

Supplementary Table 1. Genome sequences proposed as types for *Candidatus* species that satisfy the SeqCode data quality recommendations.

Proposed species name ¹	NCBI Identifier	Genome Type	Completeness	Contamination	Checkm2_compl	Checkm2_cont	Contig count	MIMAG_high	MIMAG_med	N50_contig_kb	Longest_contig_kb	tRNA_count	tRNA_aa_count	ssu_count	ssu_length	lsu_23s_count	lsu_23s_length
<i>Cloacimonas acidaminivorans</i>	GCA_000146065.1	Isolate	100	1.1	99.91	0.19	1	TRUE	FALSE	2246.82	2246.82	46	20	2	1598	2	3037
<i>Puniceispirillum marinum</i>	GCA_000024465.1	Isolate	99.94	0.15	100	0.09	1	TRUE	FALSE	2753.527	2753.527	36	20	1	1484	1	2715
<i>Tenderia electrophaga</i>	GCA_001447805.1	derived from environmental sample	99.63	2.05	100	0.53	2	TRUE	FALSE	3656.958	3656.958	41	20	1	1499	1	2890
<i>Pseudothioglobus singularis</i>	GCA_001281385.1	Isolate	98.68	0	99.99	0.23	1	TRUE	FALSE	1714.148	1714.148	38	20	1	1536	1	2885
<i>Desulfuridis audaxviator</i>	GCA_000018425.1	Isolate	98.09	0.32	99.98	0.18	1	TRUE	FALSE	2349.476	2349.476	45	20	2	1697	3	3372
<i>Obscuribacter phosphatis</i>	GCA_001899315.1	derived from metagenome	97.44	2.28	95.27	4.37	55	TRUE	FALSE	246.807	735.22	42	20	1	1488	1	2957
<i>Kapaibacterium thiocyanatum</i>	GCA_001899175.1	derived from metagenome	96.99	0	99.28	0.05	31	TRUE	FALSE	373.065	951.664	42	20	1	1483	1	2789
<i>Muiribacterium halophilum</i>	GCA_002869225.1	derived from metagenome	96.56	3.5	90.31	4.31	154	TRUE	FALSE	32.07	182.03	39	20	1	1556	1	3009
<i>Methylomirabilis oxygentifera</i>	GCA_000091165.1	derived from environmental sample	96.26	2.59	100	0.45	1	TRUE	FALSE	2752.854	2752.854	47	20	1	1558	1	3023
<i>Promineifilum breve</i>	GCA_900066015.1	Isolate	93.64	3.64	99.93	1.58	3	TRUE	FALSE	3989.163	3989.163	48	20	1	1504	1	2927
<i>Magnetobacterium casense</i>	GCA_000714715.1	Isolate	92.42	0.91	92.54	0.23	70	TRUE	FALSE	90.253	252.526	41	20	1	1525	1	2981
<i>Hepatobacter penaei</i>	GCA_000742475.1	Isolate	91.94	0	97.11	0	15	TRUE	FALSE	133.248	241.151	44	20	1	1612	1	2746
<i>Hydrothermus pacificus</i>	GCA_002011615.1	derived from metagenome	91.53	0	95.11	0.02	19	TRUE	FALSE	176.033	342.452	45	20	1	1563	1	3900
<i>Bipolaricaulis anaerobius</i>	GCA_900465355.1	Isolate	91.53	0	98.02	0.04	1	TRUE	FALSE	1324.338	1324.338	46	20	1	1562	1	3023
<i>Binatus soli</i>	GCA_002479255.1	derived from metagenome	97.48	0.84	98.02	0.01	65	FALSE	TRUE	138.054	233.241	48	20	1	1563	2	1888
<i>Hepatoplasma crinochetorum</i>	GCA_000582535.1	Isolate	92.17	0	97.05	0.05	1	FALSE	TRUE	657.101	657.101	27	20	1	1533	1	2933
<i>Azobacteroides pseudotrichonymphae</i>	GCA_000010645.1	derived from single cell	89.51	1.09	99.95	0	5	FALSE	TRUE	1114.206	1114.206	38	20	2	1516	1	2887
<i>Nucleicultrix amoebiphila</i>	GCA_002117145.1	Isolate	78.38	0	96.55	0.2	1	FALSE	TRUE	1838.212	1838.212	44	20	2	1483	2	2748
<i>Saccharimonas aalborgensis</i>	GCA_000392435.1	Isolate	67.13	0.93	99.75	0.33	1	FALSE	TRUE	1013.781	1013.781	46	20	1	1500	1	3190
<i>Johnnevsia muelleri</i>	GCA_000953435.1	Isolate	27.08	0	96.63	0.13	1	FALSE	FALSE	357.498	357.498	32	20	1	1547	1	2960
<i>Thermobaculum terrenum</i>	GCA_000025005.1	Isolate	98.58	0	99.97	0.8	2	FALSE	TRUE	2026947	2026947	51	20	2	1502	2	2927

