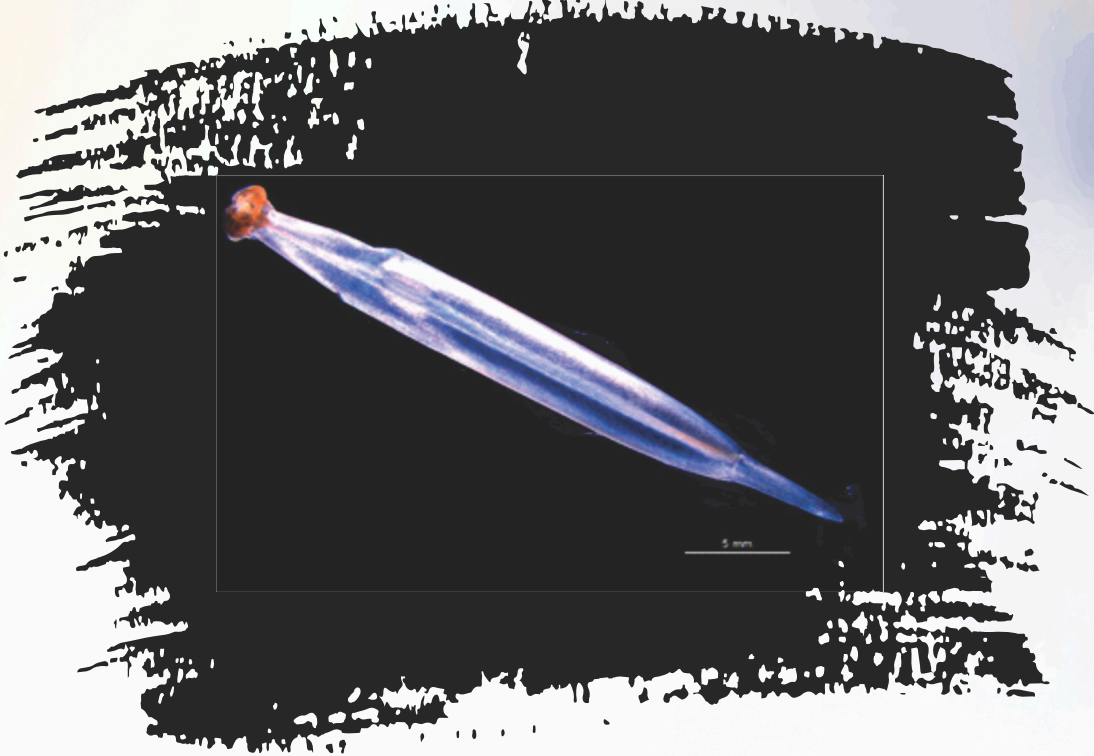


FAUNA OF INDIA CHECKLIST

JULY, 2024

ONLINE VERSION 1.0



PHYLUM CHAETOGNATHA

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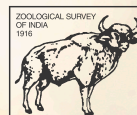
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Comments on the checklist:
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ZOOLOGICAL SURVEY OF INDIA
Ministry of Environment, Forest & Climate Change

PHYLUM CHAETOGNATHA

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Introduction: Chaetognaths (from Greek 'chaeto' or bristle and 'gnathos' or jaw) are a phylum of marine invertebrate predators distinguished by their bilaterally symmetrical coelomate body that range in size from 1.3 to 105 mm (Pauly *et al.*, 2021). Due to their rapid darting movements, they are frequently called as "arrow worms". They are also referred to as "glass worms" due to their elongated, thin, and typically transparent body structure. Other major diagnostic features include their lateral/tail fins, grasping hooks or spines located on either sides of the mouth, and teeth rows located at the frontal end of the mouth (Harzsch *et al.*, 2015). Despite their delicate and slender body structure, chaetognaths were reportedly present during the early Cambrian Period (Vannier *et al.*, 2007). They are prominent pelagic zooplankton constituting upto 15% of the zooplankton biomass across the global oceans and are present in all marine habitats, from estuarine waters to open oceans, polar waters, and deep sea ecosystems (Bone *et al.*, 1991). Chaetognaths are protandric hermaphrodites showing direct development; cross-fertilization is more habitual, while some species are known to self-fertilize (Reeve, 1970). They are a conspicuous carnivorous zooplankton group with the juveniles feeding mainly on smaller-sized preys such as copepod nauplii and tintinnids, while their adult counterparts are voracious feeders of copepods, other crustacean groups, larval fishes, and other chaetognaths. They in turn form a substantial food source for other marine invertebrates and commercially important fishes. Thus arrow worms facilitate structuring of the pelagic food web mainly by cropping a sizeable portion of copepods, and also serve as an essential connecting link between primary consumers and higher trophic level consumers.

