

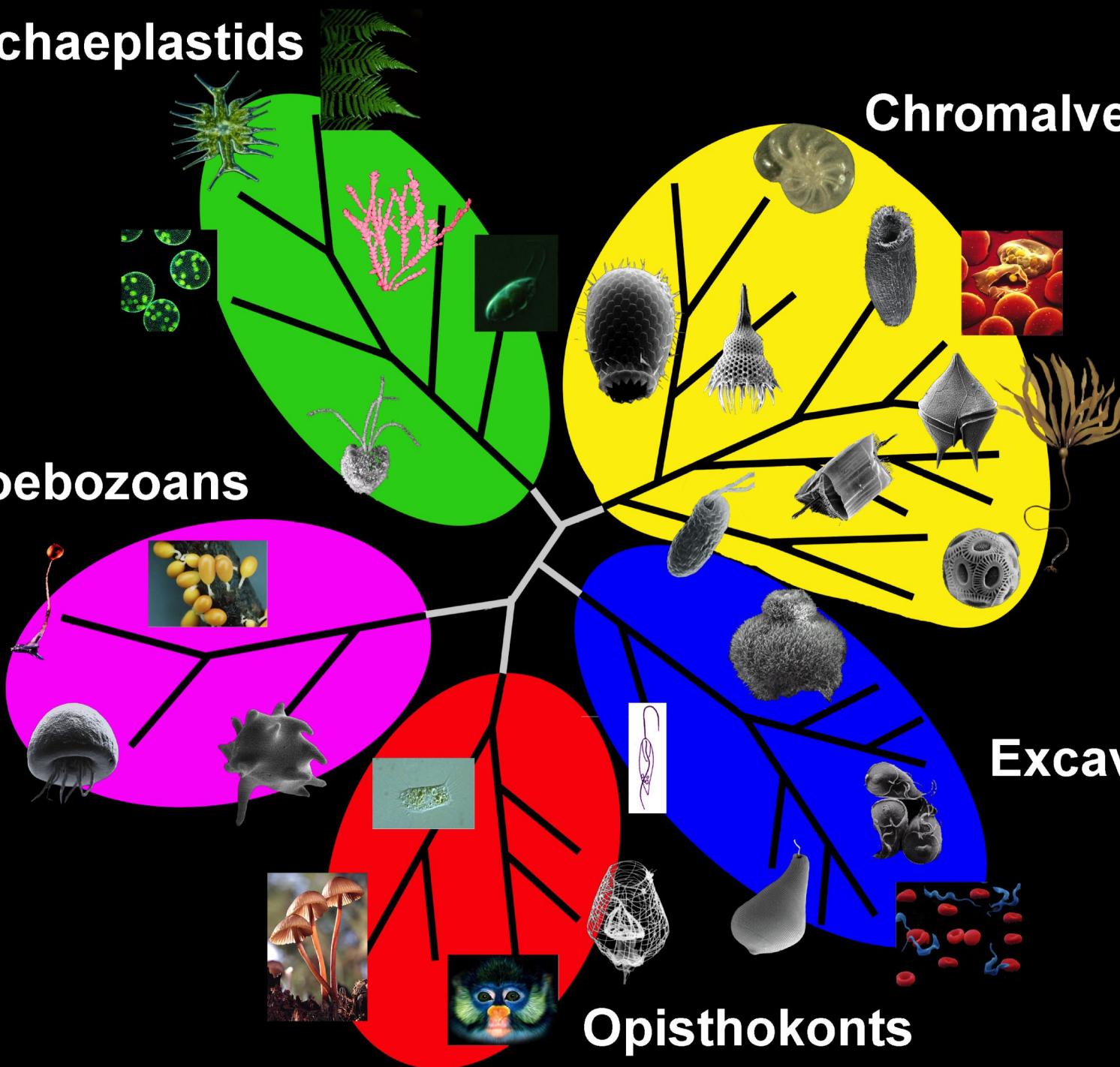
# PTEE

## Aula 03

# Roteiro

- Seminário
- Diversidade de protistas
- Ensaios aula passada
- Ensaio hj

# Archaeplastids



# Chromalveolates

# Amoebozoans

# Excavates

# Opisthokonts

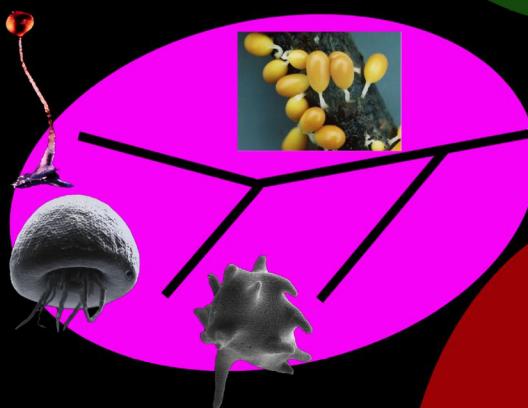
Archaeplastids

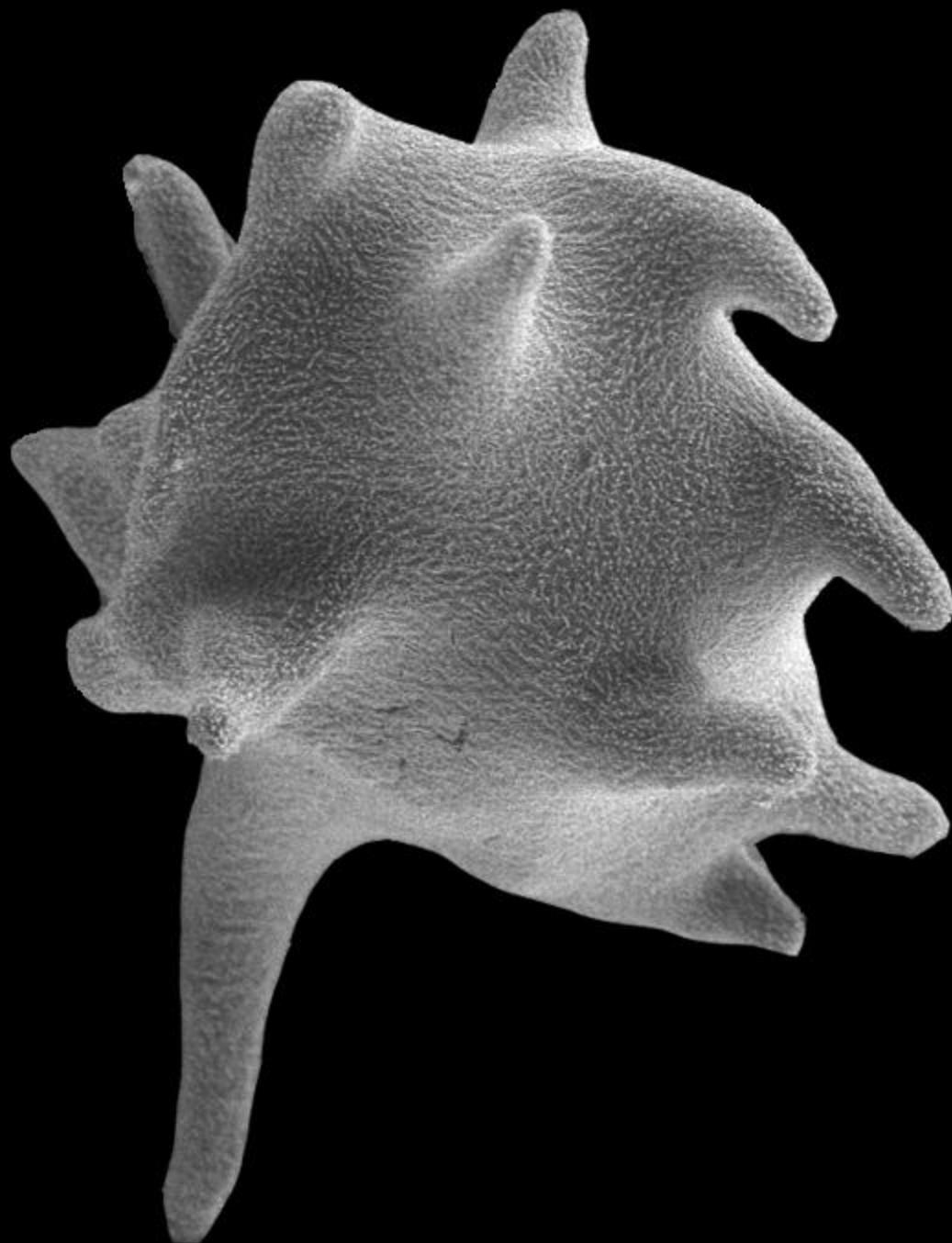
Chromalveolates

Amoebozoans

Excavates

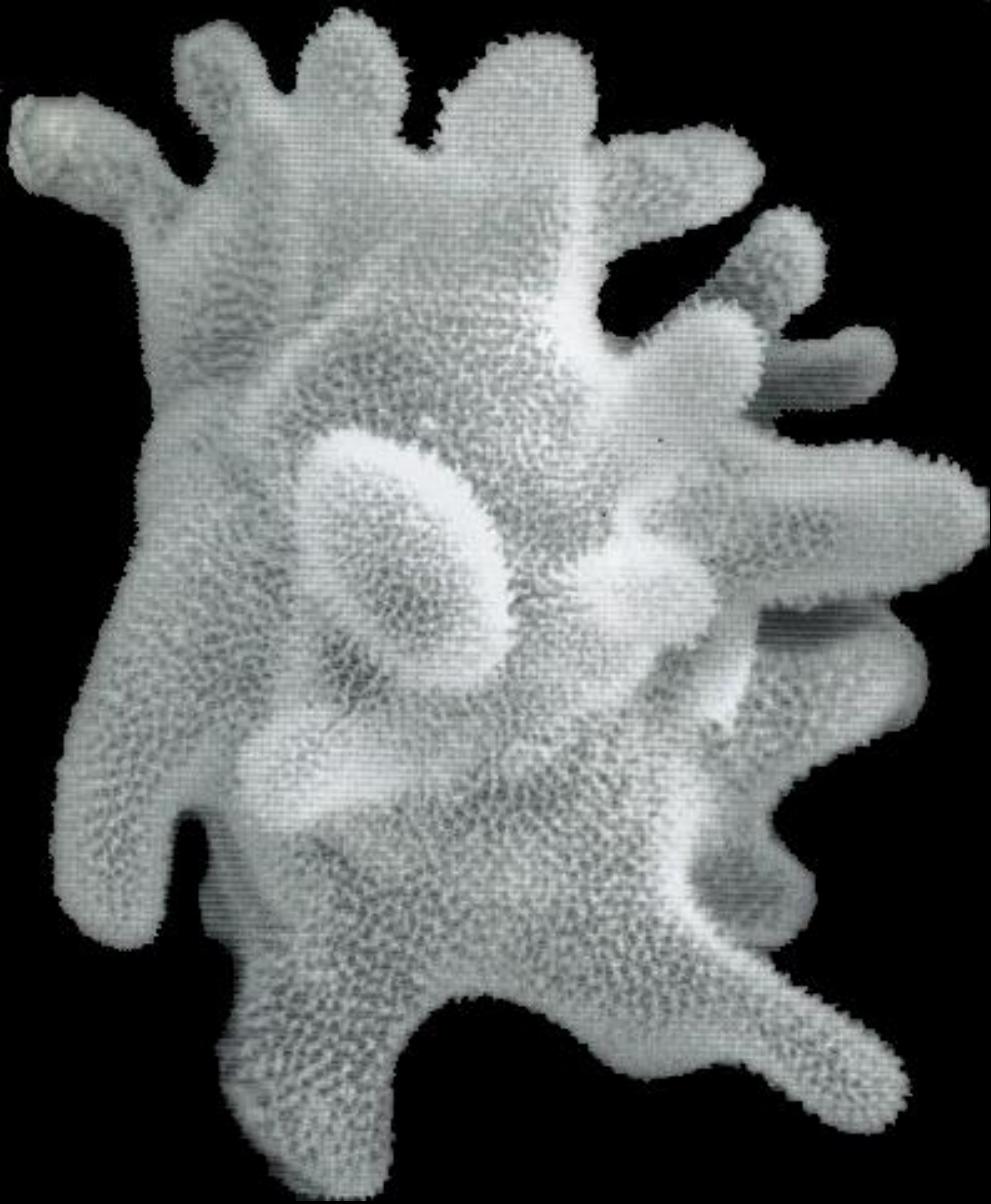
Opisthokonts





unidentified  
freshwater  
amoeba

courtesy of  
Brian Leander  
University of British Columbia  
Vancouver, Canada



*Dactylamoeba  
elongata*

Tubulinida

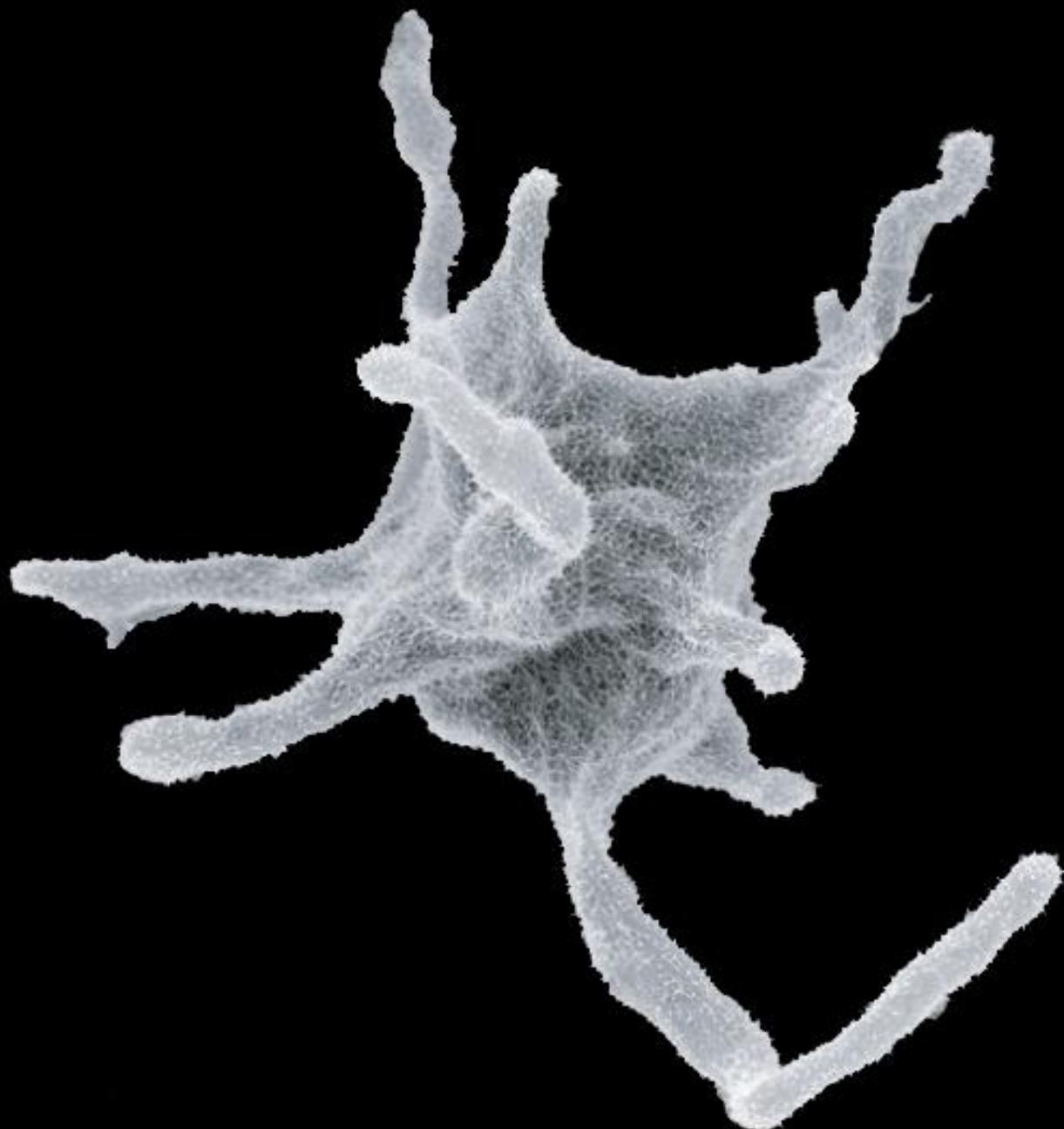
courtesy of  
Wilhelm Foissner  
University of Salzburg  
Austria



***Mayorella* sp.**

**Tubulinida**

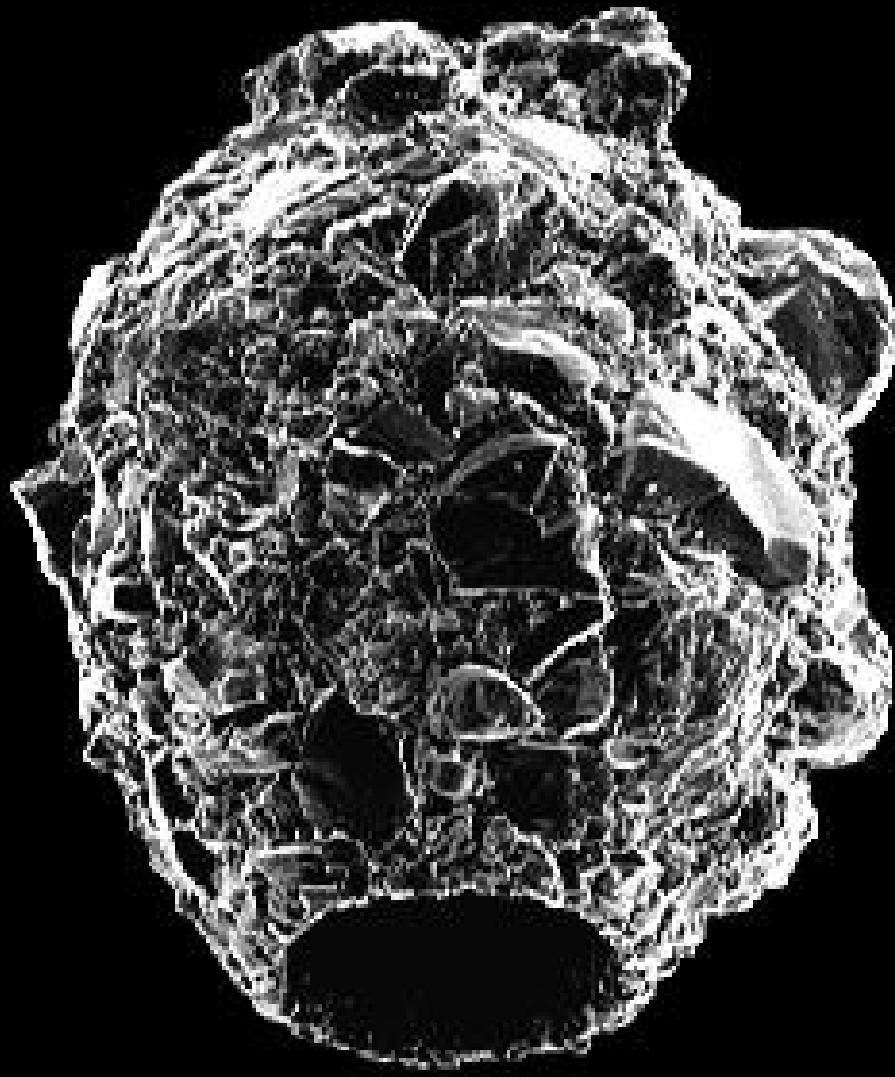
Kreutz, M. and Foissner , W. 2006:  
The Sphagnum ponds of Simmelried  
in Germany: a biodiversity hot-spot  
for microscopic organisms.  
Protozoological Monographs Vol. 3,  
Shaker Verlag, Aachen, Germany



*Mayorella sp.*

Tubulinids

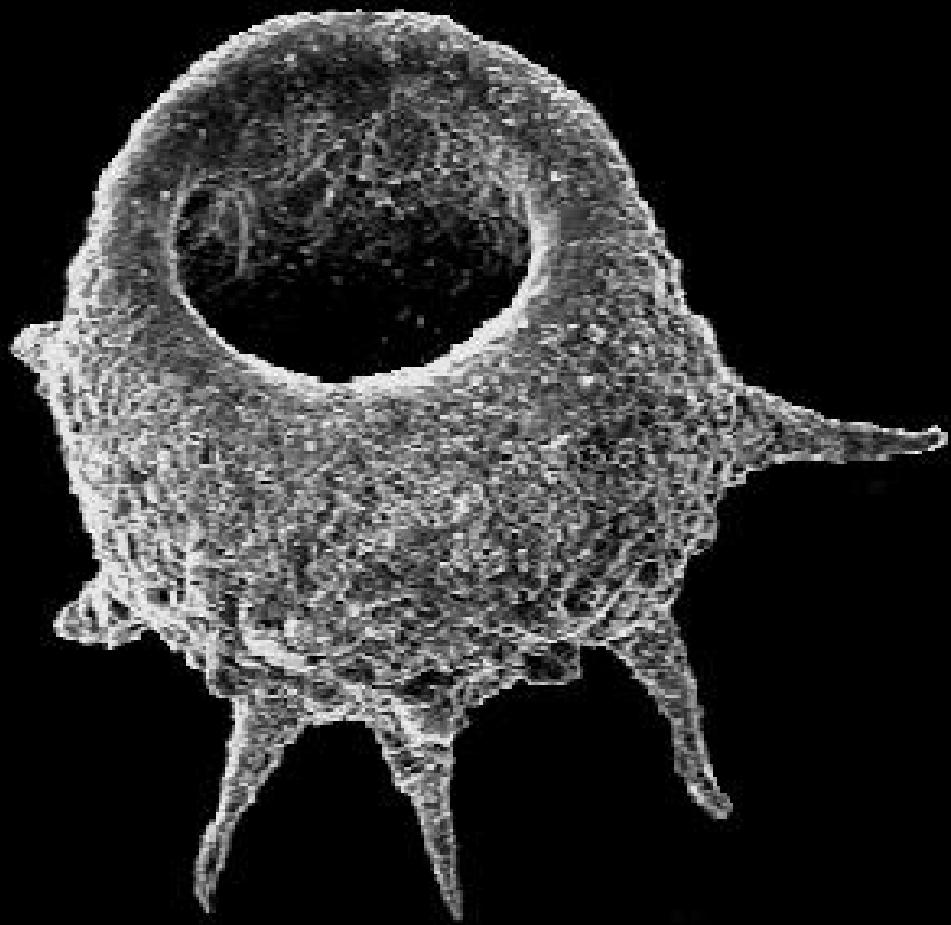
courtesy of  
Masaki Yoshida  
Rikkyo University  
Tokyo, Japan



*Diffugia oblonga*  
empty agglutinated  
test

arcellinida

©Coquina Press  
<http://www.palaeo-electronica.org>



***Centropyxis  
constricta  
empty test***

**arcellinida**

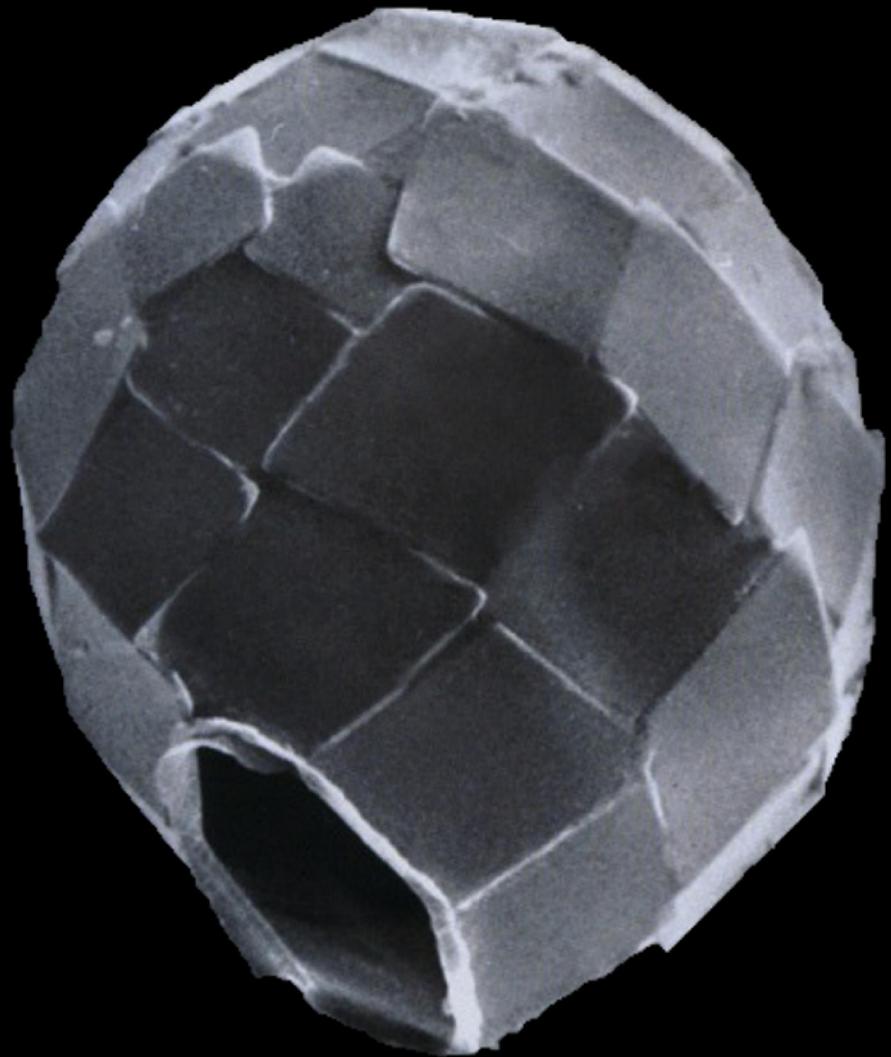
©Coquina Press  
<http://www.palaeo-electronica.org>



*Arcella*

**arcellinida**

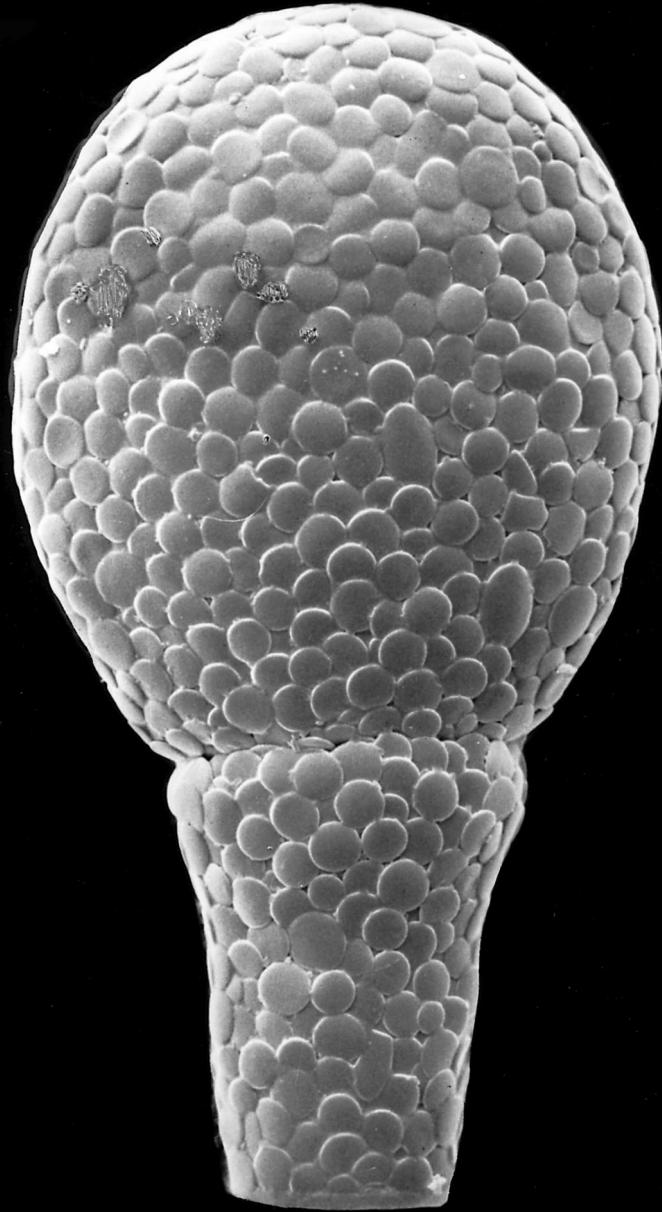
Kreutz, M. and Foissner , W. 2006:  
The Sphagnum ponds of Simmelried  
in Germany: a biodiversity hot-spot  
for microscopic organisms.  
Protozoological Monographs Vol. 3,  
Shaker Verlag, Aachen, Germany



*Paraquadrula*

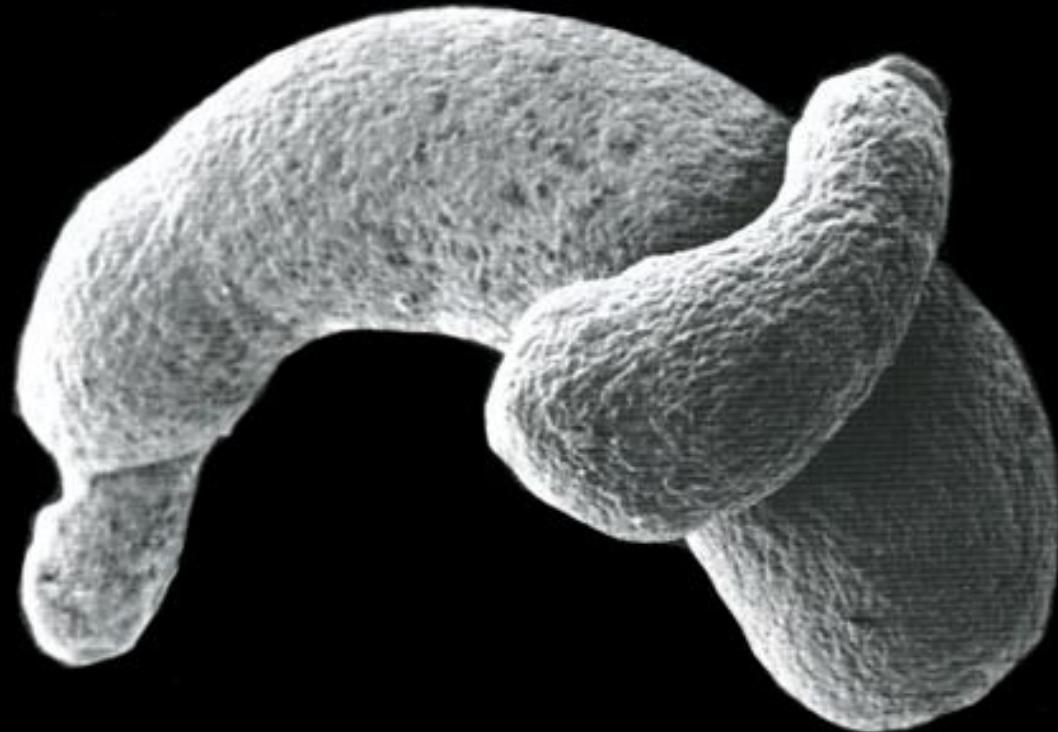
arcellinida

Kreutz, M. and Foissner , W. 2006:  
The Sphagnum ponds of Simmelried  
in Germany: a biodiversity hot-spot  
for microscopic organisms.  
Protozoological Monographs Vol. 3,  
Shaker Verlag, Aachen, Germany



***Nebela vas***  
**arcellinida**

courtesy of  
**Wilhelm Foissner**  
**University of Salzburg,**  
**Austria**



*Pelomyxa palustris*

Archamoebae

Hausmann et al. 2003:  
Protistology, 3<sup>rd</sup> edition  
©Schweizerbart'sche  
Verlagsbuchhandlung



**Unidentified  
Plasmodial  
Slime Mould**

**Myxomycetes**

courtesy of  
Greg and Mary Beth Dimijian  
[www.dimijianimages.com](http://www.dimijianimages.com)



*Stemonitis  
axifera*

**Plasmodial  
Slime Moulds  
(Myxomycetes)**

courtesy of  
Clive Shirley  
The Hidden Forest  
[www.hiddenforest.com.nz](http://www.hiddenforest.com.nz)



*Leocarpus  
fragilis*

**Plasmodial  
Slime Moulds  
(Myxomycetes)**

courtesy of  
Clive Shirley  
The Hidden Forest  
[www.hiddenforest.com.nz](http://www.hiddenforest.com.nz)



*Dictyostelium discoideum*

**Cellular Slime Mould  
(Dictyostelids)**

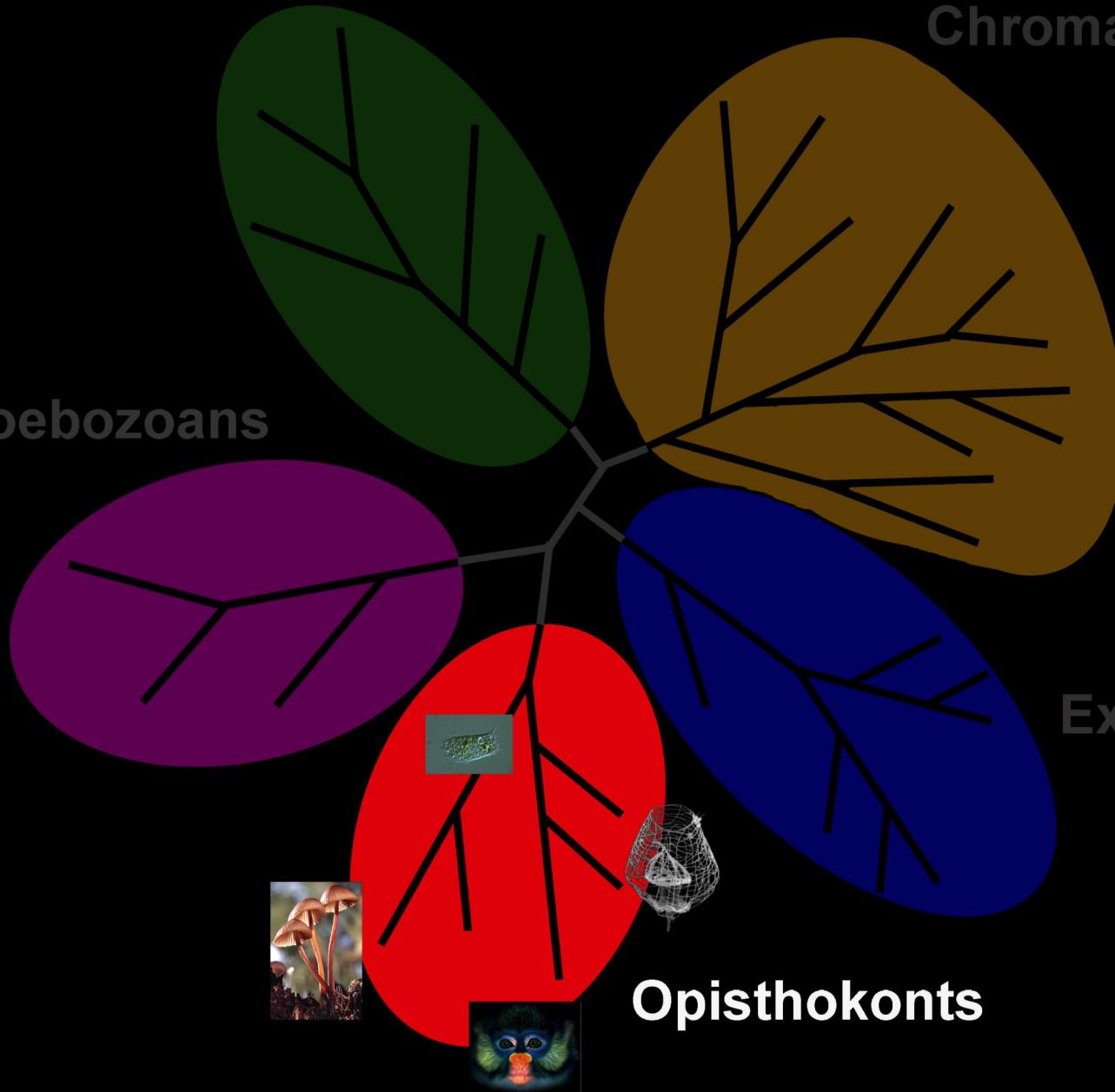
# Archaeplastids

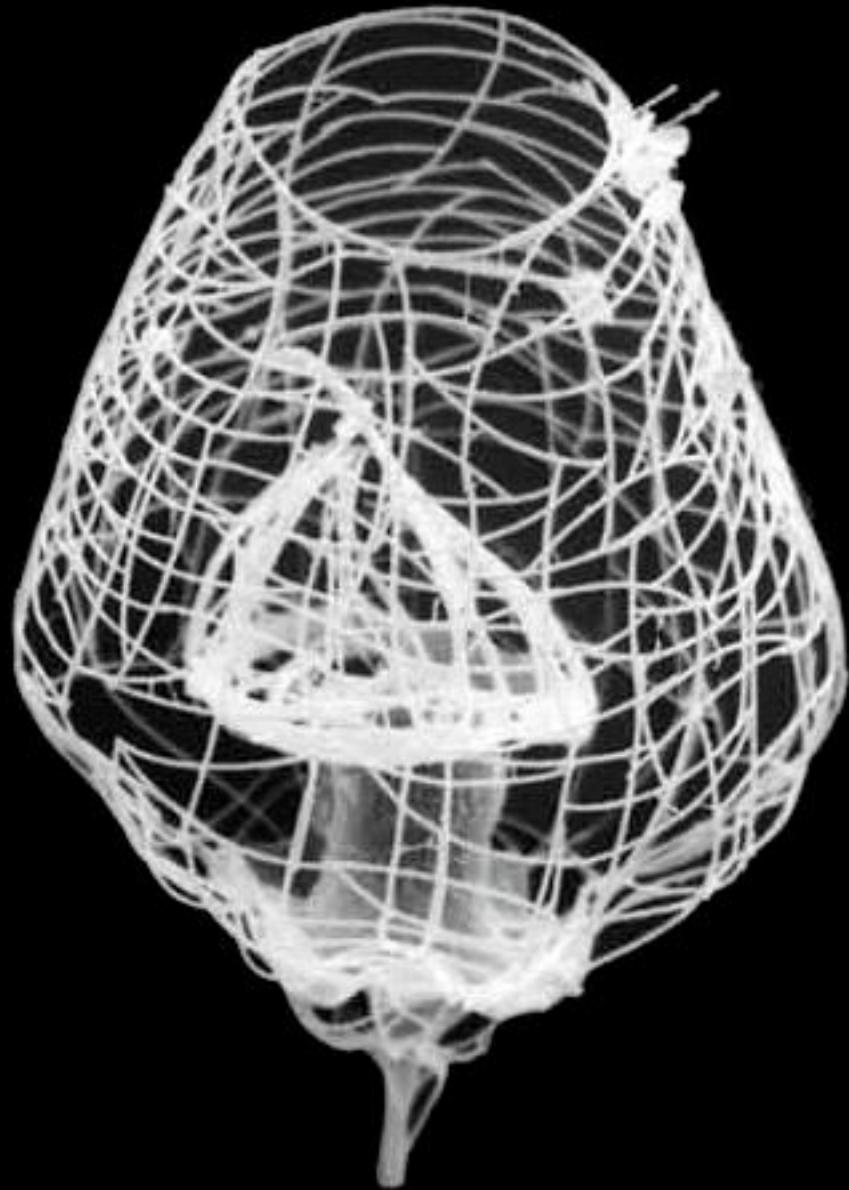
Chromalveolates

Amoebozoans

Excavates

Opisthokonts

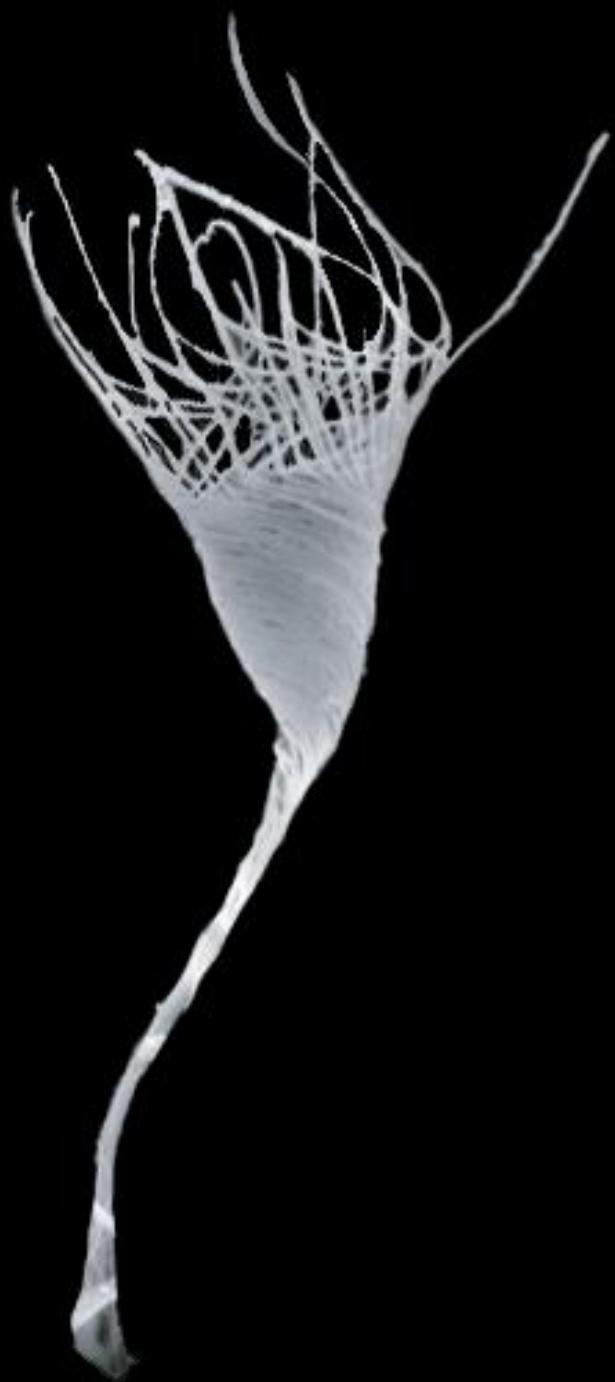




***Kakoea antarctica***

**Choanoflagellates**

courtesy of  
Fiona Scott  
Australian Antarctic Division  
Kingston, Tasmania  
©Commonwealth of Australia



