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Odonata of Guangxi Zhuang Autonomous Region, China, part II: Anisoptera

Keith D.P. Wilson
18 Chatsworth Road, Brighton, BN1 5DB, UK. <wilsonkd@ntlworld.com>

Key words: Odonata, dragonfly, Guangxi, China, checklist, new genus, *Atratothemis*, new species.

Abstract

Taxonomic and faunistic information is provided on the Anisoptera of Guangxi Zhuang Autonomous Region, China. The genus *Atratothemis* is established to receive a newly discovered libellulid species *A. reelsi* sp. nov. belonging to the subfamily Pantalinae. *Oligoaeschna aquilonaris* sp. nov., *Periaeschna rotunda* sp. nov., *Petaliaeschna gerrhon* sp. nov. and *Asiagomphus giza* sp. nov. are described. The first males of *Stylurus erectocornis* and *Nihonogomphus huangshaensis* and the first female of *Macrogomphus guilinensis* are described. *Diplacodes bipunctata* and *Idionyx unguiculata* are recorded from mainland China for the first time. *Somatochlora taiwana* is synonymised with *S. dido*.

Introduction

This is the second paper in a two part series, providing taxonomic and faunistic information on the Odonata of Guangxi, based on specimens collected during surveys conducted between 1997 and 2002. The first paper (Wilson & Reels 2003) provided an account of 74 species of Zygoptera recorded from Guangxi. This second report provides the first comprehensive account of the Anisoptera of Guangxi. A checklist of Anisoptera, recorded from Guangxi, is provided in Table 2, which includes authorship and year of publication. Authorities are given after species names in the general text only, if a name is not listed in Table 2. Information on the ecology, zoogeography and climate of Guangxi is provided in Wilson & Reels (2003).

Published records for Guangxi odonates are sparse but at least nine new species of Anisoptera have previously been described from Guangxi. In Needham's (1930) manual of the dragonflies of China 18 species of Anisoptera were recorded from Guangxi, including original descriptions of *Chlorogomphus nasutus* and *Melligomphus dolus*. Needham (1930) also described *Davidius unicornis* from Guangxi but this proved to be a synonym of *Heliogomphus scorpio* (Chao 1954), which was described from neighbouring Guangdong. The enigmatic *Chlorogomphus papilio* was recorded by Needham (1930) from Sichuan and Guangxi.

Chao Hsiu-fu, who specialised on the study of Chinese gomphids, described many species from southern China including *Macrogomphus guilinensis* (Chao 1982) and *Sinogomphus asahinai* (Chao 1984) from Guangxi. Liu (1985) described *Stylurus nanningensis*, and Liu & Chao, in Chao (1990), jointly described *Stylurus erectocornis*. *Nihonogomphus huangshaensis* was described by Chao &

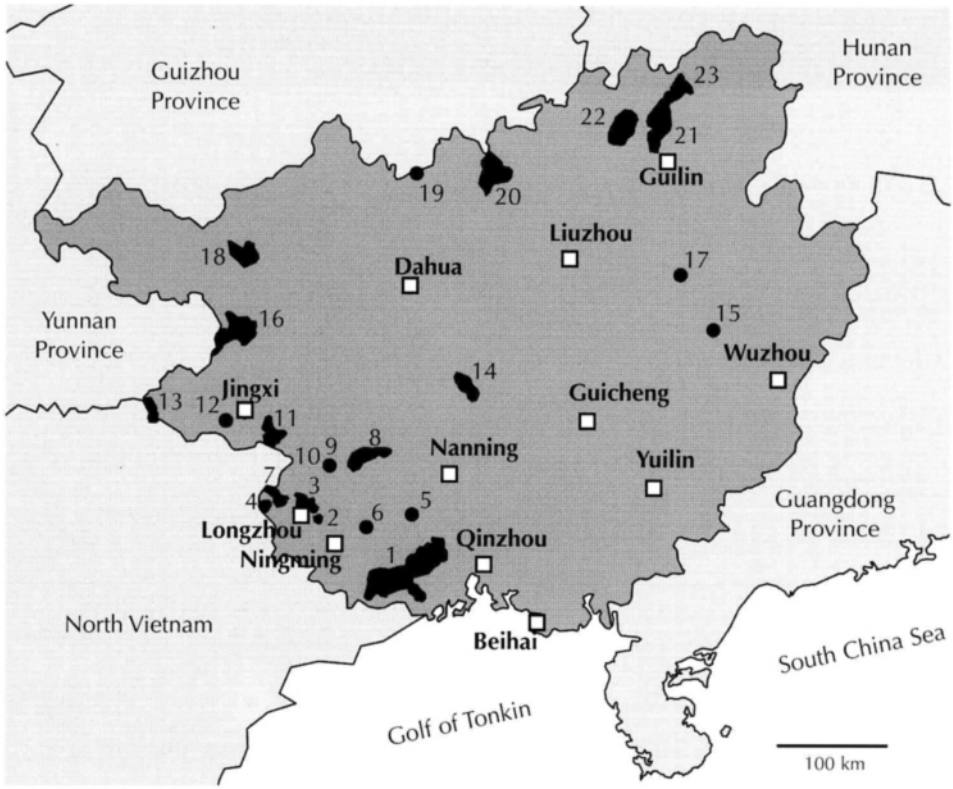

Figure 1: Guangxi Zhuang Autonomous Region showing locations of areas surveyed. For the numbers, see Table 1.

Zhu (1999) from a single female specimen collected from Huangsha, Guangxi. Chao (1990, 1995) reported a further nine gomphids. The province is clearly very rich in gomphids with 19 species previously recorded in total, despite the lack of any systematic survey work. A further 22 species are enumerated here.

Sui & Sun (1984) recorded nine common and widespread odonates from Guangxi, including *Sympetrum croceolum croceolum*, which has not been recorded in surveys reported here. A third chlorogomphid, *Chlorogomphus kitawakii*, was described from Guangxi by Karube (1995). Zhou et al. (1994) recorded *Macromia urania*, and three further *Macromia* species were recorded from Guangxi by Wilson (1998), including the original description of *M. fulgidifrons*. Hua (2000) collated numerous records of odonates from China and provided details of a further 23 species from Guangxi.

A total of 128 species of anisopterans are listed here in the checklist (Table 2). Sixty-three of these species are recorded from Guangxi for the first time, including a new libellulid genus, and five new species. Together with the 74 zygopterans enumerated in a first paper (Wilson & Reels 2003) the total number of odonate species recorded from Guangxi is 202. This sum includes seven species in this paper, which have not been formally described, and are listed here as 'sp.'. I am currently examining a lot of specimens from neighbouring Guangdong Province, which may help to establish the status of these unnamed species.

Table 1. Locations surveyed in Guangxi Zhuang Autonomous Region, China. N: National Nature Reserve, R: Regional Nature Reserve, C: County Nature Reserve.

Nr./Site	Area (km²)	Altitude (m)	Type of protected area	Coordinates Date
1 Shiwandashan, Qinzhou County, SW Guangxi	1,745	150-1,462	R	21°30'-22°08'N, 107°30'-108°30'E v 1997, ix 2000
2 Longrui, Longzhou Ningming County, SW Guangxi	21	300-500	N	22°12'-22°20'N, 107°10'-107°15'E v 1998
3 Nonggang, Longzhou County, SW Guangxi	80	300-700	N	22°13'-22°33'N, 106°46'-107°04'E v 1998
4 Chunxiu, Longzhou County, SW Guangxi	50	300-500	R	22°22'-22°32'N, 106°32'-106°36'E v 1998
5 Fusui, Fusui County, SW Guangxi	80	400-600	R	22°24'-22°36'N, 107°50'-108°00'E v 1998
6 Chongzuo (Banli Village), Chongzuo County, W Guangxi	185	200-600	R	22°24'-22°46'N, 107°22'-107°33'E vii 1999
7 Qinglongshan, Longzhou County, SW Guangxi	151	300-500	R	22°27'-22°29'N, 106°32'-106°53'E v 1998
8 Xidamingshan, Daxin County, SW Guangxi	601	100-1,071	R	22°40'-22°58'N, 107°17'-107°46'E x 1998
9 Daxin County Town, W Guangxi	-	-	-	22°41'N, 107°16'E vii 1999
10 Daxin, Daxin County, W Guangxi	209	400-600	R	22°42'-22°48'N, 107°01'-107°15'E vii 1999
11 Gulongshan, Jingxi County, W Guangxi	297	250-1,300	R	22°50'-23°10'N, 106°40'-106°50E vii 1999
12 Diding, Jingxi County, W Guangxi	-	-	C	23°06'-23°08'N, 105°57'-105°59'E vii 1999
13 Nonghua (Baidu Village), Napo County, W Guangxi	134	400-1,400	R	23°14'-23°20'N, 105°23'-105°35'E vii 1999
14 Damingshan, Mashan County, central Guangxi	649	300-1,700	R	23°24'-23°30'N, 108°20'-108°32'E v 1997, ix 2000
15 Dapingshan, Guiping County, E Guangxi	19	500-1,000	C	23°30'-23°40'N, 109°58'-110°03'E ix 1998
16 Dawangling, Baise City, NW Guangxi	819	130-1,400	R	23°32'-23°51'N, 106°10'-106°30'E viii 1999
17 Dayaoshan, Jinxiu County, E Guangxi	2,022	110-1,900	R	23°40'-24°24'N, 109°50"-110°25'E ix 1998
18 Cenwanglaoshan, Lingyun County, NW Guangxi	298	1,000-2,062	R	24°25'-24°35'N, 106°15'-106°30'E vii-viii 1999, v 2002
19 Mulun, Huangjiang County, N Guangxi	301	500-1,000	N	25°01'-25°14'N, 107°50'-108°10'E vii 1998
20 Jiuwanshan, Luocheng, N Guangxi	964	700-1,600	R	25°07'-25°20'N, 108°36'-108°50'E vii 1998
21 Qingshitan, Lingchuan County, NE Guangxi	391	250-1,700	R	25°20'-25°47'N, 110°05'-110°17E viii 1998
22 Huaping, Longsheng County, NE Guangxi	174	500-1,900	N	25°31'-25°40'N, 109°49'-109°58'E viii 1998
23 Maoershan, Xingan County, NE Guangxi	451	700-2,142	R	25°46'-26°00N, 110°15'-110°32'E viii 1998

1997-2002 SURVEYS

Odonates were collected by a team assembled by the Hong Kong based Kadoorie Farm and Botanic Garden Corporation during field trips conducted in May 1997, May-October 1998, July-August 1999, September 2000 and May 2002. Graham Reels (GR) and I (KW) collected the majority of odonates, with assistance from Billy Hau Chi-hang (BH) and Michael Lau (ML). The sites surveyed are shown in a map (Fig. 1) and listed in Table 1. The programme was conducted in collaboration with the Guangxi Forestry Department of Guangxi Zhuang Autonomous Region, Guangxi Institute of Botany and the South China Agricultural University. Selected synonymic notes are provided for newly recorded and poorly known species from Guangxi. Details of common and widespread, newly recorded, species are tabulated in Table 3. Distribution records are provided for Chinese provinces and grouped together with Taiwanese records, since Taiwan belongs to the same zoogeographic region as China.

All specimens are currently held in the author's collection. Measurements of specimens are provided in mm for length of abdomen plus anal appendages (= Abd.) and hindwing maximum length. This style of measurement is adopted to be comparable with the majority of papers treating the Asian fauna. Terminology with regard to odonate morphology follows Rowe (1987).

Table 2. Checklist of odonate species recorded from Guangxi Zhuang Autonomous Region.

Taxon	**Source of original Guangxi record**
Aeshnidae	
Aeshna petalura Martin, 1908	This paper
Anaciaeschna jaspidea (Burmeister, 1839)	Hua (2000)
Anax guttatus (Burmeister, 1839)	Sui & Sun (1984), as *A. goliathus* Fraser
immaculifrons Rambur, 1842	This paper
n. nigrofasciatus Oguma, 1915	Hua (2000)
parthenope julius Brauer, 1865	Hua (2000)
Boyeria sinensis Asahina, 1978	This paper
Cephalaeschna needhami Asahina, 1981	This paper
Gynacantha japonica Bartenef, 1909	Hua (2000)
subinterrupta Rambur, 1842	Sui & Sun (1984)
Oligoaeschna aquilonaris sp. nov.	This paper
Periaeschna magdalena Martin, 1909	Needham (1930): Lo-chen-hsien
rotunda sp. nov.	This paper
Petaliaeschna gerrhon sp. nov.	This paper
Planaeschna r. risi Asahina, 1964	This paper
sp. A	This paper
sp. B	This paper
suichangensis Zhou & Wei, 1980	This paper
Polycanthagyna erythromelas (McLachlan, 1896)	This paper
ornithocephala (McLachlan, 1896)	This paper
Tetracanthagyna waterhousei McLachlan, 1898	This paper

Taxon	Source of original Guangxi record
Gomphidae	
Anisogomphus anderi Lieftinck, 1948	Chao (1995)
koxingai Chao, 1954	This paper
sp.	This paper
Asiagomphus giza sp. nov.	This paper
pacificus (Chao, 1953)	This paper
xanthenatus acco Asahina, 1996	This paper
Burmagomphus sowerbyi (Needham, 1930)	Chao (1990)
vermicularis (Martin, 1904)	This paper
Davidius fruhstorferi Martin, 1904	Chao (1995)
Gomphidia a. abbotti Williamson, 1907	This paper
confluens Selys, 1878	Chao (1990)
k. kruegeri Martin, 1904	This paper
Heliogomphus scorpio (Ris, 1912)	Needham (1930), as *Davidius unicornis* (Needham); Shan-tang, Lo-chen-hsien
Ictinogomphus pertinax (Selys, 1854)	Needham (1930), as *Ictinus fallax* (Selys)
Labrogomphus torvus Needham, 1931	This paper
Lamelligomphus camelus (Martin, 1904)	This paper
formosanus (Matsumura, 1926)*	Hua (2000)
sp.	This paper
tutulus Liu & Chao, 1990	This paper
Leptogomphus e. elegans Lieftinck, 1948	Chao (1990)
perforatus Ris, 1912	This paper
Macrogomphus guilinensis Chao, 1982	Chao (1982), loc. typ. in Guangxi: Guiling
Melligomphus ardens (Needham, 1930)	Chao (1990)
dolus (Needham, 1930)	Needham (1930), as *Gomphus dolus*; loc. typ. in Guangxi: Pinglan, Shan-fang, Lo-chen-hsien
Merogomphus paviei Martin, 1904	This paper
Nepogomphus sp.	This paper
Nihonogomphus huangshaensis Chao & Zhu, 1999	Chao & Zhu (1999), loc. typ. in Guangxi: Huangsha
thomassoni (Kirby, 1900)	Chao (1990)
Nychogomphus duaricus (Fraser, 1924)	This paper
Ophiogomphus sinicus (Chao, 1954)	This paper
Paragomphus capricornis (Förster, 1914)	This paper
pardalinus Needham, 1942	Chao (1990)
Sieboldius deflexus (Chao, 1955)	This paper
Sinictinogomphus clavatus (Fabricius, 1775)	Hua (2000)
Sinogomphus asahinai Chao, 1984	Chao (1984), loc. typ. in Guangxi
sp.	This paper
Stylogomphus sp.	This paper
Stylurus amicus (Needham, 1930)	This paper
erectocornis Liu & Chao in Chao, 1990	Chao (1990), loc. typ. in Guangxi: Nanning
nanningensis Liu, 1985	Liu (1985), loc. typ. in Guangxi: Nanning
Trigomphus beatus Chao, 1954	Chao (1990)

* in Oguma (1926)

Taxon	Source of original Guangxi record
Chlorogomphidae	
Chlorogomphus kitawakii Karube, 1995	Karube (1995), loc. typ. in Guangxi: Mt Tiantang Ling, Jinxiu
n. nasutus Needham, 1930	Needham (1930), loc. typ. in Guangxi: Tung-lo, Lo-chen-hsien
papilio Ris, 1927	Needham (1930): Guangxi; see also Wilson (2002: 66-67, figs 1-10, Mulun, Guangxi, 21 vii 1998)
Cordulegastridae	
Anotogaster sieboldii (Selys, 1854)	This paper
Corduliidae	
Epophthalmia elegans (Brauer, 1865)	Hua (2000)
Idionyx carinata Fraser, 1926	This paper
claudia Ris, 1912	Needham (1930): Lo-chen-hsien
unguiculata Fraser, 1926	This paper
victor Hämäläinen, 1991	This paper
Macromia berlandi Lieftinck, 1941	Zhou et al. (1994): Sanjiang
clio Ris, 1916	Wilson (1998), as *M. hamifera* Lieftinck; Shiwandashan
fulgidifrons Wilson, 1998	Wilson (1998), loc. typ. in Guangxi: Shiwandashan
moorei malayana Laidlaw, 1928	Wilson (1998): Shiwandashan
urania Ris, 1916	Zhou et al. (1994): Sanjiang
Somatochlora dido Needham, 1930	This paper
Libellulidae	
Acisoma p. panorpoides Rambur, 1842	Sui & Sun (1984)
Atratothemis reelsi sp. nov.	This paper
Brachydiplax chalybea flavovittata Ris, 1911	This paper
farinosa Krüger, 1902	This paper
Brachythemis contaminata (Fabricius, 1793)	Hua (2000)
Cratilla l. lineata (Brauer, 1878)	This paper
Crocothemis s. servilia (Drury, 1770)	Sui & Sun (1984)
Deielia phaon (Selys, 1883)	Hua (2000)
Diplacodes bipunctata (Brauer, 1865)	This paper
nebulosa (Fabricius, 1793)	Sui & Sun (1984)
trivialis (Rambur, 1842)	Needham (1930): Lo-chen-hsien
Hydrobasileus croceous (Brauer, 1867)	This paper
Lyriothemis elegantissima Selys, 1883	This paper
pachygastra (Selys, 1878)	Needham (1930): Yun-shu-tchau, Lo-chen-hsien
tricolor Ris, 1919	This paper

Taxon	Source of original Guangxi record
Libellulidae (continued)	
Nannophya pygmaea Rambur, 1842	Needham (1930): Yun-shu-tchau, Lo-chen-hsien
Neurothemis fulvia (Drury, 1773)	Needham (1930): Lin-yung-hsien
t. tullia (Drury, 1773)	Hua (2000)
Onychothemis testacea tonkinensis Martin, 1904	This paper
Orthetrum albistylum speciosum (Uhler, 1858)	Hua (2000)
chrysis (Selys, 1891)	This paper
glaucum (Brauer, 1865)	This paper
japonicum internum (McLachlan, 1894)	Hua (2000)
luzonicum (Brauer, 1868)	Needham (1930), as *O. devium* Needham; Soochow
melania (Selys, 1883)	Needham (1930): Lo-chen-hsien
pruinosum neglectum (Rambur, 1842)	Needham (1930), as *O. neglectum* (Rambur); Ho-dsu-hsien
s. sabina (Drury, 1770)	Needham (1930): Shan-fang, Lo-chenhsien
t. testaceum (Burmeister, 1839)	Hua (2000)
t. triangulare (Selys, 1878)	This paper
Palpopleura s. sexmaculata (Fabricius, 1787)	This paper
Pantala flavescens (Fabricius, 1798)	Sui & Sun (1984)
Potamarcha congener (Rambur, 1842)	This paper
Pseudothemis zonata (Burmeister, 1839)	Hua (2000)
Rhodothemis rufa (Rambur, 1842)	This paper
Rhyothemis variegata arria (Drury, 1773)	Hua (2000), as *R. v. variegata* (Linnaeus)
Sympetrum b. baccha (Selys, 1884)	This paper
c. croceolum (Selys, 1883)	Sui & Sun (1984)
darwinianum (Selys, 1883)	Sui & Sun (1984)
eroticum ardens (McLachlan, 1894)	Hua (2000) as *Sympetrum e. eroticum* (Selys, 1883)
hypomelas (Selys, 1884)	Needham (1930): Yao-mah-chan, Lin-yung-hsien
infuscatum (Selys, 1883)	This paper
parvulum (Bartenef, 1912)	This paper
s. speciosum Oguma, 1915	This paper
Tetrathemis platyptera Selys, 1878	This paper
Tholymis tillarga (Fabricius, 1798)	Hua (2000)
Tramea virginia (Rambur, 1842)	Needham (1930)
Trithemis aurora (Burmeister, 1839)	Sui & Sun (1984)
festiva (Rambur, 1842)	Needham (1930): Lo-chen-hsien
Urothemis s. signata (Rambur, 1842)	Hua (2000)
Zygonyx asahinai Matsuki & Saito, 1995	This paper
iris insignis (Kirby, 1900)	This paper

AESHNIDAE

Aeshna petalura Martin, 1908
(Figs 2a-d)

Aeshna petalura Martin, 1908: 78, figs 28, 77 [type: ♂, India, Darjeeling, Khasia-hills]; — Fraser (1936: 128-130, figs 40a, 40b, Sikkim, India).
Aeshna taiyal Asahina, 1938: 541, figs 1-14 [type: Taiwan]; — Lieftinck et al. (1984: 37-38, Taiwan); — Wang & Heppner (1997: 80-81, photos, ♀, Taiwan).
Aeshna petalura taiyal Asahina. — Davies & Tobin (1985: 5-6, Himalayas and Taiwan); — Wang (2000: 218-219, photos ♂, ♀, Taiwan).

Guangxi specimen: 1 ♂, 22 viii 1998, Maoershan, leg. GR.
Distribution: Bhutan, China (Guangxi, Taiwan), India and Nepal.
Remarks: This is the first documented, continental record of a male *A. petalura* and the first record of this species from mainland China. It is a montane species known to occur in Taiwan from 1,500-3,130 m. The head, thorax and caudal appendages are illustrated in Figure 2. I concur with Schorr et al. (2004) who state *A. taiyal* Asahina is a synonym of *A. petalura*.

