

AGRION

NEWSLETTER OF THE WORLDWIDE DRAGONFLY ASSOCIATION

PATRON: Professor Edward O. Wilson FRS, FRSE

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Secretary: Linda Averill. 49 James Road, Kidderminster, Worcester, DY10 2TR, UK. Email: lindamaverill@aol.com

Editors: Keith Wilson. 18 Chatsworth Road, Brighton, BN1 5DB, UK. Email: kdpwilson@gmail.com

Graham Reels. C-6-26 Fairview Park, Yuen Long, New Territories, Hong Kong. Email: gtreels@cyberdude.com

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AGRION

NEWSLETTER OF THE WORLDWIDE DRAGONFLY ASSOCIATION

AGRION is 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. Members can download previous issues of *AGRION* 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]

Only one article, previously published in *AGRION*, features odonates from the Arabian Peninsula. The article, titled, 'Soqatra - The Island of Dragon's Blood' by Wolfgang Schneider, was published in 1999 (*AGRION* 3[2]: 27-28). It describes a brief visit, made by Wolfgang and Henri Dumont to Yemen's Socotra Island in 1996, where they collected 14 of the 18 species known from Socotra. In this issue of *AGRION* there is a distinct flavour of Al Jazirah (= Arabia) as there are three articles devoted to the region including one from Oman and two from Oman and the United Arab Emirates (UAE).

Given that rainfall is extremely low throughout the Arabian Peninsula and much of it is desert, without any permanent running rivers, it would appear the area is unlikely to support a diverse odonate fauna, which to a large extent is true. Nevertheless, Arabia is a vast area, almost the size of India, and many odonates have been recorded including five endemics and two near-endemics. These comprise: endemics - (i) *Azuragrion granti* (McLachlan, 1903), Socotra Island, (ii) *Azuragrion somalicum amitinum* (Waterston, 1991), Oman, (iii) *Pseudagrion arabicum* Waterston, 1980, Saudi Arabia, and Yemen, (iv) *Arabicnemis caerulea* Waterston, 1984, Gulf Territories, Oman, and Yemen, (v) *Arabineura khalidi* (Schneider, 1988) Gulf Territories and Oman, and (vi) *Aeshna yemenensis* Waterston, 1984, Yemen; near-endemics - (i) *Paragomphus sinaiticus* (Morton, 1929), Egypt, Niger, Saudi Arabia, Sudan and Oman and (ii) *Urothemis thomasi* Longfield, 1932, Oman and Somalia. *Azuragrion somalicum* from Oman is illustrated on page 52, *Arabineura khalidi* is illustrated on page 56 and *Paragomphus sinaiticus* on page 57.

The countries within the Arabian Peninsula include Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, UAE and Yemen. The country of Oman, otherwise known as the Sultanate of Oman, is located at the eastern edge of the Arabian Peninsula, where the Arabian Gulf (or Persian Gulf) enters the Arabian Sea. Its neighbours are the UAE, Saudi Arabia and the Yemen. The UAE was formed from seven emirate states, which, prior to 1971, were known as the Trucial States. The seven states, termed emirates, are Abu Dhabi, Ajman, Dubai, Fujairah, Ras al-Khaimah, Sharjah, and Umm al-Quwain.

For more information on the odonates of the northeast Arabian region see the UAE and Omani articles in this edition of *AGRION*. Also included in this edition are articles from Australia, Borneo, China, Cameroon, Portugal and a review of Bert Orr and Matti Hämäläinen's splendid new book, titled: 'The Metalwing Demoiselles of the Eastern Tropics'.

Cover photo: *Tetrathemis irregularis* (Libellulidae) ovipositing towards the tip of a stick projecting from a small, shaded, tropical forest pond (13 May 2006, 15:28 hrs, Endau-Rompin, Johor, Peninsular Malaysia). The female is shown carefully depositing her eggs at a specific site. The orange mass represents hundreds of recently deposited eggs. Such egg-laying behaviour is unusual in libellulids, which typically deposit their eggs freely onto an oviposition site i.e. the water's surface or damp marshy vegetation. Photo credit: Keith Wilson.

Readers are invited to submit unusual odonate photographs illustrating an aspect of odonate biology or any interesting photographs of odonates they may have taken to illustrate the front cover of future issues of *AGRION*.

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Message from the President Gordon Pritchard [gpritcha@ucalgary.ca]

The principle event of the past six months was of course the death of Philip Corbet. I hope you found the Special Issue of *AGRION* interesting and a fitting tribute to the memory of a great scientist and fine human being, someone whom all of us were proud to have had as a colleague and friend. Thanks to Keith Wilson and Graham Reels for putting together the tribute. And don't forget that Reinhard will be putting together another tribute to Philip in a Memorial Issue of *IJO* – Volume 12(2) next year. Details were distributed with the last *IJO* and also appeared in the *AGRION* Special Issue.

We are now half way through this biennial period and time to think of the future. In this issue you will find the Board's nominations for the next (2009-2011) Board along with a nomination form which members can use to propose other names for any position on the Board except for President and Past-President. This is in accordance with Article 3 of the By-Laws which you should consult for further information.

Also, I hope that you are getting excited about our next Symposium in Mexico next June. There is more information on this elsewhere in this *AGRION*.

I had hoped to be able to give you some positive news on the negotiations with *FSIO* designed to simplify the current unsatisfactory arrangement of having two international odonatological organizations each doing the same thing: i.e. each publishing a journal and running its own biennial symposium. However, progress has been slow. We started on the list of items that I produced after my visit with Bastiaan and Marianne last September, specifically with proposals to merge the biennial symposia, but we (*WDA* and *FSIO*) have differing opinions on how the joint symposium should be named. I wrote to Kiyoshi Inoue, the President of *FSIO*, at the end of February stating our Board's position and pointing out that a solution will inevitably involve some compromise from both *FSIO* and *WDA*, but hoping that we can reach a satisfactory arrangement in the interests of global odonatology. I remain optimistic that we can get agreement on a joint symposium during the current Board's term, but the merging of the two journals will probably still be on the agenda of the next Board.

Gordon

Letter (by email) to Gordon Pritchard from David Happold

[David.Happold@anu.edu.au]

29th May, 2008

Dear Gordon,

Thank you very much for sending me the special edition of *AGRION* with the tributes to Philip Corbet. It is a marvellous publication, and I much enjoyed reading it from cover to cover. Naturally it brought back many memories, as well as providing many fascinating glimpses into Philip's life which I did not know about.

It was intriguing to read your recollections, and the mention that the two of us spent the summer together in 1962 at Flatbush - you working on your dragonflies and I on my mosquitoes. In that year, I remember that I had a considerable correspondence with Philip, not yet knowing that he was to be our External Examiner. I remember especially his enormous knowledge, his preciseness, and his wonderful scientific mind. Of course, I was especially interested in his African years because, while still a graduate student in Alberta, I was hoping to pursue a career in Africa. I lost touch with Philip for many years after this, although I knew from the "grapevine" that he went to New Zealand for many years and returned to Scotland. I also knew that he retired to Cornwall and we had a brief correspondence around 2001/2002. I was amazed and delighted when he told me that he had quoted my Sudan dragonfly studies in his [then] new book. Since these studies were just a "hobby" (my main research interest being the small mammals of the Sudan), I never dreamt that the papers would ever be cited. After the immense heat of the day, it was lovely to be able to walk along the banks of the Blue Nile (my little house was only 50m from the bank) watching the birds and dragonflies in the cool of the evening - hence the first paper. The second paper was on the dragonflies of Jebel Marra, the vast extinct volcano in Darfur. We had a two week trip on the mountain in 1965 - one of the most fascinating and remote mountains I have ever been to - a marvellous place of various types of woodland savanna, gallery forests, extensive grasslands at the higher altitudes, and even freshwater lakes in the crater. We walked up the mountain [no roads] and had about 15 mules to carry our supplies! In those days I got to know Dr Elliot Pinhey at the Bulawayo Museum who confirmed the identification of my dragonflies.

Another "point of contact" is our mutual friend Ro Lowe-MacConnell who knew Philip when he worked at EAFRO in Uganda. Ro is a great friend and we see her every year when we go to UK. Her work on African fishes, especially on the food and feeding of cichlids, overlapped with Philip's interests. Both Ro and Philip knew Hugh Cott who was one of my lecturers at Cambridge and another great African zoologist. Hugh was also a great friend and supporter of my zoological studies in Africa. People like us are so lucky to have known many wonderful and interesting people in our lives - such an enriching experience. We were fortunate to have Philip as a mentor and as our External Examiner in those early years. We gained our PhDs and were then able to embark on our respective zoological careers which have provided so much enjoyment and interest.

I have looked at my old correspondence files - from the days when letters were proper letters and it was usual to keep a carbon copy [usually on thin pink paper] of all typed letters. My first letter from Philip was dated 17 September 1962 and the last 12 November 1968. There are also his reviews on the two Sudan dragonfly papers, both of them very helpful and perceptive. I still have reprints of Philip's publication on the food of non-cichlid fish and on crocodiles in Uganda which he sent me years ago - such studies have never been bettered.

With best wishes and many thanks,

David

Australian National University,
Canberra,
Australia

5th Biennial General Meeting of the Worldwide Dragonfly Association (Abbreviated version of the minutes)

Forty six members of the WDA met in Swakupmond, Namibia on 17th April 2007 for the 5th BGM of the Association. The full version of the minutes of this meeting and the reports of the officers are available on the WDA website.

