



AGRION

NEWSLETTER OF THE WORLDWIDE DRAGONFLY ASSOCIATION

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NEWSLETTER OF THE WORLDWIDE DRAGONFLY ASSOCIATION

AGRION is the Worldwide Dragonfly Association's (WDA's) newsletter, which is normally published twice a year in January and July. Occasionally a special issue may be produced, as was the case in May 2020 when a special issue was published in response to the ongoing Covid-19 pandemic. 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/about/agrion/>]. WDA is a Registered Charity (Not-for-Profit Organization), Charity No. 1066039/0. A 'pdf' of the WDA's Constitution and byelaws can be found at its website link at [<https://worlddragonfly.org/about/>].



Editor's notes

Keith Wilson [kdpwilson@gmail.com]

WDA Membership

Membership signing up and renewal process is now handled by WDA directly from the WDA website [<https://worlddragonfly.org/>]. There are three kinds of WDA membership available, either **Regular** or single (£50/year), which is the standard category, **Family** (£75/year) or **Reduced** (£25/year). The latter is a reduced membership category for students (grade school, undergraduate, graduate, etc.) and anyone (student or not) residing in a developing nation (see [UN list](#)). For further information consult the WDA website at: [<https://worlddragonfly.org/new-changes-in-2021/>]. You can sign up for membership using the WDA's website [<https://worlddragonfly.org/membership-account/membership-levels/>] 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. Prior to 2021, membership options were with or without the WDA's journal (*The International Journal of Odonatology*)—in electronic form or hard copy, but as from January 2021 the IJO will only be available in electronic form and will be freely accessible through Open Access. For member benefits see WDA web page under Member Resources [<https://worlddragonfly.org/resources/member-resources/>].

WDA Membership Renewal

Automatic renewal is in place for existing members so they do not have to worry about their membership renewal. A reminder email, notifying members of their upcoming membership payment, will be sent seven days prior to the debit.

Conference & Meeting News

WDA Virtual Meeting and 12th Biennial General Meeting

The WDA held a virtual Odonata Conference and convened its 12th Biennial General Meeting on 15th July 2021. See write-up on page 8.

The International Congress of Odonatology ICO2023

The next ICO will be held in Paphos, Cyprus at the Neapolis University. The Congress was originally scheduled to be held in 2021 but, due to Covid-19 related uncertainties, has now been rescheduled for 25-30 June 2023. For further information consult the WDA website [[Link](#)] or contact David Sparrow, Chair of the Organising Committee [davidrospfo@hotmail.com].



Cover: Polychrome Jewel (*Africocypha varicolor*) yellow and blue forms. This damselfly has been IUCN Red List assessed as Endangered. It is found only in two streams on the Moyabi-Madzay plateau in Gabon. For further information regarding IUCN Odonata Red Listing see article "IUCN Red List: over 6000 dragonfly species assessed" on page 13. Photo credits: André Günther [andre.guenther@extern.tu-freiberg.de] - [[Link](#)].

European Congress on Odonatology (ECOO) 2020 postponed to 2022 due to Covid-19

After several Covid-19 postponements the Slovene Dragonfly Society has announced that the 6th European Congress on Odonatology (ECOO) will now take place in the city of Kamnik, Slovenia from 27-30 June 2022. In addition to lectures, poster presentations and a mid-congress trip a 6-day post-congress field trip is planned from 1-6 July. For further information see the ECOO Congress website [<https://ecoo2016.wordpress.com/>].



WDA and social media

WDA has an active social media team that hitherto has been coordinated by Manpreet Kohli. In December 2021 the WDA Board approved a new Social Media Coordinator, Emily Sandal, to replace Manpreet [<https://worlddragonfly.org/about/social-media-team/>]. Thanks to Manpreet for all her hard work over the past few years. Emily is a postdoctoral research associate at the Center for Biodiversity & Global Change at Yale University, USA. Her work focuses on functional traits and global distribution of dragonflies, with a particular focus on larval odonates. Ethan Tolman has also joined the Social Media Team as co-webmaster and he will help Will Kuhn maintain the WDA web site. Other members of the Social Media Team include Rhema Dike and Danielle Husband. Rhema is a student and research assistant at the University of Lagos in Nigeria. He studies the diversity, distribution, and taxonomy of Odonata in Southwestern Nigeria and also studies odonates as indicators of water quality. Danielle is a biology masters student at Texas Tech University. Her research focuses on west Texas odonates at undersampled and imperiled wetlands. The Social Media Team regularly posts information on Facebook and Twitter about Odonata related news and research. WDA's Facebook group can be found at [<https://www.facebook.com/WorldwideDragonflyAssociation>], and its Twitter presence at [<https://twitter.com/worlddragonfly?lang=en>].

Next issue of AGRION

For the next issue of *AGRION*, to be published at the beginning of July 2022, 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 *AGRION*.

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Message from the President

Yoshi Tsubaki [ytsubaki@iris.eonet.ne.jp]

Dear all WDA members. On behalf of the WDA board, I wish you a happy and successful New Year 2022. I'd like to take this opportunity to mention some changes that were implemented by WDA last year and to let you know what to expect during 2022-23. Before going further, I want to take this opportunity to thank Jessica Ware for her service over the last two years as President of WDA.

The next ICO will be held in Paphos, Cyprus at the Neapolis University. The Congress was originally scheduled to be held in 2021 but, due to Covid-19 related uncertainties, has now been rescheduled for 25-30 June 2023. In view of the ICO2021's postponement to 2023 the WDA Board organized a virtual Zoom event on 15th July 2021 under the strong leadership of Jessica Ware. I believe all attendees enjoyed the screening of the winners of the short videos of field work contest, plenary talks about work being done on each continent, and *My Dragon River* movie screening, filmed and presented by Georg and Dagmar Rüppell. Further details of the event can be found here in *Agrion* on page 8, the WDA's website, Twitter and WDA's Facebook group. The WDA Biennial General Board Meeting was also held virtually during this meeting.

In 2023, we expect we can have an excellent WDA meeting in Paphos, Cyprus, which will be organized by David and Ros Sparrow! Please start planning to join us and let's enjoy face-to-face talking to each other.

IJO (International Journal of Odonatology) is changing rapidly. The following is an extract from a report by John Abbot in *Agrion* [2021: 25(1):4]. After 10 years being published by Taylor & Francis, the WDA Board recognized a need for change of publisher and decided to publish through Wachholtz starting with volume 24, in January 2021. In addition, two more significant changes were made to the journal. First, *IJO* became a strictly online journal. The journal now appears in a larger A4 format with color throughout. Secondly, the journal became Open Access. The corresponding author for each article will be required to be a member of the WDA, but there will be no page charges.

These changes should result in greater reach and thus a greater number of citations for your articles. With these new benefits, we are hopeful that the odonate community will choose to support this initiative by becoming new members and that current members will appreciate these extra values.

IJO will be changed further in 2022. Starting with volume 25, *IJO* will become a self-publishing journal. With support from a professional layout designer and copy editor, we will be able to produce a high quality product. Finally, I must report a few board member updates. First, we would like to welcome to Kendra Abbott, who will be serving as President-elect. We also welcome to the board Kehinde Kemabonta, who will be serving as a Trustee. Also welcome are Emily Sandal, who has been appointed as Social Media Coordinator and Ethan Tolman who will assist Will Kuhn as a Co-webmaster.

I wish you a happy 2022 with many exiting activities in odonatology!

Yoshi Tsubaki
President, WDA

World Odonata List now hosted in TaxonWorks

John Abbott [jabbott1@ua.edu]

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

Because TaxonWorks is just a workbench, you cannot view the list on their site, but the data in each project can be displayed or accessed via API calls. The current list hosted in TaxonWorks can be viewed on Odonata Central [<https://www.odonatacentral.org/app/#/wol/>]. The list is now being maintained by a group of coordinators (Dennis Paulson, Martin Schorr, John Abbott, Cornelio Bota-Sierra, Cyrille Deliry, Klaas-Douwe Dijkstra and Federico Lozano). While this coordinating team actively combs the literature for new species and taxonomic changes, we encourage authors to email us at world.odonata@gmail.com with their publications as they come out; this will ensure that changes are quickly integrated in the list. We also recognize that our team is limited in terms of geographical coverage and expertise and are actively soliciting and welcoming new team members.

The list hosted on OC can be downloaded as xls file, just like on the Slater Museum site. One of the benefits of hosting the list in TaxonWorks is that it can be an easy place for different platforms to access the most up-to-date names. iNaturalist, for example, is now pulling its taxonomy for Odonata from this list. Additionally, we are adding literature, type information, etymology and much more for each species in the database. The list will soon be hosting English-language vernacular names for species worldwide (work in progress by Dijkstra and Paulson) and these will be available through the WOL on OC. All of this will become searchable, filterable, and downloadable in time. We hope this new platform for the list will make the WOL an even more valuable resource as the additional content and accessibility is provided. If you are interested in how to access this data for your own needs via API calls, please email jabbott1@ua.edu. We are always interested in correcting errors in the list and have setup an email, world.odonata@gmail.com, where issues can be reported.

World Odonata List

Download Excel Download CSV

Last revision: 16 Dec 2021
Number of Valid Species: 6344

WOL Coordinating Team

Dennis Paulson, Slater Museum of Natural History, University of Puget Sound, USA
Martin Schorr, Wildfrieden 25, D-54314 Zert, Germany
John Abbott, Alabama Museum of Natural History, The University of Alabama, USA
Cornelio Bota-Sierra, The University of Alabama, USA
Cyrille Deliry, Histories Naturelles, France
Klaas-Douwe Dijkstra, Naturalis Biodiversity Center, the Netherlands
Federico Lozano, Universidad Nacional de Avellaneda, Argentina

Cite as: Paulson, D., Schorr, M., Abbott, J., Bota-Sierra, C., Deliry, C., Dijkstra, K.-D. and Lozano, F. (Coordinators). 2021. World Odonata List. OdonataCentral, University of Alabama. Available at: <https://www.odonatacentral.org/app/#/wol/>. (Accessed: 24 Dec 2021).

Note: Please inform us by emailing world.odonata@gmail.com of any errors of commission or omission.

Use your browser's search function (ctrl+F for windows or cmd+F for macOS) to find taxa within the list. We are working on specific search functionality, so please check back often.

This list is being managed in TaxonWorks by the team listed above. TaxonWorks is an online workbench for taxonomy. It includes all synonyms for all species (but not the genera yet) that we have been able to confirm. We consider the list a good starting point for estimates of biodiversity in this insect order. Our goal is to continuously add information to this list that will be of value to the odonate community. We hope soon to introduce an easy way for tracking changes to the list and searching and exporting functions. The list is available to anyone through API calls and we encourage administrators of websites who rely on up-to-date odonate taxonomy to take advantage of this. If you would like to learn how to access the list via API calls for your site, please contact John Abbott (jabbott1@ua.edu).

The nomenclatural basis for this list is Bridges (1993). The classification is based on three recent publications, Dijkstra et al. (2013), Dijkstra et al. (2014) and Bybee et al. (2021) (see also [Appendix B](#) from that publication). We have not recognized any subspecies of Odonata. Instead, we have listed all named subspecies as synonyms of the species under which they were named. We are not able to judge the validity of these subspecies, and as many of them have been questioned, we chose to treat them all in the same fashion. The families are in phylogenetic order (i.e. the smaller sister-group is listed first), except in Calopterygoidea as both that superfamily and the relationships within it are too poorly resolved (Bybee et al. 2021). The genera and species are in alphabetical order within the family. The original genus, when differing from a species' current placement, is listed in square brackets after the species name.

We would like to give a special thanks to Cyrille Deliry, Martin Lindeboom, Fons Peels, Keith Wilson, and Dan Zimberlin, whose contributions to the list continue to improve it.

