

## CALOPTERA DAMSELFLIES FROM FUJIAN (CHINA), WITH DESCRIPTION OF A NEW SPECIES AND TAXONOMIC NOTES (ZYGOPTERA: CALOPTERYGOIDEA)

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Based on literature records and the examination of an extensive Odonata collection made in Fujian in 1930-1940's (now in RMNH, Leiden), 21 spp. of Caloptera (Calopterygoidea) are recognized as occurring in Fujian province in eastern China. The Fujian Caloptera material (ca 860 specimens of 18 species) in RMNH is enumerated. The following taxonomic decisions are presented: *Caliphaea nitens* Navas, 1934 is removed from synonymy with *Bayadera melanopteryx* Ris, 1912 [!] and ranked as a valid species, distinct from *C. consimilis* McLachlan, 1894. The lectotype of *Vestalis smaragdina* Selys, 1879 is designated. *Vestalis velata* Ris, 1912 (syn. *V. virens* Needham, 1930) is ranked as a good species, while the "hyaline winged form of *V. smaragdina velata*" (sensu Asahina, 1977) is described as a new sp. *Vestalis venusta* sp. n. *Bayadera continentalis* Asahina, 1973 from Fujian and *B. ishigakiana* Asahina, 1964 from the Ryukyus are treated as full sp. and not as ssp. of *B. brevicauda* Fraser, 1928 from Taiwan. *Bayadera melania* Navas, 1934 is synonymized with *B. melanopteryx* Ris, 1912. Some preliminary taxonomic comments (to be discussed in detail elsewhere) are presented: *Calopteryx grandaeva* Selys, 1853 is a probable synonym of *C. atrata* Selys, 1853, whereas *C. atrocyana* (Fraser, 1935) is a good sp. *Matrona basilaris* Selys, 1853 and *M. nigripectus* Selys, 1879 appear to be distinct sp. *Mnais tenuis* Oguma, 1913 and *M. andersoni* McLachlan in Selys, 1873 are also better treated as separate sp. Faunistic notes include: *Libellago lineata* (Burmeister, 1839) is recorded from Fujian province for the first time. Old records of *Psolodesmus mandarinus* McLachlan, 1870 and *Euphaea compar* McLachlan, 1870 (synonym of *E. formosa* Hagen in Selys, 1869) from Amoy Island near the Fujian coast are considered doubtful.

### INTRODUCTION

The National Museum of Natural History Naturalis (RMNH) in Leiden houses a large collection of Chinese dragonflies from Fujian province collected by T.C. Maa in 1939-1945 and subsequently given to M.A. Lieftinck. It is still largely unidentified and in the original envelopes, but a number of conspicuous species were placed in the identi-

fied, pinned collection by Lieftinck and a fraction of the material has been treated in the literature (e.g. ASAHINA, 1982). Courtesy of Jan van Tol I received on loan for study all ca 750 specimens of the calopterygoid families (here informally termed Caloptera) from Maa's collection. In the RMNH are also ca 20 Caloptera specimens collected by Hsiu-fu Chao in Fujian in 1939-1945, as well as ca 90 specimens by J. Klapperich in 1937- 1938. These are also dealt with in this paper.

Another collector at that time (1939) was Tso-Hsin Chen, based in Fukien Christian University in Shaowu. ASAHINA's (1973, 1979) reports on Chen's material preserved in the USNM and his references to Chen's Caloptera specimens are also included here. During the study it became evident that the status of several Chinese taxa as presently recognized in the literature is dubious. Some of these questions are dealt with in this paper.

MAA AND CHAO. — Professor Tsing-Chao Maa (born in Shanghai, Zhejiang in 1910, died in Ohio, USA in 1992) was a well-known entomologist, who worked mainly on Hymenoptera and Diptera. Dr Maa left mainland China and moved to Taiwan in 1946; in 1958-1975 he worked in the Bishop museum in Hawaii. After retirement Maa returned to Taiwan, where he continued his taxonomic studies as part time professor in Tun-hai University in Taichung. In 1988 he gave up taxonomic work due to failing eyesight and moved back to the USA. For Maa's Chinese obituary, see LIN (1992). Maa was a co-author of the "*Catalogue of Taiwanese dragonflies*" (LIEFTINCK et al., 1984), but produced no other publications on Odonata.

During his Fujian years in 1939-1945, Maa worked in different agricultural organizations in Lienching, Chungang and Shaowu and as a lecturer in the Department of Biology of Fukien Christian University in Shaowu. While in Chungang [presently called Wuyishan City] he collected a large number of insects in the "Bohea Hills" in 1939-1940; while in Shaowu [Shaoyang], he collected mainly in "Tachulan" [Dazhulan], but also elsewhere in Fujian. Most of his specimens come from sites now belonging to the Wuyi Mountains Nature Reserve. In Shaowu especially, Maa was active in the field during the whole season and his records give good information on the flight season of many calopterygoid species in Fujian.

Hsiu-fu Chao came to teach at the same department in Fukien Christian University in Shaowu in 1942. There Maa greatly encouraged Chao's interest in insects. In his "The gomphid dragonflies of China" Chao named a conspicuous new gomphid species from Zhejiang and Fujian to honour him — *Sieboldius maai* Chao, 1990.

CHECKLISTS OF FUJIAN CALOPTERA. — CHAO (1981) provided the first annotated checklist of odonates recorded from Fujian province. A total of 19 Caloptera species were included, but two of them are here deleted, one as a misidentified species and the other due to its dubious origin; see "Incorrect and dubious records" (pp. 394-396). In their guide book to Chinese dragonflies SUI & SUN (1984) mention "Fujian" in connection with 10 Caloptera species. The same authors (SUI & SUN, 1993) treat the odonate fauna of Longqi [Longxi] mountain in Jiangle county in the western part of Fujian, listing 11 Caloptera taxa. Taxa listed in these publications are indicated in the species

accounts. It should be noted that the generic and family level assignments of these authors frequently differ from each other and from general usage.

More recently ZHANG (1999) provided a chapter on odonates in a book enumerating insects known from Fujian province. Unfortunately, this treatment is rather confusing. The data appear to be copied directly and uncritically from the above mentioned three sources: CHAO (1981), SUI & SUN (1984) and SUI & SUN (1993). Since there is inconsistency in the generic and family placement of species in these three papers, ZHANG (1999) has ended up presenting 30 "species entries" within Caloptera, many species appearing twice in different genera and families; the 17 included species descriptions (with figures of male anal appendages) are direct copies from SUI & SUN (1984) or SUI & SUN (1993).

This study recognizes a total of 21 species of Caloptera damselflies as occurring in Fujian. Fujian material in the RMNH includes 18 of these, *Libellago lineata* (Burmeister, 1839) being a new addition to the provincial list.

## CALOPTERA SPECIES RECORDED FROM FUJIAN

### Amphipterygidae (s.l.)

#### *PHILOGANGA R. ROBUSTA* NAVAS, 1936

*Philoganga robusta*: CHAO, 1981: 22; – ZHANG 1999: 196, 199.\*

*Philoganga vetusta* [nec. Ris, 1912]: SUI & SUN, 1984: 216-217; – SUI & SUN, 1993: 26; ZHANG, 1999: 199.

**Material** from Fujian in RMNH. – No specimens.

Recorded from Fujian by CHAO (1953) as follows: "1 ♂, taken between Shaowu, Dazhulan [Tachulan] and Jianyang [Kienyang] Huang Keng Lu Shang, north Fujian, 22-V-1943; 2 ♀, Jianyang, Taoshui, north Fujian, 8-V-1943" [According to a translation in WILSON & REELS (2001)].

**DISTRIBUTION.** – Type locality: "Kuling" [Guling] in Jiangxi. Known from Zhejiang, Fujian, Guangxi, Guizhou, Hainan, Jiangxi and Sichuan. YANG & LI (1994) described specimens from Mt Qinling in Shaanxi as distinct subspecies *P. robusta infantua* Yang & Li, 1994.

**REMARKS.** – CHAO (1953) described, figured and keyed this and the next species in detail. For a recent review of Chinese *Philoganga* species, see WILSON & REELS (2001).

\* References below the name include only those to the available Fujian checklists (and to species listed in SUI & SUN's, 1984 book from Fujian).

*PHILOGANGA VETUSTA* RIS, 1912

*Philoganga vetusta*: CHAO, 1981: 22; – ZHANG 1999: 196.

**Material** (3 ♂, 1 ♀) from Fujian (Fukien) in RMNH (J. Klapperich leg.). – Kuantun (alt. 2300 m): 1 ♀ (teneral), 7-V-1938; 1 ♂, 29-VI-1938; 1 ♂, 4-VII-1938; 1 ♂, VII-1938.

CHAO (1953) provided the following records from Fujian: “1 ♀, Dazhulan, 7-VII-1943, Fu Chong-Xian leg.; 1 ♂, Dazhulan, 1943; 1 ♂, Xiayunkeng, 24-VI-1942, Lin Gui-Rui leg. (The above specimens were loaned from Mr. T. C. Maa); 1 ♀, Dazhulan, 23-VII-1942; 1 ♀, on the way from Dazhulan to Huangkeng, 26-VI-1943, Fu Chong-Xian leg.” ASAHINA (1978) listed *P. vetusta* from Foochow area (Coll. Kellogg). However, since Asahina did not recognize the existence of *P. robusta* (cf. WILSON & REELS, 2001), the identity of Kellogg’s specimens must be checked.

**FLIGHT PERIOD.** – Chinese records of both *Philoganga* species are from April–July.

**DISTRIBUTION.** – Type locality: “Tsa-Yiu-San” in northern part of Guangdong. According to RIS (1912) this is a montane site up to 1500 m altitude; 25°30'N, 114°E. In China the species is known from Fujian, Guangdong and Hong Kong. It has also been found in northern Vietnam (Coll. Karube, unpublished) and from east-central Laos (Coll. Hämäläinen, unpublished).

**REMARKS.** – For a treatment of this and the previous taxon, see CHAO (1953) and WILSON & REELS (2001). According to the present data both *robusta* and *vetusta* occur in Wuyi Shan area; further studies are needed.

## Calopterygidae

*CALIPHAEA NITENS* NAVAS, 1934, STAT. REV.

Figures 1, 3

*Caliphaea consimilis* [nec. McLachlan, 1894]: CHAO, 1981: 22; – SUI & SUN, 1984: 215; – ZHANG, 1999: 197, 198–199.

