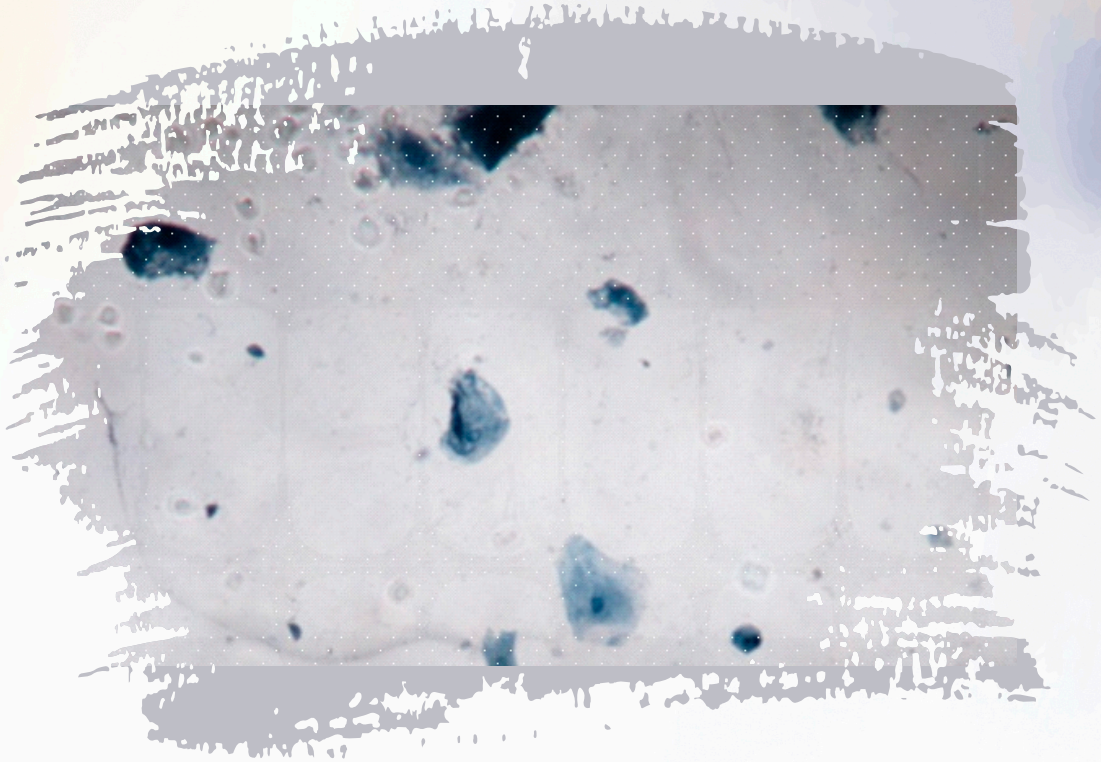
FAUNA OF INDIA CHECKLIST

JULY, 2024

ONLINE VERSION 1.0



PROTOZOA: EXCAVATA: METAMONADA, Grassé 1952 emend. Cavalier-Smith 2003

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DOI : https://doi.org/10.26515/Fauna/1/2023/Protista:Excavata: Metamonada

Key words: Metamonada, parabasalids, oxymonads, India, checklist, protozoa biodiversity.

Citation: Sarkar, P., Purushothaman, J. (2024). Fauna of India Checklist: Protozoa: Excavata: Metamonada Version 1.0. Zoological Survey India. DOI: https://doi.org/10.26515/Fauna/1/2023/Protista:Excavata: Metamonada

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

PROTOZOA: EXCAVATA: METAMONADA, Grassé 1952 emend. Cavalier-Smith 2003

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Introduction: The phylum Metamonada includes a substantial group of small flagellate amitochondriate eukaryotes. Although it is uncertain precisely what makes them up, they contain the retortamonads, diplomonads, and maybe parabasalids and oxymonads as well. All four of these families contain anaerobes that frequently live with or are parasites of other animals, for instance *Giardia lamblia*, which results in diarrhoea in mammals. Many of these anaerobes are aerotolerant anaerobes. The absence of mitochondria in these flagellates is rare. They were once thought to be among the earliest eukaryotes since they diverged from the others prior to the development of mitochondria. They do, however, still contain organelles and nuclear genes generated from them and are known to have lost mitochondria secondary to this. Hydrogenosomes, which generate hydrogen, and tiny structures known as mitosomes are examples of mitochondrial remnants. The Metamonada and Malawimonas are now thought to be sister clades of the Podiata. Flagella or basal bodies arranged in distinctive groups of four, which are frequently connected to the nucleus and form a structure known as a karyomastigont, are a common feature of all of these groups. Additionally, it is now known that the genera *Carpediemonas* and *Trimastix* are, in turn, distant relatives of the oxymonads and the retortamonad-diplomonad lines, respectively.

