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Odonata Fauna of Balut and Sarangani islands, Davao Occidental Province, Philippines

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Abstract

Balut and Sarangani islands are two small landmasses situated off the coast of Davao Occidental, Mindanao Island. Despite recent increase on odonatological data from various islands in the Philippines, these two remote islands have never been explored. Hence, a short survey was conducted on first week of April and November 7 – November 14, 2010 on all freshwater systems in these two islands. Twenty-five species under seven families and 21 genera were found representing the first Odonata record for the two islands.

Key words

Odonata, Philippines, Balut Island, Sarangani Island, phytotema

Introduction

Balut and Sarangani are small islands under the province of Davao Occidental. These two islands represent the south-eastern most inhabited islands of the Philippine archipelago. Unfortunately, the flora and fauna diversity from these islands are poorly known with Odonata never recorded before. No Odonata species from these islands were included in the general review of the Philippines fauna given by Hämäläinen & Müller (1997). And no studies were done until this one.

Material and Methods

Balut Island is approximately 80km^2 and volcanic in topography. It has gentle to very steep slopes. The highest peak rises over 600masl in the central part of the island. Although it has no recorded history of eruption, it is considered an active volcano in the Philippine archipelago. Sarangani Island on the other hand is relatively flat with no distinct mountain. It is approximately 70km^2 and located east of Balut Island.

Figure 1. Balut and Sarangani islands at the southern fringe of Philippines (map taken from GoogleMaps).

The material for this study has been collected by the second author and identified by the first. All specimens were sampled in 2010, first on the first week of April during a chiropteran survey organised to Balut Island and led by Dave Mohagan (Central Mindanao University). Since Odonata were not the main focus of the chiropterological study, many potential localities on Balut Island have not been explored. The adjacent island of Sarangani was not visited at all. Therefore a second trip to these two islands is made on November 7 – November 14, 2010 and funded by International Dragonfly Fund.

Getting there and around the two islands must be carefully planned considering the ferry operation time-table from General Santos City to Balut Island. One must be aware that the ferry does not depart on Fridays. If however, visitors get in a situation of waiting for the ferry they have the opportunity to explore the neighbouring town of Kiamba (province of Sarangani, southernmost tip of Mindanao Island, The Philippines). A short visit during the current study ended up with several interesting species including a new species of *Pericnemis*.

Travel to Balut Island by ferry is another must-think-of logistic issue that some people may find challenging as it is an overnight trip. The ferry leaves General Santos City at 9pm and arrives on the following day around 5am.

A total of six full days were spent in the field for sampling Odonata: four (November 8-11) on Balut Island and two (November 13-14) on Sarangani Island. The interior of

Balut Island was much easier explored during the second trip thanks to the newly opened road which made the mountain trekking faster. The road was constructed to allow access into the mountain as it is being converted into a rubber plantation.

Getting to the Saranggani Island was organised by hiring a motorized boat. There is no high mountain in the island and freshwater sources are confined along the coast as small springs.

Figure 2a, b. Town of Balut as viewed from the top of the mountain.

Figure 3a, b. Newly opened road leading deep into the mountain in Balut island.

Figure 4. Newly cleared forest to be converted into rubber plantation in Balut island.

Figure 5. Trees covered with thick epiphytes in Balut island.

Figure 6a, b. Forested springs, a good habitat of *Teinobasis* sp. in Balut island.

