

Table S1: Taxonomic survey of the aerobic anoxygenic photosynthetic bacteria

Genus and species	Sub-group	Ref.	Cell shape	Color	Carotenoid	Habitat
<i>Roseococcus thiosulfatophilus</i>	α -1	(34)	cocci	pink	see <i>Methylobacterium</i>	freshwater
<i>Craurococcus roseus</i>	α -1	(19)	cocci	pink	spirilloxanthin, carotenoic acid	soil
<i>Paracraurococcus ruber</i>	α -1	(19)	cocci	red	spirilloxanthin, carotenoic acid	soil
<i>Acidiphilium rubrum</i> <i>angustum</i> <i>cryptum</i> <i>multivorum</i>	α -1	(30) (29) (31)	rods	red-pink	spirilloxanthin	minewater
<i>Methylobacterium rhodesianum</i> ¹⁾ <i>radiotolerans</i> ²⁾ <i>extorquens</i> ³⁾ <i>zatmanii</i> <i>fujisawaense</i> <i>rhodinum</i>	α -2	(7)	short rods	pink-red	diglycosylester of C ₃₀ carotene-dioate, spirilloxanthin	ubiquitous
<i>Roseibium denhamense</i> <i>hamelinense</i>	α -2	(27)	rods	pink	unknown	marine
<i>Hoeflea phototrophica</i>	α -2	(4)	rods	pink to beige	spheroidenone	marine
<i>Stappia marina</i>	α -2	(11)	rods	not given	unknown	marine
<i>Labrenzia alexandrii</i>	α -2	(5)	rods	pink to beige	spheroidenone	marine
<i>Roseobacter denitrificans</i> ⁴⁾ <i>litoralis</i>	α -3	(21)	ovoid	pink	spheroidenone	marine
<i>Dinoroseobacter shibae</i>	α -3	(3)	ovoid	red	spheroidenone	marine
<i>Roseivivax halodurans</i> <i>halotolerans</i>	α -3	(26)	ovoid	pink	unknown	halophilic
<i>Rubrimonas cliftonensis</i>	α -3	(28)	short rods	pink	unknown	saline lake
<i>Roseovarius tolerans</i> <i>mucosus</i>	α -3	(12) (2)	ovoid to rods	red, pink or beige	unknown none	marine

<i>Staleyia guttiformis</i>	α -3	(14)	ovoid, in stars	beige to pink	unknown	marine
<i>Roseisalinus antarcticus</i>	α -3	(13)	rods, in stars	red	unknown	halophilic
<i>Roseicyclus mahoneyensis</i>	α -3	(18)	vibrios to cycles	pink to purple	unknown	halophilic
<i>Thalassobacter stenotrophicus</i>	α -3	(15)	ovoid	pink	unknown	marine
<i>Roseinatronobacter Thiooxidans</i>	α -3	(24)	rods	reddish orange	unknown	soda lake
<i>Erythrobacter longus litoralis</i>	α -4	(22) (38)	rods	orange	β -carotene derivatives	marine
<i>Porphyrobacter neustonensis tepidarius sanguineus</i>⁸⁾ <i>cryptus donghaensis</i>	α -4	(6) (8) (10) (17) (33)	rods or pleo-morphic	orange-red	β -carotene derivatives unknown unknown unknown	freshwater freshwater marine freshwater marine
<i>Citromicrobium bathyomarinum</i>	α -4	(37)	pleo-morphic	yellow	β -carotene type	marine
<i>Erythromicrobium ramosum ezovicum hydrolyticum</i>	α -4	(38) (39)	rods, branched	red-orange	β -carotene derivatives	freshwater
<i>Sphingomonas natatoria</i>⁵⁾ <i>ursincola</i>⁶⁾	α -4	(23) (9)(32) (35)(9) (32)	ovoid rods ovoid rods	orange brown orange-brown	unknown β -carotene derivatives	freshwater freshwater
<i>Sandaracinobacter sibiricus</i>⁷⁾	α -4	(36) (35)	thin, long rods	yellow-orange	β -carotene derivatives	freshwater
<i>Roseateles depolymerans</i>	β	(25)	rods	pink	Spirillo-xanthin	freshwater

¹⁾ = *Protaminobacter ruber* (20)

²⁾ = *Pseudomonas radora* (16)

