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This series intends to contribute to the knowledge of the regional Odonata fauna of the Southeastern Asian and Pacific regions to facilitate cost-efficient and rapid dissemination of faunistic data.

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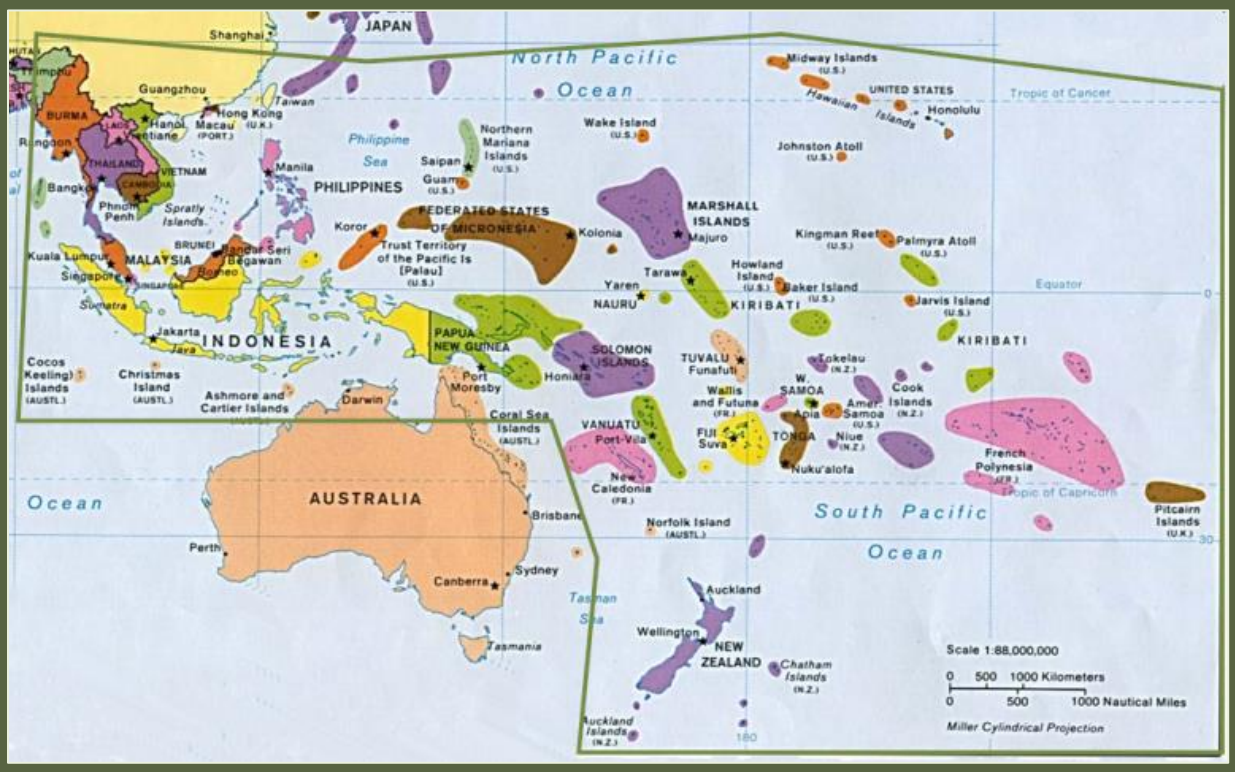
Pacific Islands comprise of Micronesian, Melanesian and Polynesian Islands.



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On a dragonfly collection from the Solomon Islands with overview of fauna from this Pacific archipelago (Insecta: Odonata)

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Abstract

Odonata fauna of the Solomon Islands (considered in its political rather than geographical borders) is revised following a recent collecting trip to Guadalcanal Island in April 2012. Some important taxonomic considerations are discussed and a complete literature review is provided for the country with an updated checklist of 64 species that is in accordance with the latest taxonomic studies on the group from that part of the world. The collection reported here was carried out on two and a half effective field days and resulted in a total of 30 taxa. Two of them (*Agyrtacantha browni* and *Gynacantha amphora*) are new to science and already described elsewhere and three others (*Lestes concinnus*, *Lathrecista asiatica festa* and *Rhyothemis resplendens*) are new to the country. A female of *Pseudagrion incisurum* is described for the first time and another female (*Rhinocypha liberata*) will be described later.

Toksave

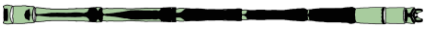
Odonata binatang bilong Solomon Aelan (insaet lo kandere bilong Solomon Aelan tasol) nao ol lukluk gut lo disla behaenim wanpla wokobaot lo Kalekana aelan lo Aeprel 2012. Dispela pepa lukluk long sumpla hap lo dispela binatang we ol sience bin no lukluk long en bepo. Na ol sumpla toksave tu long sumpla pepa we stori blo binatang stap long en, displa pepa kisim nao na wokim updeit blo kandere na kamup 64 kaen kaen binatang emi stap. Wok long bus long kisim ol binatang em kam up long tupla day na haf. Na mepla kisim 30 kaen kaen binatang. Tupla (*Agyrtacantha browni* and *Gynacantha amphora*) em niupla lo long sience, na sumpla wokim toksave long displa finis, tasol trepla narapla (*Lestes concinnus*, *Lathrecista asiatica festa* na *Rhyothemis resplendens*) em niupla recod blo kandere. Wanpla meri *Pseudagrion incisurum* mepla luksave nao tasol long displa, na narapla meri *Rhinocypha liberata* behaen bae raetim toktok blong en.

Key words: Odonata, Solomon Islands, Guadalcanal Island

Introduction

Pacific Island Odonata pose one of the biggest challenges in contemporary odonatelogy. Every professional or beginning entomologist faces significant problems because this insect order is poorly known in the Pacific (Marinov & Doscher 2011) which is a result of the Pacific Island groups being generally inadequately studied (Marinov 2012). The difficulties are of various natures and magnitudes. So far more than 230 taxa in the Pacific Islands are accepted as valid names. These are distributed over the vast area of the Pacific Ocean with many species endemic to remote islands. The latter could be problematic with regard to access and the logistics of field sampling. Species taxonomy is far from complete. Types (some of them already lost!) are deposited at museum collections all over the globe which makes it hard to check them and compare new discoveries against the already published species names. With four exceptions (Lieftinck (1962) for Micronesia, Rowe (1987) for New Zealand, Polhemus & Asquith (1996) for Hawaiian Zygoptera and Michalski (2012) for New Guinea, Maluku and the Solomon Islands), Odonata literature lacks identification keys or guides for the Pacific Ocean island groups. In a few cases keys for particular genera have been published (Donnelly 1990; Lieftinck 1971, 1975; Zimmerman 1948). Although including very detailed species checklist, previous studies often operate on the assumption that widespread species are well known to the general public. Some of drawings figuring important identification features were found to be incorrect, incomplete or misleading. As a result the researchers must rely on original species descriptions, which (if they present important details at all!) are seldom accompanied by figures of genitalia, wing venation or other important diagnostic features. This apparent gap in the knowledge is a serious disadvantage for everyone who embarks on the challenges of studying Pacific Odonata.

However, this work may be truly rewarding. The region is very diverse and contains a range of rainforest and riparian habitats, mountain bogs, lowland mangroves and other type of biotopes with specific geological history and ecological peculiarities for each of the island groups. Researchers dealing with this region add new taxa (either to the country checklist or to science) almost every time they sample even the best studied places. Several new species have been recently reported as discovered from Fiji (Donnelly per. comm., Van Gossum et al. 2006), Solomon Islands (Donnelly 1987, Polhemus et al. 2008), Kingdom of Tonga (Donnelly per. comm.) and pending description. While Tonga is largely understudied compared to the rest of the Pacific (Marinov 2012), the Solomon Islands and Fiji have been sampled on several occasions and a number of papers have already been published. Faunistic reviews of those areas are important to understand past sampling efforts and elucidate further regions that must be considered for additional study. Marinov (2011, 2012) provided such overviews for Fiji and Tonga respectively. A synopsis of the Solomon Islands Odonata is given below.



Literature review of the Odonata of the Solomon Islands

Before beginning with the literature review an important consideration must be made. It relates to the political and geographic status of the Solomon Islands. As they may cause confusion in future work, a short explanation is provided here. Figure 1 represents the geographical situation of the entire Solomon Islands archipelago. It is a group of more than a thousand islands situated NE of Australia within a group known as Melanesia. Presently the islands are divided between two countries – Bougainville Island belongs to Papua New Guinea while the rest of the islands form the nation Solomon Islands (marked by two red lines). The literature review is prepared for the nation Solomon Islands and thus only the political borders were taken into account when extracting the data from the previous studies.

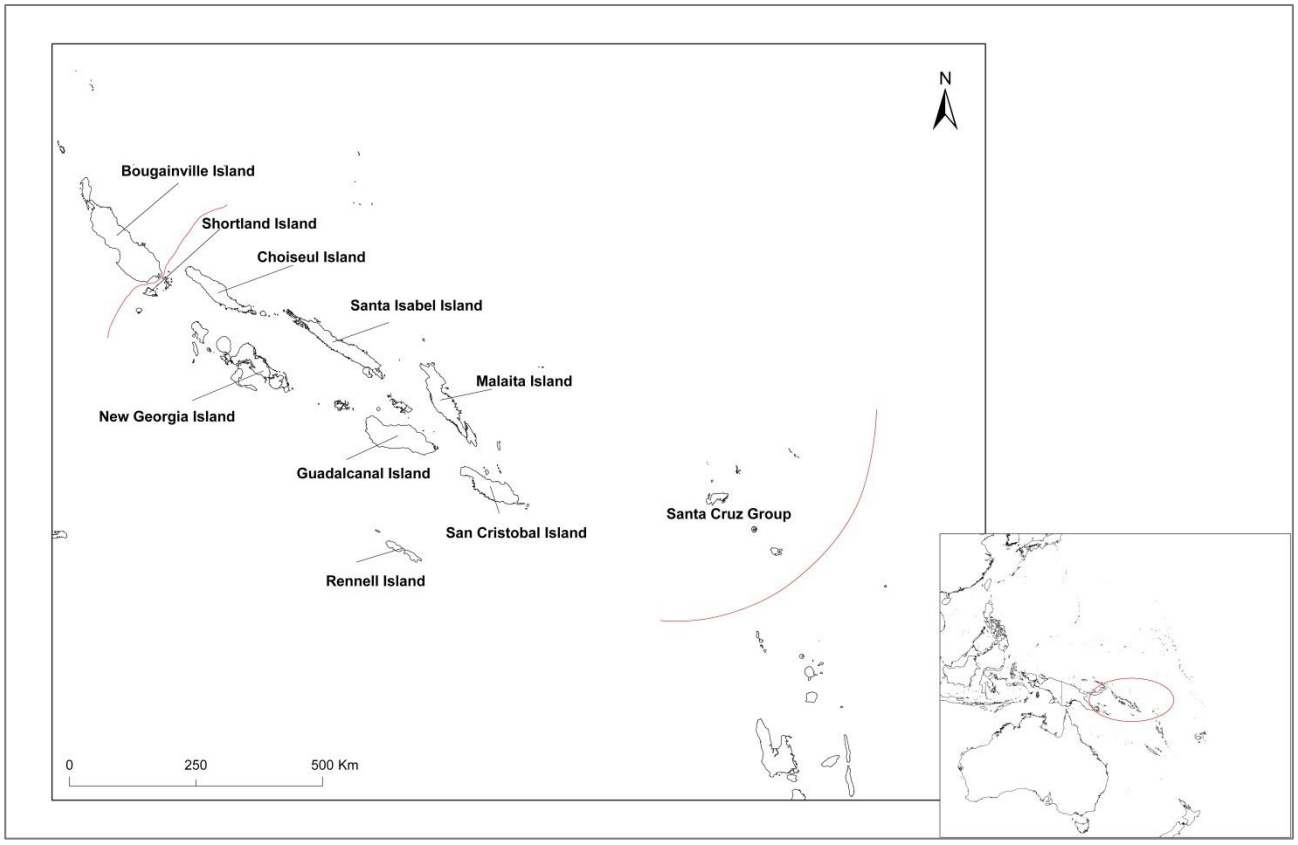


Figure 1. General situation of the Solomon Islands representing the main islands within the archipelago. Red lines outline the political borders of the country Solomon Islands.

