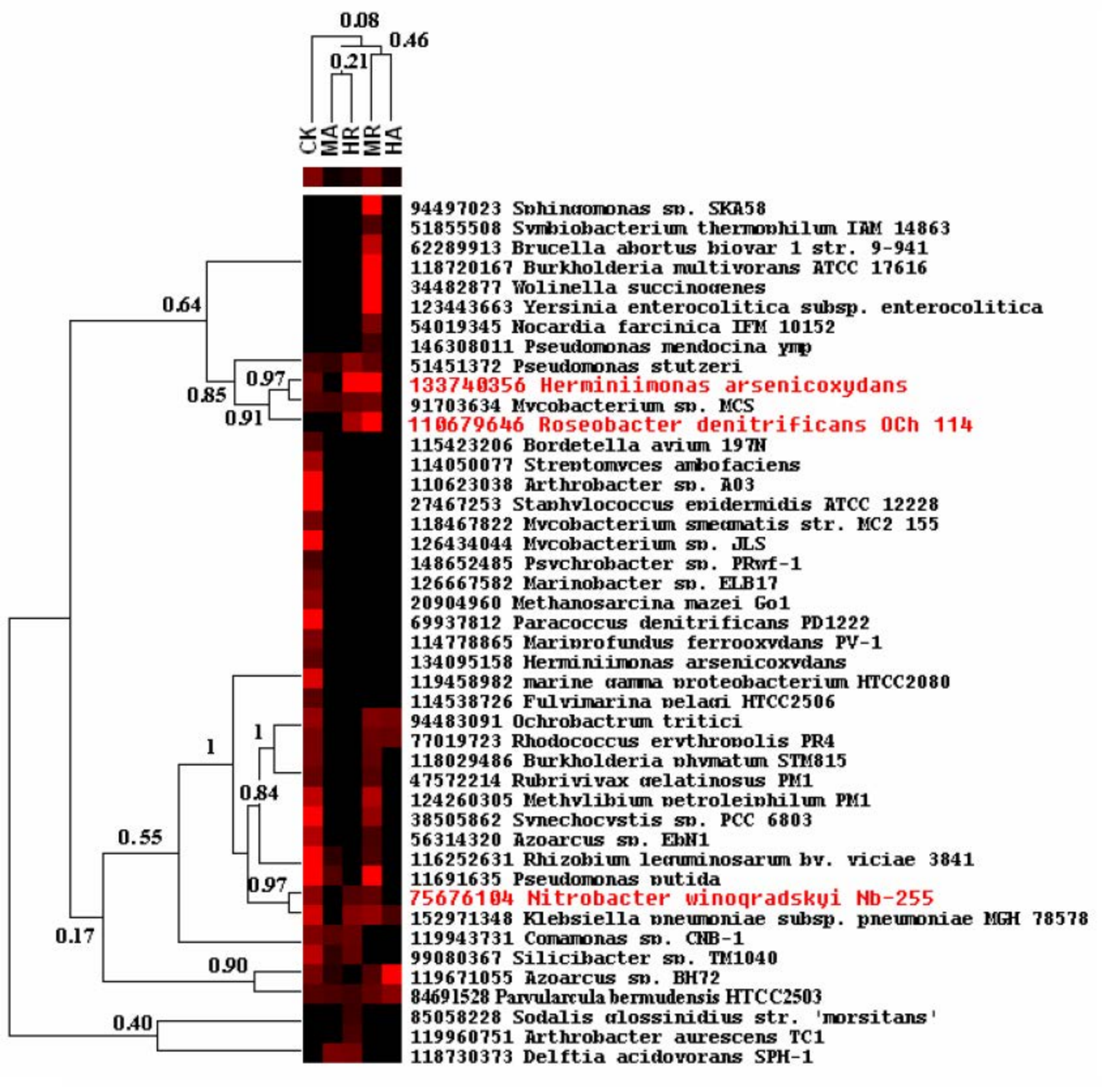
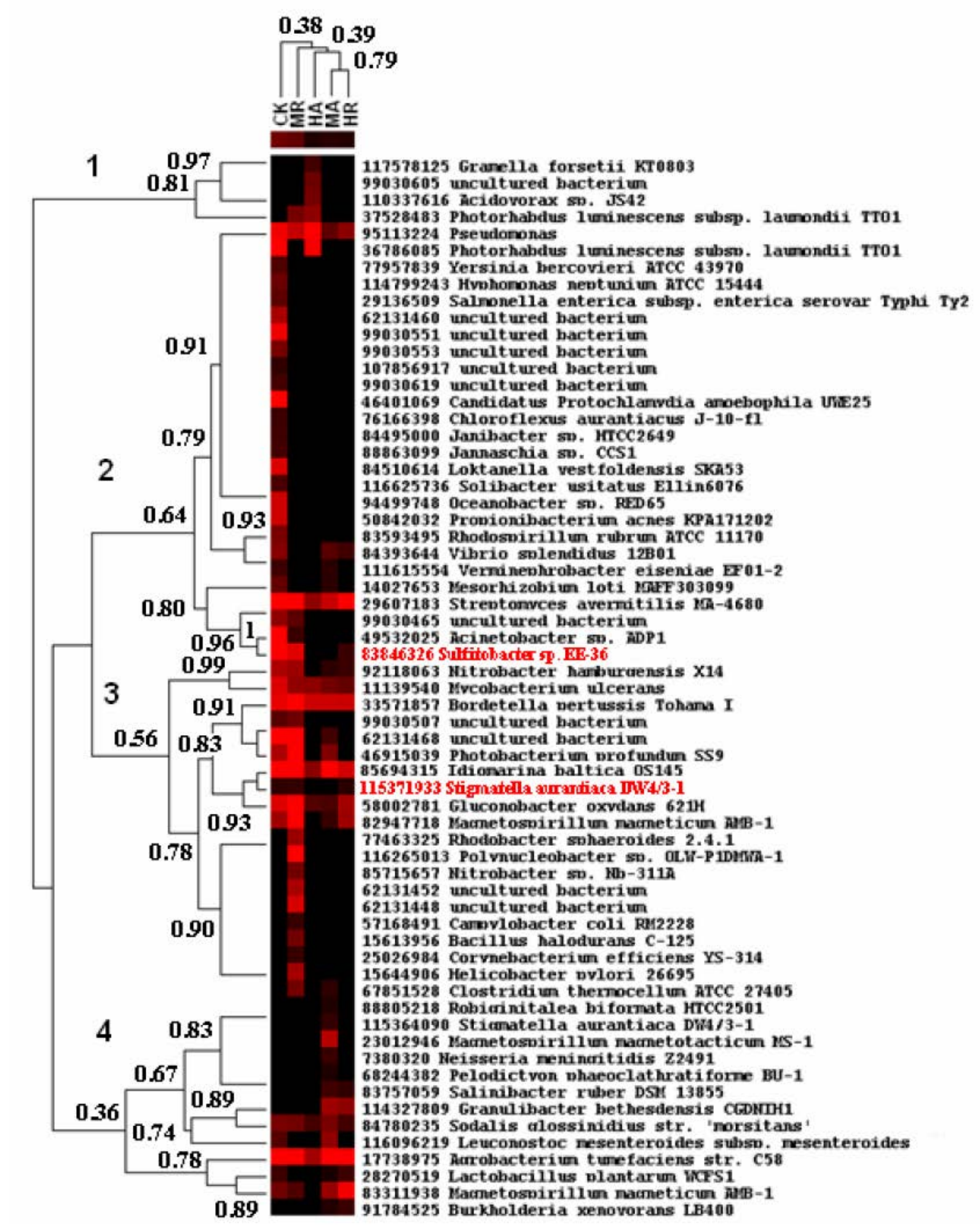
Supplemental Data Summary

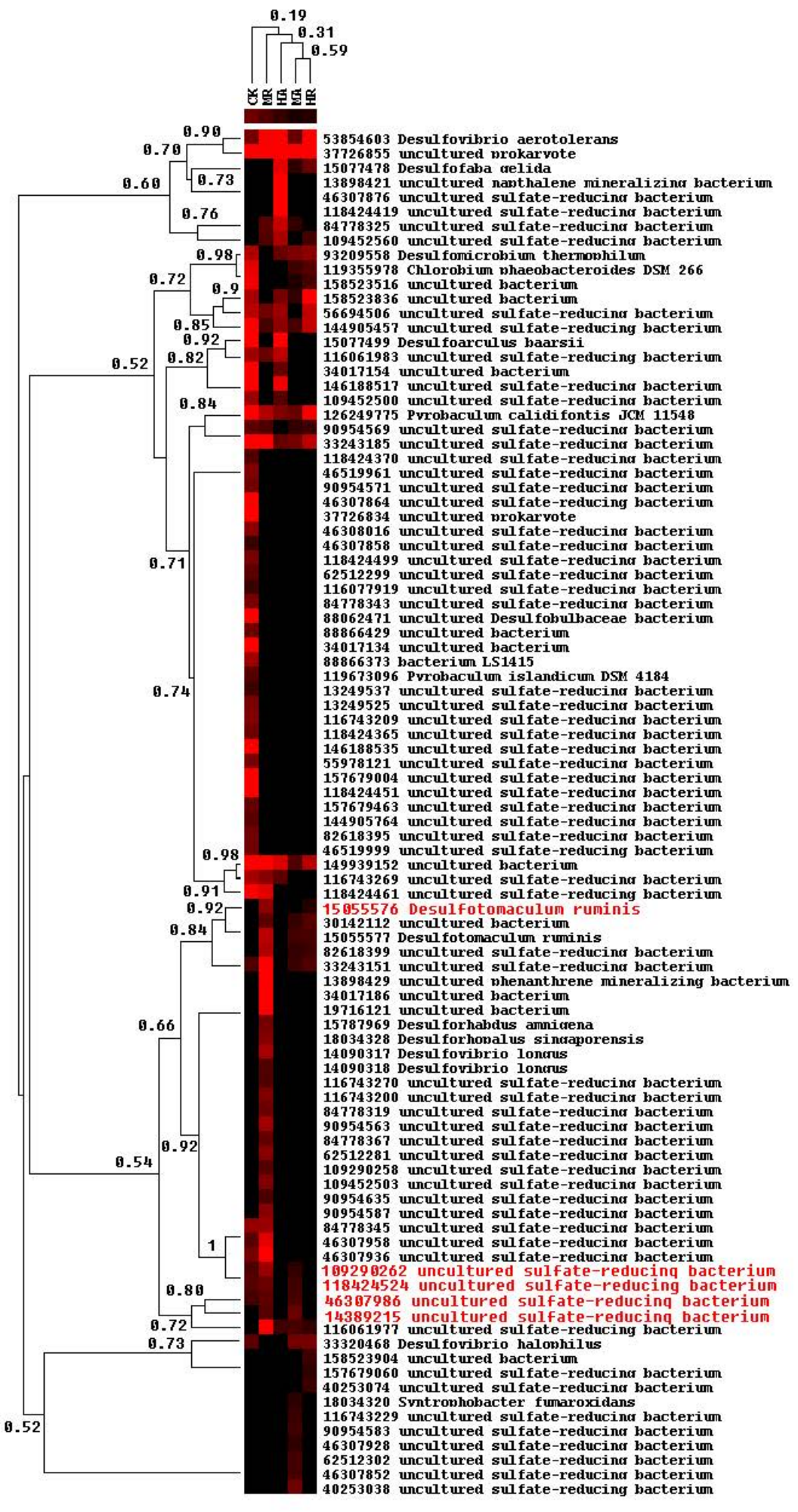
Fig. S1 Hierarchical cluster analysis of arsenic-resistance genes (*arsA/B/C*) based on hybridization signal intensities for all soil samples. The correlation coefficients are shown at the tree branches. The sequence labeled with red colors (on the right) only detected in the rhizosphere samples.

Fig. S2 Hierarchical cluster analysis of phosphorus-utilizing genes based on hybridization signal intensities for all soil samples. The correlation coefficients are shown at the tree branches. The sequence labeled with red colors (on the right) only detected in the rhizosphere samples. The criterion used to define the clusters 1 to 4 was arbitrarily selected based on the structure of the gene cluster tree (left).

Fig. S3 Hierarchical cluster analysis of sulfate-reducing genes (*dsr*) based on hybridization signal intensities for all soil samples. The correlation coefficients are shown at the tree branches. The sequence from 15055576 labeled with red color (on the right) only detected in the rhizosphere samples. Other red labeled sequence were not detected in the highly As-contaminated soils (HR and HA).


