

# AGRION

NEWSLETTER OF THE WORLDWIDE DRAGONFLY ASSOCIATION

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# AGRION

## NEWSLETTER OF THE WORLDWIDE DRAGONFLY ASSOCIATION

AGRION is the Worldwide Dragonfly Association's (WDA's) newsletter, published twice a year, in January and July. The WDA aims to advance public education and awareness by the promotion of the study and conservation of dragonflies (Odonata) and their natural habitats in all parts of the world. AGRION covers all aspects of WDA's activities; it communicates facts and knowledge related to the study and conservation of dragonflies and is a forum for news and information exchange for members. AGRION is freely available for downloading from the WDA website at [http://worldddragonfly.org/?page\\_id=125](http://worldddragonfly.org/?page_id=125). WDA is a Registered Charity (Not-for-Profit Organization), Charity No. 1066039/0.

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### Editor's notes

Keith Wilson [kdpwilson@gmail.com]

### Conference News

**4th European Congress on Odonatology, Tyninge, Sweden, 11-14 July, 2016.** The deadline for registration has now passed but it might still be possible to join the Congress if you contact Magnus Billqvist [magnus.billqvist@gmail.com]. See web site at: [<https://ecoo2016.wordpress.com/>].

**International Congress of Entomology, from the 25<sup>th</sup> - 30<sup>th</sup> September 2016, in Orlando, Florida, USA.** The International Congress of Entomology (ICE2016) is the biggest congress of its kind, and will be attended by around 3,000 participants from all around the world. The congress will feature a large number of symposia ranging from applied ecology, to physiology, morphology and genomics across all insect taxa.

### The International Congress of Odonatology 2017 (ICO2017) - Preliminary Announcement



The International Congress of Odonatology 2017 (ICO2017), originally scheduled to be held in Algeria, will be held in the Gillespie Centre at Clare College, Cambridge from 16<sup>th</sup>-20<sup>th</sup> July 2017. For further information see page 53 and the ICO2017 web site at [<http://www.ico2017.org/>].



### Stories from social and cultural odonatology

In this issue there is a second story, published in AGRION by Matti Hämäläinen, in his series of 'Stories from social and cultural odonatology', titled: 'How the Madagascan libellulid *Trithemis selika* (Selys, 1869) got its name' (see page 94). The first article in this series by Matti was titled: 'The first collectors of *Somatochlora sahlbergi* - a story of an arduous expedition to Siberia in 1876' and was published in AGRION 19(2). These are fascinating, well-researched stories and long may they continue. Matti says: "Social and cultural odonatology, as I will use it, is a broad concept. It covers anything which has developed in the brains of odonatologists, be it taxon names or derogatory comments on colleagues. In future articles in this series I wish to write on random topics related to past odonatologists and their work on dragonflies". Matti has also updated his 2015 'Catalogue of individuals commemorated in the scientific names of extant dragonflies, including lists of all available eponymous species-group and genus-group names' (Hämäläinen, 2016: *International Dragonfly Fund Report* 92:1-132 [<http://www.dragonflyfund.org/en/idf-report.html>]).

### Wilhelm Stüber (1877-1942)

There is also an epic and captivating article by Matti Hämäläinen and Albert Orr detailing the life and odonate collecting activities of Wilhelm Stüber who supplied many thousands of odonate specimens, collected from New Guinea, to Maurits Lieftinck. Over 100 species and subspecies were subsequently described by Lieftinck based on this material (see page 68).

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**Cover photo: Dark-winged skimmer (*Diastatops pullata*), Cuyabeno National Park, Lago Agrio, Ecuador, 29 Feb 2016, taken with Micro Four Thirds camera (ISO 400, f6.7, 1/500s); see article on Micro Four Thirds camera systems on page 90. Photo credit: Keith DP Wilson.**



## Madagascar

In the past 50 years there has been very little survey odonate work conducted in Madagascar. In the July 1999 issue of *AGRION* Mike Parr reported on a trip to Madagascar he made from 5-28 April 1999, together with the late Dr Allen Davies who was also a WDA member, and two British Dragonfly Association members. In 2003 J. Butler published two separate papers in *Odonatologica* describing the larvae of *Isomma hieroglyphicum* and *Phyllomacromia trifasciata*. Also in 2003 J. Legrand described *Tatocnemis virginiae* and *Malgassophlebia mayanga* from Madagascar, in two separate papers published in *Revue Française d'Entomologie*. A good review of the state of knowledge of the Madagascan odonate fauna was published in *IJO* [Dijkstra & Clausnitzer, 2004: Critical species of Odonata in Madagascar. *IJO* 7(2):219-228]. In the July 2009 issue of *AGRION* the first, rather stunning, male of *Viridithemis viridula* was photographed and described from north Madagascar. In this issue we have two articles reporting on the first ecotourist Odonatours trip to Madagascar (see page 56 & page 62). During the trip the group encountered and collected five new species to science. One of these new species was named Attenborough's pintail (*Acisoma attenboroughi*) and KD Dijkstra presented a photograph of the newly described species to honour Sir David Attenborough on his 90th birthday (see page 67).

## WDA website

The WDA website can be accessed at [<http://worlddragonfly.org/>]. The site contains general information about dragonflies and the Society including, the composition of its WDA Board of Trustees, details of its WDA Conservation and Research Grants, WDA meetings and publications. WDA membership application forms can be completed at [[http://worlddragonfly.org/?page\\_id=141](http://worlddragonfly.org/?page_id=141)] or downloaded for completion and submission to WDA Secretary at [[http://worlddragonfly.org/wp-content/uploads/2013/11/membership\\_application\\_form.pdf](http://worlddragonfly.org/wp-content/uploads/2013/11/membership_application_form.pdf)].

## Odonatological Abstract Service

The first issue of the Odonatological Abstract Service (OAS) was published in July 2000 by the International Dragonfly Fund (IDF) in cooperation with the WDA. All the published abstracts have been uploaded to the WDA web site and are available to download in the members' area [<http://worlddragonfly.org/>]. We owe a great deal of thanks to past and present Editors of the OAS, namely Dr. Martin Lindeboom, Dr Klaus Reinhardt, Martin Schorr and Dr Milen Marinov. The present Editors, Martin Schorr [oestlap@online.de] and Dr Milen Marinov [milen.marinov@canterbury.ac.nz], are standing down and currently there are no replacement editors to continue the service.

Most academics can obtain odonatological abstracts and papers through their academic institutions' subscription to the 'Web of Science' scientific citation indexing service maintained by Thomson Reuters, but such a service is not freely available to WDA members without an affiliation to an academic institution.

However, everyone can take advantage of Google Scholar which is freely accessible at [https://scholar.google.co.uk/]. Google Scholar is a search engine that indexes the full text and metadata of most peer-reviewed academic journal literature, and conference papers, dissertations, technical reports and other scholarly literature, such as selected Web pages, court decisions and patents. It was first released in November 2004 and has grown to be a very powerful tool. It is similar in function to the subscription based Thomson Reuters' Web of Science and Elsevier's Scopus. Google Scholar users can search for papers of an odonatological nature and using the "group of" feature find available links to the journal articles, both fee-based and free full-text links. It also has a "cited by" search feature.

Other freely accessible academic search engines include CiteSeerX. The open access getCITED has largely been replaced by Google Scholar and its website ceased to function in mid-2014. Given the growth and capability of Google Scholar, anyone with access to a computer and moderately fast internet connection can tailor their own OAS. Nevertheless, if anyone has access to a scientific citation indexing service, and would like to continue the OAS service for our members, the WDA Board of Trustees would be very happy to hear from you. If you are interested and willing please contact the WDA Secretary Jessica Ware [wda.secretary@gmail.com].

# Odontological Abstract Service

**published by the INTERNATIONAL DRAPOLOGY FOCUS (IDF) in cooperation with the WORLDWIDE DRAPOLOGY ASSOCIATION (WIDA)**

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**1997**

**14278.** Hietala A. (1997). Role Little Grindling Trees and Planes des Burgundians. Belgische Forschung der Naturhistorisch-Botanical Garden of Ghent University. Reel List of Insected Odontophora of the Federal State Belgium (Austria) is presented at page 118 Address: unknown

**14280.** May, M.L. (1997). The status of some species of Eclogina Odontology - Conspicuousness. Ent. news, 108(2) 77-81. [I have investigated the identity and generic placement of five little known species of congeneric damselfly adults assigned to Eclogina. Of these, E. cammerensis is shown not to belong to Eclogina but probably to be an aberrant Euphydryx. E. huxleyi, currently known as a subspecies of E. huxleyi, appears to be well-differentiated from the latter as it is from E. vandermast, so I consider E. huxleyi to be a full species. Examination of the type of E. vandermast demonstrated it to be identical with Argynis (now Cecron) sandwicensis. E. pseudocalliphora has been recorded as a synonym of E. elegans in recent catalogs, probably owing to misinterpretation of Emerson's (1941) comparison of three distinct species. Finally, I have apparently identified with the earlier described E. nesi; also discuss the possible relevance of these taxa to E. cyathigerum and E. borealis.] (Author)

**2000**

**14281.** Esaki, S. (2000). Two records of Epiplebiae species new in Nagano Prefecture. Tomo 42-42. (In Japanese, with English title and abstract.) Japan. 01-7-19999. Mitsuo (Esaki), 34-45 Yamamoto, Matsumoto (Japan) Address: Esaki, 34-45 Yamamoto, Matsumoto, Nagano 390-0077. E-mail: Esaki3445@yahoo.co.jp

**14282.** Esaki, S. (2000). A hybrid male supposed between Sympterygia v. eremicus and S. tsuchida matsumotoi. Tomo 42-35. (In Japanese, with English title and abstract.) Zohyoko (Esaki) Address: Esaki, 34-45 Yamamoto, Matsumoto 390-0077. Japan. E-mail: Esaki3445@yahoo.co.jp

**14283.** Fukuhara, N. (2000). Successive invasion and extinction of Odontoptera species in the island of Yakushima, Shimane City, Tanaka Prefecture (Oki Island). Tomo 42-37. (In Japanese, with English summary.) Other than Odontoptera species, Polysphincta melanodonta, Aspidoplectra aspidaria and Sympterygia speciosa were newly invaded to the island from the mainland land Kinki-Kansai, Shimane City, Tanaka Prefecture, Central Honshu, Japan. A total of 41 sympatric species belonging to 16 families have been recorded from the last time (1988). Aras nigropunctata nigropunctata and Epiplebia melanogris were recorded from the land for the first time. (Author) Address: Fukuhara, N., National Institute of Advanced Industrial Science and Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8565 Japan. E-mail: yv-fukuhara@aist.go.jp

**14284.** Fukuhara, N.; Arai, Y. (2000). Records of interspecific hybrid between Sympterygia kuroha and S. v. eremicus. Tomo 42-37. (In Japanese, with English summary.) [Two males (IX-XII-1998, v. X-1998) of the supposed hybrid between Sympterygia kuroha and Sympterygia eremicus were captured from the island of Yakushima, Shimane City, Tanaka Prefecture, Japan. One was female, the other was male.] (Author) Address: Fukuhara, N., Shimane University, Matsuyama Campus, 2-1-1, Bunkyo, Matsuyama 750-8582, Japan.

**14285.** Matsuda, I. (2000). Aras guttata collected again in Sakai City, Osaka Prefecture, in 1995. Tomo 42-72. (In Japanese, with English summary.) [The mature male of Aras guttata were captured by "Tombo-kuri" (catching dragonflies by net) and small ones of Odonatoptera kuchi Park in Sakai City, Osaka Prefecture on July 11, August 7, 8,13 and September 18, 1995. It is very interesting that the migrating specimens were caught both in winter and just after hibernation had begun. (Author) Address: Matsuda, I., 658-0197, # 1-7 Chuo-Hashiwa Minatomirai 1-chrome, Japan.

**14286.** Matsuki, K.; Saito, Y. (2000). Description of the larva of Mease meense (No. 1816; Calopterygidae) from Lake Biwa. Tomo 42-37. (In Japanese, with English summary.) [The ultimate larval stage of Mease meense was

### Next issue of AGRION

For the next issue of *AGRION*, to be published at the beginning of January 2017, please send your contributions to Keith Wilson [kdpwilson@gmail.com] or Graham Reels [gtreels@gmail.com]. All articles, information and news items related to dragonflies or of interest to WDA members are most welcome and will be considered for publication. Please send all text and figure captions in a Word file by email, preferably, or on a disk by post. Please do not include artwork with the text but provide a separate file or files in soft copy form, ideally in a compressed format (e.g. 'jpeg' or 'gif'), or as files on disk if sent by post.

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

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### Members' update

#### Change of address

Colin Adams, 55 Grafton Street, Preston, Lancashire, PR1 8JH, UK. [colinpauladams@gmail.com].

Robert Ketelaar, Ecoloog, Rhienderinklaan 25, 7231 DB Warnsveld, The Netherlands. [robert.ketelaar@vlinderstichting.nl].



## International Congress of Odonatology 2017, Clare College, Cambridge, UK

### Preliminary announcement

**Richard Rowe [richard.rowe.dragonflies@gmail.com]  
International Congress Coordinator**



The International Congress of Odonatology 2017 (ICO2017) will be held in the Gillespie Centre at Clare College Cambridge from 16 to 20 July 2017. Registration will be on Saturday 15 July.

#### *Explanation*

ICO2017 was scheduled for Annaba, Algeria. It became clear that in the current political climate it will not be possible to hold a well-attended ICO2017 there. This is largely a matter of perception as there is no objective evidence that Algeria is anything but a safe destination. However, as we have experienced at previous Congresses, perception is everything, and a good Congress needs the more peripheral attendees for success. Plan B has involved shifting the meeting to Cambridge UK.

#### *Scientific programme*

Boudjéma Samraoui remains in charge of the scientific programme. Three special sessions are being organised, associated with the Cambridge location: 'Dragonfly vision', 'Dragonfly flight', celebrating the contributions of Charlie Ellington and 'Ten years since Philip', looking at advances in fields Philip Corbet contributed to.

#### *Registration*

Registration will open on 1 January 2017. Ordinary registration will close 31 March 2017.

#### *Paper proposals (with abstracts)*

Submission by 31 March 2017.

#### *Poster proposals (with abstracts)*

Submission by 31 March 2017. There is limited space for posters.

#### *Costings*

All costings are in GBR pounds. We anticipate ordinary registration will be about \$US500. This will include morning and afternoon tea and lunch provided in College on session days, and the mid-congress tour. The Congress dinner will be held in the evening of the 20<sup>th</sup> in Caius College Hall (Philip Corbet's old college). The cost will be about \$US80.

#### *Accommodation*

A limited amount of accommodation is available in Clare College. We are seeking additional sources of accommodation.

#### *Accompanying persons*

An accompanying persons programme will be arranged, at least on an informal basis. There are lots of things to do in and about Cambridge.

#### *Invited*

As always the ICO2017 is open to all odonatologists, affiliated or unaffiliated. Letters of invitation will be issued as requested (from those seeking institutional support/leave etc., etc.). An email address link will be on the website shortly. Please make any special points to be covered in the letter clear in your request.

The Congress website is at [<http://www.ico2017.org>] and information will be posted as it becomes available.

The congress logo is a stylised *Anax imperator* male to represent Philip Corbet's pioneering work on seasonal regulation in this species. Philip's Ph.D research was carried out in the Zoology Department of Cambridge University under the supervision of Vincent Wigglesworth, the renowned insect physiologist. Philip was his only ever ecology student.



## First Natura 2000 sites for *Coenagrion ornatum* and *Cordulegaster heros* in the Mediterranean biogeographical region to be proposed in Bosnia and Herzegovina

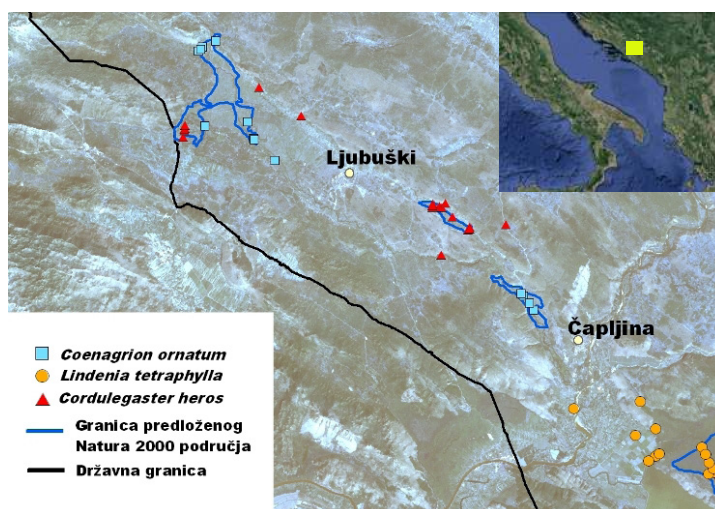
Dejan Kulijer [dejan.kulijer@gmail.com]

From 2013 to 2015 the Society for Biological Research and Protection of Nature - BIO.LOG conducted dragonfly surveys in the Neretva River catchment, an important biodiversity area of the Mediterranean hotspot in Bosnia and Herzegovina. The Neretva River represents the largest and the most significant river draining into the north-east Adriatic. With its large tributaries, Trebižat and Trebišnjica, the Hutovo blato wetland represents a unique ecological system in this part of Europe that encompasses some of the most valuable remnants of Mediterranean wetlands on the eastern Adriatic coast, and is one of the few areas of this kind remaining in Europe.

The research focused on three priority key biodiversity areas in the Neretva catchment: the Hutovo blato wetland, the lower part of the Neretva River valley and the Trebižat River. The valley of the Neretva River and Hutovo blato have been known as very important areas for birds for a long time, but the significance of these freshwater habitats for many other species, particularly invertebrates, is poorly recognized and largely unknown.

The survey was conducted as part of the project "Karst freshwater habitats: identification and participatory conservation planning of threatened invertebrate and fish species" that was implemented by the BIO.LOG Society in collaboration with Slovene Odonatological Society (SOD) and funded by Critical Ecosystem Partnership Fund (CEPF). With the final goal to improve the conservation and protection status of species and habitats in key biodiversity areas in the Neretva catchment area, this project aimed to identify the most important freshwater habitats for conservation of threatened dragonfly, mollusc and fish species and to ensure sufficient scientific data for their efficient protection and long-term survival. With our project we intended to collect necessary data and identify key areas for protection of threatened species for which the data are missing.

The project resulted in many new country records of 51 dragonfly species, including three species of European conservation concern: *Coenagrion ornatum*, *Lindenia tetraphylla* and *Cordulegaster heros*. Based on the results, four potential Natura 2000 areas for dragonflies were identified and proposed to be included in



Figures 1-3. (1) Four identified Natura 2000 sites for dragonflies in Bosnia Herzegovina. (2) Field work at Hutovo Blato. (3) Neretva River at Počitelj. Photo credits: D. Kulijer.



the future Natura 2000 network in BiH. Three of these areas that were identified for *Coenagrion ornatum* and *Cordulegaster heros* would represent the first Natura 2000 sites for these species in the Mediterranean biogeographical region in Europe. The proposal and project results were submitted to the relevant nature conservation institutions in the country.

This project was also planned to be the first phase in the process of a long term protection of the most valuable biodiversity areas in the country. One of the important future challenges we were addressing is development of a monitoring program and establishment of a network of researchers in the country and the region to facilitate future surveys and gathering of data on the distribution and habitats

of threatened species. The future activities on dragonflies will be particularly focused on the development and implementation of monitoring of Natura 2000 species at selected locations.

At the moment, projects that help fulfill Natura 2000 criteria are an important issue in the Balkans, along with the threat of hydroelectric development. Even though countries like Bosnia and Herzegovina are years from EU accession, projects aiming at identification of potential areas for the network have already been implemented in several countries. In many countries in the Balkans national protection is weak and sometimes exists only on paper, but Natura 2000 protection is often seen as a more modern and international approach that people seem to respect more. Sometimes it can be better to propose Natura 2000 sites for the protection of some important areas because it can ensure faster designation when the country does become an EU member state.

Unfortunately, the nature conservation institutions in Bosnia and Herzegovina are not ready for this task and lack the capacity and the data. The project of the BIO.LOG Society tried to contribute to this process with the identification of potential Natura 2000 sites for dragonflies in the key biodiversity areas of the Mediterranean in Bosnia and Herzegovina. The project also analyzed the current proposition for N2K species in BiH and showed that current, still unofficial proposition largely failed to identify areas for Natura 2000 dragonfly species in the country. Projects like this can help national institutions in the process of the identification of the Natura 2000 Network in order to fulfill obligations in the accession process.

Further information, project reports and publications can be found at the web site of the project: [www.karsthabitats.ba]. Information on dragonflies of Bosnia and Herzegovina is available at [www.biolog.ba/odonata]. The results of the dragonfly investigation are presented in the PDF publication: "Priority key areas for the protection of biodiversity of the Mediterranean in Bosnia and Herzegovina - The protection of endangered species of dragonflies (Order Odonata)" (in the local language). The results collected in the scope of the Fourth Balkan Odonatological Meeting, that was also supported by the project, were published in IDF report 95.



**Figures 4-5. (4) Kravice waterfall at Trebižat River. (5) Hutovo blato wetland. Photo credits: D. Kulijer.**



## The birth of Odonatours and the astonishing inaugural tour to Madagascar in January 2016

Phil Benstead [phil@odonatours.com]  
Odonatours [http://www.odonatours.com/]

My first experiences as an embryonic naturalist revolved around a dip-net and a microscope. As a 9-year-old I was fascinated by the life aquatic and would happily draw ostracods and *Daphnia* for hours in my notebooks, identifying many of them with the aid of the simple reference books available to me. The gift of my first pair of binoculars, though, saw me going down a path familiar (no doubt) to many readers of this article. I became a committed birder and spent the greater part of my young adulthood joyfully chasing birds around the globe. Exposure to the rich species diversity of the tropics however ensured that my interest in aquatic fauna and especially Odonata was slowly rekindled. The problem way back then though was how to identify the stuff you found!

It is hard nowadays to remember life before the internet but its advent suddenly created an online world where communities of naturalists could come together, and the identification of previously difficult groups of organisms, like tropical dragonflies, suddenly became possible through shared effort and collaboration. Likewise digital cameras and modern binoculars suddenly put the world of invertebrates into close focus. Against this backdrop of technological progress, I found myself working as a freelance naturalist, leading general natural history tours. Inevitably birding often took second place on such tours and I found myself returning to many of the haunts of my youth, but now with a mandate to look at other taxa; taxa ignored or simply unnoticed during previous bird-oriented visits. Now I could search out dragonflies and with the help of the internet and communication with benevolent experts have a chance of putting names to things. My interest in Odonata grew and so did my list!

The advent of dragonfly tourism was inevitable but is still very much in its infancy, pioneered by the likes of Dave Smallshire (UK) and Dennis Paulson (USA). Both are authors of acclaimed Odonata field guides for their respective regions. It was a meeting with Dave at the UK BirdFair that set the wheels in motion for an incredible collaborative tour of Peninsula Malaysia in 2013 together with a group of ten of his 'regulars'. Our two-week tour, along with one of Malaysia's finest field naturalists (Dennis Yong), took in the wild, ancient rainforest of Taman Negara, the genteel but well-forested hill station of Fraser's Hill and the mangroves and coastline around Kuala Selangor. A fairly typical nature-oriented itinerary therefore but for dragonflies we also had to factor in a day in some peatswamp forest, an important habitat for a specialised and very desirable suite of species.

How did we do? Well in many ways it exceeded our expectations; of the c. 250 species of Odonata currently recorded for Peninsula Malaysia we managed to see and photograph around 120! Added to this we saw a wealth of other wildlife, enjoying the mammals and birds especially, and when we could summon up the energy many of us went for night-walks after dinner in search of amphibians and other fauna.

This very positive experience in Malaysia encouraged the creation of Odonatours – a travel company dedicated to the pursuit of dragonflies and



**Figure 1. Group photo - the full cast including staff and supernumeraries (notably Njaka Ravelomanana and Alain Gauthier). Photo credit: Pam Taylor.**



damselflies. The inaugural tour was planned - a trip to Madagascar with the celebrated odonatologist KD Dijkstra. Madagascar is a country whose odonate fauna has been little studied since the 1950s and KD and I were confident that our two-week tour would net us some surprises. The eventual results though exceeded our wildest dreams.

Day 1 saw us shambling from our hotel rooms for an early flight from the capital 'Tana' south-west to Toliara. Here we had an early lunch and then began driving back north-east towards Isalo NP. En route we passed the splendid Zombitse NP – to be the subject of a day later on in the tour. We made an inspired roadside stop at a bridge during a break in the low cloud. Examination of the permanent stream from the bridge produced our first odos; common libellulids (*Trithemis kirbyi* and the endemic *T. selika*). Walking down to the streamside KD got to work searching the marginal vegetation and we found our first *Pseudagrions* (three species: the splendid chrome yellow-marked *punctum*, the red-faced *malgassicum* and the only stunning blue *seyrigi* of the trip). We also had great views of *Zygonyx lachesis* (including an ovipositing female), and our first *Anax tumorifera* and *Palpopleura vestita*.

An enjoyable introduction to the odonate fauna of Madagascar but the best was yet to come as we trooped back to the bus, when KD tentatively identified a female *Crocothemis striata*. A species only known from the type locality at Isalo and from just male specimens when it was described in 1981! Unrecorded and unphotographed in the wild since, we were overjoyed. Having got us onto the female KD moved a short distance and found a stunning male. Fairytale stuff. Rich plush 'Rhodothemis' red with black pterostigmas and legs – a very striking beast and a great start to the tour.

Day 2 saw us investigating the beautiful Namaza valley in Isalo NP. This is a fantastic spot for wildlife and one of the highlights of the tour without a doubt. To get to the stream we followed a trail along the valley side, picking up small skimmer (*Orthetrum abbotti*), *Orthetrum azureum*, our first giant *Thermothemis*, and track-side rock scarlets (*Crocothemis divisa*). At the picnic area we finally gained access to the stream and set to work working out field characters for the two rather similar endemic *Trithemis* species that were common here (*persephone* and *selika*). Examination of males in the hand eventually led to a working set of field characters by the end of the day.

