



AGRION

NEWSLETTER OF THE WORLDWIDE DRAGONFLY ASSOCIATION

PATRON: Professor Edward O. Wilson FRS, FRSE

Volume 23, Number 2

July 2019

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ISSN 1476-2552



蝴蝶裂唇蜓 交尾 | 宋睿斌 摄

Chlorogomphus (Aurorachlorus) papilio, mating pair | Photo by Ruibin Song

AGRION

NEWSLETTER OF THE WORLDWIDE DRAGONFLY ASSOCIATION

AGRION is the Worldwide Dragonfly Association's (WDA's) newsletter, published twice a year, in January and July. The WDA aims to advance public education and awareness by the promotion of the study and conservation of dragonflies (Odonata) and their natural habitats in all parts of the world. AGRION covers all aspects of WDA's activities; it communicates facts and knowledge related to the study and conservation of dragonflies and is a forum for news and information exchange for members. AGRION is freely available for downloading from the WDA website at [<https://worlddragonfly.org/publications/>]. WDA is a Registered Charity (Not-for-Profit Organization), Charity No. 1066039/0.

A 'pdf' of the WDA's Constitution and bylaws can be found at its website link at [<https://worlddragonfly.org/wda/>]



Editor's notes

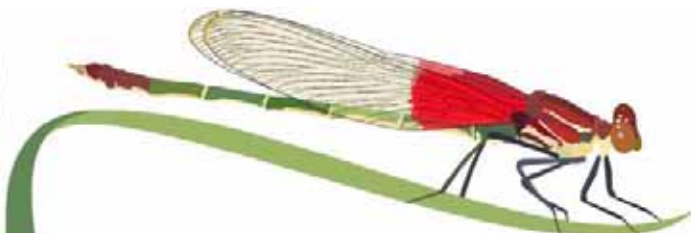
Keith Wilson [kdpwilson@gmail.com]

WDA Membership

There are several kinds of WDA membership available either with or without the WDA's journal (*The International Journal of Odonatology*). You can sign up for a membership using the WDA's website [<http://worlddragonfly.org/join/>] or by contacting the WDA secretary directly [wda.secretary@gmail.com]. Sponsored memberships are also available for those who cannot afford the cost due to currency restrictions or other reasons.

Conference & Meeting News

ICO 2019
AUSTIN ★ TEXAS ★ USA



ICO2019, 14-19th July 2019, Austin, Texas

The 2019 International Congress of Odonatology will be held in Austin, Texas in the southern US. Austin is a great destination for dragonflies and damselflies with 116 species known from the Austin area and 245 species in Texas! The Sunday night ice breaker and all the meetings will take place in downtown Austin on Lady Bird Lake at the 2nd floor of the Palmer Event Center. On Wednesday night, our Congress Dinner will take place within walking distance from the Palmer Event Center, on boats touring Lady Bird Lake where we'll watch the famous Mexican free-tailed bats emerge from the Congress Street Bridge, the largest urban bat colony in the world.

To make cost more flexible, the mid-conference trip will now be an optional Friday local field trip. We will take you to some of the hotspots for dragonflies in the Austin area.

For the post-congress trip, we'll travel to the Rio Grande Valley in south Texas to see some of the Neotropical fauna that just makes it into the United States. Click here for more info.

We are hoping to see all of you in Austin, Texas July 14-19th for ICO 2019!

For more details see the ICO 2019 web site [[Link](#)] or contact John Abbott [jabbott1@ua.edu].

Cover: Photo from page 496, Volume 1, *Dragonflies and Damselflies of China* by Haomiao Zhang. Published January 2019. The photo depicts a wonderful capture of a mating pair of the chlorogomphid *Chlorogomphus (Aurorachlorus) papilio* Ris, 1927; surely one of China's most charismatic dragonflies. Photo credit Ruibin Song. Further details of the new two-volume set of books and their availability are provided on pages 47-49.

DSA Annual Meeting

The Dragonfly Society of the Americas Annual Meeting will be held in Austin, Texas from July 12-14. More information can be found at the DSA 2019 Meeting website [\[Link\]](#).

European Congress on Odonatology (ECOO) 2020

The 6th European Congress on damselflies and dragonflies, ECOO 2020, will be held in Slovenia from 29 June to 2 July, with a post congress field trip. Visit the ECOO 2020 website for more information [\[Link\]](#).

International Journal of Odonatology

Issue one of the 2019 volume of the WDA's International Journal of Odonatology, IJO 22(1), was published 18 March 2019 and has now been mailed out to subscribers. The digital version is now available online at the Taylor & Francis website [\[Link\]](#).



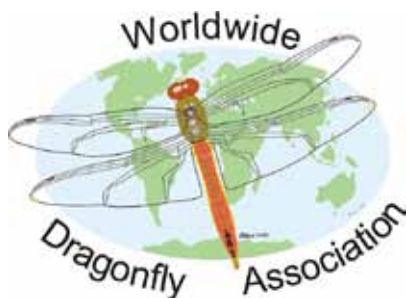
Next issue of *AGRION*

For the next issue of *AGRION*, to be published at the beginning of January 2020, please send your contributions to Keith Wilson [kdpwilson@gmail.com] or Graham Reels [gtreels@gmail.com]. All articles, information and news items related to dragonflies or of interest to WDA members are most welcome and will be considered for publication. Please send all text and figure captions in a Word file by email. Please do not include artwork with the text but provide a separate file or files, ideally in a compressed format (e.g. 'tiff', 'jpeg' or 'gif'). Do not make up plates of multiple photos but send original photo images as separate files.

If you have an odonate photo illustrating any rarely observed aspect of dragonfly biology, or an unusual species, or simply a stunning dragonfly shot, please submit it for consideration for publication on the front cover of *AGBION*.

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WDA Biennial Report 2017-2019

Report of the President

My presidentship started and somehow remains turbulent. My first function when entering the WDA board was being President elect. This meant to me looking forward to enjoy two years of apprenticeship to be prepared for the great task of finally becoming President of WDA. This lazy period unfortunately lasted only from June to October 2017, when Nancy van der Poorten stepped back as WDA President, and was therefore much shorter than anticipated. Likewise, the rest of the 2017-2019 period remained somewhat unsettled. Adolfo Cordero who agreed to step in for me as President elect, had to step down after about one year due to health issues. Also, at our partners at Taylor & Francis (T&F), several changes happened. Ali Paskins stepped down as Managing Editor and was replaced by Hennie Thompson. In June of this year, Hennie stepped down and the new Managing Editor will now be Ellen Goodman (see the Editors report). All these fluctuations have surely not helped our society to stabilize.

So, let me write about the society. The status of WDA is surely not as good it should be. The major symptom is that WDA has lost many members. In the first years of its existence our society had about 400 members, currently we are less than 200 (see the Secretary's report). Surely the odonatological community is much larger looking at regional societies such as the British Dragonfly Society, the Japanese Society for Odonatology, or the Gesellschaft Deutschsprachiger Odonatologen (the German speaking odonatological society, mainly of Austria, Germany and Switzerland), which all have noticeably more members than WDA. How can we activate the membership potential and encourage more people to join our odonatological family? Already during the ICO2017 in Cambridge the board discussed two major subjects in this respect. One has to do with the international odonatological journals; I will write about this below. The other subject was that we felt that WDA members are not satisfied with membership administration service T&F is providing. Major issues were that payment was complicated and not always successful, some people did not receive the journal despite of paying, for members from certain countries payment was extra costly due to money transfer problems, etc. The board therefore discussed and decided to takeover membership admin from T&F a.s.a.p. It was my decision to stop the process of taking over membership administration at least during the period 2017-2019. This was not because I think we are unable to do this - it was simply because I felt we were not sufficiently prepared to do so. Moreover, after some phone calls, I had the feeling that some of the issues were being solved in the meantime by T&F, often with the help of our secretary, Jessica Ware.

There will be a workshop during ICO2019 where we will discuss the future of WDA and IJO and I hope that many persons will attend and contribute to our discussion process. As pointed out by our Journal Editor John Abbott *IJO* is continuing to suffer from too few submissions as well as from too few subscribers (i.e. WDA members). I follow John in his analysis that one of the problems is that we are too small a scientific community for maintaining two international journals (*IJO* and *Odonatologica*, even three counting *Notulae odonatologicae*). Most odonatologists may agree that it is not a comfortable situation subscribing to – and paying for – two international odonatological journals. I know that many persons already decided to subscribe either to *IJO* or *Odonatologica* and abandon the other, even if they may regret not receiving relevant information published in one of them. This is probably not only due to costs but also perceived differences in philosophies between the journals. From my perspective, one of the major issues for odonatology is therefore to somehow find arrangements reducing the numbers of international journals in our field or find another way of limiting the costs. Already during the ICO2017 in Cambridge we were intensively, and sometimes maybe a bit too emotionally, discussing whether there is the possibility of a merger of the journals. I was later again discussing the issue with Florian Weihrauch, the Editor and Publisher of *Odonatologica*. It seems that in the near future a merger seems not feasible. The good message may be that Florian and I agreed staying in touch, which means a merger is not fully off the table for the future.

My privilege is also to report some good news. Javier Muzon, our Conference Coordinator, was extremely successful in persuading people being the hosts of future International Congresses of Odonatology. In his report he announces the venue for the next five ICOs, i.e. from 2021 to 2027. ICO2017 will be held on Cyprus and I look very much forward to this event, as I look forward to the ICO2019 in Austin!

Another privilege is to welcome the new board members and thank all board members who served 2017-2019. I would like specifically to acknowledge some persons: Jessica Ware who will become our next President of WDA and like me has not have served as President elect. However, Jessica has gained much experinece of WDA matters by serving for many years as our Secretary. Thank you so much! Peter Brown has agreed to take on two positions, Secretary and Treasurer. Maybe I need already now to apologize to him for causing this double function. But, actually I really hope that this merger will simplify some of the work that was shared so far between Secretary and Treasurer. Will Kuhn substantially improved our website (worlddragonfly.org) and is constantly working on making us fit for the modern media world.

Welcoming to the Board:

President: Jessica Ware (Nominated by Frank Suhling, seconded by Ola Fincke)

President Elect: Yoshi Tsubaki (Nominated by Ola Fincke, seconded by Mamuro Watanabe and Göran Sahlén).

