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# ON AN ACCOUNT OF INDIAN HEPTAGENIIDAE (EPHEMEROPTERA) WITH KEY TO THEIR IDENTIFICATION

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## INTRODUCTION

Mayflies are amphibiotic insect and represent order Ephemeroptera, which inhabit both lotic and lentic ecosystem of our water. Heptageniidae is one of the family of these insects, which in our country is represented by 13 species under 7 genera. It represents almost one seventh of the whole component of Indian mayflies, others are represented by 77 species under 24 genera and 11 families. This is the third biggest, family among Indian Ephemeroptera. World over this family is represented by 378 species under 28 genera (Table - 1, page 144). All the species of this family are endemic to India, though one has extended distribution in orient, thus we have essentially and exclusively oriental element represented under this family. Heptageniidae has 7 species represented in the zone of higher elevation ranging between 1900 to 5297 meters above mean sea level. *Ororotsia hutchinsoni* Traver (1939) has been recorded as larvae in a lentic fresh water lake at an altitude of 5297 m which happens to be highest elevation record for any mayfly within our limits. Of our 13 Heptageniidse, male of 9, female of 12 and larvae of only 1 is known (Table - II, page 145), A key has been formulated to distinguish all 7 genera and 13 species of Indian Heptageniids.

## SYSTEMATIC

Heptageniidae is one of the most distinctive family of mayflies represented almost all over the world by 378 species under 28 genera. It comes only next to Baetidae, qualitatively which is represented by 519 species under 17 genera. In contrast Indian Heptageniidae are represented by 13 species under 7 genera. Of these Rhithrogena Eaton has been recorded for the first time within our limits (Srivastava & Ray, 1987). Indian Heptageniids, thus, represents only a very small fraction of world's fauna of this group and obviously indicates strong possibility of more representation, as is also true for the whole order, on further detailed investigation of our lotic and lentic ecosystem both at high altitude and plains.

Our knowledge of Indian Heptageniids is due to Dubey (1971), Eaton (1885) Hubbard (1974), Kapur and Kripalani (1963), Kimmins (1937), Ulmer (1920), Walker (1860). Srivastava (1979, 1983) has discussed our high altitude mayflies representation and our endemic component including Heptageniidae. In the Indian sub region (i.e. India, Sri Lanka, Pakistan, Nepal, Sikkim, Bhutan, Bangladesh, Burma) Heptageniids are represented by 16 species under 7 genera (Hubbard and Peters, 1978). Of the 7 genera representing Indian Heptageniids *Cinygmina* Kimmins (1937) and *Ororotsia* Traver (1939) are endemic with sole representative under each genera. *Rhithrogena* has been recorded by *R. parva* (Ulmer). Srivastava and Roy (1987) from Maurbhanj district, Orissa.

Within Indian sub continent the genus is only represented by another species, *R. basiri* Ali (1971) from Swat, Pakistan. In orient it is represented from Taiwan and Java.

*Salient features of Heptageniidae :*

Demouline (1958) placed this family under superfamily Heptageniodea alongwith two other families Ametropodidae and Leptophlebiidae. Jensesn (1972) has revised Heptageniidae of the world.

Members of this family are distinguished by following salient points, specially considering our own Heptagennid representatives :

These are medium sized mayfly, smallest being *Rhithrogena parva* with body of male and female measuring respectively 5 and 5.4 mm. While largest recorded is *Afronurus solangensis* Dubey (1971) with female measuring 18 mm in body length. Eyes of both male and female are separated and do not meet on mid dorsal line, this gap is very narrow in male but in female appreciably wide. Eyes are mostly spherical or ovoid in most of the species but are bean shaped in *Afronurus solangensis*. Surface between two eyes inwardly arched in *A. curtus* Dubey (1971). In frontal view the head normally looks triangular as in *A. solangensis* or in some quadrangular like *A. curtus*. The head of *Ororotsia hutchinsoni* Traver (1939) is very distinctively enlarged into prominent lobes which is prominently visible in its frontal aspect. This character coupled with both claws are alike, acutely pointed distinguished it from other genera of the family.

