante nueva red área, entre otras. Tenía la

DSA News

esperanza de comprar algunas redes acuáticas, pero son muy caras, incluso cuando una empresa se va a la quiebra. En resumen, me estoy preparando para coleccionar odonatos en un futuro próximo.

¿Estás pensando en coleccionar algo este año también? Ciertamente lo espero y también espero que 2022 sea el año en que intente participar varios proyectos de ciencia ciudadana. Los científicos necesitan que los ciudadanos ayuden a recopilar más datos de los que podrían recopilar sin ellos. Por supuesto, realizaremos las Odolimpíadas nuevamente este año, pero aun así quiero alentarlos a participar en otros proyectos de ciencia ciudadana, o a trabajar con científicos en su área, o por que no ha crear los suyos propios. También espero que 2022 sea el año en que comience a publicar más trabajos de ciencia ciudadana en ARGIA, así que considere esta convocatoria abierta para sugerencias o consultas sobre posibles proyectos de ciencia ciudadana sobre los que le gustaría escribir un artículo. Con las poblaciones de insectos en declive en todo el mundo y con evaluaciones recientes

de la IUCN que indican que el 16% de todas las especies de Odonata están en peligro de extinción, ahora es el momento de llevar su pasatiempo a un nivel completamente nuevo. Espero leer más sobre los proyectos de ciencia ciudadana en los que todos ustedes participan este año ya que los datos que generan son de vital importancia.

*Amanda Whispell, editora en jefe de ARGIA, está ocupada escribiendo manuscritos relacionados con su trabajo sobre el cambio de color en *Argia apicalis* (Blue-fronted Dancer), haciendo divulgación científica y creando arte científico. La puedes contactar en el correo electrónico editor@dragonflysocietyamericas.org o en Twitter en @AmandaWhispell. Para más información acerca de las investigaciones de Amanda visita su página web www.amandawhispell.com.*

Eclosion

To *Nannothemis*

By Ken Tennesen

At the bog 'round Jyme Lake
(small gem in the pendant that is the North Woods)
on a shiny blue June day,
I'm searching for the smallest dragonfly,
the aptly named *Nannothemis bella*,
the males powder-blue over black,
the females in contrast, black and yellow banded,
little wasp look-alikes when they fly.

I struggle to get my camera close,
down where they're flitting from perch to perch,
so at home they are,
inches above the divots in this water-logged sponge.



Suddenly I imagine them chiding me —
Catch today, it'll never be tomorrow —
as I continue to apologize
to the tiny sphagnum plants that I've squashed
with my unwinged awkwardness,
realizing too late, as might you,
that this could go on forever.

- Ken Tennesen 2021

Dispatches from a Specimen Collection

By John Deitsch

These past few years, I have had the wonderful opportunity to work as a part-time curator and cataloguer of Odonata specimens in the Cornell University Insect Collection (hereafter CUIC). The CUIC contain specimens originating from a great range of latitudes and longitudes, with species ranging from the cosmopolitan, ever-journeying Wandering Glider (*Pantala flavescens*) to the phylogenetic peculiarity *Epiophlebia superstes*. Collection work has given me the opportunity to explore entire clades of Odonata that would otherwise be impossible for me to see here on the eastern seaboard of North America. What follows is a miscellany of thoughts born out of working with Odonata specimens that, at its heart, is a celebration of Odonata diversity.

I quickly learned that identification of dragonfly and damselfly specimens can be quite different from identifying the very same species, genera, or family in the field. This is not an earth-shattering discovery, but I was surprised (embarrassed?) to realize the extent to which my in-the-field identification was based on behavioral cues rather than morphological characters. A coenagrionid in a dense tangle of riparian vegetation is likely a forktail, a coenagrionid

horizontally perched on a rock in a river is probably a dancer, and that little red speck on a duckweed mat is surely a firetail. But what about a damselfly on a No. 2 pin with a label that unhelpfully says, “near pond.” Of course, there are color patterns, but imagine for a moment that the damselfly in question has been sitting on that pin since 1903 and all vestiges of color faded decades ago. Often too, older specimens are missing body parts and they are not missing insignificant body parts — they are missing abdomens and heads. Fortunately, I can use morphological characteristics like wing venation to identify the more decrepit specimens. The practical application of this lesson is that the next time I am watching a Furtive Forktail (*Ischnura prognata*) at some delightfully shady stream, I may find myself pondering, “How would I identify this species if it were a 119-year-old specimen on a pin?”

Specimen collections are not only a historical documentation of nature, but also of naturalists interacting with nature. I quickly discovered that much of the time I spent sorting unsorted specimens would be spent tracking down synonyms. How many synonyms does a species need before taxonomists are behooved to gift it with a homonym or antonym? In this way, collection work is a reminder that science often curls like a forceps tail’s cerci rather than



Figure 1. *Calopteryx maculata* (Ebony Jewelwing) at Mill Creek Nature Center in Gwinnett County, Georgia, 31 May 2019. Spreading its wings in display along a sandy stream.

Eclosion



Figure 2. *Megaloprepus caerulatus* (Blue-winged Helicoptera) on the Osa Peninsula in Puntarenas, Costa Rica, 20 July 2019. Though commonly observed during my stay, this was the only individual helicopter that perched for a photograph.

proceeding in an orderly fashion. There are vast armies of specimens bearing names that have since been discarded; my favorites are those that were once holotypes or paratypes for a unique species. These specimens now designate a taxonomic dead-end; rather than representing a species to all of science, they are a reminder that studying odonates can be a splendidly confusing endeavor. Sometimes, the history enshrined in collections is of a more intimate nature. There is one Blue Dasher (*Pachydiplax longipennis*) specimen that was preserved with its last meal (a winged ant alate) partially consumed. This seems an injustice to both parties! Being eaten is not an evolutionarily advantageous result for an ant, and to have its failure recorded for future generations to admire? And for the poor dragonfly, to be caught by a rogue entomologist mere seconds before a meal! Nevertheless, I find this buy-one-get-one-free specimen endearing because I have a fond memory of watching a Blue Dasher eating fire ant alates as they

emerged from their anthill in a sunny Georgia pasture.

Working with specimens frequently reminds me of past encounters with Odonates. Ebony Jewelwings (*Calopteryx maculata*) are abundant in North America east of the Great Plains, but I did not see one for the first several years of my “dragonfly-phase.” I did most of my observing at the small suburban lake that bordered my backyard, and Ebony Jewelwings, lovers of shady streams that they are, did not visit my yard. The CUIC has many jewelwing specimens because they are abundant and because they are beautiful. Sadly, the most captivating behavior of Ebony Jewelwings, their hesitant, graceful wing-spreading displays, is not possessed by collection specimens. Ebony Jewelwings are happy to live on small, urban streams that would not inspire John Muir to pick up his pen, but if they are good enough for the fluttering dance of the jewelwing, they are good enough for me. Therein rests a conclusion I reached while labeling many jewelwing specimens: entomologists should forever be happier than philosophers because even the most insignificant silty streams are home for odonates. I know that I always find joy in the presence of jewelwings.

Helicopter damselflies are the largest damselflies in the world, one *Megaloprepus* specimen fills a tray that can fit more than 40 Furtive Forktails. Residing in tropical forests, they breed in phytotelmata, small water-filled cavities in trees or other plants. They specialize in preying on spiders, plucking them haplessly from their webs. Apex predators in their phytotelma ecosystems as naiads and the scourge of spiders as adults, helicopter damselflies are behaviorally fascinating. I have encountered these forest giants in two locations in my life. First, while hiking in a Pacific rainforest of Costa Rica after a morning deluge, I watched them meander through sunbeams penetrating the canopy high above. This encounter was fleeting as I was unable to follow them off-trail into an understory theoretically teeming with fer-de-lances. Second, amidst the cabinets of the CUIC, I studied these damselflies for several moments while adding new labels to their drawers to reflect recent taxonomic shuffling. Though these were two very different encounters with Odonata beauty, both are firmly lodged in my memory.

Even though jewelwing specimens do not dance and pinned bluets may lose their namesake blue, I am grateful to have had the chance to work with odonates in a specimen collection. I have seen species from around the globe, learned a thing or two about wing venation, and deepened my appreciation for dragonflies and damselflies.

John Deitsch is finishing up his final semester at Cornell, studying entomology and biology. He can be reached at jfd77@cornell.edu or @DeitschJohn on Twitter. For more information and photos, please visit: <https://jfddeitsch.wixsite.com/entomornithologist>.

Random Tales from a New Dragonfly Chaser

By Linda Taylor

My interest in Odonata began about two years ago, when I ran out of birds and butterflies to photograph. In the two years since I became a serious “dragon hunter,” I’ve had several memorable experiences.

The most amusing incident occurred at Richland Creek Wildlife Management Area near Corsicana, Texas. The wildlife management area is a reconstructed wetland owned and managed by the Texas Parks and Wildlife Department. The North Unit is made up of numerous cells and basins, a marsh, a canal, and a lake. In other words, perfect Odonata hunting grounds. As I strolled along the levee with my camera, a Texas Parks and Wildlife truck pulled alongside and the man inside asked, “Are you looking for anything in particular?” When I answered, “Dragonflies,” he responded, “There’s one on your shoulder.” I turned my head to look, and sure enough, there was an Eastern Pondhawk (*Erythemis simplicicollis*) staring back at me from my left shoulder.

The most surprising event occurred at Cooper Lake State Park, near Sulphur Springs, Texas. As I approached the edge of the lake, I thought I spotted a Prince Baskettail (*Epitheca princeps*) flying back and forth above the water near the shoreline. I observed his flight pattern for a few moments

and then began to slowly edge my way along the shoreline to position myself for a head-on flight shot. Just as I raised my camera, a Cliff Swallow (*Petrochelidon pyrrhonota*) swooped down from a nearby tree and snatched the dragonfly! I wish I had a photo of my face at that instant because I stood there for several seconds with my mouth wide open in disbelief.

