**LAST UPDATED: 10/3/17, 05/10/18, 05/14/18, 5/25/18, 7/25/18**

**Kylie Langlois**

**kylie.langlois@stonybrook.edu**

Genera-potential function inventory

For each genus identified by post-sequencing processing (using Greengenes\_13\_8 via mothur or QIIME, or SILVA\_132\_99 via QIIME2), a potential function was identified through a literature review. When formally describing a new genus, a battery of physiological tests are conducted on the cultured type species. These studies provided the potential function of each genus. Some notable exceptions are when a genus or type species could not be cultured in isolation and were cultured in consortia or observed in its natural habitat.

\*\*\*NOTE: The presence of genes that often indicate physiological traits will be added as another literature review is conducted.

“Potential function (initial)” describes how each genus was described in the initial paper; “potential function” denotes the broad functional group used for downstream analyses.

\*\*\*NOTE: Genera without a reference in “Citation” are currently being investigated.

Running total: 335 genera, 202 EndNote citations

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *Genus* | Potential function (initial) | Potential function | Citation | Notes |
| *A17* |  | non-N |  | family: Pirellulaceae |
| *Acetivibrio* |  | Cellulolytic |  |  |
| *Acetobacteroides* |  | Hydrogen-producing | (Su et al., 2014) | carbohydrate-fermenting, anaerobic, produce CO2, H2, acetate |
| *Acidibacter* |  | Fe3 reduction | (Falagán and Johnson, 2014) | acidophilic, obligate heterotroph, tolerant of arsenic (V), feeric iron reduction under microaerobic or anaerobic conditions |
| *Acidobacterium* |  | non-N | (Kishimoto et al., 1991) | acidophilic, found in mineral environments |
| *Acidovorax* |  | non-N |  | causes bacterial fruit blotch on cucurbits |
| *Acinetobacter* |  | non-N | (Cicconi et al) | isolated from Loyalsock Creek as part of undergraduate course, only identification is from poster |
| *Actinobacteria\_*  *phylum\_hgcI clade* |  | varied |  | phylum level clade, cannot assign potential function |
| *Actinotalea* |  | Cellulolytic+ | (Bagnara et al., 1985). (Yi et al., 2007) |  |
| *Aeromonas* |  | non-N | (Janda and Abbott, 1998) | human pathogen |
| *Aetherobacter* |  | non-N | (Garcia et al., 2016) | myxobacteria |
| *Agrobacterium* |  | non-N |  | disease forming, uses nitroglycerine as sole N source (microbewiki) |
| *Akkermansia* |  | non-N | (Derrien et al., 2004) | found in human gut microbiota, use mucin as sole nitrogen source |
| *Algorimarina* |  | non-N | (Kendall et al., 2006) | syntrophic with methanogens |
| *Alicyclobacillus* | use nitrate | Denitrification | (Wisotzkey et al., 1992) | can grow in acidic environments |
| *Alkanibacter* |  | non-N | (Friedrich and Lipski, 2008) |  |
| *Alkanindiges* |  | non-N | (Bogan et al., 2003) | alkane-degrading |
| *Allorhizobium-*  *Neorhizobium-*  *Pararhizobium-*  *Rhizobium* |  | N fixation | (Mousavi et al., 2014) | can enter N fixing symbioses with legumes |
| *Altererythrobacter* |  | non-N | (Kwon et al., 2007a) | aerobes |
| *Anaerococcus* |  | non-N | (Ezaki et al., 2001) | can be found in vaginal discharges |
| *Anaerolinaceae WCHB1-05* |  | Cellulolytic | (Xia et al., 2016) | Anaerolineae lineage (Chloroflexi phylum), found in anaerobic digesters, fermentative lifestyle, may be able to use ethanol as carbon source |
| *Anaerolinea* |  | Cellulolytic |  |  |
| *Anaeromyxobacter* | nitrate as electron acceptor, nitrous oxide to dinitrogen | Denitrification | (He and Sanford, 2003) |  |
| *Anaerospora* |  | non-N | (Woo et al., 2005) |  |
| *Aquabacterium* | nitrate as electron acceptor | Denitrification | (Kalmbach et al., 1999) | isolated from biofilms |
| *Aquicella* |  | non-N | (Santos et al., 2003) | related to Rickettsiella and Legionella |
| *Arcobacter* | nitrate as electron acceptor | Denitrification | (Pati et al., 2010) | genome of A. nitrofigilis sequenced by |
| *Arenimonas* |  | non-N | (Kwon et al., 2007b) | described by |
| *Arthrobacter* | nitrification | Nitrite oxidation |  |  |
| *Aurantimicrobium* |  | non-N | (Nakai et al., 2015) | aerobic |
| *Azoarcus* | nitrogen fixation | N fixation | (Reinhold-Hurek et al., 1993) | can be found in endophytic chambers of some plants |
| *Azospirillum* | fix N | N fixation | (Steenhoudt and Vanderleyden, 2000) | rhizobacterium |
| *Bacillus* | some denitrify | Denitrification |  |  |
| *Bacteriovorax* |  | non-N | (Davidov and Jurkevitch, 2004) | Predators |
| *Bacteroides* |  | non-N |  | can be motile or nonmotile, usually mutualistic, especially in guts |
| *Bauldia* |  | non-N | (Yee et al., 2010) | obligate aerobe |
| *Bdellovibrio* |  | non-N |  | wikipedia |
| *Bifidobacterium* |  | non-N |  | wikipedia |
| *Blastocatellaceae\_family\_JGI 0001001-H03* |  | varied |  | family level, cannot assign potential function |
| *Blautia* |  | Denitrification | (Liu et al., 2008) (Müller and Frerichs, 2013) | isolated from human and animal feces some acetogenic |
| *Blvii28* |  | non-N |  | family: Rikenellaceae, found in gastrointestinal tract (wikipedia) |
| *Bosea* |  | Thiosulfate oxidation | (Das et al., 1996) |  |
| *Bradyrhizobium* | some fix N, some use NH4 or NO3 as N source | N fixation | (Jordan, 1982) | found in root nodules |
| *Bryobacter* |  | non-N | (Kulichevskaya et al., 2010) |  |
| *Burkholderia* |  | non-N | (Yabuuchi et al., 1992) |  |
| *Butyrivibrio* |  | Cellulolytic |  |  |
| *C39* |  | non-N |  | family: Rhodocyclaceae, wikipedia |
| *Caldanaerobacter* |  | Cellulolytic |  |  |
| *Caldicellulosiruptor* |  | Cellulolytic |  |  |
| *Candidatus*  *Diapherotrites\_*  *phylum* |  | varied\_archaea |  | phylum level, cannot assign potential function |
| *Candidatus*  *Pacearchaeota\_*  *phylum* |  | varied\_archaea |  | phylum level, cannot assign potential function |
| *Candidatus Accumulibacter* |  | Polyphosphate-accumulating | (Mao et al., 2015) | accumulate P, reduce nitrate |
| *Candidatus babela* |  | non-N | (Pagnier et al., 2015) | genome sequenced by |
| *Candidatus brocadia* | anammox | Anammox |  |  |
| *Candidatus jettenia* | anammox | Anammox |  |  |
| *Candidatus koribacter* |  | Denitrification+ |  |  |
| *Candidatus kuenenia* | anammox | Anammox |  |  |
| *Candidatus metachlamydia* |  | non-N |  | chlamydia-like intracellular parasite |
| *Candidatus nitrosoarchaeum* | ammonia oxidizer | Ammonia oxidation | (Lehtovirta-Morley et al., 2011) | acidophilic ammonia oxidizer, could provide missing link between acidic soils and high ammonia oxidation rates |
| *Candidatus nitrosocaldus* | ammonia oxidation | Ammonia oxidation | (De la Torre et al., 2008) |  |
| *Candidatus nitrososphaera* | ammonia oxidation | Ammonia oxidation |  |  |
| *Candidatus nitrosotalea* | ammonia oxidizer | Ammonia oxidation | (Lehtovirta-Morley et al., 2011) | acidophilic ammonia oxidizer, could provide missing link between acidic soils and high ammonia oxidation rates |
| *Candidatus Nitrosotenuis* |  | Ammonia oxidation | (Li et al., 2016) |  |
| *Candidatus nitrotoga* | nitrite oxidizer | Nitrite oxidation | (Alawi et al., 2007) | described by psychrophilic |
| *Candidatus Omnitrophus* |  | Magnetatactic+ | (Kolinko et al., 2016) | contains Nif‐specific ferredoxin III, maybe N fixation, may reduce S, contains genes for magnetatism |
| *Candidatus phytoplasma* |  | non-N |  |  |
| *Candidatus planktophila* |  | non-N | (Jezbera et al., 2009) | found in freshwater, no axenic culture |
| *Candidatus protistobacter* |  | non-N | (Vannini et al., 2013) | obliate symbiont of ciliate from Euplotes genus |
| *Candidatus protochlamydia* |  | non-N | (Collingro et al., 2005) |  |
| *Candidatus rhabdochlamydia* |  | non-N | (Kostanjsek et al., 2004) | share lots of genetic similarity to chlamydia |
| *Candidatus saccharimonas* | nitrate reduction | Denitrification | (Kindaichi et al., 2016) | genomes sequenced from WWTPs |
| *Candidatus solibacter* |  | Denitrification+ | (Kindaichi et al., 2016) | genomes sequenced from WWTPs |
| *Candidatus vidania* |  | non-N | (Gonella et al., 2011) |  |
| *Candidatus\_brocadia* |  | Anammox | (Gonella et al., 2011) |  |
| *Candidatus\_methanoregula* |  | Methanogen | (Bräuer et al., 2011) | hydrogenotrophic methanogen |
| *Candidatus\_nitrososphaera* |  | Ammonia oxidation |  |  |
| *Candidatus\_protochlamydia* |  | non-N | (Bräuer et al., 2011) |  |
| *Candidatus\_rhabdochlamydia* |  | non-N | (Bräuer et al., 2011) |  |
| *Candidatus\_xiphinematobacter* |  | non-N | (Vandekerckhove et al., 2002) | endosymbiont of nematodes |
| *Caulobacter* |  | non-N | (MacRae and Smit, 1991) | isolated from various WWTPs |
| *Cellulomonas* |  | Cellulolytic+ | (Bagnara et al., 1985) |  |
| *Cenarchaeum* | ammonia oxidation through different pathways | Ammonia oxidation | (Hallam et al., 2006) | only contain one species that is symbiont of sponges, have amoA genes |
| *Chitinophaga* |  | non-N | (SANGKHOBOL and Skerman, 1981) | hydrolyze chitin but not cellulose |
| *Chlamydia* |  | non-N | (Collingro et al., 2005) | interacellular pathogen, cannot synthesize its own ATP or grow on artificial medium,  temperature sensitive, two cell forms: non-infectious reticulate body and vegetative form. Found in wastewater by |
| *Chthoniobacter* |  | non-N | (Sangwan et al., 2004) |  |
| *Cloacibacterium* |  | non-N | (Allen et al., 2006) | isolated from wastewater |
| *Clostridium* |  | Cellulolytic |  |  |
| *Compostimonas* | nitrate reduction | Denitrification | (Kim et al., 2012) |  |
| *Conexibacter* |  | Denitrification | (Monciardini et al., 2003) |  |
| *Coprococcus* |  | non-N | (HOLDEMAN and Moore, 1974) | peptones used as nitrogen source |
| *Corynebacterium* |  | non-N |  | found in gut microbiome (wikipedia) |
| *Coxiella* |  | non-N |  | 5 genomes of C. burnetii exist <https://www.patricbrc.org/portal/portal/patric/GenomeList>?  cType=taxon&cId=777&displayMode=Complete&dataSource=RAST&pk=1178009952#  key=1178009952&pS=20&aP=1&aT=&cwG=false&cF=&gId=&gName=&gdir=ASC&  gsort=genome\_name&sdir=ASC&ssort=genome\_name |
| *Crenothrix* |  | Methanogen | (Stoecker et al., 2006) | methane oxidation, weird pmmoA, can precipitate iron |
| *Crocinitomix* |  | non-N | (Bowman et al., 2003) | described by |
| *Cupriavidus* |  | non-N | (Vandamme and Coenye, 2004) | genus described by |
| *Curtobacterium* |  | non-N | (Funke et al., 2005) | acid produced from glucose breakdown |
| *Cytophaga* |  | non-N |  |  |
