



AGRION

NEWSLETTER OF THE WORLDWIDE DRAGONFLY ASSOCIATION

PATRON: Professor Edward O. Wilson FRS, FRSE

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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 <http://ecoevo.uvigo.es/WDA/dragonfly.htm>. WDA is a Registered Charity (Not-for-Profit Organization), Charity No. 1066039/0.

Editorial

Keith Wilson [kdpwilson@gmail.com]

As detailed in the last issue of *AGRION*, the 2011 International Congress of the World Wide Dragonfly Association will be held at the Kanagawa Prefectural Museum of Natural History in Odawara City, Kanazawa, Japan 31st July to 5th August 2011. Further details and updated information can be found at the 2011 International Congress of Odonatology Home Page [<http://www.odonata.jp/wda2011/index.html>].

On the 28th November, 2010, Dr. Syoziro Asahina passed away at the age of 97. Dr. Asahina's publications on Asian Odonata were truly prolific and his contribution to our understanding and knowledge of Asian dragonflies and damselflies has been immense. Bridges (1994: Catalogue of the family-group, genus-group and species-group names of the Odonata of the World) lists no less than 222 publications by Asahina during the years 1934 to 1994 and he continued to publish Odonata papers for several years after this period. We hope to include an article in the next issue of *AGRION* covering Asahina's amazing odonatological contributions.

In this issue Reinhard Jödicke is acknowledged and thanked, following his retirement as Editor, for his tremendous efforts, over the past ten years, to raise the standards of the WDA's International Journal of Odonatology (IJO), which led to the journal's inclusion, by the Institute for Scientific Information (ISI), in the Science Citation Index (SCI). The SCI covers the world's leading journals in science and technology. The IJO is also included in Scopus, which is the largest abstract and citation database of research literature. I'd like to add my thanks and appreciation here for all Reinhard's hard work and achievements for IJO.

On a technical matter *AGRION* is designed to be read as a booklet and is made available on-line in portable document format (pdf). The cover page is produced as a single page and the interior of the booklet is comprised of two-page spreads. The pages of two-page articles are designed to be viewed together in a single two-page spread. However, in order to view the document as designed it is important to select 'Show Cover Page During Two-Up' in the latest versions of Adobe Reader, which is selected under 'View' and then 'Page Display'. If 'Show Cover Page During Two-Up' is not selected, in Two-Up view, Adobe will link the cover page to the inside page and all right-side pages will become shifted to left-side pages and vice versa. So, to enjoy *AGRION* as designed please select 'Show Cover Page During Two-Up' when viewing in Two-Up view Adobe Reader.

For the next issue of *AGRION*, to be published at the beginning of July 2011, 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 a Word file by email (preferably) or on disk by post. Please do not forward any original artwork but send a soft copy, ideally in a compressed format e.g. 'jpeg' or 'gif', or as a file on disk if sent by post.

In keeping with the practice adopted for WDA's official organ, the International Journal of Odonatology a dragonfly photo now appears on the front cover of each issue of *AGRION*. If you have a 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 in *AGRION*.

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Reinhard Jödicke Retirement

As announced in our previous *AGRION* issue, after ten productive years as Managing Editor of IJO, Reinhard Jödicke has retired from this position. Ever since WDA achieved independence from Backhuys in 2004, Reinhard dedicated all his personal time and a preferential devotion to the journal. He spent an inordinate amount of time communicating with authors and referees, thoroughly correcting format, style, and references, checking graphics and tables, and evaluating the scientific merit and quality of each contribution, in order to achieve consistency and a high quality level in all of IJO publications. These goals were most certainly met, and thanks to his almost single-handed efforts IJO is today recognized as a high quality scientific journal, one where odonatologists from the entire world feel proud to publish their work.

Reinhard, the odonatological community and all your many friends, collaborators, and authors whom you so kindly and professionally guided during all these years thank you from the bottom of our hearts for making our work so much better!

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WDA travel grants for the 2011 International Congress of Odonatology in Japan

The WDA considers it is very important that Southeast Asian odonatologists are encouraged to attend the forthcoming 2011 International Congress of Odonatology held in Odawara, Japan. Therefore, at least three travel grants will be awarded to odonatologists from SE Asia (not including Japan). Each of these grants amounts to a maximum of 600 euro. Applications should be short but must include the following information:-

- Name, address, date of birth and details on bank account of the applicant (Name, Address, Bank Name, Bank Address, Account Number and when available IBAN or Swift Code)
- Current position
- Overview of expected costs for attending the symposium
- Indication as to why you would like to attend the symposium
- Outline of the presentation or poster you would like to present

Applications should be sent to Vincent Kalkman [Vincent.kalkman@ncbnaturalis.nl] before 1st March, 2011.

Membership Updates 2010

2010: 276 Members (including 7 sponsored memberships) across 39 countries		
New Members in 2010	Cancellations in 2010	Non Payers at end of year
7	5	29

Details of new members and change of addresses			
New Members			
Lawrence Ball	Wood End Cottage, 12 New Lane, Sutton Green, Guildford, GU14 7QF	UK	lb285@kent.ac.uk
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**Serial photographs of emergence of *Protosticta satoi* (Asahina, 1997)
(dark form) in Tam Dao National Park, North Vietnam
(Zygoptera: Platystictidae)**

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Tam Dao National Park

Tam Dao National Park is located in Vinh Yen town and Me Linh districts, Vinh Phuc province, North Vietnam. The national park lies along a massif, which runs from north-west to south-east, and is isolated from other high-elevation areas by intervening areas of low elevation. There are several peaks over 1,300 m in the national park, the highest of which is Mount Tam Dao Bac at 1,592 m. The lowest point in the national park is c.100 m.

Most of the streams and rivers in the national park are steep and fast flowing. Tam Dao experiences a tropical monsoon climate. The mean annual rainfall of around 2,800 mm is concentrated in the rainy season from April to October, when 90% of the total rainfall occurs. During the dry season, rainfall and humidity at higher elevations can be very low, making these areas susceptible to forest fire.

***Protosticta satoi* (Asahina, 1997) - dark form**

The first record of the species was made by Asahina in 1997. Based on a single female, which was collected from Tam Dao National Park, Asahina erected the new subspecies *Protosticta khaosoidaoensis satoi*.

Later, in 2008, Van Tol studied specimens collected from Cuc Phuong National Park, Ninh Binh Province, Tam Dao National Park, Vinh Phuc Province, Vietnam and compared them to *Protosticta beaumonti* Wilson 1997 dark form from Guangxi, China (Wilson & Reels 2003). Based on the material from Cuc Phuong National Park, he concluded that “*satoi*” is a distinct species, differing from the Thailand species, *P. khaosoidaoensis*. Van Tol believed it possible that specimens from Cuc Phuong, the female from Tam Dao (Asahina, June 1997) and *P. beaumonti* Wilson, March 1997 from Hong Kong might belong to the same species but elected to establish *P. satoi* as a distinct species. If *P. satoi* proves to be synonymous with *P. beaumonti*, the new status of the species would be reduced to a junior synonym of *P. beaumonti*.

Van Tol (2008) also questioned whether the Guangxi *P. beaumonti* dark form of Wilson & Reels 2003 is a synonym of *P. satoi* dark form from Tam Dao or if they are distinct species. Van Tol also described the dark form of the species from Tam Dao, compared to the Cuc Phuong specimens that he matched with the female specimen collected from Tam Dao described by Asahina (1997).

Beside, Wilson (personal comment) believe it is possible, and perhaps most likely, that the dark form *P. beaumonti* from Guangxi sensu Wilson & Reels 2003 is indeed distinct from *P. beaumonti* Wilson, 1997 and is synonymous with *P. satoi* (Asahina, 1997).

Habitat of *Protosticta satoi* (Asahina, 1997) - dark form - in Tam Dao National Park

The species was found in swiftly-flowing streams in forests around Tam Dao village, in high mountain areas with elevation about 800 to 1200m asl. The bottom of the streams is sand and rock, and concentration of oxygen in the water is very high.

Serial photographs of emerging of *Protosticta satoi* (Asahina, 1997) - dark form

On 18th April 2009, I carried out a field trip to Tam Dao National Park. While searching for dragonflies in the main stream, at the bottom of Silver Waterfall in the forest, I suddenly noticed a tiny larva of a damselfly that was crawling on an overhanging rock surface, in highly humid conditions, just about 10-15cm above the running water. After about 20 minutes of motionlessness, the larva began emerging. The emergence happened in gloomy conditions, however the temperature (at the middle of the day) was relatively high.

The first photo of the emergence sequence was taken at 12:36pm, and the last at 13:33pm, as the damselfly reached full size. A photo of a fully mature adult with true mature colours is also published in this paper, taken at the same location in June 2008 (see Photo 9)-. The duration of the maturation to full colour for the species was not determined.

Population and threats to the species

Though good numbers of individuals of the species were recorded in the locality, the species faces many threats mainly because of tourist activity and small-scale agricultural activities of the local people. Indeed, the forests are being destroyed for plantations and hotel/restaurant construction, and the streams, particularly the main stream that runs through the village, are being polluted by sewage from hotels, restaurants and local houses. All these factors are affecting the species at the tourist area of the National Park.



Photos 1-8. *Protosticta satoi* emergence sequence, 18th April 2009, Tam Dao National Park. 1st photo: 12:36 hr, 2nd photo: 12:38 hr, 3rd photo: 12:41 hr, 4th photo: 12:42 hr, 5th photo: 12:45 hr, 6th photo: 12:51 hr, 7th photo: 13:13, 8th photo: 13:33 hr.

Conclusion

This is the first time that images of emerging of *P. satoi* black form in Tam Dao have been presented. The total time from the larvae crawling out from the water to the maiden flight was more than one hour, in middle of the day, in early summer. A detailed description of the larvae has not been published. It is not known how long it takes to develop from the teneral form to true colour mature form.

The population and its relation with the other colour form in Cuc Phuong National Park should be studied further. The taxonomic position relative to *P. beaumonti* Wilson 1997 also needs to be confirmed.

Solutions for protecting the species by keeping the habitat should be understood by local government, because they are very sensitive insects, and populations could very easily be destroyed because they are quite restricted in distribution.



Photo 9. Mature male *Protosticta satoi* 27th June 2008, Tam Dao National Park.

Acknowledgements

I was supported by a WDA Grant in 2010 for studying dragonfly fauna in Vietnam, and I am thankful to the Association for its support. I thank my wife, Nguyen Thi Huong Giang, who assisted me in the field trip to Tam Dao in 2009. I also thank Martin Schorr, Matti Hämäläinen, Keith Wilson and some other colleagues for their help in many ways to my research on dragonflies in Vietnam. Many thanks to Graham Reels who helped to revise this manuscript.

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The first European Congress on Odonatology

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European Odonatology is booming. New atlases, field guides, organisations and internet sites pop up in each country. Even more important is the fact that in many of the European countries new people are getting interested in dragonflies. One of the few things European odonatology was missing was a place where all people interested in dragonflies could meet. The First European Congress on Odonatology, organised by Sonia Ferreira, was therefore perfectly timed.