**Material** (49 ♂, 30 ♀) from Fujian (Fukien) in RMNH (all T.C. Maa leg., if not otherwise stated). – Chungan, Lower Kuantun: 1 ♂, 1 ♀, 3-VI-1942; 1 ♂, 21-VIII-1945; – Chungan, Upper Kuantun: 1 ♀, 22-VIII-1945; – Chungan, Sangchiang to Miaowan: 3 ♂, 1 ♀ 10/11-VI-1943; – Chungan, Tsilichiao (alt. 1000 m): 4 ♂, 3 ♀, 4/5-VIII-1945; – Shaowu: 1 ♀, 5-VIII-1945; – Shaowu, Shui Pei Kai: 1 ♀, 9-VIII-1943; – Shaowu, Tachulan (alt. 1000 m): 3 ♂, 3 ♀, 1/5-VI-1942; 2 ♂, 1 ♀, 9/10-VI-1942; 5 ♂, 1 ♀, 16/21-VI-1942; 1 ♂, 2 ♀, 25/29-VI-1942; 2 ♂, 4/6-VII-1942; 3 ♂, 2 ♀, 25-VII-1942; 1 ♂, 1-IX-1942; 3 ♂, 3 ♀, 7/12-VI-1943; 4 ♂, 1 ♀, 1/3-VIII-1945; 9 ♂, 4 ♀, 6/11-VIII-1945; 4 ♂, 1 ♀, 15/17-VIII-1945; 1 ♀, no date; – Shaowu, Taoshui: 1 ♀, 11-VI-1942; – Shaowu, Tun-mo-kuan, Chung-an Hsien, H-f. Chao leg.: 1 ♂, (no date); – Shaowu, Ta-chu-lan, H-f. Chao leg.: 1 ♂ 24-VII-1940; 1 ♂, 6-IX-1943; 1 ♀, 17-IX-1943; 1 ♀, 2-X-1943.

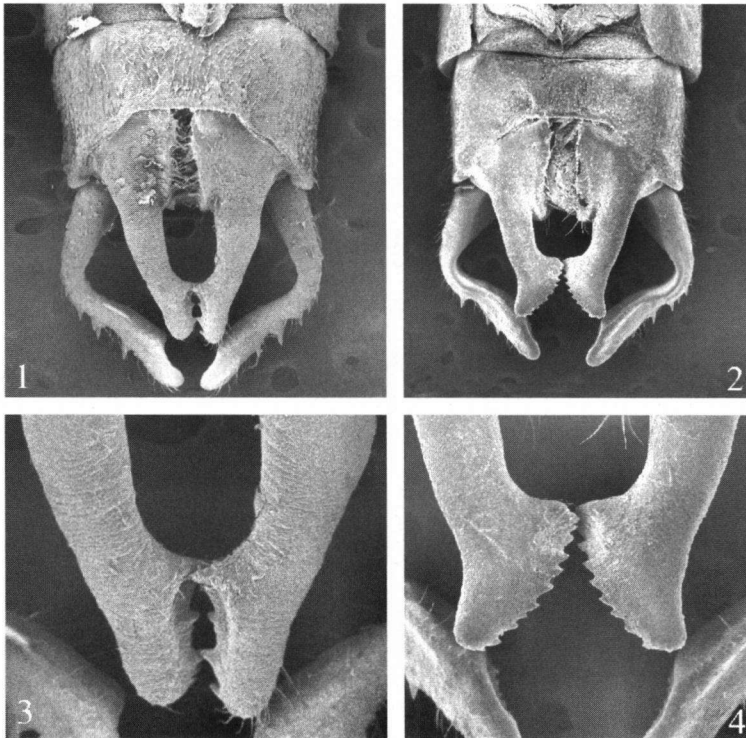
ASAHINA (1976) reported 86 ♂, 64 ♀ of this species (as *C. consimilis*) from “Kua-

tun, 2300 m, Fukien, leg. J. Klapperich" in coll. Schmidt.

FLIGHT PERIOD. — Records from the beginning of June to the beginning of October. All specimens taken in the first week of June and most from the second week of June are teneral.

DISTRIBUTION. — Type locality: "T'ien Mou-Chan" in Zhejiang. Evidently confined to the south-eastern parts of China, known at least from Zhejiang, Fujian and Guangxi.

REMARKS. — Navas originally described *Caliphaea nitens* and *Bayadera melania* (both from "Chekiang: T'ien Mou-Chan" as new species in the same publication NAVAS (1934). Rather confusingly the calopterygid *Caliphaea nitens* was synonymized with the euphaeid species *Bayadera melanopteryx* Ris, 1912 by CHAO (1962). From Chao's Chinese text it is evident that the available type specimen of *B. melania* had been mistakenly labelled as the type of *C. nitens* in the collection. Although Chao suspected this mixup, he still synonymized the two species. It remains unclear from Chao's text whether the real type specimen of *C. nitens* (the original description indicates the presence of at least 1 ♂ and 1 ♀) is present in the collection of the Zoological Institute of Academia Sinica. Anyway, in this case the original published descriptions are more



Figs 1-4. Ventral view of male anal appendages and apex of inferior appendages: (1, 3) *Caliphaea nitens* (Fujian); — (2, 4) *C. consimilis* (Sichuan).

reliable than the labels fixed to the specimens, therefore *Caliphaea nitens* must be removed from synonymy with *Bayadera melalopteryx*! The original illustrated description of *C. nitens*, which in fact is reasonable adequate, clearly shows that it is without question a *Caliphaea* species. DAVIES & YANG (1996) believed that it was Chao's intention to synonymize *C. nitens* with *C. consimilis*, but from Chao's text it is evident that this is not the case; clearly he did not study any *Caliphaea* specimens at all. For the synonymy of *B. melania*, see pp. 392-393. ASAHINA (1956) mentioned the existence of *C. nitens* in a footnote, but did not comment on its status. In ASAHINA's (1976) detailed review of Caliphaeinae, *nitens* was not mentioned at all.

#### CONSIMILIS VERSUS NITENS

I have compared the Fujian specimens with the description of *C. nitens* and specimens of *C. consimilis* McLachlan, 1894 from Sichuan and Yunnan. The Fujian specimens agree with the description of *C. nitens*, which I consider as a valid species. *C. nitens* is clearly a slimmer insect, easily seen from the shape of thorax and the apical abdominal segments of male.

*C. nitens* differs consistently from *C. consimilis* in the shape of the male inferior appendages. The differences are best seen in ventral view (Figs. 1-2). The inferior appendage in *nitens* is proportionally longer, thinner and straighter; the serrated tip of the appendage is not curved outwards at the apex (Figs. 3-4). Moreover in *nitens* males abdominal segments 8-10 are proportionally not as broad as in *consimilis*. In *nitens* (both sexes) the posterior lobe of the prothorax is considerably less bulged than in *consimilis*. In lateral view the posterior lobe is lower than the middle lobe in *nitens*, but higher in *consimilis*. In females the sharp lateral spine arising from the mesostigmal plate is slightly shorter (and straighter) in *nitens* than in *consimilis* (cf. figs 30-31 in ASAHINA, 1976). ASAHINA (1956, fig. 2 and 1976, fig. 27) illustrated anal appendages of *C. nitens* from its type locality (but identified as *C. consimilis*). Similarly the figure of male anal appendages of "*C. consimilis*" in SUI & SUN (1984, p. 215) clearly depicts *C. nitens*.

The *Caliphaea* taxon from Doi Inthanon (North Thailand), which ASAHINA (1985) identified as *C. confusa* Hagen, 1859, represents a new species described by HAMALAINEN (2003).

Consequently, the list of known *Caliphaea* species is as follows:

*Caliphaea* Selys (syn. *Notholestes* McLachlan, 1887)

*C. confusa* Hagen in Selys, 1859 (syn. *Notholestes etwesi* McLachlan, 1887)

*C. consimilis* McLachlan, 1894

*C. nitens* Navas, 1934

*C. thailandica* Asahina, 1976

*C. angka* Hämäläinen, 2003

*ARCHINEURA INCARNATA* (KARSCH, 1892)

*Archineura incarnata*: CHAO, 1981: 22; – ZHANG, 1999: 192.

*Echo incarnata*: SUI & SUN, 1984: 192-193; – SUI & SUN, 1993: 23.

**Material** (7 ♂, 5 ♀) from Fujian (Fukien) in RMNH (T.C. Maa leg., if not otherwise stated). – Chungan, Miaowan (Chutun): 1 ♂, 2 ♀, 11-VIII-1945; – Kua Tun, J. Klapperich leg.: 3 ♂, 2 ♀, 6/14.VI-1938; – Shaowu: 1 ♀, 1942; – Shaowu, KuShienKai: 1 ♂ (teneral), 2-V-1944; – Shaowu, Tachulan (alt. 1000 m): 1 ♂, 24-VI-1942; 1 ♂, no date.

Recorded also from “Foo Chow” (type locality of *Archineura basilactea* Kirby, 1894).

**FLIGHT PERIOD.** – Fujian records are from the beginning of May till mid-August. In Guangxi recorded also as late as in mid-September (WILSON & REELS, 2003).

**DISTRIBUTION.** – Type locality: “Omi-shan” [Emei Shan] in Sichuan. Known from the following provinces of China: Zhejiang, Fujian, Guangdong, Guanxi, Sichuan, Hubei.

**REMARKS.** – This rare species is one of the largest calopterygoids, equalled only by *Archineura hetaerinoides* (Fraser, 1933) from Laos and *Echo maxima* Martin, 1904 from northern Vietnam. The generic combinations of the latter two taxa are doubtful and will be treated elsewhere.

*CALOPTERYX ATRATA* SELYS, 1853

(? Syn. *Calopteryx grandaeva* Selys, 1853)

*Calopteryx atrata*: CHAO, 1981: 595.

*Agrion atratum*: SUI & SUN, 1984: 189-190; – ZHANG, 1999: 191.

**Material** (23 ♂, 15 ♀) from Fujian (Fukien) in RMNH (T.C. Maa leg., unless otherwise stated). – Chungan, Bohea Hills: 2 ♀ (teneral), 24/25-VI-1939; 1 ♀, 9-VII-1939; 1 ♂, 10-IX-1939; 2 ♂, 3 ♀, 30-IX-1939; 1 ♀, 15-X-1939; 1 ♂, XI-1939; 1 ♂, 24-VIII-1940; – Chungan, Fengchiapan: 1 ♀, 19-VII-1941; – Pucheng City: 3 ♂, 19-VIII-1940; – Shaowu (alt. 500 m), J. Klapperich leg.: 2 ♂, 1937; 1 ♀, 22-IX-1937; 1 ♂ 22-X-1937; – Shaowu, City to Kaoyang: 1 ♂, 12-X-1941; – Shaowu, KuShienKai: 4 ♂, 1 ♀, 11/18-IX-1945; – Shaowu, Tachulan (1000 m): 1 ♀, 15-X-1941; 3 ♂, 1 ♀, 29-VIII-1942; 1 ♂, 2 ♀, 19-IX-1942; – Tainin City: 3 ♂, 2-IX-1940; – Yungan City: 1 ♀, 1941 [bearing the date 24-IV, but this may be mistake, perhaps for 24-IX, since the specimen is fully mature].

ASAHINA (1979) listed 1 ♀ from “Fukien, Shaowu, 22-VII-1939” in Coll. Tso-Hsien Chen.