My most startling encounter was at the Lake Waco Wetlands in Waco, Texas. On a hike down a heavily shaded trail near open pools of water, I spotted a Blue-faced Meadowhawk (*Sympetrum ambiguum*) perched in the low-cut grass. Since he was near the slope and facing the water, I knelt in some vegetation on the side of the slope to get a better picture of his face. I took a few photos and then heard rustling to my right. As I turned to look, I saw a large snake resembling a Water Moccasin (*Agkistrodon piscivorus*) a few feet away. So, I did what any sane person would do. I stood up and said, “Shoo! Go away!” When that had no effect on the snake, I decided it was time to move on. In the same location 364 days later, I finally got my second chance to photograph a Blue-faced Meadowhawk. This time, there were no snake interruptions.

My most entertaining experience was also at the Lake Waco Wetlands. As I stood on the edge of a gravel path, intently searching for a dragonfly, I heard a commotion in the brush behind me. I glanced over my left shoulder in



Sympetrum ambiguum (Blue-faced Meadowhawk) at Lake Waco Wetlands, Waco, Texas; November 2020; photograph by Linda Taylor.

Eclosion



Pantala flavescens (Wandering Glider) at Lake Waco Wetlands, Waco, Texas; June 2021; photograph by Linda Taylor.

time to see something dart out of the brush, then swiveled to the right in time to see a Southern Leopard Frog (*Rana sphenocephala*) leaping down the path with a Redstripe Ribbon Snake (*Thamnophis proximus rubrilineatus*) in hot pursuit. At the end of the long path, the frog dove into the weeds, and the snake rose like a periscope, searching right and left for his lost meal. I was so amazed by the sight, I forgot to take a picture.

The most challenging situation occurred after a flood at the Lake Waco Wetlands. The Wetlands are located near the Brazos River and after a heavy rain the river flooded the remote loop trail. My husband and I did not know that, so as we hiked we first encountered a short stretch of shoe-deep water, then a couple of stretches of ankle-deep water. Schools of carp swam across the flooded trail, some halfway out of the water as they attempted to get from one side to the other. Numerous piles of fire ants floated in the water, some latching onto my ankles when I stopped to photograph a Wandering Glider (*Pantala flavescens*). Finally, as we neared the end of the half-mile loop, we were confronted with a long section of very cold knee-deep water. We forged ahead to higher ground, thankful to have escaped the floating ant beds and

the snakes. Oh, did I forget to mention the snakes?

Finally, the most perplexing circumstance I experienced transpired in Paris, Texas. After participating in a charity bike ride, we headed over to the Pat Mayse Lake Wildlife Management Area, where we had seen numerous dragonfly species on a previous visit. The absence of dragonflies was very disappointing. Later that afternoon, I found more dragonflies in the drainage ditch by our hotel parking lot than there were at the wildlife management area. I was even able to add a Citrine Forktail (*Ischnura hastata*) to my life list. I've come to realize that every dragonfly outing is an adventure waiting to happen. I hope to have many more memorable experiences to share.

Linda enjoys traveling and photographing wildlife and recently created an educational poster for the Lake Waco Wetlands Research Center after completing a year-long survey of the Wetlands dragonflies. Her photos can be viewed at <https://lindarocotaylor.smugmug.com>.

Rodolfo Novelo-Gutiérrez: a prominent researcher, professor, and friend

Rodolfo Novelo-Gutiérrez is recognized for his remarkable contributions to the taxonomy and ecology of Odonata. He was born in México City and has a bachelor's degree in biology from the Universidad Autónoma de México. He also completed his postgraduate studies (master's of science and doctorate) at the same prestigious university. He was an outstanding student who was mentored by the distinguished professors Miguel Ángel Morón and Enrique González Soriano.

Professor Novelo-Gutiérrez started his studies in the field of entomology at a very young age, but he was quickly captivated by the dragonflies and damselflies. He has been working with the order Odonata since 1981, when he described the sexual behavior of *Orthemis ferruginea* (*Roseate Skimmer*). During his postgraduate studies, he worked on the biosystematics of Mexican dragonfly larvae. As a researcher and professor, he has focused on life stage descriptions and establishing the ecological requirements for numerous Odonata species from Asia, Central America, and South America. He is recognized as an eager describer of new species and has become one of the most respected taxonomists in Latin America.

At the beginning of his career, professor Novelo-Gutiérrez was a teacher's assistant in the subjects of Zoology and Entomology at the UNAM; later, he started as a professor in the Universidad Autónoma Metropolitana-Unidad

Xochimilco in Mexico City. He has since been appointed as lead researcher at the Instituto de Ecología, A.C. (INECOL) in Xalapa, Veracruz. He has also been a prominent mentor, serving as an advisor on a remarkable number of thesis committees for both graduate and postgraduate students. Rodolfo is not only a great researcher and professor – he has also turned into a dear friend to all his students and colleagues thanks to his helpful, caring, and supportive demeanor.

Professor Novelo-Gutiérrez has participated in an important number of national and international conferences and meetings as a coordinator, organizer, speaker, and lecturer. He has also published more than 200 papers and notes in various indexed scientific journals and has participated as author, editor, and compiler of an important number of chapters featured in recognized entomology books. He has collaborated with different national and international research groups and has been distinguished by the Mexican Science and Technology Council on three occasions.

Rodolfo's almost 40 years as a researcher made him a prominent academic figure, but his kind nature made him an endearing friend. We have been lucky to enjoy not only his valuable knowledge, but also his amazing friendship.

Respectfully, his grateful students.



Rodolfo in his office at Instituto de Ecología, A.C. (INECOL) in Xalapa, Veracruz, Mexico in 2020; photograph by Cornelio Bota-Sierra.

Semblanza al profesor Doctor Rodolfo Novelo-Gutiérrez

El doctor-profesor-investigador Rodolfo Novelo Gutiérrez nació en la ciudad de México. Cursó sus estudios de licenciatura en Biología, Maestría y Doctorado en la Universidad Nacional Autónoma de México (UNAM), un puma de pura sangre.

Los profesores Miguel Ángel Morón y Enrique González Soriano orientaron sus estudios hacia la entomología. De cariño, el profesor Enrique González le dice a Rodolfo “el güero”.

Rodolfo comenzó desde joven a estudiar los insectos y su corazón fue conquistado por las libélulas. Sus colectas de campo comenzaron en la Reserva de la Biosfera “Los Tuxtlas”, Veracruz, lugar exuberante y mágico para los naturalistas y biólogos. De este lugar se han descrito varias especies nuevas de libélulas para la ciencia.

De igual forma, Rodolfo, desde inicios de su carrera participó como asistente – ayudante de profesor de algunas asignaturas en la UNAM, en especial Zoología y Entomología.

Posteriormente, Rodolfo comenzó su camino como profesor asistente en la Universidad Autónoma Metropolitana- Unidad Xochimilco y luego, fue nombrado como investigador asociado y titular en el Instituto de Ecología, A.C., en Xalapa, Veracruz.

De ahí en adelante, Rodolfo ha sido investigador y director de trabajos de grado en Licenciatura, Maestría y Doctorado. Sus estudiantes han consolidado con él, además de un trabajo de investigación robusto, una cálida amistad. Siempre con gran amabilidad y buen humor trata a sus amigos, colegas y estudiantes.

El profesor Rodolfo ha participado en diferentes congresos nacionales e internacionales como ponente, conferencista, coordinador y organizador. Así mismo, ha sido revisor de diferentes artículos científicos y evaluador de diferentes trabajos de grado y propuestas de investigación.



Rodolfo collecting at Reserva La Forzosa, Anorí, Antioquia, Colombia in 2019; photograph by Cornelio Bota-Sierra.

El Dr. Rodolfo Novelo, ha publicado más de 200 artículos científicos y ha participado como autor, editor y compilador de diferentes capítulos de libros. También ha colaborado en diferentes grupos de investigación nacionales e internacionales y ha recibido tres distinciones del Sistema Nacional de Investigadores, del Consejo Nacional de Ciencia y Tecnología de México (SNI-Conacyt).

Los casi 40 años de trayectoria investigativa del Dr. Novelo-Gutiérrez lo califican como una prominente

figura académica, pero su naturaleza amable y colaboradora lo convierten en un entrañable amigo. Como sus estudiantes, hemos sido afortunados al poder aprender de él y tener la oportunidad de acceder a sus vastos conocimientos y a su generosa amistad.

Con cariño, sus agradecidos estudiantes.

Nymph Cove: Preserving and Storing Odonate Nymphs and Exuviae



By Marla C Garrison and
Ken J Tennesen

In the previous Nymph Cove installment, we discussed how and where to collect nymphs. Of course, a major goal of collecting nymphs is to learn how to identify them. Once proficient in identifying local species, final and penultimate instars can often be diagnosed in hand and released on site after data is recorded (i.e. common or uncommon, size classes present, near emergence? etc.). However, if the nymphs cannot be identified in hand, and/or they are purposefully collected for a specific scientific study, it is necessary to retain and preserve them. Sampling nymphs is an important means of documenting habitat, maintaining natural history databases, identifying species assemblages, assessing population trends, and obtaining other valuable life history information. As with all aquatic insects, identifying many species of Odonata nymphs requires examining small details, taking precise measurements, and counting minute setae, all exercises best conducted under a dissecting microscope. This usually

means collecting and preserving nymphs or exuviae; we discuss here the most proven methods (in our experience) to ensure their proper preservation and storage.

