THE BOGHAUNTER

Occasional News About the Dragonflies and Damselflies of Vermont

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Two New Dragonflies for Vermont

By Bryan Pfeiffer

The rapid pace of Odonata discovery continues in Vermont with the addition of two species to the state's unofficial checklist this past field season.

On an ideal fall day, I netted Vermont's first ***Aeshna subarctica*** (Subarctic Darner) at an unnamed spruce bog in Essex County. In one sense, the record is little more than a missing puzzle piece in the circumboreal distribution of this handsome insect. But the discovery – along with the state's first ***Libellula cyanea*** (Spangled Skimmer) last summer – suggest that we're continuing to learn more about the ode fauna in this under-surveyed state.

The two new records bring Vermont's odonata list to 92 Anisoptera species and 42 Zygoptera species (give or take a few, depending on your taxonomic view of the world). It also shows, however, that Vermont remains beckoning country for new ode discoveries.

With ***A. subarctica*** recorded in Quebec and Massachusetts, Vermont was overdue. On September 10, in my usual *Aeshna* acquisition mode, I had parked myself at the edge of the bog pond, where I would pick off countless patrolling ***A. canadensis*** (Canada Darner) and ***A. interrupta*** (Variable Darner).

Only when I drifted over to a section of the bog with flooded *Sphagnum sp*. did I encounter several males of ***A. subarctica*** (the microhabitat where Paul-Michael Brunelle, Nick Donnelly, and Blair Nikula advised me to look).

A. subarctica seemed to hover and hang more than the other *Aeshna* species at the bog that day, about a meter or so above the mat, almost *Epitheca*-like, so lazily that I identified by sight the new state record before he landed in my net.

Perhaps the other important note on this discovery is the late date. Donnelly had suggested that waiting

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Blair Nikula

Aeshna subarctica (Subarctic Darner)

VT Hosts DSA Meeting and BioBlitz

By Bryan Pfeiffer

It should be great for Gomphids, magnificent for Macromids, and lovely for Libellulids when odonatists from across the Northeast converge on Vermont in June for a northeast regional gathering of the Dragonfly Society of the Americas and a BioBlitz.

The DSA meeting will run from Thursday to Sunday, June 24-27. Odonatists will convene in Hartford, Vermont, for explorations in the Upper Connecticut River Valley (not far from White River Junction, Vermont, and Hanover, New Hampshire).

Awaiting the adventurous person with a net is a smorgasbord of habitats, including: emergent marshes, small and large ponds, well-oxygenated rivers (including the dramatic Quechee Gorge), a reservoir, and various sunny woodland openings. The setting includes the Connecticut River, the White River, and the Ottauquechee River. New state records are likely.

For details on the DSA meeting consult <www.vinsweb.org/BioBlitz/DSA-NE.html>.

The meeting coincides with a BioBlitz organized by the Vermont Institute of Natural Science. The BioBlitz is a 24-hour race against time to identify every living thing at a site along the Ottauquechee River in Hartford. It is expected to expected to attract biologists from across the Northeast.

Part science, part education, and a lot of fun, BioBlitzes are

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Two New Vermont Dragonflies

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until after Labor Day at our latitude wasn't too late for ***A. subarctica***. To be sure, more sites await discovery for this species. One prime candidate is Molly Bog in Morristown, which also seems to have patches of flooded Sphagnum.

The ***Libellula cyanea*** discovery was a bit more accidental. It came at the end of a butterfly count at North Springfield Lake in Weathersfield (Windsor County) on July 6.

Blair Nikula

Libellula cyanea (Spangled Skimmer)

A group of birders in the area had organized the region's first Fourth of July Butterfly Count. And as the successful day wound to a close, a lone ***Pantala flavescens*** (Wandering Glider) drifted overhead at the north end of the reservoir.

Closer to shore, my attention drifted to odes, which included ***Anax junius*** (Common Green Darner), ***Libellula pulchella*** (Twelve-spotted Skimmer), and other common species, even a ***Leucorrhinia intacta*** (Dot-tailed Whiteface).

