

CHAPTER 5

PRELIMINARY KEY TO THE MATURE LARVAE OF

HYDROPSYCHIDAE OF SOUTHERN THAILAND

Introduction

Caddisflies are one of the most dominant insect groups in freshwater. However, knowledge of the systematics of the caddisfly fauna in Thailand is still limited, most particularly for the larvae, the life stage that benthologists most often encounter in the field. Caddisflies are excellent indicators of water quality, and to appreciate fully the utility of the group as a bioassessment tool requires a good taxonomic knowledge of the fauna, particularly at the species level (Resh and Unzicker, 1975; Lenat and Resh, 2001). The ability to distinguish the larvae provides a better understanding of the patterns of population and production dynamics in freshwater ecosystems (Resh, 1976). The literature dealing with the taxonomy of the caddisfly larvae of Thailand is very limited. The present study represents the first attempt to consolidate the available taxonomic information on larval taxonomy for part of the caddisfly fauna in southern Thailand. Larva-adult associations are now available for only approximately 18% of the approximately 128 species of Hydropsychidae represented in Thailand. Presented here is a key to the known subfamilies, genus, and species of Hydropsychidae of southern Thailand. This key leaves much room for improvement as additional species become known in the larval stage.

The aim of producing a preliminary key at this stage is that it might stimulate further work on Thai caddisflies and speed the resolution of remaining taxonomic problems.

Key to Subfamilies, Genera, and Species of Mature Hydropsychid

Larvae (in part)

1. Posterior ventral apotome about as long as anterior ventral apotome (Fig. 3.3); frontoclypeus as wide or wider behind eyes than at its anterior margin (Fig. 3.1); meso- and metanotal plates subdivided by transverse ecdysial line (Figs. 3.8-3.9); anterior margin of frontoclypeus evenly convex (Figs. 3.1-3.2); frontoclypeus with elongate setae entire plate (Fig. 3.19); abdominal segments densely covered with elongate spear-shaped cone hairs and hair-like setae (Fig. 3.23); pronotum with weakly sulcus on posterior portion (Fig. 3.7)Diplelectroninae, *Diplelectrona gombak*

1'. Posterior ventral apotome much shorter than anterior ventral apotome (Fig. 3.256) or inconspicuous (Fig. 3.323); frontoclypeus narrower behind eyes than at its anterior margin (Fig. 3.347); meso- and metanotal plates without transverse ecdysial line (Figs. 3.141-3.142, 3.378-3.379) 2

2(1'). Abdominal gills each with up to 40 filaments arising fairly uniformly along central stalk; or gills each with less than 20 filaments arising fairly uniformly along central stalk (Figs. 3.387, 3.411); foretrochantin never forked (Figs. 3.380, 3.400)..... Macronematinae, 3

2'. Abdominal gills each with up to 10 filaments arising mostly near apex of central stalk (Figs. 3.181, 3.343); foretrochantin usually forked (Fig. 3.204), but sometimes not (Fig. 3.330)Hydropsychinae, 8

3(2). Head flattened with conspicuous U-shaped carina dorsally (Fig. 3.394); foretibia and tarsus with rows of long hairs (Figs. 3.380, 3.400); anteclypeus membranous bearing a pair of transverse sclerites adjacent to the frontoclypeus (Figs. 3.370, 3.392); mandibles without mesal tuft of hairs (Figs. 3.372, 3.395); submentum trapezoidal; gills present on abdominal segments I-VII; sternum of segment VIII without sclerites (Fig. 3.430)*Macrostemum*, 6

3'. Head not both flattened and with conspicuous U-shaped carina (Fig. 3.475), but if flattened, then with a carina (Fig. 3.456); foreleg without rows of long hairs on tibia and tarsus (Figs. 3.444, 3.484)4

4(3'). Larva large sized body (≥ 11.0 mm), dark-brown; forelegs with rows of long, recumbent setae; head not flattened; frontoclypeus with anterior margin notched on medial portion; lateral side each with lobe; right mandible with mesal tuft of hairs; abdominal segments I-VIII each with 4 pairs of dorsolateral gills; abdominal segments I-V each with 2 pairs of ventrolateral gills; venter of anal proleg with spike-like setae on caudal lobes..... *Trichomacronema*, *Trichomacronema tamdao*

4'. Larva small sized body (≤ 6.0 mm), yellow-brown; foretibia and tarsus with scattered setae*Pseudoleptonema*, 5

5(4'). Head flattened, with conspicuous U-shaped carina dorsally (Figs. 3.456, 3.469); frontoclypeus with anterior margin strongly convex; gills present on metanotum; abdominal segments I and VIII with 2 pairs of dorsolateral gills on each side *Pseudoleptonema supalak*

5'. Head not flattened; frontoclypeus with anterior margin notched (Fig. 3.436); gills absent on metanotum; abdominal segments I, II, and VIII with 3 pairs of dorsolateral gills on each side; mesonotum with small black patches on posterolateral corners (Fig. 3.442) *Pseudoleptonema quinquefasciatum*

