

Supplementary Table S1. Comparative morphology of microsporidian species\* from Clade 4, subclade B

Species, reference	Host	Localisation	Spore morphology and size, $\mu$ m	SW; Ex/En**	PT <sup>‡‡</sup>	Ppt : ant./post.	PV	SPV/PPV	Features of life cycle
<i>Globosporidium paramecii</i> (present study)	<i>Paramecium primaurelia</i> , <i>Paramecium pentaurelia</i> (Ciliate)	cytoplasm of ciliate cells, in rare cases perinuclear space	spherical, two size classes: "large" (3.7 $\pm$ 0.2), "small" (1.9 $\pm$ 0.2)	57-87; in large spores: 29-47 /24-40, in small spores: 25-40/13-17	isofilar (0.5) <sup>‡‡‡‡</sup>	bipartite: vesicular /sac-like	+	$\pm$ sp are either in direct contact with HCC or enclosed in an inconspicuous individual SPV	dimorphic, monokaryotic, di- and polysporoblastic (2, 4, 6)
<i>Euplotespora binucleata</i> (Fokin et al. 2008)	<i>Euplotes woodruffi</i> (Ciliate)	cytoplasm of ciliate cells	ovoid-cylindrical, 3.2–3.7 x 1.4–1.9	80; -	isofilar (0.5)	bipartite: a rather small lamellar/ a large sac-like	+	+ individual SPVs closely associated with Ex	monomorphic, monokaryotic mer and spt, diplokaryotic spb and sp; karyogamy within spt, disporoblastic (?)
<i>Helmichia lacustris</i> (Voronin 1998, Tokarev et al. 2012)	<i>Chironomus plumosus</i> (Insecta: Diptera)	adipose tissue, within the cisternae of hRER <sup>⊙</sup>	rod-shaped, 2.5–3.6 $\times$ 1.1–1.7	80; -	isofilar (0.5)	bipartite: lamellar/ spongy	-	+ SPV+PPV: sp are within a two-layered sheath,	monomorphic, diplokaryotic mer and spt, spt divide meiotically to

								including the smooth inner membrane of SPV and the outer membrane of hRER	produce <i>sptp</i> with single nuclei, monokaryotic <i>sp</i> , polysporoblastic (8) <sup>†</sup>
<i>Mrazekia macrocyclopis</i> (Issi et al. 2010)	<i>Macrocyclops albidus</i> (Crustacea: Copepoda)	adipose tissue; generalized infection at the final stage of the disease	rod-shaped , 7.3–10.5 × 1.6–2.3	-; Ex?/ up to 150	anterior clavate manubrium + thin filament (3.5–4.5)	bipartite: tightly packed lamellae/ spherical or tubular	+	+ sporoblasto-genetic SPVs	monomorphic, diplokaryotic, di- or polysporoblastic (2 or 4, rarely 8)
<i>Cystosporogenes legeri</i> (Kleespies et al. 2003)	<i>Lobesia botrana</i> (Insecta: Lepidoptera)	intestinal epithelium, generalized infection at the final stage of disease	bean-shaped, 2.5-3.0 x 1.5-1.8	no measurements (thin, rugose Ex and thin En)	isofilar (7-8)	bipartite: dense lamellar / loose lamellar	+	+ SPV/PPV ? (membrane-like envelope)	monomorphic, monokaryotic, polysporoblastic (8, 16, 32 or more)
<i>Cystosporogenes operophterae</i> (Canning et al. 1985; Canning and Curry 2004)	<i>Operophtera brumata</i> (Insecta: Lepidoptera)	silk glands, gut and generalized infection at the final stage of disease (also in eggs)	elongate-ellipsoid, 2.5-1.2	150-190 ; 25-40 / 125	isofilar (10-12)	bipartite: lamellar/ tubular	+	+ SPV/PPV ? (single close-fitting membrane)	monomorphic, monokaryotic, polysporoblastic (4-60)