We worked hard here checking the stream for *Pseudagrions* and having a nice encounter with an obliging *Zygonyx elizabethae*, before moving upstream to look for *Nesolestes* species and gomphids. In this we were successful enjoying the first of many *Calophlebia karschi* and finally getting to grips with the common *Nesolestes* here. Climbing higher



Figures 2-4. (2) Day 1 produced the first surprise of the tour when we rediscovered the poorly-known *Crocothemis striata* – unrecorded since it was described in 1981. (3) The existence of an undescribed pintail on Madagascar had been known for some time. KD and his Malagasy colleagues described it this year in honour of Sir David Attenborough on his 90th birthday – *Acisoma attenboroughi*. (4) *Ceriagrion nigrolineatum* was one of a number of species found for the first time at the marsh above Vohiparara (Ranomafana NP).

we found our first *Malgassophlebia*, and finally found some gomphids with *Paragomphus fritillarius* being the better of the two species encountered (we also saw *madegassus*). Exhausted we staggered back to the picnic area for lunch with the lemurs, getting visitations from ring-tailed lemur, a single Verreaux's sifaka and some red-fronted brown lemurs.

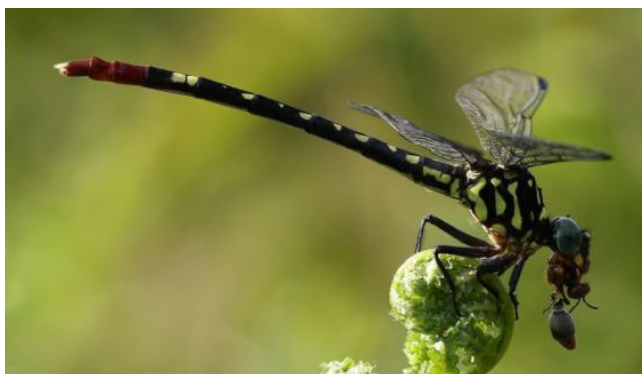
Walking the short distance back to the bus produced another gomphid – a female *Onychogomphus aequistylus*. Driving on we searched out Isalo Ranch. Part of the team had been staying here prior to our arrival and reported that in the afternoon the trees around the compound were festooned with exciting species riding out the heat of the day. Sure enough we quickly started finding some great species hanging in the trees around the car park. This was very enjoyable stuff with plenty of low *Phyllomacromia bifasciata* being an obvious target. The *Nesocordulia malgassica* here were fantastic and we all caught up with stationary *Hemicordulia* too. Sometimes we found these three species perched up within feet of each other! Superb. Also in the garden our first *Rhyothemis semihyalina*, *Urothemis assignata* and an endemic lynx-spider (*Peucetia madagascariensis*).

Our last stop of the day was a quick look at a marsh that looked very good and did indeed produce a few new species for the trip, including *Diplacodes lefebvreii*, the soon-to-be-described *Acisoma* and *Ceriagrion glabrum*.

Day 3 saw half of us searching optimistically for *Viridithemis* and other wildlife at Zombitse. KD and the rest of the team worked the hotel grounds. Whilst the Zombitse team got stuck into some birds and mammals on a guided walk, Phil hoofed around some outlying wetlands hoping for *Viridithemis*. This failed ultimately but netted the only *Lestes simulator* of the tour, and our only *Orthetrum lemur* were seen by a few of us in the dry roadside ditches here later.

Meanwhile the hotel team enjoyed an interesting day interrupted at midday by a heavy rain shower. A morning look for odonates after breakfast at the lake produced both *Tramea* species, *Trithemis hecate*, *Orthetrum trinacria* and a fine black emperor (*Anax tristis*). The swampy forest stream back in the hotel grounds produced furbelly (*Archaeophlebia martini*), a stunning little libellulid. After the rainstorm went through some of the team found themselves at a nice marshy open part of the stream finding our first wisps (*Agriocnemis exilis* and *A. gratiosa*) and a lovely little endemic libellulid, *Diplacodes exilis*.

A travel day took us to Ranomafana NP and the next day many opted to go on a lemur hike, bagging 2-5 species of lemur depending on fitness-levels. A smaller team went for a reconnoitre up around Vohiparara. Around the village we looked at the margins of fallow and active rice paddies and dug out our first *Proplatynemis sanguinipes* and *Pseudagrion dispar*. Walking the nearby trail to a marshy area was productive. Wading about in the marsh started to



Figures 5-8. (5) Truly a privilege to spend time in the field with KD, we all enjoyed his total enthusiasm and commitment to the job in hand. (6) The dainty *Ischnura filosa*, a Malagasy endemic – another feature of the marsh above Vohiparara (Ranomafana NP). (7) Our first *Isomma* was this fantastic snacking female *I. elouardi*. (8) The endemic *Pseudagrion alcicorne* was frequently encountered along rivers in both Andasibe and Mantadia at the end of the tour.



produce dividends when we connected with an interesting little libellulid that turned out to be a new species for science. It got away before we could catch it for a better look though...With time ticking ever onwards we headed back to the bus and our rendezvous with the lemur team.

The lemur team had had a great morning by all accounts. Those that peeled off halfway did sterling work finding a lovely little shaded rocky stream stuffed with great odonates. This small stream produced a lovely wine-dark *Tatocnemis*, a small lime-green *Pseudagrion (approximata)* and a new *Neodythemis (arnoulti)* and was visited by the entire team after lunch.

Day 6 saw us under a blue sky and back at Vohiparara. Birds and mammals featured heavily during the morning in the cloud-forest. We took lunch at the trail-head and afterwards checked out the marsh and river nearby which produced our first looks at *Lestes silvaticus*. Moving uphill we checked out the river for gomphids unsuccessfully and then enjoyed a wander around some likely-looking fish ponds. Here we found *Ischnura senegalensis*, *Africallagma rubristigma* and *Agriocnemis exilis*.

With rain still not falling we had time to check a pond much lower down and just below our hotel. We headed there straight away and were pleased to find that *Rhyothemis cognata* was common at the site. Also here were more *Diplacodes exilis* and a stunning encounter with our first *Isomma* (a female *elouardi*). Back at the hotel we found our first *Phaon* (the endemic *rasoherinae*), which was waiting for us on the steps in the garden and which posed nicely for a series of photographs.

Day 7 saw the weather still holding fair (three days with sun at Ranomafana – an incredible result). Some of the team headed back up to the marsh to look for the new libellulid species. The remainder elected to stay on the road and look for birds and dragonflies along the river. As usual odonates were hard to find in the marsh but after an hour of wading about we started to produce some new species. First up was a local concentration of the endemic *Ischnura filosa*. Then KD finally located the new libellulid, perhaps a *Diplacodes*, and we all waded over for a view. Nearby we found a small gathering of perhaps 4-5 *Ceriagrion nigrolineatum* – a stunning electric green coenagrionid.

Before lunch we all walked along the road. At the first stop by the impressive cascade we got great looks at a patrolling *Zygonyx viridescens* (bagging the first photos of this poorly-known species). Walking further we were surprised by the lack of odonates on the wet rock faces and roadside runnels we encountered, habitats that would doubtless have been utilised in more stable tropical ecosystems.

We took lunch at the park restaurant again and then headed down into forest at the Talakately bridge. Here the *Onychogomphus* perched for photographs and were briefly joined by an *Isomma*. Walking in to the forest we checked out a delightful forest stream finding another *Tatocnemis* species and more *Nesolestes* before heading on up to the Belle Vue and our dusk appointment with the delightful fanaloka – a nocturnal carnivore.

The next day was a driving day but we got a good stop in at Ankazomivady for more *Ischnura filosa* and



Figures 9-11. (9) One of the commoner forest libellulids throughout was *Neodythemis hildebrandti*. (10) The garden at the Isalo Ranch provided a memorable hour as we hunted out dragonflies hanging about in shade trees during the heat of the day. A number of *Nesocordulia malgassica* were encountered this way. (11) The big *Nesolestes ranavalonae* was one of the many highlights at Mantadia NP.

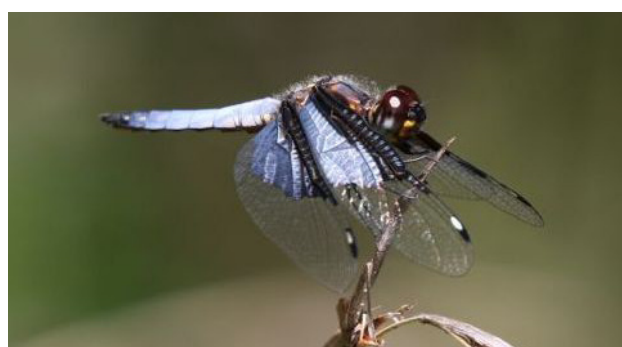
*senegalensis*. The following day another long drive took us past Tana and on to the Perinet area – the last location of the tour.

Day 10 was perhaps the most eagerly anticipated day of the tour and it was a rather cloudy, overcast one! The weather gods had finally turned their backs on us. Would we see odonates? KD was slightly downcast! Would the most promising site of the tour fail to produce? Our first stop along the bumpy track was at a swampy pool set in the forest and there were dragons! Here we saw our first black-splashed elf (*Tetrathemis polleni*) and Hova featherlegs (*Proplatycnemis hova*). *Thermothemis* were commonplace and searching the swampy forest produced the first of many fineliners (*Teinobasis allaudi*). Along the road a few bright *Zygonyx ranavalonae* were obvious and also new for our list.

Taking to the vehicles again and bumping along the track we eventually reached the trail-head for a small forest-edge pond. Here we waded through some common odonate species. The overcast conditions created very oppressive and rather steamy conditions but odonates were flying. We took an early lunch at the bridge and here it became apparent that the lack of sunshine was not seriously affecting invertebrate activity. Our first *Pseudagrion alcicorne* and *Proplatycnemis pseudalatipes* were well received and KD quickly added a fine male *Isomma hieroglyphicum* to the mix with the net.

Lunch done we walked along the loop trail taking in some amazing wetland habitats that slowly gave up an incredible array of species. KD searched high and low picking up our first huge *Nesolestes ranavalonae* in root plate ponds in swampy forest. A shallow seep-stream produced more *Protolestes* (*kerckhoffae*) females and a simply stunning rusty-red and certainly undescribed *Nesocordulia* that was the undoubted odo of the trip for many of us. Another surprise was the violet-blue *Pseudagrion ampolomitae* that we encountered egg-laying underwater and we also found a few *Malgassophlebia mediodentata* along the small sandy streams. Exciting stuff and in the most beautiful habitat you could imagine. Dragging ourselves away we headed for a rocky stream for the last half hour of park opening time... Here we quickly discovered a surprise *Protolestes leonorae* and KD came up trumps with another *Nesocordulia* – this one a stunning green and yellow confection and later identified as *mascarenica*. What a day!

On Day 11 we elected to visit the nearby MMA private reserve, which offered excellent *Gynacantha* habitat along the river. The weather was rather overcast and this too suited *Gynacantha* (a genus conspicuously absent from our trip list to date) but unfortunately no-one had told the *Gynacantha* and we failed to find any! The morning was not without excitement though despite the challenging conditions. A *Lestes* photographed by some here proved to be another new species (to science!) but we only realised after the fact. Could we find it in the park tomorrow? The birders chased ibises madly until they finally connected but it was generally quiet for birds again. KD found us a new *Pseudagrion* (*lucidum*) that



Figures 12-15. (12) This female *Onychogomphus aequistylus* was perched by the trail beside the Namaza at Isalo NP. (13) The tiny *Palpopleura vestita* was a common endemic often encountered on roadsides and in agricultural areas. (14) *Pseudagrion renaudi* is just one of the many reasons to visit the stunning Isalo NP. (15) Our only *Pseudagrion seyrigi* came at a chance roadside stop on the first day.



proved to be present at various points along the large river during the day.

After a restaurant lunch we headed back out. A bird team headed into another private reserve (Mitsinjo) looking for vangas but did better after the guided walk had finished by walking along the road. The odo-team investigated some habitats along the river beside the Vakona Lodge road. Here they searched successfully for a perched *Isomma hieroglyphicum* – bagging a nice male – and had exciting views of two hunting Eleonora’s falcons that appeared to be eating dragonflies...

The last day dawned wet and sadly stayed that way for most of the morning session inside the national park. Odonates in the rain in the forest included great looks at our last *Tatocnemis malgassica*. KD had earmarked two marshes on the way in and we checked them on the way out, at the first we spooked the *Lestes* we were searching for and it quickly disappeared. A shy species! The next marsh came up trumps but again we could only bag a few photographs before the two individuals melted away again. Our fifth and final new species to science bagged on the tour!

That just left lunch, goodbyes and the start of the long journey home during which I for one reflected on a superb trip that had netted over 90 species of odonate, including an incredible potential five species new to science. I am looking forward to the next one already but suspect the inaugural tour may well be the bench-mark for many years to come!

The publicity generated by the tour when we returned home had one final unexpected and exciting outcome. The BBC contacted KD and asked if he would consider naming one of the new species in Madagascar in honour of Sir David Attenborough on his 90<sup>th</sup> birthday. We now have *Acisoma attenboroughi* to add to our trip list! We might have to wait a little longer for the five new species KD found during the tour to be named but it was very exciting to be a part of the process.



**Figure 16. *Phyllomacromia trifasciata* often encountered hooked up in the shade.**

## Mad about Madagascar

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

I have always wanted to go to Madagascar but knew it couldn't be the usual way Netta Smith and I travel by flying to a country, renting a car, and driving around to interesting places to see and photograph nature. So when I was informed of Phil Benstead's new company Odonatours and his first tour to Madagascar, I was hooked. Both the chance to visit the fabled island without worrying about logistics and an emphasis on odonates, which would surely be neglected on a birding tour, sealed the deal. Knowing that Phil was an all-around naturalist (so we were also on a birding tour) and that KD Dijkstra would be the odonate resource person accompanying us made it even sweeter, and when we learned that most of the participants were people we already knew, it got better yet.

Netta and I and Susan Masta and Jay Withgott, long-time friends, traveled to the island a week early, arriving in Antananarivo in the wee hours of the new year 2016. We spent a day at the Au Bois Vert hotel in Tana to acclimate and relieve jet lag, and that was very worthwhile, as the hotel grounds have birds, lizards and butterflies, and there is even a small pond where we saw six species of Odonata. There we found the magnificent *Thermothermis madagascariensis*, the largest libellulid I have ever seen and fortunately common all over the island.

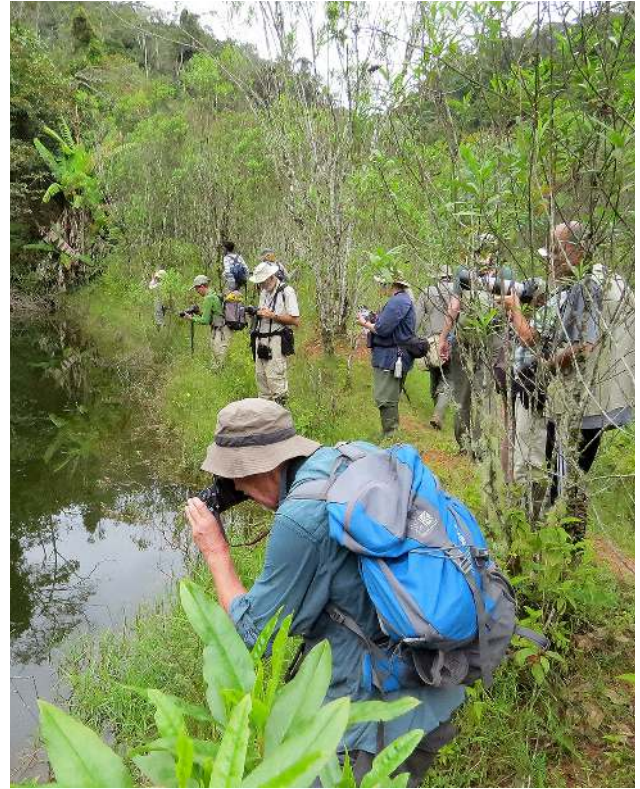
We came early so we could enjoy the southwest, as that area was not to be emphasized in the odonate tour. Callan Cohen, of Birding Africa, arranged this part of our trip. We were so glad we did so, as we got to spend time in drier and more open areas, with much easier birding, as well as time at the seashore. Odonates were not prominent near the coast (we did find *Macrodiplax cora* and *Trithemis annulata*, not seen on the tour), but the landscape and other wildlife made up for it. I highly recommend the Auberge de la Table/Arboretum d'Antsokay near Toliara, Hotel Paradisier at Ifaty, and Hotel Isalo Ranch as places from which southwestern Madagascar natural history can be thoroughly enjoyed. The Hotel Paradisier in particular was one of the best places I have ever been for lizards and snakes, and Reniala Private Reserve is a must if you're a birder. Nocturnal excursions at several places produced almost unbelievably cute mouse lemurs as well as many other critters.

On the 8th we met our fellow travelers at La Relais de la Reine, a beautiful hotel in a spectacular sandstone setting at the gateway to Isalo National Park. The four of us were captivated by the Namaza Trail, along a crystal-clear stream in a wooded canyon, and ended up taking the trail on three days (with the group on the last day). When our attention wasn't taken up by chameleons and butterflies and lemurs (three diurnal species!), we were able to tally quite a large number of odonates, from the common coenagrionid *Azuragrion kauderni* to the big and showy *Anax tumorifer*. We got our first taste of Malagasy endemic damselfly genera with *Proplatycnemis malgassica* and *Nesolestes* cf. *robustus*. The latter was just the first of several species we encountered that were apparently undescribed. *Calophlebia karschi*, a libellulid with narrow velvet-black wings, was common and a favorite among all, as was *Palpopleura vestita*, with its silvery-blue wing markings and habit of perching on



Figures 1-4. (1-2) *Thermothermis madagascariensis*. (3) *Anax tumorifer*. (4) *Nesolestes* cf. *robustus*. Photo credits: Dennis Paulson and Netta Smith.





Figures 5-11. (5) Ranomafana. (6) Mantadia National Park. (7) *Calophlebia karschi*. (8) *Palpopleura vestita*. (9) *Phyllomacromia trifasciata*. (10) *Nesocordulia malgassica*. Photo credits: Dennis Paulson and Netta Smith.





Figures 11-16. (11) *Trithemis selika*. (12) *Archaeophlebia martini*. (13) *Orthetrum trinacria*. (14) *Prolestes kerckhoffae*. (15) *Tatocnemis malgassica*. (16) O'Shaughnessy's chameleon (*Calumna oshaughnessyi*). Photo credits: Dennis Paulson and Netta Smith.



the tips of vertical twigs.

The grounds of the Hotel Isalo Ranch turned out to be magnetic to dragonflies, as there were both lotic and lentic wetlands nearby, and the wooded hotel grounds furnished shelter from the hot midday sun and breezes. It seemed as if every tree had something of interest hanging in the shade from lower branches, including *Phyllomacromia trifasciata* (downright common!), *Nesocordulia malgassica* and *Hemicordulia similis*. *Paragomphus madegassus*, *Trithemis selika*, *Urothemis assignata* and other dragons perched up on the higher branches in the sun.

Le Relais de la Reine wasn't quite as buzzing with odonates, but the group found some good ones there, including our first of the endemic libellulid *Archaeophlebia martini*, with hairs along the underside of the abdomen earning it the name "furbelly." A small marsh was host to our smallest odonates, two species of *Agriocnemis*. Some of us visited a big pond on the property and saw the huge *Anax tristis*, sadly no photos or captures. I was especially tickled to photograph a male *Orthetrum trinacria* perched just under an exuvia of the same species. The rugged landscape and luxurious hotel made this venue more than worthwhile. Birds and lizards were everywhere.

After another day at Le Relais we set out for the eastern side of the island, a long day's scenic drive that took us to Ranomafana National Park, well above sea level and over 400 square kilometers in area. This was our first rainforest area, and just after dark our bus was greeted there by a flamboyant O'Shaughnessy's Chameleon crossing the road. We spent three days around Ranomafana and soaked up the forest, the odonates, and the other wildlife. We found species of the endemic damselfly genera (and families?) *Protolestes* (we surely overused the word 'spectacular') and *Tatocnemis* (oddly perching with wings closed or open), as well as great gomphids in the genera *Isonoma* and *Onychogomphus*. One of the more interesting things to me was the similarity (convergence?) of *Phyllomacromia trifasciata*, *Nesocordulia malgassica*, and some of the gomphids with yellow-striped black thorax and yellow-patterned black abdomen with a prominent yellow spot just before the bright rufous tip. Is there something adaptive about this color pattern?

A personal thrill at Ranomafana was the finding of a comet moth, *Argema mittrei*, at the park headquarters. It was resting on a fence early one morning, and I couldn't think of a better way to start the day—especially after having had a good breakfast and my first cup of coffee. It was funny that this and another moth were actually the two animals I wanted to see most in Madagascar.

At a marsh at Vohiparara, near Ranomafana, Netta and I saw our first *Acisoma* of the trip, the little libellulid with a unique shape that has gained it the name "pintail." While on the tour we were informed by KD that he wanted to find an undescribed dragonfly that he could name after David Attenborough, to be presented to him on his 90th birthday. We found five or six such animals, and because KD and co-authors Lotte Mens, Kai Schütte, and Frank Stokvis were working on a revision of *Acisoma*, he chose this species, which had long been considered the widespread *A. panorpoides*. The revision, recently published in *Zootaxa* (4109[2]), includes the Malagasy one



**Figures 17-19. (17) *Onychogomphus aequistylus*. (18) *Acisoma attenboroughi* (see also page 67). (19) Namaza. Photo credits: Dennis Paulson and Netta Smith.**

now bearing the name *Acisoma attenboroughi* to honor this most famous of all naturalists. You can watch the presentation on the BBC! (See page 67).

From Ranomafana we traveled another day through the outskirts of Antananarivo to end up at Andasibe-Mantadia, another extensively protected rainforest at mid elevation. We spent three days there as well and visited numerous streams in the forest. This area didn't seem as rich in odonates as some others, and in fact I felt that dragonflies in general were less diverse and less abundant in Madagascar than any other tropical region I have visited, and that includes many. Nevertheless, the ones we did find were very welcome and photogenic. We found three species of *Zygonyx*, all Malagasy endemics, and they were a delight to watch, coursing over streams and feeding over clearings. Those of us who love to photograph animals in flight had a lot of fun with these swift fliers!

Two species of damselflies especially impressed me here, the very slender *Teinobasis alluaudi* of the swamps and the featherleg *Proplatycnemis pseudalatipes*, just as neat as its name is long. The most impressive vertebrate was the Indri, the largest living lemur and quite an auditory treat for us every day as we stayed at the Feon'ny Ala hotel next to the forest. But my biggest thrill on our last day at the hotel was finding my second wanted moth, a sunset moth *Chrysiridia rhipheus* along the road; I had just about given up hope of seeing this spectacular insect (oops, I used that word again). On the down side, I thought that birding was quite poor in the rainforest areas; birds were hard to find and hard to see when we did find them. The most notable were a pair of Madagascar Crested Ibises feeding along a forest trail. But we were there in insect and herp season, not birdsong season.

The only other disappointment was not being able to collect dragonfly specimens, something that still seems important to me for anyone surveying tropical wetlands. I'm a firm believer that all ecotourists should be allowed to collect insect specimens with the proviso that they identify them, write a paper about them, and then deposit them in a permanent collection, thus adding sorely needed biodiversity knowledge. I'll admit that I love photography enough that our collection of photos goes a long way toward eliminating the pain. We took about 16,000 photos, after a lot of deletion down to just over 6,000.

The trip for the most part exceeded our expectations. It was wonderful in so many ways every day. For me, the herps probably stole the show--60 species encountered and photographed, compared with only 103 species of birds (others saw more birds)! But the odonates were great as well, and the group found over 90 species with all of our diligent searching. You can learn their common names and see what they look like when KD and associates publish their book on Mad dragonflies!



Figures 20-21. (20) Madagascan sunset moth (*Chrysiridia rhipheus*). (21) Grey-brown mouse lemur (*Microcebus griseorufus*). Photo credits: Dennis Paulson and Netta Smith.



## Klauss-Douwe B. Dijkstra honours Sir David Attenborough on his 90<sup>th</sup> birthday

Keith DP Wilson [kdpwilson@gmail.com]

May 8<sup>th</sup>, 2016 was Sir David Attenborough's 90<sup>th</sup> birthday. The Madagascan dragonfly *Acisoma attenboroughi* was named by Klaas-Douwe Dijkstra (KD) and his colleagues in honour of David Attenborough (Mens et al., 2016). KD was also honoured, in his own words: "to (dragon-) fly the flag for taxonomy during the birthday celebrations" and spoke for natural history in an associated article in the scientific journal *Nature* titled: 'Restore our sense of species' (Dijkstra, 2016).

On May 8<sup>th</sup>, 2016 KD presented Sir David with his eponymous dragonfly species, in the form of a photograph (see Figure 1), in a BBC One televised interview: 'Attenborough at 90' [<http://www.bbc.co.uk/programmes/p03qxjzj>].

In the *Nature* 'Comment' article KD mentions the 60 new odonate species he described from Africa last year, together with Jens Kipping and Nicolas Mézière, in a single volume

of the December 2015 issue of *Odonatologica* (Dijkstra et al., 2015), which adds one new species to every 12 previously known from Africa, and KD points out that: "most of what is unknown, however conspicuous, is simply not looked for. The field is empty while the labs are full."

KD also argues that natural history and taxonomy, which he suggests to unite under a single name, 'bionomy', are critical to provide a moral counterweight to Earth's runaway exploitation and emphasizes that intact biodiversity is the embodiment of sustainability. KD adds that expanding and sharing our consciousness of other species, which can be said to be medieval now, is one of the greatest challenges of our time.

