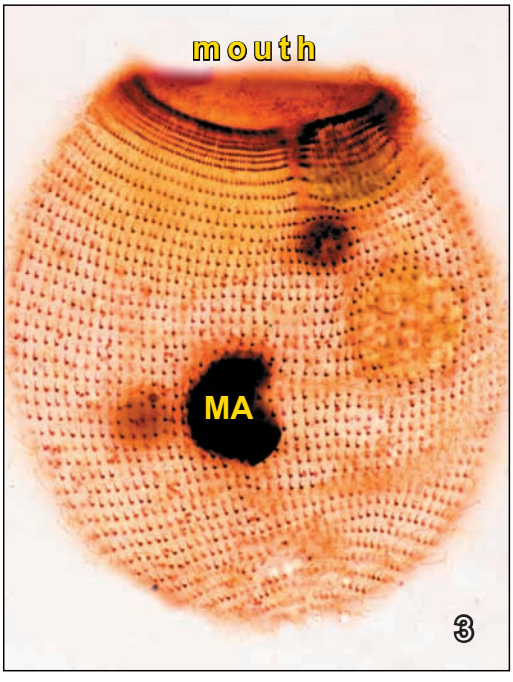


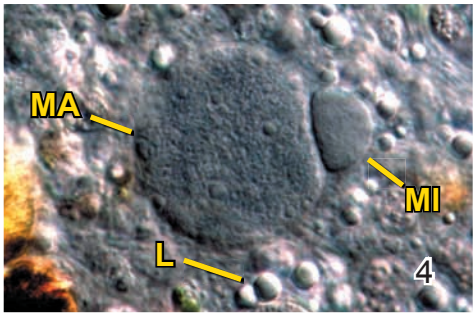


Fig. 1 – 4: Ciliates. *Pelatractus grandis* from life (1, 2, 4) and after silver carbonate impregnation (3). This about 200 µm long, densely ciliated (3) species lives in a delicate lorica. *Pelatractus* is a sapropelic species feeding on a variety of algae, which are ingested through the large mouth at anterior body end. The posterior end bears a blister of unknown function (1, 2). L – lipid droplets, MA – macronucleus, MI – micronucleus.

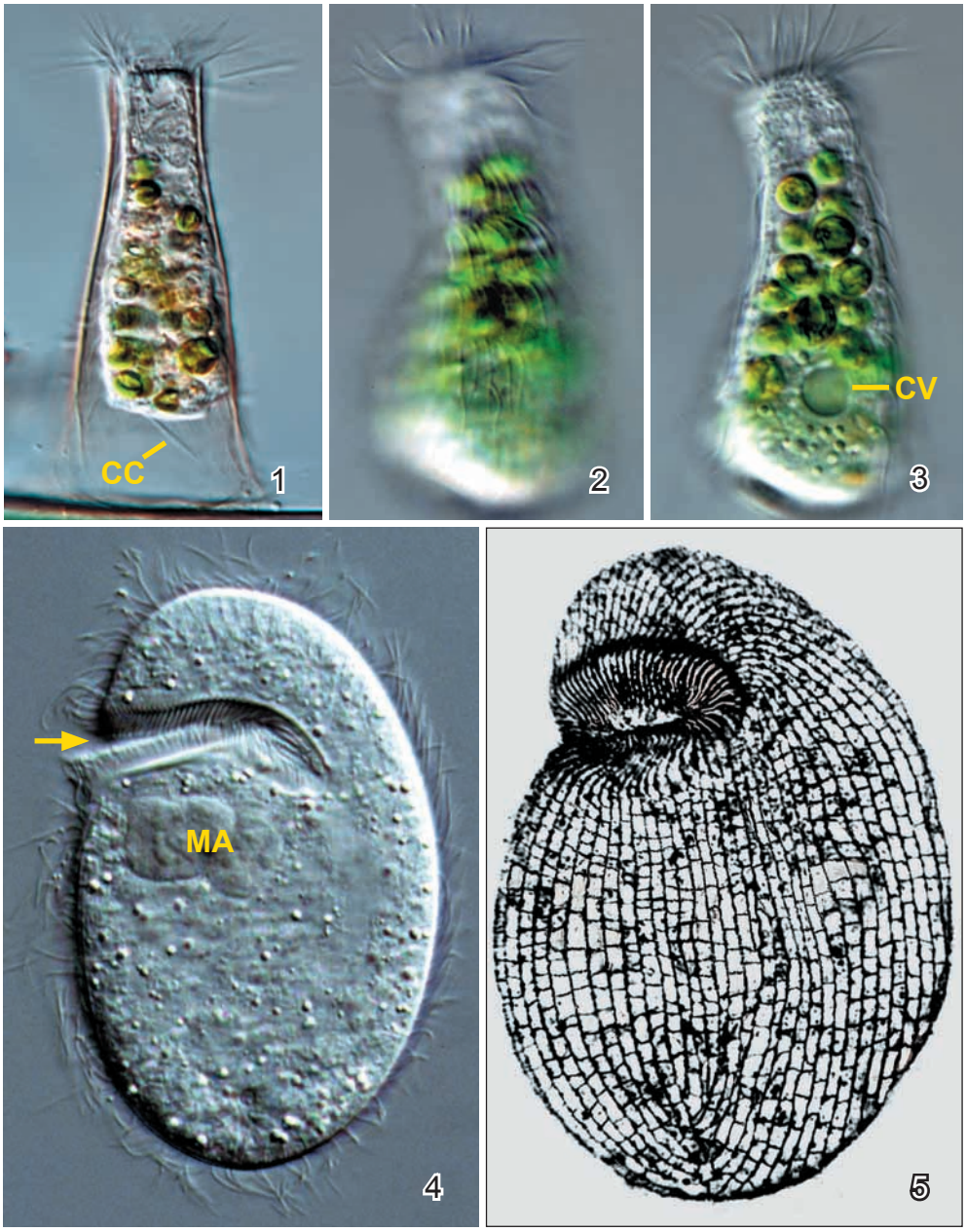


Fig. 1 – 5: Ciliates. *Metacystis lagenula* (1 – 3; length with lorica ~ 60 µm) and *Plagiopyla nasuta* (4, 5; lenght ~ 100 µm) are ciliates with unclear systematic position. *Metacystis* is sessile and has a delicate lorica. The plasm contains symbiotic green algae. *Plagiopyla* is a sapropelic ciliate with a large oral apparatus (4, arrow) and a nice silverline pattern. CC – caudal cilia, CV – contractile vacuole, MA – macronucleus.

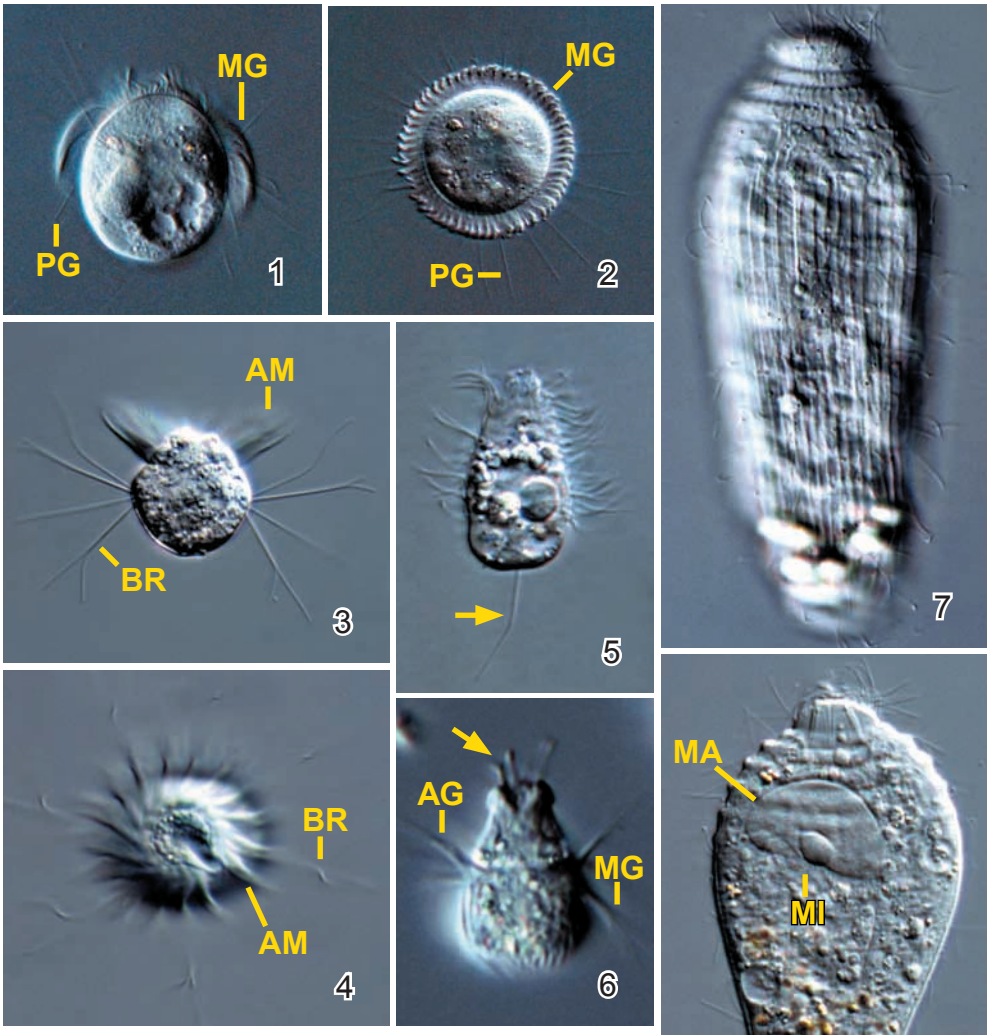
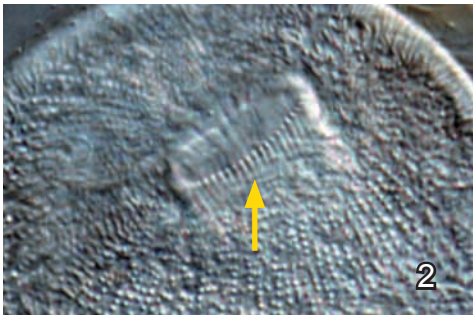
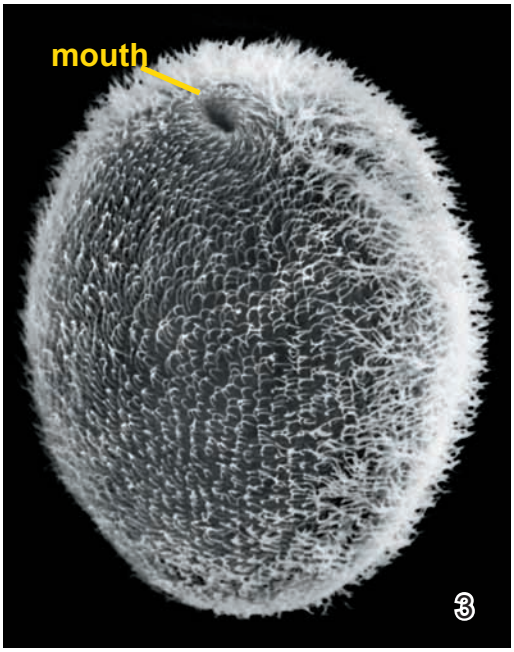


Fig. 1 – 8: Ciliates. Most of the species shown on this plate can jump (1 – 6) and/or are of uncertain systematic position (1 – 4, 6 – 8). **1, 2:** *Askenasia volvox*, an about 40 µm long gymnostome, has three ciliary girdles. **3, 4:** *Halteria grandinella* has a diameter of 20–40 µm and performs fast jumps with rows of bristles in mid-body. Likely, it is an oligotrich ciliate, as indicated by adoral membranelles on anterior body end. **5:** *Urotricha agilis* is an about 15 µm long prostome with a long caudal cilium (arrow). **6:** *Mesodinium acarus* is only 15 µm long. The ciliature is similar to that of *Askenasia*, but the mouth contains pin-shaped processes which can be extruded (arrow). **7, 8:** *Lagynus elegans* is about 100 µm long and has conspicuous grooves anteriorly. Possibly, it is related to *Urotricha* (5). AG – anterior girdle, AM – adoral membranelles, BR – jumping bristles, EX – extrusomes, MA – macronucleus, MG – middle girdle, MI – micronucleus, PG – posterior girdle.





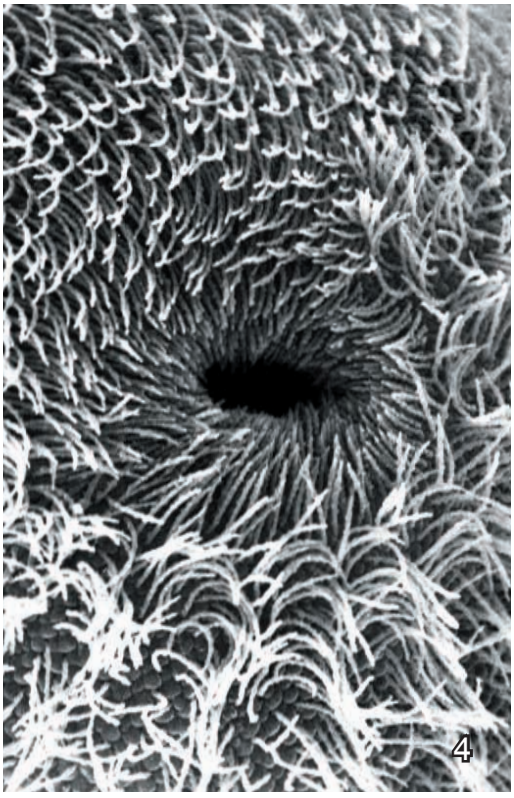


Fig. 1 – 4: Ciliates. *Holophrya teres* is a 200–300 µm long, common prostomatid ciliate which is very densely ciliated, especially around the mouth (4). The mouth is conical and supported by fine rods (1, 2, arrows). In Simmelried, *H. teres* occurs mainly in the mud. MA – macronucleus.

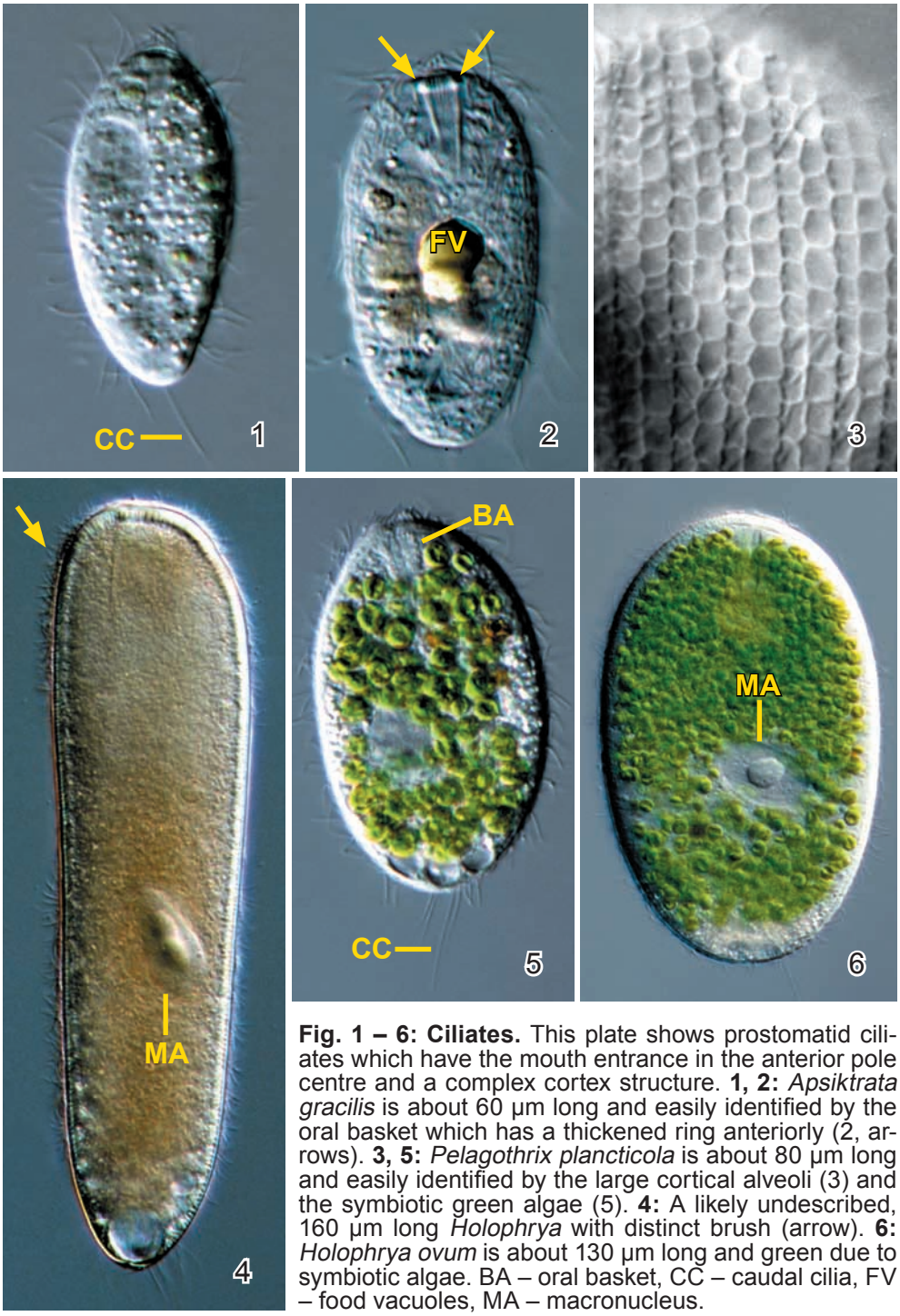


Fig. 1 – 6: Ciliates. This plate shows prostomatid ciliates which have the mouth entrance in the anterior pole centre and a complex cortex structure. **1, 2:** *Apsiktrata gracilis* is about 60 µm long and easily identified by the oral basket which has a thickened ring anteriorly (2, arrows). **3, 5:** *Pelagothrix plancticola* is about 80 µm long and easily identified by the large cortical alveoli (3) and the symbiotic green algae (5). **4:** A likely undescribed, 160 µm long *Holophrya* with distinct brush (arrow). **6:** *Holophrya ovum* is about 130 µm long and green due to symbiotic algae. BA – oral basket, CC – caudal cilia, FV – food vacuoles, MA – macronucleus.

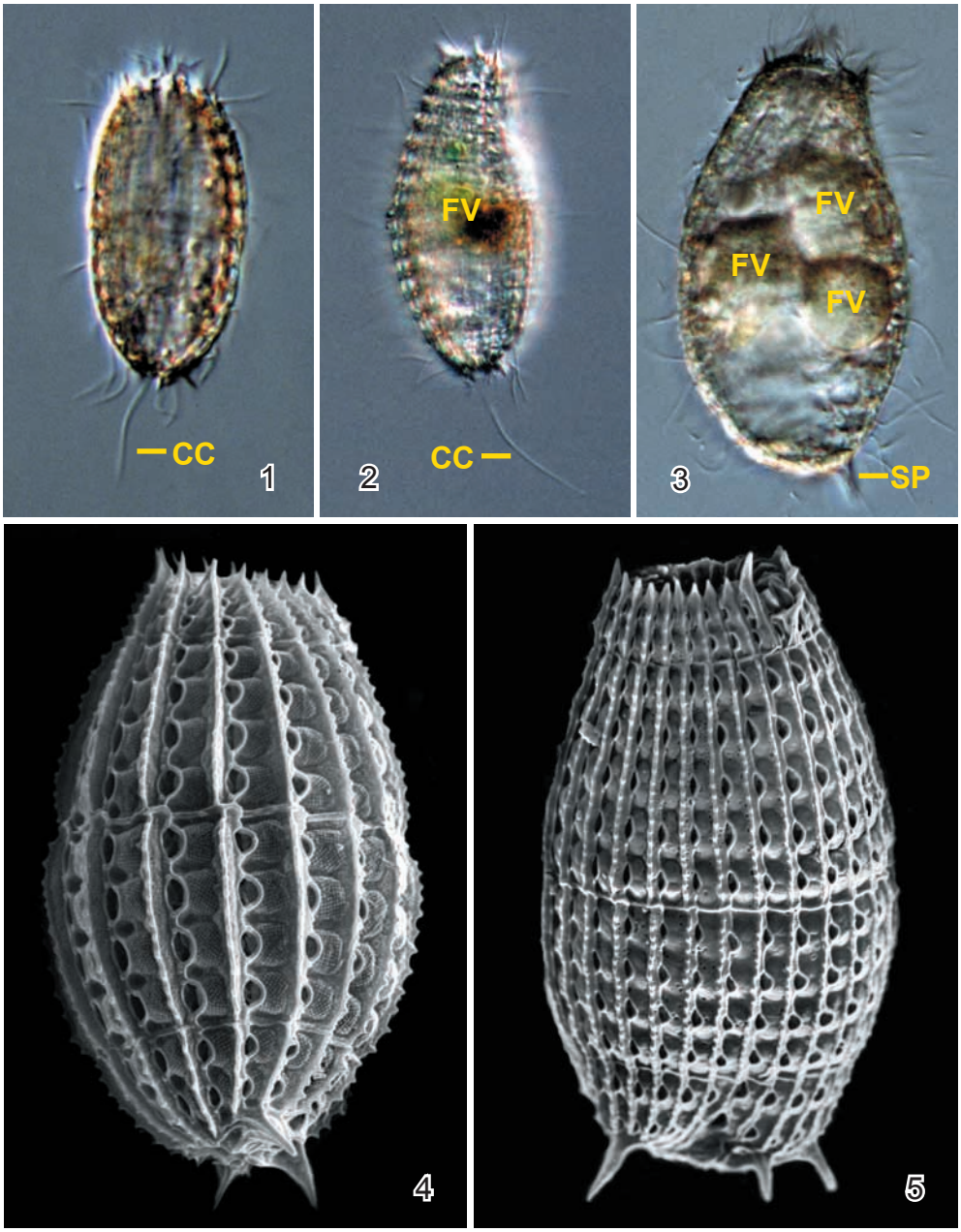


Fig. 1 – 5: Ciliates. *Coleps hirtus* (1, 4) and *C. amphacanthus* (2, 3, 5) have a conspicuous armour composed of a calcified polysaccharide. These two species differ, inter alia, by body size (~ 55 x 25 µm vs. 70 x 35 µm), body shape (barrel-like vs. widened in posterior half and distinctly flattened), and the number of plates (~ 15 vs. 25) composing the armour. For details, see next plate. CC – caudal cilium, FV – food vacuoles, SP – spines.

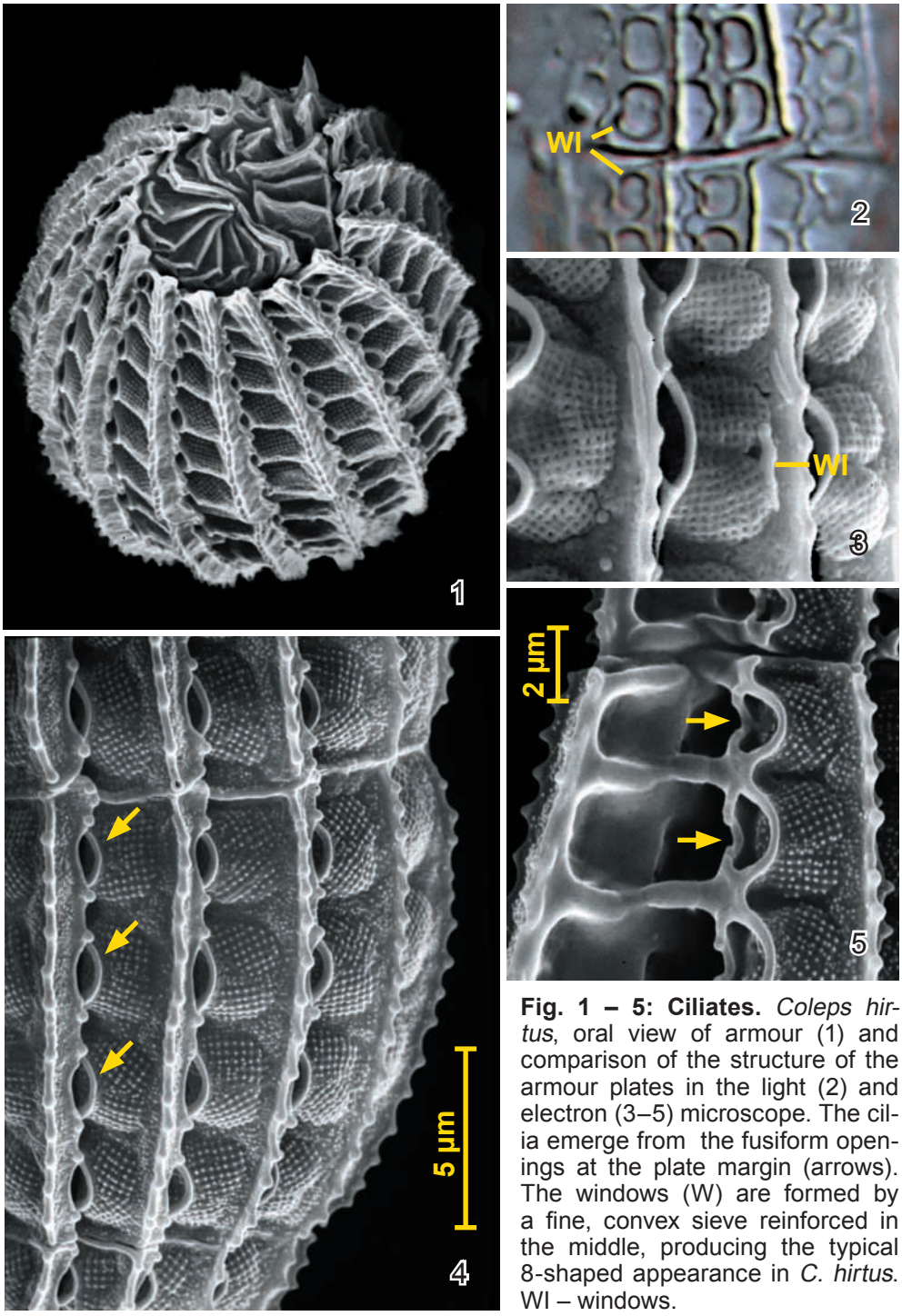


Fig. 1 – 5: Ciliates. *Coleps hirtus*, oral view of armour (1) and comparison of the structure of the armour plates in the light (2) and electron (3–5) microscope. The cilia emerge from the fusiform openings at the plate margin (arrows). The windows (W) are formed by a fine, convex sieve reinforced in the middle, producing the typical 8-shaped appearance in *C. hirtus*. WI – windows.

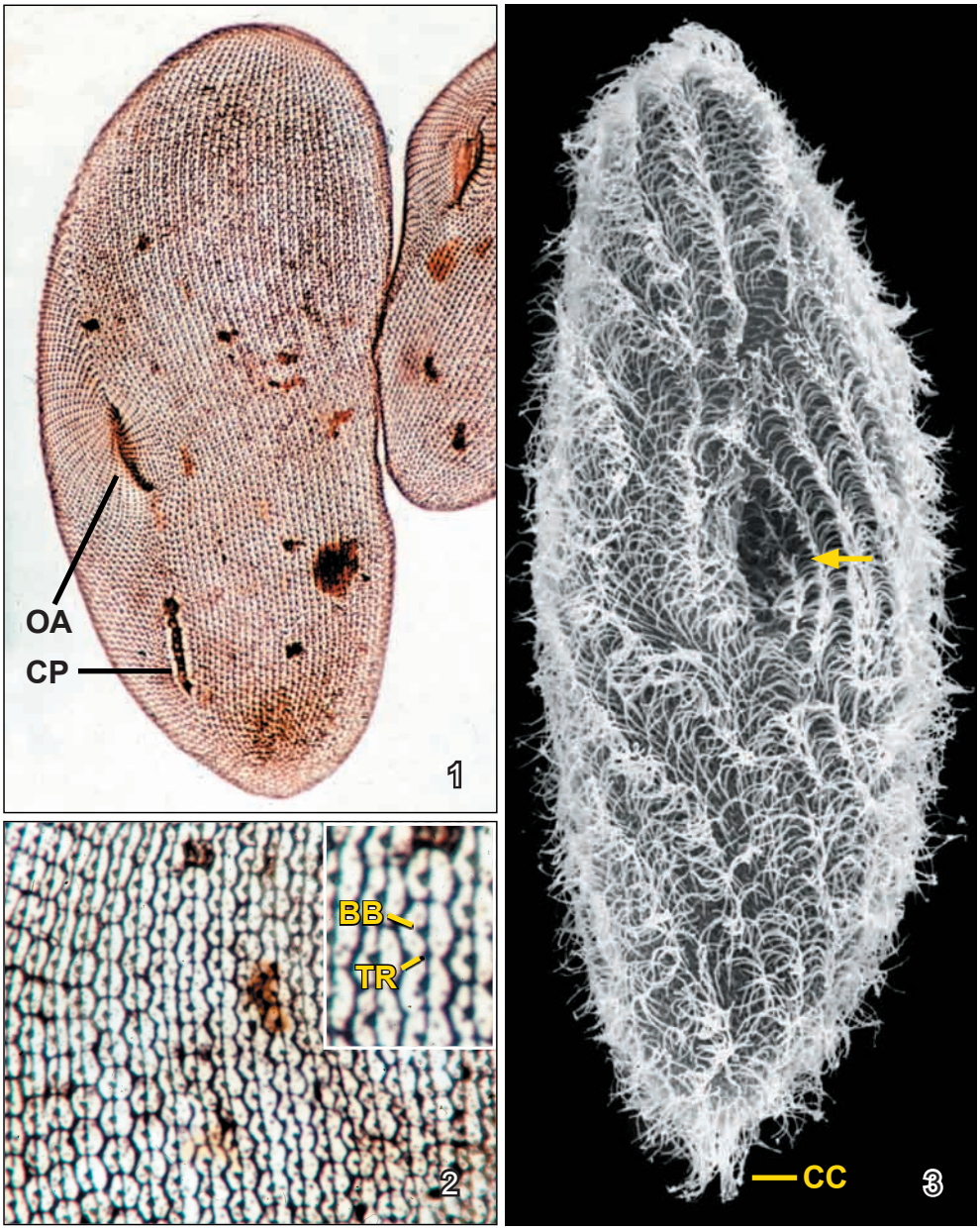


Fig. 1 – 3: Ciliates. *Paramecium aurelia* (complex) is about 150 µm long and is common in the mud of Simmelried. Here, the species is shown after Klein-Foissner silver nitrate impregnation (1, 2) and in the scanning electron microscope, where the metachronal ciliary waves are well recognizable. Silver nitrate impregnation reveals that the basal bodies of the cilia and the trichocysts are connected by silverlines, suggesting some "neural" function (1, 2, inset). Arrow in (3) marks mouth entrance. BB – basal body, CC – caudal cilia, CP – cytopyge, OA – oral apparatus, TR – trichocyst.

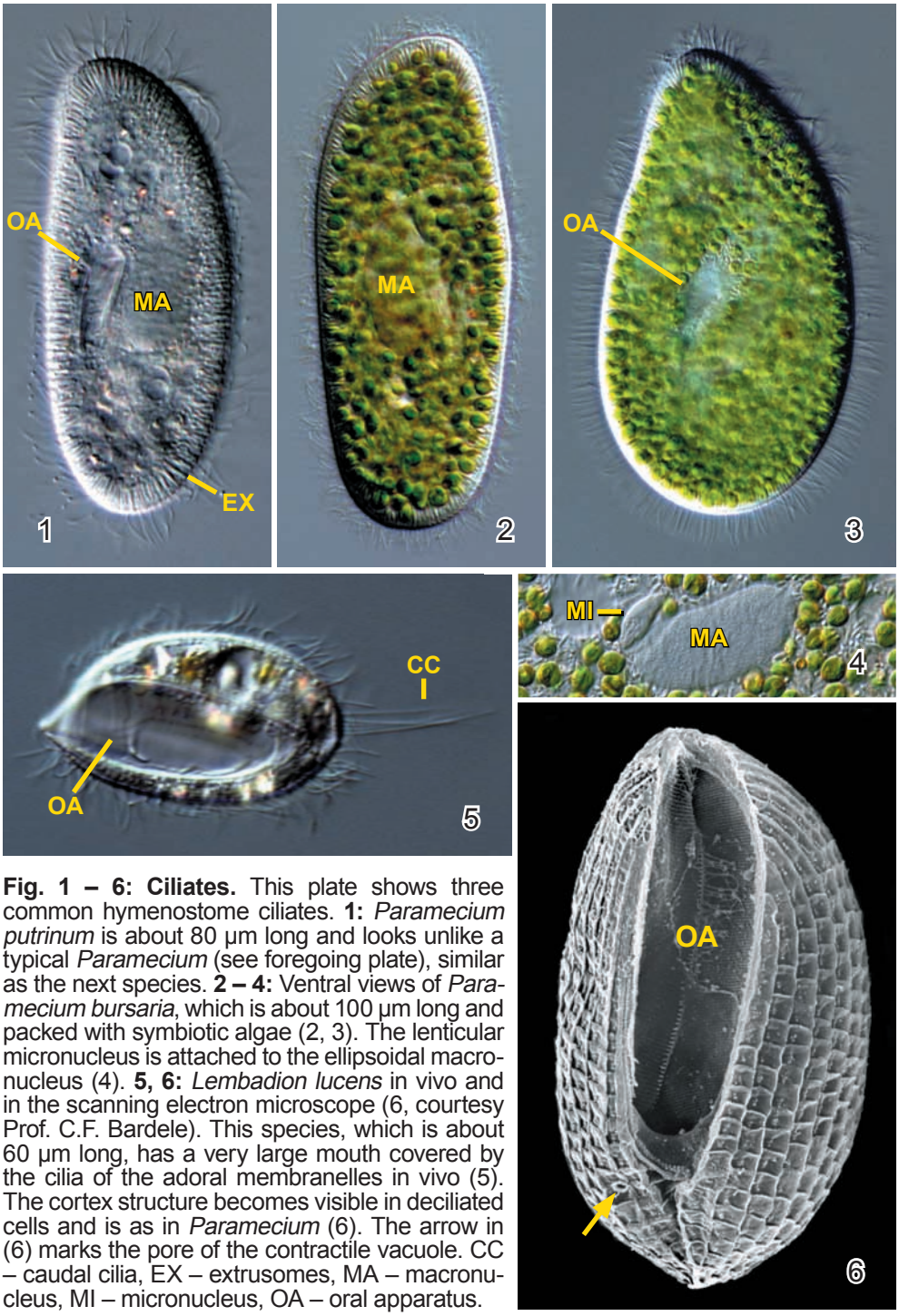


Fig. 1 – 6: Ciliates. This plate shows three common hymenostome ciliates. **1:** *Paramecium putrinum* is about 80 µm long and looks unlike a typical *Paramecium* (see foregoing plate), similar as the next species. **2 – 4:** Ventral views of *Paramecium bursaria*, which is about 100 µm long and packed with symbiotic algae (2, 3). The lenticular micronucleus is attached to the ellipsoidal macronucleus (4). **5, 6:** *Lembadion lucens* in vivo and in the scanning electron microscope (6, courtesy Prof. C.F. Bardele). This species, which is about 60 µm long, has a very large mouth covered by the cilia of the adoral membranelles in vivo (5). The cortex structure becomes visible in deciliated cells and is as in *Paramecium* (6). The arrow in (6) marks the pore of the contractile vacuole. CC – caudal cilia, EX – extrusomes, MA – macronucleus, MI – micronucleus, OA – oral apparatus.

