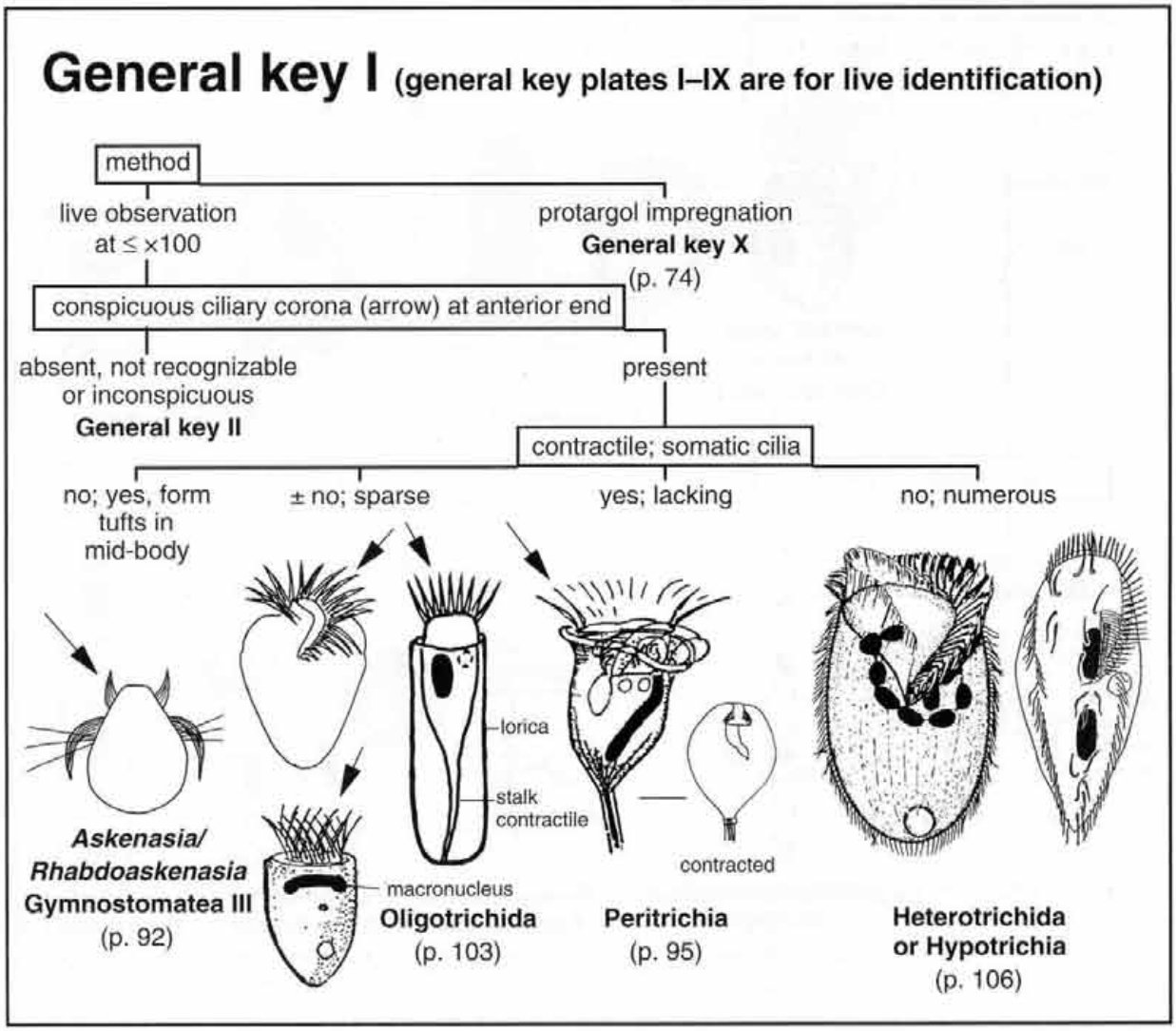
4 IDENTIFICATION, DESCRIPTION AND ECOLOGY OF SPECIES

4.1 Key to Main Groups and Species

The key contains all species described in the book plus some rare and benthic forms not treated in detail. It is easy to use and most supraspecific taxa are keyed out at least two times. Furthermore, with few exceptions, all characters asked can be easily recognized at low magnification (about ×100). **Plates X–XIV of the general key are designed to identify specimens from protargol slides, in which about 70 % of the taxa can be identified to at least genus level;** species identification frequently needs additional information from live specimens. All sizes refer to live specimens, which usually shrink by 10–20 % in protargol preparations.

Consider that you may find many more species in the samples when they are from small ponds, the littoral, or microaerobic/anaerobic hypolimnions (Table 3.6). Many of these are basically benthic or periphytic and can be determined with the keys by FOISSNER et al. (1995) and FOISSNER & BERGER (1996). Furthermore, you will frequently find not yet described species and genera.

Check all species identifications against the detailed descriptions in the systematic section. Use bright field or interference contrast, not phase contrast microscopy, for live observation.



General key II

[1] Use vital organisms only! Note that many plankton ciliates become rapidly morbid and globular after sampling and, especially, when transferred to the slide! If in doubt, continue with "no".

from General key I

conical[1]

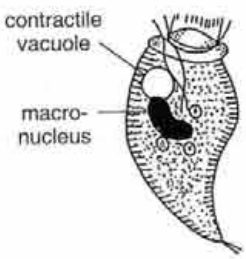
no or unknown

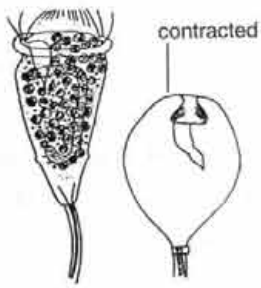
yes

contractile

no

yes





Oligotrichida
(p. 103)

Peritrichia
(p. 95)

barrel-shaped or ellipsoidal[1]

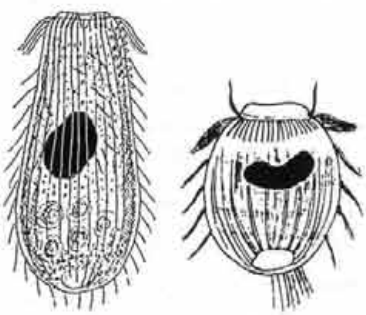
no or unknown

yes

tintinnid which left lorica

Oligotrichida I
(p. 103)

Prostomatida
(p. 99)



Gymnostomatea
(p. 90)

slender[1], length : width ≥ 5:1

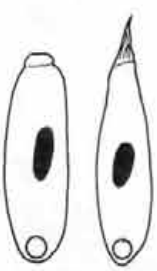
no or unknown

General key III

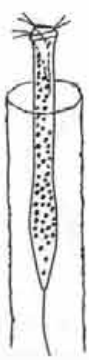
yes

Lepidotrachelophyllum lineare
300–500 µm
(p. 262)

Pelagodileptus trachelioides
230–800 µm
(p. 232)



Lagynophrya acuminata
70–95 µm
(p. 258)



Ophrydium
Peritrichia I, II
(p. 95, 96)

General key III

[1] Use vital organisms only! Note that many plankton ciliates become rapidly morbid and globular after sampling and, especially, when transferred to the slide! If in doubt, continue with "no".

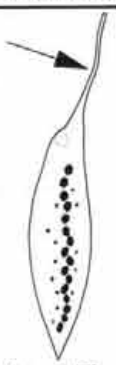
from General key II

proboscis or proboscis-like elongation (arrow)[1]

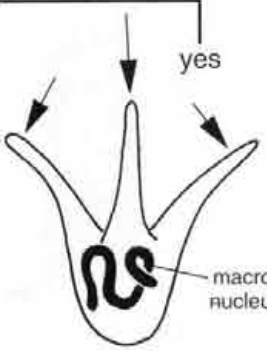
no or unknown

yes

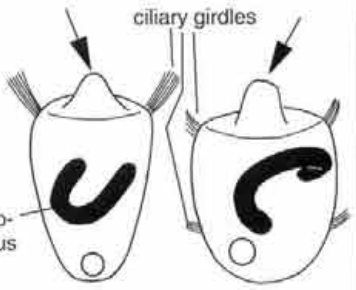
Paradileptus elephantinus
100–450 µm
(p. 221)



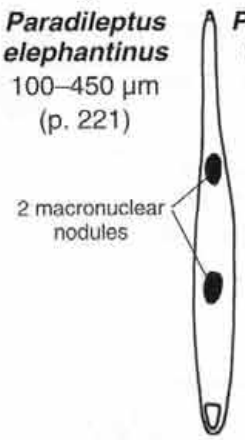
Pelagodileptus trachelioides
230–800 µm
(p. 232)



Teuthophrys trisulca
150–300 µm
(p. 238)

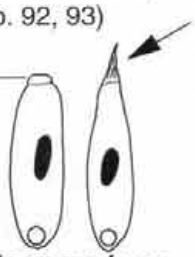


Monodinium/Didinium
Gymnostomatea III, V
(p. 92, 93)



Lepidotrachelophyllum lineare
300–500 µm
(p. 262)

Pelagolacrymaria
Gymnostomatea I
(p. 90)



Lagynophrya acuminata
70–95 µm
(p. 258)

shape bizarre (with spines, processes, cavities ...)[1]

no or unknown

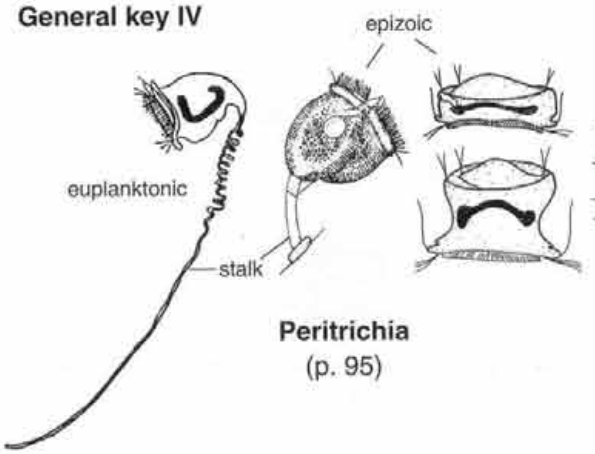
yes
Special key I
(p. 79)

stalk and/or attached to plankton organisms

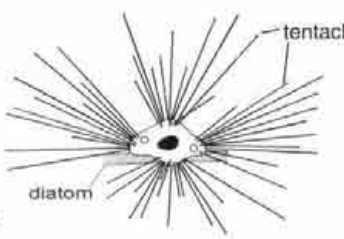
no or unknown
General key IV

yes

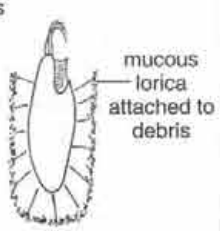
epibiontic on algae, especially diatoms



Peritrichia
(p. 95)



Gajewskajophrya melosirae
50–90 µm
(p. 725)



Cyrtolophosis mucicola
20–40 µm
(p. 718)

General key IV

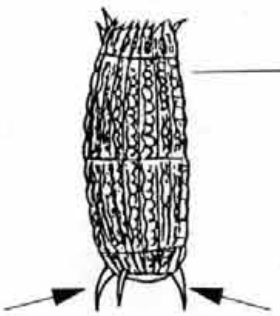
from General key III

[1] Usually, tentacles are retractile rods with a small distal knob, i. e. are widest at the anterior end. Cilia, cirri (= bundle of cilia), adoral membranelles, and spines gradually narrow to the distal end, i. e. are widest at the posterior (proximal) end (see figures)

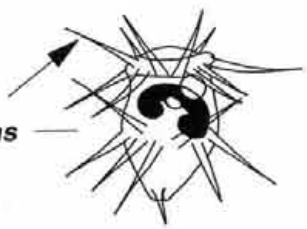
body with spines

absent or not recognizable

present



Coleps
Prostomatida I
(p. 99)

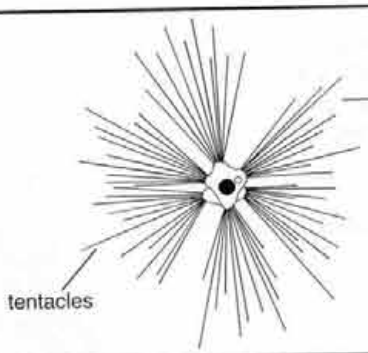


Hastatella radians
40–60 µm
(p. 460)

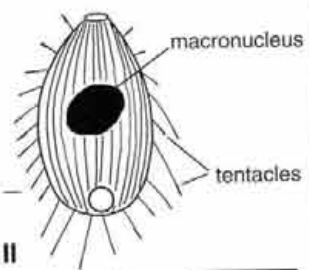
tentacles[1]

absent or not recognizable

present



Suctoria
(p. 107)

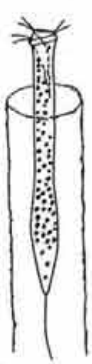


Actinobolina or ***Belonophrya***
Gymnostomatea II
(p. 91)

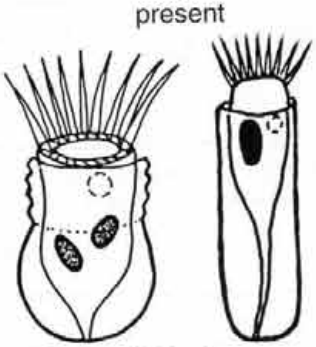
lorica

absent or unknown

present

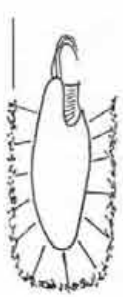


Ophrydium versatile or ***O. eutrophicum***
Peritrichia I
(p. 95)



tintinnids
Oligotrichida I
(p. 103)

mucous lorica attached to debris



Cyrtolophosis mucicola
20–40 µm
(p. 718)

large (>200 µm)

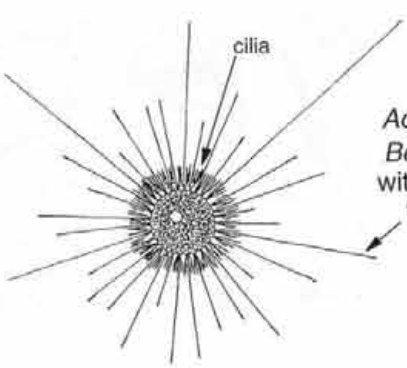
no

yes
Special key II
(p. 80)

small (<50 µm)

no
General key V

yes
Special key III
(p. 81)



Actinobolina/ Belonophrya with extended tentacles

General key V

from General key IV

[1] See also the less common species *Hastatella radians* (Peritrichia I, p. 95), *Histiobalantium bodamicum* (Hymenostomata, p. 94), and *Spirotella plancticola* (Hypotrichia, p. 106)

colonial

no or unknown

Epistylis or ***Epicarchesium***
Peritrichia II, IV
(p. 96, 98)

yes

Ophrydium
Peritrichia I, II
(p. 95, 96)

1–15 cm sized, green globules

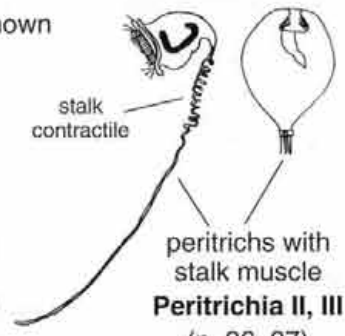
conspicuously coloured (including zoochlorellae bearing species) or dark (observe with bright field)

no or unknown

yes
Special key IV
(p. 82)

conspicuously (more than 50 %) contractile (touch with a needle or a mounted eyelash)

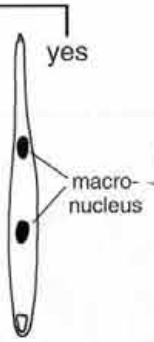
no or unknown



peritrichs with stalk muscle
Peritrichia II, III
(p. 96, 97)

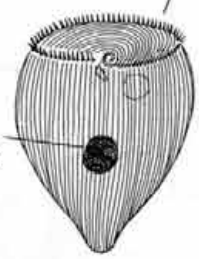
yes

contracts and extends very slowly



Lepidotrachelophyllum lineare
300–500 µm
(p. 262)

usually only fully contracted specimens are found in the samples!



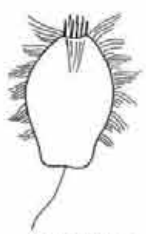
Stentor
Heterotrichida
(p. 106, 662)

movement

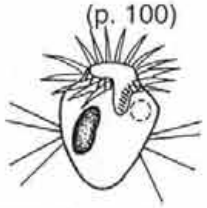
different or unknown
General key VI

fast-rotating and/or jumping[1]

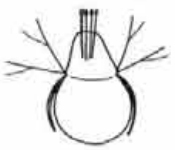
extremely fast, straight or zigzag



urotrichs
Prostomatida II–IV
(p. 100)



Halteria/Pelagohalteria
Oligotrichida II
(p. 104)



Askenasia or ***Mesodinium***
Gymnostomatea II, III
(p. 91, 92, 134)

Limnostrombidium, Pelagostrombidium or ***Rimostrombidium***
Oligotrichida II, III
(p. 104, 105)

Didinium/ Monodinium
Gymnostomatea III, V
(p. 92, 93)

General key VI

from General key V

[1] Discrimination of cilia and cirri (= several adhering cilia forming fairly thick bundles): if you see cilia at a magnification of ×100–400, that is, without oil immersion, then these are very likely cirri!

conspicuous ciliary girdles

absent or unknown

present
Special key XII
(p. 89)

denticle disc on posterior end

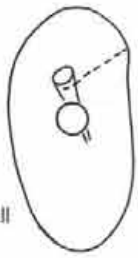
absent or unknown

present
Trichodina
Peritrichia I
(p. 95)

cytoplasm with ingested filamentous cyanobacteria

no or unknown

yes
Obertrumia aurea
120–250 µm
(p. 700)



colourfull

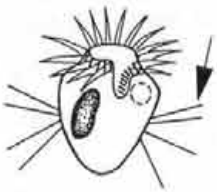
do you see "cilia" (cirri[1]; arrow) on body at a magnification of ×100

no or unknown

yes

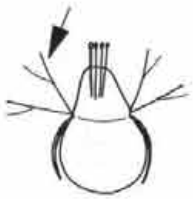
To recognize the following characters, specimens must be slightly squeezed (flattened) and studied with a magnification of at least ×250

Hypotrichia
(p. 106)



Halteria/
Pelagohalteria
Oligotrichida II
(p. 104)

Askenasia/
Rhabdoaskenasia
Gymnostomatea III
(p. 92)



Mesodinium
Gymnostomatea II
(p. 91)

macronucleus

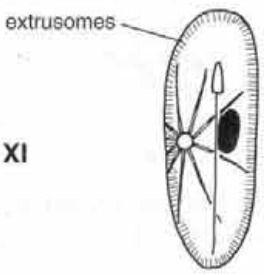
globular, ellipsoidal or reniform

C-shaped, J-shaped, vermiform, moniliform, or composed of 2 nodules
Special key IX
(p. 87)

rod (extrusome) fringe or conspicuous bundles of extrusomes (observe at ×400 and with bright field)

absent or unknown
General key VII

present
Special key XI
(p. 89)

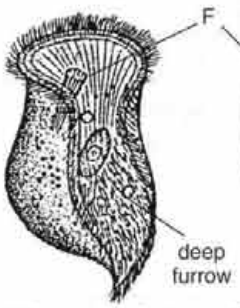


General key VII

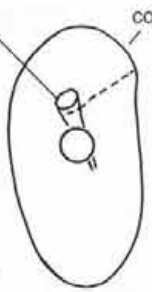
from General key VI

mouth (use magnification ≥ ×250)

with distinct funnel (F) composed of slender rods

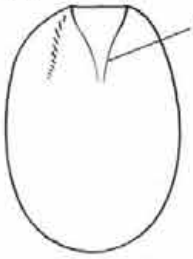


Phascolodon vorticella
60–90 µm
(p. 693)



Obertrumia aurea
120–250 µm
(p. 700)

in large cavity



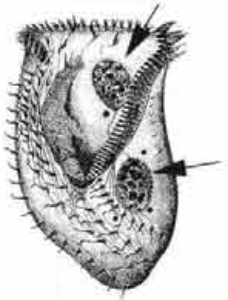
Prostomatida
(p. 99)

at base of a proboscis (arrow)

different **General key VIII**

macronucleus (arrow)

2 nodules

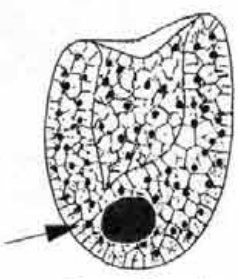


Pelagotrichidium faurei
about 280 µm
(p. 683)

reniform or ellipsoidal

Bursaridium pseudobursaria
80–200 µm
(p. 709)

± globular



***Bursellopsis* Prostomatida IV**
(p. 102)

moniliform

Linostomella vorticella
about 170 µm
(p. 655)

Paradileptus elephantinus
100–450 µm
(p. 221)

Pelagodileptus trachelioides
230–800 µm
(p. 232)

Teuthophrys trisulca
150–300 µm
(p. 238)

General key VIII

[1] Discrimination of cilia and cirri (= several adhering cilia forming fairly thick bundles): if you see cilia at a magnification of ×100–400, that is, without oil immersion, then these are very likely cirri!

