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Odonata Fauna of Balabac Island, Philippines with descriptions of two new species

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Abstract

The Odonata fauna of Balabac Island, Philippines was studied in March 2013. A total of 41 species under 33 genera were recorded. Twenty-eight species were recorded for the first time in the island. One genus – *Mortonagrion* was recorded for the first time in the Philippines. *Mortonagrion astamii* spec. nov. and *Prodasineura poncei* spec. nov. are new to science and are described. Three previously recorded species remained elusive and not seen during the survey.

Keywords: new species, *Prodasineura poncei*, *Mortonagrion astanii*, Philippines, Palawan, Balabac, Odonata

Introduction

Balabac Island (Figure 1 & 2) is the southernmost island of the province of Palawan. This ovoid island lies less than 70km north of Banggi Island (North Borneo, Malaysia), and south of Palawan Island (Philippines) for around 40km. The highest point rises to nearly 600 meters above sea level located along the south-eastern side of the island flanking Barangay Indalawan. Rolling hill and vast lowland swamp covers the rest of the island. Geologically, this island is rich with mineral reserves such as copper and nickel ores, and silica (compare John 1963).

Balabac is very interesting both culturally and biologically. The island is formerly known as “Molbog” after its tribal inhabitants. Presently, the island is predominantly occupied by Muslim residents. Majority of the residents depend on agriculture and fishing for their means of living. The island has very rich marine resources (Ong et al. 2002).

Figure 1 a. Map of Balabac and Sites surveyed in Balabac (http://maps.google.de)

Figure 1 b. Balabac island at the distance

Figure 2 a-b port of Balabac

Balabac is home to Philippine mouse deer (*Tragulus napu nigricans* Thomas, 1892), the world's smallest ungulate. Aside from this island endemic species, several endemic species of flora and fauna are found in Balabac (see e.g. Boulenger 1894). Many of these endemic species are directly or indirectly threatened from human activities (see e.g. Regoniel 2006).

Odonatologically, this island lacks extensive data. Lieftinck (1957) listed 13 species while Hämäläinen & Müller (1997) listed 15 species under five families based on literature. Another species – *Drepanosticta ceratophora* is listed by van Tol (2005) increasing the known number to 16. The present paper provides an update on the Odonata fauna of Balabac.

The present survey explored seven major locations for nine field days (Figure 1a). All potential Odonata habitats were explored (Figure 3). The island was very dry during the survey (Figure 4). Mangrove swamps reduced in area and many streams and rivulets have dried. The water level in large rivers was very shallow. Majority of tree holes and *Pandanus* leaf axils also had run dry and were without any possibility for development of water bound organisms (Figure 5). Locals had to dig holes to get drinking water (Figure 6).

Figure 3 a. River tributary (observe the present water level in relation to dried water mark),

Figure 3 b. Dammed forested spring for domestic use

Figure 3 c. Nearly dry small forested river

Figure 3 d-e. Buttress of large trees served as habitat of phytothelmatan Odonata

Figure 3 f-g. Nearly dry waterfall

Figure 3. h. Forested stream

Figure 3 i. lowland small river

Figure 3 j. river in lowland swamp

Figure 3 k. mangrove waterways

Figure 3 l. Coastal swamp

Figure 3 m. Forested creeks

Figure 3 n. Forested creeks

Figure 4 a. Dried rice field

Figure 4 b. Dried swamp

Figure 4 c. Nearly dry swamp

Figure 4 d. Clean river with very low water level

Figure 5. Dried *Pandanus* sp. leaf axils

Figure 6 a. Children fetching drinking water; b. Source of drinking water in lowland swamp

Study sites

A. Pugad Lawin, So. Rangkapon, Brgy. Katagupan

This is the western most sampling site. The area is a lowland swamp forest. Old Dipterocarp trees predominates the area and used as nesting sites for sea eagles. During the survey most of the swamp is dry.

B. So. Bakong, Brgy. Malaking Ilog

This is a tributary of the largest river system explored. The water is very clear. In most section of the river, the water level is shallow and the movement is slow. No rapids were noted during the survey. Pristine forest covers the surrounding area.

