Catalogue of free-living ciliates (Protozoa: Ciliophora) recorded from Australia

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Abstract

All published reports of ciliated protozoan species free-living in Australia have been compiled into a taxonomic catalogue and cross-referenced bibliography. Records were extracted from 127 publications and are listed (with taxonomic authorities, synonyms, sizes, habitats and geographic locations) for ~620 ciliate species belonging to 284 genera in 130 families, 42 orders and 10 classes. Only free-living ciliate species are recorded from aquatic and terrestrial habitats (those living in association with a host are listed in another catalogue). Studies on ciliates in Australia have been sparse and fragmentary for such a vast and diverse continent, thus knowledge about the biodiversity and ecology of our ciliate fauna is limited and often speculative.

Introduction

Ciliated protozoa (phylum Ciliophora) are unique amongst the unicellular eukaryotes because they are the only group to exhibit nuclear dualism. Individual cells possess two different types of nuclei; vegetative macronuclei and reproductive micronuclei. Asexual reproduction occurs by transverse binary fission across rows of cilia (homothetogenic fission) whereas some species exhibit sexual reproduction by the phenomenon of conjugation (temporary fusion of two conjugates which exchange micronuclei).

As their common name implies, ciliates are also characterized by the possession of simple cilia, or compound ciliary organelles, in at least one stage of their life cycles (compound subpellicular infraciliature is universally present even when cilia are absent). Cilia are elongate hair-like extensions of the cell membrane with an internal microtubular core (universal 2+9 configuration = 2 single central microtubules surrounded by 9 peripheral doublets). They are organelles of motility used for locomotion and/or feeding. Cilia (singular, cilium) are similar in ultrastructure to flagella (singular, flagellum), and they are collectively often called undulipodia (singular, undulipodium) because both use cross-linked proteins (dynein-walking mechanism) to undulate about their basal kinetosome (unlike the rotary motion unique to flagella in bacteria).

Ciliates, together with dinoflagellates and apicomplexans, possess subpellicular alveoli which are membrane-bound sacs beneath the plasma membrane. Alveoli are thought to serve many varied functions: ranging from support (helping maintain body shape, act as fulcrum for undulipodia); metabolism (storage); osmoregulation (mucocysts); excretion (extrusomes); protection (toxicysts, trichocysts); and even hunting (haptocysts).

Most ciliate species are free-living in aquatic or terrestrial habitats but many are commensals in vertebrate or invertebrate hosts and some are parasitic. Early classification systems recognized three main classes of ciliates mainly on the basis of their patterns of somatic (body) and buccal (oral) ciliation. The 'lower holotrichs' have simple body and oral ciliature; most are free-living species but some are highly specialized symbionts aiding cellulose digestion in herbivores. The 'higher holotrichs' have simple body ciliature but more specialized oral ciliature forming membranelles; most occur as free-living organisms but some live as commensals or parasites in a range of animals. The 'spirotrichs' have reduced body ciliation but well-developed oral ciliature

forming an adoral zone of membranelles; most are bactivores living in aquatic and terrestrial habitats.

More recently, ten major monophyletic lineages have been recognized on the basis of their infraciliature; i.e. the ultrastructural organization of their kinetids (comprising basal bodies (= kinetosomes) and associated microtubular ribbons and fibrils). These lineages (ranked as classes) have been well supported by modern molecular biological studies using several gene sequences. The classification scheme therefore used in this document follows that of:

> Lynn, D.H. & Small, E.B. 2000. Phylum Ciliophora Doflein, 1901. In: Lee, J.J., Leedale, G.F. & Bradbury, P. (eds.), *An Illustrated Guide to the Protozoa*. Second Edition, Society of Protozoologists, Allen Press Inc., Lawrence, Kansas, Vol. 1, pp. 371-656.

The subphylum Postciliodesmatophora contains ciliates possessing somatic dikinetids with postciliodesmata or overlapping postciliary microtubular ribbons. Two classes are recognized: the Heterotrichea (‘different hair’) in which the left oral polykinetid does not encircle the body and the macronuclei do not divide; and the Karyorelictea (‘surviving nucleus’) which exhibit simple nuclear dualism and when the macronucleus divides, microtubules occur outside the macronuclear envelope. The subphylum Intramacronucleata is a diverse group, whose members are united by the presence of microtubules inside the macronuclear envelope during division. Eight classes are recognized: the Spirotrichea (‘coiled hair’) with conspicuous oral membranelles (previously known as polyhymenophoreans); the Litostomatea (‘simple mouths’) with a noncurved tubular cytopharngeal apparatus (rhabdos); the Phyllopharyngea (‘leaf throated’) with cytopharyngeal phyllae; the Colpodea (‘breast shaped’) with reniform body profiles; the Prostomatea (‘before mouth’) with simple apical mouths; the Nassophorea (‘pot bearer’) with curved tubular cytopharngeal apparatus (cyrtos or nasse); the Plagiopylea (‘misshapen marker’) with twisted oral tubes; and the Oligohymenophorea (‘few membrane-bearer’) with an adoral zone of three membranelles.

All records given in this catalogue have the following format: Taxon + authority [synonyms]; size; habitat; region; reference. Where information is unavailable, the abbreviation NR indicates Not Recorded. All taxa are listed as genus and species names, immediately followed by their taxonomic authorities (where, by convention, brackets indicate revision by the subsequent authority). Synonyms are given where appropriate within square brackets (complete synonymy given by abbreviation ‘syn.’; partial synonymy indicated by symbol ‘=’). When provided in the publication, ciliate size is given as the ranges in length by breadth (in micrometers). The habitat is listed for each record as freshwater, salt lake, marine (including oceanic and estuarine habitats), moss, soil (including exposed lake sediment), leaf-litter or tree-bark. The site of occurrence in Australia (Fig. 1) is given as the zoogeographic region (terrestrial drainage divisions encoded R1-R12, coastal and oceanic regions encoded R13-R30; region unspecified encoded RU). The publication from which each entry was extracted is then listed by numeric code corresponding to numbered references given at the end of the document. All records are derived from published (‘peer-reviewed’) material prior to 2010 (constituting books, book chapters, research papers, conference proceedings, published conference abstracts, expedition reports and society records).

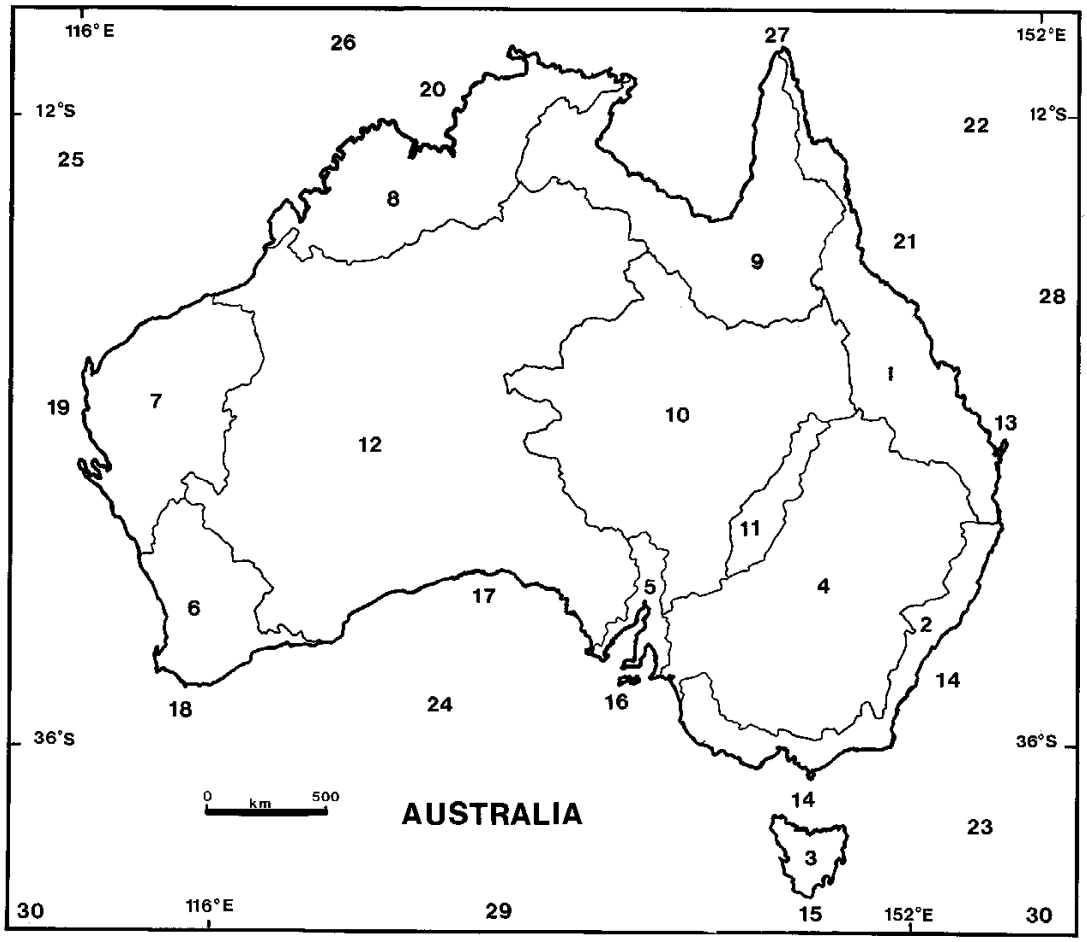

Figure 1. Regions of Australia given for each entry in checklist: R1, North-east drainage; R2, South-east drainage; R3, Tasmanian drainage; R4, Murray-Darling drainage; R5, South Australian drainage; R6, South-west drainage; R7, Far-west drainage; R8, North-west drainage; R9, Carpentarian drainage; R10, Lake Eyre drainage; R11, Bulloo-Bancannia drainage; R12, Western plateau drainage; R13, North-east coast; R14, South-east coast and Bass Strait; R15, Tasmanian coast; R16, South Australian Gulf; R17, Bight coast; R18, South-west Coast; R19, Far west coast; R20, Timoresian coast; R21, Great Barrier Reef; R22, Coral Sea; R23, Tasman Sea; R24, Great Australian Bight; R25, Indian Ocean; R26, Timor Sea/Arafura Sea; R27, Gulf of Carpentaria/Torres Strait; R28, Pacific Ocean; R29, Antarctic Region; R30, Southern Ocean.

Taxonomic catalogue

Phylum: Ciliophora Doflein, 1901 [ciliates; with nuclear dualism, conjugation, alveoli, cilia]
Unidentified ciliate species; NR; freshwater, marine, soil; RU, R2, R4, R6, R21; 8, 15, 41, 52, 72, 77, 96, 105, 118

Subphylum: Postciliodesmatophora Gerassimova & Seravin, 1976 [somatic dikinetids with postciliodesmata]

Class: Karyorelictea Corliss, 1972 [simple nuclear dualism, vermiform bodies, often contractile]
Order: Protostomatida Small & Lynn, 1985 [oral cilia inconspicuous, or absent]
Family: Kentrophoridae Jankowski, 1980
Tracheloraphis Dragesco, 1958; NR; marine; RU (81)
Tracheloraphis caudata Dragesco & Raikov, 1966; NR; freshwater; R2 (25, 28)

Family: Trachelocercidae Kent, 1881
Trachelocerca Ehrenberg, 1833; NR; freshwater, marine; RU, R2 (75, 81)
Trachelocerca conifer Kahl, 1930; 50-90 μm; salt lake; R6 (85)
Trachelocerca fusca Kahl, 1928; NR; freshwater; R2 (25, 28)
Trachelocerca olor (Muller, 1776) Kahl, 1930 [syn. *Lacrymaria olor*]; NR; freshwater; R2 (104, 111, 115)
Order: Loxodida Jankowski in Small & Lynn, 1985 [somatic cilia on right of flattened body]
Family: Loxodidae Butschli, 1889
Loxodes Ehrenberg, 1833; NR; freshwater; R2, R3 (58, 74, 124, 127)
Remanella Kahl, 1933; NR; marine; RU (81)

Class: Heterotrichea Stein, 1859 [heterotrichs, left oral polykinetid not encircling body]
Order: Heterotrichida Stein, 1859 [somatic kineties usually insert on oral region]
Family: Blepharismidae Jankowski, in Small & Lynn, 1985
Blepharisma Perty, 1849; NR; soil; R5 (84, 126)
Blepharisma americanum (Suzuki, 1954) Hirshfield *et al*., 1965; 155-200 x 64-112 μm; freshwater; R6 (1, 33)
Blepharisma bimicronucleatum Villeneuve-Brachon, 1940; NR; soil; R1, R5 (13, 43, 47)
Blepharisma halophila Ruinen, 1938; 100-250 x 50 μm; salt lake; R5, R6 (85, 95)
Blepharisma hyalinum Perty, 1849; NR; soil; R1, R2, R5 (13, 43, 47)
Blepharisma steini Kahl, 1932; 150-200 μm; soil; R5 (13, 43, 47)
Blepharisma undulans Stein, 1867; NR; soil; RU (43)
Family: Climacostomidae Repak, 1972
Climacostomum Stein, 1859; NR; freshwater; R2, R3, R4 (17, 86, 106, 107, 119)
Climacostomum virens (Ehrenberg, 1838) Stein, 1859; 100-360 x 55-150 μm; freshwater, soil; RU, R2 (25, 28, 35, 98)
Fabrea Henneguy, 1890
Fabrea salina Henneguy, 1890; 141-200 μm; salt lake; R6 (85)
Family: Condylostomatidae Kahl, in Doflein & Reichenow, 1929
Condylostoma Bory de St. Vincent, 1826; 35-70 μm; marine, salt lake; RU, R6 (81, 85)
Condylostomides Silva Neto, 1994
Condylostomides trinucleatus Foissner *et al.*, 2002; 170-270 x 100-135 μm; soil; R4 (1, 47)
Family: Folliculinidae Dons, 1914
'*Diafolliculina' nomen nudum* Hadzi, 1951; NR; freshwater; R3 (127)
Folliculina Lamarck, 1816; NR; marine; RU, R14 (81, 124)
Folliculina ampulla Muller, 1786; NR; freshwater; R2 (7)
Folliculina hirundo (Kent, 1881) Kahl, 1932; NR; marine; R14 (124)
Folliculina producta Wright, 1859; NR; salt lake; R5 (95)
Metafolliculina Dons, 1925
Metafolliculina andrewsi Hadzi, 1938; NR; freshwater; R2 (7)
Parafolliculina Dons, 1914
Parafolliculina amphora Dons, 1913; NR; freshwater; R2 (7)
Parafolliculina hirundo Kent, 1882; NR; freshwater; R2 (7)
Parafolliculina violacea (Giard, 1888) Kahl, 1932; NR; marine; R19 (7)
Family: Peritromidae Stein, 1867
Peritromus Stein, 1862; NR; marine; RU (81)
Family: Spirostomidae Stein, 1867
Gruberia Kahl, 1932; NR; marine; RU (81)