*Acanthoeca  
spectabilis*

Choanoflagellates

courtesy of  
**Masaki Yoshida**  
**Rikkyo University**  
**Tokyo, Japan**



***Xestospongia muta***  
**Barrel Sponge**

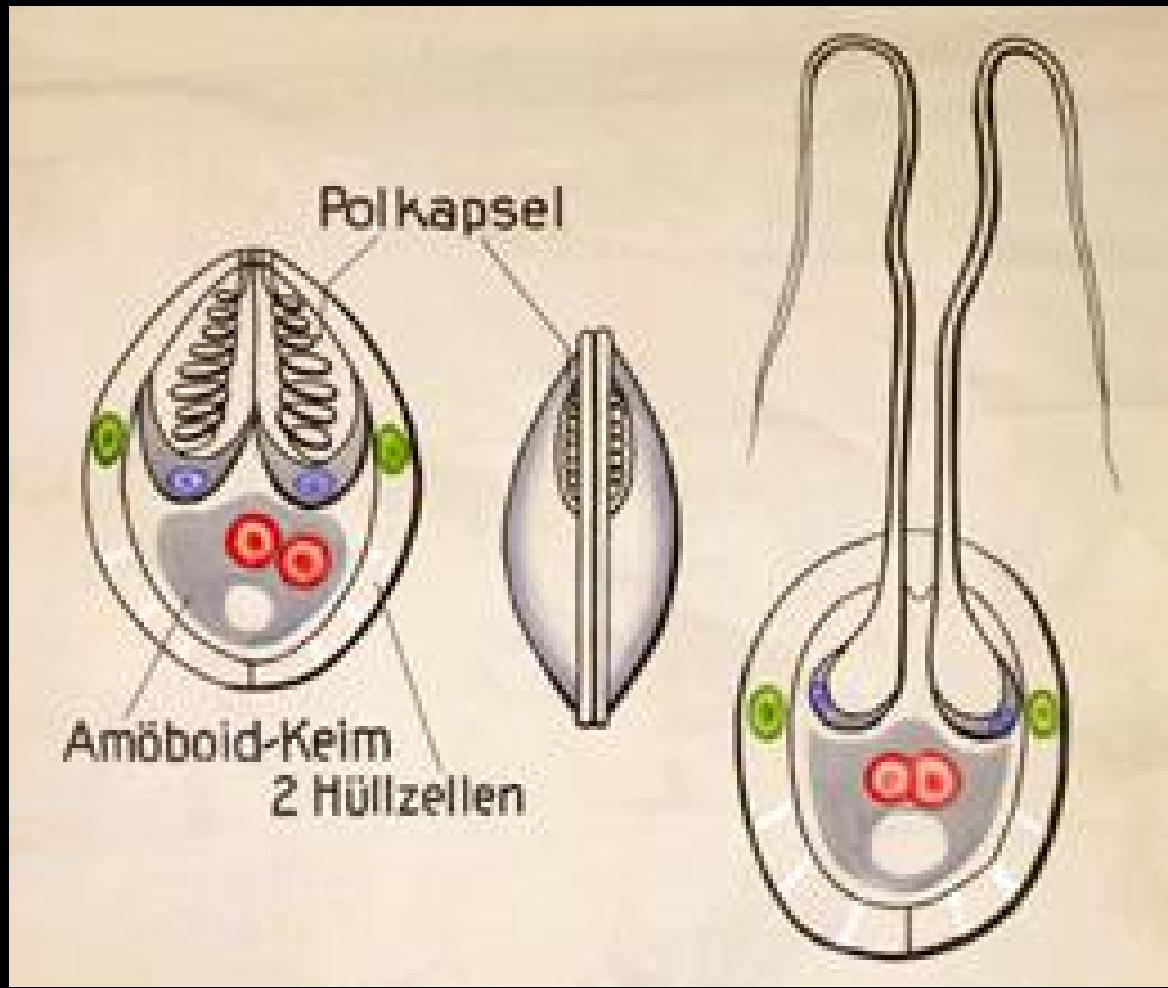
**Animals**

courtesy of  
Jonathan Bird  
[www.jonathanbird.net](http://www.jonathanbird.net)



# Animals

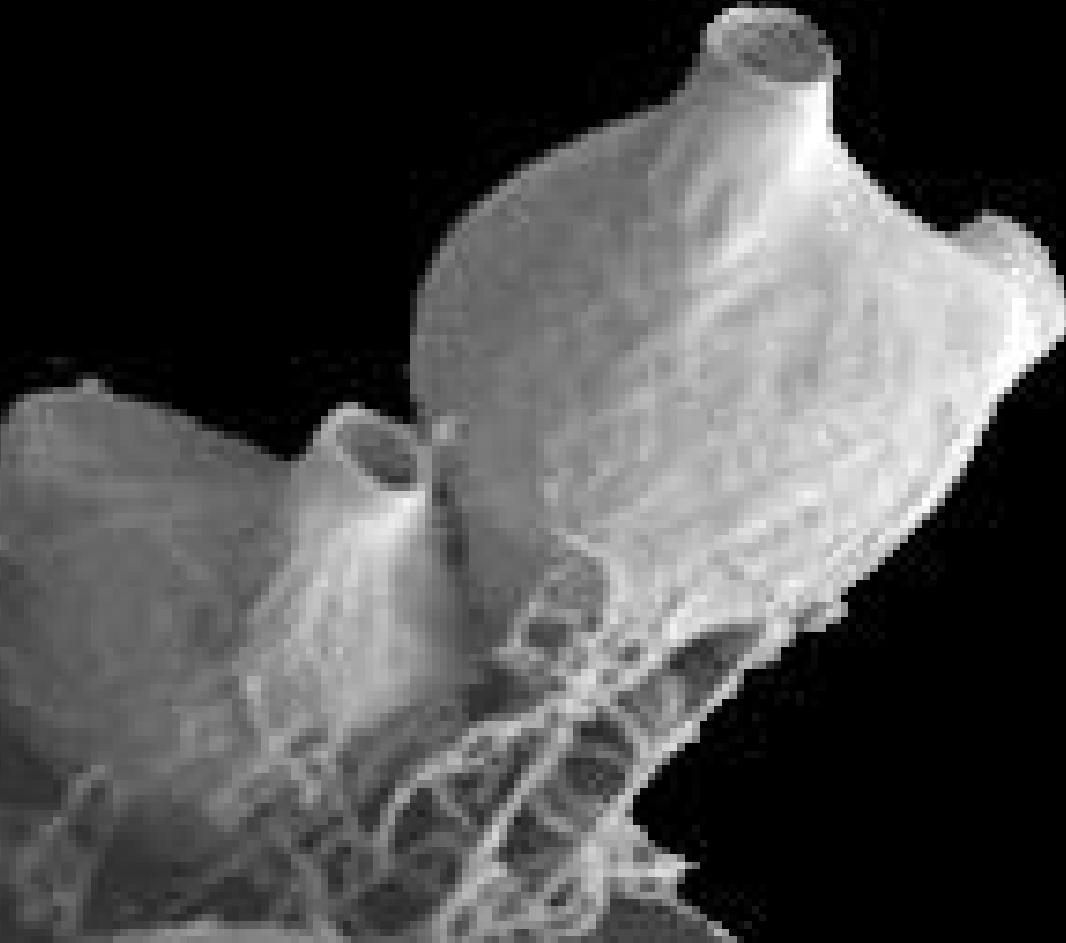
courtesy of  
Werner Spohr  
[www.spohr-wildlife.ch](http://www.spohr-wildlife.ch)



*Myxobolus pfeifferi*

**Myxosporidians  
Animals**

courtesy of  
Humboldt University  
Berlin, Germany



*Batrachochytrium  
dendrobatidis*

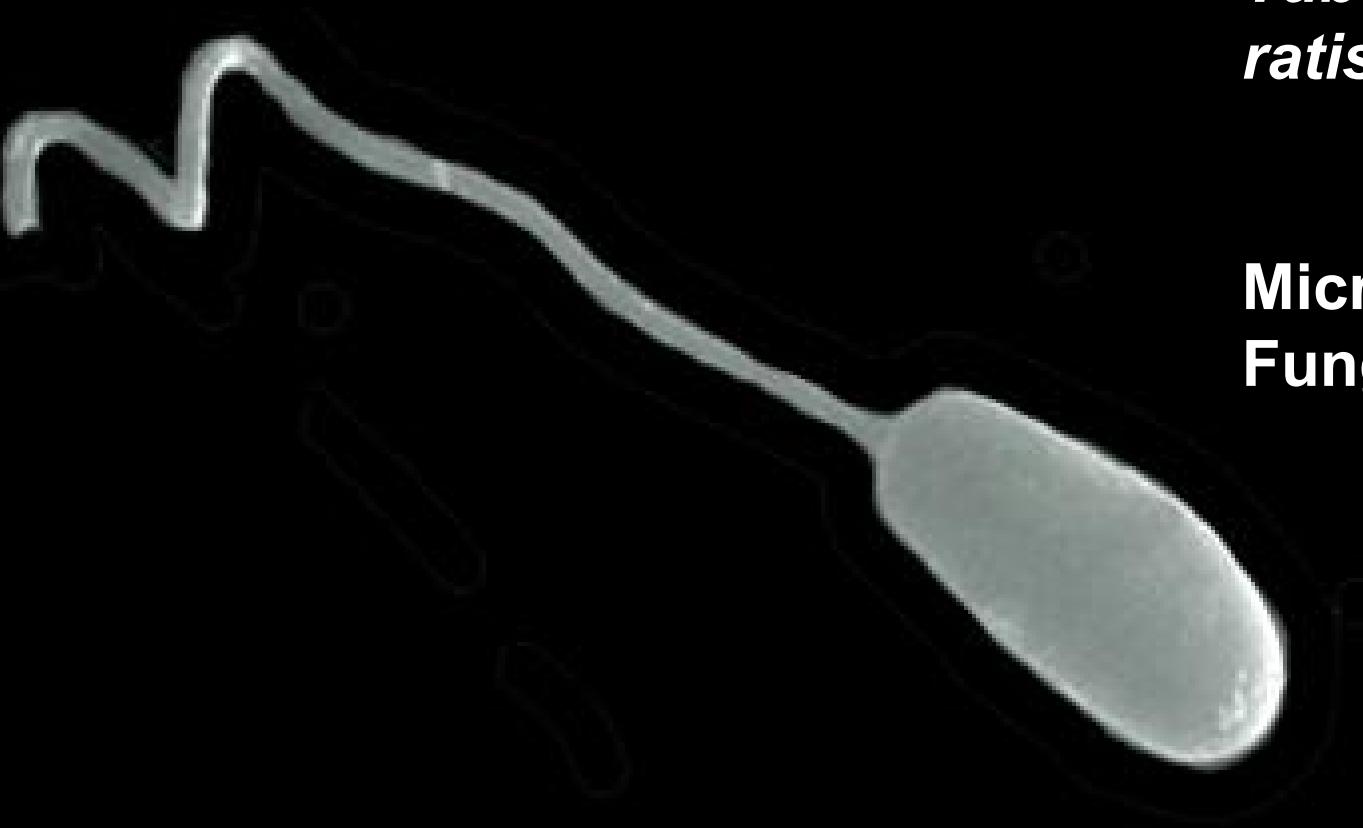
Chytrids  
Fungi

courtesy of  
Lee Berger  
CSIRO Australian Animal Health Laboratories  
Geelong, Victoria, Australia



# Fungi

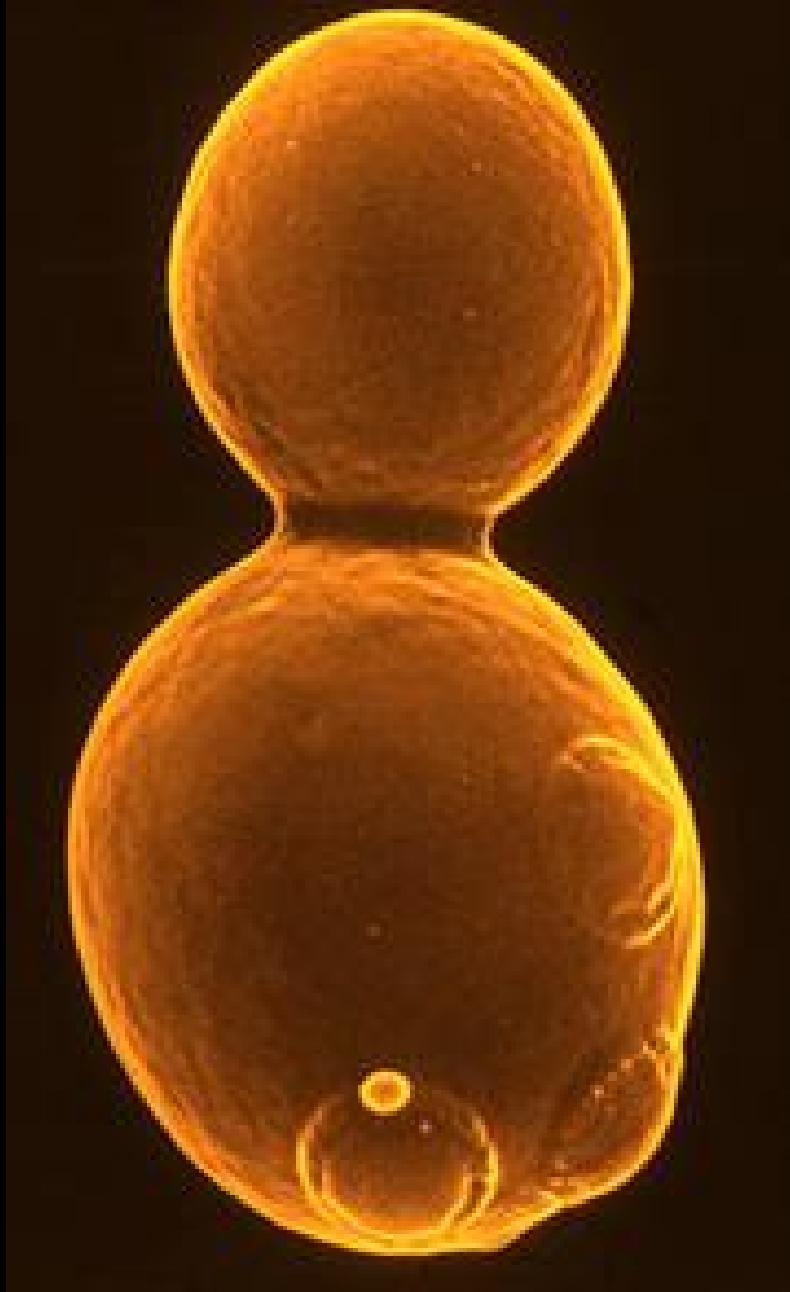
[www.pbase.com](http://www.pbase.com)



*Tubulinosema  
ratisbonensis*

**Microsporidia  
Fungi**

Franzen, C. et al. 2005: In vitro cultivation  
of an insect microsporidians *Tubulinosema*  
*ratisbonensis* in mammalian cells.  
J. Euk. Microb. 52: 349-355



*Saccharomyces  
cerevisiae*

**Yeast  
Fungi**

[http://68.90.81.6/ScienceTAKS/  
Kingdom%20Details.htm](http://68.90.81.6/ScienceTAKS/Kingdom%20Details.htm)

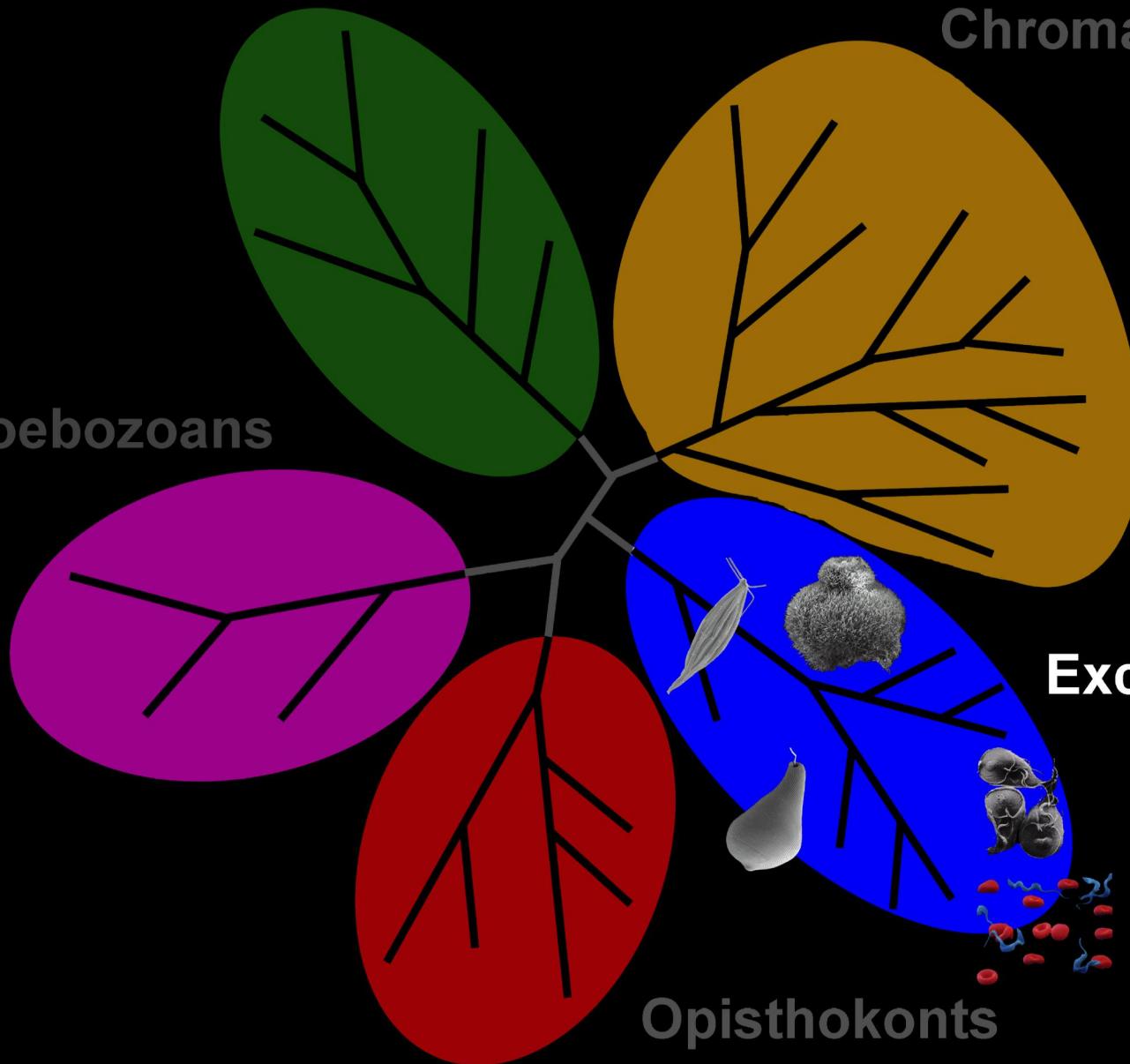
**Archaeplastids**

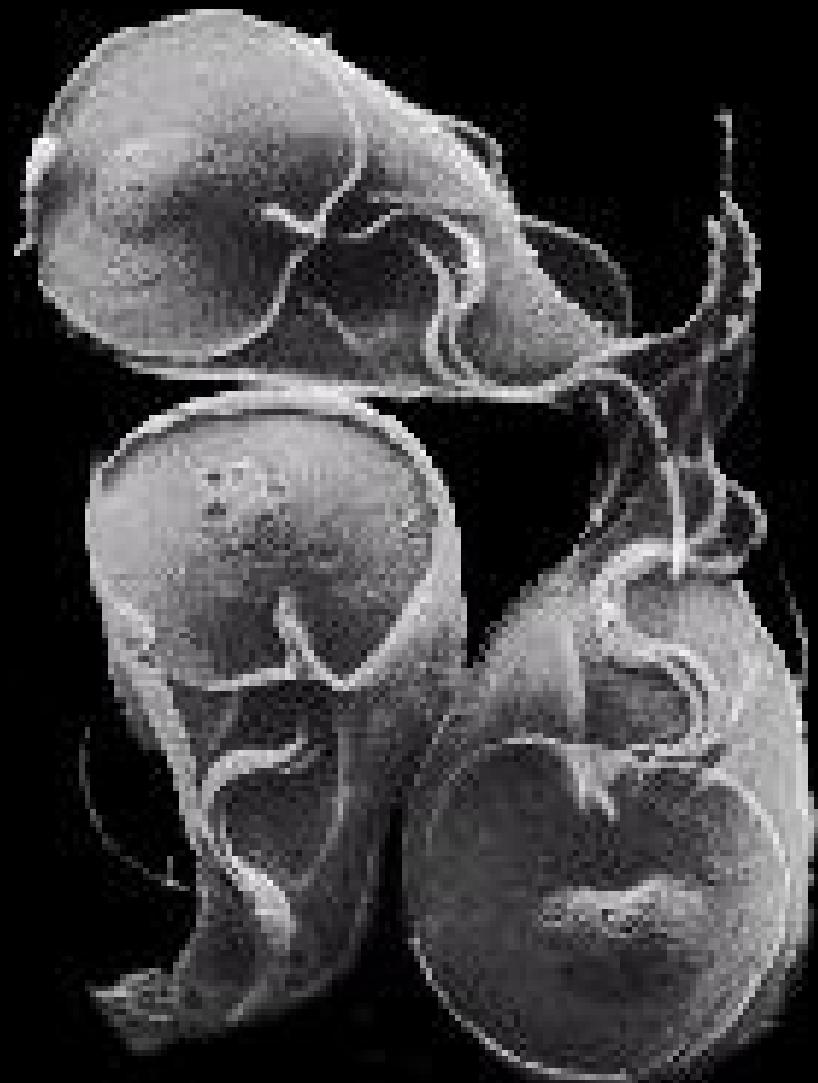
**Chromalveolates**

**Amoebozoans**

**Excavates**

**Opisthokonts**





*Giardia lamblia*

Diplomonads

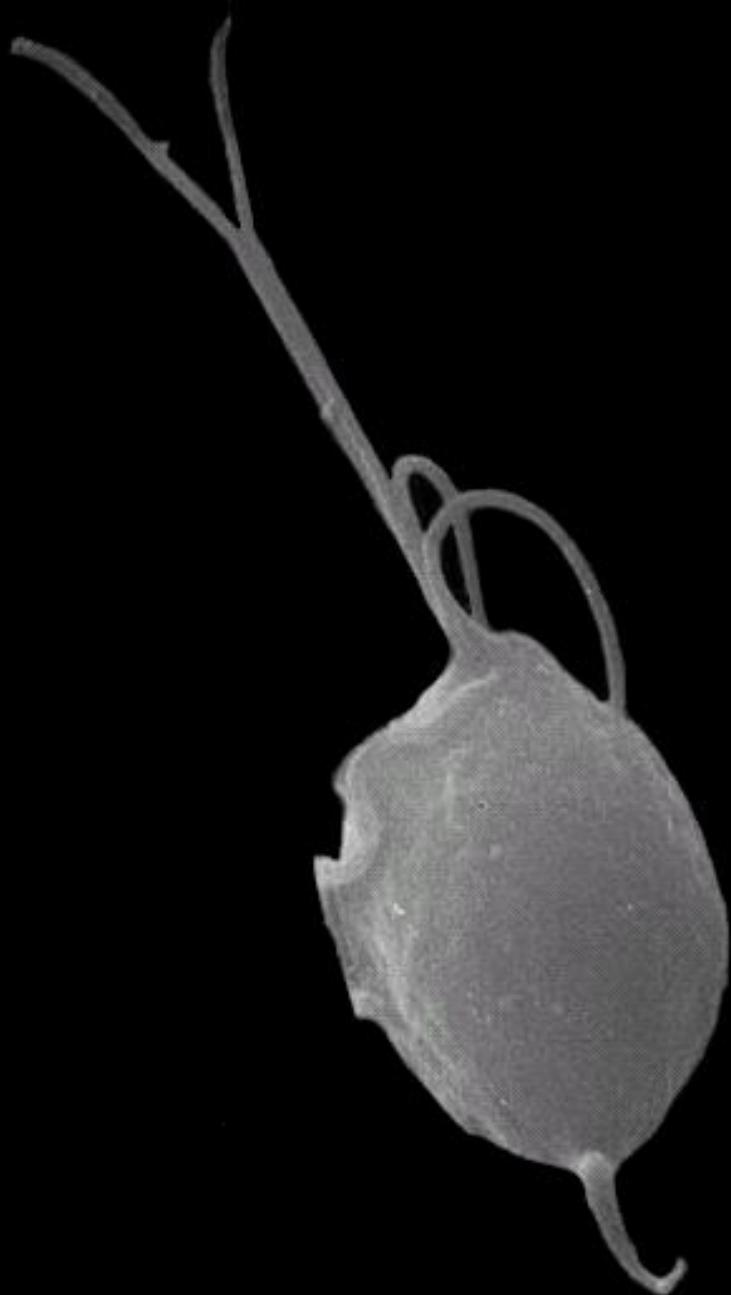
courtesy of  
Arturo Gonzalez  
CINVESTAV  
Mexico



*Spironucleus  
elegans*

Diplomonads

courtesy of  
Guy Brugerolle  
Blaise Pascal University of  
Clermont-Ferrand, France



*Trichomonas  
vaginalis*

Trichomonads  
Parabasalians

courtesy of  
Louis de Vos  
Free University of Brussels  
Belgium



***Devescovina  
striata***

**Cristamonads  
Parabasalians**

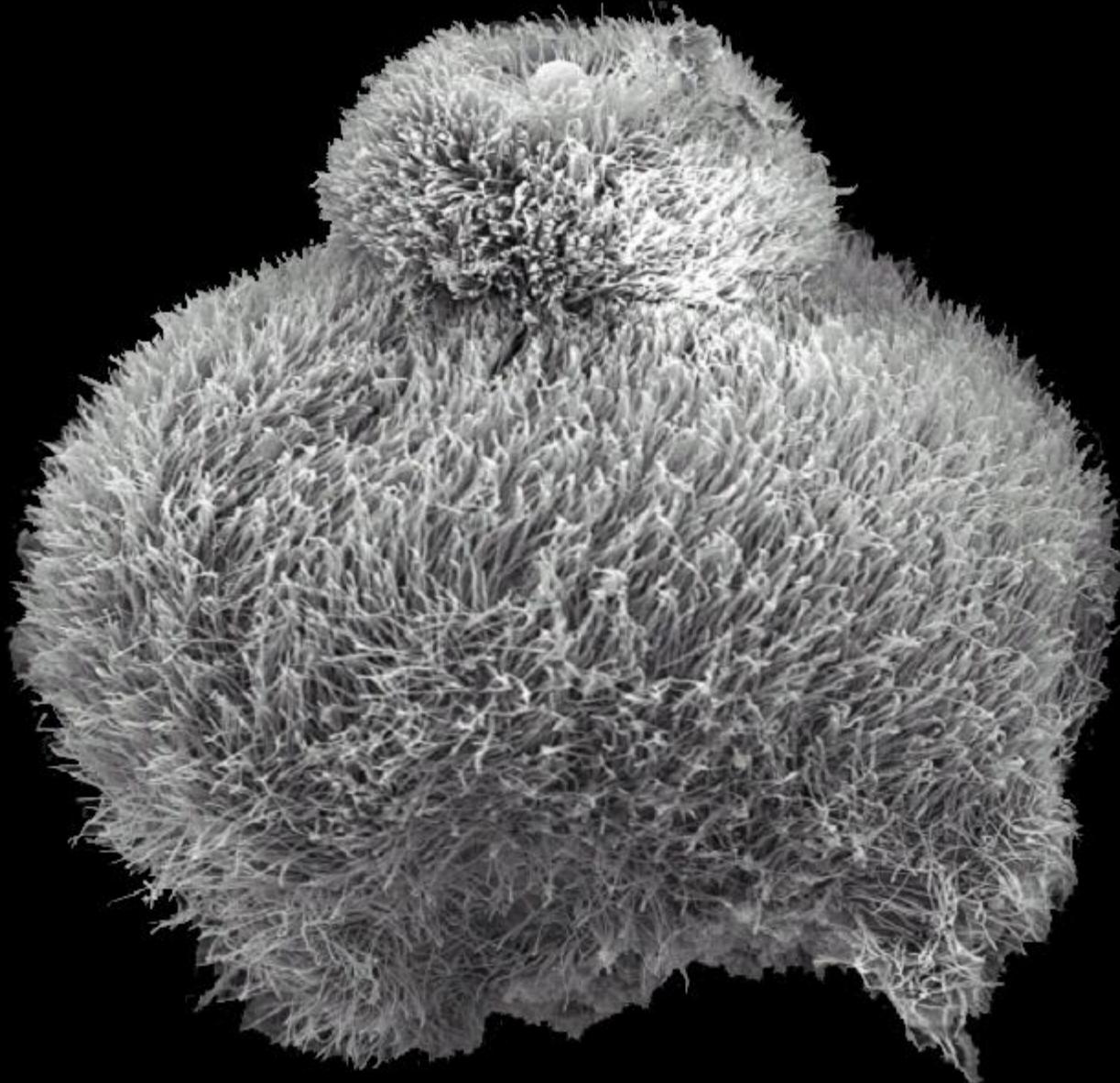
Kirby, H. 1941: Devescovenid flagellates  
of termites. II The genus *Devescovina*.  
Univ. Calif. Publ. Zool. 45: 1-92



***Staurojoenina  
assimilis***

**Hypermastigotes  
Parabasalians**

Dolan, M. et al. 2004: Cysts and symbionts of *Staurojoenina assimilis* Kirby from *Neotermes*. *Europ. J. Protistol.* 40: 257-264



*Eucomonympha  
imla*

**Hypermastigotes  
Parabasalians**

Carpenter, K. J. and Keeling, P. J.  
2007: Morphology and phylogenetic  
position of *Eucomonympha imla*.  
*J. Euk. Micro.* 54: 325-332



***Streblomastix  
strix***

**Oxymonads**

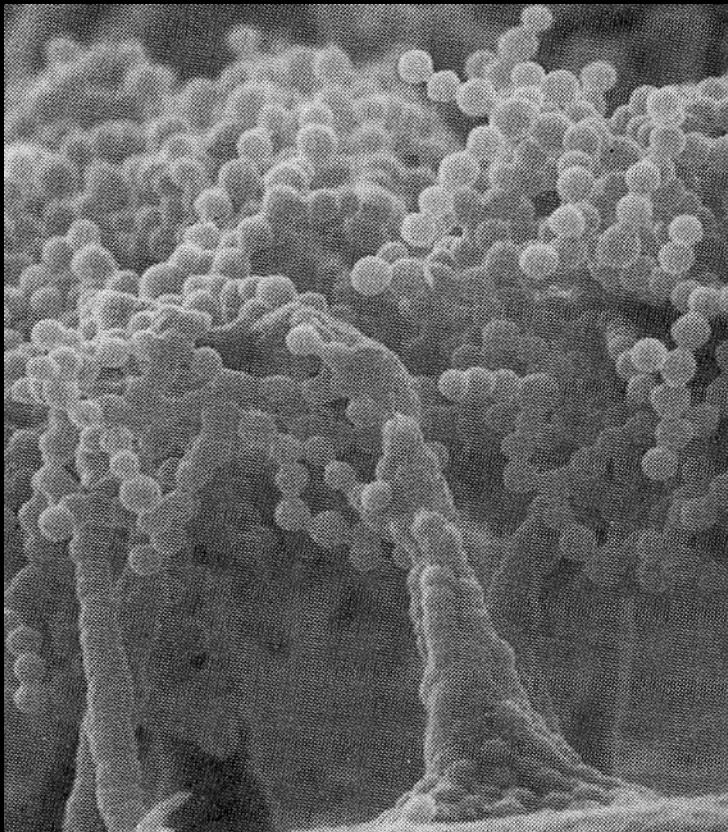
Leander, B. S. and Keeling, P. J. 2004:  
Symbiotic innovation in the oxymonad  
*Streblomastix strix*. *J. Eukaryot. Microbiol.*  
51: 291-300



*Saccinobacculus  
minor*

Oxymonads

Carpenter, K. J., Waller, R. F. and Keeling, P. J. 2008: Surface morphology of *Saccinobacculus* (Oxymonadida): implications for character evolution and function in oxymonads. *Protist* 159: 209-221



***Acrasis rosea***

**Heteroloboseans**

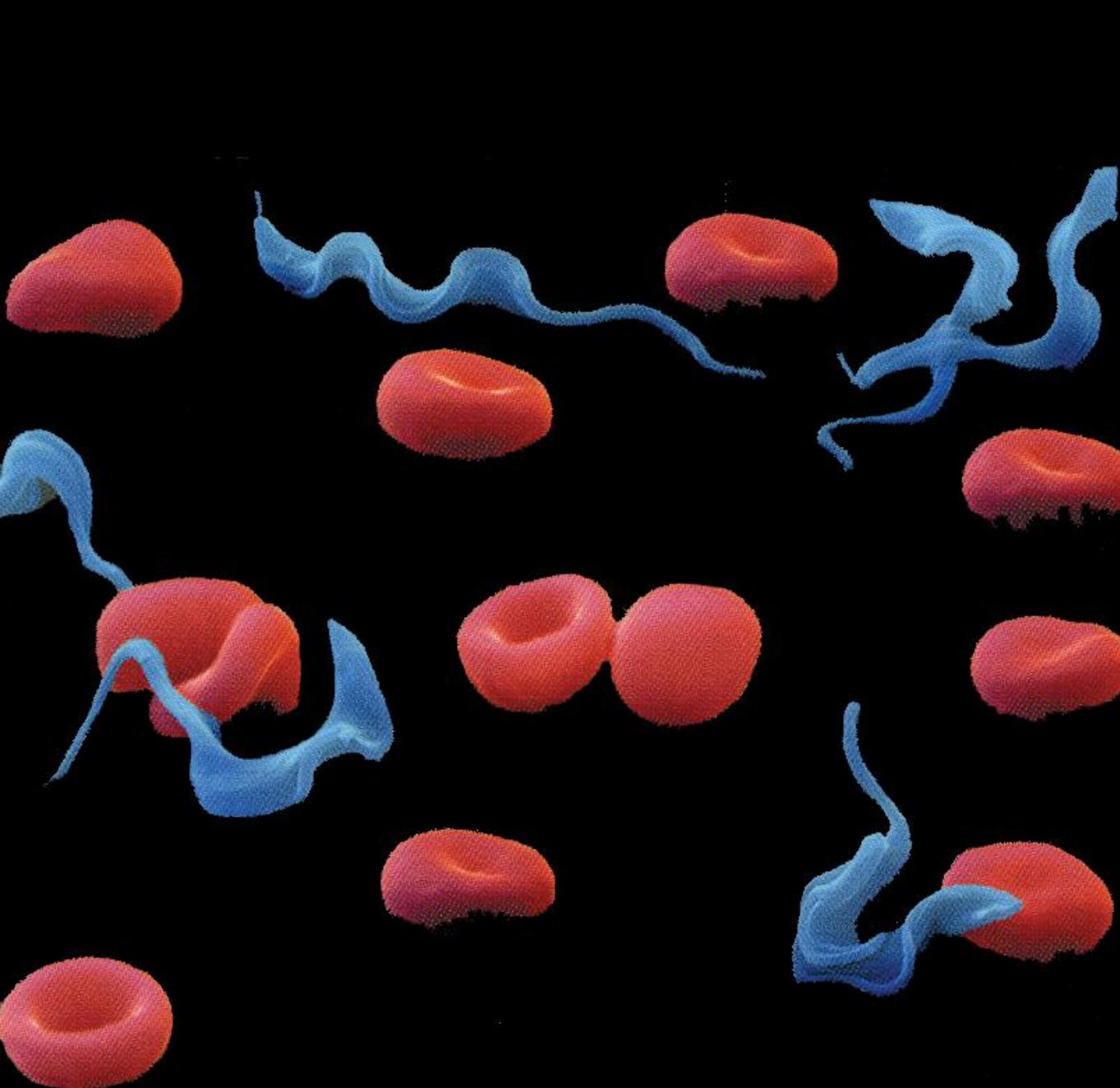
Blanton, R.: Phylum Acrasea 1989. In:  
Margulis, L. et al. (eds.): The Handbook  
of Protoctista, 1<sup>st</sup> edition  
©Jones and Bartlett Publishers, Boston