C. Swamp/lake, Brgy. Katagupan

This is the largest remaining pool of water noted as most of the swamp is already dry. The area is surrounded by lowland Dipterocarp trees mixed with mangrove tree species. One species of dragonfly was noted in the area that closely resembles *Camacinia gigantea* but differ in size. It was not caught hence not reflected in the annotated list.

D. Dalabuan, Brgy. 6

This lowland area is relatively forested. Coconut mixes with mangrove trees. The area is relatively dry leaving locals to dig to get freshwater supply for domestic use.

E. Indalawan Falls, Brgy. Indalawan

This waterfall lies deep in the forest. There is no clear trail going to the waterfall. Although a pristine site, some traps for the mouse deer were found. A good population of *Prodasineura poncei n. sp.* and *Rhinocypha humeralis* was encountered in the area.

F. Brgy. 6

This is the most populated area surveyed. Despite the presence of human habitation and relatively more waste flowing into the water system, the nearby creek is very clear.

G. Brgy. Malaking Ilog

Exploring this river system was not easy. There is no clear trail going into the forest. Although the water is shallow, large boulders and slippery rocks make the trek difficult. *Leptogomphus palawanus* population was found in the upper reaches of the river. However, the headwater of this river was not reached during the survey.

Balabac is one of the few islands in the Philippine archipelago explored by the authors that has good forest cover (Figure 7). The forest changes from coastal mangrove forest to lowland Dipterocarp forest. Large old Dipterocarp trees were encountered near the coast and along the roads. Although logging activities were encountered

both in lowland and in upland areas (Figure 8), the mountain cover was relatively intact.

Figure 7 a. Lowland forest in Brgy. Indalawan b. Tall canopy trees

Figure 7 c. Sea eagle's nest

Figure 8 a. Slash and burn site

Figure 8 b-c. Newly cut logs encountered in the forest

Figure 9 a. Municipal Hall of Balabac island b. Courtesy visit with the mayor (right to left, Hilario Cahilog, Mayor Shuaib Astami, Dr. Dennis Ponce and staff of Mayor Astami)

Results

Forty-one species under 33 genera, and nine families were found. Twenty-eight species were recorded for the first time in the island. One genus – *Mortonagrion* was recorded for the first time in the Philippines. Three undescribed species belong to *Prodasineura* and *Mortonagrion* and two potentially new species (*Pseudagrion* and *Teinobasis*) were found. Unfortunately, three previously recorded species were not found in the present survey.

Annotated Lists of Species [* first record, $^{+}$ previously recorded but not found on the present survey]

Chlorocyphidae

1. *Rhinocypha humeralis* Selys, 1873 (Figure 10)

Figure 10 *Rhinocypha humeralis* male

Protoneuridae

2. **Prodasineura poncei* spec. nov. (Figure 11)

Materials. – **Holotype male**, "Brgy. MalakingIlog, Balabac Island, Philippines, 8.iii.2013, leg. Hilario Cahilog" (to be deposited in Assumption College of Nabunturan Museum – Compostella Valley Province, Philippines). **Paratypes** – 4 males, 2 females, "same data as holotype"; 4 males, "Indalawan Falls, Brgy. Indalawan, Balabac Island, Philippines, 8-9.iii.2013, leg. Hilario Cahilog", 8 males, 2 females, "So. Bakong, Brgy. MalakingIlog, Balabac Island, Philippines, 12.iii.2013, leg. Hilario Cahilog". Other materials – (not included in the paratypes due to missing abdomen) 1 male, "Indalawan Falls, Brgy. Indalawan, Balabac Island, Philippines, 8-9.iii.2013, leg. Hilario Cahilog", 1 male, "So. Bakong, Brgy. Malaking Ilog, Balabac Island, Philippines, 12.iii.2013, leg. Hilario Cahilog".

Diagnosis. – This orange *Prodasineura* has predominantly black thorax. The antehumeral stripe is absent or reduced to a small streak near the alar ridge. The rest of Philippine orange coloured *Prodasineura* has complete antehumeral stripe.

Etymology. – a noun in genitive case after Dennis Ponce MD, municipal health officer of the Municipality of Balabac for his many help to make the Balabac survey successful.

Figure 11. a-c. male of *Prodasineura poncei* spec. nov.