| *Dechloromonas* | nitrate as electron acceptor | Denitrification | (Coates et al., 2001) | can couple benzene oxidation to nitrate reduction in pure culture |
| *Delftia* |  | non-N | (Wen et al., 1999) |  |
| *Demequina* |  | non-N | (Yi et al., 2007) |  |
| *Denitratisoma* |  | non-N |  |  |
| *Denitrobacterium* | nitrate reduction | Denitrification |  |  |
| *Desulfobulbus* |  | non-N |  | inhabitants of human gastrointestinal tract (wikipedia) |
| *Desulfosporosinus* |  | Sulfur reduction | (Stackebrandt et al., 1997) | reduces thiosulfate and sulfate |
| *Desulfovibrio* |  | Denitrification |  | can reduce sulfate, sulfur, nitrate, nitrite, uranium, chromium, and iron (microbewiki) |
| *Devosia* |  | Denitrification | (Nakagawa et al., 1996) | some species can fix N |
| *Dialister* |  | non-N | (Moore and Moore, 1994) | found in human mouths, can cause gingivitis |
| *Dinghuibacter* |  | non-N | (Lv et al., 2016) |  |
| *Dokdonella* |  | Denitrification | (Yoon et al., 2006) |  |
| *Dongia* |  | Denitrification | (Liu et al., 2010) |  |
| *Duganella* |  | non-N | (Hiraishi et al., 1997) | aerobic, chemoorganotrophic |
| *Dyella* |  | Denitrification | (Xie and Yokota, 2005) |  |
| *Ethanoligenens* |  | non-N | (Xing et al., 2006) |  |
| *Eubacterium* |  | Cellulolytic |  |  |
| *Faecalibacterium* |  | non-N | (Duncan et al., 2002) | found in human gut microbiota, produce butyrate |
| *family\_*  *Microscillaceae\_*  *OLB12* |  | varied | (Hahnke et al., 2016) |  |
| *Ferribacterium* | nitrate reduction | Denitrification | (Cummings et al., 1999) | dissimilatory Fe(III) reducing, couples oxidation of acetate and other org compounds to iron reduction or nitrate reduction |
| *Ferritrophicum* |  | Fe2 oxidation | (Weiss et al., 2007) | microaerophilic, lithotrophic |
| *Ferruginibacter* |  | non-N | (Lim et al., 2009) |  |
| *Fimbriimonas* |  | non-N | (Im et al., 2012) |  |
| *Flavisolibacter* |  | non-N | (Yoon and Im, 2007) |  |
| *Flavobacterium* |  | non-N |  | (microbewiki) |
| *Gaiella* |  | Denitrification | (Albuquerque et al., 2011) |  |
| *Gallionella* | nitric oxide reduction | Nitric oxide reduction | (Anderson and Pedersen, 2003; Emerson et al., 2013) | found in deep sea hydrothermal vents, only have in situ growth conditions, reduces iron, only one  species in genus found nitric oxide reductases in the genome of gallionella |
| *Gemmata* |  | varied |  | wide variety of metabolisms within genus http://www.cell.com/current-biology/fulltext/S0960-9822(13)00836-1 |
| *Gemmatimonas* |  | non-N |  | (microbewiki) |
| *Geobacter* |  | non-N |  | can oxidize metals, including iron and radioactive metals |
| *Georgfuchsia* | nitrate reduction, only with toulene | Denitrification | (Weelink et al., 2009) | isolated from polluted aquifer |
| *Geothrix* | nitrate as electron acceptor | Denitrification |  | 94% similarity to Holophaga, use fe (III) ase electron acceptor (microbewiki) |
| *Giesbergeria* |  | non-N | (Grabovich et al., 2006) | isolated from activated sludge |
| *Glomus* |  | non-N |  |  |
| *Gouta19* |  | Sulfur reduction |  | may be Thermodesulfovibrio |
| *Haliangium* |  | non-N | (Fudou et al., 2002) | obligate aerobe |
| *Halocella* |  | Cellulolytic |  |  |
| *Halomonas* |  | Denitrification | (Vreeland et al., 1980) | high salt tolerance |
| *Herbaspirillum* | some denitrify | Denitrification | (Baldani et al., 1986) |  |
| *Herminiimonas* |  | non-N | (Fernandes et al., 2005) |  |
| *Heteroc45\_4W* |  | non-N |  | family: Chthoniobacteraceae, copy from Chthoniobacter |
| *Holophaga* |  | non-N | (Liesack et al., 1994) | genus described by |
| *Hydrogenophaga* |  | Denitrification | (Willems et al., 1989) |  |
| *Hymenobacter* |  | non-N | (Reddy, 2013) | diverse genus |
| *Hyphomicrobium* | nitrate reduction | Denitrification | (Moore, 1981) | genus described by |
| *Hyphomonadaceae\_family\_SWB02* |  | varied |  | family leve, cannot assign potential function |
| *Ideonella* |  | non-N | (Malmqvist et al., 1994) | chlorate as electron acceptor |
| *Ignavibacterium* |  | Sulfur reduction | (Iino et al., 2010) | KEY: use of ferredoxins |
| *Incisomonas* |  | non-N | (Cavalier-Smith and Scoble, 2013) | marine heterokont flagellate |
| *Janthinobacterium* |  | non-N | (Ciesielski et al., 2014) (Shoemaker et al., 2015) (Hornung et al., 2013) | ability to produce short and potentially medium length chain PHAs  Chemoorganoheterotroph found in soils. Aerobic, can form antifungal compounds |
| *Kaistia* |  | Denitrification | (Im et al., 2004) |  |
| *Kaistobacter* |  | non-N |  | in Sphingomonadaceae, use metabolism of Sphingomonad |
| *Knoellia* |  | Denitrification | (Groth et al., 2002) |  |
| *Kuenenia* |  | Anammox | (Groth et al., 2002) |  |
| *Lacunisphaera* |  | non-N | (Rast et al., 2017) | aerobic |
| *Legionella* |  | non-N |  | use amino acids to grow and can be parasitic, most species are motile (microbewiki) |
| *Leptolinea* |  | non-N | (Yamada et al. 2006)? | isolated from activated sludge |
| *Leptolyngbya* | nitrogen fixation | N fixation | (Shimura et al., 2015) | terrestrial and FW cyanobacterium |
| *Leptonema* |  | non-N |  | wikipedia |
| *Leptospira* |  | non-N |  | disease causing or saprobic (wikipedia) |
| *Leptotrichia* |  | non-N | (Couturier et al., 2012) | anaerobic, part of normal human flora, can be pathogenic in immunosuppressed patients |
| *Levilinea* |  | non-N | (Yamada et al., 2006) | anaerobic |
| *Limnobacter* |  | Sulfur oxidation | (Spring et al., 2001) | thiosulfate oxidation |
| *Luteimonas* |  | Denitrification | (Finkmann et al., 2000) | only reduce to N2O |
| *Luteolibacter* |  | non-N | (Glaeser et al., 2012) | (Verrucomicorbium) |
| *Lysobacter* |  | Degrade chitin | (CHRISTENSEN and Cook, 1978) |  |
| *Macellibacteroides* |  | non-N | (Jabari et al., 2012) |  |
| *Magnetospirillum* |  | non-N | (Thrash et al., 2010) | can use perchlorate as terminal electron acceptor, exhibit aerotaxis and magnetotaxis |
| *Malikia* | some nitrate reduction | Denitrification | (Spring et al., 2005) |  |
| *Massilia* | some strains may reduce nitrate | Denitrification | (Lindquist et al., 2003) | isolated from human blood and tissue samples |
| *Megasphaera* |  | non-N | (Rogosa, 1971) |  |
| *Mesorhizobium* |  | N fixation | https://en.wikipedia.org/wiki/Mesorhizobium | one species can N fixation, M. loti (root nodules) |
| *Methanobacterium* |  | non-N | (Zeikus and Wolee, 1972) | methanogenic |
| *Methanobrevibacter* |  | Methanogen |  | archaea, wikipedia |
| *Methanomassiliicoccus* |  | Methanogen | (Dridi et al., 2012) | archaea |
| *Methanosaeta* |  | non-N | (Smith and Ingram-Smith, 2007) | acetoclastic methanogen |
| *Methanosarcina* |  | Methanogen |  | microbewiki |
| *Methanospirillum* |  | Methanogen | (Ferry et al., 1974) | hydrogenotrophic methanogen |
| *Methylobacter* |  | Methanotroph | (wikipedia) | family Methylococcaceae are all methanotrophs |
| *Methylobacterium* |  | non-N |  |  |
| *Methylococcaceae* |  | *Methanotroph* | (Bowman, 2006) |  |
| *Methylocystis* |  | Methanogen | (Belova et al., 2013) | facultative methanotroph |
| *Methylomonas* |  | Methanotroph |  | wikipedia |
| *Methylophaga* |  | non-N |  | strict methylotrophs |
| *Methylosarcina* |  | non-N |  | methanotrophic |
| *Methylosinus* |  | Denitrification | (Sullivan et al., 1998) |  |
| *Methylotenera* |  | non-N | (Kalyuzhnaya et al., 2006) | use methylamine as sole N source |
| *Methylothermus* | can use nitrate or ammonia as N source | Denitrification | (Tsubota et al., 2005) | methanotroph |
| *Methyloversatilis* |  | non-N | (Kalyuzhnaya et al., 2006) | methylotroph, closest relationship to denitrifier |
| *Methylovulum* |  | Methanotroph | (Iguchi et al., 2011) |  |
| *Micromonospora* |  | non-N |  | wikipedia |
| *Mucilaginibacter* |  | non-N | (Pankratov et al., 2007) |  |
| *Mycobacterium* |  | non-N | (Butler et al., 1993) | potentially disease causing |
| *Mycoplasma* |  | non-N | (Wodke et al., 2013) |  |
| *Neochlamydia* |  | obligate parasite | (Horn et al., 2000) | obligate intracytoplasmatic parasite of H. vermiformis |
| *Nevskia* |  | non-N | (Kim et al., 2011) |  |
| *Niabella* |  | non-N | (Kim et al., 2007) |  |
| *Nitratifractor* | denitrification | Denitrification | (Nakagawa et al., 2005) |  |
| *Nitratireductor* | nitrate reduction to nitrite only | Denitrification | (Labbé et al., 2004) |  |
| *Nitratiruptor* | nitrate as electron acceptor | Denitrification | (Nakagawa et al., 2005) |  |
| *Nitrobacter* | nitrite oxidation | Nitrite oxidation |  |  |
| *Nitrosococcus* | Nitrite oxidization | Nitrite oxidation |  |  |
| *Nitrosocosmicus* |  | Ammonia oxidation | (Sauder et al., 2017) |  |
| *Nitrosomona-daceae\_*  *family\_GOUTA6* |  | Ammonia oxidation |  | type genus is Nitrosomonas |
| *Nitrosomona-daceae\_*  *family\_MND1* |  | Ammonia oxidation |  | type genus is Nitrosomonas |
| *Nitrosomonas* | ammonia oxidation | Ammonia oxidation |  |  |
| *Nitrosopumilus* | ammonia oxidation | Ammonia oxidation |  |  |
| *Nitrososphaera* | ammonia oxidation | Ammonia oxidation |  |  |
| *Nitrosospira* | ammonia oxidizing | Ammonia oxidation | (Meincke et al., 1989) |  |
| *Nitrosovibrio* | Ammonia oxidizing | Ammonia oxidation |  |  |
| *Nitrospina* | nitrite oxidizing | Nitrite oxidation |  |  |
| *Nitrospira* | nitrite oxidizing | Nitrite oxidation |  |  |
| *Nitrospirillum* | N fixation | N fixation | (Chung et al., 2015) |  |
| *Novosphingobium* |  | non-N |  | http://genome.jgi.doe.gov/novar/novar.home.html |
| *Opitutus* | nitrate reduction to nitrite | Denitrification | (Chin et al., 2001) | isolated from anoxic rice paddies, grow better in syntrophic assembalges with methanogens |
| *Or-59* |  | non-N | (Sangwan et al., 2004) | same family as Chthoniobacter |
| *Paenibacillus* |  | fix N |  | wikipedia |
| *Pajaroellobacter* |  | obligate parasite | (Brooks et al., 2016) | cause of bovine abortion |
| *Paludibacter* |  | non-N | (Ueki et al., 2006) |  |
| *Paludibaculum* |  | Fe3 reduction | (Kulichevskaya et al., 2014) | facultative anaerobe, can reduce nitrate, produce CO2, acetate |
| *Parcubacteria\_family\_Candidatus Magasanikbacteria bacterium* |  | OD-1 | http://www.uniprot.org/taxonomy/1752731 |  |
| *Parvibaculum* |  | Oxidize surfactants | (Schleheck et al., 2004) |  |
| *Pedobacter* |  | non-N | (Steyn et al., 1998) |  |
| *Pedomicrobium* | nitrate reduction | Denitrification | (Gebers and Beese, 1988) | found on biofilms, can oxidize manganese |
| *Pedosphaera* |  | non-N | (Kant et al., 2011) | genome sequenced |
| *Pelagicoccus* |  | OD-1? |  |  |