The *Nature* paper is open access [<http://www.nature.com/news/natural-history-restore-our-sense-of-species-1.19870>]; the revision of *Acisoma* dragonflies with the description of *A. attenboroughi* sp. nov. is in *Zootaxa* [<http://biotaxa.org/Zootaxa/article/view/zootaxa.4109.2.3>].

Klaas-Douwe B. Dijkstra is active on African.Dragonflies Facebook [<https://www.facebook.com/african.dragonflies/>] and Bionomer on Twitter [KD Dijkstra (@bionomer)]. He is associated with Stellenbosch University in South Africa and Naturalis Biodiversity Center in The Netherlands.



**Figure 1. Attenborough's pintail (*Acisoma attenboroughi*), Madagascar. Photo credit: Erland Nielsen. The dragonfly had been confused with its African and Asian counterparts for 174 years but DNA studies in the molecular labs at the Leiden Museum in the Netherlands and Hamburg Museum in Germany confirmed its unique species status.**

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**Wilhelm Stüber (1877-1942) collector extraordinaire  
of New Guinean dragonflies, discoverer of the fabulous  
Sepik blue orchid, tragic victim of war**

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**Introduction**

New Guinea is home to one of the richest odonate faunas on earth. At present nearly 500 species are known and new species are regularly being discovered and described. Since 2010, 63 new species from New Guinea and its satellite islands have been named. In addition three books have appeared on the subject where previously there was none: an identification manual by John Michalski (Michalski 2012), a bilingual (English and Bahasa Indonesia) illustrated field guide to New Guinean damselflies (Zygoptera) by Vincent Kalkman and Albert Orr (Kalkman & Orr 2013) and a similar companion guide to New Guinean dragonflies (Anisoptera) by Albert Orr and Vincent Kalkman (Orr & Kalkman 2015). These books provide accessible references and the means to identify New Guinean odonate species and have greatly increased interest in the region's fauna.

With New Guinea Odonata in the spotlight, it is time to pause and consider the life of one man, Wilhelm Stüber, who together with M.A. Lieftinck, did more to establish the foundation of our present knowledge than any other person. Although a commercial collector rather than a scientist, Stüber's efforts were such that the Odonata of northern New Guinea are still the best known in the region (Kalkman & Orr 2013, Orr & Kalkman 2015). In the past particularly, the essential role of the collector as a supplier of raw material for research was often taken for granted. Collectors seldom received the credit they deserved, whereas the taxonomists who processed their material were often lionised, if only within their own small scientific community. We hope to redress this imbalance a little here by documenting some highlights in the life of this most remarkable man.

*Summary of Odonata studies in New Guinea from 1828 to 1929*

However before considering Stüber's contribution, we should begin with a brief historical account of studies of New Guinean Odonata up to the end of the 1920s, in order to appreciate the state of knowledge at the time when M.A. Lieftinck first arrived in Buitenzorg (Bogor), Java to begin his life's work on the Odonata of the region, a good deal of it in collaboration with Stüber.

The first scientifically collected dragonfly specimens in New Guinea may have been a female specimen of *Agrion australis* Guérin, 1832 [presently known as *Argiolestes australis* (Guérin, 1832)] and a male specimen of *Rhincocypha tinca* Rambur, 1842, which were collected in early 1828 by the zoologists of the L'Astrolabe expedition, led by Jules Dumont d'Urville, when the party visited Waigeo Island (Offak) off the northwestern coast of New Guinea. Other dragonfly specimens collected before the 1890s also exclusively originated from the western part of New Guinea, including the Vogelkop and adjacent small islands, then part of the Dutch East Indies. Among these were specimens collected by Hermann von Rosenberg in 1858 or 1861, from which Friedrich Brauer (1867) described four new Anisopteran species (presently known as): *Gynacantha rosenbergi*, *Brachydiplax denticauda*, *Brachydiplax duivenbodei* and *Rhyothemis pygmaea*; in the case of the last species, however, the given locality, 'Neuguinea', may be wrong. The first published regional synopsis, *Odonates de la région de la Nouvelle Guinée* by Edmond de Selys Longchamps (1878) included only material collected from the Vogelkop and adjacent small islands. This paper, which also dealt with the Celebes and the Moluccas, listed 33 species from New Guinea and Yapen, Biak and Numfor islands, over half of which were described as new. In another paper, Selys Longchamps (1879) dealt largely with the same material but provided more detailed species descriptions. The material discussed in these Selysian papers was collected by Adolf Bernhard Meyer in 1872 and Léon François Laglaize in 1876–1878.

The first Odonata collections from the eastern part of the island, mainly from Kaiser-Wilhelmsland (also known as German New Guinea) in north-eastern New Guinea, were studied and reported on by Friedrich Förster (1898, 1900, 1903). Specimens of 45 species had been collected by Carl Wahnes, Samuel Fenichel and Lajos Biro in the 1890s and early 1900s. Friedrich Ris (1898, 1900) examined and recorded the 27 species collected in New Britain by Friedrich Dahl in 1896–1897. René Martin (1909) listed ca 44 species, collected by Lamberto Loria in the British Protectorate of Papua in the south-eastern part of New Guinea in 1889–1891; earlier, the same author (Martin 1902) had named one new species from northwestern New Guinea. Herman Willem van der Weele (1909a, 1909b) listed 42 identified species from Netherlands New Guinea, collected by the Dutch New Guinea Expeditions in 1903 and 1907. Other important contributions to our knowledge of the Odonata of Netherlands New Guinea were those of Ris (1913a, 1913b, 1915), who treated a total of 67 species collected by Hendrikus Albertus Lorentz and Gerard Martinus Versteeg in separate expeditions and Herbert Campion (1915) who reported on collections from Netherlands New Guinea collected by the British Ornithologists Union Expedition and the Wollaston Expedition. Lastly, Robin Tillyard (1926) recorded 23 species from the Territory of



Papua collected by Allan R. McCulloch in 1922–1923.

According to our calculations by the end of 1929 a total of 139 presently recognised odonate species had been recorded from New Guinea and its adjacent satellite islands, such as Waigeo, Misool, Biak and Japen, as well as New Britain and New Ireland. Of these, 87 species were originally described from specimens collected in the region. In addition 21 taxa now considered synonyms or subspecies had been named. The figure of 139 species corresponds to 28 % of the 491 species presently known from New Guinea and its satellites.

### Collaboration of M.A. Lief tinck and Wilhelm Stüber on the study of New Guinea Odonata

On 16 September 1929, Maurits Anne Lief tinck (Fig. 1), a 25-year-old biology graduate from the University of Amsterdam, assumed the post of Zoologist at the Zoological Museum and Laboratory of the Botanical Gardens in Buitenzorg, Java, the Dutch East Indies. This event he was to call his 'glorious occasion', by which he meant 'glorious opportunity'. Shortly after, in January 1930, Wilhelm Stüber (no photo available), a 52-year-old German colonist living in New Guinea visited the museum and expressed an interest in collecting insects and other animals for the museum commercially. He offered material from the surroundings of his plantation near Hollandia, on the northern coast of the island and further afield. Lief tinck especially desired specimens of Odonata, a group in which he had already established himself as a significant researcher. The deputy director of the museum, Karel Willem Dammerman and Wilhelm Stüber entered into a financial agreement. This agreement meant a new era in the research of New Guinean Odonata. On his return to Hollandia, Stüber threw himself into this new project with great gusto.

Lief tinck kept detailed records of the species and specimens Stüber sent. In the archives of Naturalis Biodiversity Center in Leiden are documents listing each of the 28 consignments of Odonata specimens received. There are also 45 letters from Stüber to Lief tinck (1930–1939) and copies of 32 letters from Lief tinck to Stüber (1930–1937). During the first two years Lief tinck wrote in Dutch, but after 1932 he began writing in German. Stüber also occasionally wrote in Dutch and some letters include a few sentences in English. (In the present article the quotations taken from these letters are translated into English by us; in some cases the original German text is also given). Lief tinck's letters were typed, but with one exception Stüber's letters were handwritten until November 1936, when he acquired a typewriter. Many of his letters, especially those in 1932–1933 were very long, two of them 28–29 pages. Given his barely legible handwriting (Figs. 2 and 7) it may have been difficult for Lief tinck to read and interpret all details; at least it was very hard for us, and many points in the letters remain uncertain. Some of the letters are very discursive and contain wild philosophical or metaphysical speculations. Sometimes while describing a dragonfly's behaviour He would suddenly switch to private fantasies or other irrelevant matters before returning to dragonflies.

The letters and lists of the contents of the individual shipments provide an intimate picture of the collaboration of these two men with all its ups and downs. The letters also reveal many interesting details of Stüber's



Figure 1. M.A. Lief tinck, aged 25 years, leaving Europe for Java in 1929.

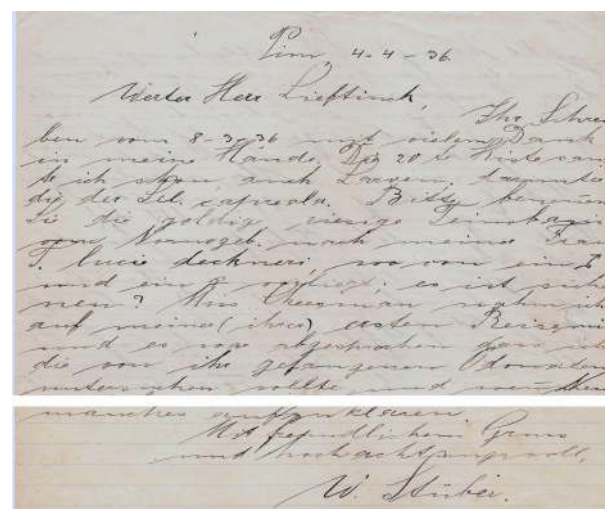


Figure 2. Extracts from Wilhelm Stüber's letter to M.A. Lief tinck on 4 April 1936 showing his signature. In this letter he requests that Lief tinck name a *Teinobasis* species after his wife.

life and personality and show how well he eventually came to know the dragonfly species of the areas in which he collected. In those days letters between Hollandia and Buitenzorg took two or three weeks to reach the receiver, depending on ships' schedules, so a reply to a letter could not be expected before one month at the earliest. On numerous occasions the letters crossed in the mail and this caused misunderstandings and open conflict, especially when money was being discussed.

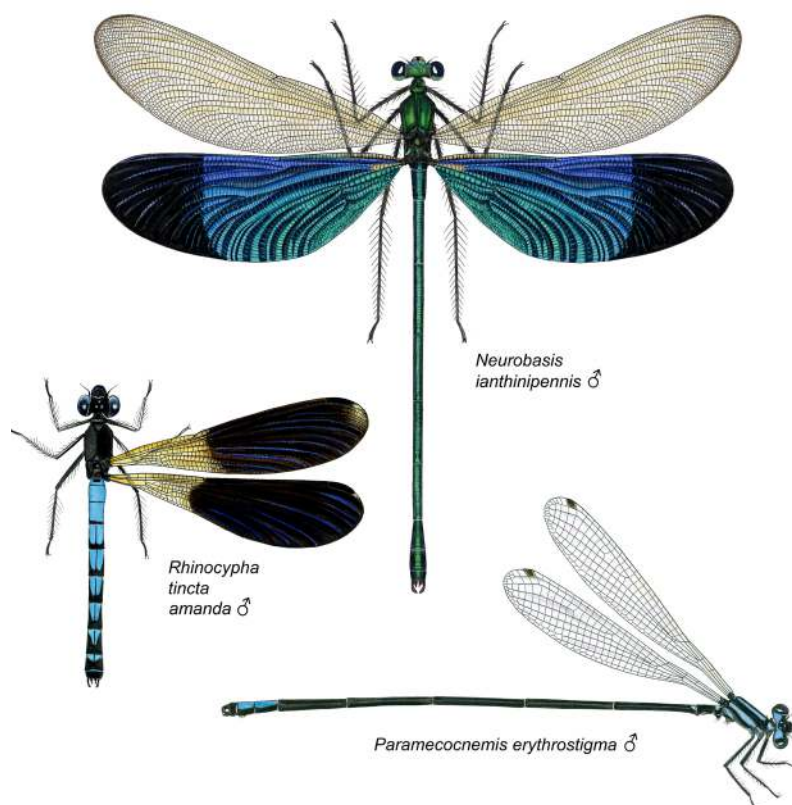
In the introduction to the first part of his 'The dragonflies of New Guinea and neighbouring islands' series Lief tinck (1932) wrote of Stüber's visit in 1930: "The result was that, from May, 1930, until the present date a very extensive collection of Odonata was brought together by Mr. Stüber [including eight lots of specimens, the last being collected in April–June 1931], who did all that was humanly possible to carry out the objects of his mission with which he had been entrusted."

#### Summary of specimens collected

The first eight shipments comprised in total 6,900 specimens, representing 122 species. Of these 56 were undescribed species or subspecies (three). From these Lief tinck described 34 new Zygoptera species in his 1932 paper (see Table 1). Even among Stüber's very first shipment (735 specimens of 48 species), collected in May 1930, Lief tinck recognised eight definite new species. However the *pièce de la resistance* was the peculiar little *Thaumatagrion funereum* Lief tinck, 1932, the little dark-winged damselfly (Fig. 3) placed by Lief tinck in its own genus in the Platynemididae, but now considered to be a coenagrionid (Dijkstra *et al.* 2014). Stüber, in a letter to Lief tinck, describes this swamp-dwelling species as rare and local, but he still managed to provide 89 specimens, evidently mainly from near his plantation at Pim to the south of Hollandia. Another spectacular find was the new genus and species *Paramecocyphus erythro stigma* Lief tinck, 1932 (Fig. 4), of which Stüber provided 108 specimens, with many pairs in copula. One can only imagine Lief tinck's joy at receiving such quantities of novel material so carefully documented and well curated. In many of his letters Lief tinck expressed his great gratitude to Stüber for his efforts.



**Figure 3.** *Thaumatagrion funereum* Lief tinck, 1932 - a new damselfly genus and species, described from numerous specimens collected by Wilhelm Stüber in Hollandia in 1930–1931. Photo credit: Stephen Richards..



**Figure 4.** The damselflies *Neurobasis ianthinipennis* Lief tinck, 1949 and *Rhinocypha tincta amanda* Lief tinck, 1938, both common species in the Hollandia area, were included in large numbers in the first shipments. Lief tinck failed to initially recognise the former as a new species. On the other hand *Paramecocyphus erythro stigma* represented a new and remarkable genus. Artwork by A.G. Orr.



Stüber's first dragonfly collections in 1930–1931 came from the hilly surroundings of Hollandia at altitudes varying from 50 to 300 m, as well as from the densely forested southern slopes of the eastern part of the Cyclops Mountains, up to an altitude of 500 m. He also carried out extensive collecting in the numerous swamps and rivers to the south of that mountain range and in the swampy area (Tami-Ebene) between Jotefa Bay and the Tami River. These locations are situated in a square bounded by 2° 30' and 2° 40' S and 140° 40' and 140° 50' E (Fig. 5).

Regular consignments of Odonata specimens continued to arrive in Buitenzorg until mid-1939. In 1932–1934, besides the Hollandia area, Stüber collected mainly around Lake Sentani, reaching the areas west of the lake as far as to Mameda. He also climbed into the Cyclops Mountains to altitudes of ca 1,200 m. In May and October 1935 he made his first visits to the swampy areas east of the Tami River, southeast of Humbolt Bay. His last specimens from the Cyclops were collected in 1935. Between the latter half of 1931 and the end of 1935 he collected a total of ca 4,900 specimens.

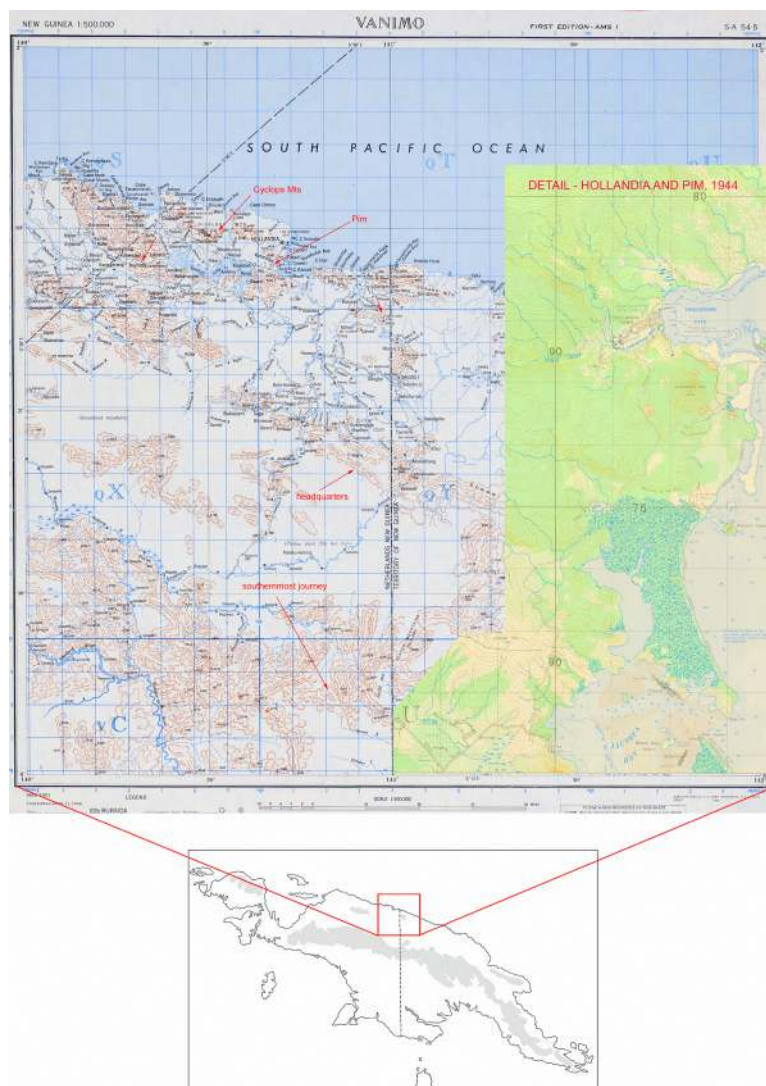
From 1936–39 Stüber's main collecting ground shifted to the area east of the Tami River near the border with the mandated territory, including 'southern Bewani hills' (headwaters of Tami River), as by then he was able to combine collecting with his duties in this area in the service of the Dutch government (see page 85). In these four years he collected a total of ca 2,000 specimens, the most remote ones coming from south of the Pauwasi River (3° 46' 10" S; 140° 48' 40" W), a locality he visited in June 1939 (Fig. 5).

In total Stüber sent ca 13,800 Odonata specimens to Lieftinck. These included ca 165 species. Thus, in just 10 years Stüber had collected more species in New Guinea than the combined total of all previous collectors; his takings represent more than one third of the presently known New Guinean fauna and ca 75 % of the species known from the northern part of the island where his operations were confined. He also took long series of most species, in contrast to all earlier collections which had usually included only a single or a few specimens of each species. He also collected larvae and exuviae of dragonflies, making many interesting finds.

Although Stüber was already advanced in years, he was a diligent and active collector and his contribution to the knowledge of New Guinean Odonata was phenomenal. It is fair to suggest that his prodigious collecting activity enabled Lieftinck, who was still at the beginning of his career, to specialize in the study of New Guinean Odonata and rapidly become the regional expert on this group.

#### *Stüber – a skilled observer*

As well as being a prolific and discerning collector of dragonflies, Stüber also familiarised himself with much of the regional odonate fauna and became a skilled observer. From the very beginning he indicated that he would like to have returned identified reference specimens of each species, so that he could learn to know them by their correct names. When Lieftinck failed to send the requested specimens, Stüber complained and wrote: "Ich bin



**Figure 5. Maps of the Hollandia area in relation to New Guinea showing Wilhelm's Stüber's collecting areas. Red arrows indicate significant collecting areas. Insert right, 1:20,000 map (dated 1944) showing in detail the area of Hollandia and Pim. The larger map (from 1942) by courtesy of the University of Texas Libraries, The University of Texas at Austin.**

**Table 1. List of new dragonfly species and subspecies named from specimens collected by Wilhelm Stüber.**

All = the whole type series was collected by Stüber. Most = most specimens of the type series was collected by Stüber. Part = part of the specimens of the type series was collected by Stüber. \* Holo- or lectotype was collected by Stüber. Genus name in bold font – based on Stüber's material.

<b>Lestidae</b>		<i>Pseudagrion farinicolle</i> Lieftinck, 1932	Most *
<i>Indolestes luxatus</i> (Lieftinck, 1932)	All *	<i>Pseudagrion pelecotomum</i> Lieftinck, 1932	All *
<i>Indolestes lygisticercus</i> (Lieftinck, 1932)	All *	<i>Pseudagrion silaceum</i> Lieftinck, 1932	Most *
<i>Lestes pertinax</i> Lieftinck, 1932	All *	<i>Teinobasis alternans</i> Lieftinck, 1935	All *
<b>Platystictidae</b>		<i>Teinobasis aurea</i> Lieftinck, 1932	All *
<i>Drepanosticta clavata</i> Lieftinck, 1932	All *	<i>Teinobasis dominula</i> Lieftinck, 1937	All *
<i>Drepanosticta exoleta</i> Lieftinck, 1932	All *	<i>Teinobasis luciae</i> Lieftinck, 1937	All *
<b>Calopterygidae</b>		<i>Teinobasis scintillans</i> Lieftinck, 1932	All *
<i>Neurobasis ianthinipennis</i> Lieftinck, 1949	Part	<i>Teinobasis s. serena</i> Lieftinck, 1932	All *
<b>Chlorocyphidae</b>		<i>Teinobasis serena humeralis</i> Lieftinck, 1949	All *
<i>Rhinocypha tincta amanda</i> Lieftinck, 1938	Part *	<i>Teinobasis stigmatizans</i> Lieftinck, 1938	All *
<b>Argiolestidae</b>		<b><i>Thaumatagrion funereum</i></b> Lieftinck, 1932	All *
<i>Metagrion subornatum</i> (Lieftinck, 1935)	All *	<i>Xiphiagrion truncatum</i> Lieftinck, 1949	All *
<i>Metagrion tristis</i> (Lieftinck, 1935)	All *	<b>Aeshnidae</b>	
<b>Isostictidae</b>		<i>Agyrtacantha tumidula</i> Lieftinck, 1937	All *
<i>Selysioneura capreola</i> Lieftinck, 1932	All *	<i>Plattycantha acuta</i> Lieftinck, 1937	All *
<i>Selysioneura phasma</i> Lieftinck, 1932	All *	<i>Plattycantha venatrix</i> Lieftinck, 1937	All *
<i>Selysioneura stenomantis</i> Lieftinck, 1932	All *	<b><i>Oreaeschna dictatrix</i></b> Lieftinck, 1937	All *
<i>Selysioneura umbratilis</i> Lieftinck, 1932	All *	<b>Gomphidae</b>	
<b><i>Tanymecosticta fissicollis</i></b> (Lieftinck, 1932)	All *	<i>Ictinogomphus lieftincki</i> (Schmidt, 1934)	Part
<b>Platycnemididae</b>		<b>Corduliidae</b>	
<b><i>Arrhenocnemis sinuatipennis</i></b> Lieftinck, 1933	All *	<i>Anacordulia stueberi</i> Lieftinck, 1938	All *
<i>Idiocnemis chloropleura</i> Lieftinck, 1932	Most *	[Syn. of <i>Metaphya tillyardi</i> Ris, 1913]	
<i>Idiocnemis nigriventris</i> Lieftinck, 1937	All *	<i>Hemicordulia cyclopica</i> Lieftinck, 1942	All *
<i>Idiocnemis oblitterata</i> Lieftinck, 1932	All *	<i>Procordulia astridae</i> Lieftinck, 1935	All *
<i>Nososticta beatrix</i> (Lieftinck, 1949)	Part	<i>Procordulia sylvia</i> Lieftinck, 1935	All *
<i>Nososticta callisphaeana</i> (Lieftinck, 1937)	All *	<b>Synthemistidae</b>	
<i>Nososticta chalybeostoma</i> (Lieftinck, 1932)	All *	<i>Palaeosynthemis gracilentia</i> (Lieftinck, 1935)	All *
<i>Nososticta cruentata</i> (Lieftinck, 1932)	All *	<i>Palaeosynthemis cervula</i> (Lieftinck, 1938)	All *
<i>Nososticta cyanura</i> (Lieftinck, 1932)	All *	<i>Palaeosynthemis feronia</i> (Lieftinck, 1938)	All *
<i>Nososticta eryhrura</i> (Lieftinck, 1932)	All *	<b>Libellulidae</b>	
<i>Nososticta fonticola</i> (Lieftinck, 1932)	All *	<i>Aethriamanta nymphaeae</i> Lieftinck, 1949	All *
<i>Nososticta nigrofasciata</i> (Lieftinck, 1932)	Part *	<i>Bironides liesthes</i> Lieftinck, 1937	All *
<i>Palaiargia carnifex</i> Lieftinck, 1932	All *	<i>Bironides teuchestes</i> Lieftinck, 1933	All *
<i>Palaiargia c. charmosyna</i> Lieftinck, 1932	All *	<i>Diplacina antigone</i> Lieftinck, 1933	Part *
<i>Palaiargia charmosyna cyclopica</i> Lieftinck, 1949	Part	<i>Diplacina hippolyte</i> Lieftinck, 1933	All *
<i>Palaiargia halcyon</i> Lieftinck, 1938	All *	<i>Diplacina ismene</i> Lieftinck, 1933	All *
<b><i>Papuargia stueberi</i></b> Lieftinck, 1938	All *	<i>Diplacina persephone</i> Lieftinck, 1933	All *
<b><i>Paramecoccnemis erythrostigma</i></b> Lieftinck, 1932	All *	<i>Diplacina phoebe anthaxia</i> Lieftinck, 1933	All *
<b>Coenagrionidae</b>		<i>Huonia arborophila</i> Lieftinck, 1935	Most *
<i>Aciagrion tonsillare</i> Lieftinck, 1937	All *	<i>Huonia oreophila</i> Lieftinck, 1935	All *
<i>Agriocnemis adercus</i> Lieftinck, 1932	All *	<i>Microtrigonia gomphoides</i> Lieftinck, 1933	All *
<i>Archibasis crugigera</i> Lieftinck, 1949	Part *	<i>Nannophlebia adorina</i> Lieftinck, 1938	All *
<i>Agriocnemis ensifera</i> Lieftinck, 1932	All *	<i>Nannophlebia alexia</i> Lieftinck, 1933	All *
<i>Ceriagrion inaequale</i> Lieftinck, 1932	All *	<i>Nannophlebia amaryllis</i> Lieftinck, 1955	All *
<i>Ischnura stueberi</i> Lieftinck, 1932	All *	<i>Nannophlebia amphicyllis</i> Lieftinck, 1933	All *
<i>Papuagrion auriculatum</i> Lieftinck, 1937	Most *	<i>Nannophlebia ampycteria</i> Lieftinck, 1933	Most *
<i>Papuagrion corruptum</i> Lieftinck, 1938	All *	<i>Nannophlebia anatyia</i> Lieftinck, 1933	All *
<i>Papuagrion degeneratum</i> Lieftinck, 1937	All *	<i>Nannophlebia axiagasta</i> Lieftinck, 1933	Part *
<i>Papuagrion fraterculum</i> Lieftinck, 1937	All *	<i>Nesoxenia mysis tarafia</i> Lieftinck, 1942	All *
<i>Papuagrion laminatum</i> Lieftinck, 1937	All *	<i>Neurothemis ramburii papuensis</i> Lieftinck, 1942	Part *
<i>Papuagrion oppositum</i> Lieftinck, 1949	Part *	<i>Orthetrum balteatum</i> Lieftinck, 1933	All *
<i>Papuagrion prothoracale</i> Lieftinck, 1935	Part *	<i>Rhyothemis phyllis beatricis</i> Lieftinck, 1942	Part *
<i>Papuagrion rectangulare</i> Lieftinck, 1937	All *	<i>Rhyothemis princeps irene</i> Lieftinck, 1942	Part *
<i>Papuagrion rufipedum</i> Lieftinck, 1937	All *	<i>Rhyothemis regia juliana</i> Lieftinck, 1942	All *
<i>Papuagrion spinicaudum</i> Lieftinck, 1937	All *	<i>Tetrathemis irregularis papuensis</i> Lieftinck, 1942	Most *
<i>Pseudagrion civicum</i> Lieftinck	All *	<i>Tramea aquila</i> Lieftinck, 1942	Part *
<i>Pseudagrion tinctatum</i> Lieftinck, 1932	All *	<i>Tramea propinqua</i> Lieftinck, 1942	Most *



kein Gelehrtes, aber ein Liebhaber von Zoo- und Geologie" (I am no scholar, but I have a love of Zoology and Geology). Thereafter Lieftinck sent him identified specimens and copies of lists of species received with specimen numbers. In the lists he also marked which species were no longer wanted and those of which more specimens were welcome. Damselflies no longer wanted after the first consignment included *Neurobasis* and *Rhinocypha* (Fig. 4), which had been sent in large numbers (221 and 103, respectively). These conspicuous insects comprised 44 % of the specimens collected in May 1930 (later in 1932 when Lieftinck started to suspect that there was more than one species in these genera he requested more specimens and Stüber provided them). Quite soon Stüber started to know many species by name and to recognize those which were new. By early 1932 he had begun to write in his letters notes on the species, their life colours and observations of their behaviour using the scientific names. He also added notes on colours in life on the envelopes, many of which were copied verbatim by Lieftinck onto his own envelopes and generally incorporated in his descriptions.