Figure 11. d. synthorax of a male *Prodasineura poncei* spec. nov.; e. cerci male of *Prodasineura poncei* spec. nov. male (dorsal); f. cerci of male of *Prodasineura poncei* spec. nov. male (lateral)

Description of male:

Labium and mandibles black. Head entirely black except for bluish genae, front of the face adjacent to the compound eye, antero-lateral margin of frons and a small streak on the inner angle of the postclypeus.

Synthorax predominantly black (Figure 11d). Prothorax entirely black. Anterior lobe of prothorax short and erect, posterior lobe simple, collar-like. Two parallel yellow stripe runs across the lateral side of the synthorax; the upper stripe runs across metepimeron from first coxa to the wing base, second stripe runs ventral half of the metepisternum. Legs – coxae pale with baso-medial black patch, femora, tibiae, tarsae including spines black except for pale ring on the base of femora, and the anterior surface of tibiae.

Wings hyaline with black veins. Arculus just off Ax2; rudimentary anal bridge; Cu2 on fore wing terminates below Sn, hind wing just off first postnodal vein. Postnodals 15 and 13 in forewing and hind wing, respectively. Pterostigma black rectangular.

Abdomen predominantly black except: S1 yellow ring distal third, S2 yellow dorsal half, S3 baso-dorsal third a tapering orange stripe; baso-dorsal aspect of S4 – S7 small paired spots. Cerci and paraproct white except for the blackened ventral aspect of cerci and the apices of paraproct (Figure 11e-f). Cerci same length as S10, pointed with two prominent ventral spine; inner spine larger while the outer spine much sharper and pointed. Paraproct robust with curved medially directed apices.
Measurements [mm]: hind wing: 19, abdomen: 30

Variations:
Humeral stripe present as small incomplete streak near the wing bases. In some specimens, it is limited as very faint narrow streak.
Measurements [mm]: hind wing: 18-20, abdomen: 29-31.

Description of female:
Labrum greenish patch surrounded by black margin with central black spot connected to the inner margin. Genae and anteclypeus yellowish. Frons black with small paired yellow spot. The rest of the head black with yellow stripe across the head along the anterior ocelli.

Prothorax black with pale patch in the lateral sides of anterior lobe, lateral aspect of median lobe and extreme sides of posterior lobe. Lateral part of posterior lobe produced into paired flat elongation curved antero-dorsad, behind it another much shorter rounded tubercle; middle part simple.

Synthorax similarto male except for the presence of narrow complete humeral stripe. Abdomen black except for pale lateral sides, S3-S6 has faint baso-dorsal white spot.

Measurements [mm]: hind wing: 19, abdomen: 34.

Remarks:
This is the predominant *Prodasineura* in the island. It was recorded in nearly all sites explored both from coastal to the interior. This species prefers small partly shaded

streams. Although a small population was encountered on the swamp where clear flowing water surface from the ground.

3. **Prodasineura* spec. nov.

This species closely resembles the first in terms of colour markings. Unfortunately, only one specimen was collected since it was initially confused with the first species. Since only one specimen was collected the description is postponed until more materials are available.

Unlike the first species, it has a complete yet very narrow antehumeral stripe. It also differs on the shape of the cerci.

Platystictidae

4. *Drepanosticta ceratophora* Lieftinck, 1974 (Figure 12)

This species has a wide distribution in the island. It occurs in small forested seepages. It was first recorded by van Tol (2005) in Balabac.

Figure 12. *Drepanosticta ceratophora* male

Platycnemididae

5. *Coeliccia axinocercus* Lieftinck, 1974 (Figure 13)

It occurs in all areas explored. This species was encountered from mountain streams to lowland swamps where small springs surface from the ground. The thorax pattern shows some individual variations.

