

**ORTHOPTERA IN THE BUKIT TIMAH AND
CENTRAL CATCHMENT NATURE RESERVES
(PART 2): SUBORDER ENSIFERA**

2nd Edition



Ming Kai Tan

Lee Kong Chian Natural History Museum
National University of Singapore
Singapore
2017

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Cover photograph of a *Scambophyllum* nymph on a tree trunk. © Tan Ming Kai.

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CONTENTS

1.	Introduction	1
2.	Methods	2
3.	Results and Observations	2
4.	Ensifera Recorded from Bukit Timah and Central Catchment Nature Reserves	4
a.	Family Gryllidae	4
b.	Family Mogoplistidae	46
c.	Family Gryllotalpidae	55
d.	Family Rhaphidophoridae	59
e.	Family Gryllacrididae	59
f.	Family Tettigoniidae	64
5.	Acknowledgements	97
6.	Literature Cited	98
7.	How to Cite this Book	101

INTRODUCTION

The Orthoptera is the order of insects consisting of the grasshoppers (suborder Caelifera), as well as crickets and katydids (suborder Ensifera). They are among the most diverse (around 27,000 species worldwide) and common terrestrial macro-invertebrates (Cigliano et al., 2017). In the Tropics, these insects can be found in most terrestrial habitats, from the dipterocarp forests and grassland sites to mangrove and coastal forests, and even highly urbanised areas. Orthopterans also occupy a diverse array of microhabitats, from subterranean and leaf litter to the forest canopy and streams. Although the orthopterans consist of species ranging from herbivores to carnivores (Poo et al., 2016), most orthopterans are primary consumers. They also play important roles as nutrient recyclers (Badenhausser et al., 2015) and pollinators of plants (Micheneau et al., 2010). Owing the sensitivity of orthopterans to their floristic environment, understanding their interactions with plants also paves potential paths to using orthopterans as bio-indicators of forests (Bazelet & Samways, 2011; Fartmann et al., 2012).

The diversity of orthopterans in and around the Bukit Timah Nature Reserve (BTNR) and the Central Catchment Nature Reserve (CCNR) was first published in 2012 (Tan, 2012a; 2012b). It was based on intensive sampling of the nature reserves between 2010–2011 and 150 species of orthopterans were recorded from the BTNR and CCNR including 10 species that have been found to be new to science (see Gorochoff & Tan, 2011, 2012; Ingrisch & Tan, 2012; Tan, 2012c, 2012d). However, some species could not be identified to specific level at that time. It was also mentioned that more species could be expected with more comprehensive sampling. Indeed, a subsequent survey in the Mandai Road area by Tan et al. (2015) discovered 14 new records of orthopterans for the CCNR. All these new data called for a second edition of the orthoptera in the BTNR and CCNR. In this latest edition, the names for more species, including those found to be new to science, have been updated. Some of the species previously identified to generic level only are now assigned to species. Moreover, based on new collections between 2012–2015, nine new species records have been added. Lastly, additional information in this edition includes a short remark (on taxonomy and/or natural history) and the national conservation status category for each species.

METHODS

Specimens were identified by me using relevant, published keys and descriptions (Karny, 1923, 1926a, 1926b; Chopard, 1931, 1969; Ragge, 1961; Murphy, 1973; Otte & Alexander, 1983; Townsend, 1983; Jin & Kevan, 1992; Kevan & Jin, 1993; Ingrisch, 1995, 1997, 1998a, 1998b, 1998c, 2006, 2011; Gorochoy, 1998a, 1998b, 2004, 2007, 2009, 2010, 2011a, 2011b, 2013; Helfert & Sanger, 1998; Willemse, 2001; Kim & Kim, 2002; Wang & Shi, 2005; Liu & Kang, 2007; Zhou et al., 2010; Kim, 2011; Ma & Zhang, 2011; Robillard, 2011; Yang & Yang, 2012; Robillard et al., 2013) and by comparison with voucher specimens and type specimens (sometimes only images available). Where doubtful, the identities of the orthopteran specimens were verified by Andrej Gorochoy, Liu Chun-Xiang, Sam Heads, Sigfrid Ingrisch, Tony Robillard, and Pattarawich Dawwrueng. Please refer to Tan (2012a) for the complete description of the methods for the sampling and collection of material.

Classification and nomenclature of species were based on the Orthoptera Species File Online Version 5.0/5.0 (Cigliano et al., 2017). The families, subfamilies, and tribes are arranged alphabetically for ease of reference. In the habitus photographs, the measurement indicated refers to the body length (from the vertex of fastigium to the abdominal apex, exclusive of ovipositor or cercus) of freshly euthanised specimens. The national conservation status categories follow those of Davison (2008): Common, Least Concern, Vulnerable, Endangered and Critically Endangered.

RESULTS AND OBSERVATIONS

Overall, 123 known species representing six families from the suborder Ensifera were collected and examined from the BTNR and CCNR whereas 117 species were recorded previously (Tan, 2012b). The superfamily Grylloidea (64 species from two families) is the most species rich, followed by the Tettigonioidea (47 species from one family). At the other extreme, the superfamily Rhaphidophoroidea and Stenopelmatoidea are represented by merely one family each with a small number of species (one and eight species, respectively). Among the families, the species number is significantly higher in the Gryllidae (54 species) and Tettigoniidae (47 species), whereas the Rhaphidophoridae is only represented with a single species. Forty-two species have had their nomenclature updated in this new edition. Nine species were also added to the original checklist:

1. *Odontogrylodes latus* Chopard (Gryllidae)
2. *Sclerogryllus* sp. 2 (Gryllidae)
3. *Pentacentrus* sp. 1 (Gryllidae)
4. *Micrornebius distinctus* Tan (Mogoplistidae)
5. *Micrornebius eclipsus* Tan (Mogoplistidae)
6. *Micrornebius mandai* Tan (Mogoplistidae)
7. *Capnogryllacris fruhstorferi* (Griffini) (Gryllacrididae)
8. *Larnaca* (*Larnaca*) *fasciata dammermani* (Karny) (Gryllacrididae)
9. *Xestophrys horvathi* Bolívar (Tettigoniidae)

The classification of the taxa is as follows:

- Order Orthoptera
 - Suborder Ensifera
 - Superfamily Grylloidea
 - Family Gryllidae (54)
 - Family Mogoplistidae (10)
 - Superfamily Gryllotalpoidea
 - Family Gryllotalpidae (3)
 - Superfamily Rhaphidophoroidea

Family Rhaphidophoridae (1)
 Superfamily Stenopelmatoidea
 Family Gryllacrididae (8)
 Superfamily Tettigonioidea
 Family Tettigoniidae (47)

The lineages of Ensifera found in and around BTNR and CCNR are comparably representative of the overall phylogenetic diversity of Ensifera (see Song et al., 2015). Five of the seven monophyletic clades (or superfamilies) of the Ensifera are represented here in the BTNR and CCNR. The two missing clades (Schizodactyloidea and Hagloidea) do not occur in Singapore and the Malay Peninsula (Cigliano et al., 2017). This is an impressive representation, especially since the two nature reserves comprise of a relatively small area of fragmented forest located in the middle of highly urbanised Singapore. This is in spite of the fact that the species composition can be observed to be dominated by a few large families.

Additionally, based on the material collected from the BTNR and CCNR between 2010–2015, 23 species new to science were also described. They are listed here chronologically:

1. *Asiophlugis temasek* Gorochov & Tan, 2011 (Tettigoniidae)
2. *Glenophisis singapura* Tan, 2012 (Tettigoniidae)
3. *Jambiliara selita* Ingrisch & Tan, 2012 (Tettigoniidae)
4. *Nahlaksia bidadari* Ingrisch & Tan, 2012 (Tettigoniidae)
5. *Oxylakis singaporensis* Ingrisch & Tan, 2012 (Tettigoniidae)
6. *Gryllotalpa nymphicus* Tan, 2012 (Gryllotalpidae)
7. *Gryllotalpa wallace* Tan, 2012 (Gryllotalpidae)
8. *Trellius neesoon* Gorochov & Tan, 2012 (Gryllidae)
9. *Tremellia timah* Gorochov & Tan, 2012 (Gryllidae)
10. *Phaloria jerelynae* Gorochov & Tan, 2012 (Gryllidae)
11. *Singapuriola separata* Gorochov & Tan, 2012 (Gryllidae)
12. *Micrornebius kopisua* Tan & Ingrisch, 2013 (Mogoplistidae)
13. *Ornebius insculpta* Tan & Ingrisch, 2013 (Mogoplistidae)
14. *Lebinthus luae* Robillard & Tan, 2013 (Gryllidae)
15. *Paragraecia temasek* Tan & Ingrisch, 2014 (Tettigoniidae)
16. *Peracca mirzai* Tan & Ingrisch, 2014 (Tettigoniidae)
17. *Peracca macritchiensis* Tan & Ingrisch, 2014 (Tettigoniidae)
18. *Varitrella (Cantotrella) orion* Gorochov & Tan, 2014 (Gryllidae)
19. *Cesasundana lorniensis* Tan, 2014 (Tettigoniidae)
20. *Micrornebius distinctus* Tan, 2014 (Mogoplistidae)
21. *Micrornebius eclipsus* Tan, 2014 (Mogoplistidae)
22. *Micrornebius mandai* Tan, 2014 (Mogoplistidae)
23. *Endodreelanva jimini* Tan & Kamaruddin, 2016 (Gryllidae)

The national conservation status categories for all 123 species are provided with the hope to aid conservation managers in decision and policy making when the orthopterans are being used as bio-indicators. It should however be noted that it is not easy to obtain population size, area of occupancy, and rates of decline for insects. As such, the status provided here for each species is qualitative and dependent on the author's experience and observations in the field between 2009 and 2016. Threats to the Ensifera and Orthoptera in general are mostly habitat loss and degradation. A summary of the national conservation status categories for the Ensifera are summarised below:

1. Common: 31
2. Vulnerable: 56
3. Endangered: 23
4. Critically endangered: 13

**ENSIFERA RECORDED FROM THE BUKIT TIMAH AND
CENTRAL CATCHMENT NATURE RESERVES**

FAMILY Gryllidae

So far, 54 species from 13 subfamilies of Gryllidae have been collected. The subfamilies Trigonidiinae and Podoscirtinae are represented with the largest number of species (13 and 10, respectively). On the other hand, five subfamilies are represented with two or less species—Itarinae, Oecanthinae, Pentacentrinae, Pteroplistinae, and Sclerogryllinae.

Subfamily Eneopterinae

The review of the subfamily from Singapore can be found in Robillard & Tan (2013) and a key to species can be found in Tan & Robillard (2014).

***Cardiodactylus singapura* Robillard
(Fig. 1)**

Material collected. — ZRC.ORT.105, 1 female, Venus Trail, 8 October 2010, coll. M. K. Tan & M. R. B. Ismail; ZRC.ORT.123, 1 female, Wallace Trail, 3 November 2010, coll. M. K. Tan; ZRC.ORT.133, 1 male, Nee Soon pipeline, 25 November 2010, coll. M. K. Tan, R. W. J. Ngiam & M. R. B. Ismail; ZRC.ORT.1091, 1 female, Woodcutter Trail, 24 August 2013, coll. M. K. Tan & H. Yeo.

Remarks. — This species was described from Singapore but may also be found in Peninsular Malaysia (Tan & Kamaruddin, 2016a). Another species from the same genus, *Cardiodactylus admirabilis* Tan & Robillard can be found in Singapore, but is not recorded in the BTNR and CCNR (Tan & Robillard, 2014).

National conservation status. — Common.

***Lebinthus luae* Robillard & Tan
(Fig. 2)**

Material collected. — ZRC.ORT.294, 1 male, 1 female, Hindhede Nature Park, 2 June 2011, coll. M. K. Tan (paratype).

Remarks. — Only the generic name was provided in the first edition (*Lebinthus* sp.). The species was formally described by Robillard & Tan (2013). This species is named after the recently retired curator of the Lee Kong Chian Natural History Museum, Ms. Lua Hui Kheng. This species is restricted to mostly coastal forests (such as those in Labrador Nature Reserve and Pulau Ubin) and parts of the BTNR (Tan et al., 2012; Robillard & Tan, 2013; Tan, 2013).

National conservation status. — Vulnerable.

***Nisitrus vittatus* (de Haan)
(Fig. 3)**

Material collected. — ZRC.ORT.116, 1 male, Hindhede Nature Park, 30 October 2010, coll. M. K. Tan.

Remarks. — This is among the more common species of crickets found in nature parks and nature reserves in Singapore. In the day, the male can be heard continuously chirping in the vegetation (Robillard & Tan, 2013).

National conservation status. — Common.



Fig. 1. *Cardiodactylus singapura* Robillard: A, female, 19.5 mm; B, ZRC.ORT.133, male, 17.7 mm.



Fig. 2. *Lebinthus luae* Robillard & Tan: ZRC.ORT.294, female, 17.5 mm (A); ZRC.ORT.294, male, 16.4 mm (B).



Fig. 3. *Nisitrus vittatus* (de Haan): ZRC.ORT.116, male, 14.8 mm.

Subfamily **Euscyrtinae**

These crickets are known as the quiet crickets, because unlike most crickets, the male does not have the stridulatory apparatus on its wings and as such, cannot produce calling songs.

Beybienkoana trapeza Liu & Shi (Fig. 4)

Material collected. — ZRC.ORT.285, 1 male, Mandai Track 15, 24 April 2011, coll. M. K. Tan; ZRC.ORT.280, 1 female, Mandai Track 15, 28 May 2011, coll. M. K. Tan.

Remarks. — Only the generic name was provided in the first edition (*Beybienkoana* sp.). Examination of the male genitalia and comparison with type specimens allowed the material to be identified to species. This species is so far found only among bamboo clumps. This species was described from China but is also found in Peninsular Malaysia (Tan & Kamaruddin, 2016a).

National conservation status. — Endangered.

Euscyrtus (Osus) concinnus (de Haan) (Fig. 5)

Material collected. — ZRC.ORT.323, 1 male, Mandai Track 15, 21 June 2011, coll. M. K. Tan, R. W. J. Ngiam, J. J. Y. Chan & T. Robillard.

Remarks. — The species inhabits grassy areas.

National conservation status. — Common.



Fig. 4. *Beybienkoana trapeza* Liu & Shi: ZRC.ORT.285, male, 14.7 mm (A); ZRC.ORT.280, female, 19.3 mm (B).



Fig. 5. *Euscyrtus (Osus) concinnus* (de Haan): ZRC.ORT.323, male, 10.3 mm.



Fig. 6. *Euscyrtus (Osus) c.f. hemelytrus* (de Haan): ZRC.ORT.284, female, 12.5 mm (A); ZRC.ORT.279, male, 12.2 mm (B).



Fig. 7. *Patiscus malayanus* Chopard: ZRC.ORT.336, female, 15.5 mm.

Euscyrtus (Osus) hemelytrus (de Haan)
(Fig. 6)

Material collected. — ZRC.ORT.284, 1 female, Mandai Track 15, 24 April 2011, coll. M. K. Tan; ZRC.ORT.279, 1 male, Mandai Track 15, 28 May 2011, coll. M. K. Tan; ZRC.ORT.415, 1 male, Nee Soon pipeline, 23 July 2012, coll. M. K. Tan & R. W. J. Ngiam.

Remarks. — This species tends to be found among tall grasses.

National conservation status. — Common.

Patiscus malayanus Chopard
(Fig. 7)

Material collected. — ZRC.ORT.336, 1 male, 1 female, Wallace Trail, 6 August 2011, coll. M. K. Tan; ZRC.ORT.1036, 1 male, Mandai Track 15, 16 May 2014, coll. M. K. Tan & H. Yeo.

Remarks. — Only the generic name was provided in the first edition. Examination of male genitalia allowed the material to be identified to species. This species tends to be found among tall grasses and can be found coexisting with the two *Euscyrtus* species.

National conservation status. — Common.

Subfamily **Gryllinae**

These crickets are ground-dwelling; many of them form burrows underground.

Gryllus bimaculatus De Geer
(Fig. 8)

Material collected. — ZRC.ORT.134, 1 female, Nee Soon pipeline, 25 November 2010, coll. M. K. Tan, R. W. J. Ngiam & M. R. B. Ismail.

Remarks. — This ground-dwelling species is very widespread and can be sold in aquarium as live fish food.

National conservation status. — Common.

Gymnogryllus c.f. *angustus* (Saussure)
(Fig. 9)

Material collected. — ZRC.ORT.156, 1 male, Chestnut Track, 17 December 2010, coll. M. K. Tan; ZRC.ORT.250, 1 male, Senapang Link, 24 March 2011, coll. M. K. Tan; ZRC.ORT.295, 1 male, Hindhede Nature Park, 2 June 2011, coll. M. K. Tan.

Remarks. — Only the generic name was provided in the first edition (*Gymnogryllus* sp. 1). Further examination allowed the material to be identified tentatively to species. This large ground-dwelling cricket digs burrows in the forest floor and produces high-pitched and resonant buzzes at night, sometimes in large numbers. Upon disturbance, it retreats into its burrow, making it difficult to observe.

National conservation status. — Common.



Fig. 8. *Gryllus bimaculatus* De Geer: ZRC.ORT.134, female, 22.9 mm.



Fig. 9. *Gymnogryllus* c.f. *angustus* (Saussure): ZRC.ORT.250, male, 30.4 mm.

Gymnogryllus malayanus Desutter-Grandcolas
(Fig. 10)

Material collected. — ZRC.ORT.299, 2 males, Lornie Trail, 18 June 2011, coll. M. K. Tan; ZRC.ORT.445, 1 female, Upper Seletar Trail, 13 April 2013, coll. M. K. Tan & H. Yeo.

Remarks. — Only the generic name was provided in the first edition (*Gymnogryllus* sp. 2). Examination of male genitalia allowed the material to be identified to species. This large ground-dwelling cricket digs burrows in the forest floor and produces high-pitched and resonant buzzes at night. The calling song of this species is louder and higher pitched than that of *Gymnogryllus angusta*. Upon disturbance, it retreats into its burrow, making it difficult to observe.

National conservation status. — Vulnerable.

Loxoblemmus parabolicus Saussure
(Fig. 11)

Material collected. — ZRC.ORT.169, 2 males, Nee Soon pipeline, 20 December 2010, coll. M. K. Tan, R. W. J. Ngiam & M. R. B. Ismail; ZRC.ORT.275, 1 male, Eco-Link CCNR, 16 May 2011, coll. M. K. Tan & R. W. J. Ngiam.