As his skills increased and after receiving copies of the first parts of Lieftinck's monograph, he began advising Lieftinck, suggesting to him aspects to which he should pay more attention in certain species descriptions. He gave fatherly advice: "Look at these collections very carefully, spare no effort", "Be very careful with this species", "Please look once more at the comment on the envelope", "Please pay more attention to all *Papua*grion; do not take offence at this advice." He also pointed out some possible errors in Lieftinck's identifications, although in one letter he admits "Who I am to advise you" and "Don't feel bound by my suggestions." In one letter he also suggested that Tillyard made a grave mistake in one case. Elsewhere, discussing *Palaeosynthemis*, he wrote that Förster was 'auf dem richtigen Weg', (on the right track) but he lacked enough material to prove his claim. This clearly shows his deep interest in the subject and his serious attempts to reach scientific conclusions. It is difficult for us to assess how many of his taxonomic suggestions were correct. Lieftinck often referred to those cases where Stüber was right, but seldom mentioned his mistakes. But it is known that Stüber correctly recognized several of his discoveries as new species. He also tried to educate himself, asking Lieftinck questions such as: "How many Odonata species are known from each continent?", "Are there other odonate families than those in the lists of my collections?"

However, lacking training, his general knowledge of insects was inevitably limited. Having found strange-looking insect larvae in rushes he asked Lieftinck (10th May 1933) whether they were mantids and do their wings develop later? Or do there exist odonates without wings? Do mantid larvae develop with wings as the dragonflies do? Two weeks later he sent the larvae to Lieftinck with a request: "Here is the mantid or wingless dragonfly of which the larvae are in bottles 4 and 5)". Lieftinck could advise him that they were mantids, but mantid larvae are terrestrial.

In a letter on 10th May 1933 Stüber presumed that the peculiar 'Schlangenkopflarven' (snake head larvae) which he had found were larvae of *Notoneura* and provided a long explanation of how he came to this conclusion after thinking earlier that they could be *Agriocnemis ensifera*, adults of which were abundant at the same site. Then he concluded that since these *Notoneura* larvae look so different, it means that *Notoneura* should be removed from the Agrionines. Lieftinck was able to inform him that these 'Slangenkopflarven' are larvae of water beetles of the family Dytiscidae!

On 10th April 1933 Stüber's hunter Jati found a peculiar 'dragonfly' with very long antennae. Stüber wrote (25th April 1933) that it was certainly an odonate, perhaps a link between *Podopteryx* and *Cordulia*! He made a life size drawing and drafted a brief description, in which some characters of this species were compared with those of *Procordulia* (colour of body) and *Podopteryx* (wings). He wrote that the family to which this species belonged remained for science to decide. It should be named as 'coming from the primitive paradise'. He said that he could not sell this unique specimen to the Buitenzorg Museum and asked Lieftinck to keep good care of it during the description. He promised that should he find another specimen he would gift it to the museum. The illustration shows that it is a species of Ascalaphidae. On 1st January 1934 he asked for the return of this 'Schmetterling-Cordulide' or to keep good care of it for him in the museum. On 25th January



**Figure 6. Male of *Palaeosynthemis gracilentia* (Lieftinck, 1935), first found by Wilhelm Stüber in the southern Cyclops Mountains in September 1930. Artwork by A.G. Orr.**

1934 Liefstinck informed Stüber that it was a species of *Suhpalacsa* and that it would be returned to him.

Despite these many 'howlers', especially in the early period of his interest, Stüber also kept detailed behavioural notes that show powers of observation often surpassing those of many of his professional contemporaries. He deduced, correctly, that the larvae of *Papuagrion* breed in water collected in the leaf bracts of *Pandanus* trees (letter 22nd March 1937). This was subsequently shown to be correct by Toxopeus (1939), a lepidopterist who may have been advised to search in these habitats by Liefstinck on the basis of Stüber's advice or by Stüber himself. In a letter to Liefstinck on 2nd February 1933 Stüber described the behaviour of foraging and ovipositing *Palaeosynthemis gracilentia* (Fig. 6) in the forests of the Cyclops Mountains. Later (Liefstinck 1935, p. 293) cited this account making some errors in transcription. Originally Stüber wrote:

Flutet die Sonne das Cyclopengebirge mit Licht und dringen ihre Strahlen gegen 10 a.m. in die Täler und Schluchten ein, dann erscheinen hier, wo Breschen im Urwald oder wo sich Bäche kreuzen, die *Palaeosynthemis* Arten. Auf zwanzig bis fünfzig Meter Höhe segeln oder schweben sie langsam hin und her; die leiseste Bewegung ihrer Flügel erblitzt bronzegold im Sonnenlicht. Unten vom Bach herauf vernimmt mein Ohr jetzt eine unbeschreibbare, sehr fein gestimmte Musik! Es sind winzige, wohl kaum Millimeter grosse, weiss und schwarze Mückchen, die von den Nesselbäumen (*Laportea*) ihren Schlafplatz verlassen und im Schwarm der Sonne zufliegen. Bald kugelförmig, bald säulenartig drehen sie sich – im wirbelnden Tanz – ins Licht – ins Verderben. Nun kommt Bewegung in die *Palaeosynthemis*! In rasender Geschwindigkeit schießen sie auf ihre Beute. Sie sind nun schwarz-bronze blitzende und sich überschlagende Sperber geworden!

Which we freely translate as: "About 10 a.m. as the sun floods the Cyclops Mountains with light and its rays penetrate the valleys and gorges, then *Palaeosynthemis* species appear at rainforest gaps or at places where rivulets cross. They hover or slowly glide to and fro at a height of twenty to fifty metres; the slightest movement of their wings flashes bronze-gold in the sun; my ear perceives an indescribable, very finely attuned music rising from the rivulet below! These are tiny white and black midges, probably measuring scarcely a millimetre, which coming from the Nettle-trees (*Laportea*), leave their resting places and rise to the sun in a swarm, now like a globe, then like a column they spin – in a whirling dance – to the light and – to their doom. Now the *Palaeosynthemis* come swooping in! With frantic speed they pounce on their prey. They become [like] sparrow hawks, tumbling, flashing bronze and black."

His enthusiasm, clearly shown by his excited language and free use of exclamation marks, is infectious! Stüber was a truly gifted naturalist and dragonflies were surely his greatest scientific passion. He also professed his great interest in dragonflies in



Letter dated 17th March 1934 (sequential text on folded sheets)

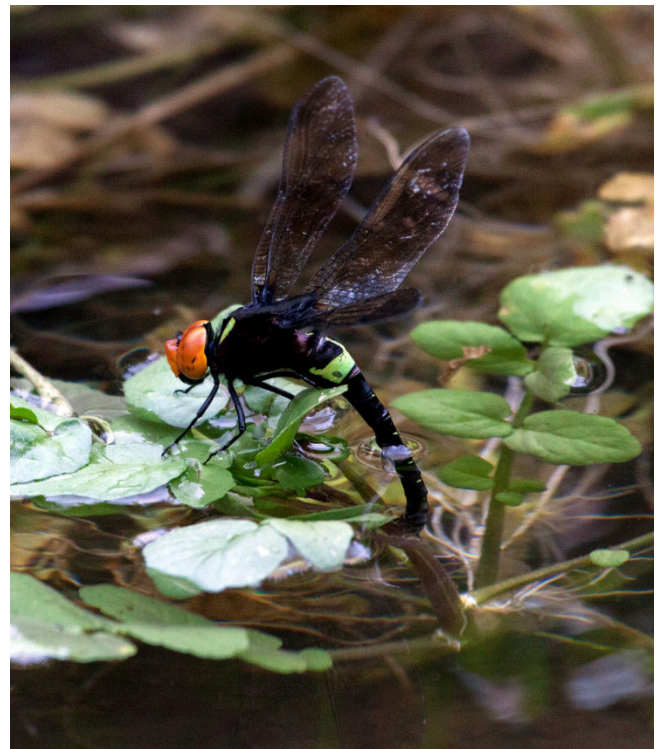


Letter dated 12th January 1936



Letter dated 4th April 1936

**Figure 7.** Extracts of Wilhelm Stüber's three letters to M.A. Liefstinck, where he relates his sighting of a gigantic red-eyed dragonfly (*Riesenlibelle*) in the southern Cyclops Mountains in 1932.



**Figure 8.** An ovipositing female of *Oreaeschna dictatrix* Liefstinck, 1937, a new aeshnid species and genus named and described on the basis of a single male and numerous female specimens collected by Wilhelm Stüber in the southern Cyclops Mountains. The wing span of this species is 'only' 11 cm, so considerably less than in Stüber's mysterious 'Riesenlibelle' from the same mountains. Photo credit: Sandra Lamberts.



his letters on 1st August 1932 and on 2nd October 1932, which were sent at the time of a period of acrimonious correspondence with Liefstinck concerning financial matters (see page 76).

*The mysterious gigantic dragonfly of the Cyclops Mountains – an hallucination or .....?*

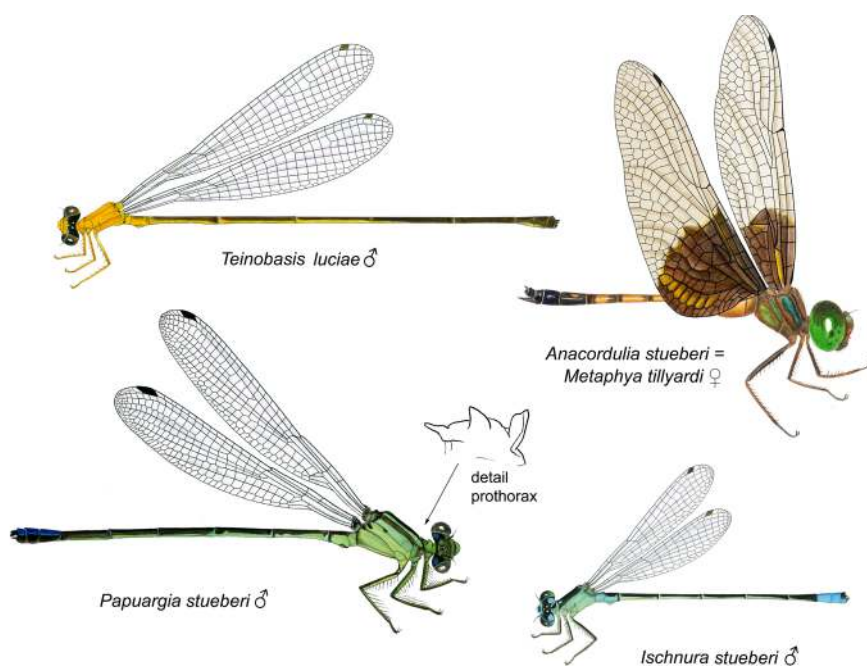
In three separate letters (Fig. 7) Stüber speaks of a gigantic dragonfly (*Riesenlibelle*) which he claims to have seen in the Cyclops Mountains. On 17th March 1934 he wrote: "... and I saw many things: In 1932, on two days in the Cyclops an aeshnid? with red eyes, a gigantic individual with a wing span of about 50 cm! In 1933 at 700 metres a gigantic *Anax*!" Liefstinck did not comment on these reports. In a letter dated 12th January 1936, after receiving very good payment from selling orchids, Stüber wrote of his plans for a three month trip to the Cyclops, where he hoped to find again his '*Riesenlibelle*', and thereby 'make science happy'. At this stage Liefstinck (8th March 1936) became interested and asked what he meant by this '*Riesenlibelle*'. "Something new again? It can only be an aeshnid." Liefstinck evidently did not remember Stüber's first claim of the existence of this creature. On 4th April 1936 Stüber replied: "I saw the gigantic dragonfly at Cyclops only once and my hunter saw it on two days. It has an exceptionally large head with a whopping great long abdomen. Its size is about three times that of an *Anax*! Unfortunately we failed to catch it." Liefstinck made no further comment, obviously not trusting this fantastic claim. In a letter the previous year Stüber had written that he would like to find a small *Pterodactylus* or a large *Brontosaurus* in the Cyclops! To be sure, New Guinea was then a land of great mystery, but this was even then, a bizarre and fanciful idea.

The claim of a dragonfly with a wingspan of 30 cm or more was certainly absurd but it might indicate the presence of an unknown giant of lesser proportions. Stüber never did return to the Cyclops, as he was soon after fully occupied by his new post in government service (see page 85). Did Stüber experience an hallucination or could there still be an exceptionally large aeshnid awaiting discovery? If anyone feels there may be a grain of truth in this report, please go to the Cyclops, find this creature and catch it! In 1932 Stüber collected at altitudes of 1000–1200 m and lower at 300–400 m.

*Over 100 new dragonflies*

Eventually Liefstinck described a total of 101 new species-group taxa based on Stüber's specimens, 91 new species and 10 new subspecies (Table 1, Figs 3-4, 6, 8–10, 16), almost one sixth of all new taxa Liefstinck described in his 60 year career. For 79 taxa only Stüber's specimens were available. The remainder also included material by other collectors, but in most cases the bulk of the specimens came from Stüber. His specimens became the holotype or lectotype of 99 described taxa. Also the type material of one new species *Ictinus liefstincki* Schmidt, 1934 [presently *Ictinogomphus liefstincki* (Schmidt, 1934)] included a specimen collected by Stüber, obtained via Liefstinck, although the collector's name was not mentioned (Schmidt 1934). In addition Stüber's material included the formerly unknown female sex of seven species and the unknown male sex of one species; all described by Liefstinck.

Nearly all new species collected by Stüber were named in Liefstinck's seven-part monograph 'The dragonflies of New Guinea and neighbouring islands' which appeared in 1932, 1933, 1935, 1937, 1938, 1942 and 1949, and totalled nearly 900 pages. The last volume, which also contained a detailed geographical analysis of the species of the Papuan region, was delayed by World War II. The first three parts of the series were based almost entirely on Stüber's material. Two of 'Stüber's' new species were



**Figure 9. Odonate species named in honour of Wilhelm Stüber and his wife: *Ischnura stueberi* Liefstinck, 1932, *Papuargia stueberi* Liefstinck, 1938, *Anacordulia stueberi* Liefstinck, 1938 (synonym of *Metaphya tillyardi* Ris, 1913) and *Teinobasis luciae* Liefstinck, 1937. Artwork by A.G. Orr.**

described in other papers (Lieftinck 1935a, 1955). The letters reveal that Stüber received copies of the first four volumes. After receiving the third part he wrote: “When will this series of publications be finished? It will be a fine work, which will enable future researchers to further our knowledge.”

#### *Dragonfly species named in honour of Stüber and his wife*

Lieftinck acknowledged Stüber’s work by naming three new species after him. The first was a coenagrionid damselfly *Ischnura stueberi* (Fig. 9) described in Part I of the New Guinea Odonata series (Lieftinck 1932) from a long series of both sexes collected in Humboldt Bay area near Hollandia between July 1930 and February 1931. In Part V of the series Lieftinck (1938) named two more species after Stüber, a new genus and species of coenagrionid damselfly *Papuargia stueberi* [original spelling *Papuargia stüberi*] (Figs. 9 and 10) and a corduliid dragonfly *Anacordulia stueberi* [original spelling *Anacordulia stüberi*] (Fig. 9). Stüber had collected a series of 8 males and 7 females of the *Papuargia* in the southern Bewani hills from April-May 1937; he also provided a detailed and accurate description of the colours in life, while noting the curious short horns on the prothorax. *Papuargia stueberi* is now placed in Platynemididae (Dijkstra *et al* 2014). The single female specimen of the corduliid was taken at Humboldt Bay in Hollandia on 19th December 1930. Later Lieftinck himself synonymised *Anacordulia stueberi* with *Metaphya tillyardi* Ris, 1913 (Lieftinck 1961).

In a letter dated 1st December 1932 Stüber asked Lieftinck to name a species after his wife ‘Lucie Deckner’. He specified that the name should also include her family name. Later, on 4th April 1936 he suggested that Lieftinck might name a golden coloured, large new *Teinobasis* species as ‘*T. lucie deckneri*’ (Fig. 2). Stüber had found this new species at ‘Nonno (Japoe) hills’ [Ijapo Mountains], ‘ca 15 km south of Bougainville Mts’ on 12th February 1936 in a joint trip which he made with Evelyn Cheesman (see page 83). Lieftinck replied that he will do this with pleasure, but pointed out that the epithet ‘*luciae*’ would look better than ‘*luciedeckneri*’. The description of *Teinobasis luciae* appeared in Part IV of his New Guinea series (Lieftinck 1937) with the etymology: “*T. luciae* (Fig. 9) is the largest and one of the most graceful members of the Papuan representatives. I take the pleasure in naming it after Frau Lucie Deckner, the wife and constant companion of Mr. Stüber, who has given a great deal of assistance in her husband’s field-work.” Lucie must have been a ‘nickname’ (unknown to her surviving relatives<sup>1</sup>), since the official name of Stüber’s wife was Juliana Brighantine Deckner (see page 83). Although she did not participate in field work, she helped her husband in preparing specimens. In her book *The land of the red bird* Cheesman (1938) wrote as follows: “Outside the [Stüber’s] house is a large table to hold the tins of butterflies and dragonflies being dried in the sun. This is also Frau Stüber’s share of the work and the children help her. For the whole family is alive to the importance of catching insects...”.

#### *Financial disputes over payments for Stüber’s specimens*

Although Stüber had become intensely interested in dragonflies and their study, he was nevertheless a commercial collector and basically collected to earn money to live and to support his large family. Lieftinck kept a detailed record of the payments given to him and money matters were discussed in most letters until 1937. Altogether he received a total of 645 fl. (Dutch guilders) during the period July 1930–July 1937. In today’s money this equals ca € 5,870. Of this amount the museum paid only 150 fl. (€ 1,284), the rest being paid by Lieftinck personally. In retrospect this seems poor reward for ca 13,800 specimens representing ca 165 species, of which over 100 were new species to science. This equates to less than 50 Euro cents per specimen or ca € 57 for each new species in 2016 in today’s money. Based on the correspondence between Stüber and Lieftinck it is easy to understand Stüber’s position: The sum paid was insufficient to compensate for the wages needed to pay Stüber’s Papuan ‘hunters’ and helpers, as well as other expenses incurred during fieldwork in remote regions, quite apart from



**Figure 10. *Papuargia stueberi* Lieftinck, 1938 - a new damselfly species in a new genus named in Wilhelm Stüber’s honour. Stüber collected specimens in the southern Bewani Hills in 1937. Photo credit: Stephen Richards.**

<sup>1</sup> This caused an erroneous statement in Hämäläinen (2015, p. 95).





**Figure 11. A view of the Cyclops Mountains wreathed in cloud. Photo credit: Jonathan Baillie.**

failing to adequately remunerate Stüber himself.

At first things went smoothly. For his first three consignments in May–September 1930 Stüber was paid as originally agreed. He received a total of 69.85 fl. [€ 557]. For the 17 new species he was paid 25 cents per specimen (70 specimens altogether). For other specimens the payment was 5c or 10c depending on the size of the series of individual species. Stüber was pleased with these payments and collected further material later in 1930 and in 1931. By July 1931 he had already sent eight shipments, but so far had only been paid for the first three. The Great Depression had by then reached the Dutch East Indies and the museum no longer had money to pay for them. However, since Liefstinck was eager for more material, he began paying Stüber privately. He explained that in spite of this the specimens would become the property of the museum. He also requested that Stüber should not send dragonflies to other museums or dealers and promised to help him sell Odonata duplicates to other museums and collectors as soon he had published his descriptions of new species. In 1931 Liefstinck sent three payments totalling 95 fl. [€ 805]. In April 1932 he sent only 10 fl. in recompense for the 10<sup>th</sup> shipment (451 specimens of 52 species). Stüber was not pleased and explained to Liefstinck the trouble and expense involved in collecting dragonflies. “You would be shocked if you knew the expenses which I have incurred for the collection of dragonflies sent so far.” (Later he gave details: during the last two years he had paid 720 fl. in salaries and for food for his helpers and paid 387 fl. for transport during field work. However, he omitted to mention that during the same trips he also collected orchids and various other insects, hence the total expenses he claimed were not related to dragonfly collecting alone!). Earlier Stüber had already started to search for other potential clients for his dragonflies. He was also irritated because his ‘Reisebuch’ (travel diary) and a valuable map had been lost by the museum (see page 81). A serious conflict followed. On 23rd June 1932 Stüber requested that Liefstinck should send ‘a large’ advance for his next shipment within two months. He asked one or two dollars [ca USD 16-32 in today’s money] per specimen of new or rare species. Unless Liefstinck agreed he threatened to sell all his new dragonfly species to an American dealer, who wanted to have material of new species, but was not interested in known species. Liefstinck sent an urgent telegram and a letter promising that in future he was prepared to pay 2 fl. /specimen for each new species (up to 20 specimens per species). For all rare or otherwise desirable species he would pay 1 fl. /specimen (up to 10 specimens) depending on the species and number of specimens. Liefstinck retained the right to decide what was a desirable species and requested that all specimens collected should come to him.

Unfortunately Stüber did not receive the telegram and before Liefstinck’s letter reached Hollandia, he had sent a ‘farewell letter’ on 1st August 1932, writing that from now on he would sell his new dragonfly species to America. He wrote: “If you had continued to work with me and paid 100 fl. per month you would have been

able to publish a 'wunderbarlich Werk' [a fantastic work] within four years. Now all new species which I find will go out of the country. I will collect all new dragonfly species I can find with great enthusiasm." He hoped that Liefstinck would not be offended by this letter and ended it with the wish: "Hoffentlich lesen Sie meinem letzten Briefen mit guten Herzen [Hopefully you will read my last letter with a good heart]."

Liefstinck was horrified and on 1st September 1932 he wrote a bitter letter with some sarcastic comments (not repeated here). He regretted that Stüber had not received his telegram sent on 20 July. Had he received it, the unfortunate letter of 1st August would not have been written. Liefstinck wrote that it would have been an irredeemable mistake if Stüber had already sent his valuable specimens [from the Cyclops Mountains] to some mere 'Mihi-Sucher' [a self-seeking person whose main interest in describing new species is personal aggrandisement] and asked why Stüber, knowing that Liefstinck could not afford to pay, taunted him with new species, which he had not seen, although he desperately needed them? He also wondered why he should read the letter with a good heart and retorted: "**Nein**, Herr Stüber, das nenne ich kein **fair play** [**No**, Mr Stüber I do not call this **fair play**]" Liefstinck promised to start paying him a fixed monthly payment and remained waiting for Stüber's reply.

