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Four new species of Hydropsychidae (Insecta: Trichoptera) from Yunnan Province, China

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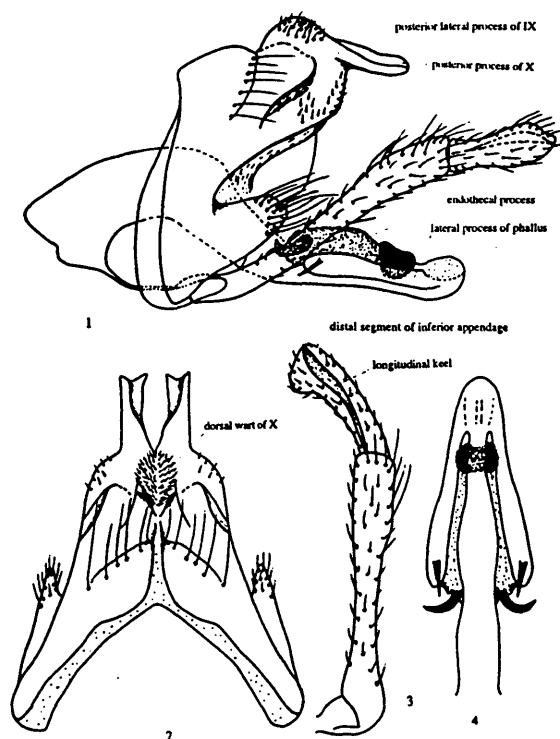
Abstract. Four new species, *Hydropsyche* (*Ceratopsyche*) *carina* n.sp., *H.* (*C.*) *shizongensis* n.sp., *H.* (*C.*) *excavata* n.sp. and *Potamyia ovalis* n.sp., collected in Yunnan Province, are described and figured. The type specimens are kept in the Insect Collections of Nanjing Agricultural University.

Hydropsyche (*Ceratopsyche*) *carina* n.sp. (Fig. 1-4)

Body yellow-brown, forewing length: male 9-10 mm, body length: 7-8 mm.

Male genitalia: Posterior lateral process of tergum 9 nearly square-shaped in lateral view. Posterior processes of 10 parallel to each other, each with a dorsal ridge and with its apico-mesal portion concave. A pair of dorsal warts of 10 broadly fused mesally. Distal segment of inferior appendage about one half as long as basal segment with a longitudinal keel on its mesal surface. Basal half of phallus gently humped upward to about 40 degrees, nearly twice as stout as distal half; two lateral processes presented on the apex of phallus, directed backward and each with a sub-distal spine, its apices reaching two-thirds along the phallus from the base. Endothecal processes membranous, each with a hooked apical spine. This new species is distinguished from all other species in the subgenus *Ceratopsyche* by the apex of the phallus being produced backward in two large lateral processes, about as long as one-third of phallus.

Holotype male: Hewai village, Wujiepu town, Luxi County, Yunnan province, 11 June 1998, 1730m elev., collected by Gui Furong. **Paratypes:** 5 males, same data as holotype; 1 male, small river of Zhuji village, Zhuji town, Shizong County, Yunnan Province, 12 June 1998, 1835m elev., collected by Gui Furong; 1 male and 10 females, 1 km east of Huanian Farm, Eshan County, Yunnan.



Figs. 1-4: *Hydropsyche* (*Ceratopsyche*) *carina* n.sp., male genitalia: 1. lateral view; 2. dorsal view of tergum 9 and 10; 3. inferior appendage, dorsal view; 4. distal part of phallus, ventral view.

Province, 4 June 1998, 1090m elev., collected by Gui Furong; 1 male, Fuquan village, Jinping town, Eshan County, Yunnan Province, 5 June 1998, 1593m elev., collected by Gui Furong; 1 male, upper part of small river, Shicheng village, Xize town, Xuanwei City, Yunnan Province, 14 June 1998, 1795m elev., collected by Gui Furong; 8 males, Bianao river, Huaping County, Yunnan Province, 30 May 1996, 1280m elev., collected by Yang Lianfang, John Morse and Du Yuzhou; 1 male, Xinzhuang river, Huaping County, Yunnan province, 30 May 1996, 1280m elev., collected by Wang Xinhua.

Etymology: Latin, "a keel", referring to the distal segment of the inferior appendage with a longitudinal keel.

