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From

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NEW CHINESE MAYFLIES FROM KIANGSI PROVINCE (EPHEMEROPTERA)*

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In the present paper six species of mayflies, which are hitherto undescribed and new to science, are described and illustrated. The material for this study was collected by Dr. Wei-I Yang, now of Fan Memorial Institute of Biology, when he was the Director of the former Bureau of Entomology of Kiangsi Province, and was given to me when I was at Paris in the summer of 1932 for the Fifth International Congress of Entomology and when he was in the Laboratoire de Entomologie there. I am deeply indebted to Dr. Yang for his generosity in furnishing me the material for this study.

The six species herewith described fall into the following classification.

Family Ephemeridae

Subfamily Paligeninae

1. *Anagenesia yangi* n. sp.

Subfamily Potamanthinae

2. *Potamanthellus chinensis* n. sp.
3. *Potamanthodes nanchangi* n. sp.

Family Heptageniidae

Subfamily Heptageninae

4. *Iron minor* n. sp.

Family Baetidae

Subfamily Siphonurinae

5. *Isonychia kiangsinensis* n. sp.

Subfamily Ephemerellinae

6. *Ephemerella sinensis* n. sp.

FAMILY EPHEMERIDAE

Subfamily Paligeninae

Anagenesia yangi n. sp.

Length of body: Holotype ♂ imago 25 mm., Allotype ♀ subimago 22 mm., other males measure from 26 to 27 mm., and other females measure from 17 to 18 mm. Length of wing: Holotype ♂ imago 19 mm.

♂ imago (In alcohol)

A very large and heavy species. General coloration light brown to brown above and pale to pale creamy below.

* Supported by a Class C grant from the China Foundation 1933-'35.

Head broad and somewhat depressed. Vertex broad and light brown. Front pale. Compound eyes grayish and widely separated apart. Ocelli with black ring at base and pale on top. Antennae whitish with two large basal segments and a terminal filament.

Thorax with pronotum light yellowish brown, somewhat lighter on the margins and the middle portion. Mesonotum brownish with a light longitudinal stripe along the median line. Metanotum light yellowish brown. Ventral surface of thorax pale.

Legs pale. Foreleg short and stout, shorter than the hind leg. Fore tarsus slightly shorter than the femur and five segmented. Mid-femur very short only half the length of tibia. Mid-tarsus four segmented. Hind leg the longest. Hind tibia very long twice the length of the femur. Hind tarsus four segmented. Last tarsal segment bears only one claw.

Wings uniformly white. Subcosta of fore wing hidden in a fold of the membrane under radius, being invisible at apex and visible only at base. Branches of radius and media approaching each other in pairs. Three conspicuous sets of longitudinal veins proceed in pairs to the outer margin which is sinuate. Media forked before the middle at the same place with the radial forking.

Abdomen brownish above and pale below. Segments 3-9 each bearing a dusty brown patch at the middle of the tergum. Posterior margin of tenth tergite straight at middle and with two deep triangular lateral notches at the bases of the two lateral tails. Posterior margin of tenth sternite roundly notched. Tails pale. The lateral tails very long measuring 48 mm. in length, and pubescent all over. Median tail very short and rudimentary, consisting of only four or five segments.

Genitalia with forceps consisting of three segments. Basal segment very long, last two segments very short. The last two segments together being about $\frac{1}{4}$ the length of the basal segment. Pineal lobes of imago narrow and with a sharp incurved distal tooth. They are separated. Pineal lobes of subimago fused at base and broader than in imago.

♀ Subimago (In alcohol)

General coloration brown to chocolate above, light brown to brown below.

Head with vertex brown, armed with two reddish brown transverse patches behind the two lateral ocelli. Epicranial suture chocolate. Front light brown. Lateral ocelli same as in male. Median ocellus not elevated.