**FLIGHT PERIOD.** – Apparently a late season species; Fujian records from late June till mid-October.

**DISTRIBUTION.** – Type locality: “Surroundings of Shanghai” in Zhejiang. *C. atrata* is the most widespread calopterygid in China and is known at least from the following provinces: Inner Mongolia [“Chai-ho-keu, Jehol”], “Manchuria”, Hebei, Shanxi, Shan-

dong, Jiangsu, Henan, Shaanxi, Zhejiang, Fujian, Sichuan, Hubei, Hunan, Guizhou, Guangdong, Guangxi. It also occurs in Korea peninsula, Vladivostok area in Russia and throughout Japan, except for Hokkaido and the Ryukyus.

REMARKS. — I studied the holotype female of *C. grandaeva* (apparently from Zhou-shan Island in Zhejiang), which differs from the syntype female of *C. atrata* (from Shanghai area in Zhejiang) only by having broader wings. Since the wing breadth in the Chinese *atrata* populations (also in the present Fujian material) is very variable, *grandaeva* is probably conspecific with *atrata*. On the other hand the “first male of *C. grandaeva*” from Tonkin, described by RIS (1912) proved to be conspecific with *C. atrociana* (Fraser, 1935) (type locality: “Tonkin” in northern Vietnam), which is a good species, separable from *atrata* by having differently shaped and broader wings with sparser reticulation and by details in body colour.

*CALOPTERYX MELLI* RIS, 1912

*Agrion melli*: SUI & SUN, 1993: 22; — ZHANG, 1999: 191-192.

Material (1 ♂, 1 ♀) from Fujian (Fukien) in RMNH (T.C. Maa leg.). — Shaowu, Tachulan (alt. 1000 m): 1 ♂, no date; — Shaowu, Tsitow: 1 ♀, 13-X-1941.

FLIGHT PERIOD. — The few earlier published Chinese records are from late May to late September.

DISTRIBUTION. — Type locality: “Tsa-Yiu-Shan” in northern Guangdong (see under *Philoganga vetusta*). An uncommon species known from Zhejiang, Fujian, Guangdong, Guangxi and Hainan.

REMARKS. — *C. melli* is closest to *C. coomani* Fraser, 1935, which is known only from northern Vietnam. Hopefully in the future DNA studies will cast light on whether *melli* and *coomani* represent distinct species.

*MATRONA B. BASILARIS* SELYS, 1853

*Matrona b. basilaris*: CHAO, 1981: 21; — SUI & SUN, 1984: 193-194; — SUI & SUN, 1993: 23; — ZHANG, 1999: 192-193.

*Matrona basilaris nigripictus* [nec. Selys, 1879]: SUI & SUN, 1993: 23; — ZHANG, 1999: 193.

Material (34 ♂, 17 ♀) from Fujian (Fukien) in RMNH (T.C. Maa leg., unless otherwise stated). — Prov. Fo Kien, G. Siemssen vend.: 1 ♂, 1 ♀, 14-XI-1903; — Changting City: 1 ♂ (just emerged), 12-VI-1940; — Changting Tsin-gshanpu: 1 ♀ (just emerged), 8-VI-1940; — Chungan, Bohea Hills: 1 ♂, 9-VII-1939; 2 ♂, 2 ♀, 12/21-IX-1939; 3 ♂, 2 ♀, 15/18-X-1939; 1 ♂, 1 ♀, 26-VIII-1940; — Chungan, Tsilichiao (alt. 1000 m): 1 ♀, 17-X-1941; — Kwangtseh, J. Klapperich leg.: 1 ♂, 2-IX-1937; 2 ♂, 19-IX-1937; 1 ♂, 29-IX-1937; — Gunchi: 1 ♂, 15-XI-1939; — Kienyang, Nwangkeng Gikeng: 2 ♂, 1 ♀, 11/12-X-1943; — Shaowu (alt. 500 m), J. Klapperich leg.: 1 ♂, 1 ♀, 30-VI-1937; — Shaowu, City to Kaoyang: 1 ♂, 12-X-1941; — Shaowu, Hsiawandao: 1 ♀, 1944; — Shaowu, KuShienKai: 2 ♂, 2 ♀, 11/19-IX-1945; 1 ♂, 1 ♀, 12/18-X-1945; — Shaowu, Tachulan (alt. 1000 m): 2 ♂, 1 ♀, 29-VIII-1942; 1 ♂, 1 ♀, 19-IX-1942; 1 ♀, 3-XI-1942; 6 ♂, 10/



28-VIII-1945; 1 ♂, 11-IX-1945; — Tainin City: 1 ♂, 2-IX-1940; — Wuku: 2 ♂, 31-VIII-1944.

NAVAS (1933) and ASAHINA (1970) listed specimens from Foochow and ASAHINA (1978) from Kuliang mountains and Foochow area.

FLIGHT PERIOD. — The known Fujian records from early June till early November. The earliest known records are from late March (in Sichuan).

DISTRIBUTION. — Type locality: “Surroundings of Shanghai” in Zhejiang. *M. b. basilaris* is widely distributed in China, known at least from Inner Mongolia [Jehol], Shanxi, Henan, Anhui, Zhejiang, Fujian, Shaanxi, Sichuan, Jiangxi, Guangdong, Guangxi, Hainan, Yunnan. It also occurs in northern Vietnam.

REMARKS. — The taxonomy of the genus *Matrona* is still inadequately known, but apparently 4-5 good species can be recognized. HAMÄLÄINEN & YEY (2000) described the Taiwanese taxon as a distinct species, *M. cyanopectera* and confirmed the specific status of the western Chinese *M. kricheldorfii* Karsch, 1892, the most divergent species in the genus. Also *M. basilaris* and *M. nigripictus* Selys, 1879 may be best ranked as distinct species, separable by wing colour and density of reticulation of wings. *M. nigripictus* occurs in NE India, Burma, Thailand, Laos and Vietnam. It probably also ranges into Chinese territory in Yunnan, but no precise data are available to me. For incorrect records of *nigripictus* in China, see pp. 394-395.

#### MNAIS MNEME RIS, 1916

*Mnais mneme*: CHAO, 1981: 21; — SUI & SUN, 1993: 24-25; — ZHANG, 1999: 194.

Material (23 ♂, 16 ♀) from Fujian (Fukien) in RMNH (T.C. Maa leg.). — Changting City: 23 ♂, 14 ♀, 10-VI-1940; — Yungan, Kongchuan: 2 ♀, 11-VI-1940.

According to ASAHINA (1974, 1978) the localities “Back Liang” and “Ling Sioh” given as sites for *M. mneme* in NEEDHAM (1930) are in Fujian and the specimens from “Schui Yuan San” and “Lofu Shan”, described by MAY (1935a) as “*Mnais earnshawii thoracicus* n. subsp.” are from Fujian and represent *M. mneme*.

FLIGHT PERIOD. — Like its congeners, a typical spring species; the published Chinese records are from March to early July.

DISTRIBUTION. — Type locality: “Atchong, Min-Fluss, Süd-China” in (?) Guangdong. Fujian seems to be the northernmost corner of the range of this species, known also from Guangdong, Hong Kong, Guangxi, Hainan, Yunnan, Vietnam and Laos.

REMARKS. — ASAHINA (1974) clarified the confusion surrounding *M. mneme*, originally described from 3 female specimens. All females in the present Fujian material have smoky brown wings and agree well with the type series. All males have orange wings, which is apparently the dominant wing colour form in this species. There is considerable variation within *M. mneme* (s.l.), which is characterized by having a penile structure different from other sympatric *Mnais* species. Females from Hainan, Laos and Vietnam

have quite hyaline wings; in south Vietnamese specimens the pterostigma in females is rudimentary. Further studies will reveal whether these forms represent distinct taxa or simply display the range of character states of a highly variable species.

*MNAIS TENUIS* OGUMA, 1913

*Mnais tenuis*: CHAO, 1981: 21; – ZHANG, 1999: 194.

*Mnais andersoni tenuis*: CHAO, 1981: 595.

**Material** (154 ♂, 86 ♀) from Fujian (Fukien) in RMNH (T.C. Maa leg., if not otherwise stated). – Aotow to Taoshui: 1 ♂ (hyaline), 1 ♀, 6-V-1943; – Changting City: 1 ♂ (hy.), 10-VI-1940; 1 ♂ (orange), 14-IV-1941; – Changting, Hotien: 1 ♂ (hy.), 1 ♂ (or.), 20-IV-1941; – Changting, Niuling: 3 ♂ (hy.), 4 ♂ (or.), 12/28-IV-1941; – Chungang, Bohea Hills: 26 ♂ (hy.), 19 ♀, 13/29-IV-1940; 3 ♂ (hy.), 1 ♀, 3-V-1940; – Chungang, Kuatun: 1 ♀, 4-V-1942; – Chungang, Sanchiang to Miaowan: 4 ♂ (hy.), 3 ♂ (or.), 3 ♀, 10/11-VI-1943; – Chungang, Sienfengling: 2 ♂ (hy.), 3-VI-1942; – Chungang, Sienfengling to Sanchiang: 1 ♂ (hy.), 1 ♂ (or.), 10/11-VI-1943; – Chungang, Silisao: 1 ♂ (or.), 27-IV-1942; – Chungang, Tsilichiao (alt. 1000 m): 1 ♂ (hy.), 1 ♂ (or.), 4-V-1942; 6 ♂ (hy.), 1 ♂ (or.), 3 ♀, 3/9-VI-1942; – Chungang, Tsilichiao to Sanchiang: 1 ♂ (or.), 24-IV-1943; – Chungang, Upper Kuatun, (alt. 1400 m): 2 ♂ (or.), 2-V-1943; – Kienyang, Aotow to Kwangkeng: 3 ♂ (or.), 11-VI-1942; – Kienyang, Kwangkeng to Tachulan: 2 ♀, 20-IV-1945; – Kienyang, Liutun: 1 ♂ (or.), 22-IV-1942; – Kienyang, Saikiayen: 1 ♂ (hy.), 2 ♂ (or.), 6-VI-1942; – Kua Tun, J. Klapperich leg.: 2 ♂ (or.), 2 ♂ (hy.), 2 ♀, 5/13-V-1938; 6 ♂ (hy.), 2 ♀, 1/8-VI-1938; – Shaowu: 1 ♂ (or.), 1942; – Shaowu, Tachulan, (alt. 1000 m): 2 ♂ (or.), 1 ♀, 23/29-IV-1942; 8 ♂ (hy.), 1 ♂ (or.), 4 ♀, 1/13-V-1942; 8 ♂ (hy.), 1 ♂ (or.), 12 ♀, 20/31-V-1942; 5 ♂ (hy.), 2 ♂ (or.), 5 ♀, 1/12-VI-1942; 3 ♂ (hy.), 1 ♂ (or.), 2 ♀, 16/28-VI-1942; 1 ♂ (hy.), 1942; 1 ♂ (or.), 1 ♀, 22/26-IV-1943; 4 ♂ (hy.), 3 ♂ (or.), 8 ♀, 2/13-V-1943; 5 ♂ (hy.), 1 ♂ (or.), 7 ♀, 16/28-V-1943; 16 ♂ (hy.), 2 ♂ (or.), 10 ♀, 1/12-VI-1943; 1 ♀, 20-VI-1943; – Shaowu, Tachulan to Aotow: 1 ♂ (or.), 6-V-1943; – Shaowu, Aotow to Taoshui: 1 ♂ (or.), 6-V-1943; – Shaowu, Tachulan to Taoshui: 1 ♂ (or.), 9-V-1943; 2 ♂ (hy.), 20-V-1943; – Taoshui: 1 ♂ (hy.), 9-V-1943.