*Stephanopogon  
colpoda*

Heteroloboseans

courtesy of  
Masaki Yoshida  
Rikkyo University  
Tokyo, Japan



*Trypanosoma  
brucei*  
(and red blood  
cells)

Kinetoplastids

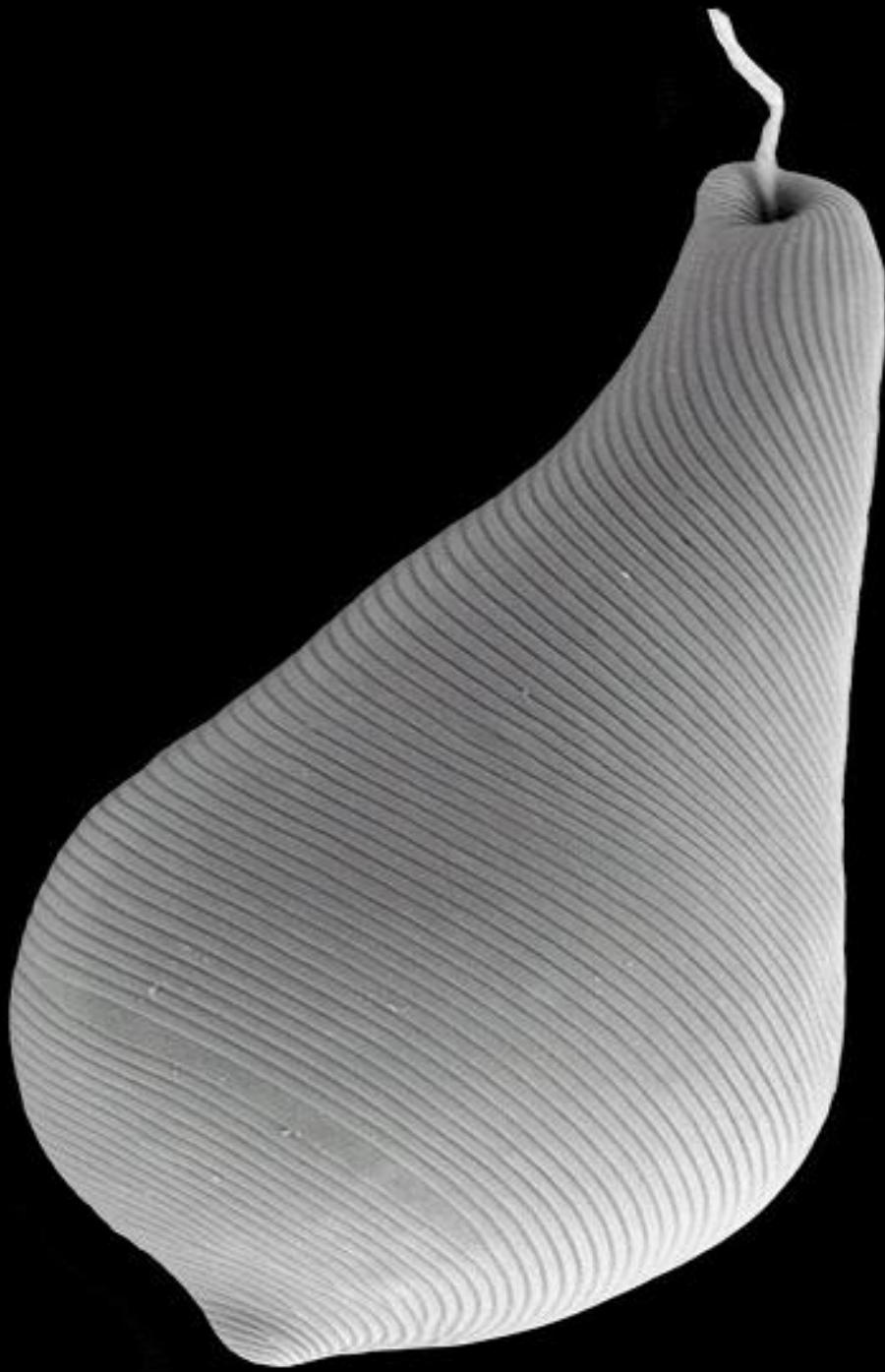
courtesy of  
Oliver Meckes and  
Nicole Ottawa  
eye of science  
Reutlingen, Germany



*Entosiphon  
sulcatum*

Euglenids

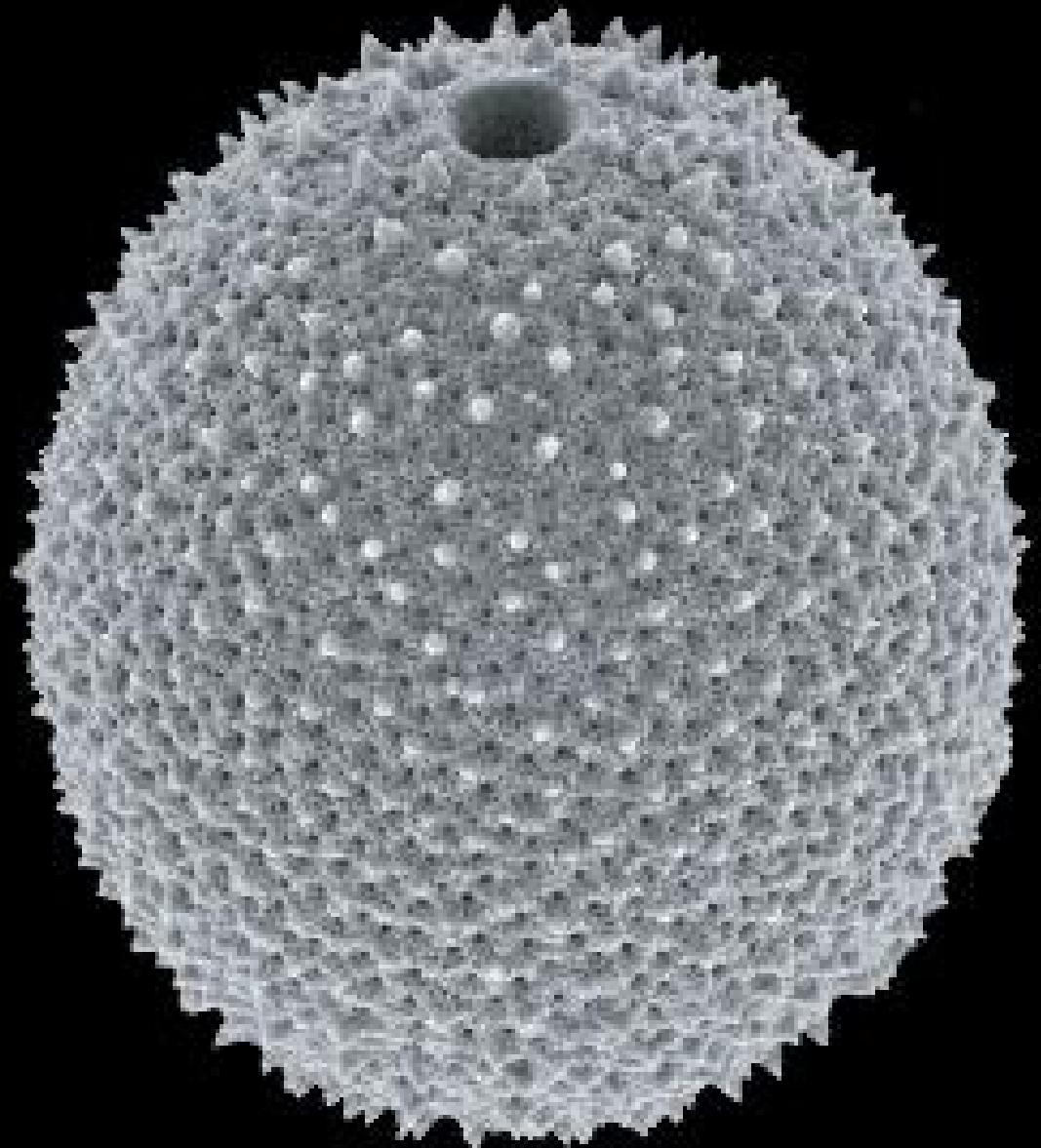
courtesy of  
**Masaki Yoshida**  
**Rikkyo University**  
**Tokyo, Japan**



*Euglena gracilis*

Euglenids

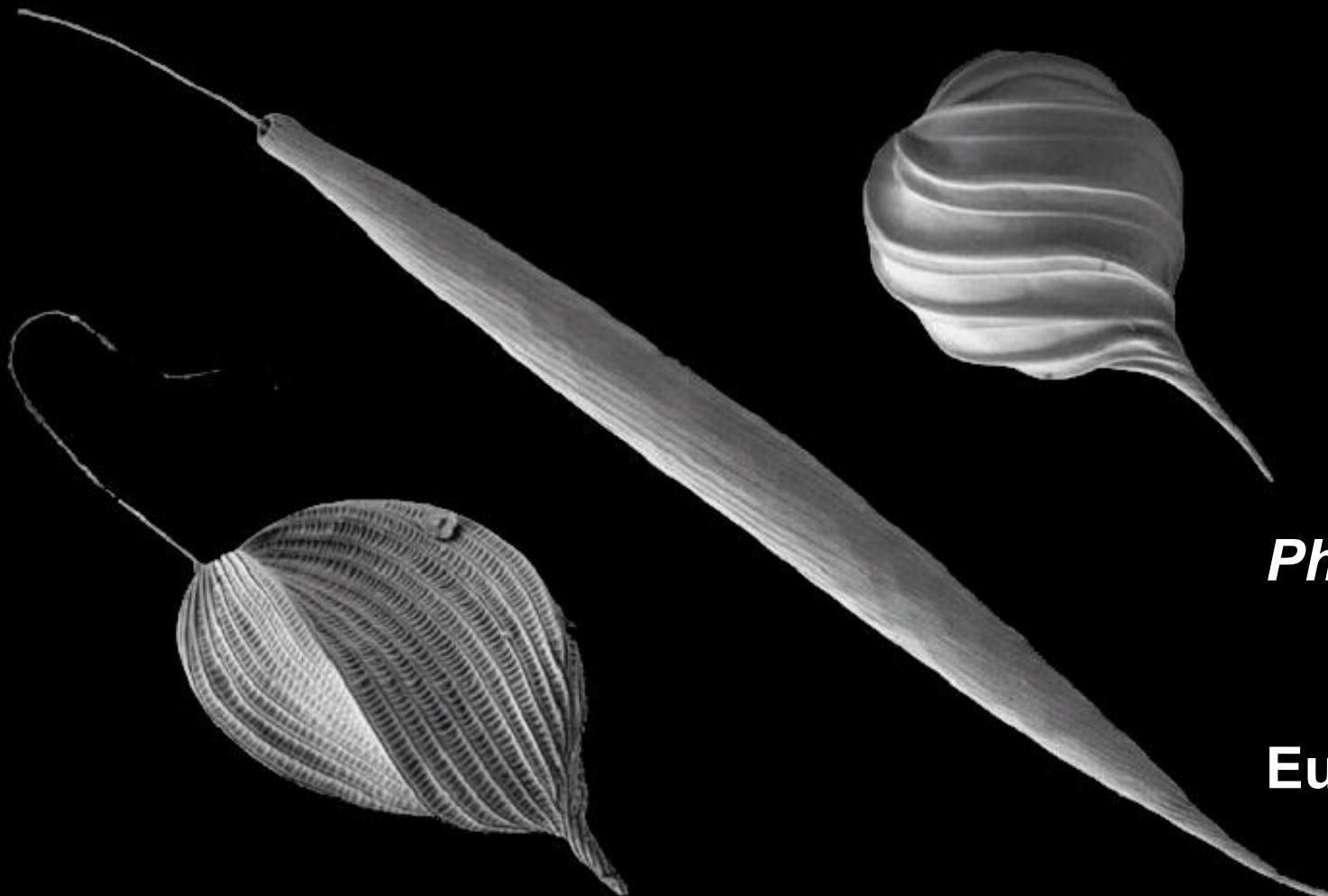
courtesy of  
Brian Leander  
University of British Columbia  
Vancouver, Canada



*Trachelomonas*

Euglenids

courtesy of  
Masaki Yoshida  
Rikkyo University  
Tokyo, Japan



***Phacus spp.***

**Euglenids**

Leander, B. S. and Farmer, M. A. 2001:  
Evolution of *Phacus* (Euglenophyceae)  
as inferred from pellicle morphology  
and SSU rDNA. J. Phycol. 37: 143-159

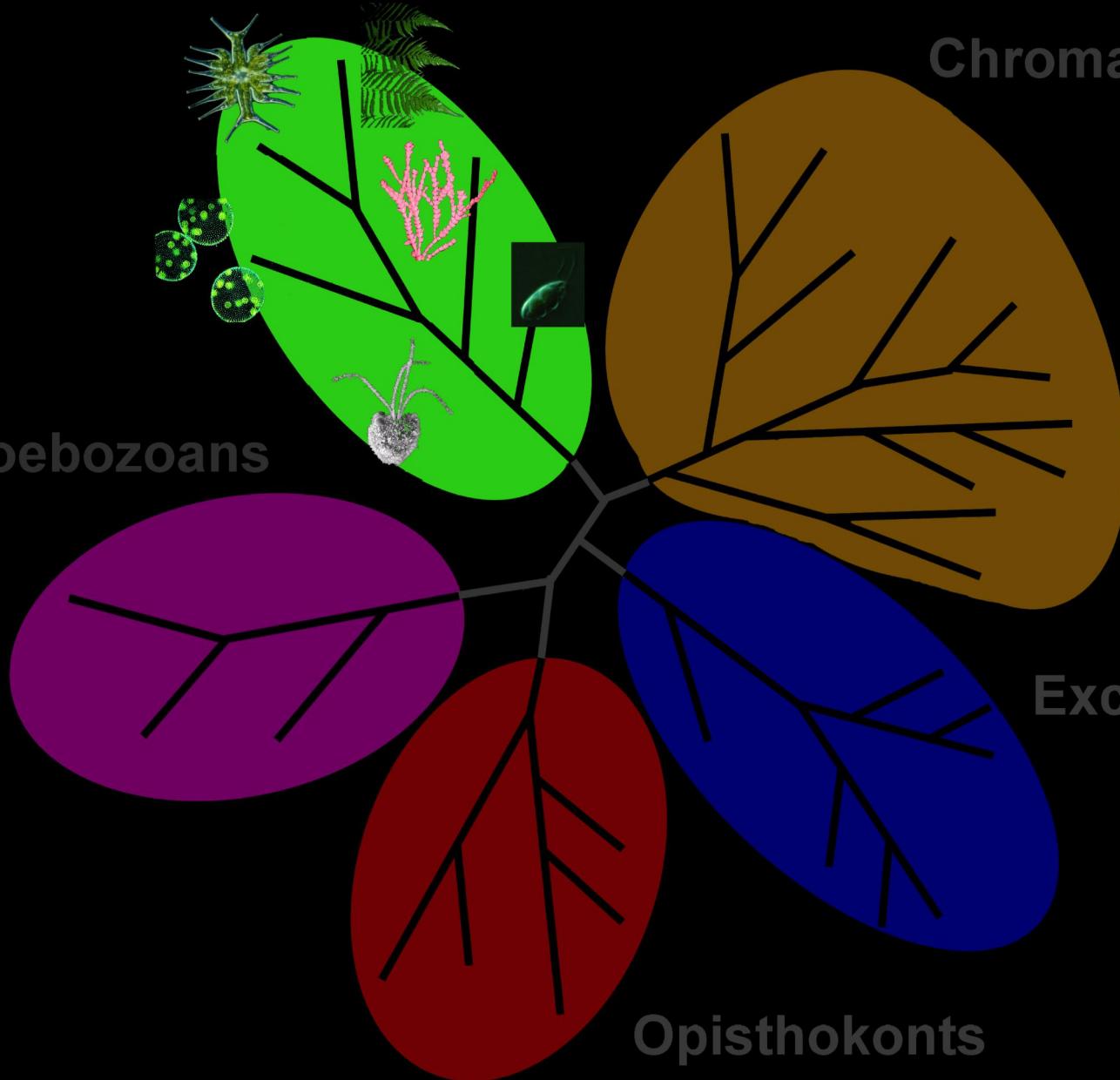
# Archaeplastids

Chromalveolates

Amoebozoans

Excavates

Opisthokonts

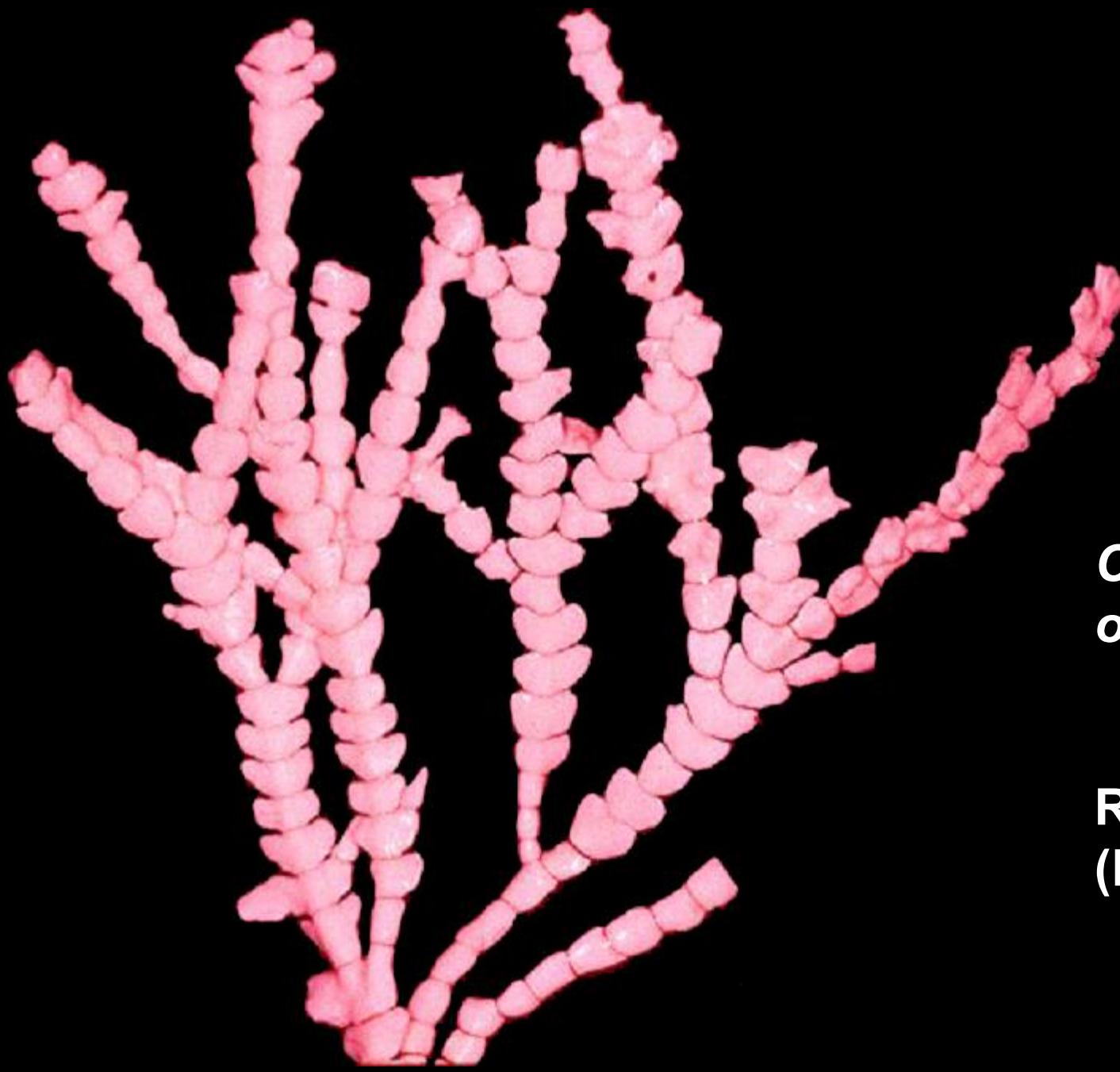




*Cyanophora  
paradoxa*

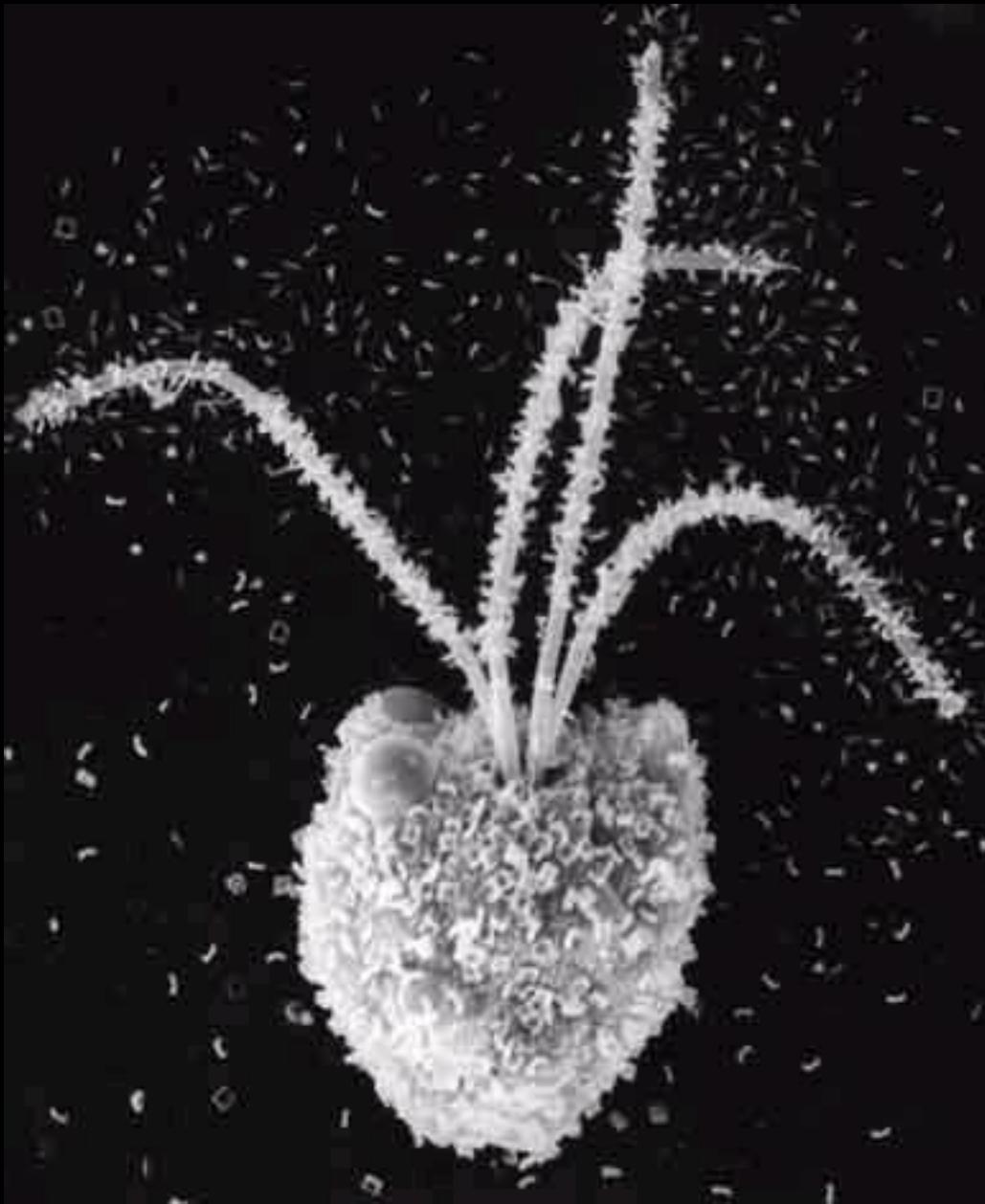
**Glaucophytes**

courtesy of  
Philippe Silar  
University of Paris South  
Orsay, France



*Corallina  
officinalis*

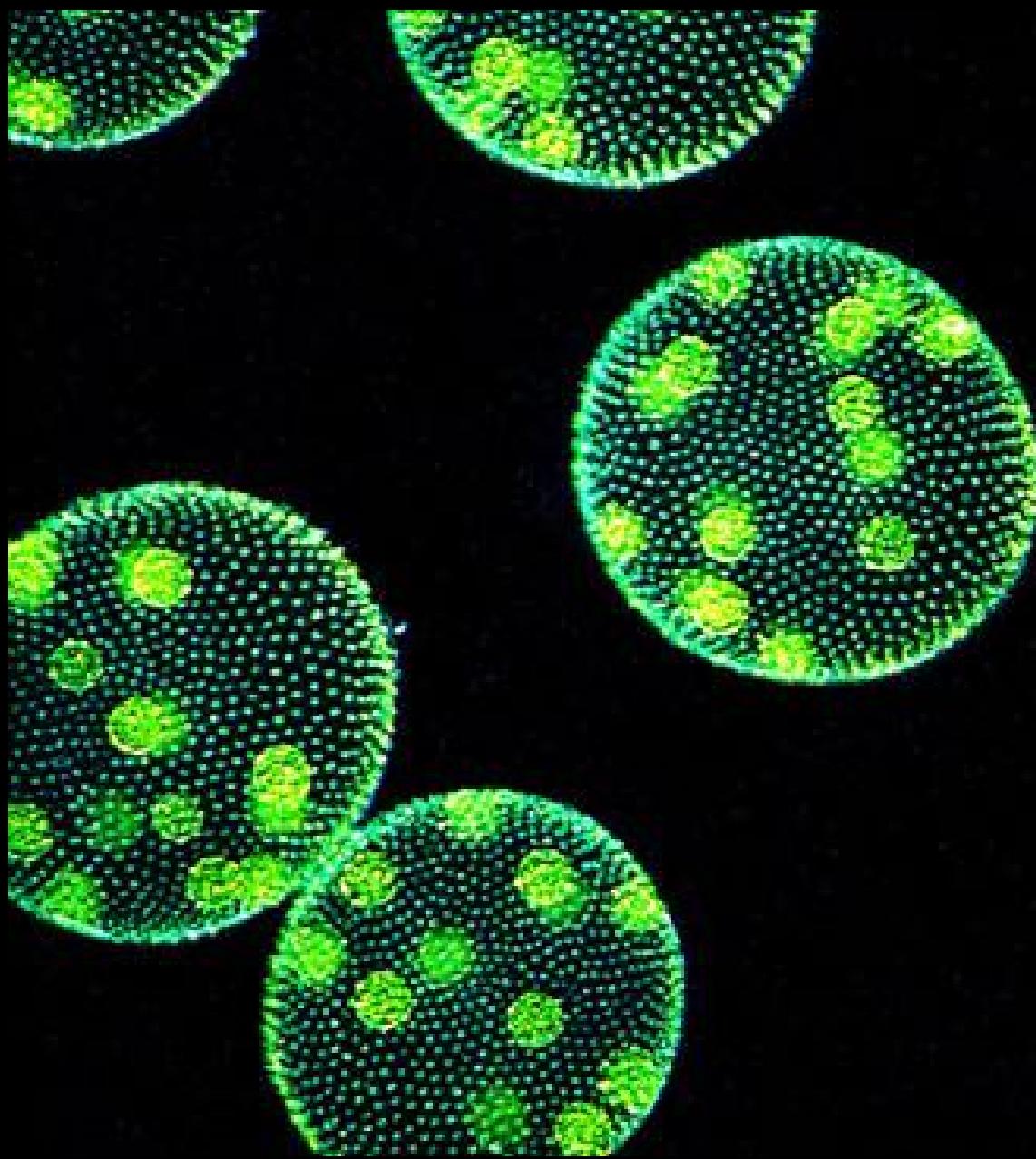
**Red Algae  
(Rhodophytes)**



*Pyramimonas  
gelidicola*

Prasinophytes

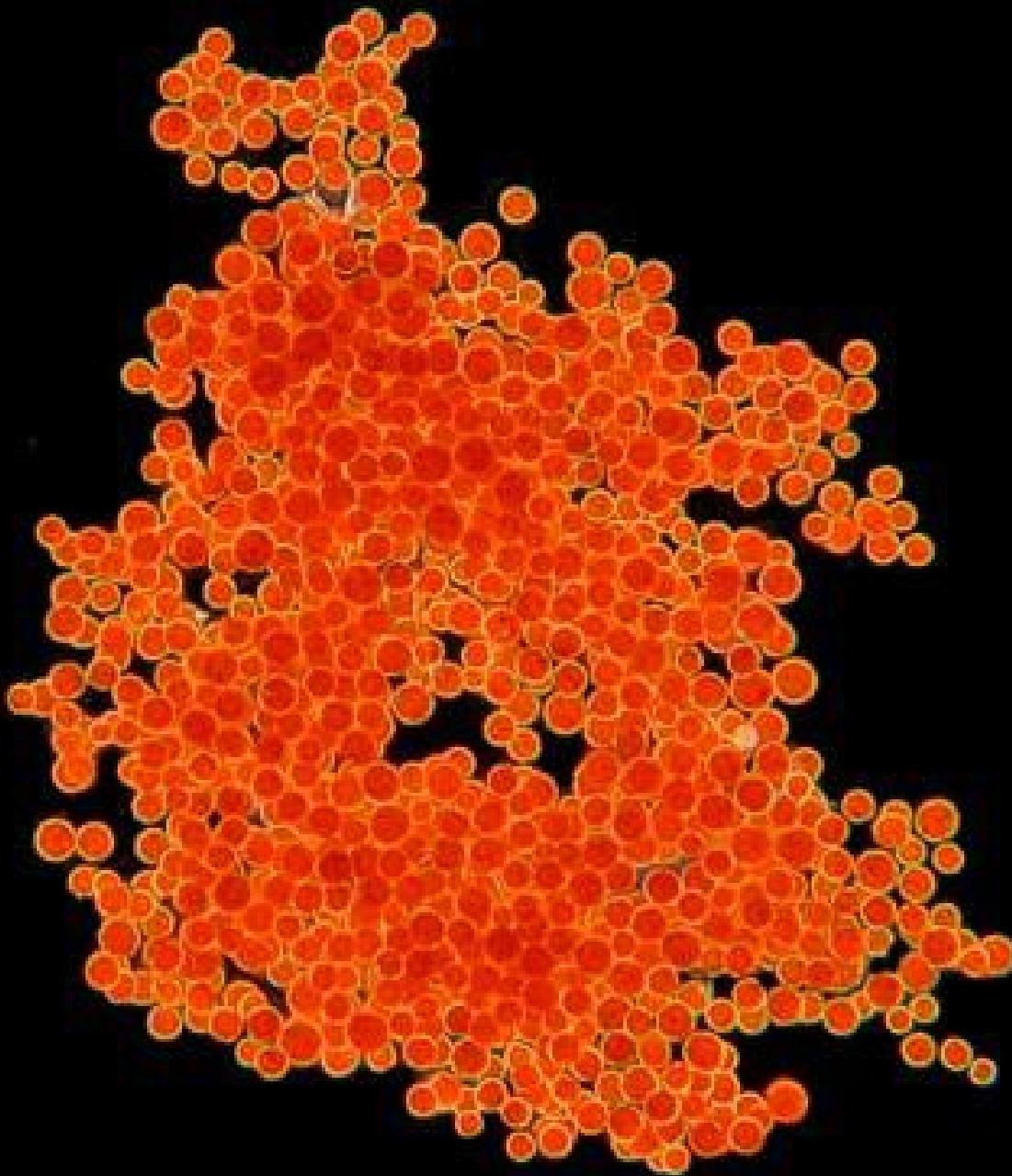
courtesy of  
Sandy Melloy  
Australian Antarctic Division  
Kingston, Tasmania  
©Commonwealth of Australia



*Volvox globator*

**Chlorophytes  
(Green Algae)**

Schmitt, R. and Sumper, M. 2003:  
Developmental biology: how to turn  
inside out. Nature 424: 499-500



*Haematococcus  
pluvialis*

**Chlorophytes  
(Green Algae)**

©Gerald Helbig  
[www.lebendkulturen.de](http://www.lebendkulturen.de)



*Micrasterias* sp.

**Chlorophytes  
(Green Algae)**

©Yee, N. & Entwistle, T.J.: ALGPIC:  
Quick pictorial identification of Australian  
Freshwater Algae.  
[http://www.rbgsyd.nsw.gov.au/  
information\\_about\\_plants/botanical\\_info/  
australian\\_freshwater\\_algae2/algpic](http://www.rbgsyd.nsw.gov.au/information_about_plants/botanical_info/australian_freshwater_algae2/algpic)



**Land Plants**

**Streptophytes**

courtesy of  
Chuck Neel (Slug)  
[www.pbase.com](http://www.pbase.com)

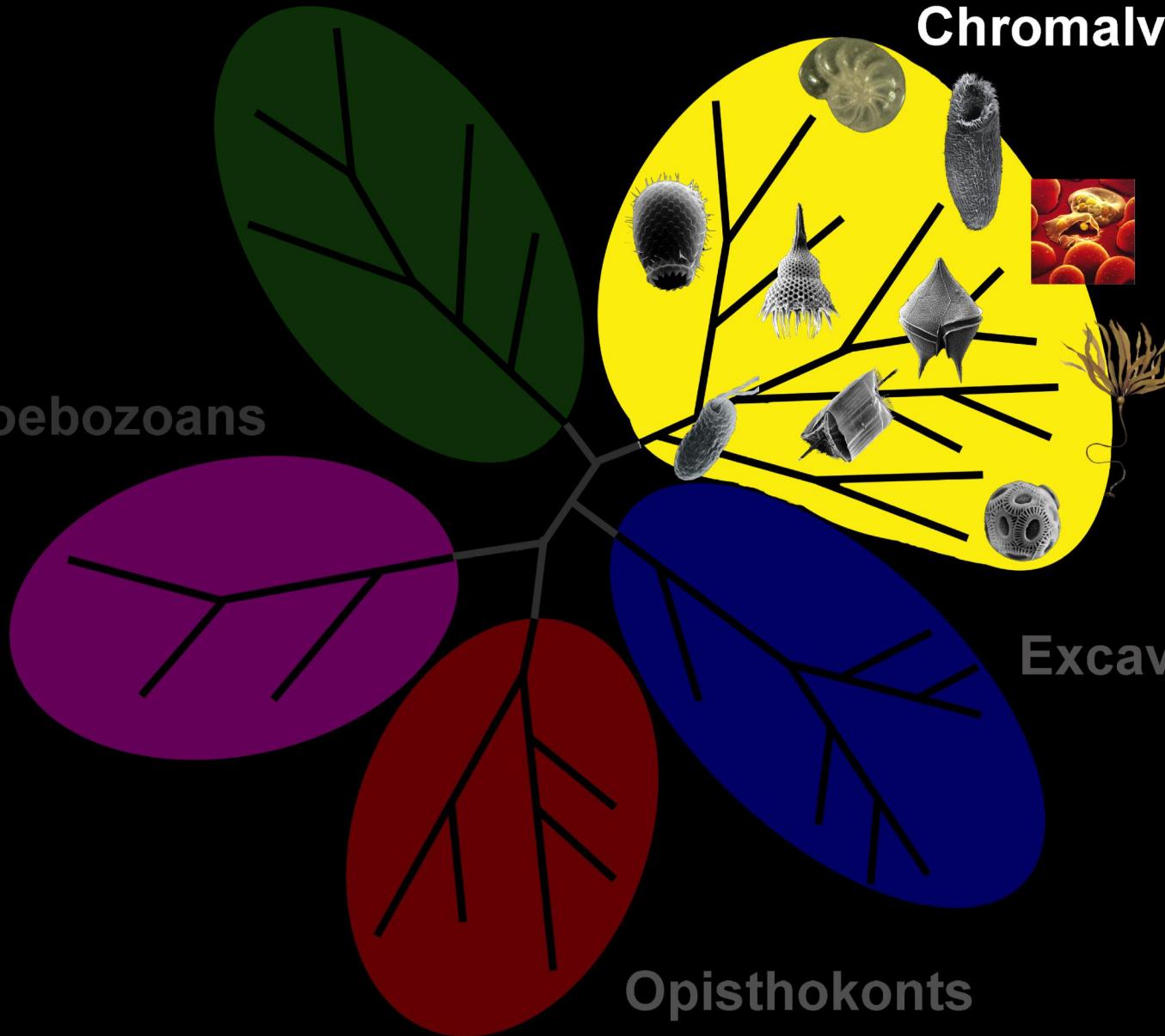
# Archaeplastids

## Chromalveolates

Amoebozoans

Opisthokonts

Excavates

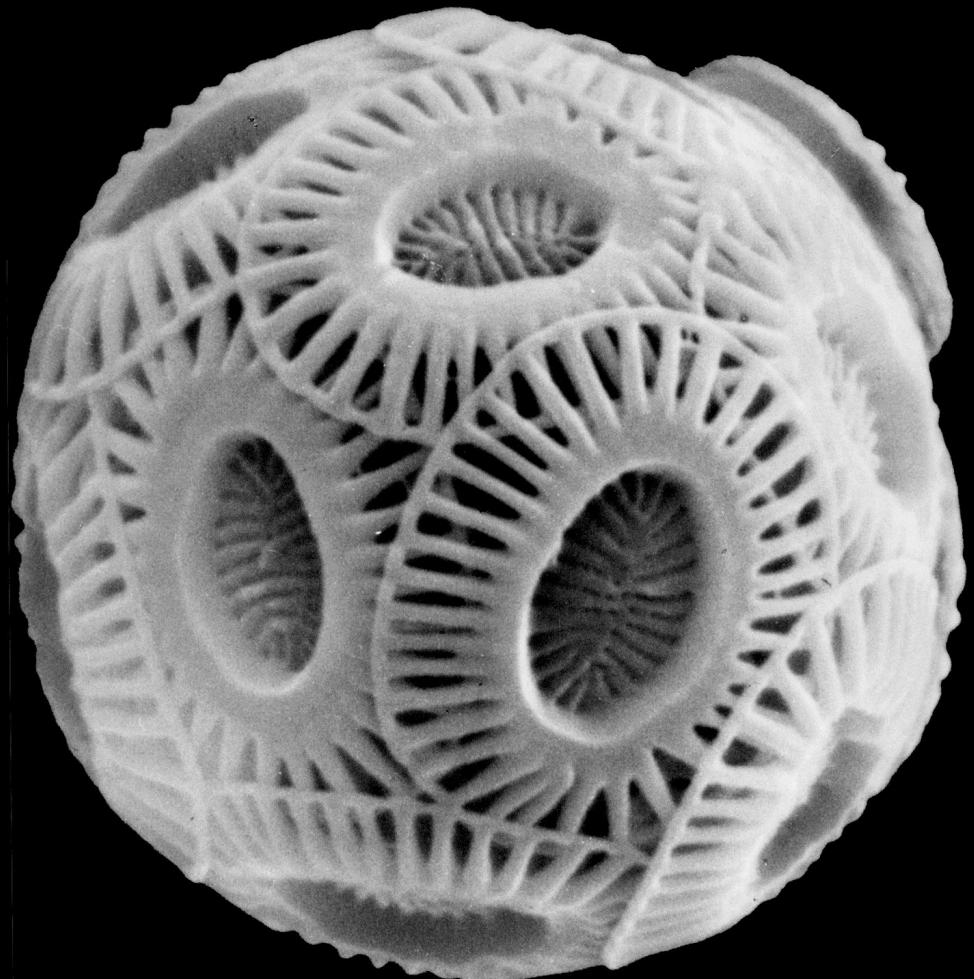




*Chroomonas sp.*

Cryptomonads

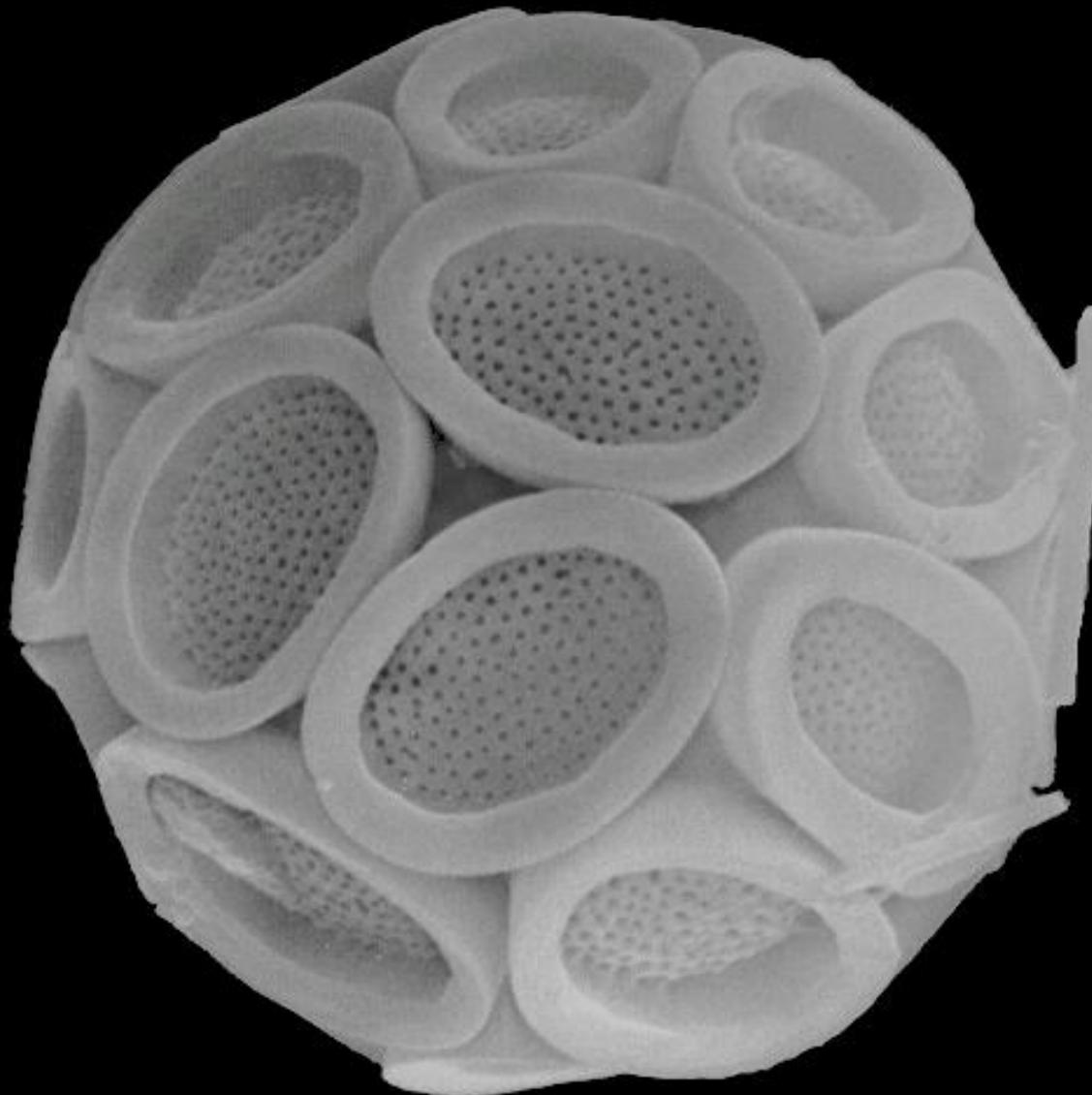
Kugrens, P. et al. 1986: Cell form and surface patterns in Chroomonas and Cryptomonas cells (Cryptophyta) as Revealed by scanning electron microscopy  
J. Phyc. 22: 512-522