Both fore and hind wings may be present. This family shares 5 tarsal joint character with Baetidae but differs in well developed network of longitudinal and transverse cross veins in both wings. Cross veins in *R. parva* are almost transparent but mostly these are pigmented and in costa and subcosta area thick, dark brown in *A. curtus* but in this extends to the fork of Rs in *Heptagenis nubilia* Kimmins (1937). Cross vein to the stigmatic area vary between 9 - 16. In O. *hutchinsoni* it 9 - 12, 13 in *A. curtus*, 14 in *Epeorus (Epeorus) lahulensis* Kapur and Kripalini (1963), 16 in *A. solangensis*, and maximum 19 in *H. nubilia*. There are 5 - 6 cross vein in costal space before bula in *E. (E.) lahulensis* and *O. hutchinsoni*. Corresponding to the stigmatic area there are 7 - 8 cross veins in the sub costal space of the last named species.

Forewing may be hyaline as in *Cinygmina assamensis* Kimmins (1937), *Ecdyonurus eatoni* Kimmins, *E. indicus* Hubbard (1974) (=*E. subfuscus* Kimmins), *Heptagenia solangensis* Dubey (1971), *H. nubilia, O. hutchinsoni* and *R. parva*. In contrast wings of *A. curtus, A. solangensis* and *E. (E.) lahulensis* are translucent. Besides pigmentation of veins wing of *E. eatoni* has a pale brown spot at base and apex of stigmatic area while that of A. *solengensis* has a brownish black band. Size wise forewing is either slighter shortly than body length, say 16 : 18 in *A. solangensis* ; 11 : 12 in *O. hutchinsoni* in female but in male 11 : 10; 7 : 8 in male; 8 : 11 in female of *E. indicus*, or may be slightly bigger in only a few like *A. curtus* which has 12 : 10 ; 13 : 8 in male and 13 : 9 in female of C. *assamensis*, 10 = 11 : 9 in male; 12-16;9:11 in female of *E. eatoni* ; 10:7.5 in *E. (E.) lahulensis*; 7:5 in male and 9:5.4 in female of *R. parva*.

Hind wing are generally very small, and may be hyaline or translucent in same sequence as in case of fore wing. The hind wing length to forewing length is related as 6:12 in *A. curtus*, 5:16 in *A. solangensis*, 6:13 in *C. assamensis*, 3:10 in *E. lahulensis*, 4:11 in male and 4:13 in female of *H. solangensis* and 1.75 - 2 : 8.5 - 9 in *H. nubila*. Costal projection may not be prominent as in *A. solangensis*, slightly arched outwardly in *A. curtus* but in *E. (E,) lahulensis* there is a preminent outward bulge of costal margin.

Fore legs are longer than rest. Tarsus are 5 jointed, all joints are having moveable articulation. Femora of *A. curtus* are characterstic1y curved which is not the case in any other Indian Heptageniids. Claws of each tarsus are similar and out of two claws on each tarsus one is acute, pointed and other is blunt, straight claws of Larvae of *O. hutchinsoni* have 5 pectinations, incidently this is only Indian Heptageniids whose larva is known. Pigmentation band of dark brown colour present on basal, middle, apical region of femora of *E. eatoni, E. indicus* and *H. nubilia.*

Abdomen pale to dark brown. In *E. eatoni* there are redish brown marking of definite pattern while in *E. indicus* marking of purplish brown on yellow background. *E. lahulensis* has pale brown to moderate brown but in *H. solangensis* it is dark brown. Segment I-VIII are yellow, IX-X brown in *H. nubilia*. In male of *R. parva* I-IX are pale with mid dorsal markings but in *female* it is absent. Abdomen VII-X are redish brown, besides overlaying olive brown on IX-X in *O. hutchinsoni.*

Genital forcep is invariably 4 segmented. There are no spine to penes lobes in C. *assamensis*. In *E. eatoni* both penes lobes are fused, swollen at apex, stimuli are short, in curved and a strong inner tooth. In contrast penes lobe of *E. indicus* are not fused, constricted apically but not swollen, stimuli are strong, down curved. In *E. lahulensis* penes lobes long, distinctly separated, slightly divergent laterally, beset with number of minuts spines ventrally just below apex. Penes lobes are apically expanded in *H. solangensis* with one short, stout basal spine. Ovipositor may be 1 segmented as in *A. solangensis* or 2 segmented as in *A. curtus*. In *H. solangensis* its curved downward and backwards, is heavily selerotized. In *O. hutchinsoni* sub-anal plate has a medium, wide gaping 'V' shaped cleft. Anal cerei are paired, long, filamentous. These may be only slightly longer than body as in *A. curtus* (10.3:10) or double or more than double as in *C. assamensis* (20:9), *E. eatoni* (25:9-11) *H. solangensis* (22:11), *O. hutchinsoni* (15:10).

