

BRAUERIA (Lunz am See, Austria) 33:26-30 (2006)

The immature stages of *Pseudoleptonema quinquefasciatum* MART. and *P. supalak* MAL. & CHANT. (Trichoptera: Hydropsychidae)

Taeng-on PROMMI, Surakrai PERMKAM & Hans MALICKY

Abstract

Larvae and pupae of *Pseudoleptonema quinquefasciatum* and *P. supalak* (Trichoptera: Hydropsychidae) were collected from montane streams in southern and western Thailand. Pupal identifications were based on characters of male genitalia, and larvae were associated with the larval sclerites in the pupal case. The immature stages are described, diagnosed, and figured.

Introduction

The genus *Pseudoleptonema* MOSELY 1933 is a small genus in the subfamily Macronematinae. Some species were earlier included in *Macronema*. The following species are now known: *P. ceylanicum* HAGEN 1858, *P. godapitigama* SCHMID 1958 and *P. kalukandama* SCHMID 1958 from Sri Lanka, *P. supalak* MALICKY & CHANTARAMONGKOL 1998 and *P. erawan* MALICKY & CHANTARAMONGKOL 2001 from Thailand and *Pseudoleptonema sinuatum* ULMER 1906 from Borneo. *P. quinquefasciatum* MARTYNOV 1935 is widespread from India and Nepal to Laos and Vietnam (HOANG & al. 2005; MALICKY, 1998; MALICKY & CHANTARAMONGKOL, 1999). Here we describe the larvae and pupae of *P. quinquefasciatum* and *P. supalak*, which firmly associated by the presence of the male and female metamorphotypes in the same field collections.

Materials and Methods

The hydropsychid larvae and pupae were collected from montane streams in southern and western Thailand. At these collection sites, adults were collected using black light traps with timers to operate simultaneously from one hour before sunset to 1.5 hours after sunset near the stream margins. Insects attracted to the black light were collected in a tray filled with water and a few drops of liquid detergent and transferred into 80% EtOH in the next morning.

Larvae and pupae were collected by handpicking from the upper and lower surfaces of submerged stones. The specimens were preserved in 95% EtOH and brought to the laboratory where they were sorted to morphospecies. Adult genitalia were cleared by heating in 10% NaOH at 70°C for 30 minutes. The association between the adult and the fully developed pupa was established with genitalic characteristics. Further, the identified pupa was found to be related to the final larval instar.

Description of the larvae

***Pseudoleptonema quinquefasciatum* MARTYNOV 1935**

Larva: Body shape as usual in Hydropsychidae (Fig. 1). Head yellow to brown. Notal sclerites pale yellow-brown.

Head: Dorsal view rounded. Dorsum of head brown mesally, rest area yellow (Fig. 2). Frontoclypeus with transverse of three, pale spots posterior corner. Anterior margin of frontoclypeus notched, asymmetrical (Figs. 2-3). Head with hairlike setae on dorsal and lateral, mingled with brushlike setae inconspicuous. Ventral surface of head smooth, golden-

yellow, with anterior ventral apotome not fully delimited, ecdysial line absent on the right side; posterior ventral apotome small. Ventral part of the head with anterior 6 stridulatory lines widely separated. Submentum with anterior margin entire, not cleft, with a few, black, setae at anterior angles (Fig. 4). Labrum golden-yellow, broad, anterolateral with golden, pectinate-like setae; dorsal surface of labrum with scattered, medium long, hairlike setae (Fig. 1). Mandibles reddish-brown, short, broad at base, asymmetrical, with a lateral trough, long, black setae along base of trough; right mandible with a mesal tuft of hairs (Fig. 5).