Spirostomum Ehrenberg, 1833; NR; freshwater; R2, R3 (74, 123, 127)
Spirostomum ambiguum Muller-Ehrenberg, 1838; NR; freshwater; R2 (98, 124)
Spirostomum minus Roux, 1901; NR; freshwater; R2 (25, 28)
Spirostomum teres Claparede & Lachmann, 1859; NR; freshwater; R2 (25, 28)
Family: Stentoridae Carus, 1863
Stentor Oken, 1815; NR; freshwater; R1, R2, R3, R4 (27, 59, 69, 73, 116, 127)
Stentor amethystinus Leidy, 1880; 150-500 x 106-150 μm; freshwater; RU, R4 (45, 66)
Stentor barretti Kent, 1881; NR; freshwater; R2 (104, 124)
Stentor coeruleus Ehrenberg, 1830; NR; freshwater; R2 (124)
Stentor igneus Ehrenberg, 1838; NR; freshwater; R2 (103, 124)
Stentor polymorphus Muller, 1773; 110 x 50 μm; freshwater; R1, R2 (59, 98, 100, 104, 124)
Stentor roeselii Ehrenberg, 1835 [= *S. roeselli*]; NR; freshwater; R2 (99, 104, 111)
Parastentor Vuxanovici, 1961; NR; freshwater; R3 (127)

Subphylum: Intramacronucleata Lynn, 1996 [microtubules occur inside macronuclear envelope during division]

Class: Spirotrichea Butschli, 1889 [spirotrichs, with conspicuous oral polykinetids]
Subclass: Protocruziidia de Puytorac *et al*., 1984 [cluster of paradiploid macronuclei]
Order: Protocruziida Jankowski in Small & Lynn, 1985 [typically 6 left serial oral polykinetids]
Family: Protocruziidae Jankowski, in Small & Lynn, 1985
Protocruzia de Faria *et al.,* 1922; NR; marine; RU (81)
Subclass: Hypotrichia Stein, 1859 [flattened rigid body; compound cilia (cirri)]
Unidentified hypotrich ciliates; NR; marine; R21 (64)
Incertae sedis
Balladyna Kowalewski, 1882; NR; freshwater; R3 (127)
Halterioforma Horvath, 1956 [syn. *Jeannellia* Tucolesco, 1962]; NR; freshwater; R3 (127)
Order: Kiitrichia Nozawa, 1941 [frontoventral cirri in semicircular files]
Incertae sedis
Family: Transitellidae Fryd-Versavel & Tuffrau, 1978
Balantidioides Penard, in Kahl, 1930 [= *Transitella* Gellert, 1950]
Balantidioides dragescoi Foissner *et al*., 1982; NR; soil; RU (43, 47)
Order: Euplotida Small & Lynn, 1985 [frontoventral cirri never forming more than one file]
Suborder: Euplotina Small & Lynn, 1985 [no neck-like constriction]
Family: Aspidiscidae Ehrenberg, 1838
Aspidisca Ehrenberg, 1831; NR; marine; RU, R3, R21 (3, 81, 127)
Aspidisca cicada (Muller, 1786) Claparede & Lachmann, 1859; NR; freshwater; R2 (25, 28)
Aspidisca costata (Dujardin, 1841) Kahl, 1932; NR; freshwater; R2 (25, 28)
Aspidisca lynceus (Muller, 1773) Ehrenberg, 1830; NR; freshwater, soil; RU, R2 (25, 28, 43)
Aspidisca marsupialis Penard, 1922; NR; freshwater; R2 (25, 28)
Aspidisca turrita Ehrenberg, 1838; NR; freshwater; R2 (25, 28)
Family: Euplotidae Ehrenberg, 1838
Euplotes Ehrenberg, 1830; NR; freshwater, marine, salt lake; RU, R2, R3, R4, R6, R21 (3, 4, 58, 69, 74, 81, 85, 127)
Euplotes balteatus (Dujardin 1842) Kahl, 1932; NR; freshwater; R2 (25, 28)

Euplotes charon (Muller, 1786) Stein, 1859; NR; freshwater; R2 (124)
Euplotes eurystomus Wrzeseniowski, 1870; NR; freshwater; R2 (25, 28)
Euplotes labiatis Ruinen, 1938; 23-45 x 16-29 μm; soil, salt lake; R5 (1, 13, 43, 95)
Euplotes muscicola Kahl, 1932; NR; soil; R3, R5 (13, 43)
Euplotes patella (Muller, 1773) Ehrenberg, 1833; NR; freshwater; R2 (104, 124)
Euplotopsis Borror & Hill, 1995
Euplotopsis muscicola (Kahl, 1932) Borror & Hill, 1995; NR; soil; RU (47)
Family: Uronychiidae Jankowski, 1979
Diophrys Dujardin, 1840
Diophrys salina Ruinen, 1938; 30-40 μm; salt lake; R5 (95)
Uronychia Stein, 1857
Uronychia transfuga (Muller, 1786) Kahl, 1932; NR; freshwater; R2 (25, 28)
Subclass: Choreotrichia Small & Lynn, 1985 [oral polykineties encircle anterior conical body]
Order: Tintinnida Kofoid & Campbell, 1929 [sessile; aboral attachment to lorica]
Unidentified tintinnid species; NR; marine, freshwater; R2, R18, R19, R21, R28 (57, 71, 78, 110, 117)
Family: Codonellidae Kent, 1881
Codonella Haeckel, 1873; NR; marine; R18 (57)
Codonella annulata Claparede & Lachmann, 1858; NR; marine; R14 (125)
Codonella lagenula Claparede & Lachmann, 1858; NR; marine; R14 (125)
Tintinnopsis Stein, 1867; NR; marine; R18 (57)
Tintinnopsis compressa Daday, 1887; 39-59 μm; marine; R21 (76)
Tintinnopsis curvicauda Daday, 1887; NR; marine; R14 (125)
Tintinnopsis cyathus Daday, 1887; NR; marine; R14 (125)
Tintinnopsis cylindrica Daday, 1887; 144-300 x 34-45 μm; marine; R21 (76)
Tintinnopsis gracilis Kofoid & Campbell, 1929; 123-177 μm; marine; R21 (76)
Tintinnopsis mortensii Schmidt, 1902; 60-70 μm; marine; R21 (76)
Tintinnopsis radix (Imhof, 1886) Kofoid & Campbell, 1929; 353-502 x 46-61 μm; marine; R14, R21 (18, 19, 76)
Tintinnopsis rotundata Kofoid & Campbell, 1929; 52-57 x 26-28 μm; marine; R21 (76)
Tintinnopsis tocatinensis Kofoid & Campbell, 1929; 65-92 μm; marine; R21 (76)
Tintinnopsis urnula Meunier, 1910; NR; marine; R14 (18, 19)
Tintinnopsis vasculum Meunier, 1910; NR, marine; R14 (18, 19)
Tintinnopsis ventricosa Daday, 1887; NR; marine; R14 (125)
Family: Codonellopsidae Kofoid & Campbell, 1929
Codonellopsis Jorgensen, 1924
Codonellopsis brevicaudata Brandt, 1906; 178 x 60 μm; marine; R21 (76)
Codonellopsis indica Kofoid & Campbell, 1929; 73-94 x 44-54 μm; marine; R21 (76)
Codonellopsis ostenfeldtii (Schmidt, 1902) Kofoid & Campbell, 1929; 99-189 x 60-65 μm; marine; R14, R21 (18, 19, 76)
Codonellopsis parvicollis Marshall, 1934; 48-61x 39-51 μm; marine; R21 (76)
Stenosemella Jorgensen, 1924
Stenosemella lacustris Foissner & O'Donoghue, 1990; 40-50 μm; freshwater; R5 (1, 33)

Stenosemella nivalis (Meunier, 1910) Kofoid & Campbell, 1929; 31-34 μm; marine; R21 (76)

Family: Cyttarocylidae Kofoid & Campbell, 1929

Cyttarocylis Fol, 1881; NR; marine; R22 (61)

Cyttarocylis cassis Haeckel, 1873; NR; marine; R14 (125)

Cyttarocylis claparedei Daday, 1887; NR; marine; R14 (125)

Favella Jorgensen, 1924; NR; marine; RU, R14, R18 (18, 57, 81)

Favella azorica (Cleve, 1900) Jorgensen, 1924; 73-107 μm; marine; R21 (76)

Favella campanula (Schmidt, 1901) Jorgensen, 1924; NR; marine; R14 (18, 19)

Family: Dictyocystidae Haeckel, 1873

Dictyocysta Ehrenberg, 1854; NR; marine; RU, R22 (61, 81)

Dictyocysta elegans Ehrenberg, 1854; NR; marine; R22 (61)

Dictyocysta reticulata Kofoid & Campbell, 1929; 58-65 x 43-48 μm; marine; R21 (76)

Dictyocysta templum Haeckel, 1873; NR; marine; R14 (125)

Family: Metacylididae Kofoid & Campbell, 1929

Climocylis Jorgensen, 1924

Climocylis scalaria (Brandt, 1906) Jorgensen, 1924; 181-258 μm; marine; R21 (76)

Climocylis scalaroides Kofoid & Campbell, 1929; 90-224 μm; marine; R21 (76)

Coxliella Brandt, 1908

Coxliella ampla (Jorgensen, 1899) Brandt, 1908; NR; marine; R14 (18)

Coxliella laciniosa (Brandt, 1906) Kofoid & Campbell, 1929; 93-95 μm; marine; R21 (76)

Helicostomella Jorgensen, 1924; NR; marine; R18 (57)

Metacylis Jorgensen, 1924

Metacylis corbula Kofoid & Campbell, 1929; 39-43 x 42-44 μm; marine; R21 (76)

Family: Petalotrichidae Kofoid & Campbell, 1929

Craterella Kofoid & Campbell, 1929

Craterella aperta Marshall, 1934; 56-65 x 52-55 μm; marine; R21 (76)

Family: Ptychocylidae Kofoid & Campbell, 1929

Epiplocylis Jorgensen, 1924

Epiplocylis blanda (Jorgensen, 1924) Kofoid & Campbell, 1929; 120-155 x 65-90 μm; marine; R21 (76)

Epiplocylis constricta Kofoid & Campbell, 1929; 90-112 μm; marine; R21 (76)

Epiplocylis deflexa Kofoid & Campbell, 1929; 95-112 x 56-73 μm; marine; R21 (76)

Epiplocylis exigua Kofoid & Campbell, 1929; 88 μm; marine; R21 (76)

Epiplocylis healdi Kofoid & Campbell, 1929; 65-77 μm; marine; R21 (76)

Epiplocylis ralumensis (Brandt, 1906) Kofoid & Campbell, 1929; 69-73 μm; marine; R21 (76)

Epiplocylis undella (Ostenfeld & Schmidt, 1902) Kofoid & Campbell, 1929; 103-112 x 56-62 μm; marine; R21 (76)

Family: Rhabdonellidae Kofoid & Campbell, 1929

Protorhabdonella Jorgensen, 1924

Protorhabdonella curt (Cleve, 1901) Jorgensen, 1924; 39-52 μm; marine; R21 (76)

Protorhabdonella simplex (Cleve, 1900) Jorgensen, 1924; 58-69 μm; marine; R21 (76)

Rhabdonella Brandt, 1906; NR; marine; R18 (57)

Rhabdonella amor (Cleve, 1900) Brandt, 1906; 77-92 μm; marine; R21 (76)

Rhabdonella brandti Kofoid & Campbell, 1929; 158-198 μm; marine; R21 (76)

Rhabdonella hebe (Cleve, 1900) Brandt, 1907; NR; marine; R14 (18, 19)

Rhabdonella quantula Kofoid & Campbell, 1929; 104-172 μm; marine; R21 (76)

Rhabdonella spiralis (Brandt, 1906) Brandt, 1907; 266-411 x 67-73 μm; marine; R21 (76)

Rhabdonellopsis Kofoid & Campbell, 1929

Rhabdonellopsis intermedia Kofoid & Campbell, 1929; 240-370 x 60-75 μm; marine; R21 (76)

Family: Tintinnidae Claparede & Lachmann, 1858

Amphorella Daday, 1887

Amphorella brandti Jorgensen, 1924; 107-190 x 29-35 μm; marine; R21 (76)

Amphorella ganymedes Entz, 1884; NR; marine; R14 (125)

Amphorella laackmanni Jorgensen, 1924; 75-84 μm; marine; R21 (76)

Amphorella minor Jorgensen, 1924; NR; marine; R21 (76)

Amphorella quadrilineata (Claparede & Lachmann, 1858) Daday, 1887; 108-145 x 38-43 μm; marine; R21 (76)

Amphorellopsis Kofoid & Campbell, 1929

Amphorellopsis acuta (Schmidt, 1902) Kofoid & Campbell, 1929; 116-121 μm; marine; R21 (76)

Dadayiella Kofoid & Campbell, 1929; NR; marine; R19 (78)

Dadayiella ganymedes (Entz, 1884) Kofoid & Campbell, 1929; 75-95 μm; marine; R21 (76)

Daturella Kofoid & Campbell, 1929

Daturella lacunae Marshall, 1934; 72-91 μm; marine; R21 (76)

Eutintinnus Kofoid & Campbell, 1939; NR; marine; RU, R19 (78, 81)

Salpingella Jorgensen, 1924

Salpingella subconica Kofoid & Campbell, 1929; 97-131 μm; marine; R21 (76)

Steenstrupiella Kofoid & Campbell, 1929

Steenstrupiella intumescens Jorgensen, 1924; 172-238 μm; marine; R21 (76)

Steenstrupiella steenstrupii (Claparede & Lachmann, 1858) Kofoid & Campbell, 1929; 84-197 μm; marine; R21 (76)

Tintinnus Schrank, 1803; NR; freshwater, marine; R2, R14 (7, 124)

Tintinnus apertus Kofoid & Campbell, 1929; 85-103 μm; marine; R21 (76)

Tintinnus attenuatus Kofoid & Campbell, 1929; 228-410 μm; marine; R14, R21 (19, 76)

Tintinnus lusus-undae Entz Sr., 1885; 176-298 μm; marine; R21 (76)

Tintinnus pacificus Kofoid & Campbell, 1929; 108-120 μm; marine; R21 (76)

Tintinnus stramentus Kofoid & Campbell, 1929; 142-176 μm; marine; R21 (76)

