

**AESHNIDAE OF GUANGDONG  
AND HONG KONG (CHINA), WITH THE DESCRIPTIONS  
OF THREE NEW *PLANAESCHNA* SPECIES  
(ANISOPTERA)**

K.D.P. WILSON<sup>1</sup> and Z. XU<sup>2</sup>

<sup>1</sup> 18 Chatsworth Road, Brighton, BN1 5DB, United Kingdom  
kdpwilson@gmail.com

<sup>2</sup> Department of Entomology, College of Natural Resources and Environment  
South China Agricultural University, Guangzhou 510642,  
Guangdong province, P. R. of China  
xuzaifu@scau.edu.cn

*Received September 1, 2007 / Reviewed and Accepted March 28, 2008*

Taxonomic information is provided on the Chinese aeshnid fauna from Guangdong and Hong Kong, based on surveys completed from 1998 to 2005. *Planaeschna hui* sp. n. (holotype: ♂, Shimentai, Guangdong), *P. nanlingensis* sp. n. (holotype: ♂, Nanling, Guangdong) and *P. skiaperipola* sp. n. (holotype: ♂, Shimentai, Guangdong) are described. *Periaeschna rotunda* Wilson is synonymised with *Cephalaeschna klotsi* Asahina. *Petaliaeschna gerrhon* Wilson is combined with the genus *Periaeschna* Martin and the first ♀ described. *Boyeria karube* Yokoi is newly recorded from China. Keys are provided for the determination of Oriental Brachytronini genera and identification of Chinese spp. of ♂ *Cephalaeschna* Selys, *Periaeschna* Martin and *Petaliaeschna* Fraser. A total of 25 aeshnids are recorded from Guangdong, including 3 new spp., and 3 new provincial records. 12 aeshnids are recorded from Hong Kong, including *Planaeschna skiaperipola* sp. n. (paratype: ♀, Wu Kau Tang, Hong Kong).

**INTRODUCTION**

The majority of odonates examined were obtained from two sets of surveys completed between 1998 and 2005. The first set of these surveys was undertaken by teams organised by the Hong Kong based Kadoorie Farm and Botanic Garden Corporation (KFBG) between 1998 and 2002. The main collectors during these field trips were Keith DP Wilson (KW), Graham T Reels (GR), Billy Hau Chi-hang (BH) and Michael Lau (ML). The second set of surveys was under-

taken by teams of undergraduate and postgraduate students led by Xu Zaifu (XZ), Professor of Entomology, South China Agricultural University (SCAU), during the period 2002-2005. KW accompanied XZ during some of the surveys completed and identified all the specimens collected. The survey data from KFBG and SCAU is supplemented from additional survey work conducted independently by KW during the period 1992 to 2005 and other published data. The details of locations surveyed are provided in Table I below and a checklist of aeshnids recorded from Guangdong and Hong Kong is provided in Table II. The checklist also includes source details of the original record.

The Odonata of Hong Kong has been reported in detail by ASAHINA (1965, 1987, 1988) and WILSON (1995, 1997, 2003, 2004). The Zygoptera of Guangdong was reported by WILSON & XU (2007) but hitherto information on the Anisoptera from Guangdong has been limited. A report on the odonates from the Man and Biosphere Reserve at Dinghushan, Guangdong (WILSON, 1999) included a description of *Cephalaeschna dinghuensis*. KARUBE (2002) described a second aeshnid; *Planaeschna gressitti* from Yim Na Shan, Guangdong. EASTERN & LIANG (2000) reported three aeshnids, *Anaciaeschna jaspidea*, *Anax immaculifrons* and *A. parthenope julius*, from Macau, which is located at the western mouth of the Pearl River delta in central, southern Guangdong. The odonate fauna from neighbouring Guangxi (WILSON & REELS, 2003; WILSON, 2005) and Hainan Island (WILSON & REELS, 2001) has been enumerated. Hainan was historically included as part of Guangdong Province but was made a separate province in 1988.

KFBG published preliminary reports on the surveys conducted by the South China surveys teams undertaken in Guangdong (FELLOWES et al., 2002a-c, 2003a-c, CHAN et al., 2004a-b) but these reports contain limited information on the specimens examined. Details of material covered by these reports are provided here and selected synonymic notes are provided here for aeshnid species of interest, newly recorded from Guangdong and Hong Kong. Details of specimens collected, for which selected synonymic notes are not provided below, are tabulated in Table III.

### *BOYERIA KARUBEI* YOKOI, 2002

Figures 4-5

*Boyeria sinensis* nec Asahina, 1978: WILSON, 2005: 114 (Guangxi).

*Boyeria karubei* Yokoi, 2002: 12-14 (type-loc. Lak Sao, Laos, teneral ♂ and teneral ♀).

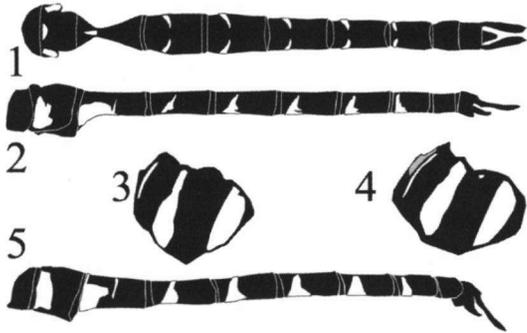
**Material.** – 1 ♂, Longtanjiao, 2-VII-2000, coll. KW; – 1 ♀, Longtanjiao, 3-VII-2000, coll. KW; – 1 ♀, Chengjia, 5-VII-2000, coll. KW; – 1 ♀, Nanling, 23/25-VII-2003, coll. ZX; – 1 ♂, Shimentai, 7-VIII-2003, coll. KW.

REMARKS. — ASAHINA (1978) described *Boyeria sinensis* from a single male from 'Chengtu', Sichuan, which he described as, 'not very mature'. The Guangdong and Guangxi specimens are identical to the original description of *B. karubei* provided by YOKOI (2002) with minor exceptions (Tab. IV); notably the colouration of antealar carina, which is pale brown, and absence of yellow synthoracic dorsal stripes in mature females. *Boyeria karubei* was described from teneral specimens and the colour differences noted can be accounted for by ageing. YOKOI (2002) considered *sinensis* as a different species to *karubei* based on its (i) lack of yellow dorsal stripes on the synthorax, (ii) superior appendages without distinct subbasal ventral tubercle and (iii) superior appendages with rounded rather than pointed apices. In ASAHINA's (1978) description of *sinensis* he described the dorsum of the synthorax as, 'brownish, front stripe ambiguous (perhaps absent)'. Given that female specimens of Chinese *Boyeria* in our possession have faded yellow dorsal stripes and the stripes of one of these is barely visible this character cannot be relied upon to differentiate *sinensis* from either Asian species of *Boyeria*. Faded female dorsal stripes are also a feature observed in *B. maclachlani* (Selys, 1883) from Japan (SUGIMURA et al., 2001). One of the Guangdong males possesses superior caudal appendages with a small baso-ventral bulge but not nearly as extensive as the protuberance depicted in Asahina's drawing of *sinensis*. The final character to differentiate *karubei* from *sinensis* is the pointed apices of the superior appendages. It is apparent there are clear structural differences to separate *sinensis* from *maclachlani* but there are no overt structural differences to distinguish *karubei* from *maclachlani*. The face of *karubei* is paler than *maclachlani* and the abdominal yellow colour pattern is more developed in *karubei* (Figs 4-5) than *maclachlani* (Figs 1-3).

DISTRIBUTION. — China (Guangdong, Guangxi) and Laos.

### GYNACANTHA BAYADERA SELYS, 1891

*Gynacantha bayadera* Selys, 1891: HUA, 2000: 10 (Guangdong, Henan, Jiangsu, Jiangxi, Sichuan). LIEFTINCK et al., 1984: 40-41 (Taiwan).



Figs 1-5. [1-3] *Boyeria maclachlani*, Japan, male: (1) abdomen, dorsal view; — (2) abdomen, lateral view; — (3) synthorax, lateral view. — [4-5] *B. karubei*, Guangdong, male: (4) synthorax, lateral view; — (5) abdomen, lateral view.

REMARKS. — *G. bayadera* is easily distinguished from other Chinese *Gynacantha* by the absence of a black 'T' mark on the crest of the frons. It is closely related to *G. saltatrix*.

DISTRIBUTION. — It ranges from India, through peninsula Malaysia and the Philippines to New Guinea. The distribution in China is uncertain. It has been reported from Taiwan, by LIEFTINCK et al (1984) as, 'probably widespread all over the island'. It also occurs in Hainan Island (Wilson, unpublished data). ASAHINA (1966) noted that MARTIN (1911) had recorded *G. bayadera* from China but had provided an illustration of a *Gynacantha* species, labelled as *bayadera* with a clear T-mark on the frons. ASAHINA (1978) also noted a specimen collected from Sichuan of *G. saltatrix* in the Graham collection, preserved in the US Museum of Natural History, and suggested it might relate to the Chinese record of '*G. bayadera*' referred to in NEEDHAM (1930). SUI & SUN, 1984 recorded *bayadera* from Jiangsu province but illustrated a photo, labeled as *G. bayadera*, which clearly shows a black T-mark on the frons. The Chinese distribution of *G. bayadera* is probably restricted to south China.

KEY TO CHINESE BRACHYTRONINI GENERA WITH WINGS  
POSSESSING CROSS-VEINS IN THE BASAL SPACE I.E.

*CEPHALAESCHNA* SELYS, 1883, *GYNACANTHAESCHNA* FRASER, 1922,  
*PERIAESCHNA* MARTIN, 1909 AND *PETALIAESCHNA* FRASER, 1927

- 1 Pterostigma without brace-vein; dorsal carina prominent and pale yellow coloured; broad wings with dense venation; long and narrow triangle with 6-7 cells; anal triangle 4-6 celled; membranule vestigial; narrow frons with coned top; arc usually distal to outer primary antenode; female genital plate broadly angled and tipped with small hair-like spines ..... *Petaliaeschna*  
– Pterostigma with brace-vein; carina less prominent and usually dark coloured ..... 2
- 2 Last female sternite developed into a sharply angled dentigerous plate which ends with a pair of long, forcep-shaped spines; width of frons less than half width of head; arc usually slightly proximal to outer primary antenode; anal triangle usually 3-celled ..... *Periaeschna*  
– Last female sternite rounded not as above; width of frons usually significantly more than half head width or occasionally equal to or very slightly less than half head width ..... 3
- 3 Brace-vein situated at proximal border of pterostigma; anal triangle usually 4-6 celled; last female sternite rounded and not developed into a prominent dentigerous plate ..... *Cephalaeschna*  
– Brace-vein situated slightly external to the proximal border of pterostigma; arc situated at the level of the outer primary antenode; anal triangle 3-celled; female sternite developed into an acutely pointed, two-pronged dentigerous plate. Distribution: Single extralimital species *G. sikkim* (Karsch, 1891) known from Bangladesh, India & Nepal ..... *Gynacanthaeschna*

*CEPHALAESCHNA DINGHUENSIS* WILSON, 1999

Figures 6-13

*Caliaeschna* (?) *acutifrons* (nec Martin, 1909): RIS, 1916: 55-56 (1 ♀, Tsa-Yu-San, Guangdong, pl. 2, fig. 5, Guangdong).

*Cephalaeschna risi* nec ASAHINA, 1981: 6-11 (part material: 1 ♀, Tsa-Yu-San, Guangdong).

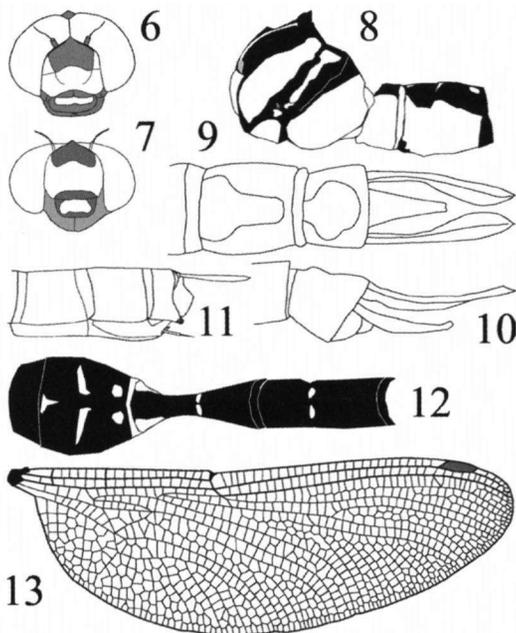
*Cephalaeschna dinghuensis* WILSON, 1999: 31-34, figs 14-18 (type-loc. Dinghushan, Guangdong).

*Cephalaeschna* sp. FELLOWES et al., 2002c: 18 (6-V-1998, Dinghushan, Guangdong).

