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Checklist of the caddisfly family Rhyacophilidae (Insecta: Trichoptera) in India

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(Insecta: Trichoptera) in India

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Checklist of the caddisfly family Rhyacophilidae (Insecta: Trichoptera) in India

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Abstract. The present checklist covers the fauna of the Trichopteran family Rhyacophilidae Stephens, 1836. Based on extensive surveys done during 2003–2019 and previous species records, we find that the family Rhyacophilidae is represented by two genera and 184 species in India. The genus *Rhyacophila* Pictet contains 165 species in India while the genus *Himalopsyche* Banks contains 19 described species. The Indian Himalayan region is inhabited by more species than the rest of India.

Key words. Himalayan, species diversity, *Rhyacophila*, *Himalopsyche*, distribution.

ZooBank registration. urn:lsid:zoobank.org:pub:61B26BAC-7E89-4056-9CC7-05C747D03BF6

Introduction

Rhyacophilidae Stephens, 1836, comprise a relatively large family of suborder Integripalpia, with *Rhyacophila* Pictet, 1834, as its type genus. This family was taxonomically revised by Ross (1956) and Schmid (1970) in India. The caddisflies of this family predominantly inhabit north temperate regions and are mainly found in North America, Europe, and Asia, but their range also extends southward into India and the tropical areas of southeastern Asia.

The larvae are free-living, predacious, and usually inhabiting cool fast-flowing rivers and streams. The larvae often possess abdominal and thoracic gills. They have a sclerite on abdominal tergum IX, which distinguishes them from larvae of suborder Annulipalpia. They lack mesonotal sclerites and a prosternal horn, differentiating them from larvae of other families of suborder Integripalpia (Holzenthal et al. 2007).

Like those of other basal lineages of Integripalpia, pupae of Rhyacophilidae are enclosed in a semipermeable cocoon under their domed pupal shelter that is constructed of small rocks. The pupae lack a pair of terminal lobes or slender sclerotized processes apically; abdominal terga III, IV, and V each have two pairs of sclerotized hook plates; and the mandibles have preapical teeth.

The heads of adult Rhyacophilidae have three dorsal ocelli. The second segment of each 5-segmented maxillary palp is short and globular and the sclerotization of its apical segment is not fragmented or annulate. Each foretibia has a preapical spur in addition to the apical pair of spurs.

In India the family Rhyacophilidae is represented by two genera: *Rhyacophila* and *Himalopsyche* Banks, 1940. The type species of the genus *Rhyacophila* is *R. vulgaris* Pictet, 1834 (selected by Ross 1944). It is mostly Holarctic and Oriental in distribution, consisting of 793 species globally (Morse 2020; personal communication). Among these, 432 species have been recorded from the Oriental Region, whereas India and its immediately surrounding

areas are inhabited by 164 species (Morse 2020). The genus *Himalopsyche* is thought to have originated in the Oriental Region (Schmid 1989). Worldwide, this genus is represented by 50 species, with one species reported from the Nearctic, nine species from the East Palearctic, and 43 species from the Oriental Region (Morse 2020). The type species for *Himalopsyche* is *Himalopsyche tibetana* (Martynov, 1930) (originally *Rhyacophila tibetana*). Among the 43 *Himalopsyche* species of the Oriental Region, around 19 species are from India and its adjoining areas (Kaur and Saini 2015). Based upon detailed studies of available literature, collection surveys, and identification of previously collected specimens, we present an updated checklist of Rhyacophilidae in India including the distribution and geographical status of each species.

Materials and Methods

The specimens were collected from diverse sites across India in the months of April to October during 2003–2019. The collections were made near rivers, tributaries, ponds, freshwater streams, and lakes having varying water qualities, temperatures, and altitudes during 1–4 hours from dusk using fluorescent blue light and Mercury bulb placed beside a white sheet; the lights were powered with 12-volt rechargeable batteries. The collected specimens were preserved in 70% ethyl alcohol with a drop of glycerin. The morphological identification of specimens was performed under stereozoom binocular and stereozoom trinocular microscopes. For the examination of genitalia, the abdominal tips were removed with the help of fine-tipped entomological forceps and unsclerotized tissues were cleared in KOH (10–12 %) overnight. The lactic acid procedure proposed by Blahnik et al. (2007) was followed for clearing the genitalia of some specimens. The specimens are vouchered in the museums of the Department of Zoology, Baba Ghulam Shah Badshah University, Rajouri, Jammu & Kashmir (J&K), Zoological Survey of India, Kolkata (ZSI-Kolkata); Department of Zoology and Environmental Sciences, Punjabi University Patiala, Punjab (PUP) and Division of Entomology, Indian Agricultural Research Institute, New Delhi (IARI).

Results

I. *Himalopsyche* Banks, 1940

1. *H. amitabha* Schmid, 1966
Distribution: India (Sikkim).
Geographic status: A Himalayan species endemic to India.
2. *H. angnorbui angnorbui* Schmid, 1963
Distribution: Nepal, India (Uttarakhand, Sikkim, Himachal Pradesh).
Geographic status: A widely distributed Himalayan species.
Subspecies: *H. angnorbui sherpa* Schmid, 1963
Distribution: India (Sikkim).
Geographic status: A Himalayan species endemic to India.
3. *H. bhagirathi* Schmid, 1963
Distribution: Nepal, India (Uttarakhand).
Geographic status: A widely distributed Himalayan species.
4. *H. biansata* Kimmins, 1952
Distribution: Tibet, Bhutan, India (Sikkim).
Geographic status: A widely distributed Himalayan species.
5. *H. digitata* (Martynov, 1935), *Rhyacophila*
Distribution: Bhutan, Nepal, India (Arunachal Pradesh, Sikkim, West Bengal, Uttarakhand, Sikkim).
Geographic status: A widely distributed Himalayan species.
6. *H. dolmasampa* Schmid, 1963
Distribution: Nepal, India (Sikkim, Uttarakhand).
Geographic status: A widely distributed Himalayan species.