Everyone who has been to a symposium before knows that it is not about lectures or posters. It is all about venue, food and people. During the symposium most time was spent at the city of Vila do Conde where the hotels and the restaurants were and at the research institute CIBIO at Vairão. CIBIO is very suited for meetings with a very pleasant meeting room and good lunches. Remarkably enough the research institute even has its own swimming pool and here we had one of the highlight of the symposium in the form of a barbeque with local meat and fish. Another highlight was the very rich buffet we had during the symposium dinner held in a spacious garden overlooking the Douro river in Porto; nice wines, meats, cheeses, desserts topped off with quality coffee.

Between the food we had presentations. Most of these took only 15 minutes so that several dozen could be given within three days. A large number of topics were addressed varying from taxonomy, faunistics, conservation to climate change. Many countries are currently working towards a distribution atlas and the symposium gave a good overview on the various national projects. In a high number of the presented projects DNA is used to focus on a single species or species-group. These projects try to gain a better insight in the biogeography of European odonates and the impact of climate change and fragmentation.

1	Carlo Utzeri	Italy	44	Adrian Parr	UK
2	Maja Cipot	Slovenia	45	Alberto Crepaldi	Switzerland
3	Luigi Giugliano	Italy	46	Steve Prentice	UK
4	Dolf Ramaker	Netherlands	47	Cédric Vanappelghem	France
5	Ali Šalamun	Slovenia	48	Costanza Uboni	Italy
6	Ruj Šalamun	Slovenia	49	Klaas-Douwe B Dijkstra	Netherlands
7	Laia Fontana-Bria	Spain	50	Goran Kokić	Croatia
8	Albano Soares	Portugal	51	Natalia Mrnjavac	Croatia
9	Dušan Šácha	Slovakia	52	Jürgen Ott	Germany
10	Robert Ketelaar	Netherlands	53	Damjan Vinko	Slovenia
11	Philippe Lambret	France	54	Shirley Nelson	Ireland
12	Robby Stoks	Belgium	55	Geert De Knijf	Belgium
13	Michael Post	Germany	56	Suzanna Persson	Sweden
14	Adriana Bobinec	Croatia	57	Vincent Kalkman	Netherlands
15	Xavier Houard	France	58	Kent Olsen	Denmark
16	Marija Matejcic	Croatia	59	Pedro Moreira	Portugal
17	Florian Weihrauch	Germany	60	Attila Kalmár	Hungary
18	Ida Suhling	Sweden	61	Tiago Rodrigues	Portugal
19	Frank Suhling	Germany	62	Jean-Pierre Boudot	France
20	Andreas Martens	Germany	63	Dorothea Laister	Austria
21	Olalla Lorenzo Carballa	Spain	64	David Thompson	UK
22	David Outomuro Priede	Spain	65	Manuel Ferreras Romero	Spain
23	Göran Sahlén	Sweden	66	David Thompson's backpack	UK
24	Serena Santolamazza Carbone	Spain	67	Sami Karjalainen	Finland
25	Oleg Kosterin	Russia	68	Bob Reimer	United Arab Emirates
26	Wouter Wakke	Netherlands	69	Laura Gordon	UK
27	Adolfo Cordero Rivera	Spain	70	Otakar Holuša	Czech Republic
28	Jaap Bouwman	Netherlands	71	Joaquín Márquez-Rodríguez	Spain
29	Sönke Hardersen	Italy	72	Klaus Guido Leipelt	Germany
30	Linda Strand	Sweden	73	Dick Groenendijk	Netherlands
31	Genaro da Silva	Spain	74	Ewoud Van der Ploeg	Netherlands
32	Dejan Kulijer	Bosnia and Herzegovina	75	Tim Termaat	Netherlands
33	Aires Lemos Pires	Portugal	76	Magnus Billqvist	Sweden
34	Gerold Laister	Austria	77	Ernestino Maravalhas	Portugal
35	Marina Vilenica	Croatia	78	Klaus-Jürgen Conze	Germany
36	Miloš Jović	Serbia	79	Sónia Ferreira	Portugal
37	Maria Cecília Gomes	Portugal	80	Elena Dyatlova	Ukraine
38	Despina Kitanova	Macedonia	81	Vadym Kormyzenko	Ukraine
39	Brian Nelson	Ireland	82	Elisa Riservato	Italy
40	Antonio Torralba-Burrial	Spain	83	De Knijf Isha	Belgium
41	Phill Watts	UK	84	Rosa Ana Sánchez Guillén	Spain
42	Gianmaria Carchini	Italy	85	Demolder Heidi	Belgium
43	Hajnalka Gyulavári	Hungary			

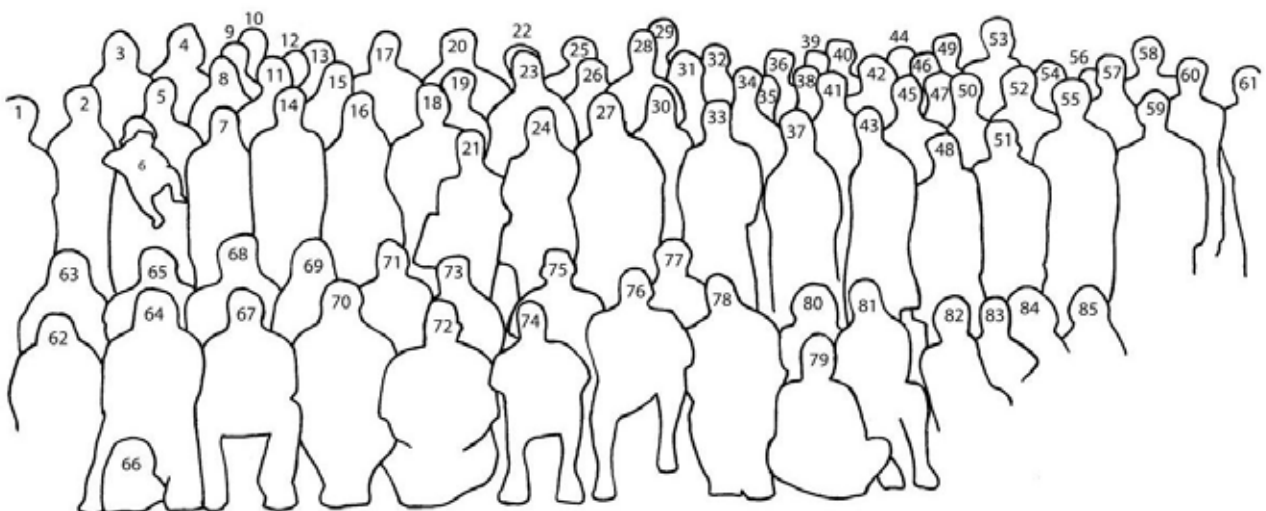
Key to group photo of the 85 attendees of the first European Congress on Odonatology held 2-5 July 2010 in Vairão-Vila do Conde, Portugal.

Good food and presentations would not make much of a symposium without nice people. The 85 people attending the meeting came from all over Europe (24 countries present!) and were a fine mix young and slightly older people. I had the impression that everyone felt welcome and at ease from almost the very start.

Probably the best compliment you can get when you organise a symposium is that other people start offering to organise the next. Already during the symposium an offer was made to organise the second European symposium (2012, Belgrade) and two others have already opted for 2014 and 2016.



Photo: Group photo of the 84 of the 85 attendees of the first European Congress on Odonatology held 2-5 July 2010 in Vairão-Vila do Conde, Portugal (see <http://europeandragonflies.com/>). Credit: Erland Refling Nielsen; the 85th attendee.



Key to group photo of the 85 attendees of the first European Congress on Odonatology held 2-5 July 2010 in Vairão-Vila do Conde, Portugal.

Odonata fieldwork camp in Portugal: July 7-14, 2010

Tim Termaat [tim.termaat@vlinderstichting.nl]
Dutch Butterfly Conservation



Photo: Group picture summer camp Portugal. Credit: Erland Refling Nielsen.

On July 5 the successful 1st European Congress on Odonatology ended (see report on pages 8-9). But for more than 30 people the party was not over yet: a week of fieldwork in the northeastern part of Portugal was about to begin. The aim of the field camp was to gather a substantial number of dragonfly records from this poorly known region, while seeing some Iberian specialities on the way. Add the Portuguese sun, kitchen & lifestyle, and it is clear that we were about to have a very pleasant week.



Photo: *Macromia splendens*. Credit: Tim Termaat.

After one day without an official programme (which was used by several people to make a successful trip to a nearby population of *Macromia splendens*), the participants were divided into two groups. One group went to the village Gimonde, to sample Montesinho Natural Park and its surroundings. The second group went a bit further south, to sample the area around Vale de Algosó with special focus during the second half on the Sabor River. One of Europe's few remaining wild rivers, Sabor River is located in a pristine region protected under national and European environmental agreements. Sadly however, a dam is currently being built here.

Both groups joined again in Barrocal do Douro on July 11, to sample Douro International Natural Park and its surroundings.

Montesinho Natural Park, and the area south of it, turned out to be very good for rheophilic odonates. The combination of various types of brooks, rivulets and rivers yielded a nice species diversity. To name a few species: *Calopteryx haemorrhoidalis*, *Coenagrion caeruleum*, *Platynemis acutipennis*, *P. latipes*, *Boyeria*



Photo: Rio Sabor. Credit: Tim Termaat.

irene, *Gomphus graslinii*, *Onychogomphus forcipatus*, *O. uncatus*, *Cordulegaster boltonii*, *Macromia splendens* and *Oxygastra curtisii*. Standing waters were present as water reservoirs. Interesting species could be found here if emergent vegetation was present: *Lestes sponsa* (only known in Portugal from this area), *L. virens*, *Sympecma fusca*, *Coenagrion scitulum*, *Anax parthenope*, *Sympetrum flaveolum* and *Trithemis annulata*. Another nice treat was the Marbled Newt (*Triturus marmoratus*), which gave nice views at one of the lakes.

Unfortunately several people who visited the area around Vale de Algosó became ill for a few days, but they managed to find most of the mentioned species nonetheless. In addition, they found *Coenagrion mercuriale* at two sites.

The running waters in Douro International Natural Park were less well developed and had already dried out in many cases. However, a significant number of ponds could be found, with various vegetation characteristics. Typical species that were recorded here included *Lestes barbarus*, *L. dryas*, *L. virens*, *Coenagrion scitulum*, *Ischnura graellsii*, *Ceragrion tenellum*, *E. viridulum*, *Aeshna affinis* (rare in Portugal), *Gomphus pulchellus*, *Sympetrum fonscolombii* and *S. meridionale*.

In total, 48 species were recorded during the fieldwork camp. The best additions for the Portuguese database were new localities for *Coenagrion caerulescens*, *Erythromma viridulum*, *Aeshna affinis*, *Anax parthenope*, *Gomphus graslinii*, *Oxygastra curtisii*, *Macromia splendens*, *Sympetrum flaveolum* and *S. meridionale*.

To summarise it all: we had a very nice and interesting week, with many dragonflies and plenty of opportunity to chat and share knowledge with fellow odonatologists from all corners of Europe. Many thanks to Sónia Ferreira for the excellent organisation (the cleaning lady in Barrocal will not forget her anytime soon!) and all participants for the good time we had.



Photo: *Gomphus graslinii*. Credit: Tim Termaat.