Table I (see appendix) represents the chronology of the Odonata species checklist of the Solomon Islands. Species are given with full references to their original publication name and locality (verbatim according to the literature source) and page number. All new species described from the Solomon Islands are marked with an "*". If the species was sampled from multiple places, the verbatim locality is given for the type only or for the top locality from the list. The occurrence in other localities is indicated with "#".

Selys (1886) appears to be the first recorder of the Solomon Islands Odonata fauna. One species new to science is reported with no specific locality. Kirby (1889) added another three taxa, two of which (one species and one subspecies) were new to science. He also made a short comment regarding "... a long series of a species which appears to be identical with *Neurothemis innominata*, Brauer, which Brauer subsequently regarded as a form of *N. oculata*." (Kirby 1889: 322). Apparently Kirby wanted to deal with those specimens should more material become available. Unfortunately the subsequent literature lacks any information about them. Both *N. innominata* Brauer, 1867 and *N. oculata* (Fabricius, 1775) are synonyms of the widespread (see below) *N. stigmatizans* (Fabricius, 1775). In one of the subsequent studies over the region Förster (1898) reported two new taxa for the country with *Agrionoptera similis salomonis* as new to science. The later is, however, considered a synonym of *A. insignis similis* Selys, 1879 and thus included in Table I under this name.

The next contribution was that of Ris (1909-1919). In the very detailed work on family Libellulidae from Selys' collection he provided identification keys to species/subspecies level, illustrated new and little known species, synonymised various taxa and described a number of taxa new to science. Eight of the species included in his monograph are reported as collected from Solomon Islands with three of them new for the archipelago. While compiling the data for his monograph Ris came across a female *Camacinia othello* Tillyard, 1908 that had remained unnoticed in the Selys collection. He consulted the validity of his identification with Tillyard who subsequently published it relating the whole story of the discovery of this specimen (Tillyard 1910). The same female was later included in Ris (1909-1919) and is one of these eight species reported above, however Tillyard (1910) takes the priority as the discoverer of the species for the Solomon Islands and is thus included in Table I. Ris (1909-1919) introduced two new taxa – *Diplacodes remota* and *Rhyothemis phyllis marginata*. However, only the second name is considered in Table I as new to the country because the other species is a junior synonym of *D. trivialis* (Rambur, 1842). The type series of *R. p. marginata* included specimens collected not only from the Solomon Islands. In fact the holotype male originates from Mioko, Bismarck Archipelago, but in Table I an asterisk is given for the specimen collected from the Solomon Islands as well, to denote that it belongs to the type series.

Another holotype from the Solomon Islands was published by Campion (1924) and recalled from the type locality by Kimmins (1934). Cowley (1937) illustrated penes of Chlorocyphidae and presented three specimens sampled from the Solomon Islands. They belong to two different taxa (Table I) which were individually discussed in the subsequent studies by Lieftinck (1938; 1949a, b).

Maurits Anne Lieftinck's work within the region of New Guinea and neighbouring islands is impressive and deserves special high admiration. His life-time contributions to the world Odonata fauna were summarised in van Tol (1992). Additions to the

Solomon Islands Odonata were made in a number of papers spanning a long period from 1932 till soon after his death in 1985. Then Jan van Tol (Leiden Museum, The Netherlands) compiled some of Lieftinck's last records and published five new species as well as discussing the validity of several others (Lieftinck 1987). Other people contributed towards Solomon Islands Odonata during the same period, but for a better appreciation of Lieftinck's significant contribution, the next paragraph is dedicated to his inspiring achievements. The chronology of the new additions to the Solomon Islands Odonata fauna is shown in Table I. Here an overview of the main contribution is prepared. Also, short comments on taxa not included in Table I as well as doubtful records are discussed.

M. Lieftinck introduced a total of 39 new species for the country, which is about 61% of the 64 species known so far (Table I). Nearly half of those described from the Solomon Islands were in fact new to science. *Teinobasis emarginata* sp. n. is the only species new to science not included in Table I. Lieftinck (1949a) described it based on one juvenile female and Lieftinck (1987) later synonymised it with *T. aluensis* Campion, 1924 – a species described from the Solomon Islands. *Gynacantha mocsaryi* Förster, 1898 is removed from the Solomon Islands checklist. It was reported twice. Lieftinck (1949a) included it in a table that summarised Odonata fauna of the region. This record is most probably based on Lieftinck (1949b) where he reports it from the Bougainville Island, which is in fact part of Papua New Guinea.

Lieftinck's work was mainly focused on the neighbouring island of New Guinea and commenced with Lieftinck (1932). New additions to the Solomon Islands' fauna were first reported in 1949. This is the year when two considerable contributions were published. The chronology chosen here follows the fact that *Rhinocypha liberata* Lieftinck, 1949 was described in the final paper on the New Guinea series (Lieftinck 1949a) and mentioned again in the consecutive study dedicated to the Bismarck Archipelago and the Solomon Islands (Lieftinck 1949b). However, Lieftinck must have already had most of the specimens with him while working on both papers, because his Catalogue of the Odonata of the Papuan region (Lieftinck 1949a) lists species introduced as new to the country Solomon Islands in Lieftinck (1949b). The latter paper was selected as the original source for new data for the country because the Catalogue was most probably compiled based on the geography of the region and not on the political borders.

Two of the species new to the country introduced by Lieftinck need some clarification. Lieftinck (1949b) was not certain about the correct identification of *Ceriagrion erubescens* Selys, 1891 because the two males that were available for study lacked their terminal segments. The same species was later confirmed for the country (Polhemus et al. 2008); however, it is now considered a synonym of *Ceriagrion aeruginosum* (Brauer, 1869) which is the name preferred in Table I. *Orthetrum sabina* (Drury, 1770) was reported as new to the country (Lieftinck 1949b) long before the taxonomic re-

vision that resulted in erecting a new species *O. serapia* Watson, 1984 which is very closely associated with *O. sabina*. Both species occur in Table I for the moment, the reason being their sympatry in several parts of their ranges (Watson 1984). Their status in the Solomon Islands remains unclear for now.

Alongside new species, Lieftinck described new taxa that were not identified properly because of the state of preservation of the original specimens, difficulties usually associated with immature specimens or taxonomic uncertainties at the time of study. All those taxa are presented in Table II (see appendix) with short explanations, which in fact give incentives for further studies on these interesting taxonomic issues.

Similar taxonomic uncertainties and controversies are commonly found in the literature published on the odonate fauna of the Solomon Islands. Kimmins (1957) reported 14 taxa three of which were new to science and included a teneral female *Lieftinckia* ? sp. which was damaged. Kimmins (1959) gave data on another 12 taxa, three of which were new to the country (Table I), three sampled as larvae only (Zygoptera, Aeshnidae, Libellulidae) and *Agriocnemis* sp., a teneral male without terminal abdominal segments. Kimmins (1959) was also not certain of the correct identification of a female *Hemicordulia oceanica* Selys, 1871. This species is included in Table I because it was later reported for the same locality, Lake Tegano, Rennell Island by Lieftinck (1968). However, its status requires confirmation because these records predated the description of the morphologically similar *H. hilaris* Lieftinck, 1975. In the discussion associated with this description Lieftinck (1975) questioned all previous *oceanica* records from Fiji, Tonga and Samoa suggesting their inclusion within the newly erected species *hilaris*. He also excluded *oceanica* from Bougainville Island believing that species' main distribution is within the Society Islands (French Polynesia). However, no comments on the specimens from Rennell Island were provided.

Data on the Odonata of the Solomon Islands after Lieftinck's and Kimmins' studies diminished considerably. Records are scattered amongst: 1) revisions on particular taxa: *Tramea eurybia*-group (Watson 1967), family Isostictidae (Donnelly 1993) and genus *Argiolestes* (Kalkman 2008); 2) general odonatological studies over the Pacific (Lieftinck 1962, Donnelly 1987); and 3) analysis of the freshwater biotas of the country (Polhemus et al. 2008). Collectively those studies added six new species to the country with three new to science.

Polhemus et al. (2008) deserves special attention. It is the last thorough limnological study over a vast area covering much of the country. Although not the main study subject, Odonata were sampled with special attention as being representative of the areas of freshwater endemism in the Solomon Islands. At the same time it is the first compilation of an Odonata species checklist for the country including Bougainville (Papua New Guinea). A total of 63 taxa were included, which is compatible with what is presented here in Table I. *Argiolestes bougainville* Kalkman, 2008; *Lieftinckia kimminsi* Lieftinck, 1963; *Gynacantha mocsaryi* Förster, 1898 and *Rhyothemis resplen-*

dens Selys, 1878 were previously reported from Bougainville only and thus not included in Table I. *Rhyothemis regia juliana* Lieftinck, 1942 is missing in Table I because Polhemus et al. (2008) included this species with its general distribution only, which makes it difficult to assess whether this record comes from Bougainville Island or other parts of the Solomon archipelago. Originally *R. r. juliana* was described from North New Guinea (Lieftinck 1942). Four taxa included in Table I are missing in the checklist compiled in Polhemus et al. (2008): *Rhinocypha tincta semitincta* Selys, 1869, *Camacinia othello* Tillyard, 1908, *Nannophya pygmaea* Rambur, 1842 and *Orthetrum serapia* Watson, 1984.