Remarks. — This ground-dwelling species can be found among short grasses along forest edge.

National conservation status. — Common.



Fig. 10. *Gymnogryllus malayanus* Desutter-Grandcolas: ZRC.ORT.299, male, 35.2 mm.

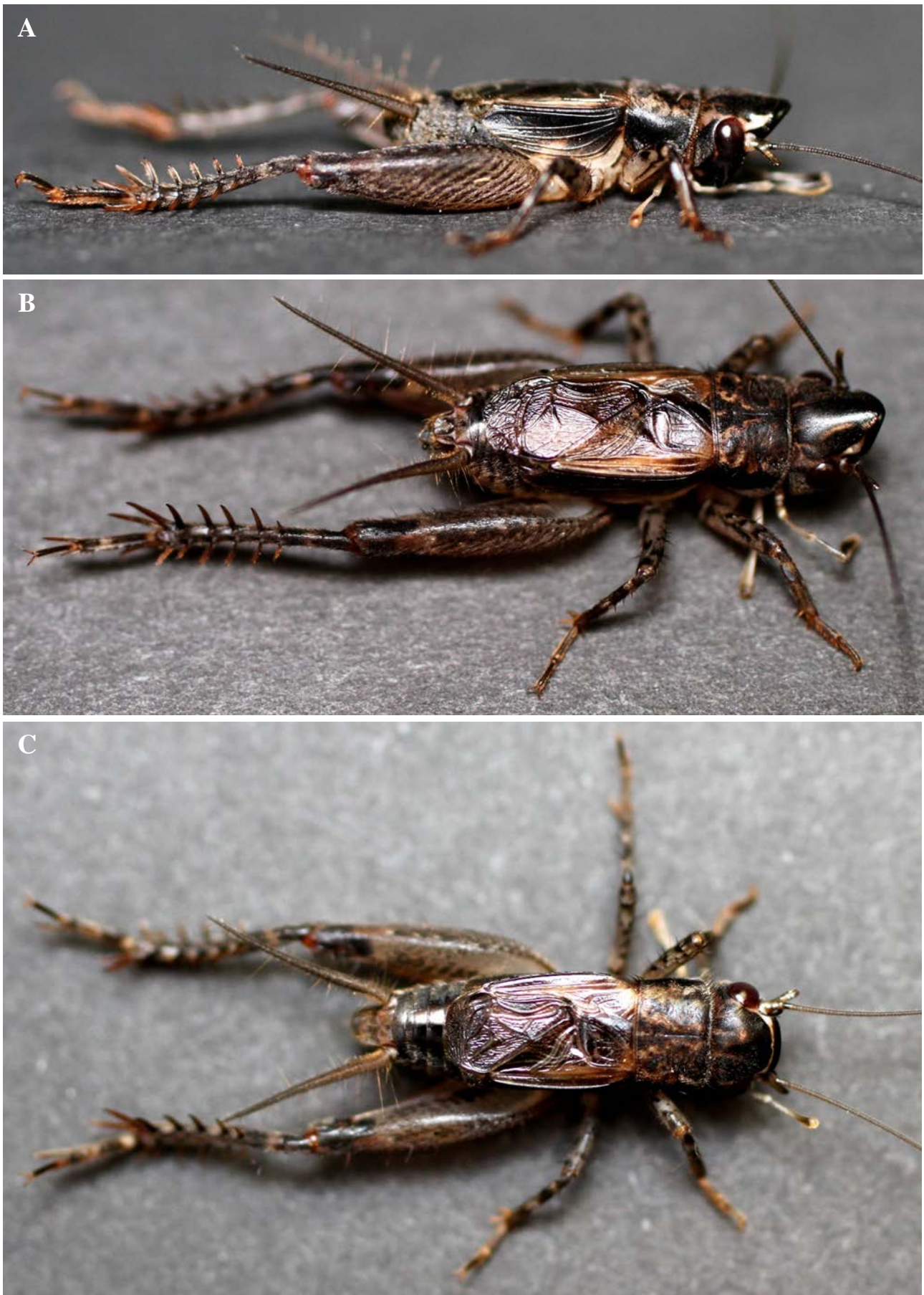


Fig. 11. *Loxoblemmus parabolicus* Saussure: ZRC.ORT.169, male, 13.8 mm (A); ZRC.ORT.169, male, 13.7 mm (B); ZRC.ORT.275, male, 13.0 mm (C).

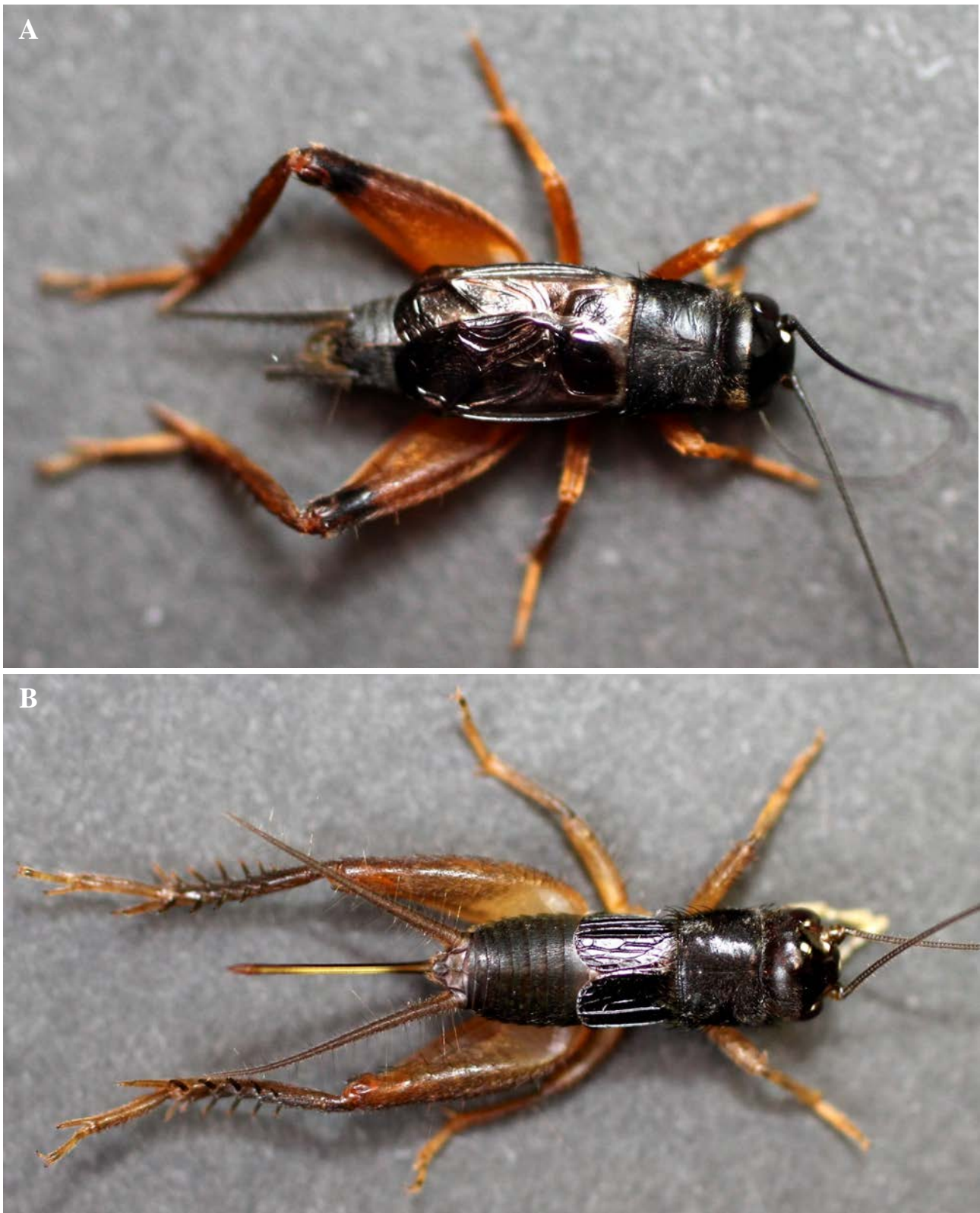


Fig. 12. *Mitius* species: ZRC.ORT.271, male, 11.4 mm (A); ZRC.ORT.329, female, 10.8 mm (B).

Mitius sp.
(Fig. 12)

Material collected. — ZRC.ORT.271, 1 male, Venus Trail, 2 May 2011, coll. M. K. Tan; ZRC.ORT.329, 1 female, Eco-Link CCNR, 26 July 2011, coll. M. K. Tan, R. W. J. Ngiam & NParks volunteers.

Remarks. — This ground-dwelling species can be found among short grasses along forest edge.

National conservation status. — Common.

Teleogryllus sp.
(Fig. 13)

Material collected. — ZRC.ORT.161, 1 male, Nee Soon pipeline, 20 December 2010, coll. M. K. Tan, R. W. J. Ngiam & M. R. B. Ismail; ZRC.ORT.1067, Mandai Track 15, 13 June 2014, coll. M. K. Tan & H. Yeo.

Remarks. — This ground-dwelling species can be found among short grasses along forest edge.

National conservation status. — Common.

Velarifictorus (Velarifictorus) aspersus aspersus (Walker)
(Fig. 14)

Material collected. — ZRC.ORT.127, 1 female, Lornie Trail, 15 November 2010, coll. M. K. Tan & M. R. B. Ismail; ZRC.ORT.221, 1 male, Dairy Farm Loop, 7 February 2011, coll. M. K. Tan; ZRC.ORT.366, 1 male, Hindhede Nature Park, 17 January 2012, coll. M. K. Tan; ZRC.ORT.404, 1 male, Wallace Trail, 8 March 2012, coll. M. K. Tan; ZRC.ORT.1033,1034, 2 males, Mandai Track 15, 22 May 2014, coll. M. K. Tan & H. Yeo.

Remarks. — Only the generic name was confirmed in the first edition. Examination of male genitalia allowed the species to be identified. This is a very common ground-dwelling cricket found along forest edges and grassy areas and even urbanised areas. The male can be heard chirping at night, sometimes quite loudly.

National conservation status. — Common.



Fig. 13. *Teleogryllus* species: ZRC.ORT.161, male, 23.6 mm.



Fig. 14. *Velarifictorus (Velarifictorus) aspersus aspersus* (Walker): ZRC.ORT.127, female, 16.1 mm (A); ZRC.ORT.221, male, 14.9 mm (B).

Subfamily **Itarinae**

Itara johni Gorochov (Fig. 15)

Material collected. — ZRC.ORT.269, 1 female, Senapang Link, 28 April 2011, coll. M. K. Tan; ZRC.ORT.314, 1 female, Senapang Link, 5 July 2011, coll. M. K. Tan & L. F. Cheong; ZRC.ORT.328, 1 male, Chestnut Track, 26 July 2011 (day), coll. R. W. J. Ngiam; ZRC.ORT.408, 1 female, 13 June 2012, coll. M. K. Tan & R. W. J. Ngiam; ZRC.ORT.443, 1 male, Lower Peirce Reservoir Park, 10 August 2012, coll. M. K. Tan.

Remarks. — This is a forest-restricted species that tends to inhabit foliage of understorey plants. The male produces loud and high-pitched resonant chirps at night. Species from this subfamily are updated here. A second species in the previous edition comprising of only females has been removed until male specimens are provided to verify the identity of the species.

National conservation status. — Vulnerable.

Subfamily **Landrevinae**

Known commonly as the bark crickets, they tend to be found among tree barks and branches. The wings of many species are not developed for flying and some species do not have hind wings.

Endodreelanva jimini Tan & Kamaruddin
(Fig. 16)

Material collected. — ZRC.ORT.172 (paratype), 1 male, Belukar Track, 31 December 2010, coll. M. K. Tan & H. P. M. Woo; ZRC.ORT.231 (paratype), 1 female, Chestnut Track, 20 February 2011, coll. M. K. Tan; ZRC.ORT.247 (holotype), 1 male, Mandai Avenue felled forest, 17 March 2011, coll. M. K. Tan & R. W. J. Ngiam; ZRC.ORT.289 (paratype), 1 male, Senapang Link, 29 May 2011, coll. M. K. Tan.

Remarks. — A different generic name (*Duolandrevus* sp. 1) was provided in the first edition. Examination of male genitalia allowed the material to be identified to genus. The species was formally described by Tan & Kamaruddin (2016c). This is a forest-restricted species. This species is hard to observe as it tends to be found among branches and bark. It hides in hollow branches upon disturbance. The wings in the adult are highly reduced and cannot be used for flight.

National conservation status. — Vulnerable.

Duolandrevus (Bejorama) parvulus Gorochov
(Fig. 17)

Material collected. — ZRC.ORT.197, 1 male, Rifle Range Link, 23 January 2011, coll. M. K. Tan & R. W. J. Ngiam.

Remarks. — Only the generic name was provided in the first edition (*Duolandrevus* sp. 2). Examination of male genitalia allowed the material to be identified to species (see Tan & Kamaruddin, 2016c). This is a forest-restricted species which is difficult to find as it tends to hide among fallen tree trunks.

National conservation status. — Vulnerable.

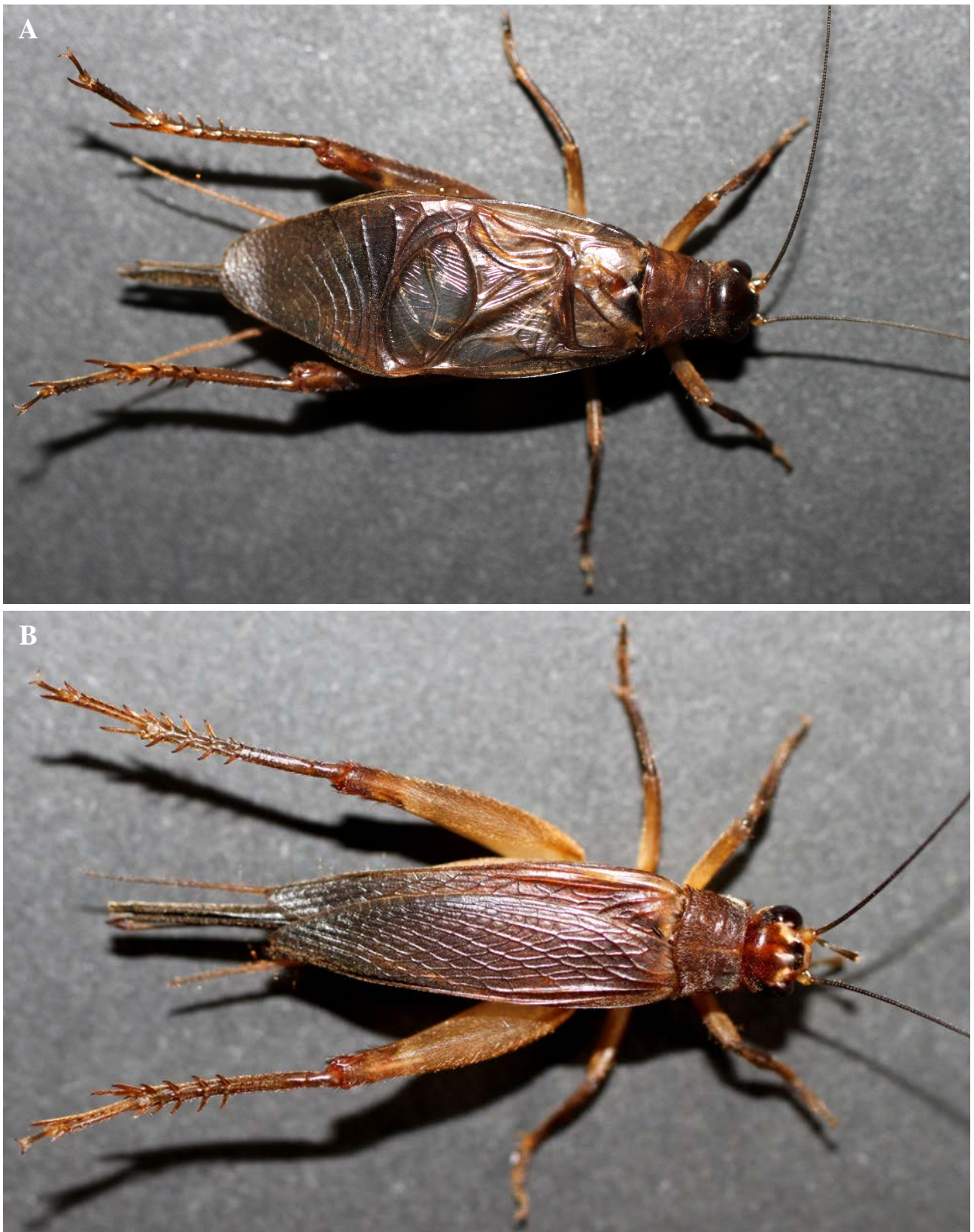


Fig. 15. *Itara johni* Gorochov: ZRC.ORT.328, male, 19.5 mm; ZRC.ORT.314, female, 15.9 mm.