More Odonata records from Thailand

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In 2009 and 2010 we made several visits to Thailand and made collections and photographs of odonates which were treated by the first author. VZ, a coleopterologist, and AK travelled to Central and North Thailand in late July-August 2009 and May-June 2010; their collections are kept partly at the Institute of Systematics and Ecology of Animals of Siberian Branch of Russian Academy of Sciences and AK's private collection. Earlier collected specimens from his collection were also treated. NV, a dipterologist, travelled in North, East, Central and Peninsular Thailand in November-December 2009 and 2010. His collection is kept with OK. In April 2010, OK had an opportunity to observe several odonate individuals at Trat. NV managed to record two species for the first time for Thailand while all made a number of new provincial records; i.e., not mentioned in Hämäläinen and Pinratana, 1999, Ferro et al., 2009 and smaller publications. Most of these new records were unsurprising, and were kindly confirmed as new by Dr. Matti Hämäläinen, except for those for Mae Hong Son Province, for which he has unpublished data.

New records for Thailand

Two new records were made by NV in Phang Nga Province.

Mortonagrion arthuri Fraser, 1944: 9 ♂, 5 ♀ collected, also photographed – Similan Island No.4. (8.57° N 97.635° E) , 12.12.2009.

This species appeared to be rather common in the canopy shade of a forest with dense coppice, and also at a shady path, not far from an

almost dried out temporal brook with a silty bed (but not at its banks). Identification was unmistakable by the elaborate male appendages (Fraser, 1944; Asahina, 1965) and the female thoracic structures (Asahina, 1965). Both sexes were similarly coloured: they were brownish, with rather distinct black spots at the posterior end of abdominal S2-7 and black rings on S8-9, and a diffuse lilac-bluish pattern composed of two diffuse stripes on either side of the pterothorax (not well seen in all specimens), spots at the fore and rear end of the brownish part of abdominal segments, and a conspicuous spot occupying the fore half of S8 (Fig. 1). So, our males looked more or less like the immature holotype (Fraser, 1944). Judging from specimens known from Singapore (Tang et al., 2010), this colouration corresponds to mature females but mature males acquire a contrasting black-and-green or black-and-blue colouration of the thorax, and S1-2 and S7-10 become black beyond the blue spot on S8. Most probably the individuals observed and collected on the Similans were all immatures.

The known distribution of the species is remarkable. It is known from the Malcolm Island of Meguri islands, Tennaserim, Lower Burma (Asahina, 1965), being a member of the same archipelago in a broad sense as the Similans; from Butterworth (the type locality) on the western coast of Peninsular Malaysia; from five localities in Singapore (Tang et al., 2010) and from Thioman Island east of Peninsular Malaysia (Orr, 2005). [The Similan record discussed was mentioned in Tang et al. (2010) prior to this paper.] It is striking that four out of five sites from where *M. arthuri* was hitherto known are small islands around the Malay Peninsula, and only the type locality is on the mainland coast (but opposite to Penang Island). At the same time, it is found in quite different habitats. All four localities in Singapore are mangroves. At the same time the Similans and Thioman are surrounded by deep sea (and hence both are popular diving sites) and lack mangroves. In the Similans, *M. arthuri* was found in the forest. NV pointed out that the water catchment of the brook is very restricted and the water supply, from rains, should be irregular; he supposed that the larvae may tolerate temporary drought. The type locality is situated at a sandy low coast with coconut palms (Fraser, 1944).

It looks like this species is rather indifferent to a habitat type but behaves as a 'small island specialist'. This term

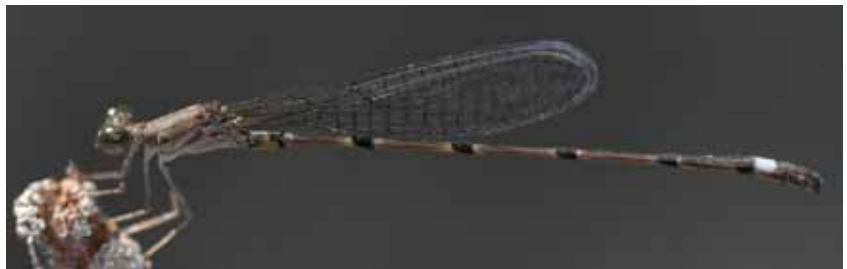


Fig. 1. *Mortonagrion arthuri*, a male, the Similan Island No. 4, a dry forest near a silty brook. 17.02.2009; photo by Nikita Vikhrev.

used to be applied to a number of bird species, such as the Nicobar Pigeon which inhabits the Similans as well. But a tiny damselfly cannot be a small island specialist in the same sense as a bird, which is a large and motile creature, for a bird is able to select a small island for breeding 'by intention', at the behavioural level while a damselfly is hardly 'informed' if it lives on an island or not. However, both may enjoy absence of some deleterious factors on a small island: birds' nests are safe from many terrestrial predators and the damselfly may also avoid some predators or parasites present in the mainland. We may hypothesise that *M. arthuri* was a member of biocenoses which spread over the Sunda continental shelf as it emerged from the sea and turned to land as a consequence of falling sea level during the repeated ice ages in higher latitudes in the Pleistocene. These most probably were forests but anyway were young and hence impoverished communities compared to the ancient ones on the mainland. So they may have lacked that unknown hypothetical factor which restricts distribution of *M. arthuri*. When the ocean reinvaded and the land withdrew, this damselfly might have remained as a relict on islands surrounding the Malay Peninsula. Alternatively, the species may just be adapted to habitats close to the sea and so somewhat mineralised due to aerosol transport of sea salts, or it may tolerate drought and irregular water levels at coastal brooks fed by local rains only.

Agrionoptera sexlineata Selys, 1879: 1 ♀ photographed (Fig. 2) in the environs of Khao Lak, at a small brook in a primary forest near its margin (8.760° N 98.284° E), 19.12.2009. The female steadily perched on the same stem and was not at all cautious. The thoracic and abdominal pattern, especially yellow S8, makes identification unmistakable. This species is widespread in Sundaland except Java (Orr, 2005) and so was quite unsurprising for the Malay Isthmus.



Fig. 2. *Agrionoptera sexlineata*, a female from Phang Nga Province, the Khao Lak environs, 28.02.2009; photo by Nikita Vikhrev.

Records for provinces of Thailand

Mae Hong Son Province

Heliocypha biforata (Selys, 1959): 1 ♂, 1 ♀ (NV) – Pai environs, 12-19.11.2010.

Aciagrion pallidum Selys, 1891: 1 ♀ (NV) – the same place and dates.

Copera marginipes (Rambur, 1842): 1 ♂ (NV) – the same place and dates.

Coeliccia poungyi Fraser, 1924: 1 ♂ (NV) – the same place, 7.11.2009; 1 ♂ (photo by NV) – the same place, 9.11.2009.

Brachydiplax sp. (? *farinosa* Krüger, 1902): 1 ♀ (NV) – the same place, 12-19.11.2010. Abdomen 17 mm, hind wing 24 mm. The specimen has 8 antenodals, as in *B. farinosa*, and the vulvar lamina as expected in this species but somewhat too deeply incised (Fig. 3b, c). However, the pterothorax pattern is stripy (Fig. 3a) rather than having few yellow spots, if any, on the dark background, as should be in *B. farinosa*, and corresponds to that of the Chinese taxon *B. chalybea flavovittata* Ris, 1911 (but not of *B. sobrina* (Rambur, 1842)). The abdominal black pattern is not so pronounced as in the mentioned subspecies but not so reduced as in *B. c. chalybea* Brauer, 1868. The specimen does not look very young. In this respect it is noteworthy that Donnely (1994: 86) reported from Chanthaburi Province a male of "*Brachydiplax* sp. (Krathing) like *farinosa* but with different hamule. Not *sobrina* or *chalybea*."

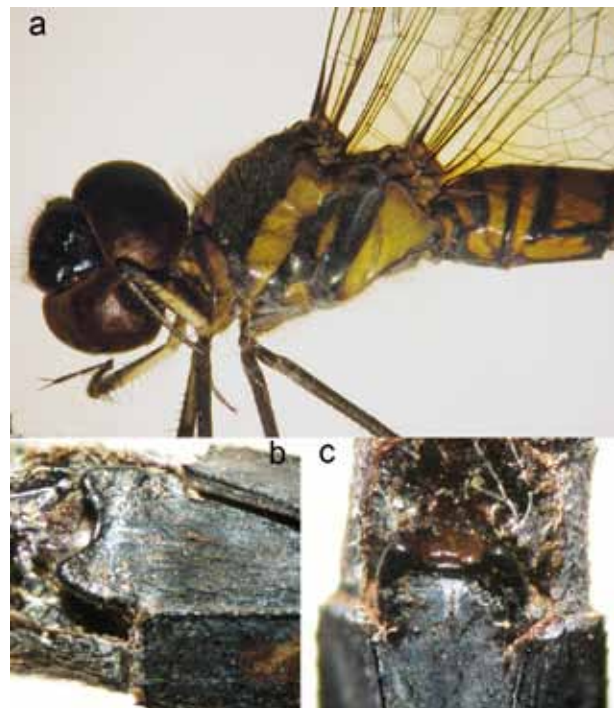


Fig. 3. *Brachydiplax* sp. (? *farinosa* Krüger, 1902), a female from Mae Hong Son Province, Pai environs, 12-19.11.2010. (a) head, thorax and base of abdomen; (b), (c) vulvar lamina.

Zygonyx iris malayana (Laidlaw, 1902): 2 ♂ (NV) – at Cave Lodge, 19.57° N, 98.28° E, 23.11.2010.

Lampang Province

Aristocypha fenestrella (Rambur, 1842): 4 ♂, 1 ♀ (VZ), 1 ♂ (AK) – 32 km S of Lampang, near Wiang Kosui National Park, ~450 m, 18°04'01" N, 99°39'52" E, 2.06.2010.

Libellago lineata (Burmeister, 1839): 1 ♂ (AK) – the same place, 2-4.06.2010.

Ceriagrion chaoi Schmidt, 1964: 1 ♂, 1 ♀ (VZ) – the same data. In male, tergites 8-10 vaguely darkened.

Coeliccia poungyi Fraser, 1924: 1 ♂ (AK) – the same data.

Heliogomphus ?svihleri (Asahina, 1970): 1 ♀ (AK) – the same data. *H. svihleri* is so far known by two females only, from Nakhon Nayok and Chiang Mai Provinces (Hämäläinen and Pinratana, 1999). Our specimen is again a female, a teneral one with the pattern just appearing on the head and thorax but still absent on the abdomen. However, the wing venation suggests *Heliogomphus* (Fig. 4a), the vulvar lamina shape agrees, while two pairs of spines, above the ocelli and on the occiput (Fig. 4b, c), are diagnostic for *H. svihleri* (Asahina, 1986). The ocellar spines are smaller and more widely set than in Asahina's figures but a teneral condition of a specimen should be taken into account in this respect.

Neurothemis tullia (Drury, 1773): 1 ♂ (AK) - the same data.

Phrae Province

Argiocnemis rubescens rubeola Selys, 1877: 1 ♀ (VZ) - 70 km SE Lampang, 280 m, 17°50' N, 100°03,6' E, 20.08.2009.

Diplacodes trivialis (Rambur, 1842): 2 ♂ (VZ) – the same data.

Kamphaeng Phet Province

Neurothemis fulvia (Drury, 1773): 2 ♂ (VZ) – Mae Wong National Park, 187 m, 15°53,7' N, 99°20,7' E, 9.08.2009; attracted by light.

Brachydiplax farinosa Krüger, 1902:
1 ♂ (VZ) – the same data.