Anax nigrofasciatus nigrofasciatus Oguma, 1915

Anax nigrofasciatus Oguma; — Needham (1930: 74-75, Nanking); — Hua (2000: 10, Fujian, Guangxi, Gansu, Guizhou, Hebei, Hubei, Jiangsu, Liaoning, Shanxi, Sichuan, Taiwan, Yunnan, Xizang).

Guangxi specimens: 1 ♂, 1 ♀, Damingshan, 12 v 1997, leg. KW; 1 ♂, Huaping, 16 vii 1998, leg. GR; 1 ♂, Maoershan, 24 viii 1998, leg. GR.
Distribution: China (Fujian, Guangxi, Gansu, Guizhou, Hebei, Hubei, Jiangsu, Liaoning, Shanxi, Sichuan, Taiwan, Yunnan, Xizang [Tibet], Zhejiang), Japan, Korea and Philippines. *A. nigrofasciatus nigrolineatus* Fraser is known from Bhutan, China, India Nepal and Thailand. It is distinguished from the nominate taxon by the presence of fine black thoracic sutures compared with the definite, broad, black sutures of the nominotypical subspecies.

Boyeria sinensis Asahina, 1978

Boyeria sinensis: Asahina, 1978b: 239-243, figs 9, 10 [type: Szechwan].

Guangxi specimens: 1♂, Maoershan, 24 viii 1998; 1♀, Dayaoshan, 22 ix 1998; 1♂, Dapingshan, 25 ix 1998; all leg. GR.
Distribution: China (Guangxi, Sichuan).

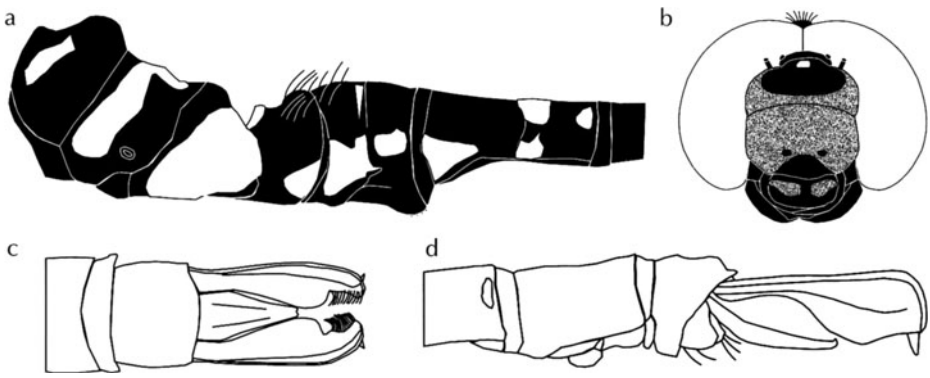

Figure 2: *Aeshna petalura* ♂, Guangxi — (a) thorax and basal abdomen, lateral; (b) head, frontal; (c) caudal appendages, dorsal; (d) same, lateral.

Cephalaeschna needhami Asahina, 1981
(Figs 3a-e)

Cephalaeschna needhami: Asahina, 1981: 9, 11, figs 34-39 [type: Kuling, China]; — Asahina (1982: 7-9, fig. 1, Fukien).

Guangxi specimen: 1♂, Dayaoshan, 17 ix 1998, leg. GR.
Redescription of male: Large *Cephalaeschna* with blackish-brown legs, mid-brown Pt, well-developed yellow, transverse abdominal stripes, sharply pointed superior appendages. Labium pale creamy-brown. Labrum pale reddish-brown. Anteclypeus and postclypeus pale reddish-yellow. Face of frons reddish-black with fine pale margin at base (Fig. 3b). Top of frons reddish-brown, paler at base and sides of frons. Apex of frons distinct but gently rounded. Vertex and occiput blackish-red. Antennae pale reddish-brown. Width of frons (4.5 mm) exceeds half width of head (8.5 mm). Prothorax dull black with mid-brown frontal lobe. Synthorax dull black with broad, yellow dorsal stripe, sharply pointed towards head at exterior corner. Mesepimeron with broad yellow stripe as illustrated in Figure 3a. Metepisternum with triangular-shaped yellow spot below wing base. Metepimeron with broad yellow stripe. Metaposternum orange-brown. Legs reddish-black. Wings (Fig. 3e) hyaline with mid-brown Pt subtending 3-4 cells. Brace vein aligned with inner basal border of Pt. Anal triangle 3-celled. Abdomen predominantly dull reddish-black. S1 with pale brownish-yellow mid-lateral spot at distal margin. S2 with pair of mid-lateral orange-brown spots at base and distal margin. Auricle dull yellowish-brown above and blackish-red below. Dorsum of S2 with triangular-shaped dull yellow spot at base, pair of dull yellow spots along basal edge of transverse carina, and broad transverse spot at distal margin (Fig. 3a). S3-6 with pair of distinct, small yellow, triangular-shaped spots at transverse carina, narrowly divided by distinctly ridged dorsal carina, and small undivided, elliptical spot at distal margin. S8-10 uniformly reddish-black apart from a minute, narrowly divided, faint spot at distal margin of S8. Caudal appendages black as illustrated (Figs 3c, 3d).

Measurements: Abd. 54.0, Hw 44.0. In comparison: type, Abd. 49.4, Hw 45.0.
Distribution: China (Fujian, Guangxi, Jiangxi?).
Remarks: Asahina (1981) assumed the single male and single female specimens labelled, "Kuling, China, July 1933, Dr. Lew" were taken from Mt. Lushan near Kiukiang in Kiangsi province (Jiangxi). It is possible they were actually taken from Guilin, Guangxi, which was historically spelt "Kuling".

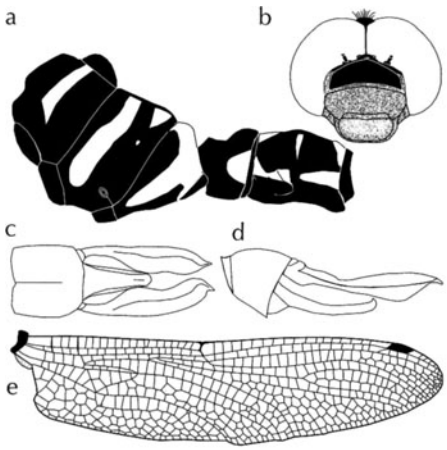

Figure 3: *Cephalaeschna needhami* ♂, Guangxi — (a) thorax and basal abdomen, lateral; (b) head, frontal; (c) caudal appendages, dorsal; (d) same, lateral; (e) hindwing.

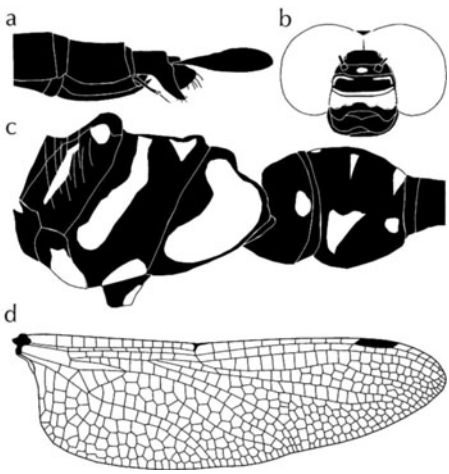

Figure 4: *Oligoaeschna aquilonaris* sp. nov. ♀, Maoershan, Guangxi — (a) tip of abdomen, lateral; (b) head, frontal; (c) thorax and basal abdomen, lateral; (d) hindwing.

Oligoaeschna aquilonaris sp. nov.
(Figs 4a-d)

Guangxi specimen: Holotype ♂, Maoershan, 22 viii 1998, leg. GR. Holotype will be deposited at Tai Lung Experimental Station, Agriculture, Fisheries and Conservation Department, Lin Tong Mei, Sheung Shui, Hong Kong SAR, China.
Etymology: *aquilonaris* = northern.
Description of female: Head with roundish appearance, when viewed from the front (Fig. 4b). Labium with central lobes greenish-yellow, broadly bordered at the fontal margins with pale reddish-brown and lateral lobes pale reddish-brown. A small, isolated, faint greenish-yellow spot at base of blackish-brown mandibles. Labrum shiny black. Anteclypeus dark reddish-brown. Postclypeus coloured dark brown lower half and greenish-yellow upper half. Face of frons with upper three quarters black, ruggose and basal quarter dark brown, smooth and shiny. Top of frons pale green with broad black T-mark, the stem expanded basally and the top of the T extending to the sides. Sides of frons black with a pale green central stripe extending to dorsal surface to form a pair of dorso-lateral stripes, widely sepa-

rated by the stem of the T-mark. These narrow dorso-lateral stripes commence at lateral base of frons, away from the eye margin, and extend, transversely, across one quarter of the frons dorsum. Top of head, and antennae black. Vertex rectangular, black, with rounded corners and upper surface and a small rounded dent at each side, above the lateral ocelli. In addition there is a fine, transverse groove across the anterior base of vertex. Frontal ocelli shiny, pale orange brown. Prothorax dark with small triangular spot at side of dorsal, central lobe. Synthorax blackish-brown with greenish-yellow dorsal stripe angled inwards towards wing bases. Large roundish greenish-yellow dorsal spot at wing base. Large lateral yellow stripes as shown in Figure 4c. Dorsum is fringed with long, pale hairs. Wings palely enfumed amber throughout, with dense wing venation in comparison with other species of this genus. Hw is illustrated in Figure 4d. Pt mid brown subtending 3-4 cells. Discoidal field with three cell rows at origin. Two cell rows between R4 and Rspl. Legs black. Base of abdomen blackish-brown with greenish-yellow spots as shown in Figure 4c. S3-6 with pair of transverse, apple green, posterior, dorsal spots becoming smaller towards the rear of the abdomen. S7-10 blackish-brown. Dorsum of S10 less than half width of S9. Caudal segments as illustrated in Figure 4a. Cerci of female with long, leaf-like, paddle-shaped expanded cerci with rounded tips.

Measurements: Abd. 53.0, Hw 44.0.

Remarks: Two groups of *Oligoaeschna* were recognised by Lieftinck (1968). These comprise (1) *pryeri*-group: brightly coloured, probably diurnal, ♀ cerci short and inconspicuous, ♂ with prominent black T-mark on top of frons; and (2) *poecilopteta*-group: sombre, crepuscular, ♀ with prominent, long cerci resembling stalked paddles. Based principally on the structure of the penile organ, Karube & Yeh (2001) established the genus *Sarasaeschna* to receive members attributed by Lieftinck (1968) to the *pryeri*-group of *Oligoaeschna*. Four species of *Sarasaeschna* are known from China: one from Hainan, *S. sabre* (Wilson & Reels) and three from Taiwan including *S. pyanan* (Asahina), *S. tsaopiensis* (Yeh & Chen) and *S. lieni* (Yeh & Chen). In addition *S. niisatoi* (Karube) is known from neighbouring northern Vietnam. It is a smaller species (♀ abdomen excl. cerci 40.85-41.05 mm, Hw 35.2-38.6 mm) with a reddish-brown labrum. Hitherto, the only *Oligoaeschna* (poecilopteta-group) recognised from China is *O. petalura* Lieftinck described from Hainan. Most *Oligoaeschna* are found in the Philippines and Indonesia, especially the islands of Sumatra and Borneo. Some outliers are found on the Andaman Islands and Singapore. The new taxon from Guangxi represents the most northerly location for this genus.

Differential diagnosis: With the presence of long, leaf-shaped cerci, the Maoershan female clearly belongs to *Oligoaeschna* (i.e. *poecilopteta*-group) and represents the first record of the genus from continental China. The Hainanese *O. petalura* is only known from a male specimen, but it has more open wing venation and a post-clypeus with a linear mid-basal stripe of ochreous-orange. Compared with the cerci of other known *Oligoaeschna* females the paddle-shaped cerci of *aquilonaris* has a much shorter stem, which is stouter, expanding rapidly to form the blade.

Periaeschna magdalena Martin, 1909
(Figs 5a-d)

Periaeschna magdalena Martin, 1909: 157, fig. 157, pl. 6/fig. 22 [type: Tonkin]; — Fraser (1936: 82-84, Bengal, Assam, Tonkin); — Asahina (1956: 224, 225, figs 47, 48, Zhejiang); — Asahina (1961: 5, figs 30, 31, Jiangsu); — Lieftinck et al. (1984: 36, Taiwan); — Wilson & Reels (2001: 177-178, figs 84-87, Hainan).

Cephalaeschna magdalena (Martin). — Needham (1930: 79-80, pl. 8/fig. 15, Lochen-hsien, Guangxi, see remarks); — Hua (2000: 10, Fujian, Hubei, Jiangsu, Sichuan).

Guangxi specimens: 2 ♀, Shiwandashan, 09 v 1997, leg. KW.
Redescription of female: Medium-sized, brown and yellow *Periaeschna* with large, densely veined wings. Labium, labrum and frons and vertex mid-brown. Both specimens slightly teneral. Clypeus and occiput pale orange-brown (Fig. 5a). Width of frons (4.4 mm) less than half width of head (9.4 mm). Synthorax glossy mid-brown with fine, yellow dorsal stripe (Fig. 5c). Mesepimeron and metepimeron with broad yellow stripes. Venation of wings dense. Wings hyaline apart from dark, blackish-brown patches at bases. Pt pale brown and usually braced at basal end but brace not always aligned with basal end of Pt. Hw illustrated in Figure 5d. Legs uniformly mid-brown. S1+2 mid-brown with yellow quadrate spot towards ventral margin of S2 (Fig. 5c). S3-7 mid-brown at base becoming dark brown distally with square-shaped, yellow spot at baso-ventral corner. S8-10 dark brown with yellow spot at baso-ventral corner of S8. Distal corners of S10 extended ventrally to form a pair of robust, divaricate spines. Ovipositor large but not extending past mid-point of S10 (Fig. 5b).
Measurements: Abd. 45.0-49.5, Hw 46.0-48.0.
Distribution: China (Fujian, Guangxi, Hainan, Hubei, Jiangsu, Sichuan, Taiwan, Zhejiang), Myanmar, NE India, Thailand and Vietnam.
Remarks: Needham (1930) states his record of *magdalena* was collected at Lochen-hsien but refers to this locality as "Fukien", which is Cantonese for Fujian Province. On numerous occasions, elsewhere in his book, Needham attributes this same locality to "Kwangsi" i.e. Guangxi Autonomous Region. This record confirms the presence of *magdalena* in Guangxi.

Periaeschna rotunda sp. nov.
(Figs 6a-e)

Guangxi specimen: Holotype ♂, Dayaoshan, 19 ix 1998, leg. GR. Holotype will be deposited at Tai Lung Experimental Station, Agriculture, Fisheries and Conservation Department, Lin Tong Mei, Sheung Shui, Hong Kong SAR, China.
Etymology: From Latin rotundus meaning rounded in reference to the rounded tips of the superior appendages.
Description of male: Large-sized *Periaeschna* with rounded-tipped superior appendages. Labium and labrum creamy ferruginous brown with dark brown border at basal margin of labrum, which is expanded at centre (Fig. 6a). Anteclypeus and postclypeus smudgy dark reddish-brown. Face of frons blackish-brown becoming

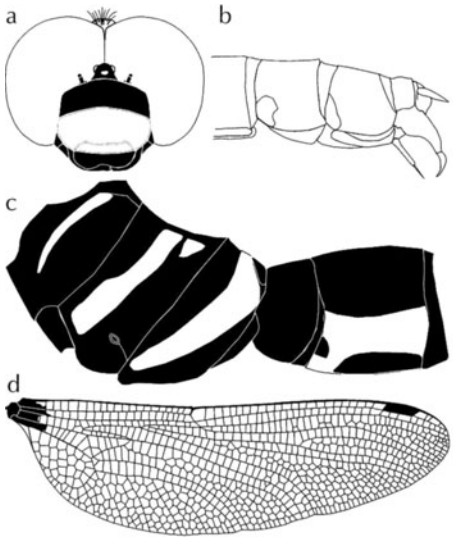

Figure 5: *Periaeschna magdalena* ♀, Guangxi — (a) head, frontal; (b) caudal abdomen, lateral; (c) thorax and basal abdomen, lateral; (d) hindwing.

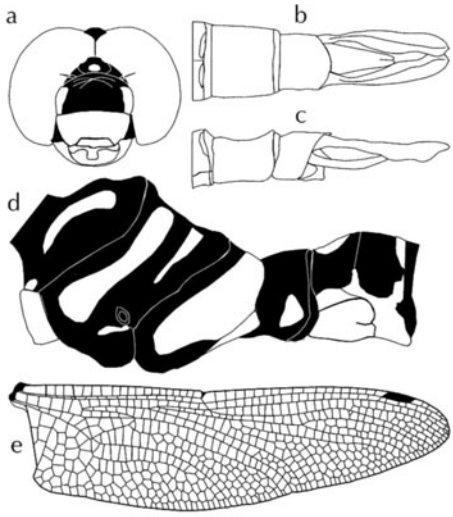

Figure 6: *Periaeschna rotunda* sp. nov. ♂, Dayaoshan, Guangxi — (a) head, frontal; (b) caudal appendages, dorsal; (c) same, lateral; (d) thorax and basal abdomen, lateral; (e) hindwing.

paler at base with smoothly rounded prominence at dorso-frontal margin. Top of frons dark brown fading to pale yellow at sides. Lower lateral margins of frons yellow. Antennae pale reddish-brown. Vertex and occiput dark reddish-brown. Width of frons (4.5 mm) less than half width of head (9.75 mm). Prothorax mid-brown. Synthorax blackish-brown with pale curved, yellow dorsal stripe, broadest towards wing bases (Fig. 6d). Broad, pale yellow lateral stripe across mesepimeron. Triangular-shaped pale yellow stripe across metepisternum, not extending to spiracle. Small elongated spot below spiracle adjacent to border of metakatepisternum. Metepimeron predominantly pale yellow. Metaposternum pale yellow. Legs blackish-brown with femora dark reddish-brown at base. Wings hyaline with Pt subtending 3-4 cells and braced at proximal end. Venation of Hw illustrated in Figure 6e. Abdomen mainly dark reddish-brown at base becoming matt black from S3-10. Triangular, pale yellow spot at side of S1. Dorsum of S2 with triangular pale yellow spot at base extending to transverse carina and pair of broad oval spots at distal margin narrowly divided at carina. Pale yellow spot above ferruginous-brown coloured auricle. Lower distal corner of S2 mainly pale yellow (Fig. 6d). S3-8 with pair of narrow, triangular, pale yellow spots adjacent to transverse carina and another pair of broader, pale yellow spots at distal margin; these latter pairs are joined in S4-6 to form single, triangular-shaped spots. S9+10 entirely black. Caudal appendages dark reddish-brown. Inferior appendage slightly longer than S10 and more than half length of superior appendages (Figs 6b, 6c). Tips of superior appendages smoothly rounded with minute prominence at tip. Superior appendages strongly ribbed at centre and more than twice length of S10, with thick margin of long black hairs arising from inner dorsal face.

Measurements: Abd. 58.5, Hw 44.0.
Remarks: Three species of *Periaeschna* are known from China: (1) *P. flinti* Asahina, broadly distributed across China including Fujian, Guangdong, Jiangsu and Sichuan with a subspecies from Assam, *P. f. assamensis* Asahina, (2) *P. magdalena* (see above), and (3.) *P. mira* Navás from "Kuling", Jiangxi.
Differential diagnosis: *P. flinti* is a relatively small species with male superior appendages possessing a small sub-basal swelling; a feature absent in *rotunda*. In addition male *P. flinti* have acutely pointed superior appendages with curved, down-turned tips. *P. magdalena* is also a relatively small species with males possessing characteristically shaped superior appendages, which have a folded blade and acutely pointed tips. *P. mira* is a poorly described species but is smaller (♂ Abd. 47 mm, Hw 43.5 mm; ♀ Abd. 53.0 mm, Hw 44.5 mm), and is stated to have a yellow face and yellow auricles.

P. laidlawi (Förster), from Peninsular Malaysia, *P. nocturnalis* Fraser, from India and Thailand, and *P. unifasciata* Fraser, from India and Nepal are all known from the Oriental region and possess acutely pointed superior appendages. *P. biguttata* (Fraser) from India (Assam) has males with obtusely tipped superior appendages but possesses characteristic oval yellow spots on the sides of the thorax, reminiscent of several species of *Boyeria*.

Petaliaeschna gerrhon sp. nov.
(Figs 7a-c)

Guangxi specimen: Holotype ♂, Maoershan, Guangxi, 23 viii 1998, leg. GR, S8-10 missing. Holotype will be deposited at Tai Lung Experimental Station, Agriculture, Fisheries and Conservation Department, Lin Tong Mei, Sheung Shui, Hong Kong SAR, China.
Etymology: The name *gerrhon*, meaning wickerwork, reflects the dense wing venation of this species. It is a noun in apposition.
Description of male: Large-sized *Petaliaeschna* with yellow face, very dense wing venation, and pale legs darkened at distal quarter of femora. Labium creamy ferruginous-red. Labrum ochreous yellow with broad greenish-yellow distal border. Anteclypeus mid-brown. Postclypeus ochreous yellow. Face and sides of frons ochreous yellow at base becoming dark brown at dorsal surface (Fig. 7b). Shallow conical projection, bluntly pointed, at frontal apex of frons. Width of frons (4.7 mm) less than half width of head (9.8 mm). Vertex and occiput mid-brown and antennae pale brown. Prothorax pale brown. Synthorax darkish-brown with prominent dorsal carina coloured pale yellow. Barely discernible, short, narrow dorsal stripe and very faint, isolated dorsal spot below alar sinus (Fig. 7a). Mitten glove-shaped, bright yellow stripe across mesepimeron and metepisternum. Metepimeron predominantly bright yellow. Metaposternum yellow. Coxae brown, slightly reddish, with mid and hind coxae pale yellow at posterior margin. Legs pale whitish-brown with femora of foreleg dark brown and mid and hind legs dark brown towards junction with tibia (distal quarter of mid-leg and hind-leg darkened). Hw petiolate with reduced membranule (Fig. 7c). Arc is situated distal to the distal primary Ax. Pt reddish-brown subtending 5 cells. Both Fws braced proximally but only one Hw braced at proximal end. Wings with very dense venation. Anal field 15 cells. IR3

divided, giving rise to 4 cell rows, three cells from wing margin. IR2 commences much closer to nodus than Pt. Abdomen, S1+2, reddish-brown with fine interrupted yellow stripe along dorsal carina of S2. Side of S1 with yellow stripe at center and side of S2 bright yellow below including the auricle. Isolated pale triangular stripe at center of latero-distal margin. Side of S3 with pale triangular spot at ventral base extending to transverse suture. S3-7 with well separated transverse, extremely fine, faint, pale spots. S3-7 otherwise entirely blackish-brown above with quadrate yellow spot at ventral bases.

