Illustrated Guide to Culture Collection of Free-living Amoebae

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Illustrated Guide to Culture Collection of Free-living Amoebae

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KATALOGIZACE V KNIZE – NÁRODNÍ KNIHOVNA ČR

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PREFACE

The study of free-living amoebae was initiated in the Czech Republic more than 40 years ago at the Institute of Parasitology (Academy of Sciences of the Czech Republic). Dr. Lubor Červa, member of the former Department of Protozoology at that Institute, was the leading scientist on the teams which clarified amoebic aetiology in 16 cases of acute purulent meningoencephalitis occurring between 1962 and 1965 in Northern Bohemia, Czech Republic (Červa and Novák 1968; Červa et al. 1968). Among his other contributions to the knowledge of agents of human amoebic infections, Dr. Červa co-authored a study on pathogenic *Naegleria fowleri* isolated from an indoor swimming pool that was identified as a source of large outbreaks of primary amoebic meningoencephalitis (Kadlec et al. 1978).

In the following decades, worldwide attention continued to be devoted mainly to free-living amoebae which are pathogenic for humans and to environmental sources of human infections. Simultaneously, new data on free-living amoebae which are ubiquitous in soil and aquatic habitats were accumulated, documenting the vast diversity of this group of organisms.

The occurrence of free-living amoebae in fish was neglected for a long time. The work on this topic started at the Institute of Parasitology with the transfer of the Department of Protozoology from Prague to České Budějovice in 1983 when the research projects of the Department shifted focus to fish parasites. The study of free-living amoebae was included as a side project. At the beginning, we had sufficient skills in sterile laboratory work and transmission electron microscopy techniques as well as basic knowledge of methods of culturing, but we lacked experience in the observation and identification of these diverse and changeable organisms.

At the end of the 80s, electron microscopy and some non-morphological approaches (isoenzyme analyses) were introduced by Frederick C. Page, the leading scientist in the field of free-living amoebae, as a step forward that radically changed taxonomy and methods of identification of amoebae. During the next two decades, DNA sequence data became the primary means of identification of eukaryotic microorganisms, including amoebae. Despite real progress in understanding of free-living amoebae, the correct association of DNA sequences with amoeba species defined morphologically has remained a problem. Type cultures of amoebae are available only in rare cases so that the determination of whether or not a new amoeba strain matches a previously described species and can bear its name is difficult, if not impossible. Misidentifications of strains, the sequences of which are used for phylogenetic analyses and subsequent changes in high level taxons, are not a rare occurrence either. Serious problems in generic/species delineation and new strain determination persist especially if only a single strain represents the described species and established genera.

All these facts were taken into account shortly after we started our amoeba studies. We decided to integrate key information about morphology and ultrastructure with molecular data for all our isolated strains store all these strains in a cryocollection, store the corresponding samples of DNA and deposit in GenBank the data obtained from those.

The cryopreserved culture collection mentioned in this volume is a by-product of studies on free-living amoebae made within the research projects of the Institute of Parasitology, Biology Centre of the Academy of Sciences of the Czech Republic. Contrary to major culture collections maintained commercially, it is based solely on the work of researchers of the Institute.

Anyone who has tried to isolate an amoeba strain, maintain it in culture, characterise it both morphologically and molecularly, and cryopreserve it, knows the great investment of time and energy that is required before such data and materials are obtained. The collection strains are available to those interested in their further study in cooperation with the researchers of the Institute. Some of the strains actually are, or may become, type cultures of newly described taxa. We will not hesitate to enable free access to them on anyone's request.

Acknowledgements

First, we should thank the late Dr. Jiří Lom, teacher and friend, who had the excellent idea of expanding the study of free-living amoebae to fish hosts as well. It is thanks to his understanding, encouragement and scientific advice that the satisfaction of isolating and culturing amphizoic amoebae could be experienced and a substantial part of the work completed before his passing away.

We are also deeply indebted to those colleagues who gave us the opportunity of using their facilities in different parts of the world as well as to those who on their field trips enthusiastically collected materials for our isolation attempts. Special thanks are extended to the staff of the Electron Microscopy Unit of the Institute of Parasitology, Biology Centre of the Academy of Sciences of the Czech Republic, headed by Jana Nebesářová, for their highly professional assistance in ultrathin sectioning and operation of a JEOL JEM 1010 electron microscope. We would also like to acknowledge Hana Pecková, who provided valuable technical assistance in strain culturing and in the preparation of DNA samples for sequencing over several years of our cooperation. Finally, this Guide would have been impossible without the dedicated technical assistance provided by Helena Dvořáková, who took care of the final graphic elaboration of the plates.

The Grant Agency of the Academy of Sciences of the Czech Republic, the Czech Science Foundation, the Research Plan of the Institute of Parasitology, Biology Centre of the Academy of Sciences of the Czech Republic (Z60220518), and the Faculty of Science of the University of South Bohemia, České Budějovice, Czech Republic (MSM 60007665801) are recognized for their financial support of several projects, with the results partly contributing to the assemblage of this Guidebook.

Iva Dyková

DEFINITION OF ORGANISMS TREATED

As may be seen from the literature that has been accumulated over the last 50 years, the term free-living amoebae has been used most frequently for species of several genera that were recognized as potential pathogens of humans (see, e.g., review of Schuster and Visvesvara 2004). We use the term free-living amoebae in its broad sense to encompass amoebae and amoeboid free-living protists with shape-shifting cells. Our main interest is the amphizoic amoebae, i.e., those that proliferate both living free and endozoically in various animal hosts.

Taxonomically, amoebae and amoeboid organisms, which were grouped together within Rhizopoda Von Siebold, 1845 and within Sarcodina Schmarda, 1871 for a long time, are scattered across the eukaryotic tree of life (Pawlowski 2008). They can be found in a majority of eukaryotic "supergroups", playing a potentially crucial role in their evolution, yet they are often represented by a single sequence of SSU rDNA in the phylogenetic trees.

The strains of amoebae presented in this Guide fall mostly within the "supergroup" Amoebozoa Lühe, 1913, which in its current concept emerged around the turn of the millennium (e.g., Cavalier-Smith 1998). They often belong to genera of lobose amoebae without undulipodia in either stage of their life cycle, classified as Tubulinea. Another large cluster of amoebozoans presented herein belongs to Flabellinea, a group that is not well supported by molecular data and mainly contains flattened amoebae (e.g., *Vannella*). Numerous other strains presented in the Guide (e.g., *Mayorella*, *Stenamoeba*) clearly belong to Amoebozoa, although they do not form large clades with other genera and their respective position within the amoebozoan phylogenetic tree is uncertain. Some strains (e.g., those of *Protacanthamoeba*) form small clusters with a few other genera (e.g., *Acanthamoeba* + *Balamuthia*), but their relationships with other amoebozoan branches also remain unknown. Of the other major groups containing amoebae, Heterolobosea Page et Blanton, 1985 are represented by numerous strains of *Naegleria* and a few other vahlkampfiids. The Opisthokonta Cavalier-Smith, 1987 sensu Adl et al., 2005 is represented by the type strain of *Nuclearia pattersoni*. One strain belongs to Rhizaria Cavalier-Smith, 2002.

We believe that due to ongoing studies the number of strains, that temporarily can only be grouped within amoebae *incertae sedis* and which are characterised by the type of their mitochondrial cristae (tubular, discoid or flattened), will diminish soon. However, it seems that in some strains, SSU rDNA sequence, as the only piece of molecular data available for a given organism, cannot be helpful in solving its taxonomic placement.

Sequences of some strains form extremely long branches in trees based on SSU rDNA sequences. Such problematic groups are the most interesting ones, which promise to advance the knowledge of diversity of amoeboid organisms.

METHODS OF ISOLATION AND CULTURING

All primary isolates from which we derived the strains were obtained using either MY75S agar for marine materials or NN agar for freshwater materials. Both culturing media were prepared according to the recipes from Page (1988). We used 75% seawater prepared from Sea Salts (Sigma) as a liquid base for MY75S agar and "PAS" (Page's amoeba saline, i.e., Neff's amoeba saline modified by Page 1988) for the NN agar.

In our initial attempts, we closely followed the recommendations given by Page (1988) and Kalinina and Page (1992) for culturing of free-living amoebae. Later, we simplified these methods by the omission of autoclaved bacteria spread on the surface of the agar. Since we realized that amoebae isolated from tissues as well as from environmental samples always bring bacteria to the culture, we decided to use these live bacteria as food for amoebae, controlling the bacterial growth through the nutritional quality of agar. Malt and yeast extracts were added (from traces to more significant amounts) up to the maximum 0.1 g of each per litre as given in the recipe for Stoianovitch's malt and yeast extract agar (MYAS) by Page (1988). The concentration of the agar varied within the range of 1.5–2.5%. Bacteria, especially those present in marine isolates, sometimes caused liquefaction of the agar, in which trophozoites sank some distance below the surface. Using a more concentrated agar partly solved the problem facilitating routine subculturing and, step by step, bacterial contamination diminished. Primary isolates were subcultured at a variable interval of several days, depending on their condition, which was examined on plates *in situ* with a compound microscope, focusing through the agar to its free surface. Well-established strains could be subcultured in the standard time interval of 7–10 days. All the agar plate cultures were maintained in an incubator at 20°C.

Subculturing consisted in the selection of an individual cell or a small, morphologically uniform group of cells through the agar plate by sterile cutting off a small block of agar bearing this cell(s) and transferring the block onto a new agar plate in an upside down position. This procedure was repeated as many times as necessary for obtaining a well growing amoeba culture with a balanced population of accompanying bacteria. However, clonal cultures of one-cell origin could neither be derived from all primary isolates nor from all well-established strains. In many cases, cells multiplied only if transferred to a fresh medium in groups. To support the growth of amoebae, we used to moisten the surface of new agar plates (with a corresponding liquid base of agar) prior to transferring of agar blocks from parent cultures.

Liquid media were used for subculturing of some *Naegleria* strains. Among them, Bacto-Casitone (BCS) medium (Červa 1969), changed daily in the early phase of subculturing and once a week when the culture became well established, proved to be optimal. Other liquid media (PPG, SCGYEM) were occasionally used with limited number of strains.

For subculturing of some "difficult" strains, e.g., *Mayorella gemmifera*, *Saccamoeba* and several *Naegleria* strains, we used well-grown monolayers of cell cultures (redundant in routine subculturing of EPC, FHM or RTG cell lines). These were over layered with 75% seawater or PAS (substituting cell culture medium).

METHODS OF CRYOPRESERVATION

Long-term cryopreservation followed a routine protocol using liquid nitrogen. The freezing protocol ensuring post-thaw cell survival was as follows: cryotubes filled with suspension of trophozoites washed off agar plates, or the material of the bottoms of culture flasks mixed with fresh, distilled or sea water and DMSO (Sigma) in a final concentration of 10% v/v were placed on ice for 1hr. Then they were transferred to a freezer (–20°C) for maximum of 1hr. They were placed in a deep freezer (–80°C) for another 2–4 hrs and finally to a container with liquid nitrogen for long-term storage. To test whether cryopreservation had been successful, the content of one control cryotube was poured onto an agar plate and checked several days later and then, if necessary, after a longer period of time (up to two weeks). To safely thaw cryopreserved amoebae, the content of cryotube was gently agitated in a water bath (37°C).

METHODS OF STUDY

Morphology and ultrastructure

The growth of primary isolates as well as of subcultured amoebae was observed in translucent light on agar plates inverted upside down, focusing on the agar surface. The essential prerequisite for this was transparency of the agar medium. We started working with Difco Bacto-agar; later on, we ordered agar from different suppliers, always trying to get the best quality. Thus the surface region of the agar selected for observation under the microscope could be (in most cases) chosen in advance with the naked eye. Inverted microscope was used exclusively for observation of cultures in liquid media.

Morphology of trophozoites of individual strains was studied using hanging drop preparations and Olympus light microscopes (BH2 and BX51) equipped with Nomarski differential interference contrast (DIC). The same equipment was used for observation of cysts; however, the preparations were of different type. A suspension of cysts was placed on pre-treated slides, i.e., those coated with a thin layer of liquid transparent agar of low concentration (1–1.5%) that was left to solidify before a drop of suspension of cysts was placed on it, and covered with a cover slip. Flagellate transformation of *Naegleria* trophozoites was usually observed when hanging drop preparations were mounted using Page amoeba saline (PAS). Distilled water was used on limited number of strains.

The way we documented morphology of trophozoites, cysts and flagellated stages of amoebae and amoeboid organisms reflected the equipment available at that particular time. The shift from black&white films and prints to digital images obtained by DP70 camera was a great improvement and made the job more enjoyable.

The examination of ultrastructure was included in the study of all the strains presented in this Guide. After initial attempts to repeat preparation procedures of previous authors, we started to fix cultures of amoebae *in situ*, i.e., on the surface of agar plates. For transmission electron microscopy, we often used subcultures prepared from suspension of the parent culture seeded on several new agar plates. Cacodylate buffered 2.5% or 3% glutaraldehyde (5 ml per Petri dish) was used as the initial fixative for approximately 30 min. Prefixed amoebae together with bacteria present in the culture were then harvested from the agar plates, concentrated by centrifugation, resuspended in 0.1M cacodylate buffer that removed excess fixative and subsequently the suspension of cells was pelleted. Sometimes a small drop of 1.5% methylcellulose dissolved in 0.1M cacodylate buffer was added to the bottom of the pelleting vial in order to produce a sample of a reasonable size or to “glue” together cells that did not produce a firm pellet readily. Pelleted material was fixed in 1% osmium tetroxide for 1 hr and, after washing in distilled water, was dehydrated in an acetone series and embedded in Spurr resin. In the course of dehydration, the cells were treated with 1% uranyl acetate dissolved in 85% acetone. Additional procedures of sample preparation, e.g., of flagellated stages of *Didymium* sp., were described elsewhere (Dyková et al. 2007a).

The ultrathin sections were stained with 2% uranyl acetate in 50% methanol, post-stained with Reynolds lead citrate and examined with a JEOL JEM 1010 electron microscope operating at 80 kV. Images were collected with Megaview II soft imaging system using analySIS software. Based on our experience with the procedures described above we attribute the key role in obtaining good images to the condition of the culture processed for transmission electron microscopy. Higher proportion of young cells within the pelleted material always increases the probability of good results.

Molecular methods

We followed the principle steps of generally used protocols in molecular characterization of individual strains. They have been modified gradually in accordance with the progress in technologies available. DNA was isolated mostly from trophozoites by harvesting either from agar plate cultures or from cultures in liquid media. Cysts crushed by glass beads in a FastPrep®-24 Instrument (M.P. Biomedicals) were used for isolation of DNA in a limited number of strains. In our initial studies, we used phenol: chlorophorm extraction of DNA, followed by ethanol precipitation (Sigma chemicals used); later on, this procedure was substituted with Qiagen DNeasy Tissue Kit (Qiagen) and JETQUICK Tissue DNA Spin Kit (Genomed) protocols. After isolation, the specific DNA regions were copied with polymerase chain reaction (PCR) using eukaryotic universal primers ERIB1 and ERIB10 (Barta et al. 1997) and specific primers designed on the basis of alignments of various amoeboid organisms. Properties of the designed primers were checked with an on-line tool OligoCalc (http://www.basic.northwestern.edu/biotools/oligocalc.html). Details of PCR reactions were recorded for each strain. Resulting PCR products were separated by standard gel electrophoresis and extracted with JETQUICK Gel Extraction Spin Kit (Genomed) or High Pure PCR Product Purification Kit (Roche). TOPO-TA Cloning Kit (Invitrogen), TA Cloning Kit (Invitrogen) or Qiagen PCR Cloning Kit (Qiagen) was used for DNA cloning. DNA plasmids were isolated by JETQUICK Plasmid Miniprep Spin Kit (Genomed) or by High Pure Plasmid Isolation Kit (Roche). Sequencing reactions of cloned and uncloned PCR products were performed using either CEQ DTCS Dye Kit and automatic sequencer CEQ 2000 (Beckman Coulter), or ABI PRISM BigDye Terminator v.3.1 Cycle Sequencing Kit and automatic sequencer ABI 3130x1 (Applied Biosystems).

Phylogenetic analyses of the relationship of the studied organisms were based mainly on the sequences of SSU rDNA, and in several cases on other markers (e.g., ITS sequences in *Naegleria*). Alignments containing the newly obtained sequences and those retrieved from GenBank were prepared in ClustalX 2.0.6 (Larkin et al. 2007) and edited and checked manually in BioEdit (Hall 1999). Methods of phylogenetic tree constructions particularly included the maximum likelihood (GTR model with gamma distribution) implemented in the program RAxML 7.0.3 (Stamatakis 2006) and bayesian inference provided by MrBayes 3.1.2 (Ronquist and Huelsenbeck 2003). To further confirm the results, two other methods were employed: maximum parsimony and Fitch-Margoliash method with log-det distances, both run in PAUP* 4β10 (Swofford 2003). All trees (except for the bayesian ones) were bootstrapped.

STRUCTURE OF DATA

The Guide is designed as a catalogue of strains of free-living amoebae and amoeboid organisms isolated from organs of animals, mostly freshwater or marine fish and marine invertebrates, supplemented with occasional environmental strains. The information provided on individual amoeba strains is a brief summary of essential data. Light microscopical features, overviews and details of ultrastructure of individual strains are presented in full-page plates. Legends to these plates contain host- and geographical origin, GenBank Acc. Nos. of SSU rDNA sequences (for most strains), GenBank Acc. Nos. of ITS sequences (for strain representatives of two genera), and SL RNA gene sequences (for symbionts of *Neoparamoeba* strains). The information on strains that for various reasons have not been sequenced so far is supplemented with Nos. of DNA samples.

With the exception of several strains that are included for morphological comparison and of which only respective DNA samples are stored, all strains are cryopreserved (with their DNA stored as well). Data given for species-type strains, or strains that have been identified with species named earlier by other authors, include the corresponding literature references. The same applies to strains that have been used in published phylogenetic analyses as the representatives of genera. Data on clonal cultures of one-cell origin, which have been used for sequencing, are available in FLA DB and in the relevant references supplementing the strain data.

Our amoeba strains have a different individual history and therefore the format of their denomination is not uniform. Some strains have a numeric code that corresponds to the protocol number of the host specimen examined. Other strains have a letter code often derived from the Czech or the scientific name of the host, host organ examined, locality, etc. Abbreviated indication of a basic amoeba characteristic may also be a part of the code. Finally, combinations of these systems also occur. The variability of codes facilitated identification while multiple strains were subcultured simultaneously.

The strains included in the catalogue are ordered in accordance with their generic classification. The genera are listed alphabetically and, within genera, the strains along with their corresponding plates are listed in the computer ascending order. The same order is used in the strain code index, genus representative index and SSU rDNA GenBank Acc. No. index. Current classifications both at the generic and suprageneric level are subjected to constant re-evaluations. This is why we do not assign individual strains to taxons above the genus rank. Groups of yet undetermined (*incertae sedis*) strains, which are grouped according to their mitochondrial pattern, are also included. Strains with discoid or flattened mitochondrial cristae form group 01; strains with tubular cristae are subdivided according to their mutual phylogenetic relationships to groups 02–05.

EXPLANATION OF ABBREVIATIONS

AGD	amoebic gill disease caused by *Neoparamoeba* spp. in marine fish
ATCC	American Type Culture Collection
BCS	Bacto-Casitone medium (Červa 1969)
CC	culture collection of cryopreserved strains deposited at the Institute of Parasitology, Biology Centre of the Academy of Sciences of the Czech Republic
DMSO	Dimethyl sulfoxide
DIC	differential interference contrast
EPC	cell line originally deposited at ATCC as a carp cell line, now declared as fish cell line
FHM	epithelial cell line derived from fathead minnow
FLA	free-living amoebae
FLA DB	database of DNA samples of FLA and amoeboid organisms stored in CC
FLA DB No.	Number of stored DNA sample of strain registered in FLA DB
GenBank Acc. No.	identification number of a sequence in GenBank
ITS	internal transcribed spacers of SL RNA genes
LSU rDNA	large subunit of ribosomal DNA
MY75S agar	seawater agar (salinity near 26 $^{o}/_{oo}$) enriched with malt and yeast extract (Catalogue of the UK National Culture Collection UKNCC, 2001; http://www.ukncc.co.uk)
MYAS	Stoianovitch's malt & yeast extract agar (Page 1988)
NN agar	non-nutrient amoeba saline agar (Page 1988)
P	*Perkinsela amoebae*-like organism/endosymbiont (used as mark in figures)
PAS	Page's amoeba saline solution (see Rp. in Catalogue of the UKNCC, 2001)
PLO	*Perkinsela amoebae*-like organism/endosymbiont (used in papers and in figure legends for GenBank sequences)
PPG	proteose-peptone-glucose liquid medium (Neff 1957)
RTG-2	fibroblast cell line derived from the rainbow trout
Ref.	reference to publication
SCGYEM	ATCC liquid medium 1021
SL RNA	spliced leader RNA (mini exon) gene
SSU rDNA	gene for the small subunit ribosomal RNA
UKNCC	United Kingdom National Culture Collection

STRAIN REPRESENTATIVES OF GENERA

Strain code	GenBank Acc. No./ FLA DB No.		Species denomination	Plate No./ page No.

***Acanthamoeba* Volkonsky, 1931**

3668	1329, 1339		*Acanthamoeba* sp.	001/28
4178	1308, 1313		*Acanthamoeba* sp.	002/29
4337	1345, 1346		*Acanthamoeba* sp.	003/30
4339	1347, 1349		*Acanthamoeba* sp.	004/31
4422	1307, 1310		*Acanthamoeba* sp.	005/32
4436	1340, 1344		*Acanthamoeba* sp.	006/33
4465	946		*Acanthamoeba* sp.	007/34
4482SL	JQ271663		*Acanthamoeba* sp.	008, 009/35, 36
4528	1337, 1343		*Acanthamoeba* sp.	010/37
4706	1338, 1342		*Acanthamoeba* sp.	011/38
4800J	1312, 1315		*Acanthamoeba* sp.	012/39
ACANT	JQ271664		*Acanthamoeba* sp.	013/40
ALC10	JQ271665		*Acanthamoeba* sp.	014/41
ALC2A	JQ271666		*Acanthamoeba* sp.	015/42
CANZ	JQ271667		*Acanthamoeba* sp.	016/43
G1	1351, 1352		*Acanthamoeba* sp	017/44
GERF3	HM363628		*Acanthamoeba* sp.	018, 019/45, 46
SHETL	1053		*Acanthamoeba* sp.	020/47

***Allovahlkampfia* Walochnik et Mulec, 2009**

4165	JQ271668	JQ271643	*Allovahlkampfia* sp.	021/50
PS1073J	JQ271669	JQ271644	*Allovahlkampfia* sp.	022/51
PV66	JQ271670	JQ271645	*Allovahlkampfia* sp.	023/52

***Cochliopodium* Hertwig et Lesser, 1874**

4692S	JQ271671		*Cochliopodium minus*	024/54
4694	JQ271672		*Cochliopodium minus*	025, 026/55, 56

Strain code	GenBank Acc. No./ FLA DB No.	Species denomination	Plate No./ page No.
CCAP1537/1A	JQ271673	*Cochliopodium minus*	027/57
DP16	JQ271674	*Cochliopodium minus*	028/58
SUM3P	JQ271675	*Cochliopodium minus*	029, 030/59, 60

Copromyxa **Zopf, 1885 emend. Brown, Silberman et Spiegel, 2011**

4730	HQ687486	*Copromyxa expectata*	031/62
ALC3	JQ271676	*C. cantabrigiensis*	032, 033/63, 64
LUM	JQ271677	*Copromyxa protea*	034/65
ZEB1	JQ271678	*Copromyxa* sp.	035/66
ZEB4	JQ271679	*Copromyxa* sp.	036/67

Didymium **Schrader, 1797**

CCIKV	JQ271680	*Didymium* sp.	037, 038/70, 71
ECH1	EF118758	*Didymium* sp.	039/72
ECH14	EF118757	*Didymium* sp.	040/73
ECH43	EF118760	*Didymium* sp.	041/74
ECH49	EF118761	*Didymium* sp.	042–044/75–77

Echinamoeba **Page, 1975**

CCAP1519/1	JQ271681	*E. silvestris*	045/80

Filamoeba **Page, 1967**

CH26	AY714369	*Filamoeba sinensis*	046/82
JIH56	GQ371176	*Filamoeba nolandi*	047/83

Flabellula **Schaeffer, 1926 emend. Page, 1980**

CCAP1529/2	EU852654	*Flabellula citata*	048/86
CCAP1529/3	352, 374	*Flabellula demetica*	049/87
CCAP1529/4	JQ271682	*Flabellula trinovantica*	050/88
ISO14	JQ271683	*Flabellula* sp.	051/89
M4M	EU852657	*Flabellula* sp.	052/90
M9M	EU852653	*Flabellula* sp.	053/91
S3M27	JQ271684	*Flabellula* sp.	054/92
S5M32	JQ271685	*Flabellula* sp.	055/93
SBGL1	JQ271686	*Flabellula* sp.	056/94
SMA17	EU852652	*Flabellula* sp.	057/95

Strain code	GenBank Acc. No./ FLA DB No.		Species denomination	Plate No./ page No.
***Grellamoeba* Dyková, Kostka et Pecková, 2010**				
4168	GQ438740, GQ438741, GQ438742		*Grellamoeba robusta*	058, 059/98, 99
***Hartmannella* Alexeieff, 1912 emend. Page, 1967 (See footnote on p. 101)**				
4391	DQ084364		*H. vermiformis*	060/102
4394	JQ271687		*H. vermiformis*	061/103
4480	DQ084363		*H. vermiformis*	062/104
ECH26	JQ271688		*H. vermiformis*	063/105
GERF1	HM363626		*H. vermiformis*	064/106
PFG	DQ084366		*H. vermiformis*	065/107
PM11	JQ271689		*H. vermiformis*	066/108
TN102	DQ084365		*H. vermiformis*	067/109
***Lingulamoeba* Sawyer, 1975**				
RSH1	JQ271690		*Lingulamoeba* sp.	068/112
RSL	AY929908		*Lingulamoeba* sp.	069/113
***Mayorella* Schaeffer, 1926**				
CCAP1547/8	EU719190		*Mayorella gemmifera*	070/116
***Naegleria* Alexeieff, 1912 emend. Calkins, 1913**				
2HZ	JQ271691	JQ271646	*Naegleria clarki*	071/118
3HZ	JQ271692	JQ271647	*Naegleria clarki*	072/119
4542	JQ271693	JQ271648	*Naegleria* sp.	073, 074/120, 121
4564	AF338419	DQ768739	*Naegleria clarki*	075/122
4709	AF338420	DQ768730	*Naegleria clarki*	076/123
4796	DQ768719	DQ768742	*Naegleria fultoni*	077/124
4830	DQ768721	DQ768736	*Naegleria pagei*	078/125
4HZ	JQ271694	JQ271649	*Naegleria clarki*	079/126
62K4	JQ271695	JQ271650	*Naegleria* sp.	080/127
6HFKL	JQ271696	JQ271651	*Naegleria clarki*	081/128
6HZV	JQ271697	JQ271652	*Naegleria clarki*	082/129
A22	DQ768714	DQ768732	*Naegleria pagei*	083/130
ALM1A	JQ271698	JQ271653	*Naegleria clarki*	084/131
BCHV5	JQ271699	JQ271654	*Naegleria australiensis*	085/132
BCZ4	DQ768716	DQ768731	*Naegleria* sp.	086/133
CB1S	DQ768725	DQ768728	*Naegleria clarki*	087/134

Strain code	GenBank Acc. No./ FLA DB No.		Species denomination	Plate No./ page No.
CB2B	AF338421	DQ768726	*Naegleria australiensis*	088/135
CL	DQ768715	DQ768741	*Naegleria clarki*	089/136
GERK	HM363629	JQ271655	*Naegleria* sp.	090/137
GG1BV	JQ271700	JQ271656	*Naegleria fultoni*	091/138
GG4BV	JQ271701	JQ271657	*Naegleria* sp.	092/139
GP3	DQ768724	DQ768733	*Naegleria clarki*	093/140
J14Z1	JQ271702	JQ271658	*Naegleria* sp.	094/141
K4482J	JQ271703	JQ271659	*Naegleria* sp.	095/142
MSED4	JQ271704	JQ271660	*Naegleria clarki*	096/143
O3Z	DQ768718	DQ768738	*Naegleria* sp.	097/144
Pd72Z	AF338417	DQ768743	*Naegleria clarki*	098/145
RR11Z	DQ768722	DQ768735	*Naegleria* sp.	099/146
RR13Z	DQ768720	DQ768737	*Naegleria* sp.	100/147
S1Z	DQ768717	DQ768740	*Naegleria* sp.	101/148
SUM3V	DQ768723	DQ768734	*Naegleria* sp.	102/149
TMR	JQ271705	JQ271661	*Naegleria clarki*	103/150

Neoparamoeba Page, 1987

AFSM11	AY193723		*N. pemaquidensis*	104/152
AFSM3	AY193724		*N. branchiphila*	105/153
AMOPI	EF675600		*N. branchiphila*	106/154
FRS	AY714356		*N. pemaquidensis*	107/155
GillNOR1	AY714352	EF216912	*N. pemaquidensis*	108/156
GillNOR2	AY714354		*N. pemaquidensis*	109/157
LITHON	EU331036		*N. pemaquidensis*	110/158
NET12AFL	EF675604		*N. pemaquidensis*	111/159
NETH2T3	AY714350		*N. pemaquidensis*	112/160
NP251002	AY714351	EF216913	*N. pemaquidensis*	113/161
NRSS	AY714367	EF216914	*N. branchiphila*	114/162
PA027	AY714358	EF216915	*N. pemaquidensis*	115/163
RP	EF675603		*N. branchiphila*	116/164
SEDC	AY714353		*N. pemaquidensis*	117/165
SEDMH1	AY714366	EF216917	*N. branchiphila*	118/166
SEDST1	AY714359		*N. pemaquidensis*	119/167
SM68	AY193725		*N. branchiphila*	120/168
ST4N	AY714365	EF216918	*N. branchiphila*	121/169
ST8V	AY714355		*N. pemaquidensis*	122/170
SU03	EU331035		*N. aestuarina*	123/171
SU4	EF675599		*N. branchiphila*	124/172
TUN1	EF675607		*N. pemaquidensis*	125/173
WT2708	EF675605		*N. pemaquidensis*	126/174
WTUTS	AY714361	EF216898	*N. pemaquidensis*	127/175

Strain code	GenBank Acc. No./ FLA DB No.	Species denomination	Plate No./ page No.
***Nolandella* Page, 1980**			
AFSM9	JQ271706	*Nolandella* sp.	128/178
JKS1	JQ271707	*N. abertavensis*	129/179
***Nuclearia* Cienkowski, 1865**			
RR2G2	AY364635	*Nuclearia pattersoni*	130, 131/182, 183
***Paraflabellula* Page et Willumsen, 1983**			
RT1TT	JQ271708	*Paraflabellula* sp.	132/186
SEDF	EU852655	*Paraflabellula* sp.	133/187
STAR2	EU852658	*Paraflabellula* sp.	134/188
***Protacanthamoeba* Page, 1981**			
GERE3	HM363625	*Protacanthamoeba* sp.	135/190
PM1	JQ271709	*Protacanthamoeba* sp.	136/191
PM5	JQ271710	*Protacanthamoeba* sp.	137/192
TT3H	AY960120	*P. bohemica*	138, 139/193, 194
***Protophysarum* Blackwell et Alexopoulos, 1975**			
PV64	JQ271711	*Protophysarum* sp.	140, 141/196, 197
***Protostelium* Olive et Stoianovitch, 1960**			
4638	JQ271712	*Protostelium* sp.	142/200
***Ripella* Smirnov, Nassonova, Chao et Cavalier-Smith, 2007**			
805	JQ271713	*Ripella* sp.	143/202
CAZ6	AY929914	*Ripella* sp.	144/203
CAZ7	AY929922	*Ripella* sp.	145/204
DP13	JQ271714	*Ripella* sp.	146/205
GERL14	HM363630	*Ripella* sp.	147/206
GERL34	HM363631	*Ripella* sp.	148/207
GP2	JQ271715	*Ripella* sp.	149/208
PS2	JQ271716	*Ripella* sp.	150/209

Strain code	GenBank Acc. No./ FLA DB No.		Species denomination	Plate No./ page No.
SUM1S	AY929921		*Ripella* sp.	151/210
W181G	AY929913		*Ripella* sp.	152/211

Saccamoeba **Frenzel, 1892 emend. Bovee, 1972**

DP7	JQ271717		*Saccamoeba* sp.	153/214
LOS7N	AY145442		*Saccamoeba* sp.	154/215
MSED6	JQ271718		*Saccamoeba* sp.	155/216
NTSHR	EU869301		*Saccamoeba limax*	156, 157/217, 218
PV67	JQ271719		*Saccamoeba* sp.	158/219
W187G	JQ271720		*Saccamoeba* sp.	159/220

Stenamoeba **Smirnov, Nassonova, Chao et Cavalier-Smith, 2007**

4692L	GU810183		*S. limacina*	160/222
HP839	JQ271721		*Stenamoeba* sp.	161/223
P119	GU810184		*S. amazonica*	162/224
P126	GU810185		*Stenamoeba* sp.	163/225

Thecamoeba **Fromentel, 1874**

AF12B	135, 166, 200, 203, 558		*Thecamoeba* sp.	164/228
CCAP1583/8	JQ271722		*Thecamoeba similis*	165/229

Vahlkampfia **Chatton et Lalung-Bonnaire, 1912**

4171L	JQ271723	JQ271662	*Vahlkampfia avara*	166/232

Vannella **Bovee, 1965**

4354	AY929911	AY929930	*Vannella* sp.	167/234
4362V	AY929909	AY929928	*Vannella* sp.	168/235
4432	AY929910	AY929929	*Vannella* sp.	169/236
ACN1	JQ271724		*Vannella* sp.	170/237
AFSM6	AY929918	AY929934	*Vannella* sp.	171/238
ASL3	JQ271725		*Vannella* sp.	172/239
BAK1	JQ271726		*Vannella* sp.	173/240
BEN3V	JQ271727		*Vannella* sp.	174/241
BOTM	JQ271728		*Vannella* sp.	175/242
CAME	JQ271729		*Vannella* sp.	176/243
CH88	AY929912		*Vannella* sp.	177/244

Strain code	GenBank Acc. No./ FLA DB No.		Species denomination	Plate No./ page No.
CHOR	JQ271730		*Vannella* sp.	178/245
DB282	AY929920	AY929936	*Vannella* sp.	179/246
ECH30	JQ271731		*Vannella* sp.	180/247
ELH1	JQ271732		*Vannella* sp.	181/248
ELH2	JQ271733		*Vannella* sp.	182/249
ELH3	JQ271734		*Vannella* sp.	183/250
ELH4	JQ271735		*Vannella* sp.	184/251
ELH5	JQ271736		*Vannella* sp.	185/252
ELH6	JQ271737		*Vannella* sp.	186/253
ELH7	JQ271738		*Vannella* sp.	187/254
GERB	HM363624		*Vannella* sp.	188/255
GERL41	HM363632		*Vannella* sp.	189/256
ISCRH	JQ271739		*Vannella* sp.	190/257
ISO13	AY929905	AY929925	*Vannella* sp.	191/258
ISO4	JQ271740		*Vannella* sp.	192/259
ISOKONT	JQ271741		*Vannella* sp.	193/260
JKS2	JQ271742		*Vannella* sp.	194/261
JKZ	JQ271743		*Vannella* sp.	195/262
JRF2	JQ271744		*Vannella* sp.	196/263
KONT2Pe	JQ271745		*Vannella* sp.	197/264
LITHOV	JQ271746		*Vannella* sp.	198/265
MSPE	JQ271747		*Vannella* sp.	199/266
PHILM	JQ271748		*Vannella* sp.	200/267
PHILV	JQ271749		*Vannella* sp.	201/268
PMCH	AY929919	AY929935	*Vannella* sp.	202/269
R	JQ271750		*Vannella* sp.	203/270
REH2	JQ271751		*Vannella* sp.	204/271
RSSF	JQ271752		*Vannella* sp.	205/272
RT3TT	JQ271753		*Vannella* sp.	206/273
S2M2	AY929904	AY929924	*Vannella* sp.	207/274
S3M13	JQ271754		*Vannella* sp.	208/275
S4M23	JQ271755		*Vannella* sp.	209/276
S4M24	JQ271756		*Vannella* sp.	210/277
S4M30	JQ271757		*Vannella* sp.	211/278
S6M33	JQ271758		*Vannella* sp.	212/279
S7M35	JQ271759		*Vannella* sp.	213/280
S7M36	JQ271760		*Vannella* sp.	214/281
S98M54F	JQ271761		*Vannella* sp.	215/282
S98M7	JQ271762		*Vannella* sp.	216/283
S98M8	AY929906	AY929926	*Vannella* sp.	217/284
SBV1	AY929917	AY929933	*Vannella* sp.	218/285
SEDFS	JQ271763		*Vannella* sp.	219/286
SMA13V	JQ271764		*Vannella* sp.	220/287
SMA26	JQ271765		*Vannella* sp.	221/288
SMA30	JQ271766		*Vannella* sp.	222/289
SMA7V	JQ271767		*Vannella* sp.	223/290

Strain code	GenBank Acc. No./ FLA DB No.		Species denomination	Plate No./ page No.
SS8FJ1	AY929915	AY929931	*Vannella* sp.	224/291
SYM43	JQ271768		*Vannella* sp.	225/292
T02	JQ271769		*Vannella* sp.	226/293
ULLAP	JQ271770		*Vannella* sp.	227/294
VV	AY929923	AY929937	*Vannella* sp.	228/295

Vexillifera Schaeffer, 1926

1HZ	JQ271771	*V. bacillipedes*	229/298
6HZM	JQ271772	*Vexillifera* sp.	230/299
CCAP1590/1	HQ687485	*V. bacillipedes*	231, 232/300, 301
P124	HQ687481	*V. multispinosa*	233, 234/302, 303
P20Z	JQ271773	*Vexillifera* sp.	235/304
RMT	HQ687483	*V. tasmaniana*	236/305
RR1	HQ687482	*V. fluvialis*	237/306
S2M1	JQ271774	*Vexillifera* sp.	238/307
TIL2	HQ687484	*V. bacillipedes*	239/308

STRAINS *INCERTAE SEDIS*

Strain code	GenBank Acc. No./ FLA DB No.	Strain assignment	Plate No./ page No.
Strains *incertae sedis*, group 01			
893	53, 92	strain *inc. sed.*, group 01	240/310
912	1095, 1115, 1306, 1311	strain *inc. sed.*, group 01	241/311
CORD7	531	strain *inc. sed.*, group 01	242/312
CPD8	535,538	strain *inc. sed.*, group 01	243/313
CPD9	534, 539	strain *inc. sed.*, group 01	244/314
ECHD2	521, 525	strain *inc. sed.*, group 01	245/315
ESPO7	277	strain *inc. sed.*, group 01	246/316
J13Z	1034	strain *inc. sed.*, group 01	247/317
SS7FJ	1042	strain *inc. sed.*, group 01	248/318
TN99	127,133,1040	strain *inc. sed.*, group 01	249/319
Strains *incertae sedis*, group 02			
1HFKJ	JQ271775	strain *inc. sed.*, group 02	250/322
4388	JQ271776	strain *inc. sed.*, group 02	251/323
CC4HA	JQ271777	strain *inc. sed.*, group 02	252/324
HF1KJ	JQ271778	strain *inc. sed.*, group 02	253/325
HF3KL	JQ271779	strain *inc. sed.*, group 02	254/326
Strains *incertae sedis*, group 03			
ROD2G	JQ271780	strain *inc. sed.*, group 03	255/328
ROD4G	JQ271781	strain *inc. sed.*, group 03	256/329
ROD5G	JQ271782	strain *inc. sed.*, group 03	257/330
ROD8G	JQ271783	strain *inc. sed.*, group 03	258/331

Strain code	GenBank Acc. No./ FLA DB No.	Strain assignment	Plate No./ page No.

Strains *incertae sedis*, group 04 (See footnote on p. 333)

4790	JQ271784	strain *inc. sed*., group 04	259, 260/334, 335
BCHM5	JQ271785	strain *inc. sed*., group 04	261/336
CAL5	JQ271786	strain *inc. sed*., group 04	262/337
CAL7	JQ271787	strain *inc. sed*., group 04	263/338
MSED2	JQ271788	strain *inc. sed*., group 04	264/339
P18	JQ271789	strain *inc. sed*., group 04	265/340
PPD16	JQ271790	strain *inc. sed*., group 04	266/341
W185G	JQ271791	strain *inc. sed*., group 04	267/342

Strains *incertae sedis*, group 05

900	JQ271792	strain *inc. sed*., group 05	268/344
M6MM	JQ271793	strain *inc. sed*., group 05	269/345

Acanthamoeba Volkonsky, 1931

Plates 001–020

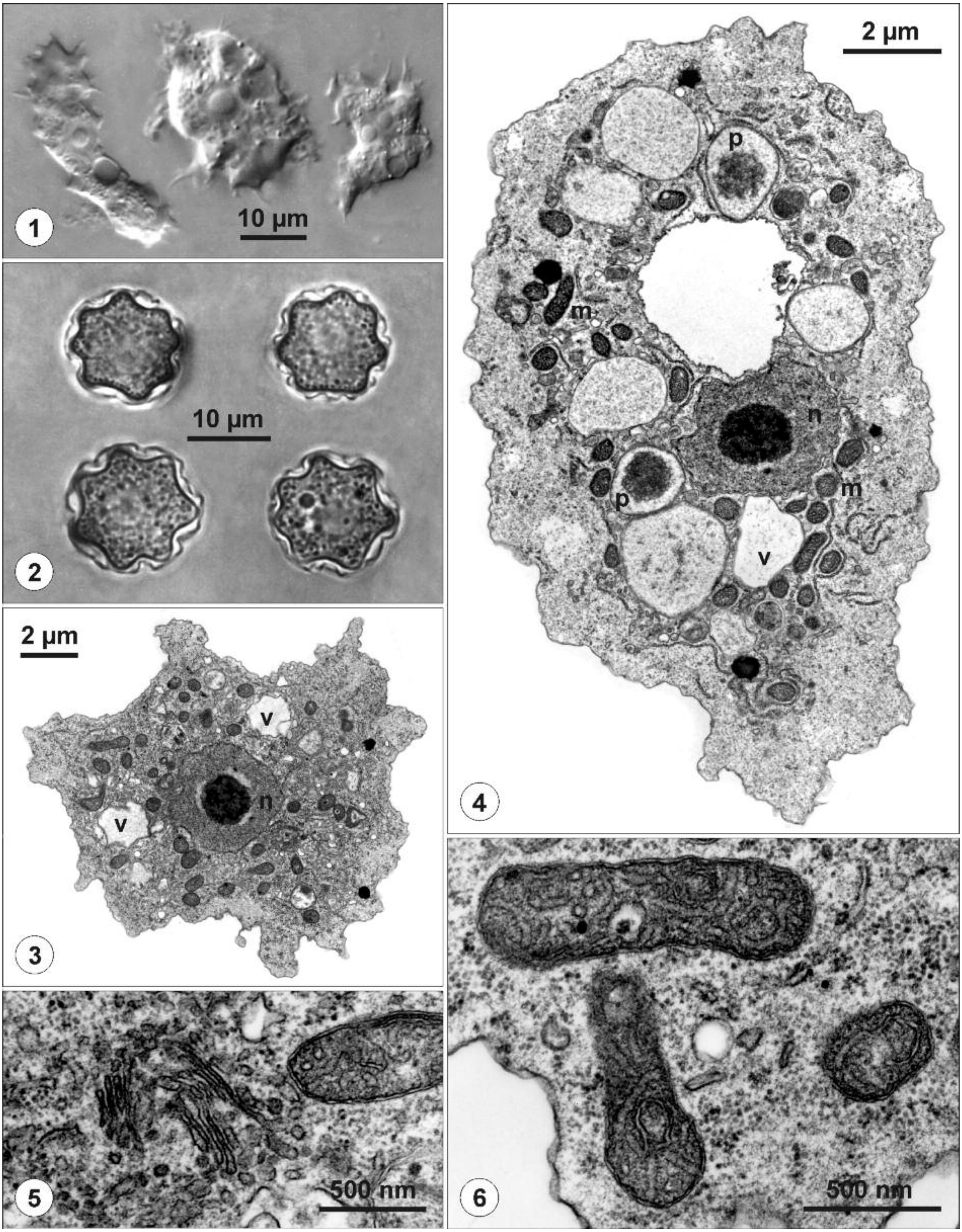

Plate 001. 3668 strain of *Acanthamoeba* sp. isolated from spleen of wels catfish, *Silurus glanis* L. from Skalice River, Central Bohemia, Czech Republic; cultured in BCS medium; stored in CC since1989; DNA samples stored under FLA DB Nos. 1329, 1339. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Cysts as seen in translucent light. **Figs. 3, 4.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosomes (p), vacuole (v). **Fig. 5.** Golgi complexes with parallel arrangement of cisternae. **Fig. 6.** Mitochondria with tubular branching cristae. Ref.: Dyková et al. 1999b.

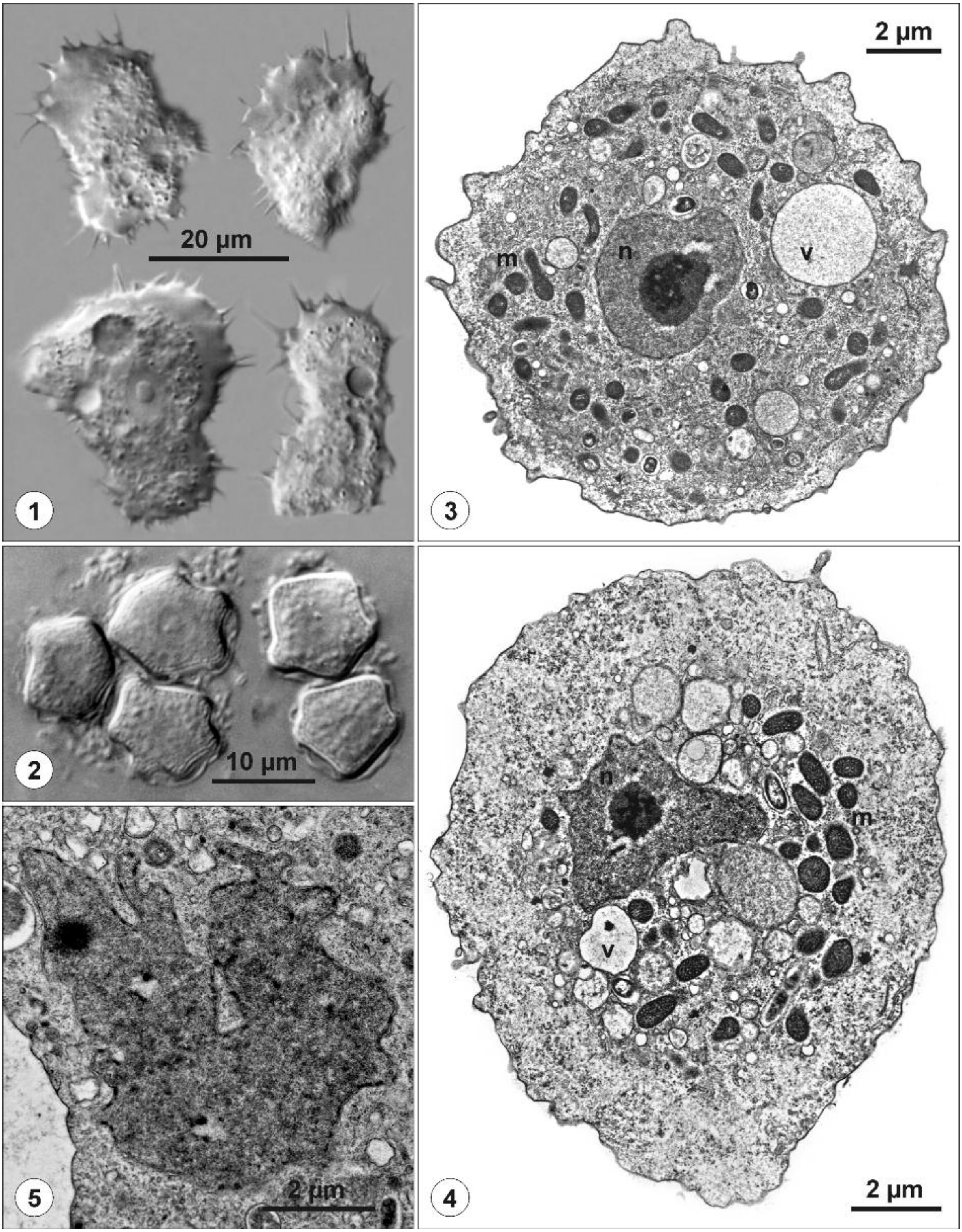

Plate 002. 4178 strain of *Acanthamoeba* sp. isolated from spleen of white bream, *Blicca bjoerkna* L. from Vltava River, South Bohemia, Czech Republic; cultured in BCS and SCGYEM media; stored in CC since 1990; DNA samples stored under FLA DB Nos. 1308, 1313. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Cysts as seen in Nomarski DIC. **Figs. 3, 4.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), vacuoles (v). Detail of lobed nucleus. Ref.: Dyková et al. 1999b.

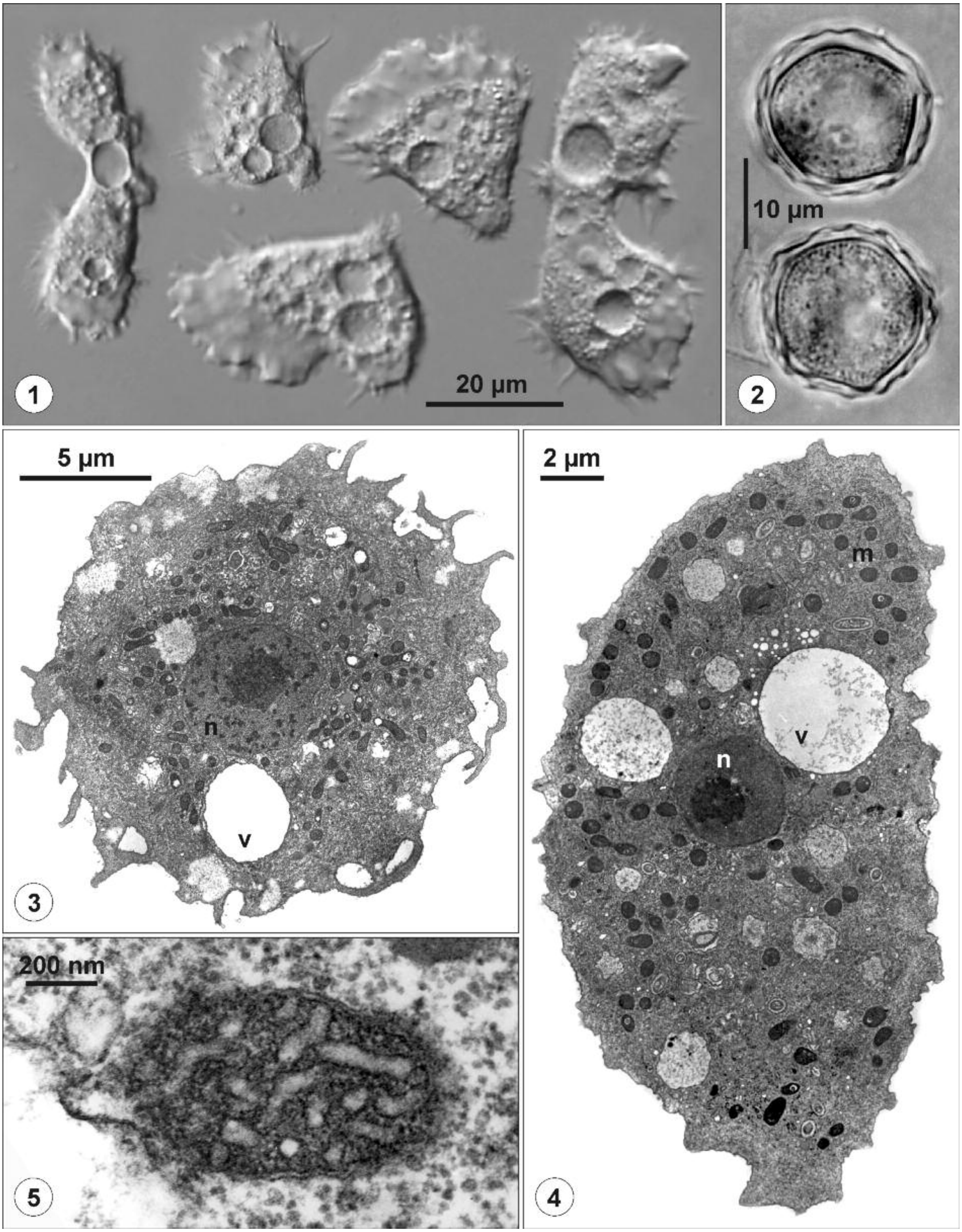

Plate 003. 4337 strain of *Acanthamoeba* sp. isolated from brain of chub, *Squalius cephalus* (L.) from Malše River, South Bohemia, Czech Republic; cultured in BCS and SCGYEM media; stored in CC since 1990; DNA samples stored under FLA DB Nos. 1345, 1346. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Cysts as seen in translucent light. **Figs. 3, 4.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), vacuoles (v). **Fig. 5.** Mitochondrion with tubular cristae. Ref.: Dyková et al. 1999b.

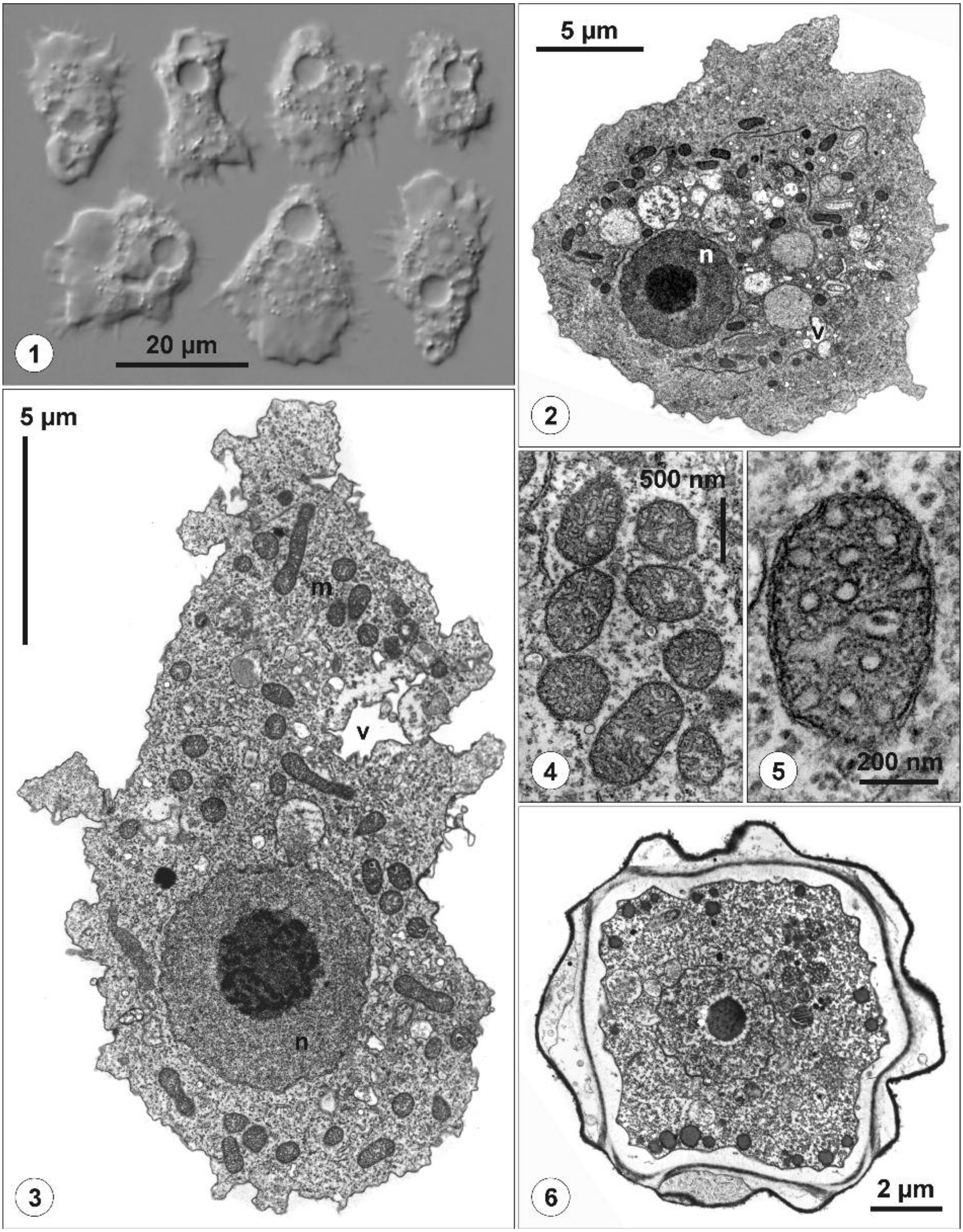

Plate 004. 4339 strain of *Acanthamoeba* sp. isolated from liver of European perch, *Perca fluviatilis* L. from Malše River, South Bohemia, Czech Republic; cultured in BCS and SCGYEM media; stored in CC since 1990; DNA sample stored under FLA DB No. 1347, 1349. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nucleus (n), mitochondria (m), vacuoles (v). **Figs. 4, 5.** Mitochondria with tubular cristae. **Fig. 6.** Mature cyst. Ref.: Dyková et al. 1999b.

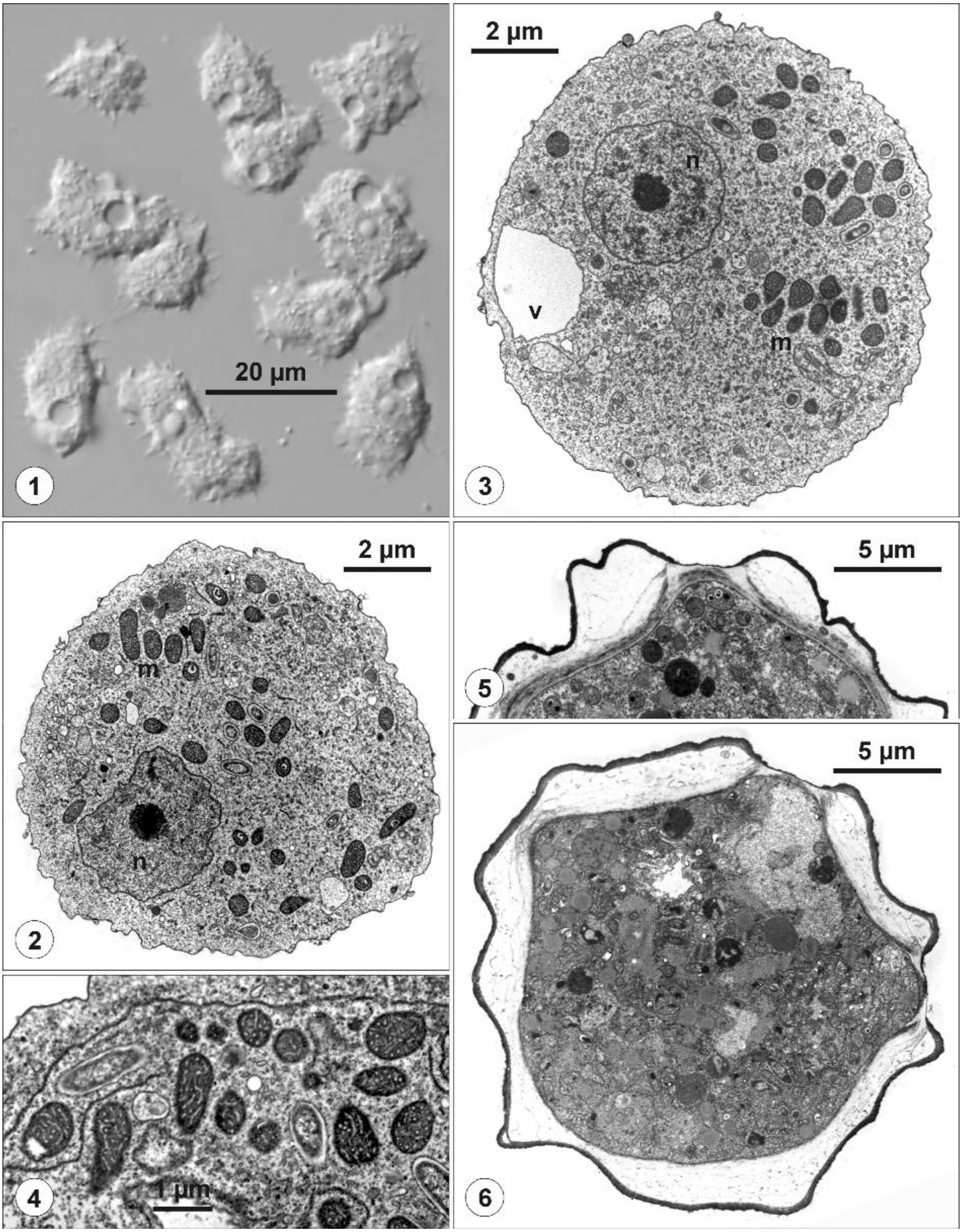

Plate 005. 4422 strain of *Acanthamoeba* sp. isolated from brain of ruffe, *Gymnocephalus cernuus* L. from Vltava River, South Bohemia, Czech Republic; cultured in BCS medium; stored in CC since 1990; DNA samples stored under FLA DB Nos. 1307, 1310. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nucleus (n), mitochondria (m), vacuole (v). **Fig. 4.** Mitochondria with tubular cristae. **Figs. 5, 6.** Mature cysts. Ref.: Dyková et al. 1999b.

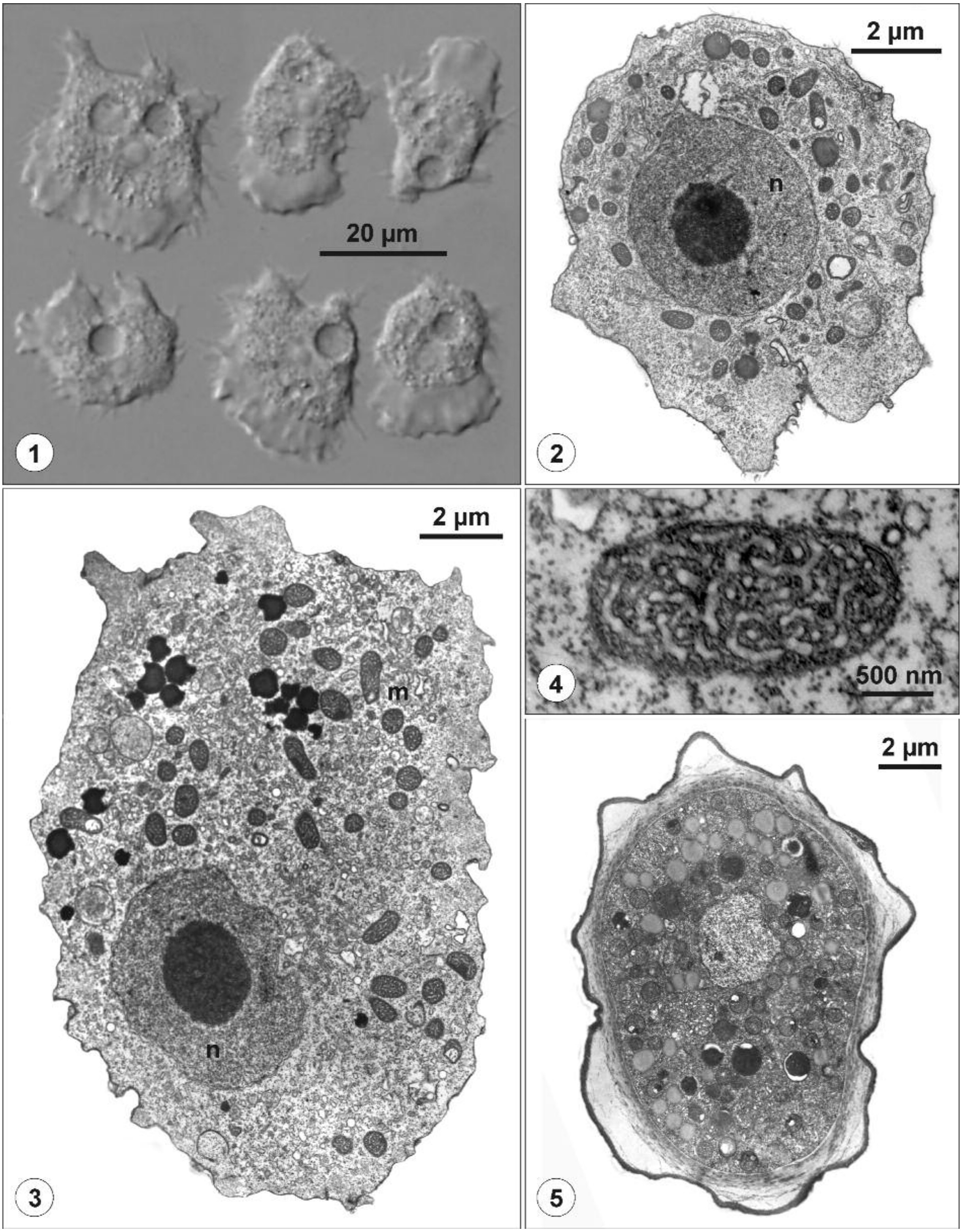

Plate 006. 4436 strain of *Acanthamoeba* sp. isolated from kidney of roach, *Rutilus rutilus* L. from Lužnice River, South Bohemia, Czech Republic; cultured in BCS, PPG and SCGYEM media; stored in CC since 1990; DNA samples stored under FLA DB Nos. 1340, 1344. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m). **Fig. 4.** Mitochondrion with tubular branching cristae. **Fig. 5.** Maturing cyst. Ref.: Dyková et al. 1999b.

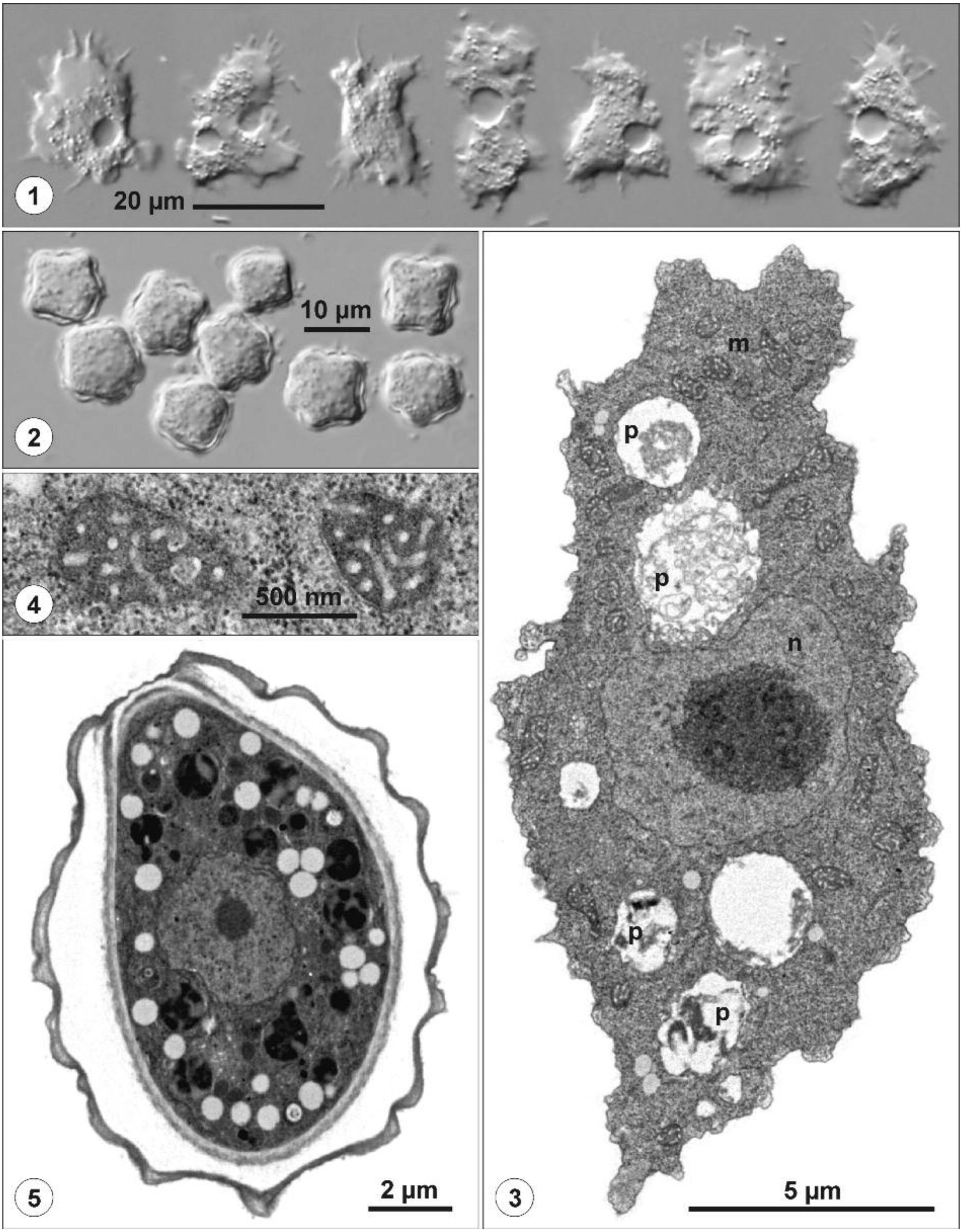

Plate 007. 4465 strain of *Acanthamoeba* sp. isolated from brain of European perch, *Perca fluviatilis* L. from Vltava River, South Bohemia, Czech Republic; cultured in BCS medium; stored in CC since 1990; DNA sample stored under FLA DB No. 946. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Cysts as seen in Nomarski DIC. **Fig. 3.** Overview of fine structure of trophozoite: nucleus (n), mitochondria (m), phagosomes (p). **Fig. 4.** Detail of ultrastructure of mitochondria with tubular cristae. **Fig. 5.** Mature cyst with bilayered wall. Ref.: Dyková et al. 1999b.

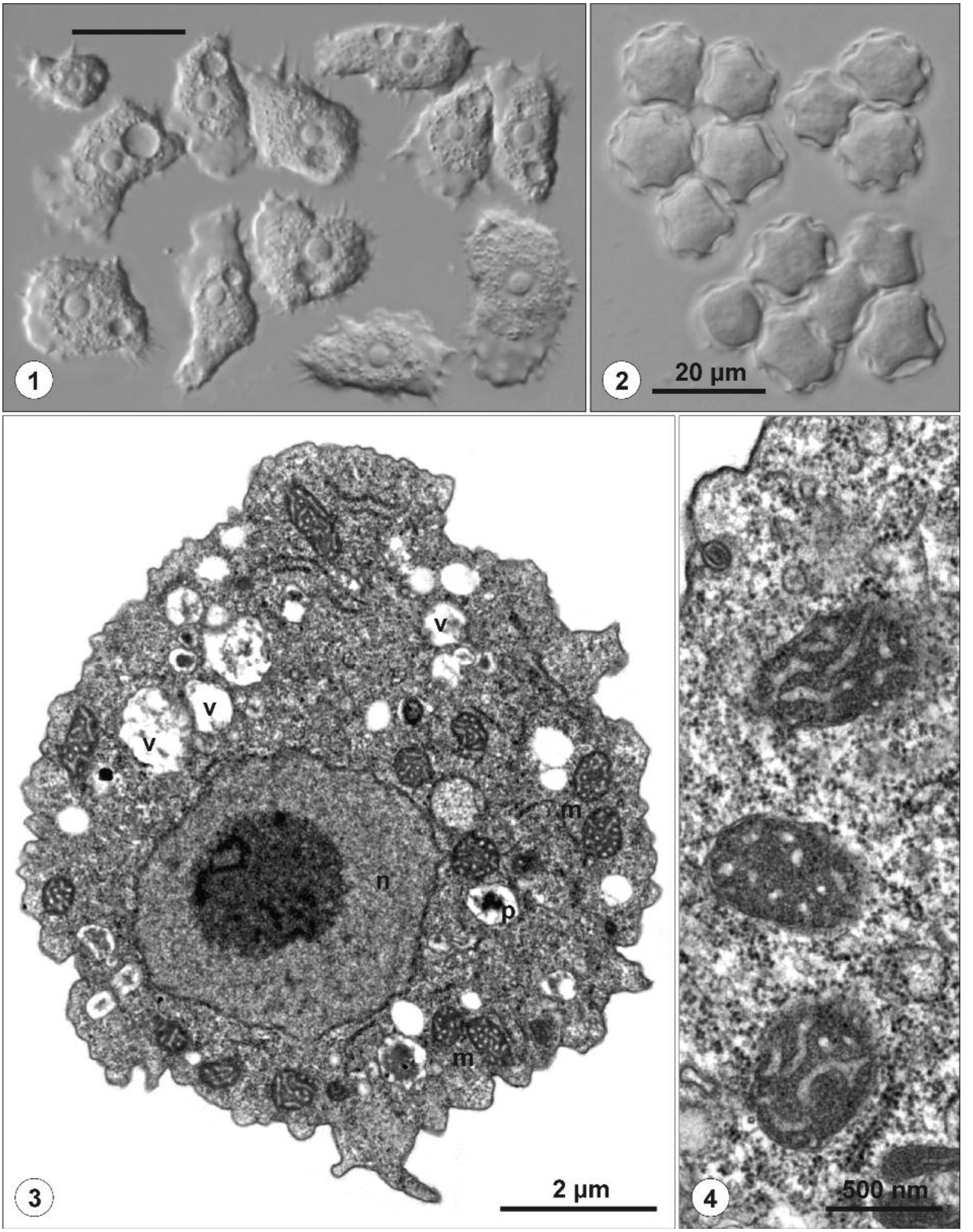

Plate 008. 4482SL strain of *Acanthamoeba* isolated from spleen of common carp, *Cyprinus carpio* L. from experimental farm in Vodňany, South Bohemia, Czech Republic; cultured on NN agar; stored in CC since 1990; GenBank Acc. No. of SSU rDNA sequence JQ271663. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC), scale bar = 20 µm. **Fig. 2.** Cysts seen in Nomarski DIC. **Fig. 3.** Overview of fine structure of trophozoite: nucleus (n), mitochondria (m), numerous vacuoles (v), phagosome (p). **Fig. 4.** Detail of ultrastructure of mitochondria with tubular cristae. (Cont.)

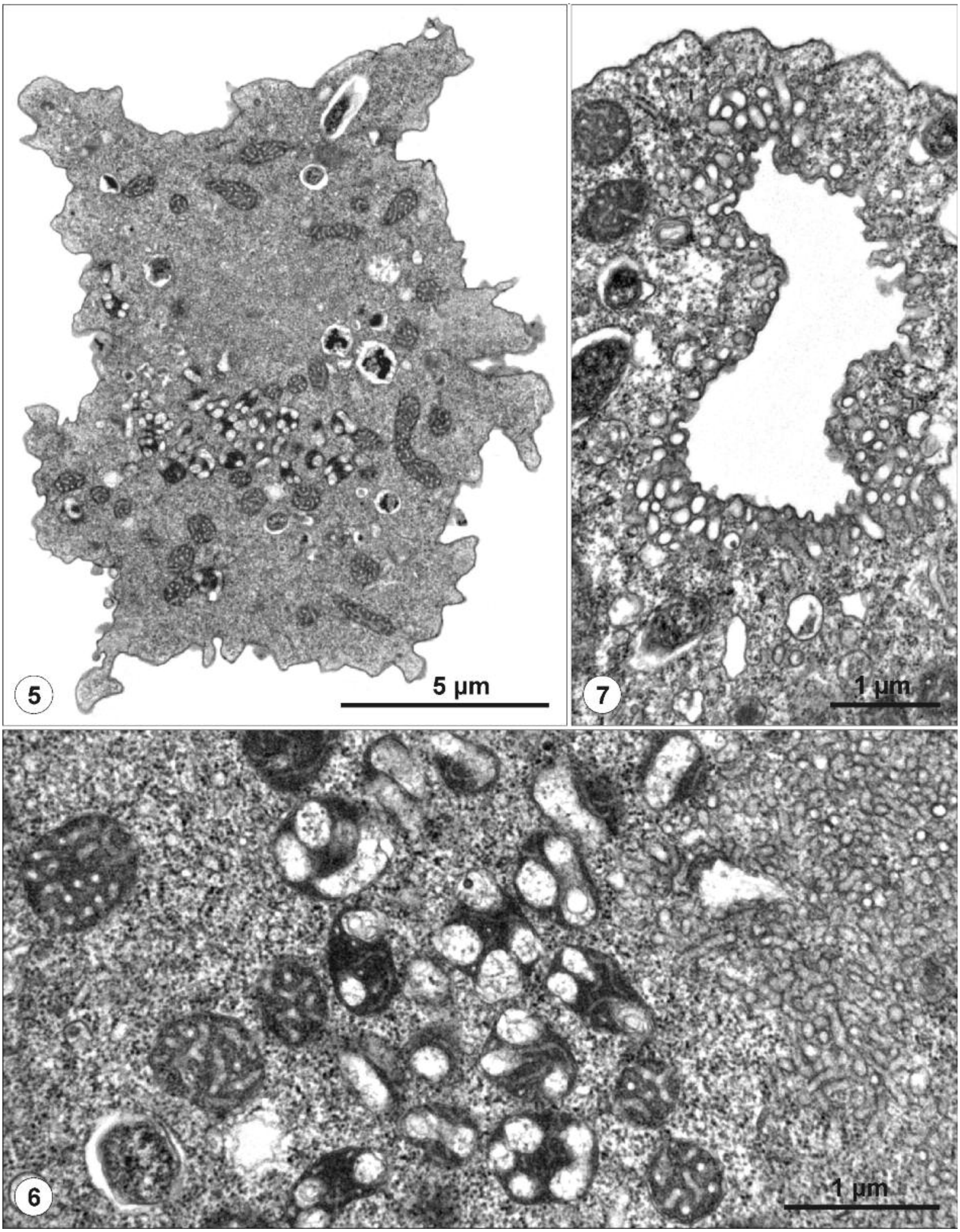

Plate 009. 4482SL strain of *Acanthamoeba* sp. **Fig. 5.** Overview of trophozoite ultrastructure (sectioned out of the plane of nucleus): mitochondria with tubular cristae characteristic of the genus. **Fig. 6.** Detail of fine structure of cytoplasm: mitochondria (m) characteristic of *Acanthamoeba* spp. (left), numerous mitochondria with matrix modified by presence of pseudoinclusions (middle), spongiom (right). **Fig. 7.** Contractile vacuole, detail of spongiom network.

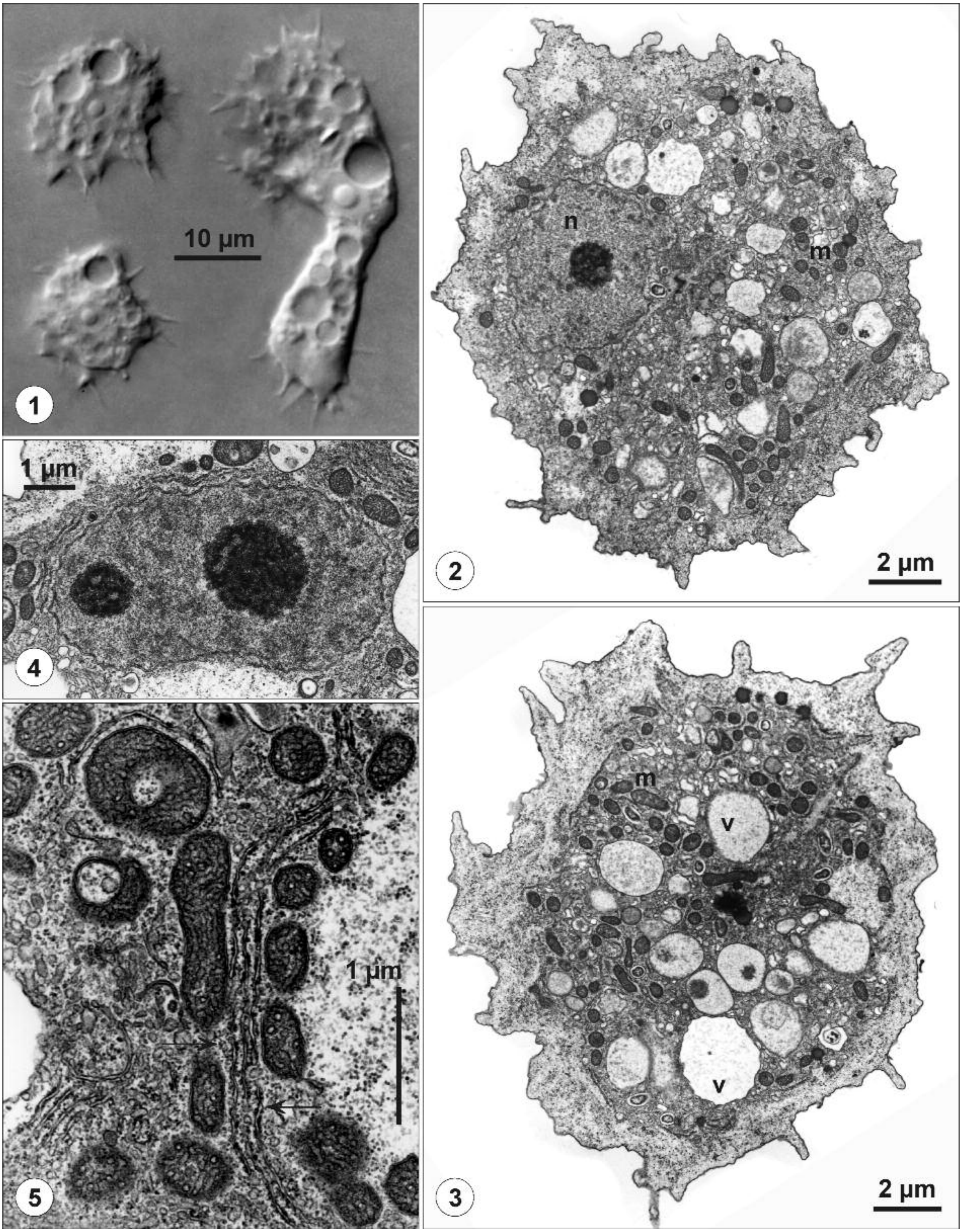

Plate 010. 4528 strain of *Acanthamoeba* sp. isolated from kidney of chub, *Squalius cephalus* (L.) from Černovický potok brook, South Bohemia, Czech Republic; cultured in BCS medium; stored in CC since 1991; DNA samples stored under FLA DB Nos. 1337, 1343. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nucleus (n), mitochondria (m), vacuoles (v). **Fig. 4.** Detail of elongated nucleus with divided nucleolar material. **Fig. 5.** Mitochondria with tubular cristae, granular endoplasmic reticulum (arrows). Ref.: Dyková et al. 1999b.

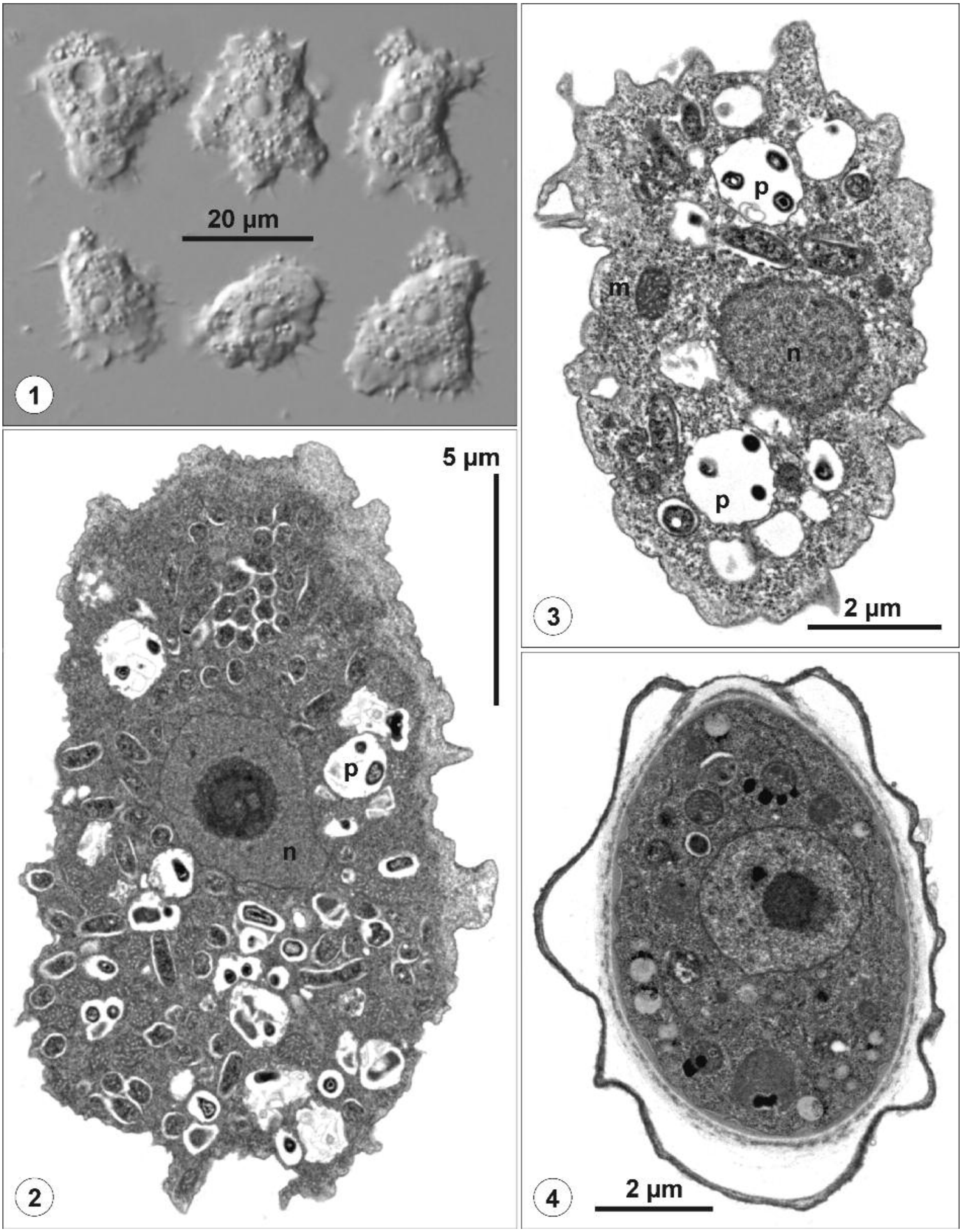

Plate 011. 4706 strain of *Acanthamoeba* sp. isolated from liver of European perch, *Perca fluviatilis* L. from Černovický potok brook, South Bohemia, Czech Republic; cultured in BCS and SCGYEM media; stored in CC since 1995; DNA samples stored under FLA DB Nos. 1338 and 1342. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondrion (m), phagosomes (p). **Fig. 4.** Mature cyst with bilayered wall. Ref.: Dyková et al. 1999b.

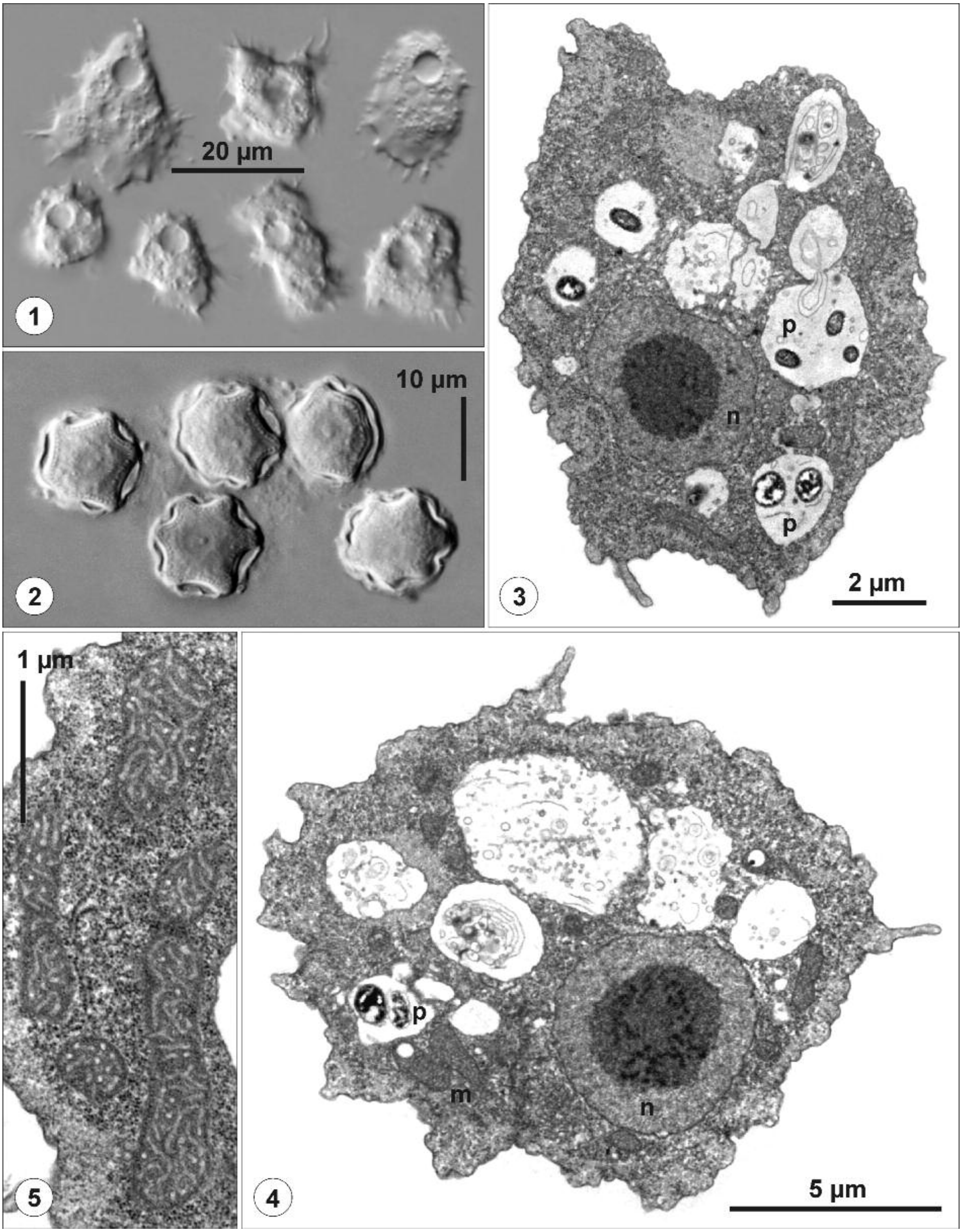

Plate 012. 4800J strain of *Acanthamoeba* sp. isolated from liver of European perch, *Perca fluviatilis* L. from Černovický potok brook, South Bohemia, Czech Republic; cultured in BCS and SCGYEM media; stored in CC since 1991; DNA samples stored under FLA DB Nos. 1312, 1315. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Cysts seen in Nomarski DIC. **Figs. 3, 4.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosomes (p). **Fig. 5.** Ultrastructure of mitochondria with tubular cristae. Ref.: Dyková et al. 1999b.

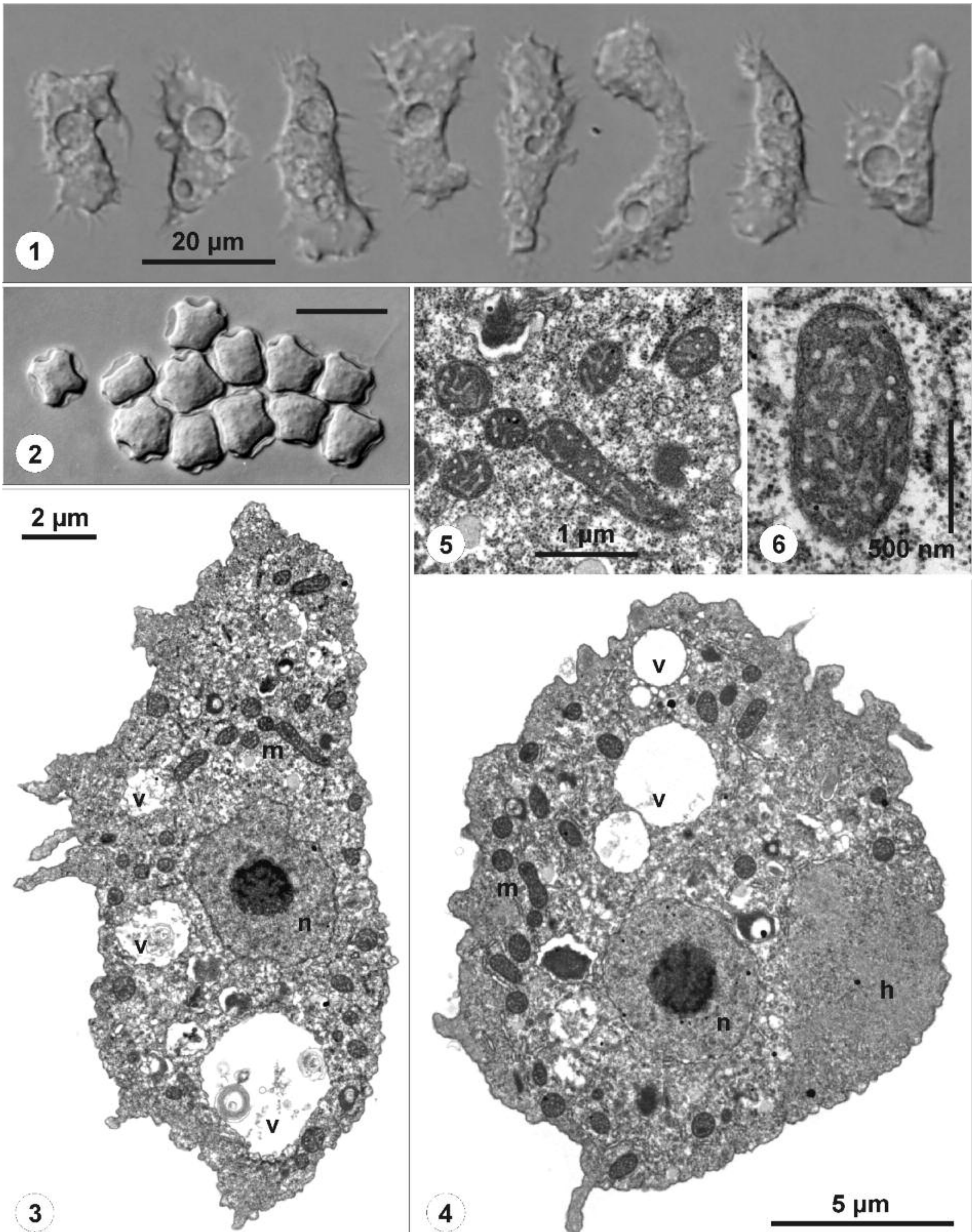

Plate 013. ACANT strain of *Acanthamoeba* sp. isolated from gills of European seabass, *Dicentrarchus labrax* (L.), derived as contaminant of *Neoparamoeba* culture; subcultured on MY75S agar; stored in CC since 1998; GenBank Acc. No. of SSU rDNA sequence JQ271664. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Mature cysts seen in Nomarski DIC, scale bar = 20 µm. **Figs. 3, 4.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), vacuoles (v), hyaloplasm (h). **Figs. 5, 6.** Details of ultrastructure of mitochondria with tubular cristae.

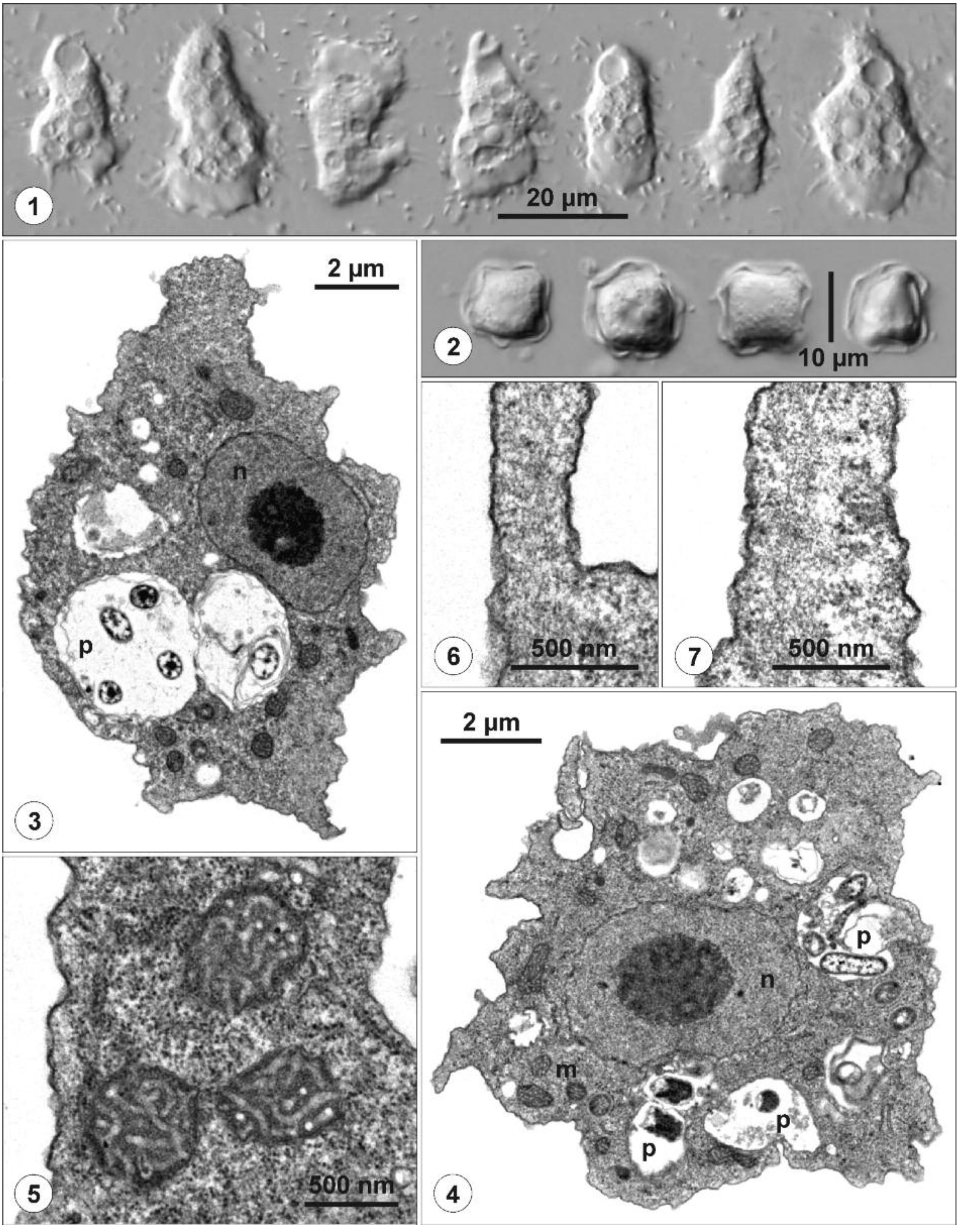

Plate 014. ALC10 strain of *Acanthamoeba* sp. isolated as environmental strain from sample of wet soil collected along Almaciga carretera, Tenerife, Canary Islands, Spain; cultured on NN agar; stored in CC since 2010; GenBank Acc. No. of SSU rDNA sequence JQ271665. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Mature cysts as seen in Nomarski DIC. **Figs. 3, 4.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosomes (p). **Fig. 5.** Detail of mitochondria with tubular cristae. **Figs. 6, 7.** Microfibrils in acanthopodia.

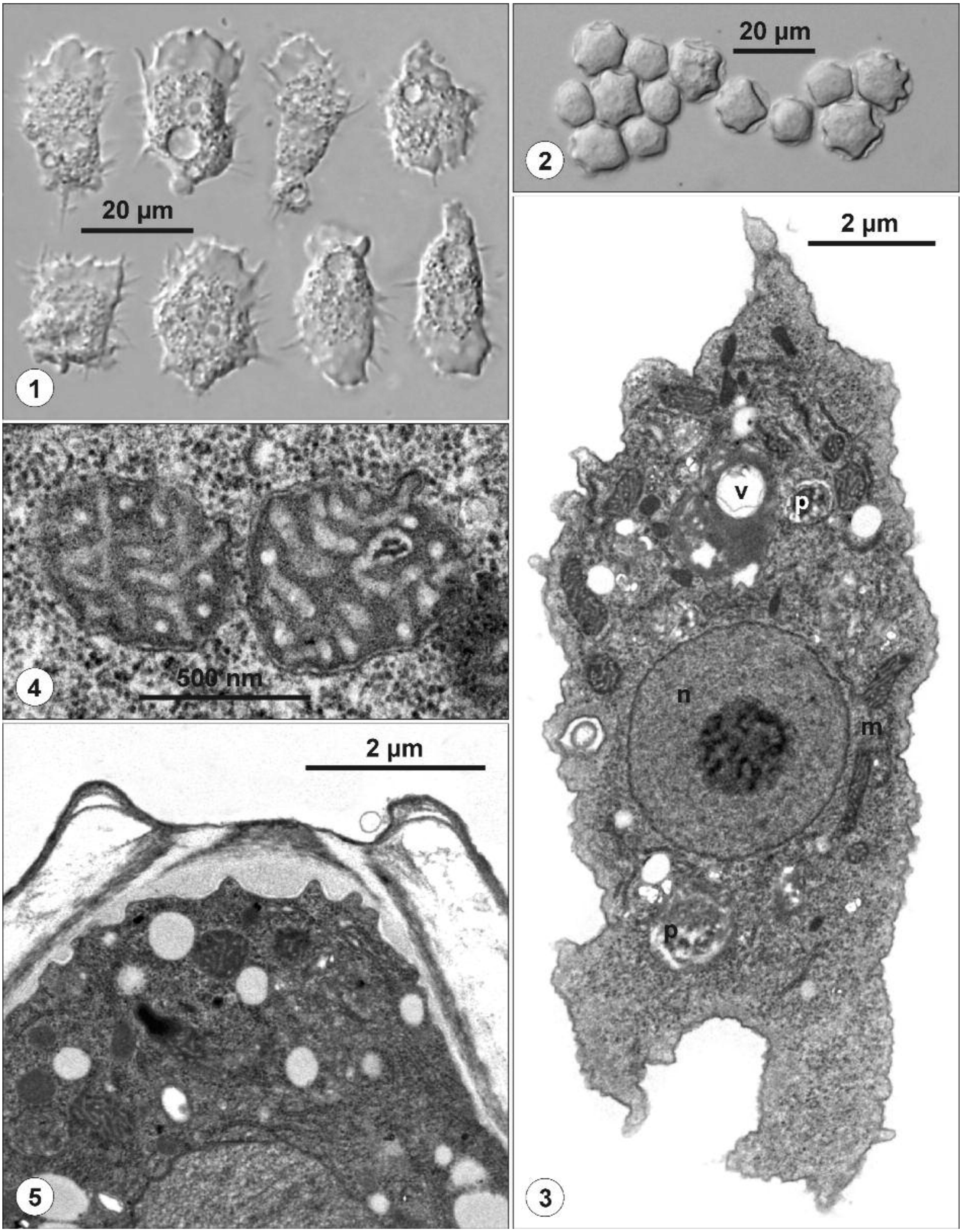

Plate 015. ALC2A strain of *Acanthamoeba* sp. isolated as environmental strain from sample of wet soil collected along Almaciga carretera, Tenerife, Canary Islands, Spain; cultured on NN agar; stored in CC since 2010; GenBank Acc. No. of SSU rDNA sequence JQ271666. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Cysts seen in Nomarski DIC. **Fig. 3.** Overview of fine structure of trophozoite: nucleus (n), mitochondria (m), phagosomes (p), vacuole (v). **Fig. 4.** Mitochondria with tubular cristae. **Fig. 5.** Outer and inner cyst wall layers meet at potential opening (cyst pore).

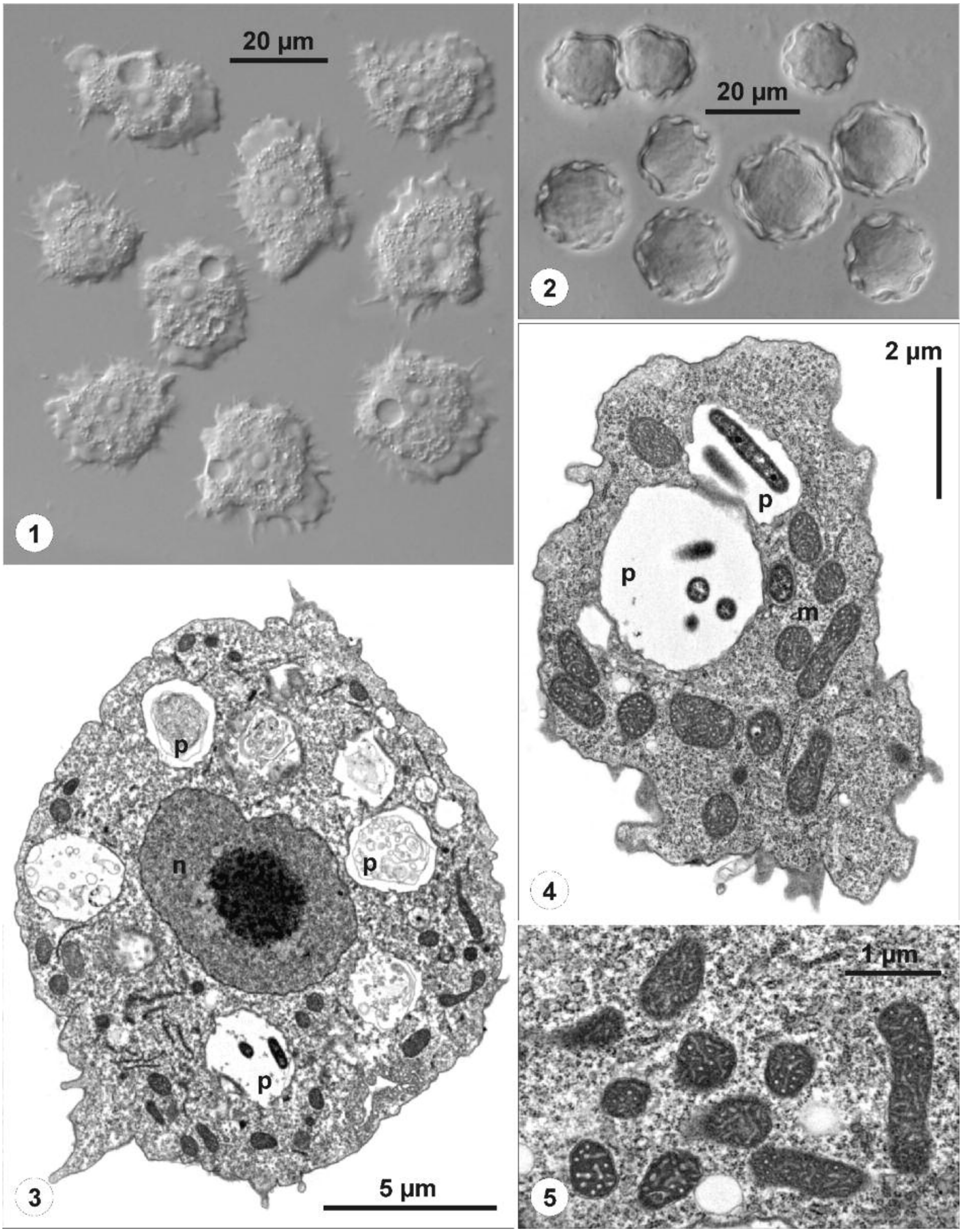

Plate 016. CANZ strain of *Acanthamoeba* sp. isolated from gills of pike-perch, *Sander lucioperca* (L.) from Vltava River, South Bohemia, Czech Republic; cultured on NN agar; stored in CC since 1999; GenBank Acc. No. of SSU rDNA sequence JQ271667. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Cysts seen in Nomarski DIC. **Figs. 3, 4.** Overview of fine structure of trophozoites sectioned in different planes: nucleus (n), phagosomes (p), mitochondria (m). **Fig. 5.** Mitochondria with tubular cristae.

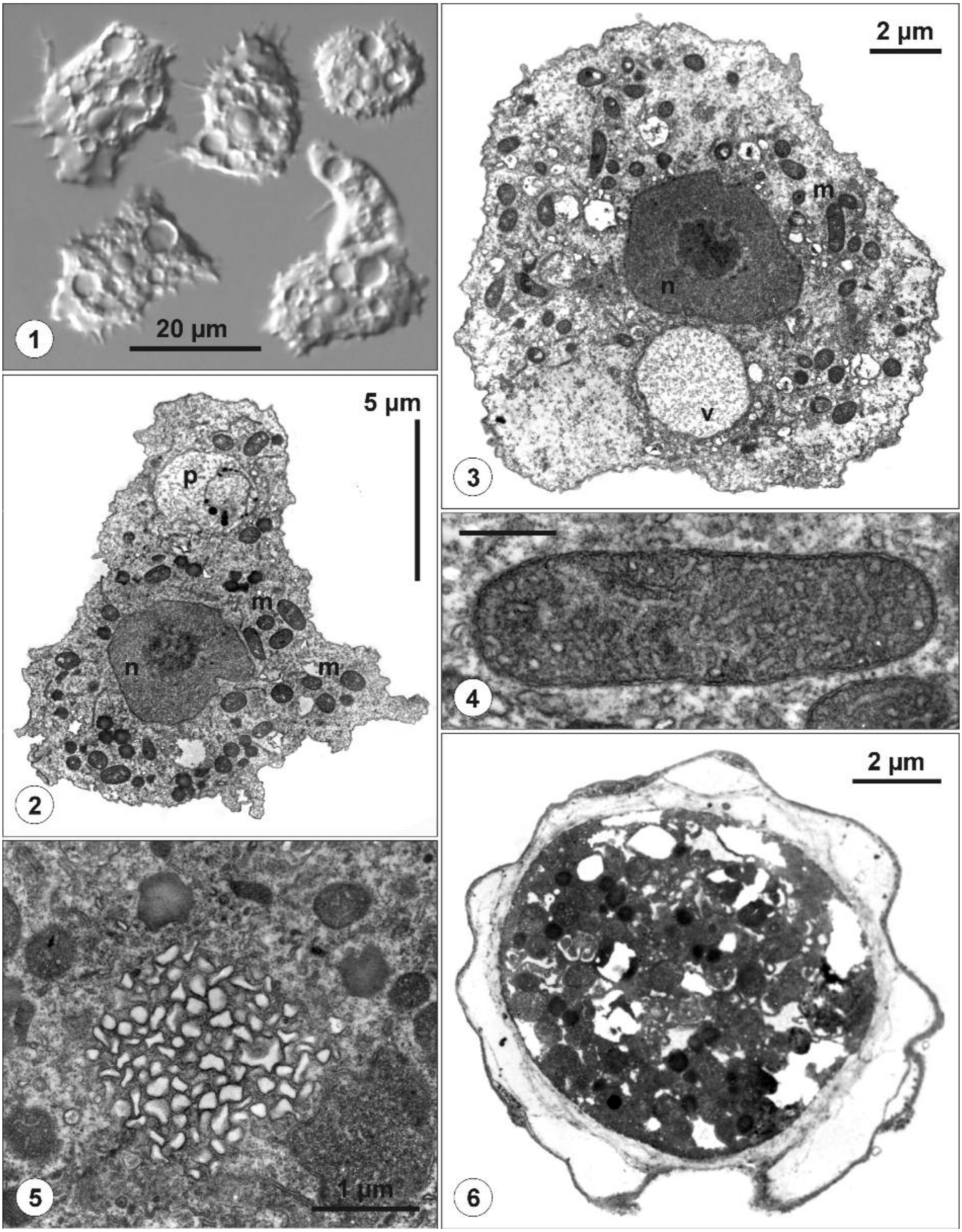

Plate 017. G1 strain of *Acanthamoeba* sp. isolated from water sample from unknown locality in Czech Republic; cultured in BCS, PPG and SCGYEM media; stored in CC since 1995; DNA sample stored under FLA DB No. 1351, 1352. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), phagosome (p), mitochondria (m), vacuole (v). **Fig. 4.** Mitochondrion with tubular cristae (scale bar = 500 nm). **Fig. 5.** Aggregate of vesicles located in the vicinity of contractile vacuole. **Fig. 6.** Overview of cyst ultrastructure. Ref.: Dyková et al. 1999b.

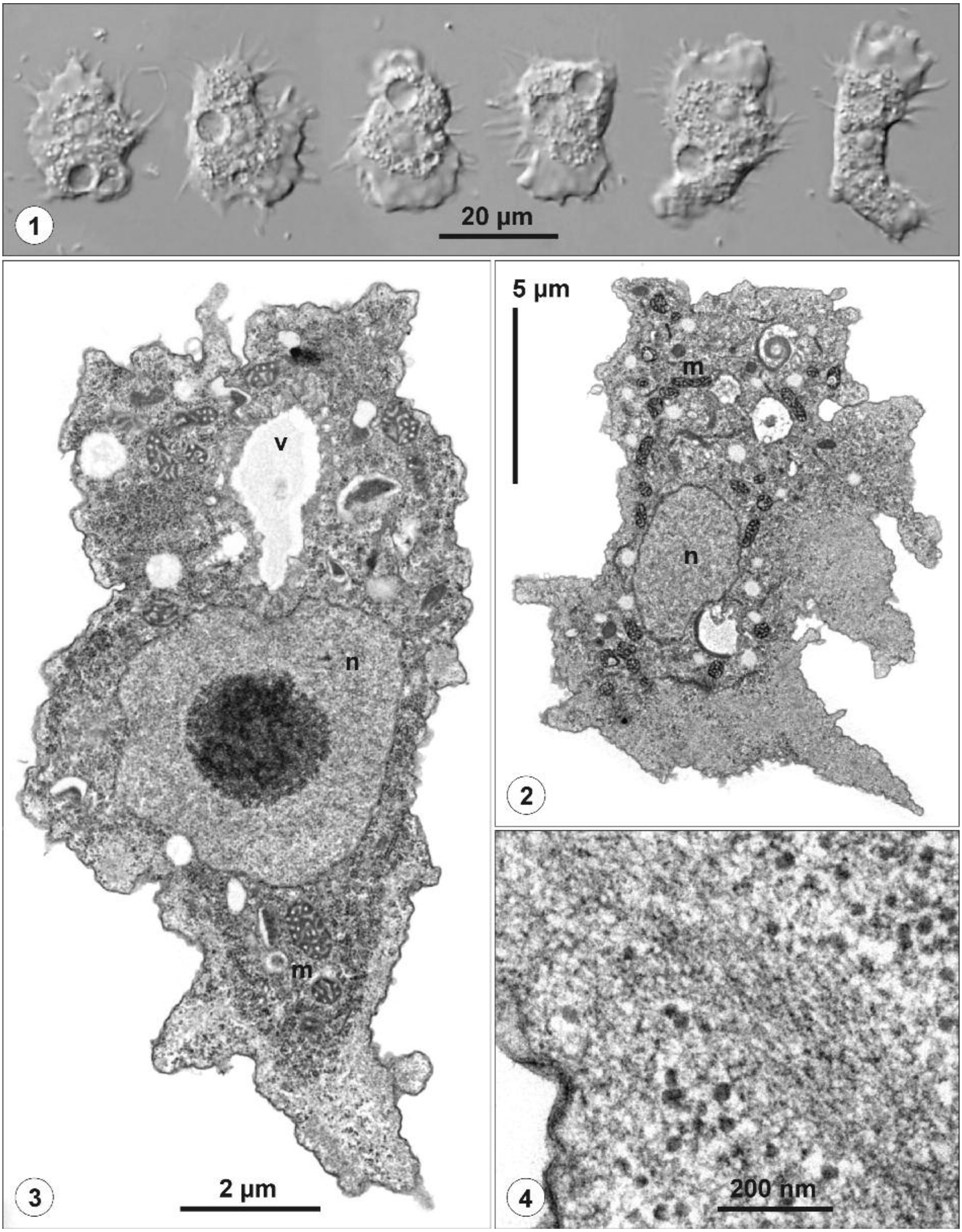

Plate 018. GERF3 strain of *Acanthamoeba* sp. isolated from gills of rainbow trout, *Oncorhynchus mykiss* (Walbaum) farmed in Baden Würtenberg, Germany; cultured on NN agar; stored in CC since 2009; GenBank Acc. No. of SSU rDNA sequence HM363628. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), vacuole (v). **Fig. 4.** Microfilaments in cytoplasm of pseudopodium. (Cont.)

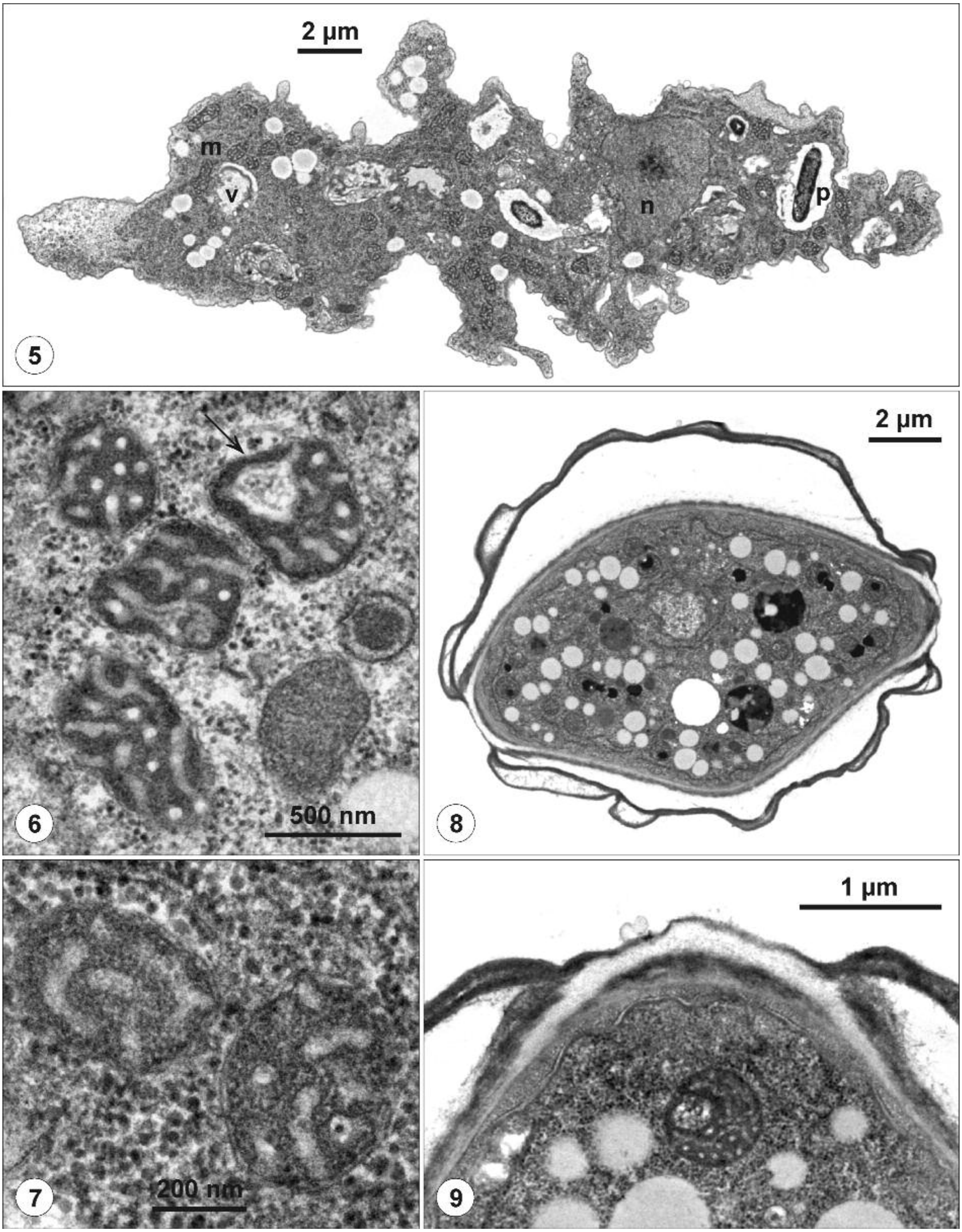

Plate 019. GERF3 strain of *Acanthamoeba* sp. **Fig. 5.** Overview of trophozoite ultrastructure: nucleus (n), phagosomes (p), mitochondria (m). **Figs. 6, 7.** Mitochondria with tubular cristae. Arrow indicates pseudoinclusion seen in one mitochondrion. **Fig. 8.** Overview of cyst ultrastructure with two pores in plane of sectioning. **Fig. 9.** Detail of potential opening of cyst (cyst pore). Ref.: Dyková et al. 2010b.

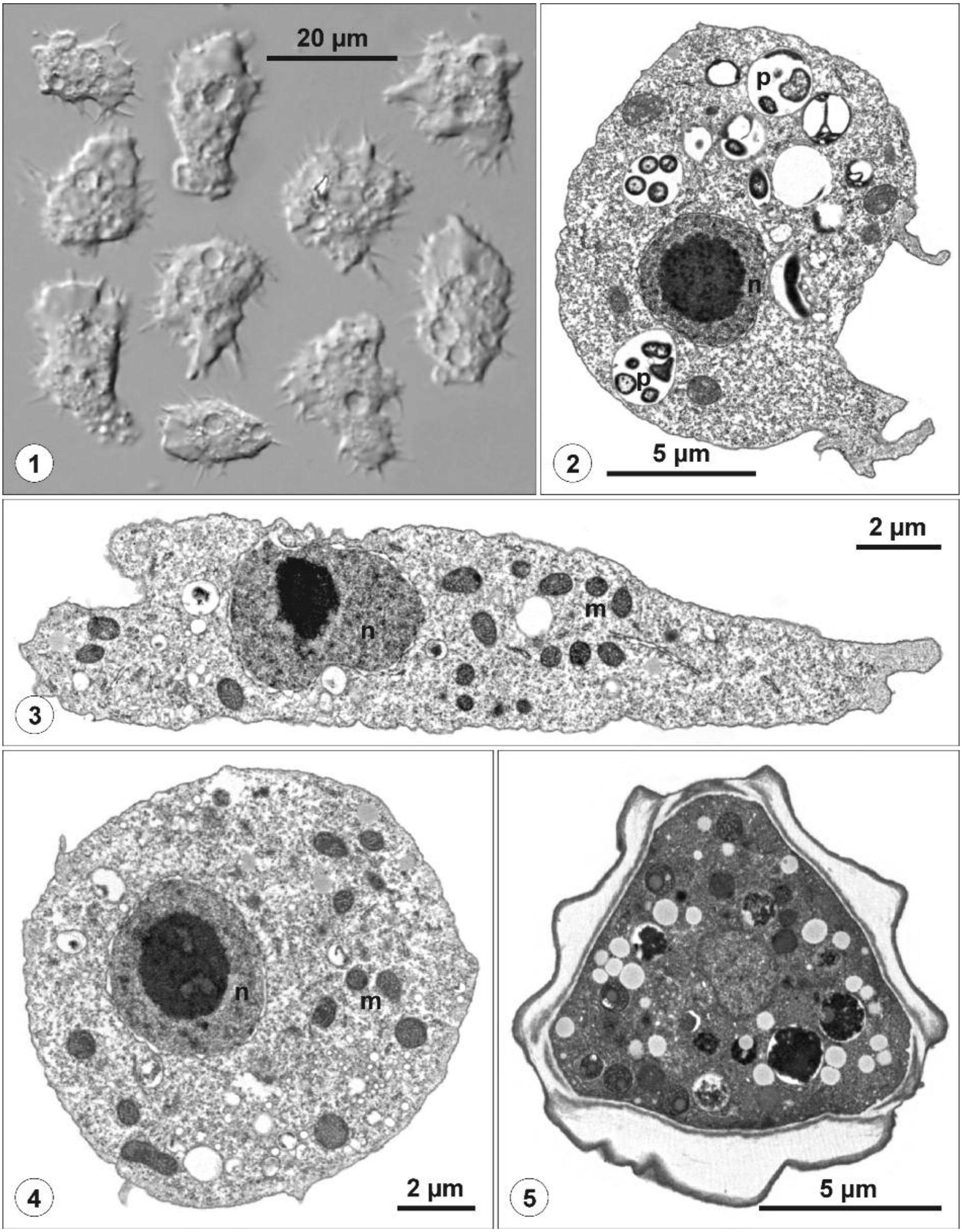

Plate 020. SHETL strain of *Acanthamoeba* sp. isolated as environmental strain from sample of sand collected in small bay in Lerwick Harbour, Shetland Islands, U.K.; cultured on NN agar; stored in CC since 2007; DNA sample stored under FLA DB No. 1053. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3, 4.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosomes (p). **Fig. 5.** Detail of ultrastructure of mature cyst.

Allovahlkampfia Walochnik et Mulec, 2009

Plates 021–023

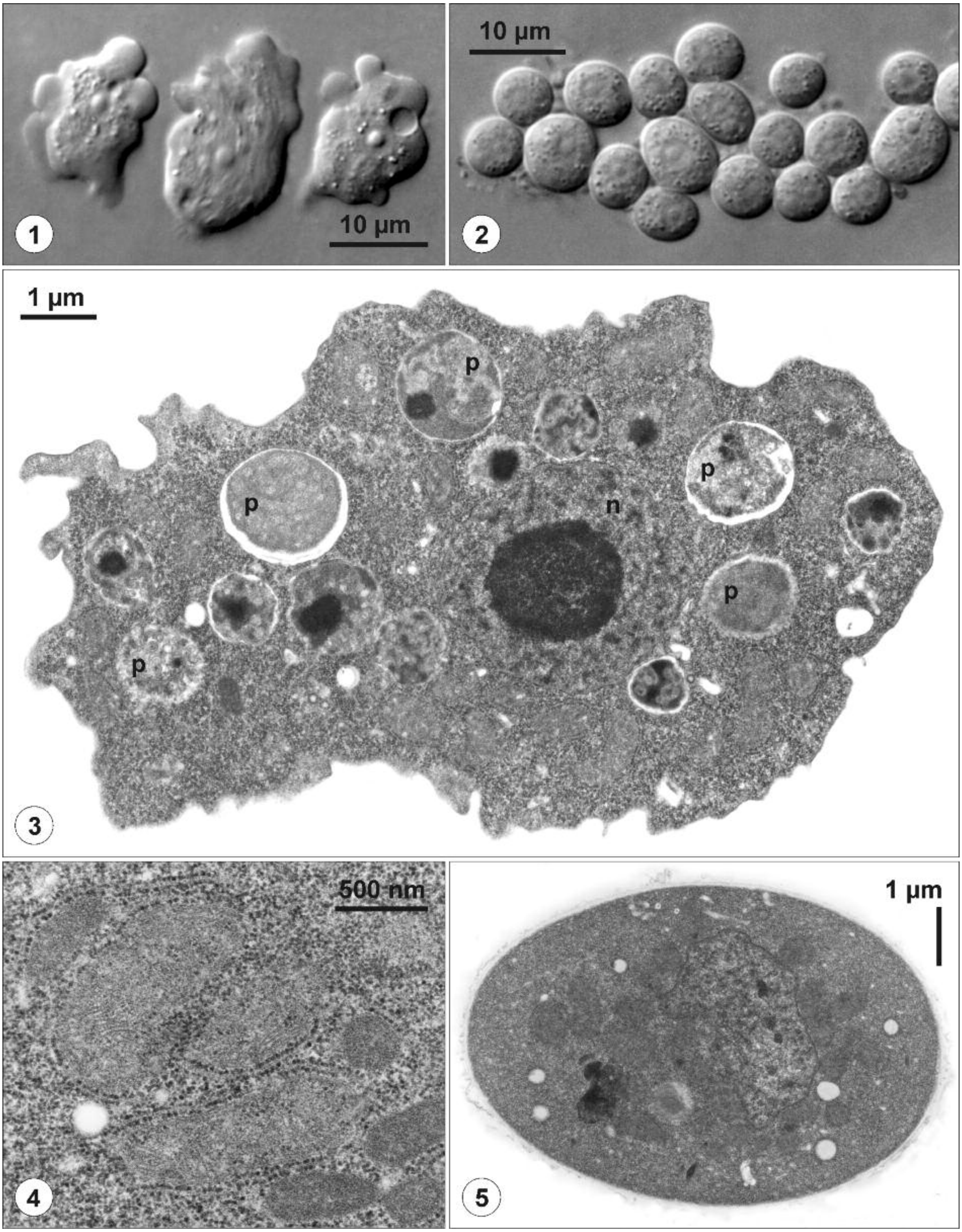

Plate 021. 4165 strain of *Allovahlkampfia* sp. isolated from liver of common dace, *Leuciscus leuciscus* (L.) from Stropnice brook, South Bohemia, Czech Republic; cultured on NN agar; stored in CC since 1990; GenBank Acc. No. of SSU rDNA sequence JQ271668, ITS JQ271643. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Cysts seen in Nomarski DIC. **Fig. 3.** Overview of fine structure of trophozoite: nucleus (n), phagosomes (p). **Fig. 4.** Mitochondria with narrow discoid cristae surrounded by endoplasmic reticulum. **Fig. 5.** Cyst formation.

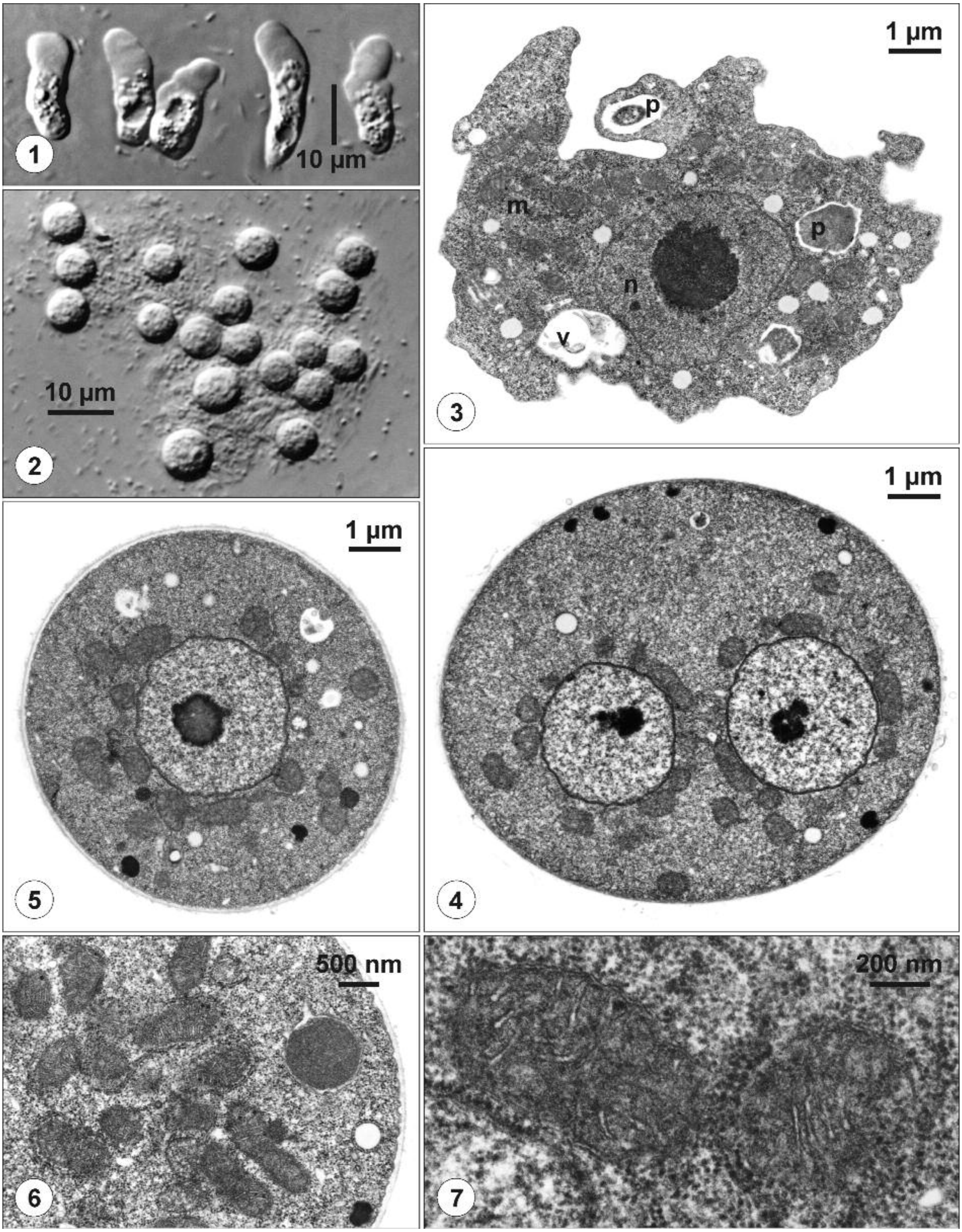

Plate 022. PS1073J strain of *Allovahlkampfia* sp. isolated from liver of striped catfish, *Pangasianodon hypophthalmus* (Sauvage) imported to pet shop, Czech Republic; cultured on NN agar; stored in CC since 2001; GenBank Acc. No. of SSU rDNA sequence JQ271669, ITS JQ271644. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Cysts as seen in Nomarski DIC. **Fig. 3.** Overview of fine structure of trophozoite: nucleus (n), mitochondria (m), phagosomes (p), vacuole (v). **Figs. 4, 5.** Two early stages of cyst formation: mitochondria in close vicinity of nuclei. **Fig. 6.** Mitochondria in early stage of cyst formation. **Fig. 7.** Detail of mitochondria with discoid cristae.

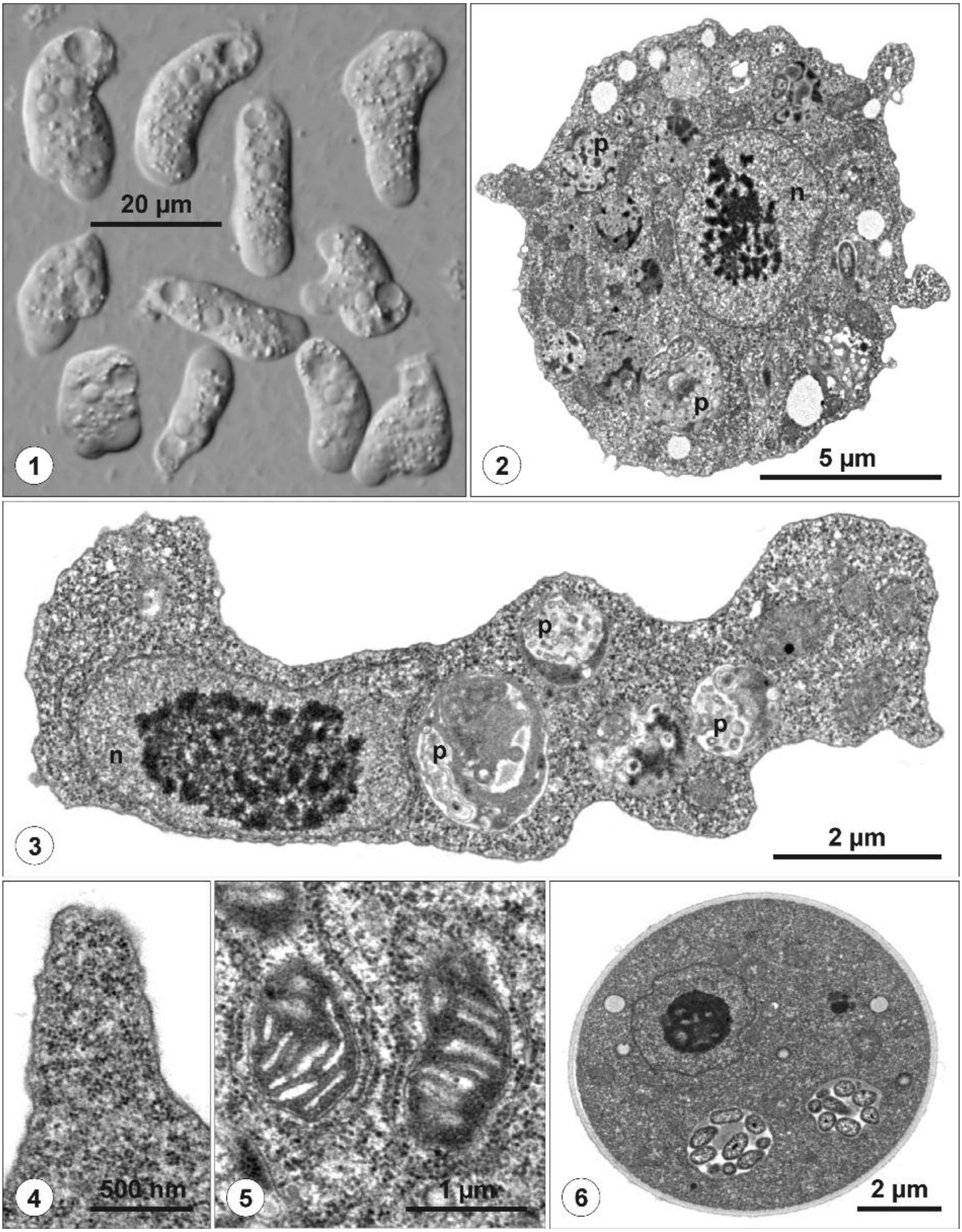

Plate 023. PV66 strain of *Allovahlkampfia* sp. isolated from material contaminating beer bottles stored in the open air for recycling, Czech Republic; cultured on NN agar; stored in CC since 2011; GenBank Acc. No. of SSU rDNA sequence JQ271670, ITS JQ271645. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), phagosomes (p). **Fig. 4.** Cell surface of trophozoite. **Fig. 5.** Mitochondria with discoid cristae. **Fig. 6.** Cyst with multiplied bacteria in its cytoplasm.

Cochliopodium Hertwig et Lesser, 1874

Plates 024–030

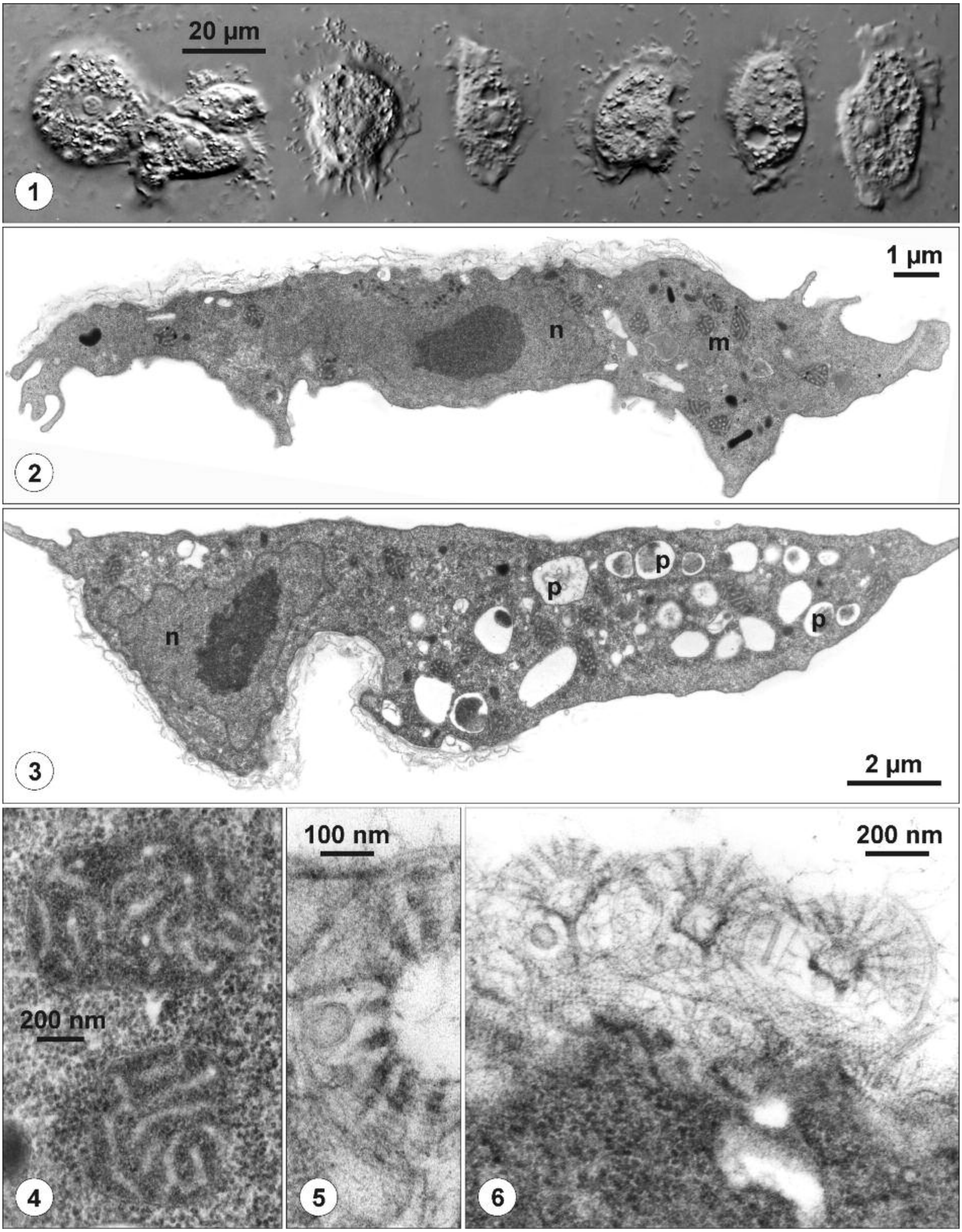

Plate 024. 4692S strain of *Cochliopodium minus* isolated from spleen of gudgeon, *Gobio gobio* (L.) from Lužnice River, South Bohemia, Czech Republic; cultured on NN agar; stored in CC since 1991; GenBank Acc. No. of SSU rDNA sequence JQ271671. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: scales on cell surface, nuclei (n), mitochondria (m), phagosomes (p). **Fig. 4.** Mitochondria with tubular cristae. **Figs. 5, 6.** Details of scale ultrastructure.

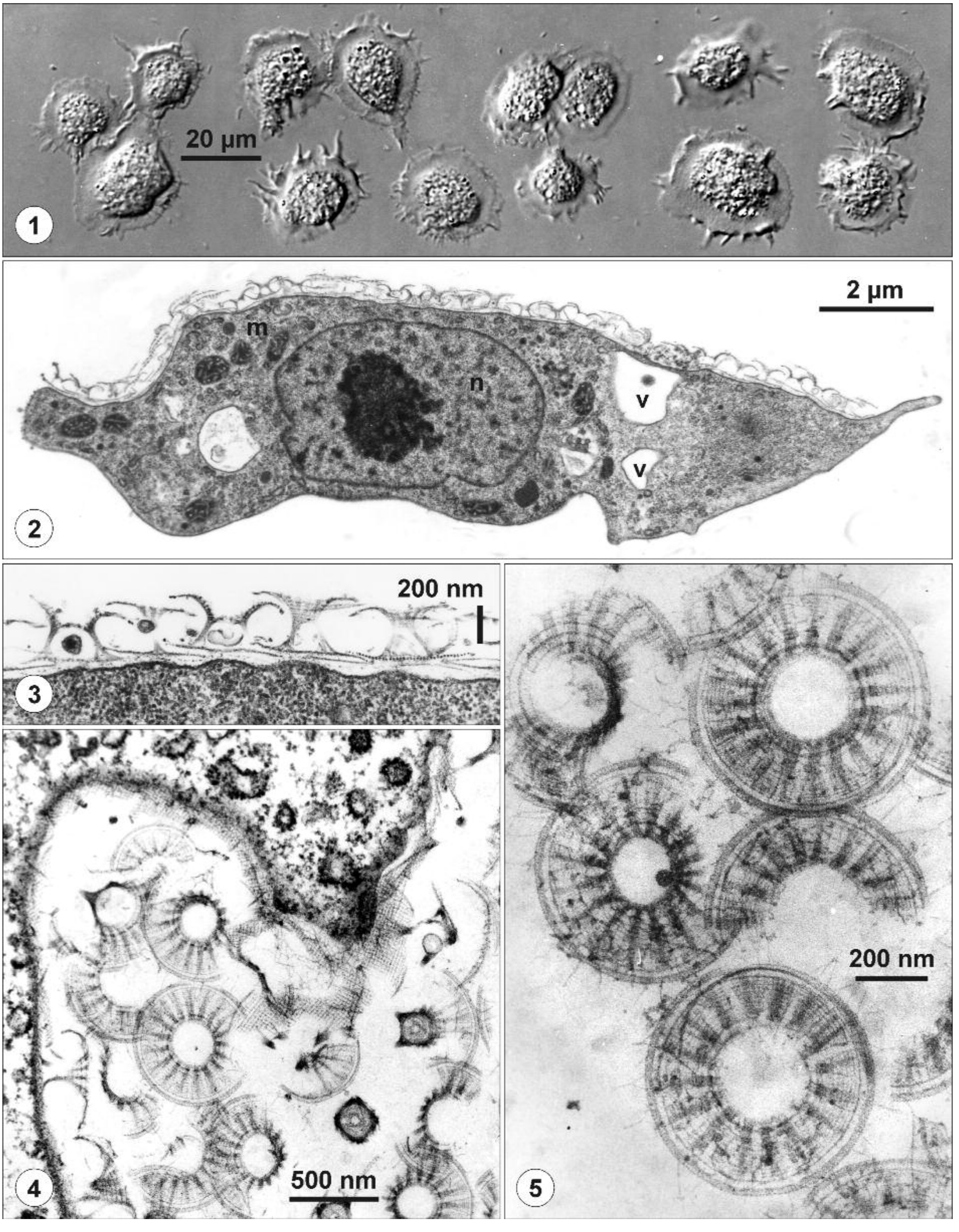

Plate 025. 4694 strain of *Cochliopodium minus* isolated from liver, kidney, brain, spleen and gills of European perch, *Perca fluviatilis* L. from Vltava River, South Bohemia, Czech Republic; cultured on NN agar; stored in CC since 1991; GenBank Acc. No. of SSU rDNA sequence JQ271672. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Overview of fine structure of trophozoite: scale-bearing surface, nucleus (n), mitochondria (m), vacuoles (v). **Figs. 3, 4.** Details of scale ultrastructure in dorso-ventral and dorsal views. **Fig. 5.** Dorsal view of highly magnified scales. (Cont.)

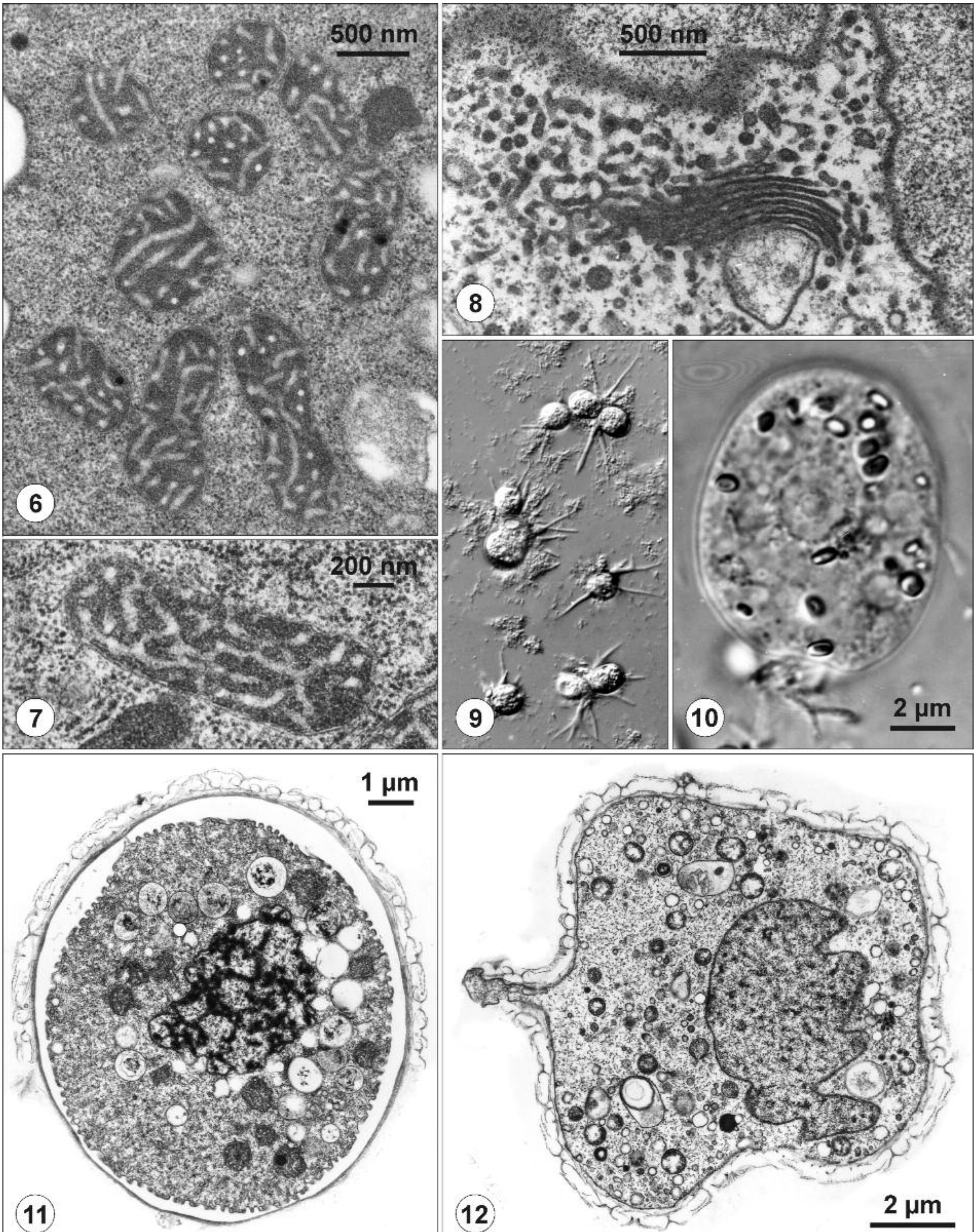

Plate 026. 4694 strain of *Cochliopodium minus*. **Figs. 6, 7.** Details of trophozoite ultrastructure: mitochondria with tubular branching cristae. **Fig. 8.** Golgi complex with parallel arrangement of cisternae located in the vicinity of nucleus. **Fig. 9.** Overview of cysts as seen in Nomarski DIC. **Fig. 10.** Detail of cyst with crystal-like bodies seen in translucent light. **Figs. 11, 12.** Cell surface of trophozoites: partly (Fig. 11) and almost completely covered with scales (Fig. 12). Ref.: Dyková et al. 1998b.