*Salient taxonomic points of Indian Heptageniids*

Genus *A. fronurus* Lestage (1924) was established with *Ecdyonurus peringueyi* Esben - Peterson. Within our limits it is represented by two species, *A. curtus* Dubey and *A. solangensis* both from riverine ecosystem at the altitude of 2900 and 2800 meters respectively. Genus has no other representative in the Indian Sub region. Former of these can be distinguished from latter in small body size (10:18), smaller forewing (12:16), smaller hind wing (4:5). Head quadrangular instead of triangular, 13 cross veins to stigmatic area instead of 16, Femora outwardly curved instead of being straight, ovipositor pale yellow, two segmented instead of dark brown single segmented.

*Cinygmina* Kimmins (1937) is endemic to India and so far has not been recorded for

extended distribution. It is represented by its genotype, *C. assamensis (=Icinygmina assamensis)* from Meghalaya Khasi Hills at much lower altitude of than former genus. By the proportion of foretarsal segment it is distinguished from *Epeorus* and from *Heptagenia* by lengthwise ratio of hind tarsal segments. Penes lobes are apically rounded and are without spines in which it is distinguished from *Ecdyonurus*, which has lateral dilation. It can be distinguished from *Cinygma*, not represented in Indian Sub-continent, in having a pair of small thin chitinous plates instead of small spine.

*Ecdyonurus* Eaton (1968) is well represented genus from much wider zone than previous two genera. Its genotype is *Ephemera venosa*. Fabricius, by original designation. This genus has 4 representative within our limits namely *E. annulifer* (Walker, 1860) from Khandala Maharastra, *E. bengalensis* (Ulmer, 1920) from Darjeeling (West Bengal) at the altitude of 2178 *M.*, *E. eatoni* Kimmins (1937), *E. indicus* Hubbard (1974) both from Khasi Hills (Meghalaya). Member of this genus generally occupy littoral zone under stones in the lotic ecosystem of rivers, streams etc. Body in general, head and thorax in particular are broad, dorsoventraly flat, Genital forcep of *E. eatoni* is 4 segmented, ochreous, penes lobes fused and swollen at apex with short, incurved stimuli. In contrast in *E. indicus* it is pale, penes lobes not meeting or fused, constricted at apical half, stimuli are short, strong down curved. Genus is represented by only one more species in the Indian sub-continent *E. islamabadicus* Ali (1967).

*Epheorus Eaton* (1881) was established with *E. torrentium* Eaton as its genotype. Within Indian limits it is represented by *E. (E.) lahulensis* Kapur and Kripalani (1963) from considerable altitude of 3200 m. inhabiting lotic ecosystem of terrential to fast running streams at Sissu, Lahul valley in Himachal Pradesh. The other species of genus represented within our limits was incidently also described from 'Kooloo' (Kulu) Himalaya namely *E. psi* Eaton (1889). This has extended distribution in Taiwan. There is characterstics abdominal markings on abdomen of later species which is absent in former. In contrast former has unlobed penes with short spine present ventrally, just below the apical margin which lacks in latter. Genus has no other additional species represented in the Indian sub-continent.

*Heptaegenia* Walsch (1963) is rather well distributed genus and has *Palingenia flavescens* Walsch as subsequent designation (Eaton, 1868). It is represented by two species within our limits - *H. nubila* Kimmins (1937) from Khasi Hills (Assam) and *H. solangensis* Dubey (1971) from R. solang, Pir Panel range (Himachal Pradesh) at an altitude of 2800 m. Former has 8 mm. body, 8.5-10 mm. forewing while later has 11 mm. body, 11-12 mm forewing, stigmatic area of forewing has 13-16:19 cross veins and basal 2/3 of penes closely opposed, apical lobe dilated outward into truncate expansion without any spine as compared to penes being closely opposed, not only basal side but all along its length, apical lobs simple expansion and with stout spine at base. Genus has only one more representative in the Indian sub-continent. *H. hazaraensis* Ali, (1970), outside orient known to be distributed in Holarctic land Nearctic quite generally distributed. *Ororotsia hutchinsoni* Traver (1939) was established to accomodate *O. hutchinsoni* Traver which has been recorded from North West Himalaya both from lotic ecosytem inhabiting at Rao and lentic ecosystem inhabiting margin of Ororotse Tso lake at considerable altitude of 5297 m. This is highest altitude record for any Indian mayfly. It is characterized by greatly