Figure 13. *Coeliccia axinocercus* a. male, b. pair in tandem

6. **Copera vittata palawana* Lieftinck, 1940 (Figure 14)

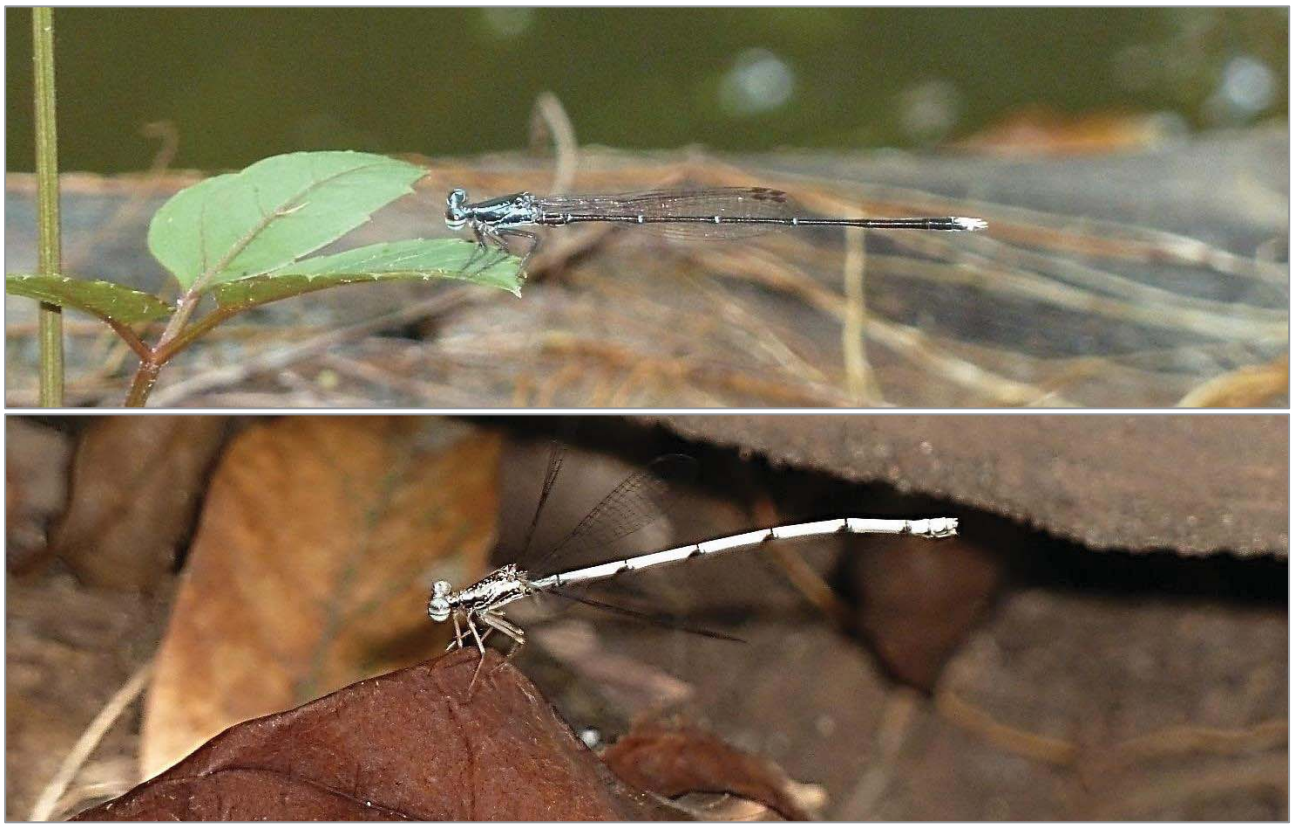

Figure 14. *Copera vittata palawana*. A. male, b. female

Lestidae

7. [+]*Lestes quercifolia* (Selys, 1878)

Calopterygidae

8. [+]*Vestalis amaryllis* Lieftinck, 1965

This species remained elusive despite extensive search. Perhaps, a survey during wet season wherein most of the waterways are filled with water will eventually show this species.

Coenagrionidae

9. **Agriocnemis f. femina* (Brauer, 1868)

10. **Argiocnemis rubescens intermedia* Selys, 1877

11. **Ceriagrion lieftincki* Asahina, 1967

12. **Mortonagrion astamii* spec. nov. (Figure 15)

Materials. – **Holotype** male, "Swamp/lake, Brgy. Katagupan, Balabac Island, Philippines, 10-11.iii.2013, leg. Hilario Cahilog". **Paratypes** – 3 males, 1 female, "same data as the holotype".

Diagnosis. – This species is close to *Mortonagrion arthuri* and *M. indraneil* (both present in the nearby Borneo Island). It differs from the two in having much longer cerci.