On 2nd October 1932 Stüber replied to Liefstinck's outburst saying that at first he was angry, but then calmed down. "There prevails much egotism in the world, which brings much misery, and I also have been egotistic. From now on I'll sell specimens only to you." He had not yet sold any specimens to the American dealer. He explained again the expenses of collecting. When Liefstinck's latest payment (10 fl.) arrived he had just bought a pair of good shoes (32 fl.) for field work. This led him to compare this imbalance with the 'big money' offered from America.

In July–December 1932 Liefstinck sent a total of 155 fl. (of this 80 fl. paid by the museum). Relations simmered down and the flow of specimens continued. Stüber's letters became even longer with more detailed information and field observations on species collected.

However, in early January 1934 Stüber complained that he had received only 15 fl. during the whole year of 1933. For financial reasons he had sacked his collectors, but he collected some specimens by himself, which he donated to the museum. Liefstinck sent 25 fl. of his own money and wrote that the museum was no longer able to pay private collectors and told Stüber to wait for better times, adding "we will take good care of your specimens in the museum and keep sending your address to foreign collectors and researchers". Evidently Liefstinck felt he could no longer afford to pay Stüber even with his own money. Stüber (17th March 1934) regretted calmly that their collaboration, which had been very interesting for him, could no longer continue. He also wrote that all his commercial insect collecting activity may soon cease, but in spite of this, he promised to continue carrying a net and to collect new species for Liefstinck if he saw any; by July he had already sent a small collection.

For all this, the collaboration continued as earlier, although payments were irregular, amounting to nothing like the sums promised by Liefstinck during the height of their arguments in 1932. Then in the latter half of 1935 storm clouds again gathered over their relationship. The main reason for this may have been the fate of Stüber's manuscript on the Cyclops Mountains, which Liefstinck as editor of the journal of *Tropische Natuur* had rejected (see page 82). Two angry letters were exchanged. Stüber wrote that since the museum was no longer able to pay he felt free to sell his dragonflies wherever he wished. (This, although he had just received 50 fl. from Liefstinck). Liefstinck replied bitterly and promised to send more money [100 fl.]: "Put it in your pocket and do not grumble so much. .... I keep working further and you collect for me - Agreed?"

A conciliatory letter arrived from Stüber on 12th January 1936: "I am sorry that my letter hurt your feelings. I would have sent you my last year's collections even without any payment. .... You were correct in saying that times are difficult. However, the sale of orchids is flourishing. When searching for them I can also collect dragonflies. .... In October 1934 I sold the first specimens of orchids [obviously *Dendrobium lasianthera*, see page 80] to Chevalier in Bandoeng and he paid 35 fl. per specimen, a total of 500 fl. [€ 4600]." Moreover, Stüber had just been promised a position in the government service. Therefore with good sales of orchids and a new steady income anticipated, his money troubles seemed to be over. In his remaining letters to Liefstinck he no longer requested money, but continued to ask for chemicals and other items needed in collecting and preserving – these he had received from Buitenzorg from the very beginning. In spite of this he received from Liefstinck 50 fl. in 1936 and the same amount in 1937.

On 12th June 1936 Stüber wrote that he had been busy with his new position as assistant administrator and had temporarily ceased collecting insects. Liefstinck congratulated Stüber on his new position, but in the next sentence wrote rather selfishly: "This grieves me very much, but I wish you all the best and hope that you will soon be settled in your Government office". Clearly he was worried that Stüber would no longer collect for him. This was not an unfounded anxiety. When Stüber learned that Liefstinck was leaving for a long sojourn in Europe in October 1937, he wrote on 6th June 1937 stating that he would stop collecting dragonflies on his departure. He wrote: "My old hunters ask too much for their services. I tried new Papuans, but they bring only common stuff." In his last letter to Stüber on 26th July 1937 Liefstinck wrote that he was very unhappy to hear of his intention to cease collecting and hoped that in the meantime he might have changed his mind. Liefstinck cajoled



him with flattering words: “My thoughts are as follows: In the interior of New Guinea lives a man who has made many sacrifices to serve science. He collects for various specialists from all corners of the world and he is the first to have revealed the wonderful fauna of this area. He has documented some of the most conspicuous (but also some obscure!) insect orders in New Guinea. Should a man like this suddenly cease his activity, this would be unprecedented?” A warm ‘farewell’ note tinged with some sadness and hope.

In the event, Stüber did not stop collecting, although obviously he no longer heard from Lieftinck (who was away from Java until 28th February 1939), but continued to send specimens and letters to him. On 3rd November 1937, he stated again that he had sacked his old collectors, adding that when the new station was opened (see page 85), he would teach ‘bushpapuans’ to collect. In 1939 he sent two letters. In his last letter of 6th July 1939 he asked Lieftinck to send a dozen light nets for catching insects. So, he was eager to continue collecting in the surroundings of his remote field station. He also intended to realise an old dream – to penetrate to the Central mountains, the distant silhouette of which he could see on the horizon, occasionally even the snow-capped Mt Juliana. But fate intervened and this expedition never eventuated (see page 85).

Almost from the start of his association with Lieftinck, Stüber was very enthusiastic about his work on dragonflies. As early as October 1932 he wrote that dragonflies had become his ‘Lieblingsarbeit’ (favourite work). A few months later he gave to understand that if he was not so much in need of money, he would stop complaining about lack of payment for dragonfly specimens. Nevertheless, when one considers the amount of effort that must have gone into collecting this material, the payment he received was modest recompense and far less profitable than his former trade in bird plumes or his on-going trade in orchids. One cannot help feeling he collected dragonflies as much for sheer pleasure and genuine interest as for profit. One imagines also, he enjoyed the contact with Lieftinck, especially given his isolation and the fact he was obviously an educated man, although untrained in natural history. It is interesting to note that in their arguments on money the older Stüber never lost his temper and invariably wrote with grace and courtesy; much more so than the young Lieftinck, who was generally more brusque, and at times downright insulting, despite the fact he was Stüber’s junior by many years and obviously the main beneficiary of this partnership.

### ***Stüber’s other insect collecting activities***

As explained below, in 1910 - early 1920s Stüber’s main income had come from the trade in bird of paradise plumes. When this was banned, he had to look to other sources of income. Collecting and growing orchids (see below) must have provided most of his income in the first half of the 1930s, but selling insects was always a welcome supplement to his finances.

Even before visiting Buitenzorg in January 1930, Stüber had collected and supplied butterflies and moths to J.M.A. van Groenendael, a Dutch amateur entomologist, who accumulated a huge collection of Lepidoptera, which went to the Zoological Museum in Amsterdam (now incorporated with the collections of Naturalis Biodiversity Center in Leiden). There are published records of Lepidoptera specimens collected by Stüber as early as April 1928. In 1936 he sent 2000 specimens of moths to van Groenendael. Apart from supplying insect specimens of various orders and molluscs to Buitenzorg Museum (most of its collections were removed to Leiden in the 1950s) since 1930, he also sold specimens at least to the British Museum (Natural History) in London, Carnegie Museum in Pittsburg, Paris Museum, to Louis Coomans de Ruiter, Maria Ernestine Walsh (also some dragonflies in 1929) and to several other recipients. Lieftinck helped him to find new clients for his non-dragonfly material.

It is virtually impossible to trace the full extent of other, non-odonate insect orders which Stüber collected and traded, but an internet search for the species name ‘*stueberi*’ and ‘W. Stüber leg.’ produced interesting results. Among insect names Stüber is commemorated in seven eponyms in addition to the three Odonata names listed above. These are: -

- *Dineutus stueberi* Ochs, 1955 (Coleoptera: Gyrinidae); presently known as *Dineutus (Rhombodineutus) helleri stueberi* Ochs, 1955
- *Sphex sericeus stueberi* Van der Vecht and Krombein, 1955 (Hymenoptera: Sphecidae); a synonym of *Sphex sericeus* (Fabricius, 1804)
- *Bewanicoris stueberi* Miller, 1958 (Hemiptera: Reduviidae)
- *Bukacoris stueberi* Miller, 1958 (Hemiptera: Reduviidae)
- *Uracanthus stueberi* Gressitt, 1959 (Coleoptera: Cerambycidae)
- *Scolia (Diliacos) ribbei stueberi* Krombein, 1963 (Hymenoptera: Scoliidae); a synonym of *S. ribbei* Betrem, 1928
- *Microsasima stueberi* De Jong, 1972 (Orthoptera: Tettigoniidae)

Stüber’s specimens have also become holotypes or paratypes of numerous non-odonate insect species. These include for instance *Nyctalemon toxopeusi* Van Regteren Altena, 1953 (Lepidoptera: Uraniidae), *Eudocima*

*prolai* Zilli & Hogenes, 2002 (Lepidoptera: Noctuidea), *Speiredonia cthulhui* Zilli & Holloway, 2005 (Lepidoptera: Noctuidea) and *Phasioormia papuana* Nihei, 2015 (Diptera: Tachinidae). All five species were collected by Stüber in the Bewani Hills area in 1937-1939. This list given here is surely incomplete since many publications on New Guinea insects, published in 1930-1950s, appeared in *Treubia* and *Nova Guinea*, journals which were not readily available to us when preparing this article.

### **Stüber – discoverer of the Sepik blue orchid**

Wilhelm Stüber collected orchids, kept an orchid garden in his plantation, and sold specimens to orchid fanciers and researchers. Sometime in the late 1920s or early 1930s he found an especially fine orchid species, which he recognised as an unknown, new species. Rather immodestly, Stüber wanted this species to be named after himself: ‘*Dendrobium stüberi*’. He sent specimens of this novelty to a few persons in the Dutch East Indies and Singapore, perhaps also elsewhere. [According to van Steenis-Kruseman (1950, p. 512) Stüber had sent one orchid to the Forest Research Institute, Buitenzorg in 1927. However, it is uncertain whether it was this new species.] One of the recipients was J.E. Zurowetz, the Austrian owner of an orchid nursery at Sambas in West Borneo. Zurowetz submitted a brief manuscript and a photograph describing the new species with the name proposed by Stüber to the journal *The Orchid Review*, published in England. Since the editor of the journal, Charles H. Curtis, could not verify the status of the proposed new species, he contacted the orchid specialist V.S. Summerhayes (of Kew Gardens). Summerhayes informed him that this species had already been described in 1932 as *Dendrobium lasianthera* by the Dutch botanist Johannes Jacobus Smith (Smith 1932). The specimen(s) described as *D. lasianthera* by Smith were also collected by Wilhelm Stüber. The provenance of Smith’s description gives: “Neu-Guinea; Ohne Fundort (Stüber ?)”. The lack of the initial in Stüber’s name suggests that Smith had received the specimen(s) from a third party.

Strangely, although the editor of *The Orchid Review* knew that ‘*D. stüberi*’ was a synonym, he decided to publish Zurowetz’s description. However, the article was retitled as ‘*Dendrobium lasianthera*, J.J. Smith (*D. stüberi*)’ and the brief 22 line long text by Zurowetz was added with an editorial comment of 12 lines in brackets explaining the synonymy.

In terms of botanical nomenclature, this case is interesting. Dr J.-F. Veldkamp (Naturalis Biodiversity Center, section National Herbarium of The Netherlands, Leiden) kindly informed us that although the name *Dendrobium stueberi* [present spelling] was originally published in synonymy, the name is validly published, since Article 36.1.(a) of the International Code of Nomenclature for algae, fungi, and plants (ICN, 2012), stating: “A name is not validly published (a) when it is not accepted by the author in the original publication”, is not applicable in this case. The name was accepted by the author (Zurowetz), although not by the editor (Curtis). The correct citation of this name is *Dendrobium stueberi* Stüber ex Zurowetz, which may be abbreviated to ‘*Dendrobium stueberi* Zurowetz’. The second option would look better in this case, since the first tends to cast Stüber, discoverer of the new species, in a poor light, since there is an ‘unwritten’ rule that you should not name a taxon after yourself. Presently, this combination is considered as a synonym of *Dendrobium lasianthera* J.J. Smith.

The Sepik blue orchid, *Dendrobium lasianthera*, is a magnificent species (Fig. 12), regarded by some as the most beautiful member of this huge genus. It has been unofficially dubbed the ‘national flower’ of Papua New Guinea and featured on postage stamps (Fig. 13). It is a large epiphyte



**Figure 12. The magnificent Sepik blue orchid (*Dendrobium lasianthera* J.J. Smith), first found by Wilhelm Stüber and described in 1932 on the basis of his specimen(s). Photo credit: Eric Hunt.**



**Figure 13. An Indonesian stamp showing the Sepik blue orchid (*Dendrobium lasianthera*).**



with enormous, up to three metre long pseudobulbs, found in swampy forest growing on small trees over rivers and streams at sea level. Its distribution in the wild is poorly documented but it appears to be endemic to lowland north New Guinea. In the field the flowering time is December-February (Zurowetz 1934). It produces erect inflorescences which last several months. The petals are rather variable in colour, being rose-purple to maroon with a yellow edge, but at any rate the epithet 'blue' is a misnomer. A genuinely blue orchid, the delicate *Dendrobium azureum* was recently described by Schuiteman (2013) from a specimen collected in Waigeo Island, off north-western New Guinea, by Evelyn Cheesman in 1938.

In 1936 in his discussions with Evelyn Cheesman (see below on page 83), Stüber still called his discovery '*Dendrobium stüberi*'. Either he did not know, or did not care, that this name was a synonym. Cheesman (1937, p. 62) wrote: "One very beautiful *Dendrobium* bears the name *stüberi*. It is a very large and striking blossom, and came from about 3000 feet up on the mountains [i.e. the Cyclops]". Either Cheesman misunderstood Stüber regarding the habitat of the species, since it does not agree with what is known of this orchid, or alternatively and perhaps more plausibly Stüber deliberately gave false information on its locality, since revealing the exact place might have attracted rival collectors there.

Wilhelm Stüber's name lives on in a commercially bred hybrid orchid variety: *Dendrobium* 'Wilhelm Stüber'. The variety was registered in the International Orchid Register maintained by the Royal Horticultural Society (London) by C.A. Chevalier on 1 January 1937. The seed parent of the hybrid is *D. lasianthera* and the pollen parent is *D. phalaenopsis* Fitzgerald (the latter species is now considered a synonym of *Vappodes bigippa* Lindley & Paxton). However, it is unclear if any specimens of this cultivar survive (See page 78 for the generous payment Stüber received from Chevalier).

### **Stüber's own manuscripts**

Stüber also actively wrote on his travels in New Guinea and also attempted to publish on scientific subjects. In February 1931 he sent his travel diary (Tagebuch) to Buitenzorg hoping that Dr K.W. Dammerman would read and comment on it. It contained over 100 handwritten pages on his travels and activities in New Guinea and a valuable map. In January 1932 he wrote to Lieftinck requesting the return of the manuscript, since someone from America had asked him to write a book about his travels and experiences in New Guinea. Unfortunately the manuscript could not be found in the museum and Lieftinck suspected that it might still be in Hollandia. Stüber was sure he had sent it and wrote indignantly that it must be in Buitenzorg and asked Lieftinck in two later letters (April and August) to make all efforts to find it.

On 20th November 1932 Lieftinck wrote that he had received from Stüber scraps of his travel report. Lieftinck said that it looked rather good, but asked him to keep 'erotisch-sensationellen' (sensational erotic) stories apart from 'landschaftlichen Schilderungen' (scenic descriptions). Lieftinck concluded that Stüber would surely find a publisher, since no perfect description of 'papuanische Landschaft' (Papuan scenery) has been published. Lieftinck remarked that literature is "filled with sensational love stories set in the tropics; they are all the same". He advised Stüber to play down this subject in his book. Later on 19th December 1932 Lieftinck wrote that with regard to the odonatological contents of the manuscript there was not much to be changed, but nevertheless he did propose changes and additions. He also asked Stüber to write a good description of the flight of *Palaeosynthemis* (see page 74). The letters do not reveal whether the 'Tagebuch' was found or whether Stüber had rewritten his texts from memory. In a letter dated 1-19<sup>th</sup> December 1932 Stüber sent for Lieftinck's consideration the text 'Die Kontinente in Zusammenhang mit Neu-Guinea' (The Continents in relation to New Guinea) with a comment: "It is a theory among others. It is based on observations and conclusions which I have made in my many travels. Since many animal and plant species are endemic, New Guinea could be a large 'Ausstrahlungszentrum' (centre of radiation)." Of course New Guinea is a striking centre of radiation, but we suspect he was suggesting that it is a source of diversification from which surrounding faunas developed.

On 2nd February 1933 Stüber thanked Lieftinck for his comments on his text 'Auf unbekannten Pfaden' (Unknown Paths) and asked if he would also read 'Leiden und Freuden des Explorers' (Joys and Sufferings of Explorers), which must have been parts of his planned book. On 6th May 1933 Lieftinck wrote that he would keep the 'Tagebuch' to read and comment on when he had more time. On 1st January 1934 Stüber asked Lieftinck to return his manuscript of 'Die alten Kontinente' (The old Continents). Lieftinck returned the manuscript with comments: "After your request I return here the manuscript of the supplementary Wegener-theory. Well presented, best thanks." Stüber asked "who is Wegener and what is his theory? I have never heard of him". This shows how ill-prepared he was to analyze such matters. In a letter he admits that he should learn more of biology and geology and asked Lieftinck to send books in German or English on these subjects. He wrote that earlier he had read about Haeckel and Darwin, but had already forgotten what they had written. Stüber's book remained unpublished and its manuscript was evidently lost during WW2. We are not aware of any of his manuscripts and travel reports having been published. However, Lieftinck published some extracts from his texts, such as the evocative note on the behaviour of *Palaeosynthemis* (see page 74), which was part of the manuscript of his intended book.

In 1935 Stüber submitted a manuscript on ‘Cyclopedgebirge’ (Cyclops Mountains) to an acquaintance in Bandoeng (Java) hoping that it might be published in a newspaper. The manuscript was forwarded to Lieftinck, who was the editor of the semi-popular journal *Tropische Natuur*. Lieftinck deemed the article unpublishable. When Stüber received Lieftinck’s rejection and negative comments on the manuscript from his acquaintance, he wrote to Lieftinck that this decision annoyed him greatly and said that he had no idea that the manuscript would end up in Lieftinck’s hands, adding that the manuscript was not aimed for a scientific journal. Lieftinck explained why he had to reject the manuscript: it lacked precision and was far too speculative. Based on their conversations, Evelyn Cheesman also expressed her opinion of Stüber’s ideas of the geology of the Cyclops range in contemptuous terms (see page 84).

No doubt Stüber wanted to be more than just a collector and adventurer. Like so many who reach late middle age, he wanted to leave behind a tangible legacy that would establish his name for posterity. He was aware that he had a fund of unique experiences and knowledge from his many years in New Guinea, one of the most poorly known parts of the globe. He was also a brilliant naturalist and keen observer. He was clearly intelligent and educated up to a point. However he lacked formal training in those areas which would have allowed him to organise his knowledge, and it is uncertain whether his temperament was suited to scientific reporting. From the writings of Cheesman and from his own letters it would appear his intellect was of a quixotic kind, given to wild fancies rather than careful consideration. To be sure, he organised his life and plantation in an exemplary fashion but this was at a practical level. Perhaps the main reason for his failure in scientific endeavours was the fact he always tried to bite off more than he could chew, perhaps understandable given his lack of formal training, his isolation from civilised intellectual society and the plethora of marvels which surrounded him. This combination united with a fertile mind to over-excite his imagination. Perhaps he would have fared better during the early days of the enlightenment than in the 20<sup>th</sup> century, when wild fancies were better tolerated and only worthwhile insights and discoveries were later remembered. It is obvious that for all his failings Stüber had plenty to offer of the latter.

#### *A short biography of Wilhelm Stüber*

Wilhelm Carl Julius Stüber was born in a small town in Prussia (in present-day Poland) on 13th August 1877<sup>2</sup>. At the age of 14 he left Wismar harbour as a stowaway on a ship and sailed first through the waters of Scandinavia, then via England to the East Indies, eventually settling in Kaiser-Wilhelmsland or German New Guinea. Little is known of his activities there, but it is known that he kept a plantation, and that he owned a schooner. His first wife, by whom he had two children, died in a boating accident.

Clearly his main income came from the lucrative trade in plumes. At that time, bird feathers, used chiefly for millinery decoration, had become a major industry throughout the world. Feathers imported



**Figure 14.** A Victoria crowned pigeon (*Goura victoria*). A flock of the same species was observed by Cheesman and Stüber in 1936, the latter, according to Cheesman, appeared to be speculating on their value in former times when the plume trade still flourished. Photo credit: Bjørn Christian Tørrissen [[https://en.wikipedia.org/wiki/Victoria\\_crowned\\_pigeon](https://en.wikipedia.org/wiki/Victoria_crowned_pigeon)].



**Figure 15.** An ‘elegant’ Edwardian lady’s hat (first decade of 20<sup>th</sup> century) incorporating an entire Lesser Bird of Paradise *Paradisaea minor*, the ‘red bird’ of Evelyn Cheesman.



from the tropics were the most desirable, perhaps none more so than the brilliant plumes of birds of paradise from New Guinea and the Moluccas. From 1905 to 1920, 30,000–80,000 bird of paradise skins were exported annually to the feather auctions of London, Paris, and Amsterdam. Also valued were the crests of Goura pigeons (Fig. 14). The trade served a prevailing fashion in women's haute couture which seems macabre to us today (Fig. 15) and even at source was worth £2 million a year, much more as retail products in Britain and Europe. In the 1920s the trade waned due to a progressive prohibition culminating in an outright ban on export in Australian-controlled Papua and the former German New Guinea in 1924, with Dutch New Guinea following suit in 1931.

At the time of Stüber's involvement skin collecting was a well regulated but lucrative part of the economy of the German territory, with its total value exceeded only by exports of copra. Three large conservation areas had been established and hunters were licensed, with all exports subject to duty of about 8%, but in the five years leading up to WWI collecting increased exponentially, culminating in 16,691 skins valued at 1.1 m marks (£50,277) being legally exported in 1913–1914. This official figure fell almost to zero with the outbreak of war (Swalding 1996). The trade was not universally accepted in Germany with calls for its cessation beginning in 1910 and gathering momentum to the point where in 1913 legislation for a total ban on bird of paradise hunting was proposed. The same year a petition bearing 17 names of plantation owners opposing the ban was prepared (Swalding 1996). The fact that Wilhelm Stüber's name does not appear on this list suggests he was probably a relatively minor player in the business and may not even have been licensed. During WWI Kaiser Wilhelmsland was occupied by Australian troops but international law forbade interference with civilian statutes and so the plume trade remained legal until the territory was officially annexed after the war. In 1917 Stüber moved to Hollandia, just over the border in neutral Dutch New Guinea. There he continued to work as an agent in the plume trade until it was finally prohibited.

Stüber had a small plantation (ca 20 hectares) in a district called Pim at the western end of the Yotefa (Jautefa) Bay, south of Hollandia town (Fig. 5). The plantation was about two kilometres away from the Pim jetty. At least in 1936 the plantation was planted with coconuts, an acre was reserved for coffee and there were kapok trees and various fruit trees, such as coffee, sago and bananas. There was also an orchid garden. A good deal of the estate contained uncut forest.

In July 1927 he married Juliana Brighantine Deckner. Born in 1902 Juliana (nicknamed Lucie) was 25 years younger than her husband. Their first child, Heinrich, had been born as early as July 1921. When Juliana became pregnant for the second time in 1927, her father, Hans Julius Waldemar Deckner, suggested to Stüber he should do the right thing and they married. Eventually they were to have two boys and four daughters. The youngest daughter was born in 1932.

#### *Visit by Evelyn Cheesman in 1936*

During her second expedition to New Guinea the English entomologist and writer Lucy Evelyn Cheesman (1881–1969) stayed a few days in Stüber's house in February 1936 and together they made a two-week expedition through swampy terrain inland to the Ijapo Hills (Mt Nomo), reaching Njau near the border. Professor L.F. de Beaufort had asked Lieftinck whether he should advise Cheesman to contact Stüber for assistance. En route to New Guinea Cheesman had visited Lieftinck at the end of December 1935 who had provided her with an introduction.

In her 1938 book *The land of the red bird* Cheesman provides a good deal of information on Stüber's activities, on his family and on his personality. Cheesman wrote: "A lean man of sixty-five [in fact nearer 60], his life in the tropics had certainly not sapped his energy, which seemed to be unlimited, nor dulled his very fertile brain" and, "I am in the habit of taking a plantation as a revelation of its owner's character, and a few hours spent on the cultivated ground filled me with admiration for the unbounded energy of the owner. It is such a rare quality in the tropics, but Herr Stuber is the type that can carve a way through any adverse circumstances. If fate took all his straw away he would continue to make bricks out of nothing, producing very creditable substitutes, and convincing everybody including himself, that they were better than bricks. While his Dutch and German neighbours spent years in proving that it was impossible to make a living there under the existing conditions, he rapidly came to that conclusion before his savings were spent, turned over most of his crops to his wife and children, and concentrated on the collecting of butterflies and orchids. By his own energy he got in touch with dealers, and gradually made a name because he took pains to supply only what was wanted". Coincidentally, just a few weeks before Cheesman, the young Australian zoologist Alan John "Jock" Marshall (1911–1967) visited Stüber's plantation. Later Marshall's wife (Marshall 1998, Chapter 4) wrote as follows: "They went by way of a plantation owned by a German, Herr Stuber. Jock was impressed with the estate – Stuber grew kapok, coffee, sago and bananas and spent much of his time collecting butterflies for the Batavia Museum. Jock knew of his international reputation among lepidopterists but was excited to find he had made pioneering trips into the interior. This was exactly the kind of contact he sought. He talked with Stuber for hours about his work, his trading with the inland natives and the establishing of friendly relations - his life among butterflies and savage man."

