

## Supplementary Material

### **Addressing knowledge gaps in the systematics of temperate south-east Australian deep-sea Raphitomidae (Caenogastropoda: Conoidea): integrative taxonomy of species of less diverse and taxonomically problematic genera**

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**Table S1. Museum registration numbers, voucher status, locality, GenBank accession numbers of samples studied herein.**

Taxon (PSH)	Museum	Registration number	Voucher	Locality	cox1	16S
<b>Ingroup</b>						
<i>Aplotoma brevitentaculata</i> Criscione et al., 2020	AMS	C.571635	Ht	Australia, VIC, East Gippsland CMR, (-37.79, 150.38), IN2017_V03_035, 2338-2581 m.	MN983163	MN985714
<i>Austrobela pyrropelex</i> (Barnard, 1963)	AMS	C.571693		Australia, GAB, (-34.07, 129.18), IN2015_C01_064, 2649-2803 m.	MN983165	MN985717
<i>Austrobela micraulax</i> (Sysoev, 1997)	MNHN	IM-2009-17087		PNG, (-5.37, 145.8), BIOPAPUA, CP3710, 384-372 m.	MT888638	-
<i>Austrobela obliquicostata</i> Criscione et al., 2021	AMS	C.571644	Pt	Australia, NSW, Hunter CMR, (-32.58, 153.16), IN2017_V03_070, 2595-2474 m.	MN983167	MN985719
<i>Austrobela procera</i> (Sysoev & Bouchet, 2001)	AMS	C.519275		Australia, QLD, Coral Sea CMR, (-23.59, 154.19), IN2017_V03_121, 1013-1093 m.	MN983164	MN985715
<i>Austrobela pyrrogramma</i> (Dautzenberg & H. Fischer, 1896)	MNHN	IM-2013-61353		Guadeloupe, (15.8, -61.47), KARUBENTHOS 2015, DW4633, 432-378 m.	MT888656	-
<i>Austrobela rufa</i> Criscione et al., 2020	AMS	C.571709	Ht	Australia, GAB, (-35.15, 134.11), IN2015_C02_131, 965-1077 m.	MN983272	MT395563
<i>Austrobela sagitta</i> Criscione et al., 2021	AMS	C.519338	Ht	Australia, Central Eastern CMR, (-30.1, 153.9), IN2017_V03_086, 2429-2518 m.	MT394375	MT395604
<i>Austrotheta crassidentata</i> Criscione et al., 2020	AMS	C.519302	Ht	Australia, TAS, Freycinet CMR, (-41.73, 149.12), IN2017_V03_004, 2820-2751 m.	MT260886	MN985768
<i>Austrotheta wanbiri</i> Criscione et al., 2021	AMS	C.572174	Ht	Australia, GAB, (-34.57, 129.57), IN2017_C01_198, 3389-3540 m.	MN983208	MN985765
<i>Biconitoma cretosa</i> Criscione et al. 2020 (B1)	AMS	C.482313	Ht	Australia, NSW, off Byron Bay, (-28.68, 154.2), IN2017_V03_090, 2587-2562 m.	MN983169	MN985722
	AMS	C.482288	Pt	Australia, NSW, off Byron Bay, (-28.37, 154.65), IN2017_V03_099, 3825-3754 m.	PQ510605	PQ508390
<i>Eucyclotoma cymatodes</i> (Hervier, 1897)	MNHN	IM-2007-17903		Philippines, (9.49, 123.93), PANGLAO 2004, S12, 8-6 m.	EU015678	HQ401676
<b><i>Eubela eulimoides</i> sp. nov.</b>	AMS	C.571643	Ht	Australia, VIC, East Gippsland CMR, (-38.48, 150.18), IN2017_V03_032, 3850-3853 m.	MN983175	MN985728
<i>Famelica acus</i> Criscione et al., 2021	MNHN	IM-2009-24922	Ht	New Caledonia, (-22.33, 167.37), EXBODI, CP3844, 970-815 m.	MW459351	-
<i>Famelica polyacantha</i> (Stahlschmidt, Chino & Kilburn, 2012)	MNHN	IM-2009-17104		PNG, (-5.62, 154.02), BIOPAPUA, DW3748, 399-398 m.	MW459346	-
<i>Famelica tasmanica</i> Sysoev & Kantor, 1987	AMS	C.571629		Australia, TAS, Flinders CMR, (-40.47, 149.4), IN2017_V03_015, 4114-4139 m.	MN983172	MN985725
<i>Famelica turritelloides</i> Criscione et al., 2021	AMS	C.482253	Ht	Australia, QLD, off Moreton Bay, (-26.95, 153.95), IN2017_V03_101, 2520-2576 m.	MN983170	MN985723
<i>Fusobela cancellata</i> (Sysoev, 1988) comb. nov. (F2)	AMS	C.572178		Australia, GAB, (-34.45, 129.49), IN2017_C01_197, 3235-3350 m.	PQ510606	PQ508391
	SAMA	D49344*		Australia, GAB, (-34.87, 130.59), RE2017_CO1_OR16SZA, 2057-2057 m.	-	-
<i>Fusobela parvioculata</i> Criscione et al. 2020 (F1)	TMAG	E59231	Ht	Australia, TAS, Flat area S of Brians, (-44.24, 147.29), IN2018_V06_169, 1443-1422 m.	MN983173	MN985727
	AMS	C.571736		Australia, GAB, (-34.45, 129.49), IN2017_C01_197, 3235-3350 m.	-	MN985726
<i>Glaciotomella investigator</i> Criscione et al., 2020	AMS	C.571621	Ht	Australia, NSW, Hunter CMR, (-32.58, 153.16), IN2017_V03_070, 2595-2474 m.	MN983178	MN985731
