



AGRION

NEWSLETTER OF THE WORLDWIDE DRAGONFLY ASSOCIATION

PATRON: Professor Edward O. Wilson FRS, FRSE

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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 [<https://worlddragonfly.org/publications/>]. WDA is a Registered Charity (Not-for-Profit Organization), Charity No. 1066039/0. A 'pdf' of the WDA's Constitution and bylaws can be found at its website link at [<https://worlddragonfly.org/wda/>]



Editor's notes

Keith Wilson [kdpwilson@gmail.com]

WDA Membership

There are several kinds of WDA membership available either with or without the WDA's journal (*The International Journal of Odonatology*). You can sign up for a membership using the WDA's website [<http://worlddragonfly.org/join/>] or by contacting the WDA secretary directly [wda.secretary@gmail.com]. Sponsored memberships are also available for those who cannot afford the cost due to currency restrictions or other reasons.

Conference & Meeting News

5th European Congress on Odonatology (ECOO) 2018 was held in Brno, Czech Republic 9-12 July 2018. For more info please contact Otakar Holuša, Mendel University in Brno, Faculty of Forestry and Wood Technology, Dept. of Forest Protection and Wildlife Management, Zemědělská 3, CZ-613 00 Brno, Czech Republic, mob: +420 606 960 769, e-mail: [holusao@email.cz] or visit the ECOO 2018 website for more information [<http://ecoo2018.com/>].

DSA Annual Meeting

The Dragonfly Society of the Americas Annual Meeting will be held in Finland, Minnesota, USA on 13-15 July 2018. More information can be found at the DSA 2018 Meeting website [<https://sites.google.com/udel.edu/dsa2018/home>].

SOL Congreso AQUATROP

The Sociedad de Odonatología Latinoamericana will hold a joint meeting with the Red Macrolatinos, the Society for Freshwater Science, and the Asociación Ecuatoriana de Limnología in Quito, Ecuador on 23-26 July 2018. For more information, visit their website [<http://riostropicales2018.org/welcome/?lang=en>].

ICO2019 Austin, Texas

The ICO2019 website is now live! Check out the link at [<https://worlddragonfly.org/ico2019>] for the International Congress on Odonatology to be held in Austin, Texas, July 14-18, 2019.

Kendra Abbott is raising money to fund students from around the world to participate in ICO2019. Kendra says: 'we want to focus on students because they represent new frontiers in odonatology (the study of dragonflies and damselflies). At the 2017 meeting in Cambridge, we had 40 students participating and we would like to double that number in 2019 by making students a focus of the meeting.

We are asking for at least US\$5,000 to help bring down the cost of student registration. If we were able to raise US\$20,000 we could fully fund



Cover: Male *Camacinia harterti*. (A) Tam Dao National Park, northern Vietnam, 14 April 2009. Photo credit: Cuong Man Do [[Link](#)].

the registration for at least 40 students coming to this meeting!

Above and beyond the student registration, this money will also be used to help fund socials for students to interact and network with researchers and conservationists, building new synergies across the globe. More funds mean more connections!

We need to raise these funds as soon as possible to give students time to register and plan for the meeting.

Your gift to fund students to attend the 2019 International Congress of Odonatology will provide invaluable assistance to the next generation of odonatologists conducting new and novel science and thus pushing the frontiers of this growing field. You can donate from the meeting web page [[Link](#)].

Learning about dragonflies is the best way to conserve them, future generations thank you for your support!' See gofundme link at [<https://www.gofundme.com/students-at-dragonfly-meeting>].

International Journal of Odonatology

John Abbott Managing Editor of WDA's International Journal of Odonatology announced to members on 27 June 2018 that IJO 21(2), June 2018, was being printed and would be mailed out soon. The digital version is now available online at the Taylor & Francis website [[Link](#)].

Next issue of AGRION

For the next issue of *AGRION*, to be published at the beginning of January 2019, please send your contributions to Keith Wilson [kdpwilson@gmail.com] or Graham Reels [gtreels@gmail.com]. All articles, information and news items related to dragonflies or of interest to WDA members are most welcome and will be considered for publication. Please send all text and figure captions in a Word file by email. Please do not include artwork with the text but provide a separate file or files, ideally in a compressed format (e.g. 'tiff', 'jpeg' or 'gif'). Do not make up plates of multiple photos but send original photo images as separate files.

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

Members contact details

Dear WDA members,

You may not have received invitations to renew your membership or subscription to IJO for this or last year. Perhaps you did not receive issues of IJO and wonder why. One reason, but surely not the only reason, may have been that we and T&F do not have your recent physical and/or email addresses. Some of you may have moved or changed email addresses and we would like to update our records to reflect this. Please understand that it has been very difficult for us to follow up on address changes, and thus we are writing to you now for your assistance. Have we "lost" some of you from our member database? Please send your current email address to wda.secretary@gmail.com and Alison.Paskins@tandf.co.uk so that we may update our records.

Thank you!
Sincerely,

Jessica (WDA Secretary, wda.secretary@gmail.com) and Frank (WDA President)

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Third Annual Butterfly and Dragonfly Race of Sri Lanka Spreading Conservation Interest through Fun

Amila P. Sumanapala [apsumanapala@gmail.com]

The Butterfly Conservation Society of Sri Lanka (BCSSL [<http://www.bcssl.lk/>]) successfully held the third annual “Butterfly and Dragonfly Race” on 19th May 2018. The event was held at the Diyasaru Park which is an urban wetland park managed by the Sri Lanka Land Reclamation and Development Corporation.

The event attracted students from several universities and schools, members of several nature conservation groups and enthusiastic members of the general public. They participated as teams of five and competed in a friendly competition trying to record the highest cumulative number of butterflies and dragonflies in the park within the given two hours. Sixteen teams attended the competition despite the rainy conditions that prevailed in



Figure 1. (A) Participants and organizing team of the Butterfly and Dragonfly Race 2018. (B) Participants and organizing team of Grow with Nature Kids’ Programme

the previous days.

Though it was the beginning of the south-western monsoon in Sri Lanka, the event was blessed with fine weather and sunshine allowing the insects to be active. Odonates were plentiful in the wetland habitats and the participants eagerly pursued them trying their best to identify them correctly. A panel of judges moved with the teams recording the odonates and butterflies independently and observing the teams. This helped in validating the observations made by the teams and also compiling an independent list of species observed within the time.

Species like Oriental Scarlet (*Crocothemis servilia*), Variegated Flutterer (*Rhyothemis variegata*) and Yellow Waxtail (*Ceriagrion coromandelianum*) were among the common species while Elusive Adjutant (*Aethriamanta brevipennis*), Marsh Dancer (*Onychargia atrocyana*) and Elephant Emperor (*Anax indicus*) were some of the rarely observed species of the day. Altogether 32 species of odonates were observed during the event and majority of the teams managed to record around two thirds of this.

It was interesting to see many teams performing really well as the majority of the participants were amateurs in the field. For some it was the first time they actually tried to identify an odonate. They learnt to observe dragonflies and damselflies in detail and identify them on their own using field guides. This hands-on experience helped in igniting an interest towards these insects and studying them, as expected by the organizing team. Among the participating teams, "NatBeHo-A," representing the society "Nature beyond Horizon" of Horizon Campus, was the best team of the day while the "Great Orange Tip" team representing students from the "Nature Team" of University of Moratuwa were runners-up. The winning team received copies of "A Field Guide to Dragonflies and Damselflies of Sri Lanka" by Amila Sumanapala and both winners and runners-up were presented with gift vouchers from a leading bookstore.

The race was followed by a brief field session on identifying dragonflies and butterflies in the field lead by eminent lepidopterist Dr Michael van der Poorten and several BCSSL members. It was aimed mainly at amateurs as an attempt to strengthen the interest of the participants.