Family: Tintinnidiidae Kofoid & Campbell, 1929

Leprotintinnus Jorgensen, 1900

Leprotintinnus nordqvisti (Brandt, 1906) Kofoid & Campbell, 1929; 125-254 μm; marine; R21 (76)

Tintinnidium Kent, 1881; NR; freshwater, marine; R2, R3, R18 (57, 72, 127)
Tintinnidium fluviatile (Sten, 1863) Kent, 1881; 120-200 x 25-30 μm; freshwater; RU (34)
Family: Undellidae Kofoid & Campbell, 1929
Parundella Jorgensen, 1924; NR; marine; R19 (78)
Proplectella Kofoid & Campbell, 1929
Proplectella acuta (Jorgensen, 1924) Kofoid & Campbell, 1929; 65 x 47 μm; marine; R21 (76)
Proplectella perpusilla Kofoid & Campbell, 1929; 47-49 x 37-38 μm; marine; R21 (76)
Proplectella tenuis Kofoid & Campbell, 1929; 69-76 x 49-56 μm; marine; R21 (76)
Undella Daday, 1887
Undella hemisphaerica Laackmann, 1910; 65-69 x 62-65 μm; marine; R21 (76)
Undella turgida Kofoid & Campbell, 1929; 37 x 35 μm; marine; R21 (76)
Family: Xystonellidae Kofoid & Campbell, 1929
Xystonella Brandt, 1906; NR; marine; R14 (18)
Xystonella lanceolata (Brandt, 1906) Brandt, 1907; 215-275 μm; marine; R21 (76)
Xystonella treforti (Daday, 1887) Laackmann, 1910; 405-469 x 75-86 μm; marine; R21 (76)
Order: Choreotrichida Small & Lynn, 1985 [not sessile; aloricate]
Suborder: Strobilidiina Small & Lynn, 1985 [somatic monokinetids with cortical flap]
Family: Strobilidiidae Kahl, in: Doflein & Reichenow, 1929
Strobilidium Schewiakoff, 1893; NR; marine, freshwater, soil; R3, R5, R21 (84, 110, 111, 127)
Unidentified strobilidiid species; NR; marine; R19 (78)
Subclass: Stichotrichia Small & Lynn, 1985 [somatic cirri; oral collar/lapel structure]
Order: Stichotrichida Faure-Fremiet, 1961 [ventral cirri in linear files]
Family: Amphisiellidae Jankowski, 1979
Amphisiella Gourret & Roeser, 1888; NR; salt lake, soil; R5 (84, 126)
Amphisiella australis Blatterer & Foissner, 1988 [= *Lamtostyla australis*]; 90-130 x 30-40 μm; soil; R1, R3, R5 (1, 13, 30)
Amphisiella magnigranulosa Foissner, 1988 [= *Uroleptoides magnigranulosus*]; 120-200 x 30-60 μm; soil, moss; R1, R3 (13, 30, 43, 47)
Amphisiella terricola Gellert, 1955; NR; soil; RU (43, 47)
Circinella Foissner, 1994
Circinella filiformis (Foissner, 1982) Foissner, 1994; NR; soil; RU (43, 47)
Gastrostyla Engelmann, 1862; NR; freshwater; R3 (127)
Gastrostyla mystacea (Stein, 1859) Sterki, 1878; 120-170 x 40-70 μm; freshwater; RU (11)
Gastrostyla steinii Engelmann, 1862; NR; soil; R5 (13, 43, 47)
Hemiamphisiella Foissner, 1988
Hemiamphisiella granulifera (Foissner, 1987) Foissner, 1988; NR; soil; RU (43, 47)
Hemiamphisiella terricola Foissner, 1988; 170-240 x 25-45 μm; moss; R5 (13, 20, 30, 43, 47)
Hemiamphisiella terricola terricola Berger, 2008; 170-240 x 25-45 μm; soil, moss; R5 (12)

Hemiamphisiella wilberti (Foissner, 1982) Foissner, 1988; NR; soil; RU (43, 47)
Paramphisiella Foissner, 1988
Paramphisiella caudata (Hemberger, 1985) Foissner, 1988; NR; soil; RU (43)
Paragastrostyla Hemberger, 1981; NR; salt lake, soil; R5 (84, 126)
Uroleptoides Wenzel, 1953
Uroleptoides magnigranulosus (Foissner, 1988) Berger, 2008 [syn. *Amphisiella magnigranulosa*]; 120-200 x 30-60 μm; soil, moss; R1, R3 (12)
Family: Kahliellidae Tuffrau, 1979
Cladotricha Gajewskaja, 1926; NR, 60-125 μm; soil, salt lake; R5, R6 (84, 85)
Cladotricha australis Blatterer & Foissner, 1988; 90-130 x 25-35 μm; soil; R5 (1, 13, 43)
Cladotricha edaphoni Wilbert, 1995; 90-125 x 32-49 μm; salt lake; R5 (126)
Cladotricha elongata Ruinen, 1938; 100-150 μm; salt lake; R5 (95)
Cladotricha halophila Wilbert, 1995; 102-172 x 25-39 μm; salt lake; R5 (126)
Cladotricha kahli Ruinen, 1938; 100-150 μm; salt lake; R5 (95)
Cladotricha koltzowii Gaiewskaia, 1925; 100-160 x 35-100 μm; salt lake; R5 (95)
Cladotricha sigmoidea Ruinen, 1938; 60-80 μm; salt lake; R5, R6 (85, 95)
Cladotricha variabilis Ruinen, 1938; 100-150 μm; salt lake; R5, R6 (85, 95)
Deviata Eigner, 1995
Deviata bacilliformis (Gelei, 1954) Eigner, 1995; NR; soil; RU (43, 47)
Engelmanniella Foissner, 1982
Engelmanniella mobilis (Engelmann, 1862) Foissner, 1982; NR; freshwater, soil; RU, R2 (25, 28, 43)
Family: Keronidae Dujardin, 1840
Keronopsis Penard, 1922; NR; freshwater; R3 (127)
Keronopsis tasmaniensis Blatterer & Foissner, 1988; 160-210 x 40-70 μm; soil; R3 (13, 43)
Family: Psilotrichidae Butschli, 1889
Psilotricha Stein, 1859; NR; freshwater; R3 (127)
Psilotricha succisa (Muller, 1786) Foissner, 1983; NR; soil; RU (43)
Family: Spirofilidae von Gelei, 1929
Chaetospira Lachmann, 1856; NR; freshwater; R3 (127)
Stichotricha Perty, 1849; NR; freshwater; R3 (127)
Stichotricha aculeata Wrzesniowski, 1866; NR; soil; RU (43)
Stichotricha secunda Perty, 1852; NR; freshwater; R2 (104, 124)
Strongylidium Sterki, 1878; NR; freshwater; R3 (127)
Order: Urostylida Jankowski, 1979 [frontoventral cirri in zig-zag files]
Family: Pseduokeronopsidae Borror & Wicklow, 1983
Tricoronella Blatterer & Foissner, 1988
Tricoronella pulchra Blatterer & Foissner, 1988; 163-208 x 82-101 μm; soil, bark; R1 (1, 13, 43)
Family: Pseudourostylidae Jankowski, 1979
Pseudourostyla Borror, 1972
Pseudourostyla franzi Foissner, 1987; NR; soil; RU (43, 47)
Family: Urostylidae Butschli, 1889
Australothrix Blatterer & Foissner, 1988

Australothrix alwinae Blatterer & Foissner, 1988; 200-350 x 50-110 μm; soil; R2 (13, 39, 43)
Australothrix australis Blatterer & Foissner, 1988; 250-400 x 60-110 μm; bark; R1 (1, 13, 39, 43)
Australothrix steineri Foissner, 1995; NR; soil; RU (43)
Bakuella Agamaliev & Alekperov, 1976; NR; freshwater; R3 (127)
Bakuella edaphoni Song *et al*., 1992; NR; NR; R5 (126)
Birojimia Berger & Foissner, 1989
Birojimia muscorum (Kahl, 1932) Berger & Foissner, 1989; NR; soil; R1, R2, R5 (13, 43, 47)
Holosticha Wrzesniowski, 1877; NR; marine; RU, R21 (3, 81)
Holosticha adami Foissner, 1982; NR; soil; RU (43)
Holosticha australis Blatterer & Foissner, 1988; 130-190 x 30-40 μm; soil; R2, R5 (1, 13, 43, 47)
Holosticha bergeri Foissner, 1987; 80-100 x 15-20 μm; soil; R1 (13, 43)
Holosticha grisea Kahl, 1935; NR; freshwater; R2 (25, 28)
Holosticha multistilata Kahl, 1928; NR; soil; RU (43)
Holosticha muscorum (Kahl, 1932) Foissner, 1982; NR; soil; R5 (13, 43)
Holosticha sigmoidea Foissner, 1982; NR; soil; RU (43)
Holosticha stueberi Foissner, 1987; NR; soil; RU (43, 47)
Holosticha sylvatica Foissner, 1982; NR; soil; RU (43)
Holosticha tetracirrata Buitkamp & Wilbert, 1974; 100-150 x 30-40 μm; soil; R1, R3, R10 (13, 43, 47)
Holosticha sylvatica Foissner, 1982; NR; soil, moss; R1, R2 (13)
Holostichides Foissner, 1987 [syn. *Parabakuella* Eigner, 1994]
Holostichides chardezi Foissner, 1987; NR; soil; RU (43)
Holostichides terricola Foissner, 1988; 80-140 x 15-30 μm; soil; R5 (13, 30, 43, 47)
Paruroleptus Kahl, 1932; NR; freshwater; R3 (127)
Paruroleptus notabilis Foissner, 1982; 136-198 x 23-46 μm; soil; R5 (13)
Uroleptus Ehrenberg, 1831 [syn. *Paruroleptus*]; NR; freshwater; R3 (127)
Uroleptus lepisma (Wenzel, 1953) Foissner, 1998; NR; soil; RU (43)
Uroleptus notabilis (Foissner, 1982) Foissner, 1998; NR; soil; RU (43, 47)

Order: Sporadotrichida Faure-Fremiet, 1961 [ventral cirri not in files]
Family: Parakahliellidae Eigner, 1997
Pattersoniella Foissner, 1987
Pattersoniella vitiphila Foissner, 1987; NR; soil; RU (43)
Family: Trachelostylidae Small & Lynn, 1985
Gonostomum Sterki, 1878
Gonostomum affine (Stein, 1859) Sterki, 1878; NR; soil, moss, bark; R1, R2, R3, R4, R5, R10 (11, 13, 42, 43, 46, 47, 84, 126)
Gonostomum kuehnelti Foissner, 1987; NR; soil; RU (43, 47)
Gonostomum strenuum (Engelmann, 1862) Sterki, 1878; 80-130 x 25-55 μm; soil; R4 (47)
Hemisincirra Foissner, 1984
Hemisincirra buitkampi (Jankowski, 1979) Berger, 2008 [syn. *Perisincirra buitkampi*]; 80-180 μm; soil; R2 (12)
Hemisincirra filiformis Foissner, 1982; NR; soil; R5 (13)
Hemisincirra gellerti (Foissner, 1982) Foissner, 1984; NR; soil, moss; R1, R5 (12, 13, 43)
Hemisincirra gellerti verrucosa Foissner & Schade, in Foissner, 2000; NR; soil; RU (47)

Hemisincirra gracilis (Foissner, 1982) Foissner, 1984; NR; soil; RU (43)
Hemisincirra inquieta Hemberger, 1985; 80-100 x 14-15 μm; soil, bark; R1, R2, R5 (12, 13, 42, 43, 47)
Hemisincirra interrupta (Foissner, 1982) Foissner, 1984; 80-130 x 8-15 μm; soil; R5 (12, 13, 43)
Hemisincirra similis (Foissner, 1982) Foissner, 1984; NR; soil; RU (43)
Hemisincirra wenzeli Foissner, 1987; 70-110 x 12-18 μm; soil; R1, R5 (12, 13, 42, 43)
Lamtostyla Buitkamp, 1977
Lamtostyla abdita Foissner, 1997; 85-120 x 20-30 μm; soil; RU, R1 (1, 42, 43)
Lamtostyla australis (Blatterer & Foissner, 1988) Petz & Foissner, 1996 [syn. *Amphisiella australis*]; 90-130 x 30-40 μm; soil; R2, R3, R5 (12, 43, 47)
Lamtostyla decorata Foissner *et al*., 2002; 100-170 x 20-35 μm; soil; R10 (12, 47)
Lamtostyla edaphoni Berger & Foissner, 1987; NR; soil; RU (43, 47)
Lamtostyla granulifera Foissner, 1997; 120-170 x 20-55 μm; soil, litter, bark; RU, R1, R8 (12, 42, 43)
Lamtostyla islandica Berger & Foissner, 1988; 60-80 x 20-25 μm; soil; R5 (12, 13, 43, 47)
Lamtostyla kirkeniensis Berger & Foissner, 1988 [= *Lamtostylides kirkeniensis*]; NR; soil; RU (43, 47)
Lamtostylides Berger, 2008
Lamtostylides kirkeniensis (Berger & Foissner, 1988) Berger, 2008 [syn. *Lamtostyla kirkeniensis*]; 100 x 27 μm; soil; RU (12)
Perisincirra Jankowski, 1978
Perisincirra kahli (Buitkamp, 1977) Hemberger, 1981; NR; freshwater; R2 (25, 28)
Perisincirra paucicirrata Foissner *et al.*, 2002; 100 x 20 μm; soil; R2 (1, 47)
Terricirra Berger & Foissner, 1989
Terricirra livida (Berger & Foissner, 1987) Berger Foissner, 1989; NR; soil; RU (43, 47)
Terricirra matsusakai Berger & Foissner, 1989; NR; soil; RU (43, 47)
Terricirra viridis (Foissner, 1982) Berger & Foissner, 1989; NR; soil; RU (43)
Urosoma Kowalewskiego, 1882
Urosoma acuminata (Stokes, 1887) Kahl, 1932; NR; soil; RU (43)
Urosoma karinae Foissner, 1987; NR; soil; R5 (13, 43, 47)
Urosoma macrostyla (Wrzesniowski, 1866) Kahl, 1932; NR; soil; RU (43)
Urosomoida Hemberger, in: Foissner, 1982; NR; salt lake, soil; R5 (84, 126)
Urosomoida agiliformis Foissner, 1982; 80-100 x 20-30 μm; soil; RU, R1, R3 (11, 42, 43, 47)
Urosomoida agilis (Engelmann, 1862) Hemberger, 1982; NR; salt lake, soil; R5 (43, 47, 84, 126)
Urosomoida perthensis Foissner & O'Donoghue, 1990; 38-70 x 15-30 μm; freshwater; R6 (11, 33)