Pronotum deep brown with a chocolate median longitudinal line. Mesonotum chocolate with a pale median longitudinal stripe. Metanotum deep brown. Ventral surface of thorax

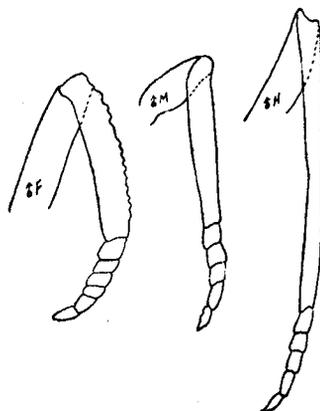


Fig. 1. *Anagenesia yangi* n. sp.
♂ Legs.

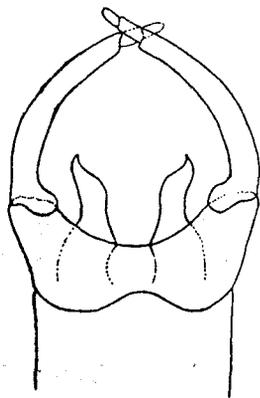


Fig. 2 *Anagenesia yangi* n. sp. ♂ imago.
Genitalia, ventral

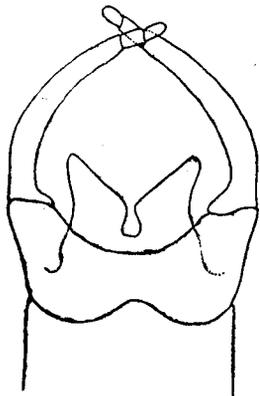


Fig. 3. *Anagenesia yangi* n. sp. ♂ subimago
Genitalia, ventral

brown to deep brown. Legs pale for the most part. Coxae deep brown.

Abdomen brownish above with dusty brown patches on the tergum of all abdominal segments. Posterior margin of tenth tergite roundly extended posteriorly in the middle. Ventral surface of abdomen light brown. Posterior margin of tenth sternite more or less straight. Tails shorter than in male, measuring only 14 mm. in length.

HOLOTYPE: one male imago from Hsieh Shan, Po-yang Lake (鄱陽湖口鞋山). Collected by Dr. Wei-I Yang on April 14, 1930. In Yin-chi Hsu's collection.

ALLOTYPE: one female subimago of same locality, date, and collector. In Yin-chi Hsu's collection.

PARATYPES: two male and two female subimagos of same locality, date and collector.

Subfamily Potamanthinae

Potamanthellus chinensis n. sp.

Length of body: Holotype ♂ imago 11 mm., another male measures 12 mm. Length of wing: Holotype ♂ imago 10 mm.

♂ imago (In alcohol)

A medium-sized species. General coloration brownish.

Head brownish, front margin triangular. Vertex narrow. Eyes grayish, more or less rounded. Ocelli with brown ring at base and pale on top. Antennae brownish with second segment about twice the length of the first one, distal filament short.

Thorax with pronotum brownish, much broader than long. Posterior margin notched. Mesonotum yellowish brown with three median longitudinal lines. Metanotum brownish. Ventral surface of thorax brownish.

Legs: Forelegs brownish, tibia twice the length of the femur, tarsal formula 1 - 3 - 3 - 2½ - 2, distal tarsal segment with two unequal blunt claws. Mid and hind legs yellowish, distal segment of tarsus with one blunt and one pointed and hooked claw.

Wings with brown patches. Cu₂ of fore wing is connected with Cu₁ at base. Cu₂ and rA independent from one another. 3A forked once with no cross veins here. M forked near the middle.

Abdomen brownish above and below. Lateral margins of tergites dusty brown. Posterior margin of tenth tergite with middle portion roundly extended out. Posterior margin of tenth sternite truncate, with two sharp, heavy, chitinized lateral pointed projections at posterior lateral angles. These two projections extending posteriorly a little beyond the two rudimentary forceps. Tails two in number, median tail rudimentary and very short being only 2-3 mm. in length. Lateral tails 27 mm. in length, pubescent with very minute hairs, with alternate reddish brown and yellowish rings.

Genitalia: Forceps rudimentary consisting of three very short segments, the two distal segments together being only half the length of the basal segment. Pineal lobes feeble and fused together with their distal ends pointed and curved inward.

