Acta Zoologica Academiae Scientiarum Hungaricae 58 (3), pp. 211–215, 2012

TWO NEW SPECIES OF *RHYACOPHILA* PICTET (TRICHOPTERA, RHYACOPHILIDAE) FROM INDIA

KAUR, L. and SAINI, M. S.

Department of Zoology & Environmental Sciences, Punjabi University Patiala, India – 147002; E-mail: lakhwinderkaur.kaur@gmail.com

Two new species of the genus *Rhyacophila* (Trichoptera, Rhyacophilidae), i.e. *R. himachalensis* sp. n. in the *R. anatina* group belonging to the *R. vulgaris* branch from Banjar (Himachal Pradesh) and *R. acutis* sp. n. in the *R. castanea* group belonging to the *R. philopotamoides* branch, from Padammaphlong (Meghalaya) are described and illustrated.

Key words: *R. vulgaris* branch, *R. philopotamoides* branch, Trichoptera, Rhyacophilidae, new species, India

INTRODUCTION

The genus *Rhyacophila* PICTET, 1834 was considered as type genus of family Rhyacophilidae by STEPHENS (1836). The genus *Rhyacophila* is Holarctic in distribution, containing over more than 783 species recognised globally. Among these, 360 species have been recorded from the Oriental region whereas India and its immediately surrounding areas are represented by 166 species (MORSE 2012). The main contributions to the Indian *Rhyacophila* include: MORTON (1900) (6 species); MARTYNOV (1927*a, b*, 1930, 1935) (11 species); KIMMINS (1952, 1953) (12 species); MALICKY (1997) (1 species); KISS (2003, 2011*a, b*) (8 species) and SCHMID (1959, 1970) (128 species).

MATERIAL AND METHODS

The material studied in this paper was collected from high altitude streams and waterfalls using a 22 watt UV or black light for 1–3 hours beginning at dusk. The collected caddisfly material was killed and preserved in 90% ethanol with a drop of glycerin. The male genitalia were removed with the help of fine tipped forceps and treated with the lactic acid procedure described by BLAHNIK *et al.* (2007). The genitalic terminology corresponds with that of SCHMID (1970). The type specimens are deposited in the Museum of the Department of Zoology & Environmental Sciences, Punjabi University, Patiala, India.

DESCRIPTION OF THE NEW SPECIES
Rhyacophila himachalensis sp. n.
(Figs 1–5)

Description. Average length of forewing 7.76 mm and that of antenna 4.85 mm. Color of body dark brown but wings, antenna, maxillary palps, labial palps and legs are light brown.

Male genitalia. Preanal appendage longer than dorsal apical lobe of segment IX and dorsal appendage of phallic apparatus longer than the paramere and rounded at apex and heavily sclerotized. The phallicata is tubular and paramere with tuft of thick setae apically. The dorsal edge of terminal segment of inferior appendage convex and basal segment of inferior appendage 3 times longer than the terminal segment. Two rows of spines present on the basal segment of inferior appendage (Fig. 1). Preanal appendage oblong in dorsal view (Fig. 2) and in ventral view terminal segment of inferior appendage with thick spines (Fig. 5).