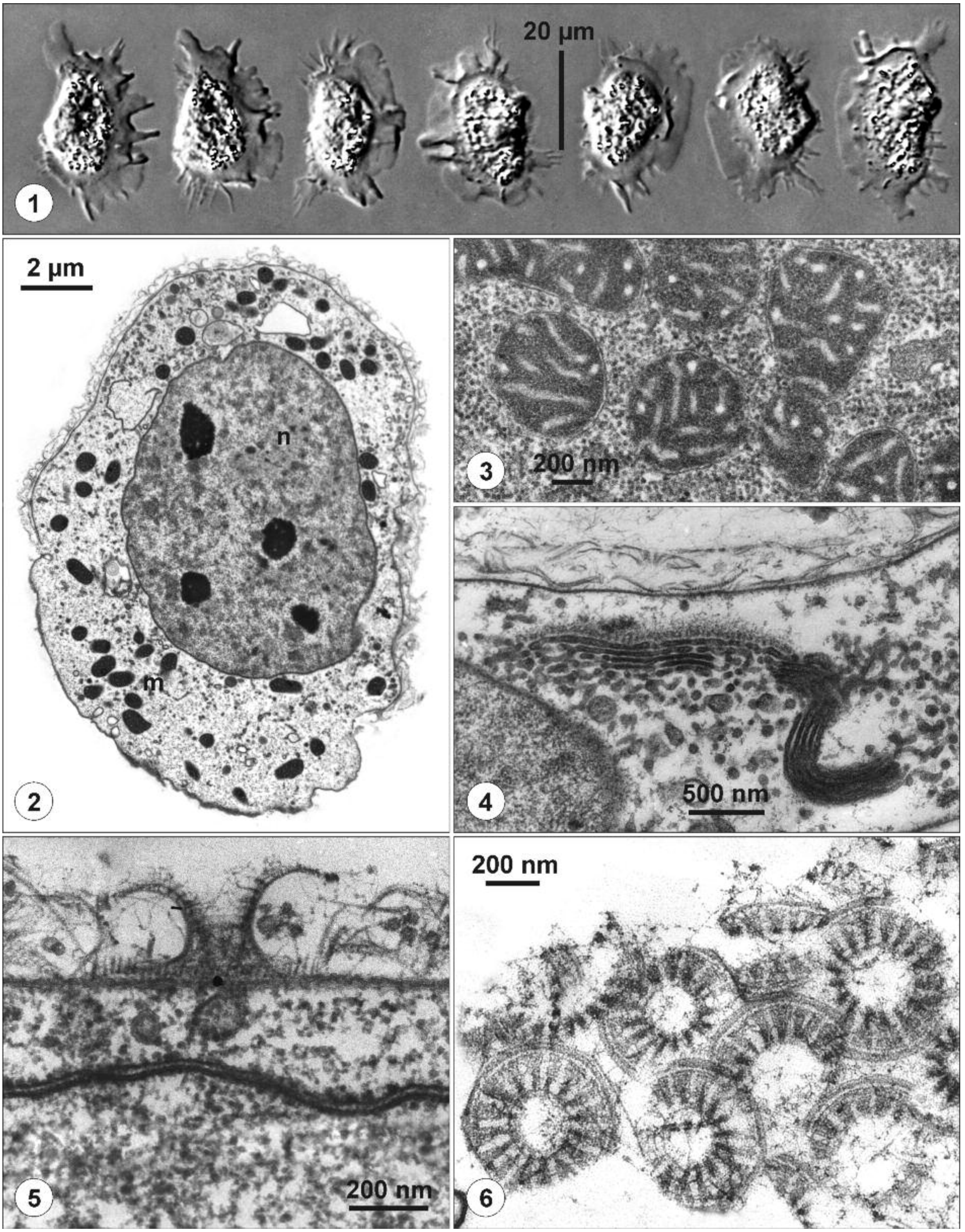

Plate 027. CCAP1537/1A/I strain of *Cochliopodium minus* obtained from UKNCC for comparison. GenBank Acc. No. of SSU rDNA sequence JQ271673. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Overview of fine structure of trophozoite in transverse section: nucleus (n), mitochondria (m) seen as electron-dense bodies, scales on cell surface. **Fig. 3.** Mitochondria with tubular cristae. **Fig. 4.** Golgi complex with cisternae in parallel arrangement. **Figs. 5, 6.** Ultrastructure of scales in dorso-ventral and dorsal views, respectively. Ref.: Dyková et al. 1998b.

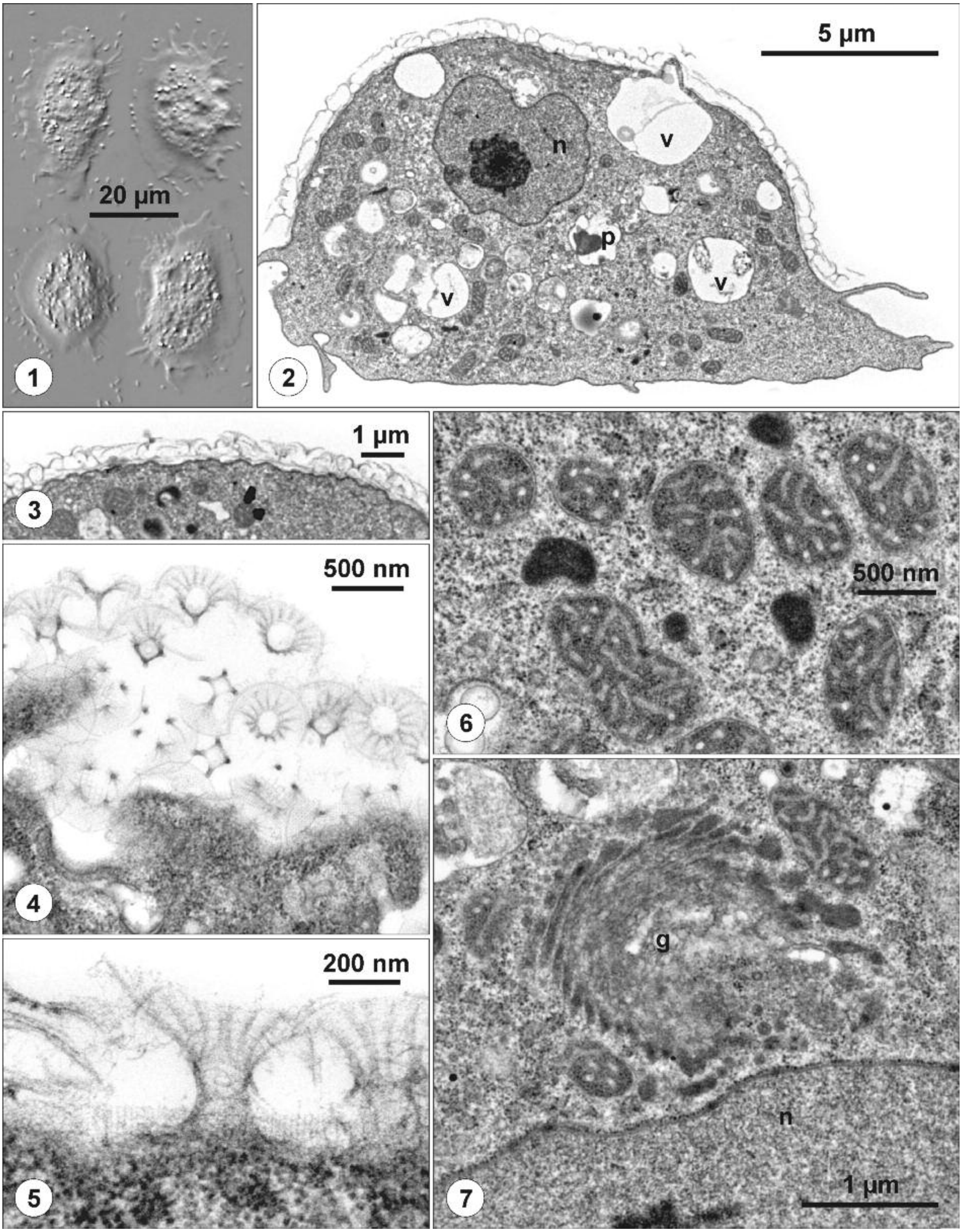

Plate 028. DP16 strain of *Cochliopodium minus* isolated from hepatopancreas of zebra mussel, *Dreissena polymorpha* (Pallas) collected in Želivka dam, Czech Republic; cultured on NN agar; stored in CC since 2005; GenBank Acc. No. of SSU rDNA sequence JQ271674. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Overview of fine structure of trophozoite with scales on non-attached part: nucleus (n), phagosomes with remnants of phagocytised material (p), vacuoles (v). **Figs. 3, 4, 5.** Overview and details of ultrastructure of scales as seen in different planes of sectioning. **Fig. 6.** Mitochondria with tubular cristae. **Fig. 7.** Golgi complex (g) in close vicinity of nucleus (n).

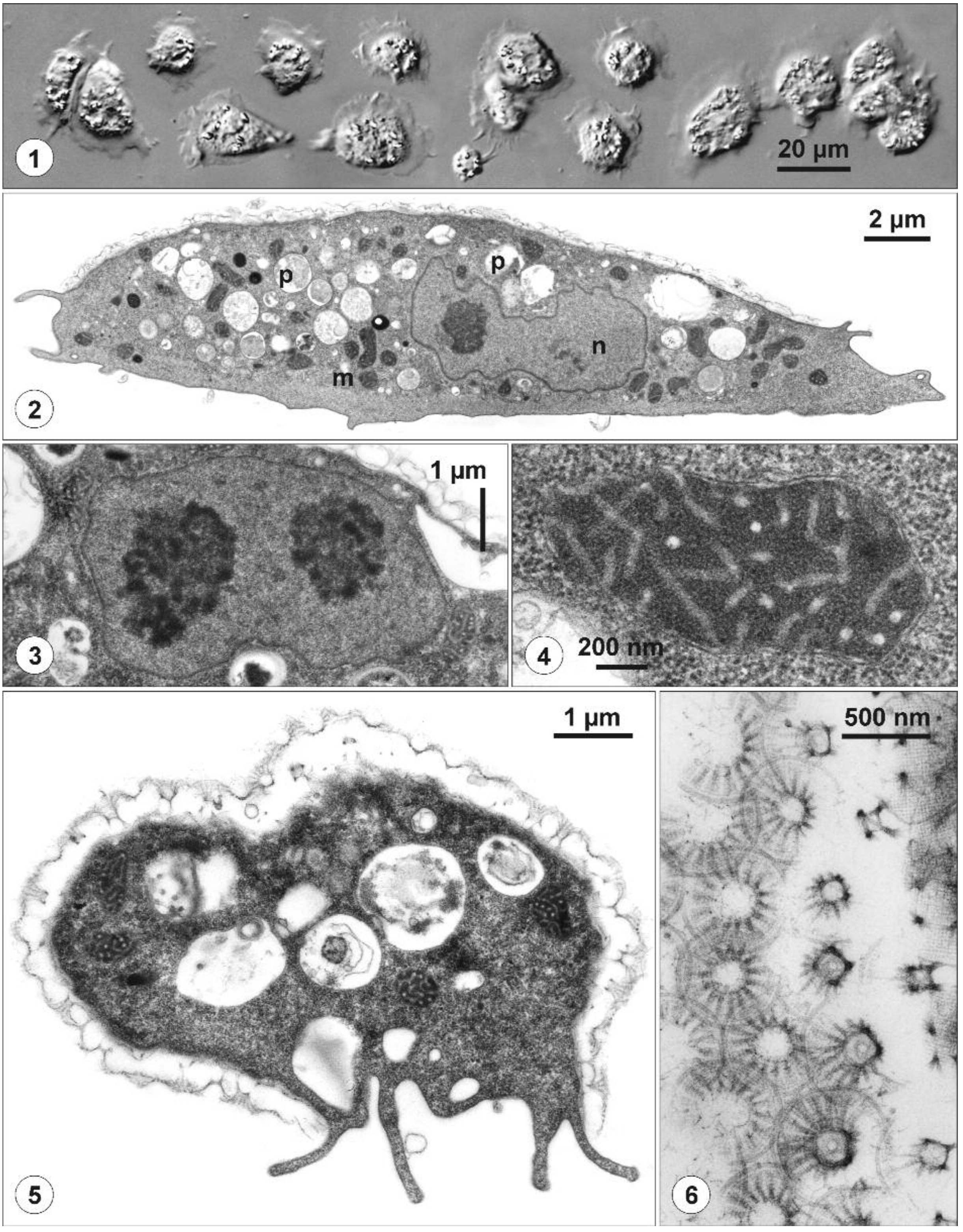

Plate 029. SUM3P strain of *Cochliopodium minus* isolated from gills of wels catfish, *Silurus glanis* L. from a small tributary of Labe River, Rumburk, Czech Republic; cultured on NN agar; stored in CC since 2000; GenBank Acc. No. of SSU rDNA sequence JQ271675. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Overview of fine structure of trophozoite: nucleus (n), mitochondria (m), phagosomes (p), scales on non-attached part of trophozoite. **Fig. 3.** Detail of trophozoite ultrastructure: nucleus with divided chromatin material. **Fig. 4.** Mitochondrion with tubular cristae. **Fig. 5.** Resting/cyst-like stage covered almost completely with scales. **Fig. 6.** Detail of scale ultrastructure. (Cont.)

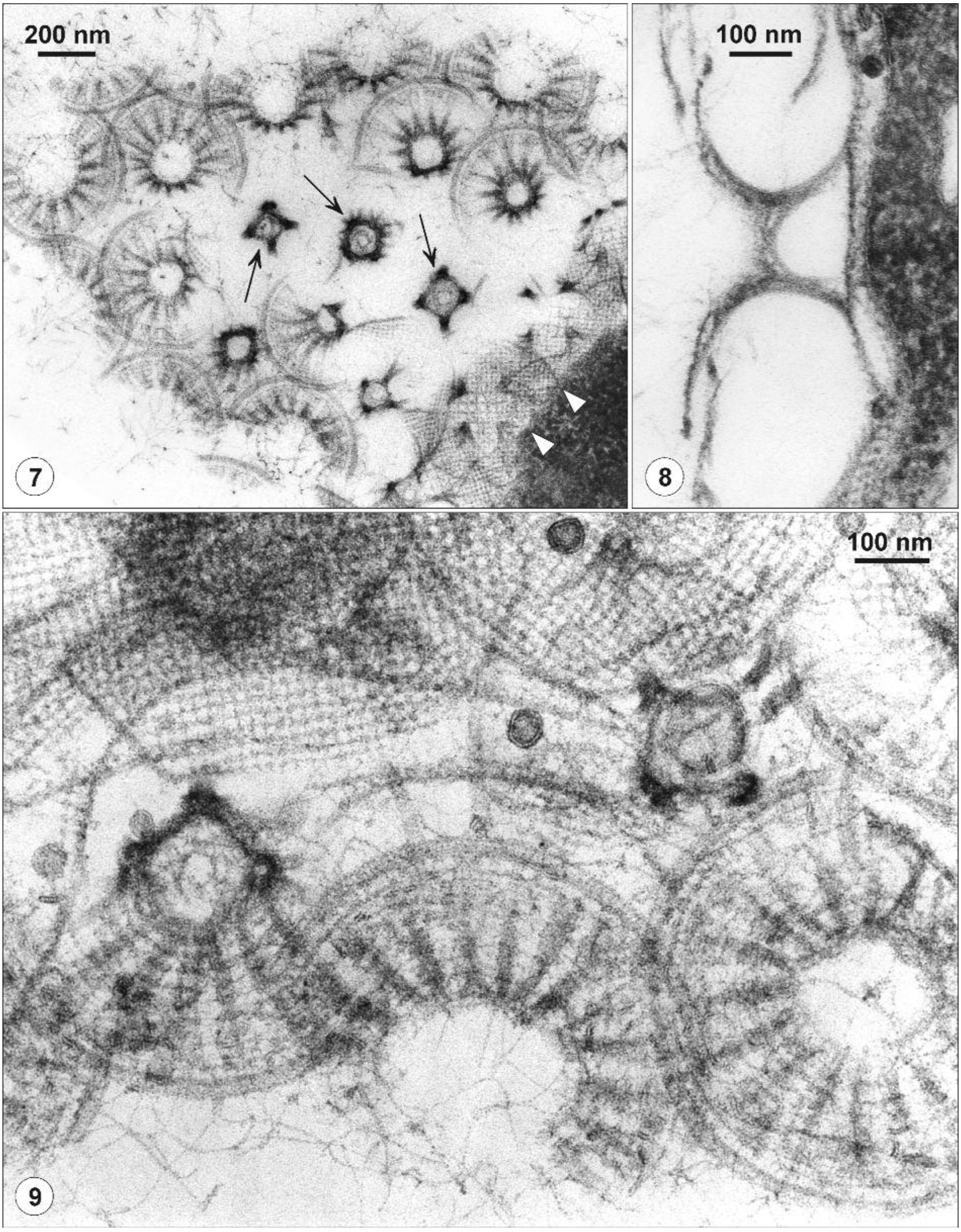

Plate 030. SUM3P strain of *Cochliopodium minus*. Details of scale ultrastructure. **Fig. 7.** Funnel-like parts of scales as seen in dorsal view; arrows indicate transverse sections through scale columns; fragments of base plates of scales are marked with white arrowheads. **Fig. 8.** Complete dorso-ventral section through microscale (rotated by 90°). **Fig. 9.** Three funnel-like parts of scales in dorsal view showing web-like pattern with rays, concentric interconnections and stripped rim (bottom part of figure); fragments of mesh-like base plates of scales (upper part of figure).

Copromyxa Zopf, 1885 emend. Brown, Silberman et Spiegel, 2011

Plates 031–036

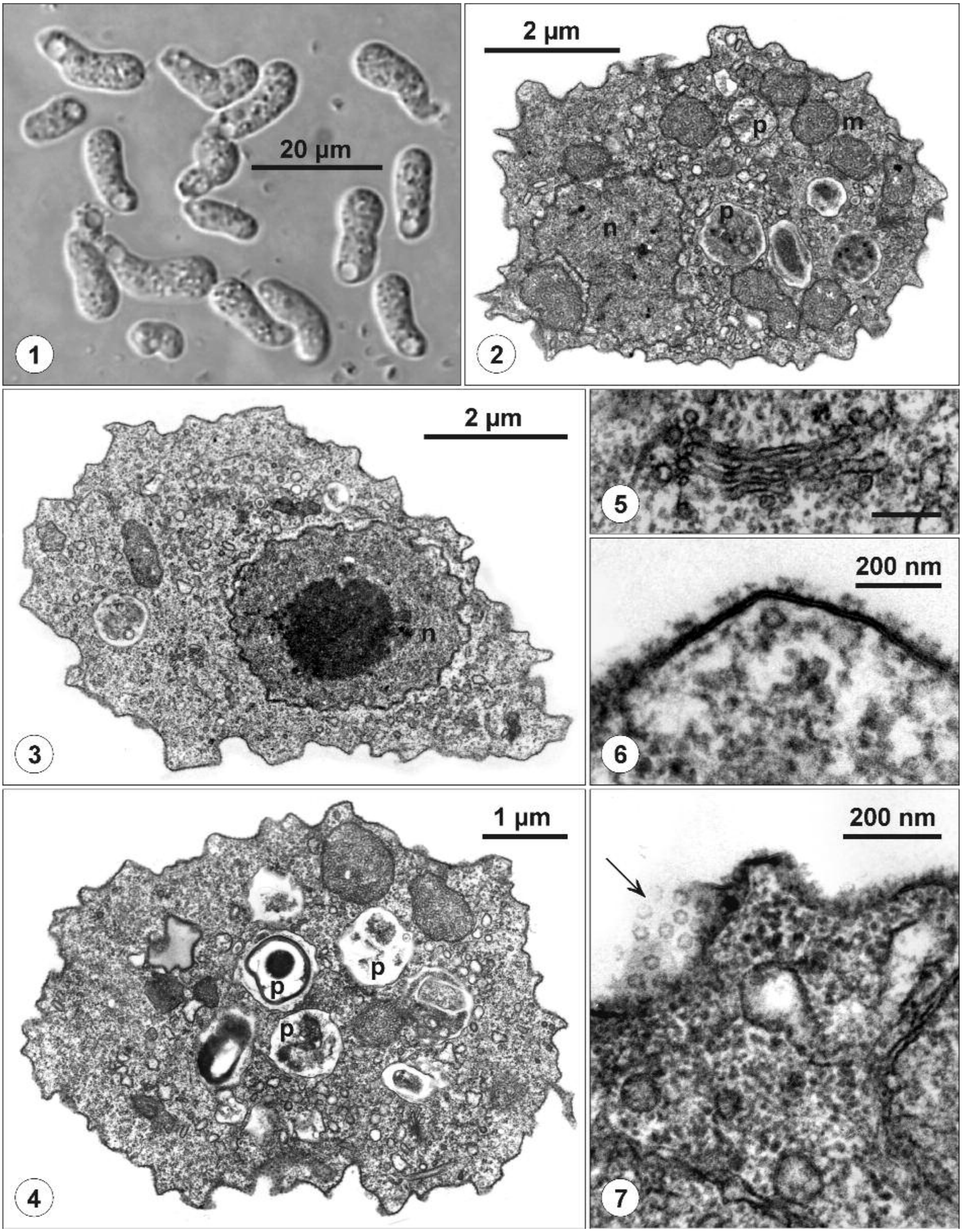

Plate 031. 4730 strain of *Copromyxa expectata* isolated from liver of European perch, *Perca fluviatilis* L. from Černovický potok brook, South Bohemia, Czech Republic; cultured on NN agar; stored in CC since 1991; GenBank Acc. No. of SSU rDNA sequence HQ687486. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3, 4.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosomes (p), small vesicles dispersed in cytoplasm. **Fig. 5.** Golgi complex, scale bar = 200 nm. **Fig. 6.** Cell surface of trophozoite: glycocalyx with cylindrical glycostyles. **Fig. 7.** Hexagonal cross sections of glycostyles (arrow). Ref.: Dyková et al. 1998c, 2011a.

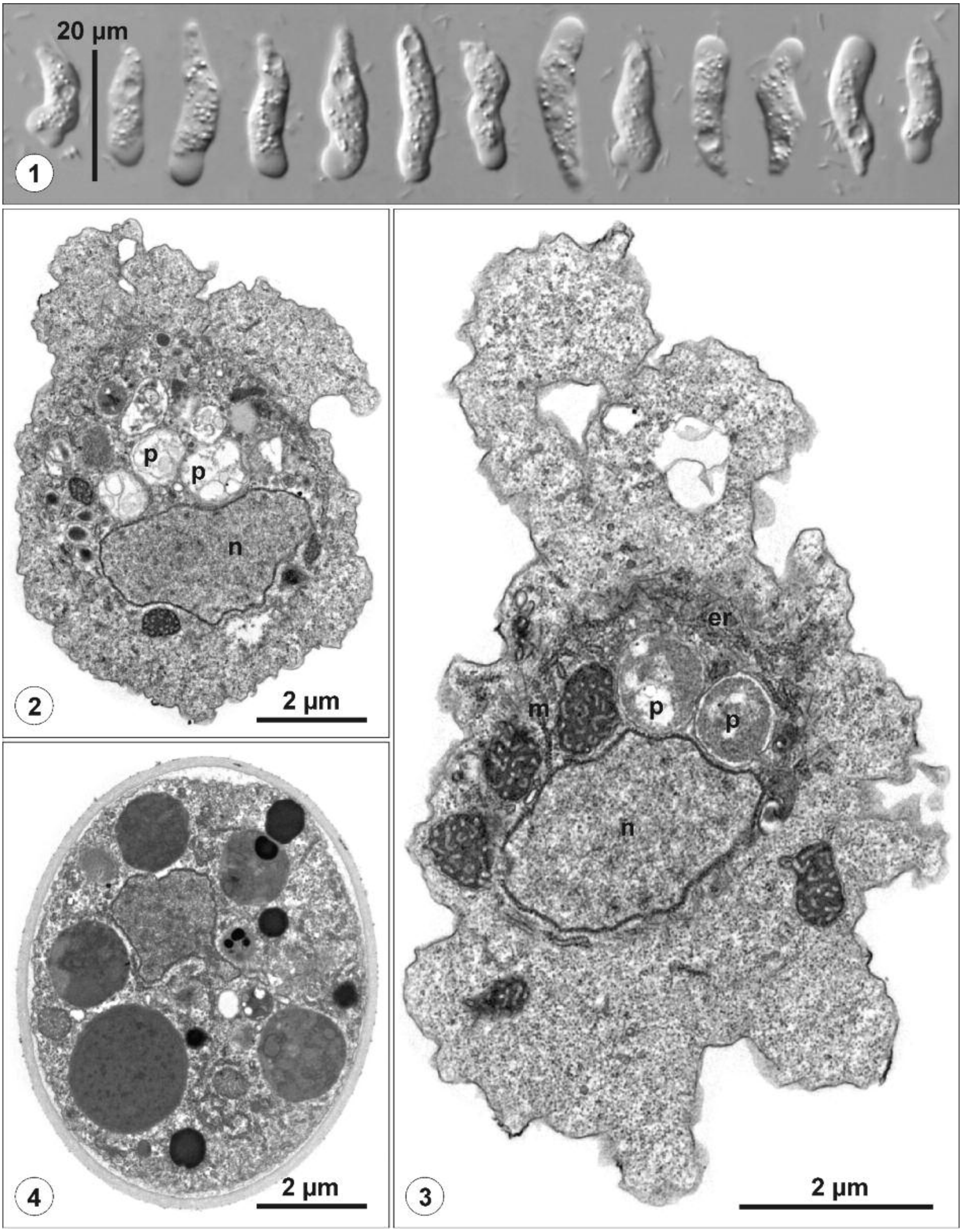

Plate 032. ALC3 strain of *Copromyxa cantabrigiensis* isolated as environmental strain from sample of wet soil collected along Almaciga carretera, Tenerife, Canary Islands, Spain; cultured on NN agar; stored in CC since 2010; GenBank Acc. No. of SSU rDNA sequence JQ271676. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosomes with remnants of phagocytised material (p), endoplasmic reticulum (er). **Fig. 4.** Encysted trophozoite with foreign electron-dense material. (Cont.)

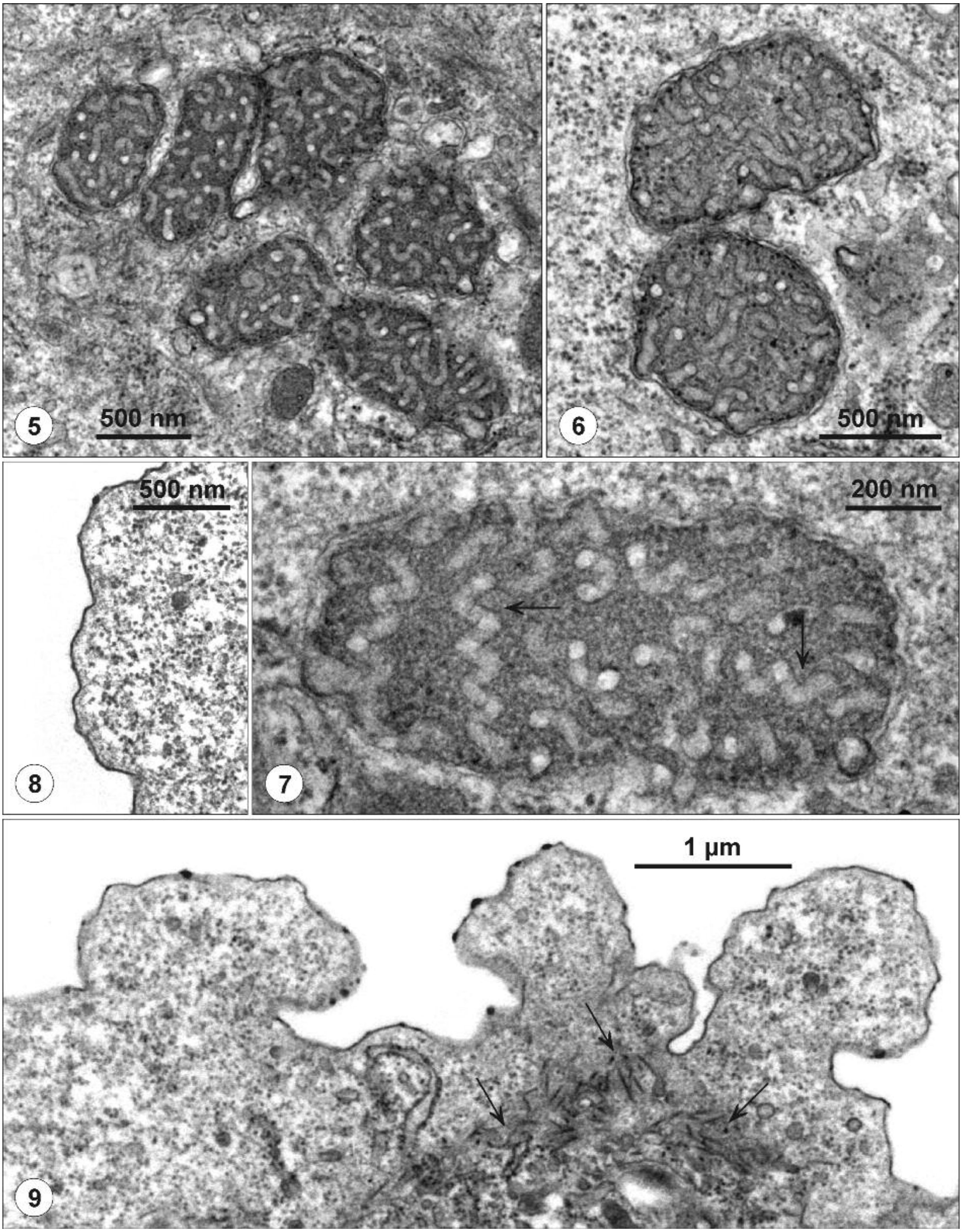

Plate 033. ALC3 strain of *Copromyxa cantabrigiensis*. **Figs. 5, 6.** Details of ultrastructure of mitochondria: matrix of mitochondria with numerous tubular twisted cristae. **Fig. 7.** Detail of mitochondrion revealing spiralling form of several cristae (arrows). **Fig. 8.** Cell surface of trophozoite. **Fig. 9.** Detail of trophozoite ultrastructure: ribosome-rich cytoplasm with aggregates of microfilaments (arrows) in vicinity of various profiles of cisternae of endoplasmic reticulum.

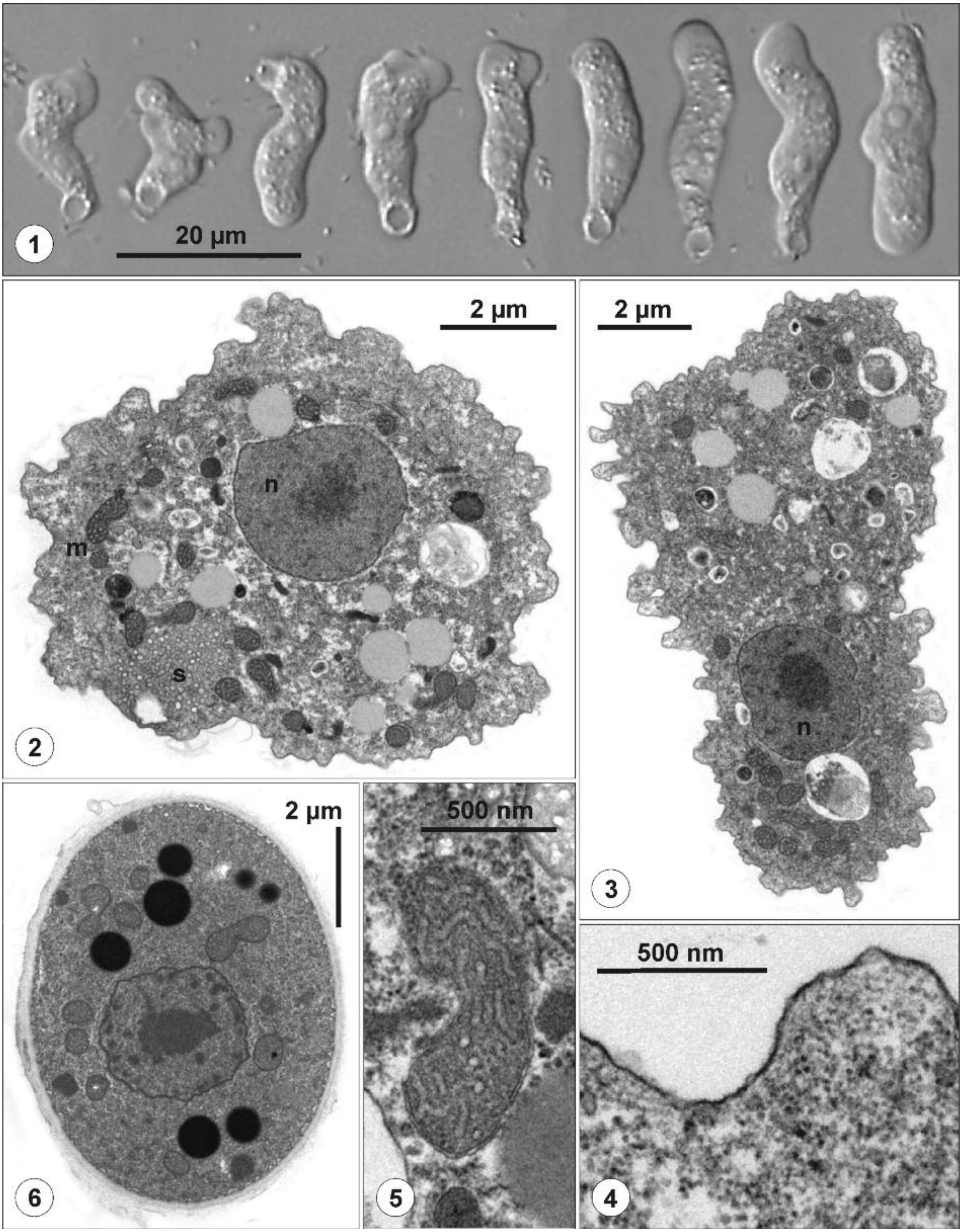

Plate 034. LUM strain of *Copromyxa protea* isolated from undetermined earthworm collected in Haklovy Dvory, South Bohemia, Czech Republic; cultured on NN agar; stored in CC since 2008; GenBank Acc. No. of SSU rDNA sequence JQ271677. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: vesicular nuclei (n), mitochondria (m), spongiom (s). **Fig. 4.** Cell surface of trophozoite. **Fig. 5.** Detail of ultrastructure of mitochondrion with tubular cristae. **Fig. 6.** Mature cyst with electron-dense bodies of foreign material.

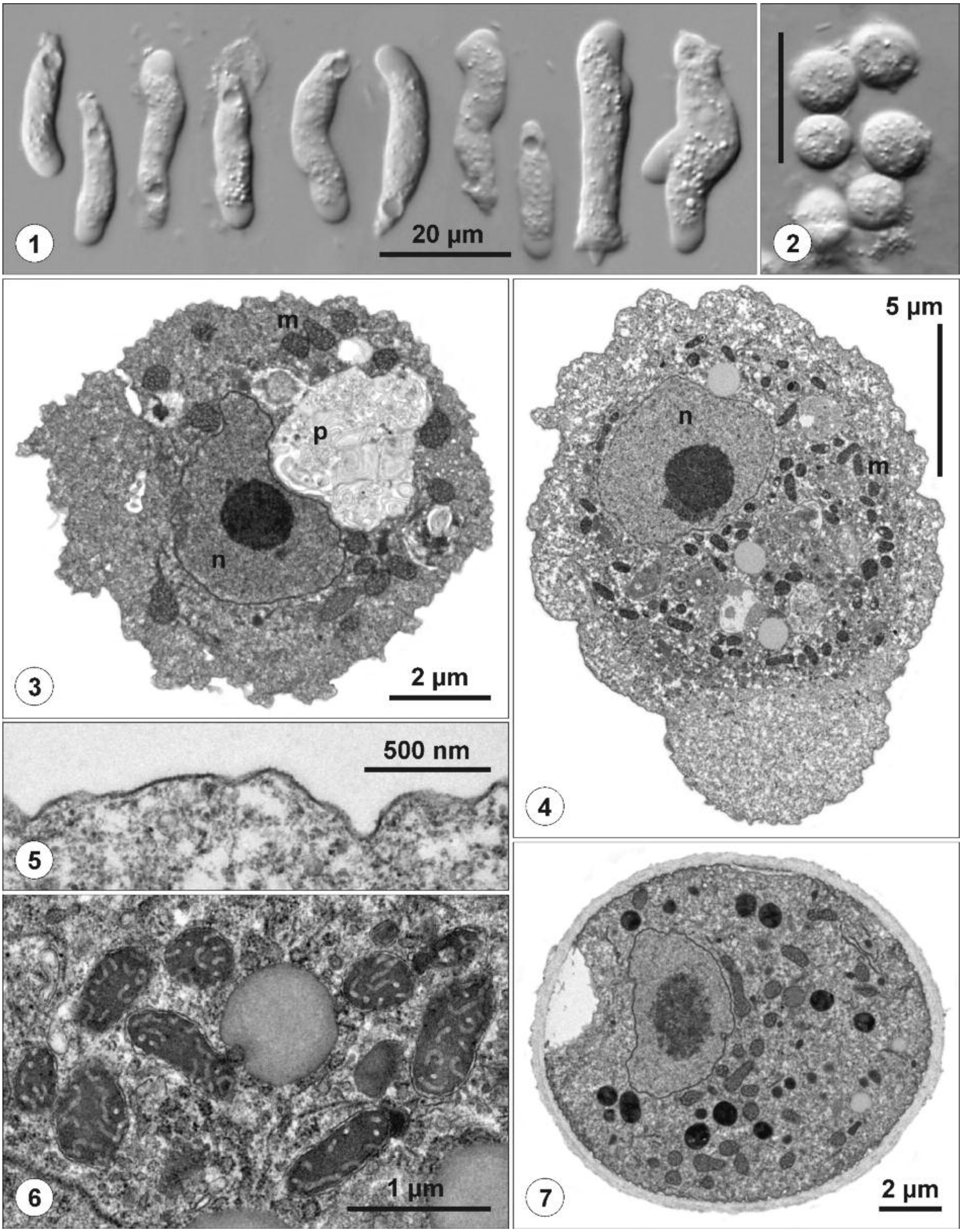

Plate 035. ZEB1 strain of *Copromyxa* sp. isolated from gills of zebra danio, *Danio rerio* (Hamilton) from stock kept in experimental facility of Instituto de Investigaciones Marinas, Vigo, Spain; cultured on NN agar; stored in CC since 2008; GenBank Acc. No. of SSU rDNA sequence JQ271678. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Cysts seen in Nomarski DIC, scale bar = 20 µm. **Figs. 3, 4.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosome (p). **Fig. 5.** Cell surface of trophozoite. **Fig. 6.** Detail of mitochondria with twisted tubular cristae. **Fig. 7.** Maturing cyst.

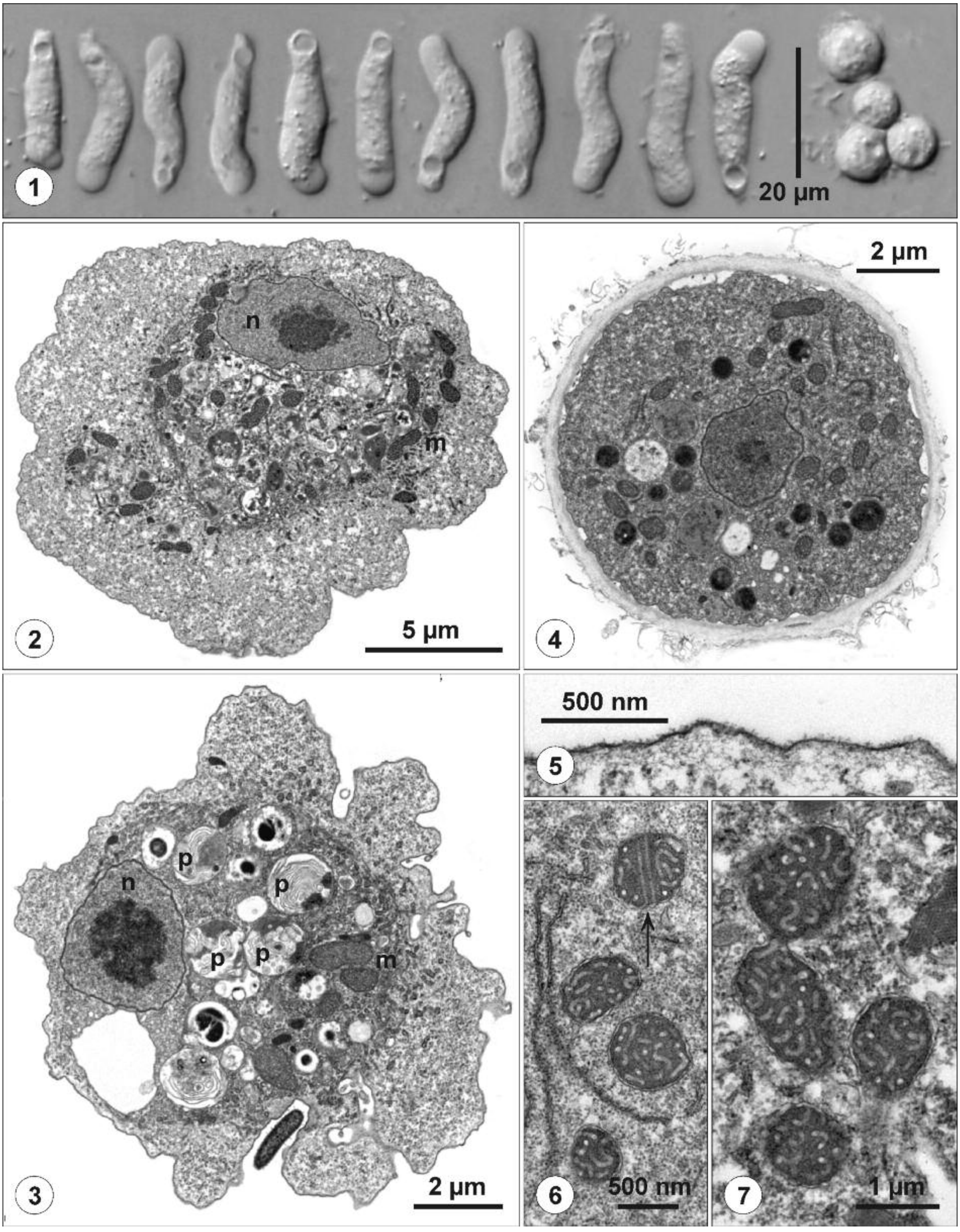

Plate 036. ZEB4 strain of *Copromyxa* sp. isolated from gills of zebra danio, *Danio rerio* (Hamilton) from stock kept in experimental facility of Instituto de Investigaciones Marinas, Vigo, Spain; cultured on NN agar; stored in CC since 2008; GenBank Acc. No. of SSU rDNA sequence JQ271679. **Fig. 1.** Trophozoites (left) and cysts (right) as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), densely stained mitochondria (m), phagosomes with remnants of phagocytised material (p). **Fig. 4.** Mature cyst. **Fig. 5.** Cell surface of trophozoite. **Figs. 6, 7.** Detail of ultrastructure of mitochondria with twisted tubular cristae. Note two cristae in strictly parallel position (arrow).

Didymium Schrader, 1797

Plates 037–044

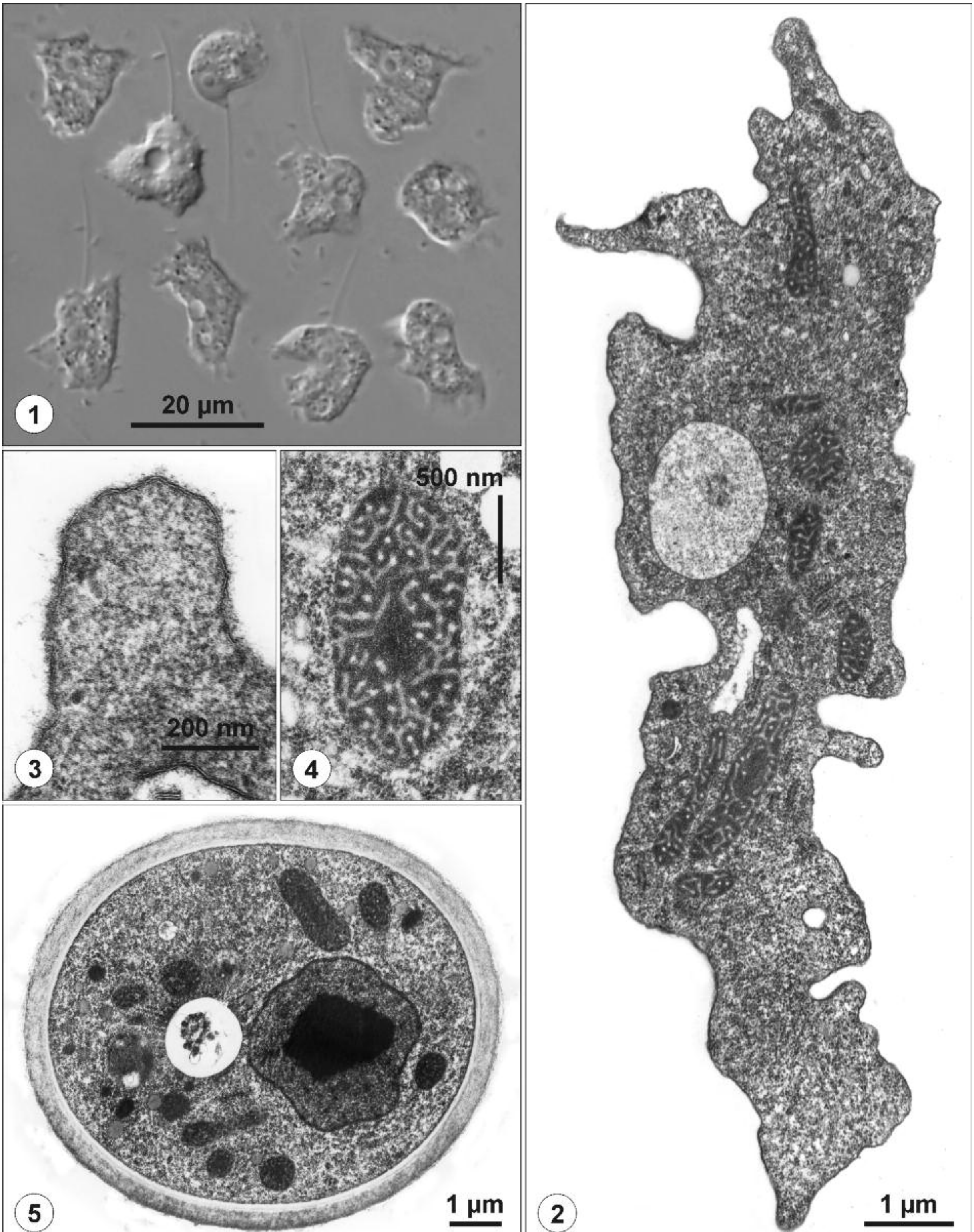

Plate 037. CCIKV strain of *Didymium* sp. isolated from gills of common carp, *Cyprinus carpio* L. from Dehtář pond, South Bohemia, Czech Republic; cultured on NN agar; stored in CC since 1998; GenBank Acc. No. of SSU rDNA sequence JQ271680. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Overview of fine structure of trophozoite sectioned out of plane of nucleus. **Fig. 3.** Cell surface of trophozoite. **Fig. 4.** Mitochondrion with tubular cristae and electron-dense core known in Myxogastrea. **Fig. 5.** Overview of cyst structure. (Cont.)

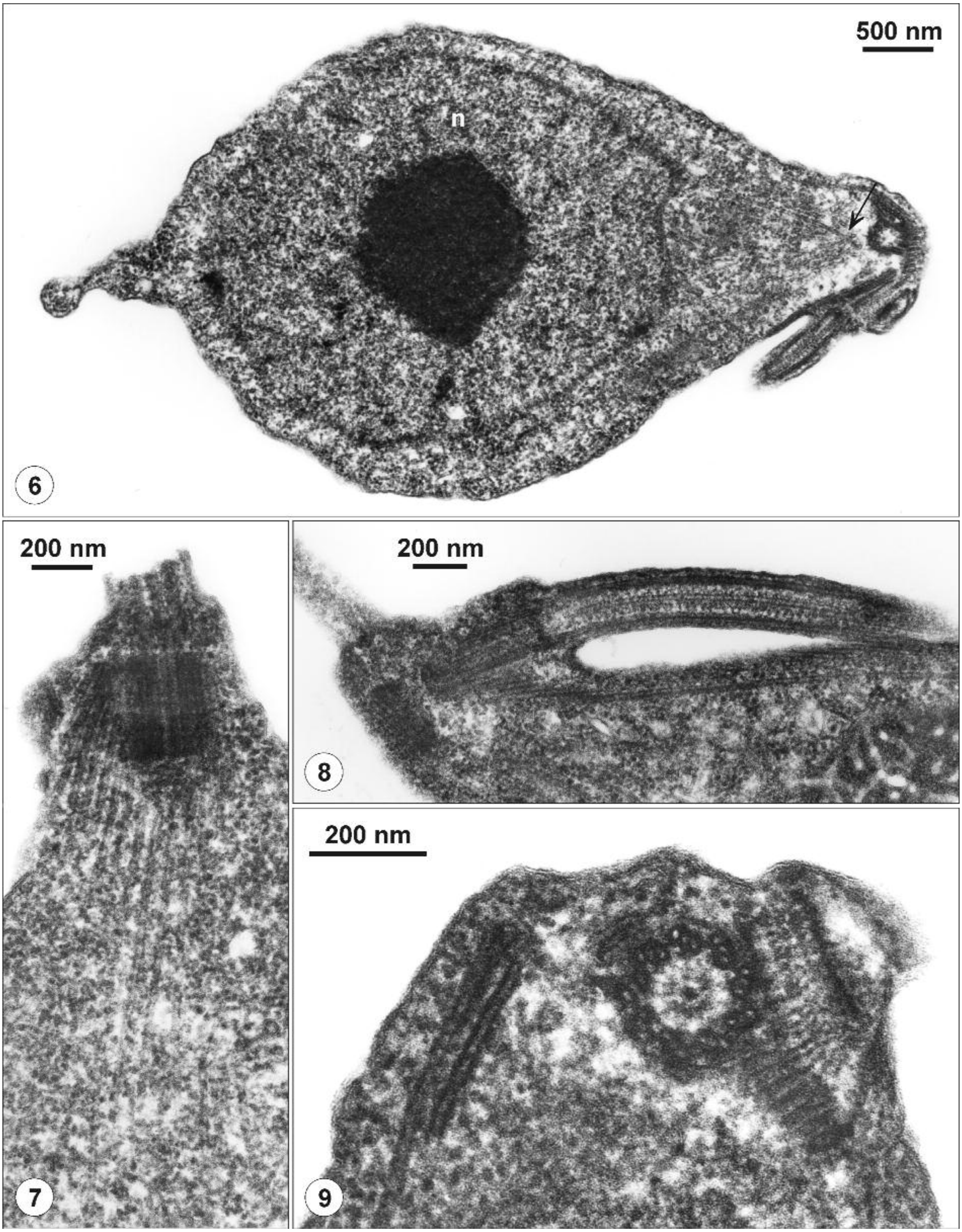

Plate 038. CCIKV strain of *Didymium* sp. Overview of ultrastructure of swarmer: nucleus (n), anterior flagellum, microtubules tapering to anterior flagellum (arrow). **Fig. 7.** Detail of microtubules in convergent arrangement. **Fig. 8.** Longitudinal section through flagellum and adjacent anterior part of swarmer. **Fig. 9.** Anterior part of swarmer cell with kinetosome-microtubular complex.

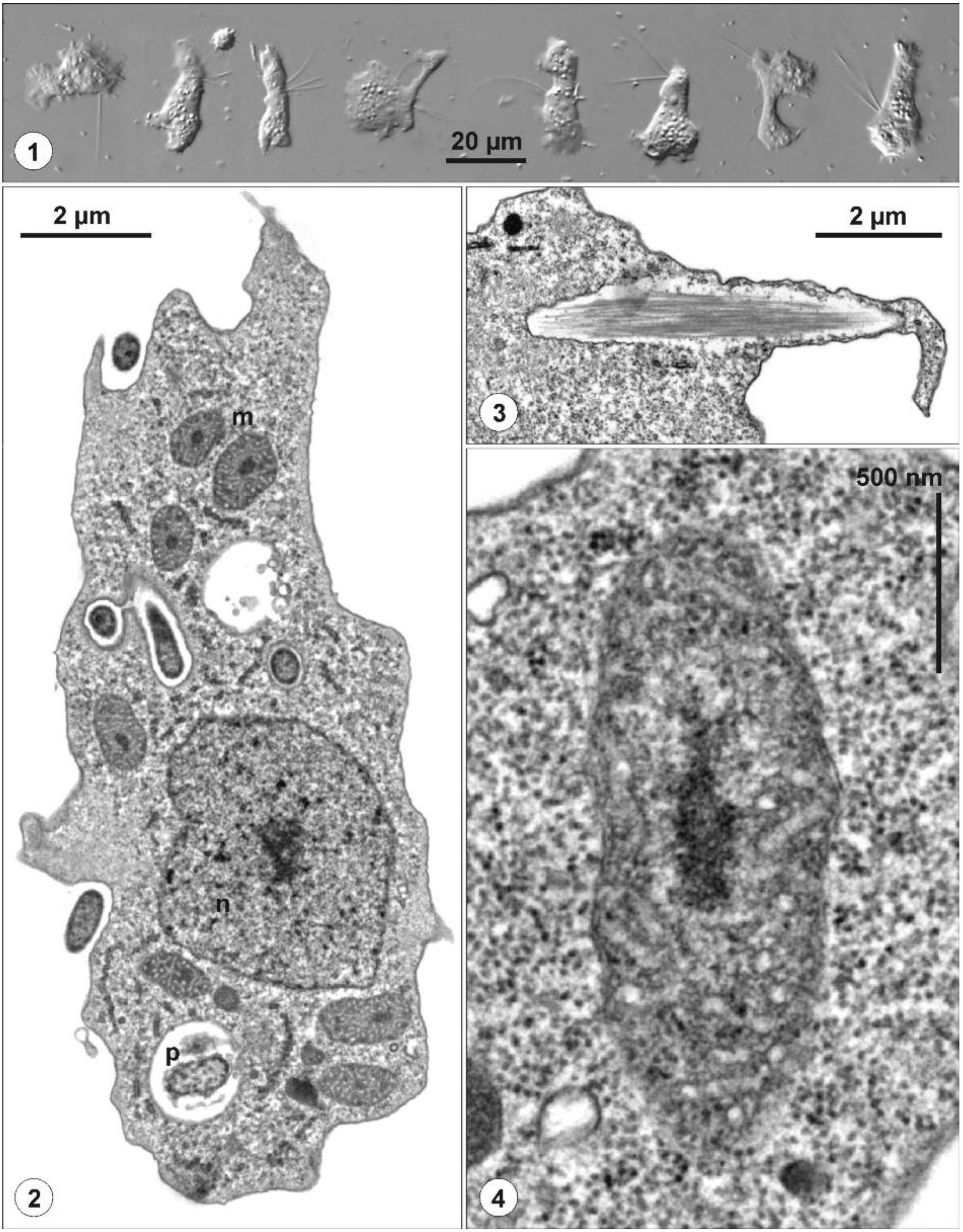

Plate 039. ECH1 strain of *Dydimium* sp. isolated from purple sea urchin, *Sphaerechinus granularis* (Lamarck) collected in Adriatic Sea, off Brač Island, Croatia; cultured on MY75S agar; GenBank Acc. No. of SSU rDNA sequence EF118758. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Overview of fine structure of trophozoite cultured on "dry" surface of agar plate: nucleus (n), mitochondria with electron-dense core, phagosome (p). **Fig. 3.** Subpseudopodium of trophozoite from "dry" culture with bunch of microfilaments in parallel arrangement. **Fig. 4.** Mitochondrion with axial electron-dense core and tubular cristae. Ref.: Dyková et al. 2007a.

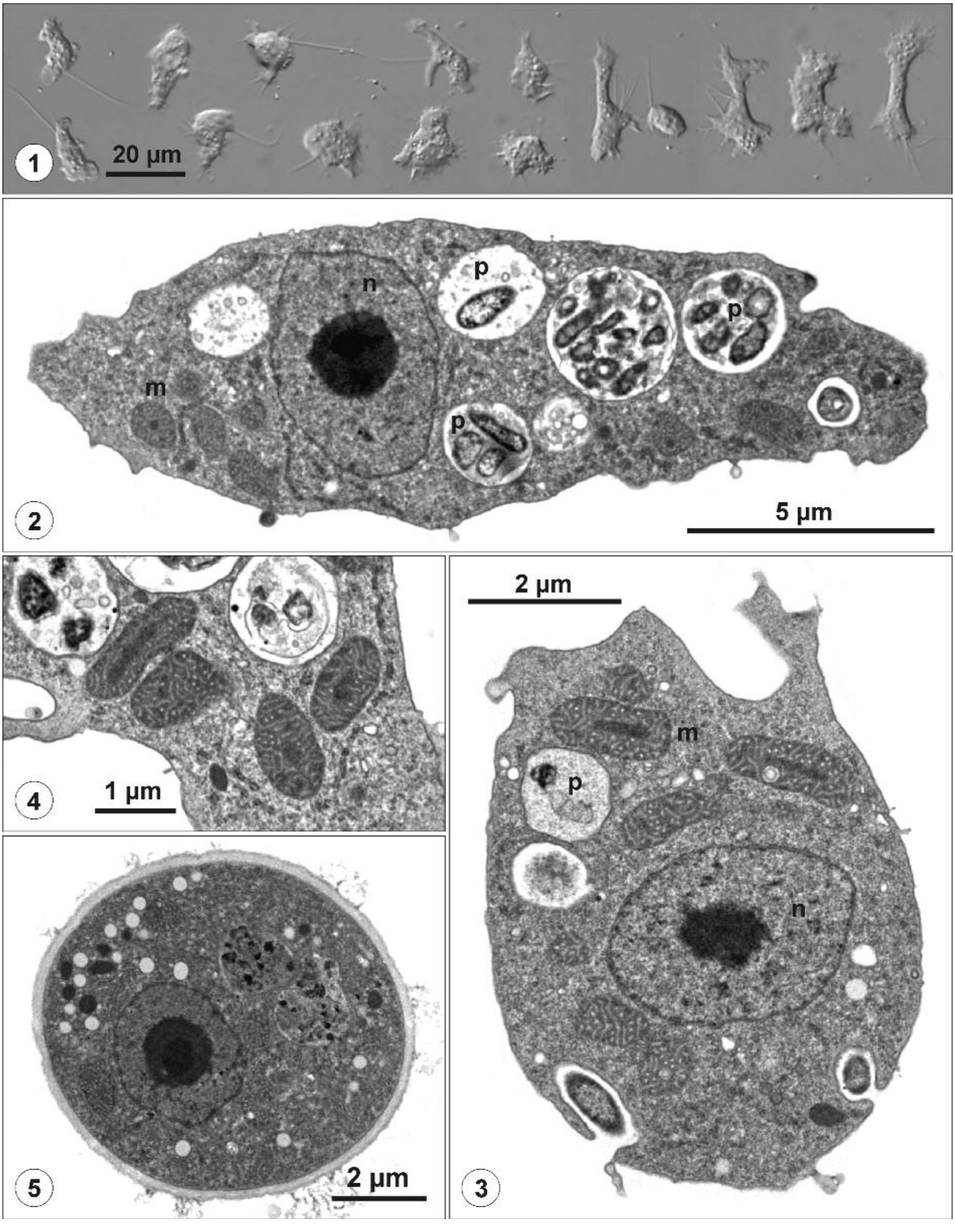

Plate 040. ECH14 strain of *Didymium* sp. isolated from purple sea urchin, *Sphaerechinus granularis* (Lamarck) collected in Adriatic Sea, off Brač Island, Croatia; cultured on MY75S agar; stored in CC since 2005; GenBank Acc. No. of SSU rDNA sequence EF118757. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosomes (p) and vacuoles with remnants of phagocytised material. **Fig. 4.** Detail of mitochondria containing tubular cristae and axial cores characteristic of Myxogastrea. **Fig. 5.** Almost mature cyst. Ref.: Dyková et al. 2007a.

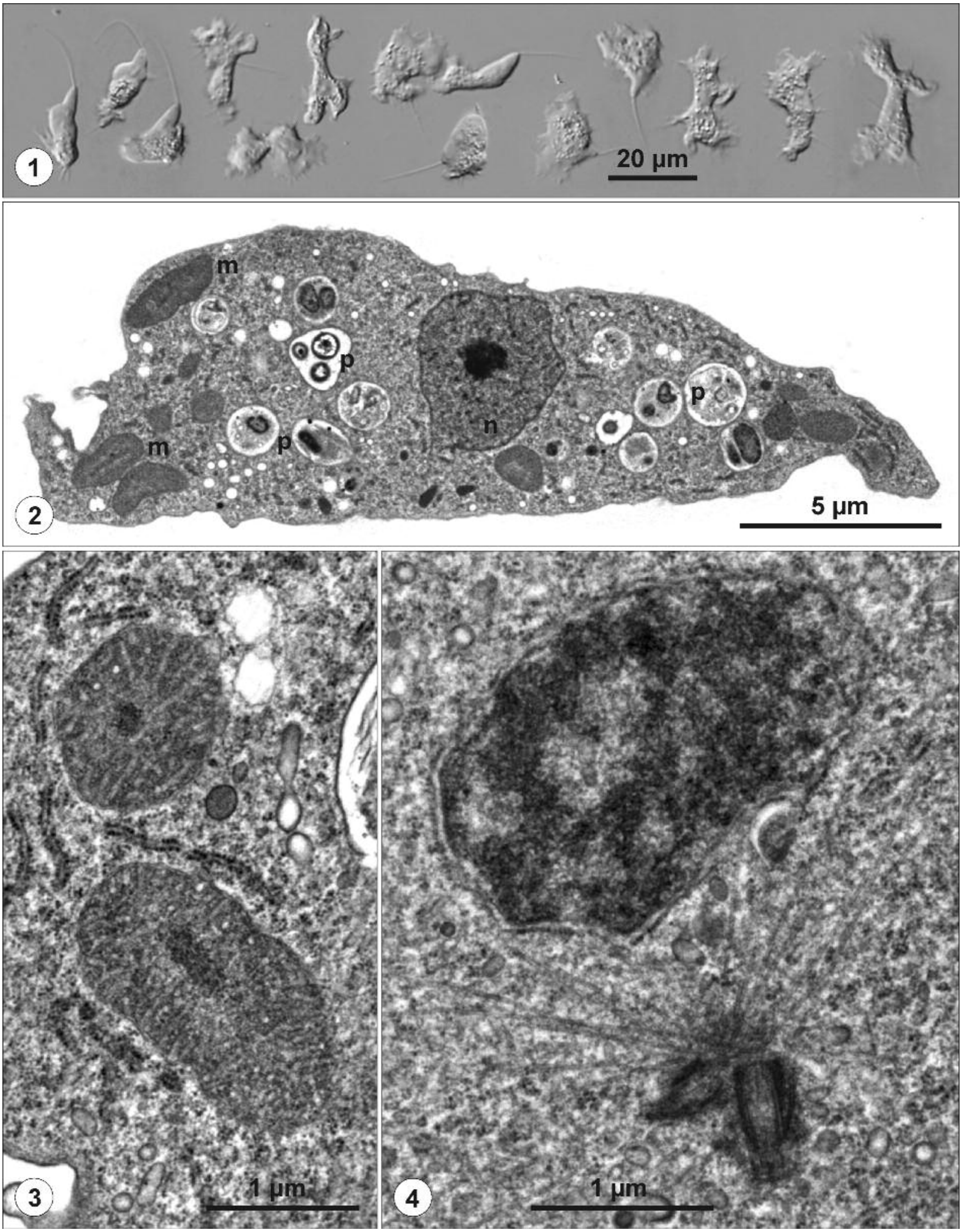

Plate 041. ECH43 strain of *Didymium* sp. isolated from purple sea urchin, *Sphaerechinus granularis* (Lamarck) collected in Adriatic Sea, off Brač Island, Croatia; cultured on MY75S agar; stored in CC since 2005; GenBank Acc. No. of SSU rDNA sequence EF118760. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Overview of trophozoite cultured on "dry" (not moistured) agar plate: nucleus (n), mitochondria (m), phagosomes (p). **Fig. 3.** Detail of ultrastructure of mitochondria with tubular cristae and axial cores characteristic of Myxogastrea. **Fig. 4.** Kinetosomes of two flagella with radially raising microtubules. Ref.: Dyková et al. 2007a.

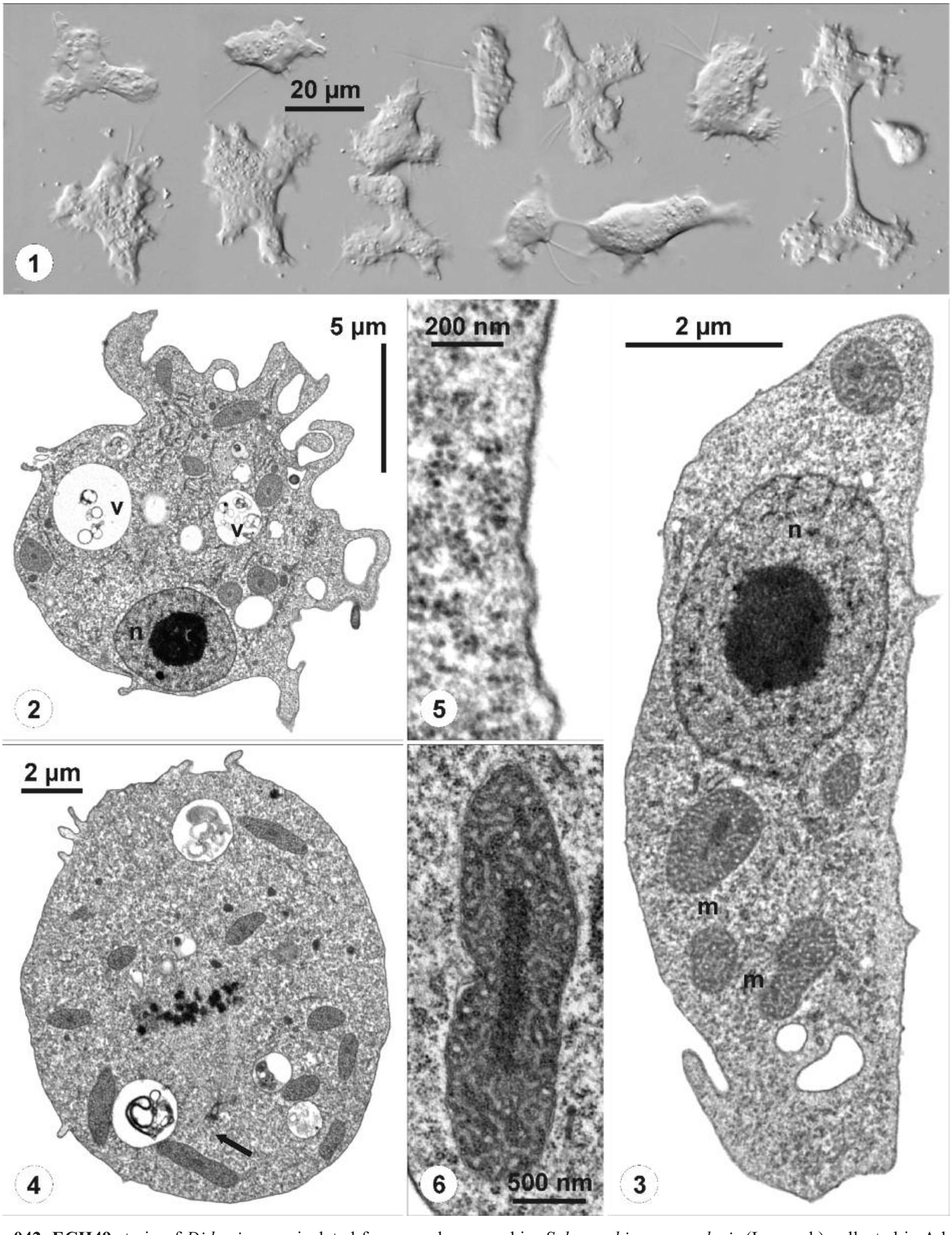

Plate 042. ECH49 strain of *Didymium* sp. isolated from purple sea urchin, *Sphaerechinus granularis* (Lamarck) collected in Adriatic Sea, off Brač Island, Croatia; cultured on MY75S agar; stored in CC since 2005; GenBank Acc. No. of SSU rDNA sequence EF118761. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: vesicular nuclei (n), mitochondria (m), vacuoles (v) with remnants of phagocytised material. **Fig. 4.** Nuclear division in metaphase, centriole (arrow). **Fig. 5.** Smooth cell surface of trophozoite. **Fig. 6.** Mitochondrion with central electron-dense core characteristic of Myxogastrea. (Cont.)

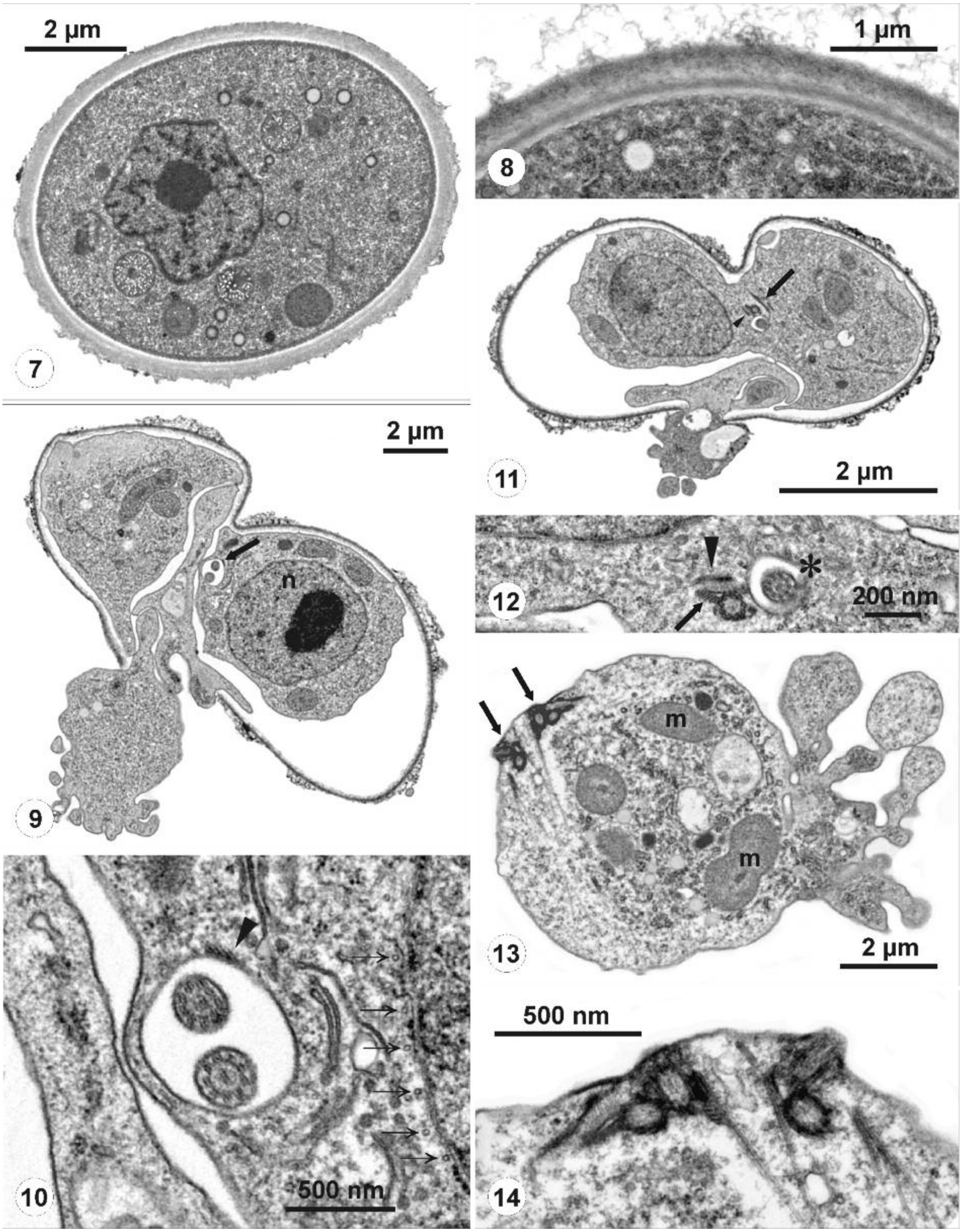

Plate 043. ECH49 strain of *Didymium* sp. **Fig. 7.** Mature cyst. **Fig. 8.** Bilayered wall of mature cyst. **Fig. 9.** Flagellated stage (future swarmer) escaping from cyst: channel with sections through two flagella (arrow). **Fig. 10.** Detail of two flagella (arrowhead) and microtubules of inner microtubular cone. **Fig. 11.** Swarmer escaping from cyst: formation of kinetosomes (arrow, arrowhead). **Fig. 12.** Formation of kinetosomes in detail (arrow, arrowhead), flagellum (asterisk). **Fig. 13.** Cell dividing into two future swarmers: amoeboid projections at posterior end (right), mitochondria (m), kinetosome-microtubular associations (arrows). **Fig. 14.** Detail of Fig. 13. Ref.: Dyková et al. 2007a. (Cont.)

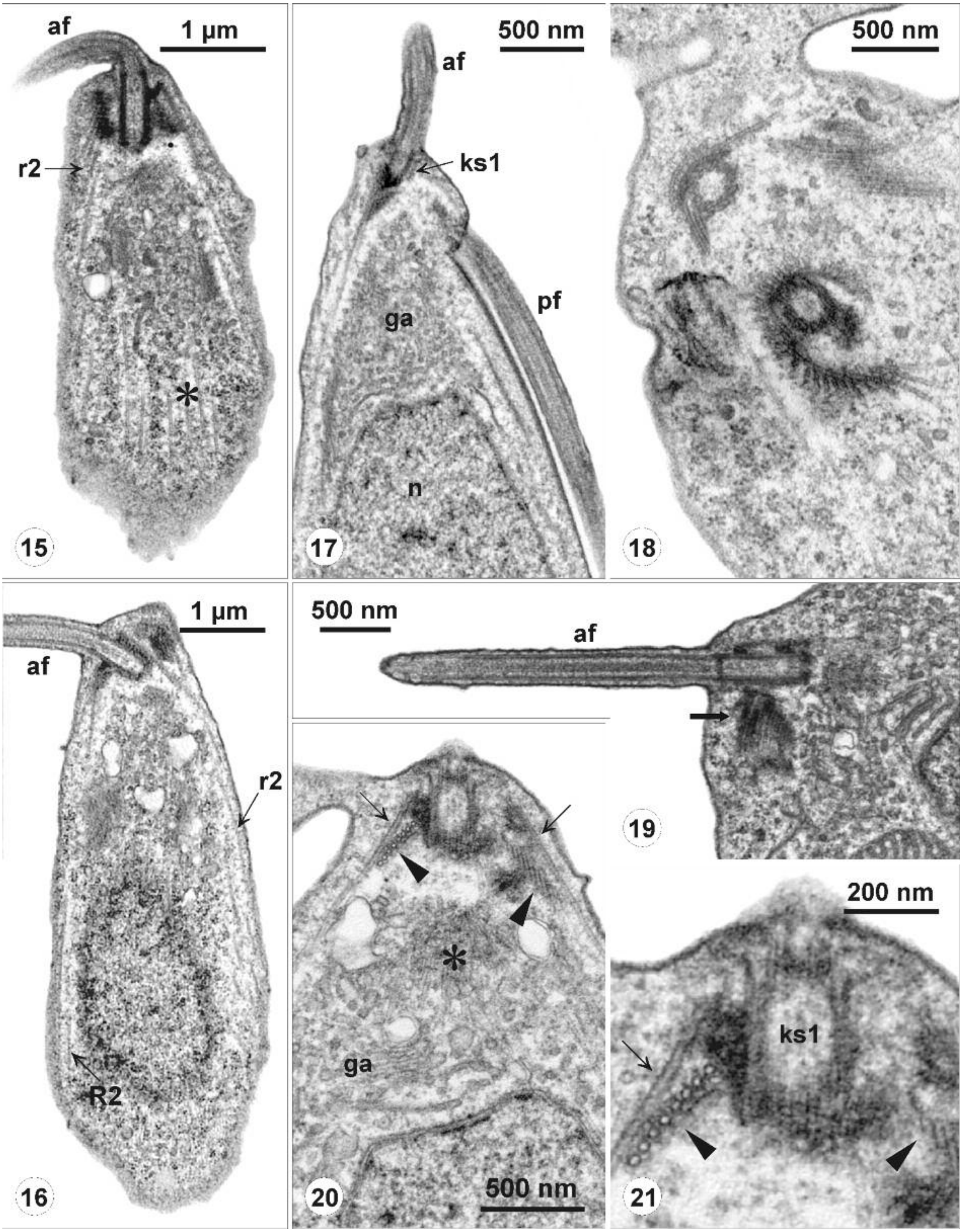

Plate 044. ECH49 strain of *Didymium* sp. **Fig. 15.** Ultrastructure of swarmer: anterior flagellum (af), microtubules of the outer (asterisk) and the inner (r2) cone. **Fig. 16.** Swarmer with nucleus. **Fig. 17.** Anterior part of swarmer: nucleus (n), anterior (af) and posterior flagellum (pf), kinetosome (ks1), Golgi apparatus (ga). **Fig. 18.** Kinetosome-microtubular complexes in apex of swarmer. **Fig. 19.** Apex of swarmer: anterior flagellum (af), grazing section of kinetosome (arrow). **Fig. 20.** Anterior part of swarmer with cytoplasmic projection (at left): microtubules of outer cone (arrows), Golgi apparatus (ga), MTOC (asterisk), microtubules (arrowheads). **Fig. 21.** Detail of Fig. 20: kinetosome (ks1). Ref.: Dyková et al. 2007a.

Echinamoeba Page, 1975

Plate 045

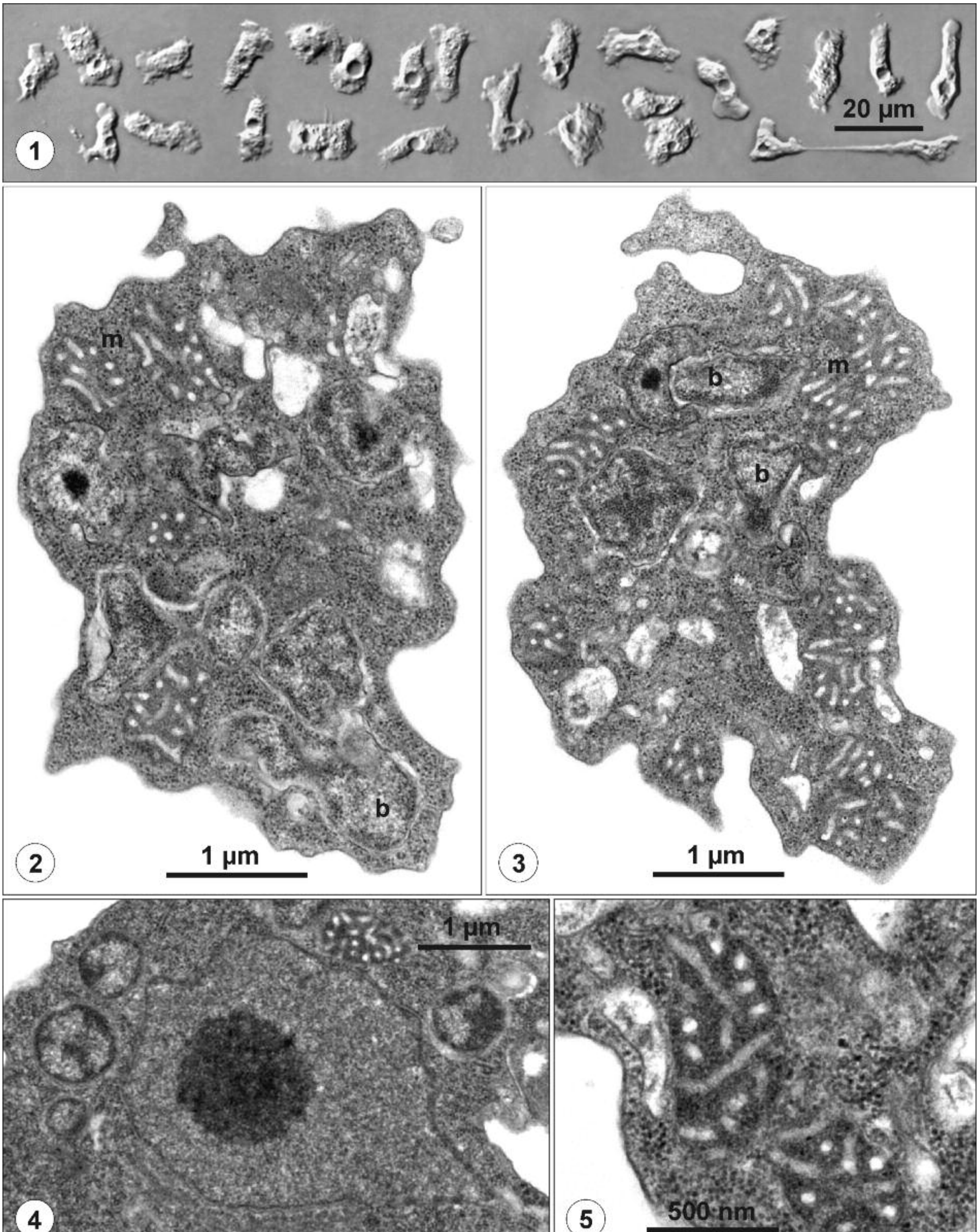

Plate 045. CCAP1519/1 strain of *Echinamoeba silvestris* obtained from UKNCC; cultured on NN agar; stored in CC from 2002 to 2003; GenBank Acc. No. of SSU rDNA sequence JQ271681. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites sectioned out of plane of nucleus: mitochondria (m), symbiotic and phagocytised bacteria (b). **Fig. 4.** Nucleus surrounded by symbiotic bacteria. **Fig. 5.** Detail of ultrastructure of mitochondria with tubular cristae.

Filamoeba Page, 1967

Plates 046–047

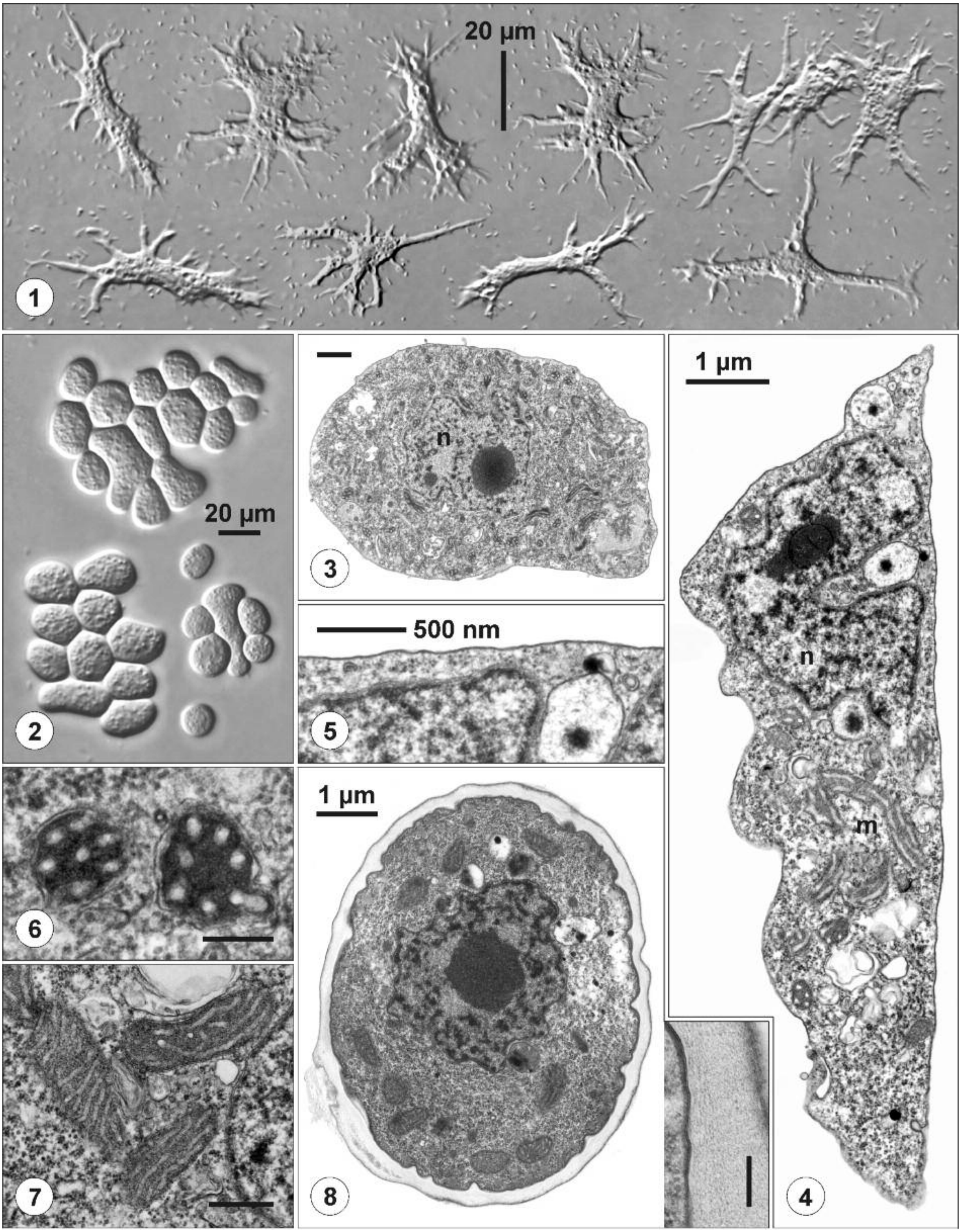

Plate 046. CH26. Type strain of *Filamoeba sinensis* isolated from gills of Prussian carp, *Carassius gibelio* (Bloch) from fish market in Wuhan, Hubei province, China; cultured on NN agar; stored in CC since 2002; GenBank Acc. No. of SSU rDNA sequence AY714369. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Cysts of typical irregular shape. **Figs. 3, 4.** Fine structure of trophozoites: nuclei (n), mitochondria (m). **Fig. 5.** Cell surface. **Fig. 6.** Mitochondria with tubular cristae, transverse section, scale bar = 200 nm. **Fig. 7.** Mitochondria sectioned longitudinally, scale bar = 500 nm. **Fig. 8.** Overview of mature cyst with magnified cyst wall (inset, scale bar = 200 nm). Ref.: Dyková et al. 2005c.

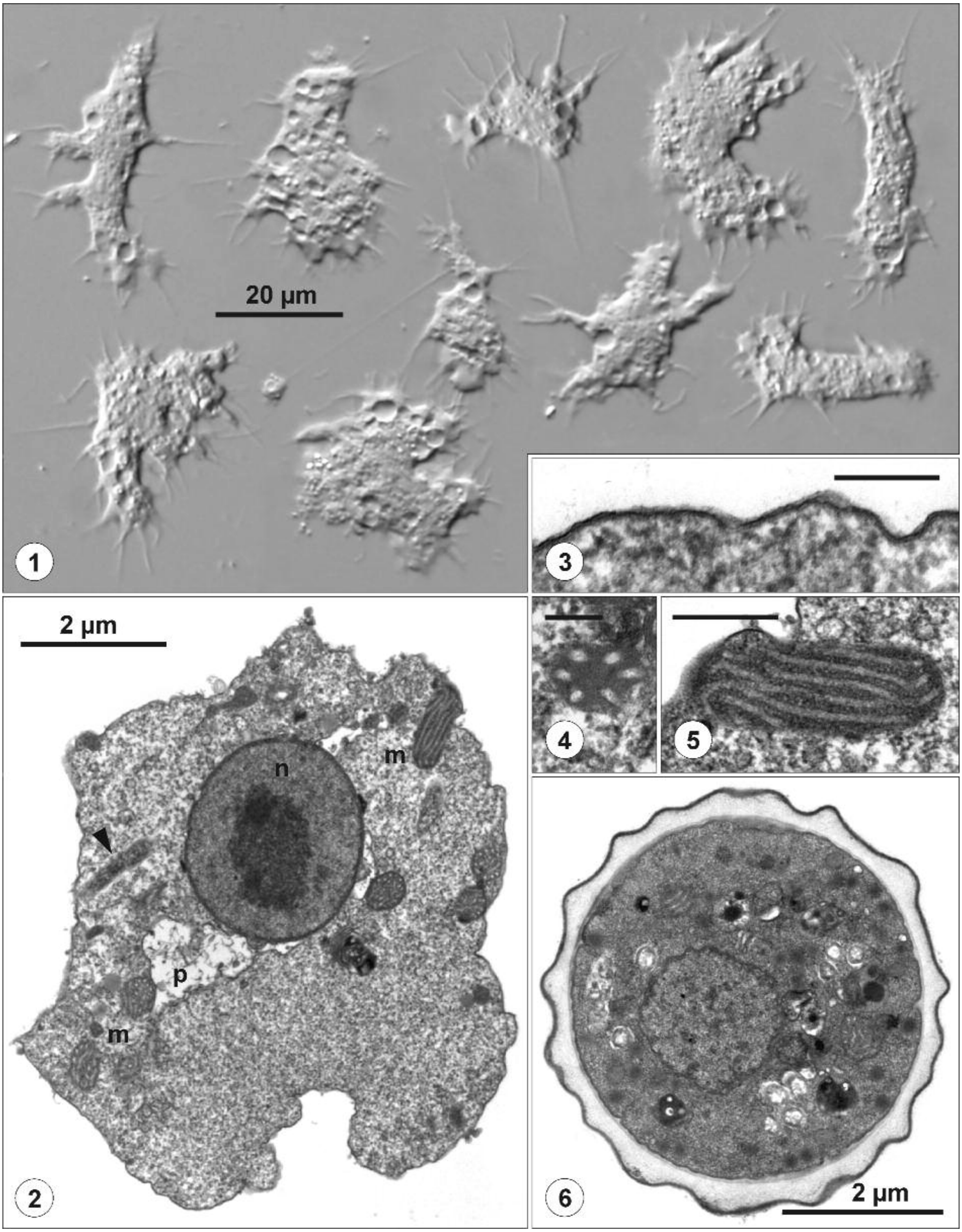

Plate 047. JIH56 strain of *Filamoeba nolandi* isolated from hot-water piping system, Vysočina region, Czech Republic; cultured on NN agar; stored in CC since 2009; GenBank Acc. No. of SSU rDNA sequence GQ371176. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Overview of fine structure of trophozoite: nucleus (n), mitochondria (m), internalized bacterium (arrowhead), phagosome (p). **Fig. 3.** Cell surface of trophozoite, scale bar = 200 nm. **Figs. 4, 5.** Mitochondria with tubular cristae in transverse and longitudinal section, scale bars = 200 and 500 nm, respectively. **Fig. 6.** Mature cyst with relatively thick wall. Ref.: Dyková et al. 2009a.

Flabellula Schaeffer, 1926 emend. Page, 1980

Plates 048–057

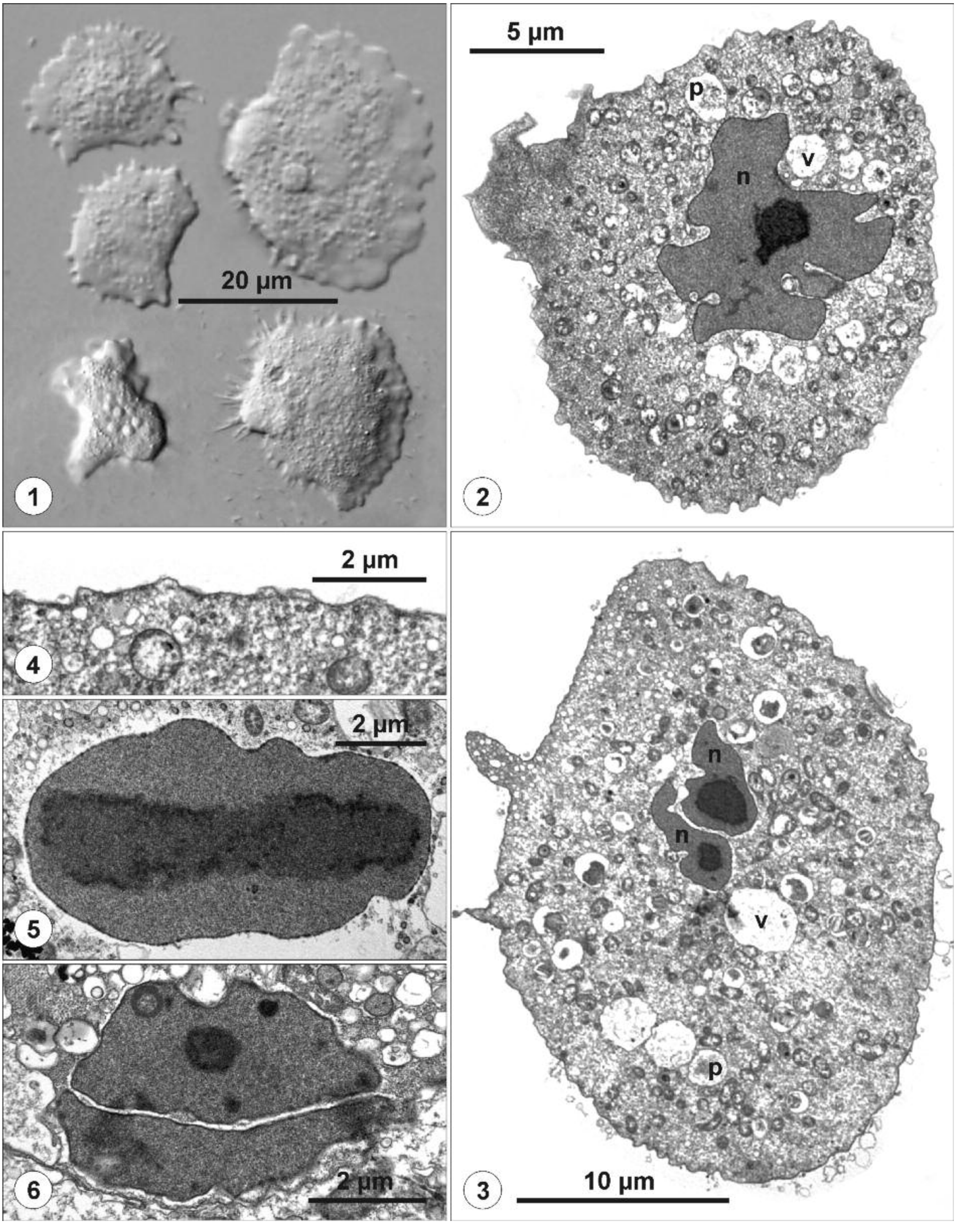

Plate 048. CCAP1529/2 strain of *Flabellula citata* obtained from UKNCC for comparison with other *Flabellula*-like strains; cultured on MY75S agar; stored in CC since 2004; GenBank Acc. No. of SSU rDNA sequence EU852654. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: lobose nuclei (n) with centrally located nucleolar masses, phagosomes (p), supernumerary vesicles and vacuoles (v) in cytoplasm. **Fig. 4.** Detail of cell surface of trophozoite. **Figs. 5, 6.** Details of nuclei in various stages of their division. Ref.: Dyková et al. 2008c.

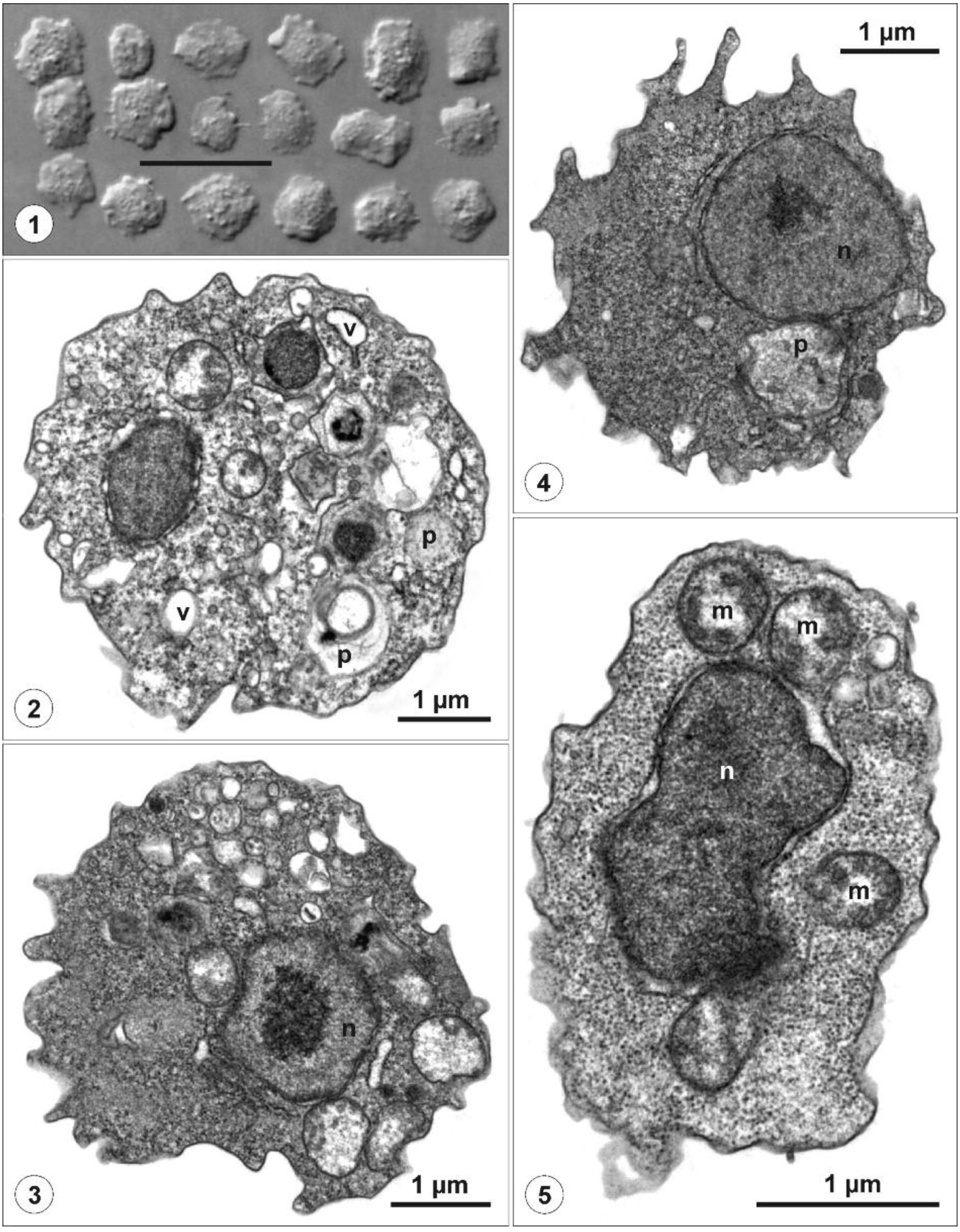

Plate 049. CCAP1529/3 strain of *Flabellula demetica* (type culture) obtained from UKNCC for comparison with other *Flabellula*-like strains; cultured on MY75S agar; stored in CC since 2004; DNA samples stored under FLA DB Nos. 352 and 374. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC), scale bar = 20 µm. **Figs. 2, 3, 4, 5.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosomes (p), numerous vesicles and vacuoles (v).

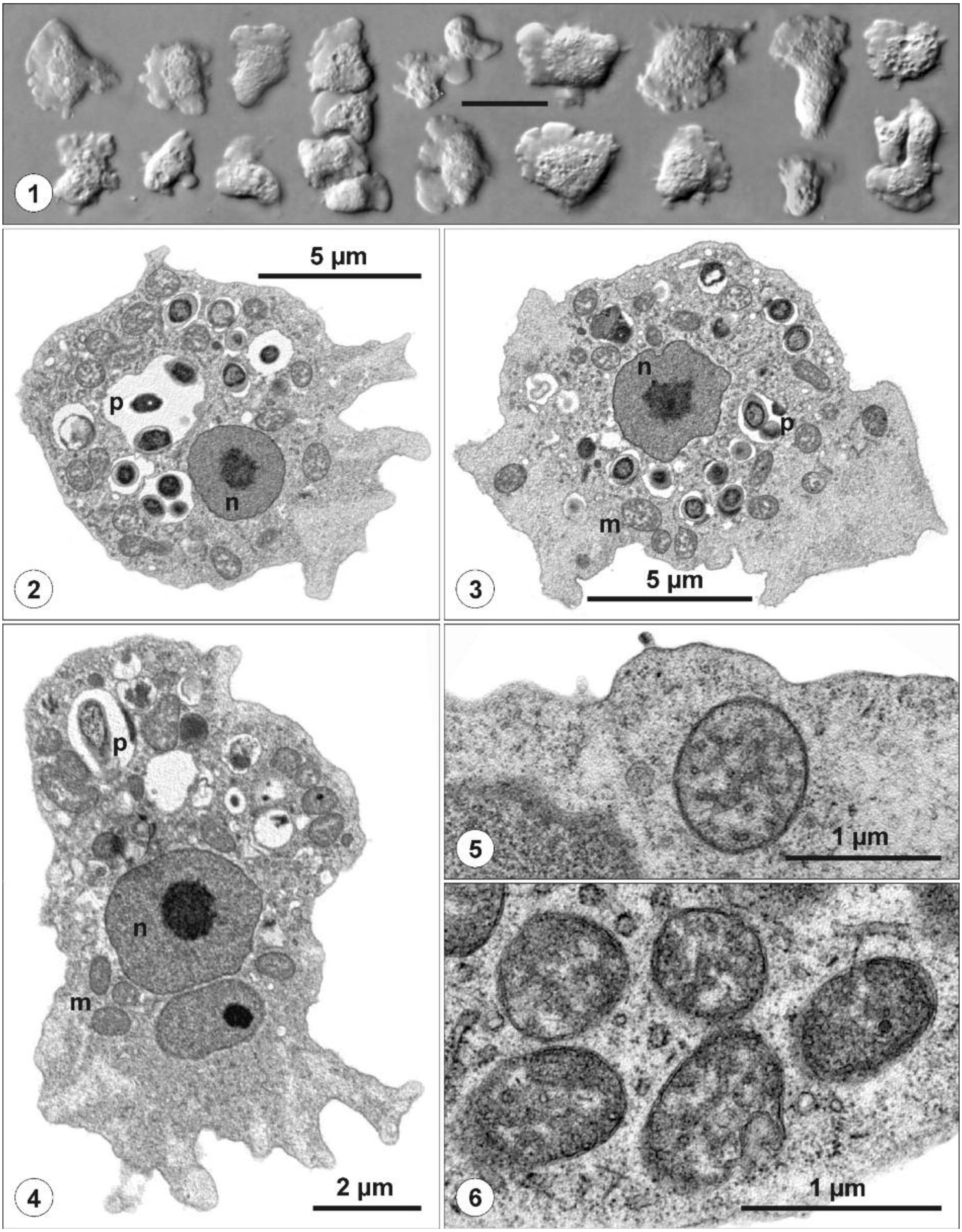

Plate 050. CCAP1529/4 strain of *Flabellula trinovantica* (type culture) obtained from UKNCC for comparison with other *Flabellula*-like strains; cultured on MY75S agar; stored in CC since 2006; GenBank Acc. No. of SSU rDNA sequence JQ271682. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC), scale bar = 20 µm. **Figs. 2, 3, 4.** Overview of fine structure of trophozoites: nuclei (n), phagosomes with numerous bacteria (p), mitochondria (m). **Figs. 5, 6.** Details of ultrastructure of mitochondria with tubular cristae of relatively small diameter.

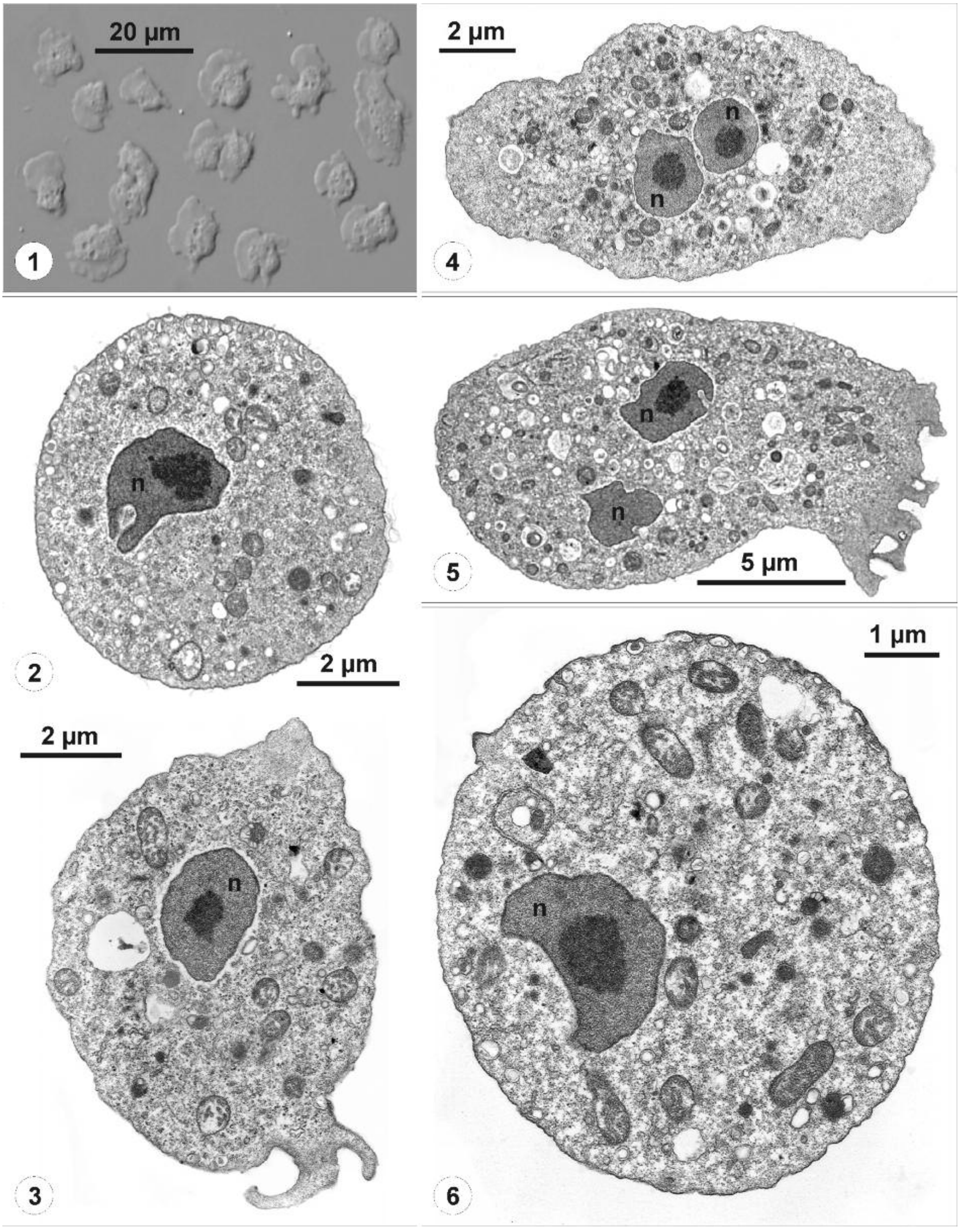

Plate 051. ISO14 strain of *Flabellula* sp. isolated from gills of European seabass, *Dicentrarchus labrax* (L.) farmed in Sicily, Italy; cultured on MY75S agar; stored in CC since 1997; GenBank Acc. No. of SSU rDNA sequence JQ271683. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC); intense light transforms them fast into rounded stages. **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), numerous vesicles and vacuoles in cytoplasm. **Figs. 4, 5.** Binucleate trophozoites with lobose nuclei (n). **Fig. 6.** Detail of trophozoite ultrastructure: lobose nucleus (n), relatively small mitochondria with hardly discernible tubular cristae, smooth cell surface.

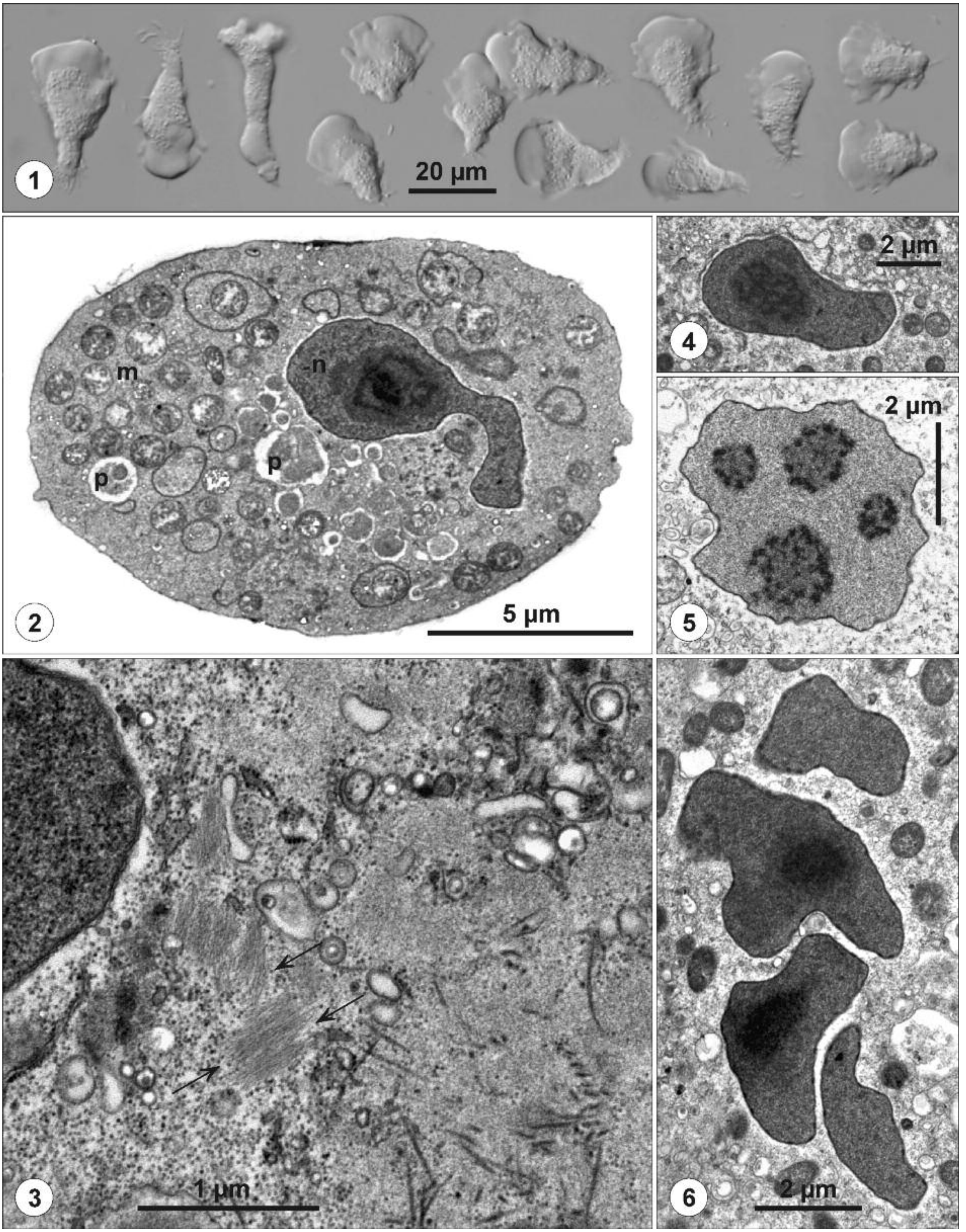

Plate 052. M4M strain of *Flabellula* sp. isolated from gills of orangeside triggerfish, *Sufflamen verres* (Gilbert et Starks) collected off the coast of Mazatlan, Sinaloa, Mexico; cultured on MY75S agar; stored in CC since 2000; GenBank Acc. No. of SSU rDNA sequence EU852657. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Fine structure of trophozoite: lobose nucleus (n), mitochondria (m), numerous phagosomes (p). **Fig. 3.** Cytoplasm with microfibrillar structures (arrows). **Fig. 4.** Lobed nucleus with nucleolus. **Fig. 5.** Nucleus of irregular shape with nucleolar material divided into four parts. **Fig. 6.** Four nuclei or four lobes of two nuclei. Ref.: Dyková et al. 2008c.

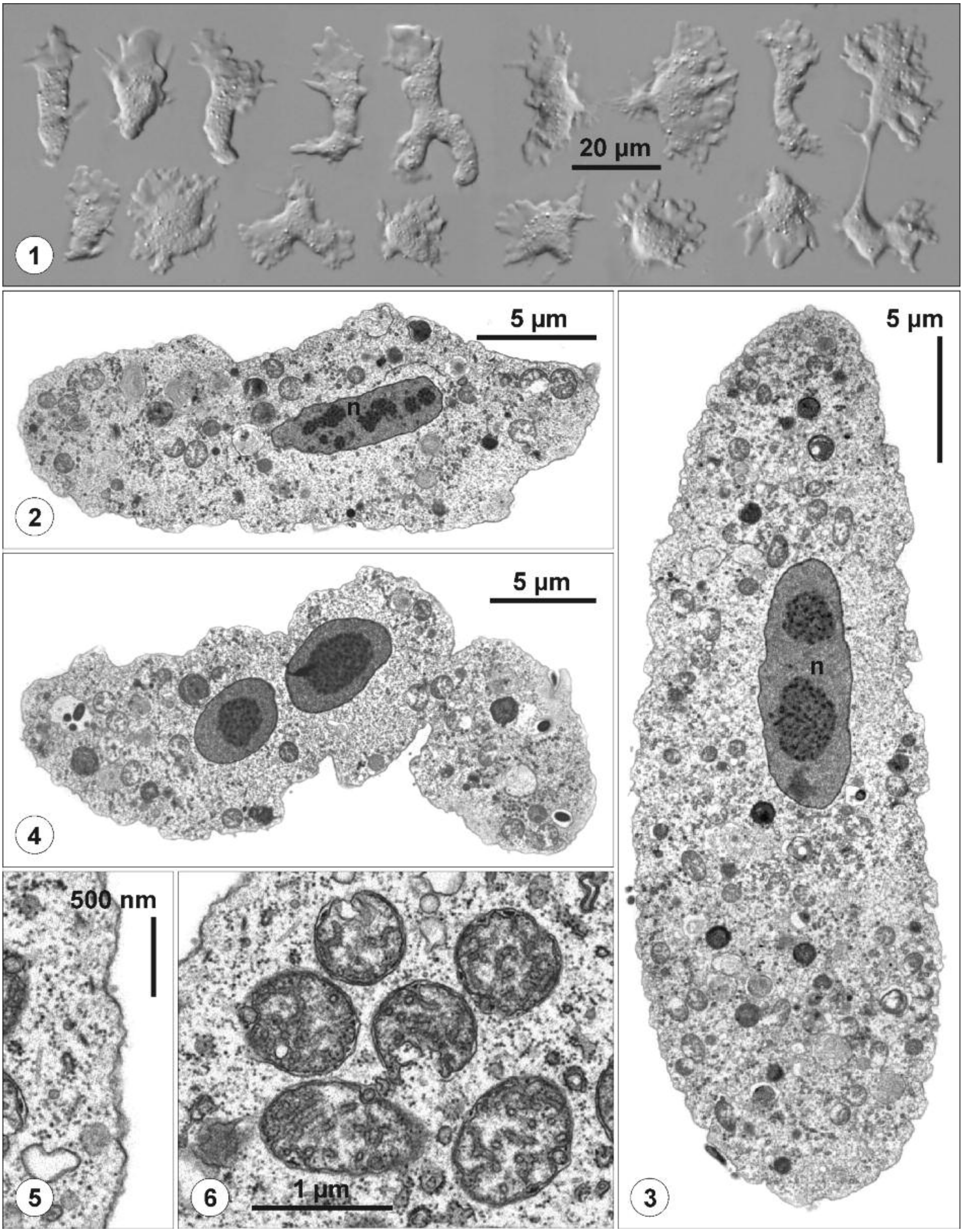

Plate 053. M9M strain of *Flabellula* sp. isolated from gills of finescale triggerfish *Balistes polylepis* Steindachner collected off the coast of Mazatlan, Sinaloa, Mexico; cultured on MY75S agar; stored in CC since 2000; GenBank Acc. No. of SSU rDNA sequence EU852653. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: small rounded mitochondria (hardly discernible), nuclei (n) with different arrangement of nucleolar material. **Fig. 4.** Binucleate trophozoite. **Fig. 5.** Cell surface of trophozoite. **Fig. 6.** Mitochondria with tubular branching cristae. Ref.: Dyková et al. 2008c.

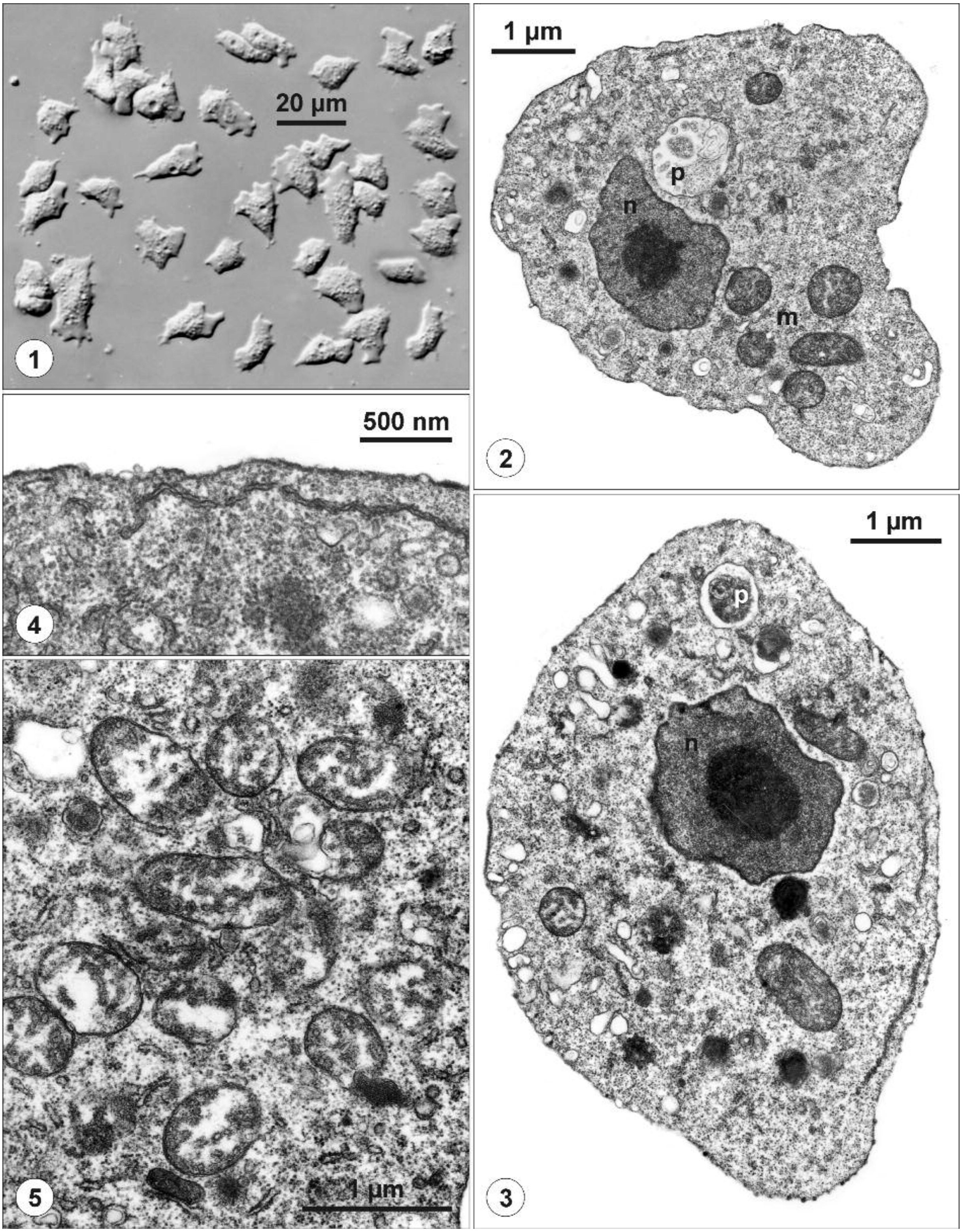

Plate 054. S3M27 strain of *Flabellula* sp. isolated from gills of turbot, *Scophthalmus maximus* (L.) farmed in NW Spain; cultured on MY75S agar; stored in CC since 1996; GenBank Acc. No. of SSU rDNA sequence JQ271684. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosomes (p). **Fig. 4.** Cell surface. **Fig. 5.** Mitochondria with tubular cristae and poorly preserved matrix.

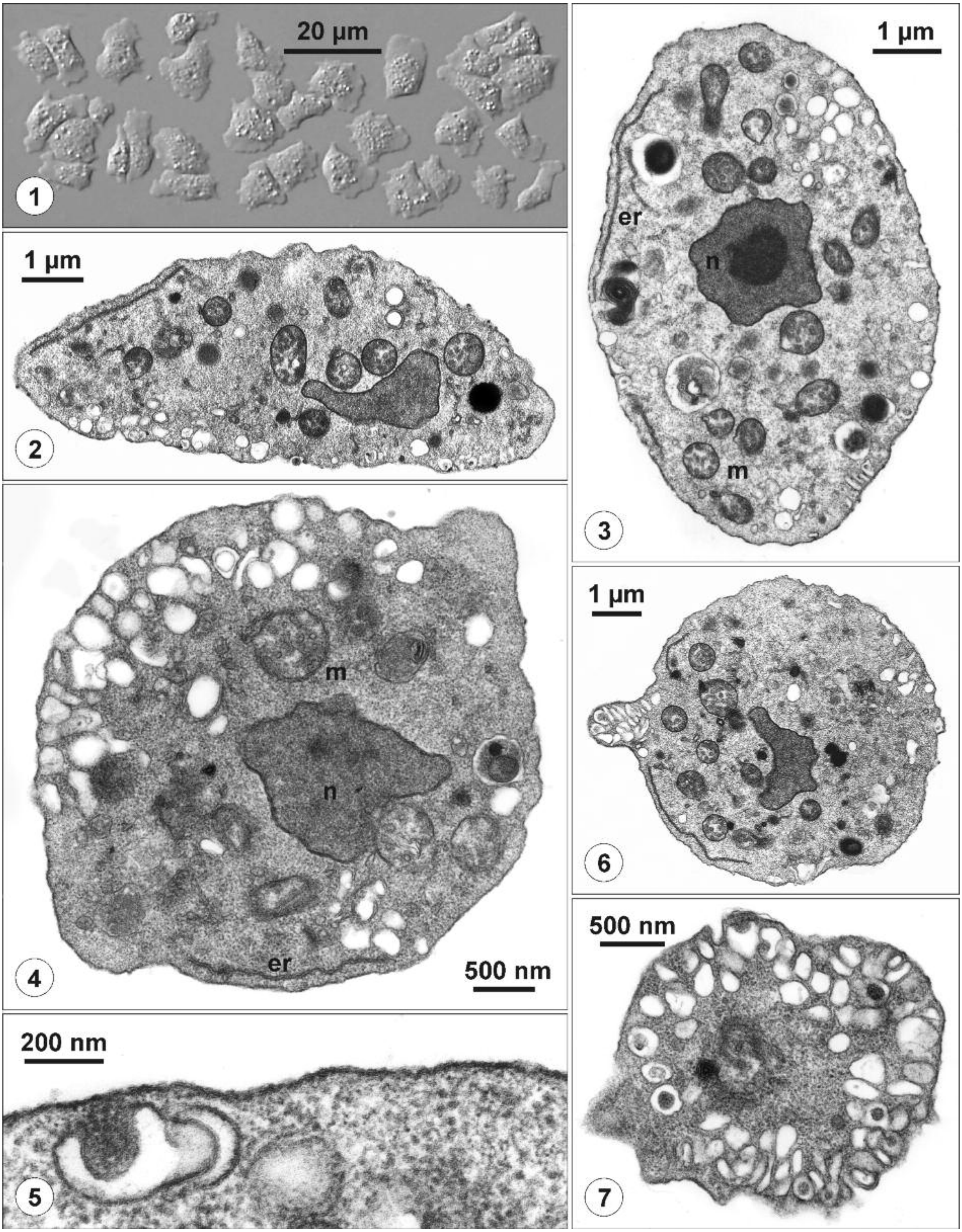

Plate 055. S5M32 strain of *Flabellula* sp. isolated from gills of turbot, *Scophthalmus maximus* (L.) farmed in NW Spain; cultured on MY75S agar; stored in CC since 1996; GenBank Acc. No. of SSU rDNA sequence JQ271685. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Overview of fine structure of trophozoite. **Figs. 3, 4.** Details of trophozoite ultrastructure: nuclei (n), mitochondria (m), endoplasmic reticulum (er), numerous vesicles in cytoplasm and under cell membrane. **Fig. 5.** Detail of cell surface of trophozoite and vesicle located under cell membrane. **Figs. 6, 7.** Overview and detail of knob-like part of trophozoite with multiple vesicles (resembling uroid).

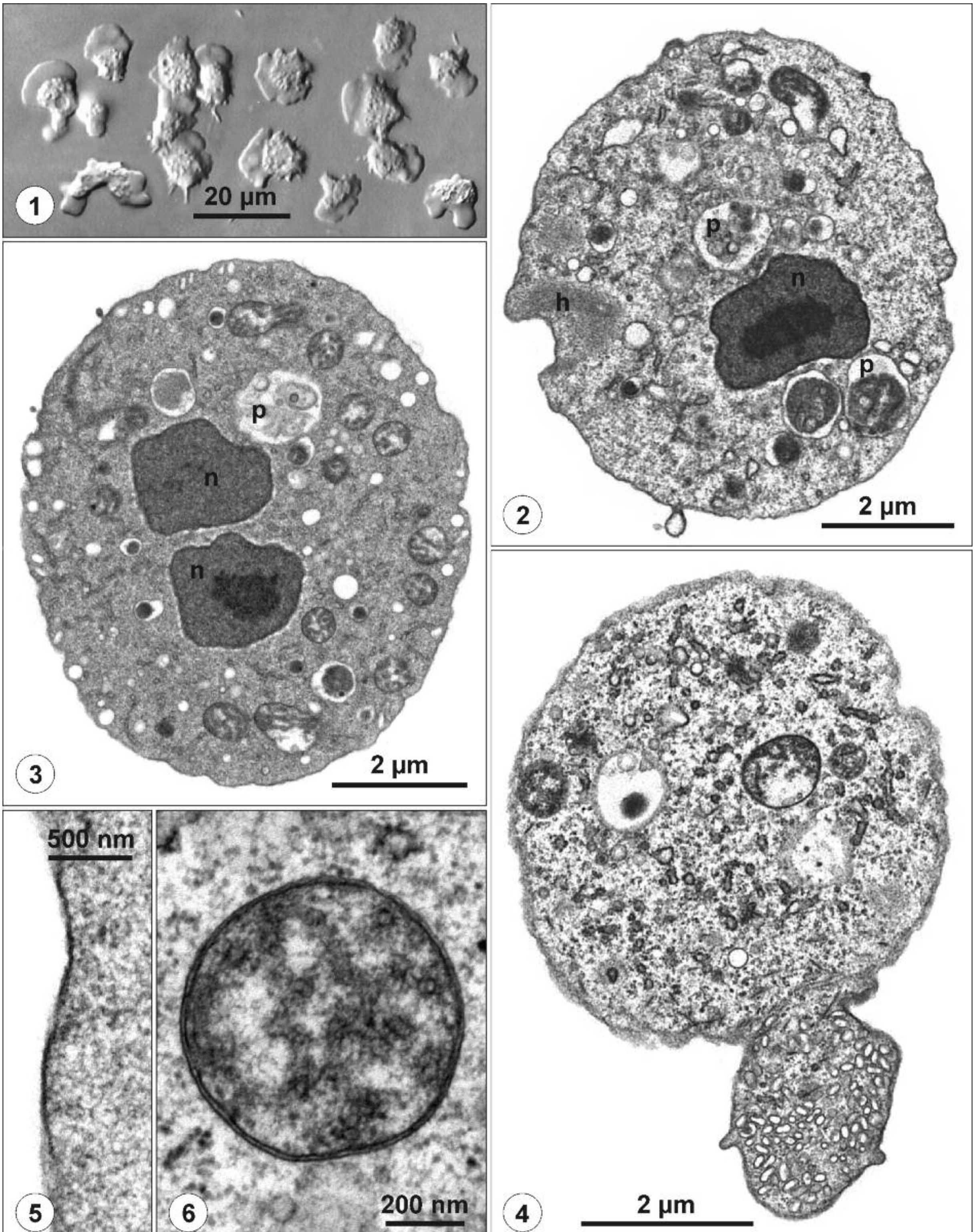

Plate 056. SBGL1 strain of *Flabellula* sp. isolated from gills of European seabass, *Dicentrarchus labrax* (L.) farmed in Sicily, Italy; cultured on MY75S agar; stored in CC since 1997; GenBank Acc. No. of SSU rDNA sequence JQ271686. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), phagosomes (p), part of hyaloplasm (h). **Fig. 4.** Overview of ultrastructure of trophozoite with knob-like structure full of vesicles. **Fig. 5.** Cell surface of trophozoite. **Fig. 6.** Detail of mitochondrion with tubular cristae.

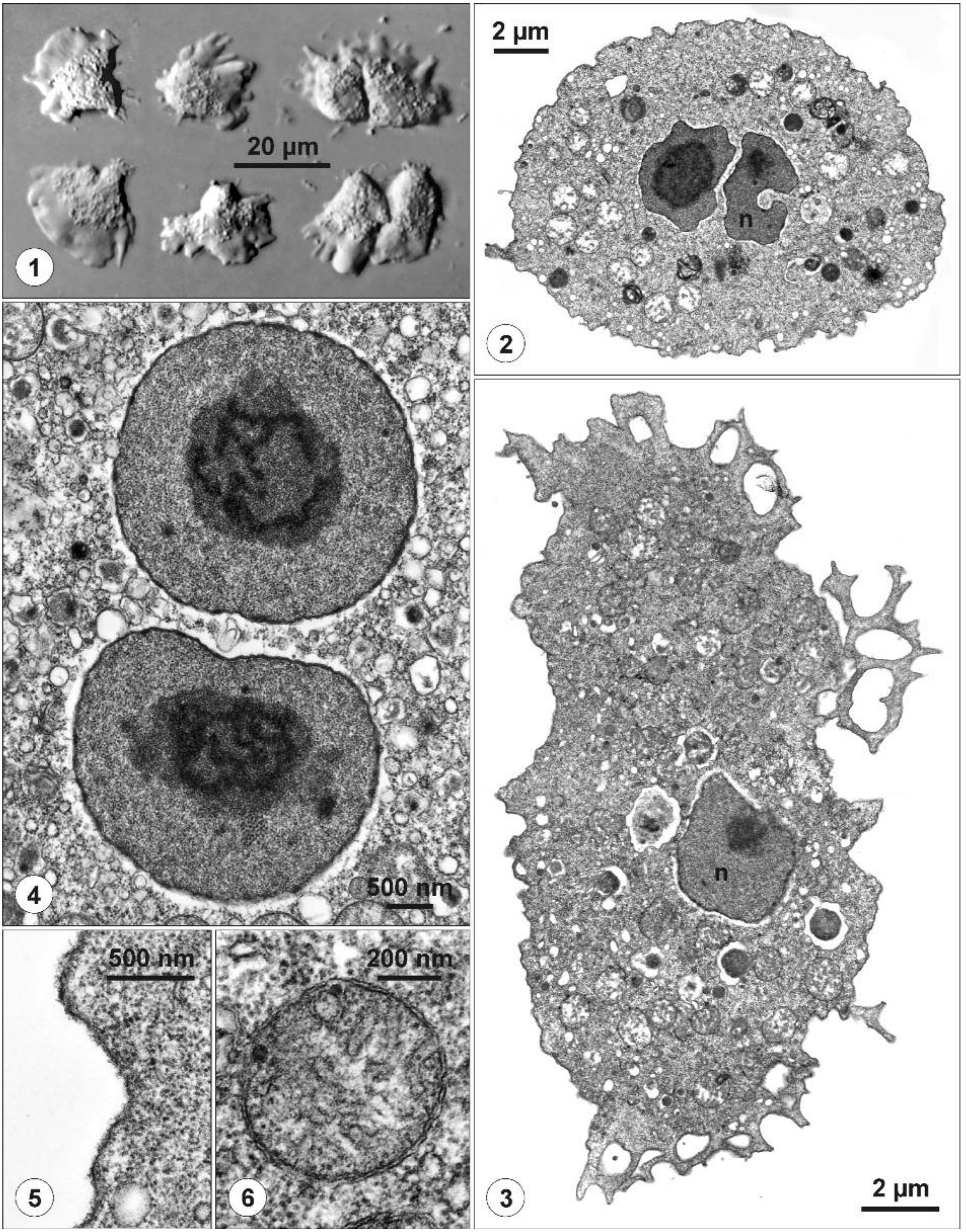

Plate 057. SMA17 strain of *Flabellula* sp. isolated from gills of turbot, *Scophthalmus maximus* (L.) farmed in NW Spain; cultured on MY75S agar; stored in CC since 2000; GenBank Acc. No. of SSU rDNA sequence EU852652. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: lobose nuclei (n), small, hardly discernible mitochondria and numerous vesicles in cytoplasm. **Fig. 4.** Two rounded nuclei. **Fig. 5.** Cell surface of trophozoite. **Fig 6.** Mitochondrion with branching tubular cristae. Ref.: Dyková et al. 2008c.

Grellamoeba Dyková, Kostka et Pecková, 2010

Plates 058–059

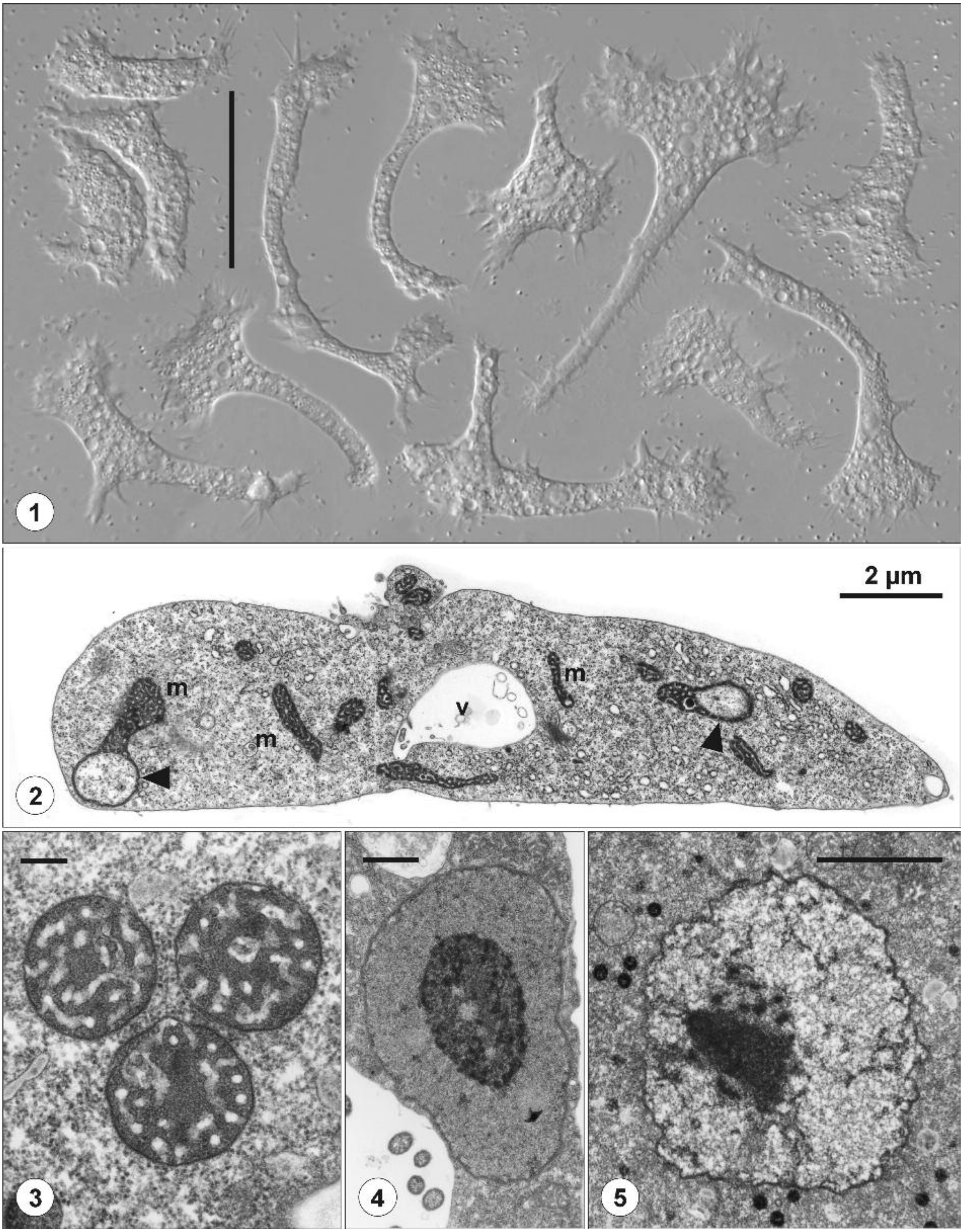

Plate 058. 4168. Type strain of *Grellamoeba robusta* isolated from kidney tissue of pike-perch, *Sander lucioperca* (L.) from Dvořiště pond, South Bohemia, Czech Republic; cultured on NN agar; stored in CC since 1992; GenBank Acc. Nos. of SSU rDNA sequences GQ438740, GQ438741, GQ438742. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC), scale bar = 50 µm. **Fig. 2.** Fine structure of trophozoite: mitochondria (m), pseudoinclusions in mitochondria (arrowheads), vacuole (v). **Fig. 3.** Mitochondria with tubular cristae, scale bar = 200 nm. **Fig. 4.** Nucleus of trophozoite as seen after division, scale bar = 1 µm. **Fig. 5.** Nuclear membrane and chromatin arrangement in the beginning of prophase, scale bar = 2 µm. (Cont.)

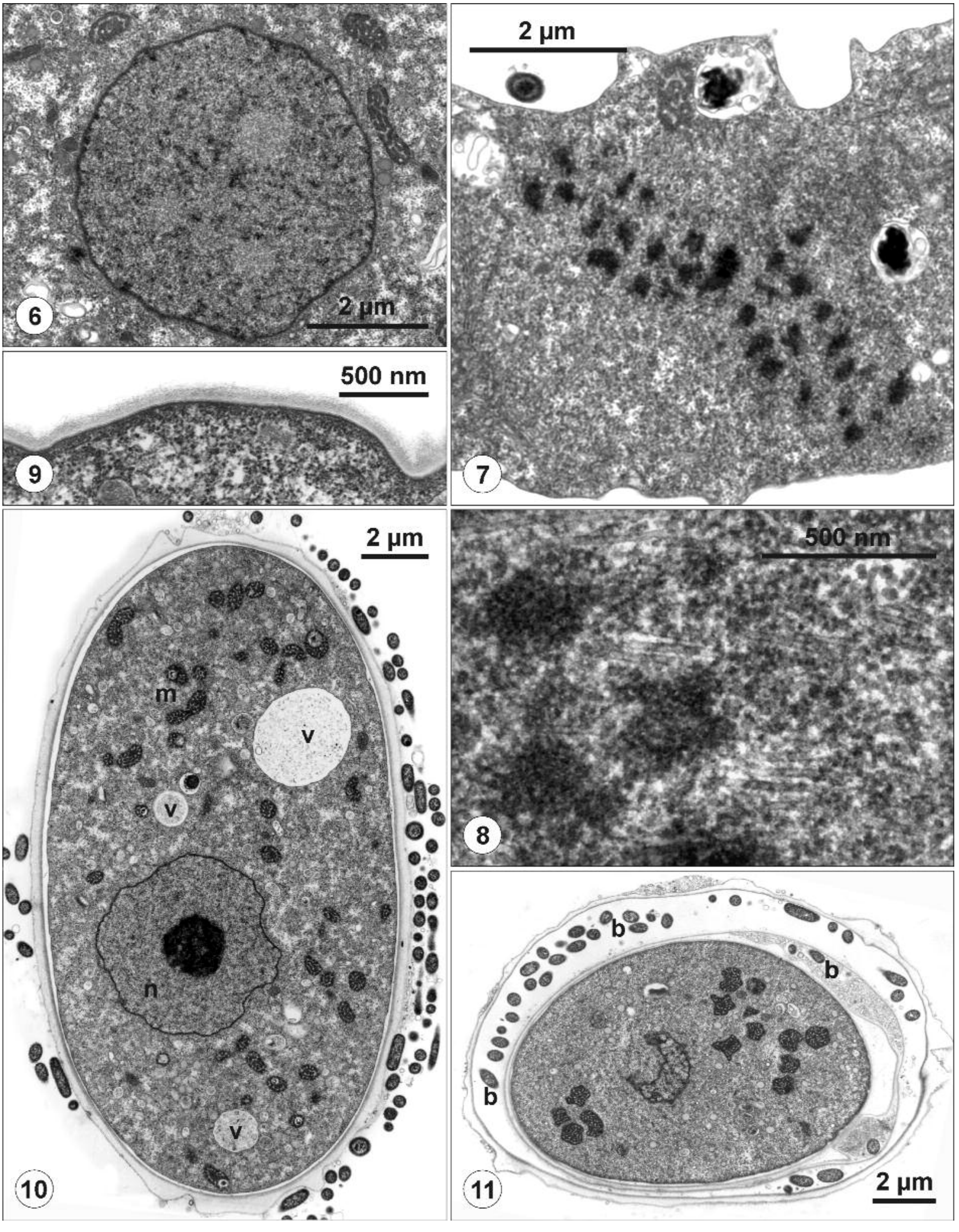

Plate 059. 4168 strain of *Grellamoeba robusta*. **Fig. 6.** Nucleus with well defined nuclear membrane. **Fig. 7.** Detail of nuclear division: disappearance of nuclear membrane and arrangement of chromatin characteristic of nuclear division metaphase. **Fig. 8.** Nuclear division in detail: microtubules and electron-dense masses of condensed chromatin. **Fig. 9.** Homogeneous material on cell surface of trophozoite transforming into cyst. **Fig. 10.** Cyst from six-week-old agar-plate culture: nucleus (n), mitochondria (m), vacuoles (v). **Fig. 11.** Thin enveloping layers splitting from cyst surface – related to clearance of bacteria (b) from cystits during formation. Ref.: Dyková et al. 2009b.

Hartmannella Alexeieff, 1912 emend. Page, 1967

Plates 060–067

Smirnov et al. (2011) have recently transferred *Hartmannella vermiformis* Page, 1967 into *Vermamoeba* Cavalier and Smirnov, 2011.

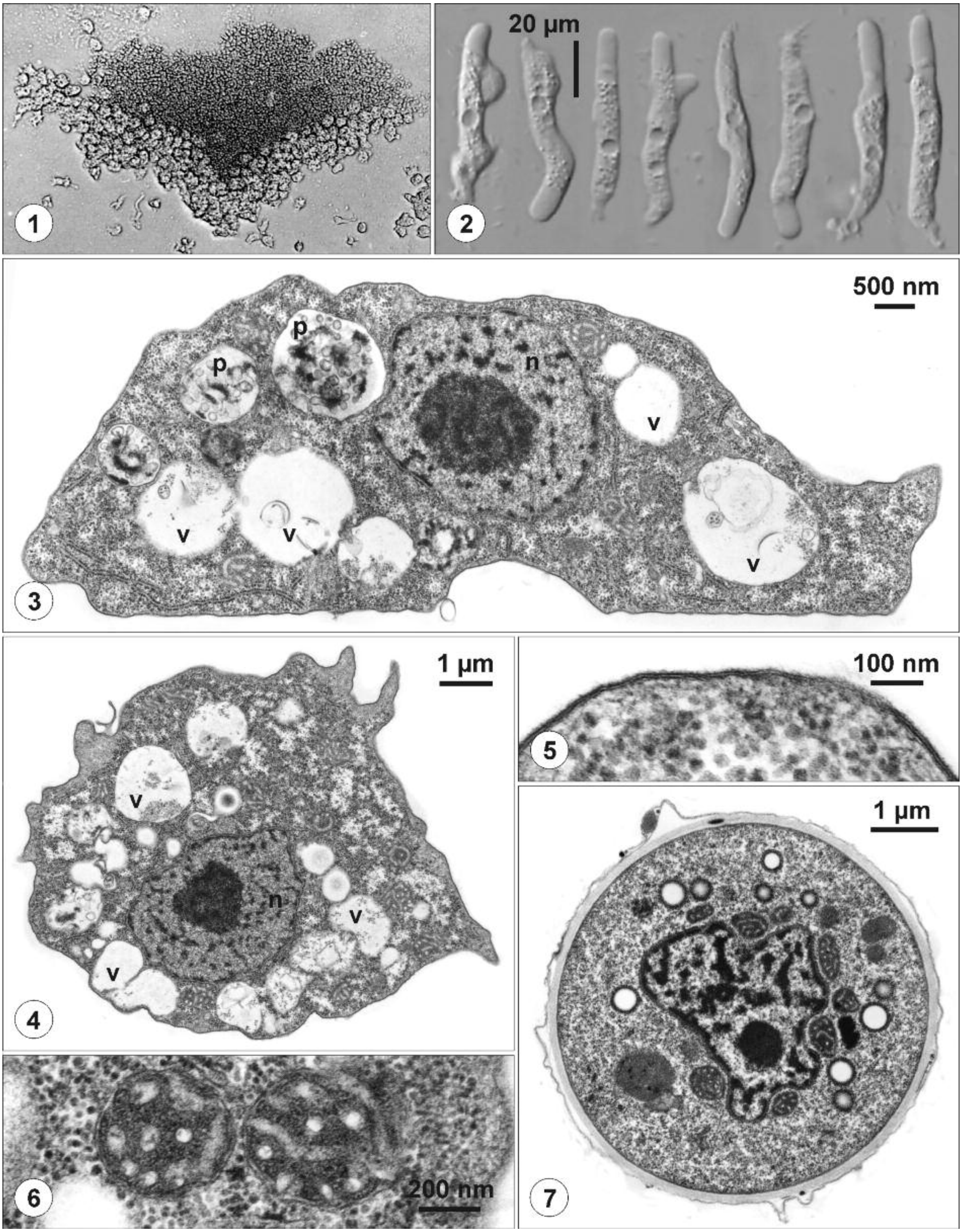

Plate 060. 4391 strain of *Hartmannella vermiformis* isolated from liver of tench, *Tinca tinca* (L.) from Lužnice River, South Bohemia, Czech Republic; subcultured on NN agar; stored in CC since 1990; GenBank Acc. No. of SSU rDNA sequence DQ084364. **Fig. 1.** Population of trophozoites growing on agar plate. **Fig. 2.**Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 3, 4.** Details of trophozoite ultrastructure: nucleus (n), phagosomes (p), vacuoles (v). **Fig. 5.** Cell surface of trophozoite with amorphous glycocalyx. **Fig. 6.** Mitochondria with tubular cristae, mostly sectioned transversely. **Fig. 7.** Mature cyst. Ref.: Dyková et al. 2005d.

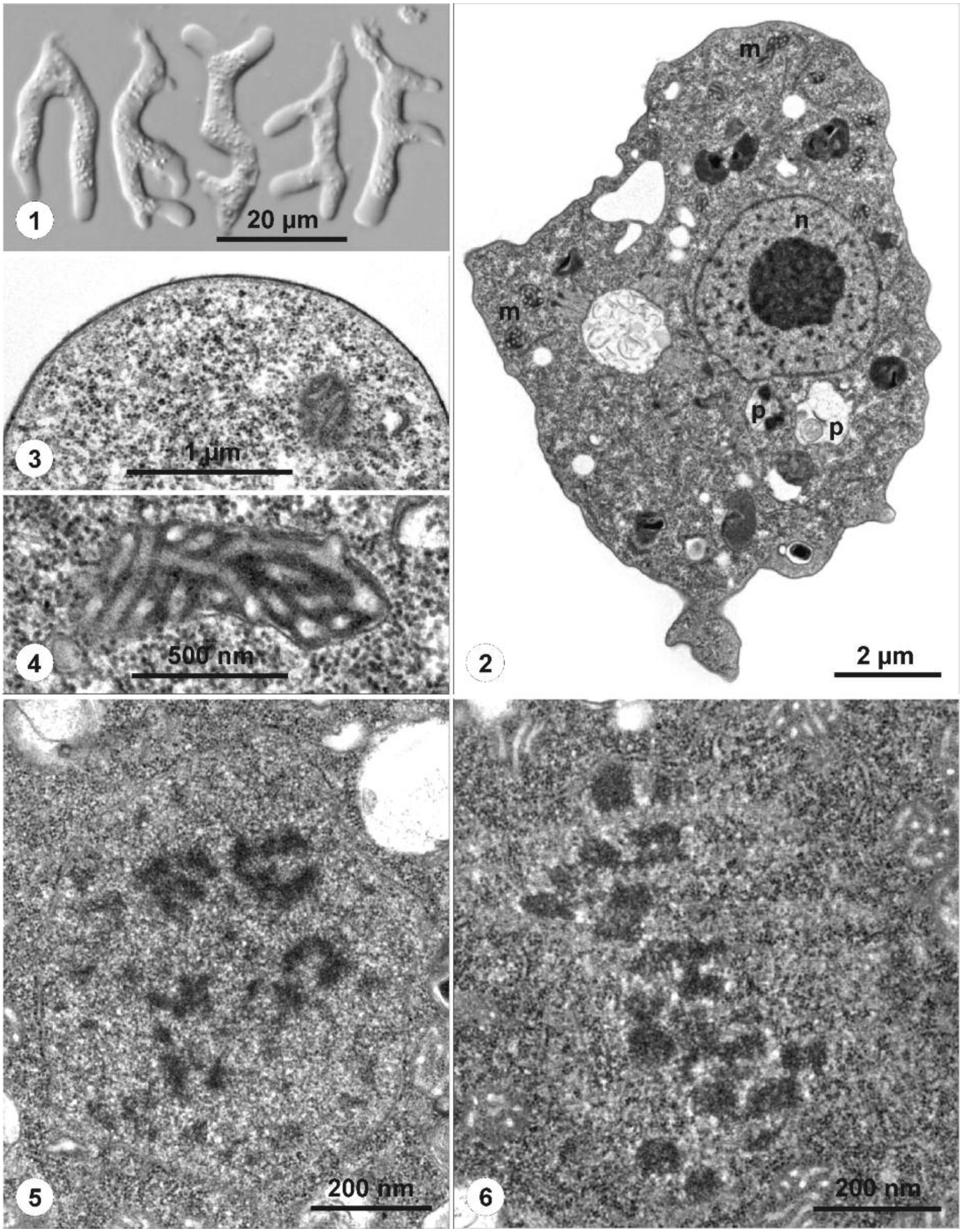

Plate 061. 4394 strain of *Hartmannella vermiformis* isolated from liver of rudd, *Scardinius erythrophthalmus* (L.) from Lužnice River, Czech Republic; subcultured on NN agar; stored in CC since 1990; GenBank Acc. No. of SSU rDNA sequence JQ271687. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Overview of fine structure of trophozoite: nucleus (n), mitochondria (m), phagosomes (p). **Fig. 3.** Cell surface of trophozoite with thin amorphous glycocalyx. **Fig. 4.** Mitochondrion with tubular cristae. **Fig 5.** Nucleus in interphase. **Fig. 6.** Open mitosis with disappearance of nuclear membrane and characteristic arrangement of chromatin granules.