| *Pelobacter* |  | non-N |  | iron and sulfure reducing (microbewiki} |
| *Pelosinus* |  | non-N | (Shelobolina et al., 2007) |  |
| *Pelotomaculum* |  | non-N | (Imachi et al., 2007) (Imachi et al., 2002) | all publications about this genus are anerobic, syntrophic, most with methanogens  (http://www.bacterio.net/pelotomaculum.html). Novel genus Pelotomaculum. Cannot degrade sulfur, sulfite, a  nd thiosulfate |
| *Peredibacter* |  | non-N | (Davidov and Jurkevitch, 2004) |  |
| *Perlucidibaca* |  | Denitrification | (Song et al., 2008). |  |
| *Phascolarctobacterium* |  | non-N | (Del Dot et al., 1993) |  |
| *Phenylobacterium* |  | non-N | (Lingens et al., 1985) |  |
| *Phycisphaeraceae\_family\_SM1A02* |  | Denitrification | (Fukunaga et al., 2009) | nitrate reduction observed in type species of type genus (only description of family is type genuse) |
| *Pilimelia* |  | non-N |  | same family as Micromonospora, wikipedia |
| *Planctomyces* |  | Anammox |  | microbewiki, seem to be same as Planctomycetes? |
| *Polaromonas* |  | non-N | (Weon et al., 2008) |  |
| *Polynucleobacter* |  | non-N | (Heckmann and Schmidt, 1987) | obligate ciliate endosymbiont |
| *Prochlorococcus* |  | OD-1? |  |  |
| *Prolixibacter* |  | non-N | (Holmes et al., 2007) |  |
| *Prolixibacteraceae\_family* |  | N fixation | (Huang et al., 2014) | proposed family |
| *Prolixibacteraceae\_family\_BSV13* |  | N fixation | (Huang et al., 2014) | proposed family |
| *Propionivibrio* | some use nitrate as electron acceptor | Denitrification | (Brune et al., 2002) | extended description of genus |
| *Prosthecobacter* |  | non-N |  | https://microbewiki.kenyon.edu/index.php/Prosthecobacter |
| *Pseudarthrobacter* |  | Denitrification | (Busse, 2016) |  |
| *Pseudo-rhodobacter* |  | non-N | (Uchino et al., 2002) |  |
| *Pseudolabrys* |  | non-N | (Kämpfer et al., 2006) |  |
| *Pseudomonas* | nitrate reduction | Denitrification | (Nishimori et al., 2000) | intracellular parasite of fish |
| *Ralstonia* | nitrate reduction | Denitrification | (Yabuuchi et al., 1995) |  |
| *Reyranella* |  | Denitrification | (Pagnier et al., 2011) | isolated from freshwater, co-cultured with amoeba |
| *Rhizobium* |  | fix N |  | same as Brachyrhizobium |
| *Rhodanobacter* | (some)nitrate reduction | Denitrification | (Kostka et al., 2012) | 6 species had full genome sequencing, all had most genes involved in full nitrate reduction to dinitrogen gas |
| *Rhodobacter* |  | N fixation |  | varied metabolisms within the genus, some fix N (microbewiki) |
| *Rhodococcus* |  | non-N |  | (microbewiki) |
| *Rhodocyclaceae dok59* |  | Denitrification | (Van der Zaan et al., 2012) | Rhodocyclaceae may degrade benzenes |
| *Rhodocyclus* |  | non-N |  | all references say purple nonsulfur bacteria http://www.bacterio.net/rhodocyclus.html |
| *Rhodoferax* | nitrate as electron acceptor | Denitrification | (Finneran et al., 2003) | species can undergo fermentative respiration, photoautotrophy under anaerobic conditions, or aerobic respiration  (http://www.bacterio.net/rhodoferax.html). R. ferrireductans can reduce Fe (III) |
| *Rhodomicrobium* |  | non-N |  |  |
| *Rhodoplanes* | capability to denitrify | Denitrification | (Hiraishi and Ueda, 1994) | Hiraishi and Ueda |
| *Rhodopseudomonas* |  | N fixation+ | https://microbewiki.kenyon.edu/index.php/Rhodopseudomonas | purple nonsulfur pohotrophic organisms, one species can degrade several constituent of lignin, one fixes N, |
| *Rickettsia* |  | non-N |  | obligate intracellular pathogens of eukaryotes https://microbewiki.kenyon.edu/index.php/Rickettsia |
| *Rikenellaceae\_*  *family\_Bact-08* |  | non-N |  | gut microbiome member (wikipedia) |
| *Romboutsia* |  | Acetogenic | (Gerritsen et al., 2014) |  |
| *Roseburia* |  | non-N |  | found in human colon (wikipedia) |
| *Roseimarinus* |  | non-N | (Wu et al., 2015) | facultative anaerobic |
| *Roseomonas* | some reduce nitrate | Denitrification | (Rihs et al., 1993) |  |
| *Rubrobacter* | nitrate reduction to nitrite | Denitrification |  | (microbewiki) |
| *Ruminiclostridium* |  | Cellulolytic | refs in (Ravachol et al., 2015 Sheng, T., et al. (2016)) | mesophilic, also metabolizes some hemicellulosic polysaccharides, produces ehtanol, acetate, and lactate |
| *Ruminococcus* |  | Cellulolytic |  |  |
| *Rummeliibacillus* |  | non-N | (Vaishampayan et al., 2009) |  |
| *Saccharibacter* |  | non-N | (Jojima et al., 2004) | only one species, isolated from pollen |
| *Saccharophagus* |  | non-N |  | degrades polysaccharides (microwiki https://microbewiki.kenyon.edu/index.php/Saccharophagus\_degradans) |
| *Saccharospirillum* | nitrate reduction | Denitrification |  | isolated from hypersaline environments |
| *Salinibacterium* |  | non-N | (Han et al., 2003) |  |
| *Sediminibacterium* |  | non-N | (Qu and Yuan, 2008) |  |
| *Shd-14* |  | Cellulolytic |  | family: Anaerolinaceae, copy from Anaerolinaea |
| *Sideroxydans* | fix N | N fixation | (Beckwith et al., 2015) (Emerson et al., 2013) | oxidize ferrous iron and reduces oxygen |
| *Siluania* |  | non-N | (Karpov et al., 1998) | one of the smallest 18S flagellate |
| *Simkania* |  | non-N |  | obligate intracellular bacteria, can cause disease (microbewiki) |
| *Simplicispira* |  | Denitrification | (Grabovich et al., 2006) | isolated from activated sludge |
| *Smb53* |  | Cellulolytic |  | family: Clostridiaceae, copy from Clostridia |
| *Smithella* |  | Propionate oxidation-syntrophy | (Liu et al., 1999) | anaerobic, syntrophic, propionate-oxidizing, co culture with methanogens, form acetate, co2, methane |
| *Solibacillus* |  | non-N | (Krishnamurthi et al., 2009) | Krishnamurthi, S., et al. |
| *Solitalea* | some reduce nitrate | Denitrification | (Weon et al., 2009) | one strain reduces nitrate, one does not |
| *Sphaerobacter* |  | non-N | (Demharter et al., 1989) | thermophilic |
| *Sphingobacterium* |  | non-N | (YABUUCHI et al., 1983) | genus first described by |
| *Sphingobium* |  | non-N | (Takeuchi et al., 2001) |  |
| *Sphingomonas* |  | non-N |  | (microbewiki) |
| *Sphingorhabdus* |  | non-N | (Jogler et al., 2013) | aerobic |
| *Spirobacillus* |  | non-N | (Rodrigues et al., 2008) | parasites of Daphnia, contain carotenoids |
| *Spirochaeta* |  | Cellulolytic |  |  |
| *Sporobacter* |  | Methanotroph | (Grech-Mora et al., 1996) |  |
| *Staphylococcus* |  | non-N |  | wikipedia |
| *Stenotrophomonas* |  | non-N |  | wikipedia |
| *Steroidobacter* |  | Denitrification+ | (Fahrbach et al., 2006) |  |
| *Sterolibacterium* | nitrate reduction | Denitrification | (Tarlera and Denner, 2003) | isolated from USB, oxidizes cholesterol to co2 |
| *Streptococcus* |  | non-N |  | human pathogen (wikipedia) |
| *Streptomyces* |  | non-N |  | create antibiotics (wikipedia) |
| *Sulfuricurvum* |  | Denitrification | (Kodama and Watanabe, 2004) | isolated from crude oil, utilized sulfide, elemental sulfur, thiosulfate, hydrogen, nitrate, oxygen as electron acceptors |
| *Sulfurimonas* | nitrate, nitrite as electron acceptors | Denitrification |  | can use zero valent surlfur, molecular hydrogen, or reduced sulfur as electron donors; nitrate, nitrite, oxygen as electron acceptors (Wikipedia) |
| *Sulfurisoma* | nitrate as electron acceptor | Denitrification | (Kojima and Fukui, 2014) | oxidizes thiosulfate, elemental sulfur, and hydrogen |
| *Sulfuritalea* | nitrate reduction | Denitrification |  |  |
| *Sulfurospirillum* |  | Sulfur reduction | refs in (Buttet et al., 2013) | microaerophilic or facultative anaerobes, versatile metabolism |
| *Sunxiuqinia* |  | non-N | (Qu et al., 2011) |  |
| *Sutterella* |  | Denitrification | (Wexler et al., 1996) |  |
| *Syntrophobacter* |  | Methanotroph | (Boone and Bryant, 1980) | syntrophic, degrades proprionate while cocultured with methanogens |
| *Syntrophorhabdus* |  | Denitrification+ | (Qiu et al., 2008) | obligate anaerobe, flexible metabolism, in syntrophy with hydrogenotrophic methanogens |
| *Syntrophus* |  | Methanotroph | (Mountfort et al., 1984) | syntrophic, needs hydrogenic methanogen |
| *Telmatospirillum* |  | N fixation-methanogen | (Sizova et al., 2007) | chemoorganotrophs/autotrophs, microaerophilic, contain NifH, found in methanogenic consortia |
| *Terrimonas* |  | non-N | (Xie and Yokota, 2006) | obligate aerobe |
| *Thermoanaerobaculaceae\_family\_Subgroup 10* |  | varied |  | unknown Acidobacteria |
| *Thermomonas* |  | non-N | (Busse et al., 2002) |  |
| *Thiobacillus* |  | Sulfur oxidation |  | wikipedia |
| *Thiobacter* |  | non-N | (Hirayama et al., 2005) | obligate thermophilic, sulfur-oxidizing, high growth on thiosulfate or elemental sulfate as an energy source and oxygen as electron acceptor |
| *Thiohalophilus* | potential denitrification | Denitrification | (Sorokin et al., 2007)? |  |
| *Thiothrix* | nitrate reduction | Denitrification | (Williams and Unz, 1985) |  |
| *Tolumonas* |  | non-N | (Fischer-Romero et al., 1996) | facultative anaerobic, toluene producing, can produce acetate, ethanol, and formate |
| *Treponema* |  | non-N |  | human pathogens, many obligate (microbewiki) |
| *Trichococcus* |  | Denitrification | (Liu et al., 2002) |  |
| **uncultured archaeon** |  | uncultured\_archaea | na |  |
| *uncultured Bacteroidetes bacterium* |  | non-N |  |  |
| *uncultured Candidatus*  *Omnitrophus* |  | Magnetatactic+ | (Kolinko et al., 2016) | contains Nif‐specific ferredoxin III, maybe N fixation, may reduce S, contains genes for magnetatism |
| *uncultured Chlorobi bacterium* |  | Sulfur oxidation | https://en.wikipedia.org/wiki/Green\_sulfur\_bacteria | phylum: "green sulfur", all are obligate anaerobic photoautotrophs, and non-autotrophs, use sulfide ions to produce CO2 |
| **uncultured euryarchaeote** |  | uncultured\_eukaryote | na |  |
| *uncultured organism* |  | uncultured | na |  |
| **uncultured Parcubacteria**  **group bacterium** |  | CPR-OD1 | (Nelson and Stegen, 2015) | one candidate species may be capable of nitrogen reactions [Castelle, C. J., et al. (2017)} |
| *Undibacterium* |  | non-N | (Kämpfer et al., 2007) | isolated from drinking water |
| *Variovorax* |  | non-N | (Willems et al., 1991) | aerobic, some strains capable of hydrogen-fueled autotrophic growth (not type species) |
| *Veillonella* |  | non-N |  | gut and oral microbiome member (wikipedia) |
| *Verrucomicrobium* |  | non-N |  | (microbewiki) |
| *Wchb1-05*  (f.Anaerolineacaea) | varied | varied |  | family: Anaerolinaceae |
| *Zoogloea* |  | non-N |  | important in reducing BOD in wastewater sludge https://microbewiki.kenyon.edu/index.php/Zoogloea |