¹ Name corrected as suggested by Oren *et al.* (2020)

Supplementary Table 2. Corrections implemented in GTDB for effectively published names of phyla defined elsewhere.

Taxon name	Type¹	Etymology	Properties and Membership²
<i>Candidatus</i> Aenigmatarcaeota corrig. (effectively published synonym: <i>Candidatus</i> Aenigmarchaeota Rinke <i>et al.</i> , 2013)	Genus <i>Candidatus</i> <i>Aenigmatarcaeum</i> ⁴ corrig. Rinke <i>et</i> <i>al.</i> 2013	Ae.nig.mat.ar.chaeo'ta. N.L. neut. n. <i>Aenigmatarcaeum</i> a <i>Candidatus</i> genus name; <i>-ota</i> ending to denote a phylum; N.L. neut. pl. n. <i>Aenigmatarcaeota</i> the <i>Aenigmatarcaeum</i> phylum	The properties of the phylum are as given by Rinke <i>et al.</i> , 2013. Membership: <i>Candidatus</i> Aenigmarchaeia (Rinke <i>et al.</i> , 2021).
<i>Candidatus</i> Aerophobota corrig. (effectively published synonym: <i>Candidatus</i> Aerophobetes Rinke <i>et</i> <i>al.</i> 2013)	Genus <i>Candidatus</i> Aerophobus Rinke <i>et al.</i> 2013	A.e.ro.pho.bo'ta. N.L. masc. n. <i>Aerophobus</i> a <i>Candidatus</i> genus name; <i>-ota</i> ending to denote a phylum; N.L. pl. neut. n. <i>Aerophobota</i> the <i>Aerophobus</i> phylum	The properties of the phylum are as given by Rinke <i>et al.</i> , 2013. Membership: <i>Candidatus</i> Aerophobia ³
<i>Candidatus</i> Calescibacteriota corrig. (effectively published synonym: <i>Candidatus</i> Calesciantes Rinke <i>et</i> <i>al.</i> , 2013)	Genus <i>Candidatus</i> <i>Calescibacterium</i> Rinke <i>et al.</i> , 2013	Ca.les.ci.bac.te.ri.o'ta. N.L. neut. n. <i>Calescibacterium</i> a <i>Candidatus</i> genus name; <i>-ota</i> ending to denote a phylum; N.L. pl. neut. n. <i>Calescibacteriota</i> the <i>Calescibacterium</i> phylum	The properties of the phylum are as given by Rinke <i>et al.</i> , 2013. Membership: <i>Candidatus</i> Calescibacteriia ³ .