Measurements: Abd. 55.5 (estimate), Hw 48.0.

Remarks: Tsuda (2000) lists six species of *Petaliaeschna*, and two of these species are known from China, namely (1) *P. corneliae* Asahina from Fujian and (2) *P. lieftincki* Asahina from Shanxi.

Differential diagnosis: Despite the fact the tip of the abdomen is missing, *P. gerrhon* is clearly recognised as a distinct species based on its large size, dense wing venation, pale legs, darkened at knees, and its thoracic and facial markings. According to Fraser (1936) the position of the arc, "markedly distal to the outer primary antenodal nerve" is one of the characteristic features of the genus *Petaliaeschna*. However, the Maoershan male has many features which are contrary to those selected as characteristic of *Petaliaeschna* by Fraser (1936), in his key to aeshnids viz. braced pterostimata, a supplementary vein arising from distal side of triangle is zigzagged, and a membranule is present. Nevertheless, the narrow frons, highly petiolate wings with a reduced membranule, and dense wing venation are consistant with the genus *Petaliaeschna* as modified by Asahina (1982). But, *P. gerrhon* also has features which conflict with characters selected by Asahina (1982) as representative of *Petaliaeschna*, such as black, rather than pale, thoracic dorsal carina and gentle curved medial frons rather than coned frons. *P. rotunda* clearly possesses many derived characters shared with *Cephalaeschna* and *Periaeschna*. But since the arc is clearly positioned distal to the second, primary Ax, *rotunda* is placed here in *Petaliaeschna*.

P. corneliae is a small species with a Hw measuring just 35 mm. It has wings with relatively open venation and a characteristic broad spot on the dorsum of S2. *P. lieftincki* is of similar size to *gerrhon*, but its wings have relatively open venation, and the top of its frons has a distinct black T-mark. The three other *Petaliaeschna* species known comprise (1) *P. fletcheri* Fraser from India, a smaller species, with relatively open wing venation and accessory vein (Mspl) arising from the distal side of the triangle not zigzagged at origin, (2) *P. pinratanai* Yeh known from northern Thailand, and (3) *P. flavipes* Karube from northern Vietnam. Both these latter species are relatively small – *pinratanai*: Abd. 44.0-46.0 mm, Hw 38.0-39.0 mm;

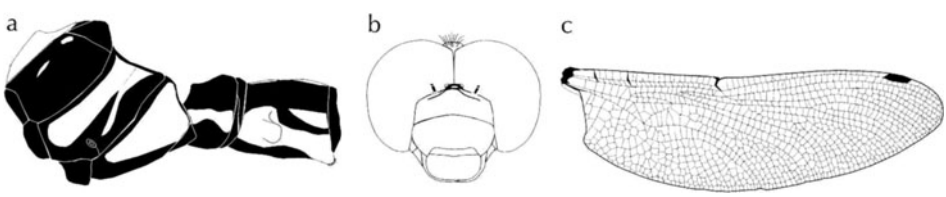

Figure 7: *Petaliaeschna gerrhon* sp. nov. ♂, Maoershan, Guangxi — (a) thorax and basal abdomen, lateral; (b) head, frontal; (c) hindwing.

flavipes: Abd. 46.5-46.8 mm, Hw 36.6-36.8 mm – with relatively open wing venation and uniformly pale brown or pale yellow legs. The fourth species, *P. tomokunii* Karube, which was described from northern Vietnam, is medium sized with Abd. 51.5 mm and Hw 43.2 mm (male). Its second lateral, yellow synthoratic stripe is restricted to basal two-thirds of mesepimeron.

Planaeschna risi risi Asahina, 1964
(Figs 8a-k)

Planaeschna risi risi Asahina, 1964: 301-303, figs 8, 9 [type: Taiwan].

Guangxi specimens: 3 ♂, 1 ♀, Shiwandashan, Guangxi, 26 ix 2000, leg. BH; 1 ♀, Dayaoshan, 16 ix 1998, leg. GR; 1 ♀, Dapingshan, 25 ix 1998, leg. GR; 1 ♀, Damingshan, 21 ix 2000, leg. BH.
Redescription of male: Medium-sized *Planaeschna* very similar to *P. suichangensis* but yellow markings generally more developed, but not as bright, and slightly heavier build. Labium pale ferruginous yellow. Labrum predominantly yellow with thick blackish-brown border. Anteclypeus dark brown. Postclypeus yellow with broad distal margin blackish-brown. Face of frons dark brown, strongly convex, heavily pitted, with broad yellow lateral margins and narrow yellow basal border (Fig. 8a). Top frons dark brown and heavily fringed with long black hairs which continue down lateral margins. Antennae, occiput and vertex black. Prothorax dark brown at dorsum and pale at sides. Synthorax dull black with broad, slightly curved, greenish-yellow dorsal stripe, broadest at posterior end, below wing bases, and narrowing sharply and obliquely at basal end. Sides of thorax patterned as shown in Figure 8b. Two of the three males have a well-developed yellow spot on the metepisternum, which extends from the wing base almost reaching the spiracle (Fig. 8b). The third male has a well-developed yellow metepisternal spot but it is not extended towards the spiracle. Legs blackish-brown with basal two thirds of inner faces of foreleg, and basal half of middle leg, pale yellow. Abdomen black with yellow pattern typical of the genus (Figs 8b, 8e). Lower sides of S1+2 mainly yellow. S1 black dorsally, with a small yellow triangular mark at base. Dorsum of S2 with broad, yellow triangular spot at base, a pair of triangular yellow spots at transverse carina and a T-shaped yellow spot at posterior margin of tergite. Dorsum of S3 with narrow basal yellow spot, yellow triangular spots across transverse carina are united at central carina, and triangular yellow spots at posterior margin are also united at centre. S4-6 with similar pattern to S3 but pair of transverse triangular spots are narrowly divided. S7+8 similar to S4-6 but triangular yellow spots at posterior margin are narrowly divided in S7 and broadly divided in S8. S9 with three pairs of small yellow spots, with basal pair very broadly separated and central and distal pairs separated by a spot width. S10 also with a pair of faint dull yellow spots. Triangular field of minute spines at distal half of S8. Inferior appendage more than half length of superior appendages (Fig. 8d). Superior appendage with distinct lateral bulge at distal third (Fig. 8c).
Measurements: Abd. 50.0-52.0, Hw 44.0-45.0.
Redescription of female: Medium-sized *Planaeschna* with reddish-brown thorax, ferruginous yellow face, mainly black labrum and very long cerci. Head width 8.5-9.0 mm. Labrum black with a pair of small basal, centrally located, yellowish spots

(Fig. 8f). Anteclypeus dark brown. Postclypeus ferruginous orange centrally and orange yellow laterally. Face of frons pitted, ferruginous brown with sides yellowish. Upper central half of face of frons slightly ridged giving rise to small prominence at apex of frons. Upper faces of frontal frons with sides flat or very slightly scalloped. Vertex and occiput black. Antennae dark brown. Prothorax reddish-brown. Lateral greenish-yellow spot below posterior lobe. Synthorax ferruginous brown. Pale greenish-yellow marks difficult to discern due to poor preservation. Pattern of pale greenish-yellow spots and stripes (Fig. 8g). Legs uniformly dark brown except for posterior faces of femora, which become paler brown towards base at basal third and paler at basal two-thirds of front leg. Wings hyaline with pale amber at base. Pt brown, braced at basal side, subtending 2-3 cells, 2.5 mm in length. Venation relatively open. Hw triangle three or four-celled. Anal field six to eight-celled. S1 reddish-brown with lateral greenish-yellow spots. S2-10 dark blackish-brown. S2 with interrupted greenish-yellow, dorsal longitudinal stripe, two pairs of dorsal transverse triangular greenish-yellow spots along transverse carina suture and at distal margin, and two longitudinal greenish-yellow stripes laterally at lower half. Dorsal pattern repeated until S7. S3 with large basal, quadrate latero-ventral yellow spot

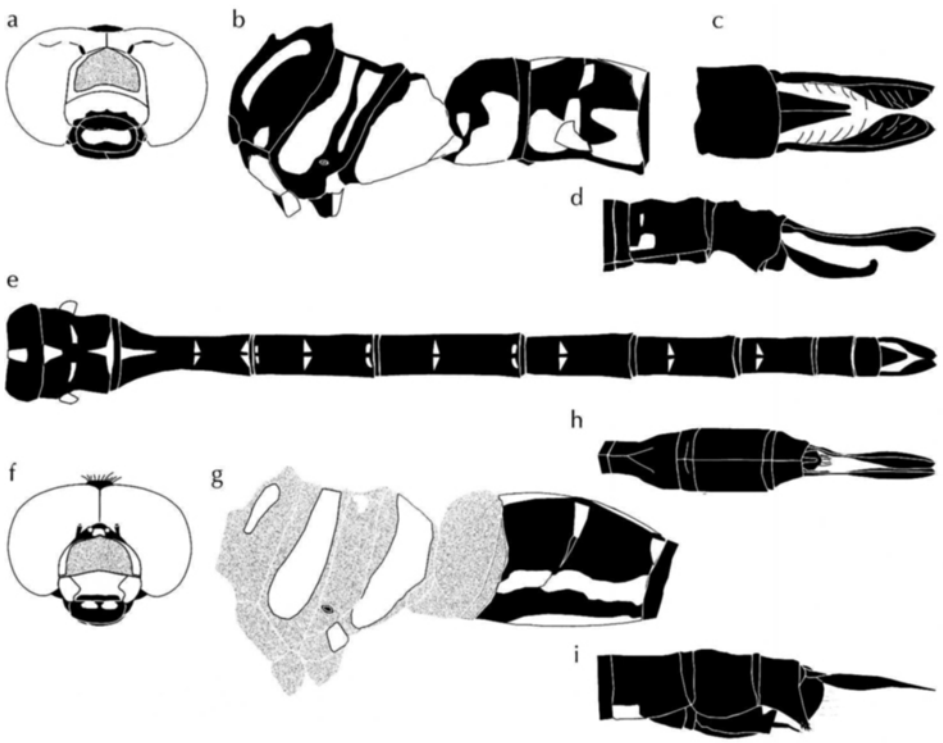

Figure 8: *Planaeschna risi risi*, Guangxi — (a) ♂ head, frontal; (b) ♂ thorax and basal abdomen, lateral; (c) ♂ caudal appendages, dorsal; (d) same, lateral; (e) ♂ abdomen, dorsal; (f) ♀ head, frontal; (g) ♀ thorax and basal abdomen, lateral; (h) ♀ tip of abdomen, dorsal; (i) same, lateral.

and smaller quadrate posterior latero-ventral yellow spot. S9+10 uniformly blackish and S8 with a pale baso-ventral spot (Fig. 8i). Distal half of the S8 dorsum covered with triangular field of very small spines but these are barely noticeable. Caudal tip as shown in Figures 8h, 8i. Length of cerci 5.5 mm, which are as long as S9+10 including the 0.5 mm suture between S8 and S9.
Measurements: Abd. 53.5, Hw 47.5-50.0.
Distribution: China (Guangxi, Taiwan). *P. risi sakishimana* Asahina is known from the Ryukyu Islands, Japan.
Remarks: At first glance, *P. risi risi* appears very similar to *P. suichangensis* described below. The female cerci of *P. risi* are very long relative to other members of this genus. Females with intact cerci are easily separated due to their long length (as long as S9+10), but males are not so easily distinguished. There is some variability in the shape of the male caudal appendages but *suichangensis* has slightly narrower superior appendages which lack a distinct distal ventral bulge.

Planaeschna sp. A
(Figs 9a-e)

Guangxi specimens: 2 ♂, Qingshitan, Guangxi, 26 vii 1998, leg. GR.
Description of male: Medium-sized brownish *Planaeschna* with well-developed abdominal pattern of pale spots. Labrum yellow with brownish-yellow sides and distal third. Anteclypeus yellow at base ferruginous yellow distally. Postclypeus yellow with broad central distal margin dark brown. Face of frons dark brown, heavily pitted, with broad yellow lateral margins and narrow yellow basal border (Fig. 9b). Top frons dark brown and heavily fringed with long dark hairs which continue down lateral margins. Antennae, occiput and vertex blackish-brown. Prothorax dark brown at dorsum and pale at sides. Synthorax dull blackish-brown with broad, slightly curved, yellow dorsal stripe, broadest at posterior end, below wing bases, and narrowing sharply and obliquely at basal end. Sides of thorax patterned as shown in Figure 9a. A well-developed yellow, elongate triangular spot on the metepisternum, which extends from the wing base almost reaching the spiracle (Fig. 9a). Legs dark brown with basal two thirds of inner faces of foreleg, and basal half of middle leg, pale yellow. Abdomen black with developed pale yellow pattern.

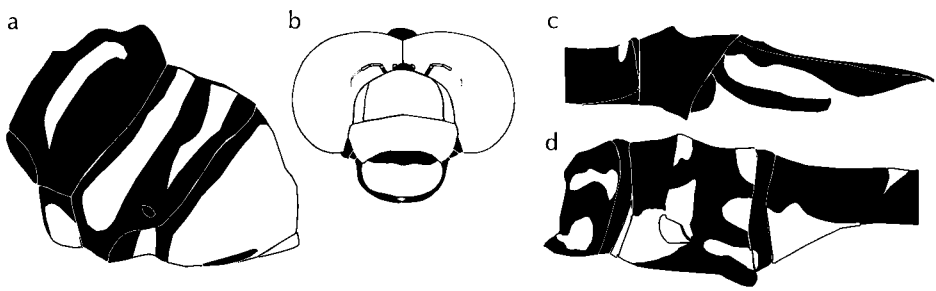

Figure 9: *Planaeschna* sp. A ♂, Gingshitan, Guangxi — (a) thorax, lateral; (b) head, frontal; (c) caudal appendages, lateral; (d) basal abdomen, lateral.

S1 with two large pale yellow lateral spots. Dorsum of S2 with small narrow, yellow triangular spot at base, a pair of ovoid yellow spots at transverse carina and a pair of triangular-shaped spots at posterior margin of tergite. Lateral pattern of S1+2 as illustrated in Figure 9d. Posterior dorsum of S2 and base of S3 with narrow carinal spots. S3 with pair of yellow triangular spots across transverse carina, narrowly separated by central carina, and triangular yellow spots at posterior margin also narrowly separated by central carina. Pattern of S3 repeated on S4-8. Dorsum S8 without a field of minute spines beyond transverse carina. S9 with large distal triangular pale spot and S10 with distal half predominantly pale (Fig. 9c). Superior appendages expanded basal to mid-point when viewed dorsally (Fig. 9e). Superior appendages with a distinct ventral bulge near the base in addition to a broad ventral bulge just beyond the mid-point when viewed from the side. Inferior appendage about half the length of superior appendages (Fig. 9c).

Measurements: Abd. 50.0-51.0, Hw 41.0-43.0.

Remarks: The caudal appendages strongly resemble those of *P. celia* Wilson & Reels. However *P. celia* is a predominantly black species with a greenish-yellow pattern. It has a black labrum, its S9+10 are entirely black and the distal two-thirds of S8 have a field of minute backward pointing spines. The superior appendages of *P.* sp. A (Fig. 9e) are compared with those of *P. risi* (Fig. 8k) and *P. suichangensis* (Fig. 11i). Both these latter species also possess a triangular-shaped field of short spines on the dorsum of S8. *P. cucphuongensis* Karube from Vietnam is a small species with caudal appendages of similar shape to those of *P. chiengmaiensis* Asahina from northern Thailand. Both these species have superior appendages with a broad ventral bulge originating just before the mid-point but both lack any distinct basal ventral bulge. *P. tamdaoensis* and *P. tomokunii* were recently described by Asahina (1996) from Vietnam. *P. tamdaoensis* has a body pattern and caudal appendages similar in shape to *P. taiwana* Asahina and *P. suichangensis*. *P. tomokunii* is only known from the female but has an entirely pale brown facial pattern. *P. bachmanensis* Karube is another recently described Vietnamese species from central Vietnam, which is allied to *tomokunii* and has black labium with oval green spots (Karube 2004). *P. viridis* Karube, is yet another recently described Vietnamese species, which has extensive bright green markings on the labrum, postclypeus, antefrons and synthorax; it is related to *P. gressitti* Karube also recently described from Guangdong (Karube 2004) and may be allied to the *P. taiwana* group. In view of the plethora of *Planaeschna* species described from the region over the past 10 years I intend to consider the status of Guangxi *Planaeschna* A and B when examining specimens from Guangdong.

Figures 8k, 9e, 11i: Male left superior appendage of three *Planaeschna* species in comparison, all in dorsal view — (8k) *P. risi*, Guangxi; (9e) *P.* sp. A, Gingshitan, Guangxi; (11i) *P. suichangensis*, Guangxi.

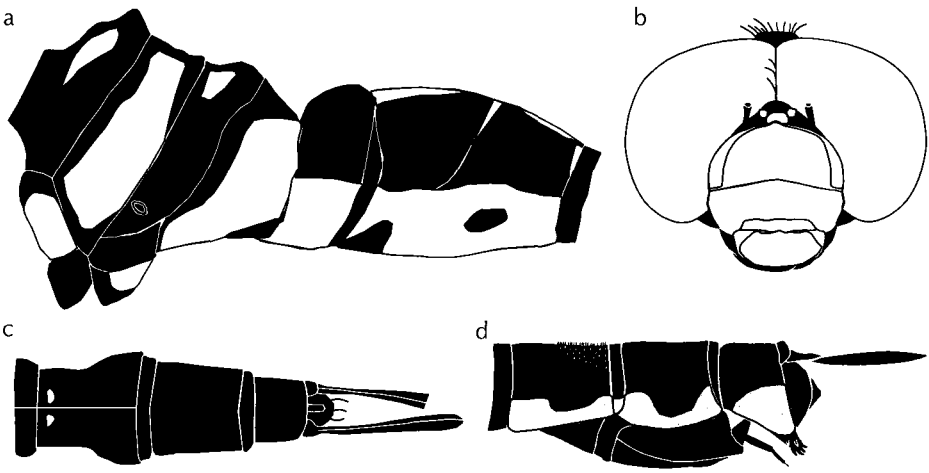

Figure 10: *Planaeschna* sp. B ♀, Dayaoshan, Guangxi — (a) thorax and basal abdomen, lateral; (b) head, frontal; (c) tip of abdomen, dorsal; (d) same, lateral.

Planaeschna sp. B
(Figs 10a-e)

Guangxi specimen: 1 ♀, Dayaoshan, 16 ix 1998, leg. GR.
Description of female: Large-sized *Planaeschna* with reddish-brown thorax, ferruginous yellow face and medium length cerci. Head width 10.0 mm. Labrum ochreous yellow; narrowly dark brown at base and sides, with basal lateral corners the most expansive area of dark brown (Fig. 10b). Anteclypeus ferruginous brown. Postclypeus ochreous yellow. Face of frons pitted, ferruginous brown with yellow sides. Upper central half of face of frons slightly ridged without a small prominence at apex of frons. Upper faces of frontal frons slightly concave. Vertex and occiput black. Antennae dark brown. Prothorax reddish-brown. Lateral greenish-yellow spot below posterior lobe. Synthorax ferruginous brown. Pale greenish-yellow marks difficult to discern due to poor preservation. Pattern of pale greenish-yellow spots and stripes, roughly as shown in Figure 10a. Legs uniformly dark brown except basal inside face of femora, which is pale, and bright pale in the front leg. Wings hyaline with pale amber area at extreme base. Pt black, braced at basal side, subtending 3-4 cells. Venation relatively dense. Hw triangle six-celled. Anal field ten-celled. S1 reddish-brown with lateral greenish-yellow spots. S2-10 dark blackish-brown with extensive greenish-yellow pattern at lower sides of S1+2 (Fig. 10a). S2 with interrupted greenish-yellow dorsal, longitudinal stripe broadest at base, two pairs of dorsal transverse triangular greenish-yellow spots along transverse carina suture and at distal margin, and greenish-yellow latero-ventral stripes as shown in Figure 10a. Dorsal pattern repeated but reduced until S7. S8-10 blackish with dark ferruginous latero-ventral spots (Fig. 10d). S8 with pair of small dorsal yellowish-green spots (Fig. 10c). Distal half of the S8 dorsum covered with triangular field of very small spines but these are barely noticeable (Fig. 10d). S3-7 dorso-laterally compressed but S8 markedly expanded to almost double its width.

Caudal appendages as illustrated in Figures 10c, 10d. Length of cerci 4.5 mm, which is 1 mm less than length of S9+10 including the 0.5 mm suture between S8+9.
Measurements: Abd. 59.0, Hw 54.0.
Remarks: The cerci are of medium length and the wings broad with relatively dense venation.

Planaeschna suichangensis Zhou & Wei, 1980

(Figs 11a-i; Figs 34a, 34b, see pp. 164, 165 and Plate II)

Planaeschna suichangensis Zhou & Wei, 1980: 227, 228, figs 1-3 [type: Zhejiang].

