



An Updated Checklist and Distribution of Plenitentoria Group of Caddisflies (Trichoptera: Integripalpia) from India

KEYWORDS

Trichoptera, Plenitentoria group, Species, Checklist, Distribution.

Sajad Hussain Pary

Research and Training Centre for Pollinators, Pollinizers and Pollination Management,
Sher e Kashmir University of Agricultural Science and Technology, Shalimar, Srinagar (J&K), India, 190025

ABSTRACT One hundred and eighty two species representing 8 families and 21 genera of Plenitentoria group of caddisflies are enlisted from India. An updated checklist of all species along with distribution (old as well as new distribution) is also given. The new distribution is based on the collection from different localities of India which include the states of Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Sikkim, Meghalaya, Arunachal Pradesh, Nagaland, Mizoram, Darjeeling (West Bengal) and some parts of Assam and the old distribution is based on the data collected from different research papers. Families having the greatest species richness are Lepidostomatidae (61 spp.), Limnephilidae (39 spp.), Goeridae (30 spp.), Apataniidae (24), Brachycentridae (12 spp.), Phryganeidae (10 spp.), Uenoidae (5 spp.) and Phryganopsychidae (1 sp.). The samples collected during 2008-2014 are lying in the laboratory of Pollination Management Research Centre, Sher e Kashmir University of Agricultural Sciences and Technology and in the Entomological laboratory of Asian Institution Punjabi University Patiala.

Introduction

India is one of the "Hot spot" of biological diversity in world and is supporting a large number of fauna and flora. Among the insects Trichoptera (caddisflies) are economically one of the most important insect order whose immature stages are totally dependent on aquatic ecosystem. The order Trichoptera comprises a group of holometabolous insects closely related to the order Lepidoptera, together the two orders form the superorder Amphiesmenoptera. Adult trichopterans ranges in size from minute with a wing span of less than 3 mm, to large with a wing span approaching 100 mm. Some species have striking colour and wing patterns but the colour generally varies from dull yellow to grey or from brown to black. They are moth like insects with wings covered by hair, not scales as in Lepidoptera. Adults have prominent antennae and in some species the antennae are exceptionally long (more than double the length of the forewing). With some exceptions the adults have well developed maxillary and labial palps, but never the coiled proboscis that characterizes most adult Lepidoptera.

Fischer (1960-1973) produced a world catalogue of caddisflies that recorded 5,546 species. The recently published work of Holzenthal et al. 2011 records 14,999 species (14,291 extant, 608 fossil, 100 *nomina dubia*). These species are referred in 688 genera (601 mostly extant, 85 fossil, 2 *nomina dubia*) and 56 families (49 extant, 7 fossil). In India order Trichoptera is represented by 27 families, containing 1046 species under 94 genera (Sharma & Chandra 2009). Plenitentoria group of caddisflies contain 12 families over the world which include, Apataniidae, Brachycentridae, Kokiriidae, Lepidostomatidae, Limnephilidae, Oeconesidae, Phryganeidae, Phryganopsychidae, Psiliidae, Plectrotarsidae, Rossianidae and Uenoidae. In India this group is represented by 7 families which include Apataniidae, Brachycentridae, Lepidostomatidae, Limnephilidae, Phryganeidae, Phryganopsychidae and Uenoidae.

Trichoptera are abundant in all types of natural aquatic ecosystems. They are apneustic and rely on dissolved oxygen for respiration. With a high diversity of species having both case and shelter constructing larvae, they are use-

ful indicators of organic pollution. Trichoptera have been used extensively in biomonitoring assays as indicator species, selected communities or assemblages of species or more broadly based family level identification of species being used to assess the health status of aquatic ecosystems. Trichoptera together with other aquatic insect orders, have also been used to assess aquatic biodiversity EPT (Ephemeroptera, Plecoptera and Trichoptera) or ETS (Ephemeroptera, Trichoptera, Simuliidae) and habitat diversity (Hannaford and Resh 1995; Hewlett 2000; de Moor 2002). The significant contributions to this group in India is by (Schmid 1962, 1965, 1968ab, 1991, 1992), (Kimmins 1950), (Martynov 1936) and (Mosely 1936, 1941, 1949a, b, c).

Material and methods

The research material dealing with the present studies comprises of about 1845 adult samples of Plenitentoria group of caddisflies collected from different localities of Indian Himalaya.