*Emiliania huxleyi*

Haptophytes

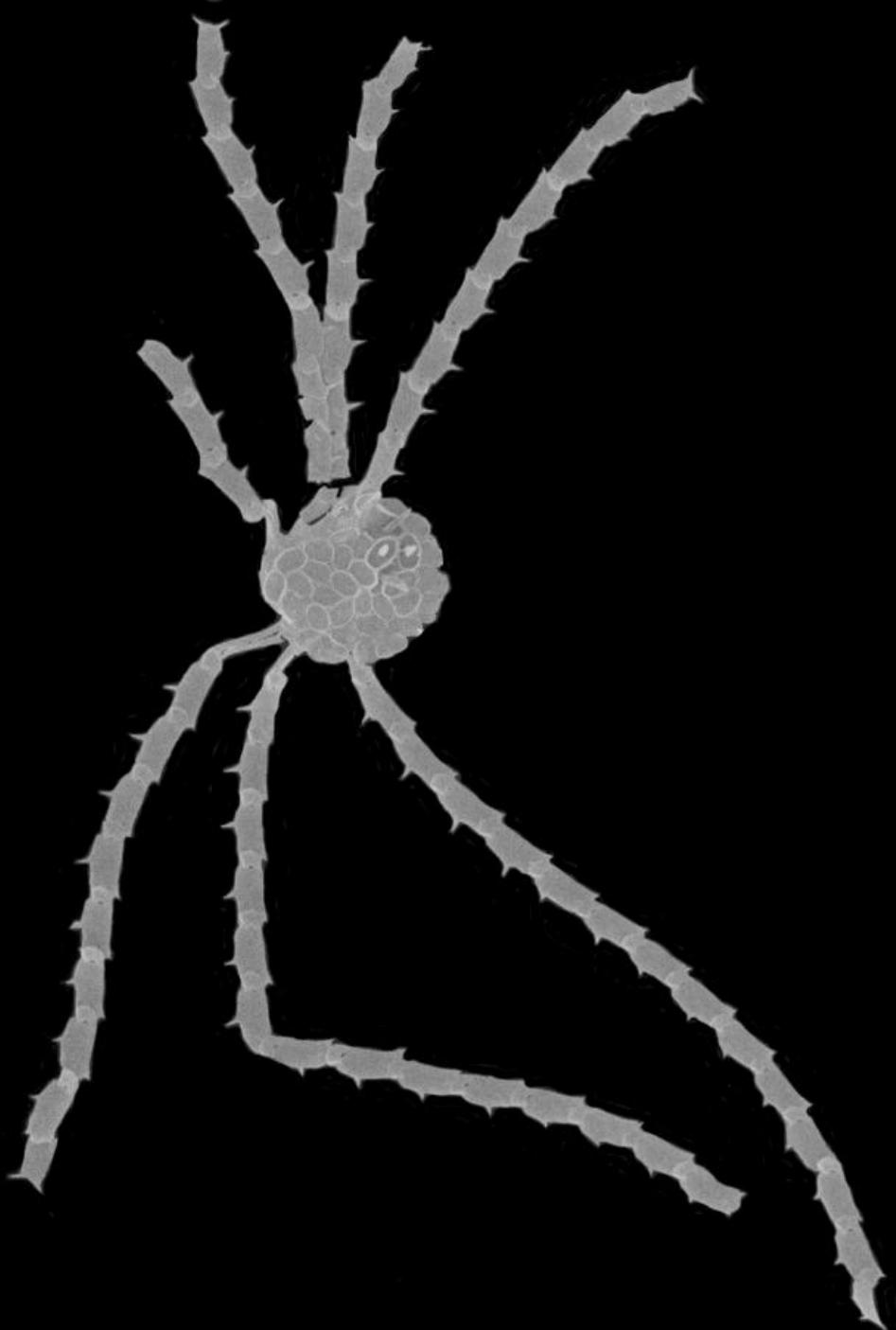
Hallegraeff, G. 1988:  
Plankton, a microscopic world  
Brill Academic Publishers, Leiden



*Pontosphaera  
discopora*

Haptophytes

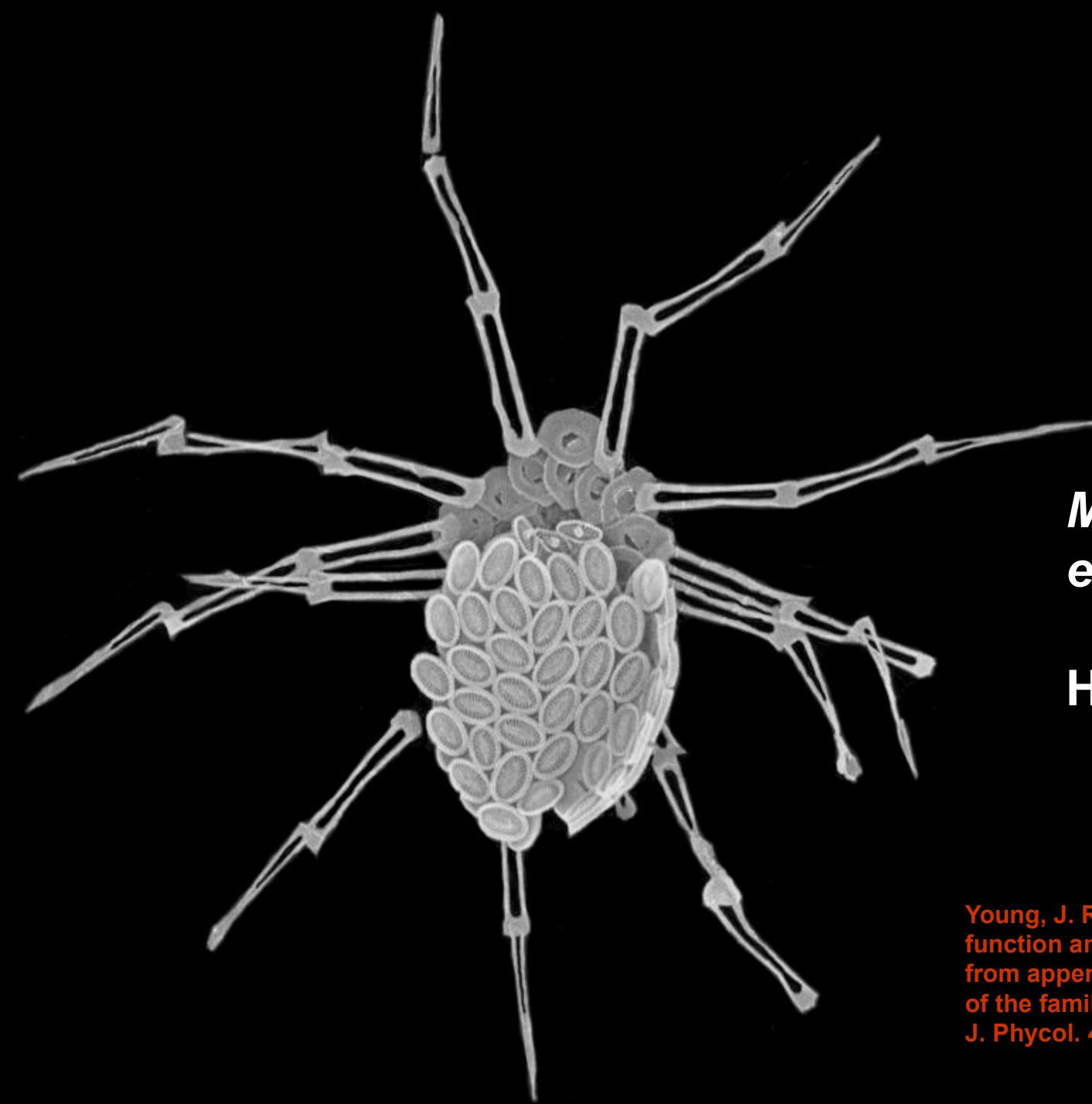
Hallegraeff, G. 1988:  
Plankton, a microscopic world  
Brill Academic Publishers, Leiden



*Ophiaster  
formosus*

Haptophytes

Young, J. R. et al. 2009: Coccolith function and morphogenesis: insights from appendage-bearing coccolithophores of the family Syracosphaeraceae. J. Phycol. 45: 213-226



*Michaelsarsia  
elegans*

Haptophytes

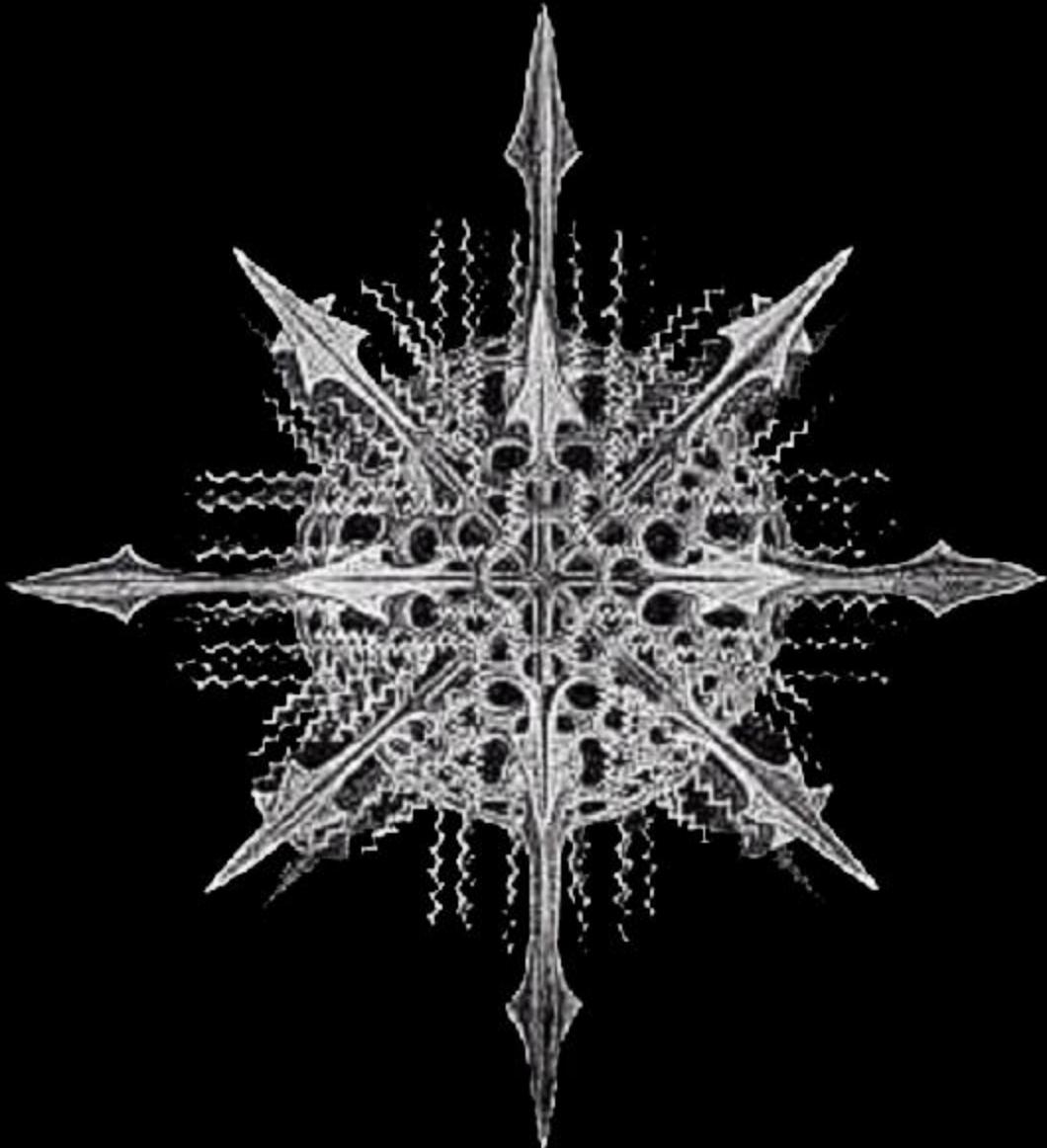
Young, J. R. et al. 2009: Coccolith function and morphogenesis: insights from appendage-bearing coccolithophores of the family Syracosphaeraceae. J. Phycol. 45: 213-226



*Acanthometra*

**Acantharians  
Radiolarians**

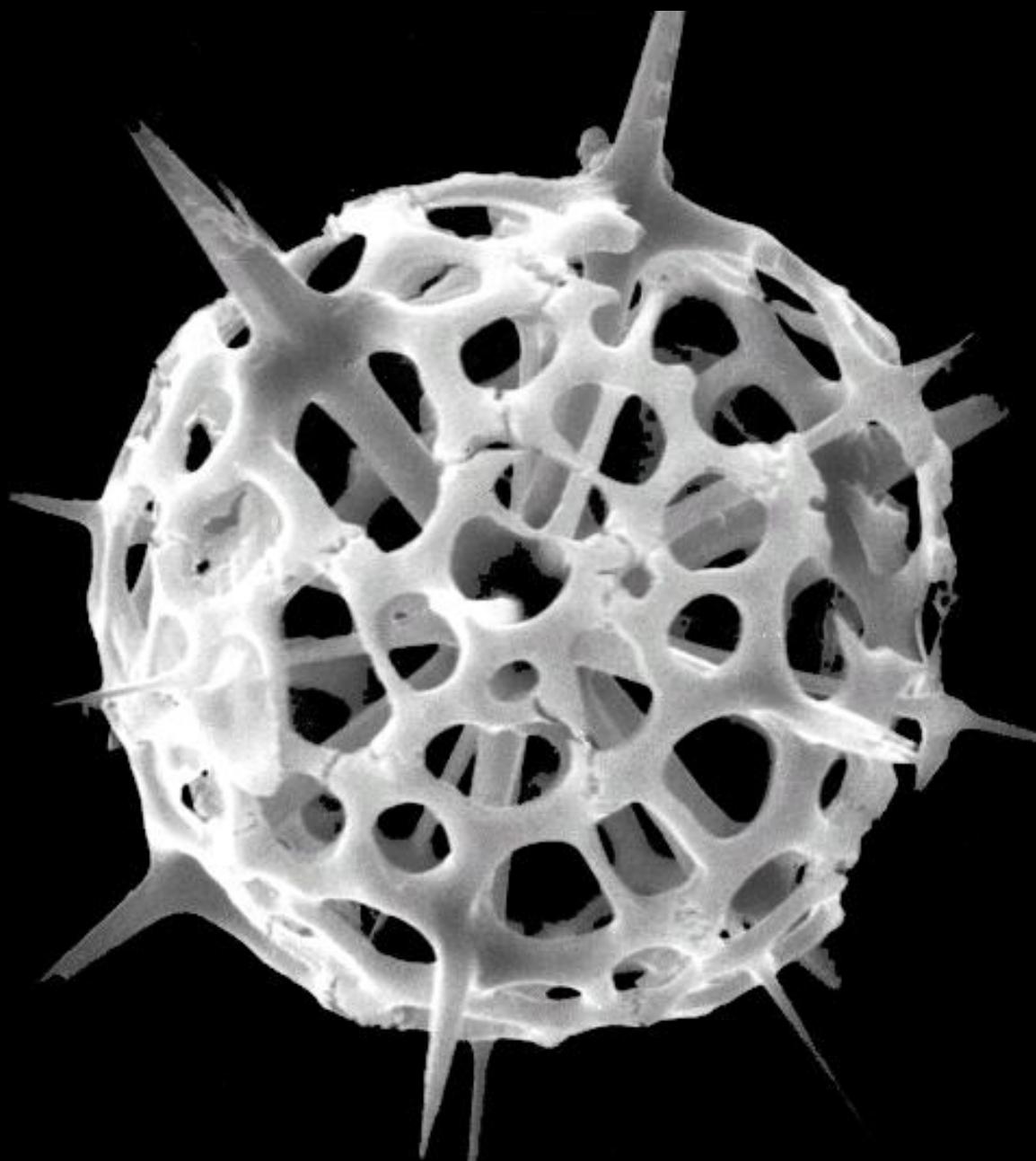
©Peter Parks, ImageQuest Ltd.  
Witney, Oxon, UK



*Lycnaspis  
miranda*

Acantharians  
Radiolarians

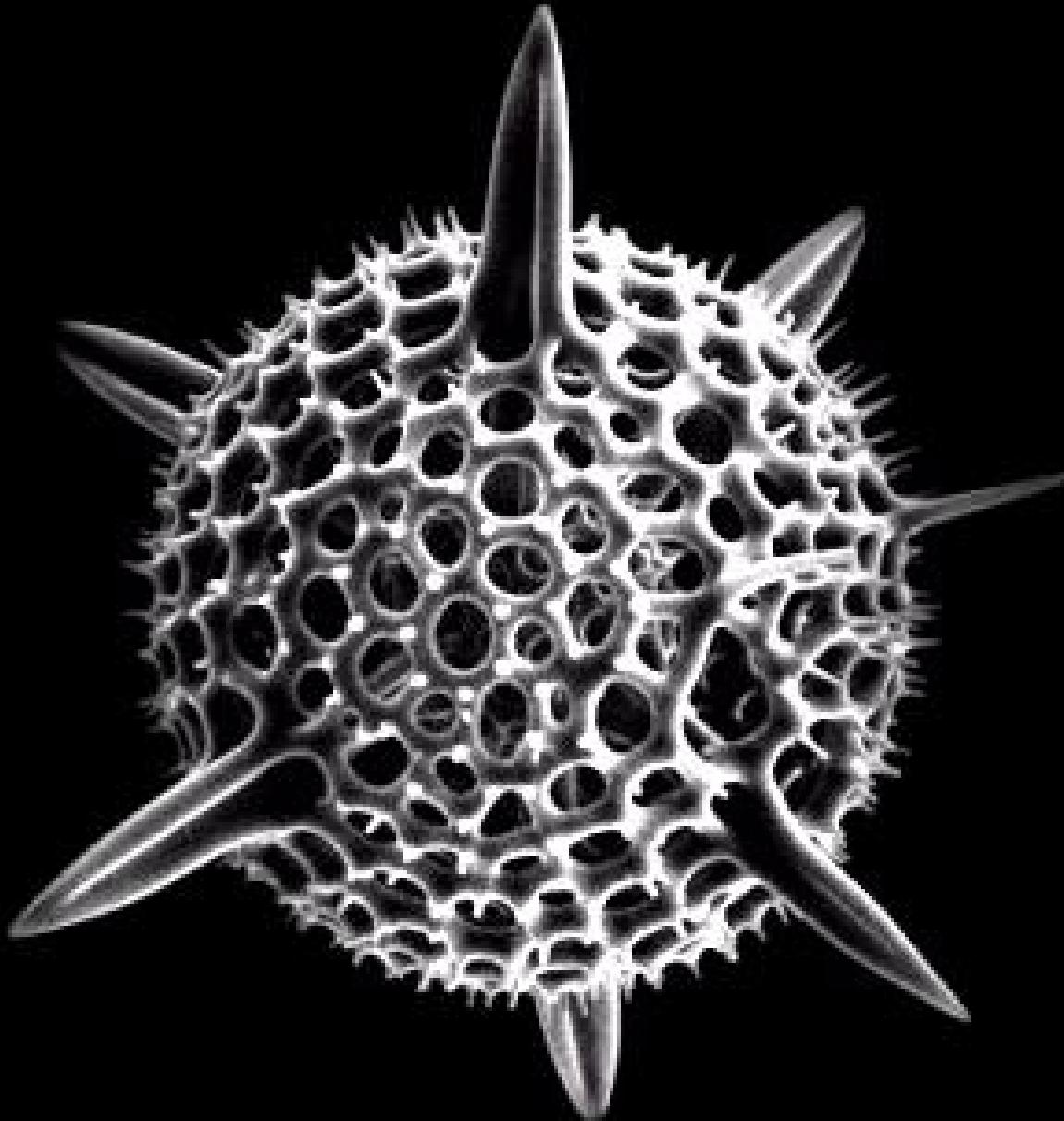
Ernst Haeckel  
Kunstformen der Natur



*Dictyacantha*

Acantharians  
Radiolarians

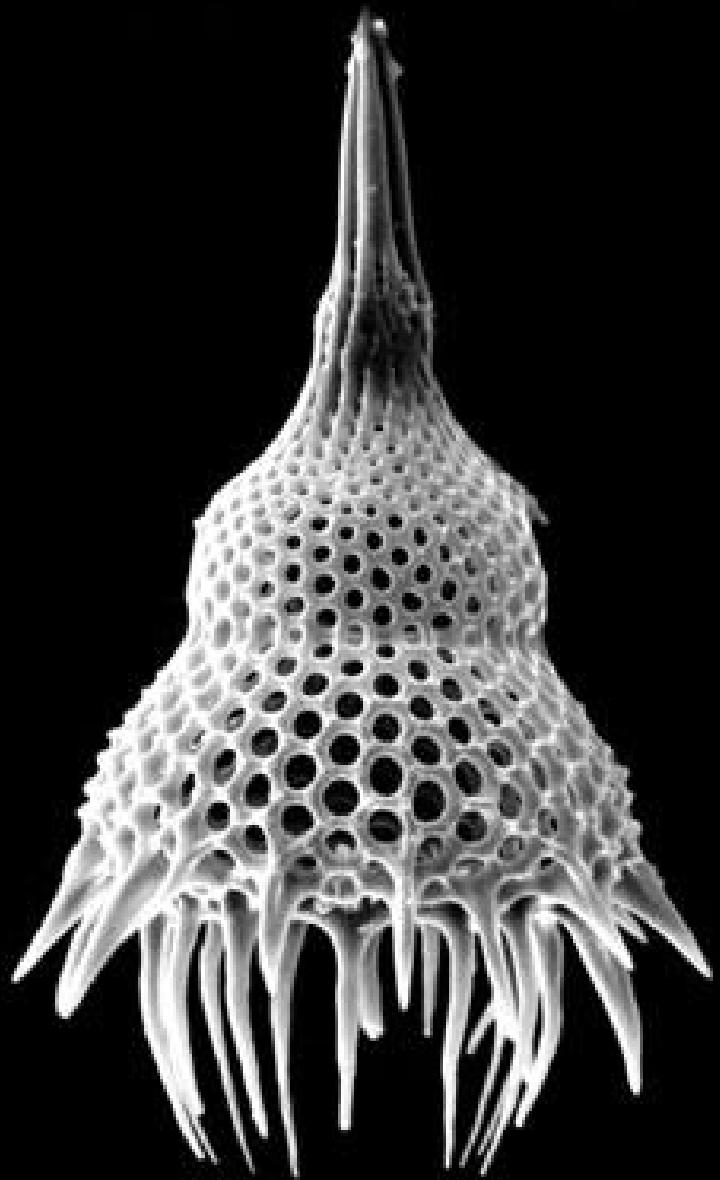
Hallegraeff, G. 1988:  
Plankton, a microscopic world  
Brill Academic Publishers, Leiden



*Hexastylus  
triaxonius*

**Spumellarians  
Radiolarians**

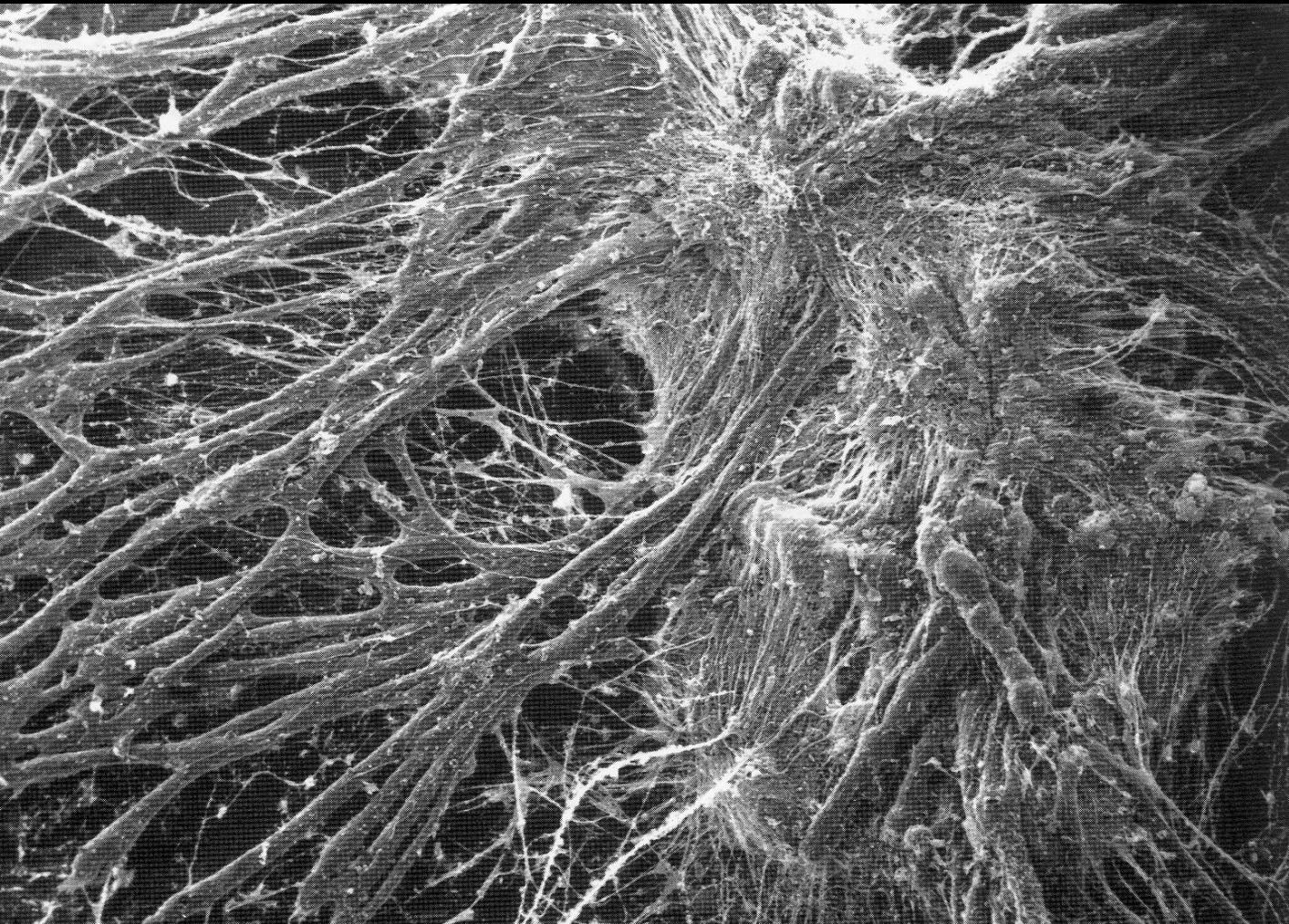
[www.radiolarian.com](http://www.radiolarian.com)



*Lamprocyclas  
maritalis*

**Nasellarians  
Radiolarians**

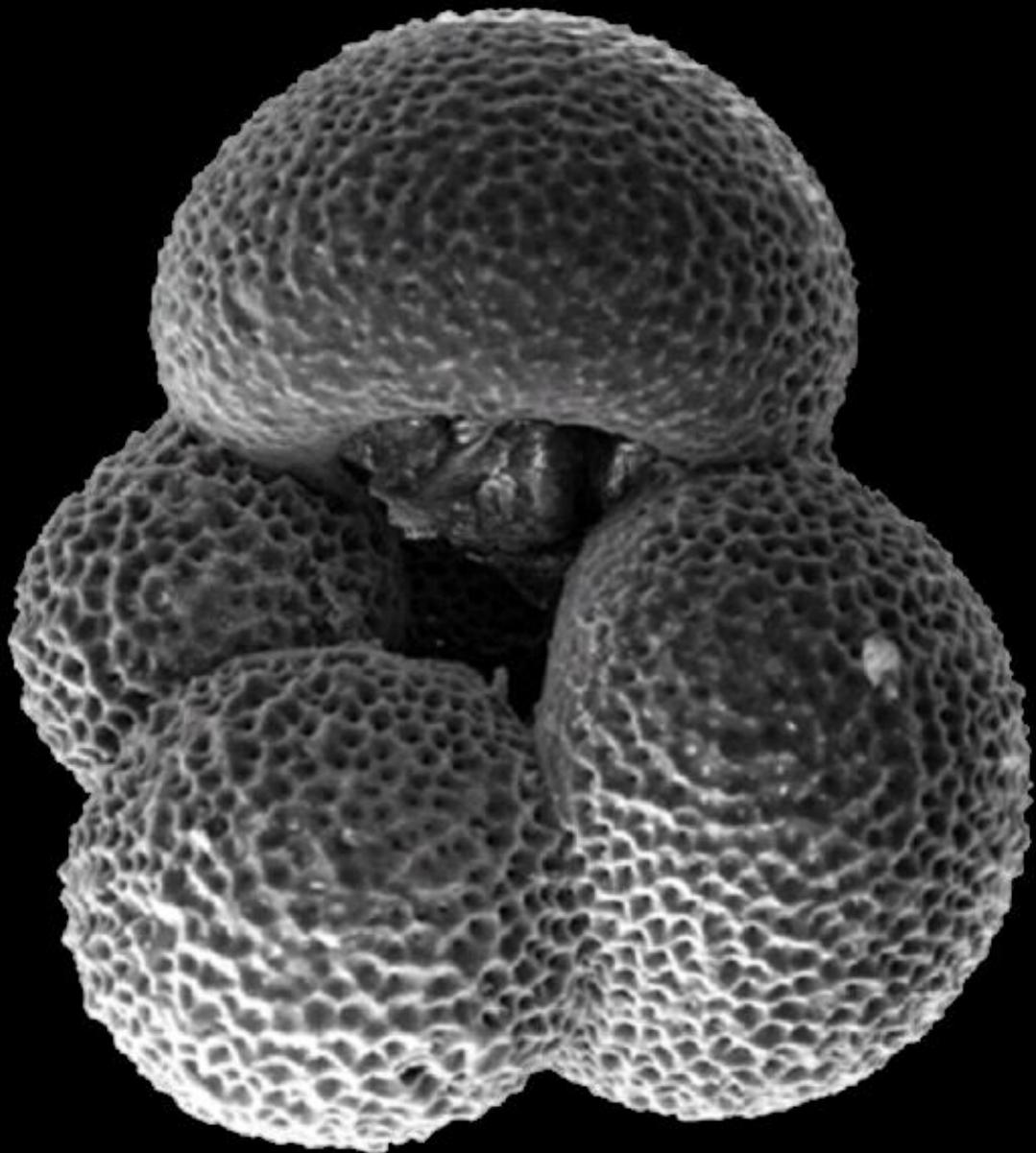
[www.radiolaria.org](http://www.radiolaria.org)



*Reticulomyxa  
filosa*

Foraminiferans

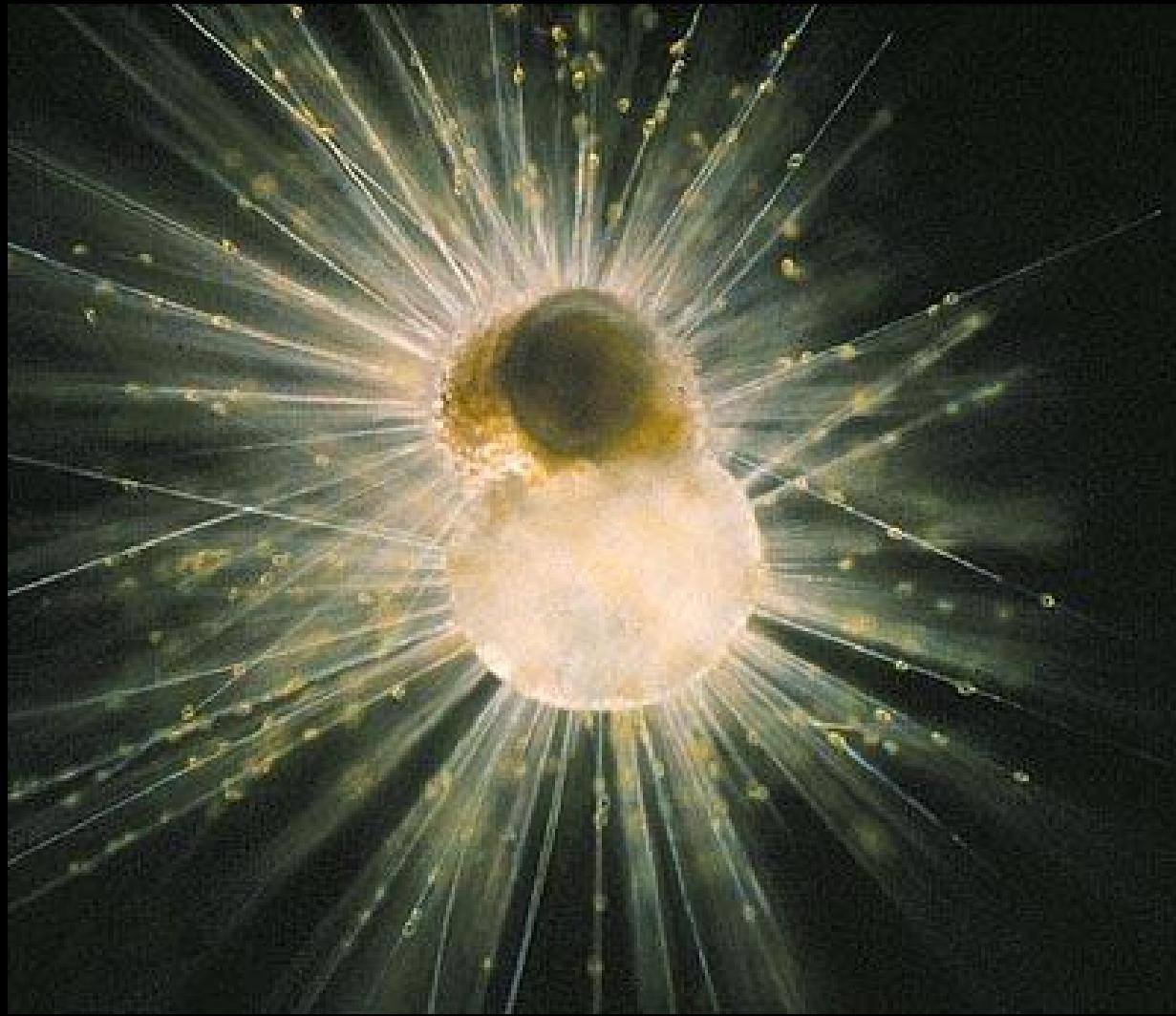
Hausmann et al. 2003:  
Protistology, 3<sup>rd</sup> edition  
©Schweizerbart'sche Verlagsbuchhandlung



***Globigerina  
bulloides***

**Foraminiferans**

Hallegraeff, G. 1988:  
Plankton, a microscopic world  
Brill Academic Publishers, Leiden



