



## ***Helicopsyche agnetae*, new species (Trichoptera, Helicopsychidae) described from Hong Kong**

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### **Abstract**

*Helicopsyche agnetae*, new species, is described and figured based on material collected in Hong Kong in May 2005. With this record two species of the family Helicopsychidae are known from China. The two Chinese species are probably sister species sharing several uniquely derived synapomorphies, and are separated from each other by features in the genitalia.

**Key words:** Trichoptera, Helicopsychidae, *Helicopsyche agnetae*, new species, China, Hong Kong

### **Introduction**

The family Helicopsychidae is characterized by the dextrally coiled larval cases made from small stones glued together with silk. The relatively small adults have the abdominal sternite 2-4 reticulated and a ventral process on sternum VI. The males usually have 2-segmented maxillary palps. Modifications in male maxillary palp segment number occurs in the Oriental species, and Schmid (1993) described the genus *Cochliophylax* for the assumed primitive Helicopsychidae with 5 maxillary palp segments in the male. Johanson (1998) demonstrated that 5-segmented maxillary palps were secondarily developed in the monophyletic Oriental species group of the subgenus *Helicopsyche*. Species with 2 and 3 maxillary palp segments also occur in this group. Two-segmented maxillary palps are present in all *Helicopsyche* species from the other faunal regions. Helicopsychidae has a cosmopolitan distribution pattern, with highest diversity in tropical and sub-tropical areas (Johanson 1998). The diversity decreases dramatically at higher latitudes. The Oriental Helicopsychidae fauna is diverse with 60 species recorded from the region, mostly from the central eastern and south-eastern parts. The Japanese *Helicopsyche yamadai* Iwata 1927, described from larval stage only, and *Helicopsyche coreana* Mey 1991 from North Korea are both Palaearctic in distribution. Johanson (1998) indicated that *H. coreana* should be separated from the Oriental species in the subgenus *Galeopsyche* Johanson 1998. However, the placement of *H. coreana* remains uncertain. The northernmost Oriental *Helicopsyche* (*Helicopsyche*) species is *H. zhejiangensis* Yang & Johanson 2004, known from from Mt. Gutian (Zhejiang Province) at 29.2°N. This new Hong Kong species is apparently closely related to *H. zhejiangensis*.

### **Materials and Methods**

The Helicopsychidae have been known from Hong Kong since Dudgeon (1987) reported an undetermined

species based on larval material sampled from different localities. No Helicopsychidae adults have previously been described from this area, and this new species may be the species reported by Dudgeon.

The adult material of the new species was collected in alcohol in a Malaise trap between 20 and 27 May 2005.

The abdomen was macerated in Proteinase K for 2 hours for DNA sampling. The abdomen was transferred into absolute ethanol and to euparal on a temporary slide for illustration before transferred back to the remaining voucher specimen. The wings were mounted in glycerol on a slide and illustrated, and subsequently returned to the alcohol vial. The head was drawn while in alcohol.

The terminology used in the description follows that of Johanson (1998).

All types are deposited and stored in 80% alcohol in the Swedish Museum of Natural History, Stockholm, Sweden (NRM).