Guangxi specimens: 1 ♂, Maoershan, 23 viii 1998; 2 ♂, Jiuwanshan, 27 vii 1998; 1 ♂, Huaping, 17 viii 1998; 1 ♀, Dayaoshan, 16 ix 1998; 1 ♂, Damingshan, 22 ix 2000; all leg. GR.
Redescription of male: Labrum blackish-brown or black with distinct yellow oblong spot at base (Fig. 11a). Face of frons bright shiny black, with pale yellow sides and top. Prothorax blackish-brown above. Synthorax blackish-brown or black with distinct yellow pattern typical for the genus (Fig. 11b). Pt 2.5-3.0 mm, subtending 3-4 cells. Base of abdomen patterned with bright greenish-yellow spots (Figs 11b, 11e). Superior appendages without distinct, distal ventral bulge when

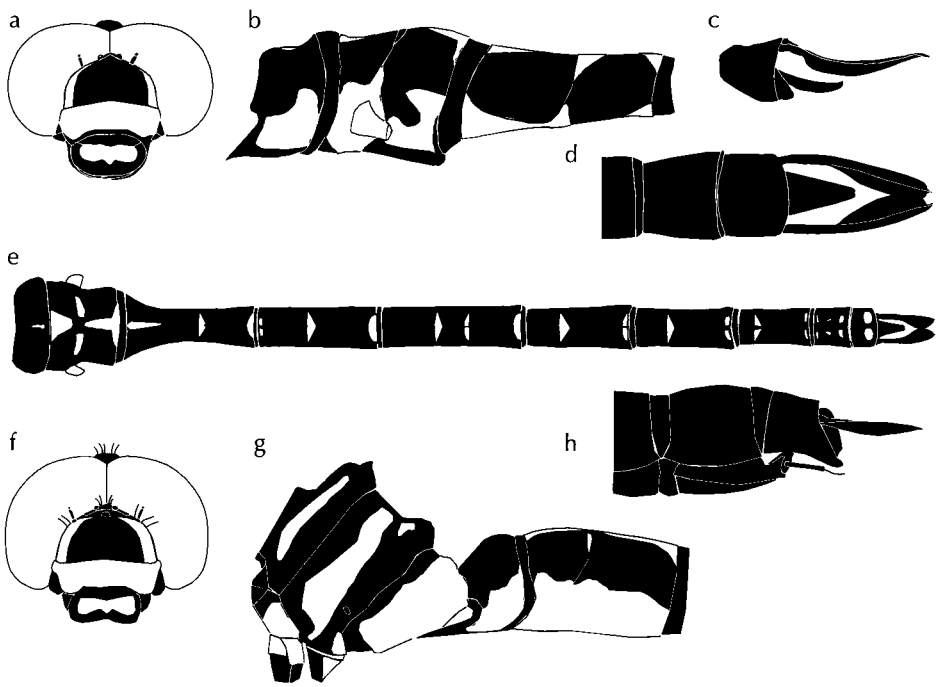

Figure 11: *Planaeschna suichangensis*, Guangxi — (a) ♂ head, frontal; (b) ♂ thorax and basal abdomen, lateral; (c) ♂ caudal appendages, lateral; (d) same, dorsal; (e) ♂ abdomen, dorsal; (f) ♀ head, frontal; (g) ♀ thorax and basal abdomen, lateral; (h) ♀ tip of abdomen, lateral.

viewed laterally, i.e. the blades of these appendages are flattened in a horizontal plane towards the tip. Inferior appendage about half the length of superior appendages (Fig. 11c). Superior appendages expanded at just before the mid-point when viewed dorsally (Figs 11d, 11i).

Redescription of female: Medium-sized *Planaeschna* with black thorax marked with a distinct bright yellow pattern, clearly marked black and yellow face with medium length cerci. Head width 9.0-9.5 mm. Labium ocherous yellow. Labrum blackish-brown with large, basal, quadrate ocherous yellow spot (Fig. 11f). Anteclypeus dark brown. Postclypeus lemon yellow with distal margin finely bordered dark brown. Face of frons pitted, blackish-brown, with sides bright yellow and upper surface dark brown. Face of frons rounded at center of face, without a distinct ridge near top of frons. Minute prominence at apex barely discernable. Vertex and occiput black. Antennae dark brown. Prothorax dull blackish-brown dorsally and pale laterally. Synthorax blackish with distinct yellow pattern (Fig. 11g). Legs blackish-brown with distinct areas of pale yellow at inner, basal halves of front and middle femora pale. Wings hyaline with amber tinted bases not extending to arculus. Pt blackish-brown, braced at basal side, subtending 3-4 cells. Venation relatively dense. Hw triangle four to six-celled. Anal field nine to eleven-celled. Abdomen predominantly blackish-brown with greenish-yellow markings. Laterally, lower halves of S1+2 almost entirely yellow. Dorsum of S2-7 with single pair small transverse triangular spots along the transverse carina. An interrupted longitudinal stripe along dorsal carina of S2. S3-7 with pale greenish-yellow spot at basal end of transverse carina which decrease in size towards the posterior end. S8-10 entirely black with the exception of a small pale spot at lateral basal corner of S8. Distal half of the S8 dorsum covered with a small triangular field of very fine spines. Cerci length 3.5 mm; not as long as the combined lengths of S9+10 which are 5.0 mm, including the suture between S8 and S9 (Fig. 11h).

Measurements: ♂ Abd. 50.0-51.5, Hw 43.0-46.5; ♀ Abd. 50.0-52.5, Hw 47.0-49.0.

Distribution: China (Guangxi, Guangdong, Zhejiang).

Remarks: A close congener to *P. suichangensis* is *P. taiwana*. Zhou & Wei (1980) compared *suichangensis* with *P. risi* but made no comparison with *P. taiwana*. The superior appendages of *taiwana* appear to be very similar, if not identical to *suichangensis* and the wing venation and colour patterns are also very similar. The labrum of *suichangensis* is surrounded by a black margin whereas the labrum of *taiwana* is entirely yellow. There remains a possibility that *suichangensis* is synonymous with *taiwana*. *P. tamdaoensis*, *P. tomokunii* and *P. cucphuongensis* were all recently described from neighboring northern Vietnam. From the description of *P. tamdaoensis* there appears to be no obvious differences compared to *P. suichangensis* and there is a strong possibility that this species is also synonymous with *suichangensis*. Asahina (1996) made no comparison with *suichangensis* in his description of *tamdaoensis*. *P. celia* is also a close congener. It can be separated by its entirely black labrum, black upper frons including sides and dorsal surface, inferior appendage more than half length of superior appendages, superior appendages with a distinct baso-ventral bulge, and blade of superior appendage bulged at a downward angle, when viewed from the side.

Polycanthagyna ornithocephala (McLachlan, 1896)

Aeschna ornithocephala McLachlan. — Martin (1908: 63, fig. 59, Moupin); — Needham (1930: 93, pl. 3/fig. 9, Moupin and Szechwan).
Polycanthagyna ornithocephala (McLachlan). — Asahina (1978b: 236-239, figs 4-6, Szechwan).

Guangxi specimens: 2 ♂, Huaping, 18 vii 1998, leg. GR.
Distribution: Bengal, China (Guangxi, Sichuan, Xizang [Tibet]) and India.

GOMPHIDAE

Anisogomphus koxingai Chao, 1954

Anisogomphus koxingai Chao, 1954: 214, 217-218, figs 285, 286, 293-298 [type ♂: Taiwan]; — Asahina (1968: 89-90, figs 1-3, ♀, Taiwan); — Lieftinck et al. (1984: 33, Taiwan, larval habitats); — Matsuki (1978: 138 [key], 147, fig. 9, larva, Taiwan); — Chao (1990: 186, 191-194, 14 figs, Fujian?, Hainan, Henan, Taiwan, Yunnan); — Wilson (1995a: 323-324, Hong Kong); — Wilson (1995b: 106-107, 115, photos ♂, Hong Kong); — Wang (2000: 205, Taiwan, photos ♂, Hong Kong).

Guangxi specimens: 1 ♀, Chunxiu, 24 v 1998, leg. BH; 1 ♀, Mulun, 19 vii 1998, leg. GR; 2 ♂, 1 ♀, Mulun, 20 vii 1998, leg. GR.
Distribution: China (Fujian?, Guangxi, Hainan, Henan, Hong Kong, Taiwan, Yunnan).
Remarks: Occiput of females with a single pair of distinct but minute spines; each spine located towards the lateral margin, as noted by Asahina (1968). Male superior appendages are yellow and slightly divaricate with black, ventral teeth at tip. Chao's (1954) original description of *koxingai* figures superior appendages, which are uniformly straight. In all other respects both male and female from Guangxi resemble Taiwanese specimens. *A. fujianensis* Zhou & Wu, described from a male specimen, appears to closely resemble *koxingai* but according to Zhou & Wu (1992) it has a differently shaped anterior hamulus, which is narrower and not so hooked as koxingai and the distal segment of penis is differently shaped. The two male Guangxi specimens have anterior hamuli identical to Taiwanese *koxingai*.

Anisogomphus sp.
(Figs 12a-c)

Guangxi specimen: 1 ♀, Diding, 08 vii 1999, leg. GR.
Description of female: Medium sized *Anisogomphus* with distinctive thoracic pattern. Labrum with basal two-thirds yellow and distal third black. Base of mandibles black. Frons with broad dorso-frontal yellow transverse stripe (Fig. 12b). A small spine is located above each lateral ocelli. Occiput adorned with thick fringe of long hairs. Prothorax black with pale yellow frontal margin and small round lateral yellow spot. Dorsum of synthorax black with yellow dorsal stripe linked to

yellow collar stripe. Antehumeral stripe complete and bulbous beneath base of wings (Fig. 12a). Mesepimeron black with yellow stripe with dog-legged extension below wings. Metepisternum and metepimeron predominantly yellow. Hind femora elongate, extending to middle of S2. Abdomen mainly black with fine yellow dorsal stripe from S1-S7. S1+2 yellow below laterally. S3-7 marked laterally below with small basal yellow spot and elongated spot centrally. S8+9 with large yellow quadrate spot at base laterally. Valvula vulvae robust and elongate (Fig. 12c).
Measurements: Abd. 40.0, Hw 34.5.
Remarks: It is difficult to distinguish female *Anisogomphus* from female *Merogomphus* specimens. Nevertheless, the Diding female, whether *Anisogomphus*, or possibly *Merogomphus*, has distinctive patterning and is apparently undescribed. Since there is only one female specimen, which does not possess any overt structural features I prefer to leave this species unnamed at present.

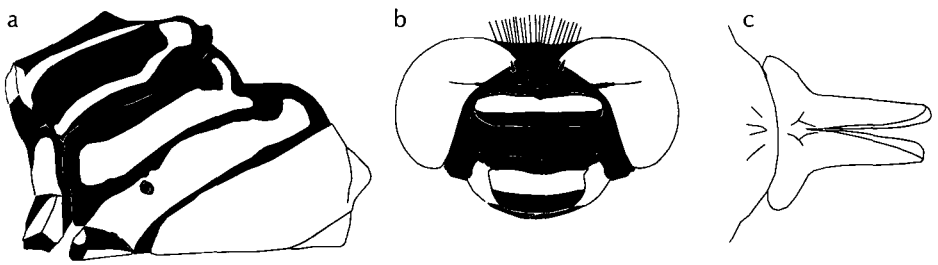

Figure 12: *Anisogomphus* sp. ♀, Diding, Guangxi — (a) thorax, lateral; (b) head, frontal; (c) valvula vulvae.

Asiagomphus giza sp. nov.
(Figs 13a-d)

Guangxi specimen: Holotype ♀, Mulun, 20 vii 1998, leg. GR. Holotype will be deposited at Tai Lung Experimental Station, Agriculture, Fisheries and Conservation Department, Lin Tong Mei, Sheung Shui, Hong Kong SAR, China.
Etymology: The name Giza, which is home to three prominent pyramids on the Giza Plateau, is a reference to the group of three large, stout, slightly flattened, triangular-shaped pegs on the occipital ridge. The species name is a noun in apposition.

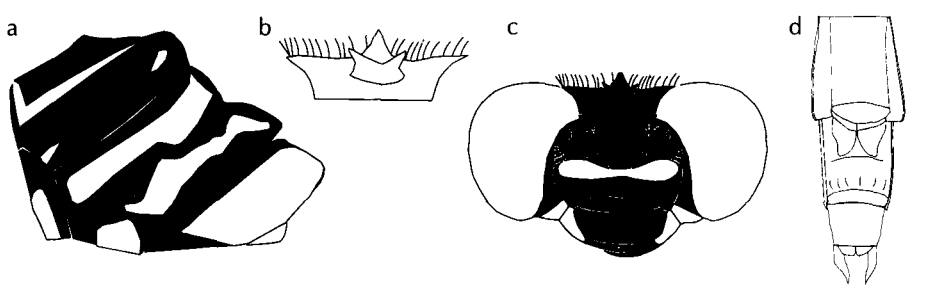

Figure 13: *Asiagomphus giza* sp. nov. ♀, Mulun, Guangxi — (a) thorax, lateral; (b) occipital margin; (c) head, frontal; (d) caudal abdomen, ventral.

Description of female: Labium black, pale at extreme lateral margins. Mandibles black with pale yellow bases. Labrum, clypeus black. Face of frons black below with yellow crest (Fig. 13c). Dorsal surface of frons black at its base with broad yellow transverse stripe across crest not quite extending to sides. Top of head black with u-shaped ridge above lateral ocelli with a bulbous prominence above each lateral ocellus. Small stout peg between lateral ocellus and eye margin. Ridge of occipital margin narrow at sides and broadens at center to accommodate three large, stout, slightly flattened, triangular-shaped pegs (Fig. 13b). Prothorax black with frontal lobe yellow and small yellow spot at lateral margin. Synthorax black with yellow dorsal 7-shaped stripes formed from collar stripe and dorsal stripe (Fig. 13a). Antehumeral stripe reduced to spot at each end. Side of synthorax with broad yellow stripes across mesepimeron and metepisternum almost connected at center. Metepimeron yellow with broad black border at anterior base and metapleural suture. Metepisternum yellow. Legs black. Wings slightly enfumed amber with mid-brown Pt, braced at proximal base and subtending six cells. S1-3 black above, yellow below with yellow stripe along dorsal carina broad over S1+2 and narrow along S3. S4-6 black with small yellow spots at lateral base and narrow, dorsal stripe at base. S7 black with basal third yellow. S8-10 entirely black. Valvula vulvae large, with well developed triangular-shaped flaps (Fig. 13d).
Differential diagnosis: The three stout, triangular-shaped peg structures on the female occipital ridge are similar in structure to *A. perlaetus* Chao, known from Fujian and Taiwan. However the *perlaetus* female lacks valvula vulvae with well-developed triangular-shaped flaps (cf. Chao 1990: 98-101, figs 1-7).

Asiagomphus pacificus (Chao, 1953)
(Figs 14a-d)

Gomphus pacificus Chao, 1953: 398, 410-413, figs 37-42 [type: Fujian]; — Asahina (1966: 112-113, figs 17-21, 27, 28, Taiwan); — Lieftinck et al. (1984: 33, Taiwan).
Asiagomphus pacificus (Chao). — Chao (1990: 97-99, figs 1-13, Fujian, Taiwan); — Hua (2000: 10, Fujian, Henan, Hunan, Taiwan, Zhejiang).

Guangxi specimens: 2 ♂, Nonggang, 21 v 1998, leg. KW; 1 ♂, Nonggang, 23 v 1998, leg. KW; 2 ♂, Chunxiu, 24 v 1998, leg. BH.

Figure 14: *Asiagomphus pacificus* ♂, Nonggang, Guangxi — (a) thorax, lateral; (b) thorax, lateral, variant; (c) secondary genitalia, lateral; (d) head, frontal.

Distribution: China (Fujian, Guangxi, Henan, Hunan, Taiwan, Zhejiang).
Remarks: Very similar to *A. hainanensis* Chao, which has more extensive yellow colouration on the sides of the synthorax, a pair of yellow quadrate spots on the labrum and is generally a less robust insect. The labrum of pacificus is entirely black (Fig. 14d). The colour pattern of the Guangxi specimens is variable in extent on the synthorax. Figure 14a shows a male with a complete yellow stripe along the episternum and a partial antehumeral stripe and Figure 14b illustrates a male with an incomplete yellow stripe along the episternum and an almost indiscernible antehumeral stripe. In comparison with *A. hainanensis*, the posterior hamulus is slightly less angulate at its anterior margin (Fig. 14c).

Asiagomphus xanthenatus acco Asahina, 1996
(Figs 15a-e)

Gomphus xanthenatus Williamson, 1907: 305-308, figs A-E [type: Myanmar].
Asiagomphus xanthenatus acco Asahina, 1996: 22-24, figs 2-9 [type: northern Vietnam].

Guangxi specimen: 1 ♂, Chunxiu, Guangxi, 24 v 1998, leg. BH.
Redescription of male: Dark coloured *Asiagomphus* with yellow basal abdomen and distal S9. The face is mainly black with a narrow yellow stripe at distal crest of frons, and yellow quadrate spots at base of mandibles and on genae adjacent to mandibles (Fig. 15c). Thorax with typical colouration for *Asiagomphus* except metepisternum is mainly black with two small yellow spots adjacent to spiracle (Fig. 15a). Abdomen is black apart from S1+2 and S9 (Figs 15a, 15e). Side of S1 is adorned with thick fringe of black hairs (Fig. 15a). Superior appendages with prominent stout ventral spine at center (Fig. 15e). Dorsal view of superior appendages shown in Figure 15d. Secondary genitalia shown in lateral view in Figure 15b.
Distribution: China (Guangxi) and Vietnam.
Remarks: If Asahina's (1996) description of *acco* is compared with Williamson's (1907) original description and drawings of *xanthenatus* it would appear unlikely that *acco* belongs to this taxon. The superior appendages of nominate subspecies are very different in style and do not possess a stout ventral spine. In addition the yellow pattern on the thorax and abdomen is more extensive than *acco*. Rather than elevate *acco* to species status subjectively it would be prudent to carry out a direct comparison with *xanthenatus*.

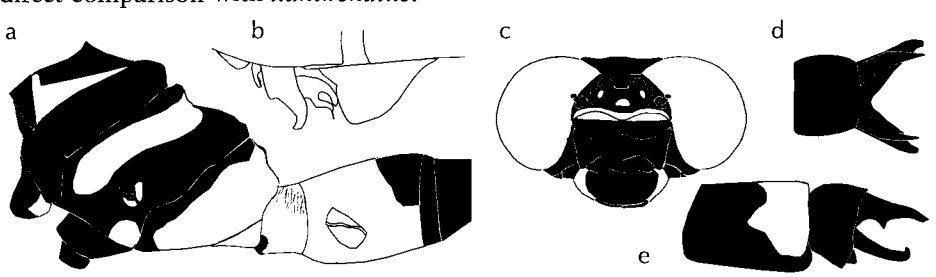

Figure 15: *Asiagomphus xanthenatus acco* ♂, Chunxiu, Guangxi — (a) thorax and base of abdomen, lateral; (b) secondary genitalia, lateral; (c) head, frontal; (d) caudal appendages, dorsal; (e) same, lateral.

Davidius fruhstorferi Martin, 1904
(Fig. 37, see p. 167)

Davidius fruhstorferi Martin, 1904: 215 [type: Tonkin]; — Chao (1995: 17-19, 32-35, figs 2, 10-11, 16, 30, 34, 36, 41, 46-47, Fujian, Guangxi, Henan, Jiangxi, Sichuan, Vietnam, Yunnan.)
Gomphus junior Navás, 1936: 38-39 [type: Jiangxi].
Davidius serenus Needham, 1941: 154 [type: Jiangxi].
Davidius fruhstorferi junior (Navás). — in part, Chao (1954: 244-247, figs 370-381).
Davidius fruhstorferi serenus Needham. — in part, Asahina (1956: 222, Zhejiang).
Davidius fruhstorferi guizhouensis Chao & Liu in Chao, 1990: 278-279, figs 1-10 [type: Guizhou].
Davidius fruhstorferi simaoensis Zhou in Zhou & Wu, 1992: 399-400, figs 31-33 [type: Yunnan].

Guangxi specimens: 2 ♂, Diding, 08 vii 1999, leg. GR; 1 ♂, 1 ♀, Cenwanglaoshan, 25 v 2002, leg. ML.
Distribution: China (Fujian, Guangxi, Guizhou, Henan, Jiangxi, Sichuan, Yunnan) and Vietnam.
Remarks: The subspecies *D. f. junior* was established by Chao (1954) from a combination of *G. junior* and *D. serenus* and characterised by its expanded posterior hamuli, but its expansion not longer than its basal width. Chao & Liu (in Chao 1990) established the subspecies *D. f. guizhouensis* based on the structure of its greatly expanded posterior hamuli, i.e. its expansion longer than its basal width. Chao (1995) realized that many of his specimens, he had previously treated as various subspecies of *Davidius*, were in fact mixed specimens belonging to two sympatric species. He established the new species *D. truncus* (Chao 1995) and assigned his previously published specimens to either *truncus* or *fruhstorferi*. *D. truncus* is known from Fujian, Jiangxi, and Zheijiang. Males are differentiated by the shape of the penile organ; *truncus* with apical portion of the middle segment short and distal segment of the penis short and *fruhstorferi* with these two segments elongated. Female *truncus* has subgenital plate truncated about half as long as S9 and *fruhstorferi* has subgenital plate nearly as long as S9. Chao (1995) assigned the names *guizhouensis*, *junior*, *serenus*, and *simaoensis* as synonyms of *fruhstorferi*, each of them without subspecific rank.

Chao (1999) created the subgenus *Paradavidius*, with *D. fruhstorferi* as the type species, to accommodate those species of *Davidius* with, inter alia, thoracic dorsal stripe connected to the collar stripe.

Gomphidia abbotti abbotti Williamson, 1907

Gomphidia abbotti Williamson. — Fraser (1934: 385-386, Thailand, Burma).
Gomphidia abbotti abbotti Williamson. — Lieftinck (1948: 261-266, figs 13-15, Peninsular Malaysia, Sumatra); — Asahina (1986: 37-40, figs 136-153, Thailand); — Wilson & Reels (2001: 191, figs 124-127, Hainan).