Taxon name	Type¹	Etymology	Properties and Membership²
<i>Candidatus</i> Cloacimonadota corrig. (effectively published synonym: <i>Candidatus</i> Cloacimonetes Rinke <i>et al.</i> , 2013)	Genus <i>Candidatus</i> Cloacimonas Pelletier <i>et al.</i> 2008	Clo.a.ci.mo.na.do'ta. N.L. fem. n. <i>Cloacimonas</i> a Candidatus genus name; <i>-ota</i> ending to denote a phylum; N.L. pl. neut. n. <i>Cloacimonadota</i> the <i>Cloacimonas</i> phylum	The properties of the phylum are as given by Rinke <i>et al.</i> , 2013. Membership: <i>Candidatus</i> Cloacimonadia ³
<i>Candidatus</i> Dormibacterota corrig. (effectively published synonym: <i>Candidatus</i> Dormibacteraeota Ji <i>et al.</i> 2017)	Genus <i>Candidatus</i> Dormibacter Ji <i>et al.</i> 2017	Dor.mi.bac.te.ro'ta. N.L. masc. n. <i>Dormibacter</i> a Candidatus genus name; <i>-ota</i> ending to denote a phylum; N.L. pl. neut. n. <i>Dormibacterota</i> the <i>Dormibacter</i> phylum	The properties of the phylum are as given by Ji <i>et al.</i> , 2017. Membership: <i>Candidatus</i> Dormibacteria (Montgomery <i>et al.</i> , 2021)
<i>Candidatus</i> Eremiobacterota corrig. (effectively published synonym: <i>Candidatus</i> Eremiobacteraeota Ji <i>et al.</i> 2017)	Genus <i>Candidatus</i> Eremiobacter Ji <i>et al.</i> 2017	E.re.mi.o.bac.te.ro'ta. N.L. masc. n. <i>Eremiobacter</i> a Candidatus genus name; <i>-ota</i> ending to denote a phylum; N.L. pl. neut. n. <i>Eremiobacterota</i> the <i>Eremiobacter</i> phylum	The properties of the phylum are as given by Ji <i>et al.</i> , 2017. Membership: <i>Candidatus</i> Eremiobacteria (Ward <i>et al.</i> 2019), <i>Candidatus</i> Xenobia (Ji <i>et al.</i> , 2021)
<i>Candidatus</i> Fermentibacterota corrig. (effectively published synonym: <i>Candidatus</i> Fermentibacteria Kirkegaard <i>et al.</i> 2016)	Genus <i>Candidatus</i> Fermentibacter Kirkegaard <i>et al.</i> 2016	Fer.men.ti.bac.te.ro'ta. N.L. masc. n. <i>Fermentibacter</i> a Candidatus genus name; <i>-ota</i> ending to denote a phylum; N.L. pl. neut. n. <i>Fermentibacterota</i> the <i>Fermentibacter</i> phylum	The properties of the phylum are as given by Kirkegaard <i>et al.</i> , 2016. Membership: <i>Candidatus</i> Fermentibacteria (Kirkegaard <i>et al.</i> , 2016)

Taxon name	Type¹	Etymology	Properties and Membership²
<i>Candidatus</i> Hydrogenedentota corrig. (effectively published synonym: <i>Candidatus</i> Hydrogenedentes Rinke et al., 2013)	Genus <i>Candidatus</i> Hydrogenedens Rinke et al., 2013	Hyd.ro.ge.ne.den.to'ta. N.L. masc. n. <i>Hydrogenedens</i> a <i>Candidatus</i> genus name; <i>-ota</i> ending to denote a phylum; N.L. pl. neut. n. <i>Hydrogenedentota</i> the <i>Hydrogenedens</i> phylum	The properties of the phylum are as given by Rinke <i>et al.</i> , 2013. Membership: <i>Candidatus</i> Hydrogenedentia ³
<i>Candidatus</i> Latescibacterota corrig. (effectively published synonym: <i>Candidatus</i> Latescibacteria Rinke <i>et</i> <i>al.</i> , 2013)	Genus <i>Candidatus</i> Latescibacter Rinke <i>et al.</i> , 2013	La.te.sci.bac.te.ro'ta. N.L. masc. n. <i>Latescibacter</i> a <i>Candidatus</i> genus name; <i>-ota</i> ending to denote a phylum; N.L. pl. neut. n. <i>Latescibacterota</i> the <i>Latescibacter</i> phylum	The properties of the phylum are as given by Rinke <i>et al.</i> , 2013. Membership: <i>Candidatus</i> Latescibacteria ³
<i>Candidatus</i> Moduliflexota corrig. (effectively published synonym: <i>Candidatus</i> Modulibacteria Sekiguchi <i>et al.</i> , 2015)	Genus <i>Candidatus</i> Moduliflexus Sekiguchi <i>et al.</i> , 2015	Mo.du.li.fle.xo'ta. N.L. masc. n. <i>Moduliflexus</i> a <i>Candidatus</i> genus name; <i>-ota</i> ending to denote a phylum; N.L. pl. neut. n. <i>Moduliflexota</i> the <i>Moduliflexus</i> phylum	The properties of the phylum are as given by Sekiguchi <i>et al.</i> , 2015. Membership: <i>Candidatus</i> Moduliflexia (Sekiguchi <i>et</i> <i>al.</i> , 2015)

¹ Type denotes nomenclature type as defined under ICNP

² Membership is based on release R06-RS207 of GTDB

³ Taxon proposed as part of this ms

⁴ GTDB Latin placeholder name

⁵ Name correction as suggested by Oren *et al.* (2020)

Supplementary Table 3. GTDB-defined higher taxa that retain their provisional names and reasons for their exclusion from the descriptions.