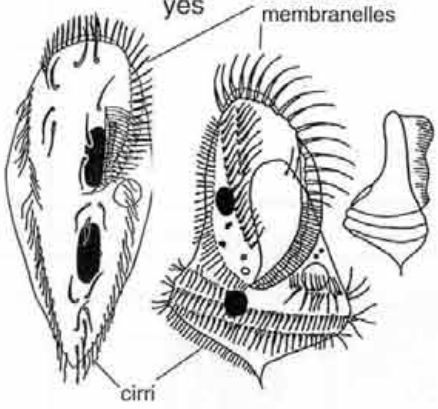
from General key VII

oral ciliature

conspicuous, that is, tufts of cilia (adoral membranelles or adoral zone of membranelles) at anterior and/or lateral margin (easily recognizable at a magnification of ≥ ×100)

do you see "cilia" (cirri[1]) on **body** at a magnification of ×100

yes

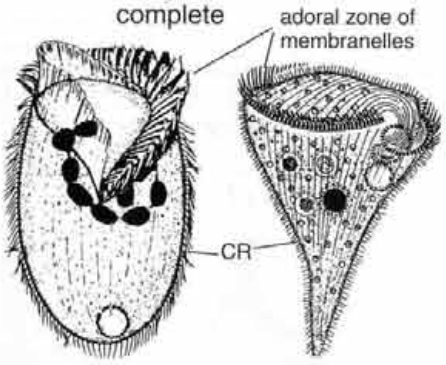


Hypotrichia
(p. 106)

no

somatic ciliature (ciliary rows; CR), use magnification > ×400

complete



Heterotrichida
(p. 106)

strongly reduced or lacking

inconspicuous

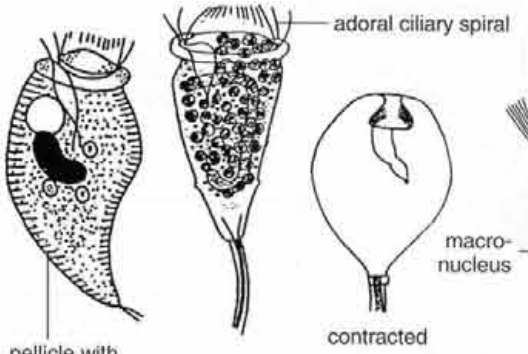
size

>40 µm
General key IX

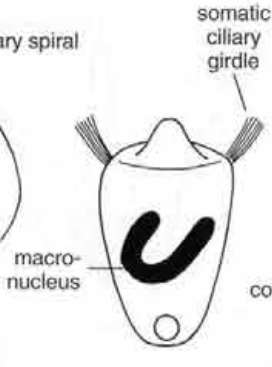
<40 µm (10–50 µm)
Special key III
(p. 81)

body contractility; oral ciliature

distinct, especially under slight coverglass pressure; continuous membrane

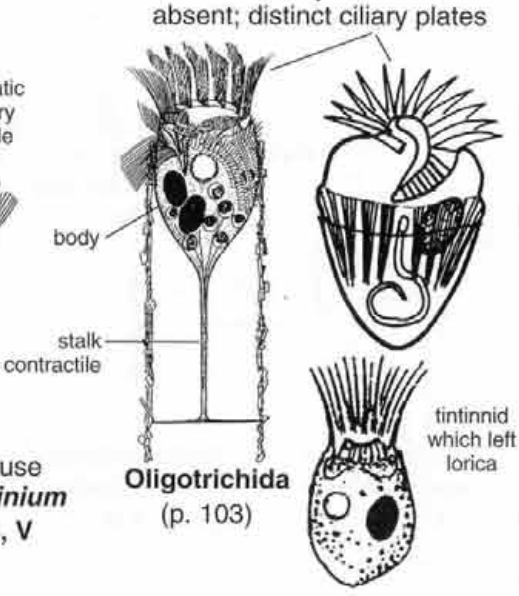


Peritrichia
(p. 95)



attention, do not confuse with ***Didinium/Monodinium***
Gymnostomatea III, V
(p. 92, 93)

absent; distinct ciliary plates



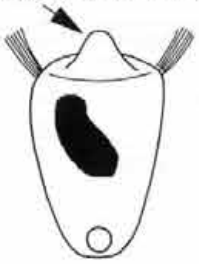
Oligotrichida
(p. 103)

General key IX

from General key VIII

anterior end

with distinct (oral) cone, bulge, or head (arrow)

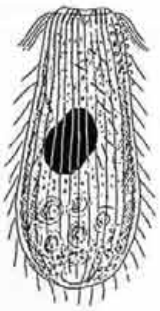


Gymnostomatea
(p. 90)

different

shape; mouth

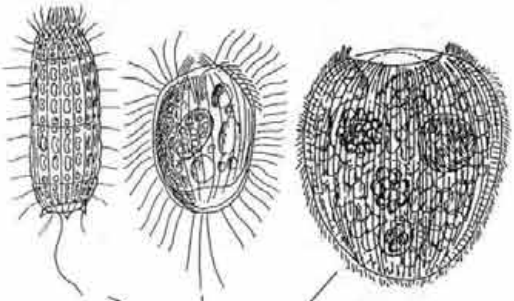
cylindroid, barrel-shaped, or globular; apical



Balantidion

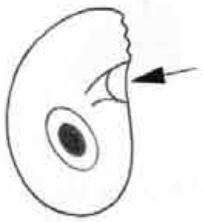
Actinobolina/ Belonophrya

Gymnostomatea I, II
(p. 90, 91)



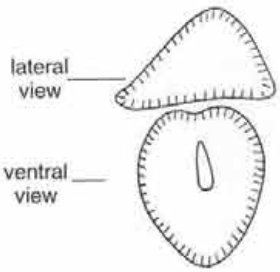
Prostomatida
(p. 99)

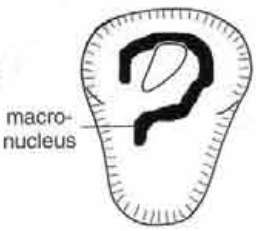
reniform, that is, one side convex, the other concave with indentation at oral opening; supapical

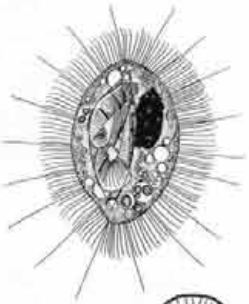


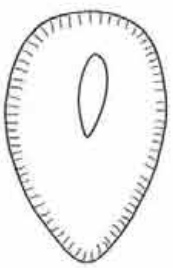
Colpoda steinii
10–60 µm
(p. 714)

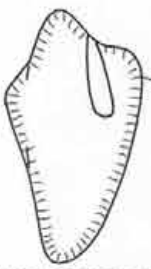
cap-shaped, obconical, lemon-shaped, obovoid, calyx-shaped; slightly to distinctly supapical

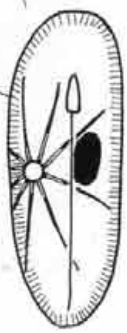












Hymenostomata
(p. 94)

General key X (general key plates X–IV are for identification of protargol-impregnated specimens)

from General key I (p. 65)

adoral zone of membranelles (AM) = serially arranged stacks of oral cilia

absent

present

cirri = patches of basal bodies

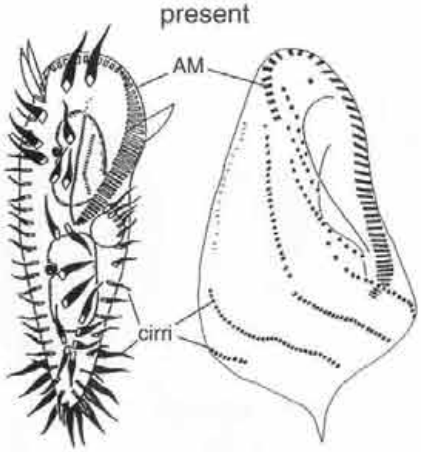
present

absent

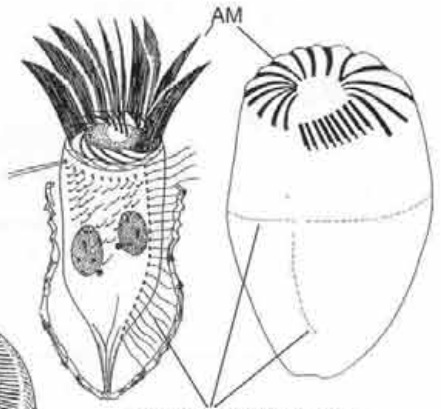
somatic ciliature

± strongly reduced

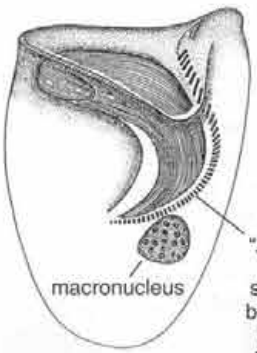
(peritrichs, which also lack somatic ciliature, do not have an adoral zone of mebranelles, but long, spirally arranged oral basal body [ciliary] rows)



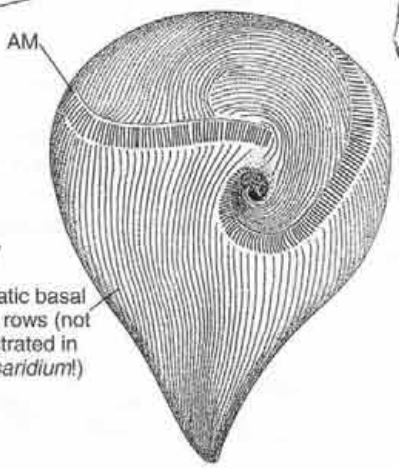
Hypotrichia
(p. 106)



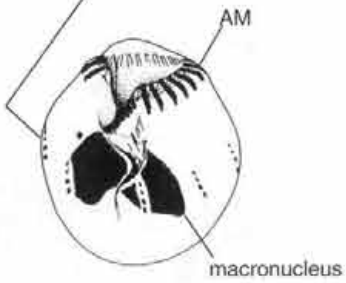
complete



Bursaridium pseudobursaria
in life 80–200 µm
(p. 709)



Heterotrichida
(p. 106)



Oligotrichida
(p. 103)

macronucleus

globular, ellipsoidal, reniform, or not clearly recognizable
General key XI

C-shaped, J-shaped, vermiform, moniliform, or composed of 2 nodules
Special key IX
(p. 87)

General key XI

from General key X

size

50–200 µm

>200 µm
Special key II
(p. 80)

<50 µm
Special key III
(p. 81)

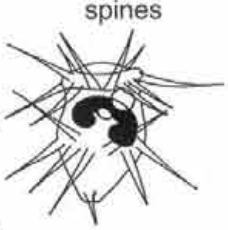
shape

different

with proboscis or proboscis-like elongation
General key III, first question
(p. 67)

with stalk
Peritrichia II–IV
(p. 96–98)

with conspicuous spines

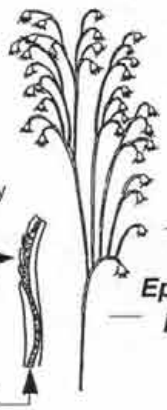


Hastatella radians
in life 40–60 µm
(p. 460)

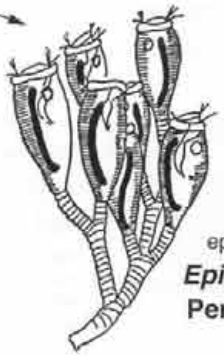
colonial

no or unknown

yes (zooids usually globular in preparations)



Epistylis procumbens
(p. 527)



stalk locally notched

stalk muscle

euplanktonic

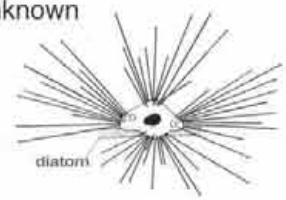
Epicarchesium pectinatum
(p. 508)

epiplanktonic
***Epistylis* spp.**
Peritrichia IV
(p. 98)

epiplanktonic

no or unknown

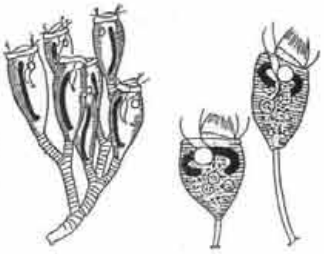
yes



diatom

Gajewskajophrya melosirae
50–90 µm
(p. 725)

Peritrichia
(p. 95)



zoochlorellae

absent or unknown
General key XII

present
Special key V
(p. 83)

Differentiation from ingested algal food: usually numerous, of same size and morphology, and not in vacuoles; 4–6 µm across with distinct membrane and dark central or acentral globule

General key XII

from General key XI

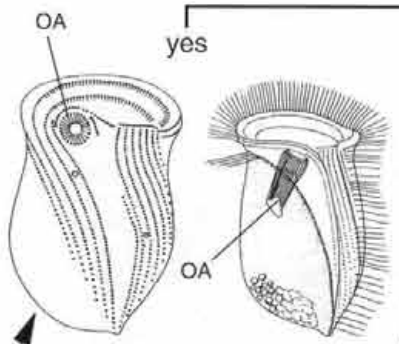
oral apparatus (OA)

apical
General key XIII

subapical

dorsal side (arrow) almost without basal bodies

yes

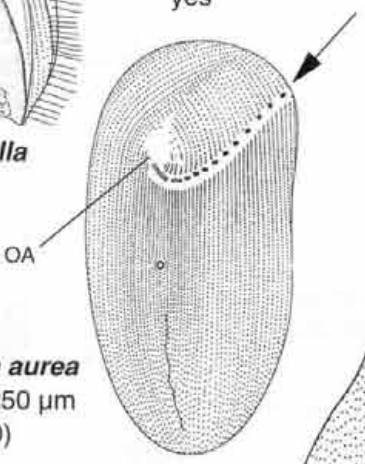


Phascolodon vorticella
in life 60–90 µm
(p. 693)

no

nassulid ciliature (arrow)
(silver carbonate impregnation preferred)

yes

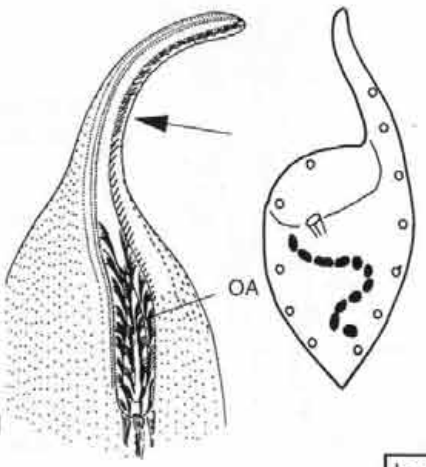


Obertrumia aurea
in life 120–250 µm
(p. 700)

no

proboscis

present

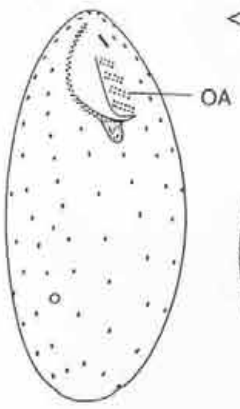


Teuthophrys*, *Paradileptus* or *Pelagodileptus
Gymnostomatea I
(p. 90)

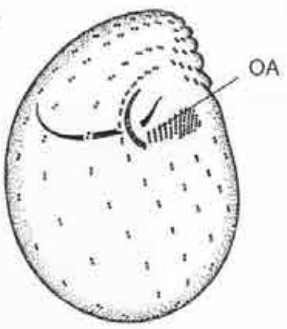
lacking

body length

<40 µm

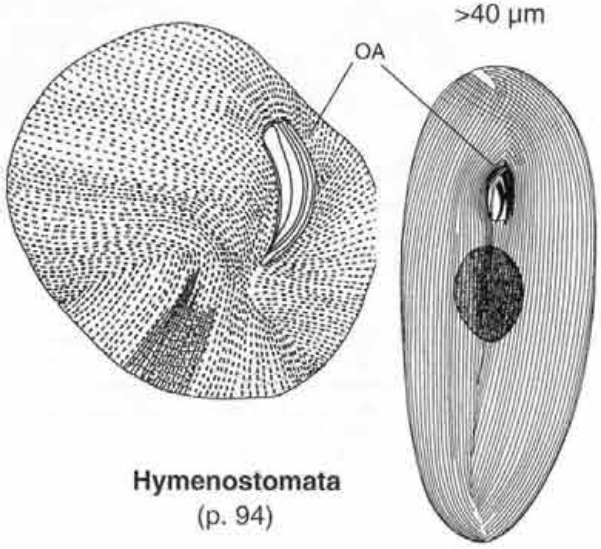


Cyrtolophosis mucicola
in life 20–40 µm
(p. 718)