<i>Endoreticulatus schubergi</i> (Cali and Garhy, 1991)	<i>Lymantria dispar</i> (Insecta: Lepidoptera)	intestinal epithelium	oval, 2.0–3.0 x 1.0-2.0	50; -	isofilar (7-9)	uniform: lamellar	non-identified	+ double-walled PPV (two membranes of a flattened cisterna of hRER)	monomorphic, monokaryotic, polysporoblastic (32)
<i>Endoreticulatus bombycis</i> (Zhang et al. 1995, Wang et al. 2005*)	<i>Bombyx mori</i> (Insecta: Lepidoptera)	intestinal epithelium	oval to kidney-shaped, 2.0-2.3 x 0.8-1.0 *	43-113; 20 / 22.5–92.5*	isofilar (3) *	uniform: cup-like*	+*	+ PPV (two membranes of a flattened cisterna of hRER)	monomorphic, monokaryotic, polysporoblastic (8-13) *
<i>Anostracospora rigaudi</i> (Rode et al. 2013)	<i>Artemia franciscana</i> , <i>Artemia parthenogenetica</i> (Crustacea: Anostraca)	intestinal epithelium, infections restricted to enterocytes	oval, 1.3x0.7	55; 15/40	isofilar (5-6)	bipartite: lamellar/vesicular	+	+ <i>mer</i> in the direct contact with HCC, <i>spt</i> , <i>spb</i> and <i>sp</i> in SPV/PPV?	monomorphic, monokaryotic, polysporoblastic (up to 32-64)
<i>Crispospora chironomi</i> (Tokarev et al. 2012)	<i>Chironomus plumosus</i> (Insecta: Diptera)	intestinal epithelium	<i>msp</i> : spherical, 1.5–2.0*; <i>dsp</i> : oval, 2.5x1.5*	<i>msp</i> : -; Ex with tubular protrusions /80; <i>dsp</i> : 60; 20/40, Ex with fragile thin villi	isofilar: <i>msp</i> : 5-6, <i>dsp</i> : 3-4	<i>msp</i> : bipartite: vesicular / lamellar <i>dsp</i> : bipartite: vacuolar / lamellar	+( <i>dsp</i> )	+ <i>msp</i> are within a thick-walled multilayered capsule, <i>dsp</i> – in direct contact with HCC	dimorphic, di- and polysporoblastic ( <i>msp</i> - from several dozens to hundred and more)

<i>Vittaforma corneae</i> (Silveira and Canning 1995)	<i>Homo sapiens</i> (Primates: Hominidae)	isolated into culture from the human eye	cylindrical, 3.0-4.6 x 0.8-1.3	no data	isofilar (5-7)	uniform: lamellar	-	+ all stages are surrounded by double-walled PPV (two membranes of a flattened cisterna of hRER)	monomorphic, diplokaryotic, polysporoblastic (4-8)
<i>Glugoides intestinalis</i> (Larsson et al. 1996)	<i>Daphnia magna</i> , <i>Daphnia pulex</i> (Crustacea: Cladocera)	intestinal epithelium	oblong to lightly reniform, 2.4-2.7x1.1-1.7	80-85;-	isofilar (5-8)	bipartite: lamellar/lamellar (anterior part is more closely packed)	+	+ PPV+SPV	monomorphic, monokaryotic, polysporoblastic (16)

*mer* – meronts, *spt* – sporonts, *sptp* - sporontogenetic plasmodium, *spb* – sporoblasts, *sp* – spores, *msp* – monokaryotic spores, *dsp* – diplokaryotic spores, HCC – host cell cytoplasm, hRER – rough endoplasmic reticulum of the host cell, PPV - parasitophorous vacuole, SPV - sporophorous vesicle

\* only species with available SSU rRNA sequences included;

\*\* SW – thickness of spore wall, nm; Ex/En – exospore thickness / endospore thickness, nm;

⌘ PT - morphology of polar tube, number of coils (in brackets);

⌘⌘ - isofilar tube, which is half-coiled (it makes one incomplete coil);

❖ Ppt – morphology of polaroplast, ant./post. – features of its anterior and posterior parts;

§ PV – presence/absence of posterior vacuole;

★ SPV/PPV – presence of sporophorous vesicle or parasitophorous vacuole;

‡ a number of spores produced during polysporoblastic sporogony;

★ data for a closely related isolate from *Ocinara lida* 'Endoreticulatus sp. Taiwan' (Wang et al. 2005);

❖ measurements of fixed spores.