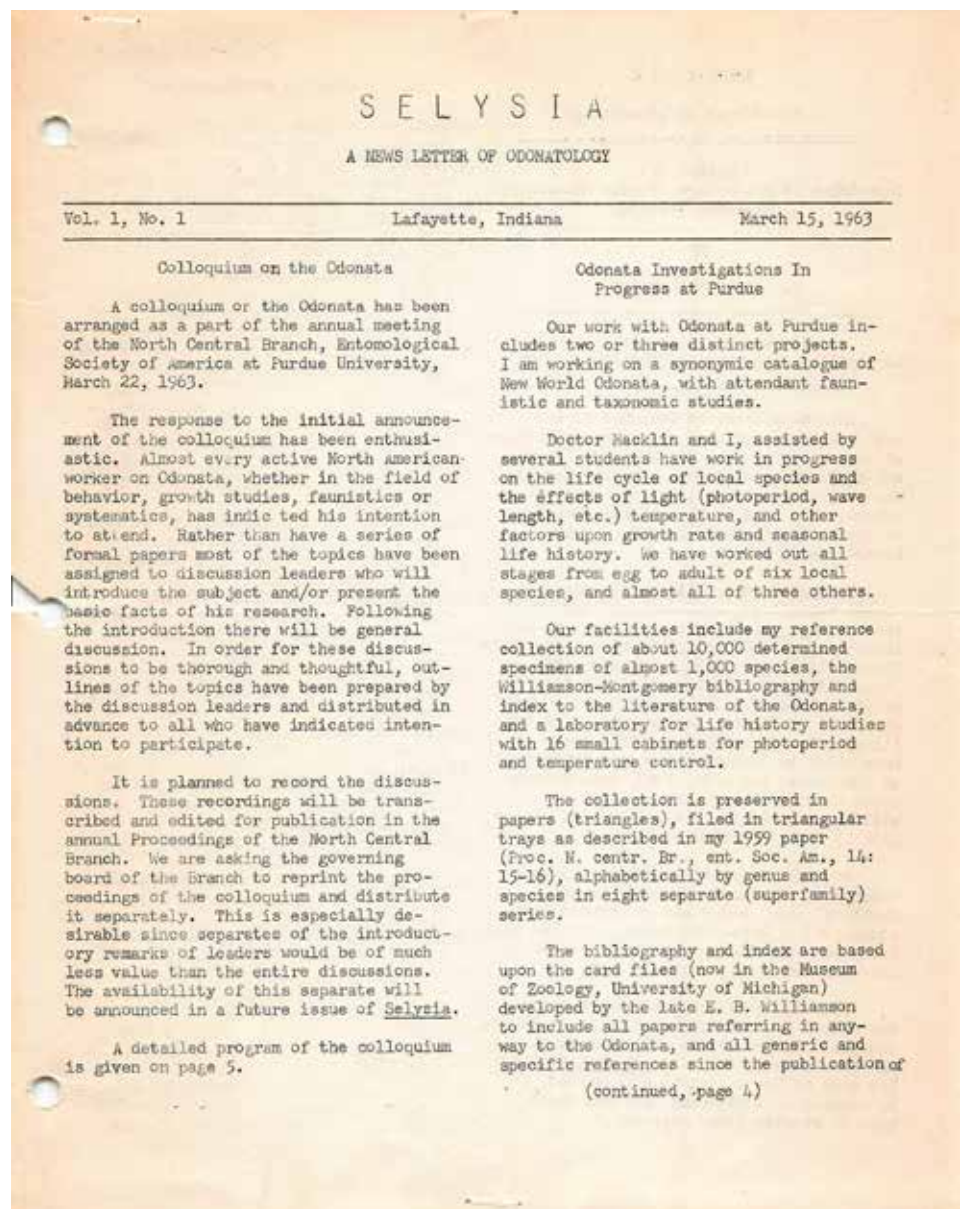
Selysia - Now available on-line

John Abbott [jabbott1@ua.edu]

Selysia was a biannual “newsletter of Odonatology” that was first published in 1963 by B. Elwood Montgomery out of Purdue University, Indiana, USA. Montgomery edited and published until Minter Westfall (Gainesville, Florida) took it over from 1970-1986, followed by Dan Johnson (Johnson City, Tennessee) from 1987-1993 and then Jill Silbsy (Purley, UK) and Martin Schorr (Zerf, Germany) from 1996 until 1997. It also served as the newsletter for the *International Odonata Foundation* (*Societas Internationalis Odonatologica*) for a time. *Selysia* preceeded *Argia*, the newsletter of the *Dragonfly Society of the Americas*, which was founded in 1989. *Selysia* contains numerous interesting and useful articles throughout its 34-year existence. The articles are varied, summarizing collecting trips and various collections as well as covering such topics as *Odonata as Indicators of Water Pollution* [1965: 3(1): 7], *Common (Folk) Names for Odonata* [1965: 3(2): 1-3], *Observations on the Spelling and Gender of Technical Names in the Odonata* [1973: 6(1): 1-6], *Evolutionary Traits in Life Cycles and Gill Development in Odonata* [1982: 11(2): 24-25], *Polychromatism in Female Aeshnidae* [1983: 12(1): 3-4], *Protodonate Endothermy Immortalized in Verse* [1987: 16(1): 1], *Clubtails on the Flambeau* [1988: 17(2): 9], and *Calopteryx aquabilis* “Flying” on water [1990: 19(2): 15].

I have scanned and OCR'd the full set so they are searchable. They are hosted on our *Worldwide Dragonfly Association* (WDA) website and available to everyone at <https://worlddragonfly.org/selysia/>. I eventually hope to have all the articles cataloged and searchable by year, title and author—so check back at the link above in due course.

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



VOL. 18, NO. 1

Johnson City, Tennessee

March 1, 1989

Dan M. Johnson, Organizing Secretary
Department of Biological Sciences
East Tennessee State University
Johnson City, TN 37601

Philip S. Corbet
The Old Manse, 45 Lanark Road

The X International Symposium held at East Tennessee State University, 1989. Registration Forms are available above. Abstracts and Resolutions are available on March 1. The I.U.C.N. Odonata Symposium will be held on Sunday, 6 August, at 10 A.M. Registration forms will be available on Saturday night for those who wish to attend. In order to accommodate certain speakers, the symposium will be held over their week between competing schedules. Papers about "adults" will be presented on Tuesday and those about "larvae" on Friday. The mid-symposium colloquium will be on Wednesday. The banquet will be Thursday afternoon. A symposium tour, led by Ken and I, will be on Saturday morning, 12 August, at 10 A.M. Registration forms will be available on Friday, 11 August, at 10 A.M. Registration forms will be available on Friday, 11 August, at 10 A.M.

The Organizing Committee Grants to partially cover the expenses of requesting more than twice the number of papers asked certain colleagues to prepare papers on the particular contributed paper series: "phylogeny"; Wolfgang Schneider on "functional morphology"; Frank Cordeiro on "ecology"; Mike May on "physiology"; and Ola Fincke on "systematics" and those contributed by travel grants. A particularly interesting symposium was on "functional morphology" and "ecology".

Vol. 25, No. 2
(Germany)

Lindern and Böblingen
September 20, 1997

Message of the S.I.O.-Secretary

Reinhard JÖDICKE
Grossenging 14
D-49699 Lindern, Germany

This issue of SELYSIA is an extraordinary and very small one, simply to inform you about the recent events.

All those who are concerned about the fate of S.I.O. can fully trust in the benefit of the new organisational modality: ODONATOLOGICA and all the other S.I.O. periodicals and services will be handled by a modern foundation management in future. The management board is a team of dedicated odontologists who will fulfil their tasks within a legal framework, with a lot of commitment and in a friendly atmosphere. Finally all those dreadful quarrels belong to the past and meaningful odontological work can prosper again in S.I.O.

Please note that legally a foundation can have no membership. Therefore all former members and all subscribers of ODONATOLOGICA will in future have to be regarded as "Associates of S.I.O."

We of course encouraged the National and Regional Offices to continue their activities as heretofore. Most of them spontaneously agreed with the principles of the foundation. At present, the setup of several additional National and Regional Offices is under discussion.

**S.I.O. continues the publication
of ODONATOLOGICA**

Kiyoshi INOUE

5-9, Fuminosato 4-chome
Abeno-ku, Osaka, 545, Japan

Message of the S.L.O.-President

During the past S.I.O. Business Meeting held on July 14, 1997 in Maribor / Slovenia, the proposed new Constitution was rejected by a majority of voters. Since this result was foreseeable and since it would have been a great pity if the organisation would have broken down, we decided to find new organisational modalities. Therefore S.I.O. was reorganised and set up as a modern international foundation and registered accordingly.

The failure of the Business Meeting in Maribor was foreshadowed, when some members of the former Council announced a mail ballot although this was clearly illegal under the then valid Constitution and even against the civil law of the referring country. We urged them to cancel the mail ballot, but they insisted on carrying out the ballot in June, even though many letters with protests against the ballot had reached them from all over the world. At this point, we had to initiate the registration of the foundation, since otherwise it would have been too late, and our S.I.O. would have been destroyed.

The establishment of the foundation was announced by me at the end of the Business Meeting when the organisational framework of former society had definitively been broken down. Now the work of our long-standing society will be continued by a modern foundation management; thus S.I.O. is able to survive. The time of unnecessary quarrels is over and peaceful odonotological work will prevail again.

The Charter of the Foundation is based on the same objectives as outlined in the old S.I.O. Constitution of 1981. The scope of activities remain likewise the same.

The S.I.O. is now managed by a Management Board which currently includes the following four persons:

- **President:** Kiyoshi Inoue, Japan
- **Secretary:** Reinhard Jödicke, Germany
- **Treasurer:** Marianne Kiauta, the Netherlands

SELYSIA 25(2)

WDA Virtual Odonata Conference and 12th Biennial General Meeting – 15 July 2021

In view of the ICO2021 postponement to 2023 the WDA organised a virtual online event on 15th July 2021. The meeting took place using Zoom videoconferencing software, and commenced at 10:00 am GMT. After a welcome and introduction from Jessica Ware, the outgoing President, there was a screening of the winners of a short video contest highlighting aspects of contestants' field work. This was followed by six plenary talks about work being done around the world. The plenary speakers represented North America, Africa, Australasia, Asia (India & Indonesia) and also two speakers gave globally focused presentations; one from the IUCN Dragonfly Specialist Group Co-chairs and one from the GEODE Project. Following the plenary presentations there was a screening of Georg Rüppell and Dagmar Hilfert-Rüppells' film: *My Dragon River*. During the event there were two breakout sessions where members could link up and socialize on various odonatological topics of interest to them and talk directly to other members in the chat session. The virtual conference programme, as it occurred, is summarized below. The plenary sessions were prerecorded and screened as short videos or PowerPoint presentations. Questions were taken for presenters if they were logged on but not all the presenters were able to log on during their presentation.