Here in Nymph Cove, we encourage the collection of exuviae whenever possible (no, we're not open to changing the title to Exuvia Cove). Exuviae are, after all, the best proof of successful breeding and development in a particular aquatic habitat, and most can be specifically identified. Adding to that, an exuvia is the exoskeleton (nonliving integument) left behind by the metamorphosing insect, so no loss of insect life is inflicted when exuviae are collected. However, there are occasions when exuviae are either damaged and unidentifiable, not available seasonally or are in habitats such as peatlands or heavily vegetated seeps where they are difficult to find. So, we realize that, under certain circumstances, nymph collecting is warranted. Therefore, in this installment we describe techniques for preserving and storing both exuviae and nymphs. Proper curation of specimens is essential for them to be of long-term significance for evaluating a species' past, present, and future and for using them as a source of viable DNA for future molecular research. Whether netting and releasing or actually collecting nymphs and exuviae, researchers and citizen scientists should always abide by the [collection guidelines set out by the DSA](#).

In our experience, exuviae are best preserved in alcohol for ease of identification. Keeping the exuviae wet minimizes breakage, facilitates brushing off sand, silt and debris, and it renders them pliable so that certain key structures, such as the labium, can be manipulated and their parts examined (many species have palpal and premental setae that must be counted).

Manipulating dry exuviae can result in substantial damage and sometimes loss of a key structure. Either ethyl or isopropyl alcohol can be used; we recommend a 70–75% solution.

Preservation of Odonata nymphs is slightly more involved. The best methods maintain near-natural shape, posture and color pattern (although color itself usually changes) but differ for Anisoptera (dragonfly) versus Zygoptera (damselfly) nymphs. Zygoptera nymphs are best preserved by placing them directly into 80% ethanol. It is advised to put each Zygoptera nymph in a separate container of alcohol, as they tend to shed their caudal gills, and if nymphs are put together, matching gills and nymphs can become a difficult to impossible task.

Most researchers, however, have found that live Anisoptera nymphs that have been dropped directly into alcohol deteriorate in a matter of weeks, usually decomposing internally and losing their shape and color. Instead, immersing Anisoptera nymphs in near-boiling water for up to one minute, depending on size, kills most microbes and fixes proteins and fats preventing internal decomposition. Specimens are removed from the hot water, cooled and placed on paper toweling to remove excess water, and immediately put in 80% ethanol (isopropanol will suffice but may not yield as high quality specimens as ethanol).

Following this treatment, nymphs should be placed in glass vials or bottles that can be sealed to prevent evaporation of the alcohol. We recommend using screw-cap vials with poly-seal plastic caps (Fig. 1); the caps have a pliable plastic insert that effectively seals the rim of the vial. These vials have been utilized for 50 years now with minimal to no visible

Nymph Cove

loss of alcohol. However, collections of vials still should be examined annually to check the alcohol level in each vial. Other vials that prevent evaporation are the patent lip vials with neoprene stoppers, although some types of stoppers swell with time making them difficult to remove from the vial. A source for vial purchase has been the BioQuip company, but we have just learned that the company is going out of business on 11 March 2022. An alternate source to check for vials is www.discountvials.com. The vial size depends on the size and number of nymphs placed in them. Most nymphs will fit in the 4-dram size, but final instars of very large species, such as *Hagenius* and most *Macromia*, require larger vials. We place nymphs in the vials posterior end first. This makes it easier to remove them for study as the legs do not hook on the constricted vial neck.

Vial labels should be printed on high quality, acid-free paper using a laser printer with permanent ink. They should include the species identification, the name of the person who identified the specimen, the locality with lat/long coordinates, the date, and the name of the collector. Also useful is the habitat in which the specimen was found, which can be printed on the back of the label if space is lacking. The example below is Arial font sizes 9 and 7 and fits well in a 4-dram vial.



Figure 1. Screw-cap vial (on right) with poly-seal cap (on left).



Figure 2. Example of a home-made wooden rack containing screw-cap vials.

Libellula semifasciata
det K.J. Tennesen 2021

ILLINOIS, McHenry County
Glacial Park Conservation Area, Ringwood
Leatherleaf Bog
25 May 2020 42.419435° -88.327462°

Coll by M.C. Garrison

Vials can be stored in vial racks (Fig. 2), which can be purchased or made from available materials. Racks should be stored in drawers that block out light. Exposure to light will bleach pigments and nymphs will become quite pale over time. After a few months of preservation, the alcohol in some vials may become discolored, especially if numerous specimens are stored therein; we recommend replacing the alcohol if that happens.

In summary, exuviae and nymphs preserved with the methods presented here have many benefits, especially regarding quality of condition and superior longevity of the specimens. Such specimens are great subjects not only for identification but also for molecular and morphological taxonomic study. Properly preserved nymph and exuviae collections serve as valuable sources for future gathering of many kinds of data.

Marla Garrison is a faculty member in the Department of Biology at McHenry County College, Crystal Lake, Illinois. She is author of Damselflies 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.

First Record of Autumn Meadowhawk, *Sympetrum vicinum*, for Nevada

By T. Will Richardson

On 20 October 2021, Jared Maninen and I briefly stopped by Rabe Meadows in Douglas County, Nevada, in the southeast corner of the Lake Tahoe Basin, to look for migrant birds. Here the Lam Wa Tah Trail passes by a small livestock impoundment known as Jennings Pond, where Burke Creek pauses on its way to Lake Tahoe. This entire area has seen considerable habitat modification for over a century, from heavy livestock grazing through the early 1900s, use as a short-lived airport strip, grading for a casino development immediately adjacent to the pond, and in 2015 restoration efforts spanning approximately nine hectares to restore the riparian and wetland habitat and the Burke Creek channel.

Though it was sunny when we arrived at about 1 PM, the day was characterized by cool temperatures (12°C), a steady breeze (20 km/h), and mostly cloudy conditions, so we were quite surprised to spot a male Autumn Meadowhawk (*Sympetrum vicinum*) perched on a split-rail fence between the trail and the pond. We took several photos each from near point-blank range (Fig. 1), as the animal seemed hesitant to fly. Occasionally flushed from its perch, it always returned to the same piece of fence, and after taking photos for a few minutes we walked away, leaving the dragonfly where it was.

This observation constitutes the first documented record for the species within the state of Nevada. Nevada is a large, arid state with relatively few people, and its odonate fauna has received very little attention. The only systematic odonate surveys in far western Nevada that I am aware of have been those by Kennedy (1917), who

visited the region in 1914, and by Ball-Damerow et al. (2014), who revisited Kennedy's sites in 2011–2013. Given the late flight season for *S. vicinum*, it is a species that can be missed during summer odonate surveys. Kennedy and Ball-Damerow's surveys did not extend past mid-September, though this is within the known flight period for the species in California.

Many taxa that occur within Nevada are found only in the Lake Tahoe area, as the Carson Range, a spur range of the Sierra Nevada, brings with it distinct floral and faunal associations. Examples include approximately 115 species and subspecies of plants (Charlet 1996; Nachlinger and Tiehm *in prep*), several species of birds (Richardson 2003; Floyd et al. 2007) and subspecies of butterflies (Austin 1985; Richardson and Murphy 2007), mammals like the Snowshoe Hare (*Lepus americanus taahoensis*; Richardson et al. 2012), the Mountain Beaver (*Aplodontia rufa*; Piaggio and Jeffers 2013), and two species of tree squirrels (Millar and Hickman 2019), at least one genus of beetle (Richardson 2021), and surely countless other invertebrate taxa. Thus the Carson Range presents a very unique environment within the state of Nevada. Because of this, and because *S. vicinum* is known from the California side of the Lake Tahoe Basin, I see no reason to suspect that this record represents a vagrant or range expansion for the species. It is highly likely the *S. vicinum* occurs at other sites in the Carson Range.

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New Records



Figure 1. Male Autumn Meadowhawk (*Sympetrum vicinum*) found at Jennings Pond, Douglas County, Nevada 20 October 2021. Additional photos and precise locality data can be found at <https://www.inaturalist.org/observations/98830104>.

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Will is co-founder and executive director of the Tahoe Institute for Natural Science (www.tinsweb.org).

New Record of *Neurocordulia xanthosoma* in Crosby County, Texas

By Joe Girgente and Hannah Wojtysiak

On the night of 9 July 2021, we were conducting casual night-time insect surveys at Silver Falls Rest Area on the White River in Crosby County, Texas. Nestled in a canyon with barren plateau rising on either side, this rest area is well known for the abundance and diversity of insects attracted to its lights. Just after 10 PM, we noticed a dragonfly that had flown in and attempted to land on the lights at the main entrance welcome sign. Upon investigation, we realized it was an Orange Shadowdragon (*Neurocordulia xanthosoma*) and excitedly began taking pictures during the course of which it perched on Hannah's shirt; later in the evening, it was seen flying around the bedsheet we illuminated with a blacklight.

The surrounding area has decent habitat for this species – a small river with moderate flow and deep pools, lots of low surrounding herbaceous vegetation on which to perch, and an abundance of prey. This represents only the second record of this species in the panhandle of Texas, the other on a large lake during a blacklighting event in 2018 about an hour south in Garza County. Other than a single 1967 New Mexico record (Clark 1979), these two north Texas records also represent the furthest west the species is known. There may very well be a larger presence of *N. xanthosoma* in under-surveyed northwest Texas, but poor aquatic connectivity and often ephemeral water sources likely limit many riverine species' ability to survive on the Great Plains.



Figure 2. Macro shot of *Neurocordulia xanthosoma* (Orange Shadowdragon) showing lateral aspect; Crosby County, Texas; 9 July 2021.

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Joe and Hannah are graduate students at Texas Tech University in Dr. Nancy McIntyre's lab. Joe is studying ecomorphology of Hylogomphus geminatus and Hannah is studying Somatochlora calverti and other rare species.



