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ARTHROPODA: INSECTA: STREPSIPTERA

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FAUNA OF INDIA CHECKLIST



ARTHROPODA: INSECTA: STREPSIPTERA

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Introduction:

The order Strepsiptera is a small, cosmopolitan group of entomophagous parasitoids notable for their extreme sexual dimorphism and unique life cycle. Fossil Strepsiptera have been found in various amber deposits, including Baltic, Burmese Cretaceous, Dominican, and Eocene Fuschun ambers, as well as in German oil shales and Colorado shales. The order is monophyletic and is divided into two suborders: Mengenillidia and Stylopodia, encompassing seventeen families. The Mengenillidia are considered more primitive.

Adult males are free-living and short-lived (1.5–6 mm in length), typically dark brown or black. They possess conspicuous flabellate antennae (reduced to 4-7 segments) that function as sensory organs for locating females. Their compound eyes have 15–150 individual ommatidia. Mouthparts, including mandibles and maxillae, have lost their trophic function and serve as sensory organs. The mesothoracic wings are reduced and function analogously to Dipteran halteres, while the metathorax is significantly enlarged to house powerful indirect flight muscles. Their legs are unique, lacking a trochanter in the fore- and mid-legs, and the metacoxa is fused to the pleurosternum in most species. The abdomen has ten segments, with the ninth bearing simplified copulatory organs (aedeagus and phallobase).

Adult females are characterized by extreme sexual dimorphism. Neotenic Females

(Stylopodia) are permanently endoparasitic, remaining within their larval cuticle inside the host. Only their fused head and thorax, called the cephalothorax, protrudes from the host's cuticle. They are "larviform," lacking distinct antennae, mouthparts, eyes, wings, legs, and external genitalia. The cephalothorax has rudimentary traces of eyes, antennae, maxillae, and mandibles. Their soft, eight-segmented abdomen contains one to five unpaired genital tubes that open into a brood canal, which in turn opens to the exterior. Nasonow's glands on the cephalothorax are thought to produce the sex pheromone that attracts males. Their size can vary enormously (e.g., 2 mm to 2.6 cm) depending on the host. Fertilization occurs via haemocoelic insemination, and reproduction is by haemocoelous viviparity, with eggs developing freely in the haemocoel. Polyembryony has also been reported in some species. Free-living females of Mengenillidia: *Mengenillidae* are wingless, and possess a distinct head with antennae, a thorax with legs, and a single genital opening for fertilization. They emerge from the host at the final larval stage to pupate externally before becoming free-living adults.

Strepsiptera undergo hypermetamorphosis, involving two or more morphologically distinct larval instars specialized for different modes of life. The first Instar Larva is one of the two free-living stages, except in the Mengenillidia. Females viviparously produce a large number (1,000 to 750,000) of these very small larvae



(0.08–0.30 mm in length). These larvae possess highly serrated thoracic and abdominal sternites, which allow them to cling to a host or vegetation. They have antennae, mandibles, a labium, slender legs with filiform tarsi, and abdominal caudal setae that can act as a "springboard" for jumping. It is believed that the first instar larva enters the host during its moulting stage when the host's cuticle is unsclerotized. Once inside, the first instar moults into an apodous second instar larva. The endoparasitic larval stage instars vary with species. In most Strepsiptera (suborder

Stylopodia), the male emerge from the host to pupate, and the neotenic female emerge and matures within the host. In Mengenillidae, both male and female late larval instars emerge from the host to pupate externally.

Global diversity: Globally 629 species under 60 genera and 17 families are known.

Diversity in India: In India 30 species in fourteen genera and six families are known.

Diversity in States

Table: Strepsipteran species diversity across states.

Table 1: Strepsipteran species diversity across states.

Sl. No.	State / Union Territory	No. of Species	No. of Endemic Species
1	Andhra Pradesh	0	0
2	Arunachal Pradesh	2	2
3	Assam	0	0
4	Bihar	3	2
5	Chhattisgarh	0	0
6	Gujarat	1	0
7	Goa	0	0
8	Haryana	0	0
9	Himachal Pradesh	0	0
10	Jharkhand	1	0
11	Karnataka	4	4
12	Kerala	1	1
13	Madhya Pradesh	0	0
14	Maharashtra	0	0
15	Manipur	0	0
16	Meghalaya	0	0
17	Mizoram	0	0
18	Nagaland	0	0
19	Odisha	0	0
20	Punjab	0	0
21	Rajasthan	0	0
22	Sikkim	0	0
23	Tamil Nadu	0	0
24	Telangana	0	0
25	Tripura	0	0
26	Uttarpradesh	0	0
27	Uttarakhand	0	0



Sl. No.	State / Union Territory	No. of Species	No. of Endemic Species
28	West Bengal	20	14
29	Andaman & Nicobar	0	0
30	Chandigarh	1	1
31	Dadra Nagar Haveli, Daman & Diu	0	0
32	Delhi	0	0
33	Jammu & Kashmir	0	0
34	Ladakh	0	0
35	Lakshadweep	0	0
36	Puducherry	0	0
37	State Unknown	1	0
	INDIA TOTAL	32	24

Endemism: Twenty-two species are endemic to India.