**Material.** – 1 ♀, Dinghushan, 14-VI-1993, coll. KW; – 1 ♀, Dinghushan, 6-V-1998, GR leg.

**REMARKS.** – ASAHINA (1981) described *Cephalaeschna risi* from specimens collected from Fujian and Taiwan. ASAHINA (ibid) stated, “Ris’s original ‘*acutifrons*’ seems to be lost by the War” but considered Ris’s description of the female collected by Mell in 1910 from Guangdong (RIS, 1916) largely agreed with his Fujianese and Taiwanese material. However, he also noted its larger size, broader wings with closer venation and larger pterothoracic stripe. ASAHINA (1981) did not mention Ris’s description of the cerci, “Appendices sehr klein, spitz, etwa doppelt so lang ...”, which agrees with *dinghuensis* rather than *risi*. The hindwing shape and venation illustrated in RIS (1916) are similar to *dinghuensis* (cf. Fig. 13).

**DISTRIBUTION.** – China (Guangdong).



Figs 6-13. *Cephalaeschna dinghuensis*, Guangdong: (6-7) male, head, frontal view; – (8) male synthorax and base of abdomen, lateral view; – (9) male caudal abdomen, dorsal view; – (10) male caudal abdomen, lateral view; – (11) female caudal abdomen; – (12) female abdomen, basal view; – (13) female hindwing.

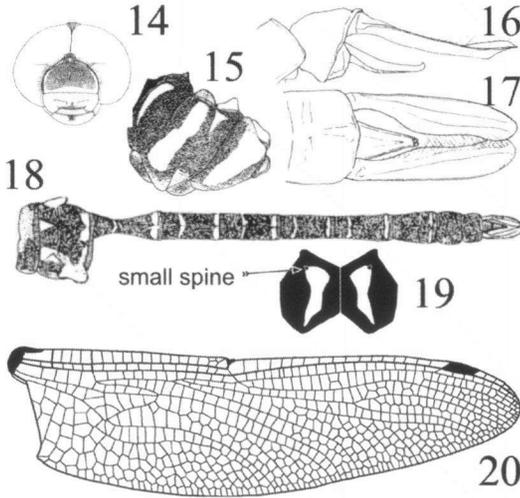
### *CEPHALAESCHNA KLOTSI* ASAHINA, 1982

Figures 14-20

*Cephalaeschna klotzi*: ASAHINA, 1982: 9-10, figs 7-11 (type-loc. Tachulan, Shaowu, Fujian); – FELLOWES et al., 2003c: 26 (Chebaling, Guangdong); – WILSON, 2004: 198-199, (♀ and exuviae, Ng Tung Chai, Hong Kong, 25-IV-2003); HUA, 2000: 10 (Fujian, Zhejiang); – WILSON & TAM, 2006: 85-86, figs 17-22 (1 ♂, 1

♀ & exuviae, Ng Tung Chai, Hong Kong).  
*Periaeschna rotunda* WILSON, 2005: 118-120, figs 6a-e (type ♂, Dayaoshan, Guangxi, 19-IX-1998) **syn. nov.**

**Material.** – 1 ♂, Longtanjiao, 3-VII-2000, coll. KW; 1 ♂, Chebaling, 16-VIII-2000, B.H leg.



Figs 14-20. [14-18] *Cephalaeschna klotsi*, Fujian, male, from ASAHINA (1982): (14) head, frontal view; – (15) synthorax, lateral view; – (16) caudal genitalia, lateral view; – (17) caudal genitalia, dorsal view. – [19-20] *Cephalaeschna klotsi*, male, Hong Kong: (19) synthorax, dorsal view; – (20) hindwing.

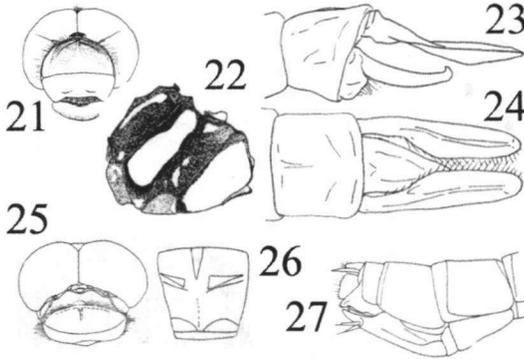
*klotsi* material, collected from Hong Kong and Guangdong, revealed a unique and distinctive feature that is shared with the *rotunda* type male, indicating it is a synonym of *C. klotsi*. The unique feature is a small and stout spine located at the outer, upper base of the male synthoracic dorsal stripe (Fig. 19). This feature is also present on the Guangxi '*rotunda*' male. A thorough examination of the Guangxi and Guangdong specimens confirms the synonymy of these two taxa.

**DISTRIBUTION.** – China (Fujian, Guangdong, Guangxi, Hong Kong & Zhejiang).

#### KEY TO CHINESE MALE CEPHALAESCHNA

- 1 Width of frons significantly more than  $\frac{1}{2}$  head width ..... 2
- Width of frons equal to or slightly less than  $\frac{1}{2}$  head width, or slightly more than  $\frac{1}{2}$  head width 3
- 2 Legs reddish brown; lateral synthorax dark brown with yellow stripe (Figs 21-24). Distribution:

**REMARKS.** – *Periaeschna rotunda* was described from a single male specimen with a narrow frons less than half width of head. Chinese *Cephalaeschna klotsi* and *C. chaoi* also possess a narrow frons (frons width ca half width of head) in contrast to other members of the *Cephalaeschna* which all feature a relatively large frons with a width greater than half the head width. A direct comparison of *klotsi* and *rotunda* material shows there are minor differences in colour pattern but no overt structural differences are apparent. The caudal appendages of *rotunda* are very similar to *klotsi*. A careful examination of *C.*



Figs 21-27. [21-24] *Cephalaeschna patrorum*, male, from ASAHINA (1981): (21) head, frontal view; – (22) synthorax, lateral view; – (23) caudal genitalia, lateral view; – (24) caudal genitalia, dorsal view. – [25-27] *Cephalaeschna observa*, female, from ASAHINA (1981): (25) head, dorsal view; – (26) basal abdomen; – (27) caudal abdomen, lateral view.

- Henan, Shanxi & Sichuan ..... *patrorum* Needham, 1930  
 – Legs black; lateral synthorax yellow with single dark band (Figs 25-27). Distribution: Sichuan ...  
 ..... *obversa* Needham, 1930
- 3 Superior appendages broad and blunt without pointed tips (Figs 14-20). Distribution: Fujian, Guangdong, Guangxi, Hong Kong & Zhejiang ..... *klotsi* Asahina, 1982  
 – Superior appendages with pointed tips ..... 4  
 4 Legs uniformly black or dark reddish brown ..... 5  
 – Legs dark brown with pale tibia darkened at femoral junction ..... 6
- 5 Superior appendages broad at tip with small sharply pointed apical prominence (Figs 28-33). Distribution: Fujian, Guangxi & Jiangxi ..... *needhami* Asahina, 1981  
 – Superior appendages slender and sharply pointed at tipped (Figs 34-38). Distribution: Fujian ....  
 ..... *chaoi* Asahina, 1982
- 6 Superior appendages flat when viewed laterally; female with reduced dentigerous plate & long cerci, more than 2 x S10 (Figs 6-13). Distribution: Guangdong ..... *dinghuensis* Wilson, 1999  
 – Superior appendages bulbous when viewed laterally; female without dentigerous plate and short cerci less than 2 x S10 (Figs 39-46). Distribution: type-loc. Fujian & Taiwan.. *risi* Asahina, 1981

### *PERIAESCHNA F. FLINTI* ASAHINA, 1978

Figures 47-56

*Cephalaeschna lugubris* (nec Martin, 1909): NEEDHAM, 1930: 81-82 (pl. 8, fig. 13, 13a, Fujian, Sichuan); – KLOTS, 1947: 10 (1 ♂, Sichuan); – HUA, 2000: 10 (Fujian, Sichuan, Zhejiang.)

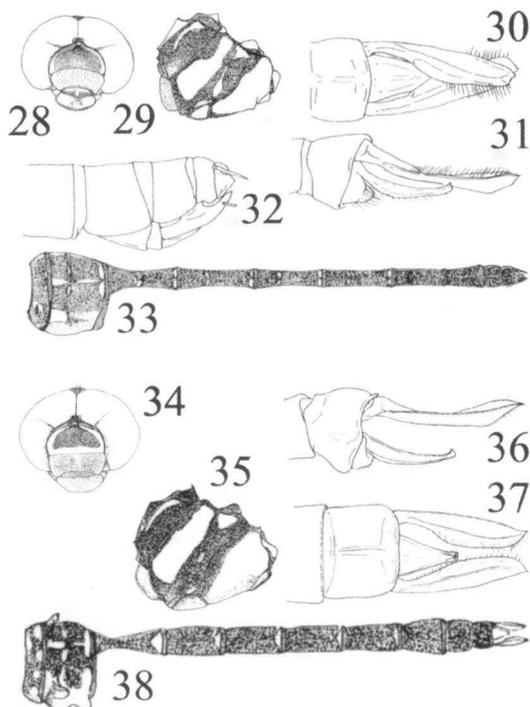
*Periaeschna flinti* ASAHINA, 1978: 240-243, figs 13-22 (1 ♀, Yim Na San [550 m], Guangdong, 13-VI-1936, coll. BMNH, J.L. Gressitt leg.; Fujian, Jiangxi, type-loc. Sichuan); – CHAN et al. (2004b): 20 (Quncaitang, Luokeng, Guangdong).

*Periaeschna f. flinti*: ASAHINA, 1982: 11 (Fujian).

*Cephalaeschna* sp.: FELLOWES et al., 2003b: 19 (1 ♀, Shimentai, Guangdong, 13-VIII-2000).

**Material.** – 1 ♂, Quncaitang, Luokeng, Guangdong, 18-IX-2002, leg. BH; 1 ♀, 13-VIII-2000, Shimentai, Guangdong, BH leg.

**DESCRIPTION.** – **M a l e.** – Small-sized *Periaeschna* with predominantly



Figs 28-38. [28-33] *Cephalaeschna needhami*, from ASAHINA (1981): (28) male, head, frontal view; - (29) male, synthorax, lateral view; - (30) male, caudal genitalia, dorsal view; - (31) male, caudal genitalia, lateral view; - (32) female, caudal genitalia; - (33) abdomen, dorsal view. - [34-38] *Cephalaeschna chaoi* male, from ASAHINA (1982): (34) head, frontal view; - (35) synthorax, lateral view; - (36) caudal genitalia, lateral view; - (37) caudal genitalia, dorsal view; - (38) abdomen, dorsal view.

Forewing triangles six-celled and hindwing five-celled. Membranule pale brownish. Abdomen as illustrated in Figure 51 with greenish-yellow maculation above pale yellow below. Caudal appendages with tip of superior appendage pointed and hooked downwards (Figs 49-50).

**F e m a l e.** - Face of frons bright yellow below and at sides with upper two-thirds ferruginous-brown narrowly divided at centre by pale ochreous vertical line, which is more obvious below (Fig. 53). Prothorax pale whitish-brown at sides and pale brown above with pale yellow triangular spot at centre of distal margin. Synthorax blackish with markings as male but yellow rather than greenish-yellow and dorsal stripe broad but slightly narrower than male (Fig. 54). Wings slightly

yellow face and superior appendages with pointed and downwardly hooked tips. Labium ferruginous-brown with creamy central lobe. Labrum, anteclypeus ferruginous-brown (Fig. 47). Front of postclypeus blackish-brown with narrow, well-defined yellow margin at lower sides and base. Crest of frons yellow at sides and ferruginous brown centrally. Synthorax blackish with a pair of very broad, triangular-shaped greenish-yellow dorsal stripes which are broadest below the black alar sinuses and narrow to a point below (Fig. 48). Mesepimeron with broad greenish-yellow stripe which narrows at upper third. Large triangular greenish-yellow spot at upper metepisternum. Metepimeron greenish-yellow, except for broad black margin along interpleural suture with metepisternum and metaposternum greenish-yellow. Legs blackish-brown.

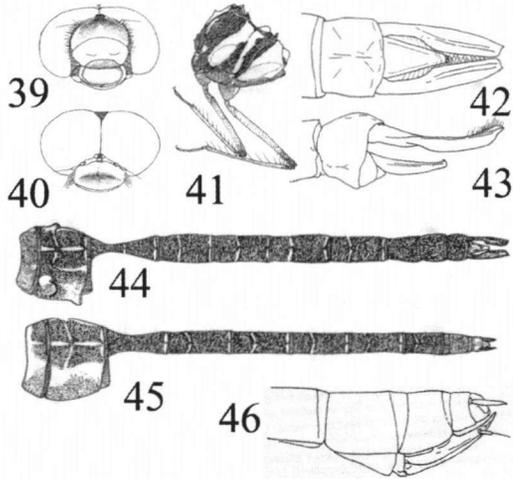
Wings slightly enfumed pale

enfumed which becomes pale amber at base proximal to triangles. Arc proximal to outer primary antenode. Forewing and hindwing triangles five-celled. Membranule pale brownish. Abdomen blackish with dorsum of S1 with central irregular-shaped linear yellow spot. Side of S1 black above mainly yellow below (Fig. 52). Dorsum of S2 with basal and distal yellow spots connected by fine yellow line along dorsal carina. Sides of S2 black above mainly yellow below. Dorsum of S3 & S4 with basal and distal yellow spots and sides with large triangular basal yellow spot and small distal circular yellow spot. Dorsum of S5 & S6 with small basal linear yellow spot and small distal yellow spot and small yellow marks at base of sides of S5-8. Basal third of S9 dark ferruginous-brown. Last sternite developed into a dentigerous plate comprised of a pair of long, forceps-shaped spines, narrowly separated (Figs 55-56.)