Secretary and Treasurer: Peter Brown (Nominated by Jessica Ware, seconded by Frank Suhling).

Managing Editor: John Abbott.

Webmaster: Will Kuhn, with assistance as needed from Rhainer Guillermo.

Symposium Coordinator: Javier Muzón.

Chair Conservation & Funding: Göran Sahlén.

Editor Agrion Newsletter: Keith Wilson, with assistance from Graham Reels.

Trustee: Mamoru Watanabe.

Trustee: Christopher Beatty (nominated by Frank Suhling, seconded by Jessica Ware).

Frank Suhling

President

Report of the President Elect

I am honoured to have the opportunity to serve the WDA over the next two years! I will be focusing my efforts on three areas (a) increasing and sustaining membership, (b) working with the board to finalize our Taylor and Francis pipeline, in order to decrease errors and increase value for members, and (c) increase visibility of the society, to advocate for dragonfly conservation, and research. As past president-elects have written in these reports, I am cautiously optimistic that the next two years will give opportunity to promote the good work of our society and its members, worldwide.

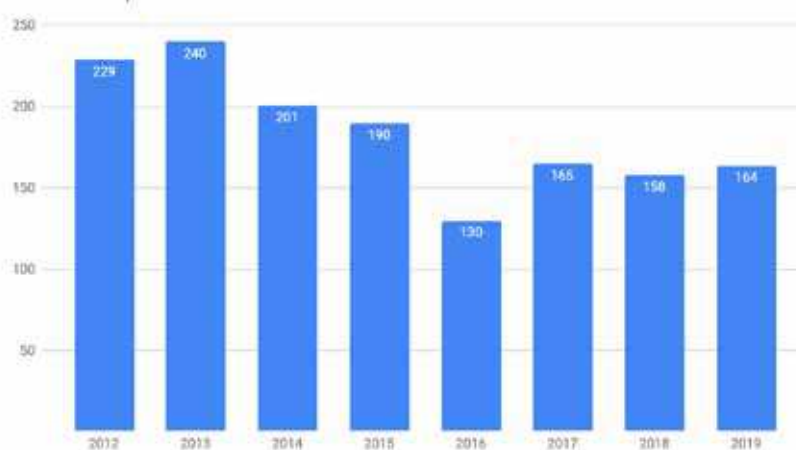
Jessica L. Ware

President Elect

Report of the Secretary

Over the last two years, the board has worked with Taylor and Francis (T&F) to resolve issues with membership renewals and recruitment, but we have struggled with staff turnover at Taylor and Francis, and I wouldn't say that things have yet been resolved: much more should be and could be done to retain members, and streamline the information and financial pipeline to/from T&F. As secretary, I have worked with the president and managing editor of *IJO* to try and create a more efficient pipeline for new members, but we struggle still with being able to grow the society and maintain memberships; there were issues of T&F sending duplicate payment requests, or not sending member renewal forms at all, and these things frustrated members greatly. Issues with the transition to T&F may have contributed to our decline in membership. We currently have 164 members who take the *IJO* subscription and 20 members who do not take the journal; membership has decreased since the contract with T&F but thanks to the efforts of WDA presidents over the last several years, we are perhaps starting to see it stabilize (see figure). If you haven't renewed your membership, please reach out to wda.secretary@gmail.com, and we can make sure you are

Membership numbers



renewed!

As secretary, I have been mostly involved with handling our correspondence; we get an average of 3 to 4 emails per month from the public and members: as in the last report, this past two-year period included mostly requests for research funding, inquiries about membership issues.

See you in Austin!

Jessica L. Ware
Secretary

Report of the Editor in Chief

Since the last report, in 2017, part of Vol. 20 (issues 2-4, 156 pp.), Vol. 21 (259 pp.) and part of Vol. 22 (issue 1 with 94 pp. and 4 additional articles not yet printed) of the *International Journal of Odonatology* were published. I am pleased to report that the impact factor for the journal has increased since the last biennial report: 0.647 (2016), 0.600 (2017), and 0.846 (2018). The 5 Year Impact Factor is 0.761. The journal has also moved up in the rankings in the Entomology JCR category from 75/96 to 65/98. I am pleased with this trend in impact factor and believe it remains respectable given the size of the odonate community and the Worldwide Dragonfly Association.

There have been no changes to the Editorial Board since the last report. I can't thank this tremendously capable group of individuals enough for their work and assistance producing *IJO*. It has been a pleasure to work with each and every one of them. They quite literally make my job possible!

There have been some changes at Taylor and Francis (T&F). Since the last report, Ali Paskins stepped down as Managing Editor and was replaced by Hennie Thompson. In June of this year, Hennie stepped down and the new Managing Editor will now be Ellen Goodman. Ellen has worked at T&F for a number of years and I think the transition will be smooth. There continues, however, to be some significant issues with respect to membership renewal and access to the journal, which no doubt continues to contribute to the overall decrease in WDA membership. The WDA Board Members continue to have discussions with T&F about these issues.

IJO continues to suffer from a lack of submissions. As a result, I had to combine the last two issues of volume 20 and 21. As stated in the last report, I believe there are a number of reasons for the low number of submissions including *IJO* being a small niche journal, there are two international journals competing in this niche space, and the proliferation of online journals providing more and more options for authors. Printed publication continues to suffer with printed issues taking considerable time to get out and make their way to the membership's hands. Early online publication however helps ameliorate this issue.

Finding knowledgeable and willing reviewers and getting those reviews in promptly has certainly contributed to delays in printed issues getting published. I appreciate all those who have contributed their expertise as a reviewer and especially those that have been successful in getting their review completed promptly.

Despite the low number of submissions, the quality has generally remained high. I am working with Richard Rowe to produce a special issue on flight that resulted from a Plenary Session at ICO 2017 in Cambridge, GB.

John C. Abbott
Managing Editor, *IJO*

Report from the Newsletter editors

Keith Wilson and Graham Reels served as *Agrion's* editors for the period 2017-2019 and have now served as editors for more than 10 years since their appointment in 2007.

As has been the trend for the past several years most articles published in *Agrion* were mainly faunistic in nature, information on new odonate books, book reviews, obituaries or reports from attendees at Odonata-related conferences and regional meetings. One obituary was published in the January 2019 issue in memoriam of Prof. Dr. Eberhardt Schmidt who died in July 2018 after a severe illness. Matti Hämäläinen continued to contribute his well-researched articles themed: 'Stories from social and cultural odonatology' and provided us with an excellent account of the: 'Entomological activities of the 1905 Nobel prize laureate Robert Koch, Father of Microbiology'.

Agrion also published many more articles of great interest from members from all parts of the globe except not surprisingly Antarctica. However, as editors we would very much welcome more general news items or general interest articles about dragonflies and damselflies from our membership.

Keith DP Wilson & Graham Reels
Newsletter editors, *Agrion*

Report of the Congress Coordinator and the International Symposia Committee

I began my activities soon after the 10th Biennial General Meeting (ICO2017, Cambridge). My first duty was to look for new locations for ICO2021 and ICO2023 since the location for the ICO2019 was already decided, it was going to be held in Austin, Texas under the coordination of John and Kendra Abbott. On December 2017, I presented several proposals for the ICOs to come after Austin, as follows:

2021 - Paphos, Cyprus. Proposed by David and Rosalyn Sparrow. The organization of ICO2021 is well advanced and many items concerning the meeting have been faced and solved. The congress will be held at Neapolis University in Paphos and will run from the evening of Sunday 20th June and conclude with the Congress dinner on Friday 25th June. For all the administration of the congress, they have committed to the NGO Terra Cypria, but as this organization does not have the chance to offer payment options through credit card or PayPal, WDA will provide help accepting payments of registration fees through credit card or PayPal.

2023 - Latin America I: there are two proposals: Boyacá, Colombia by Melissa Sanchez Herrera and Brasil by Rhainer Guillermo Ferreira. I met Melissa and Rhainer in Bogotá during 2017, and we decided in common agreement to keep both venues for 2023 and 2027 and wait a couple of years to decide which one goes first.

2025 - Fiji. Proposed by Milen Marinov

2027 - Latin America II.

Taking in consideration the general instability of many non-central countries regarding scientific funding and/or policies, next locations after Paphos, will probably need confirmation and/or revision.

1. In addition to the next ICOs locations, a few proposals regarding the involvement of the WDA with the organization of future ICOs were voted and accepted by the Board, as follows:
Special fund for ICOs organization: with the agreement of the Board, WDA will give a maximum amount of US\$ 8000-10,000 to the Organization of each ICO to cover the initial costs. For this Special fund there will be two sources of income: an extra percentage to be included in the fees (5-8%) and the earnings of each ICO (including the last one). If there is extra money from the revenue it should be destined to cover grants for students in the next Congress.
2. Financial commitment between the organizer and the Society. Since from now on, WDA will invest a significant amount of money, a previous financial commitment must be agreed upon, including:
 - a. The Organizer's agreement to return all the money given by the WDA at the end of the Congress,
 - b. The Organizer's agreement to present an initial cost plan (which must be presented to the Board for its approval, with the endorsement of the Treasurer and the Congress Coordinator). This Plan must be approved by the Board prior to WDA transferring the money.
 - c. The Organizer must consider three kinds of fees: students, WDA professionals, non-WDA professionals. These rates will depend upon each ICO. Other kind of fee (one-day participation, accompanying person, etc) must not be mandatory.
 - d. The Organizer is committed to give a minimum of 5 grants to students,
 - e. The Organizer is committed to present a final financial report to the WDA between the following 90 days from the end of the ICO.
3. Reduction of fees: obviously the general cost (fees, accommodation, air-tickets) is the biggest obstacle for the participation of many people (especially students). This obstacle is partially solved by the grants (given by ICO, WDA and other organizations), but unfortunately it is not enough. In order to reduce fees, the mid-congress field trip must be merged with the post-congress field trip and its cost separated from the registration fee.

About the approved Special fund for ICOs organization: the ICO2019 Organizing Committee asked, and received, a Special fund for the congress organization. The ICO2021 Organizing Committee is not requiring a Special Fund at this stage and they have expressed they will probably will not need any funding in the future.

