

## Supplementary material

### A metabolic model for members of the genus *Tetrasphaera* involved in enhanced biological phosphorus removal

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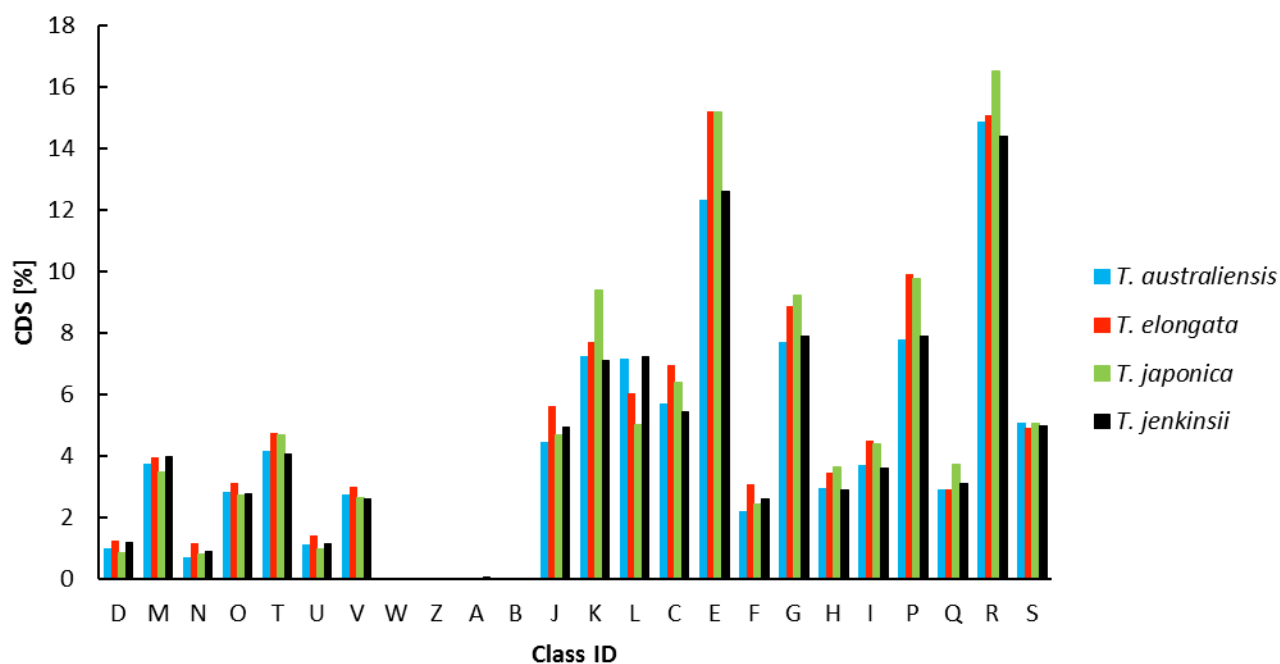


Figure S 1: The Clusters of Orthologous Groups of proteins classification of all CDSs in four studied *Tetrasphaera* isolates (*T. australiensis*, *T. elongata*, *T. japonica*, and *T. jenkinsii*). The distribution of CDSs in each class is given in percentage of the total number of CDSs for a given *Tetrasphaera* isolate.