Measurements (mm): ♂ abd. + app. 50.0-52.0, hw 41.0-42.0; ♀ abd. + app. 48.0-51.0, hw 41.0-45.0.

REMARKS. — *Periaeschna mira* was described by NAVAS (1936) from two males and a female from 'Kuling', Jiangxi. ASAHINA (1978) did not provide a differential diagnosis when he described *flinti* and made no mention of *mira*. The description provided by NAVAS (1936) was purely verbal with no drawings provided. Nevertheless there is a very close match between the Guangdong *flinti* specimens, Asahina's description of *flinti* and Navás's description of *mira*. Like *flinti* the *mira* specimens were also small-sized; ♂ abd. 47.0 mm, hw 43.5; ♀ abd. 53 mm, hw 44.5. There is a distinct possibility that *flinti* is a synonym of *mira*. The subspecies *P. flinti assamensis* Asahina, 1981 was described from Assam (north-east India)

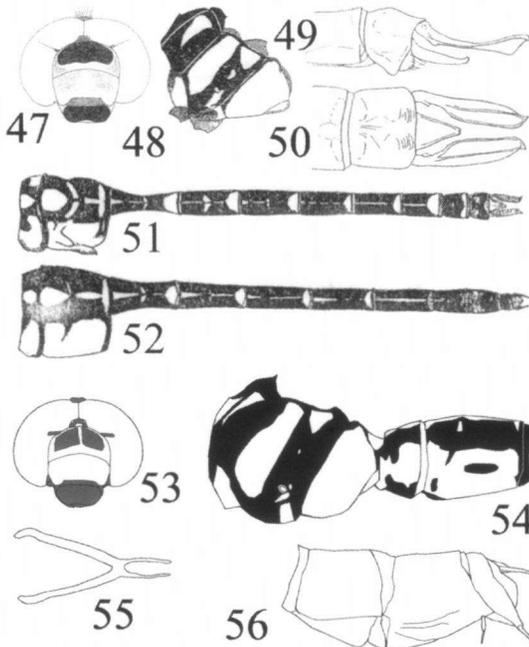
DISTRIBUTION. — China (Fujian, Guangdong, Jiangxi & Sichuan).



Figs 39-46. *Cephalaeschna risi*, from ASAHINA (1981): (39) male, head, frontal view; — (40) male, head, dorsal view; — (41) male synthorax, lateral view; — (42) male caudal abdomen, dorsal view; — (43) male caudal abdomen, lateral view; — (44) male abdomen, dorsal view; — (45) female, abdomen, dorsal view; — (46) caudal abdomen, lateral view.

*PERIAESCHNA GERRHON* WILSON, 2005 comb. nov.

Figures 57-64

*Petaliaeschna gerrhon* WILSON, 2005: 120-121, fig. 7a-c (1 ♂, Maershan, Guangxi).**Material.** – 1 ♀, Nanling, 23/25-VII-2003, coll. ZX; 1 ♀, Chonghua Liuxihe, 14-IV-2002 (no. 020300), coll. ZX.**DESCRIPTION.** – **Male.** – Large-sized, with yellowish face, and dense wing venation. Further to the description provided in WILSON (2005) the anal triangle is 6-7 cells and triangles 6-7 cells. Figures of the male from WILSON (2005) are reproduced here (Figs 57-59).**First female.** – Large-sized *Periaeschna* with dense wing venation and ferruginous-yellowish face. Labium, labrum, anterclypeus, postclypeus, frons,

Figs 47-56. [47-52] *Periaeschna flinti*, from ASAHINA (1978): (47) male, head, frontal view; – (48) male, synthorax, lateral view; – (49) male, caudal genitalia, dorsal view; – (50) male, caudal genitalia, lateral view; – (51) male abdomen, dorsal view; – (52) female abdomen, dorsal view. – [53-56] *Periaeschna flinti*, female, Guangdong: (53) head, frontal view; – (54) synthorax and basal abdomen, lateral view; – (55) dentigerous plate, ventral; – (56) caudal abdomen, lateral view.

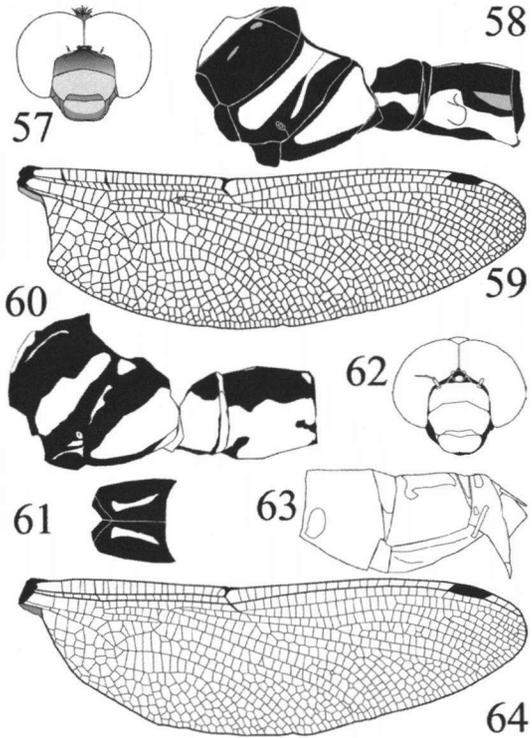
vertex, occiput and antennae entirely pale ferruginous-yellow (Fig. 62). Synthorax blackish-brown with narrow yellow dorsal stripe, which is clubbed at upper end below the alar-sinus (Figs 60-61). Dorsal carina pale yellow. Mesepimeron with broad yellow stripe which narrows quite abruptly at upper third. Triangular yellow spot at upper metepisternum and fine linear spot which does not extend to spiracle. Metepimeron blackish-brown yellow, except for broad brownish-black margin along interpleural suture with metepisternum and with broad yellow stripe. Metaposternum pale ferruginous. Legs reddish-brown. Wings en-fumed throughout with pale amber at base (Fig. 64). Abdomen blackish-brown. Lower sides of S1-S3 predominantly yellow. Pair of yellow

spots at distal border S2-S6. Sides of S4-S7 yellow baso-ventrally decreasing in extent towards caudal tip. Dorsum of S9 and S10 mainly pale yellow (Fig. 63). S10 developed into a dentigerous plate comprised of a pair of long, forcep-shaped spines, narrowly separated.

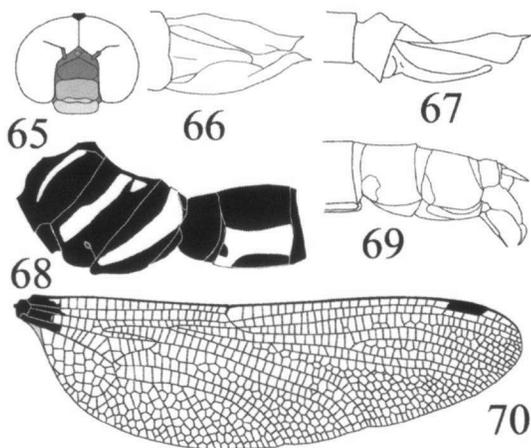
**Measurements** (mm). – ♂ abd. + app. 55.5 (est.), hw. 48.0; ♀ abd. + app. 53.0-56.0, hw 48.0-49.0.

**REMARKS.** – In the ‘Remarks’ section of the original species description (WILSON, 2005), two sentences were erroneously included, which contained factual errors. The relevant sentences are as follows, “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* (sic) clearly possesses many derived characters shared with *Cephalaeschna* and *Periaeschna*. But since the arc is clearly positioned distal to the second, primary Ax, *rotunda* (sic) is placed here in *Petaliaeschna*.” Both these two sentences should be disregarded. As noted in the description *P. gerrhon* has a prominent yellow dorsal carina (Fig. 58), a narrow frons, coned above, less than half width of head (Fig. 57), and broad wings with dense wing venation, but the arc is situated slightly proximal to the distal antenodal vein (Fig. 59). The triangles are 6-7 celled and the anal triangles are also 6-7 celled. One of the type specimen’s hindwings does not have an angled brace-vein but the remaining wings do possess angled brace-veins and the membranule is small but not vestigial. The most reliable generic character to characterise *Cephalaeschna*, *Periaeschna* and *Petaliaeschna* is the presence or absence of a genital plate in females and if present its form. *Cephalaeschna* lacks a well-developed dentigerous plate and *Petaliaeschna*



Figs 57-64. *Periaeschna gerrhon* comb. nov.: (57) male head, frontal view; – (58) male synthorax and basal abdomen, lateral view; – (59) male hindwing; – (60) female synthorax and basal abdomen, lateral view; – (61) female synthorax, dorsal view; – (62) female, head, frontal view; – (63) female, caudal genitalia, lateral view; – (64) female, hindwing.



Figs 65-70. *Periaeschna magdalena*: (65) male, head, frontal view; – (66) male caudal genitalia, dorsal view; (67) male caudal genitalia, lateral view; – (68) female synthorax and basal abdomen, lateral view; – (69) female, caudal genitalia, lateral view; – (70) female hindwing.

has a broadly angled plate tipped with small hair-like spines, whereas *Periaeschna* has an acutely angled dentigerous plate furnished with a pair of long, forcept-shaped spines.

The dense wing venation, head and body shape and colour pattern of *gerrhon* does not agree with any known Chinese species of *Cephalaeschna* or *Periaeschna*. When the male was described, without knowledge of the female, it was difficult to assign a correct genus to *gerrhon* but fortunately the female is now known.

The Nanling and Chonghua

Liuxihe *Periaeschna* females possess a dentigerous plate which ends with a pair of long, forcept-shaped spines, characteristic of the genus. Like the male they are large-sized, feature dense wing venation, pale yellowish facial pattern and have a similar thoracic pattern. The only notable differences between the male and female are the position of the arc which is slightly distal to second primary antenodal vein and darker leg colour, which is mainly pale in the male. The 6-7 celled triangles and 6-7 anal triangles of both male and female are very unusual for *Periaeschna* which normally feature less dense venation with typically 3-celled anal triangles.

Hitherto no Chinese *Periaeschna* males have been known to feature yellow dorsal carinas but this character has been noted by FRASER (1936) for general specimens of *Periaeschna nocturnalis* and is occasionally featured in *Periaeschna zhangzhouensis*. According to FRASER (1936) MApl, the accessory nerve in *Petaliaeschna*, which arises from the distal side of the triangle, is straight and well-defined along its course whereas this nerve is zig-zagged at its origin in *Periaeschna*. In *gerrhon* it is moderately straight at its origin but not throughout its length. As noted by ASAHINA (1982) both the Chinese *Petaliaeschna lieftincki* and *Petaliaeschna corneliae* possess MApl nerves with zig-zag at their origin.

DISTRIBUTION. – China (Guangdong & Guangxi)

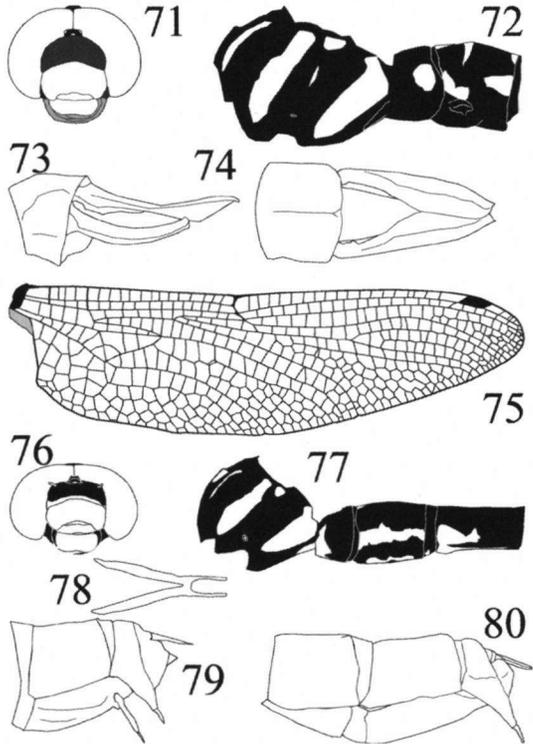
*PERIAESCHNA ZHANGZHOUENSIS* XU, 2007

Figures 71-80

**Material.** — 1 ♂, 1 ♀, Nankunshan, 7-VIII-2004, coll. KW; 1 ♂ (no. 024781), Heishiding, 15-VIII-2003, coll. ZX; 1 ♀, 28/29-VII-2003, Nanling, coll. ZX.