Yet as soon as I set eyes on those bi-colored pterostigmas, the butterflyers (not the butterflies) were startled to hear me shout "*Libellula cyanea!*" as the ode dashed away.

But with relocation help from local birder and butterflyer Wally Elton, I was able to net the male for another long-overdue state record.

In his excellent guide, *Dragonflies Through Binoculars*, Sidney Dunkle had suspected this species might fly in southwestern Vermont. His distribution maps shows it. Sure enough, Dunkle was right.

The *A. subarctica* and *L. cyanea* discoveries bring to six the number of new state records for Vermont in the past two years. More are sure to follow.

Williamsonia lintneri (Ringed Boghaunter) would be a rare and hotly pursued candidate. It's one of many good excuses to get out to a bog in May.

Bryan Pfeiffer, founder of the nature touring company Vermont Bird Tours, is editor and publisher of THE BOGHAUNTER

THE BOGHAUNTER is an occasional newsletter about the dragonflies and damselflies of Vermont. It is available for no charge, although contributions to help offset postage and printing are welcome.

CONTRIBUTIONS to **THE BOGHAUNTER** can take two forms: financial and editorial. The newsletter appears two or three times per year. Even a donation of $5 to $10 would help offset printing and postage expenses, which are borne entirely by the editor. Your articles, photos, and ideas are welcome as well. The next issue should appear in May .

THE BOGHAUNTER is on the web in color at: www.vermontbirdtours.com/boghaunter/.

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Editor ..... Bryan Pfeiffer

THE BOGHAUNTER expresses gratitude to Paul-Michael Brunelle and the Maine Department of Inland Fisheries and Wildlife for inspiration and use of the *Williamsonia fletcheri* image the front-page banner, and to Blair Nikula and Glenn Corbiere for the use of their fine images.

DSA Meeting and BioBlitz

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being organized across the country. Entomologists specializing in other taxa will be in abundance in Vermont during the event.

The formal BioBlitz survey period runs from 3 p.m. on June 25 (Friday) to 3 p.m. on June 26 (Saturday). DSA members who join the surveying can also attend the huge grand tally supper following the BioBlitz. The BioBlitz web site is at: www.vinsweb.org/BioBlitz.

The central gathering spot for all DSA members and BioBlitzers will include an indoor location with stereoscopes for any needed identification work.

The BioBlitz site is an extensive river and wetlands complex, a flood-control project of the US Army Corps of Engineers on the Ottauquechee River. The Corps is an eager participant in the BioBlitz and will issue a blanket collecting permit.

Tentative agenda for the DSA meeting:

Thursday, June 24
DSA members convene in Hartford, either at reserved campsites at Queeche State Park or at local motels. (Directions and motel information is on the web site.) Group pizza supper.

Friday, June 25
Collecting trips to various locations at the BioBlitz site. Evening speaker.

Saturday, June 26
Continued collecting at BioBlitz site or short trips to other rivers, ponds and (pending approval) a bog and rich fen. Evening Event: BioBlitz grand tally supper.

Sunday, June 27
Optional field trips.

A web site with information about the DSA gathering is at:

www.vinsweb.org/BioBlitz/DSA-NE.html

The 2003 Season Summary

Vermont somehow managed to elude the rains that soaked much of the Northeast in the spring and summer of 2003. While odonatists elsewhere were lamenting the shortage of good field days, Vermonters were out in the warm sunshine swinging nets.

Because our state remains in the early stages of ode discovery, with relatively few investigators, it's hard to compare one season to the next or to an "average season." (*Editor's Note: This summary relies to a large extent on my own observations, which is a subtle hint and a plea for others to take some field notes and send them along this year.*)

Cold rains in early April may have slowed the arrival of *Anax junius* (Common Green Darner) from points south. Mike Blust found what was most likely *A. junius* on May 4. Two more were hunting at a small pond at Herrick's Cove in Rockingham on May 18. *Basiaeschna janata* (Springtime Darner) was patrolling a woodland dirt road in Bellows Falls on the 18th as well. A few days later, ode activity began to surge. Mike, investigating Coggman Marsh in West Haven (a warm pocket of Vermont) on May 20, reported an emergence of *Ischnura verticalis* (Eastern Forktail), with some *Epitheca spinigera* (Spiny Baskettail) and *Leucorrhinia intacta* (Dot-tailed Whiteface) mixed in. They had joined the *Epitheca canis* (Beaverpond Baskettail) already on the wing.