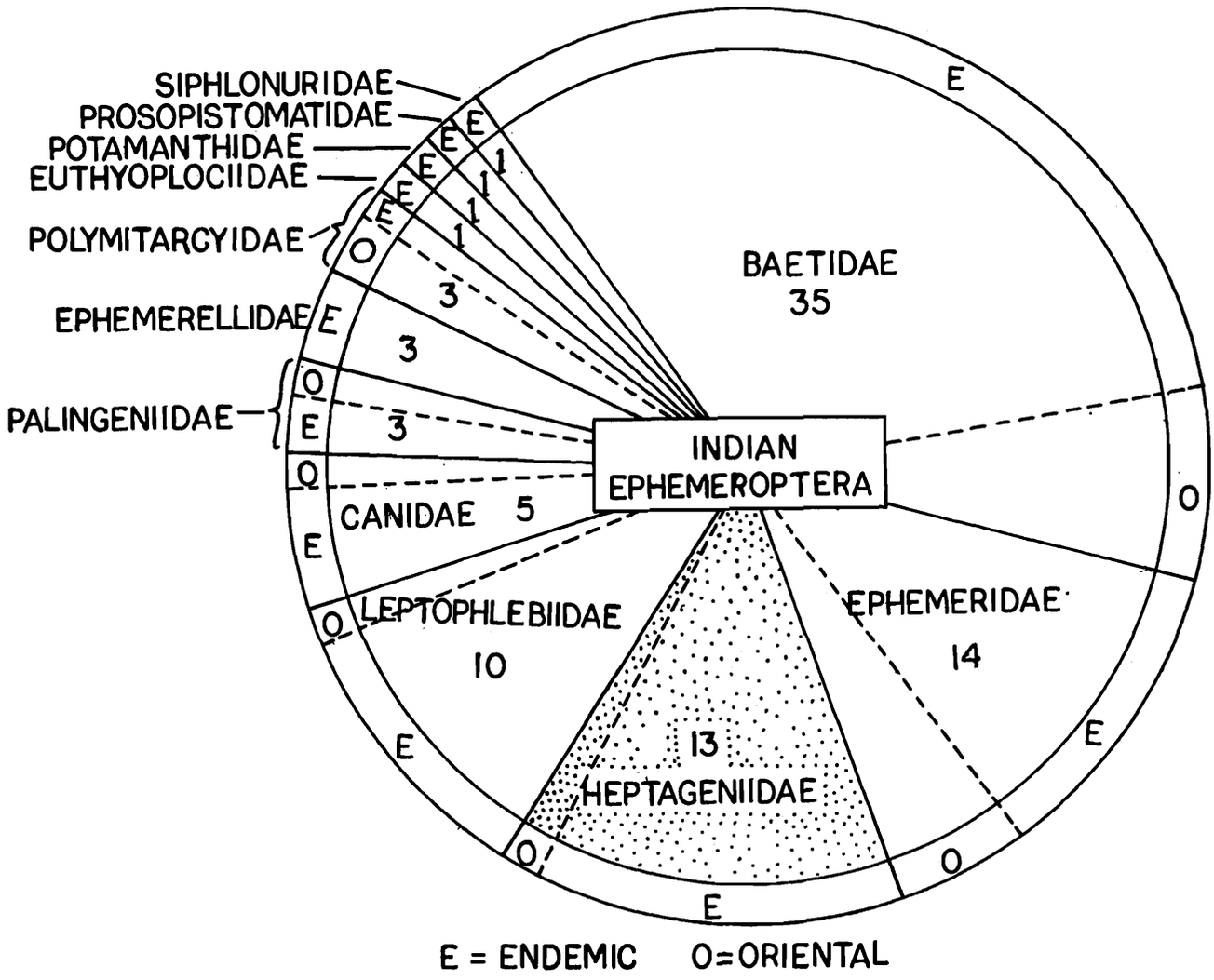
expanded frontal margin of head and similar, acutely pointed on each tarsus. This is only Heptageniid within our limits whose larvae are described. Its larvae has its frontal border of head distinctly emarginate at median line. Gills with much reduced fibrillar portion, lamellae flat, broad, roughly rounded and claws have 5 pectinations. Genus is endemic to India, nevertheless it needs further investigation with possibility of more representation, specially at higher aquatic ecosystems of Himalayas.