Javier Muzón
Congress Coordinator

Report from the Webmaster

Around December 2017, Rhainer handed over most of the WDA webmaster duties to me and graciously agreed to provide help and guidance where needed. I gave the WDA website (worlddragonfly.org) a "make-over",

updating the look and feel of the site, and updated a number of languishing pages. I also cloned the ICO2017 website, which had been a separate site, and put it under the “past meetings” section of the WDA site for posterity (worlddragonfly.org/meetings/ico2017). In planning for ICO2019, we decided to follow this model and just build the Congress site under the WDA website (worlddragonfly.org/meetings/ico2019), rather than as a separate site. For logistical and economic reasons, I believe it is in our best interest to continue this tradition for future ICOs.

Since we started tracking visitation to the worlddragonfly.org in July 2018, the site appears to be fairly popular, with roughly 175,000 pageviews (total pages that have been viewed on our site, including repeat views) from 66K visitors. Most of this traffic (78% of pageviews), however, has been to a single page: “Do dragonflies bite or sting?” (written by Dennis Paulson and Jill Silsby; [link](#)). Sometime in 2018, Google started displaying information from this page at the top of search results any time someone searches a question related to that topic. While this is exciting, we would like to have more interest in the rest of our site. ICO2019-related pages (main page, registration, abstracts, etc.) have driven about 9% of those pageviews and all other WDA-related pages make up only about 8% of pageviews.

Traffic to worlddragonfly.org predominantly comes from the United States (69%) and United Kingdom (10%), as well as Canada (4%) and Australia (3%). India, Germany, the Netherlands, South Africa, Spain, and Japan make up the remainder of the top 10 visiting countries, together totaling 4% of traffic. It is notable that Central and South American countries only make up 0.72% of traffic; perhaps by providing translations of select pages to Spanish and Portuguese, we can improve this figure.

I would like worlddragonfly.org to be a world-class source of information about Odonata and there are a number of resources on our website that could be made more valuable to the ode community and the public, helping us achieve this goal. For example, there is a listing of odonatological meetings ([link](#)), a recently published odonate-related books ([link](#)), a listing of odonate photography websites ([link](#)), and a list of regional ode-related websites ([link](#)). There are also additional fact pages (like the “dragonflies bite/sting” page), such as odes in human culture ([link](#)) and use of odes for biocontrol ([link](#)). I have not been able to keep these resources up-to-date, however, and they are languishing again. In addition, we have the ability to post short-form blogs on ode-related topics, but we rarely use this feature. I believe that keeping our resource pages up-to-date and posting informative blog posts will really add value to our site, driving site traffic and ultimately leading to increased membership. However, I do not have time to do these things as well as I would like. I would love to find a volunteer or team of volunteers to undertake these tasks.

In addition to improving the content of the WDA site, this Wordpress website is in need of some infrastructure updates through our web host, GoDaddy.com. Our current hosting plan is several years out of date, slow, and increasing in price. We need to upgrade to a newer hosting plan, which will save us money and hopefully speed up our site (cost: approx. \$300 for 3 years of hosting). We also need to renew the registration we have for domain names that are similar to our own (worlddragonfly.info, worlddragonfly.com, and worlddragonfly.net), which will also cost about \$300 and last for 5 years of registration (we have worlddragonfly.org registered until 8/2023). In total, it will cost around \$600 to make these updates.

WDA’s social media accounts on Facebook (@WorldwideDragonflyAssociation, [link](#)) and Twitter (@WorldDragonfly, [link](#)) are predominantly managed by Manpreet Kohli, with help from Melissa Sanchez Herrera and myself.

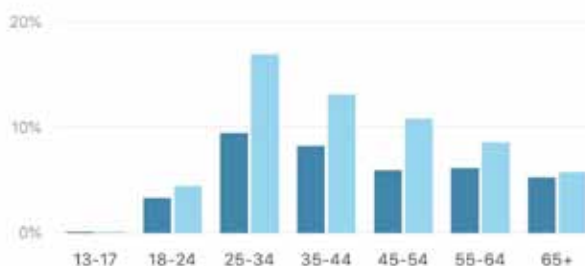
We currently have 1,355 followers on Facebook and 208 on Twitter. In terms of gender, our Facebook followers skew toward men (60%), while our Twitter followers roughly equal (49% men, 51% women). In terms of geography, our Facebook followers are predominantly from the United States (26%), Indonesia (11%) and the United Kingdom (5%). Colombia, Brazil, Germany, Mexico, the Netherlands, Spain, and Canada make up the remaining of the top 10 countries, totaling 22%. Our Twitter followers come from the US (32%), UK (21%) and Germany, as well as Brazil, Japan, India, Indonesia, Spain, Canada, Colombia (together 21%). We significantly increased our facebook membership since the start of this year. This was a direct result of the paid advertising done for promoting ICO 2019.

For more details about the demographics of our website or social media accounts, please contact myself or Manpreet.

Age and Gender

People who like your Page are in these age and gender groups. These numbers are estimates.

518 (39%) Women 805 (60%) Men



Will Kuhn
WDA Webmaster



<http://worldddragonfly.org/>

Manpreet Kaur Kohli
WDA Treasurer
195 University Avenue
Newark, NJ, 07102
U.S.A.
email: mkk24@njit.edu

July 8, 2019

Treasurer's report Summary 2017-2018

Currently, WDA maintains two accounts 1) with Lloyds Bank in the U.K. and 2) with Bank of America in United States. In the fiscal years of 2017-2018 expenditure for WDA exceeded income. Net income in 2017 was £10,178.68 while net income in 2018 was £1,763.89. In 2017 in addition to income from membership, we had income from ICO2017 as well. WDA did not receive any major donations in 2017, while we received £ 125.63 as proceeds from T-shirt sales by Jessica Ware and group. WDA gave away 3 awards during 2017 however no award was given during 2018 (see treasures Year end summary for more detail). Audits for the U.S and the U.K. Accounts were conducted for year 2017 and the accounts were found to be in good standing.

Budget for 2019-2020

WDA should receive steady income from memberships, subscriptions and royalties, unless the membership numbers change. However, following the trend of the past two years, if the expenditure continues to be more than the income, it will eventually limit our ability to give away awards. Our steady income is from membership and royalties (T&F) and our major expenditure is through WDA grants. On an average every year, we receive £3,000 (\$4,173) from T&F and have spent approximately \$2151 on grants. I recommend that we decided a fix amount in awards that we should give every year (perhaps ~ \$2000) in order to maintain healthy savings.

Sincerely,

Manpreet Kaur Kohli, WDA Treasure

Tables Attached:

1. Summary of Annual Income and Expense, 2018
2. Summary of Annual Income and Expense, 2019

Treasurer's Year End 2017 Report
7th August 2017

WORLDWIDE DRAGONFLY ASSOCIATION
Summary of income and expenses, Jan. 1 to Dec. 31, 2017

	YTD TOTAL POUNDS	--- UK --- POUNDS	-- US Account -- POUNDS	DOLLARS
INCOME				
Membership & Subscriptions & Royalties	3,850.51	3,850.51	0.00	0.00
Donations - General	0.00	0.00	0.00	0.00
Donations - Sustaining	0.00	0.00	0.00	0.00
Registration fee collected for ICO 2017	54,485.37	53,872.66	612.71	827.98
cash deposit	1,251.53	1,251.53	0.00	0.00
Other	<u>311.06</u>	311.06	0.00	<u>0.00</u>
Total Income	59,898.47	59,285.76	612.71	827.98
EXPENSES				
Bank charges (including Wire fees and check book cost)	0.00	0.00	0.00	0.00
Grants (CFC)	0.00	0.00	0.00	0.00
Symposium costs - ICO 2017	44,258.86	44,258.86	0.00	0.00
WDA Awards	4,908.89	0.00	4,908.89	6,633.64 *See Notes
ICO 2017 T-shirt Expense	552.03	0.00	552.03	745.99
Return funds in Lieu of FBO European Symposium	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>
Total expense	49,719.79	44,258.86	5,460.93	7,379.63
NET INCOME (LOSS)	10,178.68	15,026.90	-4,848.22	-6,551.65
	10,178.68			
BALANCE FORWARD FROM PREVIOUS YEAR	39,281.46	28,866.00	10,415.46	14,074.95
Note: will not match prior year subtotals due to currency shifts				
NEW BALANCE	49,460.14	43,892.90	5,567.24	7,523.30
Less funds held for European symposium*	<u>4,838.79</u>			
NET BALANCE AVAILABLE FOR WDA	44,621.35			
Note 1: * details				
Slovenia Dragonfly	\$ 1,182.91			
Cash to Rahiner (ICO-2017)	\$ 2,000.00			
Transfer to Manpreet (ICO-2017)	\$ 600.00			
Akbar Alfarisi	\$ 1,090.00			
Dejan Kulijer	\$ 941.73			
Hadeezah Bemah	\$ 819.00			

GENERAL NOTES: Currency conversions based on rates
12/31/17 USD/GBP 0.7400;
Italicized figures are actual currency; other figures are
converted and subject to exchange fluctuations

Treasurer's Year End 2018 Report
8th July 2019

WORLDWIDE DRAGONFLY ASSOCIATION
Summary of income and expenses, Jan. 1 to Dec. 31, 2018

	YTD TOTAL POUNDS	--- UK --- POUNDS	-- US Account -- POUNDS	DOLLARS
INCOME				
Membership & Subscriptions & Royalties	4,085.99	4,085.99	0.00	0.00
Donations - General	125.63	0.00	125.63	160.00
Donations - Sustaining	0.00	0.00	0.00	0.00
Registration fee collected for ICO 2019	3,623.18	0.00	3,623.18	4,614.34
cash deposit	0.00	0.00	0.00	0.00
Other	<u>0.00</u>	0.00	0.00	<u>0.00</u>
Total Income	7,834.80	4,085.99	3,748.81	4,774.34
EXPENSES				
Bank charges (including Wire fees and check	0.00	0.00	0.00	0.00
Grants (CFC)	0.00	0.00	0.00	0.00
Symposium costs - ICO 2019	5,644.45	0.00	5,644.45	7,188.55
WDA Awards	0.00	0.00	0.00	0.00
American Funds for Charity	117.78	0.00	117.78	150.00
Website development cost	<u>308.68</u>	<u>0.00</u>	308.68	<u>393.12</u>
Total expense	6,070.91	0.00	6,070.91	7,731.67
NET INCOME (LOSS)	1,763.89	4,085.99	-2,322.10	-2,957.33
	1,638.26			
BALANCE FORWARD FROM PREVIOUS YEAR	49,800.12	43,892.82	5,907.30	7,523.30
Note: will not match prior year subtotals due to currency shifts				
NEW BALANCE	51,564.01	47,978.81	3,585.20	4,565.97
Less funds held for European symposium*	<u>4,838.79</u>			
NET BALANCE AVAILABLE FOR WDA	46,725.22			

GENERAL NOTES: Currency conversions based on rates 12/31/18 USD/GBP 0.7852;
Italicized figures are actual currency; other figures are converted and subject to
exchange fluctuations

Manpreet Kaur Kohli,
WDA Treasurer

Sponsored Memberships and Conservation & Funding Committees:

We had no requests for sponsored memberships in the last two years. We currently have 12 sponsored members. We had three applicants for the WDA Research Grant in the 2017-2019 period, and funded one, Hadeezah Bemah, in October 2017. Interested applicants should use the application materials on the website to apply, sending their applications to directly to me, or to a member of the WDA board.

