

**A STUDY OF THE GENUS *CALICNEMIA* STRAND IN CHINA,
WITH THE DESCRIPTIONS OF TWO NEW SPECIES
(ZYGOPTERA: PLATYCNEMIDIDAE)**

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C. gulinensis sp. n. (holotype ♂: Gulin, Sichuan, China, 2-VII-2001), *C. porcata* sp. n. (holotype ♂: Mt Emei, Sichuan, China, 4-VII-1957), are described and a brief synopsis of the Chinese spp. of the genus *Calicnemia* Strand, 1928 is presented.

INTRODUCTION

The species of *Calicnemia* Strand, 1928 form a group of very beautiful damselflies, mainly restricted to Southeast Asia, India, and China. LIEFTINCK (1984) divided the 14 then-known species into two groups, based on the structure of the penile organ. Group I has a penile lobe terminating in long, curved, ribbon-like filaments, whereas group II has a short, broader and shield-like penile lobe without filaments. Up to the present, 17 species have been recorded in the world, six of these are known to occur in China, viz.: *C. erythromelas* (Selys), *C. eximia* (Selys), *C. sinensis* Lieftinck, *C. chaoi* Wilson, *C. haksik* Wilson & Reels and *C. miles* (Laidlaw). *C. miniata* (Selys), only recorded from China in SUI & SUN (1984), is actually a misidentification of *C. sinensis*. Of the six species, the first three have Group I penile organs and the other three have penile organs of Group II. Among species of this genus, the characters of body coloration, markings and the shape of the caudal appendages are sometimes rather similar. On the other hand, some species, such as *C. sinensis*, are usually rather variable in body coloration.

In this study, in order to identify different species and forms accurately, we use the characters of the penile organs, as well as making references to other char-

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acters. Two new species are described, and the shape of the ♂ caudal appendage of *C. erythromelas* and the different forms of *C. sinensis* are figured in detail.

TAXONOMY OF CHINESE *CALICNEMIA*

ABBREVIATIONS FOR SPECIMEN COLLECTIONS:

CHU: College of Life Sciences, Hebei University, Baoding, Hebei, China

IZAS: Institute of Zoology, Academia Sinica, Beijing, China

NKUM: College of Life Sciences, Nankai University, Tianjin, China

CALICNEMIA EXIMIA (SELYS, 1863)

Calicnemias eximia: ASAHINA, 1977: 481-483 figs 1-2, 4-12 (♂, ♀ body, ♂ penile organ & appendages), "Afghanistan, China (Szechuen, Yunnan), India, Nepal"; – LIEFTINCK, 1984: 353 key, 360 fig. 2 (penile organ), "India (Sikkim)"; – ASAHINA, 1997: 22 figs 18-19 (♂ body, appendages), "Vietnam"; – WILSON, 2003a: 264-265 figs 70-73 (♂ head, thorax, penile organ & appendages), "China (Guangxi, Taiwan), Iran".

Calicnemis eximia: FRASER, 1933: 173 key, 174-175, "India (Bangel, Sikkim, Assam)"; – SUI & SUN, 1984: 275-276, fig. 185 (♂ appendages), "China (Yunnan)".

Pyrrhosoma tinctipennis: NEEDHAM, 1930: 245 (part material), "China (Szechuen and Kwangsi)".

Material. – 1 ♂, Weixi, Yunnan, 12-VII-1981, Subai Liao leg. (IZAS); 1 ♂, Yangbi, Yunnan, 2-VII-2000, Zizhong Yang leg. (CHU); 1 ♂, 1 ♀, Leye, Guangxi, 29-VII-2004, Xin Yu leg. (NKUM).

DISTRIBUTION. – Afghanistan, China (Guangxi, Sichuan, Taiwan and Yunnan), India, Iran, Nepal and Vietnam.

REMARKS. – Males are distinctive because of their prominent bright red and yellow coloration on the head, thorax, legs and abdomen.