Assessing the areas of endemism Polhemus et al. (2008: Table 6) reported a total of 14 Odonata taxa. At least three more species (*Anaciaeschna melanostoma* Lieftinck, 1949; *Eusynthemis frontalis* Lieftinck, 1949 and *Guadalca insularis* Kimmins, 1957) known from Guadalcanal Island only are potential candidates for this table as representatives of Area 4. **Guadalcanal**. On the other hand, *A. bougainville* is reported as representative for two areas: Area 1. **Bougainville + Buka + Shortland Islands** and Area 3. **New Georgia Group**. Such classification does not make sense and the species must be deleted from Area 3, because it was described from Bougainville Island (Kalkman 2008).

One last discussion point on Polhemus et al. (2008) is associated with the colour photos given for selected aquatic insects. This is the first time that photos of Solomon Islands Odonata have been published. A total of 16 species are portrayed which is a good starting point for every beginner with the Solomon Islands species. Three of them (two new to science and one unidentified) are presented with their genus names only. As not all of them were sampled during the present study, here only one important issue could be raised. This is related to Figure 47 (page 88). It is supposed to represent *Neurothemis terminata* Ris, 1911, however this species has never been reported from the Solomon Islands. Neither is it included in the species checklist in Polhemus et al. (2008). Moreover, the main distribution of N. terminata is Sundaland and the Philippines (Orr 2005) and the wing pattern is much different from that displayed on the above mentioned figure. The photo in fact shows a male of *N. stigmatizans bramina*.

Two recent publications shaped the final checklist of the Solomon Islands Odonata presented in Table I. Michalski (2012) is an exhaustive more than 20-year study during which the author succeeded in tracking down every record for all 620 published species inhabiting the entire Papuan area. The region is defined as the island of New Guinea and all of the surrounding islands within the 200 m isobath, the Bismarck Archipelago, the Solomon Islands and islands within the Maluku group. This work is recommended to everyone interested in the odonates of this part of the world as Michalski succeeded in putting together important diagnostic features accompanied by a great number of original and previously published figures. This compilation ful-

fils the long-felt need for an easy access reference to the large volume of material published so far. In the second paper Kalkman & Theischinger (2013) raised subfamily Argiolestinae to family level and revised all genera included in it. In this revision four new genera were described and two previously proposed generic names were redefined. That resulted in a new rearrangement of the generic names of the two species described by Kalkman (2008) from the Solomon Islands (Table I).

It is evident that there are still many points of contention, uncertainty and faunistic gaps in the knowledge of the Odonata of the Solomon Islands. Therefore, any new data on the fauna of the region is very important and new studies must be encouraged. The present paper makes a small contribution to the faunal research on this Pacific archipelago. It aims to provide a species list for the visited places and hopes to clear up some taxonomic issues encountered during species identification.

Material and Methods

The material for this study was collected from one island only – Guadalcanal Island, Solomon Islands. A short geographic description is presented from Whitmore (1969).

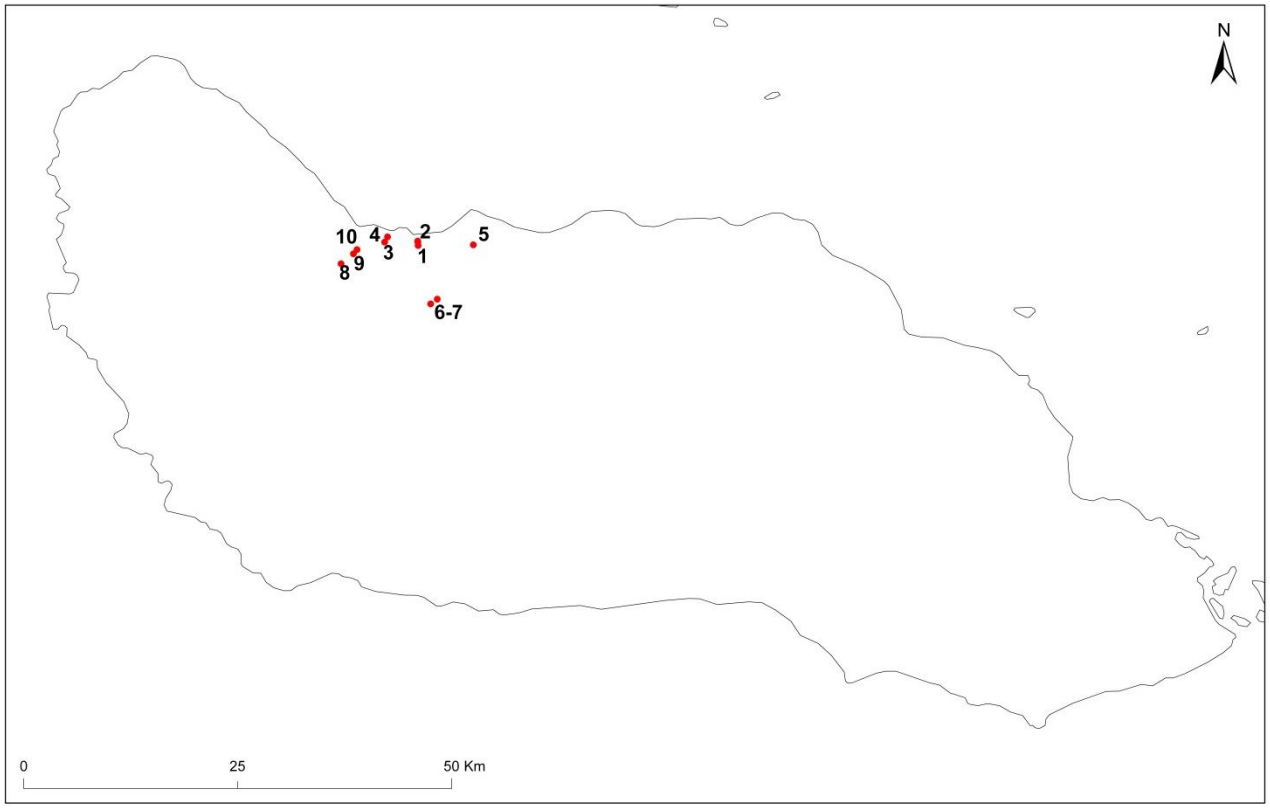


Figure 2. Sampling locations for Odonata on Guadalcanal Island.

The Solomon Islands archipelago (Fig. 1) is a recent geomorphological formation dating from the Pliocene at the latest. Only Guadalcanal and Bougainville islands have extensive coastal plains. Elsewhere the mountains rise directly from the sea and the rivers run swift and cold. The interior of the islands is characterised by steep, unstable ridges and peaks.

The Solomon Islands are amongst the wettest places in the humid tropics, and the climate may be described as tropical maritime. Mid-April to mid-May is when the SE Trade winds move north and this is associated with regular rain-bearing winds over the Solomon Islands. About August-September the season gradually changes. The SE Trade winds are replaced by equatorial air masses moving southwards. For the rest of the annual cycle the winds are irregular, blowing from various directions.

Very occasionally cyclones reach as far north as the Solomon Islands in the early months of the year and cause huge damage.

Guadalcanal Island (Fig. 1 and 2) was visited between 24 April and 03 May 2012 in relation to the IUCN Pacific Islands Species Forum, Honiara 25-27 April. Opportunistic field samples of adult Odonata were also taken. They were netted and preserved in 90% ethanol. Specimens were later dried at air temperature and kept in paper envelopes. Below is a list of the sampling localities, which are mapped on Figure 2:

1. Bulaia Backpackers 3 (9.4439°S, 159.9746°E; 57 m a.s.l.): 26-29 April.
2. Roadside ditch below Bulaia Backpackers 3 (9.4392°S, 159.9742°E; 20 m a.s.l.): 28-29 April.
3. Salapuka River in the Honiara Botanical Garden (9.4363°S, 159.9417°E; 21 m a.s.l.): 28 April.
4. Pool within the Honiara Botanical Garden (9.4363°S, 159.9417°E; 20 m a.s.l.): 28 April.
5. Rice fields and flood of the river by the Betikama College (9.4431°S, 160.0326°E; 17 m a.s.l.): 29 April.
6. Lunga River at the end of Manosten Rd, Barana Village area (9.5053°S, 159.9877°E; 40 m a.s.l.): 30 April.
7. Tributary of Lunga River; at the time of visit this was dried out with a small puddle remaining on the site (9.5002°S, 159.9947°E; 35 m a.s.l.): 30 April.
8. Kovi River above Kongulae Village (9.4610°S, 159.8936°E; 251 m a.s.l.): 01 May.
9. The track above Kongulae Village on the way to Kovi River (9.4524°S, 159.9064°E; 126 m a.s.l.): 26 April and 01 May.
10. River by Kongulae Village (9.4482°S, 159.9104°E; 99 m a.s.l.): 01 May.

Results

Annotated faunistic list

The checklist presented below includes all information that was found useful for identification of species endemic to the Australia-Papuan region only. The data on the general species distribution mainly follows Theischinger & Hawkins (2006) unless otherwise specified.

New species for the country are marked with an "*".

Chlorocyphidae

1. *Rhinocypha liberata* Lieftinck, 1949
   Locality: 8.
   Lieftinck (1949a) makes a very detailed description, but figures only the penis of the holotype male. However, he points out the similarity of the body colour pattern in lateral view between *R. liberata* and *R. tincta semitincta* Selys, 1869 which is illustrated in his earlier publication (Lieftinck 1938).

   The female remained unknown after the original species description, but was discovered during the present research. It will be described separately together with other specimens sampled from Papua New Guinea.

Figure 3. Kovi River showing a typical *Rhinocypha liberata* habitat.

Figure 4. *Rhinocypha liberata*: a) immature female sitting high above the stream, b-c) perching positions of males – on a twig hanging down towards the water and on vegetation facing head down towards the stream.

During the present study the species was found at a forested stream of about 3.5 m width with near total vegetation cover (Fig. 3). Individuals were active at about 87% humidity and air temperature of 26.5°C. Immature females (Fig. 4a) were mainly observed on plants high above the stream, out of net range. Males were selecting perching sites by the bank or directly over the stream (Fig. 4b). They preferred end branching twigs of dead wooden debris and often perched with their heads down towards the water surface (Fig. 4c).

R. liberata is reported from Ugi and Guadalcanal islands. The species is also known from New Britain (Michalski 2012).

Lestidae

2. *Lestes concinnus* Hagen in Selys, 1862*
   Locality: 5.

   All collected specimens and observed individuals were found among tall grass vegetation adjacent to the rice field at the above mentioned locality. They were aggregated in patches where the plants were cleared or trampled, so forming open areas. Adults preferred lower parts of the stems as perching position and were encountered on plants spaced apart at a distance of about 10-20 cm.

   L. concinnus is reported for the first time from the Solomon Islands. It is distributed from India through SE Asia and Australia to New Caledonia.

Disparoneuridae

3. *Nosoticta salomonis* (Selys, 1886)
   Localities: 3, 6, 7, 8, 9.

