

AGRION

NEWSLETTER OF THE WORLDWIDE DRAGONFLY ASSOCIATION

PATRON: Professor Edward O. Wilson FRS, FRSE

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NEWSLETTER OF THE WORLDWIDE DRAGONFLY ASSOCIATION

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

Editor's notes

Keith Wilson [kdpwilson@gmail.com]

Conference News

The 2013 International Congress of Odonatology was successfully held 17-21, June 2013 in Friesing, Bavaria, German. Pictures and congress information are available at the Congress Website [http://www.ico2013.eu/crbst_4.html]. A Flickr photo sharing site has been also established [<http://www.flickr.com/photos/97838251@N06/sets/72157634253243888/>].

The next European Congress is scheduled to be held from 7 July 2014 in Montpellier, France, which is close to the Camargue, a Ramsar designated wetland and the largest river delta in western Europe.

Facebook and Twitter

Arising from a decision made at the ICO 2013 General Board Meeting, WDA is now on Facebook and Twitter. The WDA Facebook website can be found at the link: [<https://www.facebook.com/WorldwideDragonflyAssociation>] and the WDA Twitter website may be found at the link: [<https://twitter.com/WorldDragonfly>]. Many thanks to William Kuhn and Melissa Sanchez Herrera for establishing these new communication facilities.

Professor Anatoly Yurevich Haritonov

On 5 April 2013, Oleg Kosterin passed on the sad news that Prof. Anatoly Haritonov, Institute of Systematics and Ecology of Animals, Siberian Branch of Russian Academy of Sciences, Novosibirsk, Russia had passed away after two years of fighting lung cancer. Anatoly Haritonov became a member of WDA in 1999. He published many odonatological papers, especially on the biology and distribution of Russian dragonflies and also published in IJO.

Daniel Grand

Daniel Grand sadly passed away on 24 May 2013. Daniel was a member of the *Société Française d'Odonatologie*, the *Société Linnéenne de Lyon* and the *Groupe de Recherche et de protection des Libellules Sympetrum*. Daniel was an enthusiastic reader of the WDA publications and became a member of the WDA in 1999. He also served as a reviewer for WDA (outside the Editorial Board) for articles in *Pantala*. Daniel Grand, together with Jean-Pierre Boudot, were the authors of: '*Les Libellules de France, Belgique et Luxembourg*', published in 2006 by Biotope; an essential book for odonatologists studying odonates in western Europe.

Next issue of AGRION

For the next issue of AGRION, to be published at the beginning of January 2014, 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.

Cover photo: Rainbowbird (*Merops ornatus*) with female *Adversaeschna brevistyla*. See Bert Orr's article in this issue: 'The importance of dragonflies as food for breeding rainbowbirds in subtropical eastern Australia', pages 24-29.

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Message from the President

I have enjoyed WDA membership since its inception owing to the enlightened sponsorship system that the WDA board instituted. I served as President Elect since Leiden (2011) before succeeding Göran Sahlen as President at Freising (June, 2013).

I look forward to working as a team with other WDA Board members to carry on the seemingly effortless but efficient manner by which our predecessors met challenges and ensured that WDA developed into a truly international organization. Our common aim will be to increase our membership and to further the conservation cause of our beloved friends the dragonflies.

I have no doubt that WDA's spirit (open, friendly and successful) is still present with us and will ever guide us in the future. We owe it to remarkable people like the late Philip Corbet, Gordon Pritchard and Bob Reimer who showed us the way. I really look forward to the next two years and to the challenges ahead.

Thank you all for your kind support.
Boudjéma

Samraoui Boudjéma [bsamraoui@yahoo.fr]

The importance of dragonflies as food for breeding rainbowbirds in subtropical eastern Australia.

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Some of the most voracious predators of dragonflies are the Bee-eaters of the family Meropidae (including the genera *Merops*, *Nyctyornis* and *Meropogon*) which inhabit the old world tropics and warm temperate regions. In the New World the same behaviour is seen in the distantly related but strikingly convergent Jacamars. The majority of Old World Bee-eaters belong to the genus *Merops* which includes 21 species, the greatest number occurring in Africa (Fry 1984). *Merops ornatus*, also known as the Rainbowbird (Figure 1), is found throughout much of Australia, where it breeds in long tunnels excavated in flat ground or in the vertical faces of river banks and in coastal dunes. It overwinters in New Guinea and possibly on islands further west, thus ensuring a continuous supply of insect food during the Australian winter or tropical dry season.

There has been only limited study of the diet of the Rainbowbird. The Honeybee, *Apis mellifera* is not native to its range but often forms a large proportion of its diet, especially around apiaries, where the birds are regarded as pests and are often shot (McKay, 1969). On the other hand, one report from Victoria claimed that dragonflies supplied the greatest biomass of food consumed, although they were numerically fewer than other forms of prey (Fry, 1984). Another study reported that larger prey items, including dragonflies, were selectively taken to the nest to feed the growing chicks (Fry, 1984). Dragonflies are also frequently illustrated as prey in photographs (e.g. Theischinger, 2011). Conversely Calver (1987) reported nestling Rainbowbirds feeding mainly on Hymenoptera with Odonata representing less than one percent of their diet.

Rainbowbirds breed regularly very near my home in southern Queensland, and recently I had the opportunity to study in some detail their foraging and nesting behaviour, and was able to identify a wide range of prey, including several species of dragonflies. In late August 2012 the first emigrating individuals appeared and at least three families dug nesting burrows or refurbished existing burrows in a sand bank along the northern shores of the small estuary known as Currimundi Lake, and along the beachfront dunes in front of the Currimundi Habitat Reserve (26° 46' 12"S, 153° 7' 19"E). This habitat island is a fully protected area of 52 ha of 'Wallum'. It comprises a complex association of vegetation types including stunted, fire-climax heath with exceptional plant diversity (up to 100 spp per hectare) and stands of low *Casuarina*, *Banksia* and *Melaleuca* forest. To seaward it is bordered by a narrow low rainforest-like association in the swale behind the sand dunes facing the Pacific Ocean to the east. Elsewhere the reserve is bounded by the salt water Currimundi Lake to the south and dense suburban areas on its northern and western sides. It contains no open fresh water, hence no odonates breed within its boundaries, but several species of Anisoptera forage there from September to April, often in large numbers.

From the time of their arrival, I observed and photographed on a daily basis the activities of one family of Rainbowbirds consisting of a breeding male, a female and a mature but subordinate male. Females are easily recognised by their shorter tail streamers but initially the two males could only be distinguished in the field by their behaviour, which involves a certain amount of supposition. In some photographs subtle differences in their streamers could be seen. Later, however the difference became very clear as the subordinate male broke both his streamers while brooding the clutch, while the dominant male kept at least one streamer intact for the entire observation period. It is believed that the birds are monogamous (Fry 1984), and although it is now well established that such claims should be treated with caution, it is highly improbable that the subordinate male had any sexual relations with the female, especially as he was very likely a son from a previous brood. My main aim was to identify prey taken using photographs and also to estimate the biomass of each item based on known live masses of the various species involved.

In early September the birds established a territory centred on their nest (26° 45' 50"S, 153° 7' 52"E) which was a 1.25 m horizontal burrow into the bank in a small embayment on the northern shore of Currimundi

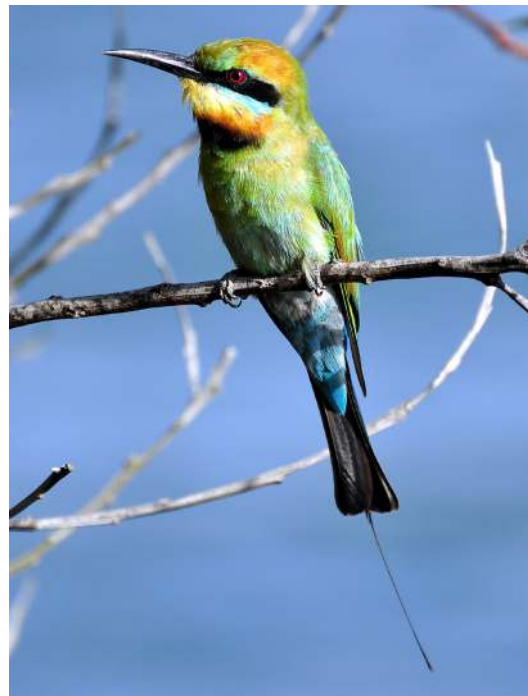


Figure 1. The dominant male rainbowbird (*Merops ornatus*) on the nest perch.

Lake (Figure 2). The foraging territory was about 6 ha in area and spanned the Lake, including a fringe of vegetation on its southern side. Beyond this lie houses and gardens where they almost never ventured. Several high foraging perches were used from time to time but in the immediate vicinity of the nest was a primary observation perch ca 10 m high, some 35 m from the nest entrance, from where all three birds made sorties and returned with prey. Prey were delivered to the nest, once it contained growing chicks, via a low nest perch 4 m from the nest entrance on the side opposite to the observation perch. The nest entrance was directly visible from the nest perch and vocal communication between the perch and the nest chamber was almost certainly possible.

With very few exceptions larger prey was taken first to the observation perch, where it was subdued, if necessary on a nearby thicker branch which served as an anvil, then it was taken to the nest perch where it was held for a few seconds to many minutes before being delivered to the nest. These habits meant it was almost always possible to obtain photographs of prey in the birds' bills at sufficient resolution to identify them to species in the case of all Odonata and at least to family for most other insects. The only exceptions were a few small Hymenoptera and Diptera (generally less than housefly size) which were swallowed very quickly either after the bird landed on the main perch or occasionally in flight. Such prey were few in number, presumably because they provide little nutritional return for the effort of catching them. Conversely larger items such as Odonata involved considerable handling, lasting up to 100 seconds in the case of large *Adversaeschna brevistylus*. Typically the bird perched on a thick branch and repeatedly bashed the dragonfly's head against it with a characteristic twist of the (bird's) head which meant that it was often turned upside down at the moment of impact. The stunned dragonfly was several times tossed into the air and caught before being swallowed head first, wings and all (Figure 3). It is likely that handling times could be considerably reduced from those normally observed, as the female immobilised and swallowed a *Hemicordulia australis* female in 10 seconds while in the middle of a very active spell of nest provisioning. Harder parts of the insect were eventually regurgitated as a pellet. Such pellets accumulated in large numbers under the main perch.