Guangxi specimens: 3 ♂, 2 ♀, Nonggang, 21 v 1998; 1 ♂, Nonggang, 23 v 1998; all leg. KW.

Distribution: China (Guangxi, Hainan), Indonesia (Sumatra), Myanmar and Peninsular Malaysia.
Remarks: Specimens are well marked with yellow, resembling Hainan examples and Asahina's (1986) B form.

Gomphidia kruegeri kruegeri Martin, 1904

Gomphidia kruegeri Martin, 1904: 216 [type: Tonkin]; — Williamson (1907: 284, 304, fig. 29/4, Tonkin); — Needham (1930: 26, pl. 3/figs 5, 5a, Tonkin, Fujian).
Gomphidia kruegeri kruegeri Martin. — Chao (1990: 424-425, 477-478 (key), Fujian, Hainan, Yunnan); — Wilson & Reels (2001: 191-192).

Guangxi specimens: 2 ♂, Shiwandashan, 08 v 1997, leg. KW; 1 ♂, Mulun, 19 vii 1998, leg. GR; 2 ♂, Mulun, 20 vii 1998, leg. GR; 1 ♂, Daxing, 15 vii 1999, leg. GR.
Distribution: China (Fujian, Guangxi, Hainan, Yunnan), Thailand and Vietnam.
Remarks: The postclypeus is entirely black and the metepisternum is black with two ovate yellow spots except the Mulun specimens, which have a black postclypeus but more extensive yellow spots on the metepisternum.

Labrogomphus torvus Needham, 1931

Labrogomphus torvus Needham, 1931a: 224-227, figs 1-4 [type: Hainan]; — Chao (1954: 237-240, figs 352-362, Fujian); — Chao (1990: 151-155, pl. 5/fig. 5.1, Hainan and Fujian); — Wilson (1995a: 321-322, fig. 1, Hong Kong); — Wilson (1995b: 104-105, 113, larva, photo ♂, Dinghu Shan and Hong Kong); — Wilson (1997: 30, Hong Kong); — Wilson (1999: 38, Dinghu Shan, Guangdong); — Wilson & Reels (2001: 182, Hainan); — Wilson (2003: 230-231, Hong Kong).

Guangxi specimens: 1 ♂, Longrui, 21 v 1998, leg. KW; 1 ♂, 2 ♀, Qingshitan, 26 viii 1998, leg. GR.
Distribution: China (Fujian, Guangdong, Guangxi, Hainan, Hong Kong).

Lamelligomphus camelus (Martin, 1904)

Lamelligomphus camelus (Martin). — Chao (1990: 353-354, Fujian; — Wilson & Reels (2001: 189, Hainan).

Guangxi specimens: 1 ♂, Chunxiu, 24 v 1998, leg. BH; 1 ♂, Jiuwanshan, 26 v 1998, leg. GR.
Distribution: China (Fujian, Guangxi, Hainan).

Lamelligomphus sp.
(Figs 16a-c)

Guangxi specimen: 1 ♀, Dawangling, 05 viii 1998, leg. GR.
Measurements: Abd. 43.0, Hw 39.0.
Remarks: This female strongly resembles *L. tutulus*, but it has an occiput with slightly smaller, flattened dorsal horns (Fig. 16a), no thoracic antehumeral stripe and the yellow stripe across the metepisternum is much reduced (Fig. 16b). The valvula vulvae (Fig. 16c) is similar to that of *tutulus* (cf. Chao: 1990: 368, fig. 2). The Dawangling female appears to represent an undescribed species. Since there is only one female, which could be aberrant, I prefer to leave this species unnamed at present.

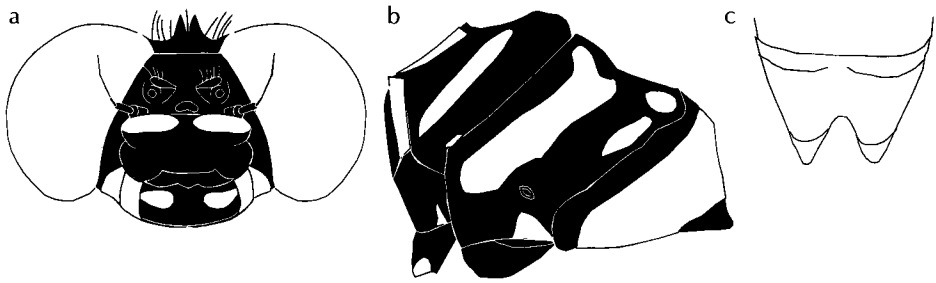

Figure 16: *Lamelligomphus* sp. ♀, Dawangling, Guangxi — (a) head, frontal; (b) thorax, lateral; (c) valvula vulvae.

Lamelligomphus tutulus Liu & Chao, 1990

Lamelligomphus tutulus Liu & Chao in Chao, 1990: 368-369, figs 1-7 [type: Guizhou].

Guangxi specimens: 1 ♀, Maoershan, 23 viii 1998; 1 ♀, Dayaoshan, 19 ix 1998, both leg. GR.
Distribution: China (Guangxi, Guizhou).

Leptogomphus perforatus Ris, 1912

Leptogomphus perforatus Ris, 1912: 68-69, 73-75, 14 figs, pl. 3/fig. 4 [type: Ting-Wu-Shan (Dinghu Shan, Guangdong)]; — Wilson (1999: 40, ♂, ♀, Dinghu Shan, Guangdong).

Guangxi specimens: 2 ♂, Shiwandashan, 08 v 1997, leg. KW; 1 ♀, Jiuwanshan, 27 vii 1998, leg. GR; 1 ♂, Maoershan, 24 viii 1998, leg. GR; 1 ♂, Xidamingshan, 17 x 1998, leg. GR; 1 ♀, Dayaoshan, 19 ix 1998, leg. GR.
Distribution: China (Guangdong, Guangxi).

Macrogomphus guilinensis Chao, 1982
(Figs 17a-f)

Macrogomphus guilinensis Chao, 1982: 11 [type: Guiling, Guangxi]. — Chao (1990: 156-157, figs 1-6, Guangxi).

Guangxi specimens: 4 ♂, 2 ♀, Nonggang, 21 v 1998, leg. KW.
Redescription of male: Large gomphine with elongate S9 and distinctive caudal appendages. Labium pale. Labrum blackish-brown with pair of large oval yellow spots. Base of mandibles, top of frons and sides of postclypeus yellow. Anteclypeus, lower frons blackish-brown (same as the female; see Fig. 17c). Top of head flat with large orange yellow spot above lateral ocelli. Prothorax black with yellow frontal and yellow transverse stripe across posterior third. Synthorax black with yellow pattern as shown for female (Fig. 17a). Legs short and stout. Hind femora not extending past rear of synthorax. Abdomen black with lower half of S1 yellow. Ventral, frontal half of S2 yellow and yellow spot at ventral, posterior corner. S3-6 black with small yellow ventral, basal, quadrate yellow spots. Basal half of S7 yellow. S8 black with large yellow lateral spot. S9 elongate more than 2x length of S8 and about 6x length of S10. S9 with tiny yellow spot at base and S10 entirely black. Superior appendages yellow with deeply forked tips. The inner tip with a convoluted ventral margin, which is blackish ventrally and towards its tip. Inferior appendages widely forked and black (Figs 17d, 17e).
First description of female: Head and thorax as in Figures 17a, 17c. Occipital ridge simple. Abdomen with more developed yellow pattern than male (Fig. 17f). Caudal appendages pale yellow. Valvula vulvae simple (Fig. 17b).
Measurements: ♂ Abd. 53.5-57.0, Hw 41.5-43.0; ♀ Abd. 51.5-55.0, Hw 45.0-46.5.
Distribution: China (Guangxi).
Remarks: All specimens were taken from a large stream with moderate flows. Substrate comprised of gravel with muddy sections.

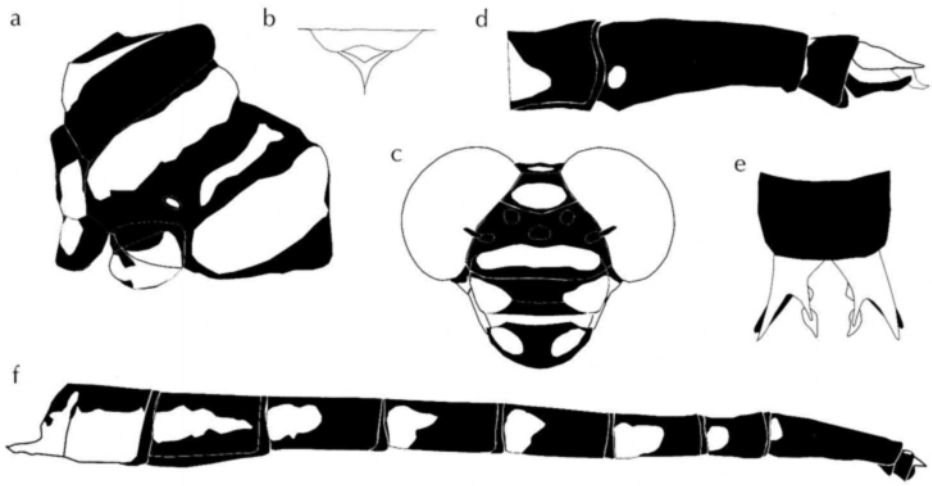

Figure 17: *Macrogomphus guilinensis*, Nonggang, Guangxi — (a) ♀ thorax, lateral; (b) ♀ valvula vulvae; (c) ♀ head, frontal; (d) ♂ caudal abdomen, lateral; (e) ♂ same, dorsal; (f) ♀ abdomen, lateral.

Nepogomphus sp.
(Figs 18a-d)

Guangxi specimen: 1 ♀ (teneral), Nonghua, 13 vii 1999, leg. GR.
Description of female: Small brightly marked *Nepogomphus* with bright yellow occipital region and broad dorsal synthoracic stripe, confluent with dorsal collar. Frontal head as illustrated in Figure 18b. Occiput area bright yellow with a series of small black teeth along occipital ridge and an irregular fringe of long dark hairs. Synthorax black with prominent yellow dorsal stripe, which joins a broad, complete, yellow collar stripe (Fig. 18a). Hint of antehumeral stripe with faint yellow spots basally and below wings. Wings possess all the venational features of *Nepogomphus* (Fig. 18c). Valvula vulvae short and bluntly rounded with shallow V-shaped cleft separating the two projections (Fig. 18d).
Measurements: Abd. 27.0, Hw 22.0.
Remarks: Members of the genus *Nepogomphus* possess distinctive wing venation. Males possess a 3-celled anal triangle, arc located between first and second primary Ax or opposite second primary Ax, two transverse veins between sectors of arc to bifurcation of R2 & R4 in Fw one in Hw, CuP and 1A divergent at Hw border, three rows of postanal cells in Hw and discoidal field with only two rows of cells nearly to wing border. *Nepogomphus* also has a rudimentary anal loop, with the loop extending slightly distal to base of subtriangle, unlike *Lamelligomphus* and *Onychogomphus* which have anal loops extending proximal to base of subtriangle. Three species of *Nepogomphus* are currently recognized: *N. fruhstorferi* (Lieftinck) from Indonesia and Peninsular Malaysia, *N. modestus* (Selys) from Bangladesh, India, Myanmar, Nepal and Pakistan, and *N. walli* (Fraser) known from China, India, Laos, Myanmar, Peninsular Malaysia and Thailand. All these taxa have a synthorax with an interrupted yellow stripe across the metepisternum and a fine dorsal yellow stripe on the synthorax. The Guangxi female has a similar valvula vulvae and identical teeth along the occipital ridge to walli but its yellow thoracic colouration is more developed. In view of the fact that the Nonghua specimen is a female and teneral I have refrained from naming a new taxon. Tsuda (2000) erroneously listed *N. hainanensis* (Chao), originally decribed as *Onychogomphus hainanesis*, but this taxon does not possess the venational characteristics of the genus *Nepogomphus* and according to Chao (1990) it belongs in the genus *Lamelligomphus*.

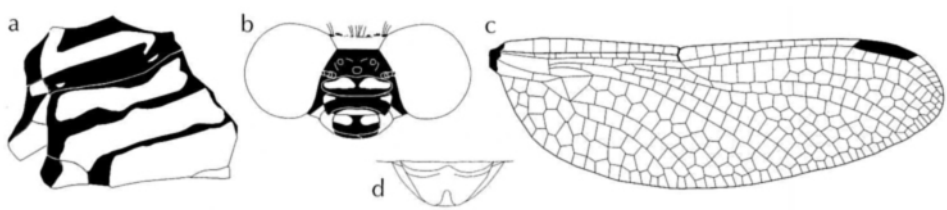

Figure 18: *Nepogomphus* sp. ♀, Nonghua, Guangxi — (a) thorax, lateral; (b) head, frontal; (c) hind wing; (d) valvula vulvae.

Nihonogomphus huangshaensis Chao & Zhu, 1999
(Figs 19a-k)

Nihonogomphus huangshaensis Chao & Zhu, 1999: 17-18, figs 1-3 [type: ♂, Huangsha, Guangxi].

Guangxi specimen: 1 ♂, Nonggang, 21 v 1998, leg. KW.
First description of male: A typical *Nihonogomphus* with entirely black labrum, black occiput and divaricate inferior appendage. Labium, labrum and postclypeus black. Anteclypeus dark brown. Base of mandibles brownish-yellow. Face of frons yellow with lower lateral corners dark brown (Fig. 19b). Top of frons yellow with basal third blackish-brown. A series of minute black pegs at dorso-lateral margins of frons. Top of head black with a domed prominence above each lateral ocellus. Occipital region black with thick fringe of long black hairs. Central region of rear of occiput yellow. Prothorax black. Synthorax black with broad yellow dorsal stripes, confluent with yellow collar stripe forming seven-shaped pattern. Small yellow elongate spot anterior to raised prominence at central dorsal carina (Fig. 19a). Legs black except inner face of forelegs, which are yellow. Wings hyaline with dark brown Pt subtending six cells. Abdomen mainly blackish-brown with greenish-yellow pattern. Dorsum of S1+2 with broad yellow, central dorsal stripe and lower lateral half yellow covering auricle. Base of S3 with small, yellow spot at lower, lateral corner and basal, narrow, elongate yellow spot at dorsal carina. Dorsum of S4-7 with pair of greenish-yellow spots at base. S8+9 expanded with large diffuse, faint brownish-yellow spots at lower, lateral margins. Distal two-thirds of dorsum

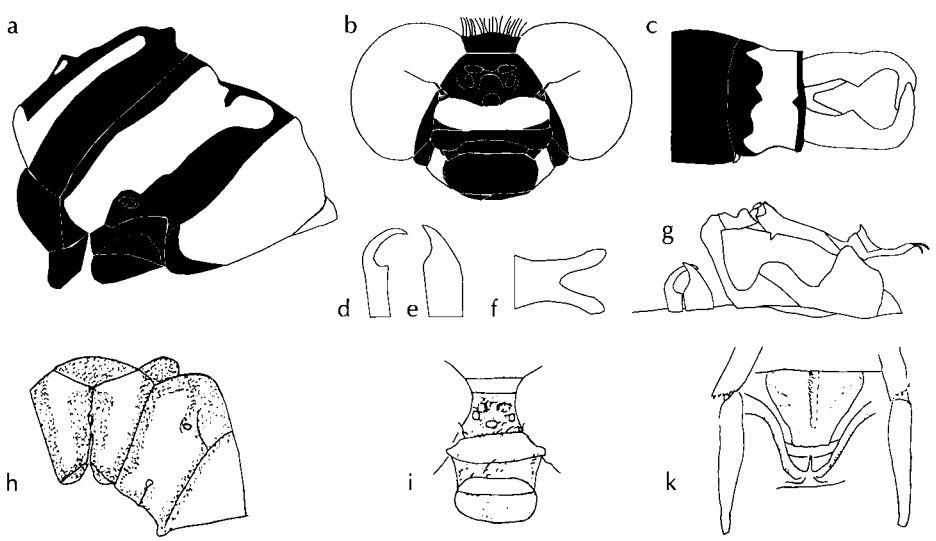

Figure 19: *Nihonogomphus huangshaensis* ♂ [a-g], Nonggang, Guangxi — (a) thorax, lateral; (b) head, frontal; (c) caudal appendages, dorsal; (d) posterior hamulus; (e) anterior hamulus; (f) inferior appendage, ventral; (g) secondary genitalia with penile organ; – ♀ [h-j], Huangsha, Guangxi — (h) thorax, dorsal and lateral; (i) head, part frontal; (k) valvula vulvae; female figures from Chao & Zhu (1999).

of S10 bright yellow, with fine black distal border. Superior appendages yellow (Fig. 19c). Inferior appendage brownish-amber and smoothly curved when viewed laterally. When viewed from below it appears strongly divaricate (Fig. 19f). Vesicle at base of penile organ sharply pointed but without prominent elongate process as seen in *N. lieftincki* Chao and *N. thomassoni* (see below). Medial segment of penile organ with prominent basal projections, when viewed laterally (Fig. 19g). Hamuli are illustrated in Figures 19d, 19e.

Differential diagnosis: Few *Nihonogomphus* possess a divaricate inferior caudal appendage. The closest congener is *N. simillimus* Chao from Fujian Province, which has similar shaped caudal appendages, posterior and anterior hamuli. The penile organs are similar but *N. simillimus* lacks the prominent basal projections of the medial segment and does not possess such a well developed distal segment. The cornua filaments are also longer in *simillimus*. *N. simillimus* can be easily distinguished by a transverse yellow band across its labrum. *N. silvanus* Zhou & Wu was described from Zhejiang Province and is apparently very similar to *N. simillimus*. It possesses an identical penile organ and similarly shaped caudal appendages and hamuli to *simillimus*.

Remarks: When Chao & Zhu (1999) described this new species they commented that it was the only member of the genus, apart from *lieftincki*, which has a black labrum. Chao & Zhu's drawings of the female are provided here in Figures 19h-k. However, *N. thomassoni* occurs in Hainan and Guangxi, on the mainland, and this species has an entirely black labrum (see below). The female subgenital plate of *thomassoni* is gently U-shaped (Wilson & Reels 2001: 187, fig. 116) whereas *huangshaensis* is more deeply curved, almost V-shaped (Fig. 19k).

Chao (1995) established the subgenus *Lobogomphus* based, principally, on differences in the structure of the penile organ. *Lobogomphus* has a penile organ possessing a posterior lobe, which is a feature absent in the type species, *N. viridis* Oguma, and in *huangshaensis*. When Chao and Zhu (1999) described *huangshaensis* from a single female they, understandably, did not mention the subgeneric status. However, Chao (1999) described the subgeneric characteristics of *Nihonogomphus* females and stated, "In the *Lobogomphus* the antehumeral stripe is broad and complete, rarely represented by a round superior antehumeral spot and the inferior antehumeral stripe is absent. In the nominate subgenus *Nihonogomphus*, the antehumeral stripe is absent, rarely represented by a short, narrow inferior antehumeral stripe below." Chao (1999) placed *huangshaensis* in the subgenus *Nihonogomphus*.

Nihonogomphus thomassoni (Kirby, 1900)

(Figs 20a-f)

Aeshna thomassoni Kirby, 1900: 531, 534-545, fig. 1 [type: Hainan].

Onychogomphus thomassoni (Kirby). — Needham (1930: 38-39, Hainan but not of Tonkin).

Nihonogomphus thomassoni (Kirby). — Chao (1954: 417, Hainan); — Asahina (1976: 4-7, figs 20, 21, Hainan). — Chao (1990: 339-340, figs 1-5, Hainan, and ♀ from Guangxi); — Wilson & Reels (2001: 186-188, figs 109-116, Hainan).

Guangxi specimens: 1 ♂, Mulun, 19 vii 1998; 1 ♂, 1 ♀, Mulun, 20 vii 1998; all leg. GR.
Distribution: China (Guangxi, Hainan).
Remarks: Asahina (1976) pointed out the type specimen, deposited in the British Museum (BMNH), lacks distal abdominal segments and Kirby's description only covered the anterior portion of the abdomen. Asahina (1976) illustrated the Hw and secondary genitalia of the type but also illustrated the caudal genitalia of a Tonkinese specimen, from the BMNH labelled as "*thomassoni*", which he considered was not *thomassoni*. Unfortunately, these later figures, depicting the caudal appendages, were reproduced by Zhou (1990) as belonging to *thomassoni*. They clearly do not belong to *thomassoni* since the inferior appendage of Hainan specimens (Wilson & Reels 2001: 187, figs 109-116) are slightly convergent at tips, whereas the BMNH Tonkinese specimen has clearly divergent tips of the inferior appendage. The mainland specimens differ significantly from Hainan males in their colouration. The Guangxi *thomassoni* labrum is entirely black (Fig. 20b). In addition the metepisternum of Hainan *thomassoni* is predominantly black with a small, irregular, yellow spot below the posterior wing base, whereas Guangxi *thomassoni* specimens have a broad yellow stripe which merges with the yellow stripe across the mesepimeron (Fig. 20a). There is a series of minute black pegs on the dorso-lateral margins of the frons, which are also possessed by the Hainan examples (Fig. 20b). The gap between the tips of the inferior appendage is slightly larger (Figs 20c, 20d). As in Hainan specimens the posterior region of the occiput at the back of the head is yellow. On the undersides of the superior appendages, where the tips are turned inwards at 90°, is a series of small black pegs along each ventral margin (Fig. 20d). These are also present on Hainan specimens. Male hamules are illustrated in Figure 20e. The female valvula vulvae is illustrated in Figure 20f. According to Chao (1995) *thomassoni* belongs to the nominate subgenus.