<i>Gladiobela abyssicola</i> Hallan et al., 2021	AMS	C.571656	Ht	Australia, NSW, off Bermagui, (-36.35, 150.91), IN2017_V03_043, 4763-4750 m.	MT081415	MT393752
<i>Gladiobela acris</i> Hallan et al., 2021	AMS	C.571697	Ht	Australia, VIC, East Gippsland CMR, (-38.48, 150.18), IN2017_V03_032, 3850-3853 m.	MN983181	MN985734
<i>Gladiobela angulata</i> Criscione et al., 2020	AMS	C.571651	Ht	Australia, NSW, Hunter CMR, (-32.58, 153.16), IN2017_V03_070, 2595-2474 m.	MN983180	MN985733
<i>Gladiobela stupa</i> Hallan et al., 2021	AMS	C.571683	Ht	Australia, NSW, Hunter CMR, (-32.14, 153.53), IN2017_V03_078, 3980-4029 m.	MN983183	MN985736
<i>Gladiobela vitrea</i> Hallan et al., 2021	AMS	C.482311	Ht	Australia, NSW, Hunter CMR, (-32.48, 152.99), IN2017_V03_069, 1006-1036 m.	MN983184	MN985737
<i>Globodaphne pomum</i> Criscione et al., 2020	AMS	C.482283	Ht	Australia, NSW, Hunter CMR, (-32.58, 153.16), IN2017_V03_070, 2595-2474 m.	MN983185	MN985738
<i>Glyphostomoides</i> sp.	MNHN	IM-2007-17892		Philippines, (9.5, 123.83), PANGLAO 2004, T39, 138-100 m.	EU015715	HQ401681
<i>Gymnobela angulosa</i> Sysoev, 1988	AMS	C.571648	Ht	Australia, TAS/VIC, Bass Strait, (-39.55, 149.55), IN2017_V03_030, 4197-4133 m.	-	PP550476
<i>Gymnobela frielei</i> (Verrill, 1885)	AMS	C.571666		Australia, VIC, East Gippsland CMR, (-37.79, 150.38), IN2017_V03_035, 2338-2581 m.	-	MN985741
<i>Gymnobela engonia</i> Verrill, 1884	AMS	C.482286		Australia, NSW, Jervis CMR, (-35.11, 151.47), IN2017_V03_053, 3952-4011 m.	-	MN985739
<i>Gymnobela agassizi</i> (Verrill & S. Smith, 1880)	AMS	C.519355	Ht	Australia, NSW, Jervis CMR, (-35.33, 151.26), IN2017_V03_056, 2650-2636 m.	-	MN985740
<i>Mioawateria</i> sp. (M1)	AMS	C.482239		Australia, VIC, East Gippsland CMR, (-37.82, 150.37), IN2017_V03_040, 2746-2600 m.	MN983186	MN985743
<i>Nodothauma magnifica</i> Criscione et al., 2020	AMS	C.532707	Ht	Australia, GAB, (-35.56, 134.08), IN2015_C02_137, 1927-1995 m.	MN983187	MN985744
<i>Pagodibela baruna</i> (Sysoev, 1997)	MNHN	IM-2007-42528		Solomon Islands, (-9.15, 158.98), SALOMON 2, CP2176, 875-600 m.	MT256967	-
<i>Pagodibela maia</i> Criscione, 2020	AMS	C.571678	Ht	Australia, Coral Sea CMR, (-23.59, 154.19), IN2017_V03_121, 1013-1093 m.	MN983188	MN985745
<i>Pagodibela meridionalis</i> Hallan et al., 2021	SAMA	D44173	Ht	Australia, GAB, (-35.04, 134.08), IN2015_C02_126, 367-409 m.	MN983189	MN985746
<i>Phymorhynchus cingulatus</i> Warén & Bouchet, 2009 (C2)	AMS	C.482152*		Australia, TAS/VIC, Bass Strait, (-39.55, 149.55), IN2017_V03_030, 4197-4133 m.	-	-
	AMS	C.519300		Australia, TAS, Flinders CMR, (-40.47, 149.4), IN2017_V03_015, 4114-4139 m.	-	PQ508393
	AMS	C.519305*		Australia, QLD, off Fraser Island, (-25.25, 154.19), IN2017_V03_109, 4006-4005 m.	-	-
	AMS	C.519388*		Australia, NSW, off Bermagui, (-36.35, 150.91), IN2017_V03_043, 4763-4750 m.	-	-
	AMS	C.571665		Australia, VIC, East Gippsland CMR, (-38.45, 150.19), IN2017_V03_032, 3850-3853 m.	-	PQ508392
	AMS	C.571764		Australia, TAS/VIC, Bass Strait, (-39.55, 149.55), IN2017_V03_030, 4197-4133 m.	-	MN985748
<i>Phymorhynchus moskalevi</i> Sysoev & Kantor, 1995 (H1)	AMS	C.482271		Australia, NSW, Jervis CMR, (-35.11, 151.47), IN2017_V03_053, 3952-4011 m.	PQ510616	-
	AMS	C.519327		Australia, NSW, off Bermagui, (-36.35, 150.91), IN2017_V03_043, 4763-4750 m.	PQ510615	-
	AMS	C.519358		Australia, NSW, off Newcastle, (-33.44, 152.7), IN2017_V03_065, 4280-4173 m.	PQ510613	PQ508400
	AMS	C.519369		Australia, TAS/VIC, Bass Strait, (-39.55, 149.55), IN2017_V03_030, 4197-4133 m.	PQ510617	-
	AMS	C.519385		Australia, NSW, off Newcastle, (-33.44, 152.7), IN2017_V03_065, 4280-4173 m.	PQ510618	-
	AMS	C.571623		Australia, TAS, Flinders CMR, (-40.47, 149.4), IN2017_V03_015, 4114-4139 m.	PQ510610	PQ508397
	AMS	C.571624		Australia, VIC, East Gippsland CMR, (-38.48, 150.18), IN2017_V03_032, 3850-3853 m.	PQ510612	PQ508399