Collection

Specimens examined in this study were primarily collected using UV black light tubes consisting of a 22 watt U.V blacklight, powered by a sealed rechargeable 12-volt batteries, placed near the water edge and deployed for 1-3 hours beginning at dusk. In some of the cases the collection was also made with the help of mercury-vapour bulb (160 watt). Some species of the genus *Lepidostoma* Rambur and *Pseudostenophylax* Martynov were collected from aquatic vegetation during day time with the help of sweeping nets. During last seven years (2008-2014), various localities falling in the states of Jammu and Kashmir, Himachal Pradesh, Uttarakhand, Sikkim, West Bengal, Arunachal Pradesh and Nagaland between an altitude of 450 m amsl-4000 m amsl were covered and surveyed. Mostly the collection was made from the interior of the forest areas having water streams and dense vegetation. The caddisflies were recognized in the field due to their sitting posture (wings held in a triangular roof over abdomen) and continuously vibrating long antenna. The adults were collected in a jar containing 70% alcohol specially designed for this purpose.

Preservation

Identification of most Trichoptera depends upon structures which get shrivel in dried specimens, therefore the specimens were preserved in wet form. Some species of genus *Eubasilissa* were preserved in dry form with regular fumigation with ethyl estate. The specimens collected during night were preserved in 70% alcohol with a drop of glycerin over the surface and were kept in a box specifically designed for the purpose. Labels carrying information regarding collection date, locality and altitude etc were appended to each of the species in the vials. Alcohol in the vials is changed after regular intervals.

Dissection of the adults for the examination of external genitalia

In order to examine the male external genitalia, the abdominal tip of the concerned individual was removed with a fine tipped forceps. After removing, the genitalia were placed in 10-12% KOH over night or until most of the organic matter is digested. The genitalia were then taken out from the KOH and put in alcohol so that the organic matter left inside may become clear. Another method known as lactic acid procedure of (Blahnik et al. 2007) were also used for clearing genitalia. These tubes were placed in the dry bath and were heated up to a constant temperature of about 120°C for about an hour. After constant heating genitalia were washed with 90% alcohol and were placed in a stain chlorozol black for about a minute. After removing the genitalia from stain were viewed under the microscope for its morphological studies. Species were identified upto species level with the help of relevant literature.

Taxonomic status of Plenitentoria group in India

Family Apataniidae

This is a northern and montane group found in North America, Europe and Asia. The family names dates to (Wallengren 1886), but for most of its history it was included as a subfamily of Limnephilidae. Wiggins 1996a treated the group as a distinct family and subsequent workers have accepted this designation [Holzenthall et al. 2007]. There are nearly 203 species in 21 genera, divided into 2 subfamilies over the world. In India this family is represented by 24 species under 4 genera. These species were contributed by (Schmid 1968a) 19 species; (Kimmins 1950); (Martynov 1936); (Mosely 1950); (Mey & Malicky 1993); (Olah 2011) and each contributed 1 species to Indian fauna.

Family Limnephilidae

This is the largest family in the Plenitentoria group, with approximately 900 described species. At higher latitudes and elevations, it is the dominant group in much of the Northern Hemisphere. The family was first established by Kolenati in 1848 and includes species described by Linnaeus in *systema Naturae*, 10th edition [Holzenthall et al. 2007]. In India (Mosely 1936) reported 6 species from Jammu & Kashmir, Uttarakhand, West Bengal and Sikkim, while (Martynov 1936) added 5 species to the Indian fauna. Kimmins 1950 added 7 species referable to 4 genera from Arunachal Pradesh and Himachal Pradesh. Schmid (1966, 1968a, 1991) contributed 41 species to the Indian Limnephilidae. Saini & Parey (2012), (Parey et al. 2013); (Saini et al. 2012) added four more species to this family in India.

Family Uenoidae

This family is found in North America, eastern Asia, and in southern Europe. It was originally described by (Iwata 1927) as a subfamily of Sericostomatidae. This family was revised by (Wiggins et al. 1985) [Holzenthall et al. 2007]. In

India family Uenoidae is represented by only by 4 species under a single genus *Uenoa* Iwata. These species were contributed by (Botosaneanu 1979); (Wiggins et al. 1985); (Martynov 1936) and (Mosely 1939b) each contributed 1 species to genus *Uenoa* in India.