CALICNEMIA ERYTHROMELAS (SELYS, 1891)

Figures 1-3

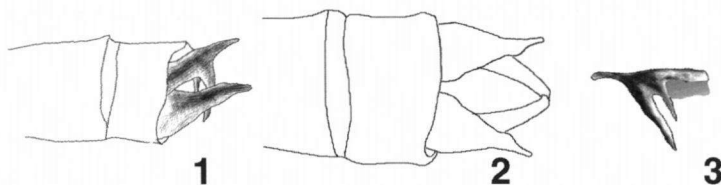
Calicnemias erythromelas: LIEFTINCK, 1984: 353 key, "Burma, Vietnam"; – ASAHINA, 1997: 22, figs 20-21 (♂ body, appendages), 23, "Vietnam".

Calicnemis erythromelas: FRASER, 1933: 173 key, 181-183 fig. 81 (♂ head), "Burma"; – SUI & SUN, 1984: 275-276, fig. 184 (♂ appendage), "China (Yunnan)".

Material. – 1 ♂, Menglong Banna, Yunnan, 26-IV-1958, Yiran Zhang leg. (IZAS); 1 ♀, Xishuang Banna, Yunnan, 22-VII-1958, Shuyong Wang leg. (IZAS).

DISTRIBUTION. – China (Yunnan), Burma, Thailand and Vietnam.

REMARKS. – This is the only species of Chinese *Calicnemias*, which has a distinctive caudal appendage in males, but this has seldom been figured clearly. The morphology of the ♂ caudal appendage is shown in Figures 1-3.



Figs 1-3. *Calicnemia erythromelas*, male, Yunnan: (1) caudal appendage, lateral; – (2) caudal appendage, dorsal; – (3) left superior appendage, inner view.

CALICNEMIA SINENSIS LIEFTINCK, 1984

Calicnemia sinensis: LIEFTINCK, 1984: 353 key, 360 fig. 3 (♂ penile organ), “China (Fukien)”; – WILSON, 2003b: 156 (♂, ♀ photo), “China (Fujian, Guangdong, Hong Kong)”.

Calicnemis miniata: SUI & SUN, 1984: 274 key, 276-277 fig. 186 (♂ appendage), “China (Fujian)” (misidentification).

Material. – 1 ♀, Jingdong, Yunnan, 28-VI-1956, Kra Jean-novsky leg. (IZAS); 1 ♂, Chongan (now is Wuyi City), Fujian, 6-VII-1960, Yiran Zhang leg. (IZAS); 1 ♂, ditto., 14-VII-1960, ditto.; 2 ♂, ditto., 26-VII-1960, ditto.; 3 ♂, ditto., 8-VIII-1960, Yong Zuo leg. (IZAS); 1 ♂, ditto., 18-VII-1960, Chenglin Ma leg. (IZAS); 2 ♂, ditto., 1-VIII-1982, Pingping Chen leg. (NKUM); 1 ♀, ditto., 10-VIII-1982, Chen Chen leg. (NKUM); 1 ♂, Chenzhou, Hunan, 23-VII-2004, Weibing Zhu leg. (NKUM); 1 ♂, Yanling, Hunan, 17-VII-2004, Jimeng Hua leg.; 1 ♂, 1 ♀, Mt Wuyi, Fujian, 31-V-2004, Haili Yu leg. (NKUM).

DISTRIBUTION. – China (Fujian, Guangdong, Hong Kong, Hunan, Yunnan).

REMARKS. – This is a species confined to China. After comparing the structure of penile organs, SUI & SUN (1984)’s material, which had been identified as *Calicnemis miniata*, is re-identified as *Calicnemia sinensis*, and it is doubtful, at this time, if there are any records of *Calicnemis miniata* from China. In this study, it is found that the type of penile organs of SUI & SUN (1984)’s material definitely belong to Lieftinck’s Group I, but, according to Lieftinck, *Calicnemis miniata* is in Group II. Presumably, SUI & SUN (1984) did not examine the penile organs when they identified their specimens in 1984, and they also implied that it is usually difficult to distinguish species of *Calicnemia* using body coloration, markings, and morphology of caudal appendages alone. It is known that body markings of *C. sinensis* are variable depending on the degree of maturity, and we must say that the variations may also have relationships with localities. Here we illustrate several samples of male *C. sinensis* from Fujian and Hunan (Figs 4-13), which show impressively various patterns of body coloration and markings. It seems that species from Hunan are usually pruinescent on the head and thorax, whereas others from Fujian are seldom like that. Nevertheless, we have no intention of