7. *H. gyamo* Schmid, 1963
Distribution: Nepal, India (Sikkim).
Geographic status: A widely distributed Himalayan species.
8. *H. hierophylax* Schmid, 1966
Distribution: India (Uttarakhand).
Geographic status: A Himalayan species endemic to India.
9. *H. horai* (Martynov, 1936), *Rhyacophila*
(syn. *R. pallida* Martynov, 1935)
(syn. *H. phedongensis* Kimmins, 1952)
Distribution: Bhutan, Nepal, India (Arunachal Pradesh, Himachal Pradesh, Sikkim, Uttarakhand).
Geographic status: A widely distributed Himalayan species.
10. *H. lanceolata* (Morton, 1900), *Rhyacophila*
Distribution: Myanmar, India (Meghalaya, Manipur).
Geographic status: A widely distributed Himalayan species.
11. *H. lepcha* Schmid, 1963
Distribution: Bhutan, India (Sikkim, West Bengal).
Geographic status: A widely distributed Himalayan species.
12. *H. lungma* Schmid, 1963
Distribution: India (Uttarakhand).
Geographic status: A Himalayan species endemic to India.
13. *H. maitreya* Schmid, 1963
Distribution: Nepal, India (Uttarakhand, Arunachal Pradesh).
Geographic status: A widely distributed Himalayan species.
14. *H. malenanda* Schmid, 1963
Distribution: Bhutan, Nepal, India (Arunachal Pradesh, Sikkim, Uttarakhand).
Geographic status: A widely distributed Himalayan species.
15. *H. schmidi* Kaur and Saini, 2015
Distribution: India (Himachal Pradesh).
Geographic status: A Himalayan species endemic to India.
16. *H. tibetana* (Martynov, 1930), *Rhyacophila*
Distribution: Bhutan, Nepal, Tibet, India (Sikkim, Uttarakhand).
Geographic status: A widely distributed Himalayan species.
17. *H. todma* Schmid, 1963
Distribution: Nepal, India/Pakistan (Uttarakhand, Jammu and Kashmir, Himachal Pradesh).
Geographic status: A widely distributed Himalayan species.
18. *H. yatrwalla* Schmid, 1966
Distribution: India (Uttarakhand).
Geographic status: A Himalayan species endemic to India.
19. *H. yongma* Schmid, 1963
Distribution: India (Sikkim).
Geographic status: A Himalayan species endemic to India.

II. *Rhyacophila* Pictet, 1834

1. *R. acutis* Kaur and Saini, 2012
Distribution: India (Meghalaya).
Geographic status: A Himalayan species endemic to India.

2. *R. alticola* Kimmins, 1953
Distribution: Nepal, Tibet, India (Sikkim).
Geographic status: A widely distributed Himalayan species.
3. *R. anatina* Morton, 1900
Distribution: China, India (Meghalaya, Sikkim).
Geographic status: A widely distributed Himalayan species.
4. *R. ancestralis* Martynov, 1935
Distribution: India (Meghalaya).
Geographic status: A Himalayan species endemic to India.
5. *R. angden* Schmid, 1970
Distribution: India (Sikkim).
Geographic status: A Himalayan species endemic to India.
6. *R. antiope* Malicky, 1997
Distribution: India (North Andaman Island).
Geographic status: An island species endemic to India.
7. *R. armitageorum* Saini and Kaur, 2012
Distribution: India (Arunachal Pradesh).
Geographic status: A Himalayan species endemic to India.
8. *R. assimilis* Kimmins, 1953
Distribution: Myanmar, India (Manipur).
Geographic status: A widely distributed Himalayan species.
9. *R. aureomaculata* Schmid, 1970
Distribution: India (Arunachal Pradesh).
Geographic status: A Himalayan species endemic to India.
10. *R. aureostigma* Schmid, 1970
Distribution: Bhutan, Nepal, India (West Bengal).
Geographic status: A widely distributed Himalayan species.
11. *R. bhotia* Schmid, 1970
Distribution: India (Uttarakhand).
Geographic status: A Himalayan species endemic to India.
12. *R. bhuchanadhara* Schmid, 1970
Distribution: Bhutan, India (Arunachal Pradesh).
Geographic status: A widely distributed Himalayan species.
13. *R. bicolor* Kimmins, 1953
Distribution: Myanmar, Vietnam, India (Manipur).
Geographic status: A widely distributed Himalayan species.
14. *R. bidens* Kimmins, 1953
(syn. *R. szabo* Kiss, 2013)
Distribution: Myanmar, Bhutan, Nepal, Vietnam, Pakistan/India (Arunachal Pradesh, Manipur, Sikkim, Uttarakhand, Jammu and Kashmir).
Geographic status: A widely distributed Himalayan species.
15. *R. chakungpa* Schmid, 1970
Distribution: Nepal, India (Sikkim).
Geographic status: A widely distributed Himalayan species.
16. *R. chamolungpa* Schmid, 1970
Distribution: India (Arunachal Pradesh).
Geographic status: A Himalayan species endemic to India.