Global diversity: The number of species that make up the phylum Metamonada is unknown. However, the phylum Metamonada includes a substantial number of small flagellate amitochondriate eukaryotes.

Diversity in India: In India, 136 species belonging to 22 genera and 10 families are recorded.

Diversity in States (Table)

Sl.No.	State/Union Territory	No. Species	No. Endemic Species
1	Andhra Pradesh	19	
2	Arunachal Pradesh	1	
3	Assam	3	
4	Bihar	3	
5	Chhattisgarh	4	
6	Gujarat	5	
7	Goa	6	
8	Haryana	4	
9	Himachal Pradesh	1	
10	Jharkhand	3	
11	Karnataka	4	

Sl.No.	State/Union Territory	No. Species	No. Endemic Species
12	Kerala	9	
13	Madhya Pradesh	4	
14	Maharashtra	3	
15	Manipur	1	
16	Meghalaya	0	
17	Mizoram	1	
18	Nagaland	1	
19	Odisha	9	
20	Punjab	3	
21	Rajasthan	5	
22	Sikkim	1	
23	Tamil Nadu	9	
24	Telangana	4	
25	Tripura	1	
26	Uttar Pradesh	6	
27	Uttarakhand	1	
28	West Bengal	12	
29	Andaman & Nicobar	1	
30	Chandigarh	1	
31	Dadra Nagar Haveli, Daman & Diu	1	
32	Delhi	5	
33	Jammu & Kashmir	1	
34	Ladakh	2	NA
35	Lakshadweep	1	
36	Puducherry	1	
	INDIA TOTAL	**136**	**0**

Endemism: No species of the phylum Metamonada are endemic to India.

Habitat: In anoxic freshwater habitats, the majority of species are free-living creatures. They are bacterivorous in this instance and move by means of flagella. At the back of the ventral groove, captured bacteria are swallowed and end up in the food vacuoles. These vacuoles are located at the back of the cell. At a particular point in their life cycle, some Trimastrix begin to develop cysts. The cyst typically has a thin outer wall and a rounded or spherical appearance. Until conditions improve and cause excystation, the basal body, flagella, and other cell components are retained within this wall.

Ecological Significance: Diplomonads can be found in a variety of global habitats. *Giardia* species can be found as cysts in both aquatic and terrestrial settings, as was previously indicated. They may endure unfavourable conditions for a long time as a result. However, trophoizoites can also be detected in the human and animal hosts' bodies. The bulk of organisms, on the other hand, are parasitic and depend on their particular hosts for survival. The majority of oxymonads are obligate symbionts that live in the

termite and roach guts and devour wood. Here, they benefit from a favourable environment for growth and aid in the digestion of wood material.

Human Significance: The parasite species of the phylum Metamonada have been connected to parasitic disorders in both marine and terrestrial animals. The disease caused by Giardia sp. is known as giardiasis. Both human and animals could be badly harmed by them.