In The Boghunter's continuing efforts to keep odonatists prepared to face the season, here's a list of odes already flying in Vermont by June 4, 2003: *Amphiagrion saucium* (Eastern Red Damsel), *Chromagrion conditum* (Aurora Dancer), *Coenagrian resolutum* (Taiga Bluet), *Ischnura verticalis* (Eastern Forktail), *Anax junius* (Common Green Darner), *Basiaeschna janata* (Springtime Darner), *Gomphus borealis* (Beaverpond Clubtail), *Lanthus parvulus* (Northern Pygmy Clubtail), *Lanthus vernalis* (Southern Pygmy Clubtail), *Cordulegaster maculata* (Twin-spotted Spiketail), *Didimops transversa* (Stream Cruiser), *Epitheca canis* (Beaverpond Baskettail), *Epitheca spinigera* (Spiny Baskettail), *Williamsonia fletcheri* (Ebony Boghaunter), *Ladona julia* (Chalk-fronted Corporal), *Libellula quadimaculata* (Four-spotted Skimmer), *Leucorrhinia hudsonica* (Hudsonian Whiteface), *Leucorrhinia intacta* (Dot-tailed Whiteface).

Blair Nikula

Gomphus vastus (Cobra Clubtail)

Two notable reports came from Massachusetts odonatist Lynn Harper. Her investigations along the shore of the Connecticut River below the Vernon Dam on June 25 included four exuviae of *Gomphus vastus* (Cobra Clubtail) and two of *Neurocordulia yamaskanensis* (Stygian Shadowdragon). We'll be sure to look for exuviae and adults during the DSA meeting at the end of June (*see page one of this issue*).

Summer odes arrived (at least in Georgia, Vermont) when Bryan Pfeiffer netted a nearly mature male *Aeshna tuberculifera* (Black-tipped Darner) on July 3 (during some sweltering hot weather) along with a teneral female *Sympetrum* species, looking a lot like *S. janeae* (Jane's Meadowhawk). A few days later, on July 6, at the end of a Fourth of July Butterfly Count in Windsor County, Bryan netted Vermont's first *Libellula cyanea* (Spangled Skimmer) at North Springfield Lake (*see page one*). Also flying at the reservoir that day was what was almost certainly a high-drifting *Pantala flavescens* (Wandering Glider).

Mike Blust and Bryan Pfeiffer spent some quality time in the good company of the elusive and handsome *Macromia illinoiensis* (Illinois River Cruiser) along the Hubbardton River and the Poultney River in Rutland County on July 8.

Pantala reports continued to trickle in during the summer months, owning mostly to more and more Vermonters looking for odes. Chip Darmstadt noticed the species in Montpelier, Sharon Riley netted a male at Dead Creek Wildlife Management Area in Addison on September 3, and Bryan caught a female at Vermont Institute of Natural Science's new site in Quechee, Vermont, on September 6 (He released it during his keynote remarks to the VINS annual meeting at the site.)

September turned to be a nice month for fall odes. *Hetaerina americana* (American Rubyspot) was flying on September 3 along Lewis Creek in Ferrisburgh, a welcome sight since this stretch of creek had been treated the previous year with a chemical to kill sea lamprey. Mike Blust, spending some time on the lower Poultney River in Rutland County on September 8, managed to net *Stylurus spiniceps* (Arrow clubtail) for a new Rutland County record. On September 10, Bryan netted Vermont's first *Aeshna subarctica* (Subarctic Darner) at an unnamed Bog in Lewis, Vermont (*see page one*). And on September 16, in downtown Montpelier, at the corner of State and Elm, Bryan noticed an old female *Dromogomphus spinosus* (Black-shouldered Spinyleg) sitting on the pavement (and about to become road kill). Bryan picked up and hand-delivered the ode to the North Branch of the Winooski River nearby. She flew off under her own power.

