

PSEPHENIDAE:

1. Check list of the Psephenidae of China (Coleoptera)

C.-F. LEE & M.A. JÄCH

Abstract

22 species of Psephenidae from China are listed, including information on the type depository, sex of the holotype, type locality and new distributional records. Notes on the ecology of each subfamily are given. *Microebrianax* PIC is synonymized with *Psephenoides* GAHAN. *Schinostethus satoi junghuaensis* LEE, YANG & BROWN is synonymized with *S. satoi satoi* LEE, YANG & BROWN. *Mataeopsephus coreanicus* DELÈVE is recorded for the first time from China (Liaoning). *Mataeopsephus nitidipennis* WATERHOUSE is recorded for the first time from Hong Kong.

Key words: Coleoptera, Psephenidae, China, species list

Introduction

Psephenidae belong to the superfamily Dryopoidea (sensu CROWSON 1978) or Byrrhoidea (sensu LAWRENCE & BRITTON 1994). The larvae are exclusively aquatic. Most species live in running water (springs, brooks, rivers), only few are known to occur in stagnant water, some genera prefer seepage water. Their flattened, often discoidal and "sucking-disc-like" body form distinguishes psephenid larvae immediately from other aquatic insect larvae. Due to this particular body form they are often termed "water pennies". Pupae are usually terrestrial, but pupae of Psephenoidinae are aquatic. Adults are strictly terrestrial, they are short lived and display an interesting mating behavior (BROWN 1987, GAHAN 1914, JÄCH 1984, LEE & YANG 1993, MURVOSH 1971).

BROWN (1981) listed 24 genera and 130 species of Psephenidae in his world check list. Since then, three new genera (*Granuleubria* JÄCH & LEE, *Microebria* LEE & YANG and *Nematopsephus* JÄCH & JENG) and ca. 30 new species have been described, five known genera (*Bertrandia* PIC, *Drupeubria* NAKANE, *Falsodrupeus* PIC, *Macroebria* PIC, *Spineubria*) have been transferred to this family and 5 generic synonymies have been established (*Alabameubria* BROWN and *Spineubria* = *Dicranopselaphus* GUÉRIN; *Cophaesthetus* WATERHOUSE and *Drupeubria* NAKANE = *Schinostethus* WATERHOUSE; *Grammeubria* KIESENWETTER = *Ectopria* LECONTE).

Only one species, *Mataeopsephus nitidipennis* WATERHOUSE, was listed by WU (1933, 1937) in his catalogues of Chinese Psephenidae. However, under the family Dascillidae, 7 additional species were listed by WU (1937) (*Cophaesthetus opacus* WATERHOUSE, *Dicranopselaphus testaceicornis* (PIC), *Eubrianax albomaculatus* PIC, *E. ramicornis* KIESENWETTER, *Homoeogenus obscurus* (PIC), *H. punctatum* WATERHOUSE and *Schinostethus nigricornis* WATERHOUSE). *Eubrianax ramicornis* and *Schinostethus opacus* must be removed from the list of Chinese species since neither their original descriptions nor any other publication indicates that these species ever were found in China. MIWA (1931) recorded *E. ramicornis* from Taiwan. However, the distribution of this species very probably is limited to Japan (see CHU & HAIHO 1981).

In the present paper, we follow the systematic concept of HINTON (1955) who divided the Psephenidae into four subfamilies (Psepheninae, Eubrianacinae, Psephenoidinae, and Eubriinae).

The species lists below include the following information: author, year and page of original description, type locality (province only), type depository, sex of the holotype, important references and new distributional records.

Abbreviations:

BMNH	The Natural History Museum, London [formerly: British Museum (Natural History)]
CASS	California Academy of Sciences, San Francisco
CWBS	China Water Beetle Survey
KUF	Entomological Laboratory, Kyushu University, Fukuoka
MHNP	Muséum national d'Histoire naturelle, Paris
NMW	Naturhistorisches Museum, Wien
NTU	Department of Plant Pathology & Entomology, National Taiwan University, Taipei
SIW	Smithsonian Institution, Washington, D.C. [= National Museum of Natural History]
TMB	Természettudományi Múzeum, Budapest

CWBS loc. 8: **Hong Kong;** New Territories; Tai Po Kau Forest Nature Reserve near Tai Po New Town; stream, ca. 3 m wide, flowing through secondary forest, ca. 150 - 200 m a.s.l.; 27.VI.1992; leg. Jäch

The material of this survey is based mainly on literature records. The material of the CWBS and the very rich material collected by D. Dudgeon with light traps in Hong Kong (deposited in the NMW) is included only partly (Psepheninae).