17. *R. chandzo* Schmid, 1970
Distribution: Nepal, India (Arunachal Pradesh).
Geographic status: A widely distributed Himalayan species.
18. *R. changpa* Schmid, 1970
Distribution: Nepal, India (Sikkim).
Geographic status: A widely distributed Himalayan species.
19. *R. chayulpa chayulpa* Schmid, 1970
Distribution: Bhutan, Nepal, India (Sikkim, Uttarakhand).
Geographic status: A widely distributed Himalayan species.
Subspecies: *R. chayulpa ringmo* Schmid, 1970
Distribution: India (Arunachal Pradesh).
Geographic status: A Himalayan species endemic to India.
Subspecies: *R. chayulpa tsetangpa* Schmid, 1970
Distribution: India (Uttarakhand).
Geographic status: A Himalayan species endemic to India.
20. *R. chematangpa* Schmid, 1970
Distribution: India (Sikkim).
Geographic status: A Himalayan species endemic to India.
21. *R. chembo chembo* Schmid, 1970
Distribution: Nepal, Bhutan, India (Arunachal Pradesh).
Geographic status: A widely distributed Himalayan species.
Subspecies: *R. chembo lartsepa* Schmid, 1970
Distribution: India (Uttarakhand).
Geographic status: A Himalayan species endemic to India.
22. *R. chenmo* Schmid, 1970
Distribution: India (Manipur).
Geographic status: A Himalayan species endemic to India.
23. *R. chimdro* Schmid, 1970
Distribution: India (Arunachal Pradesh).
Geographic status: A Himalayan species endemic to India.
24. *R. chomoyuma* Schmid, 1970
Distribution: India (Manipur).
Geographic status: A Himalayan species endemic to India.
25. *R. choprai* Martynov, 1935
Distribution: India (Uttarakhand).
Geographic status: A Himalayan species endemic to India.
26. *R. chugalungpa* Schmid, 1970
Distribution: India (Sikkim).
Geographic status: A Himalayan species endemic to India.
27. *R. chulukpa* Schmid, 1970
Distribution: India (West Bengal).
Geographic status: A Himalayan species endemic to India.
28. *R. chumikpa* Schmid, 1970
Distribution: India (Arunachal Pradesh).
Geographic status: A Himalayan species endemic to India.
29. *R. chungse* Schmid, 1970
Distribution: India (Arunachal Pradesh, Manipur, Nagaland).
Geographic status: A Himalayan species endemic to India.

30. *R. churongpa* Schmid, 1970
Distribution: India (Uttarakhand).
Geographic status: A Himalayan species endemic to India.
31. *R. curvata* (Morton, 1900)
(syn. *R. mortoni* Kimmins, 1953)
(syn. *R. sumatrana* Ulmer, 1930)
(syn. *R. suthepensis* Malicky, 1987)
Distribution: Thailand, China, Indonesia, Malaysia, Myanmar, India (Meghalaya, Manipur, Sikkim).
Geographic status: A widely distributed Himalayan species.
32. *R. dafla* Schmid, 1970
Distribution: India (Arunachal Pradesh).
Geographic status: A Himalayan species endemic to India.
33. *R. dakshi* Schmid, 1970
Distribution: Nepal, India (West Bengal).
Geographic status: A widely distributed Himalayan species.
34. *R. dgaldanpa* Schmid, 1970
Distribution: India (Arunachal Pradesh).
Geographic status: A Himalayan species endemic to India.
35. *R. dikkaravasini* Schmid, 1970
Distribution: India (Chennai).
Geographic status: A south Indian species endemic to India.
36. *R. dilata* Martynov, 1935
Distribution: Nepal, India (Himachal Pradesh, Uttarakhand, Sikkim).
Geographic status: A widely distributed Himalayan species.
37. *R. dirangpa* Schmid, 1970
Distribution: India (Arunachal Pradesh).
Geographic status: A Himalayan species endemic to India.
38. *R. dolingpa* Schmid, 1970
Distribution: India (Meghalaya).
Geographic status: A Himalayan species endemic to India.
39. *R. dongkyapa* Schmid, 1970
Distribution: Bhutan, Nepal, India (Arunachal Pradesh).
Geographic status: A widely distributed Himalayan species.
40. *R. dongre* Schmid, 1970
Distribution: India (Sikkim).
Geographic status: A Himalayan species endemic to India.
41. *R. dorje* Schmid, 1970
Distribution: India (Chennai).
Geographic status: A south Indian species endemic to India.
42. *R. drokpa drokpa* Schmid, 1970
Distribution: Bhutan, Thailand, India (Arunachal Pradesh, Uttarakhand).
Geographic status: A widely distributed Himalayan species.
Subspecies: *R. drokpa nyenpa* Schmid, 1970
Distribution: India (Sikkim).
Geographic status: A Himalayan species endemic to India.
43. *R. drosampa* Schmid, 1970
Distribution: Thailand, India (Meghalaya).
Geographic status: A widely distributed Himalayan species.