Time in GMT/ EDT/Tokyo	Item	Details
10:00/5:00/18:00	Welcome and introduction of board members	Host: Jessica Ware
10:30/5:30/18:30	Video contest entries	Host: Chris Beatty
11:00/6:00/19:00	Breakout rooms & socializing	Host: Göran Sahlén
11:30/6:30/19:30	Biennial General Meeting	Host: Jessica Ware & Yoshi Tsubaki
	Plenary talks (ca. 10 minutes each)	
12:30/7:30/20:30	Bruce Archibald, Department of Biological Sciences, Simon Fraser University, Burnaby, British Columbia, Canada. Bruce is a palaeontologist and recently the lead author of an important paper that established a new extinct suborder of Odonata, the suborder: Cephalozygoptera from the early Eocene (ca. 50 million years ago) [Link] . His presentation focused on odonate fossils found in ancient lake bed deposits in British Colombia and the discovery of several species making up the new suborder: Cephalozygoptera.	Host: Keith Wilson
12:45/7:45/20:45	IUCN Species Specialist Group - Dr Viola Clausnitzer, Dept of Zoology, Senckenberg Research Institute, Frankfurt & Federico Lozano, National University of Avellaneda, Buenos Aires, Argentina, Environmental Science. Viola and Federico are co-chairs of the IUCN Dragonfly Specialist Group. Their presentation discussed the IUCN global dragonfly assessment with 5,342 species assessments already published and a further 900 assessments waiting to be published in 2021. See article on "IUCN Red List: over 6000 dragonfly species assessed" on page 13.	Host: Keith Wilson
13:00/8:00/21:00	Associate Professor Kehinde Kemabonta, University of Lagos, Nigeria. Presentation on African dragonflies especially odonates from West Africa at Benin, Nigeria and Cameroon.	Host: Keith Wilson
13:15/8:15/21:15	Richard Rowe retired, formerly from James Cook University, Townsville Queensland, Australia. His presentation covered the present status of Australasian odonate research.	Host: Keith Wilson
13:35/8:35/21:35	Pungki Lupiyaningdyah, from Museum Zoologicum Bogoriense, Research Center for Biology, LIPI and currently a PhD student at the Department of Biology, Brigham Young University, Utah, USA. Punk's presentation covered Odonata research in Indonesia.	Host: Keith Wilson
13:50/8:50/21:50	Prof KA. Subramanian (Subbu), Scientist & Officer-in-Charge at the Southern Regional Centre for the Zoological Survey of India. Based in Chennai, Tamil Nadu, southern India. His presentation focused on south Asian odonate research.	Host: Keith Wilson

Time in GMT/ EDT/Tokyo	Item	Details
14:15/9:15/22:15	Prof Seth Bybee – GEODE Team (Genealogy & Ecology of Odonata). Associate Professor Brigham Young University, Provo, Utah, USA. Seth's presentation explained the activities and purpose of the GEODE working group focusing on evolutionary relationships, ecological niches, and geographic locations for all known living and extinct dragonflies and damselflies.	Host: Keith Wilson
14:30/9:30/22:30	Screening of the magnificent film: <i>My Dragon River</i> , filmed and presented by Georg Rüppell and Dagmar Hilfert-Rüppell	Host: Jessica Ware
16:00/10:00/23:00	Breakout rooms & socializing	Host: Peter Brown

Worldwide Dragonfly Association 12th Biennial General Meeting Programme held virtually 15th July, 2021

All persons logged on to the virtual Odonata Conference were welcome to attend but only WDA members were able to vote.

1. Appointment of Chairman Jessica Ware (the outgoing President)
 2. Appointment of minute recorders - The Zoom Biennial General Meeting was recorded
 3. Approval of Agenda
 4. Apologies for Absence
John Abbott sent his apologies for his absence
 5. Approval of minutes of the 11th Biennial General Meeting July 2019 - Minutes approved
 6. Matters Arising (from minutes) - None
 7. Report of the President - Jessica Ware
 8. Report of the Secretary - Peter Brown
 9. Report of the Treasurer - Peter Brown
 - presentation of accounts
 - acceptance of accounts
 10. Biennial Report of Managing Editor of IJO Jessica summarised on behalf of John Abbott
 11. Biennial Report of Webmaster Will Khun and Manpreet
 12. Biennial Report of Editor of *Agrion* newsletter - Keith Wilson
 13. Biennial Report of Chairman of International Congress Committee - Frank Suhling
 14. Biennial Report of Conservation and Fund Committee - Göran Sahlén
(the complete **2019–2021 WDA Biennial Report** was published in the July 2021 issue of *Agrion* pp 44-47).
 15. Discharge of Present Board of Trustees - Jessica
 16. Announcement of results of the election to the 2021–2023 Board:
President: Yoshi Tsubaki
President Elect: Kendra Abbott
Secretary and Treasurer: Peter Brown
Managing Editor: John Abbott.
Webmaster: Will Kuhn, with assistance as needed from Rhainer Guillermo.
Symposium Coordinator: Frank Suhling (nominated by Jessica Ware and Göran Sahlén)
Chairman Conservation & Funding: Göran Sahlén.
Editor *Agrion* Newsletter: Keith Wilson, with assistance from Graham Reels.
Trustee: Kehinde Kemabonta
Trustee: Christopher Beatty
Past President: Jessica Ware
The above Board members were duly appointed
 17. Remarks from the new WDA President
 18. New business
 19. Date and time of next meeting: 23-25 June 2023, Paphos, Cyprus
- End of meeting

Given the vagaries of Zoom videoconferencing the virtual meeting proceeded remarkably smoothly and was well attended. Thanks are especially due to the plenary session speakers and to Jessica Ware who was principally responsible for organising and hosting the conference.

Edward Osborne Wilson
(Birmingham, Alabama 10 June 1929 –
Burlington, Massachusetts 26 December 2021)

The Patron of the WDA, the distinguished American entomologist and scientist Edward Osborne Wilson, sadly passed away, at the age of 92, on 26 December 2021 in Burlington, Massachusetts.

Professor E.O. Wilson FRS was unanimously elected by the WDA Board as Patron of the WDA in June 2001 after he graciously accepted an invitation. Professor Wilson's acceptance letter:

"I consider it a special honor indeed to be invited to serve as Patron of the Worldwide Dragonfly Association, particularly since, as you point out, our commitment to in-depth taxon biology is so closely matched. So I accept gladly."

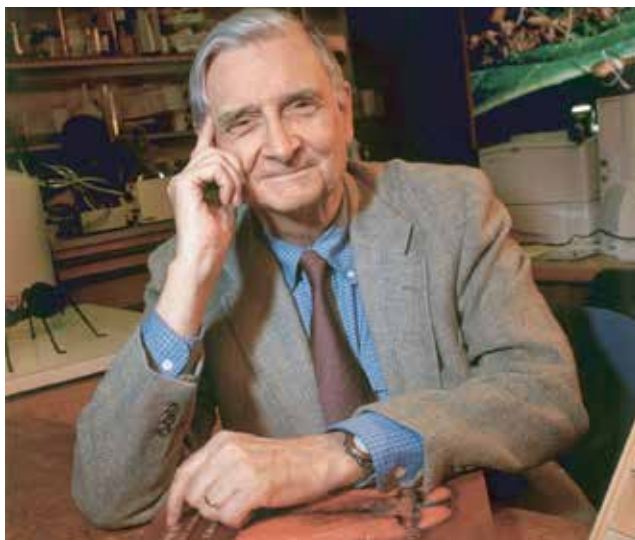
A full statement was issued upon his death by Joel R. Johnson representing the *E.O. Wilson Biodiversity Foundation*. The statement is repeated here below:

A full statement on the death of Edward O. Wilson issued by the *E.O. Wilson Biodiversity Foundation* (updated 27th December 2021) [[Link](#)]

The *E.O. Wilson Biodiversity Foundation* mourns the passing of preeminent scientist, naturalist, author, teacher, and our inspiration, E.O. Wilson, Ph.D. One of the most distinguished and recognized American scientists in modern history, Dr. Wilson devoted his life to studying the natural world and inspiring others to care for it as he did.

"E.O. Wilson's holy grail was the sheer delight of the pursuit of knowledge. A relentless synthesizer of ideas, his courageous scientific focus and poetic voice transformed our way of understanding ourselves and our planet. His greatest hope was that students everywhere share his passion for discovery as the ultimate scientific foundation for future stewardship of our planet. His gift was a deep belief in people and our shared human resolve to save the natural world," said Paula J. Ehrlich, CEO & President of the *E.O. Wilson Biodiversity Foundation*, and co-founder of the *Half-Earth Project*.

E.O. Wilson was called "Darwin's natural heir," and was known affectionately as "the ant man" for his pioneering work as an entomologist. Dr. Wilson was Honorary Curator in Entomology and University Research Professor Emeritus at Harvard University, Chairman of the E.O. Wilson Biodiversity Foundation Board of Advisors, and Chairman of the Half-Earth Council. He is widely recognized as one of the foremost naturalists in both science and literature, as well as a synthesizer in works stretching from pure biology across to the social sciences and humanities. Dr. Wilson was the author of



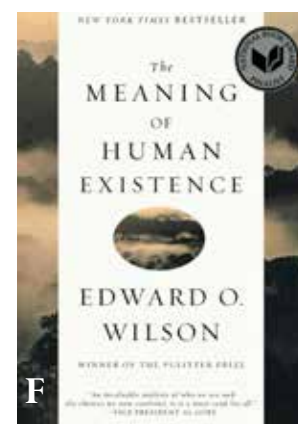
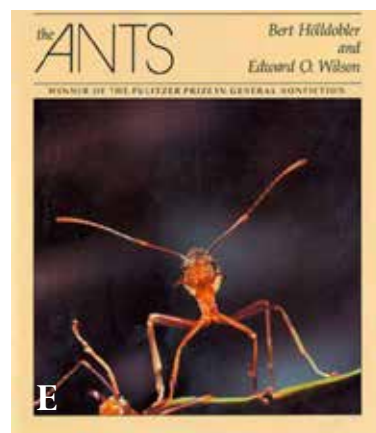
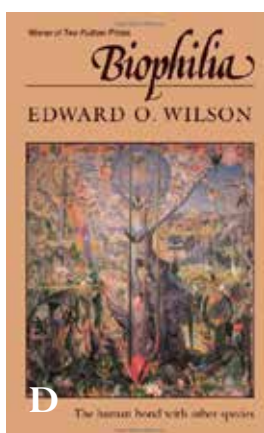
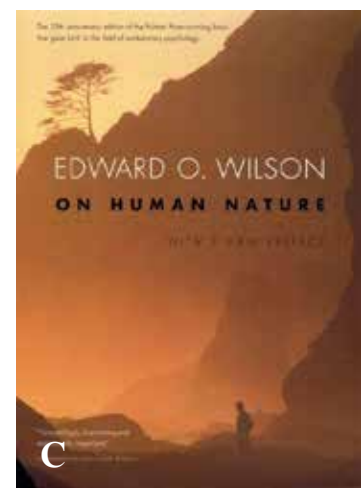
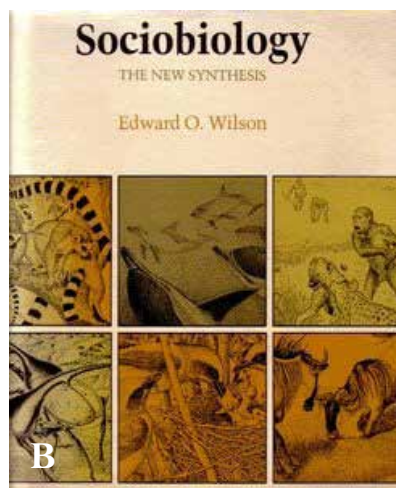
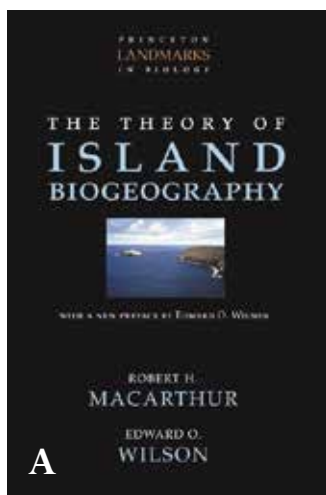
Edward O. Wilson, February 2003. Photo credit: Jim Harrison [Wikimedia Commons](#).



