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## ***Rhithrogena trispina* sp. n., a New Species from China (Ephemeroptera: Heptageniidae)**

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### **Abstract**

A new species, *Rhithrogena trispina* sp. n. from Tian-Mu-Shan Mountain of South-east China, is described and figured in detail at the imaginal stage. From the position of gonopore on the penis lobe, it belongs to the *znojkoii*-group.

**Keywords:** *Rhithrogena trispina* sp. n., new species, Ephemeroptera, Heptageniidae, China.

### **Introduction**

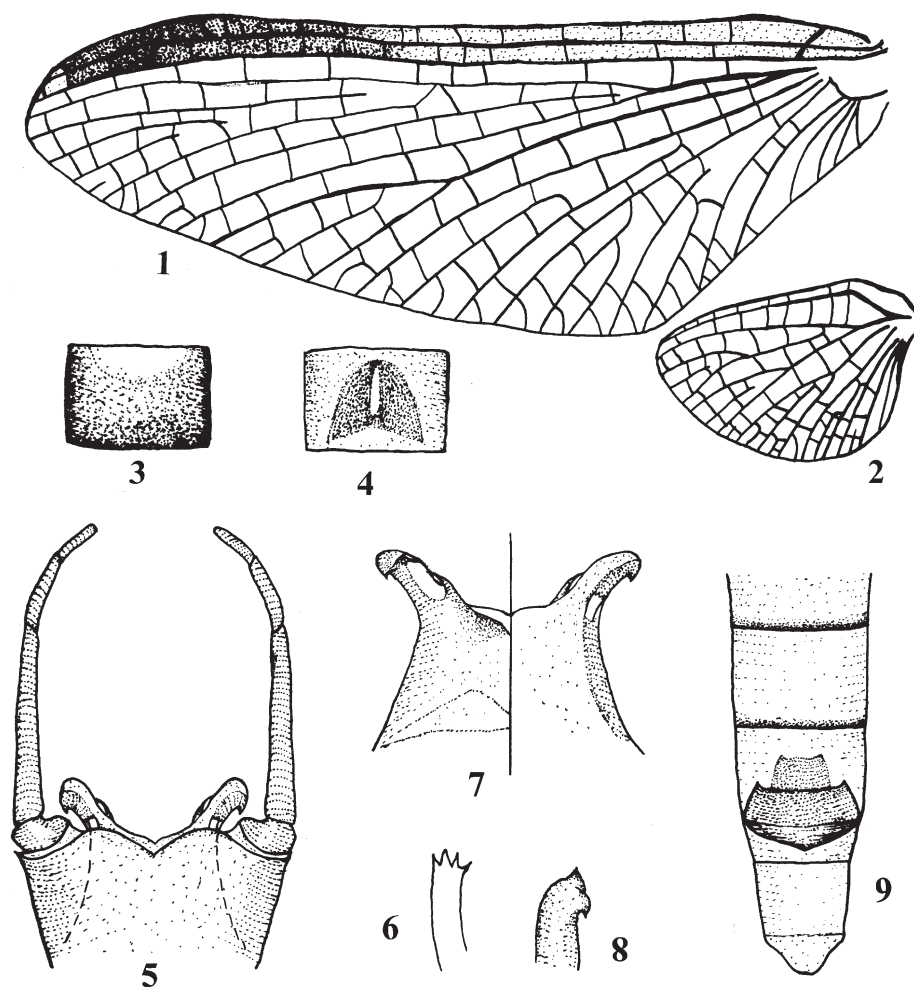
The genus *Rhithrogena* was erected by Eaton in 1881 for some species previously placed in genus *Heptagenia*, plus some new species. From then on, more than 100 species have been described in *Rhithrogena*. Among them, more than 80 occur in the Palearctic realm (Tshernova et al., 1986) and 23 in the Nearctic region (Allen & Cohen, 1977; McCafferty, 1997). In the Oriental region, as far as we know, 8 species are known (Ulmer, 1912; Hubbard & Peters, 1978; Braasch, 1981, 1984; Braasch & Soldán, 1986; Kang & Yang, 1994).

Sowa (1984) divided the European *Rhithrogena* species into 7 groups. After that, Belfiore (1987), Sartori & Oswald (1988) and Sartori & Sowa (1992) proposed new groups so that today 10 groups are recognised in the genus.

