

The dragonflies of Singapore: An updated checklist and revision of the national conservation statuses

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Abstract. Over the past few years, the popularisation of local dragonflies (Odonata) among academics and amateurs has resulted in several new records, rediscoveries, and a better understanding of the distribution and conservation significance. Consequently, the species checklist and conservation status categories based on published materials are outdated and do not accurately reflect the current knowledge. Hence, we have conducted a comprehensive assessment of all species to produce the most updated Singapore checklist and revised national conservation status. The total number of Odonata species ever recorded from Singapore now stands at 131 which are composed of nine Nationally Extinct and 122 extant species. Of the extant species, 14 are of highest conservation importance because they are considered Critically Endangered and Very Rare. This paper supersedes previous checklists and conservation statuses. It will be a useful reference for anyone with an interest in Singapore dragonflies

Key words. Odonata, dragonflies, Singapore, national status

INTRODUCTION

Research on Singapore's dragonflies (Odonata) was pioneered in a milestone publication by Murphy (1997) in which species in the Bukit Timah Nature Reserve (BTNR) and Central Catchment Nature Reserve (CCNR) were documented. Building on from Murphy (1997), Norma-Rashid et al. (2008) published the first Singapore checklist of 117 species and their respective national conservation status. In the same year, a separate set of conservation status categories based on the International Union for Conservation of Nature and Natural Resources (IUCN) criteria was provided in the second edition of Singapore Red Data Book (Davison 2008). The subsequent publication of Tang et al. (2010), Ngiam (2011), Ngiam & Davison (2011), and Chow et al. (2012) not only galvanised scientific research in local dragonflies, it also propelled these insects into the conservation mainstream which led to the popularisation of dragonflies among local naturalists. Social media is now a convenient platform for enthusiasts to share a wide array of knowledge on dragonflies, and information such as species localities, photography tips or requests for species identification from more knowledgeable members of the dragonfly enthusiast community. These platforms are in the form of blogs, websites and the popular 'Dragonflies of Singapore' Facebook group. Information on how to identify dragonflies is also featured on smartphone applications, viz. 'SGBioAtlas' and 'Dragonflies of Singapore'.

The colourful and conspicuous adult dragonflies understandably garner the most attention compared to the largely unseen aquatic larvae. Nevertheless, some research has shed light on the larval stage of their life-cycles (Ngiam et al., 2011; Ngiam & Leong, 2012; Ngiam & Dow, 2013; Orr et al., 2010; Orr & Ngiam, 2011). Moreover, a DNA barcoding project led by the National University of Singapore (NUS) has contributed considerable knowledge by matching larvae with adults for some species. This result is available as high-resolution photographs in the website 'Animal and Plants of Singapore' hosted by the Lee Kong Chian Natural History Museum (2016) and it has proven to be a valuable aid in identifying dragonfly larvae collected during freshwater research projects.

A consequence of this new knowledge generated by professional and amateur odonatologists is a vastly deepened understanding of Singapore's Odonata diversity since 1997, notably in leaps and bounds within the last six years. Indeed, the species and conservation statuses in Murphy et al. (2008), Tang et al. (2010), and Chow et al. (2012) are already outdated. Therefore it is timely to revise the diversity and conservation status of Singapore's dragonflies. This paper aims to provide the most updated species list and conservation status categories based on collated data from us, and incorporating contributions by members of the local dragonflies watching community. This paper will serve as an important reference for a broad range of users, such as scientists, amateur dragonfly watchers, as well as practitioners in conservation management and environmental consultancy.

METHODS

Our personal working lists of Odonata species and sightings were first combined into a master list. Recognising the rapid growth of Singapore's dragonfly-watching scene, we decided it was imperative to include sighting records from the wider community. Hence RWJN extended an invitation on the 'Dragonflies of Singapore' Facebook group to solicit contribution of records for non-common species. These were combined into the master list. Also added to the list were records from various sources made available to us. The majority of these were from research project reports. In this way, we ensured that the collated data were reasonably exhaustive. Regional Odonata expert Rory Dow was consulted on species of uncertain taxonomic status and vernacular names for those species without one. The new names are marked with an asterisk in the Appendix. The most current and accurate list of all known species ever recorded from Singapore is thus finalised and presented here in the Appendix.

Two conservation status schemes are presently assigned to local dragonflies. One is based on the likelihood an adult of a species would be encountered in the field (Tang et al., 2010), while the other is based on the IUCN Red list categories which assessed a species' conservation status category by the number of localities it occurs in (Murphy et al., 2008). In this review we decided to maintain the use of these two status schemes, albeit with slightly modified criteria, because they supplement each other to provide an accurate reflection of the local context. Species not listed in Murphy et al. (2008) and Tang et al. (2010) were also assessed according to our modified criteria.

While the IUCN risk criteria have been applied to most taxa, it has proven difficult to implement for invertebrates. This is because many species are undescribed and the distribution of described species remains largely unknown (Cardoso et al., 2011). Moreover, the species' spatio-temporal variation in abundance and sensitivity to habitat changes remains poorly studied. These shortfalls make it very challenging in using IUCN categories to classify invertebrates (Cardoso et al., 2011). In our review of the conservation status of the local dragonflies, the Prestonian shortfall, which refers to the inadequacy of information on abundance and its variation over time and space (Samways, 2015) impeded the proper application of the IUCN criteria. The recommendation by Cardoso et al. (2011) to use Area of Occupancy (AOO) and Extent of Occurrence (EOO) is also unsuitable for a small country like Singapore. Hence we adopted the method in Murphy et al. (2008). This entailed using the number of localities as the only assessment to assign each species into the IUCN Red List categories (IUCN, 2012). The utilisation of locality numbers is consistent with status assessment of dragonflies in other territories (Wilson, 2004; Smallshire & Swash, 2014; Reels & Zhang, 2015). To better reflect the small land area of Singapore, we adjusted the number of localities used in the original IUCN criteria. The final categories and criteria are presented in Table 1.