³⁾ = *Protaminobacter ruber*, *Pseudomonas* AM1

⁴⁾ = *Erythrobacter* Och114

⁵⁾ = *Blastobacter* n. (23)

⁶⁾ = *Erythromicrobium* u. (36), *Erythromonas* u. (35)

⁷⁾ = *Erythromicrobium* s., *Erythrobacter* s. (38)

⁸⁾ = *Agrobacterium sanguineum* (1)

LITERATURE CITED

1. Ahrens R. 1968. Taxonomische Untersuchungen an sternbildenden Agrobacterium-Arten aus der westlichen Ostsee. *Kieler Meeresforschungen* 24:147-73
2. Biebl H, Allgaier M, Lünsdorf H, Pukall R, Tindall BJ, Wagner-Döbler I. 2005. *Roseovarius mucosus* sp. nov., a member of the Rosobacter clade with trace amounts of bacteriochlorophyll a. *Int. J. Syst. Evol. Microbiol.* 55:2377-83
3. Biebl H, Allgaier M, Tindall BJ, Koblizek M, Lünsdorf H, Pukall R, Wagner-Döbler I. 2005. *Dinoroseobacter shibae* ge. nov., sp. nov., a new aerobic phototrophic bacterium isolated from dinoflagellates. *Int. J. Syst. Evol. Microbiol.* 55:1089-96
4. Biebl H, Tindall BJ, Pukall R, Lünsdorf H, Allgaier M, Wagner-Döbler I. 2005. *Hoeflea phototrophica*, nov. sp., *Hoeflea phototrophica* sp. nov., a new marine aerobic Alphaproteobacterium that forms bacteriochlorophyll a. *Int. J. Syst. Evol. Microbiol.* published online:
5. Biebl H, Tindall BJ, Pukall R, Lünsdorf H, Allgaier M, Wagner-Döbler I. 2006. Description of *Labrenzia alexandrii*, gen.nov. sp.nov., and consequences for the genus *Stappia*. *Int. J. Syst. Evol. Microbiol.* submitted:
6. Fuerst JA, Hawkins JA, Holmes A, Sly LI, Moore CJ, Stackebrandt E. 1993. *Porphyrobacter neustonensis*, gen. nov., sp. nov., an aerobic bacteriochlorophyll-synthesizing budding bacterium from fresh water. *Int. J. Syst. Bacteriol.* 43:125-34

7. Green PN, Bousfield IJ, Hood D. 1988. Three new *Methylobacterium* species: *M. rhodesianum* sp. nov., *M. zatmanii* sp. nov., and *M. fujiwaense* sp. nov. *Int. J. Syst. Bacteriol.* 38:124-7
8. Hanada S, Kawase Y, Takaichi S, Matsuura T, Shimada K, Nagashima KVP. 1997. *Porphyrobacter tepidarius* sp. nov., a moderately thermophilic aerobic photosynthetic bacterium isolated from a hot spring. *Int. J. Syst. Bacteriol.* 47:408-13
9. Hiraishi A, Kuraishi H, Kawahara K. 2000. Emendation of the description of *Blastomonas natatoria* (Sly 1985) Sly and Cahill 1997 as an aerobic photosynthetic bacterium and reclassification of *Erythromonas ursincola* Yurkov et al. 1997 as *Blastomonas ursincola*. *Int. J. Syst. Bacteriol.* 50:1113-8
10. Hiraishi A, Yonemitsu Y, Matsushita M, Shin YK, Kuraishi H, Kawahara K. 2002. Characterization of *Porphyrobacter sanguineum* sp. nov., an aerobic bacteriochlorophyll containing bacterium capable of degrading biphenyl and dibenzofuran. *Arch. Microbiol.* 178:45-52
11. Kim B-C, Park JR, Bae J-W, Rhee S-K, Kim K-H, Oh J-W, Park YH. 2005. *Stappia marina* sp. nov., a marine bacterium isolated from the Yellow Sea. *Int. J. Syst. Evol. Microbiol.* in press:
12. Labrenz M, Collins MD, Lawson PA, Tindall BJ, Schumann P, Hirsch P. 1999. *Roseovarius tolerans* gen. nov., sp. nov., a budding bacterium with variable bacteriochlorophyll a production from hypersaline Ekho Lake. *Int. J. Syst. Bacteriol.* 49:137-47

