

Additional file 3

Genes induced specifically under nitrogen fixation conditions

Gene ID	Gene name	Functional description	RpoN consensus ^{a,b}	Counterparts in DJ ^c	Counterparts in BH72 ^c
PST0029		conserved hypothetical protein	Yes	y	n
PST0035		coserved hypothetical protein	Yes	y	n
PST0200*		4-hydroxyphenylpyruvate dioxygenase	Yes	y	y
PST0265	<i>osmC</i>	osmotically inducible protein	Yes ^b	y	n
PST0266		ribonucleotide reductase, alpha subunit	Yes ^b	y	n
PST0349	<i>ntrC</i>	nitrogen regulation protein	Yes ^b	y	y
PST0350	<i>ntrB</i>	nitrogen regulation protein	Yes ^b	y	y
PST0353	<i>glnA</i>	glutamine synthetase	Yes	y	y
PST0446		cytoplasmic membrane protein	Yes	y	y
PST0502	<i>glnK</i>	nitrogen regulatory protein P-II	Yes ^b	y	y
PST0503	<i>amtB1</i>	ammonium transporter	Yes ^b	y	y
PST0504	<i>amtB2</i>	ammonium transporter	Yes ^b	n	y
PST0565		major facilitator family transporter	Yes	y	y
PST0571		conserved hypothetical protein	?	n	n
PST0585		site-specific recombinase	?	n	n
PST0586		conserved hypothetical protein	?	n	n
PST0610		dihydroxyacid dehydratase	Yes	n	y
PST0632		type I restriction-modification system	?	n	n
PST0692	<i>phaP</i>	phasin PhaP	?	y	y
PST0722	<i>prkA</i>	serine protein kinase PrkA	Yes	y	y
PST0754		membrane protein	Yes	y	y
PST0811	<i>katA</i>	catalase	?	n	n
PST0813		major facilitator family transporter	Yes	y	y
PST0856		conserved hypothetical protein	?	n	n
PST0874	<i>pctA</i>	chemotactic transducer PctA	Yes	n	y
PST0937		conserved hypothetical protein	Yes	n	n
PST0949		conserved hypothetical protein	?	y	n
PST1140		conserved hypothetical protein	?	y	y
PST1273		putative membrane protein	Yes	y	y
PST1279		conserved hypothetical protein	?	y	n
PST1301	<i>cobS</i>	cobalamin (5'-phosphate) synthase	Yes	y	y
PST1302		glutaredoxin-related protein	Yes ^b	y	n
PST1303		thiosulfate sulfurtransferase glpE	Yes ^b	y	y
PST1304	<i>nifQ</i>	nitrogen fixation protein NifQ	Yes ^b	y	y
PST1305		arsenate reductase related protein	Yes ^b	y	y
PST1306	<i>nifB</i>	FeMo cofactor biosynthesis protein NifB	Yes ^b	y	y
PST1308		transcriptional regulator, LysR family	?	y	y
PST1312	<i>tpmA</i>	thiopurine s-methyltransferase	Yes	y	n
PST1313	<i>nifA</i>	positive regulatory protein	Yes ^b	y	y
PST1314	<i>nifL</i>	negative regulatory protein	Yes ^b	y	y