Taxon (PSH)	Museum	Registration number	Voucher	Locality	cox1	16S
	AMS	C.571634		Australia, NSW, off Bermagui, (-36.35, 150.91), IN2017_V03_043, 4763-4750 m.	PQ510608	PQ508395
	AMS	C.571671		Australia, VIC, East Gippsland CMR, (-38.48, 150.18), IN2017_V03_032, 3850-3853 m.	PQ510614	-
	AMS	C.571705		Australia, TAS, Flinders CMR, (-40.47, 149.4), IN2017_V03_015, 4114-4139 m.	PQ510607	PQ508394
	AMS	C.571706		Australia, NSW, off Bermagui, (-36.35, 150.91), IN2017_V03_043, 4763-4750 m.	PQ510609	PQ508396
	AMS	C.571711		Australia, VIC, East Gippsland CMR, (-38.48, 150.18), IN2017_V03_032, 3850-3853 m.	MN983191	MN985749
	AMS	C.571712		Australia, VIC, East Gippsland CMR, (-38.48, 150.18), IN2017_V03_032, 3850-3853 m.	PQ510611	PQ508407
	MNHN	IM-2013-41884		Snake Pit, Mid-Atlantic Ridge, (23.37, -44.95), BICOSE, PL568-NAS, 3466 m.	MN942683	MN942686
<i>Phymorhynchus oceanicus</i> (Dall, 1908) (C1)	AMS	C.571627		Australia, off Bermagui, (-36.35, 150.91), IN2017_V03_043, 4763-4750 m.	MN983192	MN985750
<b><i>Pleurotomella bathysinuata</i> sp. nov. (P1)</b>	SAMA	D63333	Ht	Australia, GAB, (-34.74, 131.84), IN2015_C01_108, 1350-1321 m.	MN983193	MN985751
	SAMA	D44172	Pt	Australia, GAB, (-34.74, 131.84), IN2015_C01_108, 1350-1321 m.	PQ510619	PQ508401
<i>Pleurotomella cala</i> (Watson, 1886) (P2+A)	AMS	C.487456		Australia, GAB, (-35.16, 131.64), IN2015_C01_052, 1834-1892 m.	PQ510620	PQ508402
	WAM	S32236		Australia, WA, Off Houtman Abrolhos Is., (-29.06, 113.64), SS1005/084, 1000-1000 m.	MN983194	MN985752
	MNHN	IM-2007-17848		Chesterfield Is., New Caledonia, (-20.08, 160.33), EBISCO, DW2625, 741-627 m.	EU015657	HQ401701
<i>Pleurotomella</i> sp. (PC)	ZSM	mol_20021232		Antarctica, (-54.02, -62.02), LAMPOS, ANT XIX-5, PS61/145-1, 272 m.	-	MN985774
<i>Pleurotomella</i> sp. (PB)	ZSM	mol_20021548		Antarctica, Drake-Strasse, (-54.5, -56.14), LAMPOS, ANT XIX 5, PS61/150-1, 286 m.	MN983195	MN985772
<i>Pontiothauma</i> sp.	AMS	C.482298		Australia, NSW, Central Eastern CMR, (-30.26, 153.87), IN2017_V03_088, 4481-4401 m.	MN983196	MN985753
	AMS	C.519343	Ht	Australia, NSW, Hunter CMR, (-32.14, 153.53), IN2017_V03_078, 3980-4029 m.	PP545483	PP550487
<i>Pontiothauma transregna</i> Criscione & Hallan, 2024	AMS	C.482289	Pt	Australia, Central Eastern CMR, (-30.1, 153.9), IN2017_V03_086, 2429-2518 m.	MN983197	MN985754
	AMS	C.571641	Ht	Australia, NSW, Hunter CMR, (-32.58, 153.16), IN2017_V03_070, 2595-2474 m.	PP545484	PP550488
<i>Pueridaphne bruneri</i> (Verrill & Smith, 1884) comb. nov.	AMS	C.572165		Australia, GAB, (-34.45, 129.49), IN2017_C01_197, 3235-3350 m.	MN983198	MN985755
<i>Rimosodaphnella brunneolineata</i> Bonfitto & Morassi, 2013	MNHN	IM-2007-42460		Philippines, (8.72, 123.32), PANGLAO 2005, CP2381, 280-259 m.	MW459340	-
<i>Rimosodaphnella guraradara</i> Criscione et al., 2021	AMS	C.571613	Ht	Australia, NSW, Jervis CMR, (-35.33, 151.26), IN2017_V03_056, 2650-2636 m.	MN983199	MN985756
<i>Rimosodaphnella solomonensis</i> Bonfitto & Morassi, 2013	MNHN	IM-2007-42524		Solomon Islands, (-7.73, 157.7), SALOMON 2, CP2215, 880-718 m.	MW459339	-
<i>Rimosodaphnella truvana</i> Criscione et al., 2021	AMS	C.571685	Ht	Australia, TAS/VIC, Bass Strait, (-39.55, 149.55), IN2017_V03_030, 4197-4133 m.	MN983200	MN985757
<i>Gymnobela yoshidai</i> (Kuroda & Habe, 1961)	MNHN	IM-2013-52031		New Caledonia, (-24.75, 168.1), NORFOLK 2, DW2091, 896-600 m.	MT888669	-
<i>Spergo annulata</i> Criscione et al., 2021	AMS	C.519333	Ht	Australia, NSW, off Byron Bay, (-28.68, 154.2), IN2017_V03_090, 2587-2562 m.	MT394378	MT395607
<i>Spergo castellum</i> Criscione et al., 2021	AMS	C.482148	Ht	Australia, VIC, East Gippsland CMR, (-37.79, 150.38), IN2017_V03_035, 2338-2581 m.	MT394380	MT395609
<i>Spergo fusiformis</i> (Habe, 1962)	AMS	C.482154		Australia, QLD, Coral Sea CMR, (-23.59, 154.19), IN2017_V03_121, 1013-1093 m.	MN983201	MN985758
<i>Spergo parvidentata</i> Criscione et al., 2021	AMS	C.519401	Ht	Australia, TAS, Flinders CMR, (-40.47, 149.4), IN2017_V03_015, 4114-4139 m.	MT394383	MT395612
<i>Spergo sibogae</i> Schepman, 1913	MNHN	IM-2013-59400		Taiwan, (19.8, 116.48), ZHONGSHA 2015, CP4157, 1389-1205 m.	MT888640	-
<i>Spergo tenuiconcha</i> Criscione et al., 2021	AMS	C.482142	Ht	Australia, VIC, East Gippsland CMR, (-38.48, 150.18), IN2017_V03_032, 3850-3853 m.	MT394393	MT395622
<i>Taranis</i> sp.	MNHN	IM-2007-42296		Philippines, (15.95, 121.83), AURORA 2007, CP2749, 473-473 m.	HQ401584	HQ401707
<i>Teretiopsis nodicarinata</i> Sysoev & Bouchet, 2001 (T1)	AMS	C.519289		Australia, QLD, Coral Sea CMR, (-23.59, 154.19), IN2017_V03_121, 1013-1093 m.	PQ510621	-
<i>Thatcheria mirabilis</i> Angas, 1877	MNHN	IM-2007-17924		Solomon, (-8.28, 160), SALOMON 2, CP2184, 523-464 m.	EU015736	FJ868138
<i>Theta lyronuclea</i> Clarke, 1959	AMS	C.482290		Australia, NSW, Jervis CMR, (-35.11, 151.47), IN2017_V03_053, 3952-4011 m.	MN983207	MN985764
<i>Theta microcostellata</i> Criscione et al., 2021	AMS	C.571657	Ht	Australia, NSW, Hunter CMR, (-32.58, 153.16), IN2017_V03_070, 2595-2474 m.	MN983210	MN985767
<i>Theta argeta</i> (Dall, 1890) comb. nov.	AMS	C.532711		Australia, GAB, (-35.82, 134.11), IN2015_C02_141, 2852-2800 m.	MN983209	MN985766
<i>Trochodaphne cuprosa</i> Criscione et al., 2020	AMS	C.571611	Ht	Australia, NSW, Jervis CMR, (-35.33, 151.26), IN2017_V03_056, 2650-2636 m.	MN983211	MN985770
	AMS	C.571622		Australia, QLD, Coral Sea CMR, (-23.59, 154.19), IN2017_V03_121, 1013-1093 m.	MN983206	MN985763
	MNHN	IM-2007-17845		Chesterfield Is., New Caledonia, (-21.48, 162.6), EBISCO, CP2651, 883-957 m.	EU015654	HQ401708
<i>Typhlosyrinx supracostata</i> (Schepman, 1913) (S1)	AMS	C.519335		Australia, NSW, off Byron Bay, (-28.05, 154.08), IN2017_V03_100, 999-1013 m.	MN983212	MN985771
<i>Xanthodaphne charcotiana</i> Bouchet & Warén, 1980 (X1)	AMS	C.482305		Australia, NSW, Jervis CMR, (-35.33, 151.26), IN2017_V03_056, 2650-2636 m.	PQ510625	PQ508394
	AMS	C.482306		Australia, NSW, Jervis CMR, (-35.33, 151.26), IN2017_V03_056, 2650-2636 m.	PQ510628	PQ508409
	AMS	C.519320		Australia, TAS, Freycinet CMR, (-41.73, 149.12), IN2017_V03_004, 2820-2751 m.	PQ510627	PQ508408
	AMS	C.563081		Australia, VIC, East Gippsland CMR, (-38.48, 150.18), IN2017_V03_032, 3850-3853 m.	PQ510630	PQ508411
	AMS	C.571612		Australia, VIC, East Gippsland CMR, (-38.48, 150.18), IN2017_V03_032, 3850-3853 m.	PQ510626	PQ508398
	AMS	C.571672		Australia, TAS, Freycinet CMR, (-41.73, 149.12), IN2017_V03_004, 2820-2751 m.	PQ510631	-
	AMS	C.571734		Australia, GAB, (-34.45, 129.49), IN2017_C01_197, 3235-3350 m.	MN983176	MN985730
	AMS	C.571769		Australia, TAS, Freycinet CMR, (-41.73, 149.12), IN2017_V03_004, 2820-2751 m.	PQ510629	PQ508410
	SAMA	D44146		Australia, GAB, (-36.07, 132.64), IN2015_C01_016, 4602-4612 m.	PQ510633	PQ508413
	SAMA	D44150		Australia, GAB, (-35.82, 134.11), IN2015_C02_141, 2852-2800 m.	PQ510633	PQ508412
	SAMA	D49345		Australia, GAB, (-34.45, 129.49), IN2017_C01_197, 3235-3350 m.	PQ510634	PQ508414
<b><i>Xanthodaphne galara</i> sp. nov. (D1)</b>	AMS	C.519362	Ht	Australia, NSW, off Bermagui, (-36.36, 150.64), IN2017_V03_044, 2821-2687 m.	MN983174	MN985729
	AMS	C.519376	Pt	Australia, Bass Strait, (-39.46, 149.28), IN2017_V03_022, 2760-2692 m.	PQ510624	PQ508405
	AMS	C.571608	Pt	Australia, NSW, Hunter CMR, (-32.58, 153.16), IN2017_V03_070, 2595-2474 m.	PQ510623	PQ508404