## Species description

### *Helicopsyche agnetae*, new species

Fig. 1–9

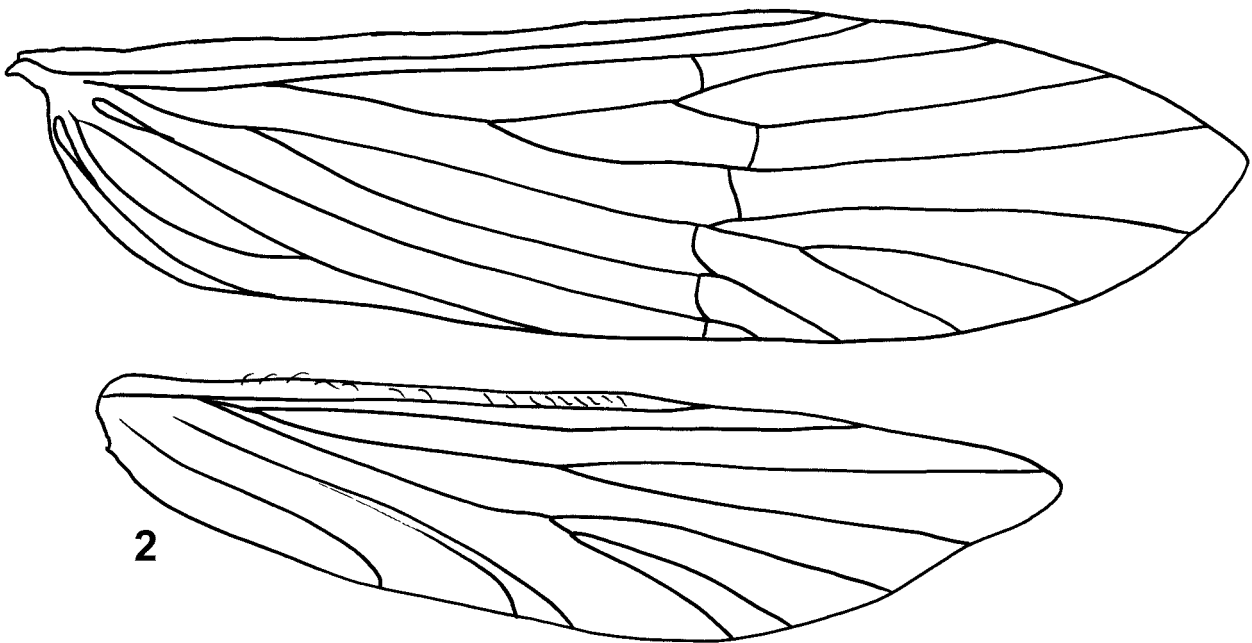
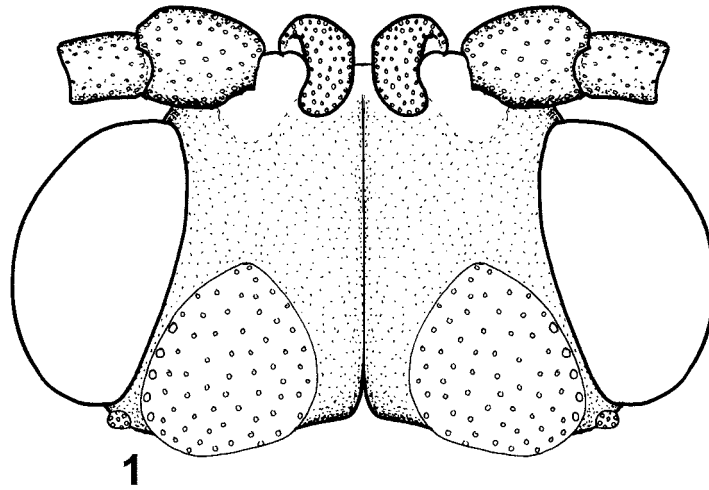
*Helicopsyche agnetae* genitalia are similar to those of *H. zhejiangensis*. *Helicopsyche agnetae* is distinguished from *H. zhejiangensis* by having narrower ventral part of segment IX, broader dorsal branch of gonocoxite and segment X, and much thicker phallus.

**Male head.** Cephalic setal warts large, oval to ovoid, about as broad as eyes in dorsal view (Fig. 1); post-antennal setal warts absent; interantennal setal warts large, tubular, oriented vertically between antennae. Distal segment of maxillary palps slightly longer than basal segment, shorter than eye diameter, as long as scape. Foreleg anterior spur minute, about one-fifth as long as posterior fore leg spur.