Cheesman wrote that the house was rather small for the half-German wife and the many children. “A corner of the verandah housed my baggage, but that was the only space I would allow them to give up to me, though the whole place was most generously put at my disposal; and I was rather ashamed of occupying that, for every foot of the floor was needed for sleeping mats at night.”

Cheesman praised Stüber’s knowledge of local conditions, but also complained of his garrulousness and relaxed organisation of the expedition. Describing their first meeting in Hollandia, she wrote: “That first evening, when for hours I garnered facts from him about local conditions was one of the most profitable I have ever spent ...”; “Herr Stuber shared my evening meal on that first evening in Hollandia, and never stopped talking except to put something in his mouth – and that did not happen very often.” “In a few minutes I had a rough list made of all that would be required [for the field trip], and some queries to be answered. But there was a good deal of difficulty in discussing practical points, because my visitor’s mind flew about wildly on quite incongruous subjects. While I asked questions on stores, he declaimed on the geology of the Cyclops Range, of which he knew nothing, and made most amazing statements with utter disregard of facts. When I had extracted enough information, and proceeded to discuss carriers and the camp, he was babbling about spiritualism and astrology, and quoting proof of there being spirits inhabiting the mountains. I was alternating between hope and despair, at one moment thinking that this was the very man who would give help I wanted, and at the next that it would be impossible to expect any plan to be successful with such an erratic guide.”

During their joint field trip Cheesman appreciated Stüber’s abilities as a guide who knew the local conditions well and spoke the natives’ language fluently. She admired how the natives chatted freely with him, since this was most unusual. She also noticed that he was very fit for his age; when crossing streams using fallen trees as bridges Stüber was “nearly as agile as the [native] boys” and, unlike Cheesman (who was four years younger than Stüber), he had seldom to clamber down the banks and wade through the stream.

In their field work Cheesman and Stüber worked independently and usually met for the sunset evening meal. This suited Cheesman, who preferred to work alone. Cheesman wrote somewhat uncharitably: “Herr Stuber did not take part in that process of catching insects at the screen. He used to relax in the evening after supper, by lying on his back in his hut with one leg over the other crooning old German songs very untunefully – or some mission-hymn which was in vogue among the boys just then and which they accompanied on a mouth-organ”. Then, to Cheesman’s dismay Stüber suddenly announced that there was insufficient food and that they had to return. “I was completely staggered”. “I had no intention of doing such a thing. There was at the very least five days’ work planned ahead”. However, after obtaining an unexpected new supply of food, they agreed to stay three more days. On the last evening in the field Stüber suddenly insisted he wished to learn how to operate a moth screen. The “desperately tired” Cheesman tried to explain that there was no point setting up the screen on a dry evening near the river, but since he “behaved so much like a disappointed child” she finally agreed and the screen was set up, but “of course not a single insect appeared the whole evening”. (It should be mentioned that Stüber seems to have been a good student, since in 1937–1939 he collected many moths in the Bewani mountains, almost certainly attracted to light; some of them were new species, quite recently described). The whole next day was spent walking back to the coast, the distance of about 30 km. “Herr Stuber did not once stop talking all the way home”, wrote Cheesman peevishly.

In her later book *Things worth while* (1957) Cheesman wrote of her trip to Mt. Nomo: “and I had a good guide (though not a very reliable companion, as it turned out); in a German who was temporarily in Hollandia. He knew the bush, he had travelled alone in unmapped territory which gave him an assurance that bushmen instinctively recognize. That was enough credential for me. Herr Stuber wished to learn how to collect and preserve insects other than dragonflies, for he was already sending these to a Dutch entomologist [Lieftinck]; and he was under contract to the Dutch Government to open a boundary road beyond Mt. Nomo. So we were mutually accommodating, which was lucky.” She also wrote: “The sight of them [Goura pigeons, Fig. 14] started the reminiscences by Stuber, who had been an agent in the plumage trade, paradise birds were the most valuable, but the crests of these blue-grey pigeons made good prices. Stuber’s stories were fascinating, though I suspected them of a considerable amount of embroidery for he was very boastful.”

The remark that Stüber was not ‘a very reliable companion’ is of course highly subjective. It refers to the incident explained above (also repeated in this 1957 book) of how he wanted to cut short the trip. Evelyn Cheesman never enjoyed field work with other collectors and she always wanted to be independent. The Anglo-Irish odonatologist Cynthia Longfield (1896–1991) shared a small ship cabin with Cheesman in the St. George Expedition to the Pacific in 1924–1925. In Longfield’s biography written by Hayter-Hames (1991) it says: “Evelyn Cheesman, a self-contained character, and a scientist jealous of her own work, had by now [in Tahiti in February 1925] become irritated by the slow progress of the St George and had quarrelled with almost every one of the scientists. When they arrived at Papeete, Evelyn therefore left the expedition and went her own way...”. From then on she always travelled alone. Her negative comments on Stüber must be seen in this light. It was unusual for her to spend so much time in the society of a social equal on her field trips.

Stüber also made comments on Cheesman. They are mostly more generous than her remarks on him. In



his letter to Lieftinck on 4th April 1936 he wrote that he met Cheesman after she had returned from her hard field work in the Cyclops Mountains with four Papuans. “She looked wretched when I met her two days ago. But she must be very strong. She is very capable and in her field of research she has remarkable knowledge”. On 14th November 1936 he wrote that Miss Cheesman must have done a good job, especially during the trip to the Cyclops where she was allowed to use his former camps. “Sie verdiente es auch – denn sie war ein echter Mensch – nur etwas knickerich – aber perfecte Menschen gibt es ja nicht.” (She earned all this since she was a very sincere person, only a little niggardly, but perfect people do not exist).

Nevertheless it is from the irascible Cheesman we get a real sense of Wilhelm Stüber the man. He spoke excellent English – he liked to eat cucumbers soaked in lime – he often went barefoot – he thumped the table to emphasise his points at their first meeting, so causing the camp table to collapse repeatedly. This is a picture of an affable eccentric and a warm-hearted enthusiast, an intelligent adventurer and an opportunist. The man who wrote with such verve and excitement of his encounters with *Palaeosynthemis gracilentia* in the Cyclops Mountains. Stüber was obviously a man of spiritual sensibilities. In a letter to Lieftinck (2nd April 1932) he stated his motto to be “*Veni creator spiritus, accende lumen sensibus*” (Come, creator spirit, kindle the light of our senses). These words were taken from the first lines of the first and fourth stanzas of a well known 9th century hymn, believed to be written by the Benedictine monk Rabanus Maurus, still in use in the Catholic Church. It was translated into German by Martin Luther and others, and Stüber’s use of the Latin text, and a reference to the Pope, suggests he was probably raised in the Catholic faith. Other remarks in his letters however, reveal he probably subscribed to a personalised spirituality, which seems to have meandered and shifted from one theme to another, never crystallizing in a commitment to any fixed creed. It is probably best to regard him as an unconventional Christian with eccentric mystical tendencies. His faith perhaps mirrored his science. It was rather chaotic and quirky.

#### *Stüber in government service*

From the collection records compiled by Lieftinck, it is evident that Stüber made his two first visits to the area between the River Tami and the border with the Territory of New Guinea (former German New Guinea) in May and October 1935, when he collected in ‘East Tami and Tarafia’. In November 1935 he penetrated further inland to ‘Njau Sanke and Skoffrai’, ca 30 km south of the Oenake range and Mt Bougainville. These trips interested the Dutch Government, and early in 1936 they inquired whether he would be interested in joining the government service to open ‘a new road’ and a new government station in the area near the boundary of the Territory of New Guinea which was not yet under control. Stüber agreed and in April 1936 he started his work as ‘bestuursassistent’ (assistant administrator). The ultimate goal was to open a ‘road’ from the coast to Waris, on the southwestern slopes of the Bewani mountains and further to the Keeram River. In his letter to Lieftinck on 22nd March 1937 he wrote that he had established his headquarters in the Bewani mountains, five days walk from Hollandia. “Perhaps everything will be complete this year.” He visited this area south of the Bewani mountains for the first time in April 1937. On 3rd November 1937 he wrote that the ‘Hauptstation’ would be built at ‘Ampas, Kali Bau’ at about 3° 10’S and 140° 54’W (Fig. 5). In his last letter to Lieftinck, written in Ampas on 6 July 1939 Stüber wrote that he now had 10,000 sq. km under his control, with a population of 3,500 Papuans. He had just returned from a long trip to southwards of Pauwasi River, where he reached 3° 46’ 10”S and 140° 48’ 40”W (Fig. 5).

The government’s ultimate goal was to bring the fierce Waris tribes under control. These tribes lived in the area between Keeram and Bapi Rivers on both sides of the border. Stüber’s station at Ampas was the first inland patrol post in Dutch New Guinea, all others being on the coast. No better man than Stüber could have been found for this job, since he was already known by local people and was fluent in the local language. A man hunting insects and orchids was unlikely to arouse suspicion among the natives. The most important criterion was that there were no Dutch officials with experience of New Guinea forest. However, in 1940 Stüber’s work was abruptly interrupted by World War II.

#### *Internment and death of Stüber*

Stüber’s life was to end tragically. In May 1940 all adult male German nationals in the Dutch East Indies were rounded up and interned by the authorities following the invasion of the Netherlands by Germany. Among them was the 62-year-old Wilhelm Stüber. He was incarcerated in a camp in Sumatra. When Japan entered the war in alliance with the Axis powers in December 1941, it was deemed necessary for security reasons to move the German prisoners to British India. Stüber was sent on the freighter ‘*van Imhoff*’ which was attacked and sunk by a Japanese bomber on 19th January 1942. Of the 473 detainees aboard, only 66 survived. Wilhelm Stüber was not among them. Further information on the incident may be found in De Jong (1984), Bappert (2004), Gräbner (2012) and Womack (2015).

For Wilhelm Stüber it was a terrible end to a varied, interesting and productive life and a great loss to entomology. For his family the war against the Japanese also had dire consequences. Only his wife and her two oldest children Heinrich Maarten and Ida Rosalia survived; the other children died in Hollandia. After the war they remained in Hollandia, but the confiscated plantation was never restored to them. They immigrated to the Netherlands in 1962. Stüber’s wife Juliana died in 1985.

M.A. Lieftinck survived the war, spending over three years in Japanese prison camps in Java from December 1942 to January 1946. In 1949 he published the seventh and final part of his New Guinean Odonata series including several new species based on Stüber's specimens. In the introduction (dated Aerdenhout, January, 1947) Lieftinck wrote: "These collections, together with the extensive series sent to the Buitenzorg Museum by the late Mr. W. Stüber, from 1930 until 1939, form the basis of this work." Therefore by then Lieftinck knew that Stüber was dead.

Wilhelm Stüber's legacy is still not fully realised. In various museum collections there are numerous insect specimens collected by him in New Guinea which have not yet been scientifically studied. Undoubtedly more new species will be described from his material. Perhaps some will be named *stueberi*. We hope so.

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**Figure 16.** *Rhyothemis regia juliana* Lieftinck, 1942. In a surge of patriotism following the invasion of his homeland, M.A. Lieftinck named three splendid New Guinean *Rhyothemis* subspecies after members of the Dutch royal family; this one after Princess Juliana, the Queen regnant apparent of the Netherlands. Ironically, all specimens of this new taxon had been collected by Wilhelm Stüber, who, although in government service, had been deemed an enemy alien and interned. Artwork by A.G. Orr.



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**African Freshwater Entomology Workshop (AFRESH) Workshop  
1-7 February 2016, Midmar, KwaZuluNatal, South Africa**

**Viola Clausnitzer [violacl@t-online.de]**

From 1-7 February 2016 the first AFRESH workshop was held at Midmar in KwaZuluNatal, South Africa (AFRESH: **A**frican **F**reshwater **E**ntomology **W**orkshop) as part of Michael Samway's and KD Dijkstra's JRS Biodiversity Foundation project [[http://jrsbiodiversity.org/grant/stellenbosch\\_dragonflies/](http://jrsbiodiversity.org/grant/stellenbosch_dragonflies/)]. It was organized and held in cooperation with the Albany Museum of Rhodes University in Grahamstown in South Africa.

The workshop was attended by 69 delegates representing 21 African countries working with dragonflies, damselflies, mayflies and caddisflies convened for the first time in history.

The main goals of the workshop were:-

- (1) provision of field skills;
- (2) provision of identification skills;
- (3) room for networking;
- (4) provision of information on conservation and environmental education.

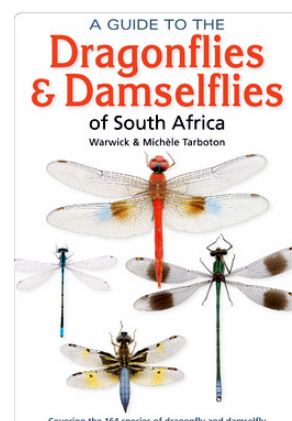
The workshop was considered a great success by the organizers and attendees, resulting in a memorandum and several new co-operations and proposals. It will lead to an increase in data and information on Africa's dragonflies. Freshwater quality and availability will be a main focus for Africa's future. Four-fifths of global population growth in the 21st century is predicted to be in Africa, and it is on this continent that future impacts on threatened biodiversity will be greatest. As insects make up over two-thirds of all aquatic species, the aim was to gather university lecturers and students, museum researchers and curators, conservation managers and educators, environmental consultants, ecotourism guides, and nature enthusiasts together at AFRESH1. We are now equipped to set priorities for African freshwater biodiversity research and conservation.



**Figure 1. AFRESH 1 Workshop group photo, Midmar in KwaZuluNatal, South Africa.**

**Guide to the Dragonflies & Damselflies of South Africa**  
By Warwick & Michèle Tarboton

The recently published field guide to the dragonflies and damselflies of South Africa, which covers all species known to occur in the region, was published in May 2015 (see July, 2015 *AGRION*, p. 74). The 216 page publication with 400 colour plates is now available as a digital 'pdf' from Penguin Random House South Africa. Price R199.00 see [<https://penguinbookssa.snaplifty.com/product/9781775841852>]



## Micro Four Thirds camera system - a light-weight alternative to digital SLR camera systems

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Travelling wildlife and dragonfly photographers, who like to take high quality macro photographs, landscapes and also distant animal and bird photographs, but who do not want to be weighed down by heavy equipment, now have an alternative choice of light-weight digital camera systems compared to traditional digital single lens reflex (SLR) cameras. These alternative systems are known as mirrorless interchangeable-lens cameras (MILC) and 'bridge cameras' but the image quality of the latter, although in many cases very good, cannot compete with the high quality of digital SLRs. MILCs have many features in common with digital SLRs and currently there are numerous manufacturers producing MILC systems including, in chronological order of their date of introduction, Epson, Leica, Olympus and Panasonic, Samsung, Sony, Nikon, Pentax, Fujifilm and Canon. The widest choice of lenses for MILCs are produced by Olympus and Panasonic for their Micro Four Thirds system (MFT). MFT cameras use the smallest sensor size adopted in MILC systems, and as a result MFT lenses are also amongst the smallest and lightest MILC lenses. The surface area of the MFT sensor is nevertheless nine times the area of typical compact cameras and bridge cameras using small 1/1.25" & 1/1.23" sensors (see Figure 1). Following the recent introduction of a series of rugged, weatherproofed, high quality and high performance 'professional' MFT lenses, over the past three years, the light-weight MFT system has now come of age and represents serious competition to digital full frame SLR and Advanced Photo System type-C (APS-C) SLR camera systems, in a market hitherto dominated by Canon, Nikon and Sony.

The forerunner to the MFT system, the Four Thirds system, was first announced 13 February 2001 and was developed jointly by Olympus and Eastman Kodak for digital SLR and mirrorless cameras and associated interchangeable lenses. The system utilises an 'open standard' lens mount, enabling third party manufacturers to produce lenses and cameras that are compatible with each other under licence arrangements. The first Four Thirds camera was the 5 megapixel Olympus E-1, announced 24 Jun 2003, and the majority of Four Thirds cameras have hitherto been made by Olympus but Panasonic and Leica also make Four Thirds cameras. It wasn't until September 2011 that Nikon announced its first mirrorless camera and Canon followed in June 2012.

In August 2008 Olympus and Panasonic introduced the Micro Four Thirds (MFT) system that uses the same Four Thirds sensor but replaces the digital SLR mirror viewfinder with either a live preview, displayed on a liquid crystal screen, as seen in compact cameras, or an electronic viewfinder, or both. The main purpose for removing the reflex mirror box viewfinder was to reduce the distance between the lens mount and the sensor, enabling the production of much smaller lenses and cameras. Four Thirds lenses may be used on a MFT camera but due to the smaller size of the MFT lenses and lens mount an adaptor has to be used.

The Four Thirds sensor measures 17.3 x 13 mm and is half the length of a full frame 35 mm sensor (36 mm in length); it covers 26% of the full frame sensor area. For comparison of sensor sizes commonly used in digital cameras see Figure 1. In digital photography the Crop Factor or Magnification Factor is the ratio of a camera's imaging area to a reference full frame 35 mm camera which has a 36 x 24 mm sensor.

It is calculated by dividing the full frame sensor diagonal measurement (43.3 mm) by the cropped sensor diagonal, which for a Four Thirds sensor (17.3 x 13 mm) is 21.64 mm, giving rise to a Crop Factor of 2.0 x. To find the equivalent focal length of a lens and camera using a cropped sensor the lens' focal length is multiplied by the Crop Factor. In the case of MFT camera a 75-300 mm lens has an equivalent focal length range of 150-600 mm. The depth-of-field also increases for cropped sensor images relative to full frame images taken at

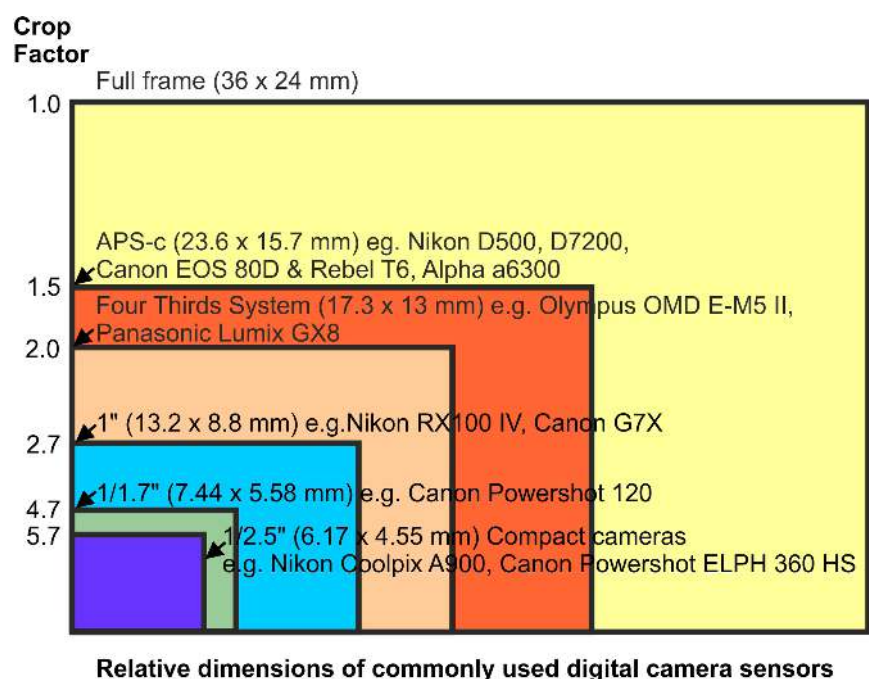


Figure 1. Comparison of commonly used digital camera sensors.



the same distance from the subject using equivalent focal length lenses. To obtain an equivalent depth-of-field for an MFT lens, compared to a full frame set-up, divide the f-stop of the full frame lens by 2 e.g. for subjects set at the same distance from the camera, an MFT Olympus OM-D E-M1 camera and Olympus 300 F4 MFT lens with aperture set at F4 would produce a depth-of-field broadly equivalent to a full frame Nikon D800 using a 600 mm F4 lens set at F8 i.e. for equivalent camera and lens set-ups an MFT lens has approximately two f-stops greater depth-of-field. The increased depth of field can be a useful feature, good for macro photography but not so good for isolating subjects from their background. However, several prime lenses are made for MFT cameras with apertures as fast as F0.95, which can achieve shallow depths of field equivalent to fast F1.8 full frame prime lenses.

The extreme close focus ability and light weight of the MFT telephoto lenses also open up new options for the dragonfly photographer. In bird photography it's important not to intrude on a bird's comfort zone, which usually necessitates the use of long reach telephoto lens, such as 600 mm or 800 mm lenses and perhaps a 1.4 x teleconverter. On a smaller scale the same problem arises in dragonfly photography. I do not know any dragonfly photographer who would consider using a full frame dSLR lens super telephoto lens to take dragonfly shots; some might use a 300mm and a 1.4x or 2.0x teleconverter or perhaps a 100-400 mm zoom but certainly not a larger lens, as the weight problems would be prohibitive, and dSLR super telephoto lenses do not focus at close distances. The most commonly used technique is to slowly, slowly approach a settled odonate and get close enough to use a long macro lens such as a 150 mm, 180 mm or 200 mm macro (minimum focus of a Nikon 200 mm F4 macro is 0.5m achieving 1:1 magnification); this technique, more often than not, results in disturbing active and alert dragonflies and damselflies. MFT light-weight telephoto lenses, close focusing (300 mm, or 75-150 mm coupled with a 1.4 teleconverter), are perfectly suited for taking odonate portraits.

For the past few years I have used a Nikon D800 full frame camera weighing 1kg and a Nikon 200 mm F4 macro lens weighing 1.2 kg to take portrait and close-up photographs of dragonflies. The total weight of this full frame macro camera system is around 2.2 kg. The Olympus E-M1 MFT camera weighs just 0.5 kg and the 75-300 mm weighs as little as 0.4 kg, so my light-weight travelling MFT set-up is less than half the weight of my 200 mm macro full frame gear. As yet there is no long focal length fully compatible MFT macro lens greater than 60 mm made by Panasonic or Olympus but Samyang produce a 'manual use only' 100 mm (200 mm full frame equiv.) macro lens for MFT cameras; this lens has no electronic connection to the camera body. Olympus makes a 60 mm (120 mm full frame equiv.) macro lens (1:1 magnification), weighing just 186 g, which is useful for damselfly and small dragonfly close-ups, but for medium-sized and large dragonfly portraits the Olympus 75-300 mm (150-600 mm full frame equiv.) or the 300mm 'professional' F4 lens (600 mm equiv.) can be used to take high quality images from surprisingly short distances. The 75-300 mm lens will focus as close as 0.9 m at 75 mm focal length and 1.3 m at 300 mm. The new 'professional' Olympus 300mm, F4 lens weighs 1.27 kg and has a minimum focus of 1.4 m. The minimum focus on the latest 3.8 kg Nikon 400 mm F4 prime lens is 4.4 m and the 3.9 kg Canon EF 600 mm is 4.5 m. The close focusing capabilities of the MFT long telephoto lenses, such as the Olympus 300



**Figure 2. Dark-winged skimmer (*Diastatops pullata*), Cuyabeno National Park, Lago Agrio, Ecuador, 29 Feb 2016, taken with Micro Four Thirds camera Olympus E-M5 II, and Olympus 75-300mm lens. Lens and camera details: (600mm full frame equivalent), ISO 400, 1/400s, f/8. Photo credit: Keith DPWilson.**

mm F4 prime lens enable the taking of up to ca. 1:5 ratio images. The Olympus 75-300 mm lens zoomed to 300 mm focal length and focused on a subject at the closest distance of 0.9 m produces an actual subject image width of just under 10 cm on the MFT sensor i.e. max magnification of 0.18x. The portrait image of the dark-winged skimmer (*Diastatops pullata*) shown in Figure 2, taken in the Ecuadorian Amazon basin was obtained using a hand-held 75-300 mm, zoomed to 300 mm, from about 1.5 m distance from the subject. The broad-bellied chaser photographed in Figure 3 was taken using an Olympus E-M5 Mk II and 300mm F4 'professional' lens and a 1.4x digital teleconverter (840mm equivalent), hand-held! From about 1.5 m, the minimum focus distance for this lens set-up, only a small part of the libellulid dragonfly would fit on to the sensor; I had to take a full (1 m) step back to fit the full dragonfly into frame!

I should point out that Canon announced in November, 2014 its new super telephoto 100-400 mm F4.5-5.6 Mark II zoom lens, weighing a modest 1.57 kg, and capable of focusing at just 0.98 m (max. magnification = 0.31), which is a major improvement on the Mark 1 lens (Mark 1 min. focus = 1.8 m). This lens is proving to be very popular with wildlife photographers using Canon DSLR cameras.

Only Olympus and Panasonic produce MFT cameras but numerous third party manufacturers also produce MFT lenses, in addition to Olympus and Panasonic, including Tamron and Sigma, whose lenses function with autofocus, and Voigtländer, Kowa, Tokina and Samyang who produce manual focus only MFT lenses.

A summary of the main advantages and disadvantages of the MFT system compared to full frame digital SLR cameras is listed in Table 1. The list is not comprehensive as there are many additional features that have been developed for MFT cameras e.g. Olympus E-M5 II on-board keystone compensation and Olympus E-M5 II high-resolution mode that produces a 40-megapixel JPEG image and a 64-megapixel RAW file (must use tripod as image has to be absolutely still for multiple exposures and a free Photoshop plug-in is required for processing the high-resolution RAW images), Olympus E-M5 II and E-M1 focus bracketing and stacking (focus is shifted slightly during multiple exposures to achieve incredible depths of field (see [<http://cameras.olympus.com/stack/en/>])).