Once again, this report is by no means a comprehensive account of the 2003 field season. The Boghaunter looks forward to reports from more observers in 2004.

BOOK REVIEW

A New Gift for Vermont Odonatists

A Field Guide to the Dragonflies and Damselflies of Massachusetts
By Blair Nikula, Jennifer L. Loose, and Matthew R. Burne
Published by the Massachusetts Natural Heritage and Endangered Species Program
196 pages; 300 photographs; essential Illustrations
$20 postage paid

By Bryan Pfeiffer

Rarely casual is the pursuit of Odonata. Unlike birds, for example, dragonflies and damselflies seem to demand more of our attention to small details.

To be sure, it's fine to call that neon gem floating by the pond edge nothing more than a Bluet. And who among us hasn't left some Meadowhawks identified no further than *Sympetrum species*?

Yet Odonatists seem to dwell in a house of detail — the curve of a hamule, the spine on a cercus, the veins of a wing. They're the clues and tools to discovery, to knowing a dragonfly's identity. And, for many of us, discovery (which precedes understanding and, we hope, action and conservation) is what makes this insect order so compelling.

Fine presentation and the essential details are the shining strengths of *A Field Guide to Dragonflies and Damselflies of Massachusetts*. This amazing guide is a Vermont odonatist's dream come true, for beginners and experts alike.

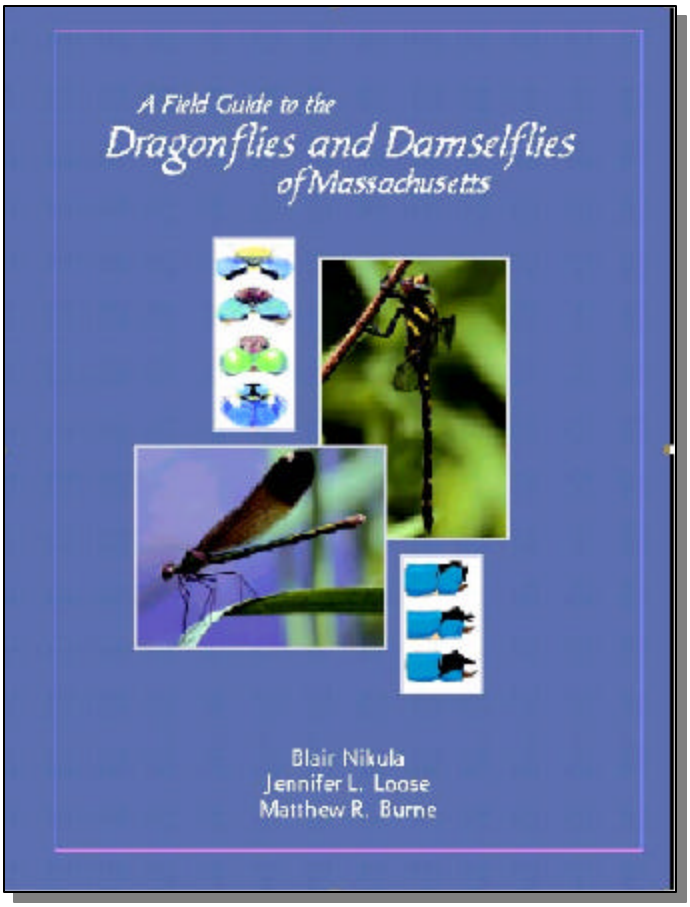
Spiral bound, with near-waterproof glossy paper, it is a field guide in the truest sense of the term. But spend a bit of time on the sofa with the text of this book. The opening pages offer a concise introduction to the taxonomy, life history, study and conservation of Odonata. One-page summaries of each family offer valuable details for the advancing odonatist.

Each species account covers the essentials on the ode's morphology, with photographs (including most females) and a text description of the key field marks. The "Range/Status" entry for each species covers its North American range (no maps) as well as the range in Massachusetts. There's a "Habitat" description as well. And the valuable "Notes" entry offers tips on everything from a species' hunting and patrolling behaviors to the female's ovipositing habits.

