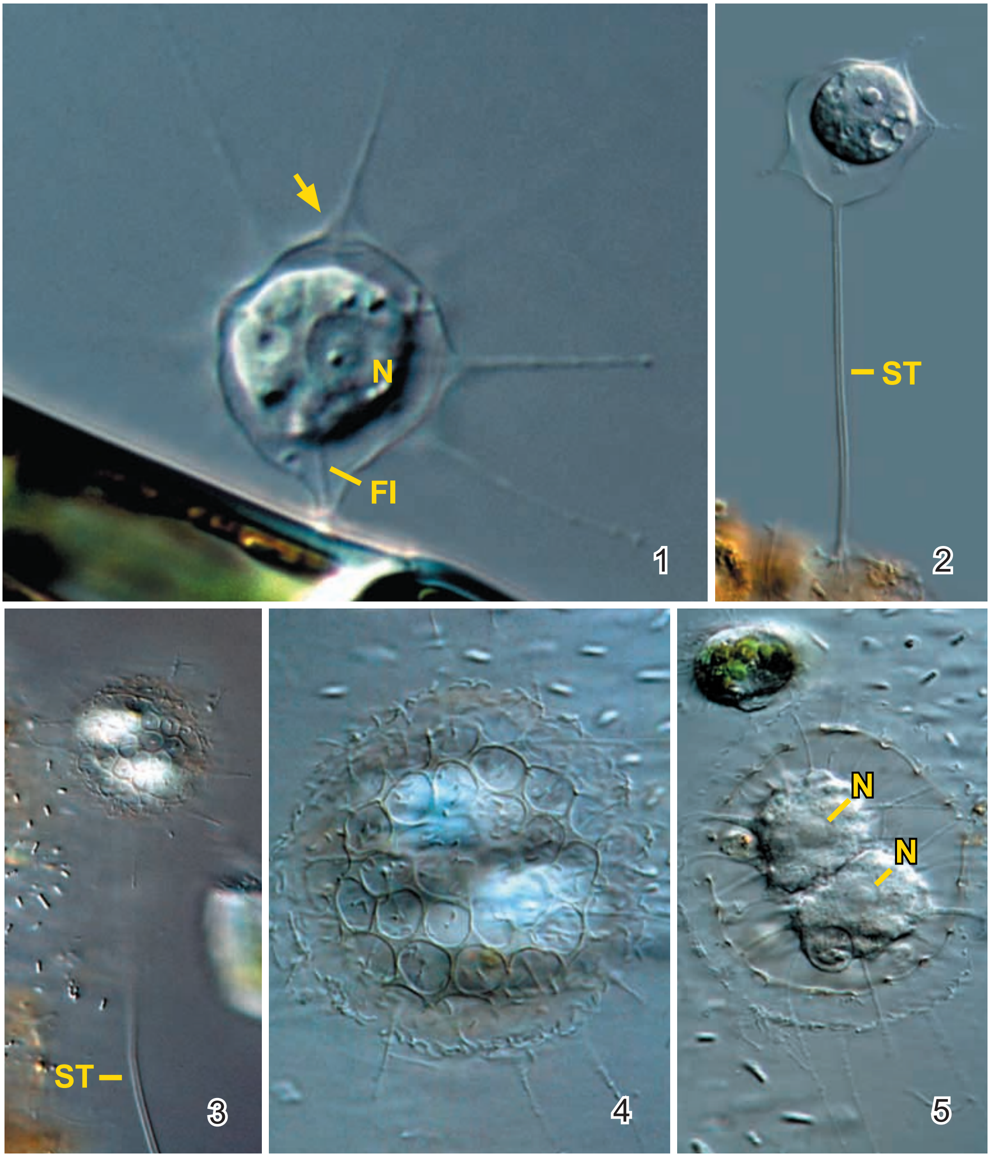


Fig. 1 – 5: Pseudoheliozoa. Pseudoheliozoa are a poorly defined group of minute organisms with characteristics similar to those of the Heliozoa. The main difference is the lack of axopodia with microtubular axonemes. The pseudoheliozoans have filose pseudopodia and a stalked test. **1:** The rare *Hedriocystis brachypous* is about 11 µm across and has a polygonal test with a short stalk containing a fine filament (FI). The filopodia emerge from small perforations in the test (arrow). **2:** *Hedriocystis pellucida* is about 15 µm across and is quite similar to *H. brachypous*, but has a long stalk. **3 - 5:** *Clathrulina elegans* is about 30 µm across and lives in a stalked test with polygonal pores, from which the filopodia emerge. The specimen shown is in a late stage of division (5). FI – filament, N – nucleus, ST – stalk.

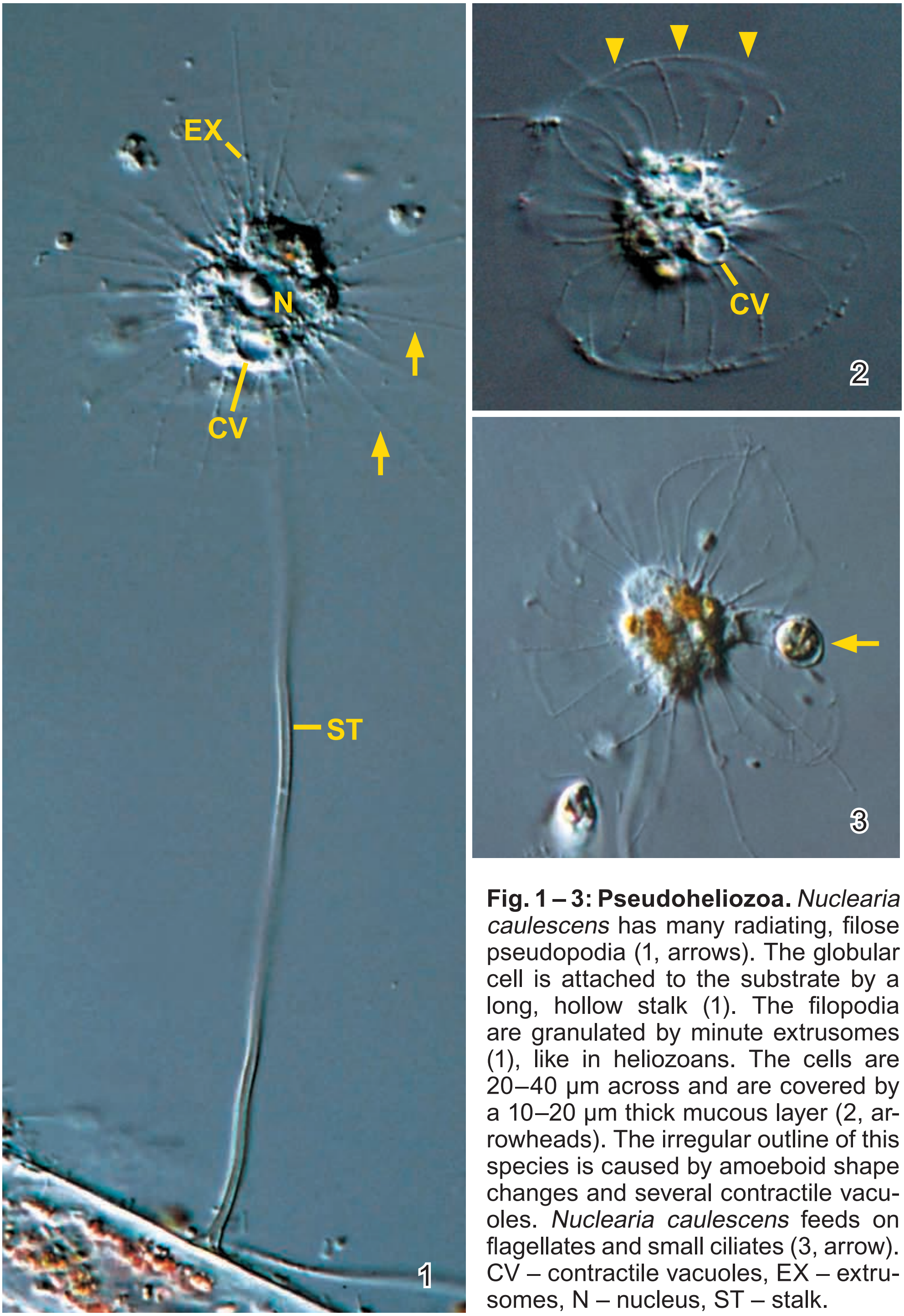


Fig. 1 – 3: Pseudoheliozoa. *Nuclearia caulescens* has many radiating, filose pseudopodia (1, arrows). The globular cell is attached to the substrate by a long, hollow stalk (1). The filopodia are granulated by minute extrusomes (1), like in heliozoans. The cells are 20–40 µm across and are covered by a 10–20 µm thick mucous layer (2, arrowheads). The irregular outline of this species is caused by amoeboid shape changes and several contractile vacuoles. *Nuclearia caulescens* feeds on flagellates and small ciliates (3, arrow). CV – contractile vacuoles, EX – extrusomes, N – nucleus, ST – stalk.

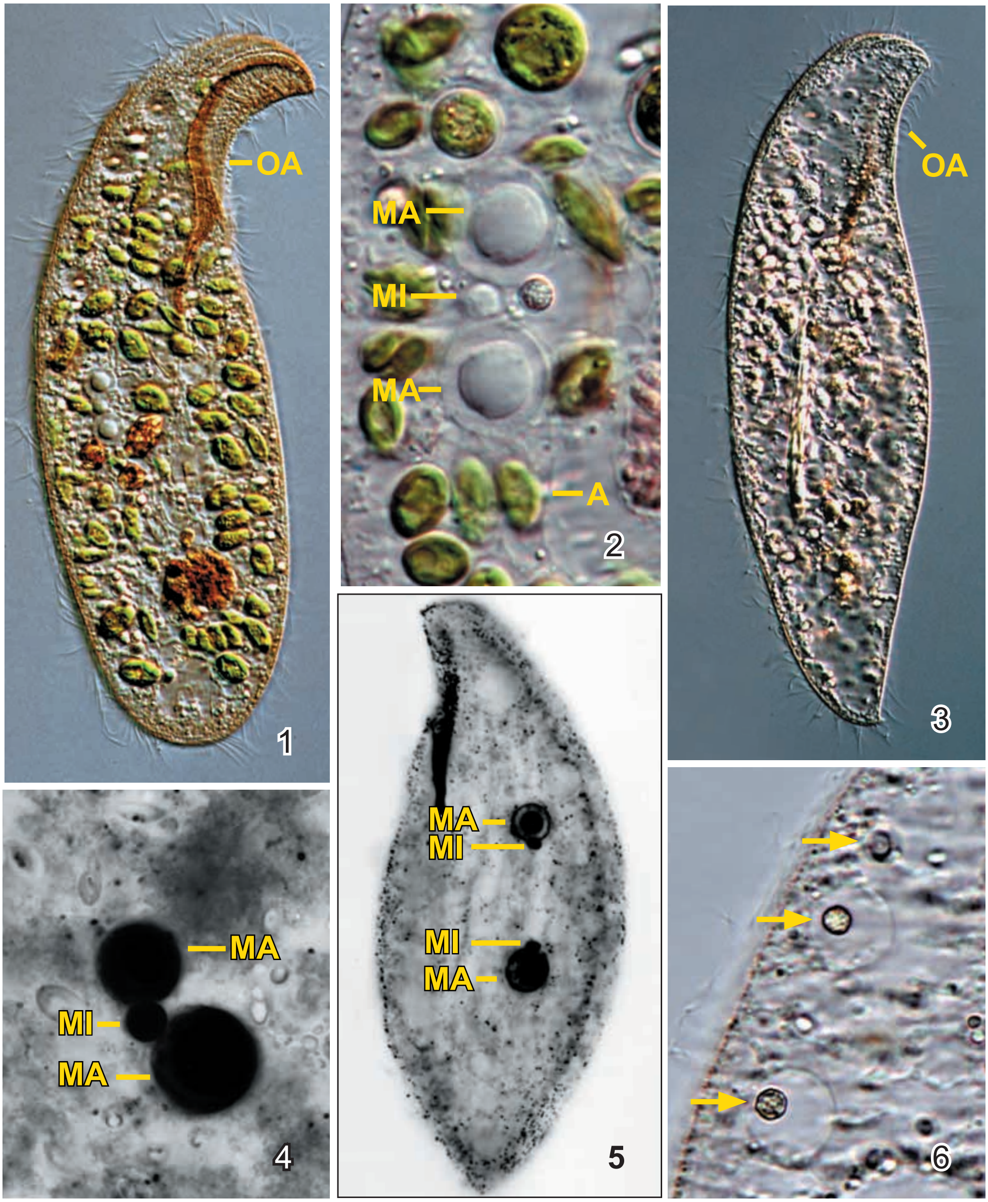
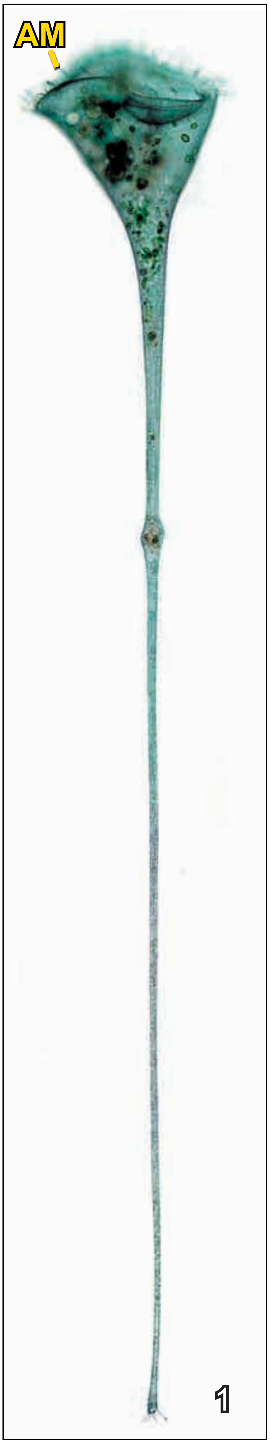


Fig. 1 – 6: Ciliates. *Loxodes rostrum* (1, 2, 4) and *L. striatus* (3, 5, 6) are middle-sized (length ~ 200 µm) karyorelictean ciliates, that is, the macronucleus does not divide but originates from a micronucleus anlage. The two species differ mainly by the nuclear apparatus: two macronucleus nodules with one micronucleus in between in *L. rostrum* (2, 4) and two widely separate macronucleus nodules each with a micronucleus in *L. striatus* (5). Arrows in figure 6 mark the Müller organelles, that is, barium globules in a vacuole, which are likely gravity receptors. A – symbiotic algae, MA – macronucleus nodules, MI – micronucleus, OA – oral apparatus.



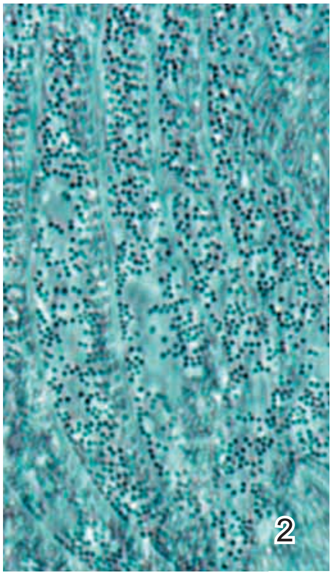
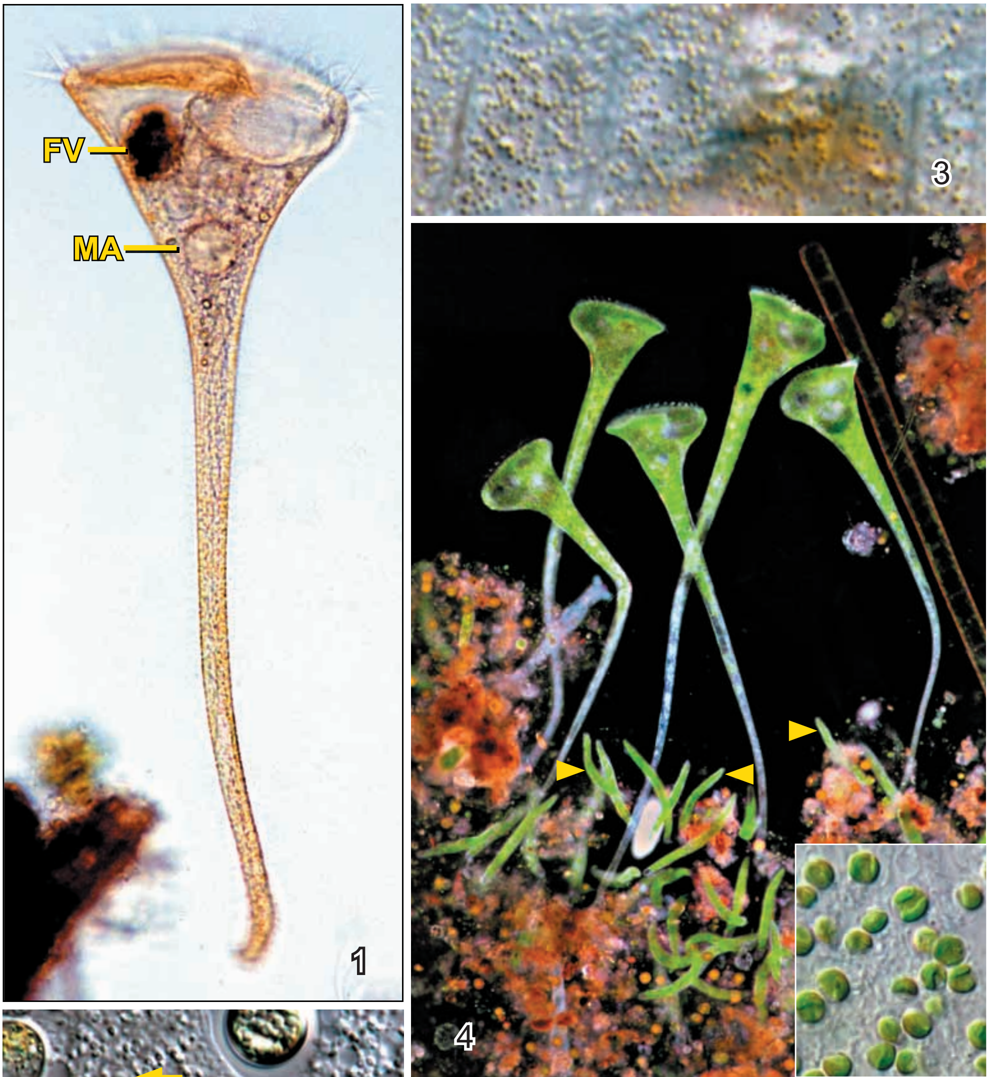


Fig. 1 – 5: Ciliates. *Stentor* spp. are highly contractile, heterotrichous ciliates with a mighty zone of adoral membranelles along the anterior body margin. Species are distinguished according to the macronucleus pattern and the colour. **1, 2:** *Stentor coeruleus* is blueish and, as this unique micrograph shows, up to 4 mm long (1). The colour is caused by blueish cortical granules (2). **3:** *Stentor muelleri* is colourless, up to 1 mm long, and has a mucous lorica. **4, 5:** *Stentor fuliginosus* is golden and up to 500 µm long. The macronucleus is accompanied by a single micronucleus (5). AM – adoral membranelles, CV – contractile vacuole, MA – macronucleus, MI – micronucleus.



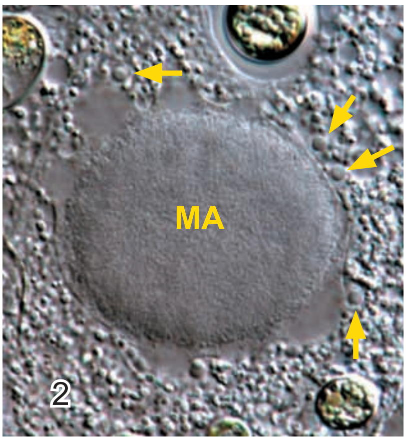
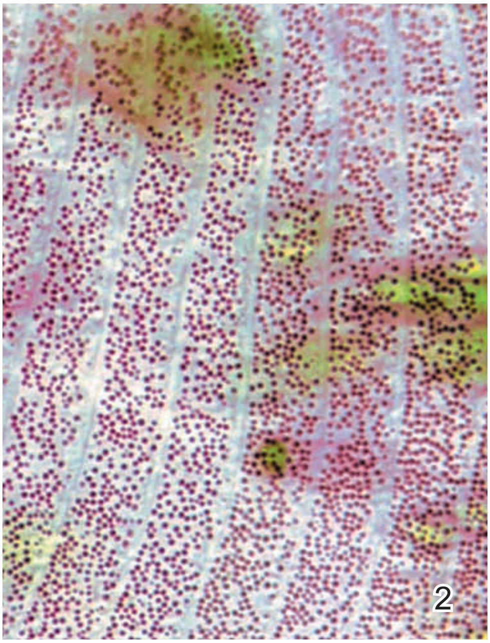
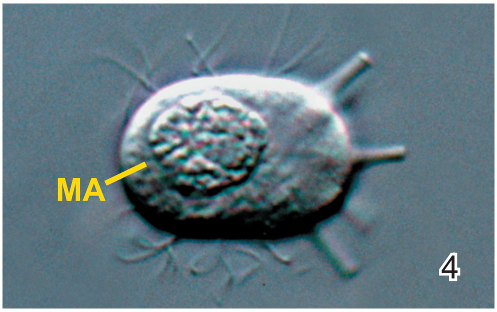


Fig. 1 – 4: Ciliates. 1 – 3: *Stentor niger* is 200–350 µm long and appears yellowish or brownish in bright field (1) due to cortical pigment granules (3). In contrast to *S. amethystinus* and *S. fuliginosus*, this species lacks symbiotic algae. The macronucleus of *S. niger* is accompanied by many micronuclei (arrows). **4:** *Stentor polymorphus* can reach a length of 2 mm and is full of symbiotic green algae (inset). In the mud, where *S. polymorphus* anchors, are many *Pseudoblepharisma tenue* var. *viride* (arrowheads), which are also green due to symbiotic algae. FV – food vacuole, MA – macronucleus.





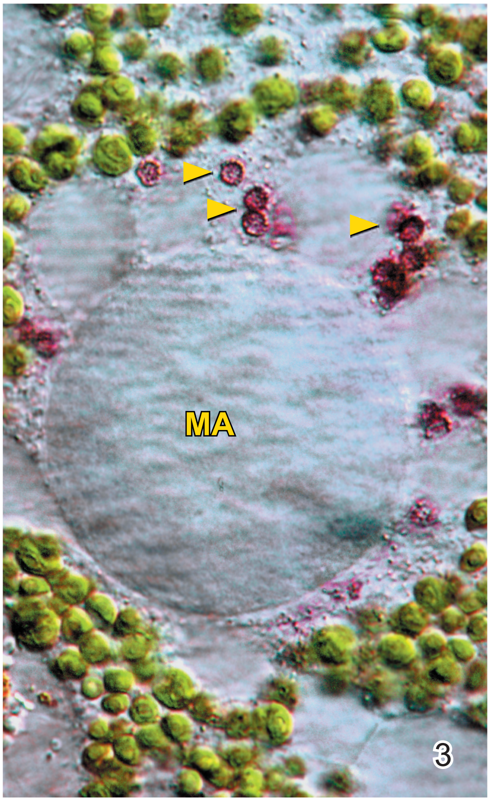
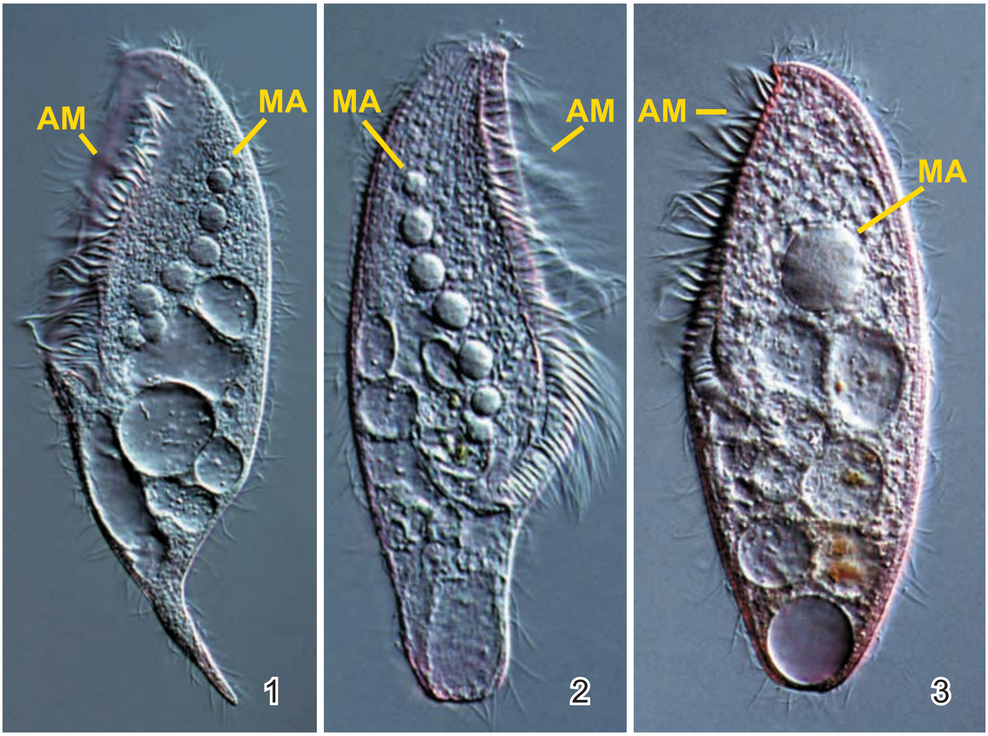


Fig. 1 – 4: Ciliates. 1 – 3: *Stentor amethystinus* is up to 500 µm long and has a mighty adoral zone of membranelles along the anterior body margin. The cytoplasm contains symbiotic algae (3), while the cortex is studded with amethyst-coloured granules about 1 µm across (2). The spherical macronucleus is surrounded by many micronuclei enveloped in cortical granules (3, arrowheads). **4:** Rather frequently, *Stentor* spp. are parasitized by an about 20 µm long suctorian ciliate, *Sphaerophrya stentori*. AM – adoral zone of membranelles, MA – macronucleus.