Works Cited

Alawi, M., Lipski, A., Sanders, T., and Spieck, E. (2007). Cultivation of a novel cold-adapted nitrite oxidizing betaproteobacterium from the Siberian Arctic. ISME J *1*, 256-264.

Albuquerque, L., França, L., Rainey, F.A., Schumann, P., Nobre, M.F., and da Costa, M.S. (2011). Gaiella occulta gen. nov., sp. nov., a novel representative of a deep branching phylogenetic lineage within the class Actinobacteria and proposal of Gaiellaceae fam. nov. and Gaiellales ord. nov. Systematic and applied microbiology *34*, 595-599.

Allen, T.D., Lawson, P.A., Collins, M.D., Falsen, E., and Tanner, R.S. (2006). Cloacibacterium normanense gen. nov., sp. nov., a novel bacterium in the family Flavobacteriaceae isolated from municipal wastewater. International journal of systematic and evolutionary microbiology *56*, 1311-1316.

Anderson, C., and Pedersen, K. (2003). In situ growth of Gallionella biofilms and partitioning of lanthanides and actinides between biological material and ferric oxyhydroxides. Geobiology *1*, 169-178.

Bagnara, C., Toci, R., Gaudin, C., and Belaich, J. (1985). Isolation and Characterization of a Cellulolytic Microorganism, Cellulomonas fermentans sp. nov. International journal of systematic and evolutionary microbiology *35*, 502-507.

Baldani, J., Baldani, V., Seldin, L., and Döbereiner, J. (1986). Characterization of Herbaspirillum seropedicae gen. nov., sp. nov., a root-associated nitrogen-fixing bacterium. International journal of systematic and evolutionary microbiology *36*, 86-93.

Beckwith, C.R., Edwards, M.J., Lawes, M., Shi, L., Butt, J.N., Richardson, D.J., and Clarke, T.A. (2015). Characterization of MtoD from Sideroxydans lithotrophicus: a cytochrome c electron shuttle used in lithoautotrophic growth. Frontiers in microbiology *6*, 332.

Belova, S.E., Kulichevskaya, I.S., Bodelier, P.L., and Dedysh, S.N. (2013). Methylocystis bryophila sp. nov., a facultatively methanotrophic bacterium from acidic Sphagnum peat, and emended description of the genus Methylocystis (ex Whittenbury et al. 1970) Bowman et al. 1993. International journal of systematic and evolutionary microbiology *63*, 1096-1104.

Bogan, B.W., Sullivan, W.R., Kayser, K.J., Derr, K., Aldrich, H.C., and Paterek, J.R. (2003). Alkanindiges illinoisensis gen. nov., sp. nov., an obligately hydrocarbonoclastic, aerobic squalane-degrading bacterium isolated from oilfield soils. International journal of systematic and evolutionary microbiology *53*, 1389-1395.

Boone, D.R., and Bryant, M.P. (1980). Propionate-degrading bacterium, Syntrophobacter wolinii sp. nov. gen. nov., from methanogenic ecosystems. Applied and environmental microbiology *40*, 626-632.

Bowman, J. (2006). The methanotrophs—the families Methylococcaceae and Methylocystaceae. In The prokaryotes (Springer), pp. 266-289.

Bowman, J.P., Nichols, C.M., and Gibson, J.A. (2003). Algoriphagus ratkowskyi gen. nov., sp. nov., Brumimicrobium glaciale gen. nov., sp. nov., Cryomorpha ignava gen. nov., sp. nov. and Crocinitomix catalasitica gen. nov., sp. nov., novel flavobacteria isolated from various polar habitats. International journal of systematic and evolutionary microbiology *53*, 1343-1355.

Bräuer, S.L., Cadillo-Quiroz, H., Ward, R.J., Yavitt, J.B., and Zinder, S.H. (2011). Methanoregula boonei gen. nov., sp. nov., an acidiphilic methanogen isolated from an acidic peat bog. International journal of systematic and evolutionary microbiology *61*, 45-52.

Brooks, R.S., Blanchard, M.T., Clothier, K.A., Fish, S., Anderson, M.L., and Stott, J.L. (2016). Characterization of Pajaroellobacter abortibovis, the etiologic agent of epizootic bovine abortion. Veterinary microbiology *192*, 73-80.

Brune, A., Ludwig, W., and Schink, B. (2002). Propionivibrio limicola sp. nov., a fermentative bacterium specialized in the degradation of hydroaromatic compounds, reclassification of Propionibacter pelophilus as Propionivibrio pelophilus comb. nov. and amended description of the genus Propionivibrio. International journal of systematic and evolutionary microbiology *52*, 441-444.

Busse, H., Kämpfer, P., Moore, E., Nuutinen, J., Tsitko, I., Denner, E., Vauterin, L., Valens, M., Rosselló-Mora, R., and Salkinoja-Salonen, M. (2002). Thermomonas haemolytica gen. nov., sp. nov., a gamma-proteobacterium from kaolin slurry. International journal of systematic and evolutionary microbiology *52*, 473-483.

Busse, H.-J. (2016). Review of the taxonomy of the genus Arthrobacter, emendation of the genus Arthrobacter sensu lato, proposal to reclassify selected species of the genus Arthrobacter in the novel genera Glutamicibacter gen. nov., Paeniglutamicibacter gen. nov., Pseudoglutamicibacter gen. nov., Paenarthrobacter gen. nov. and Pseudarthrobacter gen. nov., and emended description of Arthrobacter roseus. International journal of systematic and evolutionary microbiology *66*, 9-37.

Butler, W., O'connor, S.P., Yakrus, M., Smithwick, R., Plikaytis, B., Moss, C., Floyd, M., Woodley, C., Kilburn, J., and Vadney, F. (1993). Mycobacterium celatum sp. nov. International journal of systematic and evolutionary microbiology *43*, 539-548.

Buttet, G.F., Holliger, C., and Maillard, J. (2013). Functional genotyping of Sulfurospirillum spp. in mixed cultures allowed the identification of a new tetrachloroethene reductive dehalogenase. Applied and environmental microbiology *79*, 6941-6947.

Cavalier-Smith, T., and Scoble, J.M. (2013). Phylogeny of Heterokonta: Incisomonas marina, a uniciliate gliding opalozoan related to Solenicola (Nanomonadea), and evidence that Actinophryida evolved from raphidophytes. European Journal of Protistology *49*, 328-353.

Chin, K.-J., Liesack, W., and Janssen, P.H. (2001). Opitutus terrae gen. nov., sp. nov., to accommodate novel strains of the division'Verrucomicrobia'isolated from rice paddy soil. International journal of systematic and evolutionary microbiology *51*, 1965-1968.

CHRISTENSEN, P., and Cook, F. (1978). Lysobacter, a new genus of nonfruiting, gliding bacteria with a high base ratio. International journal of systematic and evolutionary microbiology *28*, 367-393.

Chung, E.J., Park, T.S., Kim, K.H., Jeon, C.O., Lee, H.-I., Chang, W.-S., Aslam, Z., and Chung, Y.R. (2015). Nitrospirillum irinus sp. nov., a diazotrophic bacterium isolated from the rhizosphere soil of Iris and emended description of the genus Nitrospirillum. Antonie van Leeuwenhoek *108*, 721-729.

Ciesielski, S., Górniak, D., Możejko, J., Świątecki, A., Grzesiak, J., and Zdanowski, M. (2014). The Diversity of Bacteria Isolated from Antarctic Freshwater Reservoirs Possessing the Ability to Produce Polyhydroxyalkanoates. Current microbiology *69*, 594-603.

Coates, J.D., Chakraborty, R., Lack, J.G., O'Connor, S.M., Cole, K.A., Bender, K.S., and Achenbach, L.A. (2001). Anaerobic benzene oxidation coupled to nitrate reduction in pure culture by two strains of Dechloromonas. Nature *411*, 1039-1043.

Collingro, A., Poppert, S., Heinz, E., Schmitz-Esser, S., Essig, A., Schweikert, M., Wagner, M., and Horn, M. (2005). Recovery of an environmental chlamydia strain from activated sludge by co-cultivation with Acanthamoeba sp. Microbiology *151*, 301-309.

Couturier, M.R., Slechta, E.S., Goulston, C., Fisher, M.A., and Hanson, K.E. (2012). Leptotrichia bacteremia in patients receiving high-dose chemotherapy. Journal of clinical microbiology *50*, 1228-1232.

Cummings, D.E., Caccavo Jr, F., Spring, S., and Rosenzweig, R.F. (1999). Ferribacterium limneticum, gen. nov., sp. nov., an Fe (III)-reducing microorganism isolated from mining-impacted freshwater lake sediments. Archives of Microbiology *171*, 183-188.

Das, S.K., Mishra, A.K., Tindall, B.J., Rainey, F.A., and Stackebrandt, E. (1996). Oxidation of Thiosulfate by a New Bacterium, Bosea thiooxidans.(strain BI-42) gen. nov., sp. nov.: Analysis of Phylogeny Based on Chemotaxonomy and 16S Ribosomal DNA Sequencing. International journal of systematic and evolutionary microbiology *46*, 981-987.

Davidov, Y., and Jurkevitch, E. (2004). Diversity and evolution of Bdellovibrio-and-like organisms (BALOs), reclassification of Bacteriovorax starrii as Peredibacter starrii gen. nov., comb. nov., and description of the Bacteriovorax–Peredibacter clade as Bacteriovoracaceae fam. nov. International journal of systematic and evolutionary microbiology *54*, 1439-1452.

De la Torre, J.R., Walker, C.B., Ingalls, A.E., Könneke, M., and Stahl, D.A. (2008). Cultivation of a thermophilic ammonia oxidizing archaeon synthesizing crenarchaeol. Environmental microbiology *10*, 810-818.

Del Dot, T., Osawa, R., and Stackebrandt, E. (1993). Phascolarctobacterium faecium gen. nov, spec. nov., a novel taxon of the Sporomusa group of Bacteria. Systematic and applied microbiology *16*, 380-384.

Demharter, W., Hensel, R., Smida, J., and Stackebrandt, E. (1989). Sphaerobacter thermophilus gen. nov., sp. nov. A deeply rooting member of the actinomycetes subdivision isolated from thermophilically treated sewage sludge. Systematic and applied microbiology *11*, 261-266.

Derrien, M., Vaughan, E.E., Plugge, C.M., and de Vos, W.M. (2004). Akkermansia muciniphila gen. nov., sp. nov., a human intestinal mucin-degrading bacterium. International journal of systematic and evolutionary microbiology *54*, 1469-1476.

Dridi, B., Fardeau, M.-L., Ollivier, B., Raoult, D., and Drancourt, M. (2012). Methanomassiliicoccus luminyensis gen. nov., sp. nov., a methanogenic archaeon isolated from human faeces. International journal of systematic and evolutionary microbiology *62*, 1902-1907.

Duncan, S.H., Hold, G.L., Harmsen, H.J., Stewart, C.S., and Flint, H.J. (2002). Growth requirements and fermentation products of Fusobacterium prausnitzii, and a proposal to reclassify it as Faecalibacterium prausnitzii gen. nov., comb. nov. International journal of systematic and evolutionary microbiology *52*, 2141-2146.

Emerson, D., Field, E., Chertkov, O., Davenport, K., Goodwin, L., Munk, C., Nolan, M., and Woyke, T. (2013). Comparative genomics of freshwater Fe-oxidizing bacteria: implications for physiology, ecology, and systematics. Frontiers in microbiology *4*, 254.

Ezaki, T., Kawamura, Y., Li, N., Li, Z.-Y., Zhao, L., and Shu, S.-e. (2001). Proposal of the genera Anaerococcus gen. nov., Peptoniphilus gen. nov. and Gallicola gen. nov. for members of the genus Peptostreptococcus. International journal of systematic and evolutionary microbiology *51*, 1521-1528.

Fahrbach, M., Kuever, J., Meinke, R., Kämpfer, P., and Hollender, J. (2006). Denitratisoma oestradiolicum gen. nov., sp. nov., a 17β-oestradiol-degrading, denitrifying betaproteobacterium. International journal of systematic and evolutionary microbiology *56*, 1547-1552.

Falagán, C., and Johnson, D.B. (2014). Acidibacter ferrireducens gen. nov., sp. nov.: an acidophilic ferric iron-reducing gammaproteobacterium. Extremophiles *18*, 1067-1073.

Fernandes, C., Rainey, F.A., Nobre, M.F., Pinhal, I., Folhas, F., and Da Costa, M.S. (2005). Herminiimonas fonticola gen. nov., sp. nov., a Betaproteobacterium isolated from a source of bottled mineral water. Systematic and applied microbiology *28*, 596-603.

Ferry, J.G., Smith, P.H., and Wolfe, R. (1974). Methanospirillum, a New Genus of Methanogenic Bacteria, and Characterization of Methanospirillum hungatii sp. nov. International journal of systematic and evolutionary microbiology *24*, 465-469.

Finkmann, W., Altendorf, K., Stackebrandt, E., and Lipski, A. (2000). Characterization of N2O-producing Xanthomonas-like isolates from biofilters as Stenotrophomonas nitritireducens sp. nov., Luteimonas mephitis gen. nov., sp. nov. and Pseudoxanthomonas broegbernensis gen. nov., sp. nov. International journal of systematic and evolutionary microbiology *50*, 273-282.

Finneran, K.T., Johnsen, C.V., and Lovley, D.R. (2003). Rhodoferax ferrireducens sp. nov., a psychrotolerant, facultatively anaerobic bacterium that oxidizes acetate with the reduction of Fe (III). International journal of systematic and evolutionary microbiology *53*, 669-673.

Fischer-Romero, C., Tindall, B., and Jüttner, F. (1996). Tolumonas auensis gen. nov., sp. nov., a toluene-producing bacterium from anoxic sediments of a freshwater lake. International journal of systematic and evolutionary microbiology *46*, 183-188.