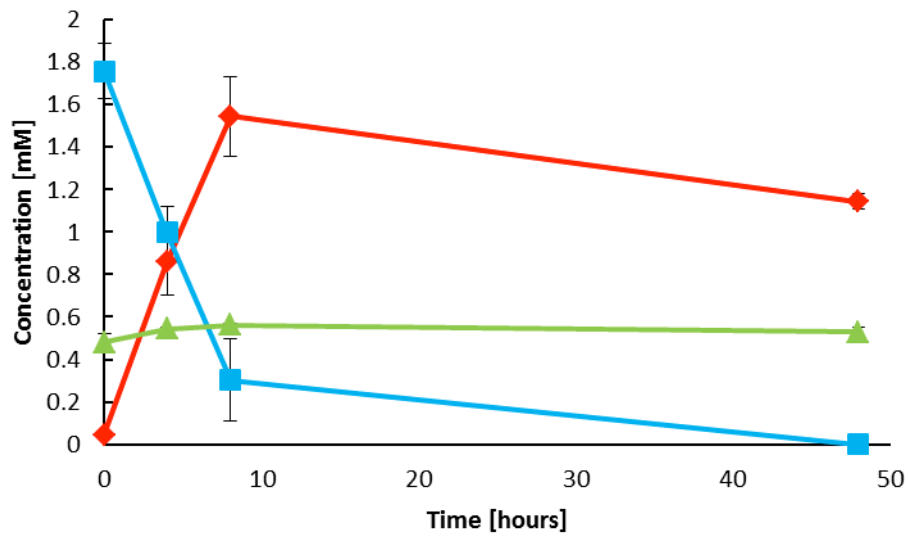


Figure S2: The ability of *Tetrasphaera* to reduce nitrite and nitrate. The average concentration from duplicate experiments of nitrite (red diamonds), nitrate (blue squares), and ammonium (green triangles) are shown when nitrate is added to a *T. japonica* culture. The concentrations are shown with standard deviations.

Table S1: Table with all genes of special interests

No.	Gene	Protein	EC number	<i>Accumulibacter</i>	<i>T. australiensis</i>	<i>T. elongata</i>	<i>T. jenkisnii</i>	<i>T. japonica</i>
<b>Glycolysis</b>								
1	<i>glcK</i> <i>glkA</i>	Glucokinase	2.7.1.2	-	BN11_3210003	BN10_360033	BN13_230016	BN12_2220003
2	<i>ppgK</i>	Polyphosphate glucokinase	2.7.1.63	-	BN11_900007	BN10_730009	BN13_770043	BN12_1040007 BN12_1260016
3	<i>pgi</i>	Glucose-6-phosphate isomerase	5.3.1.9	CAP2UW1_2124	BN11_460001	BN10_120038	BN13_230004	BN12_130067 BN12_1240008
4	<i>pfp</i>	Pyruvophosphate-fructose 6-phosphate 1-phosphotransferase	2.7.1.90	CAP2UW1_0237	BN11_60019	BN10_1000001	BN13_610027	BN12_2620011
5	<i>fba</i>	Fructose bisphosphate aldolase	4.1.2.13	CAP2UW1_3196	BN11_1240007 BN11_1780008 BN11_1780010	BN10_650045	BN13_810016	BN12_4140009
6	<i>tpiA</i>	Triosephosphate isomerase	5.3.1.1	CAP2UW1_0486	BN11_460016	BN10_1080001	BN13_770012	BN12_130060
7	<i>gapA</i> , <i>gad</i>	Glyceraldehyde-3-phosphate dehydrogenase A	1.2.1.12	CAP2UW1_0822 CAP2UW1_2669	BN11_460018	BN10_810036	BN13_770014	BN12_130058
8	<i>pgk</i>	Phosphoglycerate kinase	2.7.2.3	CAP2UW1_0487	BN11_460017	BN10_810037	BN13_770013	BN12_130059
9	<i>gpmA</i>	Phosphoglyceromutase 1	5.4.2.1	CAP2UW1_0408 CAP2UW1_1301	BN11_3920001	BN10_890010	BN13_670041	BN12_2660015
9	<i>gpmB</i>	Phosphoglyceromutase	5.4.2.1	CAP2UW1_0305	-	BN10_310002 BN10_470001	-	-
10	<i>eno</i>	Phosphopyruvate hydratase	4.2.1.11	CAP2UW1_3325 CAP2UW1_2666	BN11_3710002	BN10_920026	BN13_490015	BN12_840010 BN12_2450005
11	<i>pyk</i>	Pyruvate kinase	2.7.1.40	CAP2UW1_0821 CAP2UW1_1890 CAP2UW1_1860	BN11_380006	BN10_860019	BN13_190018	BN12_4080005
12	<i>edd</i>	6-phosphogluconate dehydrase	4.2.1.12	-	-	-	-	-
13	<i>eda</i>	2-dehydro-3-deoxy-phosphogluconate aldolase	4.1.2.14	-	-	-	-	-
<b>Glcconeogenesis</b>								
14	<i>g6pc</i>	Glucose 6-phosphatase	3.1.3.9	-	-	-	-	-
15	<i>fbp</i>	Fructose-1,6-bisphosphatase	3.1.3.11	CAP2UW1_0957 CAP2UW1_3072	BN11_320003 BN11_100009	-	BN13_810036	BN12_2020004