During the meeting the President Hidenori Ubukata handed over the Chairmanship to the new president Gordon Pritchard. The nominations to the Board were accepted by the membership and the Trustees for the next two years are as follows:

President	Gordon Pritchard
President Elect	Wolfgang Schneider (nominated by Reinhard Joedicke, seconded by Mike May)
Immediate Past President	Hidenori Ubukata
Secretary	Linda Averill
Treasurer	David Allan Fitch
Managing Editor	Reinhard Joedicke
Webmaster	Adolfo Cordero (nominated by Rob Arnold, seconded by Hidenori Ubukata)
Chair of Funding Committee	Goran Sahlen
Chair of Conservation Committee	Viola Clausnitzer
Symposium Co-ordinator	Richard Rowe
Trustee	Dennis Paulson
Trustee	Keith Wilson (nominated by Dennis Paulson, seconded by Gordon Pritchard)

The new President, in his opening remarks thanked the Trustees for their continuing hard work and made special note that we would be losing two valuable members of the Board in Mike May & Rob Arnold who had both given many years of service to WDA. New Board members Wolfgang Schneider, Adolfo Cordero & Keith Wilson were welcomed.

Gordon Pritchard said that we have a strong Association at the end of our first decade and he was delighted to report that a proposal had been made to move towards merging the two journals forming the primary literature for odonatology – *IJO* and *Odonatologica*. Currently the Board has approved a committee to consider the implication of a merger and to undertake preliminary discussions. The process will be taken slowly and carefully and will consider both the specific details and the overall picture for the greater good of WDA. Once the recommendations have been formulated the matter will be brought back to the Board for discussion and then opened to the membership for further discussion.

A presentation was given by Rodolfo Novelo-Guitierrez about the 6th WDA symposium which will be hosted by the Instituto de Ecologia in Xalapa, Mexico, in July or August 2009.

An invitation was then put forward on behalf of the Japanese Group of WDA to host the 7th symposium at the Kanagawa Prefectural Museum of Natural History in Odawara City, Japan in 2011. The proposal was accepted unanimously by the members present.

Linda Averill [Lindamaverill@aol.com]
Secretary

Update on WDA members beginning 2008

0472	Pamela	Hunt	26 Whitewater Drive	Penacook	NH 03303	USA	biodiva@verizon.net	DAF Single (w/o J)
0473	Thomas	Schneider	Arnold-Knoblauch-Ring 76	14109	Berlin	Germany	Thomas.schneider@charite.de	Member Single (j)
0474	Linda	Barnett	30 Framlingham Road	Peterborough	PE2 8UG	UK	mangohq@ntlworld.com	Member student(j)
Change of Address								
0008	John	Hawking	15 Eltham Court	Wodonga	Vic 3690	Australia		Member
0408	Erik	Pilgrim	4350 Hillcrest Drive	Bellbrook	OH 45305	USA	anisopteran@yahoo.com	DAF
0414	Lyudmila	Khrokalo	Post Box 16	03118	Kyiv	Ukraine		Member
0179	Kazuya	Matsubara	Room B-201 Park-Side-Koike	1-16-30 Nabeshima	Saga City, Saga Pref	849-0937 Japan		Member
0102	Gordon	Pritchard	210 Dagleish Bay NW	Calgary	Alberta, T3A 1K9	Canada		DAF
0166	Floris	Vandehaeghe	Kleine Snijdersstraat 17	B-9280 Lebbeke		Belgium		Member Single (w/o J)

International Symposia

Richard Rowe [richard.rowe@jcu.edu.au]

The biennial International Symposia are a core activity of the Worldwide Dragonfly Association. So far we have held five, each different and each exciting. The sixth is coming soon, and plans are in hand for the seventh.

Our 2009 Symposium will be held in Xalapa, Veracruz, Mexico from 7-12 June with Enrique Gonzalez, Rodolfo Novello and Alex Cordoba organising. The location is Rodolfo's home base, and is in an area where all three of the organisers have conducted extensive research. This will be our first visit to the neotropical biogeographic zone and local knowledge will be high. So it is time to start arranging your diary, travel planning and reading up on the history, cultures and the regional culinary delights of Veracruz (you will find Mexico is a large and incredibly diverse country). Picking up a little Mexican Spanish before arrival won't go amiss either ...

Details of the symposium organisation will appear both in the next issue of Agrion and on the WDA website early in 2009 (when there will be a call for papers, letters of invitation etc.).

The future: in his presidential message Gordon has commented on plans to join the WDA and FSIO symposia. For our part planning for the 2011 Symposium in Japan is well in hand and we are seeking a location in Europe for the 2013 event. Suggestions have been the Danube plain (Hungary or Austria) or Ireland ... but it is open and we are seeking expressions of interest from prospective hosts.

Portuguese dragonflies - deserts of information

Sónia Ferreira [Hiporame@gmail.com]

Centro de Investigação em Biodiversidade e Recursos Genéticos da Universidade do Porto (CIBIO-UP)
Campus Agrário de Vairão; R. Padre Armando Quintas, Crasto 4485-661 Vairão, Portugal

CIBIO: <http://cibio.up.pt/>

Portugal is one of the most poorly investigated countries in western and central Europe regarding Odonata. This is a most astonishing fact as Portugal constitutes a “hot spot” between western palaearctic and palaetropic faunas, making it – from a faunistic point of view – one of the most interesting European regions. Influxes of afrotropical species that today are regarded as regular part of the European fauna, as *Diplacodes lefebvrei* or *Brachythemis leucosticta*, have been recorded in Portugal for the very first time on the continent.

On the other hand, it is currently still unclear whether the westernmost distribution ranges of some palaearctic species extend to Portugal or not – examples are *Ischnura elegans*, *Gomphus vulgatissimus* or *Sympetrum vulgatum ibericum*. Consequently, the Portuguese fauna still holds a satisfactory amount of potential surprises to stimulate the exploratory urge of odonatologists.

With the recent publication of an annotated literature and a reliable checklist, the knowledge about Portuguese dragonflies experienced a considerable advance, still the volume of available data is incredible small and substantially old. For instance more than 50% of the 10 km squares of the country do not have any record at all (see black dots on the map).

Portugal is a fairly common holiday's destiny and much of the available information results from the visits of numerous foreign entomologists. Still we believe that much more information has been collected in recent years and therefore we wish to encourage its publication, so that more data becomes available to include in the Portuguese database. Information on existing collections containing Portuguese material is also looked-for. We are available to help put into context the new data or give other information that may be needed. If you have any information on Portuguese dragonflies please contact us.

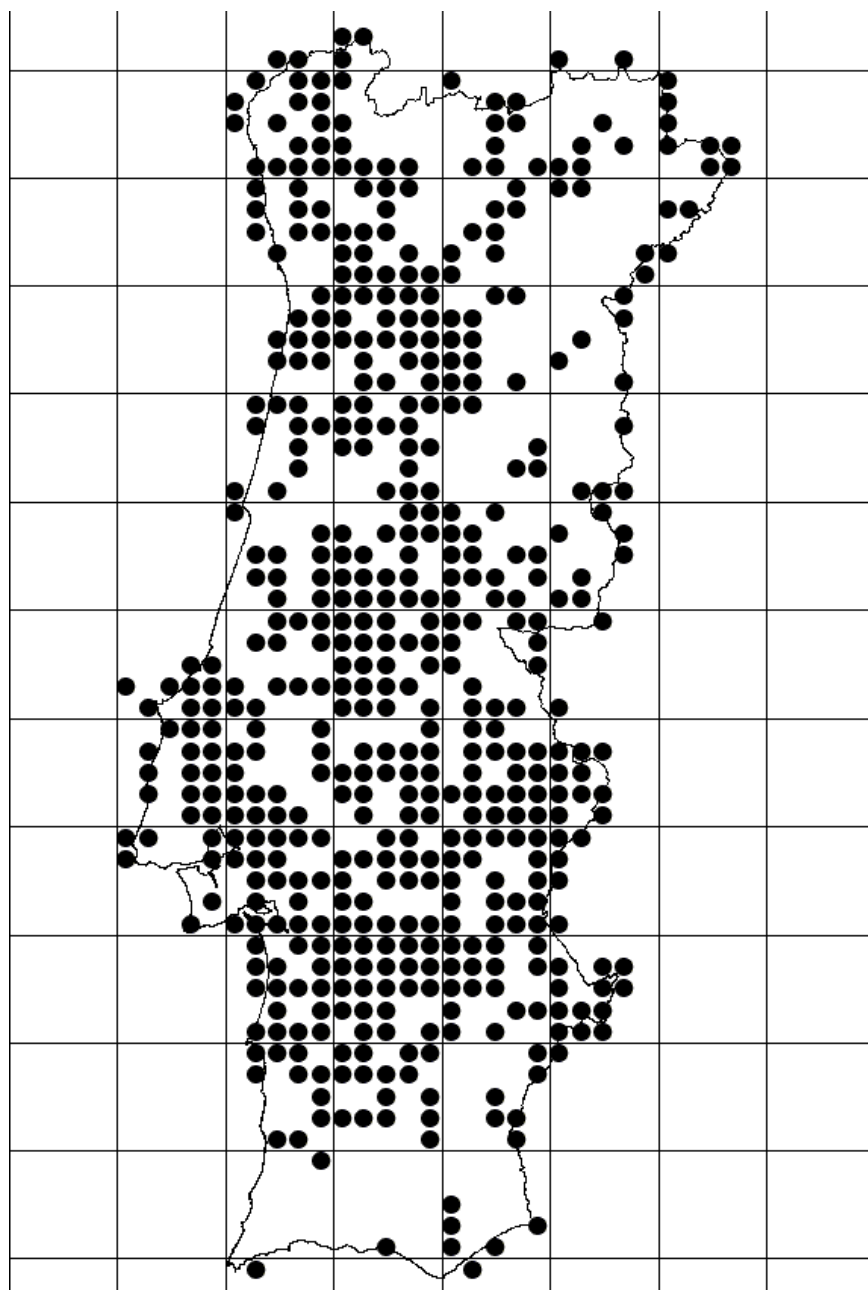


Figure 1: Map of Portugal illustrating 10 km squares with odonate records. More than 50% of the 10 km squares do not have any records!