Etymology. – a noun in genitive case, after Mayor Shuaib Astami of the Municipality of Balabac, for approving and facilitating the odonatological survey conducted in his jurisdiction.

Figure 15. a. male *Mortonagrion astamii* spec. nov.

Description of male:

Labium and mandible light brown. Labrum whitish faintly bordered by dark brown. Genae, anteclypeus and postclypeus light brown. Rest of the head black except for blue irregularly shaped post-ocular area (Figure 15b), and brown patch behind the ocelli.

Prothorax light brown. Anteriore lobe simple, erect. Middle lobe simple dome shaped. Posterior lobe obliquely oriented, rectangular. Synthorax brownish: darker stripe along the dorsal carina; both sides of humeral suture (broadest of the three); and posterior half of metepimeron, a little blacker near the wing base. Legs – pale except for the black spines, blackish joints and darker brown posterior margin of femur.

Wings hyaline with black veins. Anal crossing beyond second antenodal vein. Postnodals 9 and 7 forewing and hind wing, respectively. Pterostigma obliquely rectangular dark brown.

Abdomen brown darkening at each apical segments. S1 light brown with black apical ring, broader on the dorsum; S2 – S6 brown with basal pale ring bluish on the dorsum; S7 blackish with pale basal ring bluish on the dorsum; S8 black with blue baso-dorsal 2/3rd; S9 – S10 black. Cerci dark brown (Figure 15c-d). Paraproct more

than twice the length of S10, blackish, elongate flattened with sharp ventral spine at the tip, and a much larger spine baso-medially.

Measurements [mm]: hind wing: 14, abdomen plus cerci 27.

Description of female:
Same as the male, except for a much darker thorax and abdomen.
Measurement [mm]: hind wing: 15, abdomen: 25.