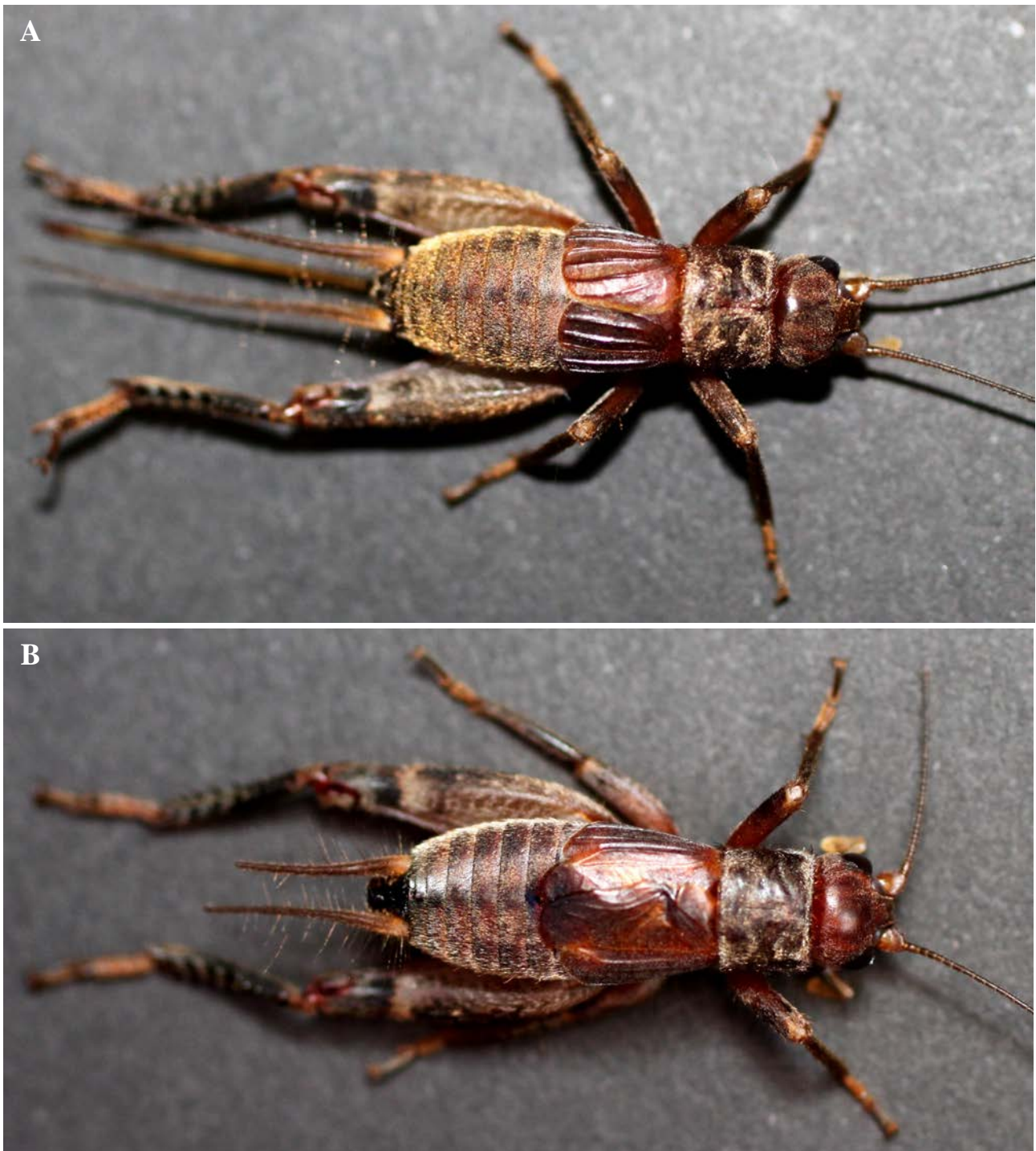


Fig. 16. *Endodreelanva jimini* Tan & Kamaruddin: ZRC.ORT.231, female, 18.4 mm (A); ZRC.ORT.247, male, 17.9 mm (B).



Fig. 17. *Duolandrevus (Bejorama) parvulus* Gorochov: ZRC.ORT.197, male, 13.7 mm.



Fig. 18. *Odontogryllodes latus* Chopard: ZRC.ORT.1039, male, 12.2 mm. Image by Visionary Digital System (LKC NHM).

Odontogryllodes latus Chopard
(Fig. 18)

Material collected. — ZRC.ORT.210, 1 male, Nee Soon Swamp Forest, 20 December 2010, coll. M. K. Tan, R. W. J. Ngiam & M. R. B. Ismail; ZRC.ORT.244, 1 male, Upper Seletar Trail, 12 March 2011, coll. M. K. Tan; ZRC.ORT.1039, 1 male, Mandai secondary forest, 4 June 2014, coll. M. K. Tan & H. Yeo.

Remarks. — This is a forest-restricted species that is difficult to find as it tends to inhabit branches and tree bark. It will hide in hollow branches when disturbed. The tegmina in the male are highly

reduced and cannot produce sounds. This species is new to this list because material previously collected was initially thought to be a nymph until male genitalia were dissected and examined to confirm the identity (see Tan & Kamaruddin, 2016c).

National conservation status. — Vulnerable.

Subfamily **Nemobiinae**

Crickets from this subfamily are generally small. They differ from those of another subfamily of small crickets, the Trigonidiinae, by the absence of adhesive pads on their tarsi and tend to inhabit the ground or short grasses (instead among understorey plants or undergrowth) (Otte & Alexander, 1983).

Polionemobius* c.f. *taprobanensis (Walker)
(Fig. 19)

Material collected. — ZRC.ORT.310, 1 male, Venus Trail, 25 June 2011, coll. M. K. Tan.

Remarks. — Only the generic name was provided in the first edition (*Pteronemobius* sp. 3). Examination of the male genitalia allowed the material to be identified to species. This species can be found in urbanised parks. The male produces soft chirping sounds at night.

National conservation status. — Common.

Pteronemobius* (*Pteronemobius*) c.f. *indicus (Walker)
(Fig. 20)

Material collected. — ZRC.ORT.270, 286, 1 male, 1 female, Venus Trail, 2 May 2011, coll. M. K. Tan; ZRC.ORT.318, 1 male, Rifle Range Link, 7 July 2011, coll. M. K. Tan & L. F. Cheong.

Remarks. — Only the generic name was provided in the first edition (*Pteronemobius* sp. 2). Examination of the male genitalia allowed the material to be identified to species. It is very similar to other species in the same subfamily but differs by the male genitalia. This species is among the larger species in Singapore.

National conservation status. — Common.

***Pteronemobius* sp. 1**
(Fig. 21)

Material collected. — ZRC.ORT.194, 1 female, Mandai Track 15, 18 January 2011, coll. M. K. Tan & H. P. M. Woo; ZRC.ORT.252, 1 male, Mandai Track 15, 30 March 2011, coll. M. K. Tan.

Remarks. — The taxonomy of this group requires further study before the species can be identified. It is found among grassy areas but this is a less widespread and common species, at least in Singapore.

National conservation status. — Vulnerable.



Fig. 19. *Polionemobius* c.f. *taprobanensis* (Walker): ZRC.ORT.310, male, 6.7 mm.



Fig. 20. *Pteronemobius (Pteronemobius)* c.f. *indicus* (Walker): ZRC.ORT.318, male, 7.6 mm.



Fig. 21. *Pteronemobius* species 1: ZRC.ORT.194, female, 5.5 mm (A); ZRC.ORT.252, male, 6.2 mm (B).

Pteronemobius sp. 2
(Fig. 22)

Material collected. — ZRC.ORT.320, 1 male, Nee Soon pipeline, 14 July 2011, coll. M. K. Tan, M. R. B. Ismail & L. F. Cheong.

Remarks. — More taxonomic studies are required before this species can be identified. It is found in grassy areas but this is a less widespread and common species, at least in Singapore.

National conservation status. — Vulnerable.



Fig. 22. *Pteronemobius* species 2: ZRC.ORT.320, male, 5.7 mm.

Subfamily **Oecanthinae**

Crickets from this subfamily tend to be pale in colour, sometimes green, and appear fragile. The tegmina in the male are enlarged for producing loud calls. The species within each genus are very similar and require dissection of the male genitals for identification to species. Unfortunately, some species lack information on the male genitals, thus making it difficult to identify to species for the material collected in the BTNR and CCNR.

Oecanthus sp. (Fig. 23)

Material collected. — ZRC.ORT.325, 1 male, Mandai Track 15, 9 August 2011, coll. M. K. Tan & J. J. Y. Chan.

Remarks. — This species is found in grassy areas where the male can be heard producing calls at night. The 19th century American novelist Nathaniel Hawthorne (1833) once said: “If moonlight could be heard, it would sound just like this.” ‘This’ referred to species from this cosmopolitan genus.

National conservation status. — Vulnerable.



Fig. 23. *Oecanthus* species: ZRC.ORT.325, male, 11.2 mm.



Fig. 24. *Xabea* species: ZRC.ORT.267, male, 10.9 mm.

Xabea sp.
(Fig. 24)

Material collected. — ZRC.ORT.287, 1 male, MacRitchie Nature Trail, 10 April 2011, coll. M. K. Tan; ZRC.ORT.267, 1 male, Woodcutter Trail, 26 April 2011, coll. M. K. Tan, R. W. J. Ngiam, J. J. Y. Chan & W. L. Lim.

Remarks. — In contrast to the former species, this is a forest-restricted species. This genus also differs from the former by the cerci being shorter than the mesotibiae (they are longer than the mesotibiae in *Oecanthus*); the hind tibiae are without subapical spurs or small spines (subapical spurs and spines are present in *Oecanthus*), and the male tegmina have a bent Cu1 vein (straight in *Oecanthus*) (Otte & Alexander, 1983). The male can be heard calling at night among the leaves of trees.

National conservation status. — Vulnerable.

Subfamily **Phaloriinae**

Phaloria jerelynae Gorochov & Tan
(Fig. 25)

Material collected. — ZRC.ORT.277, 1 male, BTNR main road, 19 May 2011, coll. M. K. Tan & L. F. Cheong (holotype); ZRC.ORT.360, 1 male, BTNR main road, 24 October 2011, coll. M. K. Tan, R. W. J. Ngiam & L. F. Cheong (paratype); ZRC.ORT.450, 1 male, BTNR main road, 24 October 2011, coll. M. K. Tan, R. W. J. Ngiam & L. F. Cheong (paratype); ZRC.ORT.451, 1 male, BTNR main road, 8 January 2012, coll. M. K. Tan & J. J. Y. Chan (paratype); ZRC.ORT.452, 1 female, BTNR main road, 26 October 2012, coll. M. K. Tan.

Remarks. — An endemic species found only in a small patch of forest within the BTNR. It is mostly found among foliage of understorey plants but calling songs can also be heard at night from the canopy. The calling song consists of repeated double chirps (Gorochov & Tan, 2012).

National conservation status. — Critically endangered.



Fig. 25. *Phaloria jerelynae* Gorochov & Tan: ZRC.ORT.277, male, 15.4 mm.



Fig. 26. *Tremellia timah* Gorochov & Tan: ZRC.ORT.144, male, 16.9 mm.

Tremellia timah Gorochov & Tan

(Fig. 26)

Material collected. — ZRC.ORT.144, 1 male, Hindhede Nature Park, 30 October 2010, coll. M. K. Tan (paratype); ZRC.ORT.458, 1 male, Dairy Farm Loop, 20 January 2012, coll. M. K. Tan, R. W. J. Ngiam & W. L. Lim (paratype); ZRC.ORT.457, 1 male, Hindhede Nature Park, 29 January 2012, coll. M. K. Tan & J. J. Y. Chan (holotype); ZRC.ORT.463, 1 female, Wallace Trail, 10 July 2012, coll. M. K. Tan & K. H. Ong (paratype); ZRC.ORT.466, 1 male, Upper Seletar Trail, 13 April 2013, coll. M. K. Tan & H. Yeo.

Remarks. — An endemic forest species. It can be found fairly commonly among shrubs and the understorey vegetation. The male can be heard producing a series of trilling calls at night (Gorochov & Tan, 2012).

National conservation status. — Vulnerable.

Trellius neesoon Gorochov & Tan

(Fig. 27)

Material collected. — ZRC.ORT.266, 1 male, Nee Soon pipeline, 20 April 2011 (day), coll. M. K. Tan & M. R. B. Ismail (holotype).

Remarks. — An endemic species restricted to swamp forests. It can be found among vegetation near streams. It is a good jumper and can also fly over relatively long distances.

National conservation status. — Critically endangered.



Fig. 27. *Trellius neesoon* Gorochov & Tan: ZRC.ORT.266, male, 15.6 mm.



Fig. 28. *Pentacentrus* sp. 1: ZRC.ORT.1071, female, 8.5 mm. Image by Visionary Digital System (LKCNHM).

Subfamily **Pentacentrinae**

Pentacentrus sp. 1
(Fig. 28)

Material collected. — ZRC.ORT.1071–1078, 4 males and 3 females, Mandai secondary forest, 7 June 2014, coll. M. K. Tan, H. Yeo & L. F. Cheong.

Remarks. — This species is new to the list. It was reported as a new record for the CCNR in Tan et al. (2015). This species has distinctly short black and white antennae. It is not common but can be found along forest edges. It can be attracted to light traps.

National conservation status. — Vulnerable.

Subfamily **Podoscirtinae**

Aphonoides sp. 1
(Fig. 29)

Material collected. — ZRC.ORT.102, 1 male, Venus Trail, 8 October 2010, coll. M. K. Tan & M. R. B. Ismail; ZRC.ORT.120, 1 male, Lornie Trail, 2 November 2010, coll. M. K. Tan.

Remarks. — It is a relatively common species in the forest. Many species from this genus are very similar and can only be reliably differentiated by comparing the male genitalia. It is found to inhabit understorey plants, and usually found on leaves or branches.

National conservation status. — Vulnerable.



Fig. 29. *Aphonoides* species 1: ZRC.ORT.120, male, 11.8 mm.



Fig. 30. *Aphonoides* species 2: ZRC.ORT.115, female, 13.1 mm.

***Aphonoides* sp. 2**
(Fig. 30)

Material collected. — ZRC.ORT.115, 1 female, Hindhede Nature Park, 30 October 2010, coll. M. K. Tan.

Remarks. — This is a less commonly sighted species than the former. Note the difference in the wing patterns between the two species. They are found to inhabit understory plants, usually on leaves or branches.

National conservation status. — Vulnerable.

***Aphonoides* sp. 3**
(Fig. 31)

Material collected. — ZRC.ORT.233, 1 female, Mandai Track 15, 22 February 2011, coll. M. K. Tan; ZRC.ORT.296, 1 male, Hindhede Nature Park, 2 June 2011, coll. M. K. Tan.

Remarks. — This species was *Aphonoides* sp. 4 in the first edition. This species differs clearly from the previous two species by their colouration. It is also a relatively rarer species than sp. 1 although it can be found along forest edge. They are found to inhabit understory plants, usually on leaves or branches.

National conservation status. — Vulnerable.

***Mistshenkoana* sp.**
(Fig. 32)

Material collected. — ZRC.ORT.167, 1 female, Rifle Range Link, 5 November 2010, coll. M. K. Tan.

Remarks. — Only the genus name was available in the first edition (*Aphonoides* sp. 3). A forest-restricted species, this species is also rarely encountered and as such, little is known about them. Further examination allows the material to be identified to a more correct genus name and updated here.

National conservation status. — Vulnerable.

***Mnesibulus (Mnesibulus) c.f. brunnerianus* (Saussure)**
(Fig. 33)

Material collected. — ZRC.ORT.290, 1 female, Senapang Link, 29 May 2011, coll. M. K. Tan; ZRC.ORT.361, 1 male, BTNR main road, 24 October 2011, coll. M. K. Tan, R. W. J. Ngiam & L. F. Cheong.

Remarks. — Only the generic name was provided in the first edition (*Mnesibulus* sp.). New male specimen allowed the material to be identified tentatively to species. This is a forest-restricted species. It is found to inhabit understory plants, usually on leaves or branches.

National conservation status. — Vulnerable.



Fig. 31. *Aphonoides* species 3: ZRC.ORT.233, female, 16.5 mm (A); ZRC.ORT.296, male, 15.5 mm (B).



Fig. 32. *Mistshenkoana* sp.: ZRC.ORT.167, female, 12.2 mm.



Fig. 33. *Mnesibulus* (*Mnesibulus*) c.f. *brunnerianus* (Saussure): ZRC.ORT.290, female, 14.7 mm.



Fig. 34. *Idiotrella* c.f. *karnyi* (Chopard): ZRC.ORT.170, male, 25.2 mm.

***Idiotrella* c.f. *karnyi* (Chopard)**
(Fig. 34)

Material collected. — ZRC.ORT.103, 104, 1 male, 1 female, Venus Trail, 8 October 2010, coll. M. K. Tan & M. R. B. Ismail; ZRC.ORT.170, 1 male, Dairy Farm Pass, 31 December 2010, coll. M. K. Tan & H. P. M. Woo; ZRC.ORT.1014, 1 female, Sime Track, 25 August 2012, coll. M. K. Tan.

Remarks. — The species was tentatively identified as *Varitrella* or *Idiotrella* or *Noctitrella* sp. 1 in the first edition. Examination of male genitalia allowed the material to be identified to species. This is a forest-restricted species and are found to inhabit foliage on understorey plants. Species from this specious genus can only be reliably identified by comparing male genitalia.

National conservation status. — Vulnerable.

***Sonotrella (Calypotrella) bipunctata* (Chopard)**

(Fig. 35)

Material collected. — ZRC.ORT.151, 1 male, Dairy Farm Loop, 10 December 2010, coll. M. K. Tan & M. R. B. Ismail.

Remarks. — Only the generic name was provided in the first edition (*Sonotrella* sp.). Examination of male genitalia allowed the material to be identified to species. This is a rare and forest-restricted species and little is known about it.

National conservation status. — Endangered.

***Sonotrella (Megatrella) typica* Gorochov**

(Fig. 36)

Material collected. — ZRC.ORT.198, 1 female, Rifle Range Link, 23 January 2011, coll. M. K. Tan & R. W. J. Ngiam; ZRC.ORT.1031, 1 male, Woodcutter Trail, 11 October 2013, coll. M. K. Tan & H. Yeo.

Remarks. — The species was tentatively identified as *Zvenella* sp. in the first edition. Examination of male genitalia allowed the material to be identified to species. This is a rare and forest-restricted species that can be sighted occasionally along forest edges. This species was observed to feed on *Dillenia suffruticosa* leaves.

National conservation status. — Endangered.



Fig. 35. *Sonotrella (Calypotrella) bipunctata* (Chopard): ZRC.ORT.151, male, 17.5 mm.



Fig. 36. *Sonotrella (Megatrella) typica* Gorochov: ZRC.ORT.198, female, 32.8 mm.



Fig. 37. *Varitrella (Cantotrella) orion* Tan & Gorochov: ZRC.ORT.200, male, 22.1 mm.

***Varitrella (Cantotrella) orion* Tan & Gorochov**
(Fig. 37)

Material collected. — ZRC.ORT.200, 1 male, Hindhede Way, 26 January 2011, coll. M. K. Tan (holotype).

Remarks. — The species was tentatively identified as *Varitrella* or *Idiotrella* or *Noctitrella* sp. 2 in the first edition. The species name is updated here after the species was formally described (Gorochov & Tan, 2014). There is only one record of this endemic species. Little is known about them. The single male collected is also the holotype of this species (Gorochov & Tan, 2014).

National conservation status. — Critically endangered.



Fig. 38. *Varitrella* or *Idiotrella* or *Noctitrella* species 1: ZRC.ORT.315, female, 21.9 mm.



Fig. 39. *Singapuriola separata* Gorochov & Tan: ZRC.ORT.274, male, 11.2 mm.

***Varitrella* or *Idiotrella* or *Noctitrella* sp. 1**
(Fig. 38)

Material collected. — ZRC.ORT.315, 1 female, Dairy Farm Pass, 6 July 2011, coll. M. K. Tan.