But beyond the fine species accounts are the details we crave. They're on display in close-up drawings of some of the classics in Odonata identification solutions:

- Terminal appendages on *Lestes* species and Coenagrionidae species.
- Thoracic stripes on *Aeshna* species.
- Terminal appendages on key Gomphid species, as well as *Somatochlora* species.

They're drawn large enough for easy use in the field (after looking at the appropriate appendage through a hand lens).



At the risk of violating copyright laws, here's an idea: Make color photocopies of these drawings, plastic-coat them at your local office or print shop, and tote these nifty ID cards along with you in the field.

That's not to say that this guide won't be welcome in your field bag. Indeed, wherever I go from spring through fall, *A Field Guide to Dragonflies and Damselflies of Massachusetts* will go with me. The only weakness, not a significant one, is that the production of this guide did not do justice to Blair Nikula's color photographs. (Of course, The Boghaunter is no better.)

This is, of course, a field guide to 166 species found in Massachusetts. A review of the unofficial Vermont species list finds the following recorded here but not in the Massachusetts guide (thanks to Mike Blust for figuring these out):

- *Archilestes grandis* (Great Spreadwing)
- *Chromagrion interrogatum* (Subarctic Bluet)
- *Enallagma antennatum* (Rainbow Bluet)
- *Enallagma vernale* (Springtime Bluet)*
- *Aeshna sitchensis* (Zig-zag Darner)
- *Somatochlora albicincta* (Ringed Emerald)
- *Somatochlora franklini* (Delicate Emerald)
- *Sympetrum danae* (Black Meadowhawk)

Of course, this fine guide also includes a number of species not found in Vermont — at least not yet. So get your copy and start looking. To order send a check for $20, written to: Massachusetts Heritage and Endangered Species Program, 1 Rabbit Hill Road, Westborough, MA 01581.

* Taxonomic status uncertain. Mentioned under *E. cyathigerum* (*E. c. vernalis*).

The Stylurus Saga Continues

By Chip Darmstadt

Last year I reported on my observations of *Stylurus scudderi* (Zebra Clubtail) at the outdoor municipal pool in Montpelier, Vermont. This appears to be unusual behavior for this species and, without a specimen to back me up, my observation was subject to some question (to put it mildly). So this past summer I resolved to make a public spectacle of myself at the pool by bringing a net and trying to catch a voucher specimen.

My initial visit to the pool (with Bryan Pfeiffer) turned up nothing. But we somehow managed to convince the pool director, lifeguards, and staff of the importance of our mission. We may have even provided some relief from the day-to-day routine at the pool. Sure enough, a few days later, on June 7, 2003, a lifeguard at the pool called me at work to report some poolside dragonfly activity. Staff there had even managed to catch a dragonfly, but it escaped. I grabbed my net (not my swimming trunks) and dashed to the pool.

Mercifully the pool wasn't overly crowded when I arrived. And, in a matter of minutes, I caught a male *S. scudderi*. The individual was patrolling and hovering in the shallow end and proved easy to catch. The pool is less than 50 meters from the North Branch of the Winooski River.

Glenn Corbiere

Stylurus scudderi (Zebra Clubtail)

While I was able to conclusively prove that *S. scudderi* does indeed frequent the pool, I was not able to document the presence of any females, much less ovipositing behavior. However, about a week later my wife witnessed an ovipositing clubtail at the pool, although she wasn't absolutely certain the dragonfly was *S. scudderi*. So stay tuned. I'm hopeful that by next summer we can put the rest the *Sylurus* saga.

Chip Darmstadt, a skilled naturalist, is director of the Vermont Institute of Natural Science's North Branch Nature Center in Montpelier, Vermont. <www.vinsweb.org>

New England Odonate Conference

Massachusetts, that hotbed of dragonfly activity, will host a regional conference on Odonata in April.

The New England Odonate Conference will be Saturday, April 17, in Athol, Mass., possibly continuing informally into Sunday.