PST1315	<i>rnfA</i>	electron transport complex, A subunit	Yes ^b	y	y
PST1316	<i>rnfB</i>	electron transport complex, B subunit	Yes ^b	y	y
PST1317	<i>rnfC</i>	electron transport complex, C subunit	Yes ^b	y	y
PST1318	<i>rnfD</i>	electron transport complex, D subunit	Yes ^b	y	y
PST1319	<i>rnfG</i>	electron transport complex, G subunit	Yes ^b	y	y
PST1320	<i>rnfE</i>	electron transport complex, E subunit	Yes ^b	y	y
PST1321	<i>rnfH</i>	electron transport complex, H subunit	Yes ^b	y	y
PST1322	<i>nifY2</i>	dinitrogenase iron-molybdenum cofactor biosynthesis protein	Yes ^b	y	y
PST1323		nitrogen fixation-related protein	Yes ^b	y	y
PST1324		conserved hypothetical protein	Yes ^b	y	y
PST1325	<i>pnfA</i>	conserved hypothetical protein	Yes ^b	y	y
PST1326	<i>nifH</i>	Fe protein	Yes	y	y
PST1327	<i>nifD</i>	MoFe protein, alpha subunit	Yes ^b	y	y
PST1328	<i>nifK</i>	MoFe protein, beta subunit	Yes ^b	y	y
PST1330	<i>nifY</i>	nitrogenase iron-molybdenum cofactor biosynthesis protein	Yes	y	y
PST1331		conserved hypothetical protein	Yes ^b	y	y
PST1333	<i>nifE</i>	nitrogenase iron-molybdenum cofactor biosynthesis protein	Yes ^b	y	y
PST1334	<i>nifN</i>	nitrogenase iron-molybdenum cofactor biosynthesis protein	Yes ^b	y	y
PST1335	<i>nifX</i>	nitrogenase iron-molybdenum cofactor biosynthesis protein	Yes ^b	y	y
PST1336		protein of unknown function DUF269	Yes ^b	y	y
PST1337		protein of unknown function DUF683	Yes ^b	y	y
PST1338		ferredoxin, 4Fe-4S	Yes	y	y
PST1342		conserved hypothetical protein	Yes ^b	y	n
PST1344		conserved hypothetical protein	Yes	y	y
PST1346	<i>modB</i>	molybdate ABC transporter	Yes ^b	y	y
PST1347	<i>modA</i>	molybdenum ABC transporter	Yes ^b	y	y
PST1348		putative molybdenum-binding protein	Yes ^b	y	y
PST1349	<i>hesB</i>	Fe-S cluster assembly protein	Yes ^b	y	y
PST1350	<i>nifU</i>	Fe-S cluster assembly protein NifU	Yes ^b	y	y
PST1351	<i>nifS</i>	nitrogenase metallocusters biosynthesis protein NifS	Yes ^b	y	y
PST1352	<i>nifV</i>	homocitrate synthase	Yes ^b	y	y
PST1353	<i>cysE</i>	serine acetyltransferase (<i>cysE</i> -like)	Yes ^b	y	y
PST1354		conserved hypothetical protein	Yes ^b	y	y
PST1355	<i>nifW</i>	nitrogenase stabilizing/protective protein	Yes ^b	y	y
PST1356	<i>nifZ</i>	Fe-S cofactor synthesis protein	Yes ^b	y	y
PST1357	<i>nifM</i>	putative peptidyl-prolyl cis/trans isomerase	Yes ^b	y	y
PST1404	<i>fliC</i>	flagellin type B	Yes	y	y
PST1495		TonB-dependent siderophore receptor	?	y	n
PST1503		conserved hypothetical protein	Yes	y	n

PST1520		conserved hypothetical protein	Yes	y	n
PST1521		outer membrane protein	?	y	n
PST1561		ribosomal subunit interface protein	?	y	n
PST1563	<i>adhC</i>	alcohol dehydrogenase class III	?	y	y
PST1642		rhodanese domain protein	?	y	n
PST1643		conserved hypothetical protein	?	n	n
PST1644		conserved hypothetical protein	Yes	n	n
PST1711	<i>exbD1</i>	TonB system transport protein	Yes	y	y
PST1712	<i>exbB1</i>	TonB system transport protein ExbB	Yes ^b	y	y
PST1713		TonB protein, C-terminal domain	Yes ^b	y	y
PST1714		predicted Zn-dependent protease	Yes ^b	y	n
PST1715		TldD/PmbA family protein	Yes ^b	y	n
PST1920		conserved hypothetical protein	Yes	n	n
PST1954		nitrite reductase [NAD(P)H], small subunit	Yes ^b	y	y
PST1955		nitrite reductase [NAD(P)H], large subunit	Yes ^b	y	y
PST1992		ABC transporter	Yes ^b	n	y
PST1993		glutamate-ammonia ligase	Yes ^b	y	y
PST2002		conserved hypothetical protein	Yes	n	n
PST2003		ABC-type transport systems	Yes	n	n
PST2048		universal stress protein family	?	y	n
PST2137	<i>glgA</i>	glycogen synthase	Yes	y	y
PST2154		alpha-amylase family protein	Yes	y	y
PST2234		heat shock protein, HSP20 family	Yes	y	n
PST2335		aminotransferase	Yes	y	y
PST2381		conserved hypothetical protein	Yes	y	y
PST2400	<i>nasS</i>	nitrate-binding protein NasS	Yes	y	y
PST2402		conserved hypothetical protein	?	n	n
PST2406	<i>nasA</i>	nitrate transporter	Yes	y	y
PST2409		assimilatory nitrite reductase large subunit	Yes ^b	y	y
PST2410		assimilatory nitrite reductase small subunit	Yes ^b	y	n
PST2411		assimilatory nitrate reductase	Yes ^b	y	y
PST2425		conserved hypothetical protein	Yes	y	n
PST2496		conserved hypothetical protein	Yes	n	y
PST2498		conserved hypothetical protein	?	n	n
PST2501		capsular polysaccharide biosynthesis protein	Yes	y	y
PST2508		methyl-accepting chemotaxis transducer	Yes	n	n
PST2747		chromosome segregation ATPase	Yes ^b	y	n
PST2748		OmpA family protein	Yes ^b	y	y
PST2837		conserved hypothetical protein	Yes	y	n
PST2862		nucleoside-binding outer membrane protein	Yes	n	y
PST2897		probable oxidoreductase	Yes	n	n
PST2899		hypothetical protein	Yes	y	y
PST2900		probable ABC transporter	Yes	y	y
PST2906		conserved hypothetical protein	Yes	n	n