Loei Province

Prodasineura autumnalis (Fraser, 1922): 1 ♂ (VZ) – Phu Ruea, 735 m a. s. l., 17°27'10" N, 101°29'25" E, 27.05.2010.

Macromia chalybepumensis Hämäläinen, 1986: 1 ♂ – the same place, 26.05.2010. The male corresponds to the original description (Hämäläinen, 1986) in all details but in addition a slight yellowish tint is noticeable at the hind wing base somewhere between the middle of the anal loop and wing anal angle.

Neurothemis fulvia (Drury, 1773): 1 ♀ (VZ) – the same place, 27.05.2010

Rhyothemis plutonia Selys, 1883: 1 ♀ (VZ) – the same data; 1 ♀ (AK) – the same place, 26-28.05.2010.

Zygonyx iris malayana: 1 ♂ (VZ) – the same place, 27.05.2010.

Uthai Thani Province

Orthetrum testaceum (Burmeister, 1839): 1 ♂ (VZ) – Thap Sela, 154 m, 15°31,7' N, 99°25,4' E, 15.08.2009.

Nakhon Ratchasima (Korat) Province

Argiocnemis minima Selys, 1877: 1 ♂ (VZ) – Nong Bun Nak village, 240 m a.s.l., 14°41,4' N, 102°27,25 E, rice fields, 13-14.05.2010; 1 ♂, 1 ♀ (AK) – the same place, without date.

Macrogomphus matsukii Asahina, 1986: 1 ♂ (AK) – the same place, 08.2009. The inner branch of the cercus is slightly longer than in the figure by Asahina (1986) and in profile protrudes a bit more backwards than the outer branch, but the head and thorax pattern and strongly ridged hamuli are distinctive and coincide with the figures

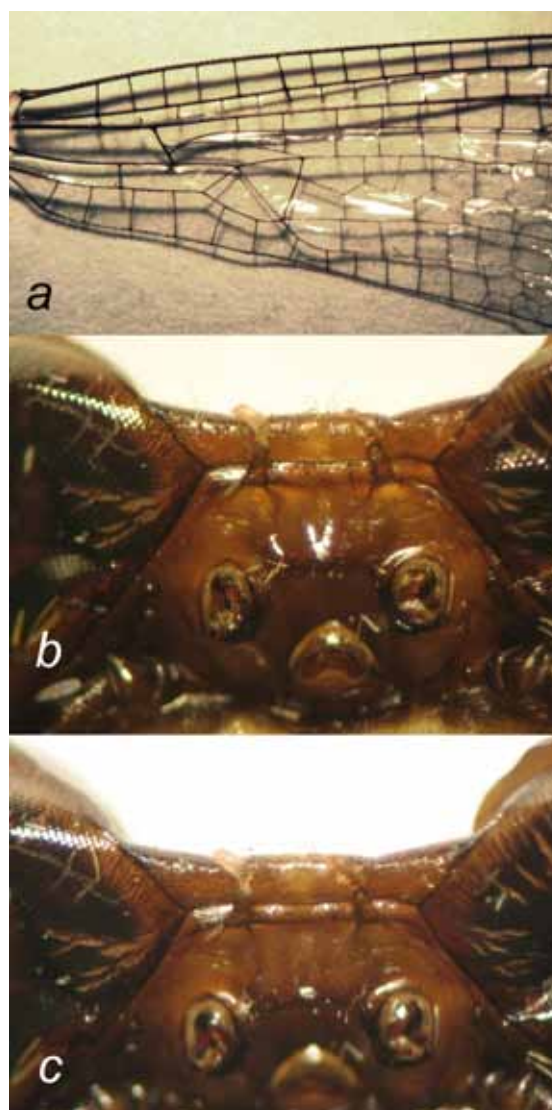


Fig. 4. *Heliogomphus ?svihleri* (Asahina, 1970): a teneral female, 32 km S of Lampang Province, near Wiang Kosui National Park, 2-4.06.2010. (a) the fore wing base; (b), (c) top of the head.

in detail. A rare species, however reported for the adjacent Saraburi Province (Asahina, 1986).

Acisoma panorpoides Rambur, 1842: 2 ♂ (VZ, rice fields) – the same place, 13-14.05.2010.

Aethriamanta brevipennis (Rambur, 1842) – the same place, 1 ♀ (22.05.2010), 1 ♀ (25.05.2010).

Indothemis carnatica (Fabricius, 1798): 1 ♂ (VZ) – the same data as above; 2 ♂ (AK) – the same place, 08.2009.

Orthetrum luzonicum (Brauer, 1868): 2 ♂ (AK) – the same place, 08.2009.

Palpopleura s. sexmaculata (Fabricius, 1787): 4 ♂ (AK) – Wat Soeng Sang, near Non Sambun village, 260 m, 14°16,5' N, 102°23,3 E, 3.08.2009.

Potamarcha congener (Rambur, 1842): 1 ♂ (VZ) – the same place, 24.07.2009; 2 ♀ (AK) – the same place, 08.2009.

Pseudothemis jorina Förster, 1904: 1 ♂ (VZ) – the same place, 29.07.2009.

Rhyothemis variegata (Linnaeus, 1763): 1 ♀ gynochromic (VZ) – the same data as above; 1 ♀ gynochromic (VZ) – the same place, 28.07.2009; 2 ♂ (VZ, in a forest) – 14.05.2010; 1 ♂, 1 ♀ gynochromic (VZ, rice fields) – 13-14.05.2010; 1 ♂ (AK) – 20.05.2010; 1 ♀ gynochromic (AK) – 20-21.05.2010; 1 ♀ gynochromic (VZ) – 22.05.2010. The capture of altogether three males, rarely collected in this species, is noteworthy. For example, M. Hämäläinen (pers. comm.) has not had male specimens from Thailand.

Zyxomma petiolatum Rambur, 1842: 1 ♂ (VZ) – the same place, 5.08.2009.

Sa Kaeo Province

Brachythemis contaminata (Fabricius, 1793): 1 ♂, 1 ♀ (AK) – Ta Phraya District, La Lu, Bankob River, 15-16.05.2010.

Lathrecista asiatica (Fabricius, 1798): 1 ♂ (AK) – the same place, 3-14.04.2007; 1 ♂ (AK) - 2-4.06.2010.

Pantala flavescens (Fabricius, 1798): 1 ♂ (VZ) – the same place, 16.05.2010; 1 ♀ (AK) – the same place, 15-16.05.2010.

Potamarcha congener: 1 ♂ (AK) – the same place, 3-14.04.2007.

Chanthaburi Province

Heliaeschna uninervulata Martin, 1909: 1 ♂ (NV) – the Khao Khitchakut National Park environs, Krating Country Resort, in a restaurant (12.820528° N 102.129596° E), 3.11.2009. The species is rare and has been reported for North, South and Central Thailand (Hämäläinen and Pinratana, 1999)

Trat Province

Ceriatrigon cerinorubellum (Brauer, 1865): 1 ♀ (a photo, OK) – a pond at Trat bus station, 11.04.2010.

Diplacodes trivialis: several ♂ visually (OK) – the same data.

Lathrecista asiatica: 1 ♂ (a photo, OK) – the same data.

Neurothemis tullia: 1 ♀ (a photo, OK) – the same data.

A note on *Coeliccia didyma* (Selys, 1863)

Fraser (1933: 160) described the male anal appendages in this species as “livid or pale yellow, the base of superiors and the apices of inferiors black”. Asahina (1984), who listed specimens from throughout Thailand and Malaysia, described them as yellowish. At the same time Orr (2005) in his pocket guide for dragonflies of Peninsular Malaysia and Singapore states they are black. They are also black in two of our males from Phang Nga Province in peninsular Thailand: 1 ♂, a brook in a hillside primary forest near Khao Khuan Kha, 5 km NE of Khok Kloi, 8°18'04.48" N, 98°20'08.80" E, 23.02.2009 (OK); 1 ♂, Khao Lak environs, 14.12.2009, (NV). Curiously, in a male collected by AK in Lampang Province (32 km S of Lampang, near Wiang Kosui National Park, 2.06.2010), the appendages are dark-brownish but the uppers gradually change to whitish dorsally from about the level of the ventral hook to the tip. All three of our females collected together with males, 1 ♀ with the male from Khao Khuan Kha and 2 ♀ with that from Lampang, differ from that depicted by Asahina (1984: fig. 8) in colouration of tergite IX which is shown as light below but with a diffuse dark dorsal stripe. In all our females it is dark below, while dorsally it is also dark in the Khao Khuan Kha female, which has just two small yellow spots in the tergite upper part, yellow in one Lampang female and with a dark stripe in the other one.

More species for the Khao Khitchakut National Park

In the last five years this park was briefly visited by NV in almost every year in the dry season, and quite a handful of species have now been recorded for it (Donnelly, 1994; Kosterin and Vikhrev, 2008, 2009). Last time it was visited by Nikita on 3-5.11.2009. In addition to the above mentioned *H. uninervulata*, on 3.11.2009 at the Krating River lower reaches (12.823° N 102.127° E) he collected a male of *Euphaea masoni* Selys, 1879, collected and photographed a male *Prodasineura verticalis* sensu Asahina (but see Hämäläinen and Pinratana, 1999) and on

5.11.2009 photographed a male *Coeliccia megumii* Asahina, 1984 at the same section of the Krating River above the waterfalls and just above the confluence of its two headwaters, where it has rather a slow current above a granite bed (12.840° N 102.129° E); that is, just at the place where *C. yamasakii* Asahina, 1984 occurred in January 2006 (Kosterin and Vikhrev, 2008). So this is the third species of *Coeliccia* registered for this park (also *C. kazukoe* Asahina, 1984 was found in 2006 (Kosterin & Vikhrev, 2008) in the forest quite above and away from this site). The Khao Khitchakut National Park appears to have a very rich fauna, which is not surprising since it is in the famous and well studied Soi Dao Mts., 20 km SW (over the mountain range) from the Khao Soi Dao National Park.

Acknowledgements

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**On one of the oldest, best looking
and possibly most successful odonatists**

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According to sources on the World Wide Web the rainbow bee-eater (*Merops ornatus*) is widely distributed throughout Australia and eastern Indonesia, including Bali, the Lesser Sundas and Sulawesi, and east to Papua New Guinea, the Bismarck Archipelago and, rarely, the Solomon Islands. It is a vagrant visitor to locations further north including Palau, south-western Micronesia, Saipan, the northern Mariana Islands, and Miyako Island and the southern Ryuku Islands in Japan. The majority of the global population breeds in Australia (including on Rottnest Island and islands in the southwest Torres Strait). Breeding has also been recorded in eastern Papua New Guinea

(around Port Moresby and the Ramu Valley) and may possibly occur in the Lesser Sundas.

In the ornithological literature the bird is quite often pictured with mostly an unidentifiable dragonfly in its beak. The present photo, however, shows the rainbow bee-eater with a rather unusual delicacy. It consists of a male of *Notoaeschna sagittata*, a dragonfly species that inhabits rapid streams and rivers in the southeast of mainland Australia. *Notoaeschna* is the only Australian dragonfly genus with larvae by structure and size of their legs clearly showing adaptation to fast flowing streams and riffle situations, and accordingly human dragonfly collectors find it quite difficult to catch adults. In the photo the bird is displaying its prey well enough to show even the specific character of *N. sagittata*: male with segment 10 narrower than the preceding segments. This makes the abdomen look bellied and unique at least amongst Australian aeshnoids.