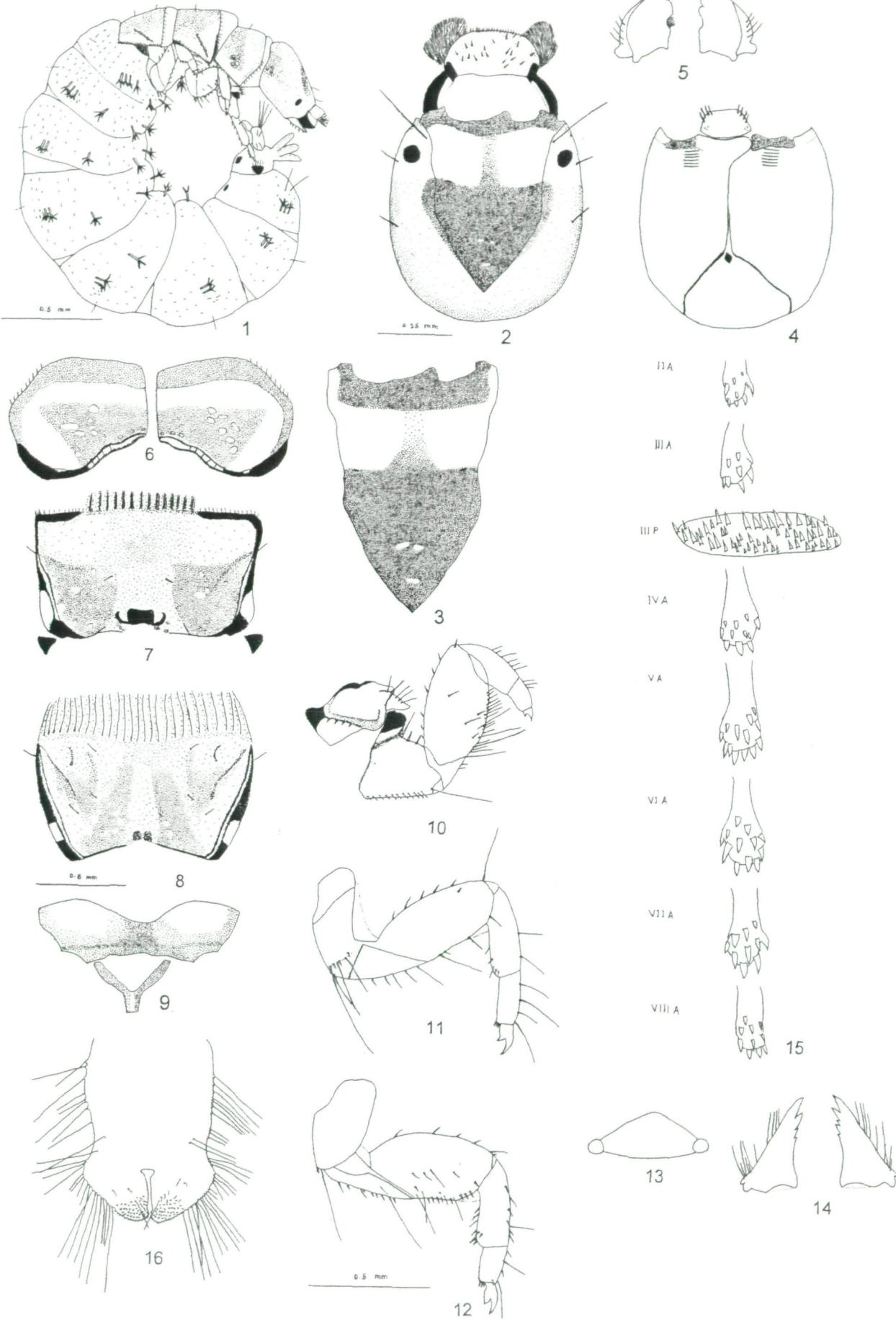
Thorax: Notae pale yellow-brown. Pronotum dark posteromesally with pale muscle scars; anterior angle with long, hairlike setae projecting beyond anterior margin, surface scattered with long, hairlike setae anterior half (Fig. 6). Meso- and metanotum pale yellow-brown; anterior margin membranous with slender setae projecting beyond anterior margin; dorsal surface scattered with hairlike setae; mesonotum with dark, small patch posterolateral (Figs. 7-8). Prosternum transverse, narrow mesal, swollen at lateral portion, with a large Y-shaped sclerites at the posteromesal (Fig. 9). Propleuron with a row of stout setae in ventral portion; trochantin tapering to an apical point, with a few, long, setae (Fig. 10). Coxa of foreleg with a row of short and medium long slender setae in ventral margin, dorsal margin with a few spikelike setae; ventral margin of femur with long slender setae; dorsal margin of tibia and tarsus with scattered long slender setae. Mid- and hindlegs similar, with scattered long slender setae, apex of tibia and tarsus with spikelike setae (Figs. 11-12). Tarsal claw of forelegs almost straight, claws of mid- and hindlegs curved. Mesosternum with one pair of gills, no gills on metasternum.