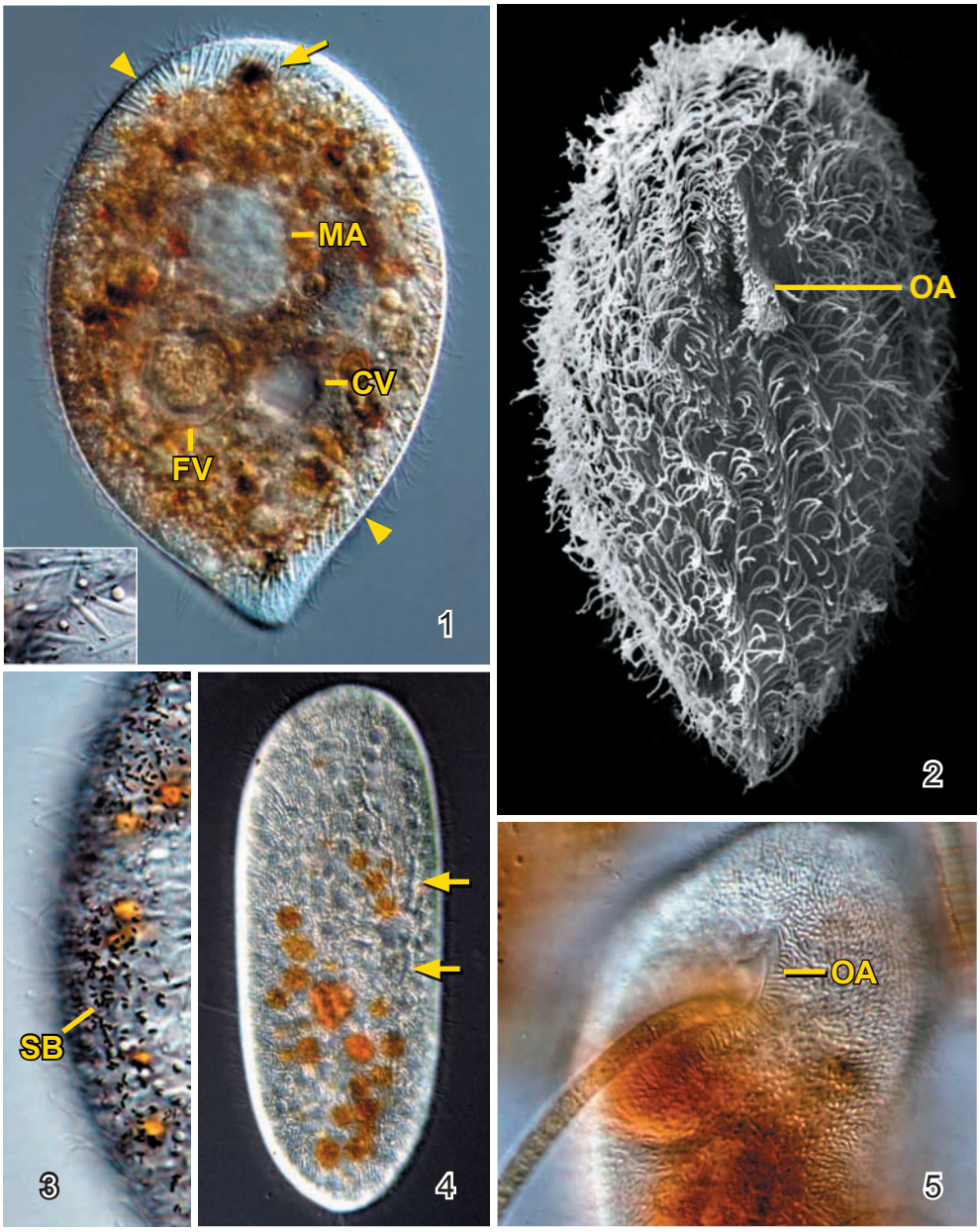


Fig. 1 – 5: Ciliates. *Frontonia atra* (1 – 3) and *F. leucas* (4, 5) in the light (1, 3, 4, 5) and scanning electron (2) microscope. **1 – 3:** *Frontonia atra* is about 250 µm long and brownish due to symbiotic bacteria (3), which accumulate to an "eyespot" (1, arrow). Arrowheads mark trichocysts (1, inset). **4, 5:** The pale *F. leucas* reaches 600 µm and has a conspicuous contractile vacuole with long collecting canals (arrows). It can feed on filamentous cyanobacteria (5). CV – contractile vacuole, FV – food vacuole, MA – macronucleus, OA – oral apparatus, SB – symbiotic bacteria.

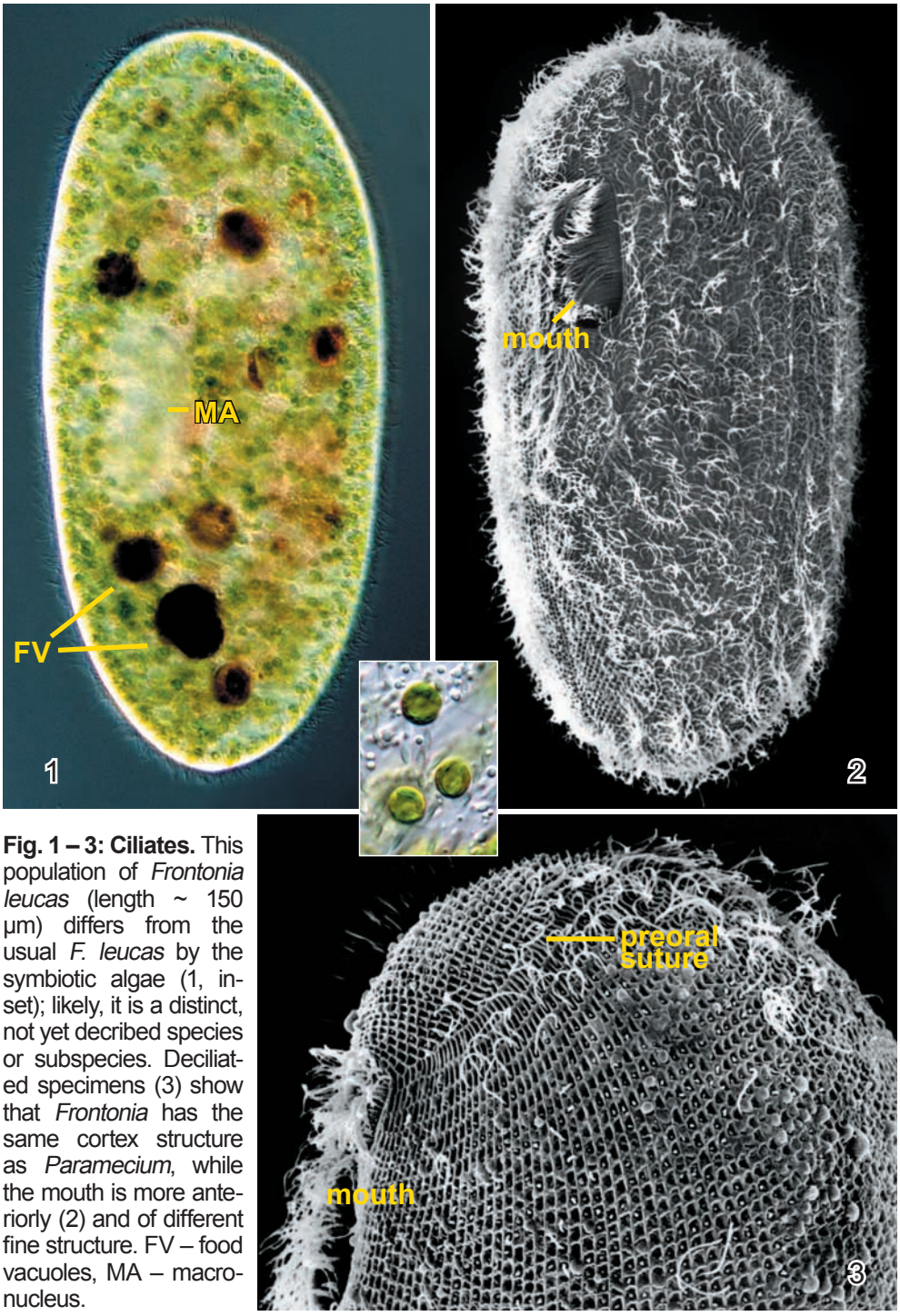
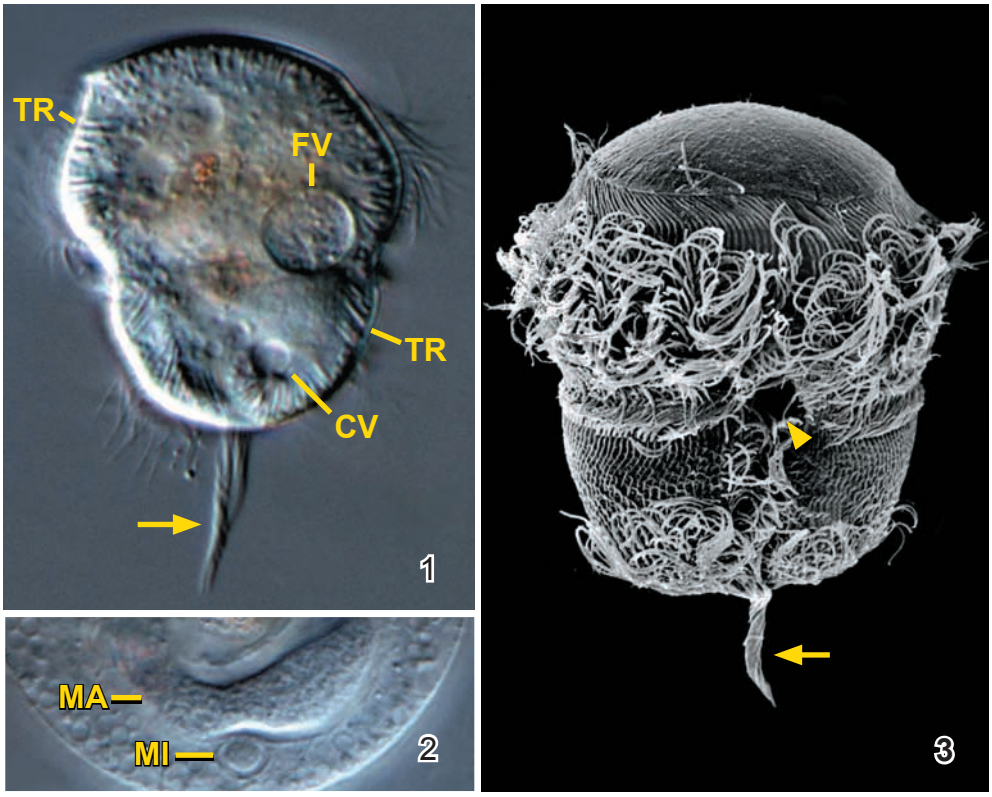


Fig. 1 – 3: Ciliates. This population of *Frontonia leucas* (length ~ 150 µm) differs from the usual *F. leucas* by the symbiotic algae (1, inset); likely, it is a distinct, not yet decribed species or subspecies. Deciliated specimens (3) show that *Frontonia* has the same cortex structure as *Paramecium*, while the mouth is more anteriorly (2) and of different fine structure. FV – food vacuoles, MA – macronucleus.



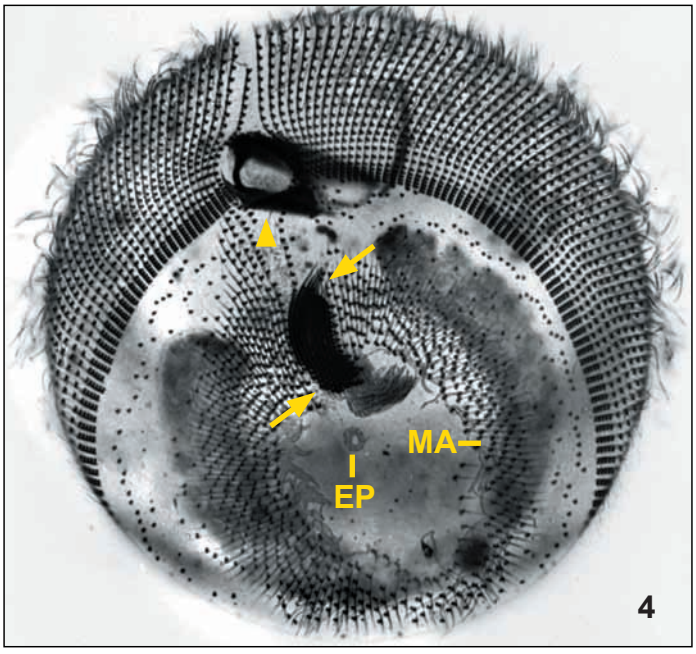


Fig. 1 – 4: Ciliates. *Urocentrum turbo* is about 70 µm long and related to the common *Paramecium*. It has a complex ciliary pattern well recognizable in the scanning electron microscope (3) and after silver impregnation (4). Arrowheads mark oral apparatus. The posterior cilia bundle (arrows) secretes a slimy thread on which the ciliate rotates rapidly. CV – contractile vacuole, EP – excretory pore, FV – food vacuole, MA – horseshoe-shaped macronucleus, MI – micronucleus.

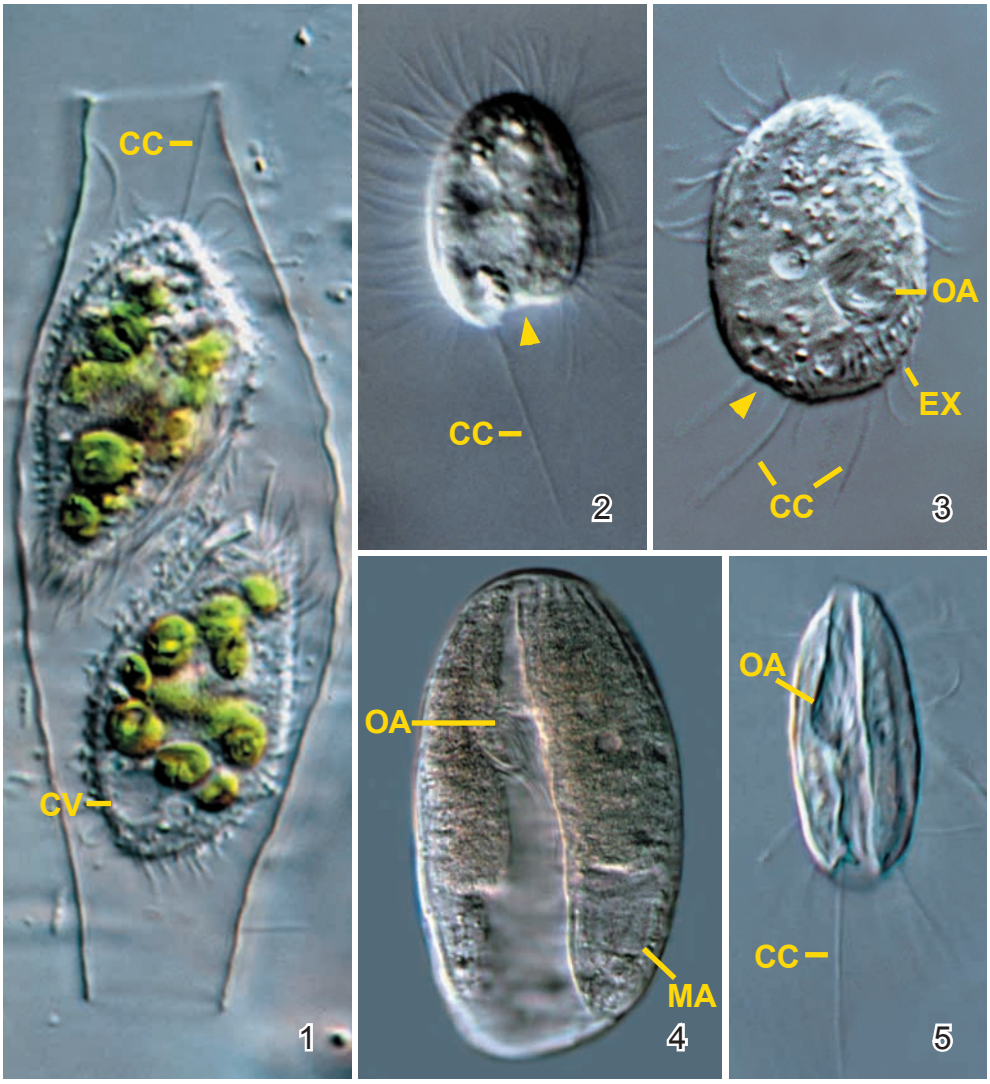


Fig. 1 – 5: Ciliates. The species shown on this plate belong to the scuticociliates, some of which are very common (e. g., *Cinetochilum margaritaceum*) or rare (e. g., *Calyptotricha pleuronemoides*). **1:** *Calyptotricha pleuronemoides* lives in a rather thick and thus conspicuous lorica open at both ends. The specimens, which are about 50 µm long, contain symbiotic green algae. When just divided, two specimens inhabit a single lorica. **2:** A 30 µm long, undescribed scuticociliate with a 30–35 µm long caudal cilium and a conspicuous posterior cavity (arrowhead). **3:** *Cinetochilum margaritaceum,* an about 25 µm-sized, very common ciliate, has a minute concavity at the site of the contractile vacuole (arrowhead). This cavity makes the species easy to identify, in spite of its minuteness. **4, 5:** *Cristigera pleuronemoides* (4) and *C. phoenix* (5) differ by body shape and size (~ 40 µm vs. 60 µm) and details of the ciliature and postoral furrow. CC – caudal cilia, CV – contractile vacuole, EX – extrusomes, MA – macronucleus, OA – oral apparatus (mouth entrance),

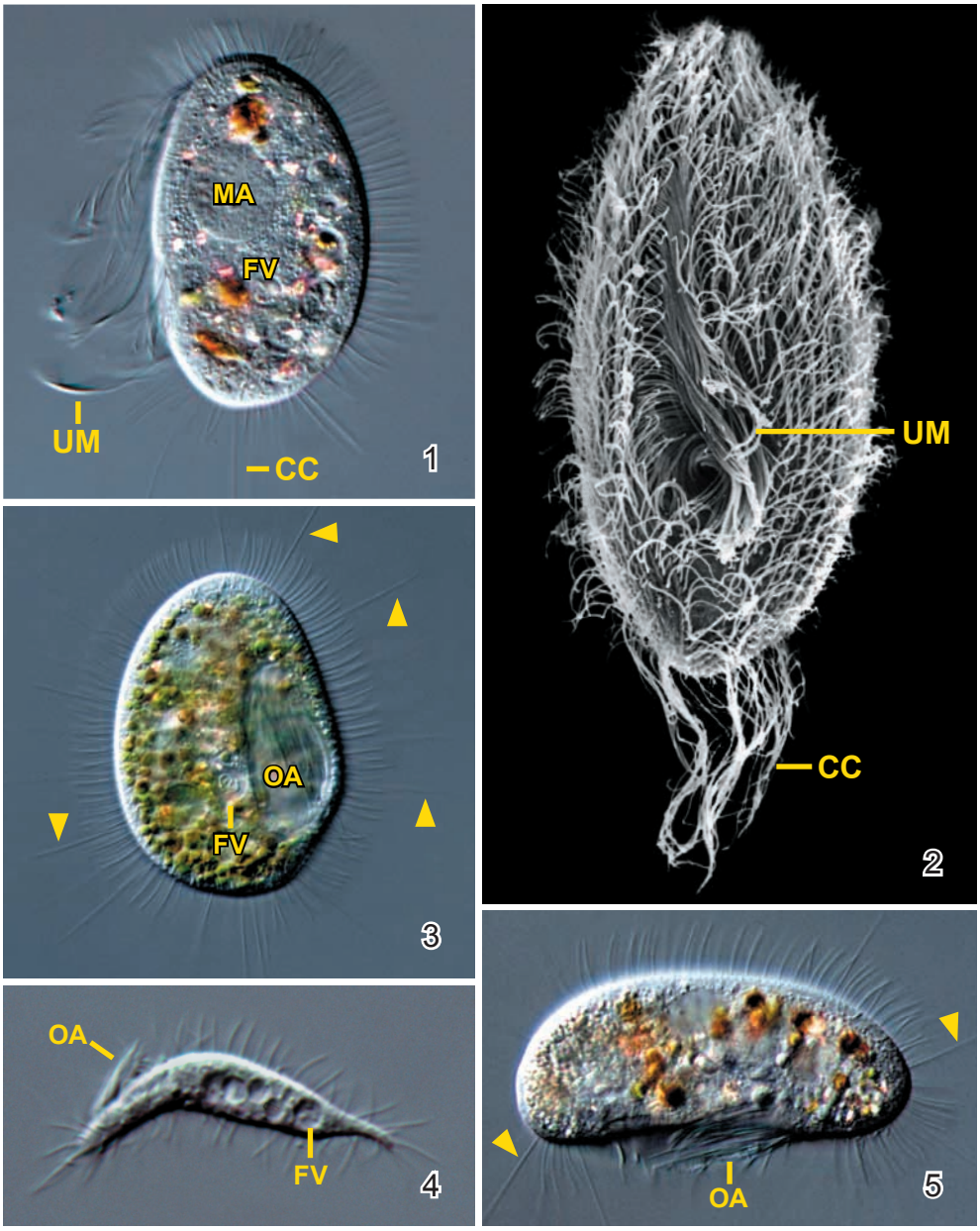


Fig. 1 – 5: Ciliates. This plate shows further scuticociliates. The scutica forms the oral apparatus during ontogenesis. **1, 2:** Left side and ventral view of *Pleuronema coronatum*, an about 100 µm long, common species. **3, 5:** *Histiobalantium natans* (3) and *H. majus* (5) differ by size (~ 80 vs. 140 µm) and shape (ellipsoidal vs. oblong). Arrowheads mark elongated bristles. **4:** *Kahlilembus attenuatus* is only about 40 µm long and tapered at both ends. CC – caudal cilia, FV – food vacuoles, MA – macronucleus, OA – oral apparatus, UM – undulating membrane.

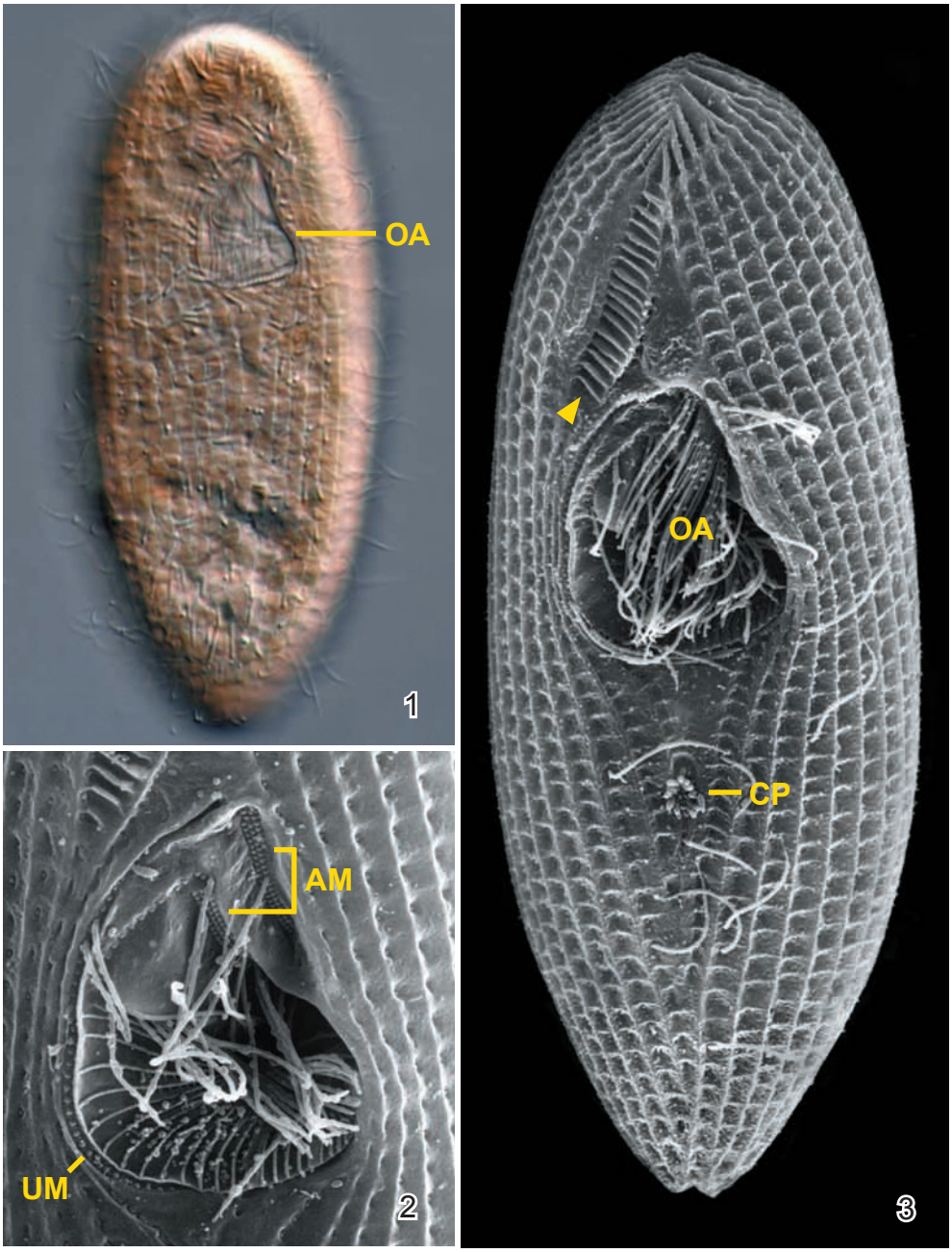


Fig. 1 – 3: Ciliates. *Sathrophilus vernalis*, an about 70 µm long scuticociliate, has an orange cytoplasm (1) and a curious, ladder-like structure above the oral apparatus (3, arrowhead). The complex ciliary pattern and cortex can be best seen in scanning electron micrographs of deciliated cells (2, 3). AM – adoral membranelles, CP – cytopyge, OA – oral apparatus, UM – undulating membrane.

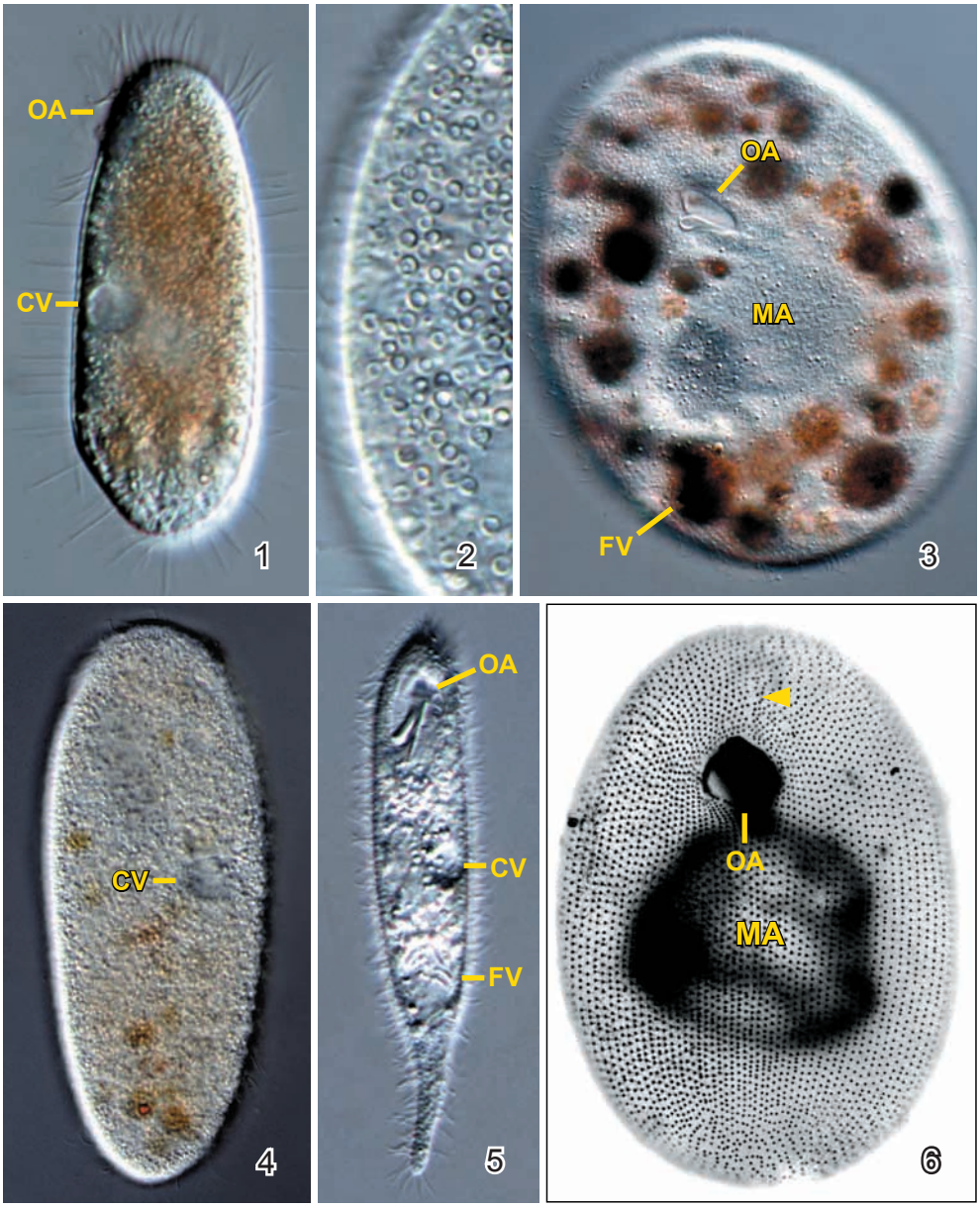


Fig. 1 – 6: Ciliates. This plate shows further hymenostome ciliates, which are holotrichously ciliated and have a comparatively small mouth composed of three adoral membranelles and an undulating membrane. **1, 2:** *Dexiotricha granulosa* is 60 µm long and has ring-shaped cytoplasmic granules (2). **3, 6:** *Epenardia myriophylli* is 130 µm long and has the preoral suture (arrowhead) above the centre of the oral opening. **4:** The 160 µm long *Loxocephalus luridus* is studded with granules and thus difficult to investigate. **5:** Likely, this is *Glaucoma frontata*, but this has to be checked by silver impregnation. CV – contractile vacuole, FV – food vacuole, MA – macronucleus, OA – oral apparatus.

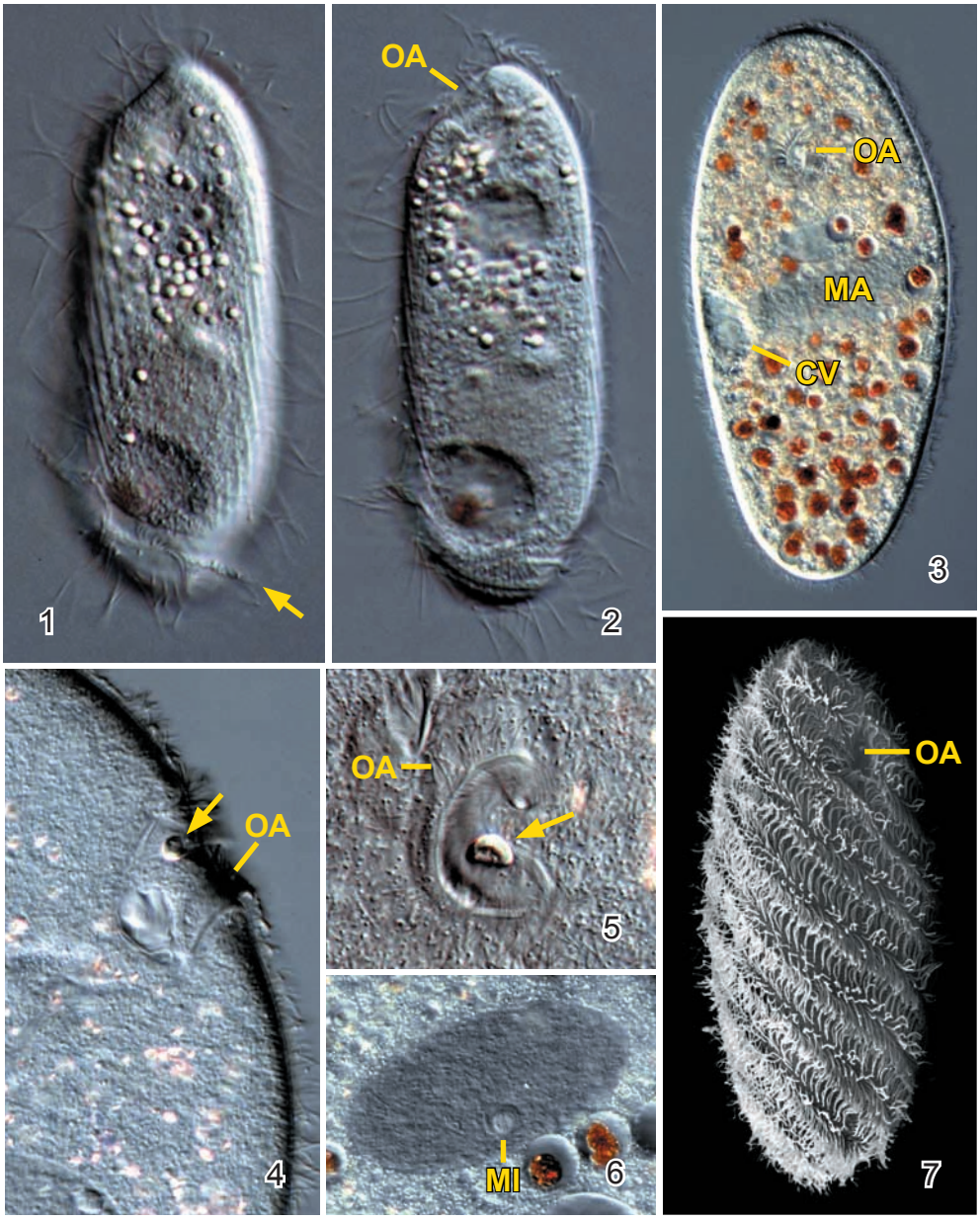


Fig. 1 – 7: Ciliates. 1, 2: *Trichospira inversa* is a very rare, about 90 µm long ciliate of unclear systematic affinity. It has a deep buccal cavity (2) and a typical ciliary spiral (arrow). **3 – 7:** *Ophryoglena* spp. are 100–500 µm long, hymenostome ciliates which feed on cells of dying metazoans. The deep buccal cavity is 6-shaped and contains a light sensitive organelle (3 – 5, arrows). The macronucleus is ellipsoidal (6). The ciliature is very dense and thus shows nice metachronal waves (7). MA – macronucleus, MI – micronucleus, OA – oral apparatus.

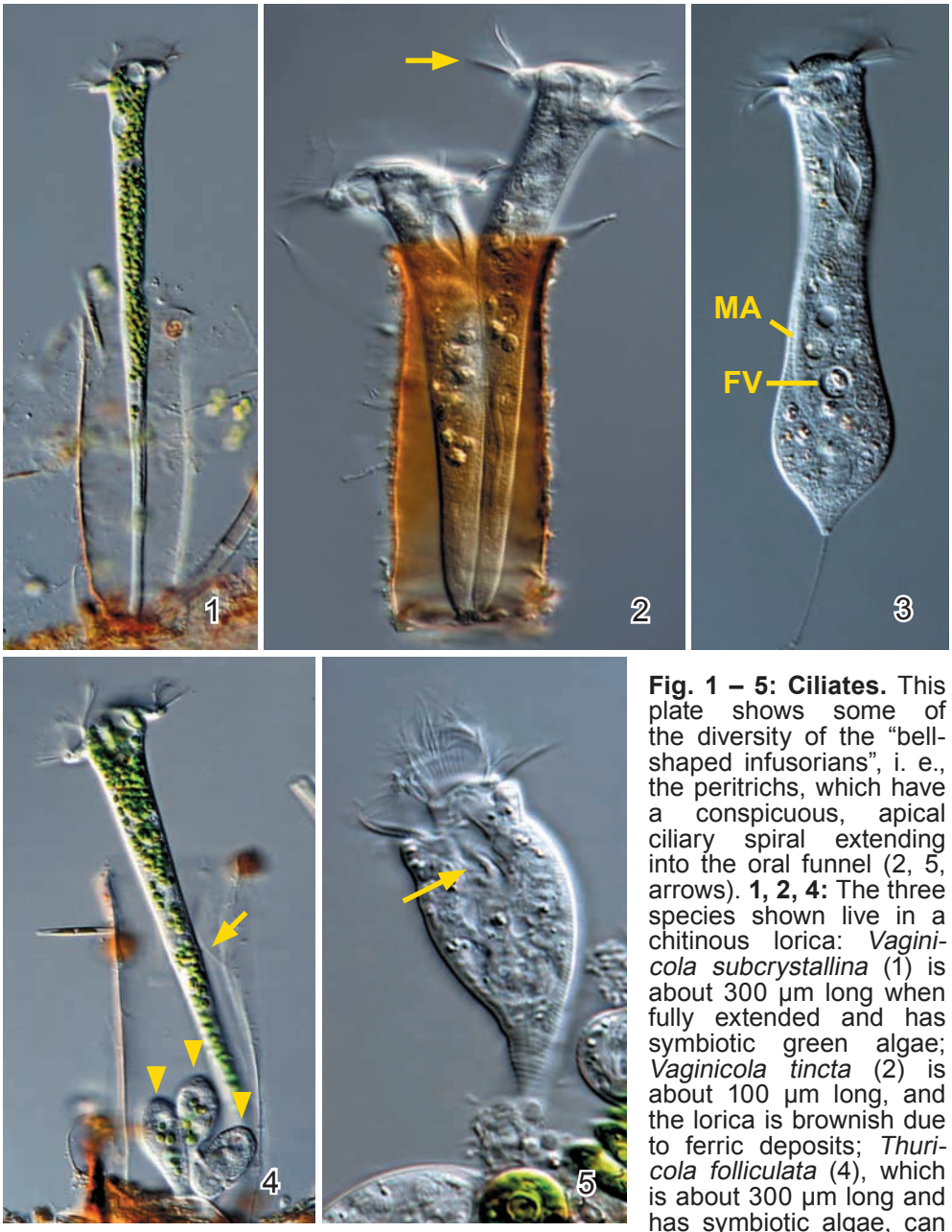


Fig. 1 – 5: Ciliates. This plate shows some of the diversity of the "bell-shaped infusorians", i. e., the peritrichs, which have a conspicuous, apical ciliary spiral extending into the oral funnel (2, 5, arrows). **1, 2, 4:** The three species shown live in a chitinous lorica: *Vaginicola subcrystallina* (1) is about 300 µm long when fully extended and has symbiotic green algae; *Vaginicola tincta* (2) is about 100 µm long, and the lorica is brownish due to ferric deposits; *Thuricola folliculata* (4), which is about 300 µm long and has symbiotic algae, can close the lorica with a subapical operculum (arrow). Note the three microgametes on lorica bottom (arrowheads) **3:** *Gerda crassicaule* is about 200 µm long and lives in a slimy lorica too hyaline to be recognizable in this micrograph. The species may form small colonies. **5:** *Scyphidia rugosa* is attached to debris, while most congeners live epizooically, that is, are attached to a variety of metazoans. FV – food vacuole, MA – macronucleus.