As a parallel event to the race, the "Grow with Nature Kids' Program", a specially designed program for kids between 6 and 15 years of age was held in the evening. Around 40 children took part in this event and they were given hands-on experience on nature using activities like creating a model of a butterfly lifecycle, jigsaw puzzles and treasure hunts.

The BCSSL would like to thank all of its members and well-wishers including the Field Ornithology Group of Sri Lanka and Sri Lanka Land Reclamation and Development Corporation for the support provided to make these events a success.



Figure 2. (A) Yellow waxtail (*Ceriagrion coromandelianum*). (B) Marsh dancer (*Onychargia atrocyana*) (C) Elusive adjutant (*Aethriamanta brevipennis*). (D) Variegated flutterer (*Rhyothemis variegata*).



Figure 3. (A) Winners - Team: NatBeHo-A. (B) Runners-up - Team: Great Orange Tip

New records of *Camacinia harterti* Karsch, 1890 and a review of old records

K.D.P. Wilson [kdpwilson@gmail.com]

Abstract

The early pre-1910 records of *Camacinia harterti* Karsch, 1890 are reviewed and both Sikkim, India and northern Vietnam are added to the historic range of this rare libellulid, known from the Oriental region. Details of four new recent records of *C. harterti* from Brunei, China (Guangdong & Yunnan) and many new records from northern Vietnam have confirmed its presence in Vietnam and, added considerably to the known range of this rare and hitherto poorly known species. Details of these records are provided and the male figured and redescribed. Its IUCN Data Deficient Red List status is briefly reviewed and it is recommended that its current status should be revised to Vulnerable.

Introduction

Until the turn of the century *Camacinia harterti* was considered to be an extremely rare libellulid with a large historical range covering much of southeast Asia. Very little was known regarding this flamboyant, but rarely recorded dragonfly; not even the stunning orange and bright red colour of the abdomen, which was thought to be plain brown. Several recent records, sightings and photographs have provided considerably more information about this richly coloured forest-dwelling odonate.

It is known to use phytotelmata, in the form of water-filled cavities associated with tree buttresses (Lieftinck, 1954), as breeding sites. It was first described from a single female from Sumatra by Karsch (1890) who was much impressed by the insect, despite his specimen being the brownish-coloured female, and commented:

‘Die prachtvolle Art wurde im Januar 1889 in einem einzigen weiblichen Exemplare vom Herrn Reserve-Lieutenant Ernst Hartert bei Batu Sankahan (vielleicht 8000’ hoch) im Gebirge von Deli auf Sumatra erbeutet und ist nach ihrem Entdecker benannt’.

Translation: *‘This magnificent species was collected in January 1889; a single female specimen by Lieutenant Ernst Hartert at Batu Sankahan (maybe 8000’ high) in the mountains of Deli, Sumatra and named after its discoverer’.*



Figure 1. Male *Camacinia harterti*, Xishuangbanna National Nature Reserve, southern Yunnan, May 2017. Photo credit: Zhang Haomiao [[Link](#)].

It was IUCN red-list assessed in 2013 as Data Deficient (Wilson & Dow, 2013). At the time of the assessment the species was historically known to have a wide distribution across Oriental Asia but then there had only been three recent records from widely separated locations; one female from Brunei collected ca. 1990s (Orr, 2001), one male from Nanling National Nature Reserve, north Guangdong, southern China, collected in 2000 (Wilson & Dow, 2013) and lastly two males from Chiang Rai, northern Thailand collected in 2003 and 2004 (Katatani et al., 2004). There were also several much older records (see range notes and synonymic synopsis below). Since 2013 Do (2014) has reported a single male from Tam Dao National Park, northern Vietnam, 14 April 2009 and documented the observation in his *Vietnam Insect blog* on 5 April 2014 and Tom Kompier (2015) also recorded a single male from northern Vietnam at Xuan Son National Park, Phu Tho, 31 May 2014 and similarly reported it in his *Dragonflies and damselflies of Vietnam blog*. Both Do and Kompier provided excellent photos of the mature male, which are reproduced here by kind permission in Figure 4(A-B). In May 2016, another superb male photograph of male *C. harterti* was taken by Hao-miao Zhang (2017) in the very dense forest of the Xishuangbanna National Nature Reserve, southern Yunnan, China that is also reproduced here by kind permission (see Fig. 1).

Tom Kompier has also been very busy recently and reported a series of northern Vietnamese records on the [<https://Observation.org>] website made between 31 May 2014 to 10 June 2018 at five provinces: Yen Bai, Phu Tho, Quang Binh, Cao Bang, and Vinh Phuc (Tam Dao). Details of these records are provided in the synonymic synopsis.

Habitat

Lowland and submontane hill forest habitat from 250-600 m. It occurs in richly forested hill slopes of moderately high mountainous areas typically peaking at 1,200-2,500 m.

There is no evidence that the Sumatra comment: 'perhaps 8000' (= 2,438 m), mentioned in the original description by Karsch (1890) relates to the height at which the type specimen was captured and this comment was taken out of context by Ris (1913: 928) as fact. The observation of ovipositing *C. harterti* in April 19, 1950 near Balimungan, Deli at ca. 600 m was made close to the type-locality in Deli, northeast Sumatra ca. 550 m.

The species' habitat, assumed to be lowland and submontane forest, has undergone vast clearance and disturbance throughout its

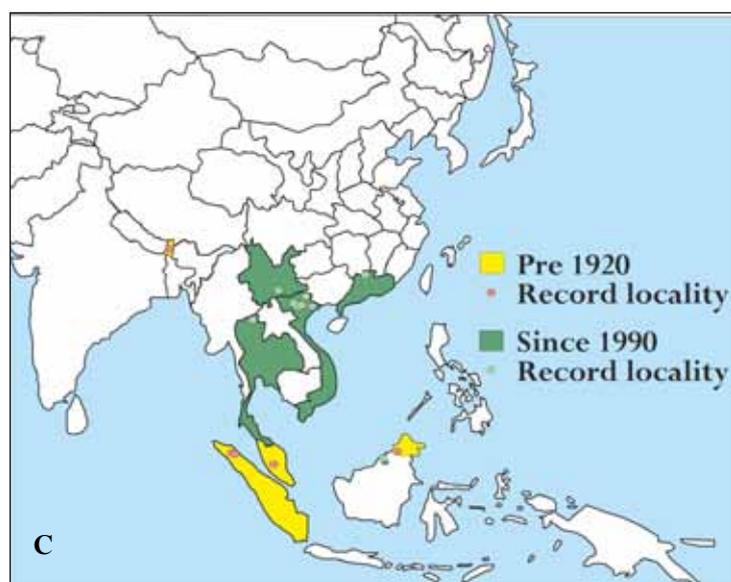
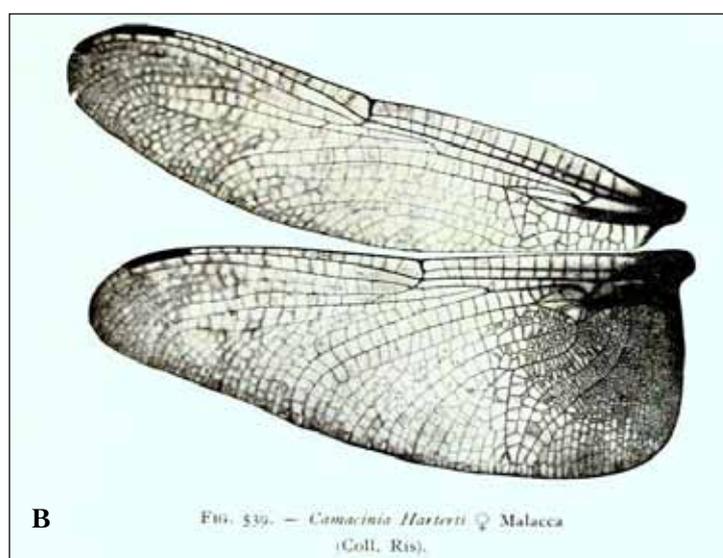
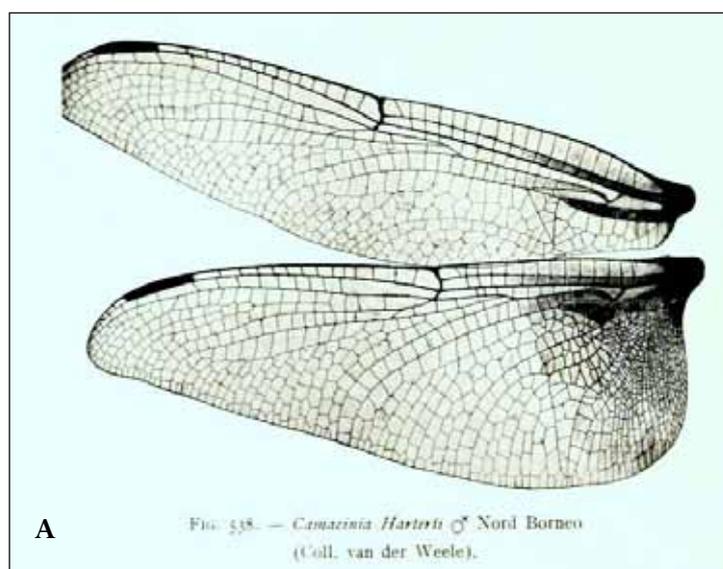