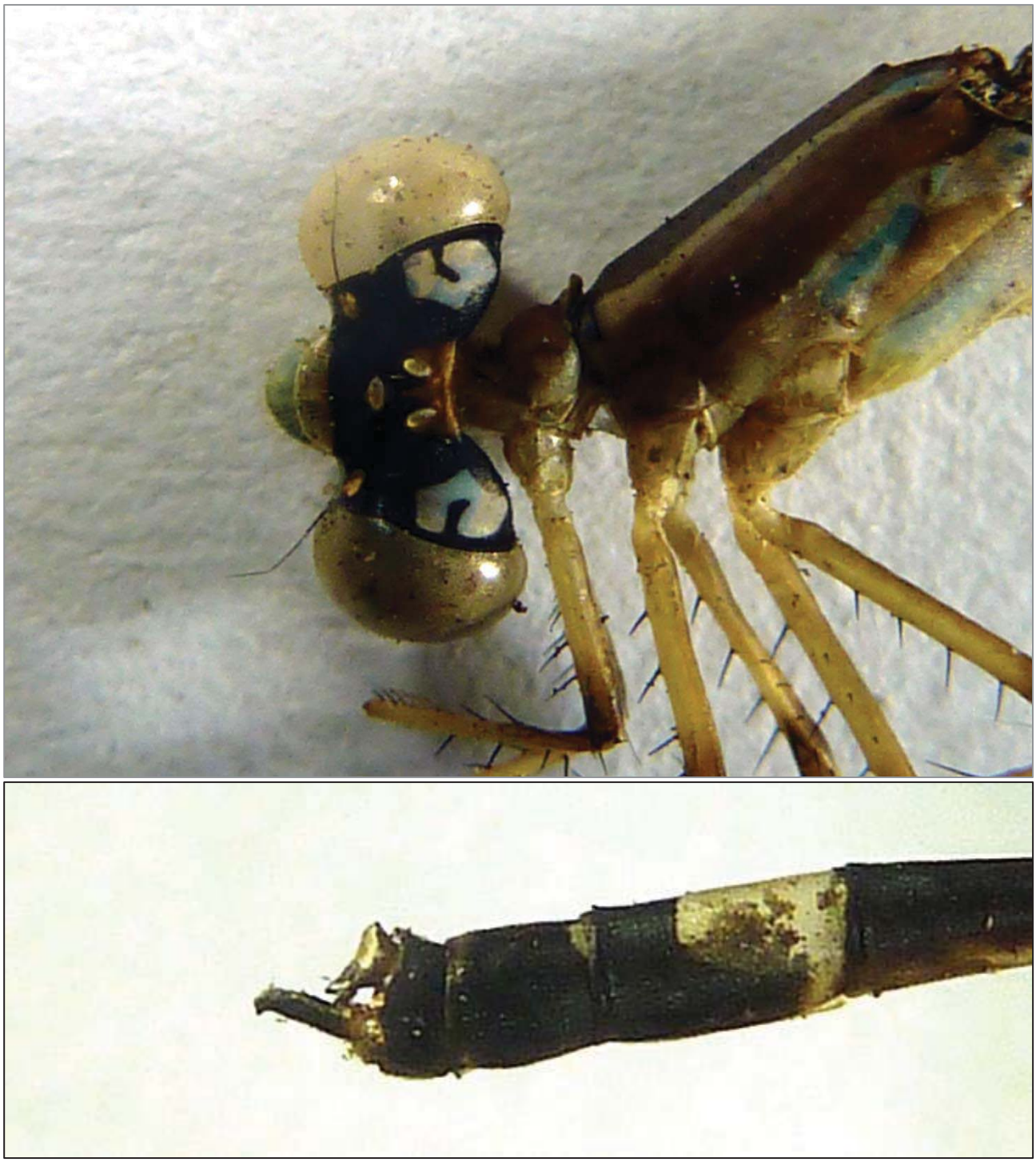

Figure 15 b. post-ocular area of *Mortonagrion astamii* spec. nov. ; c. cerci of *Mortonagrion astamii* spec. nov. male (lateral view)

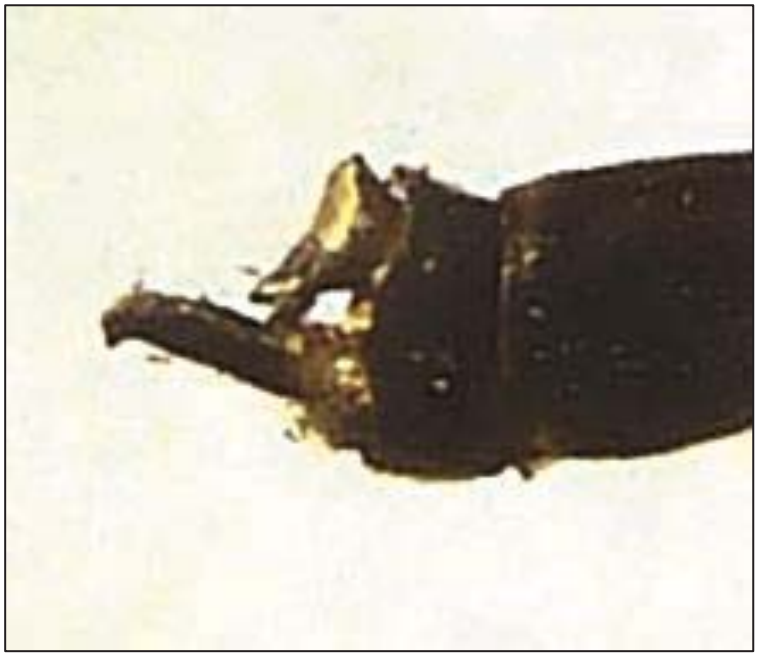

Figure 15 d. cerci of *Mortonagrion astamii* spec. nov. male (oblique postero-lateral view)

Remarks:

This is the first record of this genus in the Philippine archipelago. Considering the lack of extensive survey conducted in lowland swamps and mangrove areas and the extensive destruction on this kind of habitat, many species under this genus may have disappeared without having been described.