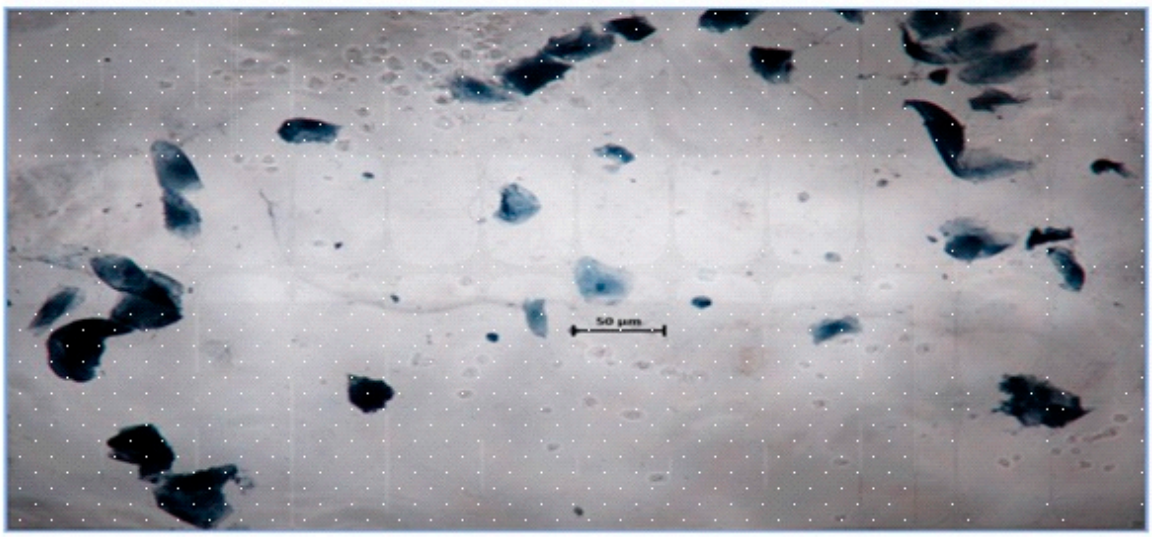
Threatened species: Species of the phylum Metamonada from India are not assessed for IUCN threat categories.

Protected Species as per WPA (2022): Species of the phylum Metamonada are not listed under any schedules of Wildlife Protection Act (2022).

Species under CITES: Species of the phylum Metamonada are not listed under any appendices of CITES.

Invasive alien species: No species of the phylum Metamonada are reported to be invasive in India.

Gap areas: There aren't many phylum Metamonada investigations done in India. It is essential to perform a thorough study of phylum Metamonada in order to fully understand the diversity of the phylum Metamonada in India. Many species are only known from type collections and have not been reported in recent years.



Trichomonas gallinae (Rivolta, 1878) from host *Milvus migrans* (Boddaert, 1783)

Sl. No.	Species
	Phylum METAMONADA
	Class PARABASALIA
	Order TRICHONYMPHIDA
	Family TRICHONYMPHIDAE
	Genus ***Pseudotrichonympha***
1	*Pseudotrichonympha indica* Chakraborty & Bannerje
2	*Pseudotrichonympha cordiformes* (KARANDIKAR & VITTAL)
3	*Pseudotrichonympha subapicalis* (KARANDIKAR & VITTAL)
	Genus ***Spirotrichonympha***
4	*Spirotrichonympha froilanoi* (KARANDIKAR & VITTAL)
5	*Spirotrichonympha roonwali* (DAS)
6	*Spirotrichonympha parteri* (KOIDZUM)
	Genus ***Trichonympha***
7	*Trichonympha meghalayensis* (DAS, MANDAL, TIWARI, NANDI & SARKAR)
8	*Trichonympha* sp.
9	*Trichonympha agilis* Leidy, 1877
	Genus ***Teranympha***
10	*Teranympha mirabilis* (KOIDZUMI)
	Order TRICHOMONADIDA
	Family TRICHOMONADIDAE
	Genus ***Hypotrichomonas***
11	*Hypotrichomonas hemidactyli* Bhaskar Rao et al., 1976
12	*Hypotrichomonas osmaniae* Krishnamurthy, 1967
13	*Hypotrichomonas venkataramiahii* Dayakar et al., 1977
14	*Hypotrichomonas avium* Navarathnam, 1970
	Genus ***Pentatrichomonas***
15	*Pentatrichomonas capellae* Navarathnam,1970
16	*Pentatrichomonas centropi* Navarathnam,1970
17	*Pentatrichomonas smithi* Navarathnam, 1970
18	*Pentatrichomonas tardigradi* Navarathnam,1970
19	*Pentatrichomonas vulpi* Todd, 1963
	Genus ***Trichomonas***
20	*Trichomonas vaginalis* (Donné corr.Ehrenberg)
21	*Trichomonas sp.*
22	*Trichomonas ruminantium* Braune
23	*Trichomonas bramae* Sambasivarao and Narasimhamurti, 1982