Family: Oxytrichidae Ehrenberg, 1838
Australocirrus Blatterer & Foissner, 1988; NR; soil; RU (47)
Australocirrus octonucleatus Foissner, 1988 [syn. *Rigidocortex octonucleatus*]; 120-300 x 60-130 μm; soil; R5 (13, 30, 43)

Australocirrus oscitans Blatterer & Foissner, 1988; 180-260 x 80-120 μm; soil; R2 (1, 11, 13, 43)

Cyrtohymena Foissner, 1989

Cyrtohymena australis Foissner, 1995; NR; soil; RU (43)

Cyrtohymena candens (Kahl, 1932) Foissner, 1989; 150-250 x 60-80 μm; soil; R10 (11, 13, 42, 43, 47)

Cyrtohymena candens depressa (Gellert, 1942) Foissner, 1989; NR; soil; RU (43)

Cyrtohymena citrina (Berger & Foissner, 1987) Foissner, 1989; NR; soil; R2, R5 (13, 43, 47)

Cyrtohymena primicirrata (Berger & Foissner, 1987) Foissner, 1998; NR; soil; RU (43)

Cyrtohymena quadrinucleata (Dragesco & Njine, 1971) Foissner, 1989; NR; soil; RU (43, 47)

Cyrtohymena tetracirrata (Gellert, 1942) Foissner, 1989; NR; soil; R5 (13, 43)

Histriculus Corliss, 1960

Histriculus cavicola (Kahl, 1935) Berger & Foissner, 1987 [= *Sterkiella cavicola*]; 140-220 x 70-100 μm; soil; R2 (13)

Histriculus histrio (Muller, 1773) Corliss, 1960; 90-140 x 40-70 μm; freshwater; RU (11)

Histriculus muscorum (Kahl, 1932) Corliss, 1960 [syn. *Sterkiella histriomuscorum*]; NR; soil, bark; R1, R3, R5 (13)

Histrio Sterki, 1878

Histrio steinii Sterki, 1878; NR; freshwater; R2 (124)

Laurentiella Dragesco & Njine, 1971

Laurentiella strenua (Dingfelder, 1962) Berger & Foissner, 1989; 100-150 μm; soil; RU (11, 43)

Notohymena Blatterer & Foissner, 1988

Notohymena australis (Foissner & O'Donoghue, 1990) Berger, 1999 [syn. *Oxytricha australis*]; 80-140 x 30-45 μm; freshwater; R6 (11)

Notohymena rubescens Blatterer & Foissner, 1988; 90-100 x 30-35 μm; moss; R1 (1, 11, 13, 43)

Oxytricha Bory de St. Vincent, in Lamouroux *et al*., 1824; NR; freshwater; R3, R4 (69, 127)

Oxytricha africana Foissner, 1999; 80-115 x 30-40 μm; soil, litter; R1, R8 (44, 47)

Oxytricha auripunctata Blatterer & Foissner, 1988; 80-130 x 25-35 μm; soil, moss; R5 (1, 11, 13, 43)

Oxytricha australis Foissner & O'Donoghue, 1990 [= *Notohymena australis*]; 66-140 x 22-45 μm; freshwater; R6 (1, 33)

Oxytricha candens Kahl, 1932; NR; soil; R5 (84)

Oxytricha granulifera Foissner & Adam, 1983; 80-130 x 35-50 μm; soil, moss; R1, R5 (11, 13, 43, 47)

Oxytricha granulifera quadricirrata Blatterer & Foissner, 1988 [= *Oxytricha quadricirrata*]; 70-100 x 20-30 μm; soil; R5 (1, 11, 13, 43, 47, 54)

Oxytricha lanceolata Shibuya, 1930; 90-110 x 30-50 μm; soil; RU, R3 (11, 42, 43, 47)

Oxytricha longa Gelei & Szabados, 1950; 60-100 x 25-40 μm; salt lake, soil; R5 (11, 84, 126)

Oxytricha longigranulosa Berger & Foissner, 1989; 135 x 55 μm; freshwater, soil, moss; R1, R2 (11, 13, 25, 28, 42, 43, 47)

Oxytricha nauplia Berger & Foissner, 1987; NR; soil; RU (43)
Oxytricha platystoma Ehrenberg, 1831 [syn. *Steinia platystoma*]; NR; freshwater; R2 (124)
Oxytricha quadricirrata Blatterer & Foissner, 1988 [syn. *Oxytricha granulifera quadricirrata*]; 70-100 x 20-30 μm; soil; R5 (11)
Oxytricha salmastra Dragesco & Dragesco-Kerneis, 1986; 110-155 x 48-56 μm; freshwater; R2 (25, 28)
Oxytricha setigera Stokes, 1891; 40-60 x 16-21 μm; soil, bark; R1, R2, R3, R5 (11, 13, 42, 43)
Oxytricha siseris Vuxanovici, 1963; NR; soil; RU (43, 47)
Paragonostomum Foissner *et al*., 2002
Paragonostomum caudatum Foissner *et al.*, 2002; 70-110 x 15-25 μm; soil; R8 (1, 47)
Pattersoniella Foissner, 1987
Pattersoniella vitiphila Foissner, 1987; 140-330 x 70-150 μm; soil; RU, R1 (11, 42)
Rigidocortex Berger, 1999
Rigidocortex octonucleatus (Foissner, 1988) Berger, 1999 [= *Australocirrus octonucleatus*]; 120-300 x 60-130 μm; soil; R5 (11, 13, 30, 43)
Steinia Diesing, 1866; NR; freshwater; R3 (127)
Steinia platystoma (Ehrenberg, 1831) Diesing, 1866 [= *Oxytricha platystoma*]; NR; freshwater; R2 (25, 28)
Sterkiella Foissner *et al*., 1991 [= *Histriculus*]
Sterkiella cavicola (Kahl, 1935) Foissner *et al*., 1991 [= *Histriculus cavicola*]; 140-220 x 70-100 μm; soil; RU (11, 43, 47)
Sterkiella histriomuscorum (Foissner *et al*., 1991) Berger, 1992 [= *Histriculus muscorum*]; 100-150 x 40-60 μm; soil, moss; RU, R1, R3 (11, 34, 42, 43, 47)
Stylonychia Ehrenberg, 1830; NR; freshwater; R3 (127)
Stylonychia mytilus (Muller, 1773) Ehrenberg, 1830; 80-300 μm; freshwater; RU, R2 (5, 11, 34, 43, 98, 104, 124)
Stylonychia nodulinucleata Shi & Li, 1993; 270-310 x 95-110 μm; freshwater, soil; RU (11)
Stylonychia pustulata (Muller, 1786) Ehrenberg, 1835; NR; soil; RU (43)
Tachysoma Stokes, 1887; NR; freshwater; R3 (127)
Tachysoma granulifera Berger & Foissner, 1987; NR; soil; RU (43, 47)
Tachysoma humicola Gellert, 1957; 45-60 x 15-20 μm; soil; R1, R5 (11, 13, 43, 47)
Tachysoma pellionellum (Muller, 1773) Borror, 1972; 55-100 x 15-30 μm; freshwater; R2 (25, 28)

Subclass: Oligotrichia Butschli, 1887 [oral polykinetids in open circle; reduced somatic cilia]
Order: Halteriida Petz & Foissner, 1992 [long somatic cilia; often cirrus-like bristles]
Family: Halteriidae Claparede & Lachmann, 1858
Halteria Dujardin, 1841; NR; freshwater; R2, R3, R4 (69, 74, 127)
Halteria grandinella (Muller, 1773) Dujardin, 1841; 20-40 μm; freshwater, soil; RU, R1, R2, R3, R5 (13, 25, 28, 34, 43, 47, 74, 84, 98)
Meseres Schewiakoff, 1893
Meseres corlissi Petz & Foissner, 1992; NR; freshwater, soil, litter; R4 (56, 121, 122)
Order: Strombidiida Petz & Foissner, 1992 [short somatic cilia in girdle]
Family: Strombidiidae Faure-Fremiet, 1970

Strombidium Claparede & Lachmann, 1859; NR; freshwater, marine; RU, R2, R21 (3, 25, 28, 72, 81,, 110, 111)
Strombidium claparedi, Kent, 1882 [misspelled *Strombium*]; NR; freshwater; R2 (124)
Strombidium sulcatum Clararede & Lachmann, 1859; 30-40 x 20-36 μm; freshwater; R2 (98)
Tontonia Faure-Fremiet, 1961; NR; marine; R21 (111)
Unidentified strombidiid species; NR; marine; R19 (78)
Sedis mutabilis in Subphylum Intramacronucleata
Order: Armophorida Jankowski, 1964 [body twisted to left; oral region spiralled]
Family: Metopidae Kahl, 1927
Bothrostoma Stokes, 1887
Bothrostoma mirabilis (Kahl, 1927) Janokowski, 1964; NR; freshwater; R2 (25, 28)
Metopus Claparede & Lachmann, 1858
Metopus contortus Quennerstedt, 1867; NR; freshwater; R2 (25, 28)
Metopus hasei Sindheim, 1929; NR; soil; R1, R3, R5 (13, 43, 47)
Metopus minor Kahl, 1927; 30-40 μm; freshwater; R2 (25, 28)
Metopus striatus McMurrich, 1884; NR; freshwater; R2 (25, 28)
Palmarella Jankowski, 1975
Palmarella (Palmarium) salina (Gajewskaja, 1925) Jankowski, 1975; 30 μm; salt lake; R6 (85)
Order: Clevelandellida de Puytorac & Grain, 1976 [somatic kineties forming sutures]
Family: Nyctotheridae Amaro, 1972
Nyctotherus Leidy, 1849; NR; NR; R2 (68)
Order: Phacodiniida Small & Lynn, 1985 [ovoid compressed body; elongate oral membranelles]
Family: Phacodiniidae Corliss, 1979
Phacodinium Prowazek, 1900
Phacodinium metschnicoffi (Certes, 1891) Kahl, 1932; soil; R5 (13, 43)
Order: Odontostomatida Sawaya, 1940 [small compressed body, often spined; two somatic fields]
Family: Epalxellidae Corliss, 1960
Epalxella Corliss, 1960
Epalxella mirabilis (Roux, 1899) Corliss, 1960; NR; freshwater; R2 (25, 28)
Epalxella striata (Kahl, 1926) Corliss, 1960; NR; freshwater; R2 (25, 28)
Pelodinium Lauterborn, 1908
Pelodinium reniforme Lauterborn, 1908; NR; freshwater; R2 (25, 28)
Family: Mylestomatidae Kahl, in Doflein & Reichnenow, 1929
Mylestoma Kahl, 1928
Mylestoma pusillum Kahl, 1935; NR; freshwater; R2 (25, 28)

Class: Litostomatea Small & Lynn, 1981 [simple mouths, with rhabdos; somatic monokinetids with tangential transverse ribbon and laterally-directed kinetodesmal fibril]
Subclass: Haptoria Corliss, 1974 [free-living species, carnivores/protistivores]
Order: Cyclotrichida Jankowski, 1980 [somatic ciliary girdle]
Family: Mesodiniidae Jankowski, 1980
Askenasia Blochmann, 1895; NR; freshwater; R2, R3 (74, 127)
Mesodinium Stein, 1862; NR; aqautic, freshwater; RU, R2, R3 (60, 81, 127)
Mesodinium pulex Claparede & Lachmann, 1858; NR; freshwater; R2 (25, 28)
Mesodinium rubrum Lohmann, 1908 [= *Myrionectra rubrum*]; ~30 μm; freshwater, estuarine waters, marine; R2, R28 (2, 62, 63, 117)
Order: Haptorida Corliss, 1974 [circumoral kineties surrounding cytostome]
Family: Acropisthiidae Foissner & Foissner, 1988

Acropisthium Perty, 1852
Acropisthium mutabile Perty, 1852; NR; soil; RU (43)
Chaenea Quennerstedt, 1867; NR; freshwater; R2, R3 (25, 28, 127)
Clavoplites Foissner *et al*., 2002
Clavoplites australiensis Foissner *et al.*, 2002; 120 x 40 µm; soil; R10 (1, 47)
Clavoplites edaphicus Foissner *et al.*, 2002; 100 x 35 µm; soil; R10 (1, 47)
Clavoplites terrenum (Foissner, 1984) Foissner *et al.*, 2002 [syn. *Enchelydium terrenum*]; NR; soil; RU (47)
Coriplites Foissner, 1988
Coriplites australis Foissner, in Blatterer & Foissner, 1988; NR; soil; RU, R1 (13, 47, 54)
Coriplites grandis Oertel *et al*., 2008; 150-220 x 30-40 µm; soil; R1, R10 (80)
Coriplites terricola Foissner, 1988 [= *C. australis* cf. Blatterer & Foissner, 1988]; 50-80 x 10-15 µm; soil; R1, R5 (13, 30, 43, 47, 80)
Fuscheria Foissner, 1983
Fuscheria lacustris Song & Wilbert, 1989; NR; soil; RU (43, 47)
Fuscheria nodosa Foissner, 1983; 35-46 x 18-26 µm; freshwater; R6 (1, 33, 43, 47)
Fuscheria terricola Berger *et al*., 1983; NR; soil; R1, R2, R3, R5 (13, 47)
Fuscheria uluruensis Foissner & Gabilondo, in Gabilondo & Foissner, 2009; 80-120 x 60 µm; soil; R10 (55)
Sikorops Foissner, 1999
Sikorops namibiensis Foissner *et al.*, 2002; 115 x 33 µm; soil; R10 (47)
Family: Actinobolinidae Kahl, 1930
Belonophrya Andre, 1914
Belonophrya pelagica Andre, 1914; 50 x 30 µm; litter; R4 (45)
Family: Apertospathulidae Foissner *et al*., 2005
Apertospathula Foissner *et al*., 2002
Apertospathula inermis Foissner *et al.*, 2002; 40-75 x 8-15 µm; soil; R2 (47, 51)
Apertospathula cuneata Foissner & Xu, 2006; 40-70 x 10-20 µm; soil; R1 (1, 51)
Family: Arcuospathidiidae Foissner & Xu, 2006
Arcuospathidium Foissner, 1984
Arcuospathidium atypicum (Wenzel, 1953) Foissner, 1998; NR; soil; RU (43)
Arcuospathidium australe Foissner, 1988; 65-100 x 20-30 µm; soil; R5 (1, 13, 30)
Arcuospathidium cultriforme (Penard, 1922) Foissner, 1984; NR; soil; R5 (13, 43)
Arcuospathidium cultriforme cultriforme (Penard, 1922) Foissner, 1984; NR; soil, litter; R5 (51)
Arcuospathidium cultriforme lionotiforme (Kahl, 1930) Foissner, 1984; NR; soil; RU (47)
Arcuospathidium cultriforme scalpriforme (Kahl, 1930) Foissner, 2003; NR; NR; RU (51)
Arcuospathidium lionotiforme (Kahl, 1930) Foissner, 1984; NR; soil; RU (43)
Arcuospathidium multinucleatum Foissner, 1999; 100-200 x 15-40 µm; litter, soil; R1 (44, 47, 51)
Arcuospathidium muscorum (Dragesco & Dragesco-Kerneis, 1979) Foissner, 1984; 80-130 x 25-40 µm; moss, soil; RU (43, 47, 51)