In determining the number of localities for each species, we are of the opinion that as far as dragonflies are concerned in the Singapore context, each recorded locality can be regarded as a single location with the exception of the Bukit Timah Nature Reserve (BTNR) and Central Catchment Nature Reserve (CCNR) because both reserves are essentially a mosaic

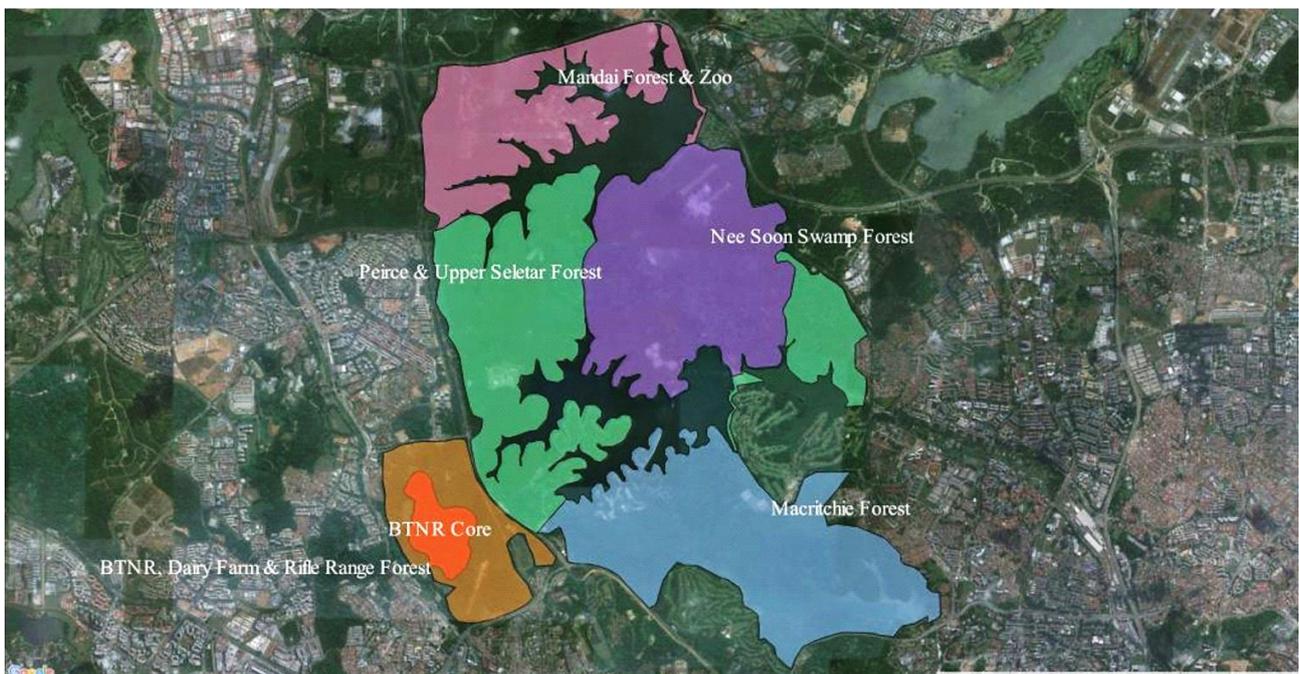


Fig 1. Map indicating the delineated forest patches in and surrounding CCNR and BTNR. For this assessment, we consider CCNR to contain four separate localities and BTNR with two separate localities. Google Earth. Image©DigitalGlobe. 3 April 2016

of different forest types (Corlett, 1997; Yee et al., 2011). More importantly for dragonflies, the creation of reservoirs caused the many streams and swamps in the reserves to become unique in their hydrology and disconnected from each other in distinct forest patches. As a result, stenotopic species could be restricted to small, isolated areas within the reserves. To better reflect the different distribution patterns of stenotopic and eurytopic species within both reserves, we delineated the BTNR and CCNR, and their adjacent forests into four and two locations, respectively (Fig. 1). The Mandai Forest and Zoo, Peirce and Upper Seletar Forest, and Macritchie Forest are indicative of the three main forest patches largely separated by the reservoirs of Upper Seletar, Upper and Lower Peirce. Within Peirce and Upper Seletar Forest lies the unique Nee Soon Swamp Forest which we delimited based on the map in Li et al. (2016). For the BTNR, we considered the BTNR, Dairy Farm and Rifle Range as one contiguous forest patch. Within this area is the BTNR Core which is composed of primary vegetation (Hassan Ibrahim, pers. comm. 2016) and steep hill streams.

The modified conservation status criteria as they are used here do not consider abundance or encounter frequency which is vital in assessing a species conservation status. However as previously discussed, quantitative data on this aspect is inadequate for a robust assessment. The next best option is to infer qualitatively from anecdotal records and field observations. To this end, we modified the categories in Tang et al. (2010) to produce a new set which serves as a function of distribution, abundance, and chance of encounter (Table 1). In assigning a species to a specific conservation status category, an encounter probability (percentage) was used. The probability of encountering a species can be determined by its abundance and/or elusiveness. Although there is a degree of subjectivity to this assessment, we believe the consolidated information and data provide a more accurate reference for us to assign a category that better reflects a species' degree of rarity in the Singapore context.

Table 1. Criteria used in the conservation status, and distribution and rarity.

Singapore Red Data Book Conservation Status (Adopted from the IUCN)	Conservation Status Criteria	Distribution & Rarity	Criteria
Critically Endangered (CR)	Found in one location only	Widespread	Found in more than five locations
Endangered (EN)	Found in two to three locations	Restricted	Found in five or less locations
Vulnerable (VU)	Found in four to five locations	Common	At most known locations, almost 100% chance of encountering adults and/or larvae
Near Threatened (NT)	Found in more than five locations but habitat type/locations are at risk, or very sporadic records of few individuals	Uncommon	At most known locations, almost 75% chance of encountering adults and/or larvae
Least Concern (LC)	Found in more than five locations	Rare	At most known locations, almost 50% chance of encountering adults and/or larvae
Nationally Extinct (NE)	No records for more than 50 years	Very Rare	At most known locations, almost 25% chance of encountering adults and/or larvae
		Nationally Extinct	No records for more than 50 years