16	<i>ppdk</i>	Pyruvate, phosphate dikinase	2.7.9.1	CAP2UW1_2514	BN11_650029	BN10_820042	BN13_1220006	BN12_2730003
17	<i>pgm</i>	Phosphoglucomutase	5.4.2.2	CAP2UW1_2125 CAP2UW1_2943	BN11_960004	BN10_570002	BN13_100074	BN12_350017 BN12_2840007
<b>Glycogen synthesis / glycogenolysis</b>								
18	<i>glgC</i>	Glucose-1-phosphate adenylyltransferase	2.7.7.27	CAP2UW1_2126	BN11_850014 BN11_1180006	BN10_1080041	BN13_110004	BN12_520006
19	<i>glgA</i>	Starch (bacterial glycogen) synthase	2.4.1.21	CAP2UW1_2661	BN11_850013	BN10_1080042	BN13_110005	BN12_520007
20	<i>glgB</i>	1,4-alpha-glucan-branching enzyme	2.4.1.18	CAP2UW1_0256 CAP2UW1_2061	BN11_960002	BN10_570003	BN13_100073	BN12_350019
21	<i>glgP</i> , <i>glgY</i>	Glycogen phosphorylase	2.4.1.1	CAP2UW1_2663 CAP2UW1_0255	BN11_240010 BN11_750005	BN10_570005	BN13_630008	BN12_350025
22	<i>glgX</i>	Glycogen debranching enzyme	3.2.1.-	CAP2UW1_0257 CAP2UW1_1590	BN11_3200008 BN11_260009	BN10_570008 BN10_530007	BN13_100069 BN13_130033	BN12_350027 BN12_2780004
23	<i>malQ</i>	4-alpha-glucanotransferase	2.4.1.25	CAP2UW1_1512	BN11_1110012	BN10_130032	BN13_140037	BN12_420008
<b>Pyruvate metabolism</b>								
24	<i>ppc</i> , <i>pepC</i>	Phosphoenolpyruvate carboxylase	4.1.1.31	CAP2UW1_1517	BN11_1780015	-	BN13_810027	-
25	<i>ppck</i> , <i>pckG</i>	Phosphoenolpyruvate carboxykinase	4.1.1.32	CAP2UW1_0771 CAP2UW1_1298	BN11_1510003	BN10_440007 BN10_640016 BN10_640015	BN13_590023	BN12_960007 BN12_3980003
26	<i>pyrS</i>	Pyruvate synthetase	1.2.7.1	CAP2UW1_2510 CAP2UW1_2511 CAP2UW1_2512 CAP2UW1_2513	BN11_10045 BN11_870002 BN11_10046	BN10_460016 BN10_460015	BN13_90018 BN13_90019	BN12_460011 BN12_460012
27	<i>pdhA</i>	Pyruvate dehydrogenase E1 component, alpha subunit	1.2.4.1	CAP2UW1_1838	BN11_20027 BN11_530003	BN10_50014 BN10_20004	BN13_70027** BN13_70028** BN13_50043	BN12_590003 BN12_2860013
	<i>pdhB</i>	Pyruvate dehydrogenase E1 component, beta subunit	1.2.4.1	-	BN11_20028	BN10_50013	BN13_70026	BN12_590002
	<i>pdhC</i>	Pyruvate dehydrogenase E2 component	2.3.1.12	CAP2UW1_1839	BN11_410014* BN11_20029*	BN10_50012	BN13_70025	BN12_70001* BN12_590001*
	<i>lpd</i>	Pyruvate/2-oxoglutarate dehydrogenase complex E3 component	1.8.1.4	CAP2UW1_2390 CAP2UW1_1840	BN11_160019 BN11_5240005 BN11_1020002	BN10_670011 BN10_290002 BN10_470027 BN10_420003	BN13_160031	BN12_160025 BN12_3350004
28	<i>maeA</i>	NAD-dependent malic enzyme	1.1.1.38	CAP2UW1_0018 CAP2UW1_0772	BN11_10003	BN10_1380009	BN13_30063	BN12_2240010