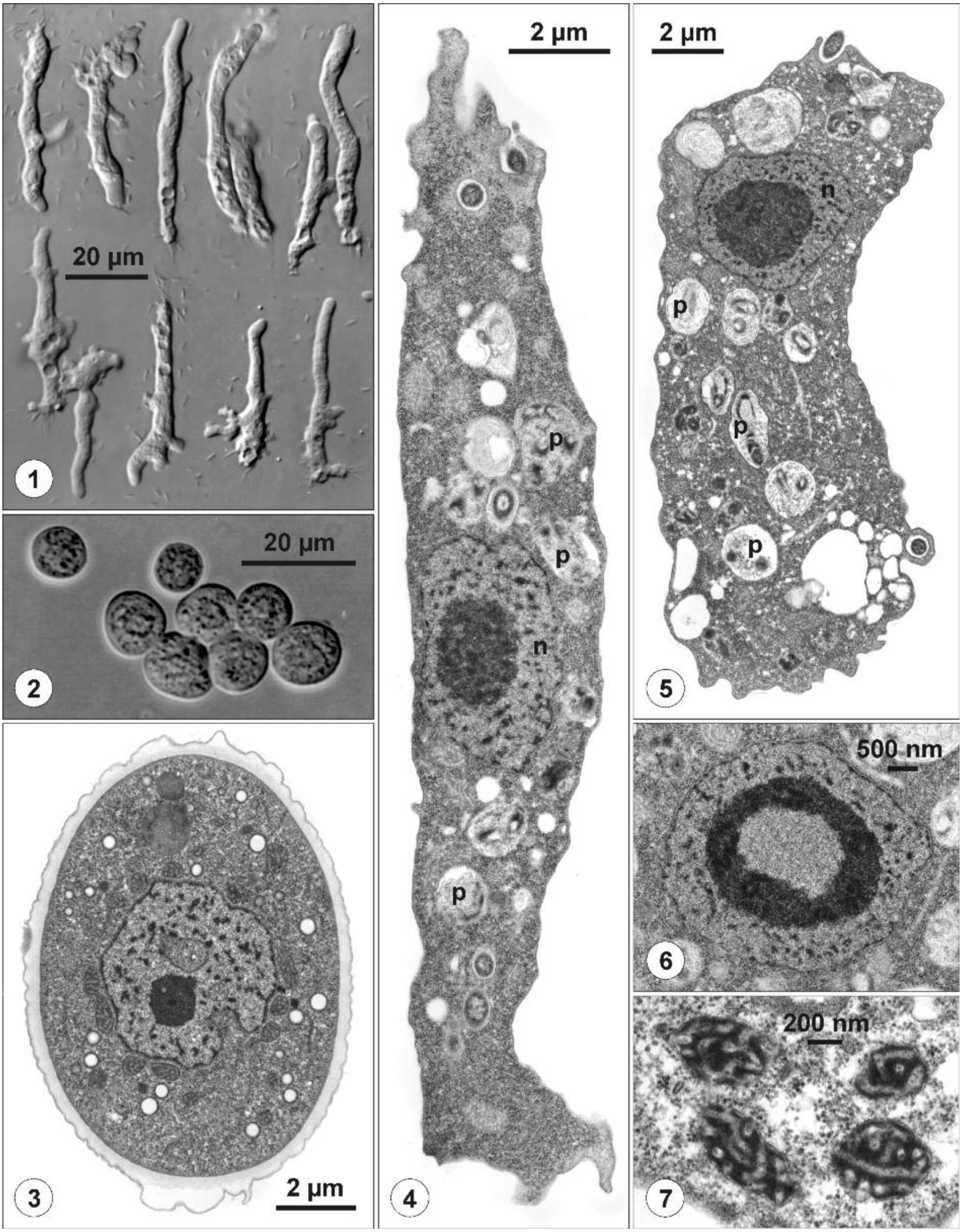

Plate 062. 4480 strain of *Hartmannella vermiformis* isolated from spleen of common carp, *Cyprinus carpio* L. from experimental facility of Institute of Fisheries and Aquaculture, Vodňany, South Bohemia, Czech Republic; subcultured on NN agar; stored in CC since 1990; GenBank Acc. No. of SSU rDNA sequence DQ084363. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Cysts in the beginning of their formation. **Fig. 3.** Mature cyst. **Figs. 4, 5.** Overview of fine structure of trophozoites: nuclei (n), numerous phagosomes in cytoplasm (p). **Fig. 6.** Detail of vesicular nucleus. **Fig. 7.** Mitochondria with tubular cristae. Ref.: Dyková et al. 2005d.

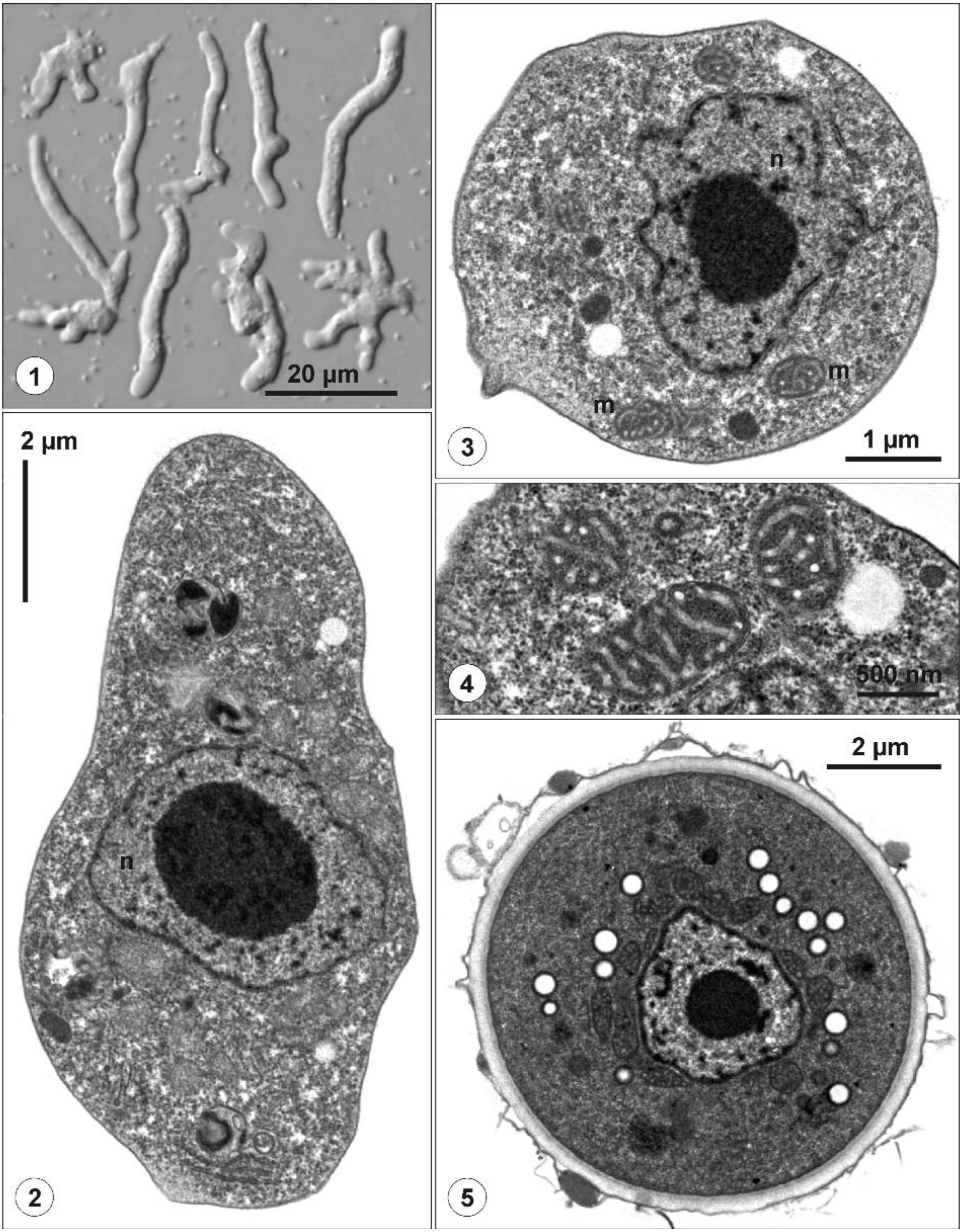

Plate 063. ECH26 strain of *Hartmannella vermiformis* isolated from haemolymph of purple sea urchin, *Sphaerechinus granularis* (Lamarck) collected in Adriatic Sea, off Brač Island, Croatia; subcultured on MY75S agar; stored in CC since 2005; GenBank Acc. No. of SSU rDNA sequence JQ271688. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m). **Fig. 4.** Detail of ultrastructure of mitochondria with tubular cristae. **Fig. 5.** Mature cyst.

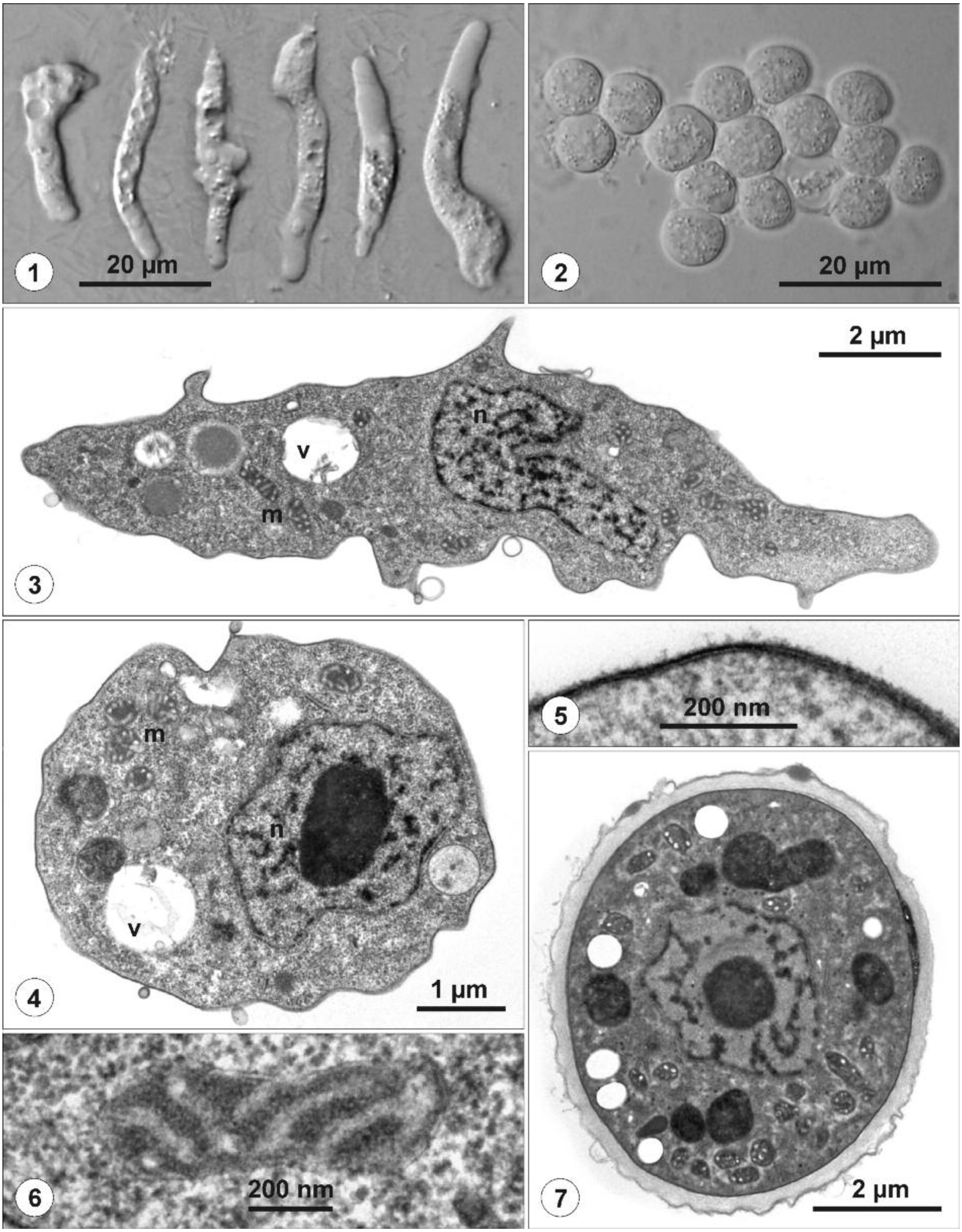

Plate 064. GERF1 strain of *Hartmannella vermiformis* isolated from gills of rainbow trout, *Oncorhynchus mykiss* (Walbaum) farmed in Baden Würtenberg, Germany; subcultured on NN agar; stored in CC since 2008; GenBank Acc. No. of SSU rDNA sequence HM363626. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Cysts in the beginning of their formation. **Figs. 3, 4.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), vacuoles in cytoplasm (v). **Fig. 5.** Cell surface of trophozoite with thin amorphous glycocalyx. **Fig. 6.** Detail of ultrastructure of mitochondrion with tubular cristae. **Fig. 7.** Mature cyst. Ref.: Dyková et al. 2010b.

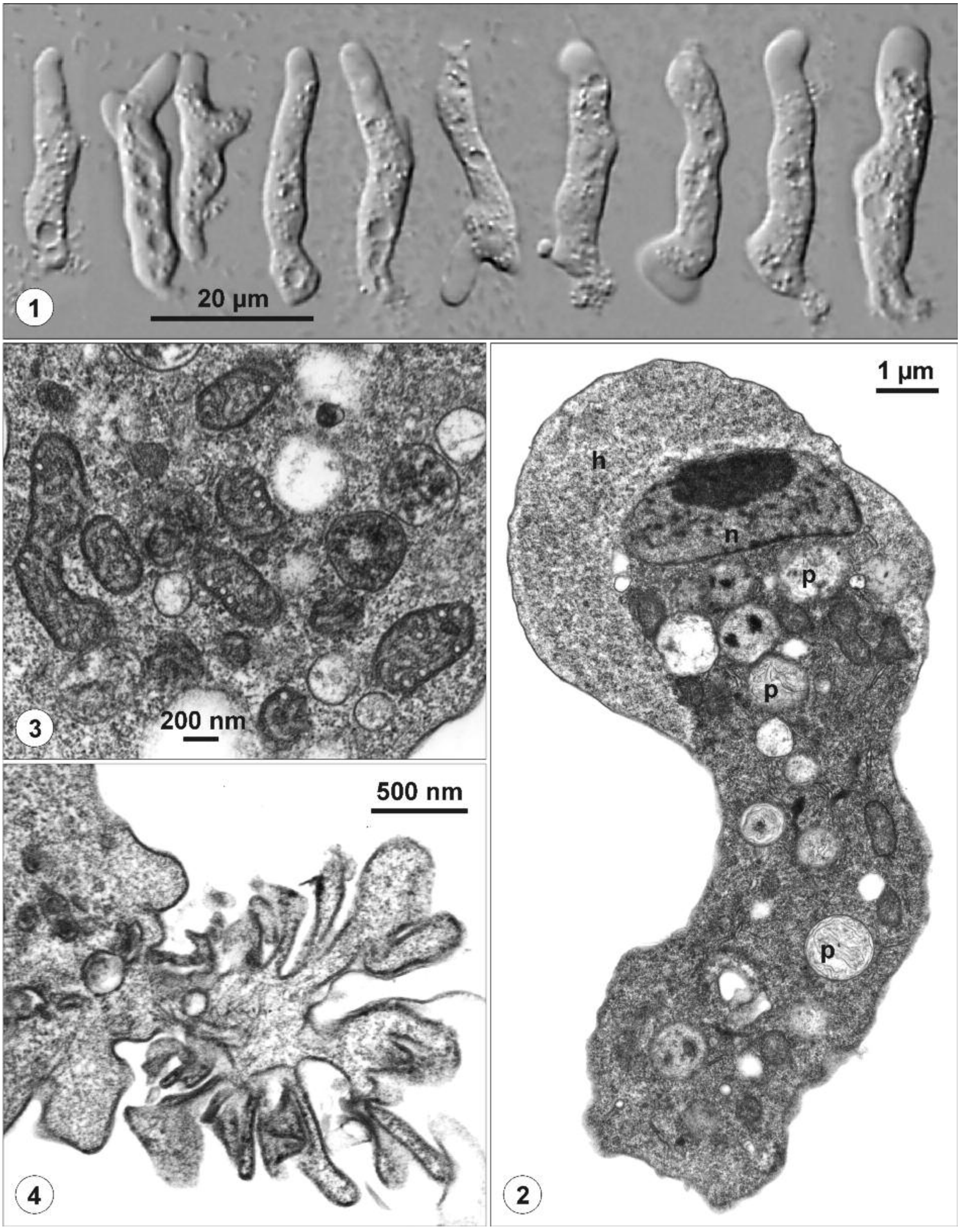

Plate 065. PFG strain of *Hartmannella vermiformis* isolated from gills of European perch, *Perca fluviatilis* L. from Dubný pond, South Bohemia, Czech Republic; subcultured on NN agar; stored in CC since 2000; GenBank Acc. No. of SSU rDNA sequence DQ084366. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Overview of fine structure of locomotive form of trophozoite: nucleus (n), phagosomes with remnants of phagocytised material (p), hyaloplasm in anterior part of trophozoite. **Fig. 3.** Mitochondria with tubular cristae. **Fig. 4.** Posterior part of trophozoite with uroidal filaments. Ref.: Dyková et al. 2005d.

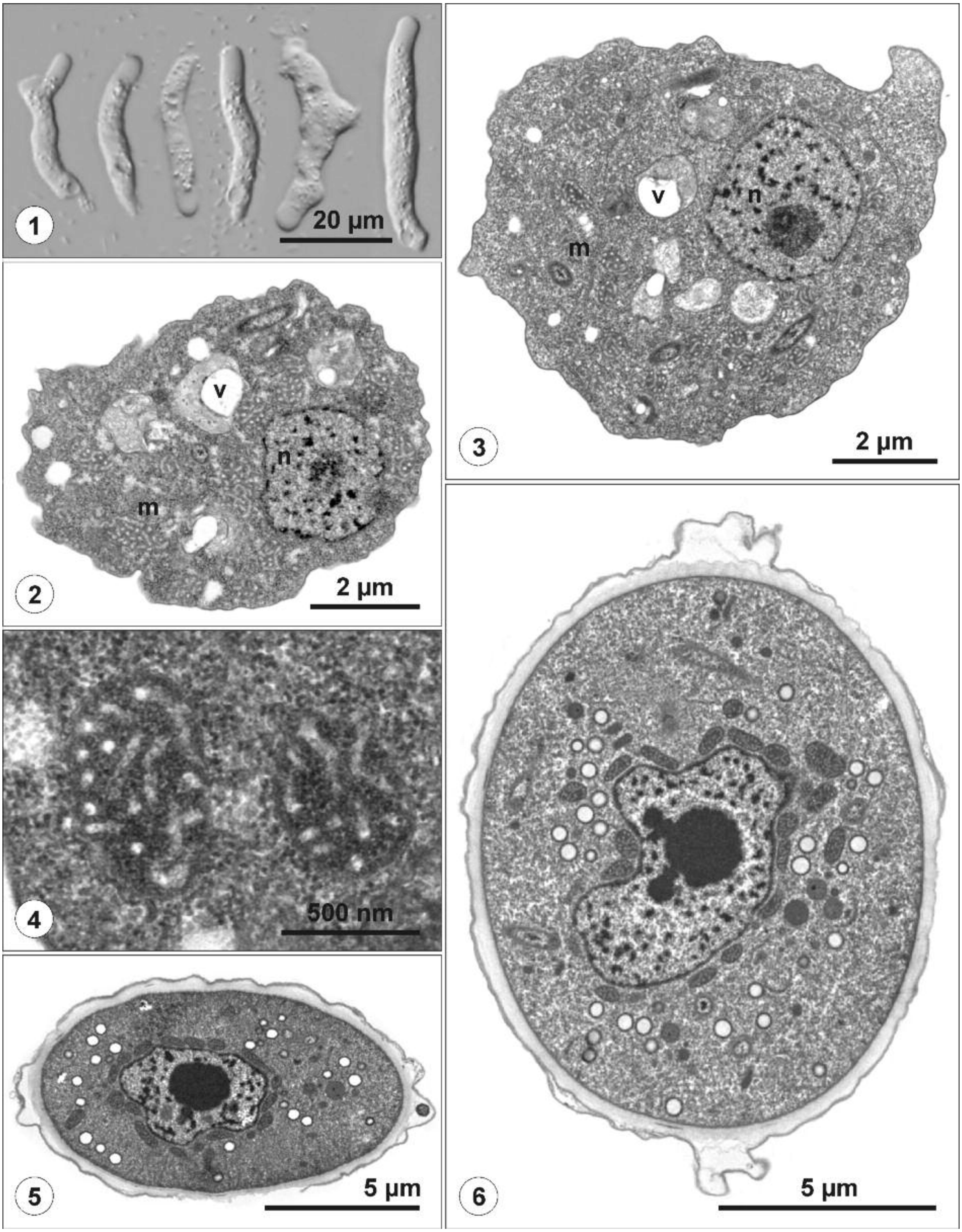

Plate 066. PM11 strain of *Hartmannella vermiformis* isolated from freshwater bryozoan, *Pectinatella magnifica* (Leidy) collected in Nové jezero water body, South Bohemia, Czech Republic; subcultured on NN agar; stored in CC since 2005; GenBank Acc. No. of SSU rDNA sequence JQ271689. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), vacuoles in cytoplasm (v). **Fig. 4.** Details of ultrastructure of mitochondria with tubular cristae. **Figs. 5, 6.** Mature cysts of typical shape: nucleus (n), nucleolus (nn).

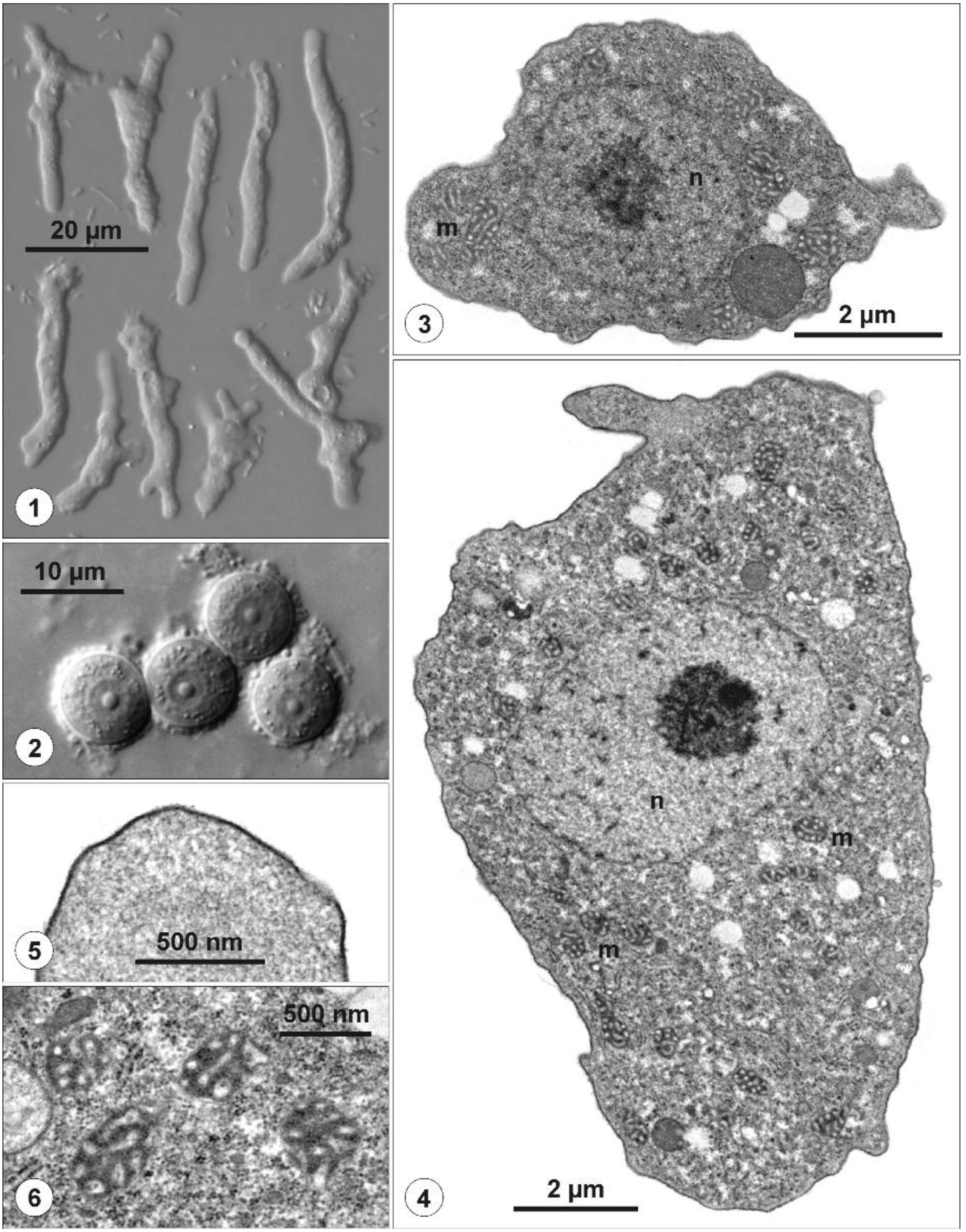

Plate 067. TN102 strain of *Hartmannella vermiformis* isolated from kidney of Nile tilapia, *Oreochromis niloticus* (L.) collected in farm supplied with water from cooling system of electric power station, South Bohemia, Czech Republic; subcultured on NN agar; stored in CC since 1994; GenBank Acc. No. of SSU rDNA sequence DQ084365. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Mature cysts. **Figs. 3, 4.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m). **Fig. 5.** Cell surface of trophozoite. **Fig. 6.** Mitochondria with tubular cristae. Ref.: Dyková et al. 1997, 2005d.

Lingulamoeba Sawyer, 1975

Plates 068–069

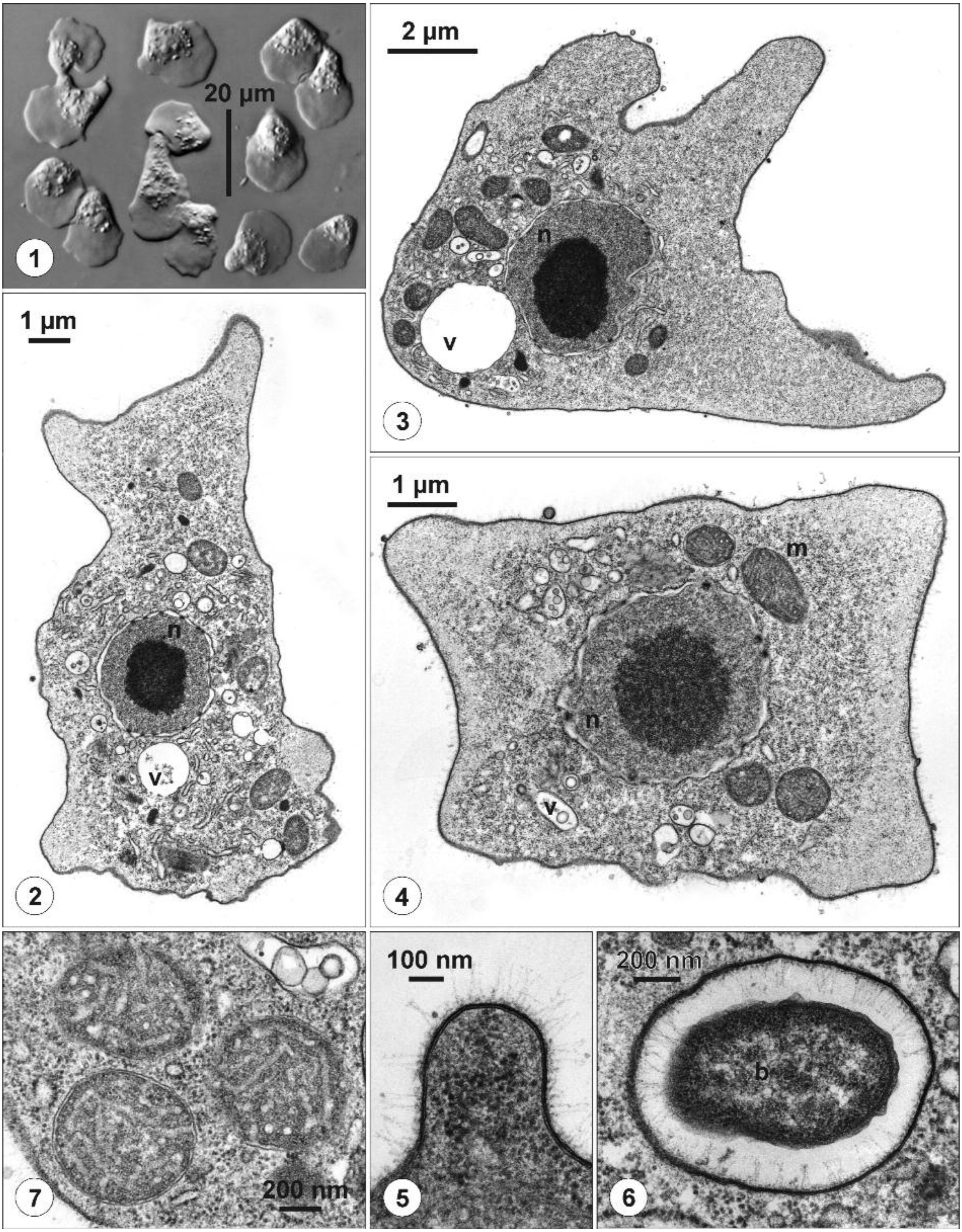

Plate 068. RSH1 strain of *Lingulamoeba* sp. isolated from gills of Atlantic salmon, *Salmo salar* L. used for AGD experiments in School of Aquaculture, Launceston, Tasmania, Australia; cultured on MY75S agar; stored in CC since 2003; GenBank Acc. No. of SSU rDNA sequence JQ271690. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC), scale bar = 20 µm. **Figs. 2, 3, 4.** Overview of fine structure of trophozoites: nuclei (n), food vacuoles (v), mitochondria (m). **Fig. 5.** Cell surface of trophozoite with glycocalyx differentiated in glycostyles. **Fig. 6.** Cell surface as seen around phagocytised bacterium (b). **Fig. 7.** Mitochondria with tubular branching cristae.

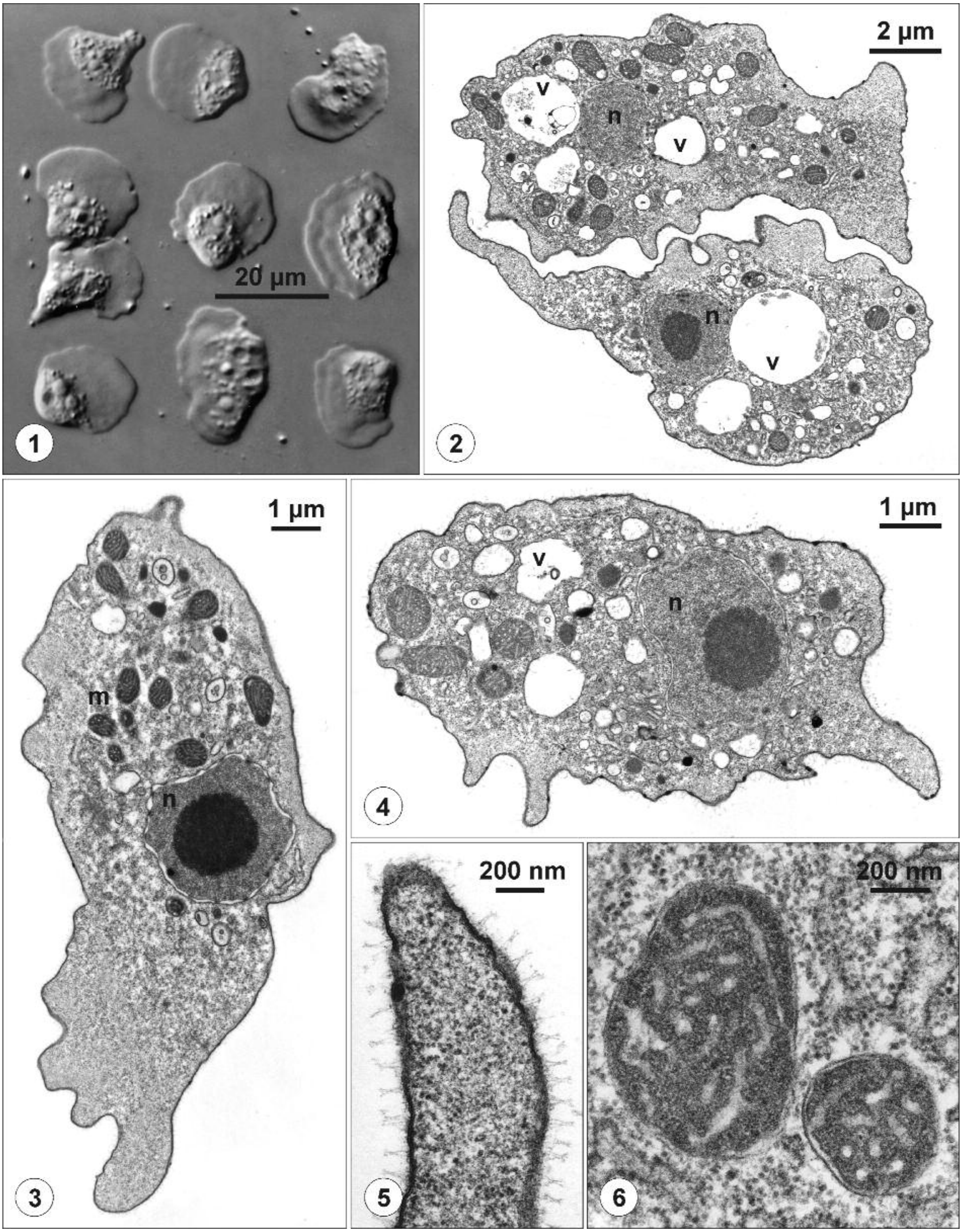

Plate 069. RSL strain of *Lingulamoeba* sp. isolated from gills of Atlantic salmon, *Salmo salar* L. used for AGD experiments in School of Aquaculture, Launceston, Tasmania, Australia; cultured on MY75S agar; stored in CC since 2003; GenBank Acc. No. of SSU rDNA sequence AY929908. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3, 4.** Overview of of fine structure of trophozoites: nuclei (n), food vacuoles (v), mitochondria (m). **Fig. 5.** Cell surface of trophozoite with glycocalyx differentiated in glycostyles. **Fig. 6.** Mitochondria with tubular branching cristae. Ref.: Dyková et al. 2005a.

Mayorella Schaeffer, 1926

Plate 070

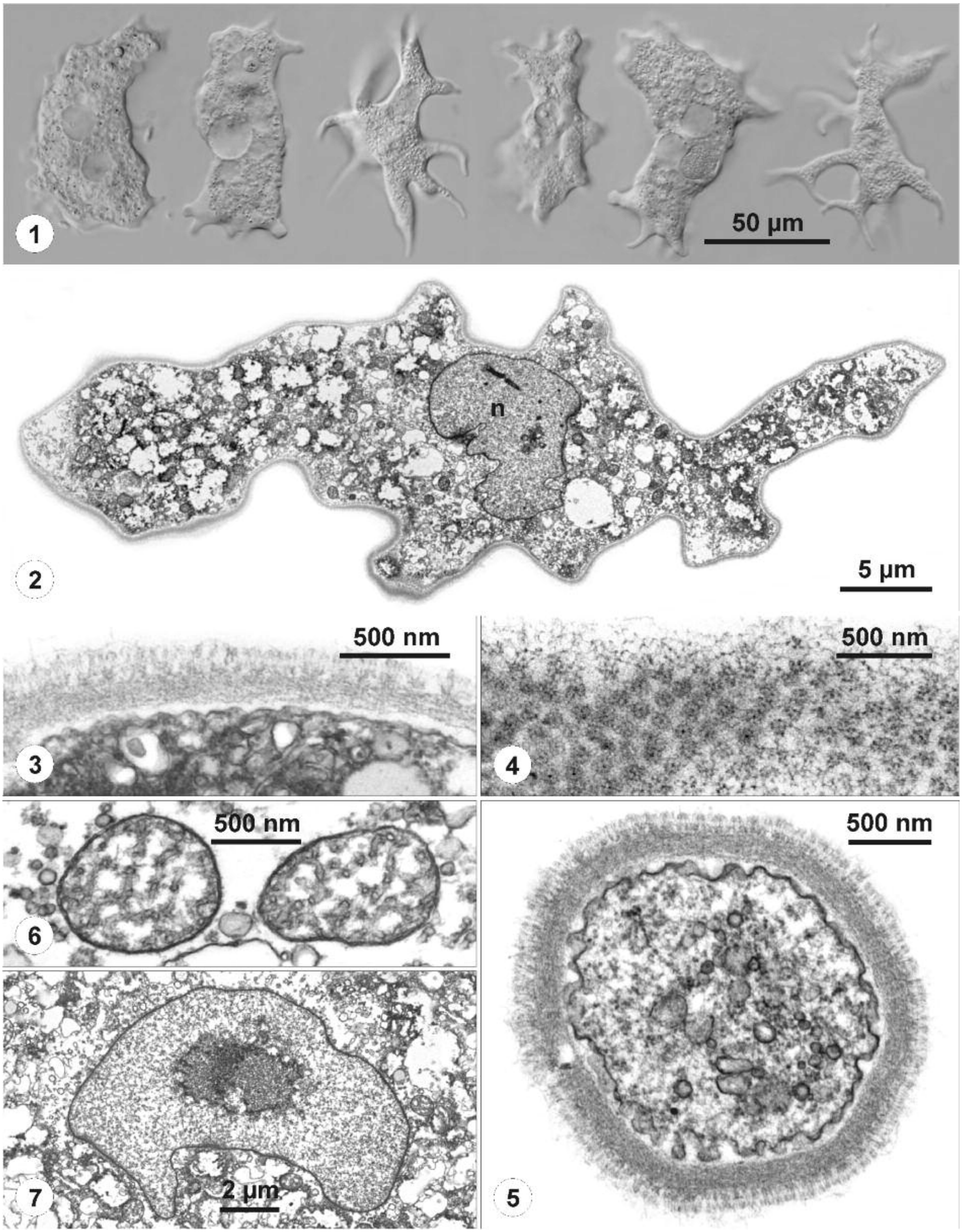

Plate 070. CCAP1547/8 strain of *Mayorella gemmifera* obtained from UKNCC; cultured on monolayers of FHM cells; stored in CC from 2006 to 2011; DNA samples stored under FLA DB Nos. 128, 167, 495, 716; GenBank Acc. No. of SSU rDNA sequence EU719190. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Overview of fine structure of trophozoite: surface coat, lobed nucleus (n), mitochondria, numerous vesicles and vacuoles. **Fig. 3.** Detail of fibrillar cell coat. **Fig. 4.** Prismatic bases of perpendicularly oriented fibrils of cell coat. **Fig. 5.** Transverse section through subpseudopodium. **Fig. 6.** Mitochondria with tubular branching cristae. **Fig. 7.** Nucleus with dense nucleolus. Ref.: Dyková et al. 2008e.

Naegleria Alexeieff, 1912 emend. Calkins, 1913

Plates 071–103

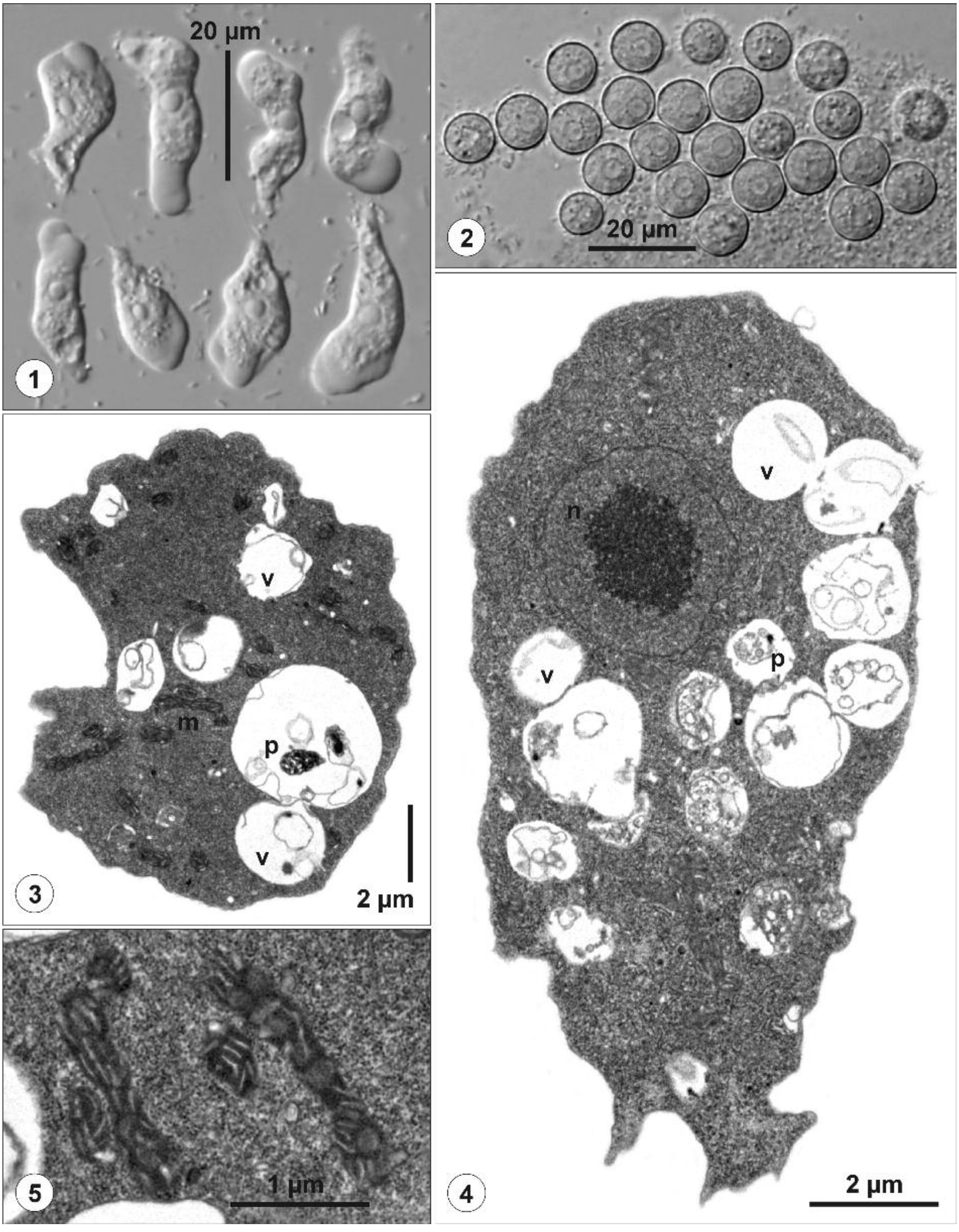

Plate 071. 2HZ strain of *Naegleria clarki* isolated from gills of bitterling, *Rhodeus sericeus* (Pallas) from natural pool in Lanžhot, South Moravia, Czech Republic; cultured on NN agar; stored in CC since 1998; GenBank Acc. No. of SSU rDNA sequence JQ271691, ITS JQ271646. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Mature cysts seen in Nomarski DIC. **Figs. 3, 4.** Overview of fine structure of trophozoites with electron-dense cytoplasm: nucleus (n), mitochondria (m), phagosomes (p), vacuoles (v). **Fig. 5.** Detail of ultrastructure of mitochondria with discoid cristae.

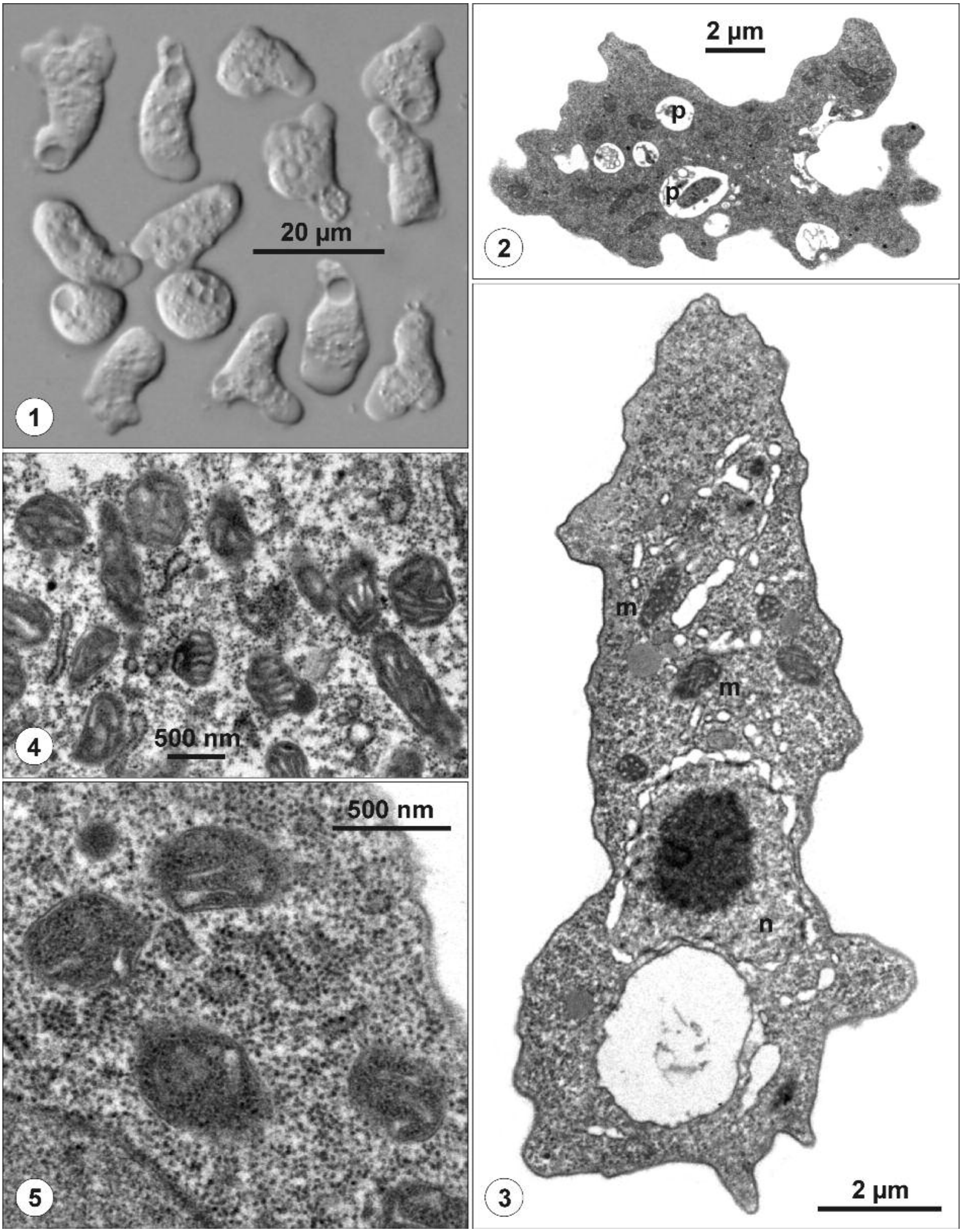

Plate 072. 3HZ strain of *Naegleria clarki* isolated from brain of bitterling, *Rhodeus sericeus* (Pallas) from natural pool in Lanžhot, South Moravia, Czech Republic; cultured on NN agar; stored in CC since 1998; GenBank Acc. No. of SSU rDNA sequence JQ271692, ITS JQ271647. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nucleus (n), mitochondria (m), phagosomes (p). **Figs. 4, 5.** Mitochondria with discoid cristae.

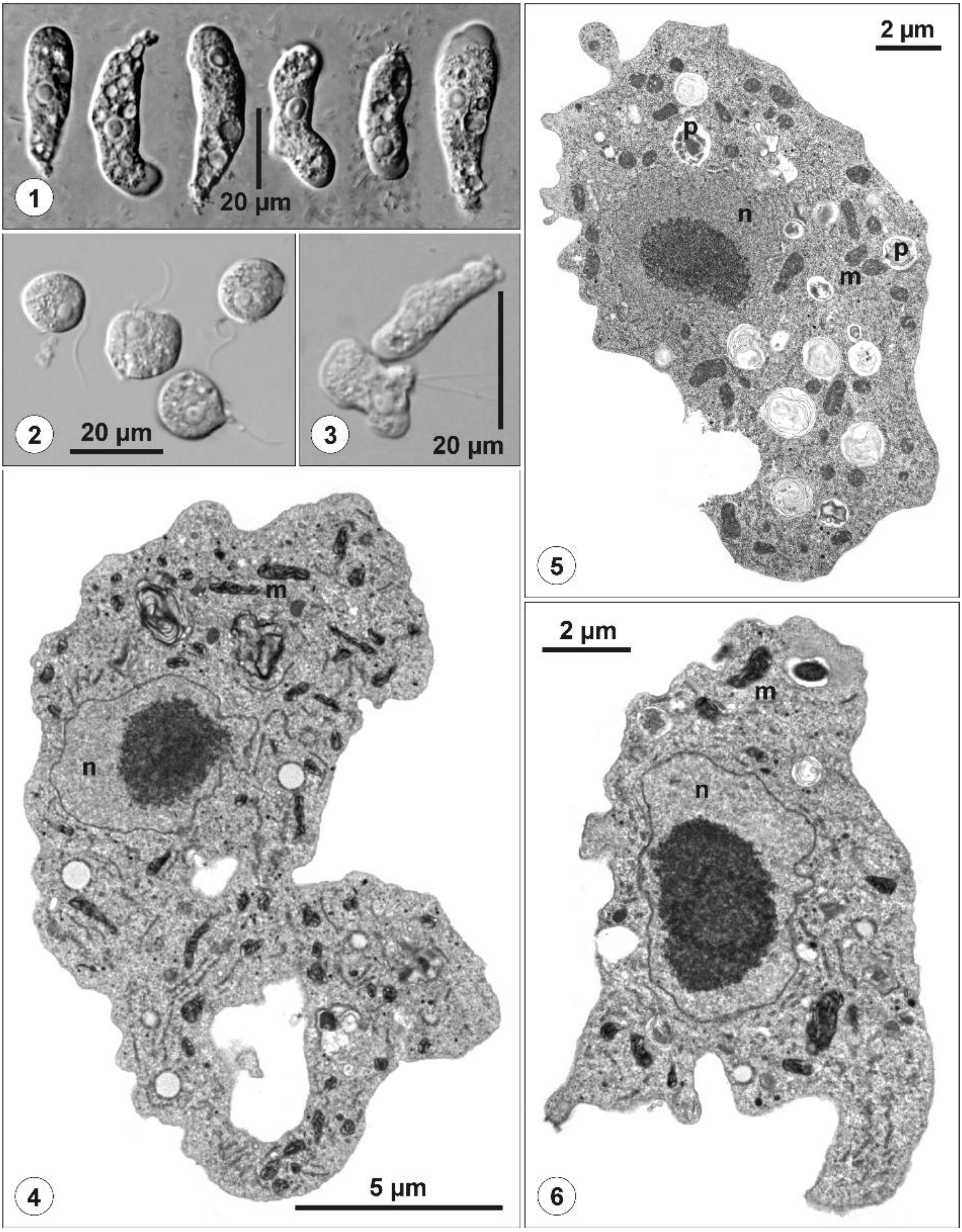

Plate 073. 4542 strain of *Naegleria* sp. isolated from liver of European perch, *Perca fluviatilis* L. from Černovický potok brook, South Bohemia, Czech Republic; cultured on NN agar; stored in CC since 1991; GenBank Acc. No. of SSU rDNA sequence JQ271693, ITS JQ271648. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Flagellated stages as documented in hanging drop preparations (Nomarski DIC). **Figs. 4, 5, 6.** Overview of trophozoite ultrastructure: nuclei (n), electron-dense mitochondria (m), phagosomes (p). (Cont.)

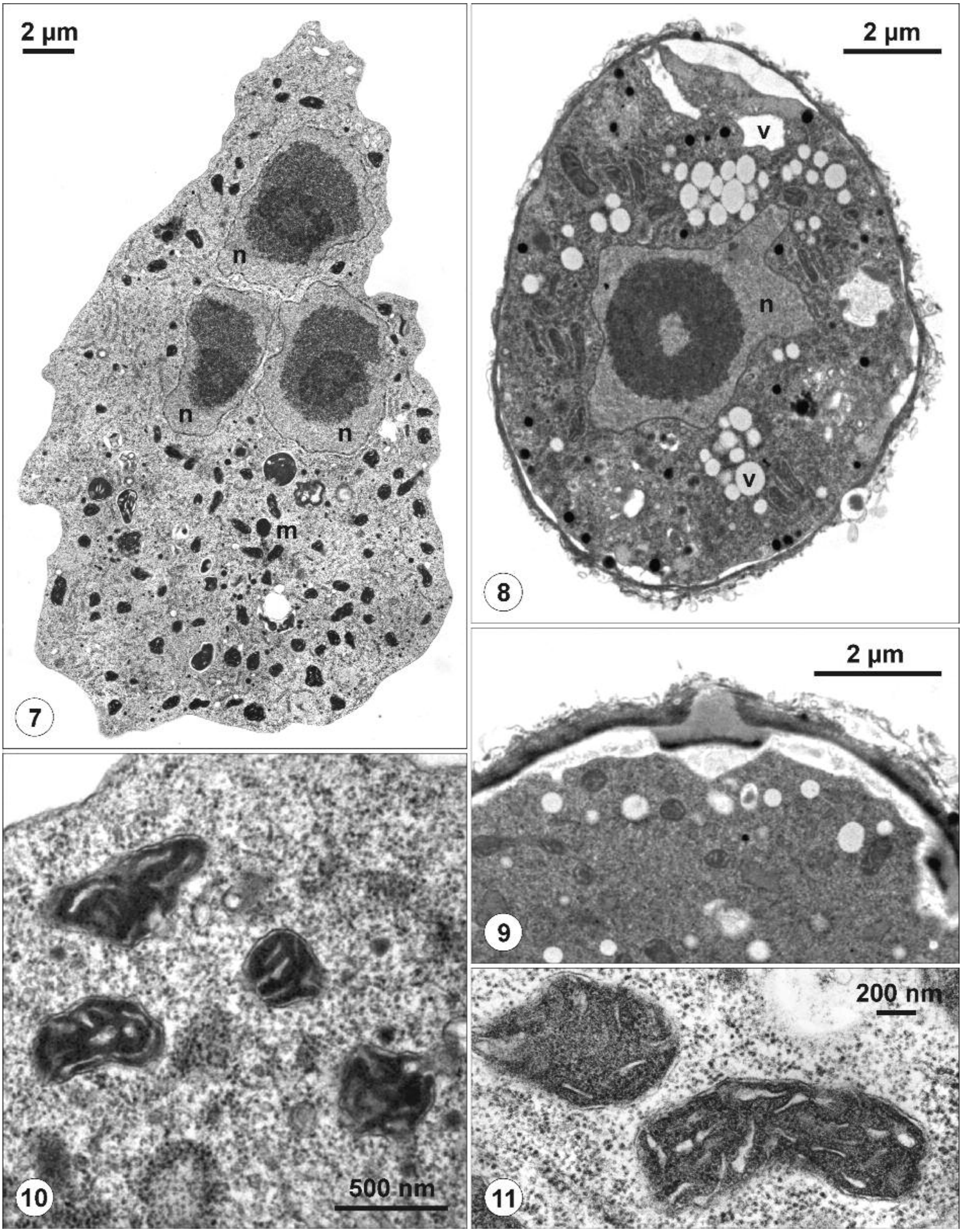

Plate 074. 4542 strain of *Naegleria* sp. **Fig. 7.** Overview of fine structure of trophozoite with three nuclei (n) and numerous electron--dense mitochondria (m). **Fig. 8.** Early stage of cyst formation with thin wall, lobose nucleus (n) and numerous vacuoles (v). **Fig. 9.** Detail from ultrathin section of mature cyst wall with typical plugged pore. **Figs. 10, 11.** Mitochondria with discoid cristae.

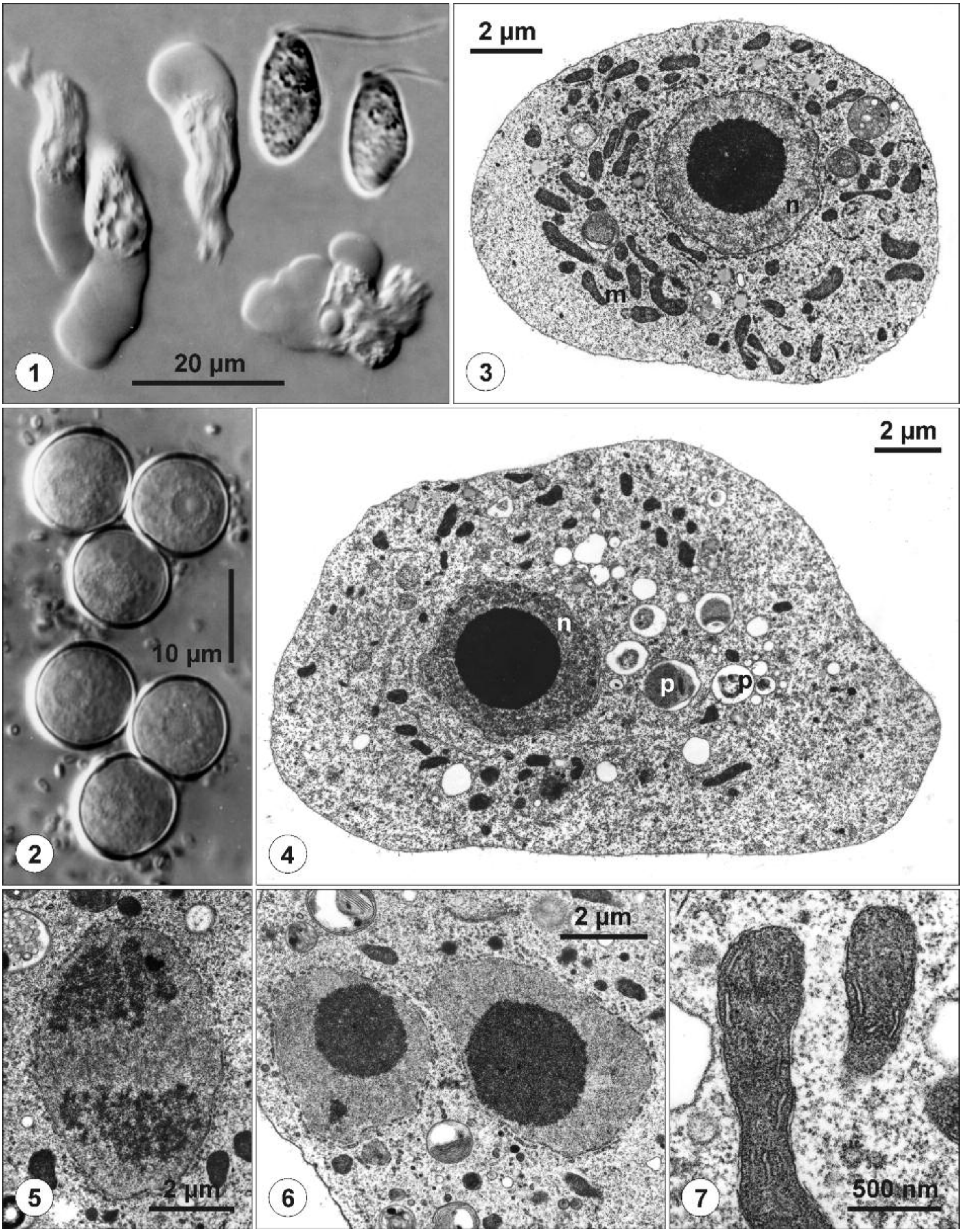

Plate 075. 4564 strain of *Naegleria clarki* isolated from kidney of European perch, *Perca fluviatilis* L. from Černovický potok brook, South Bohemia, Czech Republic; cultured on NN agar; stored in CC since 1991; GenBank Acc. No. of SSU rDNA sequence AF338419, ITS DQ768739. **Fig. 1.** Trophozoites and flagellated stages as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Mature cysts as seen in Nomarski DIC. **Figs. 3, 4.** Overview of fine structure of trophozoites: nuclei (n), densely stained mitochondria (m), phagosomes (p). **Fig. 5.** Detail of nuclear division. **Fig. 6.** Divided nuclei. **Fig. 7.** Mitochondria with discoid cristae. Ref.: Dyková et al. 2001a, 2006.

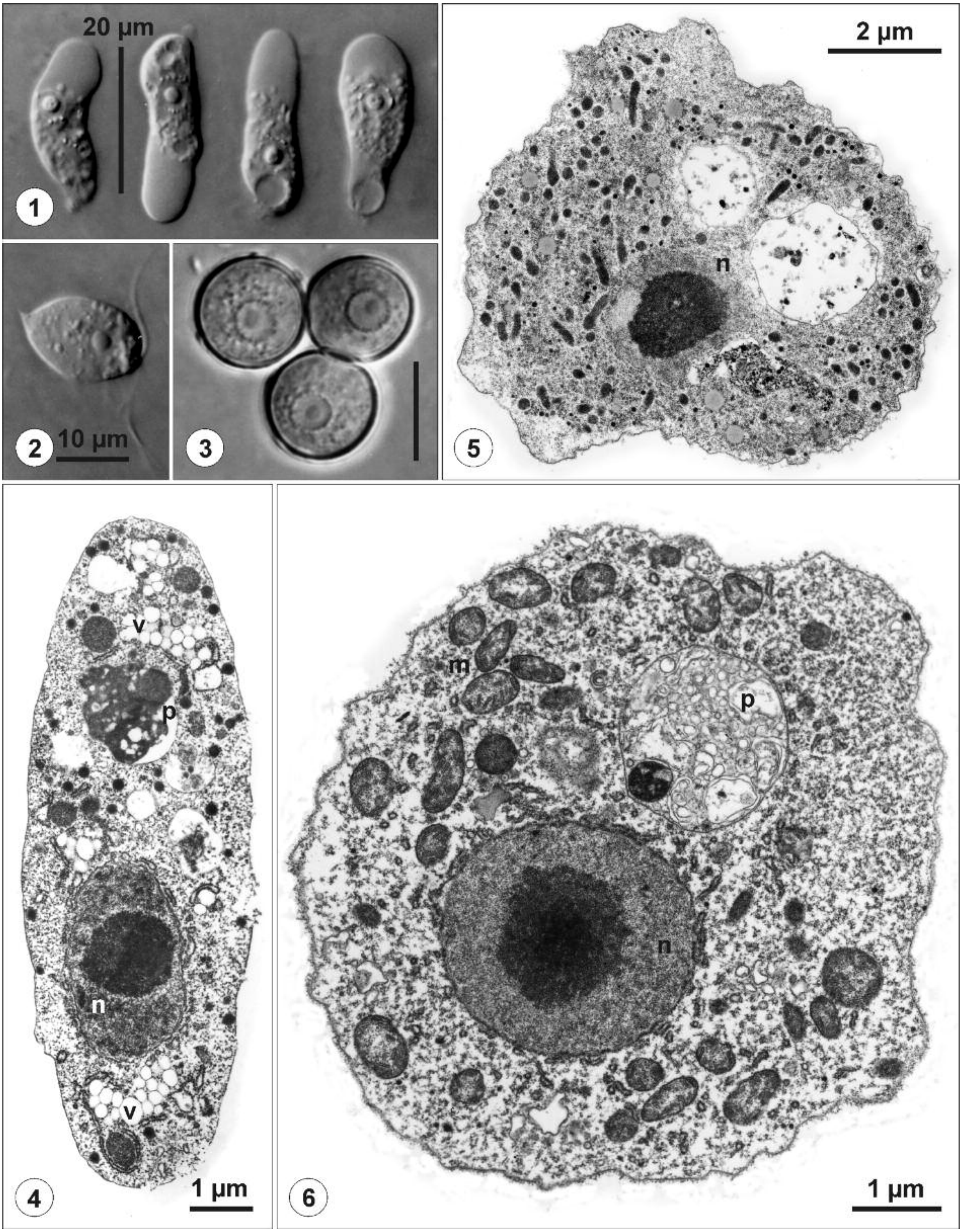

Plate 076. 4709 strain of *Naegleria clarki* isolated from spleen of European perch, *Perca fluviatilis* L. from Černovický potok brook, South Bohemia, Czech Republic; cultured on NN agar; stored in CC since 1991; GenBank Acc. No. of SSU rDNA sequence AF338420, ITS DQ768730. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Flagellated stage. **Fig. 3.** Mature cysts, scale bar = 10 µm. **Figs. 4, 5, 6.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosomes (p), vacuoles in cytoplasm (v). Ref.: Dyková et al. 2001a, 2006.

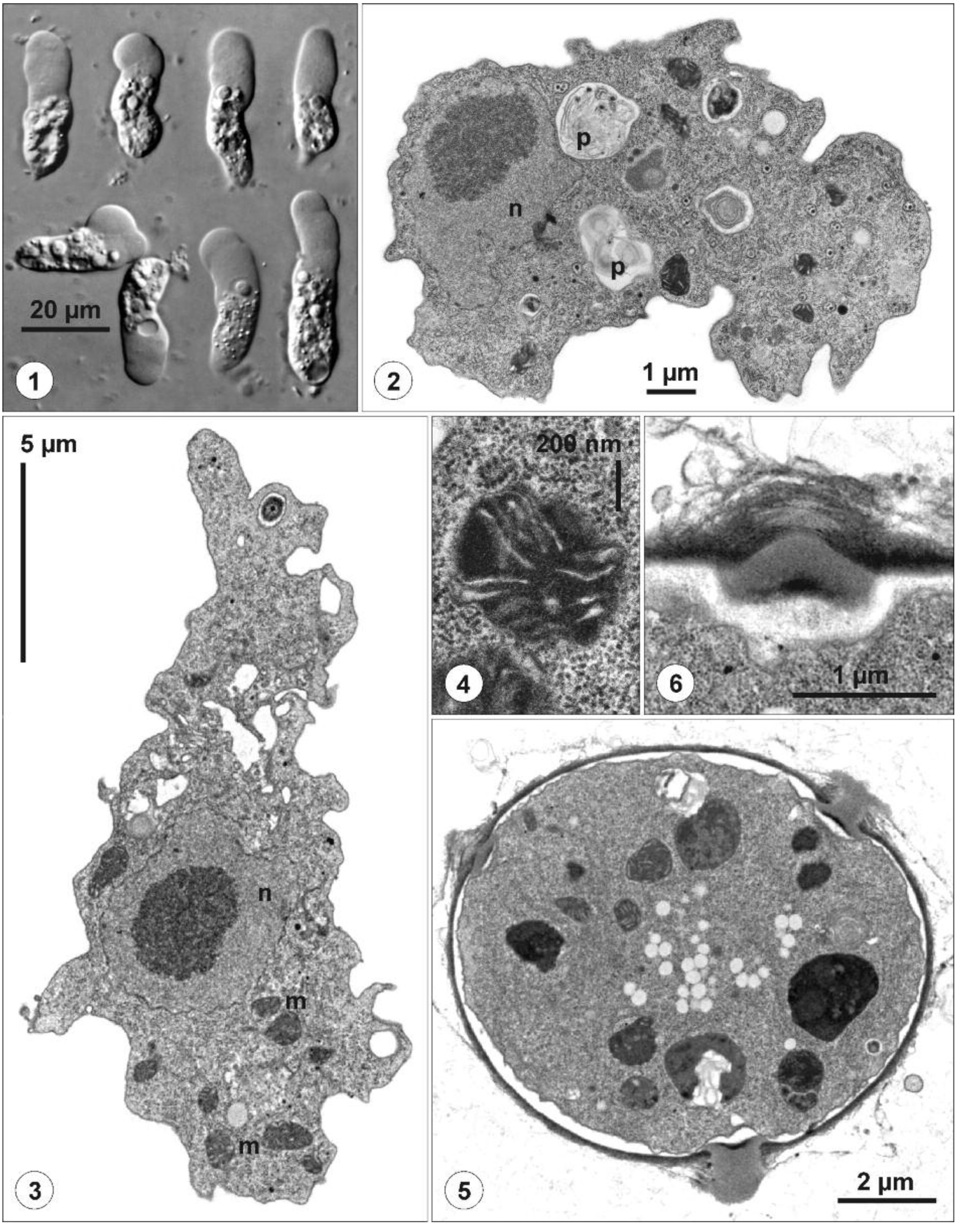

Plate 077. 4796 strain of *Naegleria fultoni* isolated from roach, *Rutilus rutilus* (L.) from Lužnice River, South Bohemia, Czech Republic; cultured on NN agar; stored in CC since 1991; GenBank Acc. No. of SSU rDNA sequence DQ768719, ITS DQ768742. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosomes (p). **Fig. 4.** Detail of ultrastructure of mitochondrion. **Fig. 5.** Early stage of cyst formation, with three pores in plane of ultrathin section. **Fig. 6.** Plugged pore in cyst wall. Ref.: Dyková et al. 2006.

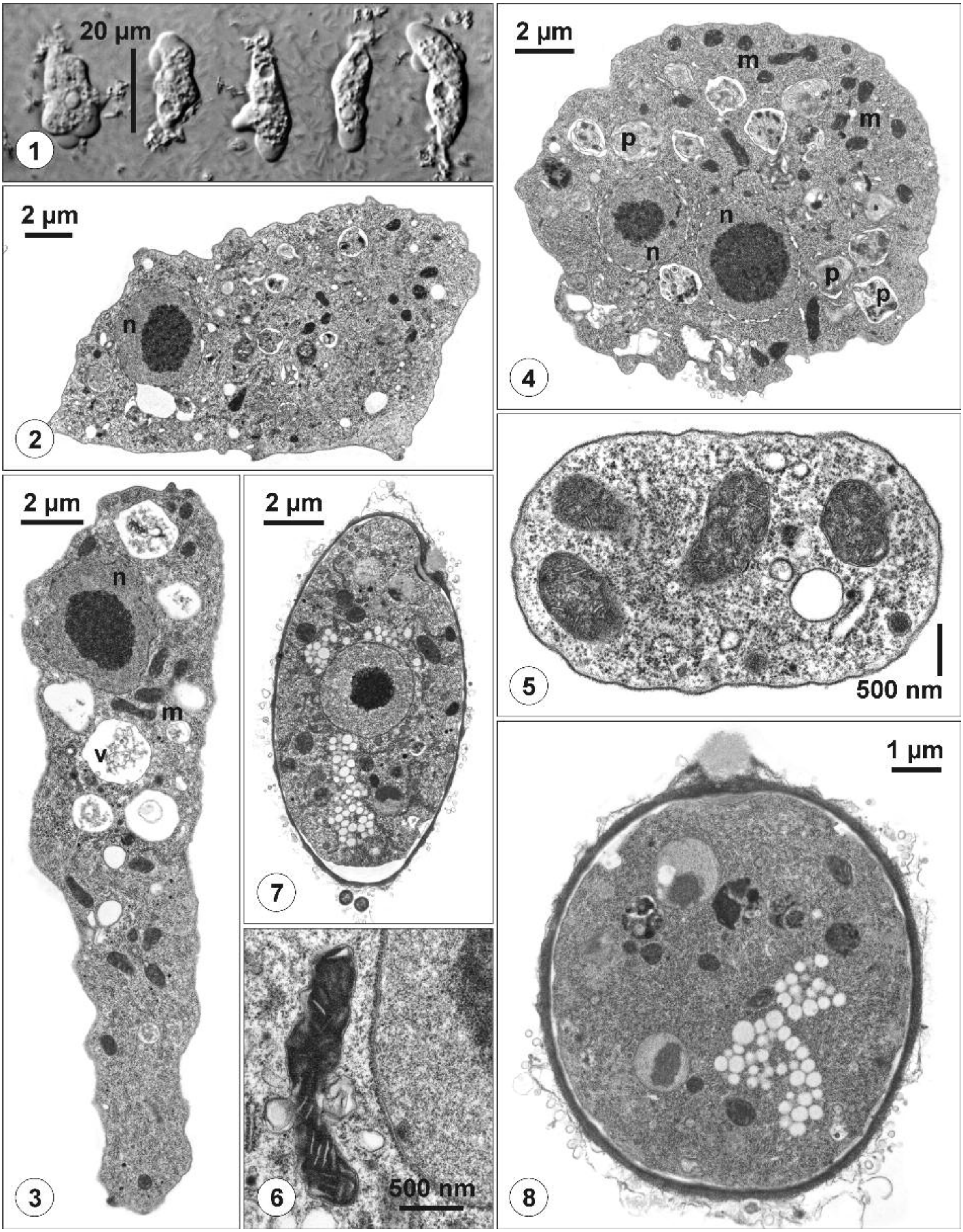

Plate 078. 4830 strain of *Naegleria pagei* isolated from kidney of brown trout, *Salmo trutta fario* L. from Liběchovka brook, South Bohemia, Czech Republic; cultured on NN agar; stored in CC since 1991; GenBank Acc. No. of SSU rDNA sequence DQ768721, ITS DQ768736. **Fig. 1.** Trophozoites overloaded with bacteria as seen in hanging drop preparations (Nomarski DIC), scale bar = 20 µm. **Figs. 2, 3, 4.** Overview of fine structure of trophozoites: nuclei (n), electron-dense mitochondria (m), phagosomes (p), vacuoles (v). **Fig. 5.** Mitochondria with discoid cristae. **Fig. 6.** Detail of mitochondrion. **Figs. 7, 8.** Early and advanced cyst with plugged pores in their walls. Ref.: Dyková et al. 2006.

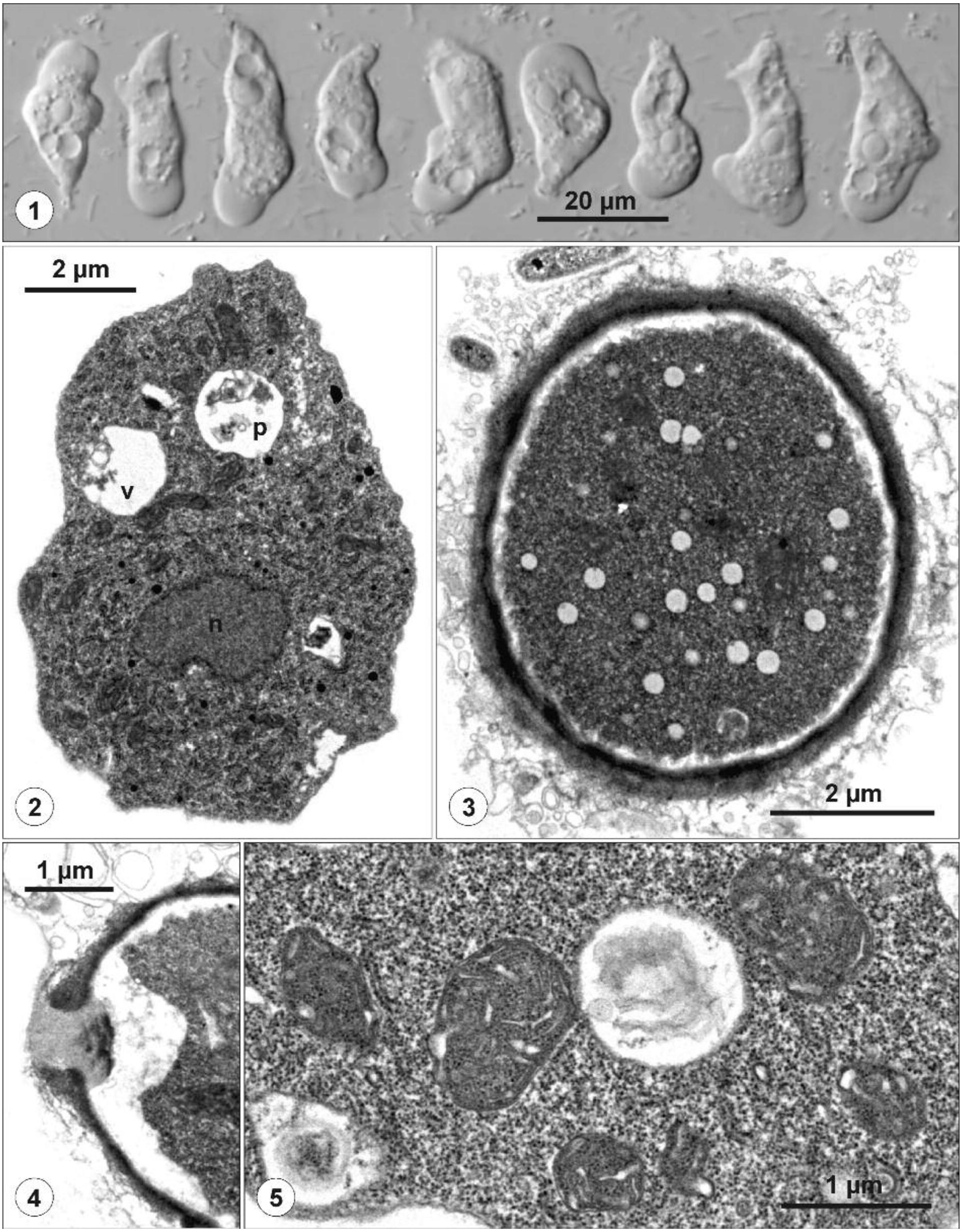

Plate 079. 4HZ strain of *Naegleria clarki* isolated from gills of bitterling, *Rhodeus sericeus* (Pallas) from natural pool in Lanžhot, South Moravia, Czech Republic; cultured on NN agar; stored in CC since 1998; GenBank Acc. No. of SSU rDNA sequence JQ271694, ITS JQ271649. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Overview of fine structure of trophozoite: nucleus (n), phagosomes (p), vacuole (v). **Fig. 3.** Early phase of cyst formation. **Fig. 4.** Pluged pore in cyst wall. **Fig. 5.** Mitochondria with discoid cristae.

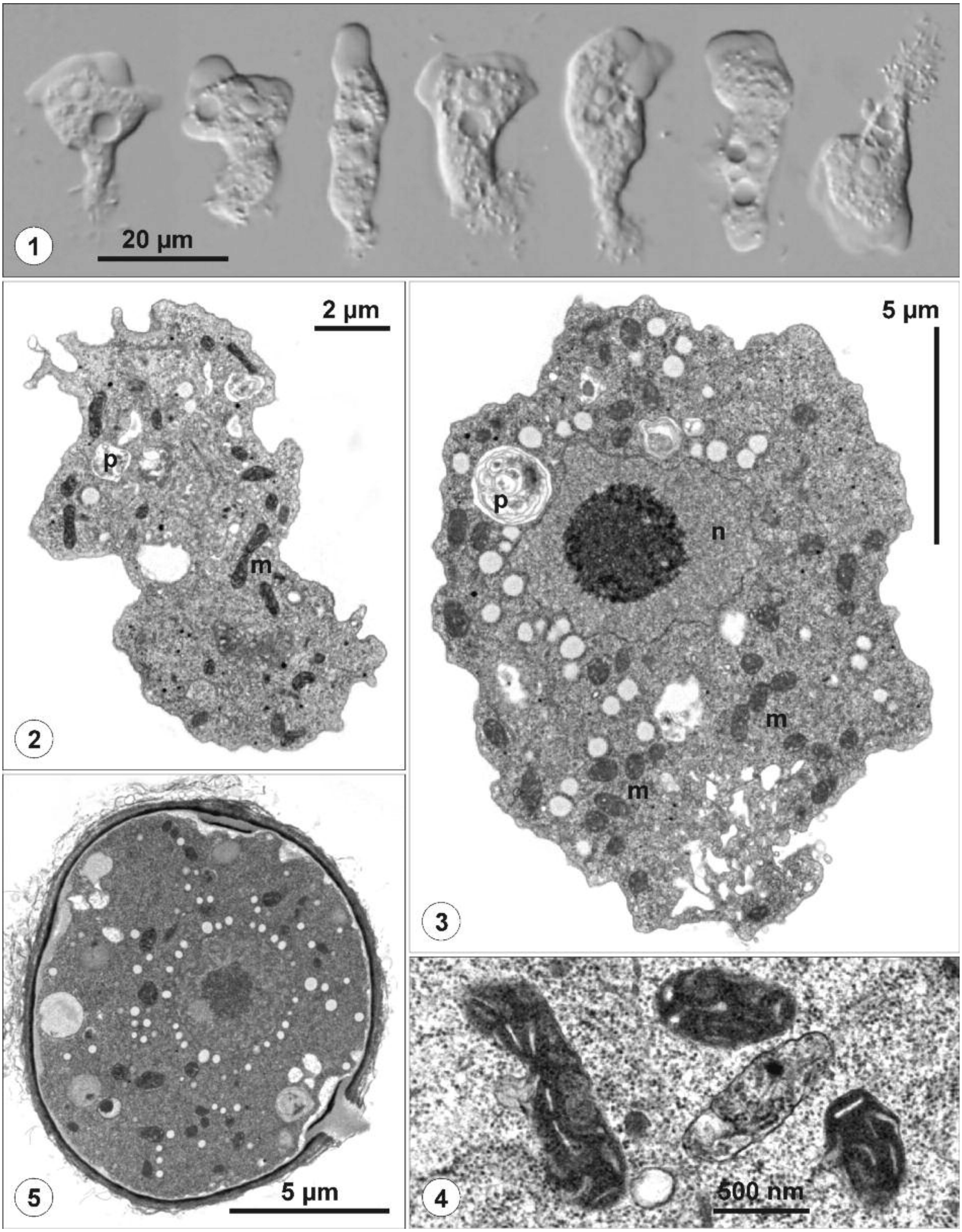

Plate 080. 62K4 strain of *Naegleria* sp. isolated from gills of common carp, *Cyprinus carpio* L. from Spolský pond, South Bohemia, Czech Republic; cultured on NN agar; stored in CC since 1991; GenBank Acc. No. of SSU rDNA sequence JQ271695, ITS JQ271650. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nucleus (n), mitochondria (m), phagosomes (p). **Fig. 4.** Detail of ultrastructure of mitochondria with discoid cristae. **Fig. 5.** Mature cyst with typical pluged pore in its wall.

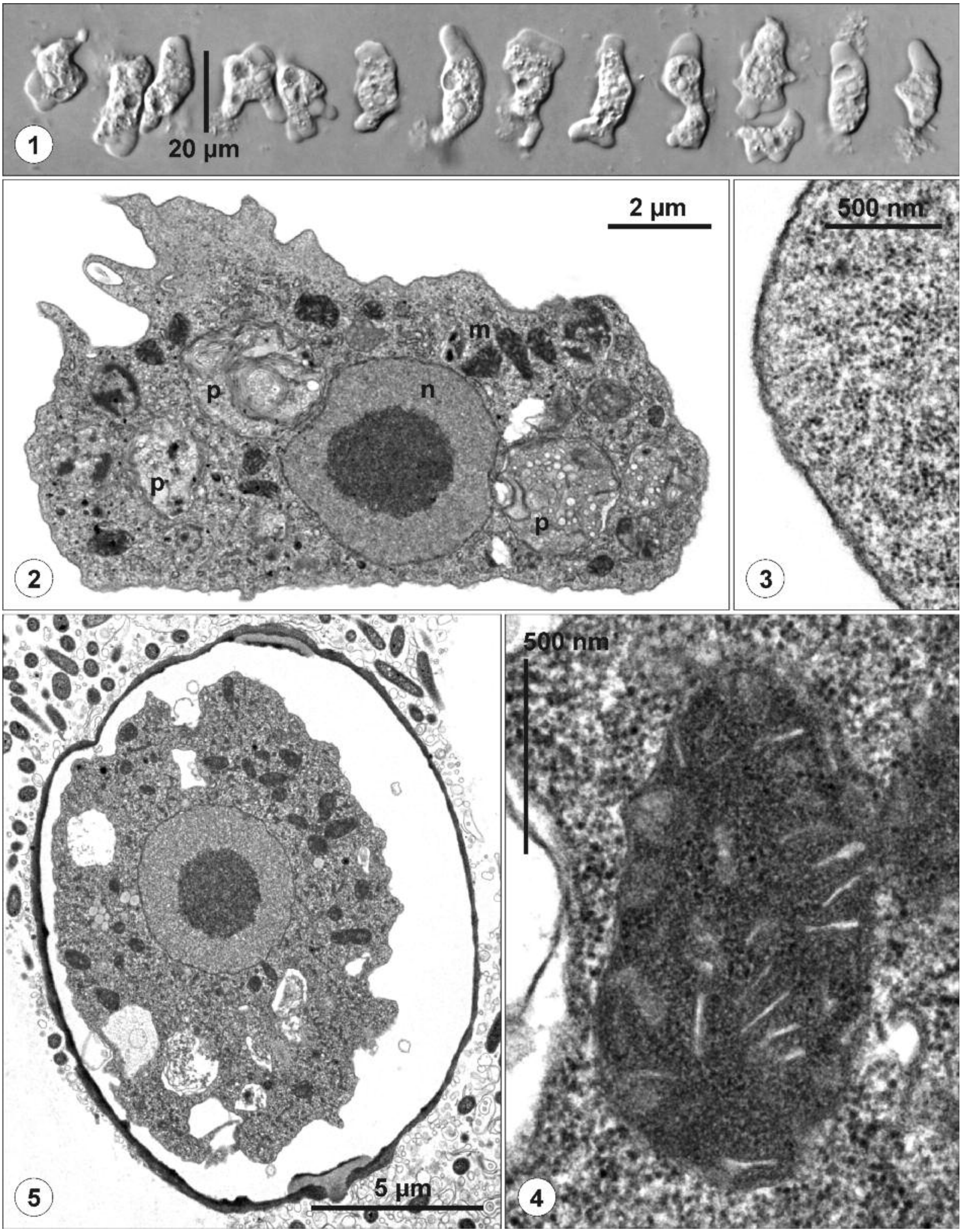

Plate 081. 6HFKL strain of *Naegleria clarki* isolated from kidney of stinging catfish, *Heteropneustes fossilis* (Bloch) imported from Singapore to pet shop in Czech Republic; cultured on NN agar; stored in CC since 2004; GenBank Acc. No. of SSU rDNA sequence JQ271696, ITS JQ271651. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Overview of fine structure of trophozoite: nucleus (n), mitochondria (m), phagosomes with remnants of food (p). **Fig. 3.** Cell surface. **Fig. 4.** Detail of ultrastructure of mitochondrion with discoid cristae. **Fig. 5.** Early stage of cyst formation.

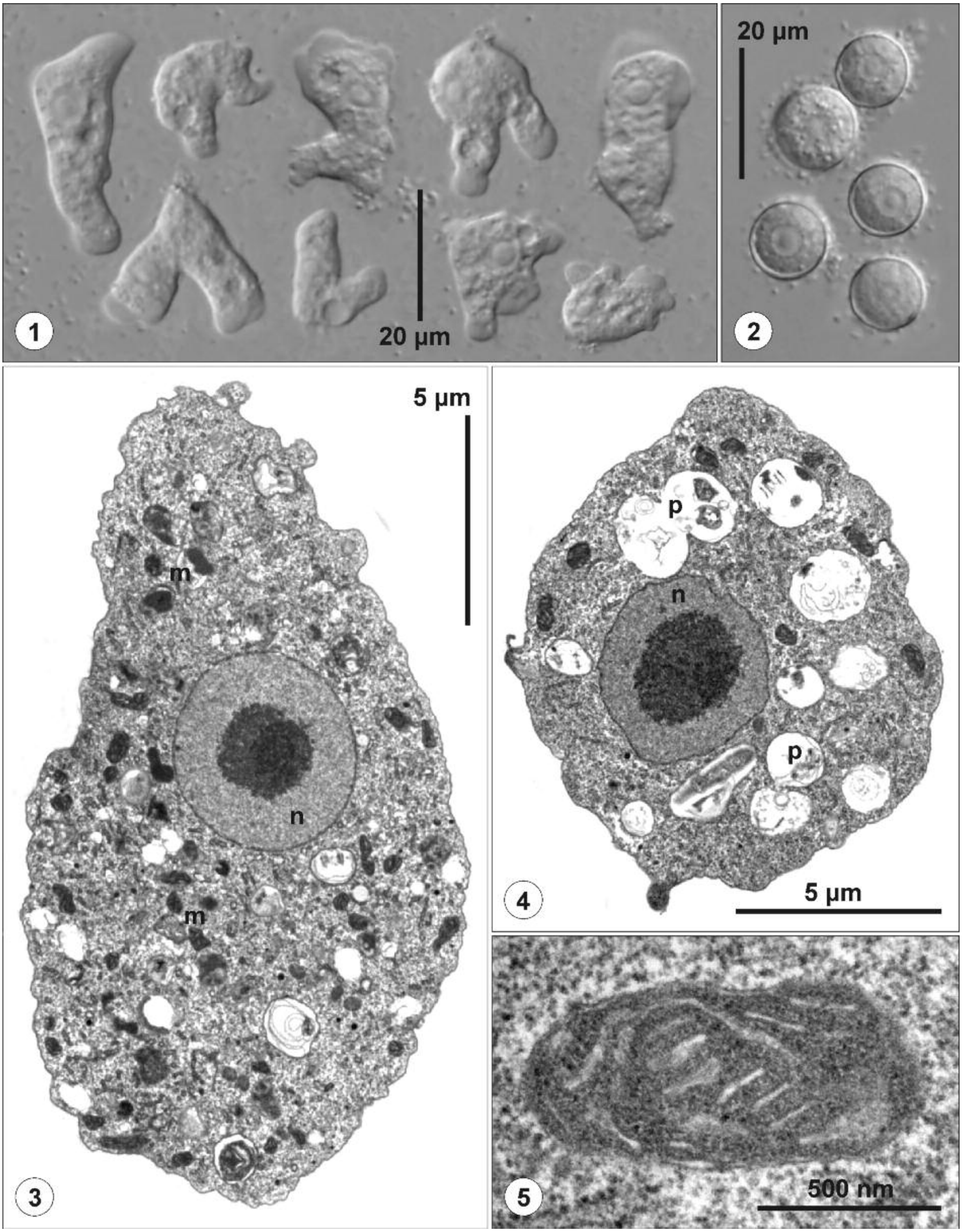

Plate 082. 6HZV strain of *Naegleria clarki* isolated from gills of bitterling, *Rhodeus sericeus* (Pallas) collected from natural pool in Lanžhot, South Moravia, Czech Republic; cultured on NN agar; stored in CC since 1998; GenBank Acc. No. of SSU rDNA sequence JQ271697, ITS JQ271652. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Cysts as seen in Nomarski DIC. **Figs. 3, 4.** Overview of fine structure of trophozoites: nuclei (n), electron-dense mitochondria (m), phagosomes with remnants of food (p). **Fig. 5.** Detail of ultrastructure of mitochondrion with discoid cristae.

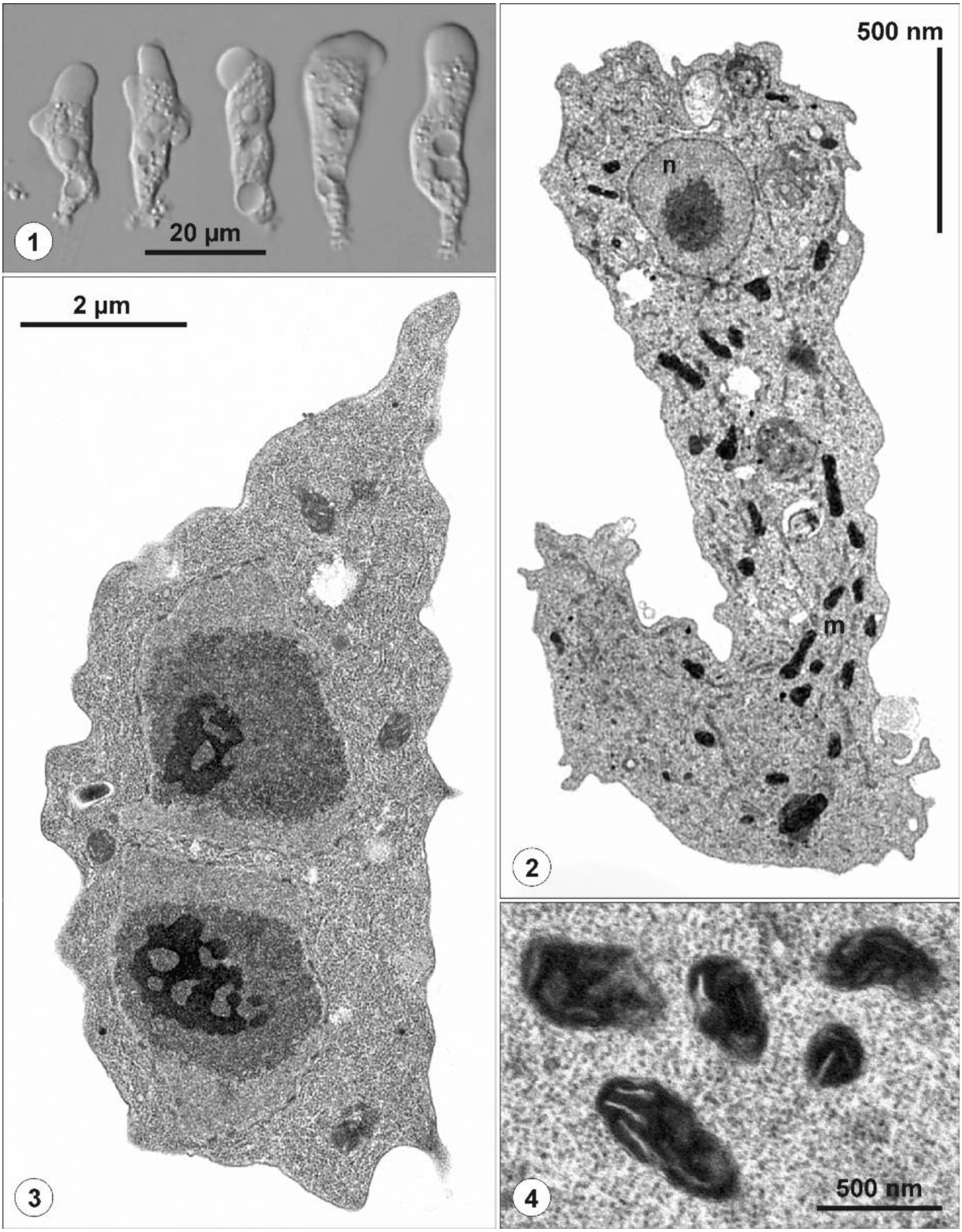

Plate 083. A22 strain of *Naegleria pagei* isolated from liver of freshwater bream, *Abramis brama* (L.) from Vyšatov pond, South Bohemia, Czech Republic; cultured on NN agar; stored in CC since 1994; GenBank Acc. No. of SSU rDNA sequence DQ768714, ITS DQ768732. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Overview of fine structure of trophozoite: nucleus (n), densely stained mitochondria (m). **Fig. 3.** Overview of ultrastructure of binucleate trophozoite. **Fig. 4.** Electron-dense mitochondria with discoid cristae. Ref.: Dyková et al. 2006

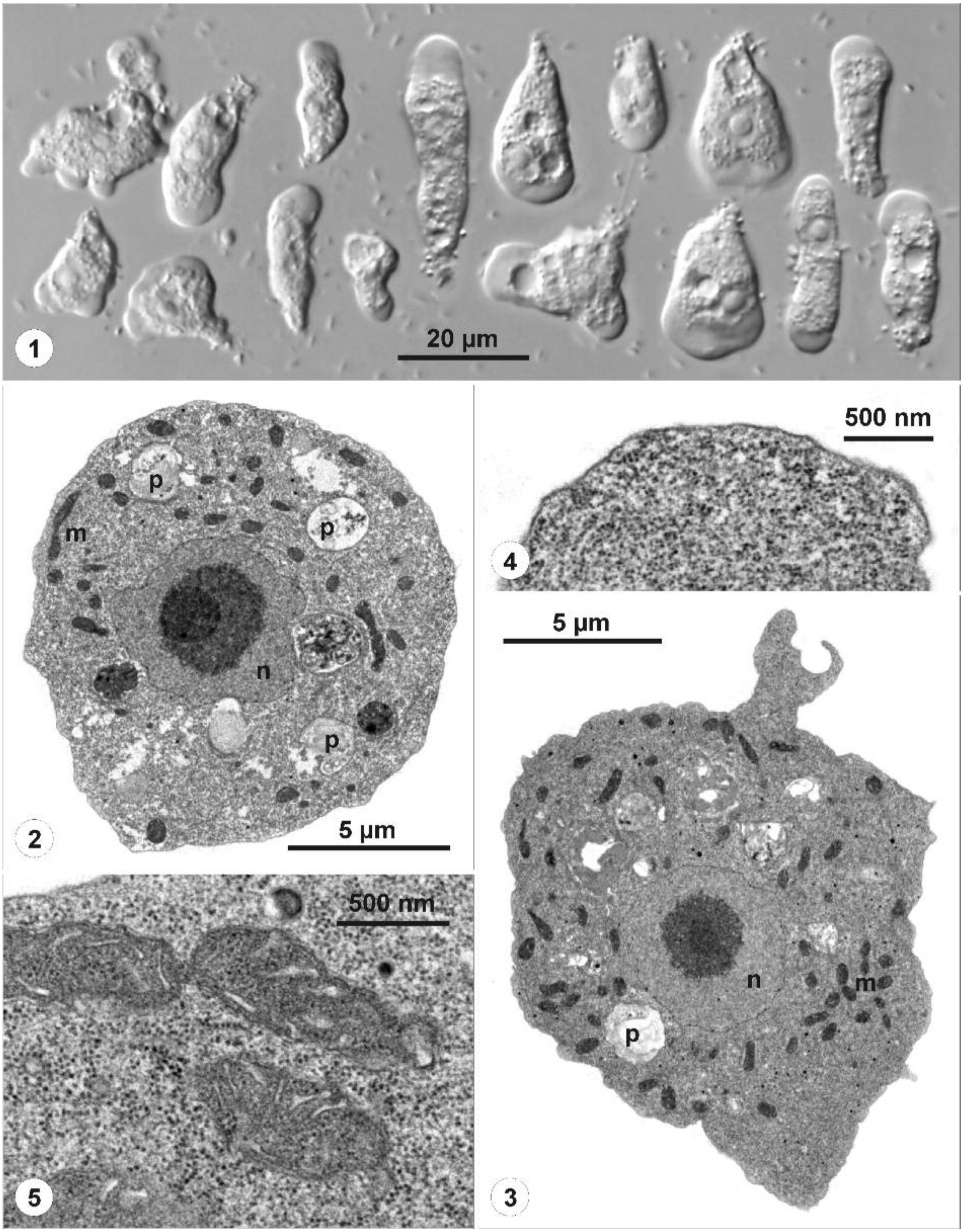

Plate 084. ALM1A strain of *Naegleria clarki* isolated as environmental freshwater strain from sample of wet mud collected along Almaciga carretera, Tenerife, Canary Islands, Spain; cultured on NN agar; stored in CC since 2010; GenBank Acc. No. of SSU rDNA sequence JQ271698, ITS JQ271653. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosomes with remnants of food (p). **Fig. 4.** Cell surface of trophozoite. **Fig. 5.** Mitochondria with discoid cristae.

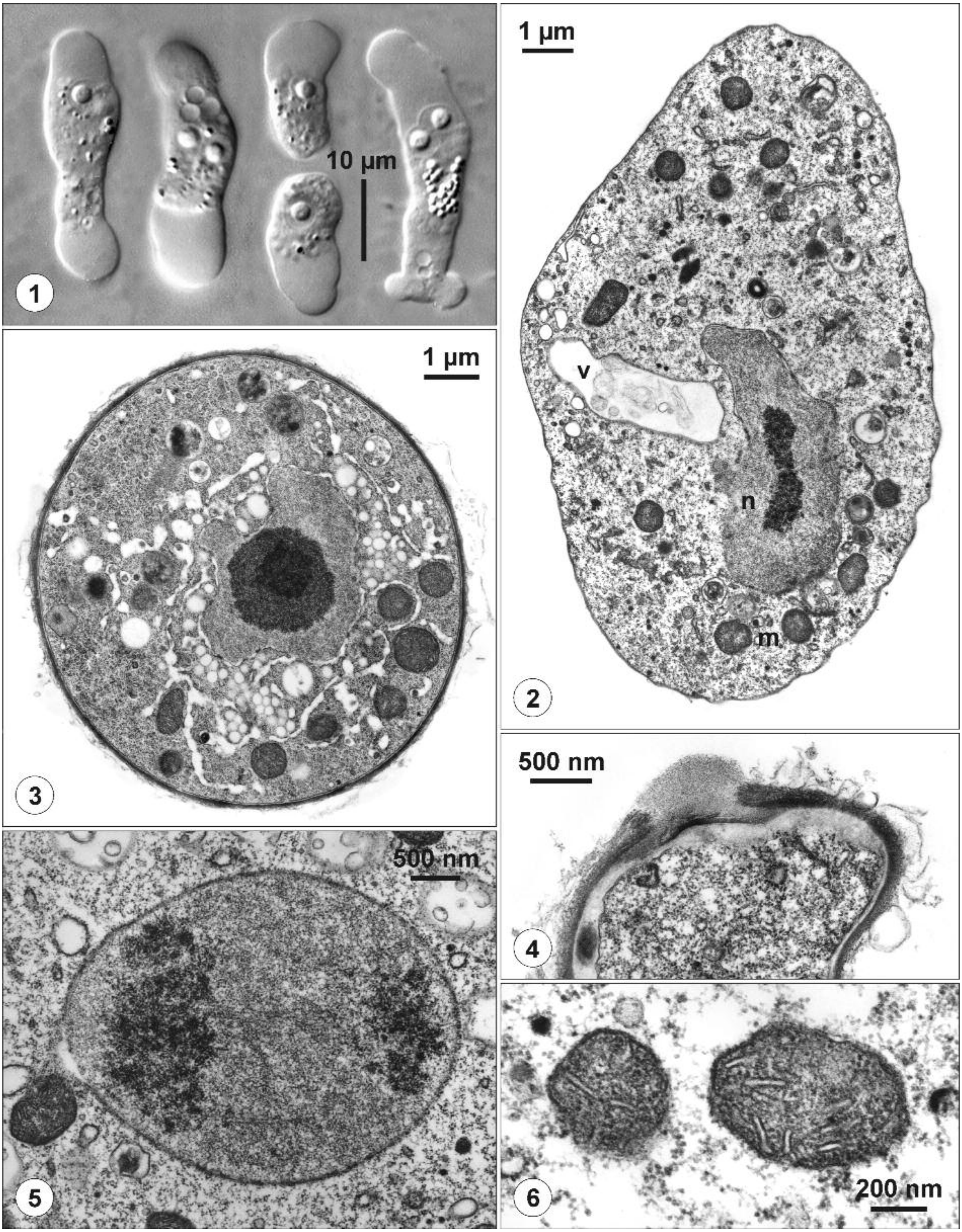

Plate 085. BCHV5 strain of *Naegleria australiensis* isolated from liver of guitarrita, *Bunocephalus coracoideus* (Cope) imported from upper Amazon River to Czech Republic; cultured on NN agar; stored in CC since 1999; GenBank Acc. No. of SSU rDNA sequence JQ271699, ITS JQ271654. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Overview of fine structure of trophozoite: nucleus (n), mitochondria (m), vacuole in cytoplasm (v). **Fig. 3.** Early stage of cyst formation. **Fig. 4.** Detail of cyst wall with plugged pore. **Fig. 5.** Detail of anaphase movement of chromatin to the poles of nucleus. **Fig. 6.** Mitochondria with discoid cristae.

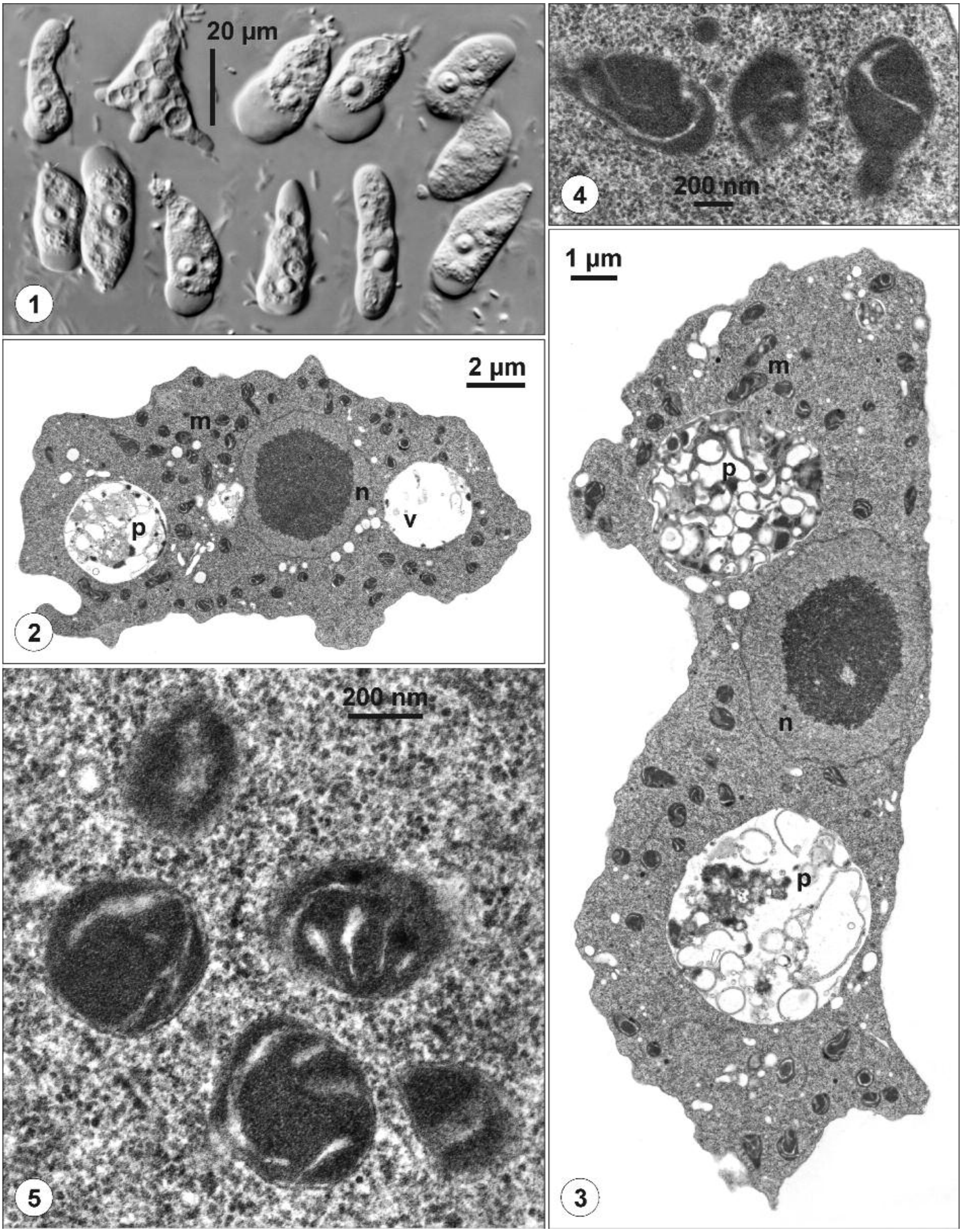

Plate 086. BCZ4 strain of *Naegleria* sp. isolated from gills of guitarrita, *Bunocephalus coracoideus* (Cope) imported from upper Amazon River to Czech Republic; cultured on NN agar; stored in CC since 1999; GenBank Acc. No. of SSU rDNA sequence DQ768716, ITS DQ768731. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC), scale bar = 20 µm. **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosomes (p), vacuoles (v). **Figs. 4, 5.** Details of trophozoite ultrastructure: mitochondria, some with unusual shape of cristae. Ref.: Dyková et al. 2006.

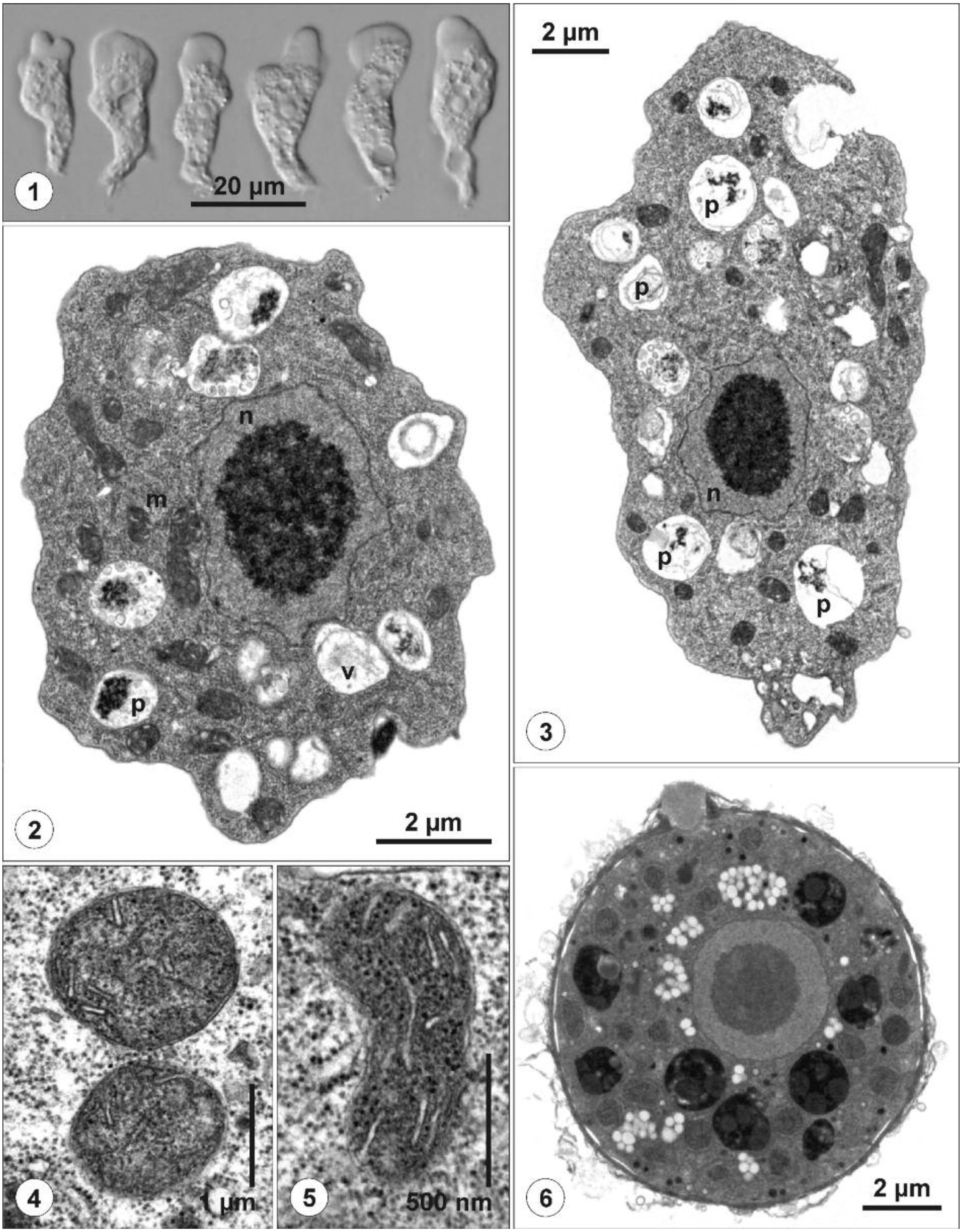

Plate 087. CB1S strain of *Naegleria clarki* isolated from spleen of Philippine catfish, *Clarias batrachus* (L.) hybrid from fish market in Bangkok, Thailand; cultured on NN agar; stored in CC since 1997; GenBank Acc. No. of SSU rDNA sequence DQ768725, ITS DQ768728. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosomes (p), vacuoles (v). **Figs. 4, 5.** Mitochondria with discoid cristae. **Fig. 6.** Early stage of cyst formation and typical plugged pore. Ref.: Dyková et al. 2006.

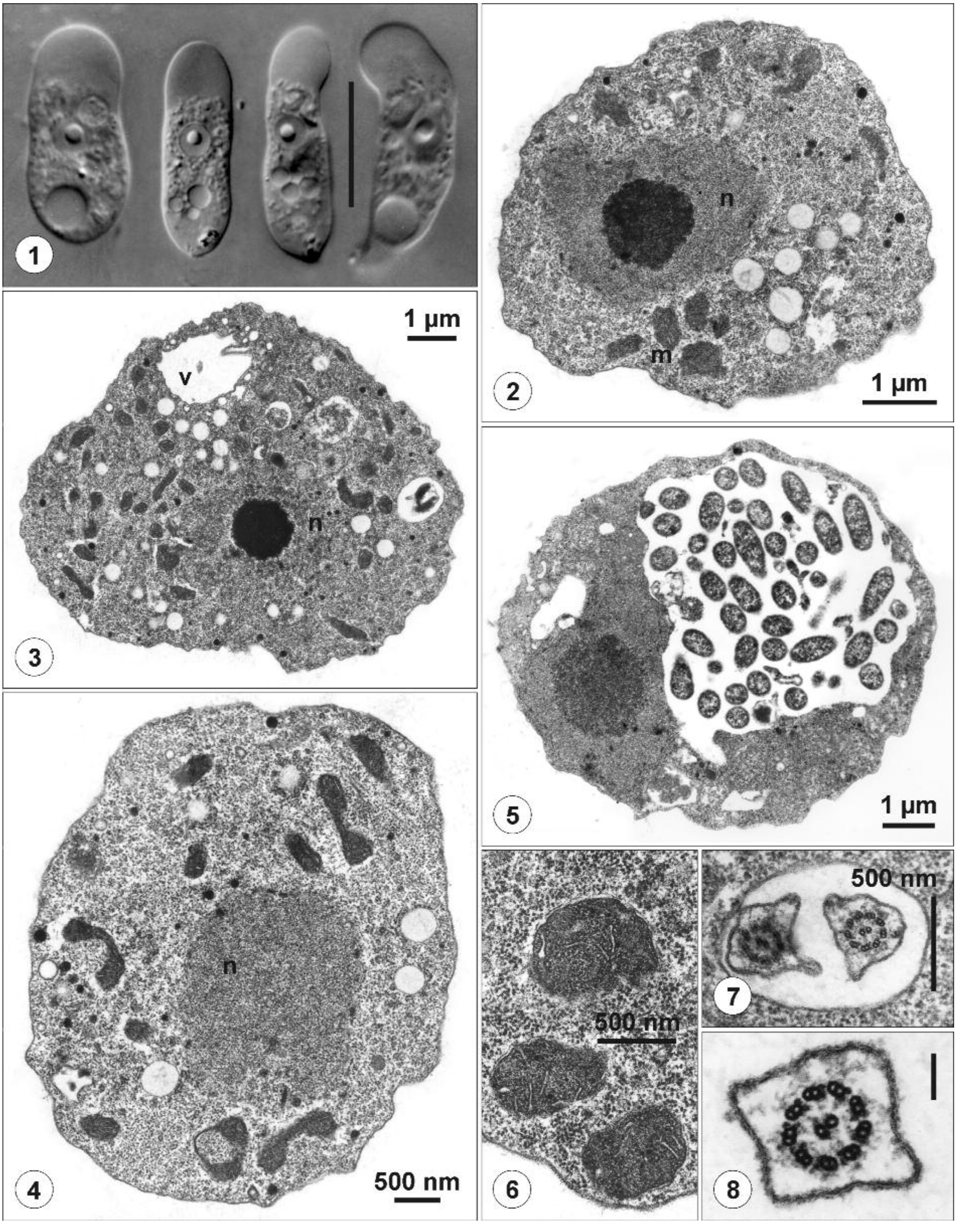

Plate 088. CB2B strain of *Naegleria australiensis* isolated from brain of Philippine catfish, *Clarias batrachus* (L.) hybrid from fish market in Bangkok, Thailand; cultured on NN agar; stored in CC since 1997; GenBank Acc. No. of SSU rDNA sequence AF338421, ITS DQ768726. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC), scale bar = 20 µm. **Figs. 2, 3, 4.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), vacuole (v) surrounded by vesicles. **Fig. 5.** Aggregate of bacteria multiplied in cytoplasm. **Fig. 6.** Mitochondria with discoid cristae. **Figs. 7, 8.** Details of flagellated stages: transverse sections through flagella. Scale bar for Fig. 8 = 100 nm. Ref.: Dyková et al. 2001a, 2006.

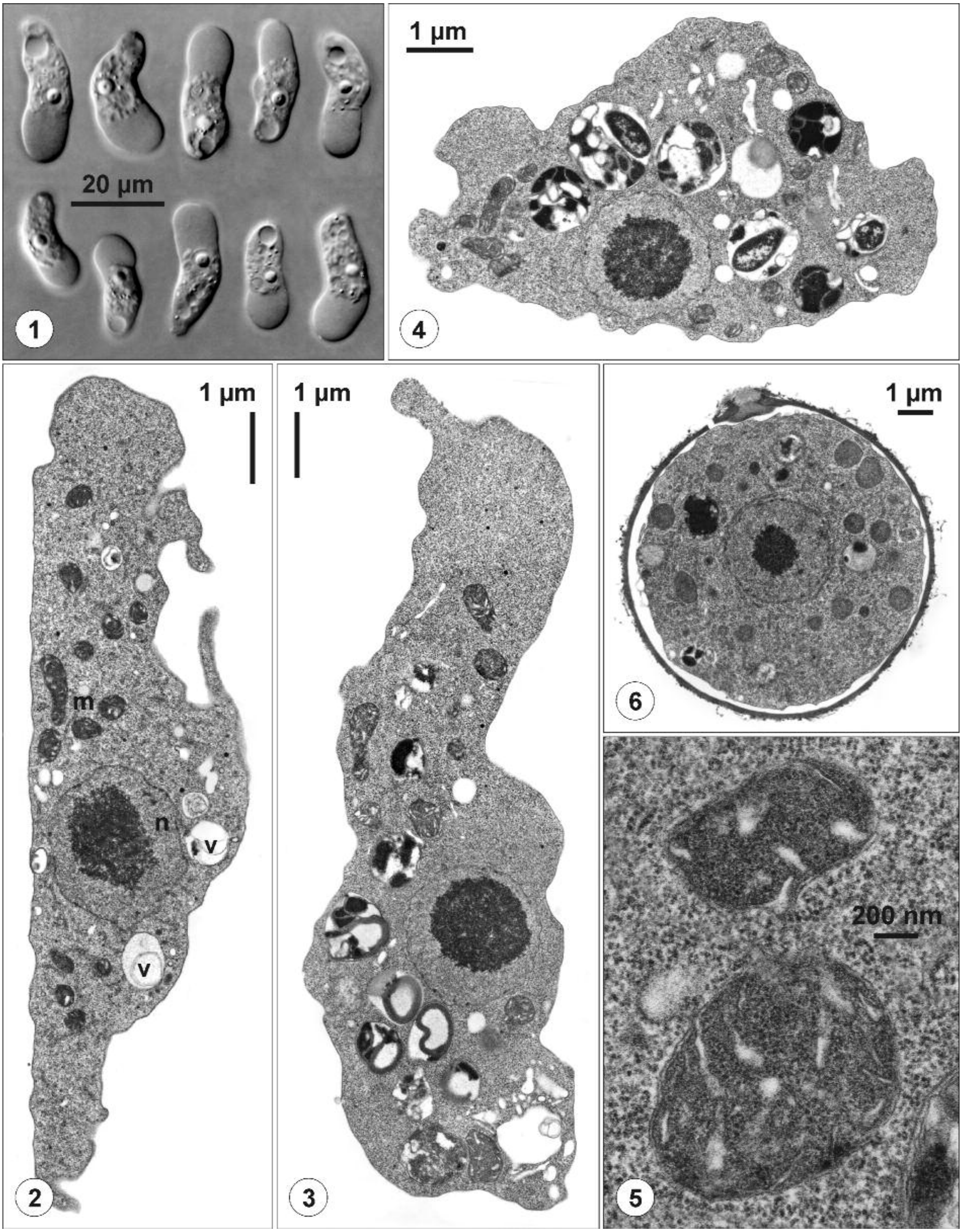

Plate 089. CL strain of *Naegleria clarki* isolated from brain of false spotted catfish, *Corydoras leucomelas* Eigenmann et Allen imported from upper Amazon River to Czech Republic; cultured on NN agar; stored in CC since 2002; GenBank Acc. No. of SSU rDNA sequence DQ768715, ITS DQ768741. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Overview of fine structure of trophozoite: nucleus (n), mitochondria (m), vacuoles (v). **Figs. 3, 4.** Overview of ultrastructure of trophozoites with cytoplasm overloaded with bacteria and their remnants. **Fig. 5.** Mitochondria with discoid cristae. **Fig. 6.** Early stage of cyst formation. Ref.: Dyková et al. 2006.

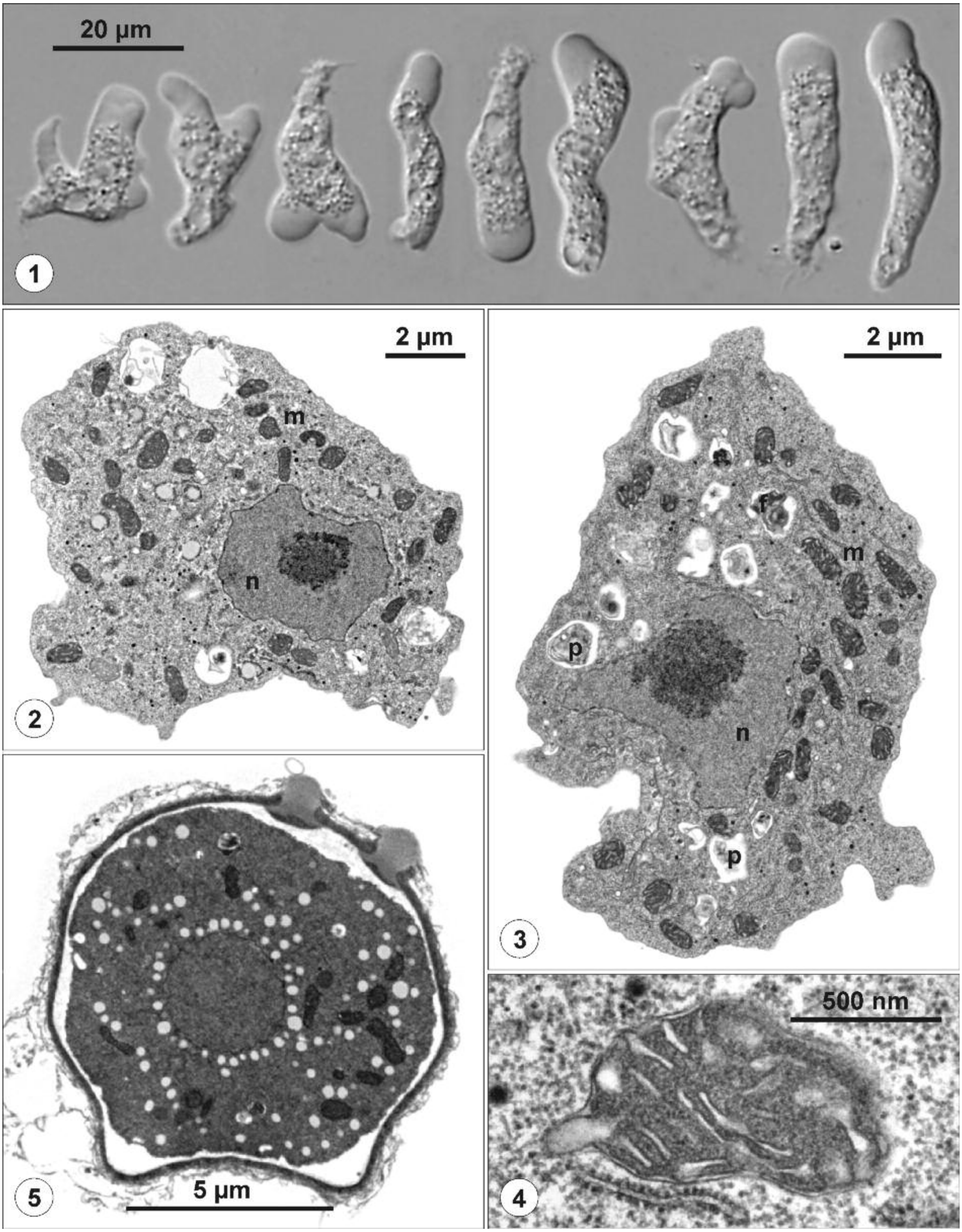

Plate 090. GERK strain of *Naegleria* sp. isolated from gills of rainbow trout, *Oncorhynchus mykiss* (Walbaum) farmed in Baden Würtenberg, Germany; cultured on NN agar; stored in CC since 2008; GenBank Acc. No. of SSU rDNA sequence HM363628, ITS JQ271655. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosomes (p). **Fig. 4.** Detail of trophozoite ultrastructure: mitochondrion with discoid cristae. **Fig. 5.** Cyst with two plugged pores in close vicinity. Ref.: Dyková et al. 2010b.

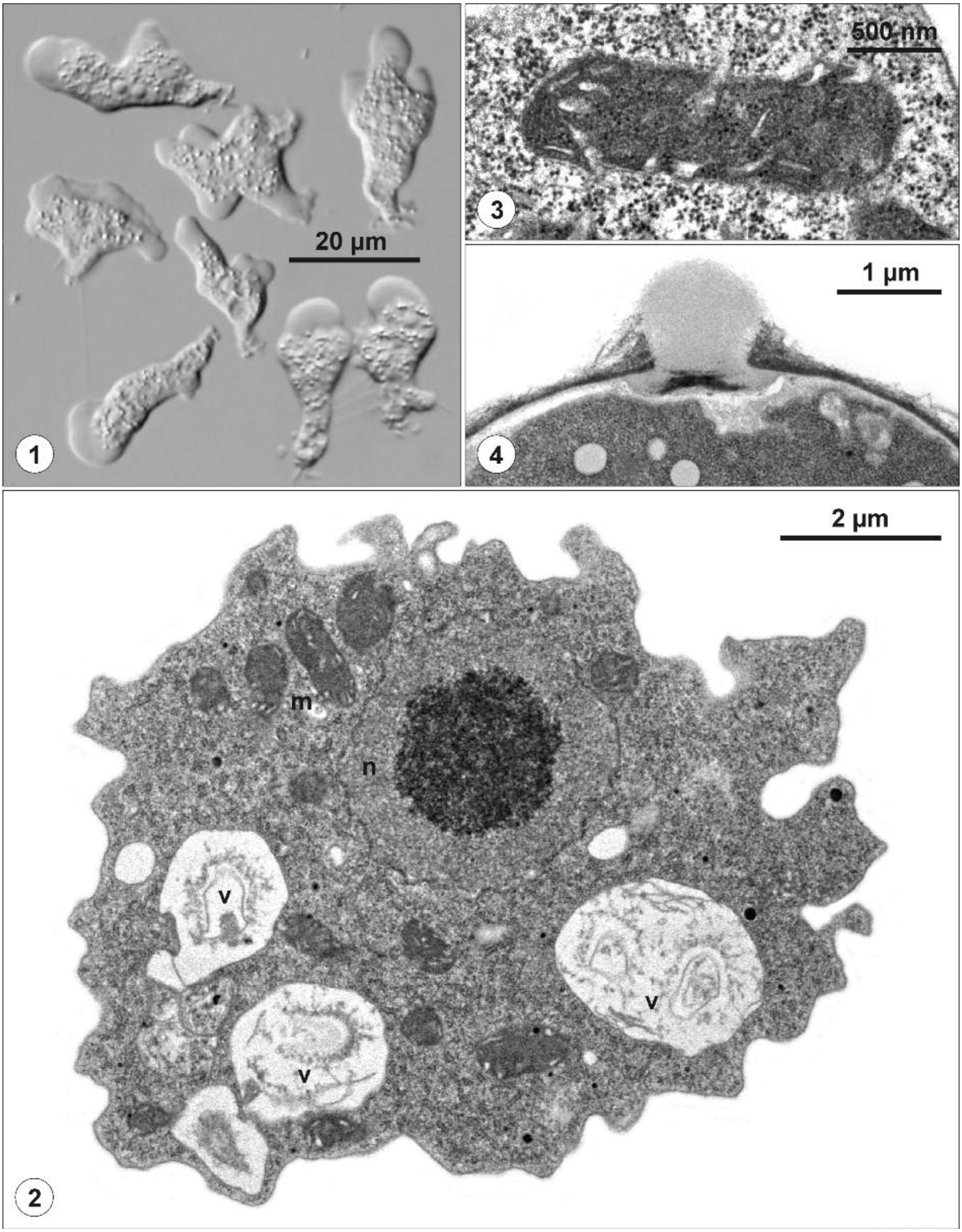

Plate 091. GG1BV strain of *Naegleria fultoni* isolated from brain of goldfish, *Carassius auratus auratus* (L.) from ornamental fish farm, Czech Republic; cultured on NN agar; stored in CC since 2009; GenBank Acc. No. of SSU rDNA sequence JQ271700, ITS JQ271656. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Overview of fine structure of trophozoite: nucleus (n), mitochondria (m), vacuoles with remnants of food (v). **Fig. 3.** Detail of trophozoite ultrastructure: mitochondrion with discoid cristae. **Fig. 4.** Detail of cyst ultrastructure: plugged pore of cyst wall.

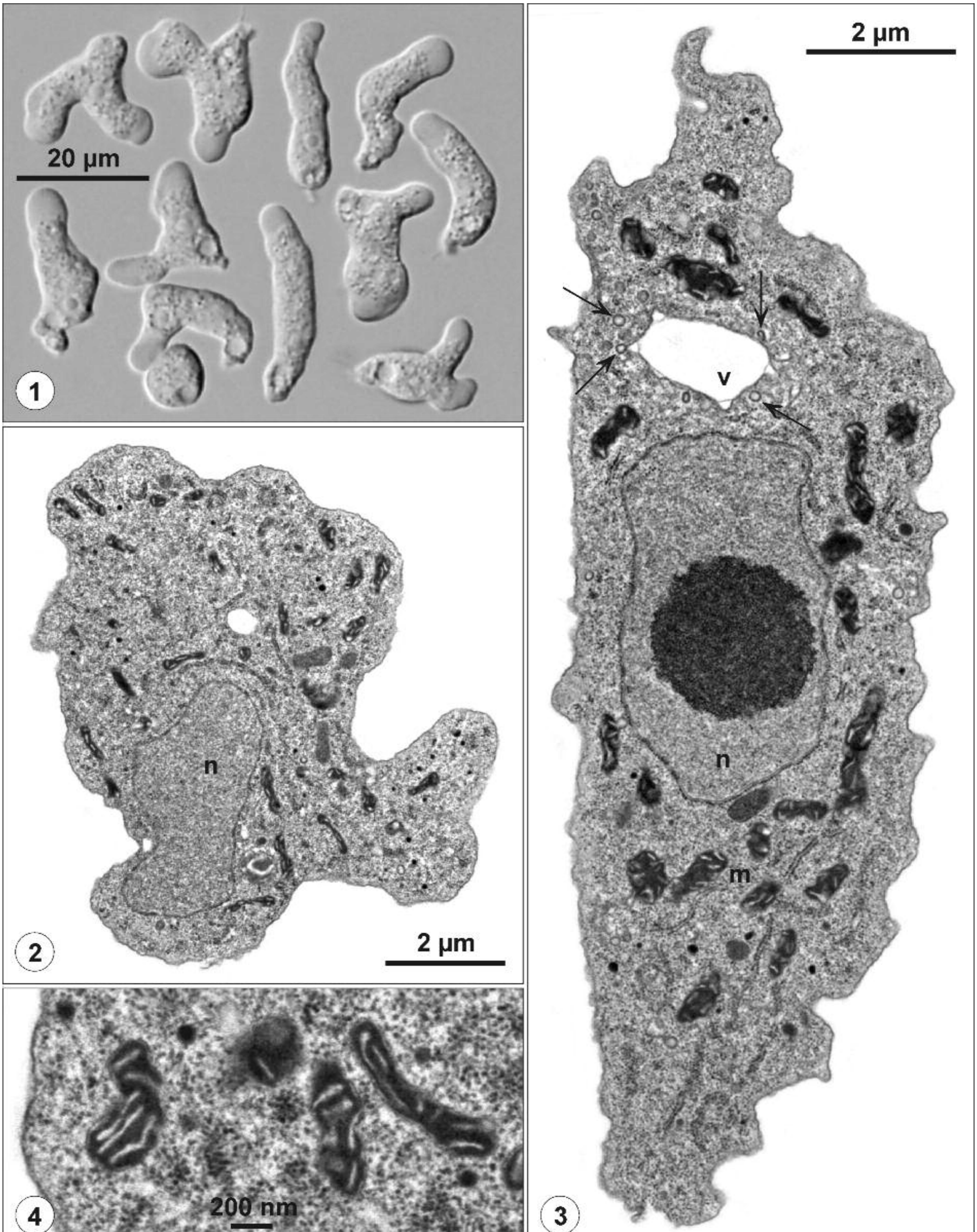

Plate 092. GG4BV strain of *Naegleria* sp. isolated from brain of goldfish, *Carassius auratus auratus* (L.) from ornamental fish farm, Czech Republic; cultured on NN agar; stored in CC since 2009; GenBank Acc. No. of SSU rDNA sequence JQ271701, ITS JQ271657. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), vacuole (v) surrounded by small vesicles (arrows). **Fig. 4.** Detail of trophozoite ultrastructure: mitochondria with discoid cristae.

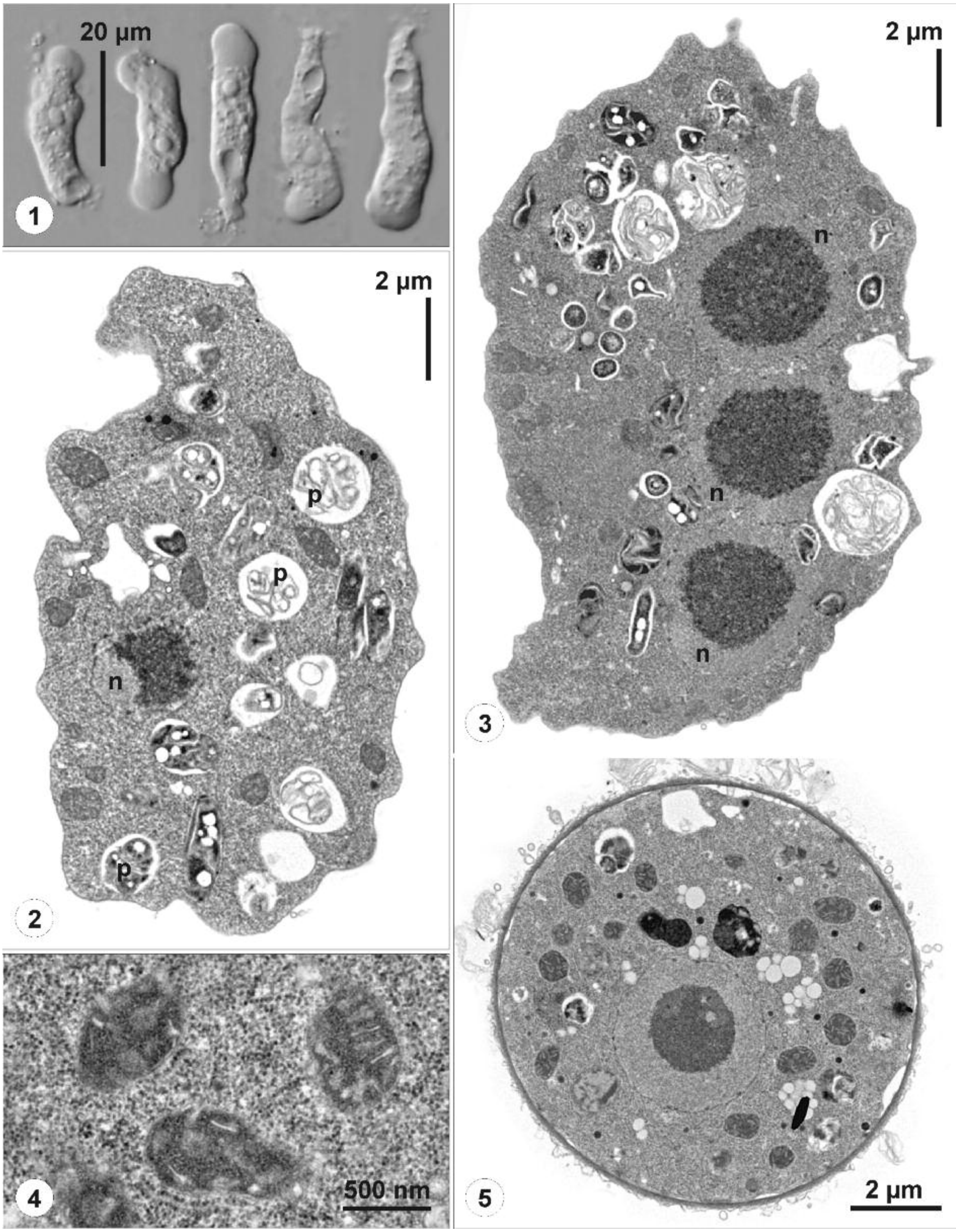

Plate 093. GP3 strain of *Naegleria clarki* isolated from gills of elephantnose fish, *Gnathonemus petersii* (Günther) imported from Congo River to Czech Republic; cultured on NN agar; stored in CC since 2002; GenBank Acc. No. of SSU rDNA sequence DQ768724, ITS DQ768733. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Overview of fine structure of trophozoite: nucleus (n), numerous phagosomes (p) in cytoplasm. **Fig. 3.** Overview of trophozoite with three nuclei (n) and cytoplasm overloaded with bacteria and their remnants. **Fig. 4.** Detail of mitochondria with discoid cristae. **Fig. 5.** Early stage of cyst formation. Ref.: Dyková et al. 2006.

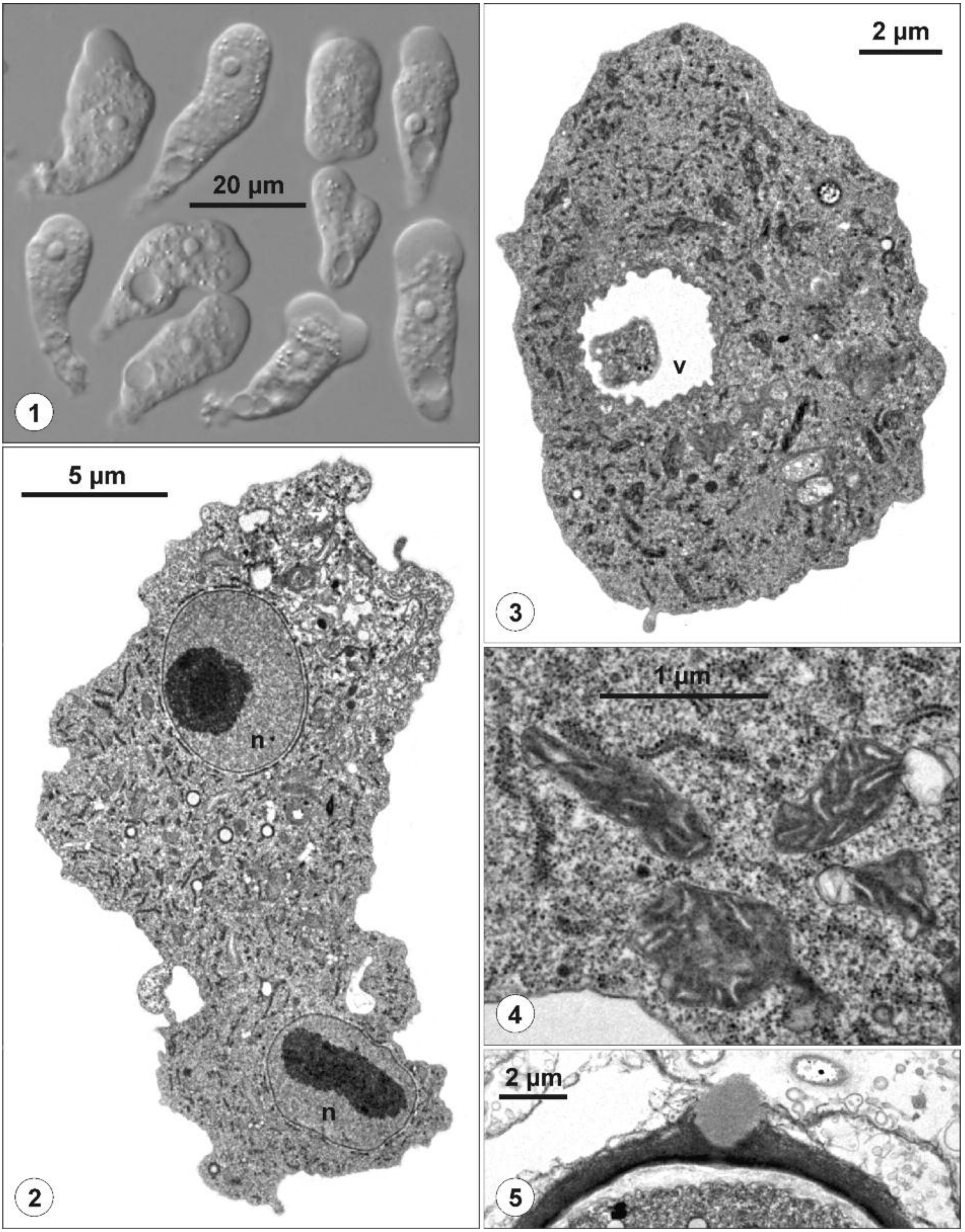

Plate 094. J14Z1 strain of *Naegleria* sp. isolated from gills of ruffe, *Gymnocephalus cernuus* (L.) from Novohaklovský pond, South Bohemia, Czech Republic; cultured on NN agar; stored in CC since 2002; GenBank Acc. No. of SSU rDNA sequence JQ271702, ITS JQ271658. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), contractile vacuole (v). **Fig. 4.** Detail of ultrastructure of mitochondria with discoid cristae. **Fig. 5.** Detail of cyst wall with plugged pore.

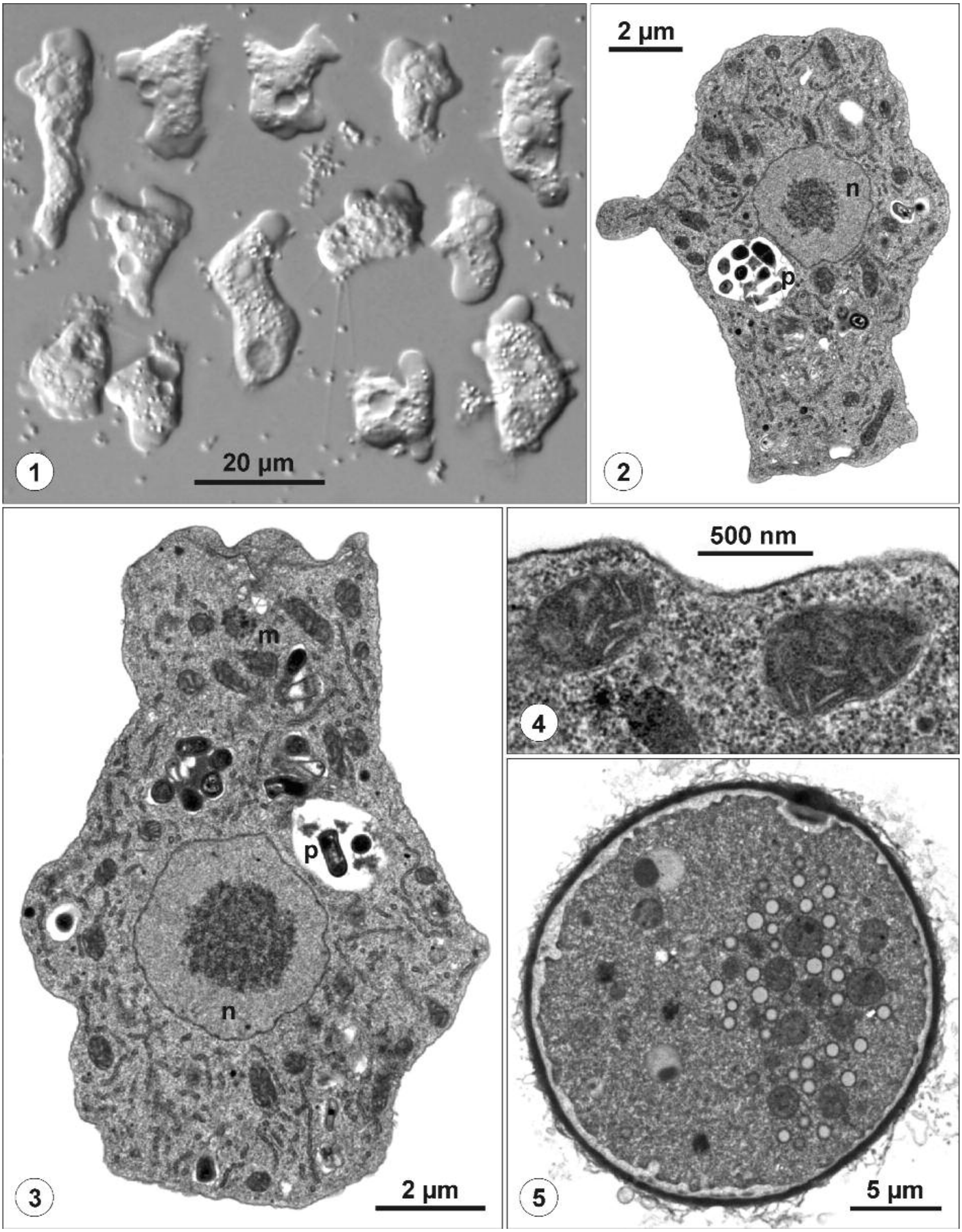

Plate 095. K4482J strain of *Naegleria* sp. isolated from liver of common carp, *Cyprinus carpio* L. from Blanice River, South Bohemia, Czech Republic; cultured on NN agar; stored in CC since 1990; GenBank Acc. No. of SSU rDNA sequence JQ271703, ITS JQ271659. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosomes (p). **Fig. 4.** Mitochondria with discoid cristae. **Fig. 5.** Early stage of cyst formation.

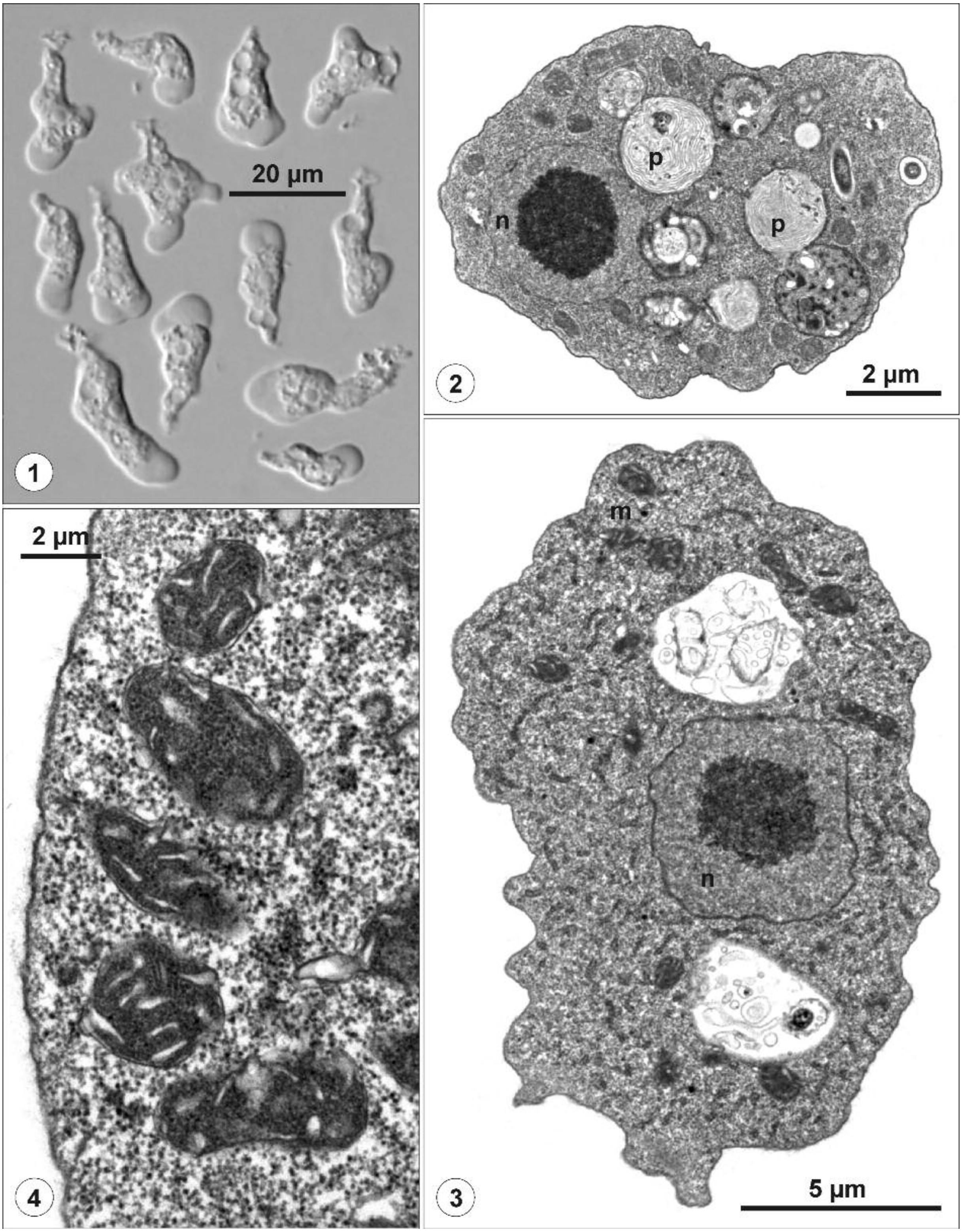

Plate 096. MSED4 strain of *Naegleria clarki* isolated from sediment in aquarium with freshwater fishes from pet shop, České Budějovice, South Bohemia, Czech Republic; cultured on NN agar; stored in CC since 2010; GenBank Acc. No. of SSU rDNA sequence JQ271704, ITS JQ271660. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosomes (p) with remnants of phagocytised materials. **Fig. 4.** Detail of trophozoite ultrastructure: mitochondria with discoid cristae.