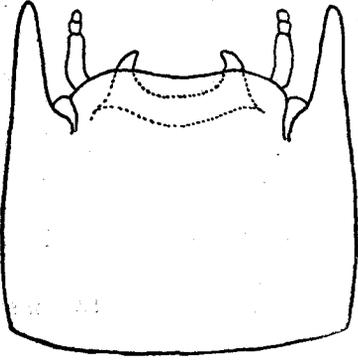


Fig. 4. *Potamanthellus chinensis* n. sp.
♂ Genitalia, ventral

HOLOTYPE: one male imago from Shang Jao (上饒). Collected by Dr. Wei-I Yang on June 15, 1930. In Yin-chi Hsu's collection

PARATYPES: one male imago of the same locality, date, and collector; another male imago from Pei Shan, Kirin Province (吉林北山). Collected by Dr. H. T. Feng on June 21, 1929. Both in Yin-chi Hsu's collection.

***Potamanthodes nanchangi* n. sp.**

Length of body: Holotype ♂ imago 10 mm. Length of wing: Holotype ♂ imago 10.5 mm.

♂ imago (In alcohol)

A medium-sized species. General coloration yellowish brown.

Head light yellowish. Vertex very narrow. Eyes large, round, grayish brown, nearly contiguous. Ocelli prominent, pale with black ring at base. Antennae pale, terminal filament short.

Thorax with pronotum yellowish, middle of posterior margin brownish and deeply notched. Mesonotum yellowish, lateral margins brownish. Metanotum brownish. Ventral surface of thorax yellowish. Legs light yellowish.

Wings transparent white, distal costal margin dull white. Cu_2 connected with 1A both arising from the same stem. 3A forked. M forked after the middle.

Abdomen brownish above. Posterior margin of each abdominal tergite dark brown. Ventral surface light yellowish. Posterior margin of tenth tergite with a quadrangular extension at the middle to cover the base of the median tail. Posterior margin of tenth sternite deeply and roundly notched. Tails light brown, dark brown ring at joints, 3 in number, 19 mm. in length.

Genitalia: Forceps each consisting of four segments, basal segment very short, two distal segments together only half as long as the second segment. Pineal lobes united, sharply pointed at tips, constricted at the middle a little posterior to the hind margin of the tenth sternite.

HOLOTYPE: one male imago from Nanchang (南昌). Collected by Dr. Wei-I Yang on May 20, 1930. In Yin-chi Hsu's collection.

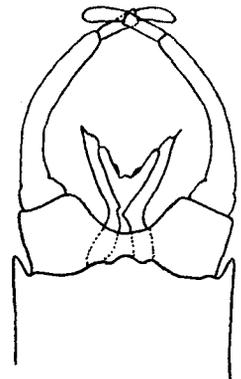


Fig. 5. *Potamanthodes nanchangi* n. sp.
♂ Genitalia, ventral

FAMILY HEPTAGENIIDAE

Subfamily Heptageninae

Iron minor n. sp.

Length of body: Holotype ♂ imago 7.7 mm. Length of wing: Holotype ♂ imago 8.5 mm.
♂ imago (In alcohol)

A medium-sized species. General coloration brownish.

Head yellowish. Eyes large, black, contiguous. Ocelli closely grouped together with basal black rings and white top. Antennae pale.

Thorax uniformly brownish above. Ventral surface yellowish with four black spots on meso- and meta-sternites. Legs pale. Fore tarsi about $1\frac{1}{2}$ longer than the femur, first tarsal segment the longest and the last one the shortest, the length of tarsal segments gradually decreasing from first segment on to the last one. Wings milky.

Abdomen with first six tergites brownish and last four yellowish, but with posterior margins brownish. Posterior margin of the tenth sternite truncate. Tails two in number, brownish at base and yellowish distally.

Genitalia: Forceps long and slender, 4-jointed, basal joint short, second joint $1\frac{1}{2}$ longer than the two terminal joints together, third joint slightly longer than the terminal one. Pineal lobes fused at base and widely diverging apically, with a small sharp tooth-like projection at the inner distal corner.



Fig. 6. *Iron minor* n. sp.
♂ Legs.

HOLOTYPE: one male imago from Shang Jao (上饒). Collected by Dr. Wei-I Yang on June 2, 1930. In Yin-chi Hsu's collection.