Clearly 2 ♂ specimens from “Shui Yuan San” identified as *M. anderssoni* (sic) in MAY (1935a) represent *M. tenuis*. ASAHINA (1975a) listed, described and illustrated specimens from “Foochow” (C.H. Kellogg Coll.) and “Kuatun” (J. Klapperich leg., Coll. Schmidt) as *M. tenuis*. He also listed Fujian and Zhejiang specimens of *M. auri-pennis* Needham, 1930 to belong to *M. tenuis*. ASAHINA (1979) listed 1 ♂, 1 ♀ from “Datchulan”, 9-V-1936, Tso-Hsien Chen Coll. as *M. andersoni tenuis*.

**FLIGHT PERIOD.** – Early season species, records from mid-April to late June.

**DISTRIBUTION.** – Type locality: “Taipin” in Taiwan. Apparently a widespread species at least in Taiwan and eastern parts of central China. ASAHINA (1975a) includes material from “North China”, Gansu, Zhejiang, Fujian, Taiwan, Jiangxi, Shanxi and Shaanxi as *M. tenuis*. WANG & al. (1990) list it from Henan.

**REMARKS.** – There is scarcely any odonate genus more difficult to work with taxonomically than *Mnais*. Continental Asian *Mnais* taxa are still poorly known. NEEDHAM (1930) listed 8 *Mnais* species from China. Unfortunately his key and descriptions were very inadequate and partly based on misidentified material. In 1974–1976 Asahina published a series of papers titled “A revisional study of the genus *Mnais*”. This study, split into eight parts published in two journals, is, at least for the continental Asian taxa,

an introduction to the immense problems of *Mnais* taxonomy rather than a definitive revision of the genus. Asahina's approach was to lump. In China only three full species were recognized, viz. *M. mneme* Ris, 1916, *M. gregoryi* Fraser, 1924 and *M. andersoni* McLachlan, 1873. In part 4 (ASAHINA, 1975a) *Mnais tenuis* Oguma, 1913 was first considered to be a good species, but in the next part (ASAHINA 1975b) *tenuis* was downgraded to a subspecies of *M. andersoni* McLachlan, 1873, since in the meantime the author had studied specimens from Vietnam and Laos with an "intermediate" thoracic colour pattern. However, since the means of classifying taxa in the genus *Mnais* are largely unsettled and their distribution still inadequately known, I prefer to rank the quite different looking *andersoni* (type locality: W. Yunnan) and *tenuis* (type locality: Taipin, Taiwan) as distinct species. ASAHINA (1975a) synonymized *M. auripennis* Needham, 1930 (type locality: Hangchow, Zhejiang) and *M. pieli* Navas, 1936 (type locality: Kuling, Jiangxi) with *M. tenuis*. Unfortunately, while preparing their book SUI & SUN (1984) obviously were not aware of Asahina's contributions and the *Mnais* species treated were: *M. anderssoni*, *M. auripennis*, *M. earnshawii* Williamson, *M. maclachlani* Fraser and *M. mneme*. Thus, confusion in subsequent Chinese publications has continued. For Chinese records of *M. icteroptera* Fraser, 1929, see p. 395.

*NEUROBASIS ANDERSSONI* SJÖSTEDT, 1926

*Neurobasis andersoni* [sic]: CHAO, 1981: 22, 595; — ZHANG, 1999: 194.

**Material** (10 ♂, 6 ♀) from Fujian (Fukien) in RMNH. — Chungan, Bohea Hills, T.C. Maa leg.: 1 ♂ (general), 6-III-1940; 1 ♂, 13-III-1940; 1 ♀, 13-IV-1940; 1 ♂, 7-V-1940. — Chungan, Bohea Hills, H-f. Chao leg.: 1 ♂, 13-IV-1940; — Kwangtseh, J. Klapperich leg.: 5 ♂, 4 ♀, 21-VIII-1937; — Shaowu, (alt. 500 m), H-f. Chao leg.: 1 ♀, 10-VIII-1939; 1 ♂, 25-VIII-1942.

**Type series** (4 ♂, 2 ♀) originates from Fujian (see below). ASAHINA (1979) listed 1 ♂ and 1 ♀ collected in Shaowu, 15-VII-1939 and 30-VII-1939 respectively (Tso-Hsien-Chen Coll. in USNM).

**FLIGHT SEASON.** — Recorded in March-May, in Fujian also in July-August; see below.

**DISTRIBUTION.** — Type locality: "Lien-Cheng-Hsien" in Fujian. Besides in Fujian, *N. anderssoni* occurs in Sichuan, Guangxi and Zhejiang.

**REMARKS.** — Specimens from the Bohea Hills are larger in size and closely resemble the type series from "Fukien; Lien-Cheng-Hsien, Mai 1921, Prof. J.G. Andersson" preserved in NRS (Stockholm). Specimens from Kwangtseh and Shaowu are smaller in size. ASAHINA (1979, p. 331-332), who had studied a male and female specimen each from Shaowu (see above), also pointed out that these were smaller in size than those he had studied from Sichuan and Guangxi. Interestingly, all these small-sized specimens have been collected later in the season in mid-July to late August, whereas the typical large-sized specimens have all been collected in March-May. In the collection drawers in RMNH (Leiden) M.A. Lieftinck had tentatively placed the big and small sized spec-

imens as different subspecies; however, by mistake the large sized ones were labelled "ssp.n.". Besides the size disparity there are also differences in venational details, possibly an allometric effect. The biological [systematic] status of these two different-looking forms requires further study. So far the small-sized individuals have been reported only from Fujian. *N. anderssoni* seems to be a rare and local insect in China. SUI & SUN (1984, p. 195 and pl. XIII, fig. 2) described and figured a male specimen of *N. anderssoni* from Guangxi incorrectly under the name "*Matrona oberthuri* Mc Lachlan". No other new records published since 1979 are known to me.

*NEUROBASIS CHINENSIS* (LINNAEUS, 1758)

*Neurobasis c. chinensis*: CHAO, 1981: 22; – SUI & SUN, 1993: 25; – ZHANG, 1999: 195.

**M a t e r i a l** from Fujian (Fukien) in RMNH. – No specimens.

KLOTS (1947) and ASAHINA (1970, 1978) listed specimens collected by C.R. Kellogg in Foochow area.

**FLIGHT PERIOD.** – In Hong Kong the species has a long flight season from April to late December (WILSON, 1995).

**DISTRIBUTION.** – Type locality: "China". In China known at least from Fujian, Hong Kong, Guangdong, Guangxi, Hainan, Yunnan and Tibet [presumably in the SE corner near the Yunnan border]. NAVAS's (1935) very northern record of *N. chinensis* from Anhui (Ou-yuen) appears doubtful. Widely distributed in South and South East Asia from NE Pakistan to Sumatra.

*VESTALIS VELATA* RIS, 1912, STAT. NOV.

(Syn. *Vestalis virens* Needham, 1930)

Figure 5

*Vestalis smaragdina velata*: CHAO 1981: 22.

**M a t e r i a l** (7 ♂, 2 ♀) from Fujian (Fukien) in RMNH. – Kwangtseh, J. Klapperich leg.: 2 ♂, 2 ♀, 15-IX-1937; 1 ♂, 17-IX-1937; 1 ♂, 25-IX-1937; – Shaowu, Tsitow, T.C. Maa leg.: 2 ♂, 13-X-1941; – Huang-kun, Kien- Yang Hsien, H-f. Chao leg.: 1 ♂, 20-VI-1943.

The type series of *V. virens* originates from "Yenping", Fujian (NEEDHAM, 1930).

**FLIGHT PERIOD.** – The few available records are from June to October.

**DISTRIBUTION.** – Type locality: "Tsa-Yiu-San" in Guangdong; cf. *Philoganga vestusta*, p. 374; an eastern Chinese species, known from Guangdong, Fujian, Zhejiang and Anhui.

**REMARKS.** – *V. velata* is easily separated from *V. smaragdina* and *V. venusta* sp.n. by its uniformly brownish tinted wings, which are still slightly broader [cf. wing photos

in ASAHINA (1977)] than in *V. venusta* sp.n. The male appendages are proportionally much longer than in the other two species, the inner side of the superiors being slightly expanded medially (cf. Figs. 5, 7-8). Females of *velata* are easily separated from those of *smaragdina* by the structure of the ovipositor valves; in *smaragdina* the ventral edge is furnished with conspicuous sharp spines, whereas in *velata* there are only minute denticles. It is more difficult to separate females of *velata* and *venusta* sp.n., in which latter the ovipositor valves are similarly armed with small denticles, and which moreover also have slightly brownish wings in older specimens. However, in *velata* female S8-9 are slightly more expanded and sides of S8-10 are marked with pale brownish patches (uniform dark metallic in *venusta* sp.n.). Also in *velata* the coxae are wholly yellow, whereas in *venusta* sp.n. they are distinctly bi-coloured, black anteriorly and yellow posteriorly. The taxonomic confusion around this and related species is discussed in connection of the next species.

*VESTALIS VENUSTA* SPEC. NOV.

Figures 6, 8

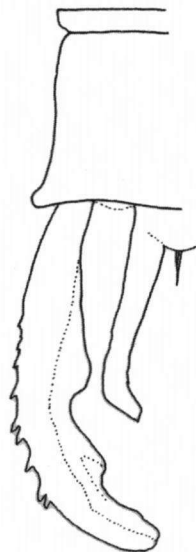


Fig. 5. *Vestalis velata*, anal appendages (left side), dorsal view.

"*Vestalis smaragdina velata* hyaline winged form sensu ASAHINA (1977)"

It is uncertain whether the descriptions of "*V. smaragdina*" in SUI & SUN (1984: 204-205, pl. 15, fig. 3) and SUI & SUN (1993: 25-26) and of "*V. smaragdina velata*" in ZHANG (1999: 195-196) refer to *V. venusta* sp.n. The shape of superior appendages and narrow wings do not match well.