	<i>maeB</i>	NAD-dependent malic enzyme	1.1.1.40	-	-	BN10_1730033	BN13_140048	BN12_2030016 BN12_560003
<b>TCA cycle</b>								
29	<i>gltA</i>	Citrate synthase	2.3.3.1	CAP2UW1_3105 CAP2UW1_2387 CAP2UW1_3882	BN11_3330001	BN10_510003 BN10_130013	BN13_430023 BN13_960005	BN12_620003 BN12_2120005
30	<i>acnA</i> , <i>acn</i>	Aconitase hydratase 1	4.2.1.3	CAP2UW1_3037	BN11_1740002	BN10_500019 BN10_960013	BN13_130052	BN12_40012 BN12_310013 BN12_500016 BN12_530005
31	<i>icd</i>	Isocitrate dehydrogenase	1.1.1.42	CAP2UW1_0663 CAP2UW1_0664	BN11_230008	BN10_520081	BN13_1860003	BN12_2390002
32	<i>sucA</i>	2-oxoglutarate dehydrogenase (E1 subunit)	1.2.4.2	CAP2UW1_2388	BN11_1110001	BN10_1470003	BN13_140055	BN12_2090005
	<i>sucB</i>	2-oxoglutarate dehydrogenase (E2 subunit)	2.3.1.61	CAP2UW1_2389 CAP2UW1_1839	BN11_2160001* BN11_1020001*	BN10_290001 BN10_300104	BN13_1010002* BN13_1020010*	BN12_3350003* BN12_3700001*
33	<i>sucC</i>	Succinyl-CoA synthetase beta subunit	6.2.1.5	CAP2UW1_0656	BN11_1040004	BN10_1120013	BN13_170042	BN12_40013 BN12_2420006
	<i>sucD</i>	Succinyl-CoA synthetase alpha subunit	6.2.1.5	CAP2UW1_0657	BN11_1040003	BN10_1120012	BN13_170043	BN12_40014 BN12_2420007
34	<i>sdhA</i>	Succinate dehydrogenase	1.3.5.1	CAP2UW1_2384	BN11_890011	BN10_630021	BN13_440025	BN12_1010007
	<i>sdhB</i>	Succinate dehydrogenase	1.3.5.1	CAP2UW1_2385	BN11_890010	BN10_630022	BN13_440024	BN12_1010006
	<i>sdhC</i>	Succinate dehydrogenase	1.3.5.1	CAP2UW1_2382	BN11_890012****	BN10_630020****	BN13_440026****	BN12_1010008****
	<i>sdhD</i>	Succinate dehydrogenase	1.3.5.1	CAP2UW1_2383	-	-	-	-
34A	<i>frdA</i>	Fumarate reductase	1.3.99.1	CAP2UW1_0926	-	-	-	-
	<i>frdB</i>	Fumarate reductase	1.3.99.1	CAP2UW1_0925	-	-	-	-
	<i>frdC</i>	Fumarate reductase	1.3.99.1	CAP2UW1_0924	-	-	-	-
	<i>frdD</i>	Fumarate reductase	1.3.99.1	CAP2UW1_0923	-	-	-	-
35	<i>fumA</i>	Fumarase (class I)	4.2.1.2	CAP2UW1_3757	BN11_2550014	BN10_130062	BN13_150051	BN12_630005
	<i>fumC</i>	Fumarase (class II)	4.2.1.2	-	BN11_3370004	BN10_140005	BN13_1500007	BN12_1610006
36	<i>mdh</i>	Malate dehydrogenase	1.1.1.37	CAP2UW1_2380	BN11_560002	BN10_520084	BN13_510009	BN12_1520001
37	<i>actP</i>	Acetate transporter	-	CAP2UW1_1608	BN11_1230008	BN10_580035	BN13_620010	BN12_1520004