Friedrich, M.M., and Lipski, A. (2008). Alkanibacter difficilis gen. nov., sp. nov. and Singularimonas variicoloris gen. nov., sp. nov., hexane-degrading bacteria isolated from a hexane-treated biofilter. International journal of systematic and evolutionary microbiology *58*, 2324-2329.

Fudou, R., Jojima, Y., Iizuka, T., and Yamanaka, S. (2002). Haliangium ochraceum gen. nov., sp. nov. and Haliangium tepidum sp. nov.: novel moderately halophilic myxobacteria isolated from coastal saline environments. The Journal of general and applied microbiology *48*, 109-115.

Fukunaga, Y., Kurahashi, M., Sakiyama, Y., Ohuchi, M., Yokota, A., and Harayama, S. (2009). Phycisphaera mikurensis gen. nov., sp. nov., isolated from a marine alga, and proposal of Phycisphaeraceae fam. nov., Phycisphaerales ord. nov. and Phycisphaerae classis nov. in the phylum Planctomycetes. The Journal of general and applied microbiology *55*, 267-275.

Funke, G., Aravena-Roman, M., and Frodl, R. (2005). First description of Curtobacterium spp. isolated from human clinical specimens. Journal of clinical microbiology *43*, 1032-1036.

Garcia, R., Stadler, M., Gemperlein, K., and Müller, R. (2016). Aetherobacter fasciculatus gen. nov., sp. nov. and Aetherobacter rufus sp. nov., novel myxobacteria with promising biotechnological applications. International journal of systematic and evolutionary microbiology *66*, 928-938.

Gebers, R., and Beese, M. (1988). Pedomicrobium americanum sp. nov. and Pedomicrobium australicum sp. nov. from Aquatic Habitats, Pedomicrobium gen. emend., and Pedomicrobium ferrugineum sp. emend.†. International journal of systematic and evolutionary microbiology *38*, 303-315.

Gerritsen, J., Fuentes, S., Grievink, W., van Niftrik, L., Tindall, B.J., Timmerman, H.M., Rijkers, G.T., and Smidt, H. (2014). Characterization of Romboutsia ilealis gen. nov., sp. nov., isolated from the gastro-intestinal tract of a rat, and proposal for the reclassification of five closely related members of the genus Clostridium into the genera Romboutsia gen. nov., Intestinibacter gen. nov., Terrisporobacter gen. nov. and Asaccharospora gen. nov. International journal of systematic and evolutionary microbiology *64*, 1600-1616.

Glaeser, S.P., Galatis, H., Martin, K., and Kämpfer, P. (2012). Luteolibacter cuticulihirudinis sp. nov., isolated from Hirudo medicinalis. Antonie van Leeuwenhoek *102*, 319-324.

Gonella, E., Negri, I., Marzorati, M., Mandrioli, M., Sacchi, L., Pajoro, M., Crotti, E., Rizzi, A., Clementi, E., and Tedeschi, R. (2011). Bacterial endosymbiont localization in Hyalesthes obsoletus, the insect vector of Bois noir in Vitis vinifera. Applied and environmental microbiology *77*, 1423-1435.

Grabovich, M., Gavrish, E., Kuever, J., Lysenko, A.M., Podkopaeva, D., and Dubinina, G. (2006). Proposal of Giesbergeria voronezhensis gen. nov., sp. nov. and G. kuznetsovii sp. nov. and reclassification of [Aquaspirillum] anulus,[A.] sinuosum and [A.] giesbergeri as Giesbergeria anulus comb. nov., G. sinuosa comb. nov. and G. giesbergeri comb. nov., and [Aquaspirillum] metamorphum and [A.] psychrophilum as Simplicispira metamorpha gen. nov., comb. nov. and S. psychrophila comb. nov. International journal of systematic and evolutionary microbiology *56*, 569-576.

Grech-Mora, I., Fardeau, M.-L., Patel, B., Ollivier, B., Rimbault, A., Prensier, G., Garcia, J.-L., and Garnier-Sillam, E. (1996). Isolation and characterization of Sporobacter termitidis gen. nov., sp. nov., from the digestive tract of the wood-feeding termite Nasutitermes lujae. International journal of systematic and evolutionary microbiology *46*, 512-518.

Groth, I., Schumann, P., Schütze, B., Augsten, K., and Stackebrandt, E. (2002). Knoellia sinensis gen. nov., sp. nov. and Knoellia subterranea sp. nov., two novel actinobacteria isolated from a cave. International journal of systematic and evolutionary microbiology *52*, 77-84.

Hahnke, R.L., Meier-Kolthoff, J.P., García-López, M., Mukherjee, S., Huntemann, M., Ivanova, N.N., Woyke, T., Kyrpides, N.C., Klenk, H.-P., and Göker, M. (2016). Genome-based taxonomic classification of Bacteroidetes. Frontiers in microbiology *7*, 2003.

Hallam, S.J., Konstantinidis, K.T., Putnam, N., Schleper, C., Watanabe, Y.-i., Sugahara, J., Preston, C., de la Torre, J., Richardson, P.M., and DeLong, E.F. (2006). Genomic analysis of the uncultivated marine crenarchaeote Cenarchaeum symbiosum. Proceedings of the National Academy of Sciences *103*, 18296-18301.

Han, S.K., Nedashkovskaya, O.I., Mikhailov, V.V., Kim, S.B., and Bae, K.S. (2003). Salinibacterium amurskyense gen. nov., sp. nov., a novel genus of the family Microbacteriaceae from the marine environment. International journal of systematic and evolutionary microbiology *53*, 2061-2066.

He, Q., and Sanford, R.A. (2003). Characterization of Fe (III) reduction by chlororespiring Anaeromxyobacter dehalogenans. Applied and environmental microbiology *69*, 2712-2718.

Heckmann, K., and Schmidt, H.J. (1987). Polynucleobacter necessarius gen. nov., sp. nov., an obligately endosymbiotic bacterium living in the cytoplasm of Euplotes aediculatus. International journal of systematic and evolutionary microbiology *37*, 456-457.

Hiraishi, A., Shin, Y.K., and Sugiyama, J. (1997). Proposal To Reclassify Zoogloea ramigera IAM 12670 (PR Dugan 115) as Duganella zoogloeoides gen. nov., sp. nov. International journal of systematic and evolutionary microbiology *47*, 1249-1252.

Hiraishi, A., and Ueda, Y. (1994). Rhodoplanes gen. nov., a new genus of phototrophic bacteria including Rhodopseudomonas rosea as Rhodoplanes roseus comb. nov. and Rhodoplanes elegans sp. nov. International journal of systematic and evolutionary microbiology *44*, 665-673.

Hirayama, H., Takai, K., Inagaki, F., Nealson, K.H., and Horikoshi, K. (2005). Thiobacter subterraneus gen. nov., sp. nov., an obligately chemolithoautotrophic, thermophilic, sulfur-oxidizing bacterium from a subsurface hot aquifer. International journal of systematic and evolutionary microbiology *55*, 467-472.

HOLDEMAN, L.V., and Moore, W. (1974). New genus, Coprococcus, twelve new species, and emended descriptions of four previously described species of bacteria from human feces. International journal of systematic and evolutionary microbiology *24*, 260-277.

Holmes, D.E., Nevin, K.P., Woodard, T.L., Peacock, A.D., and Lovley, D.R. (2007). Prolixibacter bellariivorans gen. nov., sp. nov., a sugar-fermenting, psychrotolerant anaerobe of the phylum Bacteroidetes, isolated from a marine-sediment fuel cell. International journal of systematic and evolutionary microbiology *57*, 701-707.

Horn, M., Wagner, M., Müller, K.-D., Schmid, E.N., Fritsche, T.R., Schleifer, K.-H., and Michel, R. (2000). Neochlamydia hartmannellae gen. nov., sp. nov.(Parachlamydiaceae), an endoparasite of the amoeba Hartmannella vermiformis. Microbiology *146*, 1231-1239.

Hornung, C., Poehlein, A., Haack, F.S., Schmidt, M., Dierking, K., Pohlen, A., Schulenburg, H., Blokesch, M., Plener, L., and Jung, K. (2013). The Janthinobacterium sp. HH01 genome encodes a homologue of the V. cholerae CqsA and L. pneumophila LqsA autoinducer synthases. PloS one *8*, e55045.

Huang, X.-F., Liu, Y.J., Dong, J.-D., Qu, L.-Y., Zhang, Y.-Y., Wang, F.-Z., Tian, X.-P., and Zhang, S. (2014). Mangrovibacterium diazotrophicum gen. nov., sp. nov., a nitrogen-fixing bacterium isolated from a mangrove sediment, and proposal of Prolixibacteraceae fam. nov. International journal of systematic and evolutionary microbiology *64*, 875-881.

Iguchi, H., Yurimoto, H., and Sakai, Y. (2011). Methylovulum miyakonense gen. nov., sp. nov., a type I methanotroph isolated from forest soil. International journal of systematic and evolutionary microbiology *61*, 810-815.

Iino, T., Mori, K., Uchino, Y., Nakagawa, T., Harayama, S., and Suzuki, K.-i. (2010). Ignavibacterium album gen. nov., sp. nov., a moderately thermophilic anaerobic bacterium isolated from microbial mats at a terrestrial hot spring and proposal of Ignavibacteria classis nov., for a novel lineage at the periphery of green sulfur bacteria. International journal of systematic and evolutionary microbiology *60*, 1376-1382.

Im, W.-T., Hu, Z.-Y., Kim, K.-H., Rhee, S.-K., Meng, H., Lee, S.-T., and Quan, Z.-X. (2012). Description of Fimbriimonas ginsengisoli gen. nov., sp. nov. within the Fimbriimonadia class nov., of the phylum Armatimonadetes. Antonie van Leeuwenhoek *102*, 307-317.

Im, W.-T., Yokota, A., Kim, M.-K., and Lee, S.-T. (2004). Kaistia adipata gen. nov., sp. nov., a novel α-proteobacterium. The Journal of general and applied microbiology *50*, 249-254.

Imachi, H., Sakai, S., Ohashi, A., Harada, H., Hanada, S., Kamagata, Y., and Sekiguchi, Y. (2007). Pelotomaculum propionicicum sp. nov., an anaerobic, mesophilic, obligately syntrophic, propionate-oxidizing bacterium. International journal of systematic and evolutionary microbiology *57*, 1487-1492.

Imachi, H., Sekiguchi, Y., Kamagata, Y., Hanada, S., Ohashi, A., and Harada, H. (2002). Pelotomaculum thermopropionicum gen. nov., sp. nov., an anaerobic, thermophilic, syntrophic propionate-oxidizing bacterium. International journal of systematic and evolutionary microbiology *52*, 1729-1735.

Jabari, L., Gannoun, H., Cayol, J.-L., Hedi, A., Sakamoto, M., Falsen, E., Ohkuma, M., Hamdi, M., Fauque, G., and Ollivier, B. (2012). Macellibacteroides fermentans gen. nov., sp. nov., a member of the family Porphyromonadaceae isolated from an upflow anaerobic filter treating abattoir wastewaters. International journal of systematic and evolutionary microbiology *62*, 2522-2527.

Janda, J.M., and Abbott, S.L. (1998). Evolving concepts regarding the genus Aeromonas: an expanding panorama of species, disease presentations, and unanswered questions. Clinical infectious diseases *27*, 332-344.

Jezbera, J., Sharma, A.K., Brandt, U., Doolittle, W.F., and Hahn, M.W. (2009). ‘Candidatus Planktophila limnetica’, an actinobacterium representing one of the most numerically important taxa in freshwater bacterioplankton. International journal of systematic and evolutionary microbiology *59*, 2864-2869.

Jogler, M., Chen, H., Simon, J., Rohde, M., Busse, H.-J., Klenk, H.-P., Tindall, B.J., and Overmann, J. (2013). Description of Sphingorhabdus planktonica gen. nov., sp. nov. and reclassification of three related members of the genus Sphingopyxis in the genus Sphingorhabdus gen. nov. International journal of systematic and evolutionary microbiology *63*, 1342-1349.

Jojima, Y., Mihara, Y., Suzuki, S., Yokozeki, K., Yamanaka, S., and Fudou, R. (2004). Saccharibacter floricola gen. nov., sp. nov., a novel osmophilic acetic acid bacterium isolated from pollen. International journal of systematic and evolutionary microbiology *54*, 2263-2267.

Jordan, D. (1982). NOTES: transfer of Rhizobium japonicum Buchanan 1980 to Bradyrhizobium gen. nov., a genus of slow-growing, root nodule bacteria from leguminous plants. International journal of systematic and evolutionary microbiology *32*, 136-139.

Kalmbach, S., Manz, W., Wecke, J., and Szewzyk, U. (1999). Aquabacterium gen. nov., with description of Aquabacterium citratiphilum sp. nov., Aquabacterium parvum sp. nov. and Aquabacterium commune sp. nov., three in situ dominant bacterial species from the Berlin drinking water system. International journal of systematic and evolutionary microbiology *49*, 769-777.