   During the current study *N. salomonis* was found to be common along streams and rivers of various sizes. It was more abundant at shaded, 3-6 m wide streams, but was encountered at sunny sites at the banks of larger rivers (more than 70 m in width). Adults typically hovered even when in tandem. All solitary individuals by the water were males. They chose various substrate types as perching sites including boulders in the stream channel (Fig. 5). However, most of the individuals were observed on end branches of twigs hanging over the water surface. Adults mainly kept themselves near shaded vertical slopes of the stream banks. Copulation was observed at the same type of places. Males dispersed inside the forest up to 3-4 m away from the stream or occupied narrow tributaries (1-1.5 m wide) of the main river. Occasional individuals were observed over ephemeral forest puddles more than a kilometre from the nearest water source.

   N. salomonis is widely distributed within the Solomon Islands. It is reported from Choiseul, Santa Isabel, Malaita, Guadalcanal, New Georgia and Makira islands. The species also occurs in Papua New Guinea (Lieftinck 1949a).

Figure 5. *Nososticta salomonis* male perching on an in-stream boulder.

Coenagrionidae

4. *Agriocnemis femina* (Brauer, 1868)
   Localities: 2, 4, 5, 7.

   One of the most abundant species during the study. It was encountered along the emergent vegetation of streams, bank side floods and pools and grass vegetation of the adjacent terrestrial areas (Fig. 6). No specific field observations were taken on this species.

   A. femina has a wide distribution within the Solomon Islands ranging from Rennell Island to San Cristobal. No doubt it will be found in every island of the archipelago. It occurs from India to the western Pacific and Australia.

Figure 6. *Agriocnemis femina* male among the grass vegetation.

5. *Agriocnemis pygmaea (Rambur, 1842)*
   Locality: 2 (28 April).

   Only one male was collected during the present research. It is considered an accidental species for the above mentioned locality as no further individuals were encountered during the consecutive visits. Therefore no habitat or behavioural characteristics are given here.

   A. pygmaea has been recorded only from Guadalcanal within the Solomon Islands, but probably has a much wider distribution because it is given as occurring in Asia, Indo-Australian Archipelago and Pacific.

6. *Ischnura heterosticta* (Burmeister, 1839)
   Locality: 5.

   This species was observed only in a side canal that runs parallel to a rice field. Its banks were very densely vegetated with tall emergent plants leaving a narrow area inside for the slow flowing water. Adults were sampled from the edge of the vegetation just above the water.

   Surprisingly *I. heterosticta* has been previously recorded only once from Malaita (Polhemus et al. 2008). The species ranges widely from Eastern Indonesia and Australia to the Pacific where it was recently re-confirmed for Tonga (Marinov 2012) which is by far the eastern most point in its distribution.

7. *Pseudagrion incisurum* Lieftinck, 1949
   Localities: 3, 6, 8.

   For identification of males see the original description. Lieftinck (1949b: 336-338) provides a very detailed morphological description with figures of the appendages. Females were unknown at that time and thus a description is given below.

   Head (Fig. 7): labium light yellow; mandibles light yellow at the bases becoming slightly darker midway and sharply deep red at the tips; light brownish dorsally with light yellow marking along the ventral edge; anteclypeus dark yellow; postclypeus light brownish with grey-green posterior edge; same grey-green colour dominates frontal part of the head anteriorly of median ocellus becoming light yellow towards the eyes; same yellow continues around the edge of the eyes making an almost complete circle and stops before the posterior outer corners of the occipital spots; the colouration of the area around the lateral ocelli is as follows: between them grey-green in the anterior part and dark orange at the posterior, same orange colour occupying the dorsal surface of the epicranium reaching occipital area between the lateral lobes of the head, but not going to the occipital spots; latter are grey-green with dark yellow at the posterior edges; occipital spots com-

pletely surrounded by black colour which descends at the rear part of the head; black develops also on inner areas of the lateral occeli, small spot adjacent posteriorly to the median ocellus and another spot situated in a little depression anteriorly of it; rear part of head with white pruinescence.

Figure 7. ***Pseudagrion incisurum*** **female, head (dorsal view), thorax (lateral view).**

Thorax (Fig. 7): Prothorax: mostly dark yellow with black bands running dorsally on the median lobes, descending at the border with the posterior lobe and going towards the head; posterior lobe light brown slightly erected with two black-tipped horn-like projections directed towards the head and up. Synthorax: ground colour yellow with light brown areas as follows: mesepisternum on both sides of dorsal carina and both sides of humeral suture and slightly diffuse on both sides along the second lateral suture; black lines developed along all sutures: dorsal carina completely dark, humeral suture lined up with dark which expands posteriorly to both mesepisternum and mesepimeron and same dark colour continues on the mesinfraepisternum, first lateral suture at the dorsal part and a small spot with light diffuse area around anteriorly of the suture, second lateral suture with spot at the posterior part expanding into the metepisternum. Legs yellow with black lines developed on the outer surface of all femora becoming smaller in size from front to hind and only front femora having those lines connected to the black distal spot of the femora; same pattern observed for the black area on the inner surfaces of the tibia – large and thick on the front tibia becoming less pronounced and diffused

on middle and hind ones; tarsal segments dark yellow with black tips; claws deep yellow with reddish tips; leg spines black. Wings transparent; pterostigma light yellow-brown; 15 pnq (front left), 13 pnq (hind left), 15 pnq (front right), 12 pnq (hind right).

Figure 8. ***Pseudagrion incisurum*** **male (a) sitting at a sunny spot along the bank of Lunga River (b).**

Abdomen: unicoloured almost along the whole length black dorsally and ground yellow ventrally; dark on the dorsum interrupted on S1 where a yellow spot is developed which divides the dark area S3-6 where yellow lines run up along the bases of the segments nearly joining on the top and S10 where almost the whole dark colour is replaced with orange-yellow leaving a dark line at the base of the segment; ovipositor yellow not reaching the tip of the abdomen.

During the present study *P. incisurum* was found to be a very common species in running waters. No specific habitat requirements were recorded as adults were observed on top branches of the vegetation either in shaded places of small streams (as narrow as 1m) or open sunny areas along the large rivers (Fig. 8). Solitary individuals of both sexes were encountered near the water of natural biotopes and single individuals also came to man-made ditches and roadside floods. Copulation was observed by the water.

P. incisurum is endemic to the Solomon Islands where it is reported from Guadalcanal and Choiseul islands only.

8. *Pseudagrion microcephalum microcephalum* (Rambur, 1842)
Localities: 2, 3.

Lieftinck (1932: 574-575) compares this species with other congenerics from the Papuan region and also Lieftinck (1949b: 340) illustrates male appendages of a specimen from Russell Island, Solomon Islands. Those are considered as belonging to the nominate subspecies as another subspecies, *P. m. stainbergerorum* Marinov, 2012, was recently described from Tonga.

P. m. microcephalum was observed only among high emergent bank vegetation. Adults were not seen flying inside streams. They always stayed near wet areas by the bank. However, no individuals were collected from the two sites with standing waters (Localities 4 and 5). *P. microcephalum* was perhaps overlooked at Locality 5 because the rice field area with floods, canals with no visible surface flow and densely vegetated rice pools offer a great variety of lentic habitats for this species to develop. Surprisingly *P. m. microcephalum* was not abundant in the two localities reported here and only single individuals were encountered from them.

P. m. microcephalum has been reported from Rennell, Russell, Guadalcanal and Malaita islands. Outside the Solomon archipelago it is distributed widely in India, SE Asia, Indonesia, New Guinea, Australia and Vanuatu.

9. *Teinobasis bradleyi* Kimmins, 1957
Locality: 8.

Kimmins (1957) figured anal appendages and thoracic pattern of the males. The female was unknown at that time. Only males were collected during the present study.

Females were observed in tandems sitting high in the trees and out of reach. By visual impression from a distance, both sexes were very much alike in colour and solo females should be easy to be associated with their males should they be discovered in the near future.

T. bradleyi was a common species in the only locality where it was observed. By the water adults liked high perching sites which were often out of reach even with the extension of the net. Tandems were observed up among the tree branches as well (Fig. 9). No oviposition or any other specific behavioural traits were recorded during the field search.

T. bradleyi is endemic to the Solomon Islands, reported from Guadalcanal, Santa Isabel and Malaita islands.

Figure 9. A blurry photo showing the perching position of *Teinobasis bradleyi* tandem high in the vegetation.

10. *Teinobasis rufithorax* (Selys, 1877)

Locality: 3.

This species was recorded from two males only. In the single locality those males were observed in completely shaded areas of the stream. They used the bank side vegetation as perching substrate.

T. rufithorax has a wide distribution within the Solomon Islands ranging from Shortland to Rennell islands. It also occurs in Australia, SE Indonesia and New Guinea.

11. *Xyphiagrion cyanomelas Selys, 1876*
Locality: 4.

Only one immature specimen was collected. No specific behavioural characteristics were observed.

X. cyanomelas was previously reported from various islands between New Georgia and Rennell. It is a common species in the Papuan region.

Aeshnidae

12. *Agyrtacantha browni Marinov & Theischinger, 2012*
Locality: 9 (26 April).

Lieftinck (1937) proposed *Agyrtacantha* nom. nov. to accommodate two previously described and one new species. He also provided a key to distinguish between the closely related *Agyrtacantha*, *Gynacantha* and *Plattycantha* (Lieftinck 1937: 58-59). *A. browni* is a new species collected during the present study. For its identification and relationships check Marinov & Theischinger (2012).

One male was collected only during a night walk on a bush track. It came to the torch and landed on the chest of a member of a small herpetological team (R. Brown leg.).

A. browni is so far known from one male specimen collected from Guadalcanal Island.

13. *Anaciaeschna* ? *melanostoma* Lieftinck, 1949
Locality: 5.

Lieftinck (1949b) described and illustrated the appendages of this species from one subadult male specimen. No other specimen has ever been collected since. He proposed that colour pattern (dark front of head, dorsal incomplete antehumeral spots, reduced breadth of mes- and metepimeral bands, wings deeply stained with golden yellow, and reduced light spots on the abdominal segments) rather than structural characteristics can be used for separating *melanostoma* from its closely allied *jaspidea*.

In the present study only one subadult female, which can not be identified with certainty, was collected. It was studied for important identification features given for *melanostoma* and was compared to specimens identified as *A. jaspidea* (one teneral male and one mature male) collected from Fiji and Tonga respectively. The present study female has the same colour pattern as the teneral male from Fiji although a full comparison can not be made because the latter is partly damaged. However, they both share features reported as diagnostic for *melanostoma*

– yellow subtriangular spots at the dorso-lateral corners of the mesepisternum (Fig. 10) which are visible even with the naked eye and the golden stain on the wings developed much stronger in the female compared to the male. Features that are not in full agreement with *melanostoma* are on the front of the head. In both female (Solomon Islands) and male (Fiji) the colouration resembles to some extent, but is not in full congruence with, the deep purplish-black colouration reported for *melanostoma*. The Tongan male has its forehead light yellow and also lacks the yellow subtriangular spots on the mesepisternum. No significant differences were observed in the lateral thoracic bands between specimens from the three regions – Solomon Islands, Fiji and Tonga. All those variations obscured the final identification and the female is presented here with a question mark.