<b>Taxon (PSH)</b>	<b>Museum</b>	<b>Registration number</b>	<b>Voucher</b>	<b>Locality</b>	<b>cox1</b>	<b>16S</b>
	AMS	C.571610	Pt	Australia, NSW, off Bermagui, (-36.36, 150.64), IN2017_V03_044, 2821-2687 m.	PQ510622	PQ508403
Unassigned genus sp.	MNHN	IM-2007-17927		Solomon, (-8.07, 156.92), SALOMON_2, CP2260, 399-427 m.	EU015740	HQ401674
<b>Outgroup</b>						
<i>Turris babylonia</i> (Linnaeus, 1758)	MNHN	IM-2007-17754		Philippines, (9.62, 123.88), PANGLAO 2004, R42, 22-8 m.	EU015677	HQ401715
<i>Lienardia mighelsi</i> Iredale & Tomlin, 1917	MNHN	IM-2007-17897		Philippines, (9.62, 123.77), PANGLAO 2004, B8, 0-3 m.	EU015671	MN942688
<i>Citharomangelia planilabroides</i> (Tryon, 1884)	MNHN	IM-2007-17896		Philippines, (9.56, 123.73), PANGLAO 2004, D5, 3-0 m.	EU015670	MN320420

Taxa in bold are the taxonomic names of newly described species and accession numbers of sequences generated in this study. Samples for which no DNA sequences were obtained are marked by an asterisk (\*). Abbreviations:

CMR, Commonwealth Marine Reserve; GAB, Great Australian Bight; Ht, holotype; NSW, New South Wales; PNG, Papua New Guinea; Pt, paratype; QLD, Queensland; TAS, Tasmania; VIC, Victoria; WA, Western Australia.