The Phoenix Damselfly (*Pseudolestes mirabilis*) of Hainan Island, China

Graham Reels [gtreels@cyberdude.com]

In a previous issue of this newsletter (*AGRION* 10(1)), I wrote a short account of a field trip to Hainan – the largest island in the People's Republic of China, situated south of Guangdong Province and east of northern



Photo 1. A pair of *Pseudolestes mirabilis* males face each other in agonistic flight.

Vietnam in the South China Sea. This account included a very brief description of the extraordinary Hainan endemic damselfly, *Pseudolestes mirabilis*. This species, which is common on small shady hill streams across the island, is usually considered the sole member of the family Pseudolestidae, although often placed within the rather catholic family Megapodagrionidae. It has reduced hindwings, which are gold and black on the upper surface and silvery white and black on the under surface. The silvery white colour is derived from small waxy scales – a highly unusual feature. Another peculiarity of this species is the characteristic 'arrow-head' perching posture, in which both pairs of wings are held angled backwards at an angle of approximately 135° to the thorax (see the photograph provided in Reels, 2006 or the various photographs posted on the Asia Dragonfly website by Keith Wilson). Perhaps the most remarkable feature of this unusual odonate, however, is the agonistic male territorial behaviour. In April this year I visited Wuzhishan, the highest mountain in Hainan (1,867 m). On 19 April, at a boulder stream at 700 m, I attempted to photograph this fascinating behaviour, which I describe below (Photos 1-3).

Two males of *P. mirabilis* were observed for 45 minutes, from 1700h onwards, repeatedly hovering in prolonged aerial face-offs, during which they would drift backwards, forwards, sideways or upwards over a 10m stretch of stream, for up to 4 minutes continuously, before re-lighting on their favoured perches (which were on small overhanging branches, 1.5 m apart) for periods of up to two minutes. During the aerial face-offs, the two males stayed resolutely locked face to face, usually hovering about 0.1 to 0.2 m apart (Photo 1). The hindwings were normally held motionless, hanging down (Photos 2 and 3) but were occasionally flapped up and down by one or other male for a period of perhaps three seconds. This provided a striking white flag-waving display (not, however, an act of surrender!). After 45 minutes I was forced to break off from my observations by the arrival of an ovipositing *Macromia moorei*, but that is another story.

What's in a name?

I am currently working on a simple field guide to the



Photo 2. *P. mirabilis* male hovering with hindwings hanging motionless. His opponent can be discerned in the foreground.

odonates of Hainan, to be published by Kadoorie Farm & Botanic Garden (a Hong Kong-based conservation education charity) as part of a series of field guides to Hainan's fauna and flora, aimed primarily at older schoolchildren in China. As part of this exercise, and as a means of enhancing the public recognition factor for these insects, I have been asked to provide English common names for the Hainan species. In the case of *Pseudolestes mirabilis*, I am proposing that 'Phoenix' be adopted as the English common name. The phoenix is of course familiar to westerners from ancient Egyptian theology and christian mythology, as a brilliant gold-coloured bird that rises from the ashes of its own funeral

pyre. The analogy with *P. mirabilis* males rising upwards on golden wings is obvious. More relevantly, however, 'Chinese phoenix' is the English name for fenghuang – a bird-like chimera from Chinese mythology, comprising elements of several different animals. This is an apt model for *P. mirabilis*, with its apparent bee-mimicry (see Wilson, undated), its scaled hindwings, and its hawkmoth-like resting wing posture. From the Yuan Dynasty onwards, the fenghuang symbolised the Empress, just as the dragon symbolised the Emperor (which, without wishing to strain the damselfly / dragonfly analogy too far, may also be considered apposite), and represented high virtue and grace. I can think of no better English name for this regal damselfly.



Photo 3. *P. mirabilis* male in agonistic flight, showing gold and black on hindwing upper surface, and silver scaly area on hindwing lower surface.



Photo 4. *P. mirabilis* – the Phoenix.

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- Reels, G.T., 2006. Hainan, China, August 2005. *Echo* 12-13 (in *AGRION* 10(1)).
- Wilson, K.D.P., undated. Dragonfly groups of conservation interest confined to the Oriental Region. Article on Asia Dragonfly website. <http://www.asia-dragonfly.net/Articles/OrientalOdonateBiodiversity.pdf>

Odonata of the “Glen Forest” at Samarakan, Bintulu Division, Sarawak, Malaysian Borneo

Rory Dow [rory.dow@virgin.net]

Since 2005, Graham Reels and I have collected Odonata in many parts of Sarawak; we have reported on some of these areas in previous issues of *AGRION* and *ECHO*. However, there is a tendency to concentrate on either national parks or large areas when presenting faunal lists. Here I report on one very small, but significant, area located in Bintulu Division.

Bintulu Division is situated centrally in Sarawak and, despite being the third largest of Sarawak’s administrative Divisions, has historically been very poorly investigated for Odonata, although there are a few records dating back to the first quarter of the twentieth century (for instance in Laidlaw 1920). It is a predominantly lowland area, originally with much swamp and mixed dipterocarp forest, but also with some mountains high enough to support a montane fauna. Recent surveying has revealed a fauna of more than 130 species, including one recently described species, *Libellago orri* Dow & Hämäläinen, 2008, which has yet to be found outside of Bintulu Division. All of the sampling conducted so far has been at lowland sites.

A very large part of Bintulu Division has been or is being given over to plantations of one sort or another. Although I am unable to give exact figures, it is safe to say that very little primary forest remains in the Division; the remaining lowland forest is almost all secondary, and very extensive areas have already been clear-felled and replaced with oil palm or acacia. A large part of the interior of the Division now consists of acacia plantations managed by Grand Perfect Sdn Bhd (GP). This area is known as the Planted Forest Zone (PFZ). Uniquely amongst plantation and timber companies in Sarawak, GP has a conservation office and makes some attempt at conservation. The conservation staff are hard working and enthusiastic, but unfortunately they are under-funded and face a

number of other serious problems. Within the PFZ there are a number of areas that are given protected status of one sort or another by GP. One such area is the ‘Glen Forest’, a patch of good old secondary lowland mixed dipterocarp forest located at GP’s acacia nursery at Samarakan, and classified as a ‘Recreational Forest’.

The Glen Forest is surrounded on all sides by plantation and other cleared areas, and contains several freshwater habitats. Sampling was conducted within the Glen Forest in March 2006, and January and February-March of 2008. In 2006, sampling was conducted by the author and Chin Sing Yun, while in 2008 it was conducted by the author and Roslina Ragai. These very able assistants were (CSY) or are (RR) members of GP’s conservation staff. The specific sites sampled within the Glen Forest are:

Location 1 – The Sungai (Sg.) Philip and adjacent swampy areas. The Sg. Philip is a small low gradient stream with a sedimentary bottom along most of the sampled area. The sampled section lies mostly amongst good secondary forest, with a few more open areas and sections very close to the edge of the forest. This is the best sampled site in the Glen Forest, and the only one at which larval sampling



Photo 1: Male blue form *Elatoneura analis*.



Photo 2: Male typical form *Elatoneura analis*.

has been conducted. Collecting was carried out at this location on the following dates: 5 and 7 March 2006, 27th February 2008 and 2 March 2008. Larval sampling concentrated on Anisoptera and was conducted by RR on the last date.

Location 2 – A more disturbed stream of similar physical structure to the Sg. Philip, the sampled section was partly in good secondary forest, but also partly in acacia. Collecting was carried out at this location on 29 February 2008.

Location 3 – A very small muddy trickle with much rattan. Collecting was carried out at this location on 22 January 2008.

A list of 42 species collected from the above locations in the Glen Forest is given at the end of this article; from this list it is apparent that the area, although small, has a rich fauna, with 13 families (out of 15 known from Borneo) represented and a number of poorly known species included (e.g. *Libellago orri*, *Drepanosticta* sp. cf. *versicolor*, *Teinobasis* new sp. and *Burmagomphus arthuri*), as well as some rather local ones (e.g. *Orchithemis pruinsans*, which appears to be very scarce in Sarawak). The Sg. Philip at least is also notable for the presence of unusual colour forms in its protoneurid fauna. *Elatoneura analis* occurs in both the normal form with pale orange markings and in a form with pale blue markings; *Prodasineura hyperythra* occurs in an almost entirely black form. The blue form of *E. analis* was reported previously by Orr (2001) from a location in Brunei, and an immature blue form of the closely related *E. longispina* was recorded from north-west Kalimantan and from Billiton by Lieftinck (1937). It is still not entirely clear whether the blue form of *E. analis* is merely an immature form or not, but a number of the blue individuals collected appear to be semi-teneral; in most populations immature individuals merely have much paler (almost white) orange markings. An orange male has been observed in tandem with a blue female.