*Rhithrogena* Eaton (1881) is also an established genus with *Baetis semicolorata* Curtis. Within Indian limits it has *R. parva* (Ulmor) as sole representative which has been recorded by Srivastava and Roy (In press) from Talbadh, Maurbhanj district of Orissa. It is small sized mayfly measuring, 5 mm body in male and 5.4 mm in female. Forewing are 7 mm in male and 9 mm in female, cross veins almost transparent, costal margin of wing translucent tinged with yellow. Hind wings are more clear than male. Middorsal abdominal stripe present in male on I-XX, absent in female, claws disimilar. Genus has only other species represented in Indian sub-continent which is *R. basiri* (1971) described from Swat Pakistan. Genus is also known to occur in Taiwan (Taihorin and Rikyu Island) and Java. Outside Orient it is distributed in Holarctic and in Nearctic, of general distribution.

## ENDEMISM AND HIGH ALTITUDE REPRESENTATION

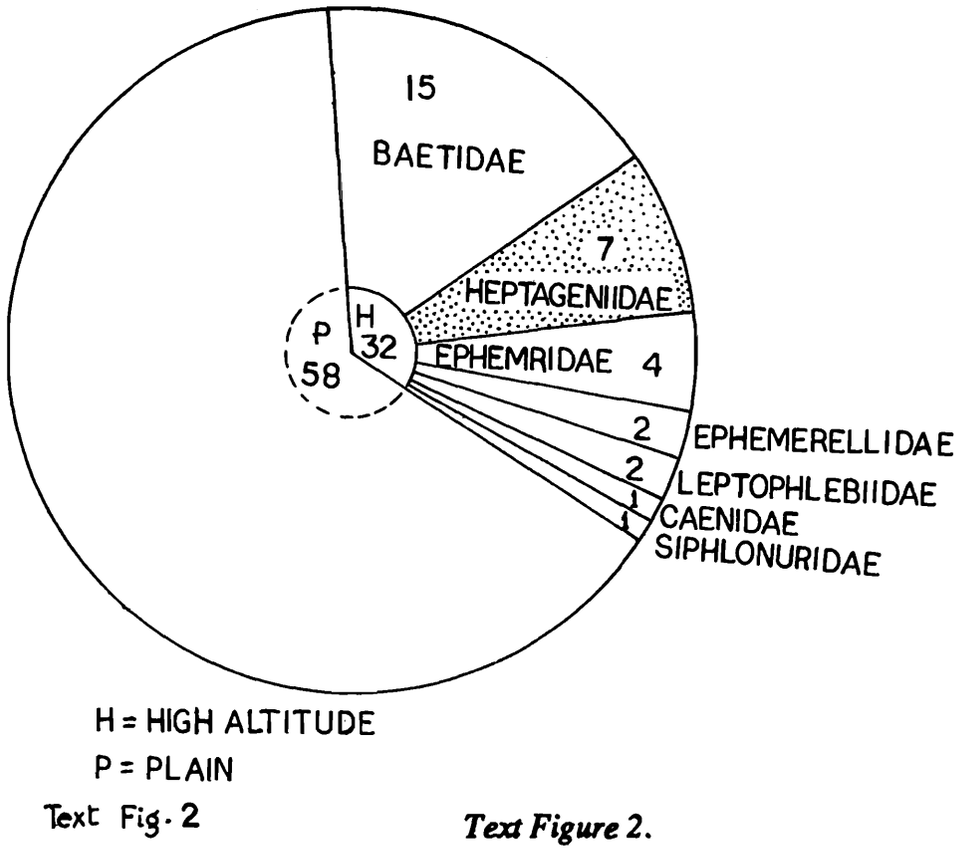
In our faunal component of mayflies, it is evident from above, that genera *cinygmina* and *Ororotsia* are endemic to India as compared to other 5 genera *viz., Afronurus, Ecdyonurus, Epesorus, Heptagenia* and *Rhithrogena* have much wider distribution not only in Orient but even beyond it. Species wise following 11 species viz. *Afronurus curtus, A. solangensis, C. assamensis, Ecdyonurus annulifer, E. bengalensis, E. eatoni, E. indicus, Epeorus (Epeorus) lahulensis. Heptagenia nubilia. H. solangensis Ororotsis hutchinsoni* are endemic to India while *Epeorus psi* also had endemic origin but has been recorded extended distribution in Taiwan. Only *Rhithrogena parva* (Ulmer) is not endemic to India, though it has only oriental distribution (Taiwan, Java, India). Thus within family Heptageniidae endemism in 90% (9:1). This endemism in our mayflies as whole is 5:1, 75 species out of total 90 species while in other major families like Baetidae this proportion is 29 species out of 35, Heptageniidae 12 out of 13, Ephemeridae 10 out of 14, Ephemerellidae has all 3 endemic, while Palingeniidae and Polymitarcyidae each one out of 3 endemic, Euthyplociidae, Potamanthidae, Prosopistomatidae, Siphlonouridae each represented by sole species endemic to our limits. 1/5 or 18 species of our mayflies are known to have extended distribution in Orient, while one among these viz. - Cl*oeon inscriptum* Bengtsson (Baetidae) has extended distribution, even beyond orient, into Europe.