Family Lepidosomatidae

This family is widely distributed throughout the Northern Hemisphere, and extends southwards to panama, New Guinea, and the Afrotropical region. It was originally described by (Ulmer 1903) as a subfamily of Sericosstomatidae. It is divided into 2 subfamilies. The nominotypical subfamily contains 3 genera and most of the species: *Hummeliella* Forsslund is a monotypic genus from China; *Lepidostoma* Rambur contains most of the diversity in the family (380 species; Afrotropical, Australasian, Palearctic, and Nearctic); and *Paraphlegopteryx* Ulmer (20 species) is widespread in the East Palearctic and Oriental regions. The subfamily Theliopsychinae (Weaver 1993) contains 4 genera: *Crunoecia* McLachlan and *Martynomyia* Fischer are the West Palearctic genera with only a handful of species each; *Theliopsyche* Banks is a Nearctic genus with half a dozen species; and *Zephyropsyche* Weaver is a small genus (4 species) from South and Southeast Asia [Holzenthall et al. 2007]. (Weaver 1988) provided a synopsis of the North American species and a review of the world species (Weaver 2002), where he synonymized several genera, formerly separated by secondary sexual characters of the male, with *Lepidostoma*. From India, 17 species of *Lepidostoma* have been described by (Mosely 1939b, 1941, 1949a, 1949b, 1949c); 5 species by (Martynov 1936); 2 species each by (Malicky 1979, 2003), (McLachlan 1871, 1878), (Ulmer 1905, 1906) and (Weaver 1989, 2002) and 1 species by (Navás 1932). Two other species i.e. *L. brueckmanni* (Malicky & Chantaramongkol) and *L. palmiles* (Ito) originally reported from Thailand & Nepal respectively have also been reported from India. (Saini and Parey 2011), (Parey and Saini 2012ab) and (Parey and Saini 2013) added 13 species to this family in India.

Family Branchycentridae

This is a Northern Hemisphere family found in both the old and new worlds. Ulmer (1903) originally established this group as subfamily of Sericostomatidae. It now contains 8 genera and a little over 113 species. Four of these genera are monotypic: *Adicrophleps* Flint (Nearctic), *Amiocentrus* Ross (Nearctic), *Dolichocentrus* Martynov (Southeastern Siberia). *Eobranhycentrus* Wiggins (Japan and Western North America) and *Tsudaea* Nozaki contain only half a dozen species. *Branchycentrus* Curtis (30 species) and *Micrasema* McLachlan (75 species) are both widespread across the Holarctic and Oriental regions [Holzenthall et al. 2007]. In India this family is represented by 12 species under 2 genera. (Schmid 1992) contributed 10 species, (Martynov 1909), (Mosely 1938) each contributed 1 species to Indian fauna of Branchycentridae.

Family Goeridae

This is a widely distributed family, found on all continents except South America and Australia. Ulmer 1903 originally described this group as a subfamily of Sericostomatidae [Holzenthall et al. 2007]. In India this family is represented by 29 species out of which 22 species are contributed by (Schmid 1965, 1991), 5 by (Mosely 1938, 1939), (Betten 1909) & (Navas 1932) each contributed 1 species to Indian Goerid fauna. Parey et al. 2012 added 1 species this family in India.

Family Phryganeidae

Leach (1815) circumscribed the Linnaean genus *Phryganea* to the species *P. grandis*, and placed the genus *Phryganea* in the tribe Phryganides with *Limnephilus*. Burmeister (1839) was the first to use the name Phryganeidae, as a subfamily of Phryganeodea. Wiggins (1998) published a book "The Caddisfly Family Phryganeidae (Trichoptera)" which serves as the definitive reference [Holzenthal et al. 2007]. In India this family is represented by only two genera *Neurocyta* Navas and *Eubasilissa* Martynov. *Neurocyta* Navas is represented by a single species from this region by (Navas 1916). Genus *Eubasilissa* is represented by 7 species. These are contributed by (Schmid 1962) contributed 3 species, (White 1862); (Betten 1909); (Martynov 1930); (Ghosh and Chadhury 1987) each contributed 1 species to Indian fauna of Phryganeidae. (Parey and Saini 2012) added two species to this family in India.

Family Phryganopsychidae

This Family contains a single genus, *Phryganopsyche* Wiggins, with only 4 species over the world. *Phryganopsyche latipennis* is the only species reported from India (Kimmins 1950).

Table I: Distribution of Indian families of Plenitentoria Group along with number of species and genera in each family

Plenitentoria Group	Distribution	No. of species & genera in the world	No. of species & genera in India
Apataniidae Wallengren, 1886	Hol, Or	200 (21)	24 (4)
Brachycentridae Ulmer, 1903	Hol, Or	113 (8)	12 (2)
Goeridae Ulmer, 1903	Afr, Aus, Hol, Or	184 (11)	30 (2)
Lepidostomatidae Ulmer, 1903	Cosmopolitan	483 (11)	61 (3)
Limnephilidae Kolenati, 1848	Aus, Hol, Neo, Or	884 (100)	39 (6)
Phryganeidae Leach, 1815	Hol, Or	120 (21)	10 (2)
Phryganopsychidae Wiggins, 1959	Pa (East Asia), Or	4 (1)	1 (1)
Uenoidea Iwata, 1927	Hol, Or	31 (4)	5 (1)

Table II. Checklist and distribution of Plenitentoria group (both old as well as new distribution) in India