Habitat: The being an endoparasitoid, the habitat is largely determined by host's habitat preference.

Ecological Significance: Strepsiptera are obligate endoparasitoids that attack insects from seven orders and thirty-five families, including Zygentoma, Orthoptera, Blattodea, Mantodea, Hemiptera (Homoptera and Heteroptera), Diptera, and Hymenoptera. Some hosts are significant economic pests, such as rice planthoppers, fruit flies, and defoliators of coconut and oil palm.

Human Significance: Strepsiptera are endoparasitoids of agriculturally important pests.

Threatened species: No species are reported as threatened in India.

Protected Species as per WPA (2022): Species reported from India are not listed under any Schedules of the Wildlife Protection Act.

Species under CITES: Species reported from India are not listed under CITES.

Invasive alien species: No invasive alien species are reported from this order.

Gap areas: Through Strepsiptera are widely distributed, they are not recorded from several states. Further, information on geographic distribution and hosts for most of the species is limited.

Checklist of Strepsiptera of India

Family: Elenchidae

1. *Elenchus japonicus* Esaki and Hashimoto, 1931

Family: Xenidae

2. *Tachytixenos indicus* Pierce, 1911
3. *Xenos ropalidae* (Kinzelbach, 1975)
4. *Xenos hebraei* Kinzelbach, 1978
5. *Xenos gadagkari* Sen & Nain, 2024

Family: Corioxenidae

6. *Corioxenos raoi* Baliga, 1967
7. *Dundoxenos kinzelbachi* Luna de Carvalho, 1985
8. *Dundoxenos lanceolatus* Hui & Hazra, 2024



9. *Triozocera pugiopennis* Chaudhuri and Das Gupta, 1979
10. *Viridipromontorius aequus* (Roy and Hazra, 2016)

Family: Lychnocolacidae

11. *Lychnocolax similis* Chaudhuri, Ghosh and Das Gupta, 1983

Family: Myrmecolacidae

12. *Myrmecolax comparilis* Roy and Hazra, 2017
13. *Myrmecolax pierci* (Chattopadhyay and Chaudhuri, 1980)
14. *Myrmecolax plantipes* (Chaudhuri, 1978)
15. *Stichotrema sagax* Roy and Hazra, 2017

Family: Halictophagidae

16. *Coriophagus calcaneus* Roy and Hazra, 2016
17. *Halictophagus acerbus* Mazumdar and Chaudhuri, 1997
18. *Halictophagus australensis* Perkins, 1905
19. *Halictophagus bipunctatus* Yang, 1955
20. *Halictophagus compactus* (Pierce, 1914)
21. *Halictophagus indicus* Bohart, 1943
22. *Halictophagus membraciphaga* (Subramanian, 1927)
23. *Halictophagus palmae* Kathirithamby and Ponnammam, 2000
24. *Halictophagus prominens* Roy and Hazra, 2016
25. *Halictophagus tenebrosus* Chaudhuri, Ghosh and Das Gupta, 1983
26. *Tridactylophagus aduncus* Mazumdar and Chaudhuri, 1999
27. *Tridactylophagus carinatus* Mazumdar and Chaudhuri, 1999
28. *Tridactylophagus coniferus* (Yang, 1964)
29. *Tridactylophagus maculatus* Chaudhuri, Ghosh and Das Gupta, 1983
30. *Tridactylophagus mysorensis* Subramaniam, 1932
31. *Tridactylophagus orientalis* (Chaudhuri and Das Gupta, 1979)
32. *Tridactylophagus sufflatus* Hui, Mukherjee and Hazra, 2023

References:

<https://www.catalogueoflife.org/data/taxon/B8VFN>

Accessed on 21st June, 2025.

Hui, P., Roy, S. and Hazra, N. (2023). Diversity and biology of the Indian Strepsiptera with a pictorial key. Indian Journal of Entomology Online published Ref. No. e23364 DoI. No.: 10.55446/IJE.2023.1364.

Kathirithamby, J. (1989). Review of the order Strepsiptera. *Systematic Entomology* 14: 41 -92.

Kathirithamby, J. (2020). ORDRE DES *STREPSIPTERA* (STREPSIPTÈRES) In: Aberlenc H.-P. et al. Les Insectes du Monde. Biodiversité. Classification. Clés de détermination des familles. Versailles, Montpellier & Plaisan: Quae & Museo éditions, 2020. Pages: 845-857.

Kathirithamby, J. (2025). World Strepsiptera Database. Accessed at <https://strepsiptera.aphia.org> on 2025-06-22. doi:10.14284/484