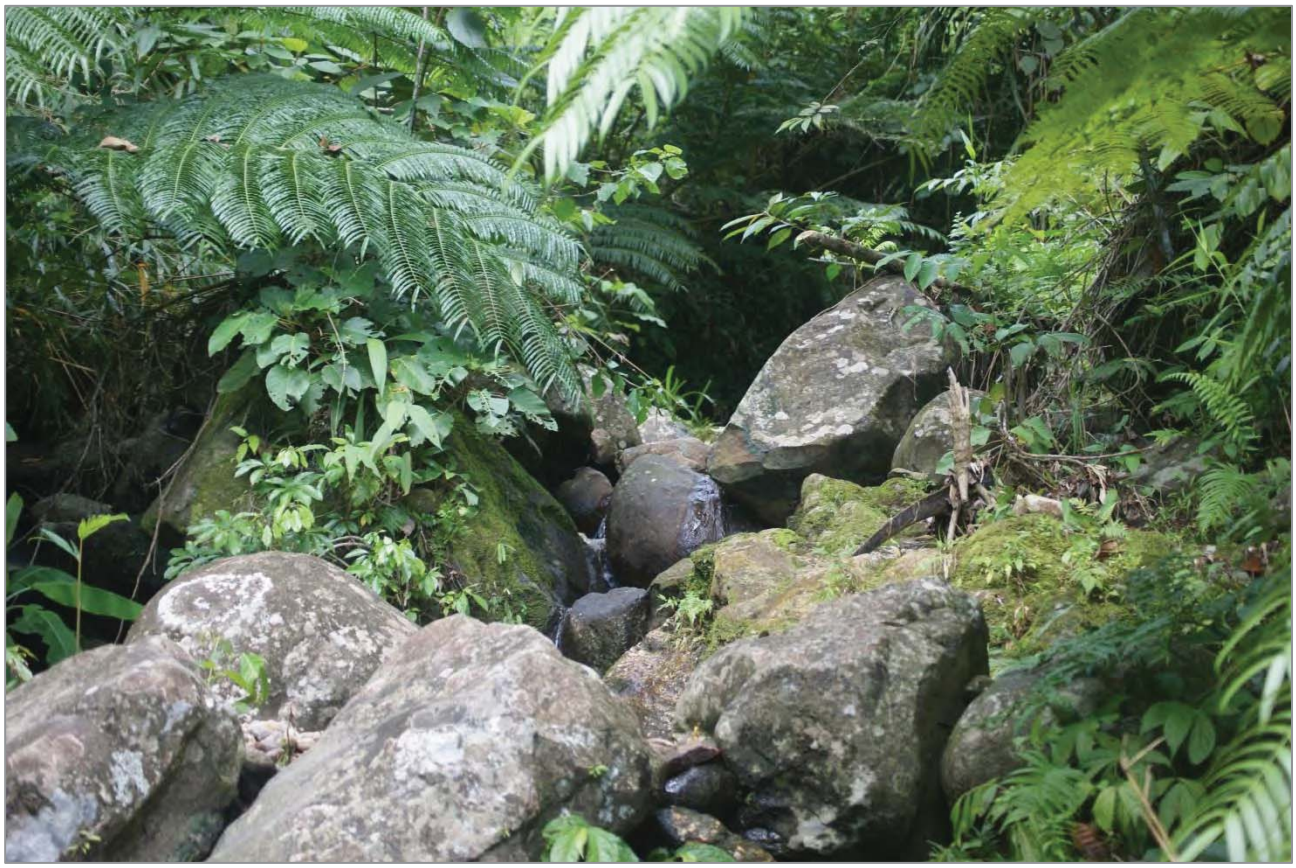

Figure 7a,b. Forested streams in Balut island.