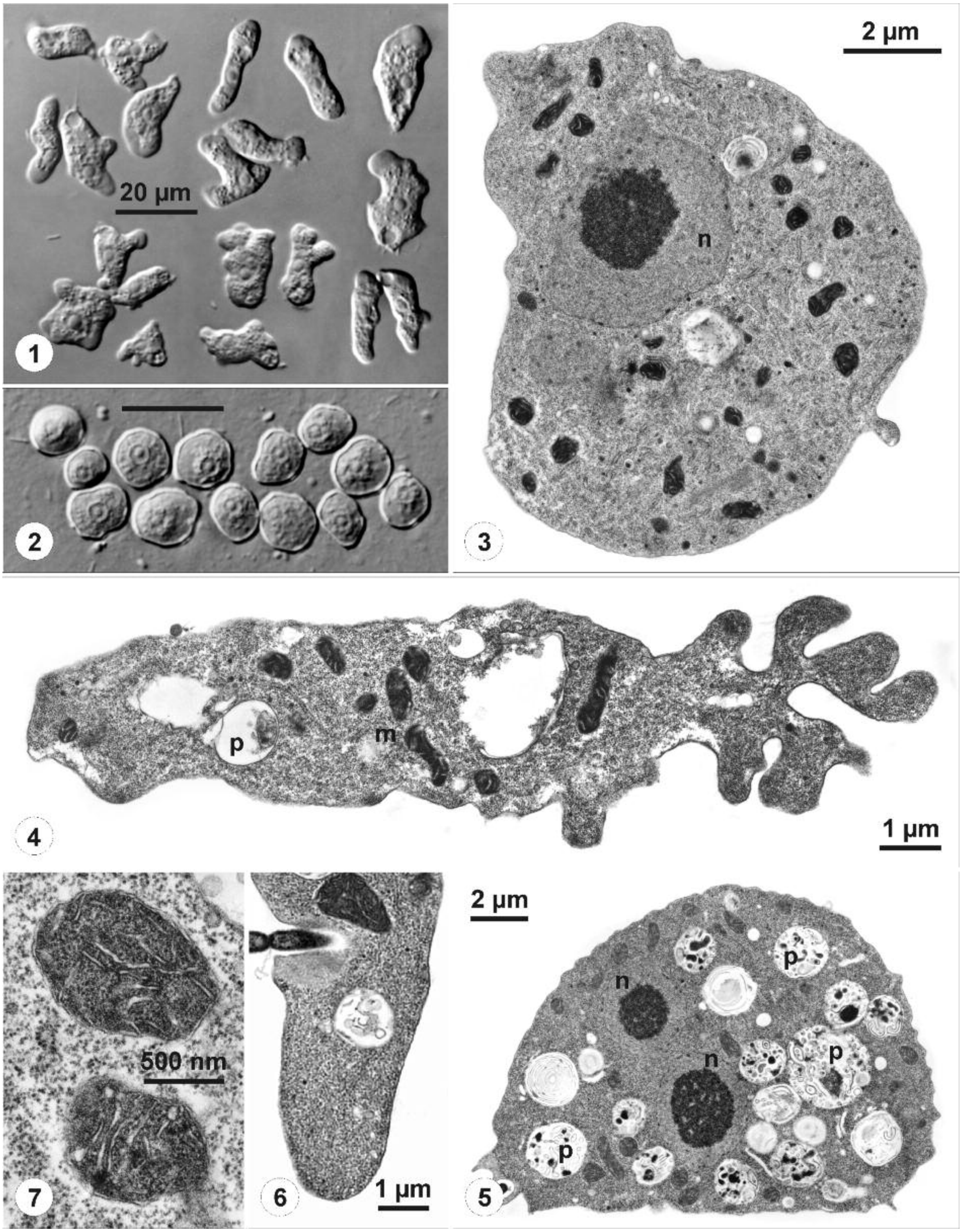

Plate 097. O3Z of *Naegleria* sp. isolated from gills of European perch, *Perca fluviatilis* L. from Svět pond, South Bohemia, Czech Republic; cultured on NN agar; stored in CC since 2002; GenBank Acc. No. of SSU rDNA sequence DQ768718, ITS DQ768738. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Mature cysts as seen in Nomarski DIC, scale bar = 20 µm. **Figs. 3, 4, 5.** Overview of fine structure of trophozoites: nuclei (n), electron-dense mitochondria (m), phagosomes with remnants of food (p). **Fig. 6.** Detail of phagocytosis. **Fig. 7.** Detail of ultrastructure of mitochondria with discoid cristae. Ref.: Dyková et al. 2006.

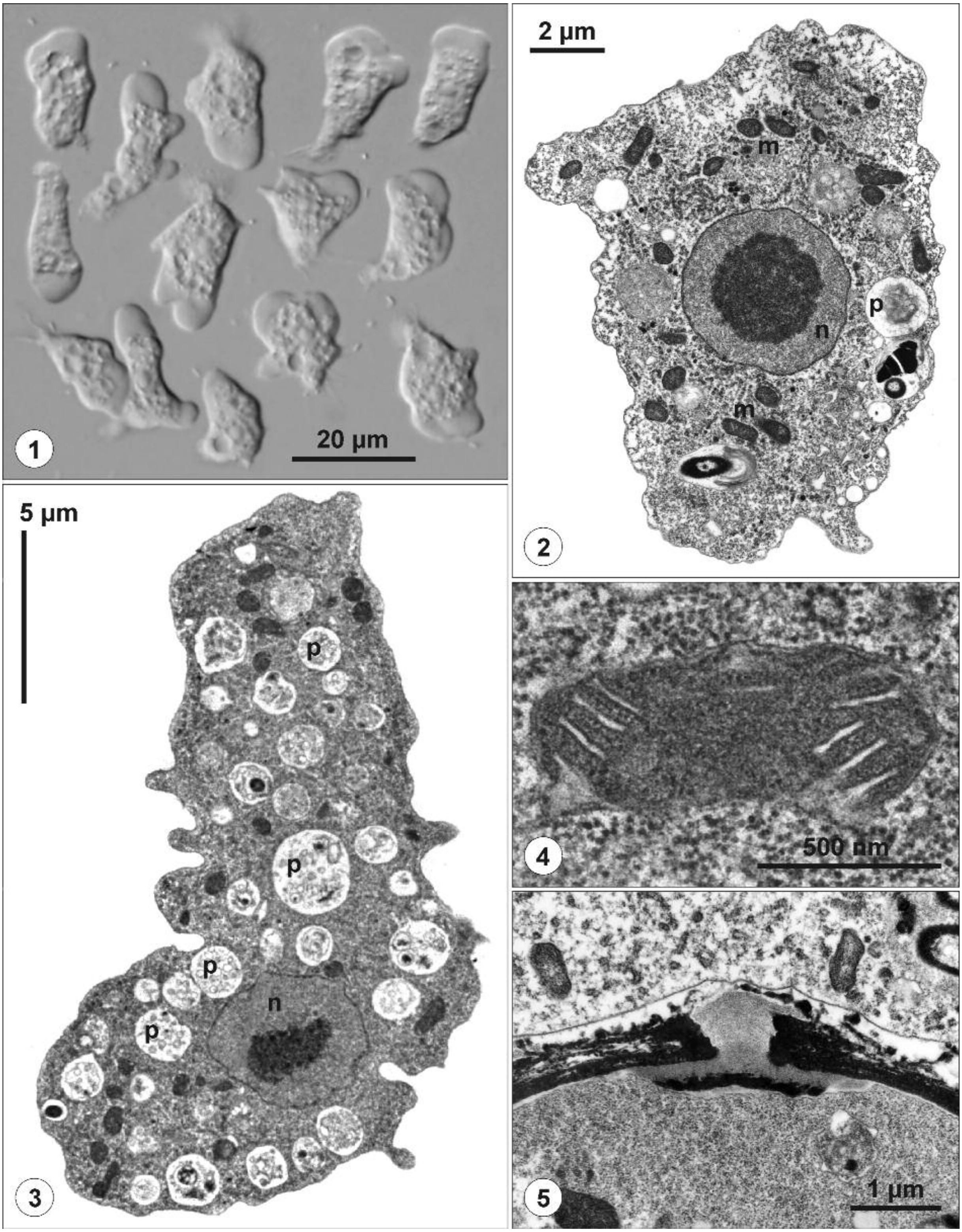

Plate 098. Pd72Z strain of *Naegleria clarki* isolated from gills of rainbow trout, *Oncorhynchus mykiss* (Walbaum) farmed in Černá, South Bohemia,Czech Republic; cultured on NN agar; stored in CC since 1998; GenBank Acc. No. of SSU rDNA sequence AF338417, ITS DQ768743. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), electron-dense mitochondria (m), numerous phagosomes (p). **Fig. 4.** Detail of ultrastructure of mitochondrion with discoid cristae. **Fig. 5.** Detail of cyst ultrastructure with plugged pore. Ref.: Dyková et al. 2001a, 2006.

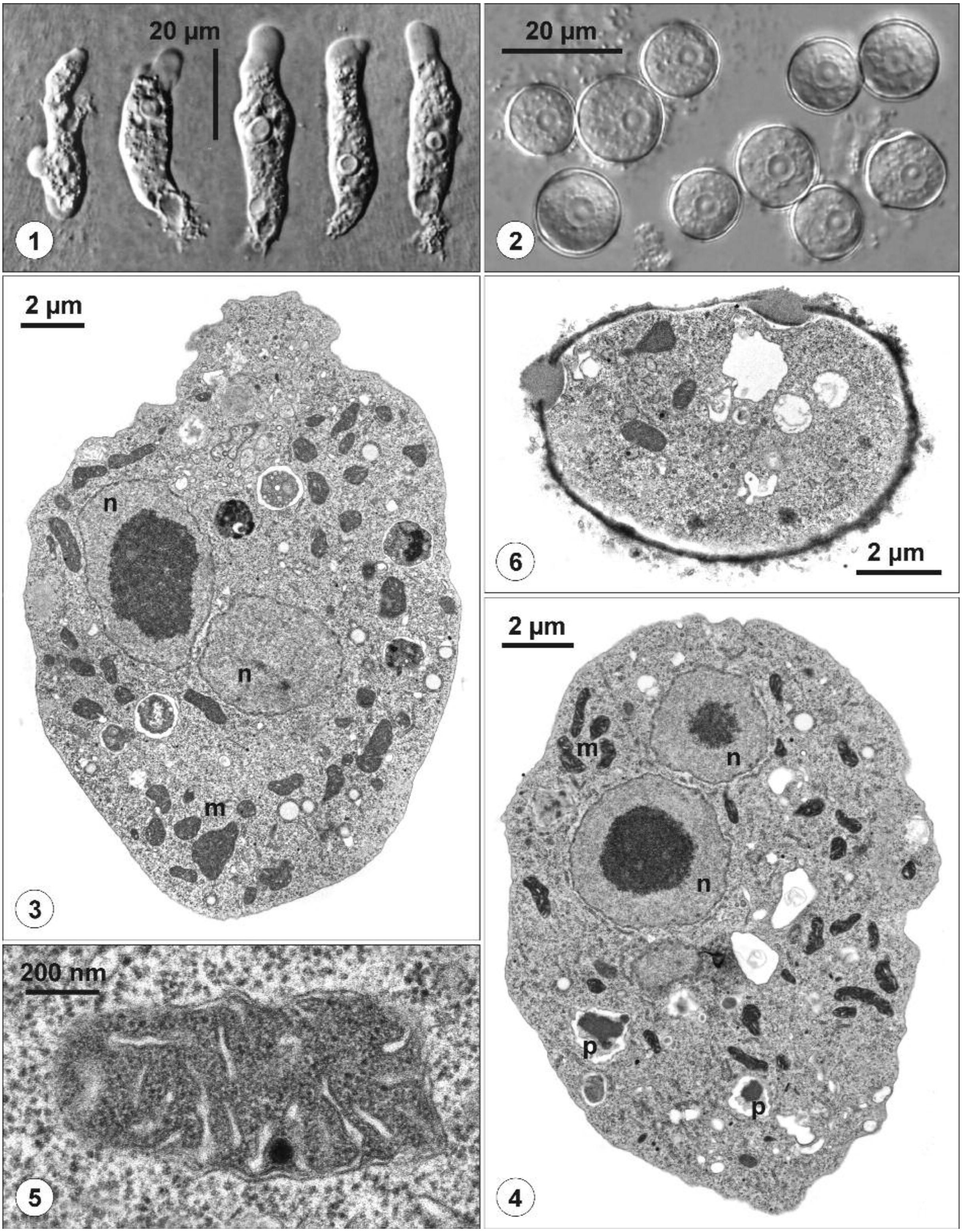

Plate 099. RR11Z strain of *Naegleria* sp. isolated from gills of roach, *Rutilus rutilus* (L.) from Novohaklovský pond, South Bohemia, Czech Republic; cultured on NN agar; stored in CC since 2000; GenBank Acc. No. of SSU rDNA sequence DQ768722, ITS DQ768735. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Cysts seen in Nomarski DIC. **Figs. 3, 4.** Overview of fine structure of binucleate stages of trophozoites: nuclei (n), electron-dense mitochondria (m), phagosomes (p). **Fig. 5.** Detail of ultrastructure of mitochondrion with discoid cristae. **Fig. 6.** Cyst with plugged pores. Ref.: Dyková et al. 2006.

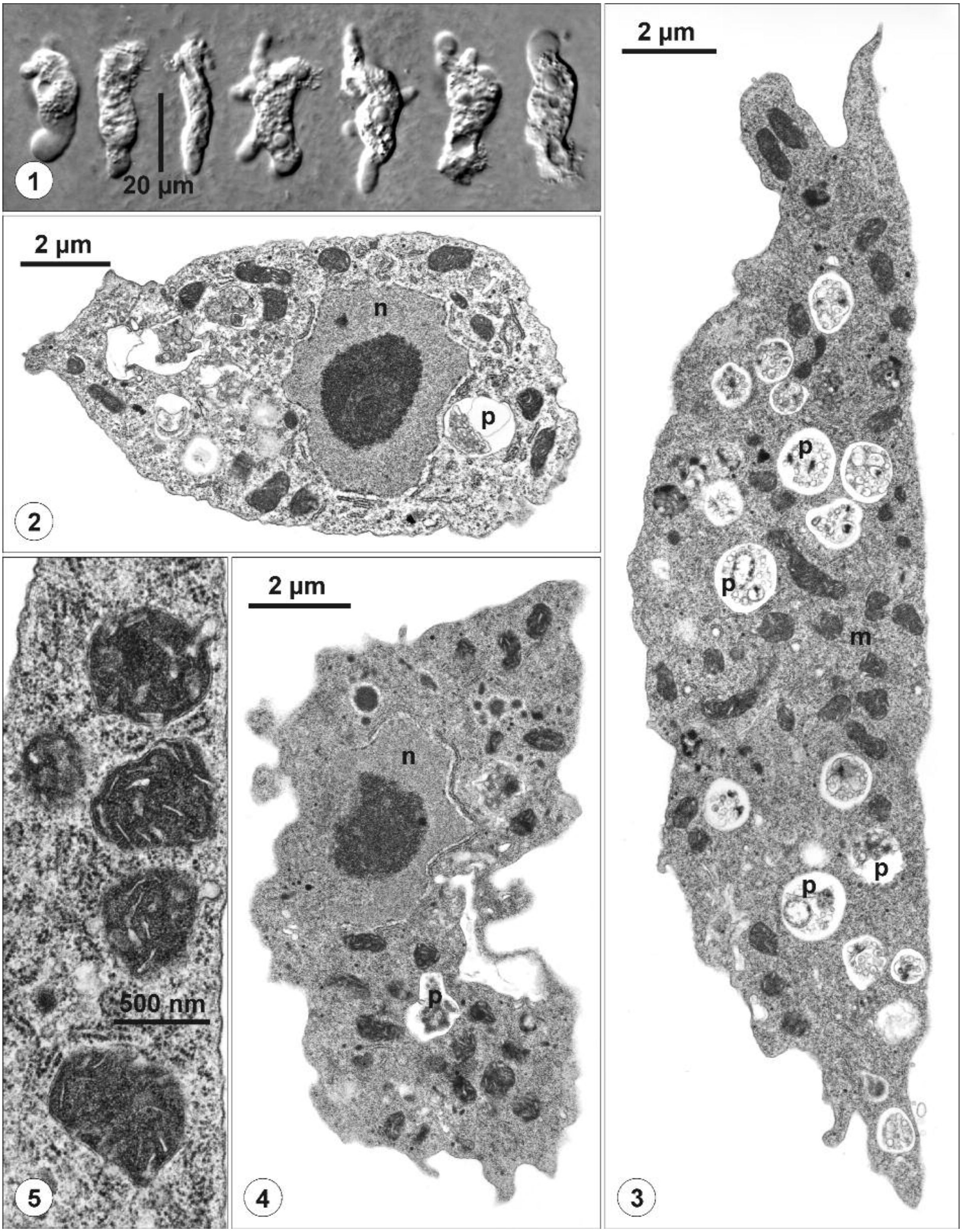

Plate 100. RR13Z strain of *Naegleria* sp. isolated from gills of roach, *Rutilus rutilus* (L.) from Novohradský pond, South Bohemia, Czech Republic; cultured on NN agar; stored in CC since 2000; GenBank Acc. No. of SSU rDNA sequence DQ768720, ITS DQ768737. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3, 4.** Overview of fine structure of trophozoites: nuclei (n), electron-dense mitochondria (m), phagosomes (p) with remnants of food. **Fig. 5.** Detail of ultrastructure of mitochondria with discoid cristae. Ref.: Dyková et al. 2006.

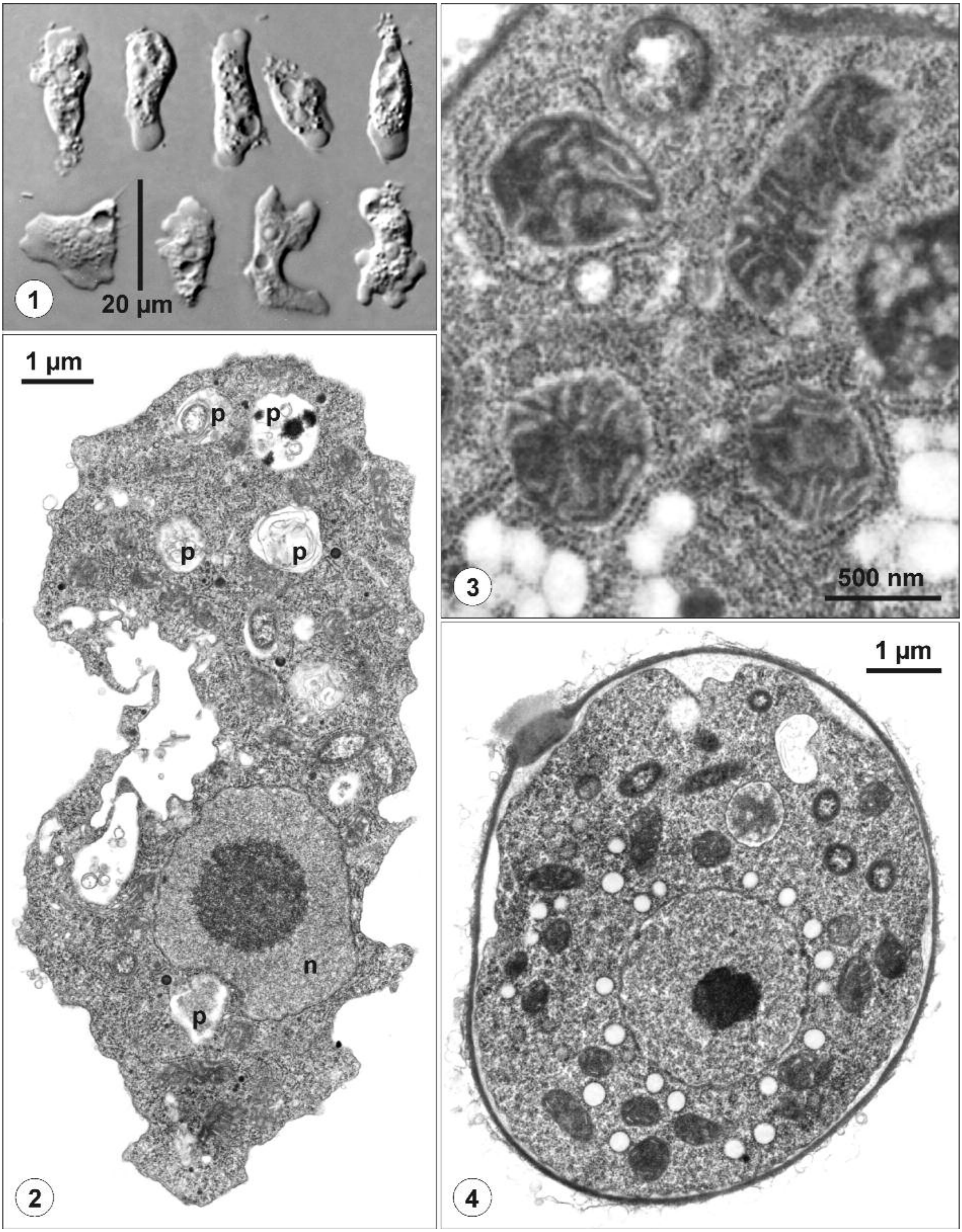

Plate 101. S1Z strain of *Naegleria* sp. isolated from gills of Northern pike, *Esox lucius* L. from Rožmberk pond, South Bohemia, Czech Republic; cultured on NN agar; stored in CC since 2002; GenBank Acc. No. of SSU rDNA DQ768717, ITS DQ768740. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Overview of fine structure of trophozoite: nucleus (n), phagosomes (p). **Fig. 3.** Detail of ultrastructure of mitochondria with discoid cristae. **Fig. 4.** Overview of cyst ultrastructure. Ref.: Dyková et al. 2006.

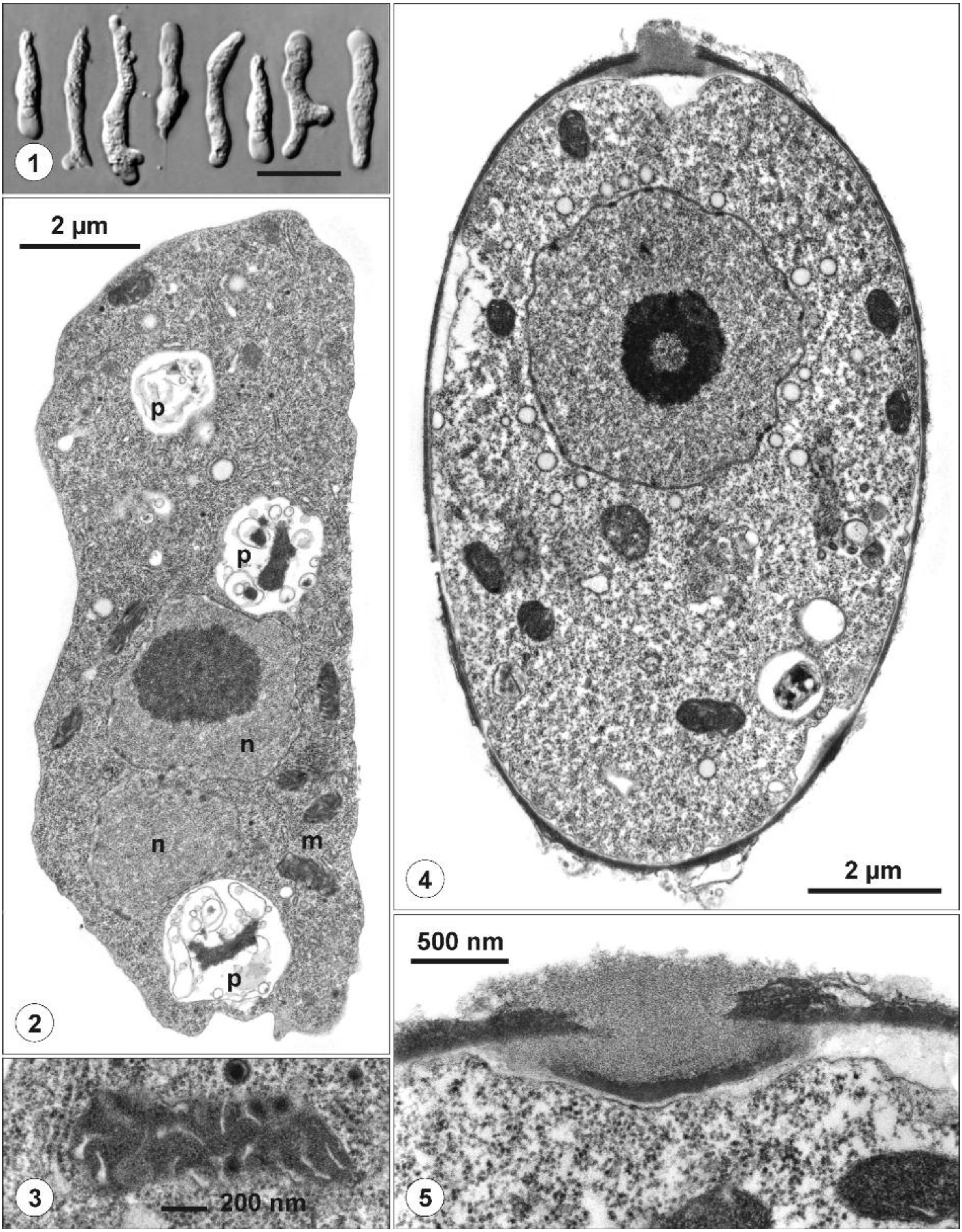

Plate 102. SUM3V strain of *Naegleria* sp. isolated from skin lesions of wels catfish, *Silurus glanis* L. from a tributary of Labe River, Czech Republic; cultured on NN agar; stored in CC since 2000; GenBank Acc. No. of SSU rDNA DQ768723, ITS DQ768734. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC), scale bar = 20 µm. **Fig. 2.** Overview of ultrastructure of trophozoite: nuclei (n), mitochondria (m), phagosomes (p) with remnants of food. **Fig. 3.** Detail of ultrastructure of mitochondrion with discoid cristae. **Fig. 4.** Early stage of cyst formation. **Fig. 5.** Detail of cyst wall with plugged pore. Ref.: Dyková et al. 2006.

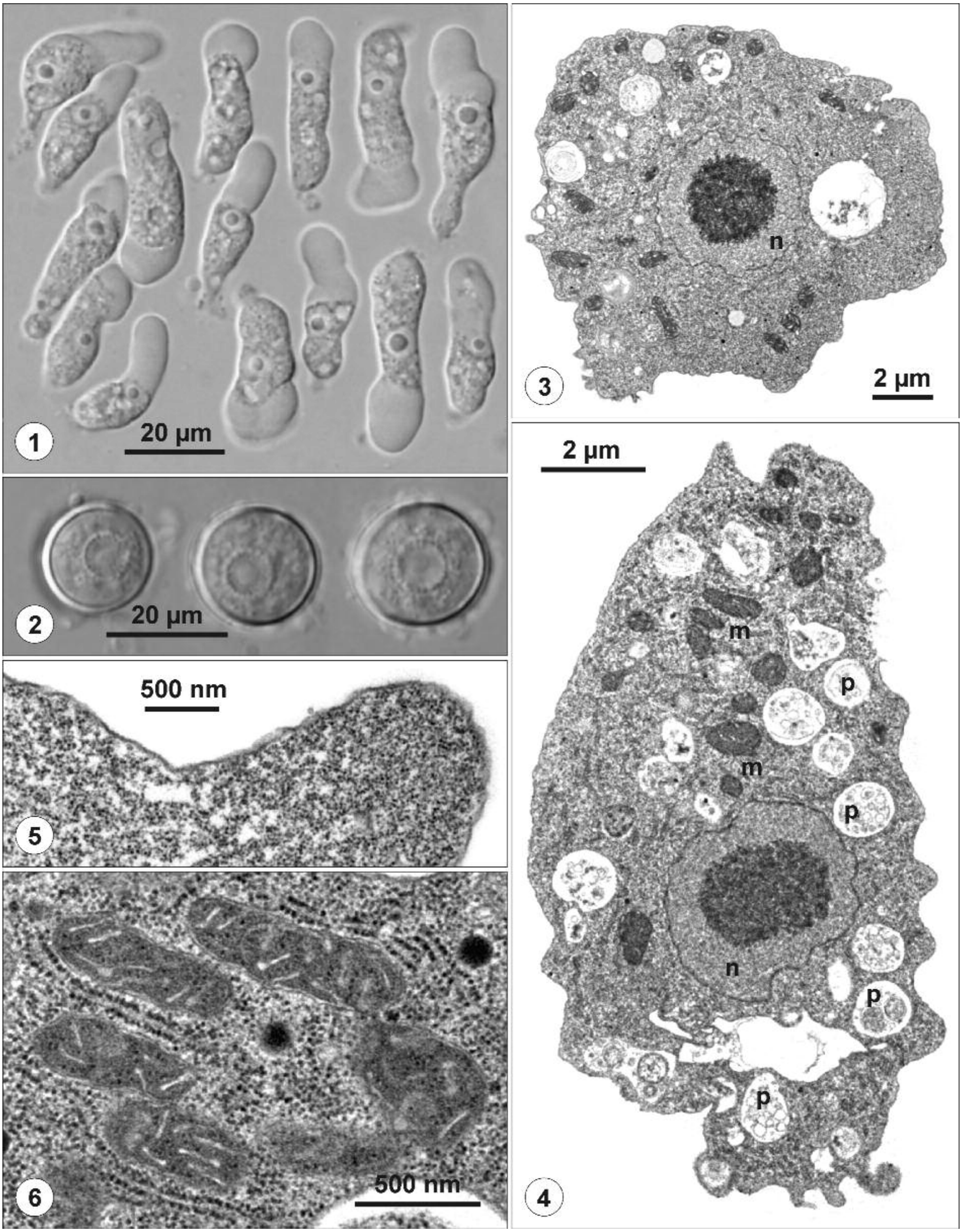

Plate 103. TMR strain of *Naegleria clarki* isolated from gills of roach, *Rutilus rutilus* (L.) caught in Lužnice River, South Bohemia, Czech Republic and maintained for over 5 months in aquarium; cultured on NN agar; stored in CC since 2010; GenBank Acc. No. of SSU rDNA sequence JQ271705, ITS JQ271661. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Cysts seen in Nomarski (DIC). **Figs. 3, 4.** Overview of fine structure of trophozoites: nuclei (n), electron-dense mitochondria (m), phagosomes (p) in cytoplasm. **Fig. 5.** Cell surface of trophozoite. **Fig. 6.** Detail of trophozoite ultrastructure: mitochondria with discoid cristae.

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Plates 104–127

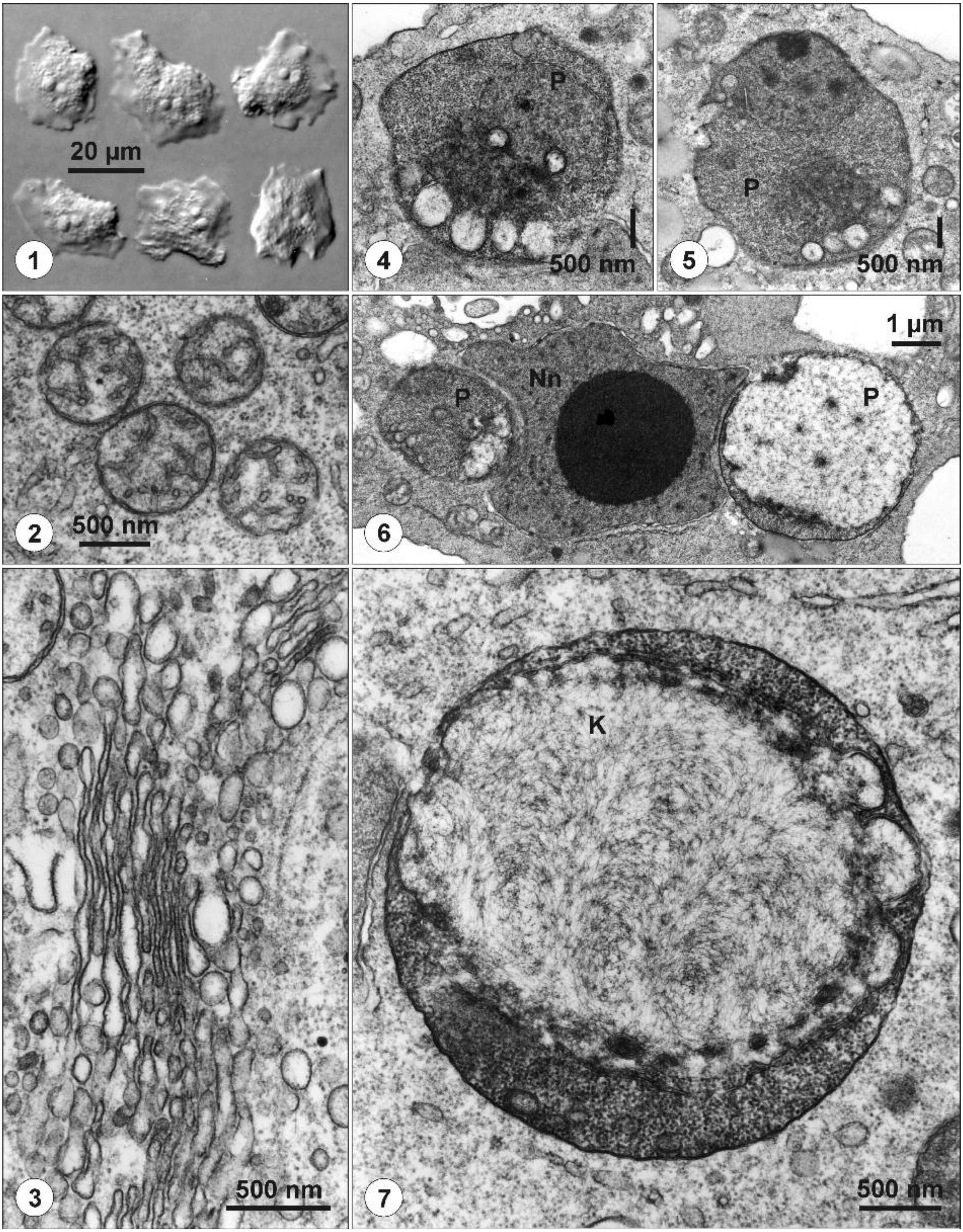

Plate 104. AFSM11 strain of *Neoparamoeba pemaquidensis* isolated from gills of turbot, *Scophthalmus maximus* (L.) farmed in NW Spain; cultured on MY75S agar; stored in CC since 2000; GenBank Acc. No. of SSU rDNA sequence AY193723, PLO SSU EU331032, SL AY163353, ITS EU884490. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Mitochondria with tubular branching cristae. **Fig. 3.** Golgi complex. **Figs. 4, 5.** *Perkinsela amoebae*-like endosymbionts (P) sectioned in similar planes. **Fig. 6.** Two endosymbionts (P) closely apposed to *Neoparamoeba* nucleus (Nn). **Fig. 7.** Transverse section through kinetoplast (K) of P with well preserved strands of DNA. Ref.: Fiala and Dyková 2003; Dyková et al. 2008b.

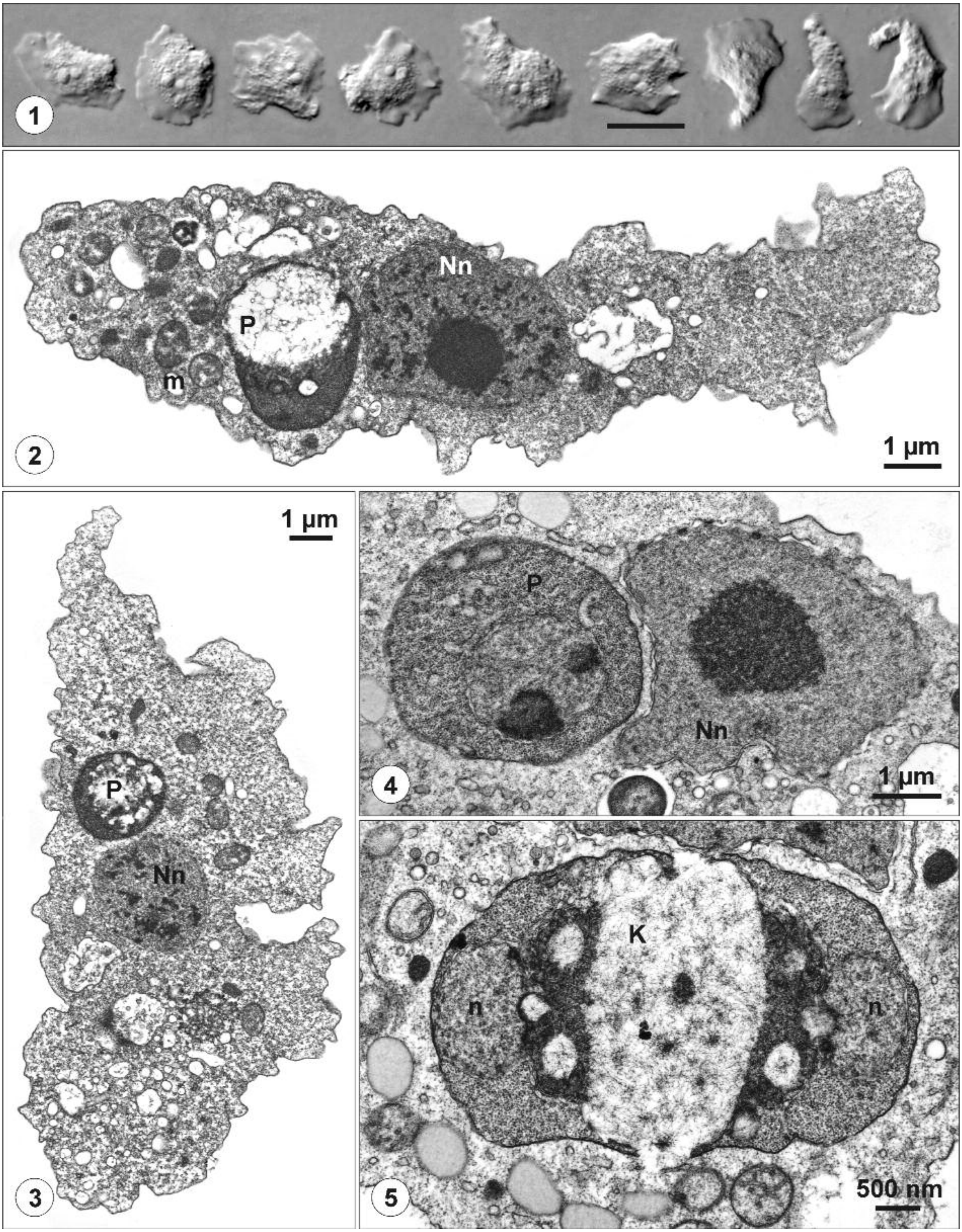

Plate 105. AFSM3 strain of *Neoparamoeba branchiphila* isolated from gills of turbot, *Scophthalmus maximus* (L.) farmed in NW Spain; cultured on MY75S agar; stored in CC since 2000; GenBank Acc. No. of SSU rDNA sequence AY193726, PLO SSU EU331002, SL AY163350. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC), scale bar = 20 µm. **Figs. 2, 3.** Overview of fine structure of trophozoites: *Neoparamoeba* nuclei (Nn), mitochondria (m), *Perkinsela amoebae*-like endosymbionts (P). **Fig. 4.** Endosymbiont (P) closely apposed to *Neoparamoeba* nucleus (Nn). **Fig. 5.** Bipolar symmetry of P seen in ultrathin section, nuclei (n), kinetoplast (K). Ref.: Dyková et al. 2005b, 2008b.

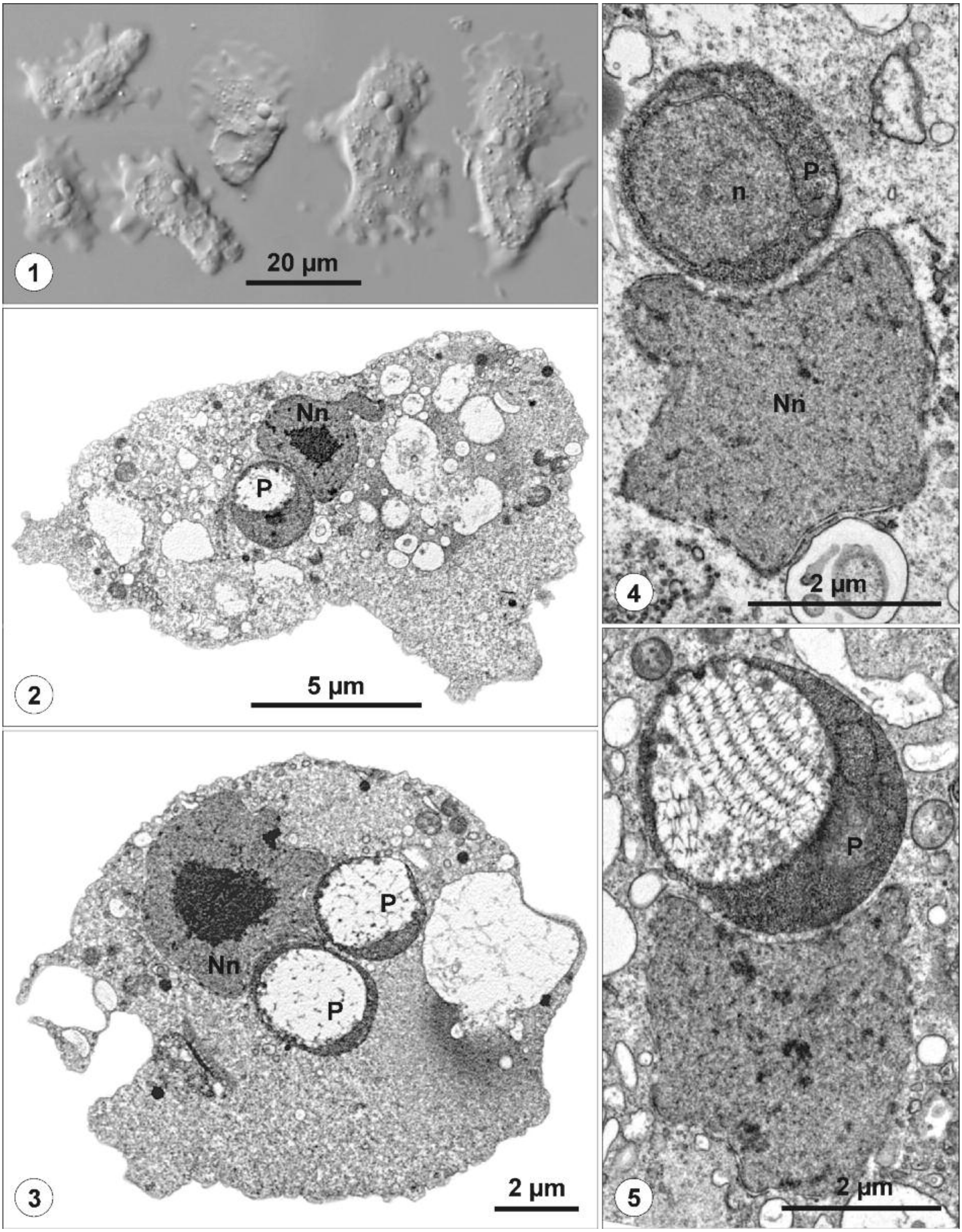

Plate 106. AMOPI strain of *Neoparamoeba branchiphila* isolated from stony sea urchin, *Paracentrotus lividus* (Lamarck) collected in Cretan Sea, Karpathos Island, Greece; cultured on MY75S agar; stored in CC since 2005; GenBank Acc. No. of SSU rDNA sequence EF675600, PLO SSU EU331028, SL EU331054, ITS EU884449. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of trophozoite ultrastructure: nuclei (Nn), *Perkinsela amoebae*-like endosymbionts (P). **Fig. 4.** P in close vicinity of amoeba nucleus (Nn) sectioned transversely through one pole, P nucleus (n). **Fig. 5.** P with regularly arranged strands of kinetoplastid DNA. Ref.: Dyková et al. 2007b, 2008b.

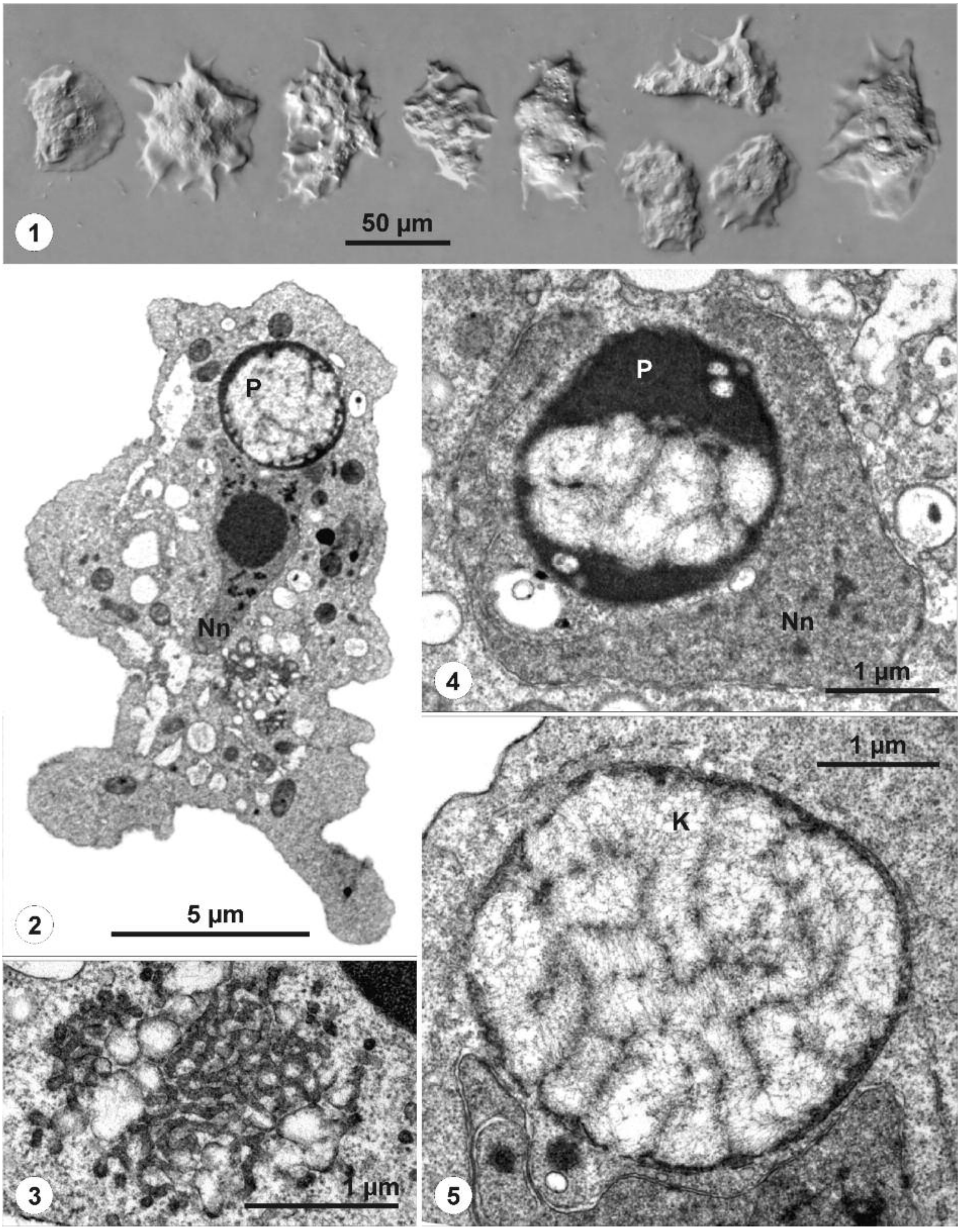

Plate 107. FRS strain of *Neoparamoeba pemaquidensis* isolated from gills of Atlantic salmon, *Salmo salar* L. from AGD infection tank, University of Tasmania, Australia; cultured on MY75S agar; stored in CC since 2003; GenBank Acc. No. of SSU rDNA sequence AY714356, PLO SSU EU331003, SL EU331037, ITS EU884450. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Overview of trophozoite ultrastructure: nucleus (Nn) and closely apposed *Perkinsela amoebae*-like endosymbiont (P). **Fig. 3.** Golgi cisternae in transverse section. **Fig. 4.** Detail of P, almost completely enclosed by *Neoparamoeba* nucleus (Nn). **Fig. 5.** Section of P at the level of kinetoplast (K) shows arrangement of DNA strands. Ref.: Dyková et al. 2008b.

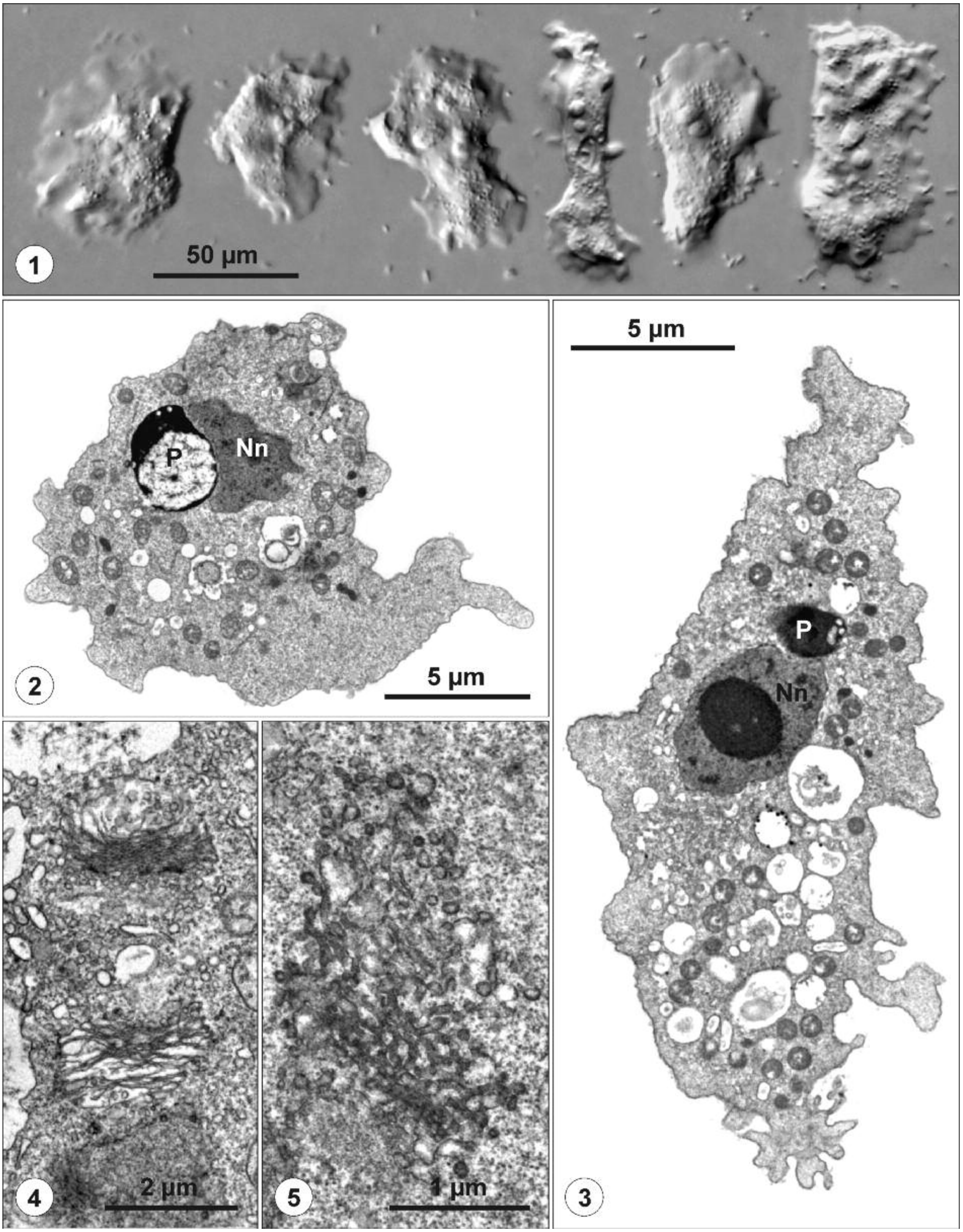

Plate 108. GillNOR1 strain of *Neoparamoeba pemaquidensis* isolated from gills of Atlantic salmon, *Salmo salar* L. from D'Entrecasteaux Channel, Bruny Island, Tasmania, Australia; cultured on MY75S agar; stored in CC since 2002; GenBank Acc. No. of SSU rDNA sequence AY714352, LSU EF216912, PLO SSU EU331020, SL EU331046, ITS EU884451. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of ultrastructure of trophozoites: nuclei (Nn), *Perkinsela amoebae*-like endosymbionts (P) closely apposed to amoeba nuclei. **Figs. 4, 5.** Golgi cisternae in different planes of sectioning. Ref.: Dyková et al. 2008b; Young et al. 2008.

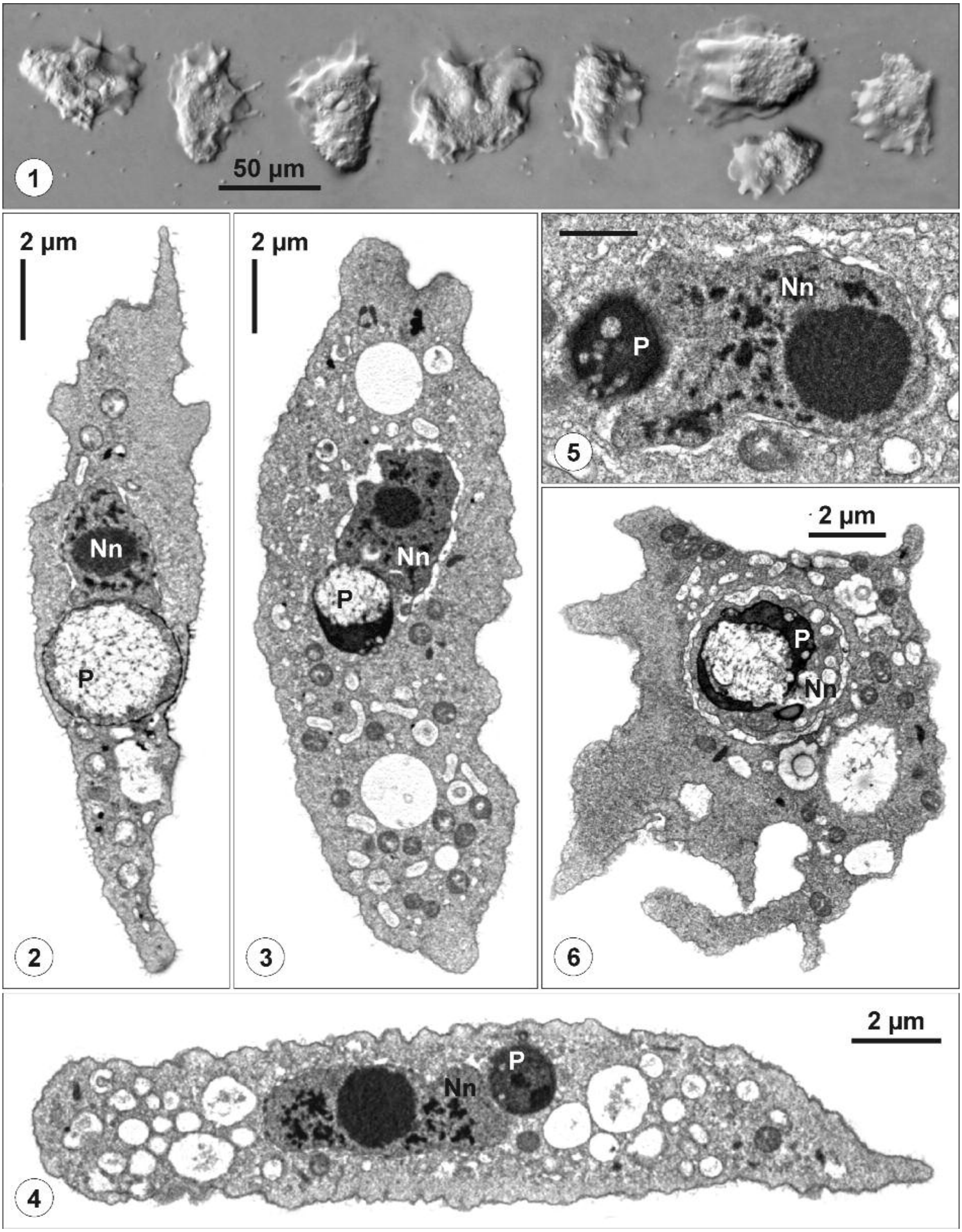

Plate 109. GillNOR2 strain of *Neoparamoeba pemaquidensis* isolated from gills of Atlantic salmon, *Salmo salar* L. from D'Entrecasteaux Channel, Bruny Island, Tasmania, Australia; cultured on MY75S agar; stored in CC since 2002; GenBank Acc. No. of SSU rDNA sequence AY714354, PLO SSU EU331007, SL EU331040, ITS EU884452. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3, 4.** Overview of trophozoite ultrastructure: nuclei (Nn), *Perkinsela amoebae*-like endosymbionts (P) in various stages of their development. **Fig. 5.** P closely apposed to amoeba nucleus (Nn), scale bar = 1 µm. **Fig. 6.** P encircled by amoeba nucleus. Ref.: Dyková et al. 2008b; Young et al. 2008.

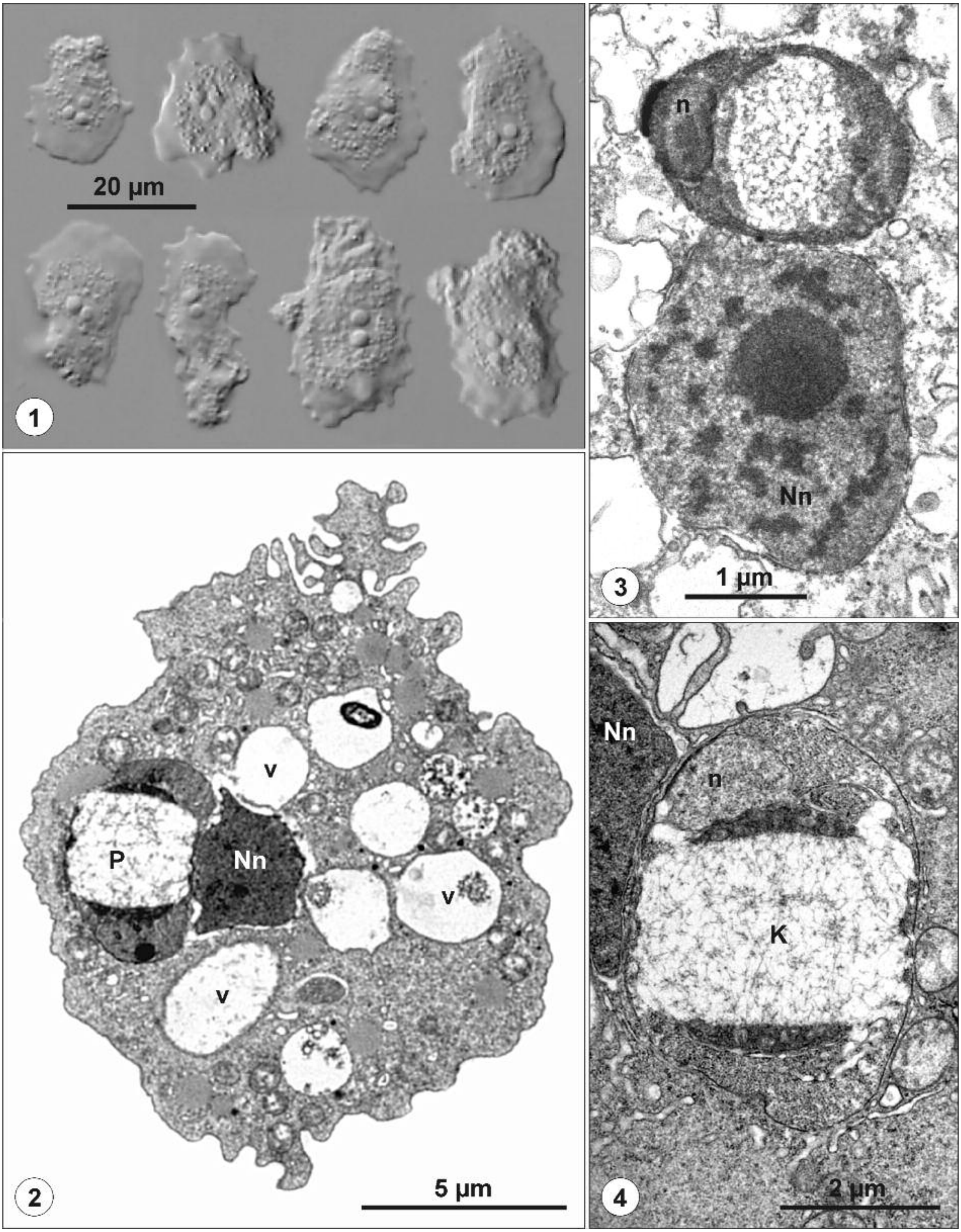

Plate 110. LITHON strain of *Neoparamoeba pemaquidensis* isolated from surface material on red alga, *Lithophyllum racemus* (Lamarck) collected in Norwegian Sea, off Vevang, Trondheim, Norway; cultured on MY75S agar; stored in CC since 2006; GenBank Acc. No. of SSU rDNA sequence EU331036, PLO SSU EU331034, SL EU331057, ITS EU884454. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Overview of trophozoite ultrastructure: nucleus (Nn), *Perkinsela amoebae*-like organism (P), vacuoles (v). **Figs. 3, 4.** Details of ultrastructure of bipolarly symmetrical P stages apposed to trophozoite nucleus (Nn): nuclei of Ps (n), kinetoplast (K). Ref.: Dyková et al. 2008b.

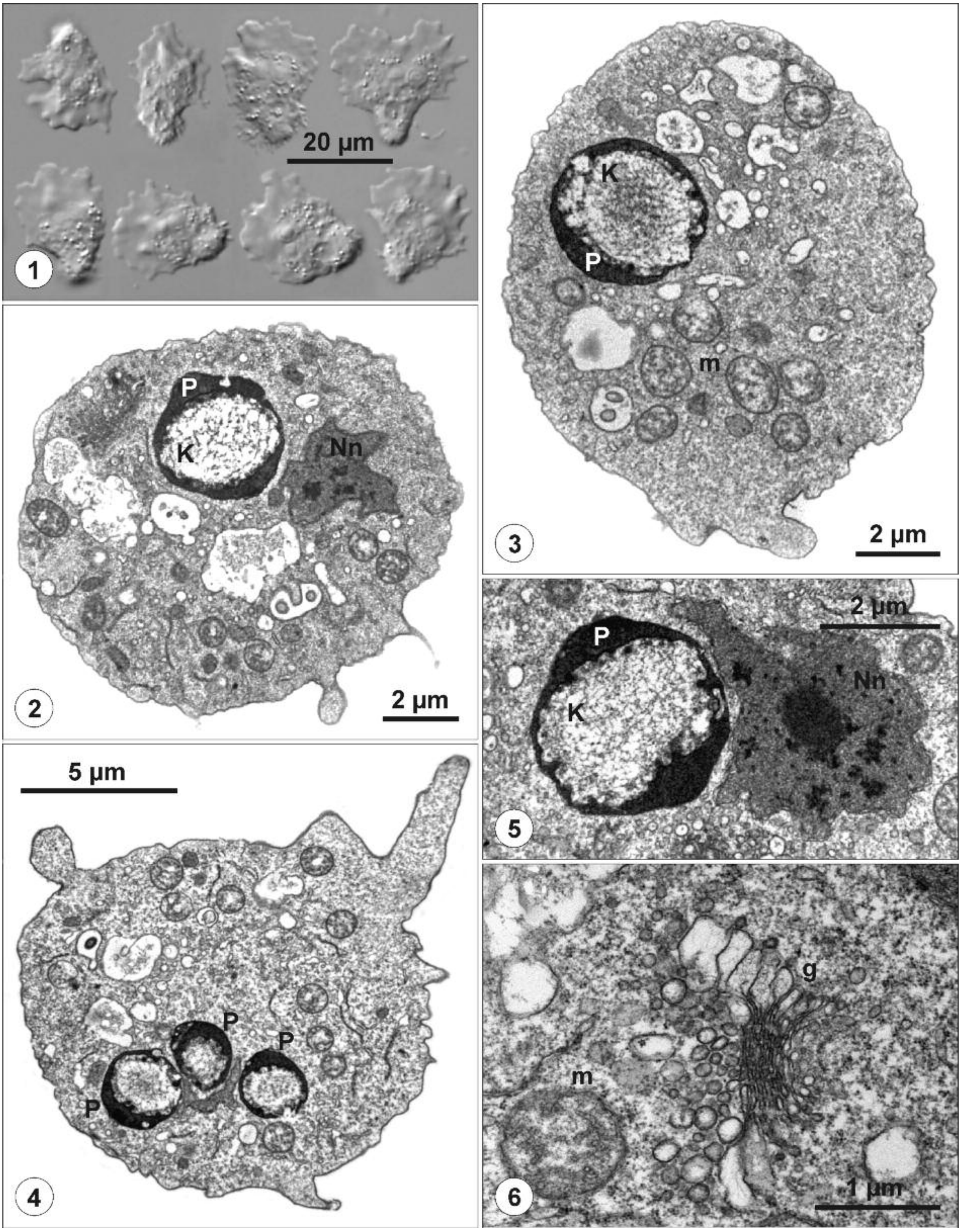

Plate 111. NET12AFL strain of *Neoparamoeba pemaquidensis* isolated from net material of Atlantic salmon sea-cages in Huon estuary, Tasmania, Australia; cultured on MY75S agar; stored in CC since 2004; GenBank Acc. No. of SSU rDNA sequence EF675604, PLO SSU EU331024, SL EU331050, ITS EU884455. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3, 4.** Overview of fine structure of trophozoites: nuclei (Nn), *Perkinsela amoebae*-like endosymbionts (P), kinetoplast (K), mitochondria (m). Note three Ps in the same plane of sectioning (Fig. 4). **Fig. 5.** Detail of P closely apposed to trophozoite nucleus (Nn). **Fig. 6.** Mitochondrion (m) and Golgi complex (g). Ref.: Dyková et al. 2007b, 2008b.

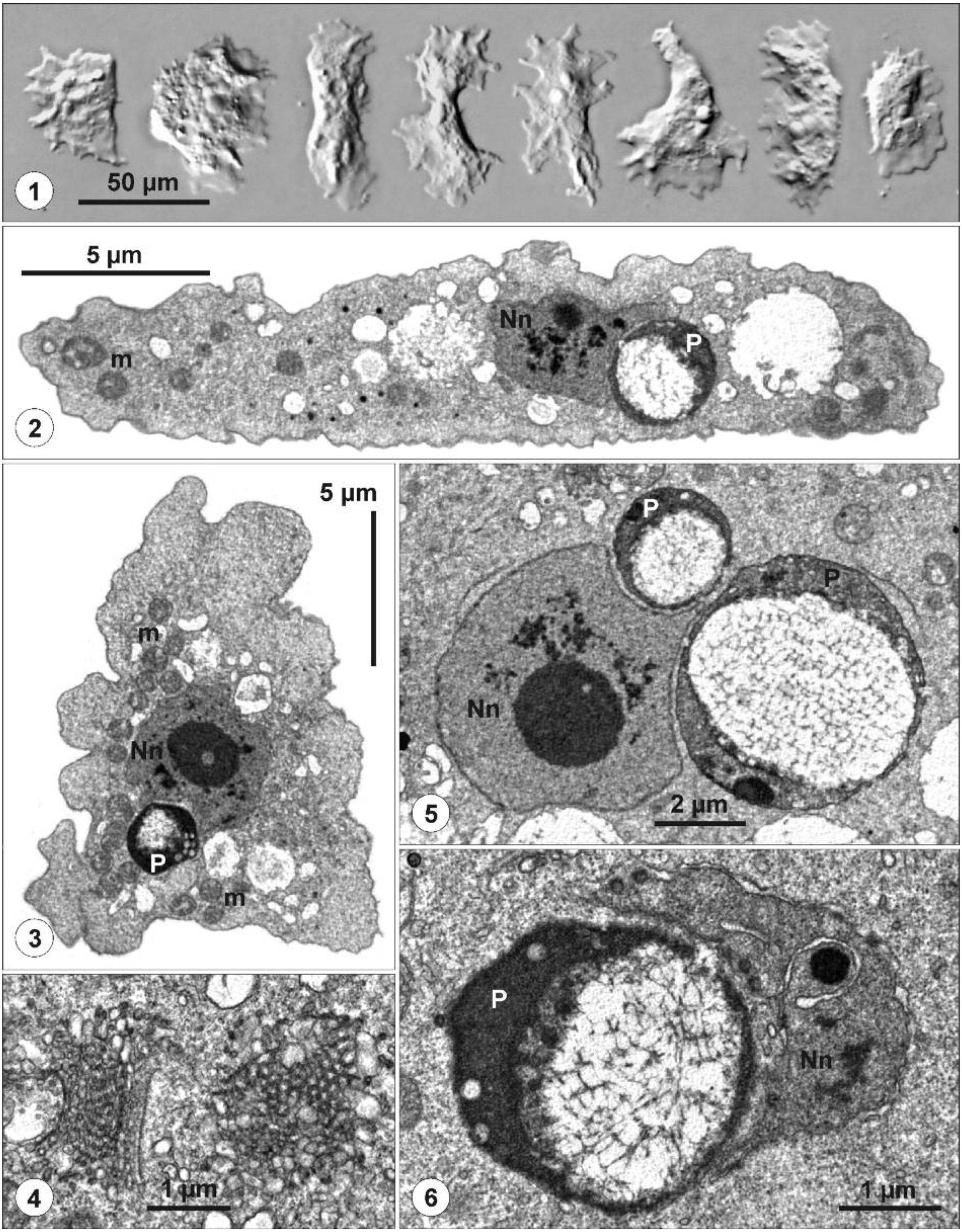

Plate 112. NETH2T3 strain of *Neoparamoeba pemaquidensis* isolated from net material of Atlantic salmon sea-cages, Huon estuary, Tasmania, Australia; cultured on MY75S agar; stored in CC since 2002; GenBank Acc. No. of SSU rDNA sequence AY714350, PLO SSU EU331010, SL EU331041, ITS EU884458. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of trophozoite ultrastructure: nuclei (Nn), mitochondria (m), *Perkinsela amoebae*-like endosymbionts (P) in different stages of development. **Fig. 4.** Golgi cisternae. **Figs. 5, 6.** Advanced stages of Ps closely apposed to trophozoite nuclei (Nn). Ref.: Dyková et al. 2008b; Young et al. 2008.

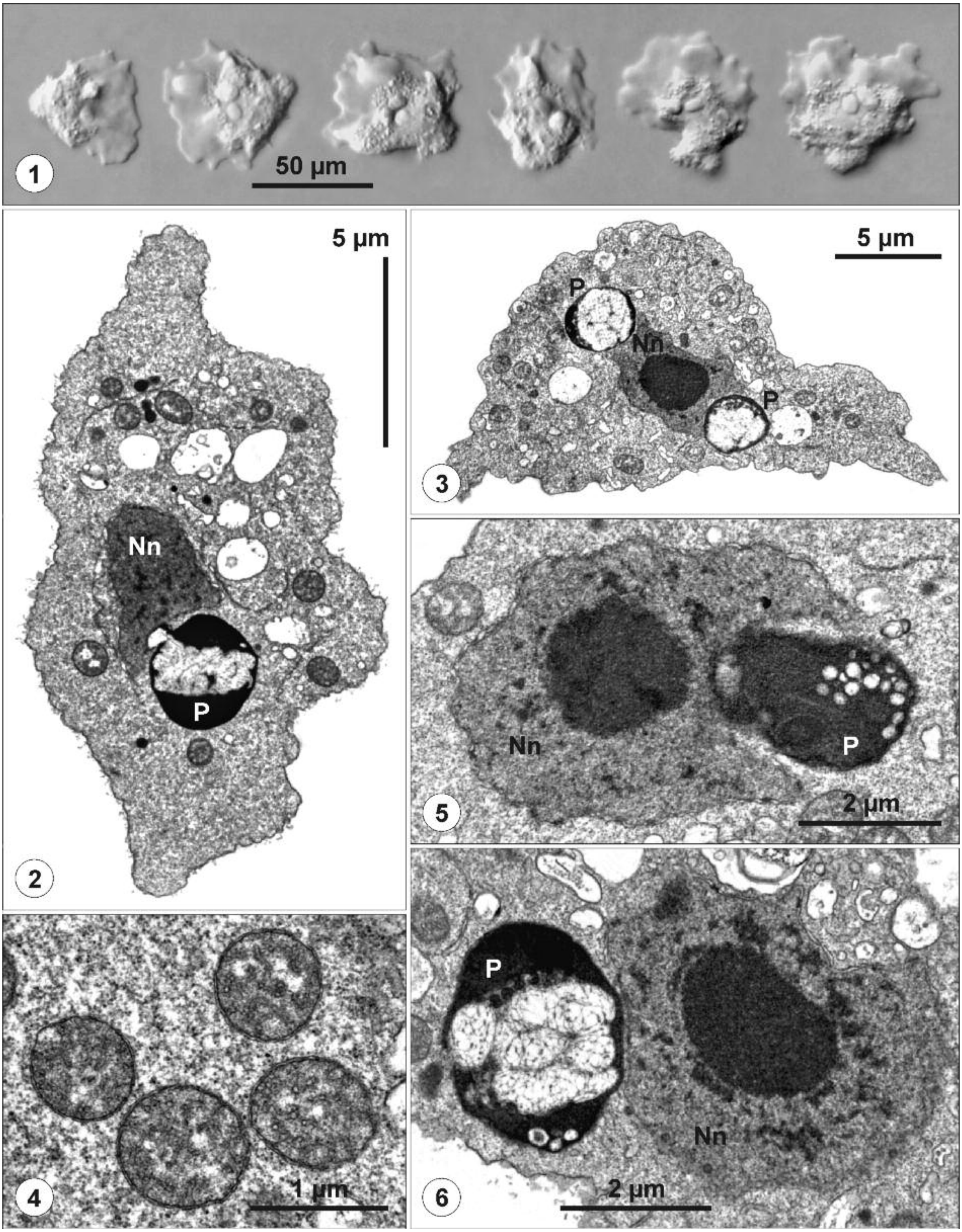

Plate 113. NP251002 strain of *Neoparamoeba pemaquidensis* isolated from gills of Atlantic salmon, *Salmo salar* L. from AGD infection tank, University of Tasmania, Australia; cultured on MY75S agar; stored in CC since 2002; GenBank Acc. No. of SSU rDNA sequence AY714351, LSU EF216913, PLO SSU EU331014, SL EU331042, ITS EU884459, EU884460, EU884461. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (Nn), *Perkinsela amoebae*-like endosymbionts (P) seen in different planes of sectioning. **Fig. 4.** Mitochondria with tubular cristae. **Figs. 5, 6.** Details of Ps and trophozoite nuclei (Nn). Ref.: Dyková et al. 2008b; Young et al. 2008.

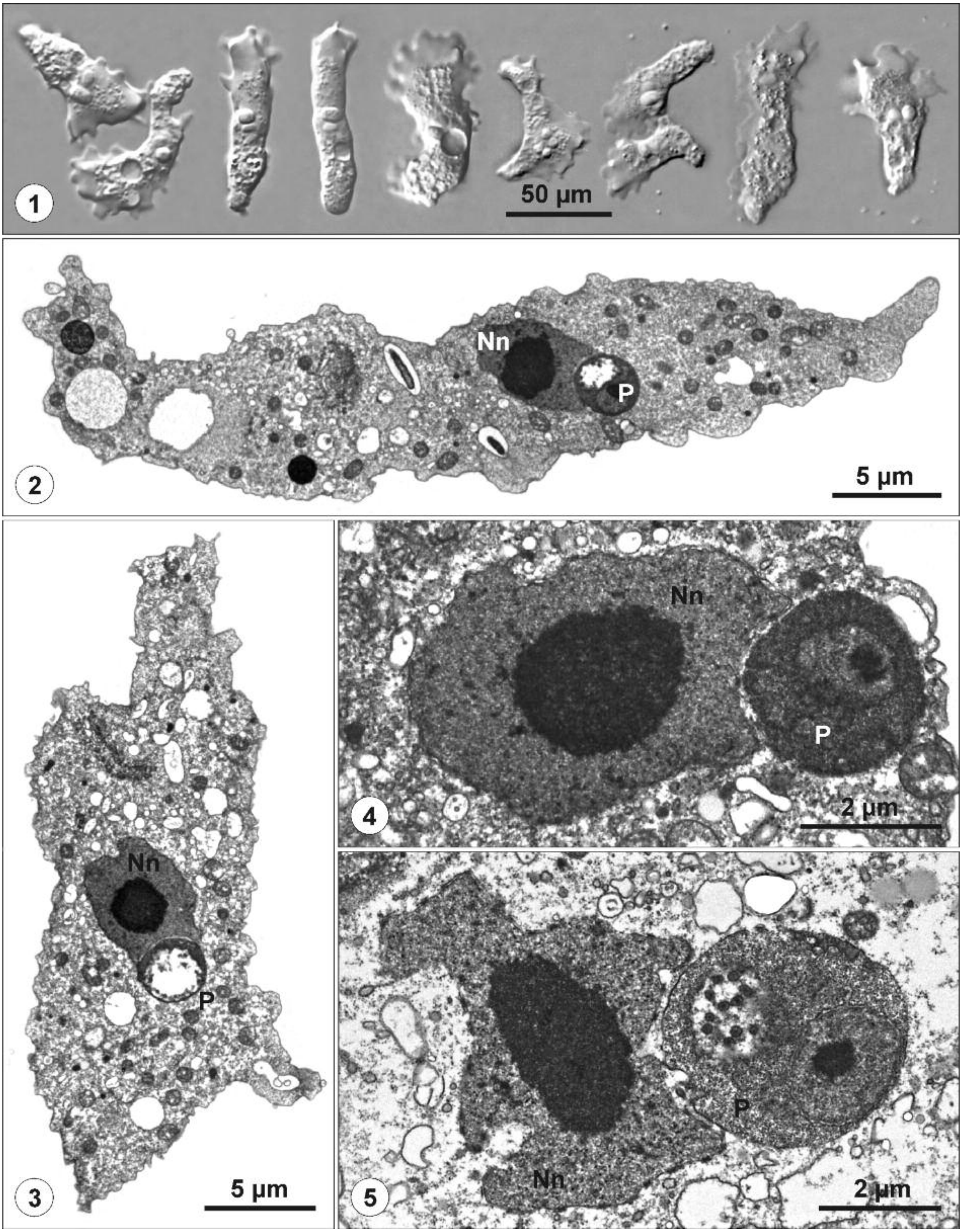

Plate 114. NRSS strain of *Neoparamoeba branchiphila* isolated from gills of Atlantic salmon, *Salmo salar* L. from AGD infection tank, University of Tasmania, Australia; cultured on MY75S agar; stored in CC since 2002; GenBank Acc. No. of SSU rDNA sequence AY714367, LSU EF216914, PLO SSU EU331004, SL EU331060, ITS EU884462, EU884463, EU884464. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (Nn), *Perkinsela amoebae*-like endosymbionts (P). **Figs. 4, 5.** Details demonstrating close apposition of nuclei of *N. branchiphila* (Nn) and Ps. Ref.: Dyková et al. 2005b, 2008b; Young et al. 2008.

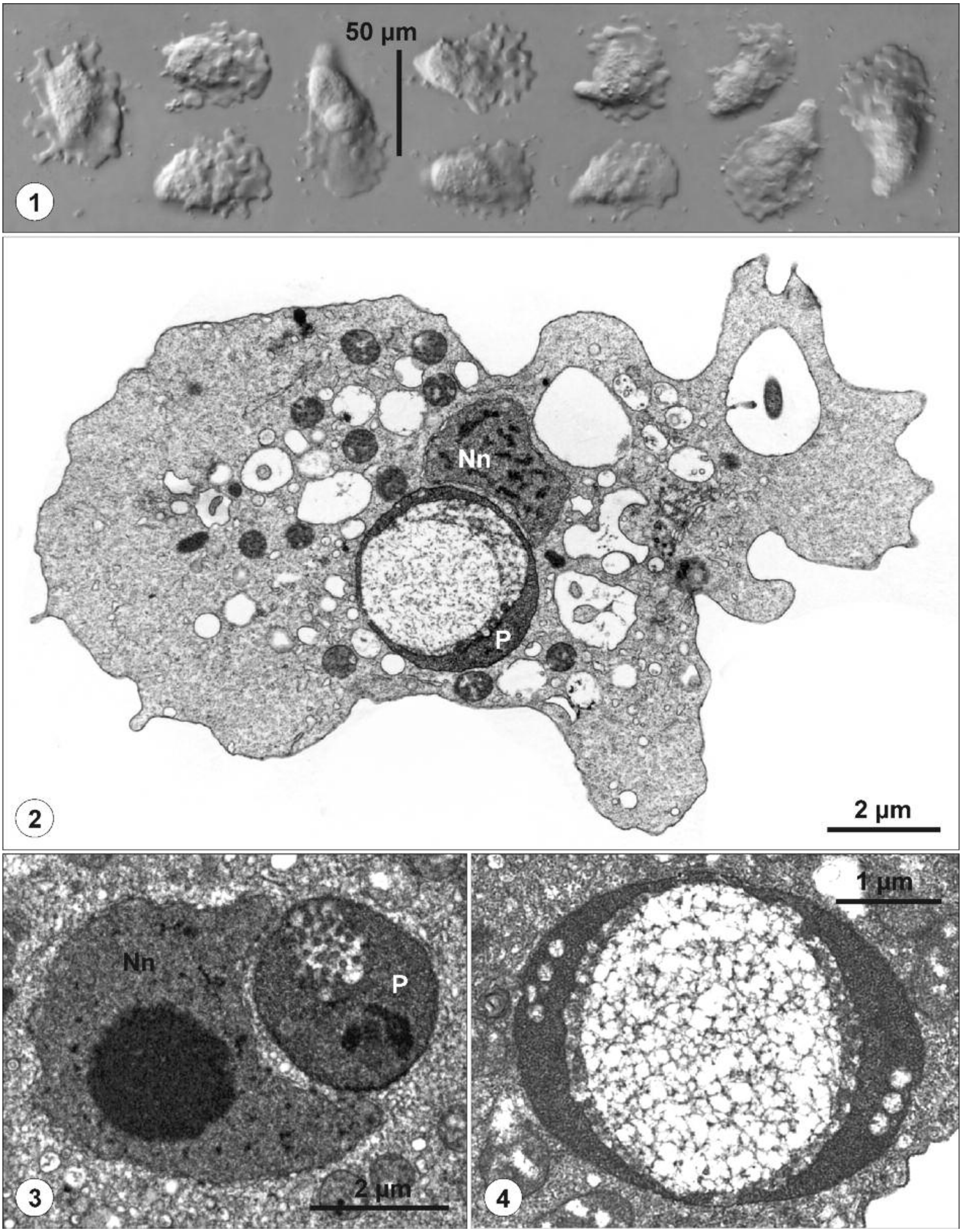

Plate 115. PA027 strain of *Neoparamoeba pemaquidensis* isolated from gills of Atlantic salmon, *Salmo salar* L. from Dover, Tasmania, Australia; stored as reference Tasmanian strain since 1994; cultured on MY75S agar; stored in CC since 2002; GenBank Acc. No. of SSU rDNA sequence AY714358, LSU EF216915, PLO SSU EU331005, SL EU331061, ITS EU884465. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Overview of trophozoite ultrastructure: nucleus (Nn), *Perkinsela amoebae*-like endosymbiont (P), mitochondria, vacuoles. **Fig. 3.** P partly encircled by nucleus of *Neoparamoeba* (Nn). **Fig. 4.** Advanced stage of bipolarly symmetrical P. Ref.: Fiala and Dyková 2003; Dyková et al. 2008b; Young et al. 2008.

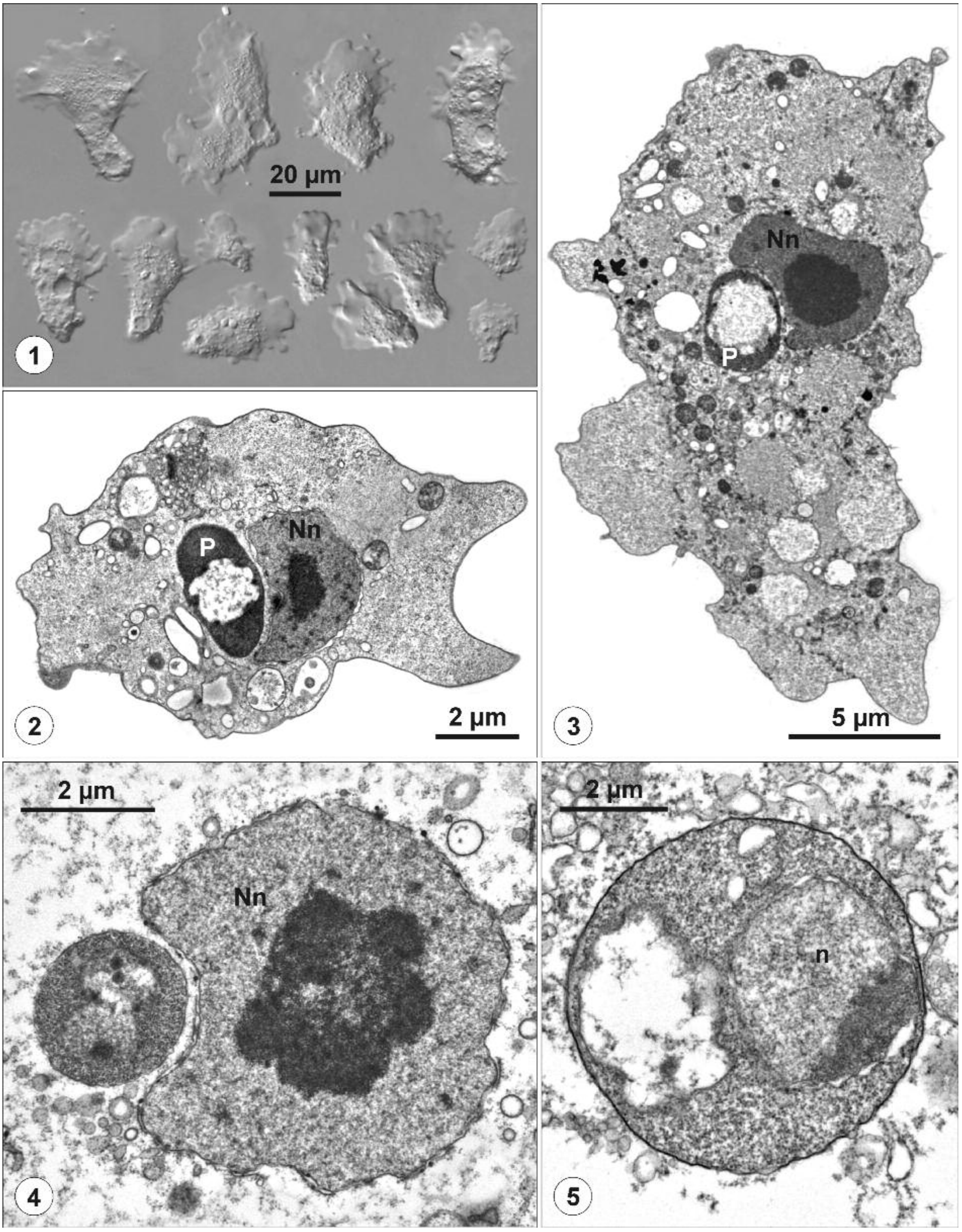

Plate 116. RP strain of *Neoparamoeba branchiphila* isolated from blue crab, *Callinectes sapidus* Rathbun, collected in Gulf of Mexico shore, Biloxi, Mississippi, USA; cultured on MY75S agar; stored in CC since 2005; GenBank Acc. No. of SSU rDNA sequence EF675603, PLO SSU EU331025, SL EU331051. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (Nn), PLO (P). **Fig. 4.** Typical position of *Perkinsela amoebae*-like endosymbiont in close vicinity of *Neoparamoeba* nucleus (Nn). **Fig. 5.** Detail of bipolar P ultrastructure with one nucleus (n) and central part of kinetoplast (strands of DNA usually are not well preserved). Ref.: Dyková et al. 2007b, 2008b.

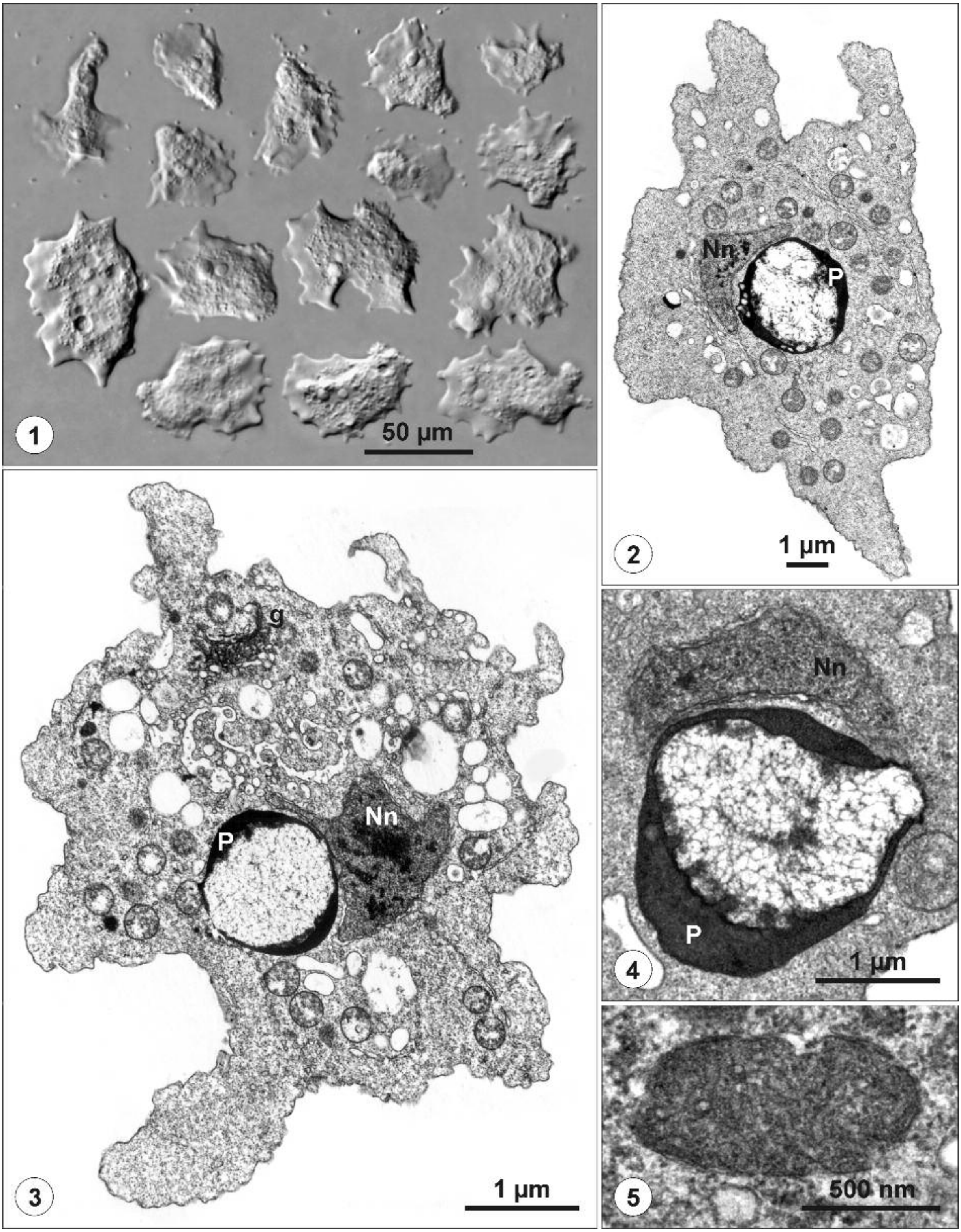

Plate 117. SEDC strain of *Neoparamoeba pemaquidensis* isolated from sediments under Atlantic salmon sea-cages in Bicheno, Tasmania, Australia; cultured on MY75S agar; stored in CC since 2002; GenBank Acc. No. of SSU rDNA sequence AY 714353, PLO SSU EU331006, SL EU331039, ITS EU884474. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (Nn), *Perkinsela amoebae*-like organisms (P), Golgi complex (g). **Fig. 4.** Detail of close apposition of amoeba nucleus (Nn) and P with not well preserved kinetoplast strands of DNA. **Fig. 5.** Mitochondrion of amoeba trophozoite. Ref.: Dyková et al. 2008b.

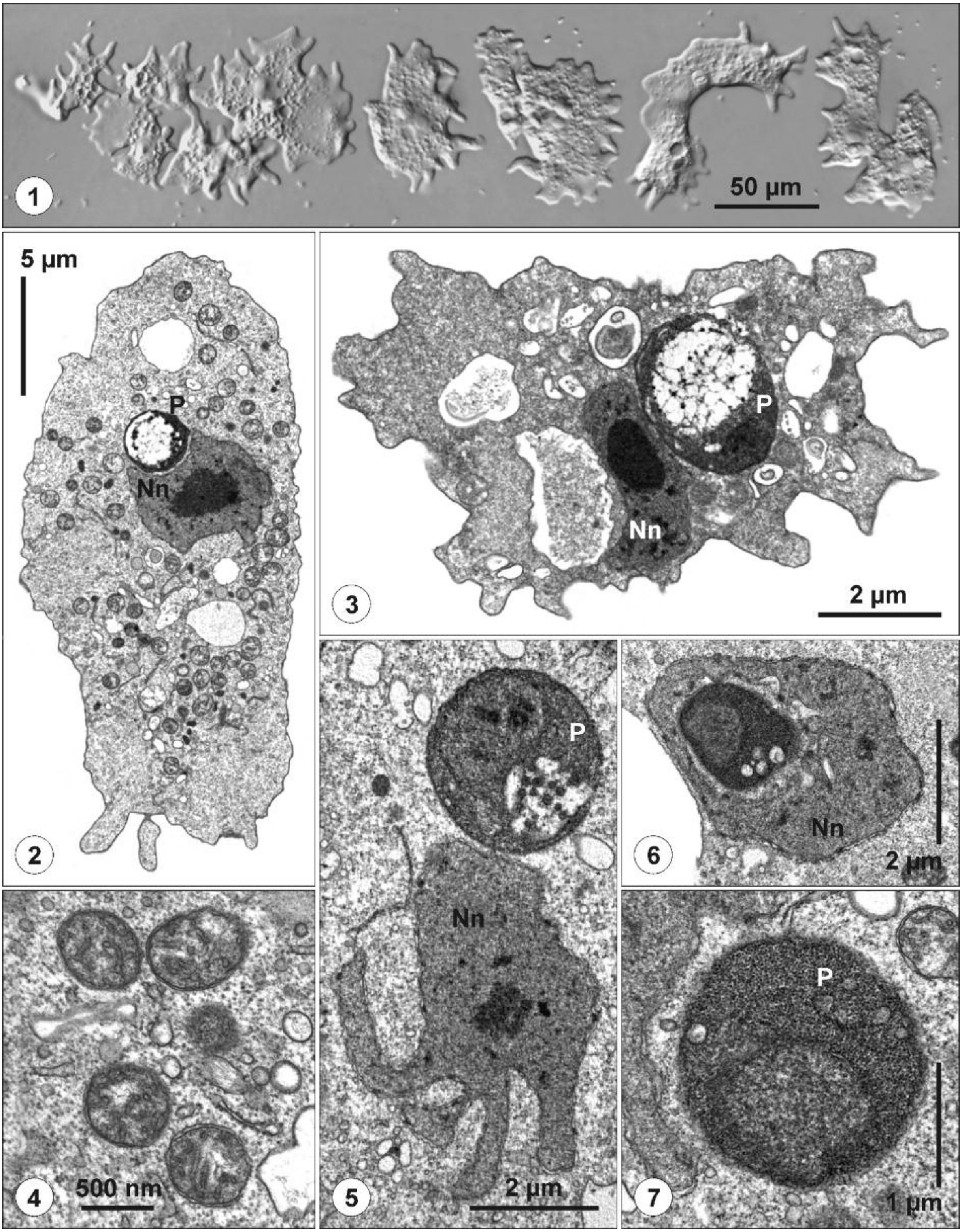

Plate 118. SEDMH1 strain of *Neoparamoeba branchiphila* isolated from sediments under Atlantic salmon sea-cages in Maquari Harbour, Tasmania, Australia; cultured on MY75S agar; stored in CC since 2002; GenBank Acc. No. of SSU rDNA sequence AY714366, LSU EF216917, PLO SSU EU331016, SL EU331043, ITS EU884478. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (Nn), *Perkinsela amoebae*-like endosymbionts (P). **Fig. 4.** Mitochondria with tubular cristae. **Fig. 5.** P in close vicinity of lobose nucleus of *Neoparamoeba* (Nn). **Fig. 6.** P completely enveloped by amoeba nucleus (Nn). **Fig. 7.** Detail of early stage of P. Ref.: Dyková et al. 2008b; Young et al. 2008.

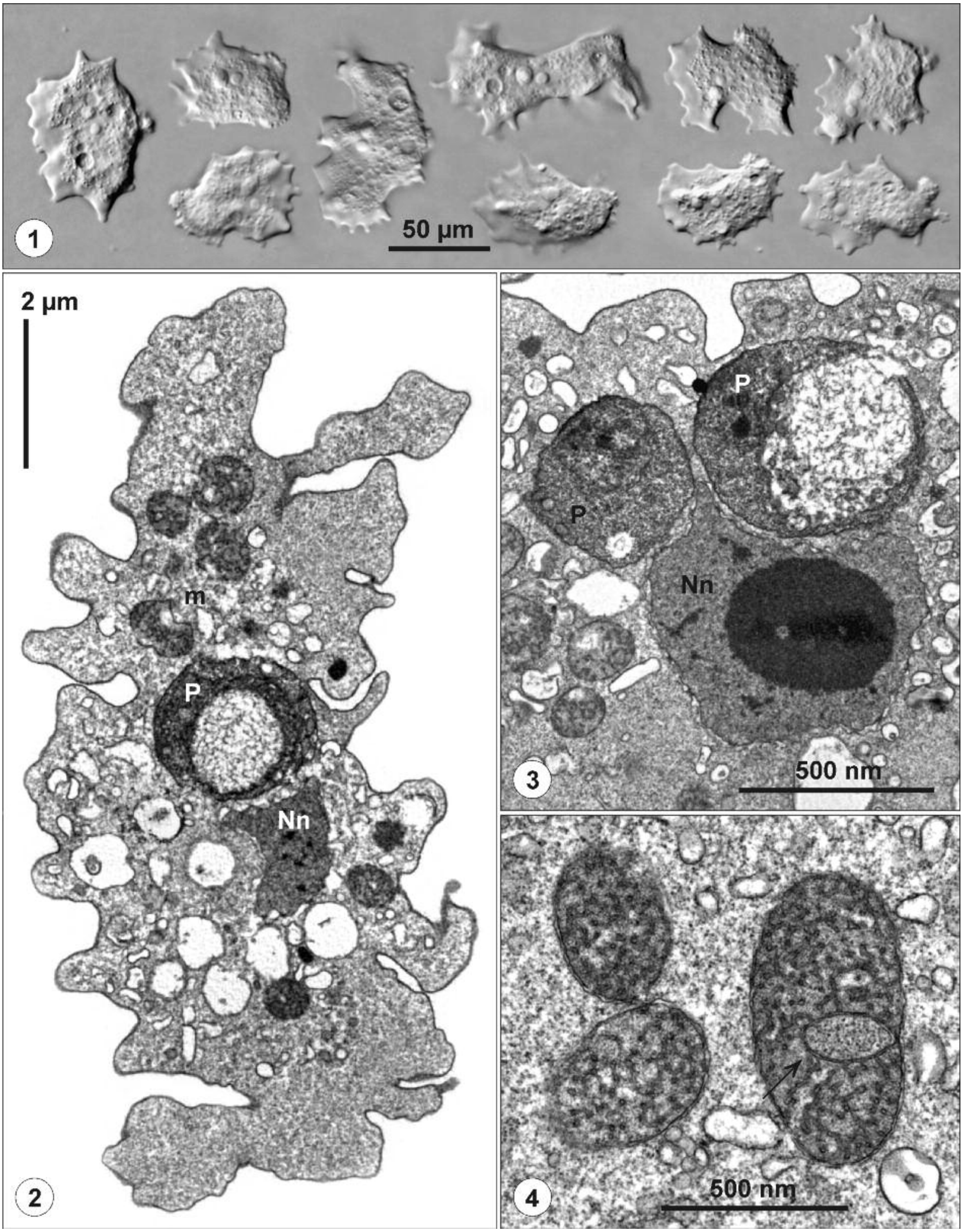

Plate 119. SEDST1 strain of *Neoparamoeba pemaquidensis* isolated from sediments under Atlantic salmon sea-cages in Stringers Cove, Tasman Peninsula, Australia; cultured on MY75S agar; stored in CC since 2002; GenBank Acc. No. of SSU rDNA sequence AY714359, PLO SSU EU331033, SL EU33103, ITS EU884479. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Overview of trophozoite ultrastructure: nucleus (Nn), *Perkinsela amoebae*-like organism (P), mitochondria (m). **Fig. 3.** Detail of two Ps closely apposed to amoeba nucleus (Nn). **Fig. 4.** Mitochondria with tubular cristae; pseudoinclusion marked with arrow. Ref.: Dyková et al. 2008b.

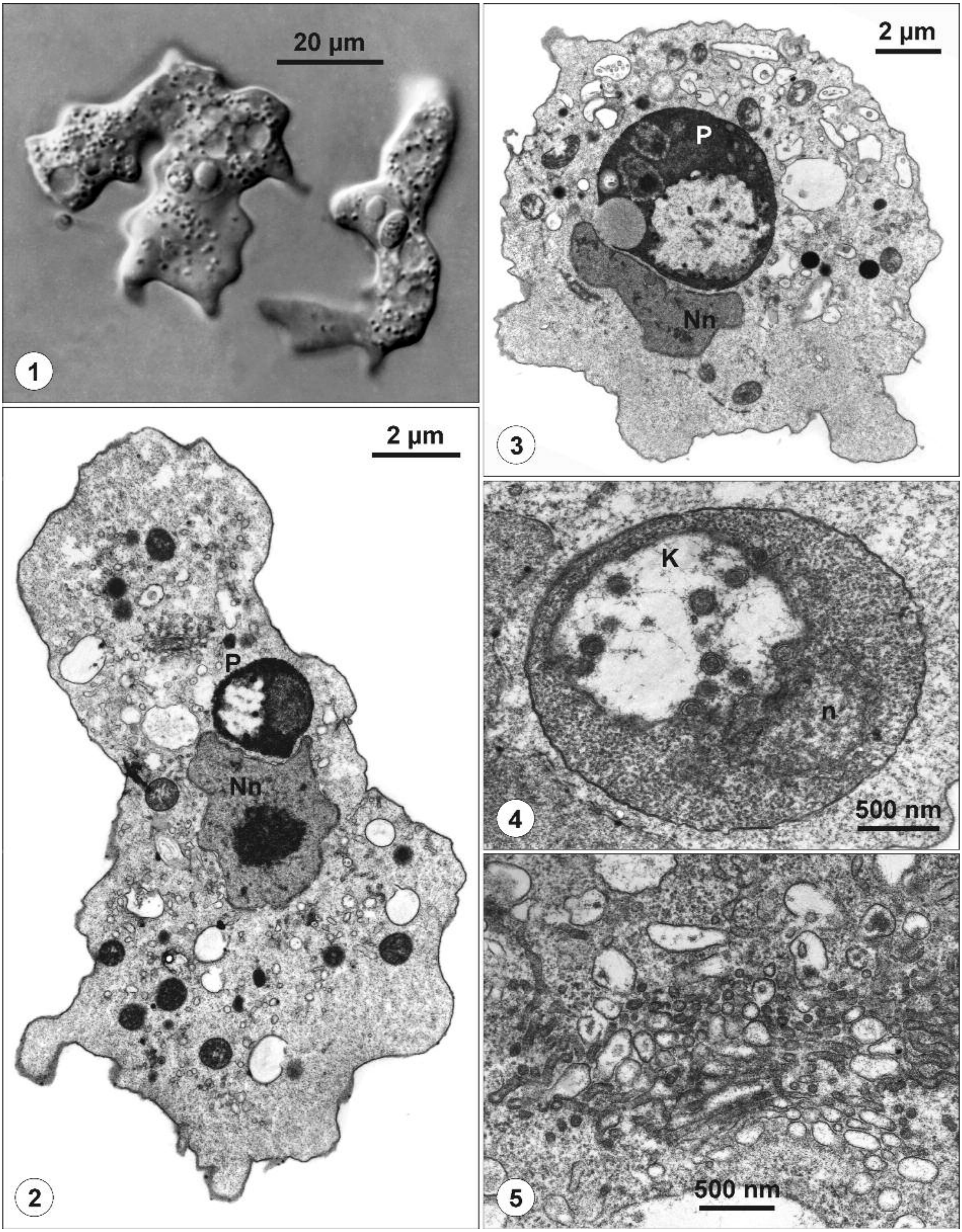

Plate 120. SM68 strain of *Neoparamoeba branchiphila* isolated from gills of turbot, *Scophthalmus maximus* (L.) farmed in NW Spain; characterized at the level of light and transmission electron microscopy and using molecular markers, but no more cryopreserved; GenBank Acc. No. of SSU rDNA sequence AY193725, PLO SSU EU331011, SL AY163351, ITS EU884480. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (Nn), *Perkinsela amoebae*-like endosymbionts (P). **Fig. 4.** Detail of P ultrastructure: part of kinetoplast (K), nucleus (n). **Fig. 5.** Golgi complex of amoeba trophozoite. Ref.: Fiala and Dyková 2003, Dyková et al. 2005b, 2008b.

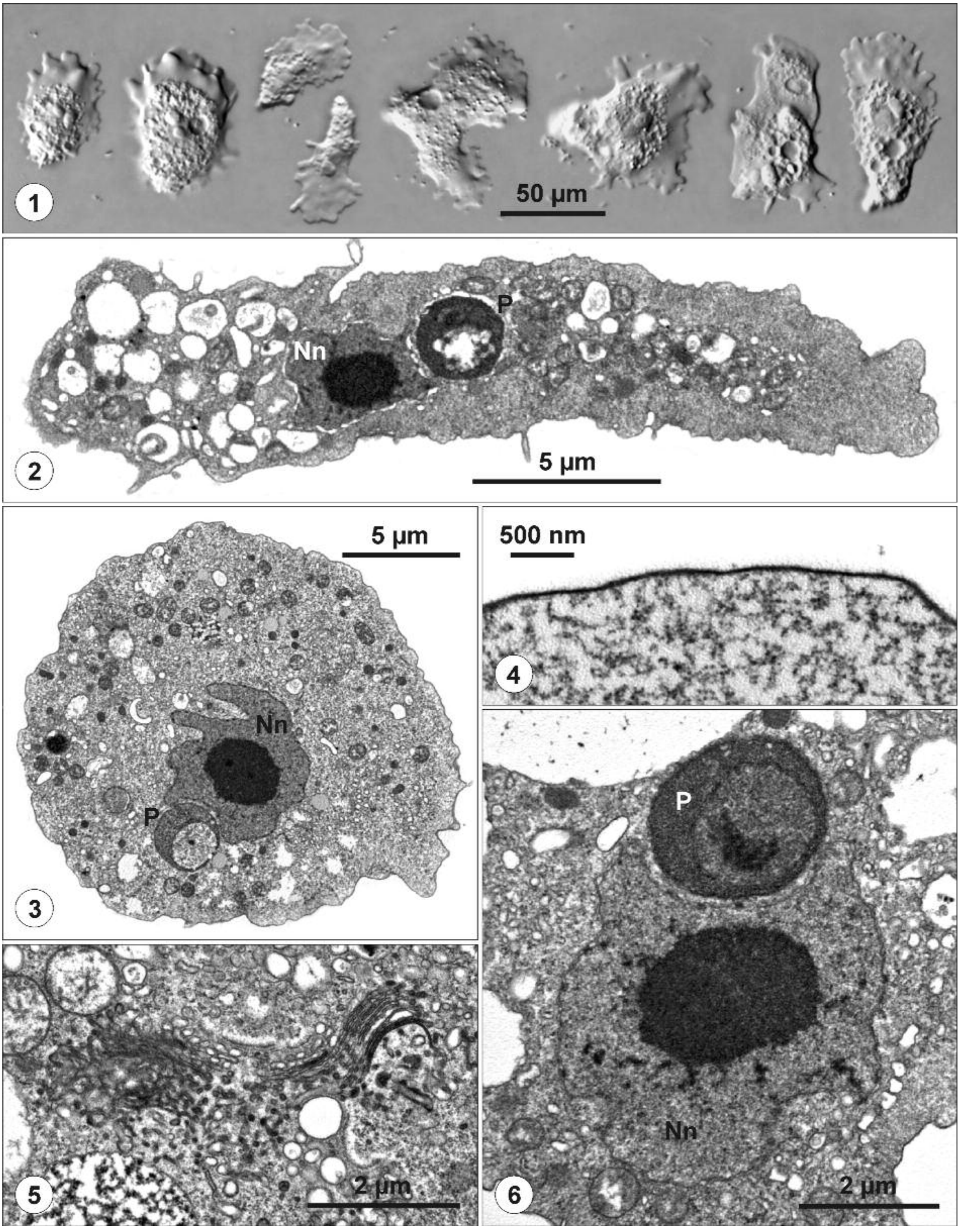

Plate 121. ST4N strain of *Neoparamoeba branchiphila* isolated from gills of Atlantic salmon, *Salmo salar* L. from sea-cage in Huon estuary, Dover, Tasmania, Australia; cultured on MY75S agar; stored in CC since 2002; GenBank Acc. No. of SSU rDNA sequence SSU rDNA AY714365, LSU EF21691, PLO SSU EU33100, SL EU331058. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (Nn), *Perkinsela amoebae*-like endosymbionts (P). **Fig. 4.** Cell surface of amoeba trophozoite. **Fig. 5.** Detail of Golgi complex. **Fig. 6.** P in close vicinity of amoeba nucleus (Nn). Ref.: Dyková et al. 2005b, 2008b; Young et al. 2008.

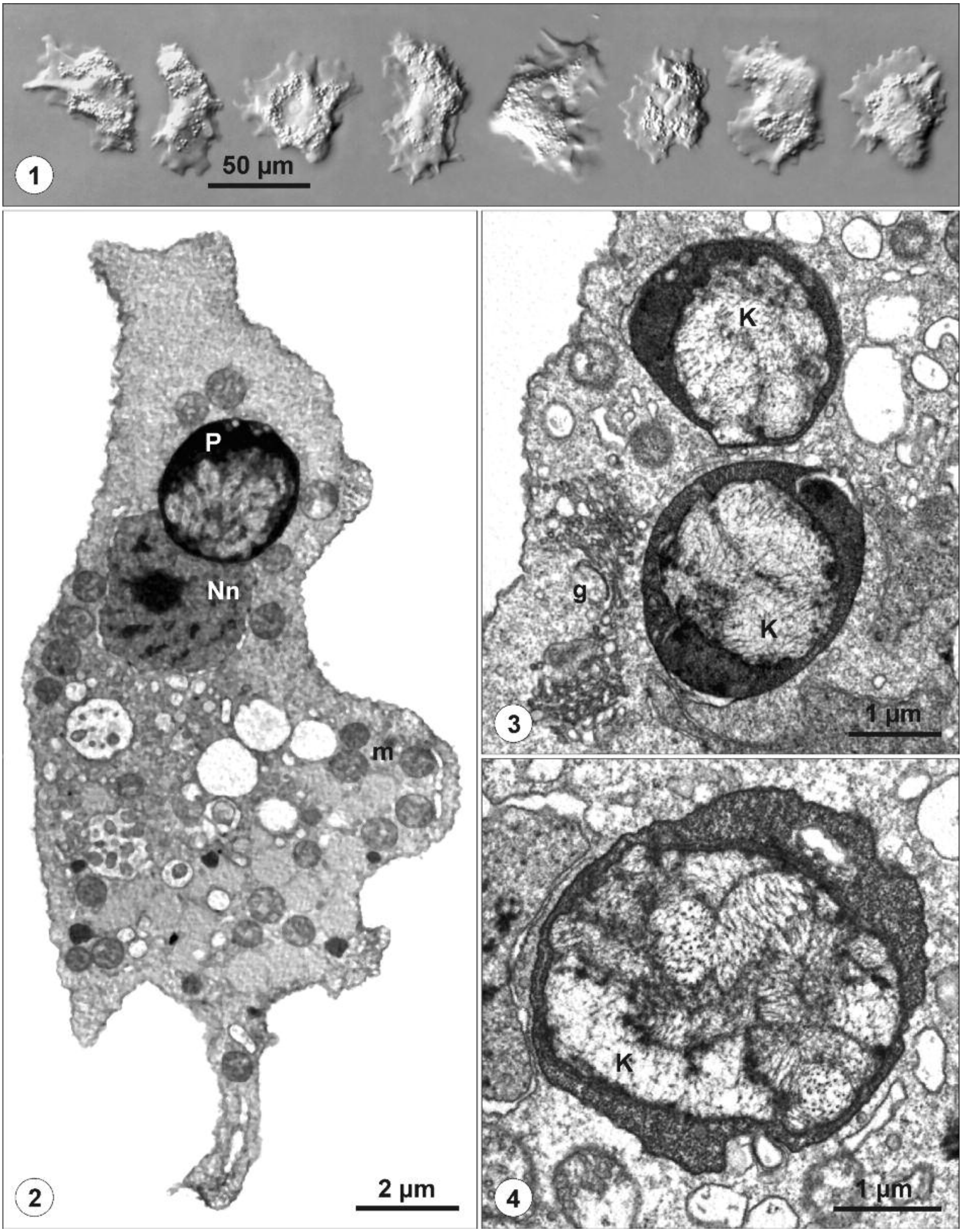

Plate 122. ST8V strain of *Neoparamoeba pemaquidensis* isolated from gills of Atlantic salmon, *Salmo salar* L. from sea-cage in Huon estuary, Dover, Tasmania, Australia; cultured on MY75S agar; stored in CC since 2002; GenBank Acc. No. of SSU rDNA sequence AY714355, PLO SSU EU331015, SL EU331059, ITS EU884492. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Overview of trophozoite ultrastructure: nucleus (Nn), *Perkinsela amoebae*-like endosymbiont (P), mitochondria (m). **Figs. 3, 4.** Details of Golgi complex (g) and P ultrastructure: kinetoplasts (K) with relatively well preserved strands of DNA. Ref.: Dyková et al. 2008b.

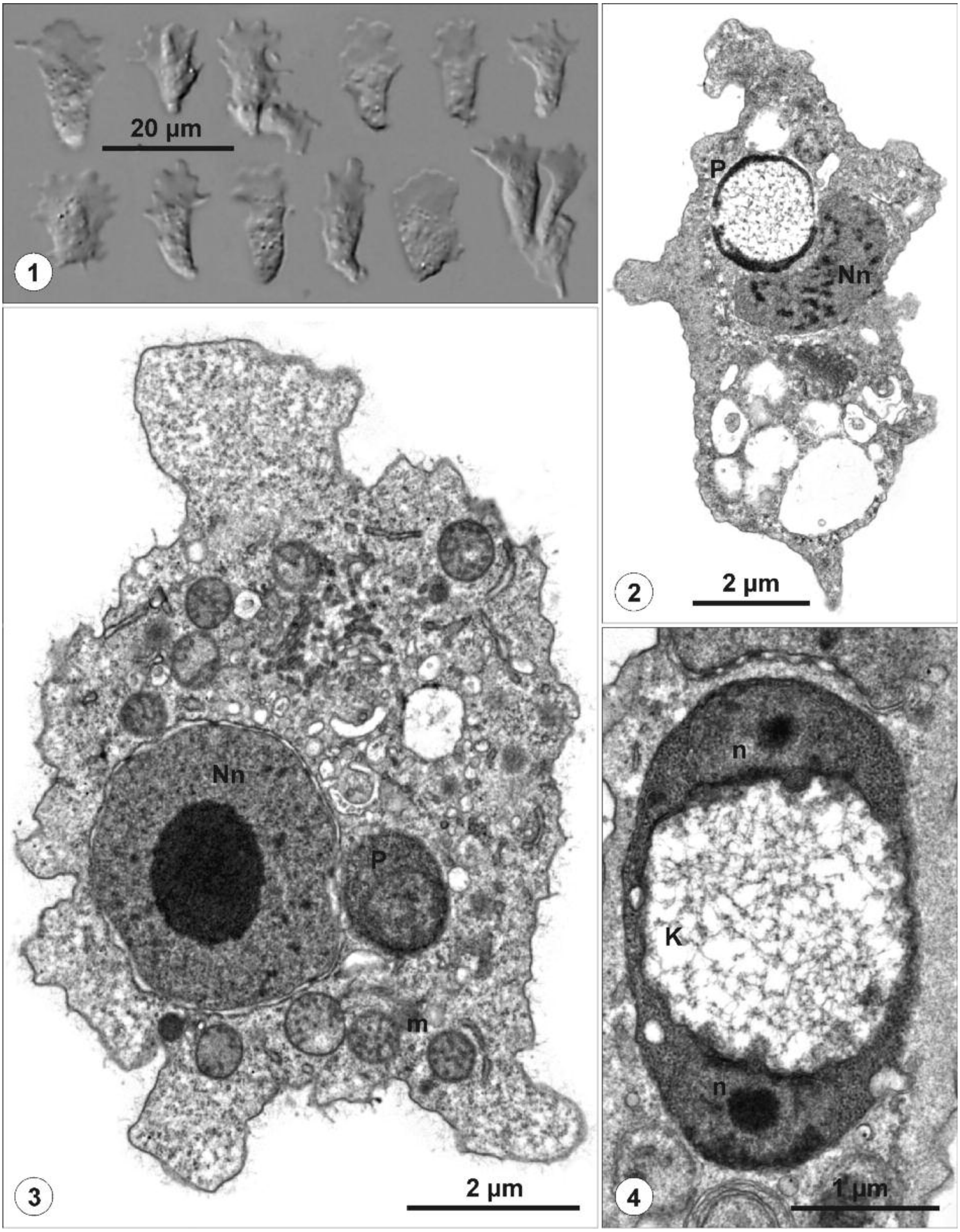

Plate 123. SU03 strain of *Neoparamoeba aestuarina* isolated from purple sea urchin, *Sphaerechinus granularis* (Lamarck) collected in Sumartin, Brač Island, Croatia; cultured on MY75S agar; stored in CC since 2006; GenBank Acc. No. of SSU rDNA sequence SSU rDNA EU331035, PLO SSU EU 331030, SL EU331056, ITS EU884481, EU884482, EU884483. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (Nn), *Perkinsela amoebae*-like endosymbionts (P), mitochondria (m). **Fig. 4.** Detail of ultrastructure of bipolar stage of P: nucleus (n), kinetoplast (K). Ref.: Dyková et al. 2008b; Young et al. 2008.

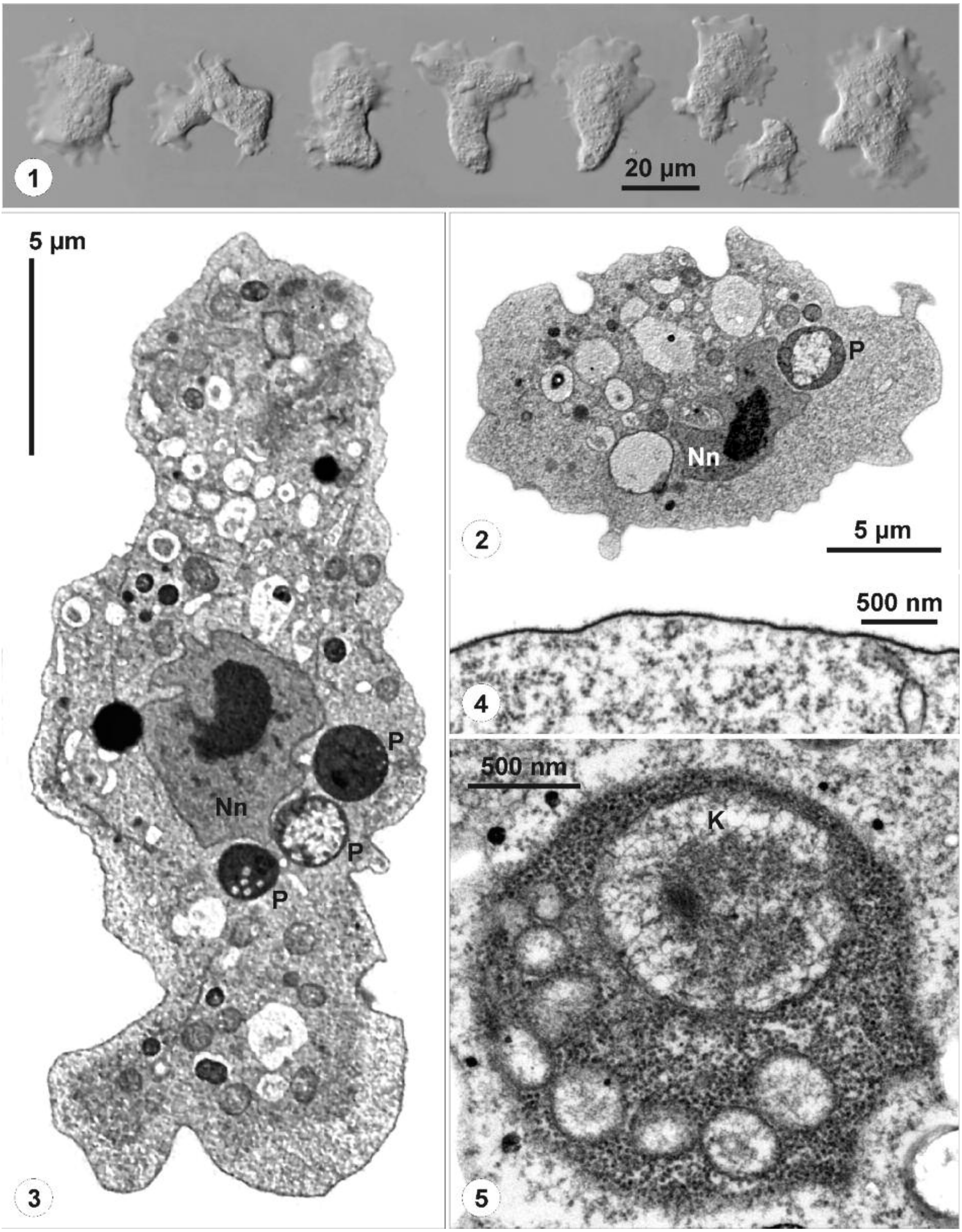

Plate 124. SU4 strain of *Neoparamoeba branchiphila* isolated from purple sea urchin, *Heliocidaris erythrogramma* (Valenciennes) collected from Tamar River, Georgetown, Tasmania, Australia; cultured on MY75S agar; stored in CC from 2005 to 2006, samples of DNA stored under FLA DB Nos. 530, 537; GenBank Acc. No. of SSU rDNA sequence EF675599, PLO SSU EU331029, SL EU331055, ITS EU884484. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (Nn), *Perkinsela amoebae*-like endosymbionts (P). **Fig. 4.** Cell surface of trophozoite. **Fig. 5.** Early P as seen in unusual plane of sectioning, kinetoplast (K). Ref.: Dyková et al. 2007b, 2008b.

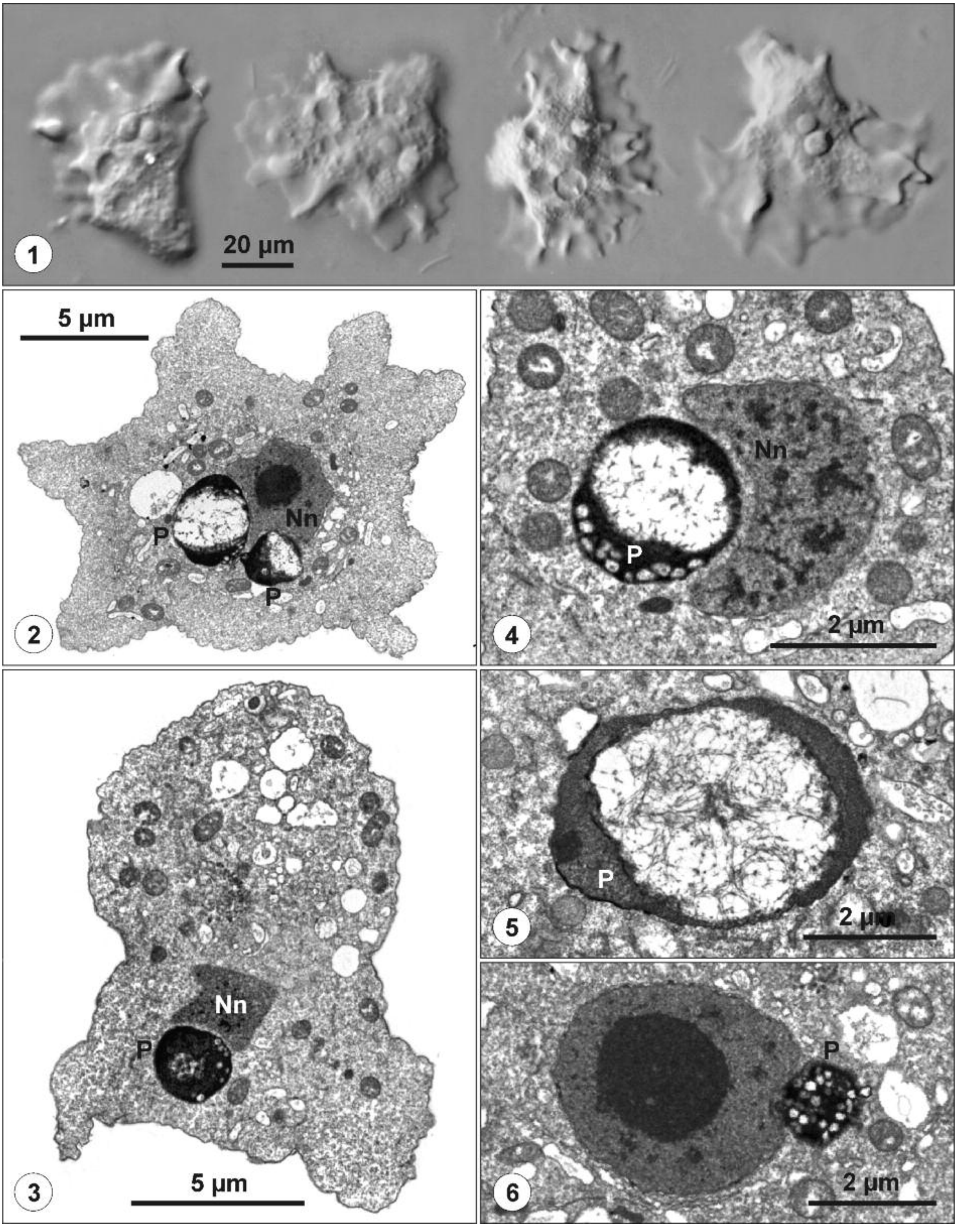

Plate 125. TUN1 strain of *Neoparamoeba pemaquidensis* isolated from gills of dead Southern bluefin tuna, *Thunnus maccoyii* (Castelnau) collected in Port Lincoln, South Australia; cultured on MY75S agar; stored in CC since 2004; GenBank Acc. No. of SSU rDNA sequence EF675607, EU331021, SL EU331047. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (Nn), *Perkinsela amoebae*-like endosymbionts (P). **Fig. 4.** Detail of close apposition of P and amoeba nucleus (Nn). **Figs. 5, 6.** Two different stages of Ps as seen in ultrathin section. Ref.: Dyková et al. 2007b, 2008b.

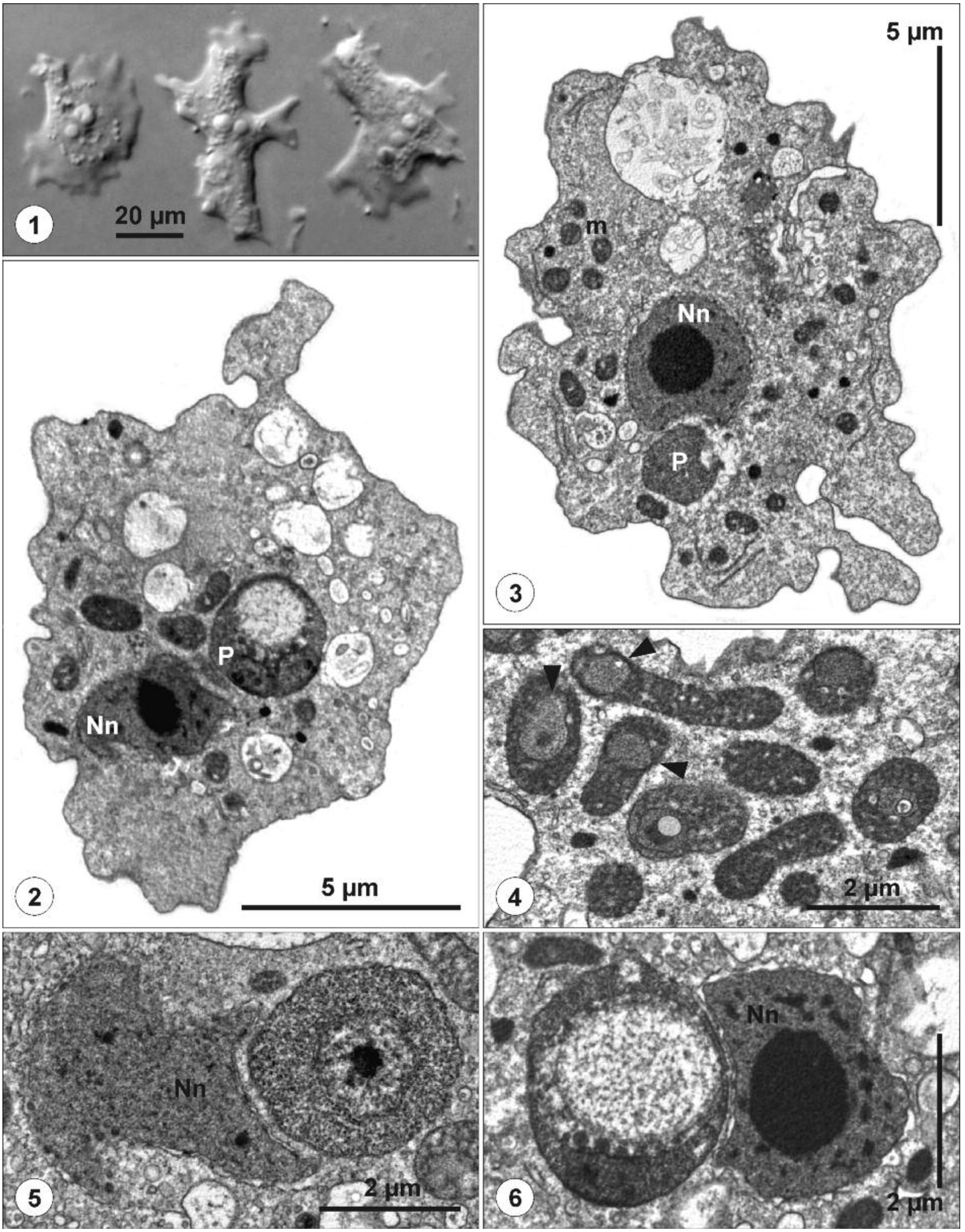

Plate 126. WT2708 strain of *Neoparamoeba pemaquidensis* isolated from gills of Atlantic salmon, *Salmo salar* L. caught near salmon sea-cages in Huon estuary, Dover, Tasmania, Australia; cultured on MY75S agar; stored in CC since 2003; GenBank Acc. No. of SSU rDNA sequence EF675605, PLO SSU EU331023, SL EU331049, ITS EU884486, EU884487, EU884488. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (Nn), *Perkinsela amoebae*-like endosymbionts (P), mitochondria (m). **Fig. 4.** Mitochondria with pseudoinclusions (arrowheads). **Figs. 5, 6.** Ps apposed to amoeba nuclei (Nn) sectioned in different planes. Ref.: Dyková et al. 2007b, 2008b.

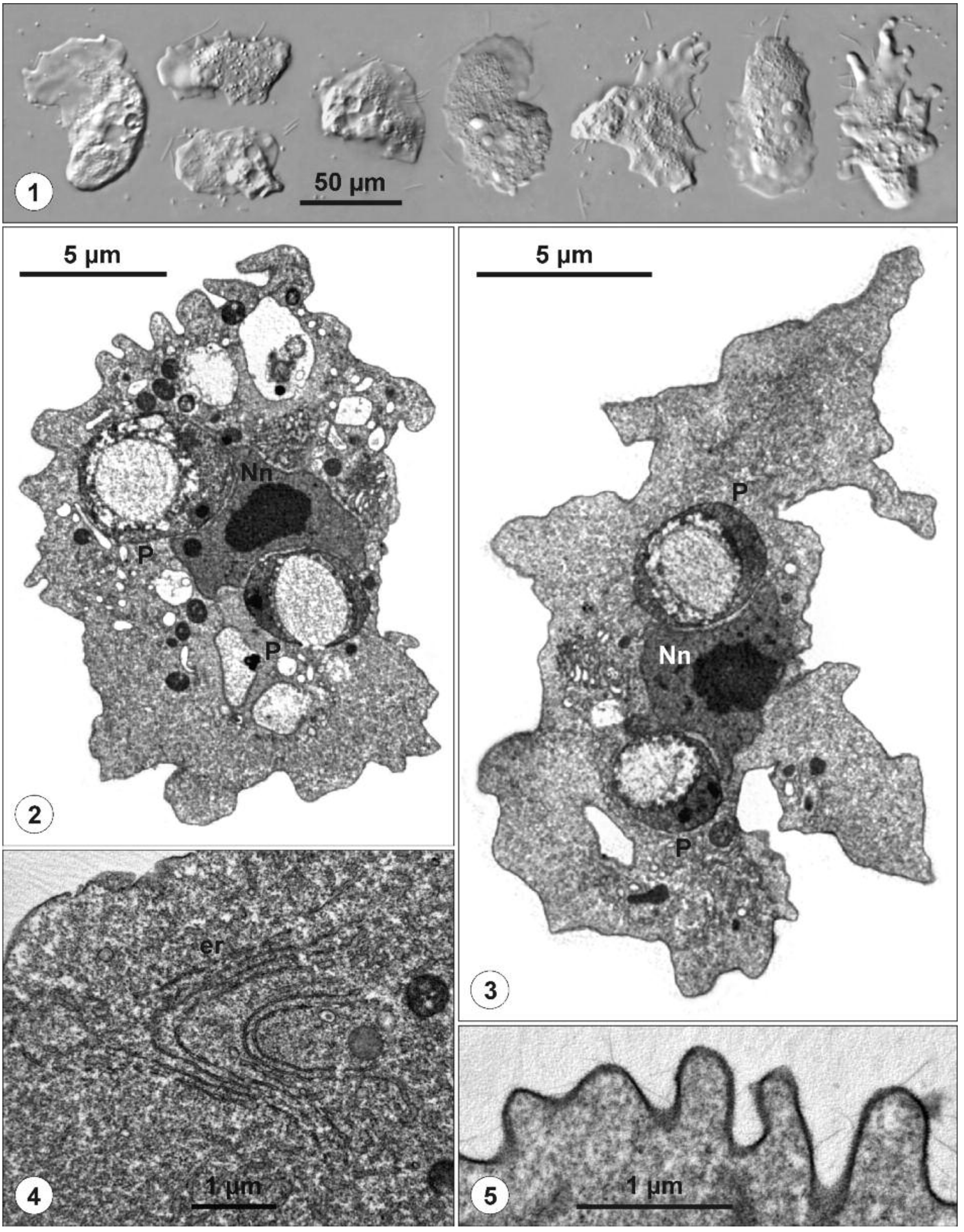

Plate 127. WTUTS strain of *Neoparamoeba pemaquidensis* isolated from gills of Atlantic salmon, *Salmo salar* L., from AGD infection tank, University of Tasmania, Launceston, Australia; cultured on MY75S agar; stored in CC since 2003; GenBank Acc. No. of SSU rDNA sequence AY714361, LSU EF216898, PLO SSU EU331012, SL EU331063, ITS EU884489. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (Nn), *Perkinsela amoebae*-like endosymbionts (P). **Fig. 4.** Parallel arrangement of endoplasmic reticulum (er). **Fig. 5.** Cell surface of amoeba trophozoite. Ref.: Dyková et al. 2008b; Young et al. 2008.

Nolandella Page, 1980

Plates 128–129

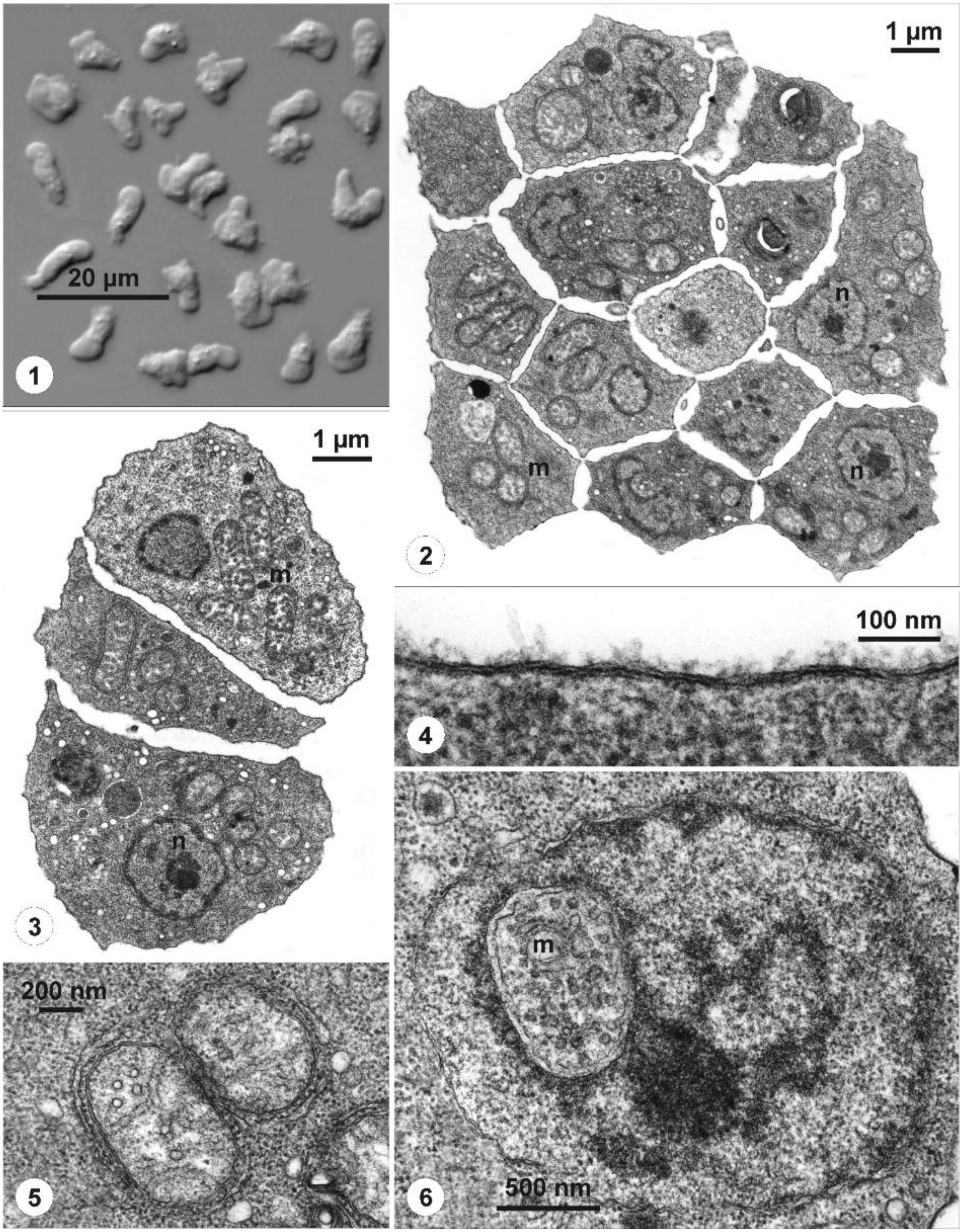

Plate 128. AFSM9 strain of *Nolandella* sp. isolated from gills of turbot, *Scophthalmus maximus* (L.) farmed in NW Spain; cultured on MY75S agar; stored in CC since 2000; GenBank Acc. No. of SSU rDNA sequence JQ271706. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: vesicular nuclei (n), relatively large mitochondria (m). **Fig. 4.** Cell surface of trophozoite. **Fig. 5.** Detail of ultrastructure of mitochondria with tubular cristae encircled with endoplasmic reticulum. **Fig. 6.** Vesicular nucleus with mitochondrion (m) inserted into its depression.

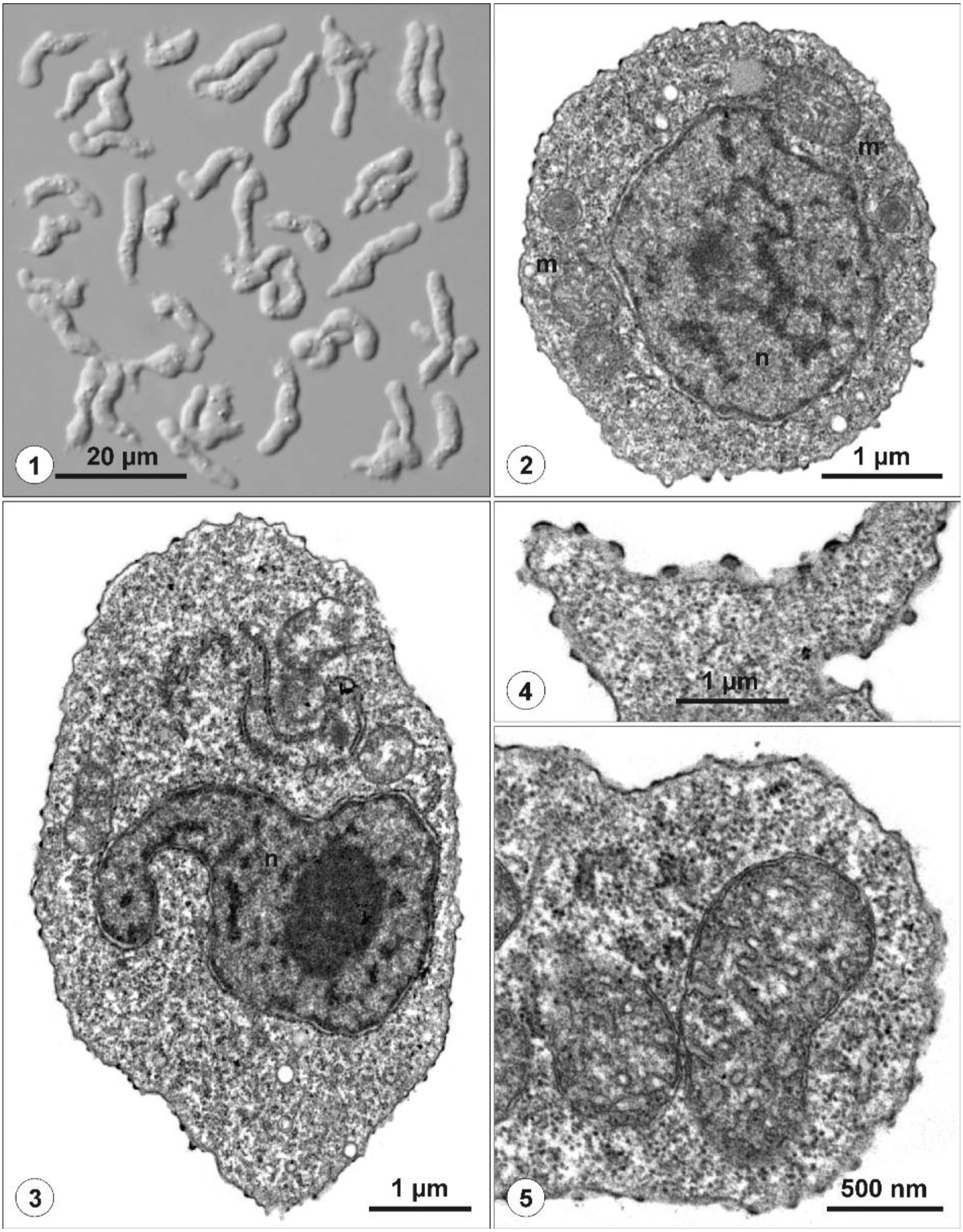

Plate 129. JKS1 strain of *Nolandella abertavensis* isolated from sand collected on Jeju Island, South Korea; cultured on NN agar; stored in CC since 2010; GenBank Acc. No. of SSU rDNA sequence JQ271707. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: vesicular nuclei (n), mitochondria (m). **Fig. 4.** Cell surface of trophozoite with electron-dense structures (in the literature reported as colosomes). **Fig. 5.** Detail of ultrastructure of mitochondria with tubular cristae.

Nuclearia Cienkowski, 1865

Plates 130–131

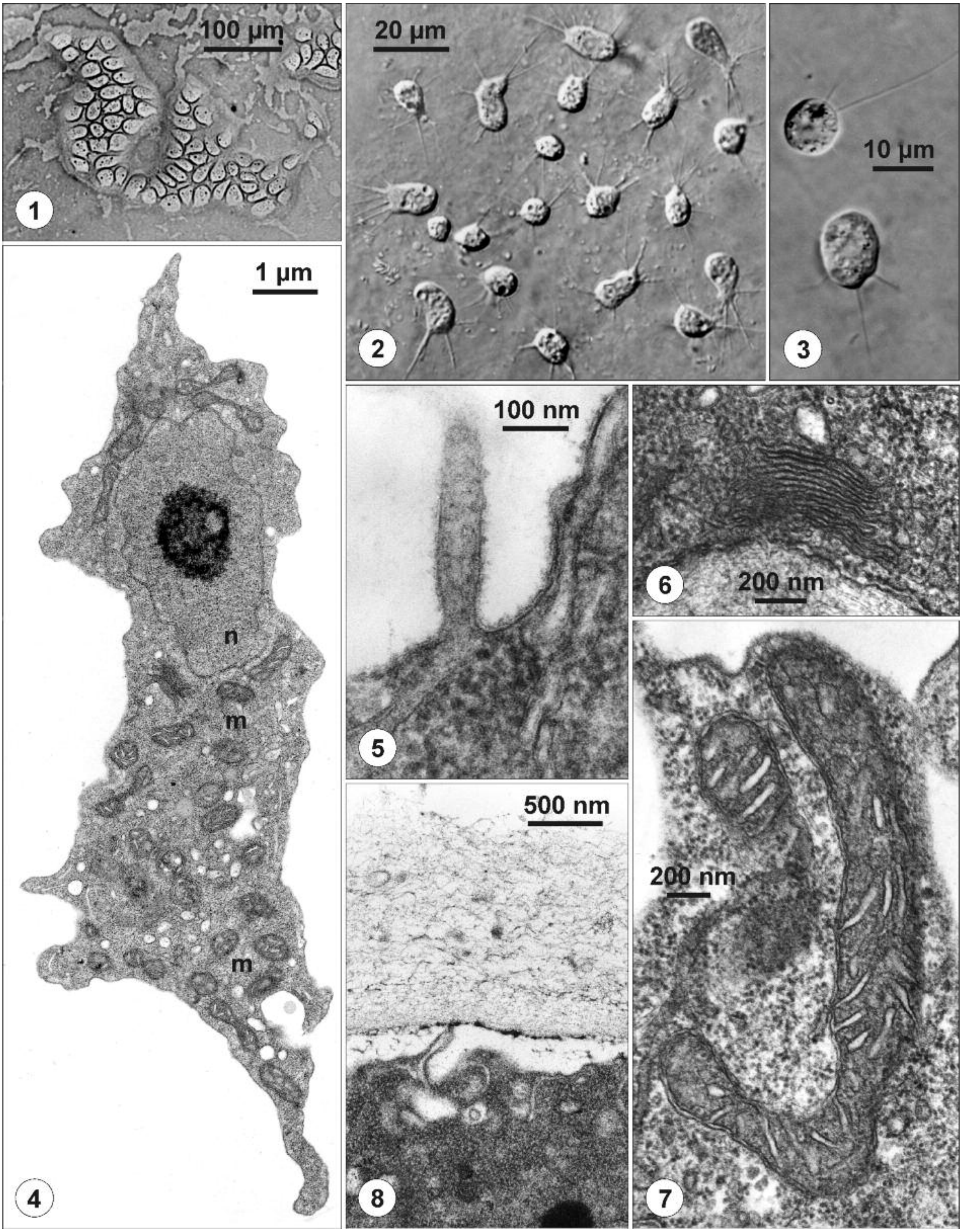

Plate 130. RR2G2. Type strain of *Nuclearia pattersoni* isolated from gills of roach, *Rutilus rutilus* (L.) from Novohaklovský pond, South Bohemia, Czech Republic; cultured on NN agar; stored in CC since 1999; GenBank Acc. No. of SSU rDNA sequence AY364635. **Fig. 1.** Agar plate culture: growing amoebae, delimitation of aggregates. **Figs. 2, 3.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 4.** Overview of fine structure of trophozoite: nucleus (n), mitochondria (m). **Fig. 5.** Short segment of long filose subpseudopodium. **Fig. 6.** Golgi complex with parallel arrangement of cisternae. **Fig. 7.** Mitochondria with flattened discoid cristae. **Fig. 8.** Sheath of extracellular matrix composed of two filamentous layers. (Cont.)

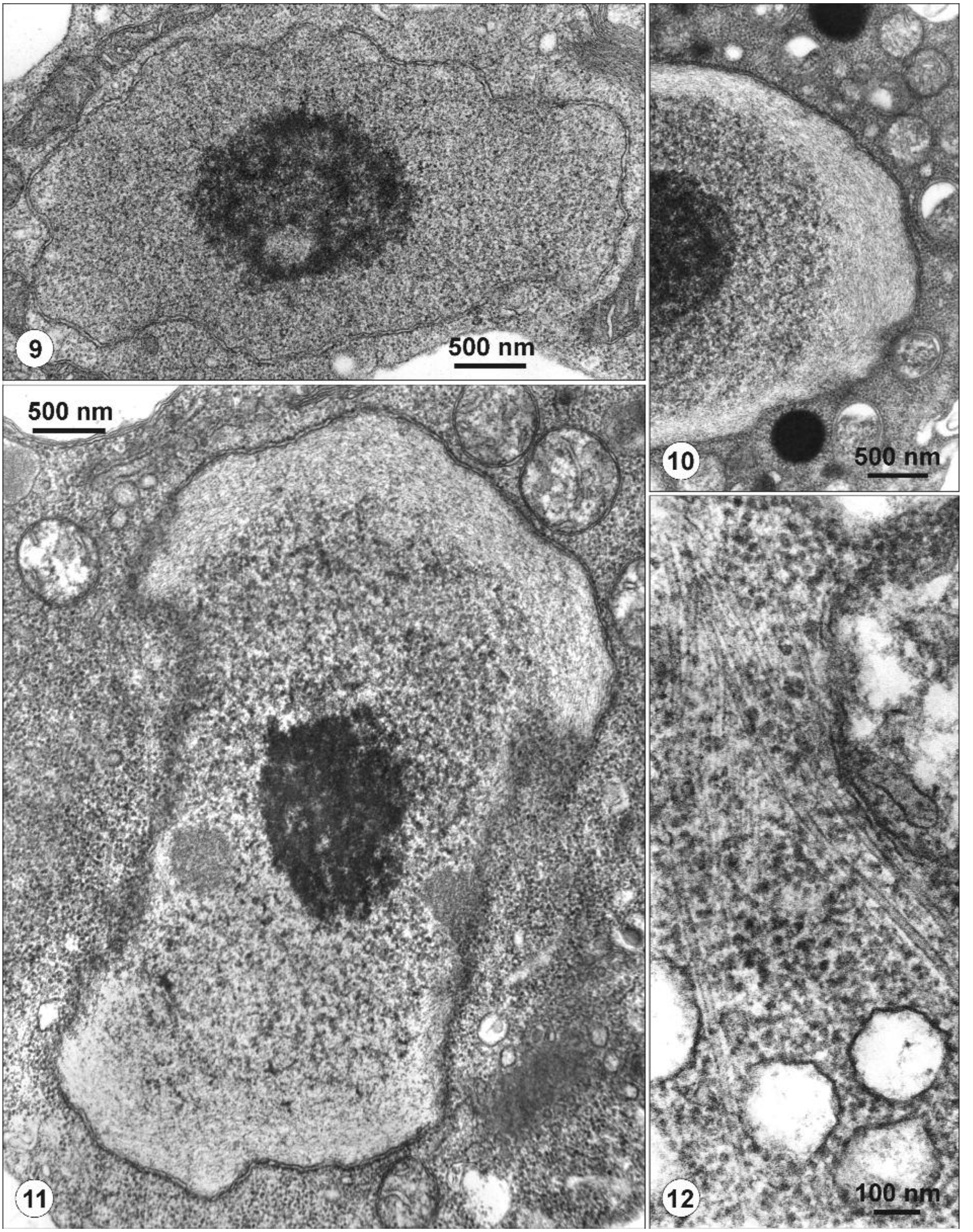

Plate 131. RR2G2 strain of *Nuclearia pattersoni*. **Fig. 9.** Detail of nucleus in interphase. **Fig. 10.** Nucleus with a layer of microfilaments arranged parallel beneath nuclear envelope. **Fig. 11.** Dividing nucleus with a layer of microfilaments arranged parallel beneath maintained nuclear envelope; extranuclear microtubules. **Fig. 12.** Convergent microtubules in cytoplasm. Ref.: Dyková et al. 2003b.