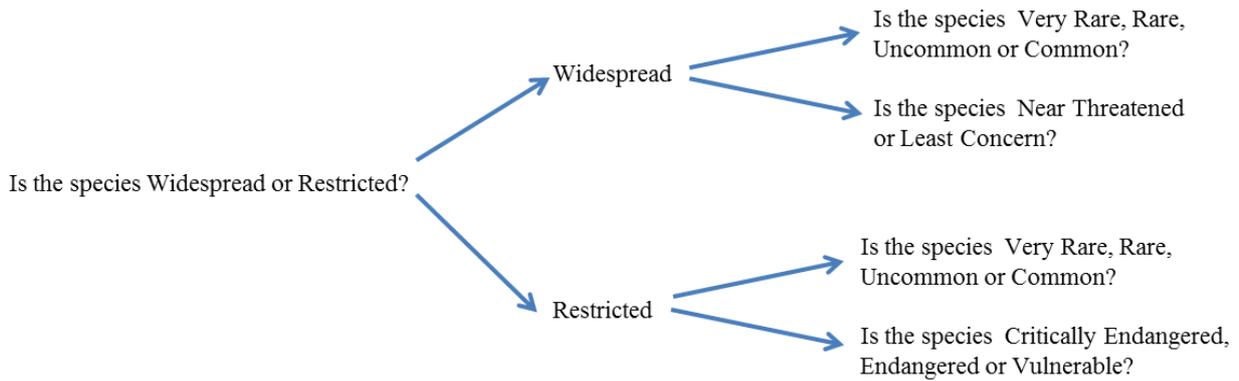


Fig. 2. Schematic diagram of the decision-making process in assigning a conservation status to a species.

The master list mentioned above was used for assigning the conservation status category from both conservation status schemes to each species. It should be emphasised that we also included larval records in the evaluation; this is especially important for elusive arboreal species from the Gomphidae family. Our decision-making framework is seen in Fig. 2.

RESULTS

The number of dragonflies (Odonata) recorded from Singapore now stands at 131 species. It consists of 50 damselflies (Suborder: Zygoptera) and 81 true dragonflies (Suborder: Anisoptera), in nine and five families, respectively. One species, *Urothemis abbotti*, was erroneously recorded as abundant in Singapore but no specimens could be found in the Naturalis Biodiversity Center Natural History Museum in Leiden, The Netherlands (Rory Dow, in litt. 2011). It was consequently removed from the Singapore list. On the other hand, *Echo modesta* was added as a male specimen of more than a century old collected from Singapore was discovered by Matti Hämäläinen in the Paris National Museum of Natural History in 2012 (Matti Hämäläinen, in litt. 2012). In our review we also reclassified three species to be Nationally Extinct. These three, together with *Echo modesta*, were added to the list of extinct species thus making a total of nine species considered Nationally Extinct. Hence 122 species are currently extant in Singapore.

Of the extant species, 64 are widespread while 58 are restricted in their distribution. Of the 58 restricted species, 21 are Critically Endangered, 19 are Endangered and 18 are Vulnerable (Fig. 3). Of the 64 widespread species, four are Near Threatened while the rest are Least Concern. In terms of rarity, 18 species are very rare, 22 species are rare, 31 species are uncommon and 51 species are common (Fig. 4). Fourteen species are considered to be of highest conservation concern because they are Critically Endangered and Very Rare. In the Appendix, these 14 species are highlighted in red.

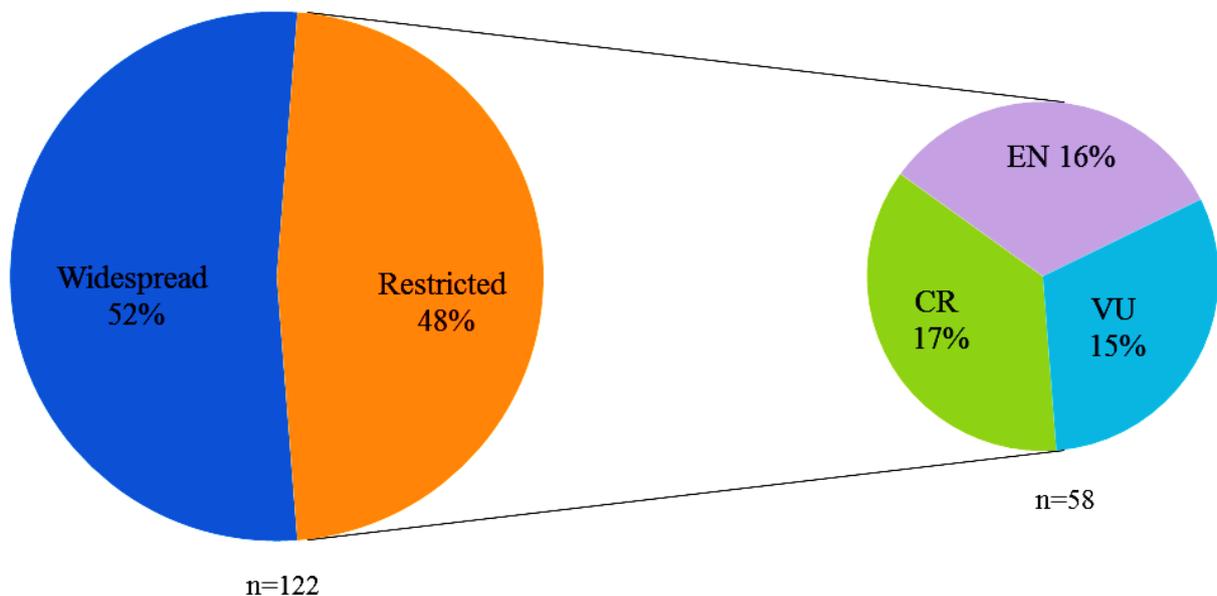


Fig. 3. Proportion of species in different conservation status categories. CR = Critically Endangered, EN = Endangered, VU = Vulnerable.