Abdomen: Abdominal segments covered with long, recumbent, hairlike setae, mingled with densely, very small, hairlike setae inconspicuous. Segments I, II and VIII each with three pairs of dorsolateral gills. Segments III-VII each with two pairs of dorsolateral gills. Gills with adjacent bases. Segments I-V each with one pair of lateral gills. Segments II-IV each with two pairs of ventral gills. Each gill with short central stalk, filaments arising from central stalk. The number of filaments varying from 0-6. The apex of central stalk that without filament and some filament with dark, slender, setae beyond the apex. Sterna of segments VIII and IX each with a pair of sclerites, sterna of segment IX with spikelike setae emanating from prominent sockets. Shape of each sclerite almost rounded. Tergum IX with large lateral sclerites. Anal prolegs with a bent claw and also decorating with a cluster of long, slender setae, lateral sclerites with row of long, black, slender setae laterally (Fig. 1).

Figures 1-12. Larval features of *Pseudoleptonema quinquefasciatum*: 1, larva; 2, dorsal aspect of head; 3, frontoclypeal apotome; 4, ventral aspect of head; 5, ventral aspect of mandibles; 6, pronotum; 7, mesonotum; 8, metanotum; 9, prosternum; 10, right propleuron, trochantin, and outer face of foreleg; 11, outer face of hindleg; 12, outer face of midleg.

Figures 13-16. Pupal feature of *Pseudoleptonema quinquefasciatum*: 13, dorsal aspect of larbrum; 14, ventral aspect of mandibles; 15, hookplates, dorsal showing abdominal segment number and anterior or posterior position; 16, dorsal aspect of apical appendages.

Pseudoeptonema quinquefasciatum



Pupa: Labrum subtriangular with rounded basolateral lobes (Fig. 13). Mandibles broad posteriorly, tapering regularly to a pointed apex; inner margin with 3-4 teeth; laterobasally with a group of long, slender setae on outer face (Fig. 14). Hook plates anterior on segments II to VIII, the plates as long as wide, with teeth on a distinct elevated lobe; posterior on segment III, plate broadly covered with numerous teeth (Fig. 15). Apical processes short, apex broad with a group of dorsolateral hooked setae; lateral surface bearing long, dark, slightly hooked setae from well developed tubercles (Fig. 16).

Material examined: Thailand, Chumphon Prov.: Khuan Mae Yai Mhom Wildlife Sanctuary, stream from Haew Lome Waterfall, 19-VI-2004, 4 adults; same locality, 9-X-2004, 2 adults; same locality, 2-IV-2005, 6 larvae, 2 mature pupae, 26 adults; same locality, 25-V-2005, 4 mature pupae; Kanchanaburi Prov.: Kheun Khao Leam National Park, Lijear stream, 5-VI-2006, 63 larvae, 20 mature pupae.

Diagnosis: This species may be recognized on the basis of the following of characters: the anterior margin of frontoclypeus is strongly notched, and dorsum of head is not flattened; the gills are absent on metanotum. In addition, segments I, II, and VIII have three pairs of dorsolateral gills on either side of the abdomen. Moreover, the small black patch is present on posterolateral of mesonotum.

***Pseudoleptonema supalak* MAL. & CHANT. 1998**

Larva: Body shape as usual in Hydropsychidae. Head yellow to brown. Notal sclerites pale yellow-brown.