We can only wonder which other interesting species of dragonflies the widely distributed Rainbow Bee-eater may catch.

Helen Fallow (Canberra) who made the photo along the Gudgenby River in Australian Capital Territory is gratefully acknowledged for making it available for this publication.



Photo: Rainbow bee-eater (*Merops ornatus*) and captured *Notoaeschna sagittata* (Aeshnidae), Gudgenby River, Australian Capital Territory. Credit: Helen Fallow (Canberra).

Additional records of *Libellago corbeti* van der Poorten, 2009 in Sri Lanka with additional comparative notes on behaviour

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Libellago corbeti was first identified in 2007 from two males that were seen on 3 July 2007 near Kudawe, Sri Lanka. Subsequently, two females were seen on 17 April 2008 at the same location and the species was described by van der Poorten (2009). Additional sightings have since been confirmed with photographic evidence from a small section of the Sinharaja Forest Reserve near the type locality and from other locations in the wet zone of the island. In addition, a specimen at the NHM London previously identified as *Libellago lineata indica* was identified as *L. corbeti* on October 26, 2010. *L. corbeti* can be distinguished from the other three known species of *Libellago* in Sri Lanka (*L. adami*, *L. finalis* and *L. greeni*) as described by van der Poorten (2009).

Additional records

1. Sinharaja Forest Reserve at the Kudawe entry point, 400 m from the entrance gate, near the start of the Moulawella Nature Trail, 500 m a.s.l.: 12 X 2007 (2 ♀, 1 ♂, K. Conniff, pers. comm., photos); 6 X 2008 (1 ♀, 1 ♂, K. Conniff, pers. comm., photos); 5 V 2008 (1 ♀, G. & N. van der Poorten, photos); 27 III 2009 (1 ♀, G. & N. van der Poorten, photos).
2. Sinharaja Forest Reserve, river running down from the Kudawe entry point, 500 m a.s.l.: 13 V 2009 (2 ♂, K. Conniff & M. Bedjanič, pers. comm.).
3. Sinharaja Forest Reserve, 2 km from the Kudawe entry point, near the stream beside the Research Station, 500 m a.s.l.: 14 XI 2008, 9:30 am (1 ♀, 1 ♂, K. Conniff & K. D. Dijkstra, pers. comm., photos); 13 V 2009 (5 ♂, K. Conniff & M. Bedjanič, pers. comm.).
4. Haycock Hill-Hiniduma, stream, 6.19.59N, 80.18.00E: 15 V 2009 (1 ♂, M. Bedjanič, pers. comm.).
5. Morapitiya Forest Reserve, stream, 6.29.50N, 80.19.49E, 180 m a.s.l.: 11 III 2010, noon (3 ♂, 2 ♀, one pair in tandem, 1 ♀ ovipositing, G. & N. van der Poorten, K. Conniff, photos).
6. Kanneliya Forest Reserve, stream near entrance, 6.11.0N, 80.25.0E, 100 m a.s.l.: 25 X 2007 (1 ♂, K. Conniff & I. Lockwood, pers. comm., no photo). In addition, a specimen procured at Kanneliya and briefly examined by the author in 2005 prior to the publication of the description of the holotype *L. corbeti* is likely that of *L. corbeti* but the specimen is not presently available for confirmation.

Previously misidentified specimens

One specimen of a female *L. corbeti* was found in a recent search of the specimens in the Natural History Museum, London England. This specimen was originally identified as *L. lineata indica*; *L. lineata* was removed from the list of Sri Lankan odonates in 2009 (Hämäläinen et. al. 2009). This specimen was from the collection of Colonel Yerbury. It was labelled “Ceylon. Yerbury. Coll. 92.– 102” and “Kottawa. 24.4.92” [1892]. The label has been corrected. “Kottawa” might refer either to Kottawa near Maharagama or to Kottawa Forest Arboretum near Galle, but the latter location is the most likely one. Both locations are in the wet zone.

No specimens of *L. corbeti* were found in a recent search of the collections in the Sri Lanka National Museum.

Behaviour

In the Sinharaja Forest Reserve, males were seen at the stream perched on low vegetation at the edge of the water or by the side of the trail perched on a bare twig 3–6 m above the ground. Females were seen perched on vegetation, usually bare twigs, at a height of 3–7 m above ground. No interaction was observed between males and females.

At Morapitiya Forest Reserve, males and females were observed flying together around noon along the shady, shallow section of a slow-flowing stream that was bordered by a thick-leaved grass-like plant, possibly of the family Cyperaceae. Though males of most species of *Libellago* engage in territorial combats, this was not observed in *L. corbeti* despite the presence in one place of three males amidst two females. During courtship, *Libellago* males typically display in front of the female by showing the white flexor surface of the tibiae and the tip of the (usually) brightly colored abdomen by raising it. In this observation, the *L. corbeti* male was observed only swinging its abdomen up and down in front of the female. Though the flexor surfaces of the tibiae of the *L. corbeti* male are white, the abdomen is entirely black and the rest of the insect is mostly black with only a few yellow markings.

A male was observed to grab hold of a female and they immediately went to the copula phase; no pre-copulatory tandem was observed. The male and female remained in copula for only a few minutes. Though *Libellago* females typically oviposit in woody material, the *L. corbeti* female oviposited into the vegetation that was

floating on the surface of the stream, which included the grass-like plant, dead leaves and dried sticks (see Photo 1). The female took several minutes to oviposit in several different sites. The male remained nearby but did not appear to be closely guarding the female – he often flew off, possibly to check out other males.

Observations of the reproductive behaviour of *L. adami* in Sri Lanka are similar – copula was quick and the female oviposited while the male sat on the nearby vegetation, guarding his territory fiercely and not allowing another male to pass in front of his position (K. Conniff, pers. comm.). Males of *L. adami*, *L. finalis* and *L.*



Photo: *Libellago corbeti* female ovipositing.

greeni engage enthusiastically in territorial combat and guard ovipositing females closely. Females of these three species oviposit in stationary woody material or loose vegetation and twigs along the river or stream. *L. adami* tends to inhabit slower streams than either *L. finalis* or *L. greeni* which prefer faster flowing streams and rivers. The courtship behaviour of these three species has not been described though they all have the white flexor tibial surfaces. Only *L. greeni* has an abdomen that is brightly coloured for its whole length. The abdomen of the other two species is brightly coloured only to S7 or S8 with the remainder being black. The courting behavior of all four species needs further observations but it is expected that that of *L. corbeti*, which is so devoid of coloured markings, would be different.

Discussion

The additional recordings made in the Sinharaja Forest Reserve have all been made along the edge of a walking trail near the Kudawe entry point that is bordered by a perennial stream or along the stream itself as it descends the slope outside the reserve. The vegetation consists mainly of dipterocarps with tree ferns, bamboo and pitcher plants. Since the trail from the Kudawe entry point through the Sinharaja Forest Reserve is well travelled, it is likely that more sightings of *L. corbeti* will be made in the reserve. The park is a protected area but the stream along which the records of *L. corbeti* have been made is a sensitive habitat and needs to be protected from any encroachment or clearing. Since much of the Sinharaja Forest Reserve is not as easily accessible and is rarely visited, it remains to be seen whether or not *L. corbeti* is found in other locations.

The presence of *L. corbeti* in three other distinct forested areas of the wet zone of the island (Haycock Hill-Hiniduma, Morapitiya Forest Reserve and Kanneliya Forest Reserve, and historically in Kottawa Forest Arboretum) is encouraging though these habitats too are under threat of being disturbed and the streams degraded.

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An influx of *Sympetrum fonscolombii* Selys in the United Arab Emirates

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Sympetrum fonscolombii is widely distributed across the warmer parts of Africa and Asia (Dijkstra, 2006) and has spread further north in Europe in recent years (Boudot *et al*, 2009). There are few records of the species for Arabia (Walker & Pittaway, 1991; Schneider & Krupp, 1993; Schneider & Dumont, 1997), but lack of records is likely a result of lack of observers. Records for the United Arab Emirates (UAE) are similarly sparse. The earliest known record is from 2000. Gary Feulner recorded single individuals during November in three separate years. Additionally, visiting naturalists recorded a group in March 2001 at Wadi Bih dam and a single individual at the Fujairah National Dairy Farm in January 2003 (Feulner *et al*, 2007). Despite a small but growing band of competent observers, the species continued to be rarely observed. Additional single records were from Kalba in November, 2005 (Paul Meridith, pers. comm.) and Wadi Wurayah in February, 2009 (Reimer, pers. obs.). Reimer also observed an apparent resident population of *S. fonscolombii* at the Wadi Saiq dam on Jebel Akdhar, Oman, in August, 2008. Many individuals were seen, most showing wing damage, some extensive.



Male *Sympetrum fonscolombii*.



Female *Sympetrum fonscolombii*.

On 30 October, 2009, Campbell observed a single individual on Lulu Island, Abu Dhabi. Two weeks later two individuals were observed at Kalba and 14 were observed at Al Wathba. By then it became clear that a significant influx of *S. fonscolombii* was underway and efforts were made to make other observers aware and to encourage submission of sightings. An appeal was made on www.uaebirding.com/forum asking observers to look closely at dragonflies observed anywhere and, if possible, forward photographs of suspected *S. fonscolombii* for firm identification. Comments on the salient field characters of the species in a UAE context and photographs of the two individuals located on 14 November were also provided. Observers were also asked to provide details on numbers, location and behaviour of any dragonflies observed, and to provide negative records from sites that had previously held dragonflies.

Records were received from a total of eleven observers for twelve sites in UAE and three in Oman. Sites ranged across the Emirates from Sir Bani Yas Island in the west to Kalba in the east. Observations in Oman were from the southern part, due to UAE observers' trips there during the Eid holidays. The largest numbers reported were from the island of Umm Al Kurkum, part of the Discovery Island group, where Keith Wilson reported hundreds on November 8th, 2009, and Masirah Island, Oman, where 180 were recorded at the Hilf Sewage Works on 18th November by Jim Scott. The earliest record for the period came from Gary Feulner who saw three at temporary water at Ruwayyah Plantation just south of Dubai on October 23rd. Breeding behaviour was seen at two sites, Al Warsan Lake, Dubai, where *S. fonscolombii* was observed from 29th November 2009 to 14th January 2010 with breeding noted on latter date, and the Al Ain Water Treatment Plant Lakes. Most other sites would not be suitable for breeding. Both breeding sites are anthropogenic. For the sites that were monitored over the period, most had peak numbers from 15th to 26th November with a brief peak, declining thereafter. The exception was the Al Ain Water Treatment Plant Lakes where numbers in the twenties were recorded from 20th November 2009 through 9th January 2010.

It is difficult to tell the origin of the *Sympetrum fonscolombii* that arrived in UAE and Oman in the fall of 2009. Given that none were seen in the Hajar Mountains, despite looking for them, it is possible that there were separate influxes to UAE and Oman with the one in UAE originating to the north possibly across the Gulf of

Arabia and the Omani influx originating on the Indian sub-continent.

No more specimens were seen from mid-January to mid-March, when one was sighted at the Al Zora Mangrove in Ajman. Then a collection of immature individuals were seen in Wadi Tarabat near Al Ain. The second record is interesting since the observer remembers seeing similar dragonflies in the same location at the same time in 2008, but at the time didn't have the experience to photograph them or identify them.