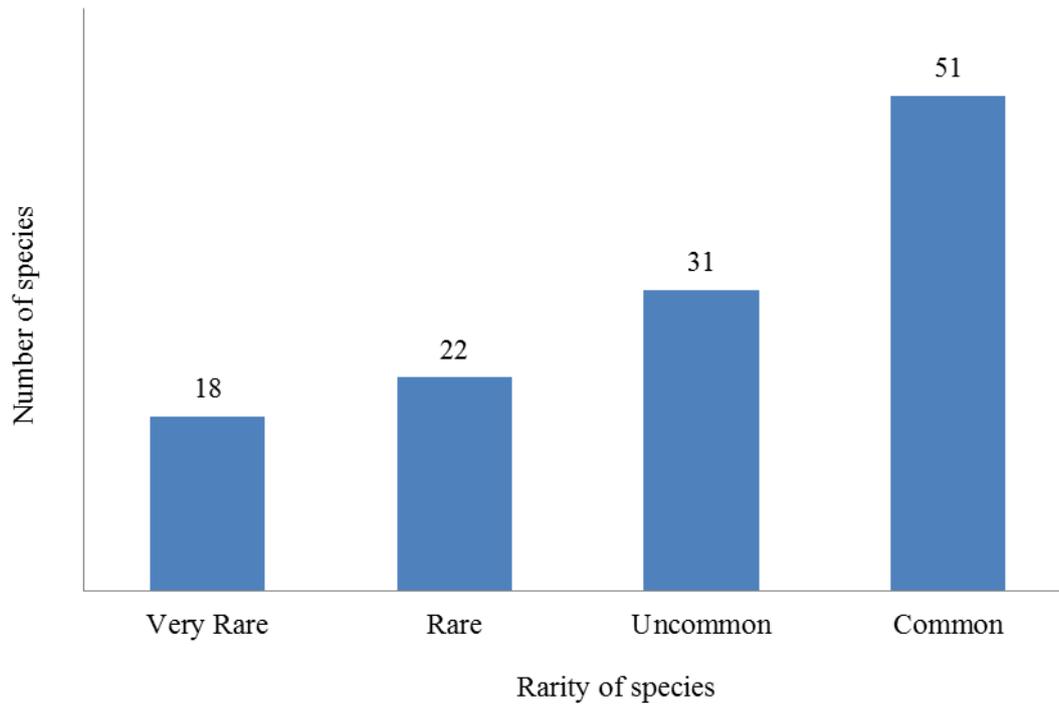


Fig. 4. Number of species in different levels of rarity.

The families are presented according to the latest taxonomic revisions by Dijkstra et al. (2013, 2014). Seventeen species with noteworthy accounts are detailed under Species Remarks.

Order **Odonata** (131 species)

Suborder **Zygoptera** (50 species)

- Family Argiolestidae (1 species)
- Family Calopterygidae (5 species)
- Family Chlorocyphidae (4 species)
- Family Coenagrionidae (23 species)
- Family Devadattidae (1 species)
- Family Euphaeidae (2 species)
- Family Lestidae (3 species)
- Family Platycnemididae (10 species)
- Family Platystictidae (1 species)

Suborder **Anisoptera** (81 species)

- Family Aeshnidae (10 species)
- Family Corduliidae (2 species)
- Family Gomphidae (11 species)
- Family Libellulidae (55 species)
- Family Macromiidae (3 species)

SPECIES REMARKS

1. *Echo modesta* Laidlaw, 1902—In 2012, Matti Hämäläinen found an old specimen labelled ‘Singapore’ in the National Museum of Natural History in Paris, France. The specimen was part of the Rene Martin collection and the date on the label by Martin’s own handwriting was most likely to be sometime between 1903 and 1914 (Matti Hämäläinen, in litt. 2012). This is reliable evidence that *Echo modesta* once existed here. Unfortunately it seems to be the only specimen known from Singapore (Fig. 5A). In view of the whitish spot on the frons of mature males (Fig. 5B), we propose the vernacular name ‘white-faced clearwing’.



Fig. 5. A, Old specimen of *Echo modesta* discovered by Matti Hämäläinen in a Paris museum. B, a mature male from Fraser's Hill. The whitish spot on the frons can be seen clearly. Scale bars = 1cm. (Photograph A by: Matti Hämäläinen. Photograph B by: Robin Wen Jiang Ngiam).

2. *Vestalis gracilis* (Rambur, 1842)—The population of this species has increased substantially at the location since it was first discovered in 2012 by LFC. Owing to this single locality, it remains Critically Endangered even though it is common where it occurs. In keeping with the 'flashwing' theme for the *Vestalis* group, we propose the vernacular name 'plain flashwing' (Fig. 6).



Fig. 6. *Vestalis gracilis* (plain flashwing) photographed at the only known location in Singapore. Scale bar = 1cm (Photograph by: Robin Wen Jiang Ngiam).

3. *Agriocnemis minima* Selys, 1877—Yi Wei Cheong first discovered this in 2011 at an open marsh habitat in the CCNR where it remains (Fig. 7). From the common name used for this genus, we propose the name 'marsh wisp'.



Fig. 7. A, Male and B, female of *Agriocnemis minima* (marsh wisp) photographed from Singapore. Scale bar = 1mm (Photographs by: Loong Fah Cheong).



Fig. 8. Male (left) and female (right) of *Agriocnemis pygmaea* (wandering wisp). Scale bar = 1mm (Photographs by: Ronnie Ang).