Kalyuzhnaya, M.G., Bowerman, S., Lara, J.C., Lidstrom, M.E., and Chistoserdova, L. (2006). Methylotenera mobilis gen. nov., sp. nov., an obligately methylamine-utilizing bacterium within the family Methylophilaceae. International journal of systematic and evolutionary microbiology *56*, 2819-2823.

Kämpfer, P., Rosselló-Mora, R., Hermansson, M., Persson, F., Huber, B., Falsen, E., and Busse, H.-J. (2007). Undibacterium pigrum gen. nov., sp. nov., isolated from drinking water. International journal of systematic and evolutionary microbiology *57*, 1510-1515.

Kämpfer, P., Young, C.-C., Arun, A., Shen, F.-T., Jäckel, U., Rossello-Mora, R., Lai, W.-A., and Rekha, P. (2006). Pseudolabrys taiwanensis gen. nov., sp. nov., an alphaproteobacterium isolated from soil. International journal of systematic and evolutionary microbiology *56*, 2469-2472.

Kant, R., Van Passel, M.W., Sangwan, P., Palva, A., Lucas, S., Copeland, A., Lapidus, A., del Rio, T.G., Dalin, E., and Tice, H. (2011). Genome sequence of Pedosphaera parvula Ellin514, an aerobic verrucomicrobial isolate from pasture soil. Journal of bacteriology.

Karpov, S.A., Kersanach, R., and Williams, D.M. (1998). Ultrastructure and 18S rRNA gene sequence of a small heterotrophic flagellate Siluania monomastiga gen. et sp. nov.(Bicosoecida). European Journal of Protistology *34*, 415-425.

Kendall, M.M., Liu, Y., and Boone, D.R. (2006). Butyrate-and propionate-degrading syntrophs from permanently cold marine sediments in Skan Bay, Alaska, and description of Algorimarina butyrica gen. novet al, sp. nov. FEMS Microbiology Letters *262*, 107-114.

Kim, B.-Y., Weon, H.-Y., Yoo, S.-H., Hong, S.-B., Kwon, S.-W., Stackebrandt, E., and Go, S.-J. (2007). Niabella aurantiaca gen. nov., sp. nov., isolated from a greenhouse soil in Korea. International journal of systematic and evolutionary microbiology *57*, 538-541.

Kim, J.M., Lee, K., Shin, K., Yang, E.J., Engel, A., Karl, D.M., and Kim, H.C. (2011). Shifts in biogenic carbon flow from particulate to dissolved forms under high carbon dioxide and warm ocean conditions. Geophysical Research Letters *38*.

Kim, S.-J., Tamura, T., Hamada, M., Ahn, J.-H., Weon, H.-Y., Park, I.-C., Suzuki, K.-i., and Kwon, S.-W. (2012). Compostimonas suwonensis gen. nov., sp. nov., isolated from spent mushroom compost. International journal of systematic and evolutionary microbiology *62*, 2410-2416.

Kindaichi, T., Yamaoka, S., Uehara, R., Ozaki, N., Ohashi, A., Albertsen, M., Nielsen, P.H., and Nielsen, J.L. (2016). Phylogenetic diversity and ecophysiology of Candidate phylum Saccharibacteria in activated sludge. FEMS microbiology ecology *92*, fiw078.

Kishimoto, N., Kosako, Y., and Tano, T. (1991). Acidobacterium capsulatum gen. nov., sp. nov.: an acidophilic chemoorganotrophic bacterium containing menaquinone from acidic mineral environment. Current microbiology *22*, 1-7.

Kodama, Y., and Watanabe, K. (2004). Sulfuricurvum kujiense gen. nov., sp. nov., a facultatively anaerobic, chemolithoautotrophic, sulfur-oxidizing bacterium isolated from an underground crude-oil storage cavity. International journal of systematic and evolutionary microbiology *54*, 2297-2300.

Kojima, H., and Fukui, M. (2014). Sulfurisoma sediminicola gen. nov., sp. nov., a facultative autotroph isolated from a freshwater lake. International journal of systematic and evolutionary microbiology *64*, 1587-1592.

Kolinko, S., Richter, M., Glöckner, F.O., Brachmann, A., and Schüler, D. (2016). Single‐cell genomics of uncultivated deep‐branching magnetotactic bacteria reveals a conserved set of magnetosome genes. Environmental microbiology *18*, 21-37.

Kostanjsek, R., Strus, J., Drobne, D., and Avgustin, G. (2004). 'Candidatus Rhabdochlamydia porcellionis', an intracellular bacterium from the hepatopancreas of the terrestrial isopod Porcellio scaber (Crustacea: Isopoda). International journal of systematic and evolutionary microbiology *54*, 543-549.

Kostka, J.E., Green, S.J., Rishishwar, L., Prakash, O., Katz, L.S., Mariño-Ramírez, L., Jordan, I.K., Munk, C., Ivanova, N., and Mikhailova, N. (2012). Genome sequences for six Rhodanobacter strains, isolated from soils and the terrestrial subsurface, with variable denitrification capabilities. Journal of bacteriology *194*, 4461-4462.

Krishnamurthi, S., Chakrabarti, T., and Stackebrandt, E. (2009). Re-examination of the taxonomic position of Bacillus silvestris Rheims et al. 1999 and proposal to transfer it to Solibacillus gen. nov. as Solibacillus silvestris comb. nov. International journal of systematic and evolutionary microbiology *59*, 1054-1058.

Kulichevskaya, I.S., Suzina, N.E., Liesack, W., and Dedysh, S.N. (2010). Bryobacter aggregatus gen. nov., sp. nov., a peat-inhabiting, aerobic chemo-organotroph from subdivision 3 of the Acidobacteria. International journal of systematic and evolutionary microbiology *60*, 301-306.

Kulichevskaya, I.S., Suzina, N.E., Rijpstra, W.I.C., Damsté, J.S.S., and Dedysh, S.N. (2014). Paludibaculum fermentans gen. nov., sp. nov., a facultative anaerobe capable of dissimilatory iron reduction from subdivision 3 of the Acidobacteria. International journal of systematic and evolutionary microbiology *64*, 2857-2864.

Kwon, K.K., Woo, J.-H., Yang, S.-H., Kang, J.-H., Kang, S.G., Kim, S.-J., Sato, T., and Kato, C. (2007a). Altererythrobacter epoxidivorans gen. nov., sp. nov., an epoxide hydrolase-active, mesophilic marine bacterium isolated from cold-seep sediment, and reclassification of Erythrobacter luteolus Yoon et al. 2005 as Altererythrobacter luteolus comb. nov. International journal of systematic and evolutionary microbiology *57*, 2207-2211.

Kwon, S.-W., Kim, B.-Y., Weon, H.-Y., Baek, Y.-K., and Go, S.-J. (2007b). Arenimonas donghaensis gen. nov., sp. nov., isolated from seashore sand. International journal of systematic and evolutionary microbiology *57*, 954-958.

Labbé, N., Parent, S., and Villemur, R. (2004). Nitratireductor aquibiodomus gen. nov., sp. nov., a novel α-proteobacterium from the marine denitrification system of the Montreal Biodome (Canada). International journal of systematic and evolutionary microbiology *54*, 269-273.

Lehtovirta-Morley, L.E., Stoecker, K., Vilcinskas, A., Prosser, J.I., and Nicol, G.W. (2011). Cultivation of an obligate acidophilic ammonia oxidizer from a nitrifying acid soil. Proceedings of the National Academy of Sciences *108*, 15892-15897.

Li, D., Sharp, J.O., and Drewes, J.E. (2016). Influence of wastewater discharge on the metabolic potential of the microbial community in river sediments. Microbial Ecology *71*, 78-86.

Liesack, W., Bak, F., Kreft, J.-U., and Stackebrandt, E. (1994). Holophaga foetida gen. nov., sp. nov., a new, homoacetogenic bacterium degrading methoxylated aromatic compounds. Archives of Microbiology *162*, 85-90.

Lim, J.H., Baek, S.-H., and Lee, S.-T. (2009). Ferruginibacter alkalilentus gen. nov., sp. nov. and Ferruginibacter lapsinanis sp. nov., novel members of the family ‘Chitinophagaceae’in the phylum Bacteroidetes, isolated from freshwater sediment. International journal of systematic and evolutionary microbiology *59*, 2394-2399.

Lindquist, D., Murrill, D., Burran, W.P., Winans, G., Janda, J.M., and Probert, W. (2003). Characteristics of Massilia timonae and Massilia timonae-like isolates from human patients, with an emended description of the species. Journal of clinical microbiology *41*, 192-196.

Lingens, F., Blecher, R., Blecher, H., Blobel, F., Eberspächer, J., Fröhner, C., Görisch, H., Görisch, H., and Layh, G. (1985). Phenylobacterium immobile gen. nov., sp. nov., a gram-negative bacterium that degrades the herbicide chloridazon. International journal of systematic and evolutionary microbiology *35*, 26-39.

Liu, C., Finegold, S.M., Song, Y., and Lawson, P.A. (2008). Reclassification of Clostridium coccoides, Ruminococcus hansenii, Ruminococcus hydrogenotrophicus, Ruminococcus luti, Ruminococcus productus and Ruminococcus schinkii as Blautia coccoides gen. nov., comb. nov., Blautia hansenii comb. nov., Blautia hydrogenotrophica comb. nov., Blautia luti comb. nov., Blautia producta comb. nov., Blautia schinkii comb. nov. and description of Blautia wexlerae sp. nov., isolated from human faeces. International journal of systematic and evolutionary microbiology *58*, 1896-1902.

Liu, J.-R., Tanner, R.S., Schumann, P., Weiss, N., McKenzie, C.A., Janssen, P.H., Seviour, E.M., Lawson, P.A., Allen, T.D., and Seviour, R.J. (2002). Emended description of the genus Trichococcus, description of Trichococcus collinsii sp. nov., and reclassification of Lactosphaera pasteurii as Trichococcus pasteurii comb. nov. and of Ruminococcus palustris as Trichococcus palustris comb. nov. in the low-G+ C gram-positive bacteria. International journal of systematic and evolutionary microbiology *52*, 1113-1126.

Liu, Y., Balkwill, D.L., Aldrich, H.C., Drake, G.R., and Boone, D.R. (1999). Characterization of the anaerobic propionate-degrading syntrophs Smithella propionica gen. nov., sp. nov. and Syntrophobacter wolinii. International journal of systematic and evolutionary microbiology *49*, 545-556.

Liu, Y., Jin, J.-H., Liu, Y.-H., Zhou, Y.-G., and Liu, Z.-P. (2010). Dongia mobilis gen. nov., sp. nov., a new member of the family Rhodospirillaceae isolated from a sequencing batch reactor for treatment of malachite green effluent. International journal of systematic and evolutionary microbiology *60*, 2780.

Lv, Y.-Y., Wang, J., Chen, M.-H., You, J., and Qiu, L.-H. (2016). Dinghuibacter silviterrae gen. nov., sp. nov., isolated from forest soil. International journal of systematic and evolutionary microbiology *66*, 1785-1791.

MacRae, J.D., and Smit, J. (1991). Characterization of caulobacters isolated from wastewater treatment systems. Applied and environmental microbiology *57*, 751-758.

Malmqvist, Å., Welander, T., Moore, E., Ternström, A., Molin, G., and Stenström, I.-M. (1994). Ideonella dechloratans gen. nov., sp. nov., a new bacterium capable of growing anaerobically with chlorate as an electron acceptor. Systematic and applied microbiology *17*, 58-64.

Mao, Y., Graham, D.W., Tamaki, H., and Zhang, T. (2015). Dominant and novel clades of Candidatus Accumulibacter phosphatis in 18 globally distributed full-scale wastewater treatment plants. Scientific reports *5*, 11857.

Meincke, M., Krieg, E., and Bock, E. (1989). Nitrosovibrio spp., the dominant ammonia-oxidizing bacteria in building sandstone. Applied and environmental microbiology *55*, 2108-2110.

Monciardini, P., Cavaletti, L., Schumann, P., Rohde, M., and Donadio, S. (2003). Conexibacter woesei gen. nov., sp. nov., a novel representative of a deep evolutionary line of descent within the class Actinobacteria. International journal of systematic and evolutionary microbiology *53*, 569-576.

Moore, L.V., and Moore, W. (1994). Oribaculum catoniae gen. nov., sp. nov.; Catonella morbi gen. nov., sp. nov.; Hallella seregens gen. nov., sp. nov.; Johnsonella ignava gen. nov., sp. nov.; and Dialister pneumosintes gen. nov., comb. nov., nom. rev., anaerobic gram-negative bacilli from the human gingival crevice. International journal of systematic and evolutionary microbiology *44*, 187-192.

Moore, R.L. (1981). The biology of Hyphomicrobium and other prosthecate, budding bacteria. Annual Reviews in Microbiology *35*, 567-594.

Mountfort, D., Brulla, W., Krumholz, L.R., and Bryant, M. (1984). Syntrophus buswellii gen. nov., sp. nov.: a benzoate catabolizer from methanogenic ecosystems. International journal of systematic and evolutionary microbiology *34*, 216-217.