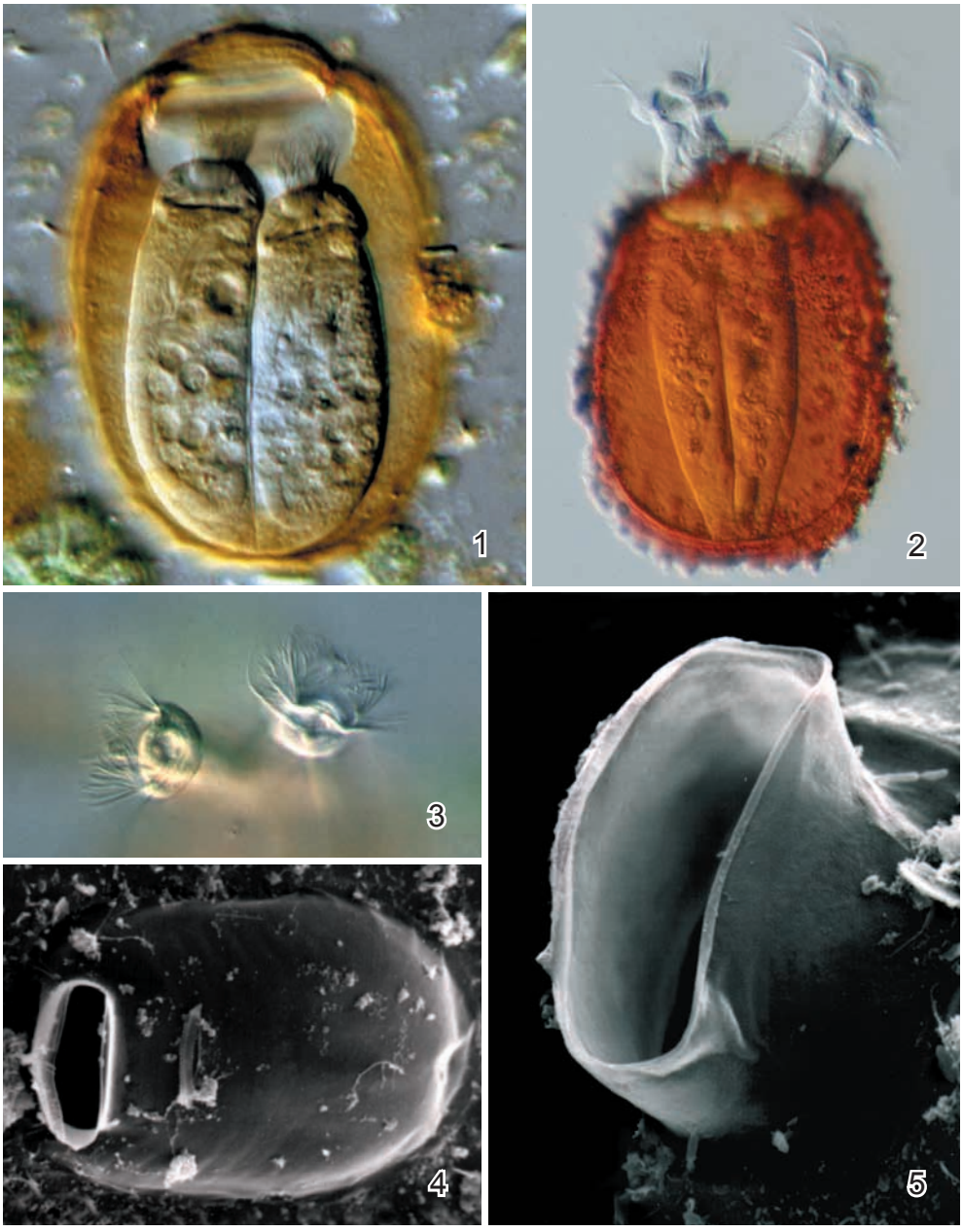


Fig. 1 – 5: Ciliates. *Platycola decumbens* from life (1 – 3) and in the scanning electron microscope (4, 5; courtesy Warren & Carey). *Platycola decumbens* is a peritrichous ciliate, i. e., related to the well-known *Vorticella*, which lives in an about 100 µm long lorica with a small collar recognizable in the SEM micrographs. The upright collar causes that the cells can be seen frontally (3). The lorica is more or less brownish due to ferric depositions (1, 2).

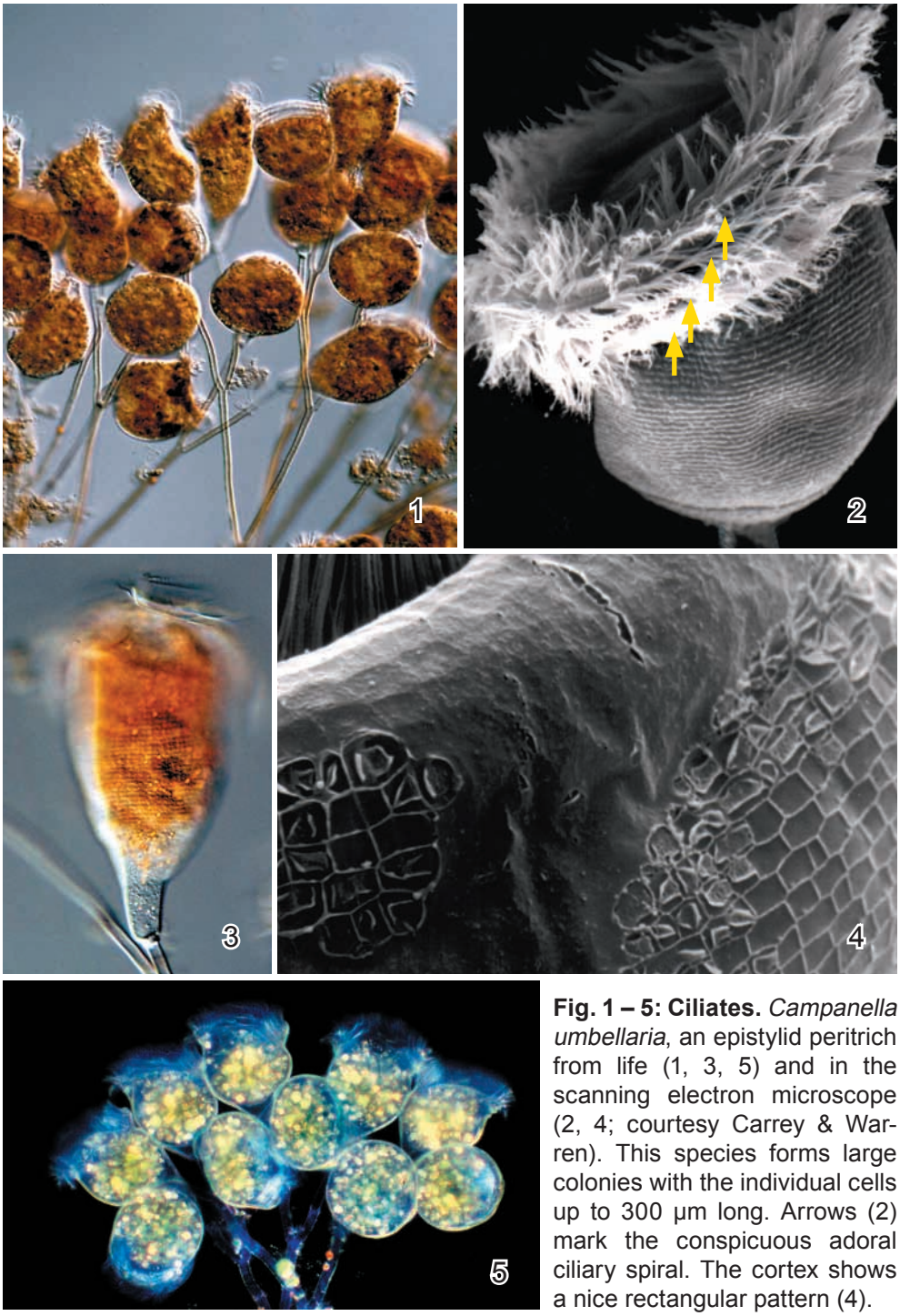


Fig. 1 – 5: Ciliates. *Campanella umbellaria*, an epistylid peritrich from life (1, 3, 5) and in the scanning electron microscope (2, 4; courtesy Carrey & Warren). This species forms large colonies with the individual cells up to 300 µm long. Arrows (2) mark the conspicuous adoral ciliary spiral. The cortex shows a nice rectangular pattern (4).

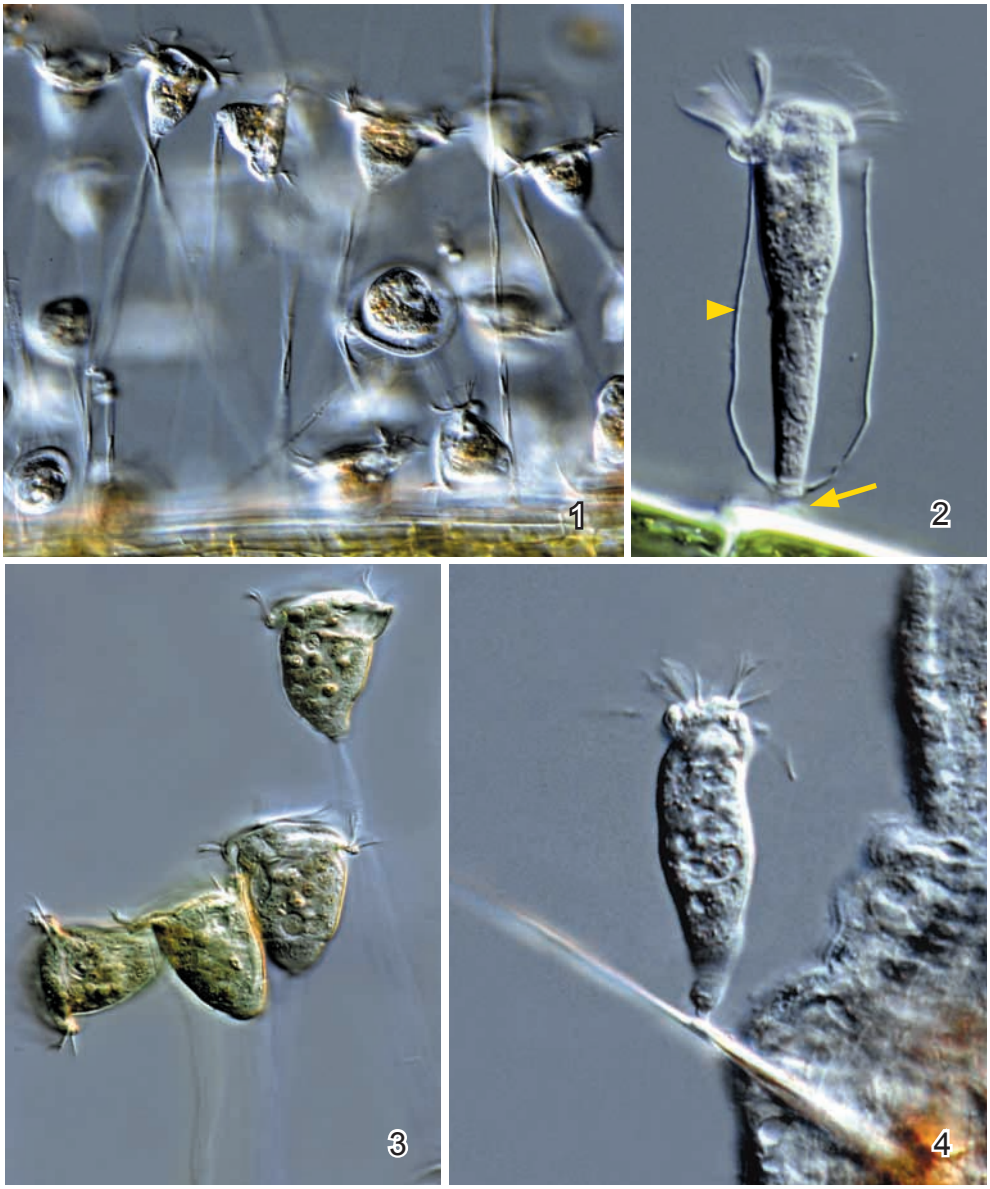


Fig. 1 – 4: Ciliates. This plate shows various types of solitary peritrichs. **1, 3:** Species of the *Vorticella convallaria*-group are campanulate, 60–80 x 45–45 µm in size, and have a long, contractile stalk. Species identification needs silver impregnation. The yellowish colour of *V. citrina* is probably caused by specific food items (3). **2:** *Cothurnia annulata* lives in a neat lorica 40–70 x 20–30 µm in size. The arrowhead marks the site of the name-giving annulus, that is, the anlage of the aboral ciliary wreath. *Cothurnia* attaches with a minute stalk (arrow), which penetrates the lorica, to various substrates. **4:** *Rhabdostyla inclinans* is about 60 µm long and attaches with a minute stalk to the bristles and skin of oligochaetes.

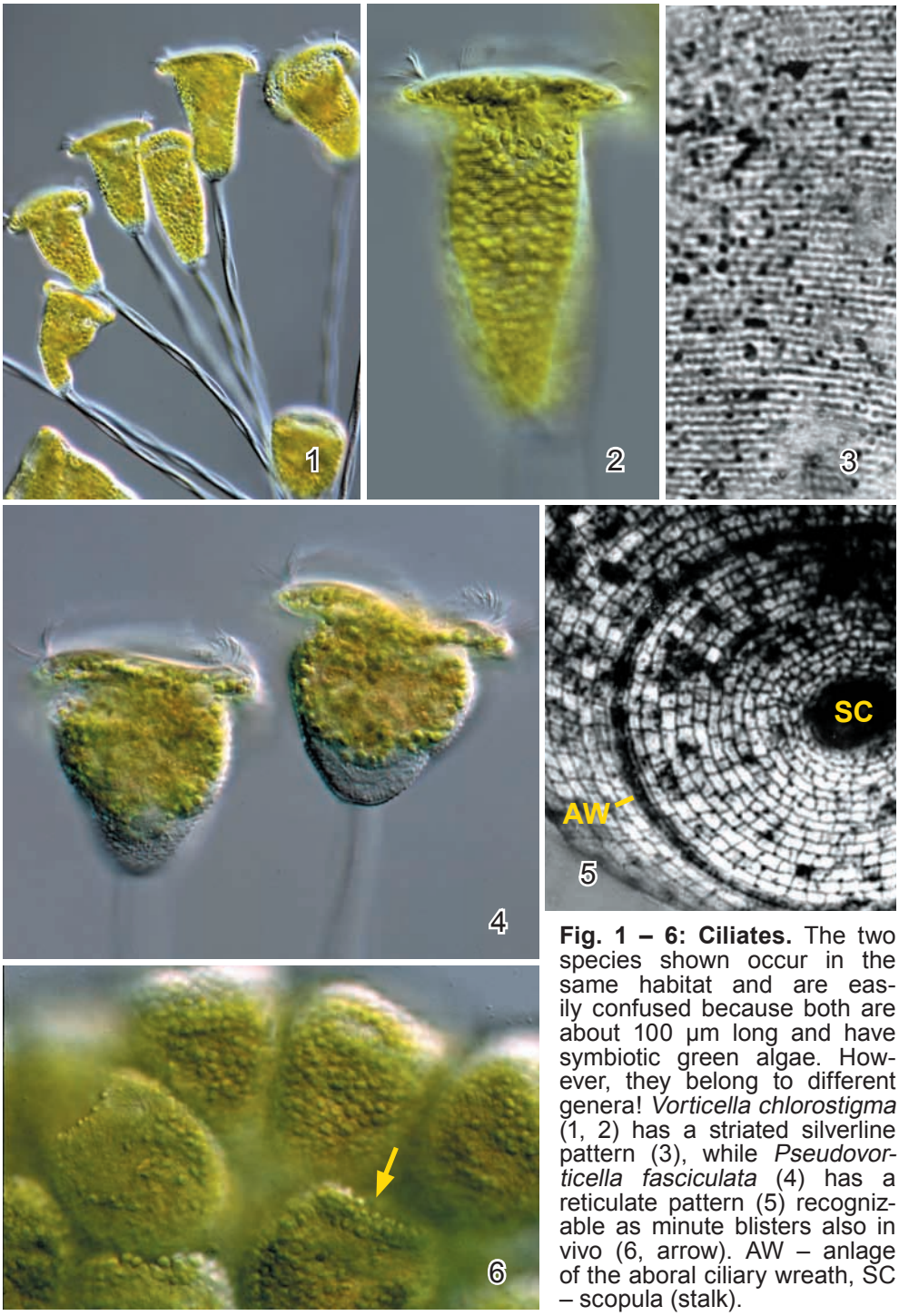


Fig. 1 – 6: Ciliates. The two species shown occur in the same habitat and are easily confused because both are about 100 µm long and have symbiotic green algae. However, they belong to different genera! *Vorticella chlorostigma* (1, 2) has a striated silverline pattern (3), while *Pseudovorticella fasciculata* (4) has a reticulate pattern (5) recognizable as minute blisters also in vivo (6, arrow). AW – anlage of the aboral ciliary wreath, SC – scopula (stalk).

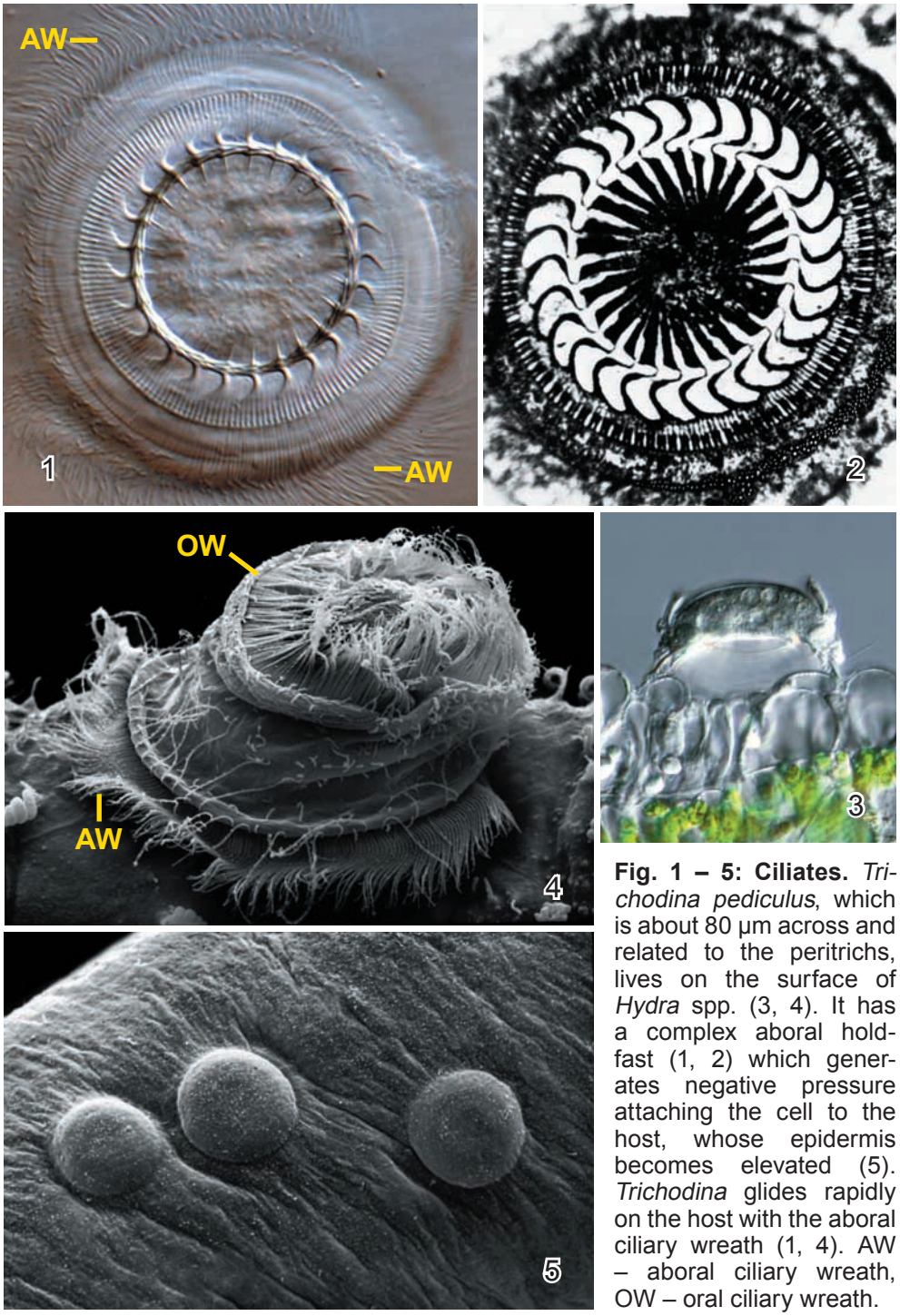


Fig. 1 – 5: Ciliates. *Trichodina pediculus*, which is about 80 µm across and related to the peritrichs, lives on the surface of *Hydra* spp. (3, 4). It has a complex aboral holdfast (1, 2) which generates negative pressure attaching the cell to the host, whose epidermis becomes elevated (5). *Trichodina* glides rapidly on the host with the aboral ciliary wreath (1, 4). AW – aboral ciliary wreath, OW – oral ciliary wreath.

6. MICRO-METAZOA PLATES

Platyias quadricornis

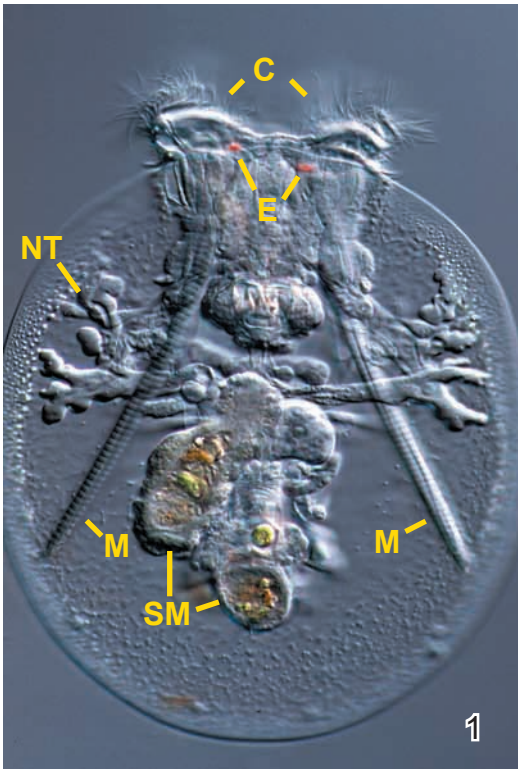


Fig. 1 – 3: Rotifers. *Testudinella* spp. have a dorsoventrally flattened lorica with an oval or roundish shape. The retractile foot is annulated and extends from a ventral opening. The foot tip is ciliated. The two lobes of the corona (1, C) have a band of cilia. All members of the genus have a pair of red eyespots. Three species can be found in floating plants from Simmelried. **1:** *Testudinella patina* is 120–200 µm long and has an almost circular, transparent lorica. The two muscles, which retract the corona, are clearly visible. Note also the branched nephridial tubes. **2:** The elliptical lorica of *T. reflexa* is 115–160 µm long. **3:** *Testudiunella parva* var. *bidentata* is about 120 µm long and is similar to *T. patina,* but has two short spines near to the posterior lorica margin (arrowheads). C – corona, E – eyespots, FT – foot, M – muscles, NT – nephridial tubes, SM – stomach.

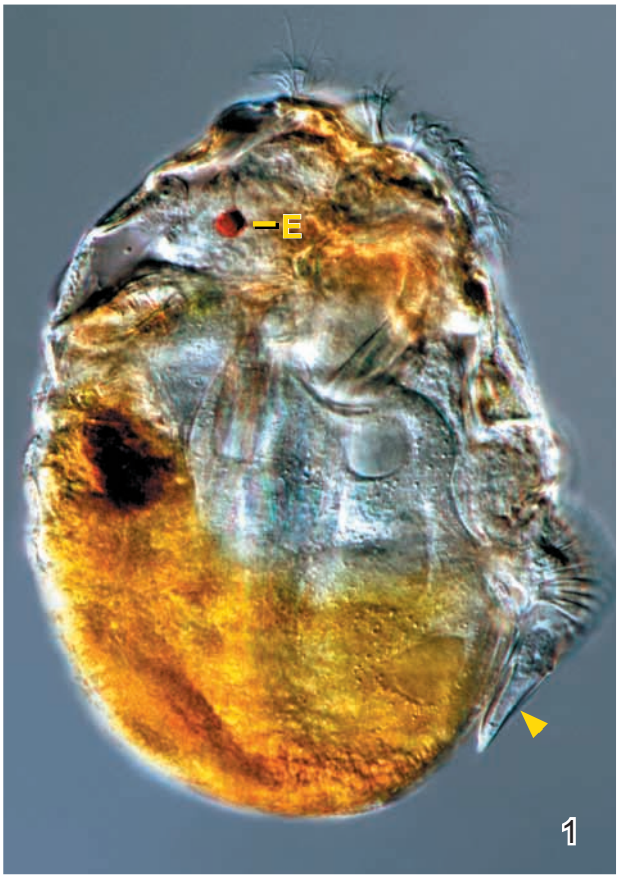
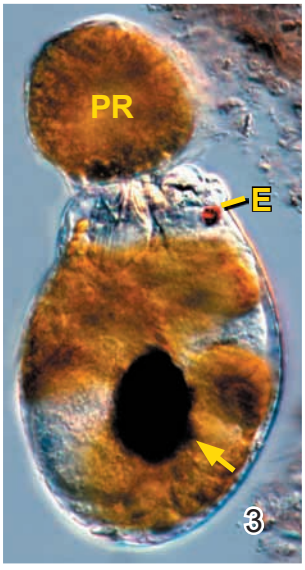
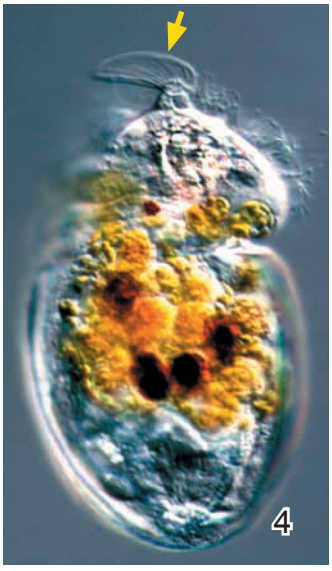
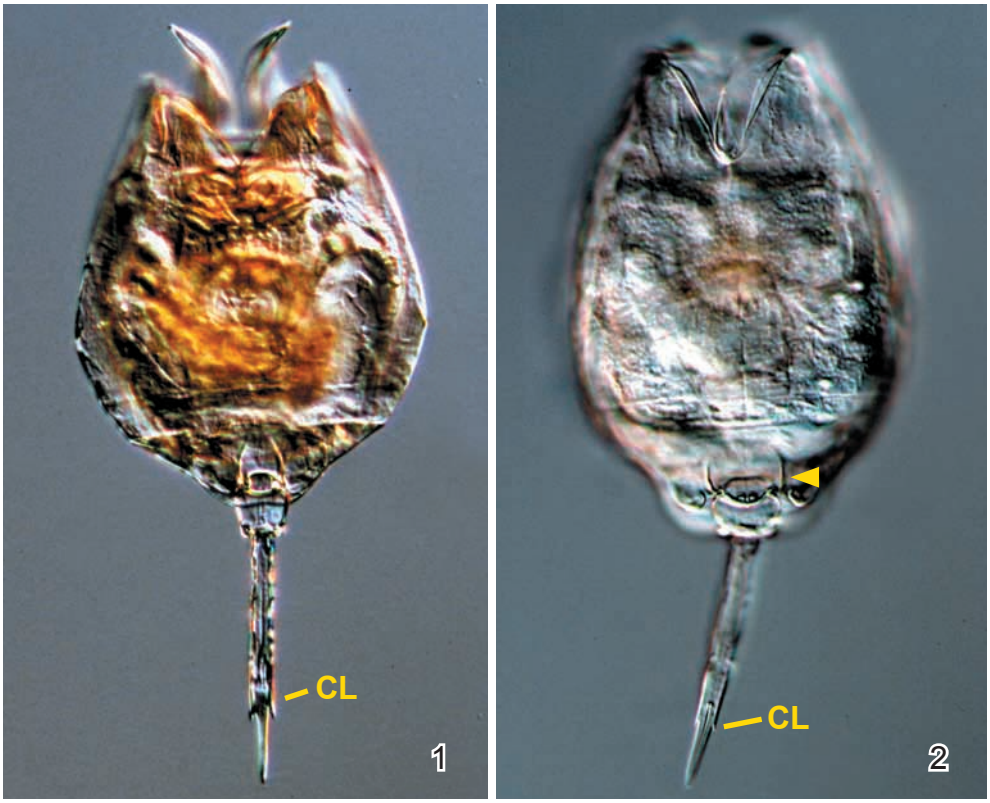


Fig. 1 – 4: Rotifers. 1, 2: The 130–220 µm long lorica of *Ploesoma lynceus* is laterally compressed and pouch-shaped. The retractible foot is annulated and has a pair of toes (1, arrowhead). The granulated surface has some longitudinal ridges (2). *Ploesoma lynceus* is rare in the plankton of Simmelried. **3, 4:** Members of the genus *Ascomorpha* are pouch-shaped, planktonic rotifers feeding on dinoflagellates. *Ascomorpha saltans* (3; 100–140 µm) has captured a *Peridinium* (PR) and starts to ingest the content. The dark mass (arrow) is the defaecation reservoir because *Ascomorpha* lacks an anus. *Ascomorpha ovalis* (4; 100–200 µm) has a hook-shaped structure (arrow) to fix the captured dinoflagellates. This species can be recognized by having four brownish or black defaecation reservoirs. E – eyespot, PR – prey.







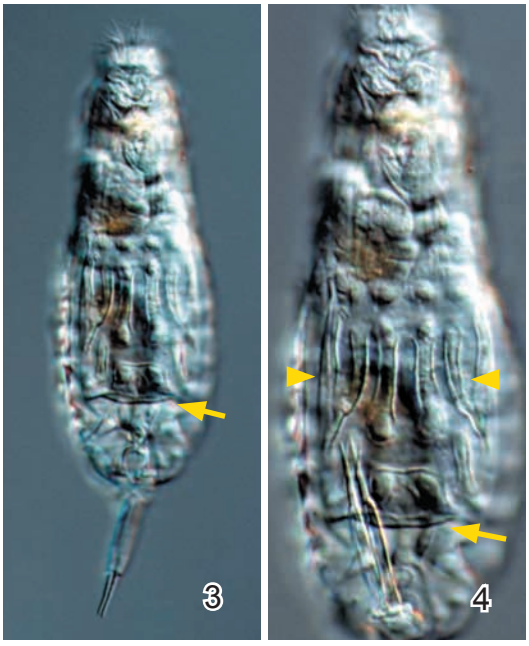
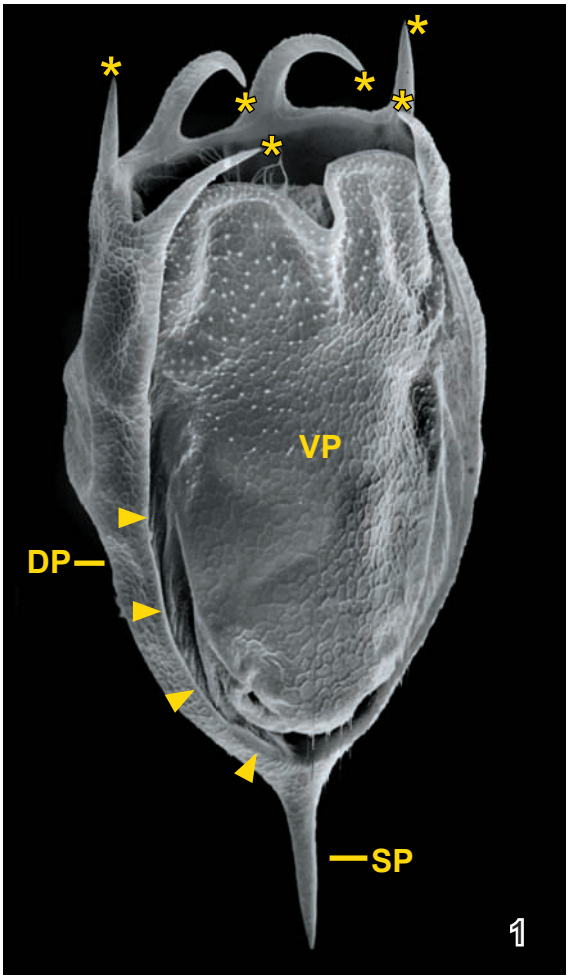
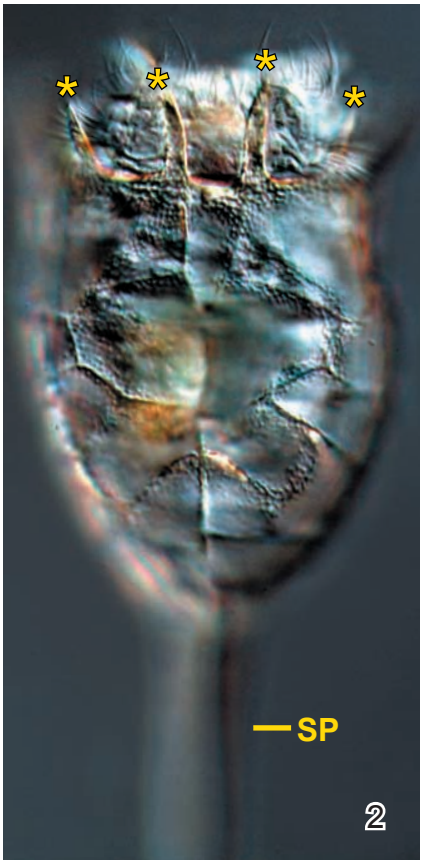


Fig. 1 – 4: Rotifers. The lorica of *Lecane* consists of a ventral and a dorsal plate laterally connected by a flexible cuticle. The foot projects from an opening at the posterior end of the ventral plate. The slender toes can be partially or completely fused and often have claws (1, 2, CL). **1:** The toes of *L. quadridentata* (130–160 µm) are fused, and the anterior opening of the brownish lorica is armed with two ventrally curved spines. **2:** The posterior third of the lorica of *L. bulla* (170–180 µm) is tapered and the shield-like plate, which protects the foot opening, is well recognizable in ventral view (arrowhead). **3, 4:** The flexible lorica of *L. inermis* (90–160 µm) has a transverse fold (arrow) and longitudinal grooves on the ventral side (arrowheads). CL – claws.