E.O. Wilson with WDA President Elect Kendra Abbott at the University of Alabama (UA) where he was an alumnus, 4 November 2019. Kendra and her students organised an exhibit of E.O. Wilson's many awards at the University of Alabama. E.O. Wilson gained B.S. and M.S. degrees in biology at UA in 1949 & 1950 respectively. In 1951 E.O. Wilson transferred to Harvard University where he gained a doctorate in 1955.

over 30 books and forewords, over 430 scientific papers, and recipient of over a hundred awards including the U.S. National Medal of Science, the Crafoord Prize and the International Prize of Biology of Japan; and in letters, two Pulitzer Prizes in non-fiction, the Nonino and Serono Prizes of Italy and COSMOS Prize of Japan. In his long career, Dr. Wilson transformed his field of research—the behavior of ants—and applied his scientific perspective and experience to illuminate the human circumstance, including human origins, human nature and human interactions. Wilson has also been a pioneer in spearheading efforts to preserve and protect the biodiversity of earth. Dr. Wilson is acknowledged as the creator of two scientific disciplines (island biogeography and sociobiology), three unifying concepts for science and the humanities jointly (biophilia, biodiversity studies, and consilience) and two major advances in global biodiversity conservation (the Encyclopedia of Life and Half-Earth).

Born June 10, 1929 in Birmingham, Alabama, “Ed” grew up in “America’s Amazon”, the Mobile-Tensaw delta, as well as Washington, D.C. At a young age, he cultivated his love for nature among the marshes and bottomland forests of Alabama and in Washington D.C.’s Rock Creek Park. Educated at University of Alabama and later Harvard University, he received his Ph.D. in entomology in 1955 and participated in expeditions to Cuba, Mexico, the South Pacific, Australia, Fiji, Sri Lanka and later, Mozambique. In the 1960s he partnered with mathematician and ecologist Robert MacArthur in developing the theory of species equilibrium which led to Wilson and MacArthur's book *The Theory of Island Biogeography*, now a standard ecology text and the basis for the scientific principle of “half-earth”. He won his first Pulitzer Prize in 1978 for *On Human Nature*, which dealt with the role of biology in the evolution of human culture, and a second in general nonfiction in 1990 for *The Ants*, co-written with Bert Hölldobler. He officially retired in 1996. After co-founding the Society of Conservation Biology, serving on the boards of The Nature Conservancy, Conservation International, and American Museum of Natural History, Dr. Wilson co-founded the *E.O. Wilson Biodiversity Foundation* in 2005. In 2016, Dr. Wilson published *Half-Earth, Our Planet’s Fight for Life*, and co-founded the *Half-Earth Project*.



A few of the major works' book covers selected from over 30 books written by by E.O. Wilson. (A) *The Theory of Island Biogeography*, 1967. (B) *Sociobiology: The New Synthesis*, 1975. (C) *On Human Nature*, 1978. Winner of the 1979 Pulitzer Prize for General Nonfiction. (D) *Biophilia*, 1984. (E) *The Ants*, 1990. Winner of the 1991 Pulitzer Prize together with coauthor Bert Hölldobler. (F) *The Meaning of Human Existence*, 2014.

with Paula J. Ehrlich, CEO & President, *E.O. Wilson Biodiversity Foundation*. The Foundation has pursued a goal of educating the next generation about biological diversity, and putting “Half-Earth”, conserving half the land and seas for biodiversity, into practice. The Half-Earth Project aims to raise the world’s level of ambition and action required to reverse the current extinction threat through the support of deep science to discover, identify, and map the world’s species. In 2009, the E.O. Wilson Biophilia Center, a 54,000 acre Florida preserve founded by M.C. Davis, opened with the mission of environmental education. In 2014, in partnership with Greg Carr, a co-founder of Dr. Wilson’s eponymous foundation, the E.O. Wilson Biodiversity Laboratory at Gorongosa National Park opened to document Mozambique’s vast ecological richness. The laboratory is under the direction of Piotr Naskręcki, Ph.D., and Half-Earth Chair, whom Wilson has called “the best naturalist in the world.” Dr. Wilson’s last lecture, “Ecosystems & the Harmony of Nature,” was presented in conversation with Sir David Attenborough and Sir Tim Smit at Half-Earth Day® 2021 in October. Wilson’s authorized biography, *SCIENTIST, E.O. Wilson: A Life in Nature* by Richard Rhodes, was published in November.

“It would be hard to understate Ed’s scientific achievements, but his impact extends to every facet of society. He was a true visionary with a unique ability to inspire and galvanize. He articulated, perhaps better than anyone, what it means to be human. His infectious curiosity and creativity have shaped the lives of so many, myself included, and I feel lucky to have called him a friend,” said David J. Prend, Chairman of the Board, E.O. Wilson Biodiversity Foundation.

Paul Simon, friend and member of the E.O. Wilson Biodiversity Foundation board shared, “It is a rare combination of good when an intellectual giant like Ed Wilson can leave a legacy of enormous scientific contributions with a memory trail of a kind, humble, generous man who had great exuberance for life.”

E.O. Wilson died on December 26 in Burlington, Massachusetts. He was 92. Dr. Wilson is preceded in death by his wife Irene K. Wilson. He is survived by his daughter, Catherine I. Cargill and her husband John. A tribute to Dr. Wilson’s life is planned for 2022. Memorial details are to be announced.

Joel R. Johnson
[jjohnson@eowilsonfoundation.org]

Editor

The death of such an eminent biologist and naturalist has been widely reported throughout the World especially in the English press both in the US and the UK. Links to a selection of ‘free to view’ articles and obituaries from the US and UK are provided below.

US

Wall Street Journal - Obituary [[Link](#)]
The New York Times [[Link](#)]
Los Angeles Times - Obituary [[Link](#)]
The Washington Post - Obituary [[Link](#)]
National Geographic [[Link](#)]

UK

The Guardian - Obituary [[Link](#)]
The Independent [[Link](#)]
New Scientist [[Link](#)]

British-American

Britannica [[Link](#)]

IUCN Red List: over 6000 dragonfly species assessed

Viola Clausnitzer [viola.clausnitzer@senckenberg.de]
 Federico Lozano [federicolozano82@gmail.com]

Following the most recent update of the International Union for Conservation of Nature Red List (IUCN, 2021), as of 9th December 2021, the number of species at risk of extinction on the Red List has exceeded 40,000 for the first time. The IUCN Red List now includes 142,577 species of which 40,084 are threatened with extinction. However, of the largest of all organism groups, the insects, only 12,100 species have been assessed so far. The complete dragonfly assessment contributes almost 50% to this number (6,016 species). The assessment was completed by members of the *IUCN Species Survival Commission (SSC) Dragonfly Specialist Group* co-chaired by Viola Clausnitzer and Federico Lozano.

The assessment of the world's dragonflies and damselflies reveals that 16% out of 6,016 species are at risk of extinction (categories CR, EN, VU and NT combined); 11% are threatened if counting only the three IUCN threat categories (CR, EN and VU). The destruction of wetlands is driving the decline of dragonflies worldwide. Their decline is symptomatic of the widespread loss of the marshes, swamps and free-flowing rivers they breed in, mostly driven by the expansion of unsustainable agriculture and urbanization (for instance in South America) around the world. In South and Southeast Asia, more than a quarter of all species are threatened, mostly due to the clearing of wetland and rainforest areas to make room for crops such as palm oil. In Central and South America, the major cause of dragonflies' decline is the clearing of forests for residential and commercial construction. Pesticides, other pollutants (particularly eutrophication) and climate change are growing threats to species in every region of the world, and are the greatest threats to dragonflies in North America and Europe. However, it was recently demonstrated that many riverine species in Central Europe recovered after heavy declines, which is due to various programs aiming to increase water quality and restore natural river morphology, indicating that restoration efforts are not futile (Bowler et al., 2021).



Polychrome Jewel (*Africocypha varicolor*). It has been Red List assessed as Endangered (Clausnitzer, 2017). Sixteen percent of the world's damselfly and dragonfly species are threatened with extinction, including *Africocypha varicolor*, a species found only in two streams on the Moyabi-Madzay plateau in Gabon. (A) Yellow form. (B) Blue form. Photo credits: André Günther [andre.guenther@extern.tu-freiberg.de]. [[Link](#)].

Dr. Bruno Oberle, IUCN Director General remarked:

By revealing the global loss of dragonflies, today's Red List update underscores the urgent need to protect the world's wetlands and the rich tapestry of life they harbour. Globally, these ecosystems are disappearing three times faster than forests. Marshes and other wetlands may seem unproductive and inhospitable to humans, but in fact they provide us with essential services. They store carbon, give us clean water and food, protect us from floods, as well as offer habitats for one in ten of the world's known species.

Dr. Viola Clausnitzer, Co-chair of the IUCN SSC Dragonfly Specialist Group added:

Dragonflies are highly sensitive indicators of the state of freshwater ecosystems, and this first global assessment finally reveals the scale of their decline. It also provides an essential baseline we can use to measure the impact of

conservation efforts,” “To conserve these beautiful insects, it is critical that governments, agriculture and industry consider the protection of wetland ecosystems in development projects, for example by protecting key habitats and dedicating space to urban wetlands.

Dr. Jon Paul Rodríguez, Chair of the IUCN Species Survival Commission pointed out that:

Most of Earth's surface, about 71%, is covered by oceans. But only 3.5% of Earth's water is freshwater. Humans share this precious resource with all other organisms that live on land. The decline of dragonflies brings again to our attention the need to prioritise investment in freshwater ecosystems, an issue that is often overlooked. For example, SDG 14 in English is "Life Below Water," while in Spanish it is "Vida Submarina" (Submarine Life), completely ignoring continental waters“.

Dr. Nathalie Pettorelli, Zoological Society of London (ZSL) Senior Scientist cautioned:

Despite the 2019 Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) report making it abundantly clear that nature deterioration needs to be urgently addressed, we are still to witness the transformative changes required for governments around the world to become nature positive,. Addressing the rapid erosion of our natural capital is not something that can wait; it's not something optional; it's not something we can just ignore. Wildlife is our key ally to tackle the numerous societal challenges we face, including the existential threat posed by climate change. Today's announcement that, for the first time, the number of endangered species has gone over 40,000 should be a wake-up call for all governments ahead of COP15.”

Toyota Motor Corporation. The Odonata Red List assessment has been supported by Toyota Motor Corporation who are quoted below.

Toyota is proud to have contributed to the global dragonfly assessment, the first insect group to be comprehensively assessed on the IUCN Red List. This achievement will make it possible to track progress in addressing biodiversity loss around the world.

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Mesamphiagrion gaudiimontanum from the Santa Ines Páramo Complex, Antioquia, Colombia, 3 October 2011. (A) Male. (B) Female. This damselfly has been Red List assessed as an Endangered species (Bota-Sierra et al., 2016). It is only known from the northern peat bogs in the highlands of the Andean Colombian Central Cordillera where it is known from only from five localities. Four years ago the population in one of the localities disappeared due to the incursion of an alien fish species. It may become Critically Endangered in future assessment due to the threats of climate change and alien fish. Photo credit: Cornelio Andrés Bota-Sierra [corneliobota@gmail.com]. [Link].

Clausnitzer, V., 2017. *Africocypha varicolor*. The IUCN Red List of Threatened Species 2017: e.T84379340A84382131. [Link]. Accessed on 19th December 2021.
IUCN, 2021. *The IUCN Red List of Threatened Species*. Version 2021-3. [https://www.iucnredlist.org/]. Accessed on 9th December 2021.

Editor

The IUCN Red List Odonata assessment of over 6,000 species article draws from the information, imagery and comments provided in the IUCN's Press Release issued 9 December 2021 titled: *Dragonflies threatened as wetlands around the world disappear - IUCN Red List* [Link].