13. *Pseudagrion microcephalum (Rambur, 1842) (Figure 16)

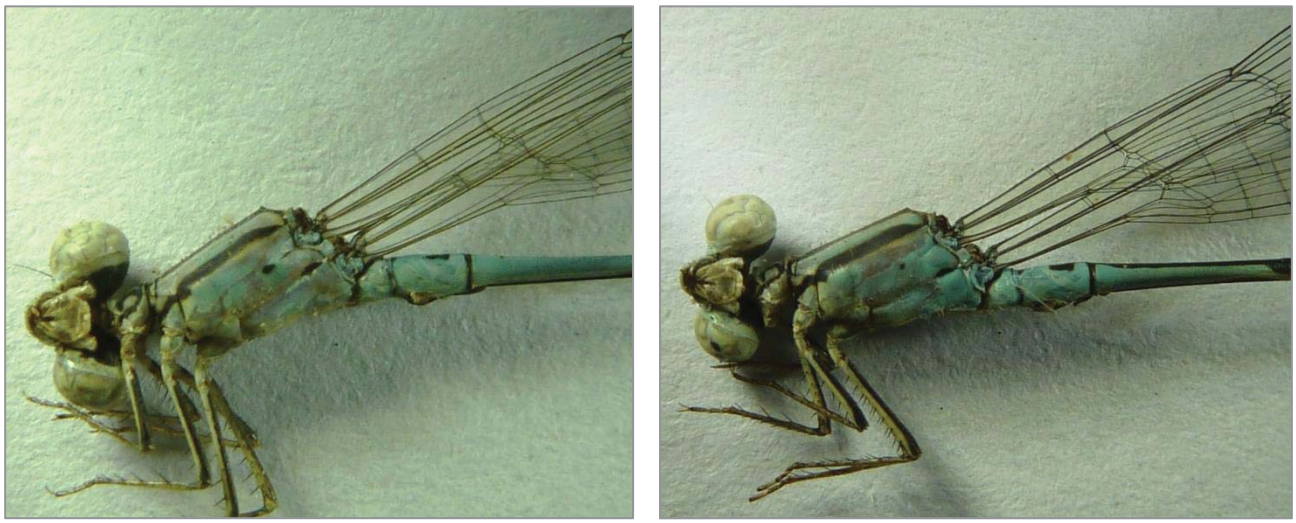

Figure 16. a. *Pseudagrion microcephalum* thorax; b. *Pseudagrion* sp. thorax

14. **Pseudagrion* sp.

This species is much bluer than *P. microcephalum*. It also differs on the shape of the cerci. This population is close to *Pseudagrion* sp.n. from Tawi Tawi Island. The Philippine *Pseudagrion* needs to be reviewed.

15. **Pseudagrion p. pilidorsum* (Brauer, 1868)

16. **Teinobasis olivacea* Ris, 1915

17. **Teinobasis* sp. cf. *samaritis* Ris, 1915

One male was collected. This species differ from *T. samaritis* from Mindanao in the shape of cerci and paraprocts. More material is needed for this potentially new *Teinobasis*.

18. **Xiphiagrion cyanomelas* Selys, 1876

Aeshnidae

19. **Gynacantha subinterrupta* Rambur, 1842

Gomphidae

20. **Leptogomphus palawanus* Asahina 1968 (Figure 17)

The Balabac population differs from Palawan population in the absence of yellow spot along the spiracle. Aside from this, no significant difference was noted.

Figure 17. a *Leptogomphus palawanus*, male

Figure 17. b. *Leptogomphus palawanus*, male

Corduliidae

21. **Epophthalmia v. vittigera* (Rambur, 1842)

Libellulidae

22. **Aethriamanta gracilis* (Brauer, 1842)
23. *Agrionoptera insignis* (Rambur, 1842)
24. **Brachydiplax c. chalybea* Brauer, 1868
25. *Cratilla l. lineata* (Brauer, 1878)
26. *Diplacodes trivialis*(Rambur, 1842)
27. **Hydrobasileus croceus* (Brauer, 1867)
28. [+]*Lathrecista asiatica*(Fabricius, 1798)
29. *Lyriothemis cleis* Brauer, 1868
30. **Neurothemis r. ramburii* (Brauer, 1866)
31. *Neurothemis t. terminata* Ris, 1911
32. *Orthetrum chrysis* (Selys, 1891)
33. **Orthetrum pruinosum clelia* (Selys, 1878)
34. *Orthetrum t. testaceum* (Burmeister, 1839)
35. *Pantala flavescens* (Fabricius, 1798)
36. **Potamarcha congener* (Rambur, 1842)
37. **Raphismia bispina* (Hagen, 1867) (Figure 18)

Figure 18. *Raphismia bispina*, a. male, b. female

38. *Rhodothemis rufa (Rambur, 1842) (Figure 19)