Mousavi, S.A., Österman, J., Wahlberg, N., Nesme, X., Lavire, C., Vial, L., Paulin, L., De Lajudie, P., and Lindström, K. (2014). Phylogeny of the Rhizobium–Allorhizobium–Agrobacterium clade supports the delineation of Neorhizobium gen. nov. Systematic and applied microbiology *37*, 208-215.

Müller, V., and Frerichs, J. (2013). Acetogenic bacteria. eLS.

Nakagawa, S., Takai, K., Inagaki, F., Horikoshi, K., and Sako, Y. (2005). Nitratiruptor tergarcus gen. nov., sp. nov. and Nitratifractor salsuginis gen. nov., sp. nov., nitrate-reducing chemolithoautotrophs of the ε-Proteobacteria isolated from a deep-sea hydrothermal system in the Mid-Okinawa Trough. International journal of systematic and evolutionary microbiology *55*, 925-933.

Nakagawa, Y., Sakane, T., and Yokota, A. (1996). Transfer of “Pseudomonas riboflavina”(Foster 1944), a Gram-Negative, Motile Rod with Long-Chain 3-Hydroxy Fatty Acids, to Devosia riboflavina gen. nov., sp. nov., nom. rev. International journal of systematic and evolutionary microbiology *46*, 16-22.

Nakai, R., Baba, T., Niki, H., Nishijima, M., and Naganuma, T. (2015). Aurantimicrobium minutum gen. nov., sp. nov., a novel ultramicrobacterium of the family Microbacteriaceae, isolated from river water. International journal of systematic and evolutionary microbiology *65*, 4072-4079.

Nelson, W.C., and Stegen, J.C. (2015). The reduced genomes of Parcubacteria (OD1) contain signatures of a symbiotic lifestyle. Frontiers in microbiology *6*, 713.

Nishimori, E., Kita-Tsukamoto, K., and Wakabayashi, H. (2000). Pseudomonas plecoglossicida sp. nov., the causative agent of bacterial haemorrhagic ascites of ayu, Plecoglossus altivelis. International journal of systematic and evolutionary microbiology *50*, 83-89.

Pagnier, I., Raoult, D., and La Scola, B. (2011). Isolation and characterization of Reyranella massiliensis gen. nov., sp. nov. from freshwater samples by using an amoeba co-culture procedure. International journal of systematic and evolutionary microbiology *61*, 2151-2154.

Pagnier, I., Yutin, N., Croce, O., Makarova, K.S., Wolf, Y.I., Benamar, S., Raoult, D., Koonin, E.V., and La Scola, B. (2015). Babela massiliensis, a representative of a widespread bacterial phylum with unusual adaptations to parasitism in amoebae. Biology direct *10*, 1.

Pankratov, T.A., Tindall, B.J., Liesack, W., and Dedysh, S.N. (2007). Mucilaginibacter paludis gen. nov., sp. nov. and Mucilaginibacter gracilis sp. nov., pectin-, xylan-and laminarin-degrading members of the family Sphingobacteriaceae from acidic Sphagnum peat bog. International journal of systematic and evolutionary microbiology *57*, 2349-2354.

Pati, A., Gronow, S., Lapidus, A., Copeland, A., Del Rio, T.G., Nolan, M., Lucas, S., Tice, H., Cheng, J.-F., and Han, C. (2010). Complete genome sequence of Arcobacter nitrofigilis type strain (CI T). Standards in genomic sciences *2*, 300.

Qiu, Y.-L., Hanada, S., Ohashi, A., Harada, H., Kamagata, Y., and Sekiguchi, Y. (2008). Syntrophorhabdus aromaticivorans gen. nov., sp. nov., the first cultured anaerobe capable of degrading phenol to acetate in obligate syntrophic associations with a hydrogenotrophic methanogen. Applied and environmental microbiology *74*, 2051-2058.

Qu, J.-H., and Yuan, H.-L. (2008). Sediminibacterium salmoneum gen. nov., sp. nov., a member of the phylum Bacteroidetes isolated from sediment of a eutrophic reservoir. International journal of systematic and evolutionary microbiology *58*, 2191-2194.

Qu, L., Zhu, F., Hong, X., Gao, W., Chen, J., and Sun, X. (2011). Sunxiuqinia elliptica gen. nov., sp. nov., a member of the phylum Bacteroidetes isolated from sediment in a sea cucumber farm. International journal of systematic and evolutionary microbiology *61*, 2885-2889.

Rast, P., Glöckner, I., Boedeker, C., Jeske, O., Wiegand, S., Reinhardt, R., Schumann, P., Rohde, M., Spring, S., and Glöckner, F.O. (2017). Three novel species with peptidoglycan cell walls form the new genus lacunisphaera gen. Nov. In the family opitutaceae of the verrucomicrobial subdivision 4. Frontiers in microbiology *8*, 202.

Ravachol, J., Borne, R., Meynial-Salles, I., Soucaille, P., Pagès, S., Tardif, C., and Fierobe, H.-P. (2015). Combining free and aggregated cellulolytic systems in the cellulosome-producing bacterium Ruminiclostridium cellulolyticum. Biotechnology for biofuels *8*, 114.

Reddy, G.S. (2013). Phylogenetic analyses of the genus Hymenobacter and description of Siccationidurans gen. nov., and Parahymenobacter gen. nov. Journal of Phylogenetics & Evolutionary Biology *2013*.

Reinhold-Hurek, B., Hurek, T., Gillis, M., Hoste, B., Vancanneyt, M., Kersters, K., and De Ley, J. (1993). Azoarcus gen. nov., nitrogen-fixing proteobacteria associated with roots of kallar grass (Leptochloa fusca (L.) Kunth), and description of two species, Azoarcus indigens sp. nov. and Azoarcus communis sp. nov. International journal of systematic and evolutionary microbiology *43*, 574-584.

Rihs, J., Brenner, D., Weaver, R., Steigerwalt, A., Hollis, D., and Yu, V. (1993). Roseomonas, a new genus associated with bacteremia and other human infections. Journal of clinical microbiology *31*, 3275-3283.

Rodrigues, J.L., Duffy, M.A., Tessier, A.J., Ebert, D., Mouton, L., and Schmidt, T.M. (2008). Phylogenetic characterization and prevalence of “Spirobacillus cienkowskii,” a red-pigmented, spiral-shaped bacterial pathogen of freshwater Daphnia species. Applied and environmental microbiology *74*, 1575-1582.

Rogosa, M. (1971). Transfer of Peptostreptococcus elsdenii Gutierrez et al. to a new genus, Megasphaera [M. elsdenii (Gutierrez et al.) comb. nov.]. International journal of systematic and evolutionary microbiology *21*, 187-189.

SANGKHOBOL, V., and Skerman, V. (1981). Chitinophaga, a new genus of chitinolytic myxobacteria. International journal of systematic and evolutionary microbiology *31*, 285-293.

Sangwan, P., Chen, X., Hugenholtz, P., and Janssen, P.H. (2004). Chthoniobacter flavus gen. nov., sp. nov., the first pure-culture representative of subdivision two, Spartobacteria classis nov., of the phylum Verrucomicrobia. Applied and environmental microbiology *70*, 5875-5881.

Santos, P., Pinhal, I., Rainey, F.A., Empadinhas, N., Costa, J., Fields, B., Benson, R., Veríssimo, A., and da Costa, M.S. (2003). Gamma-Proteobacteria Aquicella lusitana gen. nov., sp. nov., and Aquicella siphonis sp. nov. Infect Protozoa and Require Activated Charcoal for Growth in Laboratory Media. Applied and environmental microbiology *69*, 6533-6540.

Sauder, L.A., Albertsen, M., Engel, K., Schwarz, J., Nielsen, P.H., Wagner, M., and Neufeld, J.D. (2017). Cultivation and characterization of Candidatus Nitrosocosmicus exaquare, an ammonia-oxidizing archaeon from a municipal wastewater treatment system. ISME J *11*, 1142.

Schleheck, D., Tindall, B.J., Rossello-Mora, R., and Cook, A.M. (2004). Parvibaculum lavamentivorans gen. nov., sp. nov., a novel heterotroph that initiates catabolism of linear alkylbenzenesulfonate. International journal of systematic and evolutionary microbiology *54*, 1489-1497.

Shelobolina, E.S., Nevin, K.P., Blakeney-Hayward, J.D., Johnsen, C.V., Plaia, T.W., Krader, P., Woodard, T., Holmes, D.E., VanPraagh, C.G., and Lovley, D.R. (2007). Geobacter pickeringii sp. nov., Geobacter argillaceus sp. nov. and Pelosinus fermentans gen. nov., sp. nov., isolated from subsurface kaolin lenses. International journal of systematic and evolutionary microbiology *57*, 126-135.

Shimura, Y., Hirose, Y., Misawa, N., Osana, Y., Katoh, H., Yamaguchi, H., and Kawachi, M. (2015). Comparison of the terrestrial cyanobacterium Leptolyngbya sp. NIES-2104 and the freshwater Leptolyngbya boryana PCC 6306 genomes. DNA Research, dsv022.

Shoemaker, W.R., Muscarella, M.E., and Lennon, J.T. (2015). Genome sequence of the soil bacterium Janthinobacterium sp. KBS0711. Genome announcements *3*, e00689-00615.

Sizova, M.V., Panikov, N.S., Spiridonova, E.M., Slobodova, N.V., and Tourova, T.P. (2007). Novel facultative anaerobic acidotolerant Telmatospirillum siberiense gen. nov. sp. nov. isolated from mesotrophic fen. Systematic and applied microbiology *30*, 213-220.

Smith, K.S., and Ingram-Smith, C. (2007). Methanosaeta, the forgotten methanogen? Trends in microbiology *15*, 150-155.

Song, J., Choo, Y.-J., and Cho, J.-C. (2008). Perlucidibaca piscinae gen. nov., sp. nov., a freshwater bacterium belonging to the family Moraxellaceae. International journal of systematic and evolutionary microbiology *58*, 97-102.

Spring, S., Kämpfer, P., and Schleifer, K.H. (2001). Limnobacter thiooxidans gen. nov., sp. nov., a novel thiosulfate-oxidizing bacterium isolated from freshwater lake sediment. International journal of systematic and evolutionary microbiology *51*, 1463-1470.

Spring, S., Wagner, M., Schumann, P., and Kämpfer, P. (2005). Malikia granosa gen. nov., sp. nov., a novel polyhydroxyalkanoate-and polyphosphate-accumulating bacterium isolated from activated sludge, and reclassification of Pseudomonas spinosa as Malikia spinosa comb. nov. International journal of systematic and evolutionary microbiology *55*, 621-629.

Stackebrandt, E., Sproer, C., Rainey, F.A., Burghardt, J., Päuker, O., and Hippe, H. (1997). Phylogenetic Analysis of the Genus Desulfotomaculum: Evidence for the Misclassification of Desulfotomaculum guttoideum and Description of Desulfotomaculum orientis as Desulfosporosinus orientis gen. nov., comb. nov. International journal of systematic and evolutionary microbiology *47*, 1134-1139.

Steenhoudt, O., and Vanderleyden, J. (2000). Azospirillum, a free-living nitrogen-fixing bacterium closely associated with grasses: genetic, biochemical and ecological aspects. FEMS microbiology reviews *24*, 487-506.

Steyn, P., Segers, P., Vancanneyt, M., Sandra, P., Kersters, K., and Joubert, J. (1998). Classification of heparinolytic bacteria into a new genus, Pedobacter, comprising four species: Pedobacter heparinus comb. nov., Pedobacter piscium comb. nov., Pedobacter africanus sp. nov. and Pedobacter saltans sp. nov. proposal of the family Sphingobacteriaceae fam. nov. International journal of systematic and evolutionary microbiology *48*, 165-177.

Stoecker, K., Bendinger, B., Schöning, B., Nielsen, P.H., Nielsen, J.L., Baranyi, C., Toenshoff, E.R., Daims, H., and Wagner, M. (2006). Cohn’s Crenothrix is a filamentous methane oxidizer with an unusual methane monooxygenase. Proceedings of the National Academy of Sciences of the United States of America *103*, 2363-2367.

Su, X.-L., Tian, Q., Zhang, J., Yuan, X.-Z., Shi, X.-S., Guo, R.-B., and Qiu, Y.-L. (2014). Acetobacteroides hydrogenigenes gen. nov., sp. nov., an anaerobic hydrogen-producing bacterium in the family Rikenellaceae isolated from a reed swamp. International journal of systematic and evolutionary microbiology *64*, 2986-2991.

Sullivan, J.P., Dickinson, D., and Chase, H.A. (1998). Methanotrophs, Methylosinus trichosporium OB3b, sMMO, and their application to bioremediation. Critical reviews in microbiology *24*, 335-373.

Takeuchi, M., Hamana, K., and Hiraishi, A. (2001). Proposal of the genus Sphingomonas sensu stricto and three new genera, Sphingobium, Novosphingobium and Sphingopyxis, on the basis of phylogenetic and chemotaxonomic analyses. International journal of systematic and evolutionary microbiology *51*, 1405-1417.