**Table S2. Intra- and inter-PSHs/specific genetic differentiation of *cox1* sequences in the deep-sea raphitomids studied herein by means of K2p distances.**

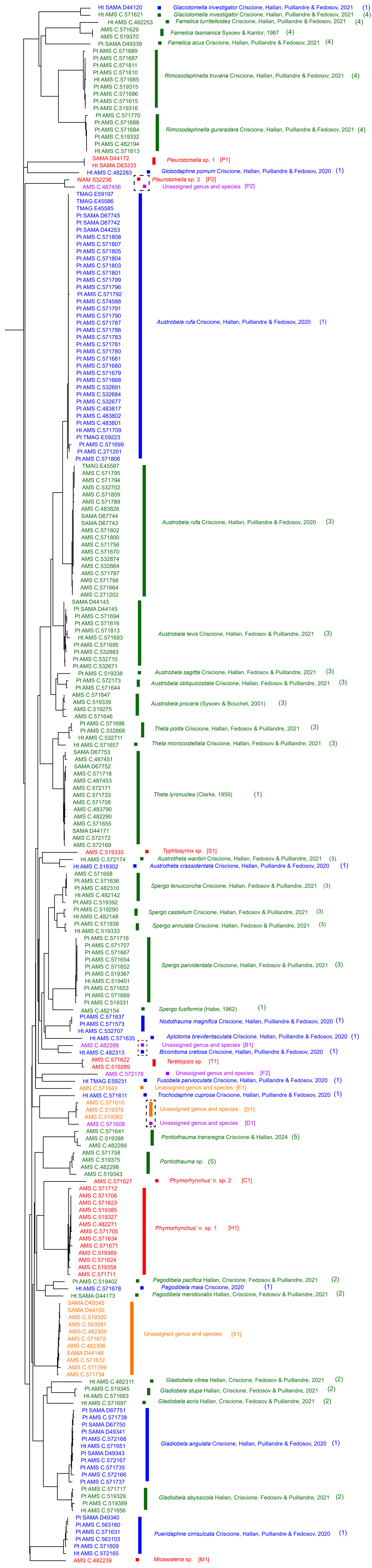
<i>cox1</i>	B1	E1	F1	F2	M1	H1	P1	P2	P3	P4	T1	S1	D1	X1
B1	0.047													
E1	0.122	-												
F1	0.137	0.133	-											
F2	0.173	0.163	0.154	-										
M1	0.139	0.118	0.145	0.172	-									
H1	0.144	0.122	0.143	0.166	0.130	0.024								
P1	0.176	0.161	0.183	0.218	0.177	0.203	-							
P2	0.194	0.184	0.193	<b>0.227</b>	0.189	0.175	0.188	0.000						
P3	0.105	0.132	0.163	0.188	0.140	0.126	0.186	0.145	-					
P4	0.158	0.155	0.187	0.209	0.150	0.141	0.201	0.173	<b>0.088</b>	0.024				
T1	0.139	0.138	0.155	0.212	0.150	0.158	0.211	0.197	0.173	0.176	0.005			
S1	0.137	0.130	0.145	0.163	0.116	0.115	0.181	0.176	0.156	0.168	0.159	-		
D1	0.153	0.158	0.134	0.175	0.142	0.122	0.208	0.201	0.150	0.164	0.167	0.142	0.019	
X1	0.117	0.119	0.137	0.152	0.118	0.095	0.186	0.170	0.129	0.137	0.144	0.105	0.110	0.003

Intra-PSH/specific distances are shaded. Maximum and minimum values of inter-PSHs/specific distance in bold. Inset: minimum, maximum and average intra- and inter-PSHs/specific p-distances.

**Table S3. Intra- and inter-PSHs/specific genetic differentiation of *16S* sequences in the deep-sea raphitomids studied herein by means of K2p distances.**

	B1	C1	C2	D1	E1	F1	F2	H1	M1	P1	P3	P4	P2	P5	S1	T1	X1
B1	0.011																
C1	0.053	-															
C2	0.072	0.049	0.003														
D1	0.051	0.054	0.062	0.006													
E1	0.036	0.048	0.067	0.035	-												
F1	0.051	0.055	0.063	0.048	0.048	0.013											
F2	0.077	0.078	0.073	0.080	0.081	0.07	-										
H1	0.059	0.055	0.063	0.055	0.055	0.053	0.093	0.001									
M1	0.043	0.039	0.054	0.049	0.037	0.047	0.083	0.052	-								
P1	0.081	0.088	0.098	0.087	0.079	0.095	<b>0.112</b>	0.104	0.088	0.000							
P3	0.077	0.078	0.089	0.081	0.076	0.069	0.108	0.090	0.067	0.100	0.004						
P4	0.083	0.082	0.092	0.076	0.080	0.081	0.111	0.086	0.072	0.099	<b>0.028</b>	-					
P2	0.068	0.060	0.079	0.062	0.062	0.062	0.086	0.076	0.053	0.085	0.064	0.059	-				
P5	0.073	0.074	0.092	0.081	0.072	0.082	0.111	0.090	0.072	0.088	0.077	0.075	0.046	-			
S1	0.047	0.055	0.060	0.045	0.041	0.046	0.079	0.046	0.032	0.083	0.064	0.068	0.057	0.072	-		
T1	0.042	0.052	0.066	0.046	0.034	0.051	0.087	0.056	0.034	0.087	0.075	0.081	0.059	0.071	0.047	0.002	
X1	0.052	0.058	0.061	0.055	0.049	0.038	0.079	0.058	0.042	0.094	0.080	0.081	0.068	0.082	0.047	0.048	0.001

Intra-PSH/specific distances shaded. Maximum and minimum values of inter-PSHs/specific distance in bold. Inset: minimum, maximum and average intra- and inter-PSHs/specific p-distances.