Hydropsyche (*Ceratopsyche*) *shizongensis* n.sp. (Fig. 5-9)

Body yellow-brown, forewing length of male 8 mm, body length 6,5 mm.

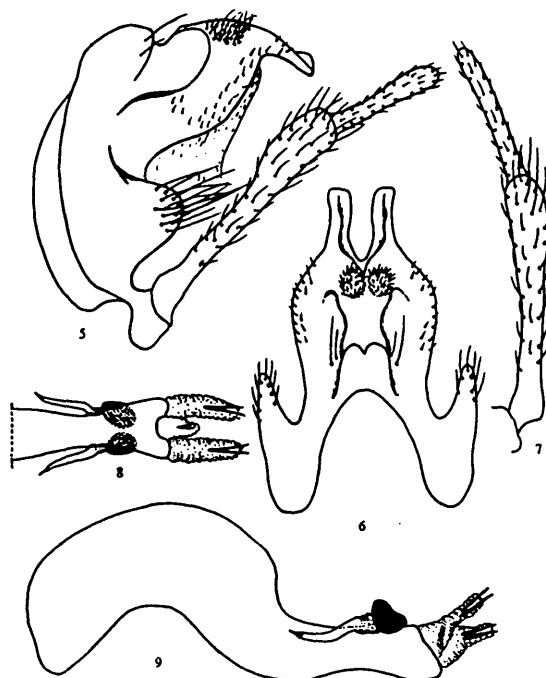
Male genitalia: Posterior lateral process of tergum 9 sub-elliptical in lateral view. Posterior processes of 10 parallel to each other, each with a dorsal ridge and with its apico-mesal portion concave. Two dorsal warts of 10 not fused to each other. Distal segment of inferior appendage straight, about three-fifths as long as that of basal segment. Basal two-thirds of phallus highly elevated, about 2,5 times as stout as its distal portion; apex of phallus with two large lateral and one small median membranous processes each bearing two spines. Endothecal processes directed backward each with a tiny distal spine.

This new species is especially close to *Hydropsyche* (*Ceratopsyche*) *tetrachotoma* LI & TIAN 1990 from Guangxi, but it could be easily distinguished from the latter by: (1) basal two-thirds of phallus highly elevated and at least 2,5 times as stout as its distal portion. (2) apex of phallus with three membranous processes rather than two processes as in the latter.

It is very similar to *Hydropsyche* (*Ceratopsyche*) *fukiensis* SCHMID 1965 from Fujian based on the apical membranous processes of phallus, but the endothecal process is much thinner and bent backward.

Holotype male: Small river of Zhuji village, Zhuji town, Shizong County, Yunnan Province, 12 June 1998, 1835m elev., collected by Gui Furong.

Etymology: Named from the county of the type locality.



Figs. 5-9: *Hydropsyche* (*Ceratopsyche*) *shizongensis* n.sp., male genitalia: 5. lateral view; 6. dorsal view of tergum 9 and 10; 7. inferior appendage, caudal view; 8. distal part of phallus, ventral view; 9. phallus, lateral view.

Hydropsyche (Ceratopsyche) excavata n.sp. (Fig. 10–13)

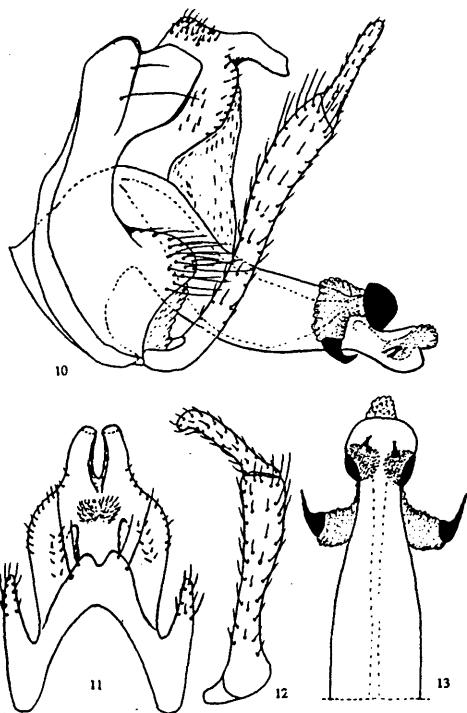
Body yellow-brown, forewing length of male 9-10 mm, body length 6,5-7 mm.