Psepheninae LECONTE & HORN

This subfamily comprises 2 genera: *Psephenus* HALDEMAN, 1853 (incl. subg. *Sinopsephenus* NAKANE), 1964 and *Mataeopsephus* WATERHOUSE, 1876. A revision of the Asiatic species of the subfamily is in preparation by the authors.

1. *Mataeopsephus coreanicus* DELÈVE, 1967: 414; KOREA; TMB; ♂; LIAONING, new record (SIW, NMW)
2. *Mataeopsephus esakii* NAKANE, 1964: 49 (*Mataeopsephenus*, invalid emendation); TAIWAN; KUF; ♂; LEE et al. (1990), redescr.
3. *Mataeopsephus nitidipennis* WATERHOUSE, 1876: 17; CHINA (exact loc. data unknown); BMNH; ♀; HONG KONG, CWBS loc. 8, new record (NMW)
4. *Mataeopsephus taiwanicus* LEE, YANG & BROWN, 1990: 74; TAIWAN; NTU; ♂
5. *Psephenus* (*Sinopsephenus*) *chinensis* NAKANE, 1964: 50; GUANGDONG; CASS; ♂; HONG KONG; DUDGEON (1995)

Mataeopsephus coreanicus could be a synonym of *M. japonicus* (MATSUMURA, 1916), described from Japan. More material has to be studied to determine this.

ECOLOGY: The life history, secondary production and microdistribution of *Psephenus* (*Sinopsephenus*) *chinensis* and *Mataeopsephus nitidipennis* (under "*Mataeopsephus* sp.") was studied by DUDGEON (1995). MURVOSH (1971) and BROWN (1987) briefly described the behavior of *Psephenus herricki* DEKAY from North America. The adult behavior of a Japanese species, *M. japonicus* (MATSUMURA), was discussed by MATSUMURA (1916). The adults of *M. japonicus*, like those of *M. taiwanicus* LEE, YANG & BROWN, are nocturnal and strongly phototactic. In contrast, American species of the genus *Psephenus* are diurnal and not attracted to light (MURVOSH 1971).

Eubrianacinae BÖVING & CRAIGHEAD

This subfamily includes only one genus (*Eubrianax* KIESENWETTER, 1874). *Microeubrianax* PIC, 1954, included in Eubrianacinae by BROWN (1981) must be transferred to Psephenoidinae. With the exception of *E. albomaculatus*, no species has been described or recorded from mainland China

although this genus is quite common in the southern parts. Numerous new species await description.

1. *Eubrianax albomaculatus* PIC, 1926: 30; CHINA (exact loc. data unknown); MHNP; probably ♀
2. *Eubrianax alishanensis* LEE & YANG, 1990: 83; TAIWAN; NTU; ♂
3. *Eubrianax flavus* LEE & YANG, 1990: 82; TAIWAN; NTU; ♂
4. *Eubrianax niger* LEE & YANG, 1990: 81; TAIWAN; NTU; ♂
5. *Eubrianax tarokoensis* LEE & YANG, 1990: 81; TAIWAN; NTU; ♂
6. *Eubrianax wulaiensis* LEE & YANG, 1990: 80; TAIWAN; NTU; ♂

ECOLOGY: Very little has been published about the ecology of *Eubrianax*. The life history, secondary production and microdistribution of an unnamed *Eubrianax* sp. from Hong Kong was studied by DUDGEON (1995). The adult behavior of some Taiwanese species was described by LEE & YANG (1990): Males of *E. flavus* fly along streams on sunny days, whereas in *E. wulaiensis*, a sympatric species, both sexes rest on the back of leaves of plants bordering streams; even if they accidentally drop, they rapidly fly up again and look for a leaf to rest on. Such behavioral diversity naturally creates reproductive separation. Thus it is not surprising that three or four *Eubrianax* species can inhabit the same locality. All Taiwanese species are univoltine. Adults occur between January and May. In addition, TAKAHASHI & SATÔ (1988) indicate that the flight activity of *E. ramicornis* is positively correlated with solar radiation and negatively correlated with wind velocity. The ecology of the American *E. edwardsi* (LECONTE) was studied by MURVOSH (1992) and CLARK & RALSTON (1974).

Psephenoidinae BOLLOW

Three genera (*Psephenoides* GAHAN, 1914, *Afropsephenoides* BASILEWSKY, 1959 and *Nematopsephus* JÄCH & JENG, 1995) and about 10 species of Psephenoidinae are known. *Microeubrianax* PIC, of which the senior author has examined the type species (deposited in the MHNP) is herewith officially synonymized with *Psephenoides*. Numerous new species await description.

1. *Psephenoides subopacus* (PIC, 1954: 64) (*Microeubrianax*); FUJIAN; one syntype (♂) in MHNP, depository of second syntype unknown

One species of the genus *Nematopsephus* was recorded from China by YANG (1994) under the unavailable name "*Sinopsephenoides filitarsus*" (nomen nudum).