Figure 2. (A-B) *Camacinia harterti* wing reproductions from Ris (1913). (A) Male, north Borneo. (B) Female, Selongor, Malacca, Peninsular Malaysia. (C) Distribution Map.

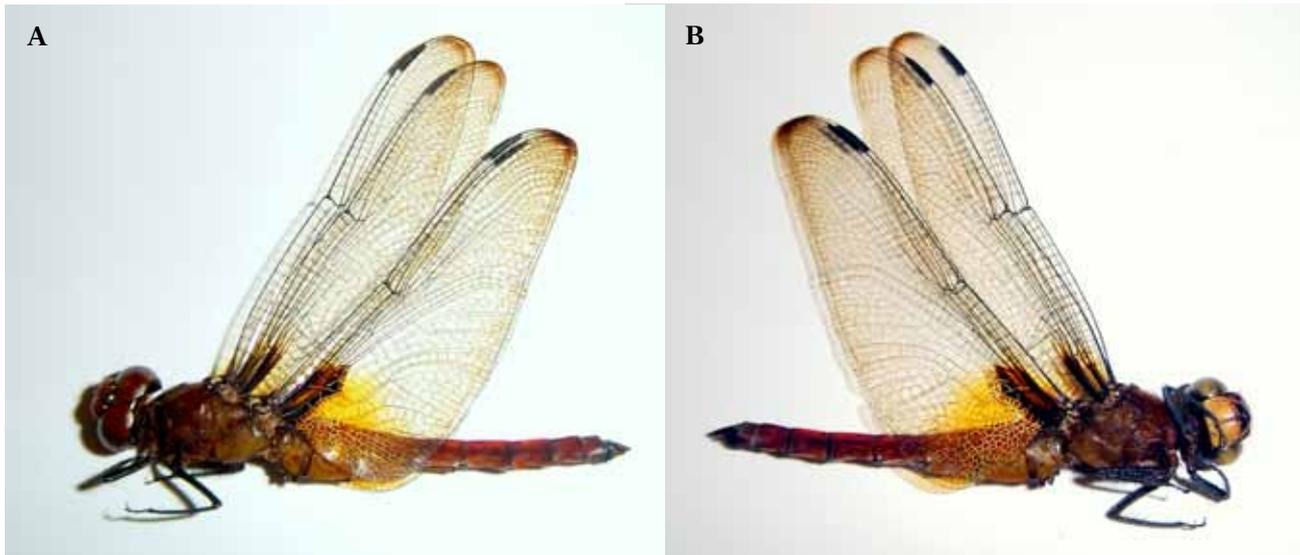


Figure 3. (A-B) Male *Camacinia harterti*, Henglongbei, Shikengkong (Babaoshan), Nanling National Nature Reserve, north Guangdong, China, 28 June 2000.

known range, but substantial areas still remain at present, albeit in varying degrees of disturbance. However, the recent series of records from richly forested protected areas indicate that *C. harterti* may be dependent on undisturbed submontane forest. As previously mentioned the species is known to adopt a specialist breeding strategy using phytotelmata, but the evidence for this is based on a single field observation as noted by Lieftinck (1954) and it is not known if this is its only breeding strategy. Its sympatric congener *Camacinia gigantea* selects pools and stagnant bodies of water in forests or forest clearings often overhung with marginal forest, but is a much more widespread and commonly encountered species, tolerant of heavily disturbed forest and also occurs in rubber plantations and coastal plains.

The interesting phytotelma breeding observation for *C. harterti* recorded by Lieftinck (1954) is provided here:

'The following interesting observation on the egg-laying habits of C. harterti was made by Mr. R. Straatman in Deli, northeast Sumatra. On April 19, 1950, his attention was drawn to a large dragonfly that flew persistently around a gigantic tree in a clearing of the forest near Balimungan (600 m alt.). The insect was evidently attracted to a deep hole existing in one of the exposed massive roots at the base of the tree, about 40 cm above the ground, as it was seen swooping repeatedly into the cavity, passed through the hollow trunk, after a few moments reappeared on the opposite side where the stem opened out into air by means of a wide aperture. On approaching the tree cautiously, the observer actually watched the female enter the cavity to oviposit in a small body of water which had assembled on the bottom of the hole, releasing her eggs into the muddy black water by rapid strokes of her abdomen. Though no larvae of harterti were found, the adult dragonfly could fortunately be captured and identified'.

Range (see distribution map in Fig. 2C)

The species was described from Sumatra (Karsch 1889: a female collected from Batu Sankahan at 550 m, Deliserdang District, Sumatra) but there are no modern records from Sumatra, which has lost much of its original forest. The species has also been reported from elsewhere in Indonesia in Borneo (Sabah and Brunei). In continental Asia it has been recorded from China (northern Guangdong, details provided below, and southern Yunnan), northern Thailand (Chiang Rai), Peninsular Malaysia, (Selangor, Malacca). Martin (1900) also described *C. harmandi*, a junior synonym of *C. harterti*, from Sikkim, northeast India and Martin (1904) later recorded *C. harmandi* from Tonkin (northern Vietnam).

The comparatively recent records since 1990 from Brunei (Orr, 2001), Guangdong (Wilson & Dow, 2013), northern Vietnam (Do (2014; Kompier, 2015. Kompier, 2018) and Yunnan (Zhang, 2017) have indicated the continuing presence of *C. harterti* in protected submontane wet forest reserves and provided wonderful photos of the mature males.

Synonymic notes are provided below and also the details and description of the 2000 Guangdong record are given for the first time.



Figure 4. Male *Camacinia harterti*. (A) Tam Dao National Park, northern Vietnam, 14 April 2009. Photo credit: Cuong Man Do [[Link](#)]. (B) Xuan Son National Park, northern Vietnam, 31 May 2014. Photo credit: Tom Kompier [[Link](#)].