Remarks. — The species was tentatively identified as *Varitrella* or *Idiotrella* or *Noctitrella* sp. 3 in the first edition. This is a rare and forest-restricted species. Male specimens are needed for identification as congeners are very similar morphologically and often can only be differentiated by the male genitalia.

National conservation status. — Vulnerable.

Subfamily **Pteroplistinae**

Singapuriola separata Gorochoy & Tan
(Fig. 39)

Material collected. — ZRC.ORT.274, 1 male, Eco-Link CCNR, 16 May 2011, coll. M. K. Tan & R. W. J. Ngiam (paratype); ZRC.ORT.464, 1 male, Eco-Link CCNR, 27 January 2012, coll. M. K. Tan & J. J. Y. Chan (paratype); ZRC.ORT.459, 1 male, Belukar Track, 3 April 2012, coll. M. K. Tan, R. W. J. Ngiam & J. J. Y. Chan (holotype); ZRC.ORT.1028, 1 male, BTNR main road, 6 January 2014, coll. M. K. Tan & H. Yeo; ZRC.ORT.1062, 1 male, Chestnut Track, 11 June 2014, coll. M. K. Tan & H. Yeo.

Remarks. — This is a new genus of cricket first described from Singapore. This genus is so far endemic to Singapore and is restricted to the forest. It hides among dead leaves and hollow branches among shrubs and trees. The male can be heard producing soft chirping songs at night while hiding among leaves and branches.

National conservation status. — Endangered.

Subfamily **Sclerogryllinae**

Sclerogryllus sp. 1
(Fig. 40)

Material collected. — ZRC.ORT.222, 1 female, Dairy Farm Pass, 10 February 2011, coll. M. K. Tan; ZRC.ORT.281, 1 male, Mandai Track 15, 28 May 2011, coll. M. K. Tan; ZRC.ORT.1040, 1 male, Mandai Track 15, 22 May 2014, coll. M. K. Tan & H. Yeo; 1 female, Mandai Track 15, grassy plot, 13 June 2014, coll. M. K. Tan & H. Yeo.

Remarks. — The taxonomy of this small genus require further investigation before species name can be confirmed. This relatively uncommon species tends to be found among forest floor and leaf litter.

National conservation status. — Vulnerable.

Sclerogryllus sp. 2
(Fig. 41)

Material collected. — ZRC.ORT.1030, 1 male, Mandai Track 15, 4 October 2013, coll. M. K. Tan & H. Yeo; ZRC.ORT.1041, 1 male, Mandai Track 15, 30 May 2014, coll. M. K. Tan & H. Yeo, 30 May 2014.

Remarks. — This species is new to this list. It was reported as a new record for CCNR in Tan et al. (2015). This species differs from the former by the white femora. The males also differ in their genitalia. This relatively uncommon species tends to be found on forest floor and dry leaf litter.

National conservation status. — Vulnerable.



Fig. 40. *Sclerogryllus* sp. 1: ZRC.ORT.222, female, 10.7 mm (A); ZRC.ORT.281, male, 9.6 mm (B).



Fig. 41. *Sclerogryllus* sp. 2: ZRC.ORT.1030, male, 10.0 mm.



Fig. 42. *Amusurgus* species 1: ZRC.ORT.168, female, 6.2 mm.



Fig. 43. *Amusurgus* species 2: ZRC.ORT.218, male, 6.8 mm.

Subfamily **Trigonidiinae**

The Trigonidiinae, commonly known as the sword-tailed crickets, is in need of revision. Unfortunately, the genitalia, which are important for diagnosis of the species, of Indo-Malayan species are insufficiently studied. It is thus difficult to identify species until all known species have been examined. In particular, species from the genus *Anaxipha* should be rightfully transferred to other genera. Species and genera are morphologically similar and often require examination of the male genitalia for identification.

Amusurgus sp. 1 (Fig. 42)

Material collected. — ZRC.ORT.168, 1 female, Sime Track, 12 December 2010, coll. M. K. Tan & R. W. J. Ngiam.

Remarks. — The taxonomy of this subfamily requires revision for proper identification of the many specious genera. Little is known about these small crickets.

National conservation status. — Vulnerable.

Amusurgus sp. 2
(Fig. 43)

Material collected. — ZRC.ORT.218, 1 male, Belukar Track, 5 February 2011, coll. M. K. Tan; ZRC.ORT.309, 1 female, Venus Trail, 25 June 2011, coll. M. K. Tan.

Remarks. — This is one of the more common species of the genus. It can be found among the foliage of understorey plants.

National conservation status. — Common.

Amusurgus sp. 3
(Fig. 44)

Material collected. — ZRC.ORT.239, 1 male, Sime Track, 3 March 2011, coll. M. K. Tan.

Remarks. — This is a forest-restricted species. Little is known about these small crickets.

National conservation status. — Vulnerable.

Amusurgus sp. 4
(Fig. 45)

Material collected. — ZRC.ORT.240, 1 female, Dairy Farm Loop, 5 March 2011, coll. M. K. Tan.

Remarks. — It is one of the rarer species of its Singapore congeners.

National conservation status. — Endangered.



Fig. 44. *Amusurgus* species 3: ZRC.ORT.239, male, 6.5 mm.



Fig. 45. *Amusurgus* species 4: ZRC.ORT.240, female, 6.0 mm.



Fig. 46. *Amusurgus* species 5: ZRC.ORT.253, male, 6.0 mm.

Amusurgus sp. 5
(Fig. 46)

Material collected. — ZRC.ORT.253, 1 male, Mandai Track 15, 30 March 2011, coll. M. K. Tan.

Remarks. — It can be found among the foliage of understorey plants.

National conservation status. — Vulnerable.



Fig. 47. *Amusurgus* species 6: ZRC.ORT.257, female, 5.9 mm.



Fig. 48. *Anaxipha* species 1: ZRC.ORT.217, male, 6.8 mm (A); ZRC.ORT.258, female, 6.4 mm (B).

Tan Ming Kai

Amusurgus sp. 6
(Fig. 47)

Material collected. — ZRC.ORT.257, 1 female, Dairy Farm Loop, 2 April 2011, coll. M. K. Tan.

Remarks. — It can be found among the foliage of understorey plants.

National conservation status. — Vulnerable.

Anaxipha sp. 1
(Fig. 48)

Material collected. — ZRC.ORT.217, 1 male, MacRitchie Nature Trail, 2 February 2011, coll. M. K. Tan; ZRC.ORT.258, 1 female, Upper Seletar Trail, 5 April 2011, coll. M. K. Tan & J. J. Y. Chan.

Remarks. — This species is found in forest, among the foliage of understorey vegetation.

National conservation status. — Vulnerable.

Anaxipha sp. 2
(Fig. 49)

Material collected. — ZRC.ORT.260, 1 male, Wallace Trail, 7 April 2011, coll. M. K. Tan.

Remarks. — This species is found in the forest, among the foliage of understorey vegetation.

National conservation status. — Vulnerable.



Fig. 49. *Anaxipha* species 2: ZRC.ORT.260, male, 5.5 mm.



Fig. 50. *Anaxipha* species 3: ZRC.ORT.262, female, 5.7 mm.

Anaxipha sp. 3
(Fig. 50)

Material collected. — ZRC.ORT.262, 1 female, Venus Trail, 9 April 2011, coll. M. K. Tan.

Remarks. — This species is also found in the forest, among the foliage of understorey vegetation.

National conservation status. — Vulnerable.

Anaxipha sp. 4
(Fig. 51)

Material collected. — ZRC.ORT.282, 1 male, Mandai Track 15, 28 May 2011, coll. M. K. Tan; ZRC.ORT.302, 1 female, Mandai Track 15, 21 June 2011, coll. M. K. Tan, R. W. J. Ngiam, J. J. Y. Chan & T. Robillard.

Remarks. — This species can also be found in grassy areas, albeit less commonly than the latter three species (below).

National conservation status. — Vulnerable.

Homoeoxipha lycoides (Walker)
(Fig. 52)

Material collected. — ZRC.ORT.324, male, Mandai Track 15, 21 June 2011, coll. M. K. Tan, R. W. J. Ngiam, J. J. Y. Chan & T. Robillard.

Remarks. — This species can be found relatively commonly among grasses and other herbaceous plants. The females have much simpler tegminal venation than the males. Some males have hind wings surpassing the tegmina.

National conservation status. — Common.



Fig. 51. *Anaxipha* species 4: ZRC.ORT.282, male, 5.8 mm (A); ZRC.ORT.302, female, 5.0 mm (B).



Fig. 52. *Homoeoxipha lycoides* (Walker): ZRC.ORT.324, male, 5.9 mm.



Fig. 53. *Natula longipennis* (Serville): ZRC.ORT.242, male, 6.5 mm.

Natula longipennis (Serville)
(Fig. 53)

Material collected. — ZRC.ORT.242, 1 male, Dairy Farm Pass, 8 March 2011, coll. M. K. Tan.

Remarks. — This species was tentatively identified as *Anaxipha* sp. 2 in the first edition. Examination of male genitalia allowed the material to be identified to species. This species can be found commonly among grasses and other herbaceous plants. The female has a much simpler tegminal venation than that in the male.

National conservation status. — Common.



Fig. 54. *Svistella* sp. 1: ZRC.ORT.261, male, 5.5 mm.

Svistella sp. 1
(Fig. 54)

Material collected. — ZRC.ORT.261, 2 males, Wallace Trail, 7 April 2011, coll. M. K. Tan.

Remarks. — This species was tentatively identified as *Anaxipha* sp. 4 in the first edition. Examination of male genitalia allowed the material to be identified to species. Among the most common of the Trigonidiinae members in Singapore, it can be found quite commonly among grasses and other herbaceous plants. The female has a much simpler tegminal venation than that of the male. The male produces soft and continuous chirping calls at night.

National conservation status. — Common.

FAMILY MOGOPLISTIDAE

These crickets are known as scaly crickets because of the scales found throughout the body (Ingrisch, 2006). The taxonomic reviews for Singapore species of the family can be found in Tan & Ingrisch (2013), and Tan (2014a). The key to Singaporean species can also be found in Tan & Ingrisch (2013) and key to Singaporean *Micrornebius* can be found in Tan (2014a).

Subfamily Mogoplistinae

Apterornebius c.f. ***chong*** Ingrisch
(Fig. 55)

Material collected. — ZRC.ORT.165, 110, 1 male, 1 female, Lower Peirce Reservoir Park, 22 October 2010, coll. M. K. Tan.

Remarks. — A forest-restricted species, it can be found among the leaves and branches of understorey plants.

National conservation status. — Vulnerable.



Fig. 55. *Apterornebius* c.f. *chong* Ingrisch: ZRC.ORT.110, female, 10.7 mm (A); ZRC.ORT.165, male, 10.2 (B).

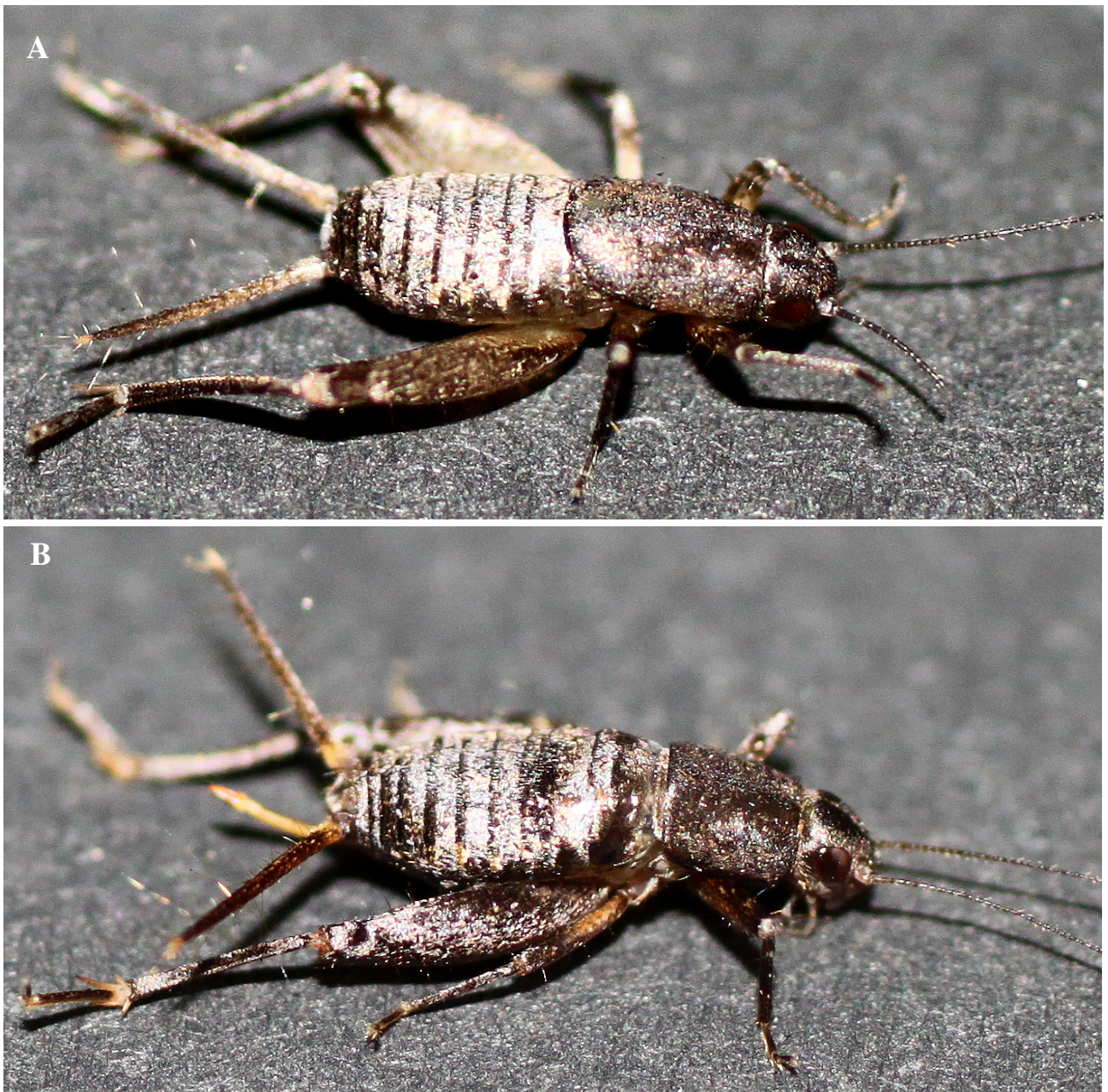


Fig. 56. *Cycloptiloides* c.f. *timah* Ingrisch: ZRC.ORT.230, male, 5.8 mm (A); ZRC.ORT.230, female, 7.1 mm (B); ZRC.ORT.300, female, 5.8 mm (C).



Fig. 56. *Cycloptiloides* c.f. *timah* Ingrisch: ZRC.ORT.230, male, 5.8 mm (A); ZRC.ORT.230, female, 7.1 mm (B); ZRC.ORT.300, female, 5.8 mm (C).

Cycloptiloides c.f. *timah* Ingrisch
(Fig. 56)

Material collected. — ZRC.ORT.201, 1 female, Wallace Trail, 27 January 2011, coll. M. K. Tan; ZRC.ORT.230, 1 male, 1 female, Woodcutter Trail, 6 February 2011, coll. M. K. Tan & R. W. J. Ngiam; ZRC.ORT.300, 1 female, Eco-Link CCNR, 21 June 2011 (day), coll. M. K. Tan, X. Guo & S. N. C. Wan; ZRC.ORT.456, 1 female, BTNR main road, 7 January 2013, coll. M. K. Tan, Y. F. Chung & S. Yap.

Remarks. — Although probably among the most abundant of the crickets in Singapore, these tiny crickets are however cryptic, and well-camouflaged in the leaf litter. It probably feeds on detritus and/or decaying matter.

National conservation status. — Common.

Ectatoderus angusticollis Chopard
(Fig. 57)

Material collected. — ZRC.ORT.174, 1 male, Upper Seletar Trail, 7 January 2011, coll. M. K. Tan & M. R. B. Ismail; ZRC.ORT.467, 2 males, Lower Peirce Reservoir Park, 10 August 2012, coll. M. K. Tan.

Remarks. — A forest-restricted species, it can be found among the leaves and branches of understorey plants.

National conservation status. — Vulnerable.

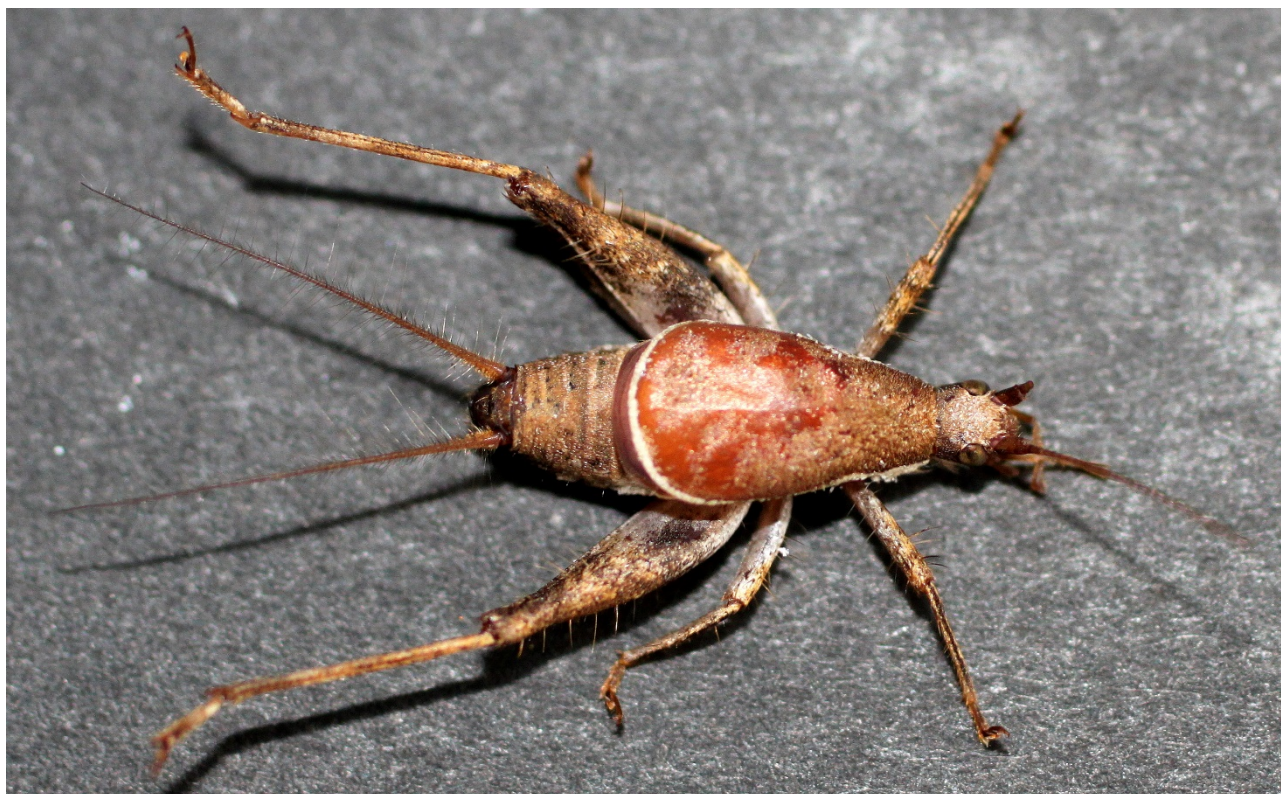


Fig. 57. *Ectatoderus angusticollis* Chopard: ZRC.ORT.174, male, 11.0 mm.