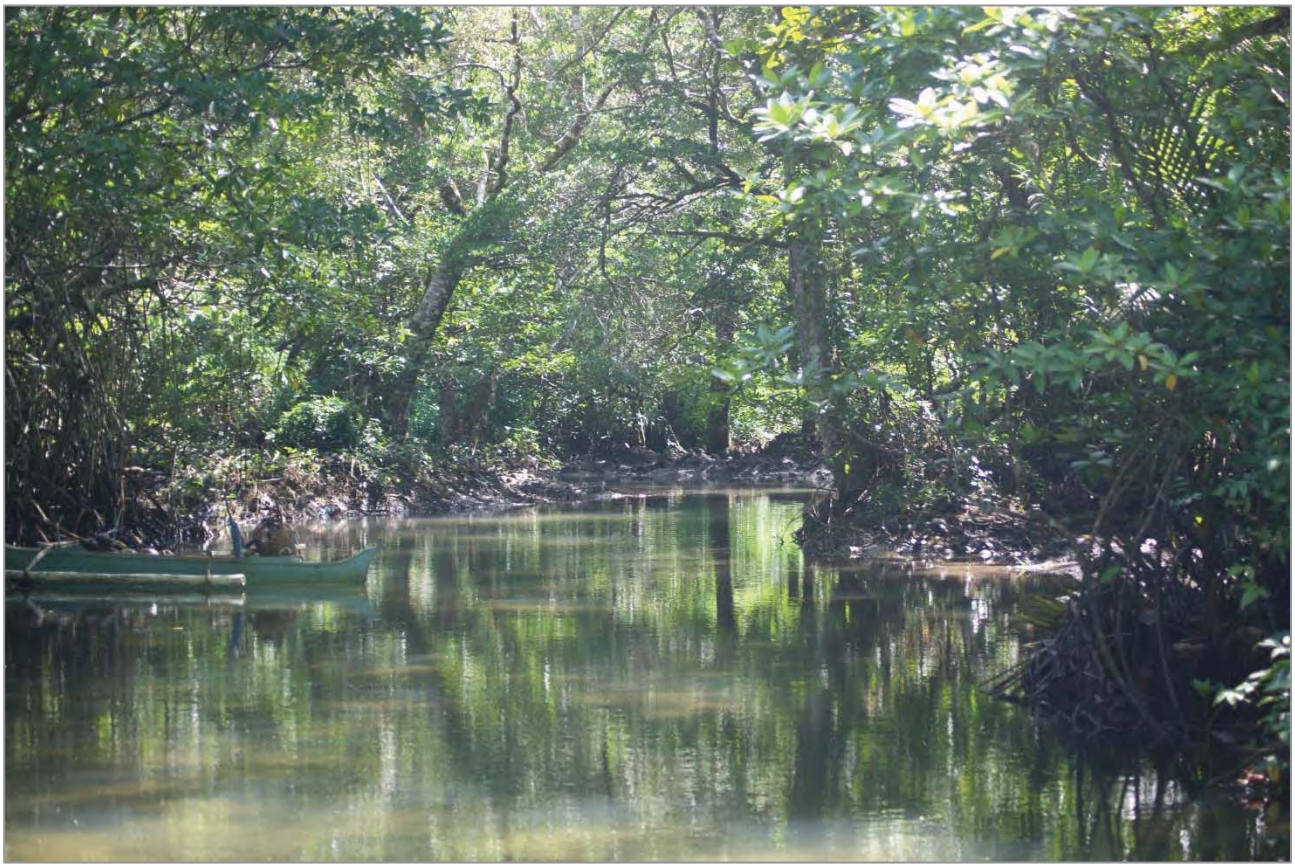

Figure 8a, b. Lowland rivers in Balut island.

Figure 8c. Lowland river in Balut island.