Most of the records of gomphids from the Glen Forest are of larvae, all collected in the Sg. Philip; these have not so far been identified beyond genus. However a teneral female of *Burmagomphus arthuri* was taken on March 2nd, 2008; other teneral *Burmagomphus* collected in 2006 could not be identified to species. The only specimen-based record of an aeshnid definitely from within the Glen Forest is of a *Tetracanthagyna* larva from the Sg. Philip, and adult *T. plagiata* has been seen near the stream. However *Gynacantha dohrni* taken at lights at buildings nearby are very likely to originate in the Glen Forest.

The richness of the fauna of the Glen Forest clearly demonstrates the value for invertebrate conservation of leaving even small areas of good secondary forest in areas being converted to plantation; it is to be hoped that this message will be heeded by plantation owners and managers, who typically seem unwilling to make any real concessions to conservation.

The Glen Forest also provides a good opportunity for comparative studies, with streams nearby lying either entirely within acacia or with very narrow buffers of highly degraded secondary forest. Some sampling has already been conducted in these lower quality habitats, on streams that would originally have been very similar to the Sg. Philip and which can reasonably be assumed to have once had very similar odonate faunas. It is intended that more sampling in both the Glen Forest and in nearby plantation sites over the next few years will eventually lead to the publication of a study comparing the faunas of the different habitats. Here it suffices to say that although the best studied plantation stream (where both adults and larva have been collected) has a 'better' fauna

than might have been expected, it is still noticeably less rich than that of the Sg. Philip. Moreover, there are good reasons to suspect that the diversity of the plantation stream fauna will drop over successive harvests, although long-term study is needed to confirm this.

Table 1: Odonata collected at locations within the Glen ForestReferences

Species	Location	Species	Location
Chlorocyphidae		Argiocnemis rubescens rubeola Selys, 1877	
<i>Libellago hyalina</i> Selys, 1859	1	<i>Ceriagrion cerinorubellum</i> (Brauer, 1865)	1
<i>Libellago orri</i> Dow & Hämäläinen, 2008	1, 2	<i>Onychargia atrocyana</i> (Selys, 1865)	1
<i>Sundacypha petiolata</i> (Selys, 1859)	1	<i>Teinobasis rajah</i> Laidlaw, 1912	1
Euphaeidae		<i>Teinobasis</i> new sp.	1
<i>Euphaea impar</i> Selys, 1859	1	Platycnemididae	
Calopterygidae		<i>Coeliccia nigrohamata</i> Laidlaw, 1918	1
<i>Vestalis amabilis</i> Lieftinck, 1965	1, 2	<i>Copera vittata</i> (Selys, 1863)	1, 2
<i>Vestalis amaryllis</i> Lieftinck, 1965	1	Gomphidae	
Lestidae		<i>Burmagomphus arthuri</i> Lieftinck, 1953	1
<i>Orolestes wallacei</i> (Kirby, 1889)	1	<i>Microgomphus</i> sp.	1
Megapodagrionidae		<i>Gomphidia</i> sp.	1
<i>Podolestes orientalis</i> Selys, 1862	1	<i>Heliogomphus</i> sp.	1
<i>Rhinagrion borneense</i> (Selys, 1886)	1, 2	<i>Macrogomphus</i> sp.	1
Platystictidae		Aeshnidae	
<i>Drepanosticta</i> sp. cf. <i>versicolor</i> (Laidlaw, 1913)	3	<i>Tetracanthagyna</i> sp.	1
Protoneuridae		Corduliidae	
<i>Elattonura analis</i> (Selys, 1860)	1, 2	<i>Macromia cincta</i> Rambur, 1842	1
<i>Prodasineura</i> sp.	1, 2	Libellulidae	
Coenagrionidae		<i>Agrionoptera insignis</i> (Rambur, 1842)	1
<i>Amphicnemis ?wallacii</i> Selys, 1863	1, 2	<i>Brachydiplax farinosa</i> Krüger, 1902	1
<i>Archibasis tenella</i> Lieftinck, 1949	1, 2	<i>Nannophya pygmaea</i> Rambur, 1842	1
<i>Archibasis viola</i> Lieftinck, 1948	1, 2	<i>Nesoxenia lineata</i> (Selys, 1879)	1
		<i>Orchithemis pruinans</i> (Selys, 1878)	1

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Success at last

Jan Taylor [jmtay5@bigpond.net.au]

For many years (as reported in *AGRION* 12, January 2008) I have been hoping to find a living specimen of the Western Swiftwing dragonfly, *Lathrocordulia metallica*. It is endemic to SW Australia and mainly breeds in permanent streams where its larvae have been found in a number of places. (The genus includes another species recorded for Queensland – only one specimen of the Queensland species has ever been collected and its larvae are unknown.)



Turquoise Tigertail, *Austrosynthemis cyanitincta*.



Steam Flatwing, *Miniargiolestes minimus*.

and settled right in front of me! It was an easy capture. There was no way I could risk getting a photograph of this as a free specimen in life, so I cooled it in the 4WD fridge and took some passable photos. It is mainly dark, almost black but with metallic green stripes on the sides of the thorax. I was surprised to find that its abdomen is quite hairy, reminding me of the Downy Emerald, *Cordulia aenea*, in England.

Where now? I have never seen the Spiny Tigertail, *Archaeosynthemis spiniger*, and no larvae have been found recently as far as I know.

I was determined that this year I would catch one at the North Dandalup site near Perth. On 27 December 2007 I had two brief sightings, but no chance of catching one. However, during my hours of watching I saw a few Lilac Hunters, *Austrogomphus lateralis*, Turquoise Tigertails, *Austrosynthemis cyanitincta* and Orange Streamcruisers, *Hesperocordulia berthoudi*. On 2 January there was even less activity, but later in the afternoon a giant Western Petaltail, *Petalura hesperia* dunked in the water, and then I saw a Western Swiftwing laying eggs! It was hovering around dipping the tip of its abdomen in the water just above a riffle. I was about to sweep it up in the net when it flew off – foiled again!

Even more determined I went again on 8 January. One flew fast past me at 10.30am. After that there was very little to be seen apart from many Stream Flatwings, *Miniargiolestes minimus* – a lovely little damselfly which rests over running water – its eyes reflect the colour of the sky above. I counted 14 on a single clump of rushes. I caught a Western Darner, *Austroaeschna anacantha* and then at 11.20 there was a sudden appearance of several dragonflies – a couple of Blue-spotted Hawkers, *Adversaeschna brevistyla* swooped down to the water, probably making settled dragonflies fly up, including Lilac Hunters and Turquoise Tigertails.

Then a female Western Swiftwing flew past



Eyes of a Stream Flatwing showing the sky and reflection of the photographer.



Female Western Swiftwing, *Lathrocordulia metallica*.

Fossicking for dragonflies and connections with an endangered species

Günther Theischinger* & Steve Jacobs

*Department of Environment and Climate Change, New South Wales,
480 Weeroona Rd, Lidcombe NSW, Australia 2141. [theischinger@environment.nsw.gov.au]

During a sampling trip for the Coastal Sustainable Rivers Audit (Coastal SRA project of the Department of Environment and Climate Change, New South Wales) a site along Sheep Station Creek on Bardool, SW of Grafton, New South Wales, Australia (30.02316°S, 152.81626°E; 98 m a.s.l.; randomly selected by computer program) was sampled on 2 May 2008. After a time-consuming and very difficult journey to the site, free water was not found anywhere along the stream within a 500 m distance upstream and downstream. Before declaring the site as dry and replacing it by a backup site, however, it was more thoroughly inspected. During this closer inspection, tiny traces of water were found between cobbles and pebbles at two locations, both less than a square foot in area, along a bedrock wall in the deepest depressions of what had probably been a pool of water with some flow several months ago.



Photo 1: The described fossicking site. Credit: S. Jacobs

Free water became available after the removal of a layer of cobble rocks and a few aquatic macroinvertebrates were found clinging to the stones. Subsequently, more cobble and smaller substrate were removed over an area of slightly less, than a square foot, so that it became possible to sweep the emerging water (about 50-100 mm deep) with a small noodle-sieve. In approximately 15 minutes the following groups of aquatic macroinvertebrates, identified for the project to family or similar level, were obtained: Worms and Leeches: Dugesidae, Gordiidae, Oligochaeta and Glossiphoniidae; Snails: Lymnaeidae; Decapoda: Atyidae; Collembola; Ephemeroptera: Caenidae and Leptophlebiidae; Odonata, as listed below; Hemiptera: Hydrometridae and Veliidae; Megaloptera: Sialidae;

Coleoptera: Carabidae, Dytiscidae, Hydraenidae, Hydrophilidae and Staphylinidae; Diptera: Chironomidae (chironomine and tanypodine); Trichoptera: Leptoceridae.