The birds probably attempted to breed in September-October, as on some days the female spent long periods in the nest at times she might be expected to be foraging. Conditions at that time were exceptionally dry and relatively few insects were on the wing and in these conditions failure to breed and egg-dumping is common (Boland, 2004). Over this period about 60 prey items were recorded, mainly small Hymenoptera and Diptera and just three *Hemicordulia australis* among the Odonata. It was clear that no nestlings were hatched as there was no nest provisioning activity. On November 3rd all three birds disappeared for four days – on the afternoon of November 7th they returned and immediately the dominant male was seen to offer small items, a tabanid (Diptera) and a catocaline moth (Lepidoptera) to the female, which she accepted with a great show of reluctance. Judging from the time she spent in the burrow it was around this time that she laid her clutch, which typically would have been laid over several days with incubation beginning after the last egg was laid to promote synchronised hatching. Presumably four eggs were laid as four fledglings later appeared. Brooding was shared by the female and at least one of the males. It was inferred from the behaviour of

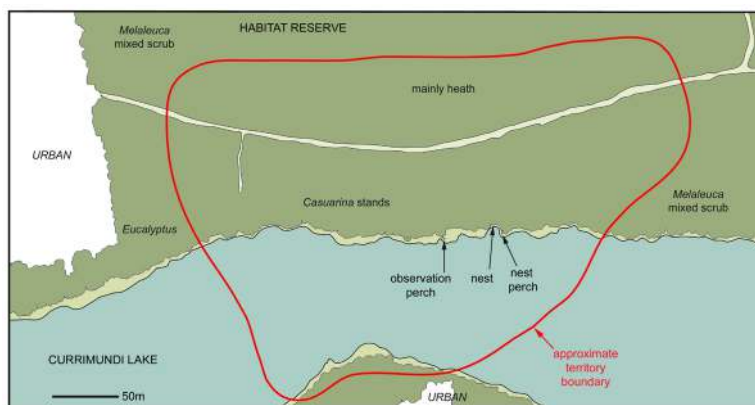


Figure 2. Map of study area showing salient features.



Figure 3. Subordinate male handling and swallowing a male *A. brevistyla* on a thick 'anvil' branch behind main perch.

the birds that the first hatching occurred on or around December 1st, which suggests an incubation period of 21 days, similar to the figure reported by Boland (2004). Boland (2004) also reports asynchronous hatching.

In the period before hatching 167 items were recorded captured and eaten on the main perch. Of these 104 were Hymenoptera, but with very few *Apis mellifera* (Honeybees) represented. Hymenoptera also represented ca 50 % of the total recorded biomass of insects consumed. Eight Odonata, representing just 4.8 % numerically but ca 13.5 % of biomass were taken. The remainder included insects from several orders, especially Diptera (13.2% numerically). The Odonata, and the birds which ate them, are listed in Table 1.

Species	Number taken	Birds (number taken)
<i>Adversaeschna brevistyla</i>	3	Ma(1), Mb(2)
<i>Hemicordulia australis</i>	3	Mb(1), F(2)
<i>Orthetrum vilosovittatum</i>	1	Mb
<i>Diplacodes melanopsis</i>	1	F

Table 1. Odonata taken in pre-hatching period Ma = dominant male, Mb = subordinate male, F = female.

All were eaten at or near the main perch with the exception of the *A. brevistylus* taken by the dominant male at or very near hatching on December 1st. He flew with the prey to the nest perch where the subordinate male was already present. The female was at this time in the nest and easily within earshot.

Instead of simply eating the dragonfly he carolled, stretched his head up and fanned his tail repeatedly (Figure 4). This behaviour was his usual response to another bird arriving at the perch with prey. Several times he presented the prey to the subordinate male, who sometimes inspected it but made no attempt to touch it – sometimes he appeared to studiously ignore it – this ritual continued for 50 seconds until the subordinate male flew off after which the dominant male swallowed the dragonfly whole, without any attempt to remove the wings.



Figure 4. Subordinate male (left) watching dominant male on the nest perch, ‘celebrating’ his capture. December 1st 2012.

In the first week after hatching items were brought to the nest at the rate of about four an hour – Mostly these were brought by the subordinate male, as the female remained in the burrow brooding the nestlings, but for about one third of the time their roles were reversed. At this stage the dominant male played no role other than encouraging the others from the main perch with exuberant displays each time they appeared with a prey item for the nest (and the larger the item the more enthusiastic was this response). Occasionally he would sit on the nest perch with a small fly which he eventually ate himself after much tail fanning and carolling. Items brought by the working pair included mostly relatively small tabanids (Diptera – ca 70 mg) and well macerated butterflies or very small cicadas. Several teneral *Hemicordulia* from which the wings were removed were also brought on the fifth day after hatching.

By the 9th of December, eight days after hatching, neither the female nor the subordinate male spent any time in the nest brooding, and both were bringing a continuous supply of food to the nest. De-winged dragonflies continued to be brought until December 11th, after which all were taken into the nest more or less entire. On the 16th day the first Hymenoptera, all *Apis mellifera*, were brought by the female in the afternoon. At first these were de venomed but as the nestlings developed increasing numbers of intact and eventually live, mobile bees were delivered. These sessions typically lasted about two hours and as the chicks neared fledging live bees were sometimes brought at the rate of one a minute by the female. Often they were brought directly to the nest perch rather than via the observation perch. Also in this latter period a few bees were also brought by the subordinate male. The dominant male took no food to the nest until December 17th, by which time the chicks would have been approaching their maximum weight (Fry 1984). He brought only small items, spent long periods on the nest perch carolling and displaying, and when he did enter the burrow he stayed up to five minutes, in contrast to the female and subordinate male who rarely spent more than a minute in the nest, even when the chicks were

relatively young. The only dragonfly offered by the dominant male was a single *A. brevicauda*, taken to the nest mouth to a half emerged chick near fledging, after two of an eventual four chicks had fledged. The first two nestlings fledged on January 1st 2013, encouraged mainly by the two males, who flew with them to the other side of the lake and fed them small items, mainly Diptera. Two others remained in the nest and were fed mainly by the female. In the evening the fledglings were herded back into the nest by the joint efforts of all three adults. On January 3rd a third fledgling emerged and finally on January 5th the final one made its maiden flight. They all returned to the nest burrow that evening but by 1000 h on January 6th they had all disappeared, migrating to parts unknown.

During their development a total of 87 Odonata were taken to the nest. Numerically these represented 13 % of a total 669 items recorded. Their total biomass contribution was about 14.1 %. However this was greater than the biomass of Hymenoptera (8.8%), which accounted for 26.6% of all items numerically; indeed, almost all of these were Honeybees brought in what appeared to be educational sessions. The biomass representation of Odonata probably would have been greater were there not an abundance of moderately large Cicadas in the area and these made up 31.8 % numerically and 60.5 % of biomass of total prey items observed taken to the nest.

Species and the numbers of Odonata taken to the nest are detailed in Table 2.

Species	Number fed to nestlings
<i>Adversaeschna brevistyla</i>	32
<i>Hemicordulia australis/continentalis</i>	48
<i>Rhyothemis phyllis</i>	2
<i>Orthetrum vilosovittatum</i>	1
<i>Orthetrum sabina</i>	1
<i>Diplacodes melanopsis</i>	1
<i>Pantala flavescens</i>	1
<i>Tamea lowei</i>	1

Table 2. Odonata taken to the nest and fed to nestlings (note *H. continentalis* was uncommon but as not all *Hemicordulia* individuals could be determined to species *H. australis* and *H. continentalis* are lumped).

Also, during the period of nest provisioning the following were eaten by the subordinate male while waiting on the nest perch for the dominant male to emerge – (the female would enter the burrow when the dominant male was within but the subordinate male would not): 1 *Hemicordulia australis*, 1 *Orthetrum caledonicum* and 1 *Diplacodes melanopsis*. The female ate two *H. australis* on the main perch and there is no reason to suppose these were ever intended for the chicks. In general however the female and subordinate male fed on Hymenoptera themselves and brought insects of other orders, especially larger species, back to the nest.

Overall, the greatest observed contribution of Odonata to the nestlings' nourishment in terms of biomass came from *A. brevistylus* (14,400 mg). *Hemicordulia* sp. made up 8,160 mg and other anisopteran species 1,710 mg.

By far the greatest contribution was made by the female, who took ca 67% of Odonata to the nest in both numerical and biomass terms, and a very similar contribution was also made by her when all insects are considered. The subordinate male contributed 31-32% (numerically and biomass) while the dominant male contributed only one odonate, noted above, which represented 1.1 and 1.8 % of total numbers and biomass respectively. His overall numerical contribution was somewhat higher (5.4%) but this might not translate to a larger biomass contribution as most items he brought were relatively small (less than 100 mg). Table 3 details these statistics.

Odonata	Ma	Mb	F	Total
<i>Adversaeschna</i>	1	10	21	32
<i>Hemicordulia</i>	0	18	30	48
Other	0	0	7	7
Total	1	28	58	87
Percent total	1.1	32.2	66.7	
Biomass Odonata (mg)	450	7560	16260	24270
Percent Odonata biomass	1.8	31.1	67.0	[100]
Total all insects	36	195	438	669
Percent total	5.4	29.1	65.5	[100]

Table 3. Breakdown of observed provisioning of Odonata to nest by individual birds Ma, Mb, F as above.

Rainbowbirds are opportunistic predators which are said to always take their prey on the wing (Fry, 1984). Although they are clearly behaviourally adapted to catch and process venomous Hymenoptera, Odonata obviously represent an important food source when available. Although previous quantitative studies have all shown that Hymenoptera provide overwhelmingly the greatest proportion of prey, including those fed to nestlings, these observations show a clear difference between nestling and adult diet, and also identify very different parenting roles on the part of male and female. When the nest was being provisioned late in the nestlings' development it is possible that the large *Adversaeschna brevistyla* was disproportionately represented in the sample. In general Odonates were brought to the nest randomly within the sequence of prey items, but occasionally long runs of the same species, or different species of dragonflies occurred. For example between 0928h and 1015h on the 17th December the female brought nine *Adversaeschna brevistylus* in succession. On 29th December between 0845h and 0935h she brought 10 *Hemicordulia* followed by four *A brevistylus*. There was no evidence that these dragonflies were particularly abundant on those days and the data suggest that the birds may become fixated on a particular prey species or class of prey. These data are not suitable for analysis using standard runs tests, but if we take the probability of any item brought to the nest being a dragonfly as 0.13, then the probability of nine or fourteen dragonflies being brought in succession by pure chance is exceedingly small.