Taxon name	Rank	Original name and rank	Reference	Reason
<i>Cyanobacteriia</i>	class. nov.	N/A	This paper.	Proposed type is the effectively published order ‘Cyanobacteriales’.
<i>Thorarchaeia</i>	class. nov.	N/A	This paper.	No type material and no designated nomenclature type.
<i>Dehalobacteriia</i>	class. nov.	N/A	This paper.	Proposed type is the order ‘Dehalobacteriales’.
<i>Nezhaarchaeales</i>	ord. nov.	<i>Candidatus</i> Nezhaarchaeota (phylum)	Wang <i>et al.</i> , 2019	No type material and no designated nomenclature type.
<i>Geothermarchaeales</i>	ord. nov.	<i>Candidatus</i> Geothermarchaeota (phylum)	Jungbluth <i>et al.</i> , 2017	No type material and no designated nomenclature type.
<i>Buchananbacterales</i>	ord. nov.	<i>Candidatus</i> Buchananbacteria (phylum)	Anantharaman <i>et al.</i> 2016	No type material and no designated nomenclature type.
<i>Magasanikbacterales</i>	ord. nov.	<i>Candidatus</i> Magasanikbacteria (phylum)	Brown <i>et al.</i> 2015	No type material and no designated nomenclature type.
<i>Veblenbacterales</i>	ord. nov.	<i>Candidatus</i> Veblenbacteria (phylum)	Anantharaman <i>et al.</i> 2016	No type material and no designated nomenclature type.
<i>Absconditabacterales</i>	ord. nov.	<i>Candidatus</i> Veblenbacteria (phylum)	Hug <i>et al.</i> 2016	No type material and no designated nomenclature type.

Taxon name	Rank	Original name and rank	Reference	Reason
<i>Curtissbacterales</i>	ord. nov.	<i>Candidatus</i> Curtissbacteria (phylum)	Brown <i>et al.</i> 2015	No type material and no designated nomenclature type.
<i>Daviesbacterales</i>	ord. nov.	<i>Candidatus</i> Daviesbacteria (phylum)	Brown <i>et al.</i> 2015	No type material and no designated nomenclature type.
<i>Levybacterales</i>	ord. nov.	<i>Candidatus</i> Levybacteria (phylum)	Brown <i>et al.</i> 2015	No type material and no designated nomenclature type.
<i>Woykebacterales</i>	ord. nov.	<i>Candidatus</i> Woykebacteria (phylum)	Anantharaman <i>et al.</i> 2016	No type material and no designated nomenclature type.
<i>Portnoybacterales</i>	ord. nov.	<i>Candidatus</i> Portnoybacteria (phylum)	Anantharaman <i>et al.</i> 2016	No type material and no designated nomenclature type.
<i>Ryanbacterales</i>	ord. nov.	<i>Candidatus</i> Ryanbacteria (phylum)	Anantharaman <i>et al.</i> 2016	No type material and no designated nomenclature type.
<i>Spechtbacterales</i>	ord. nov.	<i>Candidatus</i> Spechtbacteria (phylum)	Anantharaman <i>et al.</i> 2016	No type material and no designated nomenclature type.
<i>Sungbacterales</i>	ord. nov.	<i>Candidatus</i> Sungbacteria (phylum)	Anantharaman <i>et al.</i> 2016	No type material and no designated nomenclature type.
<i>Terrybacterales</i>	ord. nov.	<i>Candidatus</i> Terrybacteria (phylum)	Anantharaman <i>et al.</i> 2016	No type material and no designated nomenclature type.
<i>Moranbacterales</i>	ord. nov.	<i>Candidatus</i> Moranbacteria (phylum)	Brown <i>et al.</i> 2015	No type material and no designated nomenclature type.

