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Corrections, amendments and updates to “An annotated checklist of the Odonata (Insecta) known from Sarawak with records to district level”

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Abstract

Corrections, amendments and some updates to an annotated checklist of the Odonata of Sarawak (Dow 2021) published in a special edition of the Sarawak Museum Journal are listed. With one exception taxonomical updates given here are confined to those based on publications that appeared between the last revision of the manuscript (early April 2019) and its publication (February 2021). The exception is that a *Merogomphus* (?) species lumped under *M. femoralis* Laidlaw, 1931 in Dow (2021) is considered to be a separate species here. Unfortunately there are a number of problems with records at district level and the reader of Dow (2021) is advised to simply ignore the district level records and counts until a revised version of the checklist using an accurate characterisation of Sarawak's districts is produced. Additionally the number of species known from Sarawak is updated to reflect information published in Dow et al. (2021) and in this paper and now stands at 308.

Introduction

In February 2021 a checklist of the Odonata of Sarawak in Malaysian Borneo (Dow 2021) was published in a special issue of the Sarawak Museum Journal. This paper was originally submitted in 2018. The draft manuscript contained a number of errors, some of which I was able to rectify (hastily and imperfectly) during a brief copy editing opportunity in April 2019; however, the proofs of the paper were not made available for final corrections, so the published article retained numerous small errors, some stemming from the original draft and some arising as a natural consequence of the manuscript's long gestation period (three years) with the publisher, which meant that the paper was still somewhat error-strewn and already, in some respects, out of date upon publication. More seriously it recently became apparent that there were problems with my understanding of the boundaries of some of the 40 districts, so that a number of the district records and some of the district counts are incorrect.

Although the obvious place to publish what are mostly errata to Dow (2021) is in the same journal as the original publication, in practice this would result in further, very long delays. Here I provide a list of corrections and amendments plus a few taxonomical updates mainly based on publications that have appeared since early April 2019. These updates

are, with one exception, confined to cases where a new species has been named since April 2019 or where a definite name can now be assigned where one could not before (based on publications that appeared before Dow (2021)). No attempt is made to bring the entire checklist up to date here; this would be a major task since even with the Covid 19 pandemic an additional 114 days of fieldwork have already been conducted in Sarawak. Additionally, some other changes and updates made in Dow et al. (2021) are discussed in the context of the checklist presented in Dow (2021). It is to be hoped that, together with the information published here, Dow (2021) can still serve its primary purpose as a baseline for further research into the Odonata of Sarawak until a revised version is published. However, given the problems with some of the district level records (see above), even with the corrections given here, the list cannot be considered accurate at district level and cannot always be reliably used to see if a record is new for a district. Therefore, and with the better information on district boundaries now available to me, I intend to produce a fully revised and updated checklist within the next year or so. Corrections to district level records in the list below are confined to cases where there is no issue over the district involved.

Corrections, amendments and updates

Page 318 – Table 1 [correction]: Mukah, Daro District, "No records of Odonata" should be deleted.

Page 321 – **3. *Orolestes wallacei* (Kirby, 1889)** [correction]: "Mi – ma (Dow & Ngiam 2015), su (*), tu (*)" should be "Mi – ma (Steinhoff et al. 2019), su (*), tu (Dow & Ngiam 2015)". [A transposition combined with an omission].

Page 325 – **19. *Protosticta new sp. cf kinabaluensis* Laidlaw, 1915** [update]: This species was described as ***Protosticta joepani* Dow, Phan & Choong, 2020** in 2020 [see Dow et al. (2020)].

Page 333 – **52. *Libellago semiopaca* (Selys, 1873)** [amendment]: The following should be added to the records – "Si – sl (*)". [This raises the number of species recorded from Sibu Division by one.]

Page 340 – **79. *Bornargiolestes fuscus* Dow, 2014** [correction]: "Mi – b (Dow & Reels 2009)" should be "Mi – bu (Dow & Reels 2009)".