The morphology of the larvae and pupae was discussed in detail by BÖVING (1926) and HINTON (1947, 1955, 1966). The pupae are remarkable in that they are aquatic and have tufts of spiracular gills (BROWN 1987).

ECOLOGY: The life history, secondary production and microdistribution of an unnamed *Psephenoides* sp. from Hong Kong was studied by DUDGEON (1995). The adult behavior of an undescribed Taiwanese species is similar to that of *Ectopria hsui* LEE & YANG. Specimens of this species generally rest on the back of leaves, and they are strongly attracted by lights (LEE & YANG 1994). The diurnal behavior of *Psephenoides immisi* GAHAN and 2 Nepalese species was described by GAHAN (1914) resp. JÄCH (1984).

Eubriinae LECONTE

Eubriinae is the most diverse subfamily both taxonomically and ecologically. Fifteen genera and more than 60 species are included in this subfamily, but many species and a number of genera are to be described yet. Five genera are known from China: *Dicranopselaphus* GUÉRIN-MÉNEVILLE,

1861, *Ectopria* LECONTE, 1853, *Homoeogenus* WATERHOUSE, 1880, *Macroebria* PIC, 1916 and *Schinostethus* WATERHOUSE, 1880.

1. *Ectopria hsui* LEE & YANG, 1994: 387; TAIWAN; NTU; ♂
2. *Dicranopselaphus testaceicornis* (PIC, 1923: 10) (*Grammeubria*); SHANDONG; MHNP; ♀
3. *Homoeogenus chinensis* LEE & YANG, 1993: 352; SICHUAN; BMNH; ♂
4. *Homoeogenus elongatus* LEE & YANG, 1995: 355; YÜNNAN; NMW; ♂
5. *Homoeogenus lauræ* LEE & YANG, 1993: 353; TAIWAN; NTU; ♂
6. *Homoeogenus obscurus* (PIC, 1923: 12) (*Drupeus*); SHANDONG; MHNP; ♀; LEE & YANG (1995), redeser.
7. *Homoeogenus punctatum* WATERHOUSE, 1880: 565; CHINA (exact loc. data unknown); BMNH; ♀; LEE & YANG (1993), redeser.
8. *Macroebria testacea* PIC, 1954: 64; FUJIAN; depository and sex of the holotype (by monotypy) not known, the specimen was collected in 1946 by a Chinese ("Tschung Sen") and sent to J.F. Klapperich, Bonn, who frequently sold material to various European museums
9. *Schinostethus nigricornis* WATERHOUSE, 1880: 564; CHINA (exact loc. data unknown); BMNH; ♀; LEE & al. (1993), redeser.
10. *Schinostethus satoi* LEE, YANG & BROWN, 1993: 688 (= *S. satoi jinghuaensis* LEE & al., 1993: 692, syn.n.); TAIWAN; NTU; ♂

BERTRAND (1972, 1977) described and illustrated the immature stages of a number of (unnamed) genera. LEE & YANG (1993) and LEE & al. (1993) described the immature stages of *Homoeogenus* and *Schinostethus*.

ECOLOGY: The larval habitats of some Taiwanese species were described in detail by LEE & YANG (1993) and LEE & al. (1993), showing a variety of different habitats for different genera. For example, larvae of *Homoeogenus* spp. prefer still water, whereas *Schinostethus* spp. are found in seepage water.

Discussion

With the exception of *Mataeopsephus coreanicus*, all species listed above seem to be endemic to China. Most species are recorded from only one province. The majority of the species is known from Taiwan (10 spp.), followed by Fujian (2 spp.), Shandong (2 spp.), Hong Kong (2 spp.), and Guangdong, Liaoning, Sichuan, Yünnan, each with one recorded species. Three species were described from "China", without exact locality data.

The reason for the presumptive poverty of Chinese Psephenidae is simply the fact that psephenid adults are generally difficult to obtain although larvae are usually rather common. Rearing methods were described by LEE & YANG (1990, 1993). Rearing and operating light traps are generally the most efficient methods for collecting adult psephenids. By inference from the rather large number of species recently described from Taiwan, we can expect that the number of species occurring in mainland China and which are yet to be described will be at least 10 times the present number.

However, due to the obviously very restricted distribution of most species psephenids are more vulnerable to extinction than many other insects.

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Chi-Feng LEE

Department of Plant Pathology and Entomology, National Taiwan University, Taipei, Taiwan

(Recent address: *Museum of Biological Diversity, The Ohio State University, 1315 Kinnear Road, Columbus, OH 43212-1192, U.S.A.*)

Dr. Manfred A. JÄCH

Naturhistorisches Museum, Burgring 7, A - 1014 Wien, Austria

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