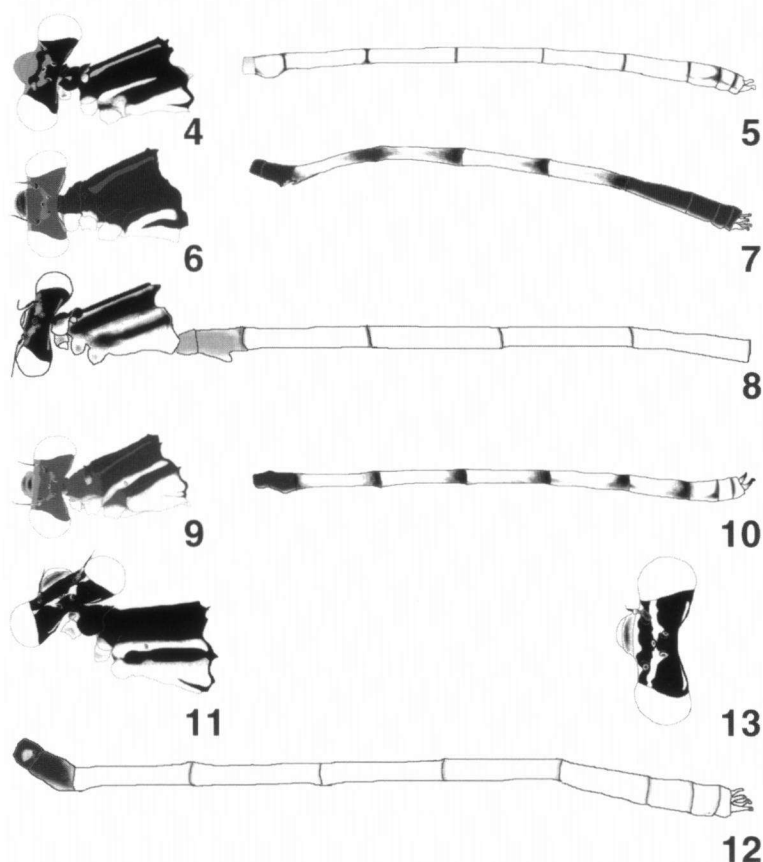
dividing these specimens from two localities into different subspecies until more specimens have been observed.

CALICNEMIA CHAOI WILSON, 2004

Calicnemia chaoi: WILSON, 2004: 428-429 figs 15-21 (♂ head, thorax, penile organ & appendages), "China (Guangdong)".

DISTRIBUTION. — China (Guangdong).

REMARKS. — We did not examine any specimens of this species. WILSON's



Figs 4-13. *Calicnemia sinensis*, male: [4-5] Mt Wuyi, Fujian: (4) head and thorax; — (5) abdomen; — [6-7] Hunan: (6) head and thorax, pruinescent; — (7) abdomen; — [8] Chongan, Fujian: body, broken; — [9-10] Yanling, Hunan: (9) head and thorax, pruinescent; — (10) abdomen; — [11-12] Longdu, Chongan, Fujian: (11) head and thorax; — (12) abdomen; — [13] Guadun, Chongan, Fujian, head, other parts similar to Figs 11 & 12.

(2004) description and figures provide details and these show that the amber wings make *chaoi* unique within the genus.

CALICNEMIA HAKSIK WILSON & REELS, 2003

Calicnemia haksik: WILSON, 2003a: 265-266 fig. 74-78 (♂ thorax, penile organ & appendages), "China (Guangxi)".

Material. — 1 ♂, Shimen, Hunan, 3-VIII-2004, Ying Tian leg. (NKUM).

DISTRIBUTION. — China (Guangxi, Hunan).