Colpoda steinii
in life 10–60 µm, usually 20–40 µm
(p. 714)

>40 µm



Hymenostomata
(p. 94)

General key XIII

AO = adoral organelles (= brosse), CA = caudal cilia, EP = excretory pore of contractile vacuole

from General key XII

oral ciliary pattern

different

basal body (ciliary) spiral (arrow) extending from anterior pole to cell centre

Peritrichia

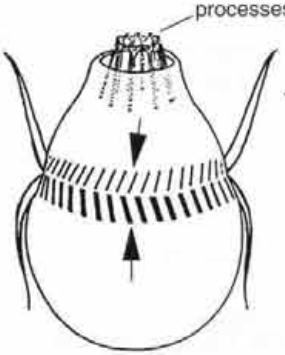
(p. 95)

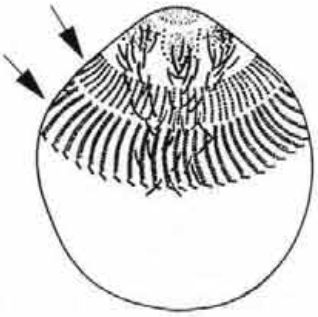
somatic basal body (ciliary) girdle(s) – (arrow)

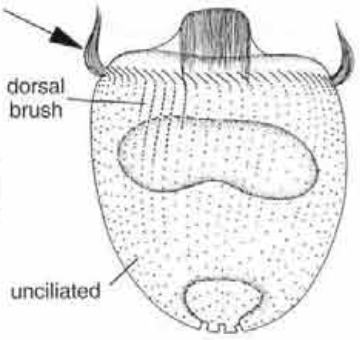
absent

present

processes



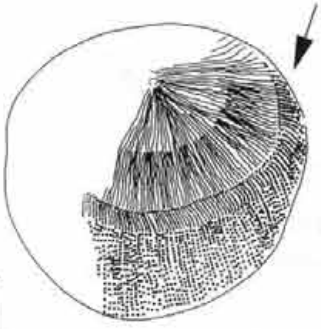




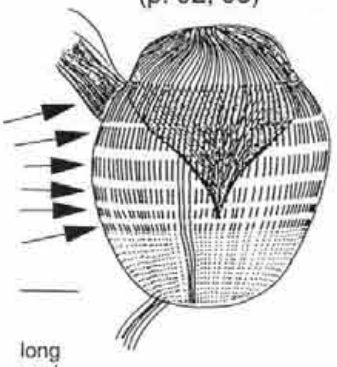
Mesodinium
Gymnostomatea II
(p. 91)

Askenasia/Rhabdoaskenasia
Gymnostomatea III
(p. 92)

Didinium/Monodinium
Gymnostomatea III, V
(p. 92, 93)



Cyclotrichium
Gymnostomatea IV
(p. 93)



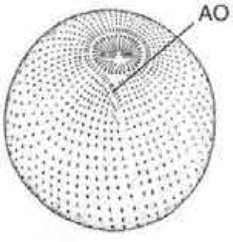
Pelagovasicola cinctum
in life 50–180 µm
(p. 213)

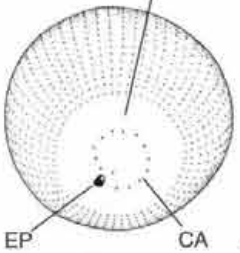
posterior pole area

different

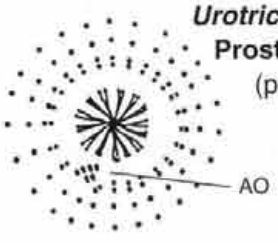
General key XIV

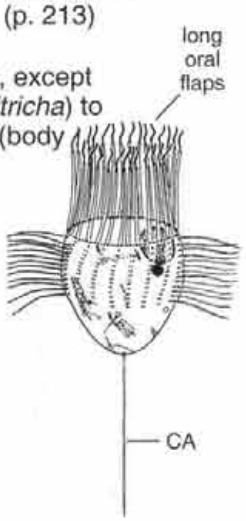
without basal bodies, except for one (zero in *Longitricha*) to many caudal cilia (body globular)



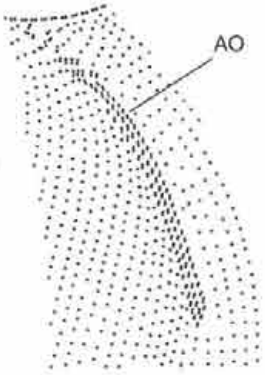


Urotricha, Longitricha
Prostomatida II–IV
(p. 100–102)





Balanion planctonicum
in life 10–22 µm
(p. 363)



Bursellopsis
Prostomatida IV
(p. 102)

General key XIV

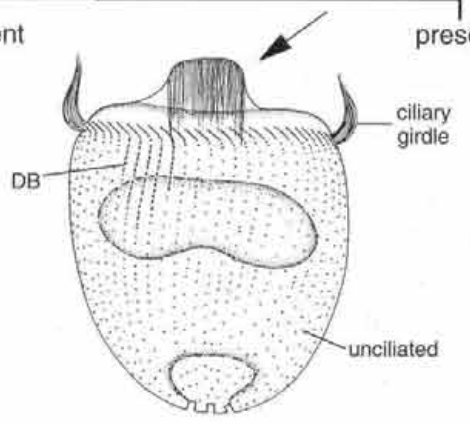
AO = adoral organelles (= brosse), DB = dorsal brush

from General key XIII

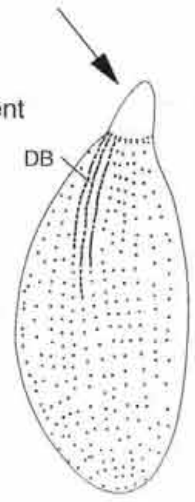
conspicuous oral cone (arrow)

absent

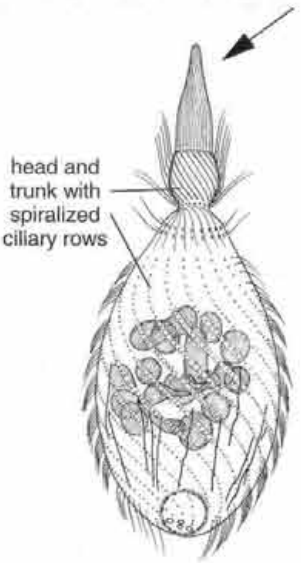
present



Didinium/Monodinium
Gymnostomatea III, V
(p. 92, 93)



Lagynophrya acuminata
in life 70–95 µm
(p. 258)

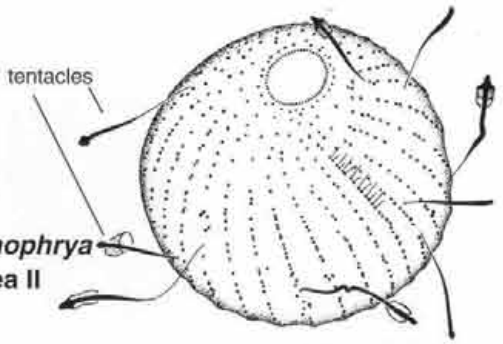


Pelagolacrymaria
Gymnostomatea I
(p. 90)

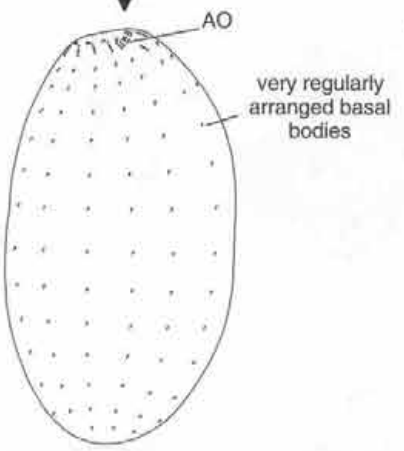
basal bodies very irregularly spaced within ciliary rows; tentacles

no; absent

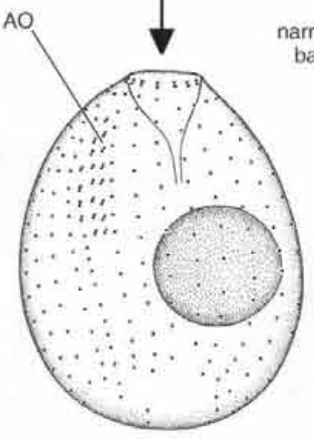
yes; present



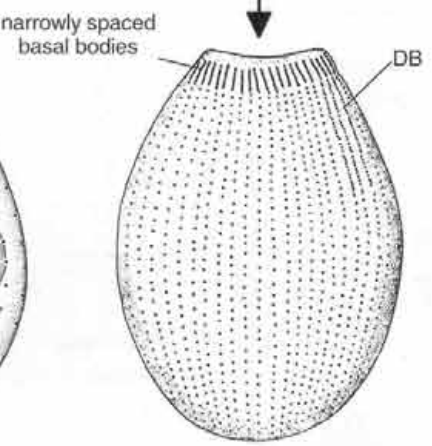
Actinobolina/Belonophrya
Gymnostomatea II
(p. 91)



Coleps
Prostomatida I
(p. 99)



Pelagothrix
Prostomatida I
(p. 99)



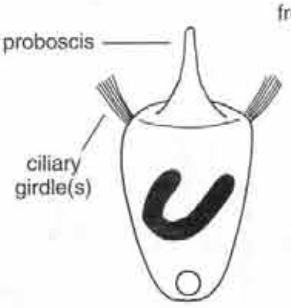
Balantidion pellucidum
in life 70–100 µm
(p. 252)

Special key I (species with bizarre shape)

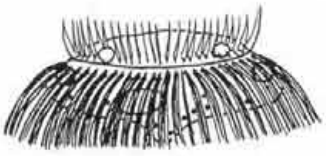
[1] Species not treated in detail!

from General key III (p. 67)

Paradileptus elephantinus
100–450 µm
(p. 221)



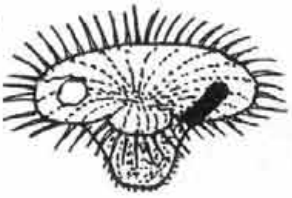
Didinium/Monodinium
Gymnostomatea III, V
(p. 92, 93)



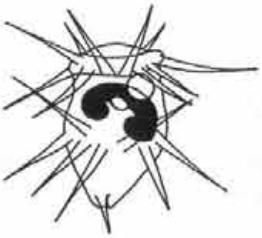
Cyclotrichium humillis[1]
25 × 56 µm

Pelagolacrymaria
Gymnostomatea I
(p. 90)

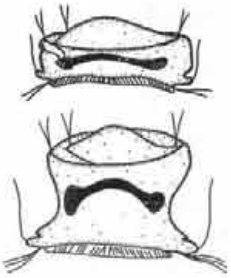
Teuthophrys trisulca
150–300 µm
(p. 238)



Lilliimorpha viridis
diameter 110 µm
(p. 164)

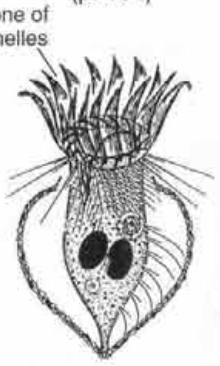


Hastatella radians
40–60 µm
(p. 460)

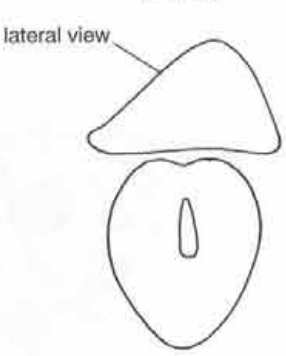


Trichodina
Peritrichia I
(p. 95)

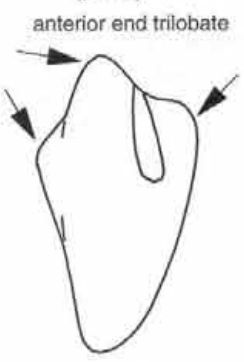
Codonella cratera
50–70 µm
lorica 43–63 µm
(p. 617)



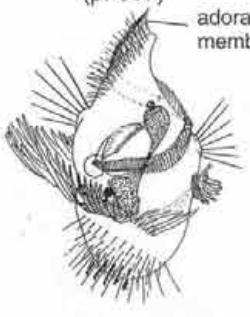
Stenosemella lacustris[1]
about 70 µm
lorica 40–48 µm
(p. 618)



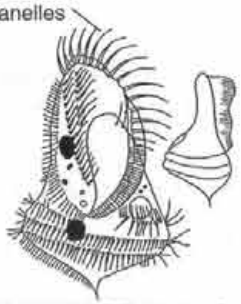
Stokesia vernalis
100–220 µm
(p. 439)



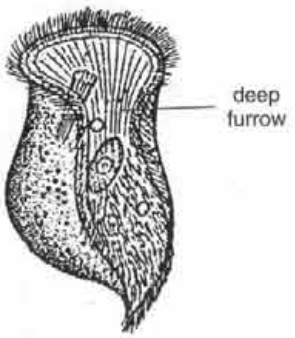
Disematostoma tetraedricum
100–140 µm
(p. 414)



Spiretella plancticola
95–160 µm
(p. 688)



Hypotrichidium conicum
90–120 µm
(p. 677)

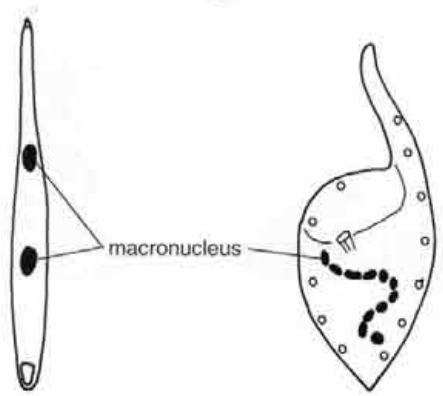


Phascolodon vorticella
60–90 µm
(p. 693)

Bursaridium pseudobursaria
80–200 µm
(p. 709)

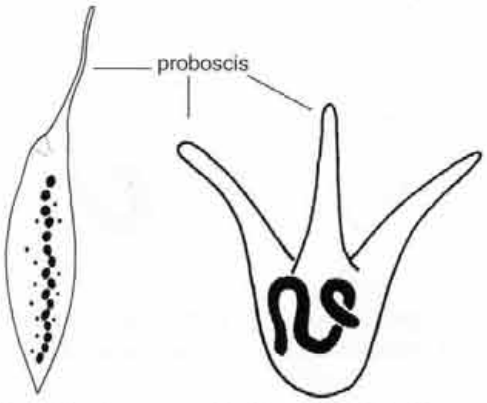
Special key II (large [usually >200 µm] species)

from General key IV (p. 68) or XI (p. 75)



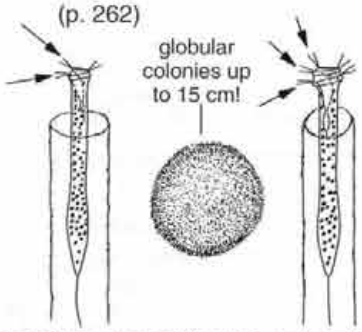
Lepidotrachelophyllum lineare
300–500 µm
(p. 262)

Paradileptus elephantinus
100–450 µm
(p. 221)

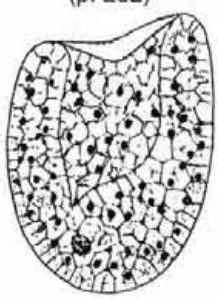


Pelagodileptus trachelioides
230–800 µm
(p. 232)

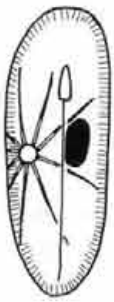
Teuthophrys trisulca
150–300 µm
(p. 238)



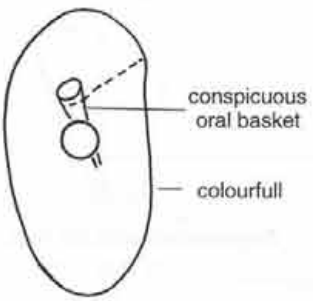
Ophrydium versatile or ***O. eutrophicum***
extended 250–400 µm long
Peritrichia I
(p. 95)



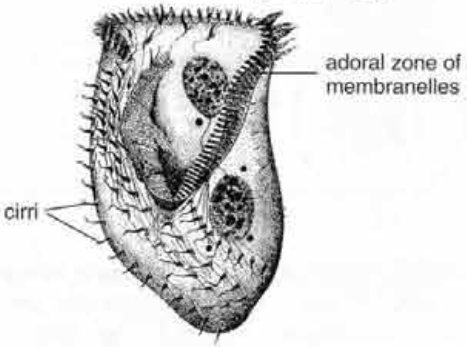
large ***Bursellopsis*** spp.
130–800 µm
(p. 100, 102)



Frontonia leucas
120–600 µm
(p. 416)

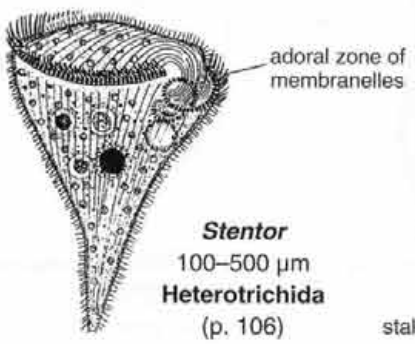


Obertrumia aurea
120–250 µm
(p. 700)

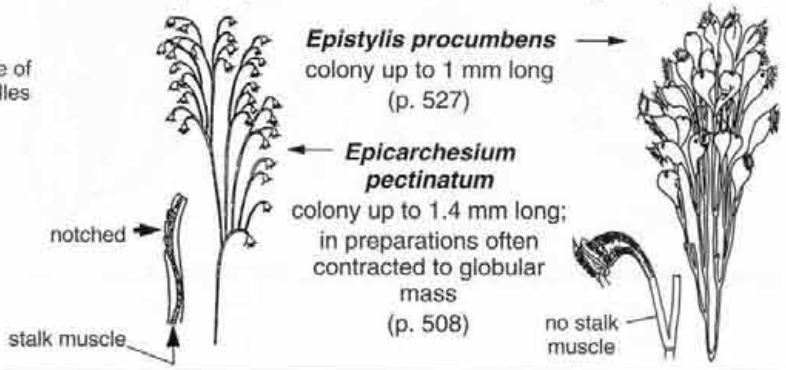


Pelagotrichidium faurei
about 280 µm
(p. 683)

Linostomella vorticella
100–210 µm
(p. 655)



Stentor
100–500 µm
Heterotrichida
(p. 106)



Epistylis procumbens
colony up to 1 mm long
(p. 527)

Epicarchesium pectinatum
colony up to 1.4 mm long; in preparations often contracted to globular mass
(p. 508)