Male genitalia: Posterior lateral process of tergum 9 sub-triangle in lateral view. Posterior processes of 10 short and stout, converging at their apices, dorsal ridges weak and each positioned on its inner side. Distal segment of inferior appendage digitate with apex slightly hooked, one-third as long as the basal segment. Basal half of phallus strongly humped, slightly stouter than distal half; apex of phallus with a dorsal, sub-elliptical concavity with several tiny spines inside. Endothelial processes membranous and elastic, each with an apical hook.

This new species is especially close to *Hydropsyche vietnamensis* MEY 1995 from Vietnam. But it could be easily distinguished from the latter by: (1) posterior processes of 10 short and stout, only about 2,5 times as long as wide, but slender and at least 4 times as long as wide in *vietnamensis*. (2) apex of phallus with a dorsal, sub-elliptical concavity and with several tiny spines inside.

Holotype male: Meici river, Futian village, Niujie town, Eryuan County, Yunnan Province, 24 May 1996, 2362m elev., collected by Wang Beixin and Gui Furong. Paratypes: 1 male, same data as holotype; 20 males, same date and locality as holotype, but 2262m elev., collected by John Morse and Zhou Changfa; 1 male, 1 km north of Zhongdian County, Yunnan province, 27 May 1996, 3250m elev., collected by Yang Lianfang, John Morse and Wang Beixin.

Etymology: Latin, "excavated", referring to the apex of phallus with a sub-elliptical excavation.



Figs. 10-13: *Hydropsyche (Ceratopsyche) excavata* n.sp., male genitalia: 10. lateral view; 11. dorsal view of tergum 9 and 10; 12. inferior appendage, caudal view; 13. distal part of phallus, ventral view.

Potamyia ovalis n.sp. (Fig. 14–19)

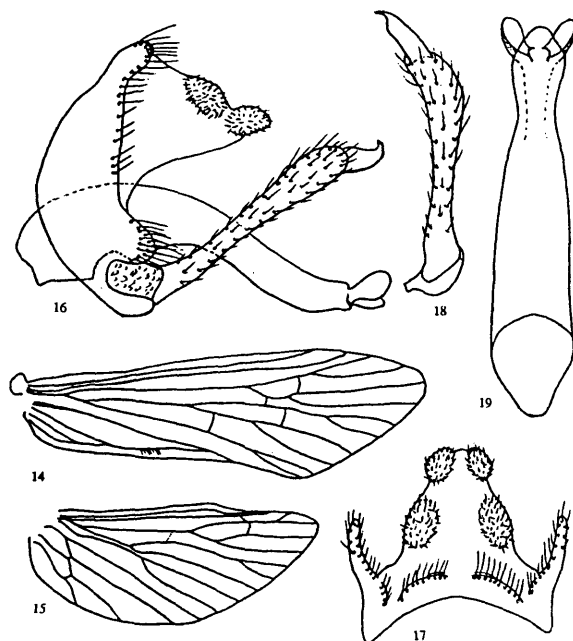
Body yellow-brown, forewing length of male 6 mm, body length 4 mm. Fore tibia without spur in male, forewing with distal portion of Cu2 and 1A fused, the first fork of hind wing present and basal portion of M and Cu1 closely parallel to each other.

Male genitalia: Posterior lateral process of tergum 9 not evident. Apex of tergum 10 blunt, without median cleft, ist posterior processes oval, setose; two distinctive, elliptical hairy areas present on this plate. Distal segment of inferior appendage is only one-fourth as long as the basal segment and hooked at apex.

This new species is close to *Potamyia parva* TIAN & LI 1987 from Yunnan. It can be easily distinguished from the latter by: (1) tergum 10 with two elliptical hairy areas, (2) posterior processes of 10 large, oval not turned upward, (3) distal segment of inferior appendage with a small apical hook.

Holotype male: Nanlan River, 2 km south of Daluo town of Menghai County, Yunnan Province, 22 July 1995, 620m elev., collected by Sun Changhai and Wang Beixin.

Etymology: Latin, "oval", referring to the shape of the posterior process of 10.



Figs. 14-19: *Potamyia ovalis* n.sp., wing and male genitalia: 14. forewing; 15. hindwing; 16. lateral view; 17. dorsal view of tergum 9 and 10; 18. inferior appendage, caudal view; 19. phallus, ventral view.

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