Göran Sahlén

Chair of Sponsored membership and Conservation and Funding committees

Report from the Japanese Group of WDA

In the April of this year, I, Akihiko Sasamoto, was newly elected as Representative of the Japanese Group of WDA, taking over Dr Hidenori Ubukata. Vice Representative Dr Ryo Futahashi and Secretary General Dr Takuya Kiyoshi remain the post. As we know, the number of the Japanese members has most decreased to only around ten; I sadly hear that some of the withdrawing members could not renew the membership in past against their will, due to trouble at renewal. We sincerely hope that they join us again. Anyway, under such circumstances of small members, we are now discussing future direction of our Japanese group.

Akihiko Sasamoto

Representative of the Japanese Group of WDA

Motions passed* during tenure of WDA President Frank Suhling (Nov. 2017 – July 2019)

Motion 1: 10% raise across the board for memberships, with new offer of ‘green memberships’ with just electronic access to IJO:

Categories (all prices in £)	WDA_2017	WDA_2018	T&F_2018	WDA earns
Student with IJO	34	40	31	9
Student with E-IJO only	.	35	28	7
Special student with E-IJO only	.	15	28	-13
Student without	7	10	.	10
Special Student no journalICO2017	.	5	.	5
Single with IJO	52	60	31	29
Single with E-IJO only	.	55	28	27
Single developing nations with E-IJO	52	31	28	2
Special single with E-IJO only	.	40	28	12
Single without	24	30	.	30
Family with IJO	66	70	31	39
Family with E-IJO only	.	65	28	37
Family without	35	40	.	40
Affiliated societies	69	90	31	59
Sustaining	74	90	.	90

Motion 2: Special fund for ICOs organization.

WDA will give a maximum amount of US\$ 8,000-10,000 to the organization of each ICO to cover the initial costs. For this Special fund there are two sources of income: an extra percentage to be included in the fees (5-8%) and the earnings of each ICO (including the last one). If there is extra money from the revenue it should be used to cover grants for students in the next Congress.

Motion 3: Financial commitment between the ICO organizer and the Society.

WDA will invest an amount of money, with a previous financial commitment must be agreed upon, including:

- The Organizer's agreement to return all the money given by the WDA at the end of the Congress
- The organizer's agreement to present an initial cost plan (which must be presented to the Board for

its approval, with the endorsement of the Treasurer and the Congress Coordinator). This Plan must be approved by the Board prior to WDA transferring the money.

- c. The organizer must consider three kinds of fees: students, WDA professionals, non-WDA professionals. These rates will depend upon each ICO. Other kind of fee (one-day participation, accompanying person, etc.) must not be mandatory.
- d. The organizer is committed to give a minimum of 5 grants to students.
- e. The organizer is committed to present a final financial report to the WDA between the following 90 days from the end of the ICO.

Motion 4: ICO Reduction of fees.

The general cost (fees, accommodation, air-tickets) is the biggest obstacle for the participation of many people (especially students). The mid-congress field trip will be merged with the post-congress field trip and its cost separated from the registration fee.

Motion 5: Selection of next venues.

WDA has sustained a west-east axis in the alternance of the cities/countries selection for the venues. In order to have a world “wider” participation we propose to incorporate also the south-north axis so as to bring the possibility for more to participate.

* Exceptions are motions for replacement of board members, and approval of grants and sponsored members, which are summarized in biennial reports and minor motions referring to specifics of a given proposal (in the case of the latter, the proposal reflects these changes, e.g. Motion 4).

New distributional record of *Rhinagrion macrocephalum* Selys, 1862 in Sumatra based on photographic evidence

Muhammad N. Janra^{1*}, SupriYadi², Ilham², Varizal² & Ika B.L. Pertiwi³

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³Faculty of Biology, Jenderal Soedirman University, Jl. DR. Soeparno no. 63. Karang Bawang, Grendeng, Purwokerto Utara, Banyumas Regency, Central Java 53122, Indonesia

Introduction

Rhinagrion Calvert, 1913 is a genus of Oriental damselflies that currently comprises 10 species distributed across Southeast Asia, Sundaland and the Philippines (Kalkman & Villanueva 2011). It was previously included within Megapodagrionidae, before being reclassified into family Philosinidae along with the genus *Philosina* Ris, 1917 based on molecular evidence (Dijkstra et al. 2014). All species of *Rhinagrion* possess distinct bright pattern on face, thorax and abdomen; many with the tip of the abdomen brightly colored, especially on male (Kalkman & Villanueva 2011). The striking coloration on tip of abdomen serves courtship and / or aggressive functions (Paulson 1981). This genus prefers primary tropical lowland forest, where it breeds in the small forest streams (Silsby 2001).

A species from this genus, *Rhinagrion macrocephalum*, is described with blue pattern on face, small blue spots on dorsum of synthorax, abdominal segment 3-7 red, abdominal segment 8-9 blue, the last abdominal segment and appendages black (Kalkman & Villanueva 2011). It is known mainly from Peninsular Malaysia (Laidlaw 1924, Kemp & Kemp 1989, Wilson & Gibert 2005) and from only north to north-east Sumatra (Lieftinck 1935). For

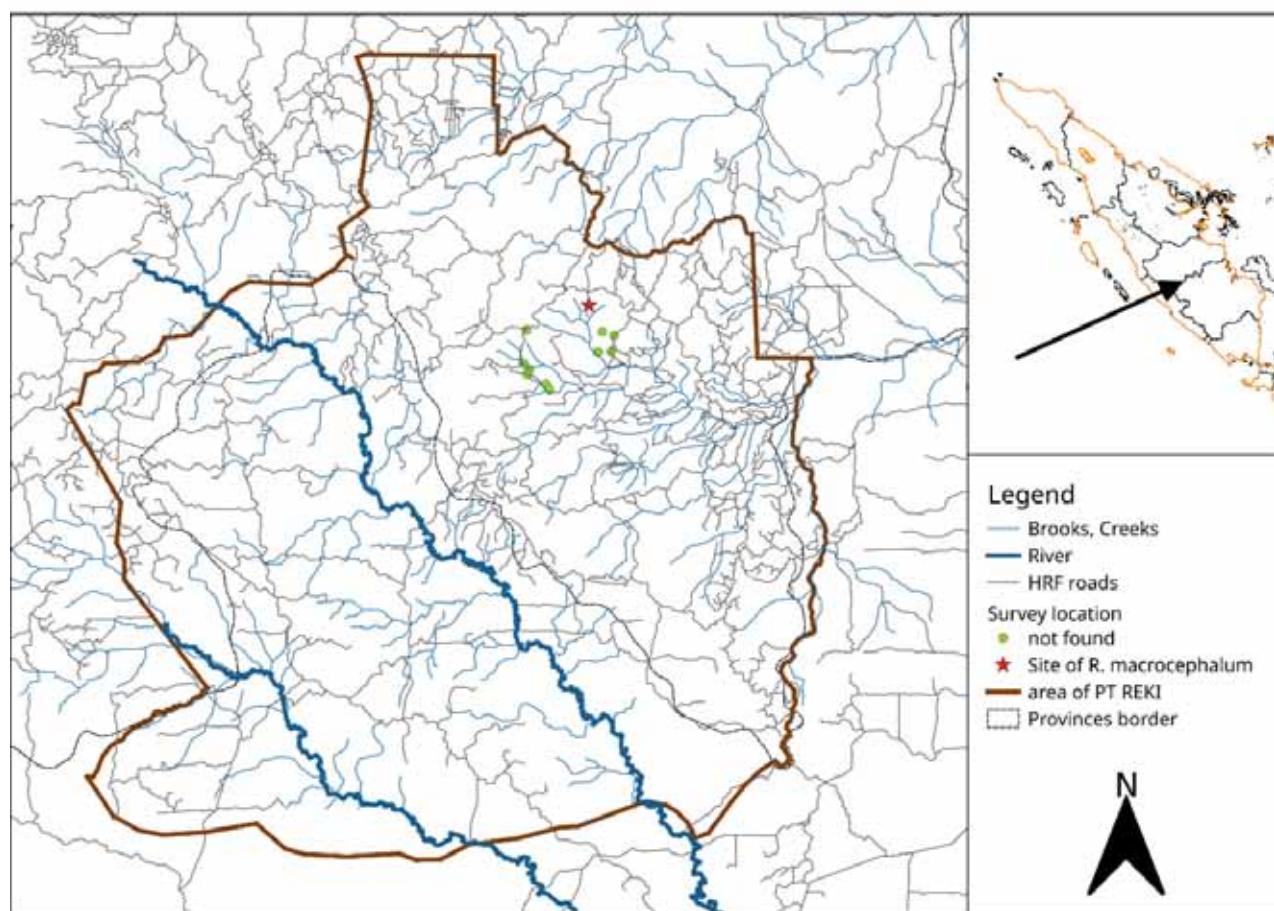


Figure 1. Map of study site. Red star marks the encounter site for *Rhinagrion macrocephalum*.

decades, there has been no further record on this species from other parts of Sumatra.