Page 343 – **91. *Coeliccica nigrohamata* Laidlaw, 1918** [amendment]: "*Coeliccica* species – Dow, Ngiam & Ahmad 2015." should be added to the list of names and publications relating to this species from Sarawak and "Be – pu (Dow, Ngiam & Ahmad 2015) should be added to the records. [This taxon from Maludam National Park is best placed under *C. nigrohamata* but **Note 26** should also be added to as follows: "The *Coeliccica* species reported from Maludam National Park in Dow, Ngiam & Ahmad (2015) is best treated as *C. nigrohamata* for now. However this form differs from *C. nigrohamata* in some respects, resembling *C. octogesima* (Selys, 1863) more; its identity is the subject of ongoing investigation." [This raises the count of species recorded from Betong Division by one.]

Page 344 – **94. *Coeliccica new sp. membranipes*-group A** [update]: Described as ***Coeliccica roberti* Dow, 2020** in Dow (2020).

- Page 344 – **95. *Coeliccia new sp. membranipes-group B*** [update]: Described as ***Coeliccia junis* Dow, 2020** in Dow (2020).
- Page 348 – **112. *Prodasineura verticalis* (Selys, 1860)** [correction]: “Mi – bu (Kimmins 1936), ma (Dow & Reels 2008), mi (Dow & Reels 2010a), so (*) ...” should be “Mi – bu (Kimmins 1936), ma (Dow & Reels 2008), mi (Dow & Reels 2010a), su (*) ...”.
- Page 350 – **126. *Amphicnemis new sp. cf remiger* Laidlaw, 1912** [update]: Described as ***Amphicnemis rigiketii* Dow, 2019** in Dow (2019).
- Page 351 – **131. *Archibasis viola* Lieftinck, 1949** [correction]: In the list of names and publications “Dow, Reels & Butler 2013a” should be removed (it is already included under *Archibasis* sp. undetermined, where it belongs).
- Page 352 – **134. *Ceriagrion bellona* Laidlaw, 1915** [amendment]: “ma (Steinhoff et al. 2019),” should be added to the records from Miri Division [an accidental omission].
- Page 355 – **150. *Stenagrion dubium* (Laidlaw, 1912)** [correction]: In the records “Sm – sj (Dow et al. 2018). Sr – ju (*)” should be “Sm – sj (*). Sr – ju (Dow et al. 2018)” [an accidental transposition].
- Page 357 – **167. *Heliaeschna crassa* Krüger, 1899** [amendment]: In the list of names and publications “Dow & Reels 2013” should be added under *Heliaeschna idae*.
- Page 360-361 – **180. *Heliogomphus borneensis* Lieftinck, 1964** [amendment]: In the list of names and publications “Dow et al. 2019” should be added under *Heliogomphus borneensis*.
- Page 363 – **198. *Leptogomphus williamsoni* Laidlaw, 1912** [correction]: In the records “Se – se (*). Si – sl (Dow 2019)” should be “Se – se (Dow 2019). Si – sl (*)” [an accidental transposition].
- Page 364 – **204. *Megalogomphus sp. A*** [update]: Now treated as ***Megalogomphus borneensis* (Laidlaw, 1914)**, at the time of the last revision to the paper the status of this form (previously treated as *M. icterops*) was still uncertain; now it is known to be a distinct species endemic to Borneo, so that “**Endemic** (Kalimantan Barat, Kalimantan Timur, Sarawak)” should also be added (see Dow & Price (2020)).
- Page 364 – **205. *Megalogomphus sp. B*** [update and correction]: Described in 2020 as *Megalogomphus buddi* Dow & Price, 2020. Also “Endemic (Brunei, Sarawak)” should read “**Endemic** (Brunei, Kalimantan Timur, Sarawak)” [see Dow & Price (2020)].
- Page 366 – **217. *Macromia callisto* Laidlaw, 1922** [correction]: In the list of names and references “Dow et al. 2019;” should be removed from the list under *Macromia callisto*. “*Macromia cf callisto*” should be “*Macromia sp. cf callisto*”.
- Page 370 – **237. *Brachygonia oculata* (Brauer, 1878)** [correction]: In the records “Mi – bu (*), ma (Kimmins 1936), mi (*), se (*).” should be “Mi – bu (*), ma (Kimmins 1936), mi (*), su (*).”
- Page 373 – **254. *Nannophya pygmaea* Rambur, 1842** [amendment]: In the records “L – li (*)” should be added. [This record was accidentally omitted from both Dow (2021) and Steinhoff et al. (2019), and is of ♂, ♀, Mentawai Boundary Trail (location 26c in Steinhoff et al. (2019)), Gunong Mulu National Park, 13 ii 2006, leg. J. Simun. It raises the number of records from Limbang Division by one].