Figure 1. *Neurocordulia xanthosoma* (Orange Shadowdragon) perching on Hannah's shirt; Crosby County, Texas; 9 July 2021.

Micrathyria ocellata in Sonora, Mexico

By David F. Smith, Doug Danforth, and Pierre Deviche

We are reporting the first observation of *Micrathyria ocellata* (Square-spotted Dasher) in the Mexican state of Sonora. This observation was recently submitted to the Odonata Central database (Abbott 2022), and can be accessed using record OC# 1935937.

The genus *Micrathyria* (tropical dashers) in the family Libellulidae has a pan-tropical distribution and contains 48 species (Paulson *et al.* 2022). Among these are 10 species in Mexico (Paulson and Gonzalez-Soriano 2022), four of which have been previously observed in the far northwestern state of Sonora. Three of these latter species have ranges that extend farther north to Florida, Texas, and Arizona in the United States. There is a single prior record for *M. ocellata* in Sinaloa, the southern neighbor of Sonora, near the coastal city of Mazatlán in November 2017 (<https://www.inaturalist.org/observations/8724634>). Records of *M. ocellata* increase as one moves farther south to Nayarit and Jalisco. The known full range for *M. ocellata* extends from northwestern and east-central Mexico south to Argentina and Brazil (Lozano 2021); there are no reports of this species from the United States or West Indies.

One of the authors, David F. Smith, photographed a dragonfly (Fig. 1a) on 24 November 2019 at Presa Tetajiosa, a site near the town of Alamos in southeastern Sonora that he regularly visits for odonate observation (Smith 2021). The overall appearance of the subject suggests *Micrathyria*; however, the thoracic and abdominal patterns differ clearly (comparison not shown) from *M. hagenii* (Thornbush Dasher), *M. aequalis* (Spot-tailed Dasher), and *M. didyma* (Three-striped Dasher), the three *Micrathyria* regularly seen at this location. Taking note of eye color, the shading and pattern of thoracic stripes, and the minimal abdominal spots except for the large, squarish spot on S7, features of the subject photographed (Fig. 1a) most closely match those of *M. ocellata* (Fig. 1b). Also evident is a hindwing longer than the abdomen, a distinguishing feature of *M. ocellata* noted by Biggs (2021). An additional tropical dasher, *M. dissocians* (Caribbean Dasher) has been reported once from the Alamos area (Odonata Central #473088), and a photograph of that species is presented (Fig. 1c) for comparison. The green eye color and greenish tint of thoracic stripes in this example of *M. dissocians* are distinct from the example shown of *M. ocellata*; however, in photographic databases a minority of *dissocians* have blue eyes and a minority of *ocellata* have green eyes, thus confounding reliance on eye color to distinguish



Figure 1. Photographic comparison of *Micrathyria* in northwestern Mexico. a. Subject photograph by David F Smith on 24 November 2019 near Alamos, Sonora. b. *Micrathyria ocellata* (Square-spotted Dasher) photograph by Dave Biggs on 10 February 2017 near Yelapa, Jalisco. c. *Micrathyria dissocians* (Caribbean Dasher) photograph by Doug Danforth on 8 October 2016 near Alamos, Sonora.

New Records

these otherwise similar species. In a recent publication (González-Soriano 2020) describing a new species of *Micrathyria* in southern Mexico and Central America, the author formulated a key to Mexican *Micrathyria* in which the configuration of cerci—divergent tips in *dissocians* and convergent tips in *ocellata*—serve to distinguish these two species. The divergent tips are evident in the photograph of *dissocians* (Fig. 1c), but the cerci tips are not appropriately oriented for clear determination in the subject photograph (Fig. 1a). Other useful distinguishing characters are a relatively longer abdomen and narrower abdominal “club” in *dissocians* (DR Paulson, personal communication).

We conclude based on the balance of features captured in the single subject photograph that this represents the first example of *M. ocellata* reported for Sonora. We further note the challenge presented by its similarity to *M. dissocians* and recognize the need for caution in distinguishing these species based on limited photographic data.

Acknowledgements

The authors thank Dave Biggs for the use of his photograph of *Micrathyria ocellata*. Further thanks go to Dennis R. Paulson for many helpful discussions of *Micrathyria* and suggestions to improve the manuscript.

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David is a retired molecular biologist residing in Embarrass, Minnesota, and Alamos, Sonora.

Doug is a retired middle school science teacher who is now trying to figure out the Bee Flies (Bombyliidae) in Southeast Arizona.

Pierre is professor of environmental physiology at Arizona State University (ASU) in Tempe. When he is not busy at work, you will often find him observing and photographing odonates throughout Arizona. He developed and maintains the Arizona odonate website: <http://azdragonfly.org>.

First two records of Great Pondhawk (*Erythemis vesiculosa*) for Canada

By Robert Tymstra

On 20 October 2021, I photographed a Great Pondhawk (*Erythemis vesiculosa*). I believed this to be the first record for Canada but the sighting soon led to a retroactive discovery of yet another individual spotted a week earlier and 160 kilometers to the north.

I was conducting a daily bird census at Fish Point Provincial Reserve for the Pelee Island Bird Observatory. The reserve is located at the southern tip of Pelee Island, a landmass noted for being the southernmost inhabited part of Canada. It is situated in the western basin of Lake Erie, roughly halfway between Cleveland, Ohio and Detroit, Michigan.

Having become a recent Odonata enthusiast, I was on the alert for something unusual, aware that the island was well situated to catch a southern stray. This day and the two days

previous saw unusually warm weather with light southwestern winds and daily temperatures reaching 22°C.

As I neared the southern tip, my census route took me scampering over several fallen trees, knocked down by a storm in May. The sheltered coves among the numerous trunks and branches along the shore created wind-free zones where migratory dragonflies could feed and rest before continuing south. I had noted several Black (*Tramea lacerata*) and Carolina Saddlebags (*T. carolina*) as well as several Common Green Darners (*Anax junius*) in this area in the preceding weeks. They seemed to be resting and hunting here before setting out south and southwest across the lake towards Ohio.

It was about 9 am, the sun was shining, and the dragonflies were beginning to get active. I was walking along the shore



Great Pondhawk; Fish Point Provincial Reserve, Pelee Island, Ontario, Canada; 20 October 2021; photograph by Robert Tymstra.



Great Pondhawk; Fish Point Provincial Reserve, Pelee Island, Ontario, Canada; 20 October 2021; photograph by Robert Tymstra.

about 50 meters from the southern tip of the island (41° 43.58' N, 82° 40.32' W). I netted a Common Green Darner, photographed it, then released it. Black Saddlebags flew around me and I studied them in hopes of finding a rare Red (*Tramea onusta*) or Striped (*Tramea darwini*) in the mix.

A large green dragonfly flew by and I assumed it was yet another Common Green Darner. It was similar in size to the Black Saddlebags. I would have ignored it, but it very cooperatively landed nearby on a dead branch about a meter above the sand near the lake edge. It was eating a fly it had just caught, possibly a Stable Fly (*Stomoxys calcitrans*). I took a few photos with a 300 mm lens before returning to my saddlebag hunt. In the viewfinder, I did notice an unusual pattern with dark markings on a green abdomen but figured it was just a strange variation.

When I returned home, I examined my photos and plugged one into iNaturalist. To my surprise, the image recognition feature of iNaturalist identified it as a Great Pondhawk and not a Common Green Darner at all! I pulled up a few Great Pondhawk photos on Google and sure enough, the green and black pattern on the slim abdomen was a match! I sent a few images to a long-time friend of mine, Scott Connop, to get his opinion on my identification.

Scott had been out with three birder friends the week before, trying to locate a Nelson's Sparrow (*Ammodramus nelsoni*) at a sewage lagoon complex near Forest, Ontario. The lagoons are about 160 km north of my sighting. Scott flushed a large green dragonfly off the dyke separating two of the lagoons (43° 5.37' N, 82° 1.17' W). He managed to

get a somewhat distant shot with a point-and-shoot camera before it flew off again. He showed the camera image to his companions (who were also odonate hunters). They dismissed it as a female Eastern Pondhawk (*Erythemis simplicicollis*). As it turned out later, they would all be kicking themselves for not having gone to look at it but in all fairness, the idea of a Great Pondhawk in Ontario was totally unexpected, not appearing in any local field guides of Ontario or neighboring states.

Scott had been processing his photographs the morning of my sighting. He plugged his pondhawk photo into iNaturalist and it also suggested that his creature was a Great Pondhawk! With no previous provincial or national records, he dismissed iNaturalist's identification as an error and entered his sighting into iNaturalist as a female Eastern Pondhawk, the infinitely more likely possibility. When I contacted him with my photos a few hours later, 'alarm bells went off' and he reexamined his photo. It was indeed a Great Pondhawk! After getting confirmation, he corrected his sighting on iNaturalist.

My sighting was, of course, unusual enough on its own, but then to have one of my friends see the same thing at quite a separate distance was very peculiar. It seems statistically probable that there must have been many more Great Pondhawks straying north for us to have spotted them so far out of range. It is highly unlikely that Scott's individual was the same as mine. Had I not taken a photograph, I would have surely overlooked it.