The odonates were identified as far as possible to specific level, and are listed and commented on here, as the described sampling method and its result appear at least unusual. Species collected included the gomphids *Austroepigomphus praeruptus*, *Austrogomphus amphi-clitus*, *Austrogomphus guerini* or *ochraceus* and *Hemigomphus gouldii* or *heteroclytus*, the corduliids (s.l.) *Austrocordulia refracta* and *Hemicordulia australiae* and the libellulids *Diplacodes haematodes* and *Orthetrum villosovittatum*. All of these odonates are either bottom-dwellers and live in stagnant water amongst detritus and in mud, sand or gravel or generally occur in riffle situations under rocks or in gravel. Species of groups usually associated with aquatic vegetation like many Zygoptera or species of fast flowing waters such as many of the aeshnids (s.l.) were not found. Whereas only a few individuals were



Photo 2: The microhabitat after the digging. Length of forceps ca. 11 cm. Credit: S. Jacobs

found of all other odonates, 126 specimens of *Austrocordulia refracta* were counted making it the clearly dominant species. The water quality measurements obtained were: temperature 18.0°C, conductivity 273mS/cm, turbidity 321 NTU, dissolved oxygen 3.4 mg/L, pH 6.8, alkalinity 80 mg/L.

Although we do not know when the next flush of water would have come to the sampled habitat, how long the larvae would have survived in their present situation or what other changes would have occurred by changing weather conditions, activity of the fauna or other factors, if the observed situation is typical for the habitat, stream, region etc., it appears clear that the dragonflies recorded include mainly or exclusively species with great ability to withstand drought or desiccation and most probably and necessarily with very flexible life-histories. For the dominant species in our sample these characteristics were established almost 100 years ago by the great R.J. Tillyard, who experimented with *A. refracta* (larva X of Tillyard 1910) and found it remarkable as regards longevity (at least 2 years three months old and still more than 6 months away from emergence of adult), resistance to starvation (at least 8 months) and resistance to drought (considerable degree of drought for nine weeks). These definite advantages in a continent like Australia may account for the fact that *A. refracta* is very widely distributed (eastern Australia from Cape York to Victoria) and occurs in a wide range of ecologically different water bodies.

In this context it appears appropriate to consider the strong contrast between *A. refracta* and one of its two congeners which is known from only three localities in the Sydney area, listed as an ENDANGERED SPECIES and possibly Australia's rarest dragonfly. This species, *A. leonardi*, discovered only relatively recently (Theischinger 1974) in or near dammed sections of larger streams, probably lacks at least the great drought resistance of *A. refracta*. *A. leonardi* apparently needs deeper and cooler water with more permanent flow or more frequent flushes than *A. refracta*, and the disappearance of these habitats together with increasingly frequent damming of tributaries to the larger streams must have had a huge impact on it. Whereas *A. refracta* turns up regularly in samples collected during the Coastal SRA project, even from more or less intermittent streams, *A. leonardi* has never been picked from any of the many hundreds of samples that were collected, generally under much more regular conditions than described above, during this project and its forerunners or even during programmes established specifically for its detection.



Photo 4: The endangered and sensitive *Austrocordulia leonardi* (male). Credit: L. Müller



Photo 3: The common and robust *Austrocordulia refracta* (male). Credit: L. Müller

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Some new records of dragonflies from Oman

Michiel J.T. van der Weide [mvdweide@kpnplanet.nl]
Vincent J. Kalkman [Kalkman@naturalis.nl]

During a three-week birdwatching trip in Oman the first author and H. van Diek, R. Felix, M. Hornman and M. Nijssen made observations of dragonflies. Between 13 September and 5 October 2002 we visited 23 sites in the Capital Area, Masirah Island, the Southeast Coast, Dhofar, Central Desert and Al Batinah. The locations we visited are described in Eriksen & Sargeant (2001).



Photo 1. Male *Azuragrion somalicum* (Wadi ash Shuwaymiyyah) 22-09-2002. Credit: R.P.W.H. Felix.

We recorded 23 species (7 Zygoptera, 16 Anisoptera) at 23 different sites. The species were mostly identified in the field. For most species, material was collected and photographs were taken. *Trithemis kirbyi* was probably seen but no material was collected, nor were any pictures taken and hence the identification remains uncertain. The material and photographs were identified by Vincent Kalkman and K.-D. Dijkstra and the specimens are stored in the National Museum of Natural History, Leiden, The Netherlands. Table 1 gives a list of places visited. Table 2 gives the records and contains information on voucher specimens.

The observations here presented contain 23 of the 40 species known from Oman (Schneider & Dumont, 1997). The

Omani fauna consist mainly of wide-ranging African species and, to a lesser extent, wide-ranging Oriental species (e.g. *Agriocnemis pygmaea*, *Pseudagrion decorum*, *Orthetrum sabina*, *Trithemis pallidinervis*). Only a small portion of the species has a smaller range and is confined to the Arabian Peninsula. The most noteworthy of these are the species of two monotypic genera *Arabineura khalidi* and *Arabicnemis caerulea*, the sole Arabian representatives of Protoneuridae and Platycnemididae respectively.

The collection here presented does not hold large surprises but is still a valuable contribution to the knowledge of the dragonflies of Oman. *Azuragrion somalicum* is confined to Somalia, Ethiopia and Oman. It was observed at a pool underneath a 'hanging garden' at the end of a canyon (Wadi ash Shuwaymiyyah). *Macrodiplax cora* is a widespread species with a largely Oriental distribution. As a strong migrant it might be a potential candidate for turning up along the Mediterranean. In Oman it was observed at both a brackish and a freshwater habitat near the shore.

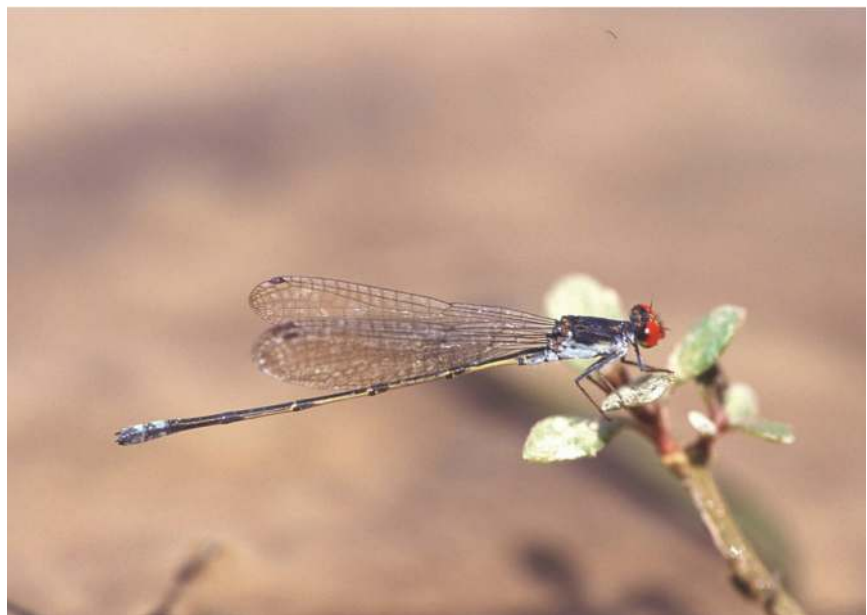


Photo 2. Male *Pseudagrion sublacteum* (Ayn Hamran) 25-09-2002. Credit: R.P.W.H. Felix.



Photo 3. Male *Macrodiplax cora* (Khor Taqah) 25-09-2002 (R.P.W.H. Felix). Photo 3. Male *Macrodiplax cora* (Khor Taqah) 25-09-2002. Credit: R.P.W.H. Felix.

Table 1. List of localities visited from 14 September to 4 October 2002.

Area	Location	Coordinates	Date
The Capital Area Masirah Island	01 - Al Ansab, Muscat area	23°33'44.9N 58°19'45.0E	14 ix 2002
	02 - sewage ponds, Hilf	20°37'46.9N 58°51'49.8E	17 ix 2002
	03 - orchard, Hilf	20°37'44.56N 58°52'01.01E	18 ix 2002
	04 - beach SE Hilf	20°34'28.7N 58°55'44.4E	18 ix 2002
	05 - sewage ponds, Hilf	20°37'46.9N 58°51'49.8E	19 ix 2002
The Southeast Coast	06 - Ab Doqm	20°40'55.8N 58°02'57.6E	20 ix 2002
	07 - Khor Dirif	18°56'21.0N 57°20'29.4E	20 ix 2002
	08 - Wadi ash Shuwaymiyyah	17°54'34.0N 55°27'26.6E	22 ix 2002
	09 - Wadi ash Shuwaymiyyah	17°54'51.9N 55°27'05.8E	22 ix 2002
	10 - beach, ash Shuwaymiyyah	17°52'36.6N 55°35'14.3E	23 ix 2002
Dhofar	11 - nature reserve Salalah	17°00'46.9N 54°10'38.5E	24 ix 2002
	12 - Ayn Hamran, spring	17°05'50.9N 54°16'44.7E	24 ix 2002
	13 - Khor Dahariz	17°01'07.7N 54°10'23.5E	24 ix 2002
	14 - Sahnawt farm, Salalah	17°02'31.6N 54°11'33.1E	24 ix 2002
	15 - beach houses Salalah	16°59'55.1N 54°06'15.1E	24 ix 2002
	16 - Ayn Hamran (stream)	17°05'50.9N 54°16'44.7E	25 ix 2002
	17 - Ayn Hamran (well)	17°05'50.9N 54°16'44.7E	25 ix 2002
	18 - Khor Taqah	17°02'14.7N 54°22'26.7E	25 ix 2002
	19 - Wadi Hanna	17°03N 54°37E	26 ix 2002
	20 - Wadi Hanna	17°03N 54°37E	27 ix 2002
	21 - Wadi Darbat	17°06N 54°27E	28 ix 2002
	22 - Jarziz farm, Salalah	17°02N 54°08E	29 ix 2002
Central Desert	23 - oasis Qatbit, central desert	19°09'19.0N 54°30'19.4W	30 ix 2002
	24 - oasis Montasar, central desert	19°27'11.6N 54°37'03.3W	01 x 2002
Al Batinah	25 - Sohar sunfarm	24°18'23.9N 56°44'58.6E	03 x 2002
	26 - Katman Milalah	24°57'50.8N 56°21'48.5E	03 x 2002
	27 - Al Ansab, Muscat area	23°33'44.9N 58°19'45.0W	04 x 2002

Table 2. Records per species per location.