44. *R. drotangpa* Schmid, 1970
Distribution: India (Sikkim).
Geographic status: A Himalayan species endemic to India.
45. *R. extensa* Martynov, 1927
(syn. *R. carletoni* Banks, 1931)
Distribution: Turkestan (Kirghizstan), India (Himachal Pradesh).
Geographic status: A widely distributed Himalayan species.
46. *R. fletcheri* (Kimmins, 1952)
(syn. *Trichophila fletcheri* Kimmins, 1952)
Distribution: India (Sikkim, Arunachal Pradesh, Uttarakhand).
Geographic status: A Himalayan species endemic to India.
47. *R. gelukpa* Schmid, 1970
Distribution: Vietnam, India (Sikkim, Arunachal Pradesh).
Geographic status: A widely distributed Himalayan species.
48. *R. gyaldzen* Schmid, 1970
Distribution: India (Meghalaya).
Geographic status: A Himalayan species endemic to India.
49. *R. gyamo* Schmid, 1970
Distribution: Thailand, India (Manipur).
Geographic status: A widely distributed Himalayan species.
50. *R. gyaspa* Schmid, 1970
Distribution: India (West Bengal).
Geographic status: A Himalayan species endemic to India.
51. *R. gyelbu* Schmid, 1970
Distribution: India (Manipur).
Geographic status: A Himalayan species endemic to India.
52. *R. himachalensis* Kaur and Saini, 2012
Distribution: India (Himachal Pradesh).
Geographic status: A Himalayan species endemic to India.
53. *R. himalayensis* Saini, Kaur and Bajwa, 2013
Distribution: India (Uttarakhand).
Geographic status: A Himalayan species endemic to India.
54. *R. hingstoni* Martynov, 1930
Distribution: Tibet, Nepal, India (Sikkim).
Geographic status: A widely distributed Himalayan species.
55. *R. hobsoni* Martynov, 1930
Distribution: Tibet, Nepal, India (Sikkim, Uttarakhand).
Geographic status: A widely distributed Himalayan species.
56. *R. inconspicua* Morton, 1900
Distribution: India (Meghalaya).
Geographic status: A Himalayan species endemic to India.
57. *R. indica* Saini, Kaur and Bajwa, 2012
Distribution: India (Sikkim).
Geographic status: A Himalayan species endemic to India.
58. *R. jayadurga* Schmid, 1970
Distribution: India (Chennai).
Geographic status: A Himalayan species endemic to India.

59. *R. kadampa* Schmid, 1970
Distribution: India (Manipur).
Geographic status: A Himalayan species endemic to India.
60. *R. kadaphes* Schmid, 1959
Distribution: Pakistan/India (Uttarakhand, Jammu and Kashmir, Himachal Pradesh).
Geographic status: A Himalayan species endemic to India/Pakistan.
61. *R. kagyupa* Schmid, 1970
Distribution: India (Arunachal Pradesh).
Geographic status: A Himalayan species endemic to India.
62. *R. kando kando* Schmid, 1970
Distribution: Bhutan, Nepal, India (Arunachal Pradesh, Uttarakhand).
Geographic status: A widely distributed Himalayan species.
Subspecies: *R. kando rengma* Schmid, 1970
Distribution: India (Manipur).
Geographic status: A Himalayan species endemic to India.
63. *R. kangjongpa* Schmid, 1970
Distribution: India (Arunachal Pradesh).
Geographic status: A Himalayan species endemic to India.
64. *R. kanichka* Schmid, 1959
Distribution: Pakistan/India (Jammu and Kashmir, Uttarakhand).
Geographic status: A Himalayan species endemic to India/Pakistan.
65. *R. karpa* Schmid, 1970
Distribution: India (Meghalaya).
Geographic status: A Himalayan species endemic to India.
66. *R. kashmirensis* Kaur and Saini, 2013
Distribution: Pakistan/India (Jammu and Kashmir).
Geographic status: A Himalayan species endemic to India/Pakistan.
67. *R. kashongpa* Schmid, 1970
Distribution: India (Manipur).
Geographic status: A Himalayan species endemic to India.
68. *R. kawachenpa* Schmid, 1970
Distribution: India (Arunachal Pradesh).
Geographic status: A Himalayan species endemic to India.
69. *R. kedara* Schmid, 1970
Distribution: Pakistan/India (Uttarakhand, Jammu and Kashmir).
Geographic status: A Himalayan species endemic to India/Pakistan.
70. *R. khamakhya* Schmid, 1970
Distribution: India (Chennai).
Geographic status: A south Indian species endemic to India.
71. *R. khasiorum* Schmid, 1970
Distribution: Nepal, India (Meghalaya, Himachal Pradesh, Uttarakhand).
Geographic status: A widely distributed Himalayan species.
72. *R. khimbarpa* Schmid, 1970
Distribution: India (Arunachal Pradesh).
Geographic status: A Himalayan species endemic to India.