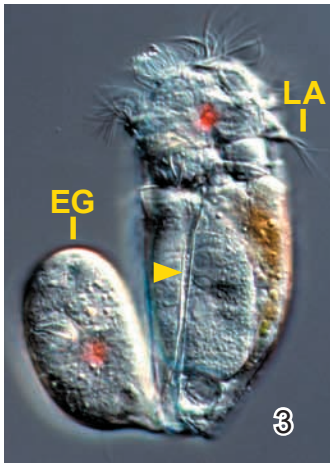


Fig. 1 – 4: Rotifers. 1, 2: *Keratella cochlearis* in the scanning electron microscope (1) and from life (2). The 80–320 µm long rotifer has a prominent posterior spine, and the dorsal and ventral plates of the lorica are connected by an inflexible ridge (1, arrowheads). The dorsal plate shows large facets (2) and curved anterior spines (asterisks). **3, 4:** *Anuraeopsis fissa* is 70–130 µm long and is similar to *Keratella*, but the plates of the lorica are joined by a flexible cuticular ridge (3, arrowhead). The specimen shown in lateral (3) and dorsal (4) view carries an egg attached to the posterior end. DP – dorsal plate, E – eyespot, EG – egg, LA – lateral antennae, SP – spine, VP – ventral plate.

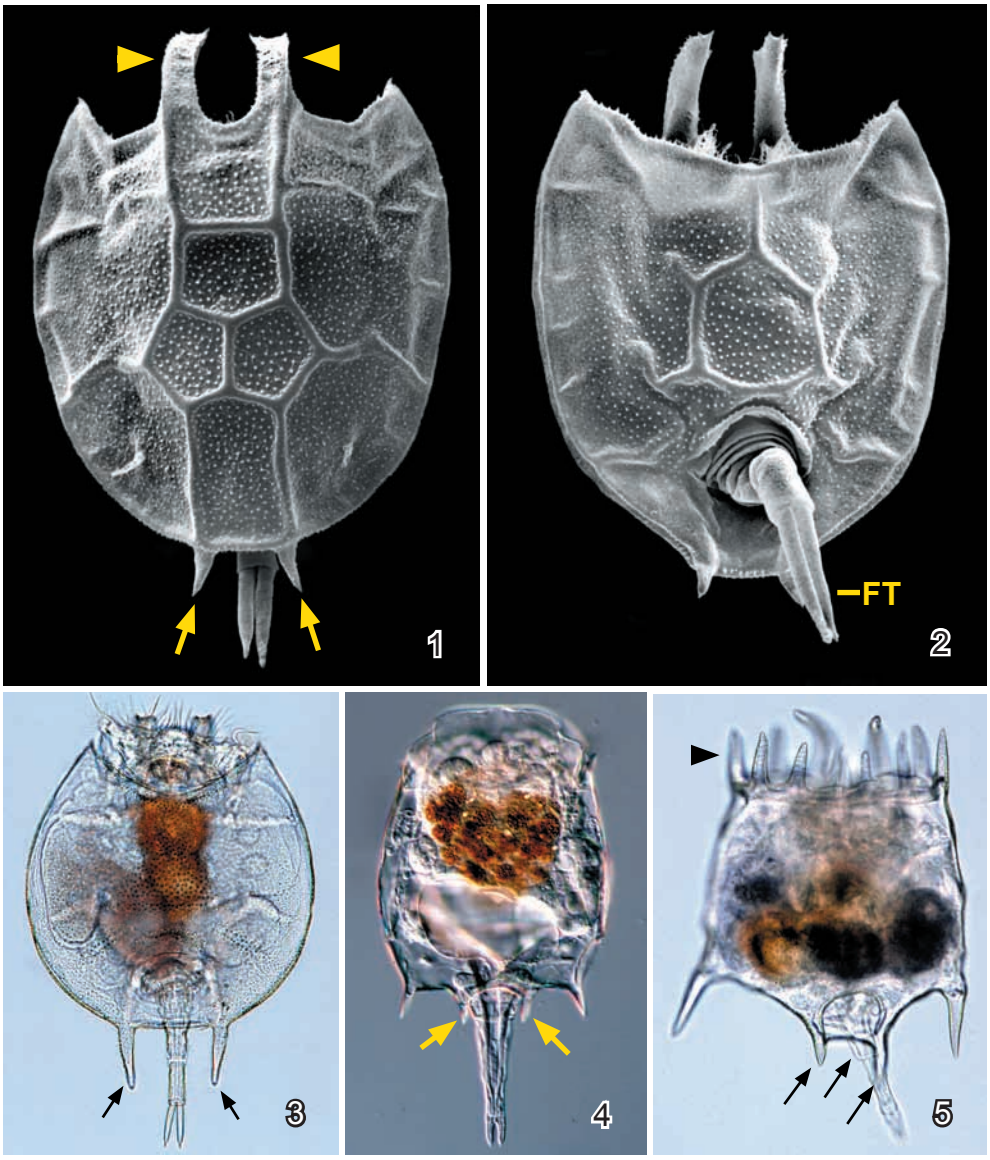


Fig. 1 – 5: Rotifers. *Platyias* is dorsoventrally flattened and the lorica is made of a single plate armed with spines. It is distinguished from *Brachionus* by the segmented, rigid foot. **1:** Dorsal (1) and ventral (2, 3) view of *P. quadricornis* in the scanning electron microscope (1, 2) and from life (3). The 170–360 µm long species has an oval or circular lorica with two spines at the posterior margin (1, 3, arrows). Two ventrally curved spines (1, arrowheads) protect the head opening. **4:** The smooth lorica of *P. polyacanthus* is 220–300 µm long and has two lateral spines and two small spines (arrows) around the foot opening. **5:** *Platyias patulus* is 170–270 µm long and has 10–12 spines around the anterior margin (arrowhead). The foot opening is protected by three spines (arrows). FT – foot.

Fig. 1 – 3: Rotifers. The roundish lorica of *Lepadella* consists of a single plate and is flattened dorsoventrally. The fused feet have three or four segments and two pointed toes. All members of the genus lack spines, but the lorica can be ornamented. **1:** *Lepadella ovalis,* the most common member of the genus, is 100–190 µm long and has an ovate lorica. The toes (T) work like tweezers. **2:** The 65–100 µm long lorica of *Lepadella triptera* is conspicuously hexagonal and keeled dorsally. **3:** In ventral view, *Lepadella punctata* has circular warts fading laterally. Above the foot opening, the warts are semicircularly arranged (arrowhead). FT – foot, T – toes.

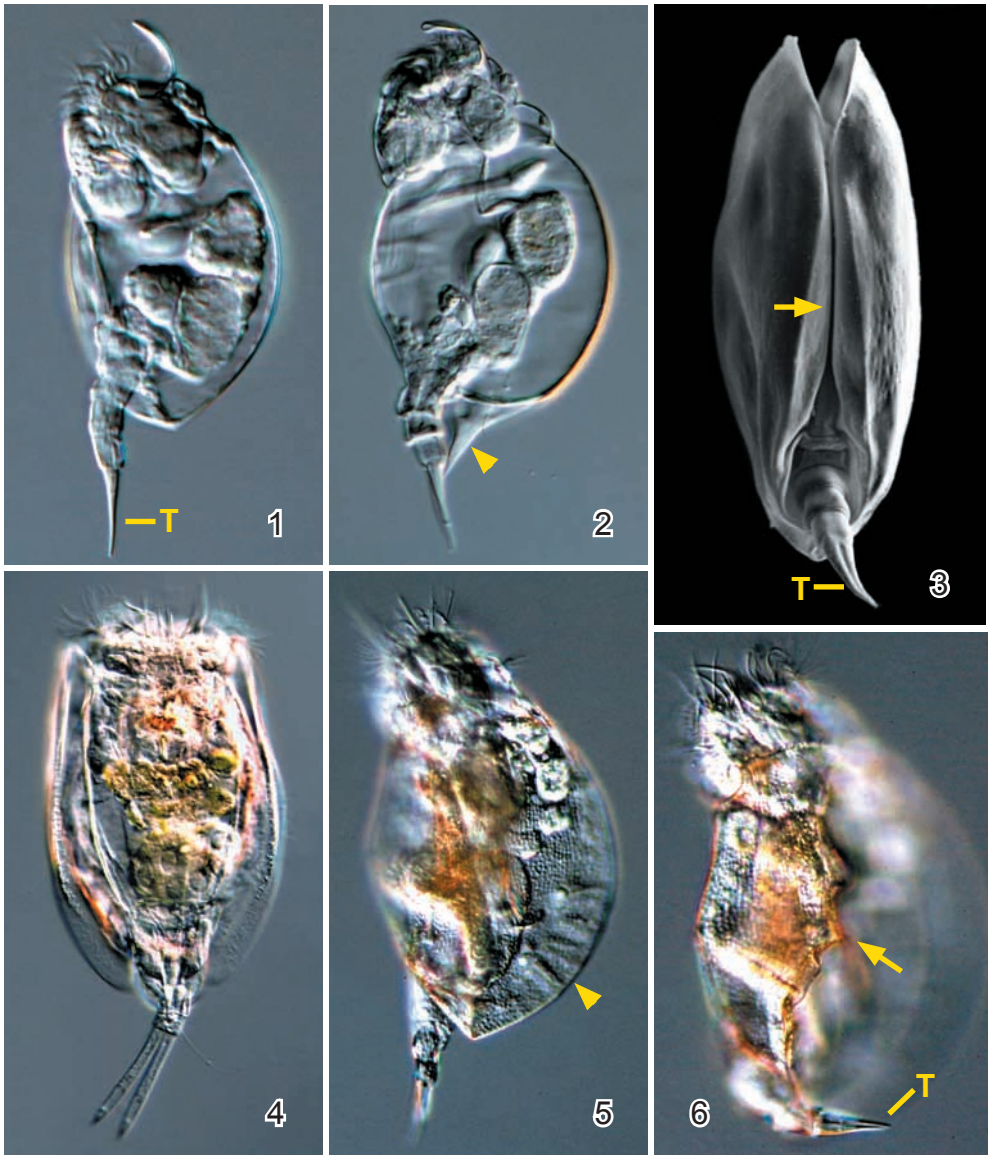


Fig. 1 – 6: Rotifers. The following species are usually found among floating plants and algae. **1 – 3:** Left side views of *Colurella obtusa* (1, 3; 80–100 µm) and *C. uncinata* forma *deflexa* (2; 60–100 µm). The posterior margin of *C. uncinata* forma *deflexa* bears a distinct spine (2, arrowhead). The lorica of *Colurella* is laterally depressed and has a conspicuous ventral cleft well recognizable in the scanning electron micrograph of *C. obtusa* (3, arrow). **4.** *Euchlanis dilata* is 200–270 µm long and has a strongly convex dorsal plate. The long toes of *Euchlanis* are sword-shaped or fusiform. **5, 6:** *Lophocharis salpina* is 120–140 µm long and has a prominent dorsal keel with some transverse folds (5, arrowhead). The lateral margin of the lorica is serrated (6, arrow). T – toes.

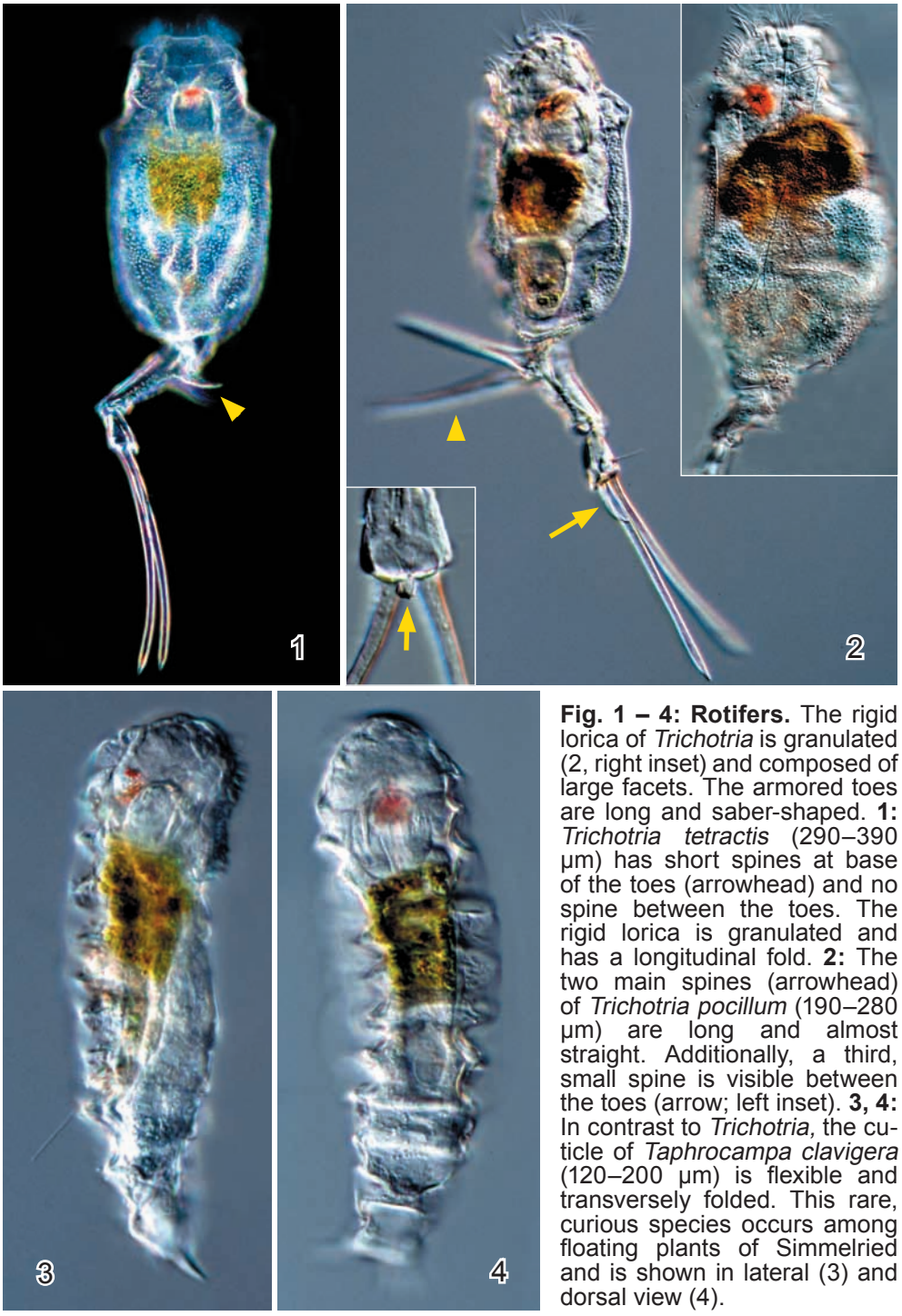
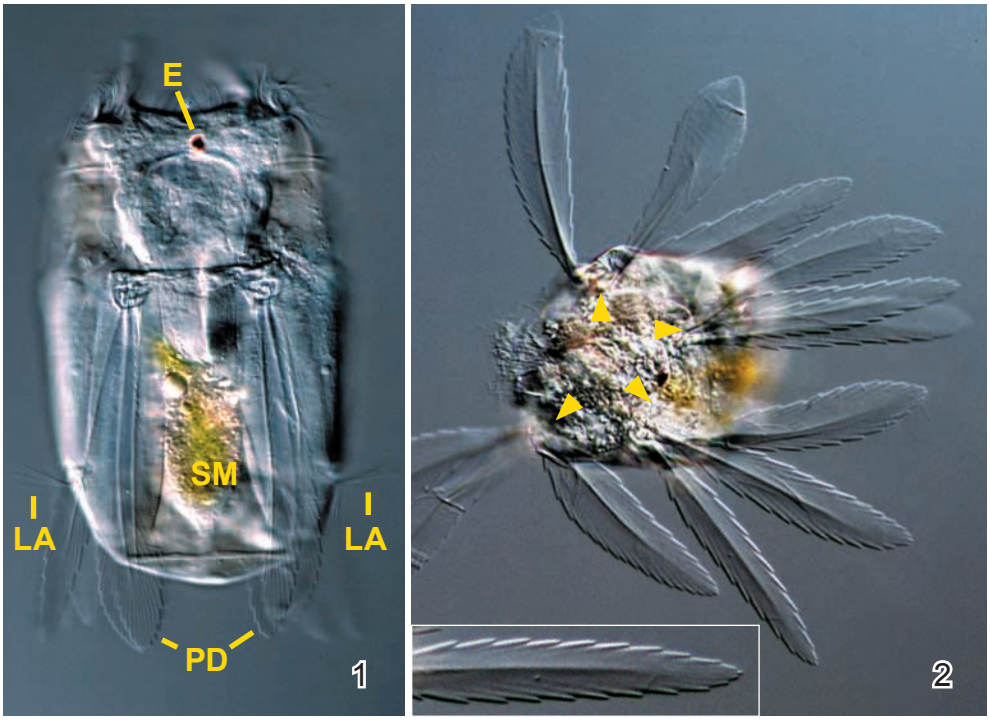


Fig. 1 – 4: Rotifers. The rigid lorica of *Trichotria* is granulated (2, right inset) and composed of large facets. The armored toes are long and saber-shaped. **1:** *Trichotria tetractis* (290–390 µm) has short spines at base of the toes (arrowhead) and no spine between the toes. The rigid lorica is granulated and has a longitudinal fold. **2:** The two main spines (arrowhead) of *Trichotria pocillum* (190–280 µm) are long and almost straight. Additionally, a third, small spine is visible between the toes (arrow; left inset). **3, 4:** In contrast to *Trichotria,* the cuticle of *Taphrocampa clavigera* (120–200 µm) is flexible and transversely folded. This rare, curious species occurs among floating plants of Simmelried and is shown in lateral (3) and dorsal view (4).



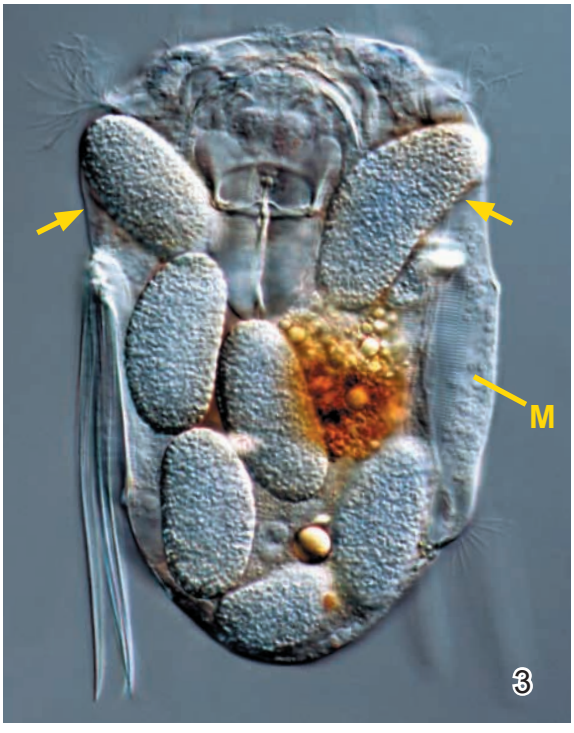


Fig. 1 – 3: Rotifers. Though the Simmelried offers only small ponds a few meters across, some planktonic rotifers occur, such as the well known *Polyarthra vulgaris.* This common species is 100–150 µm long and has 12 feather-like paddles arranged in four groups with three paddles each in the shoulder region (2, arrowheads). The paddles are well recognizable when they are spread and the rotifer is viewed apically (2). When threatened, the paddles can be spread rapidly to produce a conspicuous jump backward (2). *Polyarthra vulgaris* is attacked, preferably in summer, by *Bertramia asperospora* (3, arrows), an intracellular member of the Apicomplexa. E – eyespot, LA – lateral antennae (tactile organs), M – muscles, PD – paddles, SM – stomach.

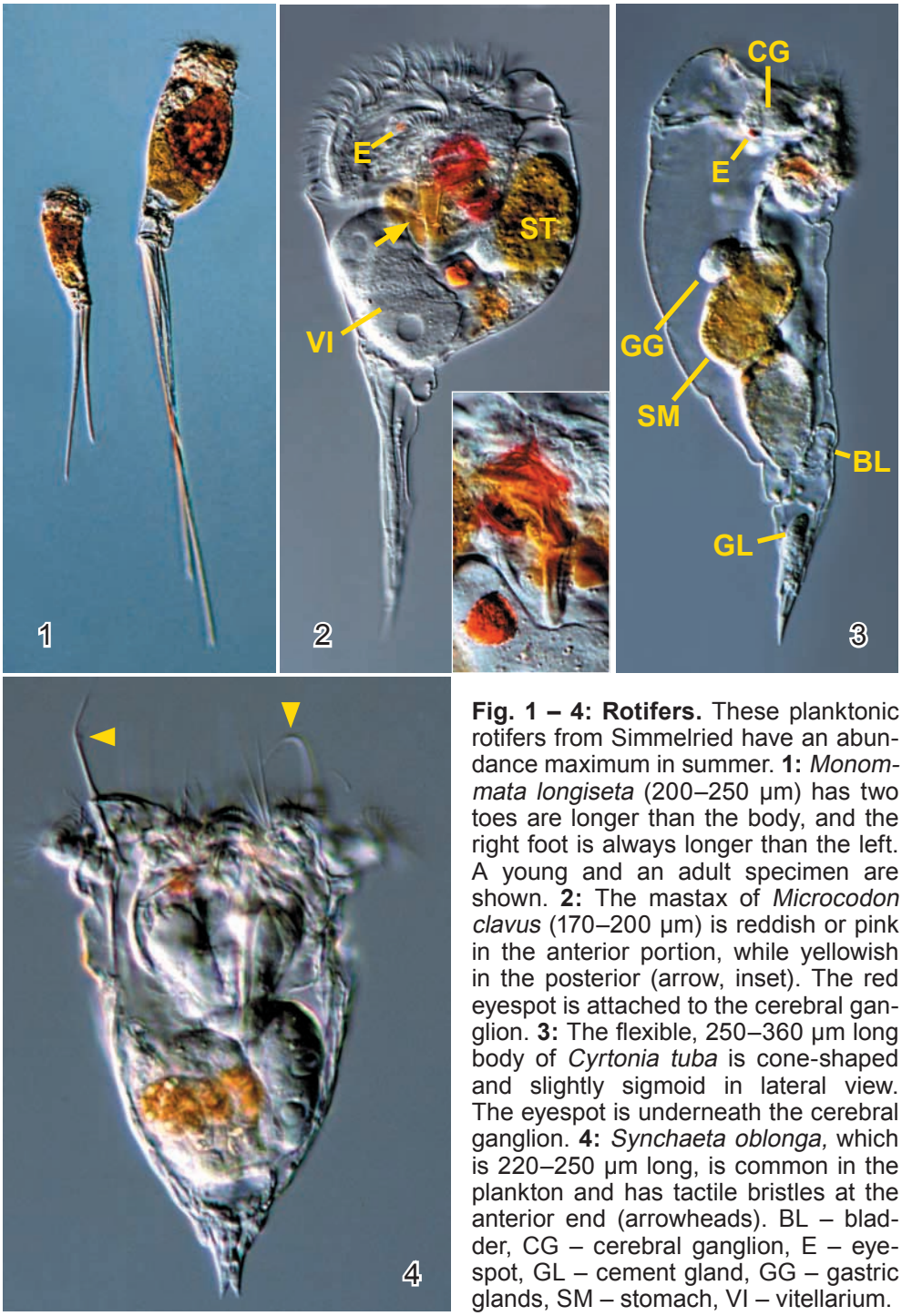
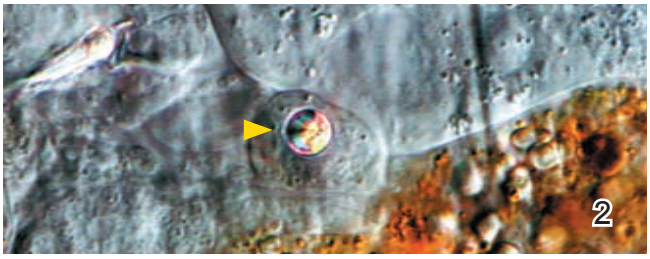
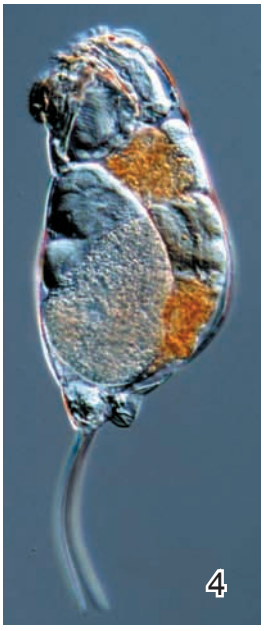


Fig. 1 – 4: Rotifers. These planktonic rotifers from Simmelried have an abundance maximum in summer. **1:** *Monommata longiseta* (200–250 µm) has two toes are longer than the body, and the right foot is always longer than the left. A young and an adult specimen are shown. **2:** The mastax of *Microcodon clavus* (170–200 µm) is reddish or pink in the anterior portion, while yellowish in the posterior (arrow, inset). The red eyespot is attached to the cerebral ganglion. **3:** The flexible, 250–360 µm long body of *Cyrtonia tuba* is cone-shaped and slightly sigmoid in lateral view. The eyespot is underneath the cerebral ganglion. **4:** *Synchaeta oblonga,* which is 220–250 µm long, is common in the plankton and has tactile bristles at the anterior end (arrowheads). BL – bladder, CG – cerebral ganglion, E – eyespot, GL – cement gland, GG – gastric glands, SM – stomach, VI – vitellarium.

Fig. 1 – 5: Rotifers. The lorica of *Cephalodella* is composed of a dorsal and a ventral plate connected by flexible membranes in lateral grooves. The corona is obliquely orientated to the ventral side. The foot consists of a single segment and has two curved toes, which can reach the length of the body. **1, 2:** *Cephalodella tenuior* is a 120–220 µm long, slender species found among floating plants. The spine-like toes are curved ventrally. A conspicuous feature of *C. tenuior* is a pair of globular crystals near the cerebral ganglion (arrowheads). **3:** *Cephalodella auriculata* is 80–160 µm long and can be easily recognized by the ventrally curved, short toes. The eyespot is attached to the margin of the cerebral ganglion (CG). **4:** *Cephalodella gibba* is 250–450 µm long and is one of the most common members of the genus. The toes have two thirds of body length and are curved dorsally. **5:** *Cephalodella tenuiseta* is 260–400 µm long and has almost straight toes as long as the body. E – eyespot, CG – cerebral ganglion.





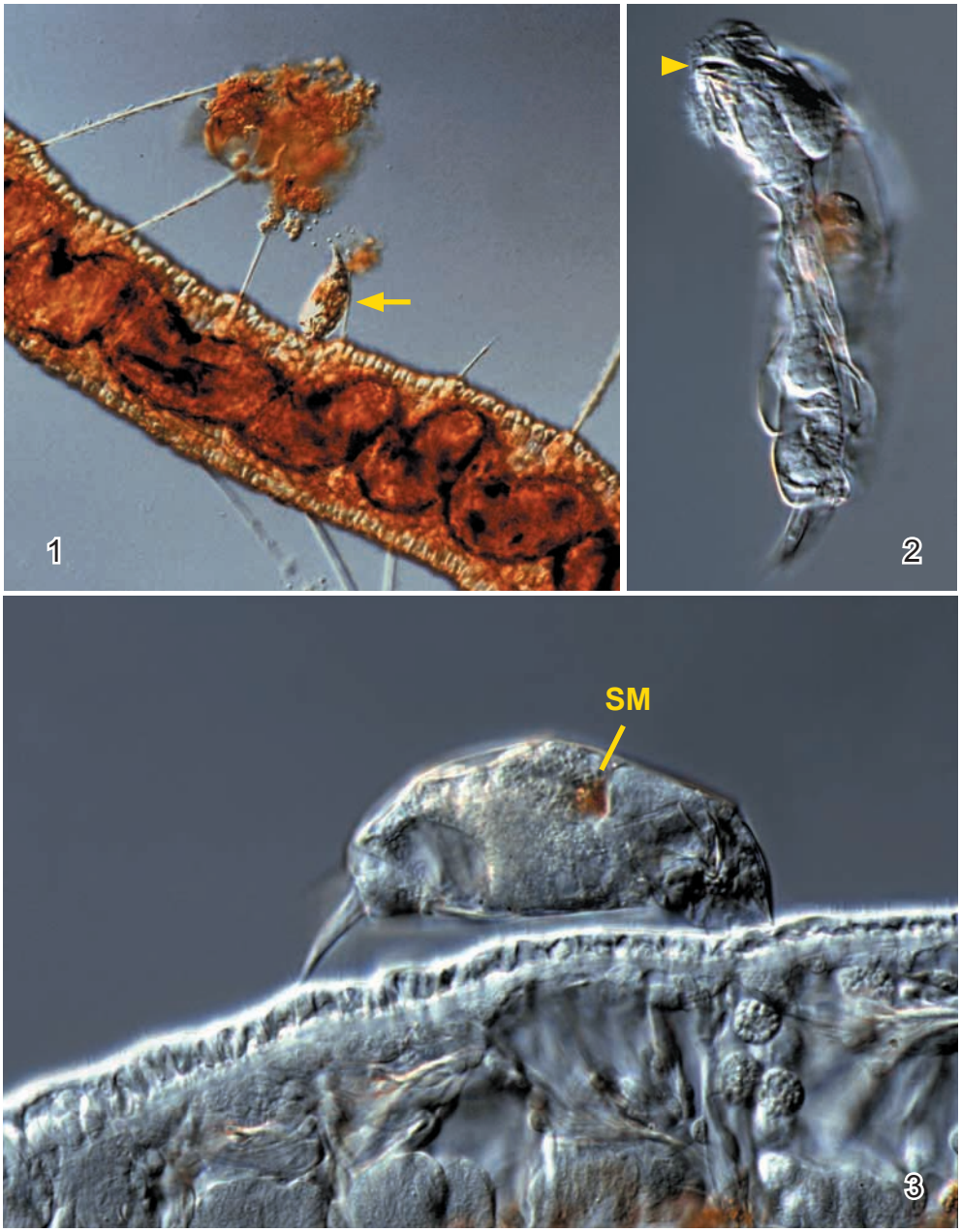


Fig. 1 – 3: Rotifers. *Cephalodella parasitica* is 110–200 µm long and adheres to oligochetes like *Chaetogaster* and *Stylaria* (1, arrow), apparently using the corona (3). Possibly, the species is feeding on epidermal cells of the host. Thus, the tweezers-like mastax is located apically (2, arrowhead). Detached specimens (2) swim around searching for a new host. *Cephalodella parasitica* lacks an eyespot; the red area near the dorsal side is the stomach (SM).

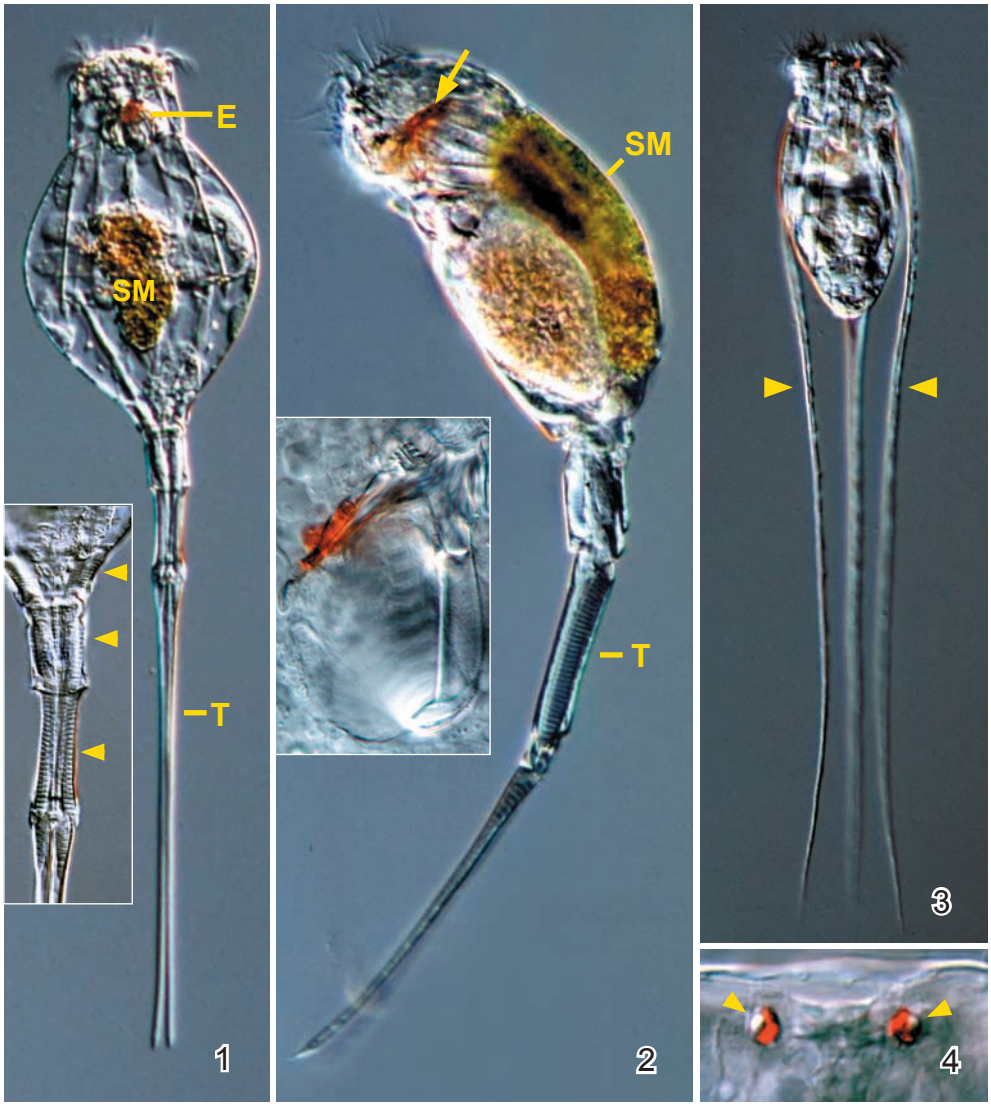


Fig. 1 – 4: Rotifers. 1: *Eudactylota eudactylota* is 550–750 µm long and common in the mud of Simmelried. The long foot is composed of three segments (inset, arrowheads) and bears two very long toes (T). During swimming, the toes are often rapidly spread resulting in conspicuous jumps. The fusiform body has a central stomach and a single eyespot. **2:** *Scaridium longicaudum* is 360–430 µm long and similar to *E. eudactylota,* but the body is cylindroidal and the large stomach, which is green from algal food, is dorsally located. The red plate in the middle of the head (arrow, inset) is not an eyespot but pigmentation. Inset: detail of mastax. **3, 4:** *Filinia limnetica* is 400–500 µm long and is a planktonic rotifer with an ellipsoidal body having three long bristles originating laterally (arrowheads) and posteriorly. The bristles can be rapidly spread to jump backwards. Apically, two eyespots with lenses can be recognized (4, arrowheads). E – eyespots, SM – stomach, T – toes.