- Page 376 – **266. *Orthetrum chrysis* (Selys, 1891)** [correction]: In the records “Si – sl (*), si (Dow, Reels & Ngiam 2015a), sl (Hincks 1930)” should be “Si – sl (Hincks 1930), si (Dow, Reels & Ngiam 2015a)”.
- Page 377 – **267. *Orthetrum glaucum* (Brauer, 1865)** [amendment]: In the records, under Miri Division, “tu (Dow & Ngiam 2015)” should be added [a simple omission.]
- Pages 377-378 – **269. *Orthetrum sabina* (Drury, 1773) and 270. *Orthetrum testaceum* (Burmeister, 1839)** [correction]: In the records, for *O. sabina* “da (*)” should be added under Mukah Division and for *O. testaceum* “Mu – da (*)” should be deleted. [This decreases the number of records for Mukah Division by one.]
- Page 274 – ***Pornothemis serrata* Krüger, 1902 B** [amendment]: “Steinhoff et al. 2019” should be added under *Pornothemis serrata* Krüger, 1902 B and “Mi – ma (Steinhoff et al. 2019)” should be added [this was omitted because after the April 2019 update a recheck of RD *Pornothemis* specimens from Gunong Mulu National Park revealed that this species was present as well as *Pornothemis serrata* Krüger, 1902 A, and this information was added to Steinhoff et al. (2019). [This raises the number of species recorded from Miri Division by one.]
- Page 380 – **283. *Rhyothemis obsolecens* Lirby, 1889** [correction]: In the records “B – da (*)” should be replaced by “Mu – da (*)”. [A simple typo that did not result in the omission of this species from the count for Mukah.]
- Page 380 – **286. *Rhyothemis triangularis* Kirby, 1889** [correction]: In the records “SA – la (Dow et al. 2018)” should be deleted. [This is actually due to an error in the Dow et al. (2018) paper where the species was incorrectly listed from a location in Sri Aman Division instead of the correct location in Julau District, Sarikei Division; this has no consequences for the count of species from Julau District in Dow (2021) since the species was listed under Julau anyway, but decreases the count of species known from Sri Aman Division by one.]
- Page 382 – **297. *Tyriobapta kuekenthali* (Karsch, 1900)** [amendment]: In the records “ku (Dow & Morris this volume)” should be added under Kuching Division [a simple omission.]
- Page 383 – **298. *Tyriobapta laidlawi* Ris, 1919** [correction]: In the records for Miri Division “bu (*)” should be deleted [a spurious record].
- Page 386 – ***Amphicnemis* sp. undetermined** [correction]: In the records, under Kuching Division “ba (Grinang 2004)” should read “ba (Grinang 2004*)”. [Somewhat surprisingly this remains the only record of the genus *Amphicnemis* from Bau District.]
- Page 386 – ***Archibasis* sp. undetermined** [correction]: In the records “Mi – bu (Kimmins 1936; ...)” should be “Ka – bg (Kimmins 1936*; ...)”. [A simple error, but one that raises the count of species known from Kapit Division by one.]
- Page 387 – ***Gynacantha* sp. undetermined** [amendment]: In the records under Miri Division, Marudi District (ma), Steinhoff et al. 2019 should be added [omission].
- Page 387 – ***Heliaeschna* sp. undetermined** [correction]: In the records under Sri Aman Division “sa (Dow & Morris in this volume)” should be “sa (Dow & Morris in this volume*)”. [This cancels out the reduction by one resulting from the deletion of *Rhyothemis triangularis* from the Sri Aman list.]