**Material.** — **Holotype** ♂, labelled "Fukien, S. China, Shaowu, Tachulan, [alt.] 1000 m, 23-XI-1942, T.[C.]Maa [leg.]" (Deposited at RMNH, Leiden). — **Paratypes** (10 ♂, 5 ♀ from the same site and collector as holotype): 1 ♂, 15-X-1941; 1 ♀, 15-X-1942; 1 ♂, 19-X-1942; 1 ♂, 24-X-1942; 1 ♀, 4-XI-1942; 1 ♀, 13-XI-1942; 1 ♂, 16-XI-1942; 1 ♂, 23-XI-1942; 2 ♂, 26-XI-1942; 1 ♂, 29-XI-1942; 1 ♂, X-1943; 1 ♀, 11-X-1943; 1 ♂, 15-X-1945; 1 ♀, no date. Deposited in RMNH, except 1 ♂ (26-IX-1942) and 1 ♀ (no date) in coll. Hämäläinen. — **Other material** (16 ♂, 11 ♀) from Fujian (Fukien), T.C. Maa leg., if not otherwise stated (in RHMN): — Shaowu, Tachulan, (alt. 1000 m): 1 ♂, 15-X-1941; — 1 ♂, 29-VIII-1942; 1 ♀, 5-IX-1942; — 1 ♀, 18-VIII-1945; — Shaowu, Tachulan to Kwanyingkeng: 4 ♂, 18/26-X-1942; 3 ♂, 2 ♀, 24-XI-1942; 1 ♂, 2 ♀, 2-XII-1942; — Shaowu, Kooyan to Tsitow: 1 ♂, 1 ♀, 13-X-1941; — Shaowu, Ta-chu-lan, H-f. Chao leg: 2 ♂, 4/16-IX-1944; — Chungan, Miaowan: 1 ♂, 3-X-1942; — Chungan, Sanchiang: 1 ♀, 18-X-1941; — Chungan, Upper Kuatun, (alt. 1400 m): 1 ♂, 2 ♀, 29-X-1942; — Kienyang, Nwangkeng: 1 ♀, 1-X-1943; — Kienyang, Nwangkeng to Lichi city: 1 ♂, 12-X-1943. — Additional material studied from Sichuan (all in USNM): — 4 ♂, Szechwan, Chengtu Plain, alt. 2000 ft., Summer 1936, Coll. D.C. Graham; — 1 ♂, Szechwan Prov., Kangting, 8300 ft [?], 16-VIII-1930, D.C. Graham?; — 1 ♂, Szechwan, Kwanshien, IX-1934, D.C. Graham. [Note. The Sichuan specimens are the same as studied and reported by ASAHINA (1977: 492) and identified as "*Vestalis smaragdina* [sic] *velata* Ris, Det. Asahina 76".]

**Etymology.** — The feminine form of the Latin adjective *venustus*, which means "charming", a proper expression to denote any *Vestalis* species; cf. the species names *amoena* and *amabilis* already used in this genus.

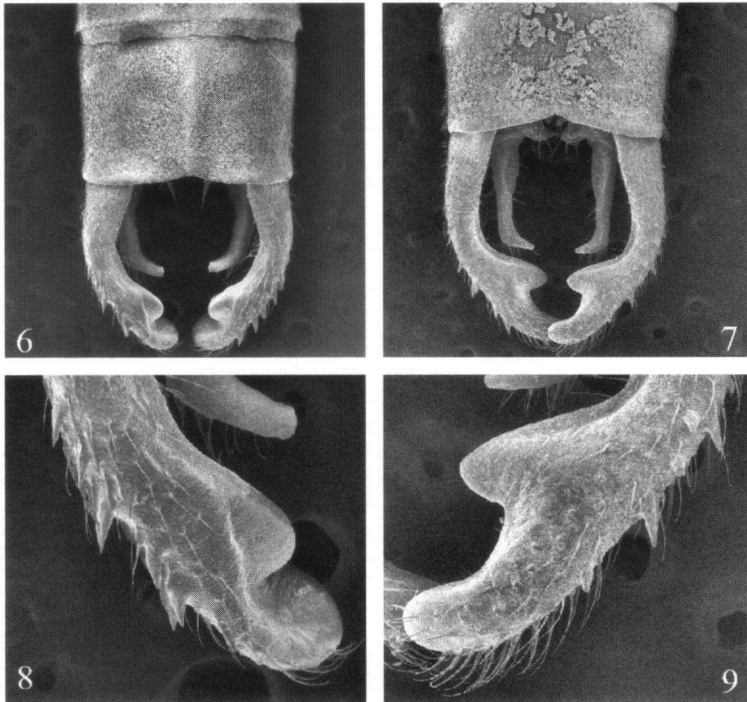
Description of this new species below is presented largely as a comparison with *V. smaragdina* of which I have studied the type series, a few specimens from Burma and numerous specimens from Thailand.

MALE. — Head. — Labium almost wholly black [at least the base of the lateral lobes is yellow in *smaragdina*]. Genae and base of mandibles black. Labrum, clypeus, frons and vertex shining metallic green. Antennae black [pedicel often partly yellow in Thai populations of *smaragdina*, but black in the type series].

Thorax. — Prothorax shining metallic green. Synthorax shining metallic green above, yellow ventrally. The yellow area covers the entire metepimeron and metinfraepisternum, the lower part of the metepisternum to the level of the stigma and the adjoining postero-ventral corner of the mesepimeron [In *smaragdina* the yellow area extends slightly more dorsad]. Legs black, posterior third of coxa yellow in middle and hind legs. [In *smaragdina* coxa are wholly yellow].

Wings. — Hyaline, obviously broader than in *smaragdina*. Apices slightly enfumed at costal corner; cf. wing photos in ASAHINA (1977). Costal space anterior to node without a distinct yellow tinge, [present in *smaragdina*].

Abdomen. — Metallic green above and on sides, dark brown ventrally. S1 with an-



Figs 6-9. Dorsal view of male anal appendages and apex of superior appendage: (6, 8) *Vestalis venusta* spec. nov. (paratype, Fujian); — (7, 9) *V. smaragdina* (Thailand, Doi Inthanon).

terolateral corner and two basal intersegmental rings obscurely pale brownish. [In *smaragdina* ventrolateral half of S1 and ventrolateral edge of S2 are yellowish]. As in *smaragdina*, S8-10 with whitish pruinescence in mature specimens.

Anal appendages. — Proportionally (as compared with the length of S10) shorter than in *smaragdina* (cf. Figs 6-7), the apical part of superiors differently shaped, the interior prominence closer to the tip than in *smaragdina*, cf. Figs 8-9.

Penile structure similar to that of *smaragdina*; cf. figures in ASAHINA (1977).

Measurements (in mm). — Hind wing 32-37, abdomen 43.5-51.

FEMALE. — Colour of head and prothorax as in male. Synthorax coloured quite similarly to the male, but the yellow colour extends a little upwards above the stigma along the 1<sup>st</sup> lateral suture. [In female *smaragdina* the yellow area in the metepisternum and at the base of the mesepimeron is more extensive, similar to the male]. Wings slightly broader than in male, hyaline or with faint brownish tinge in mature specimens, without distinct apical darkening. Abdomen metallic green. S1 with anterior ventrolateral corner yellow at base. S8-9 only moderately expanded; S8-10 uniform dark metallic on sides and ovipositor valves brown with ventral margin black in apical half; furnished with numerous minute, blunt denticles. [In *smaragdina* S8-9 are more expanded, S8-10 broadly yellow ventrolaterally, S10 metallic green only on dorsum; ventral margin of valves furnished with a row of some 20 sharp spines in the apical part, the apical 10 spines being very conspicuous (cf. fig. 16 in ASAHINA 1985)].

Measurements (in mm). — Hind wing 36-39 mm, abdomen 40-44.5.

FLIGHT PERIOD. — Evidently a late season species, the Fujian records date from late August to late November; those from Sichuan in August-September.

DISTRIBUTION. — I have studied specimens from Fujian and Sichuan. Clearly "*V. smaragdina*" records from Anhui, Zhejiang, Jiangxi and Guangxi refer to this species.

REMARKS. — SELYS LONGCHAMPS (1879) described *Vestalis smaragdina* from specimens of both sexes from "Khasyia Hills (Bengale), en octobre, par M. Atkinson". I have studied the type series kept in IRNS (Brussels). It consists of one teneral female and two mature male specimens, each pinned, bearing similar labels "Khasia Hills, Oct' 67" [handwritten white label] and "Atkinson" [printed yellow label]. The specimens lack determination labels, but are kept under the drawer label "*Vestalis smaragdina* Selys". I have selected one male specimen as **lectotype** and attached the label "*Vestalis smaragdina* Selys, 1879, LECTOTYPE, designated by M. Hämäläinen, 2003". The specimen is in good shape, but lacks both fore legs and left middle leg. The two other specimens become paralectotypes.

SELYS LONGCHAMPS (1891) recorded *V. smaragdina* specimens in Leonardo Fea's Burmese material from Cobapo, Meteleo and Iado. I have studied the 2 ♂ from Cobapo (29-IX-1888 and 3-X-1888) and 1 ♀ from Meteleo (20-VIII-1888) preserved in Coll. Selys and confirm that they are conspecific with the type series.

RIS (1912) described a new subspecies *Vestalis smaragdina velata* on the basis of 5 ♂ and 3 ♀ from "Tsa-Yiu-San" (North Guangdong). *Velata* was stated to differ from the nominate form as follows (here translated from the German): (a) colour greenish-

-blue, not so pure blue; (b) the entire wing golden smokey-brown, rather dark, venation partly of same colour, partly somewhat darker or paler (age dependant?), quite similar in both sexes. For comparison of the taxa RIS (1912) had available a male and a female *smaragdina* from Fea's Burmese material (see above).

NEEDHAM (1930) misinterpreted Ris's description of *velata* and identified and described a hyaline-winged *Vestalis* from Mokanshan [SW of Shanghai] as "*V. smaragdina* var. *velata* Ris", describing brown winged specimens from Fujian (type locality: Yenping) as a new species *V. virens*.

ASAHINA (1977) studied the type material of *V. virens*, downgrading it to a synonym of *V. smaragdina velata*. However, ASAHINA (1977) also concluded that the ssp. *velata* has two wing forms and wrote "I mean the brownish winged individuals are neither local race nor aged insects. The penile organ of both types are quite identical". Unfortunately, Asahina did not compare the male anal appendages of these "forms", although both were figured in his paper. There are clear structural differences, as seen in Figs. 5 and 6 in the present paper, which alone indicate that these "forms" are distinct species – *velata* and *venusta* sp.n., which in turn are clearly distinct from *V. smaragdina*, characterized by having differently shaped male anal appendages and female ovipositor.

All three species, as well as *V. miao* Wilson & Reels, 2001 from Hainan Island (characterized by having very short inferior appendages), have a penis of the same basic structure; cf. figures in ASAHINA (1977, 1985) and WILSON & REELS (2001). I consider that this penile structure, quite different from that of other *Vestalis* (s.l.) could be a key character to define MAY's (1935b) genus *Vestalaria*, which undoubtedly deserves at least a subgeneric status.