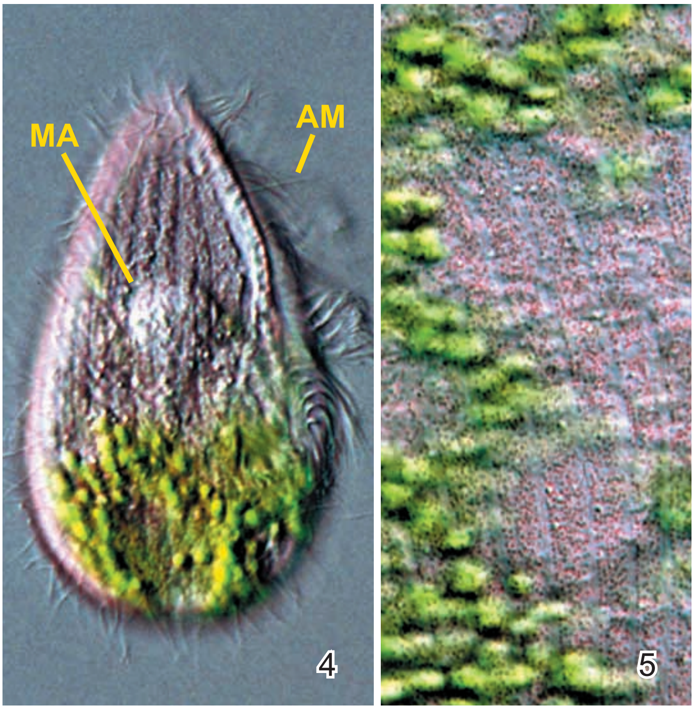
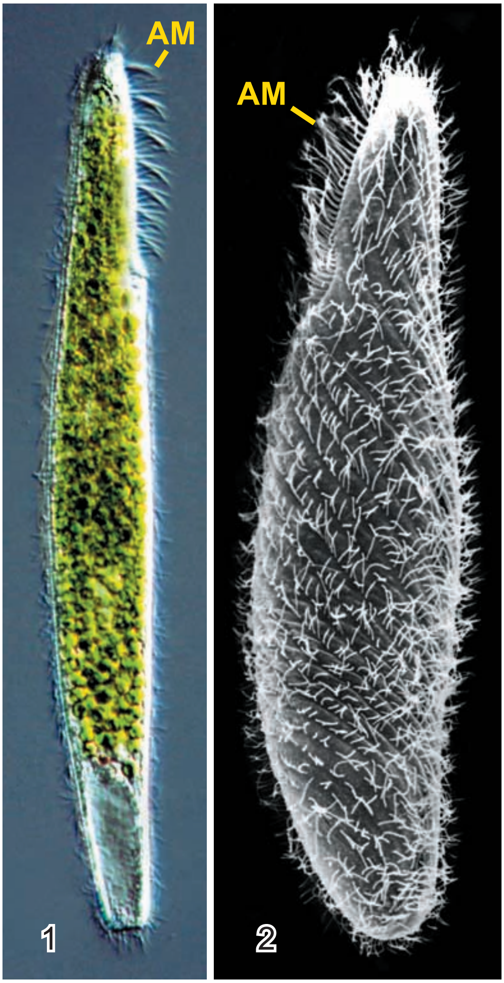


Fig. 1 – 5: Ciliates. *Blepharisma* spp. are heterotrichous ciliates with a long adoral zone of membranelles (AM). Most species are reddish due to cortical granules (5). The species shown have a size between 80 and 160 µm and are distinguished by body shape (tailed vs. rounded, slender vs. ovate) and macronucleus pattern (moniliform; 1, 2 vs. single nodule; 3, 4). **1:** *Blepharisma musculus.* **2:** *Blepharisma persicinum.* **3:** *Blepharisma steinii.* **4, 5:** *Blepharisma lateritium*, a variety with symbiotic algae. AM – adoral zone of membranelles, MA – macronucleus.

Fig. 1 – 6: Ciliates. *Spirostomum* spp. are highly contractile, heterotrichous ciliates with a long adoral zone of membranelles (2, 3, arrows). Species are distinguished by body size and shape and the nuclear pattern. **1:** *Spirostomum ambiguum* reaches 2 mm and has a moniliform macronucleus. **2, 5:** *Spirostomum teres* is up to 400 µm long and has an ellipsoidal macronucleus (5). **3:** *Spirostomum minus* is up to 600 µm long and has a moniliform macronucleus. **4:** *Spirostomum semivirescens* is about 1 mm and has symbiotic algae. **6:** *Spirostomum caudatum* reaches a length of 200–300 µm long and has a long tail (arrowheads, inset), well recognizable in this freely motile specimens. AM – adoral membranelle, CV – contractile vacuole with long canal, MA – macronucleus.



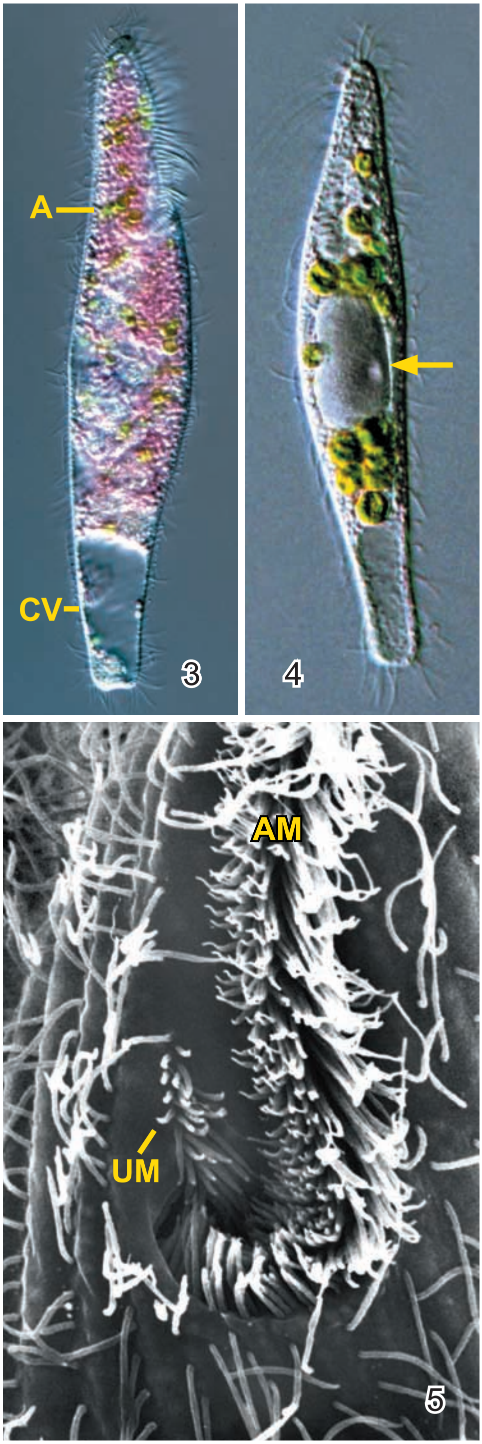


Fig. 1 – 5: Ciliates. *Pseudoblepharisma tenue* var. *viride* is a heterotrichous, about 300 µm long ciliate common in the microaerobic *Sphagnum* mud of Simmelried. It is related to *Blepharisma* and *Spirostomum*, as indicated by the long adoral zone of membranelles and the ability to contract (2, 5). The green (1) or pink (3) colour is caused by symbiotic algae (1) and ingested rhodobacteria (3). Occasionally, the macronucleus is parasitized and inflated (4, arrow). A – symbiotic algae, AM – adoral zone of membranelles, CV – contractile vacuole, UM – undulating membrane.

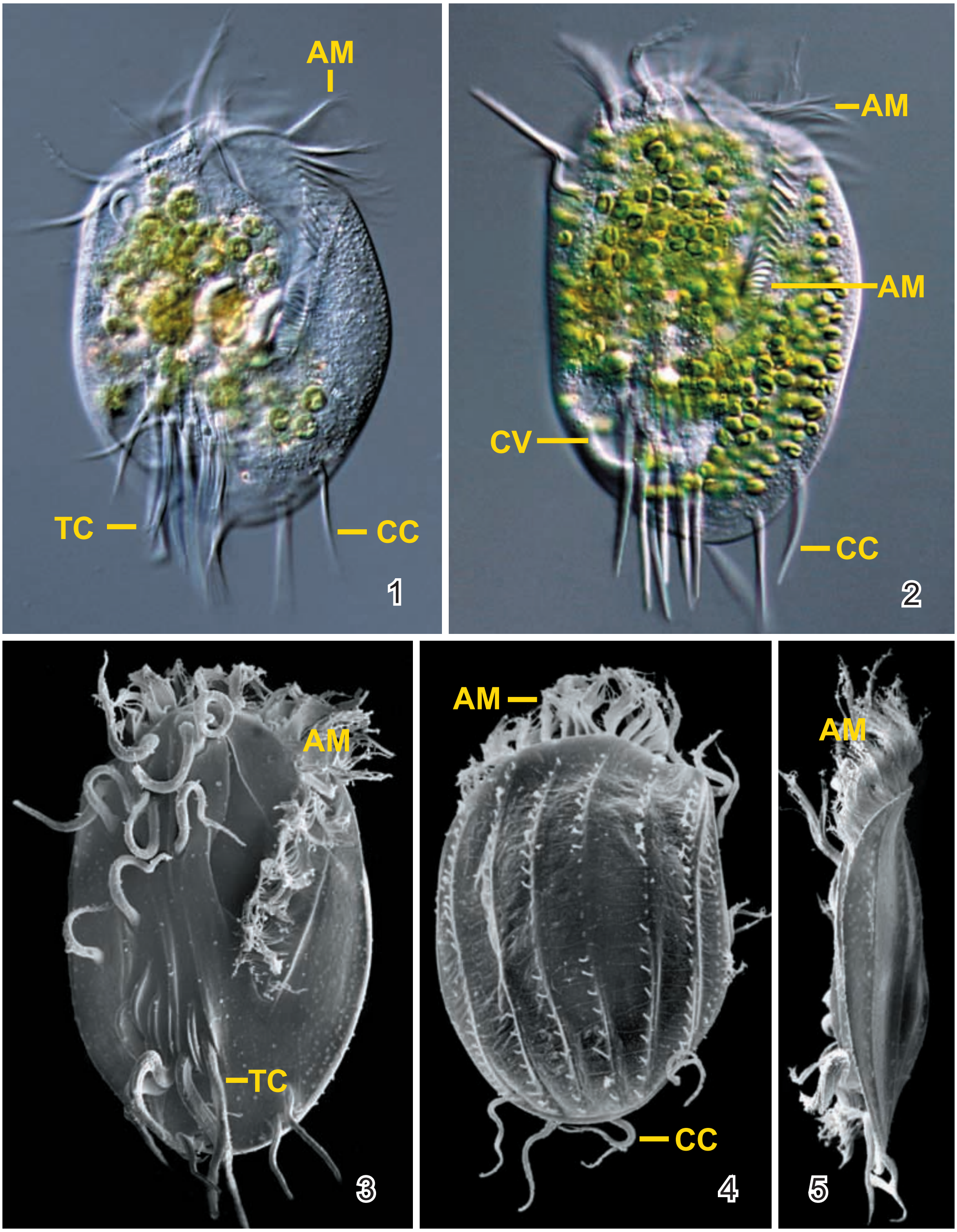


Fig. 1 – 5: Ciliates. *Euplotes patella* (1, 3 – 5) and *E. diadalos* (2), which belong to the hypotrichs, are about 100 µm long, strongly flattened (5) and differ from each other by the symbiotic green algae. *Euplotes* has an armour-like cortex and cirri on the ventral side (3), while rows of minute bristles cover the dorsal side (4). AM – adoral zone of membranelles, CC – caudal cirri, CV – contractile vacuole, TC – transverse cirri.

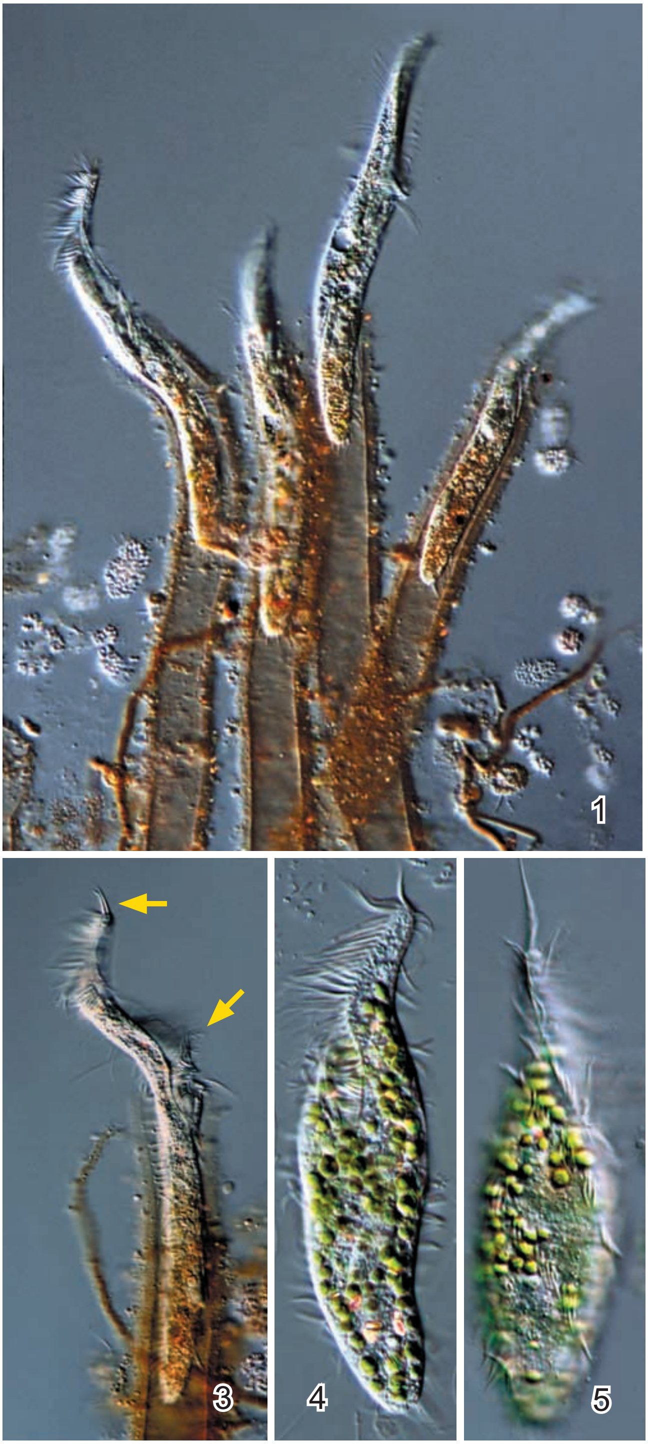


Fig. 1 – 5: Ciliates. *Sticho-tricha aculeata* (1 – 3) and *S. secunda* (4, 5) from life and in the scanning electron microscope. These about 120 µm long, hypotrichous (with cirri) ciliates live in a tube-shaped lorica, which is brownish due to ferric oxide depositions. The two species differ mainly by presence (4) vs. absence (1) of symbiotic algae. Note the long adoral zone of membranelles (arrows).

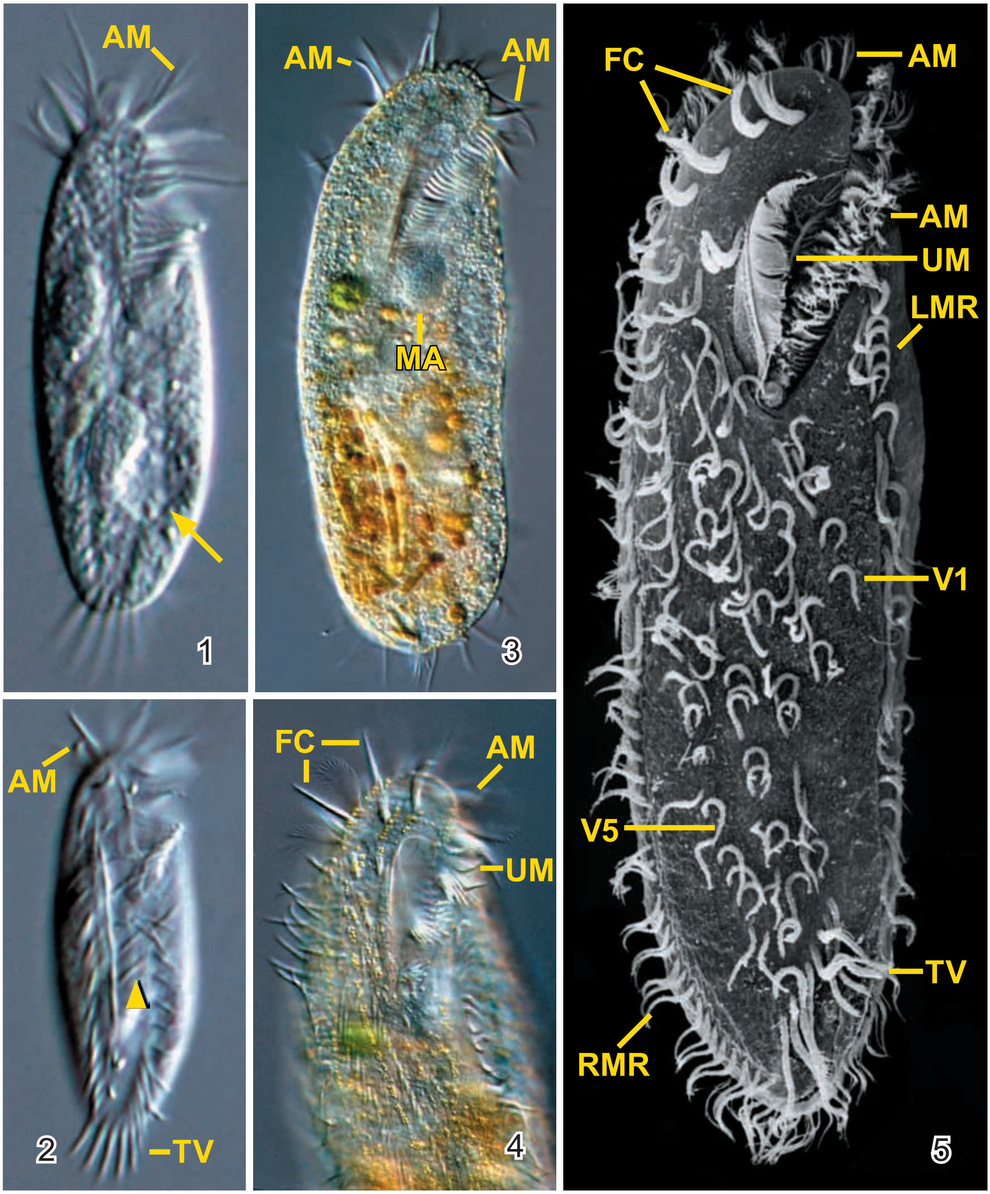


Fig. 1 – 5: Ciliates. *Holosticha pullaster* (1, 2) and *Paraurostyla weissei* (3 – 5) are hypotrichs with the cilia bundled to cirri. **1, 2:** *Holosticha pullaster* is about 80 µm long and easily identified by the subterminal location of the contractile vacuole (arrow) and the zigzaging midventral cirri (arrowhead). **3 – 5:** *Paraurostyla weissei* is 200–250 µm long and yellowish due to minute cortical granules, likely mucocysts (4). Details of the cirral pattern and oral apparatus are well recognizable in the scanning electron microscope. AM – adoral zone of membranelles, FC – frontal cirri, LMR, RMR – left and right row of marginal cirri, MA – macronucleus nodules, TV – transverse cirri, UM – undulating membrane, V1–5 – ventral cirral rows.

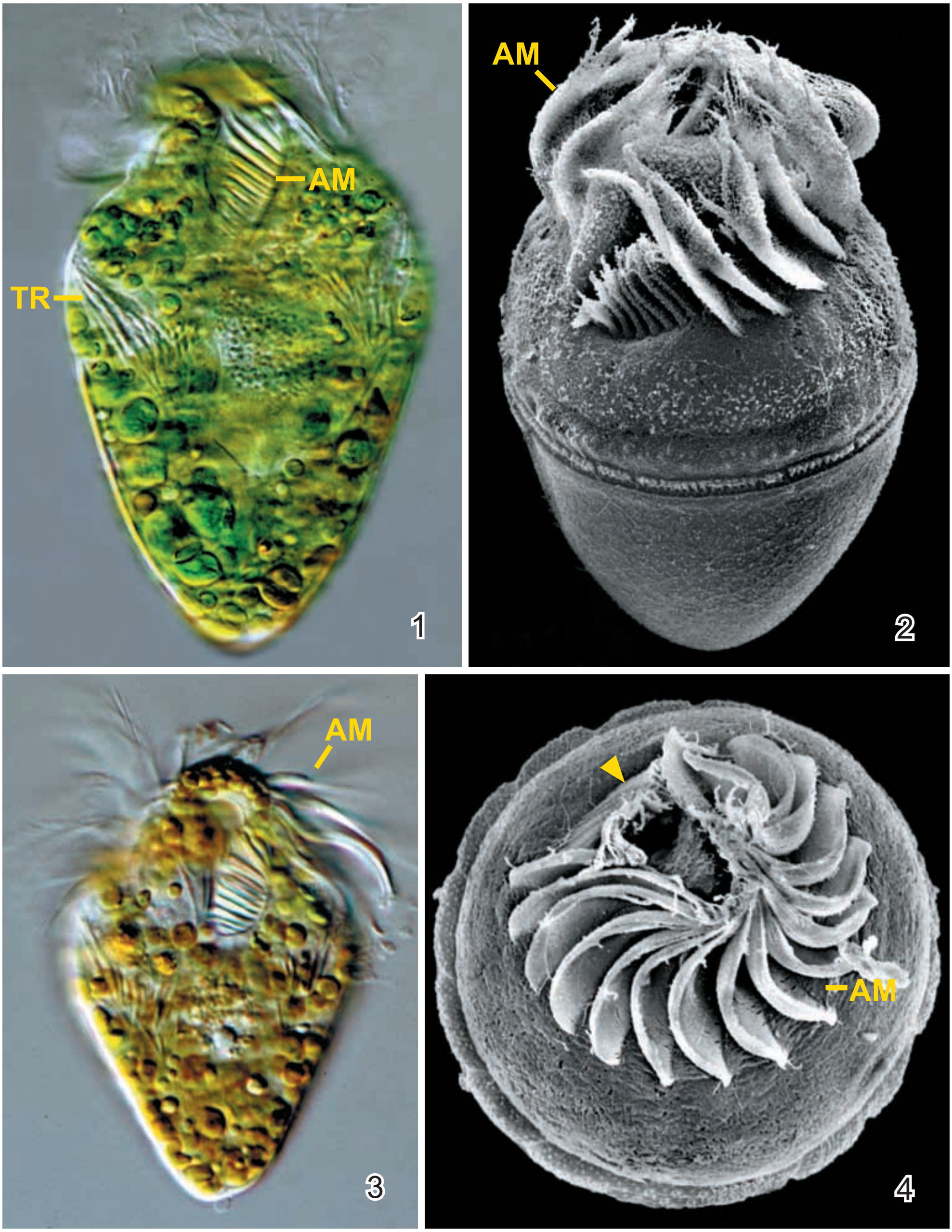
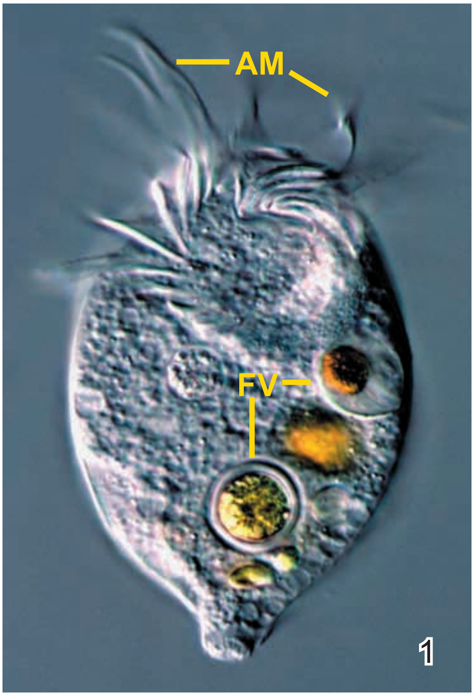
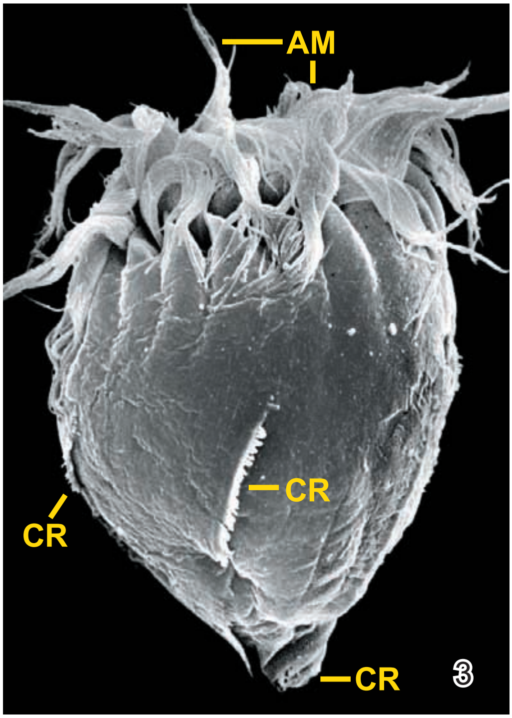
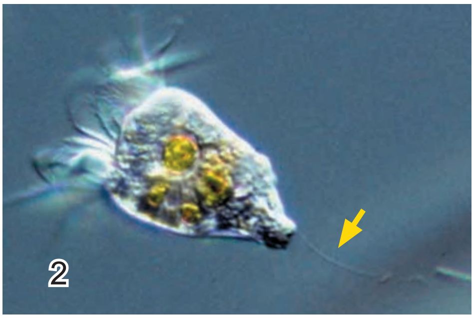


Fig. 1 – 4: Ciliates. *Pelagostrombidium viridis* is an about 80 µm long planktonic, oligotrichous ciliate, which is greenish to brownish due to cleptoplasts (stolen chloroplasts from prey algae) still working within the predator. The mighty adoral zone of membranelles (AM), which drives the organism and collects food, is well recognizable in the scanning electron microscope (2, 4). Arrowhead in figure 4 marks mouth entrance. AM – adoral zone of membranelles, TR – trichocysts.