**Male wings:** Forewing dark grey, length 2.8 mm; hind wing length 2.2 mm, with 16 hamuli. Venation as in Fig. 2.

**Male abdomen and genitalia** (Fig. 3–9): Sternum VI (Fig. 3, 4) with short process, oriented posteroventrally (Fig. 3), triangular in ventral view (Fig. 4). Segment IX, lateral view (Fig. 5), strongly expanded anteriorly, anteroventral margin nearly straight, except concave near anterior apex (Fig. 5); segment about as high as long; in dorsal view (Fig. 6), with inner margin tongue-shaped; in ventral view (Fig. 7) with minute, irregular central posterior process; in lateral view with weak tergal transverse apodeme forming a nearly straight line above superior appendage. Sternite IX with characteristically shaped apodeme along anterior margin and with lateral straight arms oriented posteriorly and converging distally. Tergum X oriented posteroventrad, slightly up-curving along its length, narrow along basal one-fifth in lateral view (Fig. 5), expands into club-shaped distal part. Tergum X with long, posterolaterally pointing lateral spines in central row, sub-apical part slightly expanded into dorsal lobe above spines, apex rounded. Tergum X deeply incised towards start of lateral spines in dorsal view (Fig. 6), slightly narrowing distally, sub-apical part slightly bent laterally before curving posteriorly at apex, with about 3 weak setae on apex. Superior appendage long, club-shaped, slightly curving posteriorly towards apex (Fig. 5). Primary branch of gonocoxite, lateral view (Fig. 5), almost ovoid, oriented dorsally, narrowest at basis, posterior margin strongly undulating due to presence of about 6 produced setal bases; secondary branch of gonocoxite short, smooth, oriented posteriorly in lateral view, laterally in ventral view. Basal plate broad, dorsal margin convex along its length in lateral view (Fig. 5), apex points anteroventrally; in ventral view (Fig. 7) narrow and parallel-sided along its length. Phallus, lateral view (Fig. 8), anterior half nearly uniformly thick; basis with triangular, anteriorly pointing, membranous plate; angled 90° at midlength; distal part thicker and more membranous than basal half; with pair of long, strong, knife-shaped sclerites having 2 ventrally oriented basal teeth; in ventral view (Fig. 9) nearly 3x wider at mid-length

than anterior and posterior parts; sperm duct divide into slender anterior and thick posterior part; knife-shaped sclerites run parallel with lateral margin.