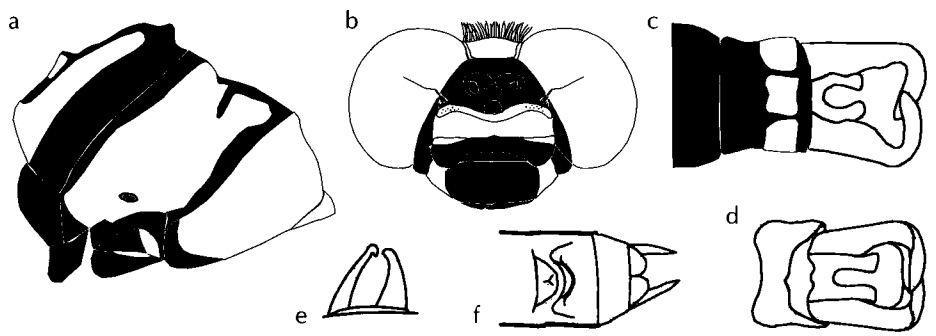

Figure 20: *Nihonogomphus thomassoni*, Mulun, Guangxi — (a) ♂ thorax, lateral; (b) ♂ head, frontal; (c) ♂ caudal appendages, dorsal; (d) same, ventral; (e) ♂ hamuli, lateral; (f) ♀ caudal abdomen, ventral.

Nychogomphus duaricus (Fraser, 1924)

Onychogomphus duaricus Fraser. — Fraser (1934: 244-247, figs 75a, 75b); — Asahina (1986: 24-26, figs 74-81, Thailand, Malaysia, Assam).
Nychogomphus duaricus (Fraser). — Chao (1990: 311-313, figs 1-10, Yunnan).

Guangxi specimens: 3 ♂, 3 ♀, Ningming, 22 v 1998, leg. KW; 1 ♀, Daxin County Town, 14 vii 1999, leg. GR.
Distribution: India (Assam, Bengal), China (Guangxi, Yunnan), Peninsular Malaysia and Thailand.
Remarks: The six specimens from Ningming were collected in a teneral condition. There had obviously been a recent mass emergence of this species from the broad main river, which passes through Ningming. The antehumeral stripe is reduced to a yellow spot in all the Guangxi specimens as described for one Malay/Assam specimen reported by Asahina (1986).

Ophiogomphus sinicus (Chao, 1954)

Onychogomphus sinicus Chao, 1954: 257, 264-266, figs 438-444 [type: Fujian and Jiangxi]; — Asahina (1965: 499-500, Hong Kong); — Asahina (1988a: 693-695, figs 17-22, same specimens as before); — Matsuki (1989: 30-31, larva from Hong Kong); — Matsuki et al. (1990: 15-16, Hong Kong).
Ophiogomphus sinicus (Chao). — Chao (1990: 383, 390-391, 7 figs, Fujian and Jiangxi; — Wilson (1995a: 332, Hong Kong]; — Wilson (1995b: 115, 121, 123, photo ♂, Hong Kong); — Saito & Ogata (1995: 33-34, figs 53-54, Hong Kong); — Wilson (1997: 33, Hong Kong); — Hua (2000: 12, Fujian, Guangxi, Hong Kong, Hainan, Hunan, Jiangxi); — Wilson (2003: 240-241, photos ♂, Hong Kong).

Guangxi specimens: 1 ♂, Jiuwanshan, 27 vii 1998; 2 ♂, Dayaoshan, 17 ix 1998; all leg. GR.
Distribution: China (Fujian, Guangxi, Hong Kong, Hainan, Hunan, Jiangxi).

Paragomphus capricornis (Förster, 1914)
(Figs 21a, 21b)

Onychogomphus capricornis Förster, 1914: 79-80 [type: Perak, Malaysia].
Paragomphus capricornis (Förster). — Asahina (1986: 32-35, figs 114-122, 128, Thailand); — Chao (1995: 30-31, figs 88-92, 1 ♀, Tongan County, Fujian); Wilson (1995a: 334-336, figs 38-48, Hong Kong); — Wilson (1995b: 122, 131, 133, photo ♂, ♀, Hong Kong); Wilson (2003: 242-243, photos ♂, ♀, Hong Kong).
Guangxi specimens: 3 ♂, Nonggang, 21 v 1998, leg. KW; 1 ♂, Nonggang, 22 v 1998, leg. KW; 1 ♂, Chongzuo, 06 vii 1999, leg. GR.
Distribution: China (Fujian, Guangxi, Hong Kong), Peninsular Malaysia, Singapore and Thailand.

Figures 21, 22: ♂ caudal abdomen of two *Paragomphus* species, lateral — (21a) *P. capricornis* from Nonggang, Guangxi; (21b) same from Hong Kong; (22) *P. pardalinus* from Hainan.

Remarks: As pointed out by Wilson & Reels (2001) males of *P. capricornis* are difficult to separate from the slightly larger males of *P. pardalinus*. Although the male lobes and posterior hamuli are slightly different it is difficult to quantify the differences, especially as specimens within populations are quite variable. Perhaps the best feature to separate these two species is the extent of the foliaceous outgrowth at the ventero-lateral margin of the eighth segment. The outgrowth in *P. capricornis* males (Figs 21a, 21b) is much less extensive than in *P. pardalinus* (Fig. 22). Female *capricornis* exhibits no foliaceous outgrowths at the ventero-lateral margin of S8-9, whereas female *pardalinus* has well-developed expansions.

Sieboldius deflexus Chao, 1955
(Figs 23a-c)

Sieboldius deflexus Chao. — Asahina (1972: 2, figs 3, 4, ♂ description, Taiwan); — Matsuki (1978: 140, 153, fig. 15, larval description); — Lieftinck et al. (1984: 30, Taiwan); — Chao (1990: 399-402, figs 1-18, Fujian, Taiwan, Zhejiang).

Guangxi specimen: 1 ♀, Jiuwanshan, 27 vii 1998, leg. GR.
Measurements: Abd. 70.0, Hw 52.0.
Distribution: China (Fujian, Guangxi, Taiwan, Zhejiang).
Remarks: Head, synthorax and valvula vulvae of this very large and robust insect are illustrated in Figure 23.

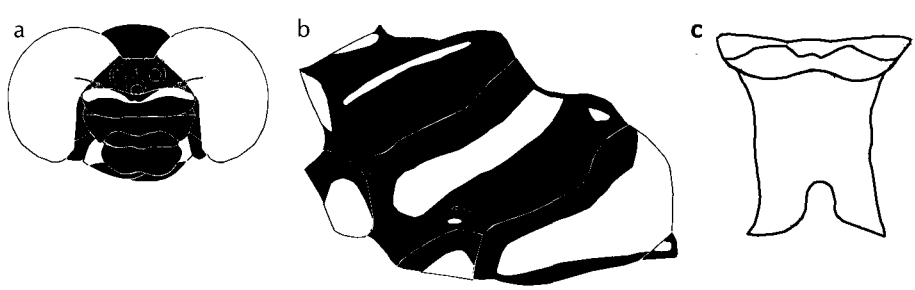

Figure 23: *Sieboldius deflexus* ♀, Jiuwanshan, Guangxi — (a) head, frontal; (b) thorax, lateral; (c) valvula vulvae.

Sinogomphus sp.
(Figs 24a-f)

Guangxi specimen: 1 ♀, Cenwanglaoshan, 25 v 2002, leg. ML.
Description of female: Smallish *Sinogomphus* with more or less complete black stripe across metepisternum and prominent, ridged protrusions above lateral ocelli. Labium, labrum, postclypeus, anteclypeus black. Base of mandibles yellow. Frons black with broad greenish-yellow stripe across the crest (Figs 24a, 24b). A pair of prominent, peg-like ridges above lateral ocelli. Vertex black. Large triangular yellow spot at rear of occiput. Occipital ridge undulating with v-shaped, central indentation. Minute yellow spot below lateral ocelli. Prothorax black with small yellow lateral spot. Synthorax mainly black with yellow collar stripe, narrowly connected at central carina (Fig. 24c). Dorsal stripe isolated. Humeral stripe reduced to small yellow spot below wing bases. Dorsal carina black with small yellow spot at collar and isolated yellow spot centrally. Broad yellow stripe across mesepimeron. Metepisternum mainly black with a pair of minute pale yellow spots adjacent to spiracle and a small isolated spot below wing bases. Large yellow spot across metepimeron and Metaposternum yellow. Legs short and black. Wings hyaline with pale amber suffusion at bases; Hw illustrated (Fig. 24d). Abdomen black with yellow spots at sides of S1-3 and broad stripe along dorsal carina. S3-7 black with basal yellow dorsal spot, basal yellow lateral spot and distal yellow lateral spot; all decreasing in side towards tip. S3-6 with S8-10 black with cerci bright yellow. Valvula vulvae as illustrated (Figs 24e, 24f).
Measurements: Abd. 31.0, Hw 32.0.
Remarks: Eleven species of *Sinogomphus* are currently known. All of these are restricted to China, including Taiwan, with the exception of one species, *S. flavolimbatus* (Oguma), which is endemic to Japan. *S. leptocercus* Chao, *S. orestes* (Lieftinck), *S. peleus* (Lieftinck), *S. pylades* (Lieftinck), *S. scissus* (McLachlan), *S. suensoni* (Lieftinck), and *S. telamon* (Lieftinck) have metepisternums coloured predominantly yellow or with a complete second yellow lateral stripe in contrast to the Cenwanglaoshan female, which has a predominantly black metepisternum.

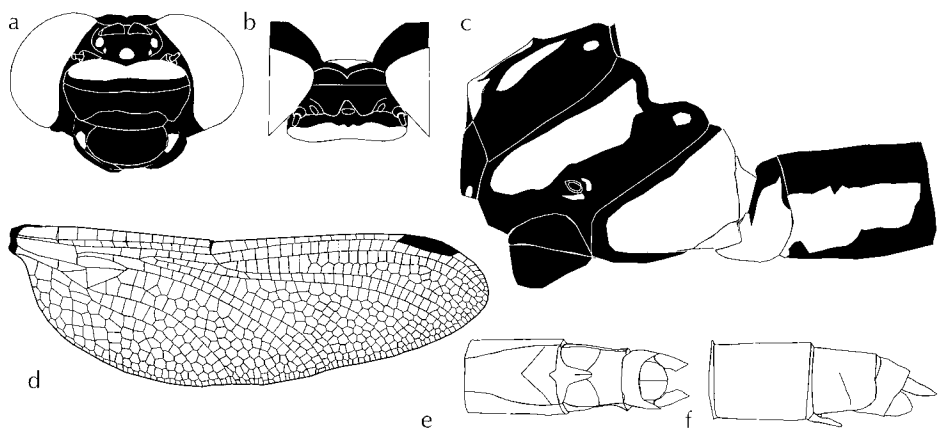

Figure 24: *Sinogomphus* sp. ♀, Cenwanglaoshan — (a) head, frontal; (b) top of head; (c) thorax and basal abdomen, lateral; (d) hind wing; (e) caudal abdomen, lateral; (f) same, ventral.

The crest of the synthorax of *S. asahinai* Chao, *S. flavolimbatus*, *S. formosanus* Asahina, *S. leptocercus*, *S. pylades*, *S. scissus* and *S. suensoni* is black unlike the Cenwanglaoshan female, which has a yellow crest. The Cenwanglaoshan female has unique combination of features and appears to represent a new species, however I prefer not to name it until additional material is found. *S. shennongjianus* Liu is listed by Bridges (1994) as a synonym of *S. scissus*.

Stylurus amicus (Needham, 1930)

Gomphus amicus Needham, 1930: 63-64, pl. 6/fig. 5 [type: Foochow, Fukien; 1 ♀ from Kiangsu reidentified by Chao (1953) as *Stylurus clathatrus* (Needham)].
Gomphus szechuanensis Chao, 1953: 418-420, figs 61-64 [type: Szechuan].
Stylurus amicus (Needham). — Chao (1990: 111-116, figs 1-29, Fujian, Sichuan; — Hua (2000: 12, Fujian, Jiangsu, Sichuan); — Wilson & Reels (2001: 182, Hainan).

Guangxi specimens: 1 ♀, Chongzuo, 06 vii 1999; 1 ♀, Nongxin, 12 vii 1999; both leg. GR.
Measurements: Abd. 50.0-53.5, Hw 42.0-45.0.
Distribution: China (Fujian, Guangxi, Hainan, Jiangsu, Sichuan).
Remarks: This is a large *Stylurus*. S9 of female is 6.5-7.0 mm more than 1.5 times length of S8, which is 4.0 mm. A stout, triangular-shaped peg is located in the centre of the occipital margin.

Stylurus erectocornis Liu & Chao in Chao, 1990
(Figs 25a-e)

Stylurus erectocornis: Liu & Chao in Chao, 1990: 121-123, figs 1-6 [type: ♀, Nanning, Guangxi].

Guangxi specimens: 1 ♂, 1 ♀ Longrui, 27 v 1998, leg. KW.
First description of male: Small-sized *Stylurus* with a moderately expanded, caudal abdomen which is bright yellow ventrally from distal S7-10. Labium with black central lobe and pale cream lateral lobes. Labrum black with large, oval, yellow spot occupying most of basal half. Base of mandibles yellow. Genae, anteclypeus and postclypeus black with small yellow spots at central base of latter. Postclypeus entirely black laterally. Occipital margin with slight dip centrally. Frontal male head as illustrated (Fig. 25a). Prothrorax black with pale yellow frontal margin and large yellow, triangular-shaped lateral spot. Dorsum of synthorax black with yellow collar, isolated dorsal stripe and complete antehumeral stripe. Side of synthorax black with well separated yellow stripes across mesepimeron and metepisternum. The latter yellow stripe is invaded at the metathoracic spiracle but reforms across the metakatepisternum. Metapleural suture broadly black with remainder of metepimeron and metaposternum yellow (Fig. 25c). Legs entirely black apart from inner face of frontal femur which is yellow. Pt reddish-brown subtending 5-6 cells. Abdomen predominantly black with extensive yellow pattern. S1 with yellow, bell-shaped, central dorsal spot and yellow lower half, laterally. S2 yellow below laterally, with longitudinal dorsal stripe extending from base to midpoint. S3-6 with yellow basal ring. Base of S7 with pair of small yellow spots. S8+9 with large quadrate yellow spots at basal centre of lateral margin. Dorsum of S10

black above lateral half and yellow below. Caudal appendages coloured entirely black and shown in Figure 25d. Superior appendages with short, central lateral spine and pointed tip. Secondary genitalia as illustrated (Fig. 25e). Posterior hamulus extensively hooked with humped shoulder.

Redescription of female: Very similar to male but possesses a pair of incredibly long spiked processes, which arise perpendicularly from their origins, just above the lateral ocelli, and protrude beyond the occipital margin (Fig. 25b). The postclypeus has a pair of lateral yellow spots.

Measurements: ♂ Abd. 45.0, Hw 35.0; ♀ Abd. 45.0, Hw 38.0.

Distribution: China (Guangxi).

Remarks: *S. kreyenbergeri* Ris (see Chao 1990: 133-134, figs 1-18) known from Jiangxi, Shandong and Zhejiang and *S. flavicornis* (see Needham 1931b: 3-4, fig. 4/1-2) from Fujian are very closely related species. *S. kreyenbergeri* was described from male only and *flavicornis* from female only. However, male *flavicornis* has been shown to have large nodule-like protuberances above the lateral ocelli whereas *kreyenbergeri* has apically rounded ridges (Chao 1990). The male secondary genitalia and caudal appendages of *erectocornis* and *kreyenbergeri* are very similar with no obvious differences. The spiked vertex processes of female *flavicornis* are convergent at their tips. Both *kreyenbergeri* and *flavicornis* have sides of synthorax black with merged or finely divided yellow stripes across mesepimeron and metepisternum. In addition the labrums of both *kreyenbergeri* and *flavicornis* are more extensively marked with yellow than *erectocornis*.

Figure 25: *Stylurus erectocornis*, Longrui, Guangxi — (a) ♂ head, frontal; (b) ♀ head, frontal; (c) ♂ thorax, lateral; (d) ♂ caudal appendages, lateral; (e) ♂ secondary genitalia, lateral.

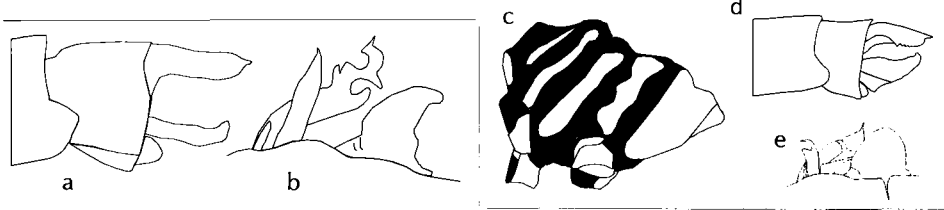

Figure 26: *Stylurus nanningensis* ♂, Qinglongshan, Guangxi — (a) caudal appendages, lateral; (b) secondary genitalia, lateral.

Stylurus nanningensis Liu, 1985
(Figs 26a, 26b)

Stylurus nanningensis: Liu, 1985: 210-211, 4 figs [type: Nanning, Guangxi] — Chao (1990: 133-136, figs 1-9); — Wilson (1999: 35, 39, figs 24, 25, ♀, Guangdong).

Guangxi specimen: 1 ♂, Qinglongshan, 24 v 1998, leg. KW.

Distribution: China (Guangdong, Guangxi).

Remarks: Inferior appendage fine at base when viewed laterally (Fig. 26a). The tip of the male penile organ is cup-shaped with a characteristic plunging keel which is a feature unique amongst Chinese *Stylurus* (Fig. 26b).

CORDULEGASTRIDAE

Anotogaster sieboldii (Selys, 1854)
(Figs 27a-d)

Anotogaster sieboldii (Selys). — Needham (1930: 102, Fukien); — Lieftinck et al. (1984: 27, Taiwan); — Hua (2000: 12, Anhui, Fujian, Guangdong, Hunan, Jiangxi, Taiwan, Zhejiang).
Anotogaster sieboldii ssp. — Asahina (1978a: 9-10, Fukien).

Guangxi specimens: 2 ♂, Huaping, 20 viii 1998; 1 ♀, Maoershan, 21 viii 1998; 1 ♂, Maoershan, 24 viii 1998; 1 ♂, Dayaoshan, 23 ix 1998; all leg. GR.
Measurements: ♂ Abd. 69.0-72.5, Hw 57.5-59.0; ♀ Abd. 81.5, Hw 61.0.
Distribution: China (Anhui, Fujian, Guangdong, Guangxi, Hunan, Jiangxi, Taiwan, Zhejiang), Korea, Russia and Japan.
Remarks: The Guangxi specimens are slightly larger than nominotypical specimens from Japan. I have closely compared the Guangxi specimens with sieboldii from Japan. The Japanese sizes were as follows: ♂ Abd. 69.0, Hw 56.0; ♀ Abd. 72.0, Hw 61.0. The only discernable differences were in the markings on the frons and synthorax. In male Guangxi specimens the dorsal surface of the frons is marked with a very narrow apical transverse stripe, whereas Japanese specimens, both male and female, have a broad, apical, crescent-shaped, yellow, transverse stripe, which occupies one third to one half of the frons. The dorsal frons of the female from Guangxi is entirely black. A frontal view of the male face is provided (Fig. 27b) and a lateral view of the synthorax (Fig. 27a). Two of the Guangxi males have a barely discernible, minute yellow spot, on the metepisternum, in the dorsal, posterior corner below the wings. All male specimens from Guangxi and Japan share similar long, fine superior appendages, which are approximately the same length as S10, or slightly longer, and sharply pointed (Figs 27c, 27d). Both Guangxi and Japanese specimens have superior appendages with an additional ventral, inward pointing spine, located at a point about one third of the length of the superior

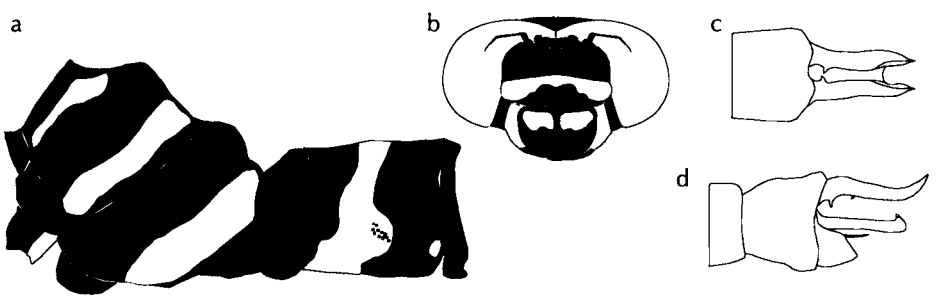

Figure 27: *Anotogaster sieboldii* ♂, Guangxi — (a) thorax and basal abdomen, lateral; (b) head, frontal; (c) caudal appendages, dorsal; (d) same, lateral.

appendage from the base, which is just visible when viewed from the side. The Guangxi female has a slightly larger yellow spot in this location and a further yellow spot below the spiracle. In contrast the Japanese specimens, both male and female, lack these additional yellow spots. The wing bases of Guangxi female, lack yellow colouration, but some forms of the Japanese females are tinged bright, amber yellow at their bases (Sugimura et al. 2001). The Guangxi specimens are not considered to represent a separate subspecific taxon.

The Guangxi specimens were compared with *A. gregoryi* Fraser, obtained from Guangdong, which is also known to occur in Yunnan, Nepal and Thailand. It is separated from *sieboldii* by its black upper frons and short inferior appendages. In addition the superior appendages, which curve out laterally at the tip, are about the same length as S10, and lack the additional mid ventral spine. The Guangxi specimens were also compared with *A. kuchenbeiseri* (Förster), also obtained from Guangdong, which is much smaller, with stout superior appendages curved out laterally at the tip, possessing two prominent ventral spines, and all wings with yellow frontal border.

A. chaoi Zhou, described from Yunnan, has a narrow yellow distal border to S2 and female with yellow wing bases. *A. cornutifrons* Lohmann, described from Shaanxi, has S9+10 predominantly coloured yellow. *A. sakaii* Zhou, from Zhejiang, has curved out superior appendages, similar to *A. kuchenbeiseri*. *A. antehumeralis* Lohmann, from Xinjiang has superior appendages with no additional mid-ventral spine, similar to *A. gregoryi*, but with upper frons with yellow cross-stripe. *A. flaveola* Lohmann, described from Taiwan, from a single female, has extensive second abdominal yellow ring and yellow wing bases.