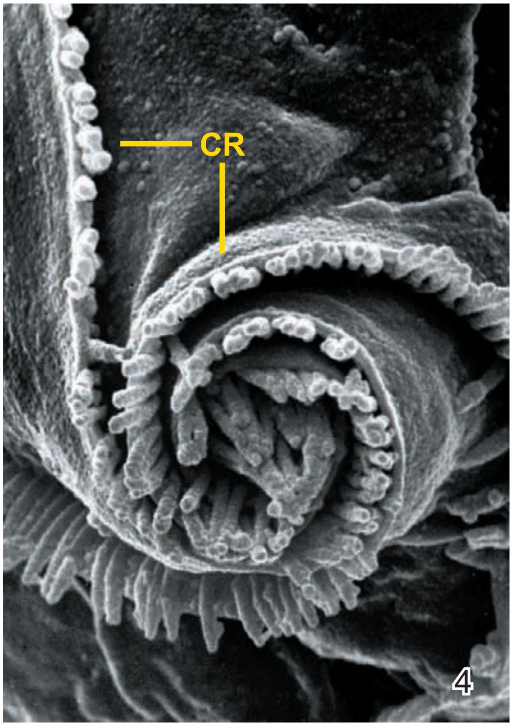


Fig. 1 – 4: Ciliates. *Strobilidium caudatum*, a 50–60 µm long, oligotrichous ciliate is easily recognizable by the campanulate body (1, 3) which, when attached to a substrate, rapidly rotates on a slimy filament (2, arrow). The somatic ciliature is reduced to a few spiral bristle rows (3) well recognizable in the posterior polar view (4). The anterior end is occupied by the mighty adoral zone of membranelles (1, 3). Feeds on bacteria and algae (1). AM – adoral zone of membranelles, CR – bristle (ciliary) rows, FV – food vacuoles.

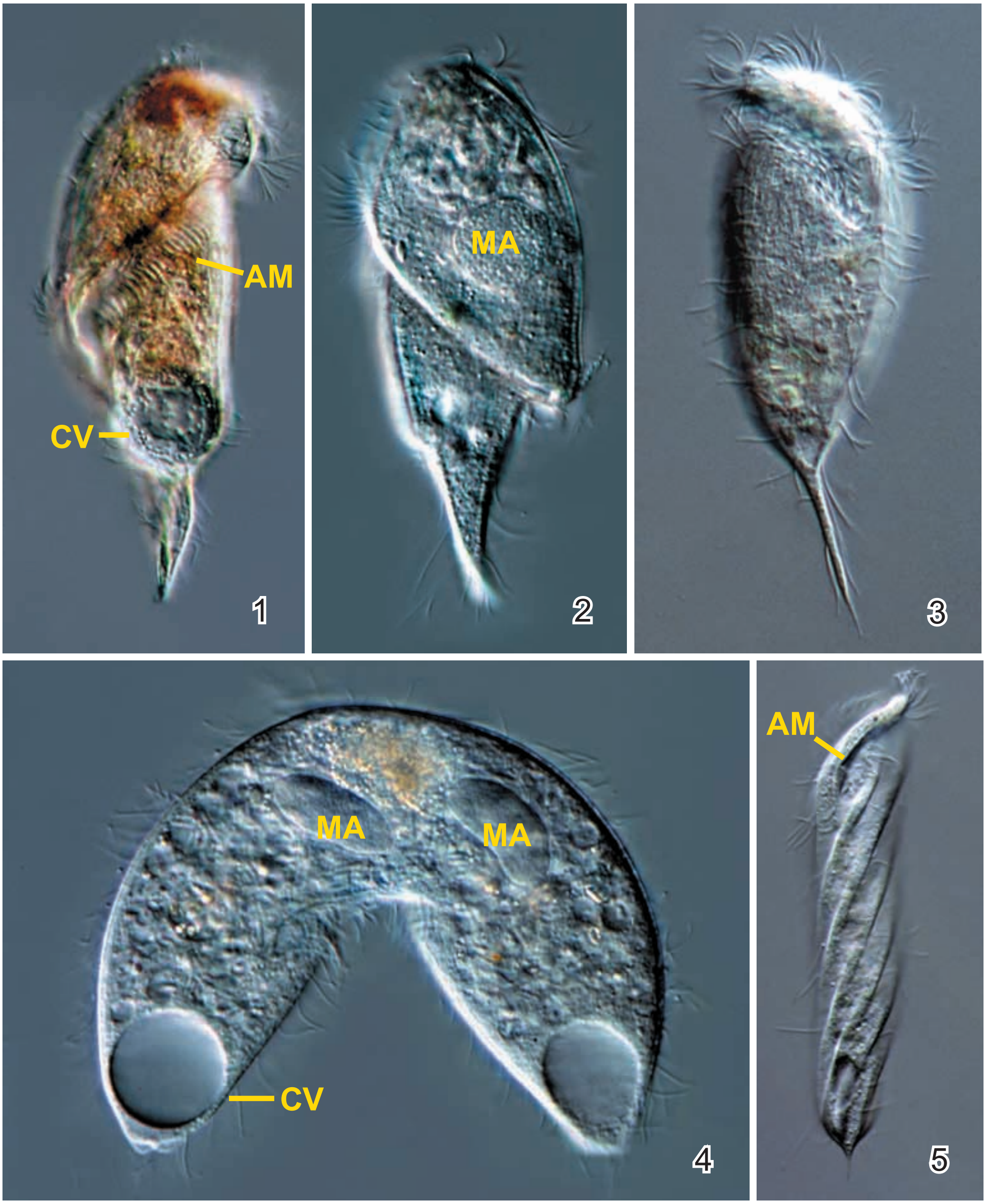


Fig. 1 – 5: Ciliates. *Metopus* and its relatives have a high diversity (see also next plates). They are anaerobics living in the organic mud, especially in ponds with decaying leaves and in the anaerobic sediment of lakes. **1, 2:** *Metopus propagatus* is a massive, 150–200 µm long, tailed species. **3:** *Metopus vestitus* is a delicate, 70–80 µm long species with a caudal spine. **4:** Conjugation (sex) of *M. pulcher*. **5:** *Tropidoatractus acuminatus* is about 120 µm long and distinctly spiralized. AM – adoral zone of membranelles, CV – contractile vacuole, MA – macronucleus.

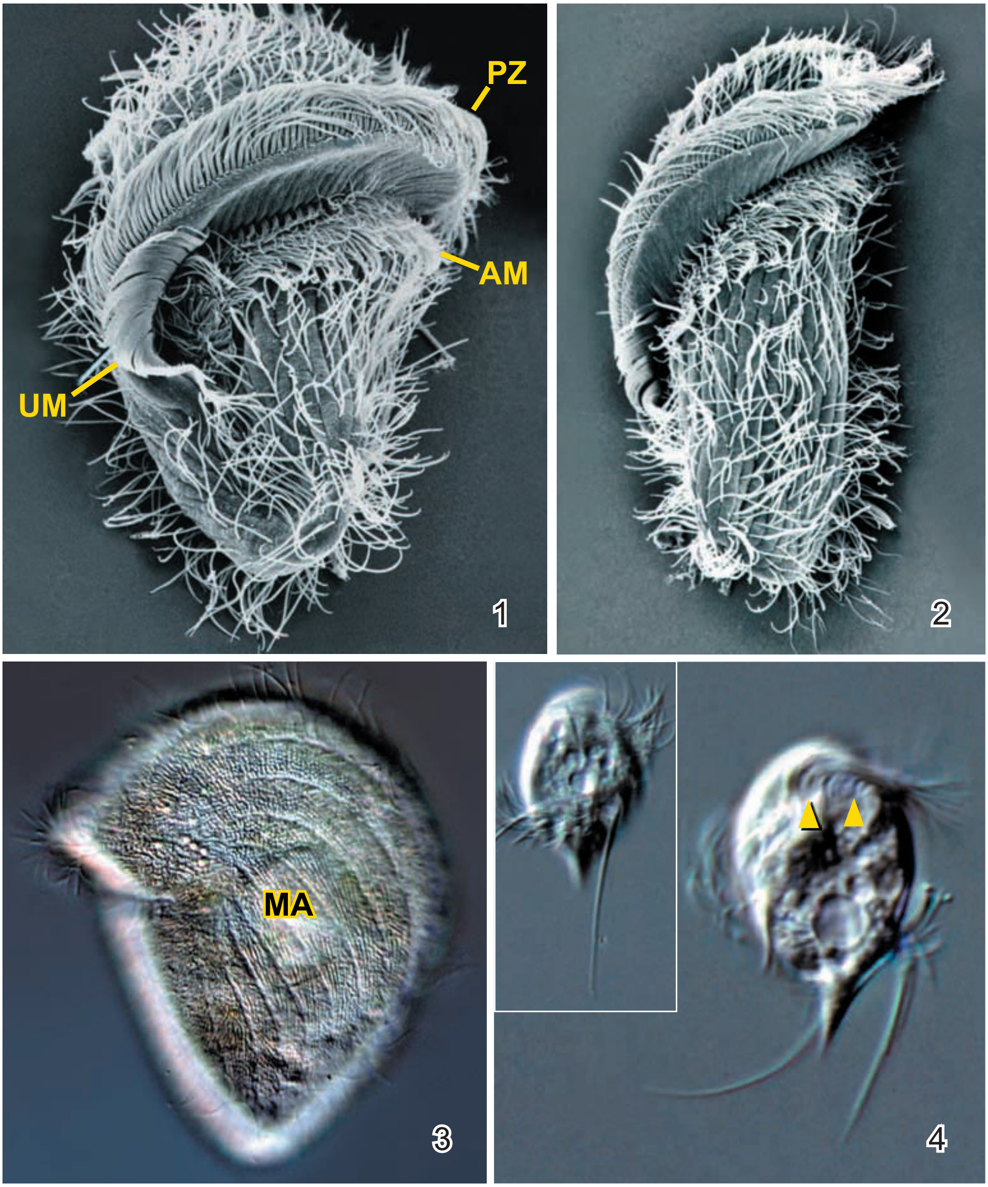


Fig. 1 – 4: Ciliates. Diversity of metopids, obligate anaerobics in the mud of ponds. **1, 3:** *Metopus bacillatus* (or *M. striatus*; courtesy Prof. C. F. Bardele), ventral (1) and dorsal (3) view in the SEM and interference contrast, where the bacilli-shaped mucocysts appear as minute, bright dots (3). SEM shows the real beauty of this type of ciliates. **2:** *Metopus ovalis* is about 150 µm long and a typical member of the genus (courtesy Prof. Bardele). **4:** *Luido parvulus*, an about 40 µm long, aberrant metopid, has a very short adoral zone (arrowheads) and long cilia bundles. Inset: varied focal plane. AM – adoral zone of membranelles, MA – macronucleus, PZ – perizonal ciliary array, UM – undulating membrane.

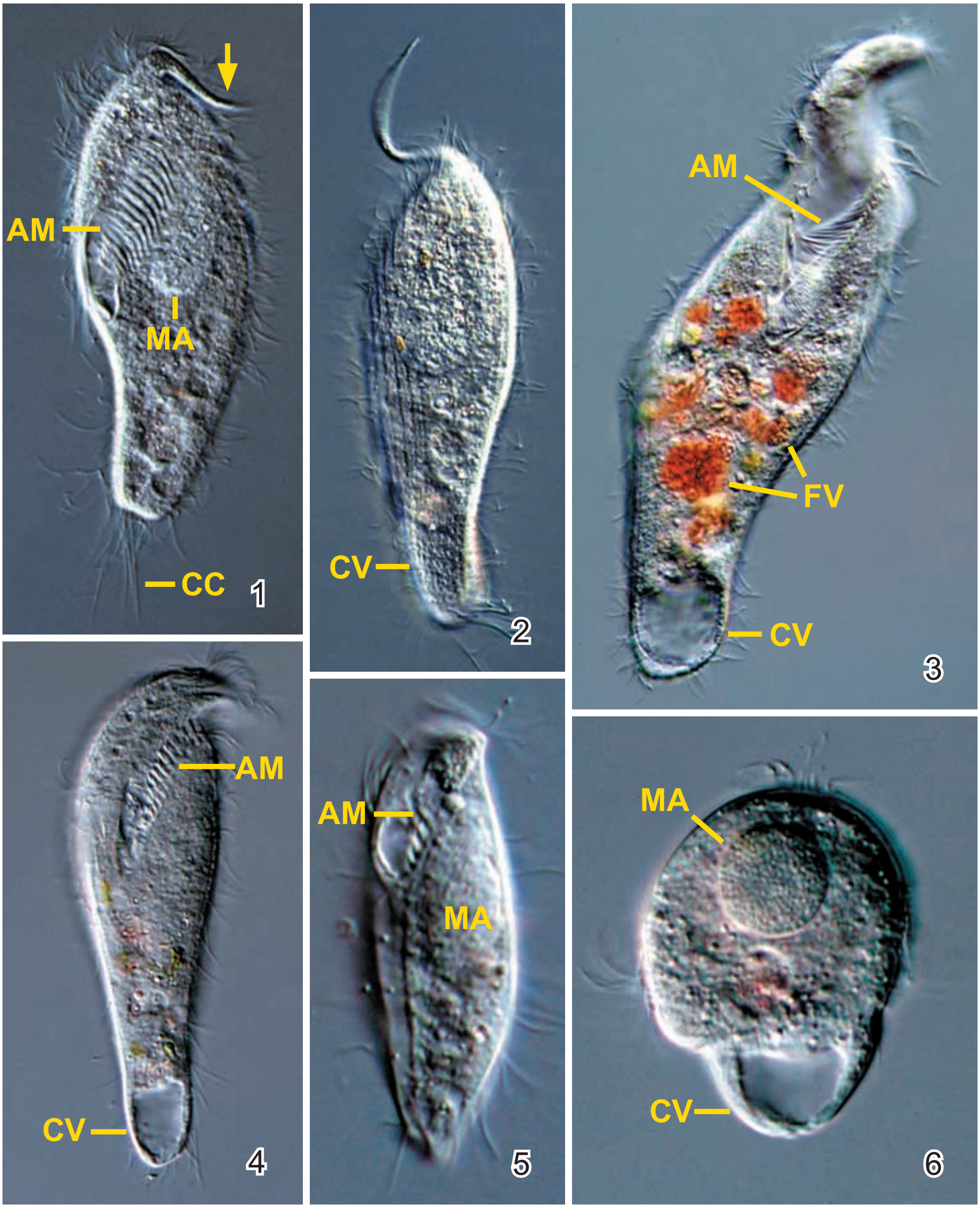


Fig. 1 – 6: Ciliates. Further metopids (see foregoing plates). **1, 2:** *Metopus nasutus* is about 130 µm long and has a nose-like process (arrow). **3:** *Metopus laminarius* is up to 260 µm long and one of the largest members of the genus. The adorale zone of membranelles is distinctly spiralized. The shape of the cells can be irregular by masses of feeded rhodobacteria. **4:** *Metopus acidiferus* is about 100 µm long and a typical member of the group. **5:** *Metopus mucicola* is a tiny (~ 40 µm) species with a hyaline, slimy lorica. **6:** *Metopus campanula* is about 60 µm long. AM – adoral zone of membranelles, CC – caudal cilia, CV – contractile vacuole, FV – food vacuoles, MA – macronucleus.

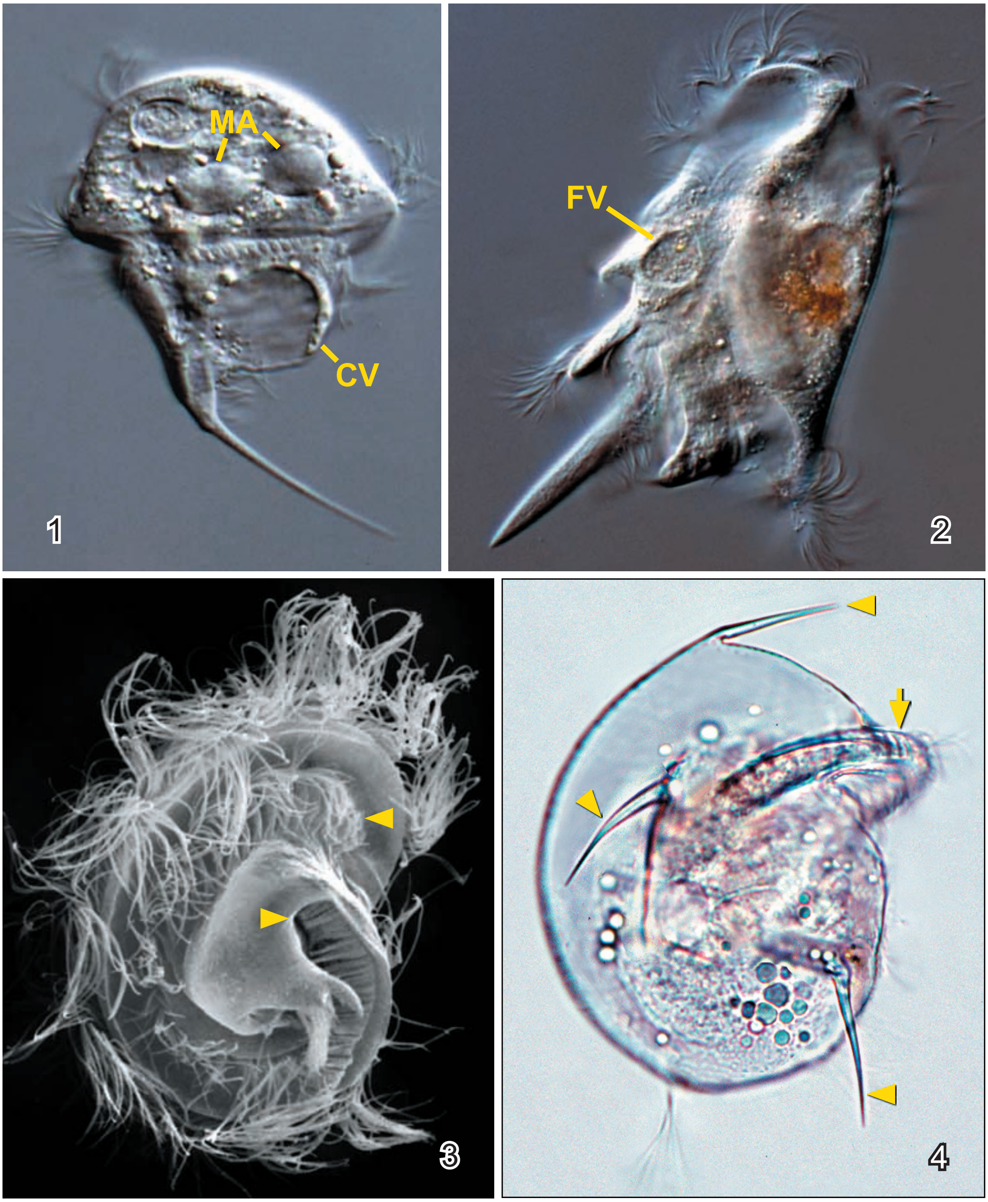


Fig. 1 – 4: Ciliates. The “aliens” shown on this plate belong to the odontostomatids, a highly aberrant group living only in anaerobic (sapropelic) mud. **1:** *Caenomorpha medusula*, length 150 µm. **2:** *Caenomorpha sapropelica,* length 200 µm. **3:** *Caenomorpha uniserialis,* posterior polar view in the scanning electron microscope, long axis about 60 µm. Arrowheads mark begin and end of adoral zone of membranelles. **4:** *Discomorphella pectinata* has curious ventral spines (arrowheads) and a conspicuous ridge with short ciliary rows (arrow), length 80 µm. CV – contractile vacuole, FV – food vacuole with rhodobacteria, MA – macronucleus nodules.