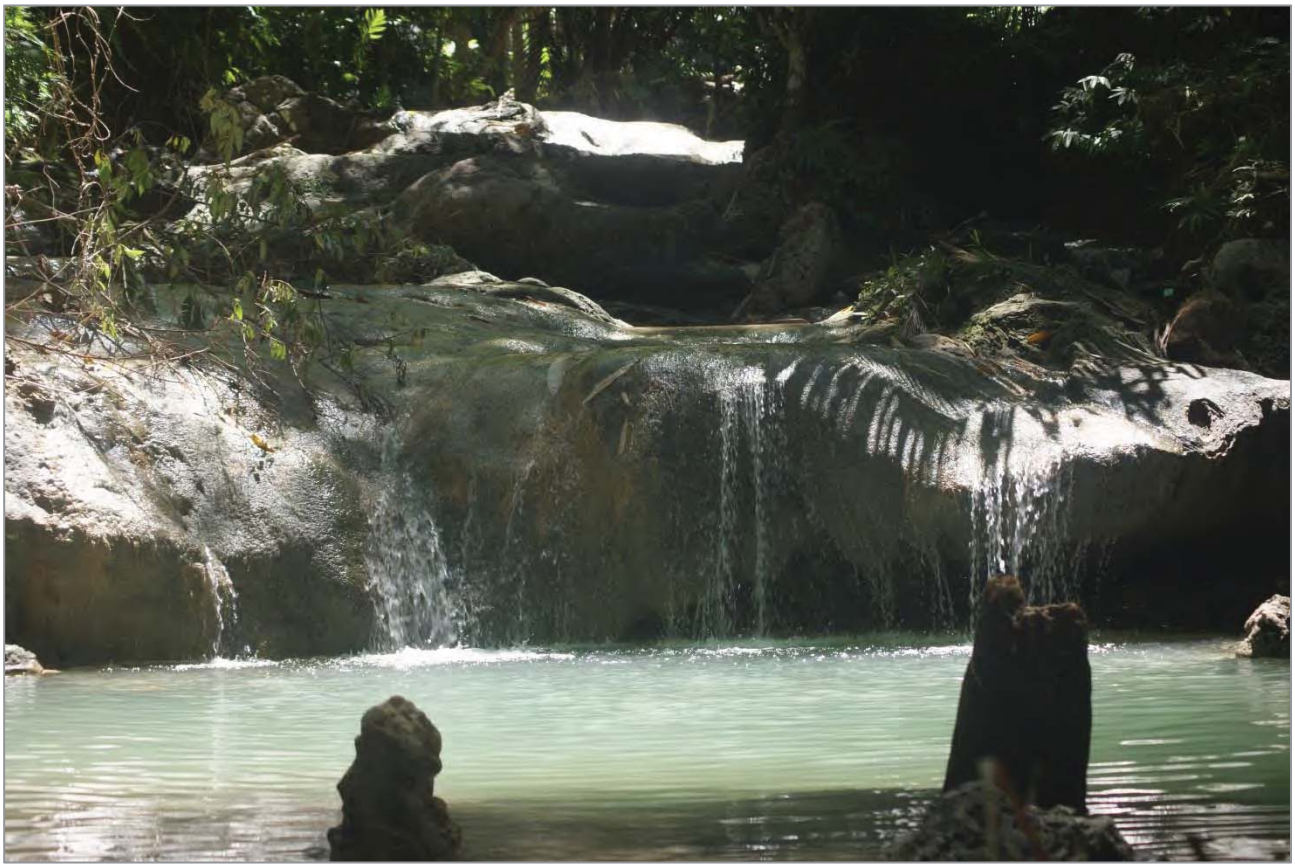

Figure 9. Hotspring in Balut island.

Figure 10 a, b. a Sarangani Island viewed from the mountain of Balut, b. boat used to cross to Sarangani Island.

Results

There were 25 species under seven families and 21 genera recorded representing the first record for the two islands. Balut was represented by 23, and Sarangani by 17 species. Two species, *Drepanosticta* sp and *Teinobasis* sp were present on Sarangani but absent in Balut. There were eight species recorded in Balut but absent in Sarangani.

Annotated list of species [B: Balut Island, S: Sarangani Island]