Congratulations to IUCN SSC Dragonfly Specialist Group

The WDA congratulates the members of the IUCN *Species Survival Commission (SSC) Dragonfly Specialist Group*, several of them whom are WDA members, in successfully finishing this monumental task. It's a great achievement and has involved many thousands of man-hours of rigorous assessment in order to complete the task. Special thanks are also due to the hard work and dedication of the *Dragonfly Specialist Group's* Co-chairs, Viola Clausnitzer and Federico Lozano, for overseeing the assessment of Odonata. It is noteworthy that Dr. Jon Paul Rodríguez, Chair of the IUCN *Species Survival Commission* has formally acknowledged the *Dragonfly Specialist Group's* achievement by issuing a *Citation of Excellence* as shown below.



Citation of Excellence awarded to IUCN SSC *Dragonfly Specialist Group* by Dr. Jon Paul Rodríguez, Chair of the IUCN *Species Survival Commission*.

First Record of *Mortonagrion aborens* Laidlaw, 1914 (Odonata: Coenagrionidae) from Nepal

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Abstract

Mortonagrion aborens Laidlaw, 1914 is recorded for the first time from Chitwan, Nepal. One male individual was photographed at Agriculture and Forestry University (AFU), Rampur, Chitwan, 26 September 2021. The total number of Odonata species recorded from Nepal is raised to 181.

Keywords: Odonata, Zygoptera, damselfly, new distribution, Nepal.

Introduction

The first checklist of Odonata of Nepal was prepared by Vick (1989) in which he listed 172 species. Conniff et al. (2020) reported eight new species raising the number of Odonata found in Nepal to 176. A more recent checklist by Kalkman et al. (2020) listed 179 species for Nepal with two doubtful records viz. *Aciagrion hisopa* (Selys, 1876) and *Ictinogomphus angulosus* (Selys, 1854). This list, however, omits another recent record, *Ceriagrion cerinorubellum* Brauer, 1865, that was reported from Nepal by Sajan and Gurung (2020). It has been observed fairly frequently across Nepal, and also in the AFU, Chitwan Study Area discussed here.

Mortonagrion aborens is reported from northeast India, Pakistan, Bangladesh and the Andaman Islands (Kalkman et al., 2020). It extends up to Indonesia (Kalimantan, Sumatra), Malaysia (Peninsular Malaysia) and Thailand (Subramanian 2010). The male differs from the female in having abdominal segments 9-10 almost entirely blue except for a transverse black line near S9 apex and a narrow black mid-dorsal line along S10, while S9-10 of female are black on the dorsum (Payra & Tiple 2016). *Indagrion gautama* Fraser, 1922, found in Pakistan, is regarded as a junior synonym of *M. aborens*, (Schorr & Paulson 2019). The closely related *Mortonagrion varralli* Fraser, 1920 is confined to South India but is morphologically very different.

Methodology

The first author partook in an opportunistic survey specifically looking for butterflies at the Agriculture and Forestry University (AFU), Chitwan, Nepal in late September, 2021. Having briefly worked on Odonata in the past, he took a photograph of an unfamiliar damselfly he came across, before returning to survey butterflies. The photo was taken using Canon 7D MarkII camera coupled with 100mm f/2.8L macro IS USM lens. On return to Pokhara, after consulting the Odonata of India website (<https://www.indianodonata.org>), he identified the species as *Mortonagrion aborens* that has not previously been reported from Nepal. For confirmation, the image was sent to Mr. Prosenjit Dawn (Assistant Professor, Zoology, Shyampur Siddheswari Mahavidyalaya, West Bengal, India) and Dr. Karen

Figure 1 (A-B). *Mortonagrion aborens* Laidlaw, 1914, Agriculture and Forestry University (AFU), Rampur, Chitwan, Nepal., 26 September 2021, 170 masl. (A) Habitus. (B) Caudal abdominal segments of male showing the typical black mid dorsal line on S10 and narrow black line near S9 apex.



Lynn Coniff (International Centre for Integrated Mountain Development). The identification was confirmed as *Mortonagrion aborens* by both odonatists. Aware of the record's importance, the first author sent the second author, who is a final year student of the AFU to the discovery site location. However, she could only find the damselflies *Ceriagrion cerinorubellum* and *Aciagrion pallidum* Selys, 1891 at the site.



Figure 2 (A-B). Study Area at Agriculture and Forestry University (AFU), Rampur, Chitwan, Nepal. Credit: Google Earth.



Figure 3. *Mortonagrion aborens* habitat at Agriculture and Forestry University (AFU), Rampur, Chitwan, Nepal, 26 September 2021.

Observation

One male individual was sighted in the premises of Agriculture and Forestry University (AFU), Chitwan, Nepal on 26.ix.2021 at 170 masl (27°39'19.5"N 84°21'12.5"E). The individual was seen inside a mango orchard among bushes in a shady habitat.

Discussion

Mortonagrion aborens has been recorded from as close as northeast India and West Bengal from as low as 10 masl (Payra & Tiple 2016). Thus, it is not considered unusual that it has now been found in the lower plains of Nepal. Also, since *Indagrion gautama*, a junior synonym, has been recorded from Pakistan, its occurrence in central Nepal has not come as a total surprise.

Acknowledgements

The authors are grateful to Mr. Prosenjit Dawn (Assistant Professor, Zoology, Shyampur Siddheswari Mahavidyalaya, West Bengal, India) and Dr. Karen Lynn Conniff (International Centre for Integrated Mountain Development) for their help regarding the identification of the species.

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New Report - State of Dragonflies in Britain and Ireland 2021
Review: Keith D.P. Wilson [kdpwilson@gmail.com]

Editors & principal authors: Pam Taylor, Dave Smallshire and Adrian Parr.
Other authors: Steve Brooks, Steve Cham, Ellie Colver, Martin Harvey,
David Hepper, Nick Isaac, Mark Logie, Damian McFerran,
Fiona McKenna, Brian Nelson and David Roy.

The Report is freely available at the British Dragonfly Society's web site: [\[Link\]](#)

The *State of Dragonflies in Britain and Ireland 2021* is an exceptional and informative Report that was published last year by the *British Dragonfly Society* (Taylor et al., 2021). It's a culmination of intensive Odonata monitoring within the British Isles from 1970 to 2019. The Report presents trends in dragonfly and damselfly populations in Britain and Ireland over the past 50 years. The trend analysis was conducted by the *UK Centre for Ecology & Hydrology* (UKCEH). Fifty-six species of Odonata are currently recorded from Britain and Ireland of which 46 species are residents or regular migrants. The remaining ten species are rare migrants. The analysis shows that 19 of the British Isles' 46 resident and regular migrant species (41%) have significantly increased their occupancy since 1970. As many as six species (13%) have colonised Britain since 1996! The trend analysis also revealed that five species (11%) showed significant declines during the same period—mainly northern and/or acid-loving upland species. These are dramatic changes and much greater than the preceding 100 years. The Report notes that: 'Dragonfly species new to Britain and Ireland are arriving and colonising at a greater rate than ever before'.

Given that the authors considered there was a lack of definitive scientific evidence they were careful not to attribute these measurable trends in odonate communities entirely to climate change but noted that: 'increased temperatures is behind many of the positive dragonfly species trends' and 'climate change may also have negative impacts for some species, especially in the future'. Also noted is that: 'Increases in the availability of suitable habitats through restoration and creation projects have also played a significant role'. The report struggled to explain species declines and commented: 'Species declines are harder to record and explain, but habitat losses and degradation through land drainage, afforestation, acidification and lack of appropriate management are strongly indicated as major factors. Changes

in weather patterns, causing both flood and drought conditions, are also implicated, as are pesticides, fertilisers and other pollutants of a similar nature. It is also the case that increases in distribution may mask underlying declines in species abundance.' The Report cited Termaat et al. (2019) in general terms but did not make reference to their detailed analysis involving calculation of Species Temperature Indices (STI), Multi-species Indicators (MSI) and Community Temperature Indices (CTI) from ten European geographical regions including the UK and their main conclusion regarding trends in dragonfly populations in relation to increased temperatures. The main conclusion,



Figure 1. The damselfly depicted is the Common Spreadwing or Emerald Damselfly (*Lestes sponsa*) that has declined more than any other odonate in the British Isles. (A) Front cover of the 2021 Report titled: *State of Dragonflies in Britain and Ireland*, female. Photo credit: Iain Leach. (B) Male, Iping Common, West Sussex, England, 3 August 2020. Photo credit: Keith Wilson

as stated in their paper, was: ‘European dragonflies, in general, have expanded their distribution in response to climate change, even though their CTI lags behind the increase in temperature’.

The new colonists to the British Isles documented are Lesser Emperor (*Anax parthenope*), first recorded in 1996, Red-veined Darter (*Sympetrum fonscolombii* - Figure 4B), which has bred from 1996, Small Red-eyed Damselfly (*Erythromma viridulum*), first recorded in 1999, Southern Emerald Damselfly, (*Lestes barbarus*), first recorded in 2002, Willow Emerald Damselfly (*Chalcolestes viridis*), which colonised southeast and east England from 2007) and Southern Migrant Hawker (*Aeshna affinis* - Figure 3A), which has colonised southern UK from 2010. Also the Dainty Damselfly (*Coenagrion scitulum*), which became extinct in Britain following extensive coastal flooding in 1953, has successfully recolonised parts of coastal Kent from around 2010. *Sympetrum fonscolombii* is not a permanent resident as it is unable to breed during the winter period throughout the British Isles and must rely on fresh immigration each year. Unlike other *Sympetrum* species the larvae develop rapidly over three months in warm conditions and do not overwinter.

The resident species showing the greatest reduction was the Common Spreadwing or Emerald Damselfly (*Lestes sponsa* - Figure 1), which according to the Report has: ‘lost roughly 35% of its range in England, Ireland, the Netherlands and Germany, though populations have remained more stable in Scotland and Wales’. The other main species showing strong declines include Moorland Hawker (*Aeshna juncea* - Figure 2B) and Black Darter (*Sympetrum danae* - Figure 3B).

The Report mentions the colonisation by new dragonfly species may result in interspecific competition and also noted issues associated with non-native invasive species introductions such as the Signal Crayfish (*Pacifastacus leniusculus*)—that may be a direct predator of mud-dwelling dragonflies. Although not highlighted in the Report, the species with the greatest positive trend (0.559 in Britain & Ireland), the aeshnid Emperor Dragonfly (*Anax imperator*), maybe a direct competitor of the aeshnid with the lowest negative trend (-0.076 in Britain & Ireland), the Moorland Hawker (*Aeshna juncea*), where their ranges and habitat preferences overlap. According to the IUCN Red List global assessment the range of *Anax imperator* (Mitra, 2016): ‘is presently expanding to the north due to global warming and has been found in the southern part of Sweden up to Uppsala. In the British Isles, its northern limit shifted by 80 km to the north so that now this species is known from Scotland’. The corollary of *Anax imperator* range extension northwards may well be the retreat of the southern range of *Aeshna juncea*. The Report notes the Moorland Hawker [known, somewhat ironically, in the UK as Common Hawker, where it is now uncommon or absent throughout much of its range, especially in southeast UK and also known as the Sedge Darner in North America where it occurs in the far north] has also declined significantly in its southern European range in Germany and The Netherlands but may have increased in Scotland.

Roy van Grunsven et al. (2020), reporting on the Dutch citizen science Odonata monitoring programme (3.2 million records for a country of less than 34,000 km² from 1991-2020) described a similar pattern with strong declines for acidophile odonates such as *Lestes sponsa*, *Sympetrum danae* and *Aeshna juncea*. Roy van Grunsven et al.



Figure 2. (A) Emperor Dragonfly (*Anax imperator*), Burton Mill bog pond, West Sussex, England, 2 August 2020. Now very common in southern UK. This species showed the greatest increase in occurrence. (B) Moorland Hawker or Common Hawker (*Aeshna juncea*), Iping Common, West Sussex, England, 19 August 1982. It is one of the last records of this species recorded in Sussex where it is now absent. Photo credits: Keith Wilson.