Figure 10. *Anaciaeschna* ? *melanostoma*, immature female showing the yellow marking at the dorsal mesepisternum.

This species was very abundant in the tall grass area by the rice field. This habitat was a difficult one in which to sample because of the thickness and height of the stems. Adults were very well concealed among the vegetation. When scared they flew away for more than 10 m and dived towards the bottom of the vegetation, disappearing out of sight. It is unclear if their activity changes towards the end of the day because the site was not investigated at dusk. *A. jaspidea* is very often reported as a crepuscular species.

A. melanostoma is endemic to the Solomon Islands. It was originally reported from Guadalcanal and has never been sampled since.

14. *Anax* sp.
Locality: 5.

Only patrolling adults were observed above the rice fields (Fig. 11). Correct species affiliation was impossible to establish in flight. Two species from the genus, which have wide distributions within the Pacific, are the most likely candidates: *A. gibbosulus* Rambur, 1842 and *A. guttatus* (Burmeister, 1839). According to previous records their areas largely overlap, which makes the precise identification even more difficult. Donnelly (1987) recorded *Anax* cf *gibbosulus* from Guadalcanal and that is the only previous data for any representative of the genus for the Solomon Islands.

Figure 11. Rice field by the Betikama College – a biotope for *Anax* sp. and several other Odonates.

15. *Gynacantha amphora* Marinov & Theischinger, 2012
Locality: 9 (26 April).

For genus/species identification see the introductory paragraph for *A. browni* and original species description.

A single male was collected during a night walk on a bush track. It was picked up from a leaf in the forest. For further details check Marinov & Theischinger (2012).

G. amphora is so far known from one male specimen collected from Guadalcanal Island.

Gomphidae

16. *Ictinogomphus australis lieftincki* Schmidt, 1935
Locality: 3.

Schmidt (1935) included this newly proposed taxon in an identification key and provided illustrations on body colour pattern. Lieftinck (1942) highlighted characters that distinguish *I. a. lieftincki* from its Australian counterpart *I. a. australis* (Selys, 1873).

Only two males were collected from a section of the stream with mixed shadow. Both were sitting on the tip of a dead branch that had fallen into the stream.

I. a. lieftincki is reported from Rennell and Guadalcanal islands only, but probably is distributed everywhere within the Solomon archipelago. It occurs also in Maluku and Papua New Guinea (Lieftinck 1942).

Libellulidae

17. *Agrionoptera insignis similis* Selys, 1879
Locality: 7.

Figure 12. *Agrionoptera insignis similis* male sitting on a green leave.

Three male specimens were collected only at one locality. They were discovered in the shade of a tributary of the main river which was nearly dried up at the time of the visit. Individuals were sitting on green leaves (Fig. 12) or at the top branches of dead trees fallen at the bottom of the small and narrow valley formed by the tributary.

Previous *Agrionoptera* records from the Solomon Islands are commented on in the Discussion. Lieftinck (1942) listed islands from E Indonesia and New Guinea as part of the extra-limital distribution of *A. i. similis*.

18. *Brachydiplax duivenbodei* (Brauer, 1866)
Locality: 4.

Observations of this species were only made at this pool. No adults were found away from the water. Males were encountered at various sites around the pool (Fig. 13). They selected mainly sunny spots and perched directly on the floating plants, but would fly to the shaded area as well. The flight was weak with very frequent pauses to hover. No aggressive behaviour between males was recorded in spite of the high density over the water surface. Females oviposit non-contact guarded by the males.

B. duivenbodei was previously known from the Solomon Islands from just two males collected on Guadalcanal Island (Lieftinck 1949b). In its extra-limital distribution the species ranges to New Guinea, Indonesia and Philippines.

19. *Diplacodes trivialis* (Rambur, 1842)
Localities: 2 (29 April), 3, 5, 6.

This species was discovered in various habitats ranging from sunny shallow roadside ditches and pools to the banks of the Lunga River – the largest river visited during the survey. However, it is unclear as to what constitutes a good habitat for the species because adults were not abundant at any of the sampling localities. Away from the water *D. trivialis* was mostly found among the sparse low grass vegetation. Individuals fly to the bushes, but open sunny areas were preferred and those were the places where the species was mostly recorded.

D. trivialis has been recorded only from Guadalcanal and Sikaiana islands from the Solomon archipelago, but probably has a much wider distribution. It inhabits territories as far as Fiji, Japan, Australia and the Seychelles.

Figure 13. Perching sites for *Brachydiplax duivenbodei*.

20. *Lathrecista asiatica festa* (Selys, 1879)*
Locality: 5.

A single male was sampled from the grass area beside the rice field. It was selecting the top of the tall (more than 1.5 m high) vegetation. It was staying at the edge of the grass field and did not enter the densely overgrown area. No other individuals were found inside the grasses in spite of intensive search. *Lathrecista*-like males were observed, but not collected by the water of the rice fields. They were perching on the top of single green stems situated low at the ground level. This was in contrast to the observation on the single male *L. a. festa* and thus it is unclear if they belonged to the same or different species.

L. a. festa is reported for the first time for the Solomon Islands. This subspecies is also distributed in New Guinea and nearby islands and New Caledonia (Davies 2002).

21. *Neurothemis stigmatizans bramina* (Guérin-Méneville, 1832)
Localities: 2, 3, 4, 5, 6, 7, 8, 9 (01 May).

N. s. bramina is the only taxa from the genus given for the Solomon Islands and was commonly observed by a number of researchers. Therefore by inference all *Neurothemis* individuals should have been assigned to this subspecies. Indeed, all males (Fig. 14) collected during the present study were consistent with this subspecies' description.

Figure 14. *Neurothemis stigmatizans bramina*, male.

Females, however, posed certain problems. Ris (1909-1919) illustrated the wing pattern of two forms named *isochrome* and *heterochrome*. Both were discovered aggregated in locality 6 presented above (Fig. 15). A third female form was also sampled in various places including the same locality. Its wing pattern differed substantially from the other two forms, but more closely resembled the male wing pattern in extent of the colour and venation (Fig. 16). Overall body structure (as size and body parts ratios) of that female form was also in greatest conformity with the *N. s. bramina* male. Figure 17 compares specimens of various ages from both sexes collected during the present research. No new name for this form is proposed here. Its correct affiliation and taxonomic position must be decided after additional field work on behavioural observations and taxonomic comparisons with specimens collected from Solomon Islands and New Guinea.

Figure 15. *Neurothemis stigmatizans bramina*, females: a) heterochrome, b) isochrome.

Figure 16. *Neurothemis stigmatizans bramina*, male and female. Note the similar colour pattern on the wings.

Individuals identified as *N. s. bramina* were some of the most commonly discovered in any location by the water. Adults preferred sunny sites, cloudless sky and high temperatures. By the water they arrived and were active at about 28.0°C and above and tended to disappear with the first signs of bad weather – decrease in temperature and cloud build-up. Males occupied territories by the water surface selecting predominantly emergent green stems or bank grass vegetation. Females were very abundant among the clusters of tall grasses away from the water. Assemblages of mature individuals were common at distances of about 650m to more than a kilometre away from any suitable larvae habitat. Males were scarcer at such sites.

N. s. bramina has been reported from all over the country. It occurs also in New Guinea and neighbouring islands through to Vanuatu.

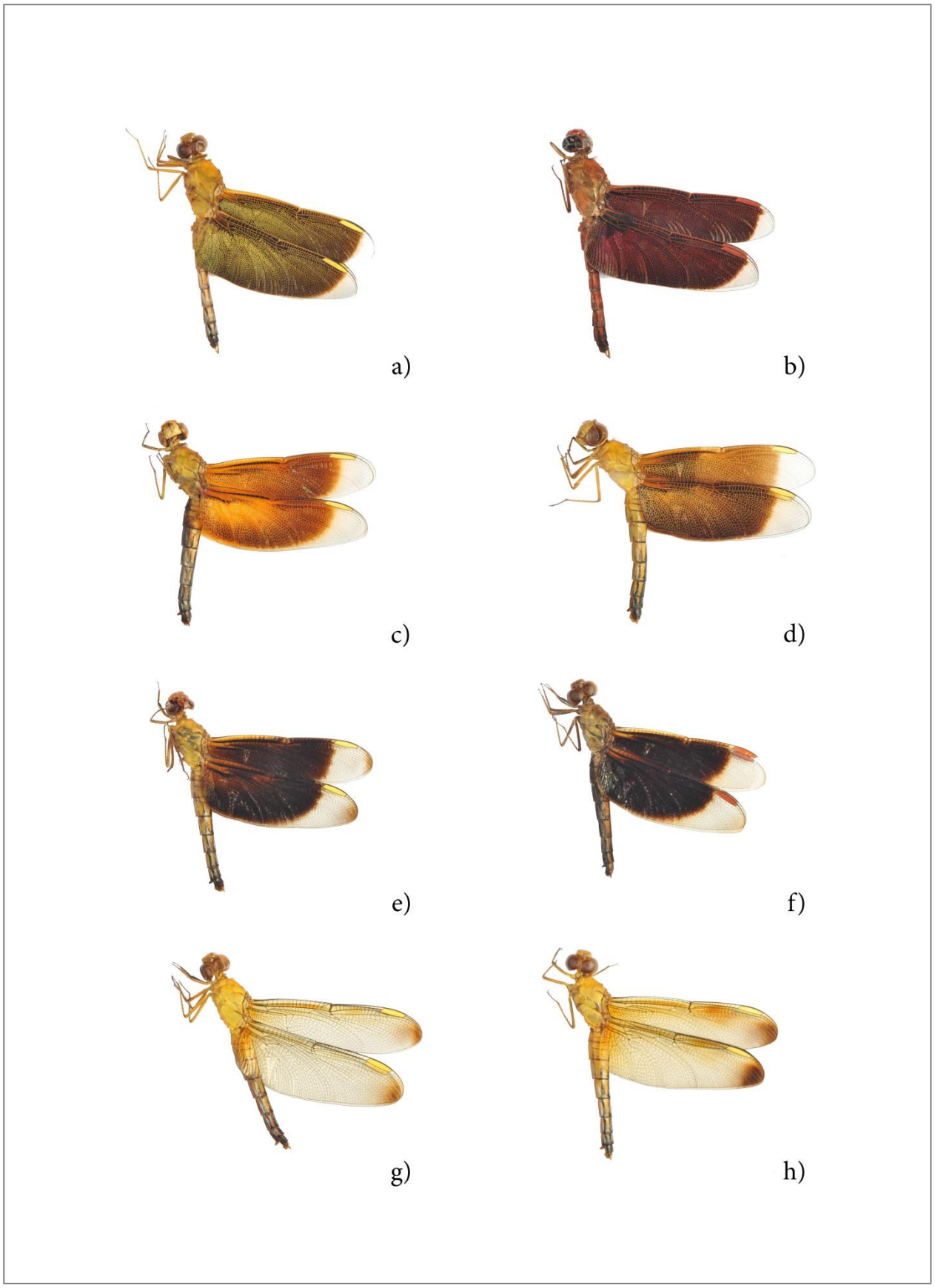


Figure 17. Comparison between immature (a, c, e, g) and mature (b, d, f, h) *Neurothemis stigmatizans bramina*: a-b) male, c-d) unknown female form, e-f) isochrome female, g-h) heterochrome female. All forms and ages are given by supposition.