*Globigerinella  
sp.*

**Foraminiferans**

©O. Roger Anderson, image  
licensed to micro\*scope



***Notodendrodes  
antarctikos***

**Foraminiferans**

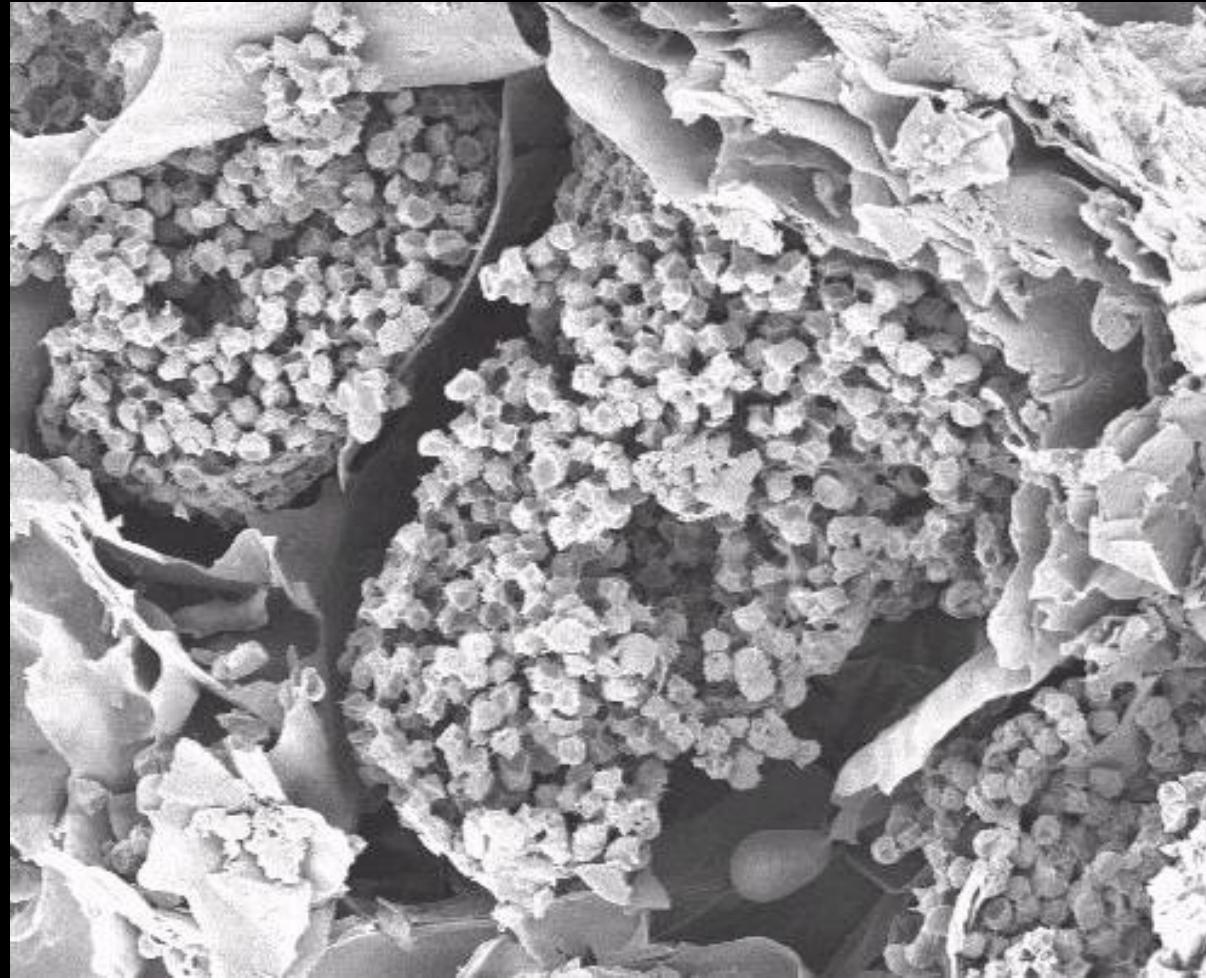
courtesy of Sam Bowser  
State University of New York  
Albany, New York, USA



*Marginopora*

Foraminiferans

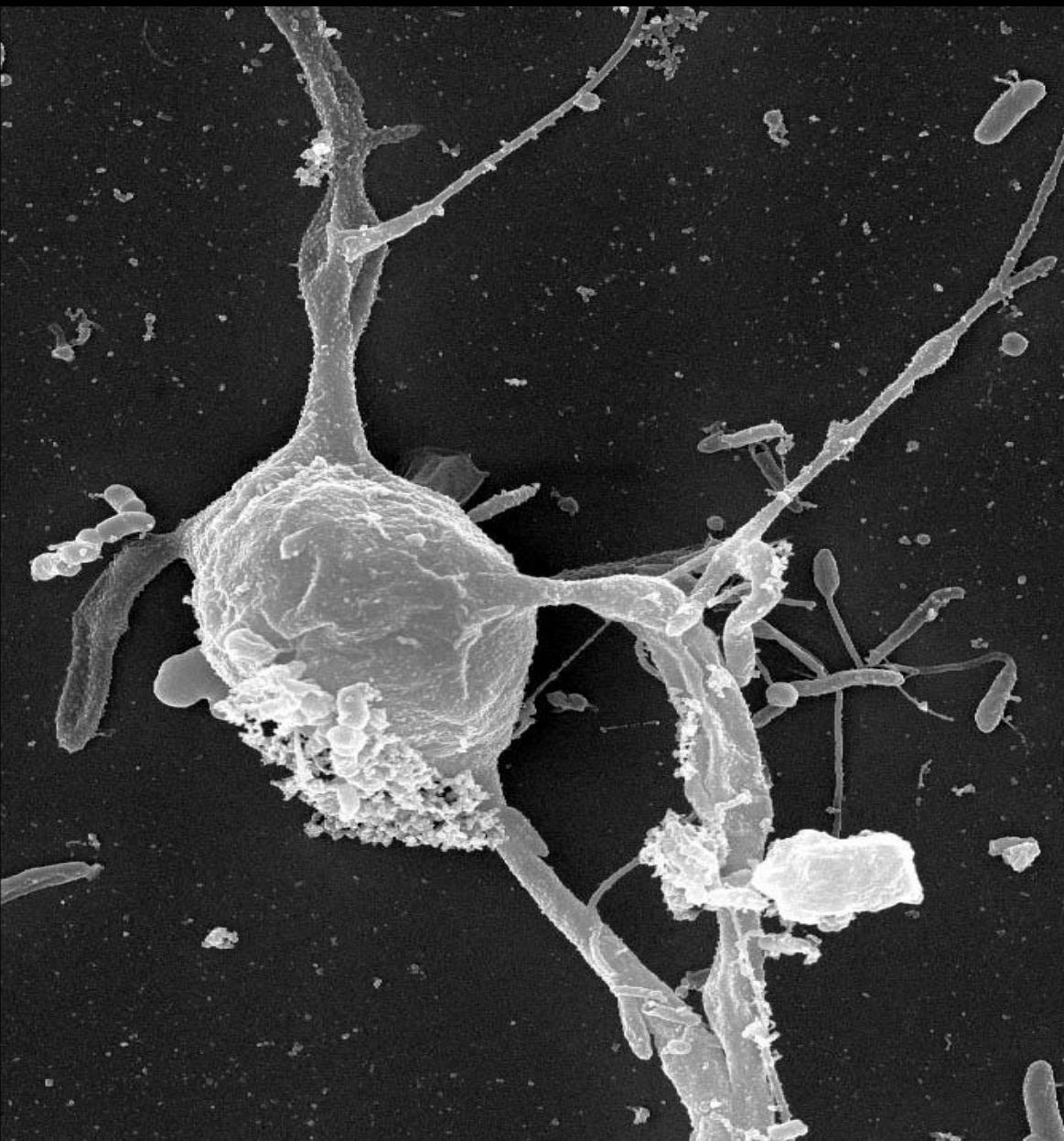
©Peter Parks, ImageQuest 3-D  
Witney, Oxon, UK



*Plasmodiophora  
brassicae*

Plasmodiophorids  
Cercozoans

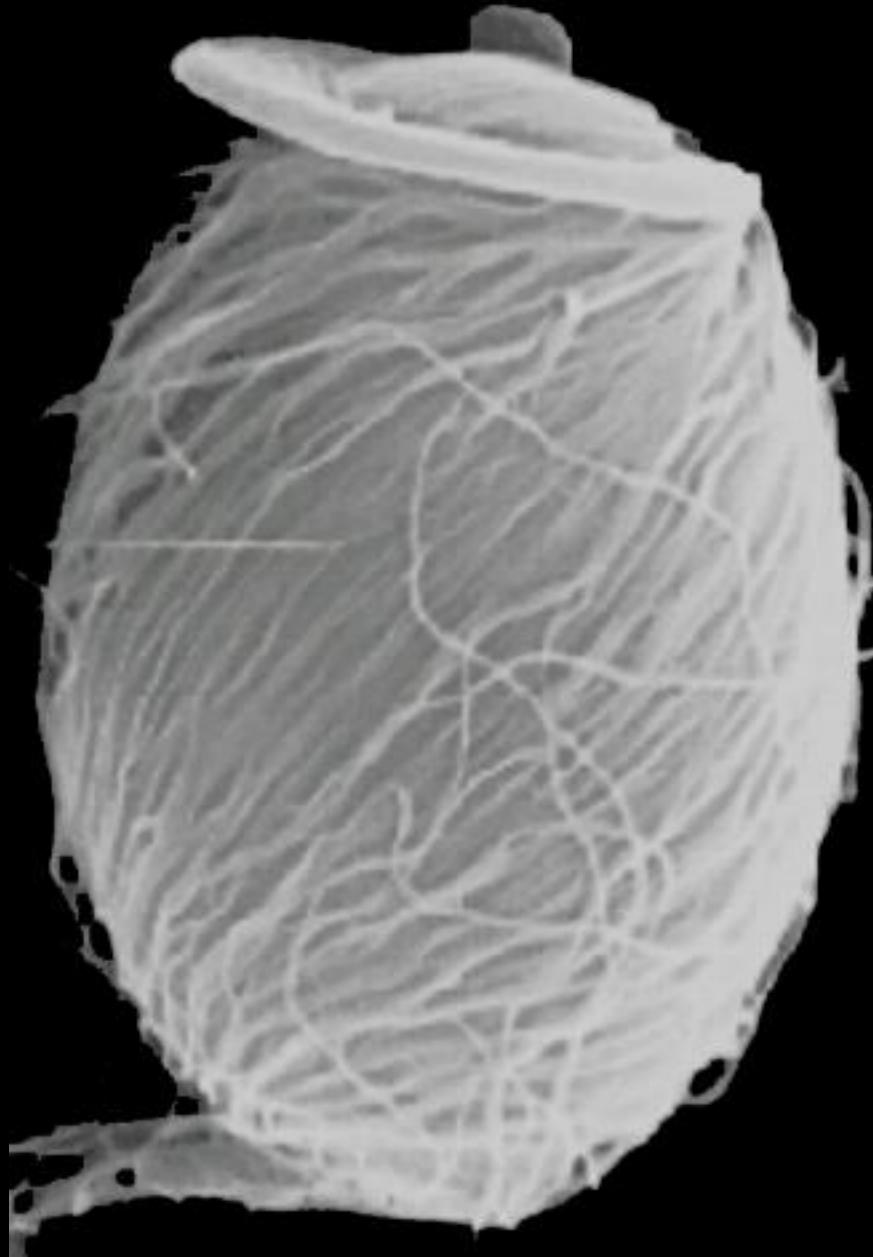
courtesy of  
Jutta Ludwig-Müller  
Technical University of Dresden  
Germany



*Gymnochlaora  
stellata*

**Chlorarachniophytes  
Cercozoans**

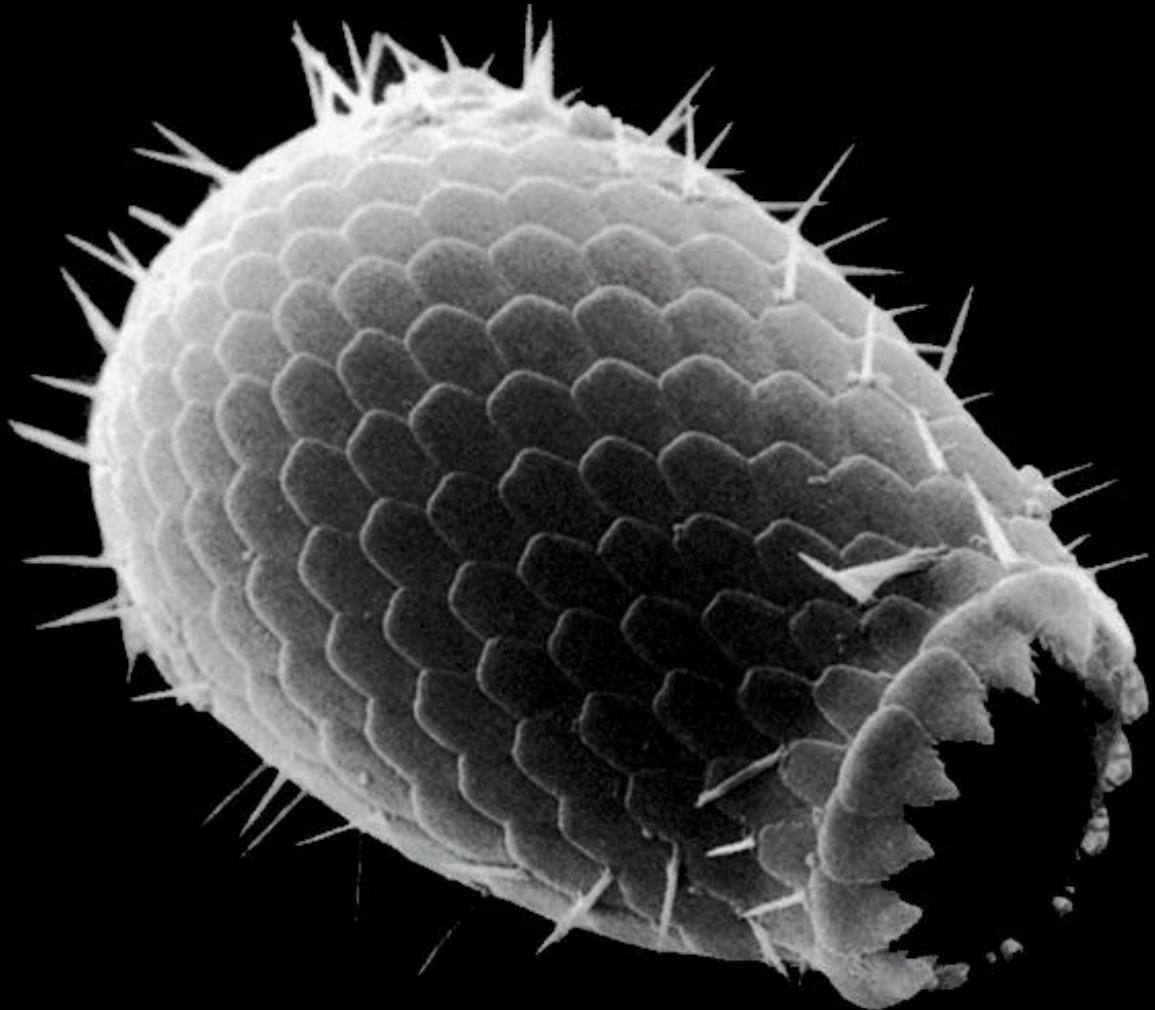
courtesy of Sam Bowser  
State University of New York  
Albany, New York, USA



*Haplosporidium  
nelsoni*

**Haplosporidians  
Cercozoans**

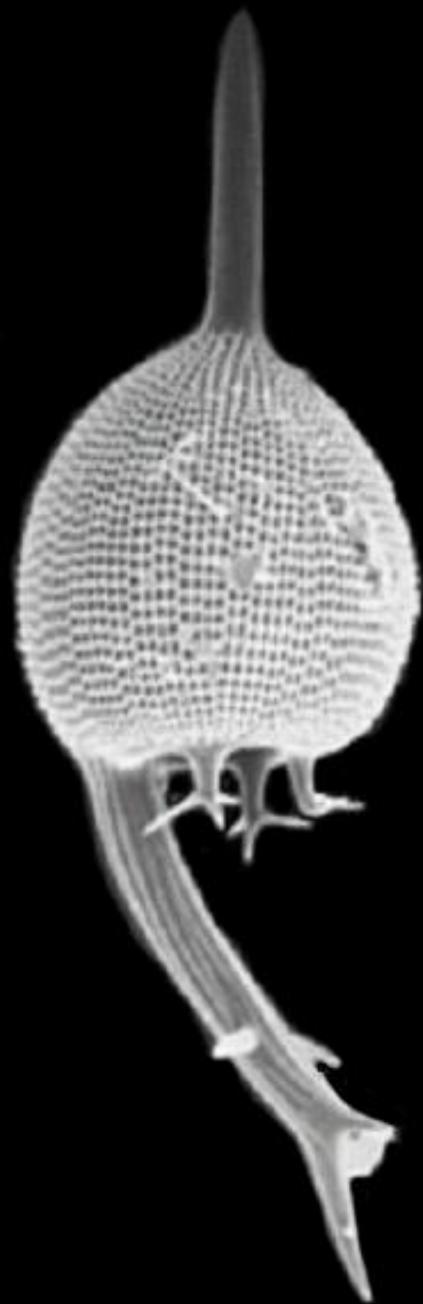
courtesy of  
Mark Siddall  
American Museum of Natural History  
New York, NY  
USA



*Euglypha  
strigosa*

**Testaceofilosians  
Cercozoans**

Meisterfeld, R. 2000: Testate amoebae with filopodia. In: Lee, J. J. et al. (eds.): The Illustrated Guide to the Protozoa 2<sup>nd</sup> edition. ©Society of Protozoologists



*Euphysetta  
elegans*

Phaeodarians  
Cercozoans

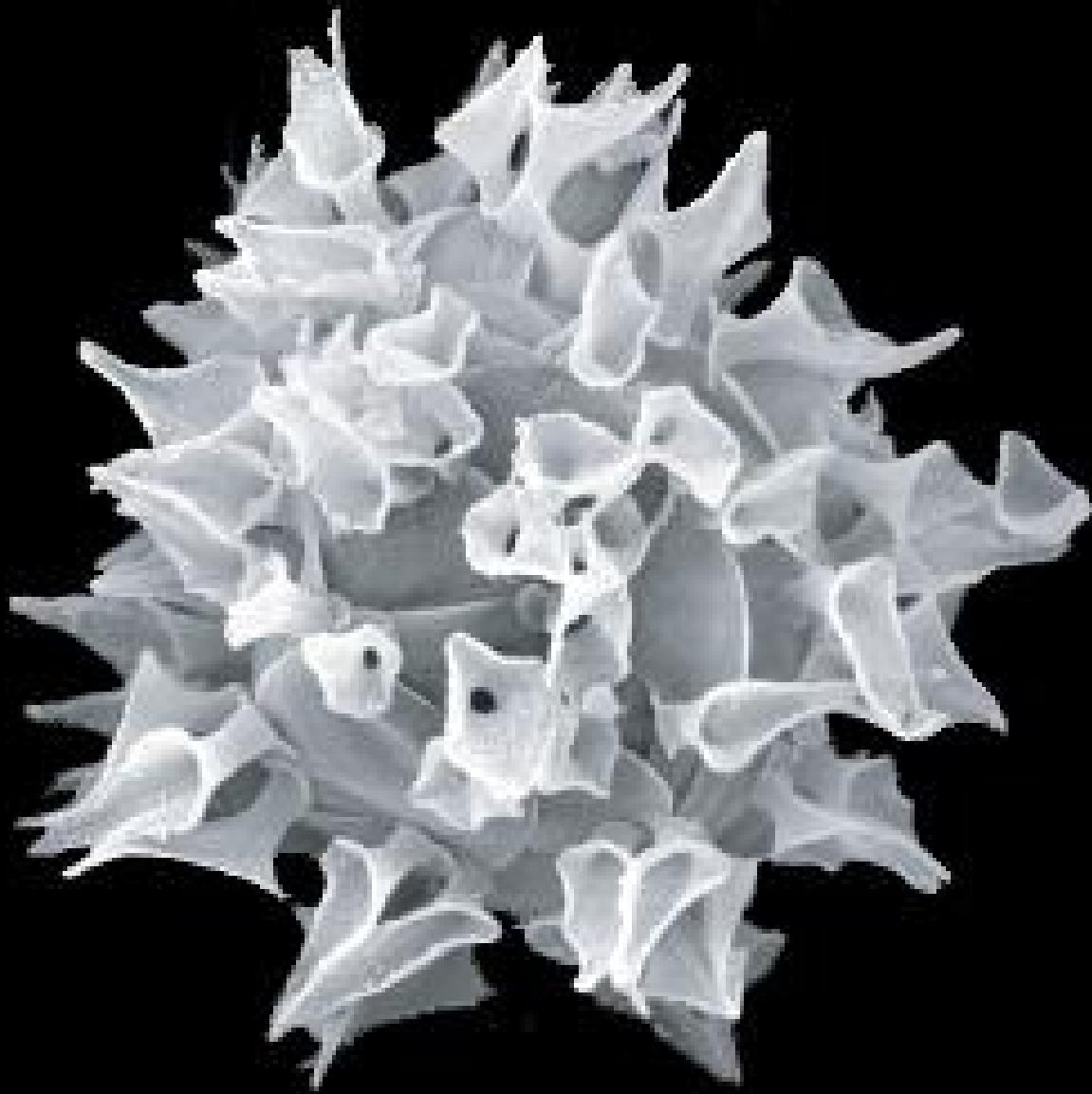
[www.radiolaria.org](http://www.radiolaria.org)



*Coelographis regina*

Phaeodarians  
Cercozoans

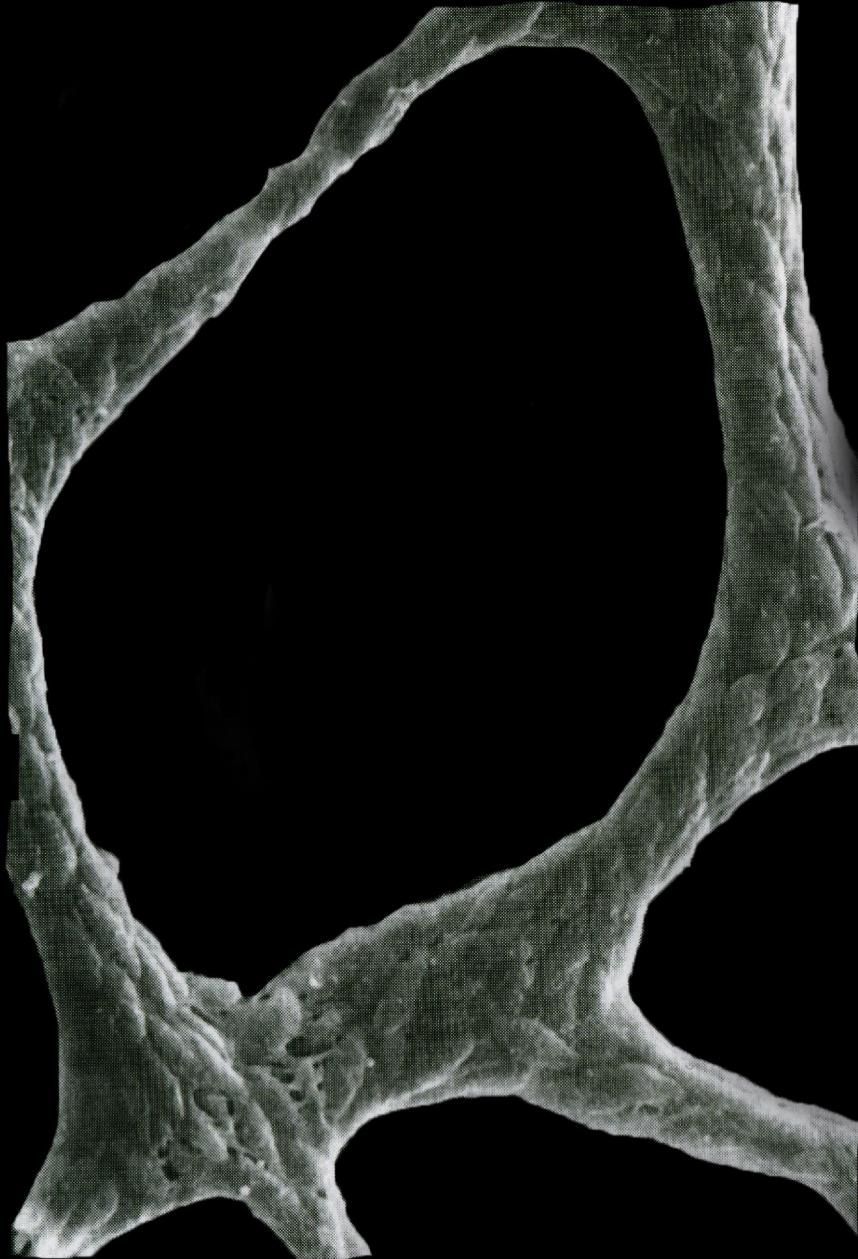
Ernst Haeckel  
Kunstformen der Natur



*Acanthocystis  
pulchra*

**Centrohelids  
*incertae sedis***

courtesy of  
Masaki Yoshida  
Rikkyo University  
Tokyo, Japan



*Labyrinthula  
coenocystis*

**Labyrinthulomycetes**

Hausmann, K. et al. 2003: Protistology,  
3<sup>rd</sup> edition. Schweizerbart'sche  
Verlagsbuchhandlung



*Schizochytrium  
aggregatum*

Labyrinthulomycetes

courtesy of  
Celeste Leander  
University of British Columbia  
Vancouver, Canada



*Achlya  
racemosa*

Oomycetes

[http://www.infusion.alconet.org/  
webquest/TheProtists.html](http://www.infusion.alconet.org/webquest/TheProtists.html)



*Phytophthora* sp.

Oomycetes

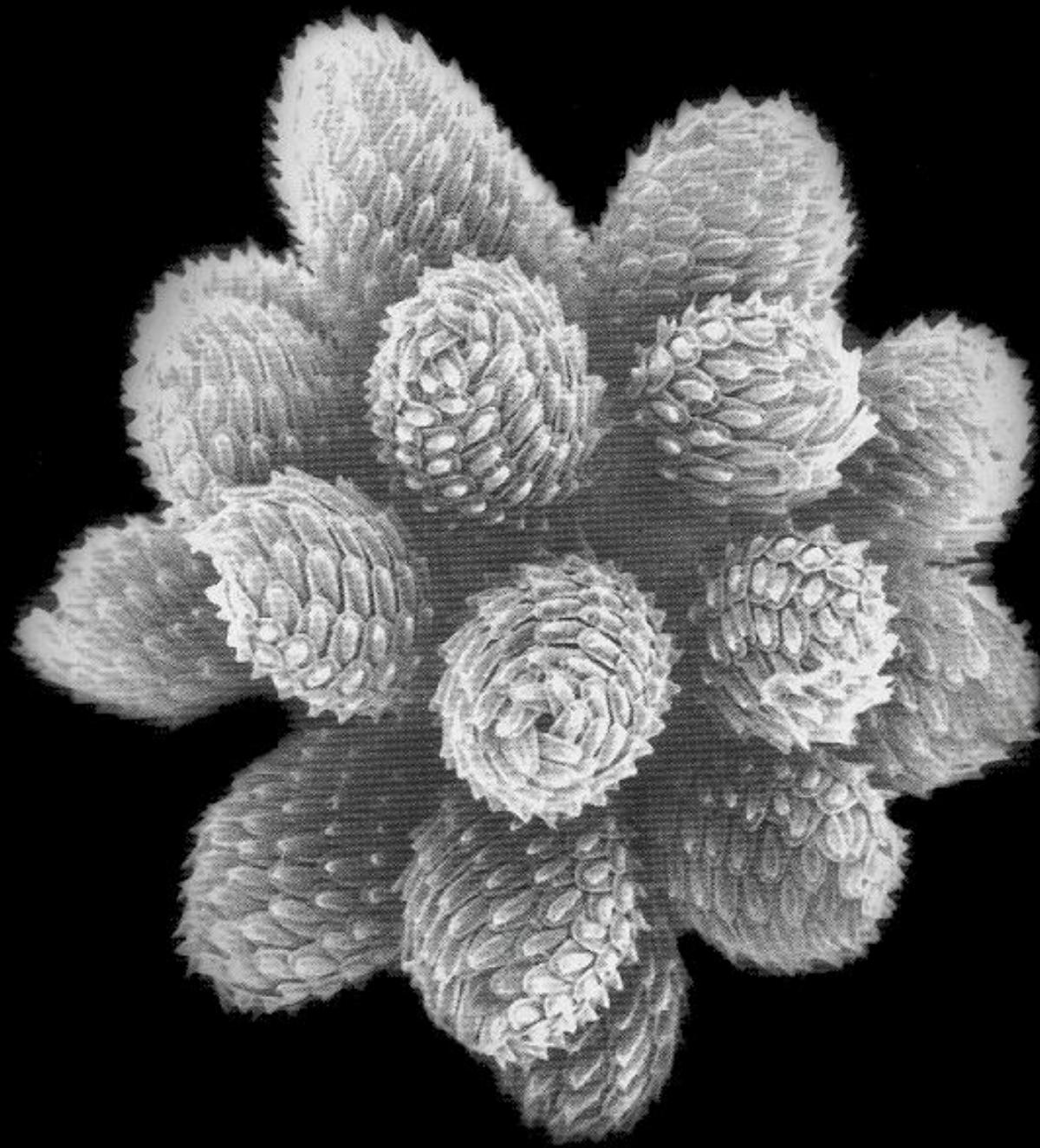
©American Phytopathological Society,  
Illustrated Guide of Plant Pathology,  
[http://www.apsnet.org/Education/Illustrated  
Glossary/PhotosA-D/amphigynous.htm](http://www.apsnet.org/Education/IllustratedGlossary/PhotosA-D/amphigynous.htm)



*Proteromonas  
lacertaeviridis*

Opalinids

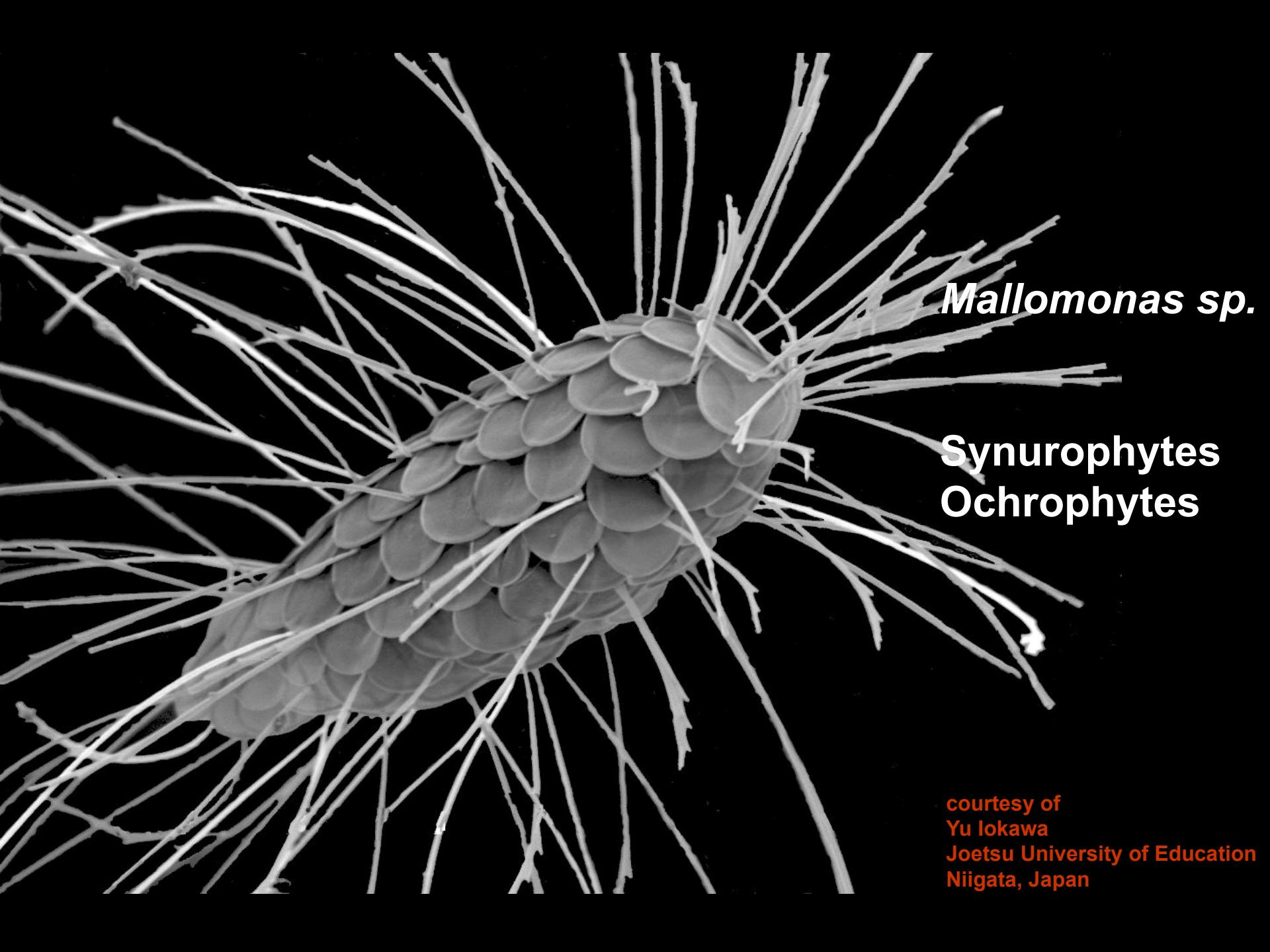
©Guy Brugerolle, University of  
Clermont-Ferrand, France.  
Image licensed to micro\*scope



*Synura  
petersenii*

**Synurophytes  
Ochrophytes**

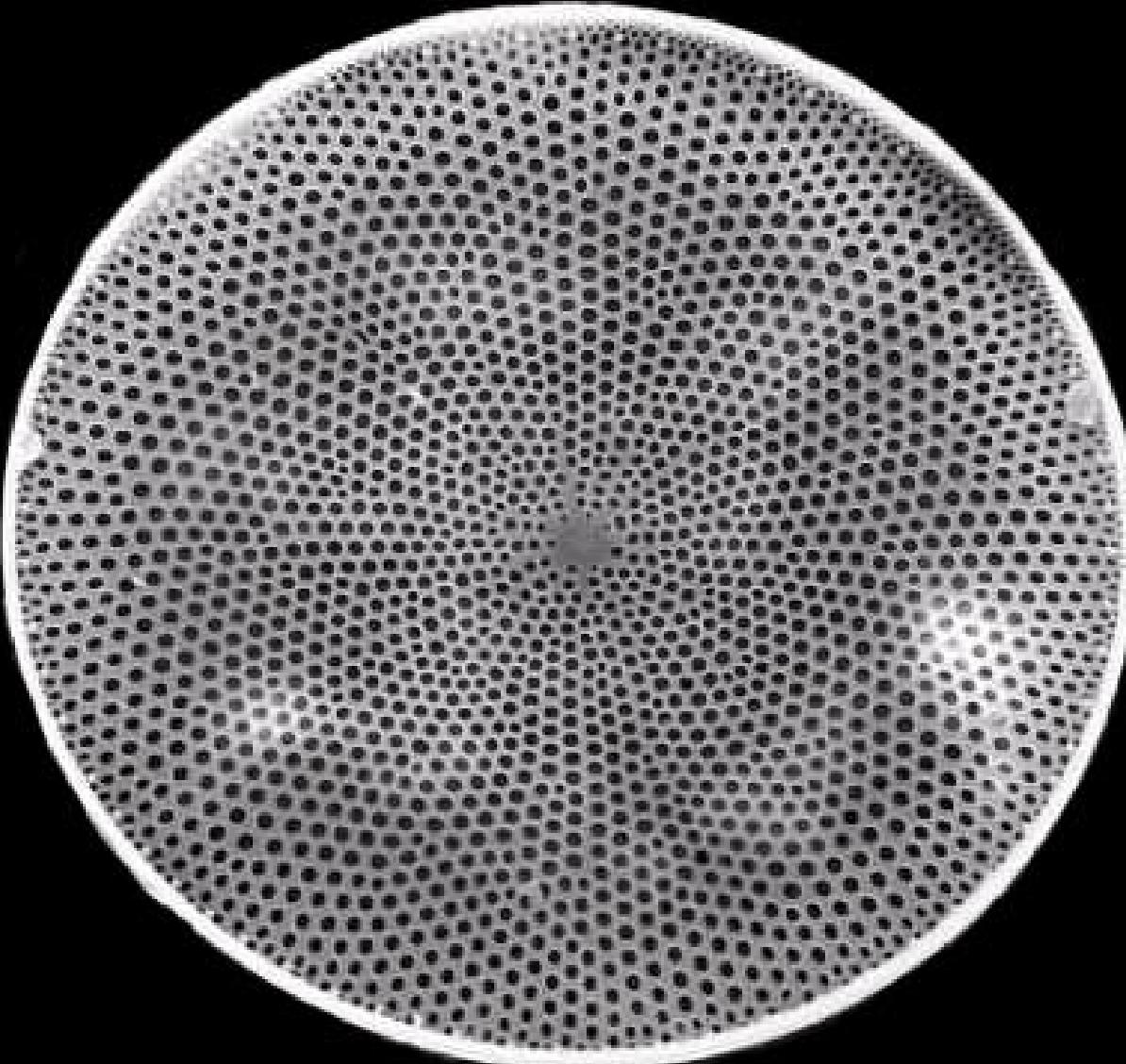
courtesy of  
Christian Bardele  
University of Tübingen  
Germany



*Mallomonas* sp.