38	<i>acs</i> , <i>acsA</i>	Acetyl-CoA synthetase	6.2.1.1	CAP2UW1_3755	BN11_1230011	BN10_580041	BN13_390014	BN12_1570008
39	<i>ackA</i>	Acetate kinase	2.7.2.1	CAP2UW1_1515	BN11_1350008	BN10_560037	BN13_910016	BN12_1100005
40	<i>pta</i>	Phosphotransacetylase	2.3.1.8	CAP2UW1_1002	BN11_1350009	BN10_560038	BN13_910015	BN12_1100006 BN12_1960009
<b>PHA synthesis</b>								
41	<i>phaA</i>	Acetyl-CoA acetyltransferase	2.3.1.9	CAP2UW1_2144 CAP2UW1_3189 CAP2UW1_3458 CAP2UW1_3463 CAP2UW1_2344	BN11_1860009 BN11_1350015 BN11_1360003 BN11_4910007	BN10_600014 BN10_1170012 BN10_920035 BN10_590081 BN10_810005	BN13_460011 BN13_130025 BN13_250034 BN13_370004	BN12_3170003 BN12_100011 BN12_800001 BN12_1200011 BN12_1580014
42	<i>phaB</i>	Acetoacetyl-CoA reductase	1.1.1.36	CAP2UW1_3919	BN11_260008	BN10_530006	BN13_100014 BN13_680001 BN13_1670003 BN13_2020001	BN12_100010 BN12_2780005 BN12_3210004
43	<i>phaC</i>	PHA synthase	2.3.1.-	CAP2UW1_3185	-	-	-	BN12_40008 BN12_270028
43a	<i>phaZ</i>	poly(3-hydroxyalkanoate) depolymerase	3.1.1.-		-	-	-	BN12_270026 BN12_40010
<b>Glyoxylate shunt</b>								
44	<i>icl</i>	Isocitrate lyase	4.1.3.1	CAP2UW1_3854	-	-	-	-
45	<i>mas</i>	Malate synthase	2.3.3.9	CAP2UW1_3850	-	-	-	BN12_2030015
<b>Polyphosphate metabolism</b>								
46	<i>pap</i>	Polyphosphate AMP phosphotransferase	-	CAP2UW1_4020	BN11_1900002	BN10_810018	BN13_130014	BN12_1580002
47	<i>adk</i>	Adenylate kinase	2.7.4.3	CAP2UW1_0385	BN11_1880019	BN10_760003	BN13_740046	BN12_1160003
48a	<i>ppk1</i>	Polyphosphate kinase 1	2.7.4.1	CAP2UW1_1063	BN11_1730011	BN10_1260013	BN13_670019	BN12_1710006
48b	<i>ppk2</i>	Polyphosphate kinase 2	-	CAP2UW1_2309	BN11_450014 BN11_2620003	BN10_120015	BN13_690007 BN13_180056	BN12_1600008
49	<i>ppx</i>	Exopolyphosphatase Ppx / GppA phosphatase	3.6.1.11 / 3.6.1.40	CAP2UW1_0060	BN11_2840003	BN10_920029	BN13_490018	BN12_1590006
50	<i>pit</i> , <i>pitA</i>	Low-affinity inorganic phosphate transporter	-	CAP2UW1_3788 CAP2UW1_2085	BN11_90014	BN10_1260007 BN10_690020	BN13_370011 BN13_670013	BN12_1710012 BN12_2400006
51	<i>pstS</i> , <i>phoS</i>	Phosphate ABC transporter subunit, periplasmic-binding component	-	CAP2UW1_2005 CAP2UW1_2007	BN11_1730004	BN10_1260011	BN13_670014	BN12_1710008
	<i>pstC</i> , <i>pho</i>	Phosphate ABC transporter subunit,	-	CAP2UW1_1749 CAP2UW1_2004	BN11_1730005	BN10_1260010	BN13_670015	BN12_1710009

	<i>W</i>	trans-membrane component						
	<i>pstA, phoT</i>	Phosphate ABC transporter subunit, trans-membrane component	-	CAP2UW1_1750 CAP2UW1_2003	BN11_1730006	BN10_1260009	BN13_670016	BN12_1710010
	<i>pstB, phoT</i>	Phosphate ABC transporter subunit, ATP-binding component	-	CAP2UW1_2002	BN11_1730007	BN10_1260008	BN13_670017	BN12_1710011
	<i>phoU</i>	Phosphate concentration transducer of pho regulon (phoR/phoB)	-	CAP2UW1_1748 CAP2UW1_1995	BN11_3350003	BN10_890008	BN13_1100006	BN12_2660016
	<i>phoS</i>	Two-component system, Sensor kinase	-	CAP2UW1_1997 (phoR)	BN11_2330005	BN10_1400002	BN13_610019	BN12_2400021
	<i>phoR</i>	Two-component system, Response regulator	-	CAP2UW1_1996 (phoB)	BN11_2330006	BN10_1400001	BN13_610018	BN12_2400022
<b>Glucose fermentation</b>								
52	<i>gluP</i>	Putative glucose permease	-	-	BN11_770005 BN11_900006	BN10_10018	BN13_150007	BN12_430018
53	<i>pyc, pc</i>	Pyruvate carboxylase	6.4.1.1	-	BN11_1480010	BN10_1550002 BN10_420010	BN13_1400004	BN12_2240005 BN12_330003
54	<i>oadA</i>	Oxaloacetate decarboxylase	4.1.1.3	-	-	-	-	-
55		Pyruvate decarboxylase	4.1.1.1	-	-	-	-	-
56	<i>mhpF</i>	Acetaldehyde dehydrogenase	1.2.1.10	-	BN11_400013	-	-	-
57	<i>aldA, dhaS</i>	Aldehyde dehydrogenase	1.2.1.3	-	BN11_770008 BN11_4620004 BN11_450008	BN10_1190008 BN10_610016 BN10_840022	BN13_10041 BN13_100015 BN13_150009	BN12_10016 BN12_80016 BN12_90004 BN12_690005 BN12_4030037
58	<i>adh</i>	Alcohol dehydrogenase	1.1.1.1	-	BN11_70023 BN11_1350013	BN10_1730038	BN13_10017 BN13_30062 BN13_400008 BN13_1890012	BN12_10040 BN12_40006 BN12_300019 BN12_320011 BN12_660002 BN12_2240007 BN12_2310002 BN12_2590011 BN12_4190010
59	<i>ldh</i>	Lactate dehydrogenase	1.1.1.27	-	-	BN10_10012	-	BN12_360018 BN12_1310011