Arcuospathidium muscorum rhopaloplites Foissner & Xu, 2006; 80-130 x 25-40 μm; soil; R10 (1, 51)

Cultellothrix Foissner, 2003

Cultellothrix atypica (Wenzel, 1953) Foissner & Xu, 2006; 65-120 x 15-30 μm; soil, litter; R5 (51)

Family: Didiniidae Poche, 1913

Monodinium Fabre-Domergue, 1888; NR; freshwater; R3 (127)

Family: Enchelyidae Ehrenberg, 1838

Enchelydium Kahl, 1930; NR; freshwater; R3 (127)

Enchelydium blattereri Foissner *et al*., 2002; 240 x 100 μm; soil; RU, R4 (1, 15, 47)

Enchelydium polynucleatum Foissner, 1984 [= *Enchelys polynucleata*]; NR; soil; R3 (13, 43)

Enchelydium terrenum Foissner, 1984 [=*Clavoplites terrenum*]; NR; soil; RU (43)

Enchelys Muller, 1773; NR; freshwater, soil; R1, R2, R3, R5 (25, 28, 58, 59, 90, 91, 92, 93, 94, 120, 127)

Enchelys multinucleata (Dragesco & Dragesco-Kerneis, 1979) Berger *et al*., 1984; NR; soil; R5 (13, 43, 47)

Enchelys polynucleata (Foissner, 1984) Foissner *et al*., 2002 [syn. *Enchelydium polynucleatum*]; NR; soil; R3 (13, 43)

Enchelys pupa Ehrenberg, 1893; NR; NR; NR (98)

Rhopalophrya Kahl, 1926

Rhopalophrya salina Kirby, 1932; 37-42 μm; salt lake; R6 (85)

Family: Lacrymariidae de Fromentel, 1876

Lacrymaria Bory de St. Vincent, 1824; NR; freshwater; R2, R3 (74, 127)

Lacrymaria australis Foissner & O'Donoghue, 1990; 40-60 x 7-13 μm; freshwater; R6 (1, 33)

Lacrymaria coronata Claparede & Lachmann, 1858; 80-220 x 20-70 μm; freshwater; R2 (98)

Lacrymaria olor (Muller, 1776) Bory de St.-Vincent, 1824; NR; freshwater; R2 (25, 28)

Phialina Bory de St. Vincent, 1824

Phialina binucleata Berger *et al*., 1984; NR; soil; RU (43, 47)

Phialinides Foissner, 1988

Phialinides australis Foissner, 1988; 80-140 x 10-20 μm; soil, moss; R1, R2, R5 (13, 30, 43, 47, 54)

Family: Pleuroplitidae Foissner, 1996

Pleuroplites Foissner, 1988

Pleuroplites australis Foissner, 1988; 35-60 x 15-25 μm; freshwater, soil; R1, R2, R5 (13, 25, 28, 30, 43, 47)

Pleuroplites smithi Foissner, 1996; NR; soil; RU (43, 47)

Family: Protospathidiidae Foissner & Xu, 2006

Protospathidium Dragesco & Dragesco-Kerneis, 1979; NR; freshwater; R3 (127)

Protospathidium arenicola Foissner & Xu, 2006; 180-300 x 20-40 μm; soil; R10 (1, 51)

Protospathidium bonneti (Buitkamp, 1977) Foissner, 1981; NR; freshwater, soil, bark; R1, R2, R5 (13, 25, 28, 42, 43)

Protospathidium serpens (Kahl, 1930) Foissner, 1981; NR; soil; RU (43, 47)

Family: Pseudoholophryidae Berger *et al*., 1984

Paraenchelys Foissner, 1983

Paraenchelys terricola Foissner, 1984; NR; soil; R1, R2, R5 (13, 43, 47)

Paraenchelys wenzeli Foissner, 1984; NR; soil; RU (43, 47)
Pseudoholophrya Berger *et al*., 1983
Pseudoholophrya terricola Berger *et al*., 1984; NR; soil; R5 (13, 43)
Family: Spathidiidae Kahl, in Doflein & Reichenow, 1929
Apospathidium Foissner *et al*., 2002
Apospathidium atypicum (Buitkamp & Wilbert, 1974) Foissner *et al.*, 2002; 125 x 20 μm; soil; RU (47)
Bryophyllum Kahl, 1931
Bryophyllum loxophylliforme Kahl, 1931; NR; soil; R1, R2, R5 (13, 43, 47)
Bryophyllum tegularum Kahl, 1931; NR; soil; RU (43)
Epispathidium Foissner, 1984
Epispathidium amphoriforme (Greeff, 1888) Foissner, 1984; NR; soil; R1, R2 (13, 43, 47)
Epispathidium ascendens (Wenzel, 1955) Foissner, 1987; NR; soil; R1, R3, R5 (13, 42, 43, 47)
Epispathidium papilliferum (Kahl, 1930) Foissner, 1984; NR; soil; R1, R2 (13, 43)
Epispathidium polynucleatum Foissner *et al.*, 2002; 130-230 x 25-40 μm; soil; R1 (47)
Epispathidium terricola Foissner, 1982; NR; soil, moss, bark; R1, R2, R3, R5 (13, 42, 43, 47)
Perispira Stein, 1859
Perispira ovum Stein, 1859; NR; freshwater; R2 (25, 28)
Spathidium Dujardin, 1841; NR; marine, freshwater; RU, R3 (81, 127)
Spathidium aciculare Foissner *et al*., 2002; 150 x 30 μm; soil; R8 (1, 47)
Spathidium anguilla Vuxanovici, 1962; NR; soil; RU (43, 47)
Spathidium bavariense Kahl, 1930; NR; soil; RU (43, 47)
Spathidium claviforme Kahl, 1930; NR; freshwater, soil; R1, R2, R3, R5 (13, 25, 28, 43, 47)
Spathidium faurefremieti Foissner, 2003; 160-330 x 13-47 μm; soil; R4 (49)
Spathidium longicaudatum (Buitkamp & Wilbert, 1974) Buitkamp, 1977; NR; soil; R3, R5 (13, 43)
Spathidium metabolicum Pomp & Wilbert, 1988; 220-240 x 20 μm; soil; R5 (84)
Spathidium muscicola Kahl, 1930; 120-140 x 27 μm; soil; R5 (43, 84, 126)
Spathidium procerum Kahl, 1930; NR; soil; R1, R5 (13, 42, 43, 47)
Spathidium spathula (Muller, 1773) Moody, 1912; NR; soil, bark; R1, R3, R5 (13, 42, 43, 47)
Family: Tracheliidae Ehrenberg, 1838
Dileptus Dujardin, 1840; NR; freshwater; R2, R3 (58, 127)
Dileptus alpinus Kahl, 1932; NR; soil, moss; R1, R5 (13, 42, 43)
Dileptus americanus Kahl, 1931; NR; soil; RU (43, 47)
Dileptus anguillula Kahl, 1931; NR; bark; R1 (13, 42, 43)
Dileptus anser Muller, 1773; NR; NR; RU (98)
Dileptus conspicuus Kahl, 1931; NR; soil; R2 (13, 43)
Dileptus gracilis Kahl, 1931; NR; soil; R3 (13, 43)
Dileptus mucronatus Penard, 1922; 150-210 x 20-25 μm; soil; R1, R5 (13, 43, 47)
Dileptus visscheri Dragesco, 1963; NR; soil; RU (43)
Dimacrocaryon Jankowski, 1967
Dimacrocaryon amphileptoides (Kahl, 1931) Jankowski, 1967; NR; soil; R1, R5 (13, 43)

Paradileptus Wenrich, 1929; NR; freshwater; R2, R3 (72, 127)
Paradileptus elephantinus (Svec, 1897) Kahl, 1931; 100-450 x 100-240 μm; freshwater; R4 (45)
Teuthophrys Chatton & Beauchamp, 1923
Teuthophrys trisulca (Chatton & de Beauchamp, 1923) Dragesco & Dragesco-Kerneis, 1986; 150-300 x 50-150 μm; litter; R4 (45)
Trachelius Schrank, 1803; NR; freshwater; R3 (127)
Trachelius ovum (Ehrenberg, 1831) Ehrenberg, 1838; 140 x 97 μm; freshwater; R2 (98, 104, 124)
Family: Trachelophyllidae Kent, 1882
Bilamellophrya Foissner *et al*., 2002
Bilamellophrya australiensis Foissner *et al*., 2002; 200 x 30 μm; soil; R4 (1, 47)
Enchelyodon Claparede & Lachmann, 1859
Enchelyodon armatides Foissner *et al*., 2002; 160 x 30 μm; soil; R8 (47, 50)
Enchelyodon lagenula (Kahl, 1930) Blatterer & Foissner, 1988; 70-100 x 15-30 μm; moss; R1 (1, 13, 43)
Enchelyodon longinucleatus Foissner, 1984; NR; soil; R3 (13, 43, 47)
Lagynophrya Kahl, 1927
Lagynophrya geleii Foissner, 1981; NR; soil; RU (43)
Spetazoon Foissner, 1994
Spetazoon australiense Foissner, 1994; 185-300 x 38-80 μm; soil; R8 (1, 37, 43)
Trachelophyllum Claparede & Lachmann, 1859; NR; freshwater; R3 (127)
Trachelophyllum apiculatum (Perty, 1852) Claparede & Lachmann, 1859; NR; soil; R2, R3, R5 (13, 43, 47)
Order: Pleurostomatida Schewiakoff, 1896 [pleurostomes; slit-like cytostome]
Family: Amphileptidae Butschli, 1889
Amphileptus Ehrenberg, 1830; NR; freshwater; R2 (24, 102)
Amphileptus anser Ehrenberg, 1838; NR; freshwater; R2 (124)
Amphileptus cygnus Claparede & Lachmann, 1859; NR; freshwater; R2 (124)
Family: Litonotidae Kent, 1882
Acineria Dujardin, 1841
Acineria uncinata Tucolesco, 1962; 28-60 x 7-15 μm; freshwater; RU, R6 (33, 40)
Litonotus Wresniowski, 1870; NR; freshwater, marine; RU, R2, R3 (25, 28, 81, 127)
Litonotus diaphanus [binomen unknown]; NR; freshwater; R2 (104)
Litonotus fasciola (Ehrenberg, 1833) Wrzesnioski, 1870; NR; freshwater; R2 (25, 28, 124)
Litonotus lamella (Muller, 1773) Schewiakoff, 1886; 48-100 x 9-25 μm; freshwater; R2, R6 (1, 25, 28, 33; 40)
Litonotus muscorum (Kahl, 1931) Blatterer & Foissner, 1988; 70-120 x 15-25 μm; soil; R5 (1, 13, 43, 47)
Litonotus vesiculosus Stokes, 1885; NR; freshwater; R2 (25, 28)
Loxophyllum Dujardin, 1841; NR; freshwater; R3 (127)
Loxophyllum australe Foissner & O'Donoghue, 1990; 90-126 x 28-43 μm; freshwater; R6 (1, 33)
Loxophyllum helus (Stokes, 1884) Kahl, 1931; NR; freshwater; R2 (25, 28)
Loxophyllum meleagris (Muller, 1773) Dujardin, 1841; NR; freshwater; R2 (104, 124)

Class: Phyllopharyngea de Puytorac *et al*., 1974 [cytopharynx with 'leaf-like' phyllae]
Subclass: Phyllopharyngia de Puytorac *et al*., 1974 [free-living/symbiotic; cyrtos; ventral cilia]
Order: Chlamydodontida Deroux, 1976 [dorsoventreally flattened body; thigmotactic ventral cilia]
Family: Chlamydodontidae Stein, 1859
Chlamydodon Ehrenberg, 1835; NR; marine; RU (81)
Chlamydodon mnemosyne Ehrenberg, 1837; 75-96 x 50-55 μm; freshwater; R2 (25, 28)
Odontochlamys Certes, 1891
Odontochlamys alpestris Foissner, 1981; NR; soil; RU (43, 47)
Odontochlamys convexa (Kahl, 1931) Blatterer & Foissner, 1992; 30-40 x 20-30 μm; soil; R10 (14, 43, 47)
Odontochlamys gouraudi Certes, 1891; NR; soil; R5 (13, 43)
Family: Chilodonellidae Deroux, 1970
Chilodonella Strand, 1928 [syn. *Chilodon* Ehrenberg, 1834]; NR; marine, freshwater; RU, R3 (81, 127)
Chilodonella cucullulus (Muller, 1786) Kahl, 1931 [syn. *Chilodon cucullus, Trithigmostoma cuculluls*]; NR; freshwater; R2 (104)
Chilodonella uncinata (Ehrenberg, 1838) Strand, 1928; NR; soil; R1 (13, 43, 47)
Pseudochilodonopsis Foissner, 1979; NR; freshwater; R3 (127)
Pseudochilodonopsis mutabilis Foissner, 1981; NR; soil; R2, R3, R5 (13, 43, 47)
Trithigmostoma Jankowski, 1967
Trithigmostoma cucullulus (Muller, 1786) Jankowski, 1967 [= *Chilodonella cucullulus*]; NR; freshwater; R2 (25, 28)
Family: Gastronautidae Deroux, 1994
Gastronauta Butschli, 1889
Gastronauta membranaceus Engelmann, 1875; NR; soil; R3 (13)
Family: Lynchellidae Jankowski, 1968
Chlamydonella Deroux, 1970; NR; freshwater; R3 (127)
Order: Dysteriida Deroux, 1976 [laterally flattened body; ventral cilia not thigmotactic; attach to substrate by unciliated adhesive region or podite]
Family: Hartmannulidae Poche, 1913
Trochilioides Kahl, 1931; NR; marine; RU (81)
Family: Dysteriidae Claparede & Lachmann, 1858
Dysteria Huxley, 1857; NR; marine; RU (81)
Subclass: Suctoria Claparede & Lachmann, 1858 [adults unciliated, with tentacles, carnivorous]
Order: Exogenida Collin, 1912 [cytokinesis exogenous (budding at surface)]
Family: Ophryodendridae Stein, 1867
Ophryodendron Claparede & Lachmann, 1859; NR; marine; R14 (124)
Family: Paracinetidae Jankowski, 1978
Paracineta Collin, 1911; NR; freshwater; R3 (127)
Paracineta lauterborni Sondheim, 1929; 27-41 x 30-38 μm; soil; R2 (39, 43, 47)
Order: Endogenida Collin, 1912 [cytokinesis endogenous (internal budding)]
Family: Acinetidae Stein, 1859
Acineta Ehrenberg, 1833; NR; freshwater, marine; RU, R2, R3 (58, 81, 111, 116, 127)
Acineta lemnarum Stein, 1859; NR; freshwater; R2 (113)
Acineta tuberosa (Pallas, 1766) Ehrenberg, 1833; NR; freshwater; R2 (25, 28)
Acinetopsis Robin, 1879; NR; freshwater; R3 (127)
Loricophrya Matthes, 1956