The Great Pondhawk is a widespread species ranging from Argentina and Brazil north to the southern United States

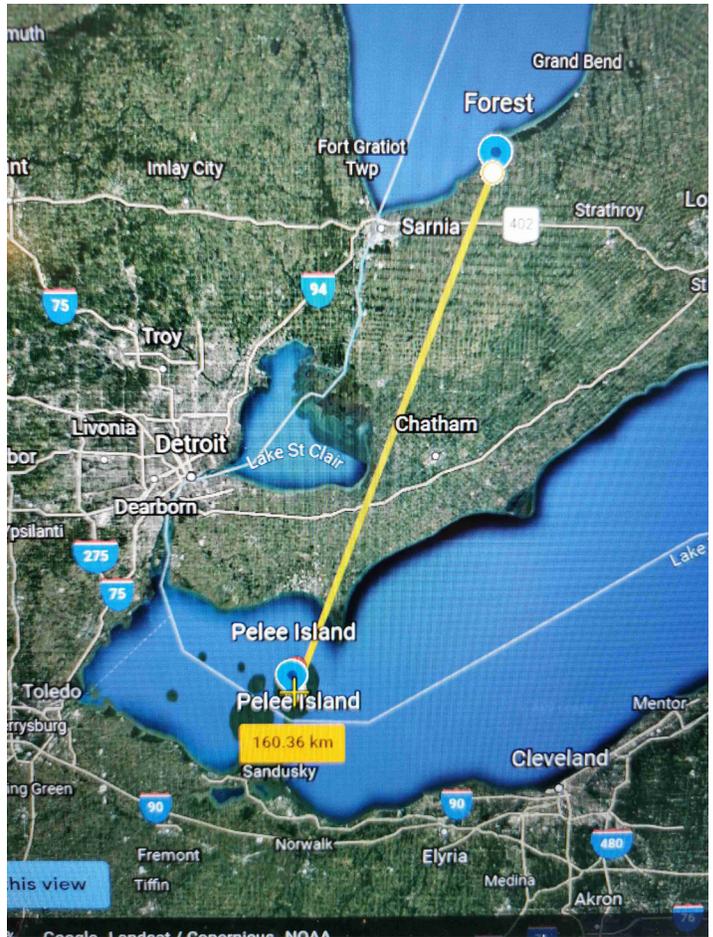
New Records

where it occurs from Florida westward to Texas and New Mexico with scattered records north to northern Arizona and southern Colorado (Paulson 2011). There are only a sprinkling of records in Odonata Central (Abbott 2006-2020) from the northern states, all of which are from recent years as follows:

- Glencarlyn, Arlington, Virginia, 15 September 2018 (OC#492346)
- Braidwood Dunes and Savanna Nature Preserve, Will County, Illinois, 2 June 2020 (OC#1509333)
- Slip Bluff County Park, Decatur County, Iowa, 4 June 2020 (OC#1358205)
- Millrace Flats WMA, Louisa County, Iowa, 17 July 2020 (OC#1405111)
- Horner Park Nature Area, Chicago, Cook County, Illinois, 10 August 2020 (OC#1557671)

I found it interesting that Great Pondhawks were featured in *ARGIA* 33(4) December 2021, "Green Invasion: influx of Great Pondhawks (*Erythemis vesiculosa*) in Arizona," by Pierre J. Deviche. He noted peak numbers in Arizona in September, not long before our Ontario sightings. Was there a weather event such as a hurricane or sustained southwest winds that could have carried a number of individuals to the northeast? Is climate change encouraging range extensions to the north?

I encourage all to look out for this possibly expanding species in the coming seasons.



Distance between the two locations where both Scott and I found our respective Great Pondhawks. Source: Google Earth.



Great Pondhawk; Forest, Ontario, Canada; 13 October 2021; photograph by Scott Cannop.

Acknowledgements

Many thanks to Scott Connop and Colin Jones for reviewing this report.

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Robert Tymstra is a keen life-long birder and recent convert to odonate chasing!

First record for North Carolina of *Rhionaeschna multicolor* (Blue-eyed Darner)

By Brian Bockhahn

Rhionaeschna multicolor, Blue-eyed Darner, is a common species in the western United States, where it inhabits a variety of wetland habitats (Paulson 2009). It ranges from British Columbia south to Mexico and eastward to Wisconsin, Iowa, Kansas, Oklahoma, and Texas (Fig. 1). An extralimital record from Martha's Vineyard, Massachusetts, was recorded in 1943 (Paulson 2011). Here, I document a second record of this western species for the United States east coast.

On 10 December 2020, in Stones Creek Game Land, Onslow County, North Carolina, I was surveying for spiders for the North Carolina Biodiversity Project, when I noticed a large darner patrolling the edge of Dry Lake, a 13-acre man-made lake (34.55894, -77.48828). It was 1:25 pm EST, sunny with a few clouds, and the air temperature was in the high 60s F. The darner spent several minutes in aerial pursuits of small caddisflies or other flying insects at the shoreline with a tree canopy height of 20–25 feet. It then began patrolling low over an eroded embankment with some sparse grasses and a few cut shrub stems, where it soon perched. With my Canon PowerShot sx540, at approximately 100× digital zoom, I was able to capture two quick photos. As I moved toward it with a net the darner took flight out over the lake edge and disappeared from view.

The sighting of any darner species at this time of year is unusual, so I quickly looked at my camera screen to see which species it was. This individual had bright blue eyes, a bright blue face, a brown thorax with thin narrow blue stripes, an abdomen with blue spotting, clear wings, and cerci that were forked

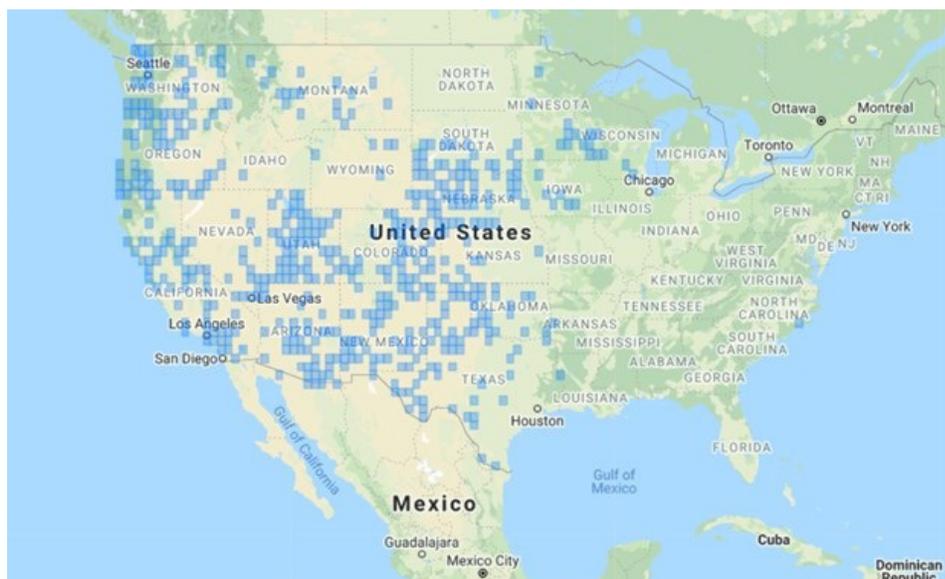


Figure 1. Range map of *Rhionaeschna multicolor*, Odonata Central.

at the tips (Fig. 2). I tentatively identified the darner as *R. multicolor*. I ruled out *R. mutata* (Spatterdock Darner) based on the narrower and straighter thoracic stripes and the more deeply forked cerci. Realizing that if my identification was correct, this was an extraordinary sighting for the East Coast, I quickly sent photos to several other dragonfly enthusiasts for their opinions. All agreed that it was, indeed, *R. multicolor*. This record was later submitted to Odonata Central and accepted as *R. multicolor* (OC#1915449).

Mark Shields and Hunter Phillips arrived at my location within 90 minutes of the sighting. Together, we searched the entire eastern shore of Dry Lake in the late afternoon sun for another hour but did not see the darner again. On 11 and 12 December Shields and Phillips made return trips, completely encircling Dry Lake, as well as visiting other nearby man-made lakes in the game lands, with no success.

As evident in the photo (Fig. 2), the individual appeared fresh with bright coloration and no discernible wing wear or damage, leading to speculations on provenance. One intriguing possibility is that it had eclosed locally. But how could an *R. multicolor* egg or larva find its way hundreds of miles to the east in coastal North Carolina? Dennis Paulson (personal communication) suggested two possible scenarios: (1) it may have arrived as an egg or nymph in aquatic plants imported from a western state, or (2) it may have been caught as a nymph and sold as fish bait.

Dry Lake is a borrow pit with no aquatic plantings, but several miles away are all manner of developments and retirement villas, often with numerous non-native plantings. Most of our imported plant exotics are from the northeast or the south, so it seems unlikely that eggs or larvae arrived in aquatic plants shipped in from Blue-eyed Darner range, but it is possible. I am unaware of dragonfly nymphs

New Records

being sold as fishing bait in North Carolina, and this location's proximity to the coast where saltwater fishing predominates makes this possibility even less likely.

Barring human intervention, the alternative explanation for this darner's appearance in eastern North Carolina is that it arrived naturally as an egg, nymph, or adult. It seems unlikely that an egg or nymph could have been transported in or on the body of a migratory animal, such as a waterbird. A more plausible scenario is that the adult flew here from the west.

R. multicolor is thought to be migratory in California, where it flies into December (Paulson 2009), and Smith and Patten (2021 p. 315) state that "records ... indicate that *Rhionaeschna multicolor* wanders eastward in the fall in Oklahoma." Their latest record is 29 November. One of four patrolling males was photographed in Austin, Texas on 2 December 2008.

R. multicolor does range south into uplands of Mexico to Michoacan (Paulson 2009), where perhaps it has a later flight period. It is possible that one of several hurricanes that hit the Gulf of Mexico that fall could have pushed individuals into the United States.

In summer and fall of 2020 there were also several major and catastrophic wildfires in the western United States that could have caused an eastward movement of western strays.