60	<i>pfl</i>	Pyruvate formate lyase	2.3.1.54	-	-	-	-	-
<b>Amino acid metabolism</b>								
61	<i>gadB</i>	Glutamate decarboxylase	4.1.1.15	-	BN11_80018	BN10_1380007	BN13_550019	BN12_240005
62	<i>gdhA</i>	Glutamate dehydrogenase, NADP-specific	1.4.1.2	-	BN11_2200006	BN10_1250009	BN13_550022	BN12_1760006
	<i>gdhB</i>	Glutamate dehydrogenase, NAD-specific		-	BN11_1560002	BN10_520008	BN13_40022	BN12_850006
63	<i>gabT</i>	4-aminobutyrate aminotransferase	2.6.1.19	-	BN11_420012 BN11_880003	BN10_840015	BN13_1040006	BN12_80014 BN12_530018 BN12_1720007
64	<i>gabD</i>	Succinate-semialdehyde dehydrogenase	1.2.1.16 / 1.2.1.24	-	BN11_1700005 BN11_3600001 BN11_4990011	BN10_840014	BN13_170011 BN13_180036	BN12_80013 BN12_450014 BN12_2260006 BN12_3980002 BN12_4030024
65	<i>gluD</i>	Glutamate transporter	-	-	BN11_1420006	BN10_900019	BN13_150067	BN12_300015
	<i>gluC</i>			-	BN11_1420007	BN10_900018	BN13_150066	BN12_300016
	<i>gluB</i>			-	BN11_1420008	BN10_900017	BN13_150065	BN12_300017
	<i>gltL / gluA</i>			-	BN11_1420009	BN10_900016	BN13_150064	BN12_300018
66	<i>purA</i>	Adenylosuccinate synthetase	6.3.4.4	-	BN11_1780005	BN10_650042	BN13_810011	BN12_4140012
67	<i>purB</i>	Adenylosuccinate lyase	4.3.2.2	-	BN11_320008	BN10_1390015	BN13_10018	BN12_2110004
68	<i>argG</i>	Argininosuccinate synthetase	6.3.4.5	-	BN11_530007	BN10_20003	BN13_1030007	BN12_2860012
69	<i>argH</i>	Argininosuccinate lyase	4.3.2.1	-	BN11_110021	BN10_1060008	BN13_1240007	BN12_1250002
70	<i>nadB</i>	L-aspartate oxidase	1.4.3.16	-	BN11_120005	BN10_1210020	BN13_600021	BN12_1320003
71	<i>aspC</i>	Aspartate aminotransferase	2.6.1.1	-	BN11_60012	BN10_680055	BN13_390063	-
72	<i>sdaA</i>	L-serine deaminase	4.3.1.17	CAP2UW1_0154	-	-	-	BN12_1920002
73	<i>aspA</i>	Aspartate ammonia-lyase	4.3.1.1	CAP2UW1_3016	-	BN10_360016	-	BN12_790014 BN12_1190012
74	<i>rocD</i>	Ornithine--oxo-glutarate aminotransferase	2.6.1.13	-	BN11_240015	BN10_300020	-	-
75	<i>rocA</i>	1-pyrroline-5-carboxylate dehydrogenase	1.5.1.12	-	BN11_2640003	BN10_520012	-	BN12_360020 BN12_1040003 BN12_1300009