4. *Agriocnemis nana* (Laidlaw, 1914)—For a period this damselfly was found only at its stronghold in the CCNR until a record was made at the Singapore Botanic Gardens in 2011.
5. *Agriocnemis pygmaea* (Rambur, 1842)—This species was rediscovered in 2012 in a malaise trap deployed by NUS at Pulau Semakau. The male specimen was collected and verified by Jayanthi Puniamoorthy from the Evolutionary Biology Laboratory, Department of Biological Sciences, NUS. More recently, two separate localities were found by members of the ‘Dragonflies of Singapore’ Facebook community (Fig. 8). The species is very cryptic and easily overlooked owing to its similarity in general appearance to the common *Agriocnemis femina*. The anal appendages have to be inspected closely to identify the species confidently.
6. *Amphicnemis bebar* Dow, Choong & Ng, 2010—The existence of this damselfly in Singapore was uncovered in 2011 (Dow & Ngiam, 2011). The vernacular name ‘Bebar wisp’ is proposed based on the type locality at Sungei Bebar in Pahang, Malaysia (Dow et al., 2010).
7. *Mortonagrion falcatum* Lieftinck, 1934—The species was thought to have been extirpated when a single locality in Tuas was mostly lost to development. A recent sighting in a marsh in the CCNR provides hope that this damselfly has gained a foothold in a more secured site (Leonard Tan, pers. obs. 2016).
8. *Teinobasis cryptica* Dow, 2010—To date, there have been no other records aside from those reported in Dow & Ngiam (2011). This species is very obscure because of its natural disposition to stay low in the shade of understorey vegetation. Fittingly, we propose the vernacular name ‘cryptic shadesprite’.
9. *Acrogomphus malayanus* Laidlaw, 1925—The first record for this species was two males collected from malaise traps in 2012 by the NUS Evolutionary Biology Laboratory. Subsequently, the larva was found and reared by RWJN (Fig. 9). The larvae can be found occasionally when sampling in forest streams with sandy substrate. ‘hooktail’ has been suggested as the vernacular genus tag for *Acrogomphus* (Rory Dow, in litt. 2016), and we propose the vernacular name ‘Malayan hooktail’.



Fig. 9. Larva of *Acrogomphus malayanus* (Malayan hooktail). Scale bar = 1cm (Photograph by: Robin Wen Jiang Ngiam).

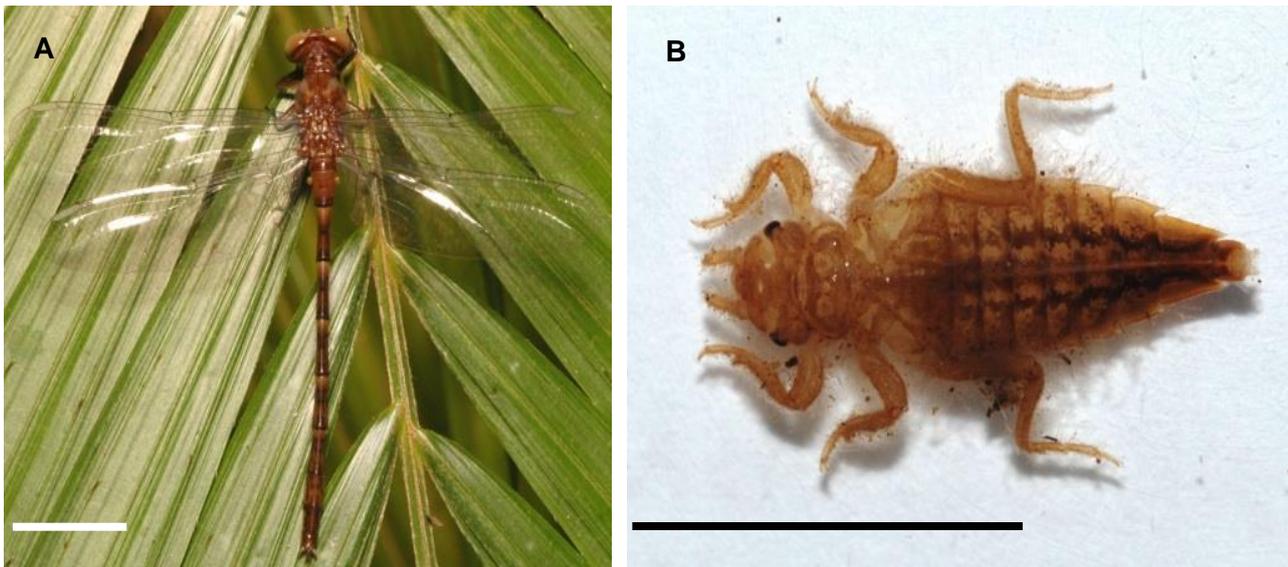


Fig. 10. A, *Burmagomphus arthuri* (Arthur's Clubtail) photographed in 2012 as a first Singapore record. B, The larva. Scale bar = 1cm. (Photograph by: Loong Fah Cheong [A]; Robin Wen Jiang Ngiam [B]).

10. *Burmagomphus arthuri* Lieftinck, 1953—This species was recorded for the first time by Yi Wei Cheong and LFC in 2012 at Nee Soon Swamp Forest (Fig. 10a). Two years later, a female larva was reared successfully by RWJN (Fig. 10b). We are currently working to publish a description of the male adult and larva. We referred to the scientific name in proposing 'Arthur's clubtail' as the vernacular name.
11. *Burmagomphus divaricatus* Lieftinck, 1964—Lieftinck (1964) alluded to the collection of a larva by D. S. Johnson in 1956 from 'Johore, Sungai Seletar, at Nee Soon'. The fact that Sungai Seletar and Nee Soon are actual locations within Singapore is undoubtable. Given that more than 50 years have passed since the last record of this species in 1956, we have adopted the criteria in Davison (2008) and categorized this species to be Nationally Extinct.
12. *Burmagomphus plagiatus* Lieftinck, 1964—In 1956, D. S. Johnson collected a larva from 'Johore, Nee Soon swamp forest' (Lieftinck (1964)). As with the previous species, the location is clearly in Singapore. Fifty years have elapsed since the last record and we have adopted the criteria in Davison (2008) and categorized this species to be Nationally Extinct.
13. *Heliogomphus kelantanensis* (Laidlaw, 1902)—The NUS malaise trap team collected one female specimen from the Chek Jawa mangrove forest site on Pulau Ubin in 2012. It was most likely a vagrant as Pulau Ubin does not have the habitat suitable for this species. We determined the species to be Critically Endangered based on its one locality in Singapore, i.e. the Nee Soon Swamp Forest.
14. *Brachygonia oculata* (Brauer, 1878)—Apart from its only stronghold in western Singapore, a single male was recorded in 2015 by Leonard Tan at another location. The new site is a plausible habitat for the species and hence considered to be its second known location in Singapore. The dragonfly can be observed easily at its western refuge but always in low abundance. The larva has recently been found by RWJN who will be describing it shortly in another publication.
15. *Neurothemis disparilis* Kirby, 1889—Since the specimen reported by Yokoi (1995) cannot be confirmed, the only substantiated record of this species is that reportedly collected by H. N. Ridley (Tang et al., 2010) more than a century ago. In view of this, we have categorized this species to be Nationally Extinct.
16. *Rhyothemis fulgens* Kirby, 1889—*Rhyothemis fulgens* has been treated as a junior synonym of *Rhyothemis pygmaea* (Brauer, 1867). However they are presently recognised as two separate species (Dow et al., 2015). It appears that *Rhyothemis pygmaea* occurs east of the Wallace Line while *Rhyothemis fulgens* is to the west (Dow et al., 2015). In this regard, the species collected by A. R. Wallace in 1854 (Tang et al., 2010) should be recorded as *Rhyothemis fulgens*, not *Rhyothemis pygmaea*.
17. *Zyxomma obtusum* Albarda, 1881—This species was first recorded in Singapore five years ago (Ngoi et al., 2011) and can be observed quite regularly at the only known location. In reference to the white pruinescence evident in mature males, we propose the vernacular name 'white duskdarter'.