Observers watched with anticipation to see if there would be a repeat of the 2009 event in 2010. Despite large influxes of other species in 2010 (*Pantala flavescens*, *Anax parthenope* and *Anax ephippiger*) only a few scattered *Sympetrum fonscolombii* were spotted in the fall of 2010.

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Tandem pair *Sympetrum fonscolombii*.



Male *Sympetrum fonscolombii* and male *Ischnura senegalensis*.

Tramea basilaris (Beauvais, 1817) new to UAE

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Photo 1: *Tramea basilaris* Dubai Desert Conservation Reserve, Al Marqab, Dubai Emirate, UAE (24.788167°N 55.673183°E), 16-Nov-2010.

Heightened interest in the Odonata in UAE has led to the increase in the number of species found from 20 reported by Graham Giles in 1998 to 27 (Reimer, Feulner & Hornby, 2009). Communications of Odonata sightings has been enhanced by the introduction of forums for fauna of UAE beyond birds on the UAE birding site, www.uaebirding.com. A recent example of that occurred when a member started a thread of bird pictures from Zakher Pools near Al Ain on November 2, 2010, that included an excellent photograph of an *Anax ephippiger* in flight. Another member responded by posting a picture of a dragonfly he had taken at Zakher Pools on November 1, 2010, that at a glance looked like a familiar species in the UAE and Northern Oman, *Trithemis arteriosa*. There were a few issues that mitigated against this being the correct identification. *Trithemis arteriosa* is locally known in the vernacular as a gully darter for its penchant for being found in narrow wadis, not open desert with anthropogenic ponds. The species of *Trithemis* that is usually found at Zakher Pools is *Trithemis annulata*. Also, the terminal appendages appeared to be longer than found on *T. arteriosa* and the basal amber in the hind wing was much darker suggesting a *Tramea* species. I was familiar with *Tramea limabata* from Dhofar and the pattern on the wing looked different. A second species of *Tramea* has been recorded for Arabia, *T. basilaris*. Reference to Samways' *Dragonflies and Damselflies of South Africa* which describes both species of *Tramea* known from Arabia, suggested that *T. basilaris* was probably the correct identification. Several experts were consulted and they concurred with the determination.

After the thread had the correct identification, a member of the staff at the Dubai Desert Conservation Reserve posted a picture he had taken at the new pools installed on the reserve which was also *Tramea basilaris*. This picture was taken roughly an hour before the photograph from Al Ain.

A visit to Wadi Wurayah on the east coast of UAE turned up at least three males, one of which was taken as a voucher specimen on November 13, 2010.

The staff of the Dubai Desert Conservation Reserve kindly allowed me to survey the new pools on November 20. Good numbers of *Tramea basilaris* were seen along with *Anax ephippiger*. A voucher specimen was taken for the reserve's collection. There had also clearly been a large emergence of *Pantala flavescens* at the pools as the shorelines were littered with exuviae. *T. basilaris* was still being recorded at the site at December 7.

In all cases, the *Tramea basilaris* specimens were seen in the company of *Pantala flavescens* and/or *Anax ephippiger*. To date, no mating behaviour has been reported or females recorded. Three sites are anthropogenic while one (Wadi Wurayah) is natural. All males have shown the black abdominal markings more typically seen on specimens of Asian origin which were once described as a subspecies *T. b. burmeisteri* (Fonseka, 2000) which are not seen in photographs from southern Africa (Samways, 2008; Suhling & Martens, 2007).

Published records for Arabia have the first record as coming from Oman in 1977 (Walker & Pittaway, 1991), with subsequent records from Saudi Arabia in 1989 (Schneider & Krupp, 1993) and Oman in 1992 (Schneider & Dumont, 1997). Each record appeared to be part of a migrating assemblage of dragonflies. It would appear that *Tramea basilaris* is probably a vagrant in Arabia and that there do not seem to be any established populations.

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Photo 2: *Tramea basilaris*, Dubai Desert Conservation Reserve, Al Marqab, Dubai Emirate, UAE (24.788167°N 55.673183°E), 16-Nov-2010.



Photos 3: *Tramea basilaris*, Dubai Desert Conservation Reserve, Al Marqab, Dubai Emirate, UAE (24.788167°N 55.673183°E), 16-Nov-2010.

Diversity of Dragonflies and Damselflies (Insecta: Odonata) in Obafemi Awolowo University, Ile-Ife, Southwestern Nigeria

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Abstract

Forest and open areas of Obafemi Awolowo University Ile-Ife, Nigeria were surveyed in order to examine the diversity of Odonata fauna of the university campus. Adult dragonflies and damselflies were collected using a sweep net, prepared with acetone and preserved using standard method. A total of 53 species of Odonata in seven families (Aeshnidae, Libellulidae, Calopterygidae, Chlorocyphidae, Coenagrionidae, Platycnemididae and Protoneuridae) were recorded. Libellulidae dominated the collection with 36 species and of these, *Nesciothemis pujoli*, *Orthetrum stemmale* and *Pantala flavescens* were recorded for the first time in Nigeria. Other species also considered new to the knowledge of the country's list are the aeshnid *Heliaeschna longfieldae* and *H. sembe*. The biogeographical distribution of these species that are new to Nigeria are discussed along with those of others in the list. More surveys are recommended for more insight into the odonate fauna of Nigeria.

Introduction

Dragonflies and damselflies are very sensitive to changes in habitat quality (e.g. forest cover and water quality). As such they are useful for monitoring impairments resulting from anthropogenic activities and long term climate change (Corbet 1999, Dijkstra 2007a). This attribute is prevalent among the forest species which are known to be stenotopic and are good colonizers, especially in areas where there are microclimatic changes in the natural habitats (Dijkstra & Lempert 2003, Dijkstra 2007a). Change in microclimate usually occurs in forested habitats as a consequence of human and natural disturbances such as deforestation, canalization, erosion and landslide (Clausnitzer 2006). Deforestation and canalization reduce the humidity and wet nature of Afrotropical forests, while the ambient temperature and water temperature within the forests increase (Dijkstra & Clausnitzer 2006).

One of the indicators of changes in these conditions is the alteration of forest Odonata species assemblages. Coope (1995) highlighted three potential responses to persistent climate change which include species extinction, in situ adaptation and migration to areas with more tolerable climate. While climate change eliminates a particular species from its natural habitat, it may become an ideal condition for colonization of the habitat by another species (Dijkstra 2006). Thus habitat requirements of species differ and are directly proportional to their

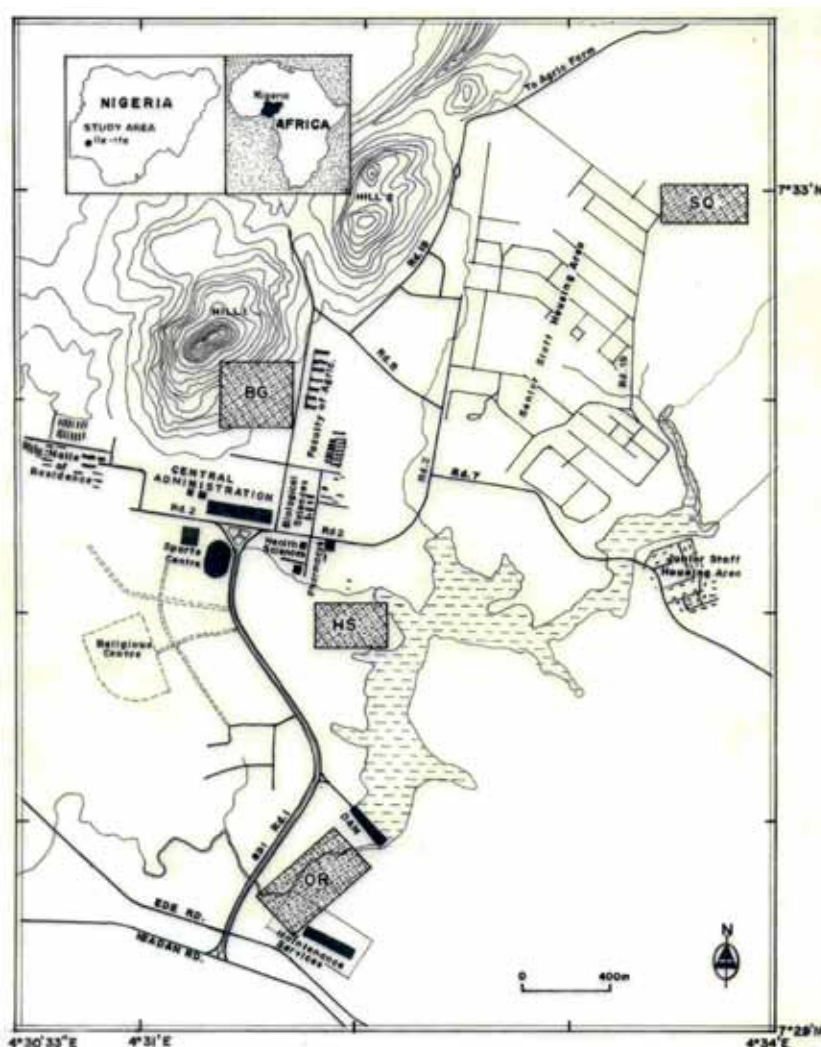


Figure 1. Obafemi Awolowo University, Ile-Ife, Nigeria (lat. 07° 29' - 07° 31' N; long. 004° 30' - 004° 34' E).

dispersal capabilities (Clausnitzer 2003, 2006). Vegetation architecture plays important role in regulating the distribution and assemblage of Odonata species (Korkeamaki & Suhonen, 2002). Che Salmah et al. (2005) found that riverside ecosystems have the richest fauna of Odonata, followed by rice field, stream, freshwater swamp and peat swamp. Although Odonata occurs in almost every type of freshwater ecosystems, microhabitat with high heterogeneity of vegetation are believed to be the primary factor determining their diversity and distribution (Watanabe et al. 2004). Therefore, to understand the pattern of deforestation, the knowledge of Odonata fauna is imperative.

Apart from the contributions of odonatists in the 1960s and 1970s (e.g. Pinhey 1962, 1964; Gambles 1975) not much has been reported ever since, hence the Nigerian odonate fauna is largely unknown. Given the constant and extensive forest fragmentation and changes in hydrology of water bodies in the country over the years, a lot of changes in odonate fauna are expected. It is therefore necessary to carry out surveys on the country's odonate fauna. Thus the need to improve on the scanty record by assessing the current status of Nigerian odonate fauna particularly in areas with relicts of natural forests and minimal disturbance can not be overemphasized. The Obafemi Awolowo University, Ile-Ife, Nigeria, has an appreciably vast estate and 30% of it is used for agriculture and infrastructural development. The rest is occupied by fragmented forests and supports a rich diversity of Odonata. It is hypothesized that although the forests are fragmented, they still harbour some species of Odonata hitherto not reported for Nigeria. Therefore this study was carried out to survey the odonate fauna of the university estate and record the species therein.

Study Sites

The vegetation of Obafemi Awolowo University, Ile-Ife, Nigeria (lat. 07° 29' - 07° 31' N; long. 004° 30' - 004° 34' E; Fig. 1), is heterogeneous and typical of tropical rainforest region of Africa as described for the country by Egborge (1971). Recent information on the patterns of annual rainfall and temperature is provided in Ogbogu (2007). Four sampling sites were selected in the university estate to represent forested areas taking cognizance of streams and a reservoir (Fig. 1). Sampling activities were also carried out randomly in the open vegetation around channels in deforested areas.