A related observation clearly demonstrating prey selectivity was shown by their predation of Honeybees. During the pre-hatching period very few Honeybees were eaten and a good proportion of the Hymenoptera component of the diet consisted of stingless native bees. However when provisioning the nest, the female managed to find Honeybees almost effortlessly, despite their relative scarcity in the habitat, and she delivered them in long, well defined runs



Figure 5. Range of odonate prey: (a) female *Orthetrum villosovittatum* at main perch, (b) female *Rhyothemis phyllis* (note eggs extruded), (c) & (d) female *Hemicordulia*, (e) female *Adversaeschna brevistyla*, (f) male *Hemicordulia*.

always in the mid-afternoon.

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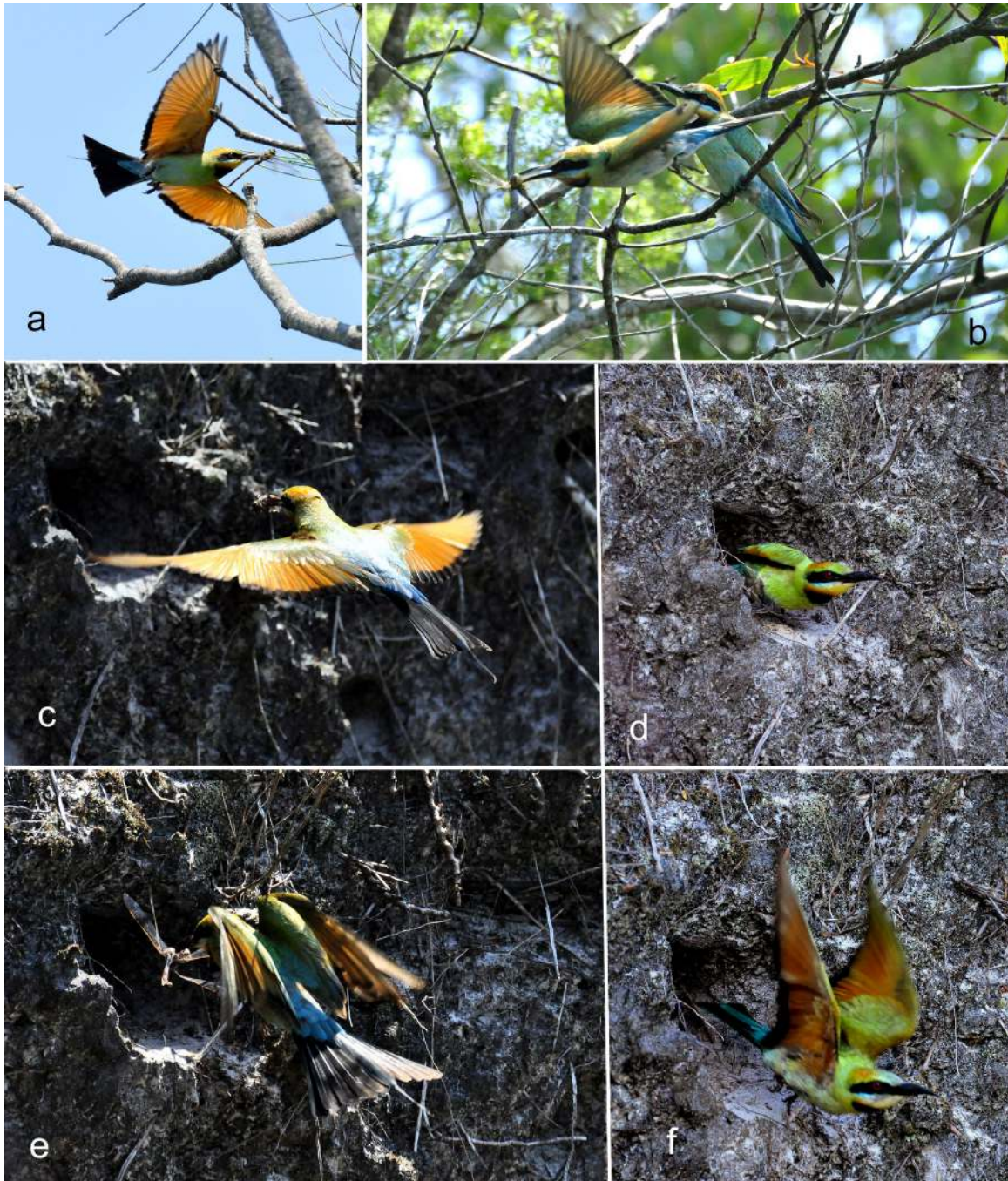


Figure 6. (a) subordinate male bringing *A. brevistyla* to main perch, (b) female leaving nest perch en route to nest with intact *A. brevistyla* with dominant male looking on, (c) delivery to nest of *A. brevistyla* with wings removed, (d) egress of bird empty-billed, (e) delivery of intact *A. brevistyla* to nest, (f) egress of same bird.

In joy and in sorrow –
the personal significance of some Selysian dragonfly names

Matti Hämäläinen [matti.hamalainen@helsinki.fi]

Baron Michel Edmond de Selys Longchamps (Fig. 1) was the foremost figure in the study of Odonata in the nineteenth century. During his long life he amassed vast collections and named numerous species, the majority of which names are still valid today. He was also a distinguished politician, serving as a senator (1855–1900) and as the President of the Belgian senate (1880–1884). Behind this highly public figure, was a very warm and emotional man, whose private cares and sorrows left their stamp on his great odonatological legacy.

As a ten-year-old boy Selys began keeping a diary, as had both his parents, and he continued it to the end of his life. Some years ago these diaries were published as a thick two volume book titled *Une vie au fil des jours: Journal d'un notable politicien et naturaliste Michel Edmond de Selys Longchamps (1823–1900)* by Caulier-Mathy & Haesenne-Peremans (2008). The earliest entry is dated 27th August 1823 and the last one on 26th November 1900 just two weeks before his death on 11th December 1900.

For us dragonfly enthusiasts, these diaries include numerous interesting details related to his odonatological activities. Some of these have been presented by Wasscher (2012) and Wasscher & Dumont (2013). They also contain many intimate matters on his family life, which reveal to us a human being behind the name Selys, a person whom most of us know only by his numerous publications, species named by him, and his large world wide collection now held at Muséum des Sciences naturelles in Brussels.

Learning the names and life stories of the members of his family enabled me to try to explore whether any of them appear as eponyms among the dragonfly species named by Selys. Selys introduced a total of ca 935 species-group names in the order Odonata. These represent ca 700 valid species and some 40–50 subspecies, which are still considered valid depending on the authority. It should be noted that these numbers do not include those numerous species names and descriptions credited to Hermann A. Hagen and to a few other authors in the series of synopses authored by Selys.

Selys named over 100 dragonfly taxa after individual people, most of them entomologists or collectors who had provided the relevant material to him to study. However, there are at least nine species which were named after his close relatives. Only in three cases is the etymological connection directly revealed in the description. All these involve the name *waltheri*, named after his youngest son **Walthère de Selys Longchamps** (1846–1912), who had collected the type specimens in Brazil in November 1872. These are: *Cyanogomphus waltheri* Selys, 1873 [Selys Longchamps, 1873] (Fig. 2), *Agrion waltheri* Selys, 1876 (presently *Minagrion waltheri*) [Selys Longchamps, 1876] and *Neoneura waltheri* Selys, 1886 [Selys Longchamps, 1886]. The type specimens of all these were stated to be collected by “M. Walthère de Selys”. All of these species are still considered valid taxa.

The etymology of the other species is not evident from the descriptions. In the nineteenth and early twentieth centuries it was not common to explain the etymologies of newly erected taxonomic names. Neither are these species mentioned, nor is their etymology directly revealed, in his diaries. However, it was possible to deduce the origin of these names from contemporaneous information found in the pages of the diaries. This work proved to be much more rewarding than I at first imagined. It was an emotional journey into the life of Edmond de Selys Longchamps with all its joys and sorrows. It was particularly moving to learn of the poignant sadness and loss which so often cast a shadow over his life.

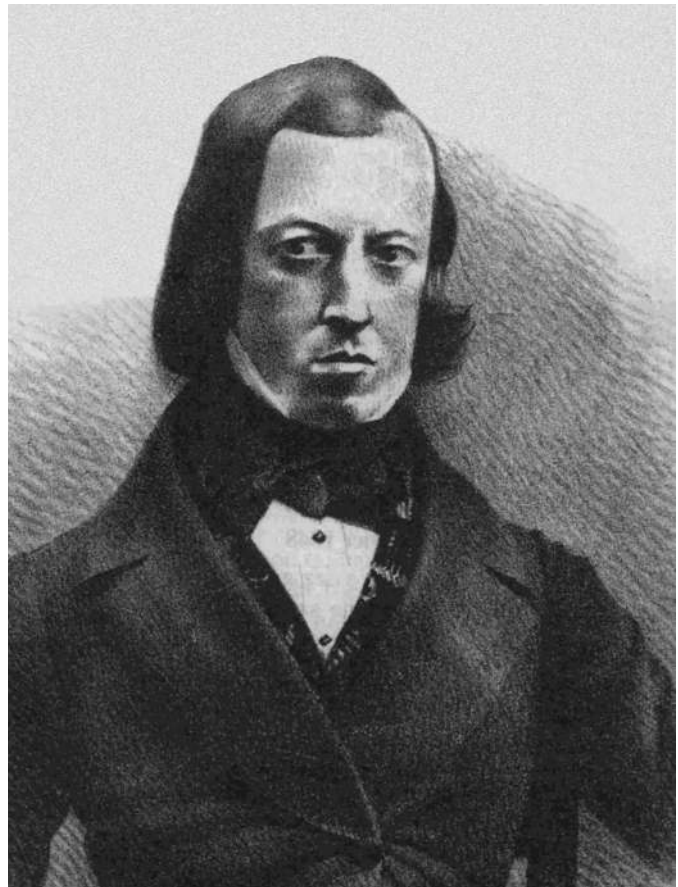


Figure 1. Edmond de Selys Longchamps (1813–1900) at a young age.



Figure 2. *Cyanogomphus waltheri* male. Argentina. Photo by Rosser Garrison.

But let us begin with joy. On 3rd March 1835 Selys wrote in his diary: “Mardi – Bal chez Mme d’Omalius au Pavillon anglais. S. [Sophie]. Je m’aperçois qu’j’aime Sophie” (“Tuesday – Ball at Mrs d’Omalius in the English pavilion. S. [Sophie]. I realise that I love Sophie”).

Selys, then aged 21 years, had met Mademoiselle **Sophie d’Omalius d’Halloy**, aged 16 years, for the first time only a few weeks earlier at a ball in Liège on the 27th of January 1835. They began courting, and were married on the 27th of February 1838. On the same day they set off on a long honeymoon through France, Italy, Switzerland and Germany. They returned home on the 10th of August 1838. Their first child Caroline was born on the 28th of February 1839.