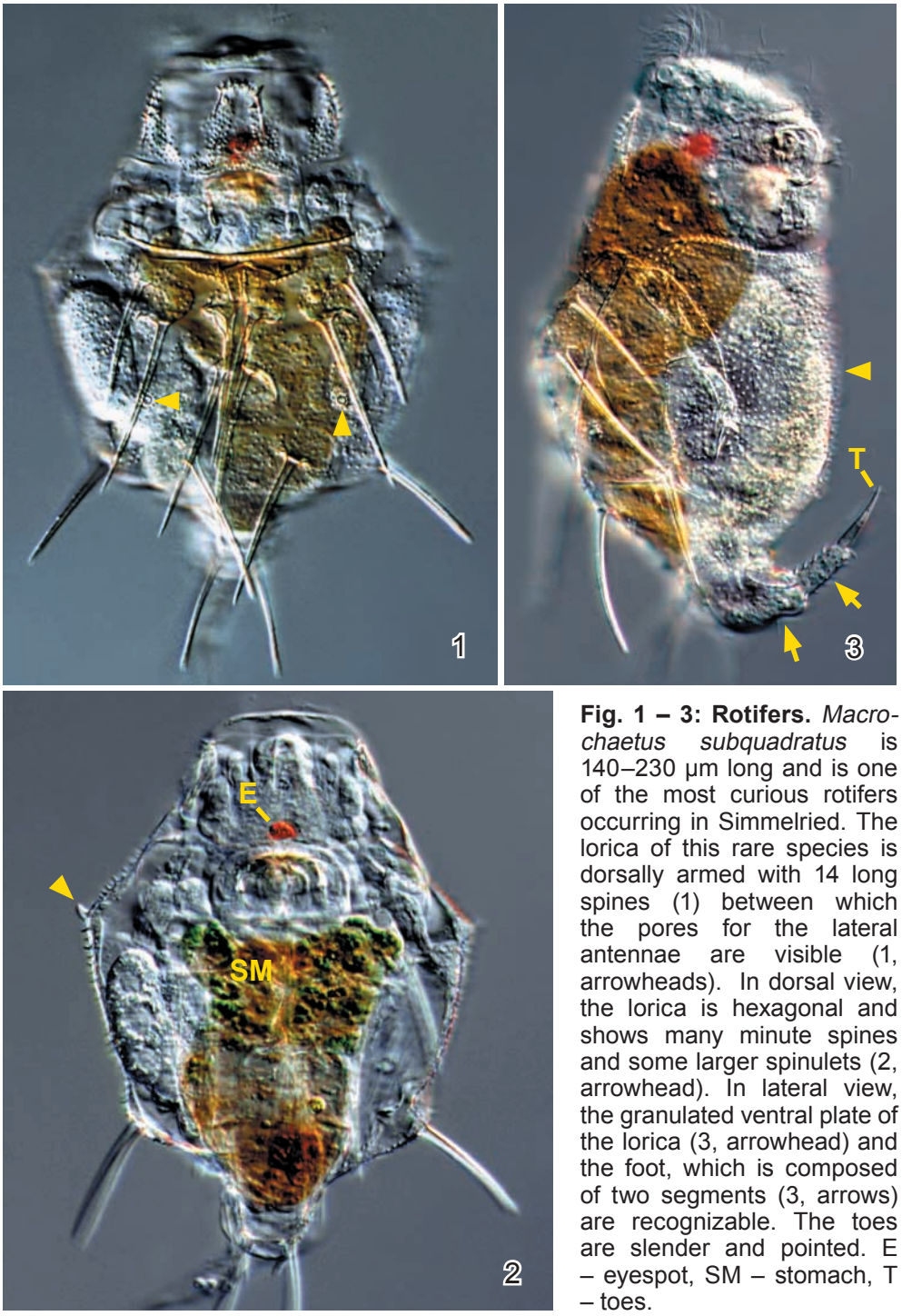


Fig. 1 – 3: Rotifers. *Macrochaetus subquadratus* is 140–230 µm long and is one of the most curious rotifers occurring in Simmelried. The lorica of this rare species is dorsally armed with 14 long spines (1) between which the pores for the lateral antennae are visible (1, arrowheads). In dorsal view, the lorica is hexagonal and shows many minute spines and some larger spinulets (2, arrowhead). In lateral view, the granulated ventral plate of the lorica (3, arrowhead) and the foot, which is composed of two segments (3, arrows) are recognizable. The toes are slender and pointed. E – eyespot, SM – stomach, T – toes.

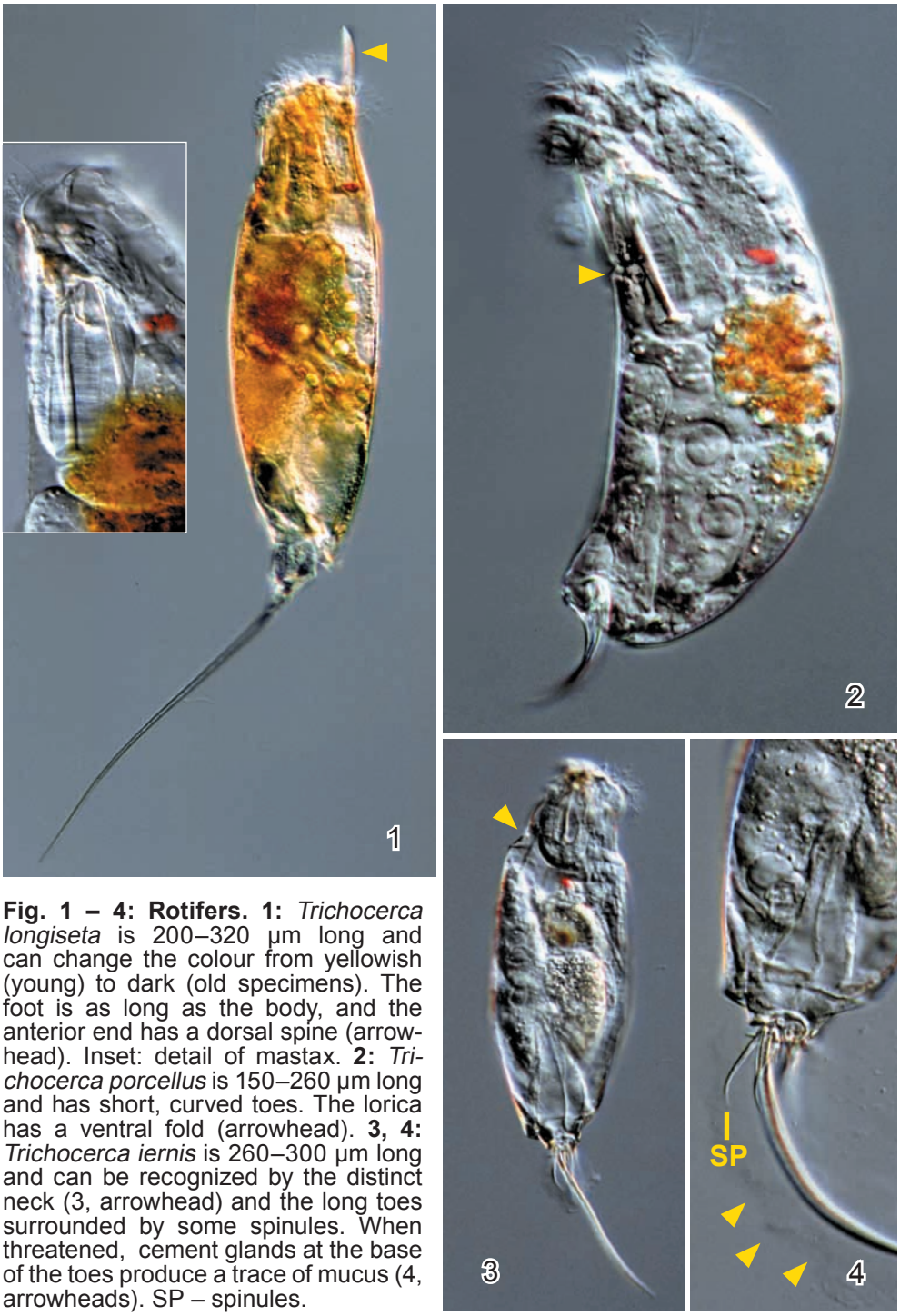


Fig. 1 – 4: Rotifers. 1: *Trichocerca longiseta* is 200–320 µm long and can change the colour from yellowish (young) to dark (old specimens). The foot is as long as the body, and the anterior end has a dorsal spine (arrowhead). Inset: detail of mastax. **2:** *Trichocerca porcellus* is 150–260 µm long and has short, curved toes. The lorica has a ventral fold (arrowhead). **3, 4:** *Trichocerca iernis* is 260–300 µm long and can be recognized by the distinct neck (3, arrowhead) and the long toes surrounded by some spinules. When threatened, cement glands at the base of the toes produce a trace of mucus (4, arrowheads). SP – spinules.

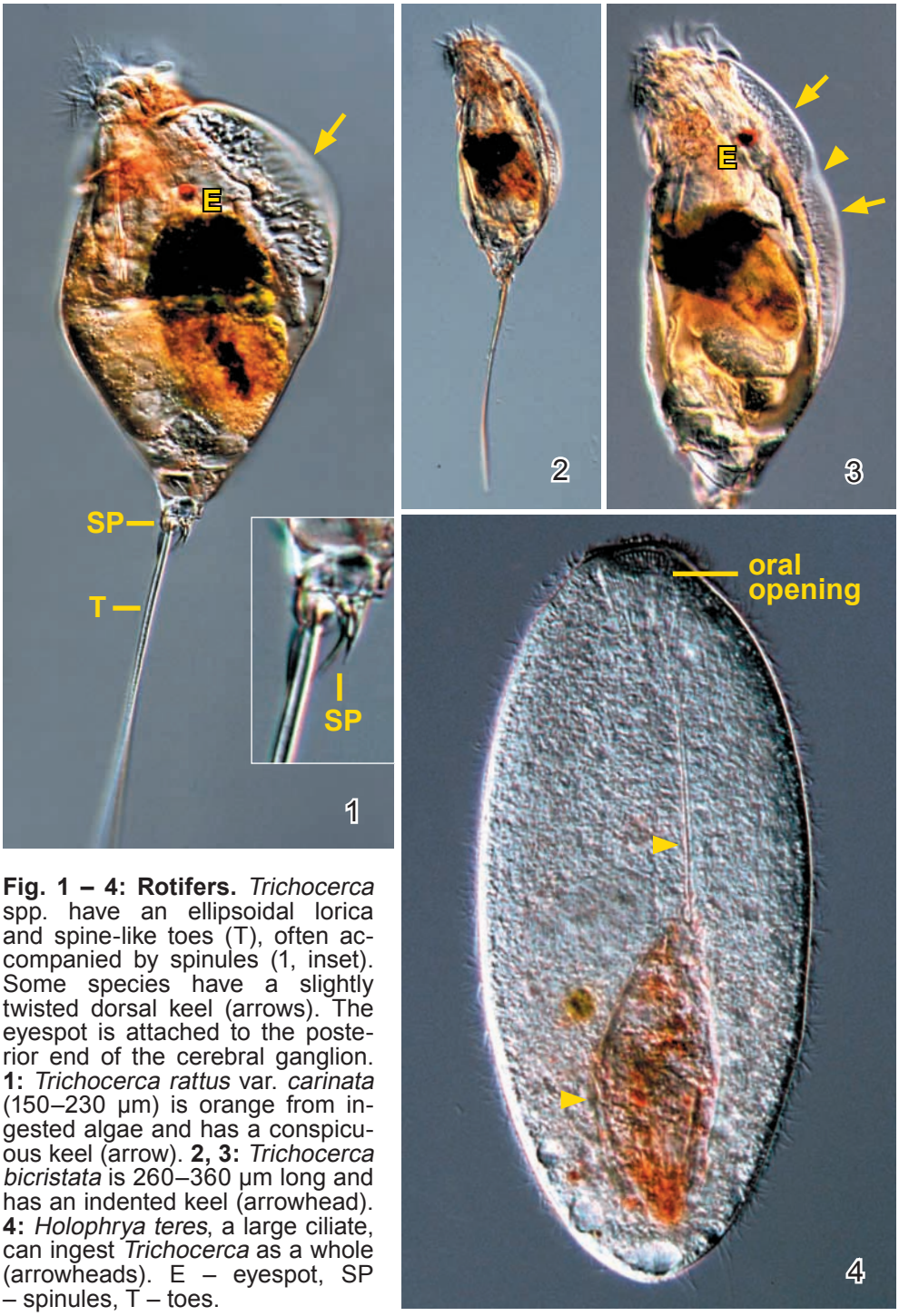


Fig. 1 – 4: Rotifers. *Trichocerca* spp. have an ellipsoidal lorica and spine-like toes (T), often accompanied by spinules (1, inset). Some species have a slightly twisted dorsal keel (arrows). The eyespot is attached to the posterior end of the cerebral ganglion. **1:** *Trichocerca rattus* var. *carinata* (150–230 µm) is orange from ingested algae and has a conspicuous keel (arrow). **2, 3:** *Trichocerca bicristata* is 260–360 µm long and has an indented keel (arrowhead). **4:** *Holophrya teres*, a large ciliate, can ingest *Trichocerca* as a whole (arrowheads). E – eyespot, SP – spinules, T – toes.

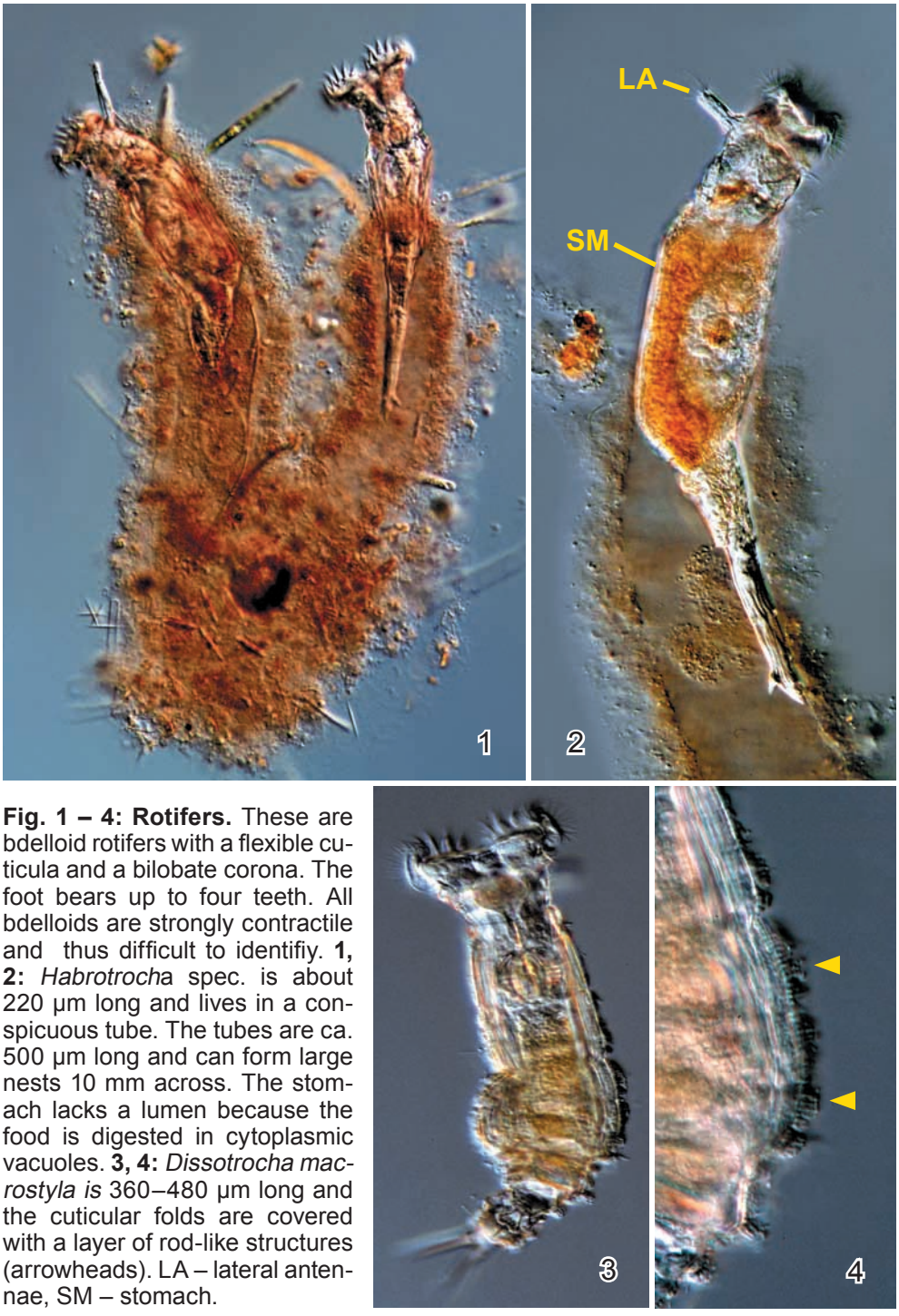
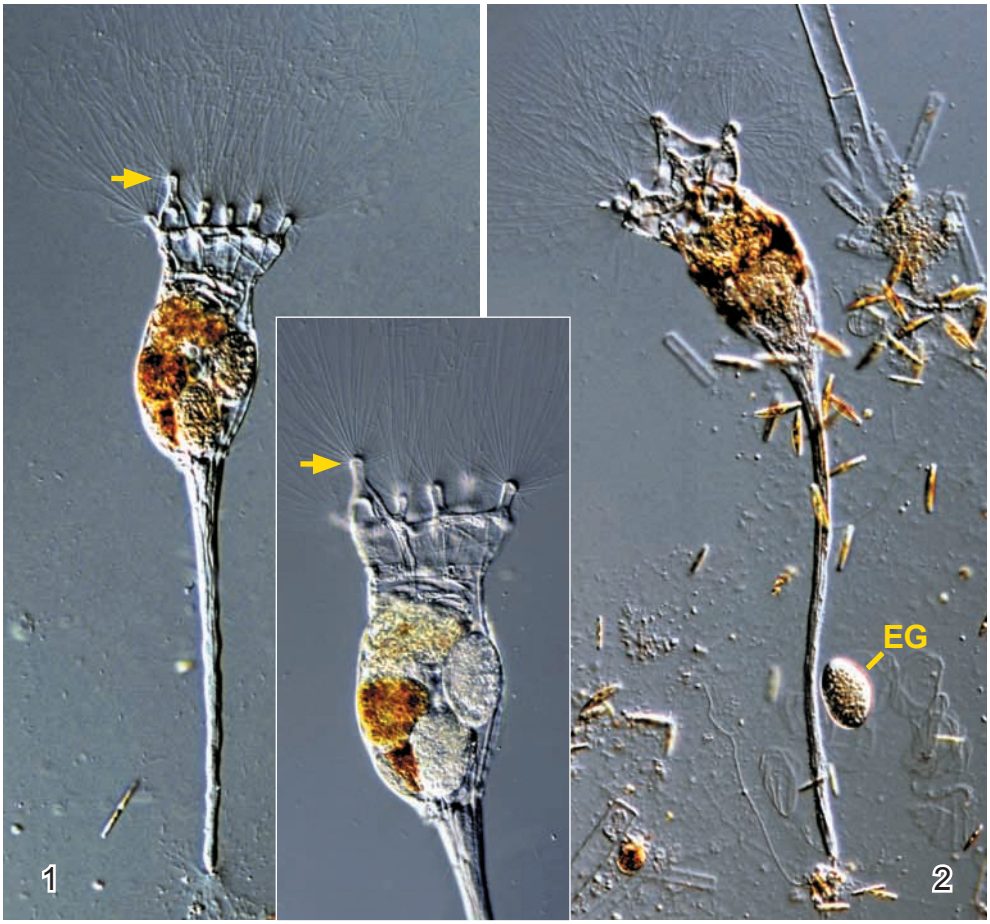


Fig. 1 – 4: Rotifers. These are bdelloid rotifers with a flexible cuticula and a bilobate corona. The foot bears up to four teeth. All bdelloids are strongly contractile and thus difficult to identifiy. **1, 2:** *Habrotrocha* spec. is about 220 µm long and lives in a conspicuous tube. The tubes are ca. 500 µm long and can form large nests 10 mm across. The stomach lacks a lumen because the food is digested in cytoplasmic vacuoles. **3, 4:** *Dissotrocha macrostyla is* 360–480 µm long and the cuticular folds are covered with a layer of rod-like structures (arrowheads). LA – lateral antennae, SM – stomach.



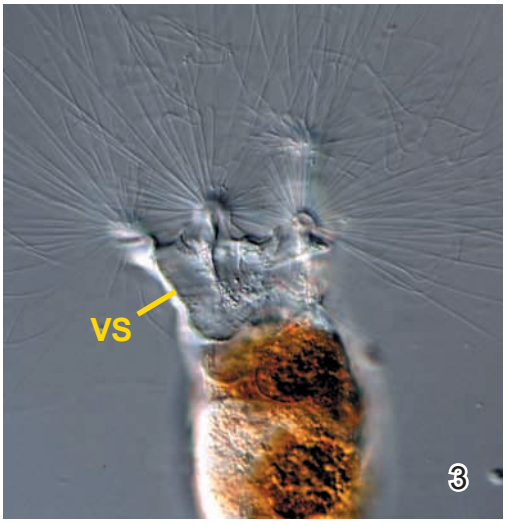


Fig. 1 – 3: Rotifers. The corona of *Collotheca* has conspicuous lobes from which bundles of setae emerge. The setae, which likely have sensory functions, can reach half the body length and show active movements. The setae corona guides the prey to the vestibulum. Most species of *Collotheca* are sessile and live in a slimy tube. **1:** *Collotheca heptabrachiata* is 500–850 µm long and can be recognized by seven knobed lobes. The dorsal lobe is elongated (arrow, inset). **2, 3:** *Collotheca ornata* is 400–850 µm long and similar to *C. heptabrachiata*, but has only five lobes. The slimy lorica is often covered by some diatoms. Inside the lorica, a deposited egg (EG) is visible. EG – egg, VS – vestibulum.

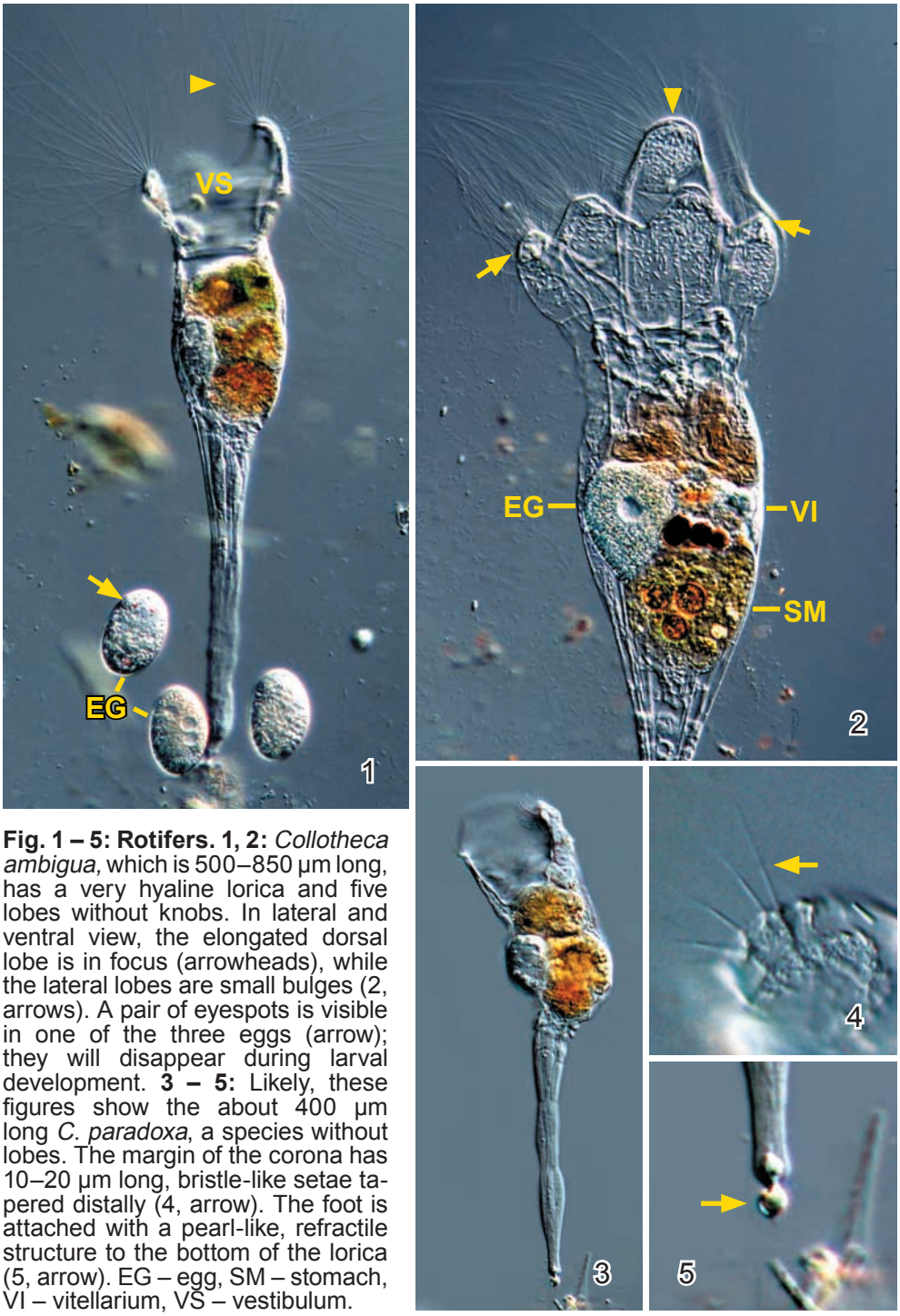


Fig. 1 – 5: Rotifers. 1, 2: *Collotheca ambigua,* which is 500–850 µm long, has a very hyaline lorica and five lobes without knobs. In lateral and ventral view, the elongated dorsal lobe is in focus (arrowheads), while the lateral lobes are small bulges (2, arrows). A pair of eyespots is visible in one of the three eggs (arrow); they will disappear during larval development. **3 – 5:** Likely, these figures show the about 400 µm long *C. paradoxa*, a species without lobes. The margin of the corona has 10–20 µm long, bristle-like setae tapered distally (4, arrow). The foot is attached with a pearl-like, refractile structure to the bottom of the lorica (5, arrow). EG – egg, SM – stomach, VI – vitellarium, VS – vestibulum.

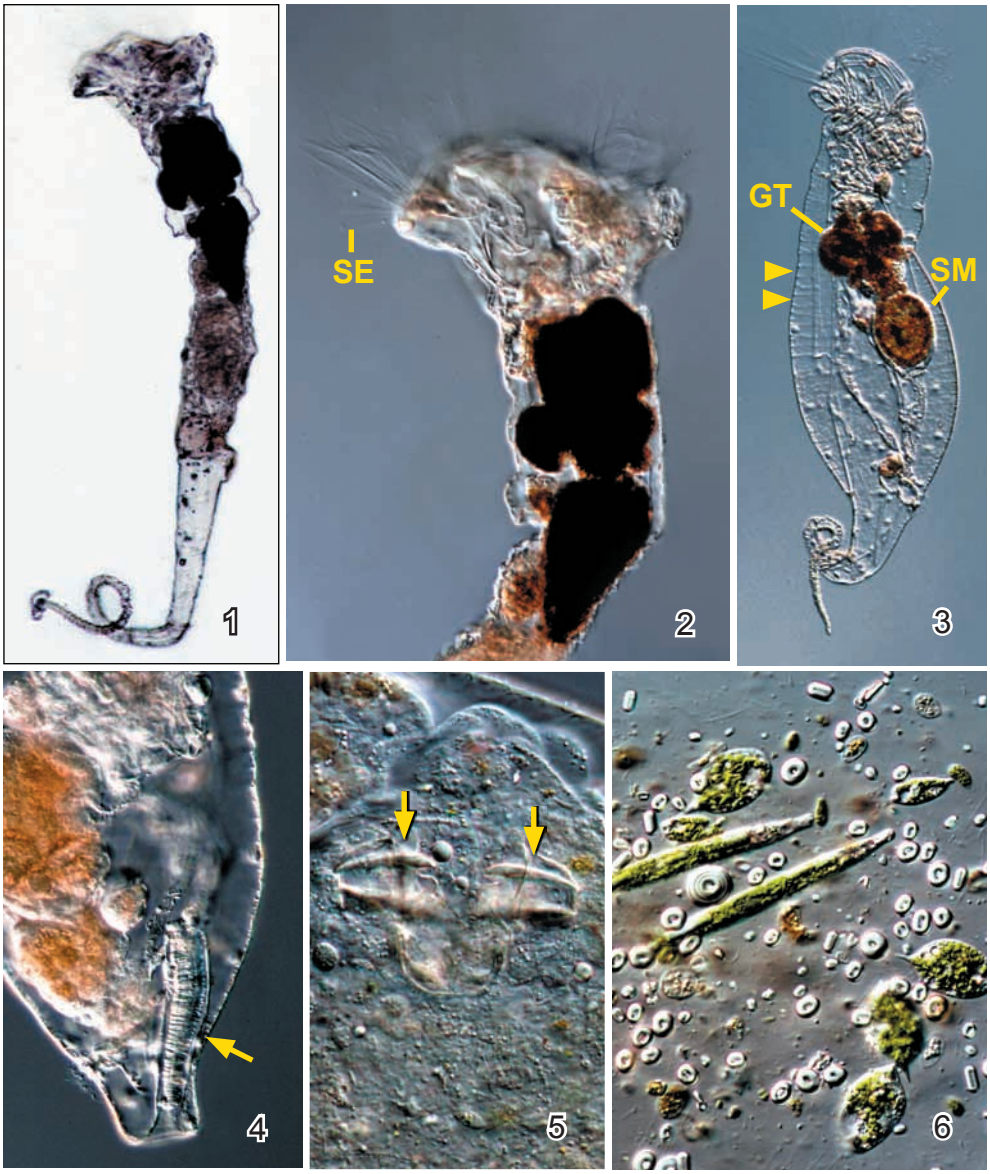


Fig. 1 – 6: Rotifers. *Collotheca atrochoides* is 1200–1600 µm long and lives in the mud of Simmelried (1). The large corona has 120–140 µm long setae (2, SE). The body and the digestive system are usually dark by food inclusions (1, 2). In a squashed specimen, the delicate transverse striation of the lorica is visible (3, arrowheads). Above the stomach is the gullet filled with prey (3, GT). The rudimentary, annulated foot is usually retracted into the body (4, arrow). The mastax has prominent teeth to grasp and fix the prey (5, arrows). When squashed, the content of the gullet is released, showing that it is composed of euglenids and rhodobacteria (6). GT – gullet, SE – setae, SM – stomach.

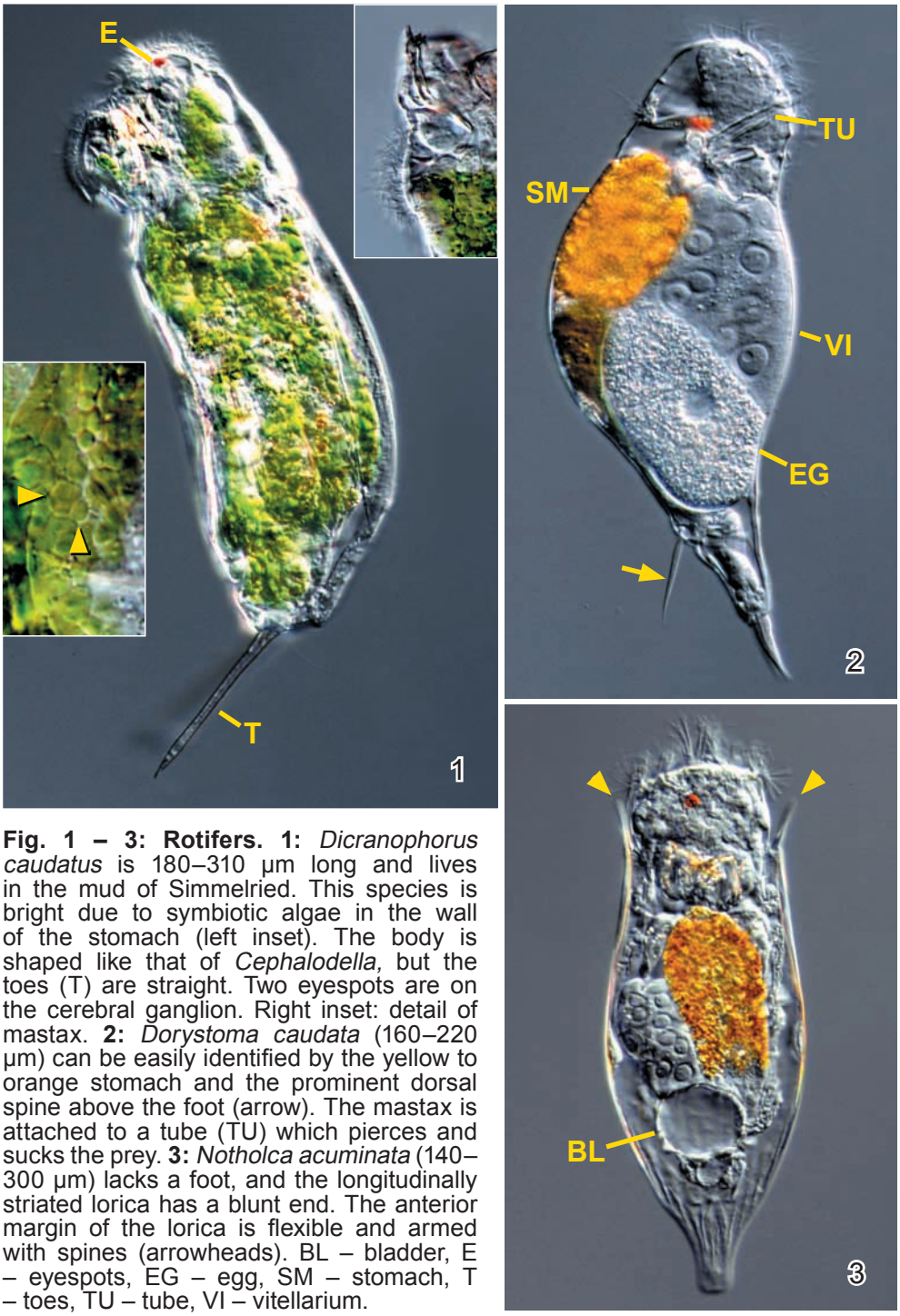


Fig. 1 – 3: Rotifers. 1: *Dicranophorus caudatus* is 180–310 µm long and lives in the mud of Simmelried. This species is bright due to symbiotic algae in the wall of the stomach (left inset). The body is shaped like that of *Cephalodella,* but the toes (T) are straight. Two eyespots are on the cerebral ganglion. Right inset: detail of mastax. **2:** *Dorystoma caudata* (160–220 µm) can be easily identified by the yellow to orange stomach and the prominent dorsal spine above the foot (arrow). The mastax is attached to a tube (TU) which pierces and sucks the prey. **3:** *Notholca acuminata* (140–300 µm) lacks a foot, and the longitudinally striated lorica has a blunt end. The anterior margin of the lorica is flexible and armed with spines (arrowheads). BL – bladder, E – eyespots, EG – egg, SM – stomach, T – toes, TU – tube, VI – vitellarium.