0.02

Figure S1 - Tree obtained from the ABGD analysis of the the cumulative *cox1* dataset of Criscione et al. (2021c). Vertical bars mark each of the 54 resulting partitions. Identification to species has been provided for 40 PSHs (in blue and green - see a. and b. of the Introduction) by (1) Criscione et al., 2021c, Hallan et al., 2021 (2), Criscione et al., 2021a (3), Criscione et al., 2021b (4) and Criscione & Hallan, 2024 (5). In this study, sequences of 14 unidentifying PSHs (in red, orange and purple - see c., d. and e. of the Introduction), were included in this dataset and subject to ABGD. Codes corresponding to the PSHs resulting from the ABGD of this study (Fig. S2) are given in square brackets, with dashed boxes indicating different partitioning than that of Criscione et al. (2021b).

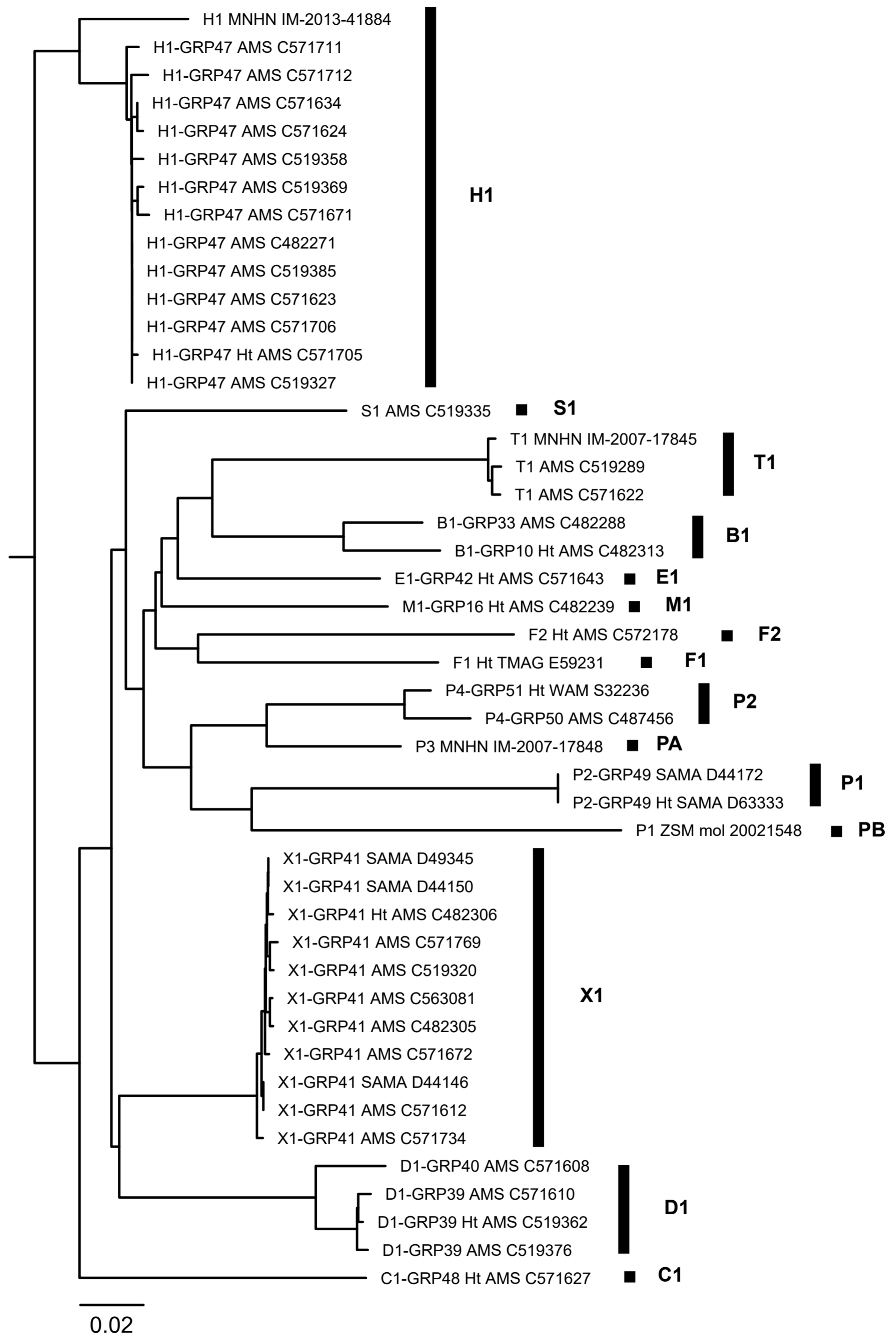


Figure S2 - Tree corresponding to an initial ABGD partition with prior maximal distance  $P=1.67e-02$  obtained from the analysis of the *cox1* dataset. Vertical bars mark each of the 15 resulting partitions.