22. *Orthetrum serapia* Watson, 1984
Localities: 2, 4, 5, 6.

Very common species in all localities. Adults choose various perching substrates, but mostly dead grass stems by the water edge (Fig. 18). Although observed in several localities oviposition was recorded only in the pool in the Botanical garden.

Distribution records are made on the data provided in Watson (1984) only. Some *O. sabina* records prior to 1984 should probably be considered as *O. serapia*, but this must be verified with closer examination. Watson (1984) reported *O. serapia* from all over the country. Outside Solomon Islands the species is known from the Philippines to Tonga.

Figure 18. *Orthetrum serapia*, male.

23. *Orthetrum villosovittatum bismarckianum* Ris, 1898
Localities: 2, 3, 4, 6, 10.

Ris (1898) introduced *Orthetrum bismarckianum* sp. nov. with supposition that it could be another race (subspecies) of *O. pruinosum* (Burmeister, 1839). The new species decision was based mainly on the specificity of the thorax pattern. He provided morphological descriptions of other body parts as well, but no illustrations. It was later transferred as a subspecies of *O. villosovittatum* Brauer (Brauer, 1868) by Ris (1909-1919).

This is one of the first species that one would see by the water. Sunny sites by the edge of pools and floods beside streams were preferred over running waters. Adults flew low over the surface and took frequent stops on green stems overhanging the water (Fig. 19).

O. v. bismarckianum has been reported from Treasury Islands, Santa Isabel, Nggela and Guadalcanal Islands.

Figure 19. *Orthetrum villosovittatum bismarckianum*, male.

24. *Pantala flavescens* (Fabricius, 1798)
Localities: 1, 5, 6.

Very common species on the island. The three localities given here are for places where the species were most numerous with rice field as the area with highest concentration of adults.

P. flavescens has been reported for the country only from Treasury Islands and Guadalcanal, but this is probably due to the fact that previous researchers may not have recorded it considering it as a very common species. It has a cosmopolitan distribution.

25. *Protorthemis woodfordi* (Kirby, 1889)
Localities: 9 (01 May), 10.

Identification of this species may be problematic as there are no good published figures on the important morphological features. Kirby (1889) introduced the species describing the body colour, but not figuring any parts. Ris (1909-1919) provided a key to the genus and a figure of the wings only. Kimmins (1957) probably made a mistake by labelling his figure 5(a, b) as *Tapeinothemis boharti*. Figure 5a features anal appendages, which are typical of what we identified as *P. woodfordi* during the current research, while Fig. 5b represents secondary genitalia of *T. boharti*. The mistake may have happened because the figure was placed immediately after the information about *P. woodfordi* samples taken on Guadalcanal Island. For clarification male diagnostic features of both species are redrawn and attached to the information for each of them.

Figure 20. *Protorthemis woodfordi*, male: a) life size photo

Figure 20. ***Protorthemis woodfordi*****, male: b-c) secondary genitalia**

Figure 20. *Protorthemis woodfordi*, male: d) anal appendages.

Figure 20 represents a life-size photo of a male *P. woodfordii* as well as details of the secondary genitalia and anal appendages.

Two males were collected and one observed in forest. Feeding behaviour was observed at a forest clearing. The single male patrolled the area with swift flight and left it within a few seconds after its arrival. At another forested site by locality 9 the adult male was collected from above a temporary puddle where it was perched high on a tree twig.

P. woodfordi is endemic to the Solomon Islands and is reported from all over the country.

26. *Rhyothemis phyllis marginata* Ris, 1913
Localities: 1 (29 April), 2, 5, 6.

Although recorded for various places, this species was encountered mainly away from the water (Fig. 21). All records other than those at Locality 2 were collected from terrestrial areas adjacent to the water and not by the water source itself.

R. p. marginata is endemic to the Solomon Islands and is reported from Alu and Guadalcanal islands. Its range extends to Bougainville Island (New Guinea) which is geographically part of the Solomon island archipelago.

Figure 21. *Rhyothemis phyllis marginata*, male.

Figure 22. Sampling location for *Rhyothemis resplendens*.

27. *Rhyothemis resplendens* Selys, 1878*
Locality: 2 (29 April).

Two males were collected from a clearing by the road (Fig. 22) and no other individuals were observed at any of the localities visited during the field sampling. It is unclear as to what the ideal habitat is for this species.

R. resplendens is reported for the first time for the country. It also occurs in Maluku, New Guinea and Australia.

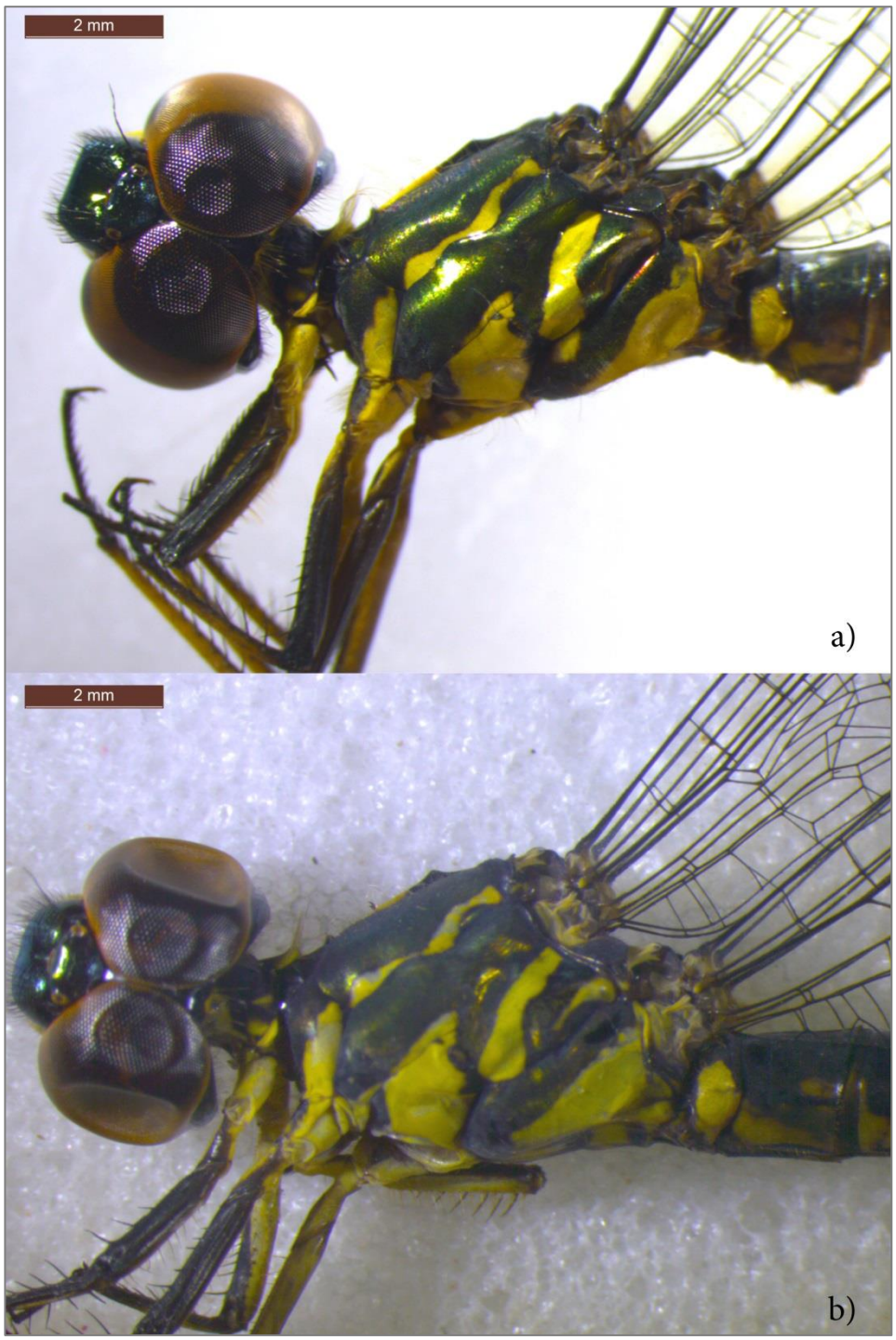


Figure 23a, b. *Tapeinothemis bohardi*: comparison between the thoraxes of both a male (a) and a female (b)

28. *Tapeinothemis bohardi* Lieftinck, 1950
Localities: 3, 8, 9 (01 May), 10.

This species was described from a holotype female. Lieftinck (1950) provided a very detailed description with illustrations on various body parts. Kimmins (1957) assigned a male allotype on the basis of a short description accompanied with illustrations of the secondary genitalia and anal appendages. For reasons explained above (cf. *P. woodfordi*) the illustrated anal appendages are believed to be of *P. woodfordi*. To avoid any confusion in future studies of the Solomon Islands' Odonata and due to the lack of representative life-sized photos of *T. boharti* a new complementary description of the male is provided below in comparison with the colour pattern of the female and featuring the important diagnostic characters of the male.

Figure 23(a-b) displays the thoracic pattern of both sexes. It shows almost no differences between females and males. A yellow spot on the metepimeron attached to the second lateral suture and lined up with the yellow band on the metepisternum is the only character typical of males and not well expressed in females, in which this spot is either completely lacking or vestigial. Kimmins (1957) commented on the pruinescence on the dorsum of the synthorax as another distinguishing feature between the sexes; however, females also have this, although much reduced compared to males. Figure 23(c-d) features male secondary genitalia and anal appendages.