Camacinia Kirby, 1889

There are three known and extant species of *Camacinia* Kirby, 1889: *C. harterti*, *Camacinia gigantea* (Brauer, 1867), which is widespread in forested areas, including heavily disturbed forest, across the Oriental Region from India to Papua New Guinea and *Camacinia othello* Tillyard, 1908 known from New Guinea, Aru Islands, Solomon Islands and northern Australia (Torres Strait Islands, Northern Territory, Queensland), where it is locally distributed but can be common where it occurs. The latter two species are similar and both possess dense wing venation with two to three cell rows above Rpl (see Fig. 6). *C. harterti* is an exception having only one cell row above the Rpl. The hind wings of *C. harterti* are relatively broader than those of *C. gigantea* and *C. othello*. The respective breadth to width ratios are *C. harterti* 1:2.6 - 1:2.8, *C. gigantea* 1:2.9, *C. othello*. 1:3.5. *C. harterti*, *C. gigantea* and *C. othello* are all very large libellulids with male hind wing widths 47.5-48 mm, 44-51 mm and 47-49 mm respectively.

Camacinia harterti Karsch, 1890 (Figs 1-5)

Camacinia harterti Karsch, 1890: 359-361 [type. ♀, Sumatra]. Ris, 1913: 925, 928-929, figs 538-539 (♂ & ♀ wings see Fig. 2A-B) [1 ♂, 1 ♀, Mt. Marapok in Sabah, near the Sarawak border, north Borneo & 1 ♀, Selangor, Peninsular Malaysia]; Lieftinck, 1954: 165-166 [Peninsular Malaysia, Borneo, Sumatra]; Orr, 2001: 211 [1 ♀, Tasek Merimbun, Brunei Darussalam in the 1990's]; Wilson & Dow, 2013 [1 ♂, 2000, Nanling National Nature Reserve, north Guangdong, China], Katatani et al., 2004 [1 ♂ 2003 & 1 male 2004, Chiang Rai, northern Thailand]; Do, 2014 [1 ♂, 14 Apr 2009, Tam Dao National Park]; Kompier, 2014 [1 ♂, 31 May 2014, Xuan Son National Park, Phu Tho, northern Vietnam]; Zhang, 2017 [1 ♂, May 2016, Xishuangbanna National Nature Reserve, southern Yunnan]; Kompier, 2018 [1 ♂, 18 Apr 2015, Phu Tho, northern Vietnam; 2 adults, 30 May 2015, do.; 1 ♂, 29 May 2016, do.; 1 ♂, 31 Jul 2017, do.; 1 adult, 27 May 2017, do.; 8 Jun 2018, do.; 1 adult, 30 Apr 2014, Quang Binh, northern Vietnam; 2 adults, 20 May 2016, do.; 1 ♂, 15 May 2017, do.; 1 ♂, 1 Jun 2016, Tam Dao, Vinh Phuc, northern Vietnam; 1 ♂, 3 Jun 2016, Cao Bang, northern Vietnam; 1 adult, 10 Jun 2018, Yen Bai, northern Vietnam].

Camacinia harmandi Martin, 1900: 103 [type. ♂, Sikkim, India]. Martin, 1904: 207 [Sikkim & Tonkin]; Ris, 1913 [proposed synonymy with *Camacinia harterti* Karsch]; Davies & Tobin, 1985: 138 [syn. of *C. harterti* Karsch, Sikkim, Malaysia]; Bridges VII.105 [syn. of *C. harterti* Karsch, Sikkim, Malaysia], Steinmann, 1997: 539 [syn. of *C. harterti*, Oriental Region].

Fraser (1920: 258-260) reported *C. harterti* from Bengal and Sikkim but later stated in his account of the genus *Camacinia* (Kirby) in Fraser (1936: 417) that the report from Sikkim was erroneous and that only one species of *Camacinia* occurs in India, Ceylon & Burma, which is *Camacinia gigantea* (Brauer, 1867). However, It is very clear from the original description of single male holotype of *C. harmandi* from Sikkim that Fraser (1936:416) was wrong to dismiss the occurrence of another species of *Camacinia* other than *C. gigantea* from within Indian limits. The unique wing venation of *C. harterti* is described clearly in Martin's original description of *C. harmandi* and an accurate description of the size and colouration, apart from the author not knowing that his poorly preserved and faded specimen had a bright red abdomen rather than dull brown: '*..le thorax est brun avec apparence de rais antéhumérales plus foncées; l'abdomen est jaune aux trois premiers segments et passe ensuite au brun jusqu'à l'extrémité..*' (translation: *the thorax is brown with darker antehumerals; the abdomen is yellow in the first three segments and then brown to the end*). It is also clear that the synonymy of *C. harmandi* with *C. harterti* proposed by Ris (1913) is correct and that both Martin's (1900) record from Sikkim, India and Martin's (1904) record from northern Vietnam should be added to the historic distributional range of *C. harterti*. The origin of Fraser's (1920) Bengal record was not given by Fraser and there were no details provided of any specimens involved but the northern limits of Bengal are contiguous with Sikkim so it is possible that the record may be accurate. However, with no supporting evidence and Fraser's (1936) keenness to dismiss the record it would seem appropriate to disregard Bengal from the historic range of *C. harterti*.

Guangdong, southern China specimen: 1 male, ca. 600 m alt., Henglongbei, Shikengkong (Babaoshan), north Guangdong, Nanling National Forest Park, China, 28-VI-2000, leg. Graham Reels.

Redescription (Figs 5A-G): Large colourful libellulid with wings bases enfumed golden-amber with dark brown streaks and male coloured with brilliant red abdomen and brown thorax.

Male: Labium pale creamy brown. Labrum dark reddish brown with three small, pale reddish brown spots at base as illustrated in Fig. 3A. Base of mandibles pale, shiny mid-brown with black tips. Clypeus, frons, genae orange-brown. Vertex raised, rounded, undivided, dark brown at base, mid-brown above. Occiput slightly raised, mid-brown. Eyes orange brown above, darker below. Prothorax small, mid-brown with dark brown frontal lobe, no fringe. Synthorax broadly striped orange brown on dorsum. Sides pale reddish-brown with metepimeron yellowish-brown. Coxae mid-brown. Legs black. Wings hyaline apart from wing bases which are golden yellow