This will be an ideal opportunity for odonatists of varying interests and experience to learn and share information about activities in various New England states.

The conference will be at the Millers River Environmental Center, 100 Main Street, Athol, Mass. Details are available <at www.millersriver.net>.

Vermont will have a "delegation" to the conference. Bryan Pfeiffer (bryan@vermontbirdtours.com) and Mike Blust (blustm@greenmtn.edu) plan to attend. We'll probably be among the conference presenters.

The conference is sponsored by the Athol Bird and Nature Club and the Massachusetts Natural Heritage and Endangered Species Program.

"The number of people looking for odonates has increased exponentially in recent years and it seems time we get together and compared notes," the noted odonatist Blair Nikula reported in his latest issue of *Ode News*. "The hope is to gather as many active odonate folks as possible to discuss not only what we've learned over the past decade or so, but, perhaps more importantly, what we still don't know and are most in need of learning."

Vermont odonatists would be wise to watch the Millers River web site. The nature center and the Athol Bird and Nature Club host a number of field trips.

Meanwhile, the Humboldt Field Research Institute along the cost of Maine will offer *Dragonflies and Damselflies: Systematics and Biomonitoring* with Frederick H. SaintOurs from May 30 – June 5. Consult <www.eaglehill.us>.

The Almost-Official Vermont Checklist

We almost have an official ode species list for Vermont. The data-compilation efforts of Nick Donnelly and Paul-Michael Brunelle, relying on contributions of many, have helped to bring into focus a picture of the state's ode fauna.

Last fall Donnelly circulated his latest collection of county-level ode records from Vermont. Many of us did our best to complete his picture. The results are below. They represent merely a species list, rather than the extensive county-level data Brunelle presented in a previous issue of The Boghaunter (*Vol. 2, No. 1)*.

To be sure, the 132 species listed below hardly represent the final word on this matter. An abundance of knowledge (and county-level records) resides in the brain and careful field notes of Vermont ode luminary Don Miller, for example. Plus, records from odonatists who have visited Vermont from time to time are still surfacing.

But, at least for now, we have a list. We can expect to hear protests and perhaps some challenges to what's below. Bring it on! We'll make this thing "official" that much sooner.

- Bryan Pfeiffer

ZYGOPTERA (DAMSELFLIES)

Calopterigidae (Jewelwings)

Calopteryx aequabilis	River Jewelwing
Calopteryx amata	Superb Jewelwing
Calopteryx maculata	Ebony Jewelwing
Hetaerina americana	American Rubyspot
Archilestes grandis	Great Spreadwing

Lestidae (Spread-winged Damselflies)

Lestes congener	Spotted Spreadwing
Lestes disjunctus	Common Spreadwing
Lestes dryas	Emerald Spreadwing
Lestes eurinus	Amber-winged Spreadwing
Lestes forcipatus	Sweetflag Spreadwing
Lestes inaequalis	Elegant Spreadwing
Lestes rectangularis	Slender Spreadwing
Lestes unguiculatus	Lyre-tipped Spreadwing
Lestes vigilax	Swamp Spreadwing

Coenagrionidaie (Pond Damsels)

Amphiagrion saucium	Eastern Red Damsel
Argia apicalis	Blue-fronted Dancer
Argia fumipennis	Variable Dancer
Argia moesta	Powdered Dancer
Chromagrion conditum	Aurora Damsel
Coenagrion interrogatum	Subarctic Bluet
Coenagrion resolutum	Taiga Bluet
Enallagma antennatum	Rainbow Bluet
Enallagma aspersum	Azure Bluet
Enallagma boreale	Boreal Bluet
Enallagma carunculatum	Tule Bluet
Enallagma civile	Familiar Bluet
Enallagma cyathigerum	Northern Bluet
Enallagma ebrium	Marsh Bluet
Enallagma exsulans	Stream Bluet
Enallagma geminatum	Skimming Bluet
Enallagma hageni	Hagen's Bluet
Enallagma signatum	Orange Bluet
Enallagma traviatum	Slender Bluet
Enallagma vesperum	Vesper Bluet
Enallagma vernale	
Ischnura hastata	Citrine Forktail
Ischnura kellicotti	Lilypad Forktail
Ischnura posita	Fragile Forktail
Ischnura verticalis	Eastern Forktail
Nehalennia gracilis	Sphagnum Sprite
Nehalennia irene	Sedge Sprite