13. Labrenz M, Lawson PA, Tindall BJ, Collins MD, Hirsch P. 2005. *Roseosalinus antarcticus* gen. nov., sp. nov., a novel aerobic bacteriochlorophyll a producing Alphaproteobacterium isolated from hypersaline Ekho Lake, Antarctica. *Int. J. Syst. Evol. Microbiol.* 55:41-7
14. Labrenz M, Tindall BJ, Lawson PA, Collins MD, Schumann P, Hirsch P. 2000. *Staleyella guttiformis* gen., sp. nov. and *Sulfitobacter brevis* sp. nov., α -3-Proteobacteria from hypersaline, heliothermal and meromictic antarctic Ekho Lake. *Int. J. Syst. Bacteriol.* 50:303-13
15. Macian MC, Arahal DE, Garay E, Ludwig W, Schleifer K-H, Pujalte MJ. 2005. *Thalassobacter stenotrophicus* gen. nov., sp. nov., a novel marine Alphaproteobacterium isolated from Mediterranean sea water. *Int. J. Syst. Evol. Microbiol.* 55:105-10
16. Nishimura Y, Shimadzu M, Iizuka H. 1981. Bacteriochlorophyll formation in a radiation-resistant *Pseudomonas radiora*. *J. Gen Appl. Microbiol.* 27:427-30
17. Rainey F-A, Silva J, Nobre FN, Silva MT, da Costa MS. 2003. *Porphyrobacter cryptus*, sp. nov., a novel slightly thermophilic, aerobic bacteriochlorophyll a containing species. *Int. J. Syst. Bacteriol.* 53:35-41
18. Rathgeber Ch, Yurkova N., Stackebrandt E, Schumann P, Beatty JT, Yurkov V. 2005. *Roseicyclus mahoneyensis* gen. nov., sp. nov., an aerobic phototrophic bacterium isolated from a meromictic lake. *Int. J. Syst. Evol. Microbiol.* 55:1597-603
19. Saitoh S, Suzuki T, Nishimura Y. 1998. Proposal of *Craurococcus roseus* gen. nov., sp. nov. and *Paracraurococcus roseus* gen. nov., sp. nov., novel aerobic bacteriochlorophyll a-containing bacteria from soil. *Int. J. Syst. Bacteriol.* 48:1043-7

20. Sato K. 1978. Bacteriochlorophyll formation by facultative methylotrophs, *Protaminobacter ruber* and *Pseudomonas* AM1. *FEBS Lett.* 85:207-10
21. Shiba T. 1991. *Roseobacter litoralis* gen. nov., sp. nov., and *Roseobacter denitrificans*, sp. nov, aerobic pink-pigmented bacteria which contain bacteriochlorophyll. *Syst. Appl. Microbiol.* 14:140-5
22. Shiba T, Simidu U. 1982. *Erythrobacter longus*, gen. nov., sp. nov., an aerobic bacterium which contains bacteriochlorophyll a. *Int. J. Syst. Bacteriol.* 32:211-7
23. Sly LI, Cahill MM. 1997. Transfer of *Blastobacter natatorius* (Sly 1985) to the genus *Blastomonas* gen. no. as *Blastomonas natatoria* comb nov. *Int. J. Syst. Bacteriol.* 47:566-8
24. Sorokin DYu, Tourova TP, Kuznetsov BB, Bryantseva IA, Gorlenko VM. 2000. *Roseinatronobacter thiooxidans* gen. nov., sp. nov., a new alkaliphilic aerobic bacteriochlorophyll a-containing bacterium isolated from a soda lake. *Microbiology (Mikrobiologiya)* 69:89-97
25. Suyama T, Shigematsu T, Takaichi S, Nodasaka Y, Fujikawa S, Hosoya H, Tokiwa Y, Kanagawa T, Hanada S. 1999. *Reseateles depolymerans* gen. nov., sp. nov., a new bacteriochlorophyll a containing obligate aerobe belonging to the β -subclass of the *Proteobacteria*. *Int. J. Syst. Bacteriol.* 49:449-57
26. Suzuki T, Muroga Y, Takahama M, Nishimura Y. 1999. *Roseivivax halodurans*, gen. nov. sp. nov and *Roseivivax halotolerans* sp. nov., aerobic bacteriochlorophyll containing bacteria isolated from a saline lake. *Int. J. Syst. Bacteriol.* 49:629-34