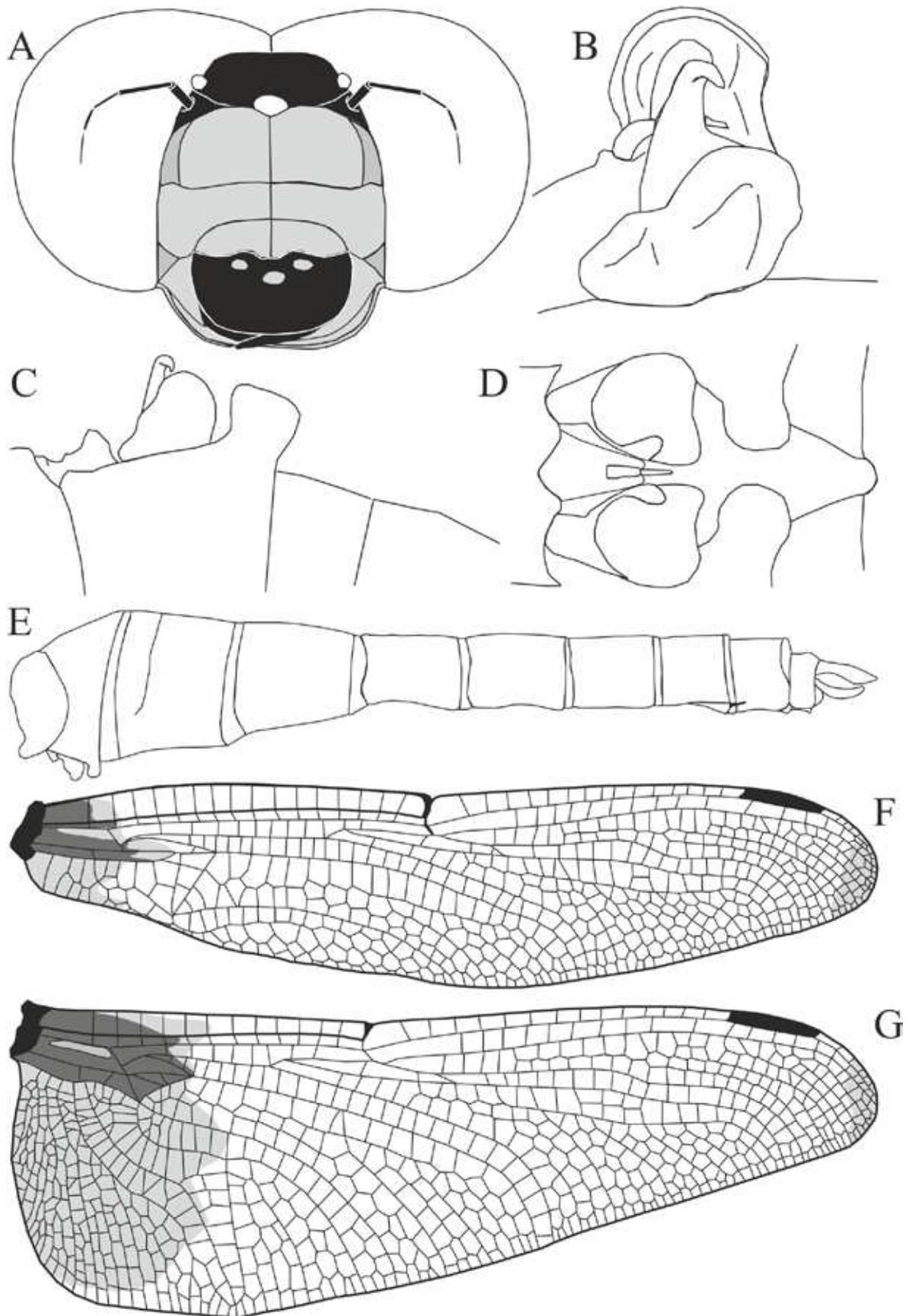


Figure 5. (A-G) Male *Camacinia harterti*, Henglongbei, Shikengkong (Babaoshan), Nanling National Nature Reserve, north Guangdong, China, 28 Jun 2000. (A) Head, frontal. (B) Genital lobe. (C-D) Secondary genitalia. (E) Abdomen, lateral. (F) Fore wing. (G) Hind wing.

and infiltrated with dark blackish-brown in the cubital spaces and below subcosta of both fore and hindwings, and faint, smoky-brown wing tips, as illustrated in Figure 5F-G. The golden yellow wing base of the broad hindwing is extensive and the dense wing venation of this area is also golden yellow. Wings narrow and pointed at apices, hindwings triangular-shaped, broad at base (breadth to length ratio 1:2.8). Pterostigma black, long (4.5 mm), covering 4-5 cells. Distal antenodal vein complete in one forewing and incomplete in the other. R3 and IR3 with distinct dip, proximal to pterostigma. Heel of hindwing anal loop quadrate. Triangle in fore and hindwings with two crossveins. One accessory vein in cubital space of forewing and two accessory veins in cubital space of hindwing. One accessory vein in bridge of forewings. CU_1 arising at posterior angle of hindwing triangle. Forewing with 16 antenodal veins. Forewing trigonal space widens. Two cubito-anal crossveins. Apical, radial and median planates present but not well-developed. Radial planate (Rpl) with two cell rows. Nodus of hindwing located closer to wing base tip than wingtip. Anal loop long and thin, apex closed with square-shaped heel and foot angled outward. Abdomen short and stout, but not broad, cylindrical in cross section between segments 1-4 and triangular in cross section from S5-9. Lateral margin of S5-8 and extreme base of S9, strongly keeled (see Fig. 5E). Dorsum S1 pale yellowish-brown, S2-3 bright yellowish-orange, S4-9 bright red above. S10 blackish-red. Intersegmental membranes of S6-S10 dark reddish-brown. Caudal appendages dark brown, simple with inferior appendage shorter than superior appendages. Secondary appendages illustrated in Figure 5C-D. Large, truncate, broad genital lobe. Hamulus with prominent base and short hooks (see Fig. 5B). Measurements (mm): male abd. + apps. 40.0; hw. 48.0.

Female: The female was first described by Karsch (1890) and figured in a coloured drawing by Orr (2005). The female body colour is predominantly pale-brown but the wings are marked almost the same as the male with dark-brown streaks located at the base of both fore and hind wings and an extensive orange-amber area occupying the basal third of the hind wing and the basal quarter of the forewing, which is similar to but more extensive than that of the male. Measurements (mm): female total length 54, abd. 33, hw. 45-48, pt. 5.

Review of IUCN Red List status assessed in 2013 as Data Deficient (Wilson & Dow, 2013)

The population of *C. harterti* is severely fragmented over a very wide area and is known to currently exist at no more than 10 locations, five of which are located in northern Vietnam, which is a qualifying IUCN Red List criterion for Vulnerable status (B1a). Moreover it can also be inferred from the historical and recent records that *C. harterti* may well be dependent on relatively undisturbed forest in a region that has lost extensive areas of primary forest cover and continues to lose forest cover due principally to logging and agricultural development throughout the Oriental region. Palm oil production expanded from 600,000 hectares in 1985 to over 6 million hectares by 2007 in Indonesia alone. According to WWF less than 10% of the native wet forest vegetation in northern Vietnam remains. Furthermore over 90 percent of the natural wet forest habitat has been heavily disturbed, and the remaining habitat is scattered as small fragments. The nine protected areas in the area cover less than 900 km² (4 percent) of the ecoregion.

Acknowledgements

I'm grateful to Do Man Cuong, Zhang Haomiao and Tom Kompier for their records and their generous permissions to use their excellent photographs. I'm also grateful to Graham Reels, who netted the north Guangdong male specimen of *C. harterti* after we had both observed the huge red libellulid for the first time when we both visited the Nanling National Nature Reserve together in northern Guangdong, China in June 2000, and for his comments and review of this paper.

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Figure 6. *Camacinia gigantea* (Brauer, 1867). (A) Male, 29 Jan 2018, Khao Lak - Lam Ru National Park, Phang-Nga, Thailand. (B) Female, Phuket, 3 Apr 2005. Photo credits: Keith DP Wilson.

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Hong Kong dragonflies of conservation importance

Graham Reels [gtreels@gmail.com]

In 1997, Keith Wilson published an important paper on the status and distribution of Hong Kong dragonflies (Wilson, 1997). This paper summarised the key findings of Wilson's studies of the Hong Kong odonate fauna over the period 1991-1997, a period which had seen the publication of the first guide book on Hong Kong dragonflies (Wilson, 1995) and the expansion of the Hong Kong check list by 70%, including several new taxa described by Wilson. In addition to providing an up to date check list of species, Wilson (1997) also identified species of conservation interest, listing 24 internationally or regionally rare species with restricted Hong Kong distributions, including seven endemic species and one endemic subspecies, and giving conservation recommendations. In the ensuing two decades the total Hong Kong list expanded to well over 120 species.

In April-July 2016 and May-June 2017, the author undertook field surveys of dragonflies across the Hong Kong Special Administrative Region ("the present study"), and a review of dragonfly records in Hong Kong over the 20 years since 1997, in order to assess the current status of 23 "key dragonfly sites" identified by Wilson (1997) and identify other key sites. A subsidiary objective was to reassess the Hong Kong species of conservation interest, augmented by review of post-1997 literature for Hong Kong, southern China and the wider region. Limited larval sampling focused particularly on finding those species, such as gomphids, that tend to be enigmatic as adults. Larvae were collected from bottom substrates and submerged vegetation with a dip net and identified in the Freshwater Biology Laboratory of the School of Biological Sciences, Hong Kong University. Exuviae were also collected. Adults were surveyed by observation in the field backed up with vouchering where this was considered useful or necessary. A total of 92 field surveys was undertaken. The study will be reported in full elsewhere but key outcomes with respect to species of conservation interest (locally and internationally) are summarised below.

