

# FAUNA OF INDIA CHECKLIST

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## ARTHROPODA: PROTURA

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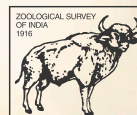
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**ZOOLOGICAL SURVEY OF INDIA**  
Ministry of Environment, Forest & Climate Change

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**Introduction:** Proturans are primitive and wingless, antennae and eyes absent, and the fore legs are modified for sensory purposes with entognathus, piercing mouthparts which are adapted for sucking, small, wingless, un-pigmented hexapods measuring about less than 2.5 mm long. Anterior legs sensory, all tarsi one-segmented, with a single claw. The front legs serve as the antennae. The unique feature is the telson tail, which is used for locomotion and for defence. Proturans are found in woodland humus, over 10 inches deep in the soil. Proturan Mouth-parts: they have been observed feeding on both mycorrhizoid and free soil-hyphae (Sturm, 1959, Nosek, 1973). Protura may be quite common, but are rarely seen. They are cryptic and occur in damp situations, such as in soil, moss, peat, leaf litter, under bark and decaying wood. They are associated with high levels of organic matter and are more commonly recorded from forest habitats. Protura still remains one of the least studied groups of Indian fauna. They are known from all zoogeographic regions.

**Global Diversity:** The order was first recognised by Silvestri (1907), when he described *Acerentomon doderoi* and related it to the insects. Berlese (1909), in a monograph on the order, considered that Protura are closely related to the myriapods and called them Myrientomata. The class and order Protura is now placed, as the sister group to the Collembola, in the Ellipura (=Parainsecta) which is recognised as the sister group to the Insecta (Kristensen, 1991). Bernard (1976) provided observations on eggs and embryology and showed that the prelarva is the first postembryonic stage. Aldaba (1985) described some prelarvae from Spain and Bernard & Tuxen (1987) provided a key to the families of proturan juveniles and described each stage. Imadaté (1991), based on the views of Tuxen (1963, 1964), Imadaté (1965, 1966) divided the Protura into two superfamilies, the Eosentomoidea and the Acerentomoidea, each with two families. Phylogenetic trends in the Protura were discussed by Tuxen (1963) and information on Protura was consolidated by Tuxen (1964) in his monograph on the world fauna. There are about 748 described species of Protura worldwide (Szeptycki, 2007).

**Diversity in India:** Prabhoo (1960 – 1986) worked extensively on Indian Protura. He reported three species under Eosentomidae; single species under family Protentomidae and another sixteen species under eight genera of family Acerentomidae. Prabhoo (1960) published details of *Baculentulus breviunguis* (Prabhoo), a species known from India that was subsequently described by Condé (1961b). Prabhoo (1986) elaborately described the present status and biogeographic considerations of Protura from India and presented a paper in 2nd International Seminar on Apterygota, Siena, Italy. There are 20 species in 10 genera under 3 families reported from India (Prabhoo, 1986). Three families are known from India, viz., Eosentomidae, Protentomidae and Acerentomidae. Later, Mandal (2011) published a checklist on Protura.

**Table-1:** Diversity of Protura in the various States of India

Sl. No.	State/UT	No. of Species	No. of Endemic Species
	<b>INDIA TOTAL</b>	<b>20</b>	<b>8</b>
1	Andhra Pradesh	0	0
2	Arunachal Pradesh	0	0
3	Assam	0	0
4	Bihar	0	0
5	Chhattisgarh	0	0
6	Gujarat	0	0
7	Goa	0	0
8	Haryana	0	0
9	Himachal Pradesh	0	0
10	Jharkhand	0	0
11	Karnataka	0	0
12	Kerala	20	8
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	Uttar Pradesh	0	0
27	Uttarakhand	0	0
28	West Bengal	0	0
29	Andaman & Nicobar	0	0
30	Chandigarh	0	0
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	0	0

**Endemism:** A total of 20 proturan species under 10 genera have so far been recorded from India, out of which 8 proturan species are endemic to India of which, from family Acerentomidae, out of 16 spp., 06 spp. are endemic and from family Eosentomidae, out of 03 spp., 02 are endemic to India.