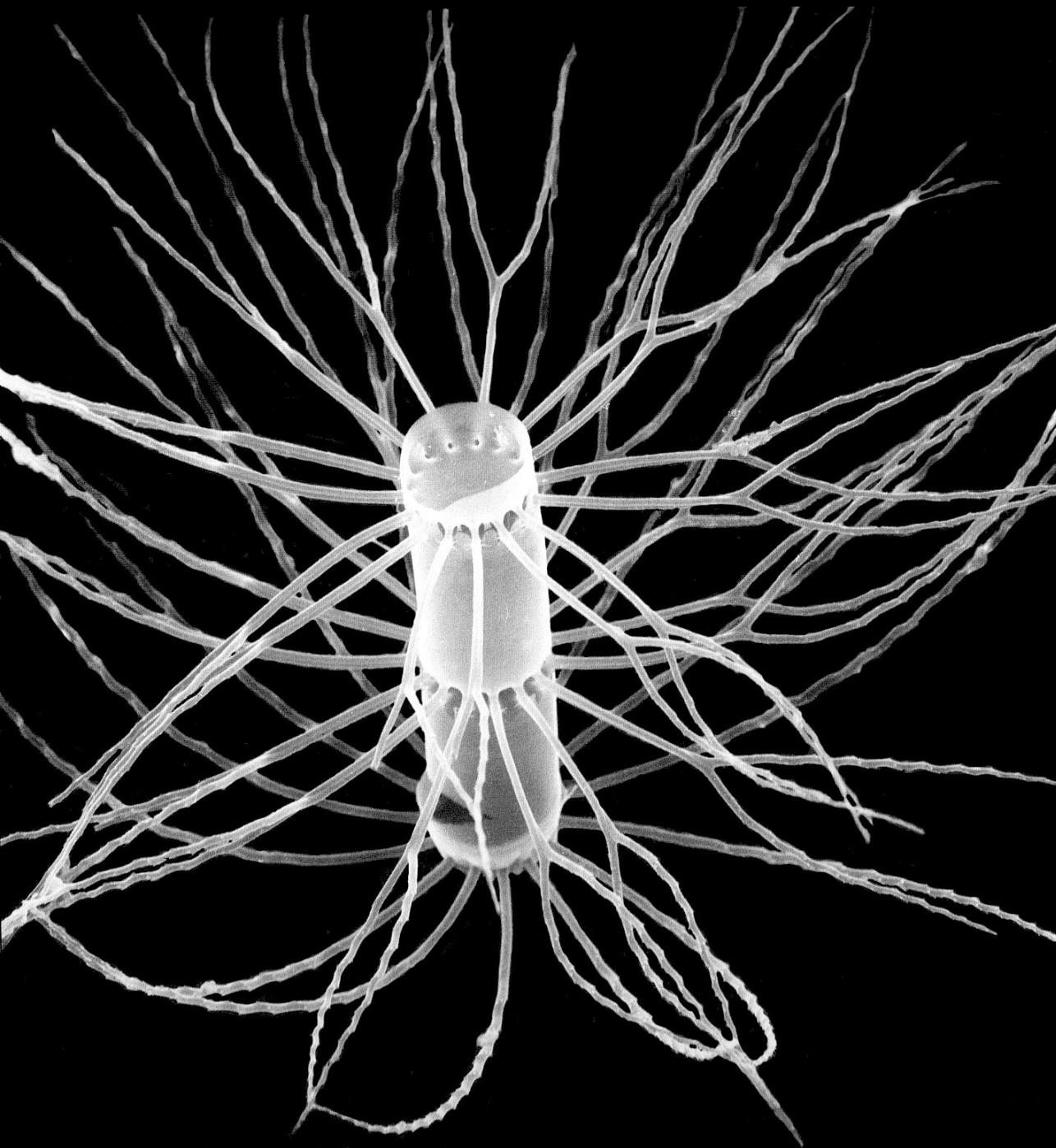
**Synurophytes  
Ochrophytes**

courtesy of  
Yu Iokawa  
Joetsu University of Education  
Niigata, Japan



*Coscinodiscus*  
Diatoms

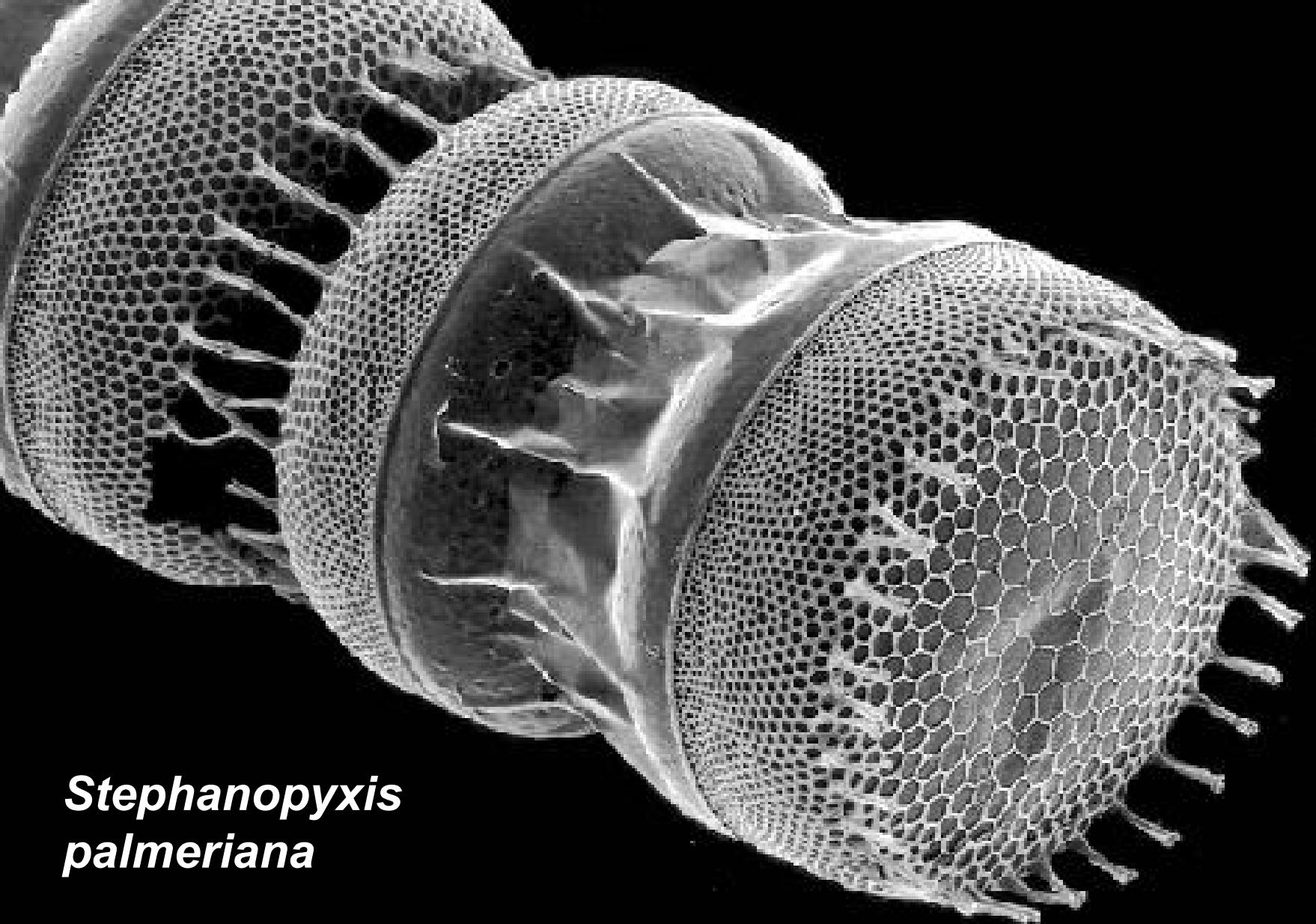
courtesy of  
Heribert Cypionka  
University of Oldenburg  
Germany



*Bacteriastrum  
furcatum*

## Diatoms

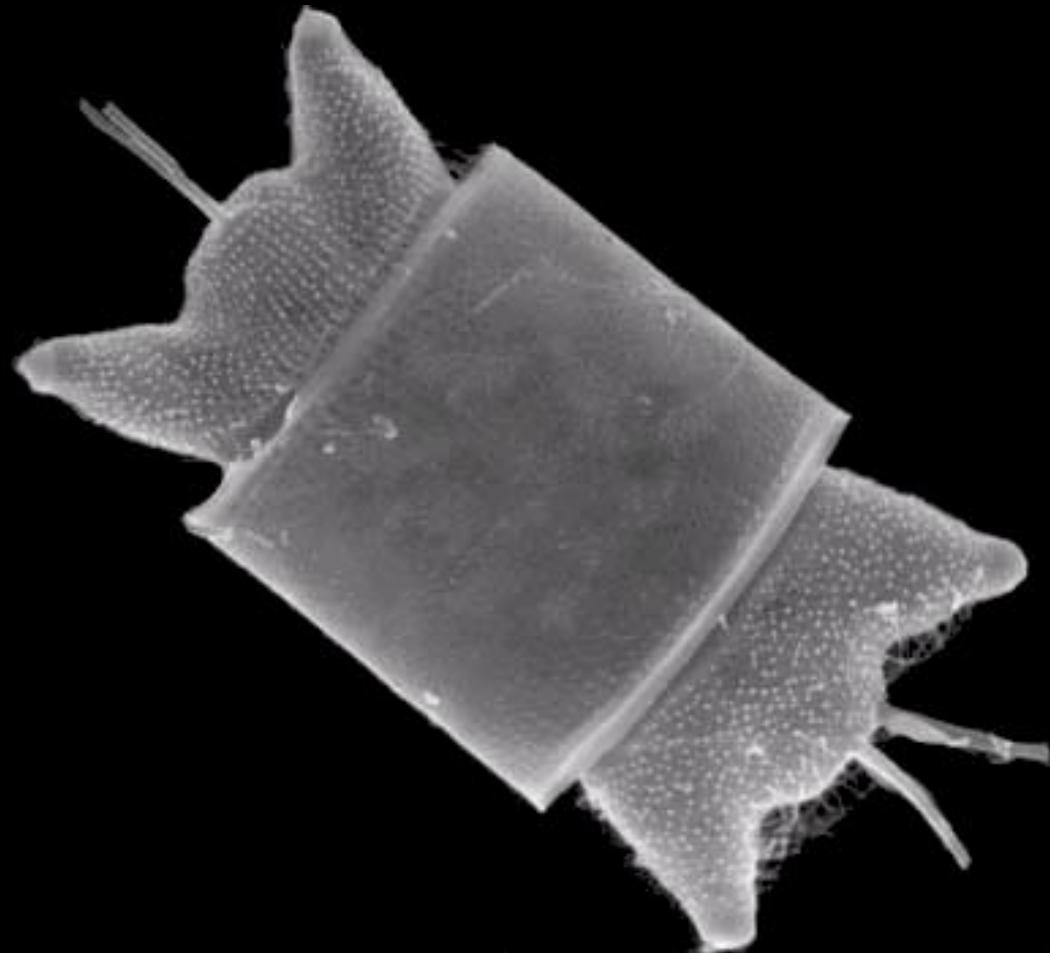
Hallegraeff, G. 1988:  
Plankton, a microscopic world  
Brill Academic Publishers, Leiden



## *Stephanopyxis palmeriana*

## Diatoms

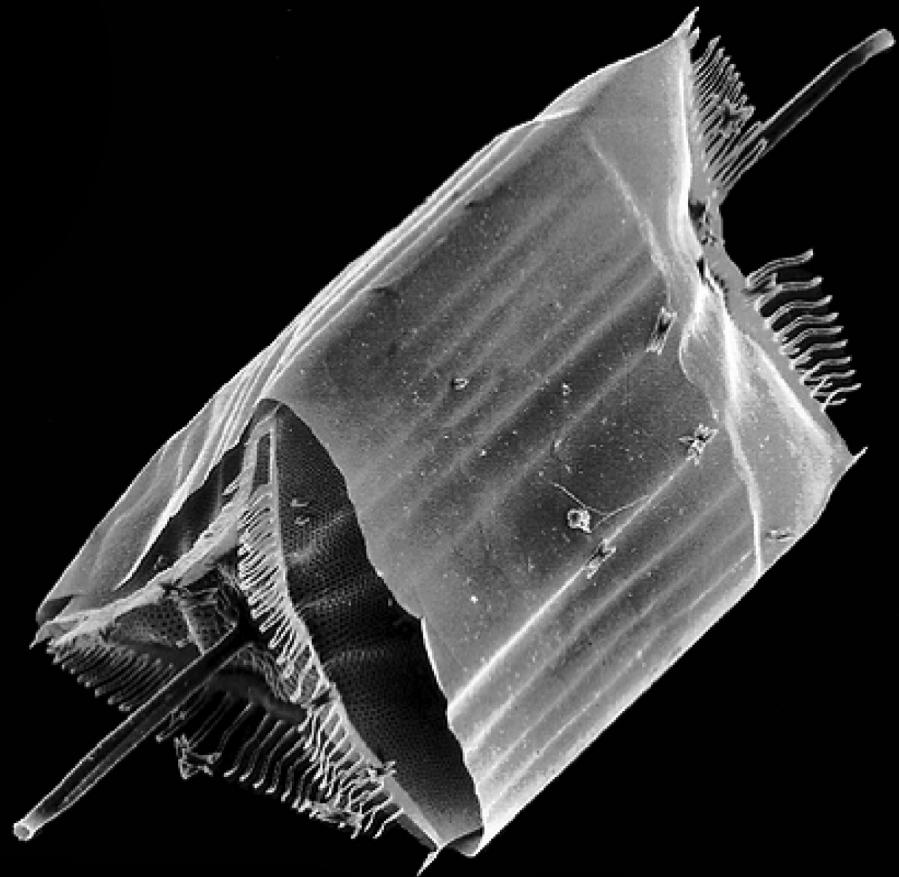
©Tamotsu Nagumo  
Nippon Dental University  
Tokyo, Japan  
Image licensed to Phycological Images



*Odontella aurita*

Diatoms

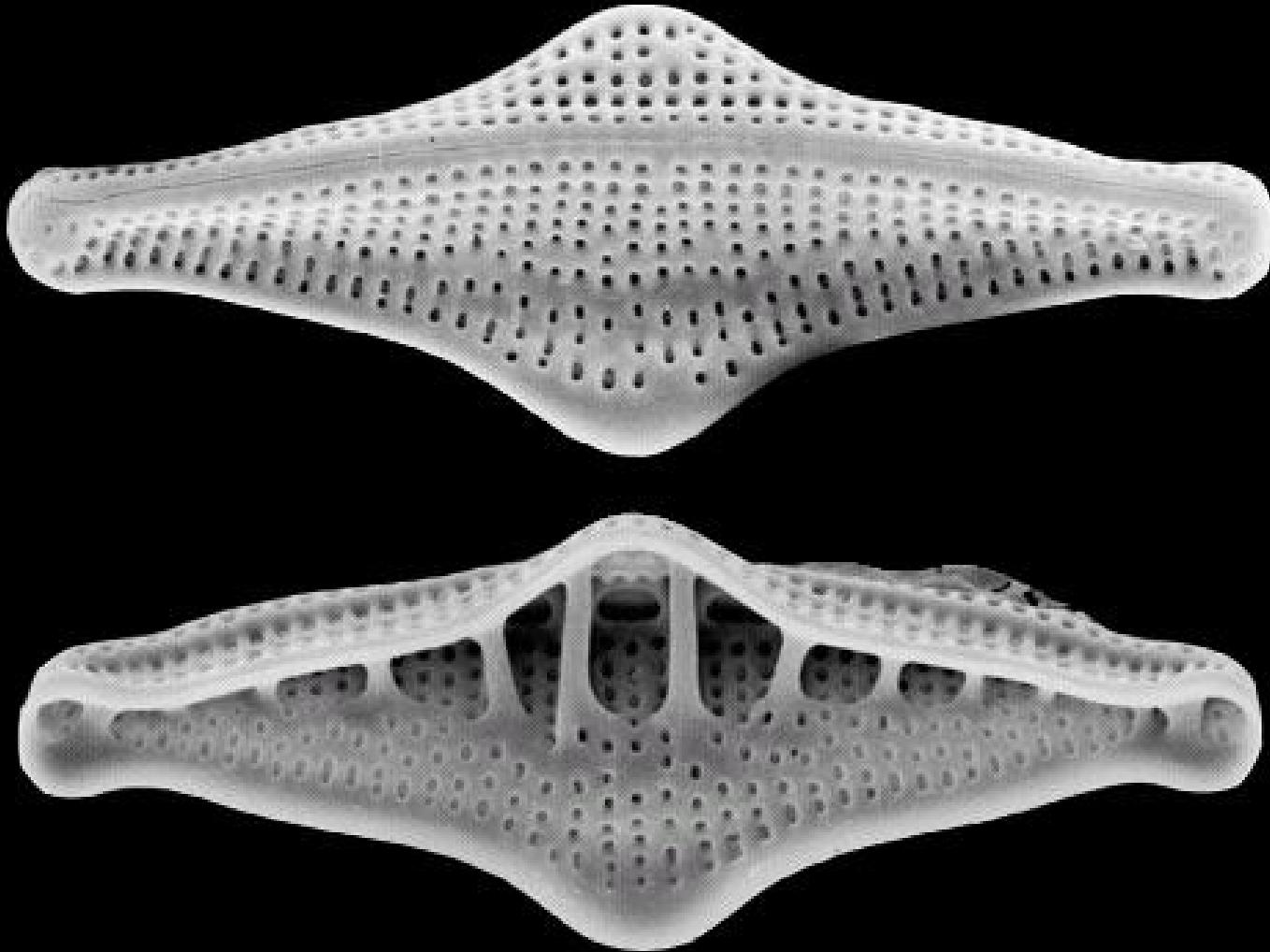
courtesy of  
Mona Hoppenrath  
Forschungsinstitut Senckenberg  
Wilhelmshafen, Germany



*Ditylum  
brightwelli*

**Diatoms**

©Tamotsu Nagumo  
Nippon Dental University  
Tokyo, Japan  
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Two scanning electron micrographs of the diatom *Nitzschia tabularia* are shown against a black background. The top image shows a single, elongated, slightly curved valve with a dense, uniform pattern of small, circular pores across its surface. The bottom image shows two valves joined together at their ends, forming a continuous chain-like structure. This joined view reveals several large, irregularly shaped apertures or openings along the junction where the valves meet.

*Nitzschia  
tabularia*

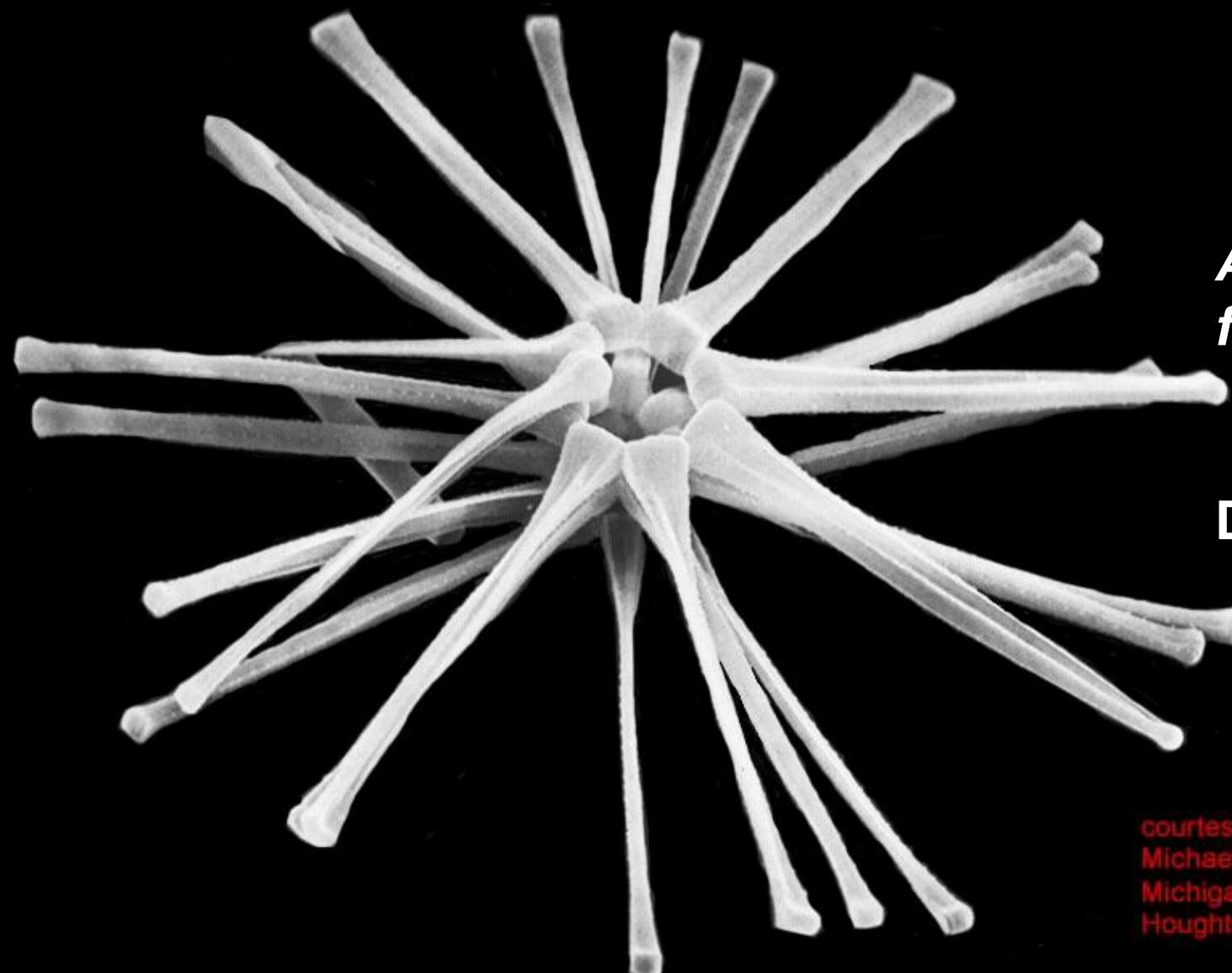
Diatoms



*Licmophora flabellata*

Diatoms

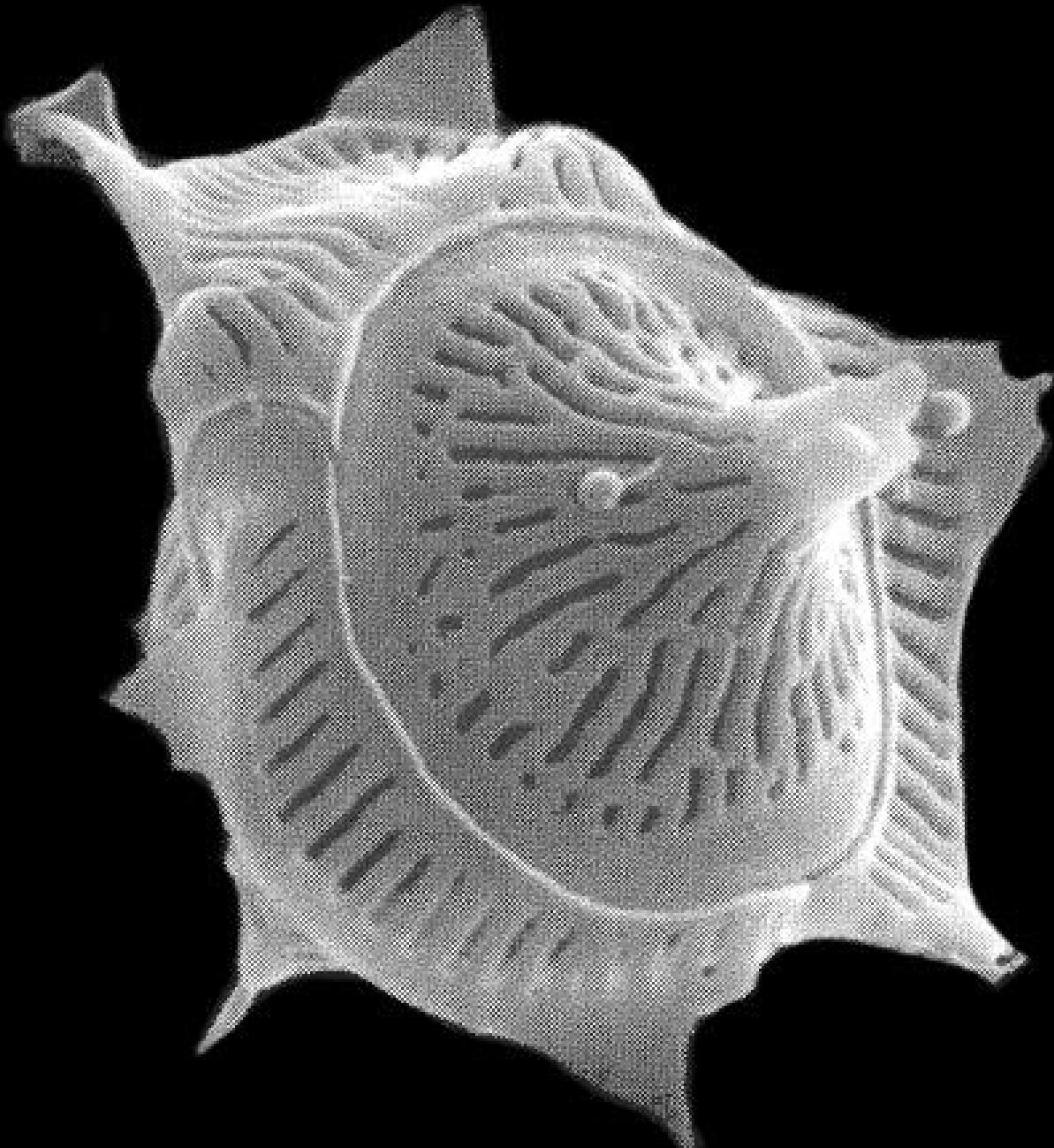
[www.pbase.com](http://www.pbase.com)



*Asterionella  
formosa*

Diatoms

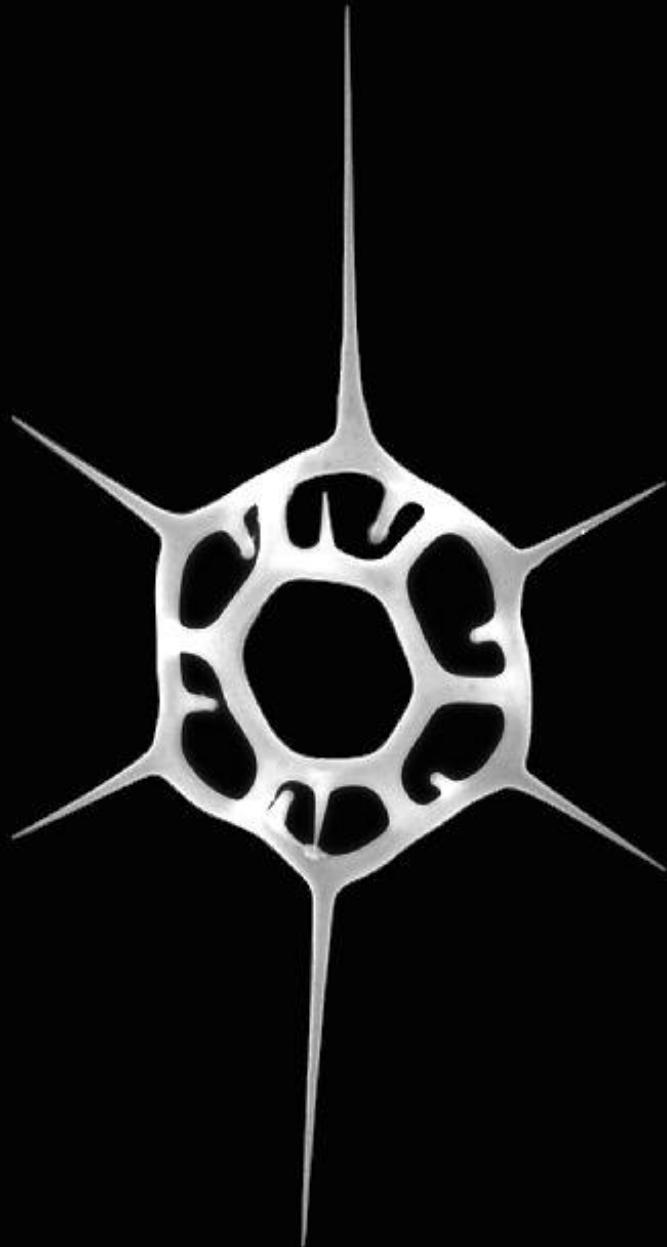
courtesy of  
Michael Gretz  
Michigan Technological University  
Houghton, Michigan, USA



*Tetraparma  
pelagica*

**Parmophytes**

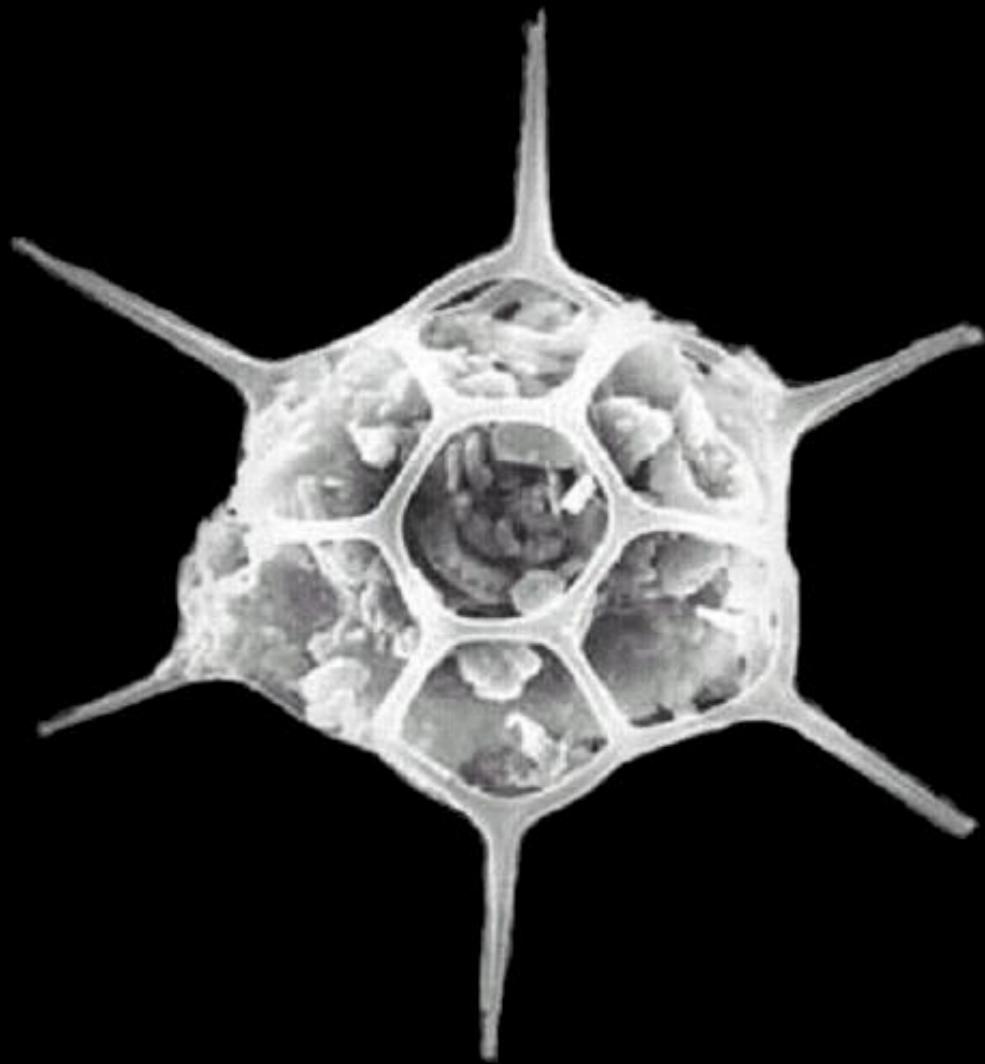
Marchant, H. J. and McElroy, A.  
1986: Nanoplanktonic siliceous cysts  
from Antarctica are algae. Mar. Biol.  
92: 53-57



**Skeleton of**  
*Dictyocha speculum*

**Silicoflagellates**

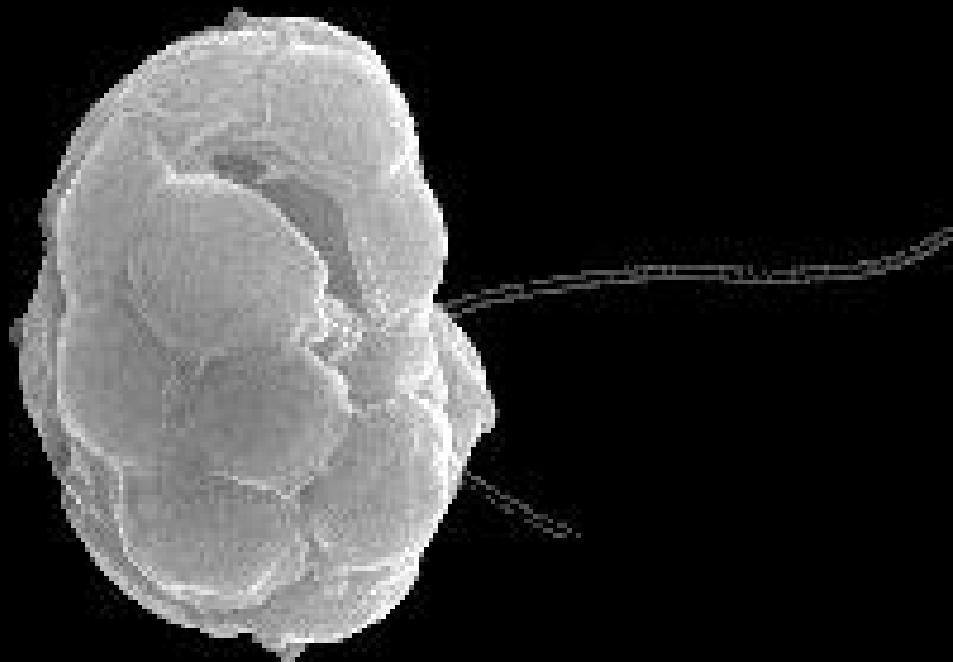
courtesy of the  
Australian Antarctic Division  
Kingston, Tasmania



*Dictyocha fibula*

Silicoflagellates

courtesy of  
Irène Zimmerlin  
University of Rouen  
France



*Heterosigma  
akashiwo*

Raphidophytes

courtesy of  
Shigeru Itakura  
**Kagoshima Prefectural Fisheries  
Technology and Development Center**  
Kagoshima, Japan



Kelp

Brown Algae  
(Phaeophytes)

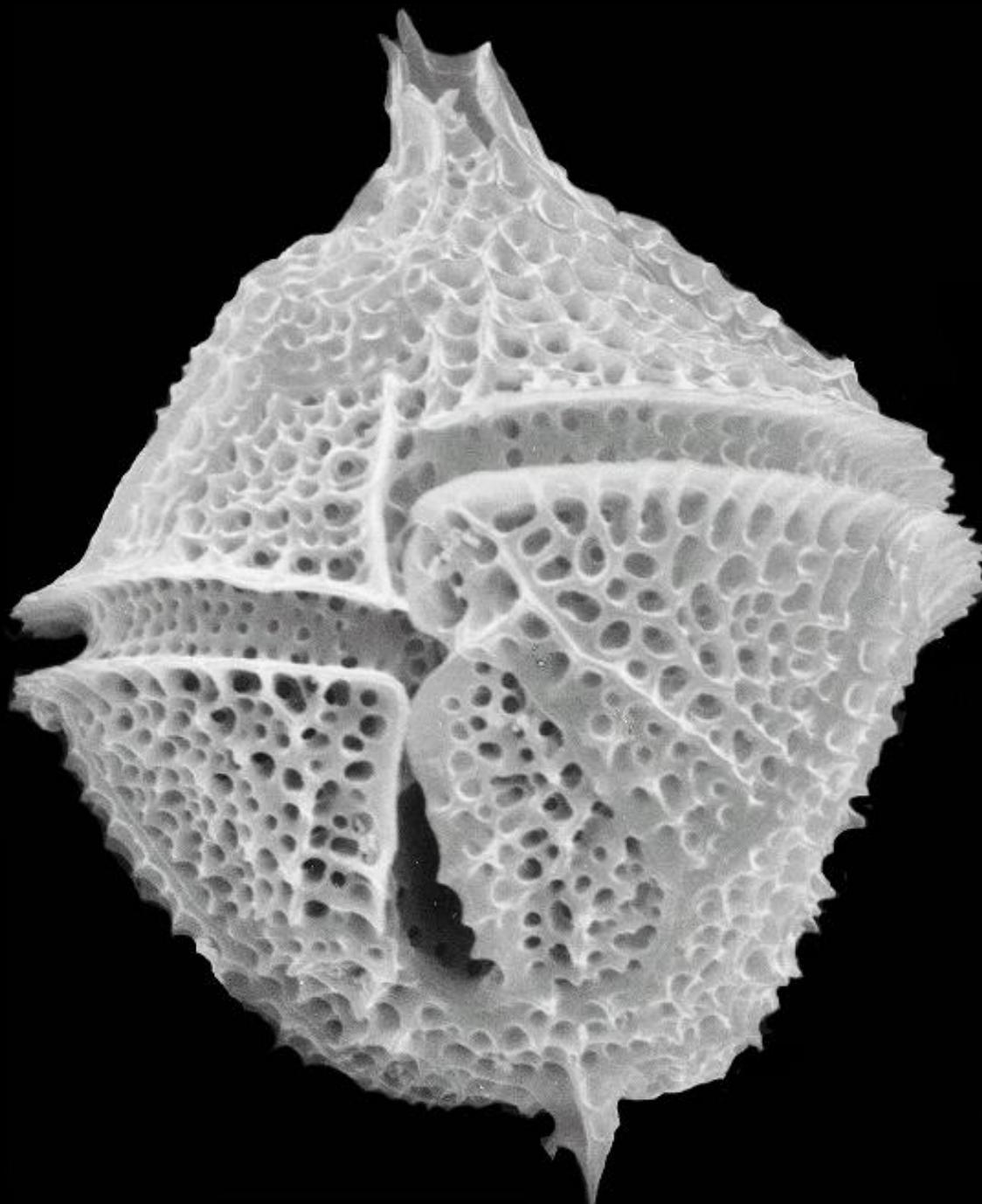
courtesy of  
Ian Skipworth  
[www.ianskipworth.com](http://www.ianskipworth.com)



*Noctiluca  
scintillans*

Dinoflagellates

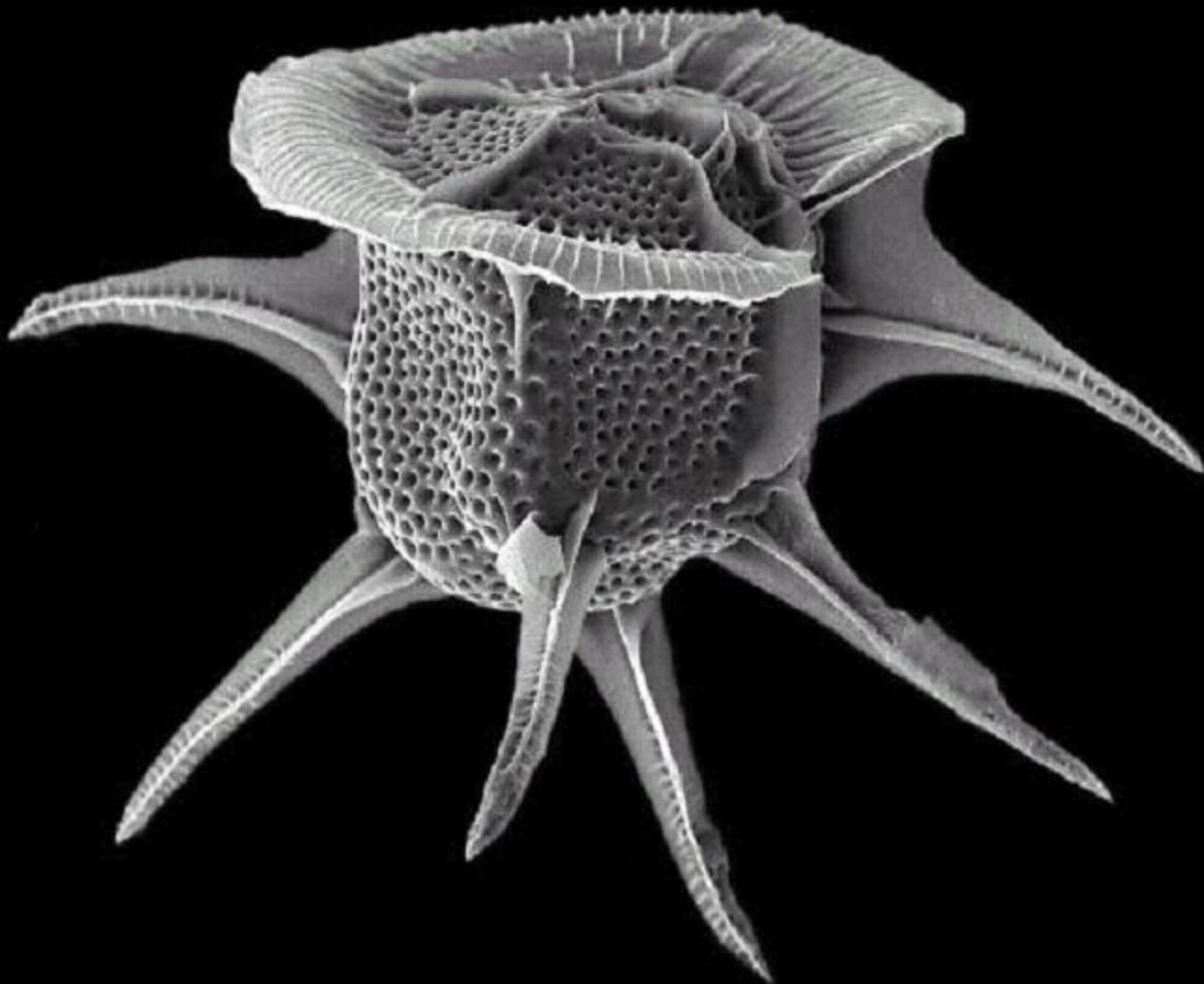
courtesy of  
Wim van Egmond  
[www.microscopy-uk.org.uk](http://www.microscopy-uk.org.uk)