Loricophrya edmondsoni (King, 1931) Matthes, 1956; NR; soil, moss; R1, R2, R5 (13)
Podocyathus Kent, 1882; NR; marine; R14 (124)
Solenophrya Claparede & Lachmann, 1859; NR; freshwater; R3 (127)
Trematosoma Batisse, 1973
Trematosoma bocqueti (Guilcher, 1950) Batisse, 1973; 20 μm; salt lake; R6 (85)
Family: Metacinetidae Butschli, 1889
Metacineta Butschli, 1889; NR; freshwater; R3 (127)
Family: Podophryidae Haeckel, 1866
Brachyosoma Batisse, 1975
Brachyosoma brachypoda mucosa Foissner, 1999; 30-60 μm; soil, litter; R3 (44)
Podophrya Ehrenberg, 1838; NR, 20-50 μm; freshwater, salt lake; R2, R3, R6 (58, 85, 127)
Podophrya cyclopum Claparede & Lachmann, 1859; NR; freshwater; R2 (124)
Podophrya elongata Claparede & Lachmann, 1859; NR; freshwater; R2 (124)
Podophrya fixa Muller, 1786; NR; freshwater; R2 (25, 28, 124)
Podophrya halophila Kahl, 1934; 25-40 μm; soil; R5 (13, 43, 47)
Podophrya mollis Kent, 1881; NR; freshwater; R2 (124)
Podophrya tristriata Foissner *et al.*, 2002; ~30 μm; soil; R1 (1, 47, 50)
Sphaerophrya Claparede & Lachmann, 1859; NR; freshwater; R2, R3 (74, 127)
Family: Tokophryidae Jankowski, in Small & Lynn, 1985
Tokophrya Butschli, 1889; NR; freshwater; R3 (127)
Order: Evaginogenida Jankowski in Corliss, 1979 [cytokinesis begun in pouch, completed exogenously]
Family: Discophyridae Collin, 1912
Dendrocometes Stein, 1852; NR; marine; RU (81)
Discophrya Lachmann, 1859; NR; freshwater; R3 (127)

Class: Nassophorea Small & Lynn, 1981 [oral nematodesmata, often forming nasse or cyrtos]
Order: Nassulida Jankowski, 1967 [dense somatic ciliation; large cyrtos]
Family: Colpodidiidae Foissner, 1995
Colpodidium Wilbert, 1982
Colpodidium caudatum Wilbert, 1982; 55-70 x 25-35 μm; soil; R5 (13, 39, 43, 47)
Colpodidium microstoma Foissner *et al.*, 2002; 55-80 x 23-35 μm; soil; R2 (47)
Pedohymena Foissner, 1995
Pedohymena australiense Foissner, 1995 [= *P. australiensis*]; 45-65 x 20-25 μm; soil; R8 (1, 39, 43, 47)
Family: Furgasonidae Corliss, 1979
Furgasonia Jankowski, 1964; NR; freshwater; R3 (127)
Parafurgasonia Foissner & Adam, 1981
Parafurgasonia protectissima (Penard, 1922) Foissner, 1999; 50-70 x 20-30 μm; soil, litter; R1 (44, 47)
Parafurgasonia sorex (Penard, 1922) Foissner & Adam, 1981; NR; soil; R1 (13, 43, 47)
Family: Nassulidae de Fromentel, 1874

Nassula Ehrenberg, 1833; NR, 60-100 μm; freshwater, salt lake; R1, R2, R6 (59, 85; 114, 120)
Nassula aurea Ehrenberg, 1833; 180 x 100 μm; freshwater; R1 (59, 98)
Nassula ornata Ehrenberg, 1833; NR; freshwater; R2 (124)
Naxella Fryd-Versavel *et al*., 1980
Naxella australis Foissner & O'Donoghue, 1990; 52-65 x 34-46 μm; freshwater; R5 (1, 33)
Naxella faurei Foissner & O'Donoghue, 1990; 60-75 μm; freshwater; RU (33)
Family: Orthodonellidae Jankowski, 1968
Orthodonella Bhatia, 1936 [syn. *Orthodon* Gruber, 1884]
Orthodonella hamatus (Gruber, 1884) Bhatia, 1936 [syn. *Orthodon hamatus*]; 60 x 28 μm; freshwater; R2 (98)
Order: Microthoracida Jankowski, 1967 [sparse somatic ciliation; small cyrtos]
Family: Microthoracidae Wrzesniowski, 1870
Drepanomonas Fresenius, 1858
Drepanomonas cf. *exigua* Penard, 1922; NR; soil; R5 (13)
Drepanomonas exigua bidentata Foissner, 1999; 15-17 x 7-10 μm; soil, litter; R5 (44, 47)
Drepanomonas muscicola Foissner, 1987; NR; soil; RU, R1 (42, 43, 47)
Drepanomonas pauciciliata Foissner, 1987; NR; soil, moss, bark; R1, R2, R5 (13, 42, 43, 47)
Drepanomonas revoluta Penard, 1922; NR; freshwater, soil; RU, R1, R2 (25, 28, 42, 43, 47)
Drepanomonas sphagni Kahl, 1931; NR; soil; RU (43, 47)
Leptopharynx Mermod, 1914; NR; marine; RU; 81
Leptopharynx costatus Mermod, 1914; NR; freshwater, soil, moss, bark; R1, R2, R3, R5, R10 (13, 25, 28, 42, 43, 47)
Leptopharynx eurystoma (Kahl, 1931) Foissner, 1998; NR; soil; RU (43)
Microthorax Engelmann, 1862
Microthorax australis Foissner & O'Donoghue, 1990; 17-25 x 9-15 μm; freshwater; R6 (1, 33)
Microthorax pusillus Engelmann, 1861; NR; freshwater; R2 (25, 28)
Microthorax simulans (Kahl, 1926) Kahl, 1931; NR; soil; R5 (13, 43)
Stammeridium Wenzel, 1969
Stammeridium kahli (Wenzel, 1953) Wenzel, 1969; NR; soil; RU (43, 47)
Trochiliopsis Penard, 1922
Trochiliopsis australis Foissner *et al*., 1988; 35-45 x 18-30 μm; freshwater; R5 (1, 31)

Class: Colpodea Small & Lynn, 1981 [curved profile; transversodesma, freshwater/edaphic]
Order: Colpodida de Puytorac *et al*., 1974 [stomatogenesis merotelokinetal; right oral polykinetid composed of few rows]
Family: Colpodidae Bory de St. Vincent, 1826
Avestina Jankowski, 1980
Avestina ludwigi Aescht & Foissner, 1990; NR; soil; RU (43)
Bresslaua Kahl, 1931
Bresslaua vorax Kahl, 1931; NR; soil; RU (43, 47)
Colpoda Muller, 1773 [syn. *Kolpoda*]; NR; freshwater; R2 (58, 74)
Colpoda aspera Kahl, 1926; NR; soil, moss; R1, R3, R5 (13, 42, 43, 47)
Colpoda augustini Foissner, 1987; 30-60 x 20-40 μm; soil; RU, R3, R5 (13, 36, 43)

Colpoda cucullus (Muller, 1773) Gmelin, 1790; 40-120 μm; soil, moss, bark; RU, R1, R3, R5, R10 (13, 36, 42, 43, 47, 98)
Colpoda ecaudata (Liebmann, 1936) Foissner *et al*., 1991; 12-54 x 7-33 μm; freshwater, soil; RU (34, 36, 42, 43, 47)
Colpoda edaphoni Foissner, 1980; 25-40 x 12-16 μm; soil, moss; RU, R1, R5 (13, 36, 42, 43, 47)
Colpoda elliotti Bradbury & Outka, 1967; NR; soil; RU (43, 47)
Colpoda flavicans (Stokes, 1885) Foissner, 1993; 50-70 x 45-65 μm; moss; R1 (36, 43)
Colpoda henneguyi Fabre-Domergue, 1889; NR; soil, moss; R1, R2, R3, R5 (13, 42, 43, 47)
Colpoda inflata (Stokes, 1884) Kahl, 1931; 35-90 μm; soil, moss, bark; RU, R1, R2, R3, R5, R10 (13, 36, 42, 43, 47)
Colpoda lucida Greeff, 1888; 70-110 x 65-90 μm; soil; RU, R1, R2, R5 (13, 36, 42, 43, 47)
Colpoda magna (Gruber, 1879) Lynn, 1978; NR; soil; RU (43, 47)
Colpoda maupasi Enriquez, 1908 [syn. *C. fastigata*]; NR; soil, moss, bark; R1, R2, R3, R5, R10 (13, 42, 43, 47)
Colpoda minima (Alekperov, 1985) Foissner, 1993; NR; soil; RU (43, 47)
Colpoda steinii Maupas, 1883; 20-40 x 15-30 μm; freshwater, soil, moss, bark; RU, R1, R2, R3, R5, R10 (13, 25, 28, 36, 42, 43, 47)
Colpoda tripartita Kahl, 1931; 90-160 x 50-80 μm; soil, moss; RU, R3, R5 (1, 13, 36, 43)
Kuehneltiella Foissner, 1990
Kuehneltiella terricola Foissner, 1990; 115-170 x 80-120 μm; soil; R10 (32, 36, 43, 47, 52, 53)
Krassniggia Foissner, 1987
Krassniggia auxiliaris Foissner, 1987; 160-250 x 110-200 μm; soil; R8 (36, 43, 44, 53)
Pseudomaryna Foissner, 2003
Pseudomaryna australiensis Foissner, 2003; 35-60 x 20-35 μm; soil; R4 (48)
Tillina Gruber, 1879 [= *Colpoda*]
Tillina flavicans Stokes, 1885; NR; soil; R5 (13)
Tillina magna Gruber, 1879; NR; soil; R5 (13)
Family: Exocolpodidae Foissner et al., 2002
Exocolpoda Foissner et al., 2002
Exocolpoda augustini (Foissner, 1987) Foissner *et al*., 2002; NR; soil; RU (47)
Family: Hausmanniellidae Foissner, 1987
Anictostoma Foissner, 1993
Anictostoma grelli Foissner, 1993; 40-70 x 15-30 μm; moss; R3 (36)
Bresslauides Blatterer & Foissner, 1988
Bresslauides australis Blatterer & Foissner, 1988; 100-120 x 70-150 μm; soil, moss; R1 (1, 13, 36, 43, 53, 82)
Bresslauides terricola (Foissner, 1987) Foissner, 1993; 150-200 x 120-170 μm; litter; R10 (36, 43)
Corallocolpoda Alekperov, 1991
Corallocolpoda grelli (Foissner, 1993) Foissner, 1993; NR; soil; RU (43)
Corallocolpoda pacifica Alekperov, 1991; NR; soil; RU (43)
Hausmanniella Foissner, 1984
Hausmanniella discoidea (Gellert, 1956) Foissner, 1984; NR; soil; R5 (13, 43, 47)

Hausmanniella patella (Kahl, 1931) Foissner, 1984; NR; soil; RU, R1, R3 (42, 43, 47)

Family: Marynidae Poche, 1913

Ilsiella Foissner, 1987

Ilsiella elegans Foissner *et al.*, 2002; 25-40 x 18-25 μm; soil; R4 (47)

Ilsiella palustris Foissner, 1993; NR; soil; RU (43, 47)

Maryna Gruber, 1879

Maryna umbrellata (Gelei, 1950) Foissner, 1993; 70-120 μm; soil; R2 (47)

Mycterothrix Lauterborn, 1898; NR; freshwater; R3 (127)

Mycterothrix tuamotuensis (Balbiani, 1887) Lauterborn, 1898; 25-50 x 25-30 μm; soil; R5 (36, 43, 84)

Order: Grossglockneriida Foissner, 1980 [small protruding cytopharynx (feeding tube)]

Family: Grossglockneriidae Foissner, 1980

Grossglockneria Foissner, 1980

Grossglockneria acuta Foissner, 1980; NR; soil; R1, R3, R5 (13, 43, 47)

Grossglockneria hyalina Foissner, 1985; NR; soil; RU (43, 47)

Mykophagophrys Foissner, 1995 [=*Pseudoplatyophrya* Foissner, 1980]

Mykophagophrys terricola (Foissner, 1985) Foissner, 1995; NR; soil; RU (42, 43, 47)

Nivaliella Foissner, 1980

Nivaliella plana Foissner, 1980; 10-25 x 6-20 μm; soil, moss, bark; RU, R1, R3, R5, R10 (13, 36, 42, 43, 47)

Pseudoplatyophrya Foissner, 1980

Pseudoplayophrya nana (Kahl, 1926) Foissner, 1980; NR; soil, moss, bark; R1, R2, R3, R5, R10 (13, 42, 43, 47)

Pseudoplatyophrya saltans Foissner, 1988; 14-20 x 10-15 μm; soil, bark; RU, R1, R2, R5 (13, 30, 36, 42, 43, 47, 54)

Pseudoplatyophrya terricola Foissner, 1985; NR; soil, moss, bark; R1, R2, R3, R5 (13)

Order: Cyrtolophosidida Foissner, 1978 [stomatogenesis pleurotelokinetal; micronucleus enclosed within perinuclear space of macronucleus]

Family: Cyrtolophosididae Stokes, 1888

Cyrtolophosis Stokes, 1885

Cyrtolophosis acuta Kahl, 1926; NR; soil; RU, R1 (42, 43)

Cyrtolophosis elongata (Schewiakoff, 1892) Kahl, 1931; 15-35 x 5-15 μm; freshwater, soil, bark; RU, R1, R2, R3, R5, R10 (13, 25, 28, 36, 42, 43)

Cyrtolophosis minor Vuxanovici, 1963; NR; soil; RU (43)