Head: Dorsal part of the head flattened with a U-shaped carina. Anterior half of the head yellow, posterior half brown. Frontoclypeus with anterior margin strongly convex; anterior half of frontoclypeus paler than the rest area (Figs. 17). Head with hairlike setae on dorsal and lateral. Ventral surface of head yellow except the area on mesolateral brown with group of muscle scars. Anterior ventral apotome not fully delimited, ecdysial line absent on right side; posterior ventral apotome small. Ventral part of the head with anterior 6 stridulatory lines widely separated. Submentum with anterior margin entire, not cleft, with a few setae at anterior angles (Fig. 18). Labrum light brown, with brown anterolateral pectinate setae; dorsal surface of labrum with medium long, hairlike setae (Fig. 17). Mandibles reddish to light brown, short, with a lateral trough, golden setae along base of trough; right mandible with a mesal tuft of hairs (Fig. 19).

Thorax: Notum yellow to light brown. Surface of each notum covered with long, hairlike setae, except in pronotum such setae cover the anterior half; long, hairlike setae projecting beyond anterior angle. Meso- and metanotum membranous with long, hairlike setae projecting beyond anterior margin (Figs. 20-22). Prosternum transverse, narrow mesally, swollen at lateral portion, with a large Y-shaped sclerite posteromesal. Fore trochantin tapering to an apical point, with a few, long, setae (Fig. 23). Forelegs with long, slender setae in ventral margin of femur; dorsal margin of tibia and tarsus with scattered setae. Midlegs shorter than hindlegs, similar in structure, scattered with long, slender setae, apex of tibia and tarsus with spikelike setae (Figs. 23-25). Mesosternum with one pair of gills, two pairs of gills on metasternum.

Abdomen: Abdominal segments covered with long, recumbent, hairlike setae, mingled with densely, small, hairlike setae inconspicuous. Segments I-VIII each with two pairs of dorsolateral gills. Gills with adjacent bases. Segment I with three pairs of ventral gills. Segment II with one pair of lateral gills. Segments II-VI each with one pair of ventral gills. Each gill with short central stalk, filaments arising from

apex of central stalk. The number of filaments varying from 0 to 2. The apex of central stalk without filament with dark, slender, setae beyond the apex. Sterna of segments VIII and IX each with a pair of sclerites, sterna of segment IX with spikelike setae emanating from prominent sockets. Tergum IX with large lateral sclerites. Anal prolegs with a bent claw and cluster of long slender setae, lateral sclerites with row of long, black setae laterally.

Pupa: Labrum elliptical (Fig. 26). Mandibles broad posteriorly, tapering regularly to a pointed apex; inner margin with 3 teeth; lateral with long setae on outer face (Fig. 27). Hook plates anterior on segments II to VIII, plates as long as wide, with teeth on a distinct elevated lobe; posterior on segment III, plate broad covered with numerous teeth (Fig. 28). Apical processes short, apex broad with a group of dorsolateral hooked setae; lateral surface bearing long, dark, slightly hooked setae from well developed tubercles (Fig. 29).

Diagnosis: This species may be recognized on the basis of the following of characters: the anterior margin of frontoclypeus is strongly convex, and dorsal part of head is flattened with a U-shape carina; the gills are present on metanotum. In addition, segments I and VIII have two pairs of dorsolateral gills on either side of the abdomen. The distribution of hairlike setae is dense on thoracic notum.

Material examined: Krabi Prov.: Khaopanombenja National Park, Huai To Waterfall, 6-X-2004, 1 adult; Phangnga Prov.: Sriphangnga National Park, stream from Tonthontoe Waterfall, 7-VIII-2004, Prommi, 3 adults; same locality, 8-X-2004, 2 adults; same locality, 7-VI-2006, 25 larvae, 2 mature pupae.