Family	Species	Records (bold = Location ; [] = vouchered)
Coenagrionidae	<i>Azuragrion nigradorsum</i> (Selys, 1876)	20 8♂, 1♀ [1♂]
	<i>Azuragrion somalicum</i> (Longfield, 1931)	9 30 [1♂, 1♀]
	<i>Ceriagrion glabrum</i> (Burmeister, 1839)	19 1♂, 1♀ [1♂, 1♀]; 20 1 copula; 27 6
	<i>Ischnura evansi</i> Morton, 1919	21 3 [1♂]
	<i>Ischnura senegalensis</i> (Rambur, 1842)	13 10 [1♂, 1♀]; 14 1; 18 10 [1♂]; 27 2♂ [1♂]
	<i>Pseudagrion decorum</i> (Rambur, 1842)	18 8 [2♂]; 21 1♂ [1♂]
	<i>Pseudagrion sublacteum</i> (Karsch, 1893)	16 10♂, 2 copula [1♂, 1♀]; 17 10♂ [1♂]; 21 6♂ [2♂]
Aeshnidae	<i>Anax ephippiger</i> (Burmeister, 1839)	5 2; 23 1
	<i>Anax imperator</i> Leach, 1815	9 3♂; 16 1♂; 19 3 [1♂]; 20 1♂, 1♀; 21 1♂
	<i>Anax parthenope</i> (Selys, 1839)	21 1♂, 1♀; 24 1♂; 27 1♂
Libellulidae	<i>Crocothemis erythraea</i> (Brulle, 1832)	1 20; 8 1♀ [1♀]; 13 2♂; 17 4♂; 18 4♂; 21 20♂ [1♂]; 27 15
	<i>Crocothemis sanguinolenta</i> (Burmeister, 1839)	16 1♂ [1♂]
	<i>Diplacodes lefebrii</i> (Rambur 1842)	18 1♂ [1♂]; 27 2♂ [1♂]
	<i>Macrodiplax cora</i> (Brauer, 1867)	13 4 [1♂]; 18 1 copula, 6♂
	<i>Nesiothemis farinosa</i> (Foerster, 1898)	21 1♂ [1♂]
	<i>Orthetrum chryostigma</i> (Burmeister 1839)	16 1 [1♂]; 17 45♂ 2 copula, 1♀ oviposition [1♂]; 20 4♂; 21 40♂, 1♀ oviposition [1♂]
	<i>Orthetrum sabina</i> (Drury, 1773)	1 4♂; 5 1; 12 1 fresh [1 exuviae]; 14 6♂; 18 3♂, 1♀ [1♀]; 21 20♂; 24 2♂; 27 25♂
	<i>Pantala flavescens</i> (Fabricius, 1798)	1 10; 2 3; 3 10; 4 3; 5 8; 6 2; 7 1; 8 6; 10 1; 11 1; 13 2; 15 1; 17 2, 1 copula; 18 4 [1]; 20 2; 21 10, 1 copula; 22 80 [1♂]; 23 6; 24 15; 25 2; 26 2
	<i>Rhyothemis semihyalina</i> (Desjardins, 1832)	18 6 [1♂]
	<i>Tramea spec.</i>	19 5 [1♀]
	<i>Trithemis annulata</i> (Palisot de Beauvois, 1807)	11 1; 14 3 [2♀]; 15 2; 17 10; 21 75♂ [1♂]; 26 2; 27 1♂
	<i>Trithemis arteriosa</i> (Burmeister, 1839)	9 10 [1♂]; 17 40♂; 19 4; 20 30♂, 2♀ [1♂]
	<i>Zygonyx torridus</i> (Kirby, 1889)	16 5 [1♂]; 17 20♂, 1 copula; 21 5

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An extraordinary confluence of events in the study of UAE and Oman Odonata

Robert W. (Bob) Reimer [breimer@eim.ae]

The UAE and Oman has been fortunate in recent years to have received the attention of several outstanding entomologists and lay people as well as support from the governments of the United Arab Emirates and Oman for these studies. The odonate fauna of the Arabian Peninsula has been reported in the *Fauna of Arabia*, the *Journal of Oman Studies* and *Tribulus* (the *Journal of the Emirates Natural History Group*). Several members of the various Natural History Groups in UAE felt that the 1998 checklist published by Graham Giles in *Tribulus* in 1998 was due for an update. We felt that with the addition of five new species and a possible sixth to the twenty known in 1998, together with improved digital photography it would be a worthwhile addition to the literature. Over the past year or two, I had been corresponding with Dr. K-D Dijkstra having originally made contact through the useful asia-dragonfly.net community. As we were trying to put the finishing touches on the article, K-D passed on the news that Dr. Vincent Kalkman, the chair of the Odonata Specialists Group of IUCN Species Survival Commission would be attending meetings in Al Ain from February 11 to 16, 2008 and would I perhaps be able to get him out on some field trips. We were most pleased to be able to arrange some outings for Vincent and his colleagues. In return, Vincent and Dr. Sascha Spector presented very interesting lectures to the Al Ain Chapter of the *Emirates Natural History Group*.

Our one mystery species for our article appeared to be a heavy set dragonfly resembling *Orthetrum chrysostigma*. There was some suggestion that the subject might be *Orthetrum ransonneti*. Tony Pittaway had recorded the species near Muscat in the early 1980s and Graham Giles had included it on his “expected but not seen” list in 1998. Chris Drew, then of ERWDA, Environmental Research and Wildlife Development Agency, (which is now Environmental Agency Abu Dhabi – EAD, the sponsor of the IUCN conference) concluded that the species was probably *O. ransonneti*. More recently numerous reports had been made from points all along the Hajar mountains of UAE and Oman including the outlier mountain near Al Ain, Jebel Hafit. The pictures sent to various experts were inconclusive. I had some pictures in my own collection from 2004 for the unknown species.

When planning Vincent’s field trips, one of the objectives was to find the mystery *Orthetrum*. Gary Feulner, our paper’s first author, suggested a location near to one of our favourite spots to take visitors due to its archaeology and natural history. When we arrived at Aboul (or Ubul, which is the current official transliteration from Arabic), we saw the usual good selection of dragonflies. As Vincent and I were examining a freshly emerged *Trithemis arteriosa* male, the chair of our group, Brien Holmes, pointed out “a blue one” further up the wadi. It turned out to be the mystery *Orthetrum* which Vincent collected for later identification back at Leiden. A hundred metres or so further on, we saw and captured a male *Orthetrum chrysostigma* for comparison. The earlier capture was clearly much more robust and larger. In spite of spending quite a bit of time observing odonata in that wadi, I had never seen the mystery *Orthetrum* there although Gary had seen them the next wadi over, a couple kilometres away.

A few days after Vincent’s return to Leiden, he wrote back to say that “I checked the specimen with specimens in our collection and I am sure it is *ransonneti*. I compared it with two males collected in Egypt. Besides we had one male from Turkey (collected before 1880!, the only known specimen from Turkey) and one female from Persia (also prior 1880). The female is not in a very good condition but it seems to show the same dark triangles on the abdomen as some of the pictures.” We were very pleased to have the mystery resolved and in time for our article deadline!

The issue of *Tribulus* containing the article was published earlier in June. It is available on the ENHG Al Ain Chapter web site at <http://www.enhg.org/trib/v17/tribulusv17P037-062.pdf>. Several other articles of interest to odonatologists and entomologists are also available on the site in the archives of the various publications of the Abu Dhabi, Al Ain and Dubai groups.



Vincent with the comparative *Orthetrum chrysostigma*



Vincent holds the mystery *Orthetrum*

A brief trip to United Arab Emirates and northern Oman

Keith Wilson [kdpwilson@gmail.com]

In late March 2008 I attended a job interview in Dubai, UAE. I was fortunate that my brief Spring visit coincided with a public holiday and I was able to take the opportunity to accompany a few friends, who live in Abu Dhabi, to visit Hatta Pools in east Dubai and Al Madhah in neighbouring northern Oman.

On the 20 March 2008, after a few hours drive from Abu Dhabi in a 4x4, we arrived at Hatta Pools and soon encountered *Anax imperator*, *Trithemis arteriosa* and ovipositing *Zygonyx torridus* in the headwaters of the pools. I also noticed a very



Photo 1: Headwaters at Hatta Pools, Dubai, UAE.

flighty, darkish damselfly which I thought might be the endemic *Arabineura khalidi*, but I was unable to take a photo or catch a specimen. We spent the night camping at Hatta and before breakfast the sun had not risen high enough to bathe the Hatta stream and pools at our camp site with sunlight. As such I was unable to confirm the identity of the illusive damselfly. We departed shortly after breakfast to visit the Hajar Mountains in the Musandam Peninsula, which is a northern Omani enclave adjacent to the Strait of Hormuz at the mouth of the Arabian Gulf.