In July 1840 there appeared a brief paper in *Revue zoologique* (Paris), where Selys described three new *Agrion* species from Belgium (Selys Longchamps, 1840). One of them was *Agrion sophia*. However, this species later turned out to be identical to *Agrion speciosum*, described by Charpentier (1840) in his book on European dragonflies earlier in the same year. Thus Selys’ dedication to his wife is expressed in this synonym of the species presently known as *Nehalennia speciosa* (Charpentier, 1840) (Fig. 3). The other two new species in this paper are also synonyms. A field record of *Agrion sophia* appears in the diaries. On the 30th of June 1841 he collected this species and *Lestes virens* in Hamelswire (near Vogelsanck, 27 km north of Waremmé).



Figure 3. A pair of *Nehalennia speciosa* (= *Agrion sophia*). Finland. Photo by Matti Hämäläinen.

Later Sophie gave birth to three more children, two sons and one daughter: Michel Ferdinand Raphaël on the 20th of November 1841, Charles Michel Edgard Walthère on the 21st of December 1846 and **Valentine Emilie Marguerite** on the 6th of February 1848. Here is a translated extract from the diary on the day of birth of his youngest child: "... Sophie gave birth to a little girl that we named Valentine, Emilie, Marguerite... Marguerite has much black hair and dark blue eyes."

In early May 1852 the four-year-old Marguerite fell ill with meningitis. In the many days which follow, the diary charts her worsening condition in despairing tones. On the 14th of May Marguerite died. In his great sorrow Selys wrote in the diary:

"Vendredi – Nefas dies... J'ai passé près de Marguerite la nuit d'hier à aujourd'hui..." ("Friday – Terrible day [in Latin]... I passed the night from yesterday to today close to Marguerite... Then, at twenty to four, the poor child, for whom I have cried so much, rendered her soul to God in my arms. As she died I felt her heartbeat fail in my hands while I flooded her cheeks with my tears, having kissed her half a minute prior to the fatal separation, and later I kissed three times her poor little still warm hand. Half an hour earlier, she was still raising her beautiful eyes to Heaven looking as though she were seeing God. Poor child, poor Marie, her second mother [nurse], poor parents ! So much despair, so many tears !...")

On 13th May, the day before Marguerite's death, Selys had commissioned two daguerreotypes of her to be made by the photographer Adolphe Kips-de Coppin. These must be among the first of their kind to portray a small child on her deathbed.

In the archives of Château d'Hallooy (the former castle of Sophie's family), presently kept at University of Liège, exists a 39-page-long handwritten document (dated 14 mai 1853) "*D.O.M. et Valentinae Aemiliae Margaritae de Selys Longchamps nata die Vita feb. M.DCCCXXXVIII, evanuit die XIVta maii M.DCCCLII Leodii*", where Selys writes on the life and death of his daughter. Her last days and her struggle against death, as well as his own desperate grief are described in detail and in a most heart-rending way. This unique and rather unusual document shows just how heavily he felt the great burden of his loss. It forms a part of the prolonged lamentations which he gave vent to with his pen. Selys was a very sensitive man, with a great affection for his family.

At the time of the death of Marguerite, Selys was working on his *Monographie des Caloptérygines* (Selys Longchamps & Hagen, 1854). However, previous to this appeared the *Synopsis des Caloptérygines* (Selys Longchamps, 1853), which was a forerunner of the monograph. One of the new calopterygid species described in 1853 was named **Echo margarita**. The species epithet undoubtedly commemorated the dear memory of his lost child. In the monograph (in 1854) the French name 'Écho Marguerite' is also given. The species was named on the basis of a single female specimen of uncertain provenance (Fig. 4). Later it was discovered that the specimen originates from Cherrapunji in north-eastern India. *Echo margarita* (Fig. 5) is a beautiful calopterygid species distributed in north-eastern India and in the adjacent border areas of northern Burma and southern Yunnan (Yu & Hämäläinen 2012, Hämäläinen 2013).

The diary entries "*Anniversaire de ma pauvre Marguerite!*" ("Anniversary of my poor Marguerite") appeared quite regularly on 14th May, not every year, but still over 20 times, the last one in 1895. On the 14th of May 1862 Selys wrote: "*Dixième anniversaire de Marguerite*" ("The tenth anniversary of Marguerite"). Then a few weeks later on the 7th June 1862 *Synopsis des Agrionines, Troisième légion: Podagrion* (Selys Longchamps, 1862) was published. It included the description of **Philogenia margarita** from the Amazon – an obvious 10th anniversary tribute to his daughter's death. As with *Echo margarita*, this species was also named on the basis of a single female specimen. This can scarcely be a coincidence, since he had many new species to choose from.

Two of Selys' granddaughters were baptised 'Marguerite', bringing him much joy. On the 24th of January 1865 Selys' daughter Caroline gave birth to a baby girl, Selys' first granddaughter. Next day Selys wrote (translated): "... Caroline is well and so is her little one, named Marie Marguerite..., I had difficulty not crying upon hearing this sweetest name, Marguerite! What a token of remembrance!"



Figure 4. The only label attached to the holotype specimen of *Echo margarita*. Photo by Matti Hämäläinen.

On the 24th of April 1874 it was Raphaël's wife Eusébia's turn to make Selys happy by naming their first born daughter Marguerite. Selys wrote in his diary: (translated) "...Happily she gave birth to a little girl who was baptised after noon in Sainte-Croix with the names of Marguerite, Ghislaine, Marie, Thérèse. May she be happy! and recall to me my poor Marguerite, may she be Marguerite reborn thanks be to God."

In his later revision of the agrionid synopses (Selys Longchamps, 1886) the male sex of *Philogenia margarita* was described from Amazonas. On the previous page he named a new species *Philogenia raphaella* from Bogota. Selys cautiously assumed that *P. raphaella* might be a local race of *P. margarita*, but no later author has doubted its status as a good species. *Raphaella* denotes the female counterpart of Archangel Raphael. Giving this name to the sister species of *margarita* was perhaps intended to have symbolic significance. Was Selys providing an angel to accompany his late daughter? There was also perhaps a double meaning intended, **Raphaël** being the name of Selys' oldest son.

Undoubtedly these damselfly names were small tokens of his deep grief over the loss of his beloved child which he expressed in many other ways. It is heartening to know that these damselfly species still survive in their ever shrinking habitats.

On the 22nd of December 1869 Selys met with another great loss. His wife **Sophie** died of cancer aged only 51 years. Selys wrote long accounts of the last days of his wife (translated): "... At half past eight, she expired. We were crying while kneeling near the bed, me kissing her with my hand in hers, and my head on her pillow, against her shoulder. It's all over. R.I.P., my poor Sophie. I was telling her while sobbing: 'Farewell good mother!'. I put in her right hand the blessed family candle while saying: 'This is the candle of dear Marguerite'...."

The diary note on 10 September 1870 reads (translated): "Finished the description of the corduliids which I had with me". The *Synopsis des Cordulines* (Selys Longchamps, 1871), published on 9th May 1871, includes the description of *Macromia sophia* from Guinea on the basis of a single male specimen. This is a very dark species (Fig. 6), and as Selys wrote, clearly different in colour from its known congeners at that time. It seems very likely Selys deliberately selected a sombre-hued species for his dedication, black being the colour of mourning. Currently this species is called *Phyllomacromia sophia*. It is endemic to the Upper Guinea region in West Africa. Although its habitats are shrinking due to deforestation it has not yet been considered a threatened species.

In February 1876 there followed another dedication to the memory of Sophie in the name *Nehalennia sophia*. This species was described from two male specimens collected by Walthère de Selys Longchamps in Brazil in November 1872 (Selys Longchamps, 1876). Unfortunately, according to the rules of nomenclature this name was a secondary homonym of his *Agrion sophia*, which had meanwhile become included in the genus *Nehalennia* Selys, 1850 as junior synonym of *N. speciosa*. W.F. Kirby (1890), who was particularly eager to rectify outstanding nomenclatorial problems, introduced a replacement name *Nehalennia selysi*. Presently this taxon is ranked as subspecies of *N. minuta* Selys, 1857. So, unfortunately, Selys' second attempt to name a damselfly species after his wife also failed. Of the three eponyms only one, *Macromia sophia*, remains valid.



Figure 5. *Echo margarita* female. India. Photo by Krushnamegh Kunte.

Selys' 1878 paper on the dragonflies of New Guinea, Moluccas and Celebes (Selys Longchamps, 1878) contains the description of a new libellulid species *Brachydiplax maria* from the Celebes and Borneo. Regarding the etymology of the specific epithet the following sentence is included (translated): "The name Maria is the one which I gave to it in several collections, nearly 30 years ago". Most likely



Figure 6. *Phyllomacromia sophia* male. Liberia. Photo by K.-D. Dijkstra.

this name refers to Selys' mother **Marie Denise** nee **Gandolphe** (1777–1857), who thirty years before, in 1848, was still alive. *Brachydiplax maria* was later synonymised with *B. chalybea* Brauer, 1868.

It should be mentioned that Selys' mother is immortalised in the oil on canvas painting of Jean-Joseph Éléonore Antoine Ansiaux. This painting (executed in 1809) and titled *Portrait de la baronne de Selys-Longchamps, née Marie-Denise Gandolphe* (also known as *Portrait of Marie-Denise Smits née Gandolphe*), shows the model in an interior, wearing a black dress and playing a harp. The painting was sold at Christie's in 2007 for £96,500. In the same year Ansiaux also painted Selys' father Baron Michel-Laurent de Selys Longchamps (1759–1837). This work is at the University of Liège.

Edmond de Selys Longchamps was an amiable family man with strong affection for his children and grandchildren. His relation with his youngest son Walthère remained warm, although Walthère's life-style and opinions, very different from those of his father must have embarrassed him. Walthère was an atheist, a socialist and a nonconformist. The worst happened in 1875. Selys wrote in his diary on 22nd February 1875 (translated): "Monday – Walthère sent me his written confidences. I cried a lot! I suffered from insomnia for some time because of his project to settle in Paris. My heart ached when I saw his weapons of civic guard today, but I didn't know my unredeemable misfortune. I am condemned to sorrow and to pain for the rest of my poor life. I used to say (in Latin) 'February, the month of roses for me'. Unhappy days!"