Observation

On 12 December 2017, a male of *R. macrocephalum* was observed during an ornithological survey conducted at PT REKI's Harapan Rainforest, near the border between Jambi and South Sumatra Provinces. The Harapan Rainforest is the first conservation concession established in Indonesia and covers almost 1,000 km² of logged secondary lowland rainforest, interspersed with patches of more mature secondary or primary forest (Burung Indonesia, Royal Society for Protection of Bird & BirdLife International 2010). The observation on *R. macrocephalum* was made in a riparian plot (2° 9' 10.1232" S, 103° 21' 42.2496" E, 93 m), one of a total of four pairs of riparian and non-riparian plots specifically created for the ornithological survey (the encounter site is marked with a red star on the map).

The male of *R. macrocephalum* was sighted flying through and perching on vertical perches. It was not initially recognized as a rare species; however, its peculiarity and difference in coloration and body features marked it as 'something special' to record. As we had no permit to collect animal specimens during this survey, a dozen pictures were taken using Nikon Coolpix P900 set on macro mode before the individual flew away. No further observation was made as it could not be followed through the dense forest. Later on, the identification was keyed through the size of blue spot marking on dorsum of thorax that was small, oval, rather oblique and broadly divided, in addition to its abdominal segment 8 and 9 that are blue with whitish sternum. This species was encountered only once during the ornithological survey campaign lasting from August to December 2017.



Figure 2 & 3. *Rhinagrion macrocephalum* at Harapan Rainforest, Jambi, December 2017. (2) Dorsolateral view (3) Frontal view.

Site Description

Rhinagrion macrocephalum was encountered in the afternoon, 1.5-2 m above a slow flowing slightly turbid brook in a swampy area of primary tropical lowland forest. The site was shaded by tight canopy with scant sunlight penetrating through. The site characters are in line with the preference of specific habitat described for *R. macrocephalum* (Kemp & Kemp 1989) or with habitat for most *Rhinagrion* species (Lieftinck 1956). This site can be categorized as undisturbed forest as it was part of Harapan Rainforest concession and actively protected from adverse human interference.

Discussion

As a known inhabitant in the primary forest within its distribution range, the encounter of *R. macrocephalum* in our survey area may signal the importance of the site in Harapan Rainforest as well as other primary forest remnants in Sumatra. This southernmost record for this species also indicates that it may occur throughout Sumatra, wherever the habitat is appropriate. While further works are needed to get better insight on the distribution of *R. macrocephalum* in Sumatra, it is more imperative to prevent habitat loss, mainly from deforestation, which becomes the major threat for this species (Kalkman & Villanueva 1989). The complete information on this species will also help in assessing its population and threatened status in Sumatra, as it is currently not listed on IUCN Red List despite having limited distribution and vulnerability toward the degeneration of its habitat.

Acknowledgement

We are in debt to PT. REKI for providing access and accommodation during survey in Harapan Rainforest. We thank CRC - EForTS for facilitating the overall fieldwork in Jambi during the survey 2017. We also acknowledge Rory A. Dow for assistance in identifying the species through pictures and Aadrian for his help with site map. For helping with fieldwork, we express gratitude to Zulfikar Abdullah, Novia L. Rahmawaty, Ellena Yusti, Andri and Fidel Ramos.

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Figure 4. Encounter site within Harapan Rainforest, Jambi.

Hiroshima City Summer 2018

Hide Natsume [romluna@y4.dion.ne.jp]

The 61st annual meeting of the Japanese Society for Odonatology (JSO) was held at Hiroshima on July 28-29, 2018. Earlier that month many cities and towns in Hiroshima prefecture had been damaged by continuous heavy rain and floods. On the way to recovering their daily life, typhoon no.12 changed its course unusually from east to west and headed for Hiroshima city, so the organizing members of JSO were expecting many attendees' cancellations to the annual meeting. Under such circumstances I took ANA677 morning flight from Tokyo to Hiroshima on July 27th as I had a plan to re-visit Hiroshima Peace Park after 45 years.

Hiroshima Peace Park

Right after checking in to the Crown Plaza Hotel I prepared my insect net and walked into the park. Some time after three o'clock in the afternoon I was standing at the Memorial Monument of Hiroshima Peace Park. (Fig.1) The temperature was high and a strong typhoon was coming near but the weather was good and almost no wind blew at that time. Visitors from various parts of the globe were here and there. As I did not have any detailed map of Hiroshima I just walked around trying to find water habitat. I stood at the edge of the Peace Park and went down to Motoyasu River (Fig.2) which is overlooked by the famous Atomic Bomb Dome. This river is next to the Setouchi sea and the salty water comes up when the tide is high so basically no dragonfly can survive. The only odonate I found there was one female of *Orthetrum albistylum* (Fig.3). Then I walked to the Bell of Peace (Figs. 4-8). I spent 40 minutes at this place and observed *Orthetrum albistylum*, *Orthetrum melania*, *Crocothemis servilia mariannae* and *Paracercion calamorum*.

The weather was continuously fine and the temperature was over 36°C so I took a taxi to move to Hiroshima Castle. I arrived at the old ruins of the castle at 4.40 and one man sitting on the chair at the entrance came to me and asked what I am as I had a large insect net with me. Knowing that I was trying to find dragonflies he explained that he is a volunteer at Hiroshima Castle to maintain a pond in the courtyard. His name is Sota san and he knows Bungo Kagimoto san, the chair of JSO 2018. He was kind to introduce the history of Hiroshima Castle and explained the way to reach the pond near the RCC (historical local radio/TV broadcast station) building. I enjoyed the scenery over there but no Odonata were at the pond. Then I moved to the outer moat of the castle and found *Paracercion calamorum*, *Orthetrum albistylum*, *Pseudothemis zonata*, *Ictinogomphus pertinax* and *Paracercion melanotum* (Fig. 9).

In the evening I met Kagimoto san (appointed as chairman of the executive committee Hiroshima 2018), Watanabe san (chairman of JSO), Kita san (committee member of JSO), and Suda san family to enjoy



Figure 1. Memorial Monument of Hiroshima Peace Park.



Figure 2. Motoyasu River and Atomic Bomb Dome.



Figure 3. Female of *Orthetrum albistylum* collected at Motoyasu River



Figure 4-6. (4) Small pond at Bell of Peace. (5) Bell of Peace visited by Italian delegation. (6) Male of *Orthetrum albistylum*.

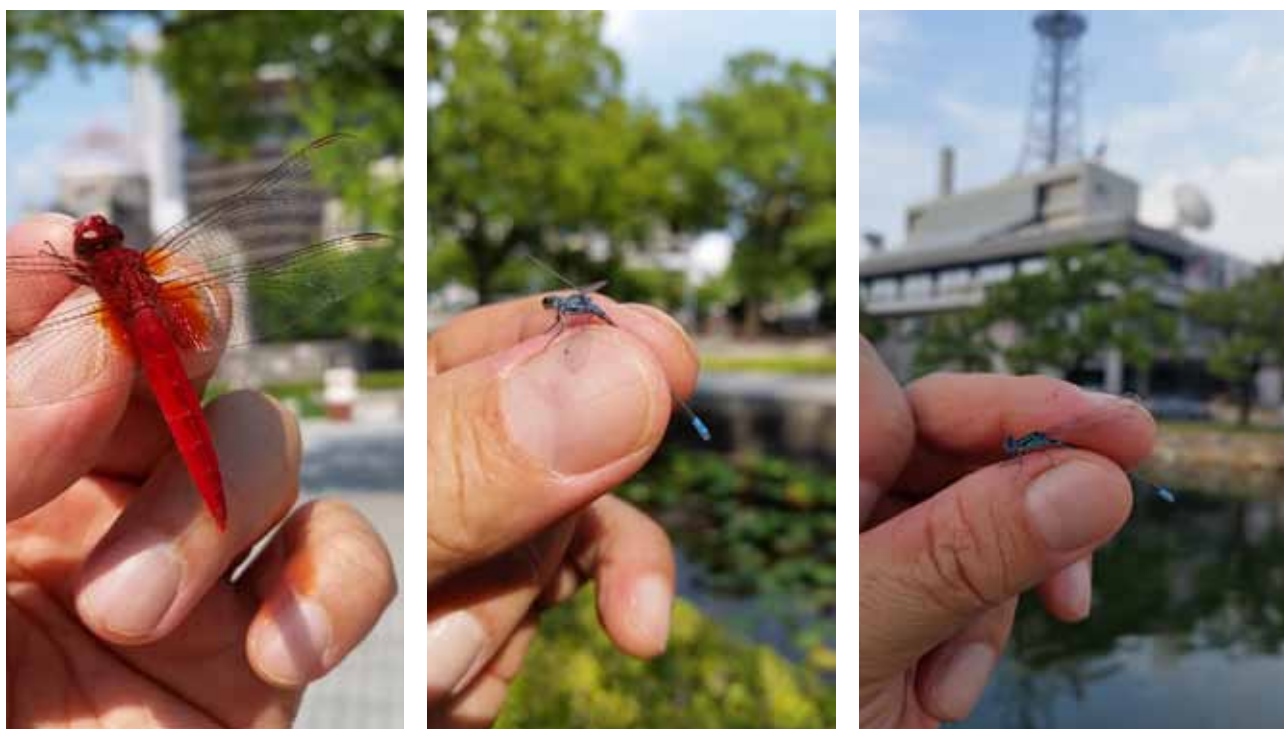


Figure 7-9. (7) Male of *Crocothemis servilia mariannae*. (8) Male of *Paracercion calamorum*. (9) Male of *Paracercion melanotum* at Hiroshima Castle.

Okonomiyaki (Japanese pan-fried cakes) at the central Hiroshima city. The typhoon had not changed its route and was exactly coming near to Hiroshima city so many of JSO members were still to decide whether they would come and join tomorrow's JSO, however Watanabe san declared at this small Okonomiyaki bar that the planned meeting on Saturday and Sunday would go ahead. Upon receipt of his strong intention we decided not to send a prepared notice of cancellation of the meetings, instead we contacted members throughout the Japanese archipelago to gather at Hiroshima on the next day.