**DESCRIPTION.** — **Male.** — Medium-sized *Periaeschna* with ferruginous coloured face. Labium, labrum, postclypeus, anteclypeus ferruginous brown (Fig. 71). Frons and vertex blackish-brown. Occiput blackish with thick fringe of black hairs. Prothorax blackish-brown. Synthorax blackish with greenish-yellow dorsal stripes and sides with two broad greenish-yellow stripes, one across the mesepimeron and the other across the metepimeron (Fig. 72). There are two small greenish-yellow spots on metepisternum above the spiracle. Legs black. Wings hyaline with short black pterostigma and pale membranule. Anal triangle 3-celled. Arc very slightly proximal to outer primary antenode. The hindwing is illustrated in Fig. 75. Abdomen with greenish-yellow spot on side of S1. Sides of S2 with a basal greenish-yellow spot above auricle, which itself is blackish below, and a distal greenish-yellow spot. Dorsum of S2 with four greenish-yellow spots: one linear basal spot, a pair of triangular spots along the transverse suture and one distal transverse spot. Dorsum of S3-7 with a pair of greenish-yellow triangular spots at transverse suture and pair of distal spots. S8-10 black. Inferior appendage relatively long at and approximately three-quarters length of superior appendages (Figs 73-74).

**Female.** — Coloured similar to male but side of abdominal S2 predominantly yellow below (Fig. 71). Head



Figs 71-80. *Periaeschna zhangzhouensis* Guangdong: (71) male, head, frontal view; — (72) male synthorax and basal abdomen, lateral view; — (73) caudal genitalia, lateral view; — (74) male caudal genitalia, dorsal view; — (75) male hindwing; — (76) female head, frontal view; — (77) female synthorax and basal abdomen, lateral view; — (78) dentigerous plate, ventral view; — (79-80) caudal genitalia, lateral view.

illustrated in Figure 76. Wings slightly enfumed. Last female sternite developed into a dentigerous plate comprised of a pair of long, forcep-shaped spines, broadly separated (Figs 79-80).

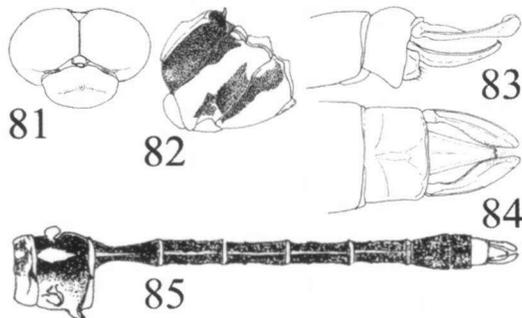
Measurements (mm). — ♂ abd. + app. 50.0-51.0, app. 4.5, hw 41.0-42.0; ♀ abd. + app. 49.0-51.0, hw 43.0-45.0.

REMARKS. — *P. zhangzhouensis* was recently described from Fujian.

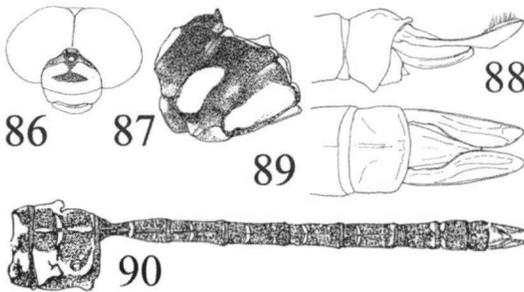
DISTRIBUTION. — China (Fujian & Guangdong).

KEY TO CHINESE MALE *PERIAESCHNA*

- 1 Synthorax with broad, triangular-shaped dorsal stripe, widest at anterior end below wing base; maximum width of stripe ca ¾ width of dorsum (mesepisternum) at the same point. Small species with yellow face apart from antefrons, which is mainly blackish-brown above, margined with yellow at lower sides and basally. Abdominal S2 with large ovoid spot at base and T-shaped distal mark; inferior appendage ca half length of superior appendages (Figs 47-56). Distribution: Fujian, Guangdong, Jiangxi & Sichuan ..... *flinti* Asahina, 1978
  - Synthorax with narrow humeral stripe not as above ..... 2
- 2 Synthorax with yellow dorsal carina ..... 3
  - Synthorax with blackish-brown dorsal carina ..... 4
- 3 Larger species with dense wing venation, hw 48.0-49.0 mm; face entirely pale yellow or ferruginous-yellow (Figs 57-64). Distribution: Guangdong & Guangxi. .... *gerrhon* (Wilson, 2005) comb. nov.
  - Medium-sized species with relatively open venation, hw 43.0-44.0 mm. Face yellowish or pale ferruginous-brown with antefrons predominantly dark ferruginous-brown (couplet 4 and Figs 71-80). Occasionally females of this taxon may feature pale yellow dorsal carina but in all males and most females it is blackish. Distribution: Fujian & Guangdong ..... *zhangzhouensis* ♀ Xu, 2007
- 4 Male superior appendages with a basal, ventral swelling, when viewed laterally; superior appendages acutely pointed Abdominal S2 with linear spot at base and transverse distal mark; inferior appendage ca three-quarters length of superior appendages. Distribution: Fujian & Guangdong (Figs 71-80) ..... *zhangzhouensis* Xu, 2007
  - Male superior appendages without a small sub-basal swelling ..... 5
- 5 Male superior appendages with a folded blade and acutely pointed tips; wings strongly enfumed at extreme base (Figs 65-70). Distribution: China (Fujian, Guangxi, Guangdong, Hainan, Henan, Hubei, Jiangsu, Jiangxi, Sichuan, Taiwan & Zhejiang), Myanmar, northeast India, Thailand & Vietnam ..... *magdalena* Martin, 1909
  - Large species; male abdomen greater than 55 mm; ferruginous-brown coloured auricles; superior appendages with rounded tips (Figs 14-20). Distribution: Guangxi ..... *Cephalaeschna klotsi* Asahina, 1982 (note *Periaeschna rotunda* Wilson, 2005 syn. nov.)



Figs 81-85. *Petalieschna corneliae*, male, from ASAHINA (1982): (81) head, dorsal view; — (82) synthorax, lateral view; — (83) caudal genitalia, lateral view; — (84) caudal genitalia, dorsal view; — (85) abdomen, dorsal view.



Figs 86-90. *Petaliaeschna lieftincki*, male, from ASAHINA (1982): (86) head frontal view; – (87) synthorax, lateral view; – (88) caudal genitalia, lateral view; – (89) caudal genitalia, dorsal view; – (90) abdomen, dorsal view.

#### KEY TO CHINESE MALE *PETALIAESCHNA*

- 1 Small species with a hindwing measuring less than 40 mm; caudal appendages entirely yellowish (Figs 81-85). Distribution: Fujian ..... *corneliae* Asahina, 1982
- Large species with a hw measuring 40 mm or more ..... 2
- 2 Frons with distinct T-mark; relatively open wing venation; male hw 45.0 mm (Figs 86-90). Distribution: northeast China ..... *lieftincki* Asahina, 1982
- Frons without distinct T-mark; dense wing venation; male hw 48.0 mm. (Figs 58-64). Distribution: Guangxi. .... *Periaeschna gerrhon* (Wilson, 2005) comb. nov.

#### *PLANAESCHNA GRESSITTI* KARUBE, 2002

Figure 126

*Planaeschna gressitti* KARUBE, 2002: 1-5, figs 1-7 [type: ♂, Yim Na San, Guangdong, 650 m alt.]

REMARKS. – The facial pattern and caudal appendages of *gressitti* are more or less identical to *suichangensis*. We have several male specimens from various locations throughout Guangdong which possess abdominal S3-8 with complete yellow rings linking the dorsal yellow marks with the ventral yellow spots. In several cases males with complete rings and males without interrupted rings (cf. Fig. 126) were collected from the same location at the same time. Other than the body maculation KARUBE (2002) mentions no other features which can be used to separate *gressitti* from *suichangensis*. We have carefully examined all our males with complete rings and cannot find any other distinguishing features when compared with normal patterned *suichangensis* which is very common throughout Guangdong.

DISTRIBUTION. – China (Guangdong).

#### *PLANAESCHNA HUI* SP. N.

Figures 91-101

*Planaeschna risi risi* nec ASAHINA, 1964: WILSON, 2005: 122-124, figs 8a-k (3 ♂, 1 ♀, Shiwandashan, Guangxi, 26-IX-2000, leg. BH; 1 ♀, Dayaoshan, Guangxi, 16-

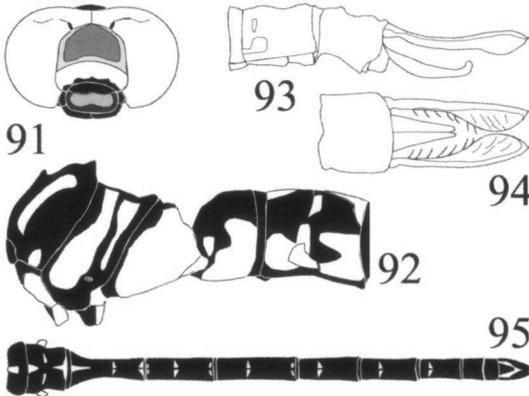
IX-1998, leg. GR; 1 ♀, Dapingshan, Guangxi, 25-IX-1998, leg. GR; 1 ♀, Daming-shan, Guangxi, 21-IX-2000, leg. BH.)

**Material.** — **Holotype** ♂, 14-VIII-2000, Shimentai, Guangdong, leg. BH. — **Paratype**: 1 ♀, Shimentai, Guangdong (N 24° 26.275'; E 113° 28.835'), 3-XII-2005, coll. KW. Other material: 1 ♀, 1/6-XII-2001 (no. 010109), Shiwandashan, Guangxi, coll. ZX. 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 species is named in honour of the Billy H a u Chi-hang who collected the first males at Guangxi and the type at Shimentai, Guangdong.

**DESCRIPTION.** — Medium-sized *Planaeschna* similar in colouration to *P. sui-changensis* but with duller more developed yellow markings and slightly heavier build.

**Male.** — 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. 91). 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. Side of thorax patterned as shown in Figure 92. Two of the three males and the holotype have a well-developed yellow spot on the metepisternum, which extends from the wing base almost reaching the spiracle. Legs blackish-brown with basal two thirds of

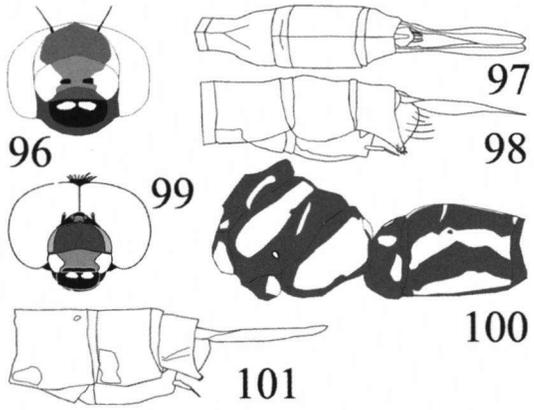


Figs 91-95. *Planaeschna hui* sp. n., male holotype, Shimentai, Guangdong: (91) head frontal view; — (92) synthorax and basal abdomen, lateral view; — (93) caudal genitalia, lateral view; — (94) caudal genitalia, dorsal view; — (95) abdomen, dorsal view.

inner faces of foreleg, and basal half of middle leg, pale yellow. Abdomen blackish with yellow pattern typical of the genus (Fig. 92). 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 (Figs 93-94). Superior appendage with distinct lateral bulge at distal third (Fig. 93).

**F e m a l e .** — Relatively robust and stout for the genus; thorax and abdomen reddish-brown or purplish-brown base colour with greenish-yellow spots and ferruginous yellow face, mainly black labrum and very long cerci. Labrum black with a pair of small basal, centrally located, yellowish spots (Figs 96, 99). Anteclypeus dark amber-brown. Postclypeus bright yellow at sides and extensive amber-brown central mark with pair of small dark brown pits (Fig. 96). Face of frons pitted, ferruginous brown with sides yellowish. Upper central half of face of frons slightly ridged giving rise to a small prominence at apex of frons. Upper face of frons with sides flattish or very slightly scalloped. Vertex and occiput black. Antennae dark brown. Prothorax reddish-brown or purplish-brown. Lateral greenish-yellow spot below posterior lobe. Synthorax ferruginous-brown or purplish-brown. Interrupted greenish-yellow stripe across metepisternum, reduced to triangular spot below wing base and extremely fine central stripe, barely visible. 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 tinted pale amber with black Pt subtending 3-4 cells and braced at proximal end. Abdomen dorso-ventrally compressed from S3-10. S2 with two distinctive broad, lateral greenish-yellow stripes; one at centre and another at ventral margin (Fig. 100.) Latero-ventral margins of S3-6 with basal and distal yellow spots; S7-9 with basal yellowish spots only. S10 entirely blackish-brown. Distal half of the S8 dorsum covered with triangular field of very small spines



Figs 96-101. *Planaeschna houi* sp. n. female, paratype, Shiwandashan, Guangxi: (96) head, frontal oblique; — (97) caudal genitalia, dorsal view; — (98) caudal genitalia, lateral view; — (99) head frontal view; — (100) synthorax and basal abdomen, lateral view; — (101) caudal abdomen, lateral view.

but these are barely noticeable. Dentigerous plate finely produced with several robust spines at tip. Length of cerci 5.5 mm. The cerci are more than 3 times the length of S10 (Figs 97-98, 101).