PST2907		ABC transporter, ATP-binding protein	Yes	y	y
PST2913	<i>topB</i>	DNA topoisomerase III	Yes	y	y
PST2982	<i>braC</i>	branched-chain amino acid transport protein	?	y	y
PST3079		membrane protein, bmp family	Yes	n	y
PST3080		oxidoreductase	Yes	n	n
PST3099		nucleoside-binding outer membrane protein	Yes	n	y
PST3106		NAD-dependent aldehyde dehydrogenase	Yes	n	n
PST3129		conserved hypothetical protein	Yes	n	n
PST3130	<i>iciA</i>	chromosome initiation inhibitor	Yes	n	n
PST3246		PqiB family protein	Yes	y	n
PST3253		membrane protein, putative	Yes	y	y
PST3361	<i>czcA</i>	heavy metal efflux pump CzcA	Yes	y	y
PST3371		conserved hypothetical protein	?	n	n
PST3408		permease	Yes	n	n
PST3414		conserved hypothetical protein	?	n	n
PST3416		Co/Zn/Cd efflux system component	?	n	n
PST3417		predicted transcriptional regulators	Yes	n	n
PST3422		out membrane porin	Yes	y	n
PST3566	<i>cynS</i>	cyanate lyase	Yes	n	n
PST3569	<i>codB</i>	cytosine transporter	Yes ^b	n	n
PST3570	<i>codA</i>	cytosine deaminase	Yes ^b	y	y
PST3597		bacterial luciferase family protein	Yes ^b	y	y
PST3598		isochorismatase family protein	Yes ^b	y	n
PST3621		transcriptional regulator, AraC family	?	y	y
PST3680		ethanolamine transporter	Yes	n	n
PST3720		branched-chain amino acid ABC transporter, putative	Yes	n	y
PST3726	<i>ureD</i>	urease accessory protein UreD	Yes ^b	y	y
PST3727	<i>ureA</i>	urease, gamma subunit	Yes ^b	y	y
PST3736	<i>ureE</i>	urease accessory protein UreE	Yes ^b	y	y
PST3737	<i>ureF</i>	urease accessory protein UreF	Yes ^b	y	y
PST3780	<i>rodA</i>	rod-shape-determining protein RodA	?	y	y
PST3795		ribosome-associated GTPase	Yes	y	y
PST3909		conserved hypothetical protein	Yes ^b	n	n
PST3910		conserved hypothetical protein	Yes ^b	n	n
PST3912		hypothetical protein	?	y	y
PST3934		conserved hypothetical protein	Yes	y	n
PST4084		ABC-type amino acid transport/signal transduction systems	?	n	n
PST4091	<i>nasR</i>	nitrate-and nitrite-responsive positive regulator	Yes	n	y
PST4092	<i>nasF</i>	NrtA-type periplasmic nitrate transport binding protein	Yes ^b	y	y
PST4093	<i>nasE</i>	nitrate ABC transporter permease protein	Yes ^b	y	y
PST4094	<i>nasD</i>	nitrate ABC transporter	Yes ^b	y	y
PST4095		putative acetyltransferase	Yes	y	n
PST4124		periplasmic binding protein, putative	Yes	n	y

^aORFs preceded by a consensus sequence that resembles the σ^{54} consensus sequence for A1501. Only sequences fully match the consensus sequence GG-N₁₀-GC and lying within 300 bp upstream of predicted ORFs were considered σ^{54} -dependent promoters. [?], genes or operons are not preceded by a σ^{54} consensus promoter that matches the criteria given above.

^bORFs likely to form an operon.

^cThe presence or absence of the *P. stutzeri* A1501 genes in the two other sequenced genomes was assessed based on the following criterion: y, gene present, identity between gene products $\geq 30\%$ and the match length $\geq 60\%$ of the full length; n, gene absent, identity between gene products $\leq 30\%$ or the match length $\leq 60\%$ of the full length.

*Genes shaded in grey were referred as a core subset of genes induced specifically under nitrogen fixation conditions.