Corduliidae

Idionyx carinata Fraser, 1926

Idionyx optata [not of Selys, 1878]. — Ris (1912: 82-83, fig. 17, 1 ♂, 1 ♀, Tsa-Yiu-San).

Idionyx carinata Fraser, 1926: 206-207 pl. VIII/fig. 1 [type: Tsa-Yiu-San, S China]. — Needham (1930: 112, pl. II/fig. 2, Tsa Yiu San, South China, N Guangdong); — Asahina (1987: 709-711, figs 38-44, Fukien, China); — Tsuda (2000: 138, 236, China).

Idionyx lieftincki Zhou, 1984: 165-166, fig. 5 [type: Zhejiang, China].

Idionyx arinata (sic). — Hua (2000: 13, Guangxi, Guangdong).

Guangxi specimens: 1 ♀, Jiuwanshan, 26 vii 1998, leg. GR; 1 ♂, Huaping, 17 viii 1998, leg. GR; 2 ♂, Huaping, 19 viii 1998, leg. GR; 1 ♂, 3 ♀, Maoershan, 23 viii 1998, leg. GR; 1 ♂, Dawangling, 05 viii 1999, leg. GR; 2 ♂, Nonghua, 13 vii 1999, leg. GR; 2 ♂, Cenwanglaoshan, 26 v 2002, leg. ML.

Measurements: ♂ Abd. 34.0-37.0, Hw 31.0-36.0; ♀ Abd. 34.0, Hw 37.0

Distribution: China (Fujian, Guangdong, Guangxi, Zhejiang).

Remarks: Asahina (1987) stated he considered *I. lieftincki* to be a synonym of *carinata*.

Idionyx claudia Ris, 1912
(Figs 28a-e)

Idionyx claudia Ris, 1912: 83-84, figs 18, 19, pl. 3/fig. 2 [type: Tsa-Yiu-San, N Guangdong]; — Needham (1930: 111-112, pl. 11/fig. 3, Lo-chen-hsien, Kwangsi and Kwangtung); — Wilson (1995b: 202, ♂ photo, Hong Kong); — Wilson (1996: 364, Hong Kong); — Wilson (1997: 35, Hong Kong); — Wilson (2003: 254-255, ♂ photo, Hong Kong).
Idionyx sp. — Saito & Ogata (1995: 38-39, figs 80-84, Hong Kong).

Guangxi specimens: 1 ♂, 1 ♀, Maoershan, 23 viii 1998; 2 ♀, Maoershan, 24 viii 1998; all leg. GR.
Measurements: ♂, Abd. 30.0, Hw 33.0; ♀ Abd. 30.0-32.0, Hw 33.0-35.0.
Distribution: China (Guangdong, Guangxi, Hong Kong).
Remarks: Female with vertex simple and rounded, similar to male. Male illustrated in Figure 28.

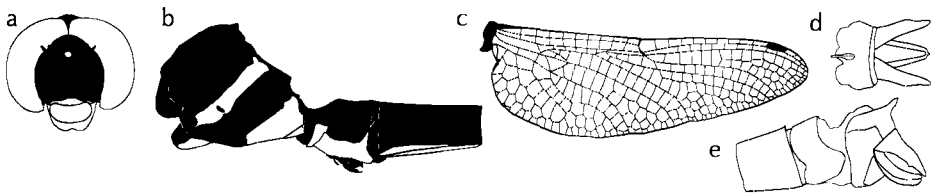

Figure 28: *Idionyx claudia* ♂, Maoershan, Guangxi — (a) head, frontal; (b) thorax and basal abdomen, lateral; (c) hind wing; (d) caudal abdomen, dorsal; (e) same, lateral.

Idionyx unguiculata Fraser, 1926
(Figs 29a-d)

Idionyx unguiculata Fraser. — Fraser (1936: 231-232, fig. 71C, pl. I/fig. 9).

Guangxi specimens: 3 ♀, Diding, 08 vii 1998, leg. GR.
Distribution: China (Guangxi), Myanmar.
Measurements: Abd. 34.5-35.0, Hw 35.0-37.0.
Remarks: This species is newly recorded from China. The female is distinguished from other *Idionyx* by its pronounced forward pointing, recurved horn arising from the domed vesicle at the top of the head (Figs 29a, 29b) and a vestigial yellow humeral stripe (Fig. 29c). There are also two cell rows between 1A and CuP, which the Guangxi specimens also possess (Fig. 29d). However, the Guangxi females have vesicles with a pair of minute horns at the base of the main horn.

Figure 29: *Idionyx unguiculata* ♂, Diding, Guangxi — (a) head, frontal; (b) head, lateral; (c) thorax and basal abdomen, lateral; (d) hind wing.

Fraser (1936) makes no mention of these small basal horns in *I. unguiculata* from Myanmar and there remains the possibility that the Guangxi series represents a new taxon. The discovery of the male will settle the matter.

Macromia clio Ris, 1916

(Figs 32a, 32b, see p. 163 and Plate IV)

Macromia clio Ris, 1916: 67 [type: Hoozan, Formosa]; — Hua (2000: 13, Fujian, Guangdong, Hainan and Taiwan); — Wilson & Reels (2001: 196-197, figs 147-149, Hainan and Shiwandashan, Guangxi).

Macromia hamifera Lieftinck, 1955: 253-256, figs 1-4 [type: Kuantun, Fukien Province]; — Wilson (1998: 469-471, figs 6, 7; 2 ♂, 2 ♀, Shiwandashan, Guangxi, 10 v 1997).

Guangxi specimens: No additional specimens.
Distribution: China (Fujian, Guangdong, Guangxi, Hainan, Taiwan) and Japan (Iromote Island, Ryukyus).
Remarks: *M. clio* was originally described from a single teneral female and *M. hamifera* from male specimens. Wilson & Reels (2001) established *hamifera* as a synonym of *clio*.

Macromia moorei malayana Laidlaw, 1928

Macromia moorei malayana Laidlaw, 1928: 133 [type: L. Tamang, Pahang]. — Asahina (1987: 358-361, figs 18-20, Thailand); — Wilson (1998: 3 ♂, Shiwandashan, Guangxi, 10 v 1997); — Wilson & Reels (2001: 198-199, Hainan).

Macromia moorei moorei Selys. — Asahina (1978b: 246, figs 27-30, Sichuan); — Zhou et al. 1994: 155, Sichuan).

Guangxi specimen: 1 ♂, Xidamingshan, 15 x 1998, leg. GR.
Distribution: China (Guangxi, Hainan, Sichuan), India, Myanmar, Peninsular Malaysia, Thailand and Vietnam (?).

Somatochlora dido Needham, 1930
(Figs 30a-f)

Somatochlora dido Needham, 1930: 115, pl. XI/fig. 4 [type: Szechuan]; — Hua (2000: 13, Heilongjiang & Sichuan).
Somatochlora taiwana Inoue & Yokota, 2001: 217-221, figs 1-6 [type: Taiwan]. New synonymy.

Guangxi specimen: 1 ♂, Maoershan, 22 viii 1998, leg. GR.
Measurements: Abd. 34.5, Hw 33.0.
Remarks: The male is illustrated in Figure 30. Inoue & Yokata (2001) described *taiwana* based on a single male. They considered *taiwana* differed from *dido* in a number of respects, principally (1) distance between the base of superior appendages and basal spine is one-third of total length in *dido* and one-sixth in *taiwana* and (2) broadest part of superiors situated distally in *dido* and centrally in *taiwana*. Our specimen is intermediate between the specimens from Sichuan and Taiwan with ratio of spine distance to total length (1) 1:4.8 and for (2) the broadest part of the superior appendage is located both centrally and distally with the shallow protrusion at this point centrally divided (Figs 30f, 30g). Inoue & Yokota (2001) also remark the inner margin of Taiwan specimen, when viewed from above, is almost straight, whereas this margin undulates in *dido* and in addition the extent of the orange tint at base of Hw in *taiwana* extends to the midrib of anal loop as opposed to the base of the anal loop in *dido*. The inner margin of our Guangxi male is again intermediate but the extent of the orange colouration is identical to the Taiwan specimen (Fig. 30c). The stripe on the Sichuan male is clearly discernable across the mesepimeron and the lower half of the stripe is absent in the Taiwan male. The lower half of the yellow stripe on the mesepimeron of the Guangxi male is fainter than the upper half (Fig. 30b). The secondary genitalia are illustrated in Figures 30d, 30e. Guangxi is located halfway between Taiwan and Sichuan. In view of the additional distributional data and the intermediate nature of the Guangxi male's morphology it is rational to treat *taiwana* and *dido* as a single species.
Distribution: China (Guangxi, Heilongjian, Sichuan, Taiwan).

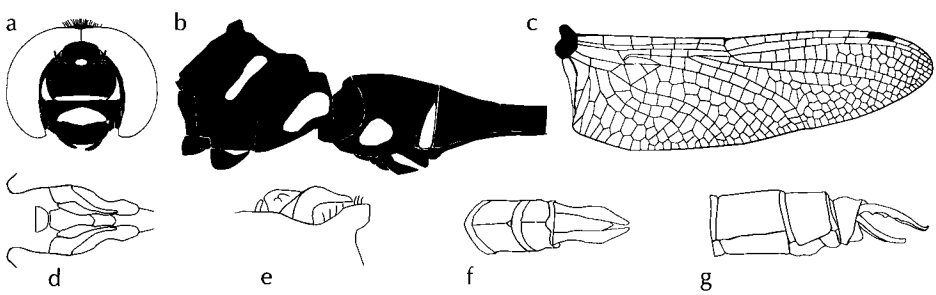

Figure 30: *Somatochlora dido* ♂, Maoershan, Guangxi — (a) head, frontal; (b) thorax and basal abdomen, lateral; (c) hind wing; (d) secondary genitalia, ventral; (e) secondary genitalia, lateral; (f) caudal abdomen, dorsal; (g) caudal abdomen, lateral.

Libellulidae

Atratothemis gen. nov.

Etymology: 'Themis dressed in black'.
Description: Wings narrow and pointed at apices, Hw triangular-shaped, broad at base (breadth to length ratio 1:2.7). Discoidal field of Fw is convergent towards wing border. Distal primary Ax of Fw is complete. Sectors of arc are fused for a very short distance in both Fw and Hw. Arc in both wings situated between first and second primary Ax. Triangle of Fw crossed and angled inward. Bridge of both Fw and Hw has several accessory cross-veins. Cubital space of Fw has a single accessory cross-vein and Hw has two accessory cross-veins. CuP of Hw arises from posterior angle of triangle. R3 and IR3 are markedly undulating. Rspl distinct, with three cell rows between Rspl and IR3. Mspl is present but less distinct than Rspl, with two cell rows between Mspl and MA. Nodus of Hw located closer to wingtip than wing base. Anal loop long and thin, apex closed with pronounced square-shaped heel and foot angled slightly outward. The distal margin of the anal loop is strongly indented below the heel. Abdomen is shorter than wingspan. Genital lobe is very small with short, narrow projection. Hamules small and not protruding.
Type species: *Atratothemis reelsi* sp. nov.
Diagnosis: *Atratothemis* has a complete distal primary Ax, pronounced undulation of R3, triangle in Fw and Hw with cross-veins, single cubito cross-vein in Fw and two in Hw, bridge with accessory cross-veins and high numbers of Ax, which are attributes consistent with the genus *Libellula*. However, the autapomorphies of *Libellula* are unknown. Bechly (2002) considers the subfamily Libellulinae, as listed by Bridges (1994), may be paraphyletic in its present extent. Bechly (2002) comments, "A distinct monophylum within Libellulinae includes all species with a reduced cubito-anal field in the Hw and a position of the arculus distal of the second primary Ax which might even be synapomorphies with Tetrathemistini". *Atratothemis* does not have a Hw with reduced cubito-anal field, and the position of the arculus is not distal to the second primary Ax. The Hw of *Libellula* has a more open wing venation and is much narrower than *Atratothemis* with the breadth to length ratio never less than 1:3.

Broad, triangular-shaped Hw (breadth to length ratio less than 1:3) with a dense wing venation basal to the anal loop and Rspl and Mspl distinct (like a primary longitudinal vein), with 2-3 cell rows between (Fraser 1957) are considered autapomorphies of the subfamily Pantalinae (Bechly 2002). Most members of the Pantalinae do not have accessory veins in the bridge and cubital spaces and the distal primary Ax of Fw is normally incomplete. Fraser (1957) considers these characters – i.e. accessory cross-veins in the cubital space and distal primary Ax complete – to be archaic (plesiomorphic) in nature. *Atratothemis* is placed here in Pantalinae since it possesses autapomorphies characteristic of this subfamily.

The new genus shares many features with the genus *Camacinia*. In general appearance the blackish male of *Atratothemis* differs radically from the more robust Oriental region males of *Camacinia*, which are characterised by uniformly ochreous, or reddish body colouration and extensively reddish to blackish coloured wings. However, the Australasian *C. othello* Tillyard also has blackish body colouration with dark brown or blackish wing bases and wing tips. The wing venation of

Camacinia and *Atratothemis* also possess many similarities. The main differences between the two genera are as follows: (1) distal margin of the anal loop is uniformly straight below the heel in *Camacinia*, unlike the prominent indentation found in *Atratothemis*, (2) sides of the discoidal field in *Camacinia*'s forewing diverge towards wing border (*harterti*) or are parallel (*gigantea* and *othello*), whereas the discoidal field of *Atratothemis* is convergent at wing border, (3) nodus of forewing in *Camacinia* is located closer to base of wing than wingtip (*harterti*) or near the centre of the wing (*gigantea* and *othello*), whereas the nodus of *Atratothemis* forewing is located closer to the wingtip, (4) profile of genital lobe of *Camacinia* is short and broad compared to *Atratothemis*, which is short and extremely narrow, and (5) hamules swollen at base with short and slightly curved, ventrally protruding, inner hook compared to the relatively small hamules of *Atratothemis*, which do not possess a ventrally protruding hook.

The polarity of the five characters listed above are unknown in terms of their relative age, i.e. archaic or recent. Members of the Tetrathemistinae are considered the most archaic of the various libellulid subfamilies currently recognised (Fraser 1957). It is a noteworthy trend in modern libellulids for the arc to gravitate towards the base of the wing. Its position in most genera of the Tetrathemistinae is between the 2nd and 3rd Ax. Given the presence of high numbers of bridge crossveins, which is a plesiomorphic character, and the position of the arc closest to the 2nd antenodal Ax in *Atratothemis*, whereas it is closest to the midpoint of the 1st and 2nd Ax in *Camacinia*, it might be assumed that *Atratothemis* exhibits the most archaic features of the two genera.

Atratothemis reelsi sp. nov.
(Figs 31a-g)

Guangxi specimen: Holotype ♂, Mulun, Guangxi, 20 vii 1998, leg. GR, broken with S5+6 missing). Holotype will be deposited at Tai Lung Experimental Station, Agriculture, Fisheries and Conservation Department, Lin Tong Mei, Sheung Shui, Hong Kong SAR, China.
Etymology: Named in honour of the collector Graham T. Reels.
Description of male: Medium-sized libellulid with entirely matt black abdomen, dark blackish-brown thorax and broad wings with bases and tips extensively coloured dark brown. Labium, labrum, mandibles black. Clypeus, frons, genae dark brown (Fig. 31a). Vertex prominently raised, pitted, rounded, shallowly divided centrally. Occiput broad, slightly raised, black. Eyes dark brown. Prothorax small, black, with no fringe. Synthorax dark reddish-brown above, blackish-brown below, with thick fringe of long reddish-brown hairs on dorsum (Fig. 31b). Coxae dark brown. Legs black. Wings pale amber throughout with extensive patches of dark brown. In Fw areas infiltrated with dark blackish-brown include the cubital spaces and below subcosta, around nodus and tip of wing (Fig. 31c). Hw is extensive coloured dark brown at base and wing tip (Fig. 31d). Both wings have dense wing venation. Pt black, long (4.0-4.5 mm), covering 3-5 cells. Distal primary Ax complete in one Fw and curiously completed but the vein divided in the other. R3 and IR3 undulating with distinct dip, proximal to Pt. Heel of Hw anal loop quadrate. Triangle in Fw and Hw with four cells. One split accessory vein in cubital space of Fw (one in other Fw) and two accessory veins in cubital space of Hw. Five to seven accessory veins in bridge of Fws. CU1 arising at poster-

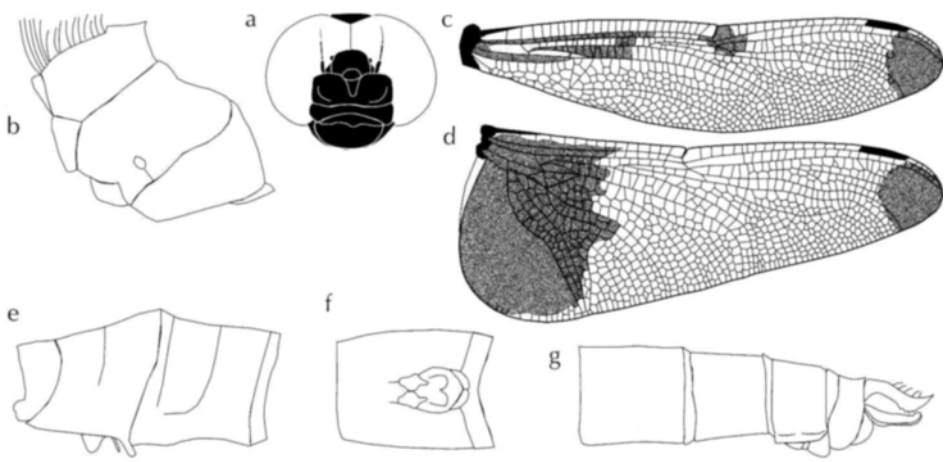

Figure 31: *Atratothemis reelsi* sp. nov. ♂, Mulun, Guangxi — (a) head, frontal; (b) thorax, lateral; (c) fore wing; (d) hind wing; (e) basal abdomen with secondary genitalia, lateral; (f) same, ventral; (g) caudal abdomen, lateral.

ior angle of Hw triangle. Fw with 26-27 Ax. Fw trigonal space widens. Hw with two cubito-anal cross-veins. Apical, radial and median planates of Hw present and well developed. Radial planate subtending 3 cell rows and medial planate subtending 2 cell rows. Abdomen black, stout, but not broad and poorly chitnised at base. Dorsum of S2 with thin tuft of long black hairs. Dorsum of S3-4 and S7-8 (S5-6 missing) and S10 with keeled dorsal carina. S1 and basal half of S2 and S9 without keeled dorsal carina. Lateral margin of S4 and S7-8 keeled, S9-10 without any sign of lateral keel. Caudal appendages black, simple with inferior appendage shorter than superior and prominent ventral teeth towards tip of superior appendages (Fig. 31g). Secondary genitalia as illustrated (Figs 31e, 31f). Genital lobe is very small with short, narrow projection. Hamules are small and not protrusive with no obvious hooks.

Measurements: Head width 7.0, Hw 43.5, Abd. 29.0 (estimate S5-6 missing).

Differential diagnosis: Superficially *Atratothemis* resembles blackish members of the *Rhyothemis* genus, which are bee mimics, with weak fluttering flight and similar broad, triangular-shaped wings with extensive black or dark bluish markings, and short, poorly chitinised abdomen. The wing venation is however quite different. *Rhyothemis* has no pronounced undulation of R3 and IR3, no supplementary veins in the bridge and distal primary Ax is incomplete. In addition the genital lobe of *Rhyothemis* is large and broadly rounded in contrast to the small, narrow genital lobe of *Atratothemis*. Members of the genus *Camacinia* share many venational characters but males of both the Oriental species, *C. gigantea* (Brauer) and *C. harterti* Karsch, have reddish-coloured bodies with distinctive wing patternation. The only other *Camacinia* known is *C. othello* from Australia, New Guinea and the Solomons. It is closest to *A. reelsi* in appearance. The males are blackish, as the name implies, and have basal third to half of each wing deep brown to black and dark brown wing tips. The uniform distal margin of the anal loop below the heel of *othello* will serve to separate it from *Atratothemis*.

Remarks: *C. gigantea* and *C. othello* have dense wing venation with two to three cell rows above Rpl. *C. harterti* is an exception with only one cell row above the Rpl. The Hw width to length ratio reveals the wings of both *C. harterti* and *A. reelsi* are, in relative terms, significantly broader than those of *gigantea* and *othello*. The respective male, breadth to width Hw ratios for the three *Camacinia* species and *A. reelsi* are: *othello* 1:3.1, *gigantea* 1:2.9-1:3, *harterti* 1:2.6-1:2.8, and *reelsi* 1:2.7. *C. harterti* does not appear to be closely realated to the other two members of *Camacinia*.

Brachydiplax farinosa Krüger, 1902

Brachydiplax farinosa Krüger. — Fraser (1936: 327, Bengal, Assam, Burma, Malaysia and Sumatra); — Asahina (1988b: 22-23, figs 51-55, Thailand); — Hua (2000: 13, Yunnan).

Guangxi specimens: 3 ♂, Longrui, 27 v 1998, leg. KW.
Distribution: Bangladesh, China (Guangxi, Yunnan), Indonesia, India, Laos, Myanmar, Peninsular Malaysia, Thailand, and Vietnam.

Diplacodes bipunctata (Brauer, 1865)

Diplacodes bipunctata (Brauer). — Tillyard (1908: 722, Australia); — Watson et al. (1991: 6, 58-59, 244-245, figs 4H, 22C, 23H, key, Australia).

Guangxi specimens: 2 ♂, Shiwandashan, 09 v 1997, leg. KW.
Distribution: Australia, China (Guangxi), Fiji, Micronesia, Guam, Indonesia, Japan, Marshall Islands, Northern Marianna Islands, New Caledonia, New Zealand, Palau, Tanzania, Vanuatu, Western Samoa and Zambia.
Remarks: This species is newly recorded from China and the record appears to be the first from continental Asia.