73. *R. khiympa* Schmid, 1970
Distribution: China, Bhutan, India (Sikkim).
Geographic status: A widely distributed Himalayan species.
74. *R. kubra* Schmid, 1970
Distribution: Nepal, Bhutan: India (Sikkim).
Geographic status: A widely distributed Himalayan species.
75. *R. kunma* Schmid, 1970
Distribution: India (Arunachal Pradesh).
Geographic status: A Himalayan species endemic to India.
76. *R. kusang* Schmid, 1970
Distribution: India (Meghalaya).
Geographic status: A Himalayan species endemic to India.
77. *R. kyadongpa* Schmid, 1970
Distribution: India (Sikkim).
Geographic status: A Himalayan species endemic to India.
78. *R. kyimdongpa* Schmid, 1970
Distribution: Thailand, Vietnam, India (Meghalaya).
Geographic status: A widely distributed Himalayan species.
79. *R. kyungpa* Schmid, 1970
Distribution: India (Arunachal Pradesh).
Geographic status: A Himalayan species endemic to India.
80. *R. langdarma* Schmid, 1970
Distribution: India (Arunachal Pradesh).
Geographic status: A Himalayan species endemic to India.
81. *R. laptsap*a Schmid, 1970
Distribution: Nepal, India (Sikkim).
Geographic status: A Himalayan species endemic to India.
82. *R. lepcha* Schmid, 1970
Distribution: Bhutan, India (Sikkim, Uttarakhand).
Geographic status: A widely distributed Himalayan species.
83. *R. lhabu* Schmid, 1970
Distribution: Vietnam, India (Manipur).
Geographic status: A widely distributed Himalayan species.
84. *R. lhadzongpa* Schmid, 1970
Distribution: Pakistan/India (Arunachal Pradesh, Jammu and Kashmir, Himachal Pradesh).
Geographic status: A Himalayan species endemic to India/Pakistan.
85. *R. lhakpa* Schmid, 1970
Distribution: India (Uttarakhand, Himachal Pradesh).
Geographic status: A Himalayan species endemic to India.
86. *R. lhopa* Schmid, 1970
Distribution: India (Chennai).
Geographic status: A south Indian species endemic to India.
87. *R. lobsang* Schmid, 1970
Distribution: India (Chennai).
Geographic status: A south Indian species endemic to India.

88. *R. lonpo* Schmid, 1970
Distribution: India (Arunachal Pradesh).
Geographic status: A Himalayan species endemic to India.
89. *R. maitripa* Schmid, 1970
Distribution: India (Arunachal Pradesh).
Geographic status: A Himalayan species endemic to India.
90. *R. manipuri* Schmid, 1970
Distribution: India (Manipur).
Geographic status: A Himalayan species endemic to India.
91. *R. manlungpa* Schmid, 1970
Distribution: India (Arunachal Pradesh).
Geographic status: A Himalayan species endemic to India.
92. *R. marpa* Schmid, 1970
Distribution: India (Arunachal Pradesh).
Geographic status: A Himalayan species endemic to India.
93. *R. milarepa* Schmid, 1970
Distribution: India (Arunachal Pradesh).
Geographic status: A Himalayan species endemic to India.
94. *R. mishmica* Kimmins, 1953
Distribution: India (Arunachal Pradesh).
Geographic status: A Himalayan species endemic to India.
95. *R. monyulpa* Schmid, 1970
Distribution: India (Arunachal Pradesh).
Geographic status: A Himalayan species endemic to India.
96. *R. muktepa* Schmid, 1970
Distribution: Thailand, India (Meghalaya).
Geographic status: A widely distributed Himalayan species.
97. *R. nabochepa* Schmid, 1970
Distribution: India (West Bengal).
Geographic status: A Himalayan species endemic to India.
98. *R. naga* Schmid, 1970
Distribution: India (Manipur).
Geographic status: A Himalayan species endemic to India.
99. *R. nagongpa* Schmid, 1970
Distribution: India (Meghalaya).
Geographic status: A Himalayan species endemic to India.
100. *R. nakpo* Schmid, 1970
Distribution: India (Manipur).
Geographic status: A Himalayan species endemic to India.
101. *R. namgyal* Schmid, 1970
Distribution: India (Meghalaya).
Geographic status: A Himalayan species endemic to India.
102. *R. narayani* Schmid, 1970
Distribution: India (Kerala).
Geographic status: A south Indian species endemic to India.

103. *R. naviculata* Morton, 1900
Distribution: India (Meghalaya, Tamil Nadu).
Geographic status: A widely distributed species endemic to India.
104. *R. netongpa* Schmid, 1970
Distribution: India (Arunachal Pradesh).
Geographic status: A Himalayan species endemic to India.
105. *R. ngawang* Schmid, 1970
Distribution: India (Meghalaya).
Geographic status: A Himalayan species endemic to India.
106. *R. ngorpa* Schmid, 1970
Distribution: Bhutan, Nepal, Tibet, India (Sikkim).
Geographic status: A widely distributed Himalayan species.
107. *R. ngulpa* Schmid, 1970
Distribution: Nepal, India (Uttarakhand, Himachal Pradesh).
Geographic status: A widely distributed Himalayan species.
108. *R. nigrorosea* Schmid, 1959
Distribution: Pakistan, India (Himachal Pradesh, Uttarakhand).
Geographic status: A widely distributed Himalayan species.
109. *R. norbu* Schmid, 1970
Distribution: India (Meghalaya).
Geographic status: A Himalayan species endemic to India.
110. *R. nyamangpa* Schmid, 1970
Distribution: India (Sikkim).
Geographic status: A Himalayan species endemic to India.
111. *R. nyelungpa* Schmid, 1970
Distribution: India (Meghalaya).
Geographic status: A Himalayan species endemic to India.
112. *R. nyerongpa* Schmid, 1970
Distribution: India (Arunachal Pradesh).
Geographic status: A Himalayan species endemic to India.
113. *R. nyerpa* Schmid, 1970
Distribution: India (Arunachal Pradesh).
Geographic status: A Himalayan species endemic to India.
114. *R. nyukmadongpa* Schmid, 1970
Distribution: India (Arunachal Pradesh).
Geographic status: A Himalayan species endemic to India.
115. *R. obscura* Martynov, 1927
Distribution: Turkestan (Uzbekistan), Bhutan, Nepal, Afghanistan, Pakistan/India (Himachal Pradesh, Sikkim, Jammu and Kashmir, Arunachal Pradesh, Uttarakhand).
Geographic status: A widely distributed Himalayan species.
116. *R. parva parva* Kimmins, 1953
Distribution: India (Meghalaya).
Geographic status: A Himalayan species endemic to India.
Subspecies: *R. parva mukpo* Schmid, 1970
Distribution: India (Manipur).
Geographic status: A Himalayan species endemic to India.