High altitude representation of Indian Heptageniids is by 7 species above 2000 Meter between range of 2178 - 5297 Meters. Of these extreme height is for *Ororotosia hutchinsoni* which is highest altitude record for any Indian mayflies. Thus little more than 50% ( 7 : 6 ) are high altitude inhabitants and all of these occupy different niches in lotic ecosystem of river, streams etc. Srivastava (1979) has indicated that 1/3 or 31:90 of Indian mayflies are high altitude inhabitants mostly occurring between 3000-4000 Meters inhabiting torrential streams of Himalayan mountain range.




*Text Figure 1.*

Shows relative prepondarance of Heptageniidae and other families of Indian Ephemeroptera & Within each family Endemic Component (R) and with oriental (C) distribution.




*Text Figure 2.*

Shows proportion of Plain (P) and High Altitude (H) Ephemeroptera of India. Among high altitude members family wise relative prepondance of Hepatageniidae and other 6 families are shown.

## KEY TO THE INDIAN SPECIES OF HEPTAGENIIDAE

1. Fore tarsus longer than tibia ..... .2

- Fore tarsus slightly smaller or equal to tibia.....4
  Fore tarsus 3/4 shorter than tibia..... .8

2 Fore tarsus is 1 1/2 times long of tibia, 5 tarsal segments are lengthwise related as 8:14:10:5:5, Hind tarsal segments 10:9:7:5:12 .....*Cinygmina (C. assamensis).*

-. Fore tarsus is 1 1/4 times long of tibia, 5 tarsal segments are related lengthwise as 10 : 24 : 18 : 13 : 11 and Hind tarsal segments related as 9 : 7 : 5 : 4 : 11:..... ..... *Heptagenia* .....3

3. Body 11 mm., 19 cross vein in stigmatic area, forcep base distinctly convex, two penes lobes are closely approximated at basal sides, expanded apically, stout spine at base ..... *H. solangensis*

-. Body 8 mm., 13-16 cross veins in stigmatic area two penes lobes are closely apposed at basal 2/3, apically dilated outwards into truncate expansion, spine absent ..... ... .....*H. nubilia*

4. Genital stimuli is in form of small spine, penes lobe dilated laterally.....5

-. Genital stimuli is much reduced to a pair of small chitinous plate..... ..... *Ecdyonoru* .....7

5. Fore tarsus almost equal to tibia, 5 tarsal segments related as 9 : 8 : 8 : 7 : 6..... .....*Epeorus*.....6

6. Abdomen with characteristic markings, penes apically unlobed but with short spine present ventrally just below the apical margin.....*E. lahulensis*

-. Abdomen without such markings, penes apically lobed, without spine.....*E. psi*

7. Penes lobes fused all along its length, genital stimuli short, spinous, incurved ..... *E. eatoni*

-. Penes lobes not fused but closely apposed, genital stimuli long, spine strong, down curved ..... .....*E. indicus (=E. subfuscus)*

7 A. Annualar marking present .....*E. annulifer*

-. Annular marking absent .....*E. bengalensis*

8. Body small sized 5-6 mm.....9

-. Body large sized 10 - 18 mm.....10

9. Wings 7 mm., hyaline except costal border which is translucent tinged with yellow. Abd. I-IX pale with mid dorsal markings which is absent in female ..... .....Rhithrogena (*R. parva*)

10. Head prominently enlarged at its frontal aspect .....*Ororostsia*.....11

-. Head not prominently enlarged at its frontal aspect.....*Afronurus* .....12

11. Male 10 mm. female 12 mm. fore wing 11 mm hyaline dark brown at base, redish brown in stigmatic area and corresponding space in Sc., 5-6 cross vein in costa before bulla and 9-12 in stigmatic area, 7-8 cross vein in corresponding space in Sc., claws olive brown, that of larvae with 5 pectinations, subanal plate with median wide gaping 'V' shaped left ..... *O. hutchinsoni*