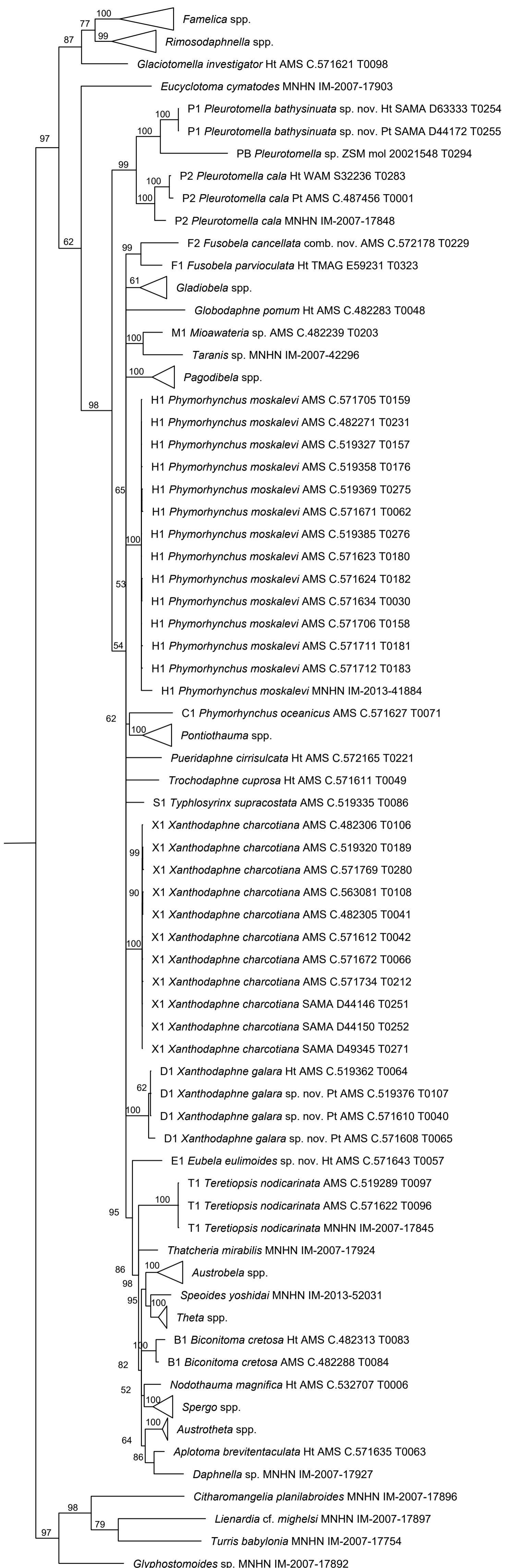


Figure S3. Bayesian (BI) consensus phylogram based on analyses of *cox1* sequence dataset. Clades containing congeneric species of genera not studied here are collapsed. Numbers near nodes indicate nodal support by Bayesian posterior probabilities (BPP).