JSO 2018

On Saturday afternoon July 28, 2018, finally 42 members joined JSO 2018 held at Hiroshima University of Technology (Fig. 10). More than 20 scheduled people could not join the meetings as many flights and trains to Hiroshima city had been cancelled because of the typhoon. In spite of the direct attack of the typhoon scheduled meetings as well as dinner/auctions at a local Italian restaurant were carried out without any problems. At the conference room the huge model of *Orthetrum poecilops miyajimaense* was displayed as this subspecies was found in 1936 by Jiro Yuuki for the first time in Itsukushima, Miyajima, Hiroshima and is endemic to this small island. After World War II Juzo Sawano of Hiroshima University found this new species to science again and in 1957 Shojiro Asahina identified this species as being the same as *Orthetrum poecilops* described from Guangdong, China in 1911 by Friedrich Ris. But later Asahina in 1970 reinstated *miyajimaense* at subspecies level, based principally on its smaller size.

The committees of nature conservation were the main events of the first day, followed by general meetings, and the annual auction at the dinner party was conducted by Haruki Karube with his humorous and thoughtful talks. On Sunday July 29 three articles and five poster presentations were carried out, and a special seminar about *Orthetrum poecilops miyajimaense* and its conservation was organized. During this special program a RCCTV film “Miyajimatombo no Nazo – Mystery of *Orthetrum poecilops miyajimaense* (1998)” was broadcast. Keith Wilson, at Hong Kong at that time, appeared in the film with Japanese visitors, and audiences at the meeting gazed on the habitat in Hong Kong with great interest.

Out of oral presentations Naoko Kawada's article was very interesting (Fig.12). She has observed and photographed lots of odonate mating and explained the differences of the shape of the heart figure. She also measured angle and durations of each genus/species with specific comments. Symmetric property of the heart shape is also calculated and categorized. Many audience members were really struck by this precious presentation and advised her to continue this splendid study.

Sadayuki Ugai made a presentation about brackish water odonata in the world (Fig. 13), and presented some photos taken at Hong Kong when he visited the site of *Orthetrum poecilops* guided by K. Wilson in 1994 (Fig. 14).

During the sessions I gave a guide and announcement of WDA, SIO and ICO2019 to be held in

Texas, USA, and made a small presentation about various *Anax* species in the world. This presentation was not originally scheduled but the originally scheduled program was not so tight due to cancelled presentations (due to inability to reach Hiroshima because of the typhoon approach).

JSO 2108 annual meeting was carried out successfully by the strong spirit of the chairman of JSO K. Watanabe, chairman of the executive committee Hiroshima B. Kagimoto and many Japanese dragonfly enthusiasts with hope for the world peace. I could not join the post meeting excursion on the Monday to observe *Orthetrum poecilops miyajimaense*, but it was a great opportunity to visit Hiroshima Peace Park again and pray for the souls as well as the peace of the world.



Figures 10-11. (10) Announcement board of JSO 2018 at Hiroshima University of Technology. (11) Huge model of *Orthetrum poecilops*, left is JSO Chairman Kenichi Watanabe.

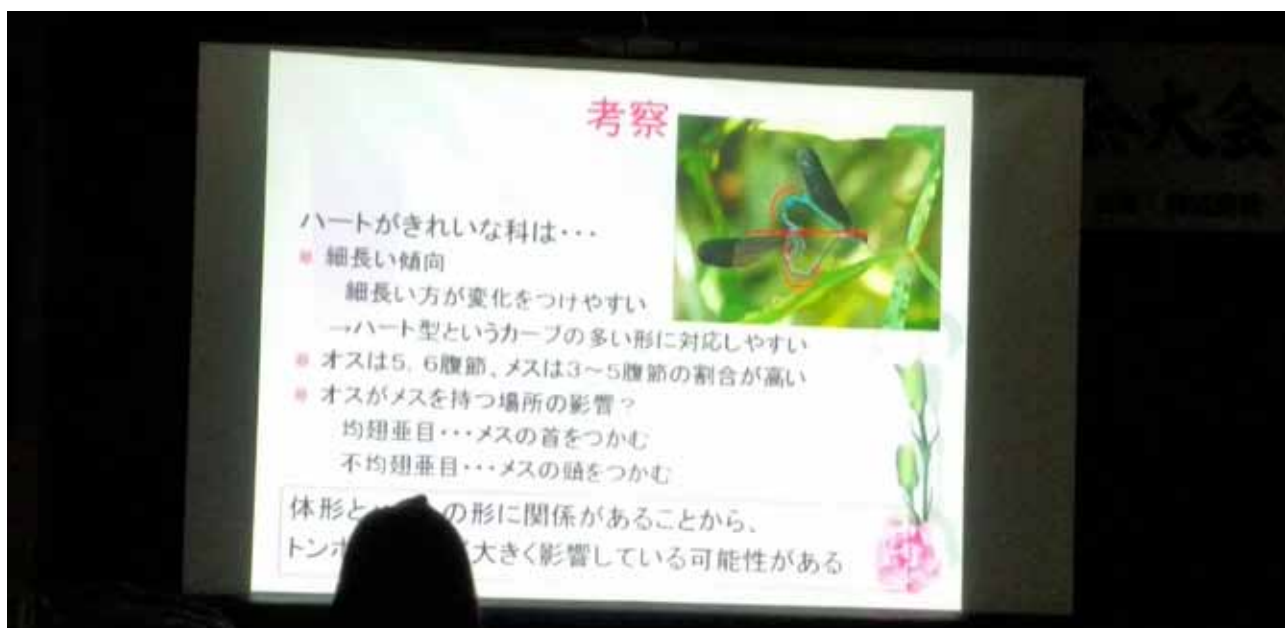


Figure 12-14. (12) Naoko Kawada presents her article 'Different shapes of odonata mating according to each genus and species'. (13) Sadayuki Ugai gives the story of his trip to Hong Kong in 1994. (14) Specimens collected in Hong Kong by Kazutaka Ikeda and S. Ugai.

New Books

Dragonflies and Damselflies of China 中国蜻蜓大图鉴 (两卷)

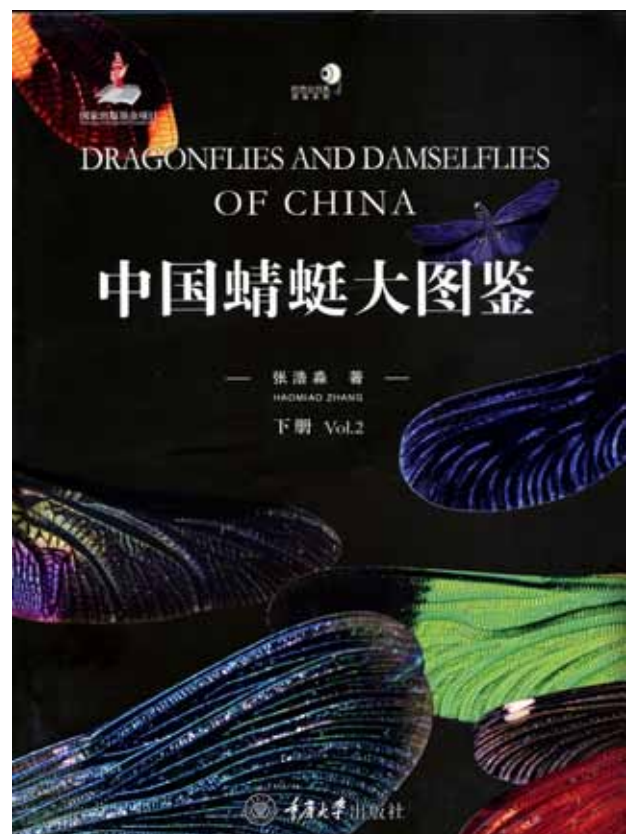
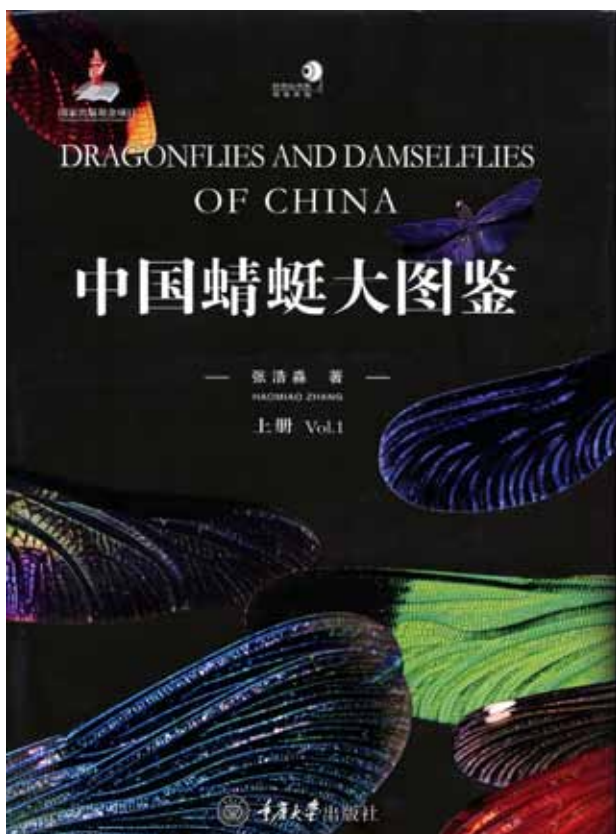
(Two-volume set in English and Chinese)

Author: Haomiao Zhang - 張浩淼

First published: January 2019, weight: 6.5 kg, 210mm x 290mm
Hardcover 1459 pp - ISBN: 9787568910378

Available from: China Book Services US\$ 278 + p&p [www.hceis.com] [[Link](#)]
Natural History Book Service (NHBS) £299 + p&p [www.nhbs.com] [[Link](#)]

The author Haomiao Zhang began to prepare this field guide in 2009 and the work has taken him almost ten years to complete. The hefty two-volume pair of books weighing 6.5 kg includes field observations of dragonflies and the results of many taxonomic studies. A total of 820 species belonging to 23 families, 178 genera from all over China are lavishly illustrated; more than in any comparable book worldwide. Thousands of high quality and beautiful photos have been carefully selected from over 200,000 shots. They have been chosen to show a dragonfly or damselfly in its best view to help readers quickly identify the species aided by a brief generalized identification text. Diagnostic photos, including wing venation, anal appendages and secondary genitalia have been taken from specimens in Haomiao Zhang's Odonata collection. Haomiao Zhang says: 'It was a difficult and complex task to select photos from my large photo library and edit both Chinese and English languages. Moreover, the book is still not complete, for with continuing fieldwork, more new species and new records will undoubtedly be discovered. China will probably be the first country to have over a thousand dragonfly species. Hopefully this colourful field guide will stimulate further interest in the fascinating Chinese odonate fauna'.