Paraflabellula Page et Willumsen, 1983

Plates 132–134

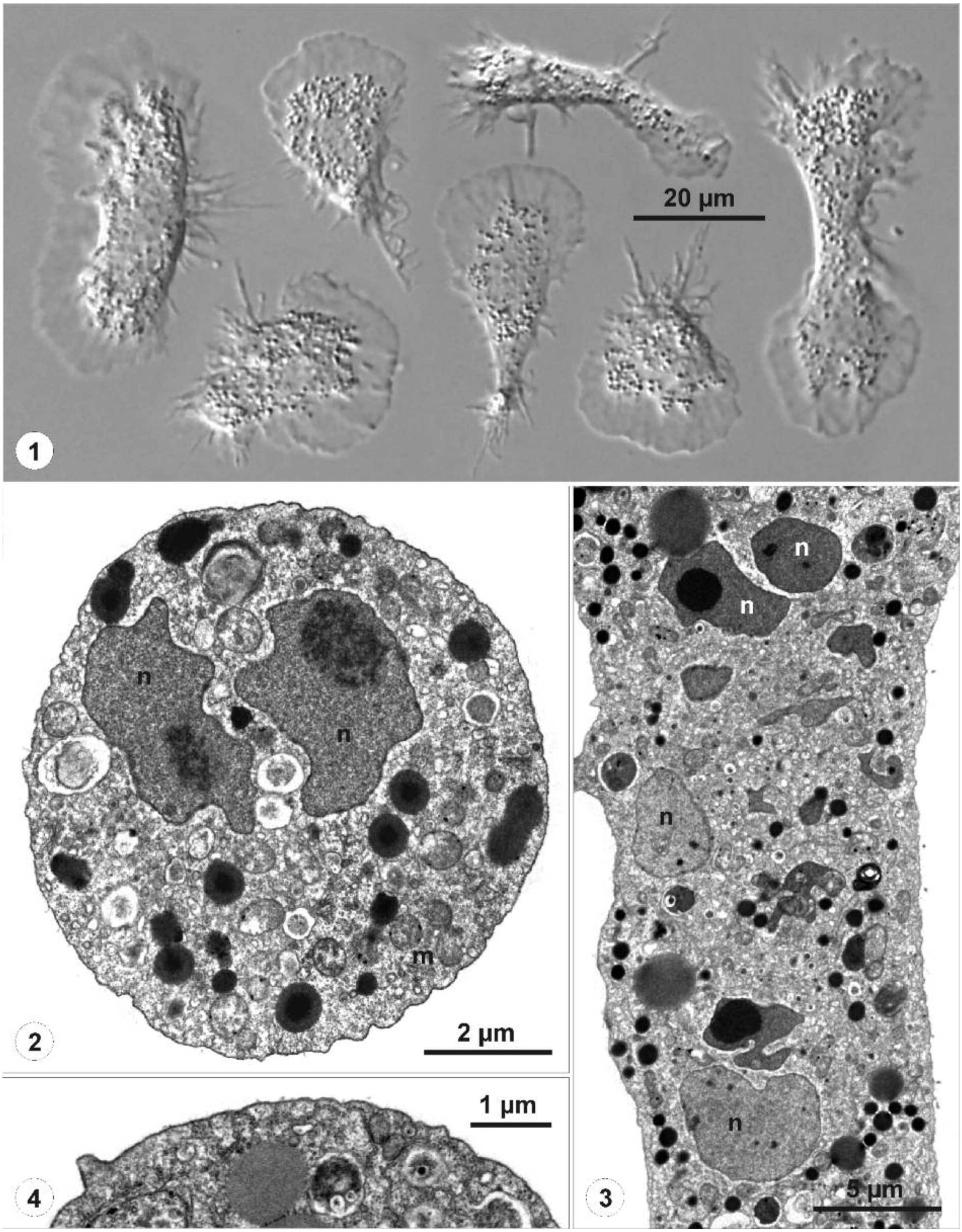

Plate 132. RT1TT strain of *Paraflabellula* sp. isolated from wet sand collected in Manuel Antonio, Costa Rica; cultured on MY75S agar; stored in CC since 2010; GenBank Acc. No. of SSU rDNA sequence JQ271708. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Overview of fine structure of trophozoite: nuclei (n), mitochondria (m) and electron-dense material in cytoplasm. **Fig. 3.** Part of longitudinal section of trophozoite with several nuclei (n) and globules of electron-dense material. **Fig. 4.** Cell surface of trophozoite.

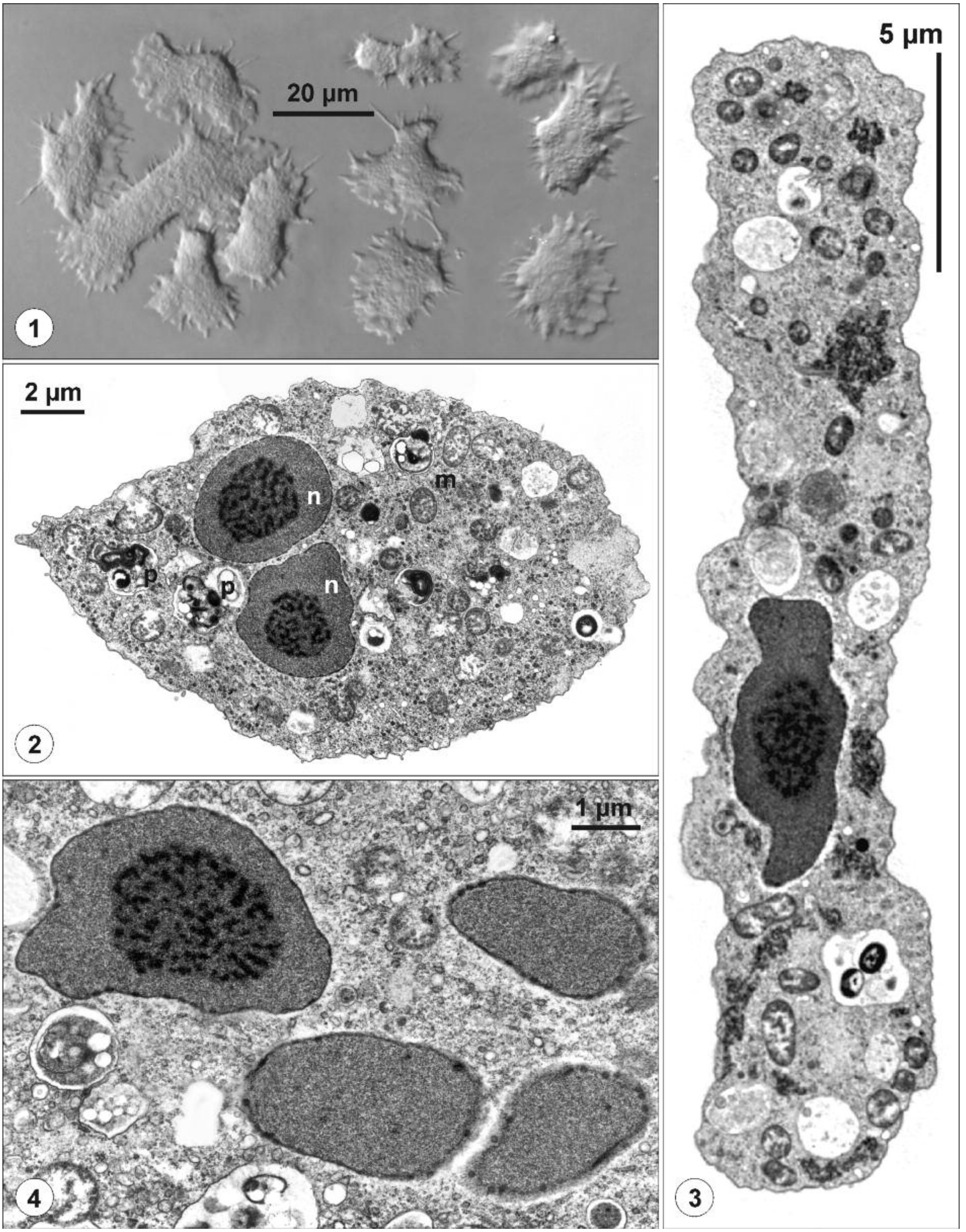

Plate 133. SEDF strain of *Paraflabellula* sp. isolated from sediments collected in Atlantic salmon farm, Tasmania, Australia; cultured on MY75S agar; stored in CC since 2002; GenBank Acc. No. of SSU rDNA sequence EU852655. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Overview of fine structure of binucleate trophozoite: nuclei (n), small (hardly discernible) mitochondria (m), phagosomes (p). **Fig. 3.** Overview of fine structure of trophozoite with one nucleus in the plane of sectioning. **Fig. 4.** Detail of ultrastructure of trophozoite with four (or less if lobed) nuclei. Ref.: Dyková et al. 2008c.

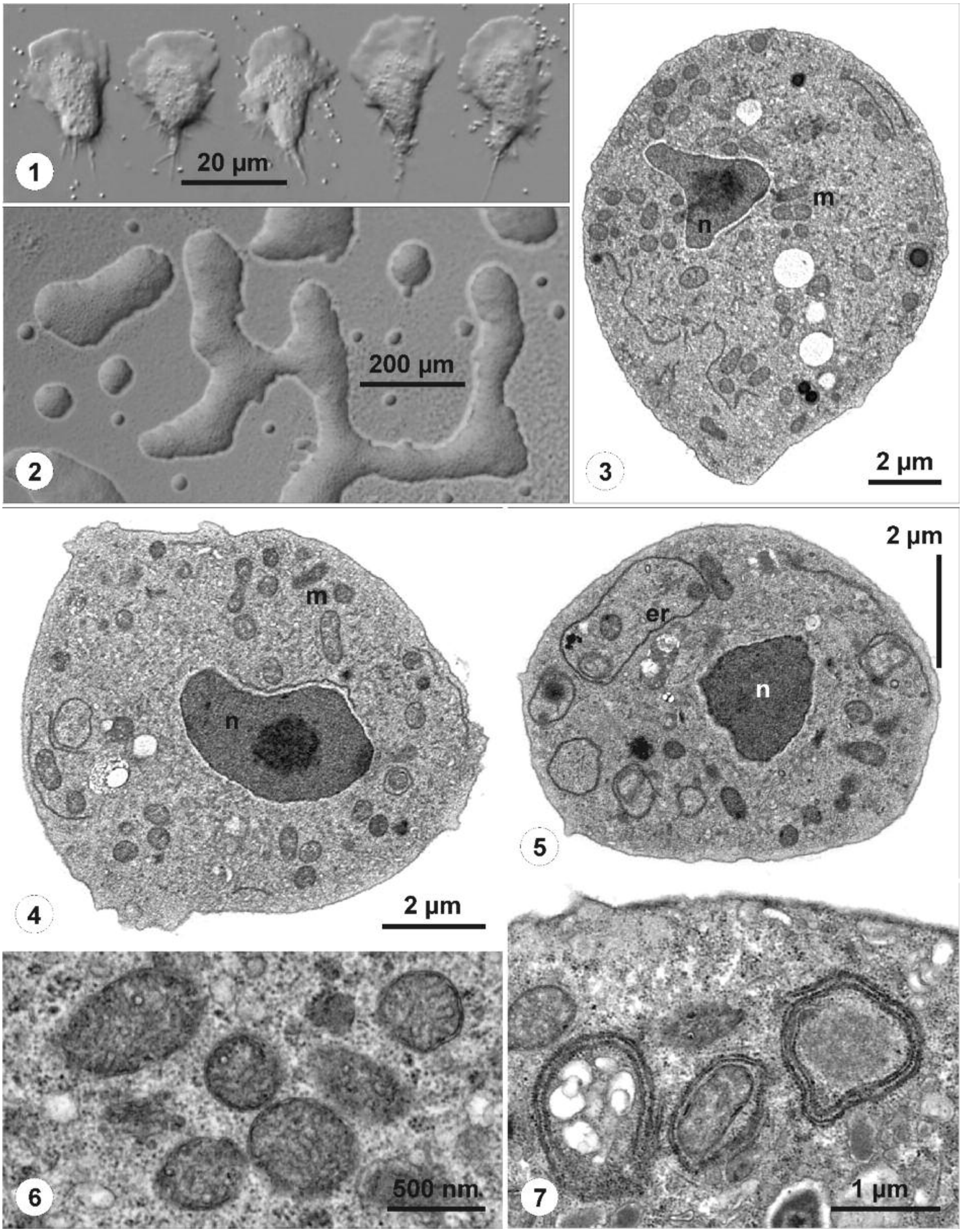

Plate 134. STAR2 strain of *Paraflabellula* sp. isolated from stomach of red cushion star, *Porania pulvillus* (O.F. Müller) collected in Norwegian Sea, off Vevang, Trondheim, Norway; cultured on MY75S agar; stored in CC since 2005; GenBank Acc. No. of SSU rDNA sequence EU852658. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Agar plate culture seen through Petri dish **Figs. 3, 4, 5.** Overview of fine structure of trophozoites: lobed nuclei (n), small rounded to bean-shaped mitochondria (m), endoplasmic reticulum (er). **Fig. 6.** Mitochondria with tubular cristae. **Fig. 7.** Cisternae of endoplasmic reticulum surrounding vesicular part of cytoplasm (left) and mitochondria (right). Ref.: Dyková et al. 2008c.

Protacanthamoeba Page, 1981

Plates 135–139

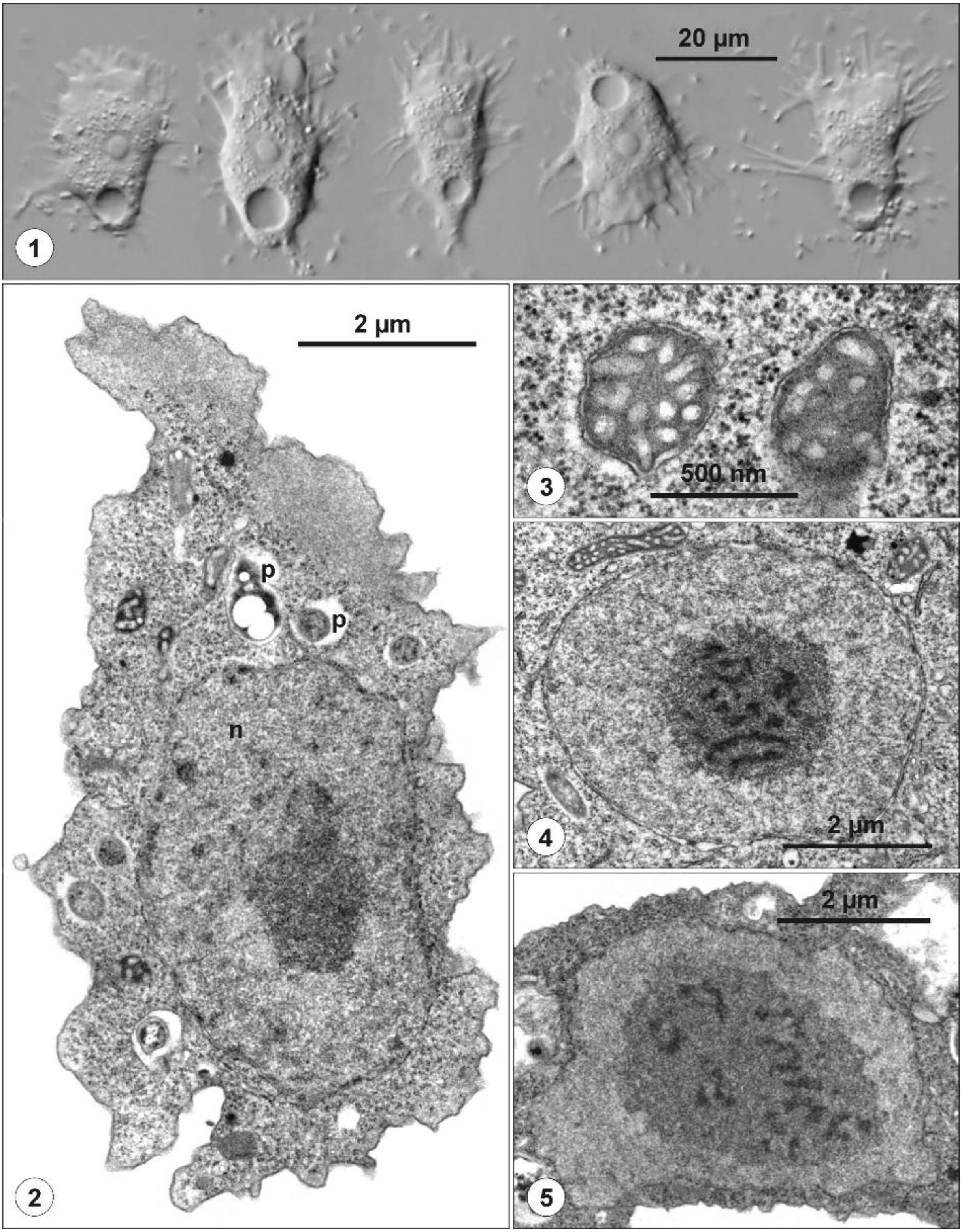

Plate 135. GERE3 strain of *Protacanthamoeba* sp. isolated from gills of rainbow trout, *Oncorhynchus mykiss* (Walbaum) farmed in Baden Würtenberg, Germany; cultured on NN agar; stored in CC since 2009; GenBank Acc. No. of SSU rDNA sequence HM363625. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Overview of fine structure of trophozoite: nucleus (n), phagosomes with bacteria (p). **Fig. 3.** Detail of trophozoite ultrastructure: mitochondria with tubulo-vesicular cristae. **Figs. 4, 5.** Vesicular nuclei with different chromatin distribution corresponding to different stages of cell division. Ref.: Dyková et al. 2010b.

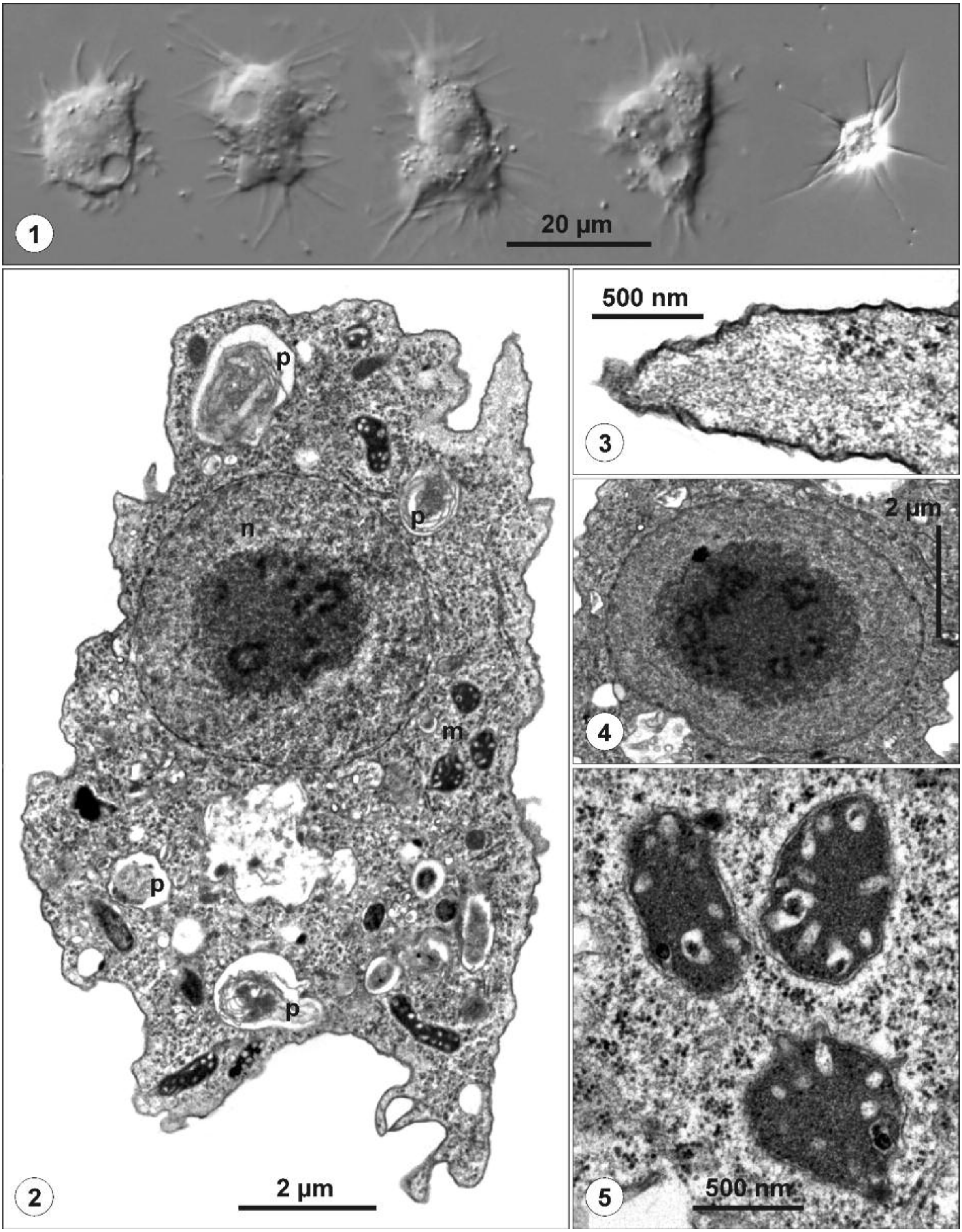

Plate 136. PM1 strain of *Protacanthamoeba* sp. isolated from freshwater bryozoan, *Pectinatella magnifica* (Leidy) collected in Nové jezero water body, South Bohemia, Czech Republic; cultured on NN agar; stored in CC since 2005; GenBank Acc. No. of SSU rDNA sequence JQ271709. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Overview of fine structure of trophozoite: nucleus (n), mitochondria (m), phagosomes (p). **Fig. 3.** Structure of cytoplasm in subpseudopodium. **Fig. 4.** Vesicular nucleus. **Fig. 5.** Mitochondria with tubulo-vesicular cristae.

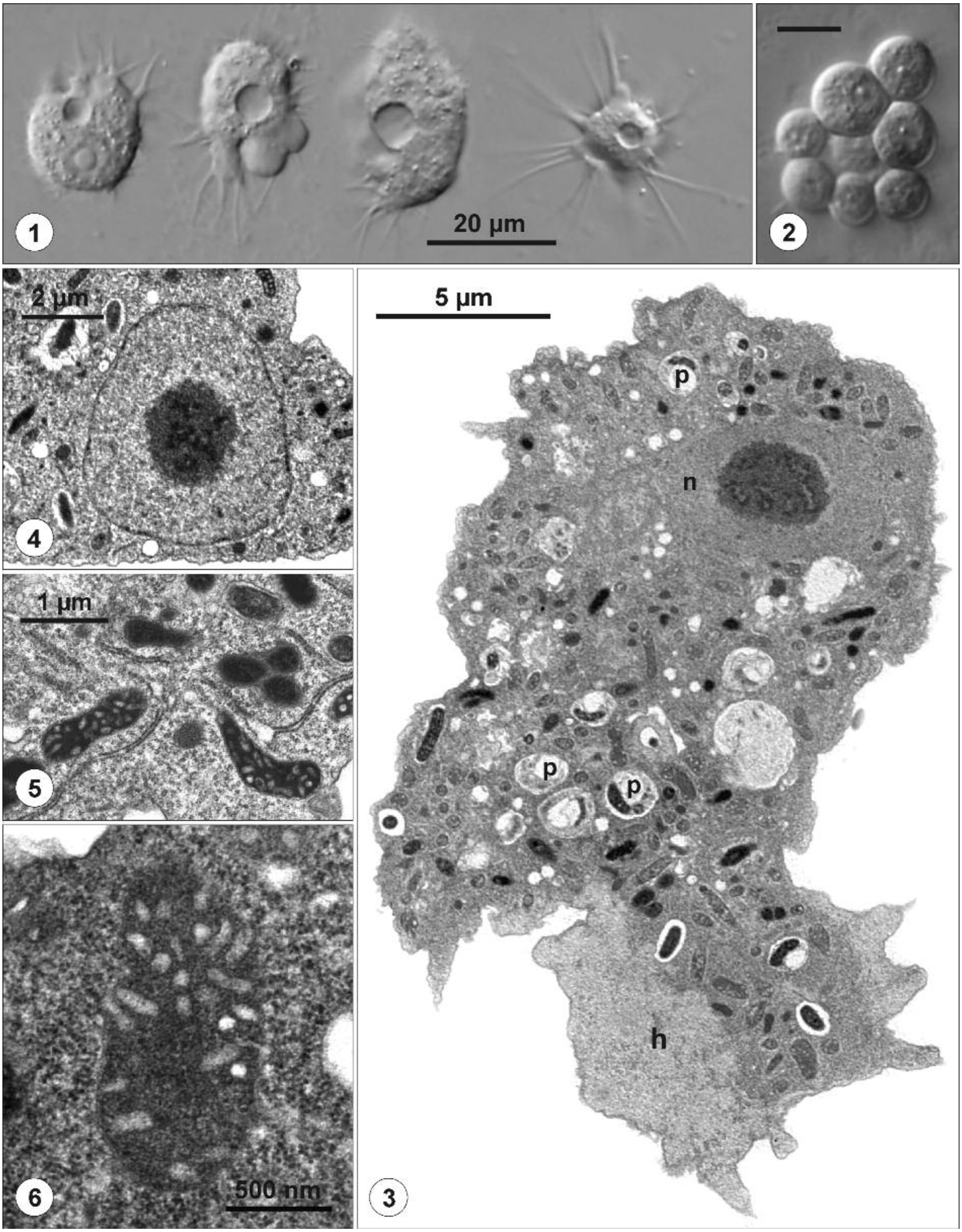

Plate 137. PM5 strain of *Protacanthamoeba* sp. isolated from freshwater bryozoan, *Pectinatella magnifica* (Leidy) collected in Nové jezero water body, South Bohemia, Czech Republic; cultured on NN agar; stored in CC since 2005; GenBank Acc. No. of SSU rDNA sequence JQ271710. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Cysts as seen in Nomarski DIC, scale bar 10 µm. **Fig. 3.** Overview of fine structure of trophozoite: nucleus (n), hyaloplasm (h), phagosomes with remnants of phagocytised material (p). **Fig. 4.** Vesicular nucleus. **Figs. 5, 6.** Mitochondria with tubulo-vesicular cristae.

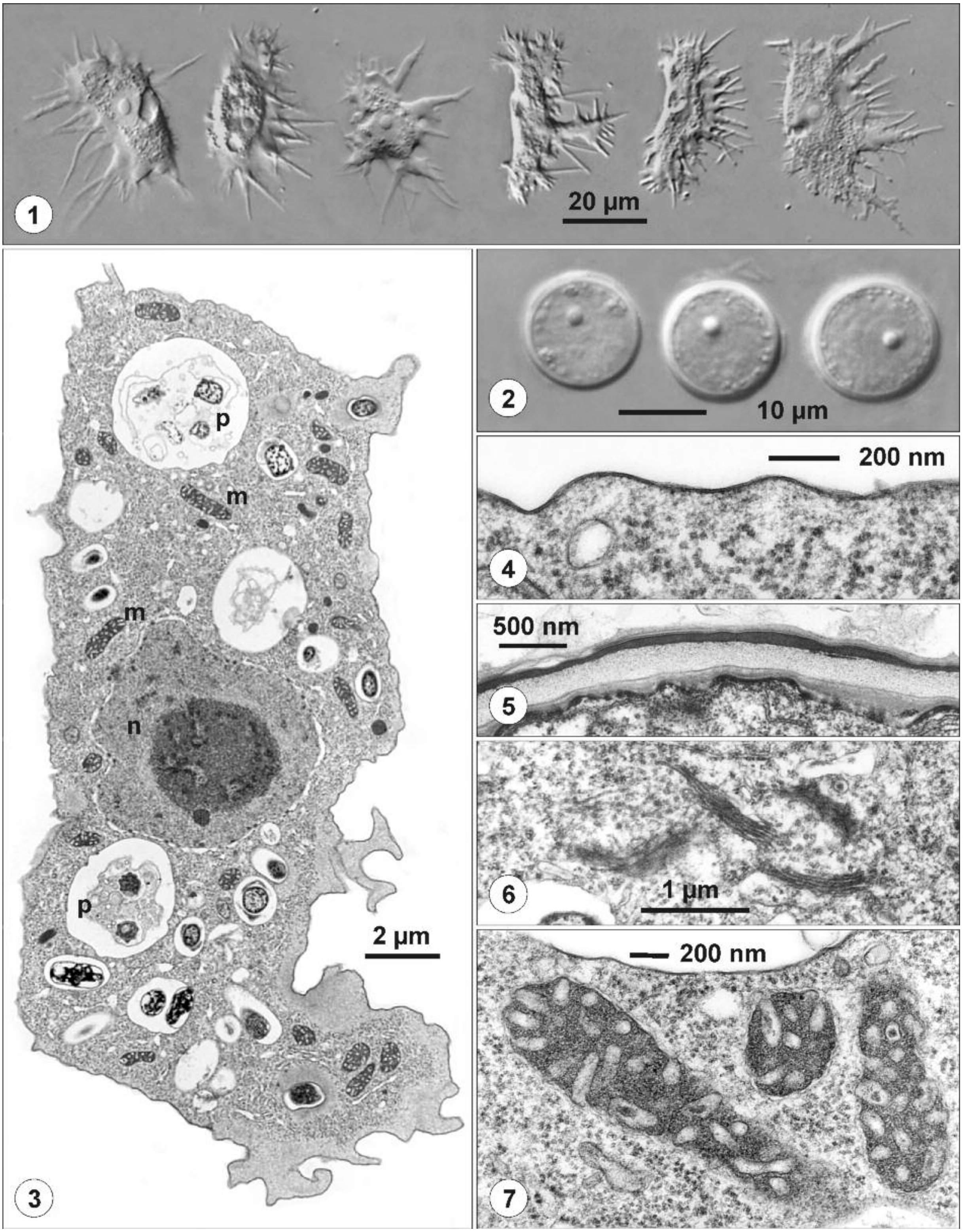

Plate 138. TT3H. Type strain of *Protacanthamoeba bohemica* isolated from liver of tench, *Tinca tinca* (L.) from Dubenský pond, South Bohemia, Czech Republic; cultured on NN agar; stored in CC since 1997; GenBank Acc. No. of SSU rDNA sequence AY960120. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Mature cysts seen in Nomarski DIC. **Fig. 3.** Overview of fine structure of trophozoite: nucleus (n), mitochondria (m), phagosomes with remnants of bacteria (p). **Fig. 4.** Cell surface of trophozoite. **Fig. 5.** Surface of cyst. **Fig. 6.** Cisternae of Golgi complexes in parallel arrangement. **Fig. 7.** Mitochondria with tubulo-vesicular cristae. (Cont.)

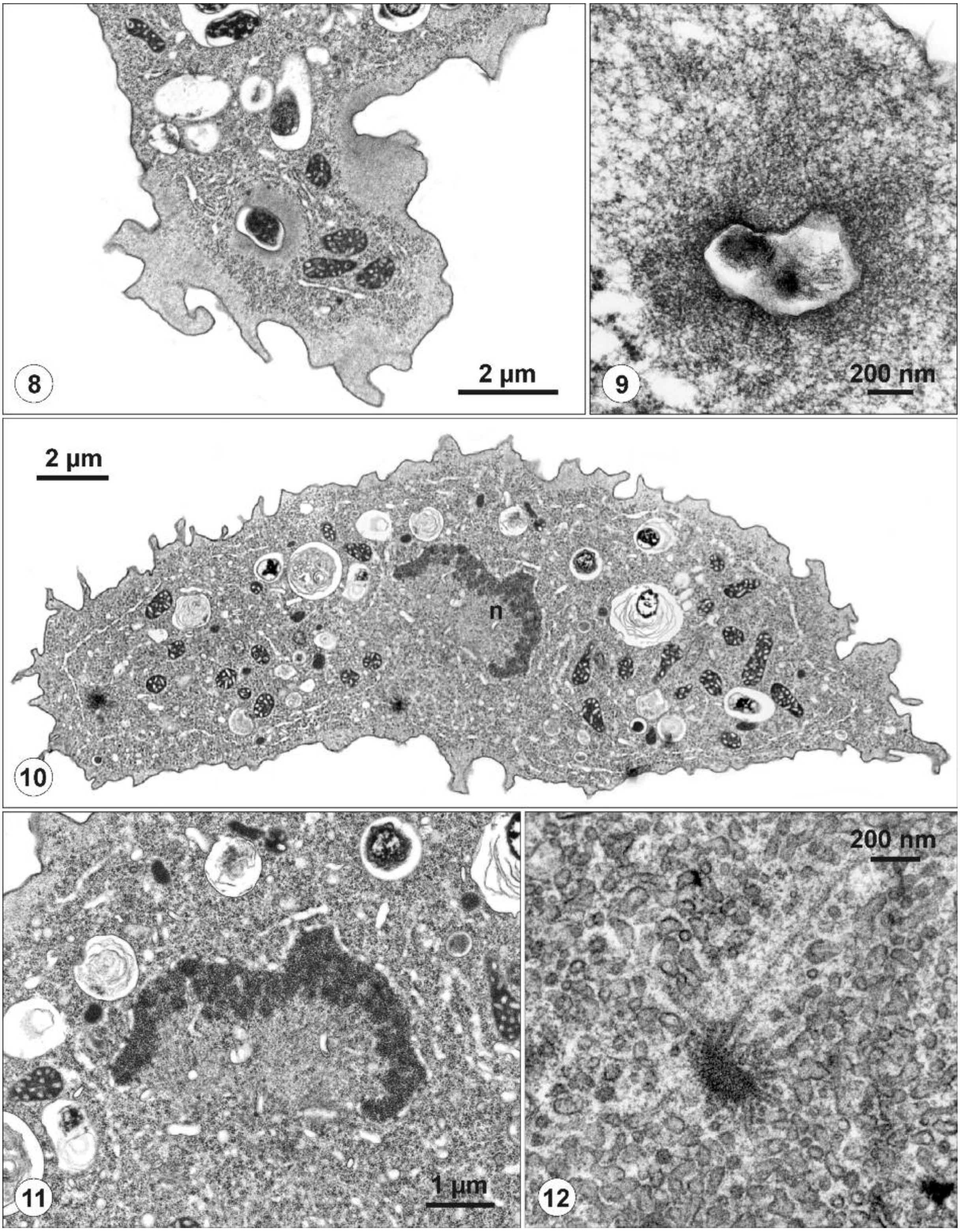

Plate 139. TT3H strain of *Protacanthamoeba bohemica*, details of ultrastructure of trophozoites. **Figs. 8, 9.** Fine structure of hyaloplasm with microfilaments accumulated around phagocytised bacteria and their remnants. **Fig. 10.** Overview of fine structure of trophozoite: nucleus (n). **Fig. 11.** Detail of Fig. 10. Part of nucleus (lacking nuclear envelope) with remnants of nucleolar mass. **Fig. 12.** Centriole-like body with radiating microtubules. Ref.: Dyková et al. 2005e.

Protophysarum Blackwell et Alexopoulos, 1975

Plates 140–141

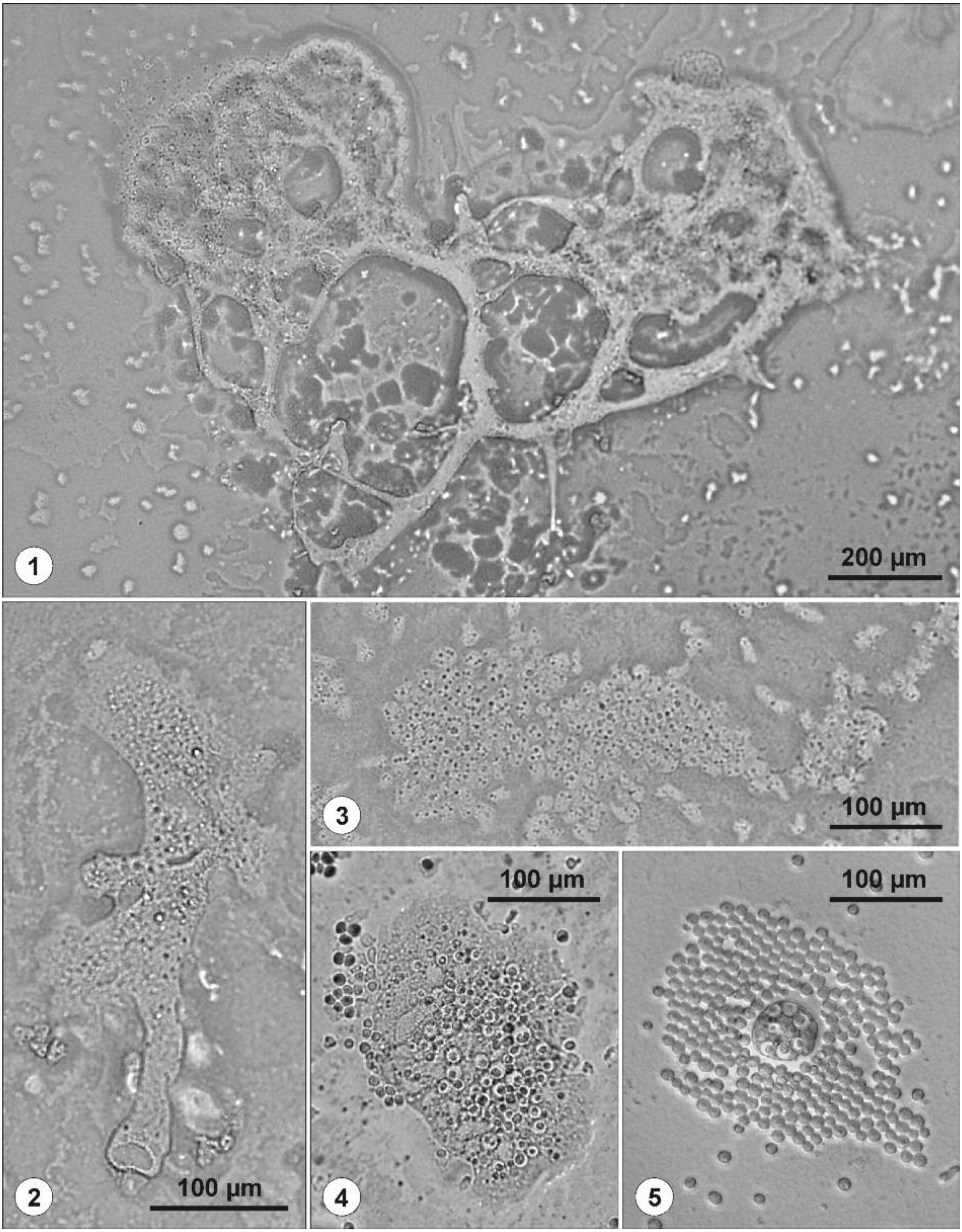

Plate 140. PV64 strain of *Protophysarum* sp. isolated from material contaminating beer bottles stored in the open air for recycling, Czech Republic; cultured on NN agar; stored in CC since 2011; GenBank Acc. No. of SSU rDNA sequence JQ271711. **Figs. 1, 2.** Syncytial plasmodia in search of food. **Fig. 3.** Mononuclear amoebae released from spores. **Fig. 4.** Supposed cyst formation due to many neighbouring amoebae present. **Fig. 5.** Spores released from ruptured sporangial mass. (Cont.)

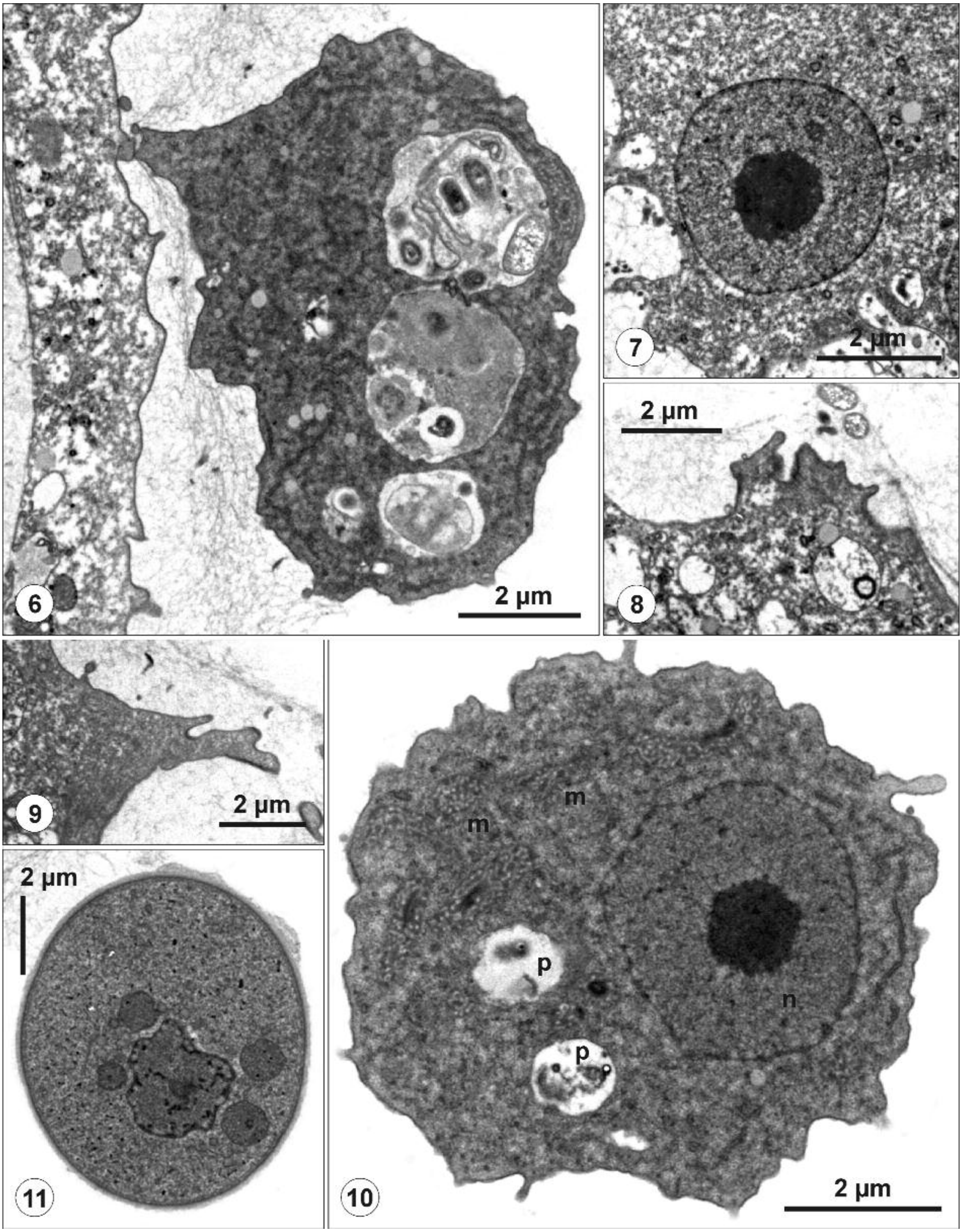

Plate 141. PV64 strain of *Protophysarum* sp., details of ultrastructure of life cycle stages. **Fig. 6.** Part of plasmodium (left) and amoeba with phagosomes. **Fig. 7.** One of numerous plasmodial nuclei. **Figs. 8, 9.** Cytoplasmic outgrowths on periphery of large syncytial plasmodium surrounded by slime. **Fig. 10.** Fine structure of mononuclear amoeba stage: nucleus (n), mitochondria (m) and phagosomes (p). **Fig. 11.** Cyst with cell wall of two layers.

Protostelium Olive et Stoianovitch, 1960

Plate 142

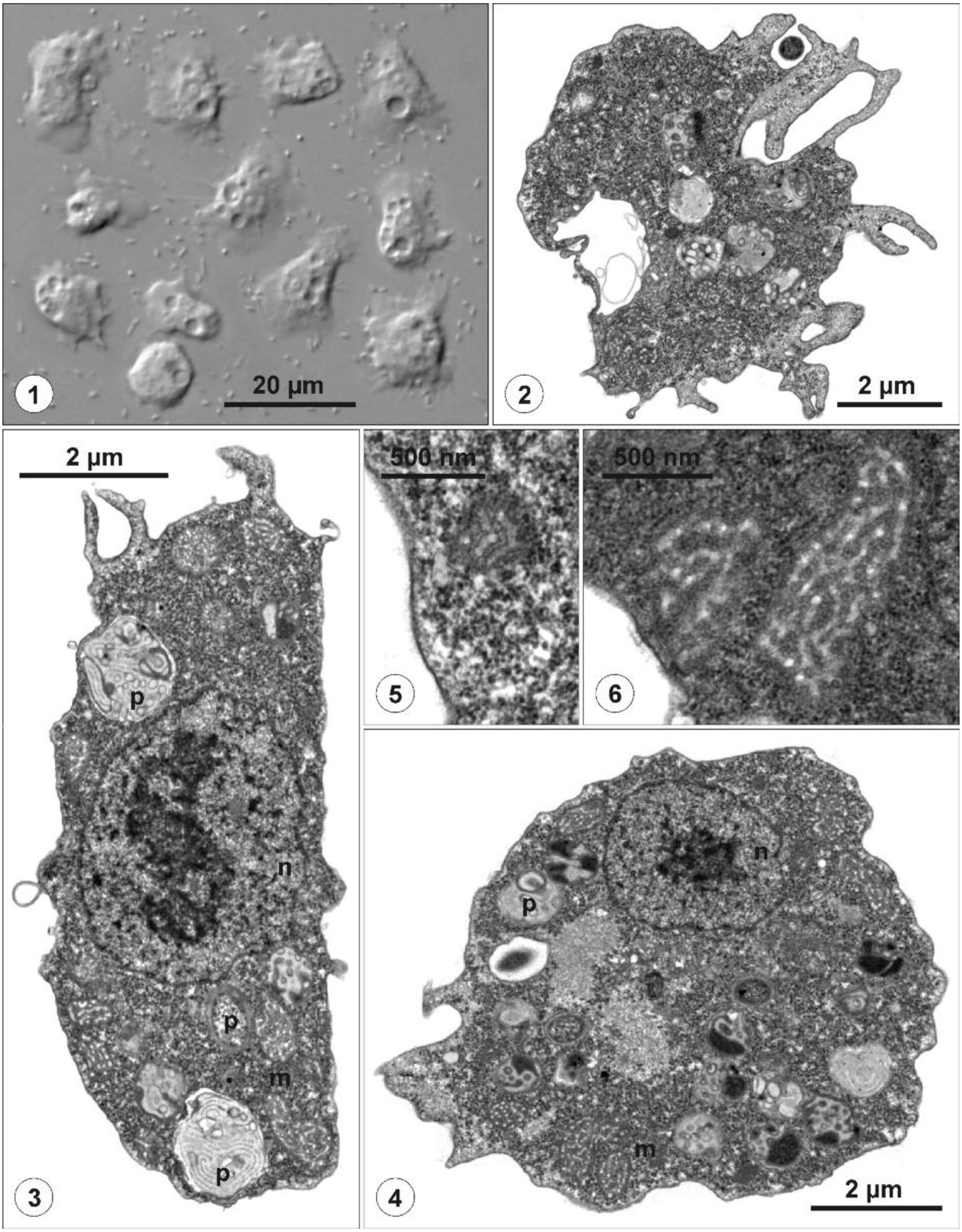

Plate 142. 4638 strain of *Protostelium* sp. isolated from spleen of perch, *Perca fluviatilis* L. from Černovický potok brook, South Bohemia, Czech Republic; cultured on NN agar; stored in CC since 1991; GenBank Acc. No. of SSU rDNA sequence JQ271712. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3, 4.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosomes (p). **Figs. 5, 6.** Details of mitochondria with tubular cristae.

Ripella Smirnov, Nassonova, Chao et Cavalier-Smith, 2007

Plates 143–152

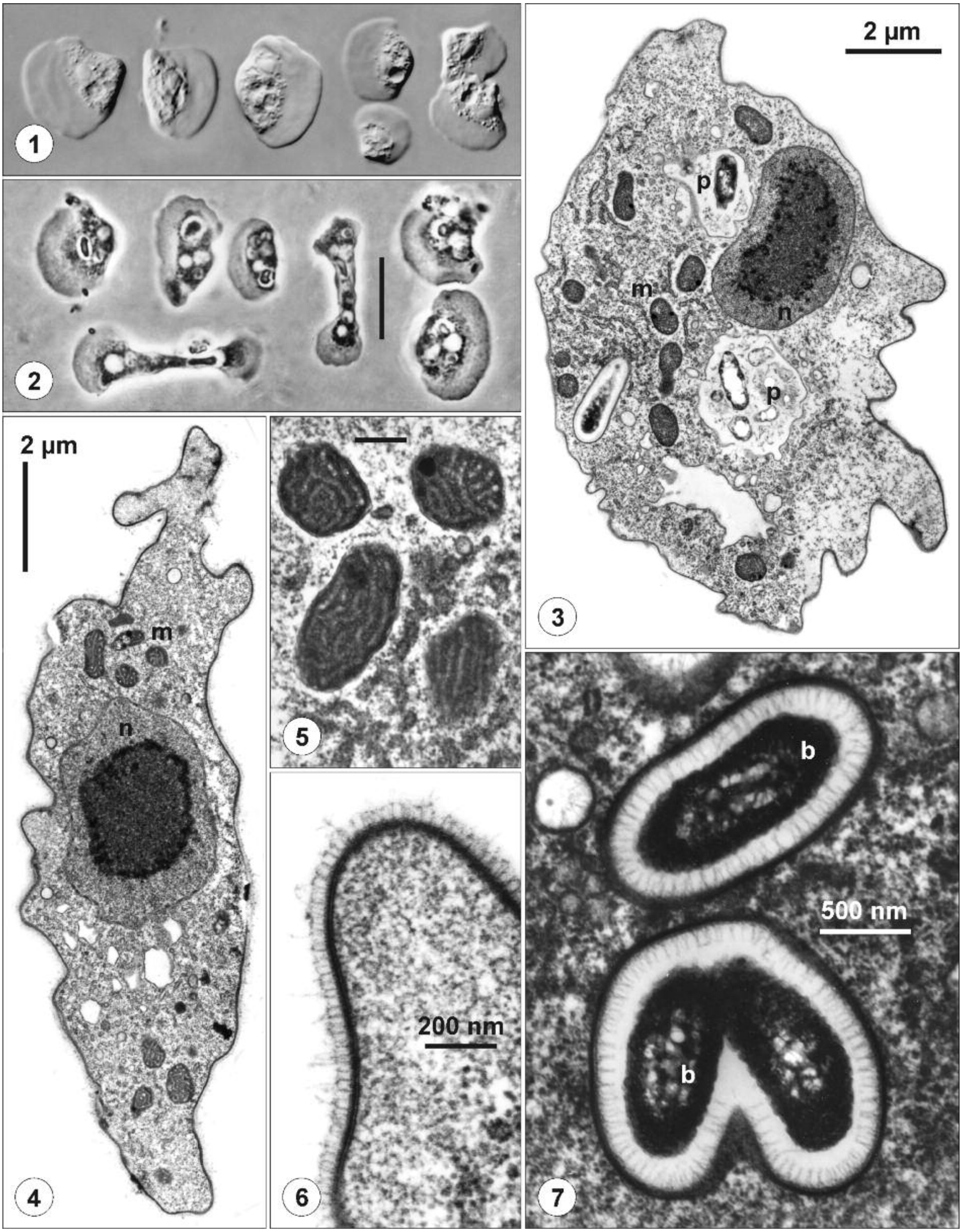

Plate 143. 805 strain of *Ripella* sp. isolated from kidney of goldfish, *Carassius auratus auratus* (L.) from experimental stock kept in research institution, České Budějovice, South Bohemia, Czech Republic; cultured on NN agar; stored in CC since 1992; GenBank Acc. No. of SSU rDNA sequence JQ271713. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Trophozoites seen in translucent light, scale bar = 20 µm. **Figs. 3, 4.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosomes (p). **Fig. 5.** Mitochondria with tubular branching cristae, scale bar = 1 µm. **Figs. 6, 7.** Cell surface of trophozoites with glycocalyx differentiated in glycostyles; phagocytised bacteria (b). Ref.: Dyková et al. 1996.

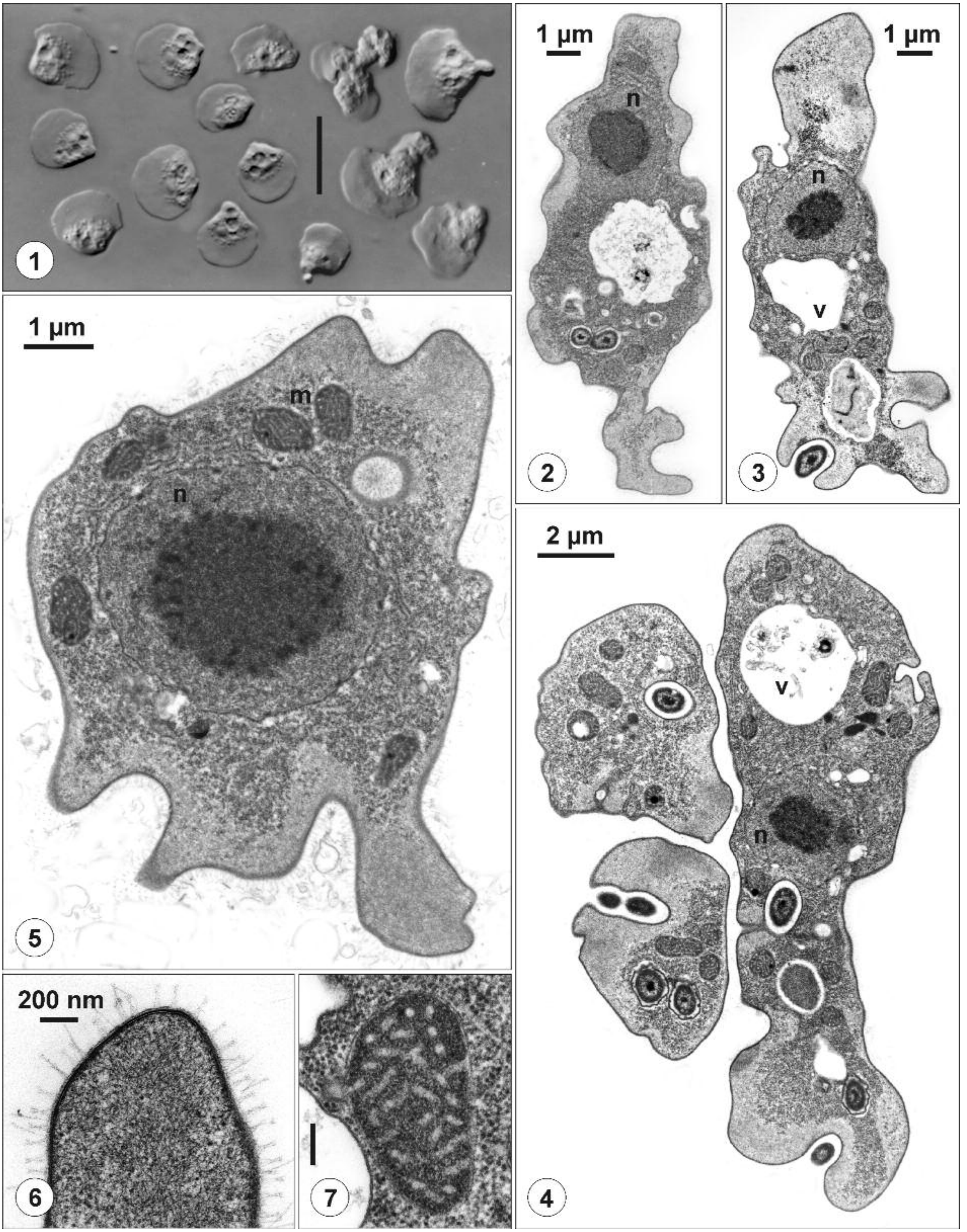

Plate 144. CAZ6 strain of *Ripella* sp. isolated from gills of *Clarias angolensis* (Steindachner) imported from Africa to pet shop, Czech Republic; cultured on NN agar; stored in CC since 1999; GenBank Acc. No. of SSU rDNA sequence AY929914. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC), scale bar = 20 µm. **Figs. 2, 3, 4.** Overview of fine structure of trophozoites: nuclei (n), vacuoles (v), mitochondria (m), bacteria. **Fig. 5.** Magnified overview of fine structure of trophozoite: nucleus (n), mitochondria (m). **Fig. 6.** Cell surface of trophozoite with glycocalyx differentiated in glycostyles. **Fig. 7.** Mitochondrion with tubular cristae, scale bar = 200 nm. Ref.: Dyková et al. 2005a.

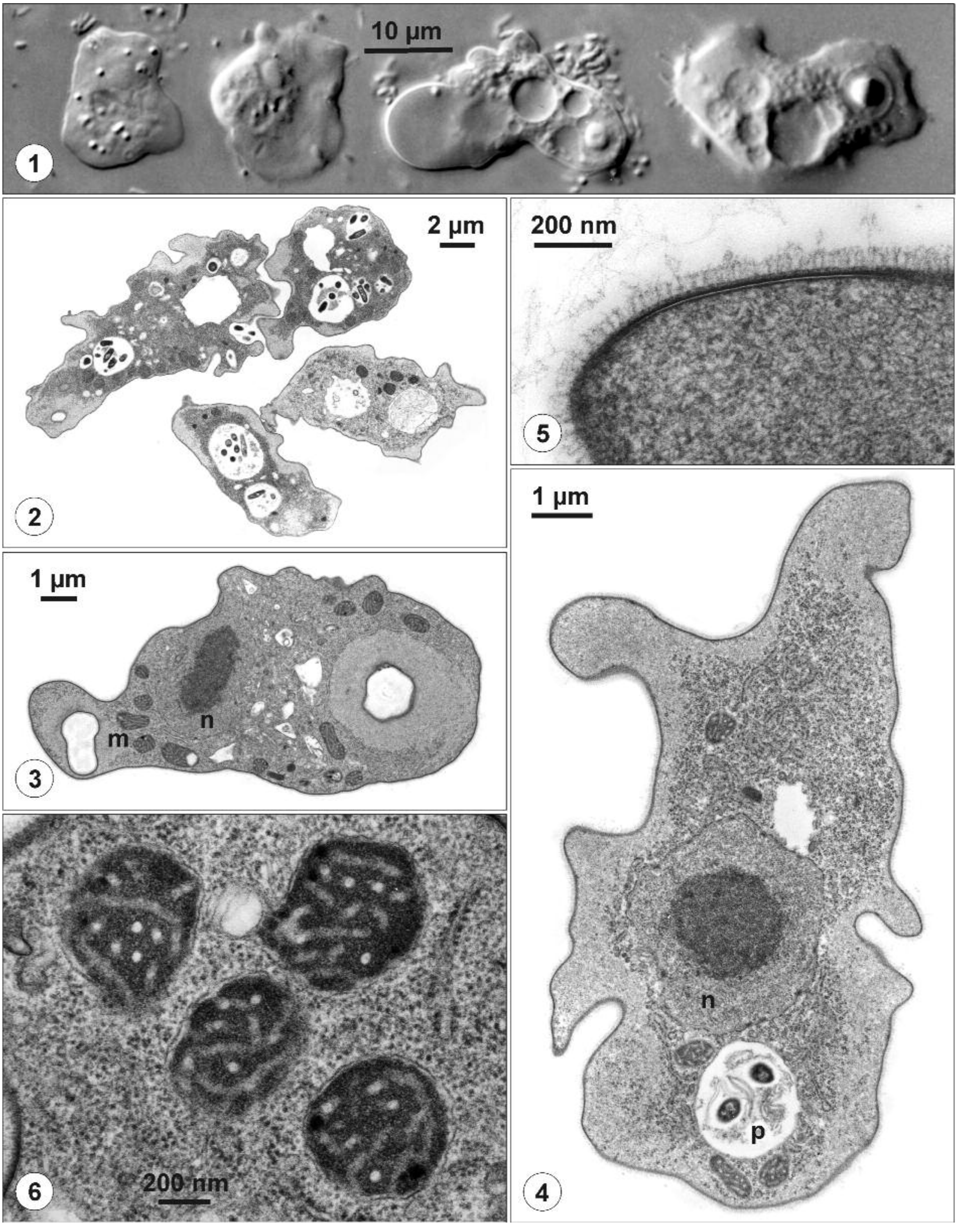

Plate 145. CAZ7 strain of *Ripella* sp. isolated from gills of *Clarias angolensis* Steindachner imported from Africa to pet shop, Czech Republic; cultured on NN agar; stored in CC since 1999; GenBank Acc. No. of SSU rDNA sequence AY929922. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3, 4.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosome (p). **Fig. 5.** Cell surface of trophozoite with differentiated glycocalyx. **Fig. 6.** Mitochondria with tubular cristae. Ref.: Dyková et al. 2005a.

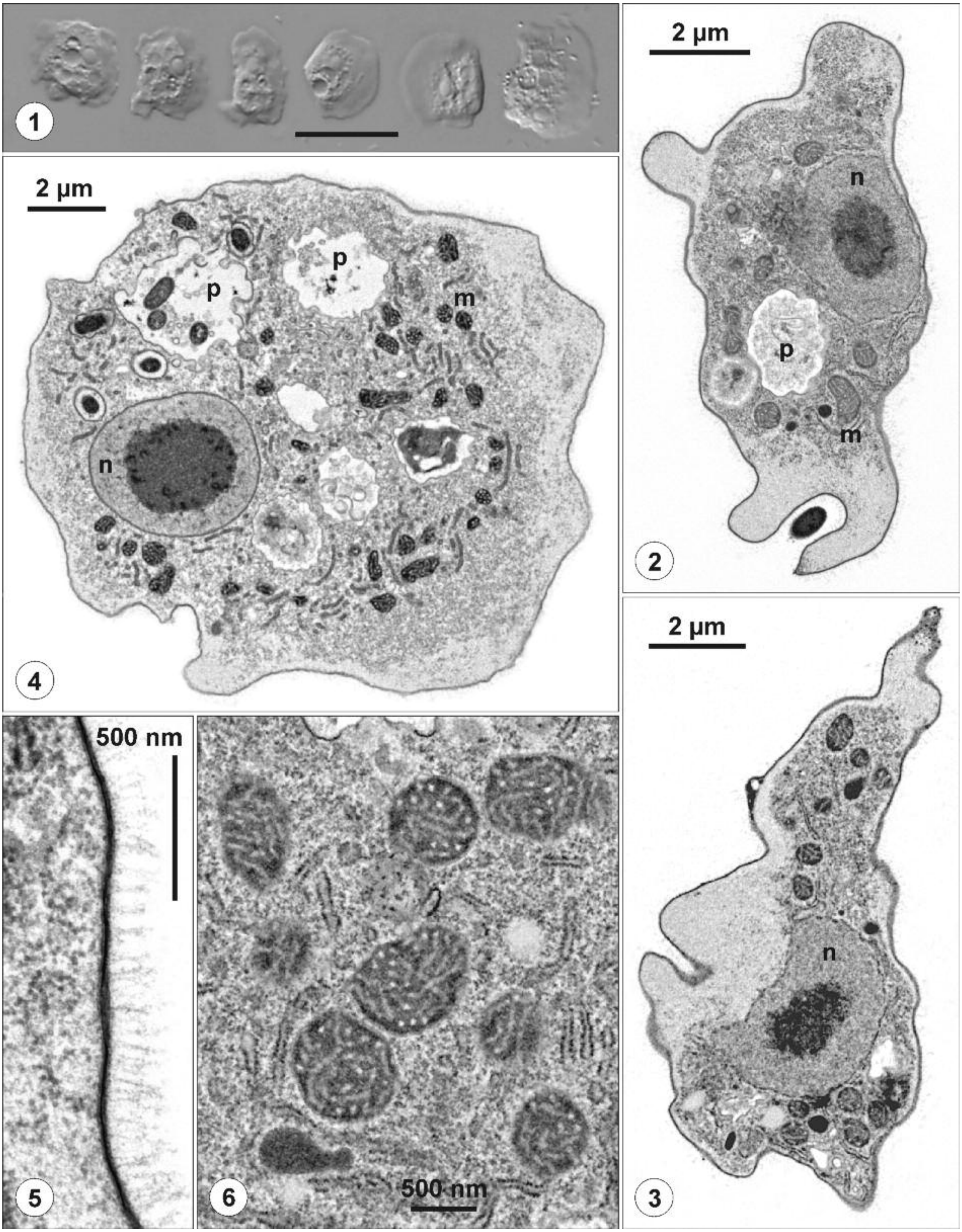

Plate 146. DP13 strain of *Ripella* sp. isolated from hepatopancreas of zebra mussel, *Dreissena polymorpha* (Pallas) collected in Želivka dam, Czech Republic; cultured on NN agar; stored in CC since 2005; GenBank Acc. No. of SSU rDNA sequence JQ271714. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC), scale bar = 20 µm. **Figs. 2, 3, 4.** Overview of fine structure of trophozoites: nuclei (n), phagosomes (p), mitochondria (m). **Fig. 5.** Cell surface of trophozoite with glycocalyx differentiated in glycostyles (not well preserved). **Fig. 6.** Mitochondria with tubular branching cristae.

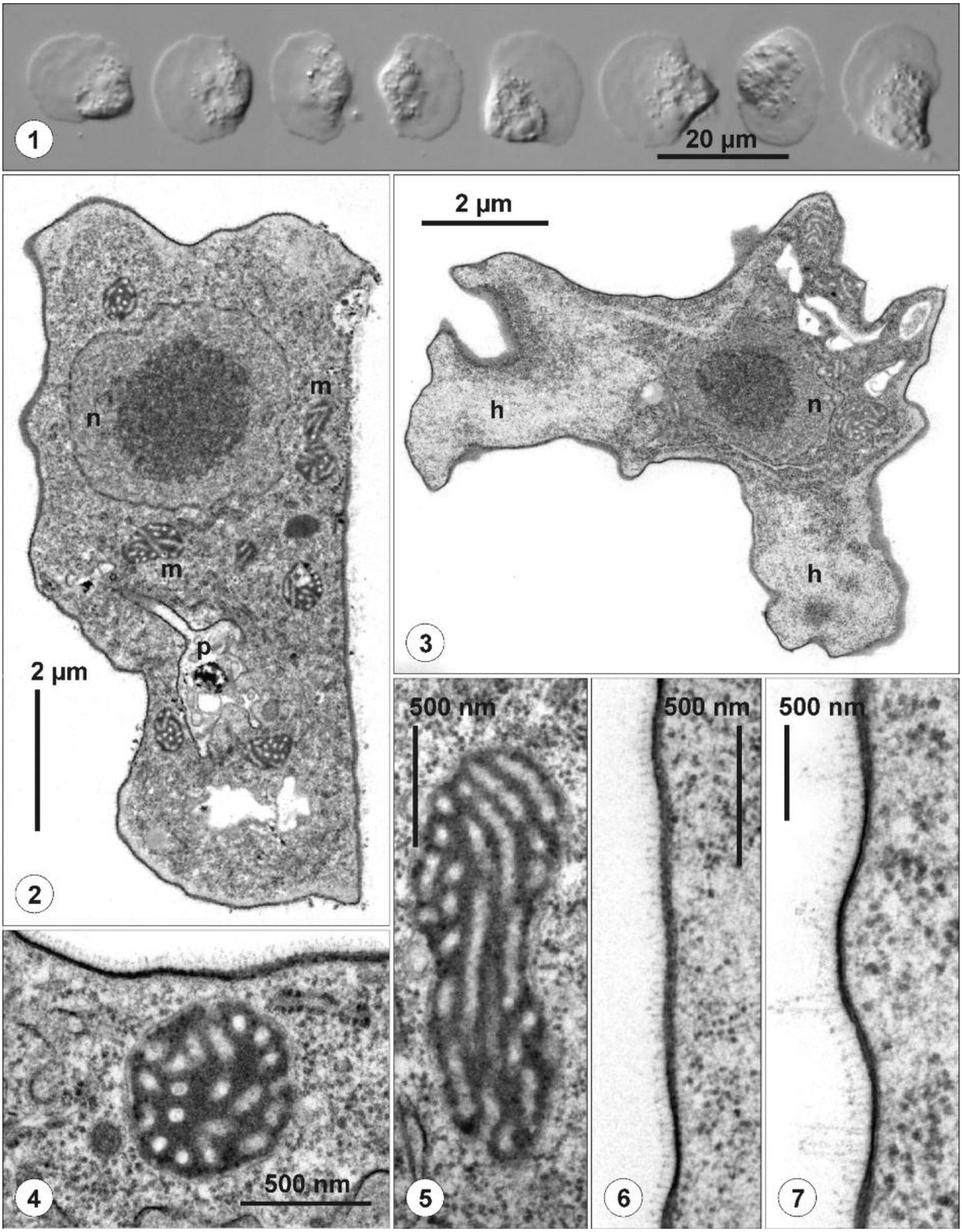

Plate 147. GERL14 strain of *Ripella* sp. isolated from gills of rainbow trout, *Oncorhynchus mykiss* (Walbaum) farmed in Baden Würtenberg, Germany; cultured on NN agar; stored in CC since 2009; GenBank Acc. No. of SSU rDNA sequence HM363630. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: hyaloplasm (h), nuclei (n), phagosome (p), mitochondria (m). **Figs. 4, 5.** Mitochondria with tubular cristae. **Figs. 6, 7.** Cell surface of trophozoites with glycocalyx differentiated in glycostyles. Ref.: Dyková et al. 2010b.

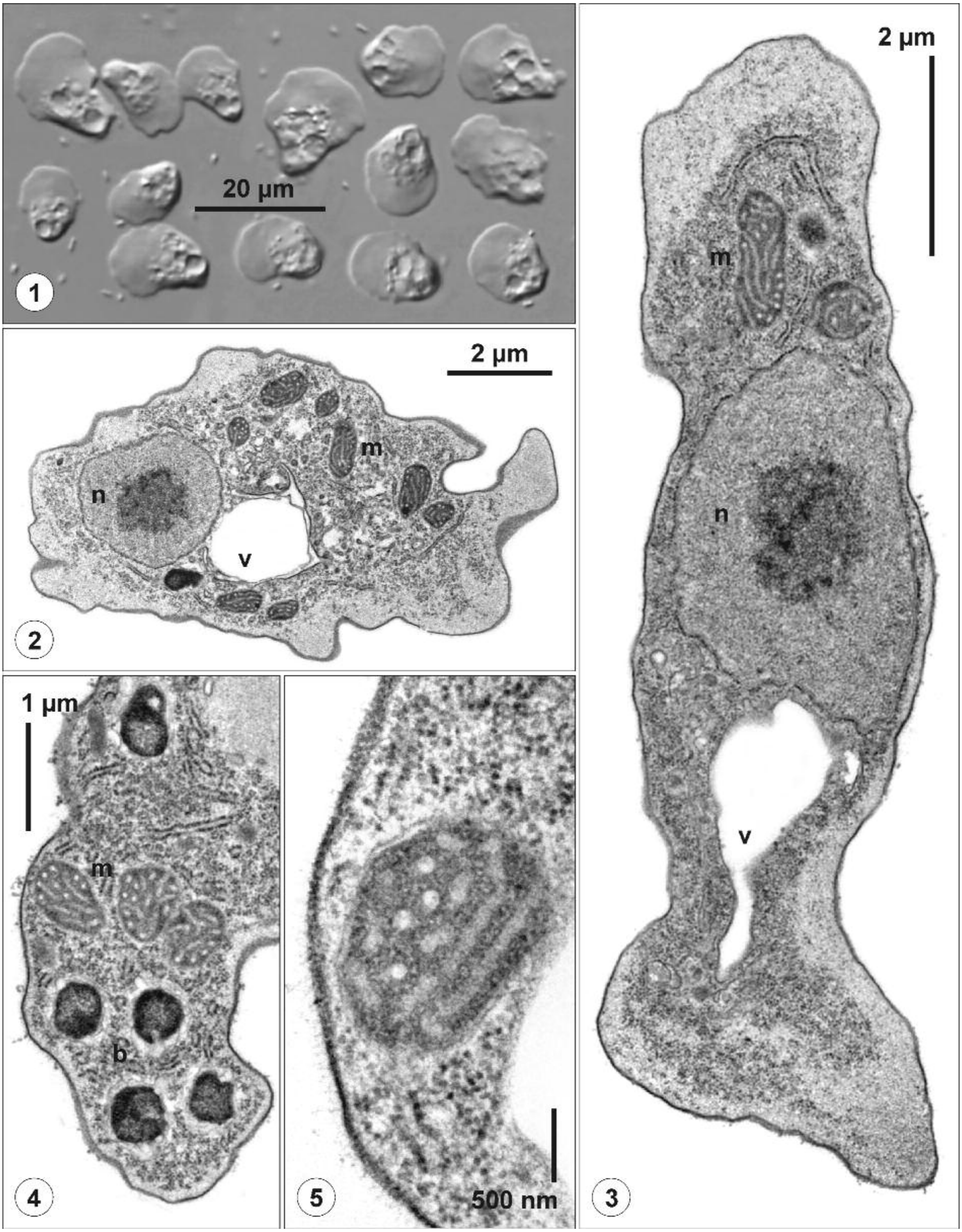

Plate 148. GERL34 strain of *Ripella* sp. isolated from gills of rainbow trout, *Oncorhynchus mykiss* (Walbaum) farmed in Baden Würtenberg, Germany; cultured on NN agar; stored in CC since 2009; GenBank Acc. No. of SSU rDNA sequence HM363631. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), vacuoles (v). **Fig. 4.** Mitochondria (m) and symbiotic bacteria (b). **Fig. 5.** Cell surface of trophozoite with amorphous glycocalyx and mitochondrion with tubular cristae. Ref.: Dyková et al. 2010b.

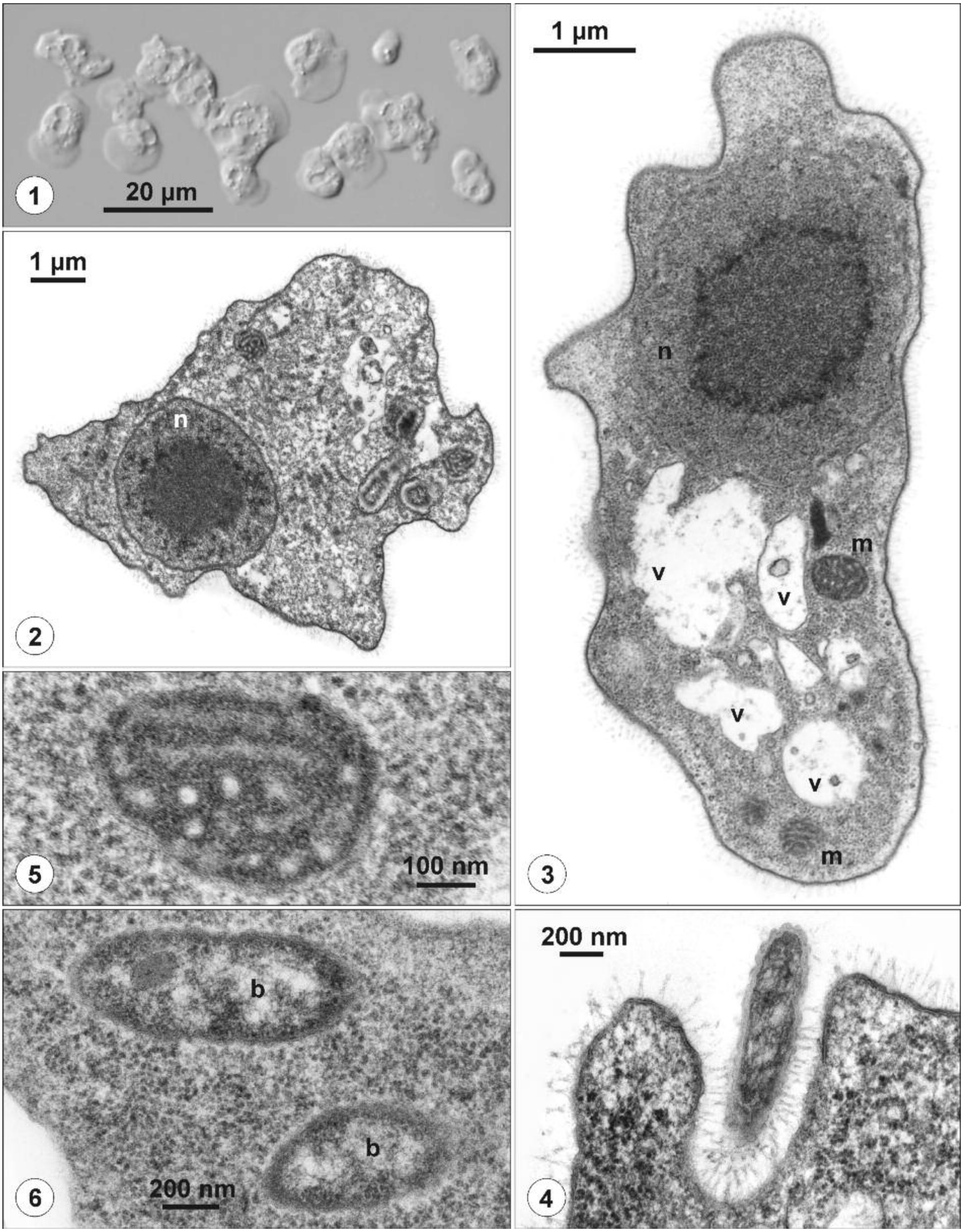

Plate 149. GP2 strain of *Ripella* sp. isolated from gills of elephantnose fish, *Gnathonemus petersi* (Günther) imported from Nigeria to pet shop, Czech Republic; cultured on NN agar; stored in CC since 2002; GenBank Acc. No. of SSU rDNA sequence JQ271715. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), vacuoles (v), mitochondria (m). **Fig. 4.** Cell surface of trophozoite with glycocalyx differentiated in glycostyles. **Fig. 5.** Mitochondrion with tubular cristae. **Fig. 6.** Symbiotic bacteria (b) in cytoplasm.

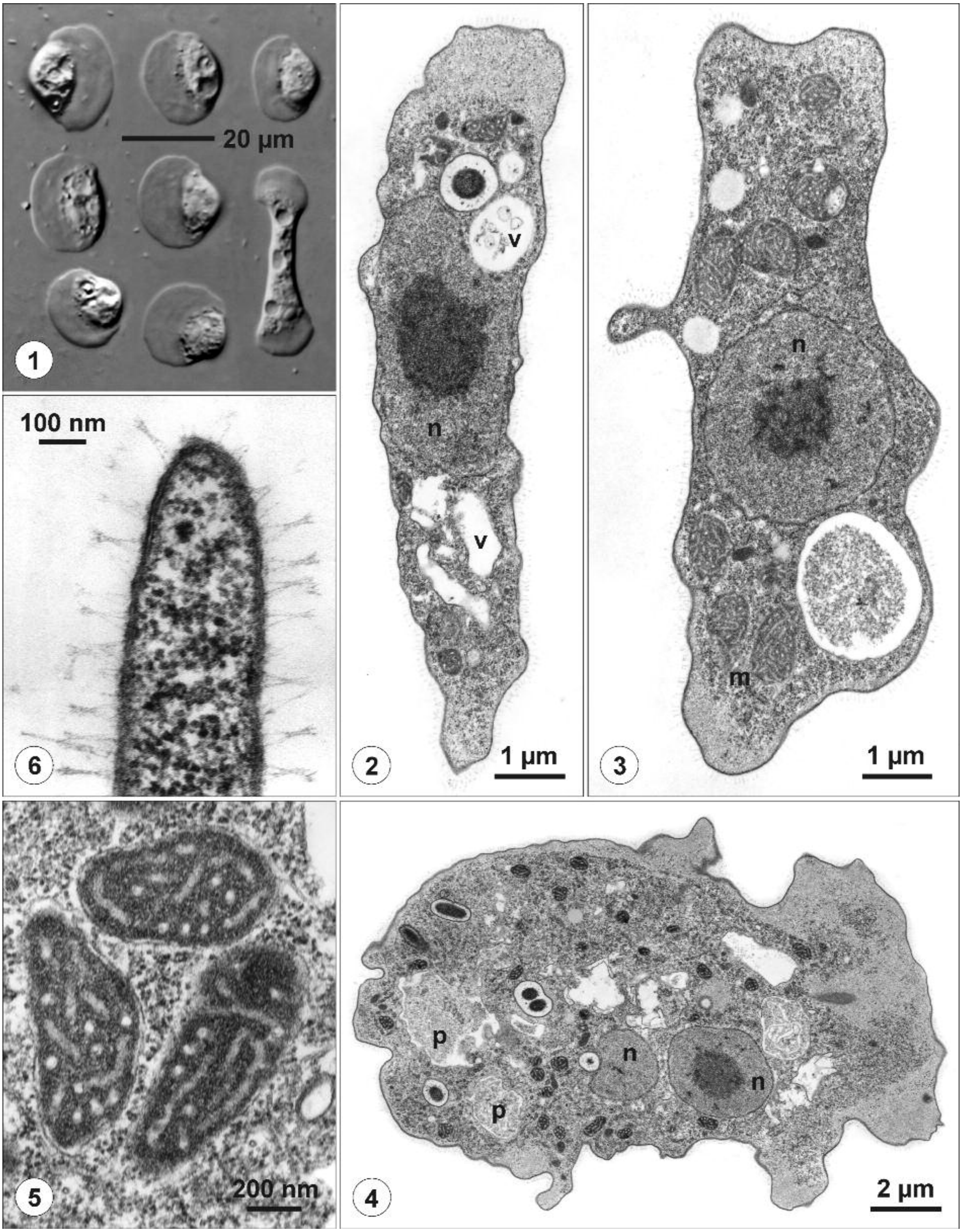

Plate 150. PS2 strain of *Ripella* sp. isolated from gills of striped catfish, *Pangasianodon hypophthalmus* (Sauvage) imported from Singapore to pet shop, Czech Republic; cultured on NN agar; stored in CC since 2000; GenBank Acc. No. of SSU rDNA sequence JQ271716. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3, 4.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosomes (p), vacuoles (v). **Fig. 5.** Mitochondria with tubular cristae. **Fig. 6.** Cell surface of trophozoite with glycocalyx differentiated in glycostyles.

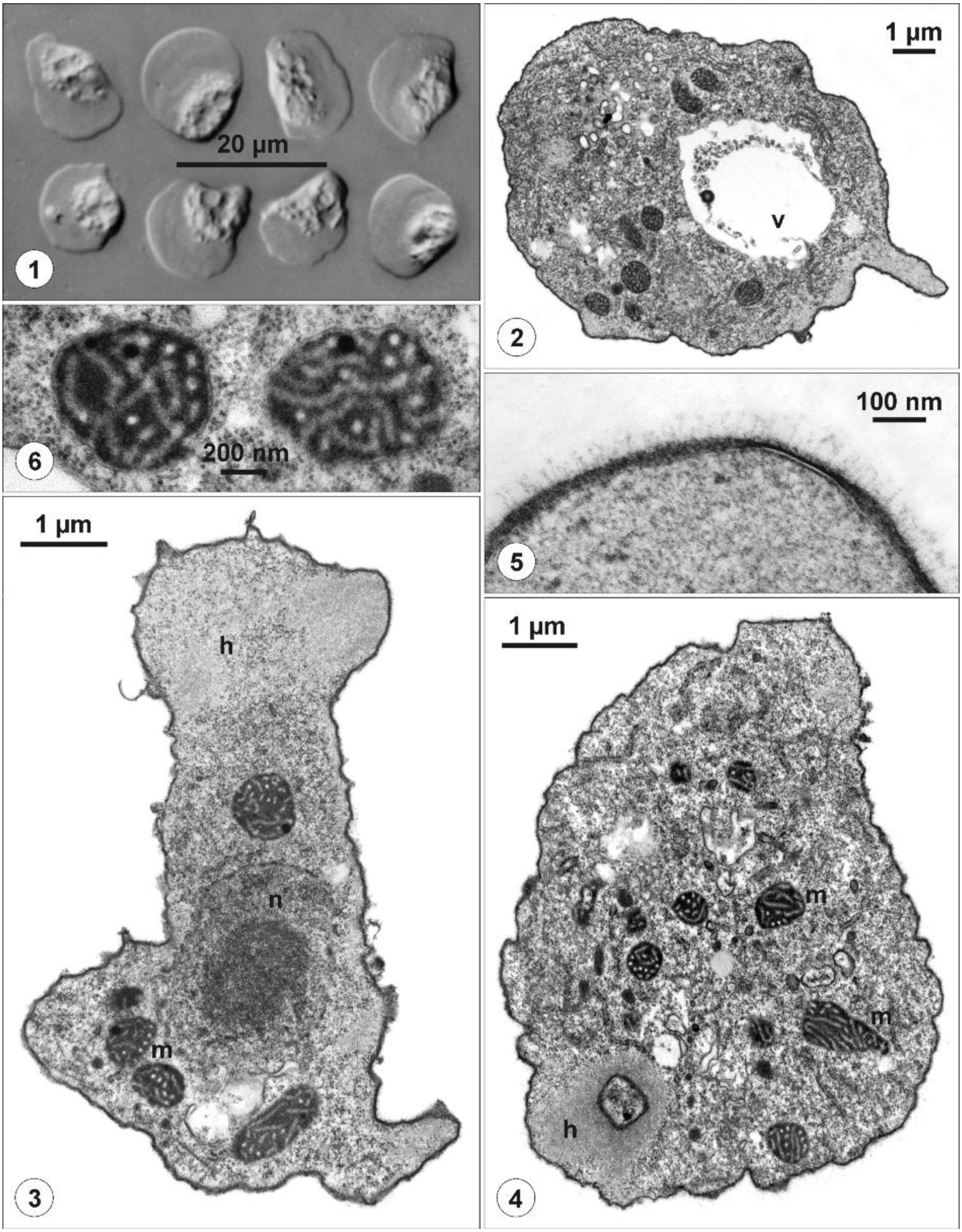

Plate 151. SUM1S strain of *Ripella* sp. isolated from gills of wels catfish, *Silurus glanis* L. from a small tributary of Elbe River, Rumburk, Czech Republic; cultured on NN agar; stored in CC since 2000; GenBank Acc. No. of SSU rDNA sequence AY929921. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3, 4.** Overview of fine structure of trophozoites: hyaloplasm (h), nucleus (n), mitochondria (m), vacuole (v). **Fig. 5.** Cell surface of trophozoite with glycocalyx differentiated in glycostyles. **Fig. 6.** Mitochondria with tubular cristae. Ref.: Dyková et al. 2005a.

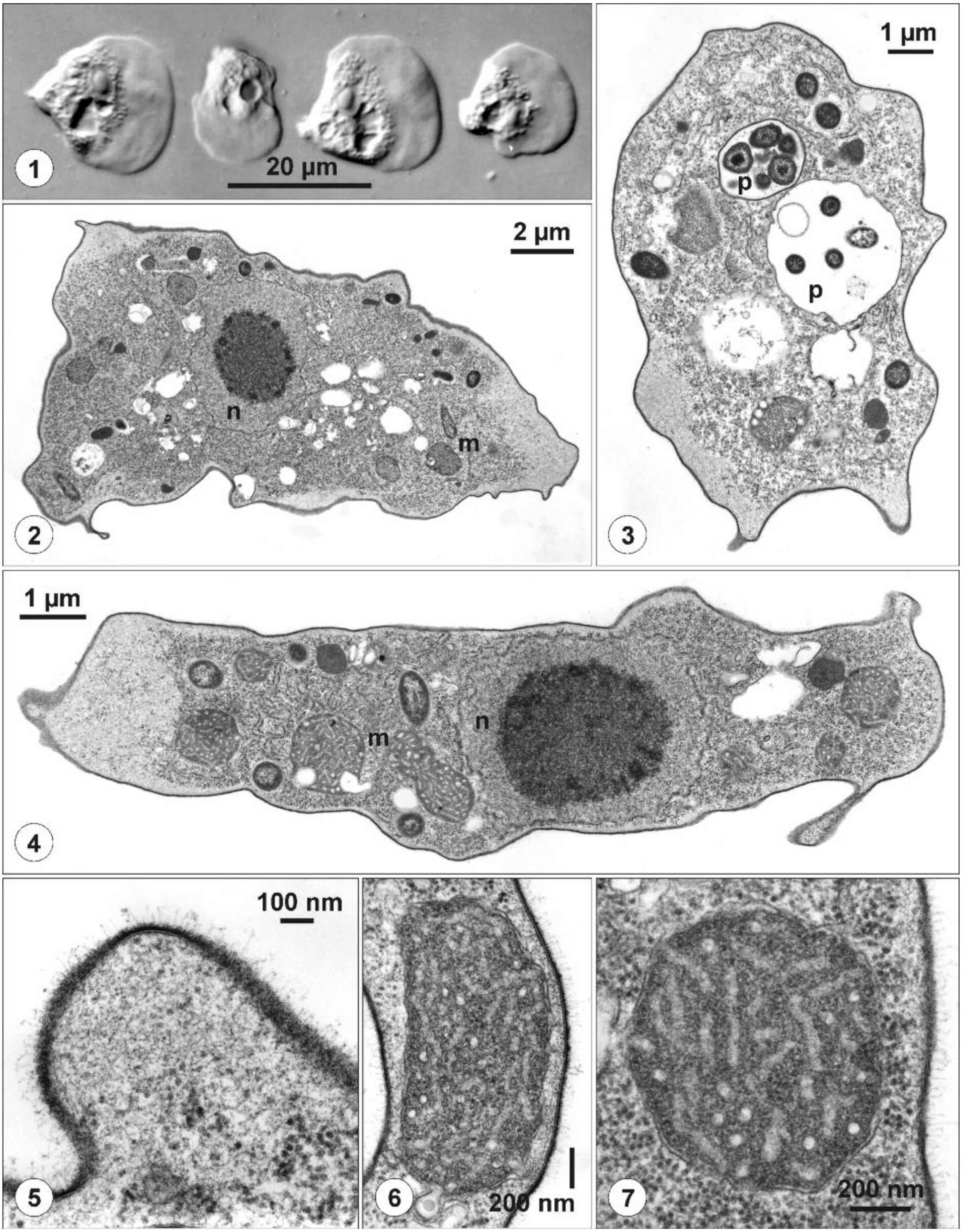

Plate 152. W181G strain of *Ripella* sp. isolated from gills of Prussian carp, *Carassius gibelio* (Bloch) from fish market in Wuhan, Hubei province, China; cultured on NN agar; stored in CC since 2001; GenBank Acc. No. of SSU rDNA sequence AY929913. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3, 4.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosomes (p). **Fig. 5.** Cell surface of trophozoite: glycocalyx with slight indication of differentiation. **Figs. 6, 7.** Mitochondria with tubular branching cristae. Ref.: Dyková et al. 2005a.

Saccamoeba Frenzel, 1892 emend. Bovee, 1972

Plates 153–159

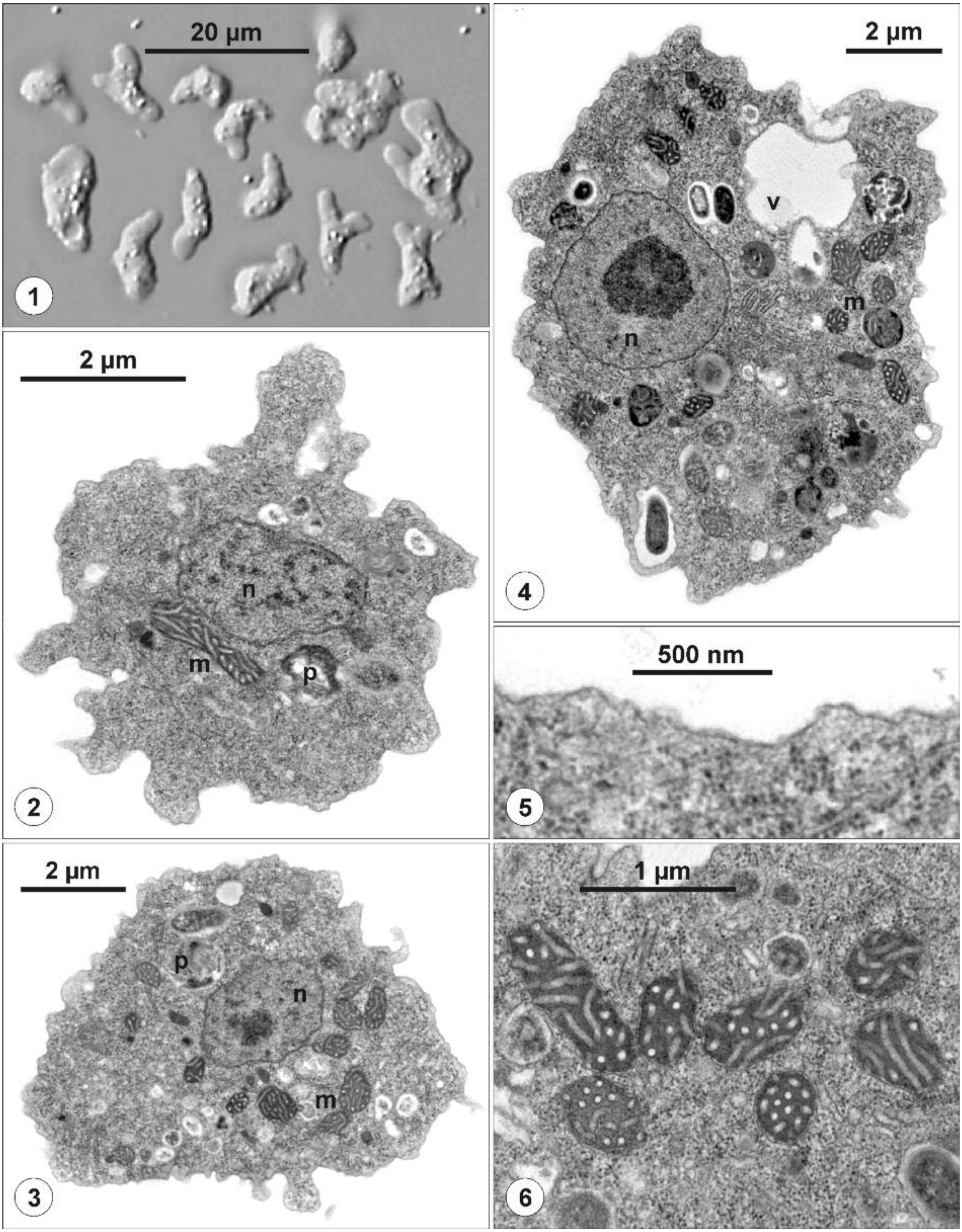

Plate 153. DP7 strain of *Saccamoeba* sp. isolated from hepatopancreas of zebra mussel, *Dreissena polymorpha* (Pallas) collected in Želivka dam, Czech Republic; cultured on NN agar; stored in CC since 2005; GenBank Acc. No. of SSU rDNA sequence JQ271717. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3, 4.** Overview of fine structure of trophozoites sectioned in different planes: nuclei (n), mitochondria (m), phagosomes (p) and vacuole (v). **Fig. 5.** Cell surface of trophozoite. **Fig. 6.** Detail of ultrastructure of mitochondria containing tubular cristae.

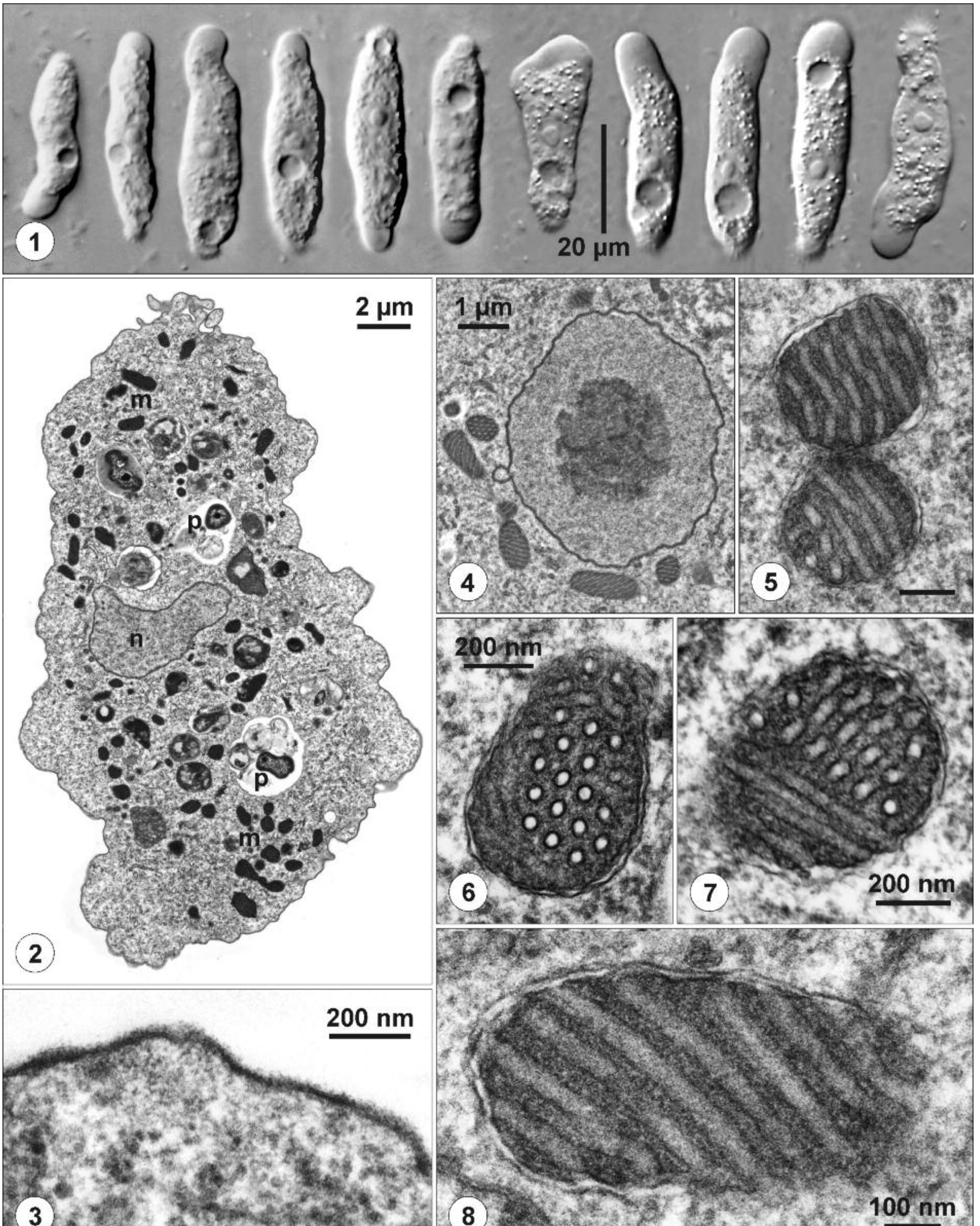

Plate 154. LOS7N strain of *Saccamoeba* sp. isolated from Atlantic salmon, *Salmo salar* L. used for re-population of Elbe River, Czech Republic; cultured on NN agar; stored in CC since 2000; GenBank Acc. No. of SSU rDNA sequence AY145442. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Overview of fine structure of trophozoite: part of nucleus in the plane of sectioning (n), densely stained mitochondria (m), phagosomes (p). **Fig. 3.** Cell surface of trophozoite. **Fig. 4.** Vesicular nucleus surrounded by mitochondria. **Figs. 5, 6, 7, 8.** Straight, non-branching tubular cristae of mitochondria in various planes of sectioning. Scale bar for Fig. 5 = 200 nm. Ref.: Dyková et al. 2002.

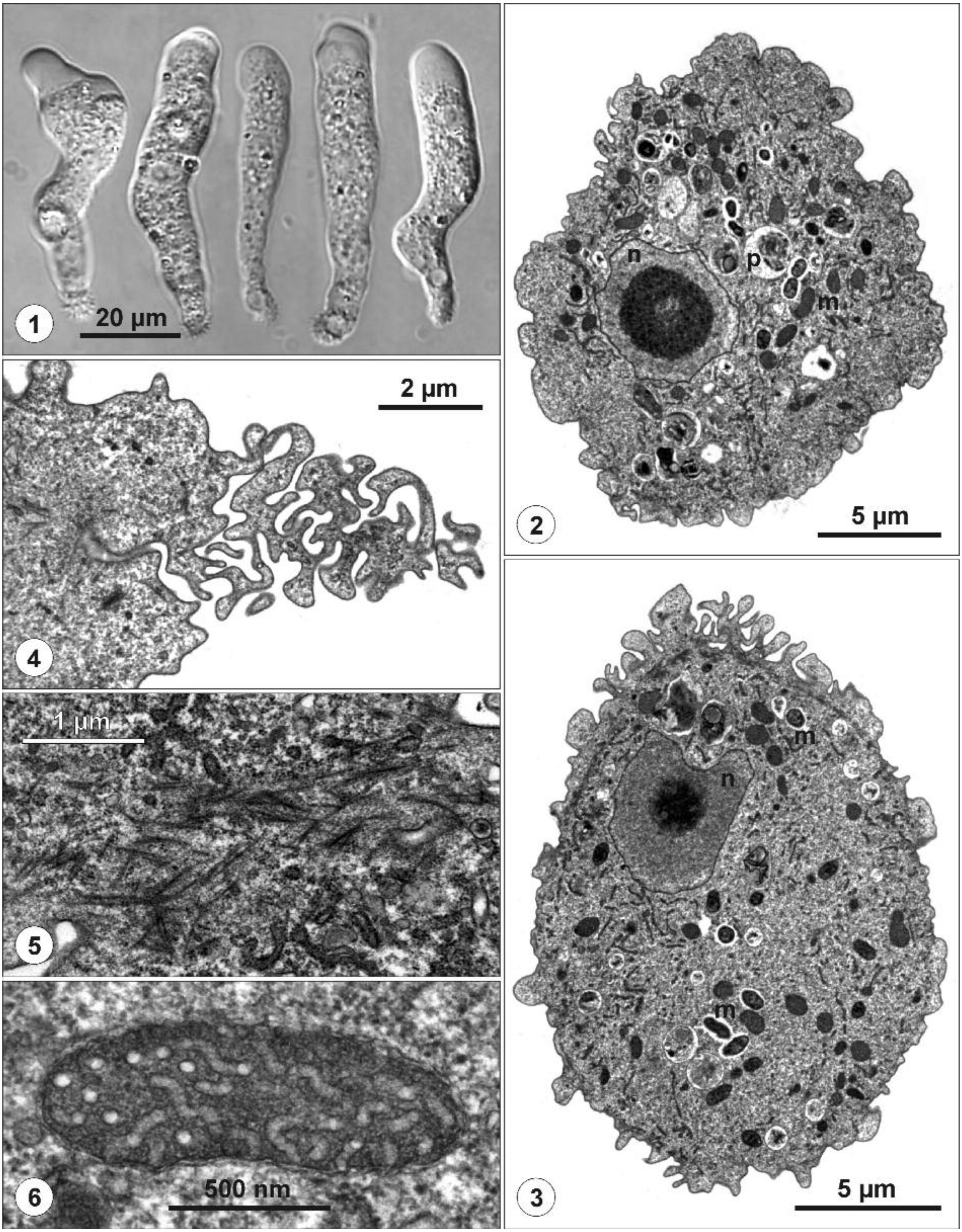

Plate 155. MSED6 strain of *Saccamoeba* sp. isolated from sediment collected from freshwater aquarium with ornamental fishes (supplied by aquarist from České Budějovice, Czech Republic); cultured on NN agar; stored in CC since 2010; GenBank Acc. No. of SSU rDNA sequence JQ271718. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: vesicular nuclei (n), densely stained mitochondria (m), phagosomes (p). **Fig. 4.** Posterior part of trophozoite with villous-knob uroid. **Fig. 5.** Aggregates of microfilaments in cytoplasm. **Fig. 6.** Detail of ultrastructure of mitochondrion with twisted tubular cristae.

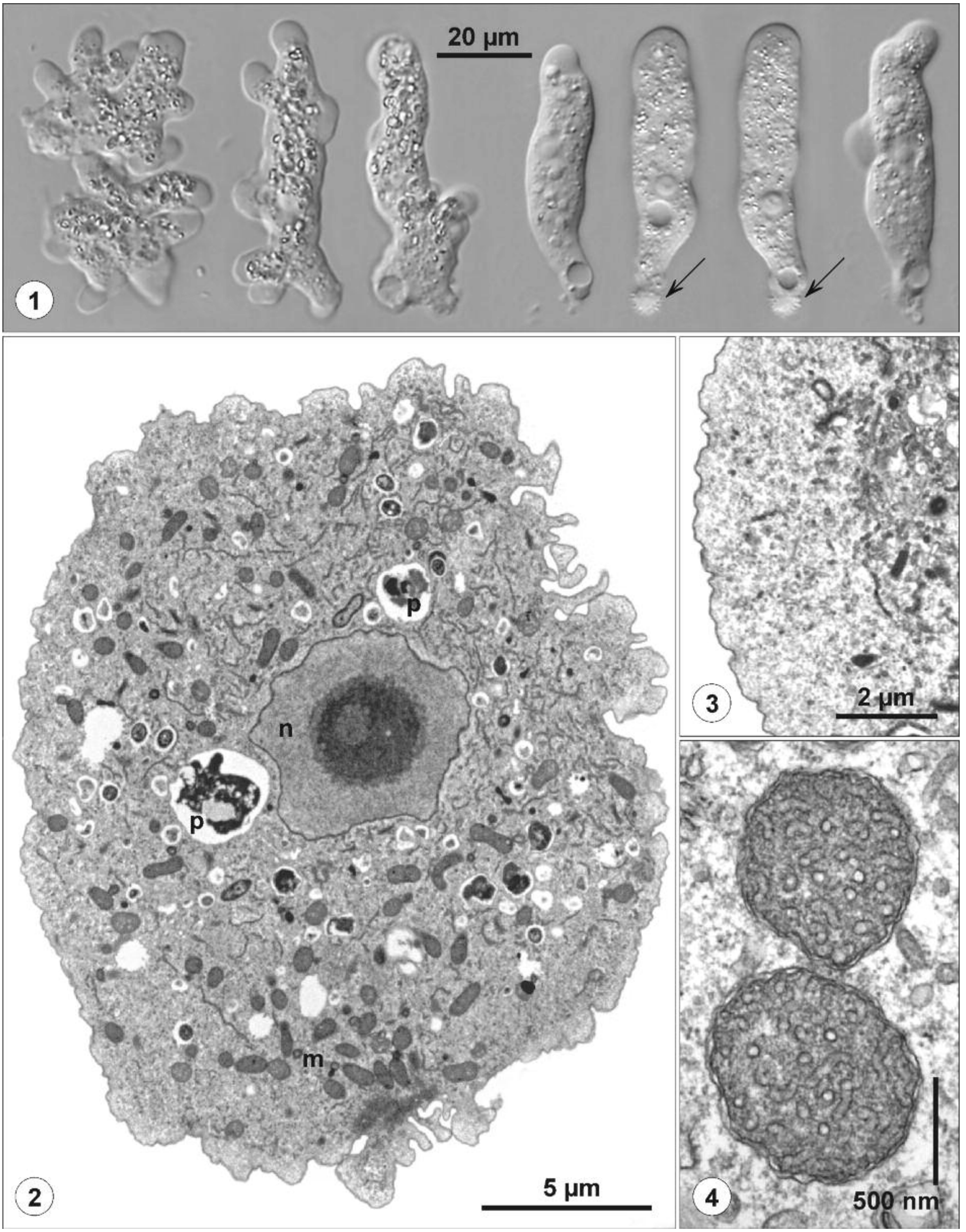

Plate 156. NTSHR strain of *Saccamoeba limax* isolated from decomposing gills of pearl gourami, *Trichogaster leeri* (Bleeker); cultured on NN agar; stored in CC since 2008; GenBank Acc. No. of SSU rDNA sequence EU869301. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). Little active trophozoites (left), transient forms (middle) and monopodial locomotive forms with uroids marked with arrows (right). **Fig. 2.** Overview of fine structure of trophozoite: vesicular nucleus (n), numerous mitochondria (m), phagosomes (p), vesicles and bacteria. **Fig. 3.** Cell surface with thin amorphous glycocalyx. **Fig. 4.** Mitochondria with twisted tubular cristae. (Cont.)

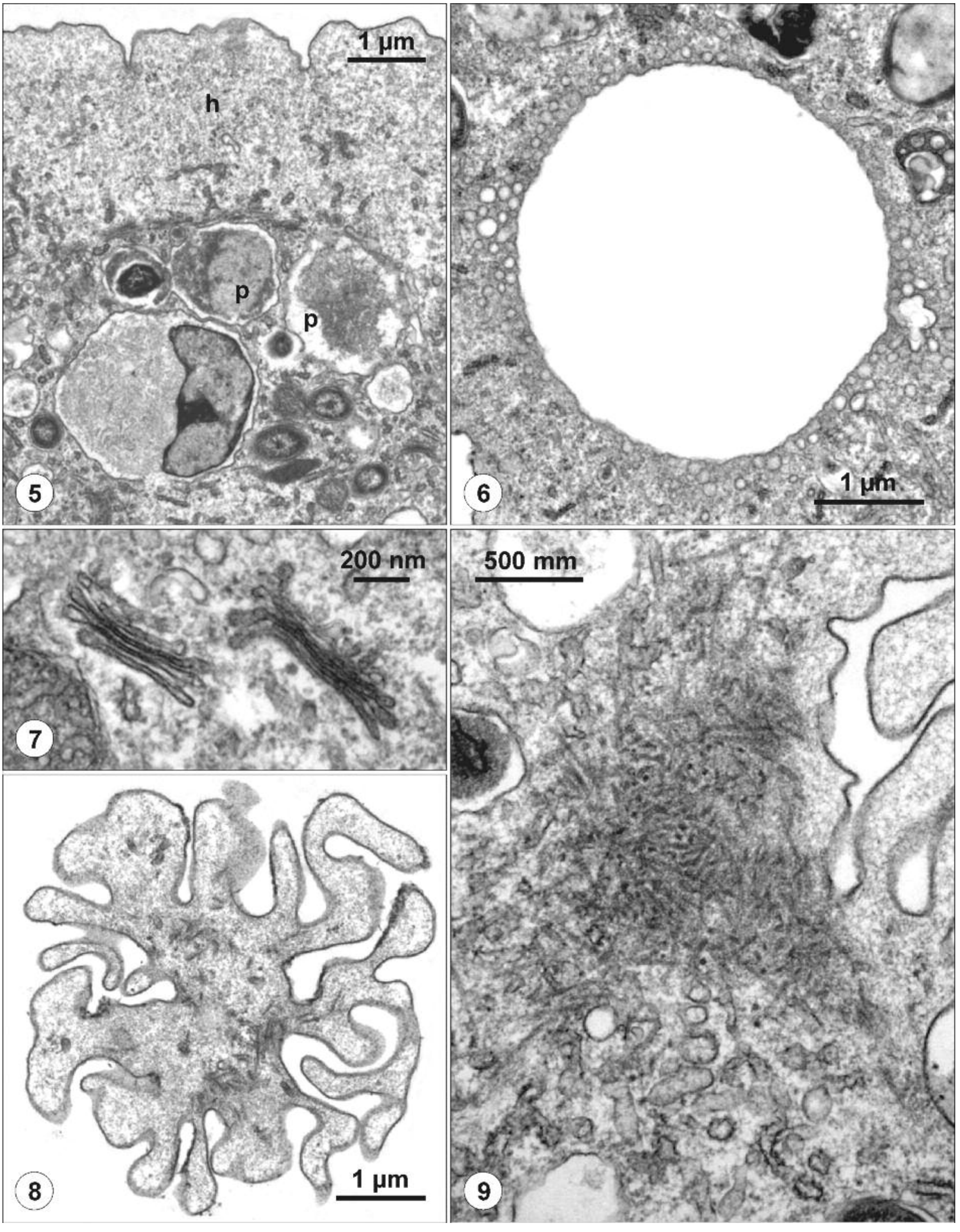

Plate 157. NTSHR strain of *Saccamoeba limax*. Details of ultrastructure. **Fig. 5.** Hyaloplasm (h) on periphery of trophozoite and part of granuloplasm containing suspected crystals, remnants of food in phagosomes (p) and bacteria. **Fig. 6.** Contractile vacuole surrounded by spongiom. **Fig. 7.** Cisternae of Golgi complexes arranged in parallel arrays. **Fig. 8.** Transverse section through villous uroid. **Fig. 9.** Aggregates of microfilaments between main cytoplasmic mass and hyaloplasm of uroid arranged in villi. Ref.: Dyková et al. 2008d.

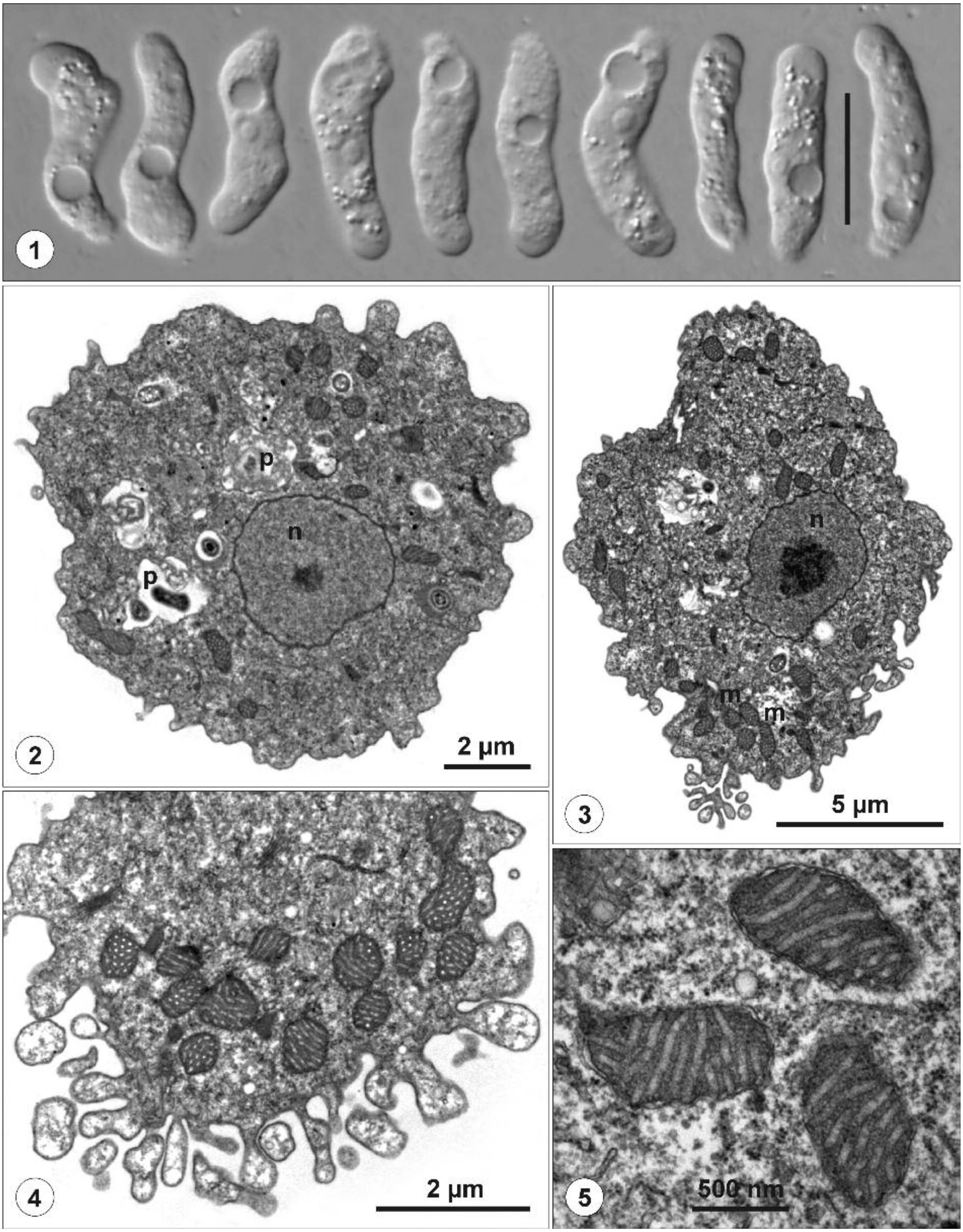

Plate 158. PV67 strain of *Saccamoeba* sp. isolated from material contaminating beer bottles stored in the open air for recycling, Czech Republic; cultured on NN agar; stored in CC since 2011; GenBank Acc. No. of SSU rDNA sequence JQ271719. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC), scale bar = 20 µm. **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosomes (p). **Fig. 4.** Ultrastructure of trophozoite sectioned in vicinity of uroid villi: numerous mitochondria concentrated in this part of cytoplasm. **Fig. 5.** Mitochondria with tubular, straight and non-branching cristae.

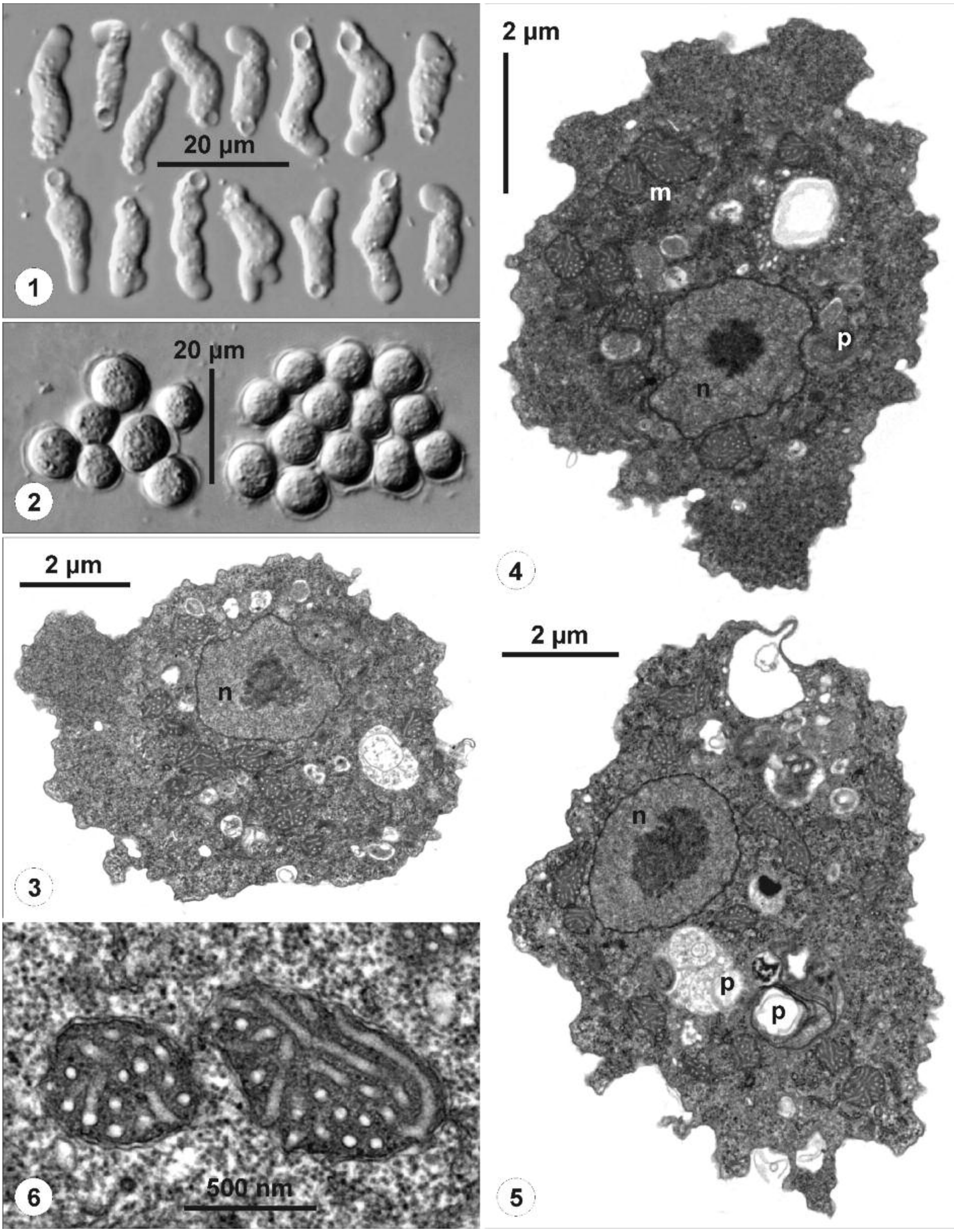

Plate 159. W187G strain of *Saccamoeba* sp. isolated from gills of Prussian carp, *Carassius gibelio* (Bloch) from Baoan Lake, Hubei province, China; cultured on NN agar; stored in CC since 2001; GenBank Acc. No. of SSU rDNA sequence JQ271720. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Cysts seen in Nomarski DIC. **Figs. 3, 4, 5.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosomes with remnants of food (p). **Fig. 6.** Detail of ultrastructure of mitochondria with tubular cristae.

Stenamoeba Smirnov, Nassonova, Chao et Cavalier-Smith, 2007

Plates 160–163

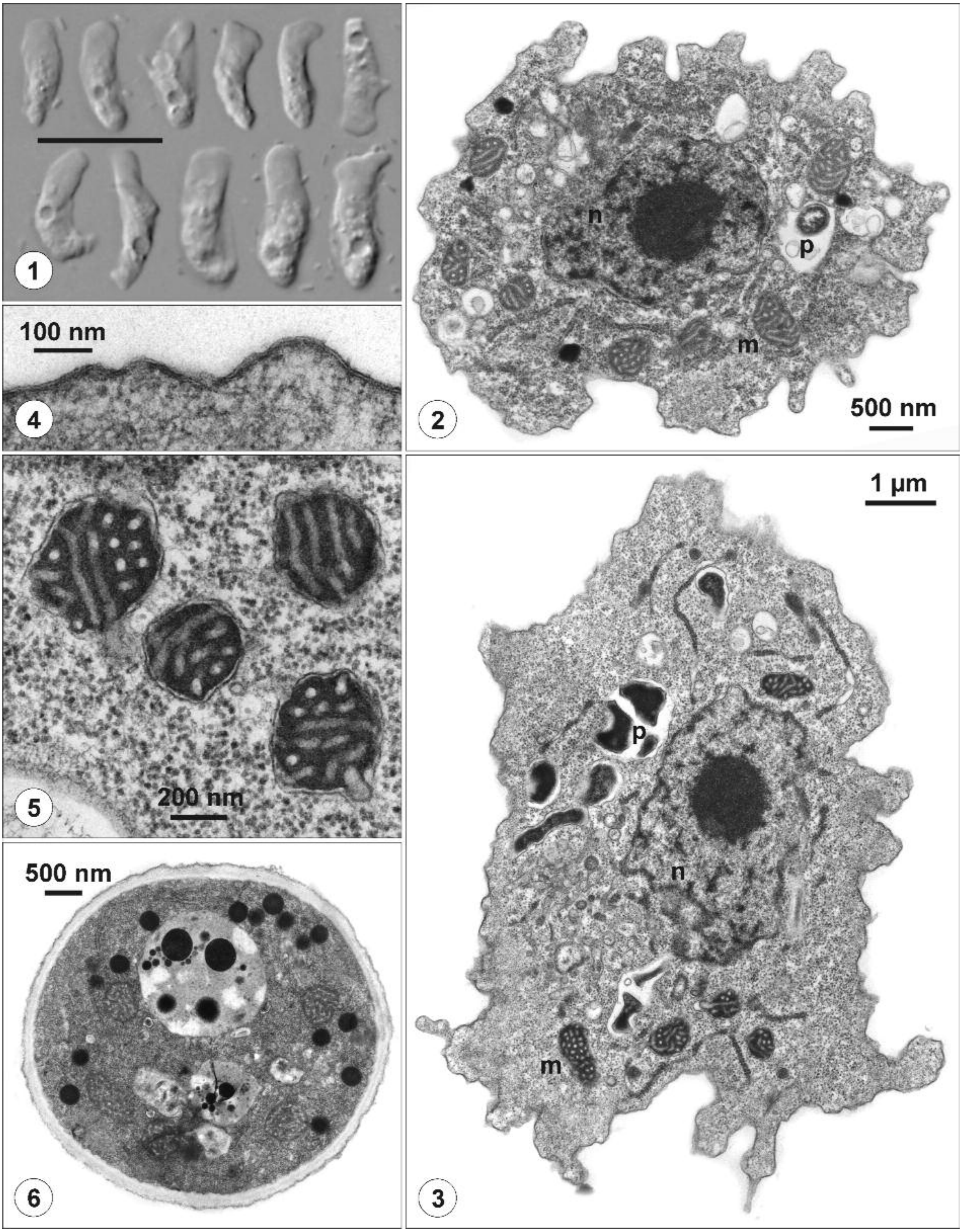

Plate 160. 4692L strain of *Stenamoeba limacina* isolated from kidney of gudgeon, *Gobio gobio* (L.) from Lužnice River, South Bohemia, Czech Republic; cultured on NN agar; stored in CC since 1991; GenBank Acc. No. of SSU rDNA sequence GU810183. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC), scale bar = 20 µm. **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosomes (p). **Fig. 4.** Cell surface of trophozoite. **Fig. 5.** Detail of trophozoite ultrastructure: mitochondria with tubular cristae sectioned longitudinally and transversely. **Fig. 6.** Early stage of cyst formation. Ref.: Dyková et al. 2010a.

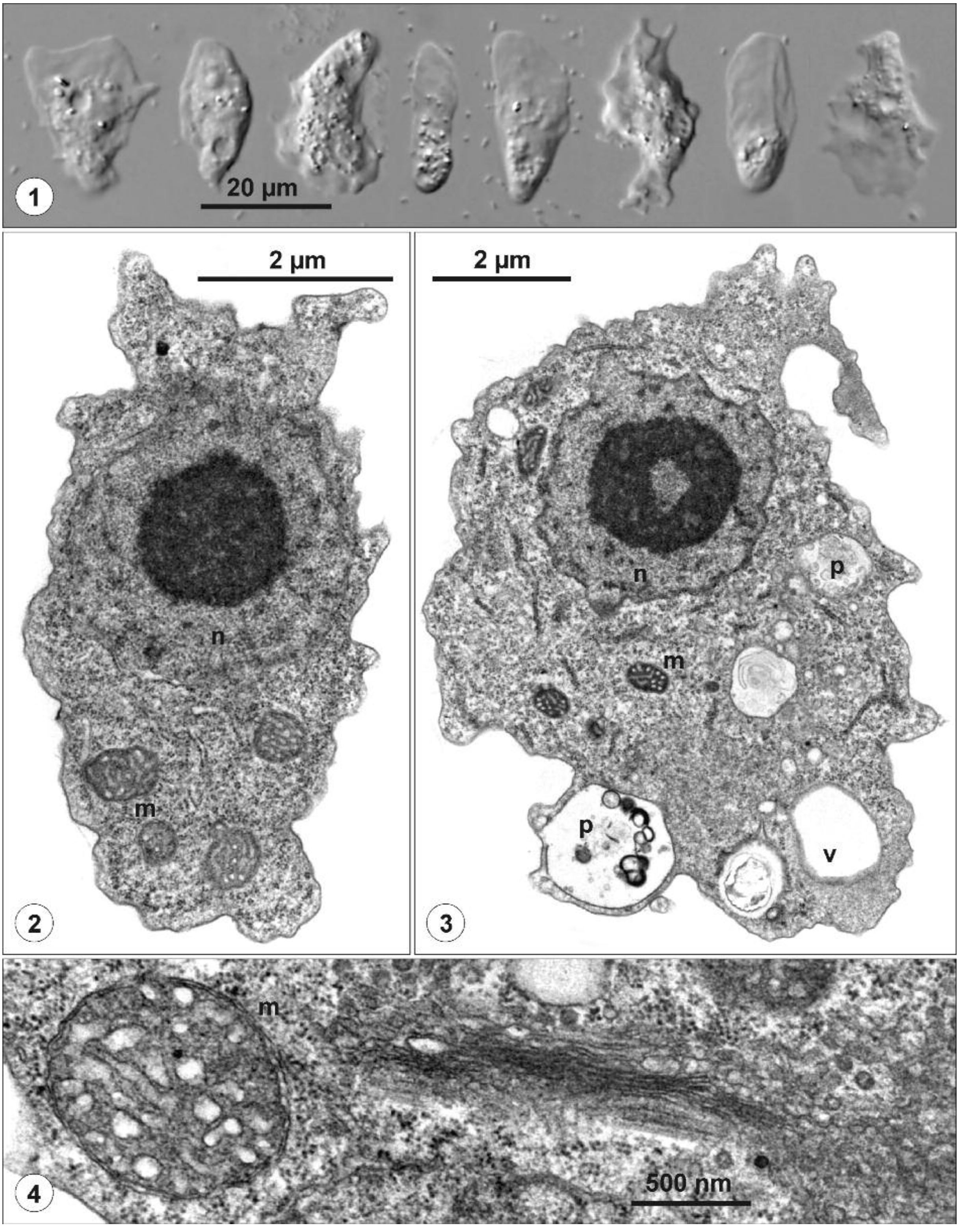

Plate 161. HP839 strain of *Stenamoeba* sp. isolated from kidney of *Haplochromis nigroides* (Pellegrin) from Lake Victoria, Tanzania; cultured on NN agar; stored in CC since 1995; GenBank Acc. No. of SSU rDNA sequence JQ271721. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosomes (p), vacuole (v). **Fig. 4.** Details of trophozoite ultrastructure: mitochondrion (m), cisternae of Golgi apparatus in parallel arrays.

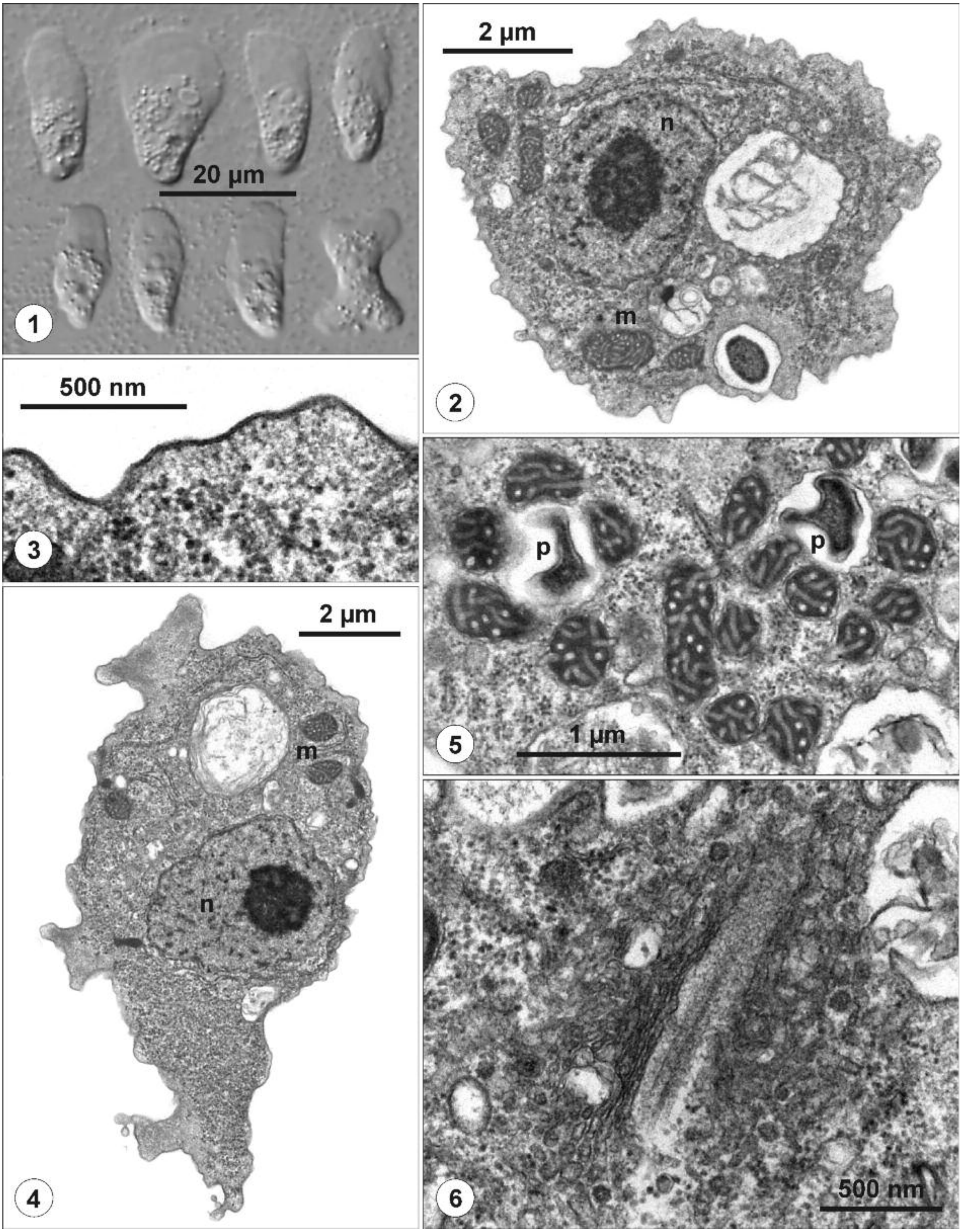

Plate 162. P119 strain of *Stenamoeba amazonica* isolated from gills of guitaritta, *Psectrogaster amazonica* Eigenmann et Eigenmann from Amazon River, Iquitos, Peru; cultured on NN agar; stored in CC since 2004; GenBank Acc. No. of SSU rDNA sequence GU810184. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 4.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosomes. **Fig. 3.** Cell surface of trophozoite. **Fig. 5.** Detail of trophozoite ultrastructure: mitochondria with tubular cristae; bacteria in phagosomes (p). **Fig. 6.** Cisternae of Golgi apparatus surrounding undetermined structure in cytoplasm. Ref.: Dyková et al. 2010a.

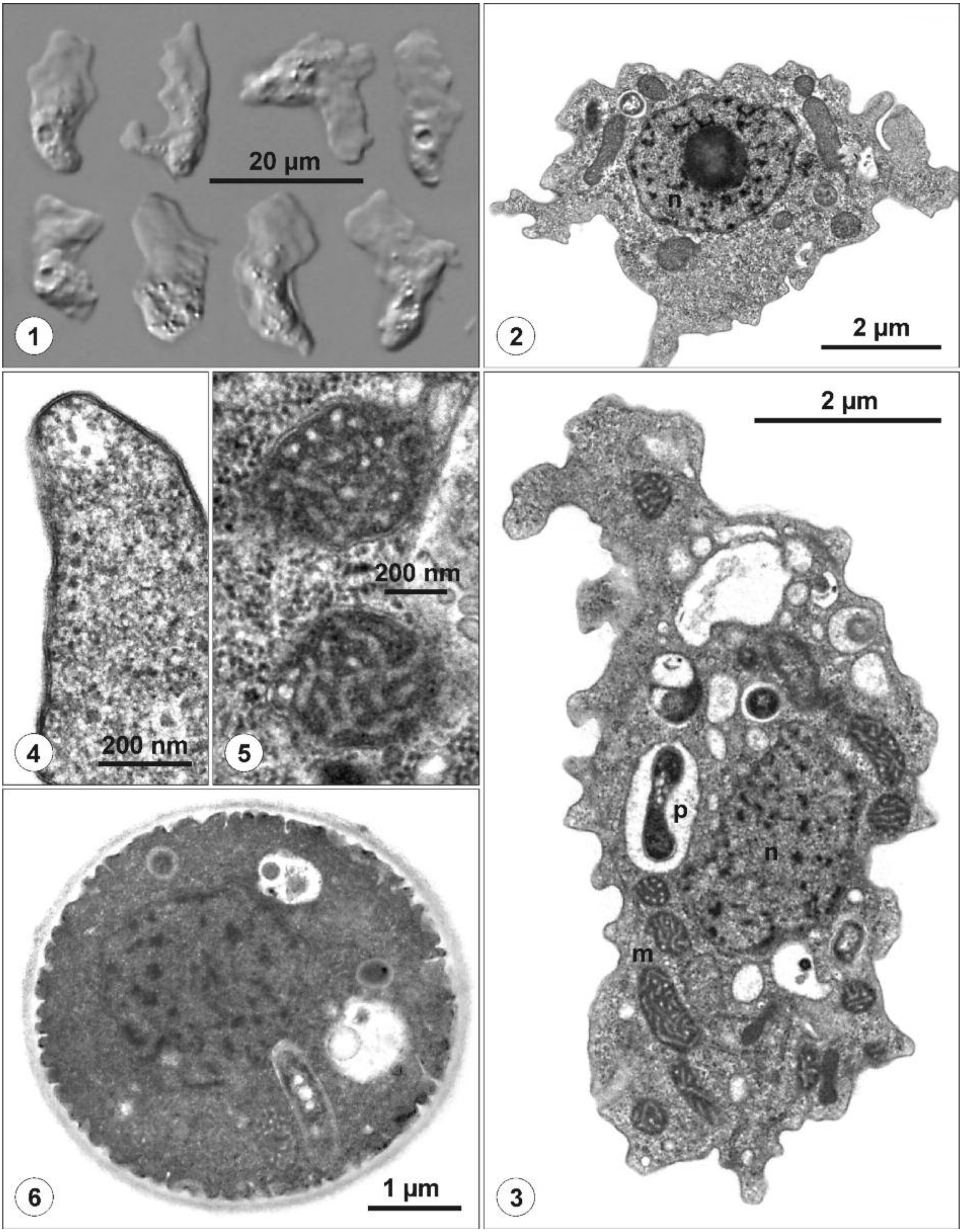

Plate 163. P126 strain of *Stenamoeba* sp. isolated from gills of zamurito, *Calophysus macropterus* (Lichtenstein) from Amazon River, Iquitos, Peru; cultured on NN agar; stored in CC since 2004; GenBank Acc. No. of SSU rDNA sequence GU810185. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosome (p). **Fig. 4.** Cell surface of trophozoite. **Fig. 5.** Detail of trophozoite ultrastructure: mitochondria with tubular cristae. **Fig. 6.** Early stage of cyst formation. Ref.: Dyková et al. 2010a.

Thecamoeba Fromentel, 1874

Plates 164–165

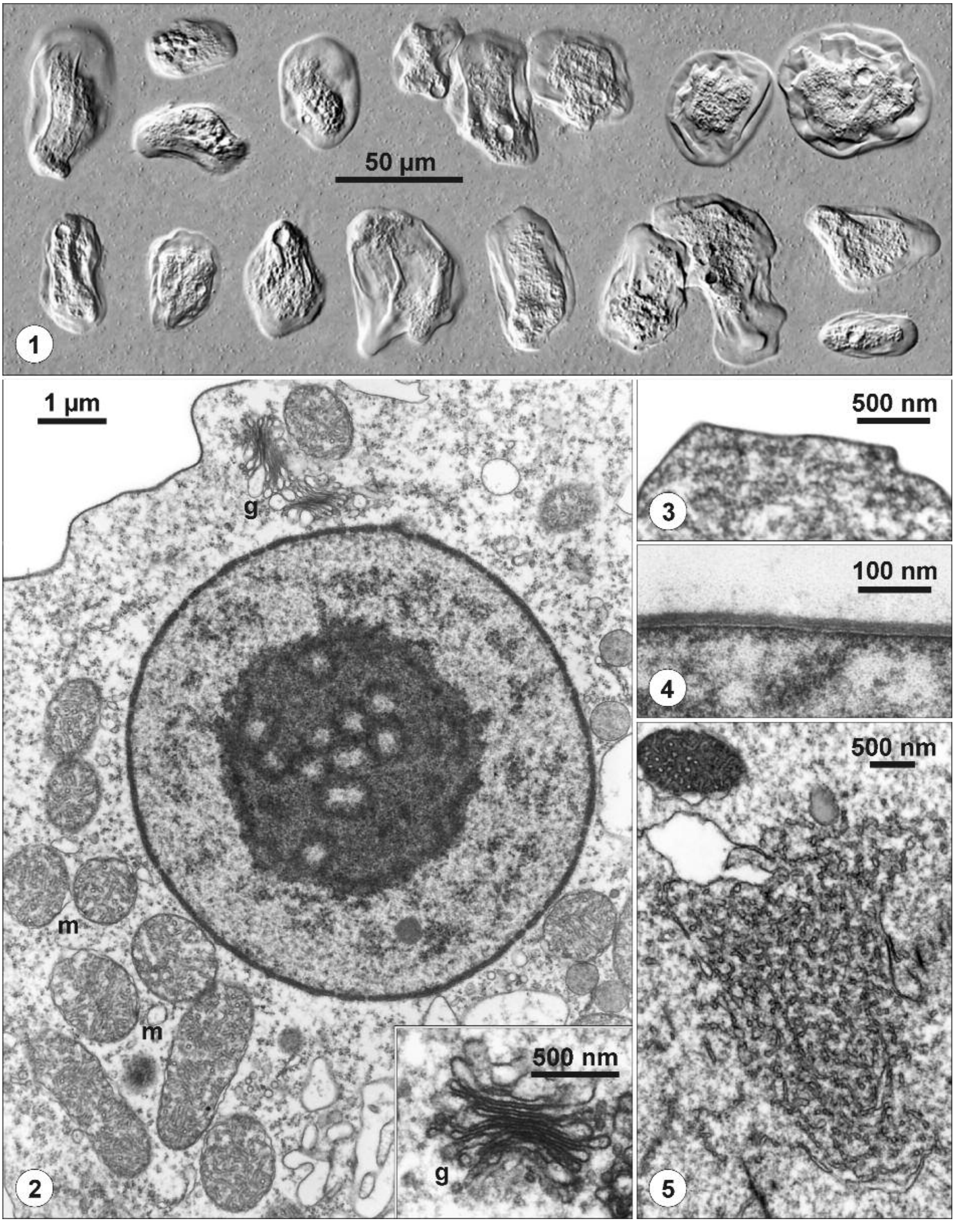

Plate 164. AF12B strain of *Thecamoeba hilla* isolated from gills of turbot, *Scophthalmus maximus* (L.) farmed in NW Spain; cultured on MY75S agar; stored in CC since 2000; samples of DNA stored under FLA DB Nos. 135, 166, 200, 203, 558. **Fig. 1.** Trophozoites with longitudinal folds and wrinkles as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Details of fine structure of trophozoite: rounded nucleus with pronounced chromatin density variation, mitochondria with branching tubular cristae (m), prominent Golgi complex (g), see also inset. **Figs. 3, 4.** Pellicle-like surface of trophozoites. **Fig. 5.** Closely spaced cisternae of endoplasmic reticulum. Ref.: Dyková et al. 2008a.

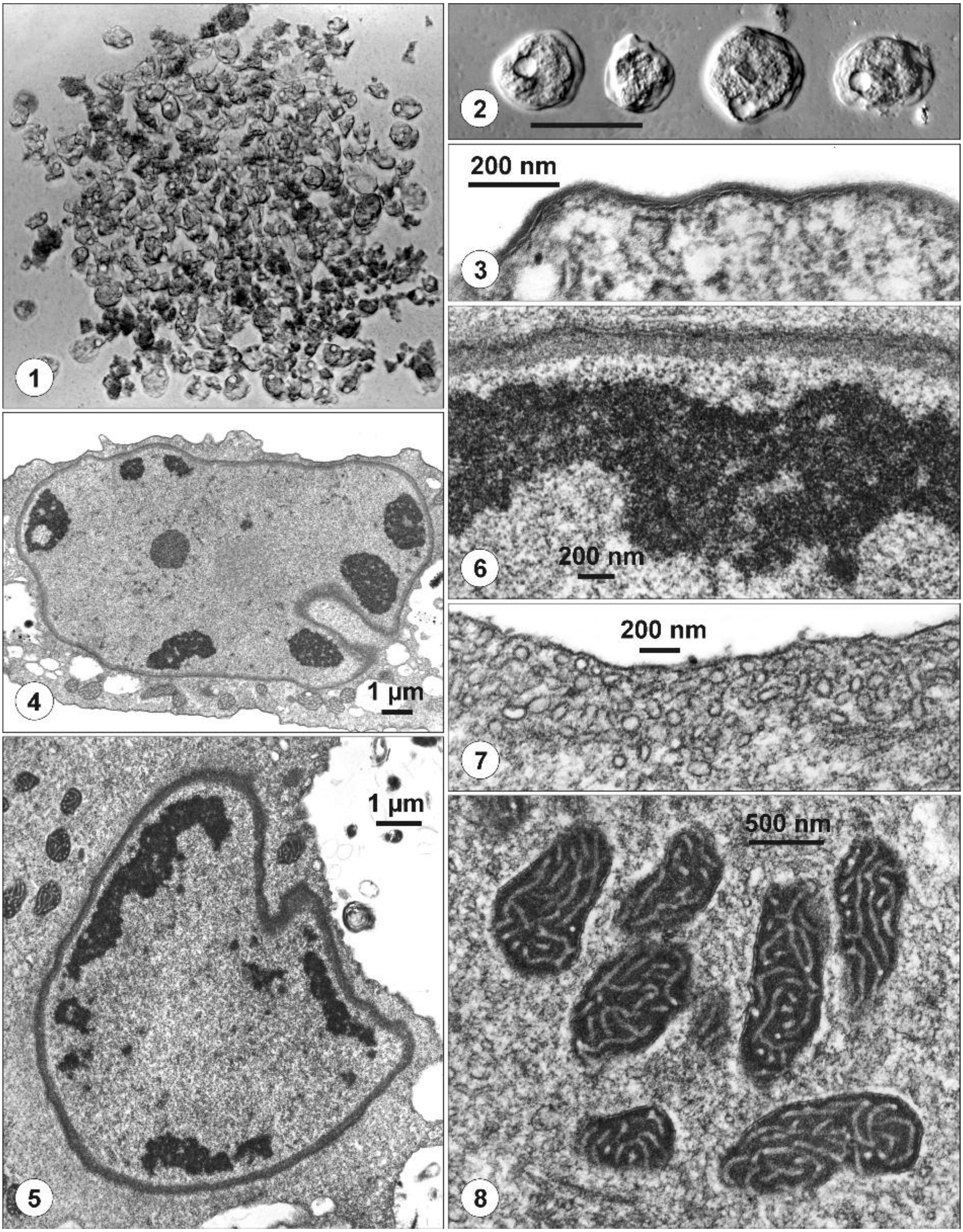

Plate 165. CCAP 1583/8 strain of *Thecamoeba similis* obtained from UKNCC for comparison; cultured on NN agar; stored in CC since 2001; GenBank Acc. No. of SSU rDNA sequence JQ271722. **Fig. 1.** Trophozoites on surface of agar as seen through Petri dish. **Fig. 2.** Trophozoites as seen in hanging drop preparations (Nomarski DIC), scale bar = 50 µm. **Fig. 3.** Pellicle-like surface of trophozoite. **Figs. 4, 5.** Overview of fine structure of nuclei: chromatin aggregates located on periphery, under nuclear envelope. **Fig. 6.** Reinforcement of inner nuclear membrane by fibrous lamina. **Fig. 7.** Spongiom surrounding contractile vacuole. **Fig. 8.** Detail of ultrastructure of mitochondria with tubular cristae. Ref.: Dyková et al. 2008a.

Vahlkampfia Chatton et Lalung-Bonnaire, 1912

Plate 166

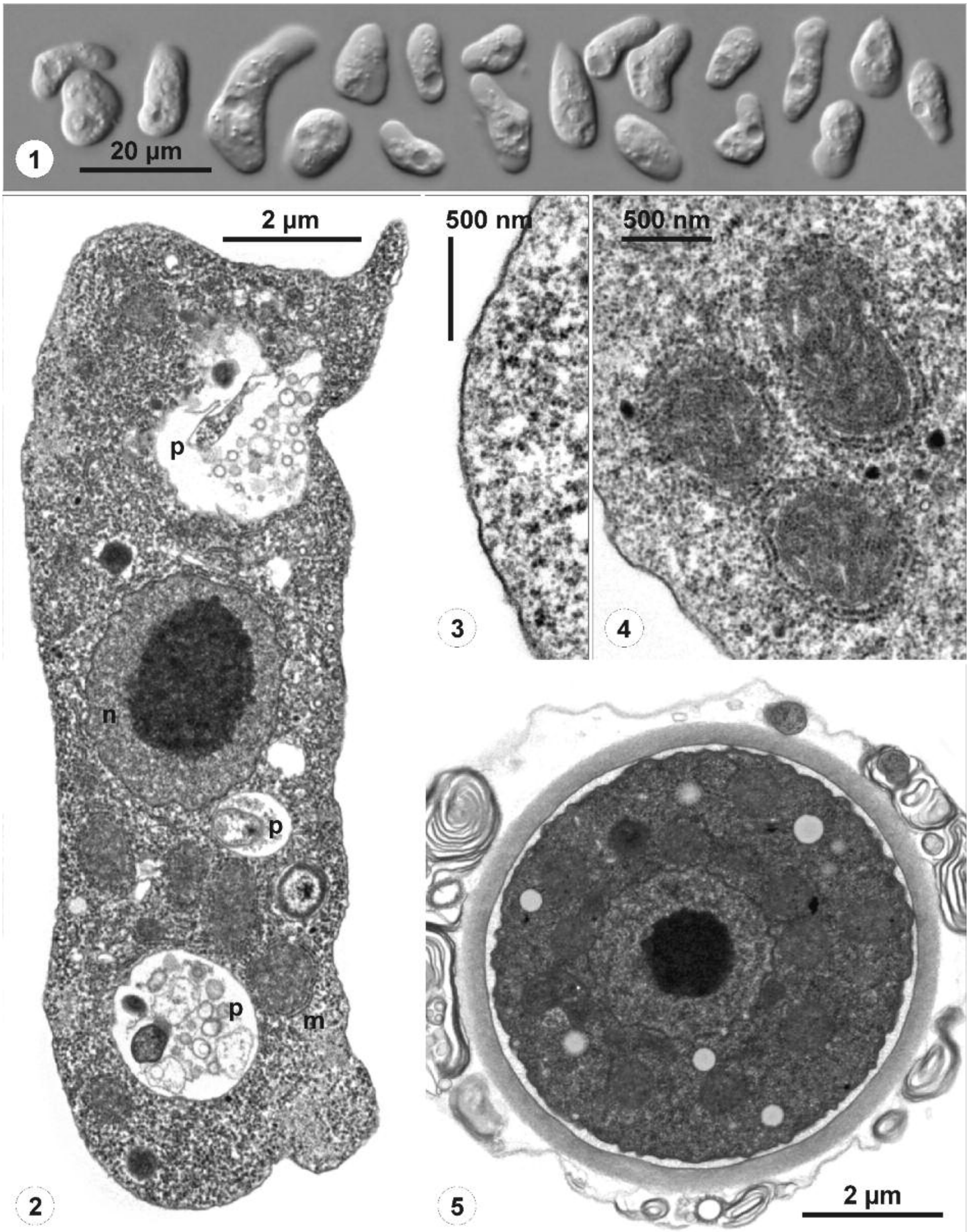

Plate 166. 4171L strain of *Vahlkampfia avara* isolated from kidney of freshwater bream, *Abramis brama* (L.) from Orlík dam, Czech Republic; cultured on NN agar; stored in CC since 1990; GenBank Acc. No. of SSU rDNA sequence JQ271723, ITS JQ271662. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC), scale bar = 20 µm. **Fig. 2.** Overview of fine structure of trophozoite: nucleus (n), phagosomes (p), mitochondria (m). **Fig. 3.** Cell surface of trophozoite. **Fig. 4.** Mitochondria with narrow discoid cristae and associated endoplasmic reticulum. **Fig. 5.** Mature cyst.