ANISOPTERA (DRAGONFLIES)

Petaluridae (Petaltails)

Tachopteryx thoreyi	Gray Petaltail

Aeshnidae (Darners)

Aeshna canadensis	Canada Darner
Aeshna clepsydra	Mottled Darner
Aeshna constricta	Lance-tipped Darner
Aeshna eremita	Lake Darner
Aeshna interrupta	Variable Darner
Aeshna sitchensis	Zigzag Darner
Aeshna subarctica	Subarctic Darner
Aeshna tuberculifera	Black-tipped Darner
Aeshna umbrosa	Shadow Darner
Aeshna verticalis	Green-striped Darner
Anax junius	Common Green Darner
Basiaeschna janata	Springtime Darner
Boyeria grafiana	Ocellated Darner
Boyeria vinosa	Fawn Darner
Gomphaeschna furcillata	Harlequin Darner

Gomphidae (Clubtails)

Arigomphus furcifer	Lilypad Clubtail
Arigomphus villosipes	Unicorn Clubtail
Dromogomphus spinosus	Black-shouldered Spinyleg
Gomphus ventricosus	Skillet Clubtail
Gomphus borealis	Beaverpond Clubtail
Gomphus descriptus	Harpoon Clubtail
Gomphus exilis	Lancet Clubtail
Gomphus lividus	Ashy Clubtail
Gomphus quadricolor	Rapids Clubtail
Gomphus spicatus	Dusky Clubtail
Gomphus adelphus	Moustached Clubtail
Hagenius brevistylus	Dragonhunter
Lanthus parvulus	Northern Pygmy Clubtail
Lanthus vernalis	Southern Pygmy Clubtail
Ophiogomphus aspersus	Brook Snaketail
Ophiogomphus carolus	Riffle Snaketail
Ophiogomphus mainensis	Maine Snaketail
Ophiogomphus rupinsulensis	Rusty Snaketail
Stylogomphus albistylus	Least Clubtail
Stylurus scudderi	Zebra Clubtail
Stylurus spiniceps	Arrow Clubtail

Cordulegastridae (Spiketails)

Cordulegaster diastatops	Delta-spotted Spiketail
Cordulegaster maculata	Twin-spotted Spiketail

Macromiidae (Cruisers)

Didymops transversa	Stream Cruiser
Macromia illinoiensis	Illinois River Cruiser

Cordulidae (Emeralds)

Cordulia shurtleffii	American Emerald
Dorocordulia lepida	Petite Emerald
Dorocordulia libera	Racket-tailed Emerald
Epitheca princeps	Prince Baskettail
Epitheca canis	Beaverpond Baskettail
Epitheca cynosura	Common Baskettail
Epitheca spinigera	Spiny Baskettail
Helocordulia uhleri	Uhler's Sundragon
Neurocordulia yamaskanensis	Stygian Shadowdragon
Somatochlora albicincta	Ringed Emerald
Somatochlora cingulata	Lake Emerald
Somatochlora elongata	Ski-tailed Emerald
Somatochlora forcipata	Forcipate Emerald
Somatochlora franklini	Delicate Emerald
Somatochlora kennedyi	Kennedy's Emerald
Somatochlora minor	Ocellated Emerald
Somatochlora tenebrosa	Clamp-tipped Emerald
Somatochlora walshii	Brush-tipped Emerald
Somatochlora williamsoni	Williamson's Emerald
Williamsonia fletcheri	Ebony Boghaunter

Libellulidae (Skimmers)