Family	Genus	Species	Country, State and locality wise previous distribution	State and locality wise new distribution in India
Lepidostomatidae	<i>Lepidostoma</i> Rambur	<i>L. armatum</i> (Ulmer)	Assam	Meghalaya: (Shillong)
		<i>L. assamense</i> (Mosely)	Nepal: Bhutan: India: Meghalaya (Cherrapunji)	

		<i>L. betteni</i> (Martynov)	West Bengal: (Darjeeling)	Sikkim (Singhik, Mangan; Uttarakhand (Gairsain)
		<i>L. destructum</i> (Ulmer)	Bhutan: India: West	Arunachal Pradesh (Hunli, Dirang)
		<i>L. digitatum</i> (Mosely)	Meghalaya (Khasi Hills)	
		<i>L. divaricatum</i> (Weaver)	Indonesia: India: Uttarakhand (Rishikesh), Meghalaya & Manipur	
		<i>L. dubitans</i> (Mosely)	Meghalaya (Khasi Hills)	
		<i>Lepidostoma fuscatum</i> (Navas).	India (Karnataka)	
		<i>L. ferox</i> (McLachlan)	North India	
		<i>L. heterolepidium</i> (Martynov)	Bhutan: Nepal: India: (West Bengal)	
		<i>L. inerme</i> (McLachlan)	China: India: Jammu & Kashmir (Leh)	Jammu & Kashmir (Pahalgam, Dobivan, Leh, Gulmarg, Baisern, Aru); Himachal Pradesh (Traila); Uttarakhand (Mandel)
		<i>L. latum</i> (Martynov)	Himachal Pradesh: Pung Pulla	Jammu & Kashmir (Tangmarg, Pahalgam, Drass)
		<i>L. kimsa</i> (Mosely)	Sikkim	(Kurseong)
		<i>L. kurseum</i> (Mosely)	Sikkim	
		<i>L. libitana</i> (Malicky)	Himachal Pradesh	
		<i>L. margula</i> (Mosely)	Jammu & Kashmir (Gulmarg)	Jammu & Kashmir (Sonmarg)
		<i>L. moulmina</i> (Mosely)	Sikkim	Assam (Jetinga)
		<i>L. nagana</i> (Mosely)	Jammu & Kashmir (Nara Nag)	Himachal Pradesh (Ahla)
		<i>L. parvulum</i> (McLachlan)	Uzbekistan: India (Jammu & Kashmir)	Jammu & Kashmir (Aru, Aphaawat, Dobivan, Yusmarg)
		<i>L. punjabicum</i> (Martynov)	Himachal Pradesh (Punjpul Nallah)	Himachal Pradesh (Pung Pulla, Purola)
		<i>L. serratum</i> (Mosely)	Meghalaya (Khasi Hills)	Meghalaya (Cherrapunge)

	<i>L. sika</i> (Mosely)	Sikkim	Arunachal Pradesh (Tato)
	<i>L. sonomax</i> (Mosely)	Tibet: India: Jammu & Kashmir (Sonamarg)	
	<i>L. steelae</i> (Mosely)	Meghalaya (Chhaglon)	
	<i>L. tesarum</i> (Mosely)	Uttarakhand (Muktesar)	Uttarakhand (Munsiyari, Mandel); Himachal Pradesh (Ghiaghi, Shayanachatti, Baksunag)
	<i>L. ylesomi</i> Weaver	India	Sikkim (Yuksum); Uttarakhand (Mandel); Jammu & Kashmir (Pahalgam)
	<i>L. doligung</i> (Malicky)	Indonesia: China: India (Andaman & Nicobar	
	<i>L. inequale</i> (Martynov)	Bhutan: India: Uttarakhand (Bhowali)	Uttarakhand (Tala)
	<i>L. khasianum</i> (Mosely)	Meghalaya (Khasi Hills)	
	<i>L. lanca</i> (Mosely)	Karnataka (Kodaikanal)	
	<i>L. palnia</i> (Mosely)	Karnataka (Kodaikanal)	
	<i>L. brueckmanni</i> (Malicky & Chantra-mongkol)	Thailand: India (Assam)	
	<i>L. palmipes</i> (Ito)	China, India (Uttarakhand, Sikkim, Arunachal Pradesh)	
	<i>L. liber</i> Malicky	Bhutan	India: Arunachal Pradesh (Loomla)
	<i>L. simplex</i> (Kimmins)	Nepal	India: Uttarakhand (Pithoragarh)
	<i>L. kashmiricum</i> Saini & Parey		Jammu & Kashmir (Pahalgam); Sikkim (Singhik); West Bengal (Darjeeling)