12. Small body (10 mm), Head in front view quadrangular, 13 cross vein in stigmatic area, mesonotal markings is dark brown, lateral stripe with two almost equal branches, femora of all legs distinctly curved, ovipositor yellow, 2 segmented ..... ..... *A. curtus*

    Larger body (18 mm), Head in front view subtriangular, 10 cross veins in stigmatic area, dirty brown mesonotal stripe with only anterior thickening. Femora not curved, ovipositer dark brown, single segmented..... *A. solangensis*

## SUMMARY

A detailed taxenomic status and saliant features of Leptophlebiidae with special reference to the Indian forms comprising of 10 species under 9 genera has been presented. A key to species has also been provided. Endemic component has been shown to be 9:1 within family which is 5:1 in all our mayflies. Half of the Indian Leptophlebiid are high altitude dweller. 2 species beyond 3000 m. and another 3 species in the range of 1200-2200 meters.

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## REFERENCES

For sake of brevity only most relevant references are indicated, hereunder, and all references mentioned can be found in Hubbard and Peters' catalogue of the Ephemeroptera of the Indian sub-region (1978, Oriental Insects Supplement, No. 9. pp.43).

Ali, S.R. 1967. The mayflies nymphs (order:Ephemeroptera) of Rawalpindi District. Pakistan J. Sci. 19 : 73-86.

Ali, S.R., 1971, Certain mayfly nymphs (Order:Ephemeroptera) of Azad Kashmir and Swat. Pakistan J. Sci. 23 : 209-214.

Dubey, O.P., 1971. Torrenticole insects of the Himalaya. VI. Descriptions of nine new species of Ephemerida from the North west Himalaya, *Oriental Ins.*, **4** : 299-302.

Eaton, A.E., 1868 An outline of a re-arrangement of the genera of Ephemeridae. *Entomologists mon. Mag.*, **5** : 82-91.

Eaton, A.E., 1881. An announcement of new genera of the Ephemeridae. *Entomologists Mon. Meg.*, **17** : 191-197.

Eaton, A.E., 1883-1888. A revisional monograph of recent Ephemeridae or Mayflies. *Trans. Linn. Soc. London, (Ser. 2) Zool.* **3** : 1-352, 65 pl.

Hubbard, M.D., 1974. Some specific homonyms in mayflies (Ephemeroptera). *J. Kansas Ent. Soc.* **47** : 357-359.

Jensen, S.L. 1972. A generic revision of the Heptageniidae of the world. Ph. D. theses. Univ. Utah. 266 p.

Kapur, A.P. and Kripalani, M. B. 1963. The mayflies (Ephemeroptera) from the North-Western Himalaya. R*eg. Indian Mus.* **59** : 183-221. pl.

Kimminis, D.E., 1937. Some new Ephemeroptera. *Ann. Mag. Nat. Hist.* (10) **16** : 430-440.

Lestage, J.A., 1924. Les. Ephemeres de 1' Afrique du Sud, Catalogue critique and systematique des especies et description de trois genres nouveaux et de sept. especes nouvelles. *Rev. Zool. Afr.*, **12** : 316-352.

Srivastava, V. D., 1979. High altitude Ephemeroptera of India. *Proc. Wkshp. High Alt. Ent. and Wildl. Ecol., Zool. Surv. India : 137 - 149.*

Srivastava, V. D. 1982. An analysis of the faunal component of Indian Ephemeroptera and their role in aquatic ecosystem *Proc. Symp. Ins. Ecol.* and *Resource Manage.* 153-168.

Srivastava, V. D. & Ray, K. K., 1987. Report on a collectionof Ephemeroptera from Orissa with a new generic record. Records . *Zool. Surv. India*, State Fauna Series 1 : *Fauna of Orissa* - Pt 1 : 129-134.

Traver, J. R. , 1939. Himalayan Mayflies. *Ann.* Mag. *Nat. Hist.* (11) **4** : 32-56.

Ulmer, G., 1920. Nene Ephemeroptren. *Archivf. Naturgesch*, A. **35** (11) : 1-80.

Walker, F., 1860. Characters of undescribed Neusoptera Es*q. Trans. Ent. Soc. London* (2) **5** :1 76-199.