6(3). Anterior section of head ridges slightly higher than posterior section in lateral view (Fig. 3.407); lateral margin of clypeus with 2 pairs of yellow rectangular marks (Figs. 3.391-3.392); abdominal segments II, III, and VI with 2 pairs of a single dorsolateral gill; heavy, long, flexible hair-like setae and dense, minute hook-like setae on abdominal segments (Fig. 3.410) *Macrostemum fenestratum*

6'. Anterior and posterior section of head ridges at same level in lateral view (Fig. 3.385) 7

7. Frontoclypeus dark-brown; anterior part widen and slightly narrower at mid-length (Fig. 3.370); head ventrally with 6 anterior stridulatory lines widely separated (Fig. 3.371); abdominal segments III and VI with 2 pairs of a single gill on dorsolateral either side; sternum VIII with a pair of long setae and a group of short setae (Fig. 3.388) *Macrostemum dohrni*

7'. Frontoclypeus medium-brown; lateral margin of frontoclypeus constricted and abruptly protruding medially (Fig. 3.414); submentum large and wider at the base; anterior margin of submentum with prominent tubercle on anteromedial portion (Fig. 3.418) *Macrostemum hestia*

8(2'). Foretrochantin forked, with dorsal fork 1.5 times as long as ventral fork (Fig. 3.143, 3.166); submentum with anterior margin strongly concave, not cleft (Figs. 3.139, 3.162); gills on abdominal segments I-VI; head with or without setae, mainly blunt setae; if setae absent, larva glabrous in appearance *Hydromanicus*, 9

8'. Foretrochantin forked, with dorsal and ventral forks equal in length (Figs. 3.97, 3.120); submentum with anterior margin cleft; gills on abdominal segments I-VII; abdominal segments densely with covered, short, cone-like hairs, mingled with club-like hairs; posterior corner of frontoclypeus with a cluster of three spots (Figs. 3.86, 3.113) *Hydatomanicus*, 11

9(8). Entire head covered with numerous, long, truncate, peg setae and tapered setae (Figs. 3.134, 3.151); each notum covered with same setae as in head; frontoclypeus with anterior margin strongly convex (Figs, 3.134-3.135); posterior margin of pronotum with weak sulcus (Fig. 3.140 *Hydromanicus abiud*

9'. Dorsolateral region of head covered with truncate peg setae (Figs. 3.157, 3.176); frontoclypeus lacking of such setae except for anterolateral corners; frontoclypeus with anterior margin slightly concave (Fig. 3.158); posterior margin of pronotum

- without sulcus10
10. Lateral margin of frontoclypeal apotome clearly widening at mid-length (Fig. 3.158); sclerites on sternum of segment VIII large, subtriangular *Hydromanicus inferior*
- 10'. Lateral margin of frontoclypeal apotome slightly widening at mid-length (Fig. 3.183); sclerites on sternum of segment VIII moderately size subtriangular *Hydromanicus serubabel*
- 11(8'). Head and thoracic notum dark; mesal region of frontoclypeus with three yellow areas in longitudinal length (Figs. 3.85-3.86); abdominal segments covered with cone-like and club-like hairs (Fig. 3.109) *Hydatomanicus adonis*
- 11'. Head and thoracic notum pale; frontoclypeus with yellow area wide anteriorly and narrow posteriorly (Figs. 3.112-3.113); abdominal segments covered with cone-like hairs of various sizes (Fig. 3.132) *Hydatomanicus klanklini*
12. Prosternum with a pair of large sclerites in intersegmental fold posterior to prosternal plate (Figs. 3.220, 3.239); anterior margin of frontoclypeus entire (Fig. 3.200); dorsum of abdomen with numerous recumbent hairs and club-like hairs; metanotum with 4 gills *Hydropsyche*, 14
- 12'. Prosternum with a pair of usually small sclerites in intersegmental fold posterior

to prosternal plate (Figs. 3.34, 3.333), but if small, anterior margin of frontoclypeus with shallow mesal excision and/or crenulate (Figs. 3.44, 3.348); dorsum of abdomen with hair-like setae, scale hairs, and spiral long hairs with wide distal pores 13

13(12'). Anterior ventral apotome with prominent anteromedial projection (Fig. 3.352); each mandible with lateral border of flanged (Fig. 3.325); foretrochantin forked or not; metanotum with 4 gills *Potamyia*, 19

13'. Anterior ventral apotome without anteromedial projection; mandibles not flanged (Fig. 3.48); foretrochantin always forked (Fig. 3.52); metanotum with 3 gills; abdominal segments covered with recumbent hair-like setae *Cheumatopsyche*, 20

14(12). Notal sclerites with a conspicuous pale mid-line stripe which appears to be a continuation of longitudinal stripe on head (Figs. 3.270, 3.276-3.278); anterior margin of frontoclypeus slightly concave (Fig. 3.271); submentum with shallow median cleft (Fig. 3.275); head and nota covered with long, acuminate peg setae (Fig. 3.289); abdominal segments covered with recumbent and club-like hairs (Fig. 3.292) *Hydropsyche dolosa*