Chlorocyphidae

1. *Rhinocypha colorata* (Hagen, in Selys, 1869) [B] Figure 11

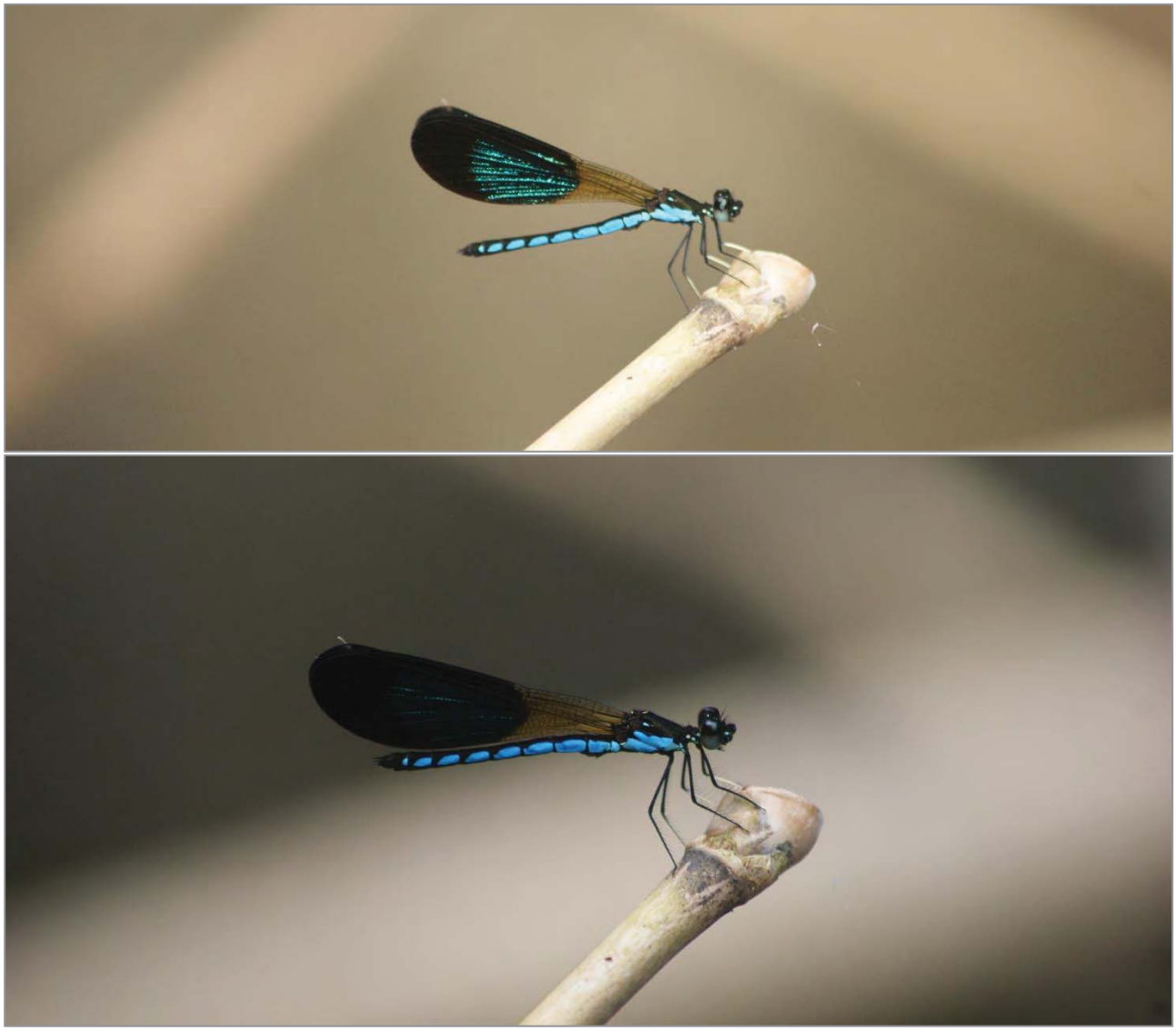

Figure 11a, b. *Rhinocypha colorata* (Hagen, in Selys, 1869), male.

This population represent the southernmost range of the species. It lies at the border between Philippines and Sulawesi. Unfortunately, we do not have any

data for Talaud Island (Sulawesi: Indonesia) to compare since that island still needs odonatological survey. The local population is very important in the phylogenetic perspective since it will serve as transition point to another allied species complex viz. *Rhinocypha tincta* (Rambur, 1842) confined in Papua New Guinea and adjacent islands.

Platystictidae

2. *Drepanosticta* sp cf. *flavomaculata* van Tol, *2005* [S] Figure 12

It is very interesting to note that although Balut Island has more freshwater sources, this species was not established despite the extensive search.

Van Tol (2005) already noted the difference in some populations he examined. There is need for a closer study of the taxon.

Figure 12. Newly emerged *Drepanosticta* sp.