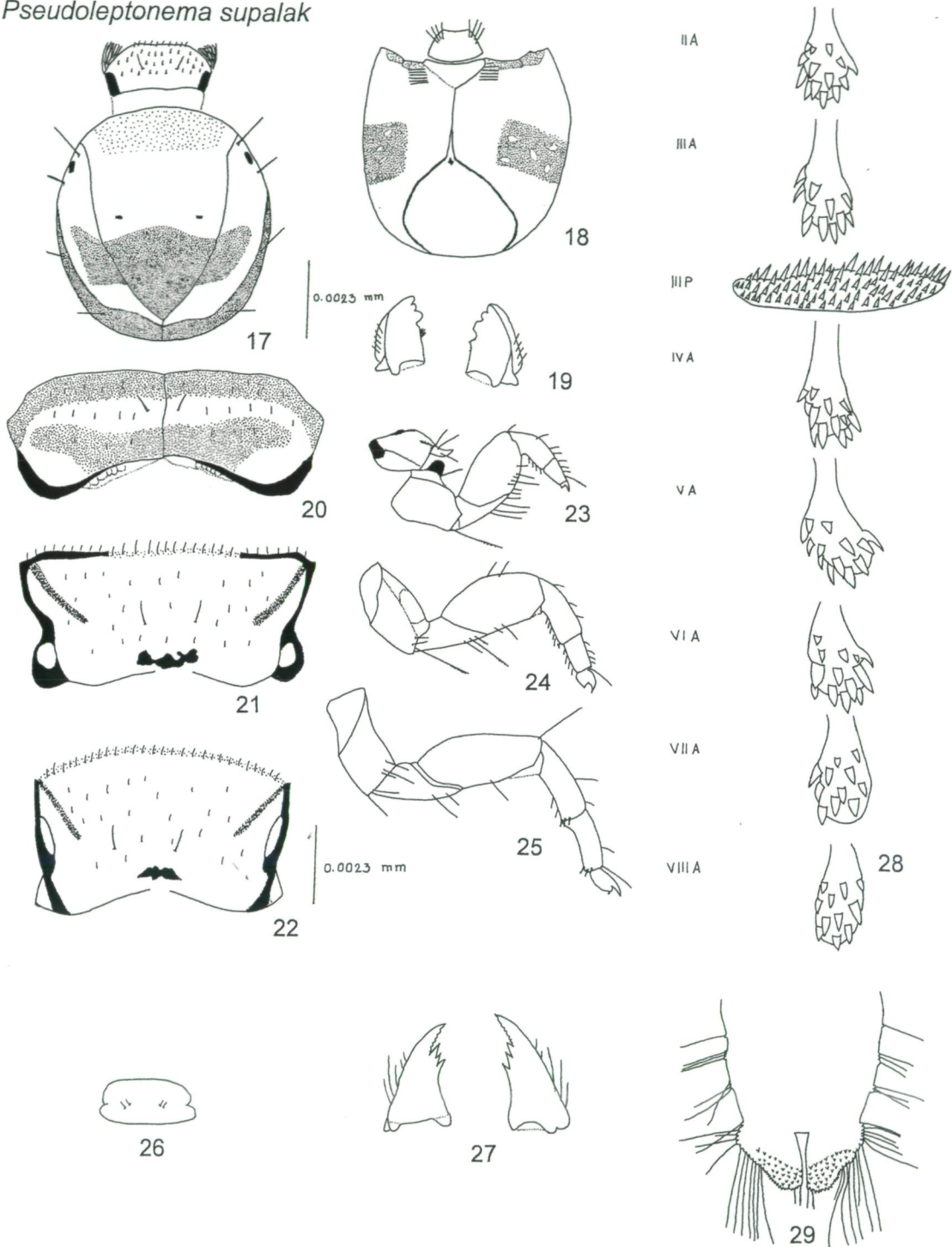
Notes on biology, ecology and distribution: Most of the specimens were collected from high turbulence habitats, especially on the rock surfaces in streams. Larval cases were found tightly attached to the substrate. At the collection sites, the streams are 4-6 m wide. *P. quinquefasciatum* has been reported from northern Thailand (Chiang Mai and Mae Hong Son Provinces) and its flight period extends from March and April. *P. supalak* has been reported from northeast Thailand (Petchaboon Province) (MALICKY 1998).