0.08
0.46
0.21
CK
MA
HR
MR
HA
94497023 Sphingomonas sp. SKA58
51855508 Symbiobacterium thermophilum IAM 14863
62289913 Brucella abortus biovar 1 str. 9-941
118720167 Burkholderia multivorans ATCC 17616
34482877 Wolinella succinogenes
123443663 Yersinia enterocolitica subsp. enterocolitica
54019345 Nocardia farcinica IFM 10152
146308011 Pseudomonas mendocina ymp
51451372 Pseudomonas stutzeri
133740356 Herminiimonas arsenicoxydans
91703634 Mycobacterium sp. MCS
110679646 Roseobacter denitrificans OCh 114
115423206 Bordetella avium 197N
114050077 Streptomyces ambofaciens
110623038 Arthrobacter sp. A03
27467253 Staphylococcus epidermidis ATCC 12228
118467822 Mycobacterium smegmatis str. MC2 155
126434044 Mycobacterium sp. JLS
148652485 Psychrobacter sp. PRwf-1
126667582 Marinobacter sp. ELB17
20904960 Methanosarcina mazei Go1
69937812 Paracoccus denitrificans PD1222
114778865 Maribrofundus ferrooxydans PV-1
134095158 Herminiimonas arsenicoxydans
119458982 marine gamma proteobacterium HTCC2080
114538726 Fulvimarina pelagi HTCC2506
94483091 Ochrobactrum tritici
77019723 Rhodococcus erythropolis PR4
118029486 Burkholderia phymatum STM815
47572214 Rubrivivax gelatinosus PM1
124260305 Methylibium petroleiphilum PM1
38505862 Synechocystis sp. PCC 6803
56314320 Azoarcus sp. EbN1
116252631 Rhizobium leguminosarum bv. viciae 3841
11691635 Pseudomonas putida
75676104 Nitrobacter winogradskyi Nb-255
152971348 Klebsiella pneumoniae subsp. pneumoniae MGH 78578
119943731 Comamonas sp. CNB-1
99080367 Silicibacter sp. TM1040
119671055 Azoarcus sp. BH72
84691528 Parvularcula bermudensis HTCC2503
85058228 Sodalis glossinidius str. 'morsitans'
119960751 Arthrobacter aurescens TC1
118730373 Delftia acidovorans SPH-1
0.64
0.97
0.85
0.91
1
1
0.84
0.55
0.97
0.17
0.90
0.40


0.38
0.39
0.79
CK
MR
HA
MA
HR
1
2
3
4
0.97
0.81
0.91
0.79
0.64
0.93
0.80
1
0.96
0.99
0.91
0.56
0.83
0.93
0.78
0.90
0.83
0.67
0.89
0.36
0.74
0.78
0.89
117578125 Granella forsetii KT0803
99030605 uncultured bacterium
110337616 Acidovorax sp. JS42
37528483 Photorhabdus luminescens subsp. laumondii TT01
95113224 Pseudomonas
36786085 Photorhabdus luminescens subsp. laumondii TT01
77957839 Yersinia bercovieri ATCC 43970
114799243 Hyphomonas neptunium ATCC 15444
29136509 Salmonella enterica subsp. enterica serovar Typhi Ty2
62131460 uncultured bacterium
99030551 uncultured bacterium
99030553 uncultured bacterium
107856917 uncultured bacterium
99030619 uncultured bacterium
46401069 Candidatus Protochlamydia amoebophila UWE25
76166398 Chloroflexus aurantiacus J-10-fl
84495000 Janibacter sp. HTCC2649
88863099 Jannaschia sp. CCS1
84510614 Loktanella vestfoldensis SKA53
116625736 Solibacter usitatus Ellin6076
94499748 Oceanobacter sp. RED65
50842032 Propionibacterium acnes KPA171202
83593495 Rhodospirillum rubrum ATCC 11170
84393644 Vibrio splendidus 12B01
111615554 Verminephrobacter eiseniae EF01-2
14027653 Mesorhizobium loti MAFF303099
29607183 Streptomyces avermitilis MA-4680
99030465 uncultured bacterium
49532025 Acinetobacter sp. ADP1
83846326 Sulfitobacter sp. EE-36
92118063 Nitrobacter hamburgensis X14
11139540 Mycobacterium ulcerans
33571857 Bordetella pertussis Tohama I
99030507 uncultured bacterium
62131468 uncultured bacterium
46915039 Photobacterium profundum SS9
85694315 Idiomarina baltica OS145
115371933 Stigmatella aurantiaca DW4/3-1
58002781 Gluconobacter oxydans 621H
82947718 Magnetospirillum magneticum AMB-1
77463325 Rhodobacter sphaeroides 2.4.1
116265013 Polynucleobacter sp. QLW-P1DMWA-1
85715657 Nitrobacter sp. Nb-311A
62131452 uncultured bacterium
62131448 uncultured bacterium
57168491 Campylobacter coli RM2228
15613956 Bacillus halodurans C-125
25026984 Corynebacterium efficiens YS-314
15644906 Helicobacter pylori 26695
67851528 Clostridium thermocellum ATCC 27405
88805218 Robiginitalea biformata HTCC2501
115364090 Stigmatella aurantiaca DW4/3-1
23012946 Magnetospirillum magnetotacticum MS-1
7380320 Neisseria meningitidis Z2491