## Chlorocyphidae

### *LIBELLAGO LINEATA* (BURMEISTER, 1839)

Material (1 ♂) from Fujian (Fukien) in RMNH. – Chantainnammu, T.C. Maa leg.: 1 ♂, 18-IX-1940.

FLIGHT PERIOD. – This species has a long flight period, in Taiwan from March to December (WANG, 2000).

DISTRIBUTION. – Type locality: "Java". In China known from Taiwan, Fujian (this record), Guangdong, Guangxi and Hainan. A widespread oriental species, ranging from Himachal Pradesh to Borneo.

### *HELIOCYPHA P. PERFORATA* (PERCHERON, 1835)

*Rhynocypha* [sic] *perforata*: CHAO, 1981: 22.

*Phynocypha* [sic] *perforata*: ZHANG, 1999: 197.

Material (3 ♂, 10 ♀) from Fujian (Fukien) in RMNH. – Kienaw, Fengio, T.C. Maa leg: 1 ♀, 26-V-1941; – Kienyang City, T.C. Maa leg: 1 ♀, 13-VIII-1940; – Kienyang, T.C. Maa leg: 1 ♀, 29-V-1941;



– Shaowu (alt. 500 m), J. Klapperich leg.: 2 ♂, 2 ♀, 20/23-X-1937; – Shaowu (alt. 500 m), H-f. Chao leg.: 1 ♀, 24-VII-1942; 2 ♀, 25-VIII-1942.; – Shaowu: 1 ♀, 1942, T.C. Maa leg.; – Shaowu City, T.C. Maa leg.: 1 ♂, 30-IX-1942; – Shaowu, Ku Hsien Kai, T.C. Maa leg.: 1 ♀, 18-X-1945.

NEEDHAM (1930) listed “1 ♂ from Fukien” and “1 ♂ from Yenping, Sept. 8”. KLOTS (1947) “2 ♂ from Yenping, 14-VI and 28-IX-1917, C.R. Kellogg”. ASAHINA (1973) lists 1 ♂, 2 ♀ from “Shaowu, 19-VIII-1939, Tso-Hsin-Cheng Coll.”

FLIGHT PERIOD. – Evidently this species has a long flight season; the present Fujian records from late May to the beginning of October. According to WILSON (1995) in Hong Kong the species is on wing from early spring till early January. In Taiwan from May to September (WANG, 2000).

DISTRIBUTION AND REMARKS. – Type locality: “Cochinchine” in Vietnam. In China the species is known from Taiwan, Fujian, Guandong, Hong Kong, Guangxi, Hainan and Yunnan. It is uncertain whether the Yunnan populations belong to ssp. *limbata* Selys, 1879 (type locality: “East Burma”), which occurs also in Laos, Thailand and Peninsular Malaysia. FRASER (1934) recorded both ssp. *limbata* and ssp. *beatifica* Fraser, 1927 from “Assam” (s.l.). LAHIRI (1987) ranked *beatifica* as a good species. This group is in need of further study. At least the differences between *perforata* and *limbata* are minor and the possibility that these represent clinal variation should be examined.

#### RHINOCYPHA DRUSILLA NEEDHAM, 1930

*Rhynocypha* [sic] *drusilla*: CHAO, 1981: 22.

*Rhynocypha drusilla*: SUI & SUN, 1984: 228-229; – SUI & SUN, 1993: 27-28; – ZHANG, 1999: 201-202.

*Phynocypha* [sic] *drusilla*: ZHANG, 1999: 197.

Material (5 ♂, 7 ♀) from Fujian (Fukien) in RMNH (T.C. Maa leg., if not otherwise stated). – Chungan (alt. 1000 m), Hsiu-fu Chao leg.: 1 ♀, 2-IX-1942; – Chungan, Tsilichiao (alt. 1000 m): 1 ♂, 2-IX-1942; – Kienyang, Liutun: 1 ♀, 2-XI-1942; – Kienyang, Nwangkeng: 1 ♀, 30-VII-1945; – Kienyang: Nwangkeng to Kaoyang: 1 ♂, 17-X-1943; – Shaowu, Kaoyang: 1 ♂, 30-VII-1943; – Shaowu, Kaoyang to Likiatun: 1 ♂, 2 ♀, 18-X-1943; – Shaowu, Tachulan (alt. 1000 m): 1 ♀, 19-IX-1942; 1 ♂, 19-IX-1945; – Shaowu, Tafugen: 1 ♀, 31-VIII-1940.

Type material includes a ♀ paratype from [Fujian] “Yen Ping, 5 September” (NEEDHAM, 1930).

FLIGHT PERIOD. – A late season species; the Fujian specimens examined were collected from the end of July to early November. Among these all from July and August are teneral; also the male collected on 19 September 1942 is teneral. The holotype was collected on “13 October 1924”.

DISTRIBUTION. – Type locality: “Ching Yuan” in Zhejiang. Known from Anhui, Zhejiang, Fujian and Guangxi.

REMARKS. – A conspicuous species with a red abdomen, superficially, *R. drusilla* male resembles *R. uenoi* Asahina, 1964 from the Ruykyus, but the female is quite dif-

ferent in appearance. Another similar looking species with a red patterned male abdomen is the rare *R. arguta* Hämäläinen & Divasiri, 1997 from north Thailand, also a late season species. The holotype male of *drusilla* from Zhejiang is a poorly preserved, discoloured specimen kept in alcohol (cf. VAN TOL & ROZENDAAL (1995, who re-described and illustrated it in detail). NEEDHAM (1930) stated "Abdomen brown, the middorsal half paler on segments 1-9". The male specimen(s) described and illustrated in SUI & SUN (1984) is obviously teneral, since the dorsal surface of S3-S9 in male was stated to be wholly yellow. Based on the present Fujian specimens, the true body colours of *drusilla* were first described by HÄMÄLÄINEN & DIVASIRI (1997); subsequently WILSON & REELS (2003) illustrated and described a well preserved *drusilla* male from Guangxi.

## Euphaeidae

### *BAYADERA BIDENTATA* NEEDHAM, 1930

*Bayadera bidentata*: SUI & SUN, 1984: 209-211; — ZHANG, 1999: 197-198.

**Material** (5 ♂, 7 ♀) from Fujian (Fukien) in RMNH (T.C. Maa leg., unless otherwise stated). — Kua-tun, (alt. 2300 m), J. Klapperich leg.: 2 ♀, 18-VI-1938; — Changting City: 1 ♂, 1 ♀, 10/13-VI-1940; — Chungan, Bohea Hills: 2 ♂, 2 ♀, 28/30-IV-1940; — Kienyang, Aotow to Kwangkeng: 1 ♂, 11-VI-1942; — Kienyang, Saikiayen: 1 ♂, 1 ♀, 6/9-VI-1942; — Shaowu: 1 ♀, 30-VII-1945.

**FLIGHT PERIOD.** — Fujian records are from the end of April to late July; all specimens collected in April were teneral. In Guangxi it has been recorded also in early August (WILSON & REELS, 2003).

**DISTRIBUTION.** — Type locality: "Zakow" in Zhejiang. Recorded in Zhejiang, Fujian, Hubei, Guangxi and Sichuan. Also known from northern Vietnam (Coll. Karube, unpublished).

### *BAYADERA CONTINENTALIS* ASAHINA, 1973, STAT. NOV.

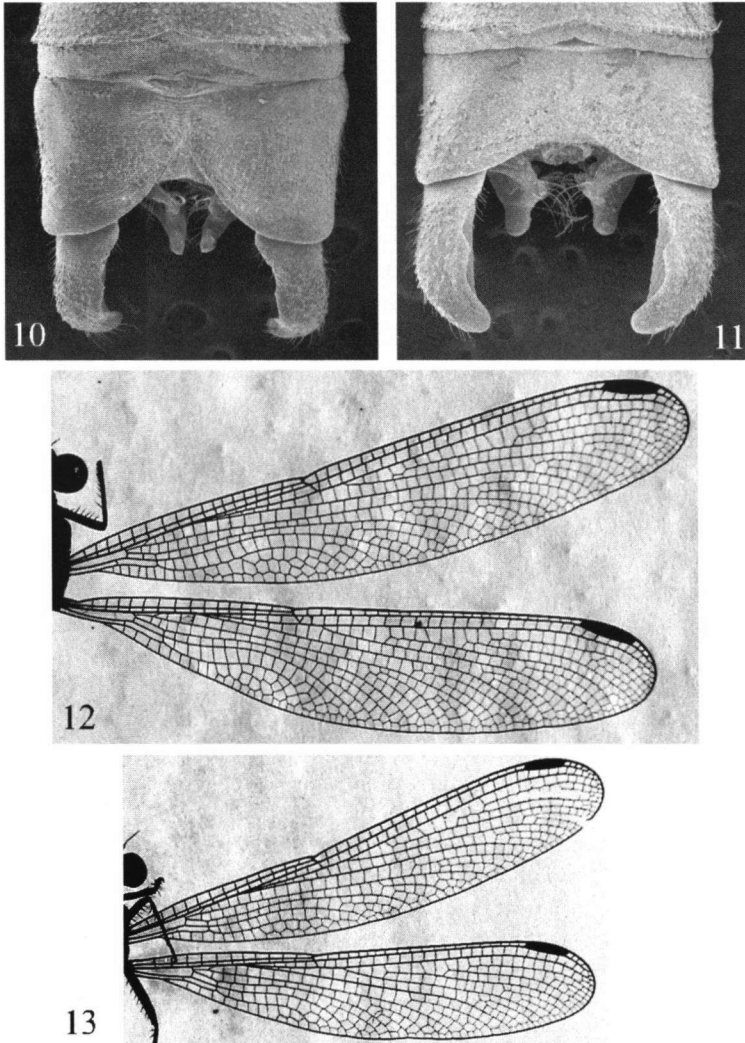
Figure 10

*Bayadera brevicauda continentalis*: CHAO, 1981: 23; — ZHANG, 1999: 198.