Walach, B. D. 1863. List of the Pseudoneuroptera of illinois contained in the cabinet of the writer, with description of over forty new species, and notes on their structural affinities. *Proc. Acad. Nat. Sci. Philadelphia.* **1862** : 361-402.

Table I : Qualitative composition of Indian Ephemeroptera

| Families | India | | World | | High Altitude | | | Distribution | |
|---|---|---|---|---|---|---|---|---|---|
| | G | S | G | S | G | S | ES | O | EO |
| Ametropedidae | - | - | 1 | 4 | - | - | - | - | - |
| Baetidae | 6 | 35 | 17 | 519 | 3 | 15 | 29 | 5 | 1 |
| Baetiscidae | - | - | 1 | 12 | - | - | - | - | - |
| Behningiidae | - | - | 3 | 5 | - | - | - | - | - |
| Caenidae | 1 | 5 | 6 | 81 | 1 | 1 | 4 | 1 | - |
| Ephemerellidae | 2 | 3 | 7 | 120 | 1 | 2 | 3 | - | - |
| Ephemeridae | 2 | 14 | 8 | 99 | 1 | 4 | 9 | 5 | - |
| Euthyplociidae | 1 | 1 | 7 | 12 | - | - | 1 | - | - |
| Heptageniidae | 7 | 13 | 28 | 378 | 6 | 7 | 12 | 1 | - |
| Leptophlebiidae | 9 | 10 | 62 | 377 | 2 | 2 | 9 | 1 | - |
| Metrotropidae | - | - | 2 | 7 | - | - | - | - | - |
| Neolphemeridae | - | - | 2 | 8 | - | - | - | - | - |
| Oligoneurillidae | - | - | 9 | 49 | - | - | - | - | - |
| Palingeniidae | 1 | 3 | 6 | 31 | - | - | 1 | 2 | - |
| Polymitarcyidae | 2 | 3 | 6 | 70 | - | - | 1 | 2 | - |
| Potamanthidae | 1 | 1 | 7 | 27 | - | - | 1 | - | - |
| Prosopistomatidae | 1 | 1 | 1 | 11 | - | - | 1 | - | - |
| Siphlanigmatidae | - | - | 1 | 1 | - | - | - | - | - |
| Siphlonuridae | 1 | 1 | 26 | 163 | 1 | 1 | 1 | - | - |
| Tricorythidae | - | - | 13 | 122 | - | - | - | - | - |
| Total | 34 | 90 | 213 | 2146 | 15 | 32 | 72 | 17 | 1 |

EO = Extra Oriental, ES = Endemic Species, G = Genera, O = Oriental S= Species.

Table II: Qualitative composition of Indian Heptageniidae

| Genus | Species | M | F | L | Distribution | | | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | | Endemic | Orient | E.O. | |
| *Afronurus* | *curtus* Dubey | - | + | - | Himachal Pradesh (R. Solang) | - | - | 2900 M |
| | *solangensis* Dubey | - | + | - | H.P. (R.Solang) | - | - | 2800 M |
| *Cinygamina* | *assamensis* Kimmins | + | + | - | Meghalaya (Khasi hills) | - | - | - |
| *Ecdyonurus* | *annulifer* (Walker) | - | + | - | Maharastra (Khandala) | - | - | - |
| | *bengalensis* Ulmer | + | + | - | West Bengal (Darjeeling) | - | - | 2178 M |
| | *eatoni* Kimmins | + | + | - | Meghalaya (Khasi hills) | - | - | - |
| | *indicus* Kimmins | + | + | - | Meghalaya (Khasi hills) | - | - | - |
| *Epeorus* | *lahulensis* Kapur and Kripalani | + | - | - | H.P. (Sissu, Lahul Valley) | - | - | 3200 M |
| | *psi* Eaton | + | + | - | H.P. (Sissu, Lahul Valley | Taiwan | - | 2743 M |
| *Heptagenia* | *nubila* Kimminis | + | + | - | Meghalaya (Khasi hills) | - | - | - |
| | *solangensis* Dubey | + | + | - | H.P. (R. Solang, Pir Panjal R) | - | - | 2800 M |
| *Ororostsia* | *hutchinsoni* Traver | - | + | + | N.W.Himalaya (Ororotse lake) | - | - | 5297 M |
| *Rhithrogena* | *parva* Ulmer | + | + | - | Orissa (Maurbhanj) | Taiwan Java | - | - |
| 7 | 13 | 9 | 12 | 1 | 12 | 1 | | |