The stream below Opa Reservoir spillway runs southwards of the campus with its lower reach highly shaded with trees and shrubs of dense canopy. This renders the stream course quite humid most times of the year. The upper reach is open, with virtually no tree but with partly submerged grass and other weeds at the banks (Fig. 2a, b). The Health Sciences building is bordered by a small but moderately disturbed forest, without streams and extends towards the reservoir to the south of the campus (Fig. 2c).

Other forested areas include the Biological Gardens, which is characterized by tall trees with emergent vegetation below the canopy (Fig. 2d, e) and a part of the residential staff quarters located north of the campus. The vegetation



Figure 2. Sampling sites of odonates in Obafemi Awolowo University, Ile-Ife, Nigeria; a & b = Upper and lower reaches of Stream below Opa Reservoir spillway respectively; c = forest behind Health Sciences buildings; d & e = sampling points in Biological Garden; f = part of forested area in Staff Quarters



Figure 3: Odonata species of Obafemi Awolowo University Ile-Ife, Nigeria which are new to the country list. a) *Nesciothemis pujoli*, b) *Orthetrum stemmale*, c) *Heliaeschna longfieldae*, and d) *H. sembe*. All photos are of preserved specimens.

is more open than the other forested sites, with few tall trees and much of shrubs (Fig. 2f). The forests have received some conservation attention ever since the university was established in the early 1960s. Therefore, deforestation is as a result of subsistence crop farming and infrastructural development is appreciably minimal hence they still maintain considerably heterogeneous vegetation in most areas.

Material and Methods

Collection of adult dragonflies and damselflies was carried out with a sweep net with 150 cm long handle and orifice 25 cm in diameter. Collection was on monthly basis between 8.00 AM and 2.00 PM for 13 months, December 2006 - January 2007. Each specimen caught was placed in a triangular envelope for processing in the laboratory and preservation. Pairs of mating males and females caught in tandem were placed together in the same envelope. Collection data such as locality, date, time and the collector's name were recorded for each specimen. Processing of specimens for preservation involved immersing the insects in triangular envelopes in acetone for 12 hr and air-drying afterwards, before storage in improvised cellophane envelopes. All specimens collected were identified by Klaas-Douwe B. Dijkstra of National Museum of Natural History Naturalis, Leiden, Netherlands.

To examine the abundance of species in the study sites the number of individuals collected for each species was recorded and presented in a checklist of odonate fauna of Obafemi Awolowo University Ile-Ife, Nigeria. All the specimens are deposited in Natural History Museum (NHM), Obafemi Awolowo University, Ile-Ife, Nigeria.

Results

A total of 195 individuals representing 53 species in seven families of Odonata were collected during the study. Of these, 156 individuals represent 40 species and two families (Aeshnidae and Libellulidae) in the suborder Anisoptera. The rest representing 13 species are distributed among five families, Calopterygidae, Chlorocyphidae, Coenagrionidae, Platycnemididae and Protoneuridae, all belonging to the suborder Zygoptera (Table 1). Libellulidae is the most abundant with 148 individuals, representing 75.90 % of the total collection. The least is the protoneurid *Elatoneura nigra* with only one (0.51 %) individual. *Orthetrum chrysostigma* and *Trithemis dicroa* are the most abundant species in this study followed by *Orthetrum brachiale*. *Orthetrum chrysostigma* was the most widespread species and is present virtually in all the sampling sites. Some of the species encountered are stenotopic and shade-loving. They include *Phaon iridipennis*, *Heliaeschna sembe*, *Chlorocypha curta* and *C. rubida*. Four species, *Nesciothemis pujoli*, *Orthetrum stemmale*, *Heliaeschna longfieldae* and *H. sembe* have never been reported as part of Nigerian fauna (See table 1 & Fig. 3). The fifth species, *Pantala flavescens* has been observed but yet to be properly documented.

Table 1. Number of individuals of the species of Odonata recorded in Obafemi Awolowo University Ile-Ife, southwestern Nigeria. (● = First record in Nigeria)

TAXA	No. of individuals	TAXA	No. of individuals
ANISOPTERA		ANISOPTERA continued	
Libellulidae		Aeshnidae	
<i>Acisoma panorpoides</i> Rambur, 1842	7	<i>Anax ephippiger</i> (Burmeister, 1839)	1
<i>Aethriamanta rezia</i> Kirby, 1889	2	<i>Gynacantha manderica</i> Grünberg, 1902	2
<i>Brachythemis impartia</i> Karch, 1890	1	● <i>Heliaeschna longfieldae</i> Gambles, 1967	1
<i>Bradinopyga strachani</i> Kirby, 1900	5	● <i>Heliaeschna sembe</i> Pinhey, 1962	4
<i>Chalcostephia flavifrons</i> Kirby, 1889	4	Subtotal	8 (4.10 %)
<i>Crocothemis divisa</i> Karsch, 1898	5	ZYGOPTERA	
<i>Crocothemis erythraea</i> (Brullé, 1832)	1	Calopterygidae	
<i>Diplacodes lefebvrii</i> (Rambur, 1842)	1	<i>Phaon iridipennis</i> Burmeister, 1839	2
<i>Eleuthemis buettikoferi</i> Ris, 1910	1	<i>Umma cincta</i> (Hagen in Selys, 1853)	1
<i>Hadrothemis infesta</i> Karsch, 1891	2	Subtotal	3 (1.54 %)
<i>Hemistigma albipuncta</i> (Rambur, 1842)	1	Chlorocyphidae	
<i>Nesciothemis minor</i> Gambles, 1966	4	<i>Chlorocypha curta</i> (Hagen, 1853)	9
● <i>Nesciothemis pujoli</i> Pinhey, 1971	5	<i>Chlorocypha rubida</i> (Hagen in Selys, 1853)	3
<i>Olpogastrea lugubris</i> Ehnberg in Karsch, 1895	1	<i>Chlorocypha selysi</i> Karsch, 1899	1
<i>Orthetrum abbotti</i> Calvert, 1892	3	Subtotal	13 (6.67 %)
<i>Orthetrum austeni</i> (Kirby, 1900)	1	Coenagrionidae	
<i>Orthetrum brachiale</i> Palisot de Beauvois, 1817	15	<i>Agriocnemis maclachlani</i> (Selys, 1877)	1
<i>Orthetrum chrysostigma</i> Burmeister, 1839	18	<i>Ceragrion glabrum</i> Burmeister, 1839	5
<i>Orthetrum hintzi</i> Schmidt, 1951	4	<i>Pseudagrion hamoni</i> (Fraser, 1955)	1
<i>Orthetrum julia</i> Kirby, 1900	10	<i>Pseudagrion kersteni</i> Gerstaecker, 1869	7
<i>Orthetrum microstigma</i> Ris, 1911	9	<i>Pseudagrion melanictum</i> Selys, 1876	3
● <i>Orthetrum stemmale</i> Selys, 1869	5	Subtotal	17 (8.72 %)
<i>Orthetrum trinacria</i> (Selys, 1841)	1	Platycnemididae	
<i>Palpopleura lucia</i> (Drury, 1773)	1	<i>Mesocnemis singularis</i> Karsch, 1891	3
<i>Palpopleura Portia</i> (Drury, 1773)	2	<i>Platycnemis sikassoensis</i> Martin, 1912	2
● <i>Pantala flavescens</i> (Fabricius, 1798)	1	Subtotal	5 (2.56 %)
<i>Rhyothemis fenestrina</i> Rambur, 1842	3	Protoneuridae	
<i>Rhyothemis semihyalina</i> (Desjardins, 1835)	1	<i>Elatoneura nigra</i> Kimmins, 1938	1
<i>Tetrathemis camerunensis</i> (Sjöstedt, 1899)	1	Subtotal	1 (0.51 %)
<i>Tholymis tillarga</i> (Fabricius, 1798)	1	Total	195 (100 %)
<i>Trithemis arteriosa</i> Burmeister, 1939	6		
<i>Trithemis dichroa</i> Karsch, 1893	17		
<i>Trithemis grouti</i> Pinhey, 1961	6		
<i>Trithetrum navasi</i> (Lacroix, 1921)	1		
<i>Urothemis assignata</i> (Selys, 1872)	1		
<i>Urothemis edwardsi</i> (Selys, 1849)	1		
Subtotal	148 (75.9%)		

Discussion

Although the University campus is located in tropical rainforest region, the characteristics of tropical forest vegetation are gradually diminishing due to subsistence crop farming activities and development of infrastructure for residence and academic activities. This explains the abundance of libellulids, some of which are known to readily colonize disturbed habitats (Che Salmah 1996, 2001; Che Salmah & Wahizatul Afzan 2004).

Many of these libellulids are well known in West Africa and apart from Nigeria, they have been recorded in the fauna of the Gulf of Guinea Islands (Dijkstra 2002, Clausnitzer & Dijkstra 2005). They are also well known in the Upper Guinea forest (Dijkstra and Lempert 2003). In general, the family is well adapted to the tropical climate hence its abundance in the study sites. Their ranges extend to Savannah region of West Africa covering the areas between Senegal in the north and Kenya in the south (Kelman et al. 2008). In fact Dijkstra and Clausnitzer (2006) and Dijkstra (2007a) note that libelluline dragonflies are quite speciose in the Afrotropical Region. Of the two libelluline species recorded in this study as new to Nigeria, *Nesciothemis pujoli* has been recorded in Ghana. Previous records of the genus in Nigeria pertain to *N. farinosa* (Foerster, 1898), *N. minor* and *N. nigeriensis* Gambles, 1966. *Orthetrum stemmale* had been reported in Guinea, Ivory Coast, Ghana, Cameroon as well as Ethiopia (Clausnitzer and Dijkstra 2005). Given its wide range of distribution in Africa, *O. stemmale* is expected to occur in Nigeria as well. There is no published record of *Pantala flavescens* in Nigeria but photographs of the species have been taken in the city of Port Harcourt, southern Nigeria (Motshagen 2005).

The distribution of the aeshnid *Gynacantha manderica* covers tropical Africa (Dijkstra 2005a). Along with *G. nigeriensis*, it belongs to the 'bullata' species group but unlike *G. nigeriensis* which has two synonyms (*G. flavipes* Fraser, 1956 and *G. sevastopuloi* (Pinhey, 1961) and distribution range covering West, Central Africa and Ethiopia, *G. manderica* has no synonym and is generally found in tropical Africa (Dijkstra 2005a). The two *Heliaeschna* species recorded in this study are hitherto absent in Nigeria's checklist and therefore recorded for the first time for the country. Six other species have been reported for Nigeria (Gambles 1980). However, apart from being native to Central Africa (Dijkstra 2005a) *H. longfieldae* is also known from nearby Cameroon (Gambles 1967). It is not clear whether *H. sembe* and *H. longfieldae* are synonyms as indicated in Dijkstra's (2005a) report but both species (Dijkstra, pers comm.) are at present regarded as distinct from one another. With the present record, the distribution range of both species certainly extends to West Africa including Nigeria, just as *H. fuliginosa* Selys, 1883 and its synonyms.