**Material** (120 ♂, 50 ♀) from Fujian (Fukien) in RMNH (T.C. Maa leg., if not otherwise stated). — Chungan, Kua-tun: 1 ♂, 1 ♀, 4-V-1942; — Chungan, Upper Kua-tun (alt. 1400 m): 1 ♂, 2-V-1943; — Chungan, Sienfengling: 2 ♂, 1 ♀, 28/30-IV-1942; — Chungan, Silichan: 1 ♂, 1 ♀; 27-IV-1942; — Chungan, Tsilichiao (alt. 1000 m): 1 ♂, 4-V-1942; 1 ♂, 28-IV-1945; — Kienyang, Siakiayen: 1 ♂, 1 ♀, 6-VI-1942; — Kua Tun, (alt. 2300 m), J. Klapperich leg.: 1 ♂, 1 ♀, 23-V-1938; 4 ♂, 4 ♀, 4/15-VI-1938; — Shaowu: 3 ♂, no date; — Shaowu, Sun-an: 1 ♀, 6-V-1942; — Shaowu, Tachulan (alt. 1000 m): 1 ♂, 31-IV-1940; 2 ♂, 29/30-IV-1942; 31 ♂, 11 ♀, 7/13-V-1942, 12 ♂, 6 ♀, 20/26-V-1942; 2 ♂, 2 ♀, 1/11-VI-1942; 1 ♀ (teneral), 9-IV-1943; 20 ♂, 8 ♀, 2/9-V-1943; 2 ♂, 2 ♀, 19/21-V-1943; 4 ♂, 1 ♀, 28-V-1943; 1 ♀, 2-VI-1943; 4 ♂, 8/12-VI-1943; 2 ♂, 1 ♀, 27-IV-1945; Shaowu, Ta-chu-lan, H-f. Chao leg.: 1 ♂, 26-IV-1945; 1 ♀, 10-V-1945; 1 ♂, 26-V-1945; — Shaowu, Tachulan to Aotow to Taoshui: 6 ♂, 6-V-1943; — Shaowu,

Tachulan to Kwanyingkeng: 9 ♂, 4 ♀, 2/6-V-1943; – Shaowu, Tachulan, Taoshui (alt. 1000 m): 7 ♂, 20-V-1943; – Shaowu, Taoshui: 1 ♀, 11-VI-1942.

ASAHINA (1973) listed a very large series from “Kuatun, Fukien, 2300 m, by J. Klapperich”, from which the holotype was selected, and 1 ♂ from “Shaowu, 19-VIII-1939, Tso-Hsin-Cheng Coll.” Recorded also from Foochow area by ASAHINA (1978).



Figs 10-13. Apex of male abdomen with anal appendages and wings: (10) *Bayadera continentalis* (Fujian); – (11-12) *B. brevicauda* (Taiwan); – (13) *B. ishikagiana* (Ishikagi).

FLIGHT PERIOD. — The present and published Fujian records indicate that this is a spring species; earliest record on 9<sup>th</sup> April (a teneral specimen) and the last on 5<sup>th</sup> July. In the present material most specimens were collected in April and May.

DISTRIBUTION. — Type locality: “Kuatun” in Fujien. Known from Zhejiang, Fujian, Guangdong and Guangxi.

REMARKS. — ASAHINA (1973) described *continentalis* as the second subspecies of *B. brevicauda* Fraser, 1928. Earlier, he had described ssp. *ishigakiana* from Ishikagi island (type locality: Omoto-dake) in the Ryukyus (ASAHINA, 1964). In the discussion below I conclude that these three taxa represent distinct species.

***B. brevicauda* Fraser, 1928, sensu nov.**

This is a widespread species in Taiwan (LIEFTINCK et al. 1984, MATSUKI & LIEN 1989). It was first described by RIS (1912) as *B. hyalina* [nec. Selys, 1879]. FRASER (1928, p. 51) noticed that Ris’s description and figures of male anal appendages were not conspecific with topotypical *hyalina* from Assam, and he renamed the Taiwanese form as a new species *brevicauda*. Fraser himself had not examined specimens from Taiwan and no type material was designated. His 1928 text was repeated verbatim in FRASER (1934, p. 83). RIS (1912) examined specimens from 3 localities in Taiwan: Hoozan, Taihorin and Tainan. Since the appendages of a male specimen from “Hoozan” were figured, this site [= Fengshan in Khaosiung Hsien province in south Taiwan] is the type locality. I have studied a small sample of *B. brevicauda*: 4 ♂, 4 ♀ from Taipei, Ilan and Taoyan counties in North Taiwan, W-c. Yeh leg. in 1995-2000.

***B. continentalis* Asahina, 1973, stat. nov.**

For *continentalis* (type locality: “Kuatun” in Fujian) ASAHINA (1973) presented 3 “subspecific characters”: different colour patterns on the prothorax and pterothorax and the quadrangle of the hind wing consistently crossed. The author noted “the small difference” in the structure of the superior anal appendages in male, but commented “It seems, however, inappropriate to emphasize such a slight character”.

However, a detailed comparison shows that *continentalis* differs markedly from *brevicauda* in the followings characters.

— In *continentalis* (both sexes) synthorax is markedly more robust than in *brevicauda*.

— In *continentalis* male the posterior margin of S10 is very strongly incised mid-dorsally (Fig. 10); in *brevicauda* only moderately so (Fig. 11).

— In *continentalis* male the inferior appendages seen in dorsal view approximate more closely (cf. Fig. 10-11) and the tip of the inferiors is more upright in lateral view; cf. also figs 44-47 and 50-53 in ASAHINA (1973).

— *Continentalis* is a hairier insect than *brevicauda*, the difference being clearest on the pterothorax above the humeral suture, the mesepisternum of *continentalis* being furnished with long thin hairs, whereas that of *brevicauda* is bare.

— Female *continentalis* has apical segments slightly more robust, and valves extend-

ing more apicad.

– The colour pattern of pro- and pterothorax is strikingly different in both sexes, cf. figs 40-43 in ASAHINA (1973).

– Other colour differences applying to both sexes: in *continentalis* the labium is wholly black, in *brevicauda* yellow on the sides; in *continentalis* the legs are brown to dark brown, in *brevicauda* black; in *continentalis* the pterostigma is a paler brown.

– In *continentalis* males seem to develop less blue pruinescence than in *brevicauda*. The original description of male *continentalis* reads “Abdomen black, palely pruinose on the basal three segments”. In the present material only a few males have slight pruinescence on the basal and apical segments.

According to ASAHINA (1973) in *continentalis* “the quadrangle in hindwing is consistently crossed (in this respect these insects deviate from the generic definition of *Bayadera* !)”. However, this seems to be a variable character, since 40 % of the *continentalis* specimens in the present material have an open quadrangle in the hindwing.

The very striking differences in structure and colour pattern clearly indicate that these are two distinct species. Therefore *Bayadera continentalis* Asahina, 1973 is raised to specific status. ASAHINA's (1973) description was based on a very rich collection from Kuatun (J. Klepperich leg., in coll. Erich Schmidt). A male from from “Kuatun, 2300 m, Fukien, 1-V-1946, leg. Klapperich”, was selected as holotype. It is kept in National Science Museum in Tokyo. BRIDGES (1994) and DAVIES & YANG (1996) incorrectly indicate the holotype as being in the USNM. However, one male paratype from “Datchulan” (Tachulan), collected by T.H. Cheng on 14-V-1939 is in the USNM.

#### ***B. ishikagiana* Asahina, 1964, stat.nov.**

In the brief original description (without illustrations) of ssp. *ishikagiana*, ASAHINA (1964) pointed out only the smaller size and some minor differences in colour pattern. Later, figures and brief additional notes of it were given in ASAHINA (1973).

I have compared the above mentioned Taiwanese *brevicauda* specimens with a series of 4 ♂ and 2 ♀ *ishikagiana* from the type locality, Mt Omoto in Ishikagi Island [collected by S. Obana in 1973, K. Watanabe in 1982 and H. Karube in 1987] and 1 ♂ from Iriomote Island [T. Yamamoto, 1979].

Besides the conspicuously smaller size, *ishikagiana* differs from *brevicauda* also in the sparser reticulation throughout its wings (cf. Figs 12-13). In the fore wing *ishikagiana* has only 12-14 antenodals, whereas there are 15-20 in *brevicauda*, in the hind wing correspondingly 9-12 and 14-17. Between IA and the wing border in the apical part there are only two cell rows in *ishikagiana*, but 3-4 cell rows in *brevicauda*. In *ishikagiana* the quadrangle is open in all specimens studied; in *brevicauda* it is usually open, but in some specimens crossed in 1-2 wings. Anal appendages and configuration of the apical edge of S10 do not seem to provide any clear differentiating characters between these taxa.

The more reduced yellow markings on the body of *ishikagiana*, pointed out by ASAHINA (1964) in the original description, are also partly age dependent characters in

both taxa. The colour pattern of the synthorax is quite similar in both taxa, as ASAHINA (1973) remarks.

The more open venation and much smaller size in *ishikagiana* puts to doubt its status as a mere subspecies. The very low number of antenodals in *ishikagiana* is exceptional among *Bayadera* species. I consider *ishikagiana* should be treated as a distinct species. The holotype is evidently in coll. Asahina in the National Science Museum in Tokyo. According *B. ishikagiana* specific status strengthens the case for protecting its habitats within its very restricted range in Ishikagi and Iriomote islands.

*BAYADERA MELANOPTERYX* RIS, 1912  
(Syn. *Bayadera melania* Navas, 1934, syn. nov.)  
Figures 14-16

*Bayadera melanopteryx*: CHAO, 1981: 23; – ZHANG 1999: 198.

**Material** (43 ♂, 44 ♀) from Fujian (Fukien) in RMNH (T.C. Maa leg., if not otherwise stated). – Chungan, Sanchiang: 3 ♂, 1 ♀, 11/12-VIII-1945; – Chungan, Sianfengling to Sanchiang: 1 ♀, 10-VI-1943; – Chungan, Tsilichiao (alt. 1000 m): 6 ♀, 5/11-VIII-1945; – Kienyang, Aotow to Kwangkeng: 1 ♀, 11-VI-1942; – Kua Tun, (alt. 2300 m), J. Klapperich leg.: 1 ♂, 2 ♀, 18/20-VI-1938; 12 ♂, 8 ♀, VII/VIII-1938; – Shaowu, Tachulan (alt. 1000 m): 1 ♂, 10-VI-1942; 24 ♂, 23 ♀, 1/18-VIII-1945; 2 ♀, no date; Shaowu, Tachulan, (alt. 500 m), H-f. Chao leg.: 1 ♂, 17-VII-1945; – Shaowu, Yashui: 1 ♂, 11-VI-1942.

ASAHINA (1977) provided wing photos of specimens from “Fukien, Kuatun, Schmidt Coll.”, without further data.

**FLIGHT PERIOD.** – The season of *B. melanopteryx* seems to follow that of *B. continentalis*. The species starts to emerge before mid-June and all above specimens collected in June are teneral; as are some collected even in early August. Apparently on the wing at least until late August.