The Hajar mountains are very impressive but at high altitude there was not a drop of water in sight. We spent the night at around 1,000 m and at this height, in March, the temperature was decidedly cool. In the morning we descended

and passed back into the UAE from north Oman but curiously at Al Madhah we entered Oman again. Al Madhah is a small circular patch of land, which is entirely surrounding by the UAE emirate of Sharjah, but officially it is a tiny enclave of Oman. Here we found a small wadhi with a tiny running stream and a pool of standing water. The stream supported several *Arabineura khalidi*, some of which were paired and ovipositing (see Photo 2). *Arabineura* is a monotypic genus belonging to the Asian family Protoneuridae and *khalidi* is the only representative of this family in Arabia. The genus was established in 1995 and the first female *khalidi* was described in the same paper (Schneider & Dumont, 1995). Also at the stream was a very obliging *Paragomphus sinaiticus*, which refused to leave its poolside rocky perch throughout my clumsy attempts to photograph it (see Photo 5). *Paragomphus sinaiticus* is listed as 'vulnerable' (VU) for Egypt, Niger, Oman, Saudi Arabia and Sudan under the 1996 IUCN Red List and the VU category -has been confirmed by Jödicke et al (2004) and Boudot (2006).

Several other odonates were present at the Al Madhah wadhi including *Anax imperator*, *Crocothemis erythraea*,



Photo 2: Paired *Arabineura khalidi* at Al Madhah, northern Oman.

Orthetrum chrysostigma, *Orthetrum sabina*, *Trithemis annulata*, *Trithemis arteriosa* and *Trithemis kirbyi*. According to Giles (1998) 20 species of Odonata can be found in the UAE with a further 9 species found in northern Oman. Two of these latter nine species were subsequently added to the UAE list (Feulner, 1999).

During my brief march visit I saw no sign of the colourful *Arabicnemis caerulea*, which is endemic to Arabia and restricted to the Gulf Territories, Yemen and Oman. Later in April 2008 I was informed that I had passed the interview and psychometric analysis and, if I wanted it, the job was mine. I accepted the post (Environmental Manager – Marine, with Nakheel, working on the Waterfront and Palm Jebel Ali projects) and have been working in Dubai since



Photo 3: Hajjah mountains, northern Oman.

the beginning of May, 2008. In late June I managed to locate *Arabicnemis caerulea* (see Photo 4) at the headwaters of a northern Omani wadhi, just over the border from the UAE. I look forward to exploring more of the Arabian Peninsula in the near future

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Photo 4: *Arabicnemis caerulea*, northern Oman



Photo 5: *Paragomphus sinaiticus*, at Al Madhah Wahdi, northern Oman.

Cameroon Reconnaissance

Klaas-Douwe “KD” B. Dijkstra [dijkstra@nnm.nl], Jens Kipping & Kai Schütte

From 2 to 6 June 2008 IUCN organised an evaluation workshop for the Central African freshwater biodiversity assessment in Yaoundé. In Africa, Cameroon’s estimated odonate richness is second only to the much larger Democratic Republic of Congo and probably lies above 300 species. As we had not been here before, we had to add some time for a first impression. Sampling habitats from a rainforest stream only separated from the Atlantic Ocean by a waterfall to a lake 2000 m above it, and from black-water swamps to the sandy mouth of Cameroon’s largest river, we found over 150 species in less than four weeks. It can only be a start...

Kai and KD made their first stop in Nyasoso, the site of Graham Vick’s successful Cameroon Dragonfly Project. The streams flowing off Mt. Kupe were almost dry, and it was difficult to find the specialities. Several *Sapho orichalcea*, *Pentaplebia stahli* (Africa’s only amphipterygid genus), *Nubiolestes diotima* (its only perilestid), *Elatoneura pruinosa* and *Chlorocnemis contraria* were found, but only singletons of *Umma mesostigma*, *Africocypha lacuselephantum* (a female), *Neurolestes trinervis*, *Stenocnemis pachystigma* and *Phyllomacromia aeneothorax*. We proceeded to Kodmin, at 1500 m in the Bakossi Mts. Mossy forests are alternated by wide views across swathes of grass and bracken to distant peaks. Incessant drizzle prevented serious odonating, but as the sun tried to force itself through the clouds, massive *Notogomphus moorei* (described from here by Graham in 2003) and *Phyllogomphus coloratus* were briefly active. Also the large red jewel *Chlorocypha centripunctata* (known just from this region and Obudu in adjacent Nigeria) appeared, including the previously unknown female. Much remains to be discovered in these highlands, which have just become a national park. From Kodmin footpaths lead through forest down to the crater lake at Edib and to Konye, where the Mamfe Road creeps over the saddle between the Bakossi and Rumpi Hills. Their odonatological potential must be great...

The road north enters the wide Nkam valley with its dramatic backdrop of forested slopes, then steeply ascends to Dschang, climbing into the clouds that cloak the highlands and crossing countless streams as they tumble down. What may lurk there? From Bamenda we explored the countryside by motorbike with our drivers Kingsley and Divine. These lush highlands are densely populated. Several endemic birds, such as the lovely Bannerman’s Turaco, cling on to existence in the few remaining slithers of forest, such as at Baba II (many villages have numbers, as they split under rival chiefs. Baba I no longer exists, Nyasoso is actually composed of I, II and III, while Kodmin was just rifting, which meant double fees and formalities for us...). Baba’s beautiful forest (1850 m a.s.l.) is small with only a few streams that seemed lifeless until several *Chlorocypha centripunctata* males settled on sunlit leaves. Higher up we scoured a more swampy section, where numerous *Chlorocnemis* males emerged from the gloom as tiny specks of sky blue and luminous orange. This species, known from a few specimens from Obudu and Kodmin, was confused with the East African *C. pauli* and is still unnamed.

The forest-rimmed crater lake at Awing (2070 m) is completely enclosed by fields and plantations and with species like *Proischnura subfurcata*, *Orthetrum camerunense* (not endemic, despite its name), *Trithemis furva* and *T. stictica* the fauna had a distinct East African feel. However the large orange-faced *Pseudagrion risi* is endemic to these highlands, while a single small *Notogomphus* male was nearest Graham’s *N. maryae*, described from further south. Despite its fairly considerable altitude (1320 m), the small river Bawock south of Bali hosted an array of more tolerant species, such as *Chlorocypha curta*. Teneral flies flew over weedy borders, among them a small all-dark *Elatoneura*. These were previously only reported from Bouar, at the Central African end of these highlands. Described as a subspecies of the bright-red *E. acuta*, the overall blackness of *E. lindleyi*, even at emergence, warrants specific status. From Bamenda we travelled to Yaoundé to join Jens and the IUCN team, making long hours for five days to evaluate over 400 red-list assessments.

The hotel’s stairwell trapped the impressive *Gynacantha africana* and *G. cylindrata*, but otherwise an afternoon excursion to the mighty Sanaga at Monatélé was our only relief. Access was impeded by an armada of wooden canoes. A lone *Zygonyx flavicosta* patrolled over them and numerous colleagues quickly flocked around us to witness data-collection in action. The swipe at the dashing rover was precise, fortunately, and any embarrassment avoided. Of more interest were the damselflies resting on the pirogues. The red *Chlorocypha* species (approaching *C. fabamacula*) require revision, while the robust pruinose *Mesocnemis* are probably new to science. This would be the third big-river species to be discovered recently, after *M. dupuyi* in 1981 (Gambia) and *M. saralisa* in 2003 (Congo).

After the meeting we met up with Dutchman Jaap van der Waarde, who works for WWF in Cameroon, to visit the large black-water river Nyong at Akonolinga, 100 km east of Yaoundé. Its grassy swamps yielded little except staggering numbers of *Chalcostephia flavifrons* and good photo-ops for the changeable *Agriocnemis forcipata*. The delight came at a swampy side-stream towards Abem. Five dark *Trithemis* species competed for sunny stakes and our attention: beside the widespread *T. aconita*, *T. grouti* and *T. nuptialis*, also the odd bronze-brown *T. aenea* and the impressive black-mantled *T. tropicana*. Adding some confusing names to the frenzy, *Pseudagrion glaucescens*,



Above Baba II. Credit KD.



Marienberg. Credit KD.



Nyong. Credit KD.



'Muddle' (Muddy puddle) -
Trithemis hartwigi habitat. Credit KD.



Lake Awing. Credit KD.



Abem side-stream. Credit Kai Schütte.



Chlorocypha centripunctata. Credit Kai Schütte.



Platycypha rufitiba. Credit Jens Kipping.



Sapho orichalcea. Credit KD.



Chlorocypha sp. (new species). Credit Jens Kipping.



Trithemis hartwigi. Credit KD.



Trithemis tropicana. Credit Jens Kipping.



Pseudagrion risi. Credit KD.



Trithemis aenea. Credit Jens Kipping.



Agriocnemis forcipata dark. Credit Jens Kipping.



Agriocnemis forcipata old male. Credit Jens Kipping.



Agriocnemis forcipata red male. Jens Kipping.



Agriocnemis forcipata female. Credit Jens Kipping.



Agriocnemis maclachlani young. Credit Jens Kipping.



Agriocnemis maclachlani old. Credit Jens Kipping.

P. glaucoideum and *P. glaucum* (was *P. basicornu*) were all present. The local girls' desire to bathe forced us to leave their dragon-drenched bathroom; the scarce deep orange-red *Ceriaagrion tricrenaticeps* the final bonus. An IUCN fieldtrip to the Fala near Muambong produced few additions, but heavy *Ictinogomphus fraseri* hawked over the river and could be caught in the fields.