FAMILY BAETIDAE

Subfamily Siphonurinae

Isonychia kiangsinensis n. sp.

Length of body: Holotype ♂ imago 13 mm., Paratype 1 ♂ subimago 12 mm. Length of wing: Holotype ♂ imago 13.5 mm.

♂ imago (In alcohol)

A large species. General coloration reddish brown.

Head mostly occupied by the two eyes. Eyes large, grayish, and contiguous. Ocelli strongly elevated, prominent, closely grouped

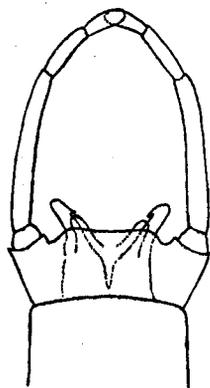


Fig. 7. *Iron minor* n. sp.
♂ Genitalia, ventral

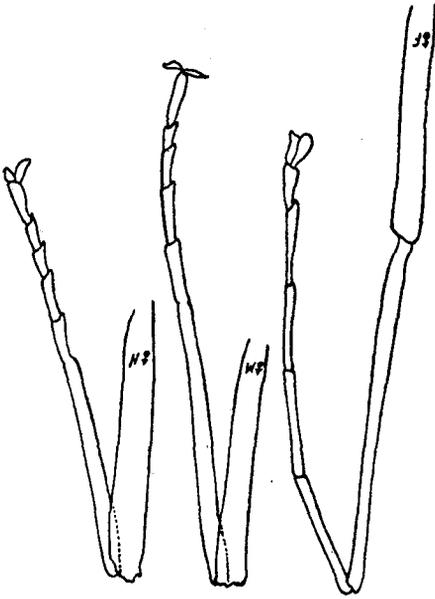


Fig. 8. *Isonychia kiangsinensis* n. sp.
♂ Legs.

together, median ocellus only $\frac{1}{2}$ the size of the lateral ocelli. Antennae yellowish, second segment quite long, terminal filament short.

Thorax: Pronotum reddish with margins dark reddish brown. Posterior margin deeply notched. Anterior margin mostly covered by the eyes. Mesonotum reddish, posterior end dark reddish. Metanotum reddish. Ventral surface of thorax reddish.

Legs: Foreleg with coxa, trochanter, femur, and tibia dark reddish brown, tarsus yellowish with distal ends of each tarsal segment brownish. Fore tarsus slightly longer than tibia, tarsal formula $2\frac{1}{2} - 2 - 1\frac{1}{2} - 1\frac{1}{2} - 1$. Mid and hind legs light yellowish or pale, tarsus nearly as long as tibia.

Wings white, stigmatic area dull white. 1A with four branched and two unbranched veins to the margin. M forked after the middle.

Abdomen light reddish brown above and yellowish below. Posterior margin of each abdominal tergite dark reddish. Tails yellowish brown, two in number, median tail very short and rudimentary.

Genitalia brownish. Forceps long, 4-jointed, basal joint enlarged, deeply excavated, second joint longest, somewhat enlarged at base, third joint longer than the terminal joint, two terminal joints together slightly shorter than the second joint. Pineal lobes separate, platelike, apical margin oblique.

♂ **subimago (In alcohol)**

General coloration brownish.

Head yellowish. Vertex narrow. Eyes dark grayish, nearly contiguous.

Pronotum brownish. Posterior margin deeply notched. Anterior margin mostly covered by the eyes. Mesonotum yellowish with lateral margins brownish. Metanotum brownish. Ventral surface of the thorax brownish.

Legs: Fore-femur reddish brown, tibia dark reddish brown, distal end of each tarsal joint reddish brown.

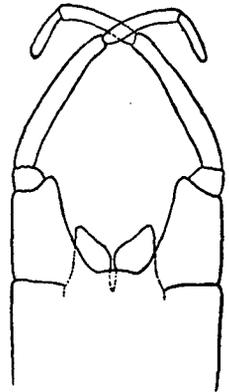


Fig. 9. *Isonychia kiangsinensis* n. sp.
♂ imago Genitalia, ventral.