Cyrtolophosis mucicola Stokes, 1885; 18-39 x 9-15 μm; freshwater, soil, moss, bark; RU, R1, R2, R3, R5 (13, 25, 28, 36, 42, 43, 47)

Plesiocaryon Foissner *et al.*, 2002

Plesiocaryon elongatum (Schewiakoff, 1892) Foissner *et al*., 2002; NR; soil; RU (47)

Plesiocaryon terricola Foissner *et al*., 2002; 60-120 x 8-12 μm; soil; RU (47)

Pseudocyrtolophosis Foissner, 1980

Pseudocyrtolophosis alpestris Foissner, 1980; NR; soil, moss, bark; R1, R3, R5, R10 (13, 42, 43, 47)

Pseudocyrtolophosis terricola Foissner, 1993; NR; soil; RU (43)

Family: Platyophryidae Puytorac *et al*., 1979

Cirrophrya Gellert, 1950

Cirrophrya australis Foissner, 1993; NR; soil; RU (43)

Ottowphrya Foissner *et al*., 2002

Ottowphrya dragescoi (Foissner, 1987) Foissner *et al.*, 2002 [syn. *Platyophryides dragescoi*]; 70-100 x 40-60 μm; bark; R1 (47)

Platyophrya Kahl, 1926

Platyophrya macrostoma Foissner, 1980; soil, moss; R3, R5 (13, 43, 47)

Platyophrya similis (Foissner, 1980) Foissner, 1987; soil; RU (43)

Platyophrya spumacola Kahl, 1927; 50-80 μm; soil, moss; RU, R1, R2, R3, R5, R10 (13, 36, 43, 47)

Platyophrya vorax Kahl, 1926; soil, bark, R1, R3, R5, R10 (13, 42, 43, 47)

Platyophryides Foissner, 1987

Platyophryides dragescoi Foissner, 1987 [= *Ottowphrya dragescoi*]; NR; soil; RU (43)

Platyophryides latus (Kahl, 1930) Foissner, 1987 [syn. *P. lata*]; 65-120 μm; bark; R1 (13, 36, 43)

Family: Sagittariidae Grandori & Grandori, 1935

Sagittaria Grandori & Grandori, 1934

Sagittaria australis Pomp & Wilbert, 1988; 30-40 x 20-25 μm; salt lake, soil; R5 (36, 43, 84, 126)

Sagittaria hyalina Foissner *et al*., 1981; 30-40 x 12-16 μm; soil; RU, R5 (36, 43, 47, 84)

Family: Woodruffiidae Gelei, 1954

Rostrophrya Njine, 1979

Rostrophrya terricola Foissner, 1993; NR; soil; RU (43)

Rostrophryides Foissner, 1987

Rostrophryides australis Blatterer & Foissner, 1988; 55-110 x 15-40 μm; soil; R5 (1, 13, 43, 47, 54)

Woodruffia Kahl, 1931

Woodruffia australis Foissner, 1993; 70-100 x 20-30 μm; soil; R10 (36, 43, 47)

Woodruffia rostrata Kahl, 1931; NR; freshwater, soil; RU, R2 (25, 28, 43, 47)

Woodruffides Foissner, 1987

Woodruffides metabolicus (Johnson & Larson, 1938) Foissner, 1987 [syn. *W. metabolica*]; 154-350 x 92-190 μm; soil; RU, R3 (13, 36, 43, 47)

Woodruffides terricola Foissner, 1987; NR; soil; RU (47)

Incertae sedis

Notoxoma Foissner, 1993

Notoxoma parabryophryides Foissner, 1993; NR; soil; RU (43, 47)

Semiplatyophrya Wilbert & Kahan, 1986

Semiplatyophrya foissneri Wilbert & Kahan, 1986; NR; soil; RU (43, 47)

Order: Bursariomorphida Fernandez-Galiano, 1978 [stomatogenesis pleurotelokinetal; deep anterior oral cavity]

Family: Bursariidae Bory de St. Vincent, 1826

Bursaria Muller, 1773; NR; freshwater; R2, R4 (47, 58, 69)

Bursaria truncatella Muller, 1773; NR; freshwater, moss; R1, R2 (13, 43, 101, 124)

Order: Sorogenida Foissner, 1985 [stomatogenesis pleurotelokinetal; oral ciliary circle; sorocarps]

Family: Sorogenidae Bradbury & Olive, 1980

Sorogena Bradbury & Olive, 1980

Sorogena stoianovitchae Bradbury & Olive, 1980; NR; soil; RU (43, 47)

Order: Bryophryida de Puytorac *et al*., 1979 [stomatogenesis pleurotelokinetal; right oral kinetids in radial rows]

Family: Bryophryidae de Puytorac *et al*., 1979

Parabryophrya Foissner, 1985
Parabryophrya penardi (Kahl, 1931) Foissner, 1985; NR; soil; R1, R5 (13, 43)
Order: Bryometopida Foissner, 1985 [stomatogenesis pleurotelokinetal; subapical oral region with paroral rows]
Family: Bryometopidae Jankowski, 1980
Bryometopus Kahl, 1932
Bryometopus atypicus Foissner, 1980; 50-85 x 30-40 μm; soil; RU (36, 43, 47)
Bryometopus balantidioides Foissner, 1993; NR; soil; RU (43)
Bryometopus pseudochilodon Kahl, 1932; 50-80 μm; soil, moss, bark; RU, R1, R2, R5, R10 (13, 36, 42, 43, 47)
Bryometopus sphagni (Penard, 1922) Kahl, 1932; NR; soil; RU (43)
Bryometopus triquestrus Foissner, 1993; 45-55 x 25-35 μm; soil; R8 (36, 43, 47)
Thylakidium Schewiakoff, 1893; NR; freshwater; R3 (127)
Thylakidium truncatum Schewiakoff, 1893; 60-110 x 40-60 μm; freshwater; R2 (36, 97, 98)
Family: Jaroschiidae Foissner, 1993
Jaroschia Foissner, 1993
Jaroschia sumptuosa Foissner, 1993; 70-100 x 40-50 μm; bark; R1 (36, 43, 53)
Family: Kreyellidae Foissner, 1979
Kreyella Kahl, 1931
Kreyella minuta Foissner, 1979; NR; freshwater; R2 (25, 28)
Microdiaphanosoma Wenzel, 1953
Microdiaphanosoma arcuatum (Grandori & Grandori, 1934) Wenzel, 1953; NR; soil; R1, R2, R3, R5 (13, 42, 43, 47)
Microdiaphanosoma terricola Foissner, 1993; 10-17 x 8-12 μm; freshwater, soil; R1, R2 (25, 28, 36, 42, 43)
Family: Tectohymenidae Foissner, 1993
Pseudokreyella Foissner, 1985
Pseudokreyella australis Foissner, 1993; 20-30 x 15-20 μm; soil; R9 (36, 43, 47)
Pseudokreyella terricola Foissner, 1985; NR; soil; R5 (13, 43)
Family: Trihymenidae Foissner, 1988
Trihymena Foissner, 1988
Trihymena terricola Foissner, 1988; 25-35 x 10-15 μm; soil, litter; RU, R5 (13, 30, 36, 43, 47)

Class: Prostomatea Schewiakoff, 1896 [prostomes; simple apical mouths]
Order: Prostomatida Schewiakoff, 1896 [no oral kinetidal specializations]
Family: Metacystidae Kahl, 1926
Metacystis Cohn, 1866
Metacystis exigua Penard, 1922; NR; freshwater; R2 (25, 28)
Metacystis truncata Cohn, 1866; NR; salt lake; R6 (85)
Order: Prorodontida Corliss, 1974 [special oral 'brosse' kinetids]
Family: Colepidae Ehrenberg, 1838
Coleps Nitzsch, 1827; NR; freshwater; R1, R2, R3 (59, 75, 86, 120, 127)
Coleps amphacanthus Ehrenberg, 1833; 56-63 x 28-41 μm; freshwater; R2, R5 (1, 25, 28, 33)

Coleps hirtus Nitzsch, 1817; 40-79 x 18-43 μm; freshwater; R1, R2 (9, 25, 28, 59, 98, 124)
Coleps uncinatus Claparede & Lachmann, 1859; NR; freshwater; R2 (124)
Family: Holophryidae Perty, 1852
Holophrya Ehrenberg, 1831; NR; freshwater; R2 (9)
Holophrya discolor Ehrenberg, 1833; 100-140 x 50-60 μm; freshwater; R2 (98)
Holophrya simplex Schewiakoff, 1889; NR; soil; R5 (84, 126)
Family: Plagiocampidae Kahl, 1926
Plagiocampa Schewiakoff, 1893
Plagiocampa bitricha Foissner, 1999; 40 x 23 μm; soil; R1, R10 (44, 47)
Plagiocampa difficilis Foissner, 1981; NR; soil; R3, R5, R10 (13, 43, 47)
Plagiocampa marina Kahl, 1935; NR; freshwater; R2 (25, 28)
Plagiocampa mutabile Schewiakoff, 1893; 40-48 x 21-25 μm; freshwater; R2 (97, 98)
Plagiocampa ovata Gelei, 1954; NR; soil; RU (47)
Plagiocampa rouxi Kahl, 1926; NR; soil; RU (43, 47)
Family: Prorodontidae Kent, 1881
Prorodon Ehrenberg, 1834 [syn. *Chilophrya* Kahl, 1930]; NR; freshwater; R3 (127)
Prorodon teres Ehrenberg, 1833; 150-220 x 72-130 μm; freshwater; R2 (25, 28, 98)
Prorodon discolor Ehrenberg, 1831; 85-135 x 75-110 μm; freshwater; R2 (25, 28)
Prorodon utahensis Pack, 1919 [= *Chilophrya utahensis*]; 30 μm; salt lake; R6 (85)
Family: Urotrichidae Small & Lynn, 1985
Rhagadostoma Kahl, 1926
Rhagadostoma completum Kahl, 1926; NR; freshwater; R2 (25, 28)
Urotricha Claparede & Lachmann, 1859; NR; freshwater; R3 (127)
Urotricha farcta Claparede & Lachmann, 1859; NR; freshwater; R3 (25)
Urotricha furcata Schewiakoff, 1892; 14-30 x 11-20 μm; freshwater; RU, R6 (1, 33, 38, 45)

Class: Plagiopylea Small & Lynn, 1985 [oral cavity curved; almost encircled by dikinetid files]
Order: Plagiopylida Small & Lynn, 1985 [with characters of class]
Family: Plagiopylidae Schewiakoff, 1896
Plagiopyla Stein, 1860
Plagiopyla frontata Kahl, 1932; 75-110 x 37-67 μm; freshwater; R2 (25, 28)
Family: Trimyemidae Kahl, 1926
Trimyema Lackey, 1925
Trimyema compressum Lackey, 1925; NR; freshwater; R2 (25, 28)
Trimyema salina Gaiewskaia, 1925; 20-70 μm; salt lake; R5 (95)

Class: Oligohymenophorea de Puytorac *et al*.,1974 [distinct oral apparatus, right paroral membrane plus three left oral membranelles]
Subclass: Peniculia Faure-Fremiet in Corliss, 1956 [membranelles (peniculus) parallel to oral cavity]
Order: Peniculida Faure-Fremiet in Corliss, 1956 [with characters of subclass]
Suborder: Frontoniina Small & Lynn, 1985 [shallow oral cavity; ophryokineties present]
Family: Frontoniidae Kahl, 1926
Frontonia Ehrenberg, 1838; NR; freshwater; RU, R2, R3 (72, 81, 127)

Frontonia depressa (Stokes, 1886) Kahl, 1931; NR; soil, bark; R1, R2, R5 (13, 43, 47)

Frontonia marina Fabre-Domerque, 1891; NR; freshwater; R2 (25, 28)

Family: Lembadionidae Jankowski, in Corlis, 1979

Lembadion Perty, 1849; NR; freshwater; R3 (127)

Lembadion curvatum Esteban *et a*l., 2000; 75-125 x 45-65 μm; freshwater; R3 (25, 52)

Suborder: Parameciina Jankowski, in Small & Lynn, 1985 [deep oral cavity; ophryokineties absent]

Family: Urocentridae Claprede & Lachmann, 1858

Urocentrum Nitzsch, 1827

Urocentrum turbo Muller, 1786; 60-65 x 40-48 μm; freshwater; R2, R3 (98, 104, 115, 124, 127)

Family: Parameciidae Dujardin, 1840

Paramecium Muller, 1773 [syn. *Paramoecium*]; NR; freshwater; R1, R2, R3 (58, 59, 65, 67, 68, 74, 75, 120, 127)

Paramecium aurelia Ehrenberg, 1838; NR; freshwater; R2 (25, 28, 104, 108, 116, 124)

Paramecium bursaria Ehrenberg, 1838; 140 x 72-110 μm; freshwater; R1, R2 (59, 98, 104)

Paramecium caudatum Ehrenberg, 1838; NR; freshwater; R1 (10, 26)

Paramecium multimicronucleatum Powers & Mitchell, 1910; NR; freshwater; R2 (10, 88)

Paramecium putrinum Claparede & Lachmann, 1858; 120-140 x 50-70 μm; freshwater; R2 (98)

Paramecium quadecaurelia Sonneborn, 1975; NR; freshwater; R10 (88, 109)

Paramecium tetraurelia Sonneborn, 1975; 105-125 x 35-44 μm; freshwater; RU, R2 (88, 89, 109)

Physanter Jankowski, 1975 [= *Faurella* Roque, 1966]; NR; freshwater; R3 (127)

Subclass: Scuticociliatia Small, 1967 [scuticociliates, with scuticum or scuticovestige]

Unidentified scuticociliate species; NR; freshwater; R2 (74)

Order: Philasterida Small, 1967 [short paroral dikinetid membrane]

Family: Cohnilembidae Kahl, 1933

Cohnilembus Kahl, 1933 [syn. *Kahlilembus* Groliere & Couteaux, 1984]; NR; freshwater; R3 (127)

Kahlilembus Groliere & Couteaux, 1984 [= *Lembus* Cohn, 1866; = *Cohnilembus* Kahl, 1933]

Kahlilembus attenuatus (Smith, 1897) Foissner *et al*., 1994; NR; soil; RU (43, 47)

Kahlilembus fusiformis (Kahl, 1926) Groliere & Couteaux, 1984; NR; soil; R5 (13, 43)

Family: Cinetochilidae Perty, 1852

Cinetochilum Perty, 1852; NR; freshwater; R3 (127)

Cinetochilum australiense Foissner *et al*., 1994 [= *C. australis*]; NR; NR; R5 (126)

Cinetochilum margaritaceum (Ehrenberg, 1830) Perty, 1852; 23-36 x 14-25 μm; freshwater, soil, moss, bark; R1, R2, R5 (13, 25, 28, 43, 47, 59, 84, 98)