### Bridge cameras

Bridge cameras, also known as superzoom cameras, bridge the gap between digital SLR and compact cameras. They are typically similar in size and weight to digital SLRs but utilise a single fixed super zoom lens (up to 65x optical zoom) rather than interchangeable lenses and make use of an electronic view finder. Most bridge cameras use small compact camera-sized sensors e.g. 1/2.3" (6.17 x 4.55 mm). In September 2012 Dennis Paulson posted, on the Odonate Listserv (Odonata-L), a summary of a series of responses he had had to his query regarding the use of 'bridge cameras' as an alternative to using heavy digital SLR equipment, especially when travelling. There were many favourable reviews about the ability and performance of these cameras, which typically weigh just 550-650 g, but the quality of the general purpose wide-angle to superzoom lenses and the small-sized sensors used ensures these cameras are not in direct competition with digital SLR or MFT cameras.

### Conclusion

The autofocus systems and resolution of MFT camera systems, combined with the use of a comprehensive range of high quality 'professional' lenses, have now reached a point where they represent an attractive alternative to conventional digital full frame SLR camera systems, especially for travelling nature photographers interested in light-weight equipment capable of taking high quality pictures of dragonflies, birds and landscapes.



**Figure 3. Broad-winged skimmer (*Libellula depressa*), UK, 17 May 2016, taken with Micro Four Thirds Olympus E-M5 II camera and Olympus 300 mm 'pro' lens plus 1.4 x digital teleconverter i.e. 420mm (840 mm equivalent), ISO 1,000, 1/250s, f/16, hand-held. Photo credit: Keith DP Wilson.**



**Table 1. Summary of advantages and disadvantages between full frame digital SLR and MFT camera systems.**

Full frame digital SLR		Micro Four Thirds	
Disadvantages	Advantages	Disadvantages	Advantages
Heavy cameras and lenses that are relatively expensive.			Very light-weight cameras and lenses that are relatively cheap.
Fast, long super telephoto lenses are very heavy and bulky, e.g. 600 mm F4 lens (ca. 3.8 to 5.0 kg weight). Usually impractical to carry long distances or take abroad when travelling.			Can take a wide selection of lenses when travelling including long telephoto lenses e.g. 300 mm (600 mm full frame equivalent lens) highly portable (ca. 0.5 to 1.27 kg weight).
Heavy, long focal length macro lenses (180 to 200 mm) ca. 1 kg	High quality, long focal length telephoto prime macro lenses available e.g. Sigma 180mm F2.8 macro; Nikon 200mm F/4 macro; Canon 180mm F3.5 macro.	No current, electronically connected, long focal length telephoto macro lens available.	Medium, very light-weight, telephoto length macro lenses available e.g. Olympus 60 mm, F2.8 macro lens.
Depth-of-field not as high as MFT equivalent.	Greater isolation of subjects.	Isolation of subjects not as good as equivalent full frame focal length.	Greater depth-of-field at same aperture setting.
	Greater sensor size (36 x 24 mm)	Smaller sensor size. (17.3 x 13 mm)	
	Greater image size e.g. Nikon D800 (36.3 megapixel produces a fine, large-sized RAW file typically 35 Mb; maximum resolution (Nikon D800) 7360 x 4912.	Smaller image size e.g. Olympus M5 Mk II produces fine, large-sized RAW file typically 17 Mb; maximum resolution 4608 x 3456.	
Viewfinder magnification not as high as MFT cameras typically 0.7 x.	Optical viewfinder.	No optical viewfinder. Initially MILC electronic viewfinders suffered from a noticeable lag time in displaying movements in the subject but the latest models have no noticeable lag time. There is a short lag time on start-up.	High quality electronic viewfinder (EVF) allows for the overlay of complex information such as manual focusing aids such as peaking and under/overexposure 'blinkies'. Higher viewfinder magnification than dSLRs. 48x.
dSLR optical view finders currently do not take advantage of technological developments such as digital zooming and peaking.			EVFs support latest manual focusing technologies such as digital zooming and peaking.
	The continuous autofocus operation of high quality dSLR cameras have superior accuracy and speed when photographing moving objects such as birds in flight.	Contrast detection used in continuous autofocus is not as fast or as accurate as dSLR, especially in low light, so not as good for taking action photographs of moving subjects such as birds in flight.	The Olympus E-M1 focuses uses phase detection in addition to contrast detection autofocus. Using Olympus 300mm F4 with its built in lens stabilisation the camera and lens stabilisation systems combine to provide up to six shutter speed steps of compensation (very effective 5-axis IS Sync technology) that permits hand-holding in well-lit conditions.
Expensive batteries.	Long battery life.	Small battery and short battery life	Batteries relatively cheap.

# Stories from social and cultural odonatology: How the Madagascan libellulid *Trithemis selika* (Selys, 1869) got its name

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As is to be expected for a member of a wealthy, noble family, Baron Edmond de Selys Longchamps (1813–1900) had refined tastes. He regularly visited the theatre, orchestral concerts and opera. From his diaries, which he kept almost daily from 27 August 1823 to 26 November 1900, Caulier-Mathy and Haesenne-Peremans (2008, pp. 1688–1696) indexed over 500 visits to the theatre, concerts, opera, ballet and revues, mainly in Liège (his home town) and in Brussels. His political duties as a senator and his activities in academic circles necessitated his visiting Brussels regularly for a few days at a time, which gave him ample opportunities to satisfy his desire for the delights of high culture. Selys was especially fond of opera and he saw at least 130, many several times.

On 12 December 1865 Selys went to Brussels to participate, as a Member of the Senate, in the funeral of King Leopold I, who had died on 10 December, and to attend the coronation of his successor King Leopold II. The funeral took place on 16 December and the coronation the next day. Further sessions of the Senate kept Selys in Brussels until 23 December. On Friday 22 December he and his wife Sophie, who had accompanied him in Brussels, and Sophie's mother Mrs Marie d'Omalus d'Hallooy went to watch the opera *L'Africaine*.

*L'Africaine* (*The African Woman*) was the last work of the German opera composer Giacomo Meyerbeer (1791–1864). The French libretto was written by the French dramatist Eugène Scribe (1791–1861). The grand opera had its premier in Paris on 28 April 1865 (Fig. 1). It became very popular and successful in Europe, the USA and Australia. The opera in five acts depicts fictional events in the life of the Portuguese explorer Vasco da Gama in the late 15th century. The heroine is Sélika (soprano), a young slave woman, supposedly from Madagascar. Sélika, actually a queen, is in love with da Gama and later she saves his life by pretending to be da Gama's wife. After realizing that da Gama is still in love with Inès (soprano), a Portuguese woman, Sélika commits suicide by inhaling the perfume of the blossoms of a poisonous tree.

Selys must have especially enjoyed this opera, as later he saw it four more times, in 1866, 1876, 1877 and 1888. His enthusiasm for it is further reflected in odonatological nomenclature.

On 12 February 1867 Selys wrote in his diary (translated): “Received Madagascan libellulids from Mr Pollen, Leiden.” François Paul Louis Pollen (1842–1886), a Dutch naturalist, had collected a small number of libellulid specimens during his expedition to Madagascar from November 1863 to July 1866. Selys studied them without delay and recognized six species in the material. By 5 June 1867 he had written a manuscript for the series of publications *Recherches sur la faune de Madagascar et de ses dépendances, D'après les découvertes de François P. L. Pollen et D. C. van Dam* (Selys Longchamps 1869). Three new species were described: *Libellula selika*, *Libellula coronata* and *Neophlebia polleni*. The latter species he placed in a new genus, but currently it is known as *Tetrathemis polleni* (Selys, 1869). The specific epithet was a dedication to the collector. *Libellula coronata* was a homonym; this species is presently known as *Chalcostephia flavifrons* Kirby, 1889. *Libellula selika*, presently known as *Trithemis*



Figure 1. Poster of the grand opera *L'Africaine* in Paris (1865).





**Figure 2. Male of *Trithemis selika*, Isalo National Park in Madagascar on 9 January 2016. Photo credit: Erland Refling Nielsen.**

*selika* (Selys, 1869), clearly comes from *Sélika*, the heroine from the opera *L'Africaine*. Selys did not provide any etymology, as this was seldom done at the time, but at least in this case there can be no doubt as to its origin.

It should be mentioned that in the same article Selys described two new '*Neophlebia*' species from the Moluccas; presently known as *Tetrathemis leptoptera* (Selys, 1869) and *Nannophlebia lorquini* (Selys, 1869).

The conspicuous and colourful *Trithemis selika* (Crimson Dropwing) (Fig. 2) is a common and widespread dragonfly in Madagascar. It inhabits a wide range of open, stagnant-water habitats, but can also be found in slow-moving streams and rivers. A subspecies *T. selika maia* Ris, 1915 occurs in the Comoro Islands. The name *maia* comes from Greek mythology.

At least a dozen other species epithets in the extant dragonflies refer to fictional characters from western cultural sources, other than Classical mythology. The best known among them are the names taken from William Shakespeare's tragedies *Hamlet* and *Othello*: *Brachygonia ophelia* Ris, 1910, *Camacinia othello* Tillyard, 1908 and *Agyrtacantha othello* Lieftinck, 1942. The most recent name of this kind is *Archboldargia scissorhandsi* Kalkman, 2007, which was named after the hero of Tim Burton's fantasy film, *Edward Scissorhands*.

'Social and cultural odonatology' as I will use it is a broad concept. It covers anything which has developed in the brains of odonatologists, be it taxon names or derogatory comments on colleagues. In future articles in this series I wish to write on random topics related to past odonatologists and their work on dragonflies.

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## The Nighthawk *Apocordulia macrops* Watson, 1980 (Anisoptera: Libelluloidea) - Godfather duties continue

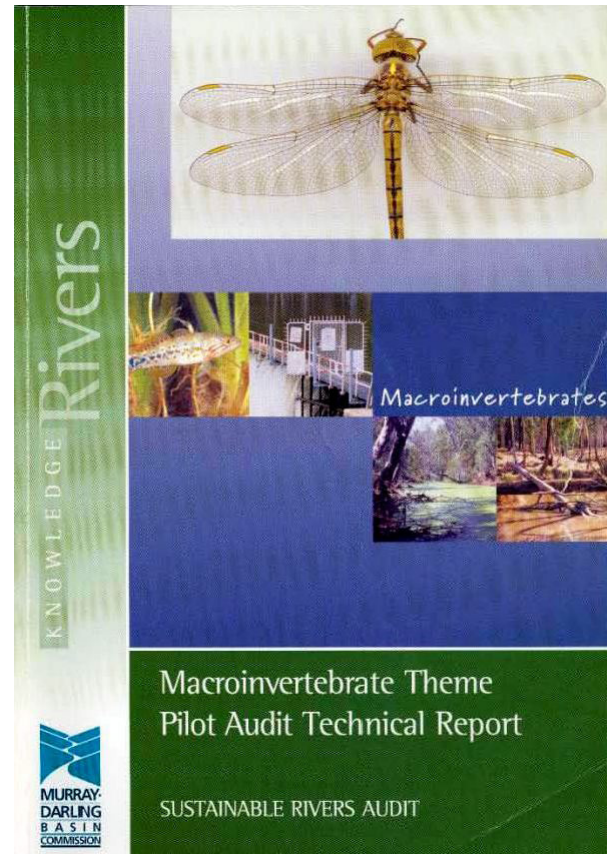
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**Abstract:** Self-imposed obligations of the author toward *Apocordulia macrops* and their execution are reported. Six new records of the species in New South Wales/Victoria are presented. *A. macrops* has recently been assessed as “Near Threatened” by the IUCN. Even stronger protection and a serious attempt to determine by genetic (DNA) studies the systematic position of *Apocordulia* are recommended and foreshadowed.

In the late 1970s Tony Watson, then curator of Odonata in the Australian National Insect Collection (ANIC), sent for a second opinion to me in Austria a then undescribed larva of a then undescribed dragonfly species. Tony subsequently reared through the larvae of this species and consulted my classical language skills for the naming of the new genus and species he was going to describe (Watson 1980), making me feel like the “godfather” of *Apocordulia macrops*. As a consequence I felt that I had to take care of the continuing survival of the species and keep track of its identification, classification and distribution.

This started with a detailed description of the larva in context with the larvae of its supposed allies, and assigning the species to what was then considered the corduliid subfamily Gomphomacromiinae but stressing its distance from the *Synthemis* (and *Gomphomacromia*) group (Theischinger & Watson 1984). The description and illustrations of the larva were good enough to be subsequently recycled in several identification keys e.g. Hawking & Theischinger (1999), Theischinger (2001), Theischinger & Hawking (2006) and Theischinger & Endersby (2009) and were the major tool in obtaining reliable geographical records because the adults proved to be extremely elusive. Following Bechly (1996) *Apocordulia* was, together with a few other genera (most notably *Austrocordulia*) included in Austrocorduliidae by Hawking & Theischinger (1999), Theischinger (2001), Theischinger & Hawking (2006) and Theischinger & Endersby (2009). Ware *et al.* (2007) then demonstrated that *Apocordulia* belongs to the larger GSI-clade (acronym for Gomphomacromia-Synthemis-Idionyx) but the genus could finally have landed in an extended Synthemistidae as this is the oldest available name in the complex.

In my spare time, I took some Australian and overseas dragonfly specialists to *Apocordulia* sites and in that way some details of its secretive adult life were revealed, its high biodiversity value was confirmed and photos of the adult were obtained. One of them was later reproduced on the cover of the *Macroinvertebrate Theme Pilot Audit Technical Report – Sustainable Rivers Audit* (Fig. 1), possibly establishing *A. macrops* as the Macroinvertebrate Icon for the Murray-Darling Basin. On invitation and promise of DNA analysis I also donated a rather comprehensive collection including *Apocordulia* and closer and more distant allies to a leading Australian scientific institution. Unfortunately, after my part was done, nothing happened. In the mean time I travelled widely in the Murray Darling Basin and was able to collect larvae and exuviae of *A. macrops* at several sites in the Murray-Darling Basin including one in Queensland (Theischinger 2009). I wrote a German article (Theischinger 2010) with, amongst other aims, the intention to argue that *Apocordulia* is not closely related to either Synthemistidae or Gomphomacromiidae. Translating part of this into English and communicating it to the odonatological community may have helped because the species was at least provisionally classified - as were a few other closer and more distant relatives - as a Genus incertae sedis in a World Systematic Consensus on the



**Figure 1.** Cover of ‘Macroinvertebrate Theme Pilot Audit Technical Report – Sustainable Rivers Audit. MDBC Publication 07/04’.



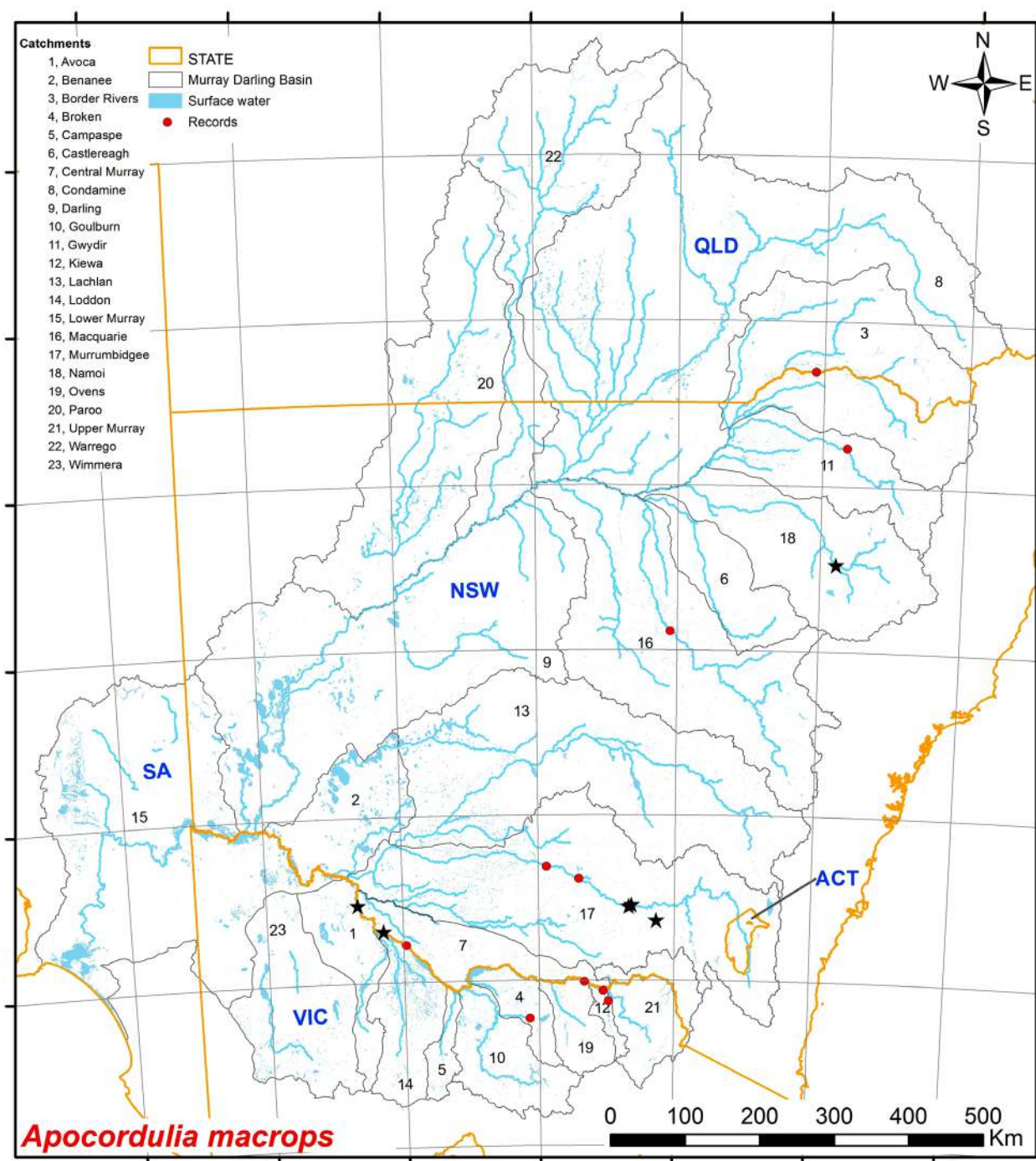


Figure 2. *Apocordulia macrops* records in the Murray-Darling Basin: red spots represent records before 2014; black stars represent records from 2014 and 2015.

classification of Odonata (Dijkstra *et al.* 2013). In the meantime all available geographic records of *Apocordulia macrops* were compiled and listed, water/flow regulation was mentioned as a factor limiting *A. macrops* occurrence among sites and habitats, and it was concluded that the species would probably not be found in catchments where it had not already been found (Theischinger *et al.* 2012, 2013). On this basis it was assessed as “Near Threatened” in the recently prepared Red List assessment (Rory Dow, pers. comm.) despite its rather wide distribution.

In 2014 and in 2015, however, I got another chance to search for *Apocordulia macrops* and, probably thanks to the ‘nose/gut-feeling’ for it that was developed over many years, I found it in six more places (see Table 1), three of them in additional catchments (Namoi River, Avoca River, Loddon River), the last two further west than any previous records, on the Murray River.

Detection of the species at the new sites reinforced the great difficulties of getting to, and finding evidence of, *A. macrops*. The new records also strengthened my view that the survival of this species in some ways depends on the mercy of water/flow regulators. The fact that this species is known from very few protected areas supports the notion that its survival is actually threatened.

**Table 1. *Apocordulia macrops* records of 2014 and 2015, all collected in edge habitat**

Site	Coordinates	Date	Number of exuviae
Namoi R @ Fingal	-30.94943/150.224641	30-May-2015	1
Murrumbidgee R @ Wiradjuri Res.	-35.09154/147.37001	17-Nov-2014	3
Murrumbidgee R @ River Meadow	-35.10910/147.32939	19-Nov-2014	6
Tarcutta Ck @ Borambola Toonga Stn	-35.28125/147.73264	17-Nov-2014	3
Murray R @ Andrew Pearce	-35.38395/143.70942	11-Nov-2015	11
Murray R d/s Rio Vista	-35.06226/143.33953	13-Nov-2015	4

The records from 2014 and 2015 are provided here not just to add a few more dots on the distribution map (Fig. 2). They are presented in order to show again the extreme patchiness of the distribution of *A. macrops* and to support the case, based on available literature and a large survey of dragonflies in the Murray-Darling Basin (Theischinger *et al.*, in prep.) (Fig. 3), for *A. macrops* to be provided the strongest possible legislatively based protection in three Australian states (New South Wales, Queensland, Victoria). The collection of exuviae represents the only reasonably safe and promising way to monitor the continued existence of this crepuscular riverine species. The new records should also be a reminder that it is time to renew the exploration of the systematic position of *A. macrops*. Also for this I shall try to play my part again.

### Postscriptum

After the completion of the manuscript for this article it emerged that my bond with *Apocordulia macrops* actually started 40 years ago with the collection of five exuviae along the Kiewa River at Wodonga in 1976, the oldest material available of the species. These exuviae were donated to ANIC, together with many larvae and exuviae of other species, only in the 1990s and were not available when the species was described (Watson 1980).

### Acknowledgements

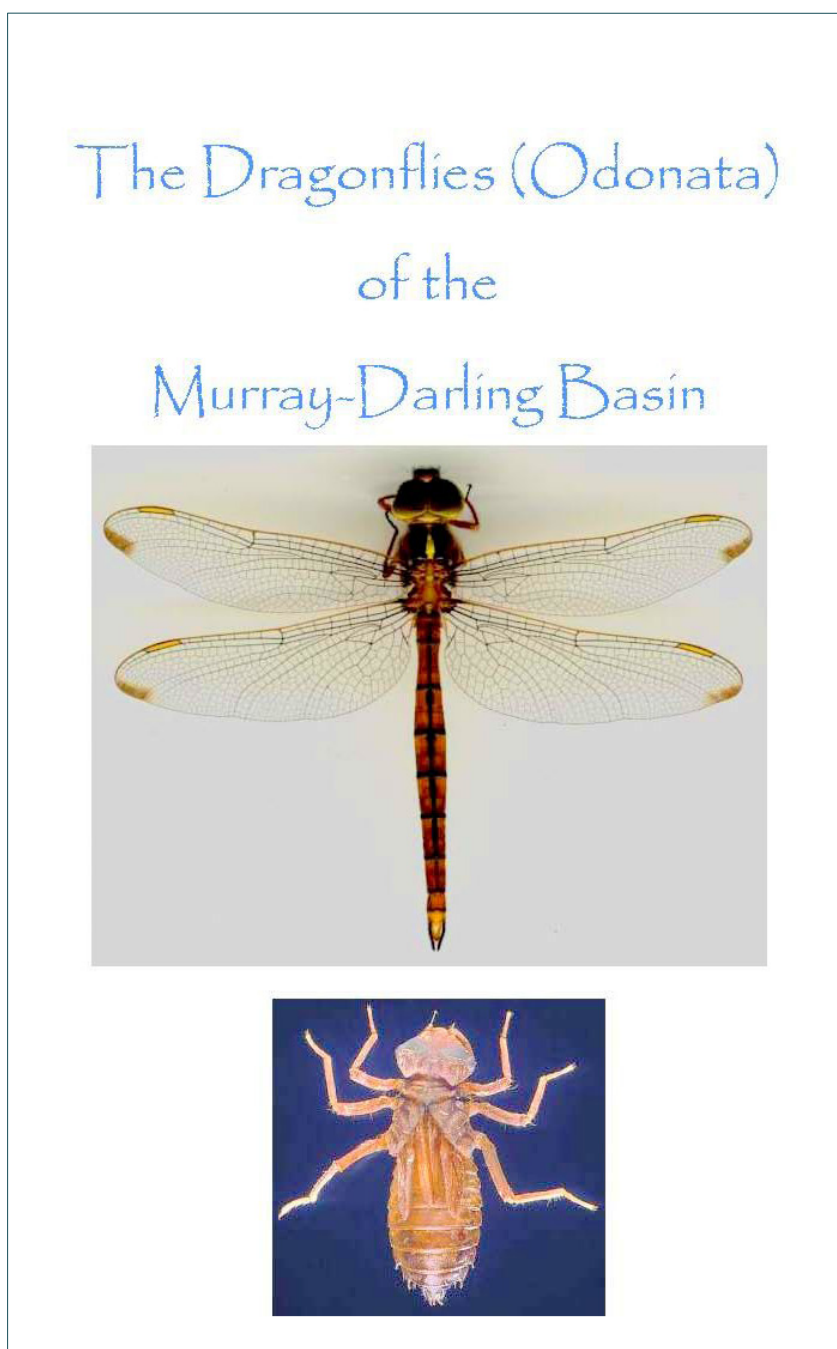
I wish to acknowledge the patience of J. Miller and S. Jacobs, colleagues and co-workers on the monitoring surveys in 2014 and 2015, for putting up with me talking too much and needing too much time whenever there appeared to be a chance to get more information on *Apocordulia macrops*. Also thanked are I. Endersby and F. Turco for their help with information on distribution and material, A. Bransden for preparing the dot map and S. Richards for providing helpful comments on the manuscript.

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**Figure 3.** Proposed Cover of '*The Dragonflies (Odonata) of the Murray-Darling Basin*' (Theischinger *et al.* in prep.).

## Searching for Rwanda's Flying Jewels

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### Introduction

Over 780 different dragonfly species are known from the African mainland. The majority of all African continental dragonflies (74%) are classified by the IUCN Red List of Threatened species as Least Concern (LC), while about 9% (65 species) have been assessed as “threatened” – ie., Critically Endangered (CR), Endangered (EN), or Vulnerable (VU) – and almost 4% (25 species) as Near Threatened (NT). These figures are from Clausnitzer et al. (2012) and all data is available at [www.iucnredlist.org]. At the moment all African species are being re-assessed against the IUCN red list criteria.