We will never know how this individual made it to coastal North Carolina, but the fact that it did indicates that observers in the eastern United States should be on the lookout for *R. multicolor* in the fall and winter. Don't assume that a late season darner is just a Common Green (*Anax junius*)!

Acknowledgements

I'd like to thank Mark Shields, John Petranka, and Kyle Kittelberger for their feedback on an earlier version of this note and Dennis Paulson and Harry LeGrand for comments on the sighting,



Figure 2. *Rhionaeschna multicolor*, first North Carolina record.

Mark and Hunter Phillips for the rapid response, and Kyle Kittelberger for immediate digital research through text.

Citations

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Brian is the Regional Education Specialist for North Carolina State Parks, where he travels across the state conducting biodiversity inventories and teaching wildlife identification workshops. While he is the leading expert of arachnids in North Carolina (see: <https://auth1.dpr.ncparks.gov/arachnid/index.php>), he has been observing odonates in the state for over two decades.

Two very significant collections of Odonata donated to FSCA last year

By Bill Mauffray

The FSCA, Florida State Collection of Arthropods, in Gainesville, Florida, is one of the largest arthropod collections in the world. Additionally, its well curated Odonata holdings are the largest in the world based on unpublished data currently being compiled for an article in the works by Emily Sandall and John Abbott.

Years ago, Dennis Paulson agreed to donate his entire collection to the FSCA. Over the years he would send paperwork officially transferring ownership of portions of his collection to the FSCA, but with the intention to retain it in his possession for life. About two years ago, Dennis contacted me to let me know that he was ready to complete the donation process of his collection. I began to investigate the cost to move his collection safely to Gainesville. There were more or less two options: rent a truck and transport it myself, or rent a moving POD and let a professional driver do the move. The expenses for both options were estimated at \$3300–3500. The first option would involve a cross country flight and drive across the country from Washington state to Gainesville, Florida. This would take at least a week or more of hard driving. The “POD” option took away that stress, so Dennis and I agreed to use that method. I set up a GoFundMe to collect donations that would help finance the move and was able to raise the necessary funds with a majority of the donations coming from DSA members. Thank you for your kind donations that have made the preservation of this amazing collection a reality.

Originally the move was scheduled for fall of 2020, but Dennis requested that we hold off until the Spring of

2021 since he needed more time to prepare his collection. As spring approached, Dennis again requested to delay the move till September. Luckily, the company I hired to provide and relocate the POD agreed to both delays and honored the original price.

Meanwhile, as a surprise, John Michalski contacted me in early July to let me know that the Donnellys (Nick and Alisa) were also ready to transfer their collection to the FSCA. The Donnelly collection had been under a similar arrangement as the Paulson collection. The Donnellys decided it was their time to downsize and enjoy complete retirement. They were planning to sell their home in Binghamton, New York, and needed to send their collection to Gainesville as soon as possible.

Nick's son, Malcolm, and John Michalski made all the arrangements and estimated they needed \$1000 to cover expenses. I contacted Bryan Pfeiffer for assistance from the Dragonfly Society of the Americas and it was approved. As a bonus, the collection that John was donating also contained a few thousand specimens from North America, Southeast Asia, and the Caribbean,

Originally Malcolm Donnelly was planning to drive directly from New York to Gainesville, but at the last minute, Malcolm decided that it would be safer for someone to accompany him to share the driving, so John Michalski volunteered to make the trip with him. On 25 August, John and Malcolm departed Binghamton in a cargo van headed towards Gainesville. The pair arrived the next afternoon where myself, Paul Skelley, Kyle Schnepf, and a few others assisted in unloading the collection into an annex building where



Truck loaded. From left: Malcolm Donnelly and John Michalski.



From left: Malcolm, Alisa, Nick, Michael, and John Michalski



Arrival in Gainesville. From left: Malcolm Donnelly, Bill Mauffray, and Kyle Schnepf.



Specimens after freezing.



Boxes sorted by column location.

the collection was frozen to kill any hitchhiking “pests.” It only took us a little over an hour to unload and John and Malcolm were on their way back back north.

After almost three weeks in the huge walk-in freezer, the collection was moved to the main collection building. I sorted out the individual boxes and placed them on the floor at the base of the columns where the specimens would normally belong in the main collection.



Sample boxes.

When it was time to begin incorporating the specimens into the main Collection, Mitch Haag spent the first day helping me start the process. In total it took three weeks working eight to nine hours a day to complete integration and it was finally completed on 17 October.

The combined Donnelly and Michalski donations contributed an estimated total of 32,000 specimens from around the world with special emphasis on Neotropical, southeast Asia, and Oceania. A total of 221 species of Zygoptera and 132 species of Anisoptera were added to the collection for the first time.

Meanwhile back in Seattle, Dennis finalized his preparations for shipping his collection on 24 October.

On Monday, 25 October, the POD was delivered to Paulson's home in Seattle, Washington. Later that afternoon, after he finished loading it, Dennis locked the POD and shipped the key to me. The next day the moving company picked it up and its cross country trip began.



Dennis' final day of packing.



POD being moved from the Paulson



POD being unloaded.

Tracking showed that the POD was first trucked to Pennsylvania, then to Atlanta, Georgia, and finally onward to Ocala, Florida to prepare for final local delivery on 12 November. It was decided by collection personnel that we unload directly into the main collection building since the annual fumigation

of the collection was scheduled for the Thanksgiving break the following week.

The following week, just before fumigation, I began to rip open the parcels and sort the boxes in a similar fashion as I did with the Donnelly Collection. In total, it took eight hours.



POD arriving at the FSCA.



POD on the truck.



Specimens being unloaded into the collection building.



Boxes unpacked and placed under corresponding species columns.

It took me 28 full days to merge Paulson's specimens, along with some remaining Donnelly material into the main collection. Based on figures provided by Dennis, his collection of over 62,000 specimens is worldwide in scope but has especially large numbers of specimens from Florida, Washington, Mexico, and Costa Rica, all places Dennis Paulson has spent great amounts of time. About 2,300 species representing over one-third of the world odonate fauna are included. New to the FSCA collection are 72 species of Zygoptera and 62 of Anisoptera.

Along with the Donnelly collection, this brings the total number of Zygoptera to 1792 and Anisoptera to 1820 species, well over 57% of the known species worldwide. A complete list of all the species in the FSCA collection can be found at www.iodonata.net. With approximately 800,000 specimens, this makes the FSCA the premier research destination for extensive odonate studies. For information on accessing this collection contact Bill Mauffray, Resident Research Associate, curator of Odonata at iodonata@gmail.com.

*Bill Mauffray is the Managing Director at the International Odonata Research Institute and the Resident Research Associate / Curator of Odonata at the Florida State Collection of Arthropods. You can find him on-line at www.iodonata.net or on Facebook with the username *iodonata*. He can be reached at iodonata@gmail.com or +1-352-219-3141.*



Bill merging the Paulson collection into the FSCA.

New Mexico State Dragonfly Drive

By Wayne Steffens

The Arthropod Collection at New Mexico State University could use your help!

With over 500,000 specimens, the Arthropod Collection at New Mexico State University in Las Cruces is the largest collection of arthropods in the state. We are currently determining, organizing, and updating the Odonata collection so records can be entered into the Symbiota Collection of Arthropod Networks (SCAN) database for all researchers to access. Our short-term goal is to obtain specimens of each of the nearly 150 species of Odonata known or suspected to occur in the state, and we would love to fill in some gaps.

Would you be willing to help? If you can donate voucher specimens of species that occur in New Mexico (or surrounding states and Mexico), you can help secure the future of collection-based dragonfly/damselfly research in New Mexico and know that your specimens and data will be preserved and available for science and students forever.



If you have specimens that you would consider donating we'd love to hear from you. If you are out collecting in the future please consider swinging a net to help us reach our goal. We especially need any gomphids, most aeshnids and some of the state's less common species.

Questions about specific needs, or to discuss? Contact Wayne Steffens biogeo@nmsu.edu.

To send donations contact:
Curator Helen Vessels at hvessels@nmsu.edu

Wayne Steffens has been conducting beetle and dragonfly surveys and research for state and federal agencies and universities for 25 years. He is determining specimens and managing the update of the Odonata collection at the New Mexico State University Arthropod Collection.



Selysia Now Available On-line

By John Abbott

Prior to *ARGIA* (first published in 1989), *Selysia* was a biannual “newsletter of Odonatology” that was started in 1963 by B. Elwood Montgomery out of Purdue University. Montgomery edited and published until Minter Westfall (Gainesville, Florida) took it over from 1970–1986, followed by Dan Johnson (Johnson City, Tennessee) from 1987–1993, and then Martin Schorr (Purley, United Kingdom and Zerf, Germany) from 1996 until 1997. It also served as the newsletter for the International Odonata Foundation (S.I.O.) for a time.

It published numerous interesting and useful articles throughout its 34-year existence. The articles are varied, summarizing collecting trips and various collections as well as covering such topics as *Odonata as Indicators of Water Pollution*, *Common (Folk) Names for Odonata*, *Observations on the Spelling and Gender of Technical Names in the Odonata*, *Evolutionary Traits in Life Cycles and Gill Development in Odonata*, *Polychromatism in Female Aeshnidae*, *Protodonate Endothermy Immortalized in Verse*, *Clubtails on the Flambeau*, and *Calopteryx aequabilis “Flying” on water*.

I have scanned and performed text recognition on the full set so they are

searchable. They are being hosted by the Worldwide Dragonfly Association and available to everyone at <https://worlddragonfly.org/selysia>. I eventually hope to have the articles cataloged and searchable by year, title, and author, so check back at the link above.

Thanks to Hal White for suggesting these should be made available and his encouragement to make it happen. The World Dragonfly Association Executive Board enthusiastically supported hosting it on the World Dragonfly Association website and has plans for hosting other such publications and literature in the future.