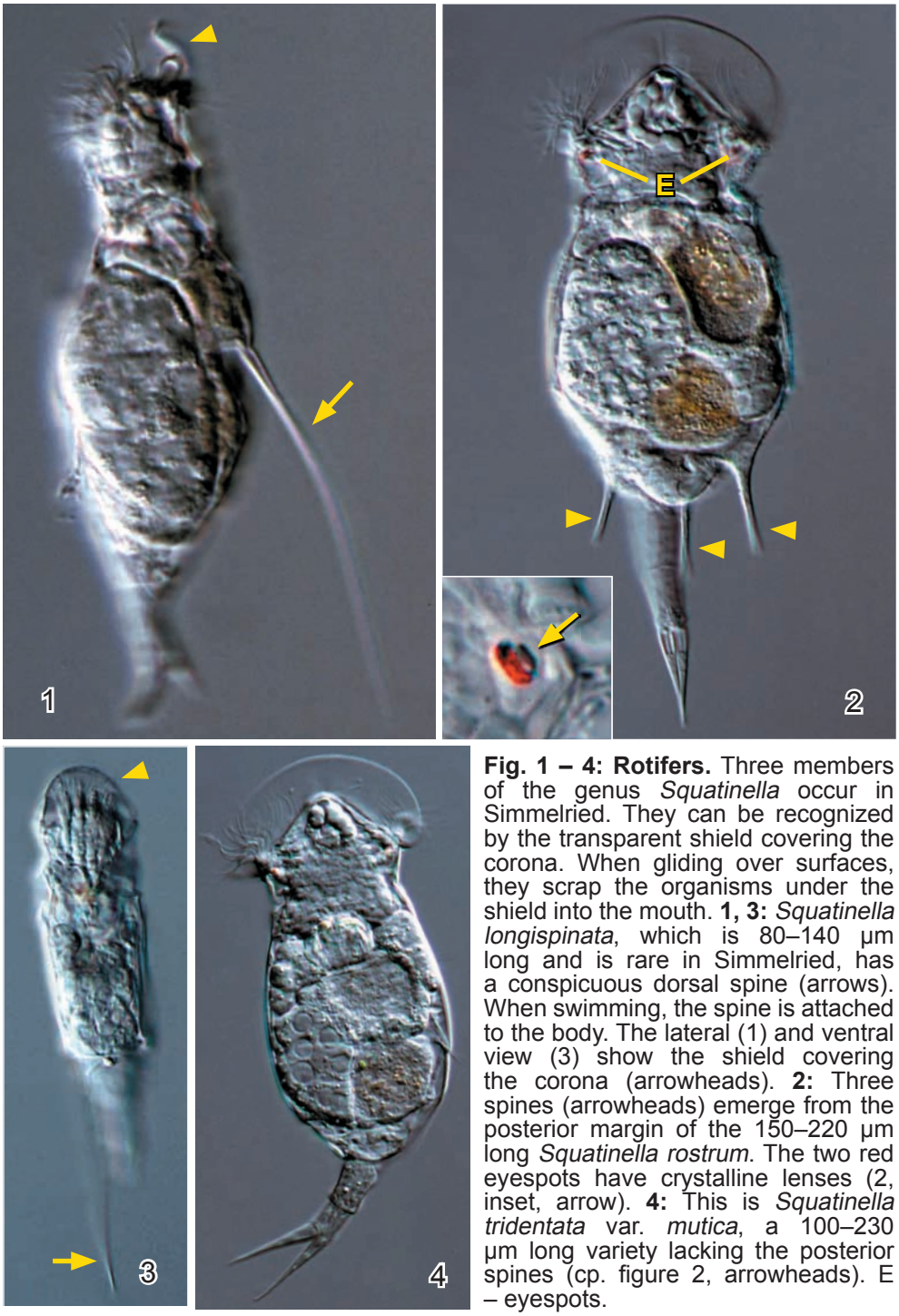
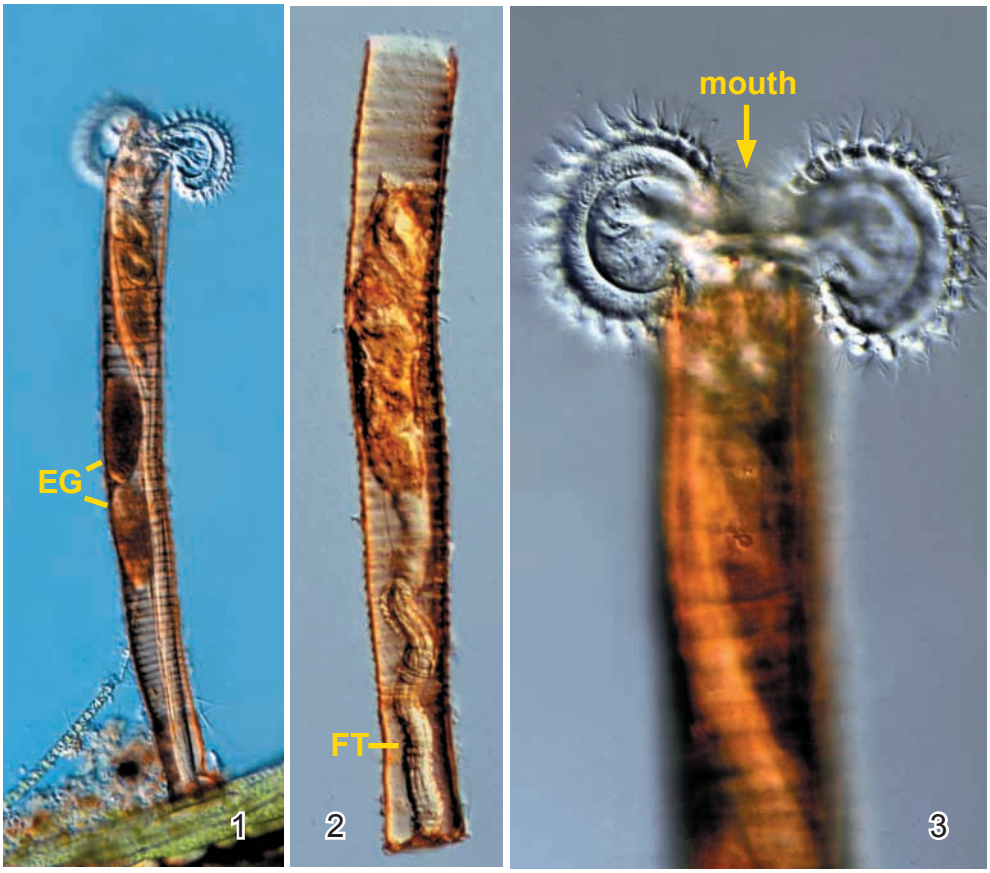


Fig. 1 – 4: Rotifers. Three members of the genus *Squatinella* occur in Simmelried. They can be recognized by the transparent shield covering the corona. When gliding over surfaces, they scrap the organisms under the shield into the mouth. **1, 3:** *Squatinella longispinata*, which is 80–140 µm long and is rare in Simmelried, has a conspicuous dorsal spine (arrows). When swimming, the spine is attached to the body. The lateral (1) and ventral view (3) show the shield covering the corona (arrowheads). **2:** Three spines (arrowheads) emerge from the posterior margin of the 150–220 µm long *Squatinella rostrum*. The two red eyespots have crystalline lenses (2, inset, arrow). **4:** This is *Squatinella tridentata* var. *mutica*, a 100–230 µm long variety lacking the posterior spines (cp. figure 2, arrowheads). E – eyespots.



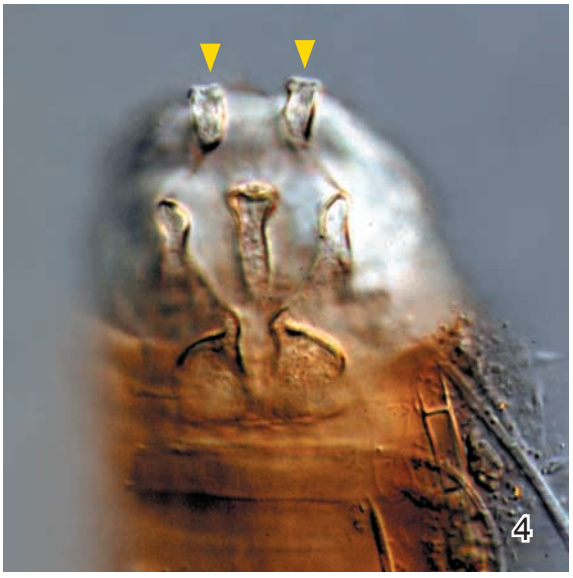


Fig. 1 – 4: Rotifers. *Limnias melicerta* is 800–1000 µm long and sessile. It builds a brownish, transparent tube. The tube material is produced by special glands in the neck region. While the secrete hardens, the animal shapes a new ring by contraction of the neck region. In an isolated tube, a retracted specimen with spirally contracted, annulated foot is visible (2, FT). The cilia of the two lobes beat in opposite directions to generate a stream of food particles to the centrally located mouth (3). For species identification, the wart pattern of the dorsal neck region is essential: *Limnias melicerta* has seven warts (4, arrowheads). EG – eggs, FT – foot.

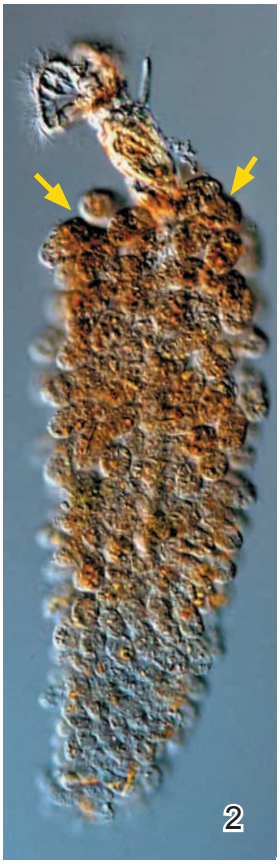


Fig. 1 – 4: Rotifers. Twigs stems of water plants and algal filaments are often covered with the tubes of *Ptygura pilula,* a 1200–1400 µm long rotifer. *Ptygura pilula* is sessile and can be easily recognized by a layer of ellipsoidal pellets covering the slimy tube (2, arrows). The pellets are made from faeces and are formed in the terminal part of the digestive tract. Then, they are placed on the upper margin of the tube. The colour of the pellets of this specimen changes with the height of the tube (2). This indicates a variation of food composition in the life cycle. When the pellets are removed, the very hyaline, slimy lorica (3, arrows), which contains many eggs, becomes visible. In dorsal view, a curious cleft is recognizable (4, arrow), where a stream of filtered particles leaves the nearly circular corona (4, arrowhead). EG – egg, LA – lateral antennae.

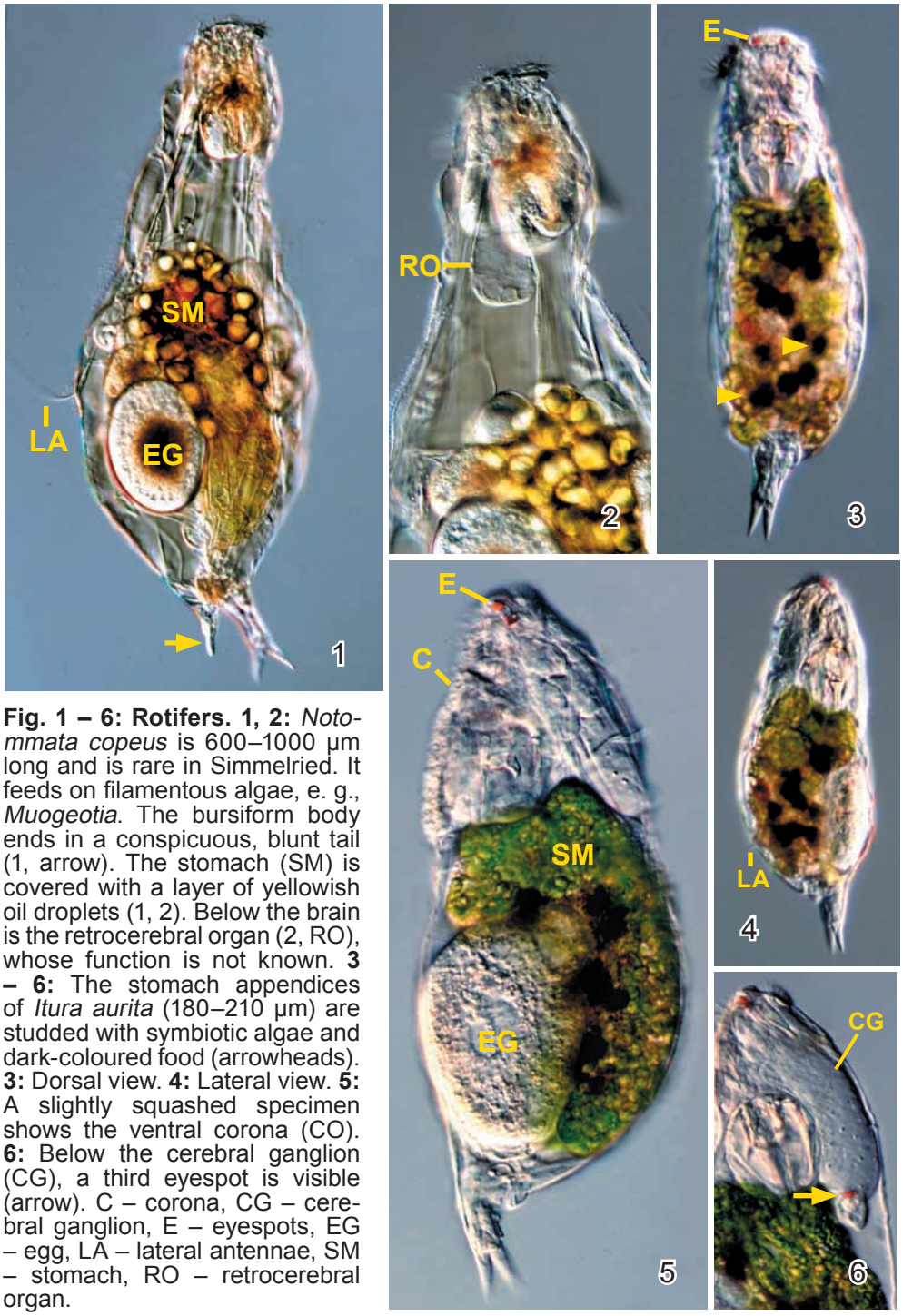


Fig. 1 – 6: Rotifers. 1, 2: *Notommata copeus* is 600–1000 µm long and is rare in Simmelried. It feeds on filamentous algae, e. g., *Muogeotia*. The bursiform body ends in a conspicuous, blunt tail (1, arrow). The stomach (SM) is covered with a layer of yellowish oil droplets (1, 2). Below the brain is the retrocerebral organ (2, RO), whose function is not known. **3 – 6:** The stomach appendices of *Itura aurita* (180–210 µm) are studded with symbiotic algae and dark-coloured food (arrowheads). **3:** Dorsal view. **4:** Lateral view. **5:** A slightly squashed specimen shows the ventral corona (CO). **6:** Below the cerebral ganglion (CG), a third eyespot is visible (arrow). C – corona, CG – cerebral ganglion, E – eyespots, EG – egg, LA – lateral antennae, SM – stomach, RO – retrocerebral organ.

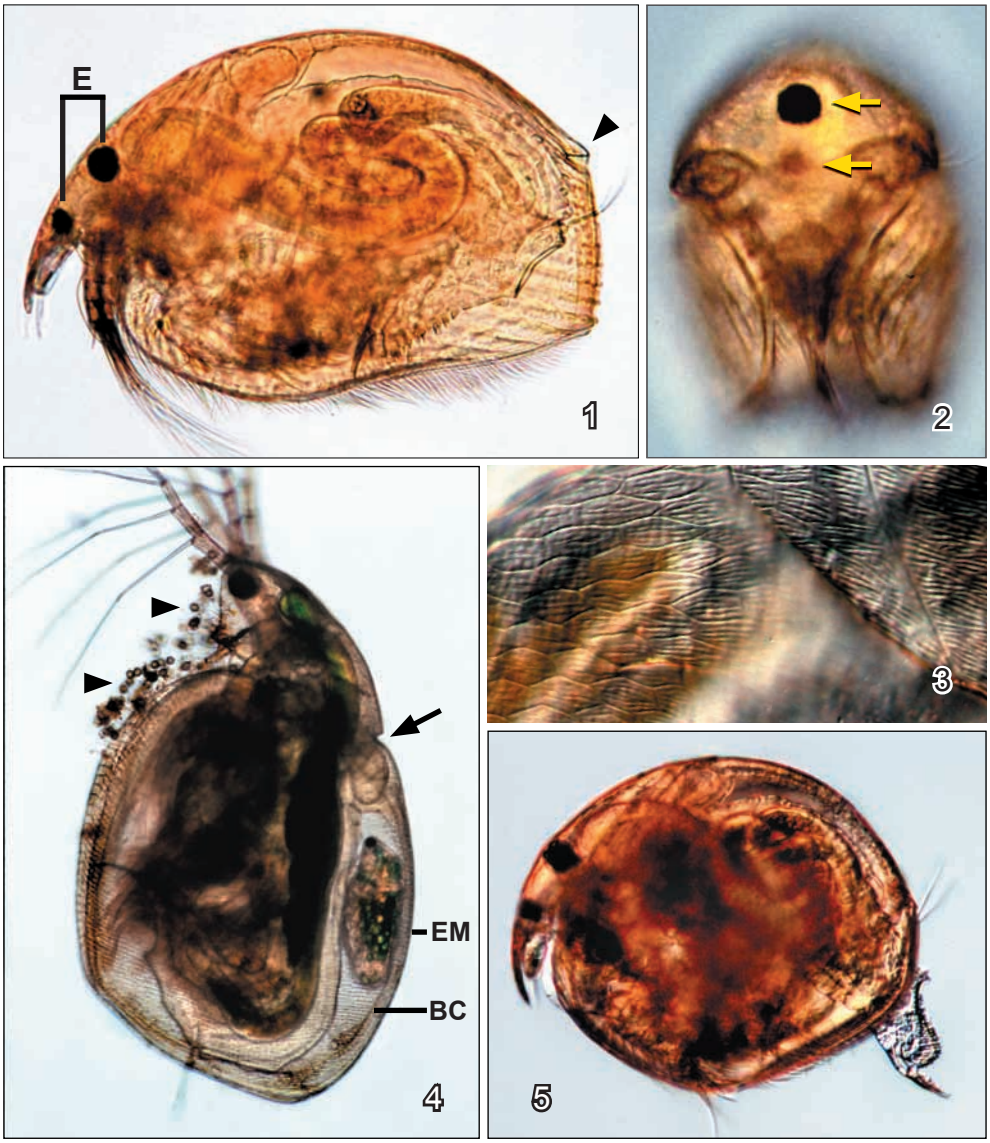
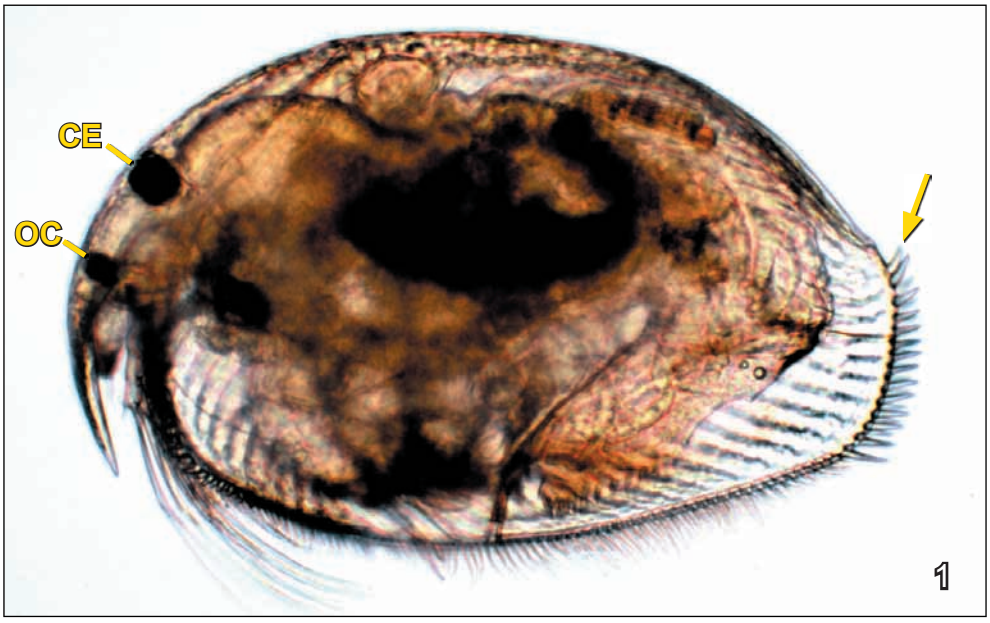


Fig. 1 – 5: Cladocera. Within the crustacea, the order Cladocera comprises more than 100 species occupying a wide range of niches in freshwater habitats. In Simmelried, ten Cladocera species were found. **1 – 3:** The posterior end of the carapace of *Alonella exisa*, which is about 300 µm long and prefers the mud, shows a distinct corner (1, arrowhead). In apical view, the vertically arranged eyes are visible (2, arrows). Within the genus *Alonella*, species can be identified by the fine striation of the reticulated carapace (3). **4:** *Simocephalus vetulus* is 1.5–4 mm long and has, underneath the tiny head, a distinct notch in the dorsal margin of the carapace (arrow). The mouth area of this specimen is colonized by an epizooic *Vorticella* (arrowheads). An embryo is visible in the brood chamber. **5:** *Chydorus sphaericus* is 300–500 µm long and can be easily recognized by the globular shape. BC – brood chamber, E – eyes, EM – embryo.



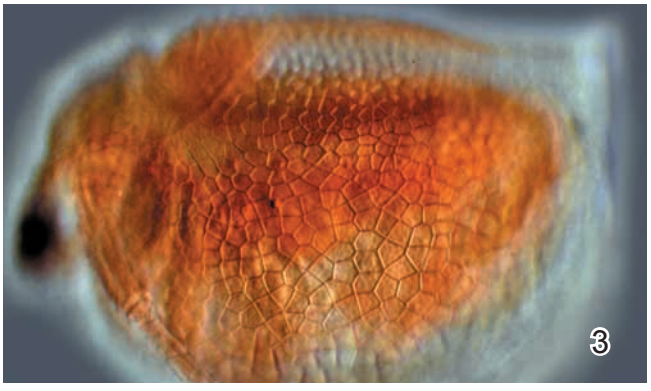


Fig. 1 – 3: Cladocera. 1: *Peracantha (Pleuroxus) truncata* is 500–650 µm long and is common between floating plants of Simmelried. The posterior margin of the carapace bears up to 20 spines with a lenght of 10–20 µm. The upper spines are curved dorsally (arrow). The complex eye (CE) is much larger than the second eye called ocellus (OC). **2, 3:** *Ceriodaphnia reticulata* is 0.8–1.5 mm long and has an almost flat dorsal side ending in a right-angeled tip (2, arrowhead). The small head is ventrally depressed and separated from the carapace by an indentation (2, arrow). *Ceriodaphnia* can be distinguished from *Daphnia* and *Simocephalus* by the prominent polygonal patterning of the carapace (3). CE – complex eye, OC – ocellus.

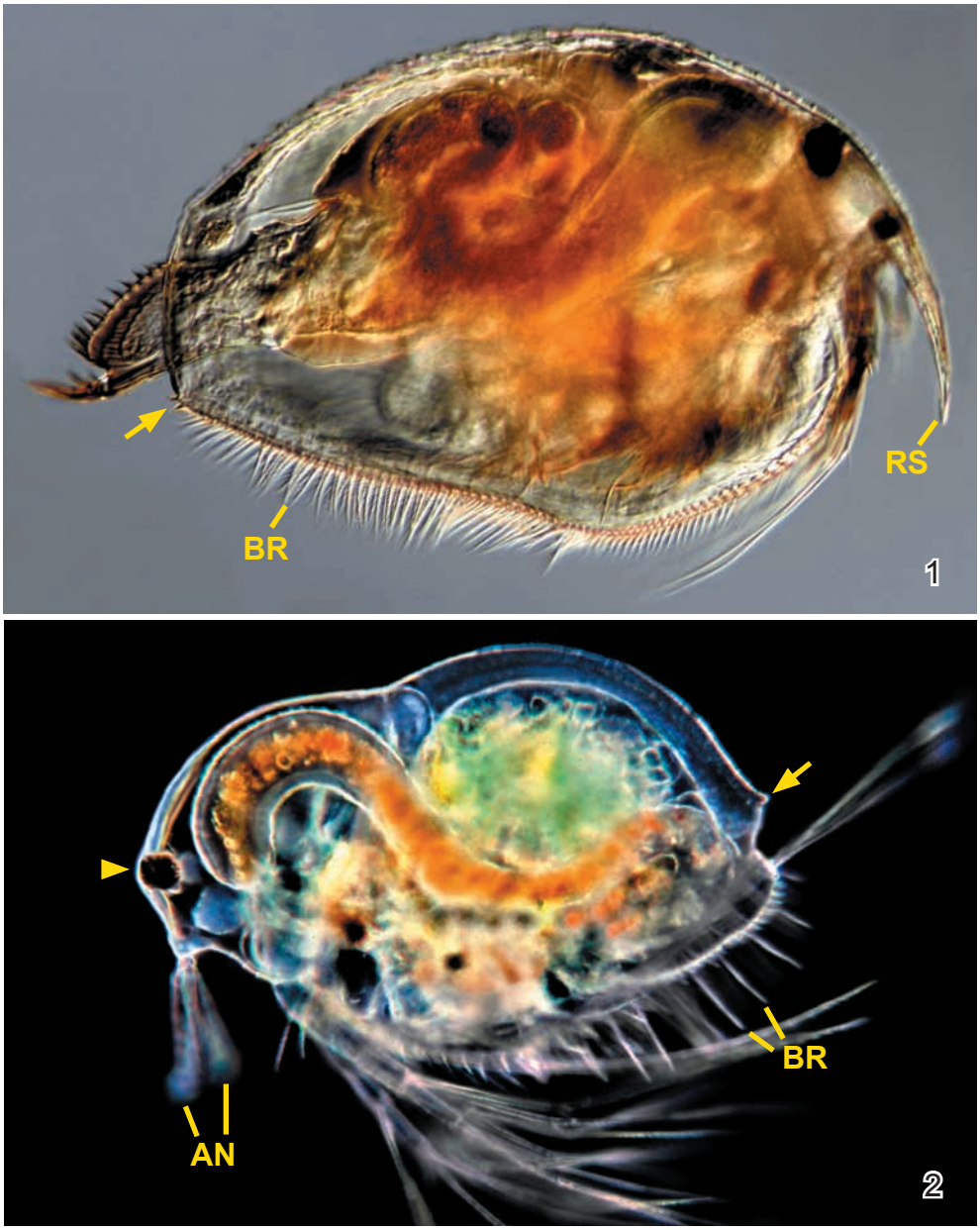


Fig. 1 – 2: Cladocera. 1: *Pleuroxus uncinatus* is 500–650 µm long and has a conspicuous rostrum often hook-like curved forward. From the posterior end emerge some tiny teeth (arrow), while the ventral margin is studded with rows of feathered bristles. **2:** *Macrothrix rosea* is 400–700 µm long and is rare in Simmelried. It can be recognized by the long first antennae (AN), a bulge over the complex eye (arrowhead), and the blunt tip at the posterior margin of the carapace (arrow). Long bristles emerge from the ventral margin. AN – antennae, BR – bristles, RS – rostrum.

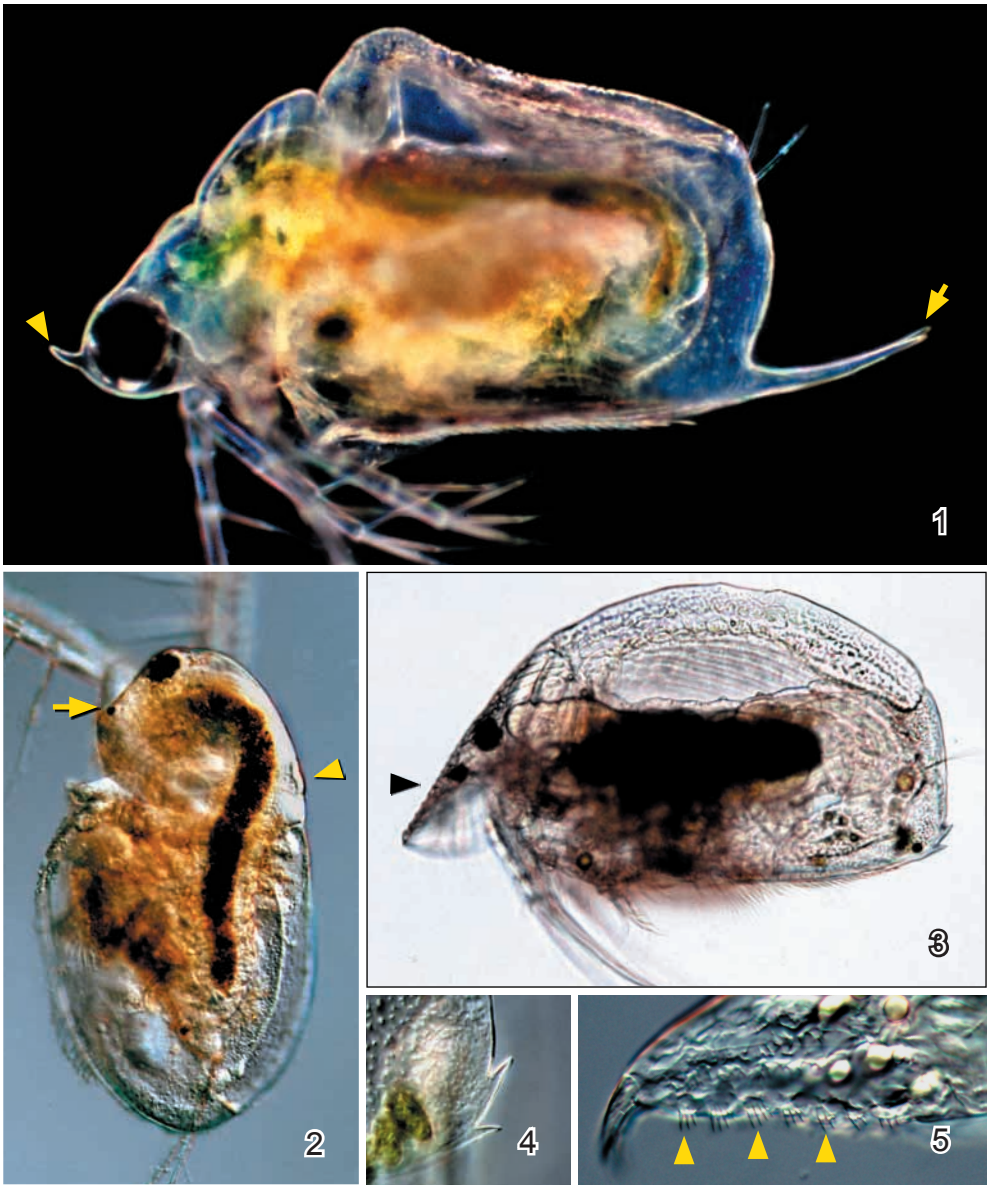


Fig. 1 – 5: Cladocera. 1: *Scapholebris mucronata* is 0.7–1 mm long and swims with the flat ventral side attached to the water surface. The head bears a conspicuous horn (arrowhead), while the valves of the carapace are elongated in two processes (arrow). **2:** *Lathonura recticornis* is rare in Simmelried. The about 1 mm long species can be recognized by a very small ocellus (arrow) and the oblong shape. In the neck region, is a gland (arrowhead). **3 – 5:** *Graptolebris testudinaria* is about 600 µm long and has a shield-like rostrum (3, arrowhead). The posterior end bears two dorsally curved teeth (4), and the dorsal margin of the carapace has small, clustered teeth (5, arrowheads).

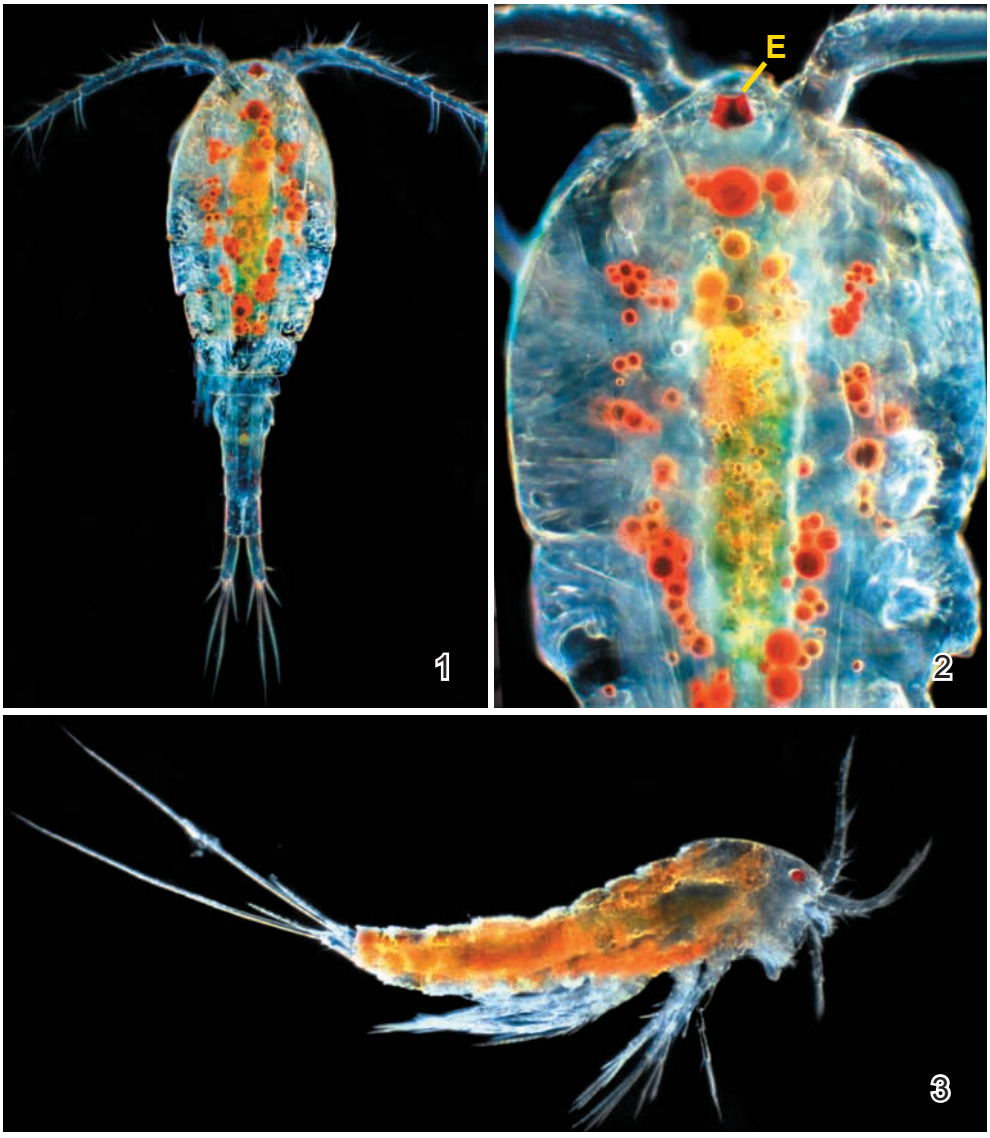


Fig. 1 – 3: Copepods. The copepods are aquatic crustacea with a length of about 0.5–3 mm. The larvae of the copepods are called nauplius and have 5 – 6 molting stages before they become adult. Copepods are one of the most important first-level consumers in the food chain. They feed on bacteria, protists and insect larvae. In some habitats, they tend to mass production in spring, but in Simmelried they are scattered. **1, 2:** *Macrocyclops albidus* is a member of the suborder Cyclopoida and about 2.5 mm long. Some specimens contain reddish or orange oil droplets around the digestive tract (2). **3:** *Attheyella crassa* is about 650 µm long and occurs among floating plants. The body has eight segments and is flexible to crawl between plants and in the mud. E – eyespot.