Cinetochilum marinum Pomp & Wilbert, 1988; 28 x 22 μm; soil; R5 (43, 84)

Platynematum Kahl, 1931

Platynematum sociale (Penard, 1922) Foissner *et al*., 1994; NR; freshwater; R2 (25, 28)

Sathrophilus Corliss, 1960

Sathrophilus muscorum (Kahl, 1931) Corliss, 1960; NR; freshwater, soil, moss, bark; R1, R2, R3, R5 (13, 25, 28, 42, 43, 47)

Family: Loxocephalidae Jankowski, 1964

Balanonema Kahl, 1931

Balanonema biceps (Penard, 1922) Kahl, 1931; NR; freshwater; R3 (25)

Dexiotricha Stokes, 1885

Dexiotricha granulosa (Kent, 1881) Foissner *et al*., 1994; NR; freshwater; R3 (25)

Family: Philasteridae Kahl, 1931

Philasterides Kahl, 1931; NR; freshwater; R3 (127)

Family: Pseudocohnilembidae Evans & Thompson, 1964

Pseudocohnilembus Evans & Thompson, 1964

Pseudocohnilembus marinus Thompson, 1966; NR; soil; R5 (13, 43)

Pseudocohnilembus persalinus Evans & Thompson, 1964; 33-41 x 21-25 μm; soil; R5 (84, 126)

Pseudocohnilembus pusillus (Quennerstedt, 1869) Foissner & Wilbert, 1981; NR; freshwater; R2 (25, 28)

Pseudocohnilembus putrinus (Kahl, 1928) Foissner & Wilbert, 1981; NR; soil; R1, R3 (13, 43)

Family: Uronematidae Thompson, 1964

Homalogastra Kahl, 1926

Homalogastra setosa Kahl, 1926; 30-35 x 18-25 μm; soil, moss, bark; R1, R3, R5, R10 (13, 43, 47, 84, 126)

Uronema Dujardin, 1841; NR; marine; R21 (3)

Uronema marinum Dujardin, 1841; 30-40 μm; brackish water, salt lake; R2, R6 (28, 85)

Uronema nigricans (Muller, 1786) Thompson & Evans, 1968; 30-35 μm; freshwater, salt lake, soil; R2, R5 (25, 84, 126)

Uronema ovale Schewiakoff, 1893; 90 x 40 μm; freshwater; R2 (97, 98)

Family: Urozonidae Groliere, 1975

Urozona Schewiakoff, 1889

Urozona buetschlii Schewiakoff, 1889; NR; freshwater; R2 (25, 28)

Order: Pleuronematida Faure-Fremiet in Corliss, 1956 [paroral cilia forming curtain-like velum]

Family: Ctedoctematidae Small & Lynn, 1985

Ctedoctema Stokes, 1884; NR; freshwater; R3 (127)

Ctedoctema acanthocryptum Stokes, 1884; NR; freshwater; R2 (25, 28)

Family: Cyclidiidae Ehrenberg, 1838

Cristigera Roux, 1899; NR; freshwater; R3 (25, 127)

Cristigera cirrifera Kahl, 1928; NR; freshwater; R2 (25, 28)

Cristigera media Kahl, 1928; NR; freshwater; R3 (25)

Cristigera setosa Kahl, 1928; NR; freshwater; R2 (25, 28)

Cyclidium Muller, 1786 [= *Kerona* Muller, 1786]; 20-25 x 18-23 μm; freshwater, soil; RU, R2, R5 (75, 81, 84, 126)

Cyclidium bonneti Groliere, 1980; NR; soil; R5 (84)

Cyclidium candens Kahl, 1928; 40-50 x 12-15 μm; salt lake; R5 (95)

Cyclidium citrillus Cohn, 1865; 25-30 μm; freshwater; R2, R3 (25, 28)

Cyclidium glaucoma Muller, 1773; 12-36 x 6-14 μm; freshwater, soil; R1, R2, R3, R5 (25, 28, 29, 59, 84, 98)

Cyclidium muscicola Kahl, 1931; NR; soil, moss, bark; R1, R2, R3, R5, R10 (13, 43, 47)

Cyclidium porcatum Esteban *et al*., 1993; NR; freshwater; R2 (25, 28)

Cyclidium terricola Kahl, 1931; NR; soil; R3, R5 (13, 43)

Protocyclidium Alekperov, 1993
Protocyclidium muscicola (Kahl, 1931) Foissner *et al*., 2002; NR; soil; RU (47)
Protocyclidium terricola (Kahl, 1931) Foissner *et al*., 2002; 28-40 x 15-20 μm; soil; R10 (47)
Family: Pleuronematidae Kent, 1881
Pleuronema Dujardin, 1836; NR; freshwater; RU, R3 (81, 127)
Pleuronema chrysalis Perty, 1852; 100 x 66 μm; freshwater; R2 (98)
Pleuronema coronatum Kent, 1881; NR; freshwater; R2 (25, 28)
Subclass Hymenostomatia Delage & Herouard, 1896 [right paroral dikinetid plus 1-3 left polykinetids]
Order: Hymenostomatida Delage & Herouard, 1896 [preoral suture, somatic monokinetids]
Unidentified hymenostomids; NR; marine; R21 (4)
Suborder: Ophryoglenina Canella, 1964 [with organelle of Lieberkuhn (watchglass organelle)]
Family: Ophryoglenidae Kent, 1881
Ophryoglena Ehrenberg, 1831
Ophryoglena atra Ehrenberg, 1833; 120-270 x 50-160 μm; freshwater; R2 (98, 99, 104)
Suborder: Tetrahymenina Faure-Fremiet, in Corliss, 1956 [no organelle of Lieberkuhn]
Family: Glaucomidae Corliss, 1971
Dichilum Schewiakoff, 1893
Dichilum cuneiforme Schewiakoff, 1893; 40 x 24 μm; freshwater; R2 (97, 98)
Glaucoma Ehrenberg, 1830; NR; freshwater; R3 (127)
Glaucoma reniformis Schewiakoff, 1893 [syn. *G. reniforme*]; 35-65 x 20-30 μm; freshwater; RU, R2 (38, 97, 98)
Glaucoma scintillans Ehrenberg, 1830; 37-55 x 25-30 μm; freshwater; R2 (75, 98)
Glaucoma setosa Schewiakoff, 1893; 37 x 16 μm; freshwater; R2 (97, 98)
Physalophrya Kahl, 1931; NR; freshwater; R3 (127)
Family: Tetrahymenidae Corliss, 1952
Deltopylum Faure-Fremiet & Mugard, 1946
Deltopylum rhabdoides Faure-Fremiet & Mugard, 1946; NR; freshwater; R2 (25, 28)
Tetrahymena Furgason, 1940 [syn. *Leucophrys* Ehrenberg, 1830]; NR; freshwater; R2 (58)
Tetrahymena australis Nanney & McCoy, 1976; NR; freshwater; RU (79)
Tetrahymena capricornis Nanney & McCoy, 1976; NR; freshwater; RU (79, 87)
Tetrahymena pyriformis (Ehrenberg, 1830) Lwoff, 1947; 10-90 μm; freshwater; RU, R1, R2, R9 (21, 22, 23, 24)
Tetrahymena rostrata (Kahl, 1926) Corliss, 1952; NR; soil, moss; R1, R2, R3, R5 (13, 43, 47)
Incertae sedis
Blepharostoma Schewiakoff, 1893
Blepharostoma glaucoma Schewiakoff, 1893; 15 x 12 μm; freshwater; R2 (97, 98)
Family: Turaniellidae Didier, 1971
Colpidium Stein, 1860; NR; freshwater; R3, R4, R5 (69, 91, 127)
Subclass: Peritrichia Stein, 1859 [peritrichs, lack somatic kineties, oral cilia extend from infundibulum, predominantly bactivores, often stalked]
Order: Sessilida Kahl, 1933 [mature trophont sessile]

Family: Astylozoidae Kahl, 1935
Astylozoon Engelmann, 1862
Astylozoon faurei Kahl, 1935; NR; freshwater; R2 (25, 28)
Family: Epistylididae Kahl, 1933
Campanella Goldfuss, 1820; NR; freshwater; R3 (127)
Epistylis Ehrenberg, 1830; NR; freshwater; RU, R1, R2, R3, R4 (16, 27, 59, 69, 72, 81, 111, 127)
Epistylis alpestris Foissner, 1978; NR; soil; RU (43, 47)
Epistylis flavicans Ehrenberg, 1838; NR; freshwater; R2 (99, 104)
Epistylis plicatilis Ehrenberg, 1831; NR; freshwater; R2 (99, 124)
Heteropolaria Foissner & Schubert, 1977; NR; freshwater; R3 (127)
Rhabdostyla Kent, 1881 [syn. *Opisthostyla* Stokes, 1886]; NR; freshwater, marine; R2, R3, R14 (124, 127)
Family: Operculariidae Faure-Fremiet, in Corliss, 1979
Opercularia Goldfuss, 1820; NR; freshwater; R3 (127)
Opercularia arboricola (Biegel, 1954) Foissner, 1981; NR; soil; R3 (13)
Opercularia articulata Goldfuss, 1820; NR; freshwater; R2 (124)
Opercularia curvicaule (Penard, 1922) Foissner, 1998; NR; soil; RU (43, 47)
Opercularia nutans Ehrenberg, 1831; NR; freshwater; R2 (104, 124)
Propyxidium Corliss, 1979 [syn. *Pyxidium* Kent, 1881]
Propyxidium inclinans (Fromentel, 1874) [syn. *Pyxidium inclinans* Penard, 1912]; NR; freshwater; R2 (104)
Family: Ophrydiidae Ehrenberg, 1838
Ophrydium Bory de St. Vincent, 1826; NR; freshwater; R3 (127)
Ophrydium sessile Kent, 1881; NR; freshwater; R2 (99, 104)
Family: Opisthonectidae Foissner, 1976
Opisthonecta Faure-Fremiet, 1906; NR; freshwater; R2 (74)
Family: Lagenophryidae Butschli, 1889
Stylohedra Kellicott, 1884; NR, freshwater; R3 (127)
Family: Vaginicolidae de Fromentel, 1874
Cothurnia Ehrenberg, 1831; NR; freshwater, marine; RU, R2, R3 (7, 81, 124, 127)
Cothurnia amphorella Maskell, 1887; 75-90 x 16-34 μm; freshwater; R2 (83)
Cothurnia imberbis Ehrenberg, 1838; NR; freshwater; R2 (113)
Cyclodonta Matthes, 1958; NR, freshwater; R3 (127)
Platycola Kent, 1882; NR; freshwater; R3 (127)
Platycola dilatata Kent, 1882; NR; freshwater; R2 (104)
Platycola longicollis Kent, 1881; NR; freshwater; R2 (104)
Pyxicola Kent, 1882; NR; freshwater, marine; R2, R3, R14 (111, 115, 124, 127)
Pyxicola affinis Kent, 1882; NR; freshwater; R2 (104)
Pyxicola carteri Kent, 1886; NR; freshwater; R2 (104)
Pyxicola furcifer Hutton, 1878; NR; freshwater; R2 (124)
Thuricola Kent, 1881; NR; freshwater; R2, R3 (7, 27, 102, 127)
Thuricola folliculata Kent, 1881; 240-420 μm; freshwater; RU (35)
Thuricola operculata (Gruber, 1879); NR; freshwater; R2 (104)
Thuricola valvata Wright, 1858; NR; freshwater; R2 (124)
Vaginicola Lamarck, 1816; NR; freshwater; RU, R2, R3 (7, 81, 104, 111, 115, 127)
Vaginicola crystallina Ehrenberg, 1830; NR; freshwater; R2 (25, 28, 99, 104, 124)
Vaginicola grandis Perty, 1852; NR; freshwater; R2 (104)
Family: Vorticellidae Ehrenberg, 1838
Carchesium Ehrenberg, 1830; NR; freshwater, marine; R2, R3, R14 (27, 113, 124, 127)

Carchesium polypinum Linnaeus, 1758 [= *C. polypium*]; NR; freshwater; R2 (99, 104, 124)

Epicarchesium Jankowski, 1985

Epicarchesium pectinatum (Zacharias, 1897) Foissner *et al*., 1999; 40-70 μm; freshwater; R4 (45)

Haplocaulus Precht, 1935 cf. Warren, 1988 [syn. *Spastostyla* Entz, 1884]; NR; freshwater; R3 (127)

Haplocaulus terrenus Foissner, 1981; NR; moss; R1 (13, 43)

Pseudocarchesium Sommer, 1951 [= *Carchesium*]

Pseduocarchesium claudicans (Penard, 1922) Foissner, 1989; NR; soil; RU (43)

Vorticella Linnaeus, 1767; NR; freshwater, marine; RU, R1, R2, R3, R4, R14 (6, 16, 59, 69, 70, 72, 74, 75, 81, 86, 99, 111, 113, 115, 116, 120, 124, 127)

Vorticella aquadulcis Stokes, 1887; 15-55 x 10-35 μm; freshwater; RU (45)

Vorticella astyliformis Foissner, 1981; NR; soil, moss; R1, R3, R5 (13, 43, 47)

Vorticella campanula Ehrenberg, 1831; NR; freshwater; R2 (104, 124)

Vorticella chlorostigma Ehrenberg, 1831; NR; freshwater; R2 (124)

Vorticella dilatata Fromentel, 1874; NR; freshwater; R2 (124)

Vorticella infusionum Dujardin, 1841; NR; soil; R3, R5 (13, 43, 47)

Vorticella microstoma Ehrenberg, 1830; 36-67 x 18-30 μm; freshwater, soil; R2, R5 (25, 27, 28, 58, 75, 84, 98)

Vorticella monilata Tatem, 1869; NR; freshwater; R2 (124)

Vorticella nana Kahl, 1932; NR; freshwater; R2 (25, 28)

Vorticella nebulifera Muller, 1773; NR; freshwater; R2 (27, 124)

Vorticella similis Stokes, 1887; NR; soil; R5 (13, 43)

Vorticella striata Dujardin, 1841; NR; soil; R5 (84)

Pseudovorticella Foissner & Schiffmann, 1975; NR; freshwater; R3 (127)

Pseudovorticella sphagni Foissner & Schiffmann, 1974; NR; soil; RU (43, 47)

Family: Zoothamniidae

Zoothamnium Bory de St. Vincent, 1826; NR; freshwater, marine; RU, R2, R3, R14 (81, 102, 124, 127)

Zoothamnium arbuscula (Ehrenberg, 1831) Ehrenberg, 1838; 200-250 x 180 μm; freshwater; RU (35)

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