Figure 3. (A) Southern Migrant Hawker or Blue-eyed Hawker (*Aeshna affinis*). The Report notes that *A. affinis* is presently showing a noticeable positive trend in Britain following its colonisation of southern UK from 2010. Photo taken in Mannheim, Kirschgartshäuser Schläge by the Bruchgraben, Baden-Württemberg, Germany. Photo credit: Andreas Eichler [Wikimedia Commons]. (B) Black Darter (*Sympetrum danae*), Burton Mill Pond, West Sussex, England, 2 August 2020. This acidophile darter has declined significantly over the past 50 years, especially in England and Northern Ireland. Photo credit: Keith Wilson.

(2020) surmised: ‘The heathland pools and peatbogs habitats, and the accompanying typical dragonfly species, are of colder climates. These habitats are at the southern border of the distribution range in the Netherlands or restricted to higher altitudes further south in Europe. So climate change is likely making the Netherlands less suitable for these species and possibly unsuitable in the (near) future’.

A recently published German study, based on 1 million odonate records over a 35-year period from different regional databases, found more species had increased (45%) than decreased (29%) or remained stable (26%) in their distribution (Bowler et al., 2021). Their occupancy analysis also corroborated the BDS findings by concluding that ‘species showing decreases were cold-adapted species using standing water habitats such as bogs’ and ‘cold-adapted habitat specialists of standing water habitats are likely to be most vulnerable to further environmental change, while increases of species associated with river habitats signal the conservation success that can be achieved by better environmental management’.

The UKCEH’s trend analysis and the comprehensive BDS Report was based on 50 years of data involving 1.4 million records, collected by some 17,000 individual recorders during the period 1970 to 2019. There is a lot more information and data included in the 83 page Report than covered here. It’s an excellent summary and analysis of the data reveals some stark trends that are well worth reading, even if you are not based in the British Isles. In general the trends are mostly good news for many British and Irish odonatists, who have more dragonflies to study and enjoy, but the dramatic rate of change in odonate populations is somewhat ominous in respect of rapid climate change and the decline of bog species calls for action to protect these sensitive habitats.

In response to the Report the Chairman of the British Dragonfly Society, Brian Walker provided a salutary message, which was included in the Report and is repeated here below:

“This report shows that dragonfly diversity in Britain and Ireland has increased and that many species have spread further north in recent years. One of the main reasons behind these changes is a response to climate change. New species and range expansions sounds like good news for dragonflies, but the speed at which new species are arriving and colonising should actually be taken as further warning about the danger of rapidly changing climate conditions. The evidence suggests that species favouring cooler conditions are contracting their range and certain habitats such as bogs are drying out and this is having an adverse effect on the species which rely on them. Dragonflies are highly mobile and can react to changes more readily than other groups, but as the report shows, even some dragonfly species seem to be adversely affected by the changes.”

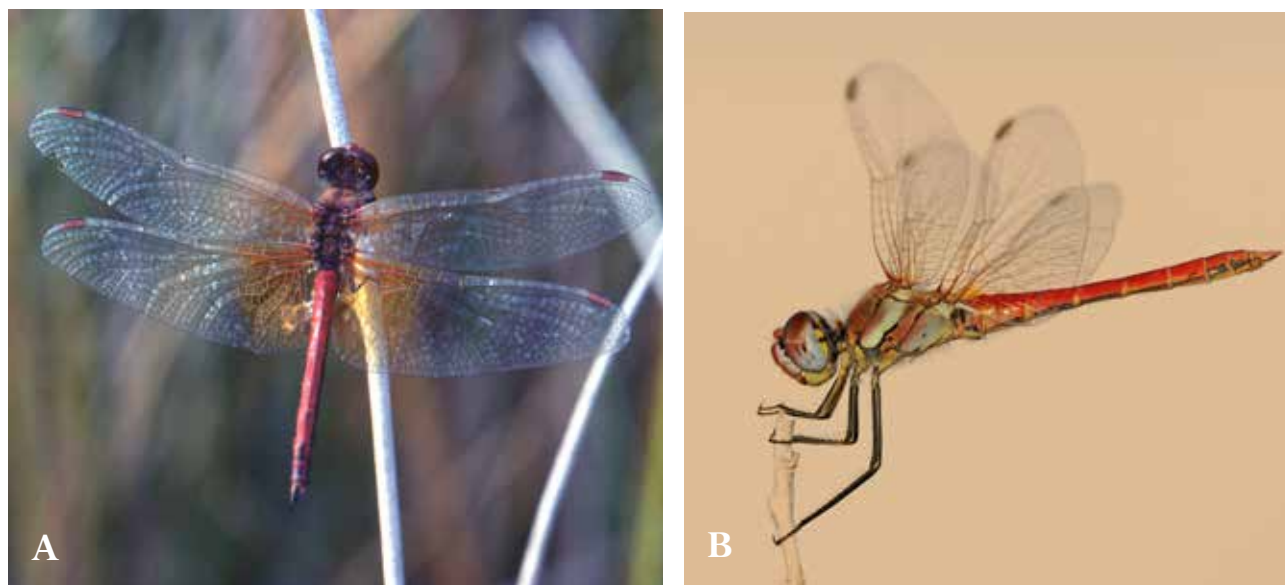


Figure 4. (A) Yellow-winged Darter (*Sympetrum flaveolum*), Woolmer Pond, Hampshire, England, 28 August 1982. Another record was made at Woolmer in 1995 during a year when there was a large influx of this species to the UK giving rise to a few transitory breeding colonies. This irregular migrant species to the British Isles prefers cooler climates and its sporadic appearance in the British Isles and over much of western Europe is in decline. It is however more common towards the east across Siberia to northern Japan. The species has a temperate distribution and in the south of its range it is largely restricted to mountain areas. (B) A northwards migrating Red-veined Darter (*Sympetrum fonscolombii*), Umm Al Kurkum, UAE, a small dry island in the Arabian Gulf, 8 November 2009. It is widely distributed across the warmer parts of Africa and Asia (Dijkstra, 2006) and now regularly migrates to the British Isles where it has now bred during the summer months but not overwintered. Photo credits: Keith Wilson.

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Book review - Dragonflies of Corfu
Review by Keith DP Wilson [kdpwilson@gmail.com]

Authors: Marie Stille & Bo Stille [info@bluesage.se]

Revised 2nd edition – June 2020

Publisher: Edition Chimaira [www.chimaira.de], 39,80 €

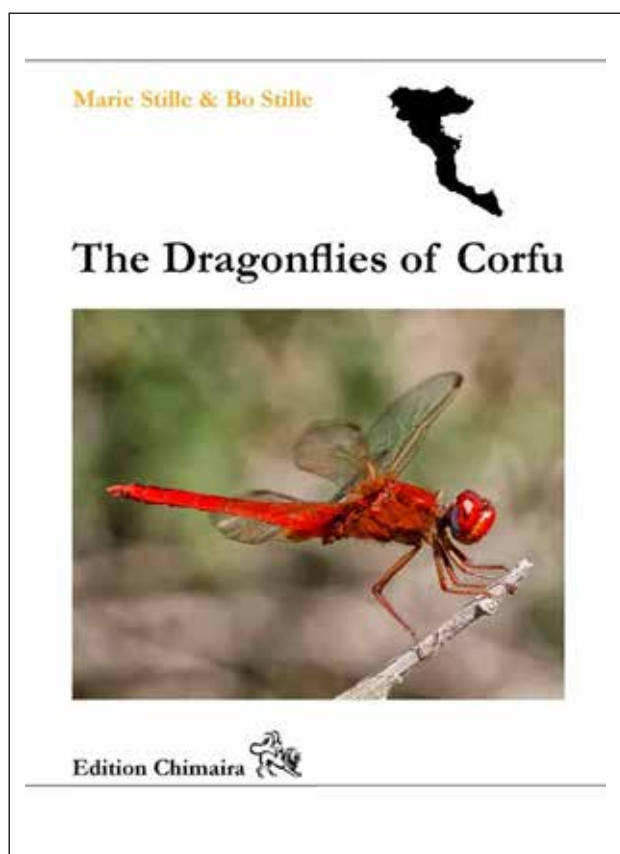
Frankfurt am Main 2020

ISSN: 1613-2327; ISBN: 978-389973-040-1

The *Dragonflies of Corfu* is an essential guide for any visitor to Corfu who wishes to explore the odonate fauna of this lush, green and beautiful Greek island. The book was first published in April 2018 as an International Dragonfly Fund (IDF) publication (Report 116). This 1st edition book is freely available from the IDF web site as a 'pdf' publication [Link]. The revised edition was published just over two years later in June 2020. The new edition now includes a forward written by Lee Durrell the American naturalist, author, zookeeper and television presenter. Her husband was the late Gerald Durrell, a British naturalist, television presenter, zoo founder and author who wrote *My Family and Other Animals*; a book that famously celebrated the lush habitats and native fauna and flora of Corfu where Gerald lived as a child from 1935 to 1939. The *Dragonflies of Corfu* introductory chapters describe the island's geology, topography and various types of wetland habitats that can be found in Corfu. The authors point out that the precipitation in Corfu is among the heaviest in Greece with an annual mean of ca. 1,100 mm. However, whilst one of the wettest of the Greek Isles, the book also discusses the threats to wetland habitats and dragonfly populations arising over the past 50 years from the extensive development of agriculture, and the huge increases in tourism and population growth—especially the issues arising from increased water extraction from rivers and ground water supplies.

The book notes 39 odonate species can presently be found on Corfu, reportedly giving the island one of the highest numbers of species in the Greek archipelago. According to the web site: [Dragonflies of Greece](#) a total of 76 species are known from Greece, therefore just over 50% of the Greek fauna can be found on Corfu. Most European odonate families are well represented on Corfu, with the exception of the Cordulegasteridae that have no species recorded, whereas five species can be found on the mainland. Notably, two of the three European species that have been red-listed by the IUCN as Critically Endangered (CR) in Europe have been recorded on Corfu. These comprise the rare Greek Red Damsel (*Pyrrhosoma elisabethae*), confined to western Greece and southern Albania and the Turkish Red Damsel (*Ceragrion georgifreyi*). The book provides details of eight Corfu localities for the Greek Red Damsel but states the Turkish Red Damsel has not been observed on the island since 1971.

The book provides a useful chapter titled: *Conservation and legislation* that draws attention to the fact that no Corfu sites have been designated as protected wetland Ramsar sites under the *Ramsar Convention*. The chapter also includes accounts of Corfu species listed under the *Convention on the Conservation of European Wildlife and Natural Habitats* (*Bern Convention*), the *IUCN Red List of Threatened Species* and *The Habitats Directive - On the Conservation of Natural Habitats and of Wild Fauna and Flora* (*Council Directive 92/43/EEC*). Other than the two aforementioned CR species one other Corfu species of noted conservation concern is the Bladetail (*Lindenia tetraphylla*), which is listed under the *Bern Convention* and *Habitats Directive* and is IUCN red-listed as Vulnerable in Europe. Details are also provided of one site in Corfu where the Bladetail has been regularly recorded. The Near Threatened Eastern Spectre (*Caliaeschna microstigma*) is recorded from four localities. Accounts of other relevant EU conservation legislation are also provided including the *EU Water Framework Directive* (*WFD, 2000/60/EG*), *Natura 2000* and Greek national legislation. Regarding the latter, details are given of the *Greek Presidential Decree (2012)* which protected 28 of the 56 wetlands on Corfu that were originally listed by WWF under their *Conservation of the*



Island Wetlands of Greece project [Link]. The book provides a list of these 56 WWF listed wetlands and their protection status in Appendix V. Precise details of all the WWF wetland sites and other important dragonfly sites can be found by reference to the locality coordinates provided in Appendix I and the species distribution maps provided in Appendix II. This locality coordinate data is not available in the first edition.