	<i>L. dirangense</i> Saini & Parey		Arunachal Pradesh (Dirang)
	<i>L. meghalaysense</i> Saini & Parey		Meghalaya (Cherrapunge)
	<i>L. garhwalense</i> Parey & Saini		Uttarakhand (Gairsain)
	<i>L. truncatum</i> Parey & Saini		Himachal Pradesh (Ahla)
	<i>L. ahlae</i> Parey & Saini		Himachal Pradesh (Ahla)
	<i>L. sonmargae</i> Parey & Saini		Jammu & Kashmir (Sonmarg)
	<i>L. curvatum</i> Parey & Saini		Arunachal Pradesh (Tato)
	<i>Lepidostoma mechukaense</i> Parey & Saini		Arunachal Pradesh (Mechuka)
	<i>L. nuburagangai</i> Dinakaran & Anbalagan	Tamil Nadu (NuburagangaiStream)	
	<i>Paraphle-gopteryx</i> Ulmer	<i>P. composite</i> (Martynov)	West Bengal (Shepi, Ghum)
	<i>P. moselyi</i> Weaver	Nepal: India: Uttarakhand	Uttarakhand (Munsiyari); Himachal Pradesh (Traila)
	<i>P. normalis</i> Mosely	Nepal: India: Arunachal Pradesh (Amatulla, Ankaling, Chug); Sikkim (Chongpung, Mangan, Yoksum), West Bengal (Labha, Samabeong)	Arunachal Pradesh (Hunli); Sikkim (Uttaray)
	<i>P. orestes</i> Weaver	Sikkim (Lachung, Chamiteng, Chateng)	
	<i>P. moselyi</i> Weaver	Uttarakhand (Saran, Akhrotkothi, Dhur, Gwaldam, Joshimath)	
	<i>P. kamen-gensis</i> Weaver	Arunachal Pradesh (Tampa La, Talung Dzong, Moshing)	
	<i>P. squamalata</i> Weaver	Arunachal Pradesh (Bordila, Rahung)	
	<i>P. ivanovi</i> Weaver	Manipur (Tairenpokpi)	
	<i>P. aykroydi</i> Weaver	Manipur (Chingsao, Singkap); Meghalaya (Nongrim, Umsawmat)	

		<i>P. bulbosa</i> Weaver	Manipur (Chingsao, Chattrik, Mapum, Singkap)	
		<i>P. schmidi</i> Weaver	Nepal: India: Arunachal Pradesh (Jhum La, Bombdila); Sikkim (Lathong, Manu, Yoksum, Tung, Teng)	
		<i>P. martynovi</i> Weaver	Manipur (Mattiyang)	
		<i>P. porntipae</i> Weaver	Manipur (Sirohi Kashong)	
		<i>P. pippini</i> Weaver	Sikkim (Chemiteng, Karponang)	
		<i>P. ulmeri</i> Weaver	Uttarakhand (Saran, Dhur, Khati); Sikkim (Lathong)	
	Zephyropsyche Weaver	<i>Z. schmidi</i> Weaver	Arunachal Pradesh (Nekhu); Sikkim (Lathong)	
Goeridae	Goera Stephens	<i>G. parapo-decha</i> Schmid	Chennai (Perumalmalai)	
		<i>G. arsudana</i> Schmid	Arunachal Pradesh (Lifakpo)	
		<i>G. janaka</i> Schmid	Manipur (Hkayam Boum)	
		<i>G. dilipa</i> Schmid	Meghalaya (Barato)	
		<i>G. valmika</i> Schmid	Meghalaya (Mawlang)	
		<i>G. vaichravana</i> Schmid	Uttarakhand (Loharket); Meghalaya (Khasi Hills)	Uttarakhand (Reetha Sahab, Gairsain)
		<i>G. rakchase</i> Schmid	Manipur (Langdang)	
		<i>G. yainadatta</i> Schmid	Arunachal Pradesh (Chug)	Sikkim(Lachung); Arunachal Pradesh (Jung)
		<i>G. sarayu</i> Schmid	Uttarakhand (Gawana)	
		<i>G. vaidehi</i> Schmid	Manipur (Khaorang)	
		<i>G. dandaka</i> Schmid	Uttarakhand (Ugsara)	
		<i>G. maithili</i> Schmid	Arunachal Pradesh (Kalaktang)	
		<i>G. kasaulya</i> Schmid	Sikkim (Rapham)	
		<i>G. raghu</i> Schmid	Sikkim (Hi)	
		<i>G. vinata</i> Schmid	Manipur (Langdang)	
		<i>G. mandana</i> Mosely	Nepal: India: (Andaman)	Assam(Jitinga); Uttarakhand (Gairsain)
		<i>G. parakiya</i> Schmid	Kerala (Kandalur)	
		<i>G. parayatta</i> Schmid	Meghalaya (Mawpran)	