76	<i>arcA</i>	Arginine deiminase	3.5.3.6	-	-	-	-	-
77	<i>arcC</i>	Carbamate kinase	2.7.2.2	-	BN11_80010	BN10_430006	-	-
78	<i>ArgF</i>	Ornithine carbamoyltransferase	2.1.3.3	-	BN11_110023	BN10_1060010	BN13_1240005	BN12_1250004
79	<i>cysA</i>	Cysteine desulhydratase	4.4.1.1 / 4.4.1.8	-	BN11_2610015	BN10_590012	BN13_30114 BN13_720020	BN12_10043 BN12_500015 BN12_2960002
80	<i>dat</i>	D-alanine aminotransferase	2.6.1.21	-	BN11_4730017	-	BN13_400013 BN13_1890008	BN12_210018
81	<i>ald</i>	L-alanine dehydrogenase	1.4.1.1	-	BN11_2610026	BN10_590046	BN13_30124	BN12_2820008
82	<i>hisC</i>	Histidinol-phosphate aminotransferase	2.6.1.9 / 2.6.1.5	CAP2UW1_2902	BN11_20022 BN11_2570004	BN10_50015	BN13_70032	BN12_590005
83	<i>ilvE</i>	Branched chain amino acid aminotransferase	2.6.1.42	CAP2UW1_2938	BN11_100008	BN10_610010	BN13_100011	BN12_660012
84	<i>tdc</i>	Threonine dehydratase	4.3.1.19	CAP2UW1_0262	BN11_2110005	BN10_920048	BN13_1660008	BN12_80006 BN12_2380015
85	<i>tdh</i>	Threonine 3-dehydrogenase	1.1.1.103	-	BN11_4860005	BN10_580033	BN13_420085	-
86	<i>itaE</i>	Threonine aldolase	4.1.2.5	-	BN11_2300004	BN10_360038	BN13_230009 BN13_550015	BN12_1940002
87	<i>kbl</i>	2-amino-3-ketobutyrate CoA ligase (glycine acetyl transferase)	2.3.1.29	-	BN11_4860006	BN10_580030	BN13_420086	-
88	<i>glyA</i>	Glycine/serine hydroxymethyltransferase	2.1.2.1	CAP2UW1_1498	BN11_1600013	BN10_1140014	BN13_300016	BN12_1150010 BN12_1190001
89	<i>serB</i>	Phosphoserine phosphatase	3.1.3.3	CAP2UW1_3895	BN11_850015	BN10_1080040	BN13_110003	BN12_520005
90	<i>serC</i>	Phosphoserine aminotransferase	2.6.1.52	CAP2UW1_2564	BN11_2330020	BN10_510004	BN13_960008	BN12_620004
91	<i>serA</i>	D-3-phosphoglycerate dehydrogenase	1.1.1.95	-	BN11_100006	BN10_330004	BN13_100025	BN12_540012 BN12_660008
92	<i>gcvP</i>	Glycine dehydrogenase (decarboxylating)	1.4.4.2	CAP2UW1_1958	BN11_2610002	BN10_590002	BN13_30103	BN12_500004
93	<i>gcvT</i>	Aminomethyltransferase	2.1.2.10	CAP2UW1_1960	BN11_1020004	BN10_290005	BN13_1020008	BN12_1500012
94	<i>gcvH</i>	Glycine cleavage complex lipoylprotein		CAP2UW1_1959	BN11_2610009	BN10_590007	BN13_30109	BN12_500010
95	<i>hutI</i>	Imidazolonepropionase	3.5.2.7	-	BN11_4500011*	BN10_230040	BN13_20016	BN12_1270004
96	<i>hutU</i>	Urocanase	4.2.1.49	-	BN11_1810004	BN10_230033	BN13_20019	BN12_1360004
97	<i>hutH</i>	histidine ammonia-lyase	4.3.1.3	-	BN11_3310009	BN10_230032	BN13_20021	BN12_1360006