Vannella Bovee, 1965

Plates 167–228

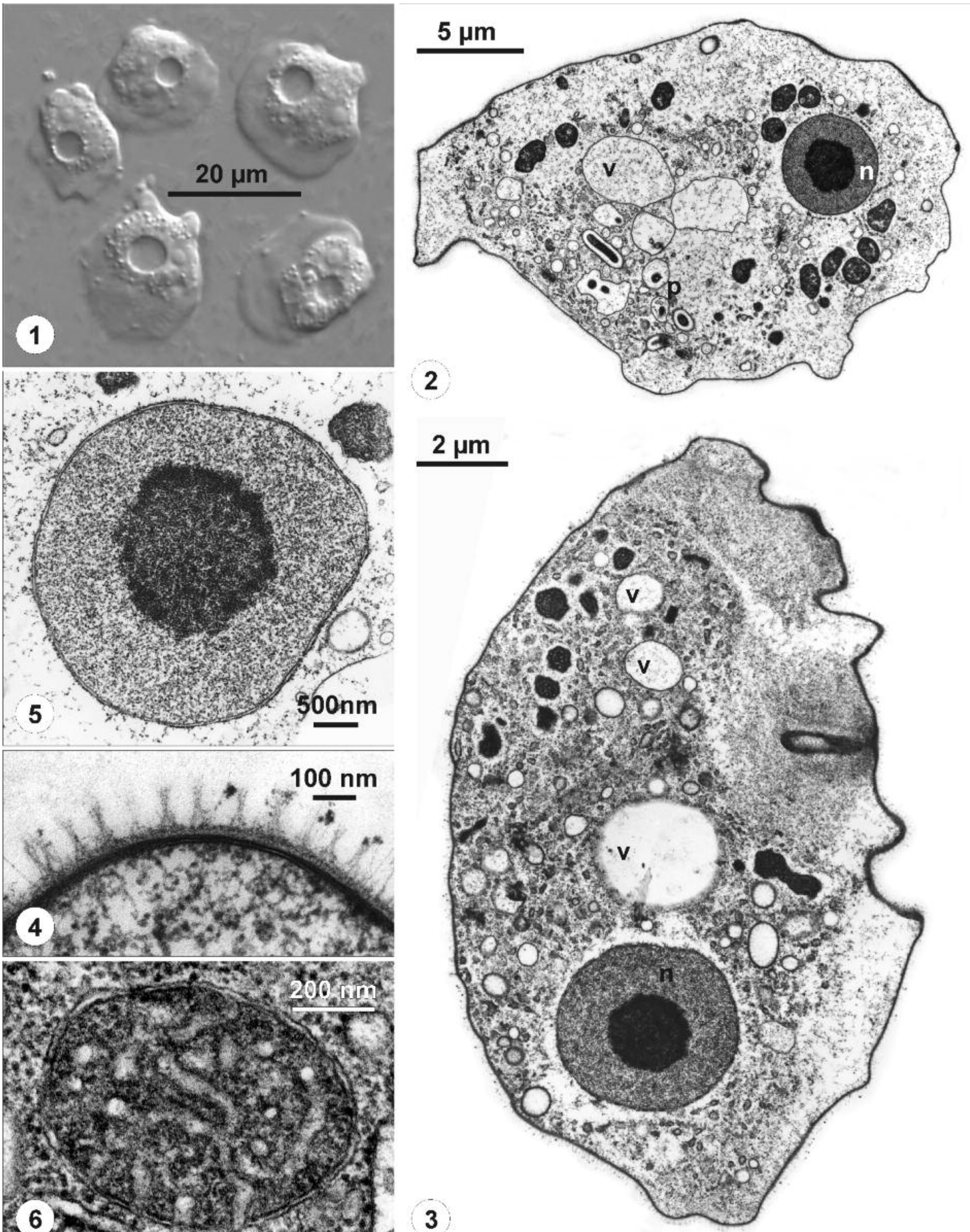

Plate 167. 4354 strain of *Vannella* sp. isolated from gills of tench, *Tinca tinca* (L.) collected from Podřezaný pond, South Bohemia, Czech Republic; cultured on NN agar; stored in CC since 1990; GenBank Acc. No. of SSU rDNA sequence AY929911, ITS AY929930. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), electron-dense mitochondria with hardly discernible crists, vacuoles (v) and phagosomes (p). **Fig. 4.** Cell surface: glycocalyx differentiated in glycostyles. **Fig. 5.** Vesicular nucleus with nucleolar material in centre. **Fig. 6.** Mitochondrion with tubular branching cristae. Ref.: Dyková et al. 2005a.

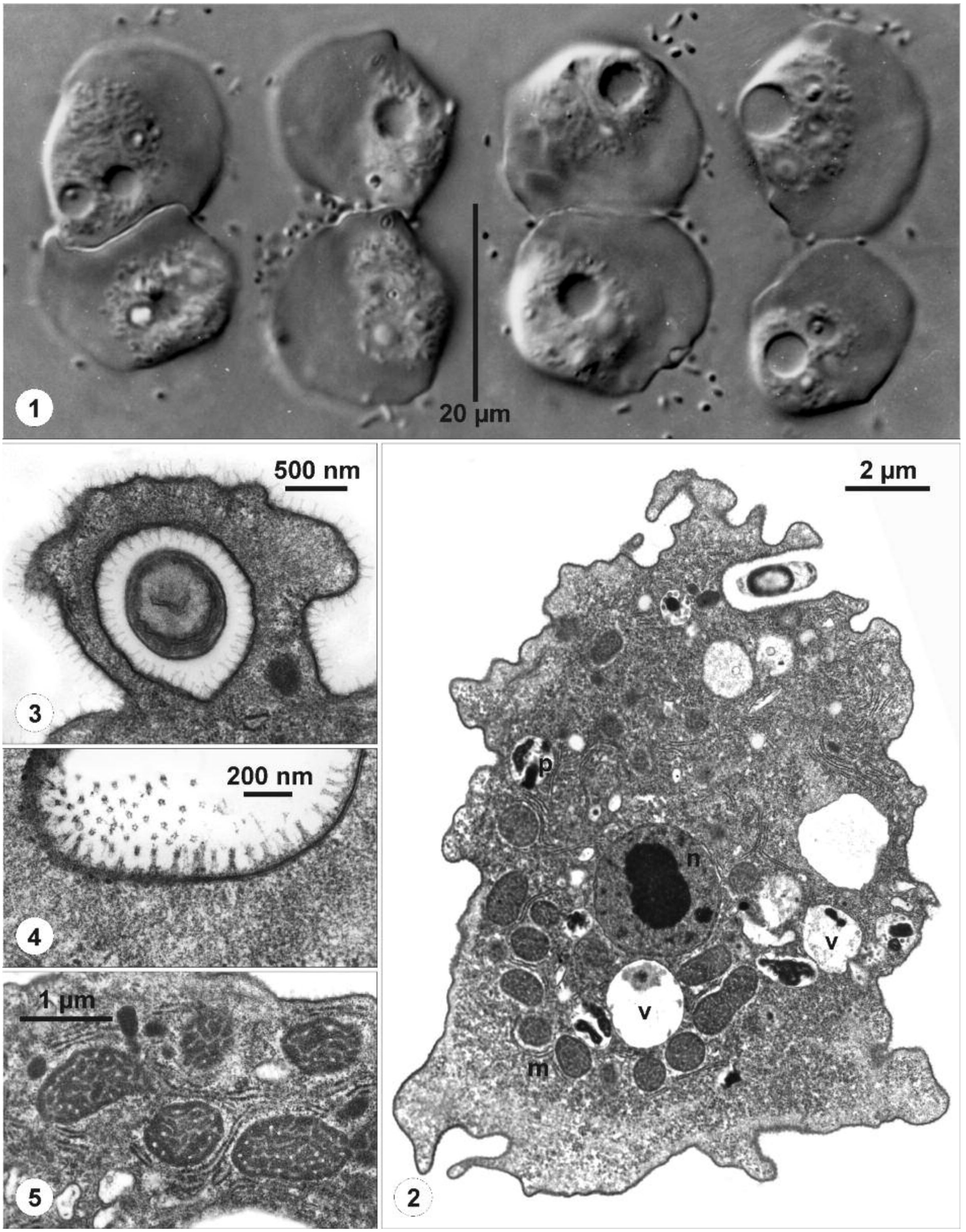

Plate 168. 4362V strain of *Vannella* sp. isolated from gills of stone moroko, *Pseudorasbora parva* (Temminck et Schlegel) from Podřezaný pond, South Bohemia, Czech Republic; cultured on NN agar; stored in CC since 1990; GenBank Acc. No. of SSU rDNA sequence AY929909, ITS AY929928. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Overview of fine structure of trophozoite: nucleus (n), phagosome (p), mitochondria (m), vacuoles (v). **Figs. 3, 4.** Cell surface of trophozoites with glycocalyx differentiated in glycostyles, seen also around phagocytised bacterium (Fig. 3). **Fig. 5.** Mitochondria with tubular branching cristae. Ref.: Dyková et al. 2005a.

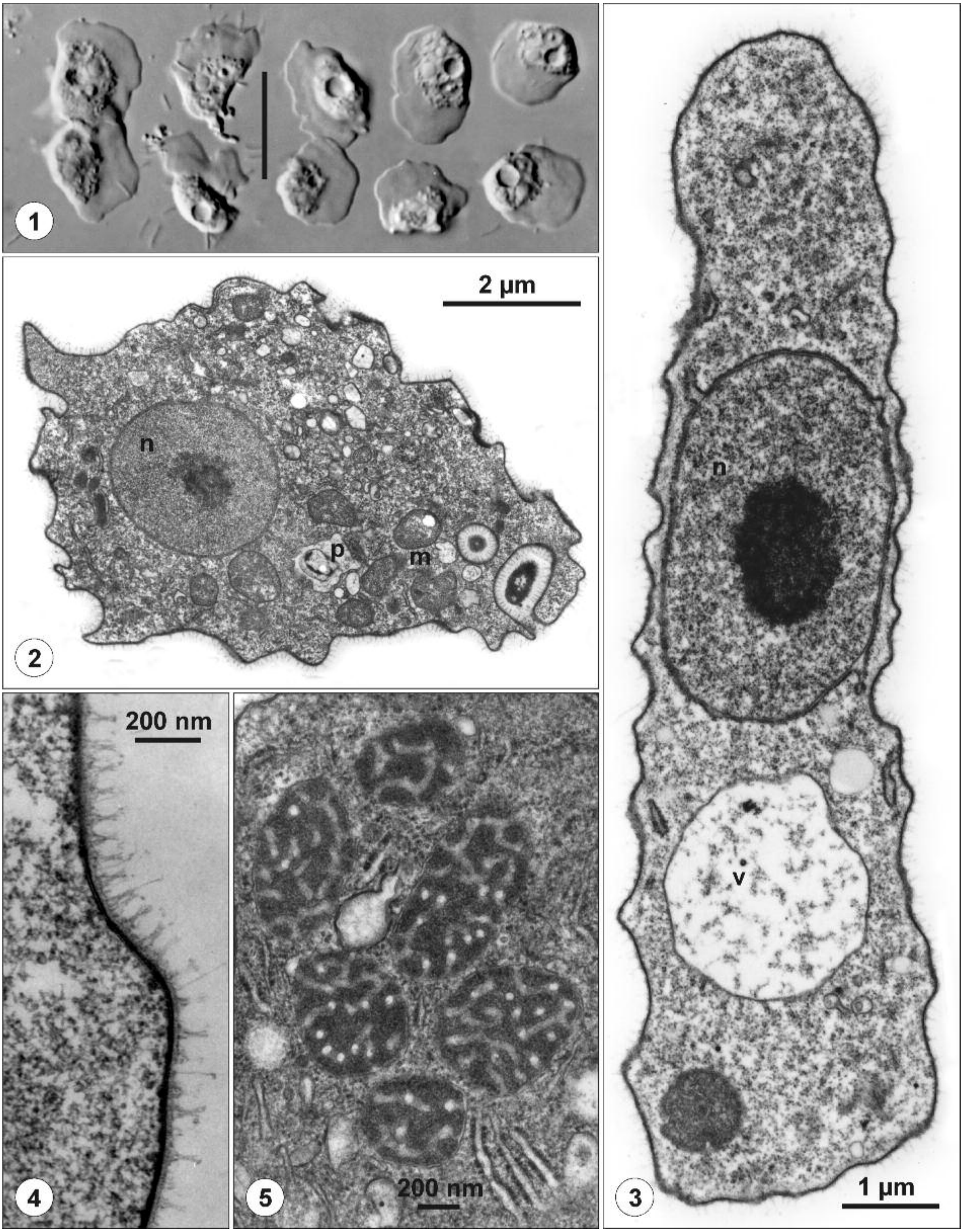

Plate 169. 4432 strain of *Vannella* sp. isolated from brain of chub, *Squalius cephalus* (L.) from Vltava River, South Bohemia, Czech Republic; cultured on NN agar; stored in CC since 1990; GenBank Acc. No. of SSU rDNA sequence AY929910, ITS AY929929. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC), scale bar = 20 µm. **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), phagosome (p), mitochondria (m), vacuole (v). **Fig. 4.** Cell surface of trophozoite with glycocalyx differentiated in glycostyles. **Fig. 5.** Mitochondria with tubular branching cristae. Ref.: Dyková et al. 2005a.

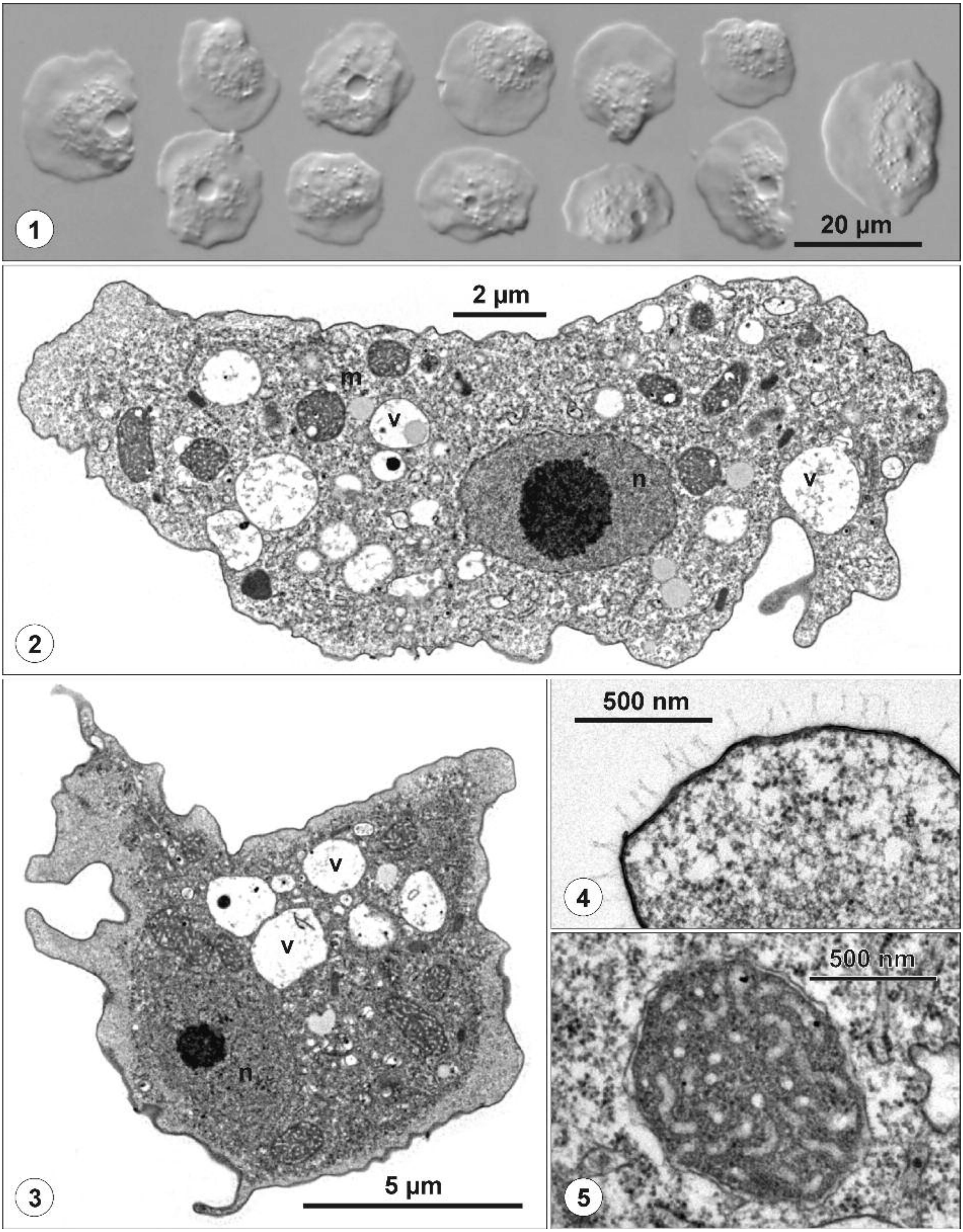

Plate 170. ACN1 strain of *Vannella* sp. isolated from gills of turbot, *Scophthalmus maximus* (L.) farmed in NW Spain; cultured on MY75S agar; stored in CC since 2003; GenBank Acc. No. of SSU rDNA sequence JQ271724. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), vacuoles (v), mitochondria (m). **Fig. 4.** Cell surface of trophozoites with glycocalyx differentiated in glycostyles (not well preserved). **Fig. 5.** Mitochondrion with tubular branching cristae.

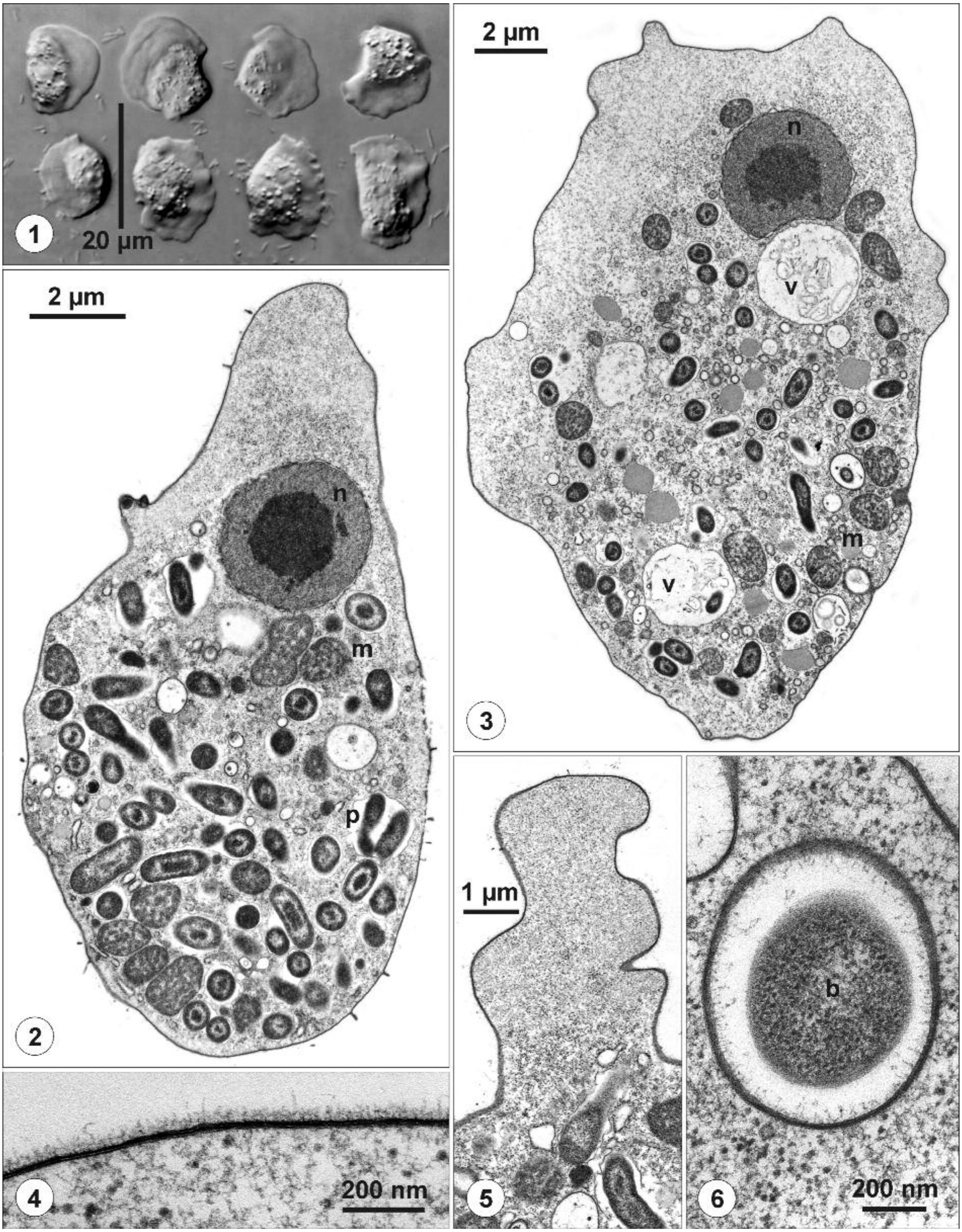

Plate 171. AFSM6 strain of *Vannella* sp. isolated from gills of turbot, *Scophthalmus maximus* (L.) farmed in NW Spain; cultured on MY75S agar; stored in CC since 2000; GenBank Acc. No. of SSU rDNA sequence AY929918, ITS AY929934. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), phagosome (p), vacuoles (v), mitochondria (m). **Figs. 4, 5.** Cell surface of trophozoites with rather amorphous glycocalyx. **Fig. 6.** Cell surface surrounding phagocytised bacterium (b). Ref.: Dyková et al. 2005a.

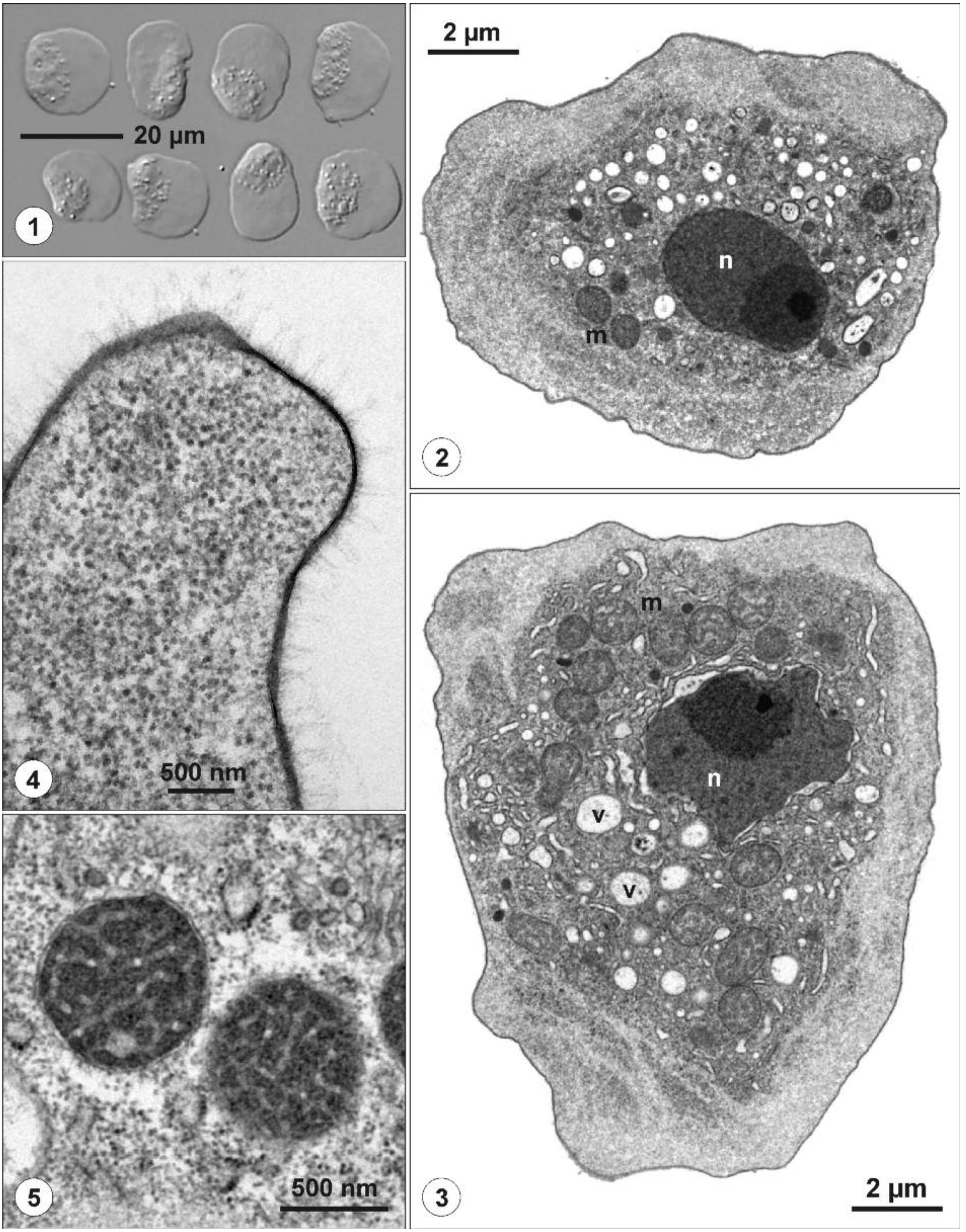

Plate 172. ASL3 strain of *Vannella* sp. isolated from suspension obtained from washed gill arches of Atlantic salmon, *Salmo salar* L. with symptoms of AGD, AGD infection tank, University of Tasmania, Australia; cultured on MY75S agar; stored in CC since 2007; GenBank Acc. No. of SSU rDNA sequence JQ271725. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n) in different planes of sectioning, mitochondria (m), vacuoles (v). **Fig. 4.** Cell surface of trophozoite with glycocalyx differentiated in glycostyles. **Fig. 5.** Mitochondria with tubular branching cristae.

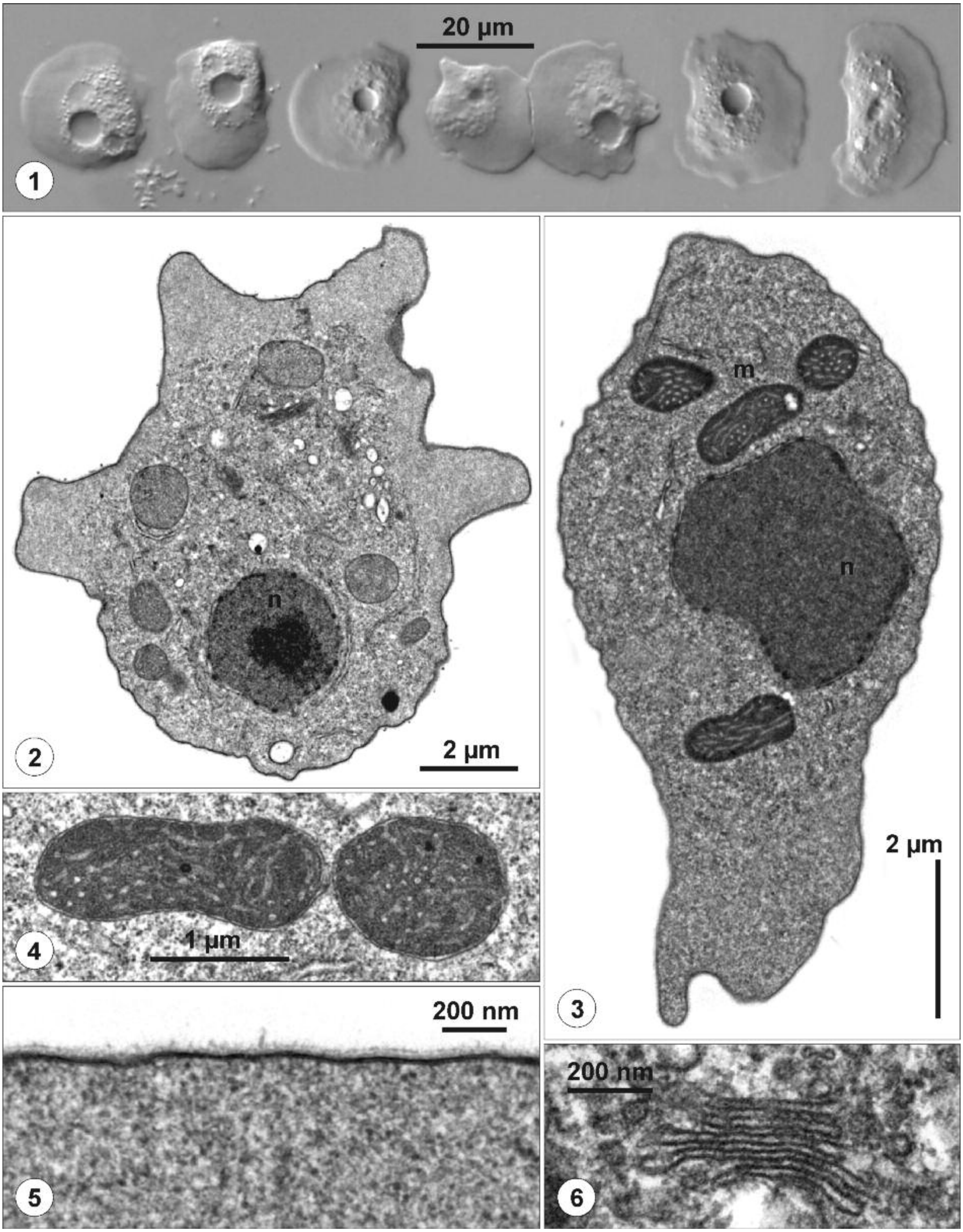

Plate 173. BAK1 strain of *Vannella* sp. isolated from mangrove mud collected in Bako Park, Sarawak, Borneo, Malaysia; cultured on MY75S agar; stored in CC since 2008; GenBank Acc. No. of SSU rDNA sequence JQ271726. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m). **Fig. 4.** Detail of mitochondria with tubular branching cristae. **Fig. 5.** Cell surface of trophozoite with amorphous glycocalyx. **Fig. 6.** Golgi complex with parallel arrangement of cisternae.

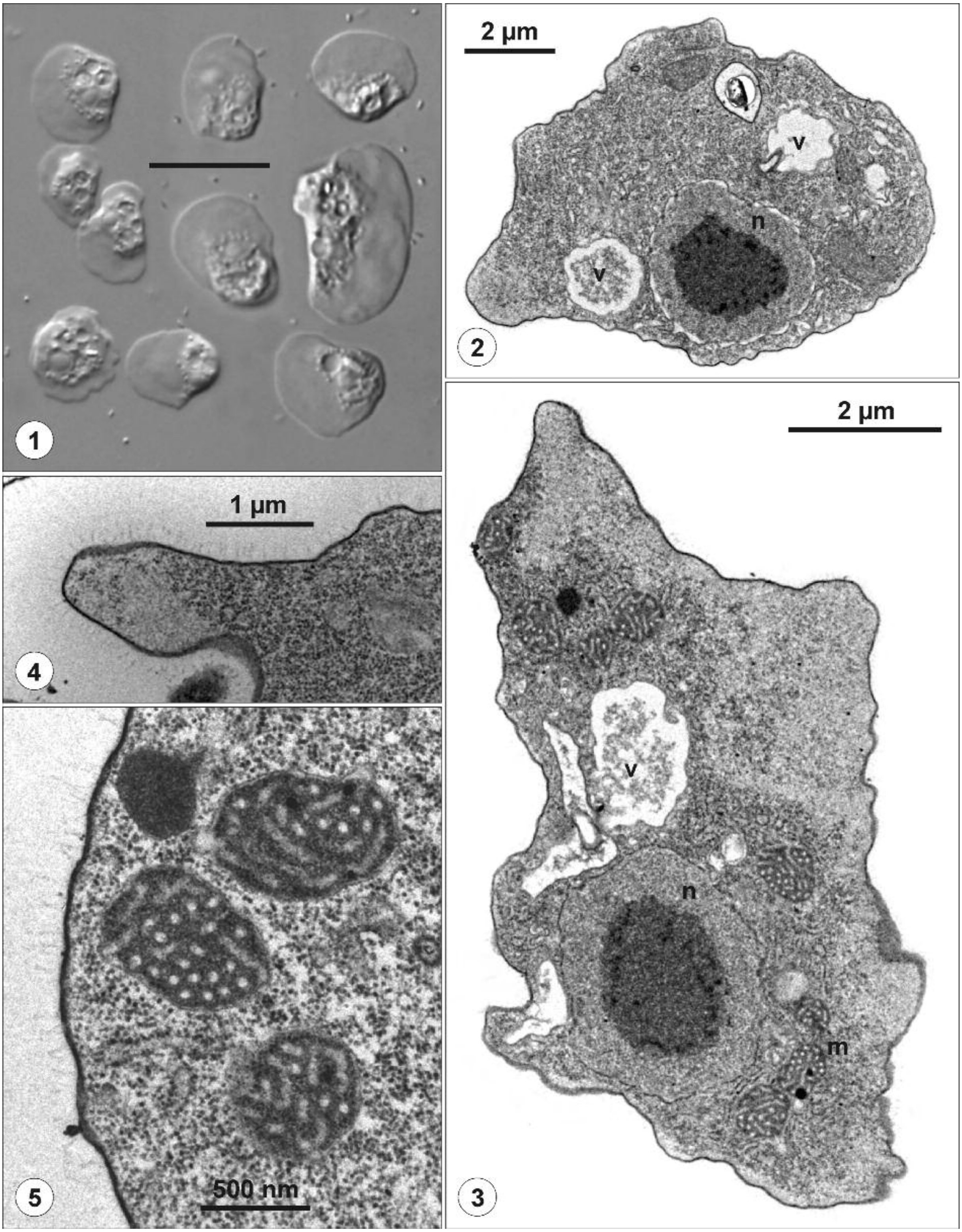

Plate 174. BEN3V strain of *Vannella* sp. isolated from mud of rivulet flowing into the sea, Benijo, Tenerife, Canary Islands, Spain; cultured on NN agar; stored in CC since 2010; GenBank Acc. No. of SSU rDNA sequence JQ271727. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC), scale bar = 20 µm. **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), vacuoles (v), mitochondria (m). **Fig. 4.** Cell surface of trophozoite: glycocalyx with not well preserved glycostyles. **Fig. 5.** Detail of cell surface and mitochondria with tubular cristae.

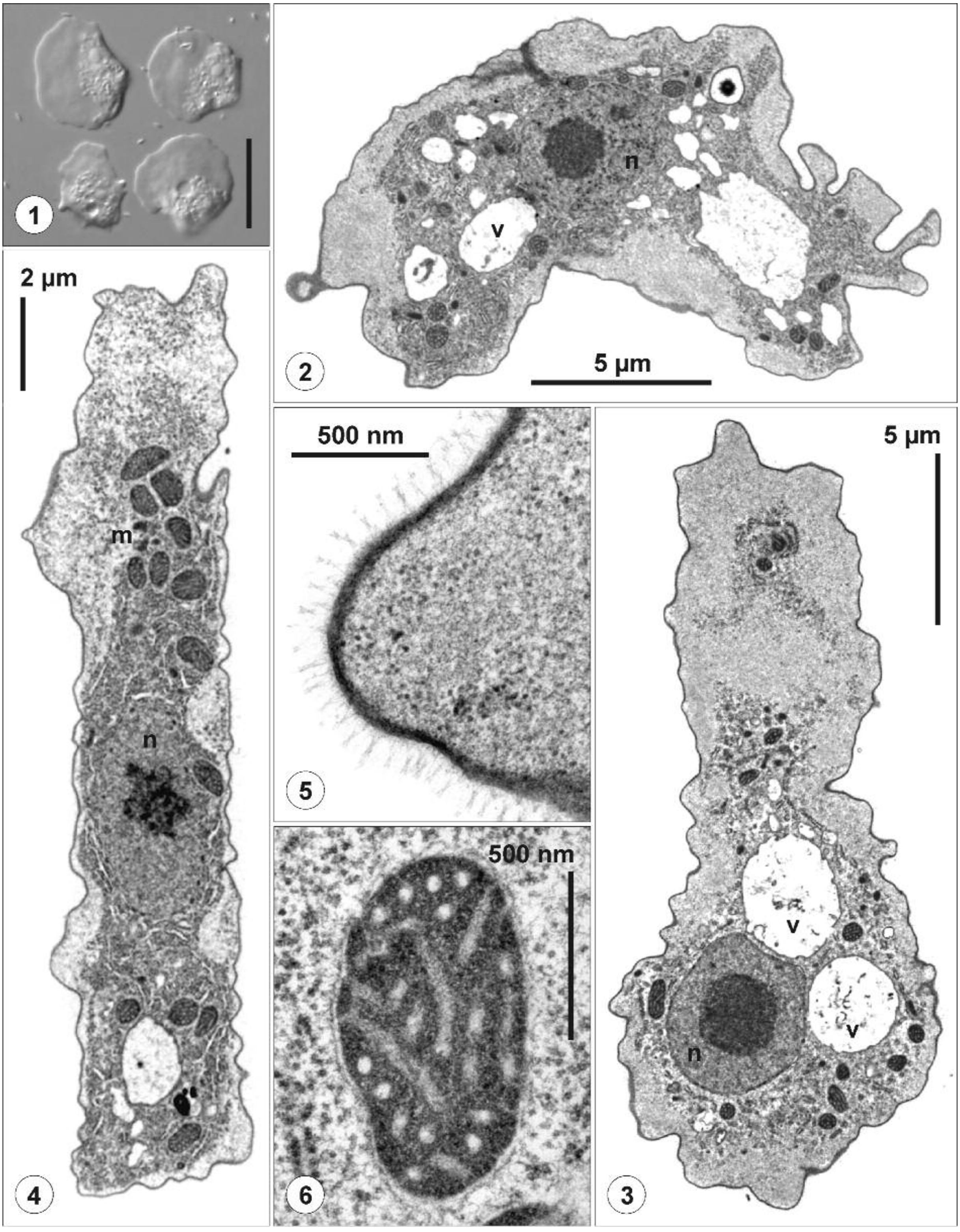

Plate 175. BOTM strain of *Vannella* sp. isolated from skin of clown loach, *Botia macracantha* (Bleeker) of unknown geographic origin, imported to pet shop, Czech Republic; cultured on NN agar; stored in CC since 2006; GenBank Acc. No. of SSU rDNA sequence JQ271728. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC), scale bar = 20 µm. **Figs. 2, 3, 4.** Overview of fine structure of trophozoites: nuclei (n), food vacuoles (v), mitochondria (m). **Fig. 5.** Cell surface of trophozoite: glycocalyx with not well preservedglycostyles. **Fig. 6.** Mitochondrion with tubular cristae.

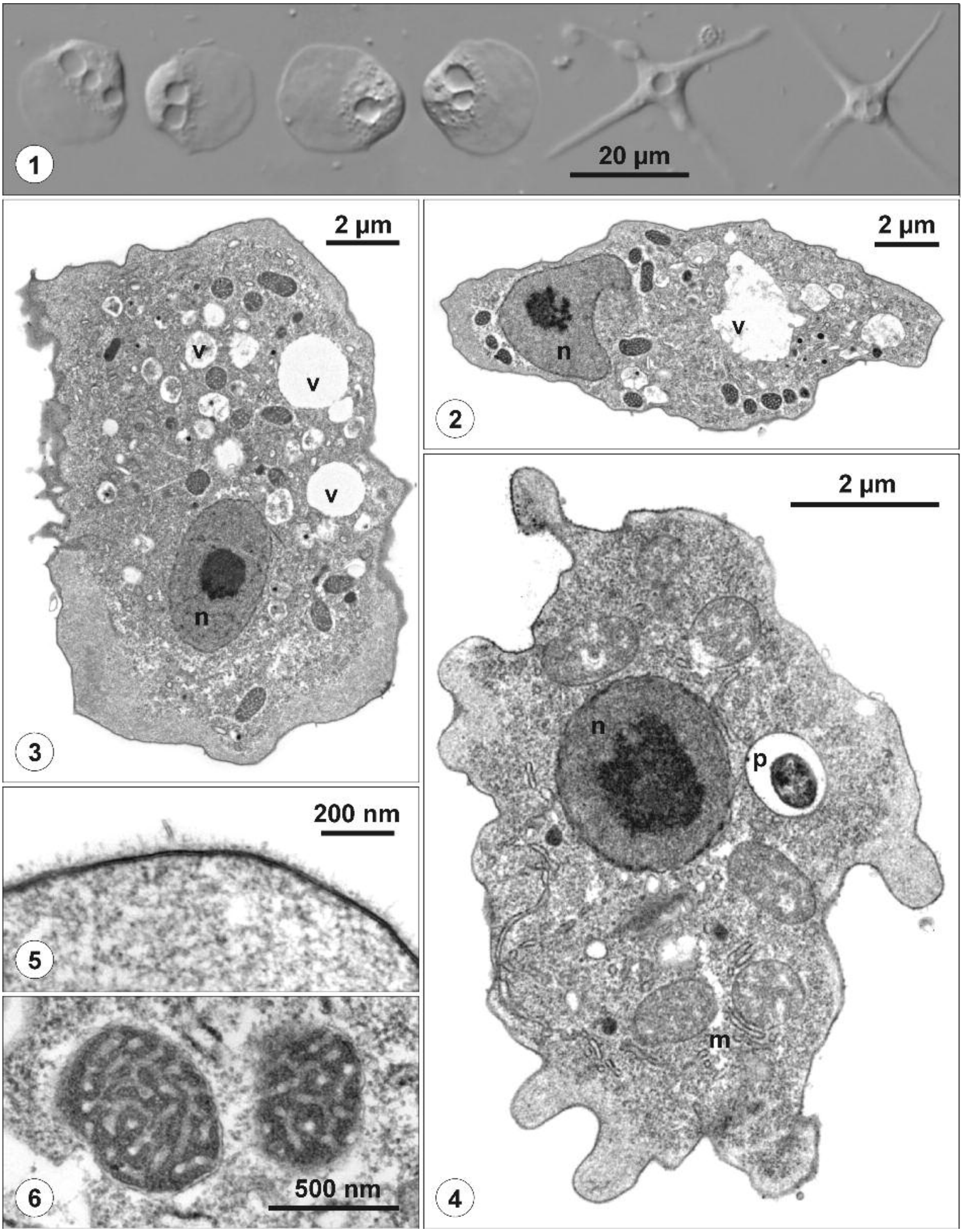

Plate 176. CAME strain of *Vannella* sp. isolated from volcanic sand collected on Mt. Cameroon, Cameroon; cultured on NN agar; stored in CC since 2008; GenBank Acc. No. of SSU rDNA sequence JQ271729. **Fig. 1.** Trophozoites, including floating stages (right), as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3, 4.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosome (p), vacuoles (v). **Fig. 5.** Cell surface of trophozoite with amorphous glycocalyx. **Fig. 6.** Mitochondria with tubular branching cristae.

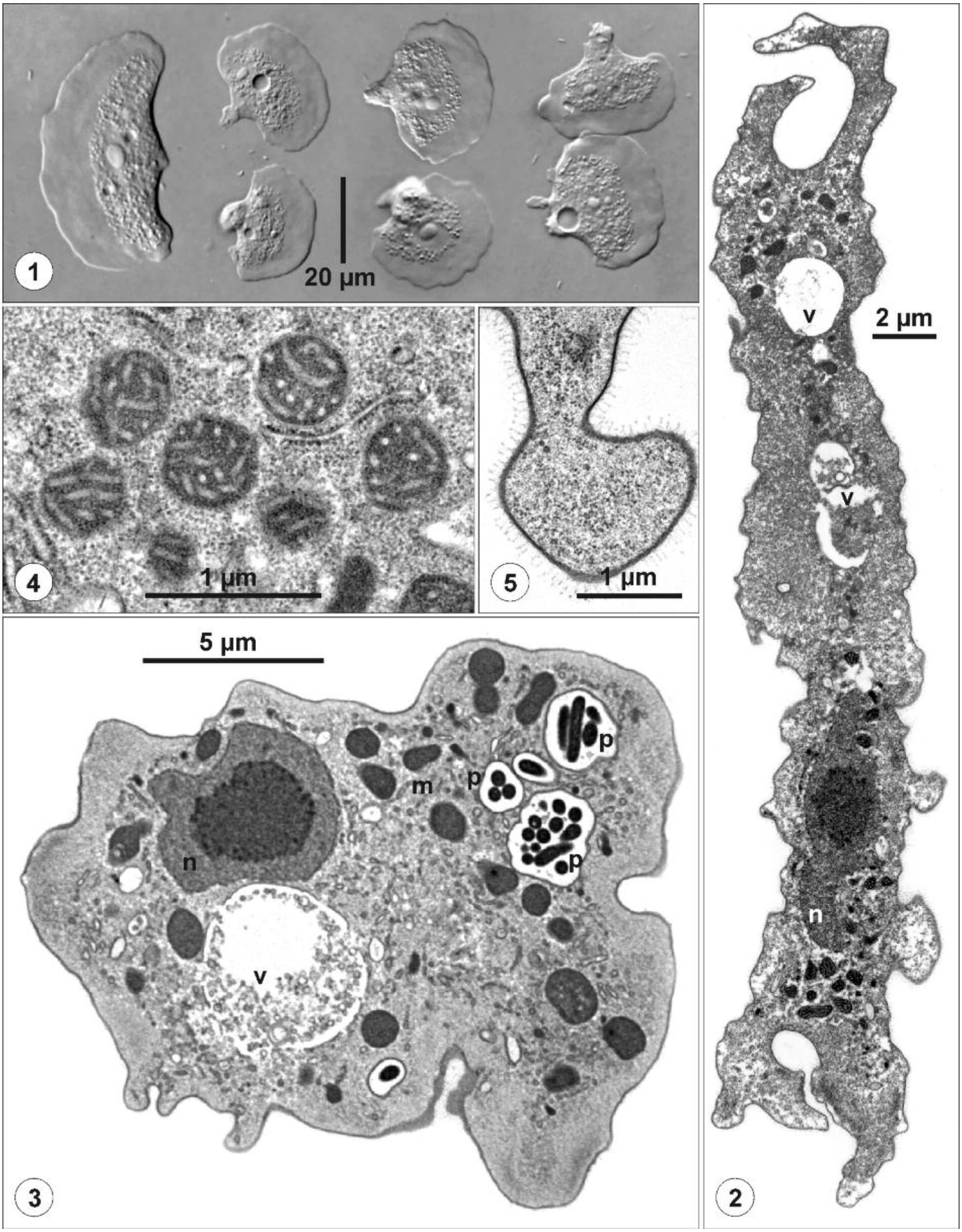

Plate 177. CH88 strain of *Vannella* sp. isolated from gills of silver carp, *Hypophthalmichthys molitrix* (Valenciennes) farmed in Ye Zhi Hu, Hubei province, China; cultured on NN agar; stored in CC since 2000; GenBank Acc. No. of SSU rDNA sequence AY929912. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosomes (p), vacuoles (v). **Fig. 4.** Mitochondria with tubular cristae. **Fig. 5.** Cell surface of trophozoite with glycocalyx differentiated in glycostyles (not well preserved). Ref.: Dyková et al. 2005a.

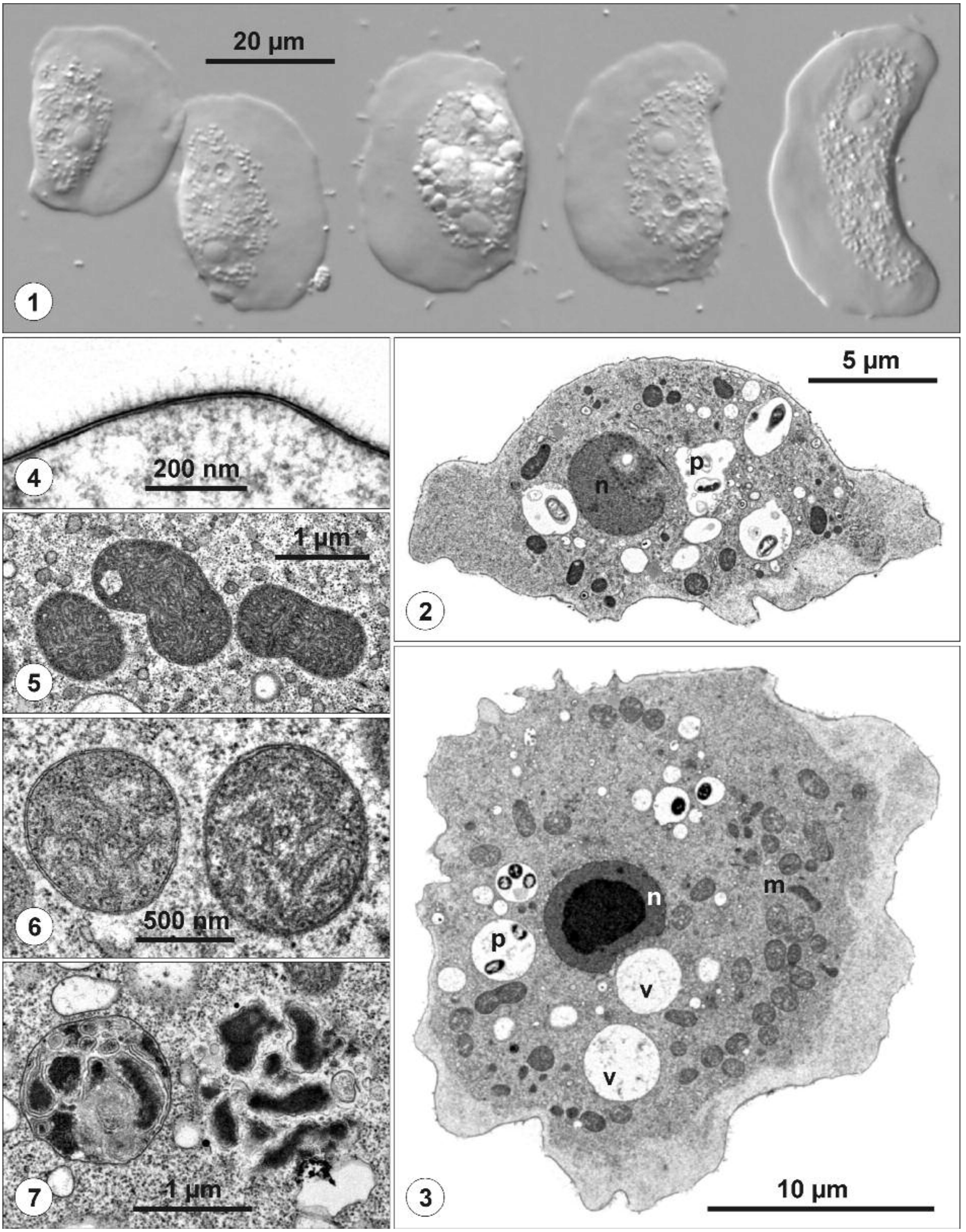

Plate 178. CHOR strain of *Vannella* sp. isolated from decomposing undetermined crab collected on beach in Savudrija, Istria, Croatia; cultured on MY75S agar; stored in CC since 2007; GenBank Acc. No. of SSU rDNA sequence JQ271730. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), phagosomes (p), vacuoles (v), mitochondria (m). **Fig. 4.** Cell surface of trophozoite with amorphous glycocalyx. **Figs. 5, 6.** Mitochondria with tubular cristae. **Fig. 7.** Detail of food vacuole and remnants of phagocytised bacteria.

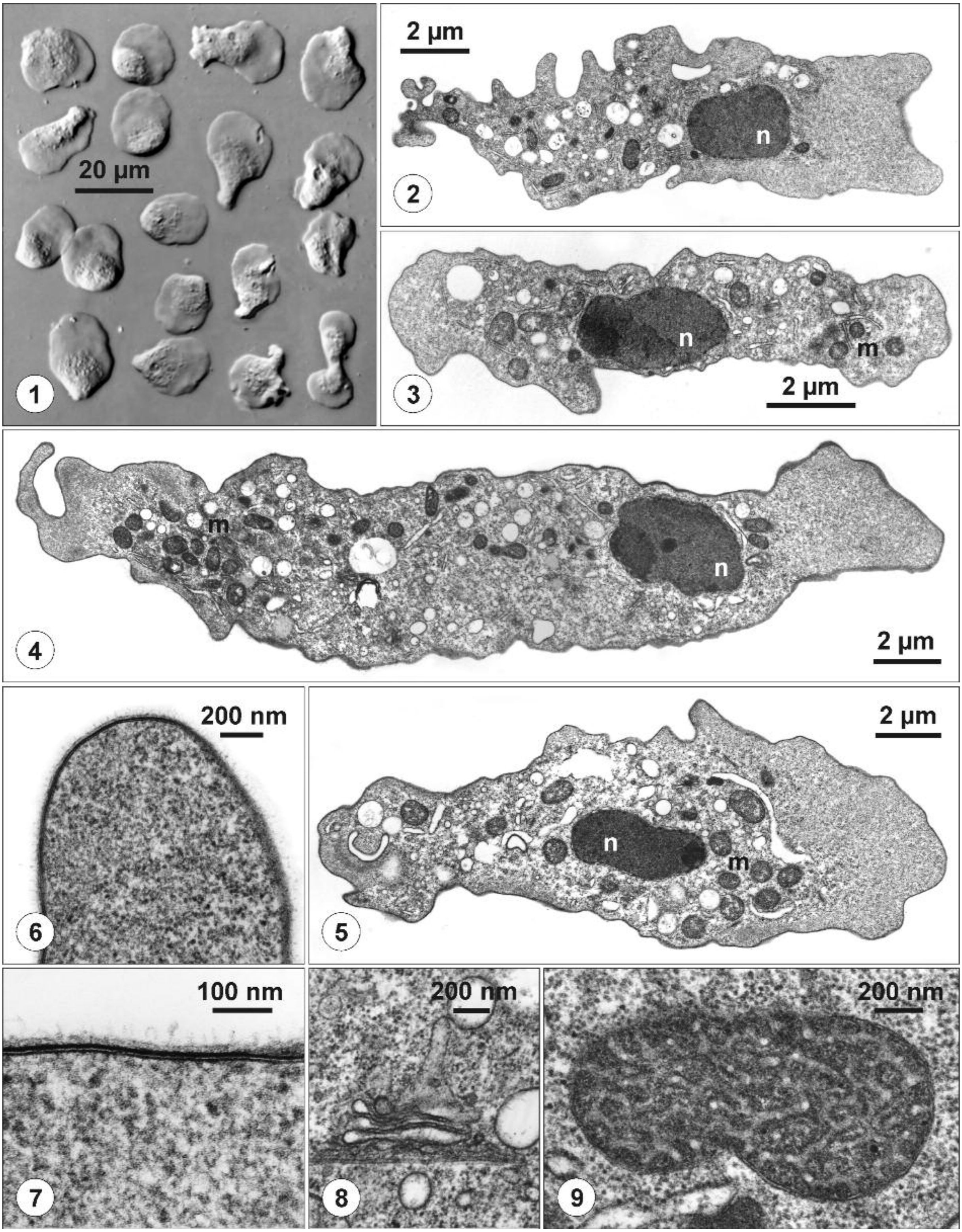

Plate 179. DB282 strain of *Vannella* sp. derived as contaminant of CCAP1560/7/I strain of *Neoparamoeba aestuarina* obtained from UKNCC; cultured on MY75S agar; stored in CC since 1999; GenBank Acc. No. of SSU rDNA sequence AY929920, ITS AY929936. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3, 4, 5.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m). **Figs. 6, 7.** Cell surface of trophozoites with amorphous glycocalyx. **Fig. 8.** Golgi complex with parallel cisternae. **Fig. 9.** Mitochondrion with tubular branching cristae. Ref.: Dyková et al. 2005a.

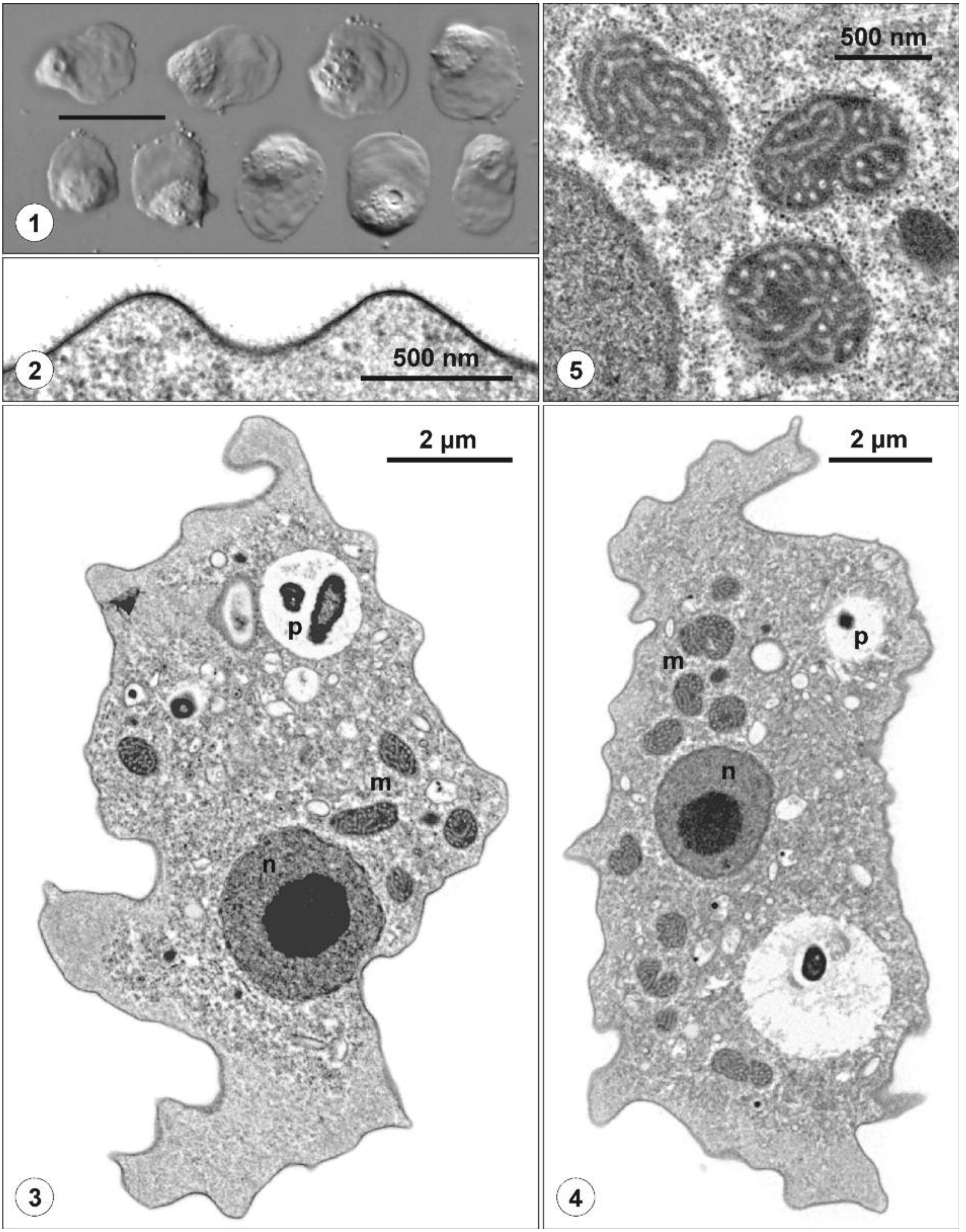

Plate 180. ECH30 strain of *Vannella* sp. isolated from coelomic fluid of purple sea urchin, *Sphaerechinus granularis* (Lamarck) collected in Adriatic Sea, off Brač Island, Croatia; cultured on MY75S agar; stored in CC since 2005; GenBank Acc. No. of SSU rDNA sequence JQ271731. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC), scale bar = 20 µm. **Fig. 2.** Cell surface of trophozoite with amorphous glycocalyx. **Figs. 3, 4.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosomes (p). **Fig. 5.** Mitochondria with tubular branching cristae.

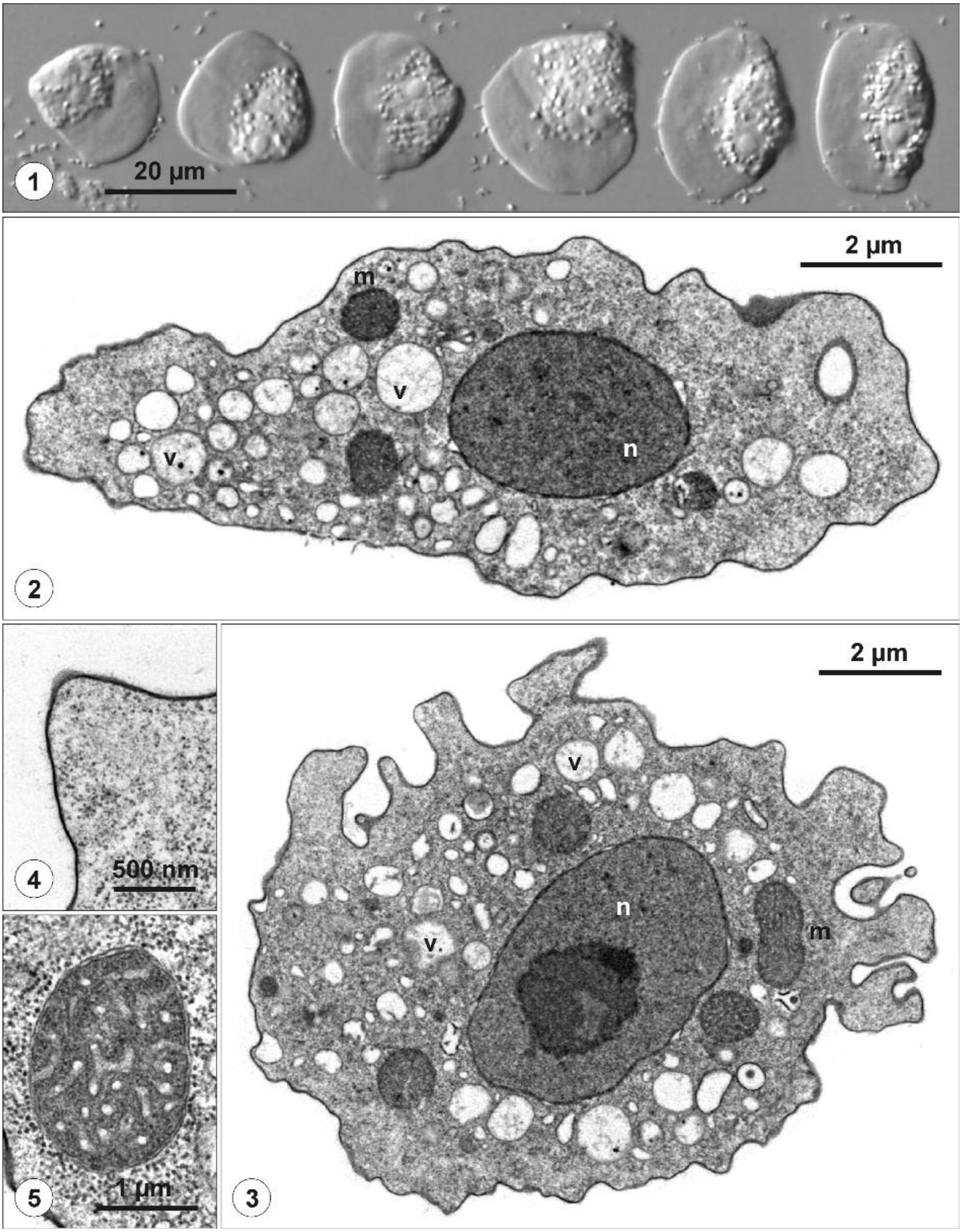

Plate 181. ELH1 strain of *Vannella* sp. isolated as environmental marine strain from surface of algae collected in La Maceta, El Hierro, Canary Islands, Spain; cultured on MY75S agar; stored in CC since 2010; GenBank Acc. No. of SSU rDNA sequence JQ271732. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), vacuoles (v). **Fig. 4.** Cell surface of trophozoite with type of glycocalyx difficult to determine. **Fig. 5.** Mitochondrion with tubular branching cristae.

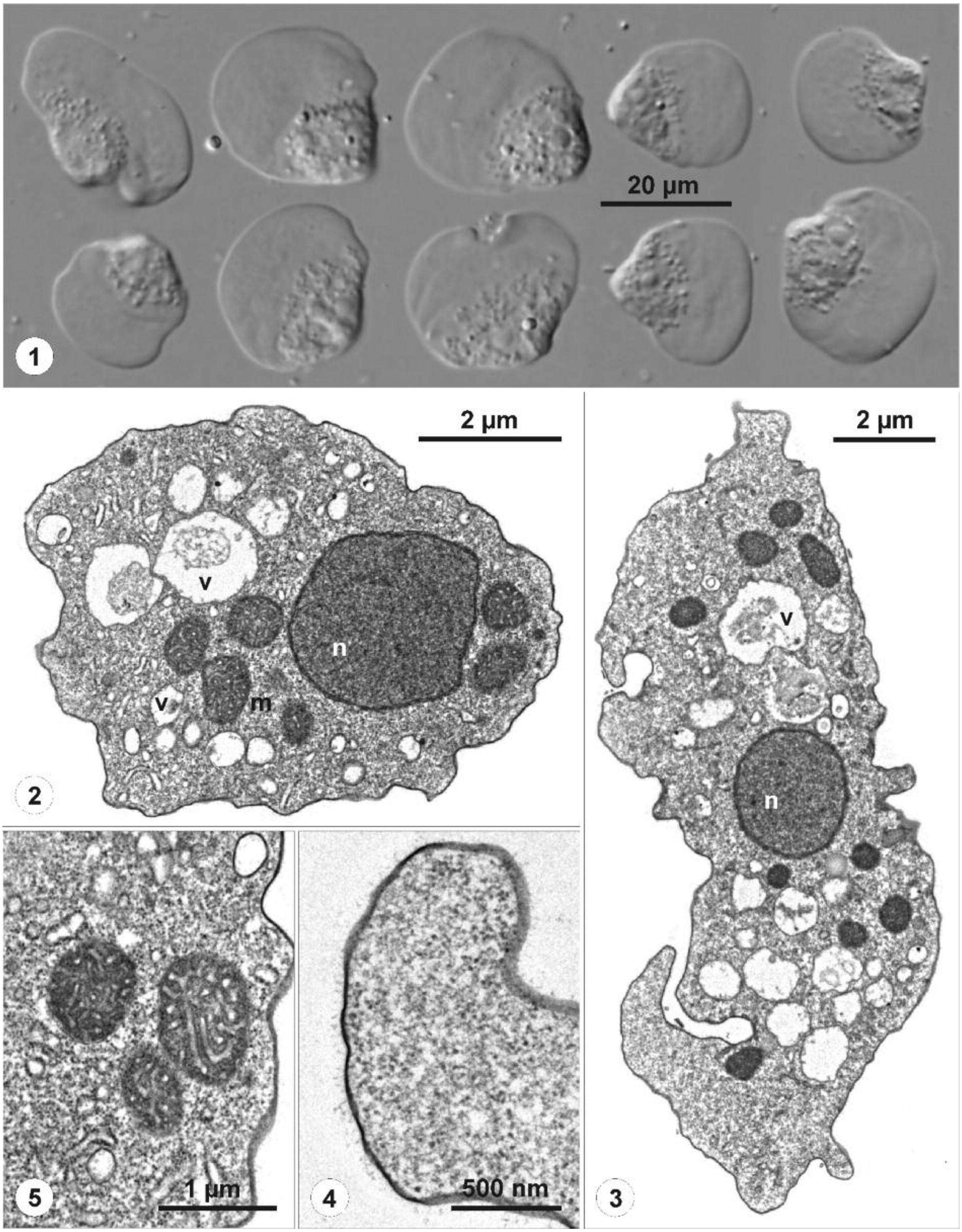

Plate 182. ELH2 strain of *Vannella* sp. isolated as environmental marine strain from surface of algae collected in La Maceta, El Hierro, Canary Islands, Spain; cultured on MY75S agar; stored in CC since 2010; GenBank Acc. No. of SSU rDNA sequence JQ271733. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), food vacuoles (v). **Fig. 4.** Cell surface of trophozoite with type of glycocalyx difficult to determine. **Fig. 5.** Mitochondria with tubular branching cristae.

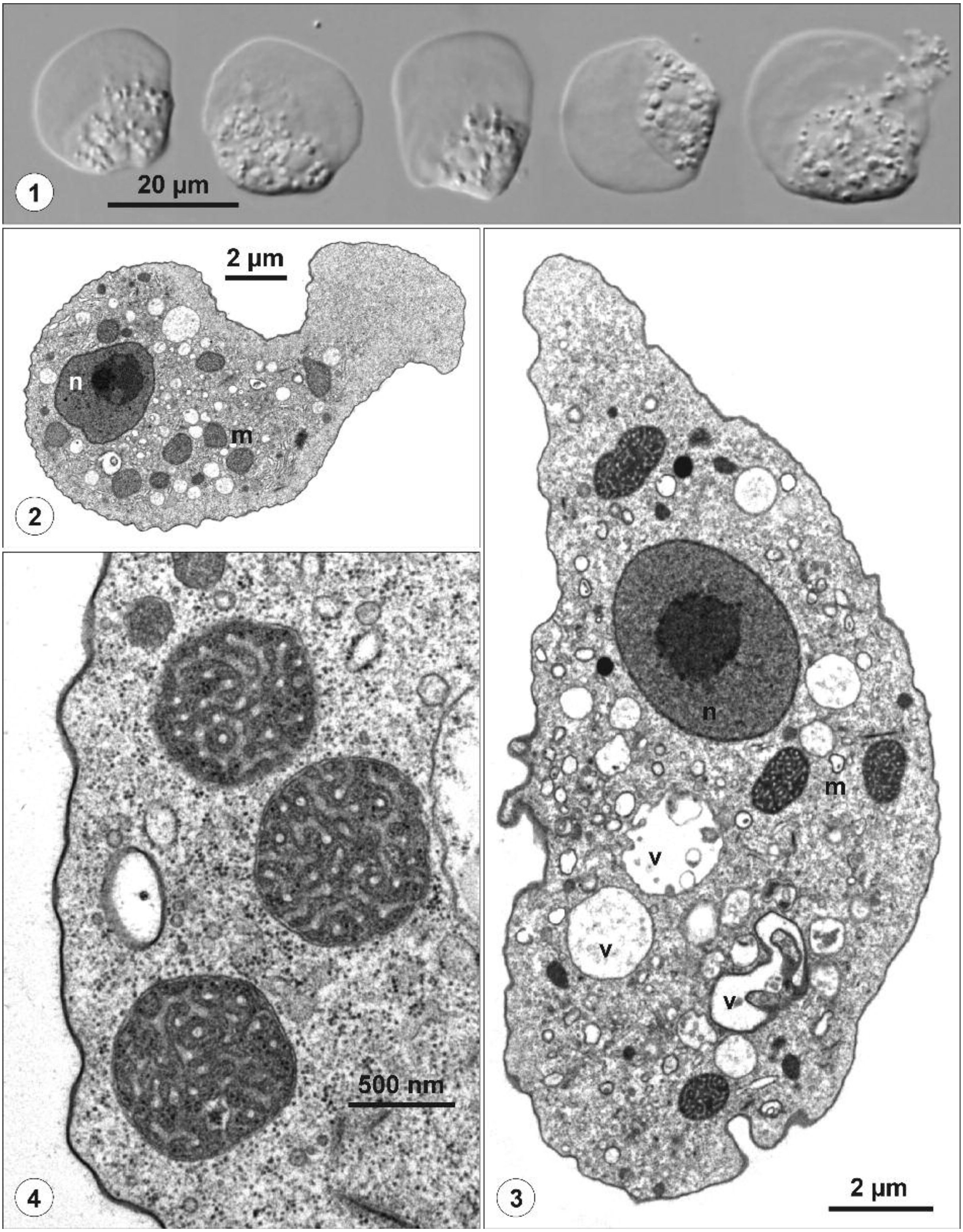

Plate 183. ELH3 strain of *Vannella* sp. isolated as environmental marine strain from surface of algae collected in La Maceta, El Hierro, Canary Islands, Spain; cultured on MY75S agar; stored in CC since 2010; GenBank Acc. No. of SSU rDNA sequence JQ271734. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), food vacuoles (v). **Fig. 4.** Cell surface of trophozoite with not well definable differentiation of glycocalyx and mitochondria with tubular branching cristae.

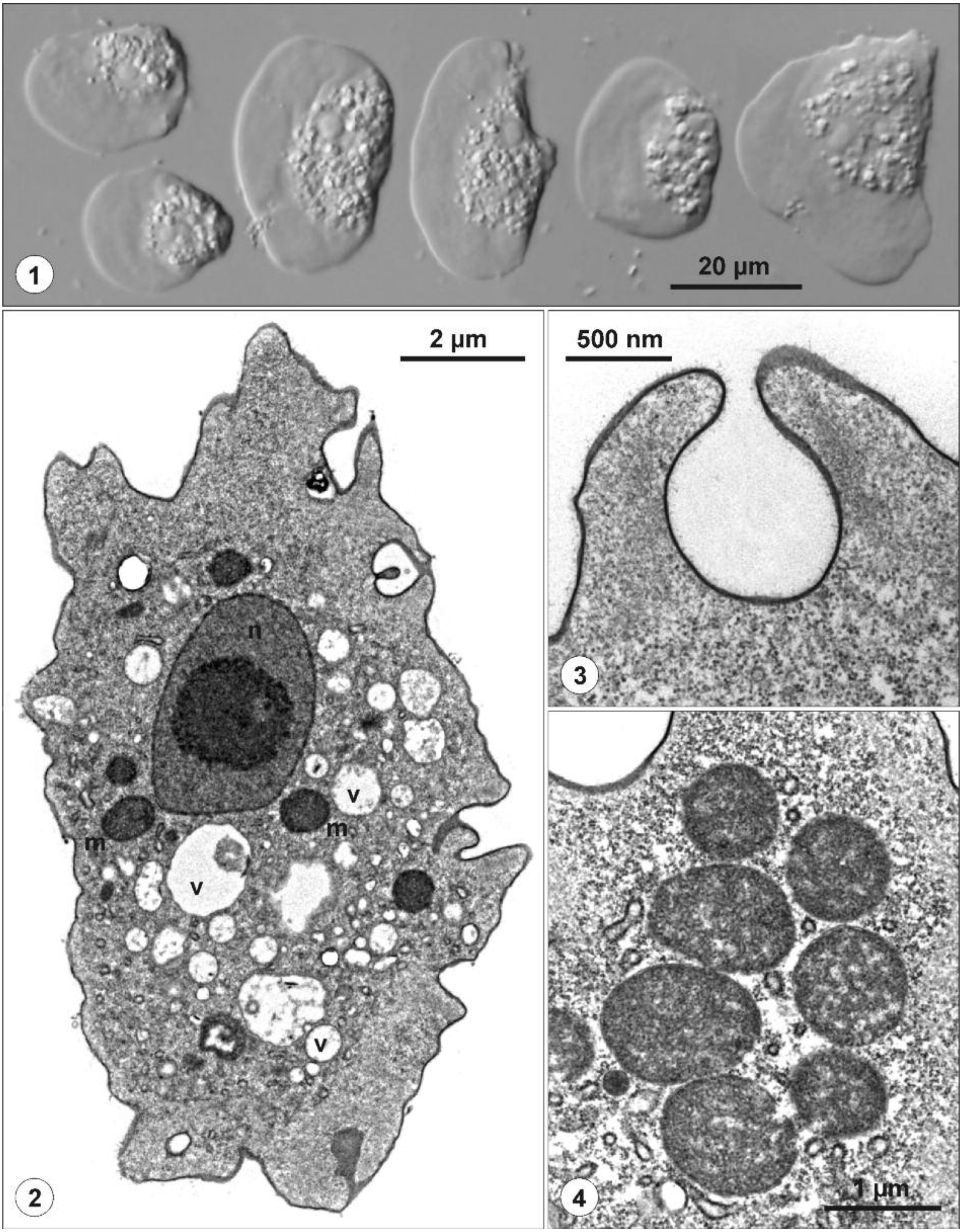

Plate 184. ELH4 strain of *Vannella* sp. isolated as environmental marine strain from surface of algae collected in La Maceta, El Hierro, Canary Islands, Spain; cultured on MY75S agar; stored in CC since 2010; GenBank Acc. No. of SSU rDNA sequence JQ271735. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Overview of fine structure of trophozoite: nucleus (n), mitochondria (m), vacuoles (v). **Fig. 3.** Cell surface of trophozoite with not well definable differentiation of glycocalyx. **Fig. 4.** Mitochondria with tubular branching cristae.

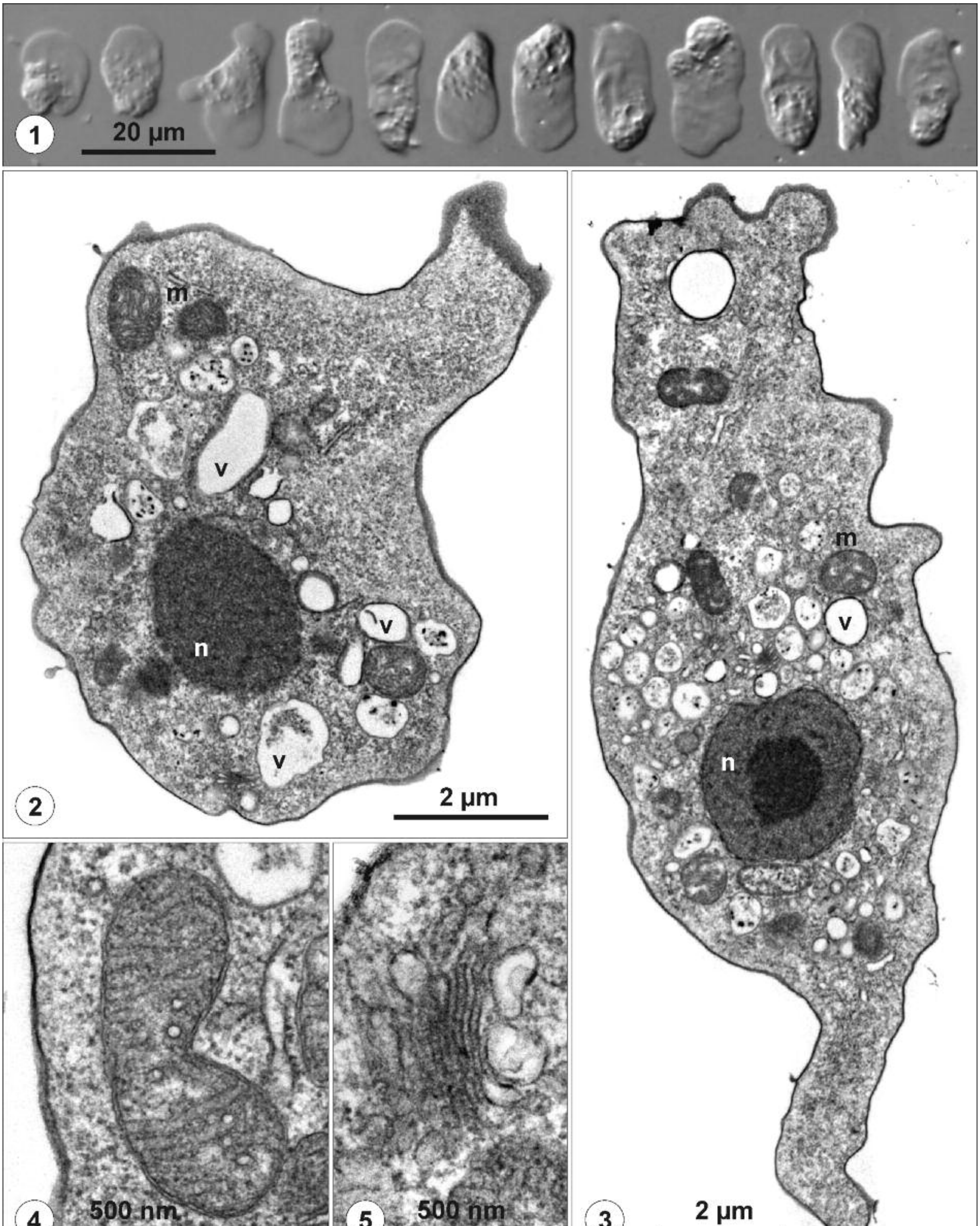

Plate 185. ELH5 strain of *Vannella* sp. isolated as environmental marine strain from surface of algae collected in La Maceta, El Hierro, Canary Islands, Spain; cultured on MY75S agar; stored in CC since 2010; GenBank Acc. No. of SSU rDNA sequence JQ271736. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), vacuoles (v). **Fig. 4.** Cell surface of trophozoite with amorphous glycocalyx; mitochondrion with tubular cristae. **Fig. 5.** Golgi complex with parallel arrangement of cisternae.

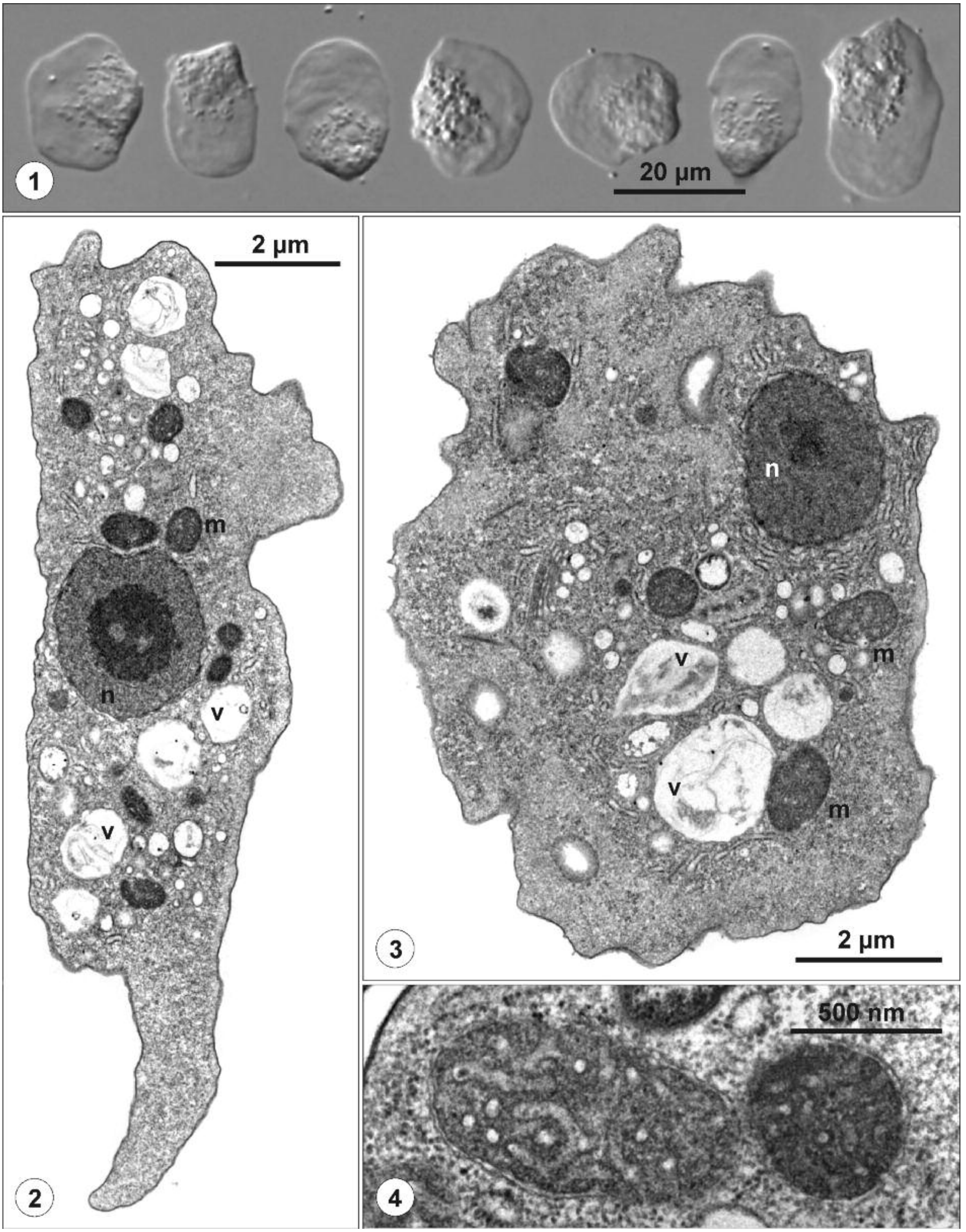

Plate 186. ELH6 strain of *Vannella* sp. isolated as environmental marine strain from surface of algae collected in La Maceta, El Hierro, Canary Islands, Spain; cultured on MY75S agar; stored in CC since 2010; GenBank Acc. No. of SSU rDNA sequence JQ271737. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), vacuoles (v). **Fig. 4.** Mitochondria with tubular branching cristae.

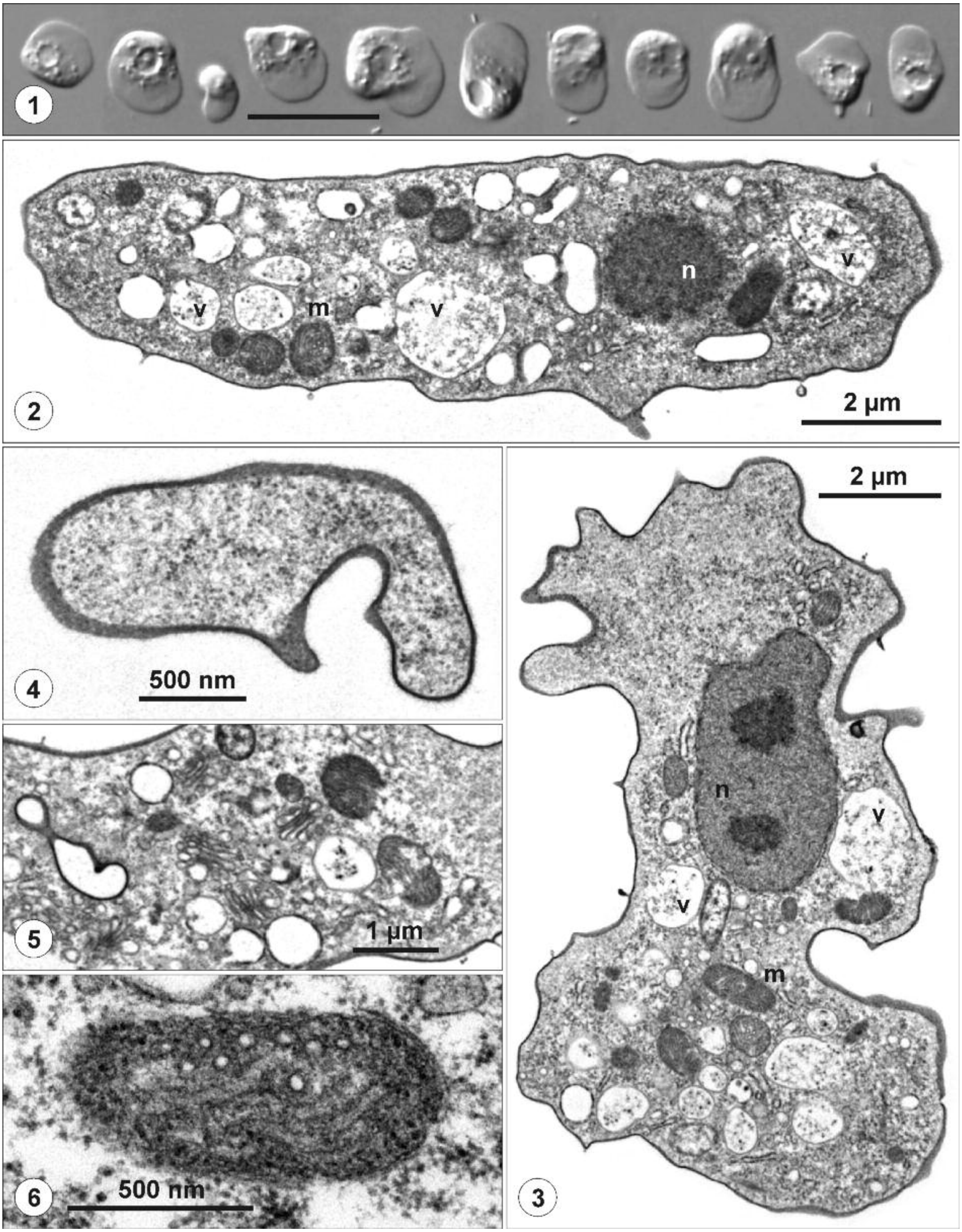

Plate 187. ELH7 strain of *Vannella* sp. isolated as environmental marine strain from surface of algae collected in La Maceta, El Hierro, Canary Islands, Spain; cultured on MY75S agar; stored in CC since 2010; GenBank Acc. No. of SSU rDNA sequence JQ271738. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC), scale bar = 20 µm. **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), vacuoles (v). **Fig. 4.** Cell surface of trophozoite with amorphous glycocalyx. **Fig. 5.** Golgi complexes with parallel arrangement of cisternae. **Fig. 6.** Mitochondrion with tubular cristae.

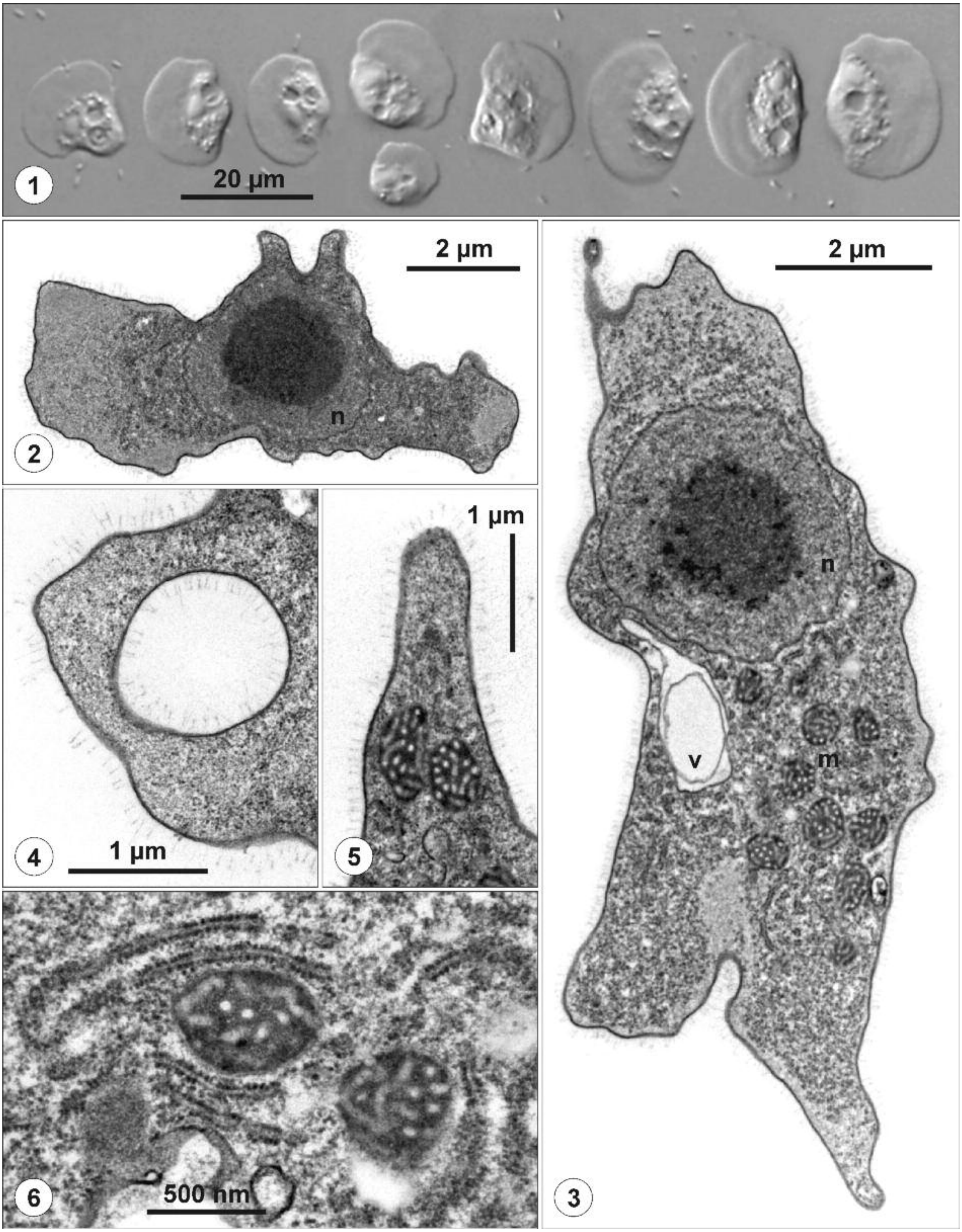

Plate 188. GERB strain of *Vannella* sp. isolated from gills of rainbow trout, *Oncorhynchus mykiss* (Walbaum) farmed in Baden Würtenberg, Germany; cultured on NN agar; stored in CC since 2008; GenBank Acc. No. of SSU rDNA sequence HM363624. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), vacuole (v). **Figs. 4, 5.** Details of cell surface with glycocalyx differentiated in glycostyles. **Fig. 6.** Mitochondria with tubular cristae and granular endoplasmic reticulum in their vicinity. Ref.: Dyková et al. 2010b.

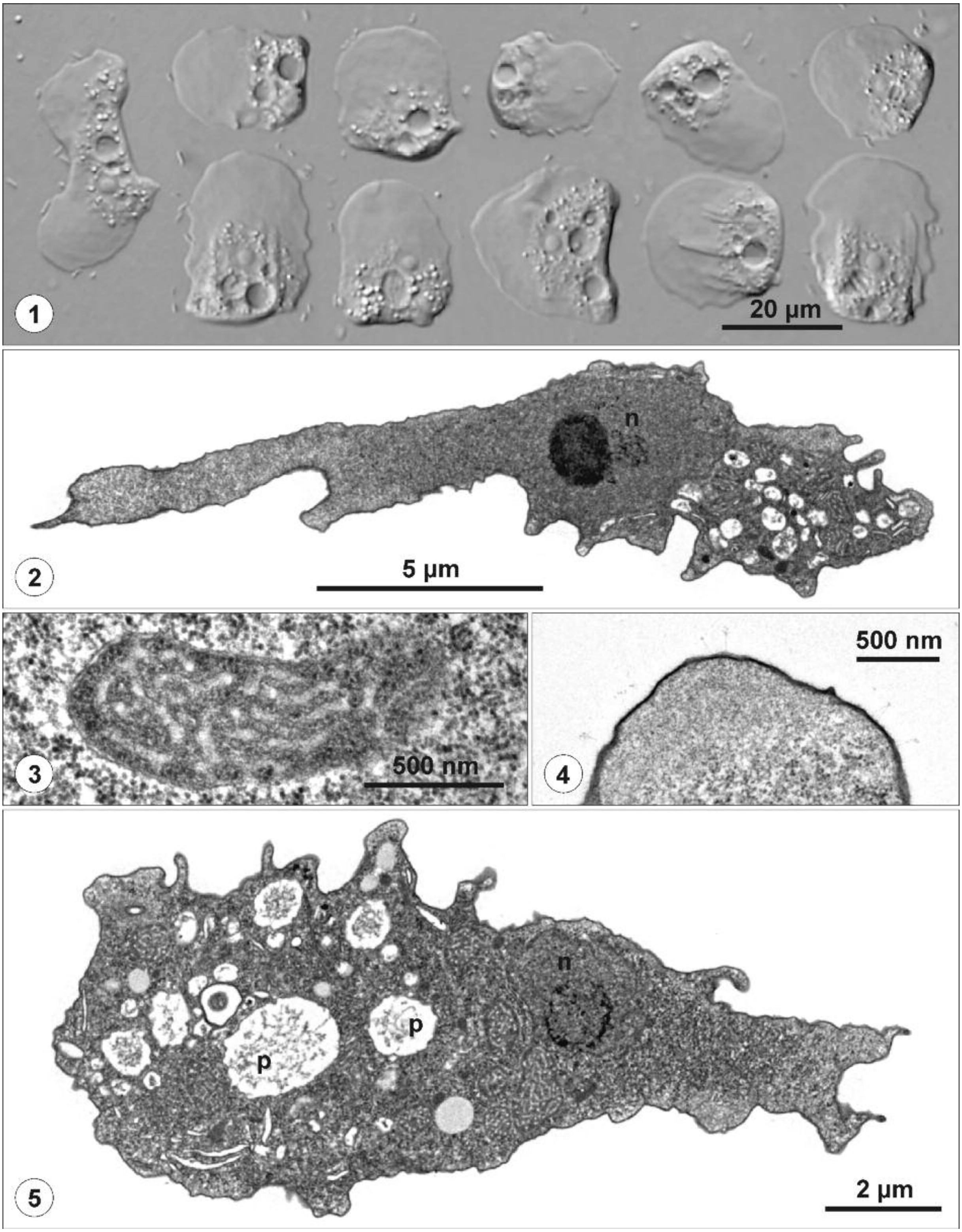

Plate 189. GERL41 strain of *Vannella* sp. isolated from gills of rainbow trout, *Oncorhynchus mykiss* (Walbaum) farmed in Baden Würtenberg, Germany; cultured on NN agar; stored in CC since 2009; GenBank Acc. No. of SSU rDNA sequence HM363632. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 5.** Overview of fine structure of trophozoites: nuclei (n), phagosomes (p). **Fig. 3.** Mitochondrion with tubular cristae. **Fig. 4.** Cell surface of trophozoite with no signs of glycocalyx differentiation. Ref.: Dyková et al. 2010b.

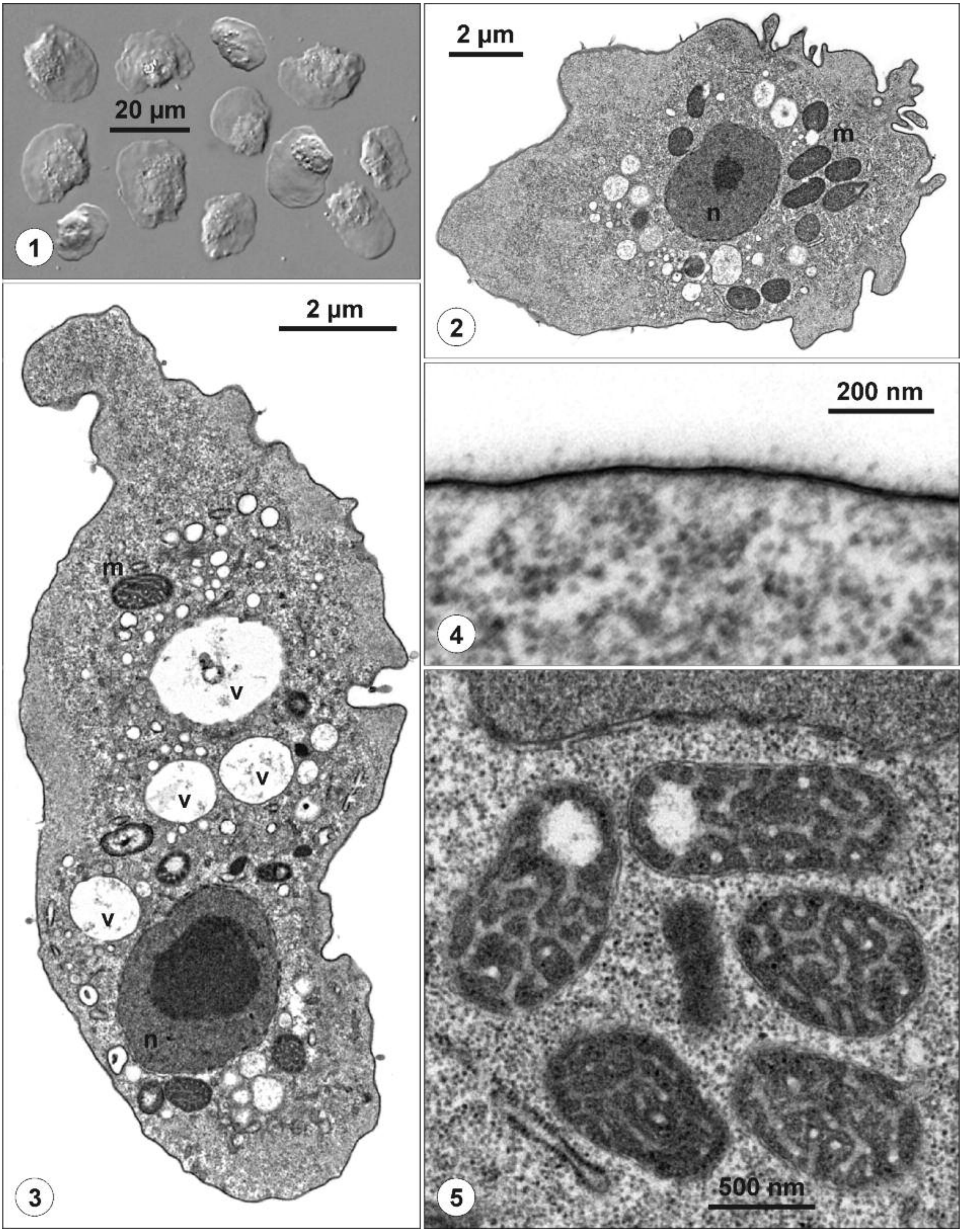

Plate 190. ISCRH strain of *Vannella* sp. isolated from sand on beach in La Gomera, Canary Islands, Spain; cultured on MY75S agar; stored in CC since 2007; GenBank Acc. No. of SSU rDNA sequence JQ271739. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), vacuoles (v). **Fig. 4.** Cell surface of trophozoite with amorphous glycocalyx. **Fig. 5.** Mitochondria with tubular branching cristae.

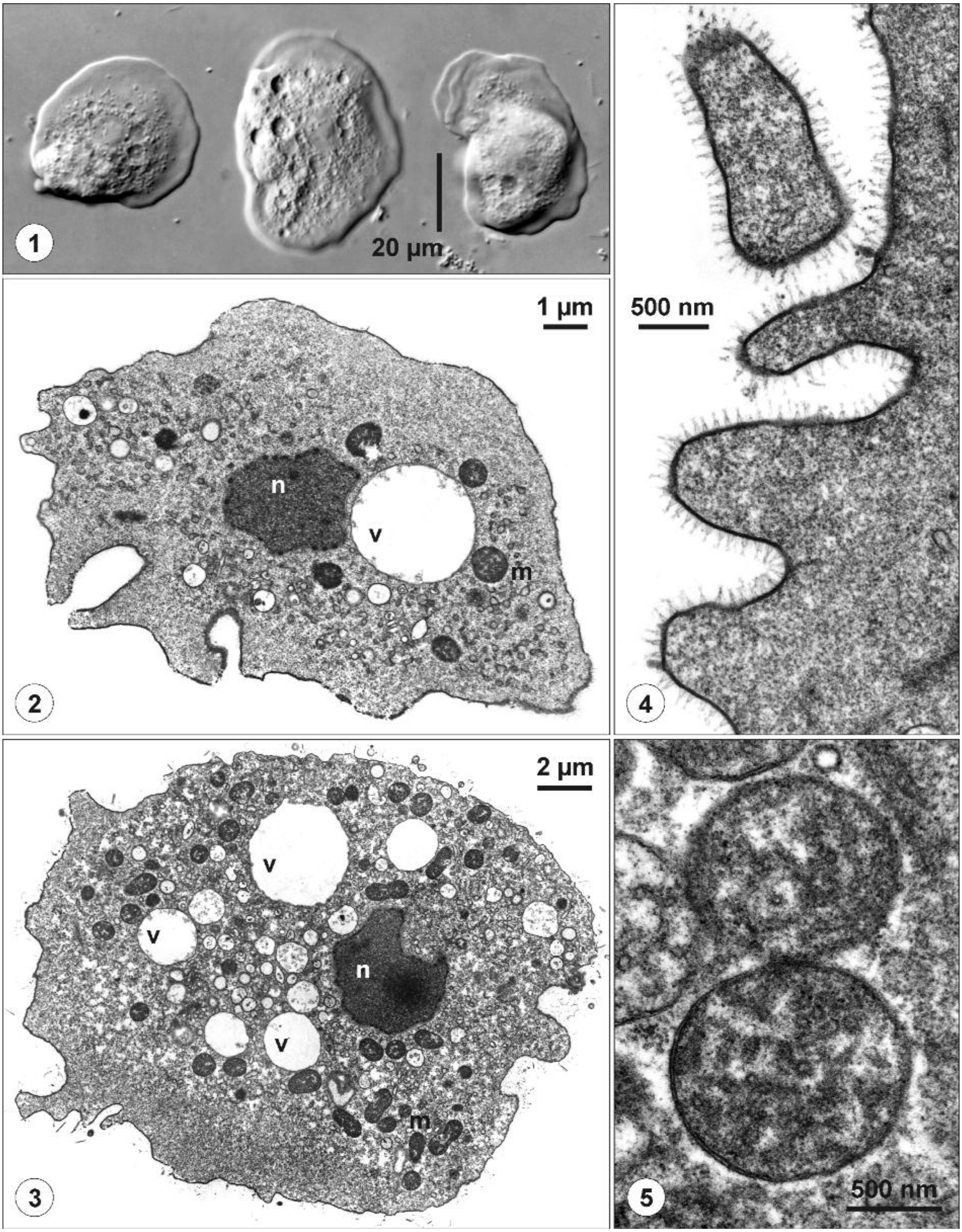

Plate 191. ISO13 strain of *Vannella* sp. isolated from gills of European seabass, *Dicentrarchus labrax* (L.) farmed in Sicily, Italy; cultured on MY75S; stored in CC since 1999; GenBank Acc. No. of SSU rDNA sequence AY929905, ITS AY929925. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), vacuoles (v). **Fig. 4.** Cell surface of trophozoite with glycocalyx differentiated in glycostyles. **Fig. 5.** Mitochondria with tubular cristae. Ref.: Dyková et al. 2005a.

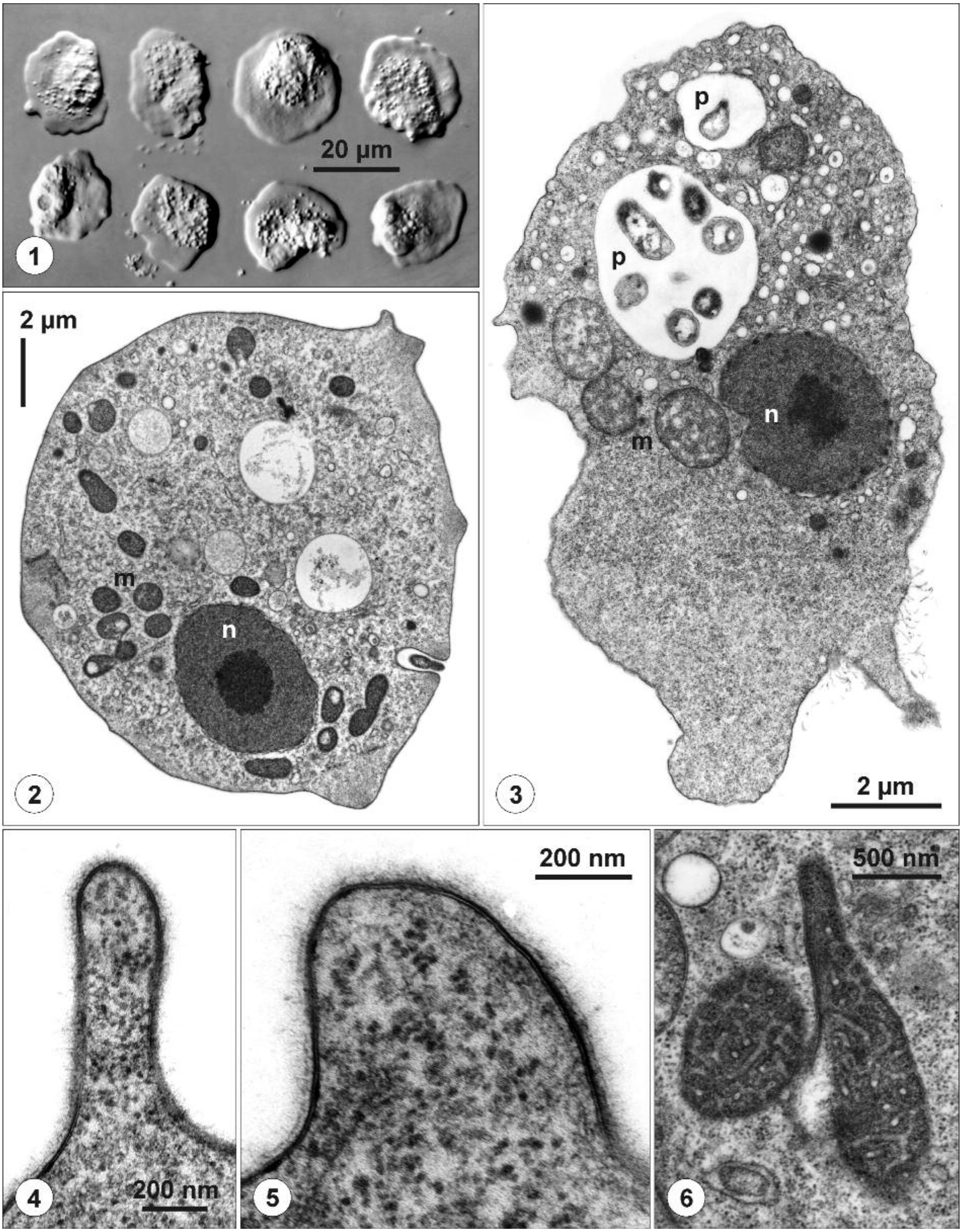

Plate 192. ISO4 strain of *Vannella* sp. isolated from gills of European seabass, *Dicentrarchus labrax* (L.) farmed in Sicily, Italy; cultured on MY75S; stored in CC since 1998; GenBank Acc. No. of SSU rDNA sequence JQ271740. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosomes (p). **Figs. 4, 5.** Cell surface of trophozoite with amorphous glycocalyx. **Fig. 6.** Mitochondria with tubular branching cristae.

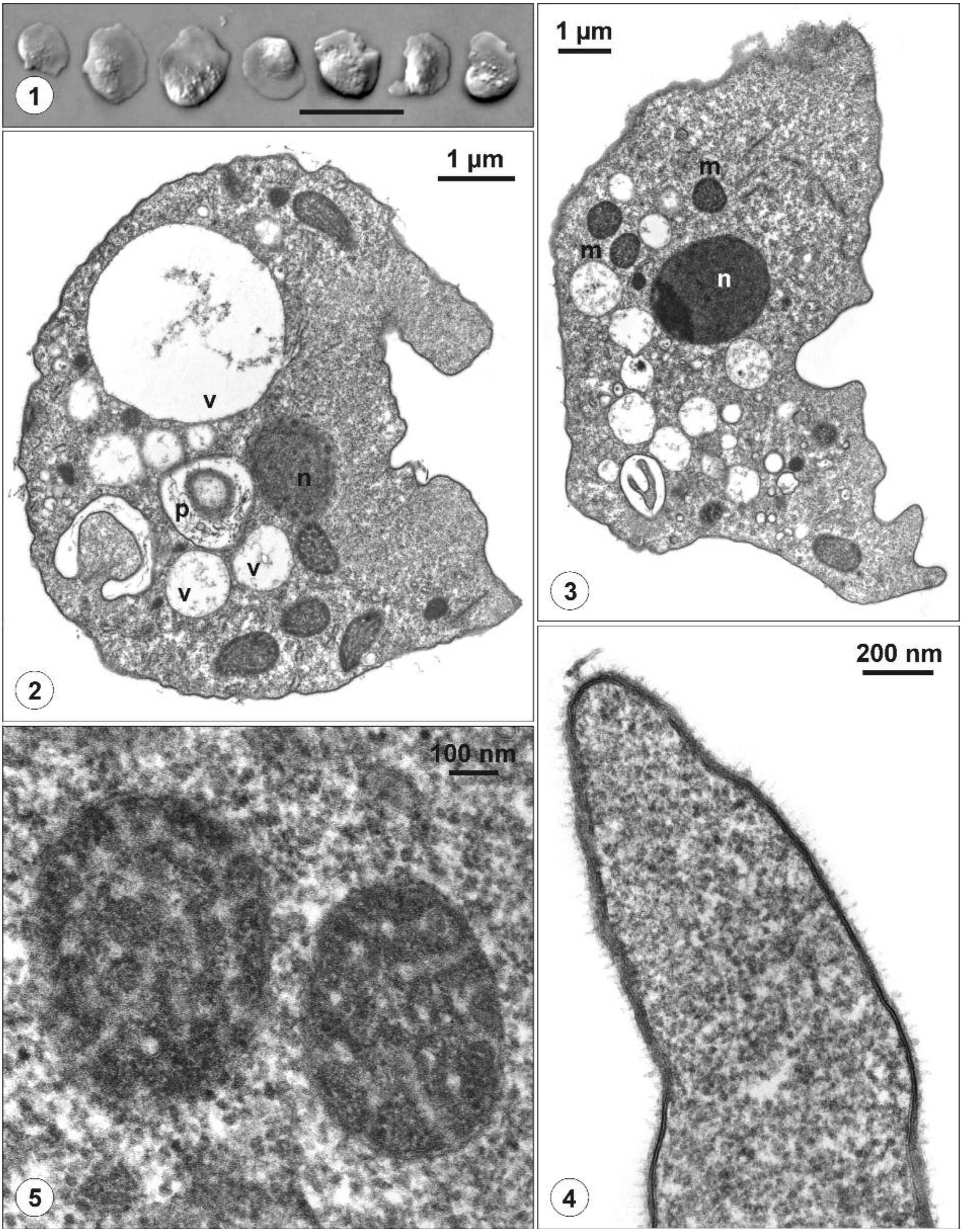

Plate 193. ISOKONT strain of *Vannella* sp. isolated from gills of European seabass, *Dicentrarchus labrax* (L.) farmed in Sicily, Italy (derived as contaminant of ISO13 strain); cultured on MY75S; stored in CC since 1999; GenBank Acc. No. of SSU rDNA sequence JQ271741. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC), scale bar = 20 µm. **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosome (p), vacuoles (v). **Fig. 4.** Cell surface with no signs of glycocalyx differentiation. **Fig. 5.** Mitochondria with tubular cristae.

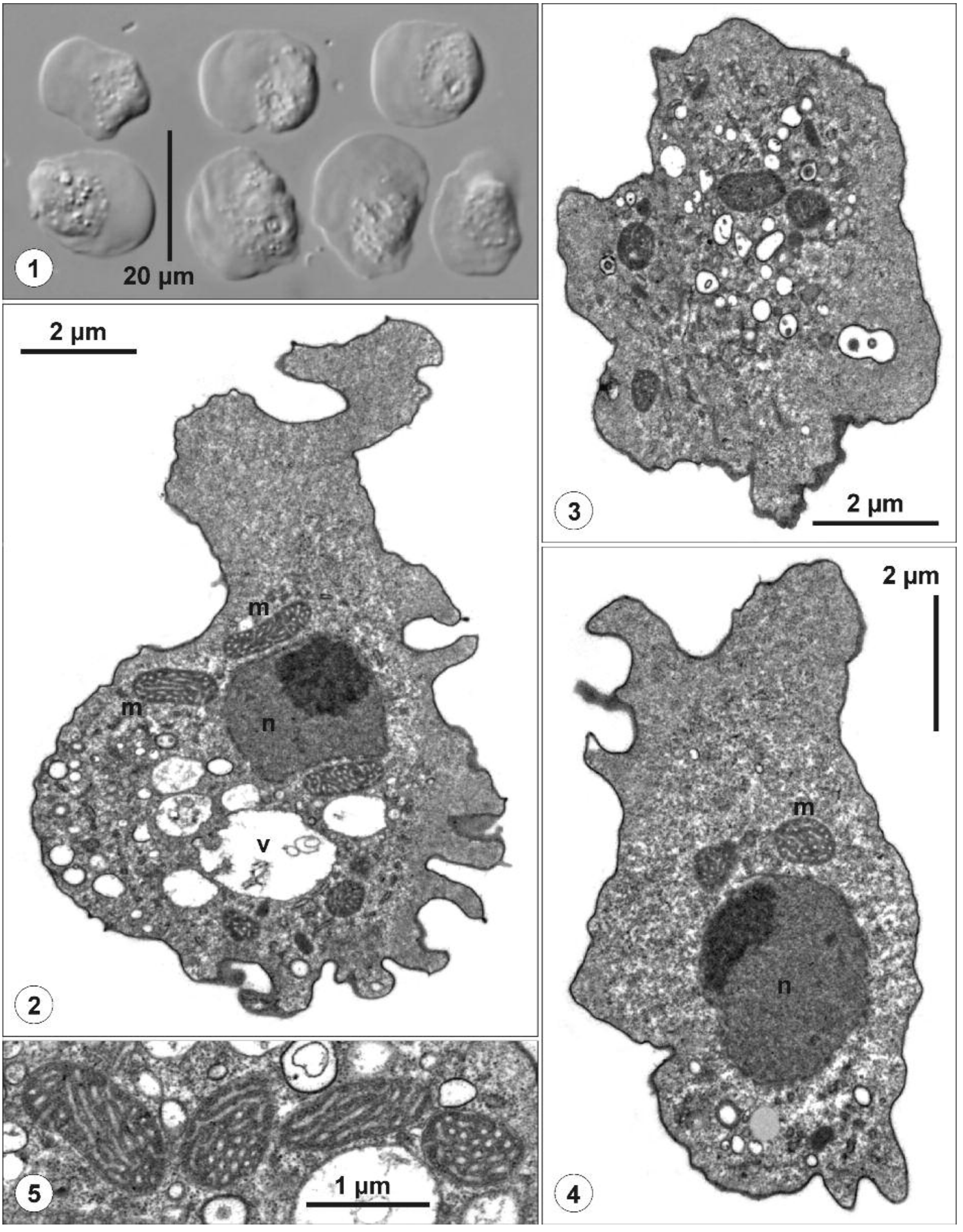

Plate 194. JKS2 strain of *Vannella* sp. isolated from sand collected on Jeju Island, South Korea; cultured on NN agar; stored in CC since 2010; GenBank Acc. No. of SSU rDNA sequence JQ271742. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3, 4.** Overview of fine structure of trophozoites: vesicular nuclei (n), mitochondria (m), vacuoles (v). **Fig. 5.** Detail of ultrastructure of mitochondria with tubular cristae.

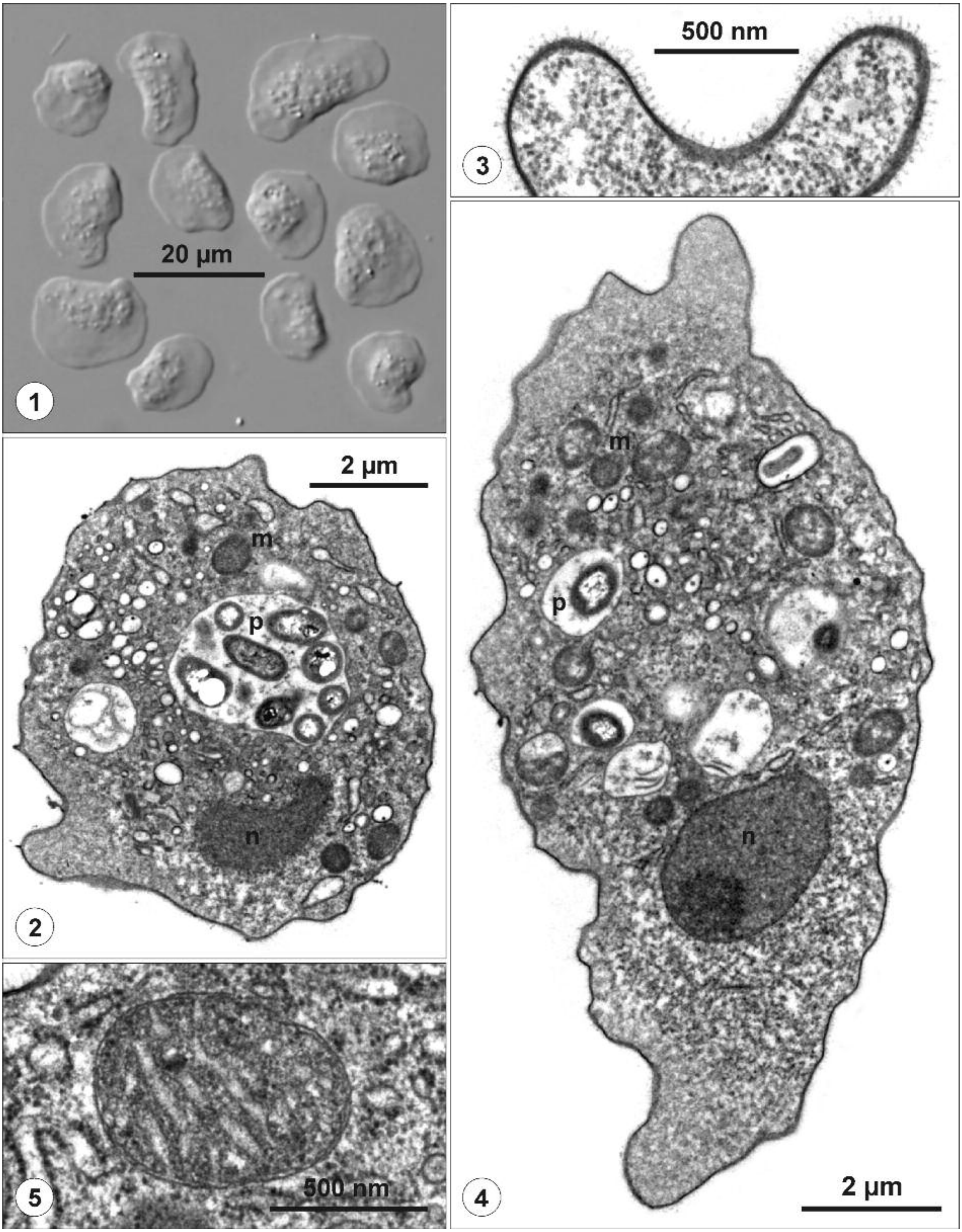

Plate 195. JKZ strain of *Vannella* sp. isolated from wet sand, Jeju Island, South Korea; cultured on MY75S agar; stored in CC since 2010; GenBank Acc. No. of SSU rDNA sequence JQ271743. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 4.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosomes (p). **Fig. 3.** Cell surface with glycocalyx differentiated in glycostyles. **Fig. 5.** Mitochondrion with tubular cristae.

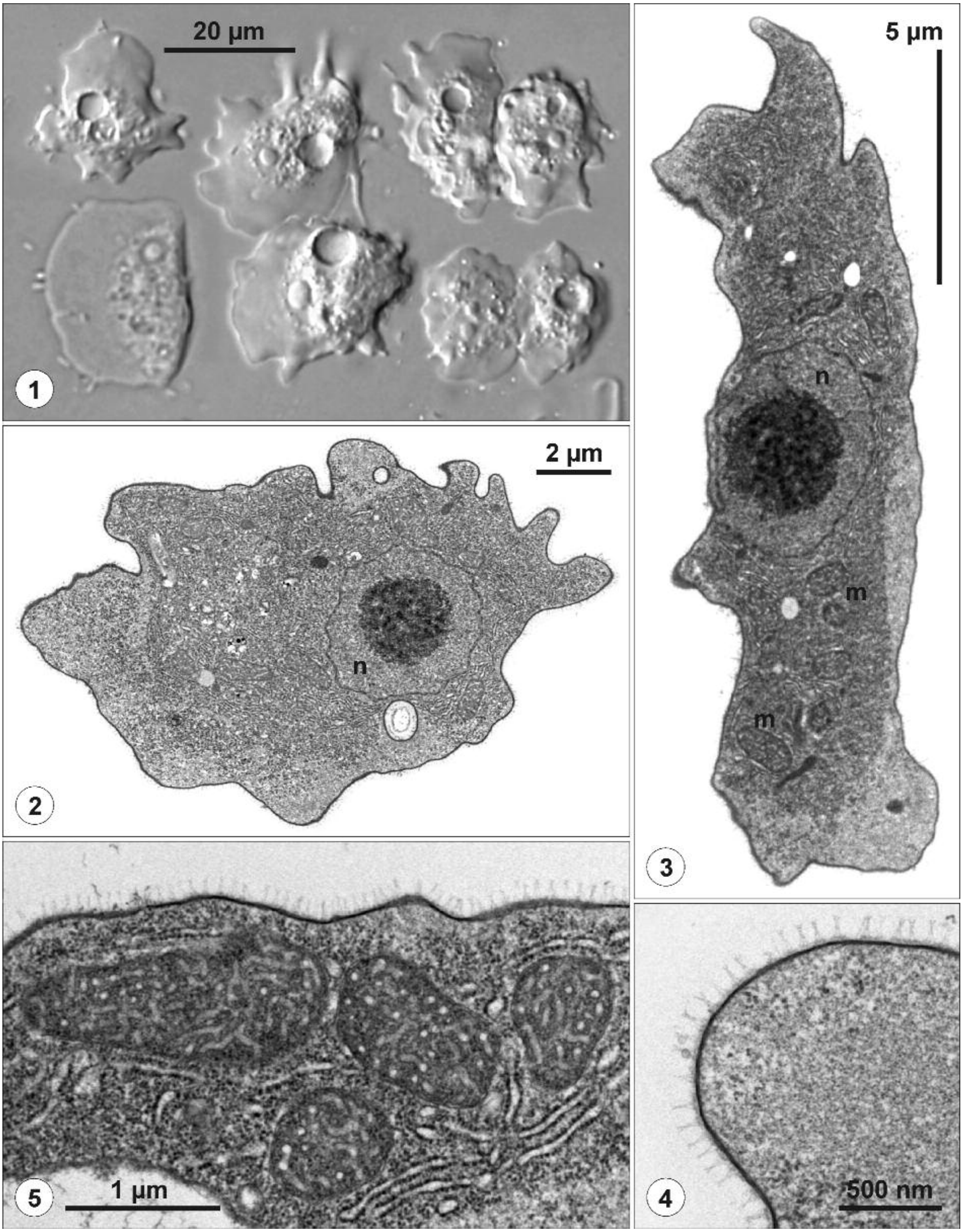

Plate 196. JRF2 strain of *Vannella* sp. isolated from wet sand collected in James Ross Island, Antarctic; cultured on NN agar; stored in CC since 2010; GenBank Acc. No. of SSU rDNA sequence JQ271744. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m). **Fig. 4.** Cell surface of trophozoite with glycocalyx differentiated in glycostyles. **Fig. 5.** Mitochondria with tubular branching cristae.

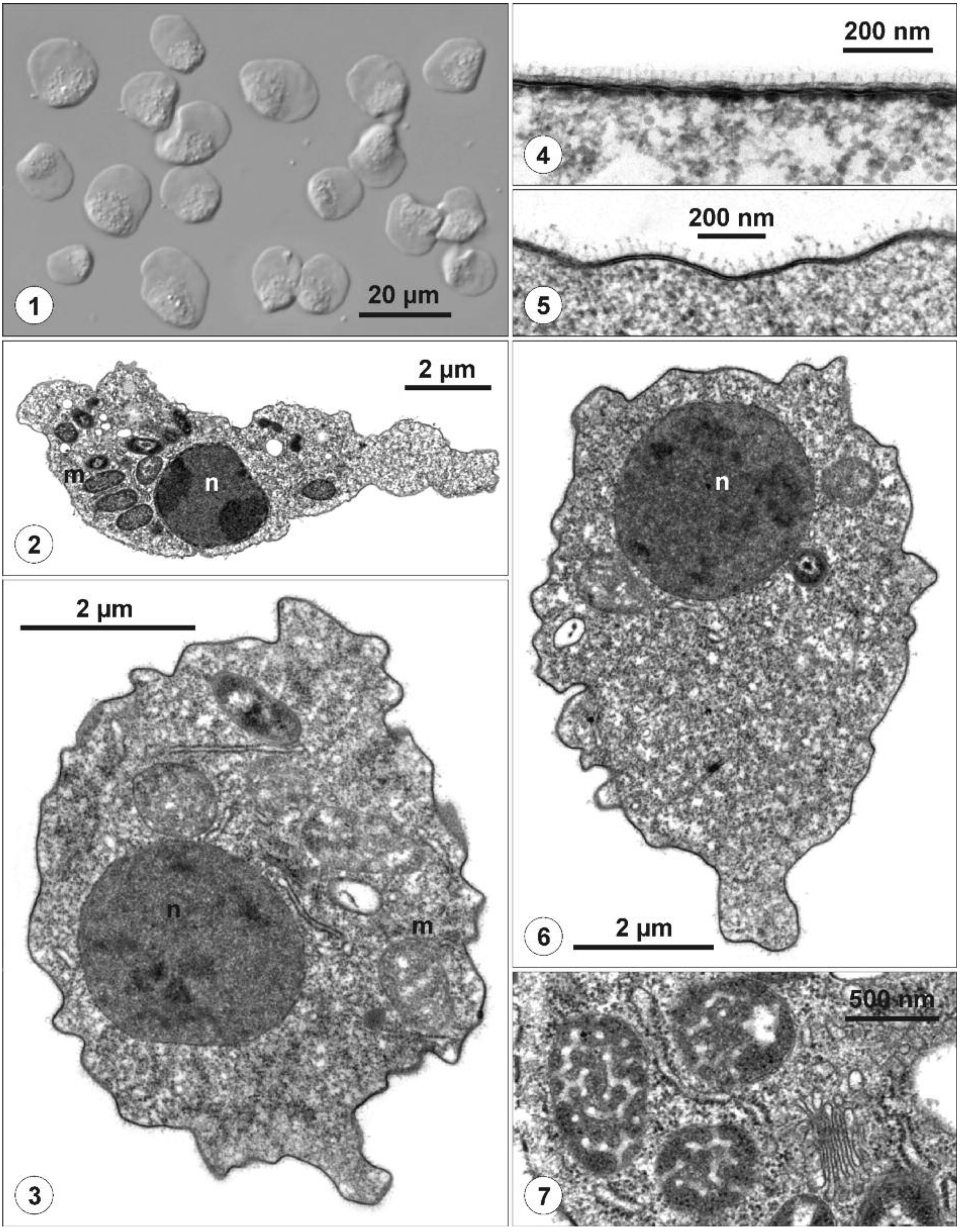

Plate 197. KONT2Pe strain of *Vannella* sp. derived as contaminant of *Paramoeba eilhardi* strain obtained from UKNCC; cultured on MY75S agar; stored in CC since 2004; GenBank Acc. No. of SSU rDNA sequence JQ271745. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3, 6.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m). **Figs. 4, 5.** Cell surface of trophozoites with glycocalyx differentiated in glycostyles. **Fig. 7.** Mitochondria with tubular branching cristae and Golgi complex (right).

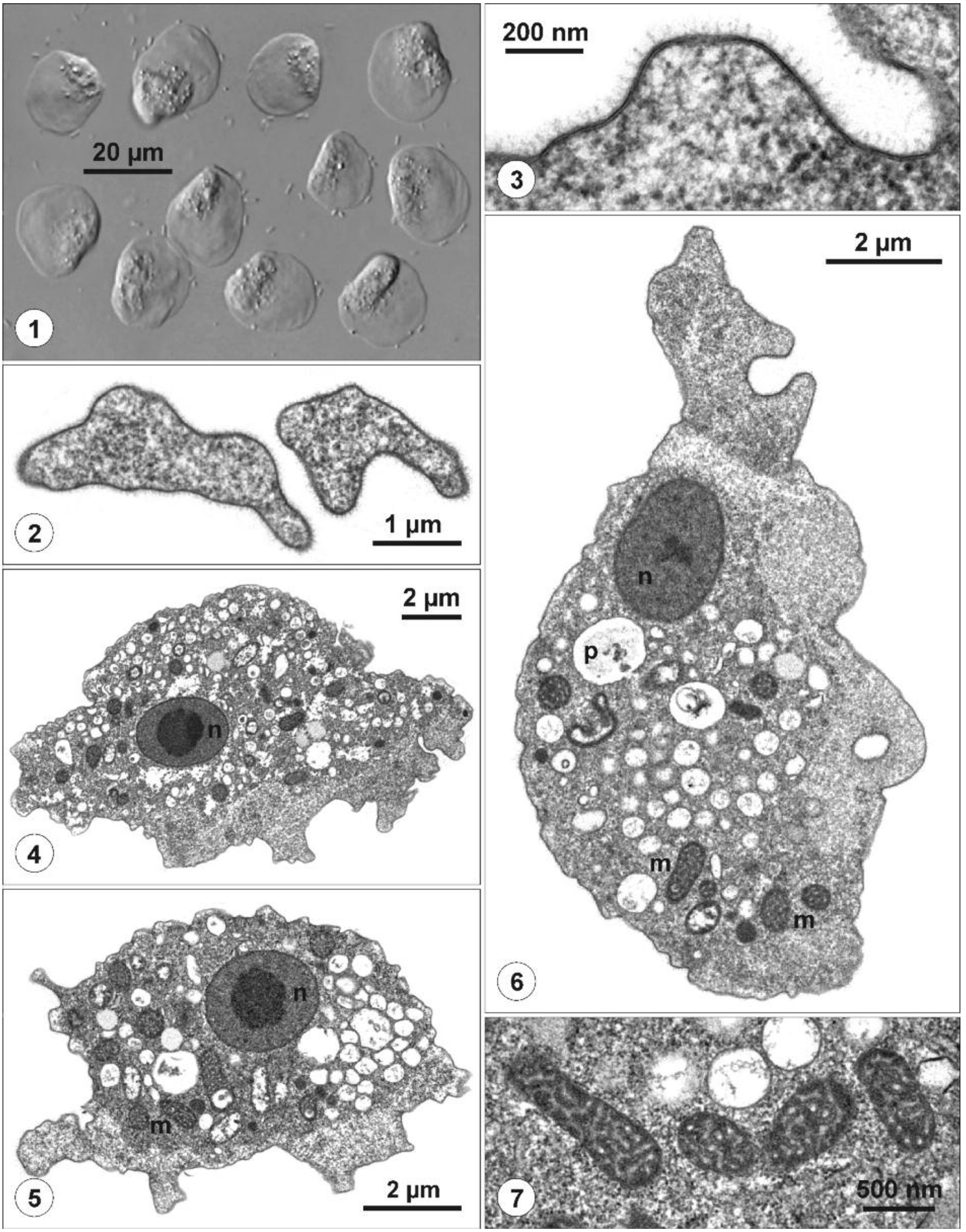

Plate 198. LITHOV strain of *Vannella* sp. isolated from material on the surface of red alga, *Lithophyllym racemus* (Lamarck) collected in Adriatic Sea, off Brač Island, Croatia; cultured on MY75S agar; stored in CC since 2006; GenBank Acc. No. of SSU rDNA sequence JQ271746. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Cell surface of trophozoites with glycocalyx differentiated in glycostyles. **Figs. 4, 5, 6.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosome (p). **Fig. 7.** Mitochondria with tubular branching cristae.

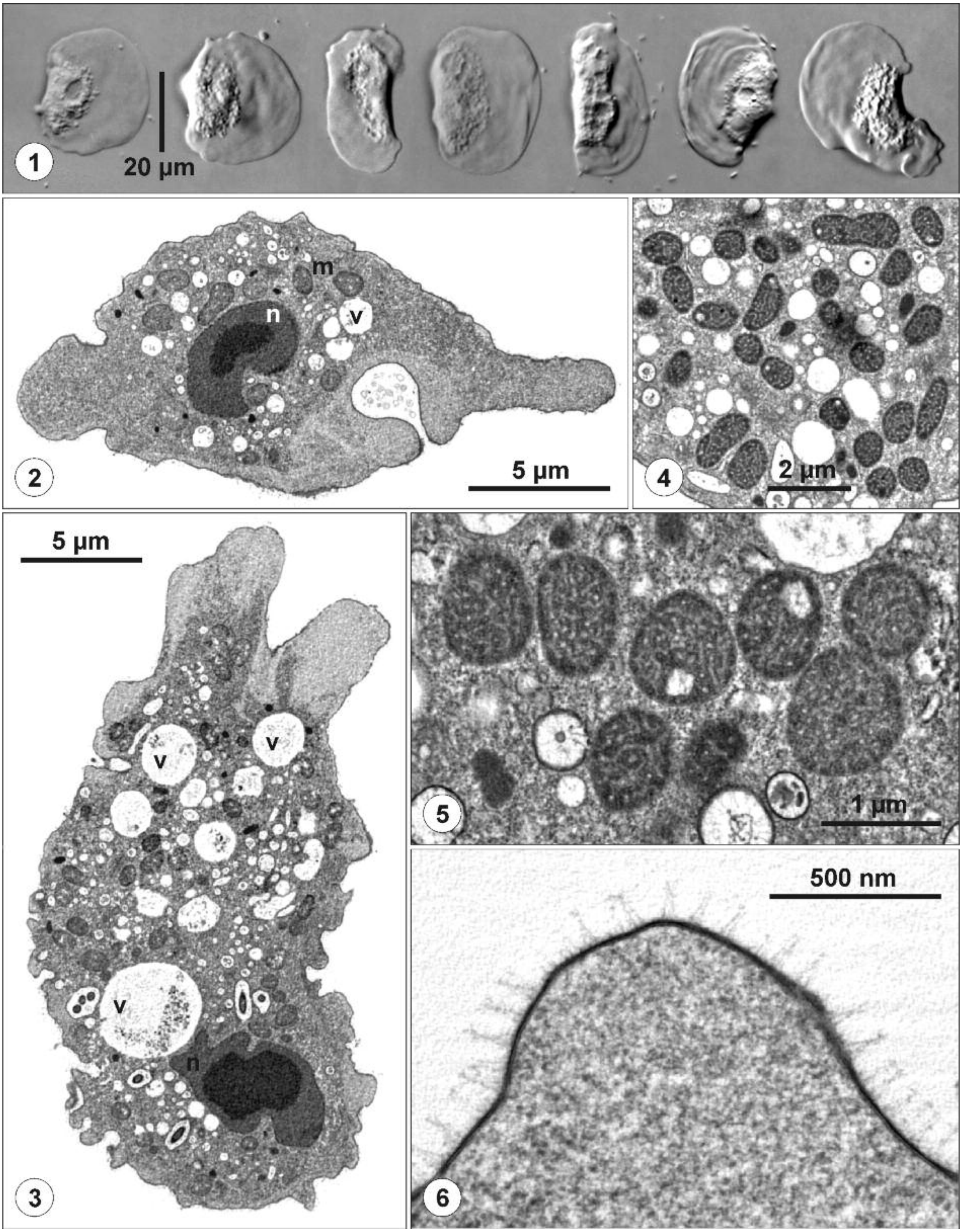

Plate 199. MSPE strain of *Vannella* sp. isolated from gills of Atlantic salmon, *Salmo salar* L. used for AGD experiments, School of Aquaculture, Launceston, Tasmania, Australia; cultured on MY75S agar; stored in CC since 2003; GenBank Acc. No. of SSU rDNA sequence JQ271747. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), vacuoles (v). **Figs. 4, 5.** Mitochondria with tubular branching cristae. **Fig. 6.** Cell surface of trophozoite with glycocalyx differentiated in glycostyles.

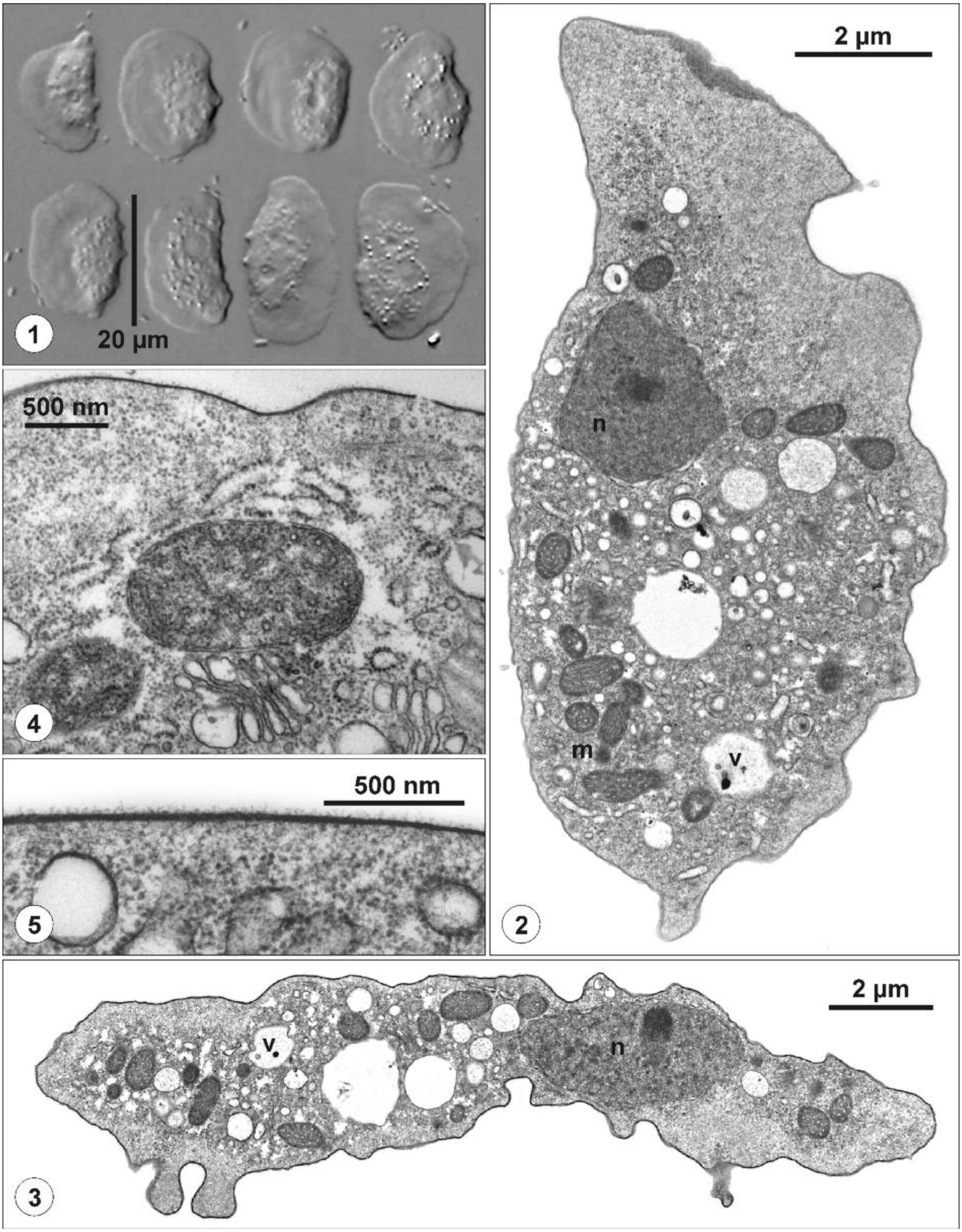

Plate 200. PHILM strain of *Vannella* sp. isolated from gills of Atlantic salmon, *Salmo salar* L. farmed in Maquari Harbour, Tasmania, Australia; cultured on MY75S agar; stored in CC since 2007; GenBank Acc. No. of SSU rDNA sequence JQ271748. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), vacuoles (v). **Fig. 4.** Mitochondrion with tubular branching cristae and Golgi complex in close vicinity. **Fig. 5.** Cell surface of trophozoite with amorphous glycocalyx.

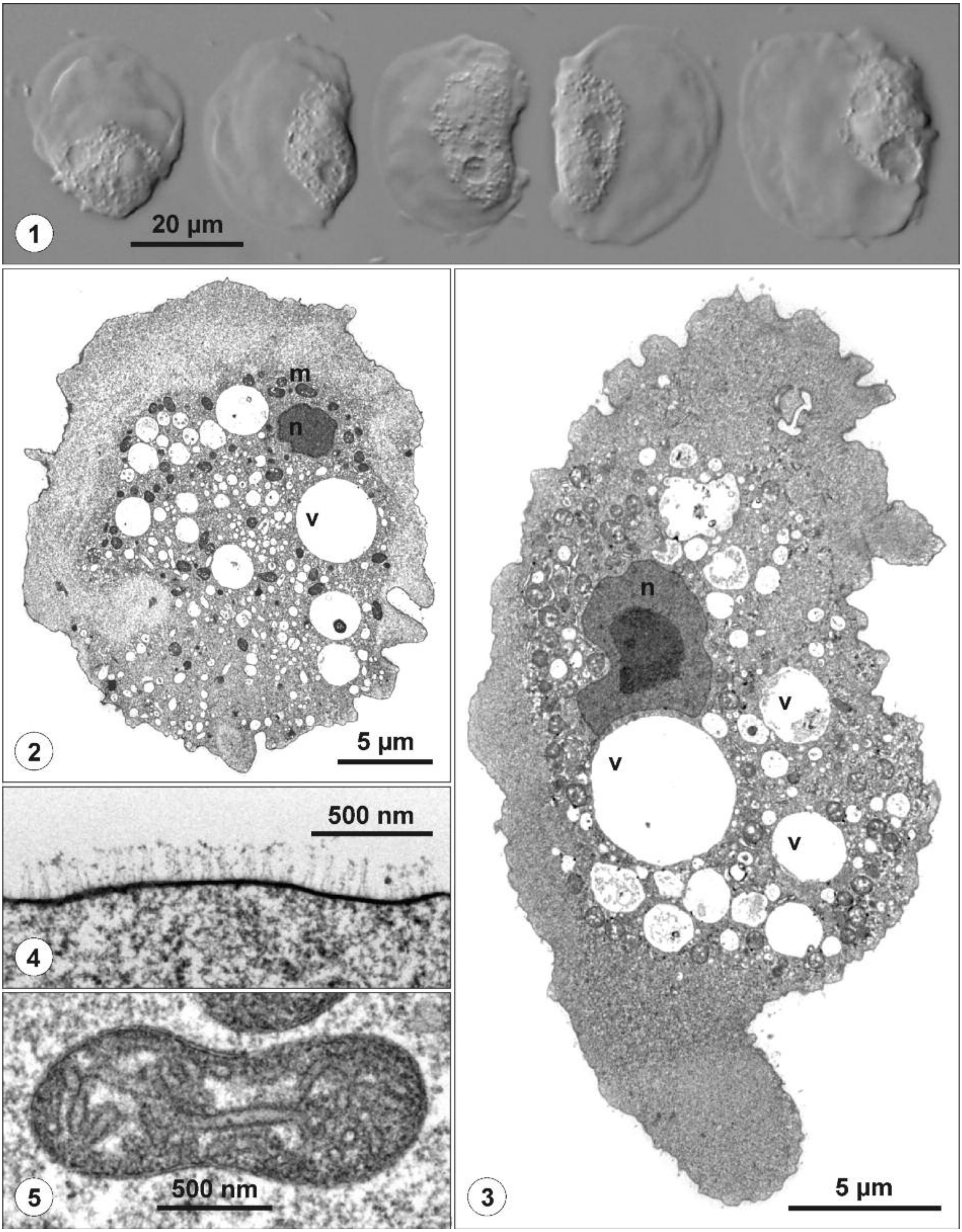

Plate 201. PHILV strain of *Vannella* sp. isolated from gills of Atlantic salmon, *Salmo salar* L. farmed in Maquari Harbour, Tasmania, Australia; cultured on MY75S agar; stored in CC since 2007; GenBank Acc. No. of SSU rDNA sequence JQ271749. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), vacuoles (v). **Fig. 4.** Cell surface of trophozoite with glycocalyx differentiated in glycostyles. **Fig. 5.** Mitochondrion with tubular branching cristae.

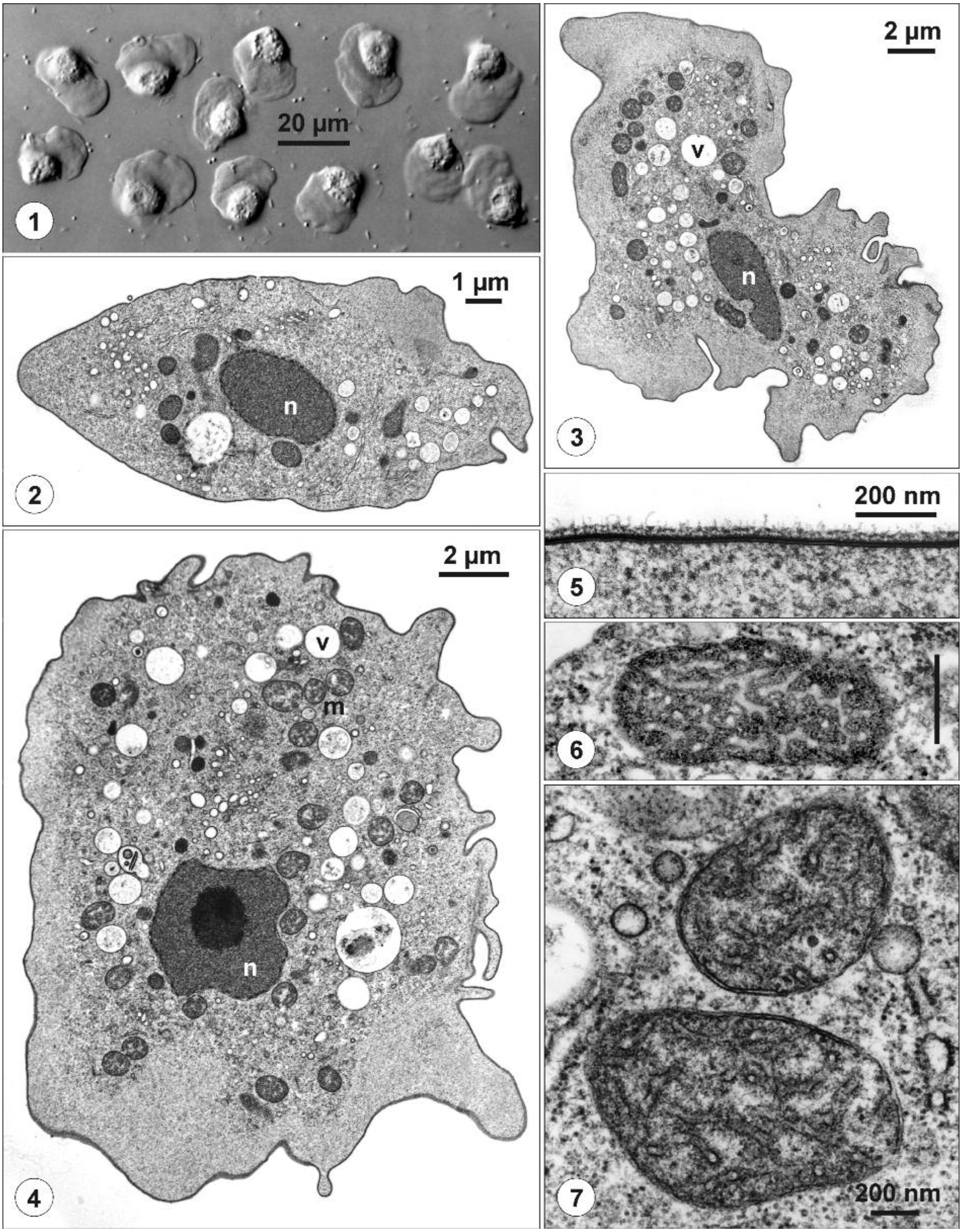

Plate 202. PMCH strain of *Vannella* sp. isolated from coelomic fluid of marbled rock crab, *Pachygrapsus marmoratus* Fabricius collected on beach in Pula, Adriatic Sea, Croatia; cultured on MY75S agar; stored in CC since 2000; GenBank Acc. No. of SSU rDNA sequence AY929919, ITS AY929935. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3, 4.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), vacuoles (v). **Fig. 5.** Cell surfrace of trophozoite with no signs of glycocalyx differentiation. **Figs. 6, 7.** Mitochondria with tubular branching cristae, scale bar = 500 nm. Ref.: Dyková et al. 2005a.