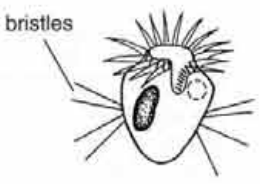
Special key III (small [<50 µm] species) from General key IV (p. 68) or XI (p. 75)

Limnostrombidium pelagicum
30–60 µm
(p. 574)

Pelagostrombidium mirabile
30–70 µm
(p. 590)

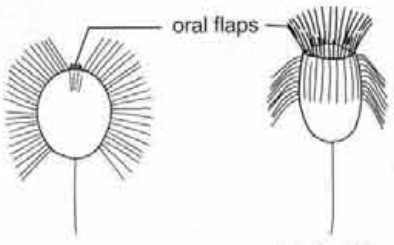
tintinnid which left lorica
Oligotrichida I
(p. 103)

Rimostrombidium
Oligotrichida III
(p. 105)

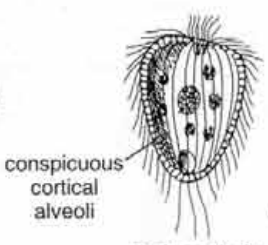


Halteria/Pelagohalteria
Oligotrichida II
(p. 104)

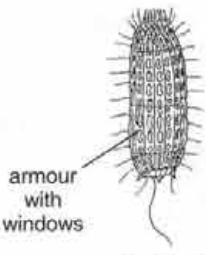
Urotricha
Prostomatida II, III
(p. 100, 101)



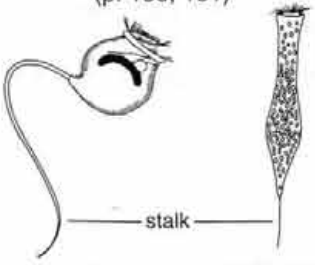
Balanion planctonicum
10–22 µm
(p. 363)



Pelagothrix
Prostomatida I
(p. 99)



Coleps
Prostomatida I
usually 50–70 µm
(p. 99)

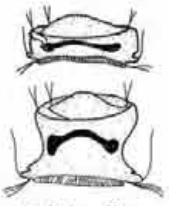


vorticellids
Peritrichia II, III
(p. 96, 97)

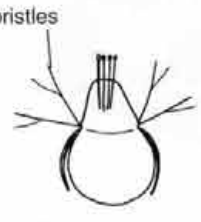
Ophrydium naumanni
40–50 µm
(p. 551)

Epistylis pygmaeum
22–50 µm
(p. 535)

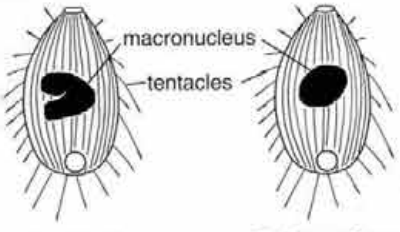
Astylozoon
Peritrichia I
(p. 95)



Trichodina
Peritrichia I
(p. 95)

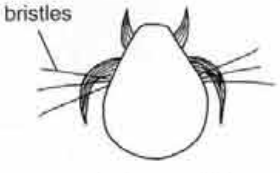


Mesodinium
Gymnostomatea II
(p. 91)



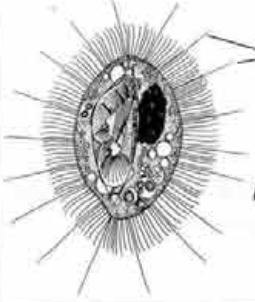
Actinobolina smalli
42–60 µm
(p. 115)

Belonophrya pelagica
40–70 µm
(p. 124)

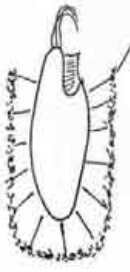


Askenasia/ Rhabdoaskenasia
Gymnostomatea III
(p. 92)

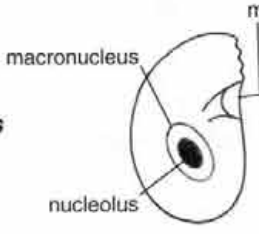
Monodinium
Gymnostomatea III
(p. 92)



Histiobalantium bodamicum
40–60 µm
(p. 424)



Cyrtolophosis mucicola
20–40 µm
(p. 718)



Colpoda steinii
10–60 µm,
usually
20–40 µm
(p. 714)

Special key IV (conspicuously coloured or dark species)

from General key V (p. 69)

colour

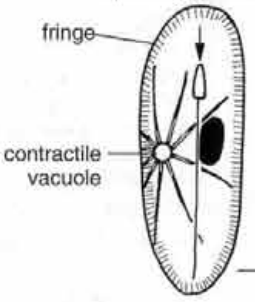
conspicuously spotted (violett, green, blue, orange ...) by ingested cyanobacteria or other food

extrusome fringe; oral apparatus

absent; conical basket (arrow)

Obertrumia aurea
120–250 µm
(p. 700)

present; triangular oral opening (arrow)



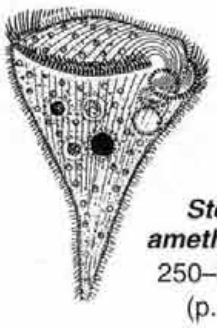
Frontonia leucas
120–600 µm
(p. 416)

grass green by zoochlorellae and/or cleptoplasts (note: number of algae sometimes rather low!)

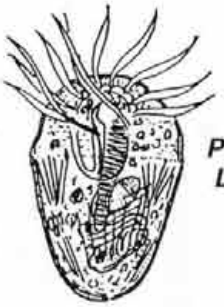
Special key V

Differentiation of zoochlorellae and food vacuoles with green algae: zoochlorellae are about 5 µm in size and lie singly in the cytoplasm, that is, are not enclosed in a vacuole as ingested algae

± black at ×100



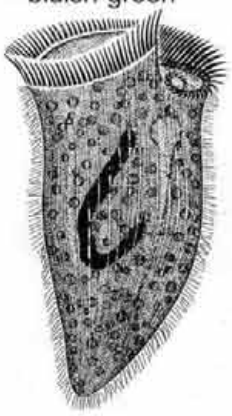
Stentor amethystinus
250–500 µm
(p. 664)



yellow-green

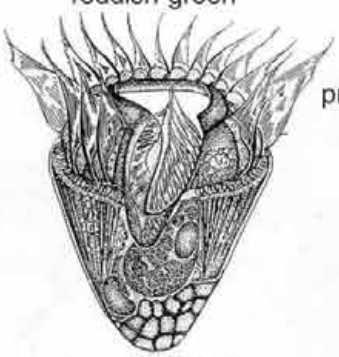
Pelagostrombidium/ Limnostrombidium
30–70 µm
Oligotrichida II
(p. 104)

bluish-green



Stentor araucanus
100–270 µm
(p. 671)

reddish-green



Pelagostrombidium fallax
40–90 µm
(p. 585)

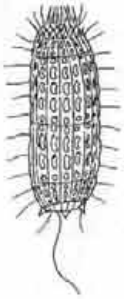
brownish

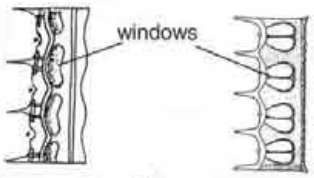
armour plates with windows

present

windows in armour

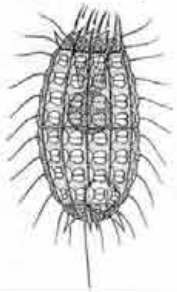
reniform



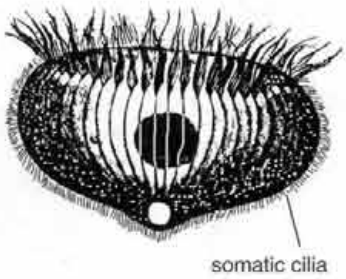


Coleps nolandi
40–65 µm
(p. 297)

bretzel-shaped



absent



Cyclotrichium brunneum
100–105 µm
Species not treated in detail!

Coleps hirtus hirtus or ***C. elongatus***
Prostomatida I
(p. 99)

Special key V (grass green coloured, usually by zoochlorellae)

from Special key IV

Peritrichia

no

yes

shape

campanulate

slender vase-shaped
Ophrydium

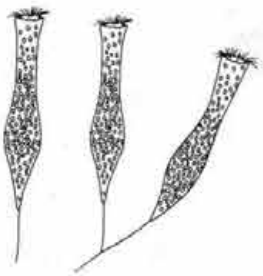
protargol-impregnated peritrich

size (extended)

40–50 µm

250–400 µm

Vorticella chlorellata
44–64 µm
(p. 491)

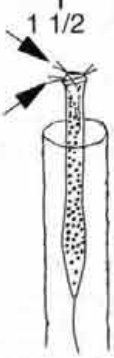


O. naumanni
solitary or colonies with ≤20 zooids
(p. 551)

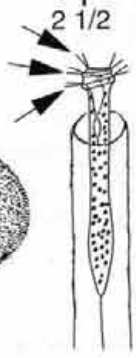
number of turns of adoral ciliary spiral on peristomial disc (arrows)

1 1/2

2 1/2



colonies up to 15 cm across



contracted *Ophrydium* 50–150 µm

O. versatile
300–400 µm
(p. 543)

O. eutrophicum
250–350 µm
(p. 540)

size

<200 µm
Special key VI

>200 µm

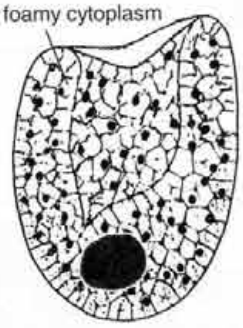
shape

cap-shaped in lateral view, cordiform in ventral view (populations with few zoochlorellae frequent)

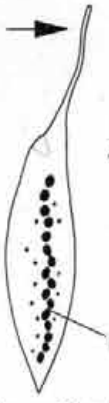
broadly ellipsoidal

1 proboscis

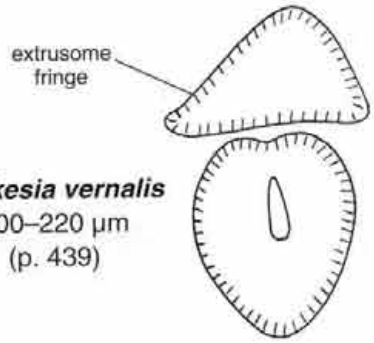
3 proboscides



foamy cytoplasm



macronucleus



extrusome fringe

Stokesia vernalis
100–220 µm
(p. 439)

Bursellopsis spumosa
400–800 µm
(p. 372)

Pelagodileptus trachelioides
230–800 µm
(p. 232)

Teuthophrys trisulca trisulca
150–300 µm
(p. 238)

Special key VI (grass green coloured, usually by zoochlorellae)

from Special key V

size

<100 µm
Special key VII

100–200 µm

shape

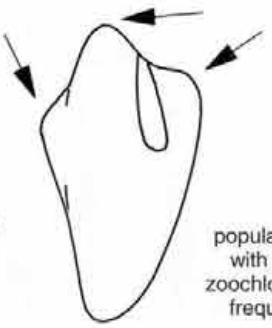
with 3 proboscides

Teuthophrys trisulca trisulca
150–300 µm
(p. 238)

with prominent oral cone

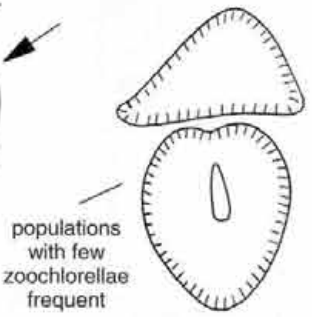
Didinium chlorelligerum
80–110 µm
(p. 167)

pyramidal, anterior end with 3 hucksters



Disematostoma tetraedricum
100–150 µm
(p. 414)

cap-shaped in lateral view, cordiform in ventral view



Stokesia vernalis
100–220 µm
(p. 439)

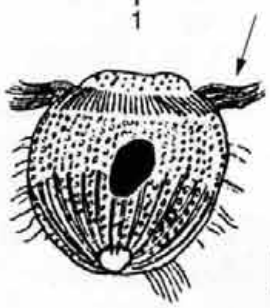
globular, ellipsoidal, or obovoidal

ciliary girdles

5–7

Pelagovasicola cinctum
50–180 µm
(p. 213)

1

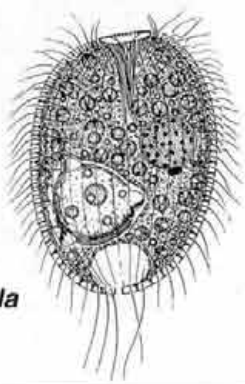


Cyclotrichium viride
66–150 µm
(p. 205)

lacking

shape; mouth

ellipsoidal; apical

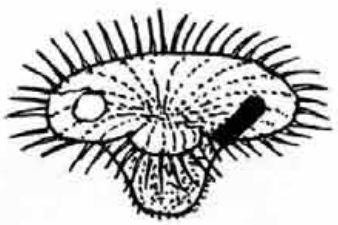


Pelagothrix plancticola
55–100 µm
(p. 401)

obovoidal; subapical

Disematostoma buetschlii
110–200 µm
(p. 409)

broadly campanulate



Lilliimorpha viridis
diameter 110 µm
(p. 164)

Special key VII (grass green by zoochlorellae or cleptoplasts)

AM = adoral zone of membranelles

from Special key VI

conspicuous ciliary corona (AM) at anterior end

present

absent
Special key VIII

shape; jumping bristles

globular, urceolate or pyriform; present

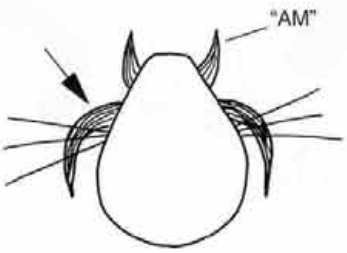
obconical; absent

sickle-shaped ciliary tufts present

no

yes

"AM"



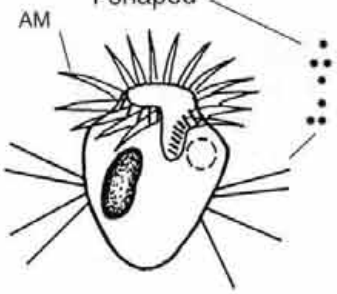
Askenasia chlorelligera
30–50 µm
(p. 151)

shape of jumping bristle complexes (protargol preparation necessary!)

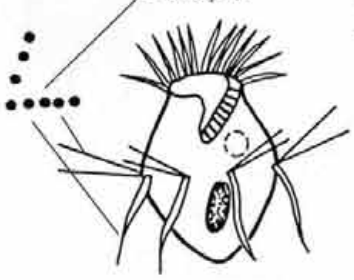
I-shaped

L-shaped

AM



Halteria bifurcata
20–30 µm
(p. 554)



Pelagohalteria viridis
20–30 µm
(p. 569)

distinct cortical ridges

absent

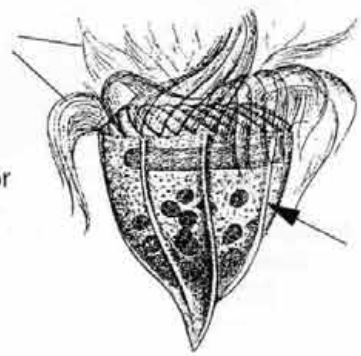
present

buccal cavity; inner portion of adoral zone

flat, short; extends almost horizontally near anterior body end

deep, long; extends meridionally to near posterior body end

AM



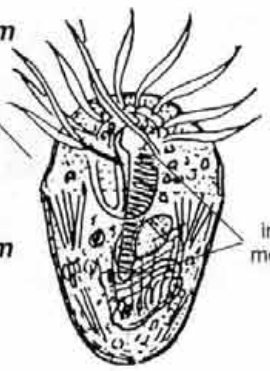
Rimostrombidium velox
30–50 µm
(p. 604)

inner adoral membranelles

extrusomes

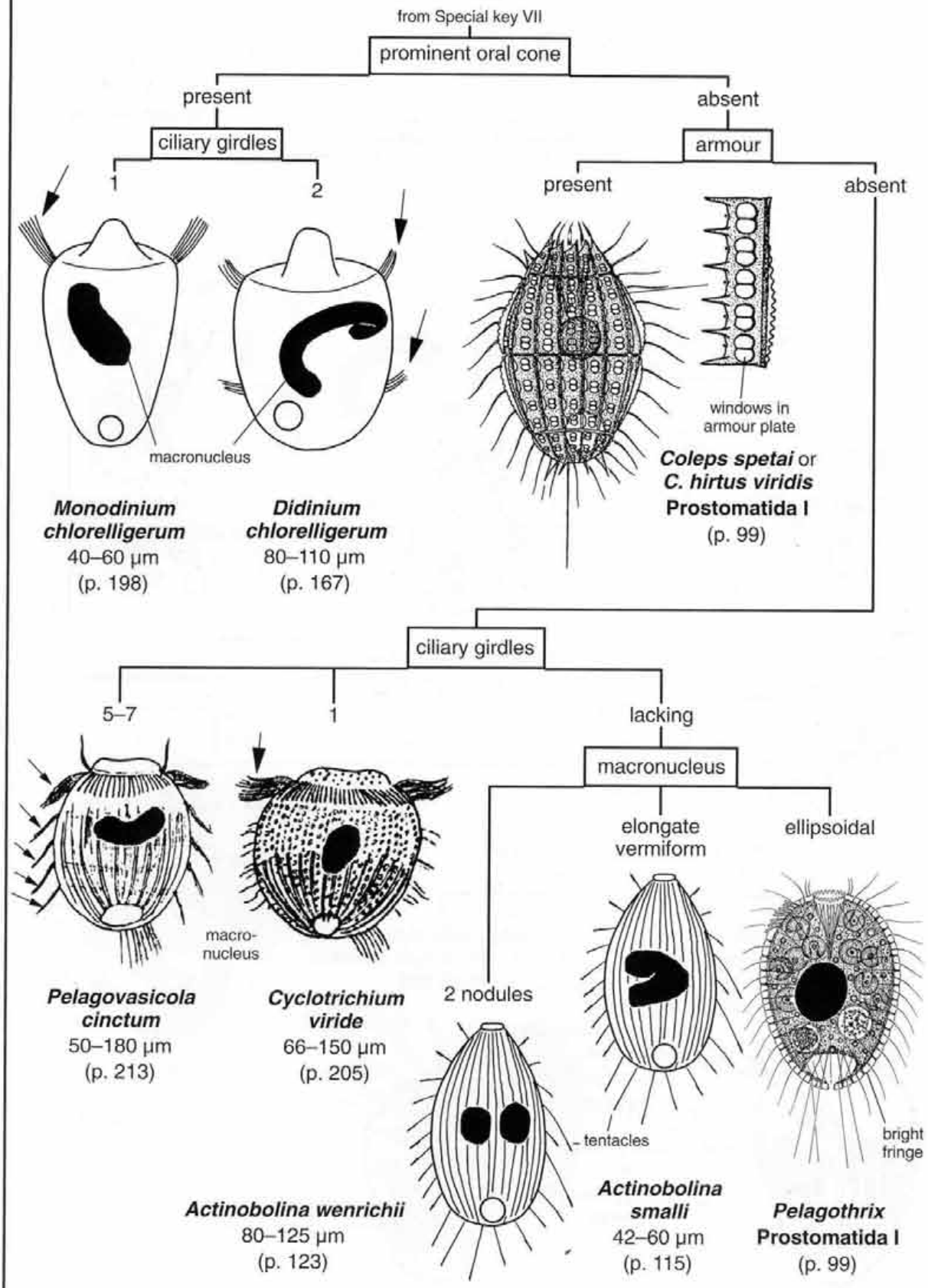
Pelagostrombidium mirabile
30–70 µm
(p. 590)

Limnostrombidium viride
50–70 µm
(p. 577)



inner adoral membranelles

Special key VIII (grass green coloured, usually by zoochlorellae)

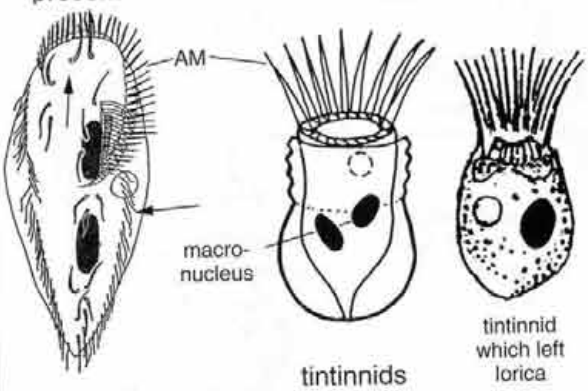


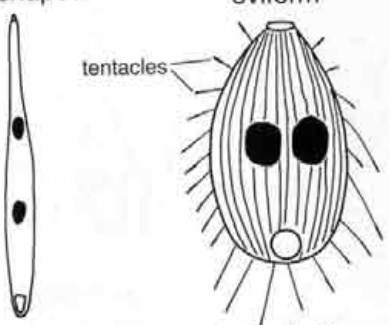
Special key IX (macronucleus)

from General keys VI, X (p. 70, 74)

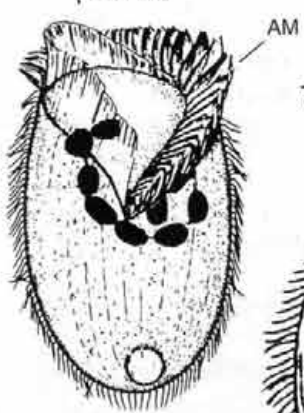
[1] Discrimination of cilia and cirri (= several adhering cilia forming fairly thick bundles): if you see cilia at a magnification of × 100–400, that is, without oil immersion, then these are very likely cirri!