68244382 Pelodictyon phaeoclathratiforme BU-1
83757059 Salinibacter ruber DSM 13855
114327809 Granulibacter bethesdensis CGDNIH1
84780235 Sodalis glossinidius str. 'morsitans'
116096219 Leuconostoc mesenteroides subsp. mesenteroides
17738975 Aurobacterium tumefaciens str. C58
28270519 Lactobacillus plantarum WCFS1
83311938 Magnetospirillum magneticum AMB-1
91784525 Burkholderia xenovorans LB400


0.19
0.31
0.59
CK
MR
HA
MA
HR
0.90
0.70
0.73
0.60
0.76
0.98
0.72
0.9
0.85
0.92
0.82
0.52
0.84
0.71
0.74
0.98
0.91
0.92
0.84
0.66
0.92
0.54
1
0.80
0.72
0.73
0.52
53854603 Desulfovibrio aerotolerans
37726855 uncultured prokaryote
15077478 Desulfofaba gelida
13898421 uncultured naphthalene mineralizing bacterium
46307876 uncultured sulfate-reducing bacterium
118424419 uncultured sulfate-reducing bacterium
84778325 uncultured sulfate-reducing bacterium
109452560 uncultured sulfate-reducing bacterium
93209558 Desulfomicrobium thermophilum
119355978 Chlorobium phaeobacteroides DSM 266
158523516 uncultured bacterium
158523836 uncultured bacterium
56694506 uncultured sulfate-reducing bacterium
144905457 uncultured sulfate-reducing bacterium
15077499 Desulfoarculus baarsii
116061983 uncultured sulfate-reducing bacterium
34017154 uncultured bacterium
146188517 uncultured sulfate-reducing bacterium
109452500 uncultured sulfate-reducing bacterium
126249775 Pyrobaculum calidifontis JCM 11548
90954569 uncultured sulfate-reducing bacterium
33243185 uncultured sulfate-reducing bacterium
118424370 uncultured sulfate-reducing bacterium
46519961 uncultured sulfate-reducing bacterium
90954571 uncultured sulfate-reducing bacterium
46307864 uncultured sulfate-reducing bacterium
37726834 uncultured prokaryote
46308016 uncultured sulfate-reducing bacterium
46307858 uncultured sulfate-reducing bacterium
118424499 uncultured sulfate-reducing bacterium
62512299 uncultured sulfate-reducing bacterium
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84778343 uncultured sulfate-reducing bacterium
88062471 uncultured Desulfobulbaceae bacterium
88866429 uncultured bacterium
34017134 uncultured bacterium
88866373 bacterium LS1415
119673096 Pyrobaculum islandicum DSM 4184
13249537 uncultured sulfate-reducing bacterium
13249525 uncultured sulfate-reducing bacterium
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118424365 uncultured sulfate-reducing bacterium
146188535 uncultured sulfate-reducing bacterium
55978121 uncultured sulfate-reducing bacterium
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46519999 uncultured sulfate-reducing bacterium
149939152 uncultured bacterium
116743269 uncultured sulfate-reducing bacterium
118424461 uncultured sulfate-reducing bacterium
15055576 Desulfotomaculum ruminis
30142112 uncultured bacterium
15055577 Desulfotomaculum ruminis
82618399 uncultured sulfate-reducing bacterium
33243151 uncultured sulfate-reducing bacterium
13898429 uncultured phenanthrene mineralizing bacterium
34017186 uncultured bacterium
19716121 uncultured bacterium
15787969 Desulforhabdus amnigena
18034328 Desulforhopalus singaporensis
14090317 Desulfovibrio longus
14090318 Desulfovibrio longus
116743270 uncultured sulfate-reducing bacterium
116743200 uncultured sulfate-reducing bacterium
84778319 uncultured sulfate-reducing bacterium
90954563 uncultured sulfate-reducing bacterium
84778367 uncultured sulfate-reducing bacterium
62512281 uncultured sulfate-reducing bacterium
109290258 uncultured sulfate-reducing bacterium
109452503 uncultured sulfate-reducing bacterium
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33320468 Desulfovibrio halophilus
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18034320 Syntrophobacter fumaroxidans
116743229 uncultured sulfate-reducing bacterium
90954583 uncultured sulfate-reducing bacterium
46307928 uncultured sulfate-reducing bacterium
62512302 uncultured sulfate-reducing bacterium
46307852 uncultured sulfate-reducing bacterium
40253038 uncultured sulfate-reducing bacterium