REMARKS. — As its specific name suggests, this taxon has a predominantly black coloration all through its body, with the exception of a little brick-red coloration at the base of abdomen.

CALICNEMIA MILES (LAIDLAW, 1917)

Calicnemia miles: LIEFTINCK, 1984: 357 key, "Burma, Thailand"; ASAHINA, 1997: 21 figs 12-13 (♂ body, appendages), "Vietnam"; — WILSON, 2003a: 265 figs 79-80 (♂ head, thorax, penile organ & appendages), 266-267, "China (Guangxi)".

Calicnemis miles: FRASER, 1933: 173 key, 178-181 fig. 80 (♂ appendages), "Burma, India (Sikkim)".

Material. — 2 ♂, Luzhou, Sichuan, 18-VII-2002, Ming Bai & Jianfeng Wang leg. (CHU); 1 ♂, Shimen, Hunan, 3-VIII-2004, Ying Tian leg. (NKUM); 1 ♂, Baishuijiang, Gansu, 10-VII-2005, Xin Yu leg. (NKUM).

DISTRIBUTION. — Burma, China (Gansu, Guangxi, Hunan, Sichuan), India (Sikkim), Laos, Thailand, Vietnam.

REMARKS. — This species has a relatively constant pattern of body coloration and markings. In all the specimens we have examined, the antehumeral stripes are always orange and the abdomen is always red, with few markings.

CALICNEMIA GULINENSIS SP. NOV.

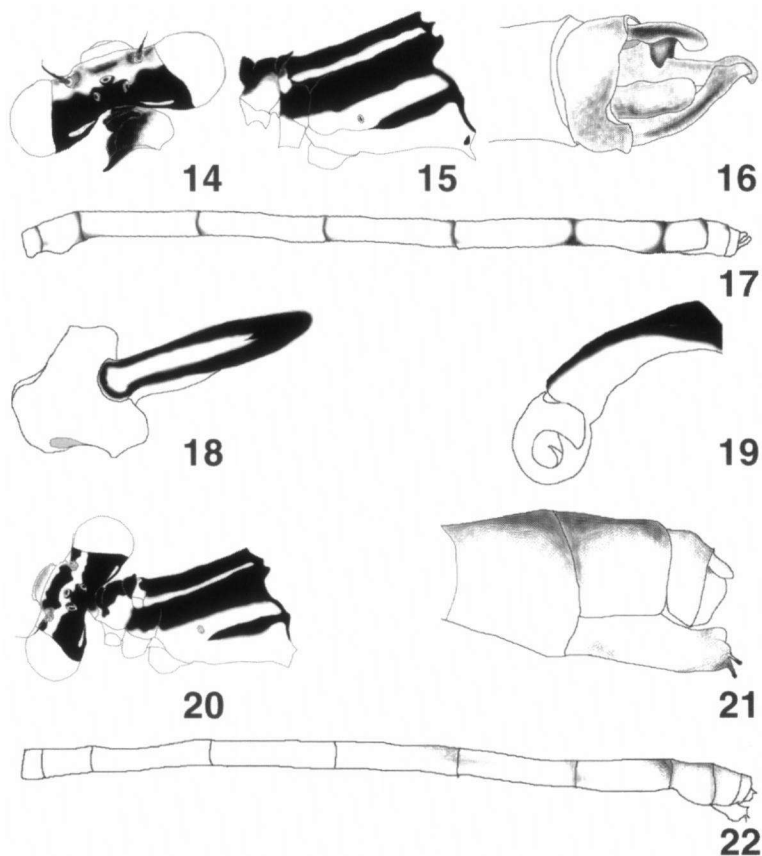
Material. — **Holotype** ♂: Yanhaijiang, Gulin, Sichuan, China, 2-VII-2001. — **Paratypes**: 1 ♀, ditto.; 1 ♂, ditto., 7-VII-2001. Holotype will be deposited at College of Life Sciences of Hebei University, Baoding, China, and paratypes will be deposited at Institute of Entomology, College of Life Sciences of Nankai University, Tianjin, China.