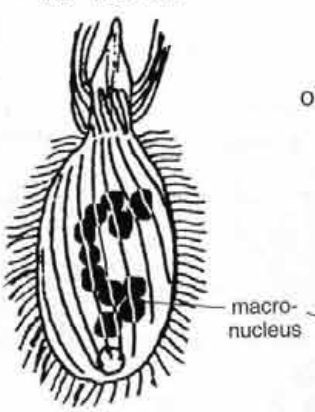
- macronucleus
  - moniliform → different → **Special key X**
  - 2 nodules
    - adoral zone of membranelles (AM)
      - present
        - cirri (arrows)[1]
          - present → **Hypotrichia** (p. 106)
          - absent → tintinnids **Oligotrichida I** (p. 103)
      - absent
        - size; shape
          - 300–500 µm; club-shaped → ***Lepidotrachelophyllum lineare*** (p. 262) or ***Trachelophyllum* spp.** (species not treated)
          - 80–125 µm; oviform → ***Actinobolina wenrichii*** (p. 123)





- adoral zone of membranelles (AM)
  - present → ***Linostomella vorticella*** 100–210 µm (p. 655)
  - absent
    - size
      - 70–120 µm → ***Pelagolacrymaria moserae*** (p. 265)
      - >100 µm
        - trunk; zoochlorellae
          - obconical; absent → ***Paradileptus elephantinus*** 100–450 µm (p. 221)
          - fusiform; present → ***Pelagodileptus trachelioides*** 230–800 µm (p. 232)





Special key X (macronucleus)

from Special key IX

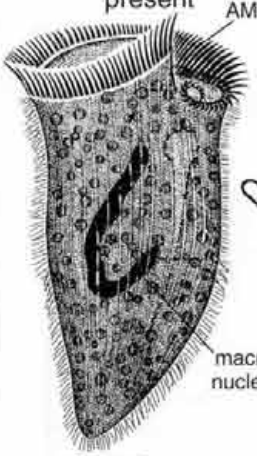
macronucleus

vermiform

adoral zone of membranelles (AM)

present

AM

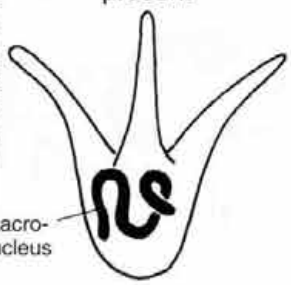


Stentor araucanus
100–270 µm
(p. 671)

absent

3 proboscides

present



Teuthophrys trisulca
150–300 µm
(p. 238)

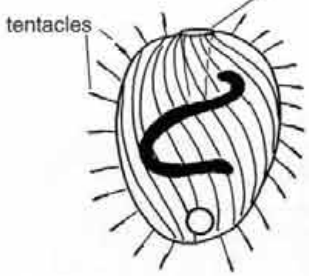
absent

meridional somatic ciliary rows

present

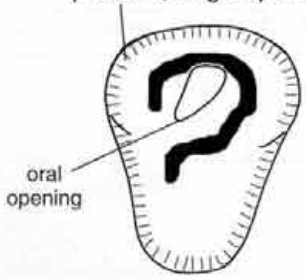
extrusome fringe; oral apparatus

absent; small funnel



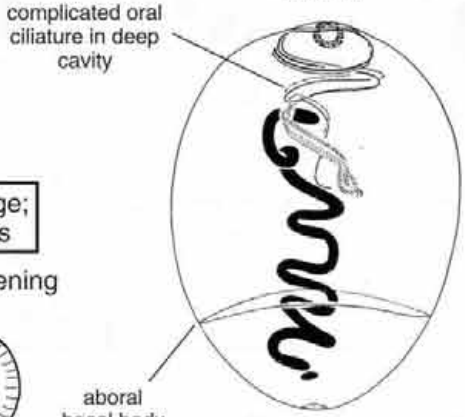
Actinobolina radians or ***A. vorax***
(Gymnostomatea II)
(p. 91)

present; large opening



Marituja pelagica
80–160 µm
(p. 431)

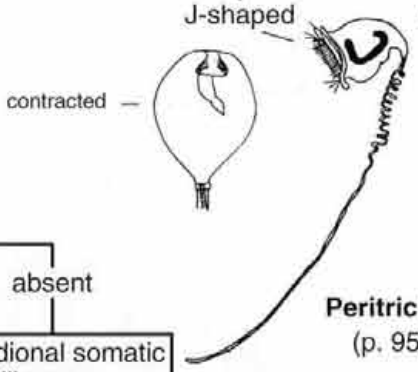
absent



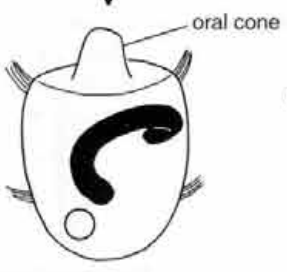
Ophrydium
Peritrichia I
(p. 95)

J-shaped

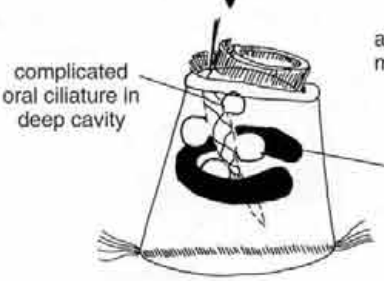
C-shaped



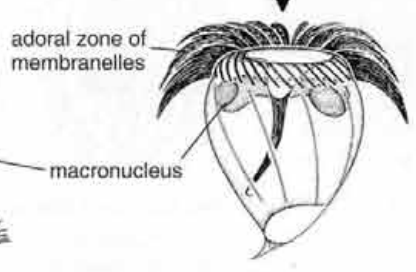
Peritrichia
(p. 95)



Didinium/Monodinium
Gymnostomatea III, V
(p. 92, 93)

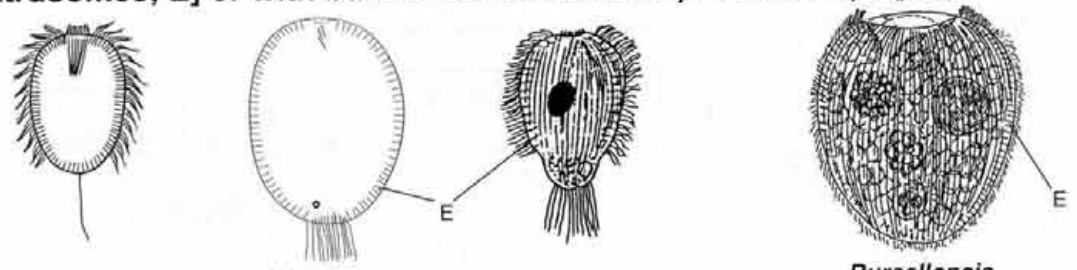


Peritrichia
(p. 95)



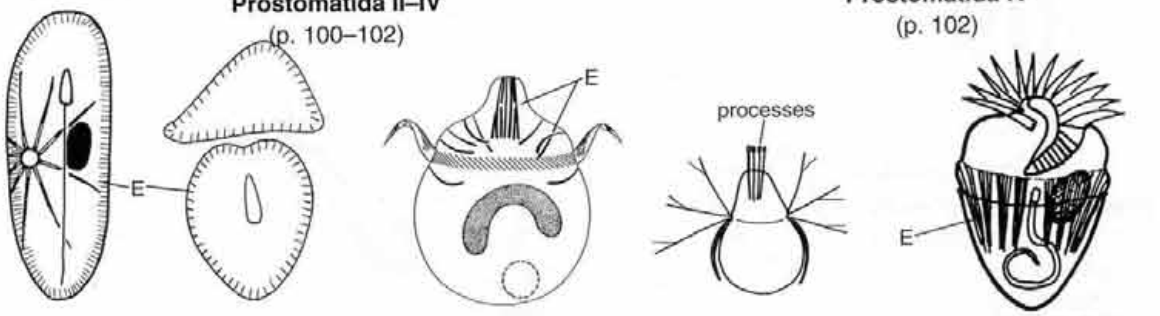
Rimostrombidium
Oligotrichida III
(p. 105)

Special key XI (species with conspicuous fringe of rods [extrusomes; E] or with bundles of extrusomes) from General key VI (p. 70)



Urotricha
Prostomatida II–IV
(p. 100–102)

Bursellopsis
Prostomatida IV
(p. 102)



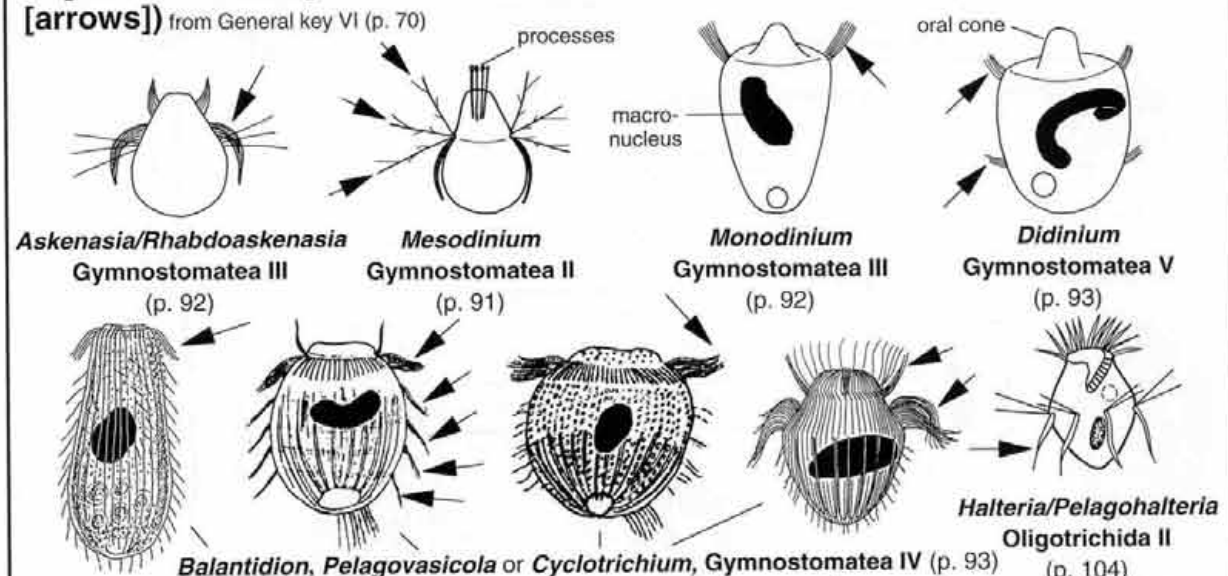
all hymenostomes
Hymenostomata
(p. 94)

Monodinium
Gymnostomatea III
(p. 92)

Mesodinium
Gymnostomatea II
(p. 91)

Limnostrombidium or ***Pelagostrombidium***
Oligotrichida II
(p. 104)

Special key XII (species with conspicuous ciliary girdles [arrows]) from General key VI (p. 70)



Askenasia/Rhabdoaskenasia
Gymnostomatea III
(p. 92)

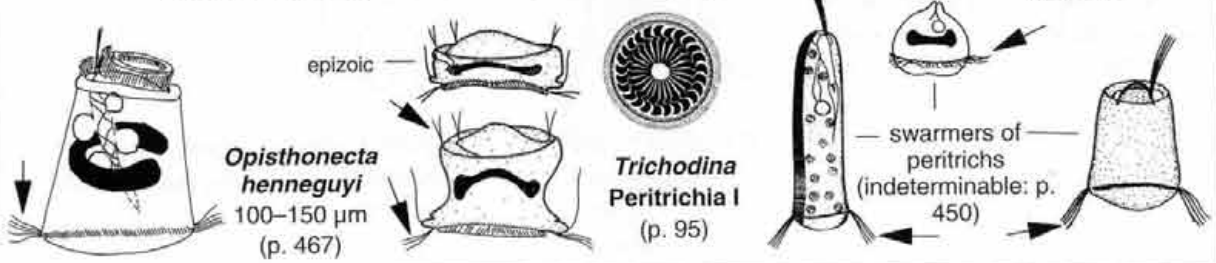
Mesodinium
Gymnostomatea II
(p. 91)

Monodinium
Gymnostomatea III
(p. 92)

Didinium
Gymnostomatea V
(p. 93)

Halteria/Pelagohalteria
Oligotrichida II
(p. 104)

Balantidion, ***Pelagovasicola*** or ***Cyclotrichium***, **Gymnostomatea IV** (p. 93)



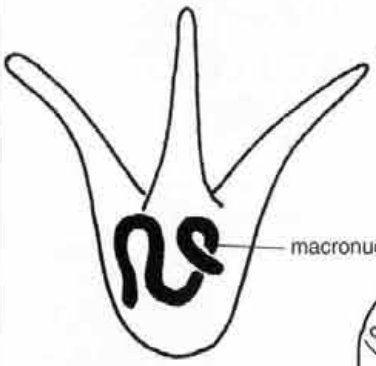
Opisthonecta henneguyi
100–150 µm
(p. 467)

Trichodina
Peritrichia I
(p. 95)

Gymnostomatea I

proboscis[1]

present (3 proboscides)

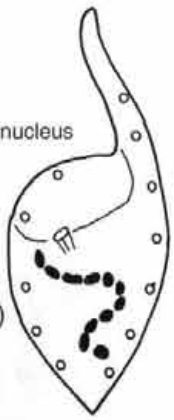


Teuthophrys trisulca trisulca (with zoochlorellae)
T. trisulca africana (without zoochlorellae)
150–300 µm
(p. 238)

present (1 proboscis)

trunk; zoochlorellae

obconical; absent



Paradileptus elephantinus
100–450 µm
(p. 221)

fusiform; present

Pelagodileptus trachelioides
230–800 µm
(p. 232)

absent

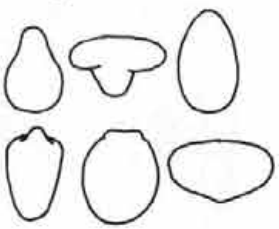
shape

elongate as shown in figures below (ciliature complete)

[1] Do not confuse with oral cone of *Monodinium/ Diniinium*

campanulate, globular, oviform, pyriform, ellipsoidal, with oral cone

Gymnostomatea II



size

<150 µm

anterior end

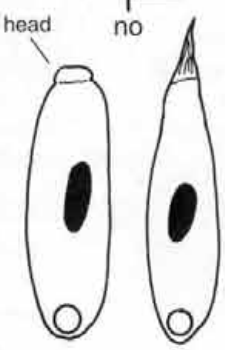
transversely truncated

Balantidion pellucidum
70–100 µm
(p. 252)

with ± distinct head

head conspicuous

no



Lagynophrya acuminata
70–95 µm
(p. 258)

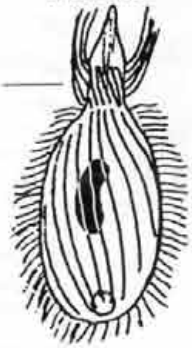
yes

macronucleus

10–21 nodules

Pelagolacrymaria moserae
70–120 µm
(p. 265)

reniform



Pelagolacrymaria rostrata[2]
100–120 µm
(p. 267)

300–500 × 60–125 µm

Lepidotrachelophyllum lineare
(p. 262)

[2]Species not treated in detail!