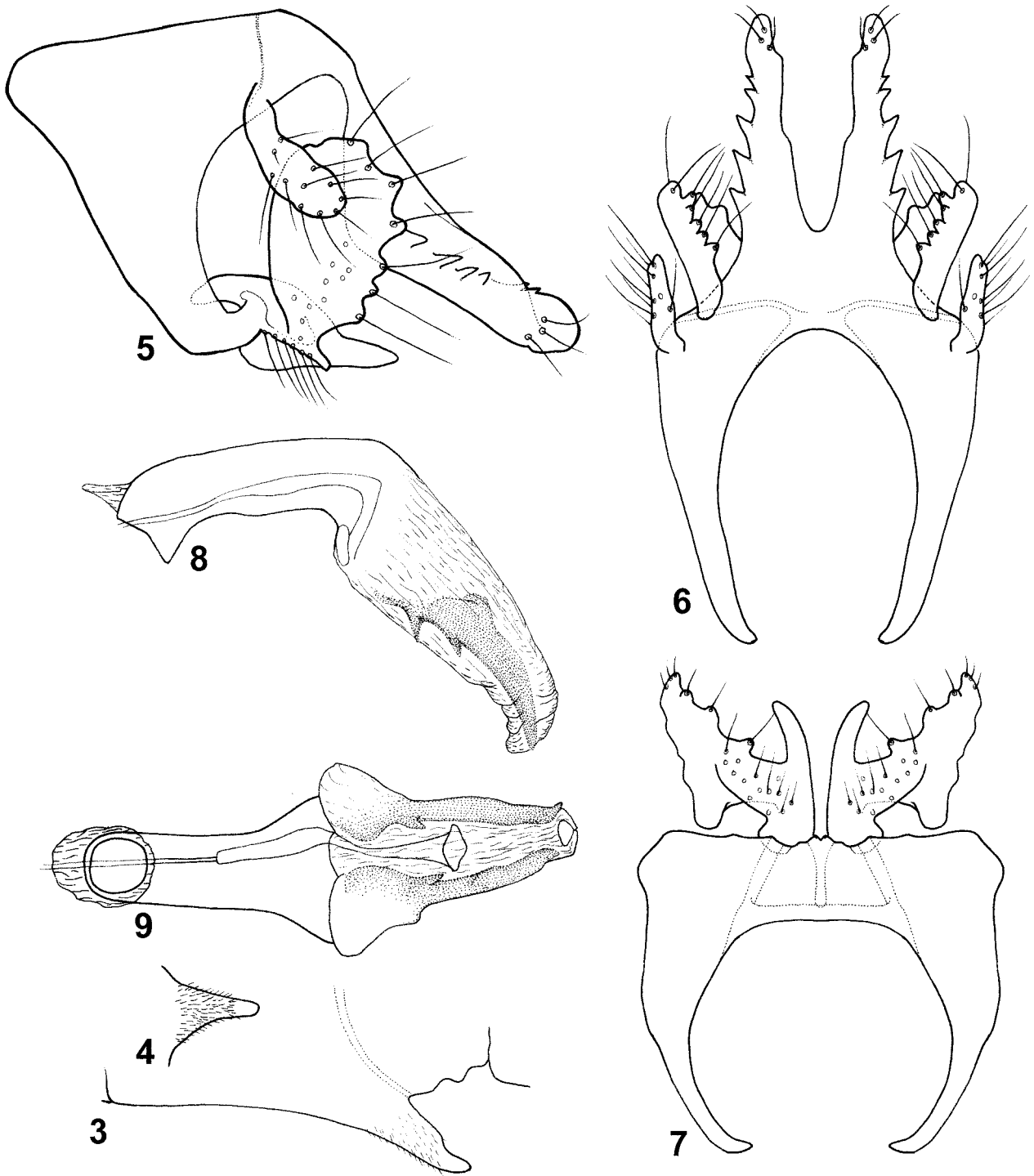
**FIGURES 1–2.** *Helicopsyche agnetae*, new species, holotype. 1 — head, dorsal; 2 — right wings.

**Holotype male:** China: Hong Kong, Sai Kung East Country Park, stream 1.2 km E Tin Mei Shan Mt., at Luk Wu, Malaise trap 20–27.v.2005 [A. Olsson & E. Ohlsson] (NRM, alcohol).