Etymology. — Named after the type locality.

MALE. — **Head.** — Labium pale yellow. Labrum, bases of mandibles, genae yellow. Anteclypeus yellow with distal border dark laterally but pale centrally. Postclypeus brownish yellow with all distal and lateral borders black. Frons yellow, with its upper half grading into dark yellow. Top of head black, pitted,

with irregular broad transverse brownish yellow line across front half, covering anterior ocellus and linking with upper half of frons at both inner bases of antennae. First antennal segment black with yellow base. Second segment yellow. Third segment dark yellow, and fourth segment black. Postocular spots yellow, stripe-like (Fig. 14).

T h o r a x. — Prothorax black dorsally, yellow laterally. Synthorax black dorsally, with yellow antehumeral stripes. Sides of synthorax black above first lateral suture and yellow below, except for a black stripe along upper 2/3 of second lateral suture (Fig. 15). Coxae yellow, outer faces of trochanters and femora dark brown with inner faces yellow. Tibiae and tarsi black. Wings hyaline, pterostigma dark brown, braced, covering one cell.



Figs 14-22. *Calicnemia gulinensis* sp. n., Yanhaijiang, Gulin, Sichuan, male: [14-19] (14) head and prothorax; — (15) thorax; — (16) caudal appendages; — (17) abdomen; — (18) penile organ, ventral view; — (19) penile organ, lateral view; — female: [20-22] (20) head and prothorax; — (21) caudal appendage, lateral; — (22) abdomen.

Abdomen. — Predominantly orange. Segment 1 yellow with pale dark brown dorsal mark and dark brown distal ring. Segments 2 to 7 with dark brown distal rings, broader at segments 6 and 7. Segments 8-9 brownish yellow with only dorsal half distal rings dark brown. Segments 10 brownish yellow with distal edge dark brown. (Fig. 17). Caudal appendages as in Figure 16, with superior appendages a little shorter than inferior, which are twice as long as abdominal segment 10. Penile organs as in Figures 18-19, with short, shield-like lobe.

FEMALE. — Very similar to male, only differing as follows: transverse brownish yellow line on top of head narrower than male, not linking with upper half of frons; leg color paler than male. Abdomen reddish yellow; caudal appendages short, obtuse, vulvar scales robust, just extending to the end of abdomen as shown in Figure 21.

Measurements (mm). — Male, abdomen + appendage 30.5; hind wing 24.0; female, abdomen + appendage 29.5; hind wing 24.5.

DIFFERENTIAL DIAGNOSIS. — The new species is much like *Calicnemia chaoi* but differs in the shape of the penile organs and by the lack of amber coloration of the wings. The base of the penile lobe (Fig. 18) of the new species is not concave as in *C. chaoi* (cf. WILSON, 2004: 429, figs 17-18). This new species is also like the new species *C. porcata* but differing with respect to the black markings covering the metathoracic pleural suture and the lack of a ridge on the surface of the penile lobe.

CALICNEMIA PORCATA SP. NOV.

Material. — **Holotype** ♂: Qingyinge, Mt Emei, Sichuan, China, 4-VII-1957, Keren Huang leg. Holotype will be deposited at Institute of Zoology Chinese Academy of Sciences, Beijing, China.

Etymology. — Named after the ridge on the surface of the penile lobe.

MALE. — **Head.** — Labium pale yellow. Labrum, bases of mandibles, and genae yellow. Anteclypeus yellow with distal border dark laterally but pale centrally. Postclypeus blackish brown with all distal and lateral borders black. Frons yellow, with its upper half grading into dark yellow. Top of head black, pitted, with irregular transverse yellow line across middle (Fig. 24), covering anterior ocellus. First antennal segment black, with second segment dark yellow. Postocular spots pale yellow, tear-shaped.

Thorax. — Prothorax black dorsally, yellow laterally. Synthorax black dorsally, with narrow yellow antehumeral stripes. Sides of synthorax with a yellow stripe across metepisternum, covering spiracle, and lower metepisternum and meteposternum yellow (Fig. 24). Legs brown. Wings hyaline, pterostigma brown, braced, covering one cell.