***Micrornebius distinctus* Tan**

(Fig. 58)

Material collected. —ZRC.ORT.1044 (paratype), 1045 (holotype), 1 male, 1 female, Mandai Track 15, 22 May 2014, coll. M. K. Tan & H. Yeo.

Remarks. — This species is new to this list. It is a small (poor dispersal ability) species that is endemic to Singapore. It has cryptic behaviour, hiding among crevices on the bark of trees. So far, it is only found in the forest in certain parts of the CCNR. There are four species in this genus recorded in Singapore. They are all morphologically similar but can be identified readily using the male genitalia. The male produces very soft chirping calls at night.

National conservation status. — Endangered.

***Micrornebius eclipsus* Tan**

(Fig. 59)

Material collected. — ZRC.ORT.1085 (holotype), 1086, 2 males, Mandai Track 15, 16 May 2014, coll. M. K. Tan & H. Yeo; ZRC.ORT.1145–1146, 1 male, 1 female, Mandai Track 15, 13 September 2014, coll. M. K. Tan & H. Yeo; ZRC.ORT.1164–1168, 5 males, Mandai Track 15, 12 October 2014, coll. M. K. Tan & H. Yeo. All remaining specimens are paratypes.

Remarks. — This species is new to this list. It is a small (poor dispersal ability) species that is endemic to Singapore. It has cryptic behaviour, hiding among crevices on the bark of trees. So far, it is only found in the forest in certain parts of the CCNR. The male produces very soft chirping calls at night.

National conservation status. — Endangered.



Fig. 58. *Micrornebius distinctus* Tan: ZRC.ORT.1945, male 4.4 mm. Image by Visionary Digital System (LKC NHM).



Fig. 59. *Micrornebius eclipsus* Tan: ZRC.ORT.1168, male, 4.1 mm. Image by Visionary Digital System (LKC NHM).

Micrornebius kopisua Tan & Ingrisch
(Fig. 60)

Material collected. — ZRC.ORT.229, 1 male, Sime Track, 1 February 2011, coll. M. K. Tan (holotype); ZRC.ORT.462, 1 male, Wallace Trail, 17 May 2012, coll. M. K. Tan (paratype); ZRC.ORT.455, 1 female, BTNR main road, 21 October 2012, coll. M. K. Tan (paratypes).

Remarks. — Only the generic name was provided in the first edition (*Micrornebius* sp.). The species name is updated here after the species was formally described (Tan & Ingrisch, 2013). This forest-restricted species is more common than the other congeners. It can be found among the leaves of understorey plants. The male produces very soft chirping calls at night.

National conservation status. — Vulnerable.

***Micrornebius mandai* Tan**
(Fig. 61)

Material collected. — ZRC.ORT.1042 (holotype), 1043, 1 male, 1 female, 1 June 2014, coll. M. K. Tan & H. Yeo; ZRC.ORT.1083–1084, 2 males, Mandai Track 15, 13 June 2014, coll. M. K. Tan & H. Yeo; ZRC.ORT.1169, 1 male, Mandai Track 15, 14 August 2014, coll. M. K. Tan & H. Yeo; ZRC.ORT.1147–1150, 4 males, Mandai Track 15, 13 September 2014, coll. M. K. Tan & H. Yeo. All the other listed specimens are paratypes.

Remarks. — This species is new to this list. It is a small (poor dispersal ability) species that is endemic to Singapore. It has cryptic behaviour, hiding among crevices on the bark of trees. So far, it is only found in the forest in certain parts of the CCNR. The male produces very soft chirping calls at night.

National conservation status. — Endangered.

***Ornebius albipalpus* Ingrisch**
(Fig. 62)

Material collected. — ZRC.ORT.136, 1 male, Sime Track, 26 November 2010, coll. M. K. Tan, M. R. B. Ismail & T. M. Leong; ZRC.ORT.297, 1 female, Upper Seletar Trail, 4 June 2011, coll. M. K. Tan; ZRC.ORT.460, 1 male, Belukar Track, 10 September 2012, coll. M. K. Tan, R. W. J. Ngiam & Y. F. Chung; ZRC.ORT.461, 1 female, Belukar Track, 5 January 2013, coll. M. K. Tan, R. W. J. Ngiam & Y. F. Chung.

Remarks. — Only the generic name was provided in the first edition (*Ornebius* sp. 2). A forest-restricted species, it can be found among the branches and leaves of understorey plants. The male produces soft chirping calls at night. The female was previously thought to be a separate species (*Ornebius* sp. 2 in the first edition). More materials allowed the reassessment and material is updated here (Tan & Ingrisch, 2013). Further examination of male genitalia also confirmed the species name (Tan & Ingrisch, 2013).

National conservation status. — Vulnerable.

***Ornebius insculpta* Tan & Ingrisch**
(Fig. 63)

Material collected. — ZRC.ORT.311, 1 male, BTNR main road, 29 June 2011, coll. M. K. Tan & J. J. Y. Chan (holotype); ZRC.ORT.453, 454, 1 male, 1 female, BTNR main road, 3 November 2012, coll. M. K. Tan (paratypes).

Remarks. — Only the generic name was provided in the first edition (*Ornebius* sp. 1). The species name is updated here after the species was formally described (Tan & Ingrisch, 2013). It is an endemic species found only in a small forest patch within the BTNR. It is found among the foliage of understorey plants. The male produces soft chirping calls at night.

National conservation status. — Critically endangered.



Fig. 60. *Micronebius kopsisua* Tan & Ingrisch: ZRC.ORT.229, male, 5.9 mm.



Fig. 61. *Micronebius mandai* Tan: ZRC.ORT.1149, male, BL = 5.1 mm. Image by Visionary Digital System (LKC�HM).

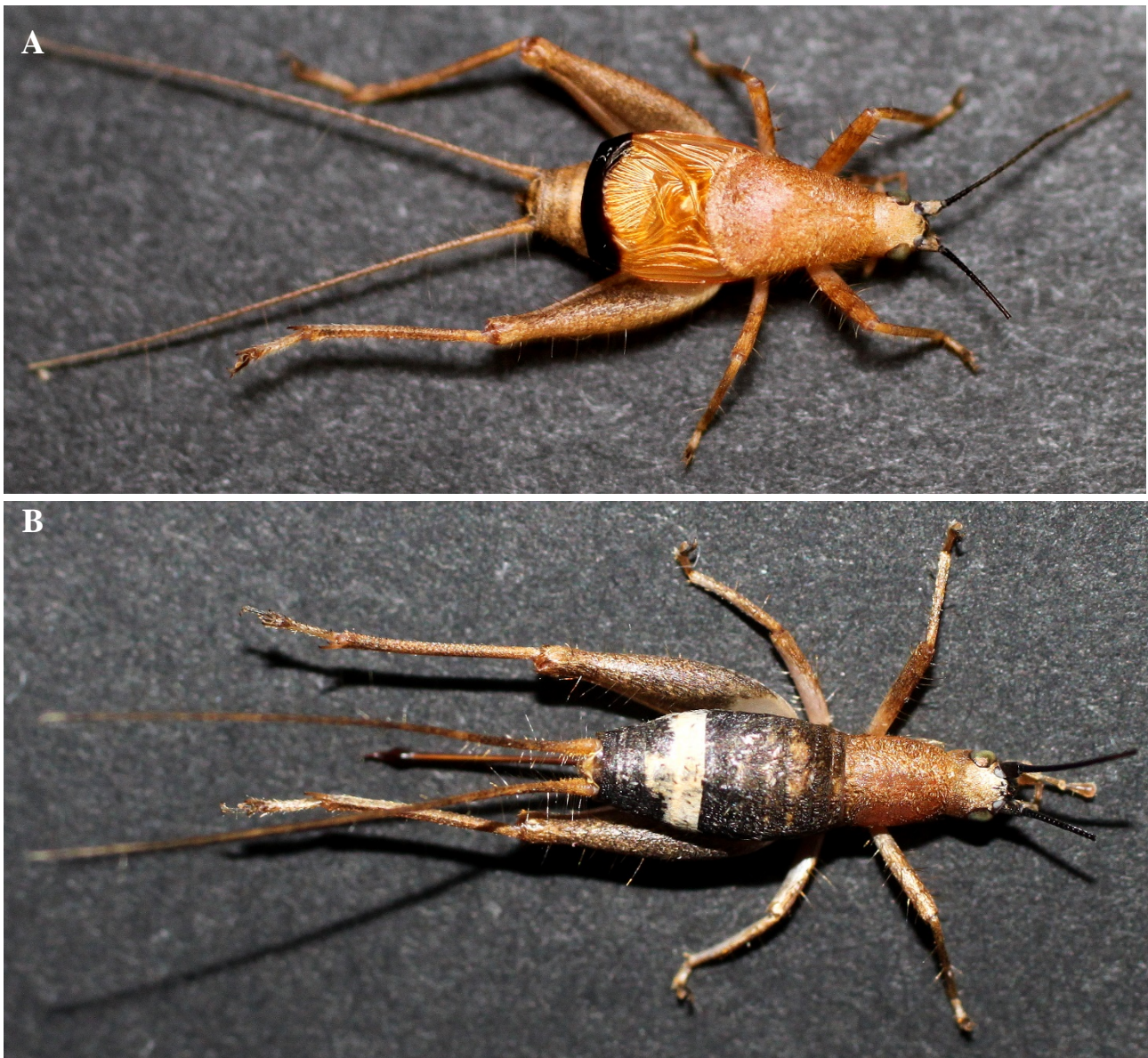


Fig. 62. *Ornebius albipalpus* Ingrisch: ZRC.ORT.136, male, 8.8 mm (A); ZRC.ORT.297, female, 9.4 mm (B).



Fig. 63. *Ornebius insculpta* Tan & Ingrisch: ZRC.ORT.311, male, 9.4 mm.



Fig. 64 *Ornebius* c.f. *pullus* Ingrisch: ZRC.ORT.216, male, 8.1 mm.

Ornebius c.f. *pullus* Ingrisch
(Fig. 64)

Material collected. — ZRC.ORT.129, 1 male, BTNR main road, 23 October 2010, coll. M. K. Tan & T. M. Leong; ZRC.ORT.216, 1 male, MacRitchie Nature Trail, 2 February 2011, coll. M. K. Tan; ZRC.ORT.400, 1 male, Hindhede Nature Park, 29 January 2012, coll. M. K. Tan & J. J. Y. Chan; ZRC.ORT.449, 1 male, BTNR main road, 9 January 2013, coll. M. K. Tan, H. Yeo & Y. F. Chung.

Remarks. — It is a forest-restricted species. It can be found among the branches and leaves of understorey plants. It is the most common *Ornebius* species in Singapore. The male produces a soft and continuous chirping call at night.

National conservation status. — Common.

FAMILY Gryllotalpidae

A key to mole cricket species can be found in Tan (2012d). The adults are very similar morphologically and often can only be differentiated by small differences in the male tegminal venation and genitalia.

Subfamily **Gryllotalpinae**

Gryllotalpa fulvipes Saussure
(Fig. 65)

Material collected. — ZRC.ORT.272, 1 male, Dairy Farm Loop, 3 May 2011, coll. M. K. Tan & J. J. Y. Chan; ZRC.ORT.278, 1 male, Hindhede Way, 25 May 2011, coll. M. K. Tan.

Remarks. — This species is restricted to forest sites. It is often subterranean and rarely sighted. Its burrows are shallow but might be extensive in area. There is also no distinct opening for its burrows. The male produces a series of lower trilling for around half an hour around 1830 hours. The male

calling song was described in Tan & Kamaruddin (2016b). This species can be easily distinguished from the former two species by its colouration. This species was classified as “Endangered” in the Red Data Book (Murphy et al., 2008) but recent observations suggest that it is more common than that. It was also mentioned that it is confined to primary forests but recent observations suggest that this is no longer true.

National conservation status. — Vulnerable.

***Gryllotalpa nymphicus* Tan**
(Fig. 66)

Material collected. — ZRC.ORT.254, 1 male, Mandai Track 15, 30 March 2011, coll. M. K. Tan (holotype); ZRC.ORT.367, 1 male, Dairy Farm Loop, 20 January 2012, coll. M. K. Tan, R. W. J. Ngiam & W. L. Lim (paratype); ZRC.ORT.1026, 1 male, Woodcutter Trail, 11 October 2013, coll. M. K. Tan & H. Yeo.

Remarks. — This species is a relatively rare and endemic (so far) and restricted to forests. It is often subterranean and rarely sighted. Its burrows are shallow but might be extensive in area. There is also no distinct opening for its burrows. The male produces low resonant buzzes for around half an hour at around 1900 hours. The male calling song was described in Tan (2012d).

National conservation status. — Vulnerable.

***Gryllotalpa wallace* Tan**
(Fig. 67)

Material collected. — ZRC.ORT.255, 1 male, Dairy Farm Loop, 2 April 2011, coll. M. K. Tan (holotype).

Remarks. — This is only one record of this endemic species. It is often subterranean and rarely sighted. Its burrows are shallow but might be extensive in area. There is also no distinct opening for its burrows.

National conservation status. — Critically endangered.



Fig. 65. *Gryllotalpa fulvipes* Saussure, 1877: ZRC.ORT.272, male, 21.7 mm.



Fig. 66. *Gryllotalpa nymphicus* Tan: ZRC.ORT.254, male, 45.2 mm.



Fig. 67. *Gryllotalpa wallace* Tan: ZRC.ORT.255, male, 31.8 mm.

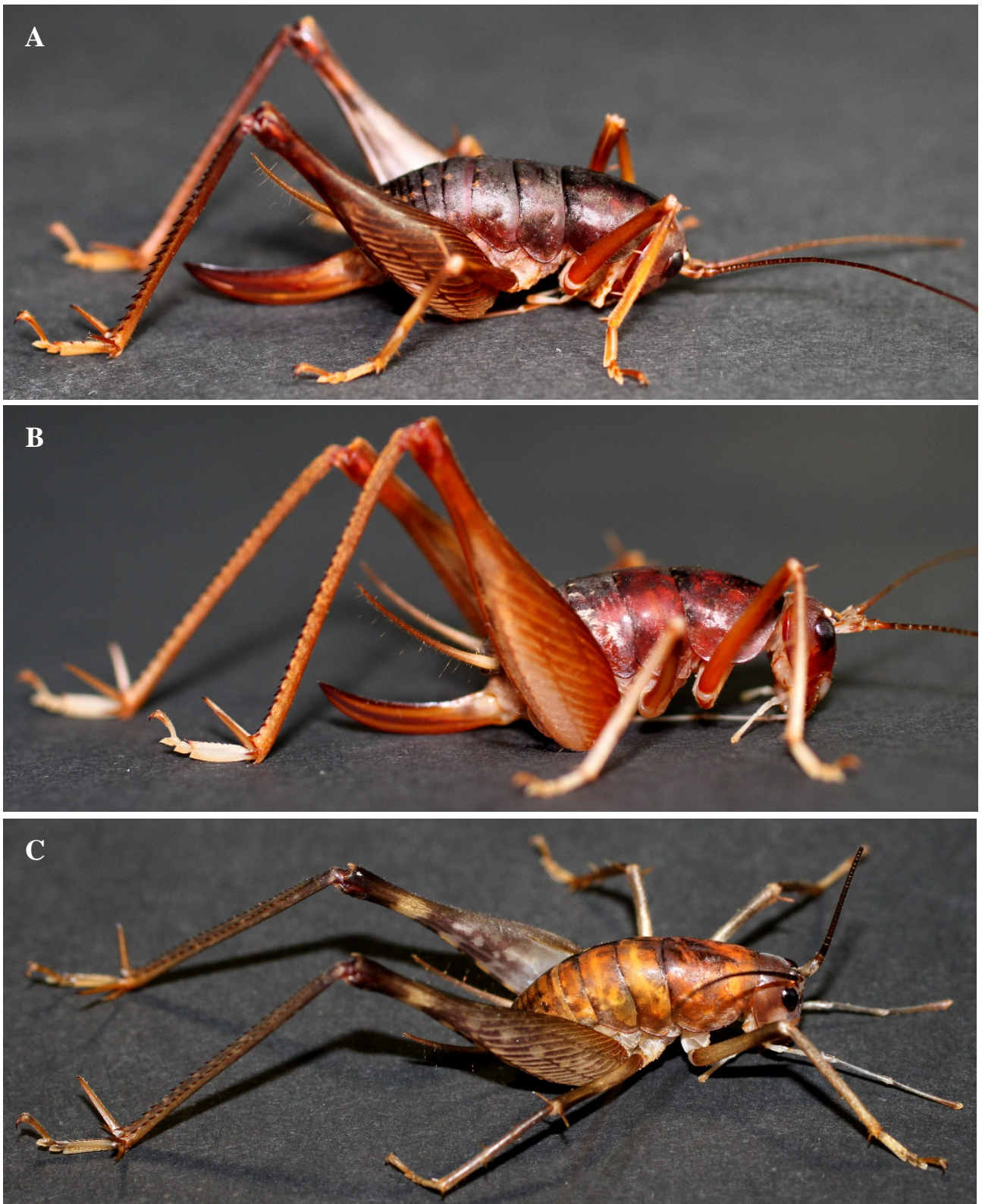


Fig. 68. *Rhaphidophora* species: ZRC.ORT.114, female, 23.4 mm (A); ZRC.ORT.163, female, 21.8 mm (B); ZRC.ORT.298, male, 22.4 mm (C).