Walthère had a relationship with Joséphine Davignon, the family cook at the Château de Longchamps in Waremme. She became pregnant and the couple decided to start a self-imposed exile in Paris in order to protect the Selys family reputation. Before marrying in Paris on the 13th of October 1881, Walthère and Joséphine had three children (Marc, Irene and Hector). Later they had three more children. The unorthodox situation must have been hard for Selys to cope with. In his diaries the first reference to the three grandchildren appeared only on the day of their parents' marriage. The scandal was so shocking that it was hidden even in the official documents of the Belgian nobility and in genealogies of the family, where the date of marriage is recorded to have already taken place ten years earlier, on the 13th of October 1871! Walthère and his family returned to Belgium in 1884 and lived in the Château d'Halloy, in his mother's original home, 50 km south of Château de Longchamps, home of Selys at Waremme.

Baron Edmond de Selys Longchamps was born on the 25th of May 1813, two hundred years ago. This article serves to mark his bicentennial. In writing his diaries Selys surely would have wanted to preserve the memories of his life in the fullest sense, at least for his children and grandchildren, and perhaps also for posterity. He lived a rich inner emotional life, which could scarcely have been expressed in his public persona, and his odonatological work, to which he was especially devoted in his final years, is a model of detachment and clarity. No doubt, for him, the diaries served a cathartic value, but they also preserve his memory as a warm and loving father and husband. It is only through the diaries that we can start to empathise with him as he, even after suffering harrowing personal losses, continued his work day in day out, systematically collecting, classifying and writing about dragonflies.

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Obituary: Gordon Pritchard (1939–2012)

Gordon Pritchard died in Calgary, Alberta, after a long struggle with multiple myeloma, on 23 December 2012. He was 73 years old. Gordon was a premier Canadian entomologist and educator and an expert on many subjects from the biology of crane flies to evolutionary questions associated with the development of insects, especially aquatic ones. But his overwhelming entomological love was the study of the Odonata (dragonflies and damselflies) and he was a significant force in the international research organizations that focused on this insect order.

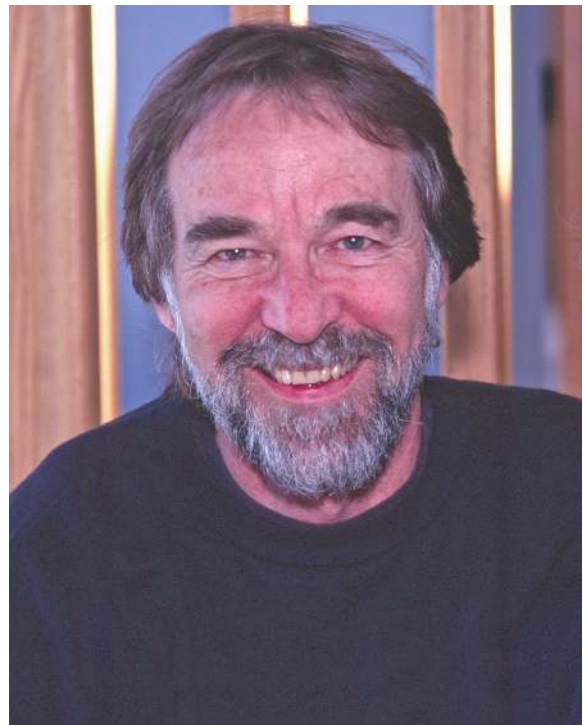
Gordon was born on 9 February 1939 in Burton on Trent, Staffordshire, a city of breweries in the English Midlands. His wartime childhood memories were of taking shelter under the family's grand piano during air-raids and seeing his father, a quartermaster sergeant with the RAF, off at the bus stop after his leaves at home.

Gordon was fascinated by the countryside around the village of Bretby, where he spent his early years. There, he played in the cowsheds and fields at the farm of a family friend, visited a bird-egg-collecting naturalist who lived down the lane, and made frequent trips by bus or foot to the Derbyshire Dales. When Gordon was nine or ten, without a net, he captured his first dragonfly, a Brown Hawker (*Aeshna grandis*) – the trick, he said, was to throw your jacket over whatever interested you. He played conkers under the chestnut trees and was awed by fields of English bluebells. Another life-long love, jazz, also evolved during those early years – Gordon began to play the drums. He made his first set from old banjo vellums and biscuit tins but, later, a thoughtful neighbour took pity on him and presented him with his first real drum set.

Gordon had been inspired by his biology teacher at grammar school and wanted to be a biology teacher himself. But, instead, in 1957 he enrolled in Imperial College, University of London, a place he later would consider the best entomology department in the world. However, all his classes couldn't have been that inspiring, because he spent much of his time immersed in jazz, rugby, drumming, and beer drinking. He received his BSc (Honours) in Zoology in 1960 and, after winning a Commonwealth Scholarship that year, he came to the University of Alberta in Edmonton, Alberta, Canada – where jazz concerts, rugby, drumming and beer drinking again rounded out his academic life. In those days the entomology department was a small place, with three faculty – Brian Hocking (chairman), George Evans (ecologist and Gordon's supervisor) and George Ball (systematist) – and only eight graduate students. But the place hummed with excitement and new ideas. It was a wonderful life for a young graduate student (Acorn 2004). Gordon's doctoral research focused on the life of larval dragonflies in the boreal forests of Alberta, especially how they capture their prey with their extendible labium. His first major publications on the Odonata stemmed from this work – prey organisms (Pritchard 1964a, b), the functioning of the labium (Pritchard 1965a), and the morphology of the labium (Pritchard 1965b) and compound eyes (Pritchard 1966). Gordon finished the field work in only one season, a sign of his efficiency and concentration. He was awarded his PhD in entomology in 1963. On 2 February that year Gordon married June Dalby in Edmonton.

After graduating, Gordon's first job was as a research scientist with CSIRO (Commonwealth Scientific and Industrial Research Organization) in Sydney, Australia, where he studied fruit flies (Pritchard 1967, 1969, 1970). Gordon's and June's daughter, Tracy, was born there in 1964. Although Gordon loved Australia and was offered a permanent research position, after three years, the family decided to move back to Canada.

Back at the University of Alberta, in 1966, Gordon filled in for George Evans while George was on sabbatical, and the next year took up a one-year teaching appointment in insect physiology at the Calgary campus of the University of Alberta. The job was offered to him by Jim Cragg, Head of the Department of Biology, who had been Gordon's external examiner at Imperial College. In 1968 Gordon's son Darren was born and a permanent position somewhere became a priority. Luckily, one appeared in Calgary and Gordon stayed put. His appointment was initially divided between the Calgary campus and the Kananaskis Field Station in the nearby Rocky Mountains. The latter spot offered much scope for field studies and Gordon began researching the population ecology and development of local crane flies (Tipulidae), which engrossed him for the next decade (Pritchard, 1971, 1976,



Gordon Pritchard. Photo: John Acorn, 2000.

1980a, 1983, Pritchard and Mutch 1984) (Acorn 2004).

Thus began a long career of solid, meticulous research. Gordon's interests were primarily in the evolutionary ecology of insects, from the evolution of individual traits, through the evolution of life-history strategies, to the evolution of communities. He worked mainly on insects with aquatic larvae and was particularly interested in the proportional allocation of time to the aquatic and terrestrial habitats and the mechanisms that determine when the transition from one to the other is made. Much research focused on the effects of temperature on insect development. Specifically, he studied temperature adaptations in aquatic insects (Pritchard et al. 2000), insects in geothermal habitats (Pritchard 1991), the colonization of temperate-zone latitudes by tropical taxa (Pritchard 1982, 2008), and the relative allocation of time to different life-cycle stages. He was interested in predatory behaviour in arthropods (Pritchard and Scholefield 1977, Proctor and Pritchard 1990); respiratory structures and mechanisms in aquatic insects; and the colonization of aquatic and terrestrial habitats, with particular reference to the evolution of aquatic life-styles and of flight in insects (Pritchard et al. 1993). Gordon delved into the evolutionary origin of insects and the phylogeny of arthropods (Pritchard et al. 1993) especially examining larval traits (Zloty et al. 1993). Although he certainly did not consider himself a systematist, he did publish in this field



(Zloty and Pritchard 2001). One of his last graduate students, Jack Zloty, named a newly discovered mayfly, *Ameletus pritchardi*, after Gordon (Zloty 1996), a fitting tribute to a career of superb aquatic insect research.

By the late 1970s, Gordon returned to studying Odonata, being intrigued by Vivid Dancers (*Argia vivida*), southern damselflies living in the warm pools at Banff. With various graduate students, he studied these damselflies all over western North America, concentrating on life history, reproductive behaviour, egg development, larval growth and the effects of temperature on physiological processes (eg, Pritchard 1980b, Leggott and Pritchard 1986, Conrad and Pritchard 1988). In the late 1980s, as John Acorn (2004) described, "...when [Gordon's] work was taking him pretty far south, he realized it was time to go to the tropics, 'where dragonflies really come from ...' One of Gordon's most frequently cited conclusions with respect to odonates is that they retain their tropical temperature responses and are thus 'prisoners of their tropical past'." In Costa Rica he studied damselflies of the genus *Cora* and *Hetaerina* (Zloty et al. 1993, Pritchard 1996, Zloty and Pritchard 2001). Some of his dragonfly work was broadly theoretical, such as his investigations into odonate mating systems and sexual selection (Conrad and Pritchard 1992).

But dragonflies were far from all that Gordon studied. He examined life histories and feeding in alderflies (Pritchard and Leischner 1973), morphology of stridulation in predaceous diving beetles (Larson and Pritchard 1974), peritrophic membranes in ground beetles (Cheeseman and Pritchard 1984), and development and survival in mosquitoes (Slater and Pritchard 1979). Stoneflies in Rocky Mountain streams were a favourite subject – sampling techniques (Mutch and Pritchard 1982), life histories (Mutch and Pritchard 1984), and growth and development (Townsend and Pritchard 1998). Caddisflies (Berté and Pritchard 1986) and mayflies (Benton and Pritchard 1988, Zloty and Pritchard 1997) did not escape his interest and neither did water mites (Proctor and Pritchard 1990). Having good-sized populations of the iconic Canadian insect, *Grylloblatta campodeiformis*, nearby in the Rockies made the study of this fascinating subterranean species relatively straightforward (Pritchard and Scholefield 1977). Gordon probably showed dozens of entomologists their first specimens of the Order Grylloblattodea during his frequent forays into the Kananaskis Valley.

One of Gordon's last and most intriguing entomological adventures was the discovery of a new family of flies (Diptera), the Oreoleptidae. Strange larvae unassigned to any known family had been found several times in torrential streams in the western mountains. But it wasn't until Jack Zloty and Gordon collected and reared larvae and pupae to adults that it was confirmed to be a distinctive, undescribed species in a new genus and family (Zloty et al. 2005). Brad Sinclair, an expert on the phylogeny of flies, collaborated with them on the project and demonstrated that the fly had unique characteristics closely related to the Tabanidae (horse flies) and Athericidae (water snipe flies). How many entomologists these days are lucky enough to find and name a new family of insects?