**Measurements** (mm). — ♂ Abd. 47.0-52.0, app. 5.0, hw 44.0-45.0; ♀ abd. 53.5-54.5, cerci 5.5., hw 45.0-50.0.

**DIFFERENTIAL DIAGNOSIS.** — A total of 17 species of *Planaeschna* McLachlan have been described to date with nine of these named in the last 10 years. The genus is mainly confined to Indo-China and China with outliers occurring in Thailand, Burma, India (Assam) and Japan. Seven species of *Planaeschna* have been described from China, and a further five species of *Planaeschna* have been described from Vietnam. Of the 17 species of *Planaeschna* hitherto described four include males with superior appendages possessing a distinctive distal, ventral bulge, when viewed laterally. These species comprise *intersedens*, *milnei*, *naica* and *risi*. The superior appendages of *hauui* also feature a distal bulge, which is easily seen when viewed laterally. Both *milnei* and *naica* possess yellow abdominal rings S3-8 i.e. transverse sutures with yellow markings linked to ventral markings. In *hauui* the dorsal spots at the transverse suture are not linked to the yellow ventral markings. *P. hauui* is closely related to *P. r. risi* from Taiwan. It can be distinguished by the colour pattern of the abdomen, which is quite different. The dorsum of abdominal S2 in *risi* has a distal pair of large, yellow, conjoined quadrate spots with central carina unmarked or extremely finely yellow; whereas *hauui* has a yellow T-shaped spot at the distal margin (Fig. 95). The female cerci of *P. risi* from Taiwan are only slightly longer than S10 whereas *hauui* females are 3 times the length of S10.

**REMARKS.** — Before collection the female was observed ovipositing in the bark of fallen trees in a montane stream within the Shimentai Reserve at approximately 300 m altitude.

**DISTRIBUTION.** — China (Guangdong & Guangxi).

### *PLANAESCHNA NANLINGENSIS* SP. N.

Figures 102-107

**Material.** — **Holotype** ♂, Nanling, Guangdong, 23/25-VII-2003, Nanling Nature Reserve, North Guangdong, coll. ZX. — **Paratypes** 2 ♀, Nanling, Guangdong, 23/25-VII-2003, Nanling Nature Reserve, North Guangdong, coll. ZX. Type deposited at South China Agriculture University, Department of Entomology, Guangzhou.

**DESCRIPTION.** — Medium-sized *Planaeschna* with postclypeus black centrally and yellow at sides.

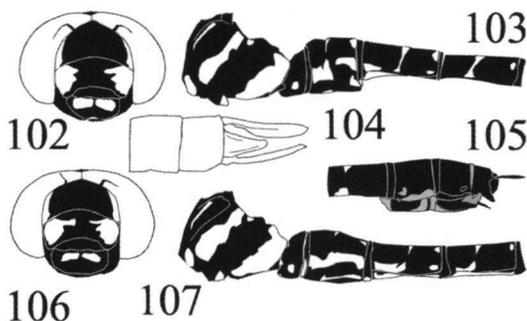
**Male.** — Labium ferruginous at sides, central lobe ochreous yellow with blackish-brown distal and basal margins. Labrum blackish-brown with a pair of large, basal quadrate yellow spots narrowly divided and fine, central spot at distal margin. Anteclypeus pale blackish-brown. Postclypeus predominantly blackish-brown

with irregularly shaped yellow sides not extending to basal margin (Fig. 102). Face and crest of frons blackish-brown with yellow sides. Synthorax blackish-brown with yellow dorsal stripe. Broad yellow lateral stripe across mesepimeron, broadest at basal half (Fig. 103). Small triangular spot at top of metepisternum. Metepimeron predominantly yellow below. Metaposternum blackish-brown. Legs blackish-brown with pale area at inner base of tibia fore and middle legs. Wings hyaline with slight amber coloration in cubital space of fore and hindwings. Abdominal blackish-brown with small yellow spot at lower side of S1. Dorsum of S2 with basal yellow spot along carina, a pair of triangular central yellow spots of and a pair of distal yellow spots. S2 with three yellow spots laterally as illustrated in Figure 103. S3 with distal pair of spots reduced to small yellow spots and S4-10 without distal yellow spots. S3-7 with transverse suture with complete yellow rings linking dorsal yellow triangular spots with ventral yellow spots. S8-10 blackish. Caudal appendages are illustrated in Figure 104. Blade of superior appendage begins its expansion approximately one quarter total length from base.

**F e m a l e .** — Face coloured very similar to male (Fig. 106). Wings hyaline with bases pale amber halfway to arc. S2 of abdomen with broad yellow stripe below and yellow ventral margin (Fig. 107). S3-7 with transverse sutures with dorsal yellow triangular spots not linked to ventral yellow spots. S8-10 blackish above with ferruginous ventral margin (Fig. 105). Cerci short less than 2 times length of S10.

**DIFFERENTIAL DIAGNOSIS.** — *P. nanlingensis* is separated from all other *Planaeschna* by a combination of the following characters: simple male caudal appendages with narrow blade commencing ca  $\frac{1}{4}$  from base; postclypeus with blackish-brown ventral margin and centre with laterally crenate-shaped yellow spots; male abdomen S3-7 with uninterrupted median yellow rings; female with short cerci and S2 with broad yellow ventero-lateral stripe.

**DISTRIBUTION.** — China (Guangdong).



Figs 102-107. *Planaeschna nanlingensis* sp. n., Nanling, Guangdong: (102): male head, frontal view; — (103) male synthorax and basal male abdomen, lateral view; — (104) male caudal abdomen, dorsal view; — (105) female caudal abdomen, lateral view; — (106) female head, frontal view; — (107) male caudal abdomen, lateral view.

*PLANAESCHNA SKIAPERIPOLA* SP. N.

Figures 108-119

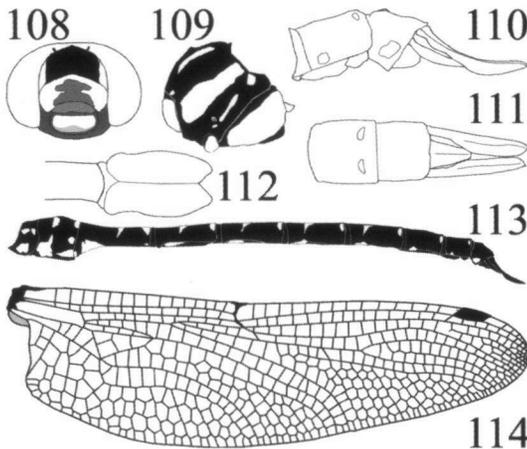
*Planaeschna* sp. A. WILSON, 2005: 124-125, fig. 9 (a-e), (2 ♂, 26-VIII-1998, Qing-shitan, Guangxi); WILSON, 2006 (1 ♀, San Uk Ha, Wu Kau Tang, Hong Kong, 30-X-2005).

**Material.** — **Holotype** ♂, immediately adjacent the Shimentai Provincial Nature Reserve (N 24° 24.558'; E 113° 06.250'), 5-XI-2005, coll. KW. — **Paratypes:** 6 ♂, Shimentai, Guangdong, 5-XI-2005, coll. KW; — 1 ♂, Shimentai, Guangdong, 3-XII-2005, coll. KW; — 1 ♀, San Uk Ha, Wu Kau Tang, Hong Kong, 30-X-2005, coll. KW. — Holotype will be deposited at Tai Lung Experimental Station, Agriculture, Fisheries and Conservation Department, Lin Tong Mei, Sheung Shui, Hong Kong SAR, China.

**Etymology.** — *skiaperipola* derived from Greek meaning 'patroller in the shade' [skia = shade; pronounced skia-peri-pola].

**DESCRIPTION.** — Medium-sized *Planaeschna* with well-developed apple-green markings and superior appendages possessing a prominent ventral bulge when viewed laterally.

**Male.** — Labium ochreous yellow. Basal colour of labrum blackish-brown with extensive pale central spot, yellow above and brownish-yellow below (Fig. 108). Anteclypeus dark amber-brown. Postclypeus mainly bright yellow with smudgy dark amber-brown central mark. Antefrons mainly black, dark-brown at basal margin with small prominence at dorso-frontal margin. Top of frons black and lateral margins of frons bright yellow. Antennae blackish-brown. Vertex and occiput

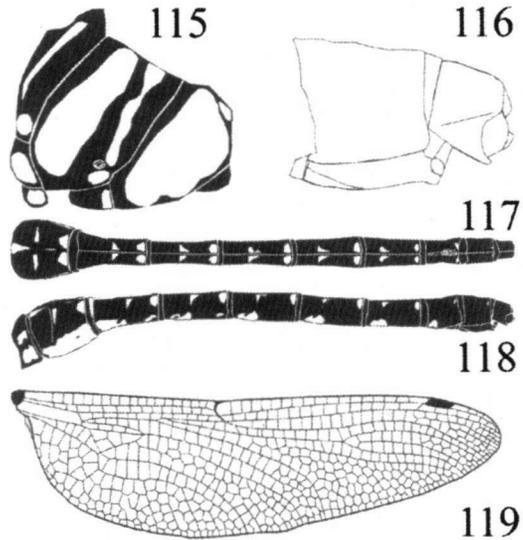


Figs 108-114. *Planaeschna skiaperipola* sp. n., holotype male, Shimentai, Guangdong: (108) head frontal view; — (109) synthorax, lateral view; — (110) caudal abdomen, dorsal view; — (111) caudal abdomen, dorsal view; — (112) abdomen, lateral view; — (113) abdomen, lateral view; — (114) hindwing.

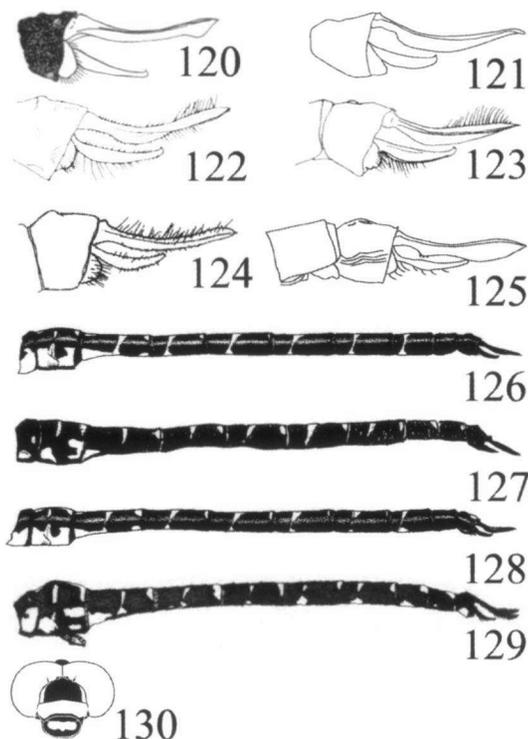
dark blackish-brown. Width of frons (4.5 mm) half width of head (9.0 mm). Prothorax dark-brown. Synthorax black with greenish-yellow dorsal stripe, broadest towards wing base (Fig. 109) and pointed anteriorly. Broad, pale greenish-yellow lateral stripe across mesepimeron, broadest at base. Narrow, interrupted greenish-yellow stripe across metepisternum, broadest at wing margin and very fine centrally and below spiracle. Metepimeron predominantly greenish-yellow. Metaposternum blackish-brown. Legs blackish-brown.

Wings hyaline with black Pt subtending 3 cells and braced at proximal end. Venation of Hw illustrated in Figure 114. Abdomen black with mainly greenish-yellow maculation dorsally and bright yellow markings at sides and ventrally (Fig. 113.) S1 black, dorsum unmarked, with pair of bright yellow spots at upper side and single bright yellow spot below. Dorsum of S2 with triangular bright yellow spot at base not extending to transverse carina and two pairs of greenish-yellow spots; one pair located posterior to transverse carina and second pair at distal margin. Side of S1 black with bright yellow auricle and surrounds, small round bright yellow spot at central, distal margin and triangular yellow spot below. Dorsum of S3-7 with pair of triangular, greenish-yellow spots adjacent to transverse carina and another pair of ovoid greenish-yellow spots at distal margin; all pairs of spots are divided by central carina. Ventrums of S3-7 with bright yellow spot basal third. Dorsum S8-9 as S3-7 but lack central pair of greenish-yellow spots. Ventrums S3-7 with bright yellow spots at basal quarter and S8 with basal pair and small distal pair of bright yellow spots. Ventrums S9 with single central pair of yellow spots. S10 entirely black above with ventrum predominantly greenish-yellow. Caudal appendages black. Inferior appendage same length as S10 and half length of superior appendages (Figs 110-111). Superior appendages with ventral bulge when view laterally, which commences at mid-point and extends to tip. Superior appendages ca half length of S10, with thick margin of long black hairs arising from inner dorsal face. The tip of the penile organ is illustrated in Figure 112.

**F e m a l e .** — Head and cerci missing. Medium-sized *Planaeschna* with a well-developed yellow colour pattern on abdomen. The well-developed dorsal abdominal colour pattern is identical to the male. Synthorax blackish-brown with long yellow dorsal stripe and well-developed yellow stripe across metepisternum interrupted at spiracle (Fig. 115). Mesepisternum and metepimeron with broad yellow stripes. Abdomen blackish-brown. S1 with two lateral yellow spots (Figs



Figs 115-119. *Planaeschna skiaperipola* sp. n., Hong Kong: (115) synthorax, lateral view; — (116) caudal abdomen, lateral view; — (117) abdomen, dorsal view; — (118) abdomen, lateral view; — (119) hindwing.