DISCUSSION

The re-evaluation of Singapore's Odonata diversity concludes with 131 species, consisting of 122 extant and nine locally extinct species. Fifty-eight species are geographically restricted to five or less known localities, of which 14 are Critically Endangered and Very Rare.

This paper presents the first comprehensive assessment of Singapore's dragonfly fauna, based not just on data from experts but also from enthusiasts who are active on social media platforms such as Facebook and blogs. By harnessing the wider reach afforded by social media, we have ensured, to the best of our abilities, that all records available are included in our assessment. Hence, to a small extent, we have incorporated citizen science to derive a conservation status category for each species. The advent of citizen science is changing the way scientists collect and analyse data. With the arrival of citizen science initiatives currently active in Singapore (Wang et al., 2016), we foresee it to contribute significantly in future conservation assessment of local biodiversity. To this end, our work here is the first step for Singapore's dragonflies. Moving forward, we hope to produce a national atlas of Singapore's dragonflies where records of each species and their distribution are represented spatially. It would form robust baseline information that can be used to improve the conservation of Singapore's Odonata.

Finally, this paper supersedes the conservation status categories for all Odonata in Davison et al. (2008) and Tang et al. (2010). We encourage all parties interested in Singapore's dragonfly fauna to use this reference for their work.

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Dr. Geoffrey W. H. Davison. (Photo by: Robin Wen Jiang Ngiam).

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APPENDIX

List of Singapore Odonata and their revised national status

Species annotated with a number are referred to in Species Remarks. Newly proposed vernacular names are marked with an asterisk. The 14 species considered to be of highest conservation concern are highlighted in red.

S/No.	Suborder	Family	Species	Vernacular Name	Distribution and Rarity	Conservation Status
1.	Zygoptera	Argiolestidae	<i>Podolestes orientalis</i>	Blue-spotted flatwing	Restricted & Uncommon	Vulnerable
2.			<i>Echo modesta</i> ¹	White-faced clearwing*	Nationally Extinct	Nationally Extinct
3.			<i>Neurobasis chinensis</i>	Green metalwing	Nationally Extinct	Nationally Extinct
4.			<i>Vestalis amethystine</i>	Common flashwing	Restricted but Common	Vulnerable
5.			<i>Vestalis amoena</i>	Charming flashwing	Restricted & Uncommon	Endangered
6.			<i>Vestalis gracilis</i> ²	Plain flashwing*	Restricted but Common	Critically Endangered
7.	Chlorocyphidae	<i>Libellago aurantiaca</i>	Fiery gem	Restricted but Common	Critically Endangered	
8.		<i>Libellago hyaline</i>	Clearwing gem	Restricted but Common	Critically Endangered	
9.		<i>Libellago lineata</i>	Golden gem	Restricted but Common	Vulnerable	
10.		<i>Libellago stigmatizans</i>	Orange-face gem	Nationally Extinct	Nationally Extinct	
11.	Coenagrionidae	<i>Aciagrion hisopa</i>	Blue slim	Restricted & Very Rare	Endangered	
12.		<i>Agriocnemis femina</i>	Variable wisp	Widespread & Common	Least Concern	
13.		<i>Agriocnemis minima</i> ³	Marsh wisp*	Restricted & Very Rare	Critically Endangered	
14.		<i>Agriocnemis nana</i> ⁴	Dwarf wisp	Restricted & Very Rare	Endangered	
15.		<i>Agriocnemis pygmaea</i> ⁵	Wandering wisp	Restricted & Rare	Endangered	
16.		<i>Amphicnemis bebar</i> ⁶	Bebar wisp*	Restricted & Very Rare	Critically Endangered	
17.		<i>Amphicnemis gracilis</i>	Will-o-wisp	Restricted but Common	Vulnerable	
18.		<i>Archibasis melanocyana</i>	Blue-nosed sprite	Restricted & Rare	Endangered	
19.		<i>Archibasis rebecca</i>	Rebecca's sprite	Restricted & Very Rare	Critically Endangered	
20.		<i>Archibasis viola</i>	Violet sprite	Widespread & Common	Least Concern	
21.		<i>Agriocnemis rubescens</i>	Variable sprite	Widespread but Uncommon	Least Concern	
22.		<i>Ceriagrion cerinorubellum</i>	Ornate coraltail	Widespread & Common	Least Concern	
23.		<i>Ceriagrion chaoi</i>	Fiery coraltail	Widespread but Uncommon	Least Concern	
24.		<i>Ischnura senegalensis</i>	Common bluetail	Widespread & Common	Least Concern	
25.		<i>Mortonagrion arthuri</i>	Arthur's midget	Restricted & Rare	Vulnerable	
26.		<i>Mortonagrion falcatum</i> ⁷	Hooked midget	Restricted & Very Rare	Critically Endangered	
27.	<i>Pericnemis stictica</i>	Dryad	Restricted & Rare	Vulnerable		
28.	<i>Pseudagrion australasiae</i>	Look-alike sprite	Widespread but Uncommon	Least Concern		
29.	<i>Pseudagrion microcephalum</i>	Blue sprite	Widespread & Common	Least Concern		
30.	<i>Pseudagrion pruinosum</i>	Grey sprite	Restricted but Common	Vulnerable		
31.	<i>Pseudagrion rubriceps</i>	Orange-faced sprite	Restricted & Rare	Vulnerable		
32.	<i>Teinobasis cryptica</i> ⁸	Cryptic shadesprite*	Restricted & Very Rare	Critically Endangered		