In a section of the book introducing odonate families the authors have added to the new edition additional annotated photographs illustrating key features that characterise the various families represented in Corfu. Other notable additions in the new book include more photographs of species and many improved images. The distribution maps have been updated and moved from the main text to the appendices where they can be more easily compared with their congeners' distributions. Graphs showing yearly precipitation and average temperature increases have been updated to reflect the high variability of annual rainfall and ongoing trend of increasing temperatures caused by climate change.

The book is well written with excellent species accounts and many high quality photographs. There is a section introducing the biology of dragonflies and an useful and extensive bibliography relevant to the study of Corfu Odonata. There are some minor irritations in the text formatting. The vast majority of the main body of text is printed using Garamond 10 font but there are many examples of the italicised names and common names printed using Garamond 11 e.g. Variable Bluet and *Aeshna affinis* on page 18. On page 150 the main text is entirely size 11 rather than 10. There are also some inconsistencies such as the use of superscript for centuries e.g. '19th and early 20th century' as printed on page 227 plus numerous cases of the italicised brackets adjacent to italicised scientific names. However, these are very minor typographical annoyances and overall the book easily achieves its stated aims of providing: 'a field guide to the island's dragonflies', to catalogue the odonate fauna's 'current distribution and description of their habitats on Corfu' and 'to raise the awareness of and the understanding for the dragonfly fauna, and to give a first idea of its status and need for protection'.

Both authors are originally from Sweden and moved to Corfu in 2011. Marie Stille studied geology and biology at Lund University in Sweden and has a Ph.D. in systematic zoology. She is currently working as a free-lance writer and photographer. Bo Stille studied chemistry and biology at Lund University and also has a Ph.D. in systematic zoology. He previously worked as assistant professor at the Department of Systematic Zoology at Lund University before joining an international pharmaceutical company.

Pyrrhoxena elizabethae – Coenagrionidae

We have observed oviposition in shallow ditches with clear, well oxygenated water and ample vegetation on its banks. Mating and oviposition have never been observed in larger rivers or streams where single or scattered individuals sometimes are found.



Figure 113. *Pyrrhoxena elizabethae* in tandem.

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Lindenia tetraphylla – Gomphidae

Lindenia tetraphylla (VANDER LINDEN, 1843) – Bladetail



Figure 159. Mature male *Lindenia tetraphylla*.

Lindenia is a monotypic genus with one large, elegant and very spectacular species. This is a powerful flyer that has its main distribution in central and southwestern Asia. In Europe, large populations are found at Lake Skadar situated at the border between Montenegro and Albania and in Greece it occurs at Lake Völvi in the northeastern part of the country and in the artificial Lake Dosi in the Peloponnese, to mention but a few places. New localities have recently been reported and it is possible that this species has been extending its range in Greece. It was first observed in Corfu in artificial ponds or barrage lakes in 2013 and in an artificial reservoir on Corfu in 2014. Most individuals have a beige ground colour with dark markings, but a uniform dark or black body colour is sometimes found in males and this coloration is common on Corfu. The abdomen is long and slender with blade-like extensions on S7 and S8. Dark microscopic spines are present on the abdomen of males, being most frequent on S3 to S7. *L. tetraphylla* is listed as Vulnerable in the IUCN European Red List and as Near Threatened in the Mediterranean counterpart. We have found *L. tetraphylla* at the Moschopolou Reservoir in southern Corfu every year since 2014 and mating was observed in 2019, but the number of individuals encountered is small. The species is a strong flyer with migratory or wandering tendencies, and vagrant individuals frequently fly far away from suitable habitats. Males often perch on the ground with slightly raised abdomen. Females lay eggs unaccompanied and the eggs are exophytic.

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New Book - Atlas of the Dragonflies and Damselflies of West and Central Asia

Series: **Brachytron Supplements** Vol: 22

Authors: Jean-Pierre Boudot, Sergey Borisov, Geert De Knijf,
Roy HA van Grunsven, Asmus Schröter, & Vincent J Kalkman,

248 pages, colour photos, colour distribution maps

Pub. date: 23 September 2021 [\[Link\]](#)

Publisher: Nederlandse Vereniging voor Libellenstudie / Libellenvereniging Vlaanderen

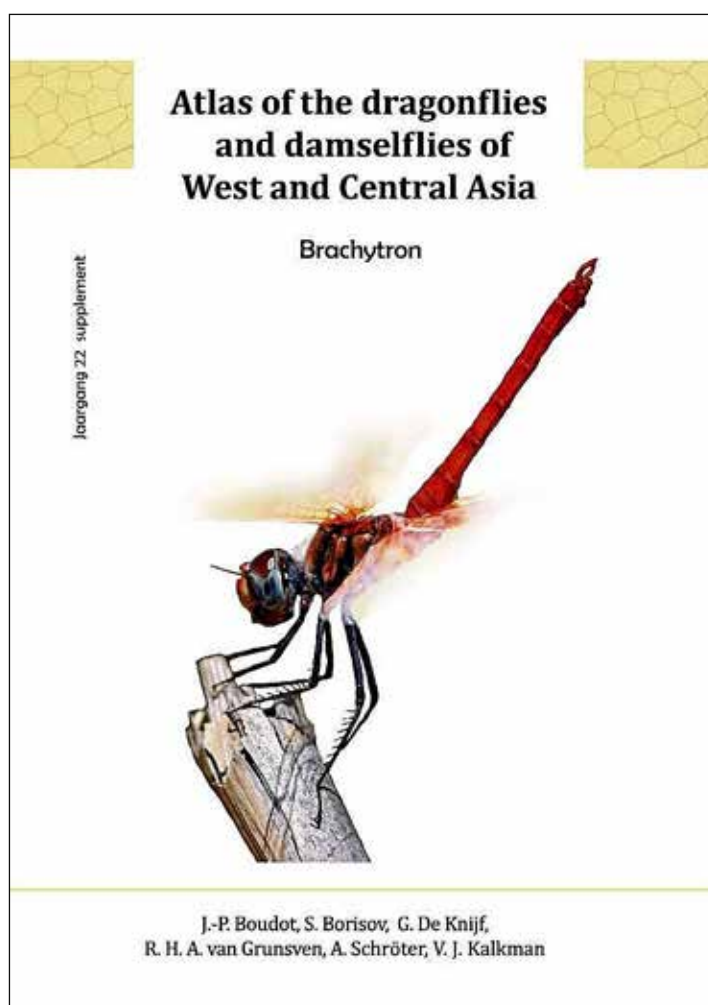
Price: Brachytron 25 € plus postage [\[Link\]](#)

NHBS £27.99 + postage [\[Link\]](#)

This book has been published as a supplement of the Dutch journal *Brachytron*. It provides a detailed overview of the distribution of Odonata of West and Central Asia for the first time. The ca. 8 million km² area covered extends from the borders of the Black Sea, west coast of Turkey and eastern Mediterranean in the west through Central Asia including the Arabian Peninsula, Iran, Turkmenistan, and Afghanistan, Tajikistan and Krygystan to West Asia at the borders of China and Pakistan. The area includes vast areas of desert but also includes the Caucasus, Zagros and Hindu Kush mountain ranges.

The maps have been compiled from a database of nearly 46,000 records. The distribution of all 173 species of dragonflies and damselflies occurring in the 24 countries of West and Central Asia are presented. For practical reasons, Kazakhstan was not included in this atlas. Distributions are shown for two time periods: prior to 1990 (approximately 13,000 records) and from 1990 onwards (approximately 33,000 available records). The fauna of the region is a mixture of species of African, Oriental and Palearctic origin with, in total, 25 species being endemic to the region and another 25 species being near endemic with roughly over 80% of their world range found in the region. For each species, a short text is provided containing additional information on taxonomy, general and regional distribution, and also habitat preference. This is accompanied by at least one picture of an adult. The introduction

contains a summary of the history of the study of dragonflies in each country of the region, including references to the most relevant papers. The article ends with a checklist tabulating the presence of each species in each of the relevant countries, and with a table showing the flight period of all species.



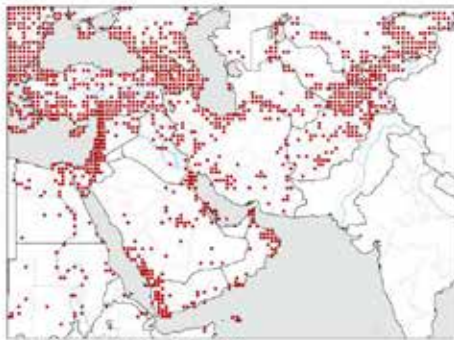


Figure 3. Distribution of records of dragonflies prior to 1950.

are available. This reflects the scarcity of water and therefore of dragonflies; however, it is likely that some widespread species with a strong dispersal ability, such as *Anis optipennis*, *Pantala flavescens*, *Libellula tetraphylla* and *Selyssetomyia nigra*, could be found in these areas at least as migrants. The scarcity or lack of data in some regions should be taken into account when judging the distribution patterns based on the maps. However, in our opinion, the density of observations is such that the general distribution patterns shown on the maps are trustworthy. Nonetheless, major surprises could still be found everywhere in the region. Most notably, Yemen, Oman and the western part of Saudi Arabia are likely places for the discovery of Afrotropical species not yet known from the region, while Oman, southeast Iran and Afghanistan are likely places to record additional species from the Oriental region. An example of the latter is the recent finding of *Ephippodictia turrita*, which is believed to have been brought to Masirah Island (Oman) by oystree Nyan, which

impacted the Indian Ocean during late October 2013 (Dubson & Chiles 2018). The description as 'new to science' of the large and rather striking *Austrobaetisca venusta* as recently as 2015 (Schneider & Benmeyer 2015) and in the south of the Arabian Peninsula (Schneider 1991–2018) evokes the likelihood of finding new species to science more suited to these regions. The area with the greatest potential for the discovery of undescribed species is Afghanistan. Fewer than 300 records are available from this huge country, with the most recent records being from 1977. Finding species new to the region or even new to science is no longer easy, but there are many other ways to increase our knowledge of the region. A good example of this is the recent advances made in our understanding of the range and distribution of the near-endemic *Umbroscia dorsalis*, together with the description of its last instar larva (Chernikov et al. 2016; Lambert et al. 2017).

8

Atlas West and Central Asia

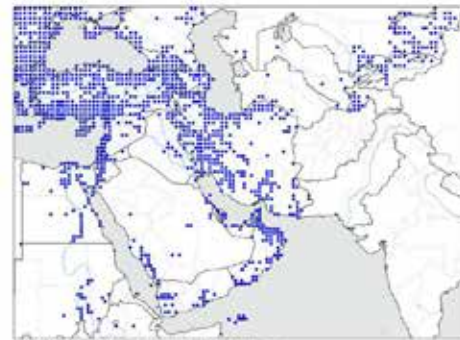


Figure 4. Distribution of records of dragonflies from 1950 onwards.

It is emphasized that the authors do not endorse any political considerations regarding country definition, nomenclature and delineation.

Biogeography

The region under consideration is at the crossroads of the Palearctic, Afrotropical and Oriental realms. The borders between these regions are not clear cut, as there are no hard natural barriers. In general most of the area of this atlas is considered Palearctic, with the southern Arabian coast in Yemen and Oman (Dhofar), Socotra and sometimes also a small area in the south of Iran considered to belong to the Afrotropical region, including the Nile valley. The Afrotropical region also borders the southern part of the Levant, where several Afrotropical species occur. Part of southeast Iran and southeast Afghanistan is considered to belong to the Oriental region, although the separation from the Palearctic is far from clear here. The Dush-Karik Desert (to the north and the mountains in Afghanistan) are often considered

as the dividing line. At the south-eastern border of Iran the Afrotropical region borders the Oriental region. This again is rather arbitrary as the border does not follow a natural barrier. As many dragonfly species are very mobile it is not surprising that several species are not restricted to one of the biogeographic realms but that species of different affinities meet in this region. In addition to species more widespread in these biogeographic realms the region also contains 25 endemic species and another 25 species being near endemic with roughly over 80% of their world range found in this region.