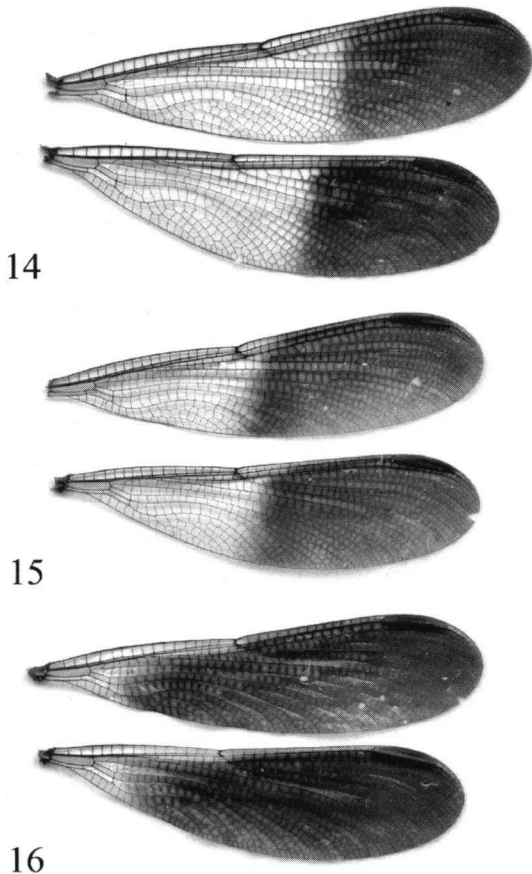
**DISTRIBUTION.** – Type locality: “Tsa-Yiu-San” in Guangdong; cf. *Philoganga vestusta*. Evidently the most widespread *Bayadera* species in China, known from Shanxi, Hubei, Sichuan, Zhejiang, Fujian, Guangdong, Guangxi. Also known from northern Vietnam (Coll. Karube, unpublished).

**REMARKS.** – As pointed out by ASAHINA (1956, 1977) and WILSON & REELS (2003) there is considerable variation in the extent of the darkened portion of the wings of *B. melanopteryx* within its range. The present material confirms that the variation can be very considerable also within populations. The extremes in the long series of males from Tachulan are presented in Figures 14 and 16. Darker winged specimens intermediate to Figures 15 and 16 are more plentiful in the material than those between Figures 14 and 15. The variability is more extensive than in the Kuatun (Fujian) specimens illustrated by ASAHINA (1977).

Females also show variation as regards the extend of dark colour in the wings. In the long series from Tachulan, most females have broadly darkened wings (as in Fig. 16), but a few females have short bands quite similar, or slightly broader than in Figure 15.

According to RIS (1912) in the two males in the type series of *B. melanopteryx* the

wing tip is dark from 2 to 4 cells distal from the nodus. These males appear to be quite similar to Figure 15. On the other hand specimens with the broadest dark band (Fig. 16) come close to the description of *Baydera melania* Navas, 1934 (type locality: "T'ien Mou-Chan" in Zhejiang), which species undoubtedly is a synonym of *B. melanopteryx*. It seems that this synonymy has not yet been established formally, although there is an indirect citation in ASAHINA (1956), doubt in CHAO (1962) and an assumption in DAVIES & YANG (1995). Unfortunately, CHAO (1962) synonymized *Caliphaea nitens* instead of *B. melania* (see above, pp. 375-376) and ASAHINA (1977), while illustrating the variability in wing colour of *B. melanopteryx* and providing also a photo of a specimen from West-Tien-Mu Shan (Zhejiang), omitted to comment on Navas' *melania*, described from the same area, although it was listed in ASAHINA (1973, p. 455). Consequently, *B. melania* has remained included as a good species in all world dragonfly catalogues, including the latest one (TSUDA, 2000).



Figs 14-16. Variability of colour pattern in male wings of *Baydera melanopteryx* in specimens from "Shaowu, Tachulan", collected on 9-VIII-1945, 1-VIII-1945 and 1-VIII-1945, respectively.

*EUPHAEA DECORATA* HAGEN IN SELYS, 1853

*Euphaea decorata*: CHAO, 1981: 22; — ZHANG, 1999: 196.

*Pseudophaea decorata*: SUI & SUN, 1984: 218-219; — ZHANG, 1999: 200.

Material from Fujian (Fukien) in RMNH. — No specimens.

NEEDHAM (1930) studied "A large number of specimens from C.R. Kellogg in Fukien" and ASAHINA (1970, 1978) listed specimens from Foochow area from Coll. Kellogg. Evidently recorded also from Longqi mountains (see p. 396 under *E. ornata*).

FLIGHT PERIOD. — In Hong Kong this species is on the wing from late April to October (WILSON, 1995).

DISTRIBUTION. — Type locality: Hong Kong. Known from Hubei, Zhejiang, Jiangxi, Fujian, Guangdong, Hong Kong, Guangxi, Yunnan and northern part of Vietnam.

REMARKS. — See the discussion of *E. ornata* on p. 396.

#### *EUPHAEA OPACA* SELYS, 1853

*Euphaea opaca*: CHAO, 1981: 22; — ZHANG, 1999: 196.

*Pseudophaea opaca*: SUI & SUN, 1984: 220-221; — ZHANG, 1999: 200-201.

Material (28 ♂, 6 ♀) from Fujian (Fukien) in RMNH (T.C. Maa leg., if not otherwise stated). — Changting City: 1 ♂, 15-VI-1940; — Chungan, Bohea Hills: 2 ♂, 25-VI-1939; 2 ♂ (teneral), 6-V-1940; — Hsintien: 12 ♂, 3 ♀, 29-V-1941; — Kienow, Fengio: 3 ♂, 25/26-V-1941; — Kienyang: 1 ♂, 1 ♀, 25/26-V-1941; — Kienyang, Kiangfang: 1 ♀ (teneral), 26-V-1941; — Kienyang, Kwangkeng to Kaoyang: 3 ♂, 12-VI-1942; — Shaowu, (alt. 500 m), J. Klapperich leg.: 1 ♀, 4-VI-1937; 1 ♂, 26-VIII-1937; — Shaowu, KuHsienKai: 1 ♂ (teneral), 2-V-1944; 1 ♂, V-1945; — Yungan City: 1 ♂ (teneral), 1-V-1941.

NEEDHAM (1930) reports specimens of both sexes from "Ling Sioh" in Fujian, MAY (1935a) provides Ris's detailed description of the female based on material from "Fokien", ASAHINA (1970) lists 1 ♂ from Foochow (see under *E. superba*, p. 396), ASAHINA (1973) a pair from "Shaowu, 15-VII-1939, Tso-Hsin-Cheng Coll." and ASAHINA (1978) a total of 9 ♂ and 1 ♀ from "Plains around Foochow, Coll. Kellogg".

FLIGHT PERIOD. — Fujian records date from early May to late August.

DISTRIBUTION AND REMARKS. — Type locality: "Chine". Known from Anhui, Zhejiang, Fujian, Guangdong, Hong Kong. SUI & SUN (1984) and CHAO (1992) listed this species also from Yunnan, but without any further data. Whether the Yunnan records refer to *E. superba* Kimmins, 1936, should be investigated. *Superba* is a Vietnamese species, recently reported also from Guangxi (WILSON & REELS, 2003).

#### INCORRECT AND DUBIOUS RECORDS FROM FUJIAN

##### *MATRONA BASILARIS NIGRIPECTUS* SELYS, 1879

In the recent Chinese literature both *M. b. basilaris* and *M. basilaris nigripectus* have been listed from same site or area, e.g. in Henan (WANG & al., 1990), Zhejiang (ZHOU & al., 1995) and Fujian (SUI & SUN, 1993); cf. pp. 378-379.

SUI & SUN (1993) listed both "*M. b. basilaris* and *M. basilaris nigripectus*" from Longqi mountain. Moreover both taxa were also listed from Baishanzu Mountain in Zhejiang by ZHOU et al. (1995) and from Henan by WANG et al. (1990). These records



may result from the misleading separating characters presented for these taxa in SUI & SUN (1984), who keyed them out only on the basis of whether or not the tip of forewing is transparent. Separation of these taxa has been difficult and there is much confusion in the earlier literature. The record from Fujian (copied also in ZHANG 1999: 193) is an obvious misidentification and refers to *basilaris*.

*MNAIS ICTEROPTERA* FRASER, 1929

SUI & SUN (1993) list this poorly known Burmese species from Longqi mountain [copied in ZHANG 1999: 193]. This is clearly a misidentification of the common *M. tenuis*, since in their book (SUI & SUN, 1984) the authors give also Zhejiang, Jiangxi, Guangdong and Yunnan as the range of *icteroptera* and do not include *tenuis* – the most widespread *Mnais* species in China; cf. remarks on pp. 380-381.

*PSOLODESMUS MANDARINUS* McLACHLAN, 1870

McLACHLAN (1870) described two new species stated to originate from “Amoy, in China”, viz. *Psolodesmus mandarinus* and *Euphaea compar*. Amoy [Xiamen] is a small island off Fujian coast opposite to central Taiwan. Later *P. mandarinus* was found to be a common insect in Taiwan, and CAMPION (1924) pointed out that *E. compar* appears to be conspecific with its common Taiwanese congener *E. formosa* Hagen in Selys, 1869. Since there seem to be no confirmed later records of either *P. mandarinus* or *E. compar* from mainland China, it is very probable that the type material in fact originated from Taiwan, but was shipped to Europe from Amoy, a busy treaty port ceded to the British in 1842 after the opium war. This would explain the misleading locality label, a common phenomenon in specimens from the 19<sup>th</sup> century. The specimens may have been collected by the famous naturalist Robert Swinhoe (1836-1877), who stayed for years both in Amoy and Formosa. Interestingly CHAO (1981) did not list *P. mandarinus* as a Fujian species, but included *Euphaea formosa* (see below).

The only other “continental Chinese record” traced in literature is “*Psolodesmus* sp.” in the list of odonates from Baishanzu mountain (Zhejiang); there is no further information.

*EUPHAEA FORMOSA* HAGEN IN SELYS, 1869

(Syn. *Euphaea compar* McLachlan, 1870)

Based on the published type locality of *E. compar* (see account of *P. mandarinus* above), CHAO (1981: 22) listed this Taiwanese species from “Amoy” [copied in ZHANG, 1999: 196]. According to data received from Mr Wen-Chi Yeh the wing colour pattern of *E. formosa* is somewhat variable and that described for *E. compar* falls within the range of this variation. Thus, both Yeh and I agree with CAMPION’s (1924) view that *compar* is synonymous with *formosa*. LIEFTINCK et al. (1984) con-

sidered *compar* as “probably a subspecies of *formosa*”, possibly because they accepted the Amoy record.

*EUPHAEA ORNATA* CAMPION, 1924

SUI & SUN (1993: 27) list this species from Longqi mountain (copied in ZHANG 1999: 201). So far all confirmed records of *E. ornata* come from Hainan Island. It should be determined if the Longqi mountain material refers to *E. decorata*, a species not included in the paper. In SUN & SUI (1984) the distribution of *E. ornata* is given as “Hainan and Yunnan”. VAN TOL & ROZENDAAL (1995) pointed out the difficulties in separating these two taxa, clearly in need of a detailed study.

*EUPHAEA SUPERBA* KIMMINS, 1936

CHAO (1981: 22) [copied in ZHANG, 1999: 196] listed this species from Fujian, based on ASAHINA (1970), who recorded a male specimen from Foochow. However, its identity had already been corrected to *E. opaca* in ASAHINA (1973).

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