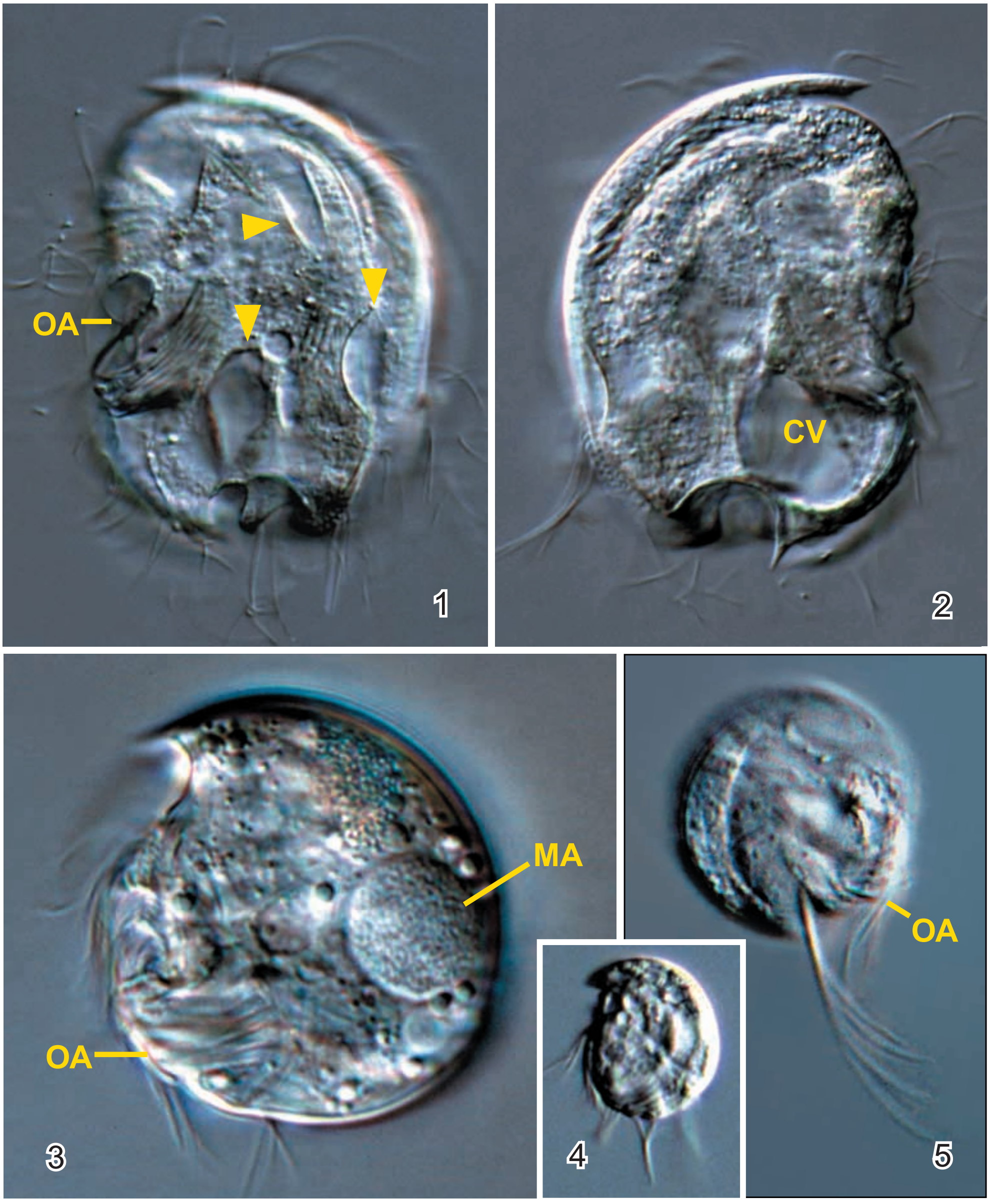
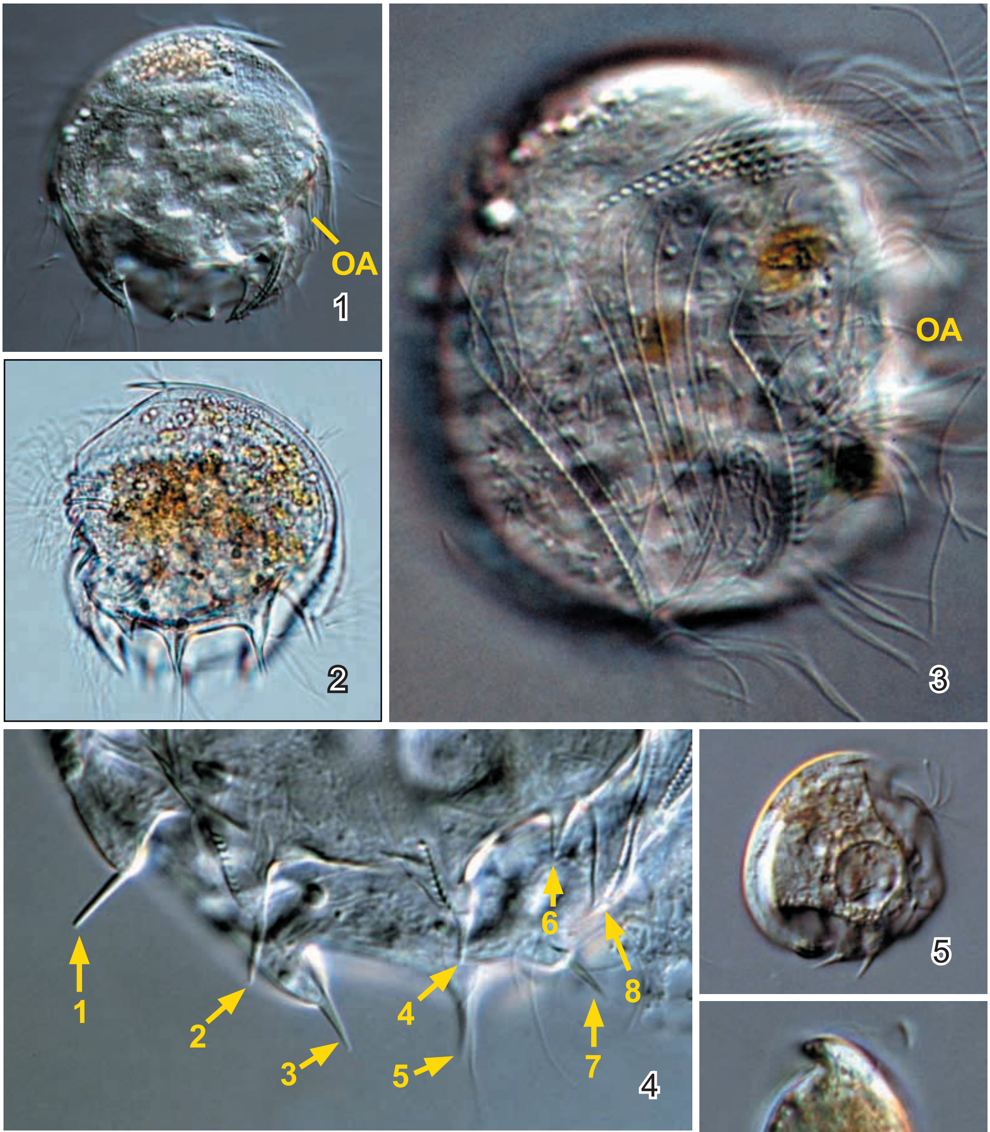


Fig. 1 – 5: Ciliates. This plate shows some odontostomatids, which have a highly sculptured cortex and complex ciliature (see also foregoing plate). **1, 2:** *Epalxella antiquorum*, length about 80 µm, right (2) and left (1) side view showing the three typical concavities (arrowheads). **3:** *Mylestoma discoideum* has a discoidal body about 40 µm across. **4:** *Mylestoma anatinum* is about 25 µm long and has a ventral anterior beak. **5:** *Mylestoma pusillum* is a truely minute ciliate (~ 20 µm) with a conspicuous ciliary bundle in body midline. CV – contractile vacuole, MA – macronucleus, OA – site of oral apparatus.



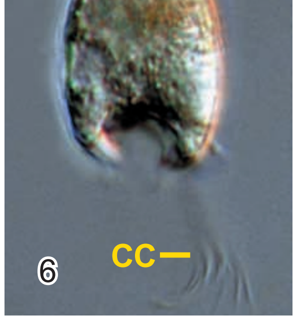


Fig. 1 – 6: Ciliates. Odontostomatids (see also previous plates) are obligate anaerobics in the mud of ponds and lakes. They have complex body shapes and ciliary patterns. **1, 2, 4:** *Saprodinium dentatum* is about 70 µm long and has 8 (numerals) cortical processes posteriorly. **3:** Right side view of *Pelodinium reniforme*, which is about 50 µm long and has a highly characteristic crest (ciliary) pattern. **5, 6:** *Atopodinium fibulatum* is only 40 µm long and has a conspicuous posterior indentation when viewed ventrally (6). CC – caudal cilia, OA – site of oral apparatus.

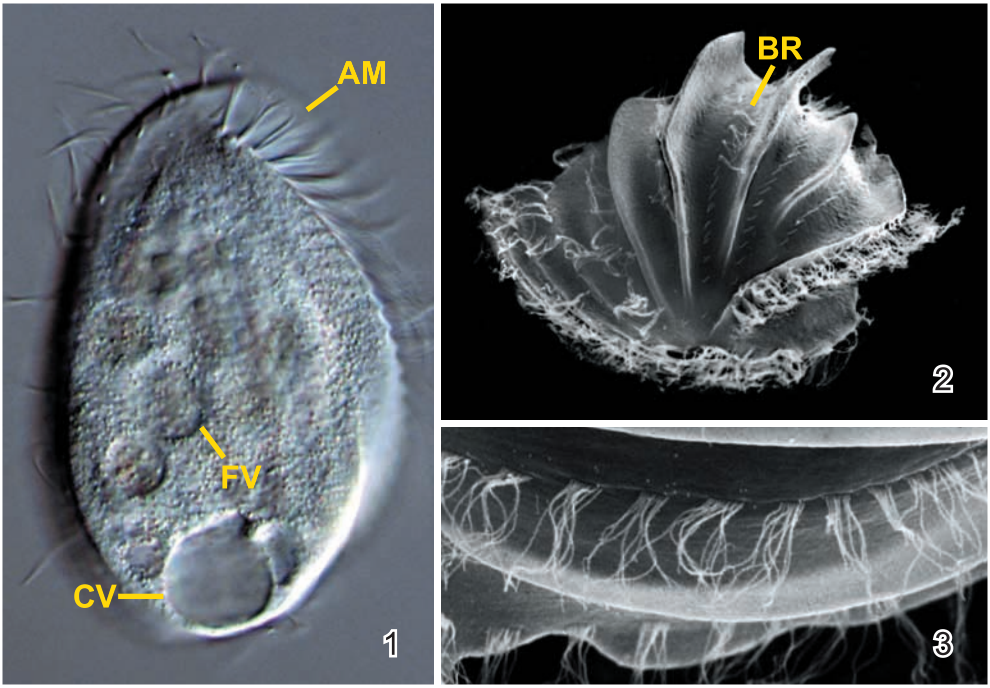
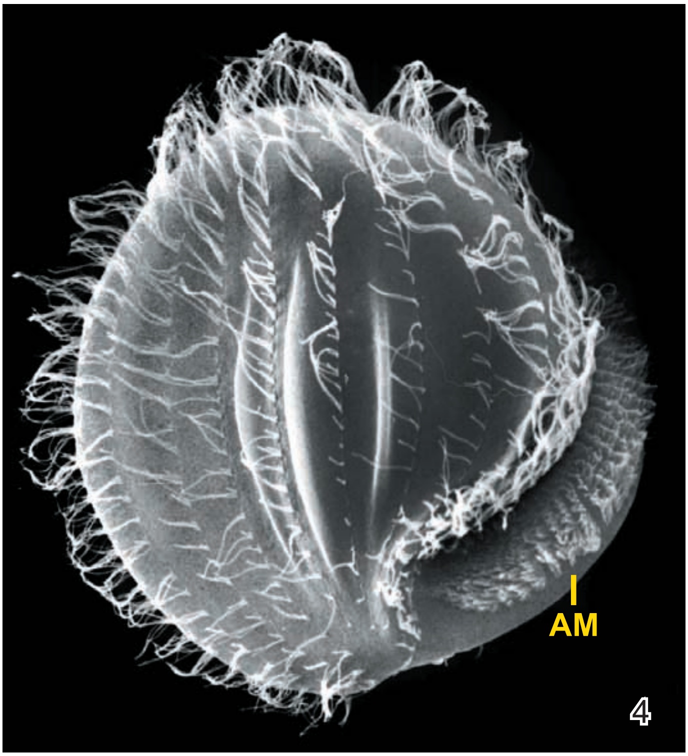
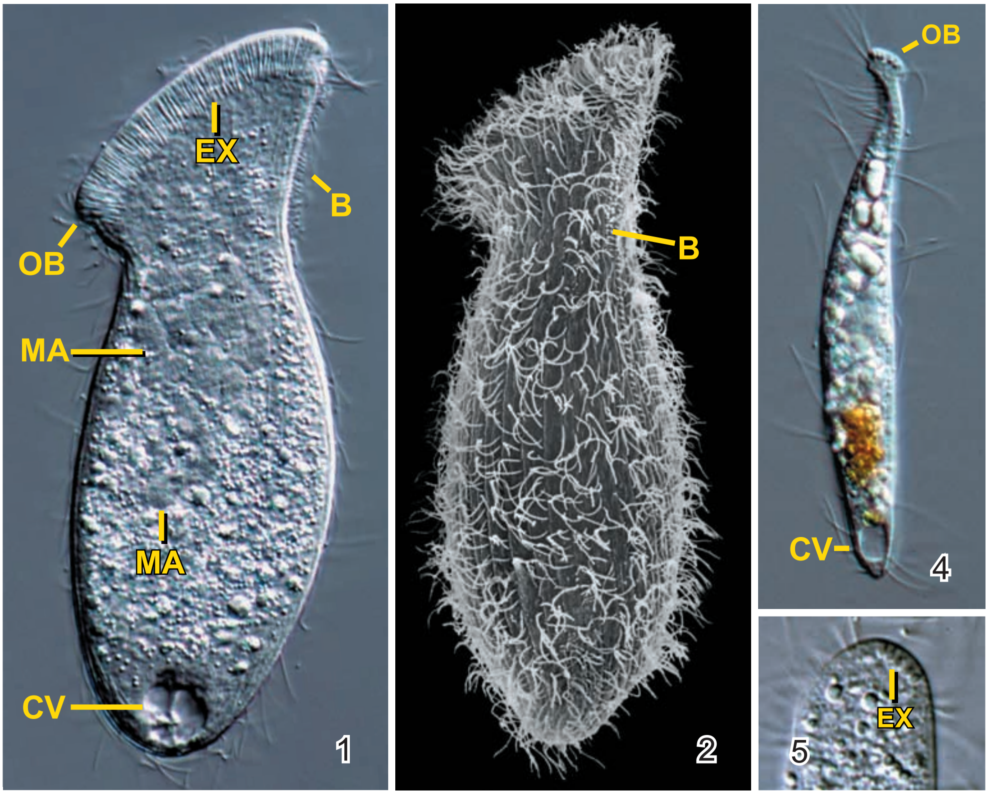


Fig. 1 – 4: Ciliates. *Phacodinium metchnikoffi* is a rare, about 150 µm long moss ciliate of doubtful phylogenetic affinity. Possibly, it is related to the hypotrichs (*Stylonychia*, *Euplotes*) because the left side has bristle rows (2) and the cilia are grouped to cirri (3, 4). The surface is strongly ridged, especially on the left (dorsal) side (2). **1, 4:** Right side views, showing the adoral zone of membranelles (AM) extending almost whole body length. **2:** Posterior polar view. **3:** Detail of a ciliary row. AM – adoral zone of membranelles, BR – bristle rows, CV – contractile vacuole, FV – food vacuole.





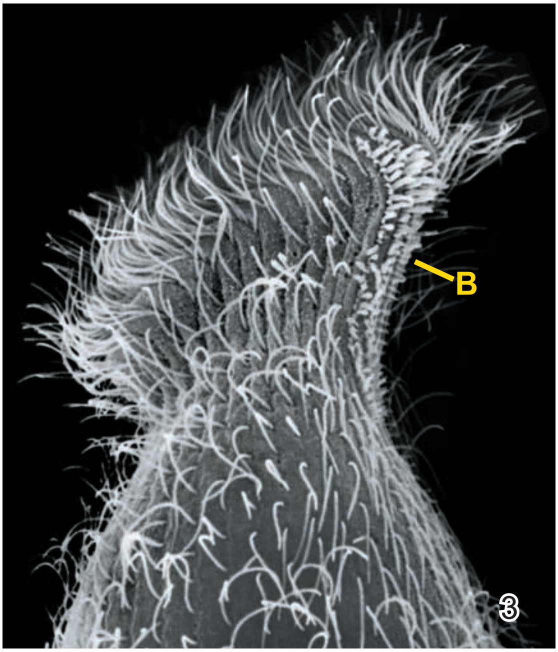
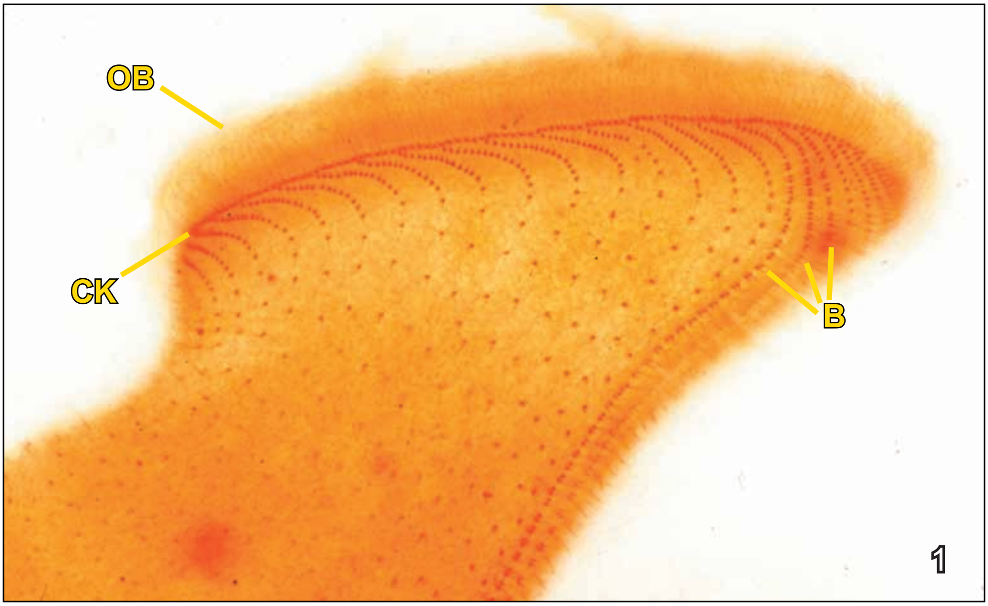


Fig. 1 – 5: Ciliates. *Epispathidium amphoriforme* (1 – 3) and *Apertospathula armata* (4, 5) belong to the holotrichously ciliated spathidiids. The anterior body end is modified to an oral apparatus, whose bulge (OB) contains toxicysts (EX), used to capture protists and small metazoans. **1 – 3:** *Epispathidium amphoriforme* is about 150 µm long and has an inconspicuous dorsal brush (B), that is, three modified ciliary rows with short, paired cilia in the anterior region of the dorsal side. The function of this organelle is not known. Further details, see next plate. **4, 5:** The tiny *A. armata* is only 60 µm long and the short oral bulge contains minute (~ 1 µm) toxicysts (5, EX). B – dorsal brush, CV – contractile vacuole, MA – macronucleus, OB – oral bulge.



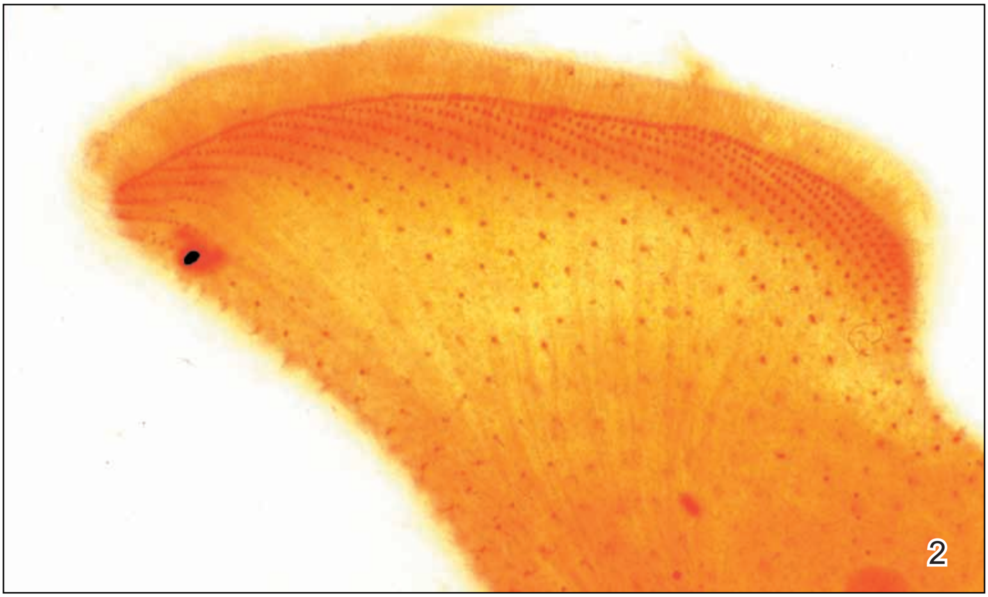
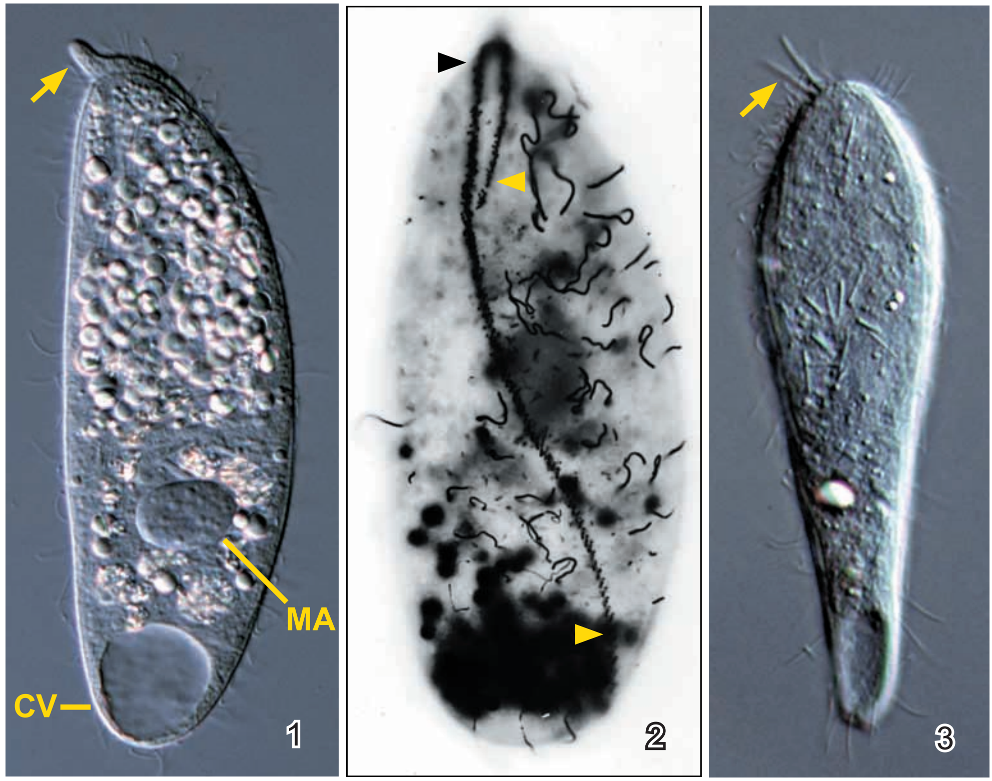


Fig. 1, 2: Ciliates. *Epispathidium amphoriforme*, ciliary pattern after protargol silver impregnation (see also foregoing plate). Silver impregnation reveals the basal bodies of the cilia with perfect clarity and is thus the most important tool in ciliate alpha-taxonomy. The micrographs show the left and right mouth area, that is, the circumoral ciliary row (CK) and the somatic ciliary rows, which are strongly curved and densely ciliated anteriorly. The paired basal bodies of the dorsal brush (B) are well recognizable. B – dorsal brush, CK – circumoral ciliary row (kinety), OB – oral bulge.



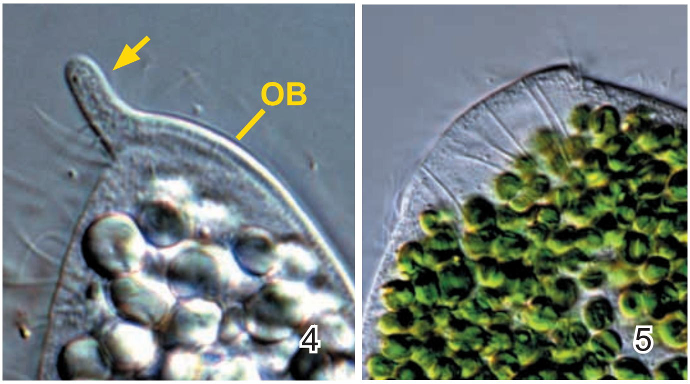


Fig. 1 – 6: Ciliates. These are rare, fully ciliated spathidiids (~ holotrichs). **1, 2, 4:** *Rhinothrix porculus* is about 100 µm long and has a nose-like elongated (1, 4, arrows), lasso-shaped oral bulge well recognizable after silver impregnation (2, arrowheads). **3:** *Rhinothrix barbatula* is about 100 µm long and has two thorn-shaped dorsal processes (arrow). **5, 6:** *Spathidium chlorelligerum* is about 200 µm long and green due to symbiotic algae. The mouth contains many rod-shaped toxicysts (5). CV – contractile vacuole, MA – macronucleus, OB – oral bulge.

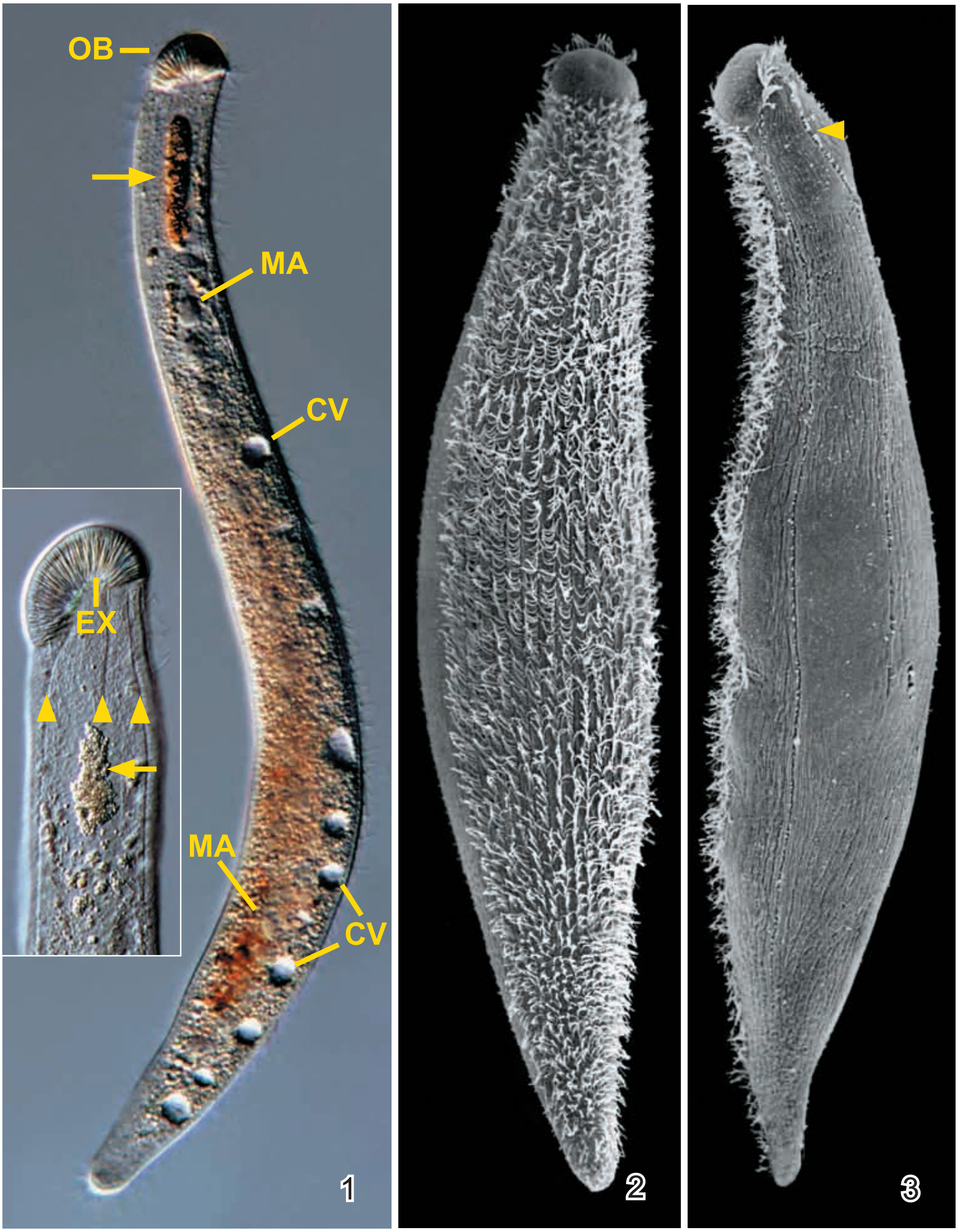


Fig. 1 – 3: Ciliates. *Homalozoon vermiculare* is a highly contractile (2, 3), gymnostome ciliate, which can extend to 600 µm (1). The ciliature of the left side is reduced to three rows of minute bristles (1, 3, arrowheads). The hemispherical oral bulge contains many toxicysts to capture other ciliates (1, inset, arrows). The function of the pharyngeal mass (1, arrows) is not known. CV – contractile vacuole, EX – extrusomes, MA – moniliform macronucleus, OB – oral bulge.