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S/No.	Suborder	Family	Species	Vernacular Name	Distribution and Rarity	Conservation Status
33.			<i>Teinobasis ruficollis</i>	Red-tailed sprite	Widespread but Rare	Near Threatened
34.		Devadattidae	<i>Devadatta argyoides</i>	Malayan grisette	Restricted & Uncommon	Endangered
35.		Euphaeidae	<i>Dysphaea dimidiata</i>	Black velvetwing	Nationally Extinct	Nationally Extinct
36.			<i>Euphaea impar</i>	Blue-sided satinwing	Widespread & Common	Least Concern
37.		Lestidae	<i>Lestes praemorsus</i>	Crenulated spreadwing	Widespread but Uncommon	Least Concern
38.			<i>Orolestes wallacei</i>	Great spreadwing	Nationally Extinct	Nationally Extinct
39.			<i>Platylestes heterostylus</i>	Slender spreadwing	Restricted & Very Rare	Critically Endangered
40.		Platycnemididae	<i>Coeliccia albicauda</i>	White-tailed sylvan	Restricted & Very Rare	Critically Endangered
41.			<i>Coeliccia didyma</i>	Twin-spotted sylvan	Restricted & Very Rare	Critically Endangered
42.			<i>Coeliccia octogesima</i>	Telephone sylvan	Restricted but Common	Vulnerable
43.			<i>Copera marginipes</i>	Yellow featherlegs	Widespread & Common	Least Concern
44.			<i>Copera vittata</i>	Variable featherlegs	Restricted & Rare	Vulnerable
45.			<i>Onychargia atrocyana</i>	Shorttail	Widespread but Uncommon	Least Concern
46.			<i>Prodasineura collaris</i>	Collared threadtail	Restricted & Uncommon	Endangered
47.			<i>Prodasineura humeralis</i>	Orange-striped threadtail	Widespread & Common	Least Concern
48.			<i>Prodasineura interrupta</i>	Interrupted threadtail	Restricted & Uncommon	Critically Endangered
49.			<i>Prodasineura notostigma</i>	Crescent threadtail	Widespread & Common	Least Concern
50.		Platystictidae	<i>Drepanosticta quadrata</i>	Singapore shadowdamsel	Restricted but Common	Vulnerable
51.	Anisoptera	Aeshnidae	<i>Anax guttatus</i>	Emperor	Widespread but Uncommon	Least Concern
52.			<i>Gynacantha basiguttata</i>	Spoon-tailed duskhawker	Restricted & Rare	Vulnerable
53.			<i>Gynacantha bayadera</i>	Small duskhawker	Restricted & Rare	Vulnerable
54.			<i>Gynacantha dohrni</i>	Spear-tail duskhawker	Widespread but Uncommon	Least Concern
55.			<i>Gynacantha subinterrupta</i>	Dingy duskhawker	Widespread but Uncommon	Least Concern
56.			<i>Heliaeschna crassa</i>	Nighthawker	Restricted & Very Rare	Critically Endangered
57.			<i>Heliaeschna uninervulata</i>	Lesser nighthawker	Restricted & Rare	Vulnerable
58.			<i>Oligoaeschna amata</i>	Paddletail	Restricted & Very Rare	Critically Endangered
59.			<i>Oligoaeschna foliaceae</i>	Leaf-tail	Restricted & Very Rare	Critically Endangered
60.			<i>Tetracanthagyna plagiata</i>	Giant hawk	Restricted & Uncommon	Vulnerable
61.		Corduliidae	<i>Hemicordulia tenera</i>	Emerald	Restricted & Rare	Endangered
62.			<i>Idionyx yolanda</i>	Shadowdancer	Widespread but Uncommon	Least Concern
63.		Gomphidae	<i>Acrogomphus malayanus</i> ⁹	Malayan hooktail*	Restricted & Rare	Endangered
64.			<i>Burmagomphus arthuri</i> ¹⁰	Arthur's clubtail*	Restricted & Very Rare	Critically Endangered
65.			<i>Burmagomphus divaricatus</i> ¹¹	Splayed clubtail	Nationally Extinct	Nationally Extinct
66.			<i>Burmagomphus plagiatus</i> ¹²	Lesser splayed clubtail	Nationally Extinct	Nationally Extinct
67.			<i>Heliogomphus kelantanensis</i> ¹³	Malayan grappletail	Restricted & Rare	Critically Endangered
68.			<i>Ictinogomphus decoratus</i>	Common flangetail	Widespread & Common	Least Concern
69.			<i>Leptogomphus risi</i>	Ris' clubtail	Restricted & Rare	Vulnerable