Global diversity: Currently 132 chaetognath species have been identified throughout the global oceans, belonging to a single class, two orders, and nine families (WORMS, 2023).

Diversity in India: In the Indian marine waters, 37 extant species belonging to a single class, two orders and five families have been reported so far.

Table-01. Diversity in States

Sl. No.	State/UT	No. of species	No. of Endemic species
	INDIA TOTAL	37	6
1	Andhra Pradesh	9	0
2	Arunachal Pradesh	0	0
3	Assam	0	0
4	Bihar	0	0
5	Chhattisgarh	0	0

Sl. No.	State/UT	No. of species	No. of Endemic species
6	Gujarat	5	0
7	Goa	6	0
8	Haryana	0	0
9	Himachal Pradesh	0	0
10	Jharkhand	0	0
11	Karnataka	9	0
12	Kerala	19	0
13	Madhya Pradesh	0	0
14	Maharashtra	7	0
15	Manipur	0	0
16	Meghalaya	0	0
17	Mizoram	0	0
18	Nagaland	0	0
19	Odisha	6	0
20	Punjab	0	0
21	Rajasthan	0	0
22	Sikkim	0	0
23	Tamil Nadu	19	0
24	Telangana	0	0
25	Tripura	0	0
26	Uttar Pradesh	0	0
27	Uttarakhand	0	0
28	West Bengal	2	0
29	Andaman & Nicobar	13	2
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	10	2
36	Puducherry	0	0
37	Unknown	31	2 (Endemic to Indian Ocean)

Endemism: Six endemic species are known to exist in Indian waters to date: *Krohnitta balagopali* Nair, Panampunnayil, Pillai & Gireesh, 2008 and *Aidanosagitta meenakshiae* (Nair, Panampunnayil, Pillai & Gireesh, 2008) are endemic to the Andaman waters; *Aidanosagitta nairi* (Casanova & Nair, 2002) and *Ferosagitta madhupratapi* (Casanova & Nair, 1999) are endemic species reported from the Agatti Lagoon, Laccadive Sea (India); *Sagitta bombayensis* Lele & Gae, 1936 is found to be endemic to the Indian neritic waters; *Eukrohnia minuta* Silas & Srinivasan, 1969 is an endemic species to the Indian Ocean.

Habitat : Chaetognaths are exclusively marine organisms with a wide distribution pattern, spanning across all marine settings, from tropics to polar oceans, from pelagic to benthic (58% of the 132 extant chaetognath species are pelagic organisms while the remaining 42% are benthic or benthopelagic), and also from neritic to oceanic regions. They have been documented in the pelagic zones of the global oceans from the surface to the deeper layers (5000 m); they are allegedly abundant along the surface waters.

Ecological Significance: Chaetognaths are active planktonic predators and their pelagic trophodynamics is an index for measuring global ocean ecology. Despite their pivotal roles as predators, competitors, and as prey in shaping the marine food chains, they are reportedly important indicators of water-masses and changing oceanographic processes. Only two species of luminous chaetognaths, *Caecosagitta macrocephala* and *Eukrohnia fowleri*, have been recognised to date (Theusen *et al.*, 2010). Certain arrow worms use a potent marine neurotoxin (most likely of bacterial origin) called tetrodotoxin to paralyze their prey. Furthermore, they also function as hosts for a variety of parasites and ectoparasites.

Human Significance : Chaetognaths are key prey for a variety of economically important fishes that contribute to a significant fraction of human diet. They are also extensively employed for scientific research opportunities due to their significant ecological traits.

Threatened species as per IUCN : No species are evaluated as threatened species as per IUCN.

Protected Species as per WPA (2022) : No species are included under any schedule as per the WPA (2022).

Species under CITES : No species are included under appendices of CITES.