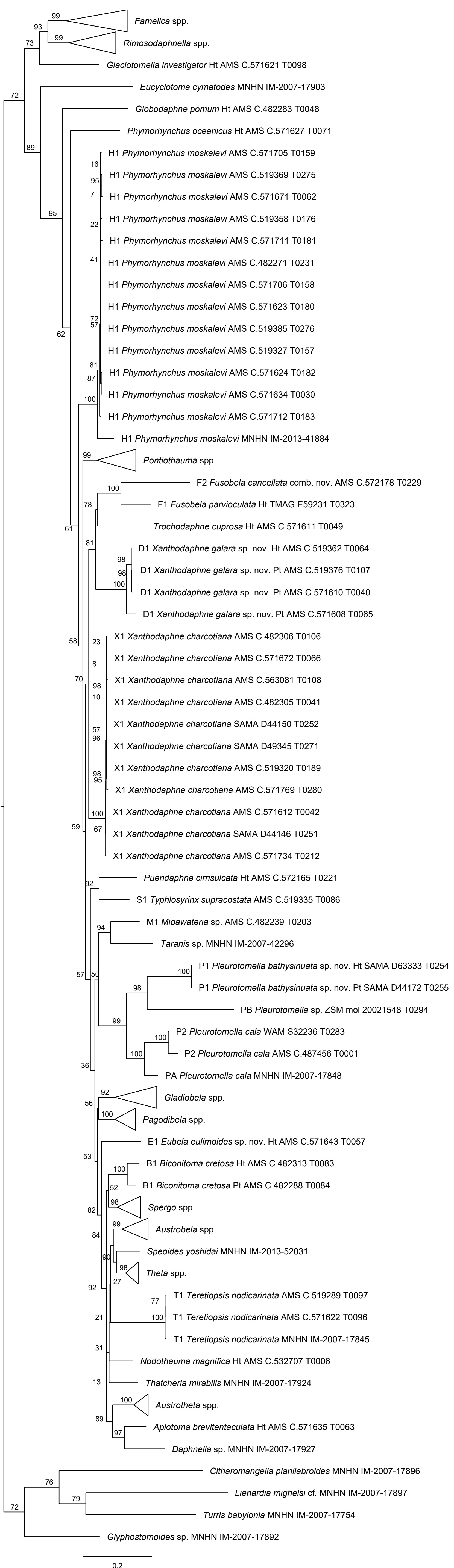
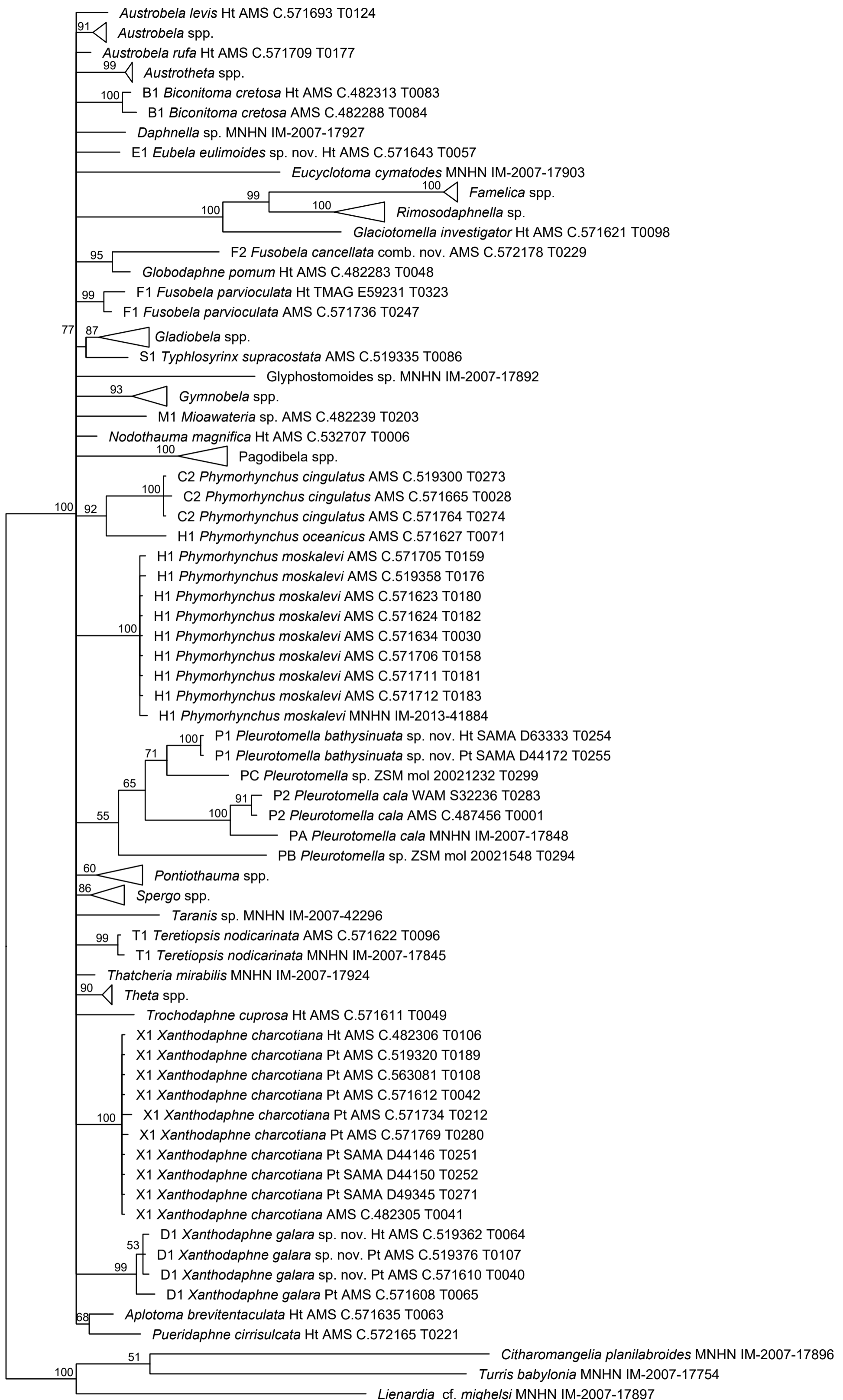
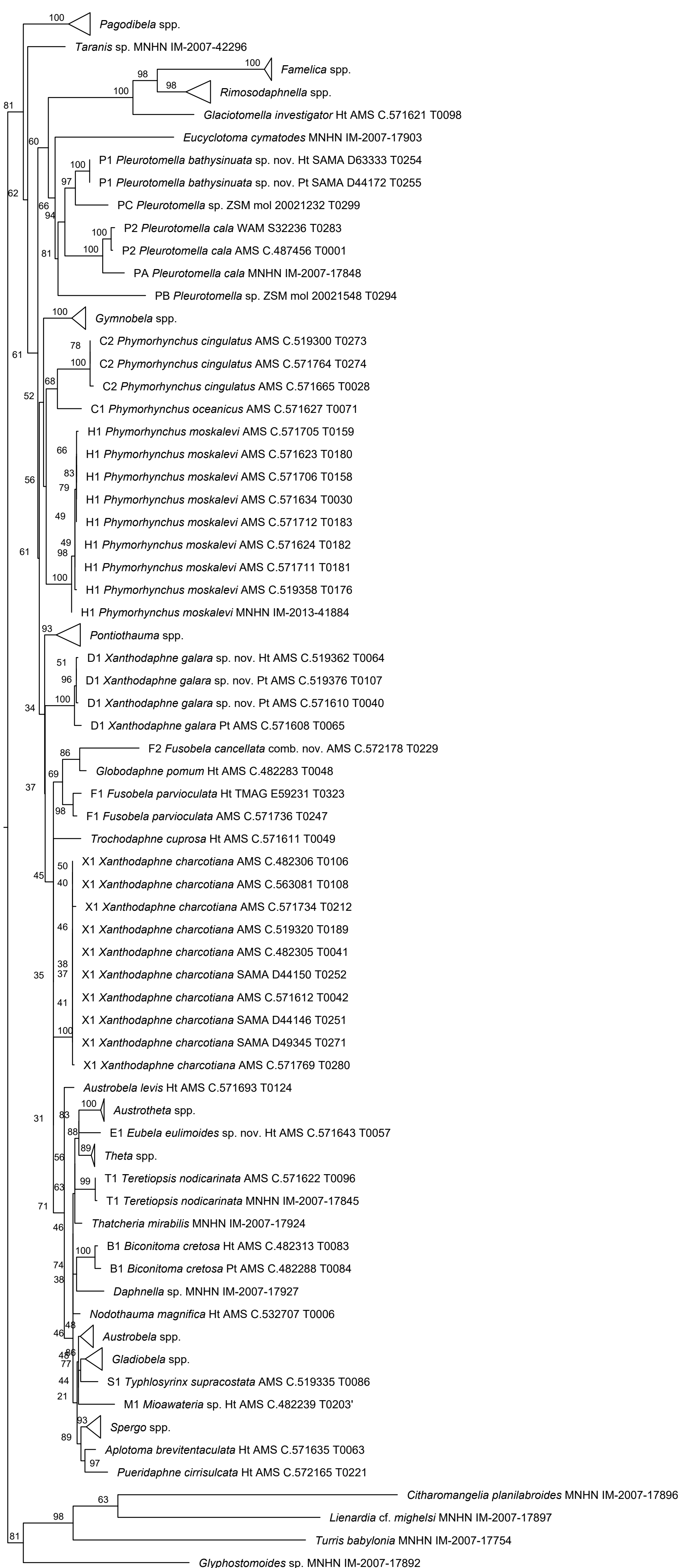


Figure S4. Maximum likelihood (ML) tree based on analyses of the *cox1* sequence dataset. Clades containing congeneric species in the outgroup are collapsed. Numbers near branches indicate nodal support (%) by ML bootstrap (BS).



0.06

Figure S5. Bayesian (BI) consensus phylogram based on analyses of 16S sequence dataset. Clades containing congeneric species of genera not studied here are collapsed. Numbers near nodes indicate nodal support by Bayesian posterior probabilities (BPP).



0.06

Figure S6. Maximum likelihood (ML) tree based on analyses of the 16S sequence dataset. Clades containing congeneric species in the outgroup are collapsed. Numbers near branches indicate nodal support (%) by ML bootstrap (BS).