27. Suzuki T, Muroga Y, Takahama M, Nishimura Y. 2000. *Roseibium denhamense* gen. nov., sp. nov. and *Roseibium hamelinense*, aerobic bacteriochlorophyll containing bacteria isolated from the east and west coast of Australia. *Int. J. Syst. Evol. Microbiol.* 50:2151-6
28. Suzuki T, Muroga Y, Takahama M, Shiba T, Nishimura Y. 1999. *Rubrimonas cliftonensis* gen. nov., sp. nov., an anaerobic bacteriochlorophyll-containing bacterium isolated from a saline lake. *Int. J. Syst. Bacteriol.* 49:201-5
29. Wakao N, Nagasawa N, Matsuura T, Matsukura H, Matsumoto T, Hiraishi A, Sakurai Y, Shiota H. 1994. *Acidiphilium multivorum* sp. nov., an acidophilic chemoorganotrophic bacterium from pyrite and mine drainage. *J. Gen. Microbiol.* 40:143-59
30. Wakao N, Shiba T, Hiraishi A, Ito M, Sakurai Y. 1993. Distribution of bacteriochlorophyll a in species of the genus *Acidiphilium*. *Curr. Microbiol.* 27:277-9
31. Wakao N, Yokoi N, Isoyama N., et al.(8). 1996. Discovery of natural photosynthesis using zinc-containing bacteriochlorophyll in an anaerobic bacterium *Acidiphilium rubrum*. *Plant Cell Physiol.* 37:889-93
32. Yabuuchi.E., Kasoka Y, Fujiwara N, Naka T, Matsunaga I, Ogura H, Kobayashi K. 2002. Emendation of the genus *Sphingomonas* Yabuuchi et al. 1990 and junior objective synonymy of the species of the three genera, *Sphingobium*, *Novosphingobium* and *Sphingopyxis*, in conjunction with *Blastomonas ursincola*. *Int. J. Syst. Bacteriol.* 52:1485-96

33. Yoon J-H, Lee M-H, Oh J-I. 2004. *Porphyrobacter donghaensis* sp. nov., isolated from seawater of the East Sea in Korea. *Int. J. Syst. Evol. Microbiol.* 54:2231-5
34. Yurkov VV, Krassilnikova EN, Gorlenko VM. 1994. Thiosulfate metabolism in the aerobic bacteriochlorophyll a-containing bacteria *Erythromicrobium hydrolyticum* and *Roseococcus thiosulfatophilus*. *Microbiology (Mikrobiologiya)* 63:91-4
35. Yurkov VV, Stackebrandt E, Buss O, Vermeglio A, Gorlenko VM, Beatty JT. 1997. Reorganization of the genus *Erythromicrobium*: Description of "*Erythromicrobium sibiricum*" as *Sandaracinobacter sibiricus*, gen nov, sp. nov., and "*Erythromicrobium ursincola*" as *Erythromonas ursincola*, gen. nov., sp. nov. *Int. J. Syst. Bacteriol.* 47:1172-8
36. Yurkov VV, Krassilnikova EN, Gorlenko VN. 1993. Effect of light and oxygen on metabolism of the aerobic bacterium *Erythromicrobium sibiricum*. *Microbiology (Mikrobiologiya)* 62:35-8
37. Yurkov VV, Krieger S, Stackebrandt E, Beatty JT. 1999. *Citromicrobium bathyomarinum*, a novel aerobic bacterium isolated from deep-sea hydrothermal vent plume waters that contains photosynthetic Pigment protein complexes. *J. Bacteriol.* 181:4515-25
38. Yurkov VV, Stackebrandt E, Holmes A, Fuerst JA, Hugenholtz P, Golecki J, Gad'on N, Gorlenko VN, Kompantseva EI, Drews G. 1994. Phylogenetic positions of novel aerobic, bacteriochlorophyll a-containing bacteria and description of *Rhodococcus thiosulfatophilus* gen. nov., sp.nov., *Erythromicrobium ramosum* gen. nov., sp. nov., and *Erythro bacter litoralis* sp. nov. *Int. J. Syst. Bacteriol.* 44:427-34

39. Yurkov VV, van Gemerden H. 1993. Impact of light/dark regimen on growth rate, biomass formation and bacteriochlorophyll synthesis in *Erythromicrobium hydrolyticum*. *Arch. Microbiol.* 159:84-9