Lyriothemis tricolor Ris, 1919

Lyriothemis tricolor Ris, 1919: 1063, figs 619, 620 [type: Sokotsu, Formosa]; — Fraser (1936: 266, 270-272, fig. 81b, Bengal and Assam).
Lyriothemis flava Oguma, 1922: 101 [type: Formosa]; — Lieftinck et al. (1984: 43-44, Taiwan).

Guangxi specimens: 2 ♂, Damingshan, 12 vii 1997, leg. KW; 1 ♂, Longrui, 26 v 1998, leg. KW; 1 ♂, Longrui, 27 v 1998, leg. KW; 1 ♂, Gulongshan, 10 vii 1999, leg. GR.
Distribution: Bangladesh, China (Hainan, Guangdong, Guangxi, Taiwan), India, Japan and Myanmar.

Orthetrum albistylum speciosum (Uhler, 1858)

Orthetrum albistylum (Selys). — Hua (2000: 14, Anhui, Fujian, Guangdong, Guizhou, Hainan, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Sichuan, Yunnan, Xinjiang, Zhejiang).
Orthetrum albistylum speciosum (Uhler). — Lieftinck et al. (1984: 46, Taiwan); — Hua (2000: 14, Guangxi, Jiangsu, Jiangxi, Taiwan, Yunnan, Zhejiang).

Guangxi specimens: 1 ♂, Mulun, 22 vii 1998; 1 ♂, Jiuwanshan, 25 vii 1998; both leg. GR;
Distribution: China (Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, Taiwan, Yunnan, Zhejiang), Japan, Korea, and Russia. *O. a. albistylum* is known from Russia, C Asia and westward through Afghanistan to Europe. The records of *albistylum* from Xinjiang may relate to the nominate subspecies.

Sympetrum baccha baccha (Selys, 1884)

Sympetrum baccha (Selys). — Needham (1930: 166, pl. 15/fig. 7, Fujian, Manchuria, Zhejiang, central and southeastern China); — Sui & Sun (1984: 166-168, Fujian, Sichuan, Zhejiang); — Hua (2000: 14, Fujian, Guizhou, Hunan, Jiangxi, Sichuan, Yunnan, Zhejiang).

Guangxi specimen: 1 ♂, Huaping, 19 viii 1998, leg. GR.
Distribution: China (Fujian, Guizhou, Guangxi, Hunan, Sichuan, Yunnan, Zhejiang) and Japan.
Remarks: The wings of the nominate subspecies are hyaline in contrast to the wings of the Japanese subspecies *S. b. matutinum* Ris, which are black-tipped. The latter is known from Heilongjiang and Russia.

Sympetrum darwinianum (Selys, 1883)

(Figs 38a, 38b, see p. 168)

Sympetrum darwinianum (Selys). — Needham (1930: 173, pl. 15/fig. 19, Central China, Japan); — Hua (2000: 14, Fujian, Guangdong, Guangxi, Henan, Hubei, Hunan, Jiangxi, Shanxi, Sichuan, Taiwan, Yunnan, Zhejiang).

Guangxi specimens: 3 ♂, 4 ♀, Huaping, 20 viii 1998; 1 ♂, 1 ♀, Maoershan, 23 viii 1998; all leg. GR.
Distribution: China (Fujian, Guangdong, Guangxi, Henan, Hubei, Hunan, Jiangxi, Shanxi, Sichuan, Taiwan, Yunnan, Zhejiang), Japan and Korea.

Sympetrum eroticum ardens (McLachlan, 1894)

Sympetrum ardens (McLachlan). — Needham (1930: 168-169, pl. 15/fig. 13, Fujian, Sichuan, Zhejiang).
Sympetrum eroticum ardens (McLachlan). — Asahina (1978a: 11-12, figs 38, 39, Fujian); — Lieftinck et al. (1984: 55-56, Taiwan); — Wilson (1999: 42, Guangdong); — Hua (2000: 14, Beijing, Fujian, Guangxi, Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, Shanxi, Sichuan, Yunnan, Zhejiang).

Guangxi specimens: 1 ♂, Huaping, 16 vii 1998; 2 ♂, 2 ♀, Mulun, 22 vii 1998; 1 ♂, 1 ♀, Jiuwanshan, 27 vii 1998; 1 ♀, Maoershan, 23 viii 1998; 1 ♂, 1 ♀, Qingshitan, 26 viii 1998; 1 ♂, 1 ♀, Dayaoshan, 17 ix 1998; 1 ♀, Dayaoshan, 23 ix 1998; 1 ♂, Dawangling, 05 viii 1999; all leg. GR; 1 ♀, Damingshan, 23 ix 2000, leg. BH.
Distribution: China (Beijing, Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, Taiwan, Shanxi, Sichuan, Yunnan, Zhejiang). *S. e. eroticum* (Selys) is known from northern China including Heilongjiang, Japan, Korea and Russia.

Sympetrum infuscatum (Selys, 1883)

Sympetrum infuscatum (Selys). — Needham (1930: 171-172, pl. 15/fig. 16, Fukien to Manchuria and Japan); — Hua (2000: 15, Anhui, Heilongjiang, Henan, Hubei, Hunan, Fujian, Jiangxi, Sichuan, Zhejiang).

Guangxi specimen: 1 ♀, Huaping, 19 viii 1998, leg. GR.
Distribution: China (Anhui, Heilongjiang, Henan, Hubei, Hunan, Fujian, Guangxi, Jiangxi, Sichuan, Zhejiang), Korea, Japan and Russia.

Sympetrum parvulum (Bartenef, 1912)

Sympetrum parvulum (Bartenef). — Needham (1930: 166-167, pl. 15/fig. 11, Manchuria; — Hua (2000: 15, Heilongjiang, Henan, Sichuan).
Guangxi specimens: 1 ♂, Mulun, 22 vii 1998; 1 ♂, Xidamingshan, 16 ix 1998; both leg. GR.
Distribution: China (Guangxi, Heilongjiang, Henan, Sichuan), Japan and Russia.

Sympetrum speciosum speciosum Oguma, 1915

Sympetrum speciosum Oguma, 1915: 142, figs 1-4 [type: Japan].
Sympetrum speciosum taiwanum Asahina, 1951: 21 [type: Taiwan]. New synonymy.

Guangxi specimens: 1 ♂, Damingshan, 12 vi 1997; 4 ♂, 1 ♀, Damingshan, 13 vi 1997; 1 ♂, 1 ♀, Damingshan, 14 vi 1997; all leg. KW; 2 ♂, Damingshan, 23 ix 2000, leg. BH.
Distribution: China (Guangxi, Taiwan), Japan and Korea.
Remarks: This species has not previously been recorded from southern mainland

China. Asahina (1951) created the subspecies *taiwanum* based on the slightly reduced extent of the yellow marks at the wing bases, when compared with Japanese specimens, and commented, "their habitats are quite strictly limited in the high mountains of Formosa, above 2000-3000 m above sea level". The Guangxi series was collected at an altitude of ca 1,000 m. Most of the males possess slightly reduced yellow/orange markings of the wing bases, which is a feature of the Taiwanese specimens. However, some of the male specimens have the same extensive wing base markings as the nominate Japanese *S. s. speciosum*. Given the two forms occur sympatrically in southern China it is appropriate to synonymise these two subspecies. Another subspecies, *S. s. haematoneura* Fraser, is known from Mongolia (Dumont 2003).

Tetrathemis platyptera Selys, 1878

Tetrathemis platyptera Selys. — Asahina (1988b: 9-10, figs 1-4, Thailand); — Wilson (1999: 42, 50, fig. 26E [photo], Guangdong); — Hua (2000: 15, Yunnan); — Wilson & Reels (2001: 201, Hainan).

Guangxi specimen: 1 ♂, Longrui, 27 v 1998, leg. KW.
Distribution: China (Guangdong, Guangxi, Hainan, Yunnan), India, Indonesia, Myanmar, Peninsular Malaysia and Thailand.

Zygonyx asahinai Matsuki & Saito, 1995

Zygonyx iris insignis (Kirby) ? — Hämäläinen (1991: 343-344, Hong Kong).
Zygonyx sp. — Asahina (1988a: 702-703, fig. 43, Fujian, Hong Kong) ; — Saito & Ogata (1995: 45-46, figs 117-119, Hong Kong); — Wilson (1995b: 201-202, Hong Kong).
Zygonyx asahinai Matsuki & Saito, 1995: 19-23 [type: Hong Kong]; — Wilson (1997: 197, Hong Kong); — Wilson (2003: 348-349, photos of exuvia and adult ♀).

Guangxi specimen: 1 ♀, Jiuwanshan, 26 vii 1998, leg. GR.
Distribution: China (Fujian, Guangdong [unpubl.], Guangxi, Hainan, Hong Kong).

Zygonyx iris insignis (Kirby, 1900)

Zygonidia insignis Kirby, 1900: 532-534, pl. XII/fig. 1 [type: Hainan Island].
Zygonyx iris Selys. — Needham (1931a: 224, Hainan); — Needham (1931b: 6, Hainan).
Zygonyx iris insignis (Kirby). — Asahina (1965: 503-504, figs 21-27, Hong Kong); — Asahina (1988a: 700-703, figs 34-42, Hong Kong); — Matsuki (1988: 24-25, figs 1, 2, 4, larval description, Hong Kong); — Wilson & Reels (2001: 202-203, figs 166, 167, Hainan).

Guangxi specimens: 2 ♂, Nonggang, 22 v 1998, leg. KW; 1 ♂, Fusui, 28 v 1998, leg. KW; 3 ♂, 1 ♀, Mulun, 20 vii 1998, leg. GR.
Distribution: China (Guangxi, Hainan, Hong Kong).

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Table 3. Details of common species, with widespread distributions, collected from Guangxi as part of the 1997-2002 odonate surveys.

Species	**Material**
Anax guttatus	1 ♂, Nonggang, 22 v 1998; 2 ♂, 21 v 1998; 1 ♀, Longrui, 22 v 1998; all leg. KW
Gynacantha subinterrupta	1 ♀, Damingshan, 23 ix 2000, leg. BH
Polycanthagyna erythromelas	1 ♀, 20 vii 1998, Mulun, leg. GR
Tetracanthagyna waterhousei	1 ♂, Qinglongshan, 24 v 1998; leg. KW
Burmagomphus vermicularis	1 ♀, Mulun, 19 vii 1999; 1 ♂, Mulun, 20 vii 1998; all leg. GR
Heliogomphus scorpio	1 ♂, Diding, 08 vii 1999, leg. GR
Ictinogomphus pertinax	1 ♀, Shiwandashan, 10 v 1997, leg. KW; 2 ♂, Nonggang, 21 v 1998, leg. KW; 1 ♂, Gulongshan, 10 vii 1999, leg. GR
Merogomphus paviei	1 ♂, Maoershan, 23 viii 1998; 1 ♂, Dayaoshan, 19 ix 1998; all leg. GR
Sinictinogomphus clavatus	1 ♀, Shiwandashan, 10 v 1997, leg. KW.
Idionyx victor	1 ♂, Shiwandashan, 08 v 1997; 1 ♀, Shiwandashan, 09 v 1998; all leg. KW
Epophthalmia elegans	1 ♀, Fusui, 28 v 1998, leg. KW; 1 ♂, Damingshan, 15 x 1998, leg. GR
Acisoma p. panorpoides	1 ♂, Qinglongshan, 24 v 1998; 1 ♂, Fusui, 28 v 1998; all leg. KW
Brachydiplax chalybea flavovittata	1 ♂, Nonggang, 23 v 1998, leg. KW
Brachythemis contaminata	1 ♂, Nonggang, 23 v 1998, obs. KW
Cratilla l. lineata	1 ♂, Qinglongshan, 24 v 1998, leg. KW; 2 ♂, 1 ♀, Chunxiu, 24 v 1998, leg. BH; 1 ♂, Longrui, 26 v 1998, leg. KW
Crocothemis s. servilia	1 ♂, Nonggang, 22 v 1998, leg. KW; 2 ♂, Dayaoshan, 23 ix 1998, leg. GR
Diplacodes trivialis	1 ♂, Nonggang, 23 v 1998, leg. KW; 1 ♂, Damingshan, 3 ix 2000, leg. BH
Hydrobasileus croceous	1 ♂, Shiwandashan, 10 v 1997, obs. KW

Species	Material
Neurothemis fulvia	1 ♂, Nonggang, 22 v 1998, leg. KW; 1 ♂, Qinglongshan, 24 v 1998, leg. KW; 1 ♂, Fusui, 28 v 1998, leg. KW; 1 ♀, Dayaoshan, 17 ix 1998, leg. GR; 1 ♂, Damingshan, 23 ix 2000, leg. BH
t. tullia	1 ♀, Damingshan, 23 ix 2000, leg. BH
Onychothemis testaceum tonkinensis	1 ♂, 23 v 1998, Nonggang, leg. KW
Orthetrum chrysis	1 ♀, Mulun, 21 vii 1998, leg. GR
glaucum	1 ♂, Huaping, 19 viii 1998, leg. GR; 1 ♂, Dayaoshan, 23 ix 1998, leg. GR; 1 ♂, Diding, 08 vii 1999, leg. GR; 1 ♂, Cenwanglaoshan, 26 v 2002, leg. ML
luzonicum	1 ♂, Shiwandashan, 09 v 1997, leg. KW; 2 ♂, Qinglongshan, 24 v 1998, leg. KW; 2 ♂, Chunxiu, 24 v 1998, leg. BH
melania	1 ♂, Huaping, 16 viii 1998, leg. GR; 1 ♂, Maoershan, 23 viii 1998, leg. GR
pruinosum neglectum	2 ♂, 1 ♀, Qinglongshan, 24 v 1998, leg. KW; 1 ♂, Dapingshan, 25 ix 1998, leg. GR
s. sabina	2 ♂, Chunxiu, 24 v 1998, leg. BH; 1 ♂, Fusui, 28 v 1998, leg. KW
t. triangulare	3 ♂, 2 ♀, Shiwandashan, 09 v 1997, leg. KW; 2 ♂, Qinglongshan, 24 v 1998, leg. KW; 1 ♂, 19 vii 1998, Mulun, leg. GR
Palpopleura s. sexmaculata	1 ♂, 1 ♀, Qinglongshan, 24 v 1998, leg. KW; 1 ♂, 20 vii 1998, Mulun, leg. GR
Pantala flavescens	1 ♂, Damingshan, 08 v 1997, leg. KW
Potamarcha congener	1 ♂, Nonggang, 23 v 1998, leg. KW
Pseudothemis zonata	1 ♀, Nonggang, 23 v 1998, leg. KW
Tholymis tillarga	1 ♀, Longrui, 27 v 1998; 1 ♀, Fusui, 28 v 1998, all leg. KW.
Tramea virginia	1 ♂, Shiwandashan, 10 v 1997, obs. KW
Trithemis aurora	3 ♂, Nonggang, 23 v 1998, leg. KW; 1 ♂, Qingshitan, 26 viii 1998, leg. GR; 1 ♀, Dayaoshan, 15 ix 1998, leg. GR; 1 ♀, Damingshan, 23 ix 2000, leg. BH; 1 ♂, Shiwandashan, 25 ix 2000, leg. BH
festiva	1 ♂, Nonggang, 21 v 1998; 1 ♂, Nonggang, 23 v 1998; all leg. KW

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Figures 32a, 32b: *Macromia clio*, male. Shiwandashan, Guangxi. Photos by Keith Wilson.

Figure 33: *Macromia fulgidifrons*, male. Shiwandashan, Guangxi. Photo by Keith Wilson.

Figure 34a, 34b: *Planaeschna suichangensis*, female. Guangdong. Photo by Keith Wilson.


b

Figure 35: *Chlorogomphus kitawakii*, male. Guangdong. Photo by Keith Wilson.

Figure 36: *Chlorogomphus papilio*, female. Guangdong. Photo by Keith Wilson.

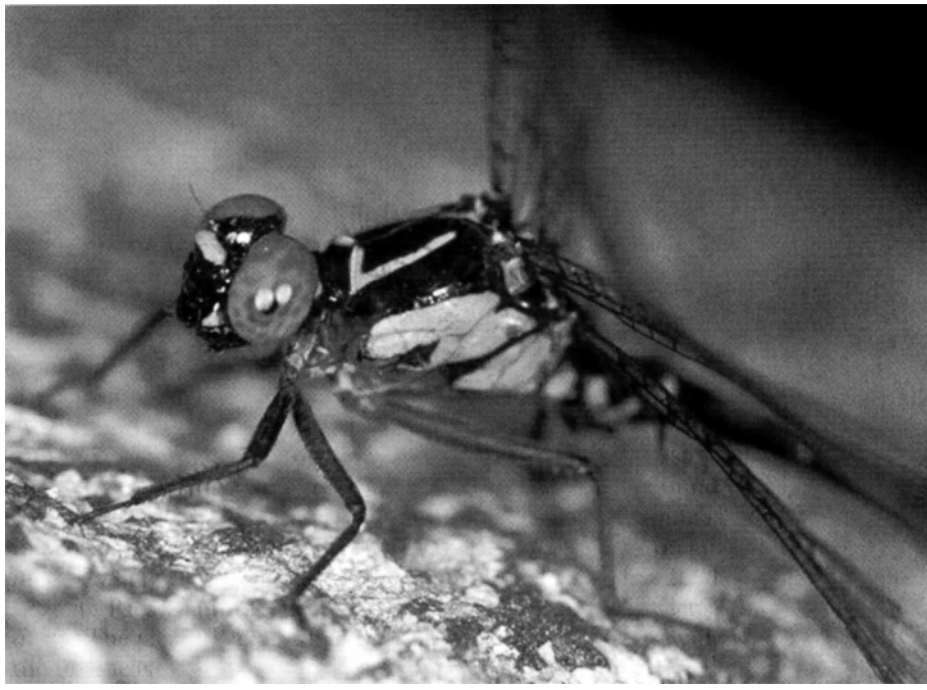

Figure 37: *Davidius fruhstorferi*, male. Guangdong. Photo by Keith Wilson.

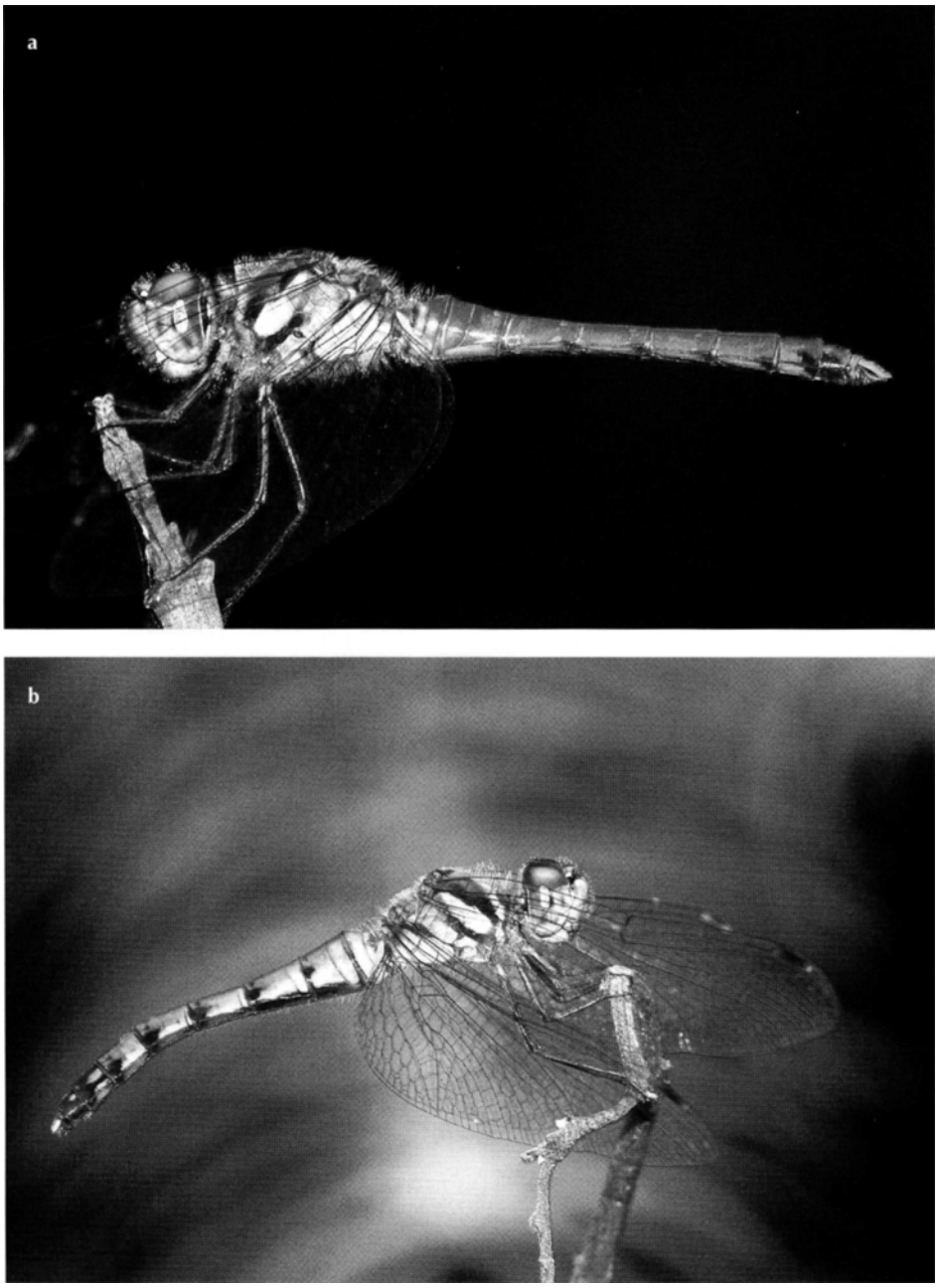

Figure 38: *Sympetrum darwinianum* — (a) male, Guangdong; (b) female, Guangdong. Photos by Keith Wilson.