FAMILY RHAPHIDOPHORIDAE

Subfamily **Rhaphidophorinae**

***Rhaphidophora* sp.**
(Fig. 68)

Material collected. — ZRC.ORT.114, 2 females, Wallace Trail, 29 October 2010, coll. M. K. Tan, R. W. J. Ngiam & M. R. B. Ismail; ZRC.ORT.163, 1 female, Nee Soon Swamp Forest, 20 December 2010, coll. M. K. Tan, R. W. J. Ngiam & M. R. B. Ismail; ZRC.ORT.226, 1 male, 1 female, Upper Seletar Trail, 7 January 2011, coll. M. K. Tan & M. R. B. Ismail; ZRC.ORT.298, 1 male, Woodcutter Trail, 16 June 2011, coll. M. K. Tan, R. W. J. Ngiam, M. R. B. Ismail & T. Robillard.

Remarks. — The taxonomy for the Singapore species still requires work and may reveal more species than currently known. This is a forest-restricted species. It is a good jumper and can be found on the forest floor or in fallen tree trunks.

National conservation status. — Vulnerable.

FAMILY GRYLLACRIDIDAE

Subfamily **Gryllacridinae**

***Capnogryllacris fruhstorferi* (Griffini)**
(Fig. 69)

Material collected. — ZRC.ORT.408, 1 female, Upper Seletar Trail, 13 June 2012, coll. M. K. Tan & R. W. J. Ngiam.

Remarks. — This species is new to this list. There is only one record of this species from Singapore. Little is known about this species.

National conservation status. — Critically endangered.



Fig. 69. *Capnogryllacris fruhstorferi* (Griffini): ZRC.ORT.408, female, 35.7 mm.



Fig. 70. *Caustogryllacris podocausta kuchingiana* (Griffini): ZRC.ORT.162, female, 25.7 mm.

***Caustogryllacris podocausta kuchingiana* (Griffini)**
(Fig. 70)

Material collected. — ZRC.ORT.162, 1 female, Nee Soon Swamp Forest, 20 December 2010, coll. M. K. Tan, R. W. J. Ngiam & M. R. B. Ismail; ZRC.ORT.190, 1 female, Woodcutter Trail, 24 December 2010, coll. M. K. Tan, R. W. J. Ngiam, M. R. B. Ismail & W. L. Lim.

Remarks. — Only the generic name was provided in the first edition (*Caustogryllacris* sp.). Further examination of material allowed the species name to be included here. A rare and forest-restricted species that seems to inhabit swamp forest.

National conservation status. — Endangered.

***Gryllacris (signifera* group) sp.**
(Fig. 71)

Material collected. — ZRC.ORT.122, 1 female, Wallace Trail, 3 November 2010, coll. M. K. Tan; ZRC.ORT.131, 1 male, Chestnut Track, 20 November 2010, coll. M. K. Tan.

Remarks. — Among the more common Gryllacridids in Singapore, it can be found in suburban areas in Singapore. It prefers shrubby and forested areas.

National conservation status. — Common.

***Gryllacris* sp.**
(Fig. 72)

Material collected. — ZRC.ORT.148, 1 male, Wallace Trail, 3 December 2010, coll. M. K. Tan.

Remarks. — Of the more common Singapore Gryllacrididae, it can be found in suburban areas. It prefers shrubby and forested areas. It is also found in landward edges of mangrove sites (Tan, 2013).

National conservation status. — Common.

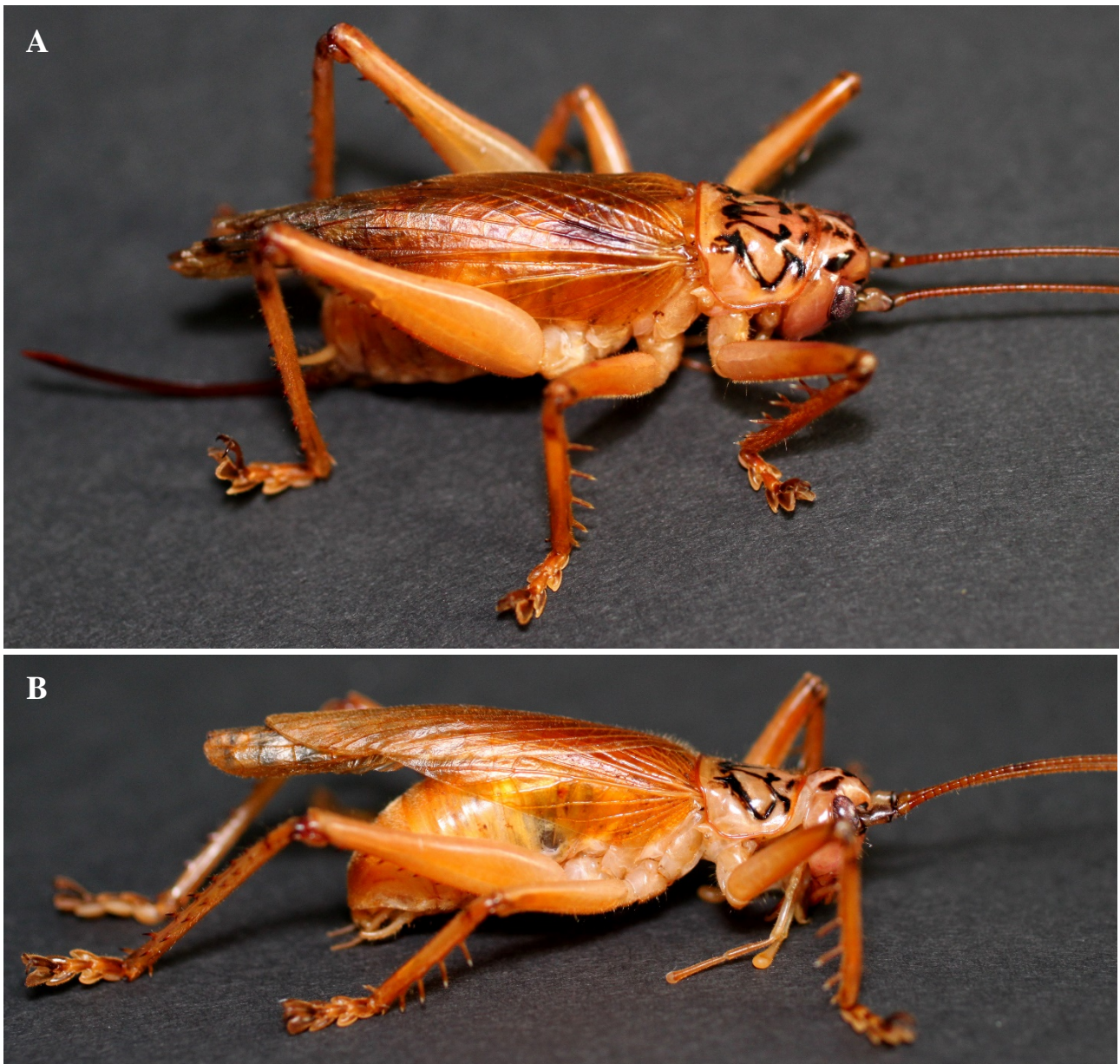


Fig. 71. *Gryllacris* (*signifera* group) species: ZRC.ORT.122, female, 31.1 mm (A); ZRC.ORT.131, male, 30.3 mm (B).



Fig. 72. *Gryllacris* species: ZRC.ORT.148, male, 34.6 mm.



Fig. 73. *Larnaca (Larnaca) fasciata dammermani* (Karny): ZRC.ORT.158, female, 24.6 mm.

Larnaca (Larnaca) fasciata dammermani (Karny)
(Fig. 73)

Material collected. — ZRC.ORT.158, 1 female, Lornie Trail, 18 December 2010, coll. M. K. Tan.

Remarks. — This is a forest-restricted species. It is fairly common among forest understorey plants. This species is new to this list, with the material thought to be the same as the latter species.

National conservation status. — Vulnerable.

Larnaca (Larnaca) nigrata crassiuscula (Karny)
(Fig. 74)

Material collected. — ZRC.ORT.130, 1 male, Chestnut Track, 20 November 2010, coll. M. K. Tan.

Remarks. — A forest-restricted species. It is fairly common among forest understorey plants. This species is very similar to the previous species and its nymphs are nearly identical. It is difficult to ascertain which is more common in Singapore especially since the nymphs can be encountered more readily than the adults.

National conservation status. — Vulnerable.

Otidiogryllacris sp.
(Fig. 75)

Material collected. — ZRC.ORT.265, 1 male, Chestnut Track, 16 April 2011, coll. M. K. Tan; ZRC.ORT.417, 1 male, Nee Soon pipeline, 23 July 2012, coll. M. K. Tan & R. W. J. Ngiam.

Remarks. — A rarely-encountered and forest-restricted species.

National conservation status. — Endangered.



Fig. 74. *Larnaca (Larnaca) nigrata crassiuscula* (Karny): ZRC.ORT.130, male, 23.9 mm.



Fig. 75. *Otidiogryllacris* species: ZRC.ORT.265, male, 16.6 mm.



Fig. 76. *Phryganogryllacris* species: ZRC.ORT.347, female, 19.5 mm.

Phryganogryllacris sp. 1
(Fig. 76)

Material collected. — ZRC.ORT.149, 1 female, Wallace Trail, 3 December 2010, coll. M. K. Tan; ZRC.ORT.347, 1 female, Nee Soon pipeline, 3 September 2011, coll. M. K. Tan.

Remarks. — A rarely-encountered and forest-restricted species. In the previous edition, two species of *Phryganogryllacris* were recorded. Until there is more material (particularly the males) to validate two distinct species, the females are currently grouped into one species and updated here as such.

National conservation status. — Endangered.

FAMILY TETTIGONIIDAE

So far, 47 species from eight subfamilies of the Tettigoniidae have been collected. Conocephalinae and Phaneropterinae are represented with the greatest number of species (14 and 12, respectively). On the other hand, four subfamilies are represented with two or less species—Hexacentrinae, Lipotactinae, Listrosclidinae, and Mecopodinae.

Subfamily Conocephalinae

Conocephalinae katydids are also known as cone-headed katydids because of the presence of conical or protruding vertex. Three tribes can be found in Singapore. The Agraeciini, sometimes also known as the spike-headed katydids, are mostly forest-restricted. The Copiphorini and Conocephalini (both groups also known as the meadow katydids) inhabit grassy areas.

Tribe **Agraeciini**

Jambiliara selita Ingrisch & Tan
(Fig. 77)

Material collected. — ZRC.ORT.157, 1 male, Chestnut Track, 17 December 2010, coll. M. K. Tan (paratype); ZRC.ORT.228, 1 female, Wallace Trail, 27 January 2011, coll. M. K. Tan (paratype); ZRC.ORT.1015, 1 female, Mandai Track 15, 29 September 2013, coll. M. K. Tan & H. Yeo.

Remarks. — This is a rather rare and forest-restricted species. Adults are not encountered often and may inhabit the forest canopy (Ingrisch & Tan, 2012).

National conservation status. — Endangered.



Fig. 77. *Jambiliara selita* Ingrisch & Tan: ZRC.ORT.157, male, 28.3 mm (A); ZRC.ORT.228, female, 30.3 mm (B).

Oxylakis (Oxylakis) singaporensis Ingrisch & Tan
(Fig. 78)

Material collected. — ZRC.ORT.119, 1 male, Lornie Trail, 2 November 2010, coll. M. K. Tan; ZRC.ORT.245, 1 female, Mandai Track 15, 13 March 2011, coll. M. K. Tan; ZRC.ORT.251, 1 male, Senapang Link, 24 March 2011, coll. M. K. Tan; ZRC.ORT.1061, 1 female, Chestnut Track, 11 June 2014, coll. M. K. Tan, H. Yeo, L. F. Cheong.

Remarks. — Only the generic name was provided in the first edition (*Oxylakis* sp.). Further examination of the material allowed the species name to be included here. One of the more common Agraeciini members in Singapore. It can sometimes be found along forest edges.

National conservation status. — Vulnerable.

Nahlaksia bidadari Ingrisch & Tan
(Fig. 79)

Material collected. — ZRC.ORT.146, 1 female, Sime Track, 26 November 2010, coll. M. K. Tan, M. R. B. Ismail & T. M. Leong (paratype); ZRC.ORT.160, 1 male, Mandai Track 15, 19 December 2010, coll. M. K. Tan & H. P. M. Woo (paratype); ZRC.ORT.164, 1 female, Upper Seletar Trail, 21 December 2010 (day), coll. M. R. B. Ismail; ZRC.ORT.206, 1 female, Chestnut Track, 29 January 2011, coll. M. K. Tan (paratype); ZRC.ORT.207, 1 female, MacRitchie Nature Trail, 2 February 2011, coll. M. K. Tan (paratype); ZRC.ORT.208, 1 male, Belukar Track, 5 February 2011, coll. M. K. Tan (paratype); ZRC.ORT.225, 1 male, Lornie Trail, 24 February 2011, coll. M. K. Tan (holotype).

Remarks. — A forest-restricted species but one of the more common Agraeciini members in Singapore. This species tends to be found among the dead branches and twigs of understorey plants. It is observed to hide among hollow branches.

National conservation status. — Vulnerable.

Paragraecia* c.f. *gracilis Ingrisch
(Fig. 80)

Material collected. — ZRC.ORT.204, 1 male, Upper Seletar Trail, 20 January 2011, coll. M. K. Tan.

Remarks. — A rare and forest-restricted species. Specimens that were collected were found on the foliage of understorey plants but little is known otherwise. It may inhabit the forest canopy.

National conservation status. — Endangered.

Paragraecia temasek Tan & Ingrisch
(Fig. 81)

Material collected. — ZRC.ORT.205, 1 female, Upper Seletar Trail, 25 January 2011, coll. M. K. Tan & M. R. B. Ismail; ZRC.ORT.1025, 1 male, Wallace Trail, 2 February 2013, coll. M. K. Tan & H. Yeo.

Remarks. — The species was identified as *Paragraecia maculata* Ingrisch in the first edition. The species name is included here after the species was formally described (Tan & Ingrisch, 2014). A rare and forest-restricted species. It may inhabit the forest canopy.

National conservation status. — Endangered.



Fig. 78. *Oxylakis (Oxylakis) singaporensis* Ingrisch & Tan: ZRC.ORT.245, female, 24.4 mm (A); ZRC.ORT.251, male, 21.7 mm (B).



Fig. 79. *Nahlaksia bidadari* Ingrisch & Tan: ZRC.ORT.160, male, 19.3 mm (A); ZRC.ORT.164, female, 20.3 mm (B).



Fig. 80. *Paragraecia* c.f. *gracilis* Ingrisch: ZRC.ORT.204, male, 22.7 mm.



Fig. 81. *Paragraecia temasek* Tan & Ingrisch: ZRC.ORT.205, female, 24.5 mm.

***Peracca (Peracca) macritchiensis* Tan & Ingrisch**
(Fig. 82)

Material collected. — ZRC.ORT.125, 1 male, Lornie Trail, 15 November 2010, coll. M. K. Tan & M. R. B. Ismail.

Remarks. — It was identified as *Peracca subulicerca* (Karny) in the first edition. It was formally described by Tan & Ingrisch (2014). A forest-restricted species, it tends to be found among rattans.

National conservation status. — Vulnerable.

***Peracca (Peracca) mirzai* Tan & Ingrisch**
(Fig. 83)

Material collected. — ZRC.ORT.153, 1 female, Nee Soon Swamp Forest, 13 December 2010, coll. M. K. Tan & M. R. B. Ismail; ZRC.ORT.348, 1 male, Nee Soon pipeline, 3 September 2011, coll. M. K. Tan.

Remarks. — It was identified as *Peracca conspicuithorax* Griffini in the first edition. It was formally described by Tan & Ingrisch (2014). A rare species restricted to swamp forests.

National conservation status. — Critically endangered.



Fig. 82. *Peracca (Peracca) macritchiensis* Tan & Ingrisch: ZRC.ORT.125, male, 35.0 mm.



Fig. 83. *Peracca (Peracca) mirzai* Tan & Ingrisch: ZRC.ORT.153, female, 41.2 mm (A); ZRC.ORT.348, male, 43.5 mm (B).



Fig. 84. *Viriacca viridis* Ingrisch: ZRC.ORT.175, male, 22.1 mm.

***Viriacca viridis* Ingrisch**
(Fig. 84)

Material collected. — ZRC.ORT.175, 1 male, Upper Seletar Trail, 7 January 2011, coll. M. K. Tan & M. R. B. Ismail; ZRC.ORT.434, 1 female, Upper Seletar Trail, 1 August 2012, coll. M. K. Tan.

Remarks. — A rare species restricted to swamp forests.

National conservation status. — Critically endangered.

Tribe **Conocephalini**

***Conocephalus* (Anisoptera) c.f. *exemptus* (Walker)**
(Fig. 85)

Material collected. — ZRC.ORT.332, 1 female, Wallace Trail, 1 August 2011, coll. M. K. Tan.

Remarks. — Further examination of material allowed the species to be identified. It is a less common and less widely distributed *Conocephalus* species in Singapore and tends to be found among tall grasses. The male can be heard calling during the day.

National conservation status. — Vulnerable.

***Conocephalus* (Anisoptera) *maculatus* (Le Guillou)**
(Fig. 86)

Material collected. — ZRC.ORT.330, 1 male, Wallace Trail, 1 August 2011, coll. M. K. Tan.

Remarks. — Among the most common orthopterans around, it can be found in grassy areas. The male can be heard calling during the day.

National conservation status. — Common.



Fig. 85. *Conocephalus* (Anisoptera) c.f. *exemptus* (Walker): ZRC.ORT.332, female, 18.6 mm.



Fig. 86. *Conocephalus* (Anisoptera) *maculatus* (Le Guillou): ZRC.ORT.330, male, 14.0 mm.



Fig. 87. *Conocephalus* (Anisoptera) *melaenus* (de Haan): ZRC.ORT.304, female, 18.2 mm.

***Conocephalus (Anisoptera) melaenus* (de Haan)**
(Fig. 87)

Material collected. — ZRC.ORT.304, 1 female, Mandai Track 15, 21 June 2011, coll. M. K. Tan, R. W. J. Ngiam, J. J. Y. Chan & T. Robillard.

Remarks. — Among the most common orthopterans around, it can be found in grassy and herbaceous plant areas. The adults can even prey on snails. The nymphs are easily distinguishable as being red with a black abdomen. The male can be heard calling in the day.