裂唇蜓属 Genus *Chlorogomphus* Selys, 1854

本属全球已知40余种。中国已知20余种。本属的主要特点是胸部侧面的黄色条纹出现在后胸前侧板，有时后胸后侧板后缘具黄色斑纹。本属被分成很多亚属，其中至少有5个亚属已经在中国发现。

The genus contains over 40 species and more than 20 are recorded from China. The main character for the genus is the presence of thoracic yellow stripes on metepisternum, in some species the ventral part of metepimeron have yellow markings. The genus is divided into many subgenera, and at least five of them have been found in China.



蝴蝶裂唇蜓 交尾 | 宋睿斌 摄
Chlorogomphus (Aurorachlorus) papilio, mating pair | Photo by Ruibin Song

Figure 3. Page 496 from Volume 1, Dragonflies and Damselflies of China by Haomiao Zhang. The photo depicts a wonderful capture of a mating pair of the chlorogomphid *Chlorogomphus (Aurorachlorus) papilio* Ris, 1927; surely one of China's most charismatic dragonflies. Photo credit Ruibin Song. The book provides details of 32 species of Chlorogomphidae recorded from China of which seven are as yet undescribed!

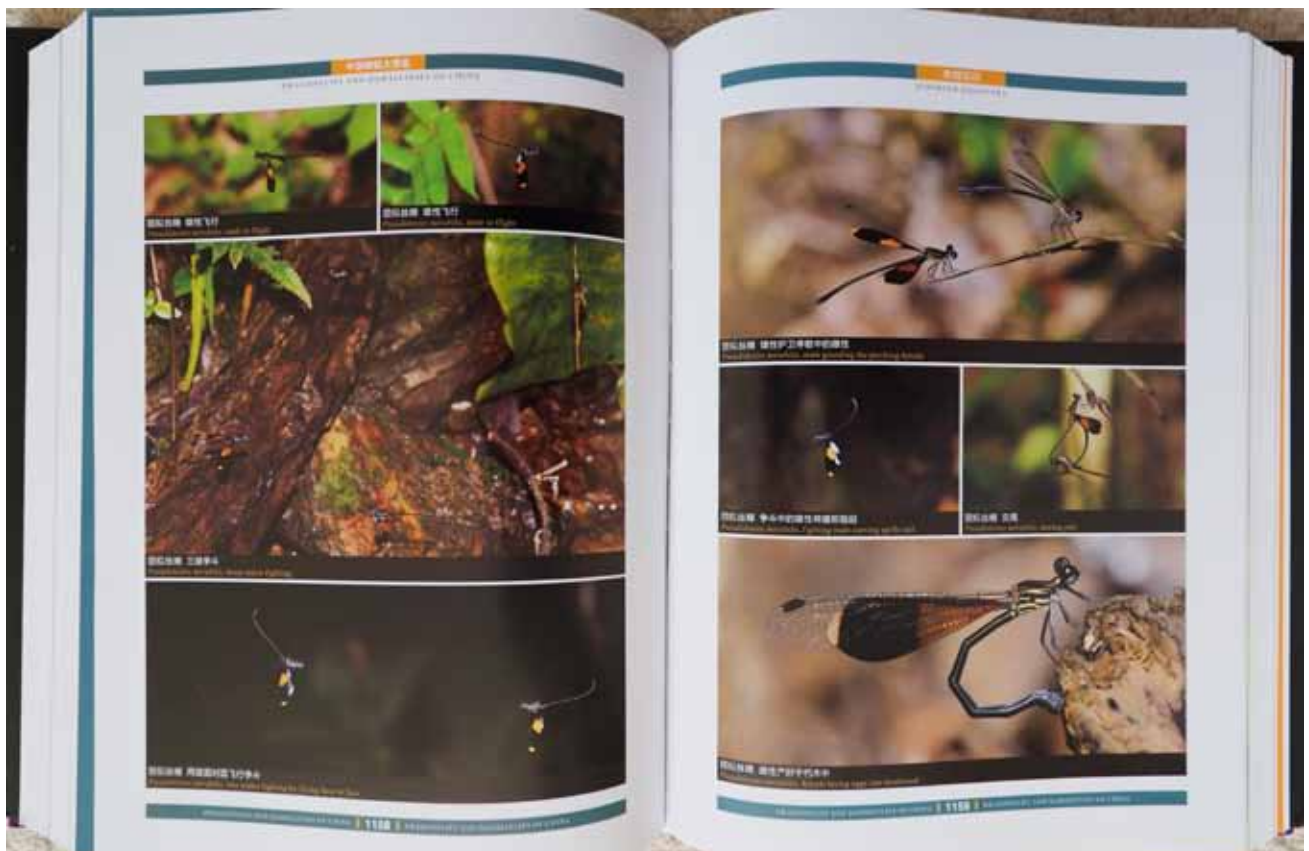


Figure 3. Pages 1158 & 1159 from Volume 2, Dragonflies and Damselflies of China by Haomiao Zhang. The page spreads shown here are four of the eight lavishly illustrated pages devoted to the Chinese endemic family Pseudolestidae and its single representative species *Pseudolestes mirabilis* Kirby, 1900, which is endemic to Hainan Island, China. Photo credits Haomiao Zhang.

Dragonflies & Damselflies A Natural History

Author: Dennis Paulson

224 pages, colour photos, 150 colour illus., ca. 21 cm x 23 cm
Publisher: Princeton University Press, USA (ISBN: 9780691180366),
E-book (ISBN: 9780691192536)
& The Ivy Press, UK (ISBN: 9781782405634), 14 March 2019

Available from: Natural History Book Service (NHBS) £19.99 + p&p [[Link](#)]
Amazon (UK) £13.31, ca. US\$25, ca. €22 + p&p
Princeton University Press US\$29.95 +p&p [[Link](#)]

Dragonflies and damselflies are often called 'birdwatchers' insects. Large, brightly colored, active in the daytime, and displaying complex and interesting behaviors, they have existed since the days of the dinosaurs, and they continue to flourish. Their ancestors were the biggest insects ever, and they still impress us with their size, the largest bigger than a small hummingbird. There are more than 6,000 odonate species known at present, and you need only visit any wetland on a warm summer day to be enthralled by their stunning colors and fascinating behavior. In this lavishly illustrated natural history, leading dragonfly expert Dennis Paulson offers a comprehensive, accessible, and appealing introduction to the world's dragonflies and damselflies.

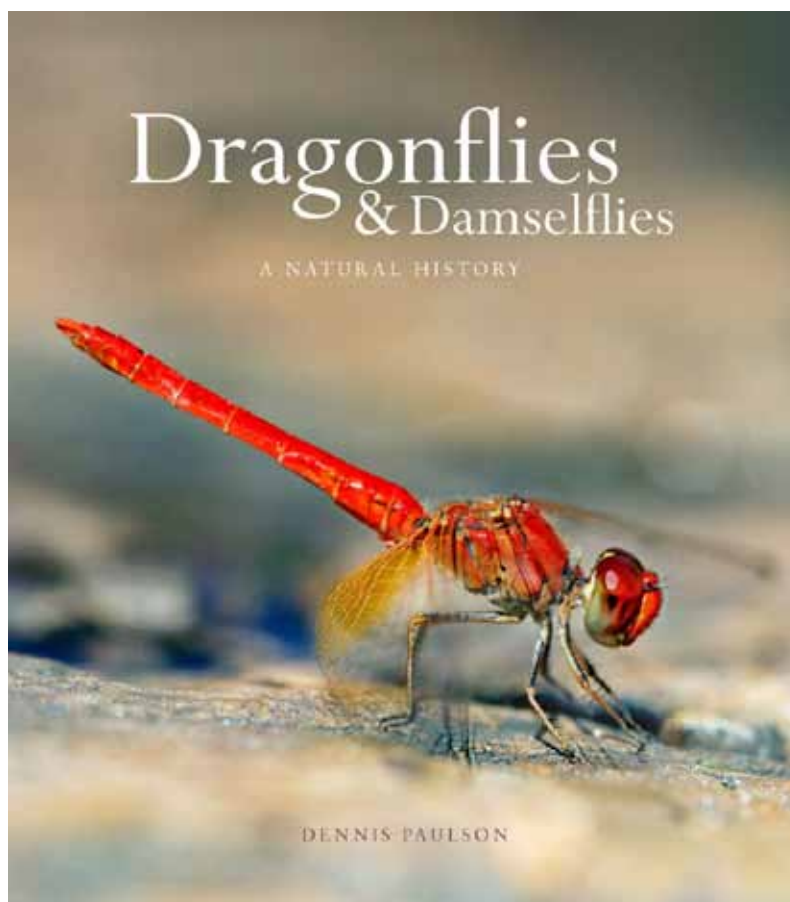
The book highlights the impressive skills and abilities of dragonflies and damselflies - superb fliers that can glide, hover, cruise, and capture prey on the wing. It also describes their arsenal of tactics to avoid predators, and their amazing sex life, including dazzling courtship displays, aerial mating, sperm displacement, mate guarding, and male mimicry.

Dragonflies and Damselflies includes profiles of more than fifty of the most interesting and beautiful species from around the world. Learn about the Great Cascade Damselfly, which breeds only at waterfalls, the mesmerizing flight of Blue-winged Helicopters, and how the larva of the Common Sanddragon can burrow into sand as efficiently as a mole.

Combining expert text and excellent color photographs, this is a must-have guide to these remarkable insects.