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S/No.	Suborder	Family	Species	Vernacular Name	Distribution and Rarity	Conservation Status
70.			<i>Macrogomphus quadratus</i>	Forktail	Restricted & Uncommon	Vulnerable
71.			<i>Merogomphus femoralis</i>	Malayan spineleg	Restricted & Very Rare	Critically Endangered
72.			<i>Microgomphus chelifera</i>	Tiny sheartail	Restricted & Rare	Vulnerable
73.			<i>Paragomphus capricornis</i>	Banded hooktail	Restricted & Rare	Endangered
74.		Libellulidae	<i>Acisoma panorpoides</i>	Trumpet tail	Widespread & Common	Least Concern
75.	<i>Aethriamanta aethra</i>		Blue adjutant	Widespread but Uncommon	Least Concern	
76.	<i>Aethriamanta brevipennis</i>		Scarlet adjutant	Widespread but Uncommon	Least Concern	
77.	<i>Aethriamanta gracilis</i>		Pond adjutant	Widespread & Common	Least Concern	
78.	<i>Agrionoptera insignis</i>		Grenadier	Widespread and Common	Least Concern	
79.	<i>Agrionoptera sexlineata</i>		Handsome grenadier	Widespread but Uncommon	Least Concern	
80.	<i>Brachydiplax chalybea</i>		Blue dasher	Widespread & Common	Least Concern	
81.	<i>Brachydiplax farinosa</i>		Black-tailed dasher	Restricted & Very Rare	Endangered	
82.	<i>Brachygonia oculata</i> ¹⁴		Pixie	Restricted & Uncommon	Endangered	
83.	<i>Brachythemis contaminata</i>		Common amberwing	Widespread & Common	Least Concern	
84.	<i>Camacina gigantea</i>		Sultan	Widespread but Uncommon	Least Concern	
85.	<i>Chalybiothemis fluviatilis</i>		Green-eyed percher	Restricted but Common	Endangered	
86.	<i>Cratilla lineata</i>		Lined forest-skimmer	Widespread but Rare	Near Threatened	
87.	<i>Cratilla metallica</i>		Dark-tipped forest-skimmer	Widespread & Common	Least Concern	
88.	<i>Crocothemis servilia</i>		Common scarlet	Widespread & Common	Least Concern	
89.	<i>Diplacodes nebulosa</i>		Black-tipped percher	Widespread but Uncommon	Least Concern	
90.	<i>Diplacodes trivialis</i>		Blue percher	Widespread & Common	Least Concern	
91.	<i>Hydrobasileus croceus</i>		Water monarch	Widespread & Common	Least Concern	
92.	<i>Indothemis limbata</i>		Restless demon	Restricted & Uncommon	Endangered	
93.	<i>Lathrecista asiatica</i>		Scarlet grenadier	Widespread & Common	Least Concern	
94.	<i>Lyriothemis cleis</i>	Bombardier	Restricted & Rare	Endangered		
95.	<i>Macrodiplax cora</i>	Coastal glider	Widespread & Common	Least Concern		
96.	<i>Nannophya pygmaea</i>	Scarlet pygmy	Widespread & Common	Least Concern		
97.	<i>Nesoxenia lineata</i>	Striped grenadier	Widespread but Uncommon	Least Concern		
98.	<i>Neurothemis disparilis</i> ¹⁵	Rare parasol	Nationally Extinct	Nationally Extinct		
99.	<i>Neurothemis fluctuans</i>	Common parasol	Widespread & Common	Least Concern		
100.	<i>Onychothemis testacea</i>	Riverhawk	Restricted & Very Rare	Endangered		
101.	<i>Orchithemis pruinans</i>	Blue sentinel	Restricted & Rare	Critically Endangered		
102.	<i>Orchithemis pulcherrima</i>	Variable sentinel	Widespread & Common	Least Concern		
103.	<i>Orthetrum chrysis</i>	Spine-tufted skimmer	Widespread & Common	Least Concern		
104.	<i>Orthetrum glaucum</i>	Blue skimmer	Widespread & Common	Least Concern		
105.	<i>Orthetrum luzonicum</i>	Slender blue skimmer	Widespread & Common	Least Concern		
106.	<i>Orthetrum sabina</i>	Variiegated green skimmer	Widespread & Common	Least Concern		

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S/No.	Suborder	Family	Species	Vernacular Name	Distribution and Rarity	Conservation Status
107.			<i>Orthetrum testaceum</i>	Scarlet skimmer	Widespread & Common	Least Concern
108.			<i>Pantala flavescens</i>	Wandering glider	Widespread & Common	Least Concern
109.			<i>Pornothemis starrei</i>	Mangrove marshal	Widespread but Uncommon	Near Threatened
110.			<i>Potamarcha congener</i>	Common chaser	Widespread & Common	Least Concern
111.			<i>Pseudothemis jorina</i>	Banded skimmer	Widespread but Uncommon	Least Concern
112.			<i>Raphismia bispina</i>	Mangrove dwarf	Widespread but Uncommon	Near Threatened
113.			<i>Rhodothemis rufa</i>	Common redbolt	Widespread & Common	Least Concern
114.			<i>Rhyothemis fulgens</i> ¹⁶	Small bronze flutterer	Nationally Extinct	Nationally Extinct
115.			<i>Rhyothemis obsolescens</i>	Bronze flutterer	Widespread but Uncommon	Least Concern
116.			<i>Rhyothemis phyllis</i>	Yellow-barred flutterer	Widespread & Common	Least Concern
117.			<i>Rhyothemis triangularis</i>	Sapphire flutterer	Widespread but Uncommon	Least Concern
118.			<i>Risioptionia dohrni</i>	Potbellied elf	Restricted & Rare	Endangered
119.			<i>Tetrathemis irregularis</i>	Elf	Restricted & Very Rare	Critically Endangered
120.			<i>Tholymis tillarga</i>	White-barred duskhawk	Widespread & Common	Least Concern
121.			<i>Tramea transmarina</i>	Saddlebag glider	Widespread & Common	Least Concern
122.			<i>Trithemis aurora</i>	Crimson dropwing	Widespread & Common	Least Concern
123.			<i>Trithemis festiva</i>	Indigo dropwing	Widespread & Common	Least Concern
124.			<i>Trithemis pallidinervis</i>	Dancing dropwing	Widespread but Uncommon	Least Concern
125.			<i>Tyriobapta torrida</i>	Treehugger	Widespread & Common	Least Concern
126.			<i>Urothemis signata insignata</i>	Scarlet basker	Widespread & Common	Least Concern
127.			<i>Zyxomma obtusum</i> ¹⁷	White duskdarter*	Restricted & Uncommon	Critically Endangered
128.			<i>Zyxomma petiolatum</i>	Slender duskdarter	Widespread & Common	Least Concern
129.		Macromiidae	<i>Epophthalmia vittigera</i>	Pond cruiser	Widespread & Common	Least Concern
130.			<i>Macromia cincta</i>	Stream cruiser	Restricted & Rare	Endangered
131.			<i>Macromia cydippe</i>	Lesser stream cruiser	Restricted & Rare	Endangered