**Habitat:** Protura may be quite common, but are rarely seen. They are cryptic and occur in damp situations, such as in soil, moss, peat, leaf litter, under bark and decaying wood. They are associated



with high levels of organic matter and are more commonly recorded from forest habitats. Protura still remains one of the least studied groups of Indian fauna. They are known from all zoogeographic regions.

**Ecological Significance:** Proturans play in maintaining the ecological balance in soil ecosystems, strategies for the conservation of proturan faunal elements in the fragile soil ecosystems necessarily need to be formulated with due importance. The destruction of Protura inhabiting soil-habitats should be checked, especially the use of poisonous chemicals either in the form of pesticides or fertilizers, and discharge of industrial effluents must be controlled.

**Human Significance:** The natural land habitats are being polluted by pollutants and gradually degraded by massive felling of trees. The degraded lands or wastelands with their little or sublevel moisture content invariably lead to the depletion or wipe-out of the proturan fauna inhabiting such areas. Further, excessive and indiscriminate use of chemical pesticides and fertilizers also has the negative impacts, resulting in the loss of proturan habitats and populations and thereby leading to imbalance in soil ecosystem.

**Threatened species as per IUCN:** There are no threatened species of proturans as per IUCN.

**Protected species as per WPA (2022):** No species of Protura has been designated as Protected species as per WPA (2022).

**Species under CITES:** No species of proturans have been recorded as species under CITES.

**Invasive alien species:** No species of proturans have been identified as Invasive Alien Species (IAS).

**Gap areas:** Prabhoo (1986) reported 20 species under 10 genera from Kerala state only. Therefore, there is ample scope for explorative inventorying work on this minute group of hexapods in other parts of the Indian subcontinent.

**Systematic list of Protura of India** (Endemic species marked with\*)

#### Class Protura Silvestri, 1907

##### Family Acerentomidae Silvestri, 1907

1. *Australentulus indicus* Prabhoo, 1972\*
2. *Australentulus noseki* Tuxen, 1967
3. *Australentulus orientalis* Prabhoo, 1972\*
4. *Australentulus tuxeni* Prabhoo, 1975\*
5. *Baculentulus breviunguis* (Condé, 1961)
6. *Baculentulus morikawai* (Imadaté & Yosii, 1956)
7. *Baculentulus umesaoi* (Imadaté, 1965)
8. *Baculentulus tosanus* (Imadaté & Yosii, 1959)
9. *Berberentulus capensis* (Womersley, 1931)
10. *Bolivaridia imadatei* (Prabhoo, 1975)\*
11. *Brasilidia nagaroorica* Prabhoo, 1977\*
12. *Kenyentulus condei* Prabhoo, 1975\*
13. *Kenyentulus kenyanus* (Conde, 1948)
14. *Protentomon pauliani* Condé, 1961
15. *Silvestridia keijiana* (Imadaté, 1965)
16. *Silvestridia solomonis* (Imadaté, 1960)

**Family Protentomidae Mills, 1932**

17. *Condeillum regale* (Condé, 1958)

**Family Eosentomidae Berlese, 1909**

18. *Eosentomon nayari* Prabhoo, 1977\*  
 19. *Eosentomon trivandricum* Prabhoo, 1975\*  
 20. *Eosentomon validum* Conde, 1961