The new species described herein was collected from Tian-Mu-Shan Mountain, Zhejiang province of Southeast China in 1999. Most of type specimens are deposited in the Department of Biology, Nankai University, Tianjin, China, but two paratypes are in the Purdue Entomological Research Collection, Purdue University, USA.

### ***Rhithrogena trispina* sp. n. (Figs. 1–9)**

*Male imago* (in alcohol). Body length 12–14 mm, fore wings 14 mm, hind wings 4.5 mm, cerci 30 mm. General colour of body brown. Compound eyes moderately



Figures 1–9. *Rhithrogena trispina* sp. n.. Male imago: (1) Fore wing; (2) Hind wing; (3) Abdominal tergum color pattern; (4) Abdominal sternum color pattern; (5) Male genitalia (ventral view); (6) Titillator; (7) Dorsal view (left) and ventral view (right) of penes; (8) Lateral view of penis. Female imago: (9) Terminal part of the female abdomen.

high and globular, their lower portion dark, black, the upper part is brown. Eyes large, almost contiguous dorsally. Ocellar base darkish. Antennae darkish brown. Fore tibiae and tarsi darker than femora, almost black; femora with a distinct small blackish dot on the dorsal surface. Fore tarsi 1.2 times length of tibiae; tarsal segments in order of decreasing lengths = 3, 2, 4, 5, 1, basal fore tarsal segment 0.25–0.33 times segment 2. Hind legs with tarsi 0.35–0.50 times as long as tibiae, tarsal segments in order of decreasing lengths = 5, 1, 2, 3, 4. Claws on all legs dissimilar, one claw blunt, the

other sharp. Wings hyaline, area between C and Sc, Sc and R<sub>1</sub> of fore wings semi-hyaline, whitish, with indistinct crossveins, especially in pterostigmatic area (Fig. 1). Venation of hind wing as shown in Fig. 2. Veins of wings brown and clear. Color pattern of each abdominal tergum as shown in Fig. 3. Median portion of each sternum distinctly darker than the lateral portions, its pattern as shown in Fig. 4. Cerci darkish.

Genitalia: forceps uniformly brown to blackish, 3 segmented with a well defined basal segment, the 1st segment is the longest, the 2nd slightly longer than the 3rd one. Median margin of subgenital plate concave (Fig. 5). Titillators with 4 denticles on apical portion (Fig. 6). Penis lobes divergent. In dorsal view (Fig. 7, left), each penis lobe has three teeth, two on apical portion of penis lobe (Fig. 8), the other on the margin of gonopore where it is clearly visible both in ventral and dorsal views (Figs. 5, 7).

*Female imago.* Body length 11–12 mm, fore wings 12–13 mm, hind wings 4.5 mm. General color brown, the posterior margin of sternum 1–6 dark brown. Legs slightly brown to yellowish. Ventral view of the terminal part of the abdomen shown in Figure 9.

*Subimago and larva.* Unknown.

#### Material

*Holotype* ♂: Shan-Mu-Ping (780 m), Tian-Mu-Shan Mountain (30.26°N, 119.34°E), Zhejiang Province, China, VI-7-1999. — *Paratypes*: 1♂, 2♀♀ as holotype; 4♂♂, Shan-Mu-Ping, V-25-1999, collected by ZHAO Ming-Xui (deposited in Insects Collection, Department of Biology, Nankai University, Tianjin, China); 2♂♂, Shan-Mu-Ping, V-25-1999, collected by ZHAO Ming-Xui (deposited in Purdue Entomological Research Collection, Purdue University, USA).

#### Etymology

The name *trispina* is derived from the Latin words *tri-* (three) and *spina* (noun, meaning spine) and refers to the three teeth on each penis lobe of the new species.

#### Affinities

Based on the characters of genitalia, *Rhithrogena trispina* sp. n. belongs to the *znojtkoi*-group *sensu* Sartori & Sowa (1992). As in *R. paulinae* Sartori & Sowa, 1992, *R. eugeniae* Kluge, 1983 and *R. anatolica* Kazanci, 1985, the gonopore of *Rhithrogena trispina* sp. n. is situated on the subterminal portion of penis lobe. Unlike any other species in the same group, *Rhithrogena trispina* sp. n. has three teeth on the gonopore margin of the penis lobe.

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