14'. Notal sclerites uniformly colored, without a conspicuous pale mid-line stripe 15

15(14'). Frontoclypeus with anterior margin strongly concave and with two distinct yellow marks (V-shaped mark on anterior margin and circular shaped on posterior

margin) (Fig. 3.300); dorsolateral portion of head, nota, and anterolateral margins of frontoclypeus covered with truncate peg setae (Fig. 3.317); abdominal segments covered with club-like hairs of various shapes (Fig. 3.319)*Hydropsyche pallipenne*

15'. Frontoclypeus with anterior margin strongly convex and without such yellow marks; venter of anal proleg lacking spike-like setae on caudal lobes16

16(15'). Head entirely yellow except dark-brown anterior margin and posterolateral corners of frontoclypeus (Fig. 3.196); dorsolateral and anterolateral margin of frontoclypeus with acuminate peg setae, mingled with tapered setae (Fig. 3.209); nota covered with truncate peg setae (Fig. 3.210); abdominal segments covered with club-like hairs of various shapes (Fig. 3.212); dark muscle scars midway between mid-line and lateral margin in posterior half of pronotum (Fig. 3.201)*Hydropsyche assarakos*

16'. Head yellow to dark-brown with two distinct yellow marks on frontoclypeus; frontoclypeus triangular; lateral margin of frontoclypeus evenly straight and pointed at apex; anterior margin strongly convex (Figs. 3.235-3.236); abdominal segments covered with club hairs; venter of anal proleg with spike-like setae on caudal lobes17

17(16'). Large diamond-shaped mark on anterior margin and small circular mark on posterior margin of frontoclypeus (Figs. 3.235-3.236); scattered brush of setae and tapered setae, with a few acuminate peg setae on anterolateral margin (Fig. 3.247);

dorsolateral area of head with same setae except brush-like setae; pronotum with many truncate setae and tapered setae on entire surface (Fig. 3.248); meso- and metanotum with heavy scale hairs and sparse truncate peg setae on entire surface (Fig. 3.249)*Hydropsyche butes*

17'. T-shaped mark on frontoclypeus (Figs. 3.216, 3.255)18

18(17'). Frontoclypeus large; strongly broadened at mid-length (Fig. 3.216); with brush of setae scattered on entire surface; head with acuminate peg setae, tapered and brush-like setae on dorsolateral region (Fig. 3.230); pronotum covered with many truncate peg and tapered setae on entire surface (Fig. 3.231); meso- and metanotum with heavy scale hairs and sparse acuminate peg setae on entire surface*Hydropsyche brontes*

18'. Frontoclypeus triangular; slightly broadened at mid-length (Fig. 3.255); with few or no brush of setae; dorsolateral region of head with acuminate peg and tapered setae (Fig. 3.272); pronotum covered with many truncate peg and tapered setae (Fig. 3.273); meso- and metanotum with heavy scale hairs and sparse truncate peg setae on entire surface*Hydropsyche camillus*

19(13). Head yellowish to brown, with muscle scars on posterior half (Fig. 3.347); foretrochantin not forked; anterior ventral apotome with prominent anteromedial tubercle and cleft apices (Fig. 3.352); lateral margin of each mandible weakly flanged (Fig. 3.349) notal sclerites yellowish to brown, with muscle scars on posterior half of

- pronotum (Fig. 3.357)*Potamyia phaidra*
- 19'. Head light-yellow, covered with many long truncate peg and tapered setae (Figs. 3.321, 3.338); foretrochantin with a vestigial dorsal ramus (Fig. 3.330); anterior ventral apotome with weakly tubercle and apices not cleft (Fig. 3.326) lateral margin of each mandible strongly flanged (Fig. 3.325)*Potamyia chaos*
- 20(13'). Vertex yellow except posterolateral half of frontoclypeus dark-brown (Fig. 3.65); frontoclypeus with anterior margin wide and deeply notched medially; coarsely crenulate with about 12 lobes (Fig. 3.66); head covered with many tapered setae on dorsolateral region (Fig. 3.81); frontoclypeus covered with same setae as head, and in a variety of forms (simple, bifid, trifid) (Fig. 3.82); nota covered with recumbent hair-like setae (Fig. 3.83)*Cheumatopsyche tramota*
- 20'. Dorsum of head yellow except entire frontoclypeus dark-brown21
- 21(20'). Frontoclypeus with deep anteromedian notch, coarsely crenulate with about 16 lobes (Fig. 3.44), scattered hair-like setae in a variety of forms (simple, bifid, trifid) (Figs. 3.60-3.61); head covered with many hair-like setae; nota covered with recumbent hair-like setae (Fig. 3.62)*Cheumatopsyche copia*
- 21'. Frontoclypeus with anterior margin concave, coarsely crenulate with about 24 lobes (Fig. 3.25), covered with brush of setae, lacking stout setae; head covered with numerous brush of setae, mingled with stout setae on dorsolateral region (Fig. 3.38);

nota densely covered with setae of a variety of forms (simple, or with 2-5filaments)

(Fig. 3.39)*Cheumatopsyche charites*