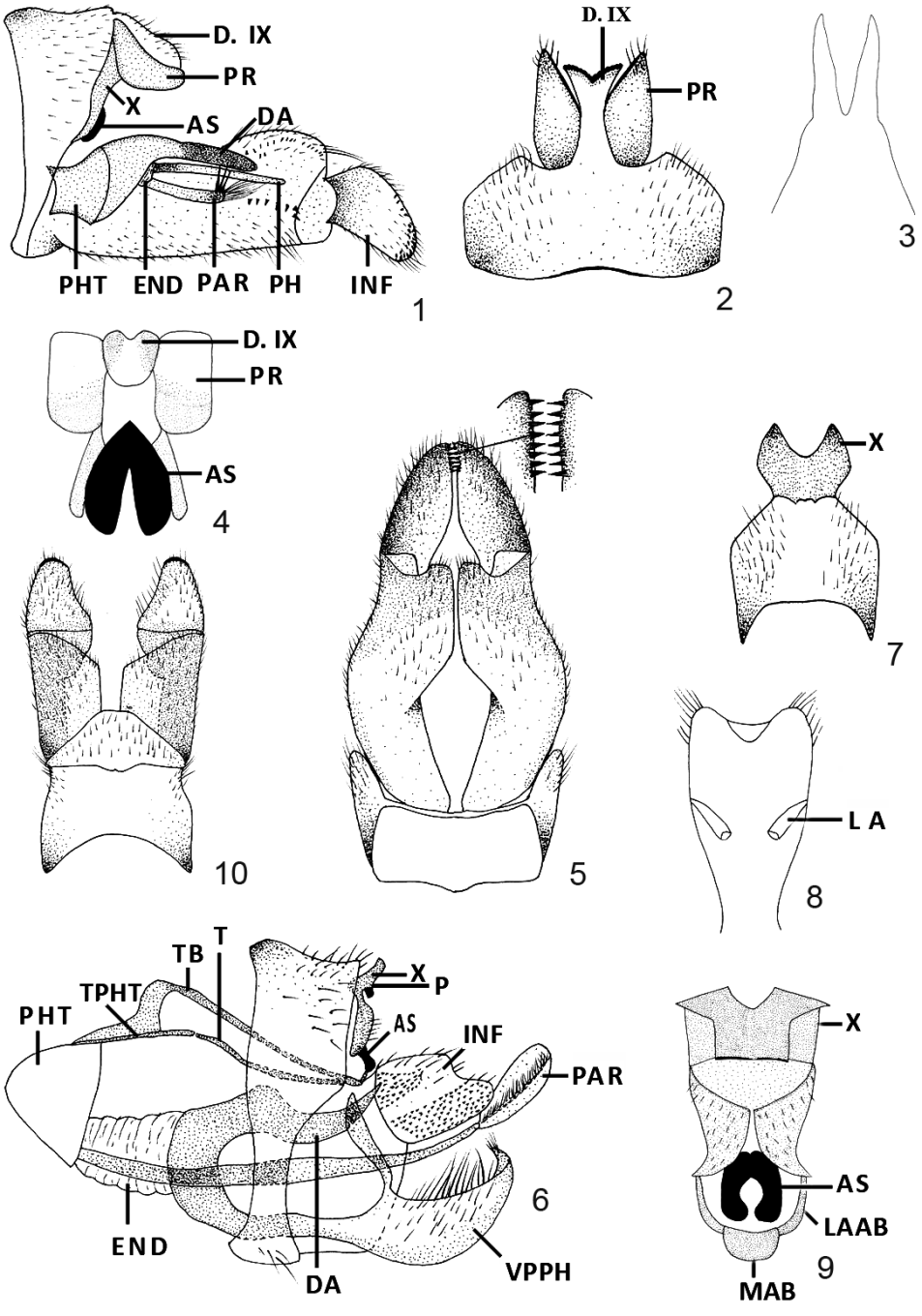
Differential diagnosis. This species is similar to *R. dongkyapa* SCHMID, 1970 but differs from it in followings. Dorsal apical lobe of segment IX curved downwards in *R. himachalensis* sp. n. (Fig. 1) but in *R. dongkyapa* it is raised upward. Preanal appendage in lateral view rounded apically in *R. himachalensis* sp. n. (Fig. 1) but in *R. dongkyapa* it is triangularly shaped. Preanal appendage in caudal view triangular shaped in *R. dongkyapa* but in *R. himachalensis* sp. n. it is truncate (Fig. 4). In *R. himachalensis* sp. n. dorsal appendage of phallic apparatus rounded at apex and longer than paramere (Fig. 1) but in *R. dongkyapa* it is triangular and shorter than paramere. In dorsal view dorsal appendage of phallic apparatus deeply indented (Fig. 3) but it is with shallow indentation in *R. dongkyapa*. Paramere with thick tuft of setae and rounded apically in *R. himachalensis* sp. n. (Fig. 1) whereas in *R. dongkyapa* tuft of setae not so thick and irregularly shaped. Terminal segment of inferior appendage almost rounded in shape (Fig. 1) whereas in *R. dongkyapa* oblong shaped.