Page 389 – **Merogomphus? sp. undetermined** [correction]: In the records “Ka – so (Dow et al. 2019). Mi – ma (Steinhoff et al. 2019)” should be “Ka – so (Dow et al. 2019*). Mi – ma (Steinhoff et al. 2019*)”. [This raises the counts of species from both Kapit and Miri Divisions by one. Also see below.]

The above list results in the following corrections to the division species counts: Betong increases by one to 70, Kapit increases by two to 154, Limbang increases by one to 94, Miri increases by two to 218, Mukah decreases by one to 42 and Sibuan increases by one to 80.

Dow (2021) listed 303 taxa from Sarawak. Dow et al. (2021) contains records, taxonomic decisions and other information that results in increases to this number and other modifications to the list presented in Dow (2021). Dow et al. (2021) recorded *Gynacantha maclachlani* Krüger, 1899 from Sarawak for the first time. They also showed that *Gomphidia caesarea* Lieftinck, 1929 is a junior synonym of *G. abboti* Williamson, 1907, which does not alter any of the numbers in Dow (2021) but is a change to a name used. In Note 65 in Dow (2021) it was noted that two forms were being lumped under the name *Macrogomphus parallelogramma* (Burmeister, 1839). Dow et al. (2021), following the publication of Kosterin (2019), treated the form occurring in the southwest of Sarawak (records from Kuching and Serian Divisions) as *M. albardae* Selys, 1878 and the form occurring elsewhere in Sarawak as *Macrogomphus* sp. Dow et al. (2021) did not discuss the record of *Macrogomphus parallelogramma albardae* from Donnelly (1997) which has no definite location stated (but is likely to be from either Sri Aman or Serian Division), but it is likely that this is also *M. albardae*. This change has no effect on the counts of species from divisions but does raise the number of species known from Sarawak by one. Dow et al. (2021) listed *Onychogomphus sensu lato* sp. B, noting that this record had been lumped under *Phaenandrogomphus safei* Dow & Luke, 2015 in Dow (2021; also see Note 68 in that publication) but that further examination had revealed that it is a distinct species. This has no effect on district and division counts but raises the number of species known from Sarawak by one. In Dow (2021) two taxa were listed under the name *Pornothemis serrata* Krüger, 1902: *P. serrata* A and *P. serrata* B and in Note 81 in Dow (2021) it was mentioned that there might even be a third species in this complex. Dow et al. (2021) confirmed that three species are involved. Since all three occur in Sarawak this also raises the number of species known from Sarawak by one; however, as in Dow et al. (2021) we leave the identity of specific records open until a revision is completed.

One further update, not based on previously published information, can be given here (since no other publication where its inclusion would be more appropriate is currently planned before a completely revised checklist is prepared). Referring to Note 59 in Dow (2021) and the correction above to the *Merogomphus? sp. undetermined* records from Miri (Gunong Mulu National Park) and Kapit (Lanjak Entimau Wildlife Sanctuary) Divisions, concerning larvae (Miri) and teneral individuals (Kapit). Since April 2019 COI was sequenced from one of the teneral specimens from Kapit Division and when compared with previously obtained sequences from the larvae from Miri Division this gives some support to these records belonging to the same species and strong support (differences well over 10% between sequences) to this being a species distinct from *Merogomphus femoralis* Laidlaw, 1931. This species can therefore be included as a separate entity in the Sarawak checklist. These additions raise the number of species known from Sarawak to 308.

Acknowledgements

Graham Reels read and improved the text of this paper.

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