World Odonata List Now Hosted in TaxonWorks

By John Abbott

The World Odonata List (<https://tinyurl.com/slaterWOL>) maintained by Dennis Paulson and Martin Schorr for many years has proved an invaluable resource to the odonate community. To expand on its usefulness, the list has been migrated to TaxonWorks (<http://taxonworks.org/>). TaxonWorks is an integrated web-based workbench for taxonomists and biodiversity scientists. It does a fantastic job of working with taxonomic names, hierarchies and everything associated with them.

Because TaxonWorks is just a workbench, you cannot view the list on their site, but the data in each project can be displayed or accessed via API calls. The current list hosted in TaxonWorks can be viewed on Odonata Central (<https://www.odonatacentral.org/app/#/wol/>). The list is now being maintained by a group of coordinators (Dennis Paulson, Martin Schorr, John Abbott, Cornelio Bota-Sierra, Cyrille Deliry, Klaas-

Douwe Dijkstra, and Federico Lozano). While this coordinating team actively combs the literature for new species and taxonomic changes, we encourage authors to email us at world.odonata@gmail.com with their publications as they come out; this will ensure that changes are quickly integrated in the list. We also recognize that our team is limited in terms of geographical coverage and expertise and are actively soliciting and welcoming new team members.

The list hosted on Odonata Central can be downloaded as an .xls file, just like on the Slater Museum site. One of the benefits of hosting the list in TaxonWorks is that it makes it easy for different platforms to access the most up-to-date names. iNaturalist, for example, is now pulling their taxonomy for Odonata from this list. Additionally, we are adding literature, type information, etymology, and much more for each species in the database. The list will soon be hosting English-language vernacular names for

species worldwide (work in progress by Dijkstra and Paulson) and these will be available through the World Odonata List on Odonata Central. All of this will become searchable, filterable, and downloadable in time. We hope this new platform for the list will make the World Odonata List an even more valuable resource as the additional content and accessibility is provided. If you are interested in how to access this data for your own needs via API calls, please email jabbott1@ua.edu. We are always interested in correcting errors in the list and have setup an email account, world.odonata@gmail.com, where issues can be reported.

John C. Abbott is chief curator and director of research and collections at The University of Alabama. Contact him at jabbott1@ua.edu or find him online at www.AbbottNaturePhotography.com.

The relationship between sediment metal concentration and Odonata (Insecta) larvae assemblage structure in Cerrado streams

Metals can be incorporated into stream sediment affecting benthic invertebrate assemblages in different ways. Odonata larvae have variable tolerances to metals; sublethal levels accumulated in larval tissue can indirectly influence assemblage structure in environments with differences in types and concentrations of metals in the sediment. This research evaluated the relationship between Odonata larvae assemblages and sediment metal content in Cerrado streams. We evaluated genus composition, abundance, richness, Shannon-Wiener (H') diversity index and Pielou's evenness index (J') of the assemblages from 12 streams. Cluster analysis was used to identify groups of streams according to sediment concentrations of Cu (copper), Zn (zinc), Ni (nickel), Fe (iron) and Mn (manganese). Canonical Redundancy Analysis (RDA) and Canonical Correspondence Analysis (CCA) were performed to determine how metals influence Odonata assemblage metrics. Cluster analysis revealed three distinct groups of streams according to

metal concentration in the sediment. RDA showed a negative relation between Pielou evenness (J') and the concentration of Ni, Cu, Zn and Mn, while abundance, genus richness and Shannon-Wiener diversity were positively related with Fe. CCA indicated that some taxa showed an opposite relation with metal concentration, but others were more abundant in streams subjected to high metal concentrations. Although the increase in iron concentration in streams can lead to an increase in the abundance of Odonata larvae, high concentrations of copper, zinc, and manganese can lead to a reduction in taxon evenness.

Citation: Bruno CGC, Gonçalves RC, dos Santos A, Facure KG, Corbi JJ, Jacobucci GB. 2022. The relationship between sediment metal concentration and Odonata (Insecta) larvae assemblage structure in Cerrado streams. *Limnetica* 41(1): 27–41.

Sixteen new records of Odonata for Colombia from the Araracuara Region (Perilestidae, Calopterygidae, Heteragrionidae, Megapodagrionidae, Polythoridae, Coenagrionidae, Aeshnidae, Gomphidae, Libellulidae)

A field trip to collect Odonata was carried out in Southern Serranía de Chiribiquete National Natural Park, Araracuara Region, Colombia. A total of 40 species were collected, of which 17 are new records for the country: *Hetaerina charca*, *Epipleoneura spatulata*, *Metaleptobasis gibbosa*, *Neoneura desana*, *N. luzmarina*, *N. fulvicollis*, *N. joana*, *Phoenicagrion paulsoni*, *Protoneura tenuis*, *Oxystigma petiolatum*, *Perissolestes romulus*, *Epigomphus paludosus*, *Zonophora regalis*, *Micrathyria hippolyte*, *Uracis oviposatrix*, and *Ypirangathemis calverti*. The genera *Schistolobos*, and *Ypirangathemis* are reported for the first time for Colombia. A map of localities, photographs of the species, and notes on dragonfly and damselfly conservation are provided.

Citation: Stand-Pérez MA, Montes-Fontalvo J, Pérez-Gutiérrez LA. 2022. Sixteen new records of Odonata for Colombia from the Araracuara Region (Perilestidae, Calopterygidae, Heteragrionidae, Megapodagrionidae, Polythoridae, Coenagrionidae, Aeshnidae, Gomphidae, Libellulidae). *Notulae odonatologicae* 9(8): 378–388, (5 January 2022). <https://doi.org/10.5281/zenodo.5702965>

New records for Puebla and Morelos, Mexico (Odonata: Aeshnidae, Coenagrionidae, Libellulidae)

Seven species of odonates new to Puebla and one to Morelos urban areas were identified from the entomological collection of the Universidad de las Américas Puebla (UDLAP), Mexico. Rarely observed species such as *Argia extranea* and *A. westfalli* were recorded in Puebla and Veracruz, respectively. *Argia fumipennis*, *Ischnura demorsa*, *I. ramburii*, *Anax junius*, and *Triacanthagyna septima* are discussed in detail. The ecological importance of the UDLAP campus, 'Flor del Bosque' State Park and Atlixco, is also noted. These records add to the knowledge of odonate distribution from Puebla, Morelos, and Veracruz.

Citation: García-Miranda O, Carrillo-Muñoz AI. 2022. New records for Puebla and Morelos, Mexico (Odonata: Aeshnidae, Coenagrionidae, Libellulidae). *Notulae odonatologicae* 9(8): 331–340, (5 January 2022). <https://doi.org/10.5281/zenodo.5702951>

Environmental Determinates of Distribution for Dragonfly Nymphs (Odonata: Anisoptera) in Urban and Non-Urban East Texas Streams, USA

We collected environmental and habitat data for nymphs of 12 dragonfly species (Odonata: Anisoptera) from 91 stream sites throughout eastern Texas, including urban and non-urban locations. Understanding the relationship of dragonflies to habitat structure and other environmental variables is crucial for the purpose of conserving these insects and better using them as predictive tools for water quality assessments, and refining tolerance values. The objectives of this study were to determine the key environmental variables influencing the diversity and distribution of dragonflies in eastern Texas streams, and further determine if differences in those factors could be observed between urban and nonurban sites. We collected samples separately from benthic habitats and woody snag habitats. Significantly fewer sites were observed to have dragonfly species on snag habitat (mean = 1.25) compared to benthic samples (mean = 14.67) (t -test, $p = 0.001$). The number of dragonfly species collected among non-urban streams (mean = 9.83)

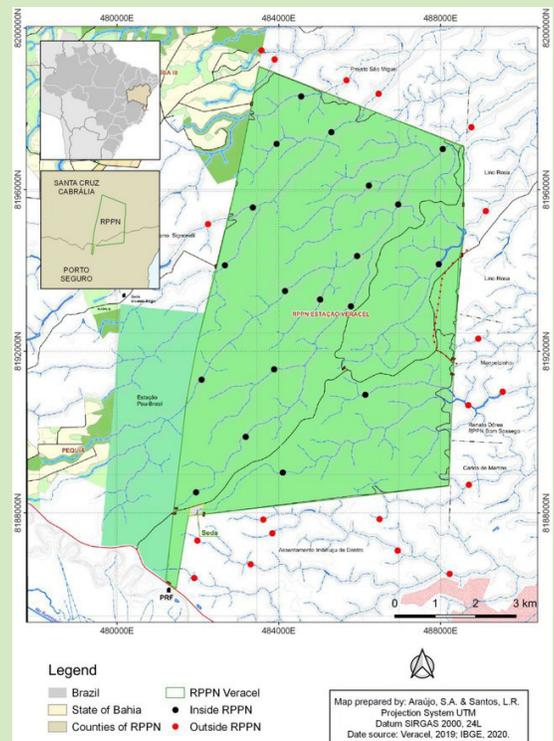
was not significantly different than urban streams (mean = 6.08; t -test, $p = 0.07$). Detrended correspondence analysis of benthic and snag habitat data collected from non-urban and urban locations showed that most of the species are oriented most closely to benthic habitats in non-urban streams. Snag habitat was shown to be poorly ordinated for all of the species. A canonical correspondence analysis of 29 water quality and habitat variables as environmental determinants of dragonfly diversity and distribution showed that distributional relationships among species are complex and often described by multiple environmental factors.