Most species of *Chlorocypha* are characterized by close association with shaded streams as observed in the present study. Eleven species are known from Nigeria (Pinhey 1967; Gambles 1975) and the three species recorded in this study are from sites with streams that are shaded by trees with considerably closed canopy. *Chlorocypha curta* has been recorded in Ghana (O'Neil 1998) and in large streams in the Upper Guinean forest (Dijkstra & Lempert 2003). In O'Neil (1998) it is reported as widespread throughout Africa. We suspect that *C. curta* is more abundant than *C. rubida* and *C. selysi* and has also been reported in adjacent Republic of Benin (Tchiboze & Dijkstra 2004) and Cameroon (d'Andrea & Carfi 1997). And *C. selysi* seems to be restricted to the extreme south of West Africa (Clausnitzer and Dijkstra 2006).

The calopterygid *Phaon iridipennis* and *Umma cincta* are well distributed in Africa and have been recorded as part of Nigerian odonate fauna (Pinhey 1962; 1971). Their known distribution range includes South Africa and Ethiopia (Clausnitzer & Dijkstra 2005), Malawi (Dijkstra 2004a), most parts of central Africa (Clausnitzer et al. 2009), the Upper Guinean forest (Dijkstra & Lempert 2003) and Cameroon. Four other species of *Phaon* have also been recorded in Nigeria (Pinhey 1971).

The three *Pseudagrion* species recorded in this study have earlier been reported in Ghana (O'Neil 1998) and Cameroon (Gambles 1980). They also occur in East Africa (Clausnitzer & Dijkstra 2005; Dijkstra 2007b; Dijkstra et al. 2007a). However, only *P. melanicterum* is among the species of this genus that have been recorded in the Upper Guinean forests (Dijkstra & Lempert 2003). The distribution of the three species covers the whole of Africa as noted by O'Neil (1998). The other coenagrionids, *Agriocnemis maclachlani* and *Ceriagrion glabrum* are widespread in Africa and have been recorded in collections from many countries including Congo-Brazzaville, Ethiopia, Ghana, Uganda, Tanzania and two islands in the Gulf of Guinea (Pinhey 1963; O'Neil 1998; Dijkstra 2002; Clausnitzer & Dijkstra 2005; Dijkstra 2005b; Dijkstra et al. 2007a). A congener of *Ceriagrion glabrum*, *C. citrinum* Champion, 1941 has been reported in western Nigeria and adjacent Republic of Benin (Tchiboze & Dijkstra 2004, Dijkstra & Vick 2004, Dijkstra 2005b). *C. citrinum* inhabits swamp forests in the south of Benin and is considered endangered in the IUCN red list (Tchiboze et al. 2008).

Mesocnemis singularis and *Platycnemis sikassoensis* have earlier been reported in Nigeria and their distribution range include Senegal, Ghana, Ivory Coast, Republic of Benin, Cameroon and the Upper Guinean forests (O'Neil 1998; Vick 1998, 1999; Dijkstra & Lempert 2003; Dijkstra et al. 2007b). Their congeners occurring along with them in the country are *M. robusta* (Selys, 1886) (Tchiboze & Dijkstra 2004, Dijkstra 2008) and *P. rufipes* Selys-Longchamps, 1886 (Vick 1998) respectively.

To conclude, it is obvious that Nigerian odonate fauna has not been surveyed adequately and as such species richness in the country is not well known. In fact it is believed (Dijkstra pers. comm.) that the eastern

part of the country bordering western Cameroon may provide good habitats for endemic species of Odonata with restricted ranges. This paucity of information on Nigerian odonate fauna will persist until a thorough nationwide survey is carried out.

Acknowledgements

We are highly indebted to K.-D. B. Dijkstra for finding time to identify our specimens. We are also grateful to the reviewers whose contributions enhanced the quality of this paper.

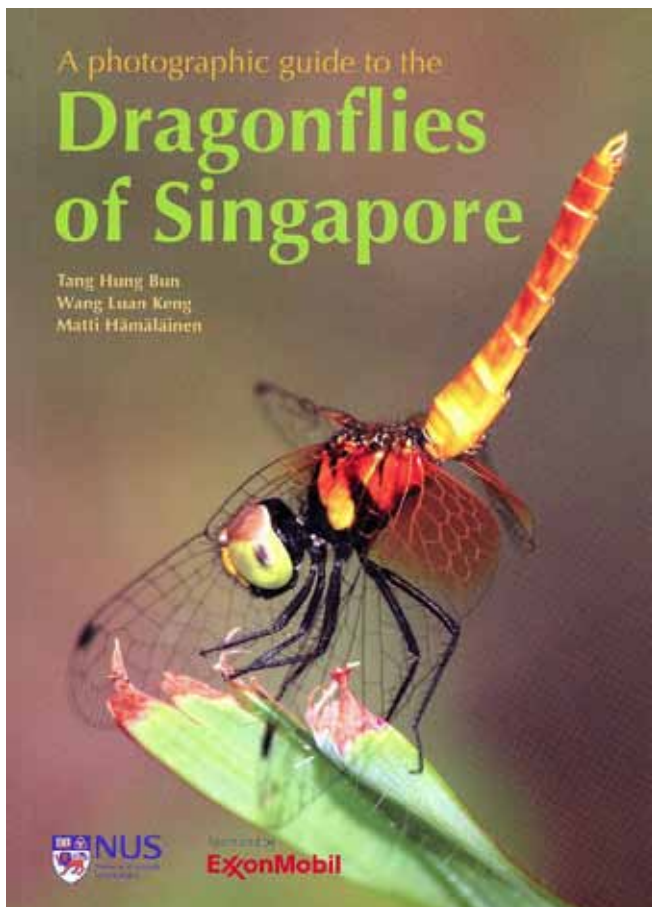
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New book: Dragonflies of Singapore by H.B. Tang, L.K. Wang & M. Hämäläinen



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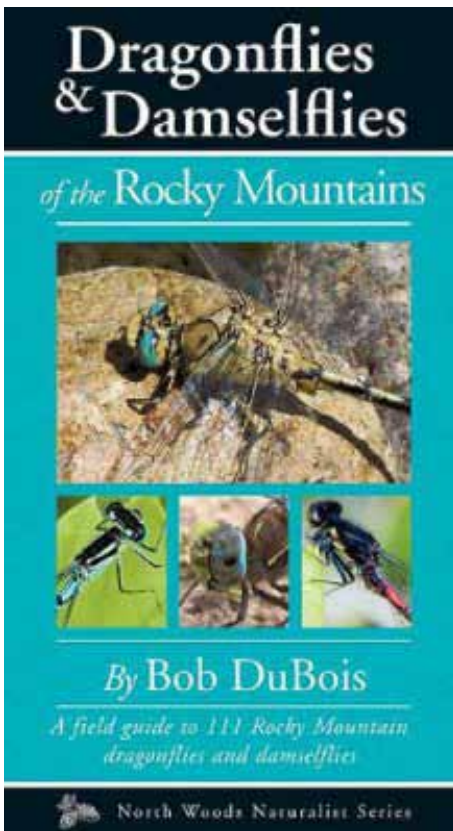
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**New book: Suomen Sudenkorennot (The Dragonflies of Finland)
by Sami Karjalainen.**

Suomen Sudenkorennot (The Dragonflies of Finland) by Sami Karjalainen was originally published in March 2002 and was favourably reviewed by Matti Hämäläinen in July, 2002 issue of *AGRION*, 6(2): 22. See extract below: -

Sami Karjalainen's book is no ordinary national dragonfly handbook. Both author and publisher have sought to produce an illustrated natural history of the highest quality to appeal to a wide audience beyond professional entomologists and insect hobbyists. The graphic layout, print quality and standard of photographs in the book are stunning. For anyone who admires adult dragonflies for their beauty this book is a must. Do not let the Finnish language discourage you from obtaining a copy.

The new edition, published in March 2010, covers all 55 Odonata species recorded in Finland, of which 54 were observed in the field and photographed by the author over a period of more than 15 years. Non-Finnish readers can extract valuable information from the distribution maps and other graphic presentations, and will, of course, be able to enjoy all the photographs. All the insects were photographed free in the wild. Updated new edition: 239 pages. First edition 222 pages. Further book details on the author's web pages at [<http://korento.net/book.html>].



**New book: Dragonflies and Damselflies
of the Rocky Mountains
by Robert DuBois**

Comprehensive field guide to all 111 species of dragonflies and damselflies found in the six-state Rocky Mountain region (ID, MT, WY, CO, UT, NM). From the foothills to the highest mountain meadows, this guide covers every species you're likely to encounter. Included inside are detailed range maps, field mark arrows and phenograms that tell you when each species is on the wing. Published May, 2010, Kollath-Stensaas Publishing, pages 301. Available from Adventure Publications [<http://www.adventurepublications.net/tek9.asp?pg=products&specific=jmnpndqi>].

Petalura hesperia dicing with death

Jan Taylor [jmtay5@bigpond.net.au]

I went looking for *Petaluras* on 27th December 2010 fearing that they would have suffered from the serious drought. We have experienced the driest winter-spring on record in the south of Western Australia. I was pleased to find that the dragonflies were active as usual and I added three new locations for them.

One was near Hoffman's Mill (inland from Yarloop) and was an ideal place to watch the dragonflies. Within a couple of hours I saw about ten of them. The site had a fresh clear-water running stream and a stagnant pond next to it. The dragonflies were settled in the vegetation round about, each occasionally flying to a new perch. Two of them chose marker posts on the side of the road bridge. It was a hot day and every so often I would see one of them fly down and splash in the stream and fly up throwing drops of water off their wings. I have found that this behaviour provides a good way of finding this elusive dragonfly – wait by water near a suitable swamp in the hills (an impenetrable spring-fed area with dense *Agonis linearifolia* and *Ghania trifida* sedges). On a hot day one will come and dunk in the water within an hour of watching, presumably to cool off and drink.

When I went to the stagnant pond I soon saw a female struggling in the water



and rescued her, while for another I was too late, it had drowned. The scum on the surface probably wetted and clung to their wings so that they could not escape after dunking in it. There were several dragonflies around this pond and I saw one female fly across the surface and dab in the water risking death.

Nearby I saw a male flying ahead of me and it settled on an *Agonis* stem above a female. When I disturbed them the male tried to couple with the female, but she was not having any of it! I have only once seen them flying in tandem; the large male petaltail equipment must provide a relatively strong grip on the female's neck when flying like this. I have yet to see a female laying eggs.

Photos 1-3: *Petalura hesperia*. Photo 1: trapped by surface tension; Photo 2: dunking in stream; Photo 3: resting on bridge marker.

Election to the Board of Trustees

In accordance with the WDA Constitution and By Laws, all members of the Board of Trustees, except for the President Elect, resign at the Biennial General Meeting following that at which they took up their posts although all (apart from the President and the Immediate Past President) are eligible for re-election. No further nominations other than those posted in our previous *Agrion* issue were received, and the 2011-2013 Board of Trustees nominations are as follow:

I,, (write your name here) vote for:

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President Elect: Boudjéma Samraoui

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Trustee: Dennis Paulson

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Trustee: Mamoru Watanabe

Please e-mail or post-mail your vote to the WDA Secretary, Dr. Natalia von Ellenrieder, Plant Pest Diagnostic Center, CDFA, 3294 Meadowview Road, Sacramento, CA 95832, USA, Natalia.Ellenrieder@gmail.com, by 12 February 2011 at the latest, after which no votes can be registered.