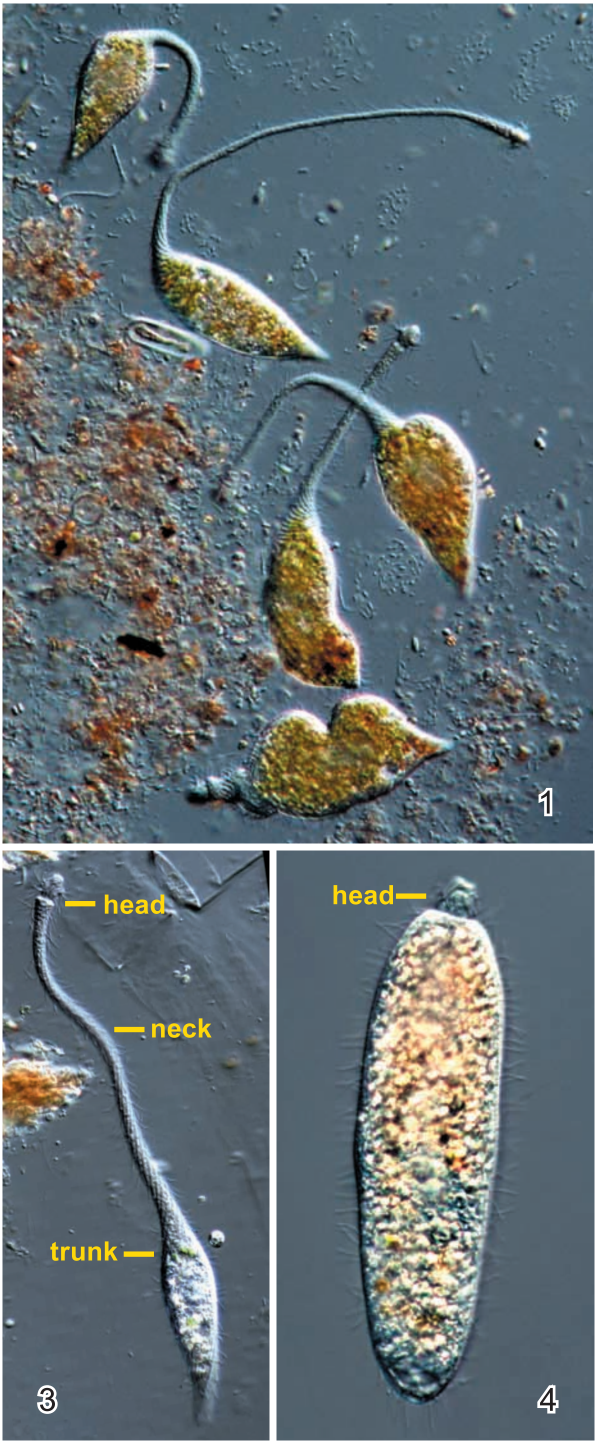


Fig. 1 – 4: Ciliates. *Lacrymaria* and *Phialina* are closely related, holotrichously ciliated predators. **1 – 3:** *Lacrymaria olor* is highly flexible and contractile (1, 2) and reaches up to 500 µm when the neck is fully extended. The body is tripartited in head, neck and trunk (3), which contains two macronucleus nodules with a micronucleus in between (2, inset). **4:** *Phialina pupula* is not contractile. It is about 100 µm long and studded with food inclusions.

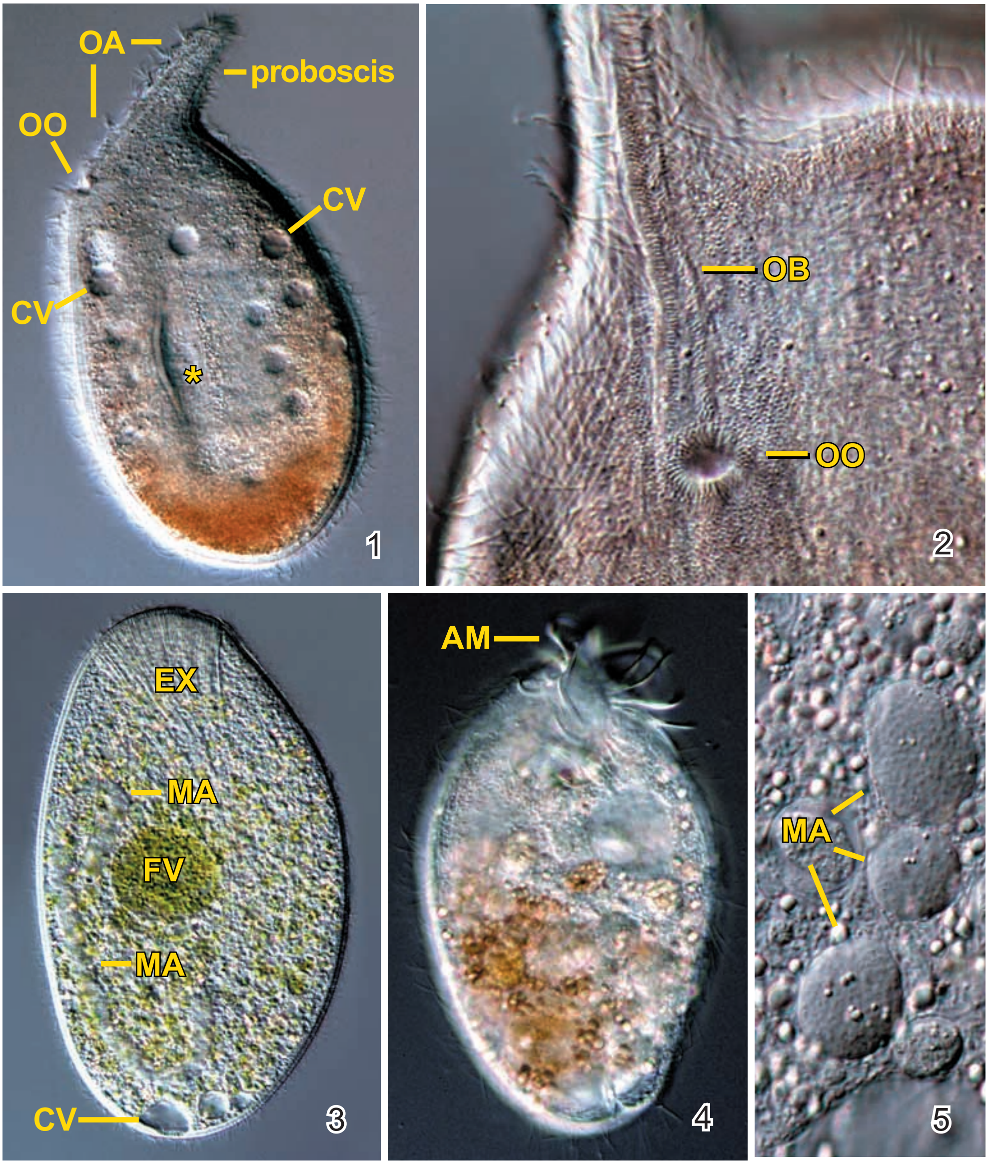
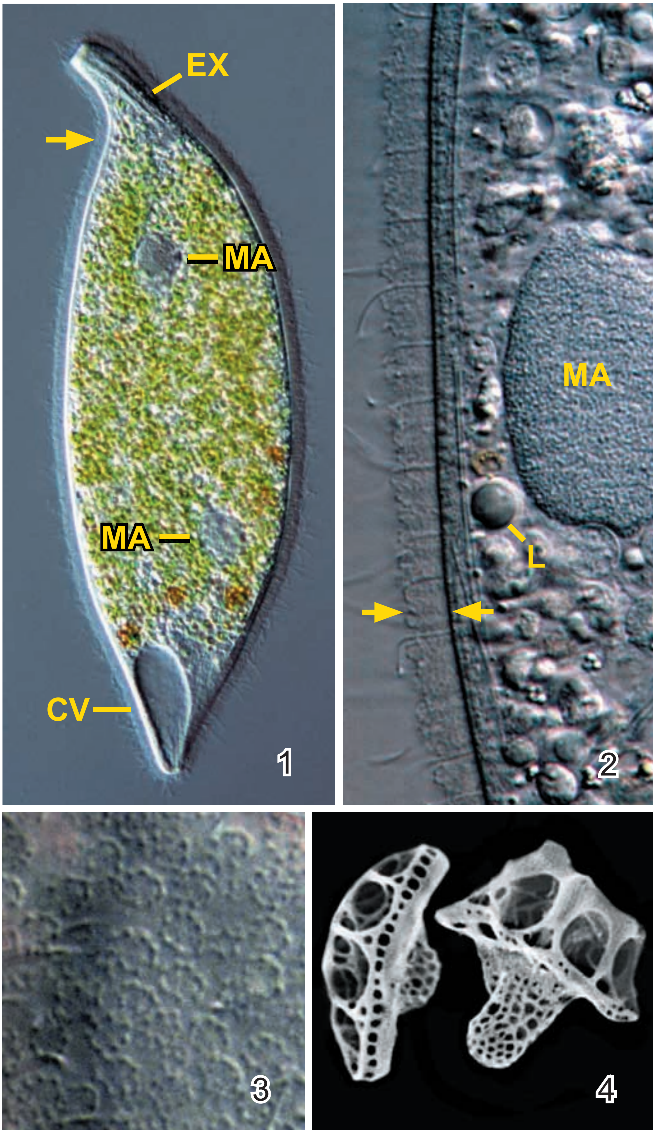


Fig. 1 – 5: Ciliates. 1, 2: *Trachelius ovum* is an about 250 µm long, gymnostome ciliate, which feeds on colonial peritrichs. It is related to *Dileptus* and thus has a short proboscis, on which the oral bulge (OB) ends at the oral opening (2, OO). In mid-body, there is a more densely ciliated groove (1, asterisk), the function of which is not known. **3:** *Prorodon niveus* is an about 350 µm long, laterally flattened, gymnostome ciliate with long extrusomes in the mouth. **4, 5:** *Condylostomides tardus* is a colourless, about 200 µm long heterotrichous ciliate with three macronucleus nodules (5). AM – adoral zone of membranelles, CV – contractile vacuole, EX – extrusomes, FV – food vacuole, MA – mmacronucleus, OA – oral apparatus, OB – oral bulge, OO – oral opening.



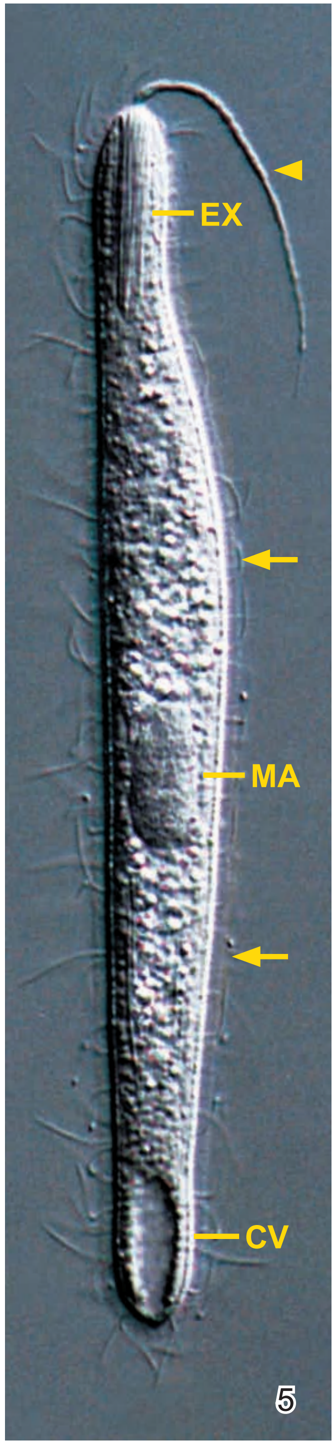


Fig. 1 – 5: Ciliates. *Trachelophyllum sigmoides* (1 – 4) and *Ileonema simplex* (5) are rare, rapacious haptorids with a slimy envelope (arrows). At higher magnification and in the scanning electron microscope, the slime consists of nicely facetted, mushroom-shaped scales (3, 4). **1 – 4:** *Trachelophyllum sigmoides* is up to 300 µm long and green due to symbiotic algae. **5:** *Ileonema simplex* is about 140 µm long and has a highly conspicuous "Mundgeißel" (arrowhead) of unknown function. CV – contractile vacuole, EX – extrusomes (toxicysts), L – lipid droplet, MA – macronucleus.

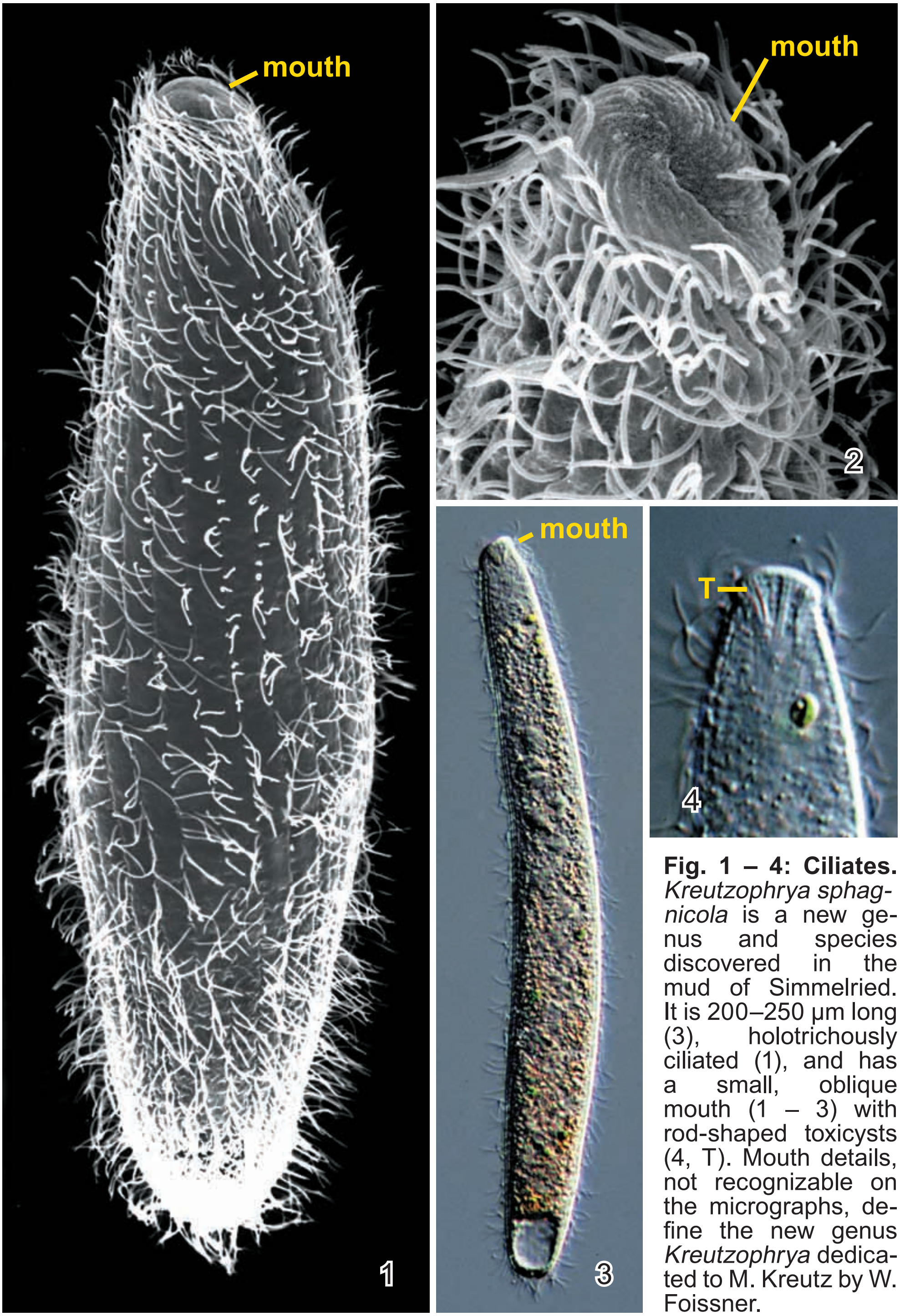


Fig. 1 – 4: Ciliates. *Kreutzophrya sphagnicola* is a new genus and species discovered in the mud of Simmelried. It is 200–250 µm long (3), holotrichously ciliated (1), and has a small, oblique mouth (1 – 3) with rod-shaped toxicysts (4, T). Mouth details, not recognizable on the micrographs, define the new genus *Kreutzophrya* dedicated to M. Kreutz by W. Foissner.

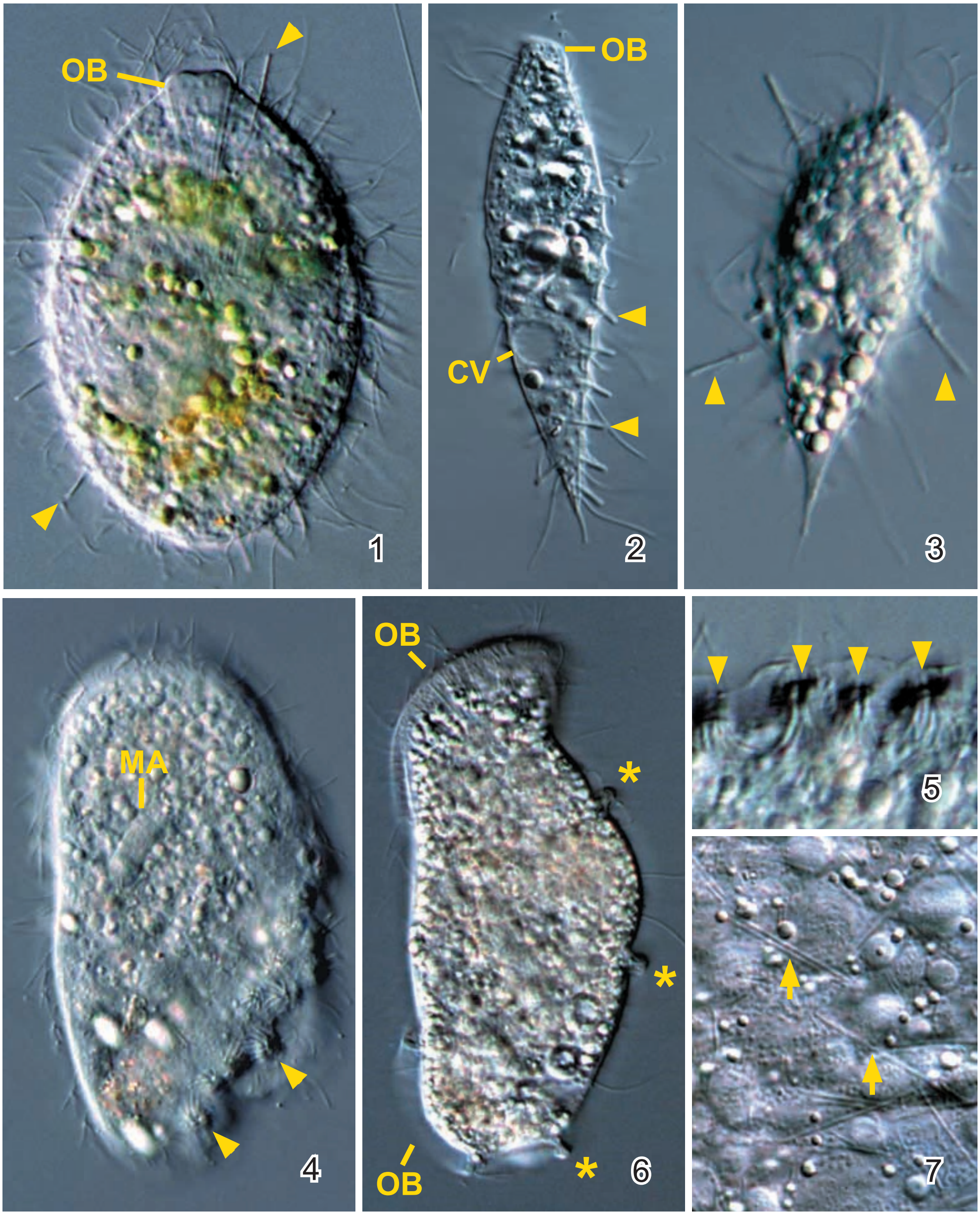
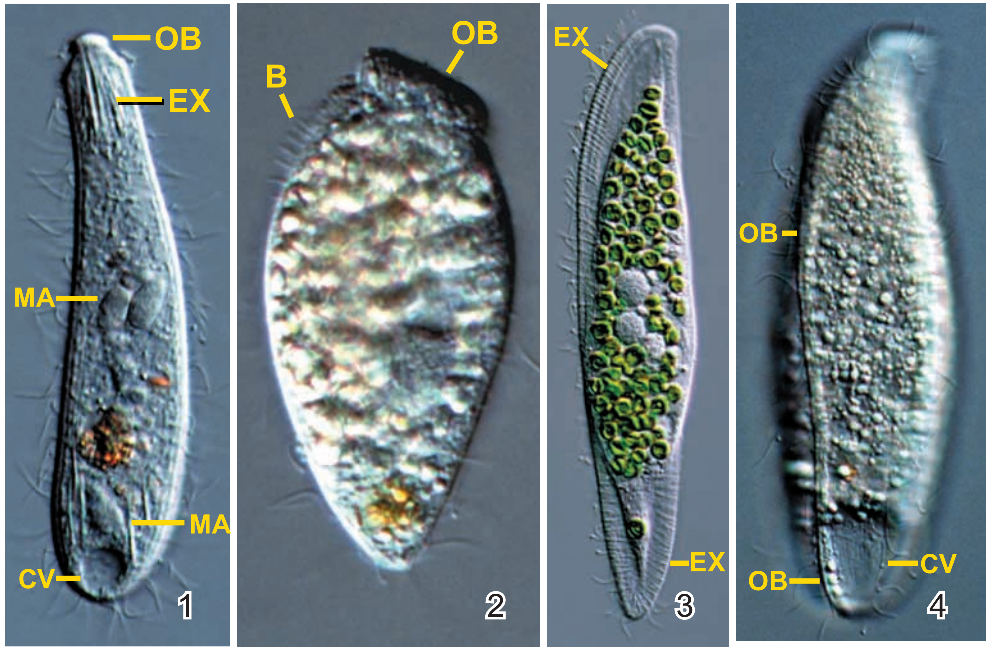


Fig. 1 – 7: Ciliates. These are rapacious, about 100 µm long, holotrichously ciliated, rare haptorids. **1 – 3:** *Actinobolina vorax* (1) and *Dactylochlamys pisciformis* (2, 3) have retractile tentacles each containing a toxicyst (arrowheads). The ciliary rows extend obliquely (3). **4 – 7:** Two, likely undescribed *Legendrea* species. They have warts (4, 5, arrowheads) with short extrusomes, while the oral bulge, which spirals around the cell (asterisks), contains long extrusomes (7, arrows). CV – contractile vacuole, MA – macronucleus, OB – oral bulge.