Gymnostomatea II

from Gymnostomatea I

ciliary girdles[1]; tentacles (in morbid specimens often difficult to recognize)[2]

[1] Inconspicuous in *Mesodinium*, where they appear bristle-like

[2] Usually, tentacles are numerous retractile rods with a small distal knob, i. e. are widest at the anterior end. Cilia, cirri (= bundle of cilia), ad- oral membranelles, and spines gradually narrow to the distal end, i. e. are widest at the posterior (proximal) end

absent; present

zoochlorellae

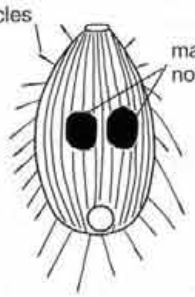
present

macronuclear nodules

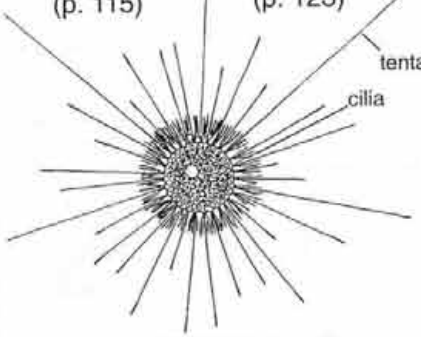
1

2

Actinobolina smalli
42–60 µm
(p. 115)



Actinobolina wenrichii
80–125 µm
(p. 123)



Actinobolina/Belonophrya
with extended tentacles

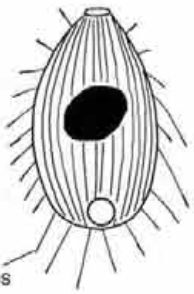
Do not confuse with → Suctoria and Heliozoa which lack cilia, or with → *Mesodinium* spp. which are ≤30 µm

present; absent

absent

shape of macronucleus

ellipsoidal to reniform



Belonophrya pelagica
40–70 µm
(p. 124)

vermiform

shape; ciliary rows

oviform; 30–60, meridional

Actinobolina vorax
100–200 µm (p. 118)

obovoidal; about 30, distinctly spiral

Actinobolina radians
65–90 µm
(p. 112)

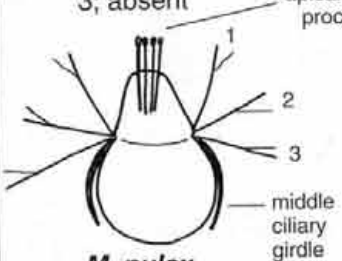
apical processes; size; bristles distally furcated

present; 12–30 µm; yes
Mesodinium

absent; >20 µm; no or bristles absent
Gymnostomatea III

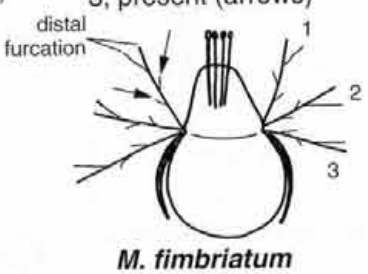
size; ciliary rows; circlets formed by anterior ciliary girdle; barbs

20–30 µm; 23–34; 3; absent



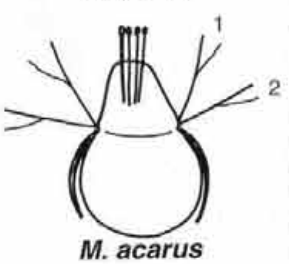
M. pulex
(p. 139)

17–22 µm; ~21; 3; present (arrows)



M. fimbriatum
(p. 138)

12–20 µm; 16–25; 2; absent



M. acarus
(p. 135)

Species not treated in detail!

Gymnostomatea III

from Gymnostomatea II

shape; size

pyriform; ≤50 µm
Askenasia and ***Rhabdoaskenasia***

with ± conspicuous oral cone; >50 µm
Didinium and ***Monodinium***

different
Gymnostomatea IV

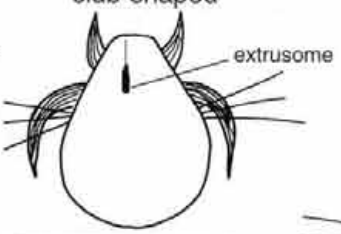
zoochlorellae

present

absent → extrusomes (use oil immersion!)

Askenasia chlorelligera
30–40 µm
(p. 151)

club-shaped



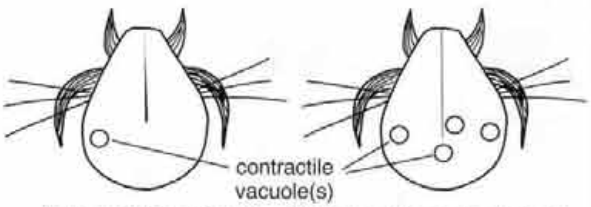
Rhabdoaskenasia minima
20–25 µm
(p. 161)

rod-shaped or acicular

contractile vacuoles; extrusomes

1; acicular

4; rod-shaped



Askenasia volvox
30–50 µm
(p. 154)

Askenasia acrostomia
40–50 µm
(p. 148)

[1] Species identification requires careful live observation, especially of extrusomes and cortex, with oil immersion

[2] Species not treated in detail!

ciliary girdles[1]

1 — ***Monodinium***

2 — ***Didinium*** or dividing ***Monodinium***
Gymnostomatea V

zoochlorellae

present

M. chlorelligerum
40–60 µm
(p. 198)

absent → conspicuous extrusome fringe on body

present

M. armatum[2]
50–60 µm
(p. 185)

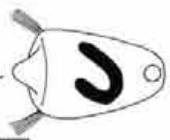
absent

oral cone

long

M. balbianii rostratum
65–100 µm
(p. 196)

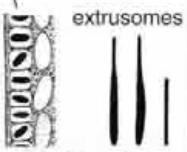
short



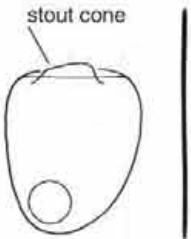
peculiar alveolar layer (AL)[1]

absent

AL present



M. alveolatum
50–65 µm
(p. 178)



cone; extrusomes

stout; rod-shaped, 3 types: 2 µm, 6 µm, 15–20 µm long

M. balbianii breviproboscis
45–70 µm
(p. 190)

short; rod-shaped, 1 type, 5–10 µm long

M. balbianii balbianii
50–120 µm
(p. 182)

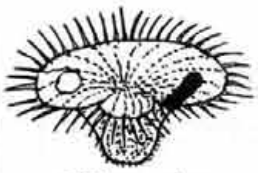
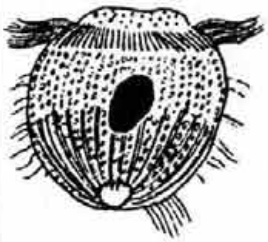
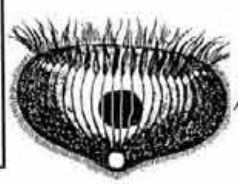
short; 3 types, as shown below

M. perrieri
50–70 µm
(p. 202)

Gymnostomatea IV

from Gymnostomatea III

shape

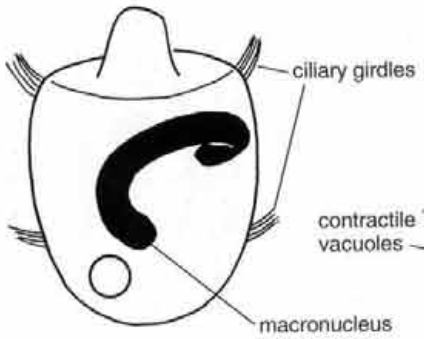
- broadly campanulate (zoochlorellae present)
  - 
  - ***Liliimorpha viridis***
    diameter 110 µm
    (p. 164)
- almost disciform, that is, distinctly wider than long
  - 
  - ***Cyclotrichium humilis***[1]
    25 × 56 µm
- obovoidal or globular
  - ciliary girdles
    - 5–7 distinct girdles
      - 
      - ***Pelagovasicola cinctum***
        50–180 µm
        (p. 213)
    - 1–2 girdles
      - green due to zoochlorellae
        - yes
          - 
          - ***Cyclotrichium viride***
            66–150 µm
            (p. 205)
        - no
          - size; shape
            - about 100 µm; broader than long
              - 
              - ***Cyclotrichium brunneum***[1]
            - about 60 µm; longer than broad
              - 
              - ***Cyclotrichium faurei***[1]
                (p. 215)

[1] Species not treated in detail!

Gymnostomatea V

from Gymnostomatea III

zoochlorellae; size

- present; 80–110 µm
  - 

  - ***Didinium chlorelligerum***
    (p. 167)
- absent; 80–200 µm, usually about 150 µm
  - 

  - dividing ***Monodinium*** spp. have 2 contractile vacuoles!
  - ***Didinium nasutum***
    (p. 171)
    dividing *Didinium* spp. have 2 contractile vacuoles and 4 ciliary girdles

Hymenostomata

All species with distinct extrusome fringe!

size

>40 µm

15–50 µm
Hymenostomata VII in
FOISSNER & BERGER (1996; p. 411)

zoochlorellae[1]

present

absent

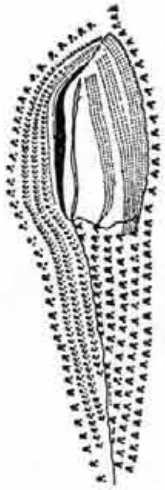
[1] Rare in several populationbs

shape; oral apparatus

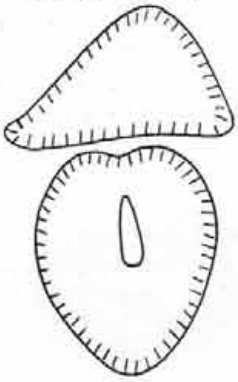
cap-shaped in lateral view, cordiform in ventral view; near mid-body

obovoid; in anterior half of body

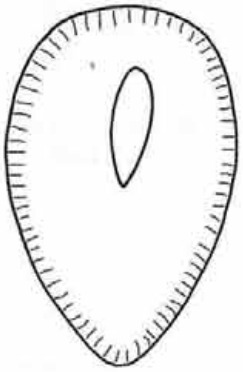
calyx-shaped, anterior end with 3 hucksters (arrows); in anterior third of body



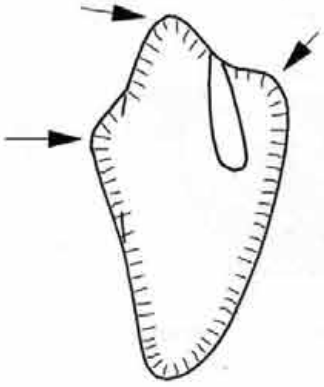
oral ciliary pattern of a hymenostome



Stokesia vernalis
100–220 µm
(p. 439)



Dematostoma buetschlii
110–200 µm
(p. 409)



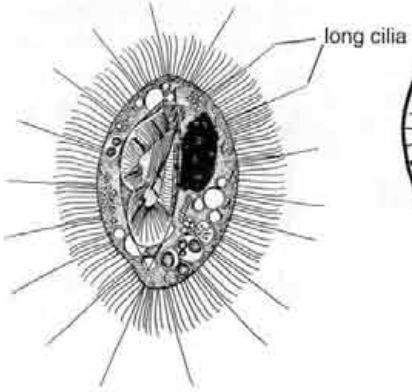
Dematostoma tetraedricum
100–140 µm
(p. 414)

length; shape

40–60 µm; broadly ellipsoidal to lemon-shaped

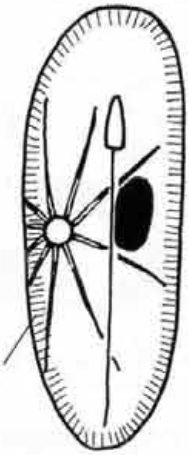
80–160 µm; obconical

120–600 µm, usually 150–350 µm; elongate obovoidal



Histiobalantium bodamicum
(p. 424)

Marituja pelagica
(p. 431)



Frontonia leucas
(p. 416)

Peritrichia I (length without stalk)

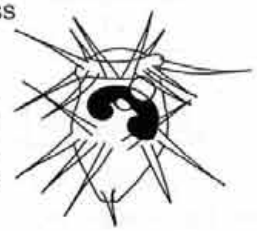
Identification of peritrichs usually requires live observation!

habitus

large, green, globular or flabby and flattened colonies up to 15 cm across

Ophrydium

with spines



Hastatella radians
40–60 µm
(p. 460)

different

stalk

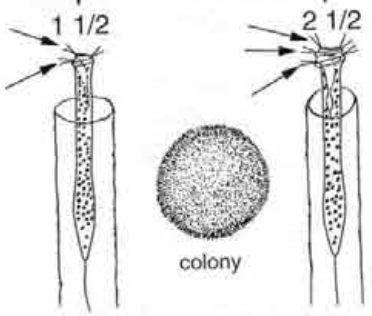
absent

present

Peritrichia II

Actually, there is no character that would unequivocally separate stalkless peritrichs from **swarmers** of stalked species. Some experience is necessary, and look for stalked peritrichs at your site. Usually, swarmers have an aboral ciliary wreath, do not whirl food into buccal cavity and/or have the oral apparatus recessed and closed. If movement is slow and staggering and the peristome open, it may be a dying stalked peritrich.

number of turns of adoral ciliary spiral on peristomial disc (arrows)



O. versatile
300–400 µm
(p. 543)

O. eutrophicum
250–350 µm
(p. 540)

aboral ciliary wreath (AW); bristles in centre of posterior end

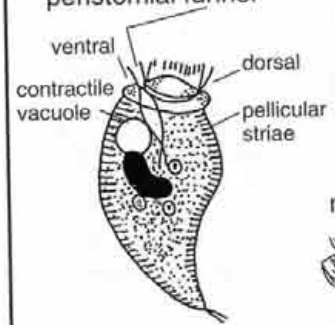
absent; present[1]

present; absent

shape; adhesive disc with denticles; life style

contractile vacuole

on ventral wall of peristomial funnel



Astylozoon fallax
40–70 µm
(p. 453)

on dorsal wall of peristomial funnel

Astylozoon faurei complex

macronucleus

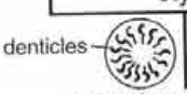
reniform

A. faurei
35–65 µm
(p. 455)

semicircular

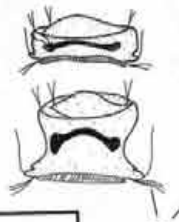
A. enriquesi
35–65 µm
(p. 455)

denticles



coin-shaped or reel-shaped; present; epizoic

Trichodina



like a truncated cone; absent; free-living

AW

Opisthonecta henneguyi[2]
100–150 µm
(p. 467)

micronucleus; number of denticles in adhesive disc; host

inconspicuous; 24–36; hydrozoans, bryozoans, fish

T. pediculus
diameter 35–100 µm
(p. 472)

conspicuous; 19–22; planktonic copepods

T. domergue megamicronucleata
diameter 50–75 µm
(p. 479)

Species not treated in detail!

[1] The bristles usually clearly separate *Astylozoon* spp. from swarmers of stalked peritrichs

[2] Easily confused with swarmes of stalked peritrichs; look for large oral apparatus, where the adoral ciliature makes 3–4 windings within buccal cavity (see introduction to group; p. 450). However, other *Opisthonecta* species have a normal-sized oral apparatus and are thus even more difficult to separate from swarmers of stalked peritrichs.

Peritrichia II

(length without stalk)

from Peritrichia I

lorica

present (usually hyaline or deserted and thus easily overlooked)
Ophrydium versatile or
O. eutrophicum (→ **Peritrichia I**)

There are rather many loricate epiphytoplanktonic peritrichs (*Vaginicola*, *Thuricola*, ...), which are poorly known and were thus excluded from the book (for determination, consult KAHL 1935, SOMMER 1951, STILLER 1940, 1971)

absent

mode of life

epiplanktonic, that is, attached to other planktonic organisms (or debris)
Peritrichia III

euplanktonic, that is, not attached to other plankton organisms or debris[1]

[1] Occasionally, epiplanktonic, colonial peritrichs detach with the stalk from the substrate. If in doubt, follow keys "Peritrichia III, IV"

stalk

branched (colonial)

stalk; shape; zoochlorellae

contractile; campanulate; absent

acontractile; campanulate; absent

acontractile; vase-shaped (globular when contracted); present

unbranched (solitary)

shape; zoochlorellae; stalk

vase-shaped; present; acontractile

campanulate or pyriform; absent; contractile

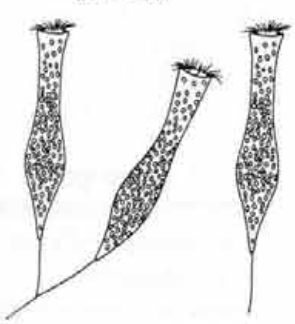
peristomial collar; stalk contraction

wider than body; srew-like (arrow)

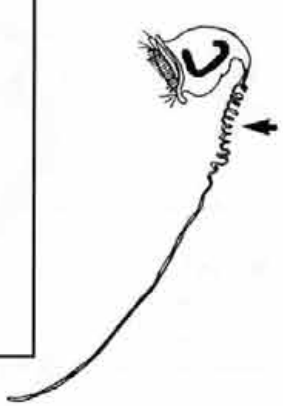
narrower than body; whipe-like

Epicarchesium pectinatum
40–70 µm
(p. 508)

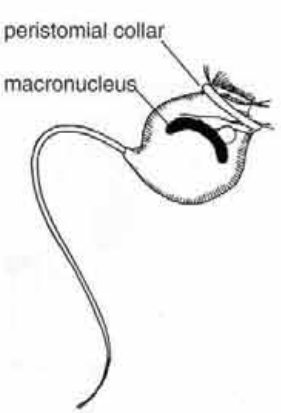
Epistylis procumbens
60–140 µm
(p. 527)



Ophrydium naumanni
solitary or in small colonies
40–50 µm
(p. 551)



Pelagovorticella natans
70–100 µm
(p. 482)



Pelagovorticella mayeri
30–55 µm
(p. 480)

Peritrichia III

(length without stalk)

from Peritrichia II

stalk

unbranched (solitary) — branched (colonial) ***Epistylis*** **Peritrichia IV**

zoochlorellae

present — absent

present ***Vorticella chlorellata*** 44–64 µm (p. 491)

stalk muscle

present — absent

stalk contraction; stalk length

zigzag (sinuous); usually ≤ body length ***Pseudohaplocaulus*** (usually attached to *Anabaena*)

helical; usually ≥ body length ***Vorticella*** and ***Pseudovorticella***

absent ***Epistylis pygmaeum*** 22–50 µm epibiontic on planktonic rotifers and crustaceans (p. 535) or *Rhabdostyla* species

size; shape;surface; granules on stalk muscle

15–55 µm, usually 35 µm; pyriform; coarse transverse striae; very inconspicuous

40–56 µm; campanulate; fine transverse striae, few to numerous blisters;; inconspicuous