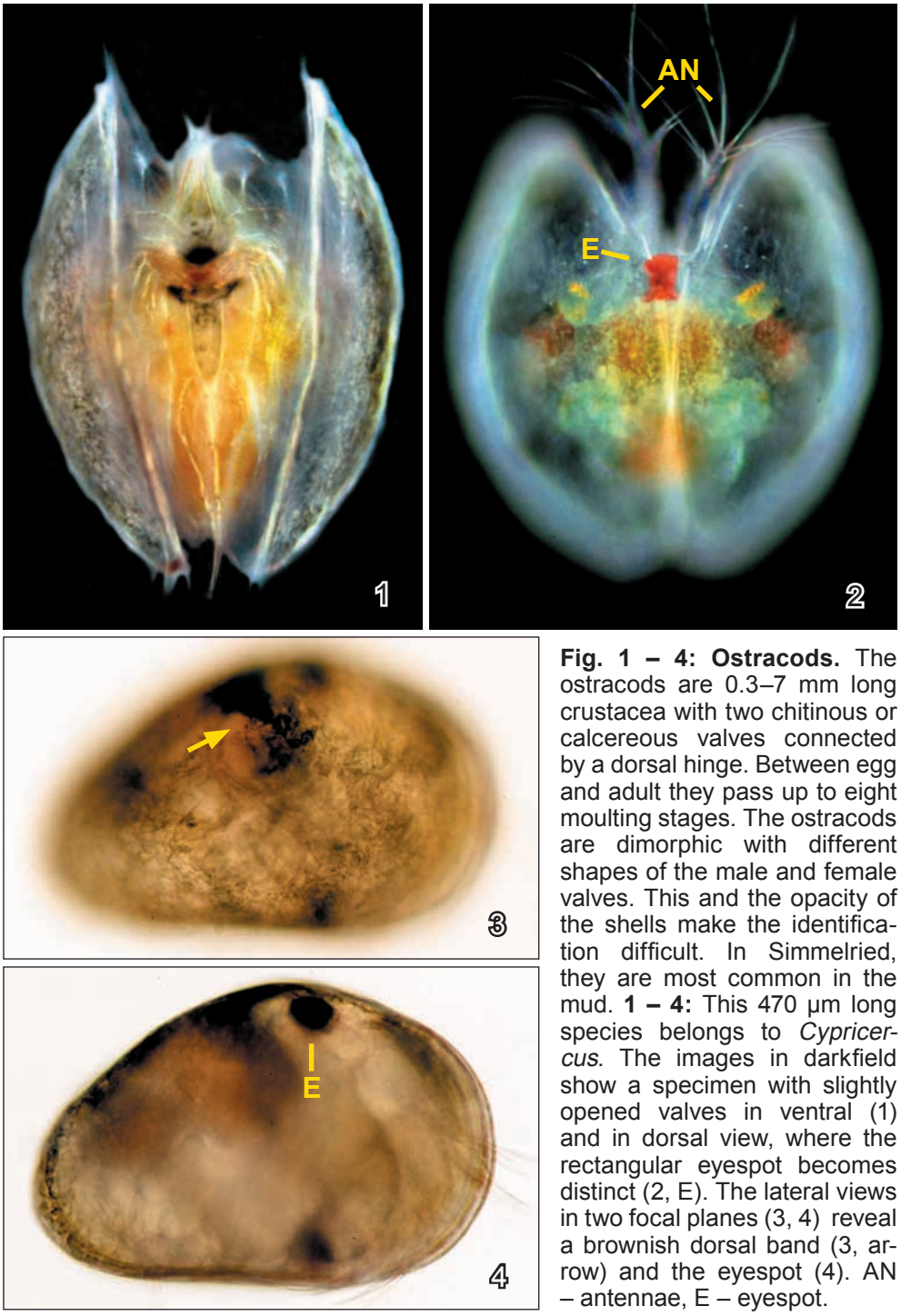
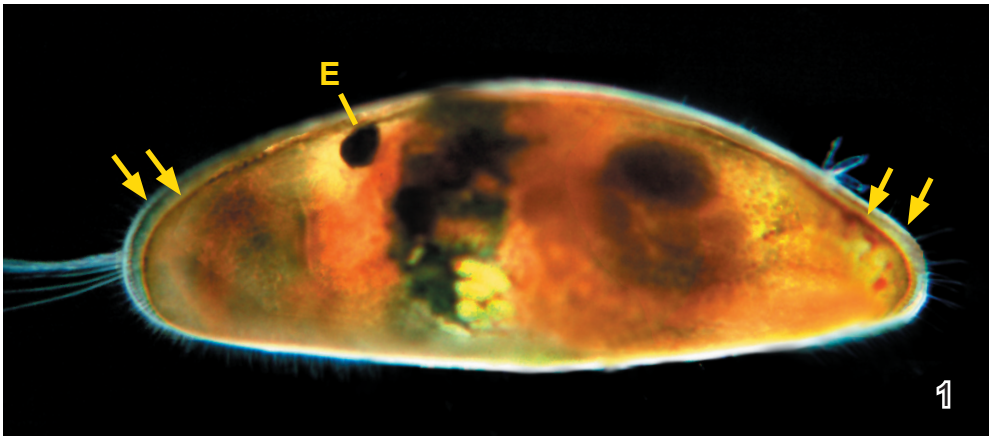
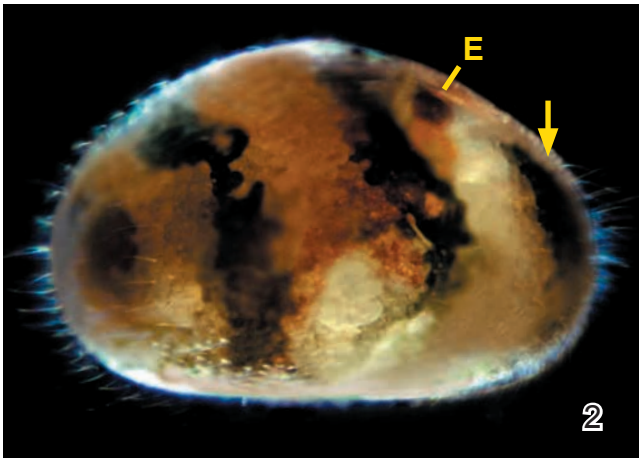


Fig. 1 – 4: Ostracods. The ostracods are 0.3–7 mm long crustacea with two chitinous or calcereous valves connected by a dorsal hinge. Between egg and adult they pass up to eight moulting stages. The ostracods are dimorphic with different shapes of the male and female valves. This and the opacity of the shells make the identification difficult. In Simmelried, they are most common in the mud. **1 – 4:** This 470 µm long species belongs to *Cypricercus*. The images in darkfield show a specimen with slightly opened valves in ventral (1) and in dorsal view, where the rectangular eyespot becomes distinct (2, E). The lateral views in two focal planes (3, 4) reveal a brownish dorsal band (3, arrow) and the eyespot (4). AN – antennae, E – eyespot.





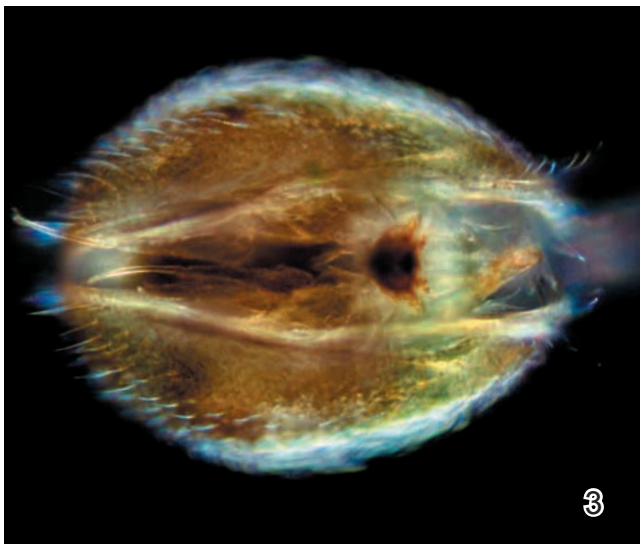
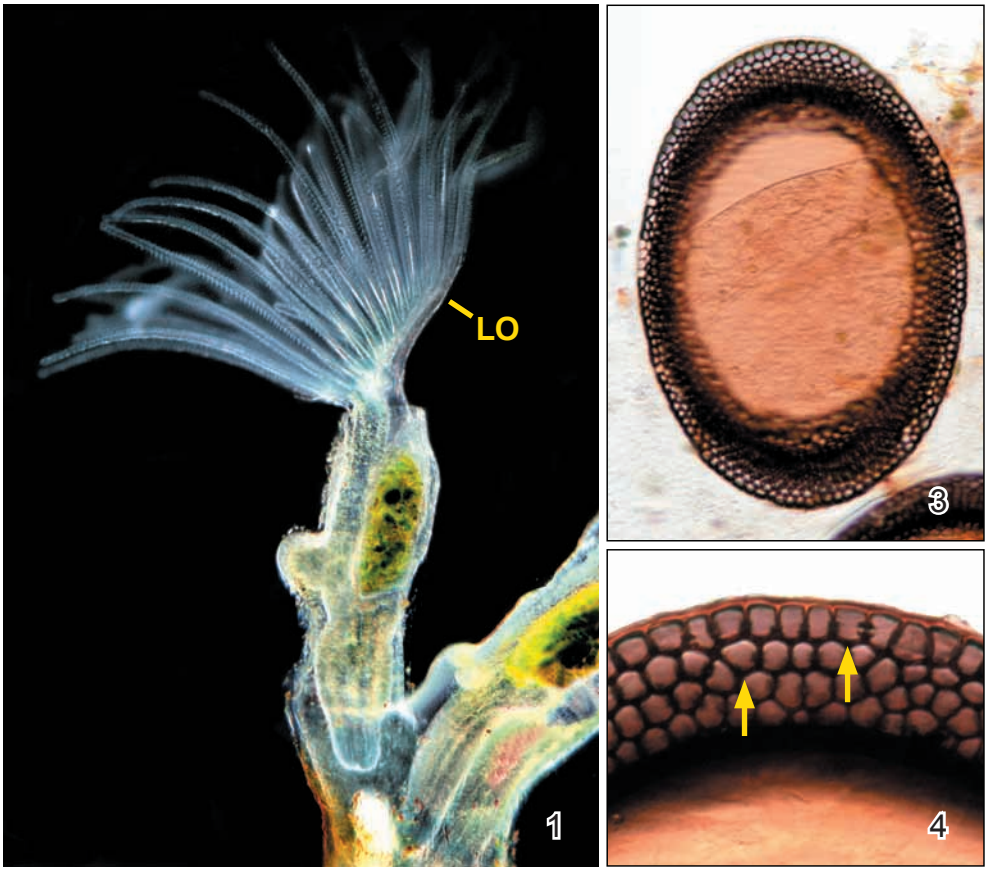


Fig. 1 – 4: Ostracods. 1: This oblong species is a member of the genus *Herpetocypris* with a length of 1.4 mm. The valves of this genus don't fit exactly because the left valve overlaps the right (arrows). **2, 3:** *Cypridopsis helvetica* is about 700 µm long and can be distinguished from the similar *C. vidua* by a fourth dark band at the posterior end (2, arrow). In ventral view, the hairy surface of the valves is visible (3). **4:** This unidentified ostracod was squashed to demonstrate the brittle character of the calcified valves. Fossil ostracoda can be found in sediments since the Ordovician period. E – eyespot.



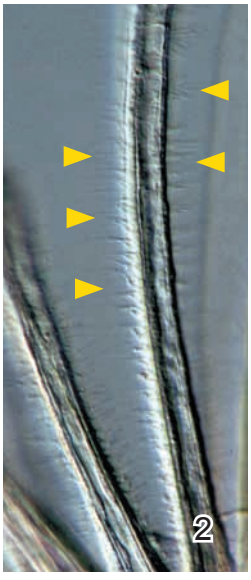


Fig. 1 – 4: Bryozoa. Bryozoa are filter-feeding metazoa attached to various submerged substrates, for instance, aquatic plants. Although bryozoa appear similar to coral polyps, they are not related. Polyps have a more simple organisation with a cavity instead of a stomach and they live in radially segmented tubes, while the bryozoan zooids have a complex organ system and simple gelatinous tubes. Each zooid is equipped with a retractable, U-shaped crown of tentacles (lophophore). The ciliated tentacles provide a water stream towards the mouth, where the food (bacteria, algae, protozoa) is selected. In Simmelried, only one species was recorded. **1:** *Plumatella repens* is 1–5 mm long and forms branched colonies with a horn-like macroscopical appearance. The specimen is shown in dark-field with extended lophophore. **2:** The retractable tentacles are about 1 mm long and ciliated (arrowheads). The synchronal ciliary waves conduct food particles towards the mouth. **3, 4:** The identification of *P. repens* is based mainly on the distinct shape of the 330–450 µm long floatoblasts (3): floatable eggs with a ring of air-filled cells (4, arrows). LO – lophophore.

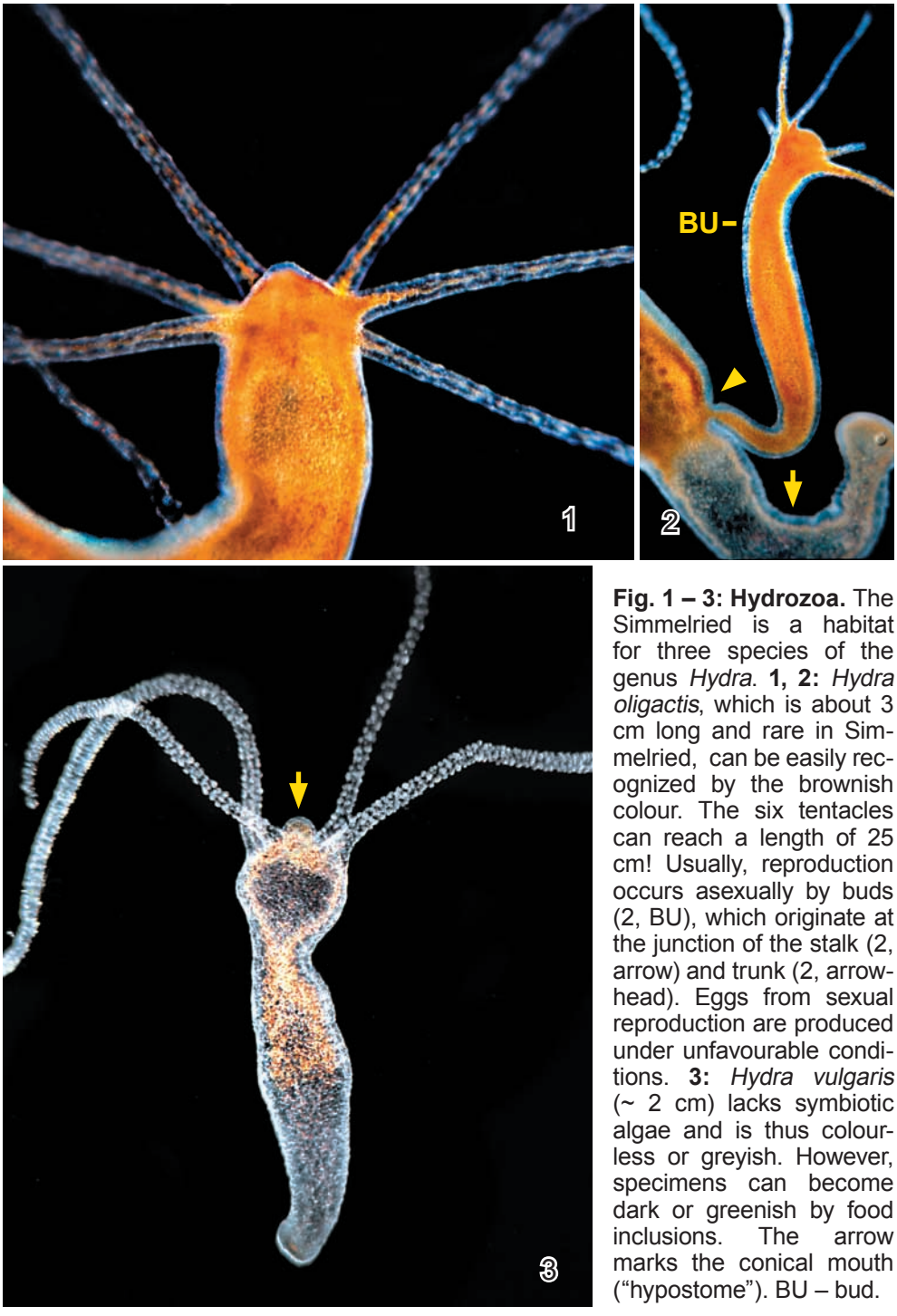
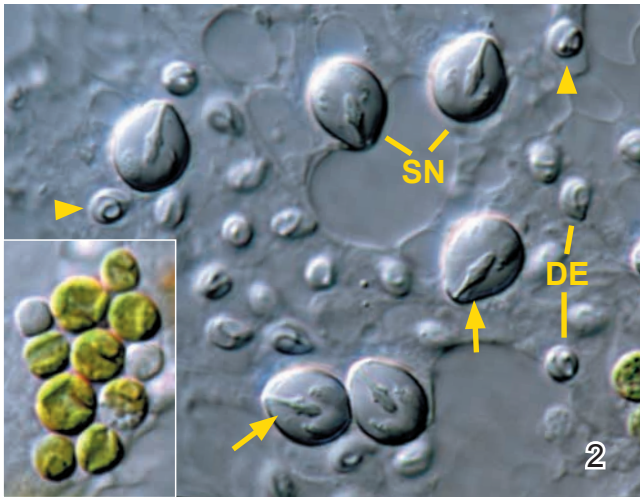


Fig. 1 – 3: Hydrozoa. The Simmelried is a habitat for three species of the genus *Hydra*. **1, 2:** *Hydra oligactis*, which is about 3 cm long and rare in Simmelried, can be easily recognized by the brownish colour. The six tentacles can reach a length of 25 cm! Usually, reproduction occurs asexually by buds (2, BU), which originate at the junction of the stalk (2, arrow) and trunk (2, arrowhead). Eggs from sexual reproduction are produced under unfavourable conditions. **3:** *Hydra vulgaris* (~ 2 cm) lacks symbiotic algae and is thus colourless or greyish. However, specimens can become dark or greenish by food inclusions. The arrow marks the conical mouth ("hypostome"). BU – bud.



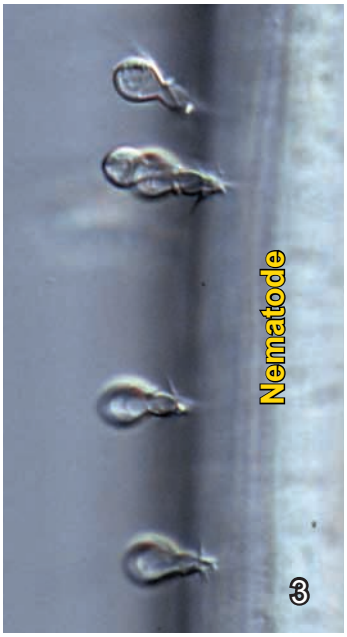
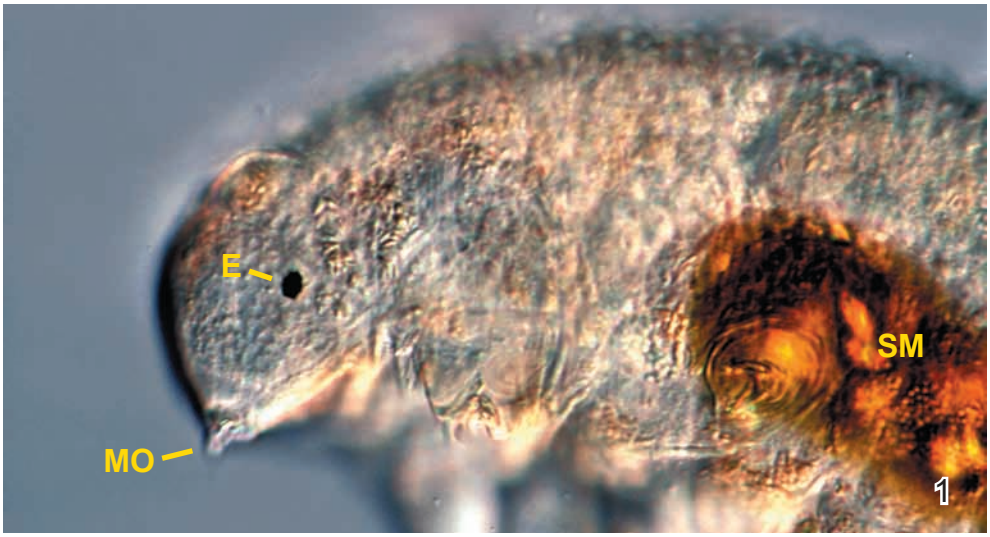


Fig. 1 – 3: Hydrozoa. 1: *Hydra viridis* is 10–15 mm long and very common in Simmelried. The green colour is caused by symbiotic algae of the genus *Chlorella* (2, inset). The tentacles contain four types of nematocysts which are used to capture and paralyze the prey, such as ciliates, annelids, copepods and cladocera. **2:** Focal plane on the ectoderm of a tentacle, where two kinds of resting nematocysts (penetrants) are visible. The larger stenoteles (SN) contain a barb-shaped structure (arrows), while the smaller desmonemes (DE) have a coiled tube inside (arrowheads). **3:** When the tentacle contacts a prey, the stenoteles explode and discharge a tube with toxin into the prey. In the case shown, a nematode was hit by numerous penetrants. SN – stenoteles, DE – desmonemes.



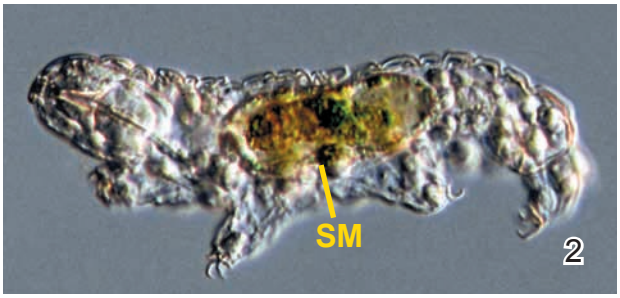


Fig. 1 – 3: Tardigrades. The tardigrades are segmented metazoans with a usual length of 0.05–1.2 mm. As a group, they can be easily identified by 4 pairs of legs ending in claws (3). Morphological studies and gene sequences reveal a relationship with the arthropods. The tardigrades are able to form cysts called "tuns", which can survive desiccation, frost and heat for many years. The transformation of the active animal into this death-like state (cryptobiosis) occurs within minutes and is accompanied by the loss of body water and production of the protective sugar trehalose (a dimer of glucose). This ability enables tardigrades to occupy extreme habitats. In Simmelried, the tardigrades occur in mosses and in pond mud. **1:** Portrait of a tardigrade (likely *Macrobiotus*) showing the single-celled left eye. **2:** Lateral view of a tardigrade with typical, bear-like movement. **3:** Ventral view of a crawling specimen. The legs are connected with nerve fibres (arrowheads). CL – claws, E – eyespot, MO – mouth, SM – stomach.

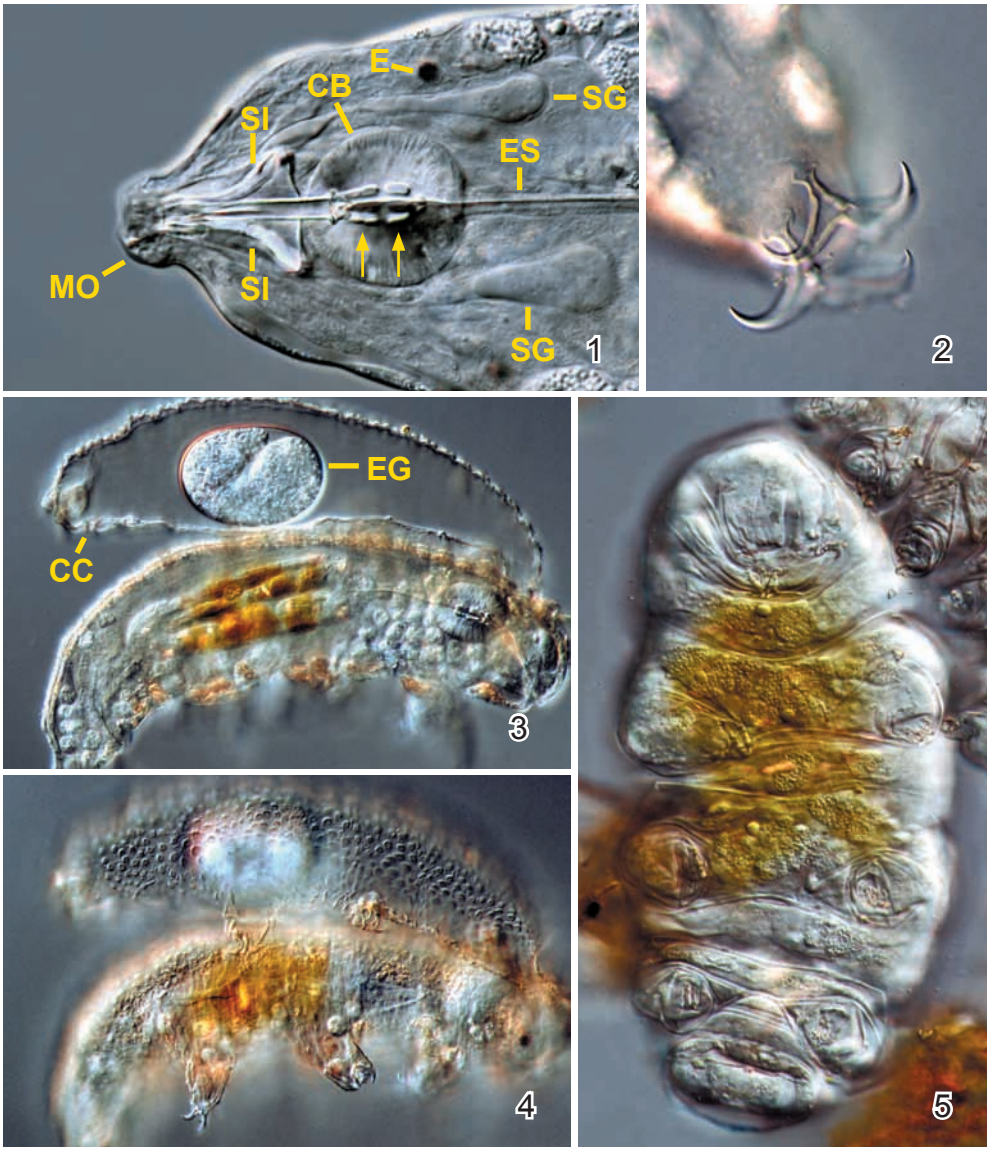
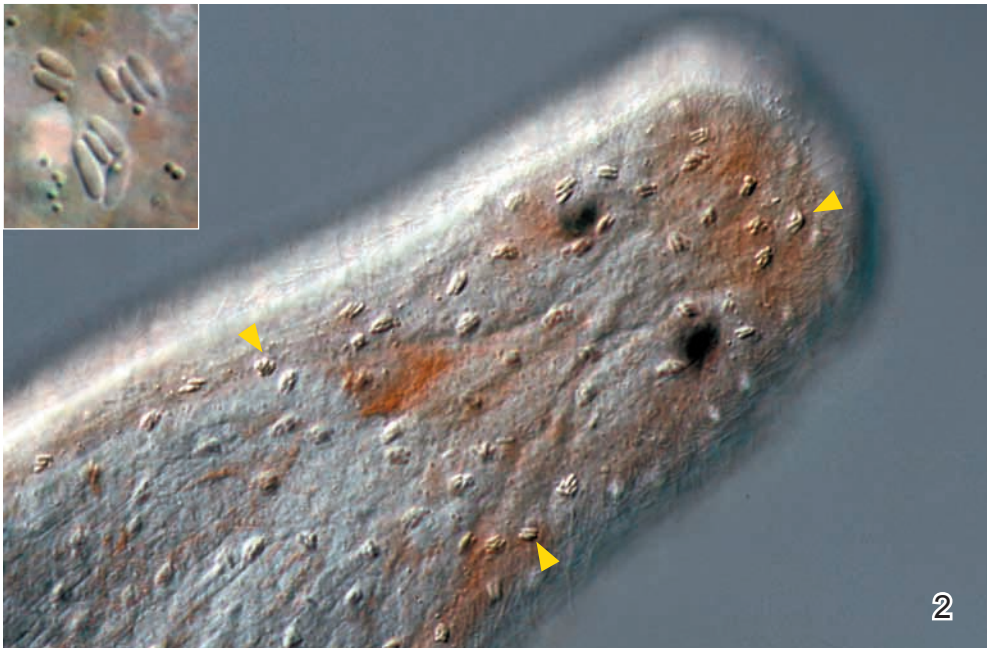


Fig. 1 – 5: Tardigrades. 1: The head of the tardigrades contains the so-called buccal apparatus, that is, a pair of curved stilets (SI) and a contractile bulb (CB) with pump function. The contact points of the bulb muscles to the esophagus are stiffened by macroplacoids (arrows). The buccal apparatus is associated with two pyriform salivary glands (SG). **2:** Detail of the end of a leg showing the four curved claws. **3, 4:** The tardigrades are moulting animals and change the chitinous cuticle (CC) periodically, often concomitantly with egglaying (3, EG). The eggs are then protected by the shed cuticle. The focus on the surface of the cuticle reveals a tubercular pattern (4). **5:** This is the shrinked tun of an unidentified tardigrade in cryptobiosis induced by dessication. The tun is 95 µm long and can be recovered to life by addition of water. CC – chitinous cuticle, E – eyespot, EG – egg, ES – esophagus, SG – salivary glands, SI – stilets.



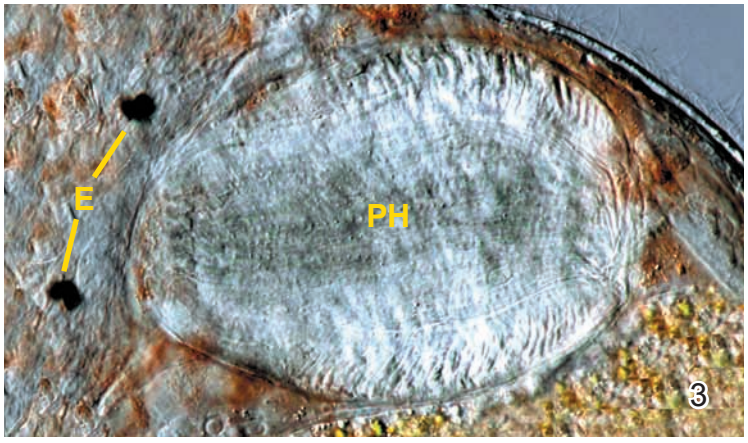


Fig. 1 – 3: Turbellaria. The turbellaria are worm-like metazoa with a densely ciliated epidermis. Thus, they are easily confused with large ciliates. The mouth of the turbellaria is on the ventral side, and the digestive system is composed of a pharynx and an intestine that lacks an anus. Thus, food remnants are released through the mouth. Some species can produce a thick mucuos coat by epidermal glands (rhabdoids). **1 – 3:** *Microdalyellia armigera* is a small, reddish pigmented turbellar rarely exceeding 1 mm (1). The intestine is dark. The head has two cup-shaped eyespots, and the epidermis is covered with groups of 2–5 µm long rhabdoids (2, arrowheads; inset). When squashed, the muscular pharynx becomes visible (3, PH). E – eyespots, IN – intestine, PH – pharynx.

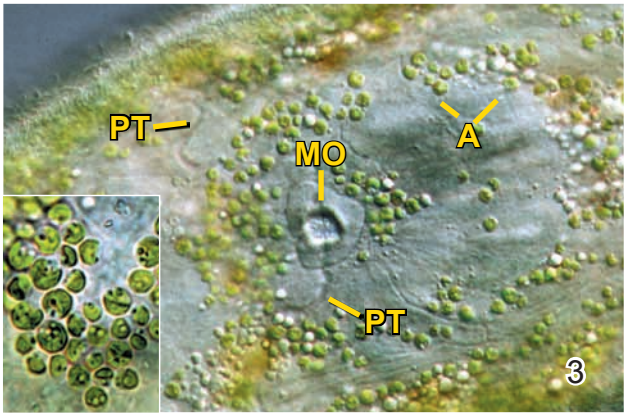


Fig. 1 – 3: Turbellaria. 1: *Catenula lemnae* is 1–5 mm long and can occur in masses. The Catenuladiae are known for asexual reproduction produ-cing chains of zooids (ZO). After fragmentation, the zooids grow to adult specimens. **2, 3:** *Typhloplana viridata* lacks eyespots and rhabdoids, but has a green colour due to many symbiotic algae underneath the epidermis (3, A and inset). The mouth (MO) is in mid-body and connected to a roundish pharynx (PH). The protonephridial tubes (PT) extend to an excretory pore near to the mouth. A – symbiotic algae, MO – mouth, PH – pharynx, PT – protonephridial tubes, ZO – zooids.

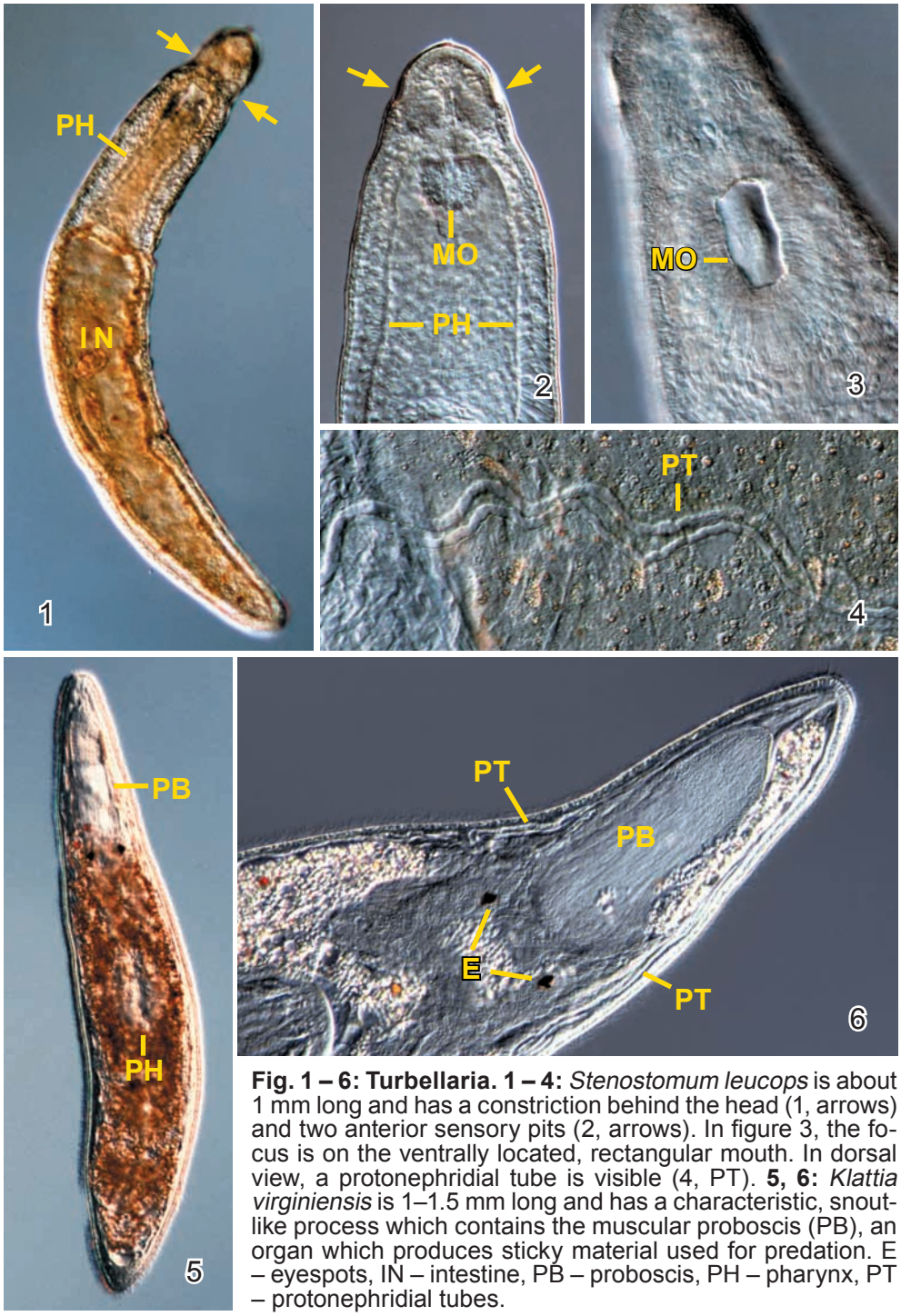


Fig. 1 – 6: Turbellaria. 1 – 4: *Stenostomum leucops* is about 1 mm long and has a constriction behind the head (1, arrows) and two anterior sensory pits (2, arrows). In figure 3, the focus is on the ventrally located, rectangular mouth. In dorsal view, a protonephridial tube is visible (4, PT). **5, 6:** *Klattia virginiensis* is 1–1.5 mm long and has a characteristic, snout-like process which contains the muscular proboscis (PB), an organ which produces sticky material used for predation. E – eyespots, IN – intestine, PB – proboscis, PH – pharynx, PT – protonephridial tubes.

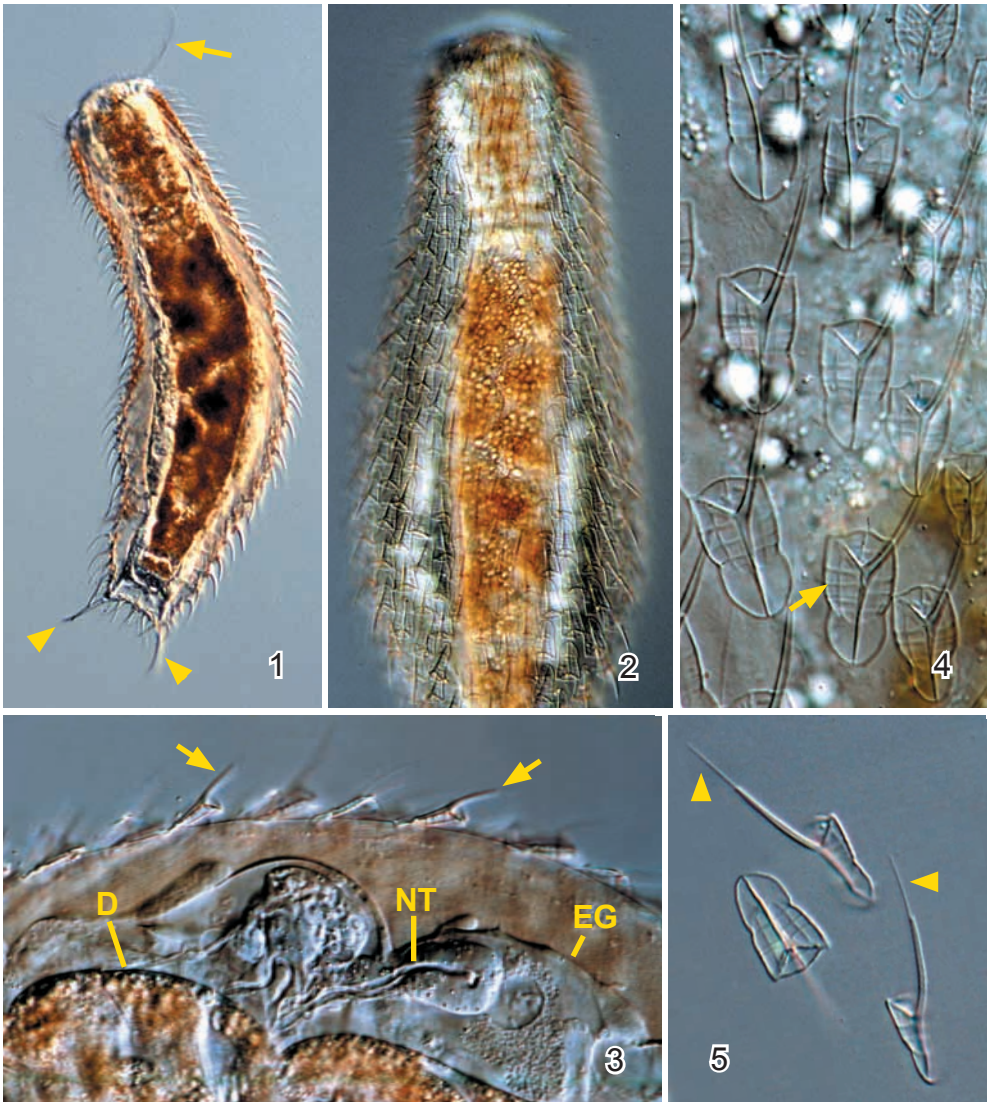


Fig. 1 – 5: Gastrotricha. The gastrotrichs are metazoans with a flexible body. While the dorsal side is covered with conspicuous, spiny scales, the ventral side is covered with cilia. The head has long lateral cilia (1, arrow), while the posterior end bears two toes (1, arrowheads). **1 – 5:** *Chaetonotus robustus* is about 600 µm long and is the largest known gastrotrich from freshwater (1). The body has a thick coat of conspicuous scales (2). In a squashed specimen the digestive tract (D), the nephridial tubes (NT), and part of an egg (EG) are visible. Arrows mark the spiny scales, shown at higher magnification and in various positions in figures 4 and 5. The scales, which are about 30 µm long, are basket-shaped and have a reticulate structure (4, arrow) and a long spine with a bristle-like end (5, arrowheads). EG – egg, D – digestive tract, NT – nephridial tubes.

