JULY 2025
ONLINE VERSION 2.0

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

PROTOZOA: EXCAVATA: EUGLENOZOA

Patatri Sarkar[1,3] & Jasmine Purushothaman[1,2*]

[1] HQ, Zoological Survey of India, New Alipore, Kolkata, West Bengal 700053
[2] jasbose@gmail.com; https://orcid.org/0000-0002-3980-4474
[3] patatri.89@gmail.com
*Corresponding author: jasbose@gmail.com

DOI : https://doi.org/10.26515/Fauna/2/2025/Protista:Excavata:Euglynozoa

Key words: Excavata, Euglenozoa, India, checklist, protozoa biodiversity.

Citation: Sarkar, P., Purushothaman, J. (2025). Fauna of India Checklist: Excavata: Euglenozoa. Version 2.0. Zoological Survey India. DOI: https://doi.org/10.26515/Fauna/2/2025/Protista:Excavata:Euglynozoa

Comments on the checklist:
E-mail your comments and suggestions to improve the checklist to zsifaunachecklists@gmail.com; jasbose@gmail.com

FAUNA OF INDIA CHECKLIST

PROTOZOA: EXCAVATA: EUGLENOZOA

Patatri Sarkar[1,3] & Jasmine Purushothaman[1,2*]

[1]HQ, Zoological Survey of India, New Alipore, Kolkata, West Bengal 700053, [2]jasbose@gmail.com; https://orcid.org/0000-0002-3980-4474, [3]patatri.89@gmail.com, *Corresponding author: jasbose@gmail.com

Introduction: The Euglenozoa represent a significant subgroup within the flagellate lineage Discoba, encompassing a diverse array of unicellular organisms that include both free-living species and medically important parasites, some of which are capable of infecting humans. This taxon is broadly classified into four major clades: Kinetoplastea, Diplonemea, Euglenida, and Symbiontida. Euglenozoans are typically unicellular and range in size from approximately 15 to 40 µm, although certain euglenid species may attain lengths of up to 500 µm. Most members of this group possess two flagella, which are inserted into apical or subapical pockets and are typically oriented in parallel. In some taxa, a cytostome, or cell mouth, is present and facilitates phagotrophy, allowing the ingestion of bacteria and other small eukaryotes. The cell surface is supported by a set of microtubules that originate from the flagellar bases, forming a structural framework along the anterior and posterior regions of the cell. A distinguishing feature of the Euglenida is their possession of chloroplasts, making them the only known eukaryotes outside the clade Diaphoretickes to conduct photosynthesis without employing kleptoplasty. These chloroplasts are surrounded by three membranes and contain chlorophylls a and b, indicating a probable origin from a green algal lineage acquired via secondary endosymbiosis. Nutritional strategies among Euglenozoa vary, with phototrophic euglenids capable of autotrophy through photosynthesis, while others rely on osmotrophy, absorbing nutrients directly from their environment. Cell division is the sole mode of reproduction observed in this group. Notably, during mitosis, the nuclear envelope remains intact, and spindle microtubules assemble within the nucleus, a process characteristic of closed mitosis.

Global diversity: Phylum Euglenozoa comprises of 122 genera and 18 families, totalling 2100 species as this phylum has its existence since the Cenomanian period.

Diversity in India: In India, total 88 species belonging to 7 genera and 3 families have been recorded.

Diversity in States (Table)

Sl. No.	State / Union Territory	No. of Species	No. of Endemic Species
1	Andhra Pradesh	6	NA
2	Arunachal Pradesh	1	
3	Assam	2	
4	Bihar	5	
5	Chhattisgarh	4	
6	Gujarat	2	
7	Goa	1	
8	Haryana	1	

