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Studies on South-east Asian fireflies: *Abscondita*, a new genus with details of life history, flashing patterns and behaviour of *Abs. chinensis* (L.) and *Abs. terminalis* (Olivier) (Coleoptera: Lampyridae: Luciolinae)

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Abstract

Abscondita, a new genus of fireflies from South-east Asia, is described from males and females of *Abs. anceyi* (Olivier 1883), *Abs. cerata* (Olivier 1911), *Abs. chinensis* (L. 1767), *Abs. perplexa* (Walker 1858), *Abs. promelaena* (Walker 1858) and *Abs. terminalis* (Olivier 1883), all transferred from *Luciola* Laporte. Both *L. dubia* Olivier 1903 and *L. dejeani* Gemminger 1870 are synonymised with *Luciola perplexa* (Walker), and *L. aegrota* Olivier 1891 and *L. melaspis* Bourgeois 1909 with *L. promelaena* Walker. Females are characterised by their bursa plates. Larvae are associated and described for

Abs. anceyi (Olivier), *Abs. chinensis* (L.) and *Abs. terminalis* (Olivier). Taxonomic issues regarding the identification of species with very similar colouration of pale dorsum and black tipped elytra are addressed and in some cases resolved. A neotype for *Luciola chinensis* (L.) is erected and *Luciola praeusta* (Kiesenwetter 1874) is synonymised with *L. chinensis* (L.). Descriptions of life histories, biology and flashing patterns of populations of *Abs. chinensis* and *Abs. terminalis* from central China are included. *Abs. terminalis* is the first Asian firefly known to possess multiple flash trains where males are documented to display with repeating flash trains.

Key words: Firefly life history, flash trains, new genus

Introduction

The taxonomy, morphology and behaviour of many lucioline fireflies in South-east Asia have been largely unexplored since most species were first described (Ballantyne 2012). There are of course notable exceptions—*Pteroptyx* Olivier in Malaysia and Thailand (see Ballantyne *et al.* 2011 for references), the lucioline firefly fauna of Taiwan (Jeng *et al.* 2003), and some studies on Chinese fireflies e.g. Fu and Ballantyne (2006, 2008), Fu *et al.* (2010, 2012).

Any investigation into Luciolinae fireflies in SE Asia encounters additional problems when attempting to identify those with yellowish brown dorsum, black tipped elytra and large and entire light organs in abdominal ventrite 7 (as in Figs 2, 7, 18, 19, 20). McDermott (1966) listed over 30 Asian and Australopacific species with this colour pattern, all of which he referred to *Luciola* Laporte (Table 1). Identification of any of these species is difficult if not impossible. Preliminary investigations (Ballantyne & Lambkin 2009, 2013) indicate that distinguishing features are in the aedeagal and aedeagal sheath structures. Unfortunately, only in a few of the species have dissections of genitalia been subsequently made.

TABLE 1. *Luciola* species with pale dorsum and dark elytral apices (following McDermott 1966).

<i>Luciola anceyi</i> Olivier	<i>L. delauneyi</i> Bourgeois	<i>L. infuscata</i> Erichson
<i>L. angusticollis</i> Olivier ¹	<i>L. dubia</i> Olivier	<i>L. intricata</i> Walker
<i>L. apicalis</i> (Eschsch.) ¹	<i>L. deplanata</i> Pic ⁷	<i>L. praeusta</i> Kiesenwetter
<i>L. bicoloripes</i> Pic ¹	<i>L. doriae</i> Olivier ⁶	<i>L. recticollis</i> Olivier ⁹
<i>L. chinensis</i> (L.)	<i>L. extricans</i> Walker ⁷	<i>L. sordida</i> Olivier
<i>L. cingulata</i> Olivier ²	<i>L. fissicollis</i> Fairmaire	<i>L. perplexa</i> Walker
<i>L. complanata</i> Gorham ³	<i>L. flava</i> Pic ⁸	<i>L. succincta</i> Bourgeois
<i>L. costata</i> Lea ⁴	<i>L. flavida</i> Hope	<i>L. substriata</i> Gorham ²
<i>L. dejeani</i> Gemminger ⁵	<i>L. incerta</i> Boisduval	

Footnotes: 1. Described with black abdominal ventrites anterior to white light organs. 2. Having set of 3 sclerites surrounding the aedeagal sheath. 3. Description suggests *Curtos* sp. 4. Transferred to *Aquilonia* Ballantyne by Ballantyne & Lambkin (2009). 5. Not from Australia; probably synonymous with *L. perplexa* (Ballantyne & Lambkin 2000). 6. LO in V7 possibly bipartite, ?= *L. humeralis*. 7. Mesoscutellum black. 8. Description highlights head yellow between eyes (Pic 1929). 9. Based on a female.

Of these pale coloured species, four appear to be widespread in SE Asia (McDermott 1966). *Luciola anceyi* Olivier 1883 and *L. chinensis* (L. 1767) were recorded from a wide range of localities by McDermott (1966). The type of *chinensis* is no longer in the Linnaean collection in London (LB examination 1993). *Luciola praeusta* Kiesenwetter 1874 was described from Japan (Kiesenwetter 1874). McDermott (1966) synonymised *L. affinis* Gorham 1880, *L. gorhami* Ritsema 1883, and *L. terminalis* Olivier 1883 with *L. praeusta*. Jeng *et al.* (2003), using aedeagal and sheath characters, considered they could differentiate two local Taiwanese populations, and retained *terminalis* as a valid species and identified the other as a *praeusta* population. They also addressed taxonomic issues concerning *praeusta*, but did not examine the type, which they indicated was supposedly collected in Japan by G. Lewis. The species has never again been collected there (Kawashima *et al.* 2003) and the type locality for *praeusta* is thus unknown.

The identity of both *Luciola chinensis* and *L. praeusta* has thus been uncertain for over 100 years and it seemed time that attempts should be made to resolve the issue at least in a taxonomic sense. Our dilemma here was either to address both *Luciola chinensis* and *L. praeusta* as *species incertae*, follow Jeng *et al.* (2003) and identify the