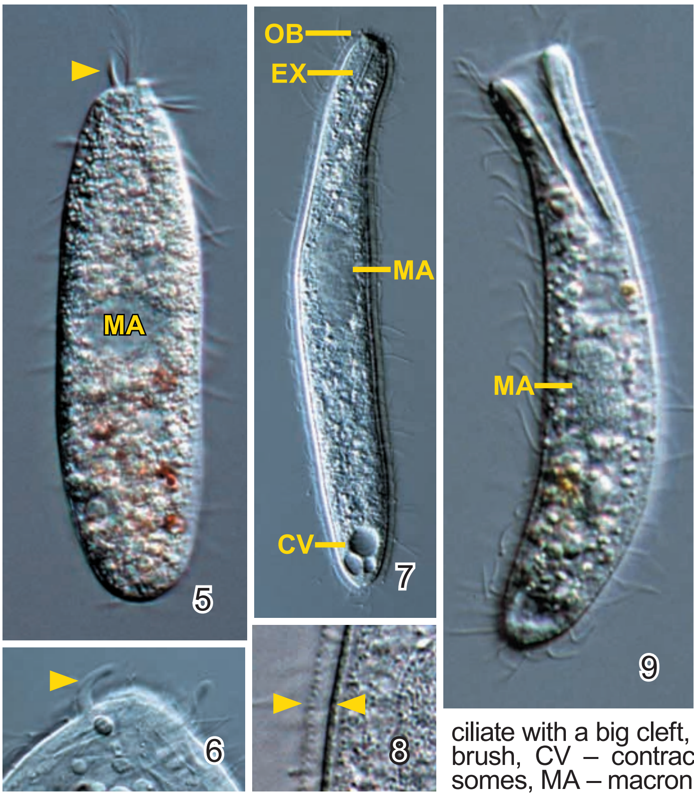


Fig. 1 – 9: Ciliates. This plate shows a described (1) and several undescribed (2 – 9) species. **1:** *Enchelyodon monilatus*, a 150 µm long haptorid with moniliform macronucleus. **2:** A pyriform haptorid (*Enchelyodon*?) with massive oral bulge, length 70 µm. **3:** A *Litonotus lamella*-like pleurostome with symbiotic algae, length 160 µm. **4:** A nice *Bryophyllum* or *Apobryophyllum* with the oral bulge extending to rear body end, length 140 µm. **5, 6:** A cylindrical haptorid with a thick bristle anteriorly (arrowheads), length 110 µm. **7, 8:** An *Enchelyodon*-like ciliate, likely a new genus, with a thin layer of fine scales (8, opposed arrowheads), length 200 µm. **9:** A strange (haptorid? hymenostome?) ciliate with a big cleft, length 100 µm. B – dorsal brush, CV – contractile vacuole, EX – extrusomes, MA – macronucleus, OB – oral bulge.

Fig. 1 – 6: Ciliates. Undescribed gymnostomes (haptorids). **1:** A broad *Penardiella* with distinct, but hardly flattened extrusome fringe (EX), length 110 µm. **2, 3:** Right side and ventral view of an *Arcuospathidium* or *Apertospathula*, length 190 µm. **4:** A curious species likely representing a new genus, length 100 µm. 5: A tiny, new *Perispira*, length 60 µm. **6:** A small *Spathidium* or *Arcuospathidium*, length 60 µm. CV – contractile vacuole, EX – extrusomes, MA – macronucleus, OB – oral bulge.

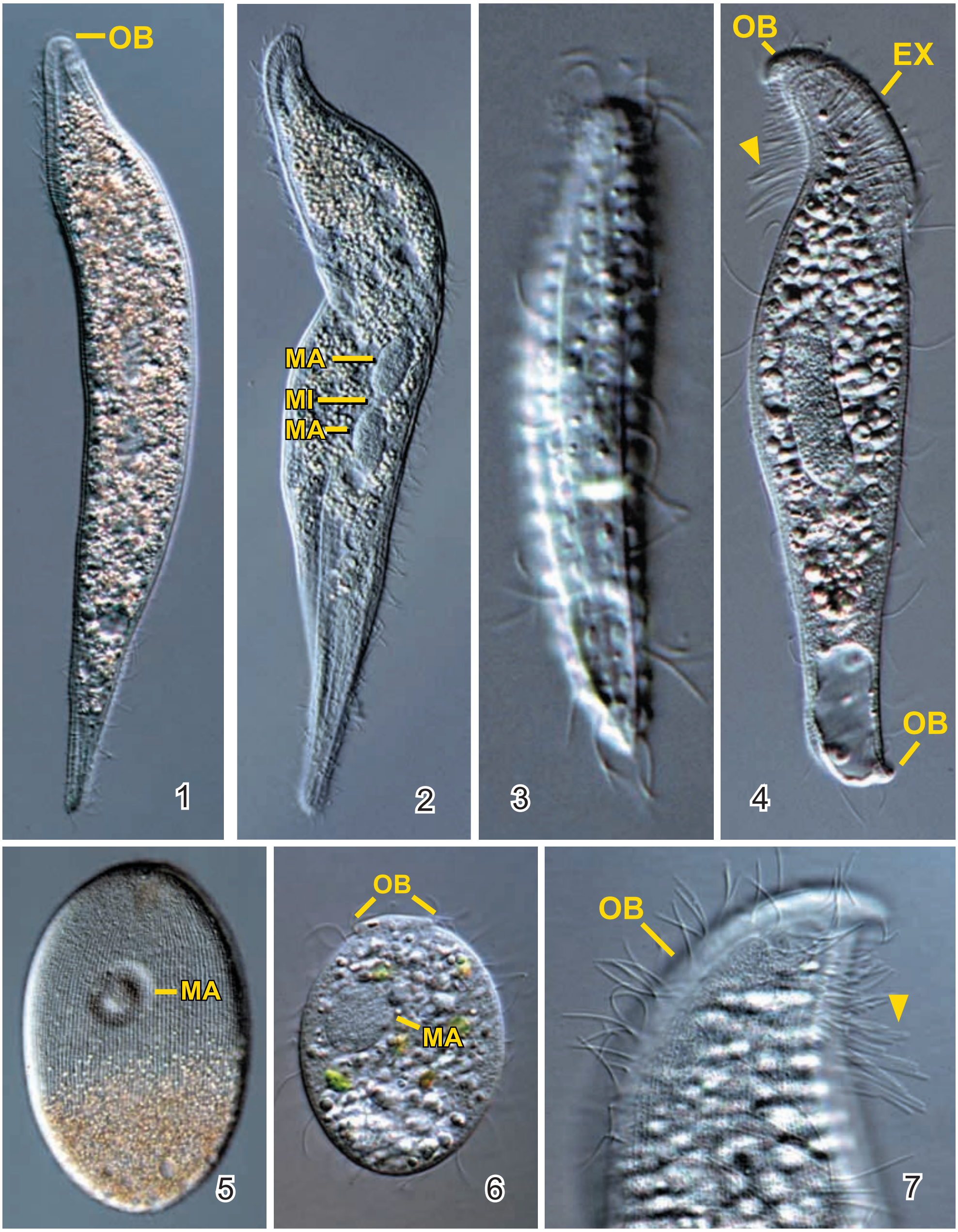


Fig. 1 – 7: Ciliates. Undescribed species. **1, 2:** A curiously-shaped, large pleurostome haptorid, length 240 µm. **3:** A warty spathidiid, length 75 µm. **4, 7:** A nice *Perispira* or *Bryophyllum*-like haptorid with conspicuous dorsal brush (arrowheads), length 160 µm. **5:** A prostomatid with many very narrowly spaced ciliary rows, length 130 µm. **6:** A globular haptorid with large oral bulge, length 40 µm. EX – extrusomes, MA – macronucleus, MI – micronucleus, OB – oral bulge.

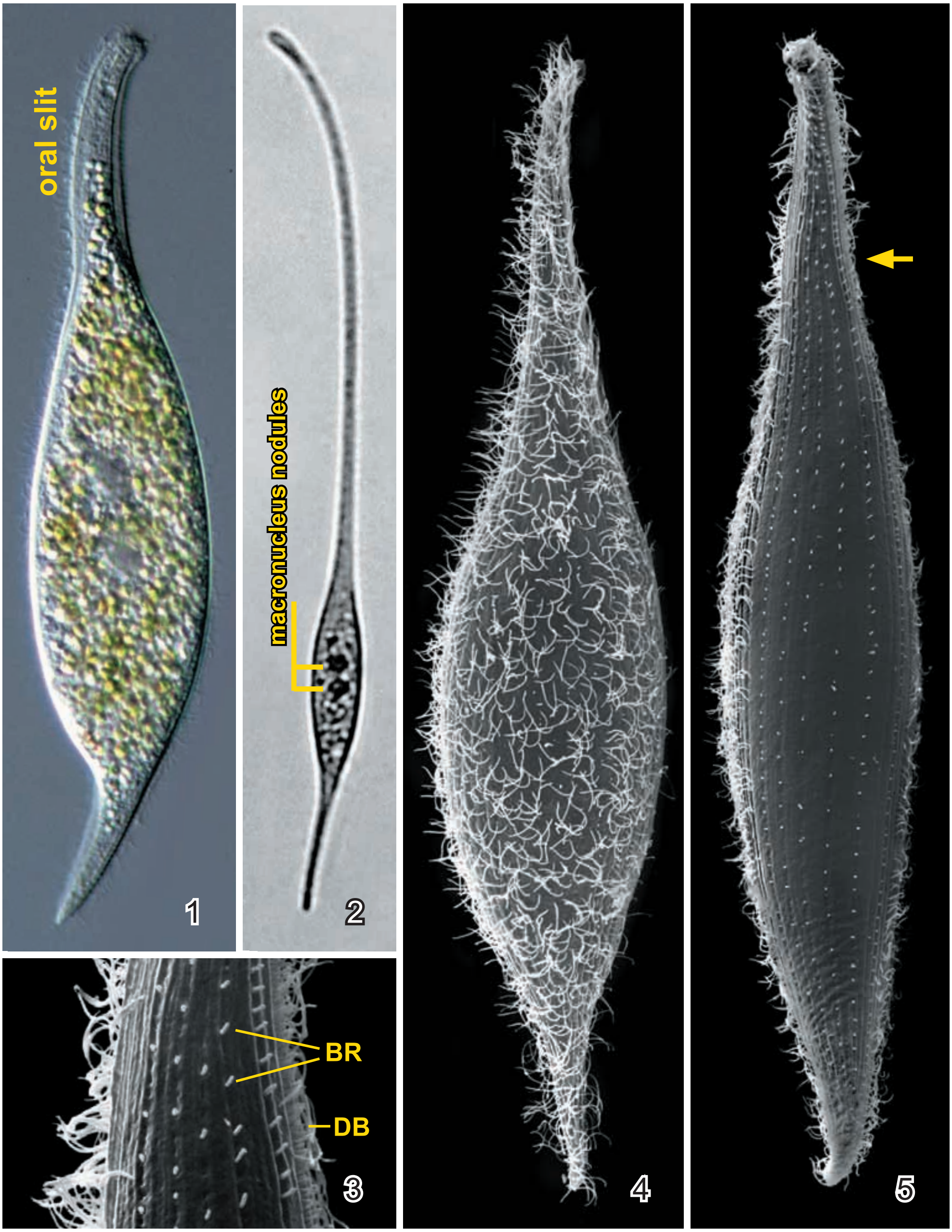


Fig. 1 – 5: Ciliates. *Amphileptus procerus* is a pleurostome ciliate with a laterally located mouth slit (1) and a fully ciliated right side, while the left has rows of minute bristles (3 – 5). Arrow in (5) marks region shown at higher magnification in figure 3. *Amphileptus procerus* is up to 500 µm long and highly contractile as shown by figures 1 (contracted) and 2 (fully extended). BR – bristles, DB – dorsal brush.

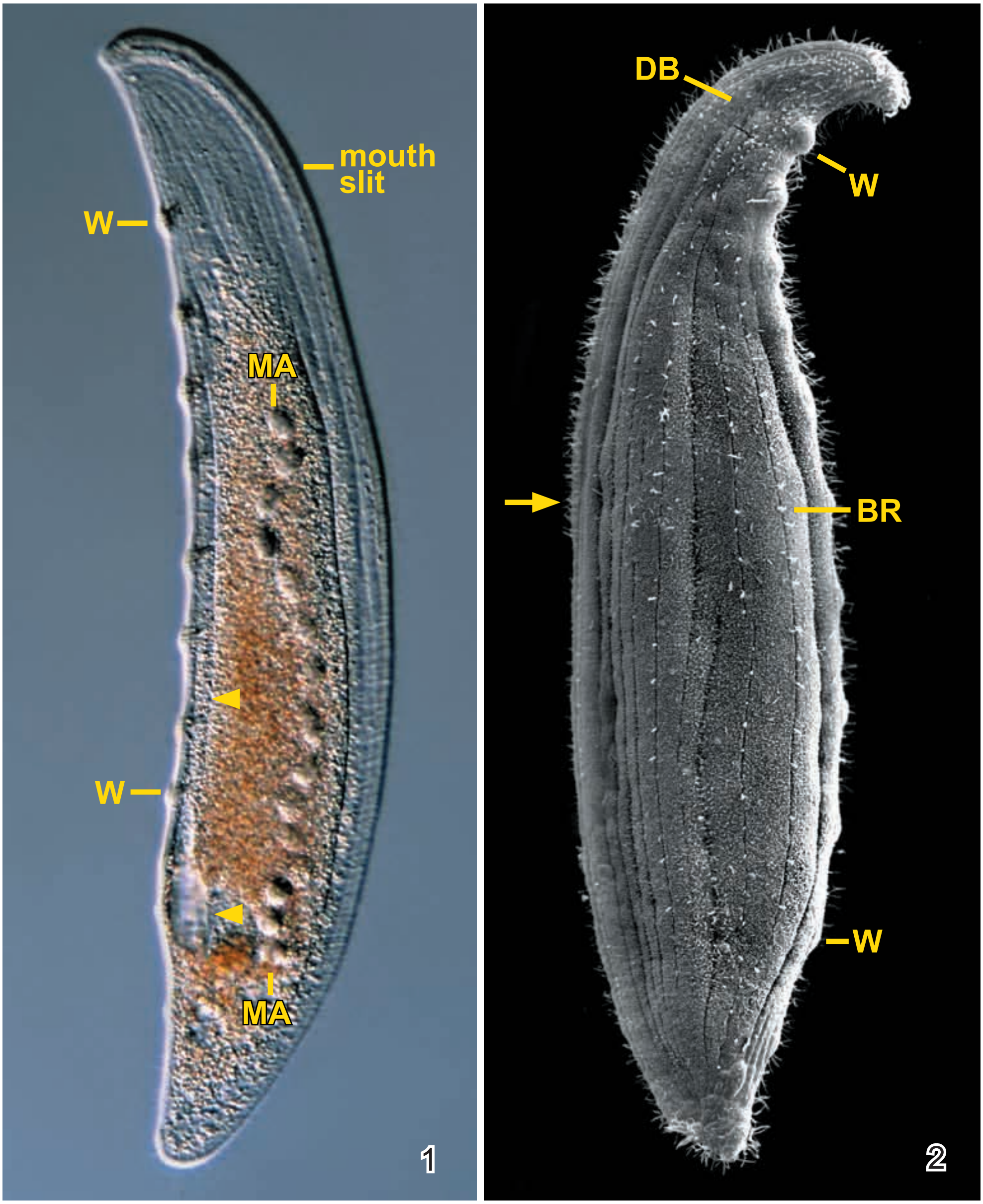
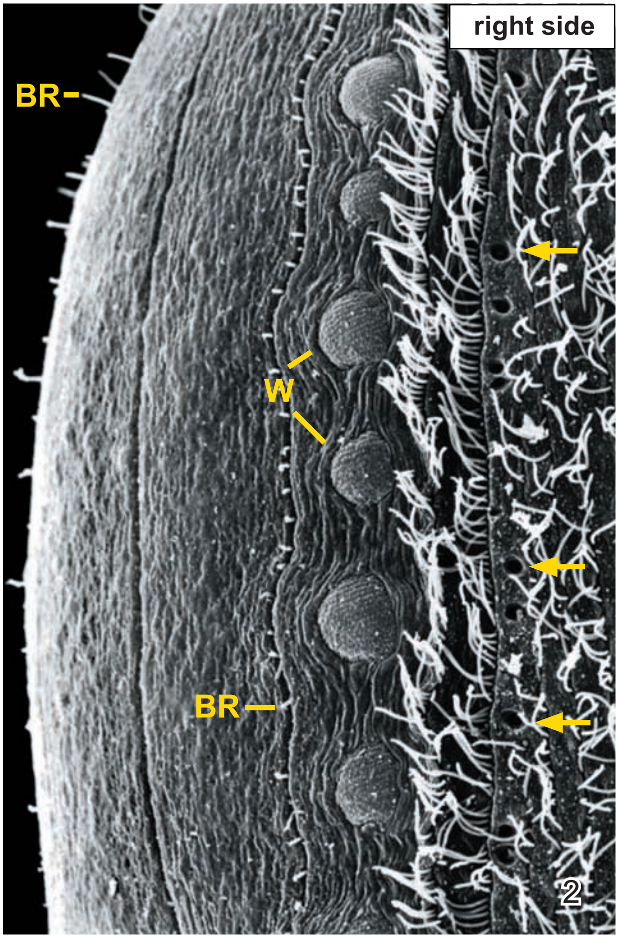


Fig. 1, 2: Ciliates. *Loxophyllum meleagris*, an about 400 µm long, majesticly gliding, pleurostomatid ciliate, is easily recognizable by the large size, the moniliform macronucleus, the curious toxicyst warts (for a detail see next plate), and the naked left side, which contains rows of minute bristles. The arrow marks the proximal end of the mouth, while the arrowheads denote the contractile vacuole which has a canal extending anteriorly. BR – bristle rows, CV – contractile vacuole, DB – dorsal brush, MA – moniliform macronucleus, W – extrusome warts.



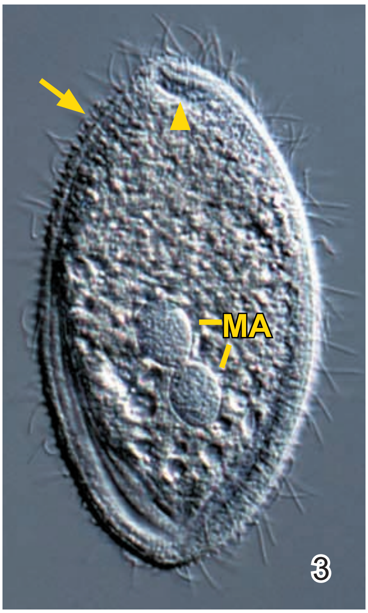


Fig. 1 – 3: Ciliates (read in context with preceding plate). **1, 2:** *Loxophyllum helus* is smaller (length ~ 200 µm) than *L. meleagris* and has only two macronucleus nodules. The extrusome warts are as distinct as in *L. meleagris* shown in figure 2. This SEM micrograph shows also a typical feature of the pleurostomatid ciliates: only the right side is ciliated, while the left has rows of minute ciliary stumps. Arrows mark excretory pores of the contractile vacuole. **3:** *Opisthodon niemeccense* is a rare, about 150 µm long pleurostome with an elliptical shape and a small anterior groove (arrowhead) containing the dorsal brush. The arrow marks the serrate body margin, a prominent feature not described in the literature; thus the Simmelried population might be a distinct species. BR – bristle rows, MA – macronucleus, W – extrusome warts.

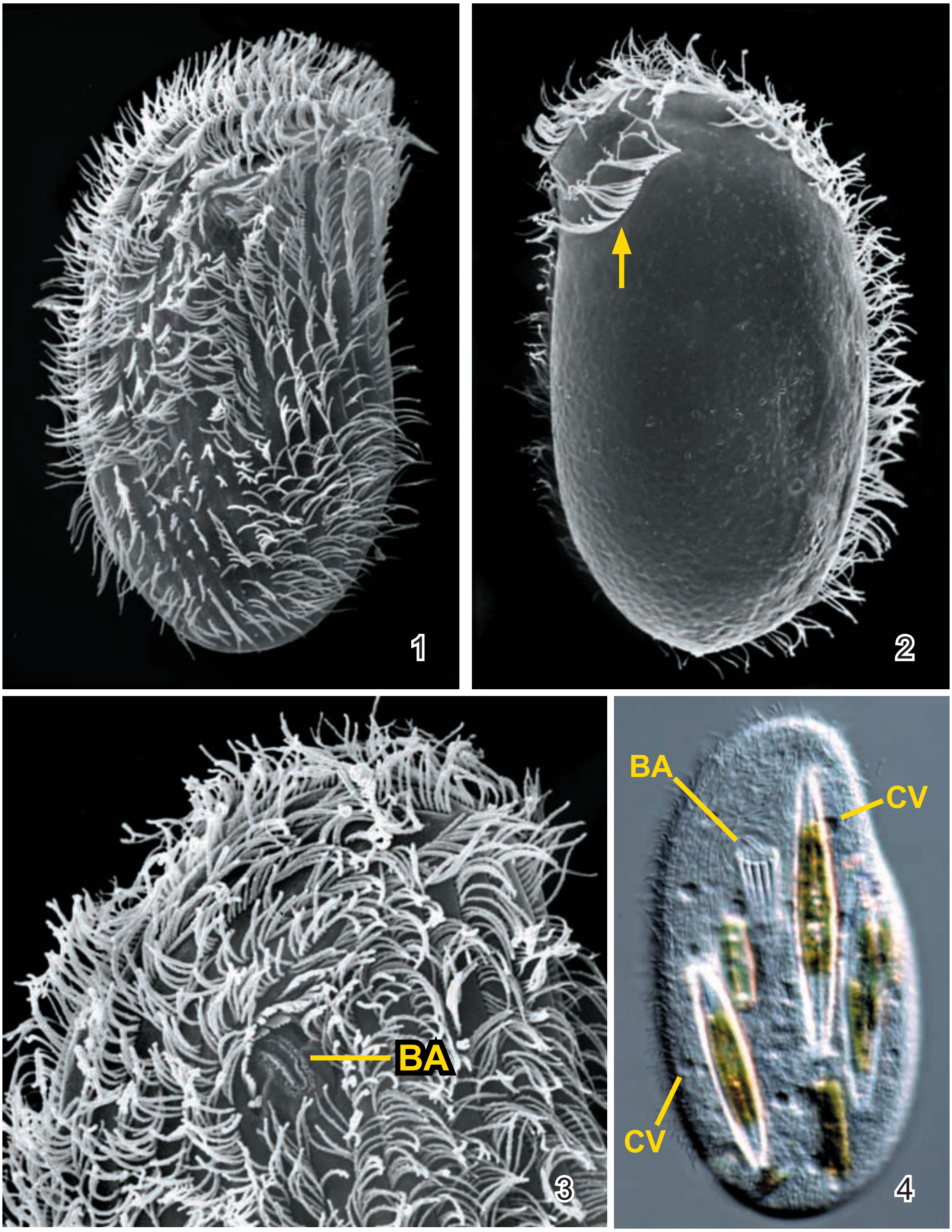


Fig. 1 – 4: Ciliates. *Trithigmostoma cucullus* from life (4) and in the scanning electron microscope. *Trithigmostoma* is a cyrtophorid, about 100 µm long ciliate, which feeds on diatoms (4) ingested via the oral basket (cyrtos; BA in 3, 4). As an Aufwuchs dweller, it is ciliated mainly on the ventral side (1), the dorsal bears only a short (sensory?) ciliary row (2; arrow). BA – oral basket, CV – contractile vacuoles.

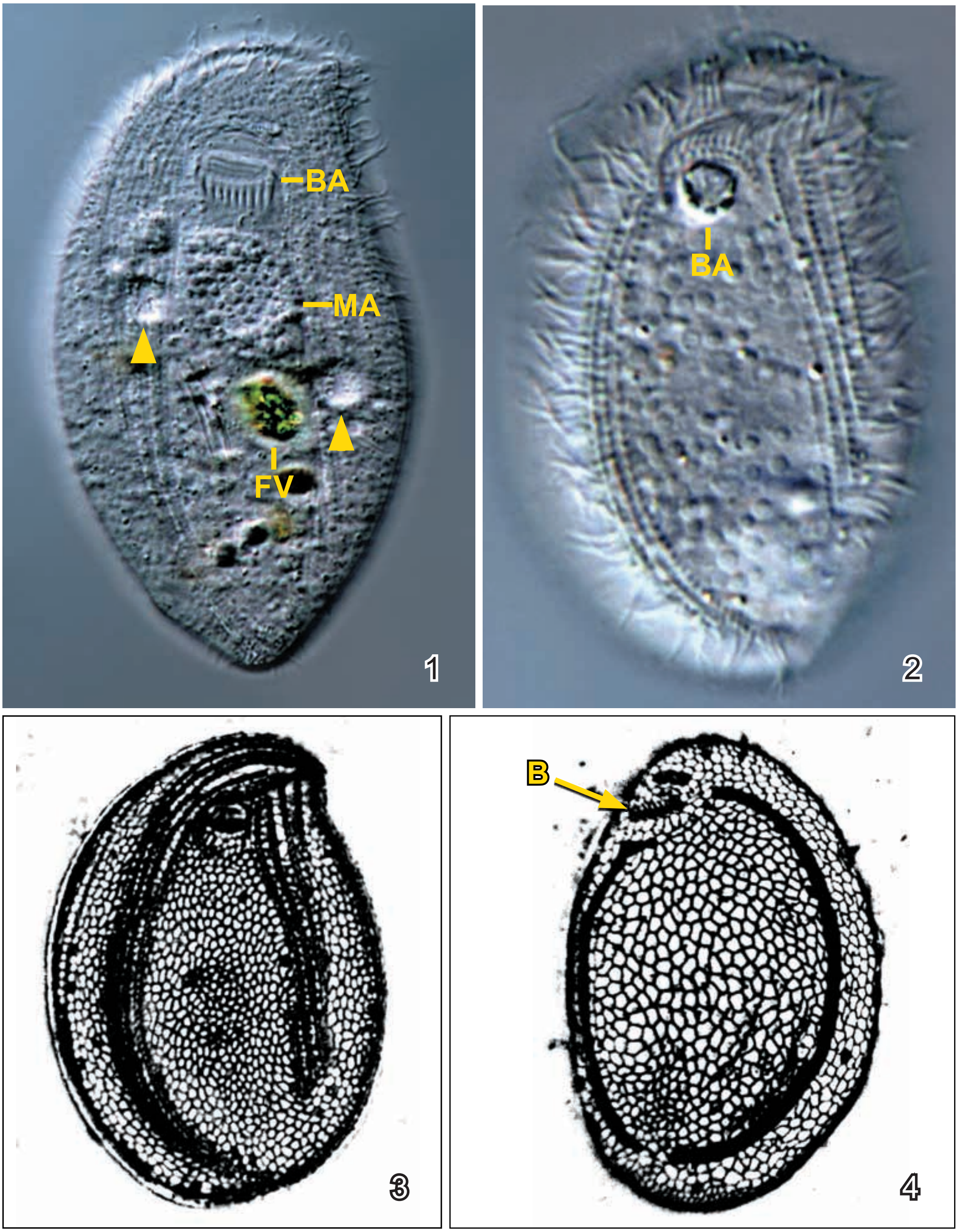


Fig. 1 – 4: Ciliates. *Pseudochilodonopsis piscatoris* (1; ventral view, length ~ 70 µm) and *Chilodonella uncinata* (2 – 4; ventral and dorsal views, length ~ 40 µm) are cyrtophorid ciliates, that is, have a conspicuous oral basket (BA). *Chilodonella uncinata* is the classical ciliate, where B. M. Klein discovered the silverline pattern revealed with silver nitrate (3, 4). B – dorsal brush, BA – oral basket, FV – food vacuole, MA – macronucleus, arrowheads – contractile vacuoles.

