

TWO NEW SPECIES OF MAYFLIES FROM CHINA

(Order Ephemera)

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In going over the collection of mayflies in the Department of Entomology at Cornell University, I found one species of Chinese mayfly which is hitherto undescribed. This species was collected by Prof. C. R. Kellogg of Fukien Christian University, Foochow, and was sent to Prof. James G. Needham, when the latter was visiting Professor of the China Foundation in China 1927- '28.

Another new species of Chinese mayfly was collected by Mr. H. T. Feng of Nankai University, Tientsin, at present a Rockefeller Foundation Fellow in this Department, on his collecting trip to Kirin Province in the summer of 1929. He has kindly turned over the specimens to me for study.

I am deeply indebted to Professors Needham and Kellogg, and Mr. Feng for their generosity in furnishing me the material for this study.

PAEGNIODES Eaton 1881

The genus *Paegniodes* was first described by Eaton in 1881 in the *Entomological Monthly Magazine* XVIII, 23, based upon the type species of the genus, *Paegniodes cupulatus*, which was recorded from Hongkong, China, and is now in the British Museum. This genus has been recorded only from China and so far only one species has been described, the type species of the genus mentioned above.

The genus belongs to the Family Ecdyonuridae and is very closely related to the genus *Heptagenia*. In fact, Eaton put the species *Paegniodes cupulatus* in the genus *Heptagenia* in 1871 before he established this genus in 1881. *Paegniodes* differs from *Heptagenia* mainly in that the caudal filaments of both the male and female are three times as long as the body, and the penis is entirely cleft, with the lobes widely separated from each other, cylindrical, and broadened into club-form at the apex.

Paegniodes fukienensis sp. nov.

Imago (in alcohol), ♂.—Thorax deep brown-ochreous above; pronotum with two more or less triangular black spots in the middle; mesopleura with a triangular black spot on each side. Abdomen light brown-ochreous above, with a median longitudinal streak; apical borders of the segments in each of the segments 2-8 on each side with a broad oblique lateral stripe from the hinder border to the spiracular line, and a fine abbreviated streak from the hinder angle of the dorsum along the same line, intense purple-madder-brown, or purple-black; venter unicolored; tenth abdominal sternite of male notched on hind margin between the genital appendages and distinctly separated from the projecting lateral parts on which the genital appendages are attached, the notch itself being convex. Setae very long, 3 times longer than the body and light burnt-umber brown. Legs dull translucent rufo-lutescent almost rufous; fore leg with

the distal projection of the tibia pitch-brown and the tarsus light brown-ochreous. *Tarsal formulae: I. $2\frac{1}{2} - 10 - 10 - 7 - 3$; II. $8 - 10 - 9 - 5 - 6$; III. $7 - 10 - 8 - 5 - 7$. Wings vitreous; fore wing burnt-umber brown along the costa from the base to the pterostigmatic space and yellowish-brown from thence to the apex in the marginal and submarginal areas; hind wing with outer marginal area tinted with raw-umber brown, costal marginal area vitreous. Penis entirely cleft, the lobes being widely separated from each other, cylindrical, broadened into club-form at apex; club portion of peneal lobes armed with a patch of short spines on the proximo-lateral portion and a tooth at the middle of its inner margin; titillators strong and caudo-laterally projected, armed with five or six teeth at the distal ends; forceps four jointed, second joint three times longer than the two terminal joints together.

Length of body 14 mm., wing 14.5 mm., setae 45 mm.

Holotype—♂ imago, Ling Sioh, Fukien Province, China, May (C. R. Kellogg), in Cornell University Collection.

EPHEMERA, Linn. 1746; restricted, Leach, 1815.

***Ephemera kirinensis* sp. nov.**

Imago (in alcohol), ♂. — Head brown-ochreous above; proximal segment of antennae with black brown ring at its distal and proximal ends; eyes grayish black, widely separated. Pronotum brown-ochreous above, with two black brown spots at the anterior margin and two black brown longitudinal stripes running to the posterior margin. Meso- and meta-nota brown-ochreous. Abdomen light yellowish brown above and light yellow below, with linear longitudinal markings. Dorsal abdominal markings: three pairs of subcontinuous and subparallel series of strongly marked black brown linear stripes, extending from the 3rd to the 9th segment down the middle of the back, with the middle pair very faint in segments 3-5, faint in segment 6, and very strongly marked in segments 7-9, 10th tergum with only two long lateral stripes and two short pale median stripes. Lateral abdominal markings: one linear black brown longitudinal stripe along the spiracular line in each segment from 3-9, and a linear oval stripe at the anterior lateral angle of each tergum just below the spiracular stripe from segments 2-7; abdominal sterna with one linear longitudinal black brown stripe on each side from segments 3-9. Wings greenish brown; fore wing with greenish brown to black brown neuration, a longitudinal blotch of dull brown area at the middle from costal margin to the medial vein, costal marginal area dull brown, outer marginal area light greenish brown; hind wing with outer marginal area pale greenish brown. Fore tibiae black brown, femora vitreous brown, tarsi light gray; mid and hind legs white. Setae yellowish brown, with black brown rings at the joints.

Length of body 16 mm., wing 13.5 mm., setae 29 mm.

Subimago (in alcohol), ♀. — Very similar to the male but paler. Wings vitreous, with black brown cross neurations only in the costal marginal area, without the

*Needham's system. Roman numerals designate the three pairs of tarsi: I=fore-tarsi, II=mid-tarsi, III=hind-tarsi. Arabic numerals designate the proportionate lengths of the five tarsal segments in terms of ten beginning from the proximal to the distal segment.

longitudinal stripe in the fore wings. Fore legs white, with black brown patches at distal ends of tibiae and femora and proximal end of tibiae.

Length of body 18 mm., wing 16 mm., setae 34 mm.

Holotype—♂ imago, *Allotype*—♀ subimago, North Hill, Kirin, June 18, 1929 (H. T. Feng), in Nankai University Collection, Tientsin, China.

Paratypes—18 ♂ imago, 6 ♀ subimago, North Hill, Kirin, June 18, 21, 1929, Kiangnan Garden, Kirin, June 20, 1929 (H. T. Feng), in Y.C. Hsu's collection.

EXPLANATION OF FIGURES.

Paegniodes fukienensis sp. nov.

Fig. 1 Male genitalia

Fig. 2 Dorsal abdominal markings

Fig. 3 Lateral abdominal markings

Ephemera kirinensis sp. nov.

Fig. 4 Male genitalia

Fig. 5 Dorsal abdominal markings

Fig. 6 Lateral abdominal markings