Discussion: The final instar larvae of *P. quinquefasciatum* and *P. supalak* can be separated by the following combination of characters. Firstly, the anterior margin of frontoclypeus is strongly notched, and dorsum of head is not flattened in *quinquefasciatum*, but in *supalak* it is strongly convex, and dorsal part of the head is flattened with a U-shape carina. Secondly, the gills are absent on metanotum in *quinquefasciatum*, but in *supalak* the gills are present on metanotum. In addition, segments I, II, and VIII have three

Figures 17-25. Larval features of *Pseudoleptonema supalak*: 17, dorsal aspect of head; 18, ventral aspect of head; 19, ventral aspect of mandibles; 20, pronotum; 21, mesonotum; 22, metanotum; 23, right propleuron, trochantin, and outer face of foreleg; 24, outer face of midleg; 25, outer face of hindleg.

Figures 26-29. Pupal feature of *Pseudoleptonema supalak*: 26, dorsal aspect of labrum; 27, ventral aspect of mandibles; 28, hookplates, dorsal showing abdominal segment number and anterior or posterior position; 29, dorsal aspect of apical appendages.

Pseudoleptonema supalak



pairs of dorsolateral gills on either side of the abdomen in *quinquefasciatum*, whereas, in *supalak* there are two pairs of dorsolateral gills on either side of the abdomen. Thirdly, the distribution of hairlike setae on thoracic notum in *quinquefasciatum* is sparser than in *supalak*. Moreover, the small black patch are present posterolaterally of mesonotum in *quinquefasciatum*, whereas, in *supalak* are absent posterolaterally of mesonotum. Other noteworthy features that might be useful in distinguishing among the larvae of species of *Pseudoleptonema* include the size and shape of the black maculation on the midline of the posterior margin of the mesonotum and metanotum, and color pattern on the head.

Acknowledgement

We would like to thank the Thailand Royal Forest Department for providing facilities in field works and permissions to get access in collecting live specimens in the national parks, wildlife sanctuaries, and wildlife management stations. This work was supported by the Royal Golden Jubilee program (Grant no. PHD/0280/2545) and Graduate School, Prince of Songkla University.

References

HOANG, D.H., TANIDA, K., BAE, Y.J., 2005, Records of the Vietnamese Macronematinae (Hydropsychidae, Trichoptera) with description of a new species. – Proc. 11th Int.Symp.Trich.(Osaka):161-174. Tokai University Press, Kanagawa.

MALICKY, H. 1998. Ein Beitrag zur Kenntnis asiatischer Macronematini (Trichoptera, Hydropsychidae) (Zugleich 24. Arbeit über thailändische Köcherfliegen). - Linzer biol. Beitr. 30(2): 767-793.

MALICKY, H., CHANTARAMONGKOL, P., 1999, A preliminary survey of the caddisflies (Trichoptera) of Thailand. - Proc. 9th Int. Symp. Trich.:205-216.

Authors:

Taeng-on Prommi, Department of Biology, Faculty of Science, Prince of Songkla University, Hat Yai, Thailand (e-mail: tprommi@yahoo.com)

Surakrai Permkam, Department of Pest Management, Faculty of Natural Resources, Prince of Songkla University, Hat Yai, Thailand (e-mail: surakrai.p@psu.ac.th)

Hans Malicky, Sonnengasse 13, A-3293 Lunz am See, Austria



Photographs from the 12th International Symposium on Trichoptera, Mexico, 18 – 22 June 2006:

Weaver, Majecki

ZOBODAT - www.zobodat.at

Zoologisch-Botanische Datenbank/Zoological-Botanical Database

Digitale Literatur/Digital Literature

Zeitschrift/Journal: [Braueria](#)

Jahr/Year: 2006

Band/Volume: [33](#)

Autor(en)/Author(s): Prommi Taeng-on, Permkam Surakrai

Artikel/Article: [The immature stages of Pseudoleptonema quinquefasciatwn MART. and P. supalak MAL. & CHANT. \(Trichoptera: Hydropsychidae\) 26-30](#)