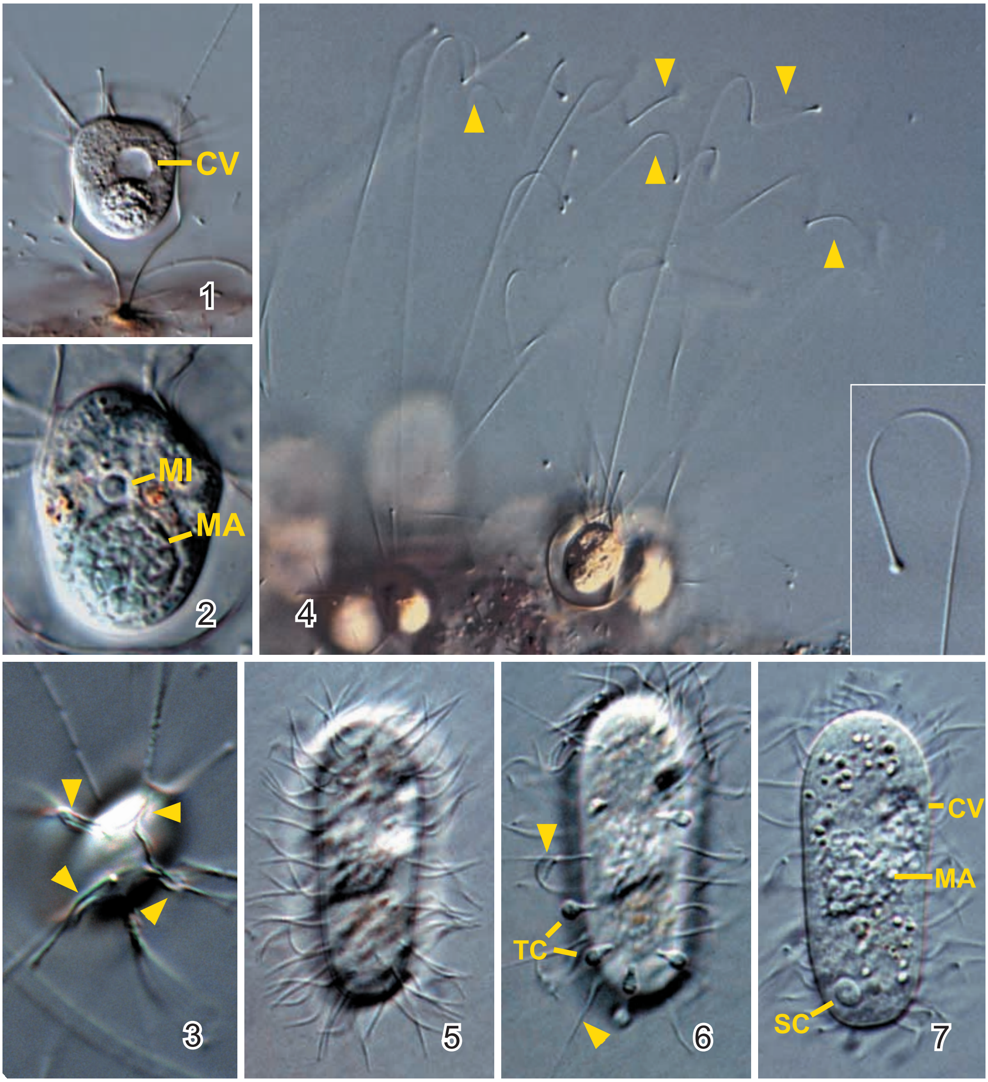


Fig. 1 – 7: Ciliates. Although the adult suctoria lack any cilia, they are true ciliates because they have a ciliated swarmer and the typical ciliate nuclear apparatus composed of a macronucleus and a micronucleus (2). The adult suctoria have numerous tentacles with extrusomes (haptocysts) at the distal end to catch the prey. **1 – 7:** *Metacineta cuspidata* is 30–40 µm high and rare in Simmelried. The lorica has a tapered stalk (1) and four apical clefts (3, arrows), where bundles of tentacles emerge. The distal region of the tentacles is bent or curled in a characteristic, species-specific manner (4, arrowheads; inset). The sole-shaped swarmer is 30–35 µm long and dorsoventrally flattened. The ventral side (5) is ciliated, while the dorsal side and the posterior end bear some small tentacles (6, TC) and long cilia (6, arrowheads). The new stalk and lorica will be generated by the scopuloid when the swarmer develops to the adult (7, SC). CV – contractile vacuole, MA – macronucleus, MI – micronucleus, SC – scopuloid, TC – tentacles.

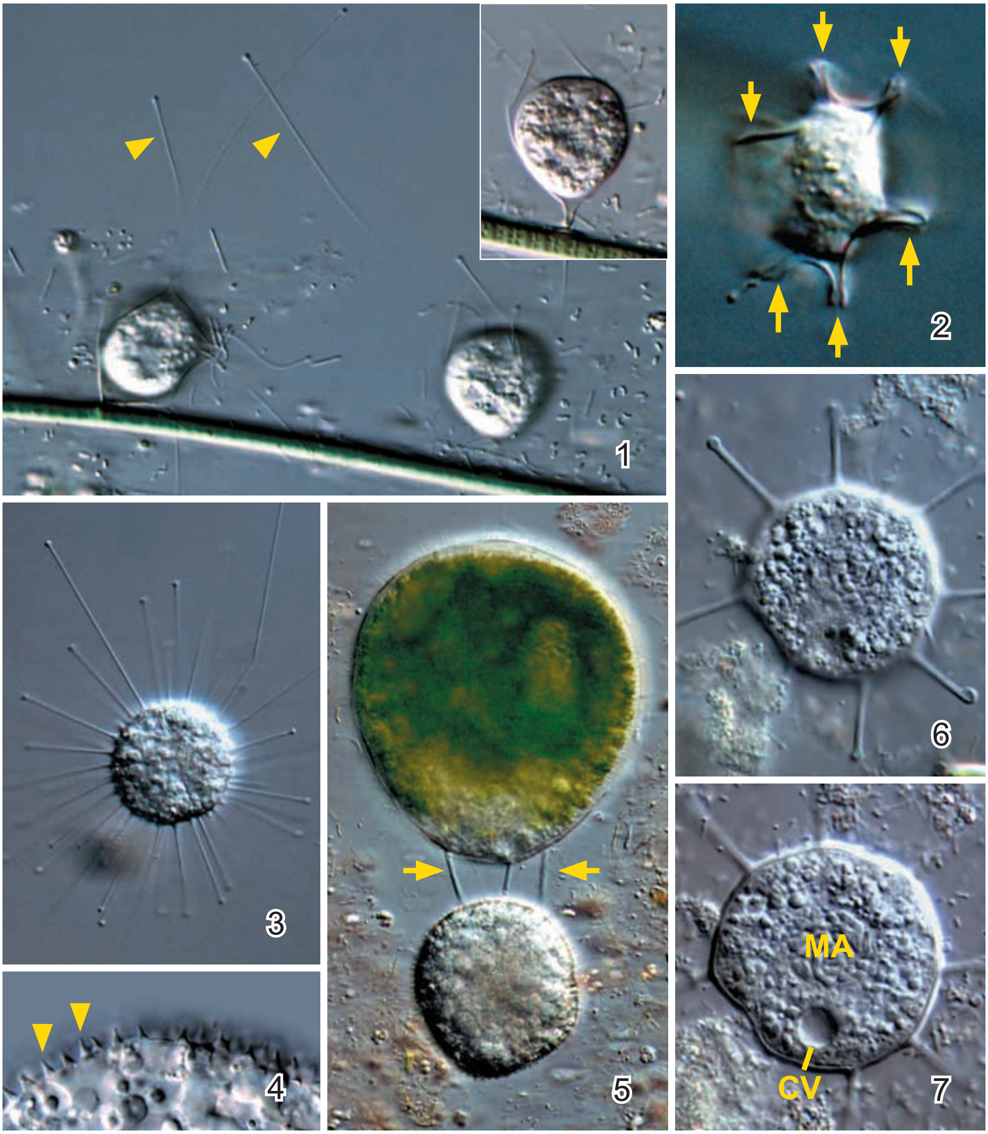


Fig. 1 – 7: Ciliates. 1, 2: *Metacineta mystacina* var. *brevipes* is 30 µm across and can be distinguished from *M. cuspidata* (see previous plate) by the straight tentacles (1, arrowheads) and the six apical clefts (2, arrows). The lorica has a short, tapered stalk (1, inset) and measures 40–45 µm. **3 – 5:** *Parapodophrya soliformis* is 40–100 µm across and the most common suctor in Simmelried. It has a spherical body with radiating tentacles. Retracted tentacles appear as tapered cones 2–3 µm high (4, arrowheads). The prey (in this case the ciliate *Holophrya* sp.) can be much larger than the predator and is sucked by the tentacles (5, arrows). **6, 7:** *Heliophrya minima* (20–50 µm) is a discoidal, strongly flattened suctor attached to the substrate with the whole body. The tentacles are separate and emerge from the margin (6). CV – contractile vacuole, MA – macronucleus.

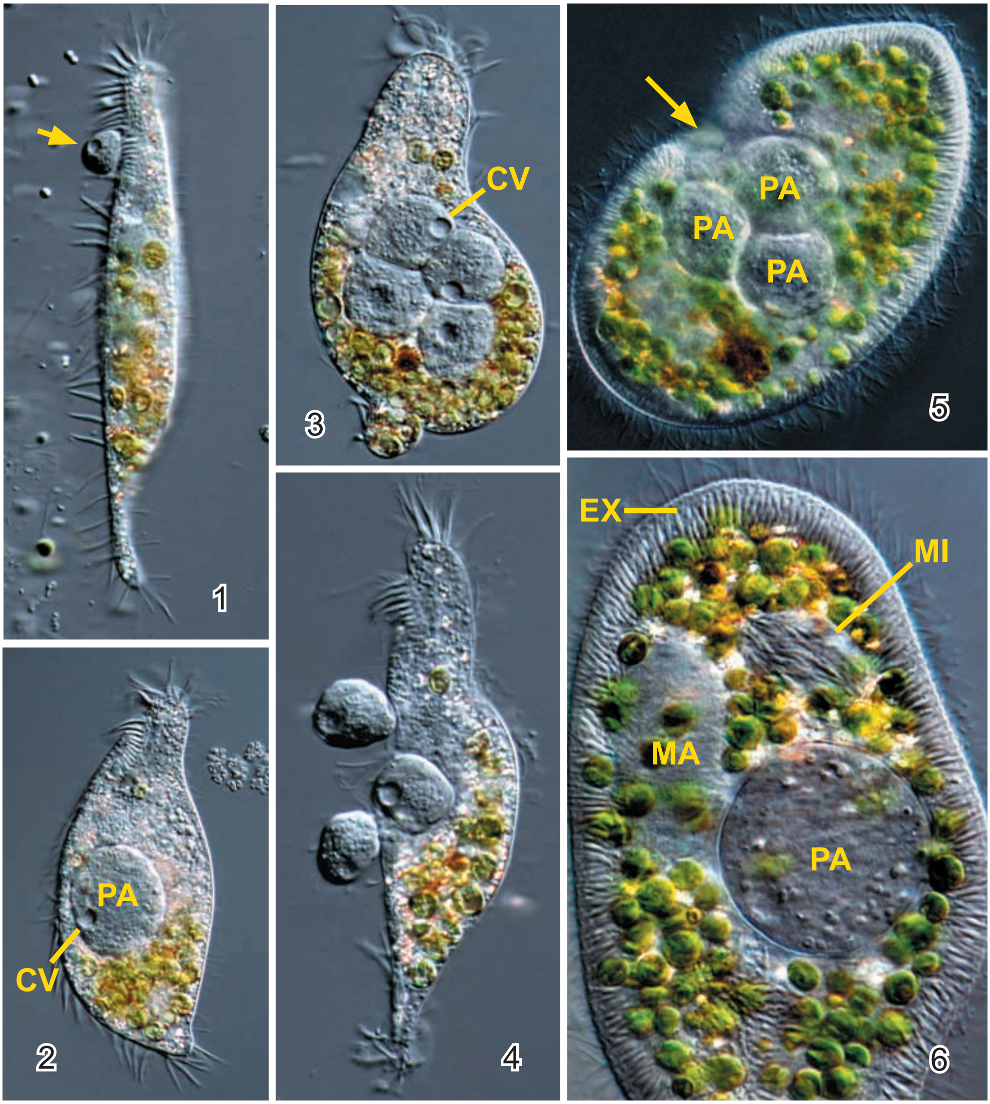


Fig. 1 – 6: Ciliates. Some suctoria parasitize other ciliates. They penetrate the host via the mouth or produce a deep host invagination connected to the environment by a minute tube. After feeding, they divide and generate swarmers. **1 – 4:** Some stages of the life cycle of *Sphaerophrya parurolepti*, which parasitizes *Uroleptus caudatus*, a stichotrichous ciliate. **1:** An about 12 µm-sized adult (arrow) attached to the mouth area. **2:** A squashed host with a 27 µm-sized parasite. **3:** A squashed host with four parasites. **4:** Three parasites leaving the host. **5, 6:** *Paramecium bursaria* parasitized by *Podophrya* or *Sphaerophrya* sp. Figure 5 shows three parasites in a bottle-shaped invagination of the host (arrow). When squashed, the globular parasite (PA) and the ellipsoidal host's macronucleus become visible (6). The micronucleus is parasitized by bacteria and thus much larger than usual. CV – contractile vacuole, EX – extrusomes, MA – macronucleus, MI – micronucleus, PA – parasite.

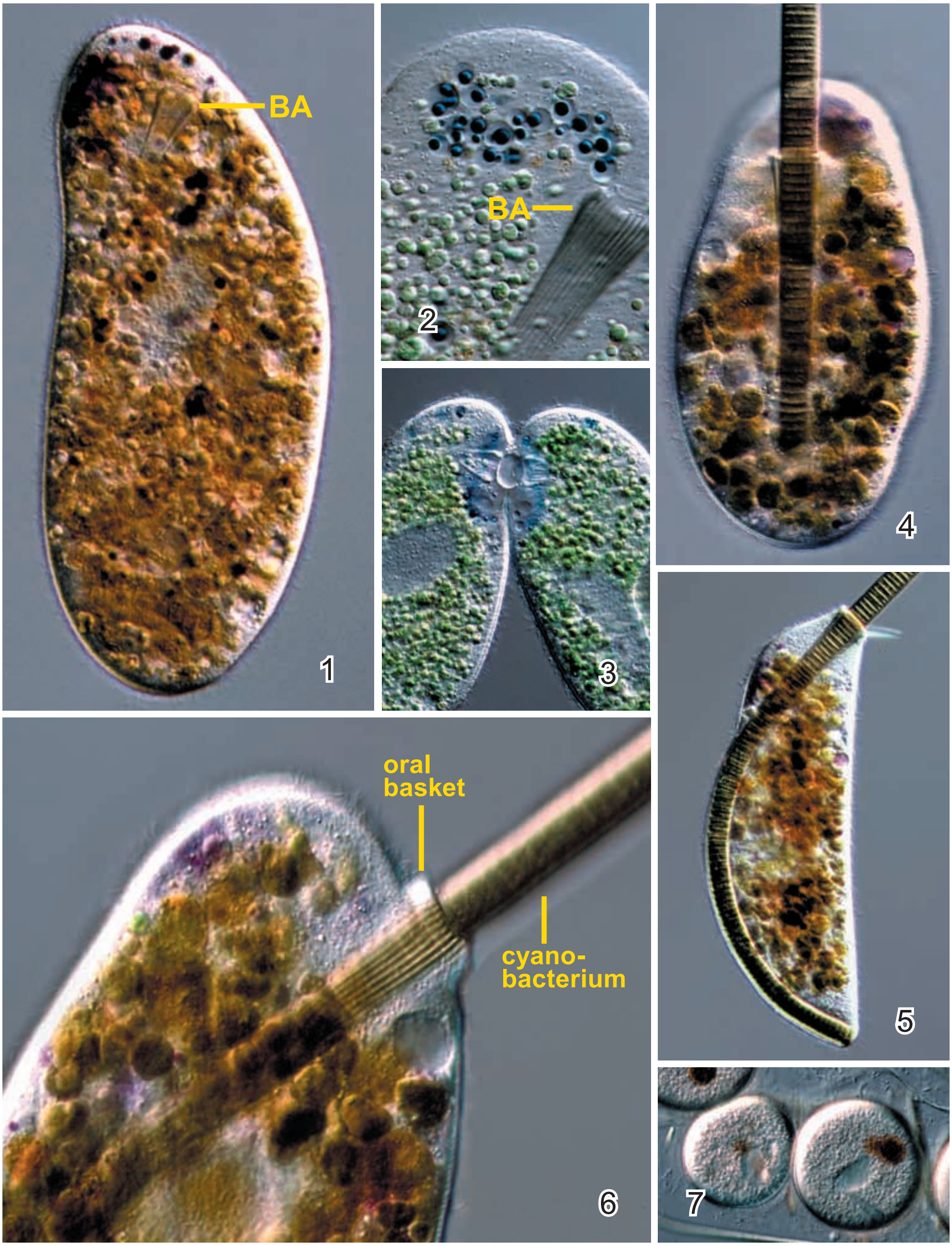
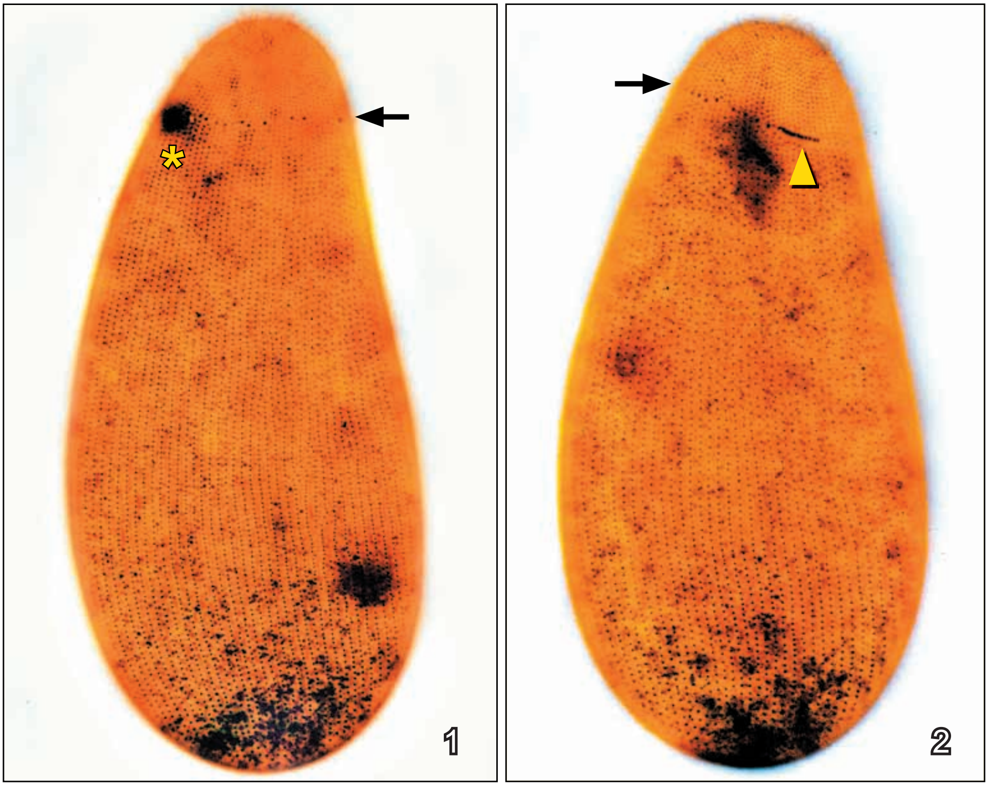


Fig. 1 – 7: Ciliates. This plate shows the life cycle of *Nassulopsis elegans*, an about 200 µm long, nassulid ciliate (1, 2) feeding on filamentous cyanobacteria, which are taken (6) and transported (4, 5) into the cell by the conspicuous oral basket made of microtubular rods (6). The coloured droplets are digestion products of the cyanobacteria. After feeding, specimens conjugate (3) or encyst (7). BA – oral basket.



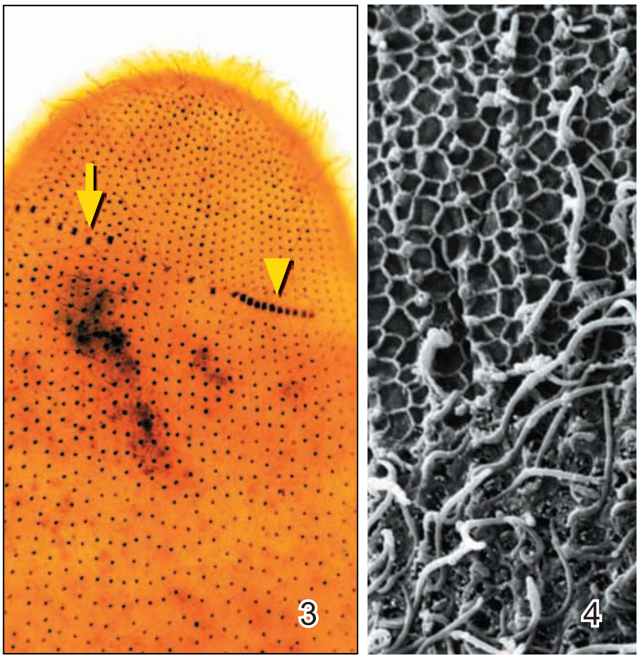


Fig. 1 – 4: Ciliates. *Nassulopsis elegans* after silver carbonate impregnation (1 – 3) and in the SEM (4). **1 – 3:** Ventrolateral and dorsolateral view showing the meridionally extending ciliary rows (basal bodies = rows of dark dots) and the almost circular synhymenium (arrows), which is composed of two parts: a large region where the minute adoral organelles are widely spaced (arrows) and a small dorsal region where they are very narrowly spaced (arrowheads). The large oral basked (see foregoing plate), which is within the cell, appears as a dark shadow (asterisk). **4:** When the cell membrane is removed, the cortical alveoli become distinct.