Sl. No.	State / Union Territory	No. of Species	No. of Endemic Species
9	Himachal Pradesh	1	
10	Jharkhand	2	
11	Karnataka	3	
12	Kerala	2	
13	Madhya Pradesh	3	
14	Maharashtra	5	
15	Manipur	1	
16	Meghalaya	1	
17	Mizoram	1	
18	Nagaland	1	
19	Odisha	3	
20	Punjab	2	
21	Rajasthan	2	
22	Sikkim	1	
23	Tamil Nadu	2	
24	Telangana	4	
25	Tripura	2	
26	Uttar Pradesh	7	
27	Uttarakhand	1	
28	West Bengal	9	
29	Andaman & Nicobar	1	
30	Chandigarh	2	
31	Dadra Nagar Haveli, Daman & Diu	1	
32	Delhi	5	
33	Jammu & Kashmir	1	
34	Ladakh	1	
35	Lakshadweep	1	
36	Puducherry	1	
	INDIA TOTAL	**88**	**0**

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

Habitat: The phylum Euglenozoa comprises a diverse group of flagellated protists that includes free-living, symbiotic, and parasitic species. While numerous members of this group function as bacteriotrophs commonly found in both freshwater and marine environments, others—such as species of the genus *Euglena*—are capable of photosynthetic autotrophy.

Ecological Significance: *Euglena* sp. can be important component of some aquatic environments as a primary producer that is consumed by other species as well as decomposers that consumes other creatures. Phylum Euglenozoa can play important ecological functions in aquatic creatures' food chain. In addition to serving as host regulators, parasites are crucial to the food chain.

Human Significance: The parasites of the phylum Euglenozoa have been associated with parasitic diseases in terrestrial and aquatic animals, particularly fishes, which can be detrimental from an economic standpoint.

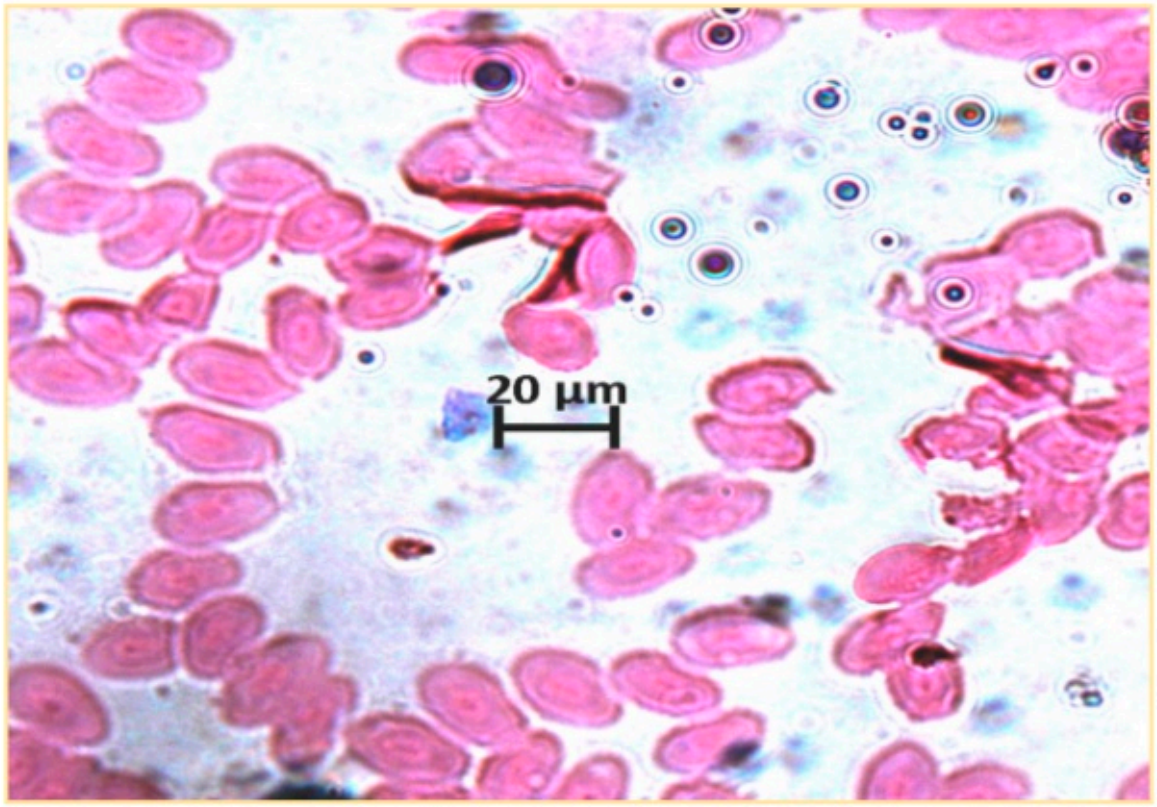
Threatened species: Species of the phylum Euglenozoa from India are not assessed for IUCN threat categories.