Sl. No.	Species
24	*Trichomonas caballi* Abraham, 1961
25	*Trichomonas frugivori* Todd, 1963
26	*Trichomonas leucuri* Todd, 1963
27	*Trichomonas singhi* Todd, 1963
28	*Trichomonas gallinae* (Rivolta, 1878)
29	*Trichomonas tenax*
	Genus ***Trichomitus***
30	*Trichomitus corydiae* Bhaskar Rao and Todd, 1968
31	*Trichomitus batrachorum* (Perty, 1852),Honigberg, 1968
32	*Trichomitus hyderabadensis* Krishnamurthy, 1968
33	*Trichomitus* sp.
34	*Trichomitus honigbergi* Navarathnam,1971
	Genus ***Tetratrichomonas***
35	*Tetratrichomonas garnhami* Navarathnam,1971
	Genus ***Tritrichomonas***
36	*Tritrichomonas lissemyi* Janakidevi, 1961
37	*Tritrichomonas gigantica* Navarathnam,1970
	Order HONIGBERGIELLIDA
	Family HEXAMASTIGIDAE
	Genus ***Hexamastix***
38	*Hexamastix periplanetae* Bhaskar Rao,1970
39	*Hexamastix singhi* Bhaskar Rao, 1970
40	*Hexamastix dobelli* Janakidevi, 1961
41	*Hexamastix gerbilli* Navarathnam, 1970
42	*Hexamastix gopali* Navarathnam, 1970
43	*Hexamastix hyderabadensis* Navarathnam, 1971
44	*Hexamastix sciuri* Todd, 1963
45	*Hexamastix spheroides* Todd, 1963
	Class ANAEROMONADEA
	Order OXYMONADIDA
	Family PYRSONYMPHIDAE
	Genus ***Dinenympha***
46	*Dinenympha exilis* (KOIDZUMI)
47	*Dinenympha* sp. Leidy, 1877
48	*Dinenympha nobilis* (KOIDZUMI)
49	*Dinenympha parva* (KOIDZUMI)
50	*Dinenympha regusa* (KOIDZUMI)

Sl. No.	Species
51	*Dinenympha leidy* (KOIDZUMI)
	Genus ***Pyrsonympha***
52	*Pyrsonympha rostrata* (MAITY & MUKHERJEE)
53	*Pyrsonympha modesta* G.Koidzumi, 1921
54	*Pyrsonympha grandis* G.Koidzumi, 1921
	Order TRIMASTIGIDA
	Family RIMASTIGIDAE
	Genus ***Trimastix***
55	*Trimastix inequalis*
56	*Trimastix marina*
57	*Trimastix pyriformis*
58	*Trimastix pyriformis*
59	*Trimastix marina*
	Class ZOOFLAGELLATE
	Order DIPLOMONADIDA
	Family HEXAMITIDAE
	Genus ***Hexamita***
60	*Hexamita* sp. (Dujardin, 1838)
61	*Hexamita gryllotalpae* Bhaskar Rao, 1968
62	*Hexamita honigbergi* Bhaskar Rao,1968
63	*Hexamita singhi* Navarathnam, 1970
64	*Hexamita hoarei* Krishnamurthy, 1967
65	*Hexamita kakatiyae* Bhaskar Rao, 1975
66	*Hexamita nesocium* Todd, 1963
67	*Hexamita pigmentatus* Todd, 1963
68	*Hexamita spillulus* Todd, 1963
	Genus ***Giardia***
69	*Giardia* sp. (Künstler, 1882)
70	*Giardia lamblia*
71	*Giardia intestinalis*
72	*Giardia dasi* Abraham, 1962
73	*Giardia indica* Saratchandra, Sambasiva Rao and Kalavathi, 1982
74	*Giardia qadrii* Navarathnam, 1969
75	*Giardia agilis*
76	*Giardia duodenalis*
	Class RETORTAMONADEA
	Order RETORTAMONADIDA