		<i>G. paracrita</i> Schmid	Uttarakhand (Laharket)	Uttarakhand (Tawaghat, Shayanachatti, Mandel, Pathibasa); Himachal Pradesh (Ahla, Khajjiar, Traila, Barara)
		<i>G. parabhava</i> Schmid	Manipur (Nungba)	
		<i>G. tridens</i> Mosely	Meghalaya (Khasi Hills)	
		<i>G. paramahasa</i> Schmid	Arunachal Pradesh (Chapai)	
		<i>G. paramika</i> Schmid	Meghalaya (Thangrain)	
		<i>G. relicta</i> Betten	India	
		<i>G. nigricornis</i> Navas	Maharashtra (Khandala)	
		<i>G. kursea</i> Mosely	West Bengal (Kurseong)	
		<i>G. kalimpa</i> Mosely	West Bengal (Kalimpong)	
		<i>G. mishmia</i> Mosely	Meghalaya (Mishmi Hills)	
	Larcasia Navas	<i>Larcasia assamica</i> Schmid	India	
		<i>Larcasia elia</i> Mosely	India	
Lim-nephilidae	Pseudostenophylax Martynov	<i>P. ithuriel</i> Schmid	Uttarakhand (Ukhal)	Uttarakhand (Mandel, Joshi-math)
		<i>P. mitchelli</i> Mosely	Pakistan (Lal Pani)	Jammu & Kashmir, (Apharwat, Khilanmarg, Izmarg)
		<i>P. schelpei</i> Kimmins	Uttarakhand (RishiGanga)	Uttarakhand (Badrinath, Govindham, Hanuman Chatti); Himachal Pradesh (Manali, Kothi)
		<i>P. arwiel</i> Schmid	Uttarakhand (Mana)	Jammu & Kashmir (Gulmarg, Khilanmarg); Uttarakhand: (Badrenath, Rana chatti)
		<i>P. griseolus</i> Martynov	Bhutan: Nepal: India(Uttarakhand Sikkim)	Himachal Pradesh (Kothi, Manali)
		<i>P. himalayanus</i> Martynov	Nepal: India	Uttarakhand (Gobind Sham)

	<i>P. amphion</i> Schmid	Uttarakhand (Rata)	Uttarakhand (Pandukeshwar, Joshimath)
	<i>P. micraulax</i> McLachlan	China: Kazakhstan : Pakistan: India: (J&K, Himachal Pradesh)	Jammu & Kashmir (Khilanmarg, Kanzalwan, Sonmarg); Himachal Pradesh (Barot, Marhi, Khajjiar); Uttarakhand (Gobind Dham, Hemkunt Saheb)
	<i>P. ovalis</i> Schmid	Nepal: Bhutan: India: Uttarakhand (Khati)	
	<i>P. latifalcatus</i> Schmid	Nepal: India: Arunachal Pradesh (Moshing)	Sikkim (Lachen)
	<i>P. fambriatofalcatus</i> Schmid	Sikkim (Zema)	
	<i>P. angustifalcatus</i> Schmid	Arunachal Pradesh: (Jhumla)	
	<i>P. tenuifalcatus</i> Schmid	Bhutan: India: Sikkim (Dongkung)	
	<i>P. pauper</i> Schmid	Sikkim (Tangshing)	
	<i>P. acutifalcatus</i> Schmid	Manipur: (Hkayam Boum)	
	<i>P. angulatus</i> Schmid	Bhutan:India: Uttarakhand: (Binaik Chatti)	
	<i>P. bifalcatus</i> Schmid	Arunachal Pradesh (Jhumla)	
	<i>P. garhwalensis</i> Schmid	Uttarakhand (Ukhal)	
	<i>P. glycerion</i> Schmid	Sikkim (Zema)	Sikkim (Namprik- dang)
	<i>P. indicus</i> Navas	West Bengal (Darjeeling)	
	<i>P. aniketos</i> Schmid	Pakistan	India: J & K (Gurez valley)
	<i>P. kashmi- rensis</i> Mosely	Pakistan: India (J&K)	
	<i>P. nectarion</i> Schmid	Arunachal Pradesh (Moshing, Bombdila, Ibid)	Arunachal Pradesh (Bom- dila, Foot Hill Camp)