Material examined: Holotype: male, Himachal Pradesh, Banjar, 950m, 30.vi.2009. Holotype is deposited in the Department of Zoology and Environmental Sciences, Punjabi University, Patiala, India. Paratype: 1 male, Uttarakhand, Mori, 1150m, 29.ix.2008.

Female: Unknown

Derivato nominis: The species is named after the name of state in which type locality is situated.

Figs 1–10. *Rhyacophila himachalensis* sp. n., male genitalia: 1 = left lateral view; 2 = dorsal view; 3 = dorsal view of dorsal appendage of phallicata; 4 = caudal view; 5 = Inferior appendage ventral view. 6–10. *R. acutis* sp. n., male genitalia: 6 = left lateral view; 7 = dorsal view; 8 = dorsal view of ventral plate of phallicata; 9 = caudal view; 10 = inferior appendage ventral view. AS = anal sclerite; DA = dorsal appendage of phallicata; D. IX = dorsal apical lobe of segment IX; END = endotheca; INF = inferior appendage; LA= lateral arm of ventral plate of phallicata; LAAB= lateral arm of apical band; MAB = median arm of apical band; P = projection of segment X; PAR= paramere; PH = phallicata; PHT = phallotheca; PR= preanal appendage; T = tendon of inferior appendage; TB = tergal band; TPHT = tenons of phallotheca; VPPH = ventral plate of phallicata; X = segment X


D. IX
PR
X
AS
DA
PHT
END
PAR
PH
INF
1
D. IX
PR
2
3
D. IX
PR
AS
4
5
X
7
10
L A
8
T
TB
TPHT
PHT
X
P
AS
INF
PAR
6
END
DA
VPPH
X
AS
LAAB
MAB
9

Rhyacophila acutis sp. n.
(Figs 6–10)

Description. Length of forewing 8.73 mm and that of antenna 5.82 mm. Color of body and wings dark brown but antenna, maxillary palps, labial palps and legs are pale yellow.

Male genitalia. Segment X in lateral view with rounded projection. Dorsal appendage of phallic apparatus pointed apically. Terminal segment of inferior appendage very small in size and with two patches of spines. Upper process of ventral plate of phallicata curved backward (Fig. 6). In dorsal view segment X rounded at edges (Fig. 7) and in ventral view inner and outer surfaces of terminal segment of inferior appendage are concave and convex respectively (Fig. 10).

Differential diagnosis. This species is similar to *R. gyaldzen* SCHMID, 1970 but it can easily distinguish from it by the following features. Segment X in *R. acutis* with rounded projection (Fig. 6) whereas in *R. gyaldzen* projection is pointed. Dorsal appendage of phallic apparatus pointed apically in *R. acutis* (Fig. 6) but in *R. gyaldzen* apex of dorsal appendage of phallic apparatus truncate. Upper process of ventral plate of phallicata curved backward (Fig. 6) but in *R. gyaldzen* it is not curved backward. In dorsal view segment X of *R. acutis* with U shaped indentation (Fig. 7) but in *R. gyaldzen* indentation V shaped. In caudal view anal sclerite bean shaped in *R. acutis* (Fig. 9) but in *R. gyaldzen* anal sclerite rounded. In dorsal view outline of ventral plate of phallicata heart shaped (Fig. 8) but in *R. gyaldzen* it is rounded.

Material examined: Holotype: male, India: Meghalaya, Padammaphlong, 1500 m, 26.v.2011. Holotype deposited in the Department of Zoology and Environmental Sciences, Punjabi University, Patiala, India.

Female: Unknown

Derivato nominis: The species name refers to the acute apex of dorsal appendage of phallic apparatus.