Sl. No.	Species
	Family RETORTAMONADIDAE
	Genus ***Retortamonas***
77	*Retortamonas blattae* (Bishop, 1931)
78	*Retortamonas toddi* Bhaskar Rao, 1968
79	*Retortamonas wenrich* Stabler, 1944
80	*Retortamonas cheloni* Janakidevi, 1962
81	*Retortamonas* sp.
	Genus ***Chilomastix***
82	*Chilomastix graecae* Navarathnam, 1971
83	*Chilomastix osmaniae* Navarathnam,1971
84	*Chilomastix bandicooti* Todd, 1963
85	*Chilomastix hyderabadensis* Todd, 1963
86	*Chilomastix indica* Todd, 1963
87	*Chilomastix megamorpha* Abraham, 1962
88	*Chilomastix nigricollisi* Todd, 1963
89	*Chilomastix palmari* Todd, 1963
90	*Chilomastix equi* Abraham, 1961
91	*Chilomastix caprae*
	Class TRICHOMONADEA
	Order TRICHOMONADIDA
	Family MONOCERCOMONADIDAE
	Genus ***Monocercomonoides***
92	*Monocercomonoides ganapati* Bhaskar Rao,1969
93	*Monocercomonoides garnhami* Bhaskar Rao, 1969
94	*Monocercomonoides qadrii* Bhaskar Rao, 1969
95	*Monocercomonoides filamentum* Janakidevi 1962
96	*Monocercomonoides singhi* Krishnamurthy, 1967
97	*Monocercomonoides indica* Navarathnam, 1970
98	*Monocercomonoides lepusi* Todd. 1963
99	*Monocercomonoides aayeedi* Abraham, 1961
100	*Monocercomonoides shortti* Navarathnam, 1970
	Genus ***Monocercomonas***
101	*Monocercomonas corydiae* Bhaskar Rao, 1970
102	*Monocercomonas laccotrephis* Bhaskar Rao, 1970
103	*Monocercomonas leucophaeae* Bhaskar Rao,1970
104	*Monocercomonas osmaniae* Bhaskar Rao,1970
105	*Monocercomonas calotexi* Saratchandra, 1979

Sl. No.	Species
106	*Monocercomonas colubrorum*
107	*Monocercomonas eryxi* Krishnamurthy, 1968
108	*Monocercomonas ganapati* Saratchandra and Narasimhamurti, 1982
109	*Monocercomonas gopali* Krishnamurthy, 1967
110	*Monocercomonas kakatiyae* Dayakar et al., 1978
111	*Monocercomonas prashadi* Saratchandra,1981
112	*Monocercomonas rayi* Saratchandra and Narasimhamurti, 1982
113	*Monocercomonas srikakulamensis* Saratchandra and Narasimhamurti, 1979
114	*Monocercomonas varani* Krishnamurthy, 1968
115	*Monocercomonas waltairensis* Narasimhamurti and Saratchandra, 1980
116	*Monocercomonas* sp.
117	*Monocercomonas anasae* Navarathnam, 1971
118	*Monocercomonas qudrii* Navarathnam, 1971
119	*Monocercomonas andhrae Kalavathi,* Saratchandra and Sambariva Rao, 1983
120	*Monocercomonas cutleri* Navarathnam, 1971
121	*Monocercomonas gerbilli* Todd, 1963
122	*Monocercomonas hoarei* Navarathnam, 1970
123	*Monocercomonas lori* Abraham, 1962
	Order SPIROTRICHONYMPHIDA
	Family HOLOMASTIGOTOIDIDAE
	Genus ***Holomastigotoides***
124	*Holomastigotoides indica* (DAS, MANDAL, TIWARI, NANDI & SARKAR)
125	*Holomastigotoides bengalensis* (CHAKRABORTY & BANERJEE)
126	*Holomastigotoides campanula* (DE MELLO)
127	*Holomastigotoides globosus* (DE MELLO)
128	*Holomastigotoides magnus* (UTTANGI)
129	*Holomastigotoides ogivalis* (DE MELLO)
130	*Holomastigotoides rayi* (KARANDIKAR & VITTAL)
131	*Holomastigotoides reniformes* (DE MELLO)
132	*Holomastigotoides spheroidalis* (DE MELLO)
133	*Holomastigotodes rayi* (KARANDIKAR & VITTAL)
134	*Holomastigotodes reniformis* (DE MELLO)
	Order CRISTAMONADIDA
	Family DEVESCOVINIDAE
	Genus ***Foaina***
135	*Foaina reflexa* (KIRBY)
136	*Foaina solita* (KIRBY)

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