117. *R. paurava* Schmid, 1959
Distribution: Pakistan, India (Meghalaya, Uttarakhand).
Geographic status: A Himalayan species endemic to India/Pakistan.
118. *R. pemba* Schmid, 1970
Distribution: India (Meghalaya).
Geographic status: A Himalayan species endemic to India.
119. *R. poba* Schmid, 1970
Distribution: Tibet, India (Sikkim).
Geographic status: A widely distributed Himalayan species.
120. *R. polha* Schmid, 1970
Distribution: India (Arunachal Pradesh).
Geographic status: A Himalayan species endemic to India.
121. *R. procliva* Kimmins, 1953
Distribution: Myanmar, India (Manipur, Arunachal Pradesh).
Geographic status: A widely distributed Himalayan species.
122. *R. putata putata* Kimmins, 1953
Distribution: India (Meghalaya).
Geographic status: A Himalayan species endemic to India.
Subspecies: *R. putata temba* Schmid, 1970
Distribution: India (Manipur).
Geographic status: A Himalayan species endemic to India.
123. *R. rhombica* Martynov, 1935
Distribution: Bhutan, Vietnam, Nepal, India (Himachal Pradesh, West Bengal).
Geographic status: A widely distributed Himalayan species.
124. *R. rongpa* Schmid, 1970
Distribution: Bhutan, Nepal, India (Manipur, Arunachal Pradesh, Uttarakhand).
Geographic status: A widely distributed Himalayan species.
125. *R. sajadi* Saini and Kaur, 2012
Distribution: India (Uttarakhand, Arunachal Pradesh, Sikkim, Assam, Himachal Pradesh).
Geographic status: A Himalayan species endemic to India.
126. *R. sakyapa* Schmid, 1970
Distribution: Nepal, India (Uttarakhand).
Geographic status: A widely distributed Himalayan species.
127. *R. sanglungpa* Schmid, 1970
Distribution: India (Sikkim).
Geographic status: A Himalayan species endemic to India.
128. *R. scissa* Morton, 1900
Distribution: Bhutan, Myanmar, Vietnam, China, Pakistan/India (Meghalaya, Arunachal Pradesh, Sikkim, Uttarakhand, Jammu and Kashmir, Nagaland, Himachal Pradesh).
Geographic status: A widely distributed Himalayan species.
129. *R. scissoides* Kimmins, 1953
Distribution: Nepal, Vietnam, Thailand, China, India (Arunachal Pradesh, Meghalaya, Sikkim, Uttarakhand).
Geographic status: A widely distributed Himalayan species.
130. *R. scotina* Kimmins, 1953
Distribution: India (Meghalaya).
Geographic status: A Himalayan species endemic to India.

131. *R. senggepa* Schmid, 1970
Distribution: India (Meghalaya).
Geographic status: A Himalayan species endemic to India.
132. *R. shakangpa* Schmid, 1970
Distribution: Nepal, India (Uttarakhand).
Geographic status: A widely distributed Himalayan species.
133. *R. sherchokpa* Schmid, 1970
Distribution: India (Arunachal Pradesh).
Geographic status: A Himalayan species endemic to India.
134. *R. sherpa* Schmid, 1970
Distribution: India (Sikkim).
Geographic status: A Himalayan species endemic to India.
135. *R. shingripa* Schmid, 1970
Distribution: India (Sikkim).
Geographic status: A Himalayan species endemic to India.
136. *R. sikungpa* Schmid, 1970
Distribution: India (Uttarakhand).
Geographic status: A Himalayan species endemic to India.
137. *R. similis* Martynov, 1935
Distribution: Taiwan, India (Uttarakhand).
Geographic status: A widely distributed Himalayan species.
138. *R. spinalis* Martynov, 1930
Distribution: Bhutan, Nepal, Tibet, India (Arunachal Pradesh, Sikkim, Uttarakhand, Meghalaya).
Geographic status: A widely distributed Himalayan species.
139. *R. stenostyla* Martynov, 1930
Distribution: Nepal, Tibet, India (Sikkim, Uttarakhand).
Geographic status: A widely distributed Himalayan species.
140. *R. sumdopa* Schmid, 1970
Distribution: India (Manipur).
Geographic status: A Himalayan species endemic to India.
141. *R. tarkiya* Schmid, 1970
Distribution: India (Sikkim).
Geographic status: A Himalayan species endemic to India.
142. *R. tashepa* Schmid, 1970
Distribution: India (Sikkim).
Geographic status: A Himalayan species endemic to India.
143. *R. tashidingpa* Schmid, 1970
Distribution: Nepal, India (Arunachal Pradesh).
Geographic status: A widely distributed Himalayan species.
144. *R. tecta* Morton, 1900
Distribution: Bhutan, Taiwan, Myanmar, India (Arunachal Pradesh, Meghalaya).
Geographic status: A widely distributed Himalayan species.
145. *R. tengyelingpa* Schmid, 1970
Distribution: India (Sikkim).
Geographic status: A Himalayan species endemic to India.