Figure 23c. *Tapeinothemis bohardi*: male secondary genitalia

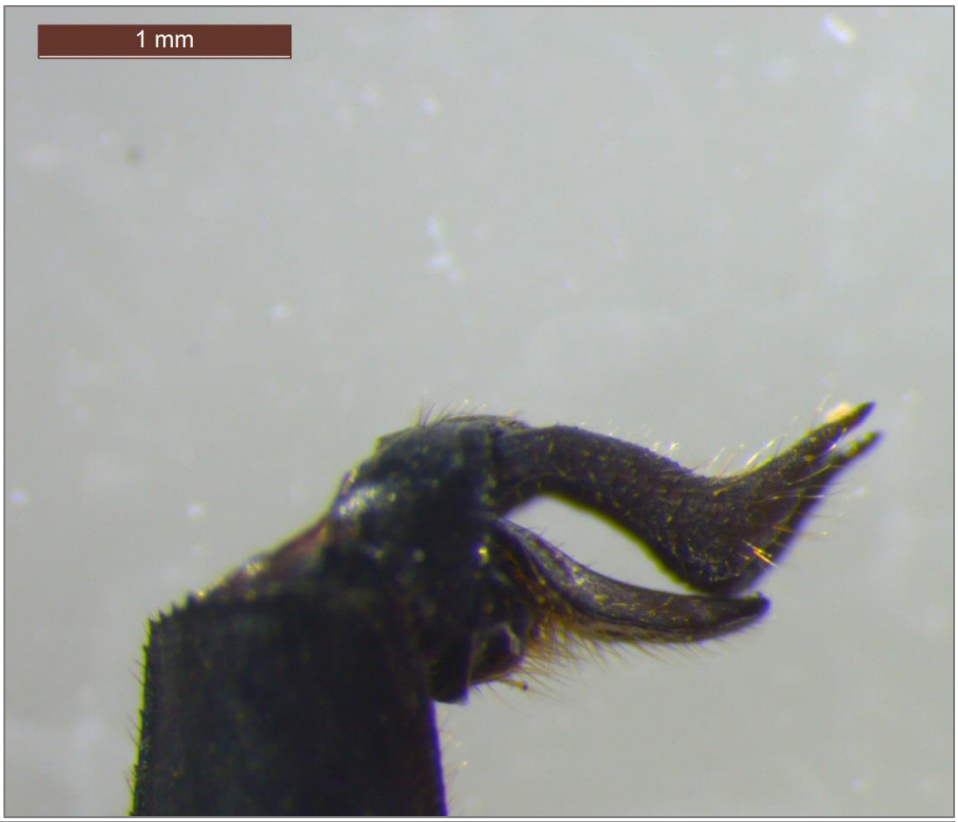


Figure 23d. *Tapeinothemis bohardi*: male anal appendages.

Figure 24. A blurry photo showing perching position of male *Tapeinothemis bohardi*.

T. bohardi was found only by narrow sections of the streams typically 1-1.5 m wide. Mostly females were observed. One male discovered during the study was collected away from the water. It was sitting on the top of a single tall stem at the edge of a forest clearing (Fig. 24). Teneral individuals fly very high among the tree canopy where they can stay out of sight.

T. boharti is endemic to the Solomon Islands and reported from New Georgia, Malaita, Guadalcanal and Little Florida islands.

29. *Tholymis tillarga* (Fabricius, 1798)
Locality: 5.

Adults were active during the day along a canal with very densely vegetated banks. They flew low over the water with very fast flight and short hovering periods. In late afternoon they started to appear by the floods beside the rice fields where they possibly stay active till dusk.

T. tillarga was reported only for Rennell Island, but probably has a much wider distribution within the Solomon Islands archipelago. Its range stretches from Africa through Australia and SE Asia to the Pacific islands of French Polynesia.

30. *Tramea liberata* Lieftinck, 1949
Locality: 5.

The original species description was not accompanied by any anatomical figures. Watson (1967) included *T. liberata* in a very detailed analysis on the species from the *eurybia*-group. The paper is richly illustrated with drawings and tables comparing the *Tramea* species including those within this group.

T. liberata was very common at the single locality given here. Adults preferred open sunny areas of the rice fields. They were often flying close to the water edge, frequently returning to the same spot.

T. liberata has been reported from Shortland Islands, Guadalcanal and Malu Paina islands. It is given also for New Guinea and New Caledonia.

Discussion

The current study proved the Solomon Islands to be an area with great opportunities for exciting odonatological discoveries. Two and a half days of effective field sampling produced a long species list with new faunistic additions to the country. A short night walk in the forest brought two new species to science (*A. browni* and *G. amphora*). A few hours spent out in an afternoon resulted in two new species (*L. concinnum* and *L. a. festa*) for the country which added one new family and one new genus to the Solomon Islands respectively. Another new species for the country (R. resplendens) was collected from the roadside vegetation. The female of one species (*P. incisurum*) was described for the first time and another female (*R. liberata*) will be described separately. The final count for Guadalcanal includes a total of eight new species to the island.

It is important to note that those discoveries were made in an area which is considered the fourth best studied region in the Pacific (New Guinea and Hawaii excluded) in terms of its Odonata fauna. The Pacific Odonata database (Marinov per. comm.) ranks Solomon Islands behind New Zealand, New Caledonia and Fiji with criteria be-

ing the number of records ever published about the area. The new additions also come from the best studied part of the archipelago. Odonata records from Guadalcanal Island surpass significantly the data from other islands. One can only imagine how much new data would have been collected should a more detailed field study have been performed over the entire country all year around!

Faunistic samples are encouraged in order to solve some interesting taxonomic questions which may have implications in better understanding the biogeography of the Pacific Odonata. Those questions are briefly discussed here with no solutions provided. With the small sample sizes and very limited access to specimens collected previously from the area, no further conclusions can be made.

Subspecies differentiation was found to be the major challenge to the taxonomy of the Solomon Islands Odonata. Different subspecies names were given for specimens collected from the same areas, which is hard to understand and makes no sense from the biogeographical point of view. This confusion was discussed by Lieftinck (1949b) who presented two subspecies, *R. phyllis marginata* and *R. p. chloe,* both collected from the same locality on Guadalcanal Island. He also suggested that possibly *R. phyllis* would be proven not as a single species with many subspecies, but rather considered as consisting of two or more full species. This discussion point has never been resolved since.

Agrionoptera species/subspecies taxonomy is another interesting study case. The synonymic list is exhaustive as the genus range is large and variations in the colouration of the thorax are great even within one oceanic archipelago. Species/subspecies affiliation inter- and intrachanged between the species almost whenever new material from the Pacific islands was brought to attention. Here is a short overview of the records from the Solomon Islands.

Kirby (1889) described *A. insularis* sp. nov. and he is the first to record this genus for the country. Kimmins (1957, 1959) reported the same taxa with subspecific rank as *A. insignis insularis*. Lieftinck (1942) made a short comment of *A. i. insularis* inhabiting the Solomon Islands, but did not report any specific locality and did not include this taxon in the key to the subspecies of *insignis*. Lieftinck (1962) reported it for the Solomon Islands as *A. papuensis insularis* and that view was shared by Michalski (2012). However, later Lieftinck (1968), analysing a collection from Rennell Island, suggested retaining it as *A. insignis insularis*.

A second taxon inhabiting the Solomon Islands was first recorded by Förster (1898). He described *A. similis salomonis*, which Ris (1909-1919) considered as a subspecies of *A. insignis* and presented as *A. i. similis*. Lieftinck (1942) followed the same opinion and included this taxon in his key for Papuan species with no new data for the Solomon Islands. Again Lieftinck (1949b) suggested full species rank for *similis* on the base of observed sympatry with other taxa reported as *A. i. papuensis* and *A. i. allogenes*. This view was revised in Lieftinck (1962) who restored the subspecific rank of *similis*,

which was later supported in Lieftinck (1968) and Michalski (2012). The same subspecies was recorded for the Solomon Islands by Polhemus et al (2008).

Lieftinck (1949b) reported another taxon from the genus as *A. insignis allogenes*, but later accepted *allogenes* as a subspecies of *A. papuensis* (Lieftinck 1962). Michalski (2012) followed this revision and since Lieftinck did not provide further taxonomic discussions on the status of *allogenes*, subspecific rank is preferred here as well.

It is clear that the taxonomy of the genus within the Papuan region is not resolved yet. Three closely related taxa, *allogenes*, *insularis* and *similis,* have been reported for the Solomon Islands. All of them were given by various authors as inhabitants of Guadalcanal, which if we accept the final view on their subspecific rank makes no sense from a taxonomic point of view. Lieftinck (1962) gives a distribution map of the subspecies within the Papuan region where *A. p. allogenes* reaches Guadalcanal as the most NE point of its range, which infers occasional invasion from Australia to the Solomon Islands. Sympatric occurrence of *A. i. similis* and *A. i. insularis* on the other hand is difficult to comprehend. Apparently species taxonomy and phylogeny within the region need further studies as to determine which diagnostic features should be considered in future studies and what are the actual outlines of the distribution areas of the subspecies.

As no any structural morphological features are provided as diagnostic for *A. melanostoma* its differentiation from *A. jaspidea* is quite arbitrary. Colour changes from teneral to adults are well known for almost every Odonata species. The description of *A. melanostoma* was based on a subadult specimen not revised during the current research, so it is unclear as to how much similar it is to our reported female specimen which is also immature. The latter, when compared to what was identified as *A. jaspidea* specimens collected from other Pacific islands, proved to be the same in the general colouration and pattern. Moreover both immature male and female shared the same arrangements of the yellow spots given as diagnostic for *melanostoma*, but differ in the colouration of the face. It looks much faded and although darker than the rest of the frons could not be considered deep purplish-black which is the characteristic given for *melanostoma*. Three possible options are envisaged here: 1) the newly reported female belongs to *A. jaspidea*, which will add another species to the country checklist, 2) *A. melanostoma* has wider distribution extending to Fiji, and 3) *A. melanostoma* should be synonymised with *A. jaspidea*. The final conclusion is not possible to be made at this stage before any other samples from the Solomon Islands are compared to the *A. melanostoma* holotype.

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Apendix

Table I. Chronological literature review of Odonata records from the Solomon Islands.