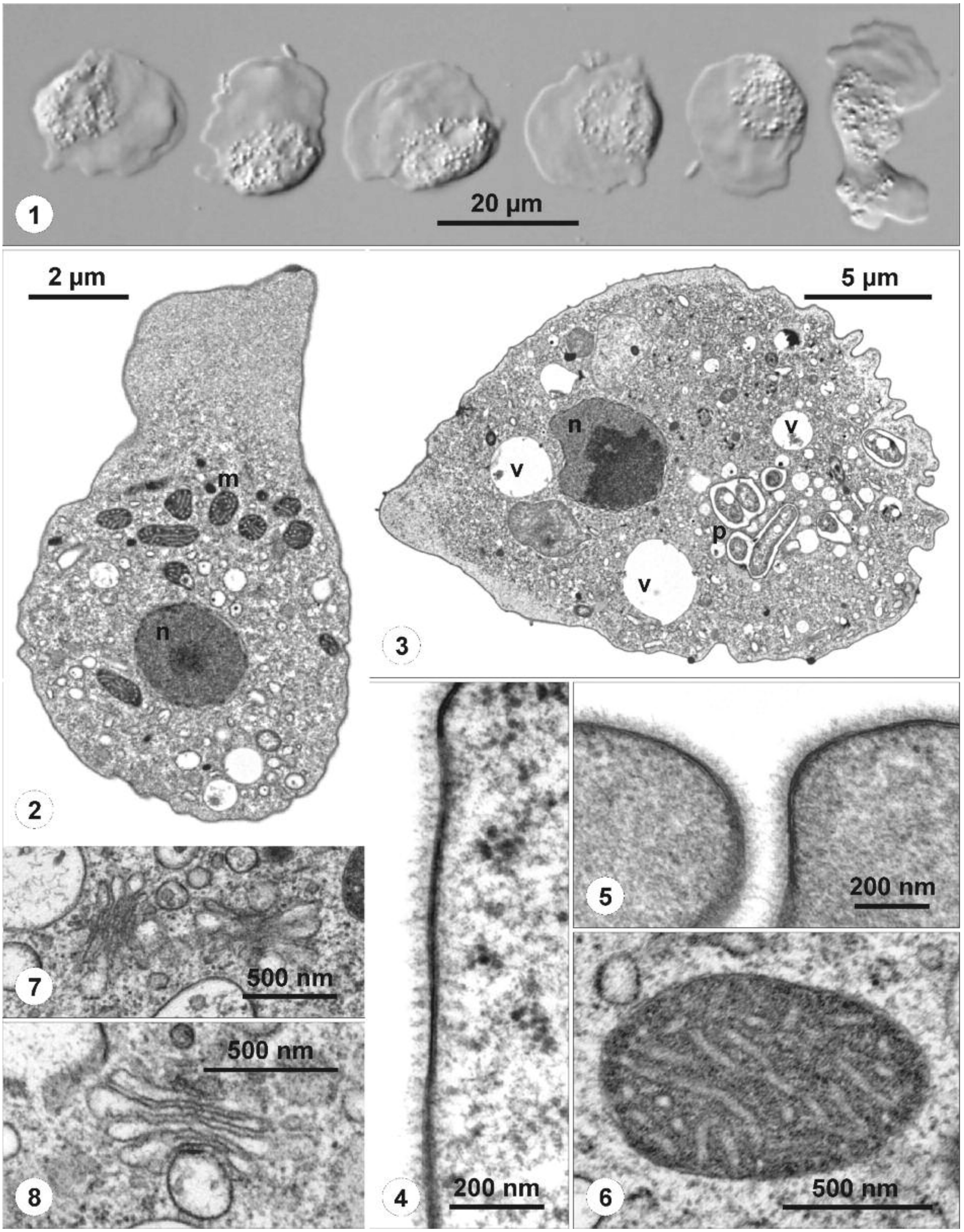

Plate 203. R strain of *Vannella* sp. isolated from haemolymph of blue crab, *Callinectes sapidus* Rathbun collected off Gulf Coast, Biloxi, Mississippi, USA; cultured on MY75S agar; stored in CC since 2005; GenBank Acc. No. of SSU rDNA sequence JQ271750. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosomes (p), vacuoles (v). **Figs. 4, 5.** Cell surface of trophozoite with thick glycocalyx, differentiation in glycostyles is uncertain. **Fig. 6.** Mitochondrion with tubular cristae. **Figs. 7, 8.** Golgi complexes with parallel arrangement of cisternae.

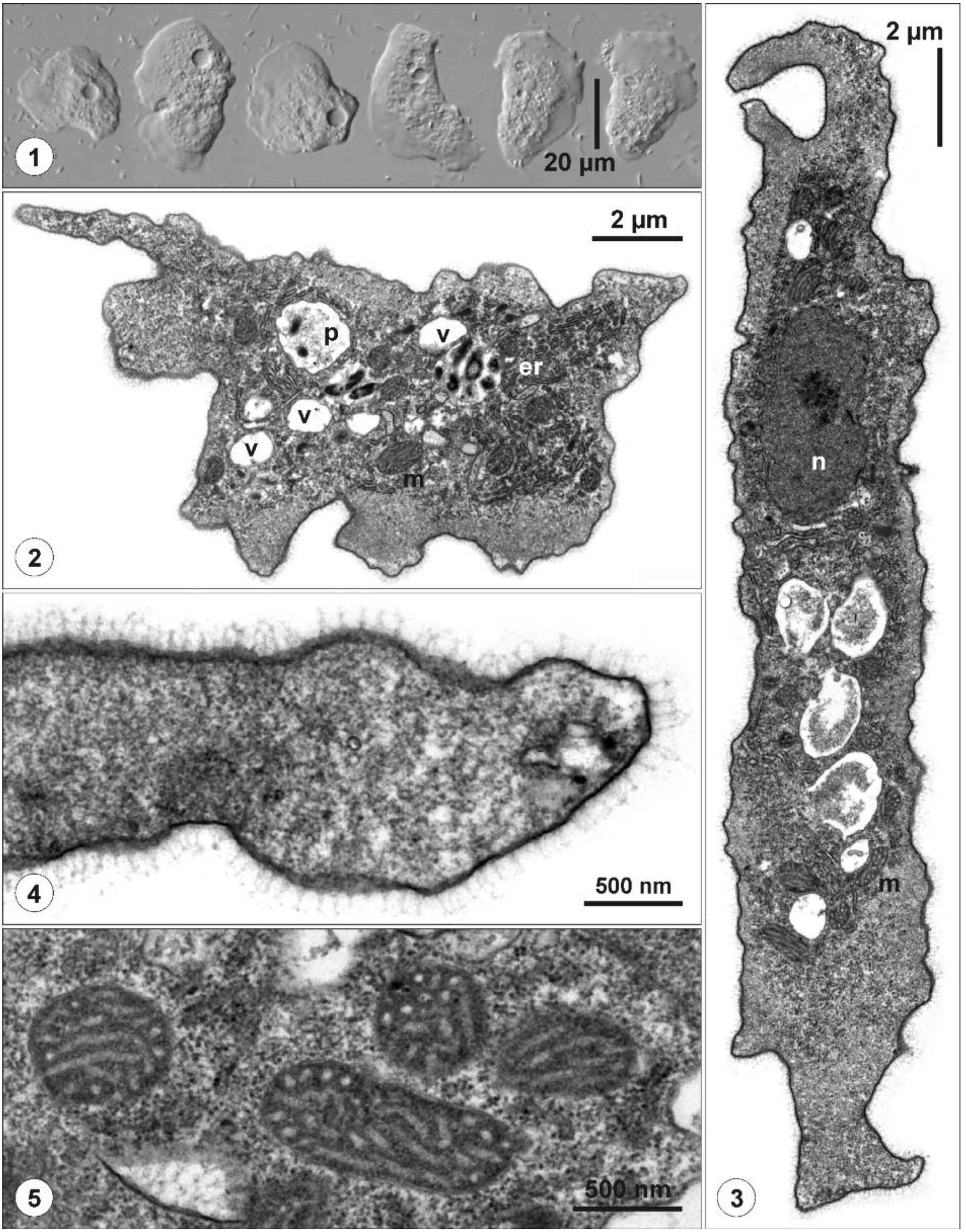

Plate 204. REH2 strain of of *Vannella* sp. isolated from gills of rainbow trout, *Oncorhynchus mykiss* (Walbaum) farmed in North Moravia, Czech Republic; cultured on NN agar; stored in CC since 2009; GenBank Acc. No. of SSU rDNA sequence JQ271751. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nucleus (n), endoplasmic reticulum (er) mitochondria (m), phagosome (p), vacuoles (v). **Fig. 4.** Cell surface of trophozoite with glycocalyx differentiated in glycostyles. **Fig. 5.** Mitochondria with tubular cristae.

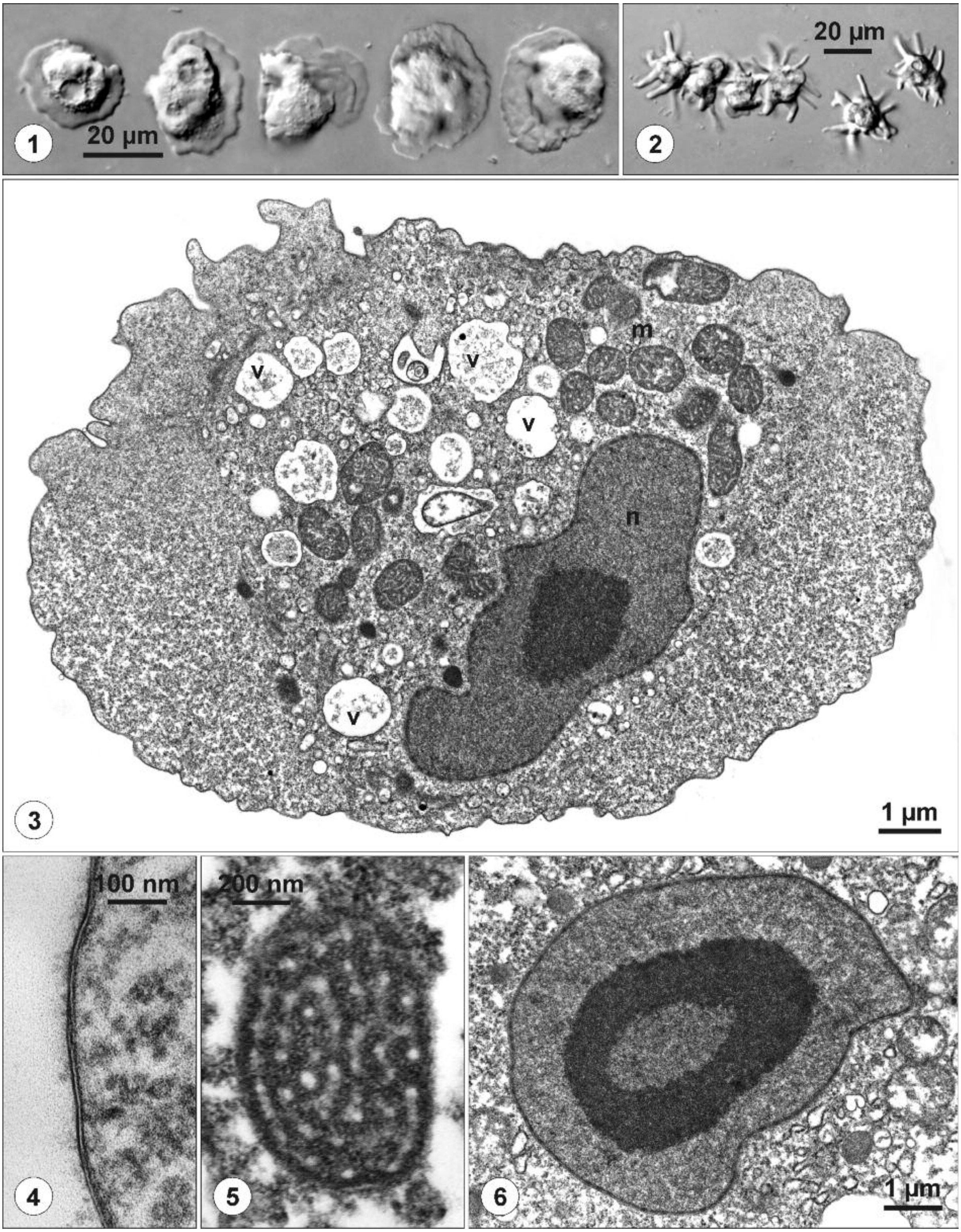

Plate 205. RSSF strain of *Vannella* sp. isolated from gills of Atlantic salmon, *Salmo salar* L. used for AGD experiments, School of Aquaculture, Launceston, Tasmania, Australia; cultured on MY75S agar; stored in CC since 2003; GenBank Acc. No. of SSU rDNA sequence JQ271752. **Fig. 1.** Attached trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Floating trophozoites (Nomarski DIC). **Fig. 3.** Overview of fine structure of trophozoite: nucleus (n), mitochondria (m), vacuoles (v). **Fig. 4.** Cell surface of trophozoite with amorphous glycocalyx. **Fig. 5.** Mitochondrion with tubular branching cristae. **Fig. 6.** Nucleus with ring-shaped arrangement of nucleolar material.

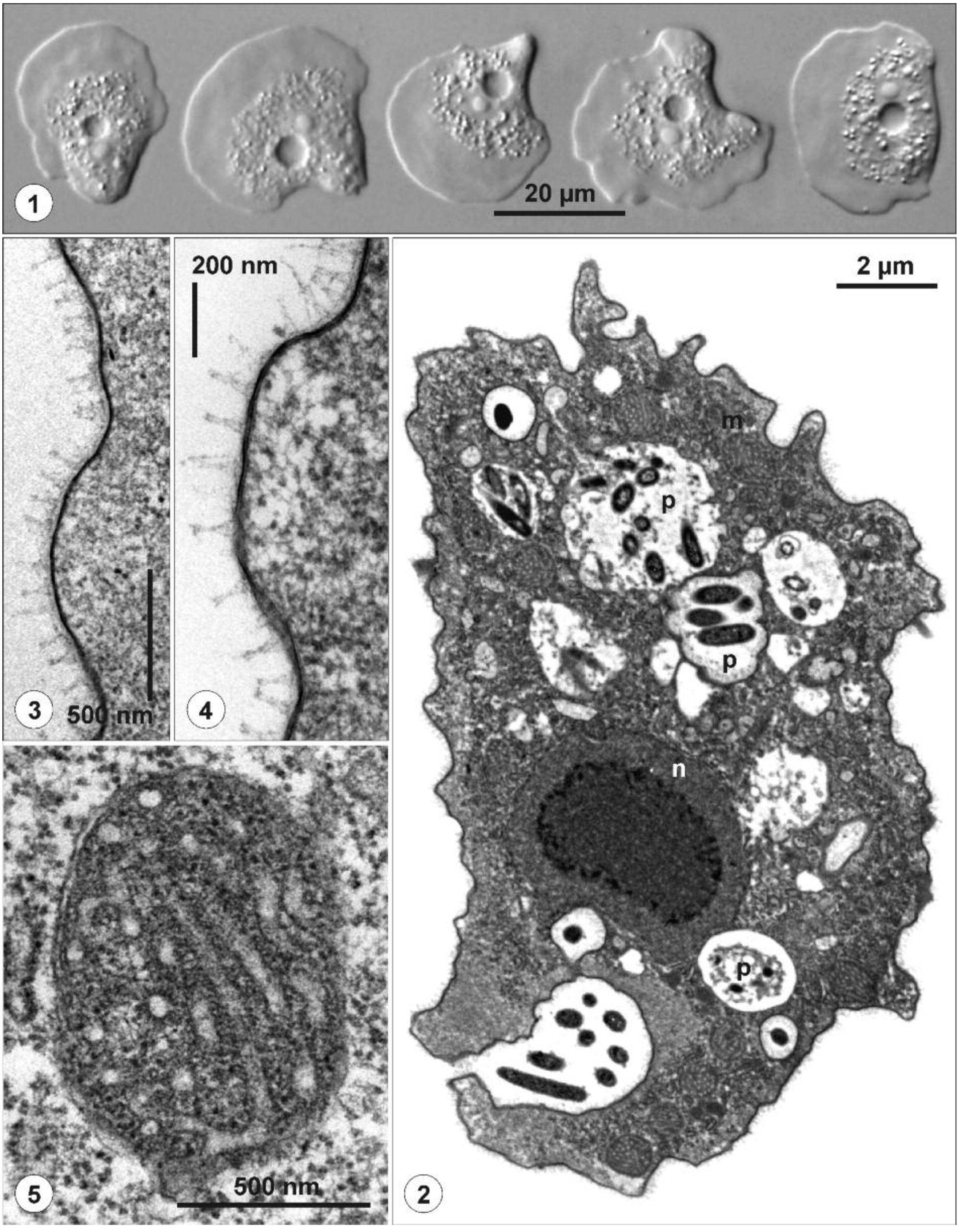

Plate 206. RT3TT strain of *Vannella* sp. isolated from wet sand collected in Cockscomb, Belize; cultured on NN agar; stored in CC since 2010; GenBank Acc. No. of SSU rDNA sequence JQ271753. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Overview of fine structure of trophozoite: nucleus (n), phagosomes (p), mitochondria (m). **Figs. 3, 4.** Cell surface of trophozoite with glycocalyx differentiated in glycostyles. **Fig. 5.** Mitochondrion with tubular cristae.

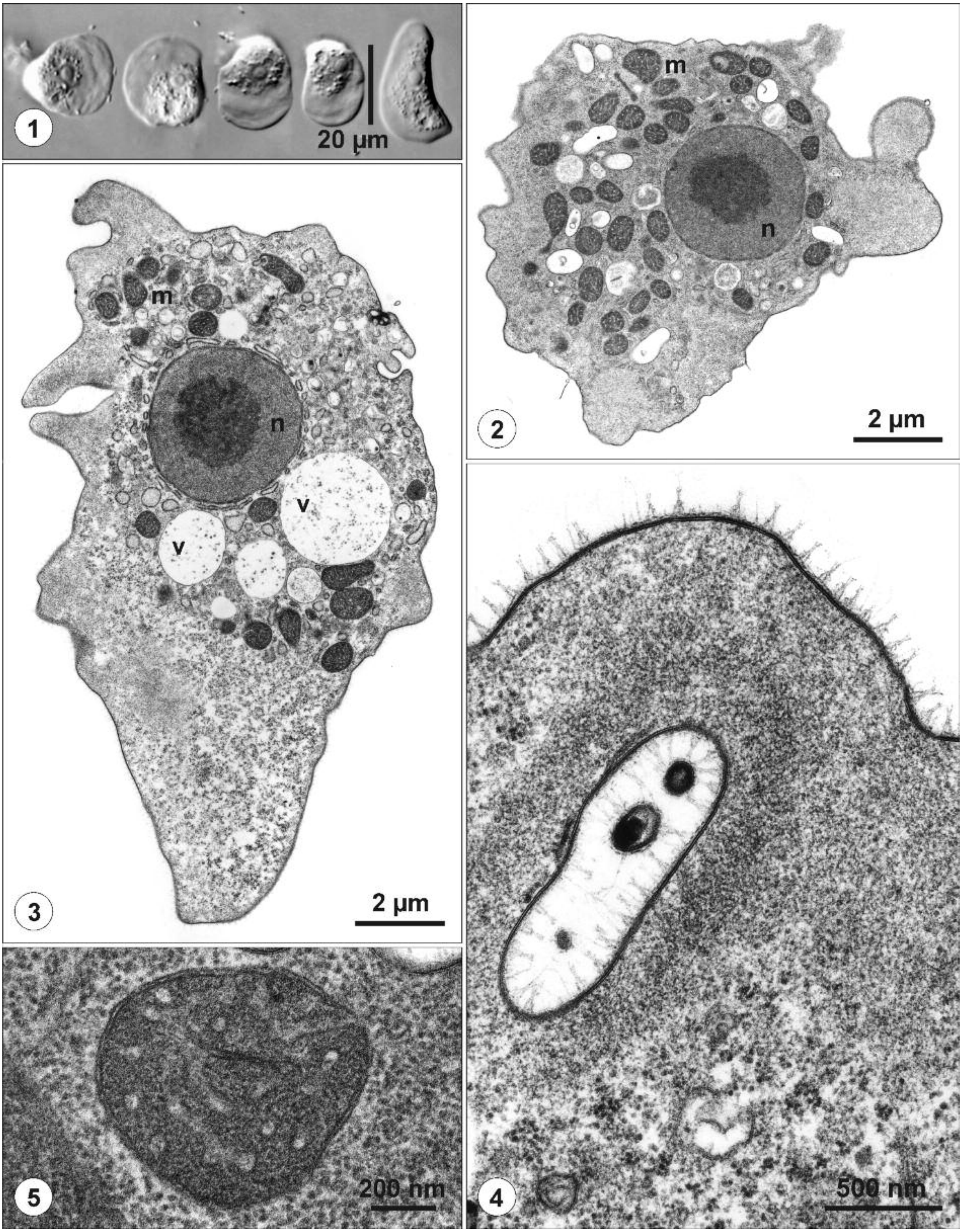

Plate 207. S2M2 strain of *Vannella* sp. isolated from gills of turbot, *Scophthalmus maximus* (L.) farmed in NW Spain; cultured on MY75S agar; stored in CC since 1996; GenBank Acc. No. of SSU rDNA sequence AY929904, ITS AY929924. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), vacuoles (v). **Fig. 4.** Cell surface with glycocalyx differentiated in glycostyles. **Fig. 5.** Mitochondrion with tubular branching cristae. Ref.: Dyková et al. 2005a.

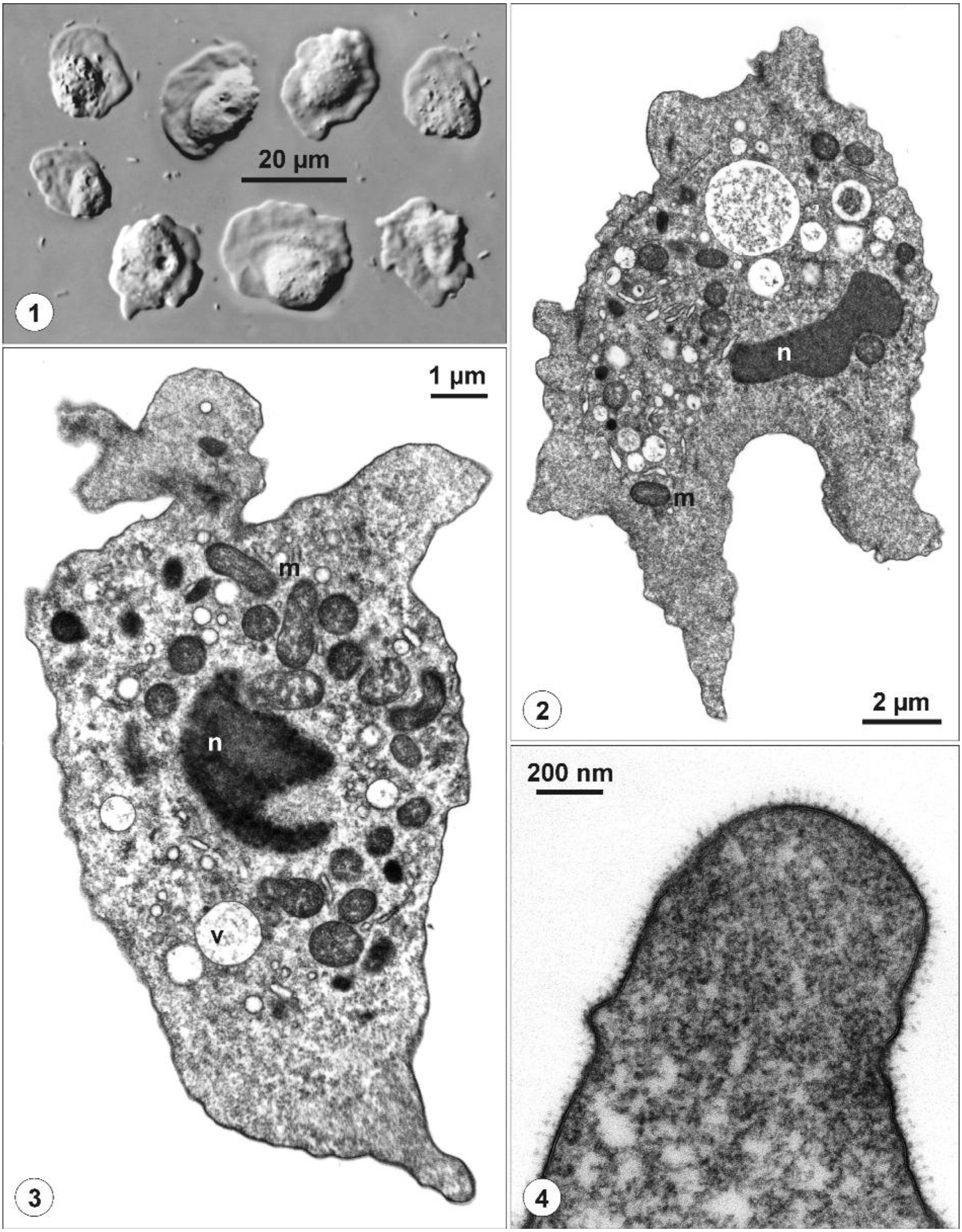

Plate 208. S3M13 strain of *Vannella* sp. isolated from gills of turbot, *Scophthalmus maximus* (L.) farmed in NW Spain; cultured on MY75S agar; stored in CC since 1996; GenBank Acc. No. of SSU rDNA sequence JQ271754. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), vacuole (v). **Fig. 4.** Cell surface with not well definable differentiation of glycocalyx.

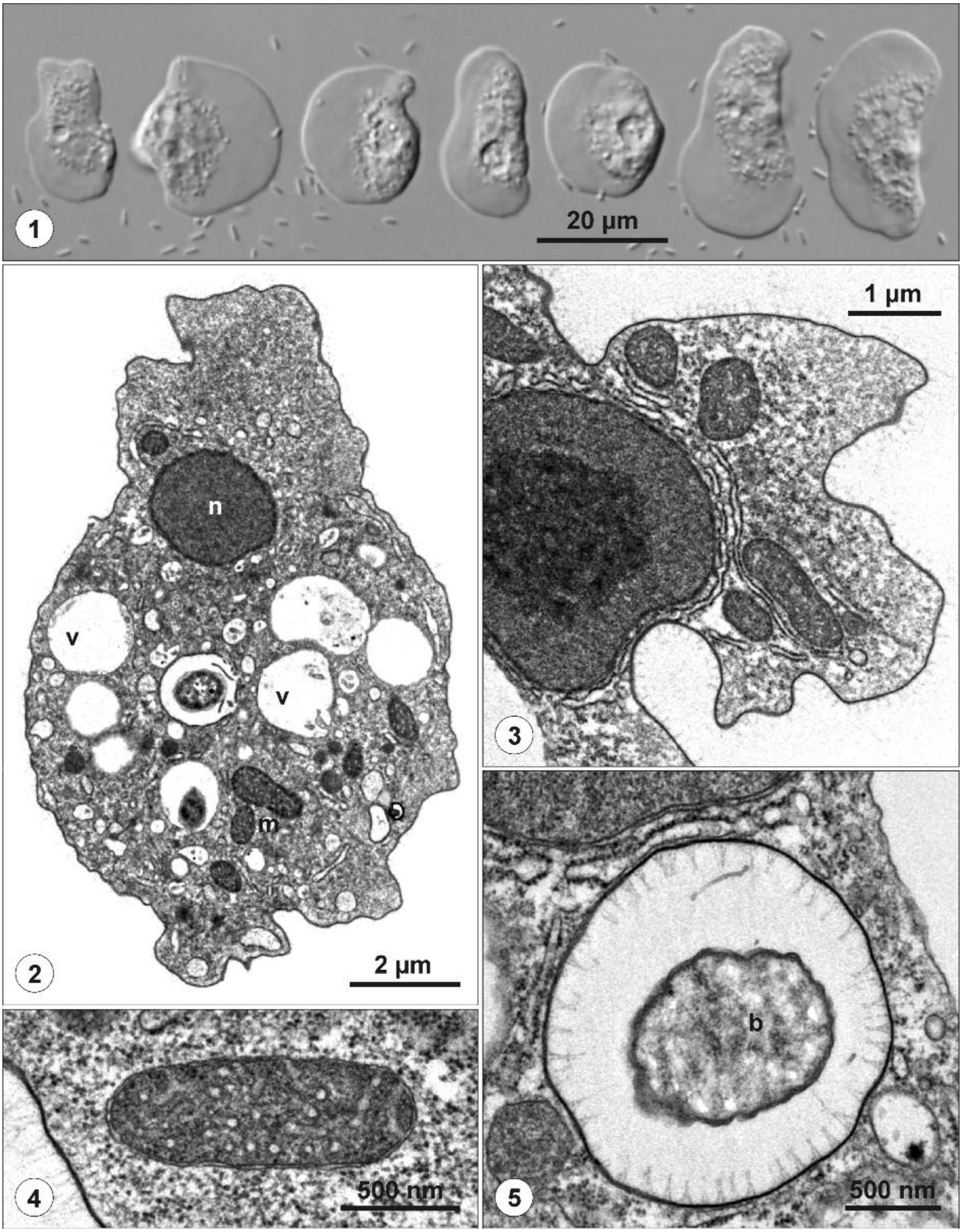

Plate 209. S4M23 strain of *Vannella* sp. isolated from gills of turbot, *Scophthalmus maximus* (L.) farmed in NW Spain; cultured on MY75S agar; stored in CC since 1996; GenBank Acc. No. of SSU rDNA sequence JQ271755**. Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Overview of fine structure of trophozoite: nucleus (n), mitochondria (m), vacuoles (v). **Fig. 3.** Endoplasmic reticulum surrounding nucleus. **Fig. 4.** Mitochondrion with tubular branching cristae. **Fig. 5.** Cell surface of trophozoite with glycocalyx differentiated in glycostyles as seen around phagocytised bacterium (b).

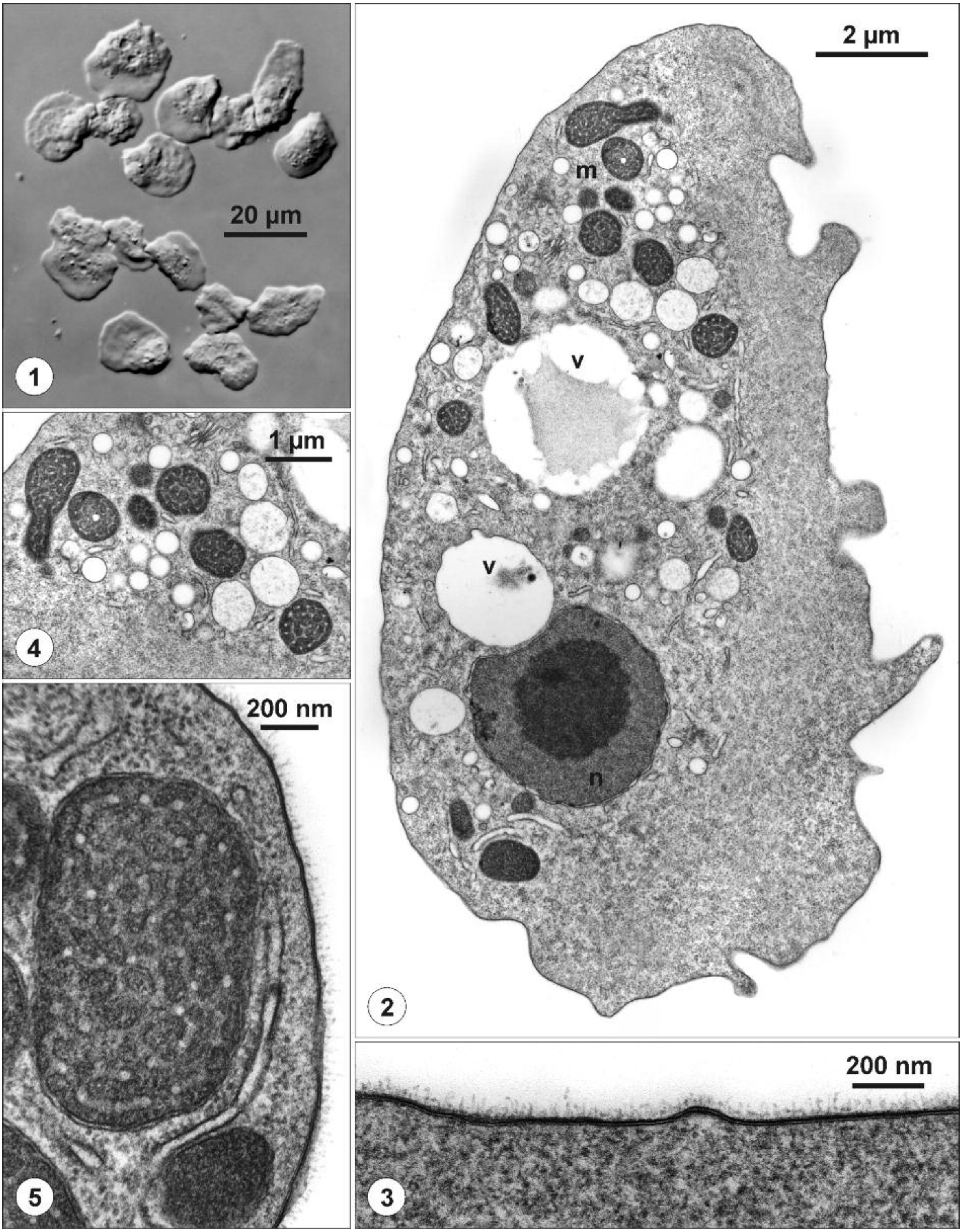

Plate 210. S4M24 strain of *Vannella* sp. isolated from gills of turbot, *Scophthalmus maximus* (L.) farmed in NW Spain; cultured on MY75S agar; stored in CC since 1996; GenBank Acc. No. of SSU rDNA sequence JQ271756. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Overview of fine structure of trophozoite: nucleus (n), mitochondria (m), vacuoles (v). **Fig. 3.** Cell surface of trophozoite with amorphous glycocalyx. **Figs. 4, 5.** Mitochondria with tubular branching cristae.

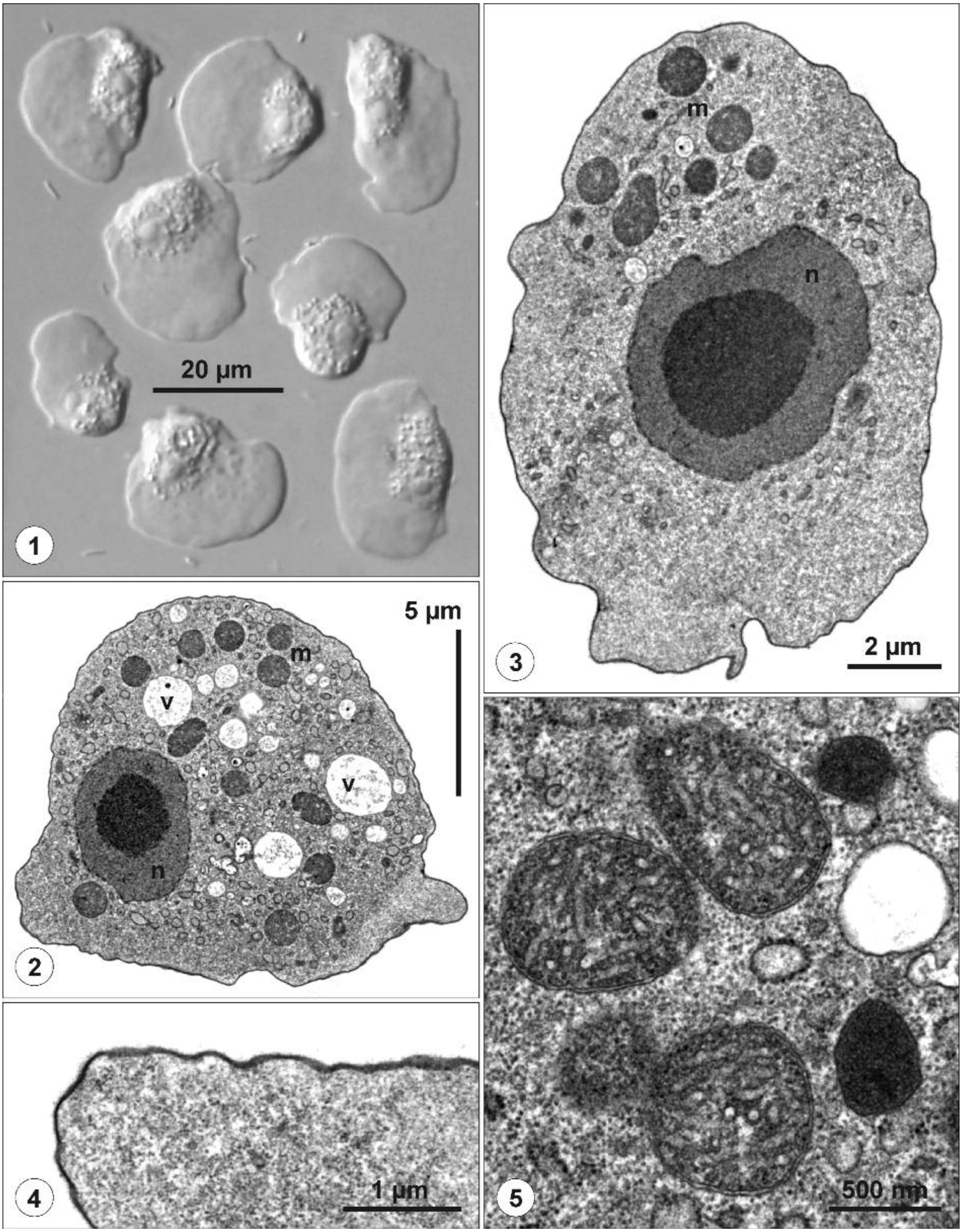

Plate 211. S4M30 strain of *Vannella* sp. isolated from gills of turbot, *Scophthalmus maximus* (L.) farmed in NW Spain; cultured on MY75S agar; stored in CC since 1996; GenBank Acc. No. of SSU rDNA sequence JQ271757. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), vacuoles (v). **Fig. 4.** Cell surface of trophozoite with amorphous glycocalyx. **Fig. 5.** Mitochondria with tubular branching cristae.

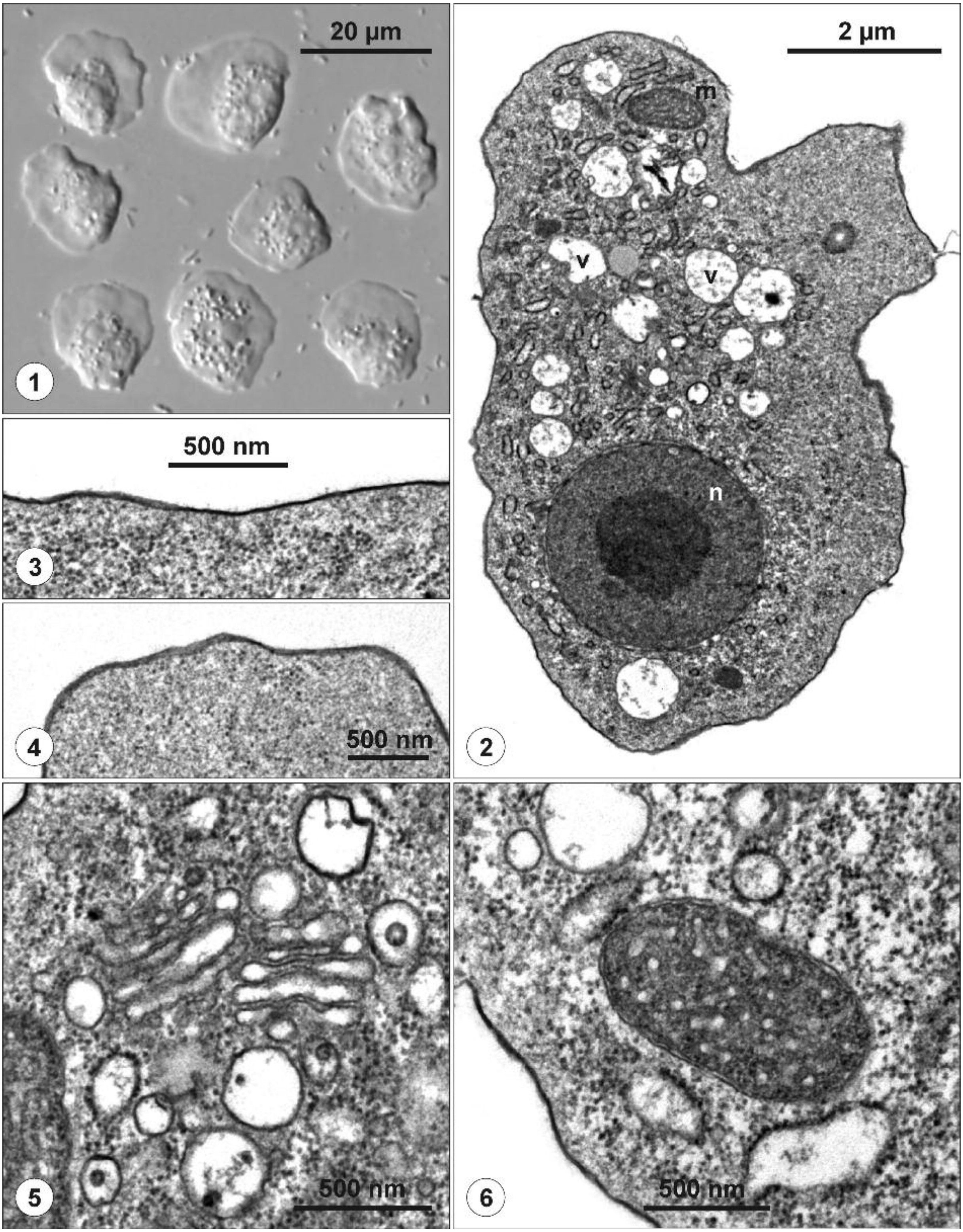

Plate 212. S6M33 strain of *Vannella* sp. isolated from gills of turbot, *Scophthalmus maximus* (L.) farmed in NW Spain; cultured on MY75S agar; stored in CC since 1996; GenBank Acc. No. of SSU rDNA sequence JQ271758. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Overview of fine structure of trophozoite: nucleus (n), mitochondrion (m), vacuoles (v). **Figs. 3, 4.** Cell surface of trophozoite with thin amorphous glycocalyx. **Fig. 5.** Golgi complexes with distended cisternae in parallel arrangement.. **Fig. 6.** Mitochondrion with tubular branching cristae.

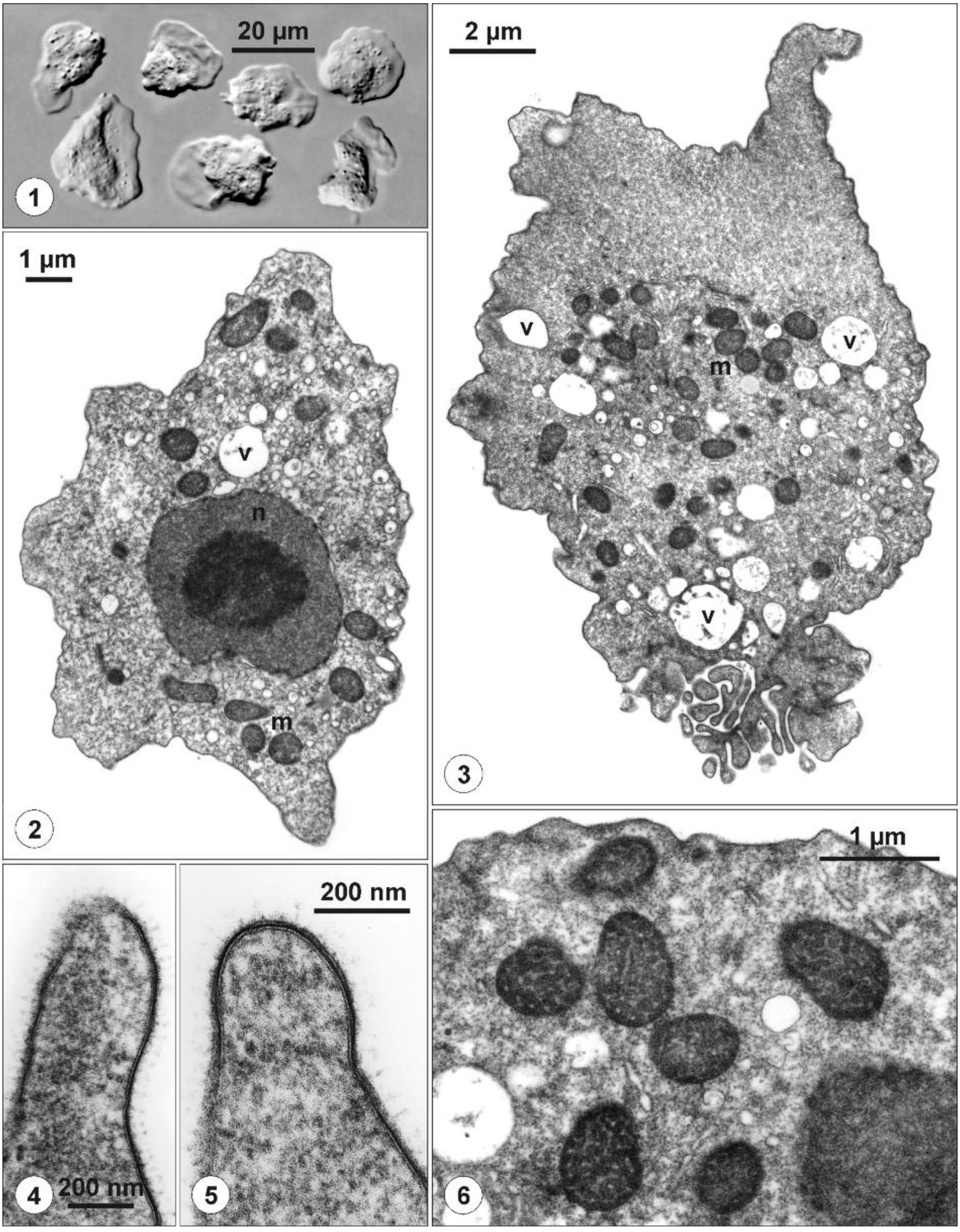

Plate 213. S7M35 strain of *Vannella* sp. isolated from gills of turbot, *Scophthalmus maximus* (L.) farmed in NW Spain; cultured on MY75S agar; stored in CC since 1996; GenBank Acc. No. of SSU rDNA sequence JQ271759. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nucleus (n), mitochondria (m), vacuoles (v). **Figs. 4, 5.** Cell surface with amorphous glycocalyx. **Fig. 6.** Mitochondria with tubular branching cristae.

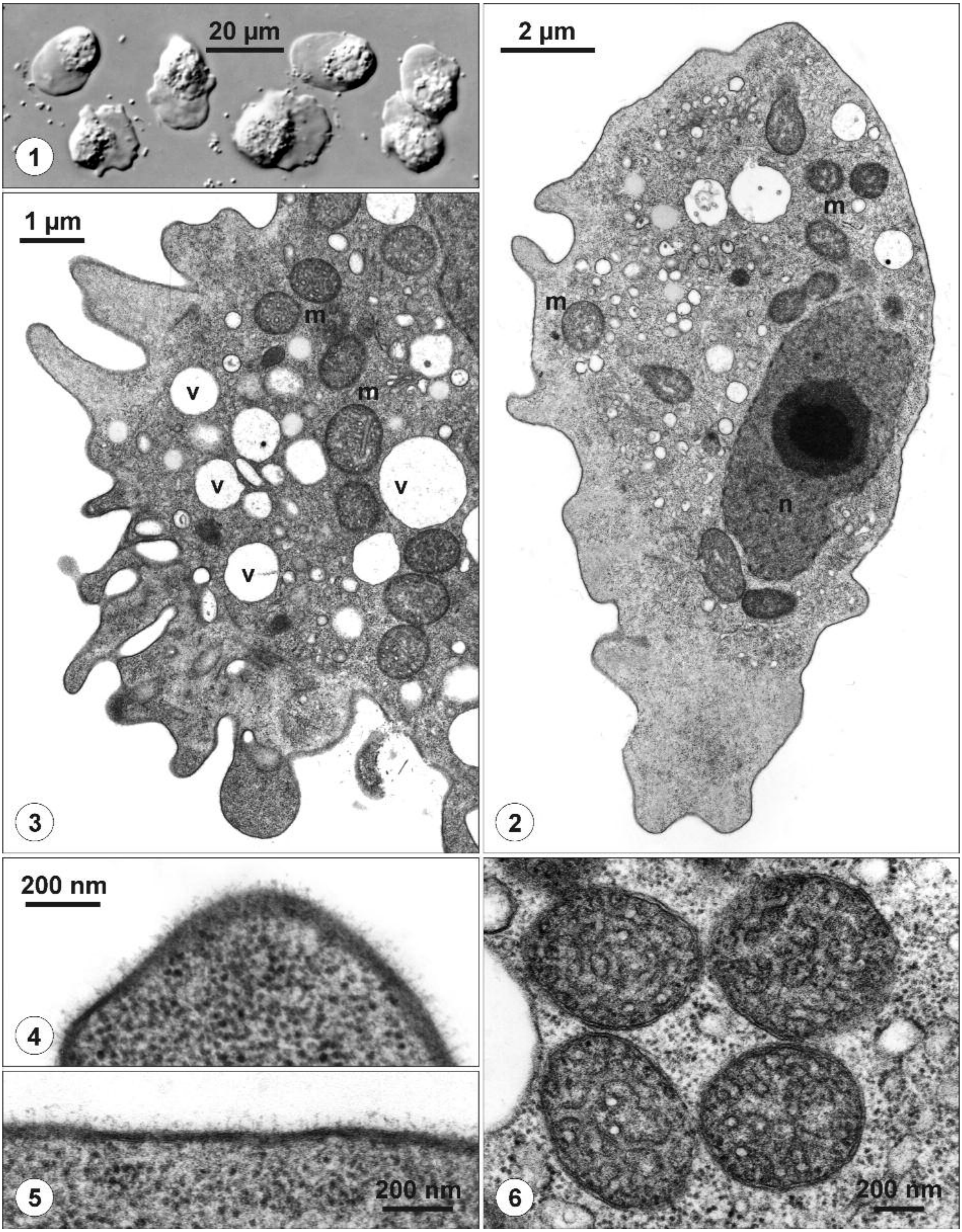

Plate 214. S7M36 strain of *Vannella* sp. isolated from gills of turbot, *Scophthalmus maximus* (L.) farmed in NW Spain; cultured on MY75S agar; stored in CC since 1996; GenBank Acc. No. of SSU rDNA sequence JQ271760. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Overview of fine structure of trophozoite: nucleus (n), mitochondria (m), vacuoles. **Fig. 3.** Part of trophozoite in detail with folds observed in active individuals: mitochondria (m), vacuoles (v). **Figs. 4, 5.** Cell surface with not well definable differentiation of glycocalyx. **Fig. 6.** Mitochondria with tubular branching cristae.

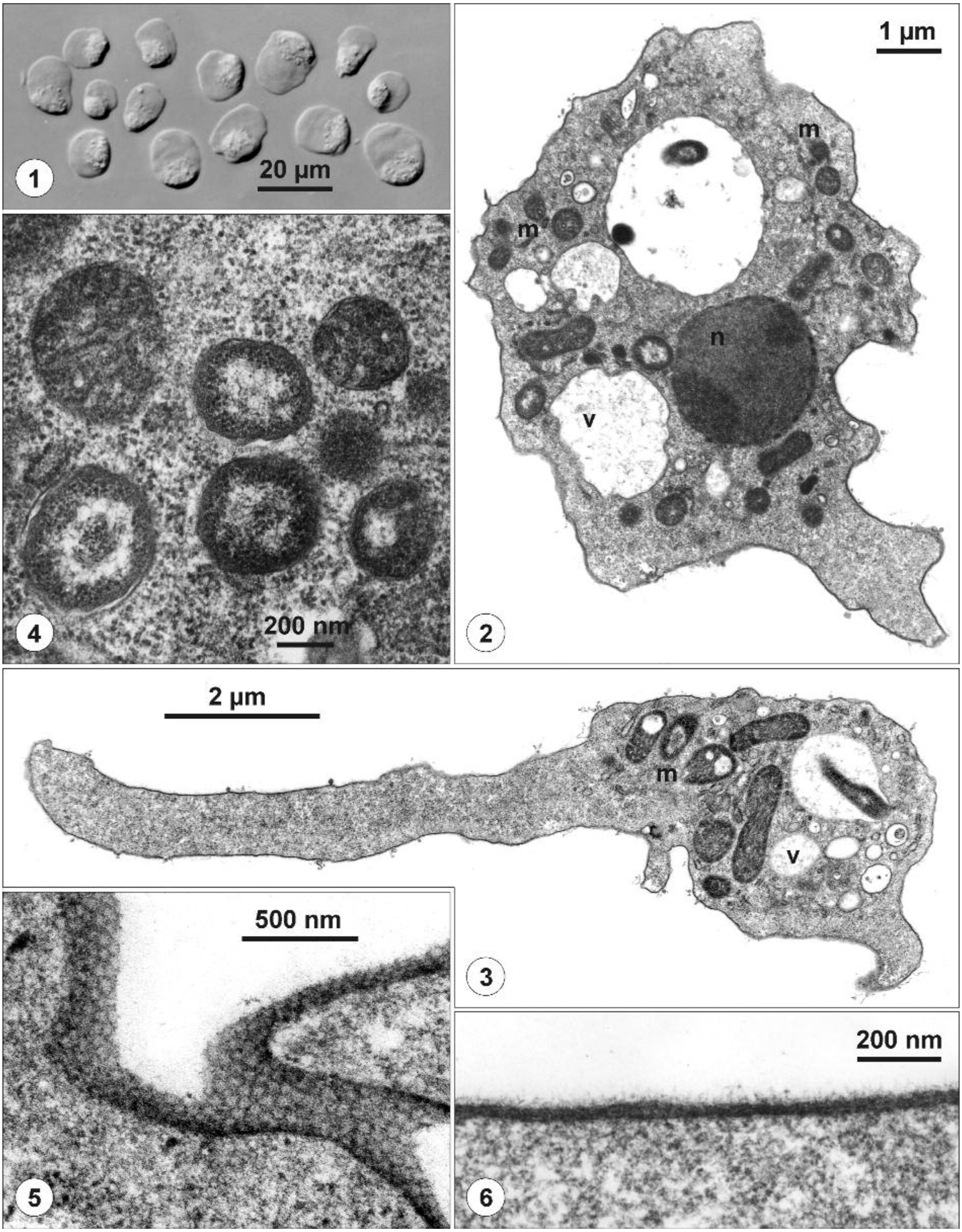

Plate 215. S98M54F strain of *Vannella* sp. isolated from gills of turbot, *Scophthalmus maximus* (L.) farmed in NW Spain; cultured on MY75S agar; stored in CC since 1998; GenBank Acc. No. of SSU rDNA sequence JQ271761. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nucleus (n), mitochondria (m), vacuoles (v). **Fig. 4.** Mitochondrion (upper left corner) and symbiotic bacteria in cytoplasm. **Figs. 5, 6.** Cell surface: glycocalyx with amorphous appearance in longitudinal section (Fig. 6) and clearly differentiated as seen in tangential section (Fig. 5).

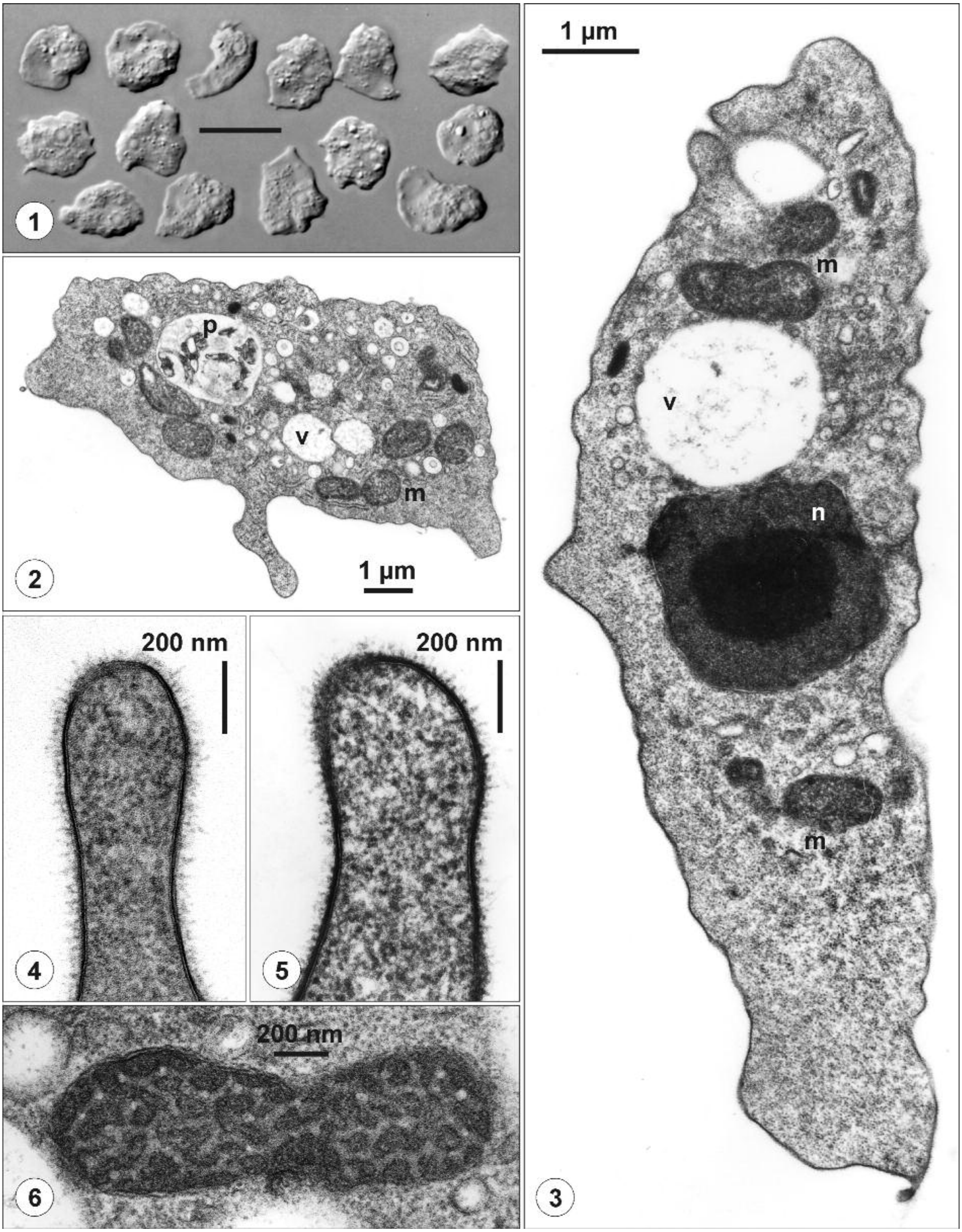

Plate 216. S98M7 strain of *Vannella* sp. isolated from gills of turbot, *Scophthalmus maximus* (L.) farmed in, NW Spain; cultured on MY75S agar; stored in CC since 1998; GenBank Acc. No. of SSU rDNA sequence JQ271762. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC), scale bar = 20 µm. **Figs. 2, 3.** Overview of fine structure of trophozoites: nucleus (n), mitochondria (m), phagosome (p), vacuoles (v). **Figs. 4, 5.** Cell surface with glycocalyx differentiated in short glycostyles. **Fig. 6.** Mitochondrion with tubular branching cristae.

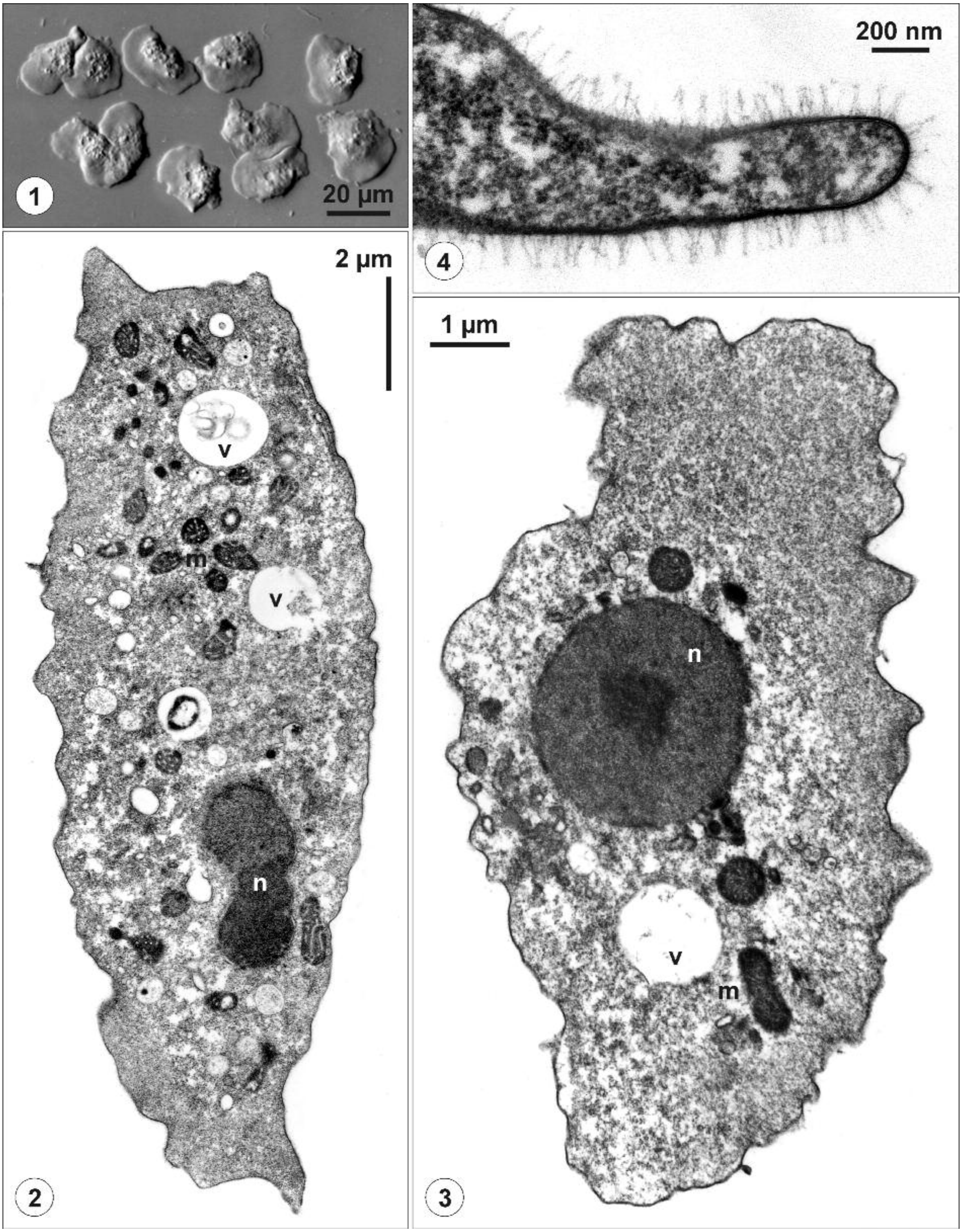

Plate 217. S98M8 strain of *Vannella* sp. isolated from gills of turbot, *Scophthalmus maximus* (L.) farmed in NW Spain; cultured on MY75S agar; stored in CC since 1998; GenBank Acc. No. of SSU rDNA sequence AY929906, ITS AY929926. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), vacuoles (v). **Fig. 4.** Cell surface with glycocalyx differentiated in glycostyles. Ref.: Dyková et al. 2005a.

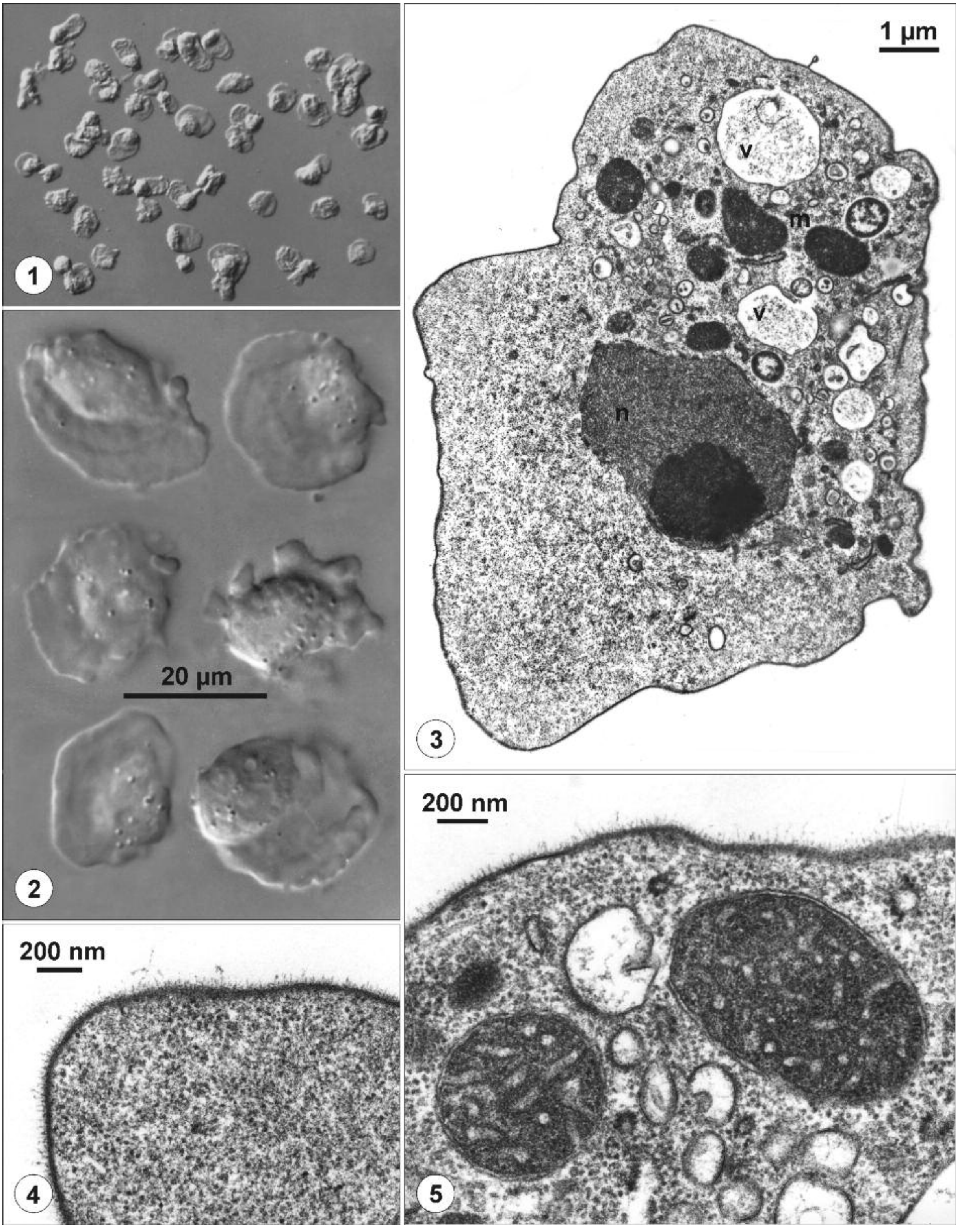

Plate 218. SBV1 strain of *Vannella* sp. isolated from gas bladder content of European seabass, *Dicentrarchus labrax* (L.) farmed in Sicily, Italy; cultured on MY75S agar; stored in CC since 1997; GenBank Acc. No. of SSU rDNA sequence AY929917, ITS AY929933. **Figs. 1, 2.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 3.** Overview of fine structure of trophozoite: nucleus (n), food vacuoles (v), mitochondria (m). **Fig. 4.** Cell surface of trophozoite with not well definable differentiation of glycocalyx. **Fig. 5.** Mitochondria with tubular branching cristae. Ref.: Dyková et al. 2005a.

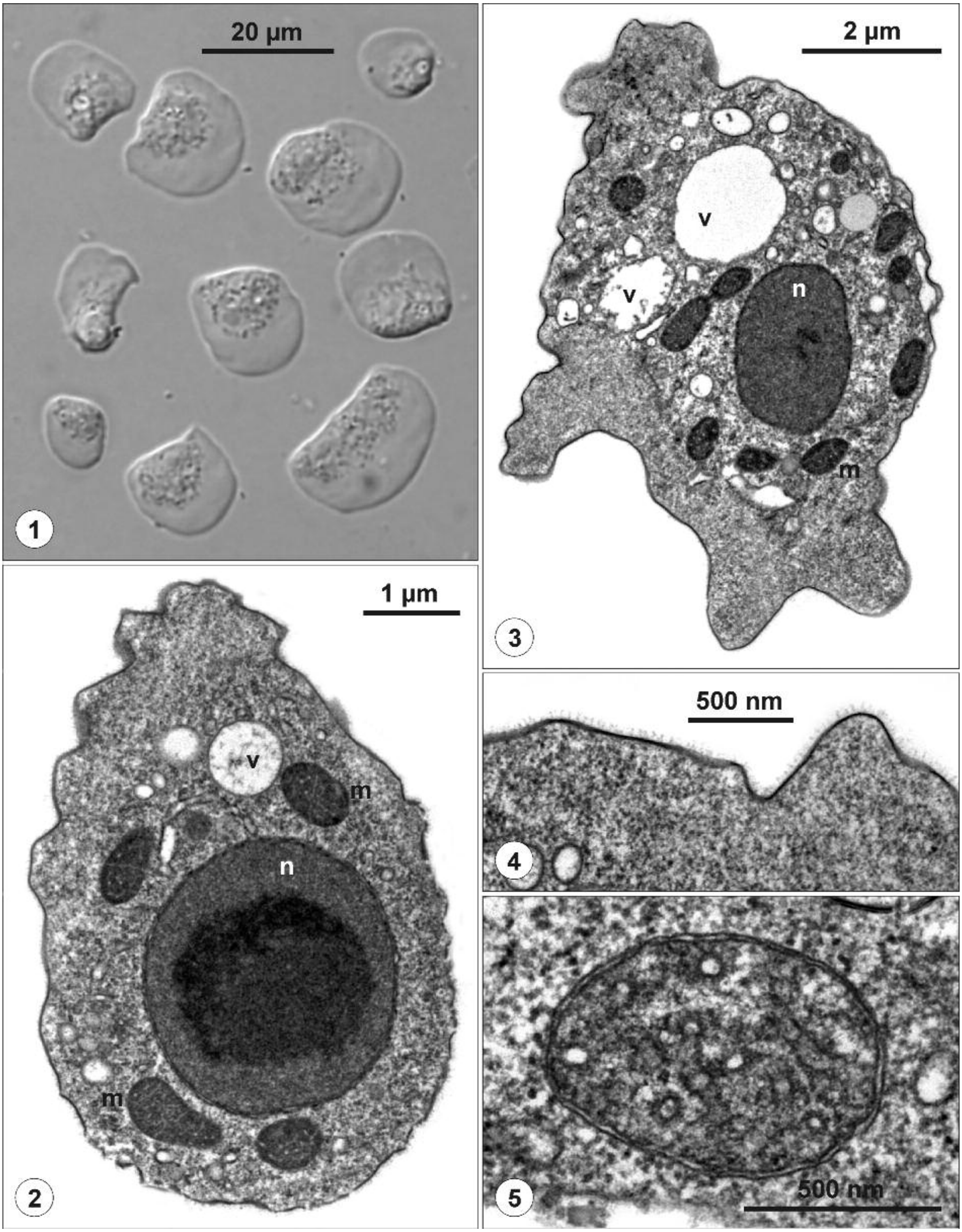

Plate 219. SEDFS strain of *Vannella* sp. isolated from sediments under Atlantic salmon sea-cages in Stringers Cove, Tasman Peninsula, Australia; cultured on MY75S agar; stored in CC since 2003; GenBank Acc. No. of SSU rDNA sequence JQ271763. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), vacuoles (v). **Fig. 4.** Cell surface of trophozoite with thin glycocalyx differentiated in glycostyles. **Fig. 5.** Mitochondrion with tubular cristae.

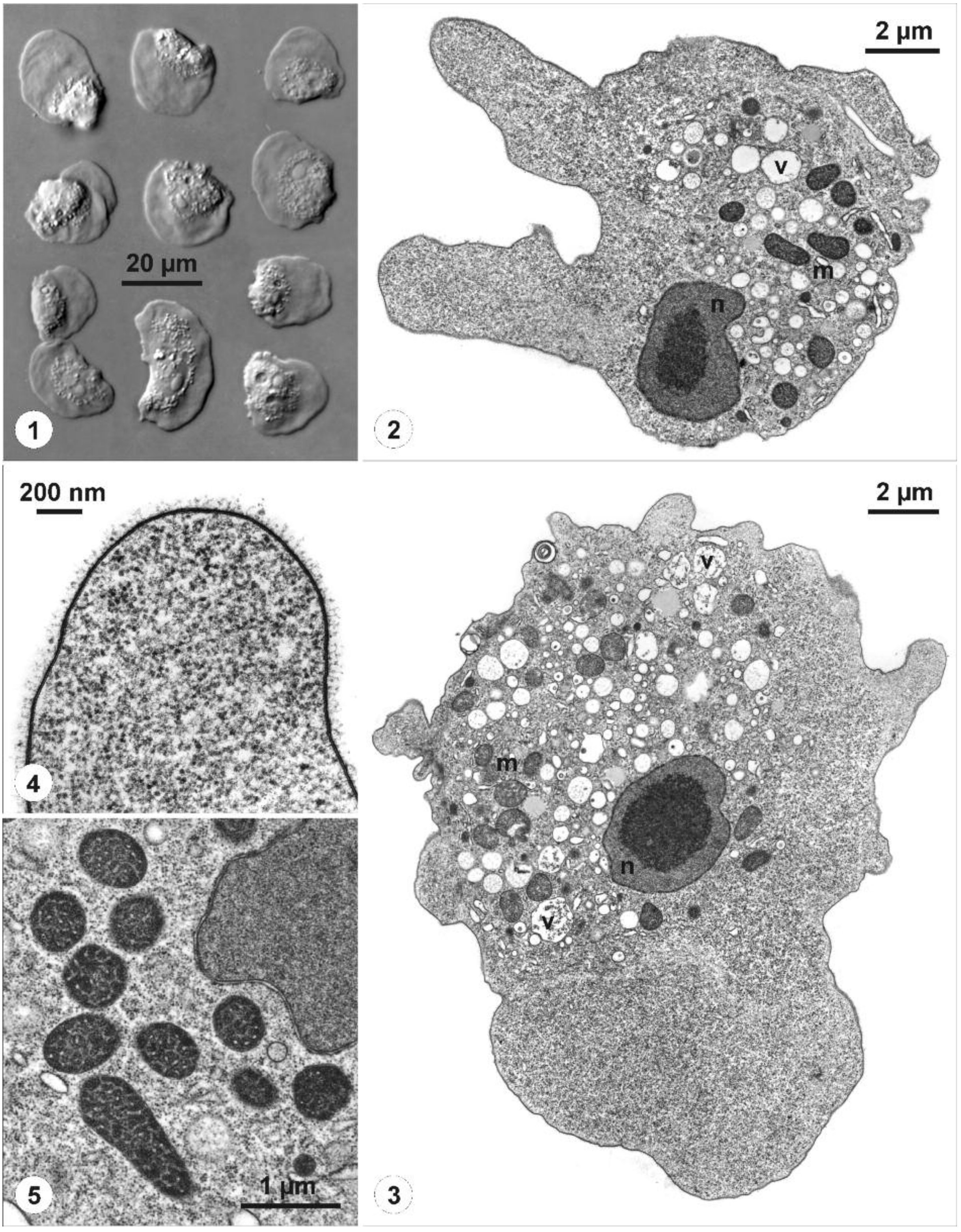

Plate 220. SMA13V strain of *Vannella* sp. isolated from gills of turbot, *Scophthalmus maximus* (L.) farmed in NW Spain; cultured on MY75S agar; stored in CC since 2000; GenBank Acc. No. of SSU rDNA sequence JQ271764. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), vacuoles (v). **Fig. 4.** Cell surface of trophozoite with thin glycocalyx differentiated in glycostyles (not well preserved). **Fig. 5.** Mitochondria with tubular branching cristae.

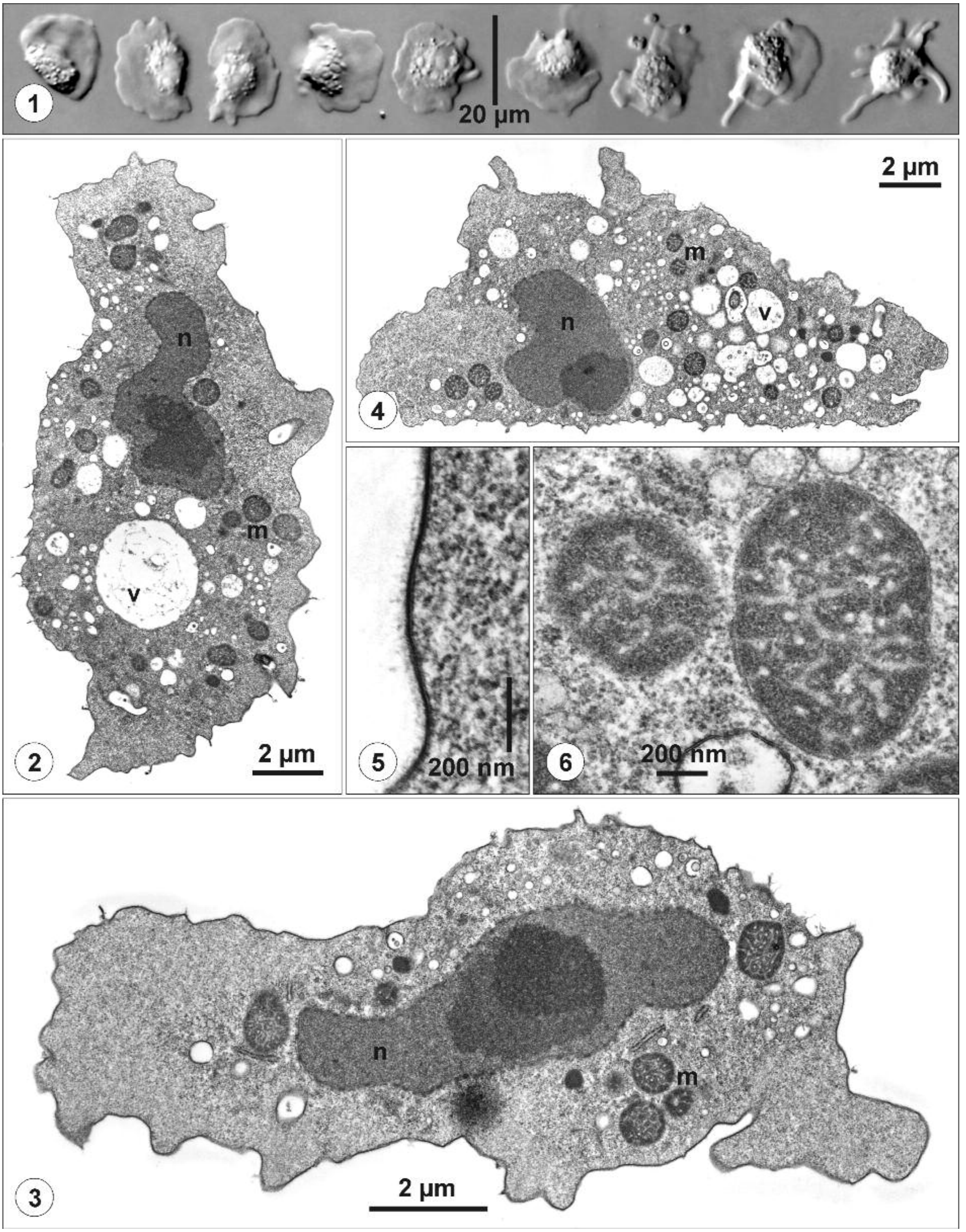

Plate 221. SMA26 strain of *Vannella* sp. isolated from gills of turbot, *Scophthalmus maximus* (L.) farmed in NW Spain; cultured on MY75S agar; stored in CC since 2000; GenBank Acc. No. of SSU rDNA sequence JQ271765. **Fig. 1.** Trophozoites, including floating stage (extreme right), as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3. 4.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), vacuoles (v). **Fig. 5.** Cell surface with thin amorphous glycocalyx. **Fig. 6.** Mitochondria with tubular branching cristae.

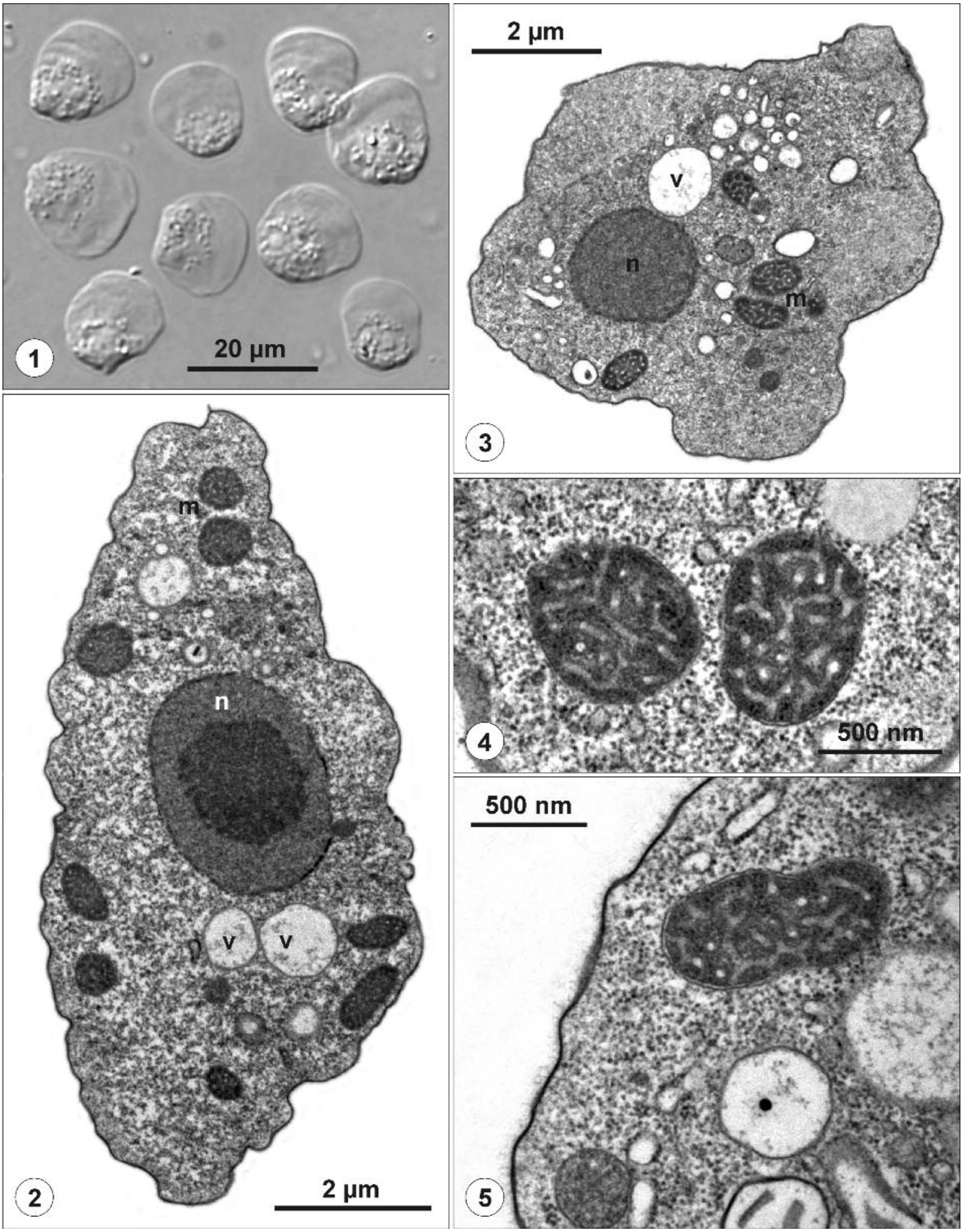

Plate 222. SMA30 strain of *Vannella* sp. isolated from gills of turbot, *Scophthalmus maximus* (L.) farmed in NW Spain; cultured on MY75S agar; stored in CC since 2000; GenBank Acc. No. of SSU rDNA sequence JQ271766. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), vacuoles (v). **Fig. 4.** Mitochondria with tubular branching cristae. **Fig. 5.** Cell surface of trophozoite with thin amorphous glycocalyx.

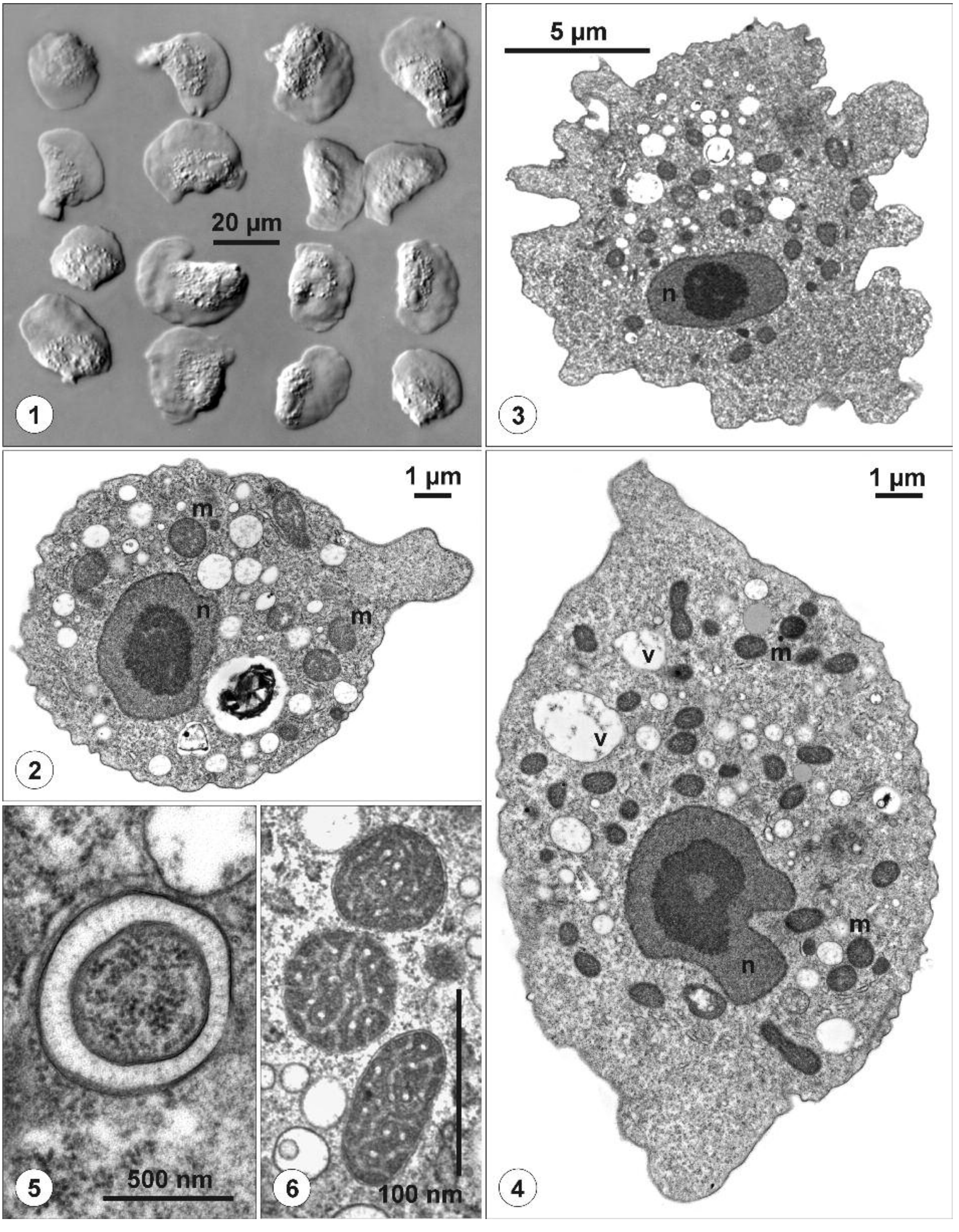

Plate 223. SMA7V strain of *Vannella* sp. isolated from gills of turbot, *Scophthalmus maximus* (L.) farmed in NW Spain; cultured on MY75S agar; stored in CC since 2000; GenBank Acc. No. of SSU rDNA sequence JQ271767. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3, 4.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), vacuoles (v). **Fig. 5.** Cell surface of trophozoite with glycocalyx differentiated in glycostyles as seen around phagocytised bacterium). **Fig. 6.** Mitochondria with tubular branching cristae.

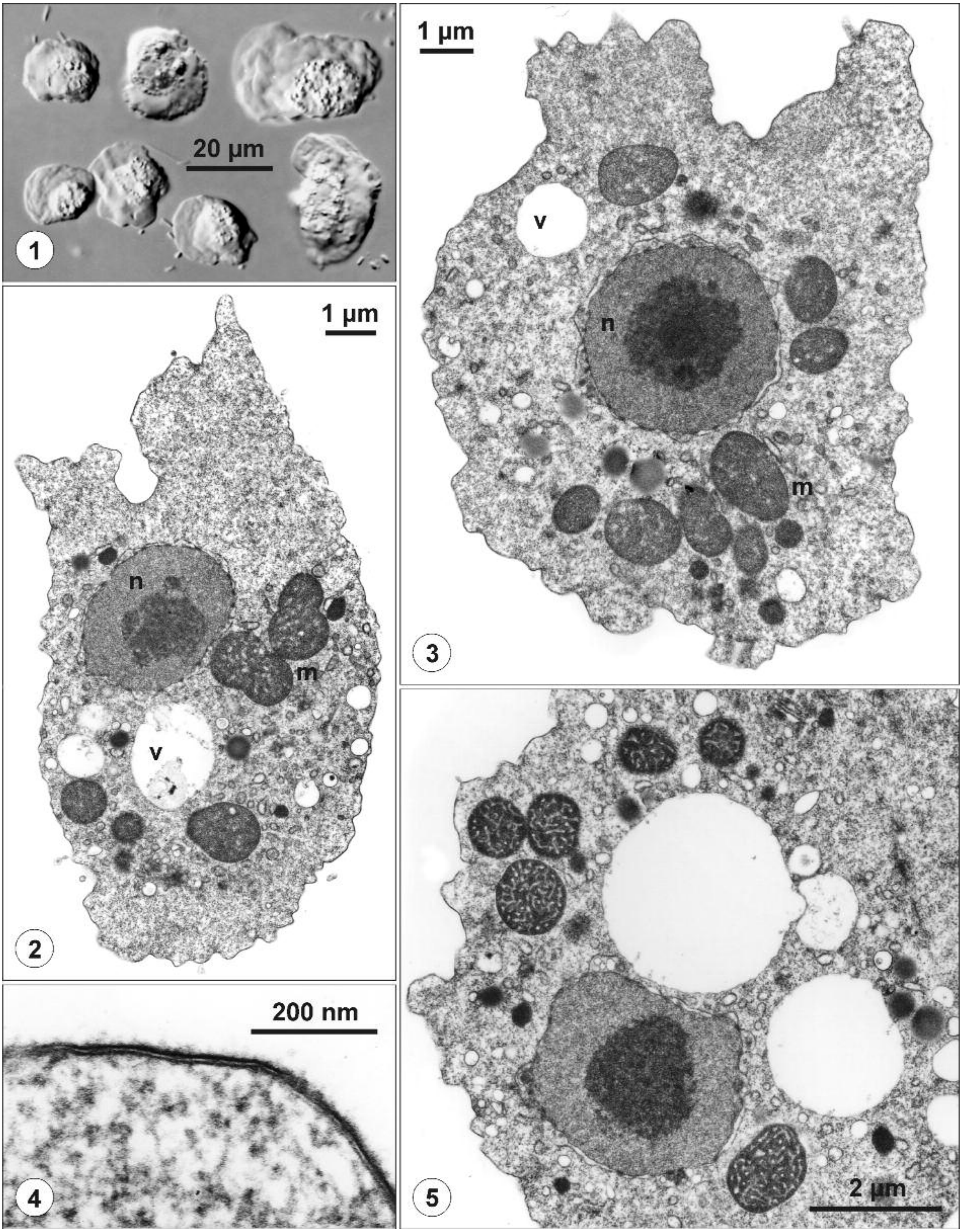

Plate 224. SS8FJ1 strain of *Vannella* sp. isolated from gills of Atlantic salmon, *Salmo salar* L. farmed in Farad, Ireland; cultured on MY75S agar; stored in CC since 2000; GenBank Acc. No. of SSU rDNA sequence AY929915, ITS AY929931. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), vacuoles (v). **Fig. 4.** Cell surface with amorphous glycocalyx. **Fig. 5.** Mitochondria with tubular branching cristae, nucleus and vacuoles. Ref.: Dyková et al. 2005a.

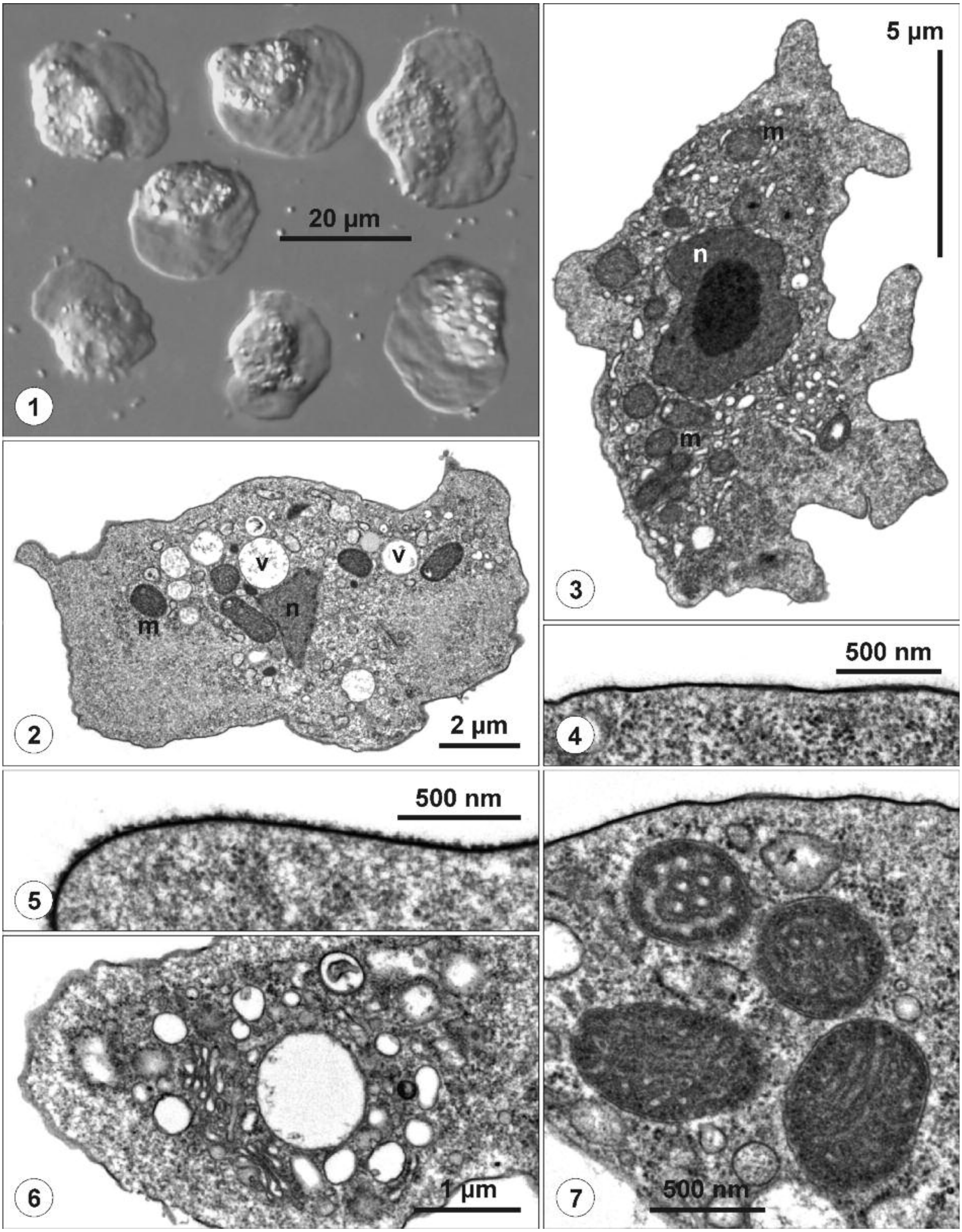

Plate 225. SYM43 strain of *Vannella* sp. isolated from gills of turbot, *Scophthalmus maximus* (L.) farmed in NW Spain; cultured on MY75S agar; stored in CC since 1996; GenBank Acc. No. of SSU rDNA sequence JQ271768. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), vacuoles (v). **Figs. 4, 5.** Cell surface of trophozoite with amorphous glycocalyx. **Fig. 6.** Golgi complexes in vicinity of large vacuole. **Fig. 7.** Mitochondria with tubular branching cristae.

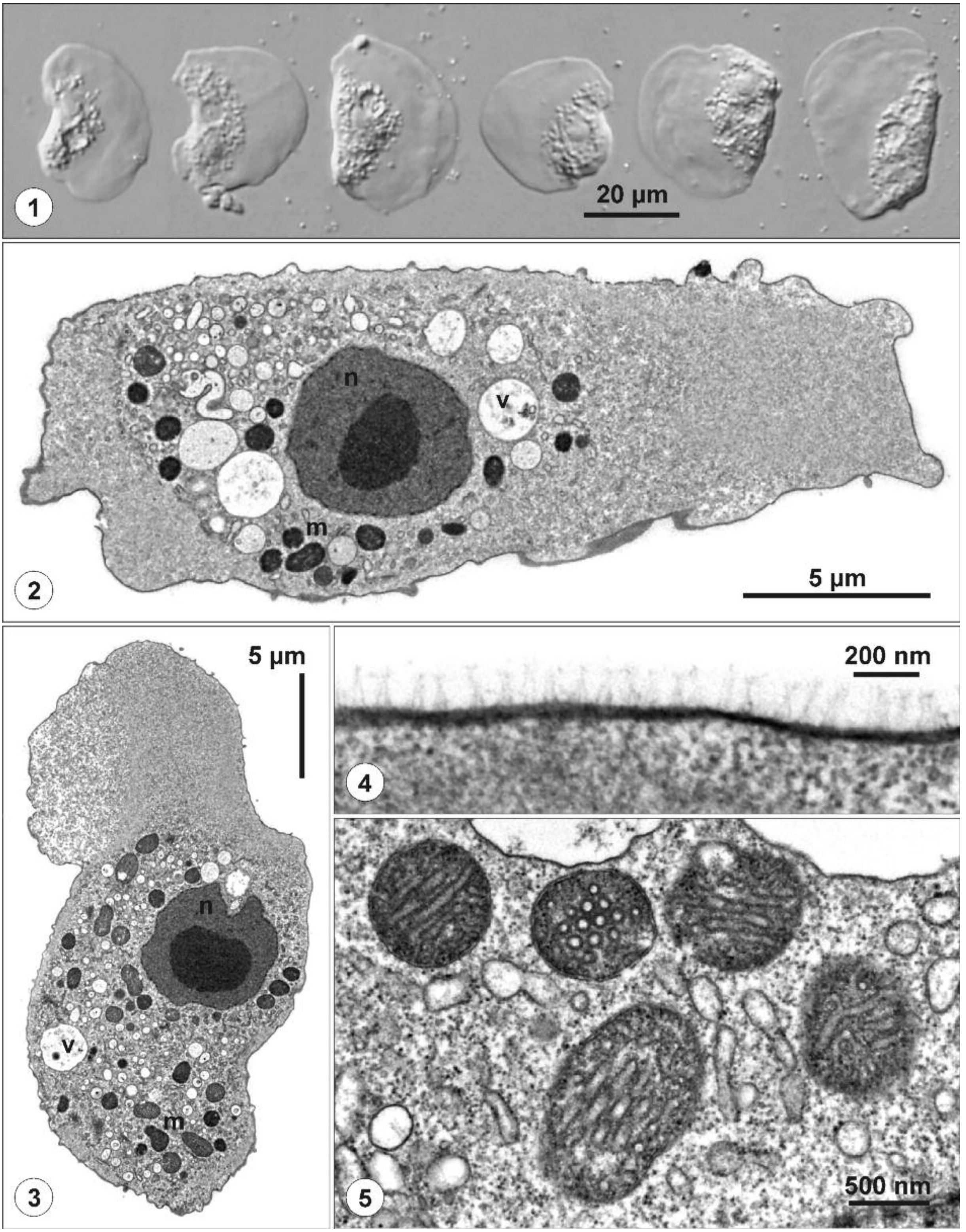

Plate 226. T02 strain of *Vannella* sp. isolated from gills of Southern bluefin tuna, *Thunnus maccoyii* (Castelnau), Tasmania, Australia; cultured on MY75S agar; stored in CC since 2007; GenBank Acc. No. of SSU rDNA sequence JQ271769. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), vacuoles (v). **Fig. 4.** Cell surface of trophozoite with glycocalyx differentiated in glycostyles (not well preserved). **Fig. 5.** Mitochondria with tubular cristae.

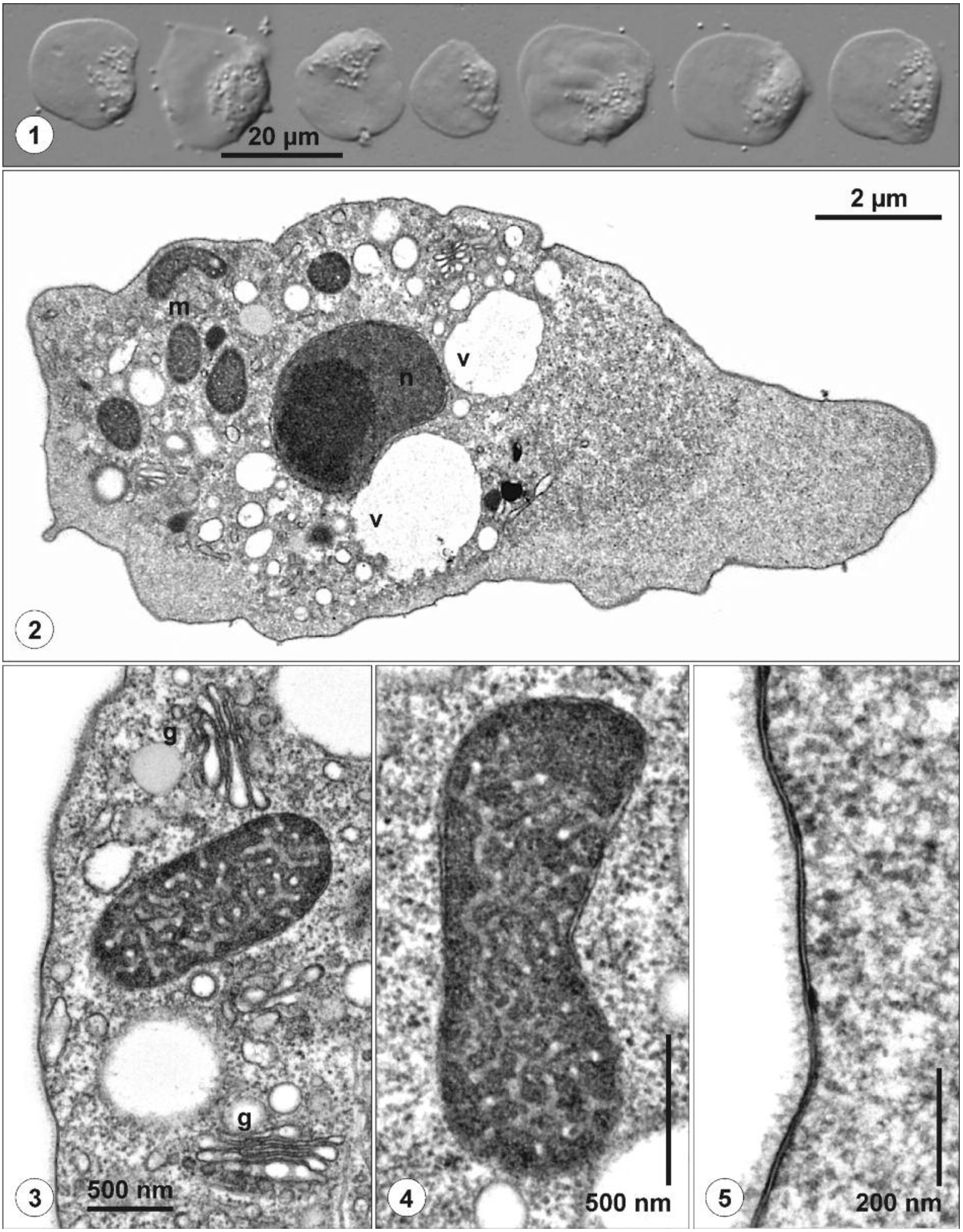

Plate 227. ULLAP strain of *Vannella* sp. isolated from sample of sand collected on beach in Ullapool harbour, Scotland, UK; cultured on MY75S agar; stored in CC since 2007; GenBank Acc. No. of SSU rDNA sequence JQ271770. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Overview of fine structure of trophozoite: nucleus (n), mitochondria (m), vacuoles (v). **Fig. 3.** Mitochondrion with tubular branching cristae and two Golgi complexes (g). **Fig. 4.** Mitochondrion with tubular branching cristae in detail. **Fig. 5.** Cell surface of trophozoite with not well defined differentiation of glycocalyx.

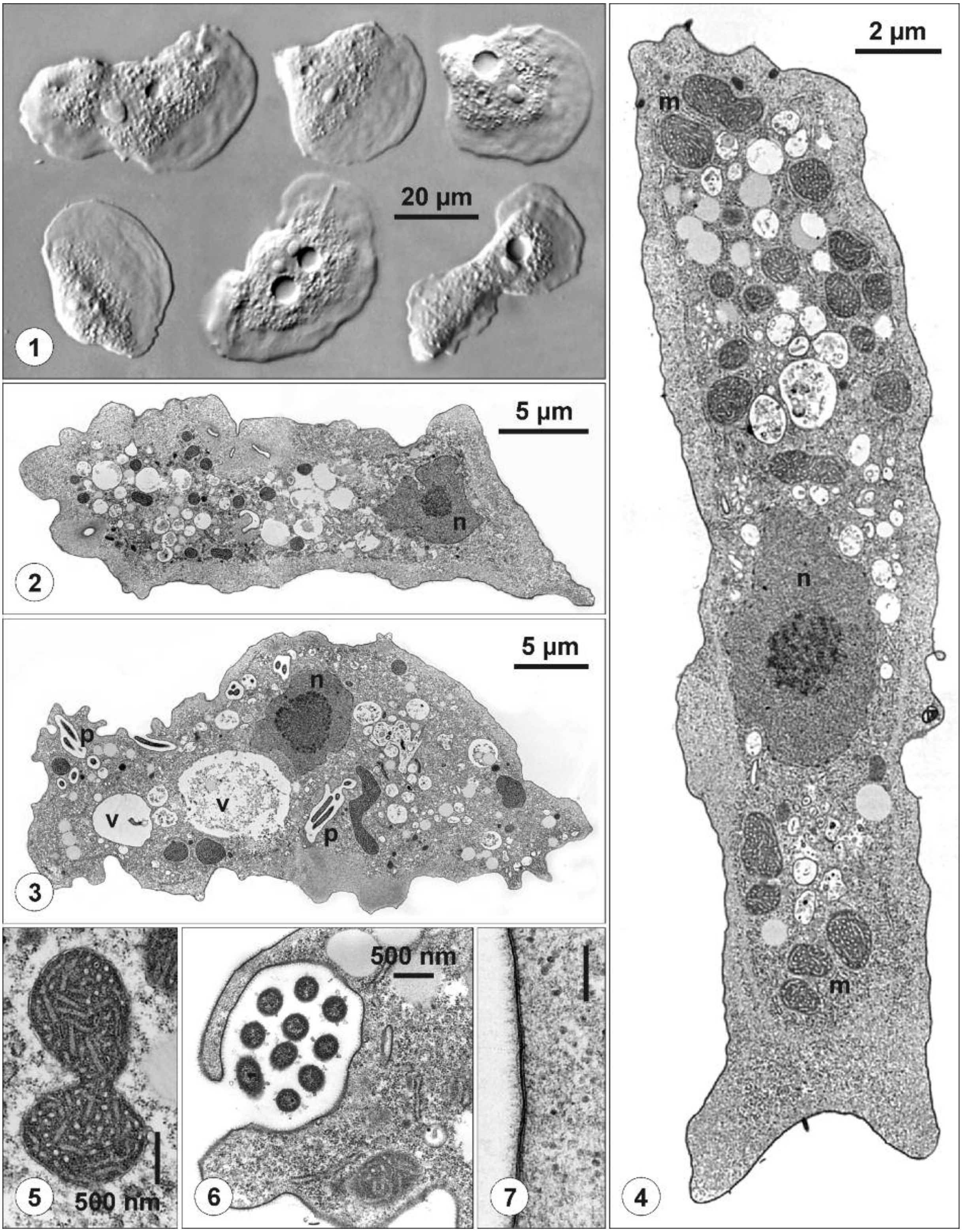

Plate 228. VV strain of *Vannella* sp. of unknown origin (subcultured and examined using light and transmission electron microscopy for colleagues from Germany); cultured on NN agar; stored in CC since 2001; GenBank Acc. No. of SSU rDNA sequence AY929923, ITS AQY929937. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3, 4.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosomes (p), vacuoles (v). **Fig. 5.** Mitochondrion with tubular cristae. **Fig. 6.** Cell surface of trophozoite as seen around phagocytised bacteria. **Fig. 7.** Cell surface of trophozoite with amorphous glycocalyx in detail, scale bar = 200 µm.

Vexillifera Schaeffer, 1926

Plates 229–239

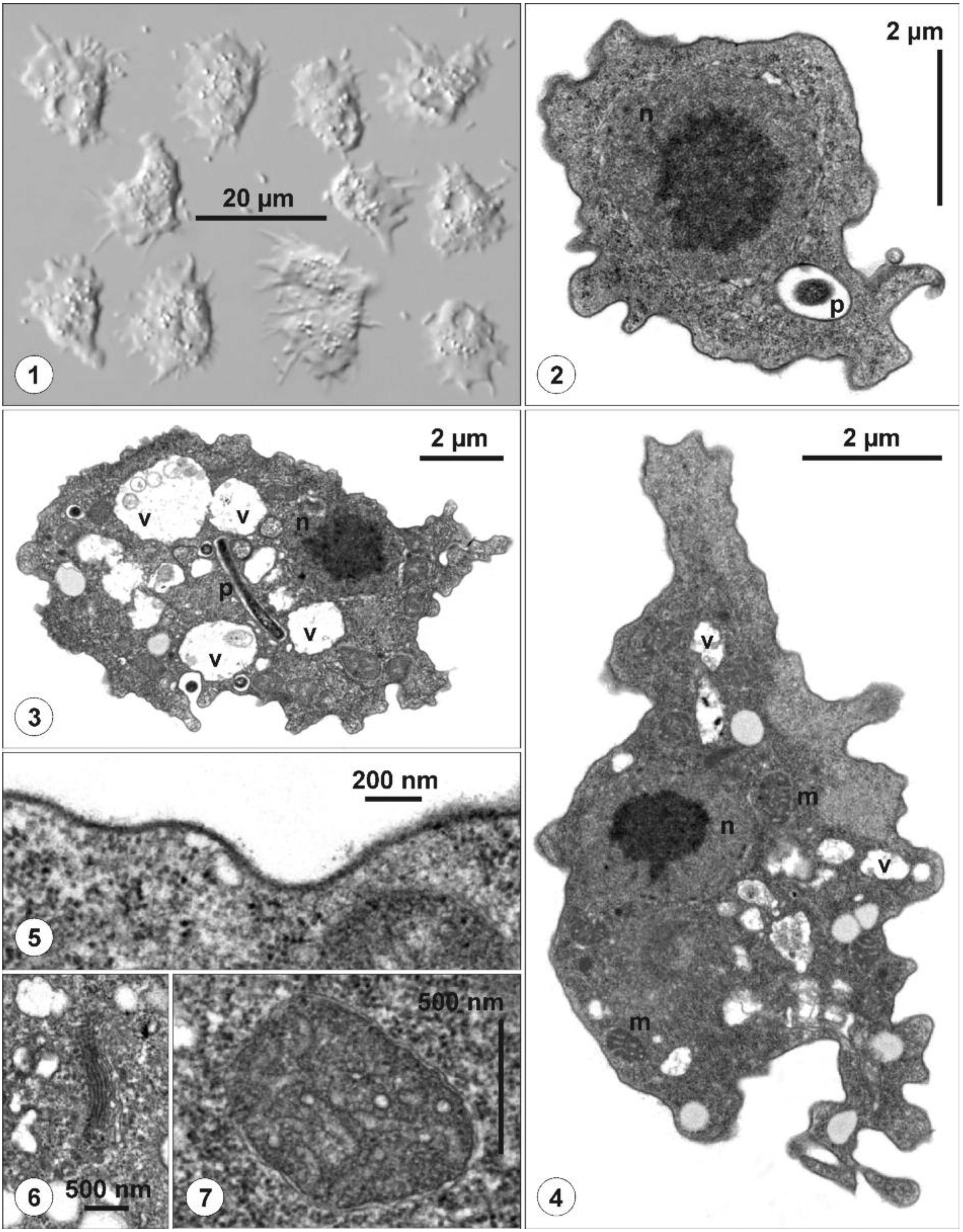

Plate 229. 1HZ strain of *Vexillifera bacillipedes* isolated from gills of bitterling, *Rhodeus sericeus* (Pallas) from natural pool in Lanžhot, South Moravia, Czech Republic; cultured on NN agar; stored in CC since 1998; GenBank Acc. No. of SSU rDNA sequence JQ271771. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3, 4.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosomes (p), vacuoles (v). **Fig 5.** Cell surface with amorphous glycocalyx. **Fig. 6.** Golgi complex. **Fig. 7.** Mitochondrion with tubular branching cristae.

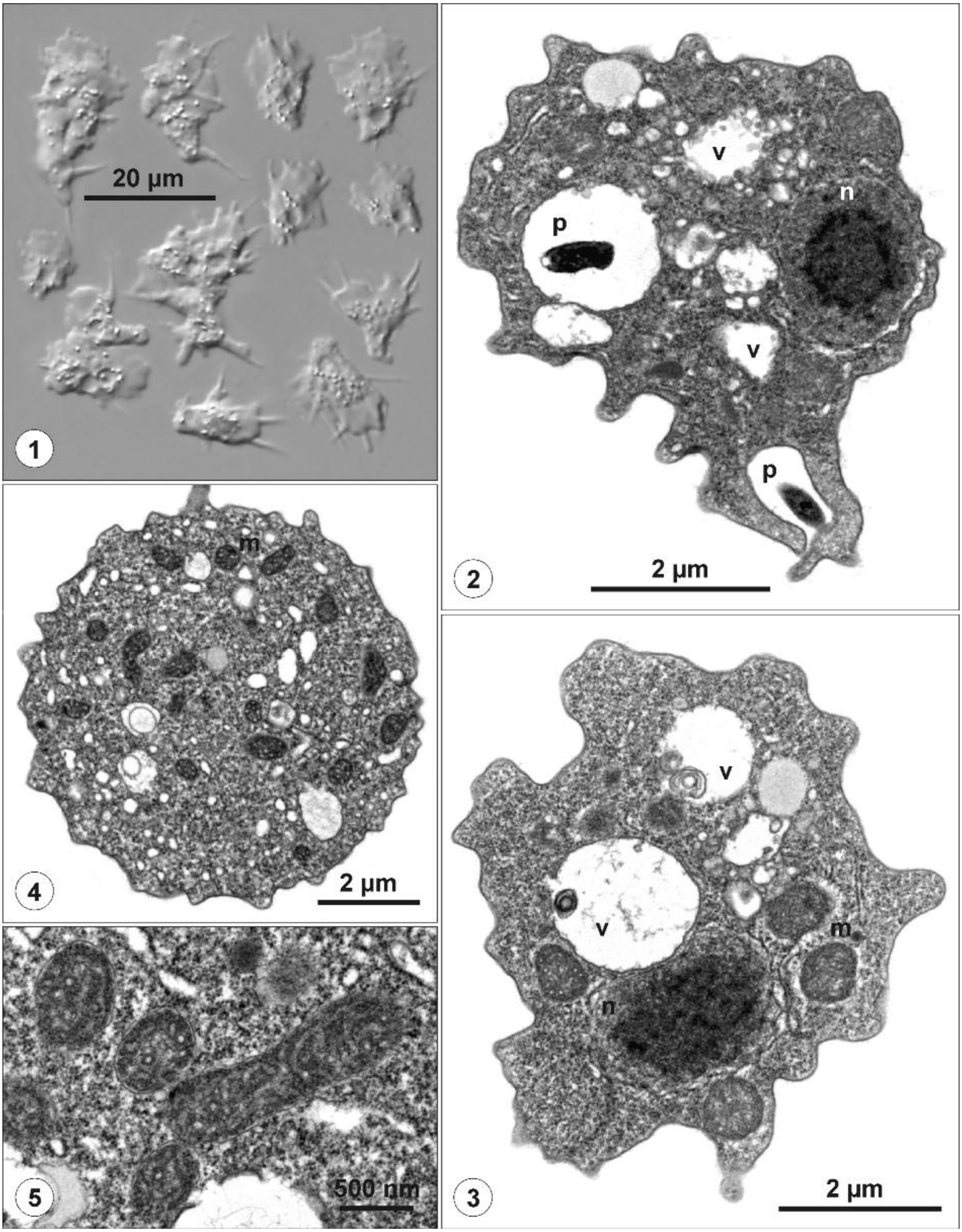

Plate 230. 6HZM strain of *Vexillifera bacillipedes* isolated from gills of bitterling, *Rhodeus sericeus* (Pallas) from natural pool in Lanžhot, South Moravia, Czech Republic; cultured on NN agar; stored in CC since 1998; GenBank Acc. No. of SSU rDNA sequence JQ271772. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3, 4.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosomes (p), vacuoles (v), **Fig. 5.** Mitochondria with tubular cristae.

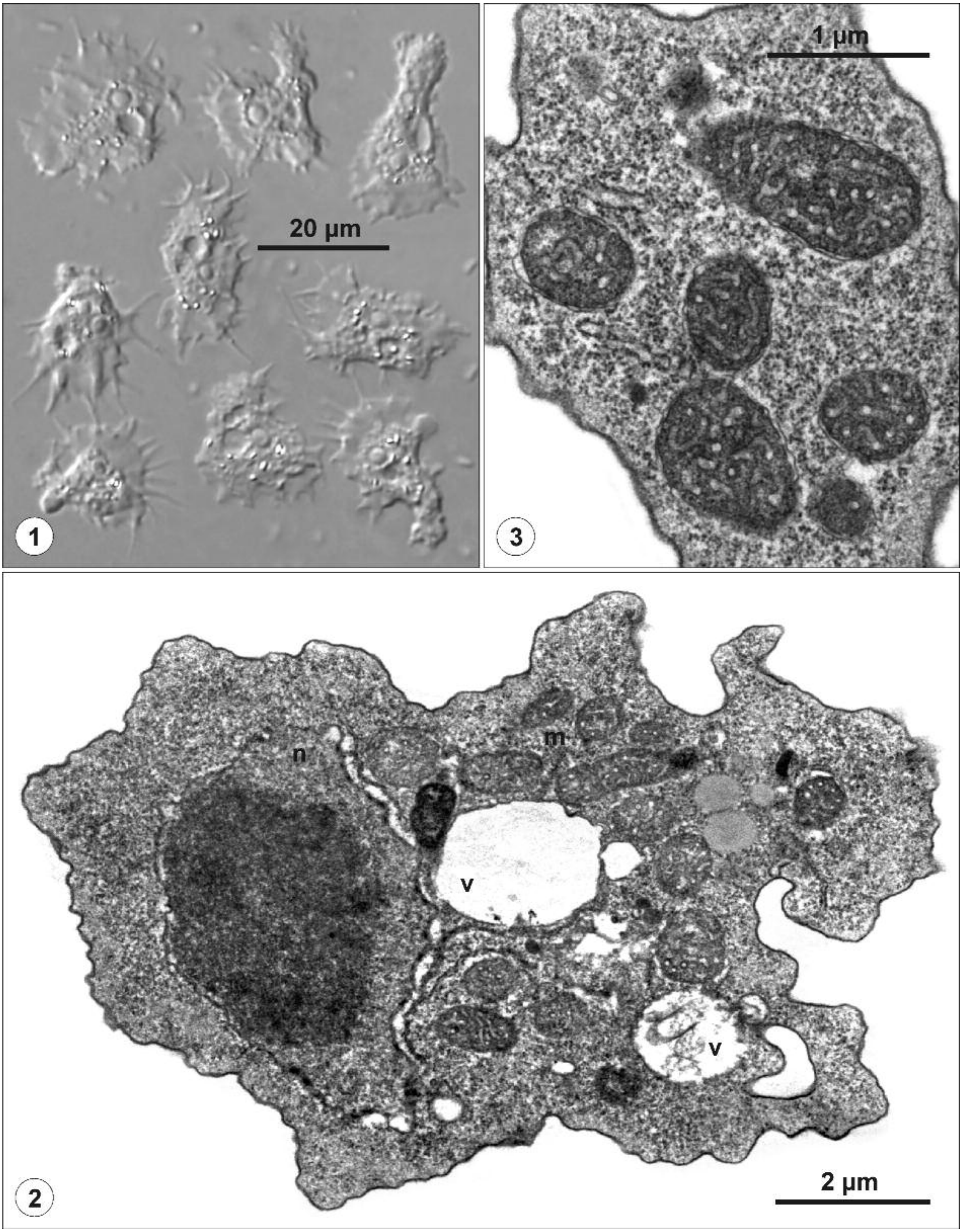

Plate 231. CCAP 1590/1. Type strain of *Vexillifera bacillipedes* obtained from UKNCC for comparison and sequencing; cultured on NN agar; stored in CC since 2000; GenBank Acc. No. of SSU rDNA sequence HQ687485. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Overview of trophozoite ultrastructure with prominent nucleus (n), numerous mitochondria (m) and vacuoles (v). **Fig. 3.** Detail of ultrastructure of mitochondria containing tubular branching cristae. (Cont.)

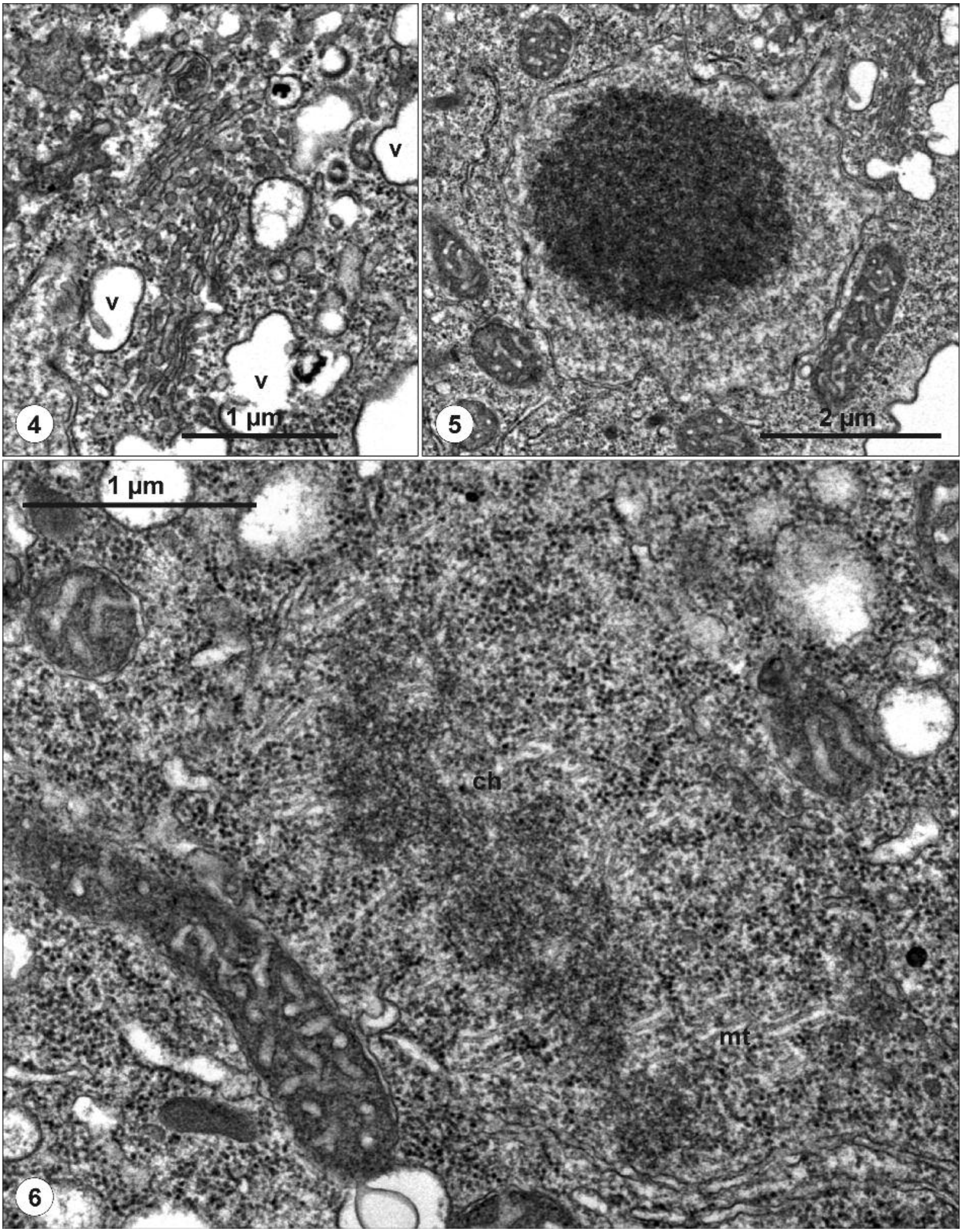

Plate 232. CCAP 1590/1. Type strain of *Vexillifera bacillipedes*, details of trophozoite ultrastructure. **Fig. 4.** Detail of ultrastructure of cytoplasm: Golgi complexes with parallel arrangement of cisternae and several vacuoles (v). **Fig. 5.** Nucleus in interphase surrounded by mitochondria. **Fig. 6.** Nuclear division within trophozoite: disappearance of nuclear membrane, condensation of chromatin (ch) and numerous microtubules/aggregated fibres of spindle apparatus (mt). Ref.: Dyková et al. 2011a.

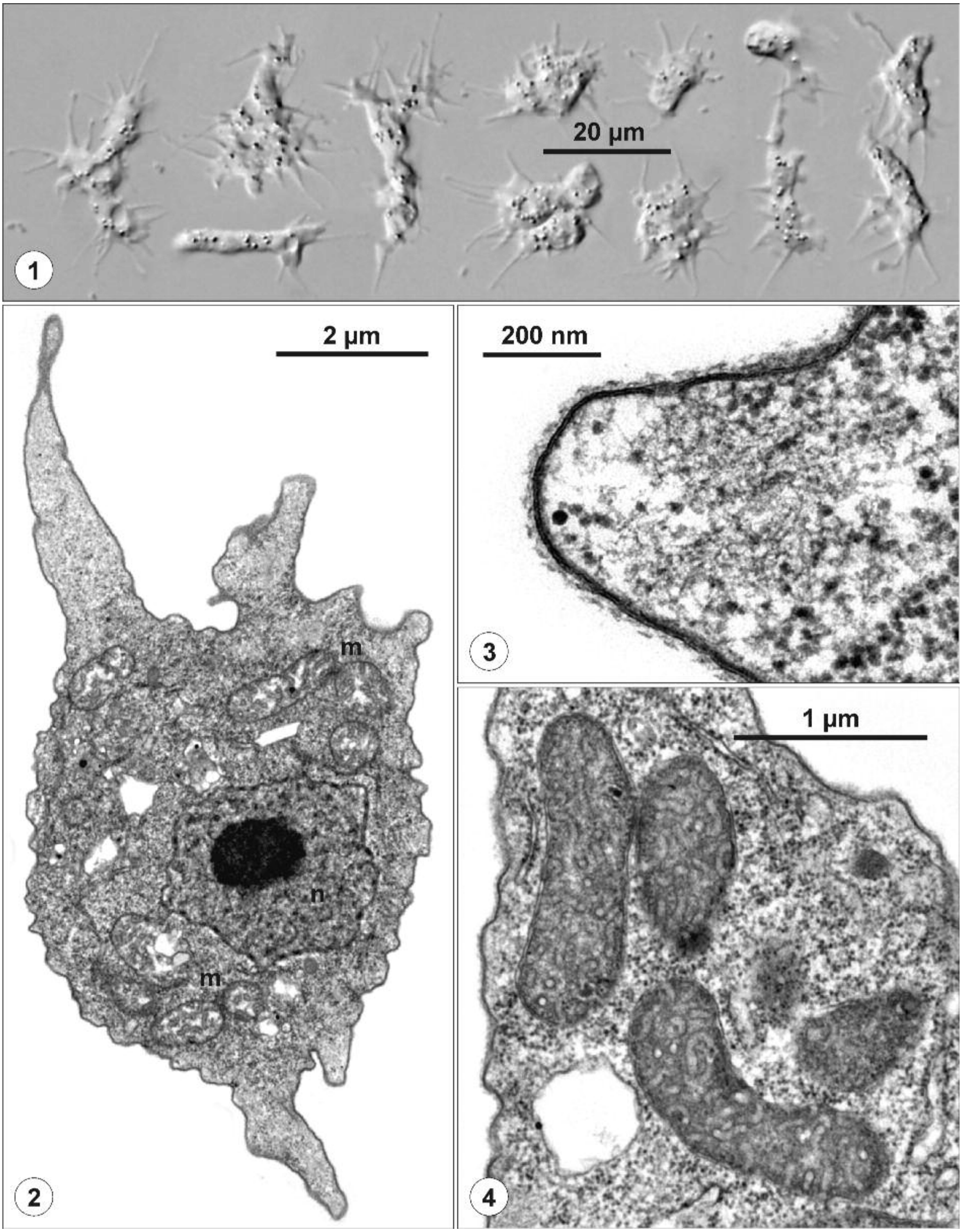

Plate 233. P124. Type strain of *Vexillifera multispinosa* isolated from gills of banded leporinus, *Leporinus fasciatus* (Bloch) from Amazon River, Iquitos, Peru; cultured on NN agar; stored in CC since 2004; GenBank Acc. No. of SSU rDNA sequence HQ687481. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Overview of ultrastructure of trophozoite with prominent pseudopodia extending from hyaloplasm, vesicular nucleus (n) with spherical nucleolus and mitochondria (m). **Fig. 3.** Cell surface with T-shaped glycostyles. **Fig. 4.** Detail of ultrastructure of mitochondria with tubular cristae. (Cont.)

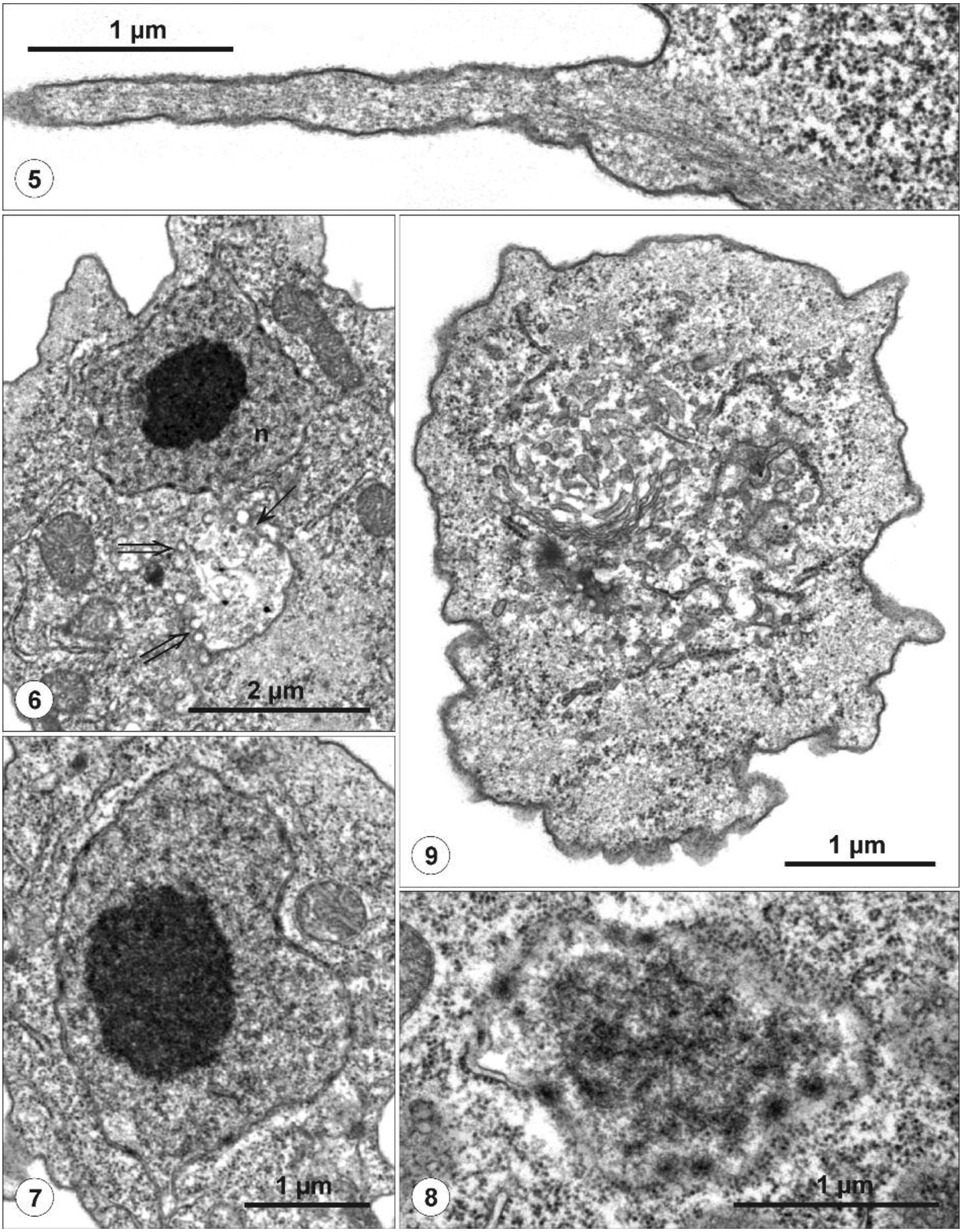

Plate 234. P124. Type strain of *Vexillifera multispinosa*. **Fig. 5.** Detail of trophozoite subpseudopodium with oriented core of microfilaments. **Fig. 6.** Contractile vacuole in vicinity of nucleus (n), surrounded by small vesicles/narrow spongiom (arrows). **Fig. 7.** Typical irregular nucleus with electron-dense nucleolus. **Fig. 8.** Disappearance of nuclear membrane and irregular arrangement of chromatin during nuclear division. **Fig. 9.** Detail of Golgi complex with channels sectioned in different planes. Ref.: Dyková et al. 2011a.

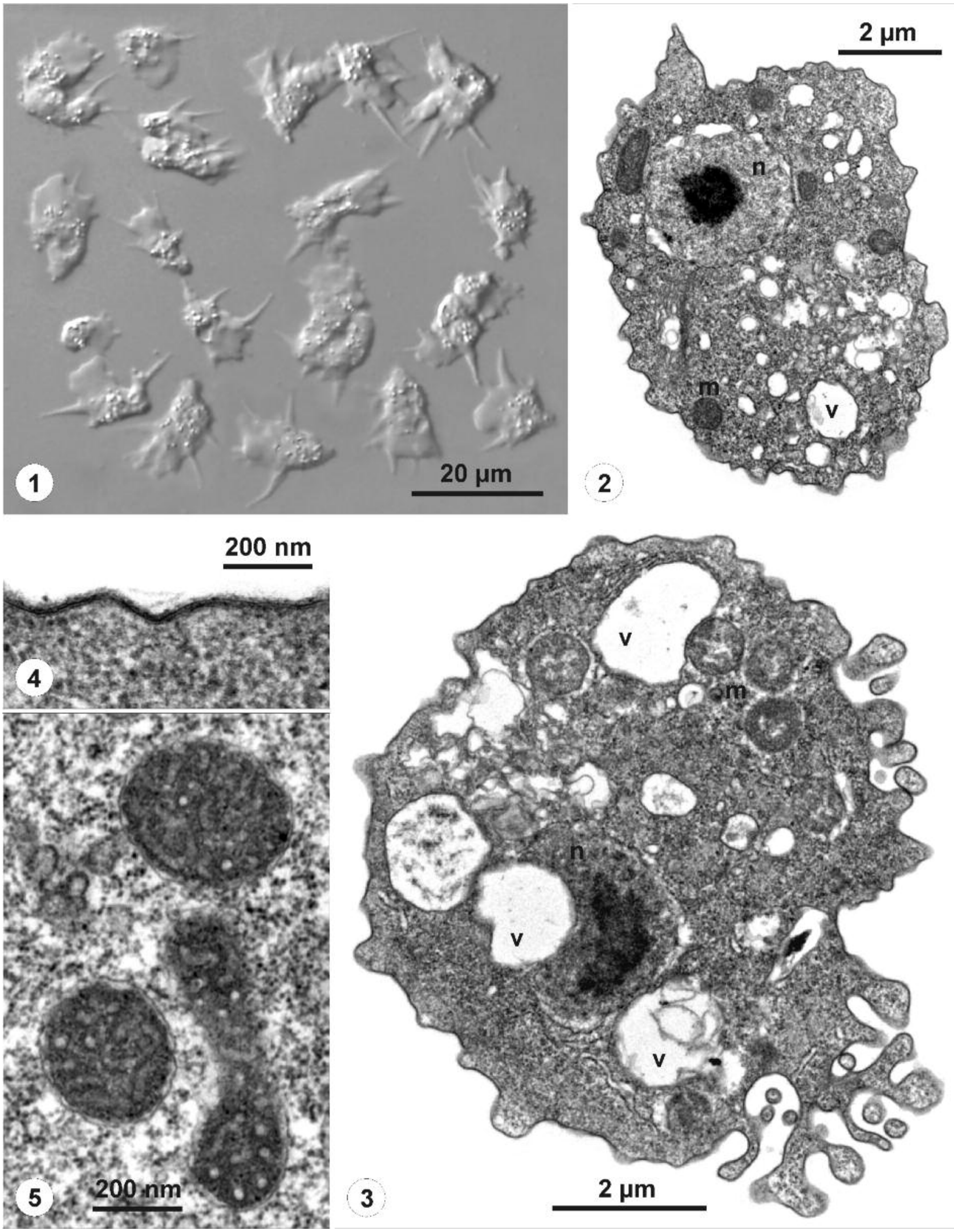

Plate 235. P20Z strain of *Vexillifera bacillipedes* isolated from gills of vimba bream, *Vimba vimba* (L.) from Vltava River, South Bohemia, Czech Republic; subcultured on NN agar; stored in CC since 1998; GenBank Acc. No. of SSU rDNA sequence JQ271773. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of ultrastructure of trophozoites: nuclei (n), mitochondria (m), vacuoles (v). **Fig. 4.** Cell surface of trophozoite with hardly discernible differentiation of glycocalyx. **Fig. 5.** Mitochondria with tubular cristae. Ref.: Dyková et al. 2011a.

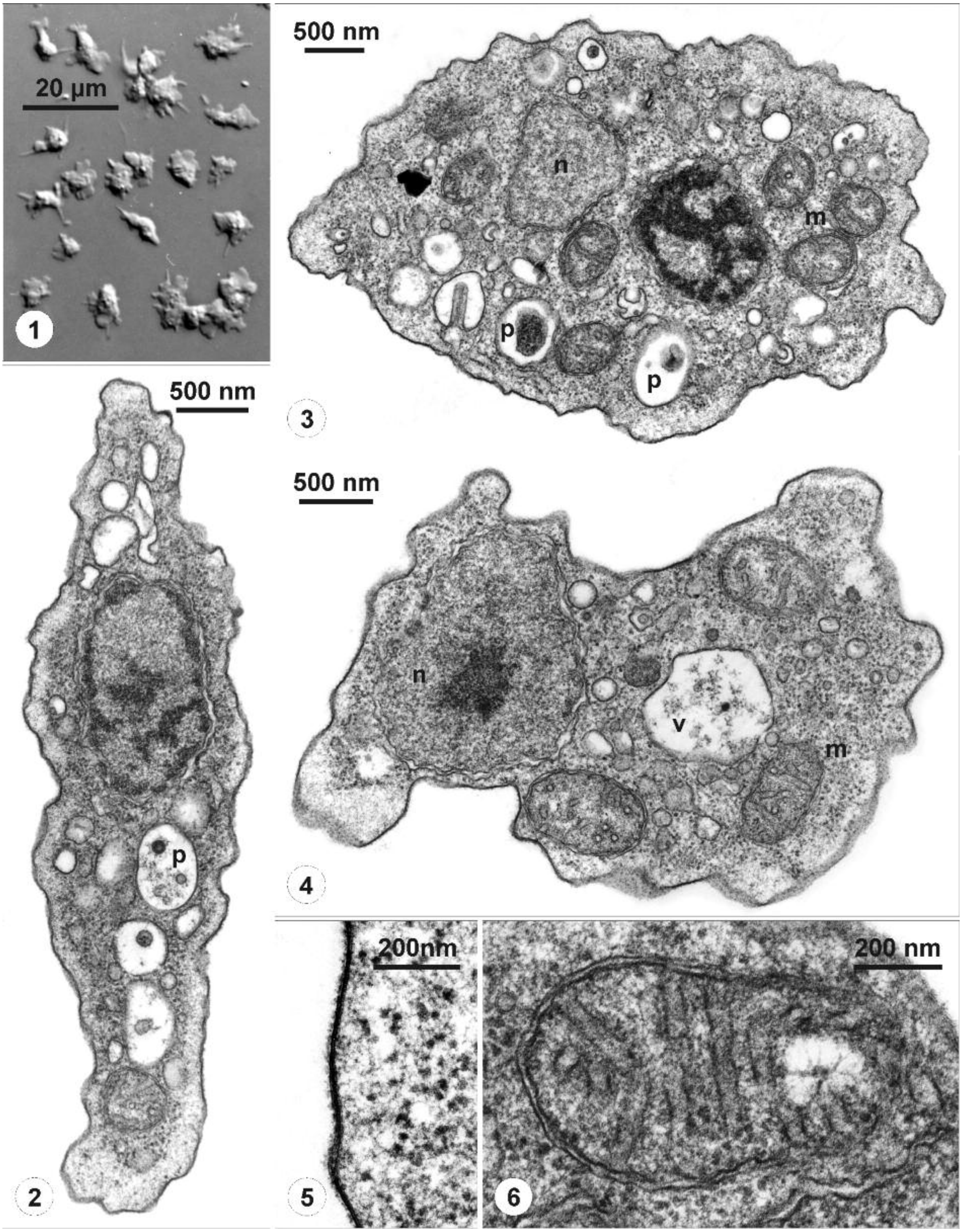

Plate 236. RMT. Type strain of *Vexillifera tasmaniana* isolated from gills of Atlantic salmon, *Salmo salar* L. used for AGD experiments, School of Aquaculture, Launceston, Tasmania, Australia; cultured on MY75S agar; stored in CC since 2003; GenBank Acc. No. of SSU rDNA sequence HQ687483. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3, 4.** Overview of trophozoite ultrastructure: nuclei (n), mitochondria (m), phagosomes (p), vacuole (v). **Fig. 5.** Cell surface of trophozoite with hardly discernible differentiation of glycocalyx. **Fig. 6.** Mitochondrion with tubular cristae. Ref.: Dyková et al. 2011a.

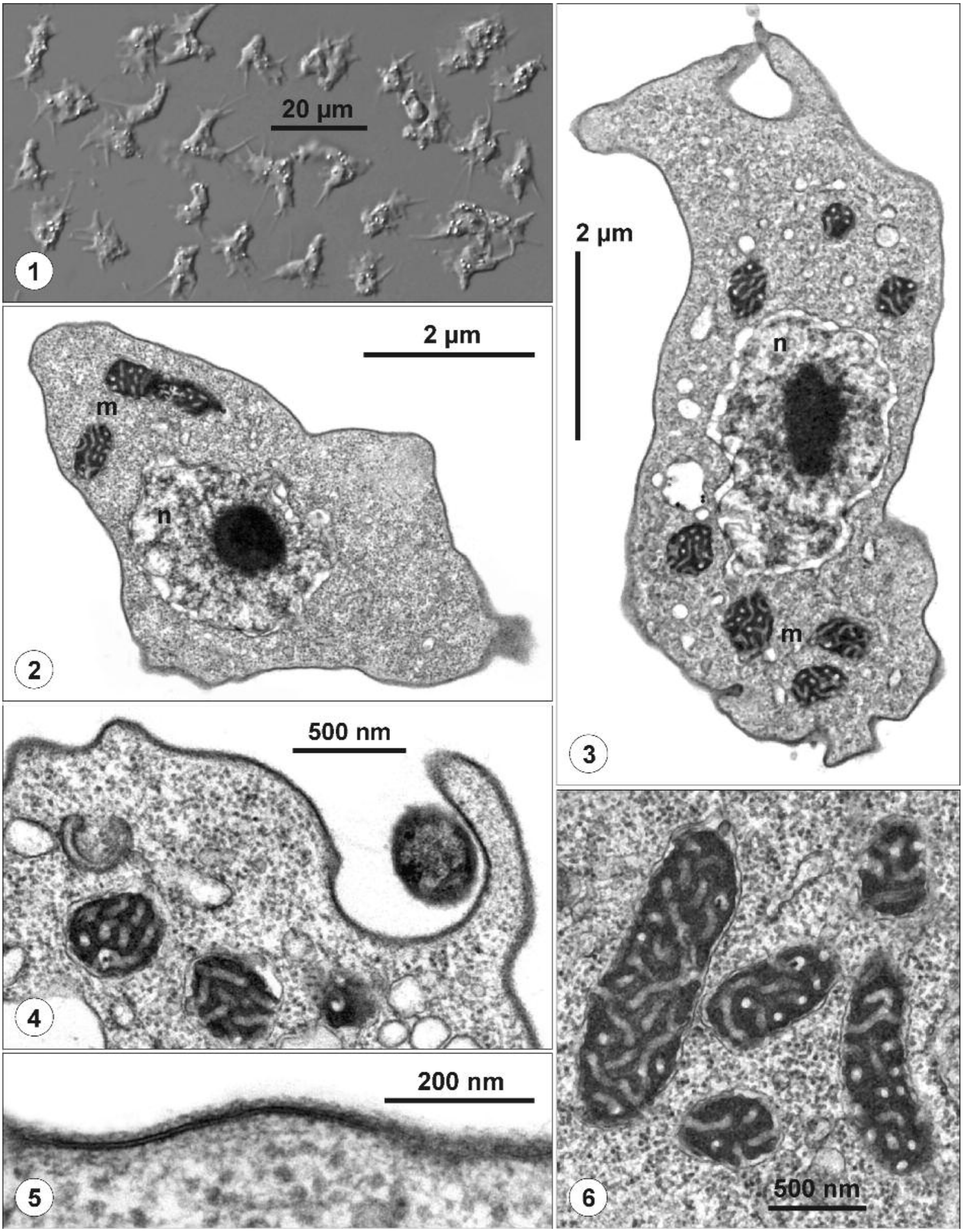

Plate 237. RR1. Type strain of *Vexillifera fluvialis* isolated from spleen of roach, *Rutilus rutilus* (L.) from Lužnice River, South Bohemia, Czech Republic; cultured on NN agar; stored in CC since 1989; GenBank Acc. No. of SSU rDNA sequence HQ687482. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of ultrastructure of trophozoites with prominent nuclei (n) and densely stained mitochondria (m). **Figs. 4, 5.** Cell surface of trophozoites with amorphous glycocalyx. **Fig. 6.** Mitochondria with tubular twisted cristae. Ref.: Dyková et al. 2011a.

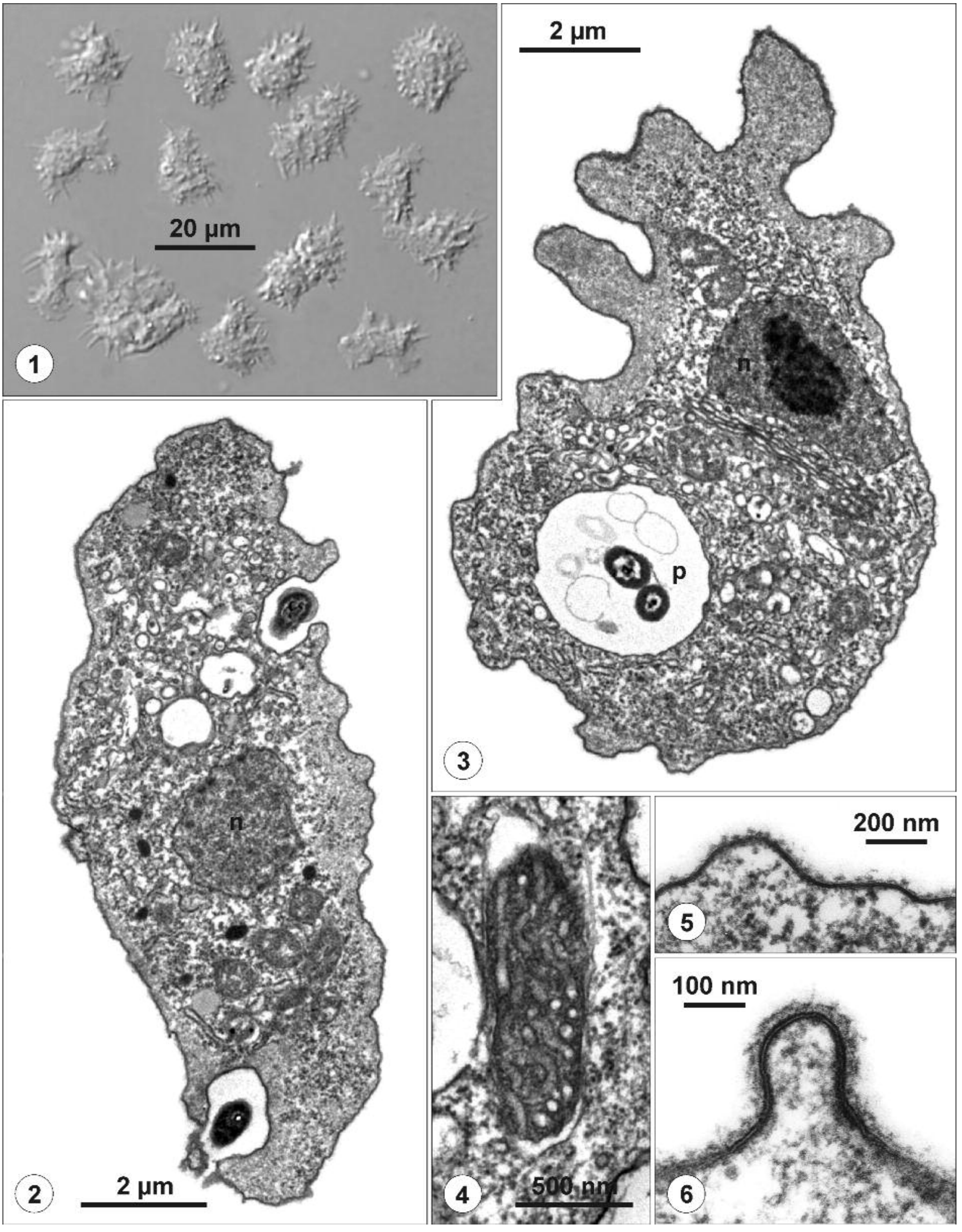

Plate 238. S2M1 strain of *Vexillifera* sp. isolated from gills of turbot, *Scophthalmus maximus* (L.) farmed in NW Spain; subcultured on MY75S agar; stored in CC since 1996; GenBank Acc. No. of SSU rDNA sequence JQ271774. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of ultrastructure of trophozoites: nuclei (n), mitochondria, phagosome (p). **Fig. 4.** Mitochondrion with tubular cristae. **Figs. 5, 6.** Cell surface of trophozoites with glycocalyx not clearly differentiated in glycostyles.