50–70 µm; campanulate; fine transverse striae; conspicuous

50–70 µm; campanulate; vesicular; inconspicuous

contractile vacuole

benthic and epiphyto-planktonic

Vorticella aquadulcis complex (p. 486)

usually attached to planktonic diatom colonies

Vorticella vernalis (p. 494)

usually benthic

Vorticella picta (p. 496)

usually benthic

Pseudovorticella monilata

Species not treated in detail! (detailed description in FOISSNER et al. 1992c)

location of contractile vacuoles (arrows)

both on ventral wall of peristomial funnel

dorsal

ventral

P. infravacuolatus 47–67µm (p. 501)

Pseudohaplocaulus infravacuolatus

arrows mark *Vorticella chlorellata*

one on ventral, the other on dorsal wall of peristomial funnel

P. anabaenae 40–50 µm Species not treated in detail!

Peritrichia IV

(length without stalk)

from Peritrichia III

stalk

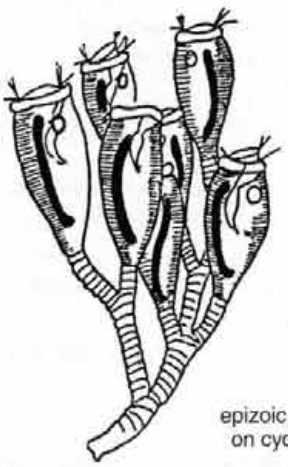
annulated

smooth

size

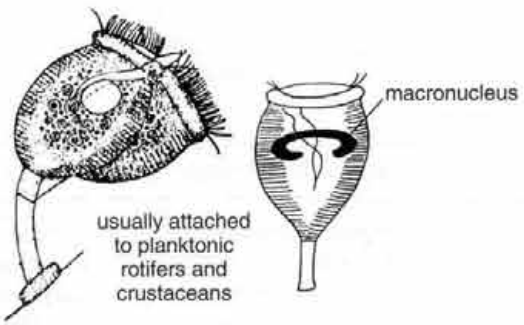
22–50 µm

>60 µm



epizoic, mainly on cyclopids

Epistylis digitalis
60–120 µm
(p. 523)

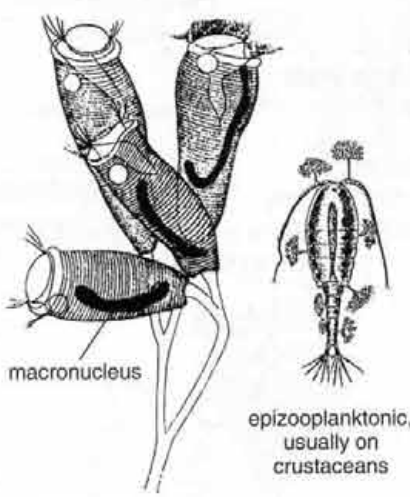


Epistylis pygmaeum
(p. 535)

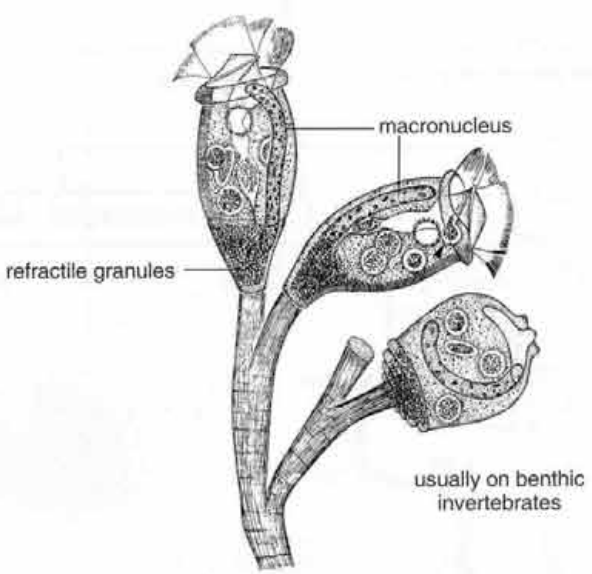
size; stalk; shape

60–100 µm; 8–12 µm; funnel-shaped

>100 µm; 20–26 µm; barrel-shaped



Epistylis anastatica
(p. 515)



Epistylis nympharum
(p. 521)

Species not treated in detail!

Prostomatida I

Species identification usually requires live observation **and** silver impregnation. Study carefully "Comparison with related species"!

[1] Do not confuse with extrusome fringe!

fenestrated armour plates and minute spines at rear end

present

Coleps

absent

zoochlorellae

present

absent

anterior main plates

windows in armour plates

with 5 windows each, marginal ridge wing-like broadened (arrowheads)

with 4 windows each, marginal ridge not wing-like broadened

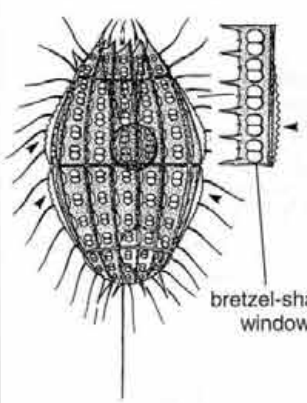
bretzel-shaped

reniform

anterior main plates; caudal cilia

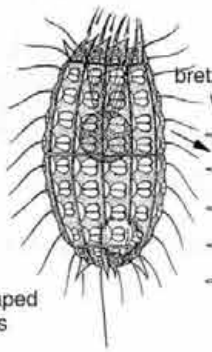
with 4 windows each; 1

with 5 windows each; 2



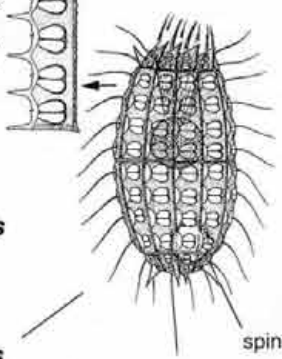
bretzel-shaped windows

C. spetai
50–70 µm
(p. 288)



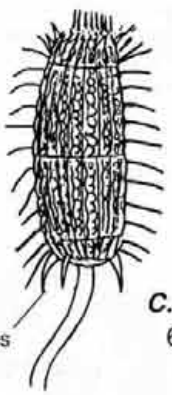
bretzel-shaped window

C. hirtus viridis
40–50 µm
(p. 284)

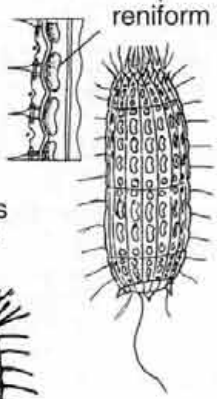


spines

C. hirtus hirtus
40–65 µm
(p. 273)



C. elongatus
60–80 µm
(p. 292)

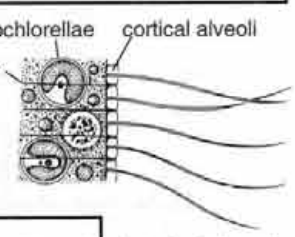


C. nolandi
40–65 µm
(p. 297)

cortex

inconspicuous
Prostomatida II

conspicuous **alveoli** form bright fringe[1]
Pelagothrix

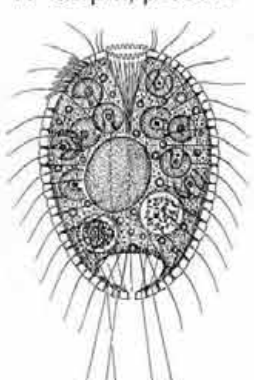


body shape; cross-section; size; extrusomes

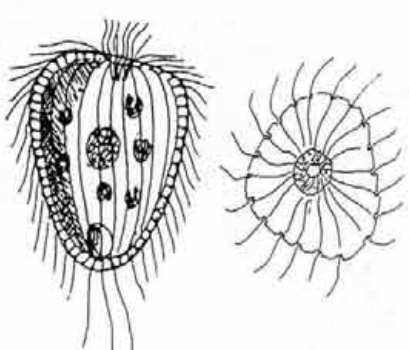
obovoidal; circular; 40–60 µm, present

triangular; triangular; 30–40 µm; absent?

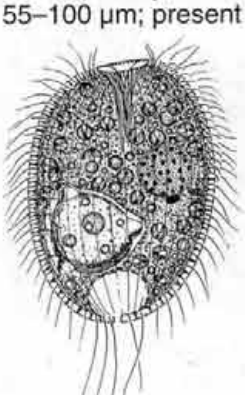
broadly ellipsoidal and obliquely truncate anteriorly; ± circular; 55–100 µm; present



P. chlorelligera
(p. 395)



P. alveolata
(p. 397)
Not treated in detail!



P. plancticola
(p. 401)

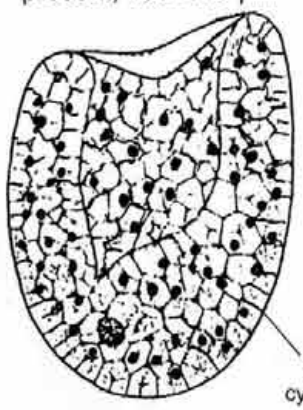
Prostomatida II

from Prostomatida I

[1] Species identification needs silver impregnation

zoochlorellae; size

present; 400–800 µm



Bursellopsis spumosa
(p. 372)

absent; ≤250 µm

size

<50 µm

number of caudal cilia

≥3 (usually at least 4)

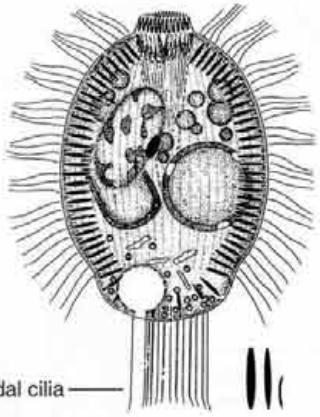
extrusomes

fusiform

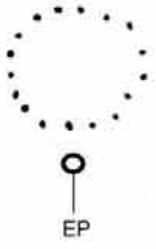
ciliary rows; excretory pore (EP) of contractile vacuole[1]

51–62; within circle formed by caudal cilia

42–50; outside circle formed by caudal cilia



Urotricha apsheronica
40–75 µm (p. 302)



Urotricha pelagica
40–70 µm (p. 309)

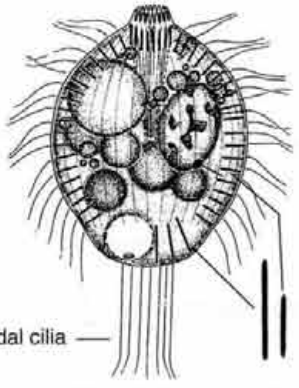
rod-shaped

extrusomes; ciliary rows

2.5–4.0 µm long; 40–50

Urotricha matthesi

2 size types: somatic ones 3 µm long, those in posterior plug 6 µm long; about 30



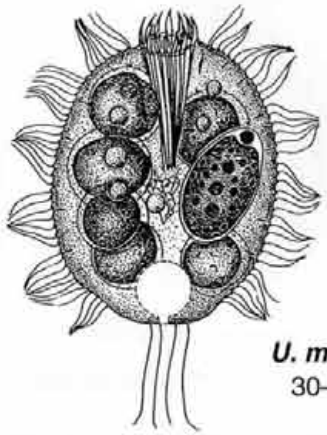
Urotricha castalia
30–40 µm
(p. 335)

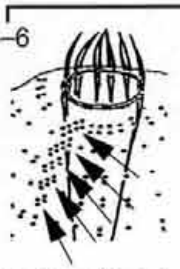
>50 µm
Prostomatida IV
(p. 102)

1 or 2
Prostomatida III

number of adoral organelles (arrows)[1]

5–6

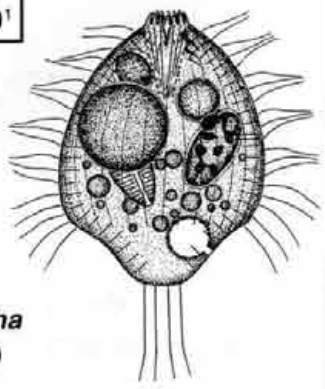




U. matthesi matthesi
30–45 µm (p. 340)

3

U. matthesi tristicha
35–45 µm (p. 342)



Prostomatida III

from Prostomatida II

number of caudal cilia

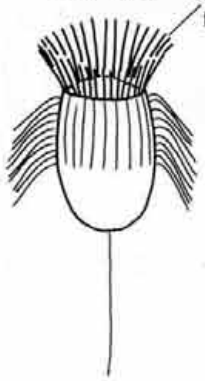
1

2

mouth; mouth flaps

as wide as body; very long

mouth flaps

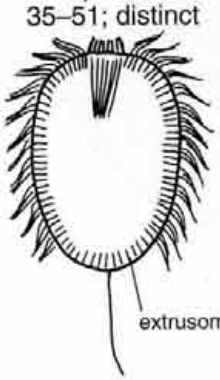


Balanion planctonicum
10–22 µm
(p. 363)

small; short
Urotricha

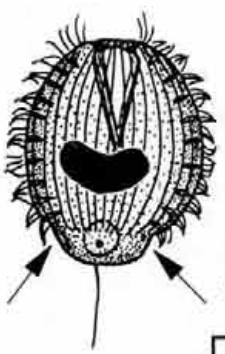
size; shape; number of ciliary rows; extrusomes

30–55 µm; broadly ellipsoidal; 35–51; distinct

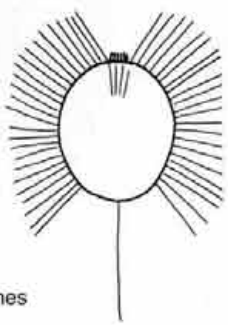


extrusomes

U. platystoma
(p. 359)
globular macronucleus!
or
U. dragescoi → Species not treated in detail!
(p. 361)
posterior, unciliated body portion distinctly set off plug-like and reniform macronucleus!



18–25 µm; globular; 17–25; inconspicuous



U. globosa
(p. 357)

15–30 µm; jug-shaped; 20–25; inconspicuous

U. farcta
(p. 351)

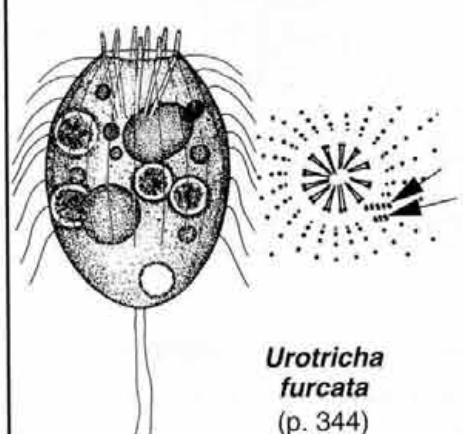
10–20 µm; cone-shaped; 12–14; inconspicuous

mouth flaps

U. agilis
(p. 348)

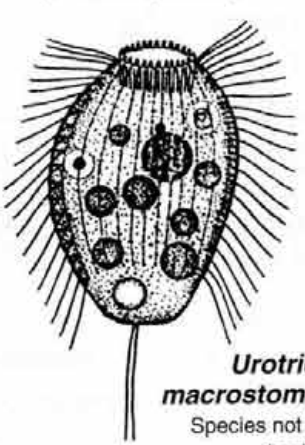
size; shape; number of adoral organelles (arrows); extrusomes

20–30 µm; broadly ellipsoidal; 2; absent



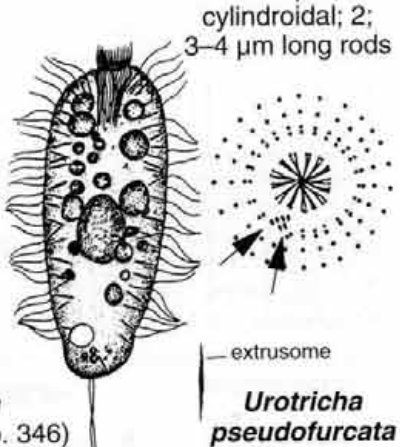
Urotricha furcata
(p. 344)

30–40 µm; ellipsoidal; 3; present (minute)



Urotricha macrostoma (p. 346)
Species not treated in detail!

15–30 µm; ± cylindroidal; 2; 3–4 µm long rods



extrusome

Urotricha pseudofurcata
(p. 347)

Prostomatida IV

from Prostomatida II (p. 100)

AO = adoral organelles = brosse; EP = excretory pore of contractile vacuole; OB = oral basket; UM = undulating membrane

[1] If in doubt, use brosse (silver impregnation or interference contrast)

oral opening

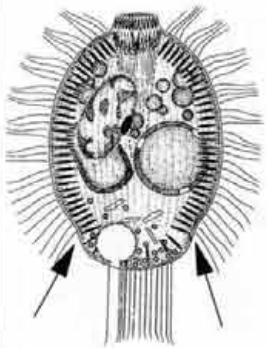
inconspicuous — large

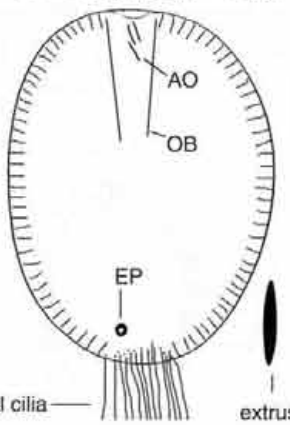
shape; caudal cilia

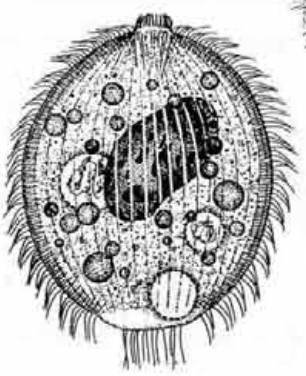
posterior, unciliated body portion plug-like set off from rest of cell; present — ovoid or globular; present — globular; absent

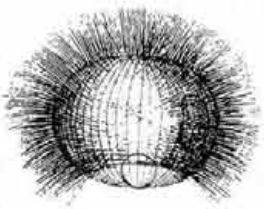
size; ciliary rows

60–120 × 40–80 µm; 98–127 (mean = 106) — 55–70 × 45–55 µm; 76–87 (mean = 81)









Longitricha puytoraci
about 50 µm
(p. 368)

extrusomes fusiform in all species

Urotricha venatrix
(p. 315)

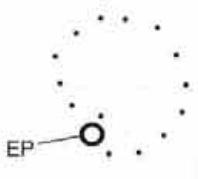
Urotricha valida
(p. 313)

cilary rows; excretory pore of contractile vacuole

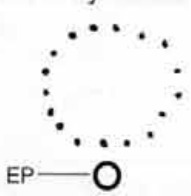
! (footnote 1)

brosse

51–62; within circle formed by caudal cilia — 42–50; outside circle formed by caudal cilia — 12–20 obliquely arranged short rows — 3 ± meridionally arranged, long rows

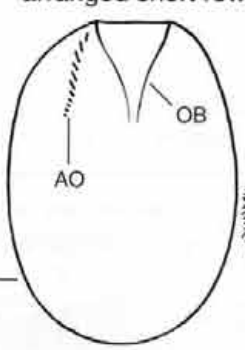


Urotricha apsheronica
40–75 µm
(p. 302)

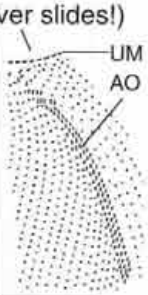


Urotricha pelagica
40–70 µm
(p. 309)

Urotricha simonsbergeri
70–120 µm
(p. 324)



Bursellopsis
(identification difficult, requires silver slides!)



size (in life); ciliary rows (mean, range); oral basal body pairs (mean, range); extrusomes

130–250 µm; 159, 130–198; 121, 97–160; rod-shaped, 10 µm long — 100–200 µm; 116, 95–140; 75, 60–98; fusiform, 5–7 µm long — 80–180 µm; 90, 85–104; -, 46–60; fusiform, 3–4 µm long — 50–110 µm; 60, 52–69; 42, 32–50; fusiform, 2.0–2.5 µm long

B. pelagica
(p. 375)

B. nigricans mobilis
(p. 387)

B. nigricans nigricans
(p. 383)

B. truncata
(p. 391)

Oligotrichida I

lorica[1,2]

present

absent

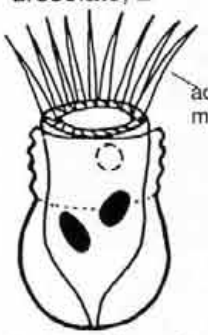
Oligotrichida II

shape of lorica; macronuclear nodules

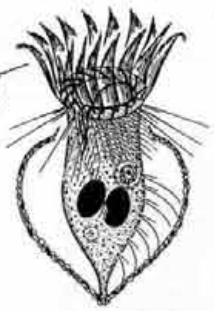
urceolate; 2 | cordiform; 2 | funnel-shaped; 2 | tubular; 1 or 2

[1] Do not confuse deserted loricae with shells of testate amoebae!