*

Acknowledgements – The authors are grateful to Dr. J. C. MORSE (Clemson University, USA) for his help. Thanks are due to Department of Science and Technology, New Delhi for providing financial assistance in accomplishing this work.

REFERENCES

BLAHNIK, R. J., HOLZENTHAL, R. W. & PRATHER, A. L. (2007) The lactic acid method for clearing Trichoptera genitalia. Pp. 9–14. *In:* BUENO-SORIA J., BARBA-ALVAREZ, R. & ARMITAGE, B. J. (eds): *Proceedings of the 12th International Symposium on Trichoptera.* The Caddis Press, Columbus, Ohio,

KIMMINS, D. E. (1952) Indian caddis flies VI. New species and a new genus of the subfamily Rhyacophilinae. *Annals and Magazine of Natural History* **12**: 347–361.

KIMMINS, D. E. (1953) Entomological results from the Swedish Expedition 1934 to Burma and British India V. Trichoptera. The genus Rhyacophila Pictet (Fam. Rhyacophilidae). *Arkiv för Zoologi* **2**: 505–555.

KISS, O. (2003) Three new species of Rhyacophila (Trichoptera, Rhyacophilidae) from Nepal. *In*: KISS, O. (ed.): *Trichoptera from Nepal*. Eger, Hungary, Published by the author, 66 pp.

KISS, O. (2011*a*) Two new species of Rhyacophila (Trichoptera, Rhyacophilidae) from Nepal. *Acta Zoologica Academiae Scientiarum Hungaricae* **57**(2): 111–116.

KISS, O. (2011*b*) Two new species of Rhyacophila (Trichoptera, Rhyacophilidae) from Nepal. *Zootaxa* **2991**: 62–68.

MALICKY, H. (1997) Weitere neue Köcherfliegen-Arten (Trichoptera) aus Asien. *Linzer Biologische Beiträge* **29**: 217–238.

MARTYNOV, A. V. (1927*a*) Contributions to the aquatic entomofauna of Turkestan. I. Trichoptera Annulipalpia. *Annuaire du Musée Zoologique de l'Académie Impériale des Sciences de Saint Pétersbourg* **28**: 162–193.

MARTYNOV, A. V. (1927*b*) Contributions to the aquatic entomofauna of Turkestan. II. Trichoptera Integripalpia, with a note on a new species of Rhyacophila. *Annuaire du Musée Zoologique de l'Académie Impériale des Sciences de Saint Pétersbourg* **28**: 457–495.

MARTYNOV, A. V. (1930) On the trichopterous fauna of China and Eastern Tibet. *Proceedings of the Zoological Society of London* **5**: 65–112.

MARTYNOV, A. V. (1935) On a collection of Trichoptera from the Indian Museum. Part I. Annulipalpia. *Records of the Indian Museum* **37**: 93–209.

MORSE, J. C. (ed.) (2012) *Trichoptera World checklist.* [Accessed 28 January 2012.]

MORTON, K. J. (1900) Descriptions of new species of Oriental Rhyacophilidae. *Transactions of the Royal Entomological Society of London* **1900**: 1–7, Plate 1.

PICTET, F. J. (1834) *Recherches pour servir à l'histoire et l'anatomie des Phryganides.* A. Cherbuliez, Geneva, Switzerland.

SCHMID, F. (1959) Trichoptères du Pakistan, II. *Tijdschrift voor Entomologie* **102**: 231–253.

SCHMID, F. (1970) Le genre Rhyacophila et la famille des Rhyacophilidae (Trichoptera). *Memoires de la Société Entomologique du Canada* **66**: 1–230.

STEPHENS, J. F. (1836) *Illustrations of British entomology; or a synopsis of indigenous insects: containing their generic and specific distinctions; with an account of their metamorphoses, times of appearance, localities, food, and economy, as far as practicable. Mandibulata. Vol. 6*. Baldwin and Cradock, London, pp. 146–208.

Revised version received March 2, 2012, accepted June 13, 2012, published August 10, 2012