146. *R. tolungpa* Schmid, 1970
Distribution: Bhutan, India (Arunachal Pradesh).
Geographic status: A widely distributed Himalayan species.
147. *R. trashipa* Schmid, 1970
Distribution: Bhutan, India (Manipur).
Geographic status: A widely distributed Himalayan species.
148. *R. trulungpa* Schmid, 1970
Distribution: Pakistan, India (Uttarakhand).
Geographic status: A widely distributed Himalayan species.
149. *R. tsering* Schmid, 1970
Distribution: India (Kerala, Meghalaya).
Geographic status: A widely distributed species endemic to India.
150. *R. tshiringpa* Schmid, 1970
Distribution: Nepal, India (Sikkim).
Geographic status: A widely distributed Himalayan species.
151. *R. tshogpa* Schmid, 1970
Distribution: India (Sikkim).
Geographic status: A Himalayan species endemic to India.
152. *R. tsiudmarpo* Schmid, 1970
Distribution: India (Arunachal Pradesh).
Geographic status: A Himalayan species endemic to India.
153. *R. tsona* Schmid, 1970
Distribution: Bhutan, India (Manipur).
Geographic status: A widely distributed Himalayan species.
154. *R. tsongkhapa* Schmid, 1970
Distribution: India (Sikkim).
Geographic status: A Himalayan species endemic to India.
155. *R. tungkorpa* Schmid, 1970
Distribution: India (Sikkim).
Geographic status: A Himalayan species endemic to India.
156. *R. tungpa* Schmid, 1970
Distribution: India (Uttarakhand).
Geographic status: A Himalayan species endemic to India.
157. *R. ugyenpa* Schmid, 1970
Distribution: India (Meghalaya).
Geographic status: A Himalayan species endemic to India.
158. *R. wangpo* Schmid, 1970
Distribution: India (West Bengal).
Geographic status: A Himalayan species endemic to India.
159. *R. yarlungpa* Schmid, 1970
Distribution: Nepal, India (Arunachal Pradesh).
Geographic status: A widely distributed Himalayan species.
160. *R. yigrongpa* Schmid, 1970
Distribution: India (Sikkim).
Geographic status: A Himalayan species endemic to India.

161. *R. yipung* Schmid, 1970
Distribution: India (Manipur).
Geographic status: A Himalayan species endemic to India.
162. *R. yishepa* Schmid, 1970
Distribution: India (Sikkim).
Geographic status: A Himalayan species endemic to India.
163. *R. yonggyapa* Schmid, 1970
Distribution: India (Manipur).
Geographic status: A Himalayan species endemic to India.
164. *R. yullha* Schmid, 1970
Distribution: Bhutan, India (Sikkim).
Geographic status: A widely distributed Himalayan species.
165. *R. chungpa* Schmid, 1970
Distribution: Bhutan, Nepal, India (Himachal Pradesh, Arunachal Pradesh, Sikkim).
Geographic status: A widely distributed Himalayan species.

Discussion

The extensive surveys and collections of caddisflies across India during 2003–2019 revealed that the family Rhyacophilidae is represented by 184 species and eight subspecies in two genera in India. The Genus *Himalopsyche* is represented by 19 species and one subspecies. Among these species six are endemic, 13 are widely distributed, and all the species are restricted to the Himalayan belt (Fig. 1). Similarly, the genus *Rhyacophila* is represented by 165 species and seven subspecies. Among them 109 species are endemic and 56 species are widely distributed. A review of the geographic status for each taxon revealed 155 Himalayan species, seven South Indian species and only one island species.

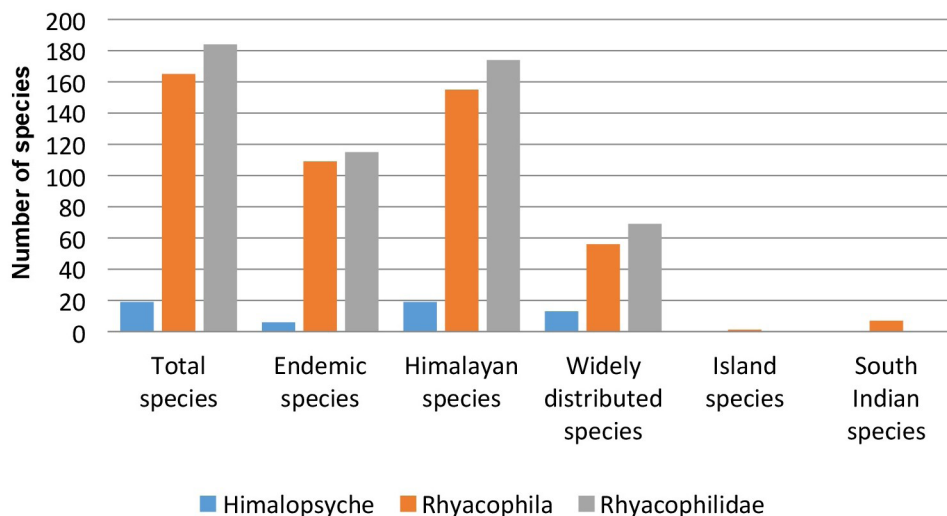


Figure 1. Geographic distribution of the family Rhyacophilidae in India.