By the early 1990s, Gordon's life was changing. He and June had divorced and he married Valerie Preuter (née Jones) on 4 August 1991. They made a terrific and inseparable team – generous, happy, full of fun. They welcomed many visitors to their Calgary home and travelled to all corners of the world.

From 1967 to 1999 Gordon was an energetic and involved teacher, researcher and administrator at the University of Calgary. By 1976 he was made Full Professor and from 1976 to 1978 he served as an Assistant Dean of Science. In 1997 the University offered early retirement to their senior faculty – the deal was so good that many, including Gordon, couldn't refuse. The administration then discovered that there was no one to teach the senior courses, and so sessional appointments were given to those interested. Gordon continued to teach during the next two years. In his retirement he was named Professor Emeritus.

Gordon's university teaching dealt primarily with evolution, ecology and entomology, and ranged from 400-student introductory classes to small graduate student tutorials. He taught in the lecture theatre, the laboratory and the field. For many years Gordon led Educational Travel Study Programs on behalf of the University of Calgary's Faculty of Continuing Education to Costa Rica, the Galápagos Islands, and to East Africa.

Gordon supervised 19 MSc and PhD students, served on over 100 graduate student thesis committees, and published 84 peer-reviewed papers. He made his first trip to the Galápagos Islands in 1983; this led to what he called a "serious interest" in Charles Darwin. In 1986

Gordon established the Annual Darwin Lecture and Dinner, on a date in February close to Darwin's birthday. This was a social and intellectual gathering for the faculty and students of the Ecology Division and included the dreaded Darwin quiz. Gordon's Darwinian knowledge was staggering and he used it well – in his teaching, research and entertainment. The event continues still – a wonderful legacy of Gordon's passion for science.

David Larson, a water beetle expert and an early doctoral student of Gordon's credits Gordon's clarity and patience in his successful teaching of difficult ideas and methodologies. He remembers Gordon as "reflective and philosophical, exhorting students to understand the basics... a councillor, a person I could bring ideas to and have them seriously considered, debated and evaluated."

Larson also recalls that "Gordon could be highly focused and immersed in his studies. A feature of American universities is for faculty to keep their office doors open and appear inviting. Gordon didn't – his door was shut and knocks went unanswered unless they were very persistent – then you would hear a muffled 'There is nobody here' and, if you didn't believe that and still knocked, there would be an eventual 'Go away!' He had time and patience for meetings but they had to be scheduled and done right." This concentration, Larson notes, can be seen in Gordon's research: "Both his morphological and experimental work is meticulous... His ecological studies are exemplary for their clear focus. He had the background of a naturalist and could see what was real and important in nature, and had the skill and care to design his studies to get to the point."

Retirement allowed Gordon to indulge his love of music. Although he had played the drums since he was a boy, he had no formal training. He loved to jam with a small group, where reading music was not required, and several nights a week were devoted to this. But when the opportunity to play with a Big Band surfaced, Gordon knew that he would have to learn to read scores – and so began the drum lessons that lasted the rest of his life. Saturday mornings were devoted to band practice and gigs took the band from seniors homes to golf and country clubs. Gordon had an encyclopedic knowledge of the jazz artists of the past and present. Hearing a piece of music, he could tell you who was playing what instrument and, most times, when and where the recording had been made.

Gordon began a lot of new things late in his life. He learned to downhill ski for his 50th birthday; he took scuba diving lessons in 1997 so he could join his children underwater on the Great Barrier Reef. In 2001 he started snowshoeing to prepare for a trek to Everest Base Camp.

Travel was integral to Gordon's being. He and Valerie travelled to all the continents – trains in Russia, Mongolia, China and Australia; ships of various shapes and sizes to the Caribbean, the Mediterranean, and Antarctica; tour buses and 4x4s in Africa; and walking in England to the places Gordon remembered as a child.

Dragonflies took Gordon to many wonderful places, from the hot springs of Canada and the US, to tropical streams in Costa Rica and Colombian Amazonia; from conferences above the Arctic Circle in Sweden to the deserts of Namibia. For most of his career, Gordon worked tirelessly in the societies that promoted and coordinated international dragonfly research and published odonatological journals. Among much other work he organized the Seventh International Symposium of Odonatology in Calgary in 1983 (Societas Internationalis Odonatologica) and, in the Worldwide Dragonfly Association, served as a Trustee, a Coordinator of International Symposia of Odonatology, and as President from 2007 to 2009.

Gordon's cancer surfaced in 2003 with a diagnosis of multiple myeloma, treatable but not curable. In



February, 2012, he wrote: “The cancer diagnosis really changed my outlook. No longer did I dwell on the past, nor did I think too much about the future. I felt really good every morning when I got up and took every day as it came, filling the day with things I wanted to do. If I didn’t get everything done that I thought I might, there was always tomorrow, which would also be a great day.”

Gordon was a dear friend. Although I didn’t see him often, he was always there, an inspiration in the background. When I did see him, there was always something to learn. I met Gordon through our shared love of dragonflies in the late 1970s. We worked together on the organization of the 1983 International Odonatological Symposium and sat through many odonatological society meetings, some of which were surprisingly testy and turbulent (I was always impressed by Gordon’s calm wisdom and negotiating skills). We collected grylloblattids in the Kananaskis Valley and watched damselflies and dragonflies along the shores of dozens of streams and ponds. We revelled in smoky Parisian nightclubs and talked into the night around campfires in the Namibian wilderness. We drank scotch and listened to jazz in the basement of his Calgary home. He was a wonderful man.

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Rob Cannings [rcannings@royalbcmuseum.bc.ca], Royal British Columbia Museum, Victoria, BC, Canada. With help from John Acorn, David Larson, Rob Longair, Jack Zloty and, especially, Valerie Pritchard. John Acorn's book, *Damselflies of Alberta: flying neon toothpicks in the grass*, which is referred to herein, contains an excellent summary of Gordon's career and influence.

***Gynacantha corbeti* Lempert, 1999 (Aeshnidae)
discovered in Thailand**

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On 30 April 2013, I was in Krung Ching National Park, Nakhon Si Thammarat Province, Thailand. Krung Ching National Park is named after a famous waterfall which can be reached via a single forest path of approximately 4 km in length, starting at the Park Headquarters.

It was at about 3 km along this path, ca. 400m altitude, when I came across and photographed a large aeshnid (Fig. 1). This was resting deep in the forest near an area of swampy land.

Believing it to be either *Gynacantha basiguttata* or *G. bayadera*, I sent the photos to Oleg Kosterin, who keeps a provincial database of Thai odonata, for identification. The reply was that he thought it likely to be yet another species, *G. corbeti*, and asked if the photos could be forwarded to others for confirmation.

The photos were then sent to Dr. Jochen Lempert, Dr. Albert Orr and Dr. Matti Hämäläinen, who all confirmed that the species was, indeed, *G. corbeti*, identified by the cerci being strongly arched and truncated and also with the epiproct being very long (Fig. 2). Dr. Lempert also confirmed that the thoracic colouring (Fig. 3) matched the type of this species.

This is the first record of this species from Thailand, and, indeed, it is believed to be the first sighting of the species since it was first described by Lempert (1999). The only previously known specimens are the Type series of two males and a single female, all from Selangor, West Malaysia.

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The author is deeply indebted to Drs. Orr, Lempert and Hämäläinen and Oleg Kosterin for their help in identifying the species and encouragement to produce this brief note.

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Figure 1. *Gynacantha corbeti* Lempert, 1999, Krung Ching National Park.



Figure 2. Caudal appendages.



Figure 3. Close-up of thorax appendages.

New record of *Amphiaeschna ampla* (Rambur, 1842) from Java

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Introduction

A group of dragonfly enthusiasts called the Indonesia Dragonfly Society (IDS) is committed to starting the recording and monitoring of the dragonflies of Java. The data presented here was collected starting in December 2012 from Banyuwangi, the easternmost tip of Java. Banyuwangi is separated by the Bali Strait from Bali.

On December 2012, IDS members spotted a species of dragonfly in Kalibendo forest on Mount Ijen, Banyuwangi, East Java at 3.00 pm. Four individuals were found hanging on a bush growing on a 5m-high cliff. Kalibendo (112 ft) is a densely forested stream (Fig. 1) with slow to rapid flowing water and a muddy or sandy bottom.

The dragonflies were identified as *Amphiaeschna ampla* and, according to Rory Dow, this is the first published record from Java in more than 50 years. The last publication which mentioned this species from Java was Lieftinck (1954), based on earlier records in, for instance, Fraser (1926), Karsch (1892), Lieftinck (1934) and Martin (1909); most of these records appear to be from west Java.

In January 2013 IDS went back to Banyuwangi to take better photographs, record the coordinates and collect specimens. *Amphiaeschna ampla* was not found at Kalibendo in two weeks of observation, but it was found in the mountainous area of Mount Marapi, which is next to Mount Ijen. Five individuals were spotted at Kalongan forest (Mount Marapi) at 1.00 – 2.00 pm. They were found close to each other. Kalongan (1417 ft) (Fig. 2) has similar characteristics to Kalibendo but it has more open areas with still water and marshes. Two females and three males were observed inactive under the shade of plants during the day, which supports the observation that *Amphiaeschna ampla* is typically crepuscular (Lieftinck 1954). Even though during the day *Amphiaeschna ampla* is not active, it sometimes flies short distances when it is disturbed.

Brief description of both sexes

Male (Figs 3, 4 and 5): Eyes light brown. Face dark brown. Abdomen dark brown with white abdominal spots. Lateral thoracic stripes straight, all green. Wings with dark basal spots. Paddle-like superior anal appendages. In life S8-S10 are held curved upwards.

Female (Figs 6 and 7): Same colour as male. More extensive brown basal markings on the wings than the male and light brown patches on the forewing between nodus and pterostigma. Paddle-like superior anal appendages.



Figure 1. The Kalibendo forest in Banyuwangi where *Amphiaeschna ampla* was first observed in December 2012.

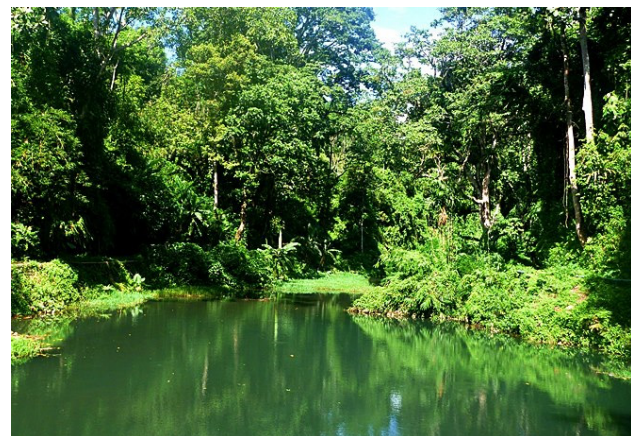


Figure 2. Kalongan forest, the other site where *Amphiaeschna ampla* found in Banyuwangi.