Tarlera, S., and Denner, E.B. (2003). Sterolibacterium denitrificans gen. nov., sp. nov., a novel cholesterol-oxidizing, denitrifying member of the β-Proteobacteria. International journal of systematic and evolutionary microbiology *53*, 1085-1091.

Thrash, J.C., Ahmadi, S., Torok, T., and Coates, J.D. (2010). Magnetospirillum bellicus sp. nov., a novel dissimilatory perchlorate-reducing alphaproteobacterium isolated from a bioelectrical reactor. Applied and environmental microbiology *76*, 4730-4737.

Tsubota, J., Eshinimaev, B.T., Khmelenina, V.N., and Trotsenko, Y.A. (2005). Methylothermus thermalis gen. nov., sp. nov., a novel moderately thermophilic obligate methanotroph from a hot spring in Japan. International journal of systematic and evolutionary microbiology *55*, 1877-1884.

Uchino, Y., Hamada, T., and Yokota, A. (2002). Proposal of Pseudorhodobacter ferrugineus gen. nov., comb. nov., for a non-photosynthetic marine bacterium, Agrobacterium ferrugineum, related to the genus Rhodobacter. The Journal of general and applied microbiology *48*, 309-319.

Ueki, A., Akasaka, H., Suzuki, D., and Ueki, K. (2006). Paludibacter propionicigenes gen. nov., sp. nov., a novel strictly anaerobic, Gram-negative, propionate-producing bacterium isolated from plant residue in irrigated rice-field soil in Japan. International journal of systematic and evolutionary microbiology *56*, 39-44.

Vaishampayan, P., Miyashita, M., Ohnishi, A., Satomi, M., Rooney, A., La Duc, M.T., and Venkateswaran, K. (2009). Description of Rummeliibacillus stabekisii gen. nov., sp. nov. and reclassification of Bacillus pycnus Nakamura et al. 2002 as Rummeliibacillus pycnus comb. nov. International journal of systematic and evolutionary microbiology *59*, 1094-1099.

Van der Zaan, B.M., Saia, F.T., Stams, A.J., Plugge, C.M., de Vos, W.M., Smidt, H., Langenhoff, A.A., and Gerritse, J. (2012). Anaerobic benzene degradation under denitrifying conditions: Peptococcaceae as dominant benzene degraders and evidence for a syntrophic process. Environmental microbiology *14*, 1171-1181.

Vandamme, P., and Coenye, T. (2004). Taxonomy of the genus Cupriavidus: a tale of lost and found. International journal of systematic and evolutionary microbiology *54*, 2285-2289.

Vandekerckhove, T.T., Coomans, A., Cornelis, K., Baert, P., and Gillis, M. (2002). Use of the Verrucomicrobia-specific probe EUB338-III and fluorescent in situ hybridization for detection of “Candidatus Xiphinematobacter” cells in nematode hosts. Applied and environmental microbiology *68*, 3121-3125.

Vannini, C., Ferrantini, F., Verni, F., and Petroni, G. (2013). A new obligate bacterial symbiont colonizing the ciliate Euplotes in brackish and freshwater:‘Candidatus Protistobacter heckmanni’. Aquatic Microbial Ecology *70*, 233-243.

Vreeland, R., Litchfield, C., Martin, E., and Elliot, E. (1980). Halomonas elongata, a new genus and species of extremely salt-tolerant bacteria. International journal of systematic and evolutionary microbiology *30*, 485-495.

Weelink, S.A., Van Doesburg, W., Saia, F.T., Rijpstra, W.I.C., Röling, W.F., Smidt, H., and Stams, A.J. (2009). A strictly anaerobic betaproteobacterium Georgfuchsia toluolica gen. nov., sp. nov. degrades aromatic compounds with Fe (III), Mn (IV) or nitrate as an electron acceptor. FEMS microbiology ecology *70*, 575-585.

Weiss, J.V., Rentz, J.A., Plaia, T., Neubauer, S.C., Merrill-Floyd, M., Lilburn, T., Bradburne, C., Megonigal, J.P., and Emerson, D. (2007). Characterization of neutrophilic Fe (II)-oxidizing bacteria isolated from the rhizosphere of wetland plants and description of Ferritrophicum radicicola gen. nov. sp. nov., and Sideroxydans paludicola sp. nov. Geomicrobiology Journal *24*, 559-570.

Wen, A., Fegan, M., Hayward, C., Chakraborty, S., and Sly, L.I. (1999). Phylogenetic relationships among members of the Comamonadaceae, and description of Delftia acidovorans (den Dooren de Jong 1926 and Tamaoka et al. 1987) gen. nov., comb. nov. International journal of systematic and evolutionary microbiology *49*, 567-576.

Weon, H.-Y., Kim, B.-Y., Lee, C.-M., Hong, S.-B., Jeon, Y.-A., Koo, B.-S., and Kwon, S.-W. (2009). Solitalea koreensis gen. nov., sp. nov. and the reclassification of [Flexibacter] canadensis as Solitalea canadensis comb. nov. International journal of systematic and evolutionary microbiology *59*, 1969-1975.

Weon, H.-Y., Yoo, S.-H., Hong, S.-B., Kwon, S.-W., Stackebrandt, E., Go, S.-J., and Koo, B.-S. (2008). Polaromonas jejuensis sp. nov., isolated from soil in Korea. International journal of systematic and evolutionary microbiology *58*, 1525-1528.

Wexler, H.M., Reeves, D., Summanen, P.H., Molitoris, E., McTEAGUE, M., Duncan, J., Wilson, K.H., and Finegold, S.M. (1996). Sutterella wadsworthensis gen. nov., sp. nov., bile-resistant microaerophilic Campylobacter gracilis-like clinical isolates. International journal of systematic and evolutionary microbiology *46*, 252-258.

Willems, A., Busse, J., Goor, M., Pot, B., Falsen, E., Jantzen, E., Hoste, B., Gillis, M., Kersters, K., and Auling, G. (1989). Hydrogenophaga, a new genus of hydrogen-oxidizing bacteria that includes Hydrogenophaga flava comb. nov.(formerly Pseudomonas flava), Hydrogenophaga palleronii (formerly Pseudomonas palleronii), Hydrogenophaga pseudoflava (formerly Pseudomonas pseudoflava and “Pseudomonas carboxydoflava”), and Hydrogenophaga taeniospiralis (formerly Pseudomonas taeniospiralis). International journal of systematic and evolutionary microbiology *39*, 319-333.

Willems, A., De Ley, J., Gillis, M., and Kersters, K. (1991). Comamonadaceae, a new family encompassing the acidovorans rRNA complex, including Variovorax paradoxus gen. nov., comb. nov., for Alcaligenes paradoxus (Davis 1969). International journal of systematic and evolutionary microbiology *41*, 445-450.

Williams, T.M., and Unz, R.F. (1985). Filamentous sulfur bacteria of activated sludge: characterization of Thiothrix, Beggiatoa, and Eikelboom type 021N strains. Applied and environmental microbiology *49*, 887-898.

Wisotzkey, J.D., Jurtshuk JR, P., Fox, G.E., Deinhard, G., and Poralla, K. (1992). Comparative Sequence Analyses on the 16S rRNA (rDNA) of Bacillus acidocaldarius, Bacillus acidoterrestris, and Bacillus cycloheptanicus and Proposal for Creation of a New Genus, Alicyclobacillus gen. nov. International journal of systematic and evolutionary microbiology *42*, 263-269.

Wodke, J.A., Puchałka, J., Lluch‐Senar, M., Marcos, J., Yus, E., Godinho, M., Gutiérrez‐Gallego, R., dos Santos, V.A.M., Serrano, L., and Klipp, E. (2013). Dissecting the energy metabolism in Mycoplasma pneumoniae through genome‐scale metabolic modeling. Molecular systems biology *9*, 653.

Woo, P.C., Teng, J.L., Leung, K.w., Lau, S.K., Woo, G.K., Wong, A.C., Wong, M.K., and Yuen, K.y. (2005). Anaerospora hongkongensis gen. nov. sp. nov., a novel genus and species with ribosomal DNA operon heterogeneity isolated from an intravenous drug abuser with pseudobacteremia. Microbiology and immunology *49*, 31-39.

Wu, W.-J., Liu, Q.-Q., Chen, G.-J., and Du, Z.-J. (2015). Roseimarinus sediminis gen. nov., sp. nov., a facultatively anaerobic bacterium isolated from coastal sediment. International journal of systematic and evolutionary microbiology *65*, 2260-2264.

Xia, Y., Wang, Y., Wang, Y., Chin, F.Y., and Zhang, T. (2016). Cellular adhesiveness and cellulolytic capacity in Anaerolineae revealed by omics-based genome interpretation. Biotechnology for biofuels *9*, 111.

Xie, C.-H., and Yokota, A. (2005). Dyella japonica gen. nov., sp. nov., a γ-proteobacterium isolated from soil. International journal of systematic and evolutionary microbiology *55*, 753-756.

Xie, C.-H., and Yokota, A. (2006). Reclassification of [Flavobacterium] ferrugineum as Terrimonas ferruginea gen. nov., comb. nov., and description of Terrimonas lutea sp. nov., isolated from soil. International journal of systematic and evolutionary microbiology *56*, 1117-1121.

Xing, D., Ren, N., Li, Q., Lin, M., Wang, A., and Zhao, L. (2006). Ethanoligenens harbinense gen. nov., sp. nov., isolated from molasses wastewater. International journal of systematic and evolutionary microbiology *56*, 755-760.

YABUUCHI, E., KANEKO, T., YANO, I., Moss, C.W., and MIYOSHI, N. (1983). Sphingobacterium gen. nov., Sphingobacterium spiritivorum comb. nov., Sphingobacterium multivorum comb. nov., Sphingobacterium mizutae sp. nov., and Flavobacterium indologenes sp. nov.: Glucose-Nonfermenting Gram-Negative Rods in CDC Groups IIK-2 and IIb. International journal of systematic and evolutionary microbiology *33*, 580-598.

Yabuuchi, E., Kosako, Y., Oyaizu, H., Yano, I., Hotta, H., Hashimoto, Y., Ezaki, T., and Arakawa, M. (1992). Proposal of Burkholderia gen. nov. and transfer of seven species of the genus Pseudomonas homology group II to the new genus, with the type species Burkholderia cepacia (Palleroni and Holmes 1981) comb. nov. Microbiology and immunology *36*, 1251-1275.

Yabuuchi, E., Kosako, Y., Yano, I., Hotta, H., and Nishiuchi, Y. (1995). Transfer of two Burkholderia and an Alcaligenes species to Ralstonia gen. nov.: proposal of Ralstonia pickettii (Ralston, Palleroni and Doudoroff 1973) comb. nov., Ralstonia solanacearum (Smith 1896) comb. nov. and Ralstonia eutropha (Davis 1969) comb. nov. Microbiology and immunology *39*, 897-904.

Yamada, T., Sekiguchi, Y., Hanada, S., Imachi, H., Ohashi, A., Harada, H., and Kamagata, Y. (2006). Anaerolinea thermolimosa sp. nov., Levilinea saccharolytica gen. nov., sp. nov. and Leptolinea tardivitalis gen. nov., sp. nov., novel filamentous anaerobes, and description of the new classes Anaerolineae classis nov. and Caldilineae classis nov. in the bacterial phylum Chloroflexi. International journal of systematic and evolutionary microbiology *56*, 1331-1340.

Yee, B., Oertli, G.E., Fuerst, J.A., and Staley, J.T. (2010). Reclassification of the polyphyletic genus Prosthecomicrobium to form two novel genera, Vasilyevaea gen. nov. and Bauldia gen. nov. with four new combinations: Vasilyevaea enhydra comb. nov., Vasilyevaea mishustinii comb. nov., Bauldia consociata comb. nov. and Bauldia litoralis comb. nov. International journal of systematic and evolutionary microbiology *60*, 2960-2966.

Yi, H., Schumann, P., and Chun, J. (2007). Demequina aestuarii gen. nov., sp. nov., a novel actinomycete of the suborder Micrococcineae, and reclassification of Cellulomonas fermentans Bagnara et al. 1985 as Actinotalea fermentans gen. nov., comb. nov. International journal of systematic and evolutionary microbiology *57*, 151-156.

Yoon, J., Blumer, A., and Lee, K. (2006). An algorithm for modularity analysis of directed and weighted biological networks based on edge-betweenness centrality. Bioinformatics *22*, 3106-3108.

Yoon, M.-H., and Im, W.-T. (2007). Flavisolibacter ginsengiterrae gen. nov., sp. nov. and Flavisolibacter ginsengisoli sp. nov., isolated from ginseng cultivating soil. International journal of systematic and evolutionary microbiology *57*, 1834-1839.

Zeikus, J., and Wolee, R. (1972). Methanobacterium thermoautotrophicus sp. n., an anaerobic, autotrophic, extreme thermophile. Journal of bacteriology *109*, 707-713.