Figs 120-130. (120) *Planaeschna risi*, from ASAHINA (1964): caudal abdomen. [121, 128, 130] *P. suichangensis*: (121) male caudal appendages, lateral view; – (128) from KARUBE (2002), abdomen, lateral view; – (130) head, frontal view. – (122) *P. cucphuongensis*, from KARUBE (1999): caudal abdomen, lateral view; – (123) *P. chiengmaiensis*, from KARUBE (1999): caudal abdomen, lateral view; – (124 & 127) *P. maolanensis*, from ZHOU & BAO (2002): caudal abdomen, lateral view; – (125) *Planaeschna celia*: caudal abdomen, lateral view; – (126) *Planaeschna gressitti*, from KARUBE (1999): abdomen, lateral view; – (129) *P. shanxiensis*, from ZHU & ZHANG (2001): abdomen, lateral view.

117-118). Dorsum of S2 with basal triangular yellow spot, pair of narrow, triangular yellow spots along transverse suture and pair of ovoid spots at distal margin. Broad ventero-lateral yellow stripe. Dorsum of S3-7 with pair of yellow triangular spots at transverse suture and pair of ovate yellow spots at distal borders. Basal ventero-lateral yellow spot S3-8. Dorsum of S8-9 with pair of fine, distal yellow spots. S10 entirely black. Wings hyaline; braced pterostigma. Hindwing is illustrated in Figure 119.

Measurements (mm). – ♂ ab. + app. 53.0, app. 4.75, hw 44.0; ♀ ab. 47.5, hw 48.0

**DIFFERENTIAL DIAGNOSIS.** – *P. skiaperipola* possesses an overt ventral bulge, when viewed laterally, which is slightly distal to the midpoint. *P. cucphuongensis* and *chiengmaiensis* also possess superior appendages, with a noticeable ventral bulge but the maximum extent of the bulge is basal to the midpoint. The colour pattern of the head and abdomen will also serve to separate *skiaperipola* from *chiengmaiensis*. The metaposternum is blackish-brown in *skiaperipola* and yellow in *chiengmaiensis*. The shape of the superior appendages and the structure of the penile organ distinguish *skiaperipola* from *cucphuongensis*. The penile tip of *cucphuongensis* also has more extensive flanges at its base than *skiaperipola*. *P. tomokunii*, known only from the female, should also be added to group of *Planaeschna* with ventrally bulged superior appendages, since it is probably allied to *cucphuongensis*. However, the facial pattern of the female *P.*

*tomokunii* is uniformly brownish and the ventero-lateral abdominal S2 is uniformly yellow. When viewed dorsally the expansion of the superior appendages develops at the mid-point in *taiwana* and the inferior appendage does not extend to the mid-point. The dorsal expansion commences well before the mid-point in *skiaperipola* and the inferior appendage extends beyond the point of expansion (Fig. 110). All other mainland Chinese *Planaeschna* (*celia*, *gressitti*, *maolanensis*, *shanxiensis* and *suichangensis*) have superior appendages, which appear slender and flat when viewed laterally.

REMARKS. — *P. skiaperipola* is active in the late season with specimens obtained in late July through to December. All Guangdong specimens were taken either within or adjacent to the Shimentai Provincial Nature Reserve. Most of the male specimens including the holotype were taken in late afternoon, at lower altitudes just outside the Shimentai Reserve in agricultural areas at the foot of montane forest. Males were especially active patrolling slow-flowing streams and man-made conduits in well-shaded areas, during low light conditions. The Hong Kong female was collected together with *Gynacantha japonica* over abandoned marshy agricultural land at dusk.

DISTRIBUTION. — China (Guangdong & Hong Kong).

#### KEY TO MALE *PLANAESCHNA* McLACHLAN, 1896

- 1 Superior appendage with distal ventral bulge, when viewed laterally, located towards tip (Figs 93 & 120)..... 2
- Superior appendage without ventral bulge, when viewed laterally, or if present it is positioned centrally (Figs 121-125)..... 6
- 2 Abdominal transverse sutures with yellow markings linked to ventral markings; dorsum of S10 yellow..... 3
- Abdominal transverse sutures with dorsal yellow markings separated from ventral yellow markings; dorsum of S10 black or reduced yellow spots ..... 4
- 3 Labrum black with pair of large quadrate yellow spots at base; postclypeus black and broadly yellow at base. Distribution: Japan ..... *milnei* (Selys, 1883)
- Labrum black rarely with two small yellow spots; postclypeus black with basal margin narrowly yellow. Distribution: Japan (Ryukyus)..... *naica* Ishida, 1994
- 4 Dorsum of abdominal S2 with pair of large conjoined, quadrate or ovoid yellow spots at distal margin; S2 central carina unmarked or with barely visible distal yellow line; labrum black with base yellow; postclypeus yellow with irregular black basal border; face of frons black (Fig. 120). Distribution: China (Taiwan), Japan (Ryukyus)..... *rishi* Asahina, 1964
- Dorsum of abdominal S2 with T-shaped yellow spot or dorsal carina with linear yellow stripe from base to apical border ..... 5
- 5 Dorsum of abdominal S2 with T-shaped yellow spot; labrum yellow with black border; postclypeus yellow with irregular black basal border; face of frons black (Figs 91-101.) Distribution: China (Guangdong & Guangxi) ..... *hau* sp. n.
- Dorsal carina with linear yellow stripe from base to apical border; labrum yellow bordered ferruginous; face of frons ferruginous. Distribution: India, Myanmar, Thailand ..... *intersedens* (Martin, 1909)
- 6 Head entirely pale brown, brownish-yellow, pale reddish-brown, pale brown and green, or only upper half of frons blackish-brown ..... 7

- Head not as above, mainly black and yellow with frons extensively marked with black or blackish-brown and bright yellow at sides ..... 10
- 7 Head mostly parrot green with pale brown anteclypeus and brown pentagonal brown mark on face of frons which is otherwise parrot green. Distribution: Vietnam ..... *viridis* Karube, 2004
- Head entirely pale brownish-yellow, pale reddish-brown, or only upper half of frons blackish-brown ..... 8
- 8 Superior appendages with distinct central ventral bulge when viewed laterally – only male known (Fig. 124) Distribution: Vietnam ..... *cucphuongensis* Karube, 1999
- Superior appendages without distinct central ventral bulge when viewed laterally (Figs 123-124) ..... 9
- 9 Head entirely pale brown. Distribution: Thailand. Note: female *P. tomokunii* Asahina, 1996 from Vietnam has pale brown face but only female known; it is probably closely allied to *P. cucphuongensis* or synonymous (Fig. 123) ..... *chiengmaiensis* Asahina, 1981
- Labium brownish-yellow, postclypeus yellowish-green, face of frons brownish-yellow, lateral frons yellowish-green (Fig. 124.) Distribution: China (Guizhou) ..... *maolanensis* Zhou & Bao, 2002
- 10 Abdominal S3-8 or S3-7 with uninterrupted median yellow rings (Fig. 126) ..... 11
- Abdominal S3-7 with interrupted median yellow rings i.e. transverse sutures of S3-7 with dorsal yellow spot separated from ventral yellow spot or very faintly connected (Figs 121-122) ..... 12
- 11 Abdominal S3-8 with uninterrupted median yellow rings (Fig. 126); postclypeus yellow with brown ventral edge; labrum brown with mid-dorsal yellow band not extending to sides. Distribution: China (Guangdong) ..... *gressitti* Karube, 2002
- Abdominal S3-7 with uninterrupted median yellow rings; male and female with postclypeus mainly black at centre and basal margin with large crenate-shaped yellow lateral marks; labrum black with a pair of large, basal quadrate yellow spots (Figs 102-107). Distribution: China (Guangdong) ..... *nanlingensis* sp. n.
- 12 Blade of superior appendages, when viewed dorsally, initiates its expansion ca ¼ from the base. Distribution: Japan (Ryukyus) ..... *ishigakiana* Asahina, 1951
- Blade of superior appendages, when viewed dorsally, initiates its expansion near the middle. 13
- 13 Superior appendages with basal ventral bulge, when viewed laterally; labrum entirely black (Fig. 125.) Distribution: China (Hainan) ..... *celia* Wilson & Reels, 2001
- Superior appendages without obvious basal ventral bulge when viewed laterally; labrum blackish-brown marked with bright yellow or orange or green ..... 14
- 14 Abdominal S3-7 with a yellow median ring triangularly expanded dorsally and interrupted medio-lateral. S8 without dorsal yellow median ring spot (Figs 113 & 129). ..... 15
- Abdominal S3-8 with a yellow median ring triangularly expanded dorsally and interrupted medio-lateral (Fig. 128) ..... 16
- 15 Superior appendages without distinct ventral bulge, when viewed laterally; length of female cerci equal to length of S10 (Fig. 129). Distribution: China (Shanxi) *shanxiensis* Zhu & Zhang, 2001
- Superior appendages with distinct ventral bulge, just distal of centre when viewed laterally; Length of female cerci more than three times length of S10 (Figs 108-119). China (Guangdong & Hong Kong) ..... *skiaperipola* sp. n.
- 16 Labrum blackish-brown with yellow or greenish cross-band (Fig. 130) ..... 17
- Labrum predominantly yellowish ..... 18
- 17 Labrum black with yellow or orange central band (Figs 121, 128, 130). Distribution: China (Fujian, Guangxi, Guangdong & Zhejiang) ..... *suichangensis* Zhou & Wei, 1980
- Labrum black above, brown below with greenish band upper central. Distribution: Vietnam ..... *bachmanensis* Karube, 2004
- 18 Labrum predominantly yellow with broad, black margins. Distribution: Vietnam ..... *tamdaoensis* Asahina, 1996
- Labrum predominantly dark yellow Distribution: China (Taiwan) ..... *taiwana* Asahina, 1951

## DOUBTFUL RECORDS

*AESHNA MIXTA* LATREILLE, 1805

*Aeshna mixta* Latreille, 1805: HUA, 2000: 9, (Heilongjiang & Guangdong).

REMARKS. — This Palaearctic species is known from Europe, north Africa, west and northeast Asia. The closest distribution locality to south China is Kashmir, where it is found at high altitude up to 7,500' (2,300 m). It is a highly migratory species and could theoretically arrive in south China as a vagrant carried by monsoonal winds. In Japan it is known from southeast Hokkaido and central to north Honshu. It is not known to breed in south Japan. *A. mixta* has also been recorded from Mongolia and Heilongjiang in north China. *A. lucia*, described from Hebei, central China (NEEDHAM, 1930), is listed as a possible subspecies of *A. mixta* by TSUDA (2000).

DISTRIBUTION. — Europe, north Africa, west & northwest Asia, China (Hebei? & Heilongjiang).

*CEPHALAESCHNA ACUTIFRONS* (MARTIN, 1909)

*Caliaeschna* (?) *acutifrons* (nec Martin, 1909): RIS, 1916: 55-56 (1 ♀, pl. 2, fig. 5, Guangdong)

*Cephalaeschna acutifrons* (nec Martin, 1909): NEEDHAM, 1930: 82 (1 ♂, 1 ♀? pl. 8, fig. 14, Fujian); — KLOTS, 1947: 10 (2 ♀, Fujian); — SUI & SUN, 1984: 29-30 (fig. 26 Fujian, Sichuan); — ZHANG, 1999: 268 (fig. 24-101, Fujian, Sichuan); — HUA, 2000: 10 (Fujian, Hunan, Sichuan.)

REMARKS. — ASAHINA (1981) described *Cephalaeschna risi* from material examined from Fujian and Taiwan (type ♂: Fujian) and assigned a Guangdong female, treated as *C. acutifrons* by RIS (1916), NEEDHAM (1930) and KLOTS (1947) to *risi*. This Guangdong female is reidentified here as *C. dinghuensis* (synonymic and remarks for *Cephalaeschna dinghuensis* above). NEEDHAM (1930) described *C. observa* from Sichuan and *C. patrorum* from specimens collected from Shanxi (type-loc.) and Sichuan. SUI & SUN (1984) did not list either *observa* or *patrorum* in their book on common dragonflies from China but listed *acutifrons* from Fujian and Sichuan! Apparently there are no confirmed Chinese records of *C. acutifrons*, which is known from India, Myanmar and Nepal (TSUDA, 2000).

*GYNACANTHA HYALINA* SELYS, 1882

*Gynacantha hyalina* Selys, 1882: NEEDHAM, 1930: 90 (China); — WILSON (1995): Hong Kong (?); — HUA, 2000: 10 (Henan, Taiwan).

REMARKS. — *G. hyalina* has only been confirmed to occur in Taiwan outside of the Philippines (LIEFTINCK et al., 1984).