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

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

Invasive alien species: No Euglenozoa species are reported to be invasive in India.

Gap areas: In India, research on the phylum Euglenozoa remains limited, with relatively few studies dedicated to its taxonomic and ecological diversity. To achieve a comprehensive understanding of the group's distribution, diversity, and functional roles within Indian ecosystems, it is essential to undertake systematic and extensive investigations.



Trypanosoma rotatorium Mayer, 1843 from host *Bufo* sp. Garsault, 1764

Sl. No.	Species
	Phylum EUGLENOZOA
	Class KINETOPLASTEA
	Order TRYPANOSOMATIDA
	Family TRYPANOSOMATIDAE
	Genus ***Trypanosoma***
1	*Trypanosoma tengari n. sp.* (Gruby, 1843)
2	*Trypanosoma rotatorium* (Mayer, 1843)
3	*Trypanosoma lewsi* Kent
4	*Trypanosoma avium*
5	*Trypanosoma* sp.
6	*Trypanosoma delhiense*
7	*Trypanosoma batrachi* Quadri
8	*Trypanosoma striati* Quadri
9	*Trypanosoma pancali* Mandal
10	*Trypanosoma channai* Narasimhamurti and Saratchandra, 1980
11	*Trypanosoma godavariensis* Saratchandra and Jayaramaraju, 1981
12	*Trypanosoma lissemysi* Saratchandra, 1980
13	*Trypanosoma bandicotti* Lingard, 1904
14	*Trypanosoma indicum* Luhe, 1906
15	*Trypanosoma evansi* (Steel, 1885)
16	*Trypanosoma theileri* Laveran, 1902
17	*Trypanosoma chattoni* Mathis & Liger
18	*Trypanosoma evansi* (Steel, 1885)
19	*Trypanosoma gambiense*
20	*Trypanosoma rangeli*
21	*Trypanosoma armeti* Mondal
22	*Trypanosoma striata* Qadri
23	*Trypanosoma granulosum* Laveran & Mesnil, 1902
24	*Trypanosoma cancili* Mandal
25	*Trypanosoma lewisi* (KENT)
26	*Trypanosoma enhydris* Sinha & Mandal
27	*Trypanosoma bengalensis*
28	*Trypanosoma choudhuryi* Mandal
29	*Trypanosoma tandoni* Mandol
30	*Trypanosoma taprobanica* Ray & Choudhury
31	*Trypanosoma systoma* Ray & Choudhury
32	*Trypanosoma loricatum* (MAYOR)
33	*Trypanosoma karyozeukton* (DUTTON & TODD)
34	*Trypanosoma malabarica* Ray & Choudhury
35	*Trypanosoma rhinopome* (BANDYOPADHYAY, RAY & DASGUPTA)
36	*Trypanosoma* (GOBIDA MANDAL)