Species of conservation interest recorded from Hong Kong

Thirty species of conservation interest recorded from Hong Kong are listed in Table 1. The vast majority (23) are forest species, several of which (*Rhipidolestes janetae*, *Calicnemia sinensis*, *Drepanosticta hongkongensis*, *Protosticta beaumonti*, *P. taipokauensis* and *Sinosticta ogatai*) are stenotopic. Two species – *Mortonagrion hirosei* (also stenotopic) and *Orthetrum poecilops* – are associated with mangroves and salt marshes, and four (*Lestes nodalis*, *Aciagrion approximans*, *Agriocnemis lacteola* and *Onychargia atrocyana*) with freshwater marshes. The unusual libellulid *Onychothemis testacea* is a lowland river species. No species is here considered endemic to Hong Kong territory, although *Sinosticta ogatai* may be considered near-endemic as the only known extra-Hong Kong population is at Wutongshan in southern Guangdong, immediately abutting the Hong Kong border (Reels, 2001; Wilson, 2004a, 2004b). Twenty Hong Kong species are currently known only from southern China (of which Hong Kong is a part); four have been placed under threat categories on the IUCN Red List of Endangered Species. Seven species are considered to fall within the "priority species" categories defined by the IUCN Odonata Specialist Group (Moore, 1997). Ten species originally described from Hong Kong are considered as being of conservation interest. Three other species are quite widely distributed in east Asia but have highly restricted distributions in Hong Kong.

Recommendations

Red Listing

The following species should be formally assessed for the IUCN Red List: *Drepanosticta hongkongensis* (Platystictidae); *Gynacantha japonica*, *G. ryukyuensis* and *Planaeschna skiaperipola* (Aeshnidae); *Asiagomphus hainanensis*, *Leptogomphus hongkongensis*, *Melligomphus guangdongensis* and *Stylurus kreyenbergi* (Gomphidae); *Idionyx victor*, *Macromidia ellenae* (Corduliidae).

Species action plans

The Hong Kong Government has committed to compile a Hong Kong List of Threatened Species, together with experts, to guide future conservation actions. This is a key initiative of the Hong Kong Biodiversity Strategy and Action Plan (BSAP). During the first five-year period (2016-2021) of the HKSAR government's BSAP, Species Action Plans should be prepared for all species listed in Table 1, involving, where appropriate, prescriptions for study of specific habitat requirements and species distribution. Monitoring of all species of conservation concern should be undertaken in order to establish and maintain an awareness of continuing population trends. This overall action plan should be reviewed with the review of the HKSAR BSAP and revised as necessary.

Species	Remarks
<i>Philoqanga vetusta</i> Ris, 1912	Priority species (Moore, 1997): taxonomically isolated.
<i>Lestes nodalis</i> Selys, 1891	Highly restricted in Hong Kong (three known sites; one unconfirmed in present study).
<i>Rhipidolestes janetae</i> Wilson, 1997	Priority species (Moore, 1997): taxonomically isolated. Originally described from Hong Kong. Globally restricted to southern China. Sparsely distributed in Hong Kong.
<i>Aciagrion approximans</i> (Selys, 1876)	Highly restricted in Hong Kong (two known sites; one unconfirmed in present study).
<i>Agriocnemis lacteola</i> Selys, 1877	Highly restricted in Hong Kong (one known site).
<i>Mortonagrion hirosei</i> Asahina, 1972	Near Threatened (IUCN). Priority species (Moore, 1997): unusual biology.
<i>Calicnemia sinensis</i> Lieftinck, 1984	Globally restricted to southern China. Sparsely distributed in Hong Kong.
<i>Onychargia atrocyana</i> Selys, 1865	Priority species (Moore, 1997): taxonomically isolated.
<i>Drepanosticta hongkongensis</i> Wilson, 1997	Originally described from Hong Kong. Globally restricted to southern China.
<i>Protosticta beaumonti</i> Wilson, 1997	Male originally described from Hong Kong. Globally restricted to southern China. Sparsely distributed in Hong Kong.
<i>Protosticta taipokauensis</i> Asahina and Dudgeon, 1987	Originally described from Hong Kong. Sparsely distributed in Hong Kong.
<i>Sinosticta ogatai</i> (Matsuki and Saito, 1996)	Priority species (Moore, 1997): taxonomically isolated. Originally described from Hong Kong. Globally restricted to southern China. Near-endemic to Hong Kong. Sparsely distributed in Hong Kong.
<i>Cephalaeschna klotsae</i> Asahina, 1982	Data Deficient (IUCN). Globally restricted to southern China. Highly restricted in Hong Kong (one known site).
<i>Planaeschna skiaperipola</i> Wilson and Xu, 2008	Globally restricted to southern China. Highly restricted in Hong Kong (one known site).
<i>Asiagomphus hainanensis</i> (Chao, 1953)	Globally restricted to southern China.
<i>Fukienogomphus choifongae</i> Wilson and Tam, 2006	Originally described from Hong Kong. Globally restricted to southern China. Highly restricted in Hong Kong (one known site).
<i>Gomphidia kelloggi</i> Needham, 1930	Endangered (IUCN). Globally restricted to southern China. Highly restricted in Hong Kong (two known sites, contiguous).
<i>Lamelligomphus hainanensis</i> (Chao, 1953)	Globally restricted to southern China.
<i>Leptogomphus hongkongensis</i> Asahina, 1988	Originally described from Hong Kong. Not recorded from elsewhere in China. Known from one locality in Laos.
<i>Melligomphus guangdongensis</i> (Chao, 1994)	Globally restricted to southern China. Sparsely distributed in Hong Kong.
<i>Ophiogomphus sinicus</i> (Chao, 1954)	Data Deficient (IUCN). Globally restricted to southern China. Sparsely distributed in Hong Kong.
<i>Sieboldius alexanderi</i> Chao, 1955	Data Deficient (IUCN). Globally restricted to southern China.
<i>Anotogaster</i> sp.	Breeding confirmed at one site.
<i>Macromia katae</i> Wilson, 1993	Vulnerable (IUCN). Originally described from Hong Kong.
<i>Idionyx claudia</i> Ris, 1912	Globally restricted to southern China. Highly restricted in Hong Kong (one known site).
<i>Idionyx victor</i> Hämäläinen, 1991	Originally described from Hong Kong. Globally restricted to southern China.
<i>Macromidia ellenae</i> Wilson, 1996	Originally described from Hong Kong. Globally restricted to southern China. Sparsely distributed in Hong Kong.
<i>Onychothemis testacea</i> Laidlaw, 1902	Priority species (Moore, 1997): taxonomically isolated. Sparsely distributed in Hong Kong.
<i>Orthetrum poecilops</i> Ris, 1919	Vulnerable (IUCN). Priority species (Moore, 1997): unusual biology.
<i>Zygonyx asahinai</i> Matsuki and Saito, 1995	Globally restricted to southern China.

Table 1. Dragonfly species of conservation interest recorded from Hong Kong.

Acknowledgements

The author wishes to thank Professor David Dudgeon of the School of Natural Sciences, The University of Hong Kong, for providing him with the opportunity and funding to undertake this study. Mr Keith Wilson generously provided much useful information. Ms Lily Ng gave logistical support and practical assistance in the laboratory. Mr Ken So provided useful references and a great deal of information on recent important dragonfly records in Hong Kong. The author thanks Moody Au, Ernest Chiu, Bill Ho, Tommy Hui, Mahler Ka, Bergman Ng, Edmond Sham, Samson So and Denis Wong for allowing use of some of their recent (2016-2017) and important dragonfly records.