Pterylogy

The flight period of each species in the area under consideration is presented in Appendix 2. For this appendix, all records from the study area with information on the month of recording were used (approximately 27,000). The main flight period, shown in slightly darker tint, is defined as each month in which 10% or more of the observations (a species at a locality on a

Biodiversity 22 Supplement: 8–248, 2021

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Ischnura intermedia Dumont, 1974 — Persian Blue-tail

Ischnura intermedia is endemic to West Asia, occurring from western Cyprus to the Kopet Dag Mountains along the border of Iran and Turkmenistan. The species is confined to Cyprus, southern Turkey, adjacent northern Syria and Iraq (Dumont & Borsook 1995; De Knyf et al. 2016) and also Iran (Schneider & Benmeyer 2015). In the latter country it occurs especially in the Zagros Mountains, and is often found at ancient drainage systems (Kazerooni & Ganati, at least 3000–5000 Years BP) (Kiani & Sadeghi 2016; Schneider & Benmeyer 2015). Old records of *I. intermedia* by Schmidt (1954) from around Tashkent have been found to pertain to *I. intermedia* (Dumont & Borsook 1995). *Ischnura intermedia* breeds in slow-flowing, well-vegetated streams, and is often confined to small secondary channels adjacent to streams and rivulets where the current slows and water is retained. Marshy areas and short swamp vegetation typically occur locally in or near the streambed, and taller grassy margins often reach up to 4 m and grow adjacent to the streams.



Populations can only become established at sites that have permanent water (De Knyf et al. 2016). The species seems to be threatened throughout its range, as many streams in the area fall dry during the summer months due to rainfall deficit and an increase in water abstraction. There have also been recent changes in water hydrology due to river damming, with the type locality in Turkey indeed now being flooded by the Atabak Dam lake. Populations of *I. intermedia* seem to be restricted to those streams that are fed with a constant flow of water from the mountains.



10

Atlas West and Central Asia

Ischnura nauri Morton, 1907 — Pale Blue-tail

Until fairly recently this species was placed in its own genus, *Rhodostolus*, but based on molecular data (Dumont et al. 2013) showed that it is part of *Ischnura*. The species is largely restricted to the Indian subcontinent and is known from Nepal, the northern two-thirds of India, Pakistan and south-east Iran. It was first found in Iran in 1905 (Dumont et al. 2011), but has since been found at 28 different localities (Dumont et al. 2011; Schneider & Dumont 2015; Schneider et al. 2015b, 2018a) and the species might be expanding its range westwards (Schneider & Benmeyer 2015). In 2003 it was found in Oman (Kiani 2015), but has not been recorded there since. In 2013 it was discovered in the United Arab Emirates (Faulstich & Jodas 2013), with additional records in 2015 and 2017 bringing the total to six different Emirates localities. The lack of historical records makes the situation



difficult to judge, but recent records give the impression that the species has increased in the western part of its range over the past two decades. *Ischnura nauri* is found along banks of rivers, brooks, ditches and ponds, sometimes occurring at localities with little vegetation; it is resilient to poor water quality (Schneider & Benmeyer 2015).



Biodiversity 22 Supplement: 8–248, 2021

11

New book - Dragonflies and Damselflies of Britain and Western Europe A Photographic Guide

Authors: Jean-Pierre Boudot, Guillaume Doucet & Daniel Grand

Illustrations: Yves Doux, 160 pp

Publisher: Bloomsbury Publishing - 27 May 2021

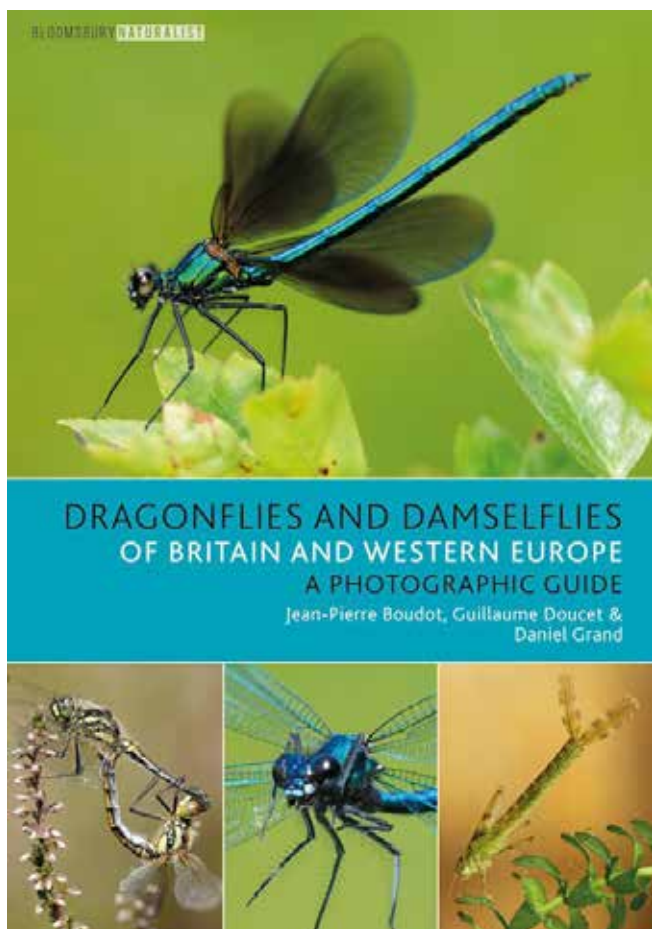
ISBN (paperback): 9781472982223

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for both adults and larvae. There is a chapter on Perography (scanned wings) and a comprehensive bibliography for adults and larvae.

Foreword by Klaas-Douwe (KD) B. Dijkstra. Dragonflies and Damselflies of Britain and Western Europe features all 98 species found in the region. Packed with outstanding photography, this comprehensive book includes close-up illustrations to highlight key identification features, diagrams of wing venation, and detailed guides to dragonfly larvae and exuviae. Each species account includes an accurate distribution map and information on field characteristics, confusion species, habitat and ecology. An introduction to the life cycle of Odonata, guidance on when and where to look for them, and the best ways to observe and photograph dragonflies and damselflies in the field are also included. These sections, combined with the identification guides, make this book the ultimate resource for any field naturalist or entomologist interested in these incredible insects.

Of the 160 pages of the book 106 are devoted to keys



Norfolk Hawker, *Aeshna isoscelis* (Marc Heath)

Pterography (Wing photography)

Included here are black-and-white or greyscale images of the male wing, and of the female wing when this differs from the male, for the various families and species covered in this book. The images have been produced by scanning wings at a resolution of 2,400ppi (pixels per inch). They

give an accurate representation of the wing venation of adult dragonflies, an important character in the identification of families, genera and sometimes even species. Unless otherwise specified (for small species), wings are shown at actual size.

Zygoptera

CALOPTERYGIDAE

Calopteryx splendens splendens



Calopteryx haemorrhoidalis



Calopteryx splendens caprai



Calopteryx splendens caprai



Calopteryx xanthostoma



Calopteryx xanthostoma



Calopteryx virgo virgo



Calopteryx virgo virgo



Calopteryx virgo meridionalis



Calopteryx virgo meridionalis



138 Dragonflies and Damselflies of Britain and Western Europe

LESTIDAE continued

Chalcosternus viridis ×1.5



Chalcosternus parvidens ×1.5



Sympetma fuscum ×1.5



Sympetma pallidum ×1.5



PLATYCNEMIDAE

Platynemis pennipes ×1.5



Platynemis latipes ×1.5



Platynemis acutipennis ×1.5



COENAGRIONIDAE

Coenagrion pusilla ×1.5



Coenagrion pulchellum ×1.5



Coenagrion hastulatum ×1.5



Coenagrion lunulatum ×1.5



Coenagrion ornatum ×1.5



Coenagrion mercatorum ×1.5



Coenagrion scitulum ×1.5



Coenagrion caerulescens ×1.5



Pterography 139

Family GOMPHIDAE continued

Genera GOMPHUS and STYLURUS

1. Tibiae entirely black, or at most with a short vestigial yellow line at base. Femora black or black and yellow.

- 1'. Legs streaked with yellow and black over entire length.

2. Abdomen strongly widened from seventh to ninth segments, marked with a clear longitudinal medio-dorsal line on the first seven segments. Segments 8–10 entirely black dorsally.

- ♂ Cercoids end in an acute short point, without external lateral teeth.
- ♀ Vulva plate broad, very wide at base and with concave sides.

Gomphus vulgatissimus

- 2'. Abdomen only slightly widened towards its extremity, marked with a clear longitudinal medio-dorsal line over its entire length.

- ♂ Cercoids with strong external lateral teeth.
- ♀ Vulva plate notched over at least half its length, with convex or straight sides.

Gomphus grasilini

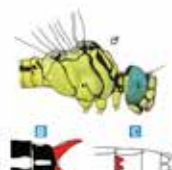
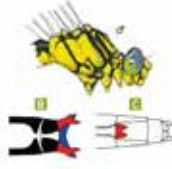
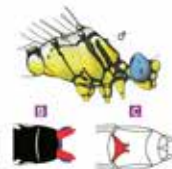
3. Abdomen slightly widened at its extremity, marked with a yellow medio-dorsal line over its entire length.

- Median and antehumeral black bands of thorax curved in opposite directions and joining to form an oval pattern.
- ♂ Cercoids quite long and curved forwards, without external lateral teeth.
- ♀ Vulva plate notched over its entire length.

Stylurus flavipes

- 3'. Black bands of thorax almost straight, antehumeral and humeral bands parallel.

- ♂ Cercoids rather short and straight in dorsal view.



Name: (L.) BULL. 1775
Source: (L.) BULL. 1775
Distribution: common in many regions, especially in central Europe, but in sharp decline due to water pollution.
Habitat: sunny, flowing waters surrounded by trees and shrubs up to 1,000m. Sometimes on larger turbulent lakes and well-vegetated gravel pits.
Checklist species: none.



Name and Source: (L.) BULL. 1775
Distribution: endemic to south-western France and the Iberian Peninsula.
Habitat: large, clear rivers and small streams, also reservoirs up to 200m.
Cercoids species: *G. grasilini* (females especially), which can be found in the same habitats.
Checklist species: *Gomphus grasilini* and *G. vulgatissimus*.



Name: (L.) BULL. 1775
Source: (L.) BULL. 1775
Distribution: common in eastern Europe, and in large rivers such as the Lure, Rhone, Rhine and Danube.
Habitat: large, natural rivers with beds of sand, silt or mud, low altitudes.
Checklist species: *Gomphus grasilini* and *G. vulgatissimus*.

Gomphus vulgatissimus | Common Clubtail/Club-tailed Dragonfly



♂ abdomen: 32–38mm



♀ abdomen: 31–37mm

- Eyes distinctly separated
- Legs entirely black (not red)
- The yellow antehumeral bands on the thorax
- Last segments black (not red)

Gomphus grasilini | Pronged Clubtail



♂ abdomen: 31–37mm



♀ abdomen: 31–38mm

- Eyes distinctly separated
- Legs black with a yellow band on the femora
- The yellow antehumeral bands on the thorax
- Yellow line on the last segments

Stylurus flavipes | River Clubtail



♂ abdomen: 32–40mm



♀ abdomen: 35–42mm

- Eyes distinctly separated
- Legs black and yellow along all their length
- Large yellow antehumeral bands on the thorax

**New book - Cambodia Odonata
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Contributors: Oleg E Kosterin & Eddie Smith
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