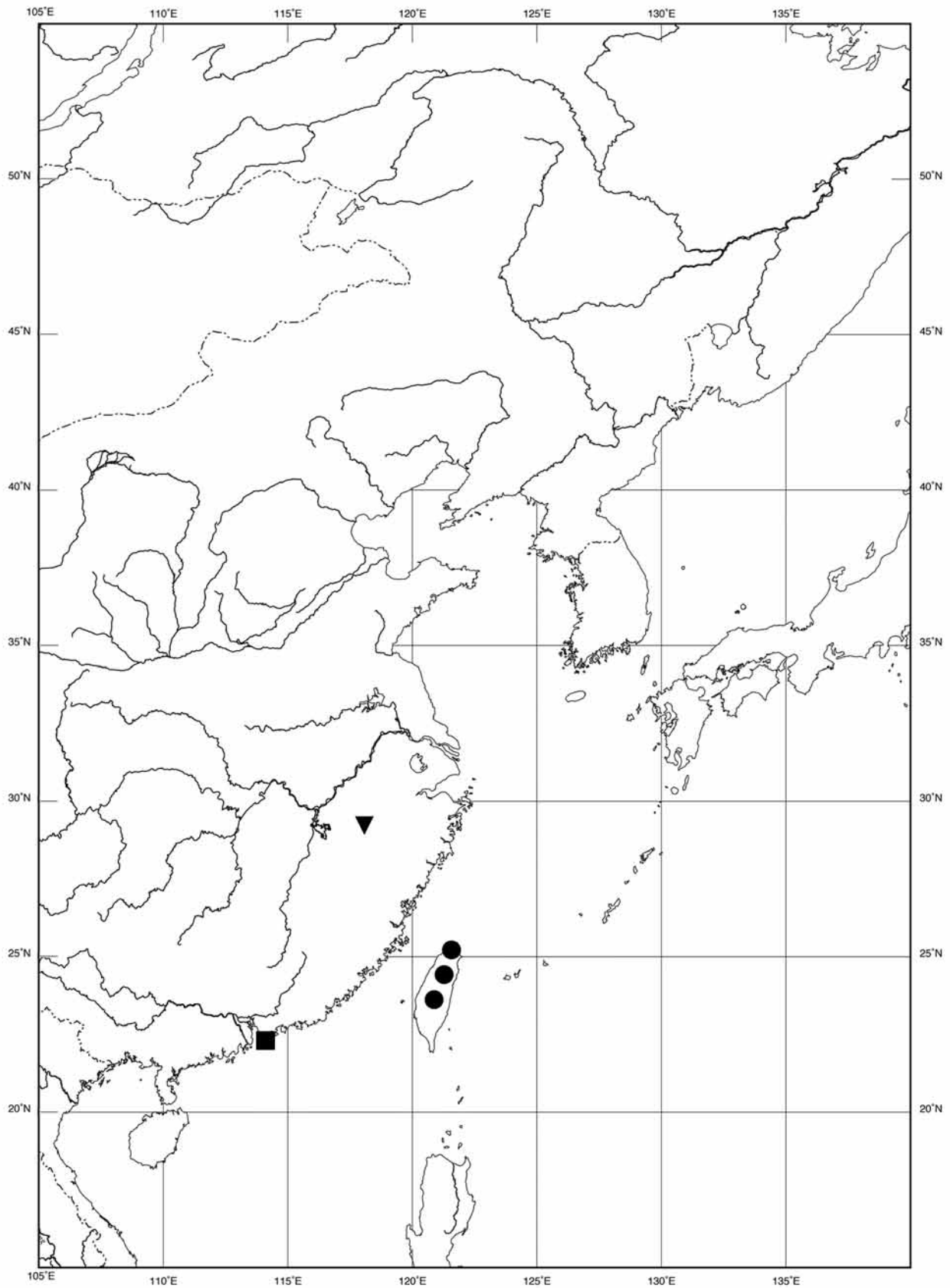
**Paratypes:** same data as holotype — 3 males.

**Distribution:** SE China (Hong Kong) (Fig. 10).

**Etymology:** *agnetae*, named after Ms. Agneta Olsson, one of the collectors of the species.



**FIGURES 3–9.** *Helicopsyche agnetae*, new species, holotype. 3 — abdominal sternum VI, lateral; 4 — process of abdominal sternum VI, ventral; 5 — genitalia, lateral; 6 — genitalia, dorsal; 7 — genitalia, ventral; 8 — phallus, lateral; 9 — phallus, ventral.



**FIGURE 10.** Map of SE China, with distribution of Chinese *Helicopsyche* species: *H. agnetae*, new species (square), *H. zhejiangensis* Yang & Johanson 2004 (triangular), un-determined larvae of *Helicopsyche* (circles)

## Discussion

*Helicopsyche agnetae*, new species and *H. zhejiangensis* share several synapomorphies, like: segment IX strongly produced anteriorly and with a small concavity immediately ventrally to anterior apex; tergite X deeply and widely incised, and has a lateral row of hooks; superior appendage large, oriented posteroventrally and slightly curving posteriorly along its length; gonocoxite oval, oriented dorsally and angled 90° towards the secondary branch of gonocoxite; phallus bent 90° at mid-length, and with a pair of large, knife-shaped sclerites at endotheca.

The type localities of the two species are situated more than 800 kilometers from each other (Fig. 10) and there are apparent geographical barriers along the shortest line between the distribution areas of the two species that could induce speciation of their common ancestor. Unidentified *Helicopsyche* specimens, known only from larvae, exist on Taiwan (Fig. 10). Future sampling will hopefully reveal the identity of the Taiwan *Helicopsyche* fauna, and whether or not the species are closely related to the mainland Chinese *Helicopsyche*, or other faunas.

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