Table I  
Locations surveyed in Guangdong

Site	Coordinates	Area (km <sup>2</sup> )	Altitude (Metres)	Protected area status	Date
Baiyong, Yangchung County, SW Guangdong	22°24'N, 111°38'E	37	200-1,042	P	3-V-1998; 1/4-V-2002
Chebaling National Nature Reserve, Shixing County, NE Guangdong	24°14'-24°46'N, 114°09'-114°16'E	76	330-1,256	N	10/12-V-1996; 7/11-IV-1999; 15/17-VIII-2000; 20/23-VII-2001; 19/21-IV-2002; 25/26-V-2002; 27/28-VII-2002
Chengjia Nature Reserve (part of Nanling), Yangshan County NW Guangdong	24° 47' N, 112° 49' E	79	700	P	4/5-VII-2000; 25-VII-2002
Dawuling, Xinyi County, SW Guangdong	22°14'-22°17'N, 111°08'-111°17'E	34.4	800-1,704	P	1/5-XI-2001; 2-V-2002; 29-VI-2002 - 3-VII-2002
Dinghushan, Zhaoqing City, C Guangdong	23°10'-23°11'N, 112°31'-112°34'E	11.6	140-1000	M & B	15/20-IV-1992, 5/8-VI-1992; 12/16-VI-1993; 10/16-VI-1994; 1/4-VI-1995; 6-V-1998; 6-IV-2000; 12-V-2002; 11/12-VIII-2005
Gaozhou Reservoir, Gaozhou City, SW Guangdong	22°09'N, 111°00'E	1002		No	4/5-V-2002
Heishiding Nature Reserve, Fengkai County, W Guangdong	23°27'-23°30'N, 111°53, 112°00'E	42	150-927	P	4/8-VII-2002
Heweishan Forest Farm, Yangchun City, SW Guangdong	21°53'N, 111°07'E	160	to 1,337	Co	4/5-V-1998
Lixihe, Conghua City, C Guangdong	23° 45' N, 113° 51' E	93	To 1,147	F	13/14-IV-2002; 24/28-VI-2002
Luokeng Nature Reserve, SW Guangdong	24°31'N, 113°20'E	294	to 1,587	P	18-IX-2002
Nanling National Nature Reserve, N Guangdong (includes Babaoshan, Chengjia, Dadingshan, Henglongbei, Jiuchongshan, Longtanjiao, Maoping, Pengshan, Shikengkong, Shiziping and Xiaohuangshan areas plus Mangshan in adjacent Hunan province)	24°38'-25°08'N, 112°40'-113°15'E	584	300-1,902	N	25-VI-2000 - 7-VII-2000; 23/25-VII-2003; 9/10-VIII-2005
Nankunshan, Longmen County, C Guangdong	23°35'N, 113°45'E	17.5	200-1,100	P	8-VI-2002; 7-VIII-2004
Qixingkeng, SW Guangdong	22°15'N, 112°02'E	6.9	100-856	Ci	24-XI-1998 - 1-XII-1998
Shimentai, Yingde City County, N Guangdong	24°22'-24°31'N, 113°05'-113°31'E	823	320-1,587	P	12/14-VIII-2000; 28/29-X-2001; 28/30-III-2003; 6/8-VIII-2003; 5/6-XI-2005; 3/4-XII-2005; 3/7-XI-2005; 5/6-XI-2005
Xiaokeng Forest Park, N Guangdong	24°42'H, 113°49'E			F	26-V-2002

Ci = City-level Nature Reserve, Co = County Level Nature Reserve, F = National Forest Park, M & B = Man & Biosphere Reserve, N = National Nature Reserve, P = Provincial Nature Reserve, No = No protected area status.

Table II  
Checklist of aeshnids recorded from Guangdong and Hong Kong

Taxon	Source of original record for Hong Kong and Guangdong	H	G
<i>Anaciaeschna jaspidea</i> (Burmeister, 1839)	ASAHINA (1965): Hong Kong; FELLOWES et al (2003a): Nanling, Guangdong.	+	*
<i>Anax guttatus</i> (Burmeister, 1839)	ASAHINA (1965): Hong Kong; WILSON (1999): Dinghushan, Guangdong.	+	*
<i>Anax immaculifrons</i> Rambur, 1842	RIS (1916): Hong Kong; WILSON (1999): Dinghushan, Guangdong.	+	*
<i>Anax nigrofasciatus nigrofasciatus</i> Oguma, 1915	WILSON (2003): Hong Kong; CHAN et al (2003b): Luokeng, Guangdong.	+	*
<i>Anax parthenope julius</i> (Brauer, 1865)	BRAUER (1866): Hong Kong; WILSON (1999): Dinghushan, Guangdong.	+	*
<i>Boyeria karubei</i> Yokoi, 2002	FELLOWES et al (2003a): Nanling, Guangdong as <i>Boyeria sinensis</i> .		*
<i>Cephalaeschna dinghuensis</i> Wilson, 1999	WILSON (1999): type-loc. Dinghushan, Guangdong.		*
<i>Cephalaeschna klotsi</i> Asahina, 1982	FELLOWES et al (2003a): Nanling, Guangdong; WILSON (2003): Hong Kong.	+	*
<i>Gynacantha bayadera</i> Selys, 1891	HUA, 2000: 10 (Guangdong).		*
<i>Gynacantha japonica</i> Bartenef, 1909	WILSON (1995): Hong Kong; WILSON (1999): Dinghushan, Guangdong.	+	*
<i>Gynacantha saltatrix</i> Martin, 1909	ASAHINA (1965): Hong Kong; WILSON (1999): Dinghushan, Guangdong.	+	*
<i>Gynacantha subinterrupta</i> Rambur, 1842	WILSON (1995): Hong Kong; WILSON (1999): Dinghushan, Guangdong.	+	*
<i>Periaeschna flinti</i> Asahina, 1978	ASAHINA (1978): Yim Na San, Guangdong.		*
<i>Periaeschna magdalena</i> Martin, 1909	This paper: Baiyong and Nanling, Guangdong.		*
<i>Periaeschna zhangzhouensis</i> Xu, 2007	This paper: Nankunshan & Heishiding, Guangdong.		*
<i>Periaeschna gerrhon</i> (Wilson, 2005)	This paper: Nanling & Liuxihe, Guangdong		*
<i>Planaeschna gressitti</i> Karube, 2002	KARUBE (2002): type-loc. Yim Na San (650 m), Guangdong.		*
<i>Planaeschna houi</i> sp. n.	This paper: type-loc. Shimentai, Guangdong & Guangxi.		*
<i>Planaeschna nanlingensis</i> sp. n.	This paper: type-loc. Nanling, Guangdong		*
<i>Planaeschna skiaperipola</i> sp. n.	This paper: Wu Kau Tang, Hong Kong & type-loc. Shimentai, Guangdong	+	*
<i>Planaeschna suichangensis</i> Zhou & Wei, 1980	FELLOWES et al (2003a): Nanling, Guangdong.		*
<i>Polycanthagyna erythromelas</i> (Mclachlan, 1896)	WILSON (1995): Hong Kong; WILSON (1999): Dinghushan, Guangdong.	+	*
<i>Polycanthagyna melanictera</i> (Selys, 1883)	FELLOWES et al (2003a): Nanling, Guangdong.		*
<i>Polycanthagyna ornithcephala</i> (McLachlan, 1896)	FELLOWES et al (2003b): Shimentai, Guangdong as <i>Aeshna ornithcephala</i> .		*
<i>Tetracanthagyna waterhousei</i> Mclachlan, 1898	ASAHINA (1988): Hong Kong; WILSON (1999): Dinghushan, Guangdong.	+	*

G = Guangdong, H = Hong Kong

Table III  
 Details of additional specimens not previously reported from Guangdong and Hong Kong

Species	Specimens collected from Guangdong unless otherwise stated
<i>Anaciaeschna jaspidea</i>	1 ♀, Longtanjiao, 3 vii 2000, coll. KW; 1 ♀, Wu Kau Tang, HK, 28-VIII-2005, coll. KW.
<i>Anax immaculifrons</i>	1 ♂ (no. 023770), Baiyong, 4/8-VIII-2003, coll. ZX; 1 ♂, Shimuntai, 7-VIII-2003, coll. KW.
<i>Anax guttatus</i>	1 ♂, Qixingkeng, 30-IV-1998, leg. GR; 1 ♂, Heweishan, 4-V-1998, leg. GR; 1 ♀, Dadingshan, 30-VI-2000, coll. KW; 1 ♂, Longtanjiao, 2-VII-2000, coll. KW; 1 ♂, Maoping, 6-VII-2000, coll. KW; 1 ♀, 13-VIII-2000, Shimentai, leg. ML; 1 ♂, Chebaling, 27/28-VII-2002, coll. ZX; 1 ♂, Shimentai, 5-XI-2005, coll. KW.
<i>Anax nigrofasciatus nigrofasciatus</i>	5 ♂, Quijiang Xiaokeng, 26-V-2002, coll. ZX; 2 ♂, Gaozhou Reservoir, 4-V-2002, coll. ZX; 1 ♂, Lungdougeng, 28-VII-2002, coll. ZX; 1 ♂, Rixin Shan, Luokeng, 19-IX-2002, leg. ML; 3 ♂, Nanling, 9-VIII-2005, coll. KW; 1 ♀, Kadoorie Farm, Hong Kong, 3-IV-2006 (photo).
<i>Anax parthenope julius</i>	1 ♂, Shimentai, 7-VIII-2003, coll. KW.
<i>Gynacantha japonica</i>	1 ♂, 1 ♀, Wu Kau Tang, HK, 20-X-2001, leg. GR; 1 ♂, Shimentai, 7-VIII-2003, coll. KW; 4 ♂, 30-X-2005, Wu Kau Tang, HK, coll. KW; 1 ♂, Shimentai, 4-XI-2005, coll. KW; 1 ♀, Shimentai, 5-XI-2005, coll. KW.
<i>Gynacantha saltatrix</i>	1 ♀, Wu Kau Tang, HK, 20-X-2001, leg. GR; 1 ♀, 4/8-VIII-2002, Huatan Forest Park, coll. ZX.
<i>Gynacantha subinterrupta</i>	1 ♂, Shing Yang, HK, XI-2002, leg. ML; San Kwai Tin, HK, 10-VII-2003, leg. Li, M-l.
<i>Periaeschna magdalena</i>	1 ♂, Baiyong, 6-V-1998, leg. GR.
<i>Planaeschna suichangensis</i>	1 ♀, Mangshan, Shikengkong (Babaoshan), 26-VI-2000, coll. KW; 1 ♂, Henglongbei, Shikengkong (Babaoshan), 28-VI-2000, coll. KW; 1 ♂, 1 ♀, Jiuchongshan, Shikengkong (Babaoshan), 29-VI-2000, coll. KW; 1 ♂, 1 ♀, Dadingshan, 30-VI-2000, coll. KW; 1 ♀, Longtanjiao, 3-VII-2000, coll. KW; 2 ♂, 2 ♀, Cheng Jia, 4-VII-2000, coll. KW; 2 ♂, Cheng Jia, 5-VII-2000, coll. KW; 1 ♂, Maoping, 5-VII-2000, coll. KW; 3 ♂, 2 ♀, Maoping, 6-VII-2000, coll. KW; 1 ♂, 1 ♀, 13-VIII-2000, Shimentai, leg. ML; 2 ♂, 2 ♀, Chebaling, 16-VIII-2000, leg. BH; 1 ♂, Chebaling, 17-VIII-2000, leg. BH; 1 ♂, Chebaling, 27/28-VII-2002, coll. ZX; 1 ♂, Heishiding, 4-VII-2002, leg. ML; 1 ♂, 1 ♀, Dawuling, 5-VII-2002, leg. ML; 1 ♀, Heishiding, 6-VII-2002, leg. ML; 1 ♂, 1 ♀, Rixin Shan, Luokeng, 18-IX-2002, leg. ML; 1 ♂, 1 ♀, Rixin Shan, Luokeng, 19-IX-2002, leg. ML; 1 ♂, 1 ♀, Shimentai, 7-VIII-2003, coll. KW; 2 ♂, Nankunshan, 4-VIII-2004, coll. KW; 2 ♂, 1 ♀, Nanling, 9-VIII-2005, coll. KW; 1 ♀, Shimentai, 5-XI-2005, coll. KW.
<i>Polycanthagyna erythromelas</i>	1 ♂ (no. 020253), Chonghua Liuxihe, 14-IV-2002, coll. ZX; 1 ♂, 1 ♀, Chonghua Liuxihe, 24/28-VI-2002, coll. ZX.; 1 ♀, Shimentai, 6-VIII-2003, leg. KW.
<i>Polycanthagyna melanictera</i>	1 ♂, Maoping, 5-VII-2000, coll. KW.
<i>Polycanthagyna ornithcephala</i>	1 ♂, Shimentai, 13-VIII-2000, leg. ML.
<i>Tetracanthagyna waterhousei</i>	1 ♂, Qixingkeng, 30-IV-1998, leg. GR.