National conservation status. — Common.

Tribe Copiphorini

Tan (2011a) reviewed the diversity of Copiphorini in Singapore and also provided natural history observations and a key to species.

***Euconocephalus nasutus* (Thunberg)**
(Fig. 88)

Material collected. — ZRC.ORT.264, 1 male, Chestnut Track, 16 April 2011, coll. M. K. Tan.

Remarks. — It inhabits grassy areas and oviposits onto grass stems. The male produces resonant, continuous trills.

National conservation status. — Vulnerable.

***Euconocephalus picteti* (Redtenbacher)**
(Fig. 89)

Material collected. — ZRC.ORT.101, 1 male, Venus Trail, 8 October 2010, coll. M. K. Tan & M. R. B. Ismail.

Remarks. — It inhabits grassy areas and forest edges. The male produces resonant continuous trills.

National conservation status. — Vulnerable.



Fig. 88. *Euconocephalus nasutus* (Thunberg): ZRC.ORT.264, male, 30.6 mm.



Fig. 89. *Euconocephalus picteti* (Redtenbacher): ZRC.ORT.101, male.



Fig. 90. *Xestophrys horvathi* Bolívar.

Xestophrys horvathi Bolívar
(Fig. 90)

Material collected. — ZRC.ORT.1065, 1 male, Mandai Track 15, 13 June 2014, coll. M. K. Tan & H. Yeo.

Remarks. — This species is new to the list. This species can be found among grassy areas. This species is larger and more robust than the other Copiphorini recorded in the BTNR and CCNR. The male produces loud (much louder than the previous two species), high-pitched and continuous trills. This species was reported as a new record for CCNR in Tan et al. (2015).

National conservation status. — Vulnerable.

Subfamily **Hexacentrinae**

Glenophysis singapura Tan
(Fig. 91)

Material collected. — ZRC.ORT.145, 1 female, Rifle Range Link, 5 November 2010, coll. M. K. Tan (paratype); ZRC.ORT.346, 1 male, Nee Soon pipeline, 3 September 2011, coll. M. K. Tan (holotype).

Remarks. — A rare, endemic and forest-restricted species. Specimens collected were found on the foliage of understorey plants but little is known otherwise.

National conservation status. — Critically endangered.

Hexacentrus unicolor Serville
(Fig. 92)

Material collected. — ZRC.ORT.335, 1 female, Wallace Trail, 1 August 2011, coll. M. K. Tan.

Remarks. — The male has much broader tegmina, unlike those of the female (more or less straight-winged). One of the most common predatory katydids in Singapore, it is found to prey on caterpillars, flies, and other orthopterans. It is common among forest edges and grassy areas. At night, the male can be heard producing discrete, low-pitched pulses to attract females.

National conservation status. — Common.



Fig. 91. *Glenophisis singapura* Tan: ZRC.ORT.145, female, 15.6 mm (A); ZRC.ORT.346, male, 13.5 mm (B).



Fig. 92. *Hexacentrus unicolor* Serville: ZRC.ORT.335, female, 21.8 mm.

Subfamily **Lipotactinae**

Sometimes referred to as the big-eyed katydids, these katydids also have truncated tegmina modified for stridulation. Although they cannot fly, these katydids are nonetheless very good jumpers.

Lipotactes maculatus Hebard (Fig. 93)

Material collected. — ZRC.ORT.159, 1 male, Lornie Trail, 18 December 2010, coll. M. K. Tan; ZRC.ORT.211, 1 female, Dairy Farm Pass, 31 December 2010, coll. M. K. Tan & H. P. M. Woo; ZRC.ORT.193, 2 males, Lower Peirce Reservoir Park, 15 January 2011, coll. M. K. Tan.

Remarks. — One of the more common katydids in forest sites, it can be found in the understorey, often hiding among branches, twigs, and the foliage of the lower-lying plants.

National conservation status. — Common.

Mortoniellus karnyi Griffini (Fig. 94)

Material collected. — ZRC.ORT.291, 1 female, Nee Soon pipeline, 31 May 2011, coll. M. K. Tan, R. W. J. Ngiam & W. L. Lim.

Remarks. — There is only one record for this species and it is far more cryptic than the previous species in the same subfamily. The specimen collected was found on the stem of an understorey plant but little is known otherwise.

National conservation status. — Critically endangered.

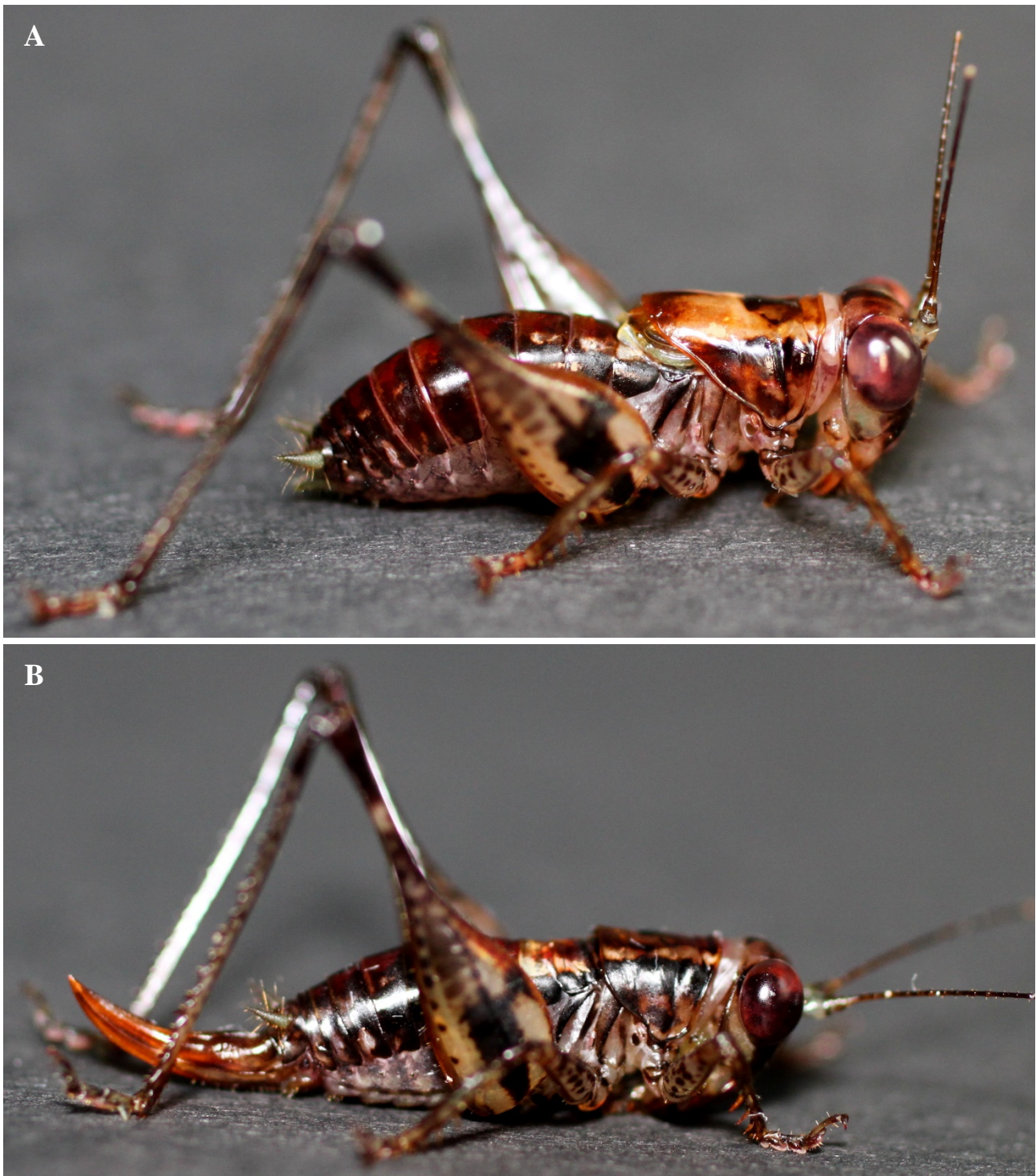


Fig. 93. *Lipotactes maculatus* Hebard: ZRC.ORT.159, male, 14.5 mm (A); ZRC.ORT.211, female, 14.2 mm (B); ZRC.ORT.193, male, 14.6 mm (C).

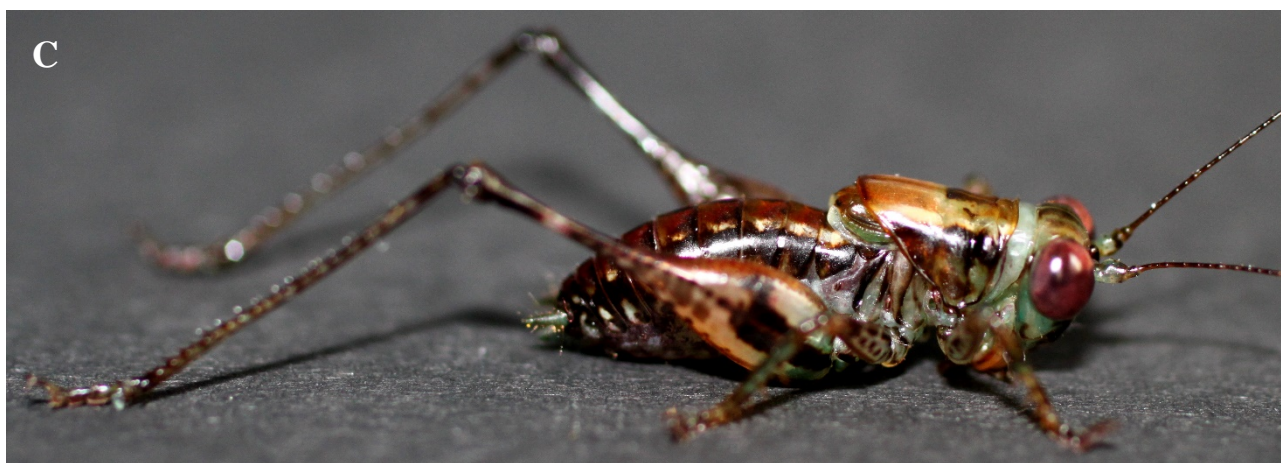


Fig. 93. *Lipotactes maculatus* Hebard: ZRC.ORT.159, male, 14.5 mm (A); ZRC.ORT.211, female, 14.2 mm (B); ZRC.ORT.193, male, 14.6 mm (C).



Fig. 94. *Mortoniellus karnyi* Griffini: ZRC.ORT.291, female, 22.1 mm.

Subfamily **Listroscelidinae**

Carliphisis c.f. *leontopolites* (Karny) (Fig. 95)

Material collected. — ZRC.ORT.182, 1 female, Dairy Farm Loop, 13 January 2011, coll. M. K. Tan; ZRC.ORT.349, 1 female, Eco-Link CCNR, 16 September 2011, coll. M. K. Tan, R. W. J. Ngiam & J. J. Y. Chan.

Remarks. — Only the generic name was listed in the first edition (*Carliphisis* sp.). Further examination of material allowed the species to be better identified but male specimens are needed to confirm the species name. A rare and forest-restricted species. It is often found beneath the foliage of understorey plants. Upon disturbance, it will flatten its body against the foliage while stretching its legs anteriorly and posteriorly.

National conservation status. — Endangered.



Fig. 95. *Carliphisis* c.f. *leontopolites* (Karny): ZRC.ORT.182, female, 16.9 mm.



Fig. 96. *Oceaniphisis* species: ZRC.ORT.177, male, 15.3 mm (A); ZRC.ORT.137, female, 16.5 mm (B).

Oceaniphisis sp.

(Fig. 96)

Material collected. — ZRC.ORT.106, 1 female, Venus Trail, 8 October 2010, coll. M. K. Tan & M. R. B. Ismail; ZRC.ORT.177, 1 male, Wallace Trail, 29 October 2010, coll. M. K. Tan, R. W. J. Ngiam & M. R. B. Ismail; ZRC.ORT.137, 1 female, Sime Track, 26 November 2010, coll. M. K. Tan, M. R. B. Ismail & T. M. Leong; ZRC.ORT.196, 1 male, Belukar Track, 19 January 2011, coll. M. K. Tan.

Remarks. — This is a forest-restricted species and often found beneath the foliage of understorey plants. Upon disturbance, it will flatten its body against the foliage while stretching its legs anteriorly and posteriorly. This species differs from the former by the shape of the spurs (movable spines) on the forelegs.

National conservation status. — Vulnerable.

Subfamily **Meconematinae**

Tribe **Meconematini**

Alloteratura sp. 1

(Fig. 97)

Material collected. — ZRC.ORT.179, 1 female, Sime Track, 26 November 2010, coll. M. K. Tan, M. R. B. Ismail & T. M. Leong; ZRC.ORT.276, 1 female, Eco-Link CCNR, 16 May 2011, coll. M. K. Tan & R. W. J. Ngiam; ZRC.ORT.350, 1 male, Eco-Link CCNR, 16 September 2011, coll. M. K. Tan, R. W. J. Ngiam & J. J. Y. Chan.

Remarks. — This is a forest-restricted species that can be found among the understorey plants.

National conservation status. — Vulnerable.



Fig. 97. *Alloteratura* species 1: ZRC.ORT.179, female, 11.9 mm (A); ZRC.ORT.350, male, 10.0 mm (B).



Fig. 98. *Alloteratura* species 2: ZRC.ORT.256, male, 12.6 mm.



Fig. 99. *Euanisous teuthroides* (Bolívar): ZRC.ORT.183, male, 17.6 mm.

Alloteratura sp. 2
(Fig. 98)

Material collected. — ZRC.ORT.256, 1 male, Dairy Farm Loop, 2 April 2011, coll. M. K. Tan; ZRC.ORT.301, 1 male, Eco-Link CCNR, 21 June 2011 (day), coll. M. K. Tan, X. Guo & S. N. C. Wan.

Remarks. — This is a forest-restricted species that can be found among understorey plants. The female was observed to oviposit into a tree trunk.

National conservation status. — Vulnerable.

Euanisous teuthroides (Bolívar)
(Fig. 99)

Material collected. — ZRC.ORT.176, 1 male, Wallace Trail, 29 October 2010, coll. M. K. Tan, R. W. J. Ngiam & M. R. B. Ismail; ZRC.ORT.183, 1 male, Lower Peirce Reservoir Park, 15 January 2011, coll. M. K. Tan.

Remarks. — The species was tentatively identified as *Meconematini* sp. 2 in the first edition. Further examination of the material allowed the species to be identified. It is a rare and forest-restricted species that can be found among foliage.

National conservation status. — Endangered.



Fig. 100. *Kuzicus (Kuzicus) c.f. denticulatus* (Karny): ZRC.ORT.118, female, 13.7 mm.

***Kuzicus (Kuzicus) c.f. denticulatus* (Karny)**
(Fig. 100)

Material collected. — ZRC.ORT.118, 1 female, MacRitchie Nature Trail, 1 November 2010, coll. M. K. Tan.

Remarks. — The species was tentatively identified as *Meconematini* sp. 1 in the first edition. Further examination of material allowed the species to be better identified. It is a rare and forest-restricted species that can be found among foliage.

National conservation status. — Endangered.

***Xiphidiopsis* sp. 1**
(Fig. 101)

Material collected. — ZRC.ORT.180, 1 male, Chestnut Track, 17 December 2010, coll. M. K. Tan; ZRC.ORT.184, 1 female, Lower Peirce Reservoir Park, 15 January 2011, coll. M. K. Tan; ZRC.ORT.241, 1 male, Dairy Farm Loop, 5 March 2011, coll. M. K. Tan.

Remarks. — This species can be found in the forest or along forest edges. It tends to inhabit the foliage of understorey plants.

National conservation status. — Common.

***Xiphidiopsis* sp. 2**
(Fig. 102)

Material collected. — ZRC.ORT.292, 1 female, Nee Soon pipeline, 31 May 2011, coll. M. K. Tan, R. W. J. Ngiam & W. L. Lim.

Remarks. — Only one collection of this species from swamp forest is available.

National conservation status. — Critically endangered.



Fig. 101. *Xiphidiopsis* species 1: ZRC.ORT.180, male, 13.0 mm (A); ZRC.ORT.184, female, 13.5 mm (B).



Fig. 102. *Xiphidiopsis* species 2: ZRC.ORT.292, female, 13.6 mm.

Tribe **Phlugidini**

Tan (2011b) reviewed the diversity of *Asiophlugis* in Singapore. Conservation status and a key to species is also provided.

Asiophlugis rete Gorochov
(Fig. 103)

Material collected. — ZRC.ORT.213, 1 male, Wallace Trail, 27 January 2011, coll. M. K. Tan.

Remarks. — Only one collection of this species is available.

National conservation status. — Critically endangered.

Asiophlugis temasek Gorochov & Tan
(Fig. 104)

Material collected. — ZRC.ORT.107, 1 male, Venus Trail, 8 October 2010, coll. M. K. Tan & M. R. B. Ismail (paratype); ZRC.ORT.108, 1 male, MacRitchie Nature Trail, 1 November 2010, coll. M. K. Tan (paratype); ZRC.ORT.109, 1 male, BTNR main road, 13 November 2010, coll. M. K. Tan (holotype); ZRC.ORT.152, 1 male, 1 female, Dairy Farm Loop, 10 December 2010, coll. M. K. Tan & M. R. B. Ismail (paratype).

Remarks. — This is a forest-restricted species and often found only on the underside of the foliage of understorey plants.

National conservation status. — Vulnerable.

Asiophlugis thaumasia (Hebard)
(Fig. 105)

Material collected. — ZRC.ORT.132, 1 male, Nee Soon pipeline, 25 November 2010, coll. M. K. Tan, R. W. J. Ngiam & M. R. B. Ismail; ZRC.ORT.212, 1 female, Dairy Farm Pass, 19 January 2011, coll. M. K. Tan; ZRC.ORT.227, 1 male, Lower Peirce Reservoir Park, 16 March 2011, coll. M. K. Tan; ZRC.ORT.360, 1 female, BTNR main road, 24 October 2011, coll. M. K. Tan, R. W. J. Ngiam & L. F. Cheong.

Remarks. — It is a forest-restricted species and often found on the underside of the foliage of understorey plants. This species was classified as “critically endangered or presumed nationally extinct” in the Red Data Book (Murphy et al., 2008) but observations so far suggest it is not as rare as *Asiophlugis rete* and can sometimes be found along forest edges. Please refer to Murphy (2008) (the species was classified in the genus *Phlugis*) and Tan (2011b) for the interesting history of the discovery of this species and the more common *Asiophlugis temasek*.