Taxon name	Rank	Original name and rank	Reference	Reason
<i>Rokubacteriales</i>	ord. nov.	<i>Candidatus</i> Rokubacteria (phylum)	Hug <i>et al.</i> 2016	No type material and no designated nomenclature type.
<i>Dehalobacteriales</i>	ord. nov.	N/A	This paper.	Proposed type is the effectively published genus ‘Dehalobacterium’.
<i>Thermosynechococcales</i>	ord. nov.	N/A	This paper.	Proposed type is the effectively published genus ‘Thermosynechococcus’; unresolved nomenclature type
<i>Rubeoparvulales</i>	ord. nov.	N/A	This paper.	Proposed type is the effectively published genus ‘Rubeoparvulum’; Untrusted source
<i>Odinarchaeales</i>	ord. nov.	N/A	This paper.	No type material and no designated nomenclature type.
<i>Helarchaeales</i>	ord. nov.	N/A	This paper.	No type material and no designated nomenclature type.
<i>Pedosphaerales</i>	ord. nov.	N/A	This paper.	Proposed type is the effectively published genus ‘Pedosphaera’; does not satisfy SeqCode quality criteria
<i>Pedosphaeraceae</i>	fam. nov.	N/A	This paper.	Proposed type is the effectively published genus ‘Pedosphaera’; does not satisfy SeqCode quality criteria

Taxon name	Rank	Original name and rank	Reference	Reason
<i>Rubeoparvulaceae</i>	fam. nov.	N/A	This paper.	Proposed type is the effectively published genus ‘Rubeoparvulum’; Untrusted source
<i>Amesbacteraceae</i>	fam. nov.	<i>Candidatus</i> Amesbacteria (phylum)	Brown <i>et al.</i> 2015	No type material and no designated nomenclature type.
<i>Chisholmbacteraceae</i>	fam. nov.	<i>Candidatus</i> Chisholmbacteria (phylum)	Anantharaman <i>et al.</i> 2016	No type material and no designated nomenclature type.
<i>Staskawiczbacteraceae</i>	fam. nov.	<i>Candidatus</i> Staskawiczbacteria (phylum)	Anantharaman <i>et al.</i> 2016	No type material and no designated nomenclature type.
<i>Brennerbacteraceae</i>	fam. nov.	<i>Candidatus</i> Brennerbacteria (phylum)	Anantharaman <i>et al.</i> 2016	No type material and no designated nomenclature type.
<i>Colwellbacteraceae</i>	fam. nov.	<i>Candidatus</i> Colwellbacteria (phylum)	Anantharaman <i>et al.</i> 2016	No type material and no designated nomenclature type.
<i>Tagabacteraceae</i>	fam. nov.	<i>Candidatus</i> Tagabacteraceae (phylum)	Anantharaman <i>et al.</i> 2016	No type material and no designated nomenclature type.
<i>Zambryskibacteraceae</i>	fam. nov.	<i>Candidatus</i> Zambryskibacteria (phylum)	Anantharaman <i>et al.</i> 2016	No type material and no designated nomenclature type.
<i>Dehalobacteriaceae</i>	fam. nov.	N/A	This paper.	Proposed type is the effectively published genus ‘Dehalobacterium’; can be potentially proposed under ICNP

Taxon name	Rank	Original name and rank	Reference	Reason
<i>Acidibacillaceae</i>		N/A	This paper.	Proposed type is the effectively published genus ‘Acidibacillus’; does not satisfy SeqCode quality criteria
	fam. nov.			
<i>Vermiphilaceae</i>		N/A	This paper.	Proposed type is the effectively published genus ‘Vermiphilus’; the original authors of the type species will independently propose the high rank name
	fam. nov.			
<i>Massilibacteriaceae</i>		N/A	This paper.	Proposed type is the effectively published genus ‘Massilibacterium’; Untrusted source
	fam. nov.			
<i>Massilibacillaceae</i>		N/A	This paper.	Proposed type is the effectively published genus ‘Massilibacillus’; Untrusted source
	fam. nov.			
<i>Chloracidobacteriaceae</i>		N/A	This paper.	Proposed type is the effectively published genus ‘Chloracidobacterium’; the original authors of the type species will independently propose the high rank name
	fam. nov.			
<i>Chloracidobacteriales</i>		N/A	This paper.	Proposed type is the effectively published genus ‘Chloracidobacterium’; the original authors of the type species will independently propose the high rank name
	ord. nov.			