***Gonyaulax  
spinifera***

**Dinoflagellates**

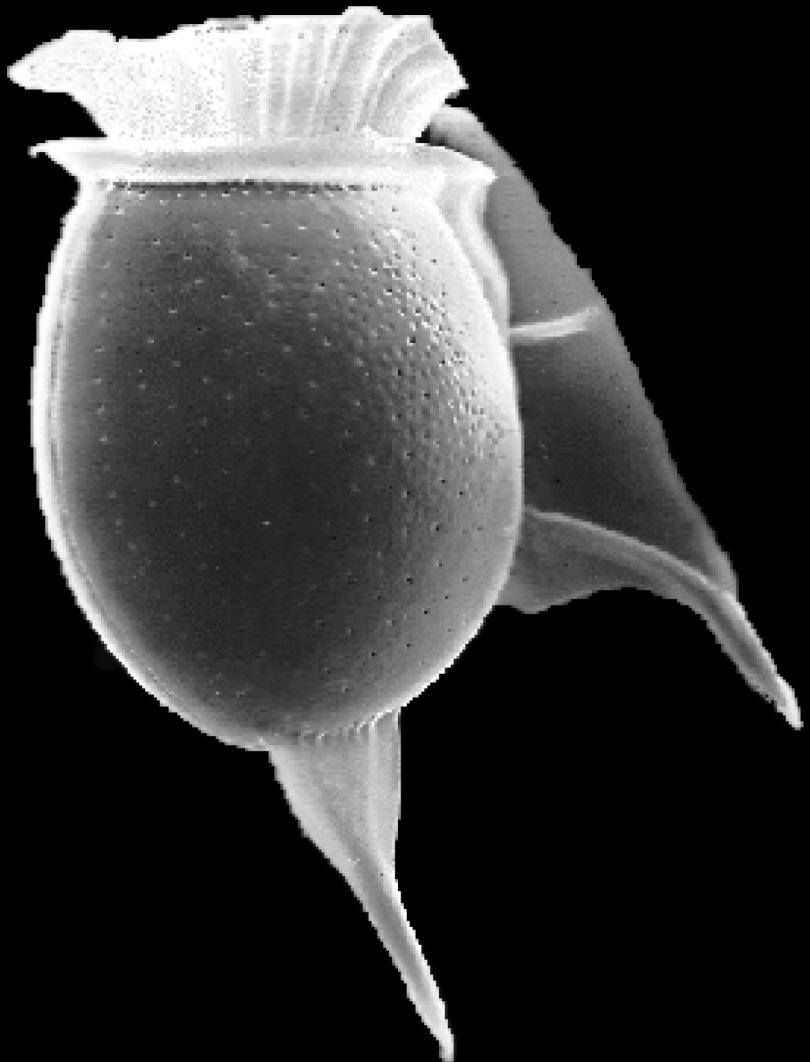
Hallegraeff, G. 1988:  
Plankton, a microscopic world  
Brill Academic Publishers, Leiden



*Ceratocorys  
horrida*

Dinoflagellates

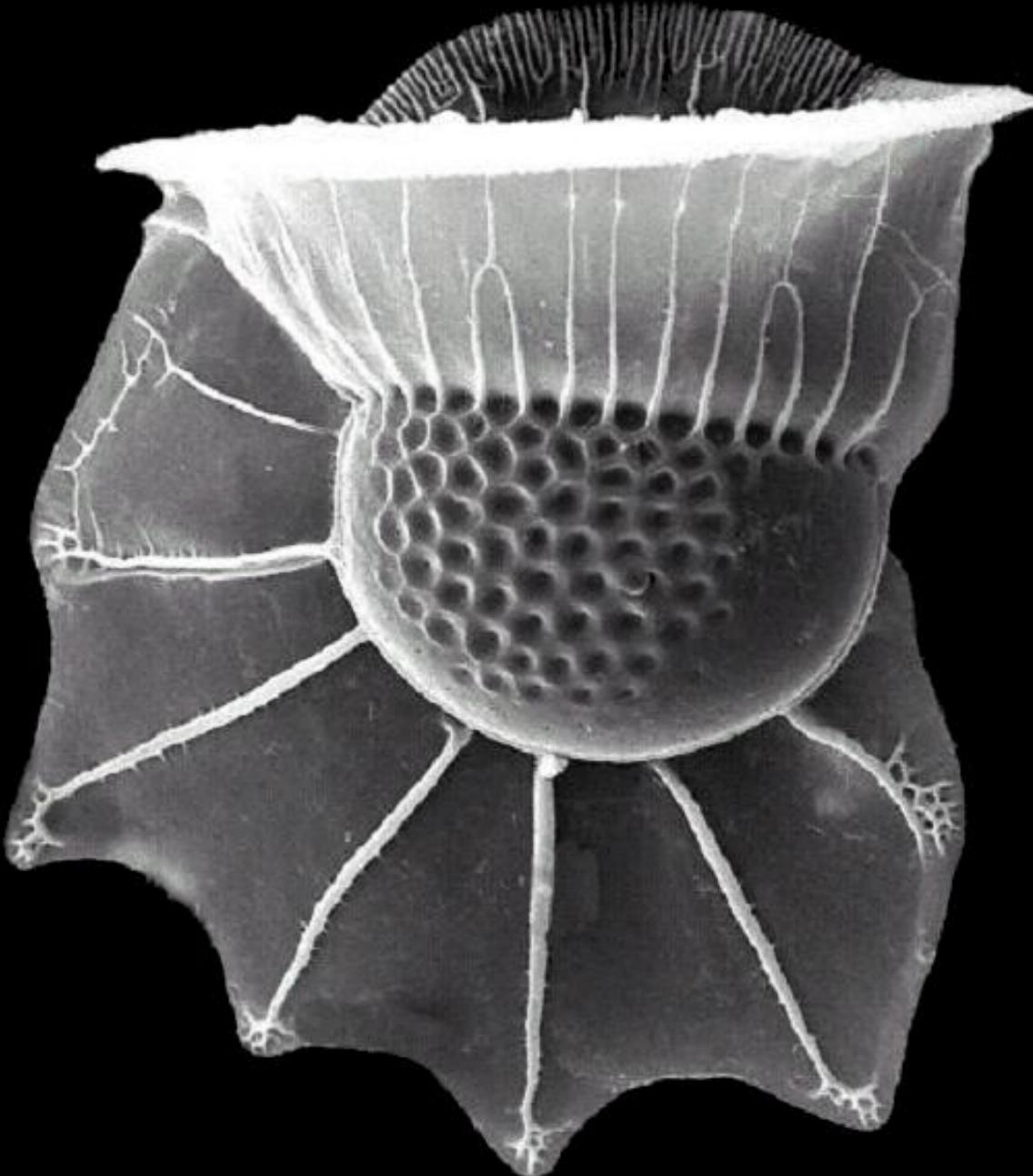
courtesy of  
Maria Faust  
Smithsonian National Museum  
of Natural History  
Washington, DC, USA



*Dinophysis  
schuettii*

**Dinoflagellates**

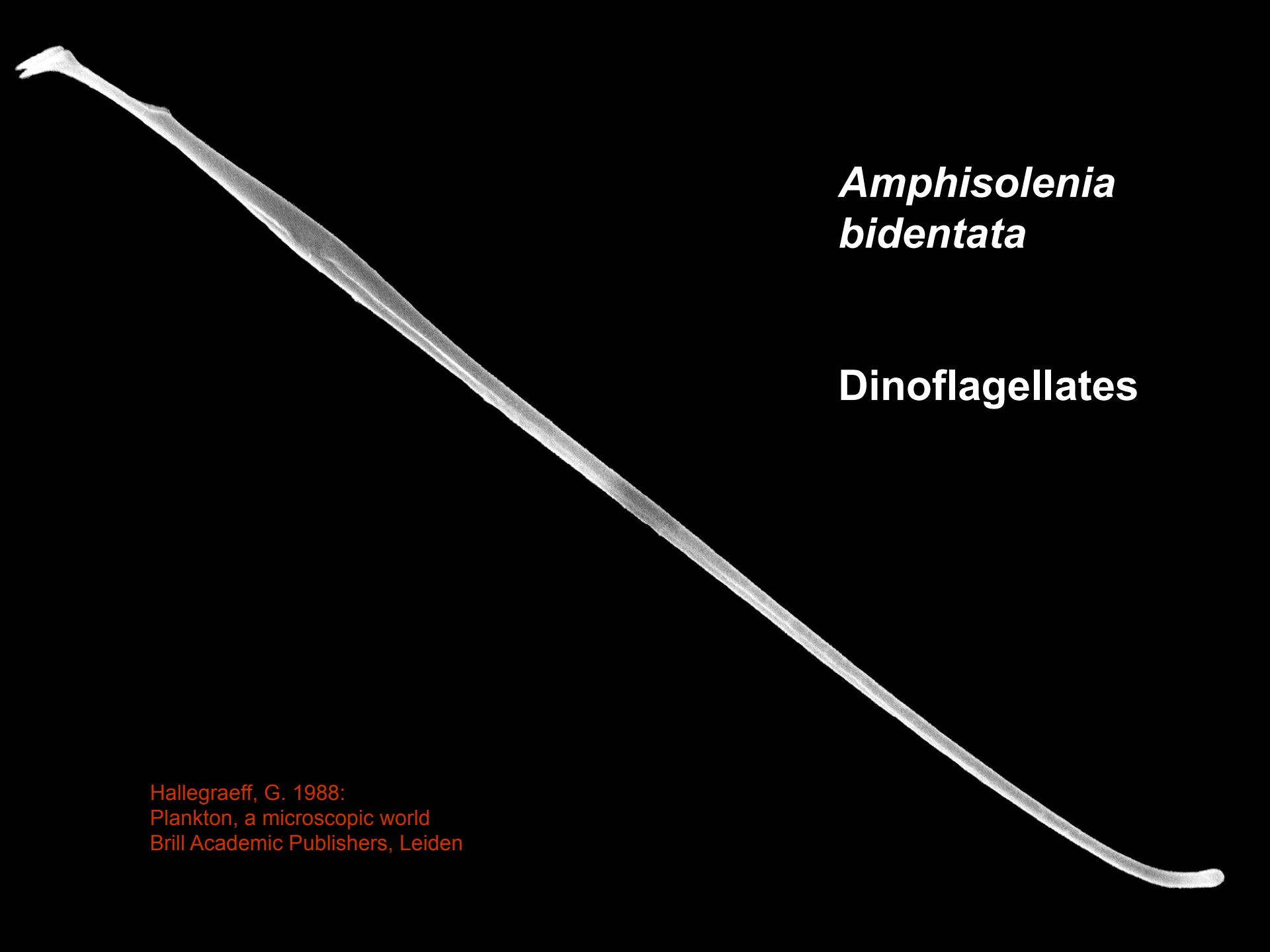
Hallegraeff, G. 1988:  
Plankton, a microscopic world  
Brill Academic Publishers, Leiden



*Ornithocercus  
thumii*

Dinoflagellates

courtesy of  
Maria Faust  
Smithsonian National Museum  
of Natural History  
Washington, DC, USA



*Amphisolenia  
bidentata*

Dinoflagellates

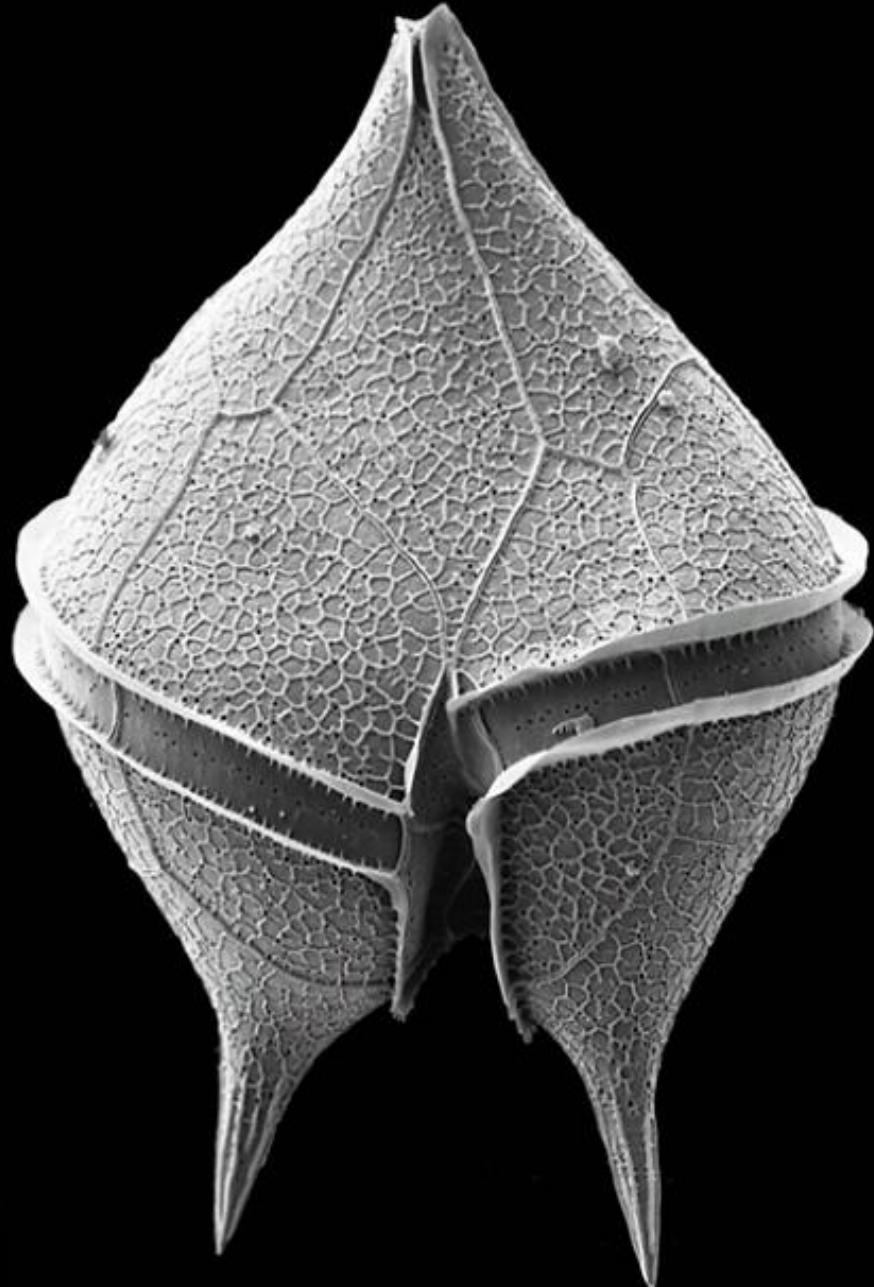
Hallegraeff, G. 1988:  
Plankton, a microscopic world  
Brill Academic Publishers, Leiden



*Podolampas  
reticulata*

Dinoflagellates

courtesy of  
Maria Faust  
Smithsonian National Museum  
of Natural History  
Washington, DC, USA



*Protoperidinium  
claudicans*

Dinoflagellates

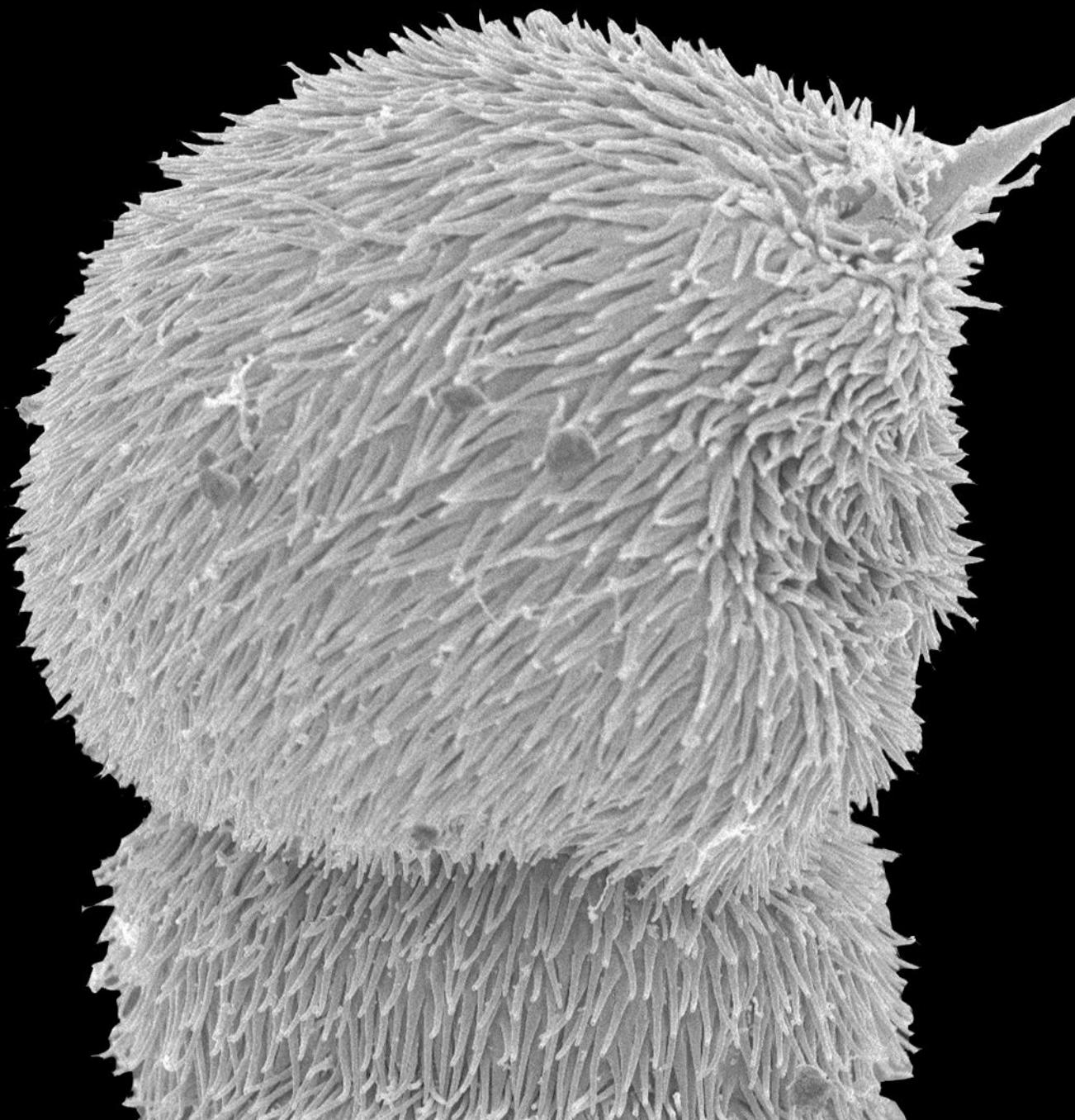
courtesy of  
David Hill  
University of Melbourne  
Australia



**a diplopsaloid  
dinoflagellate**

**(unidentifiable  
without a view of  
the epitheca)**

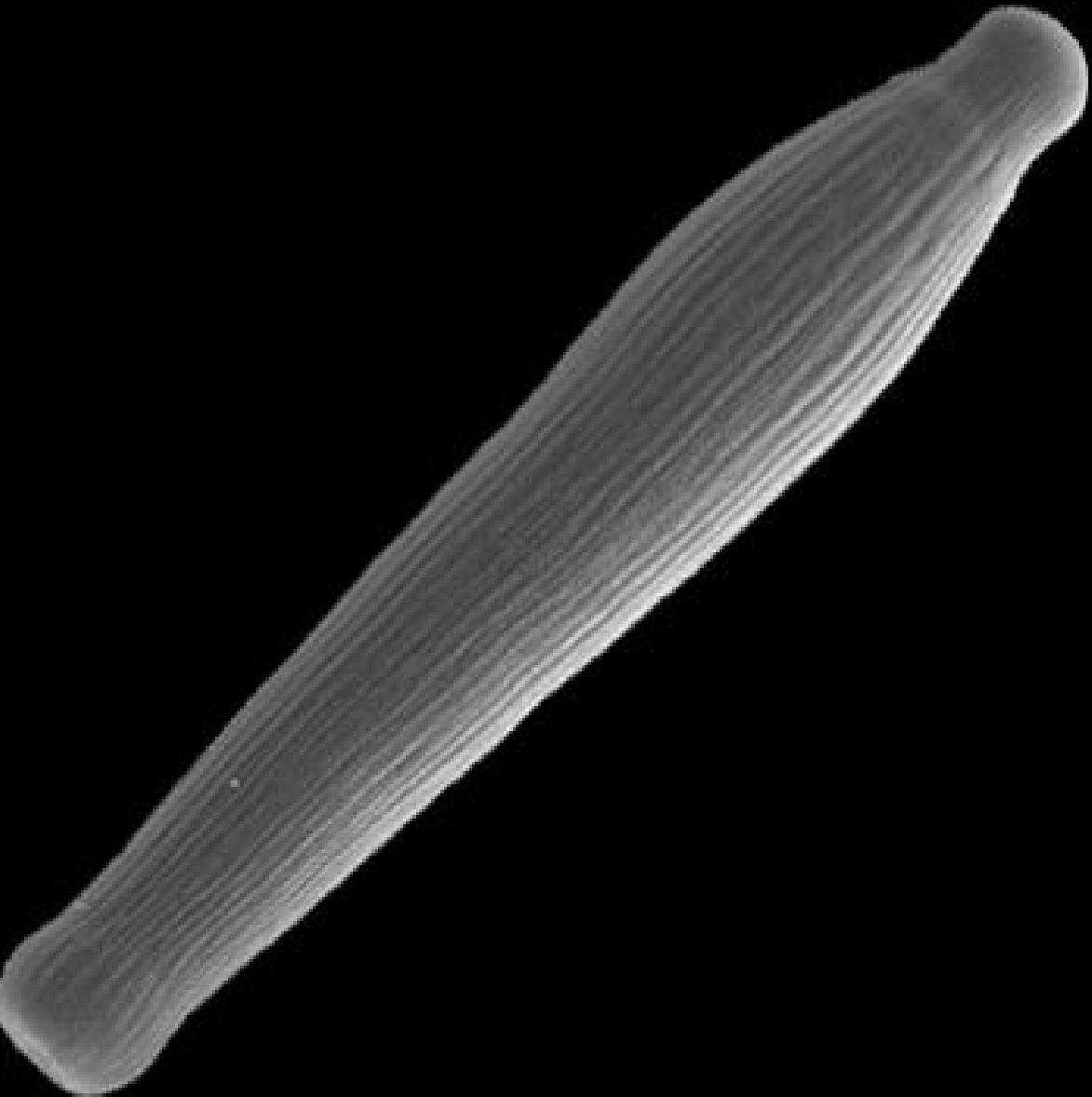
courtesy of  
**Mark Webber**  
**Vancouver, Canada**



***Haplozoon  
axiothellae***

**Dinoflagellates**

Leander, B. S. et al. 2002: Surface morphology of the marine parasite *Haplozoon axiothellae* Siebert (Dinoflagellata). Eur. J. Protistol. 38: 287-297



*Gregarina  
polymorpha*

**Gregarines  
Apicomplexans**

Heintzelman M. B. 2004: Actin and myosin in *Gregarina polymorpha*.  
Cell Mot. Cyt. 58: 83-95



***Monocystis agilis***

**Gregarines  
Apicomplexans**

Leander et al. 2003: Molecular phylogeny  
and surface morphology of marine  
aseptate gregarines (Apicomplexa):  
*Selenidium* spp and *Lecudina* spp. J.  
Parasitol. 89: 1191-1205



*Pterospora  
schizosoma  
in syzygy*

**Gregarines  
Apicomplexans**

courtesy of  
**Brian Leander**  
**University of British Columbia**  
**Vancouver, Canada**



*Plasmodium  
gallinaceum*

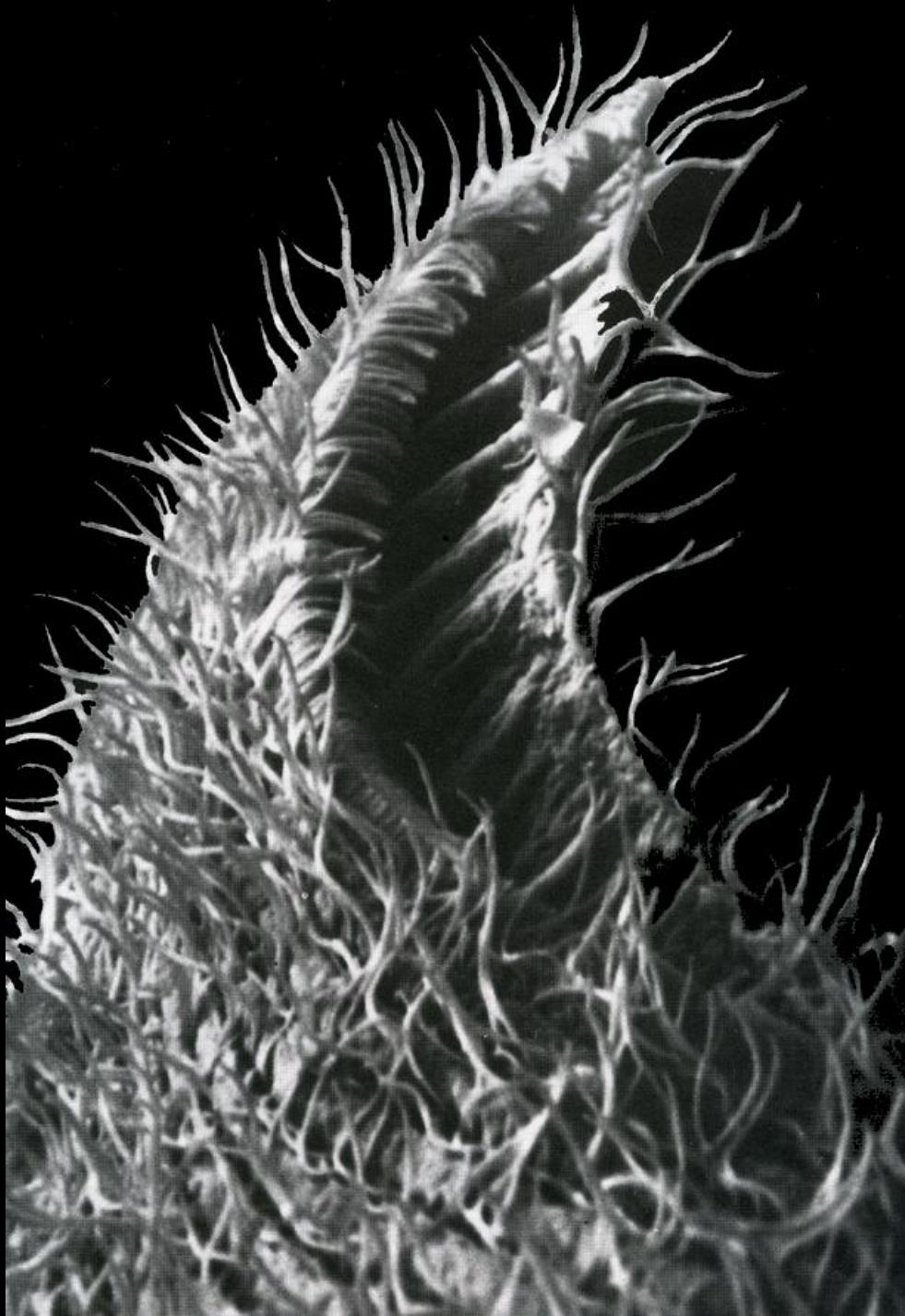
**Haematozoans  
Apicomplexans**



*Plasmodium  
falciparum*

**Haematozoans  
Apicomplexans**

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National Geographic Society, USA  
[http://science.nationalgeographic.com/  
science/enlarge/malaria-parasites.html](http://science.nationalgeographic.com/science/enlarge/malaria-parasites.html)



*Loxodes  
magnus*

Karyorelictids  
Ciliates

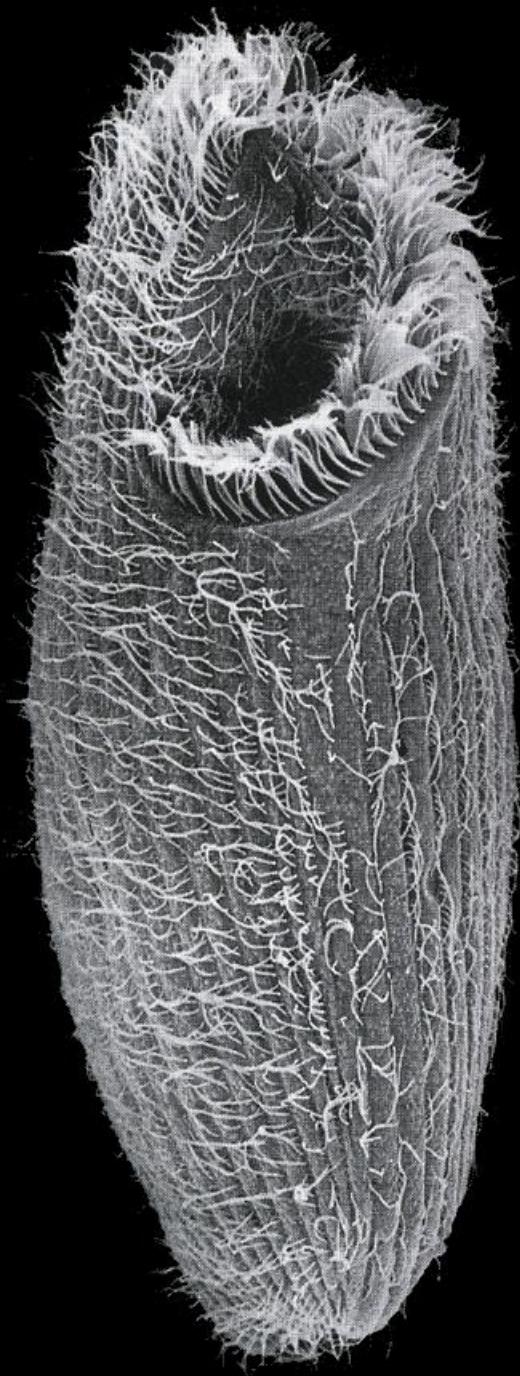
Foissner, W. and Rieder, N. 1983  
Zool. Anz. 210: 3-13



*Stentor  
polymorphus*

**Heterotrichs  
Ciliates**

©Gerald Helbig  
[www.lebendkulturen.de](http://www.lebendkulturen.de)



*Climacostomum  
virens*

Heterotrichs  
Ciliates

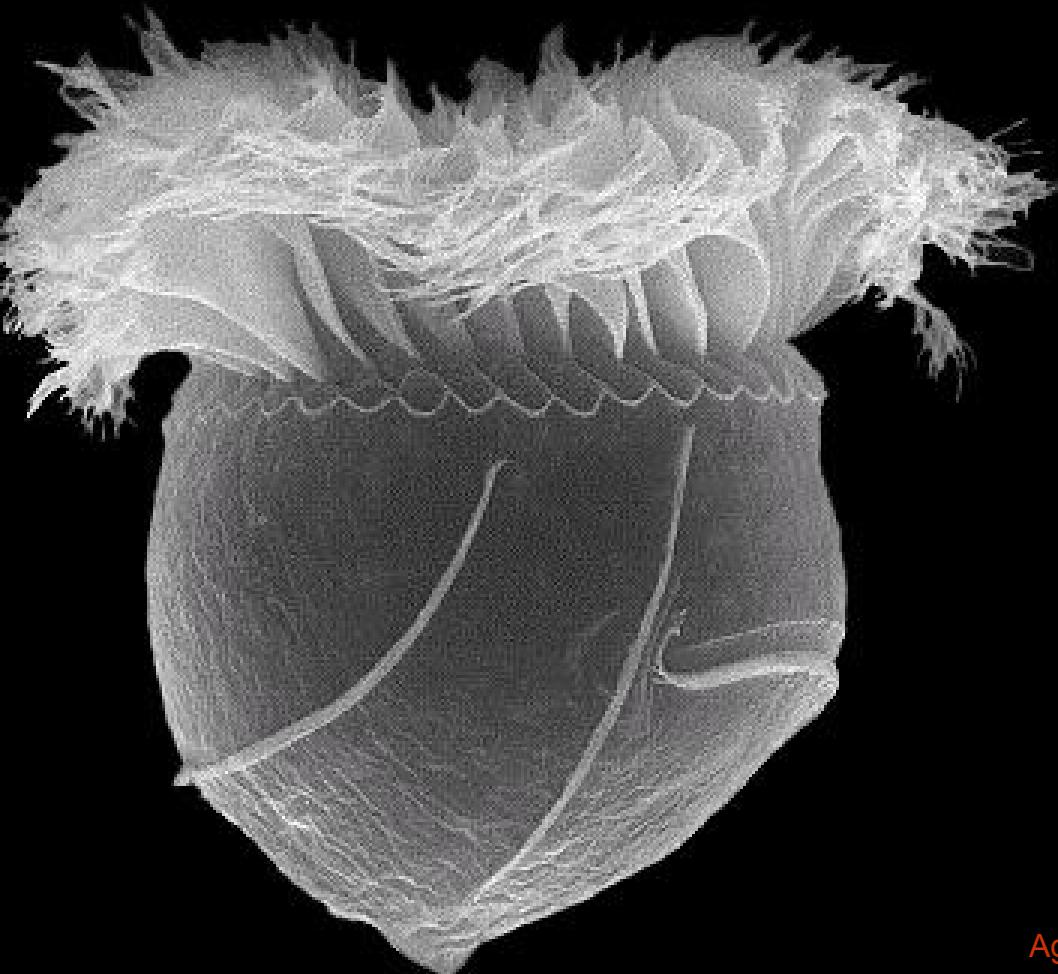
Foissner et al. 1992:  
Taxonomische und ökologische  
Revision der Ciliaten des  
Saprobiensystems, Band 2  
Bayerisches Landesamt für  
Wasserwirtschaft  
Munich, Germany

*Euplates  
affinis*



Hypotrichs  
Spirotrichs  
Ciliates

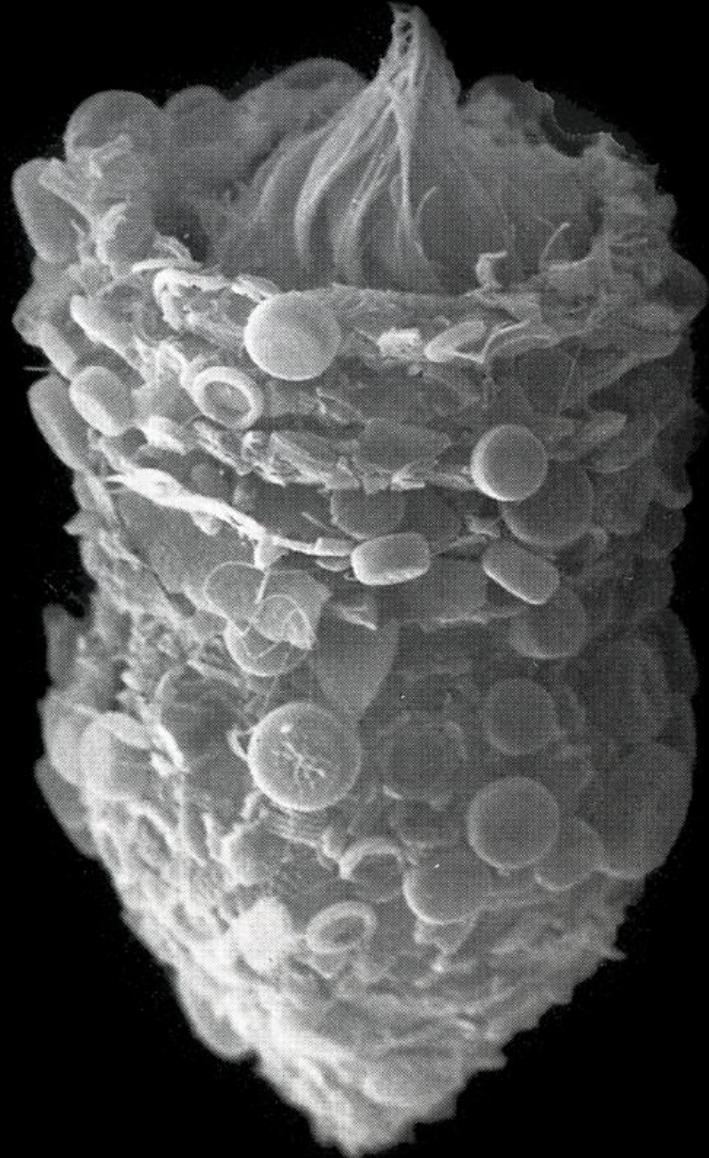
Foissner et al. 1991  
Taxonomische und ökologische  
Revision der Ciliaten des  
Saprobienystems, Band I  
Bayerisches Landesamt für  
Wasserwirtschaft  
Munich, Germany