Coenagrionidae

3. *Agriocnemis f. femina* (Brauer, 1868) [B, S] Figure 13

Figure 13. *Agriocnemis f. femina* (Brauer, 1868), male

4. *Pseudagrion p. pilidorsum* (Brauer, 1868) [B] Figure 14

Figure 14. *Pseudagrion p. pilidorsum* (Brauer, 1868), male.

5. *Teinobasis samaritis* Ris, 1915 [B, S] Figure 15

Figure 15a, b. *Teinobasis samaritis* Ris, 1915, male.

6. *Teinobasis* sp. cf. *filamentum* [S] Figure 16

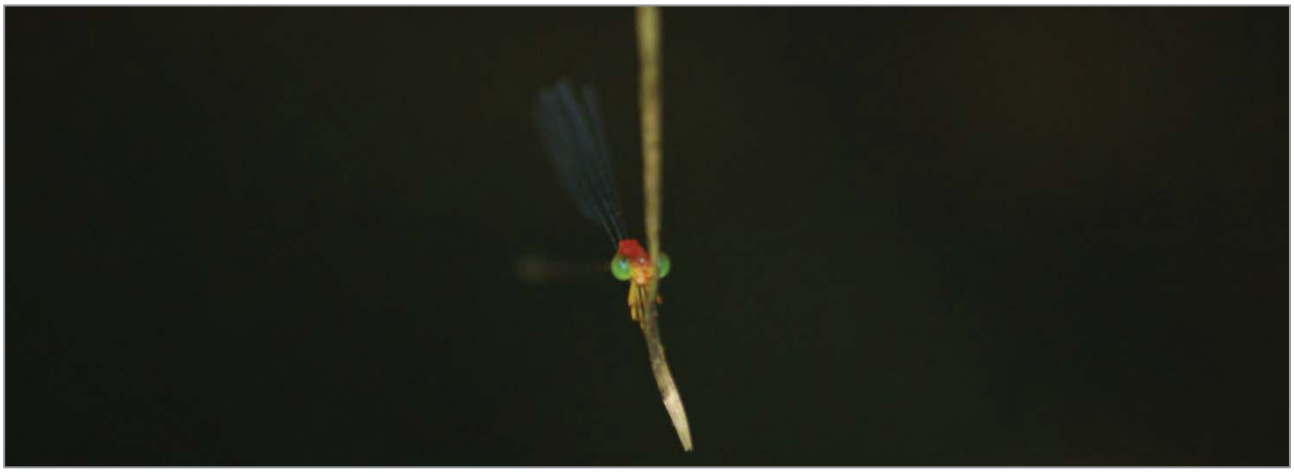

Figure 16. *Teinobasis* sp., male.

Protoneuridae

7. *Prodasineura integra* (Selys, 1882) [B] Figure 17

Figure 17a, b. *Prodasineura integra* (Selys, 1882), male.

Aeshnidae

8. *Anax guttatus* (Burmeister, 1839) [B]
9. *Gynacantha* sp. [B] Figure 18

Figure 18. *Gynacantha* sp.

Cordullidae

10. *Heteronaias heterodoxa* (Selys, 1878) [B]
11. *Idionyx* sp.cf. *yolanda Selys, 1871* [B] Figure 19

Figure 19. *Idionyx* sp.

The materials collected closely fit the description of *Idionyx yolanda* "distinct uninterrupted stripe in the metepisternum and confluent streak in the metepimeron" (Lieftinck, 1971).

Libelludidae

12. *Agrionoptera insignis* (Rambur, 1842) [B, S]
13. *Diplacina bolivari* Selys, 1882 [B, S] Figure 20

Figure 20. *Diplacina bolivari* Selys, 1882, male.

14. *Diplacodes trivialis* (Rambur, 1842) [B, S]
15. *Lathrecista a. asiatica* (Fabricius, 1798) [B, S] Figure 21

Figure 21. *Lathrecista a. asiatica* (Fabricius, 1798), female.

16. *Lyriothemis* sp. cf. *hirundo* Ris, 1913 [B] Figure 22

Figure 22a, b. Tree with buttress hole used as larval habitat of *Lyriothemis sp*

Figure 22. Larvae of *Lyriothemis* sp.