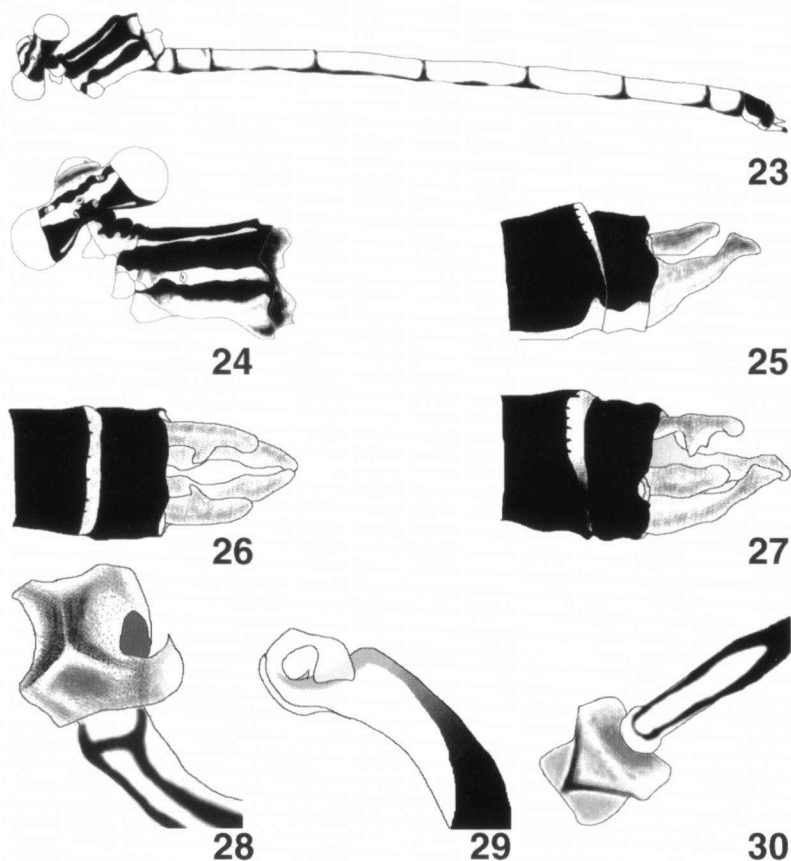
Abdomen. — Brick-red with dark brown marks as below. Segment 1 yellow, with pale brown longitudinal dorsal mark and distal ring. Segments 2 to 8 with distal rings, broader at segments 7 and 8, and irregular longitudinal stripe ventrally,

segment 2 also with a pale transverse dorsal subdistal mark. Segments 9 and 10 all black except ventro-laterally (Fig. 23). Caudal appendages as in Figures 25-27, with superior appendages a little shorter than inferior, which are twice as long as segment 10. Penile organs as in Figures 28-30, with short, shield-like lobe.

Measurements (mm). – Abdomen + appendage 31.0; hind wing 22.5.

FEMALE unknown.

DIFFERENTIAL DIAGNOSIS. – This new species is more like *C. miles* with respect to the body markings, coloration, and morphology of the caudal appendages, but differs in the characters of the penile organs because of the unique ridge on the surface of the penile lobe of the new species. The new species is also like *C. chaoi*



Figs 23-30. *Calicnemia porcata* sp. n., Qingyinge, Mt Emei, Sichuan, China, male: (23) body; – (24) head and thorax; – (25) caudal appendage, lateral; – (26) caudal appendage, dorsal; – (27) caudal appendage; – (28) penile organ, ventral view; – (29) penile organ, lateral view; – (30) penile organ, ventral view.

in body markings and shape of penile organs, but lacks the amber coloration of the wings of that species. Also, *C. chaoi* has no ridge on the surface of the penile lobe.

REMARKS. — The ridge on the surface of the penile lobe of new species gives us such a strong impression and makes it easy to distinguish it from other congeners, so we decided to describe this one as a new species, although there is only one specimen known.

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