Chronological literature review of the Odonata species check-list of Solomon Islands					
No	**Verbatim species**	**Valid species name**	**Verbatim locality**	**Page**	**References**
1	*Allonevra salomonis*	*Nososticta salomonis* (Selys, 1886)*	Iles Salomon	188	Selys (1886)
2	*Nesocria woodfordi*	*Protorthemis woodfordi* (Kirby, 1889)*	Alu Island, Solomon Islands	335	Kirby (1889)
3	*Nesoxenia cingulata*	*Nesoxenia mysis cingulata* (Kirby, 1889)*	Alu	336	Kirby (1889)
4	*Agrionoptera insularis*	*Agrionoptera insignis insularis* Kirby, 1889	Solomon Islands, Santa Anna and Alu	336	Kirby (1889)
5	*Orthetrum villosovittatum bismarckianum*	*Orthetrum villosovittatum bismarckianum* Ris, 1898	Salomons-Inseln	239	Ris (1909-1913)
6	*Agrionoptera similis* De Selys, Rasse *A. salomonis* Förster n. sp.	*Agrionoptera insignis similis* Selys, 1879	Shortland-Inselgruppe	284	Förster (1898)
7	*Camacinia othello*	*Camacinia othello* Tillyard, 1908	Solomon Islands	859	Tillyard (1910)
8	*Diplacodes remota*	*Diplacodes trivialis* (Rambur, 1842)	Iles Salomon	470	Ris (1909-1913)
9	*Neurothemis stigmatizans bramina*	*Neurothemis stigmatizans bramina* (Guérin-Méneville, 1832)	Shortland Insel, Salomons Archipel	574	Ris (1909-1913)
10	*Rhyothemis phyllis marginata*	*Rhyothemis phyllis marginata* Ris, 1913*	Alu, Salomons Inseln	945	Ris (1909-1913)
11	*Teinobasis aluensis*, sp. n.	*Teinobasis aluensis* Campion, 1924*	Alu, Solomon Islands	614	Campion (1924)
12	*Rhinocypha frontalis* Selys	*Rhinocypha tincta adusta* Lieftinck, 1949*	Shortland Is.	8	Cowley (1937)
13	*R. semitincta* Selys	*Rhinocypha tincta semitincta* Selys, 1869	Gizo Is.	9	Cowley (1937)
14	*Rhinocypha liberata*, sp.n.	*Rhinocypha liberata* Lieftinck, 1949*	Ugi Id., (off the north-coast of San Cristobal)	27	Lieftinck (1949a)
15	*Pseudagrion microcephalum* (Ramb).	*Pseudagrion microcephalum* (Rambur, 1842)	Russell Id. (Solomon Is.), Lingatu	179	Lieftinck (1949a)
16	*Pseudagrion incisurum*, sp. n.	*Pseudagrion incisurum* Lieftinck, 1949*	Guadalcanal I.	336	Lieftinck (1949b)
17	*Teinobasis rufithorax* Selys	*Teinobasis rufithorax* (Selys, 1877)	Solomon Is.#	346	Lieftinck (1949b)
18	*Ceriagrion* ?*erubescens* Selys	*Ceriagrion aeruginosum* (Brauer, 1869)	Guadalcanal I.	346	Lieftinck (1949b)
19	*Ischnura a. aurora* Brauer	*Ischnura aurora aurora* (Brauer, 1865)	Guadalcanal I., Kau Kau Plantation#	348	Lieftinck (1949b)
20	*Agriocnemis pygmaea* (Ramb.)	*Agriocnemis pygmaea* (Rambur, 1842)	Guadalcanal I.	348	Lieftinck (1949b)

Chronological literature review of the Odonata species check-list of Solomon Islands					
21	*Agriocnemis salomonis*, sp.n.	*Agriocnemis salomonis* Lieftinck, 1949*	Ganonga I. (south of Vella Lavella), Koreovuka	349	Lieftinck (1949b)
22	*Ictinogomphus australlis lieftincki* Schmidt	*Ictinogomphus australis lieftincki* Schmidt, 1935	Guadalcanal I.	352	Lieftinck (1949b)
23	*Agyrtacantha dirupta* (Karsch)	*Agyrtacantha dirupta* (Karsch, 1889)	Shortland Is., Lofung	353	Lieftinck (1949b)
24	*Gynacantha rosenbergi* Brauer	*Gynacantha rosenbergi* Kaup in Brauer, 1867	Guadalcanal I.	353	Lieftinck (1949b)
25	*Anaciaeschna melanostoma*, sp.n.	*Anaciaeschna melanostoma* Lieftinck, 1949*	Guadalcanal I., Aola	354	Lieftinck (1949b)
26	*Eusynthemis frontalis*, sp. n.	*Eusynthemis frontalis* Lieftinck, 1949*	Guadalcanal I.	359	Lieftinck (1949b)
27	*Agrionoptera insignis allogenes* Tillyard	*Agrionoptera papuensis allogenes* Tillyard, 1906	Guadalcanal I.	362	Lieftinck (1949b)
28	*Orthetrum s. sabina* (Drury)	*Orthetrum sabina* (Drury, 1770)	Tresury Is.	365	Lieftinck (1949b)
29	*Brachydiplax denticauda* (Brauer)	*Brachydiplax denticauda* (Brauer, 1867)	Guadalcanal I.	366	Lieftinck (1949b)
30	*Brachydiplax duivenbodei* (Brauer)	*Brachydiplax duivenbodei* (Brauer, 1866)	Guadalcanal I.	366	Lieftinck (1949b)
31	*Crocothemis nigrifrons* Kirby	*Crocothemis nigrifrons* (Kirby, 1894)	Guadalcanal I.	367	Lieftinck (1949b)
32	*Rhodothemis rufa* (Ramb.)	*Rhodothemis rufa* (Rambur, 1842)	Guadalcanal I.	367	Lieftinck (1949b)
33	*Rhyothemis phyllis chloe* Kirby	*Rhyothemis phyllis chloe* Kirby, 1894	Guadalcanal I.	368	Lieftinck (1949b)
34	*Pantala flavescens* (Fabr.)	*Pantala flavescens* (Fabricius, 1798)	Tresury Is.	371	Lieftinck (1949b)
35	*Hydrobasileus brevistylus* (Brauer)	*Hydrobasileus brevistylus* (Brauer, 1865)	Guadalcanal I.	371	Lieftinck (1949b)
36	*Tramea liberata*, sp. n.	*Tramea liberata* Lieftinck, 1949*	Shortland Is., Lofung	371	Lieftinck (1949b)
37	*Aethriamanta subsignata* Selys	*Aethriamanta subsignata* Selys, 1897	Guadalcanal I.	373	Lieftinck (1949b)
38	*Tapeinothemis boharti*, sp. n.	*Tapeinothemis boharti* Lieftinck, 1950*	Little Florida I.,	640	Lieftinck (1950)
39	*Lieftinckia salomonis* sp. n.	*Lieftinckia salomonis* Kimmins, 1957*	Tapenanje	314	Kimmins (1957)
40	*Teinobasis bradleyi* sp. n.	*Teinobasis bradleyi* Kimmins, 1957*	Tapenanje	315	Kimmins (1957)
41	*Guadalca insularis* sp.n.	*Guadalca insularis* Kimmins, 1957*	Tapenanje	318	Kimmins (1957)
42	*Hemicordulia* ? *oceania* Selys, 1871	*Hemicordulia oceanica* Selys, 1871	Niupani	68	Kimmins (1959)
43	*Macrodiplax cora* (Brauer, 1867)	*Macrodiplax cora* (Brauer, 1867)	Te-Nggano	69	Kimmins (1959)

Chronological literature review of the Odonata species check-list of Solomon Islands					
44	*Lieftinckia lairdi* sp. n.	*Lieftinckia lairdi* Lieftinck, 1963*	Guadalcanal I., Suta	534	Lieftinck (1963)
45	*Xiphiagrion cyanomelas* Selys, 1876	*Xiphiagrion cyanomelas* Selys, 1876	Lake Tegano at Niupani	69	Lieftinck (1968)
46	*Agriocnemis f. femina* (Brauer, 1868)	*Agriocnemis femina* (Brauer, 1868)	Niupani	70	Lieftinck (1968)
47	*Tholymis tillarga* (Fabricius, 1798)	*Tholymis tillarga* (Fabricius, 1798)	Niupani	73	Lieftinck (1968)
48	*Orthetrum serapia* sp.n.	*Orthetrum serapia* Watson, 1984	Shortland Island	8	Watson (1984)
49	*Salomocnemis gerdae* spec. nov.	*Salomocnemis gerdae* Lieftinck, 1987*	Guadalcanal I., Komugelea	269	Lieftinck (1987)
50	*Lieftinckia malaitae* spec. nov.	*Lieftinckia malaitae* Lieftinck, 1987*	Malaita I., Dala	272	Lieftinck (1987)
51	*Lieftinckia isabellae* spec. nov.	*Lieftinckia isabellae* Lieftinck, 1987*	Santa Isabel I., Maring Distr., Ta Matahi	274	Lieftinck (1987)
52	*Lieftinckia ramosa* spec. nov.	*Lieftinckia ramosa* Lieftinck, 1987*	San Jorge islet, off Santa Isabel	275	Lieftinck (1987)
53	*Teinobasis simulans* spec. nov.	*Teinobasis simulans* Lieftinck, 1987*	New Georgia I., Bareki River	282	Lieftinck (1987)
54	*Teinobasis obtusilingua* spec. nov.	*Teinobasis obtusilingua* Lieftinck, 1987*	San Cristoval I., Huni River, mouth Camp 4	283	Lieftinck (1987)
55	*Teinobasis chionopleura* spec. nov.	*Teinobasis chionopleura* Lieftinck, 1987*	Florida Is.	285	Lieftinck (1987)
56	*Teinobasis imitans* spec. nov.	*Teinobasis imitans* Lieftinck, 1987*	Guadalcanal I., Honiara	286	Lieftinck (1987)
57	*Nannophya pygmaea*	*Nannophya pygmaea* Rambur, 1842	Solomons	4	Donnelly (1987)
58	*Anax* cf *gibbosulus*	*Anax gibbosulus* Rambur, 1842	Solomons	4	Donnelly (1987)
59	*Cnemisticta latilobata* sp. n.	*Cnemisticta latilobata* Donnelly, 1993*	Malaita I., Kware'a River	129	Donnelly (1993)
60	*Argiolestes gizo* sp. nov.	*Argiolestes gizo* Kalkman, 2008*	Gizo Island	51	Kalkman (2008)
61	*Argiolestes malaita* sp. nov.	*Argiolestes malaita* Kalkman, 2008*	Malaita Island, Tagatalau, E of Auki	54	Kalkman (2008)
62	*Ischnura heterosticta* Burmeister	*Ischnura heterosticta* (Burmeister, 1839)	Malaita Prov.	77	Polhemus et al. (2008)
63	*Agyrtacantha browni* Marinov & Theischinger, 2012	*Agyrtacantha browni* Marinov & Theischinger, 2012	Kongulae Village, Guadalcanal Island	1-8	Marinov & Theischinger (2012)
64	*Gynacantha amphora* Marinov & Theischinger, 2012	*Gynacantha amphora* Marinov & Theischinger, 2012	Kongulae Village, Guadalcanal Island	1-8	Marinov & Theischinger (2012)

Table II. Unidentified taxa published in Lieftinck (1949b, 1987). Morphological descriptions were based on badly preserved specimens.

No	Verbatim name	Page	Reference	Remark
1	*Teinobasis* spec. indet.	345	Lieftinck 1949b)	immature female resembling in colouration the female from the Shortland Islands, but differing in size and structure of the posterior lobe of the prothorax
2	*Lieftinckia* spec. indet.	278	Lieftinck (1987)	subadult female near ally of *L. salomonis* left unnamed because of the absence of a topological male
3	*Lieftinckia* spec. indet.	278	Lieftinck (1987)	immature female in rather poor condition

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Swezey, O. & F. Williams, 1942. Dragonflies of Guam. Bernice P. Bishop Museum Bulletin 172: 3-6.

Tillyard, R., 1924. The dragonflies (Order Odonata) of Fiji, with special reference to a collection made by Mr. H.W. Simmonds, F.E.S., on the Island of Viti Levu. Transactions of the Entomological Society London 1923 III-IV: 305-346.

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