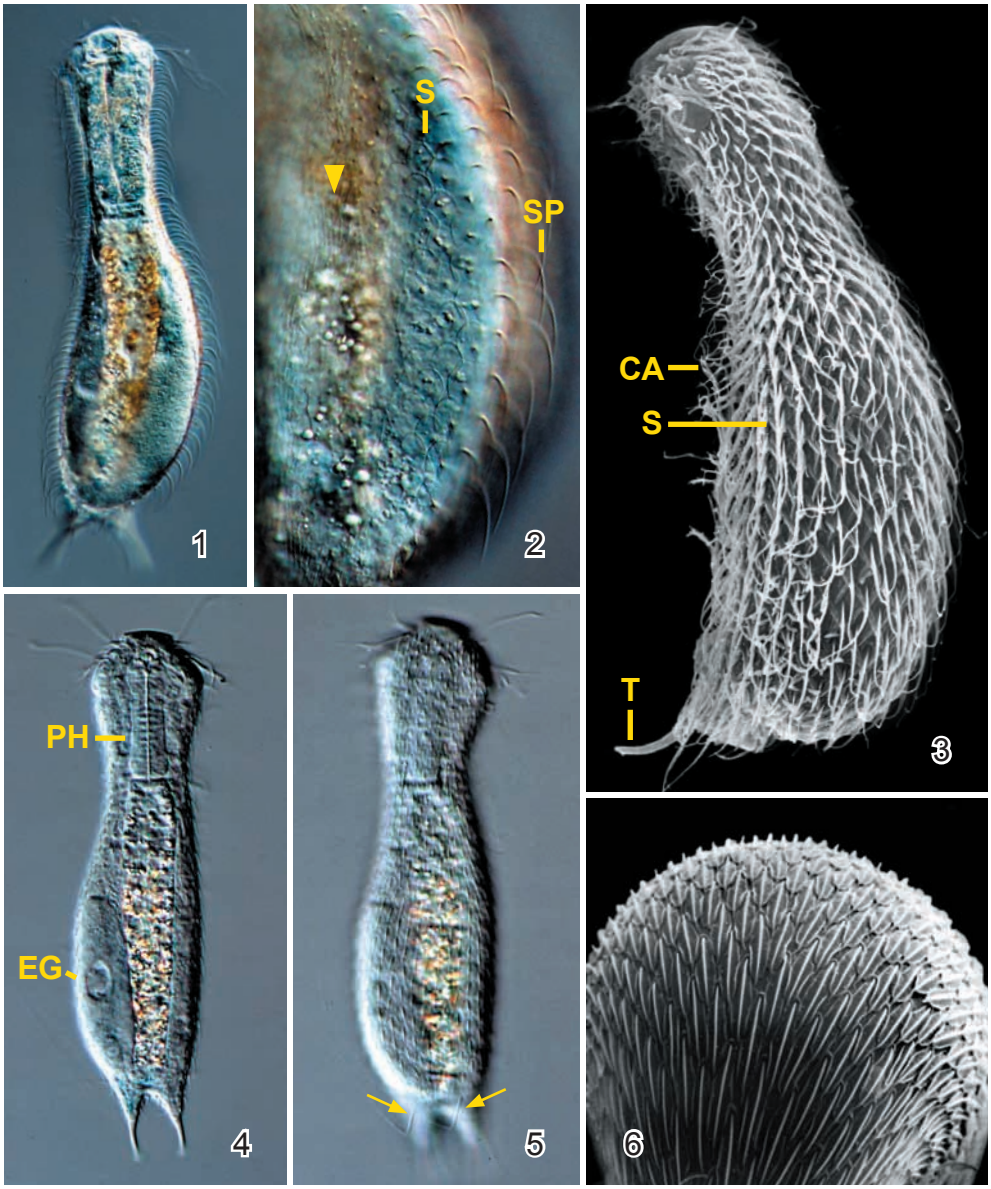


Fig. 1 – 6: Gastrotricha. 1 – 2: *Chaetonotus simrothi* is about 400 µm long and is similar to *C. robustus*, but the shield-shaped scales have a curved spine orginating from the scale centre. The lateral view (2) shows the scales (S) and spines (SP) of the dorsal side and the cilia covering the ventral side (arrowhead). **3:** Lateral view of *Chaetonotus* spec. in the scanning electron microscope. **4, 5:** *Chaetonotus brevispinosus* is about 120 µm long and has flat scales tapering to a short spine. At the posterior end of the body are two tactile bristles (5, arrows). **6:** The keeled spines of a species similiar to *C. brevispinosus* overlap like the tiles of a roof. CA – cilia, EG – egg, PH – pharynx, S – scales, SP – spines, T – toes.

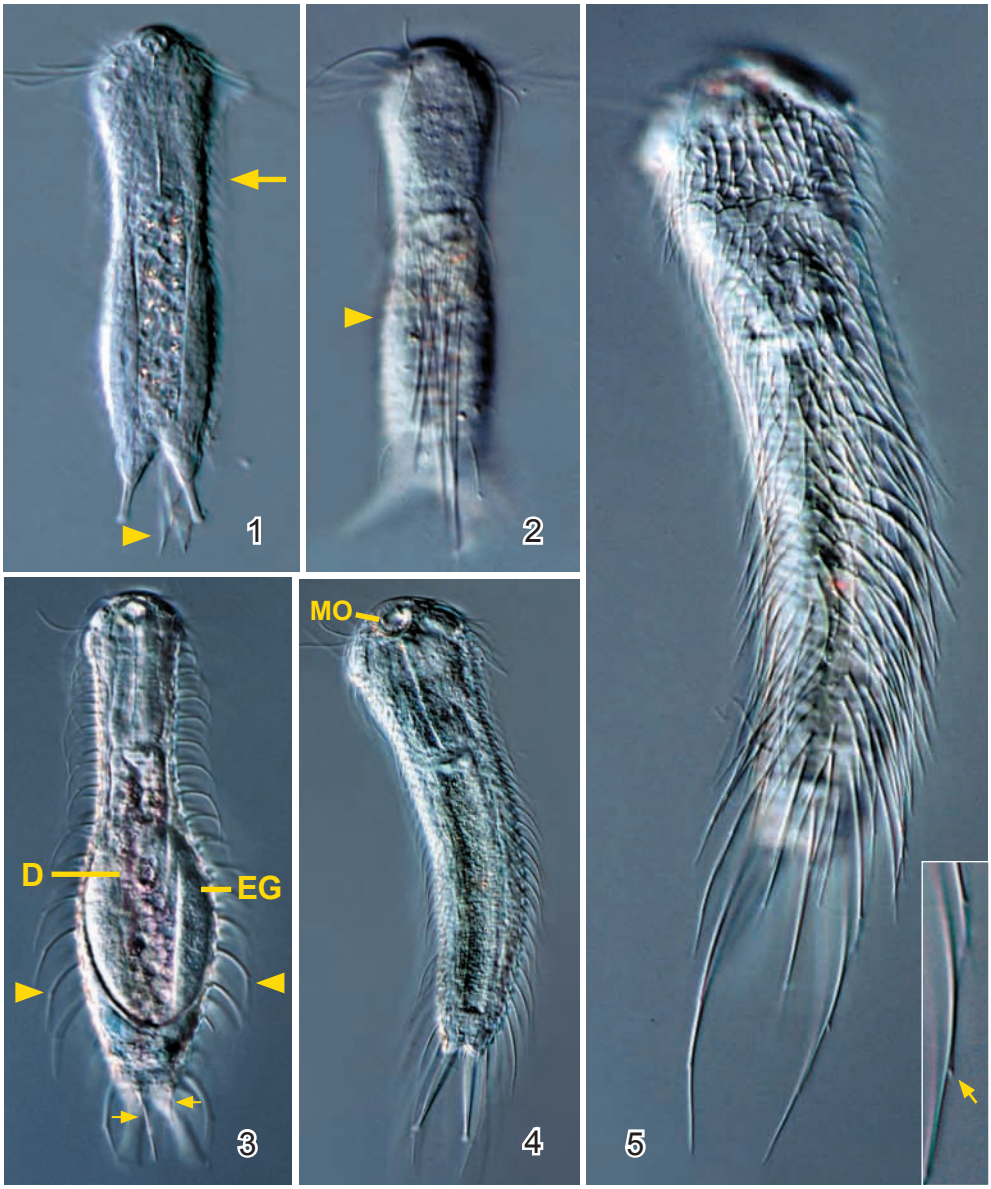


Fig. 1 – 5: Gastrotricha. 1, 2: *Chaetonotus acanthophorus* is about 100 µm long and is covered with short spines in the head and neck region (1, arrow). From a limited dorsal area orginates a bundle of 50 µm long spines (1, 2, arrowheads) extending beyond the posterior body end. **3:** *Chaetonotus similis* is about 200 µm long and is covered with bifurcated spines (arrowheads); posteriorly are two straight bristles (arrows). The digestive tract is slightly pink due to ingested rhodobacteria. **4, 5:** The length of the spines of *C. zelinkai* (200–310 µm) increases gradually towards the posterior end. The long spines of the posterior third have a small bifurcation (5, inset, arrow). D – digestive tract, EG – egg, MO – mouth.

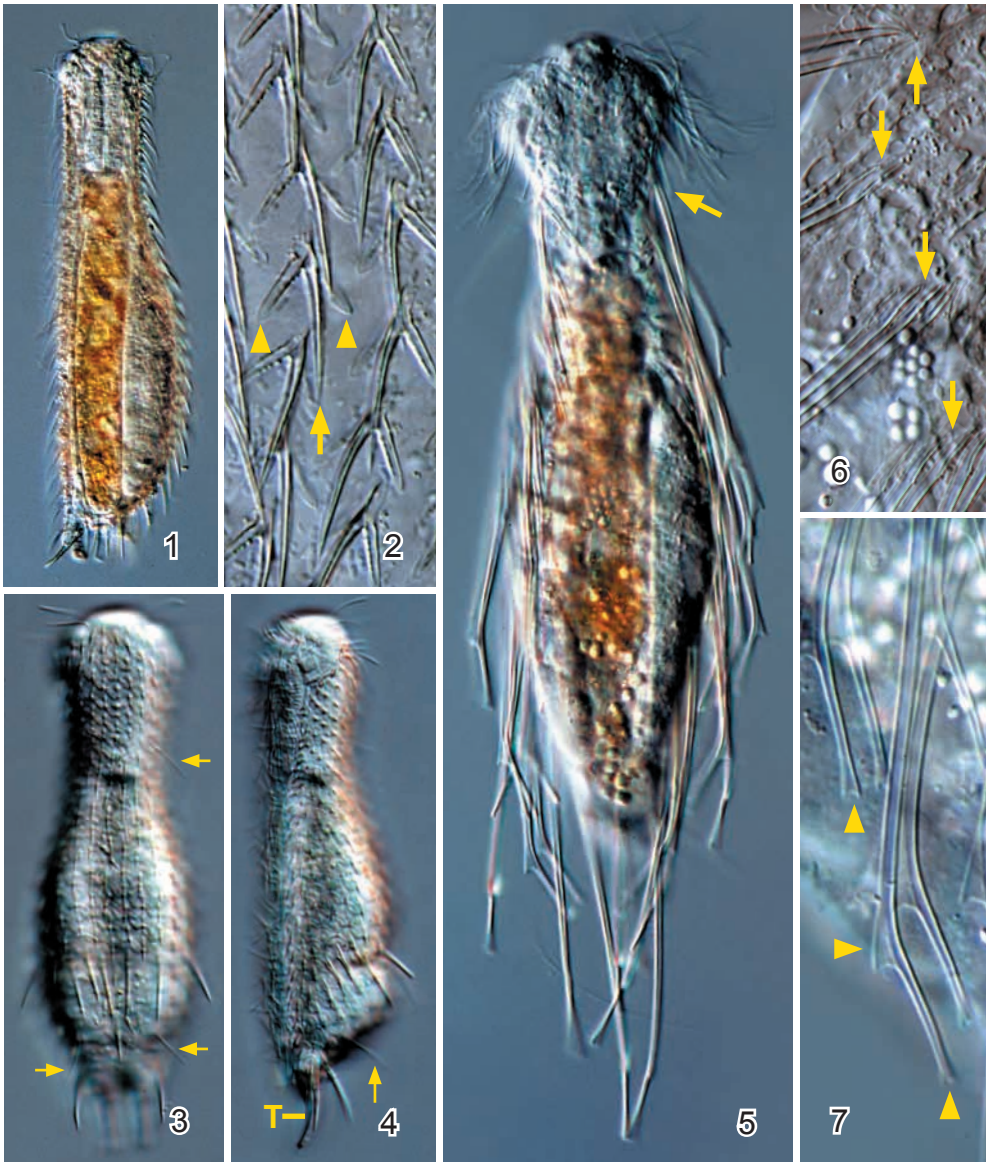


Fig. 1 – 7: Gastrotricha. 1, 2: *Chaetonotus sphagnophilus* is about 140 µm long and is similar to *C. simrothi,* but the scales have a three-pronged base with a central, long spine (2, arrow) and two bifurcated shorter spines (2, arrowheads). **3, 4:** This specimen of the rare *C. vargai* is 190 µm long and has a conspicuous transverse girdle of unbranched spines in the posterior third of the body. From the neck and the end extend four tactile bristles each (3, 4, arrows). In lateral view (4), the ventrally curved toes (T) are visible. **5 – 7:** *Dasydytes ornatus* is about 180 µm long and has circa 80 µm long, branched scales. One pair of scales extends laterally from the head (5, arrow), while other scales form seven transverse rows on the body (6, arrows). The distal end of the scales is doubly bifurcated (7, arrowheads). T – toes.

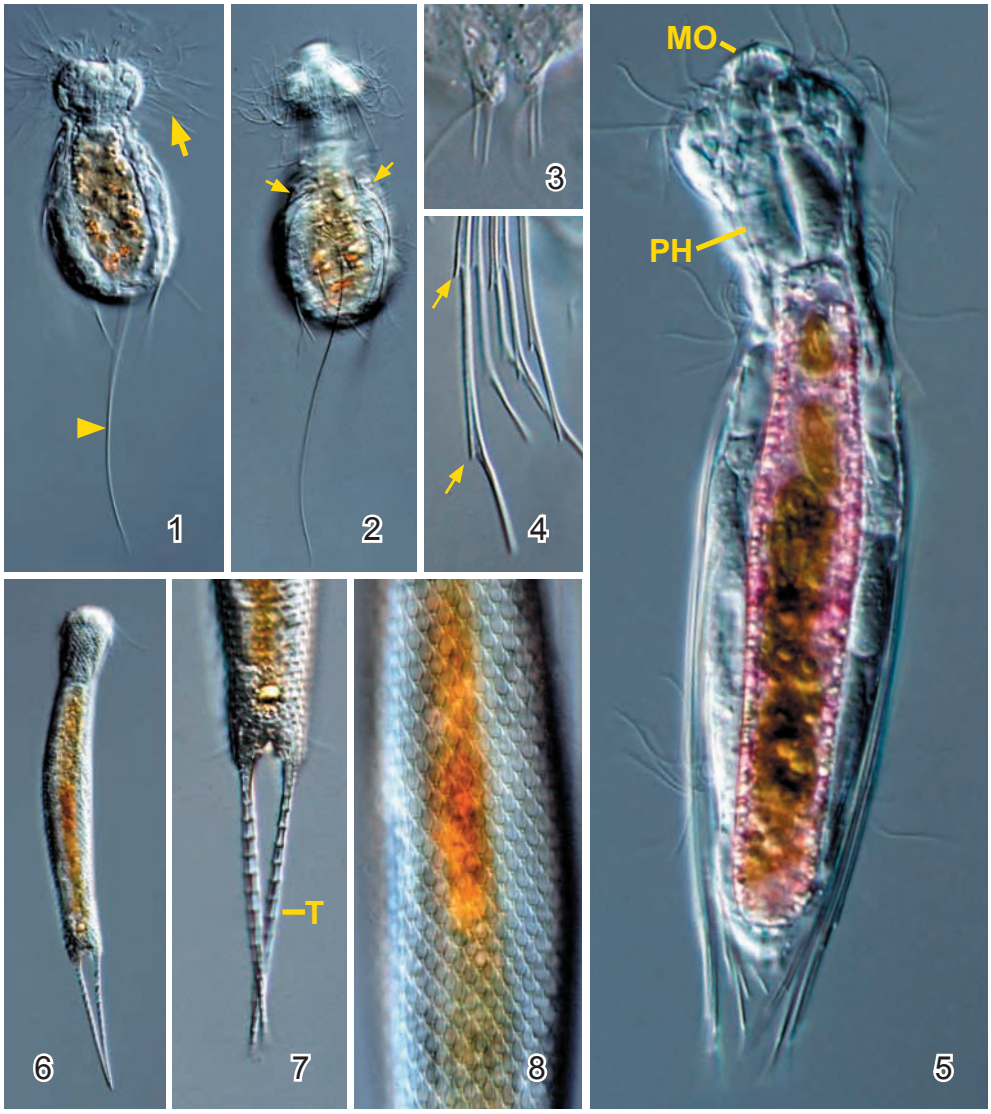


Fig. 1 – 8: Gastrotricha. 1, 2: *Haltidytes festinans* is about 100 µm long and has two conspicuous, slightly curved trailing spines on the ventral side (1, arrowhead). From the head emerge tufts of tactile cilia (1, arrow). The body is bottle-shaped, and below the neck further spines emerge laterally (2, arrows). **3 – 5:** *Stylochaeta fusiformis* is about 200 µm long and can be distinguished from *Haltidytes* by the short toes at the posterior end (3). From the shoulders orginate bundles of doubly bifurcated spines (4, arrows). When threatened, *Stylochaeta* can rapidly jump back by spreading the spines. The digestive tract is often coloured pink by ingested rhodobacteria (5). **6 – 8:** *Polymerurus rhomboides* is about 300 µm long and has long, segmented toes (7). It is covered by overlapping rhomboid scales (8). MO – mouth, PH – pharynx, T – toes.

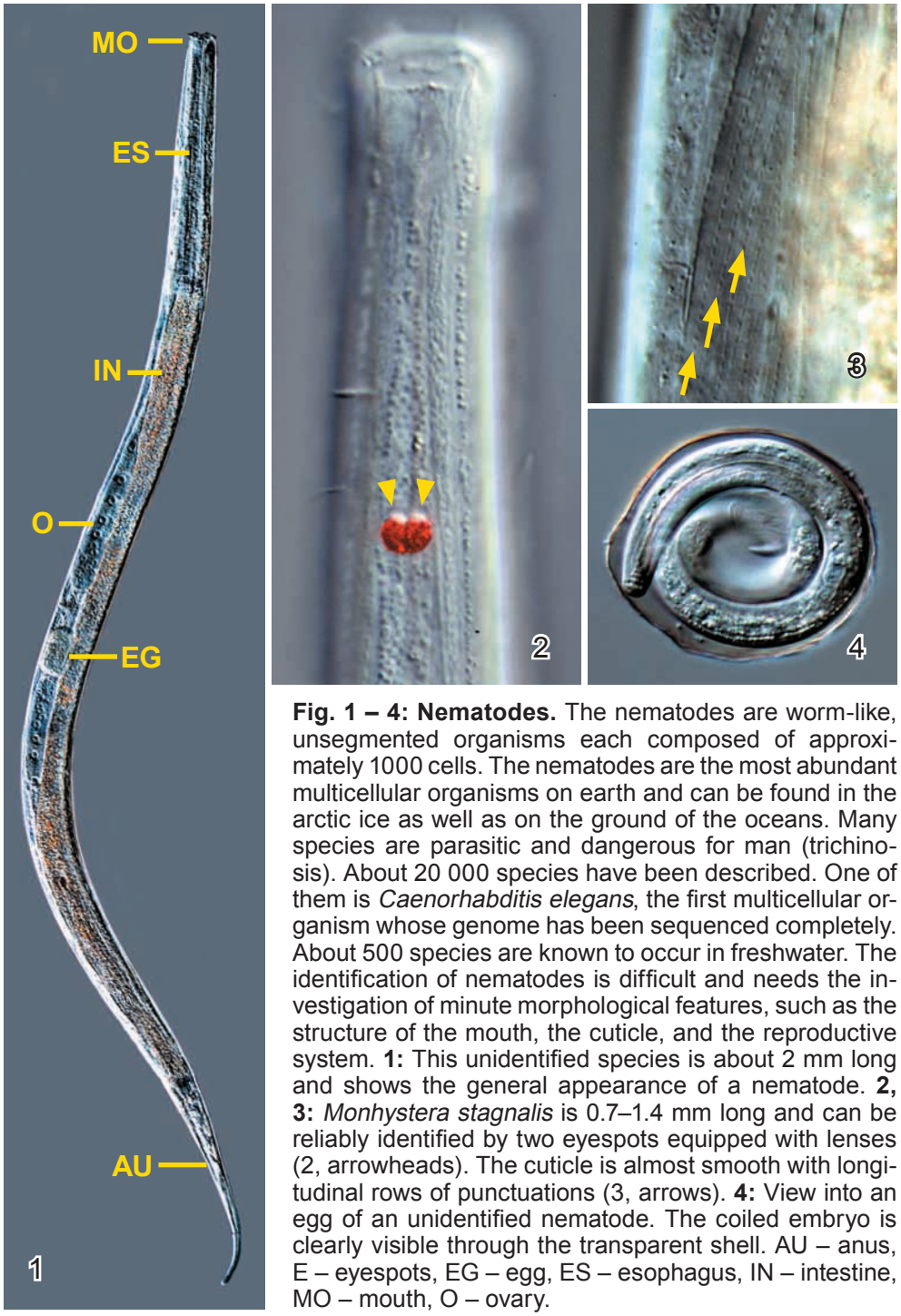


Fig. 1 – 4: Nematodes. The nematodes are worm-like, unsegmented organisms each composed of approximately 1000 cells. The nematodes are the most abundant multicellular organisms on earth and can be found in the arctic ice as well as on the ground of the oceans. Many species are parasitic and dangerous for man (trichinosis). About 20 000 species have been described. One of them is *Caenorhabditis elegans*, the first multicellular organism whose genome has been sequenced completely. About 500 species are known to occur in freshwater. The identification of nematodes is difficult and needs the investigation of minute morphological features, such as the structure of the mouth, the cuticle, and the reproductive system. **1:** This unidentified species is about 2 mm long and shows the general appearance of a nematode. **2, 3:** *Monhystera stagnalis* is 0.7–1.4 mm long and can be reliably identified by two eyespots equipped with lenses (2, arrowheads). The cuticle is almost smooth with longitudinal rows of punctuations (3, arrows). **4:** View into an egg of an unidentified nematode. The coiled embryo is clearly visible through the transparent shell. AU – anus, E – eyespots, EG – egg, ES – esophagus, IN – intestine, MO – mouth, O – ovary.

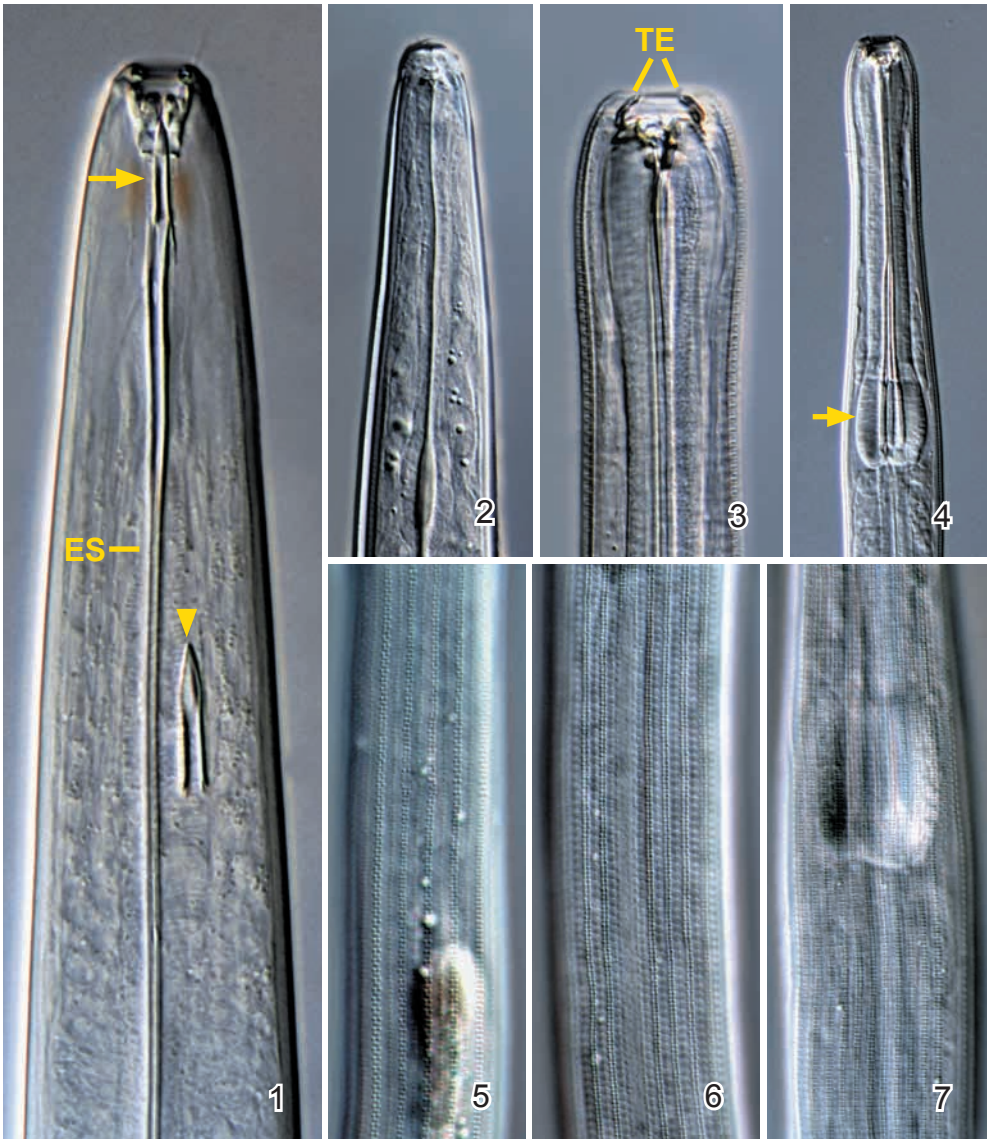
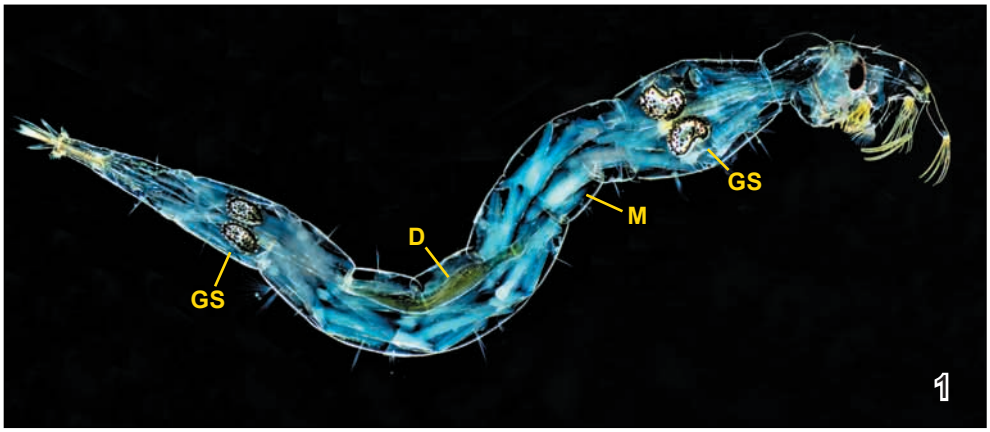
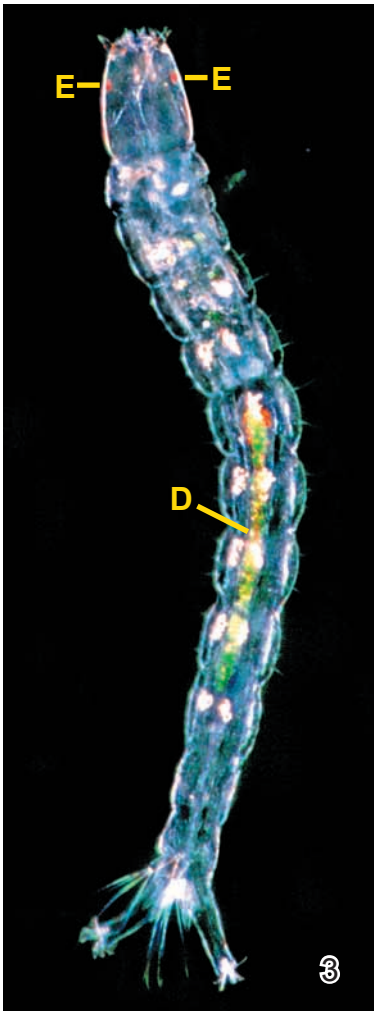


Fig. 1 – 7: Nematodes. 1: The mouth of some nematodes is equipped with a stylet to pierce plant cells. This is likely a member of the order *Dorylaimida* with a hollow stylet called odontostyle. One of the replaceable odontostyles is attached to the mouth opening (arrow), while a second has beeen generated near the esophagus (arrowhead). **2 – 7:** This are some unidentified nematodes from the Simmelried showing various oral structures adapeted to the kind of food (2 – 4). The mouth of some species is equipped with teeth (3, TE), while in other species the esophagus is surrounded by a bulb of radial muscles (4, arrow). The lower row of images (5 – 7) shows the different cuticle pattern of these three species. ES – esophagus, OS – odontostyle, TE – teeth.





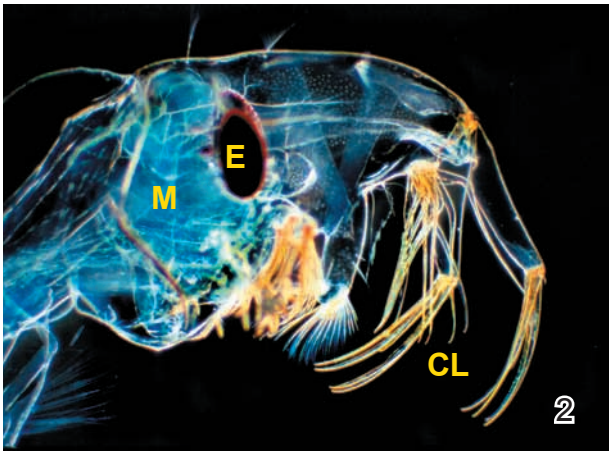
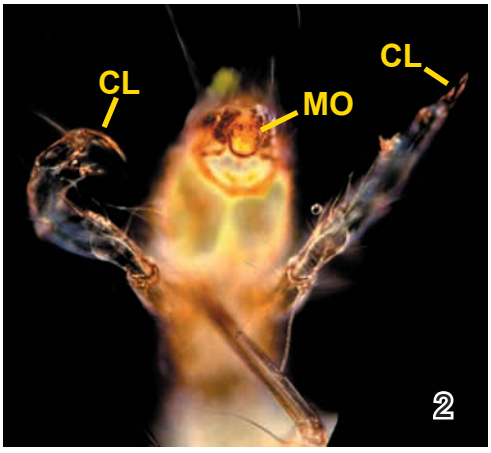


Fig. 1 – 3: Insect larvae. Many species of insect larvae can be found in the water column of the Simmelried. **1, 2:** *Chaoborus crystallinus,* the larva of the phantom midge, is 3–5 mm long. It is transparent except from the eyes and two pairs of gas sacs, which keep the larva floating horizontally (1). *Chaoborus crystallinus* swims very rapidly by flexing the body containing strong muscles, which are blue in these dark-field image composed of eight micrographs (1). The antennae evolved to claw-like structures, which are a perfect tool for capturing crustaceans, rotifers and other insect larvae (2). The digestive tract is often filled with prey in different stages of digestion (1). **3:** The digestive tract of this insect larva (possibly a member of the Tanypodinae) is green due to ingested algae. CL – claws, D – digestive tract, E – eyespots, GS – gas sacks, M – muscles.



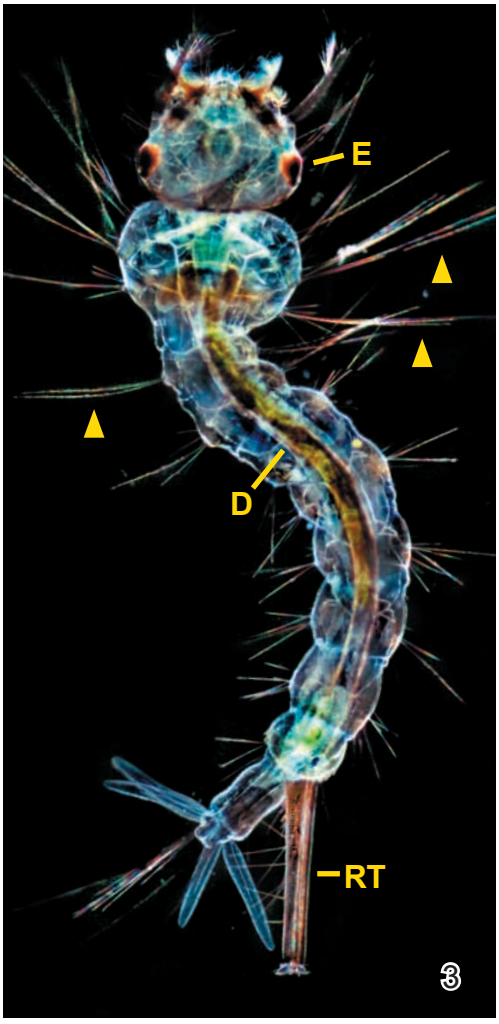


Fig. 1 – 3: Insect larvae. 1, 2: This is a larva of the caddis fly *Tricholeiochiton fagesii* (syn: *Oxyethira fagesii*). The 3.5–4 mm long larva builds a 4 mm long case of transparent silk. The case is laterally compressed and open at both ends. Characteristic are the spider-like, elongated second and third pair of legs (1, arrows), while the first pair is shorter and ends in prey-catching claws (2, CL, ventral view). **3:** This is a mosquito larva of the genus *Culex,* which can be found in masses attached to the water surface with the respiratory tube (RT). The genera of the mosquitos can be distinguished by the length and shape of this tube and the lateral tufts of hairs (arrowheads). The larvae are feeding on particulate organic matter. CL – claws, D – digestive tract, E – eyespots, MO – mouth, RT – respiration tube.

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http://www.nies.go.jp/chiiki1/protoz/

9. INDEX

The index is two-sided, that is, the same species is mentioned with the genus name ahead and with the species name ahead. This makes it easy to find a species even if it has been transferred to another genus. **Bold page numbers** refer to the page(s) where the genus and or species is depicted.

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