*Pelagostrobilidium  
neptuni*

**Choreotrichs  
Spirotrichs  
Ciliates**

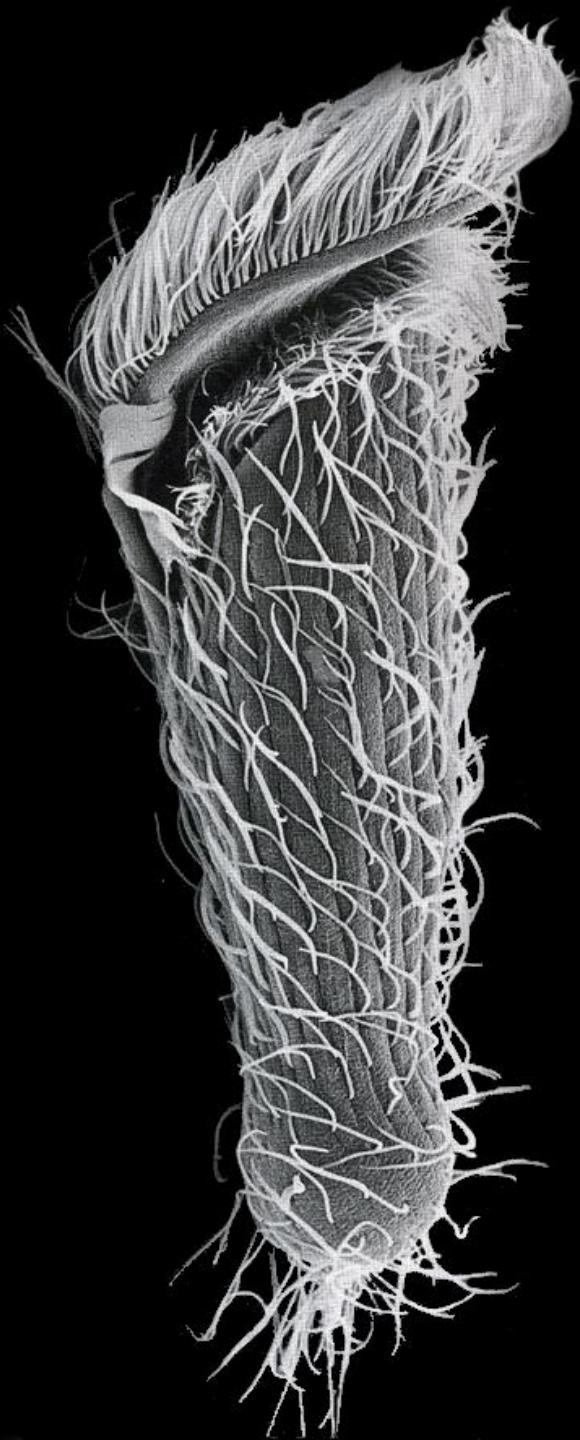
Agatha et al. 2004: *Pelagostrobilidium neptuni* and *Strombidium biarmatum*: phylogenetic position inferred from morphology, ontogenesis and gene sequence data. *Europ. J. Prot.* 41: 65-83



*Codonella  
cratera*

**Choreotrichs  
(Tintinnids)  
Spirotrichs  
Ciliates**

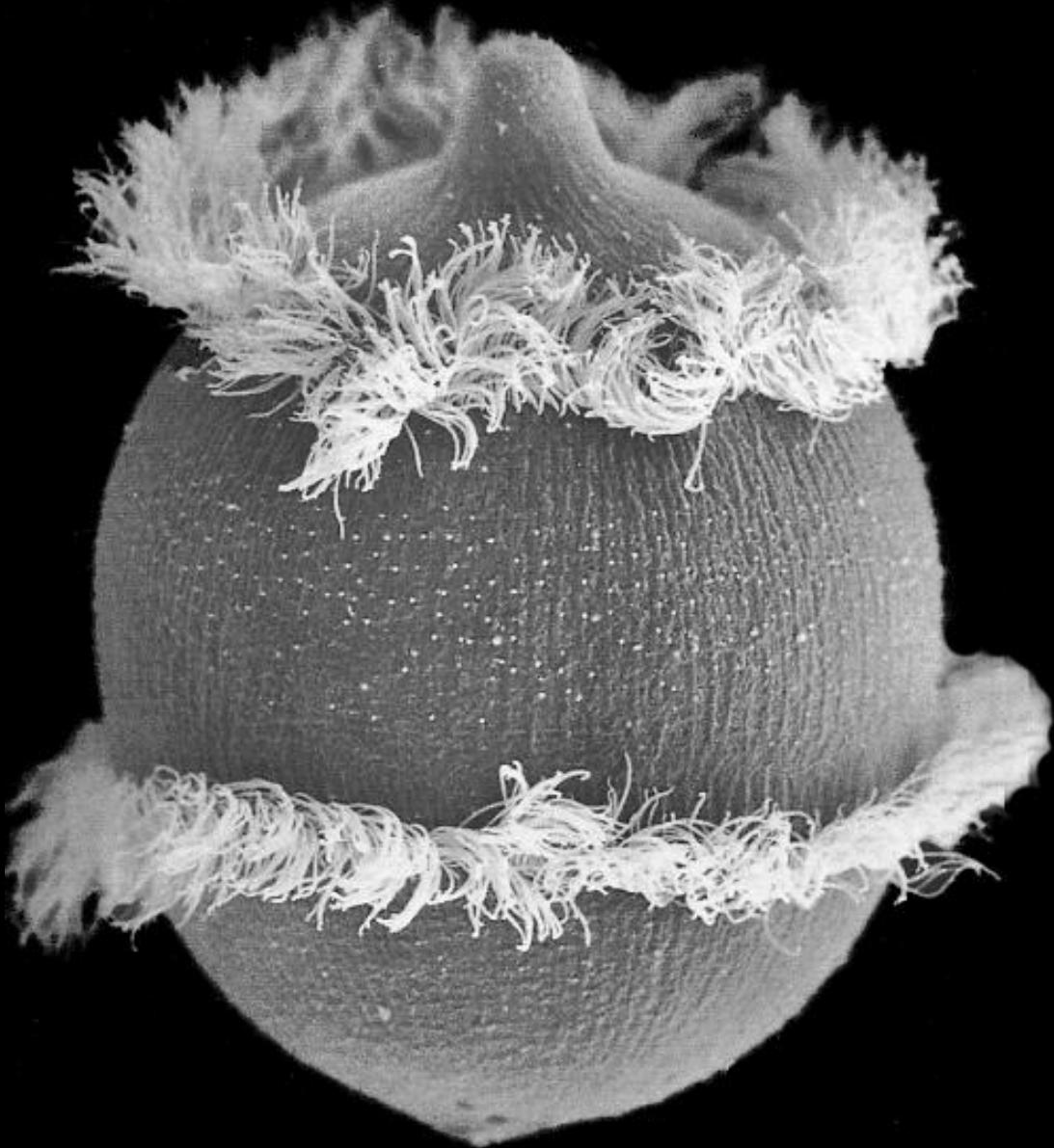
courtesy of  
Wilhelm Foissner  
University of Salzburg  
Austria



*Metopus  
es*

**Armophorids  
Ciliates**

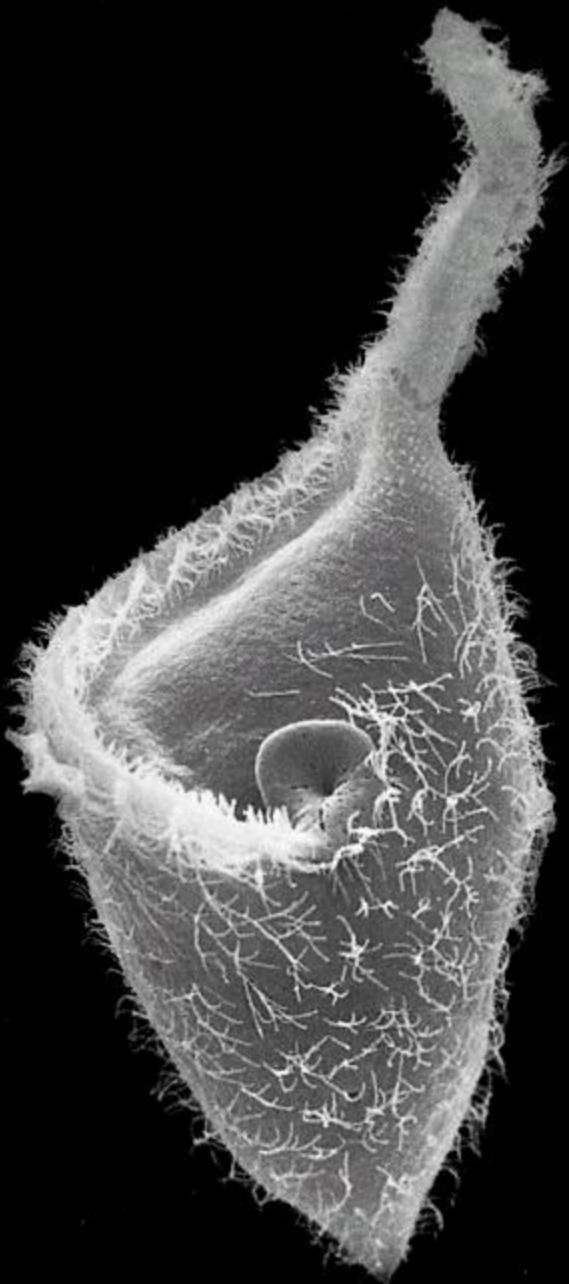
courtesy of  
**Christian Bardele**  
**University of Tübingen**  
**Germany**



*Didinium  
nasutum*

Haptorians  
Litostomes  
Ciliates

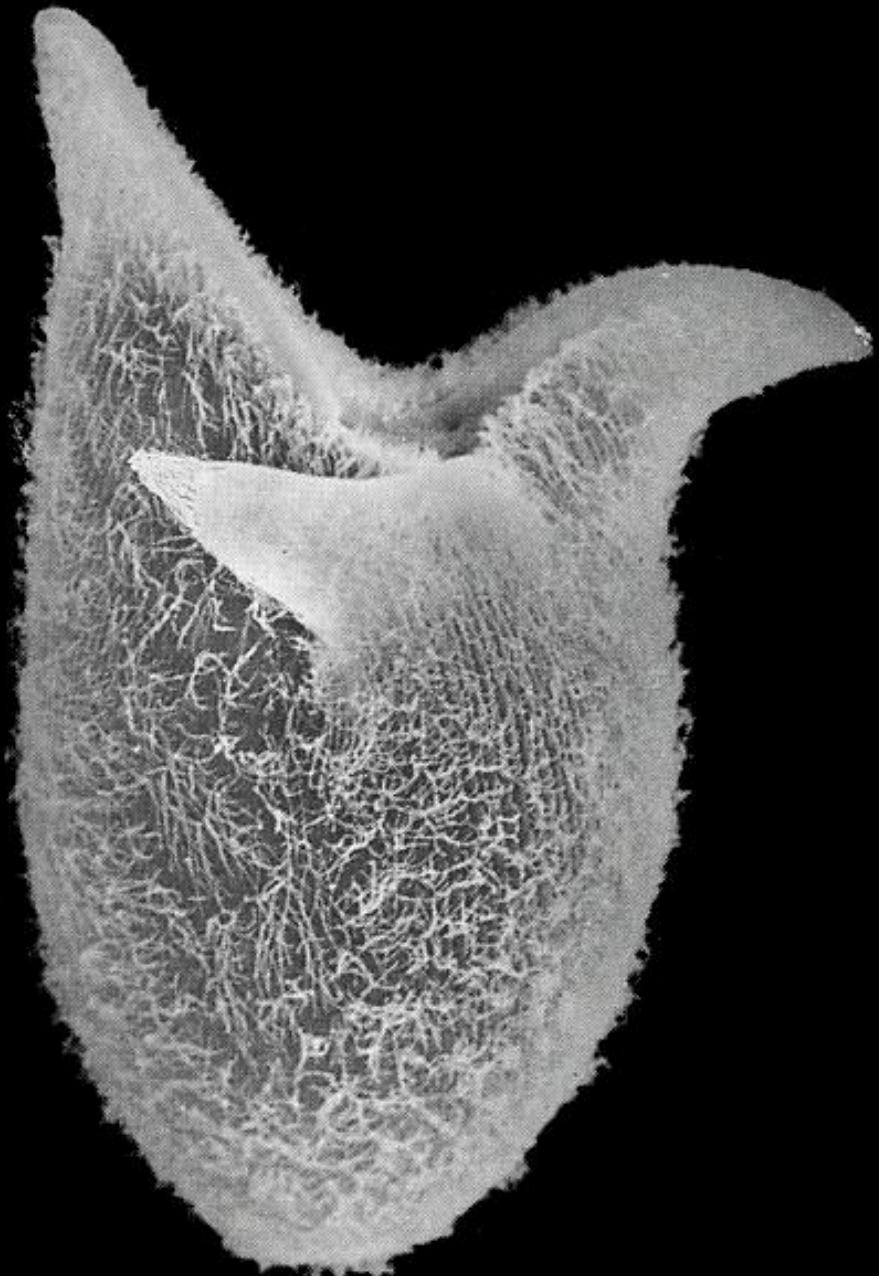
Foissner et al. 1995  
Taxonomische und ökologische  
Revision der Ciliaten des  
Saprobiensystems, Band 4  
Bayerisches Landesamt für  
Wasserwirtschaft  
Munich, Germany



*Paradileptus  
elephantinus*

**Haptorians  
Litostomes  
Ciliates**

courtesy of  
Wilhelm Foissner  
University of Salzburg  
Austria



*Teuthophrys  
trisulca*

**Haptorians  
Litostomes  
Ciliates**

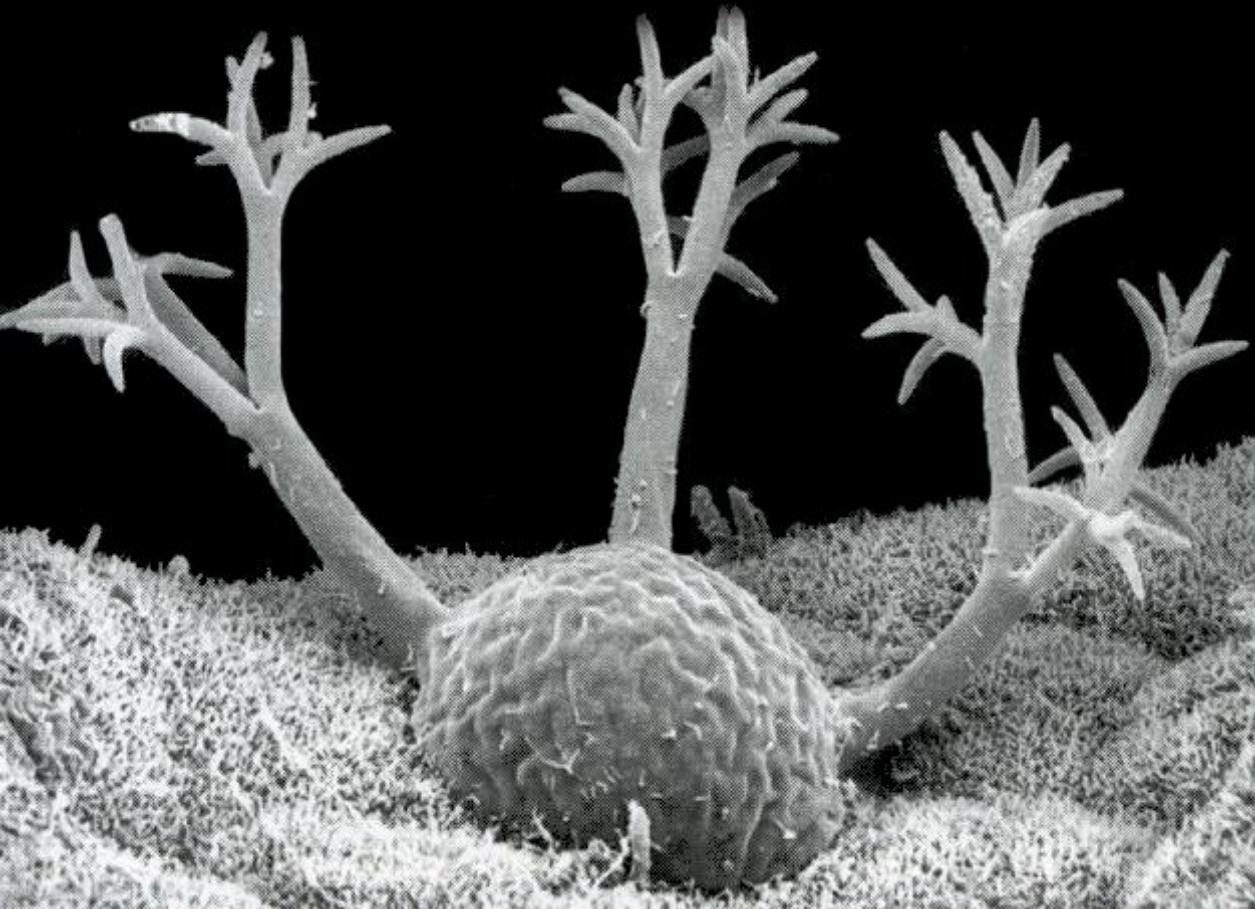
courtesy of  
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University of Salzburg  
Austria



# *Ophryoscolex*

**Trichostomatians  
Litostomes  
Ciliates**

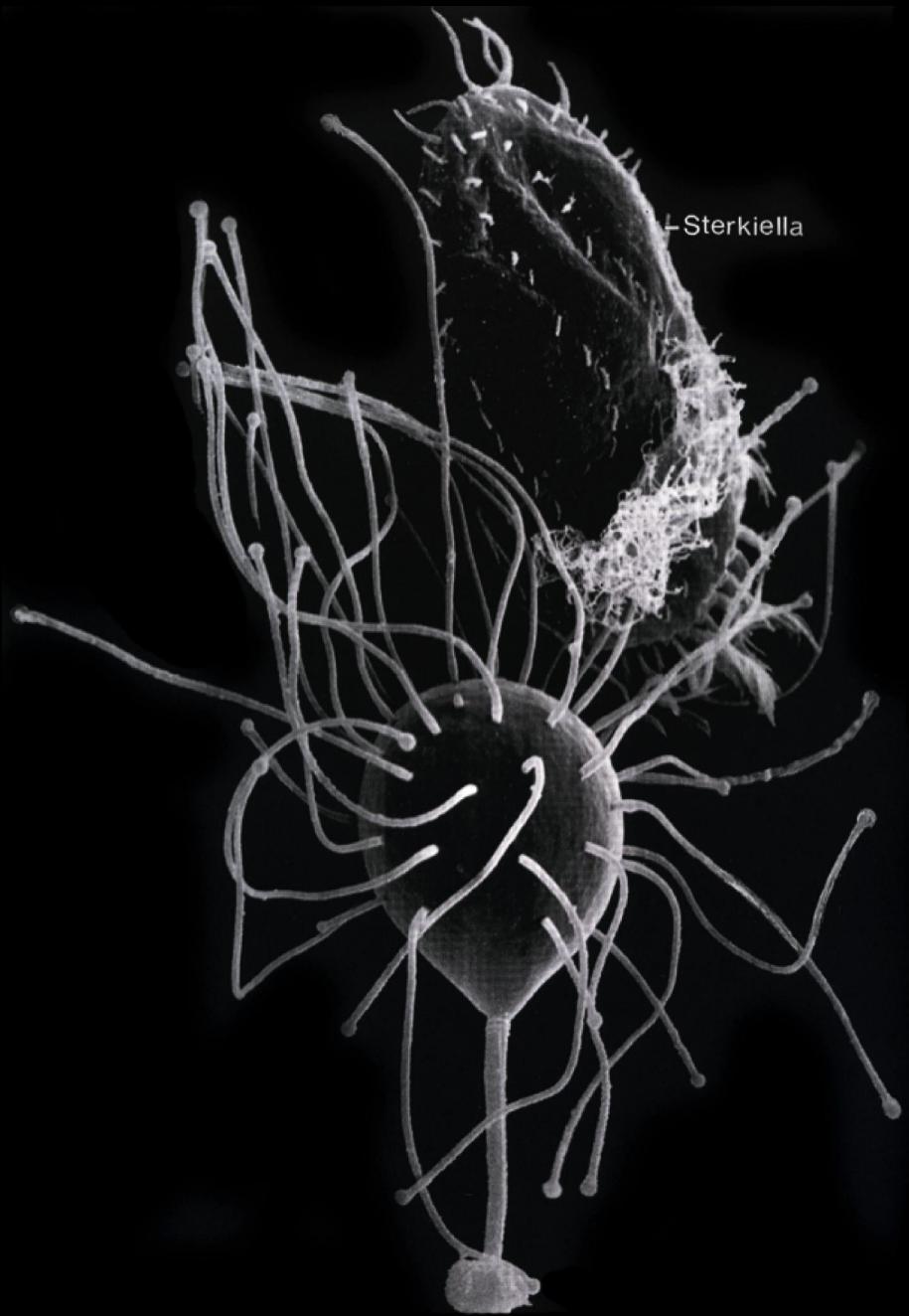
courtesy of  
Denis Lynn  
University of Guelph  
Guelph, Ontario, Canada



*Dendrocometes  
gemmipara*

**Suctorians  
Phyllopharyngeans  
Ciliates**

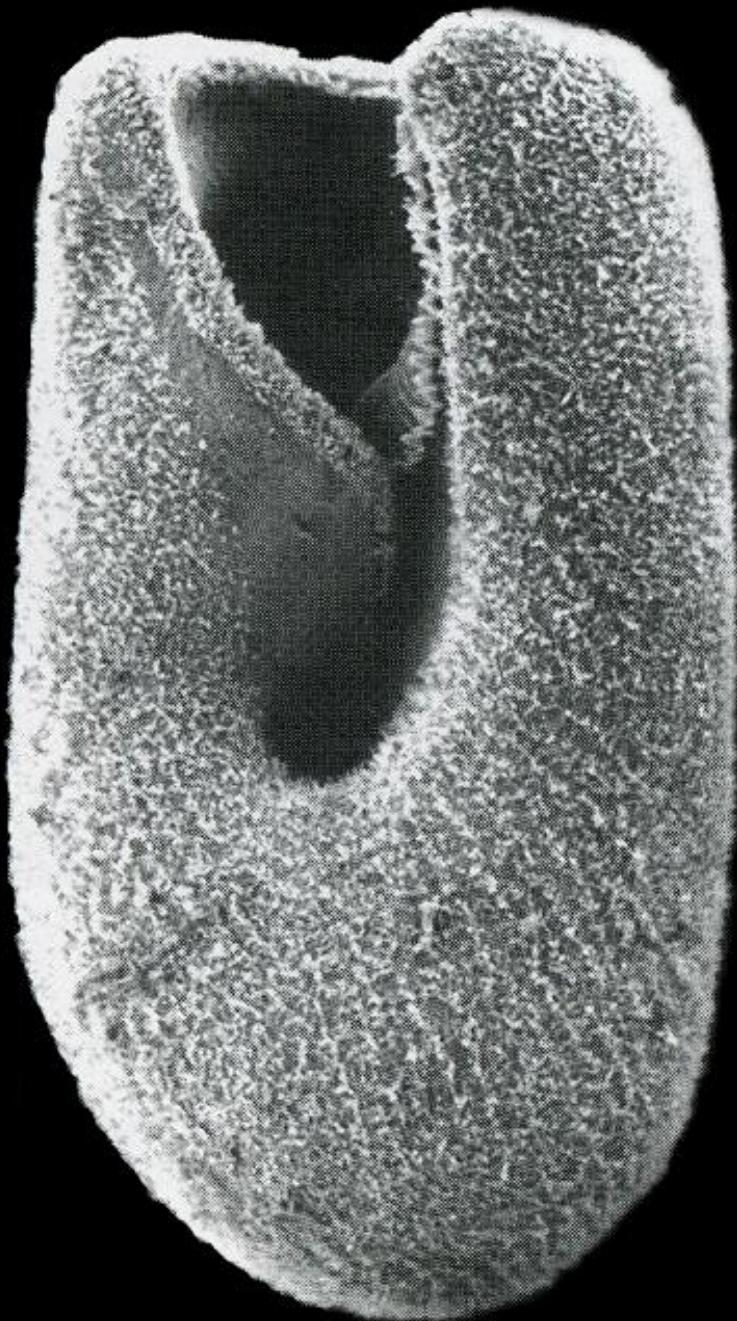
courtesy of  
Christian Bardele  
University of Tübingen  
Germany



***Prodiscophrya  
collini* feeding on *Sterkiella***

**Suctorians  
Phyllopharyngeans  
Ciliates**

Foissner et al. 1995  
Taxonomische und ökologische  
Revision der Ciliaten des  
Saprobiensystems, Band 4  
Bayerisches Landesamt für  
Wasserwirtschaft  
Munich, Germany



*Bursaria  
truncatella*

**Colpodids  
Ciliates**

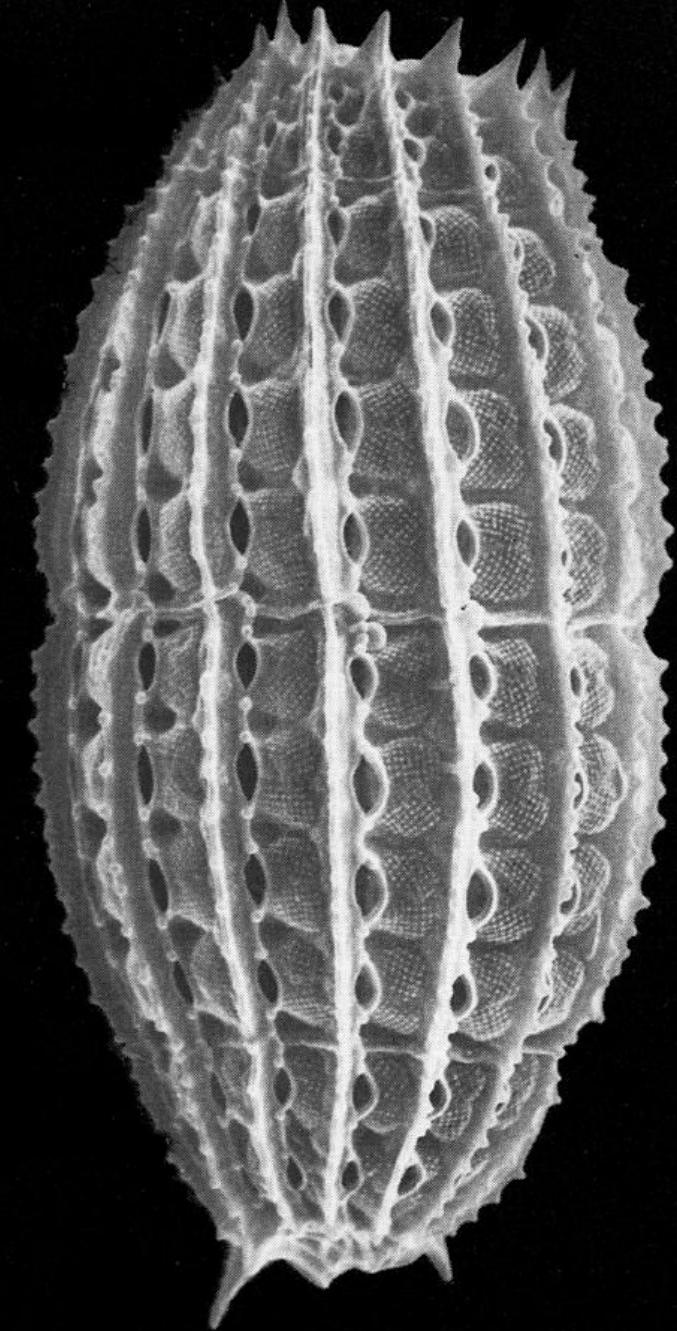
courtesy of  
Wilhelm Foissner  
University of Salzburg  
Austria



***Sorogena  
stoianovitchae***

**Colpodids  
Ciliates**

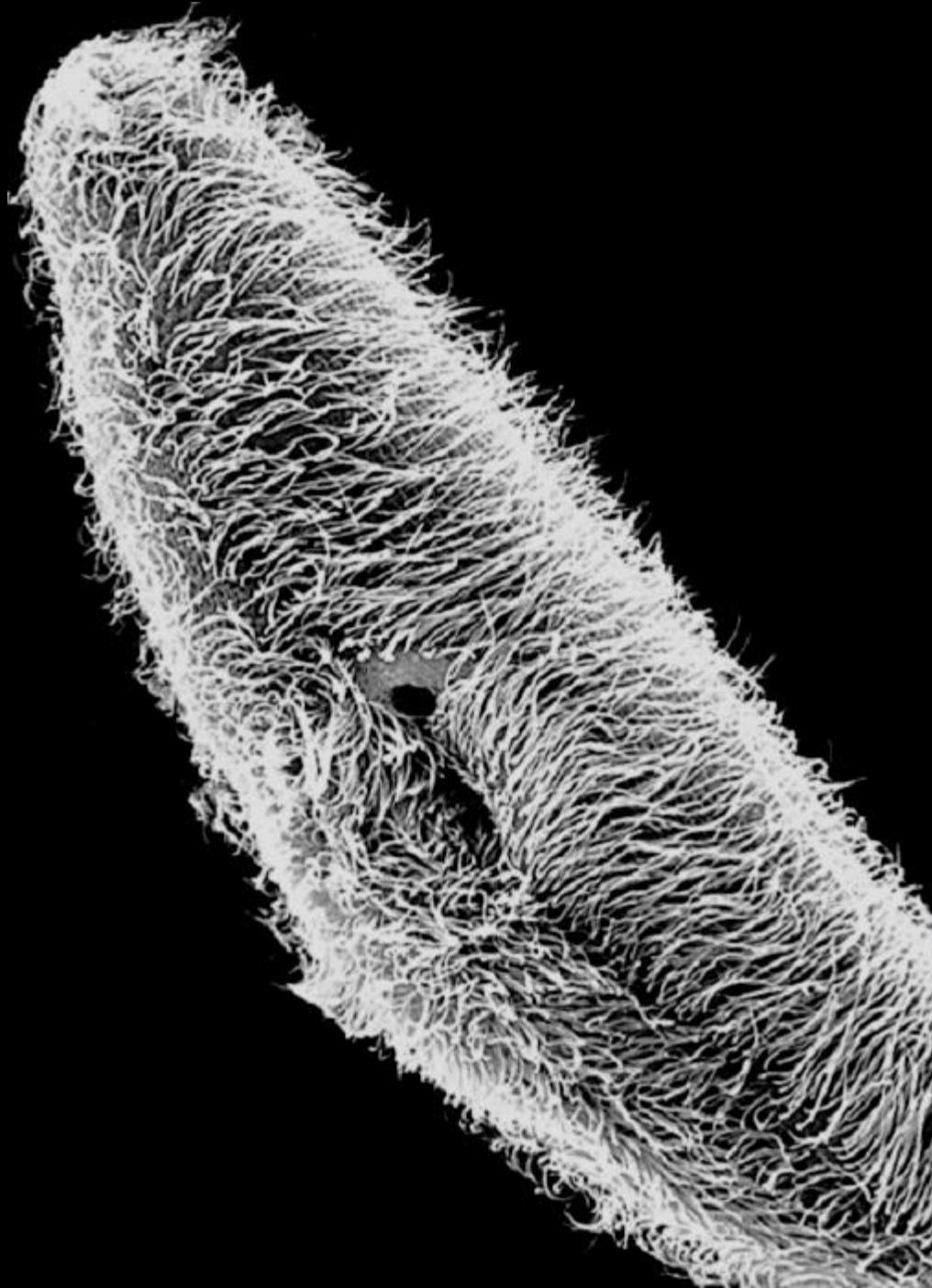
Olive and Blanton 1980:  
J. Protozool. 27: 293



***Coleps hirtus***  
**(armour)**

**Prostomateans**  
**Ciliates**

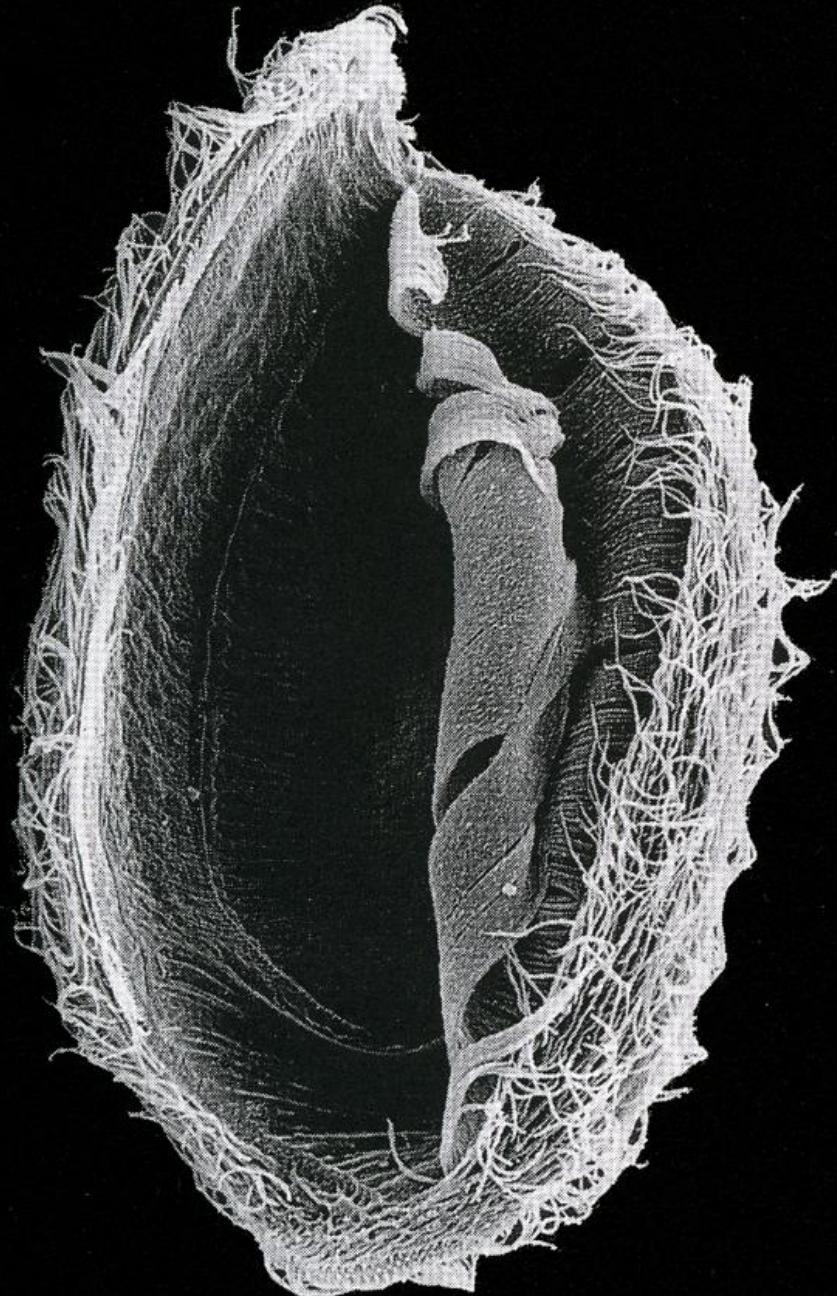
Foissner et al. 1994  
Taxonomische und ökologische  
Revision der Ciliaten des  
Saprobiensystems, Band 3  
Bayerisches Landesamt für  
Wasserwirtschaft  
Munich, Germany



*Paramecium  
aurelia*

**Peniculids  
Oligohymenophorans  
Ciliates**

courtesy of the  
**Nassau Community College**  
**Garden City, New York**  
**USA**



*Lembadion  
magnum*

**Peniculids  
Oligohymenophorans  
Ciliates**

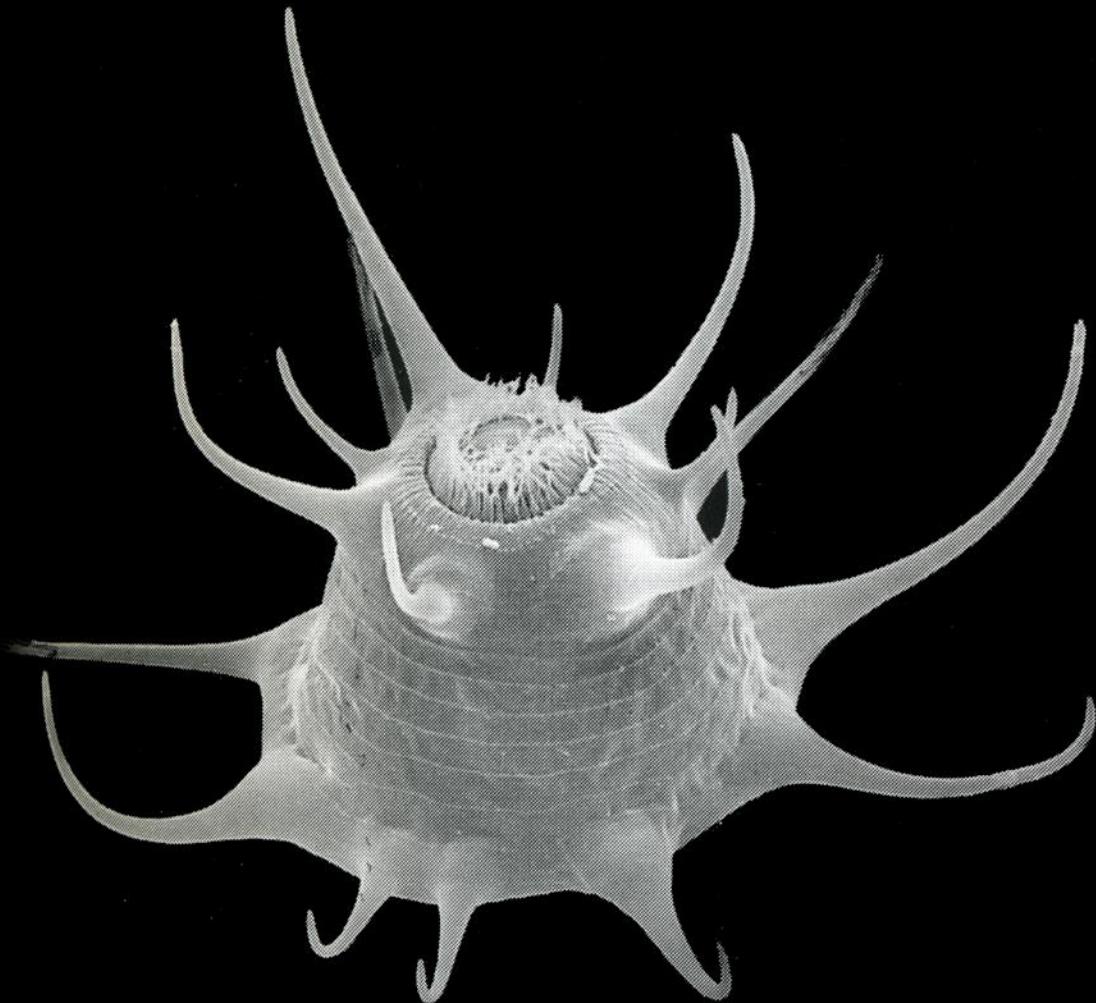
courtesy of  
**Christian Bardele**  
**University of Tübingen**  
**Germany**



*Pelagovorticella  
natans*

**Peritrichs  
Oligohymenophorans  
Ciliates**

Foissner et al. 1994  
Taxonomische und ökologische  
Revision der Ciliaten des  
Saprobiensystems, Band 2  
Bayerisches Landesamt für  
Wasserwirtschaft  
Munich, Germany



*Hastatella  
radians*

**Peritrichs  
Oligo-  
hymenophorans  
Ciliates**

courtesy of  
Wilhelm Foissner  
University of Salzburg  
Austria

# Ensaios

- Tema adequado e “blocos-de-construção”
-

# Ensaios

- - Objetividade – ordem direta e voz ativa, “convoluto”, “o mesmo”
- “*Reconstruir a história de um grupo é tentar traçar a forma como a diversidade de organismos do mesmo mudou até hoje.*”
- “*Esses motivos são barreiras intelectuais e práticas, como crenças do pesquisador, que podem não concordar com a lógica, a busca por padrões mesmo quando eles não existem, a dificuldade em testar várias hipóteses e em publicar esses trabalhos.*”