For the next week we bussed down to Kribi on Cameroon's southern Atlantic shore, where the Kienké pours down some rapids straight into the sea. Here we looked for an unnamed orange *Chlorocypha* that KD had seen in Graham Vick's collection. We found it together with two other jewels, *Chlorocypha cyanifrons* and *Platycypha rufitibia*, and the big gaudy *Pseudagrion serrulatum*: Jens took beautiful photographs of all. We quickly learned to separate both *Phaon* species by the flash of colour on every wing-beat: green in *P. iridipennis* and violet-blue in *P. camerunensis*. Travelling on to Campo, we asked the driver to stop at the first good river, the Linde. Before angry villagers demanding that we meet the chief drove us off, we were able to find some more pretty jewels, *Chlorocypha cancellata* and *C. glauca*, a *Microgomphus* exuvia and a mysterious libellulid female, just emerged, which turned out to be the first record of *Malgassophlebia westfalli* since its description from north-eastern Gabon.

We stayed in the village Nkoélon close to Campo-Ma'an National Park and beside the Bitandé River. Here the aptly-named *Sapho gloriosa* takes pride of place: the white-banded ebony wings are blue obsidian with a matt-black band in mature males. Thread-bodied *Elatoneura* lurk in the shade, only catching the eye by their white pruinosity against the dark water they over-hover. Subtle differences in micro-habitat and the extent of these patterns (on thorax and abdomen-tip) showed that three species occurred together, but structural characters were too subtle to make out in the field. They seem nearest the West African *E. balli*, the Central African *E. lliba* and the poorly-known *E. josemorai*. The second name is an anagram of the first and the two were not known to overlap. The taxonomy is, however, far from stabilised. That's why KD has another taxon labelled "*E. labi*"... Some 'spectacularities' like the swift giants *Diastomma tricolor* and *Zygonyx speciosus* simply eluded capture, but lucky air-swipes did net the shadow-cruising *Phyllomacromia paula* and the cute *Malgassophlebia bispina*. The biggest surprises, however, were on the roads. Small puddles produced small surprises, the damselfly *Platycnemis rufipes* and *Africallagma vaginale*, but a greater treat patrolled a large 'muddle' (muddy puddle) in the fork of two logging roads: violet and voluminous *Trithemis hartwigi*, which is like *T. annulata* on steroids. Known only from Bioko and two sites across the water in Cameroon, this extends the range to the nation's southern border and adds the unknown female. Another *Trithemis* female was snatched over the river and only seemed to match some males provisionally identified as *T. bifida* in the Paris museum. Too dashing to net over water, more specimens from roadside stakes, including a single male, suggest this is another new species.

At our departure from Nkoélon, a male *T. hartwigi* patrolled over the roof of the pick-up, as if it were *Pantala flavescens*! Kai and KD spent their last two nights at Marienberg, an old German mission overlooking the sandbanks of the Sanaga close to its mouth. Across the river the Douala-Edéa forest stretches for miles, enclosing lakes that time and weather did not allow us to visit. A male *Lestes uncifer* in the kitchen made for an intriguing welcome: it is more typical of swamps far from Africa's equatorial heart. Constrained by rain and imminent departure we only got a glimpse of the delta's promise. The tiny *Chlorocypha neptunus* and canary-yellow *Pseudagrion camerunense* (only the first is just known from Cameroon) inhabited the riverside. Cruisers sped over roads and meadows, almost defying capture... Almost: they were *Phyllomacromia contumax* and *P. overlaeti* (another surprising swamp species). A male and female *Neurogomphus* perched in roadside herbage were the first *N. agilis* since two males collected before 1920 from "Portuguese Guinea" and "Congo". Finally, unrelenting Kai caught a female *Gynacantha* deep in dense undergrowth. KD had lazily dismissed it as "probably another *bullata*", but in the hand it seems another new species. We can only return...



Notogomphus moorei observed at Kodmin, at 1500 m in the Bakossi Mts. (described from here by Graham Vick in 2003). Credit KD.

BOOK REVIEW

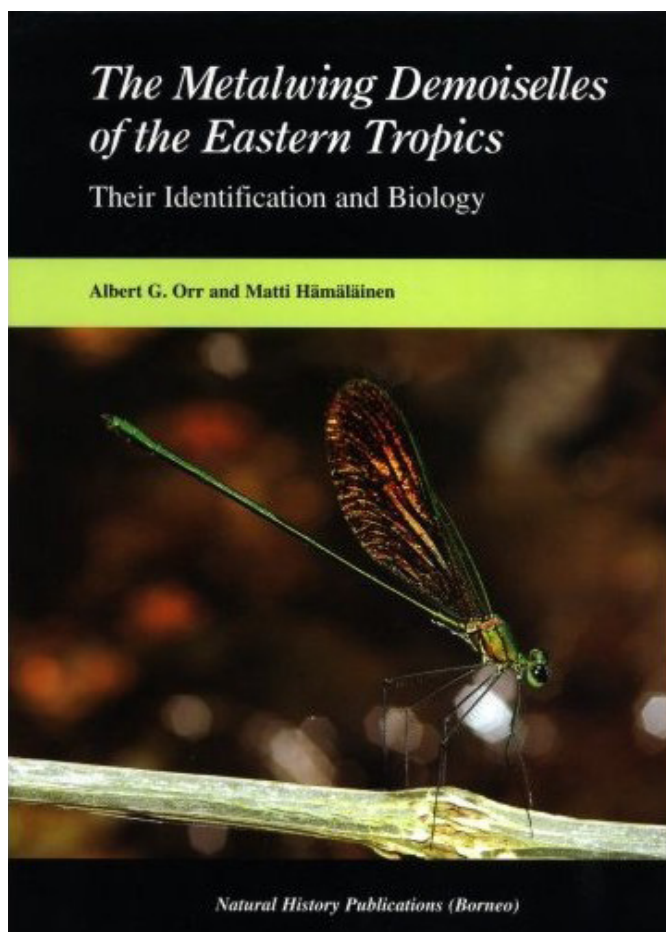
The Metalwing Demoiselles of the Eastern Tropics

by Albert G. Orr and Matti Hämäläinen

Natural History Publications (Borneo), Kota Kinabalu, 2007. 115 pages.

Dennis Paulson, Seattle, Washington [dennispaulson@comcast.net]

Few odonates are as spectacularly colored as the metalwing demoiselles of the genera *Neurobasis* and *Matronoides*. My first sighting of one of these southeast Asian calopterygids, in peninsular Malaysia, literally took my breath away. A male *Neurobasis chinensis*, it fluttered over a small forest stream, the brilliant iridescent green upper surfaces of the hindwings flashing like semaphores in the tropical sun. This is the most widespread and best-known species in the group, but there are 13 other species, all with green, blue or violet flashing wings. The males are perfectly colored to vanish from the eyes of predators while perched back in the shade and then to appear suddenly in dazzling display flights. The less showy females are also beautiful, with more subtle wing patterns.



The authors, both experienced taxonomists and superb field workers, have pooled their talents to put together a book worthy of its subjects. Profusely illustrated, it features Bert Orr's paintings of all the species, photos in life of most of them, line drawings to show many aspects of their behavior, and even electron micrographs to show the complex wing structure that provides their dazzle. There are also habitat photos and photos of the people for whom the species are named. The book is superb for its illustrations alone.

The text is equally comprehensive, as you might expect when 14 species have a book of their own. Each species is thoroughly described, including its taxonomic history and variation, both individual and geographic, that is surprisingly common. As in many other visually oriented animals, species distinctions are most evident in display organs, in this case the male hindwings. Each species is given an English name, an action more and more frequent in dragonfly publications. How could you not be excited about going into the field to look for Paradise Metalwings?

The book also includes a section on distribution, phylogeny, and biogeography (where you will find the range maps), a lengthier section on general biology, ecology and behavior, and a discussion of the basis for their iridescent colors. Of course, being calopterygids, it is to be expected that their behavior is more complex than the run-of-the-mill damselfly, and indeed it is. The males defend territories, court the females, and guard them while

they oviposit. They are much like temperate-zone *Calopteryx*, but even higher on the "oooh" scale. The rather different *Matronoides cyaneipennis* male apparently displays the undersides of its wings to the female. The authors make a final, quite interesting point that the highly colored, structurally modified wings of these odonates actually weigh more than hyaline wings and must represent a cost in both energy and aerodynamics for the males.

This book is highly recommended to all readers, for its scholarship as well as its beauty.

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Worldwide Dragonfly Association

Nominations to the WDA Board of Trustees 2009-2011

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. **Göran Sahlén** has agreed to stand for election to the post of President Elect having been formally nominated (by Gordon Pritchard) and seconded (by Frank Suhling). This will leave one vacant position on the Board and the Board is pleased to nominate **Mamoru Watanabe** (proposed by Hidenori Ubukata and seconded by Dennis Paulson). Should you wish to nominate another member of the WDA for any position on the Board of Trustees (except for President and Immediate Past President) please e-mail the Secretary or complete the following nomination form and return it to the Secretary so that it reaches her no later than 31 October 2008, after which no nominations can be registered. In the event of a vote being required for any position postal/email ballot slips will appear in the December 2008 AGRION and will need to be returned by 31 March 2009. Please confirm that any nomination is supported by two WDA members and by the person nominated.

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