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Figure 1. (A) *Gomphidia kelloggi* - Endangered (IUCN) species globally restricted to southern China. (B) *Idionyx victor* - described from Hong Kong; restricted to southern China. (C) *Onychothemis testacea* (Hainan specimen) - a taxonomically isolated species; sparsely distributed in Hong Kong. (D) *Orthetrum poecilops* - Vulnerable (IUCN) salt-tolerant species. Photo credits: Graham Reels.



Figure 2. (A) *Philoganga vetusta* - a huge damselfly in a taxonomically isolated genus. (B) *Rhipidolestes janetae* - a steep hillside species in a taxonomically isolated genus, originally described from Hong Kong where it is sparsely distributed; globally restricted to southern China. (C) *Agriocnemis lacteola* - a tiny marsh damselfly occurring at only one Hong Kong site. (D) *Mortonagrion Hirosei* - NearThreatened (IUCN) stenotopic salt-tolerant species. (E) *Onychargia atrocyana* - taxonomically isolated genus. (F) *Sinosticta ogatai* - described from Hong Kong and near-endemic; taxonomically isolated genus. (G) *Protosticta taipokauensis* - described from Hong Kong, where it is sparsely distributed. (H) *Drepanosticta hongkongensis* - described from Hong Kong; restricted to southern China. Photo credits: Graham Reels.

Erratum: Islands are calling - Short expedition to the Andaman Islands reveals five new spatial records and research gaps

Agrion 22(1): 37-41

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This is an erratum against the Odonata survey report of our Andaman Island trip published in *Agrion* 22(1) to state that the specimen identified by us as *Libellago balus* Hämäläinen, 2002 was a misidentified young individual of *Libellago andamanensis* (Fraser, 1924). Dr Matti Hämäläinen pointed out (post-publication) that the colour patterns of the dorsum of the abdomen and the lateral side of the 'rhinarium' of our specimen do not agree with *L. balus*. According to Dr Hämäläinen the dorsum and sides of abdomen of *L. balus* are almost completely orange reddish in mature males and the dorsal abdomen furnished only with tiny dark paired markings and narrow dark inter-segmental rings. In younger specimens the orange reddish colour is paler. Unlike his description our specimen had a distinct dark dorsal band from segments 1 to 8, and segments 9 and 10 were totally black. We realised that we misidentified the young specimen due to presence of more yellow markings on the face and thorax than the adult. At first we suspected it to be different from *L. andamanensis*; and then the structure of the 'rhinarium' rather than its colour misled us to the species *L. balus*. According to Dr Hämäläinen the specimen matches well with the young of *L. andamanensis*. So, the distribution of *L. balus* remains restricted to the Nicobar Islands as earlier. In light of this clarification, we take back our observations on species mentioned as *L. balus* in the published article. We also take back the proposed English name (Clearwing Gem) for the species. The new title of the article should be read as 'Islands are calling - short expedition to the Andaman Islands reveals four new spatial records and research gaps'. We thank Dr Matti Hämäläinen, Dr K. A. Subramanian, Dr Albert Orr and Dr Rory Dow for their prompt response over the discussion.



Figure 1. The specimen originally identified in *Agrion* 22(1): 37-41 in Figure 2B as *Libellago balus* Hämäläinen, 2002 is here reidentified as a young individual of *Libellago andamanensis* (Fraser, 1924).

Pooping *Brachythemis contaminata*

Robin Ngiam asked if we might consider the above photograph of a pooping *Brachythemis contaminata*, taken by Henrietta Woo, Singapore for the front cover of *Agrion*. However, we had several amazing photos of *Camacinia harterti*, which has only recently been photographed in viva for the first time, to accompany the article on this issue on this rare dragonfly. Nevertheless we're happy to include it here in all its toiletry glory.



Photo: Pooping *Brachythemis contaminata*, Singapore. Photo credit:Henrietta Woo.

New Books

Atlas of Odonata (Insecta) of the Western Ghats, India

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**Zoological Survey of India, Kolkata
(Published by the Director, Zoological Survey of India,
Kolkata, M-Block, New Alipore, Kolkata-700 053)**

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ISBN-13: 9788181714954

Price ca. Indian: Rupees 2180/-; US\$100; £65

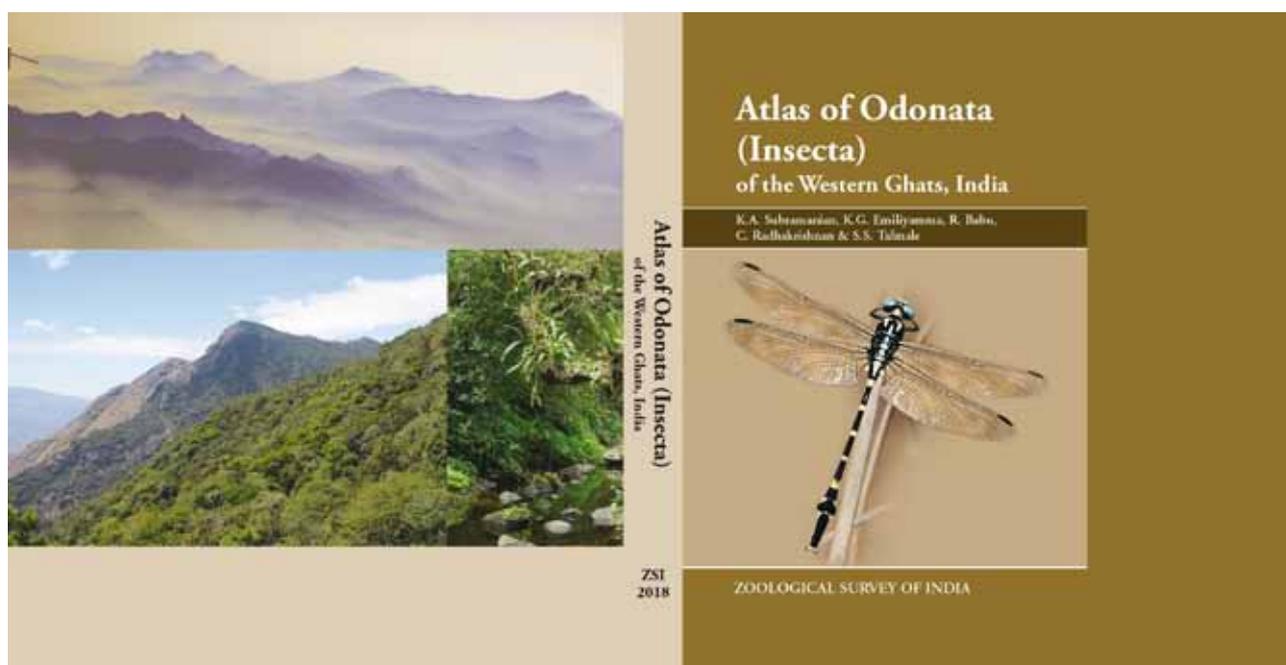
NHBS Price: £74.99 \$99/€85 approx

Pdf file available freely available at the following [[Link](#)]

Dragonflies are an ancient group of insects and key components of freshwater ecosystems. They evolved about 250 million years ago during the Devonian period and since then dominated as major predators of wetlands. Globally, over 6500 species are reported, of which 487 species are present in India. The Western Ghats, one of the global freshwater biodiversity hotspot has 193 species of which 74 are endemic to the region. The hill streams and rivers of southern Western Ghats has high diversity and endemism. The dragonflies of the region are threatened by habitat destruction, pesticide and water pollution.

The book “The Atlas of the Odonata of the Western Ghats, India” published by scientists of ZSI is prepared based on a GIS database created through field work, museum specimens and literature records. The book has mapped all the known distribution records of species and identified areas of high diversity and endemism. Each species is provided with taxonomic details, distribution records, habitat information, map and photographs.

The Atlas is first of its kind for any group of insects in India and will be useful for researchers, conservation planners and amateur naturalists.