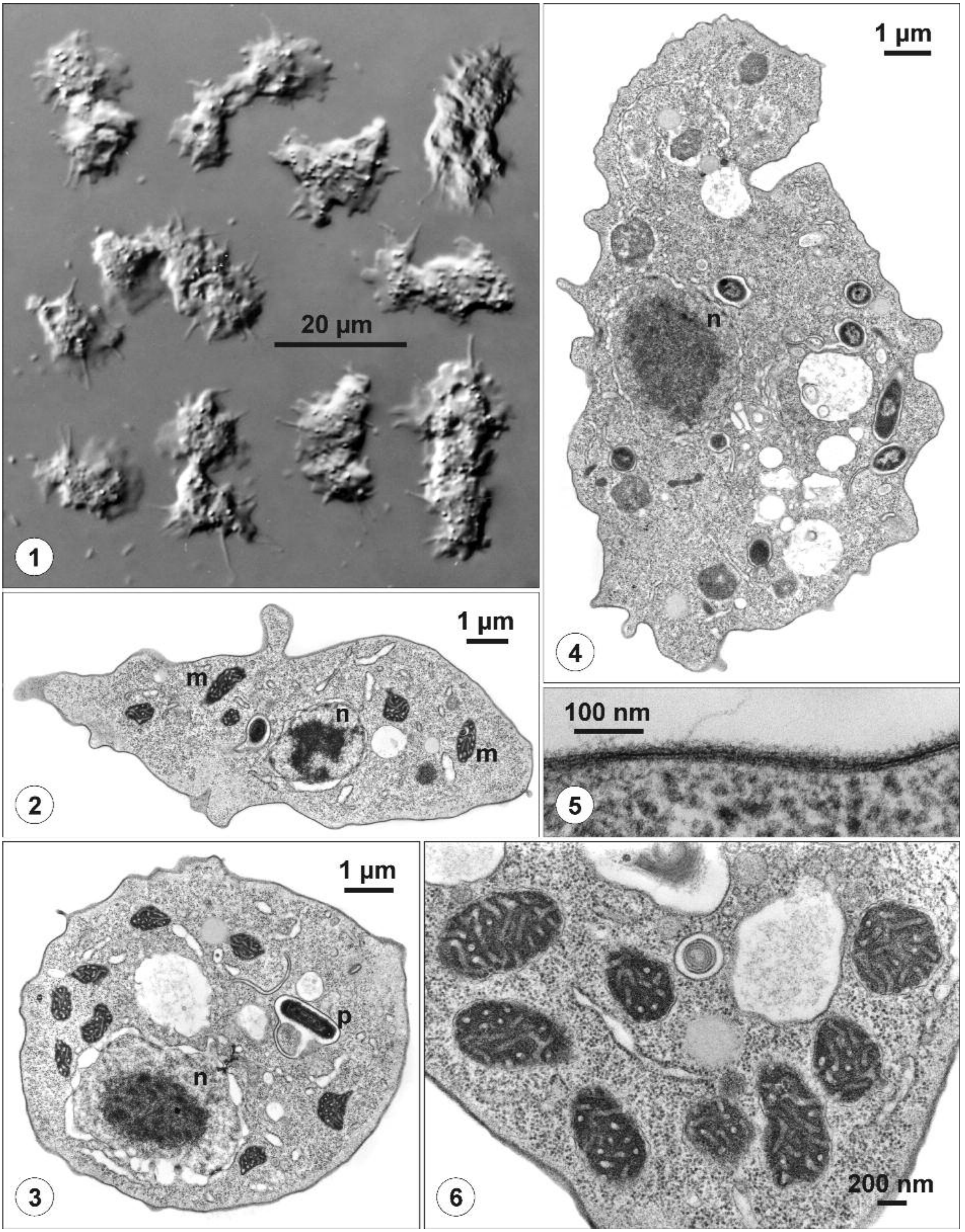

Plate 239. TIL2 strain of *Vexillifera bacillipedes* isolated from gills of Nile tilapia, *Oreochromis niloticus* (L.) collected in farm supplied with water from cooling system of electric power station, Czech Republic; cultured on NN agar; stored in CC from 2000 to 2005; sample of DNA available, stored under FLA DB Nos. 130, 132; GenBank Acc. No. of SSU rDNA HQ687484. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3, 4.** Overview of trophozoite ultrastructure: nuclei (n), densely stained mitochondria (m), phagosome (p). **Fig. 5.** Cell surface of trophozoite with amorphous glycocalyx. **Fig. 6.** Detail of mitochondria with tubular cristae. Ref.: Dyková et al. 2011a.

Strains *incertae sedis*, group 01

Plates 240–249

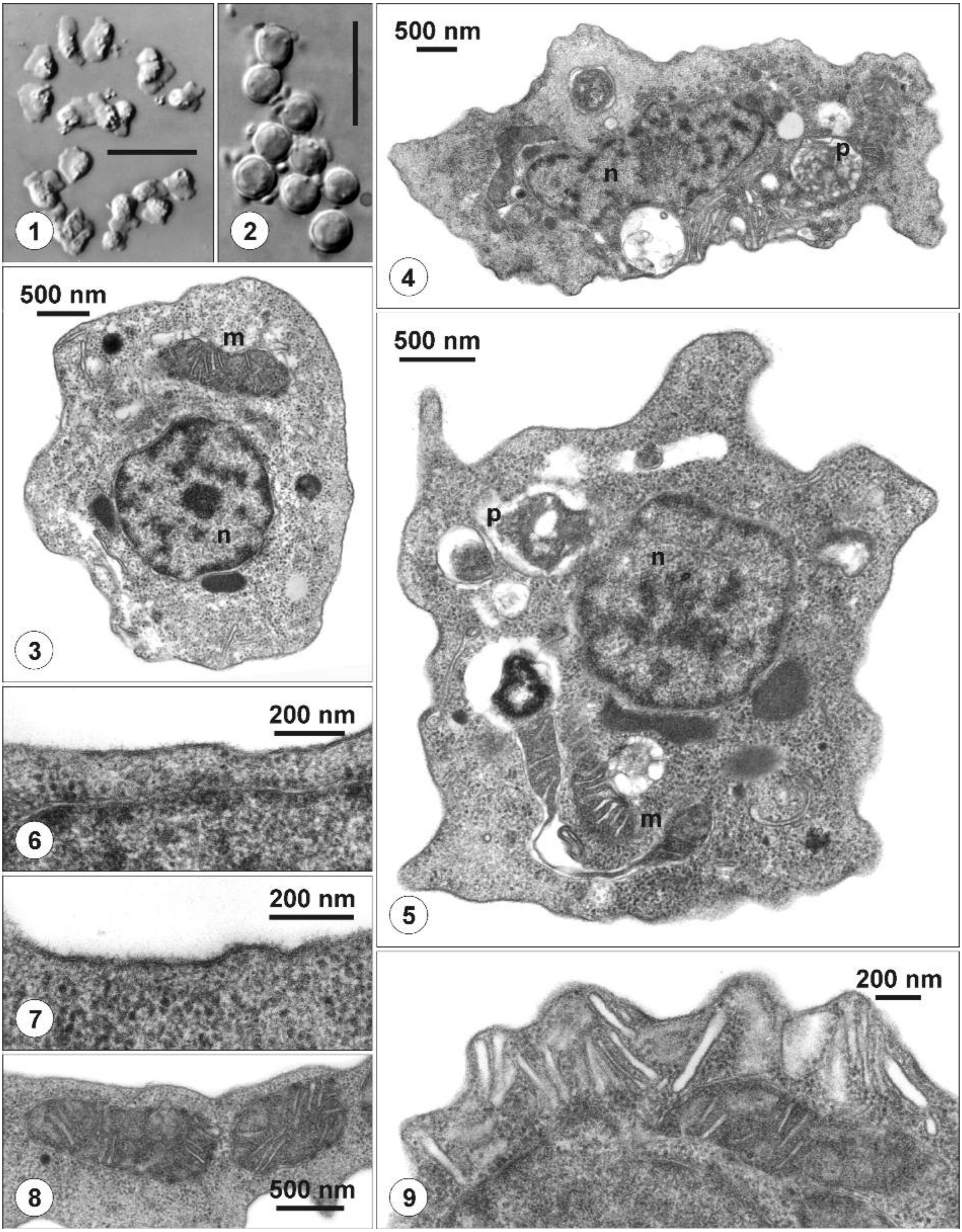

Plate 240. 893 strain of discicristate amoeboid organism isolated from brain of goldfish, *Carassius auratus auratus* (L.) collected in farm supplied with water from cooling system of electric power station, South Bohemia, Czech Republic; cultured on NN agar and cell culture (FHM cell line); stored in CC since 1993; DNA samples of different passages stored under FLA DB Nos. 53 and 92. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC), scale bar = 20 µm. **Fig. 2.** Cysts, scale bar = 10 µm. **Figs. 3, 4, 5.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosomes (p). **Figs. 6, 7.** Details of cell surface of trophozoites. **Figs. 8, 9.** Details of ultrastructure of mitochondria containing discoid cristae.

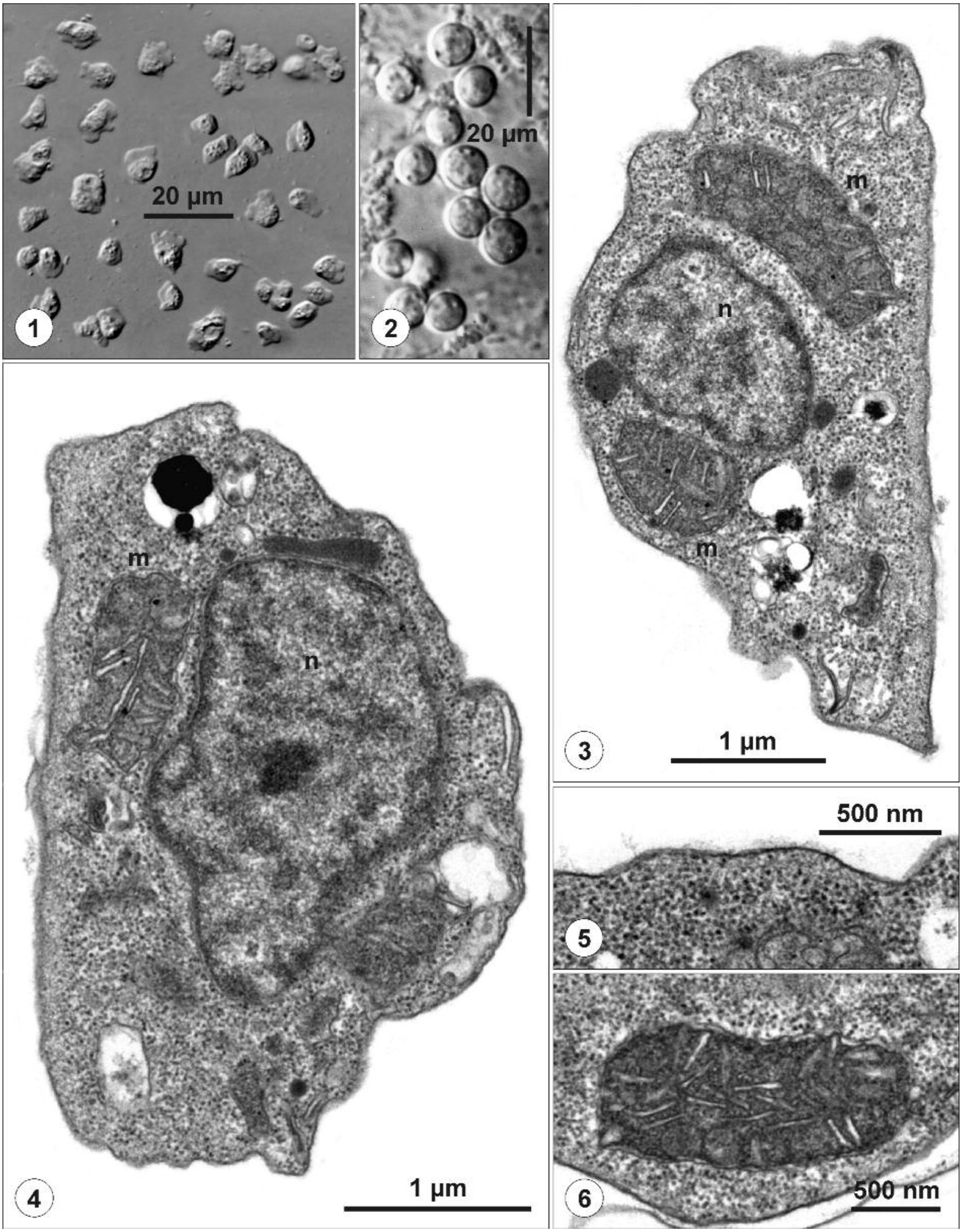

Plate 241. 912 strain of discicristate amoeboid organism isolated from kidney of *Carassius auratus auratus* (L.) from experimental stock kept in research institution, České Budějovice, South Bohemia, Czech Republic; cultured on NN agar; stored in CC since 1993; DNA samples of different passages stored under FLA DB Nos. 1095, 1115, 1306 and 1311. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Cysts as seen in Nomarski DIC. **Figs. 3, 4.** Overview of fine structure of trophozoites: vesicular nuclei (n), mitochondria with discoid cristae (m). **Fig. 5.** Cell surface of trophozoite. **Fig. 6.** Detail of mitochondrion. Ref.: Dyková et al. 1996.

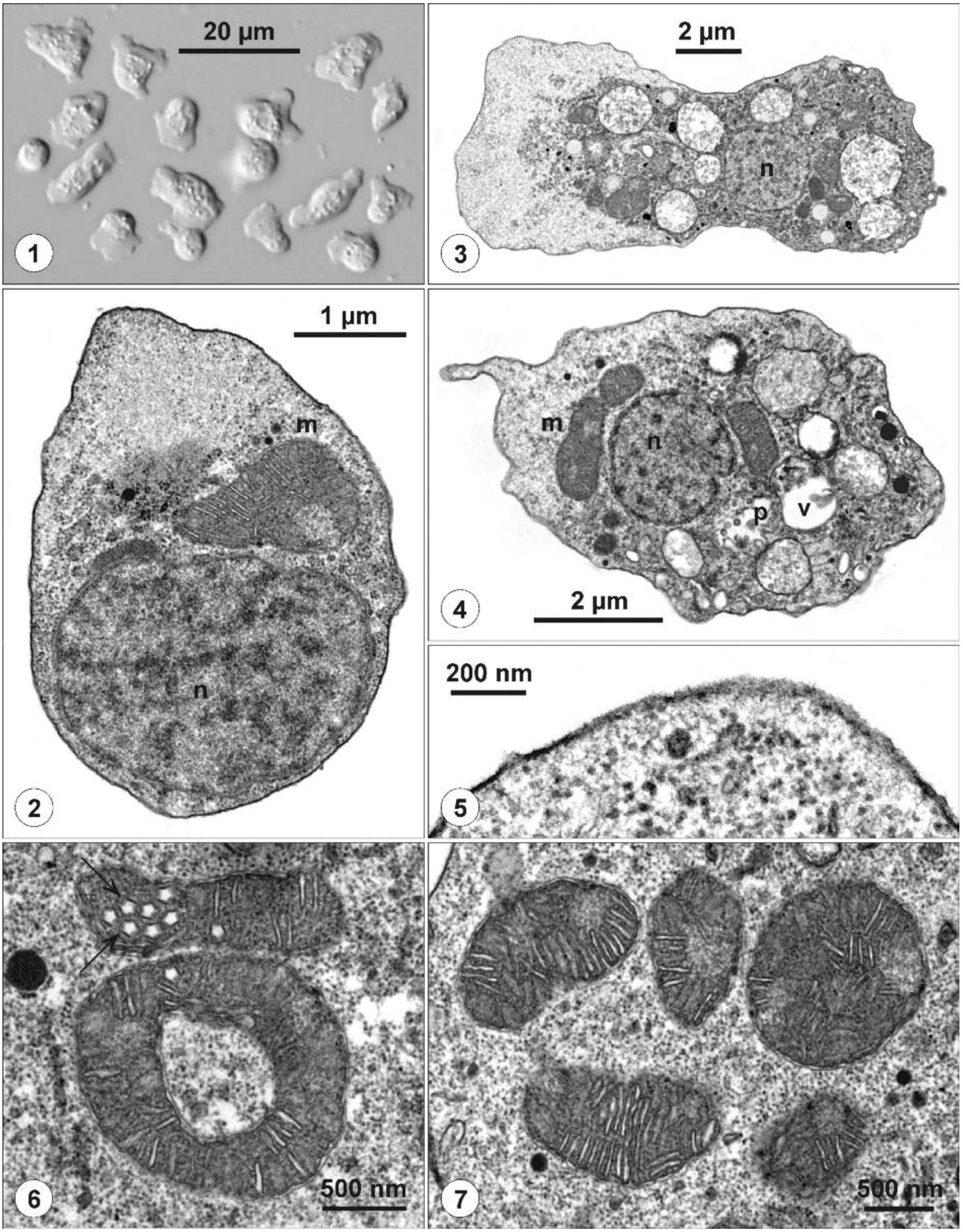

Plate 242. CORD strain of discicristate amoeboid organism isolated from sea squirt, *Corella parallelogramma* (O.F. Müller) collected in Norwegian Sea, off Vevang, Trondheim, Norway; cultured on MY75S agar; stored in CC since 2005; DNA sample stored under FLA DB No. 531. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3, 4.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosome (p), vacuole (v). **Fig. 5.** Detail of cell surface of trophozoite. **Figs. 6, 7.** Details of ultrastructure of mitochondria containing discoid cristae and unusual pentagonal structures (arrows).

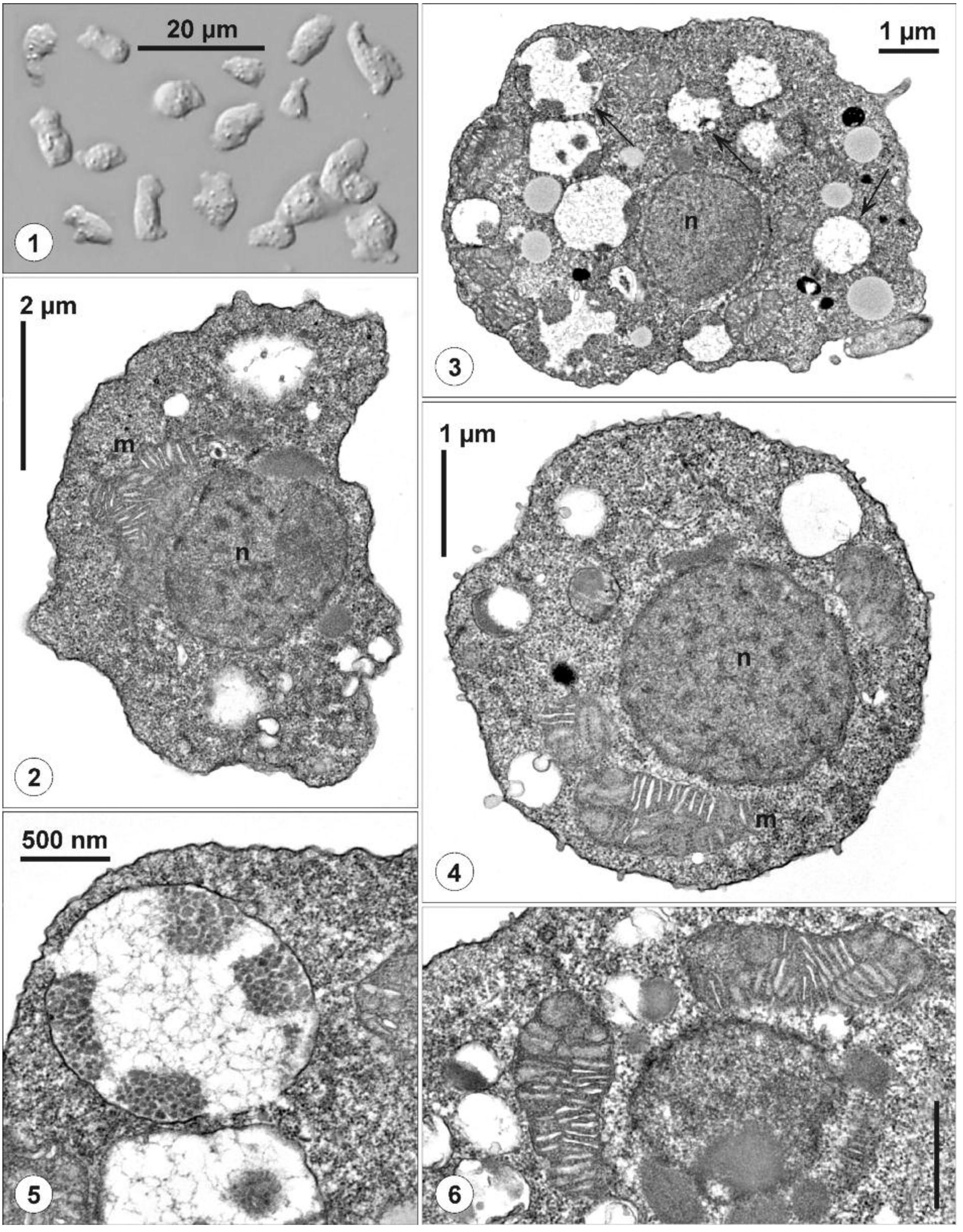

Plate 243. CPD8 strain of discicristate amoeboid organism isolated from edible crab, *Cancer pagurus* L. collected in Norwegian Sea, off Vevang, Trondheim, Norway; cultured on MY75S agar; stored in CC since 2005; DNA samples from different passages stored under FLA DB Nos. 535 and 538. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3, 4.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), vesicular structures of unknown nature (arrows). **Fig. 5.** Detail of vesicular structure demonstrating its content. **Fig. 6.** Detail of ultrastructure of cytoplasm with mitochondria containing discoid cristae, scale bar = 1 µm.

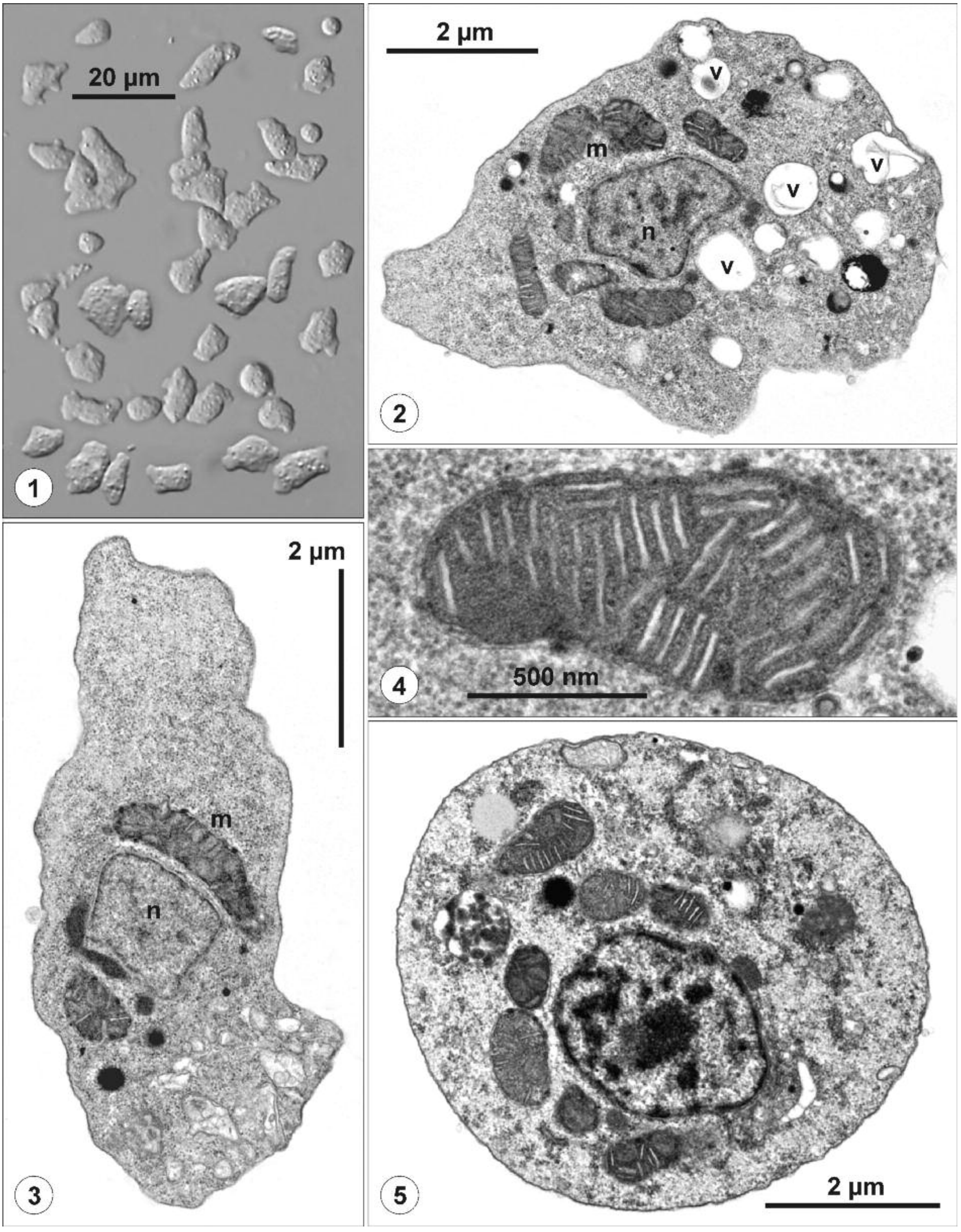

Plate 244. CPD9 strain of discicristate amoeboid organism isolated from edible crab, *Cancer pagurus* L. collected in Norwegian Sea, off Vevang, Trondheim, Norway; cultured on MY75S agar; stored in CC since 2005; DNA samples of different passages stored under FLA DB Nos. 534 and 539. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), vacuoles (v). **Fig. 4.** Detail of ultrastructure of mitochondrion: discoid cristae are arranged in parallel groups. **Fig. 5.** Rounded form/resting stage observed in culture together with trophozoites of irregular shapes.

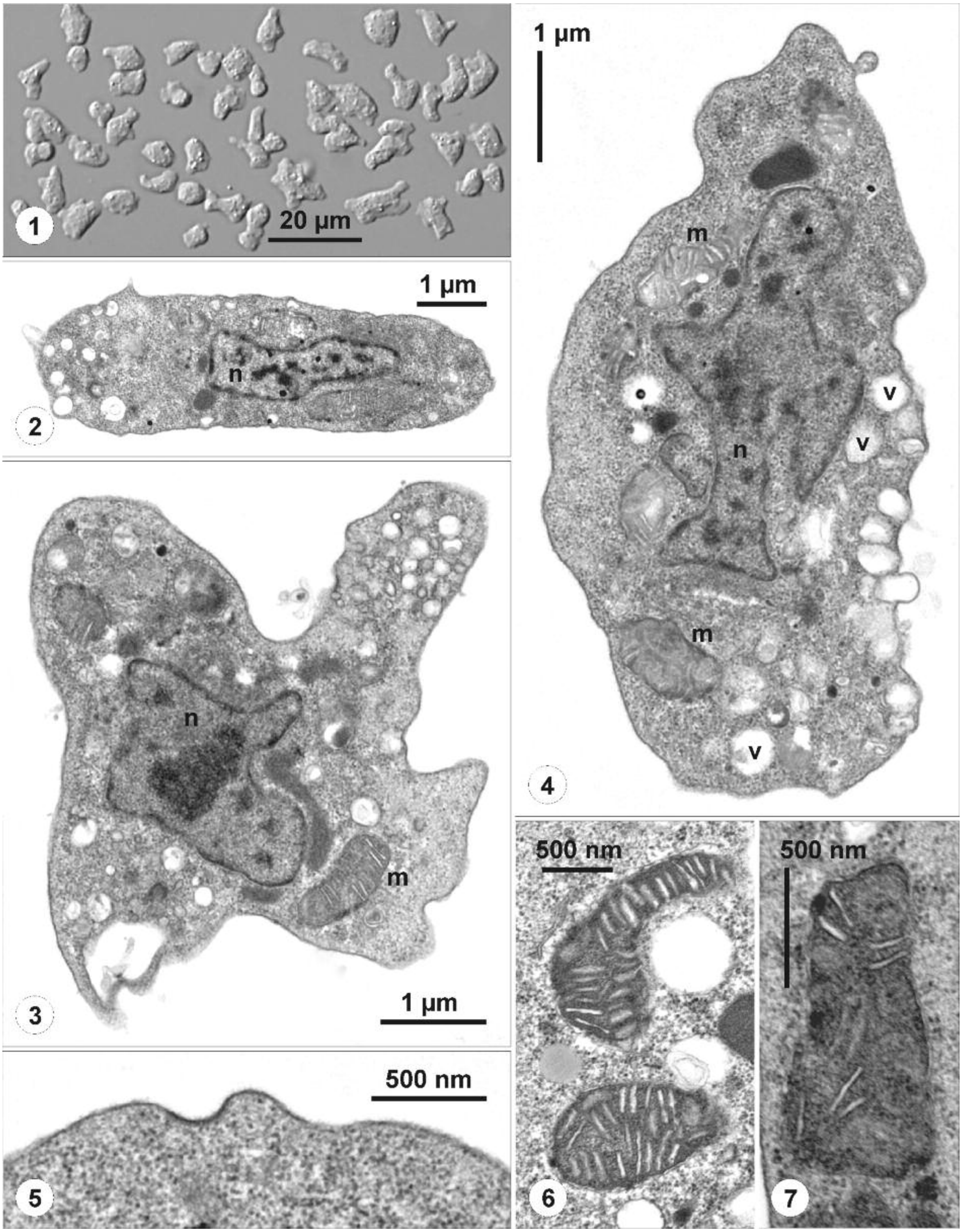

Plate 245. ECHD2 strain of discicristate amoeboid organism isolated from whit esea urchin, *Gracilechinus acutus* (Lamarck) collected in Norwegian Sea, off Vevang, Trondheim, Norway; cultured on MY75S agar; stored in CC since 2005; DNA samples from different passages stored under FLA DB Nos. 521 and 525. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3, 4.** Overview of fine structure of trophozoites: lobed nuclei (n), mitochondria (m), vacuoles (v). **Fig. 5.** Detail of cell surface of trophozoite. **Figs. 6, 7.** Details of ultrastructure of mitochondria containing discoid cristae.

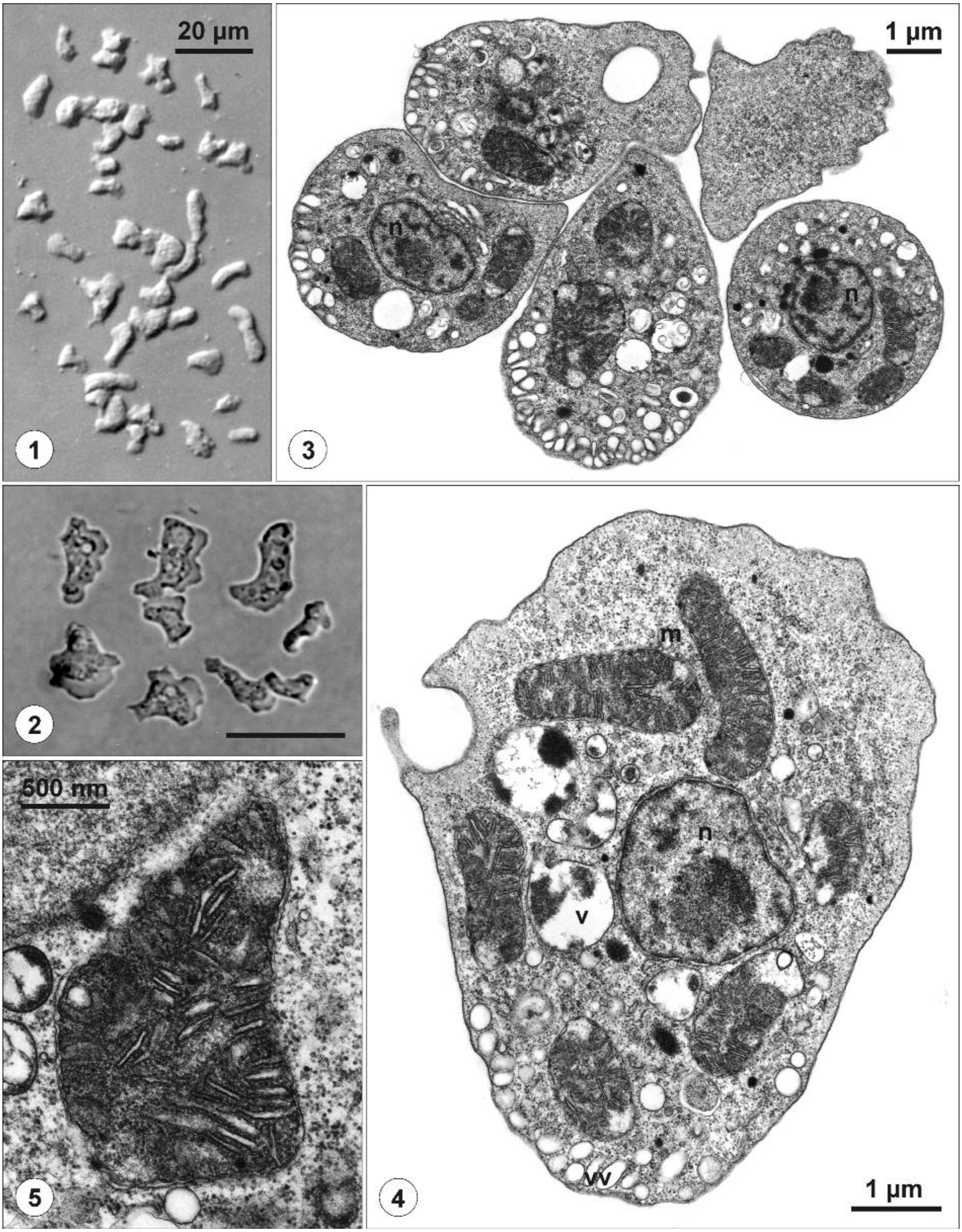

Plate 246. ESPO7 strain of discicristate amoeboid organism isolated from gills of turbot, *Scophthalmus maximus* (L.) farmed in NW Spain; cultured on MY75S agar; stored in CC since 2002; DNA sample stored under FLA DB No. 277. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Trophozoites as seen in translucent light, scale bar = 20 µm. **Figs. 3, 4.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), vacuoles (v), vesicles (vv) concentrated mostly on periphery of trophozoites. **Fig. 5.** Detail of ultrastructure of mitochondrion with discoid cristae.

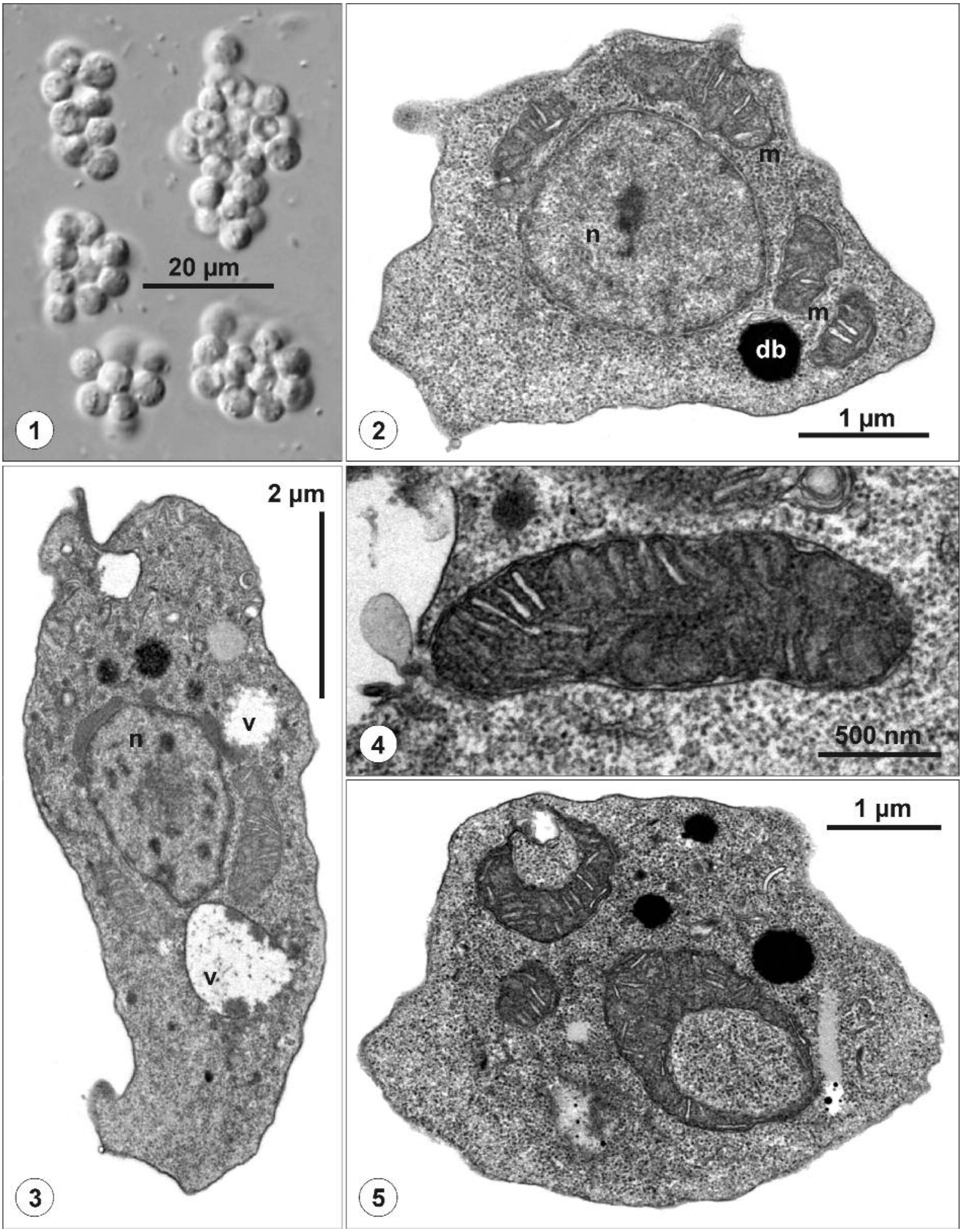

Plate 247. J13Z strain of discicristate amoeboid organism isolated from gills of ruffe, *Gymnocephalus cernuus* (L.) from Svět pond, South Bohemia, Czech Republic; cultured on NN agar; stored in CC since 1998; DNA sample stored under FLA DB No. 1034. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC) (under intense light they change to rounded bodies). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), vesicles/vacuoles (v), electron-dense bodies (db). **Fig. 4.** Detail of ultrastructure of mitochondrion containing discoid cristae. **Fig. 5.** Detail of unusual form of mitochondria resembling those with pseudoinclusions.

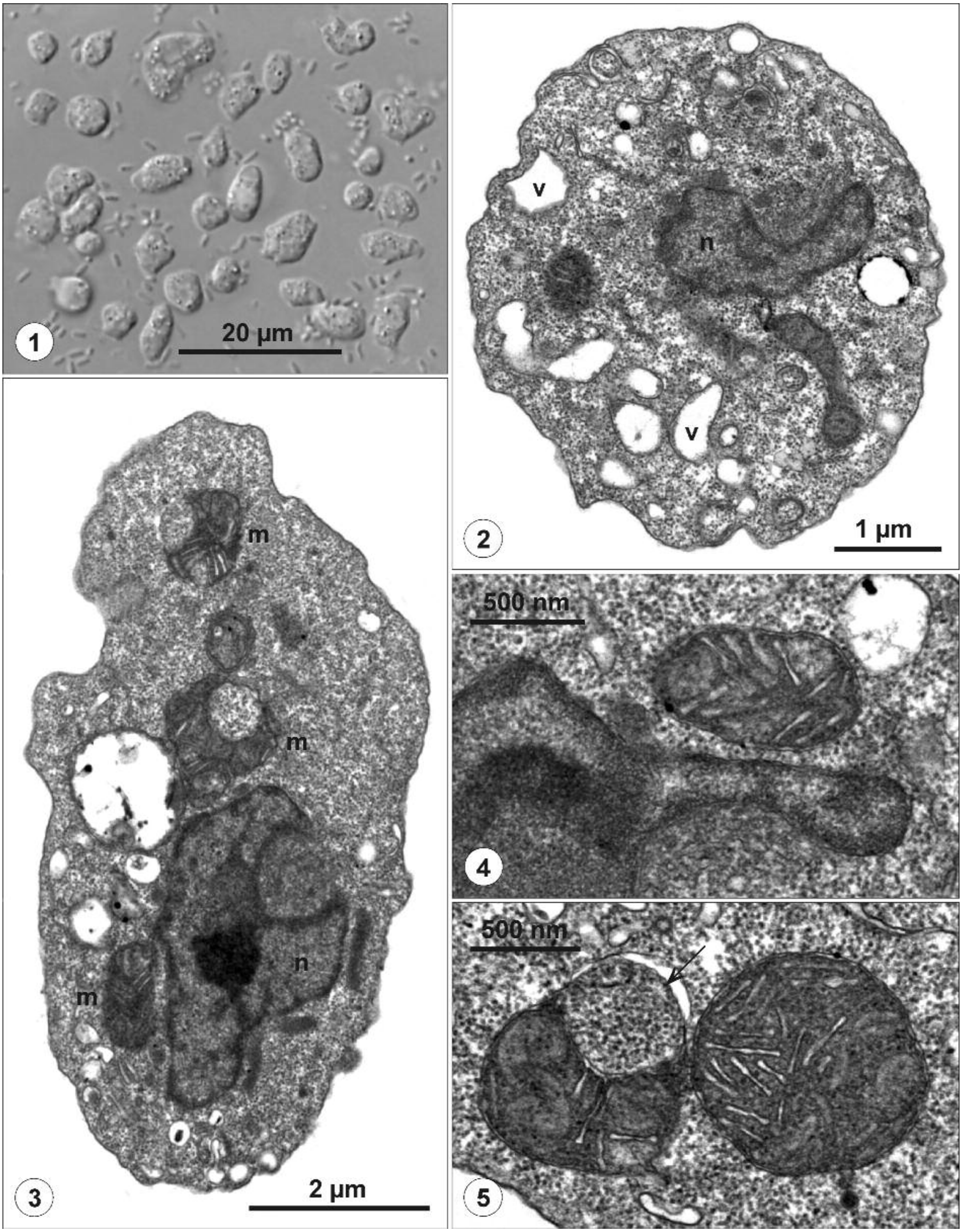

Plate 248. SS7FJ strain of discicristate amoeboid organism isolated from gills of Atlantic salmon, *Salmo salar* L. farmed in Ireland; cultured on MY75S agar; stored in CC since 2000; DNA sample stored under FLA DB No. 1042. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: lobed nuclei (n), mitochondria (m) with discoid cristae, vacuoles (v). **Fig. 4.** Details of ultrastructure of cytoplasm: nuclear lobe and mitochondrion. **Fig. 5.** Detail of ultrastructure of mitochondria containing discoid cristae and structures resembling pseudoinclusions (arrow).

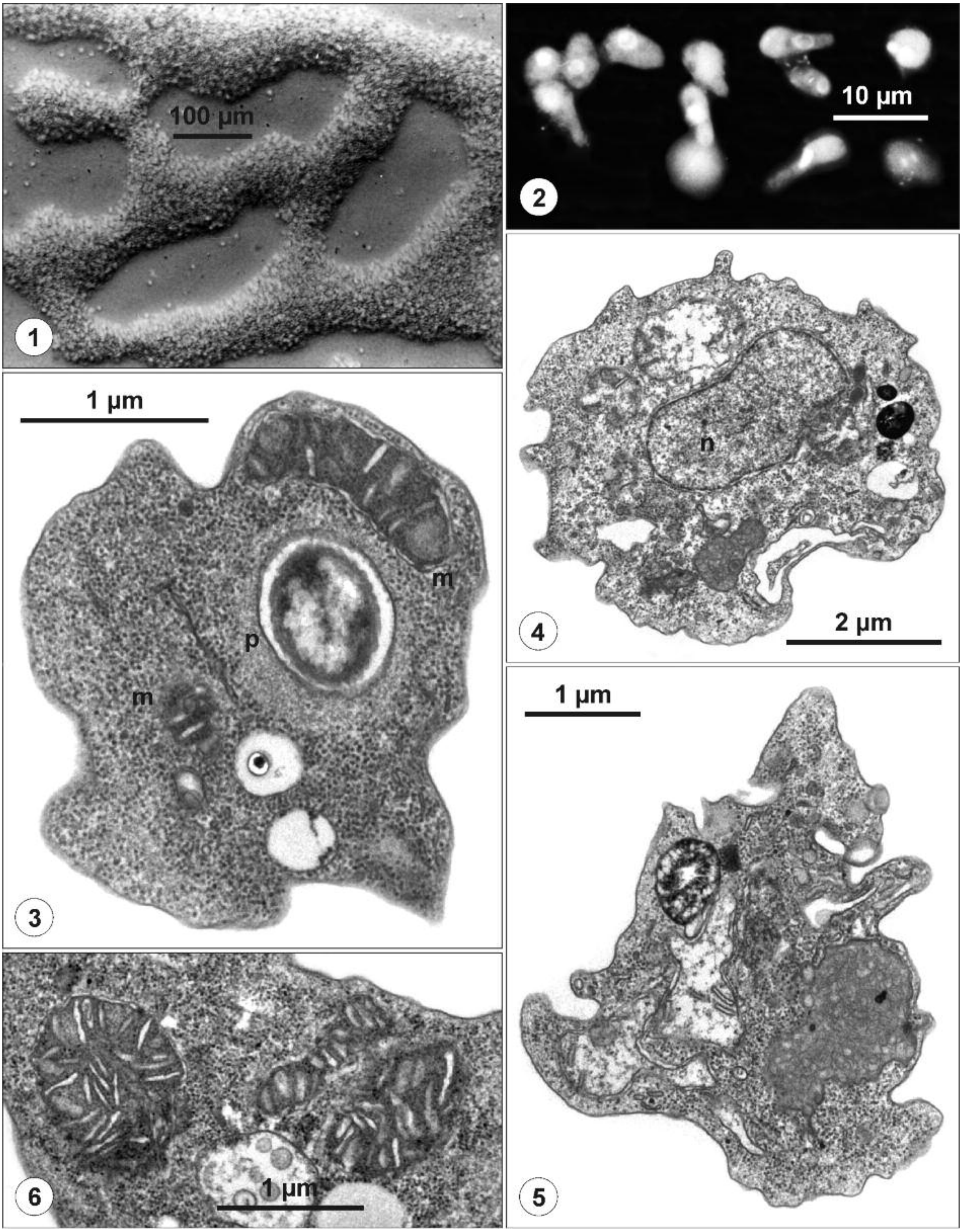

Plate 249. TN99 strain of discicristate amoeboid organism isolated from kidney of Nile tilapia, *Oreochromis niloticus* (L.) collected in farm supplied with water from cooling system of electric power station, South Bohemia, Czech Republic; cultured on NN agar; stored in CC since 1994; DNA samples from different passages stored under FLA DB Nos. 127, 133, 1040. **Fig. 1.** Agar plate culture with aggregates of trophozoites as seen in light microscope through Petri dish. **Fig. 2.** Trophozoites stained with Hoechst 33258 (Sigma) as seen in fluorescence microscope. **Figs. 3, 4, 5.** Overview of fine structure of trophozoites: nucleus (n), mitochondria (m), phagosome (p). **Fig. 6.** Ultrastructure of mitochondria containing discoid cristae. Ref.: Dyková et al. 1997.

Strains *incertae sedis*, group 02

Plates 250–254

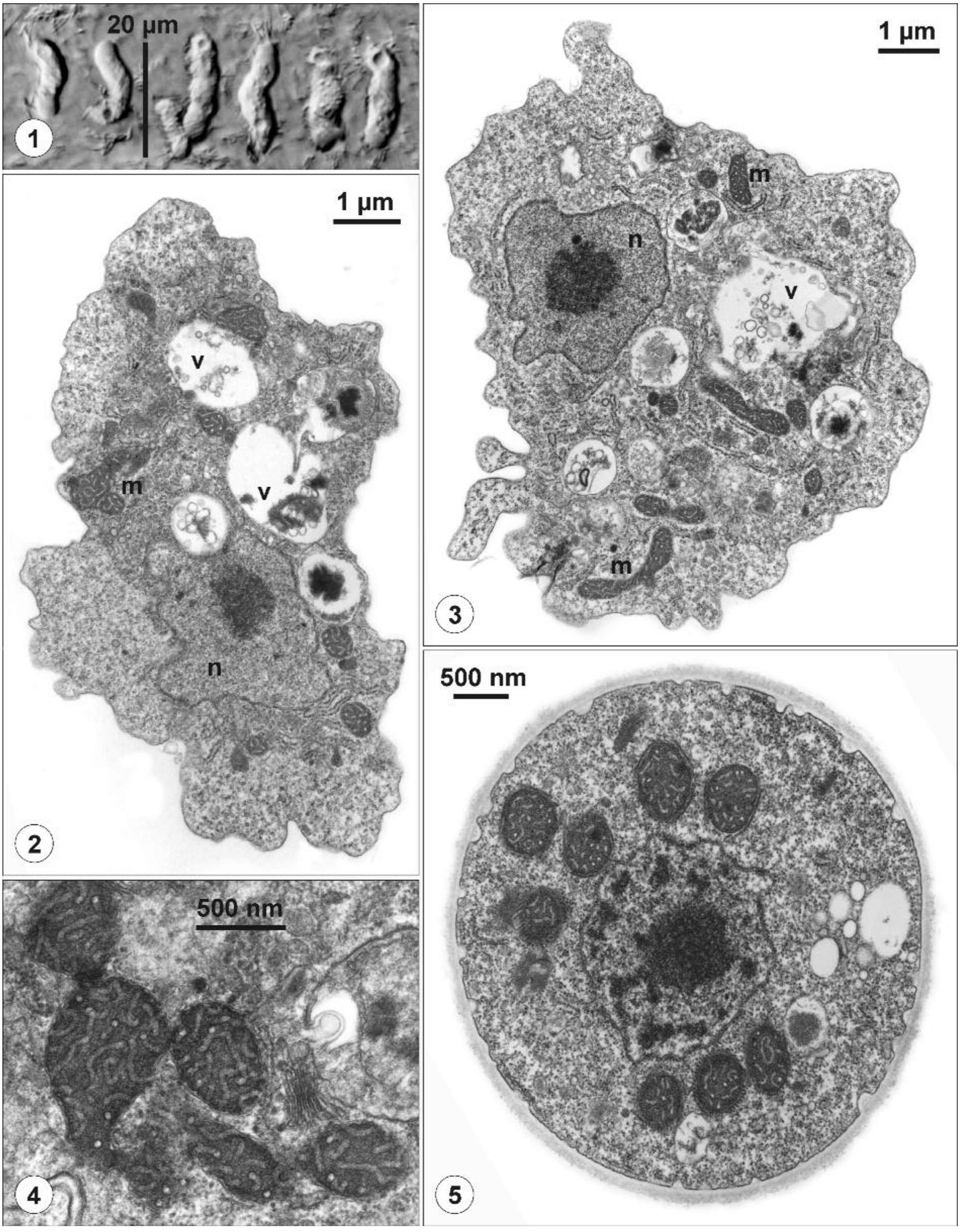

Plate 250. 1HFKJ strain of amoeboid organism with tubular cristae of mitochondria, isolated from liver of stinging catfish, *Heteropneustes fossilis* (Bloch) of unknown origin, imported to pet shop, Czech Republic; subcultured on NN agar; stored in CC since 1998; GenBank Acc. No. of SSU rDNA sequence JQ271775. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC), scale bar = 20 µm. **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), vacuoles with remnants of food (v). **Fig. 4.** Detail of ultrastructure of mitochondria with tubular cristae; Golgi complex. **Fig. 5.** Mature cyst.

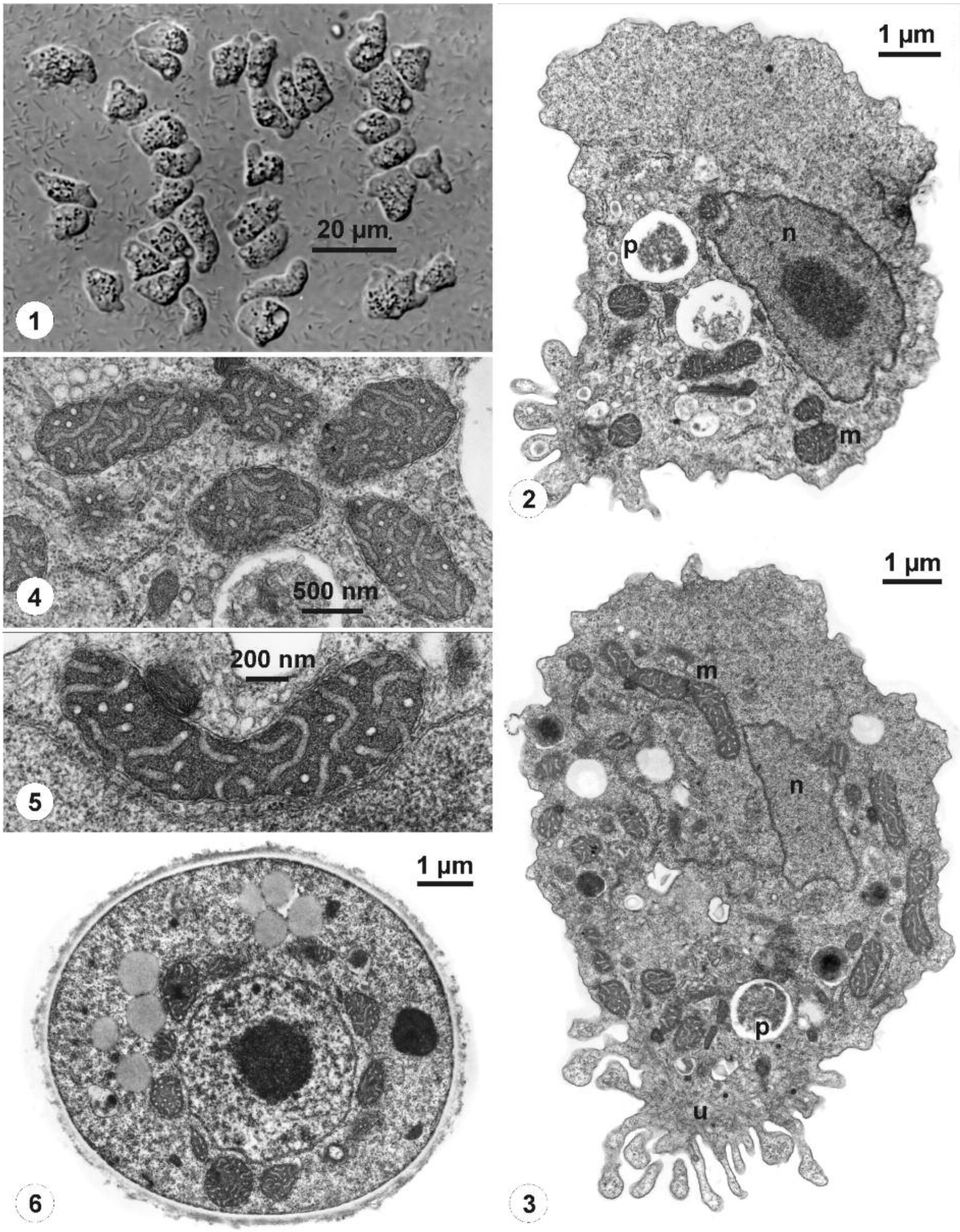

Plate 251. 4388 strain of amoeboid organism with tubular cristae of mitochondria, isolated from liver of tench, *Tinca tinca* (L.) from Lužnice River, South Bohemia, Czech Republic; cultured on NN agar; stored in CC since 1990; GenBank Acc. No. of SSU rDNA sequence JQ271776. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosomes (p), uroid-like structure (u) that cannot be seen well in hanging drop preparations. **Figs. 4, 5.** Mitochondria with tubular cristae. **Fig. 6.** Mature cyst.

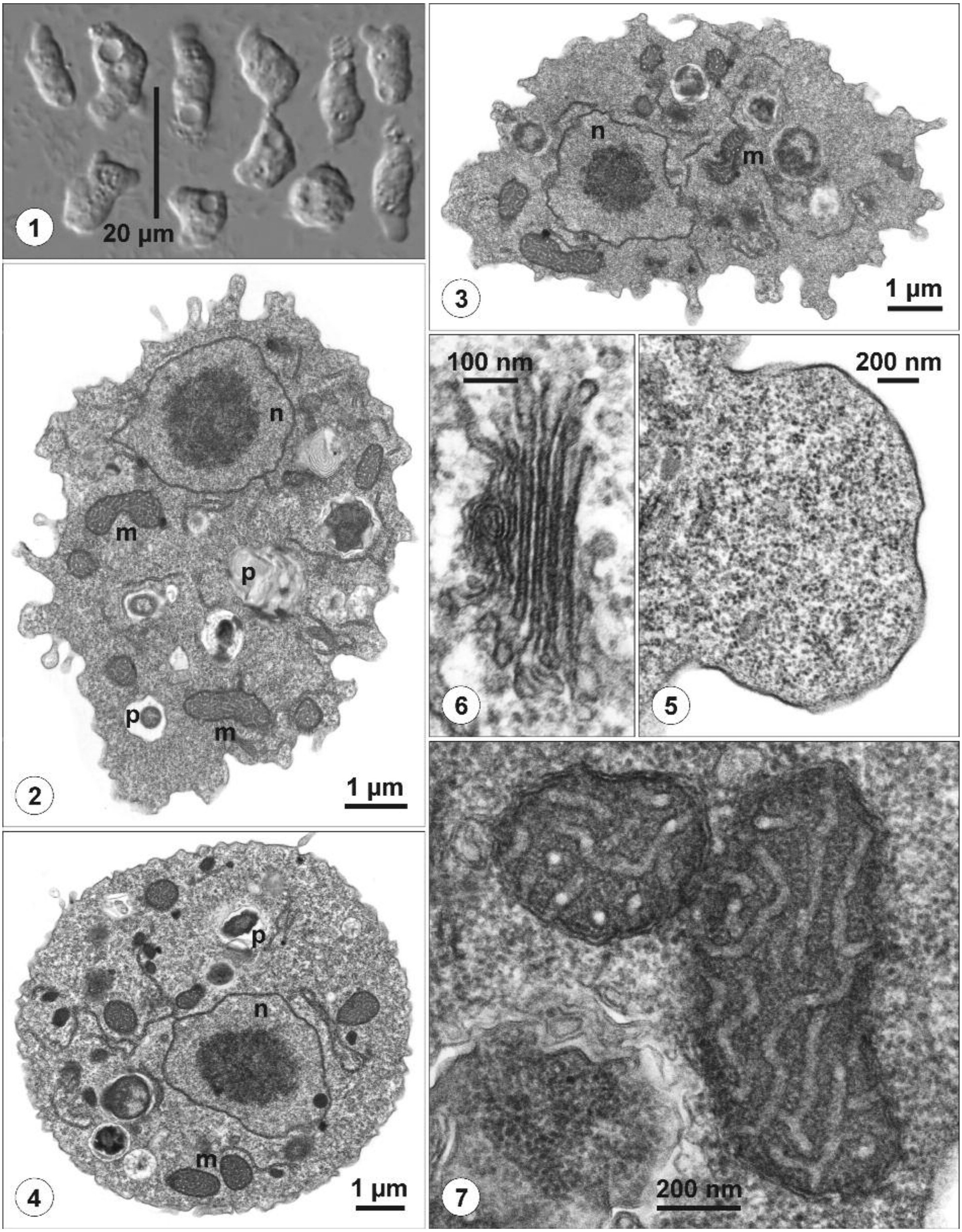

Plate 252. CC4HA strain of amoeboid organism with tubular cristae of mitochondria, isolated from liver of common carp, *Cyprinus carpio* L. from Spolský pond, South Bohemia, Czech Republic; cultured on NN agar; stored in CC since 1996; GenBank Acc. No. of SSU rDNA sequence JQ271777. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3, 4.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosomes (p). **Fig. 5.** Cell surface of trophozoite. **Fig. 6.** Golgi apparatus with parallel arrangement of cisternae. **Fig. 7.** Mitochondria with tubular cristae.

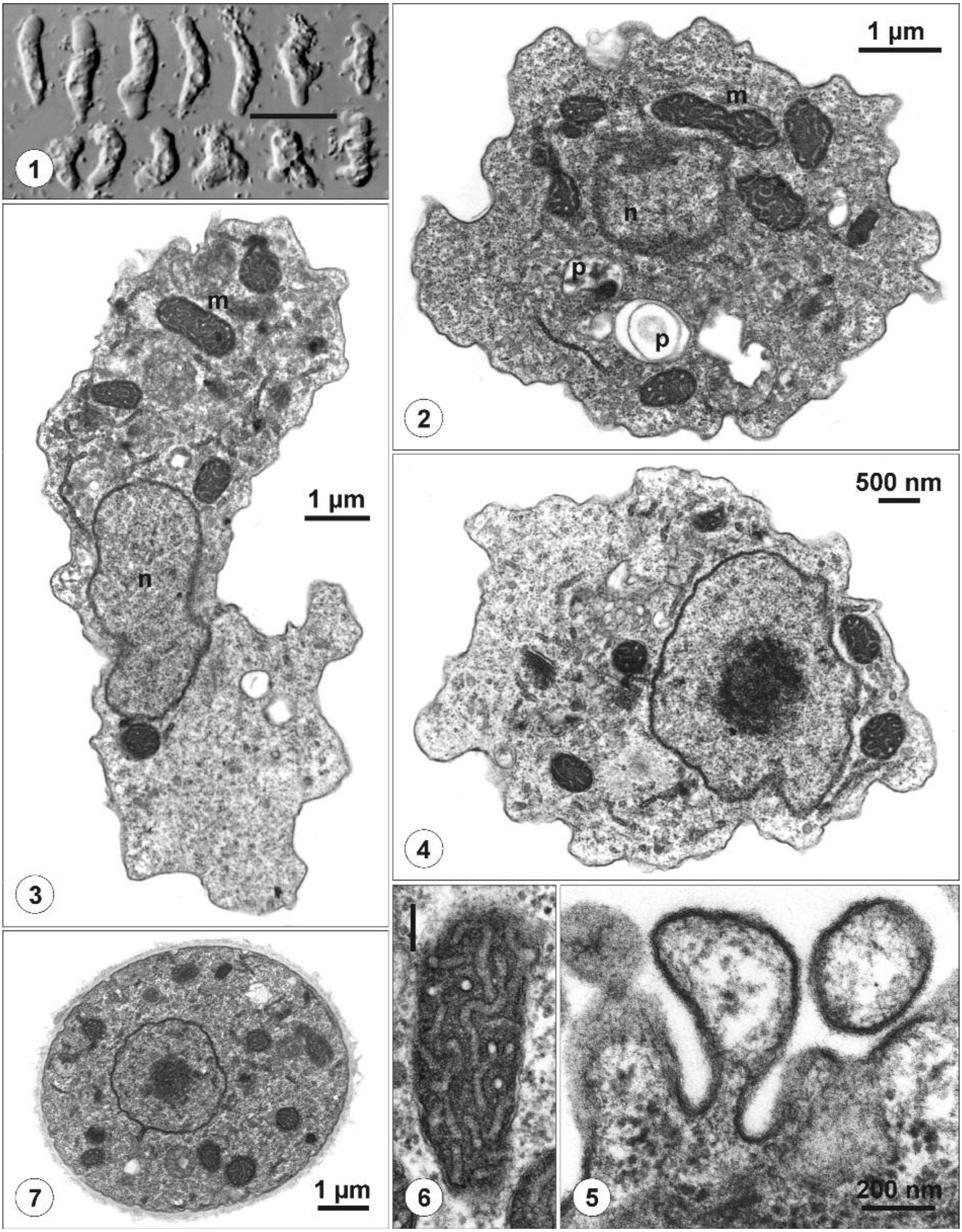

Plate 253. HF1KJ strain of amoeboid organism with tubular cristae of mitochondria, isolated from liver of stinging catfish, *Heteropneustes fossilis* (Bloch) of unknown origin, imported to pet shop in Czech Republic; cultured on NN agar; stored in CC since 1998; GenBank Acc. No. of SSU rDNA sequence JQ271778. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC), scale bar = 20 µm. **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n) sectioned out of the plane of nucleoli, mitochondria (m), phagosomes (p). **Fig. 4.** Trophozoite with nucleus displaying central nucleolar mass. **Fig. 5.** Cell surface in posterior part of trophozoite. **Fig. 6.** Mitochondrion with tubular cristae. **Fig. 7.** Cyst.

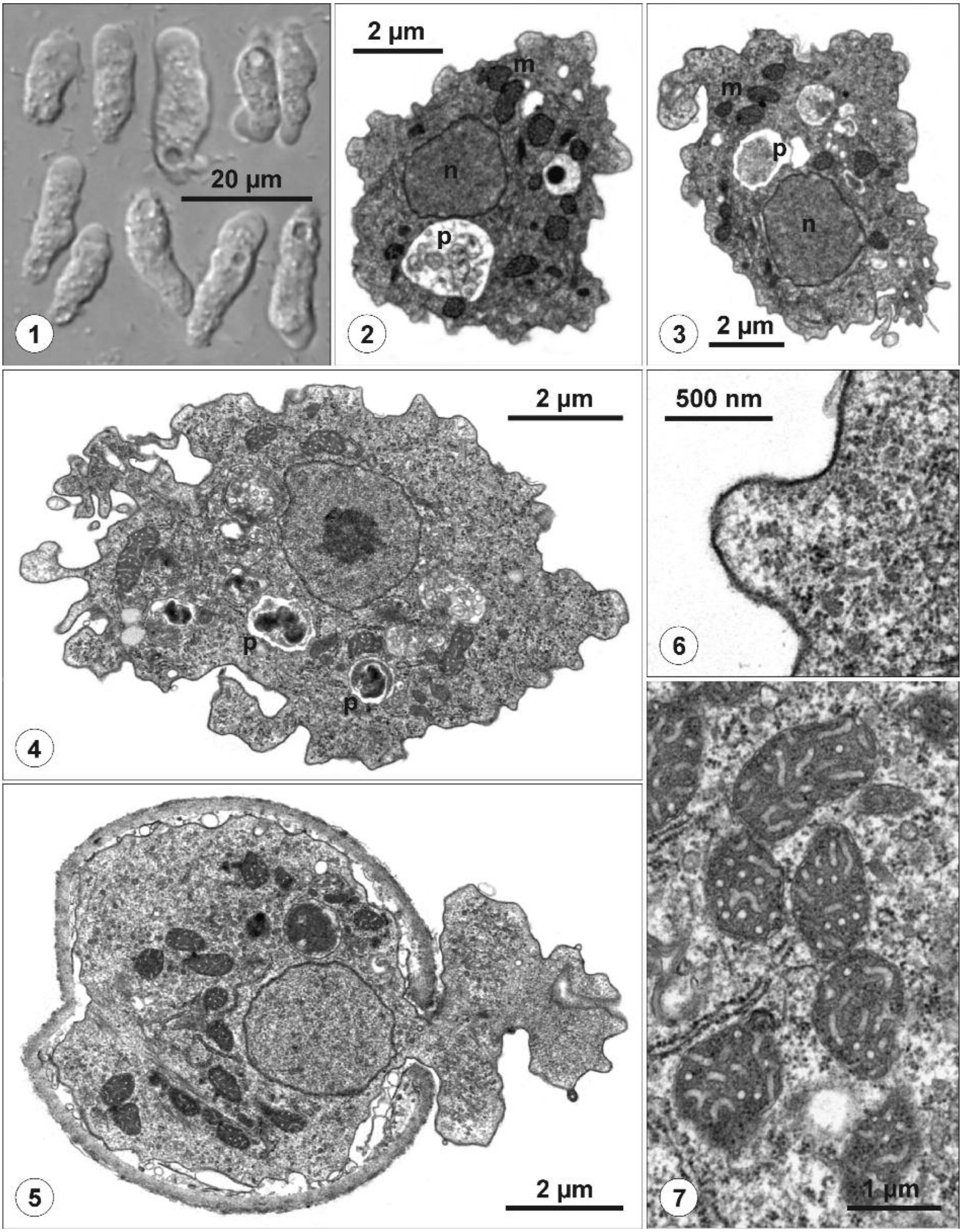

Plate 254. HF3KL strain of amoeboid organism with tubular cristae of mitochondria, isolated from kidney of stinging catfish, *Heteropneustes fossilis* (Bloch) of unknown origin, imported to pet shop, Czech Republic; subcultured on NN agar; stored in CC since 1998; GenBank Acc. No. of SSU rDNA sequence JQ271779. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n) sectioned out of the plane of nucleoli, mitochondria (m), phagosomes (p). **Fig. 4.** Overview of trophozoite ultrastructure: nucleus with centrally located nucleolus; mitochondria and phagosomes (p) in cytoplasm. **Fig. 5.** Liberation of trophozoite from cyst. **Fig. 6.** Cell surface of trophozoite. **Fig. 7.** Mitochondria with tubular cristae.

Strains *incertae sedis*, group 03

Plates 255–258

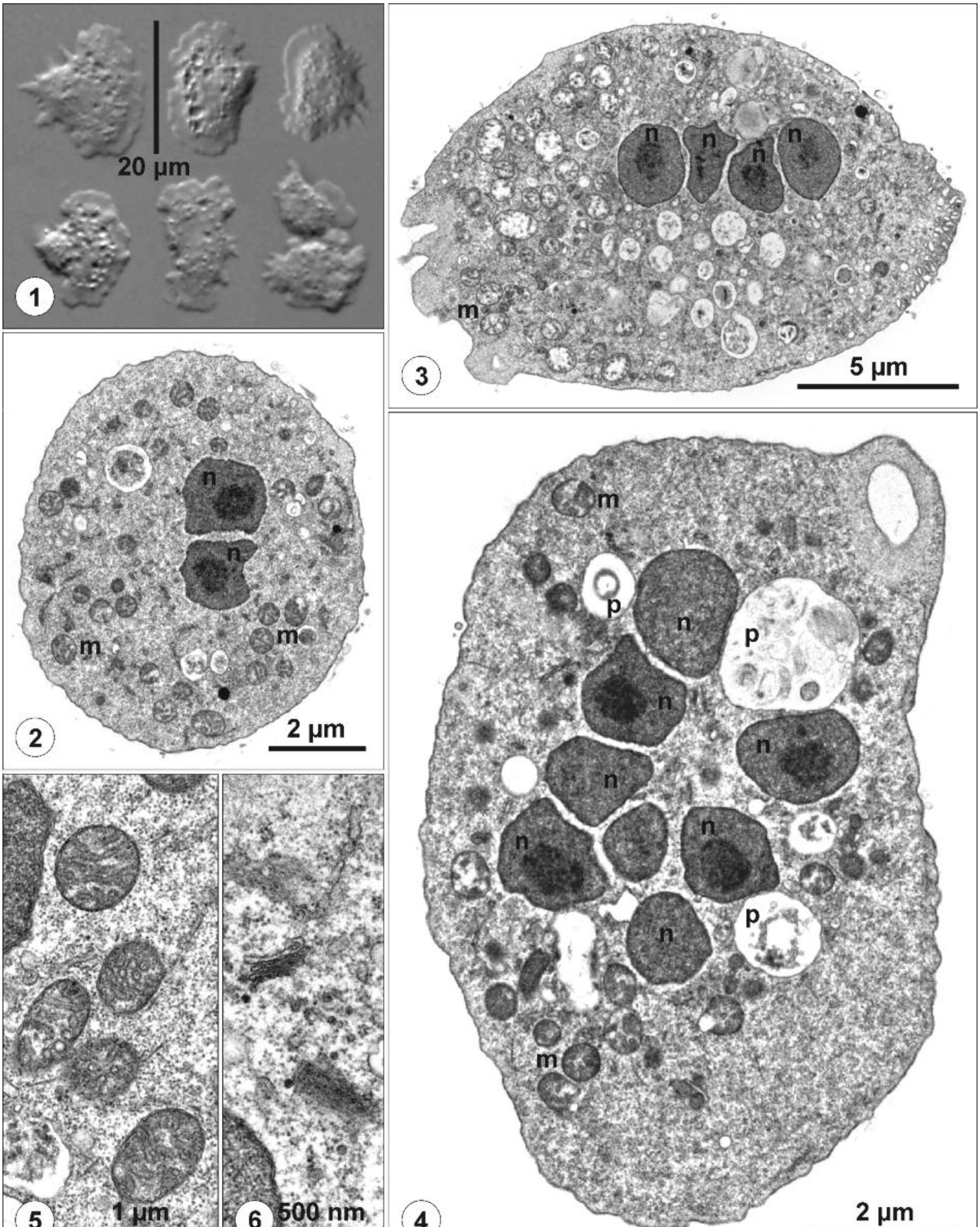

Plate 255. ROD2G strain of amoeboid organism isolated from gills of turbot, *Scophthalmus maximus* (L.) farmed in NW Spain; cultured on MY75S agar; stored in CC since 2008; GenBank Acc. No. of SSU rDNA sequence JQ271780. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: numerous nuclei (n) predominate as distinguishing feature, mitochondria (m) small, rounded to oval (hardly discernible). **Fig. 4.** Detail of trophozoite ultrastructure: eight nuclei (n), relatively small mitochondria (m), phagosomes (p) with remnants of phagocytised material. **Fig. 5.** Detail of mitochondria with tubular cristae. **Fig. 6.** Golgi complexes.

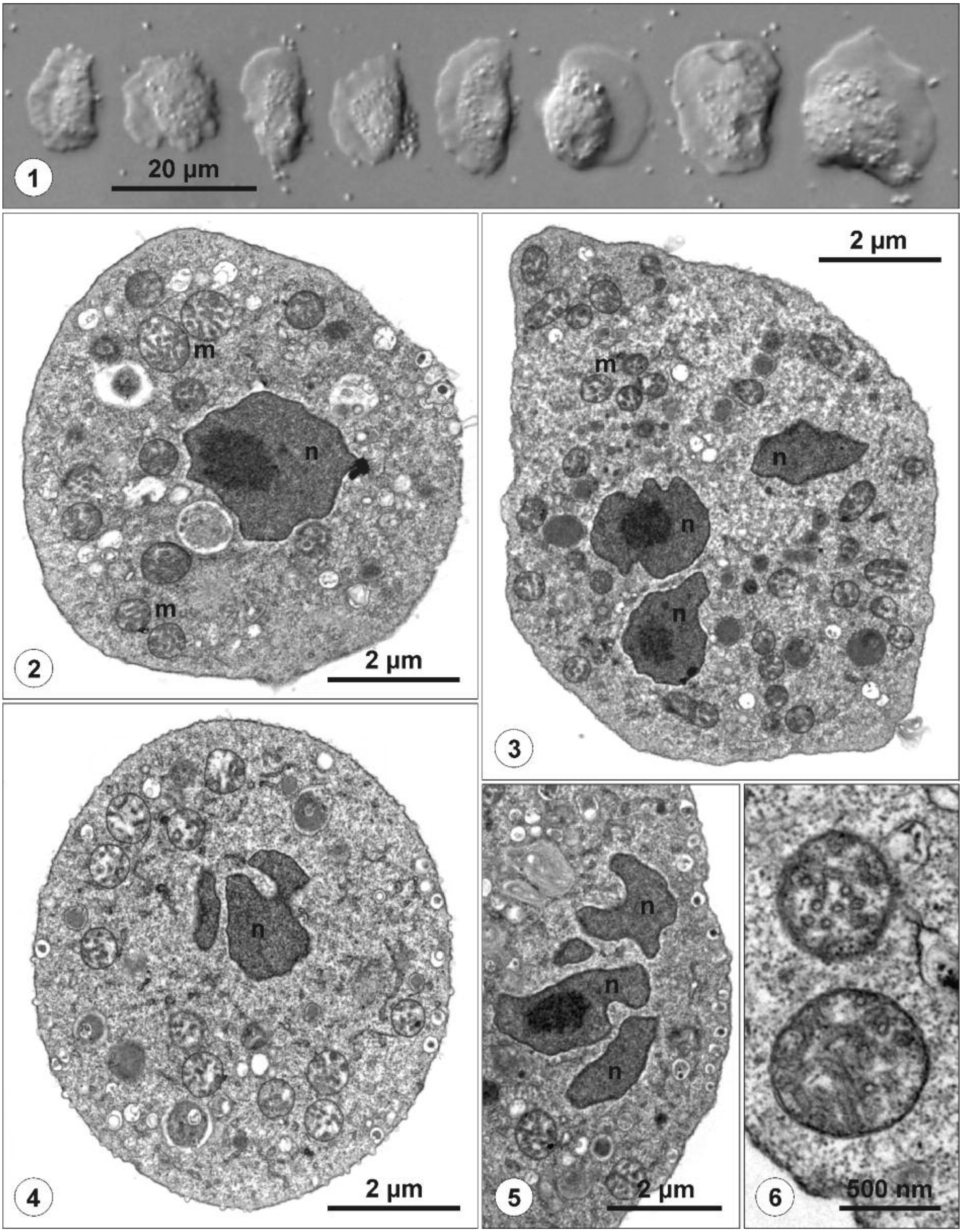

Plate 256. ROD4G strain of amoeboid organism isolated from gills of turbot, *Scophthalmus maximus* (L.) farmed in NW Spain; cultured on MY75S agar; stored in CC since 2008; GenBank Acc. No. of SSU rDNA sequence JQ271781. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3, 4.** Overview of fine structure of trophozoites including those transformed into rounded resting stages: nuclei (n), small mitochondria (m), phagosomes. **Fig. 5.** Overview of ultrastructure of trophozoites: lobed and numerous nuclei (n), small mitochondria with tubular cristae, small vesicles/phagosomes under cell membrane. **Fig. 6.** Mitochondria with tubular cristae.

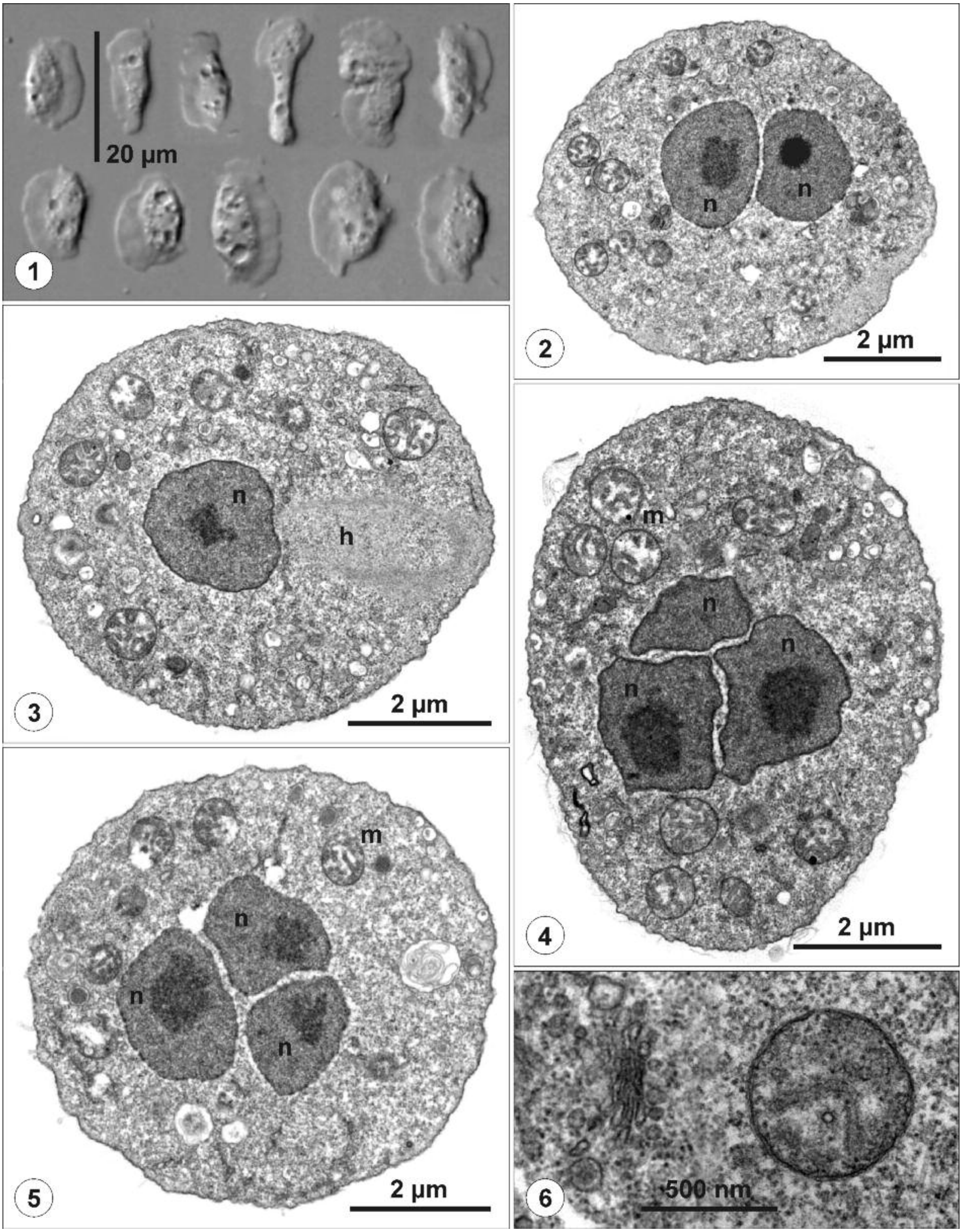

Plate 257. ROD5G strain of amoeboid organism isolated from gills of turbot, *Scophthalmus maximus* (L.) farmed in NW Spain; cultured on MY75S agar; stored in CC since 2008; GenBank Acc. No. of SSu rDNA sequence JQ271782. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria, hyaloplasm (h) rarely seen in material fixed and pelleted for TEM. **Figs. 4, 5.** Multinucleate trophozoites: finely granular cytoplasm with small mitochondria (m) contains two/three nuclei (n) in the plane of sectioning. **Fig. 6.** Golgi complex (left), mitochondrion with tubular cristae (right).

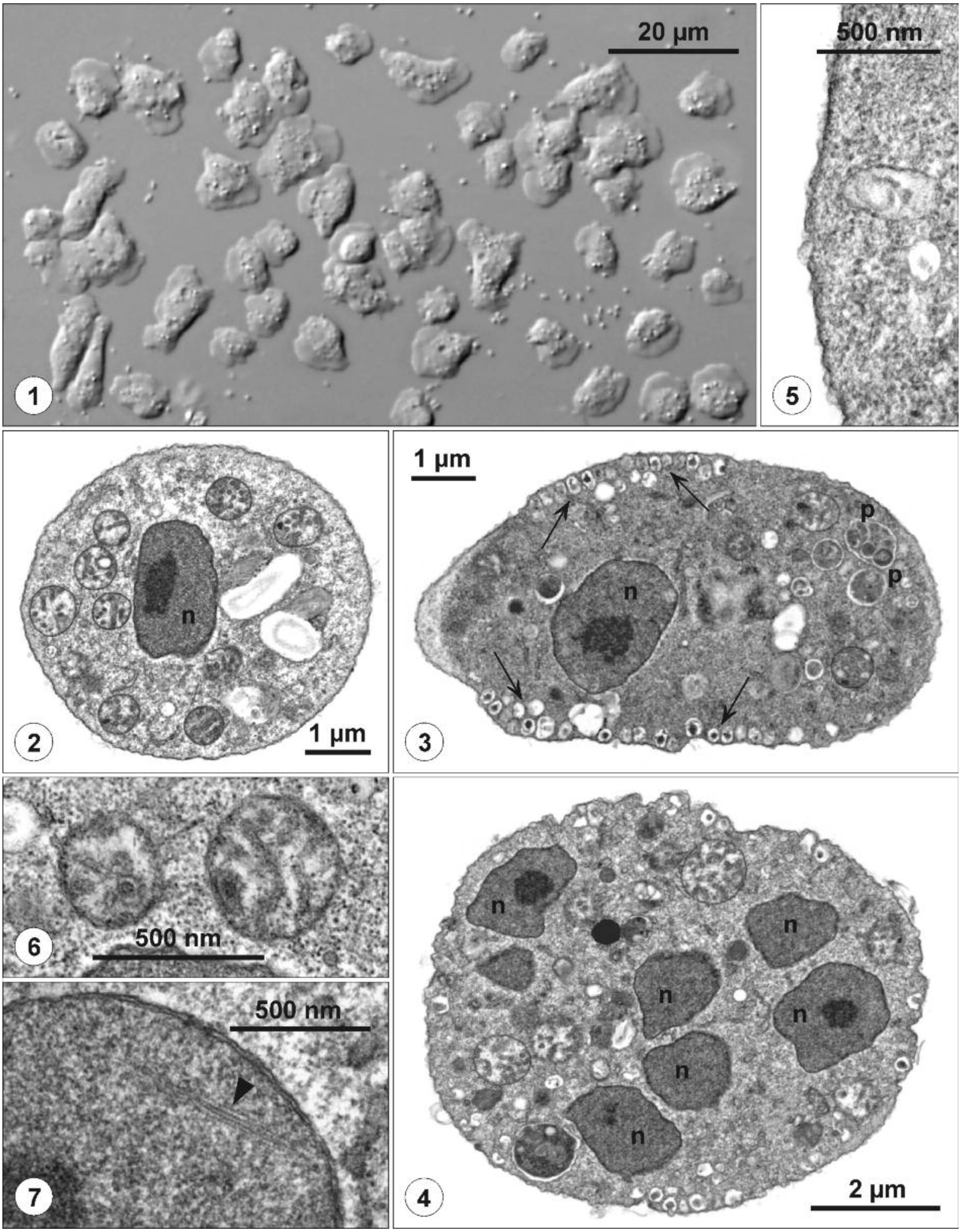

Plate 258. ROD8G strain of amoeboid organism isolated from gills of turbot, *Scophthalmus maximus* (L.) farmed in NW Spain; cultured on MY75S agar; stored in CC since 2008; GenBank Acc. No. of SSU rDNA sequence JQ271783. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3, 4.** Overview of fine structure of trophozoites: nuclei (n), small rounded mitochondria, phagosomes (p), small vesicles/vacuoles with electron-dense bodies regularly arranged under cell membrane (arrows). **Fig. 5.** Cell surface of trophozoite. **Fig. 6.** Detail of mitochondria with tubular cristae. **Fig. 7.** Part of nucleus with microtubules (arrowhead).

Strains *incertae sedis*, group 04

Plates 259–267

While this Guide was proofread, it came to our knowledge that Atlan et al. (2012) erected a new genus of amoebae, *Micriamoeba*. Phylogenetic analyses of sequence data derived from members of our *incertae sedis* group 04 strains have shown that they represent various species of this newly erected genus.

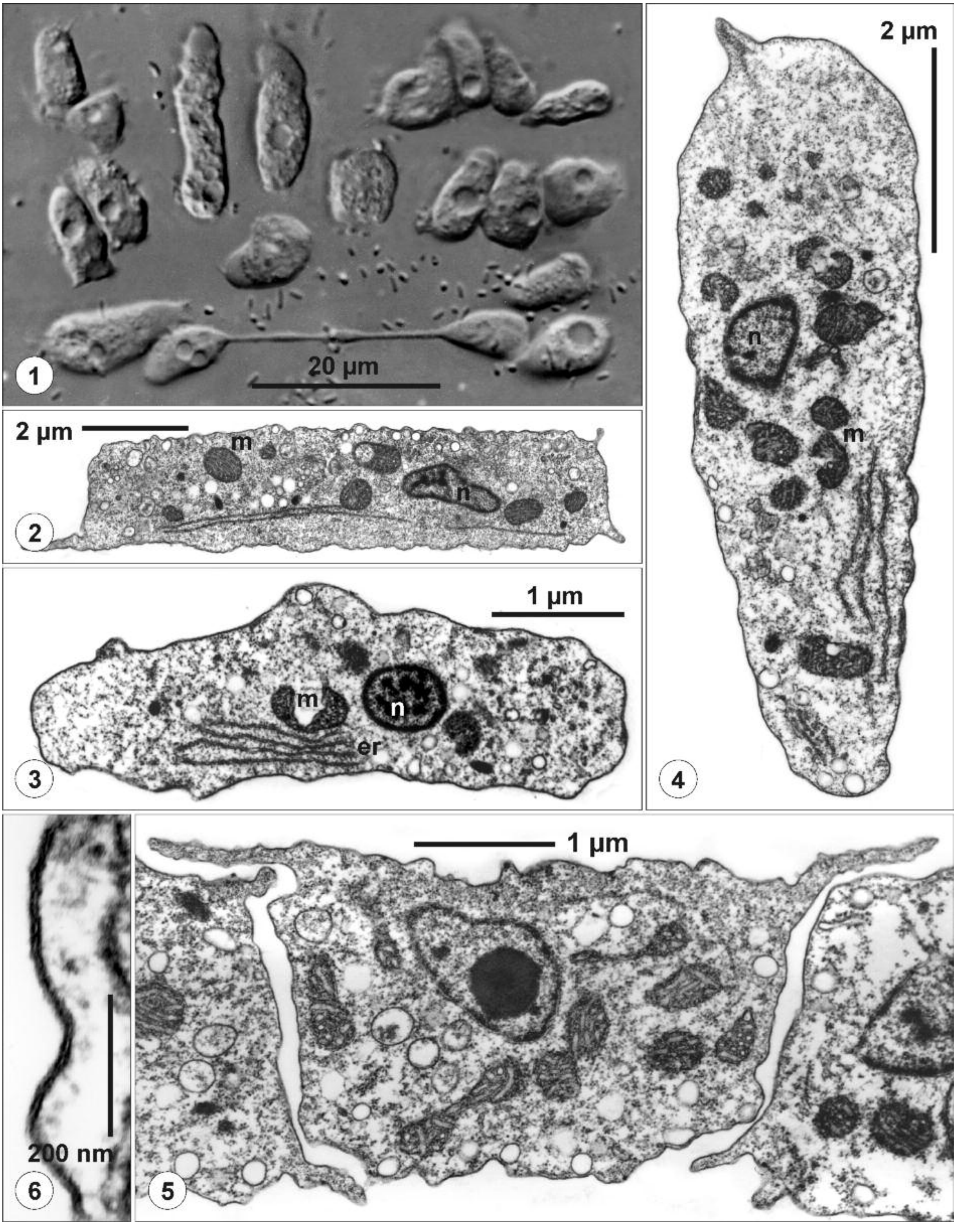

Plate 259. 4790 strain of amoeboid organism isolated from spleen of bullhead, *Cottus gobio* L. from Zlatý potok brook, South Bohemia, Czech Republic; cultured on NN agar; stored in CC since 1991; GenBank Acc. No. of SSU rDNA sequence JQ271784. **Fig. 1.** Trophozoites as seen in hanging drop preparations. Dividing cells interconnected by intercellular bridges (Nomarski DIC). **Figs. 2, 3, 4.** Overview of fine structure of trophozoites: small nuclei (n), mitochondria (m), profiles of endoplasmic reticulum (er) in close arrays parallel to cell surface. **Fig. 5.** Multiplying trophozoites located close to each other, *in situ* fixation for TEM. **Fig. 6.** Cell surface of trophozoite. (Cont.)

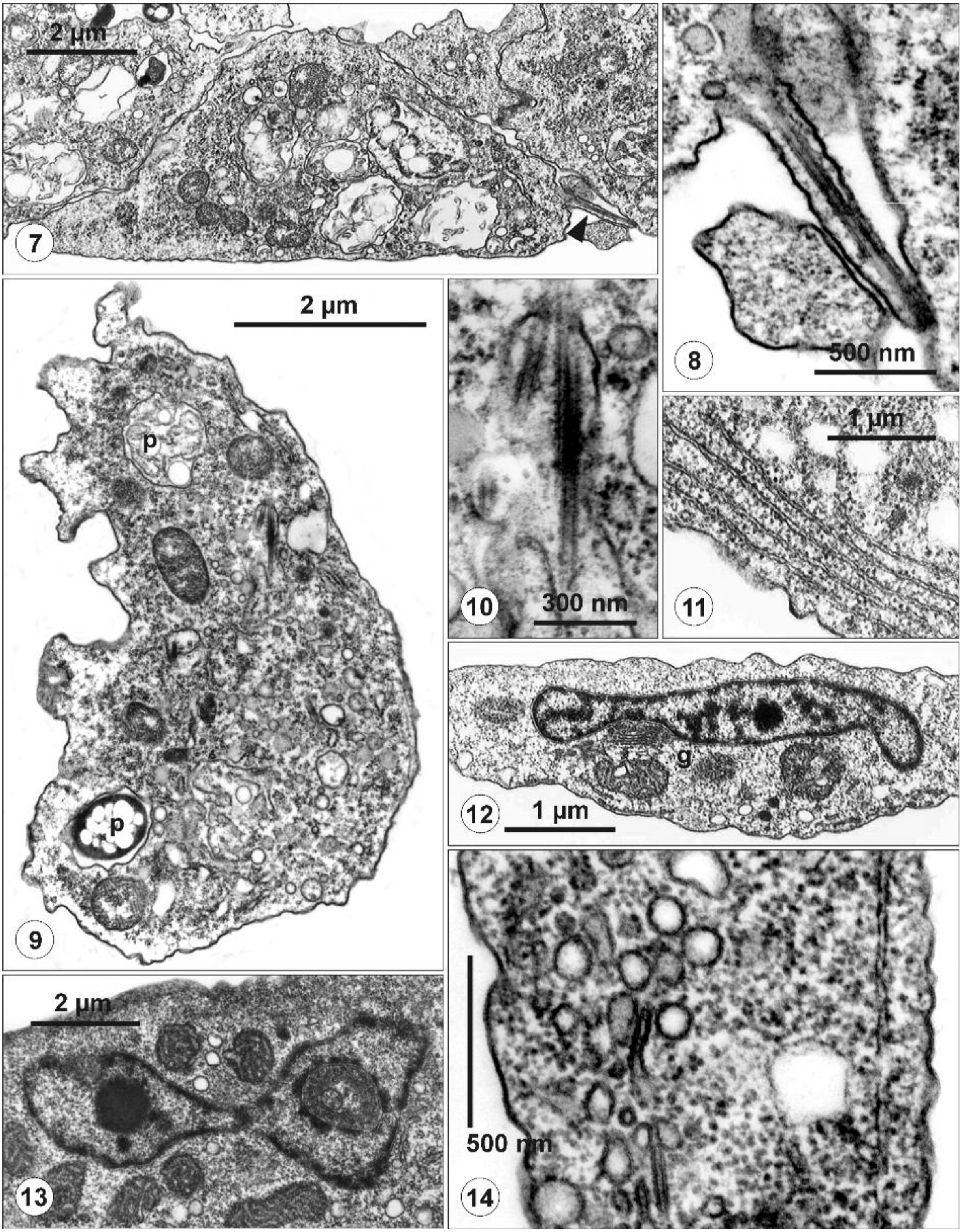

Plate 260. 4790 strain. More details of ultrastructure of trophozoites. **Fig. 7.** Trophozoite with short cytoplasmic projection (arrowhead). **Fig. 8.** Detail of cytoplasmic projection containing microtubule. **Fig. 9.** Trophozoite containing phagosomes (p), mitochondria, numerous vesicles and microtubules. **Fig. 10.** Detail of cytoplasmic microtubules. **Fig. 11.** Detail of endoplasmic reticulum. **Fig. 12.** Overview of trophozoite ultrastructure: Golgi complex (g) in depression of nucleus. **Fig. 13.** Detail of dividing nucleus. **Fig. 14.** Pinocytotic channels and vacuoles in cytoplasm. Ref.: Dyková et al. 1998c.

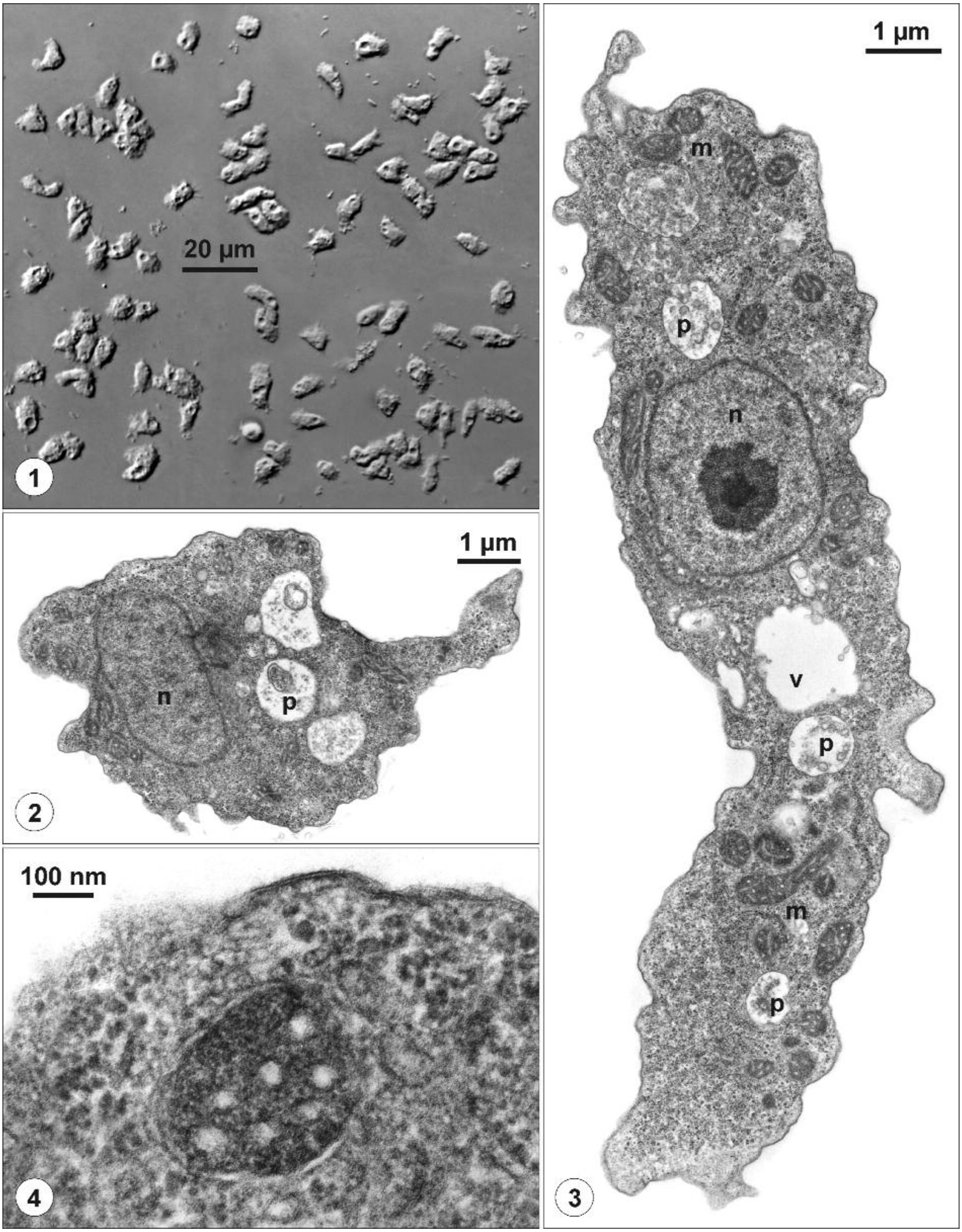

Plate 261. BCHM5 strain of amoeboid organism isolated from liver of guitarrita, *Bunocephalus coracoideus* (Cope) imported from Brazil to pet shop, Czech Republic; cultured on NN agar; stored in CC since 1999; GenBank Acc. No. of SSU rDNA sequence JQ271785. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosomes (p), vacuole (v). **Fig. 4.** Detail of ultrastructure of mitochondrion with tubular cristae in transverse section.

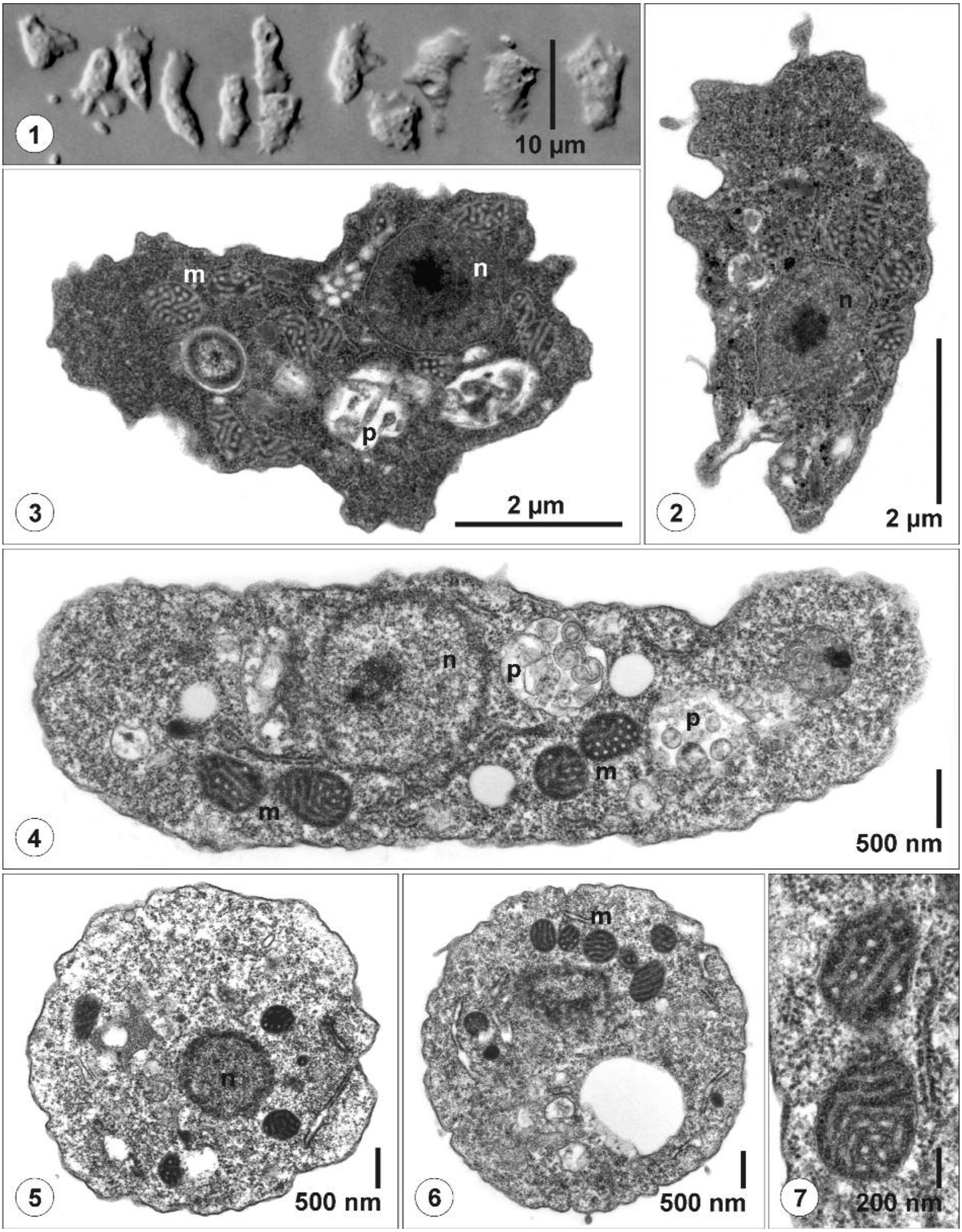

Plate 262. CAL5 strain of amoeboid organism isolated from kidney of goldfish, *Carassius auratus auratus* (L.) from experimental stock kept in research institution, České Budějovice, South Bohemia, Czech Republic; cultured on NN agar; stored in CC since 2000; GenBank Acc. No. of SSU rDNA sequence JQ271786. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3, 4.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosomes (p). **Figs. 5, 6.** Trophozoites in transverse sections: nucleus (n), mitochondria with tubular cristae in parallel arrangement (m). **Fig. 7.** Mitochondria with tubular cristae seen in various planes of sectioning.

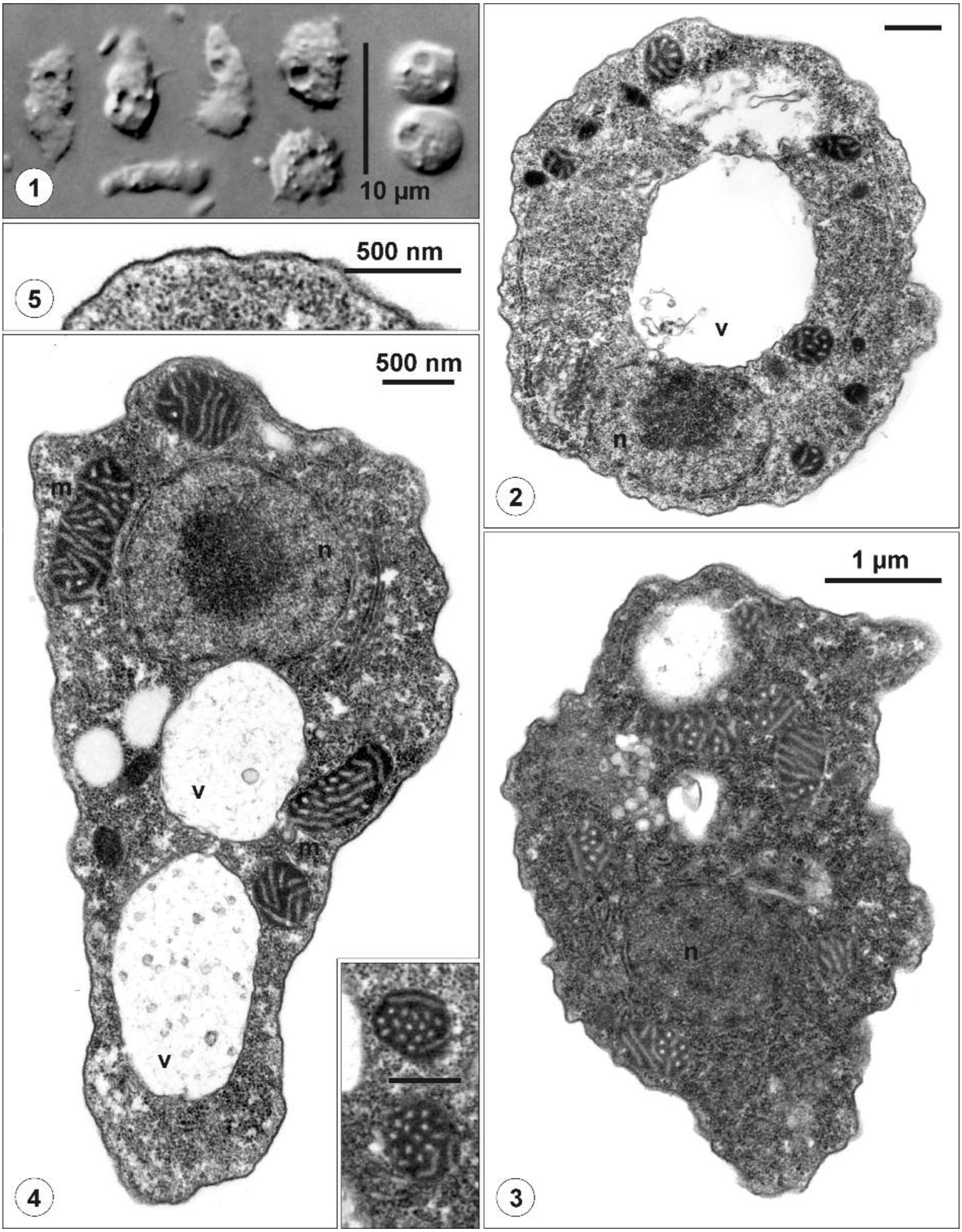

Plate 263. CAL7 strain of amoeboid organism isolated from kidney of goldfish, *Carassius auratus auratus* (L.) from experimental stock kept in research institution, České Budějovice, South Bohemia, Czech Republic; cultured on NN agar; stored in CC since 2000; GenBank Acc. No. of SSU rDNA sequence JQ271787. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3, 4.** Overview of fine structure of trophozoites sectioned in various planes: nuclei (n), mitochondria (m), vacuoles (v), scale bar for Fig. 2 = 500 nm. Inset in Fig. 4. Mitochondria with tubular cristae in transverse sections, scale bar = 500 nm. **Fig. 5.** Cell surface of trophozoite.

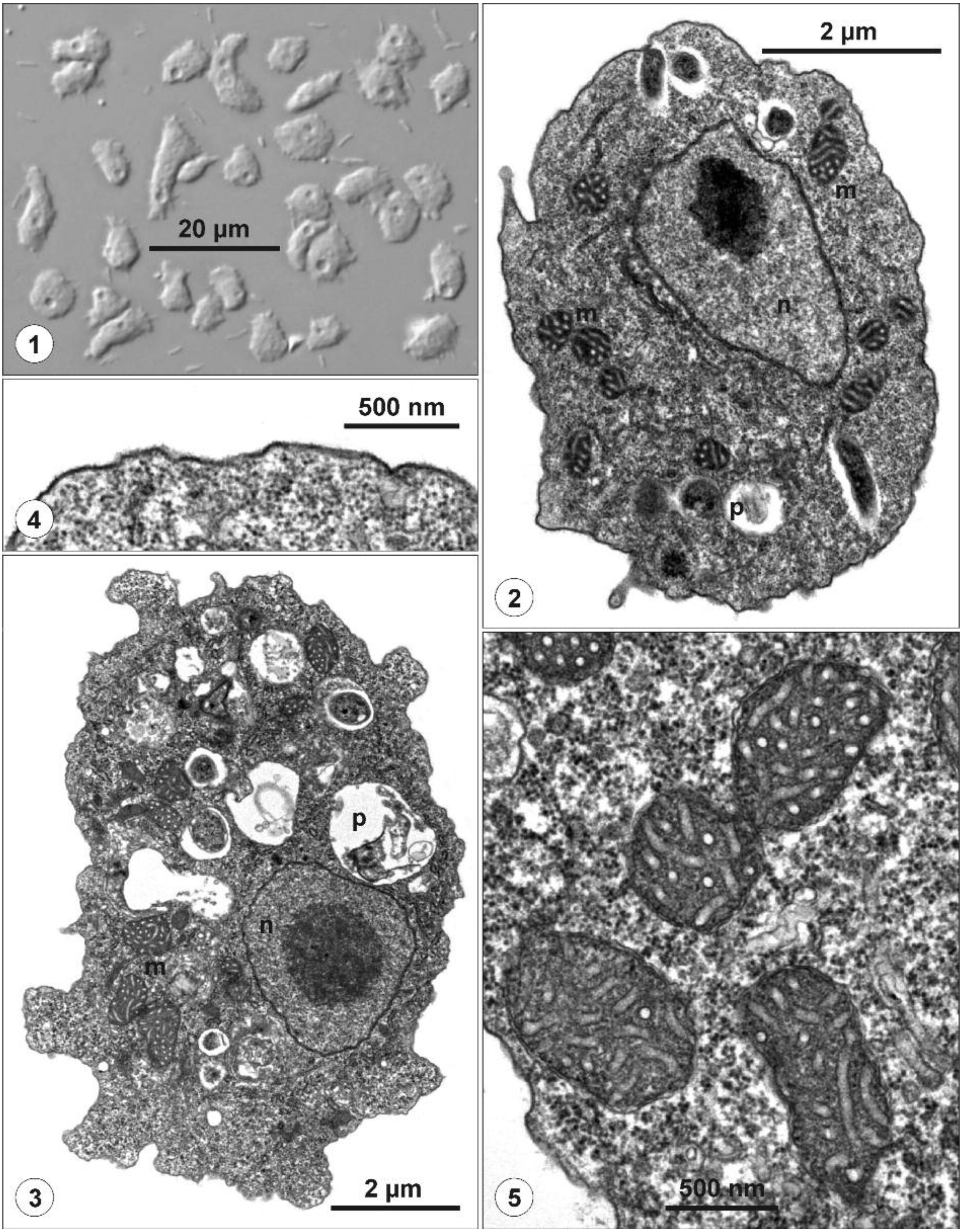

Plate 264. MSED2 strain of amoeboid organism isolated from sediment collected from aquarium with freshwater fishes, České Budějovice, South Bohemia, Czech Republic; cultured on NN agar; stored in CC since 2010; GenBank Acc. No. of SSU rDNA sequence JQ271788. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosomes (p). **Fig. 4.** Cell surface of trophozoite. **Fig. 5.** Detail of ultrastructure of mitochondria with tubular cristae sectioned in various planes.

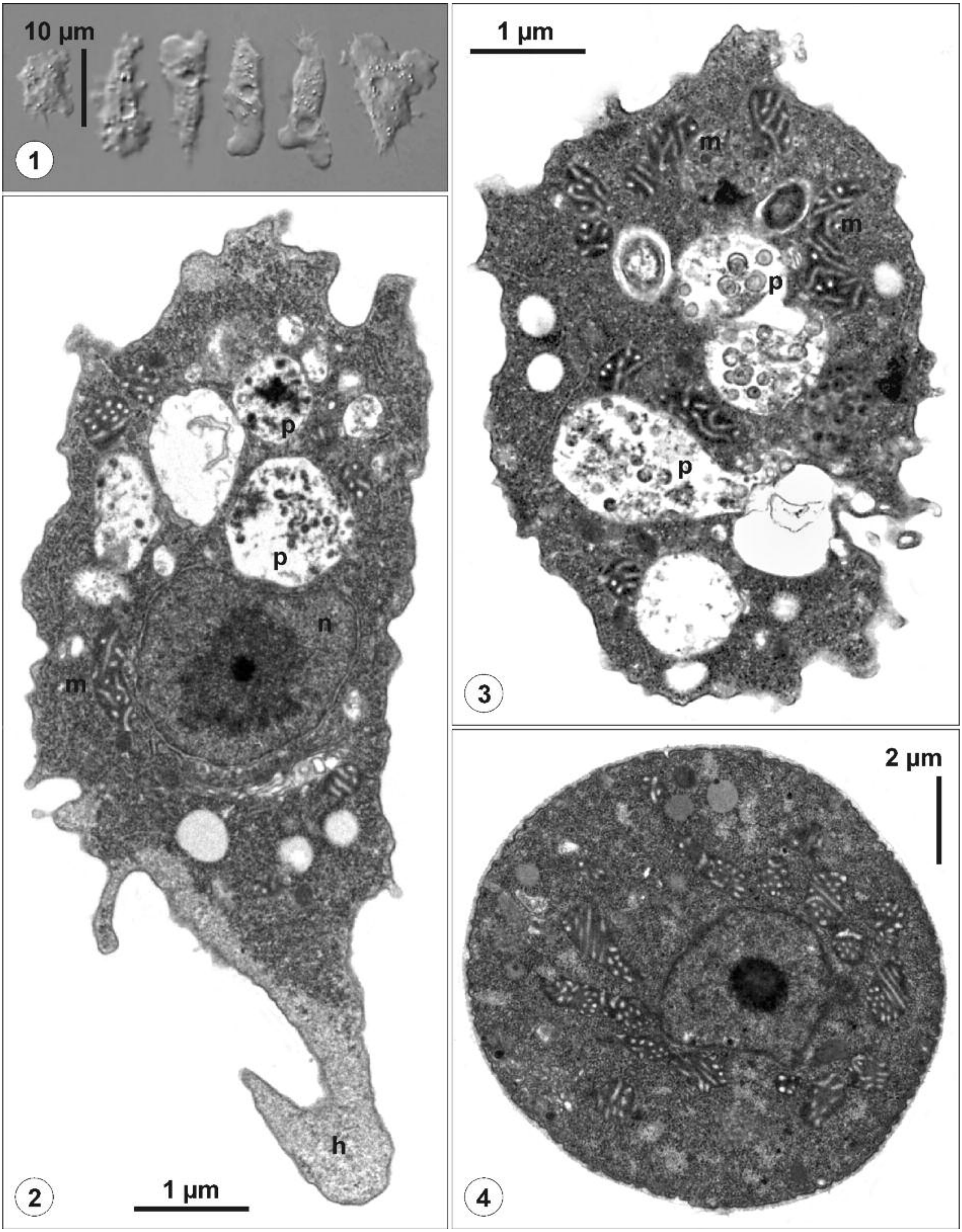

Plate 265. P18 strain of amoeboid organism isolated from gills of zamurito, *Calophysus macropterus* (Lichtenstein) from Amazon River, Iquitos, Peru; cultured on NN agar; stored in CC since 2004; GenBank Acc. No. of SSU rDNA sequence JQ271789. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites sectioned in different planes: nucleus (n), mitochondria (m), phagosomes (p), hyaloplasm (h). **Fig. 4.** Rounded, apparently resting stage, often occurring shortly after subculturing.

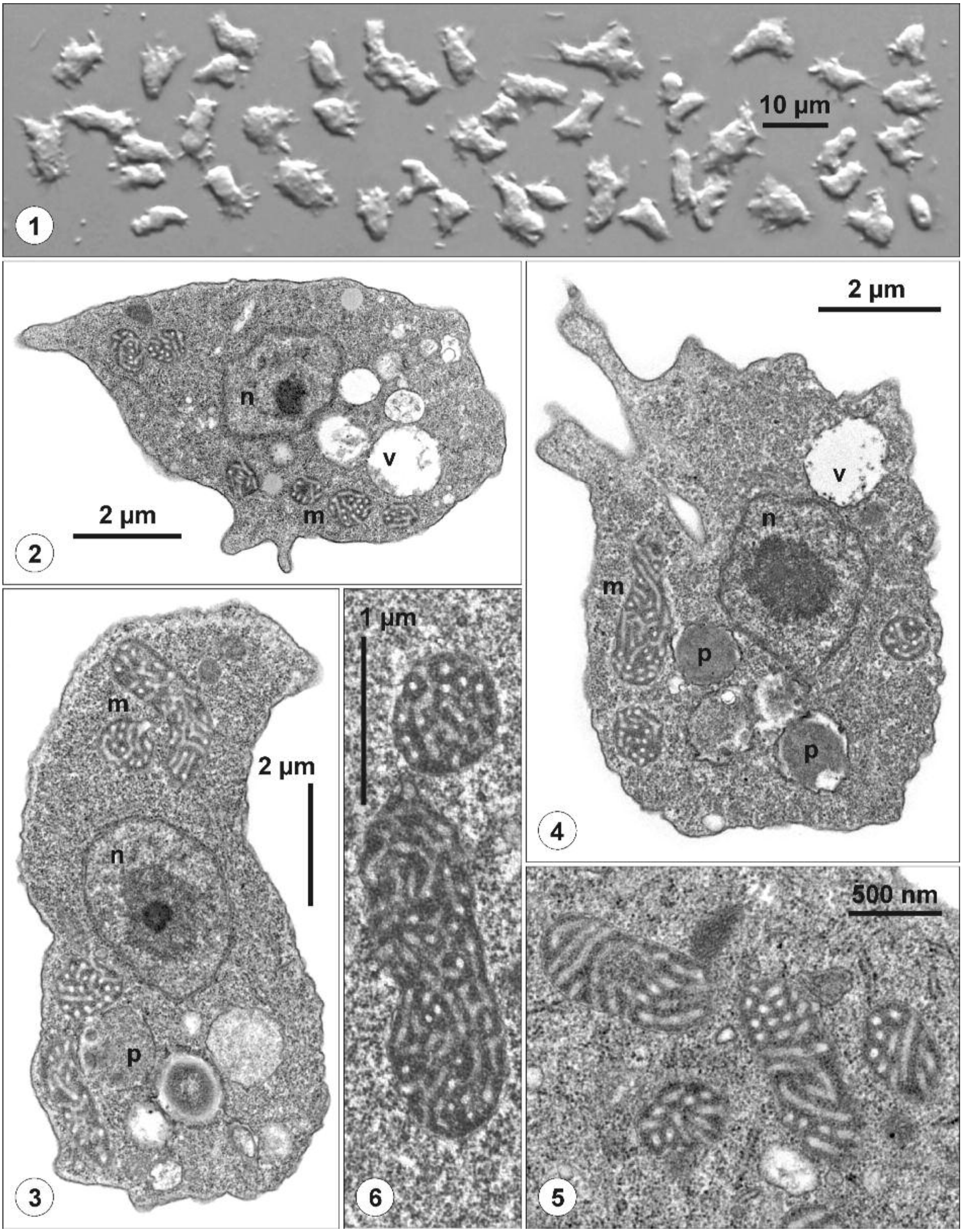

Plate 266. PPD16 strain of amoeboid organism isolated from red cushion star, *Porania pulvillus* (O.F. Müller) from Norwegion Sea, off Vevang, Trondheim, Norway; cultured on MY75S agar; stored in CC since 2005; GenBank Acc. No. of SSU rDNA sequence JQ271790. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3, 4.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m), phagosomes with remnants of phagocytised material (p) and empty vacuoles (v). **Figs. 5, 6.** Details of trophozoite ultrastructure: mitochondria with tubular cristae sectioned longitudinally and transversely.

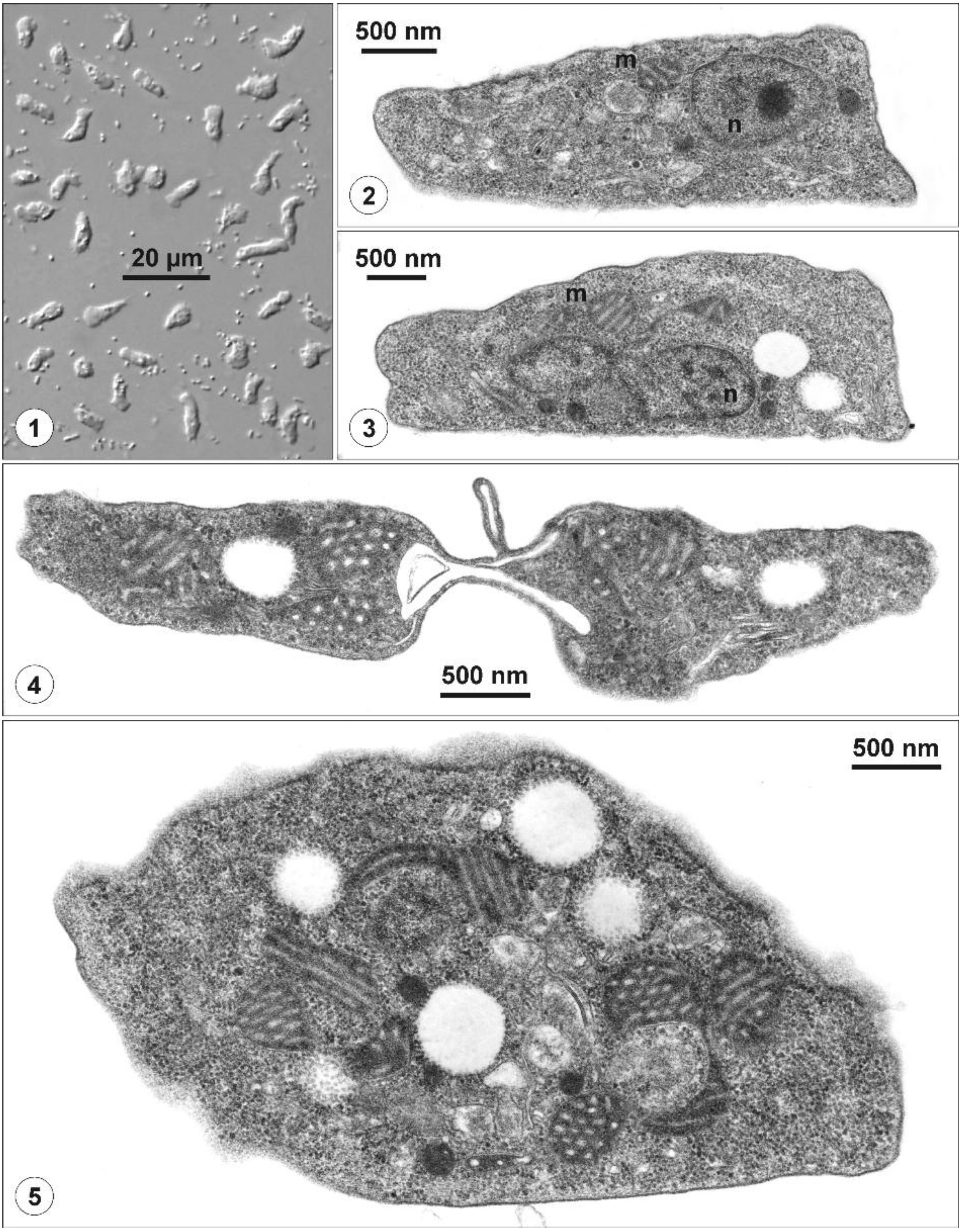

Plate 267. W185G strain of tubulocristate amoeboid organism isolated from gills of Prussian carp, *Carassius gibelio* (Bloch) from Baoan Lake, Hubei province, China; cultured on NN agar; stored in CC since 2001; GenBank Acc. No. of SSU rDNA sequence JQ271791. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: nuclei (n), mitochondria (m). **Fig. 4.** Interconnected, almost divided trophozoites sectioned out of the plane of nuclei. **Fig. 5.** Detail of trophozoite ultrastructure: mitochondria sectioned in various planes display regular, parallel arrangement of tubular cristae.

Strains *incertae sedis*, group 05

Plates 268–269

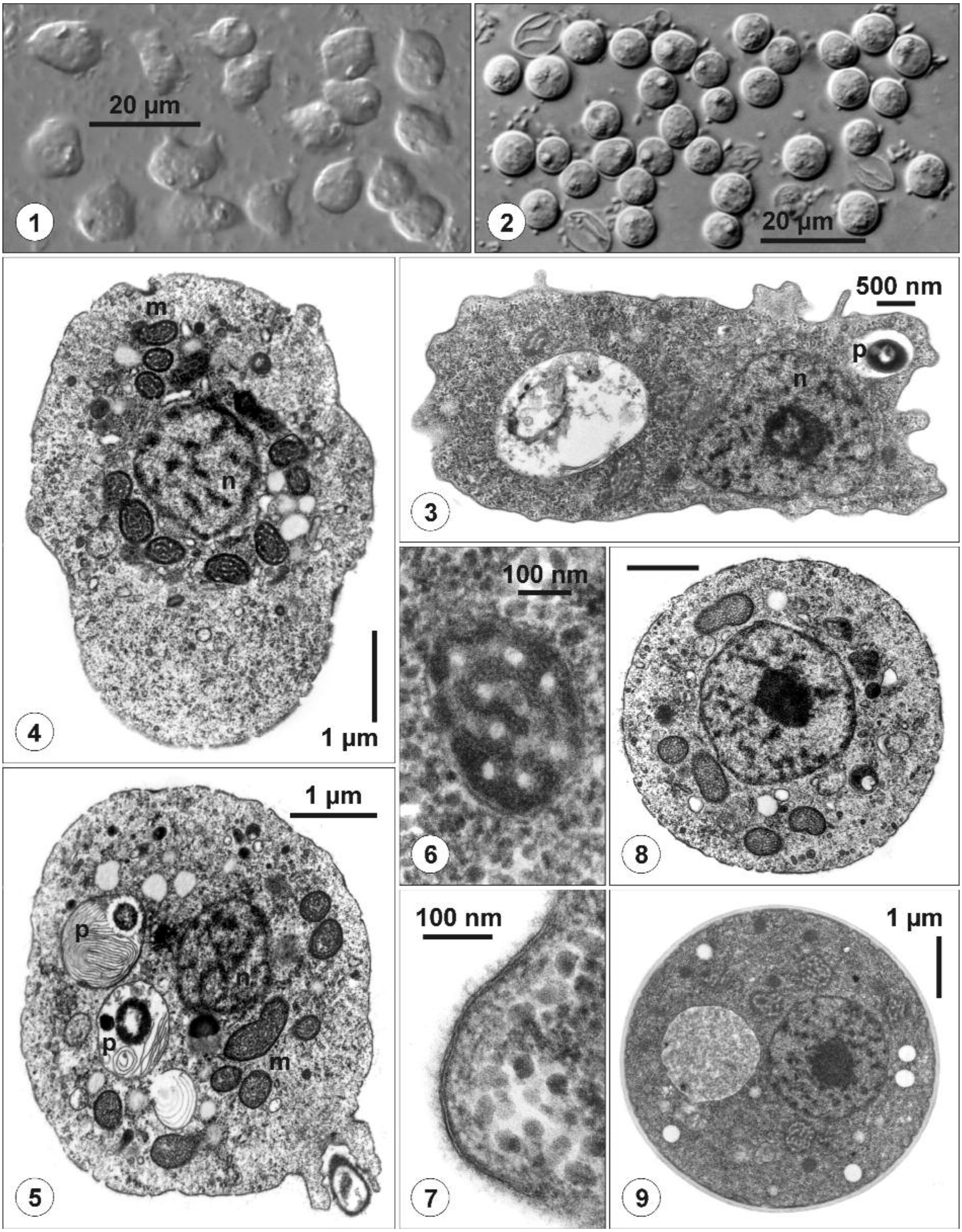

Plate 268. 900 strain of amoeboid organism isolated from liver of Nile tilapia, *Oreochromis niloticus* (L.) collected in farm supplied with water from cooling system of electric power station, South Bohemia, Czech Republic; cultured on NN agar; stored in CC since 1993; GenBank Acc. No. of SSU rDNA sequence JQ271792. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Fig. 2.** Cysts as seen in Nomarski DIC. **Figs. 3, 4, 5.** Overview of fine structure of trophozoites sectioned in different planes: vesicular nuclei (n), mitochondria (m), phagosomes (p), vesicles. **Fig. 6.** Detail of ultrastructure of mitochondrion with tubular cristae. **Fig. 7.** Cell surface of trophozoite. **Fig. 8.** Rounded, resting stage of trophozoite, scale bar = 1 µm. **Fig. 9.** Cyst.

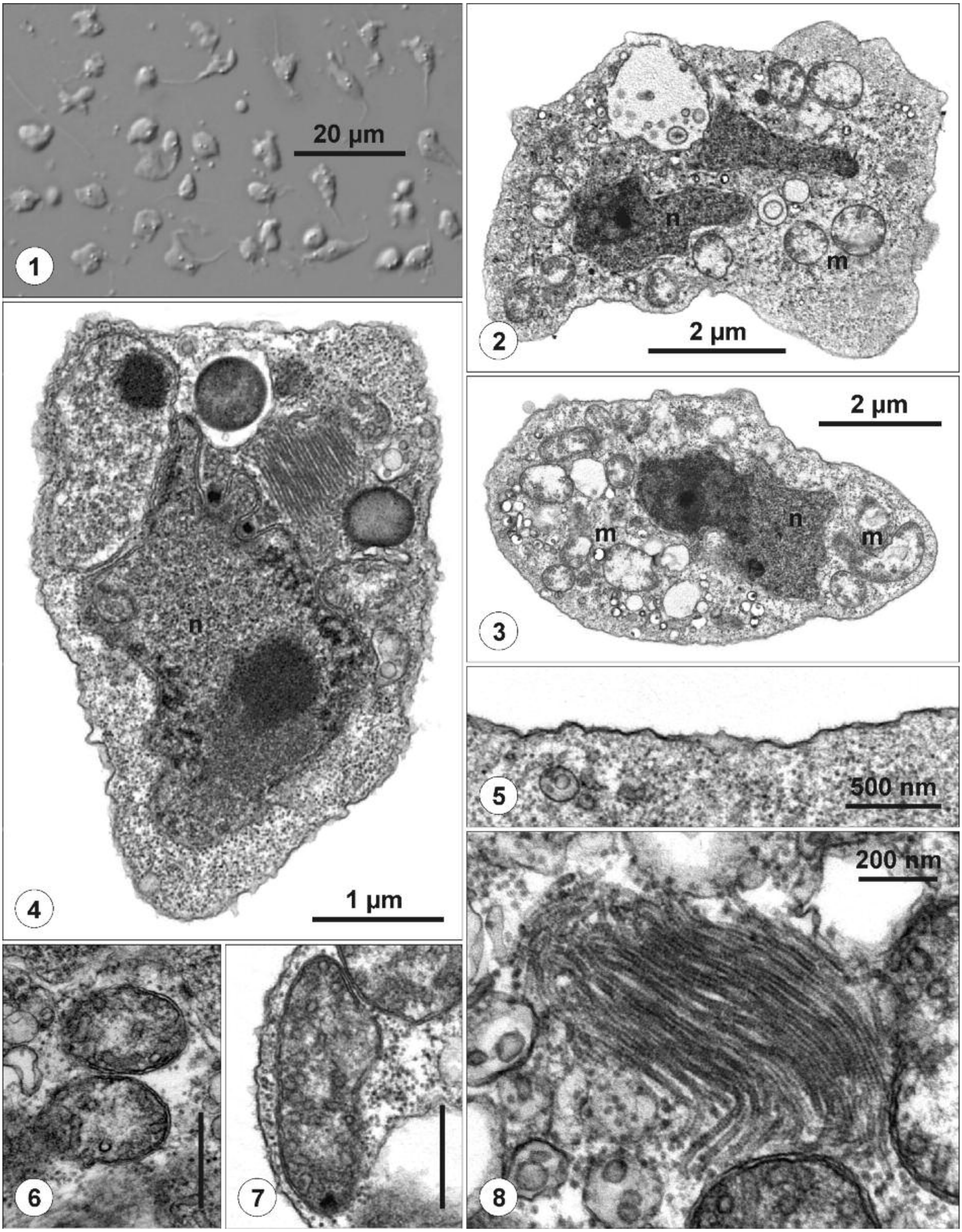

Plate 269. M6MM strain of amoeboid organism isolated from gills of finescale triggerfish, *Balistes polylepis* Steindachner collected off Mazatlan, Sinaloa, Mexico; cultured on MY75S agar; stored in CC since 2000; GenBank Acc. Nos. of SSU rDNA sequences JQ271793. **Fig. 1.** Trophozoites as seen in hanging drop preparations (Nomarski DIC). **Figs. 2, 3.** Overview of fine structure of trophozoites: lobed nuclei (n), numerous vesicles and vacuoles, mitochondria (m) with poorly preserved structure. **Fig. 4.** Overview of trophozoite ultrastructure: lobed nucleus (n), dense bodies and unidentified structure consisting of tubules in parallel arrangement. **Fig. 5.** Cell surface of trophozoites. **Figs. 6, 7.** Details of mitochondria with tubular cristae, scale bars = 500 nm. **Fig. 8.** Detail of unidentified structure seen in cytoplasm.

INDEX OF STRAIN CODES

INDEX OF GENBANK ACC. NOS. OF STRAIN SSU rDNA SEQUENCES

GenBank Acc. No.	Strain code	Species denomination	Plate No./page No.
AF338417	Pd72Z	*Naegleria clarki*	098/145
AF338419	4564	*Naegleria clarki*	075/122
AF338420	4709	*Naegleria clarki*	076/123
AF338421	CB2B	*Naegleria australiensis*	088/135
AY145442	LOS7N	*Saccamoeba* sp.	154/215
AY193723	AFSM11	*Neoparamoeba pemaquidensis*	104/152
AY193724	AFSM3	*Neoparamoeba branchiphila*	105/153
AY193725	SM68	*Neoparamoeba branchiphila*	120/153
AY364635	RR2G2	*Nuclearia pattersoni*	130, 131/182, 183
AY714350	NETH2T3	*Neoparamoeba pemaquidensis*	112/160
AY714351	NP251002	*Neoparamoeba pemaquidensis*	113/161
AY714352	GillNOR1	*Neoparamoeba pemaquidensis*	108/156
AY714353	SEDC	*Neoparamoeba pemaquidensis*	117/165
AY714354	GillNOR2	*Neoparamoeba pemaquidensis*	109/157
AY714355	ST8V	*Neoparamoeba pemaquidensis*	122/170
AY714356	FRS	*Neoparamoeba pemaquidensis*	107/155
AY714358	PA027	*Neoparamoeba pemaquidensis*	115/163
AY714359	SEDST1	*Neoparamoeba pemaquidensis*	119/167
AY714361	WTUTS	*Neoparamoeba pemaquidensis*	127/175
AY714365	ST4N	*Neoparamoeba branchiphila*	121/169
AY714366	SEDMH1	*Neoparamoeba branchiphila*	118/166
AY714367	NRSS	*Neoparamoeba branchiphila*	114/162
AY714369	CH26	*Filamoeba sinensis*	046/82
AY929904	S2M2	*Vannella* sp.	207/274
AY929905	ISO13	*Vannella* sp.	191/258
AY929906	S98M8	*Vannella* sp.	217/284
AY929908	RSL	*Lingulamoeba* sp.	069/113
AY929909	4362V	*Vannella* sp.	168/235
AY929910	4432	*Vannella* sp.	169/236
AY929911	4354	*Vannella* sp.	167/234
AY929912	CH88	*Vannella* sp.	177/244
AY929913	W181G	*Ripella* sp.	152/211
AY929914	CAZ6	*Ripella* sp.	144/203
AY929915	SS8FJ1	*Vannella* sp.	224/291
AY929917	SBV1	*Vannella* sp.	218/285
AY929918	AFSM6	*Vannella* sp.	171/238
AY929919	PMCH	*Vannella* sp.	202/269

GenBank Acc. No.	Strain code	Species denomination	Plate No./page No.
AY929920	DB282	*Vannella* sp.	179/246
AY929921	SUM1S	*Ripella* sp.	151/210
AY929922	CAZ7	*Ripella* sp.	145/204
AY929923	VV	*Vannella* sp.	228/295
AY960120	TT3H	*Protacanthamoeba bohemica*	138, 139/193, 194
DQ084363	4480	*Hartmannella vermiformis*	062/104
DQ084364	4391	*Hartmannella vermiformis*	060/102
DQ084365	TN102	*Hartmannella vermiformis*	067/109
DQ084366	PFG	*Hartmannella vermiformis*	065/107
DQ768714	A22	*Naegleria pagei*	083/130
DQ768715	CL	*Naegleria clarki*	089/136
DQ768716	BCZ4	*Naegleria* sp.	086/133
DQ768717	S1Z	*Naegleria* sp.	101/148
DQ768718	O3Z	*Naegleria* sp.	097/144
DQ768719	4796	*Naegleria fultoni*	077/124
DQ768720	RR13Z	*Naegleria* sp.	100/147
DQ768721	4830	*Naegleria pagei*	078/125
DQ768722	RR11Z	*Naegleria* sp.	099/146
DQ768723	SUM3V	*Naegleria* sp.	102/149
DQ768724	GP3	*Naegleria clarki*	093/140
DQ768725	CB1S	*Naegleria clarki*	087/134
EF118757	ECH14	*Didymium* sp.	040/73
EF118758	ECH1	*Didymium* sp.	039/72
EF118760	ECH43	*Didymium* sp.	041/74
EF118761	ECH49	*Didymium* sp.	042–044/75–77
EF675599	SU4	*Neoparamoeba branchiphila*	124/172
EF675600	AMOPI	*Neoparamoeba branchiphila*	106/154
EF675603	RP	*Neoparamoeba branchiphila*	116/164
EF675604	NET12AFL	*Neoparamoeba pemaquidensis*	111/159
EF675605	WT2708	*Neoparamoeba pemaquidensis*	126/174
EF675607	TUN1	*Neoparamoeba pemaquidensis*	125/173
EU331035	SU03	*Neoparamoeba aestuarina*	123/171
EU331036	LITHON	*Neoparamoeba pemaquidensis*	110/158
EU719190	CCAP1547/8	*Mayorella gemmifera*	070/116
EU852652	SMA17	*Flabellula* sp.	057/95
EU852653	M9M	*Flabellula* sp.	053/91
EU852654	CCAP1529/2	*Flabellula citata*	048/86
EU852655	SEDF	*Paraflabellula* sp.	133/187
EU852657	M4M	*Flabellula* sp.	052/90
EU852658	STAR2	*Paraflabellula* sp.	134/188
EU869301	NTSHR	*Saccamoeba limax*	156, 157/217, 218
GQ371176	JIH56	*Filamoeba nolandi*	047/83
GQ438740	4168	*Grellamoeba robusta*	058, 059/98, 99
GQ438741	4168	*Grellamoeba robusta*	058, 059/98, 99
GQ438742	4168	*Grellamoeba robusta*	058, 059/98, 99
GU810183	4692L	*Stenamoeba limacina*	160/222
GU810184	P119	*Stenamoeba amazonica*	162/224
GU810185	P126	*Stenamoeba* sp.	163/225
HM363624	GERB	*Vannella* sp.	188/255
HM363625	GERE3	*Protacanthamoeba* sp.	135/190
HM363626	GERF1	*Hartmannella vermiformis*	064/106
HM363628	GERF3	*Acanthamoeba* sp.	018, 019/45, 46

GenBank Acc. No.	Strain code	Species denomination	Plate No./page No.
HM363629	GERK	*Naegleria* sp.	090/137
HM363630	GERL14	*Ripella* sp.	147/206
HM363631	GERL34	*Ripella* sp.	148/207
HM363632	GERL41	*Vannella* sp.	189/256
HQ687481	P124	*Vexillifera multispinosa*	233, 234/302, 303
HQ687482	RR1	*Vexillifera fluvialis*	237/306
HQ687483	RMT	*Vexillifera tasmaniana*	236/305
HQ687484	TIL2	*Vexillifera bacillipedes*	239/308
HQ687485	CCAP1590-1	*Vexillifera bacillipedes*	231, 232/300, 301
HQ687486	4730	*Copromyxa expectata*	031/62
JQ271663	4482SL	*Acanthamoeba* sp.	008, 009/35, 36
JQ271664	ACANT	*Acanthamoeba* sp.	013/40
JQ271665	ALC10	*Acanthamoeba* sp.	014/41
JQ271666	ALC2A	*Acanthamoeba* sp.	015/42
JQ271667	CANZ	*Acanthamoeba* sp.	016/43
JQ271668	4165	*Allovahlkampfia* sp.	021/50
JQ271669	PS1073J	*Allovahlkampfia* sp.	022/51
JQ271670	PV66	*Allovahlkampfia* sp.	023/52
JQ271671	4692S	*Cochliopodium minus*	024/54
JQ271672	4694	*Cochliopodium minus*	025, 026/55, 56
JQ271673	CCAP1537/1A	*Cochliopodium minus*	027/57
JQ271674	DP16	*Cochliopodium minus*	028/58
JQ271675	SUM3P	*Cochliopodium minus*	029, 030/59, 60
JQ271676	ALC3	*Copromyxa cantabrigiensis*	032, 033/63, 64
JQ271677	LUM	*Copromyxa protea*	034/65
JQ271678	ZEB1	*Copromyxa* sp.	035/66
JQ271679	ZEB4	*Copromyxa* sp.	036/67
JQ271680	CCIKV	*Didymium* sp.	037, 038/70, 71
JQ271681	CCAP1519/1	*Echinamoeba silvestris*	045/80
JQ271682	CCAP1529/4	*Flabellula trinovantica*	050/88
JQ271683	ISO14	*Flabellula* sp.	051/89
JQ271684	S3M27	*Flabellula* sp.	054/92
JQ271685	S5M32	*Flabellula* sp.	055/93
JQ271686	SBGL1	*Flabellula* sp.	056/94
JQ271687	4394	*Hartmannella vermiformis*	061/103
JQ271688	ECH26	*Hartmannella vermiformis*	063/105
JQ271689	PM11	*Hartmannella vermiformis*	066/108
JQ271690	RSH1	*Lingulamoeba* sp.	068/112
JQ271691	2HZ	*Naegleria clarki*	071/118
JQ271692	3HZ	*Naegleria clarki*	072/119
JQ271693	4542	*Naegleria* sp.	073, 074/120, 121
JQ271694	4HZ	*Naegleria clarki*	079/126
JQ271695	62K4	*Naegleria* sp.	080/127
JQ271696	6HFKL	*Naegleria clarki*	081/128
JQ271697	6HZV	*Naegleria clarki*	082/129
JQ271698	ALM1A	*Naegleria clarki*	084/131
JQ271699	BCHV5	*Naegleria australiensis*	085/132
JQ271700	GG1BV	*Naegleria fultoni*	091/138
JQ271701	GG4BV	*Naegleria* sp.	092/139
JQ271702	J14Z1	*Naegleria* sp.	094/141
JQ271703	K4482J	*Naegleria* sp.	095/142
JQ271704	MSED4	*Naegleria clarki*	096/143

GenBank Acc. No.	Strain code	Species denomination	Plate No./page No.
JQ271705	TMR	*Naegleria clarki*	103/150
JQ271706	AFSM9	*Nolandella* sp.	128/178
JQ271707	JKS1	*Nolandella abertavensis*	129/179
JQ271708	RT1TT	*Paraflabellula* sp.	132/186
JQ271709	PM1	*Protacanthamoeba* sp.	136/191
JQ271710	PM5	*Protacanthamoeba* sp.	137/192
JQ271711	PV64	*Protophysarum* sp.	140, 141/196, 197
JQ271712	4638	*Protostelium* sp.	142/200
JQ271713	805	*Ripella* sp.	143/202
JQ271714	DP13	*Ripella* sp.	146/205
JQ271715	GP2	*Ripella* sp.	149/208
JQ271716	PS2	*Ripella* sp.	150/209
JQ271717	DP7	*Saccamoeba* sp.	153/214
JQ271718	MSED6	*Saccamoeba* sp.	155/216
JQ271719	PV67	*Saccamoeba* sp.	158/219
JQ271720	W187G	*Saccamoeba* sp.	159/220
JQ271721	HP839	*Stenamoeba* sp.	161/223
JQ271722	CCAP1583/8	*Thecamoeba similis*	165/229
JQ271723	4171L	*Vahlkampfia avara*	166/232
JQ271724	ACN1	*Vannella* sp.	170/237
JQ271725	ASL3	*Vannella* sp.	172/239
JQ271726	BAK1	*Vannella* sp.	173/240
JQ271727	BEN3V	*Vannella* sp.	174/241
JQ271728	BOTM	*Vannella* sp.	175/242
JQ271729	CAME	*Vannella* sp.	176/243
JQ271730	CHOR	*Vannella* sp.	178/245
JQ271731	ECH30	*Vannella* sp.	180/247
JQ271732	ELH1	*Vannella* sp.	181/248
JQ271733	ELH2	*Vannella* sp.	182/249
JQ271734	ELH3	*Vannella* sp.	183/250
JQ271735	ELH4	*Vannella* sp.	184/251
JQ271736	ELH5	*Vannella* sp.	185/252
JQ271737	ELH6	*Vannella* sp.	186/253
JQ271738	ELH7	*Vannella* sp.	187/254
JQ271739	ISCRH	*Vannella* sp.	190/257
JQ271740	ISO4	*Vannella* sp.	192/259
JQ271741	ISOKONT	*Vannella* sp.	193/260
JQ271742	JKS2	*Vannella* sp.	194/261
JQ271743	JKZ	*Vannella* sp.	195/262
JQ271744	JRF2	*Vannella* sp.	196/263
JQ271745	KONT2Pe	*Vannella* sp.	197/264
JQ271746	LITHOV	*Vannella* sp.	198/265
JQ271747	MSPE	*Vannella* sp.	199/266
JQ271748	PHILM	*Vannella* sp.	200/267
JQ271749	PHILV	*Vannella* sp.	201/268
JQ271750	R	*Vannella* sp.	203/270
JQ271751	REH2	*Vannella* sp.	204/271
JQ271752	RSSF	*Vannella* sp.	205/272
JQ271753	RT3TT	*Vannella* sp.	206/273
JQ271754	S3M13	*Vannella* sp.	208/275
JQ271755	S4M23	*Vannella* sp.	209/276
JQ271756	S4M24	*Vannella* sp.	210/277

GenBank Acc. No.	Strain code	Species denomination	Plate No./page No.
JQ271757	S4M30	*Vannella* sp.	211/278
JQ271758	S6M33	*Vannella* sp.	212/279
JQ271759	S7M35	*Vannella* sp.	213/280
JQ271760	S7M36	*Vannella* sp.	214/281
JQ271761	S98M54F	*Vannella* sp.	215/282
JQ271762	S98M7	*Vannella* sp.	216/283
JQ271763	SEDFS	*Vannella* sp.	219/286
JQ271764	SMA13V	*Vannella* sp.	220/287
JQ271765	SMA26	*Vannella* sp.	221/288
JQ271766	SMA30	*Vannella* sp.	222/289
JQ271767	SMA7V	*Vannella* sp.	223/290
JQ271768	SYM43	*Vannella* sp.	225/292
JQ271769	T02	*Vannella* sp.	226/293
JQ271770	ULLAP	*Vannella* sp.	227/294
JQ271771	1HZ	*Vexillifera bacillipedes*	229/298
JQ271772	6HZM	*Vexillifera* sp.	230/299
JQ271773	P20Z	*Vexillifera* sp.	235/304
JQ271774	S2M1	*Vexillifera* sp.	238/307
JQ271775	1HFKJ	strain *inc. sed.*, group 02	250/322
JQ271776	4388	strain *inc. sed.*, group 02	251/323
JQ271777	CC4HA	strain *inc. sed.*, group 02	252/324
JQ271778	HF1KJ	strain *inc. sed.*, group 02	253/325
JQ271779	HF3KL	strain *inc. sed.*, group 02	254/326
JQ271780	ROD2G	strain *inc. sed.*, group 03	255/328
JQ271781	ROD4G	strain *inc. sed.*, group 03	256/329
JQ271782	ROD5G	strain *inc. sed.*, group 03	257/330
JQ271783	ROD8G	strain *inc. sed.*, group 03	258/331
JQ271784	4790	strain *inc. sed.*, group 04	259, 260/334, 335
JQ271785	BCHM5	strain *inc. sed.*, group 04	261/336
JQ271786	CAL5	strain *inc. sed.*, group 04	262/337
JQ271787	CAL7	strain *inc. sed.*, group 04	263/338
JQ271788	MSED2	strain *inc. sed.*, group 04	264/339
JQ271789	P18	strain *inc. sed.*, group 04	265/340
JQ271790	PPD16	strain *inc. sed.*, group 04	266/341
JQ271791	W185G	strain *inc. sed.*, group 04	267/342
JQ271792	900	strain *inc. sed.*, group 05	268/344
JQ271793	M6MM	strain *inc. sed.*, group 05	269/345

INDEX OF FISH HOSTS

INDEX OF INVERTEBRATE HOSTS

Scientific and common names of invertebrate hosts from which FLA were isolated

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