Nitrogen metabolism								
98	<i>narI</i>	Nitrate reductase (gamma subunit)	1.7.99.4	-	BN11_1940006	BN10_750007	BN13_950001*	BN12_300023 BN12_4190006
	<i>narJ</i>	Nitrate reductase (delta subunit)	1.7.99.4	-	BN11_1940007	BN10_750006	BN13_950002	BN12_300022 BN12_4190007
	<i>narH</i>	Nitrate reductase (beta subunit)	1.7.99.4	-	BN11_1940008	BN10_750005	BN13_950003	BN12_300021 BN12_4190008
	<i>narG</i>	Nitrate reductase (alpha subunit)	1.7.99.4	-	BN11_1940009	BN10_750004	BN13_950004	BN12_300020 BN12_4190009
99	<i>narT</i>	Nitrate/nitrite transporter (putative nitrate transporter)		-	BN11_1940011	BN10_750002	BN13_1500003	BN12_4190005
100	<i>narU</i>	Nitrate/nitrite transporter (putative nitrite extrusion protein)		-	BN11_1940012	BN10_750001	BN13_1500004	BN12_600017
101	<i>nirB</i>	Nitrite reductase, large subunit	1.7.1.4	CAP2UW1_2777	-	-	-	BN12_2970001
	<i>nirD</i>	Nitrite reductase, small subunit	1.7.1.4	CAP2UW1_2778	-	-	-	BN12_2970003
102	<i>napA</i>	Nitrate reductase		CAP2UW1_3906	-	-	-	BN12_510011
103	<i>nirK</i>	Copper-containing nitrite reductase	1.7.2.1	-	BN11_50002	BN10_250005* BN10_830001*	BN13_500023*	BN12_3590002*
104	<i>norB</i>	Nitric oxide reductase, subunit B***	1.7.99.7	-	BN11_400018	-	-	BN12_930010
	<i>norZ</i>	Nitric oxide reductase***		CAP2UW1_2326	BN11_400018	-	-	BN12_930010
105	<i>nosZ</i>	Nitrous oxide reductase	1.7.99.6	CAP2UW1_3419	-	-	-	-
Others								
106	<i>bhbd</i>	Beta-hydroxybutyryl-CoA dehydrogenase	1.1.1.157	CAP2UW1_2758	BN11_1490005	BN10_1170022	BN13_460001	BN12_1150036
107	<i>ech</i>	Enoyl-CoA hydratase	4.2.1.17	CAP2UW1_1070 CAP2UW1_1141 CAP2UW1_1244 CAP2UW1_2373 CAP2UW1_2757 CAP2UW1_3194 CAP2UW1_4327	BN11_1080042 BN11_540010 BN11_1830011 BN11_3200006 BN11_1740023* BN11_1740024* BN11_4910008 (fused enzyme)	BN10_1170022 BN10_650009 BN10_680003 BN10_570010 BN10_1250012 BN10_230009 BN10_810004 (fused enzyme)	BN13_100067 BN13_340004 BN13_1000008	BN12_230002 BN12_350029 BN12_360002 BN12_1320012 BN12_1580015
108		Butyryl-CoA dehydrogenase	1.3.99.2	Putative	BN11_1200018 BN11_2390004	BN10_1070026 BN10_30013	BN13_350002 BN13_430010 BN13_920006	BN12_410006 BN12_410044 BN12_560002

109		Phosphobutylase	-	Putative	Putative	Putative	Putative	Putative
110		Butyrate kinase	-	Putative	Putative	Putative	Putative	Putative
111		Carboxytransferase	-	CAP2UW1_1137	BN11_480016	BN10_520079 BN10_30011	BN13_860018 BN13_1400004	BN12_410043 BN12_410033 BN12_3030001
112	<i>mcee</i>	Methylmalonyl-CoA epimerase	5.1.99.1	-	BN11_1860008	BN10_1170015	BN13_460008	BN12_3170002
113	<i>mcm</i>	Methylmalonyl-CoA mutase	5.4.99.2	CAP2UW1_1139 CAP2UW1_2499	BN11_440003 BN11_440002 BN11_2430007	BN10_460061 BN10_130099 BN10_130100	BN13_410005 BN13_740062 BN13_1280017	BN12_350010 BN12_700009 BN12_700010* BN12_1750001*
114	<i>rbcl</i>	Ribulose-bisphosphate carboxylase	4.1.1.39	CAP2UW1_0825	-	-	-	-
115	<i>glpX-SEBP</i>	Fructose-1,6-bisphosphatase II / Sedoheptulose-1,7-bisphosphatase	3.1.3.11 / 3.1.3.37	CAP2UW1_0957 CAP2UW1_3072	BN11_320003 BN11_100009	BN10_1240008	Putative	Putative
116	<i>tkt</i>	Transketolase	2.2.1.1	CAP2UW1_0959 CAP2UW1_0823	BN11_460010	BN10_1080008	BN13_770004	BN12_130069
117	<i>rpi</i>	Ribose-5-phosphate isomerase	5.3.1.6	CAP2UW1_4017	BN11_1000008	BN10_940018	BN13_680013	BN12_1070010
118	<i>prk</i>	Phosphoribulokinase	2.7.1.19	CAP2UW1_0958	-	-	-	-

\* Fragments due to contig breaks. The fragment may together with another fragment comprise a complete gene.

\*\*Pseudogenes

\*\*\* *norB* and *norZ* have amino acid identity of 90%. Therefore, this sequence may be either of these sequences.

\*\*\*\*This gene putatively codes for both *sdhC* and *sdhD*