### Rwanda

Rwanda is situated on the Albertine Rift (the western branch of the East African Rift), which is one of the diversity hotspots for African dragonflies (Clausnitzer et al. 2012). The historical information on Rwanda's dragonfly diversity is rather limited and most available records date back to the beginning of the 20th century. A total of 53 dragonfly species was known for Rwanda at the end of 2015. This is low, considering the country's richness in aquatic habitats and in comparison with the 228 species known from Uganda.

Within a project about the Lake Victoria Catchment, funded by Mac Arthur and facilitated by the IUCN Freshwater Unit, we managed to allocate some funding for field work in Rwanda. In January and March 2016 we spent a total of three weeks surveying dragonflies in Akagera NP (March 2016), Nyungwe NP (January and March 2016) and Musanze (January 2016). Erasme Uyizye and Yvette Umurungi joined us for some of this survey work. Dragonflies were observed in the field, caught with sweep nets and identified with Dijkstra & Clausnitzer (2014).

### Results

Within our rather short surveys we managed to expand the checklist of dragonflies for Uganda by 36 species to a total of 90. During the three weeks spent in the field we recorded a total of 79 species. Amongst the 37 new country records, one species is new to science (Fig. 1) and another species is possibly also new. The highest species number was recorded from the Akagera National Park area, while endemic, range-restricted and the majority of threatened species were recorded from the Nyungwe National Park. Nevertheless this is certainly not the end of Rwanda's dragonfly species and we expect at least 50 more species await discovery as new country records. Results worth mentioning are listed briefly below. A List of Rwanda's dragonflies (Odonata) with regional occurrence is provided in Table 1.

### Species-specific results

The papyrus wisp (*Agriocnemis palaeforma*) was previously only known from a few papyrus swamp areas in Uganda. Because of its scarce and scattered records it was recently globally and for Uganda nationally listed as Endangered on the Red List. After searching without success in the vast papyrus swamps in the Akagera National Park, we managed to find it in a papyrus swamp along the Akagera River. It seems that the papyrus wisp needs a certain amount of water flow in the papyrus swamp. Even though this species will be downlisted on the global Red List, it will remain in a threat category, since the records are still scarce and scattered and papyrus swamps in general have been facing serious losses in extent and quality due to building activities, agriculture, frequent burning and water pollution in Uganda.

A new sprite (*Pseudagrion*) species (Fig. 1) was found along a stream at Karamba. It is similar to the montane giant sprite (*Pseudagrion bicoerulans*) found on mountains well above 2000 m a.s.l. in northern



**Figure 1.** The new sprite (*Pseudagrion*) species found along a forest stream in the Karamba area of the Nyungwe National Park, January 2016. Photo credi: Jens Kipping.





**Figures 2. Kamiranzovu Swamp in the Nyungwe National Park, March 2016. Photo credit: Viola Clausnitzer.**

Tanzania, Kenya and eastern Uganda. It might be a highly endemic species similar to the Nyungwe junglewatcher and more information on population size, distribution and ecology is urgently required.

The sighting of a potential duskhawker from the genus *Heliaeschna* in the southern palm swamp forests of Akagera National Park would add an interesting genus to Rwanda's dragonfly fauna. This elusive genus is, like the similar genus *Gynacantha*, difficult to record. It flies in the shadow of swamp forests and is active at dusk.

The gorilla longleg (*Notogomphus gorilla*) was only recently described based on specimens collected from the Bwindi Impenetrable National Park and Bundibugyo in Uganda and from Mt Hoyo, Ituri in DRC (Dijkstra et al. 2015). Its range and habitat was described as "forest streams between about 700 and 1600 m a.s.l. in western Uganda and adjacent Congo-Kinshasa" (Dijkstra et al. 2015, p 573). In the Nyungwe National Park the gorilla longleg was found in good numbers along the Gisakura River.

The yellow-fronted longleg (*Notogomphus flavifrons*) is a high altitude species, previously only known from historical records from Bwindi Impenetrable National Park and from an unclear locality labelled "Mbarara-valley, pond". In the Nyungwe National Park we found the yellow-fronted longleg along the stream in the Uwasenkoko Marsh. This species seems to be a high altitude species restricted to areas well above 1500 m a.s.l. Another gomphid – a species of the hooktail (*Paragomphus*) genus – was only found as larvae. The identification of larvae is still difficult for many African species, due to lack of material and identification literature. Nevertheless the whole genus of the hooktails has never been recorded for Rwanda before, so this is at least a new country record.

The potential sighting of a shadowcruiser (*Idomacromia*) at the Karamba Trail is an exciting addition and needs verification. Shadowcruisers are only known from two species in West and Central Africa and only in 2004 a species was described from East Africa based on two females caught in the Bwindi Impenetrable National Park (*Idomacromia jilliana*). All shadowcruisers are very elusive and difficult to collect. Dijkstra & Kisakye (2004) write that "it may take years before the male is discovered". More surveys are urgently needed to confirm this sighting.

The Nyungwe junglewatcher (*Neodythemis nyungwe*) (Fig. 3) was described in 2006, based on one museum specimen from the "Zoologische Staatssammlung Munich", Germany, which was collected at "Rwanda, Nyungwe National Park, Karamba, (2°30'S, 29°10'E), muddy pools and slow-flowing streamlets in rainforest, alt. ca 1,500 m a.s.l." (Dijkstra & Vick, 2006). There was no further information available for this highly endemic species. While few specimens were recorded along a stream in January 2016, we found more adults emerging in the swamp forests around Kamiranzovu Swamp (Fig. 2, 4, 5) in March 2016. The Nyungwe junglewatcher seems to be restricted to the Karamba trail and Kamiranzovu Swamp area in the Nyungwe Mts and the population should be monitored in the future.

### Conservation

The three National Parks in Rwanda, Nyungwe, Akagera and Virunga, are currently well protected and do contain healthy populations of all threatened dragonfly species encountered during our trip. At the moment there is no reason to anticipate a decline in these species' populations and though they can all be named "conservation dependent" no action in respect to the National Parks is needed.

Outside National Parks hardly any natural habitats are left in Rwanda. Most of the land is used for small scale farming, some for large scale farming and in the drier areas in the north-east as pasture for cattle. Swamps and lakes do seem to be fairly natural, but they are heavily encroached and used as well. Papyrus is frequently burned in the dry season to gain access to the water and to get new land for agriculture. Despite the fact that the land outside National Parks is densely populated, the water quality away from cities and larger villages is still in a fair condition. These aquatic sites are important areas for a number of water-dependent species. Around cities, water pollution already poses a huge problem and is an immediate threat to aquatic habitats. Streams, rivers, swamps or lakes around urban areas are used as sewage and rubbish pits, to wash cars, lorries and motorcycles and as construction sites. With the increasing development of Rwanda the pressure on all aquatic sites will rise

tremendously over the next years, which will not only affect aquatic biodiversity, but also human well-being. The construction of sewage works and rubbish pits should parallel any rural and urban development. Awareness of the importance of healthy wetlands for human well-being needs to be brought to rural and urban communities. Use of pesticides and fertilizers needs to be controlled and the re-forestation of hilltops with indigenous species encouraged.

The ongoing population growth in Rwanda together with urbanization, land use intensification and industrialization are already putting a lot of pressure on Rwanda's aquatic sites. Hence we suggest the following measures should be implemented into legislation and/or carried out on the ground as soon as possible:

- control of the use of pesticides and fertilizers;
- construction of sufficiently sized sewage works at all larger settlements;
- protection of existing aquatic habitats, partially by law enforcement;
- reforestation of hill-tops and along streams and rivers with indigenous trees;
- banning of washing activities in aquatic habitats, paralleled by construction of washing places for clothes away from the water course to allow the water to seep through the soil.

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**Figures 3-4. (3) The Nyungwe junglewatcher (*Neodythemis nyungwe*), which is endemic to swamp forest areas around Kamiranzovu Swamp in the Nyungwe National Park (see Fig. 4), January 2016, photo credit: André Günther. (4) The swamp forest around Kaimanzovu Swamp, where several Nyungwe junglewatchers were found hatching in March 2016, photo credit: Viola Clausnitzer.**



**Table 1. List of Rwanda's dragonflies (Odonata) with regional occurrence.**

RL = Red List status 2016; 2016 = species recorded during the two short surveys in January and March 2016; new 2016 = new country records made during that surveys.

Species		Vernacular name	RL	Akagera	Musanze	Nyungwe	2016	new 2016
<b>Zygoptera</b>								
<b>Lestidae</b>								
<i>Lestes virgatus</i>	(Burmeister, 1839)	Smoky spreadwing	LC	x		x		
<b>Calopterygidae</b>								
<i>Umma saphirina</i>	Förster, 1916	Sapphire sparklewing	LC			x	x	x
<b>Chlorocyphidae</b>								
<i>Platycypha caligata</i>	(Selys, 1853)	Dancing jewel	LC	x				
<i>Stenocypha jacksoni</i>	(Pinhey, 1952)	Yellow-sided jewel	NT			x	x	
<i>Stenocypha tenuis</i>	(Longfield, 1936)	Slender jewel	LC			x	x	x
<b>Platycnemididae</b>								
<i>Allocnemis nigripes</i>	(Selys, 1886)	Rainbow yellowwing	LC			x	x	x
<i>Allocnemis pauli</i>	(Longfield, 1936)	Orange-tipped yellowwing	LC			x	x	x
<b>Coenagrionidae</b>								
<i>Aciagrion heterostictum</i>	Fraser, 1955	Long slim		x			x	x
<i>Africallagma elongatum</i>	(Pinhey, 1950)	Elongate bluet	LC	x	x	x	x	
<i>Africallagma pseudelongatum</i>	(Longfield, 1936)	Spotted bluet	LC	x	x	x	x	
<i>Africallagma vaginale</i>	(Sjöstedt, 1917)	Forest bluet	LC	x			x	x
<i>Agriocnemis gratiosa</i>	Gerstäcker, 1891	Gracious wisp	LC	x	x		x	
<i>Agriocnemis inversa</i>	Karsch, 1899	Highland wisp	LC	x			x	x
<i>Agriocnemis palaeforma</i>	Pinhey, 1959	Papyrus wisp	EN	x			x	x
<i>Azuragrion nigradorsum</i>	(Selys, 1876)	Sailing bluet	LC	x				
<i>Ceriagrion glabrum</i>	(Burmeister, 1839)	Common citril	LC	x			x	
<i>Ceriagrion platystigma</i>	Fraser, 1941	Variabel citril	LC	x			x	x
<i>Ischnura senegalensis</i>	(Rambur, 1842)	Common bluetail	LC	x		x	x	
<i>Proischnura subfurcata</i>	(Selys, 1876)	Fork-Tailed bluet	LC	x	x	x	x	
<i>Pseudagrion hamoni</i>	Fraser, 1955	Swarthy sprite	LC		x		x	
<i>Pseudagrion kersteni</i>	(Gerstäcker, 1869)	Powder-faced sprite	LC	x	x		x	
<i>Pseudagrion massaicum</i>	Sjöstedt, 1909	Masai sprite	LC	x			x	
<i>Pseudagrion nubicum</i>	Selys, 1876	Bluetail sprite	LC	x			x	
<i>Pseudagrion sp. nov.</i>						x	x	x
<i>Pseudagrion sjoestedti</i>	Förster, 1906	Variable sprite	LC	x			x	x
<i>Pseudagrion spernatum</i>	Hagen in Selys, 1881	Upland sprite	LC	x	x	x	x	
<i>Pseudagrion sublacteum</i>	(Karsch, 1893)	Cherry-eye sprite	LC	x	x		x	x
<b>Anisoptera</b>								
<b>Aeshnidae</b>								
<i>Afroaeschna scotias</i>	(Pinhey, 1952)	Shadow hawk	LC			x	x	x
<i>Anaciaeschna triangulifera</i>	McLachlan, 1896	Evening hawk	LC	x			x	
<i>Anax ephippiger</i>	(Burmeister, 1839)	Vagrant emperor	LC	x			x	
<i>Anax imperator</i>	Leach, 1815	Blue emperor	LC	x		x	x	
<i>Anax speratus</i>	Hagen, 1867	Orange emperor	LC	x				
<i>Anax tristis</i>	Hagen, 1867	Black emperor	LC	x		x	x	x
<i>Gynacantha villosa</i>	Grünberg, 1902	Brown dushawker	LC	x			x	
<i>Heliaeschna spec</i>		Duskhawker					x	x
<i>Zosteraeschna ellioti</i>	(Kirby, 1896)	Highland hawk	LC	x		x	x	
<b>Gomphidae</b>								
<i>Ictinogomphus ferox</i>	(Rambur, 1842)	Common tigertail	LC	x			x	
<i>Notogomphus flavifrons</i>	Fraser, 1952	Yellow-fronted longleg	VU				x	x
<i>Notogomphus gorilla</i>	Dijkstra, 2015	Gorilla longleg	VU				x	x
<i>Notogomphus lujai</i>	(Schouteden, 1934)	Albertine longleg	LC				x	x
<i>Paragomphus spec.</i>		Hooktail					x	x

Species		Vernacular name	RL	Akagera	Musanze	Nyungwe	2016	new 2016
<b>Libelluloidea incertae sedis</b>								
<b>Macromiidae</b>								
<i>Idomacromia</i> ?		Shadowcruiser					x	x
<i>Phyllomacromia contumax</i>	Selys, 1879	Two-banded cruiser	LC	x			x	x
<b>Libellulidae</b>								
<i>Acisoma trjfidum</i>	Kirby, 1889	Pied pintail	LC	x			x	x
<i>Acisoma variegatum</i>	Kirby, 1898	Slender pintail	LC	x			x	x
<i>Aethriamanta rezia</i>	Kirby, 1889	Pygmy basker	LC	x			x	x
<i>Atoconeura eudoxia</i>	(Kirby, 1909)	Fishtail highlander	LC			x	x	x
<i>Atoconeura pseudeudoxia</i>	Longfield, 1953	Hairy-legged highlander	LC	x				
<i>Brachythemis leucosticta</i>	(Burmeister, 1839)	Banded groundling	LC	x	x		x	
<i>Chalcostephia flavifrons</i>	Kirby, 1889	Inspector	LC	x			x	
<i>Crocothemis erythraea</i>	(Brullé, 1832)	Broad scarlet	LC	x			x	
<i>Crocothemis sanguinolenta</i>	(Burmeister, 1839)	Little scarlet	LC	x		x	x	
<i>Diplacodes lefebvrii</i>	(Rambur, 1842)	Black percher	LC	x		x		
<i>Diplacodes luminans</i>	(Karsch, 1893)	Barbet percher	LC	x			x	x
<i>Hadrothemis versuta</i>	(Karsch, 1891)	Variable jungleskimmer	LC	x				
<i>Hemistigma albipunctum</i>	(Rambur, 1842)	African pied-spot	LC	x	x		x	
<i>Neodythemis nyungwe</i>	Dijkstra & Vick, 2006	Nyungwe junglewatcher	CR			x	x	
<i>Nesciothemis farinosa</i>	(Förster, 1898)	Eastern blacktail	LC	x	x		x	
<i>Notiothemis jonesi</i>	Ris, 1919	Eastern forestwatcher	LC			x	x	x
<i>Orthetrum abbotti</i>	Calvert, 1892	Little skimmer	LC	x		x	x	
<i>Orthetrum brachiale</i>	(Palisot de Beauvois, 1805)	Banded skimmer	LC	x	x	x	x	
<i>Orthetrum caffrum</i>	(Burmeister, 1839)	Two-striped skimmer	LC		x	x	x	
<i>Orthetrum camerunense</i>	Gambles, 1959	One-striped skimmer	LC		x	x	x	x
<i>Orthetrum chrysostigma</i>	(Burmeister, 1839)	Epaulet skimmer	LC	x		x	x	
<i>Orthetrum guineense</i>	Ris, 1910	Guinea skimmer	LC	x	x			
<i>Orthetrum hintzi</i>	Schmidt, 1951	Dark-shouldered skimmer	LC	x				
<i>Orthetrum julia</i>	Kirby, 1900	Julia skimmer	LC	x		x	x	
<i>Orthetrum stemmale</i>	(Burmeister, 1839)	Bold skimmer	LC	x			x	x
<i>Orthetrum trinacria</i>	(Selys, 1841)	Long skimmer	LC	x			x	x
<i>Palpopleura deceptor</i>	(Calvert, 1899)	Deceptive widow	LC	x			x	x
<i>Palpopleura lucia</i>	(Drury, 1773)	Lucia widow	LC	x	x		x	
<i>Palpopleura portia</i>	(Drury, 1773)	Portia widow	LC	x	x	x	x	
<i>Pantala flavescens</i>	(Fabricius, 1798)	Wandering glider	LC		x	x	x	
<i>Parazyxomma flavicans</i>	(Martin, 1908)	Banded duskdarter	LC	x			x	
<i>Rhyothemis fenestrina</i>	(Fabricius, 1781)	Skylight flutterer	LC	x			x	
<i>Rhyothemis semihyalina</i>	(Desjardins, 1832)	Phantom flutterer	LC	x			x	
<i>Tramea basilaris</i>	(Palisot de Beauvois, 1805)	Keyhole glider	LC		x			
<i>Tetrathemis camerunensis</i>	(Förster, 1900)	Forest elf	LC	x			x	x
<i>Tholymis tillarga</i>	(Fabricius, 1798)	Twister	LC	x		x	x	x
<i>Trithemis annulata</i>	(Palisot de Beauvois, 1805)	Violet dropwing	LC	x	x		x	
<i>Trithemis arteriosa</i>	(Burmeister, 1839)	Red-veined dropwing	LC	x	x	x	x	
<i>Trithemis dichroa</i>	Karsch, 1893	Black dropwing	LC	x			x	x
<i>Trithemis donaldsoni</i>	(Calvert, 1899)	Denim dropwing	LC	x		x		
<i>Trithemis pluvialis</i>	Förster, 1906	Russet dropwing	LC	x			x	
<i>Trithemis stictica</i>	(Burmeister, 1839)	Jaunty dropwing	LC	x	x		x	
<i>Trithetrum navasi</i>	(Lacroix, 1921)	Fiery darter	LC	x			x	x
<i>Urothemis assignata</i>	(Selys, 1872)	Red basker	LC	x			x	
<i>Urothemis edwardsii</i>	(Selys, 1849)	Blue basker	LC	x			x	x
<i>Zygonyx natalensis</i>	(Martin, 1900)	Blue cascader	LC		x	x	x	
<i>Zygonyx torridus</i>	(Kirby, 1889)	Ringed cascader	LC				x	x
<b>TOTAL</b>	<b>90</b>			<b>67</b>	<b>23</b>	<b>31</b>	<b>78</b>	<b>37</b>



**Book review**  
**A Field Guide to the dragonflies of Hainan**

**Authors: Graham Reels & Haomiao Zhang**  
**Forestry Publishing House, 2015. 463 pp.**  
**ISBN: 978-7-5038-8018-6, price 40 USD**

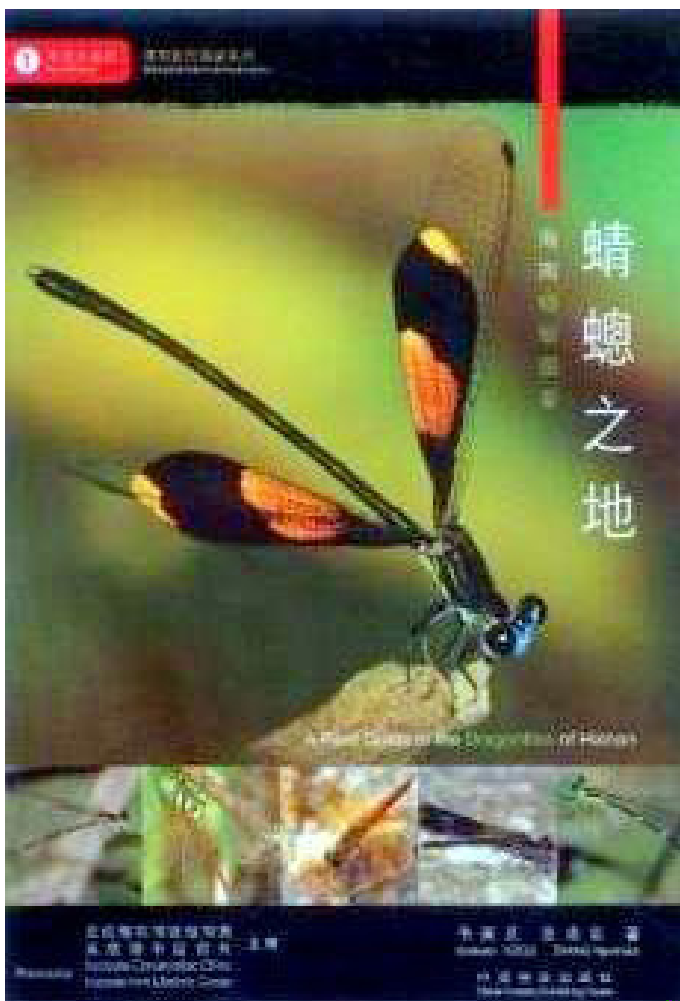
**Review by**  
**Adolfo Cordero Rivera [adolfo.cordero@uvigo.es]**

This book is a detailed account of the species diversity of odonates from Hainan, the second largest island of China. It includes 165 species, of which at least 22 are endemic, and it shows on the cover the most extraordinary of all of them, *Pseudolestes mirabilis* Kirby. Years ago, I became impressed by a couple of pictures and a short account of the behaviour of *P. mirabilis*, which Graham Reels published in *Agrion* (Reels, 2008). Since that moment I wondered how incredible it could be to observe that species in the field. Fortunately, I had the opportunity to study its behaviour in 2014 thanks to the collaboration of Haomiao Zhang, the second author of this field guide, whose knowledge of Chinese fauna is outstanding.

The book looks very attractive, and is fully illustrated with excellent pictures taken from live specimens, most of them in the field, allowing an easy identification. The text is bilingual Chinese-English, and summarizes for each species basic information on morphology, similar species, behaviour and ecology. Body size ranges are also included for all species, and a brief account on distribution is given.

The first chapter describes odonate biology, with accounts on the life cycle, larval emergence, daily behaviour, habitat requirements and their ecological role. The second chapter makes an appeal for dragonfly conservation, a topic of great urgency and interest, particularly in China, where the fast economic development creates an array of environmental problems. There is a chapter dedicated to the dragonfly watcher, which explains how to photographically document the lives of these extraordinary creatures. Chapter 4 describes the geography of Hainan and its odonate fauna, paying a tribute to previous odonatologists that have visited Hainan. The species accounts (Chapter 5) are the main part of the book, including a review of taxonomy of the order, descriptions of the main structural features useful for species identification, and a checklist of the species of the island. A final chapter deals with a variety of activities, such as observing larvae, monitoring of local fauna and guidelines for creating a pond for dragonflies.

In summary, this book will allow any interested person to identify and name all the odonates known to occur in Hainan, and certainly will be useful for environmental studies and conservation. It is a “must” in any odonatological library.



**References**

Reels, G., 2008. The Phoenix Damselfly (*Pseudolestes mirabilis*) of Hainan Island, China. *Agrion*, 12(2), 44–45.

**Book review**  
**Field Guide to the dragonflies of New Guinea**

**Authors: Albert Orr and Vincent Kalkman**  
**Brachytron 17 Supplement ISSN 1386-3460:**

**Available at NL56INGB0003161406 t.n.v.**  
**W.J.A. Hoeffnagel, city of Ankeveen.**  
**Please wire €20.50 and mention**  
**Field Guide to the dragonflies of New Guinea, 2015**  
**when ordering**

**Review by Graham Reels [gtreels@gmail.com]**

This is the companion volume to Kalkman & Orr's award-winning *Field Guide to the damselflies of New Guinea*, published in 2013 and reviewed in *Agrion* 18(1). As with the earlier volume, the text is bilingual, the English text coming at the front of the book, and a Bahasa Indonesia translation provided after Albert Orr's excellent species illustrations and the photographic plates. The book is appended by a checklist giving known species distributions in New Guinea and adjacent islands.

The text is clear and logically arranged, replicating the successful format of its companion. The rather brief but intriguing introduction informs the reader that some 490 odonate species are currently known from New Guinea – a staggering increase of over 16% on the figure of 420 species given just two years earlier in the damselfly volume. Clearly that volume achieved the desired effect of stimulating further study. Anisoptera species comprise just 38% of the total odonate fauna, at 179 species (and counting), of which about 60% are endemic, including almost all of those species associated with running waters. As endemism is also very high amongst New Guinean Zygoptera the whole fauna is highly distinctive.

Although dealing with considerably fewer species, this is a heftier volume than its predecessor, the state of knowledge of Anisoptera permitting species-level treatments throughout, where the previous volume often could only go no further than genus. And what interesting species! They include the thick-bodied, predominantly black aeshnid *Oreaeschna dictatrix*, a dozen species of the endemic genus *Palaeosynthemis* and, taking the place of the completely absent riverine gomphids, large radiations of endemic riverine libellulids in the genera *Diplacina*, *Huonia*, *Lanthanusa* and *Nannophlebia*, mostly described by the great Dutch odonatologist Maurits Lieftinck. The species accounts are augmented with clear, simple keys and tables and nearly 250 colour drawings and over 300 line drawings, either of the whole insect or of key diagnostic features such as male terminal appendages and thoracic and abdominal markings, prepared to the standard we have come to expect from Albert Orr. A short section of fine life photographs, mainly taken by Stephen Richards, follows after the plates.

More than 400 copies of the book (just under 30% of the print run) are being donated to New Guinean universities in an effort to encourage the further study of New Guinean dragonflies by local students and academics. Its predecessor won the prestigious Whitley Award, presented annually in Sydney since 1979 for outstanding publications containing new information about the fauna of the Australasian region. The admirable *Field Guide to the dragonflies of New Guinea* is no less of an achievement than its forebear.