**References**

- Aldaba, J. 1985. Contribución al conocimiento de las prelarvas de los Proturos Ibéricos. *Actas do Congresso Iberico de Entomologia*, **2**: 177-183.
- Berlese, A. 1909. Monografia dei Myrientomata. Parte I. Sistematica e morfologia esterna. Redia. *Giornale di entomologia, Firenze*, **6**: 1-182 [Pt I pp. 1-59 29 May 1909; Pt II pp. 60-182 14 Aug. 1909].
- Bernard, E.C. & Tuxen, S.L. 1987. Class and Order Protura. Immature Insects. *Dubuque, in Stehr, F.W.* (ed.). pp. 47-54.
- Bernard, E.C. 1976. Observations on the eggs of *Eosentomon australicum* (Protura: Eosentomidae). *Transactions of the American Microscopical Society*, **95**: 129-130.
- Condé, B. 1961b. Un protoure nouveau a distribution Indo-Madécasse (*Acerentulus breviunguis* n. sp.). *Bulletin du Muséum d'Histoire Naturelle. Paris*, **33**(2): 318-321.
- Imadaté, G. & Yosii, R. 1959. A synopsis of the Japanese species of Protura. *Contributions from the Biological Laboratory Kyoto University*, **6**: 1-43.
- Imadaté, G. 1964. Taxonomic arrangement of Japanese Protura (I). *Bulletin of the National Science Museum, Tokyo*, **9**: 277-315.
- Imadaté, G. 1965. Proturans-fauna of Southeast Asia. Fauna and Flora Research Society. in Kira, T. & Iwata, K. (eds). *Nature and Life in Southeast Asia. Kyoto*, pp. 195-302.
- Imadaté, G. 1966. Taxonomic arrangement of Japanese Protura (IV). *Bulletin of the National Science Museum, Tokyo*, **7**: 37-81.
- Imadaté, G. 1991. Protura. pp. 265-268 in CSIRO (ed.). *The Insects of Australia. A textbook for students and research workers. Melbourne: Melbourne University Press, Vol. 1* xiii, pp. 542.
- Kristensen, N.P. 1991. Phylogeny of extant hexapods. pp.125-140 in CSIRO (ed.). *The Insects of Australia. A textbook for students and research workers. Melbourne: Melbourne University Press, Vol. 1* xiii, pp. 542.
- Mandal G.P. 2010. [http://zsi.gov.in/checklist/Protura%20\(Insecta\).pdf](http://zsi.gov.in/checklist/Protura%20(Insecta).pdf) Zoological Survey of India, M-Block, New Alipore, Kolkata 700053.
- Nosek, J. 1973. The European Protura. Their taxonomy, ecology and distribution with keys for determination. *Geneva : Museum d'Histoire Naturelle*, pp. 345.
- Paclt, J. 1955. Protura. *Genera Insectorum*, **211**: 1-123.
- Prabhoo, N.R. 1960. *Acerentulus breviunguis* Condé (Protura: Acerentomidae) from India. *Current Science. Bangalore*, **29**: 273-274.
- Prabhoo, N.R. 1986. Protura of South India. Biogeographic considerations. *2nd International Seminar on Apterygota, Siena, Italy*, pp. 67-71.
- Silvestri, F. 1907. Descrizione di un novo genere d'insetti apterigoti rappresentante di un novo ordine. *Bollettino del Laboratorio di Zoologia Generale e Agraria della Facoltà Agraria in Portici*, **1**: 296-311.
- Sturm, H. 1959. Die Nahrung der Proturen. Beobachtungen an *Acerentomon doeroi* Silv. Und *Eosentomon transitorium* Berl. *Naturwissenschaften*, **46**: 90-91.

Szeptycki, A. 1988. New genera and species of Protura from Altai Mts. *Acta Zoologica Cracoviensia*, **31**(7): 297-362.

Tuxen, S.L. 1963. Phylogenetical trends in the Protura as shown by relationship between recent genera. *Zeitschrift für Zoologische Systematik und Evolutionsforschung*, **1**: 277-310.

Tuxen, S.L. 1964. The Protura. A revision of the species of the world with keys for determination. Actualités Sci. Industr. No. 1311, *Problèmes d'écologie*. Paris: Hermann, pp. 360.