Sl. No.	Species
37	*Trypanosoma rhodesiense*
38	*Trypanosoma cruzi*
39	*Trypanosoma brucei*
40	*Trypanosoma neveulemairei* Brumpt
41	*Trypanosoma lucknowi* Weinman et. al
42	*Trypanosoma conorrhini* (Denovan) Shortt and Swaminath
43	*Trypanosoma cyclops* Weinman
44	*Trypanosoma* (GOBIDA MANDAL)
45	*Trypanosoma brucei brucei*
46	*Trypanosoma enhydris* Sinha & Mandal
47	*Trypanosoma granulosum* Laveran & Mesnil, 1902
48	*Trypanosoma chattoni* Mathis & Zeger
49	*Trypanosoma armeti* Mondal
50	*Trypanosoma inopinatum* Sergent & Sergent
51	*Trypanosoma mega* Dutton and Todd
52	*Trypanosoma balithaensis* Ray
53	*Trypanosoma rhinolophonis* Pal and Dasgupta
	Genus ***Leptomonas***
54	*Leptomonas bakeri* Prasad and Kalavati, 1987
55	*Leptomonas indica* Prasad and Kalavati, 1987
56	*Leptomonas colosoma*
	Genus ***Leishmania***
57	*Leishmania tropica* (Ross 1903)
58	*Leishmania chagasi* (Ross 1903)
59	*Leishmania mazor* (Yakimoff and Schokhor) Bray et.al
60	*Leishmania donovani* (Laveren and Mesnil) Ross
61	*Leishmania tarentolae* (Ross 1903)
62	*Leishmania mexicana* (Ross 1903)
63	*Leishmania adleri* (Ross 1903)
64	*Leishmania donovani donovani* (Ross 1903)
65	*Leishmania infantum* Nicolle
66	*Leishmania mexicana* (Baigi) Granham
	Genus ***Bodomonas***
67	*Bodomonas rebae* Tripathi
	Order PROKINETOPLASTIDA
	Family ICHTHYOBODONIDAE
	Genus ***Ichthyobodo***
68	*Ichthyobodo sp.* Pinto, 1928
	Order EUBODONIDA
	Family CRYPTOBIACEAE
	Genus ***Trypanoplasma***

Sl. No.	Species
69	*Trypanoplasma indica* (Mandal)
70	*Trypanoplasma gupti* Gupta and Gupta 1987
71	*Trypanoplasma jayasriparvateesami nov. comb. (Syn. Cryptobia indica) Jayasri and Parvateesam, 1982)*
72	*Trypanoplasma krishnamurthyi* Wahul, 1985
73	*Trypanoplasma lomi* Wahul, 1986
74	*Trypanoplasma maguri* Gupta and Gupta 1987
75	*Trypanoplasma mysti* Joshi 1982
76	*Trypanoplasma ompoki* Shavanas et. al 1989
77	*Trypanoplasma parastomataei* Narasimhamurti et. al 1990
78	*Trypanoplasma qadrii* Krishnamurthy and Wahul,1986
79	*Trypanoplasma saranae* Wahul, 1986
80	*Trypanoplasma seenghali* Wahul, 1985
81	*Trypanoplasma solapurensis* Wahul, 1986
82	*Trypanoplasma tengari* Gupta et al., 1988
83	*Trypanoplasma vidyai* Wahul, 1985
84	*Trypanoplasma wallagoi* Wahul
85	*Trypanoplasma sp.*
	Class EUGLENOIDEA
	Order EUGLENALES
	Family EUGLENACEAE
	Genus Euglena EHRENBERG, 1830
86	*Euglena viridis*
87	*Euglena gracilis*
88	*Euglena sanguinea*

References:

Woo, P. T. (2006). Diplomonadida (Phylum Parabasalia) and Kinetoplastea (Phylum Euglenozoa). *In Fish diseases and disorders*. Volume 1: protozoan and metazoan infections pp. 46-115.

Maslov, D. A., Yasuhira, S. and Simpson, L. (1999). Phylogenetic affinities of Diplonema within the Euglenozoa as inferred from the SSU rRNA gene and partial COI protein sequences. *Protist*, 150(1): 33-42.

Cavalier-Smith, T. (2016). Higher classification and phylogeny of Euglenozoa. *European Journal of Protistology*, 56: 250-276.