Celithemis elisa	Calico Pennant
Celithemis eponina	Halloween Pennant
Erythemis simplicicollis	Eastern Pondhawk
Ladona (Libellula) exusta	White Corporal
Ladona (Libellula) julia	Chalk-fronted Corporal
Leucorrhinia frigida	Frosted Whiteface
Leucorrhinia glacialis	Crimson-ringed Whiteface
Leucorrhinia hudsonica	Hudsonian Whiteface
Leucorrhinia intacta	Dot-tailed Whiteface
Leucorrhinia proxima	Red-waisted Whiteface
Libellula cyanea	Spangled Skimmer
Libellula incesta	Slaty Skimmer
Libellula luctuosa	Widow Skimmer
Libellula pulchella	Twelve-spotted Skimmer
Libellula quadrimaculata	Four-spotted Skimmer
Libellula semifasciata	Painted Skimmer
Nannothemis bella	Elfin Skimmer
Pachydiplax longipennis	Blue Dasher
Pantala flavescens	Wandering Glider
Pantala hymenaea	Spot-winged Glider
Perithemis tenera	Eastern Amberwing
Plathemis (Libellula) lydia	Common Whitetail
Sympetrum costiferum	Saffron-winged Meadowhawk
Sympetrum danae	Black Meadowhawk
Sympetrum internum	Cherry-faced Meadowhawk
Sympetrum janeae	Jane's Meadowhawk
Sympetrum obtrusum	White-faced Meadowhawk
Sympetrum rubicundulum	Ruby Meadowhawk
Sympetrum semicinctum	Band-winged Meadowhawk
Sympetrum vicinum	Yellow-legged Meadowhawk
Tramea lacerata	Black Saddlebags

It's a Guy Thing

Sperm Competition in Odonata

Editor's Note: *With Valentine's Day approaching, The Boghaunter couldn't resist a fine report on sperm competition in Odonata. Writing in* The Zoological Society of London, *authors A. Cordoba-Aguilar, E. Uhia, and A. Cordero Rivera, offer a guide to everything you've always wanted to know about dragonfly sex (but were afraid to read). It's racy … and fascinating. We've reprinted the abstract below. But do read the entire paper.*

Glenn Corbiere

Sympetrum sp. (Meadowhawk Species) **en copula**

Abstract

Odonates (dragonflies) are well known for the ability of the males to displace sperm stored in the female's sperm-storage organs during copulation. By this means, copulating males are able to increase their fertilization success. This ability has been used as an example to illustrate a conflict of interests between the sexes in which males have evolved sperm-displacement mechanisms whilst females have presumably evolved means to avoid sperm displacement.

The present review has four aims: (1) to describe the copulatory mechanisms used during sperm displacement; (2) to analyse the causes of sperm usage patterns; (3) to discuss this information using current hypotheses on conflict between the sexes; and (4) to illuminate topics for further research.

Four copulatory mechanisms are described: sperm removal (physical withdrawal of stored sperm), sperm repositioning ('pushing' of rival sperm to sites where its use will be least likely), female sensory stimulation to induce sperm ejection, and sperm flushing (displacement of sperm using the copulating male's sperm). Sperm-precedence studies in Odonata are scarce and their values vary considerably between species. In those species in which sperm displacement is incomplete, the last copulating male obtains a high but variable short-term fertilization success which decreases with time.

Some male and female factors affecting sperm precedence patterns are mentioned: (1) male variation in genital morphology; (2) duration of copulation influenced by the male (the longer the copulation, the more stored sperm displaced); (3) adaptations of the sperm-storage organs that allow the female to manipulate the sperm she has received (i.e. avoiding sperm displacement, re-distributing sperm masses, favouring sperm located in certain sites and ejecting sperm after copulation).

We suggest that male and female odonates have co-evolved at the level of genital function with the control of stored sperm as the focus of the conflict. The benefits for males in this co-evolution lie in maximizing their fertilization success. However, it is not clear what females obtain from storing sperm and making it unreachable during sperm displacement.

Two hypothetical benefits that females may obtain for which some evidence has been gathered are genetic diversity and viability genes. It is finally suggested that odonates can become excellent subjects of study for testing current ideas related to sexual conflict and speciation processes through sexual selection.

Citation

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