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Literature Cited

- Banks N. 1931.** Some oriental neuropteroid insects. *Psyche* 38: 56–70.
- Banks N. 1940.** Report on certain groups of neuropteroid insects from Szechwan, China. *Proceedings of the United States National Museum* 88: 173–220.
- Blahnik RJ, Holzenthal RW, Prather A. 2007.** The lactic acid method for clearing Trichoptera genitalia. p. 9–14. *In*: Bueno-Soria J, Barba-Alvarez R, Armitage B. (eds.). *Proceedings of the XIIth International Symposium on Trichoptera*. The Caddis Press; Columbus, OH. xii + 378 p.
- Holzenthal RW, Blahnik RJ, Prather A, Kjer KM. 2007.** Order Trichoptera Kirby 1813 (Insecta), caddisflies. *Zootaxa* 1668: 639–698.
- Kaur L, Saini MS. 2012.** Two new species of *Rhyacophila* Pictet (Trichoptera, Rhyacophilidae) from India. *Acta Zoologica Academiae Scientiarum Hungaricae* 58: 211–215.
- Kaur L, Saini MS. 2013.** *Rhyacophila kashmirensis* sp. n. (Trichoptera: Rhyacophilidae) from India. *Polish Journal of Entomology* 82: 109–112.
- Kaur L, Saini MS. 2015.** A new species of the genus *Himalopsyche* (Trichoptera, Rhyacophilidae) with Keys to and Catalogue of Indian Species. *Vestnikzoologii* 49: 3–12.
- Kimmings DE. 1952.** New species and a new genus of the subfamily Rhyacophilinae. Indian caddis flies VI. *Annals and Magazine of Natural History (Series 12)* 5: 347–361.
- Kimmings DE. 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. 2013.** Three new species of *Rhyacophila* (Trichoptera, Rhyacophilidae) from Asia. *Acta Zoologica Academiae Scientiarum Hungaricae* 59: 13–29
- Malicky H. 1987.** The first European *Apataniana* (Trichoptera, Limnephilidae): *Apatanianahellenica* sp. n. from Greece. *Aquatic Insects* 9: 210.
- Malicky H. 1997.** Weitere neue Köcherfliegen-Arten (Trichoptera) aus Asien. *Linzer Biologische Beiträge* 29: 217–238.
- Martynov AV. 1927.** 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 AV. 1930.** On the Trichopterous fauna of China and Eastern Tibet. *Proceedings of the Zoological Society of London* 5: 65–112.
- Martynov AV. 1935.** On a collection of Trichoptera from the Indian Museum, Part I, Annulipalpia. *Records of the Indian Museum* 37: 93–209.
- Martynov AV. 1936.** On a collection of Trichoptera from the Indian Museum, Part II, Integripalpia. *Records of the Indian Museum, Calcutta* 38: 239–306.
- Morse JC. (ed.). 2020.** Trichoptera World Checklist. Available at <http://entweb.clemson.edu/database/trichopt/index.htm> (Last accessed 21 April 2020.)
- Morton KJ. 1900.** Descriptions of new species of Oriental Rhyacophilidae. *Transactions of the Royal Entomological Society of London* 1900: 1–7.
- Pictet FJ. 1834.** Recherches pour servir à l'histoire et l'anatomie des Phryganides. A. Cherbuliez; Geneva, Switzerland. 240 p.
- Ross HH. 1956.** Evolution of the mountain caddisflies. University of Illinois Press; Urbana, Illinois. 213 p.
- Saini MS, Cheema LK, Bajwa PK. 2012.** Two new species of the genus *Rhyacophila* Pictet (Trichoptera: Rhyacophilidae) from India. *Aquatic Insects* 34: 223–227.
- Saini MS, Lakhwinder K. 2011.** Revised phylogenetic analysis of Indian species of genus *Himalopsyche* Banks (Trichoptera: Spicipalpia: Rhyacophilidae). *Halteres* 3: 26–29.

- Saini MS, Lakhwinder K. 2012.** Two new species of the genus *Rhyacophila* Pictet (Trichoptera: Rhyacophilidae) from the Indian Himalayas. *Zootaxa* 3478: 309–312.
- Saini MS, Mandeep K, Bajwa PK. 2001.** An updated check-list of the Indian Trichoptera along with an illustrated key to its families. *Records of the Zoological Survey of India* 99: 201–256.
- Schmid F. 1959.** Trichoptères du Pakistan, II. *Tijdschrift voor Entomologie* 102: 231–253.
- Schmid F. 1963.** Quelques *Himalopsyche* indiennes (Trichoptères, Rhyacophilidae). *Bonner Zoologische Beiträge* 14: 206–223.
- Schmid F. 1970.** Le genre *Rhyacophila* et la famille des Rhyacophilidae (Trichoptera). *Memoires de la Société Entomologique du Canada* 66: 1–230.
- Schmid F. 1989.** Les hydrobiosides (Trichoptera, Annulipalpia). *Bulletin de l'Institut Royal des Sciences Naturelles de Belgique, Entomologie* 59: 1–154.
- Schmid F, Botosaneanu L. 1966.** Le genre *Himalopsyche* Banks (Trichoptera, Rhyacophilidae). *Extrait des Annales de la Société entomologique du Québec* 11: 123–176.
- Stephens JF. 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. 238 p.
- Ulmer G. 1930.** XLIX Entomological expedition to Abyssinia, 1926–27, Trichoptera and Ephemeroptera. *Annals and Magazine of Natural History (Series 10)* 6: 479–511.

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