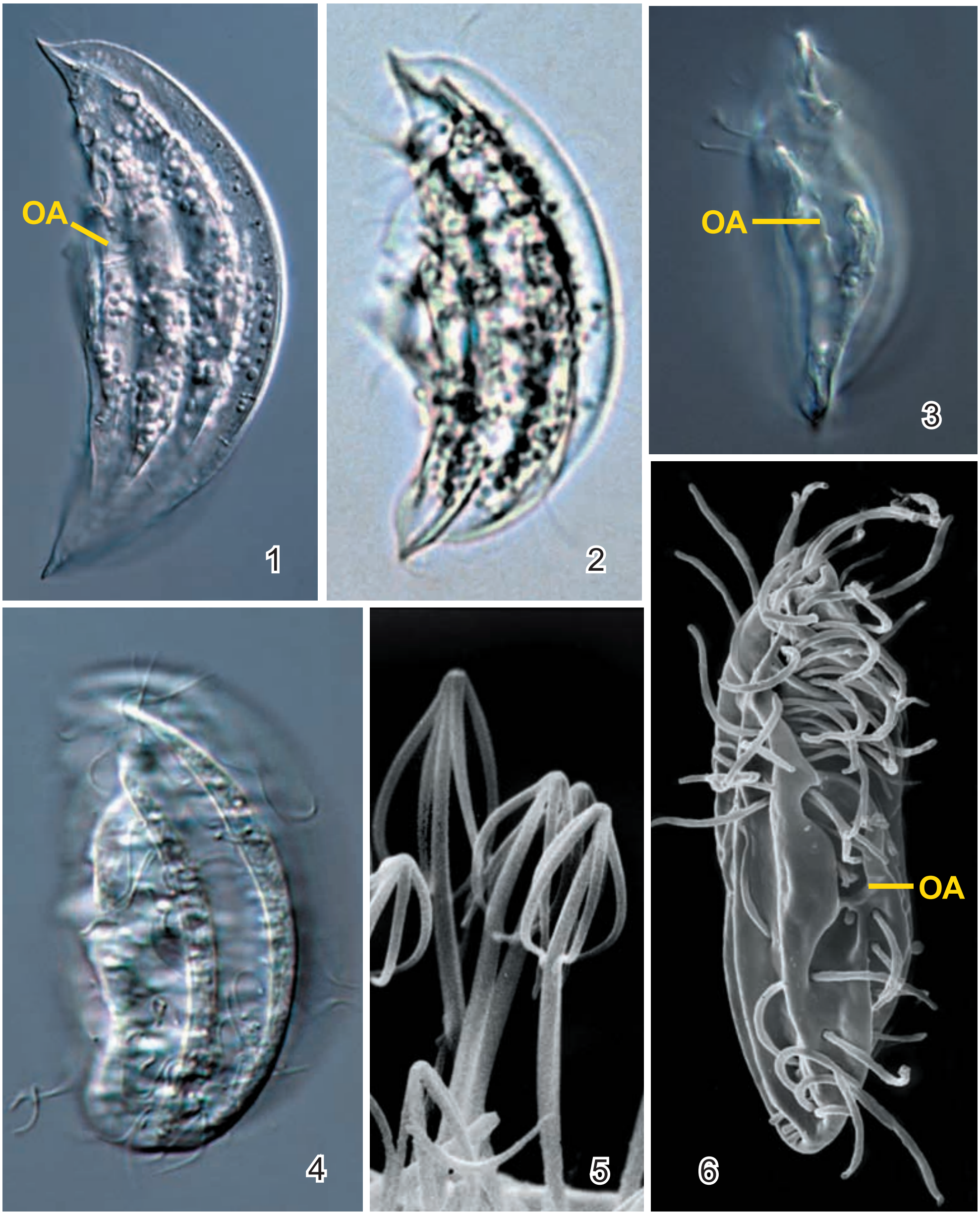


Fig. 1 – 6: Ciliates. *Drepanomonas* spp. are small, microthoracid ciliates with a nicely sculptured surface and trichocysts well recognizable in the scanning electron microscope (5, 6). **1:** *Drepanomonas dentatum* (70–80 µm), left side view. **2, 3:** *Drepanomonas* spec. (50–60 µm), a likely undescribed species from Simmelried, in left side (2) and ventral (3) view, showing the strongly sculptured surface. **4, 6:** *Drepanomonas revoluta*, right side and ventral view, length about 30 µm. **5:** Microthoracid ciliates, here *Pseudomicrothorax*, have curious trichocysts with four anchor-like processes. OA – entrance to oral apparatus.

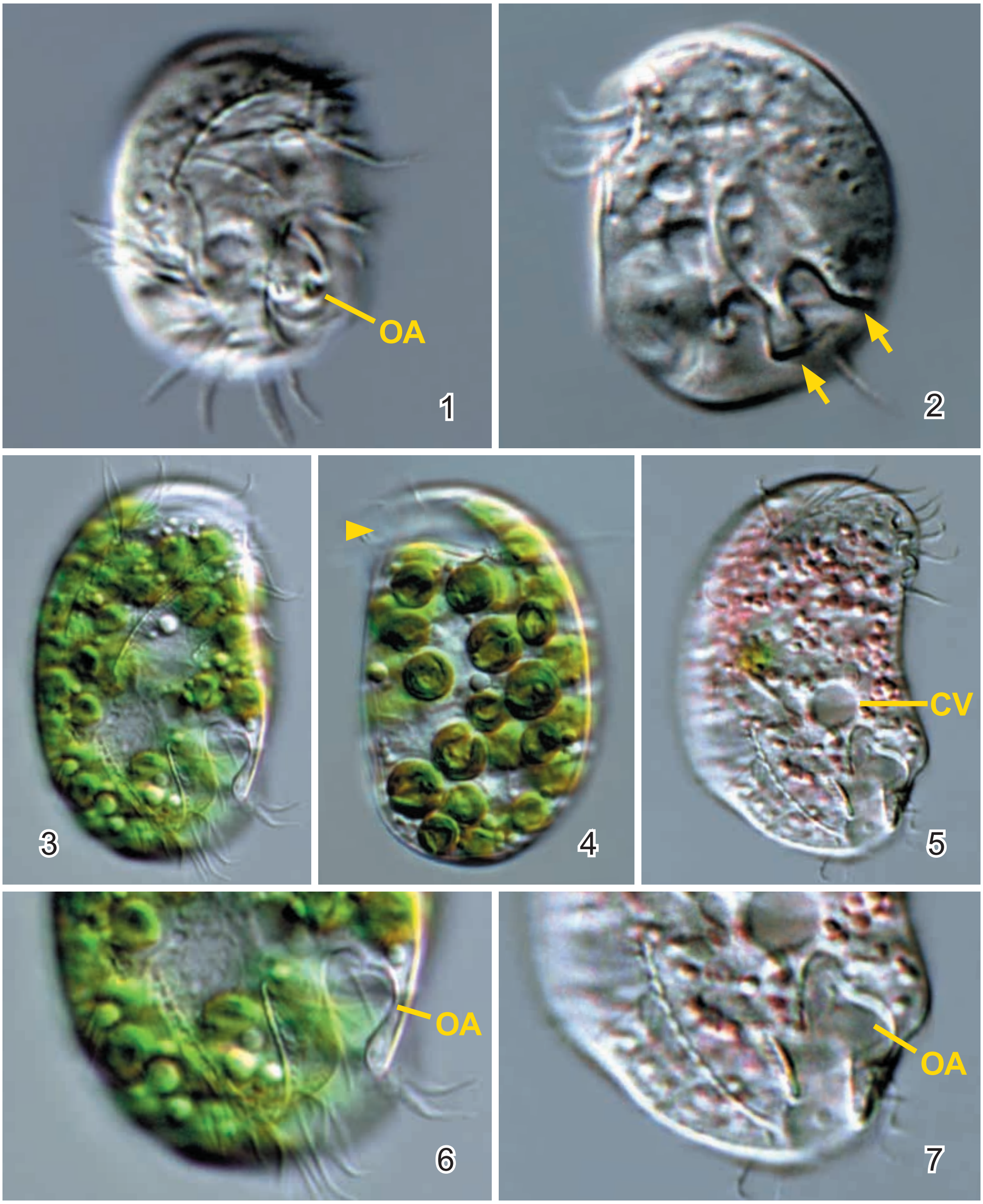
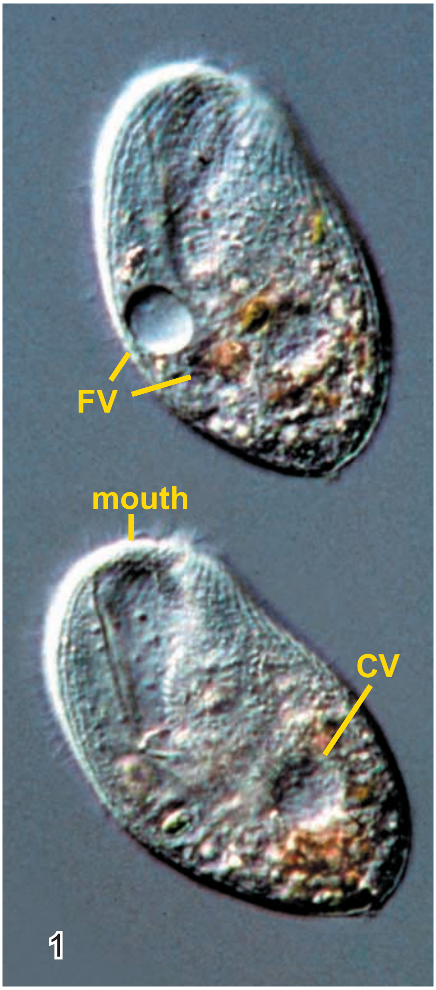


Fig. 1 – 7: Ciliates. *Microthorax* species are 20–40 µm long and strongly flattened. The glossy cortex has a complex pattern of crests and furrows, and the ciliature is strongly reduced. Most are microaerobic and feed on bacteria. **1, 2:** Right and left side view of *M. costatus* which has a curious cortex pattern (arrows). **3, 4, 6:** *Microthorax viridis* has symbiotic green algae and has a deep furrow on the anterior left side (4, arrowhead). Note the cordiform entrance to the buccal cavity (6). **5, 7:** *Microthorax pusillus* is reddish due to ingested sulphur bacteria. Note the complex cortical pattern in the buccal cavity. CV – contractile vacuole, OA – oral apparatus.



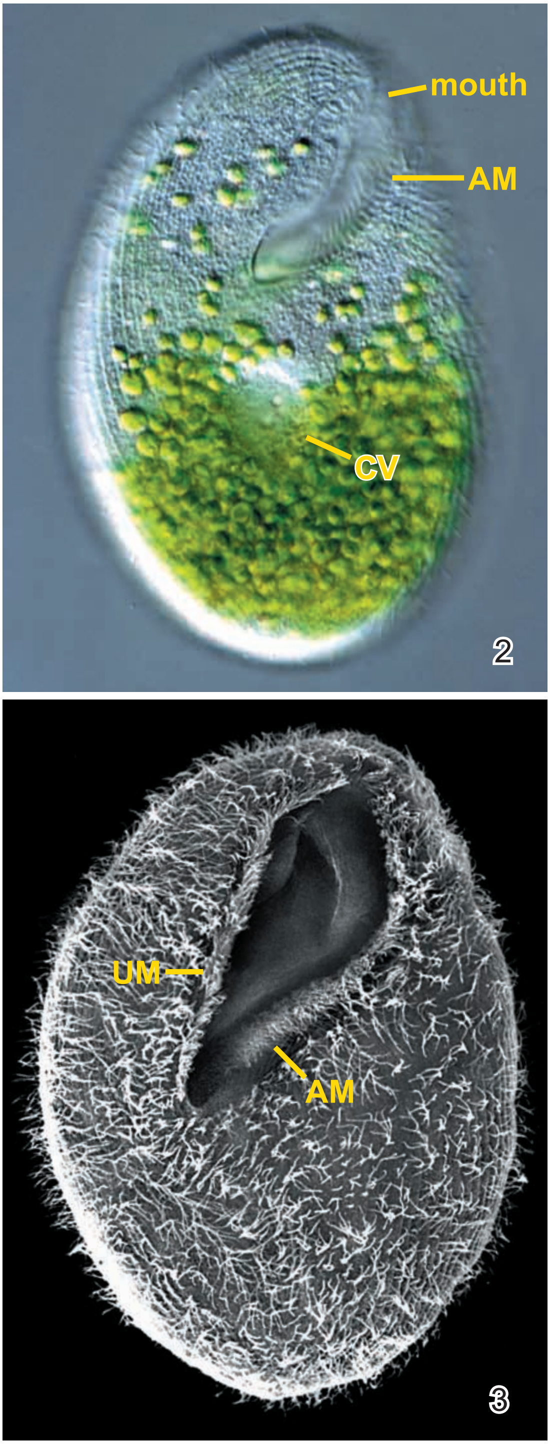


Fig. 1 – 3: Ciliates. *Bryometopus sphagni* (1, 3) and *B. viridis* (2) are about 120 µm long and differ mainly by the symbiotic algae (absent vs. present). *Bryometopus* belongs to the colpodid ciliates and has a conspicuous, oblique mouth well recognizable both in vivo (1, 2) and the scanning electron microscope (3). Both species prefer moss habitats and feed on algae and small ciliates. AM – adoral zone of membranelles, CV – contractile vacuole, FV – food vacuoles, UM – undulating membrane.

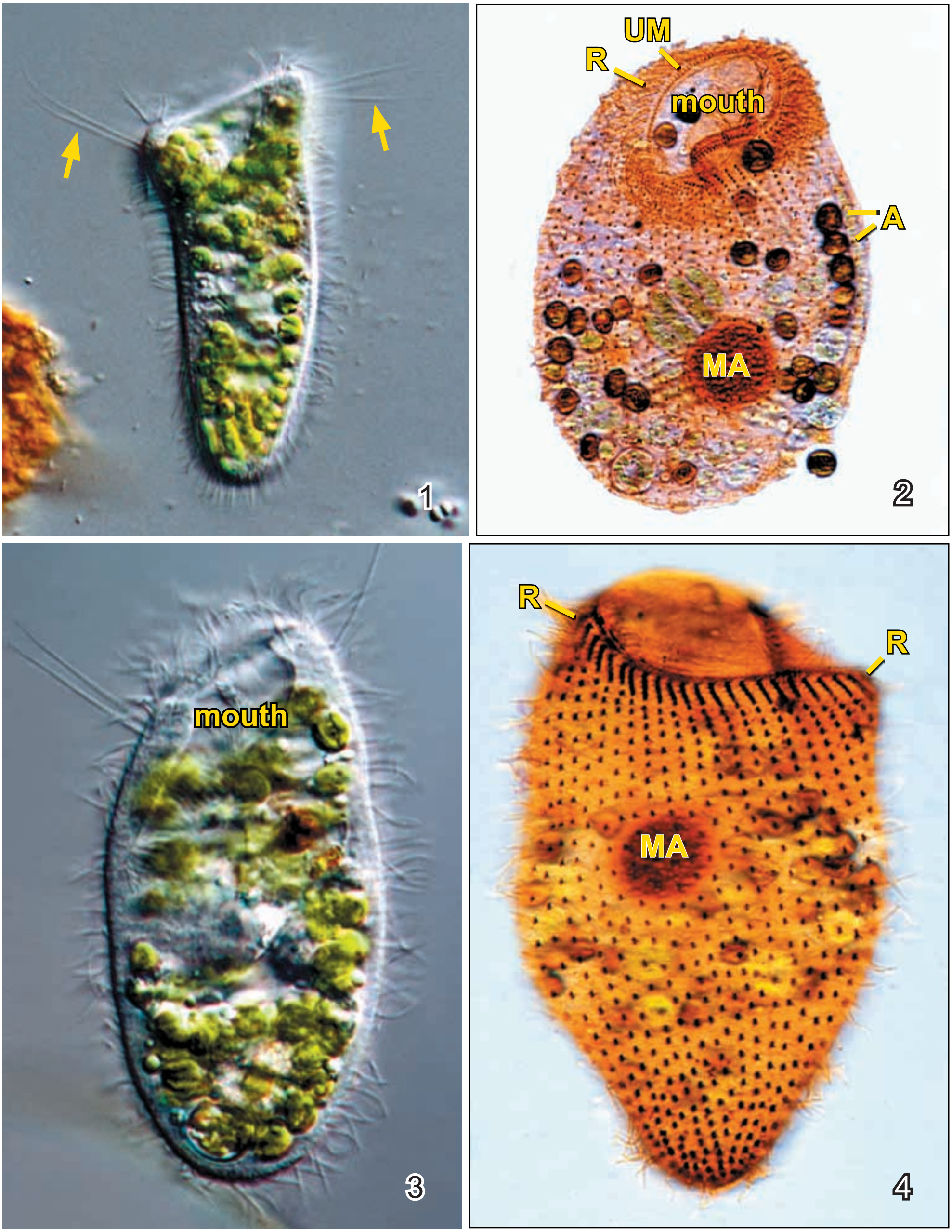


Fig. 1 – 4: Ciliates. *Paracondylostoma setigerum chlorelligerum* from life (1, 3) and after silver carbonate impregnation (2, 4). This about 70 µm long, colpodid ciliate was discovered in the Simmelried and is characterized by the symbiotic green algae. Note the ciliary ribbon (R) from which long, tactile bristles orginate (arrows). A – symbiotic green algae, MA – macronucleus, R – ciliary ribbon, UM – undulating membrane.

Fig. 1 – 4: Ciliates. *Platyophrya sphagni* (1, 2) and *Thylakidium pituitosum* (3, 4) are colpodid ciliates with symbiotic algae because they live in a poor habitat, viz., in moorland puddles. **1, 2:** *Platyophrya* is a highly flexible, about 40 µm long ciliate with a minute, subapical oral opening (arrow). It feeds on bacteria and small protists. **3, 4:** *Thylakidium* is about 80 µm long and has a large oral funnel (ends marked by arrowheads). Thus, it can feed on various algae. The species lives in a very hyaline, slimy lorica not recognizable in this micrograph.

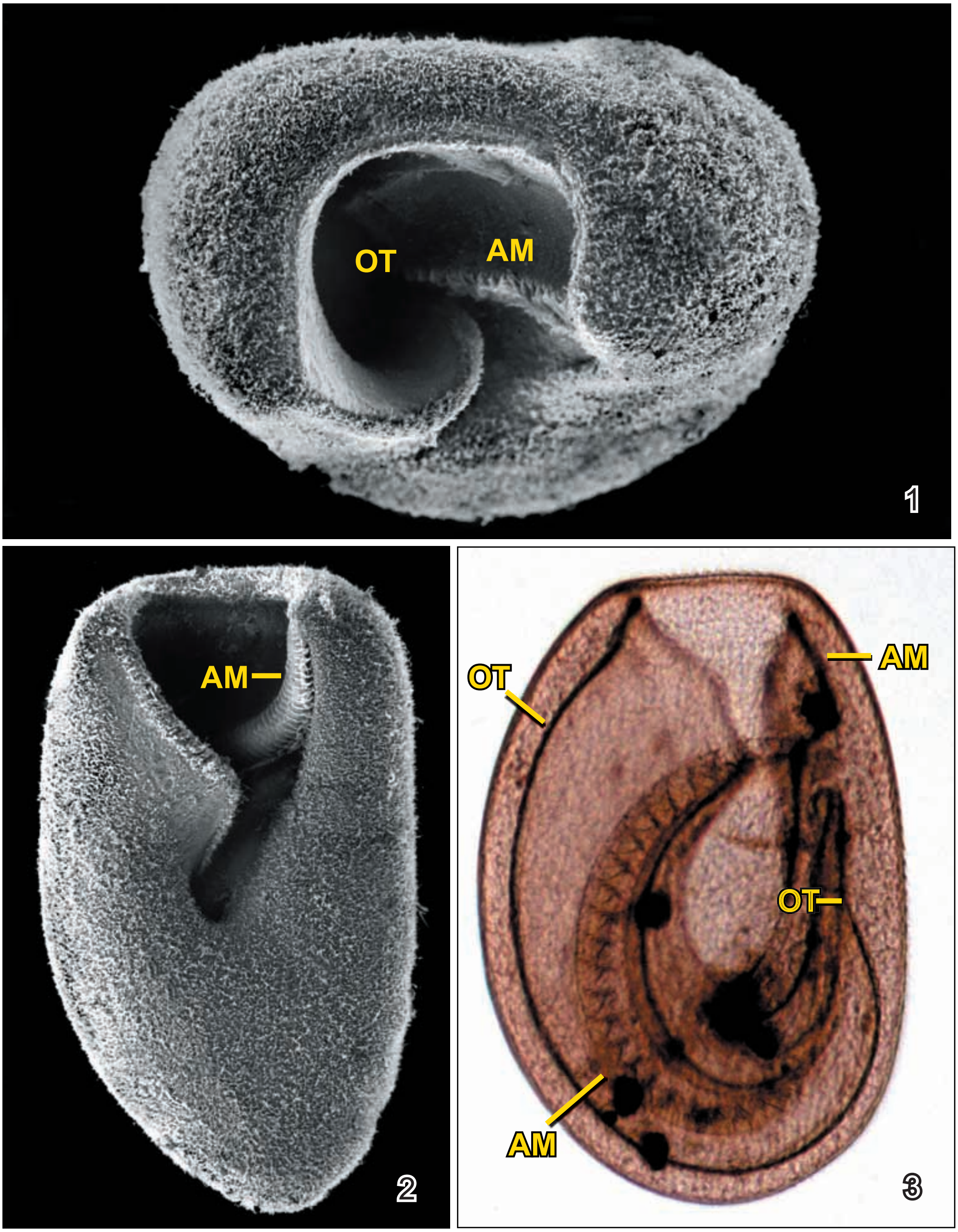


Fig. 1 – 3: Ciliates. *Bursaria ovata* (3), which occurs in the Simmelried, from life, and *B. truncata* (1, 2), which does not occur in the Simmelried, in the scanning electron microscope. These are giantic, up to 1 mm long, colpodid ciliates differing, inter alia, by the shape of the oral tube (OT): U-like (3) vs. semicircular. **1:** Frontal view showing the oral tube entrance. **2, 3:** Ventral views. The oral tube contains a large adoral zone (AM). AM – adoral zone, OT – oral tube.

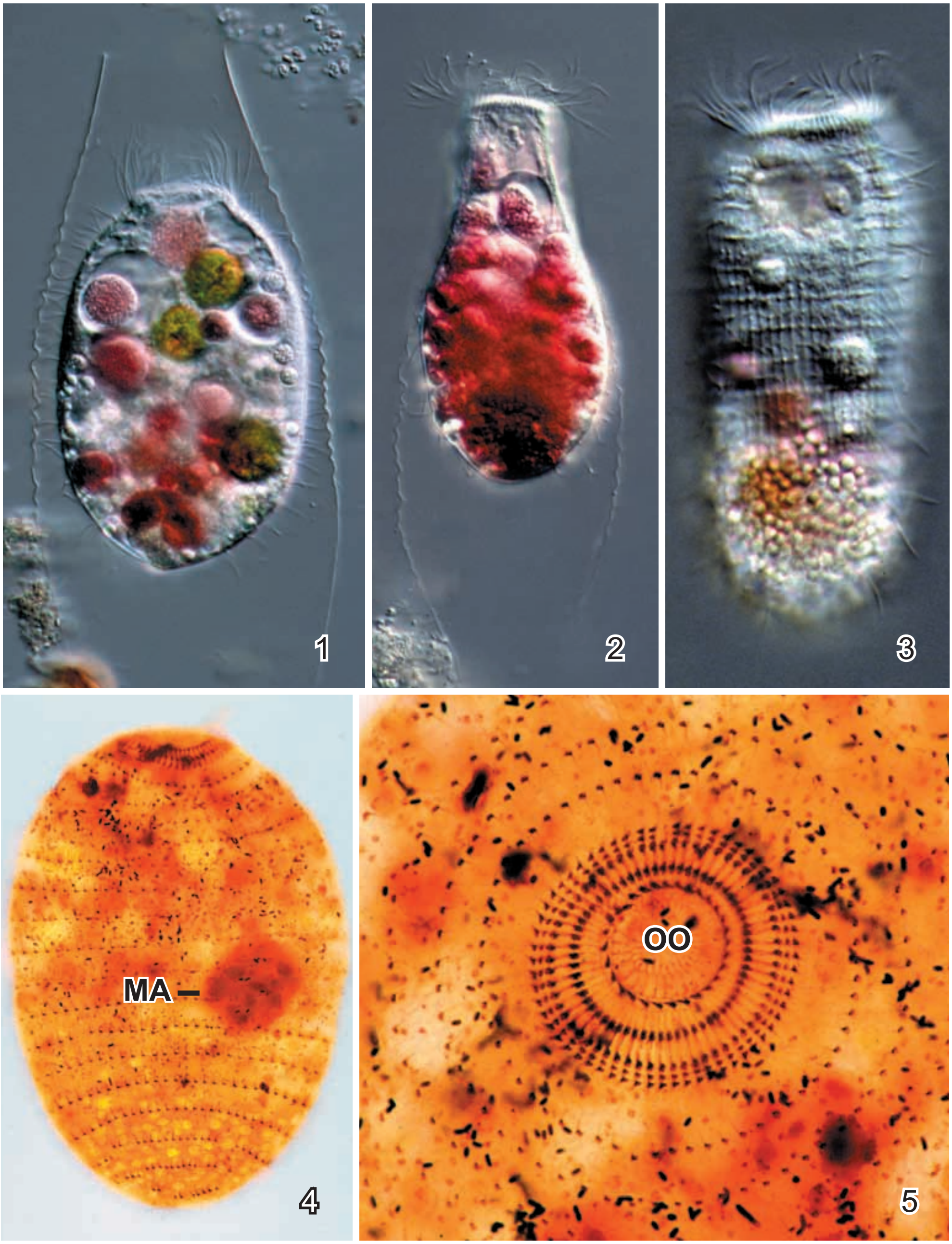


Fig. 1 – 5: Ciliates. *Vasicola ciliata* from life (1 – 3) and after silver carbonate impregnation to reveal the highly ordered, ornamental ciliary pattern (4, 5). This about 130 µm long ciliate lives in a delicate lorica anchored to debris. *Vasicola* is a sapropelic ciliate and feeds on rhodobacteria and algae, making the food vacuoles red or green. The cortex shows a rectangular pattern (3). MA – macronucleus, OO – oral opening.