National conservation status. — Vulnerable.



Fig. 103. *Asiophlugis rete* Gorochov: ZRC.ORT.213, male, 12.7 mm.



Fig. 104. *Asiophlugis temasek* Gorochov & Tan: ZRC.ORT.108, male, 21.2 mm (A); ZRC.ORT.152, female, 12.5 mm (B).



Fig. 105. *Asiophlugis thaumasia* (Hebard): ZRC.ORT.132, male, 13.3 mm (A); ZRC.ORT.212, female, 15.2 mm (B).



Fig. 106. *Mecopoda elongata* (Linnaeus, 1758): ZRC.ORT.195, male, 34.5 mm.

Subfamily **Mecopodinae**

Mecopoda elongata (Linnaeus) (Fig. 106)

Material collected. — ZRC.ORT.195, 1 male, Mandai Track 15, 18 January 2011, coll. M. K. Tan & H. P. M. Woo; ZRC.ORT.365, 1 male, Hindhede Nature Park, 17 January 2012, coll. M. K. Tan; ZRC.ORT.368, 1 male, Dairy Farm Loop, 20 January 2012, coll. M. K. Tan, R. W. J. Ngiam & W. L. Lim; ZRC.ORT.1068, 1 male, Mandai Track 15, 13 June 2014, coll. M. K. Tan & H. Yeo.

Remarks. — Probably among the most common and largest Singapore katydids. It can be heard producing discrete trilling calls at night while hiding in the undergrowth. There is also a brown variant.

National conservation status. — Common.

Subfamily **Phaneropterinae**

Tan (2014b) catalogued the diversity of Phaneropterinae from Singapore and also provided the key to the species.

Tribe **Ducetini**

Ducetia malayana Heller
(Fig. 107)

Material collected. — ZRC.ORT.308, 1 male, Venus Trail, 25 June 2011, coll. M. K. Tan.

Remarks. — It is often found in tall grasses or other herbaceous plants. There is also a brown variant. This species was previously identified as *Ducetia japonica* but recent revision indicates that specimens from Singapore belong to a separate new species (Heller et al., 2017).

National conservation status. — Common.

Tribe **Elimaeini**

Elimaea signata Brunner von Wattenwyl
(Fig. 108)

Material collected. — ZRC.ORT.192, 1 male, 1 female, Wallace Trail, 10 January 2011, coll. M. K. Tan; ZRC.ORT.403, 1 male, Wallace Trail, 15 February 2012, coll. M. K. Tan.

Remarks. — It is a forest-restricted species and tends to be found among the foliage of understorey plants. The calling song is a distinct and isolated low-pitched “zzzt”. It is relatively common during certain periods of the year during which adults can be seen in numbers at night but otherwise rarely encountered.

National conservation status. — Vulnerable.

Elimaea (Elimaea) chloris (Haan)
(Fig. 109)

Material collected. — ZRC.ORT.191, 1 male, Hindhede Way, 26 December 2010, coll. M. K. Tan.

Remarks. — Only the generic name was provided in the first edition (*Elimaea (Elimaea)* sp.). Further examination of material allowed the species to be identified (Tan, 2014b). This species is found in tall grasses or other herbaceous plants.

National conservation status. — Common.



Fig. 107. *Ducetia malayana* Heller, 2017: ZRC.ORT.308, male, 18.1 mm.

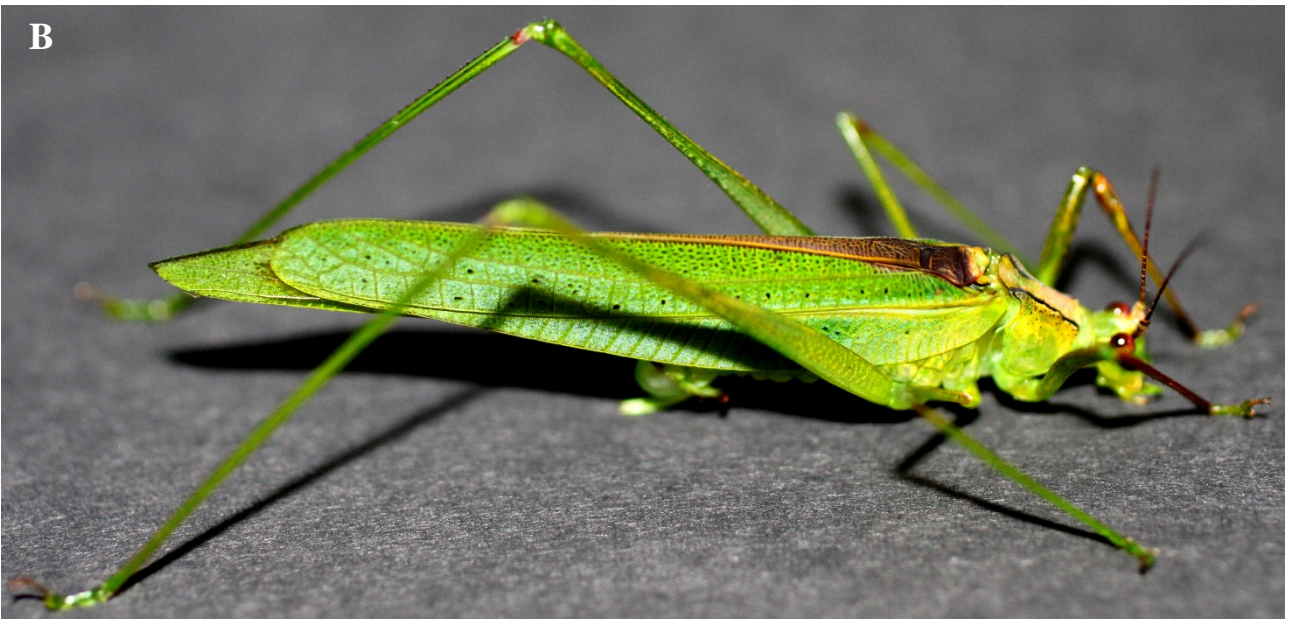


Fig. 108. *Elimaea signata* Brunner von Wattenwyl: ZRC.ORT.192, female, 26.2 mm (A); ZRC.ORT.192, male, 21.0 mm (B).



Fig. 109. *Elimaea (Elimaea) chloris* (Haan): ZRC.ORT.191, male, 26.1 mm.



Fig. 110. *Macedna martini* Karsch: ZRC.ORT.142, female, 24.5 mm.

***Macedna martini* Karsch**
(Fig. 110)

Material collected. — ZRC.ORT.142, 1 female, BTNR main road, 23 October 2010, coll. M. K. Tan & T. M. Leong; ZRC.1069, 1 female, MacRitchie, 14 June 2014, coll. M. K. Tan, H. Yeo & R. W. J. Ngiam.

Remarks. — This species was tentatively identified as *Elimaeini* sp. in the first edition. Further examination of material allowed the species to be identified (Tan, 2014c). It is a rare and forest-restricted species. Little is known about its ecology.

National conservation status. — Endangered.

Tribe **Holochlorini**

Arnobia c.f. *pilipes tropica* Gorochov
(Fig. 111)

Material collected. — ZRC.ORT.171, 1 female, Dairy Farm Pass, 31 December 2010, coll. M. K. Tan & H. P. M. Woo; ZRC.ORT.220, 1 male, Woodcutter Trail, 6 February 2011, coll. M. K. Tan & R. W. J. Ngiam.

Remarks. — This is a forest-restricted species that can sometimes be found along forest edges. This species was observed to be feeding on *Clidemia hirta*.

National conservation status. — Vulnerable.



Fig. 111. *Arnobia* c.f. *pilipes tropica* Gorochov: ZRC.ORT.171, female, 28.5 mm (A); ZRC.ORT.220, 24.8 mm (B).



Fig. 112. *Casigneta* c.f. *bisinuata* Karny: ZRC.ORT.243, female, 26.7 mm (A); ZRC.ORT.268, female, 25.3 mm (B).

Casigneta c.f. *bisinuata* Karny
(Fig. 112)

Material collected. — ZRC.ORT.154, 1 female, Nee Soon Swamp Forest, 13 December 2010, coll. M. K. Tan & M. R. B. Ismail; ZRC.ORT.243, 1 female, Upper Seletar Trail, 12 March 2011, coll. M. K. Tan; ZRC.ORT.268, 1 female, Woodcutter Trail, 26 April 2011, coll. M. K. Tan, R. W. J. Ngiam, J. J. Y. Chan & W. L. Lim.

Remarks. — Only the generic name was provided in the first edition (*Casigneta* sp.). This rare species is encountered in swamp forests. Further examination of material allowed the species to be identified (Tan, 2014b).

National conservation status. — Endangered.

Cesasundana lorniensis Tan
(Fig. 113)

Material collected. — ZRC.ORT.166, 1 female, Lornie Trail, 2 November 2010, coll. M. K. Tan (holotype).

Remarks. — Only the generic name was provided in the first edition (*Cesasundana* sp.). It is a rare, endemic, and forest-restricted species. The species was formally described by Tan (2014c).

National conservation status. — Critically endangered.

Elbenia sp.
(Fig. 114)

Material collected. — ZRC.ORT.150, 1 female, Rifle Range Link, 5 December 2010, coll. M. K. Tan.

Remarks. — This species was tentatively identified as *Elbenia* or *Phaulula* sp. It is a rare and forest-restricted species. Little is known about its ecology. Further examination of material allowed the identification to genus (listed as possibly *Phaululu* sp. in the first edition) and is updated here (Tan, 2014b).

National conservation status. — Endangered.

Holochlora c.f. *signata signata* Brunner von Wattenwyl
(Fig. 115)

Material collected. — ZRC.ORT.173, 1 female, Belukar Track, 31 December 2010, coll. M. K. Tan & H. P. M. Woo.

Remarks. — Only the generic name was provided in the first edition (*Holochlora* sp.). It can be found along forest edges. Further examination of material allowed the species to be better identified (Tan, 2014b).

National conservation status. — Vulnerable.



Fig. 113. *Cesasundana lorniensis* Tan: ZRC.ORT.166, female, 21.7 mm.



Fig. 114. *Elbenia* species: ZRC.ORT.150, female, 26.3 mm.



Fig. 115. *Holochlora* c.f. *signata signata* Brunner von Wattenwyl: ZRC.ORT.173, female, 29.2 mm.

***Psyrana* cf. *sondaica* (Carl)**
(Fig. 116)

Material collected. — ZRC.ORT.143, 1 female, Wallace Trail, 29 October 2010, coll. M. K. Tan, R. W. J. Ngiam & M. R. B. Ismail; ZRC.ORT.214, 1 female, Mousedeer Trail, 28 January 2011, coll. M. K. Tan.

Remarks. — Only the generic name was provided in the first edition (*Psyrana* sp.). It is a rare and forest-restricted species. Little is known about its ecology. Further examination of material allowed better identification (Tan, 2014b).

National conservation status. — Vulnerable.

Tribe Phaneropterini

***Phaneroptera brevis* (Serville)**
(Fig. 117)

Material collected. — ZRC.ORT.327, 1 male, Hindhede Nature Park, 20 July 2011, coll. M. K. Tan.

Remarks. — It is among the most common of katydids in Singapore. It can be found in grasses or other herbaceous plants. It tends to be found in places with abundant flowers (Tan & Tan, 2017; Tan et al., 2017).

National conservation status. — Common.

Genus group **Scambophylla**

Scambophyllum sanguinolentum (Westwood)

(Fig. 118)

Material collected. — ZRC.ORT.219, 2 males, Woodcutter Trail, 6 February 2011, coll. M. K. Tan & R. W. J. Ngiam.

Remarks. — It is a forest-restricted species that can be found on understorey plants. The early instars are distinctly different in colouration from the adults: black with white spots whereas the adults have bright orange and red hind wings, often hidden under the tegmina. The species name was corrected (from *Scambophyllum* cf. *pendleburyi* Karny in the first edition) after further examination and is updated here (Tan, 2014b).

National conservation status. — Endangered.



Fig. 116. *Psyrana* cf. *sondaica* (Carl): ZRC.ORT.143, female, 29.1 mm.



Fig. 117. *Phaneroptera brevis* (Serville): ZRC.ORT.327, male, 11.1 mm.



Fig. 118. *Scambophyllum sanguinolentum* (Westwood): ZRC.ORT.219, male, 24.8 mm.

Subfamily **Pseudophyllinae**

The scientific name for these katydids can be directly translated as ‘false-leaved katydids’ because of the leaf-mimicking tegmina. When disturbed, these katydids also tend to flatten their body against the foliage.

Tribe **Phyllomimini**

Chondroderella borneensis (Brunner von Wattenwyl)

(Fig. 119)

Material collected. — ZRC.ORT.113, 2 males, Wallace Trail, 29 October 2010, coll. M. K. Tan, R. W. J. Ngiam & M. R. B. Ismail.

Remarks. — This is perhaps the most common Pseudophyllinae member in Singapore. It tends to be found among *Dillenia suffruticosa* leaves in the forest or along forest edges. Upon disturbance, it will flatten its body against the leaf blade. The male can be heard at night producing a loud and distinct “jiiiiiit” isolated call.

National conservation status. — Common.



Fig. 119. *Chondroderella borneensis* (Brunner von Wattenwyl): ZRC.ORT.113, male, 25.2 mm.



Fig. 120. *Mioacris* or *Promeca* species: ZRC.ORT.246, female, 38.2 mm.

Mioacris or *Promeca* sp.
(Fig. 120)

Material collected. — ZRC.ORT.246, 1 female, Lower Peirce Reservoir Park, 16 March 2011, coll. M. K. Tan.

Remarks. — This is a rare and forest-restricted species. The adult may inhabit the canopy as it is rarely seen in the understorey.

National conservation status. — Endangered.

Phyllomimus inversus Brunner von Wattenwyl
(Fig. 121)

Material collected. — ZRC.ORT.112, 1 male, BTNR main road, 23 October 2010, coll. M. K. Tan & T. M. Leong; ZRC.ORT.124, 1 female, BTNR main road, 13 November 2010, coll. M. K. Tan; ZRC.ORT.237, 1 female, Lornie Trail, 24 February 2011, coll. M. K. Tan; ZRC.ORT.364, 1 male, Dairy Farm Pass, 2 January 2012, coll. M. K. Tan; ZRC.ORT.1018, 1 female, Woodcutter Trail, 24 August 2013, coll. M. K. Tan & H. Yeo.

Remarks. — This is a forest-restricted species that can be found dwelling among foliage. Upon disturbance, it will flatten its body against the foliage. The male's calling song is distinct, usually heard coming from trees. One syllable consists of a pulse which sounds like “zzzzztzk”.

National conservation status. — Vulnerable.



Fig. 121. *Phyllomimus inversus* Brunner von Wattenwyl, 1895: ZRC.ORT.112, male, 28.6 mm (A); ZRC.ORT.124, female, 29.5 mm (B).

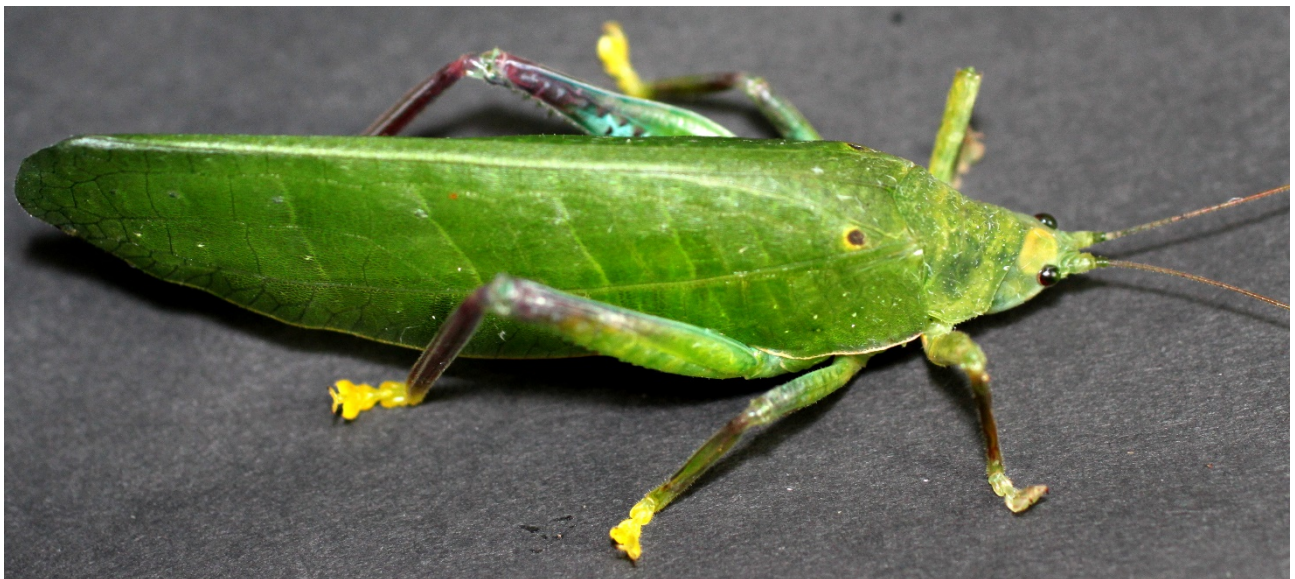


Fig. 122. *Phyllomimus elliptifolius* (Pictet et Saussure): ZRC.ORT.121, female, 44.5 mm.

***Phyllomimus elliptifolius* (Pictet et Saussure)**
(Fig. 122)

Material collected. — ZRC.ORT.121, 1 female, Lornie Trail, 2 November 2010, coll. M. K. Tan.

Remarks. — This is a rare and forest-restricted species. The adult may inhabit the canopy as it is rarely seen in the understorey. Further examination confirmed its identity and is updated here.

National conservation status. — Endangered.

Tribe Pseudophyllini

***Onomarchus* c.f. *uninotatus* (Serville)**
(Fig. 123)

Material collected. — ZRC.ORT.326, 1 female, Rifle Range Link, 7 July 2011, coll. M. K. Tan & L. F. Cheong (collected as final instar nymph; final moult on 10 July 2011).

Remarks. — This is a fairly rare and forest-restricted species. The adult may inhabit the canopy as it is rarely seen in the understorey.

National conservation status. — Vulnerable.



Fig. 123. *Onomarchus* c.f. *uninotatus* (Serville): ZRC.ORT.326, female, 37.3 mm.

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