Wings dull brownish, outer margin of fore and hind wings brownish, cross veins brownish.

Abdomen yellowish above and below. Posterior margin of each abdominal tergite reddish brown, but yellowish at middle. Tails yellowish, two in number, median one very short and rudimentary, pubescent all over, 14 mm. in length.

Genitalia very similar to those in ♂ imago, except the pineal lobes are broader.

HOLOTYPE: one male imago from Shang Jao (上饒). Collected by Dr. Wei-I Yang on June 2, 1930. In Yin-chi Hsu's collection.

PARATYPE: one male subimago from Sheng Mi (生米). Collected by Dr. Wei-I Yang on June 7, 1930. In Yin-chi Hsu's collection.

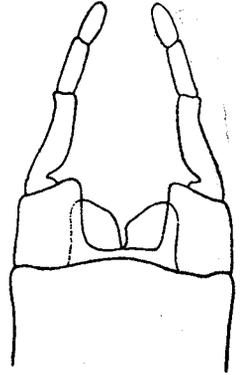


Fig. 10. *Isonychia kiangsinensis* n. sp. ♂ subimago Genitalia, ventral

Subfamily Ephemerellinae

***Ephemerella sinensis* n. sp.**

Length of body : Holotype ♂ imago 14.5 mm. Length of wing : Holotype ♂ imago 16.5 mm.

♂ imago (In alcohol)

A large species. General coloration pale to brownish.

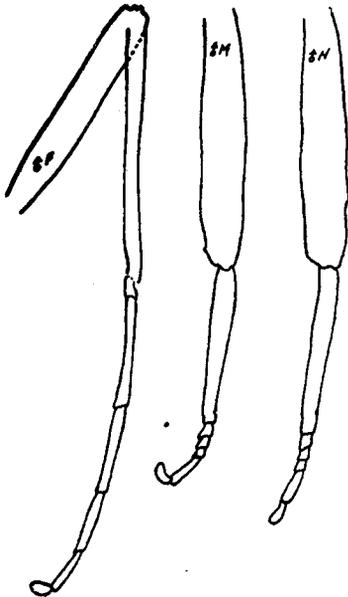


Fig. 11. *Ephemerella sinensis* n. sp. ♂ Legs

Head entirely occupied by two large dark grayish eyes on the dorsal side. Eyes contiguous. Front small. Ocelli closely grouped together, pale, with dark ring at base, prominently elevated. Antennae light brown.

Thorax with pronotum brown, anterior portion covered by the eyes. Mesonotum yellowish brown with three dark median longitudinal lines. Metanotum yellowish brown. Ventral surface of thorax yellowish brown.

Legs brownish. Fore tibia 1. 1/3 the length of femur, slightly shorter than tarsus, tarsal formula 1-6-5-5-4. Mid and hind tarsi half as long as the tibia. Tibia 2/3 the length of the femur.

Wings white, brown at base. 1A of fore wing close to 2A, 2A remote from 3A, 1A and Cu₂ entirely separated from each other. Forewings narrow. Hind wings more or less rounded.

Abdomen yellowish above and below with brown patches on the sides. Posterior margin of tenth tergite with a lobe at the middle. Posterior margin of tenth

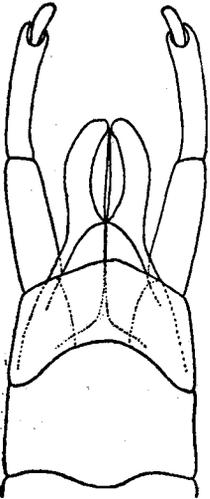


Fig. 12. *Ephemerella sinensis* n. sp.

♂ Genitalia, ventral

sternite convex. Tails three in number, 21 mm. in length, two basal joints pale, the rest brown, with dark brown ring at joints.

Genitalia: Forceps 3-jointed, two basal joints very long, about equal in length, distal joint very short, knob-like, blackish. Pineal lobes dark brown, closely fused together to form a single large plate-like structure with rounded distal margin.

HOLOTYPE: one male imago from Shang Jao (上饒). Collected by Dr. Wei-I Yang on June 6, 1930. In Yin-chi Hsu's collection.