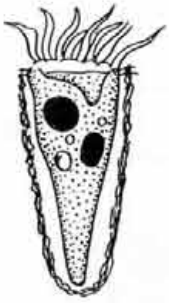
[2] Lorica often deserted when sample is older than 30 min. Specimens without lorica become stout-cylindroidal or globular and are thus easily confused with other oligotrichs, especially *Rimostrombidium* spp. Check macronucleus and/or ciliary pattern!



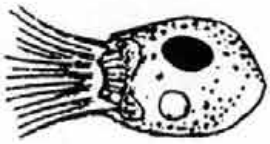
Codonella cratera
lorica 43–63 µm
(p. 617)



Stenosemella lacustris
lorica 40–48 µm (p. 618)
Species not treated in detail!



Tintinnidium ephemeridum
lorica 130–160 µm
(p. 636)



macronuclear nodules; subterminal lorica membrane (arrows)

2; present

1; absent

lorica size

>90 µm
see footnote 3

≤90 µm

lorica

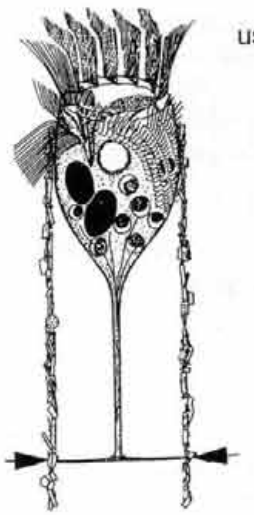
usually >100 × 30 µm, rather soft

usually <100 × 30 µm, rather stable

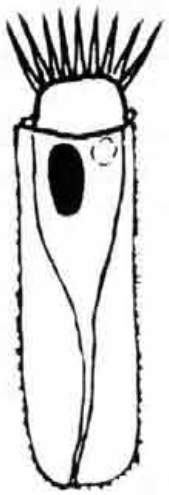
ciliary rows (silver impregnation)

composed of paired basal bodies

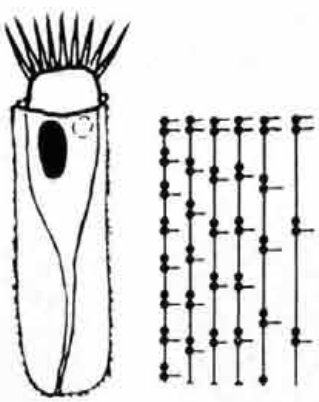
composed of single basal bodies



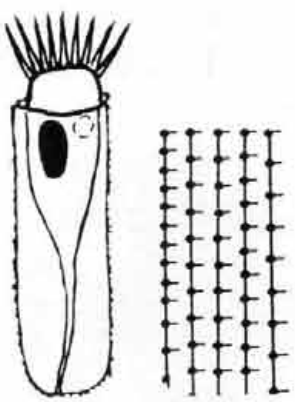
Membranicola tamari
lorica 90–160 µm
(p. 626)



Tintinnidium fluviatile
lorica 95–280 µm
(p. 637)



Tintinnidium pusillum
lorica 48–90 µm
(p. 642)



Tintinnopsis cylindrata
lorica 40–90 µm
(p. 648)

[3] Lorica of *Membranicola tamari* of similar size as in *Tintinnidium fluviatile* but composed mainly of mineral particles and thus more stable.

Oligotrichida II

from Oligotrichida I

jumping bristles

present[1] | absent

[1] Do not confuse with *Mesodinium* and *Askenasia* (→ Gymnostomatea)

shape of jumping bristle complexes (protargol impregnation!)

I-shaped
Halteria

L-shaped
Pelagohalteria

zoochlorellae; fine structure of bristle complexes

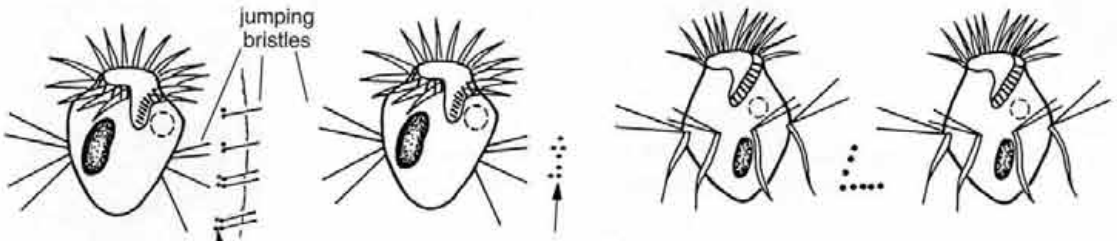
absent; 3–6 basal body pairs

present; 7 basal bodies arranged as shown

zoochlorellae; number of bristle complexes

present; 8–11

absent; 7



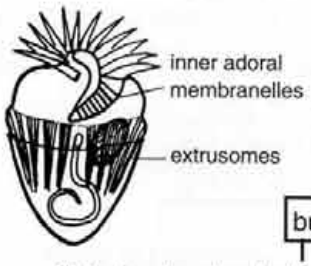
H. grandinella
20–40 µm (p. 559)

H. bifurcata
20–30 µm (p. 554)

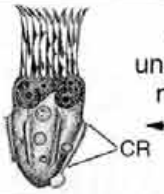
P. viridis
20–30 µm (p. 569)

P. cirrifera
25–50 µm (p. 566)

Either of the four features is sufficient to separate the groups: adoral zone of membranelles; macronucleus; distinct, rod-shaped extrusomes; ≥3 meridional to spiral ciliary rows along ± distinct cortical ridges (CR)



spiral; ellipsoidal in mid-body; present; absent
Limnostrombidium or ***Pelagostrombidium***



circular; semicircular underneath adoral zone of membranelles; absent; present
Rimostrombidium
Oligotrichida III

buccal cavity; inner adoral membranelles (IAM)

flat, short; extend almost horizontally near anterior body end: ***Limnostrombidium***

deep, long; extend meridionally underneath mid-body: ***Pelagostrombidium***

size; inner adoral membranelles; basal body pairs in ventral ciliary row (VR; silver impregnation)

colour; size; number of inner adoral membranelles

50–70 µm; 12–16; 13–18

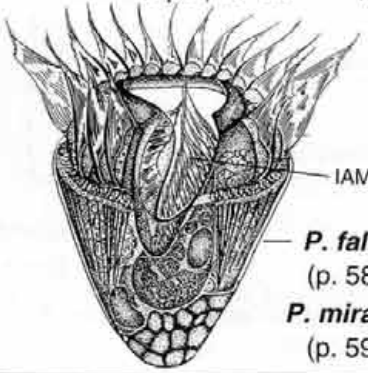
30–60 µm; 8–12; 7–10

reddish-brown (see frontispiece); 40–90 µm, mean 70 × 60 µm; 19–22

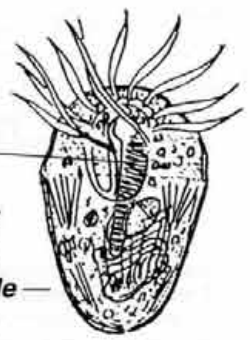
yellowish or greenish (see frontispiece); 30–70 µm, mean 43 × 38 µm; 12–17

L. viride
(p. 577)

L. pelagicum
(p. 574)



P. fallax
(p. 585)



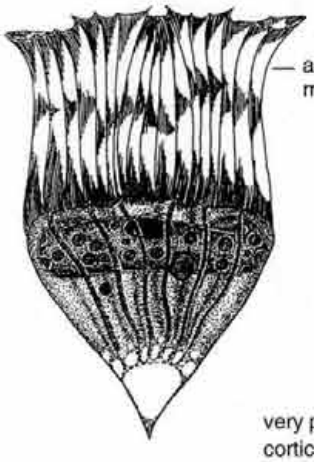
P. mirabile
(p. 590)

Oligotrichida III

from Oligotrichida II
Rimostrombidium

size

70–120 µm



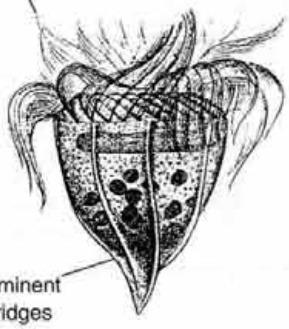
R. lacustris
(8–12 ciliary rows, mostly 10)
(p. 596)

≤60 µm

zoochlorellae

present

adoral zone of membranelles

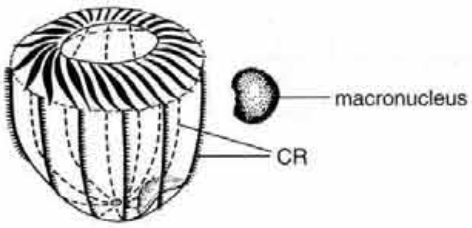


R. velox
30–50 µm
(about 8 ciliary rows)
(p. 604)

absent

macronucleus; ciliary rows (CR)

globular; about 12

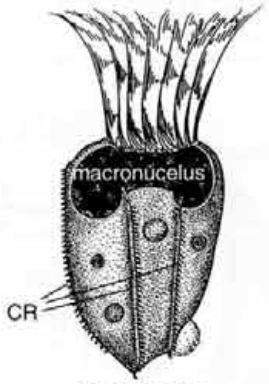


R. armeniensis
55–60 µm
(p. 595)

reniform to circular; 3 or 6 (silver impregnation)

ciliary rows (CR)

3

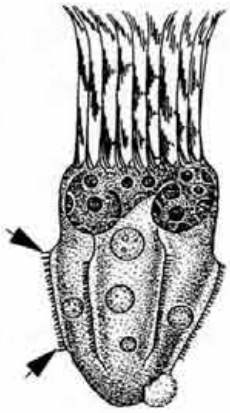


R. humile
12–38 µm
(p. 611)

6

ciliary rows (arrows)

short



R. brachykinetum
15–25 µm
(p. 606)

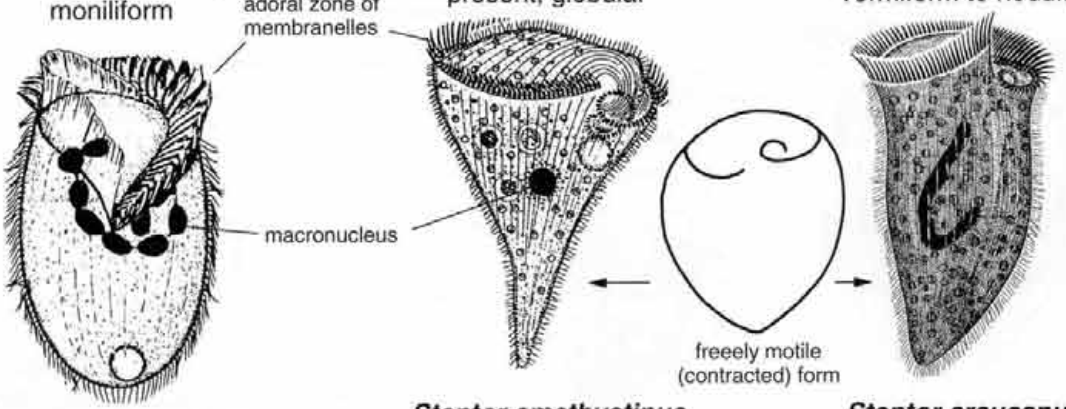
long

R. hyalinum
22–35 µm
(p. 609)

Heterotrichida

colour; zoochlorellae; macronucleus

- colourless; absent; moniliform
- dark or blackish; present; globular
- bluish-green; present; vermiform to nodular



Linostomella vorticella
100–210 µm
(p. 655)

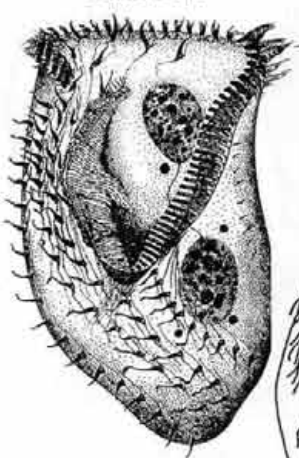
Stentor amethystinus
250–500 µm
(p. 664)

Stentor araucanus
100–270 µm
(p. 671)

Hypotrichia

shape

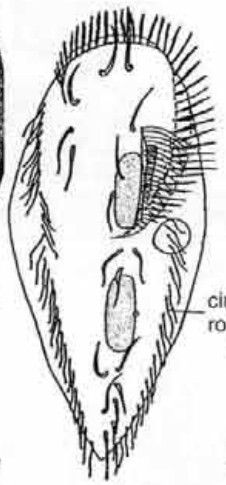
- bursiform
- different



Pelagotrichidium faurei
about 280 µm
(p. 683)
do not confuse with *Bursaridium* and *Bursaria* (→ Colpodea)

shape

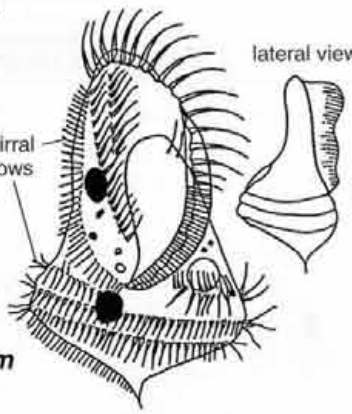
- pisciform
- bizarr



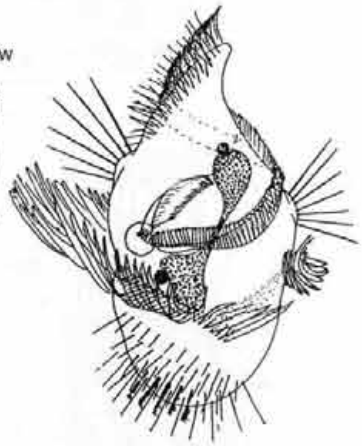
Pseudostrombidium planctonticum
120–160 µm
(p. 685)

anterior end; posterior end

- broadly rounded; with short process
- with cone-like anterior projection; broadly rounded



Hypotrichidium conicum
90–120 µm (p. 677)
(possibly several rather similar species)

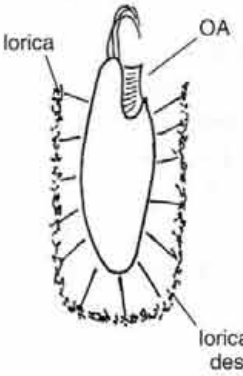


Spiretella plancticola
95–160 µm
(p. 688)

Colpodea

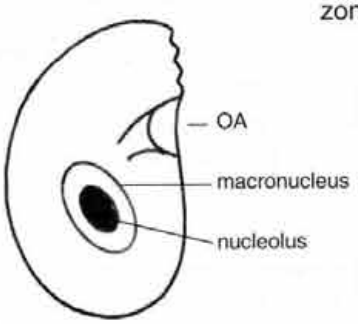
size; shape; oral apparatus (OA)

20–40 µm; ellipsoidal to ovoid; anterior



Cyrtolophosis mucicola
(p. 718)

10–60 µm, usually 20–40 µm; reniform; near midbody



Colpoda steinii
(p. 714)

80–200 µm, usually 110–150 µm; bursiform; apical in large vestibulum, adoral zone curves to right

Bursaridium pseudobursaria[2]
(p. 709)

>250 µm; bursiform; apical in large vestibulum, adoral zone curves to left

Bursaria truncatella[1,2]

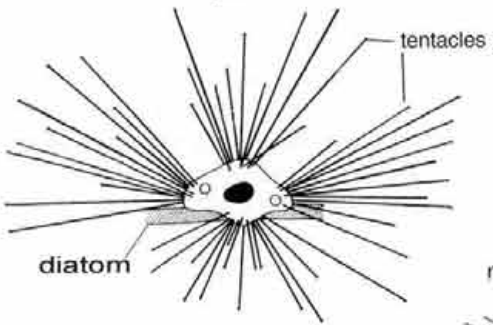
[1]Species not treated in detail!

[2] Do not confuse with *Pelagotrichidium faurei* (→ Hypotrichia)

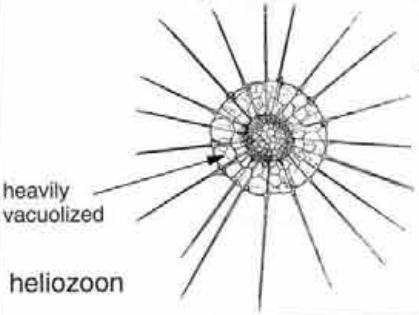
Suctoria (very likely, many epiphytoplanktonic and parasitic species have not yet been described)

epiphytoplanktonic

yes



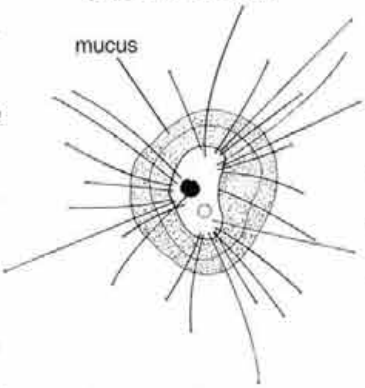
Gajewskajophrya melosirae
50–90 µm
(p. 725)



no (do not confuse with → *Actinobolina*/*Belonophrya* [Gymnostomatea II])

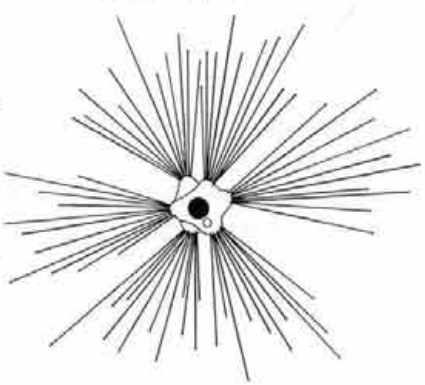
mucous layer; 6 roundish protrusions

present; absent



Mucophrya pelagica
65–110 µm
(p. 723)

absent; present



Staurophrya elegans
50–65 µm
(p. 727)

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