17. *Neurothemis r. ramburii* (Brauer, 1866) [B, S]
18. *Neurothemis t. terminata* Ris, 1911 [B, S]
19. *Orthetrum pruinosum clelia* (Selys, 1878) [B, S] Figure 23

Figure 23a. *Orthetrum pruinosum clelia* (Selys, 1878), male.

Figure 23 b. *Orthetrum pruinosum clelia* (Selys, 1878), female.

20. *Orthetrum s. sabina* (Drury, 1770) [B, S]
21. *Orthetrum t. testaceum* (Burmeister, 1839) [B,S] Figure 24

Figure 24. *Orthetrum t. testaceum* (Burmeister, 1839), male

22. *Pantala flavescens* (Fabricius, 1798) [B,S]
23. *Potamarcha congener* (Rambur, 1842) [B, S] Figure 25

Figure 25. *Potamarcha congener* (Rambur, 1842), male

24. *Trithemis festiva* (Rambur, 1842) [B, S]
25. *Zyxomma obtusum* Albarda, 1881 [B,S]

Discussion

Given by the current knowledge of the regional fauna, no endemic species could be found on Balut and Sarangani. All taxa were represented by the Odonata fauna of Mindanao. This is expectable because both islands lay off 14 kilometres from the mainland of Minadano but ca 180 kilometres from the next situated Odonata populations on the islands Pulau Karakelong in the southeast and Pulau Sangihe in the south. The mainland of Sulawesi is situated ca. 430 kilometres south of Balut and Sarangani. However, the three taxa with unresolved taxonomy may bring some interesting results once the further morphological studies have been completed.

A total of 14 species (13 Libellulidae and one Coenagrionidae) were shared between the two studied islands. *Lyriothemis* sp. cf *hirundo* was the only one from Libellulidae confined to one island (Balut) and not established on the other (Sarangani). *Agriocne-*

mis f. femina, on the other hand was the only one from Coenagrionidae represented on both islands. All 14 species are wide spread and commonly encountered within the Philippine archipelago. That means that 14 (= 82%) of the 17 species on Sarangani are widespread and common species. This very high percentage could be explained with the topography of the Sarangani Island which being flat does not favour surface flowing waters as much as Balut Island does, hence, no Chlorocyphidae were encountered. However, there could be another explanation of this phenomenon of high rate of common species being associated with the higher anthropogenic impact over the water bodies on Sarangani Island and the higher stress that the local species might experience.

Probably because of its more unsuitable topography for anthropogenic activities and more available freshwater sources, Balut is represented by a more diverse Odonata fauna including also representatives of the Chlorocyphidae, Protoneuridae, Aeshnidae, and Corduliidae.

From the zoogeographical point of view it will be very interesting to compare the Odonata fauna of the here studied islands to the next situated islands Pulau Karabelong and Pulau Sangihe. The latter are situated about 180 kilometres to the south without any terrestrial ground in between. Both island groups are separated by the zoogeographically relevant Wallace's line (see Gassmann 2005; van Tol & Gassmann, 2007).

In general, as a group of insects occurring to the west and to the east of the Wallace line the Odonata are of special interest for biogeographical studies in the Indo-Australian transition zone. Hypothesis presented by Gassmann (2005) allows for the postulation of active or passive dispersal events both into the East as well as, subsequently, back into the West (i.e. the Philippines). A detailed scenario for the distributional history of the group has been developed by van Tol & Gassmann (2007) in the context of the historical biogeography of the freshwater biota in Southeast Asia.

It also would be interesting to study and compare the island fauna north of Sulawesi with the mainland of Sulawesi. It is likely to establish a similar dominance of the good flyers (such as Libellulidae) to what given here for both Balut and Sarangani islands.

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Rebora, M., Piersanti, S. & E. Gaino. 2004. Visual and mechanical cues used for prey detection by the larva of Libellula depressa (Odonata Libellulidae). Ethology, Ecology & Evolution 16(2): 133-144.

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