131. *Epophthalmia vittata* Burmeister, 1839

1839. *Epophthalmia vittata* Burmeister, *Handb. Ent.*, 2: 845.

Distribution: India: Andaman and Nicobar Islands, Andhra Pradesh, Goa, Jharkhand, Kerala, Maharashtra, Odisha, Uttarakhand, Tamil Nadu, Tripura, Uttar Pradesh, West Bengal.

Elsewhere: Indonesia, Sri Lanka, Viet Nam.

Habits and Habitat: Usually found in open spaces away from the breeding habitats. It breeds in weedy ponds, tanks and deep pools of hill streams.



© Manoj V. Nair

Epophthalmia vittata



***Indosticta* Bedjanic, 2016**

11. *Indosticta deccanensis* (Laidlaw, 1915)

1915. *Platysticta maculata deccanensis* Laidlaw, *Rec. Indian Mus.*, 11: 388.

1917. *Platysticta deccanensis*, Laidlaw, *Rec. Indian Mus.*, 13: 340.

2016. *Indosticta deccanensis*, Bedjanic, *Zootaxa*, 4182(1): 77-80.

Distribution: India: Karnataka, Kerala.

Habits and Habitat: This rare damselfly is found in *Myristina* swamps and streams with dense riparian vegetation. It breeds in hill streams.



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Indosticta deccanensis



117. *Chlorogomphus campioni* (Fraser, 1924)

1924. *Orogomphus campioni* Fraser, *Rec. Indian Mus.*, 26: 467-469.

1931. *Chlorogomphus campioni*, Fraser, *Rec. Indian Mus.*, 33: 447, 457.

Distribution: India: Karnataka, Kerala, Tamil Nadu.

Habits and Habitat: Confined to high altitude forests. Usually soars above forest canopies descending occasionally to forest clearings. It breeds in torrential streams.



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Chlorogomphus campioni



***Macrogomphus* Scelys, 1857**

102. *Macrogomphus annulatus* (Scelys, 1854)

1854. *Heterogomphus annulatus* Scelys, *Bull. Acad. Belg.*, 21 (2): 28.

1857. *Macrogomphus annulatus*, Scelys, *Mon. Gomph.*, p. 92, 405.

Distribution: India: Karnataka, Maharashtra, Odisha, Tamil Nadu.

Elsewhere: Sri Lanka.

Habits and Habitat: Usually perch on riparian vegetation along streams and rivets where it breeds.



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Macrogomphus annulatus



Dragonflies (Odonata) of the Murray-Darling Basin

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Jan Miller, Cheryl Tang, Marion Huxley, Steve Jacobs

Published by Amazon, 2018 [Link]

[Print Replica] Kindle Edition \$3.99.
Paperback \$148.18

This publication presents a survey of the Australian dragonfly fauna of the Murray-Darling Basin (MDB), collected between 2004 and 2012. Historic and recent published distribution records are compiled and reviewed.

An updated checklist of the MDB species and identification keys to adults and larvae of all MDB species are provided in this book. The origin, diversity and distributions of the fauna are discussed. Comprehensive information on species habitats and water quality and MDB distribution maps based on the larvae collected during the MDB Sustainable Rivers Audit (SRA) are presented. The known distribution records in Australia of all MDB species is illustrated by dots on maps.

Photos of all species recorded from the MDB are provided, along with photos of typical habitats. Photos of adult specimens were mostly taken of live animals.

This book also presents climate change scenarios for the MDB species that are of conservation concern. This publication provides a baseline of Odonata data for the MDB

Foreword

The large size, spectacular colours, tremendous flight abilities and unusual reproductive behaviour make dragonflies one of the most attractive and conspicuous orders of insects.

The attitude towards dragonflies has in the past been one of caution or even fear. Lately, however, dragonflies have become a well accepted group of insects. Movies titled Dragonfly or similar have been made, and eating places with names like Dragonfly Cafe, Dragonfly Hotel or similar have appeared. Artefacts modelled on dragonflies are available from garden, art supply and stationery shops.



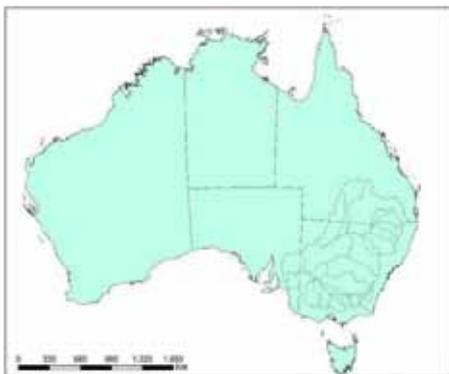
Diphobos nymphoides, male

Materials and Methods

SRA study area

Located in the southeast of Australia, the Murray-Darling Basin covers 1,061,469 square kilometers, equivalent to 14% of the country's total area. Its northernmost point is at 34.589°/146.869E, its southernmost point at 37.68°/145.754E, its westernmost at 138.574E/35.337S and its easternmost at 152.439E/28.247S.

The Basin extends some 1,365 km from north to south and 1,250 km from west to east.



Map 1 Australia showing the position and extent of the Murray-Darling Basin.

- | | |
|---|---|
| <i>Austrogomphus ochraceus</i> (Selys, 1869) | Family Libellulidae |
| <i>Hemigomphus gouldi</i> (Selys, 1854) | <i>Austrothemis nigricans</i> (Martin, 1901) |
| <i>Hemigomphus heteroclytus</i> Selys, 1854 | <i>Crocobemis nigifrons</i> (Ricker, 1884) |
| Family Synthemistidae | <i>Diplocodes bipunctata</i> (Brauer, 1885) |
| <i>Archaeosynthemis orientalis</i> (Tillyard, 1910) | <i>Diplocodes hamatolens</i> (Burmeister, 1839) |
| <i>Charisthemis flaviterminalis</i> (Martin, 1901) | <i>Diplocodes melanops</i> (Martin, 1901) |
| <i>Eusynthemis australis</i> (Tillyard, 1913) | <i>Nannophlebia rui</i> Tillyard, 1913 |
| <i>Eusynthemis areolaris</i> (Selys, 1871) | <i>Nannophlebia australis</i> Brauer, 1885 |
| <i>Eusynthemis guttata</i> (Selys, 1871) | <i>Nannophlebia debile</i> (Tillyard, 1908) |
| <i>Eusynthemis nigra</i> (Tillyard, 1906) | <i>Orthetrum colobosum</i> (Brauer, 1885) |
| <i>Eusynthemis reynoldsi</i> Theischinger, 1998 | <i>Orthetrum sabina</i> (Drury, 1770) |
| <i>Eusynthemis virgata</i> (Selys, 1871) | <i>Orthetrum villosotarsum</i> (Brauer, 1885) |
| <i>Parasynthemis regina</i> (Selys, 1874) | <i>Pantala flavescens</i> (Fabricius, 1798) |
| <i>Synthemis australis</i> (Burmeister, 1839) | <i>Rhyothemis graphisterna</i> (Rambur, 1842) |
| Family Corduliidae | <i>Tramea borealis</i> Kopp, 1956 |
| <i>Hemicordulia australis</i> (Rambur, 1842) | <i>Zygonyx elgneri</i> Ris, 1913 |
| <i>Hemicordulia intermedia</i> (Selys, 1871) | Genera incertae sedis |
| <i>Hemicordulia asperata</i> Tillyard, 1911 | <i>Apocordulia macreps</i> Watson, 1980 |
| <i>Hemicordulia tau</i> (Selys, 1871) | <i>Austrocordulia repleta</i> Tillyard, 1909 |
| <i>Procordulia jacksoniana</i> (Rambur, 1842) | <i>Cordulephya pygmaea</i> Selys, 1870 |
| | <i>Micromia atifrons</i> (Mulschan, 1883) |



Adult male *Petrolia gignosa*.