- A lavishly illustrated, comprehensive, and accessible natural history that reveals the beauty and diversity of one of the world's oldest and most popular insect groups.
- Offers a complete guide to the evolution, life cycles, biology, anatomy, behavior, and habitats of dragonflies and damselflies.
- Introduces the 39 families of dragonflies and damselflies through exemplary species accounts.
- Features tips on field observation and lab research, and information on threats and conservation.

Dennis Paulson is one of the world's leading experts on dragonflies and damselflies and has watched and photographed his favorite insect on every continent. He is the author of the major field guides to North American



species, Dragonflies of the West and Dragonflies of the East (both Princeton), and has written more than fifty scientific papers on the group. Now retired from his position as the director of the Salter Museum of Natural History at the University of Puget Sound, he lives in Seattle.

Megaloprepus caerulatus

Blue-Winged Helicopter


This spectacular damselfly could be called, by wingspread, the largest odonate. A denizen of rain forests, it can be easily seen at scattered locations where biological field stations or ecotourism lodges provide access to its preferred habitat. Spend some time at one of these places and you'll eventually come across one, looking as if it has rotary blades as it crosses a sunlit clearing anywhere from ground level to well up in the canopy. The wing strikes an air of phan, thus the windmill effect, enhanced by the iridescent blue-black spots at the tips.


This species and its relatives, widespread in the New World Tropics, are specialist predators on spiders, plucking them from the center of their webs in the forest. It has been speculated that as they hover in front of a web, the contrasting patterns on their wings mesmerize the spider, which doesn't try to escape until it's too late. These same wings may have the same effect on a satomae widdling an insect net or a jacamar swooping after it from a perch.

Helicopter damselflies are spread through the forest, independent of the wetlands that support the majority of their relatives, because they breed in elevated water pools called phytotelmata. Some of them breed in bromeliads, which have long, slender leaves that grow out from a central base; rainfall funnels water into a central area that contains it, serving as habitat for frogs, salamanders, and numerous insects, including these damselfly larvae. Others, including *Megaloprepus*, don't breed in bromeliads but inhabit tree holes that fill with water during the rainy season. Because the holes contain different amounts of water, the food supply for the larvae is very variable, and the great variation in size of the adults comes from the size attained by the larva before it emerges.

FAMILY	Coenagrionidae
DISTRIBUTION	Eastern Mexico south through Central America and northwestern South America
HABITAT	Primary rain forest

8 in
7.3-11.5 cm





Epiophlebia superstes

Damsel Dragon


This genus of three species has long occupied a puzzling position in odonate classification and it is currently placed in the suborder Anisoptera, closer to the Anisoptera than the Zygoptera. The wings are held either half open or closed. Although the hindwings are slightly broader than the forewings, an anisopteran trait, the flight is more like that of a damselfly, and the adults never glide like dragonflies. The wing venation is generalized, with crossveins that represent the archaic condition of odonates, being similar to many Mesozoic fossils of the Anisoptera.


The larva looks just like an anisopteran, but it lacks the ability to move by jet propulsion, in that way being similar to zygopterans. We have a good fossil record of adult odonates, based to a substantial degree on wing venation, but we don't have the same larval record to explain how the larvae of present-day families achieved their shapes and other adaptations.

Perhaps one of the more interesting things about this "living fossil" is its normal behavior, which is comparable to both dragonflies and damselflies in its cold-stream habitat. It is a spring species, with a highly synchronized flight season of no more than a month at the beginning of summer. Thus the larvae overwinter in the final instar, but after a very long development period of seven or eight years. With this long period, they go through 14 larval instars, which is a high number for an odonate. Males fly up and down their home river throughout much of the day if warm enough, this being observed at 59°F (12°C) or above in one study. If the air temperature is relatively low, the advent of clouds will cause them to leave the river, but if it is a warmer day, they fly during cloudy weather as well.

FAMILY	Epiophlebiidae
DISTRIBUTION	Japan
HABITAT	Swift, cold streams and rivers in hill country

8 in
5.0 cm





Page extracts from Dragonflies & Damselflies by Dennis Paulson describing and depicting bluewinged helicopter (*Megaloprepus caerulatus*) and damsel dragon (*Epiophlebia superstes*).

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Dragonfly Nymphs of North America An Identification Guide

Author: Kenneth J. Tennessen

Publisher: Springer. December 2018

Hardback ISBN: 97833199777511.

620 pp, 50 colour & 500 b/w illustrations, 50 tables

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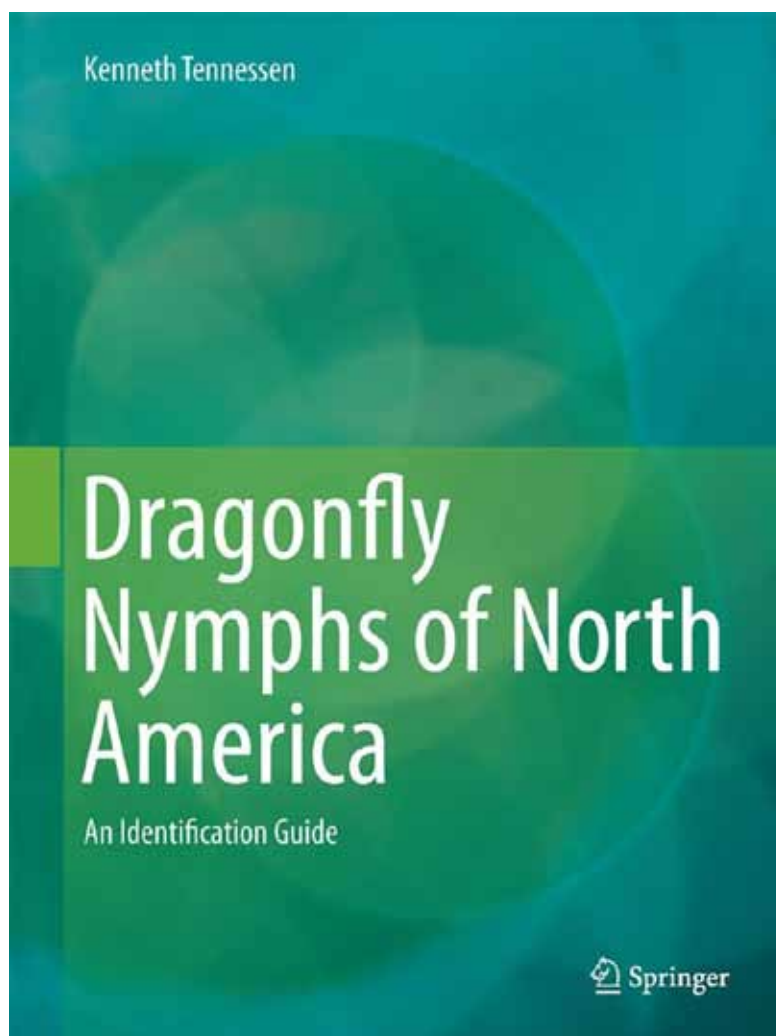
Dragonfly Nymphs of North America is the first of its kind devoted entirely to the dragonfly nymphs of North America north of Mexico, the focus being accurate identification of the 330 species of Anisoptera that occur in the region. Nymphal external morphology is described and illustrated in detail, and all terms needed to navigate the dichotomous keys are defined. Species are tabulated with references that provide the most detailed, accurate descriptions for each; species that are inadequately described are so indicated. The key separating the seven families in the region contains several new characters.

The families are then covered separately: Aeshnidae (13 genera), Gomphidae (17 genera), Petaluridae (2 genera), Cordulegastridae (2 genera), Macromiidae (2 genera), Corduliidae (7 genera), and Libellulidae (29 genera). Each family is further characterized, followed by a generic key. A drawing of the habitus and diagnostic details for each genus are provided, along with additional diagnostic remarks and notes on habitat and life cycle; for each genus, a map shows its geographic distribution in North America. Full-grown nymphs of all known species of each genus are keyed and diagnosed; characters that apply to earlier instars are noted. Morphological variation in character states was analyzed in order

to assess the reliability of previously utilized characters and to discover new characters. Most of the characters used to distinguish all levels of taxa are illustrated; a total of 702 figures, comprising 1,800 original drawings, along with selected photographs where necessary for clarity, accompany the keys.

Measurements of total length, head width, and other variables for each species are provided in tables. Difficulties with past keys and descriptions, including errors, omissions and other shortcomings, are addressed. The importance of nymph characters in helping solve generic and specific distinctions and their role in phylogenetic studies is emphasized. Methods for collecting, rearing, and preserving dragonfly nymphs and exuviae are presented. The final chapter discusses research opportunities on North American Anisoptera nymphs, including taxonomic needs, studies on structure and function, life history and microhabitat, water quality indices and conservation efforts.

The habitus drawings of all genera are arranged according to family in five plates (Appendix I); although Dragonfly Nymphs of North America is intended as a lab manual, these plates conveniently allow for comparison based on nymph shape making field identification to genus possible in many cases. Appendix II contains a brief



history of dragonfly nymph studies in North America. A glossary and an index to scientific names are included.

Kenneth J. Tennessen grew up in the Wisconsin North Woods where he became fascinated with insects at an early age. Of particular impact was the discovery of the life cycle of dragonflies, as he witnessed the transformation of nymphs from an aquatic existence to adults that could mate in the air then return to the water to lay eggs. His pursuit of knowledge on aquatic insects intensified at the University of Wisconsin where he obtained his Bachelor of Science degree in 1968. His ensuing graduate program at the University of Florida was interrupted by the military draft and one year of service in the Vietnam War. Returning to the University of Florida, he earned a Ph.D. in Entomology in 1975 under the direction of Minter J. Westfall, Jr. During his career as an environmental biologist for the Tennessee Valley Authority, he continued taxonomic research on dragonflies on his own time. Numerous collecting trips in Canada and the United States, as well as some of the collections he made in the Neotropics, provided much-needed specimens to

complete this monograph on the Anisoptera nymphs of North America. Although retired, he continues studying Odonata as a Research Associate at the Florida Collections of Arthropods. He currently lives with his wife Sandi in central Wisconsin.

Dragonfly Nymphs of North America