Table IV  
Differential features of Asian species of *Boyeria*

Taxon and location	<i>Boyeria maclachlani</i> Japan (type-loc.) (Figs 1-3)	<i>Boyeria sinensis</i> Sichuan (type-loc.)	<i>Boyeria karubei</i> Laos (type-loc.)	<i>Boyeria karubei</i> S China (Figs 4-5)
Specimens	Mature males and females	Only one immature specimen known	Only teneral specimens known	Mature males and females
Distribution	Japan including Ryukyus	China (Sichuan)	Laos	China (Guangdong and Guangxi)
Head	Head blackish with postclypeus, sides of antefrons and base of mandibles yellowish.	Face pale yellow with brownish tint	Postclypeus brownish	Face pale yellow with brownish tint
Synthorax	Pair of yellow dorsal stripes which are inconspicuous in mature females	Dorsal stripes inconspicuous or absent	Conspicuous dorsal stripes	Pair of prominent yellow dorsal stripes which are inconspicuous in mature females
Antealar carina	Brown	Yellow	Yellow	Pale brown
Superior appendages	Tips pointed with small baso-ventral protuberance	Tips rounded with prominent baso-ventral protuberance	Tips pointed with baso-ventral protuberance absent	Tips pointed with very small or inconspicuous baso-ventral protuberance
Abdominal markings	S4-8 with pair of dorsal yellow spots broadly divided at centre (Figs 1-2)	S3-7 with narrow yellow band across median transverse ridge	S4-8 with pair of dorsal yellow spots narrowly divided at centre	S4-8 with pair of dorsal yellow spots narrowly divided at centre (Fig. 4)

*PLANAESCHNA R. RISI* ASAHINA, 1964

*Planaeschna risi risi* Asahina, 1964: STEINMANN, 1997: 75, (Hong Kong); – HUA, 2000: 10 (Hong Kong).

REMARKS. – The entry in STEINMANN (1997) stating the type locality for *P. r. risi* is Hong Kong is an error, which was promulgated in HUA (2000). The type-loc. for *P. r. risi* is Taiwan.

ACKNOWLEDGEMENTS

We would like to acknowledge and thank the Kadoorie Farm & Botanic Garden for sponsoring survey work and the Forestry Department of Guangdong for permission and assistance with field-work. KW is most grateful to the South China Team, especially GRAHAM REELS, BILLY HAU

CHI-HANG, JOHN FELLOWES and MICHAEL LAU for their company and assistance with collection of specimens during the Kadoorie surveys and to JOYCE WONG for her assistance with Chinese translations. HOU RENHUAN, CHEN JUJIAN, ZHANG ZHONGRUN, RUAN DERONG, LIU JINGXIAN, TE LAKANG, HUANG WEIXIONG, WU YUYAN, SHI YUANYUAN, HU YUEJING, LUO SUJING, GUAN SHAN, ZENG JIE from South China Agricultural University are gratefully acknowledged for their assistance with fieldwork.

#### REFERENCES

- ASAHINA, S., 1964. Descriptions of new and little known dragonflies from the Ryukyus (Odonata). *Kontyû* 32: 299-310.
- ASAHINA, S., 1965. The Odonata of Hong Kong. *Kontyû* 33(4): 493-506.
- ASAHINA, S., 1966. Notes on Chinese Odonata, 1. *Kontyû* 34(2): 131-135.
- ASAHINA, S., 1978. Notes Chinese Odonata, 7. Further studies on the Graham Collection preserved in the U.S. National Museum of Natural history, Suborder Anisoptera. *Kontyû* 46(2): 234-252.
- ASAHINA, S., 1981. A revision of the Chinese dragonflies of the genus *Cephalaeschna* and its allies. *Tombo* 24(1-4): 2-12.
- ASAHINA, S. 1982. Studies on the Chinese dragonflies of the genus *Cephalaeschna* and its allies in the collection of the Leiden Museum. *Tombo* 25(1-4): 7-15.
- ASAHINA, S., 1987. A revised list of the Odonata of Hong Kong, 1. Zygotera. *Tombo* 30(1-4): 7-24.
- ASAHINA, S., 1988. A revised list of the Odonata of Hong Kong, 2. Anisoptera. *Kontyû* 56(4): 689-705.
- BRAUER, C.A., 1866. Reise der Österreichische Fregatte Novara um die Erde (in der Jahren 1857, 1858, 1859 unter den Befehlen des Commandore B. Von Willerstorff-Urbair). *Zool. Theil*, 2 Bd., *Neuroptera*. 1-104, 2 Tafn., Wien.
- CHAN, B.P.L., M.W.N. LAU, S.C. NG & J.R. FELLOWES [Eds], 2004a. *Report of Rapid Biodiversity Assessment at Heishiding Nature Reserve, West Guangdong July 2002*. South China Forest Biodiversity Survey Report Series: No. 39, Kadoorie Farm & Botanic Garden, Hong Kong.
- CHAN, B.P.L., M.W.N. LAU, S.C. NG & J.R. FELLOWES [Eds], 2004b. *Report of Rapid Biodiversity Assessment at Luokeng Nature Reserve, North Guangdong September 2002*. South China Forest Biodiversity Survey Report Series: No. 40, Kadoorie Farm & Botanic Garden, Hong Kong.
- EASTON, E.R. & G.Q. LIANG, 2000. The Odonata of Macao, southern China. *Notul. odonatol.* 5(6): 75-80.
- FELLOWES, J.R., M.W.N. LAU, B.C.H. HAU, S.C. NG, & B.P.L. CHAN (eds), 2002a. *Report of Rapid Biodiversity Assessments at Qixingkeng Nature Reserve, Southwest Guangdong, 29 April to 1 May 1998 & 24 November to 1 December 1998*. South China Forest Biodiversity Survey Report Series: No. 4, Kadoorie Farm & Botanic Garden, Hong Kong.
- FELLOWES, J.R., M.W.N. LAU, B.C.H. HAU, S.C. NG, & B.P.L. CHAN [Eds], 2002b. *Report of Rapid Biodiversity Assessment at Heweishan Forest Farm, Southwest Guangdong 4-5 May 1998*. South China Forest Biodiversity Survey Report Series: No. 6, Kadoorie Farm & Botanic Garden, Hong Kong.
- FELLOWES, J.R., M.W.N. LAU, B.C.H. HAU, S.C. NG, & B.P.L. CHAN [Eds], 2002c. *Report of Rapid Biodiversity Assessment at Dinghushan Biosphere Reserve, Western Guangdong, China 1998 and 2000*. South China Forest Biodiversity Survey Report Series: No. 7, Kadoorie Farm & Botanic Garden, Hong Kong.
- FELLOWES, J.R., B.P.L. CHAN, M.W.N. LAU, S.C. NG, G.L.P. SIU & L.K. SHING [Eds], 2003a. *Report of Rapid Biodiversity Assessment at Nanling National Nature Reserve, Northwest Guang-*

- dong June-July 2000*. South China Forest Biodiversity Survey Report Series: No. 29, Kadoorie Farm & Botanic Garden, Hong Kong.
- FELLOWES, J.R., B.P.L. CHAN, M.W.N. LAU, S.C. NG & L.K. SHING, [Eds], 2003b. *Report of Rapid Biodiversity Assessment at Shimentai National Nature Reserve, North Guangdong August 2000*. South China Forest Biodiversity Survey Report Series: No. 31, Kadoorie Farm & Botanic Garden, Hong Kong.
- FELLOWES, J.R., B.P.L. CHAN, M.W.N. LAU, S.C. NG, B.C.H. HAU, & K.W. SHING, [Eds], 2003c. *Report of Rapid Biodiversity Assessment at Chebaling National Nature Reserve, North-east Guangdong 1999, 2000, & 2001*. South China Forest Biodiversity Survey Report Series: No. 32, Kadoorie Farm & Botanic Garden, Hong Kong.
- FRASER, F.C., 1936. *Fauna of British India, including Ceylon and Burma. Odonata*, Vol. 3. Taylor & Francis, London.
- HUA, L., 2000. *List of Chinese insects* Vol. 1. Zhongshan Univ. Press, Guangzhou.
- KARUBE, H., 1999. *Planaeschna cucphuongensis* spec. nov., a new dragonfly from northern Vietnam (Anisoptera: Aeshnidae). *Odonatologica* 28(3): 279-282.
- KARUBE, H., 2002. Notes on the Chinese *Planaeschna* (Odonata: Aeshnidae) deposited in the Natural History Museum, London with description of a new species from southern China. *Tombo* 44: 1-5.
- KLOTS, E. B., 1947. The dragonflies (Odonata) in the American Museum of Natural History. *Amer. Mus. Novit.* 1341: 1-15.
- LIEFTINCK, M.A., 1960. On the identity of some little known southeast Asiatic Odonata in European museums described by E. de Selys Longchamps with descriptions of new species. *Memorie Soc. ent. ital.* 38: 229-256.
- LIEFTINCK, M.A., J.C. LIEN & T.C. MAA, 1984. *Catalogue of Taiwanese dragonflies (Insecta: Odonata)*. Asian Ecol. Soc., Taichung, Taiwan.
- MARTIN, R., 1911. Odonata. Fam. Aeschnidae, subfam. Aeschninae. *Genera Insect.* 115: 1-34.
- NAVAS, L., 1936. Névroptères et insectes voisins. Chine et pays environnants, 9. *Notes Ent. chin.* 3(4): 37-62.
- NEEDHAM, J.G., 1930. A manual of the dragonflies of China. *Zool. sin.* 11(1): i-xi, 1-344, 20 pls.
- RIS, F., 1916. H. Sauter's Formosa Ausbeute, Odonata, mit Notizen über andere ostasiatischen Odonaten. *Supplta ent.* 5: 1-81.
- STEINMANN, H., 1997. *World catalogue of Odonata, 2: Anisoptera*. Das Tierreich 111, W. de Gruyter, Berlin - New York.
- SUI, J-Z. & H-G. SUN, 1984. *Common species of dragonflies from China*. Agriculture Publishing House, Beijing, China.
- SUGIMURA, M., S. ISHIDA, K. KOJIMA, K. ISHIDA & T. AOKI, 2001. *Dragonflies of the Japanese archipelago in colour*. Hokkaido Univ. Press, Sapporo.
- TSUDA, S., 2000. *A distributional list of world Odonata*. Tsuda, Osaka.
- WILSON, K.D.P., 1995. *Hong Kong dragonflies*. Urban Council, Hong Kong.
- WILSON, K.D.P., 1997. An annotated checklist of the Hong Kong dragonflies with recommendations for their conservation. *Mem. Hong Kong nat. Hist. Soc.* 21: 1-68, pl. 1 excl.
- WILSON, K.D.P., 1999. Dragonflies (Odonata) of Dinghu Shan Biosphere Reserve, Guangdong province, China. *Int. J. Odonatol.* 2(1): 23-53.
- WILSON, K.D.P., 2003. *A field guide to the dragonflies of Hong Kong*. Agric., Fish. Conserv. Dept, Friends Country Parks & Cosmos Books, Hong Kong.
- WILSON, K.D.P., 2004. *A field guide to the dragonflies of Hong Kong*, [2<sup>nd</sup> edn], Agric. Fish. Conserv. Dept, Friends Country Parks & Cosmos Books, Hong Kong.
- WILSON, K.D.P., 2005. Odonata of Guangxi Zhuang Autonomous Region, China, 2: Anisoptera. *Int. J. Odonatol.* 8(1): 107-168.
- WILSON, K.D.P., 2006. New *Planaeschna* record (Odonata: Aeshnidae). *Porcupine*, Hong Kong 34: 5.

- WILSON, K.D.P. & G.T. REELS, 2001. Odonata of Hainan. *Odonatologica* 30(2): 145-208.
- WILSON, K.D.P. & G.T. REELS, 2003. Odonata of Guangxi Zhuang Autonomous Region, China, 1: Zygoptera. *Odonatologica* 32(3): 237-279.
- WILSON, K.D.P. & T-W. TAM, 2006. Fukienogomphus choifongae spec. nov. from Hong Kong and a new record of Cephalaeschna klotsi Asahina (Odonata: Anisoptera). *Odonatologica* 35(1): 81-87.
- WILSON, K.D.P., & Z-F. XU, 2007. Odonata of Guangdong, Hong Kong and Macau, South China, 1: Zygoptera. *Int. J. Odonatol.* 10(1): 87-128.
- XU, Q-H., 2007. Periaeschna zhangzhouensis spec. nov. from Fujian, China (Anisoptera: Aeshnidae). *Odonatologica* 36(3): 315-318.
- YOKOI, N., 2002. Description of a new Boyeria species from Central Laos (Anisoptera: Aeshnidae). *Tombo* 45(1/4): 12-14.
- ZHANG, J., 1999. Odonata. In: B. Huang, [Ed.], *Fauna of insects in Fujian province of China*, vol. 3. Fujian Agric. Univ., Fuzhou.
- ZHOU, W-B. & K-H. BAO, 2002. Amphipterygidae, Agriidae, Chirocyphidae, Epallagidae, Megapodagriidae, Coenagriidae, Platycnemididae, Aeshnidae, Gomphidae, Corduliidae and Libellulidae (sic). In: Z. Li & D. Jin, [Eds], *Insects from Maolan landscape*. Guizhou Sci. & Technol. Publ. House, Guiyang, Guizhou, China.
- ZHU, H-Q & X-X. ZHANG, 2001. A new species of the genus Planaeschna from Shanxi province, China (Odonata: Aeshnidae). *Wuyi Sci. J.* 17: 8-9.