Figure 3. A male *Amphiaeschna ampla*.



Figure 4. Male *Amphiaeschna ampla*.



Figure 5. Male caudal appendages.

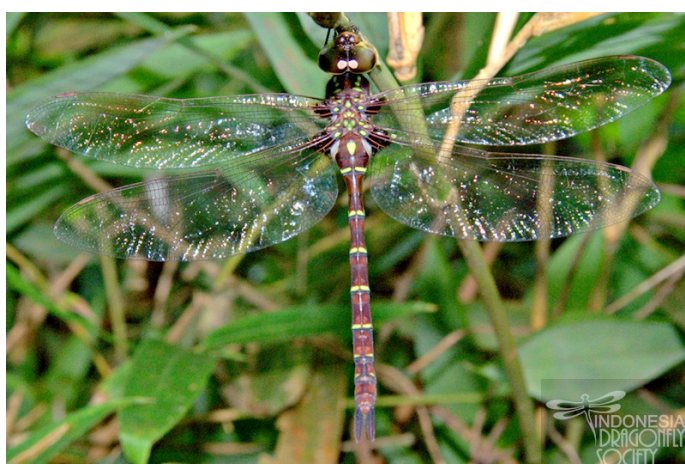


Figure 6. Female *Amphiaeschna ampla*.



Figure 7. Female caudal appendages.

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Thanks to: Rory A. Dow for helping to identify this species and for the useful comments and corrections, Karyadi Baskoro for reviewing the manuscript, Wahyu Sigit Rhd for all the photographs, and fellow photographers from Banyuwangi (Bayu Pamungkas, Rendra Kurnia, Arifin Putra, A Rahmatullah John) for guiding the field visits.

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The team. Left to right : Bayu Pamungkas (photographer from Banyuwangi), Wahyu Sigit Rhd (Head of Indonesia Dragonfly Society), Tabita Makitan (Department of Research and Development Indonesia Dragonfly Society).

On the synonymy of two enigmatic endemic clubtails from Sri Lanka (Anisoptera: Gomphidae)

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Introduction

With 124 dragonfly species from 12 families, the island of Sri Lanka is not one of the most species-rich areas in SE Asia. However, despite its very close location to the Indian Peninsula, endemism is remarkably high – 50% of the odonate fauna or a total of 62 taxa are confined to the island (Bedjanič *et al.*, 2013).

In the last dozen years considerable research has been devoted to the island's dragonfly fauna. On one hand, nine taxa new to science have been described (van der Poorten, 2009a, 2009b, 2012; Bedjanič 2010, 2013; Conniff & Bedjanič, 2013) with some new taxa still in the process of description (M. Bedjanič, in prep.; M. Bedjanič & K. Conniff, in prep.). On the other hand, several taxa have been deleted from the island's list of species. Two taxa have been deleted due to erroneous quotations (Hämäläinen *et al.*, 2009; van der Poorten, 2011) and five cases of pairs of conspecific endemic species described under different names have been recently synonymized (Bedjanič, 2008, 2009, 2012).

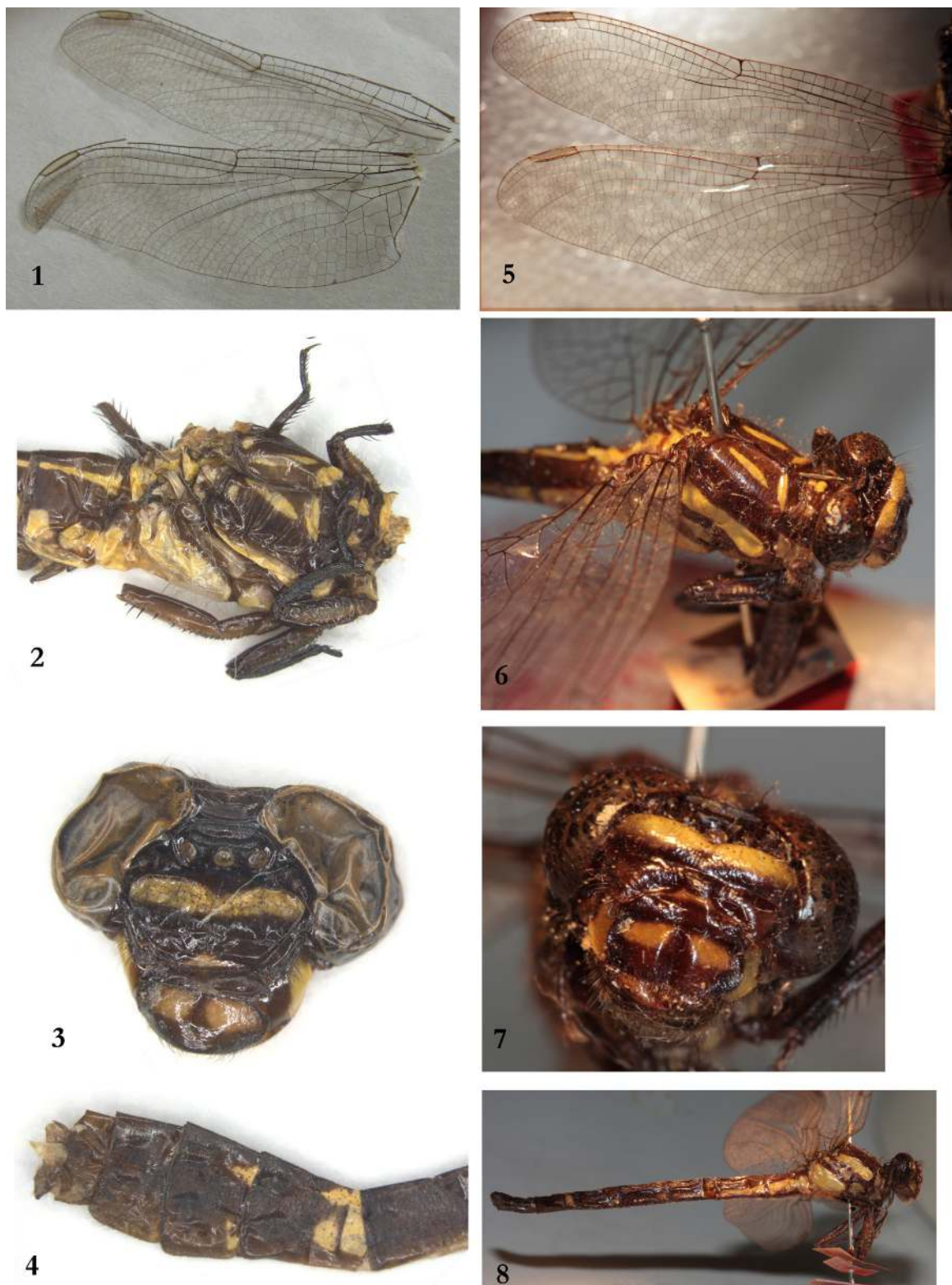
Here, we report on an additional case of synonymy recognized only recently while studying the type specimens and their photographs of two enigmatic Sri Lankan representatives of the family Gomphidae, namely *Heliogomphus ceylonicus* (Hagen in Selys, 1878) and *Anisogomphus solitaris* Lieftinck, 1971.

Taxonomic background and new status of *Heliogomphus ceylonicus* (Hagen, 1878) and *Anisogomphus solitaris* Lieftinck, 1971

The description of the endemic *H. ceylonicus* (Hagen in Selys, 1878) was based on a single female specimen, collected by plantation owner and renowned collector J. Nietner at Rambodde in the central uplands of Sri Lanka. The original name given by H. A. Hagen, *Gomphus ? ceylonicus*, has been updated several times, e.g. Kirby (1890) listed it under *Aeshna ceylonica*. F. C. Fraser was the first to put it in the genus *Heliogomphus* (Fraser, 1925), also publishing English translations of the original French description (Fraser, 1923, 1925, 1933, 1934, 1942). Despite the fact that no male was known, Fraser trusted Selys' remark on its close resemblance to the South Indian *H. promelas* and also recognized it as distinct from the other three Sri Lankan endemic *Heliogomphus* species, thus retaining its status as a good species. For more than 130 years since the description, nothing else has been known about the species, with no subsequent records or any other new information. As a part of Hagen's collection, the holotype female of *H. ceylonicus* is housed in the Museum of Comparative Zoology, Harvard University, USA.

The case of *A. solitaris*, described by Lieftinck (1971), is quite similar. This endemic clubtail has been known only from a single immature specimen of a male and its exuvia, collected by P. Brinck, H. Andersson & L. Cederholm on 18-III-1962 in Rambukpath Oya, 10 miles northwest of Hatton in the central part of Sri Lanka. Its type locality has been described as a stream in a steep ravine with bush and some indigenous vegetation; the surroundings were covered with tea and rubber plantations, while the forest had been cut and rubber planted at higher altitudes (Brinck *et al.*, 1971). While putting the new species in the genus *Anisogomphus*, M. A. Lieftinck noted that it is taxonomically isolated and that due to the considerable deviation in adult and larval characters it may even belong to a new genus. However, due to the immature condition and original damaged state of this single male specimen, this hypothesis could not be tested. The holotype male of *A. solitaris* is housed in the Museum of Zoology at Lund University in Sweden.

In May 2013, by comparing recently obtained photographs of the type material of both endemic species, it has been unexpectedly discovered that the female specimen of *H. ceylonicus* actually does not belong to *Heliogomphus*. As seen in Fig. 1, the wing venation deviates from the classic *Heliogomphus* description provided by Fraser (1934), most markedly in the number of transverse nervures between the sectors of Arc from Arc to bifurcation of Rs in the forewing and hind wing. There are three transverse nervures in the forewing and only one transverse nervure in the hind wing in the type female of *H. ceylonicus*. *Heliogomphus* species have 6–7 in the forewing and 4–5 in the hindwing; *Anisogomphus* have 4–5 and 1–2, respectively. Some other characters also clearly place the considered female in the group of Gomphinae *sensu* Fraser (1934), e.g. the seventh abdominal segment has a broad basal yellow annule and the bifurcation of Rs is symmetrical.