	<i>P. bifalcatus</i> Schmid	Arunachal Pradesh	
	<i>P. squamolinateus</i> Schmid	Arunachal Pradesh (Sangti, Ibid)	Uttarakhand (Badrinath)
	<i>Astratodina</i> Mosely	<i>As. antenor</i> Schmid	Sikkim (Onglaktang)
		<i>As. anteros</i> Schmid	Uttarakhand (Badrinath)
		<i>As. inermis</i> Mosely	Pakistan: Tibet Kanzalwan)
	<i>Phyllostenax</i> Mosely	<i>P. himalus</i> Mosely	Arunachal Pradesh (Bombdila); Himachal Pradesh (Baksunag, Barot, Sanghgan); Uttarakhand (Mandel, Sagar, Harsil); Jammu & Kashmir (Baisern, Kargil)
	<i>Asynarchus</i> McLachlan	<i>A. tibetanus</i> Schmid	
	<i>Limnephilus</i> Leach	<i>L. tibeticus</i> Schmid	Uttarakhand (Phurunda)
		<i>L. fuscovitatus</i> Mutsumara	Japan:India (Sikkim)
		<i>L. morsei</i> Saini & Parey	Jammu & Kashmir (Apharwat)
	<i>Aplatyphylax</i> Kimmins	<i>A. cristatus</i> Kimmins	India
		<i>A. erectus</i> Kimmins	India
		<i>A. eupalinus</i> Schmid	India Sikkim (Gangtok)
		<i>A. mishmicus</i> Kimmins	India
		<i>A. steelae</i> Kimmins	India
		<i>A. terrestris</i> Schmid	India Arunachal Pradesh (Bom- dila)
Apataniidae	<i>Apatania</i> Kolenati	<i>A. avydhagada</i> Schmid	Uttarakhand (Mangu Chatti)
		<i>A. brevis</i> Mosely	Jammu & Kashmir (Gagirberg, Khilanmarg)
		<i>A. auctumnalis</i> Mey&Malicky	Nepal: India: Himachal Pradesh
		<i>A. bhimagada</i> Schmid	Nepal: India: Arunachal Pradesh (Sangti)
			Arunachal Pradesh (Loomla, Bom- dila)

		<i>A. devisaraspali</i> Schmid	Arunachal Pradesh (Lhamo Tso)	Sikkim (Lachung)
		<i>A. extent</i> Kimmins	India	
		<i>A. hatra</i> Olah	India: Arunachal Pradesh (Tenga, Lama Camp)	
		<i>A. dirghabahu</i> Schmid	Nepal: India (Tangshing, Ibbid)	Sikkim (Lachung, Chungthang)
	Apatani-ana Mosely	<i>A. charadija</i> Schmid	Uttarakhand (Almora, Rata)	Himachal Pradesh (Sarchu, Panchpulla); Uttarakhand (Khurpatal, Kilbury, Jolikot)
	Moropsyche Banks	<i>Moropsyche avikritanga</i> Schmid	Manipur (Nungba)	Arunachal Pradesh (Bomdila)
		<i>Moropsyche chandrabuchita</i> Schmid	Meghalaya (Laitlyngkot)	
		<i>Moropsyche dirghakarni</i> Schmid	Meghalaya (Rumkheng)	Arunachal Pradesh (Dirang)
		<i>Moropsyche gairichringiya</i> Schmid	Manipur (Sirohi Kashong)	
		<i>Moropsyche girautcharichnu</i> Schmid	Arunachal Pradesh (Nyukmadong)	
		<i>Moropsyche girikchit</i> Schmid	Manipur (Sirohi Kashong)	
		<i>Moropsyche incerta</i> Martynov	India	
		<i>Moropsyche krichnaruna</i> Schmid	Sikkim (Lathong)	Sikkim (Lachung, Gangtok)
		<i>Moropsyche trikonakarni</i> Schmid	Sikkim (Singbung)	Sikkim (Gangtok, Nampridang)
		<i>Moropsyche urdhvakarni</i> Schmid	Manipur (Sirohi Kashong)	
		<i>Moropsyche vanegudha</i> Schmid	Arunachal Pradesh (Chug)	Arunachal Pradesh (Bomdila, Foot Hill Camp)
	Notania Mosely	<i>Notania adhanya</i> Schmid	Sikkim (Manu)	Sikkim (Lachung)
		<i>Notania brunnea</i> Mosely	India	
		<i>Notania itarichta</i> Schmid	Sikkim (Dehtang)	
		<i>Notania kricha</i> Schmid	Arunachal Pradesh (Nyukmadong)	
Branchycentridae	Micrasema McLachlan	<i>Micrasema abhavyam</i> Schmid	Sikkim (Chamiteng)	
		<i>Micrasema adhacharam</i> Schmid	Manipur (Matiyang)	
		<i>Micrasema adhiram</i> Schmid	Sikkim (Tikjak)	
		<i>Micrasema apratitam</i> Schmid	Arunachal Pradesh (Chug)	
		<i>Micrasema asajjanam</i> Schmid	Arunachal Pradesh (Rahung)	