Invasive alien species : No invasive alien species of chaetognaths are known from India

Gap areas : Since their original description, chaetognaths have always perplexed taxonomists. They are ancient invertebrates with obscure evolutionary origin. Their affinity towards protostomes remains ambiguous and requires systematic research. More qualitative and quantitative research on chaetognaths of Indian waters is required in monitoring the health and productivity of the marine ecosystem as they directly react to physical process in marine systems. Although a few species have been identified as consumers of bacteria and particulate matter, specialised research concentrating on more species of arrow worms is required to broadly generalise these food types for the complete phylum. Additionally, the true source of tetrodotoxin is still not clearly understood in chaetognaths and requires thorough studies.

Systematic list of chaetognaths of India:Kingdom **Animalia**Phylum **Chaetognatha**Class **Sagittoidea**Order **Aphragmophora** Tokioka, 1965Family **Sagittidae** Claus & Grobben, 1905Genus **Aidanosagitta** Tokioka & Pathansali, 1963

1. *Aidanosagitta bedfordii* (Doncaster, 1902)
2. *Aidanosagitta meenakshiae* (Nair, Panampunnayil, Pillai & Gireesh, 2008)
3. *Aidanosagitta nairi* (Casanova & Nair, 2002)
4. *Aidanosagitta neglecta* (Aida, 1897)
5. *Aidanosagitta oceania* (Grey, 1930)
6. *Aidanosagitta regularis* (Aida, 1897)

Genus **Caecosagitta** Tokioka, 1965

7. *Caecosagitta macrocephala* (Fowler, 1904)

Genus **Decipsisagitta** Bieri, 1991

8. *Decipsisagitta decipiens* (Fowler, 1905)

Genus **Ferosagitta** Kassatkina, 1971

9. *Ferosagitta ferox* (Doncaster, 1902)
10. *Ferosagitta hispida* (Conant, 1895)
11. *Ferosagitta madhupratapi* (Casanova & Nair, 1999)
12. *Ferosagitta robusta* (Doncaster, 1902)

Genus **Flaccisagitta** Tokioka, 1965

13. *Flaccisagitta enflata* (Grassi, 1881)
14. *Flaccisagitta hexaptera* (d'Orbigny, 1836)

Genus **Mesosagitta** Tokioka, 1965

15. *Mesosagitta minima* (Grassi, 1881)

Genus **Parasagitta** Tokioka, 1965

16. *Parasagitta elegans* (Verrill, 1873)
17. *Parasagitta tenuis* (Conant, 1896)

Genus **Pseudosagitta** Germain & Joubin, 1912

18. *Pseudosagitta lyra* (Krohn, 1853)
19. *Pseudosagitta maxima* (Conant, 1896)

Genus **Sagitta** Quoy & Gaimard, 1827

20. *Sagitta bipunctata* Quoy & Gaimard, 1827
21. *Sagitta bombayensis* Lele & Gae, 1936

Genus **Serratosagitta** Tokioka & Pathansali, 1963

22. *Serratosagitta pacifica* (Tokioka, 1940)
23. *Serratosagitta tasmanica* (Thompson, 1947)

Genus **Solidosagitta** Tokioka, 1965

24. *Solidosagitta planctonis* (Steinhaus, 1896)
25. *Solidosagitta zetesios* (Fowler, 1905)

Genus **Zonosagitta** Tokioka, 1965

26. *Zonosagitta bedoti* (Béraneck, 1895)

27. *Zonosagitta pulchra* (Doncaster, 1902)

Family **Krohnittidae** Tokioka, 1965

Genus **Krohnitta** Ritter-Záhony, 1910

28. *Krohnitta balagopali* Nair, Panampunnayil, Pillai & Gireesh, 2008

29. *Krohnitta pacifica* (Aida, 1897)

30. *Krohnitta subtilis* (Grassi, 1881)

Family **Pterosagittidae** Tokioka, 1965

Genus **Pterosagitta** Costa, 1869

31. *Pterosagitta draco* (Krohn, 1853)

Order **Phragmophora** Tokioka, 1965

Family **Eukrohniidae** Tokioka, 1965

Genus **Eukrohnia** Ritter-Záhony, 1909

32. *Eukrohnia bathypelagica* Alvariano, 1962

33. *Eukrohnia fowleri* Ritter-Záhony, 1909

34. *Eukrohnia hamata* (Möbius, 1875)

35. *Eukrohnia minuta* Silas & Srinivasan, 1969

Family **Spadellidae** Tokioka, 1965

Genus **Spadella** Langerhans, 1880

36. *Spadella angulata* Tokioka, 1951

37. *Spadella cephaloptera* (Busch, 1851)

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