Figures 1-4. Immature male of *Anisogomphus ceylonicus* [*Anisogomphus solitaris* Lieftinck, 1971; male holotype, Museum of Zoology, Lund University, Sweden]: (1) wing, right pair (flipped horizontally for better comparison); (2) thorax and first abdominal segments, dorsolateral view; (3) head, frontal view; (4) terminal abdominal segments and anal appendages, dorsolateral view (Photos: M. Bedjanič).

Figures 5-8. Female of *Anisogomphus ceylonicus* [*Heliogomphus ceylonicus* Hagen in Selys, 1878; female holotype, Museum of Comparative Zoology, Harvard University, USA]: (5) wing, left pair; (6) head, thorax and first abdominal segments, dorsolateral view; (7) head, frontal view; (8) lateral view of whole insect (Photos: N. van der Poorten; Copyright President and Fellows of Harvard College). Credit: Museum of Comparative Zoology, Harvard University.

Of course, since the group of described endemic clubtails from Sri Lanka only slightly exceeds a dozen, a comparison of Hagen's female with Lieftinck's male immediately became an option that needed careful checking. Comparison of wing venation, thorax, prothorax and head colouration and markings swiftly revealed that both taxa are actually conspecific (Figs. 1-3; 5-7). Thus, *A. solitaris* and *H. ceylonicus* are synonymized, Hagen's senior species name having priority (ICZN, 1999). The systematic positioning of the species by Lieftinck (1971) in the genus *Anisogomphus* is retained until new material and data are available.

TAXONOMY

Anisogomphus ceylonicus (Hagen in Selys, 1878) comb. nov.

SYNONYMY

Gomphus ? ceylonicus Hagen in SELYS (1878); *Aeshna ceylonica*: KIRBY, 1890; *Gomphus ceylonicus*: - FRASER, 1923; *Heliogomphus ceylonicus*: FRASER, 1925; *Anisogomphus solitaris* LIEFTINCK, 1971 syn. nov.

TYPES

Holotype data: *Gomphus ? ceylonicus* Hagen in SELYS, 1878 - holotype female; Museum of Comparative Zoology, Harvard University, USA; [description of female in Selys (1878), Bull. Acad. r. Belg. (2) 46: 455]; examined by N. van der Poorten; photographs examined by M. Bedjanič.

Holotype data: *Anisogomphus solitaris* Lieftinck, 1971 - holotype male; Rambukpath Oya, 10 mi NW of Hattton; 18-III-1962; P. Brinck, H. Andersson & L. Cederholm leg.; Museum of Zoology, Lund University, Sweden; [description of male and exuvia in Lieftinck (1971), Ent. scand. Suppl. 1: 198-202, 206, figs. 5, 9a-d.]; examined by M. Bedjanič.

Discussion

With the present case of synonymy, one of the last historical puzzles among dragonflies of Sri Lanka seems to be solved. Despite the fact that no new records were gathered on the species during fieldwork in the last few years, with the present account the future fieldwork strategies will change considerably. Regardless of the future taxonomic position of *A. ceylonicus*, the following characters will serve to distinguish this species: characteristic wing venation, predominantly black prothorax with yellow pyriform dorsal spot, well-interrupted broad mesothoracic collar, long narrow antehumeral stripe pointed at both ends, isolated upper mesepisternal spot, middle lateral yellow thoracic stripe interrupted, lateral yellow markings on S1–S3, a dorsal basal yellow patch on S7 and the anal appendages of the male (Figs. 1-8).

Serious fieldwork research, including larval sampling and work in different seasons, should be conducted in the broader surroundings of the known localities of *A. ceylonicus* as soon as possible. In the past few years, the broader area of both localities has been visited without any sight of the species. However, in the case of the locality reported by Lieftinck (1971), although the landscape is quite destroyed there, its wider surroundings still seem to fit the decades-old description. On the other hand, it is possible that the species is already extinct due to habitat degradation, fragmentation and pollution in the last decades which is still ongoing. Hopefully, however, the explanation of inappropriate odonatological fieldwork timing and methods may still hold in this case.

The IUCN category proposed for each taxa (now recognized to be conspecific) still seems to be the most appropriate (Bedjanič, 2006, 2009). Thus, endemic *A. ceylonicus* is ranked as critically endangered among globally threatened dragonfly species.

Acknowledgements

Thanks are due to Dr PHILIP PERKINS (Collections Manager, Museum of Comparative Zoology, Harvard University, USA) for permission to photograph the type specimen of *Heliogomphus ceylonicus* in the MCZ collection and to use the photographs in this article and to STEFAN COVER of the MCZ for curatorial assistance. Thanks also to Dr ROY DANIELSSON (Lund, Sweden) for kindly sending a loan of type specimen of *Anisogomphus solitaris* from the collection of the Museum of Zoology at Lund University. Part of the first author's work has been conducted in the frame of the Rufford Small Grant No. 11448-1 "Distribution Atlas of the Dragonflies of Sri Lanka: focus on the globally endangered species included on the IUCN Red List of Threatened Species" funded by the Rufford Small Grants Foundation.

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Book Review
by Albert Orr [agorr@bigpond.com]

Demoiselle Damselflies
Winged Jewels of Silvery Streams
(Neidonkorennot – Solisevien vetten lentävät jalokivet)

Text: Sami Karjalainen and Matti Hämäläinen
Photos: Sami Karjalainen
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Demoiselle Damselflies, winged jewels of silvery streams; this evocatively titled book presents an extraordinary fusion of art and science. With breathtaking photographic images and a concise, lucid text it depicts and summarizes the behaviour, ecology and global diversity of that most beautiful of odonate groups – the family Calopterygidae *sensu stricto*. However before proceeding further I must declare interest. It was my privilege and my pleasure to edit the original English text and occasionally, as editors do, to make suggestions on content. Never before have I worked on such an exquisitely conceived or well constructed book. It is a splendid example of the book as a work of art. But can I now write an unbiased review? Of that the reader must be the judge.

I will begin with the text. Firstly, apart from the title itself, the book was originally written in English, edited, then translated into Finnish, the authors' mother tongue. This is the exact reverse of what normally happens in bilingual books, and the result is most successful, with a genuinely authoritative and informative text. Too often in bilingual books we see a token and inept English text which does not do justice to the original language (I speak especially of cases where I can read both languages). In this case I can guarantee at least that the English text is a very good read.

The first part of the book, written by Sami Karjalainen, deals with habitats, adult structure, flight, egg, larva, emergence, adult life, feeding, territoriality, courtship, copulation and sperm competition, oviposition, predators and parasites and variation. These topics have been dealt with by other authors but the text here is especially concise and informative, and each topic is lavishly illustrated with photographic examples, showing mostly European species but also the exotic Oriental Metalwings, *Mnais* and others. The second and slightly longer part, which follows seamlessly from the first, was written by Matti Hämäläinen and covers the faunistics and taxonomy of European species, giants of the east (*Archineura*), Demoiselle genera worldwide, close relatives (Hetaeriniidae, Chlorocyphidae and Euphaeidae) and a comprehensive checklist of the 112 known Demoiselle (Calopterygidae) species. It is worth noting that after Selys, the author whose name appears most frequently in this list is Hämäläinen, followed by Fraser and Lieftinck. Much of the information on the numerous tropical genera has never before been assembled and summarized, and it is expertly done, with close attention to detail married with a very succinct text. Genera of the world is almost a misnomer – virtually every species is mentioned. In some cases, where it has general interest, the etymology of generic names is explained (e.g. *Echo* and *Phaon*, characters from Greek mythology). A world map shows geographic patterns of species richness, with 53 species being found in tropical and subtropical Asia excluding Sundaland, the heartland of Demoiselles.

Finally, just when we think we have reached the end of the book, beyond the checklist, we find two short chapters which are together much more than an epilogue – 'Demoiselles in history and culture' and



'Disappearing beauty', both authored by Matti Hämäläinen. The first gives us the merest glimpse into a large topic. We learn a recognizable Demoiselle was figured in Europe as early as 1320 – and provides evidence for global cooling. Eastern and particularly Japanese attitudes to Odonata are discussed and the chapter concludes with three charming Haiku about Demoiselles. 'Disappearing beauty' is arguably the finest chapter in the book – the inexorable destruction of the earth's habitats is discussed with a note of black comedy (should we be called *Homo ambulocalamitas* – walking disaster man?), which nevertheless accentuates its sombre note – we are creating a world fit only for vermin. The photograph accompanying this page shows the hind view of a demoiselle in silhouette, retreating into a disintegrating background.

The book is illustrated throughout with photographs, and they are, in the main, of exceptional quality and mostly taken by Sami Karjalainen. There is a good selection of striking action shots, showing demoiselles on the wing in courtship or combat. Others portray them in their environment, often lending them an almost surreal quality. In some cases it is the backgrounds which exhibit the greatest appeal, but never at the expense of the main subject. At no stage could the reader doubt that this is a book about demoiselle damselflies. However, many readers will connect first with the subliminally familiar background, then see the demoiselle. This is surely the way to seduce readers into looking at that which they might never before have noticed. We see a glowing red jewel set in silver (134-135), or submerging wings mingling with the colours of Monet's water lilies (99). Others (37, 40-41) capture the frenzy of activity around a breeding site, or the calm silhouette of *Matrona* (150-151) perched on a blade of grass, recalling a Chinese brush and ink drawing.

In any illustrated work of natural history it is important to constantly stimulate the reader with images which vary in their perspective, background mood and scale. The reader should experience a dynamic interaction with the book – the visual senses should be constantly engaged and even slightly challenged. The book achieves this result very skilfully. Some are natural history masterpieces, capturing seldom witnessed but commonplace dramas of the lives of demoiselles. Many are pure art photos. Some are serene and contemplative – others are action packed – almost all are technically brilliant. However not all images are entirely successful. The close up photos of *Vestalis melania* wings (32, 33) are visually interesting in a purely abstract way but scarcely do justice to the range of beauty to be found in such subjects; moreover they lack proper explanation. One can understand how these images were achieved technically, but in my opinion they do not do justice either to demoiselles or to the rest of the book.

The layout and overall structure of the book is outstanding. There is everywhere exquisite attention to detail, so that Finnish and English texts balance almost exactly, or any imbalance is compensated by the skilful placement of figure legends. The text is everywhere very well founded. There are 169 scholarly citations, discretely referenced in the text by small numbers. The format of the book is perfect. It sits easily in the hand and invites reading. It is likely the most resistant of readers, seduced by the gorgeous images, will have read and learned a good deal more science than he or she intended, before putting it down.

This book is not aimed primarily at the specialist. It is not a monograph, but nor is it a picture book – it is a book for anyone with an eye for beauty in nature and with an ordinary level of scientific curiosity – but every odonatologist will surely wish to own a copy and will find it both a thing of beauty and a valuable reference work.