		<i>Micrasema avadhiritam</i> Schmid	Meghalaya (Syndai, Khasi Hills, Jaintia hills)	
		<i>Micrasema dabhrum</i> Schmid	Uttarakhand (Gaurikund)	
		<i>Micrasema jihmam</i> Schmid	Sikkim (Teng)	
		<i>Micrasema karunam</i> Schmid	Manipur (Chingsao)	
		<i>Micrasema kripnam</i> Schmid	Arunachal Pradesh (Dirang)	
		<i>Micrasema punjaubi</i> Mosely	Himachal Pradesh (Chotah Bagahal)	
	Branchycentrus Curtis	<i>Branchycentrus kozlovi</i> Martynov	Jammu and Kashmir (Vishensar)	Sikkim: Uttarakhand Jammu & Kashmir: (Argam) Himachal Pradesh: (Sanghani)
Phryganeidae	Eu-basilissa Martynov	<i>E. maclachlani</i> (White)	Bhutan: Nepal: India (Himachal, Uttarakhand, Sikkim, Arunachal Pradesh)	Jammu & Kashmir (Patnitop); Sikkim (Golitar); Nagaland (Pfutsero); Arunachal Pradesh (Ziro, Dirang, Mechuka)
		<i>E. chomolhari</i> Schmid	Arunachal Pradesh (Chug)	
		<i>E. avalikhota</i> Schmid	Arunachal Pradesh (Jhumla)	
		<i>E. tibetana</i> Martynov	Tibet: India (Lachung)	
		<i>E. alaknanda</i> Schmid	Uttarakhand (Akhrotkoti)	Uttarakhand (Chopta, Munsiajri)
		<i>E. asiatica</i> Betten	Pakistan: Afghanistan: India (Jammu & Kashmir)	Jammu & Kashmir (Kanzalwan, Aphaawat); Himachal Pradesh (Punjpullah, Kothi)
		<i>E. wigginsi</i> Ghosh & Chaudhary	Uttarakhand (Ghangria)	
		<i>E. schmidi</i> Parey & Saini		Jammu & Kashmir (Baderwah); Himachal Pradesh (Ghiaghi, Mornala)
		<i>E. sikkimensis</i> Parey & Saini		Sikkim (Lachung)

	<i>Neurocyta Navas</i>	<i>Neurocyta arenata Navas</i>	India	
Phryganopsychidae	<i>Phryganopsyche Wiggins</i>	<i>Phryganopsyche latipennis sikkimensis</i>	India (Sikkim)	
Uenoiidae	<i>Uenoa lwata</i>	<i>U. arcuata Wiggins, Weaver & Unzicker</i>	India	
		<i>U. ferdinandoschmidi Botosaneanu</i>	India	
		<i>U. hindustana Martynov</i>	Himachal Pradesh (Punjab Nullah)	
		<i>U. laga Mosely</i>	Jammu and Kashmir (Gagabal)	
		<i>U. punja Mosely</i>	Himachal Pradesh (Chotah Bagahal)	

Discussions

Order Trichoptera is one of the largest aquatic fresh water insect order with more than 15000 described species over the world. This order is least studied in India and whatever work is done it is only by some foreign authors who either collected these species during their expedition to India or studied them from different museums of the world. So far only about 1000 species of species have been reported from India and as per the predictions by (Schmid 1984) there are more than ten thousand species that are waiting for their discovery in India. The present research endeavor was taken to study the predictions of the (Schmid 1984) and during this course of study some 35 new species of caddisflies were discovered from the Indian Himalaya and some new records were also given to the Indian fauna earlier reported from China, Bhutan, Nepal, Pakistan or Burma.

From the environmental point of view Caddisflies are one of the major groups of macroinvertebrates in freshwater ecosystems both in terms of species diversity and of density, especially in relatively unpolluted waterways. For this reason, they are significant contributors in the processing of nutrients. Because of the many different feeding strategies and habitat preferences of this diverse order, nearly every conceivable food resource is processed by caddisflies. The role of caddisflies in the food web is appreciated very well by sport fishing enthusiasts who tie imitations of larval, pupal, and adult caddisflies on hooks in order to entice their game fish to bite a hook. For this reason and because of the usual high species diversity and density of caddisflies in unpolluted surface waters, communities of Trichoptera and other macroinvertebrates are often used to detect the presence of pollution. Also caddisflies along with other insect orders like Ephemeroptera, Plecoptera or Diptera are used for assessing the water quality of a particular fresh water ecosystem. Thus from both taxonomic point of view and from the ecological point of view caddisflies are highly useful in India and particularly for detecting the changes in the fresh water ecosystem because of anthropogenic activities.

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