Citation: Bowles DE, Kleinsasser LJ. 2022. Environmental Determinates of Distribution for Dragonfly Nymphs (Odonata: Anisoptera) in Urban and Non-Urban East Texas Streams, USA. *Hydrobiology* 1(1): 76–88. <https://doi.org/10.3390/hydrobiology1010006>

Dragonflies within and outside a protected area: a comparison revealing the role of well-preserved atlantic forests in the preservation of critically endangered, phytotelmatous species

Understanding the interactions between protected areas and the surrounding landscape has become a central issue to conservation of biodiversity. The important role of protected areas in the preservation of biodiversity in tropical hotspots is widely recognized, but the role of the landscape surrounding those hotspots is poorly understood, particularly with regard to insects. In this study, we evaluated the species richness, composition, and beta diversity of Odonata assemblages inside and in the surroundings of a protected area in the Atlantic Forest hotspot. Sampling was carried out in the Private Reserve of Natural Heritage Veracel Station and its surroundings in the southern region of Bahia, Brazil. Forty sites were sampled, 22 within the reserve and 18 in the surrounding areas. We found both a greater total species richness, and a greater richness with regard to the suborder Anisoptera in the surrounding areas. In addition, the species composition differed less between the sampling sites inside the protected area. Some of the species found inside the protected area did, however, make a greater contribution of the individual species to beta diversity (SCDB). Our study suggests that the surroundings of a protected area can contribute to the maintenance of regional diversity of dragonflies, but the protected areas play a vital role in supporting critically endangered species and populations of forest specialists, e.g., phytotelmatous species.

Citation: Ribeiro C, Rodrigues ME, Sahlén G. *et al.* 2022. Dragonflies within and outside a protected area: a comparison revealing the role of well-preserved atlantic forests in the preservation of critically endangered, phytotelmatous species. *Journal of Insect Conservation* (2022). <https://doi.org/10.1007/s10841-022-00385-4>



Map of the RPPN Veracel Station and its surroundings, located in the municipality of Porto Seguro, Bahia, Brazil. Black dots show the sampling sites inside the RPPN, and grey dots show the sampling sites outside the RPPN.

Effects of urbanization on Odonata assemblages in tropical island streams in San Juan, Puerto Rico

Urbanization has considerable impacts on stream ecosystems. Streams in urban settings are affected by multiple stressors such as flow modifications and loss of riparian vegetation. The richness and abundance of aquatic insects, such as odonates, directly reflect these alterations and can be used to assess urban impacts on streams. The effects of urbanization on odonate richness and abundance on tropical islands is as yet poorly understood. The objective of this study is to identify the effects of urbanization on stream habitat quality and associated odonate assemblages in Puerto Rico. We sampled 16 streams along a rural to urban gradient in the San Juan Metropolitan Area, where each stream was characterized using the Stream Visual Assessment Protocol (SVAP) for Puerto Rico and by analyzing their surrounding land cover. A 100-m segment of each stream was surveyed to assess adult odonate richness and abundance during the rainy and dry seasons. Adults were identified visually, and their abundance was recorded. Favorable local scale factors, like improved habitat quality, as measured with the SVAP, resulted in higher abundances of odonates. However, regional factors such as percent urban cover did not appear to significantly affect richness and abundances of odonates. Overall, our study indicates that odonate assemblages are affected by the loss of habitat integrity, and conservation of tropical odonates may benefit from focusing on local scale factors.

Citation: Maldonado-Benítez N, Mariani-Ríos A, Ramírez A. 2022. Effects of urbanization on Odonata assemblages in tropical island streams in San Juan, Puerto Rico. *International Journal of Odonatology* 25: 31–42. <https://doi.org/10.48156/1388.2022.1917163>

The Brazilian Legal Amazon Odonatofauna: a perspective of diversity and knowledge gaps

The Brazilian legal Amazon occupies approximately 61% of its territory, covering a large part of Brazil's biodiversity. This large territorial dimension generates huge gaps in the animal diversity understanding, for example, the poor knowledge regarding the Odonata order. Worldwide, Odonata has almost 6,500 described species, with approximately 1,800 being recorded for the Neotropical region. Data on the Odonata order in the legal Amazon is still scarce, mainly due to its particularities, and little is known about the diversity of dragonflies in some of Brazilian states. Thus, the objective of this study is to present a list of species occurring in the states that make up the Brazilian legal Amazon. The list was made from the analysis of approximately 165 scientific papers, in addition to occurrence records contained in the SiBBR and GBIF databases. 641 species were found, which is equivalent to approximately 69% of the odonatofauna in Brazil. The states with the greatest diversity were Amazonas (n=364), Pará (n=310) and Mato Grosso (n=285). The study also indicated a low level of knowledge of the Odonata order in the states of Tocantins and Maranhão, in addition to the area of the Guianas shields, especially in the Amapá and Roraima states. Carrying out new inventories and building catalogs is essential for understanding the biodiversity in this region, especially in areas with greater need.

Citation: Garcia Junior MDN, Damasceno MT dos S, Vilela DS, Souto RNP. 2022. The Brazilian Legal Amazon Odonatofauna: a perspective of diversity and knowledge gaps. *EntomoBrasilis* 15(Feb. 2022): e977. <https://doi.org/10.12741/ebrasilis.v15.e977>

Using the ecological relationships of Odonata with a habitat integrity index to test the biodiversity ecosystem function framework

34(1) 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(s) for the photo on the right by 20 May 2022 for a chance to win fame and bragging rights!

Email your captions to:
editor@dragonflysocietyamericas.org.

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



Enallagma signatum (Orange Bluet); Duluth, Georgia; 14 May 2020; photograph by John Deitsch.

33(4) Caption Winner

The winning caption:
This is not my idea of amplexus!

Caption submitted by: Laura Beltran



American Rubyspot (*Hetaerina americana*) on a Green Tree Frog (*Hyla cinerea*); Lake Waco Wetlands, Waco, Texas; 10 October 2021; photograph by Linda Taylor.

Odolympics Parting Shots



Ana M. Hernández Vázquez ©

ODOLYMPICS WINNER: Best Dragonfly Photograph: *Erythemis vesiculosa* (Great pondhawk); Área florística manejada Lomas de Galindo, Mayabeque, Cuba; 5 November 2021; photograph by Ana María Hernández Vázquez.



ODOLYMPICS WINNER: Best Damselfly Photograph: *Argia oculata* (Oculate Dancer); photograph taken near Cuchujaqui Bridge outside Alamos, Sonora, Mexico; 14 December 2021; photograph by David F. Smith.

Odolympics Parting Shots



ODOLYMPICS WINNER: Best Ecllosion Photograph: *Progomphus obscurus* (Common Sanddragon); Mill Creek Nature Center, Gwinnett County, Georgia; 24 May 2018; photograph by John Deitsch.



ODOLYMPICS WINNER: Best Underwater Photograph: *Erythemis simplicicollis* (Eastern Pondhawk); Engeldinger Marsh, Iowa; 21 May 2020; photograph by Greg Courtney.

Odolympics Parting Shots



ODOLYMPICS WINNER: Best Group Shot: *Epitheca spinigera* (Spiny Baskettail); Sevenmile Lake, Wisconsin; 24 May 2016; photograph by Greg Courtney.



ODOLYMPICS WINNER: Best Macro Photograph: *Pantala flavescens* (Wandering Glider); Maricopa, Arizona; 14 December 2021; photograph by Pierre Deviche.



ODOLYMPICS WINNER: Best Action Shot: *Hagenius brevistylus* (Dragonhunter); Calvert County, Maryland; 20 July 2021; photograph by Jason Avery.



ODOLYMPICS WINNER: Sharpest In-Flight: *Orthemis discolor* (Carmine Skimmer); Below Presa Tetajiosa outside Alamos, Sonora, Mexico; 16 December 2021; photograph by David F. Smith.

Odolympics Parting Shots



ODOLYMPICS WINNER: Best Non-Ode Photograph: *Ganyra howarthi* (Howarth's White); Pima, Arizona; 19 December 2021; photograph by Pierre Deviche.



ODOLYMPICS WINNER: Best Copulation Photograph: *Calopteryx maculata* (Ebony Jewelwing); Calvert County, Maryland; 17 June 2021; photograph by Jason Avery.

Odolympics Parting Shots



ODOLYMPICS WINNER: Best Oviposition Photograph:
Argia oculata (Oculate Dancer); Tailândia, Pará, Brazil; 2 June 2021;
photograph by Cristian Camilo Mendoza.



ODOLYMPICS WINNER: Best Nymph Photograph:
Rhionaeschna sp. (Blue-eyed darning dragonfly); Nuevo Perú
hamlet, district, province and region of Cajamarca, Peru; October
2021; photograph by Jhonatan Kenyo David Huamán Tucumango.

Odolympics Parting Shots



ODOLYMPICS WINNER: Sharpest in-Flight Pair Photograph: *Sympetrum corruptum* (Variegated Meadowhawk); Maricopa County, Arizona; November 2021; photograph by Jim Burns.



ODOLYMPICS WINNER: Most Exciting Photograph: A Black Phoebe (*Sayornis nigricans*) with an American Rubyspot (*Hetaerina americana*); photograph by Jim Burns.

Odolympics Parting Shots



Oxyallagma sp.; Nuevo Perú hamlet, district, province and region of Cajamarca, Peru; October 2021; photograph by Jhonatan Kenyo David Huamán Tucumango.



Heteragrion sp.; São Gabriel da Cachoeira, Amazonas, Brazil; 30 November 2021; photograph by Cristian Camilo Mendoza.



Dythemis sterilis (Brown Setwing); near Cuchujaqui Bridge outside Alamos, Sonora, Mexico; 14 December 2021; photograph by David F. Smith.

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 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:

Erythemis simplicicollis (Eastern Pondhawk)
Boone River, Iowa
18 July 2021

Photograph by:
Greg Courtney



www.DragonflySocietyAmericas.org

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