Figure 19. *Rhodothemis rufa* male

39. **Rhyothemis phyllis subphyllis* Selys, 1882

40. *Rhyothemis r. regia* (Brauer, 1867) (Figure 20)

Figure 20. *Rhyothemis r. regia*, male; specimen left in the background: *Neurothemis r. ramburii*

41. **Tetrathemis irregularis hyalina* Kirby, 1889 (Figure 21)

Figure 21. *Tetrathemis irregularis hyalina,* male

42. *Tholymis tillarga* (Fabricius, 1798)

43. **Tramea transmarina euryale* (Selys, 1878)

44. **Zyxomma petiolatum* Rambur, 1842

Acknowledgement

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63	2010	Asmaa Hassan Jabr, Baghdad, Iraq	Providing odonatological literature to M.Sc. student Asmaa Hassan Jabr,Department of Biology, College of Education, (Ibn al-Haitham), Adhamiyah, Anter SQ, Baghdad – Iraq
64	2010	Kosterin, O.E., Russia	The Odonata of the Cardamon mountains in Cambodia – progress study November 2010
65	2010	Villanueva, Reagan, Philippinen	Fieldwork on dragonflies on Samar Island (Philippines)
66	2010	Villanueva, Reagan, Philippinen	Fieldwork at Balut/Saranggani (Philippines) and Talaud islands (Indonesia)
67	2010	Villanueva, Reagan, Philippinen	Endemic species of the Diomabok-Lake region south of Davao, The Philippines
68	2010	Graham Reels, Hong-Kong	African Odonata (Dijkstra & Clausnitzer, Eds) text edit
69	2011	Rory Dow, Niederlande	Expedition to the Odonata of the Hose Mts., Sarawak, Malaysia
70	2011	Dejan Kulijer, Bosia & Herzegovina	Odonata of the Livanjsko poljekarst wetland area, with special emphasis on Coenagrion ornatum
71	2011	Do Manh, Cuong, Hanoi, Vietnam	Study of Odonata in north central Vietnam
72	2011	Kosterin, O.E., Russia	The Odonata of the Cardamon mountains in Cambodia – progress study August 2011
73	2011	Villanueva, Reagan, Philippinen	Odonata of Tawi-Tawi-Island, The Philippines
74	2011	Elena Dyatlova, Ukraine	Odonata of Moldavia – progress study
75	2011	Zhang, Haomiao, Guangzhou, China	The Superfamily Calopterygoidea in South China: taxonomy and distribution III – Travelling grant to the Guizhou and Yunnan Provinces, Summer 2011
76	2011	Marinov, Milen, Christchurch, New Zealand	Odonata at artificial light sources – review paper
77	2011	Do Manh, Cuong, Hanoi, Vietnam	Providing the Odonatological literature database
78	2010	Villanueva, Reagan, Philippinen	Stereomikroskop
79	2010	Villanueva, Reagan, Philippinen	Odonata of the Diomabok-Lake region south of Davao, The Philippines Follow-up
80	2011	Villanueva, Reagan, Philippinen	Odonata of the Catanduanes-Island, The Philippines
81	2012	Villanueva, Reagan, Philippinen	Odonata of Dinapique, The Philippines
82	2012	Dow, Rory, UK/The Netherlands	Odonata of Kalimantan, Borneo, Malaysia
83	2012	Marinov, Milen, Christchurch, New Zealand	Odonata species diversity of the "Eua Island, Kingdom of Tonga"
84	2012	Marinov, Milen, Christchurch, New Zealand	Odonata of Solomon-Islands
85	2012	Villanueva, Reagan, Philippinen	Palawan-Odonata, The Philippines
86	2012	Do Manh, Cuong, Hanoi, Vietnam	Mau Son Mountain Odonata, Vietnam
87	2012	Dow, Rory, UK/The Netherlands	Odonata of Gunung Pueh, Borneo, Malaysia
In Planung			
	2013	Garrison / Ellenrieder, Sacramento, USA	Argia in Costa Rica
	2013	Villanueva, Reagan, Davao, Philippinen	Odonata of Mt. Lomot and Mt. Sumagaya, The Philippines
	2014	Büsse, Sebastian, Göttingen, Germany	Epiophlebia in China