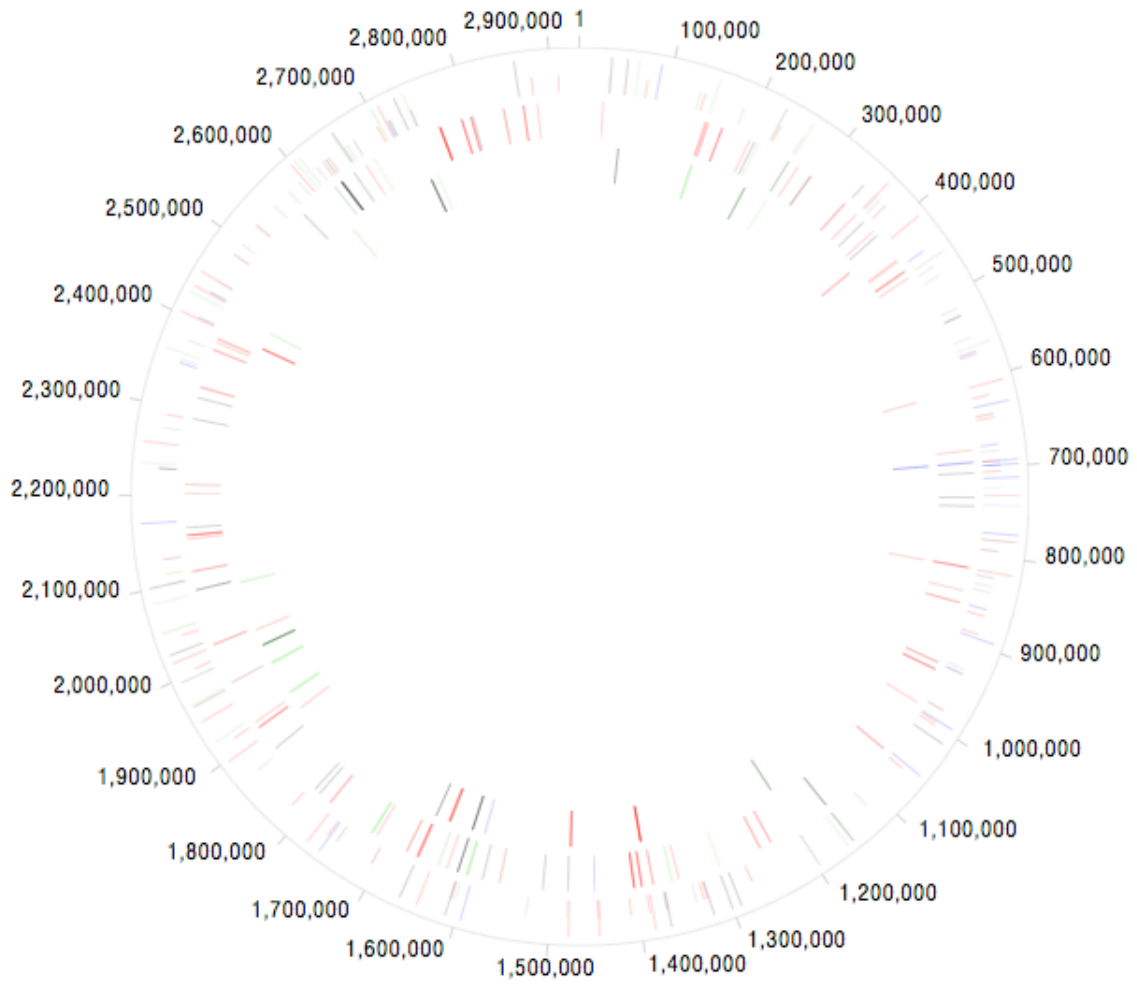


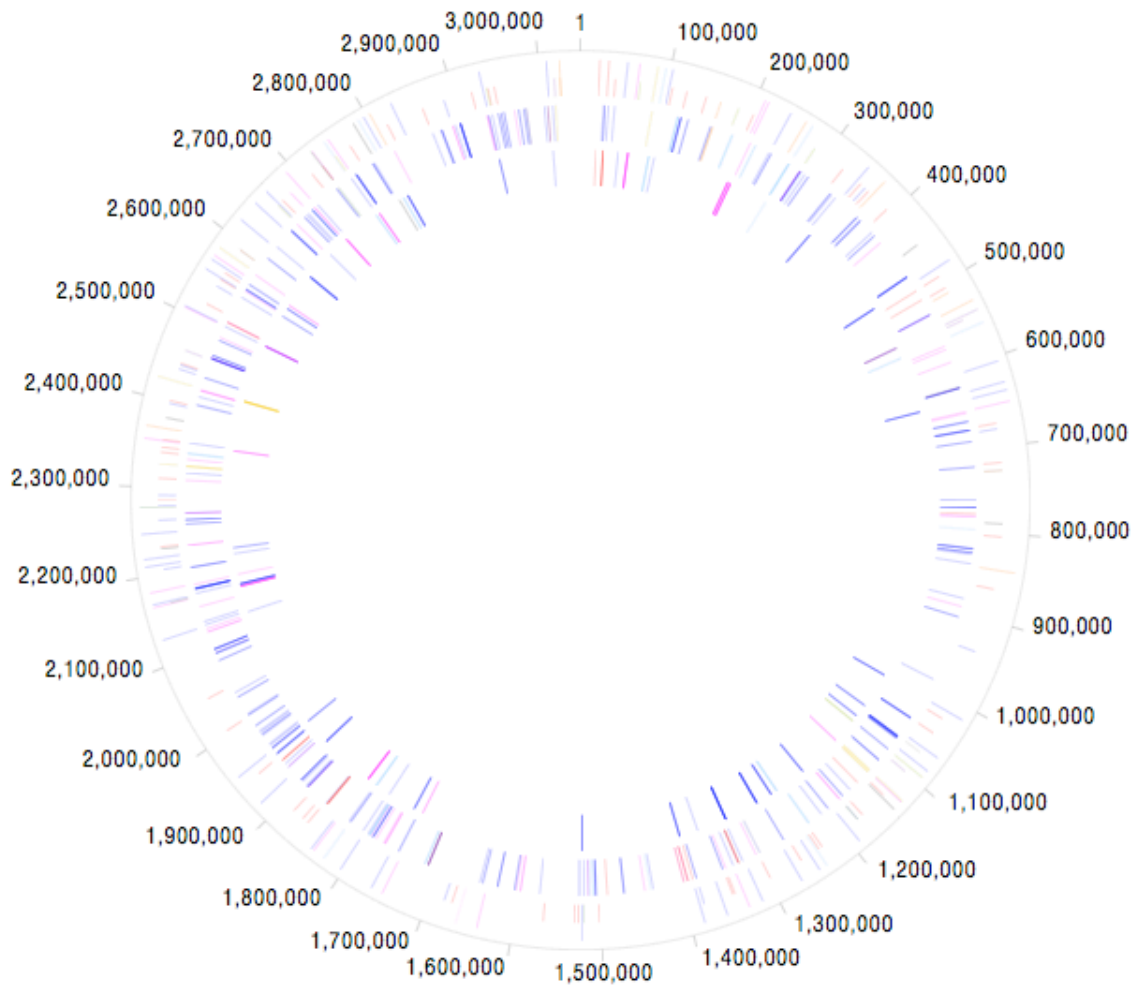
1 A



2

3

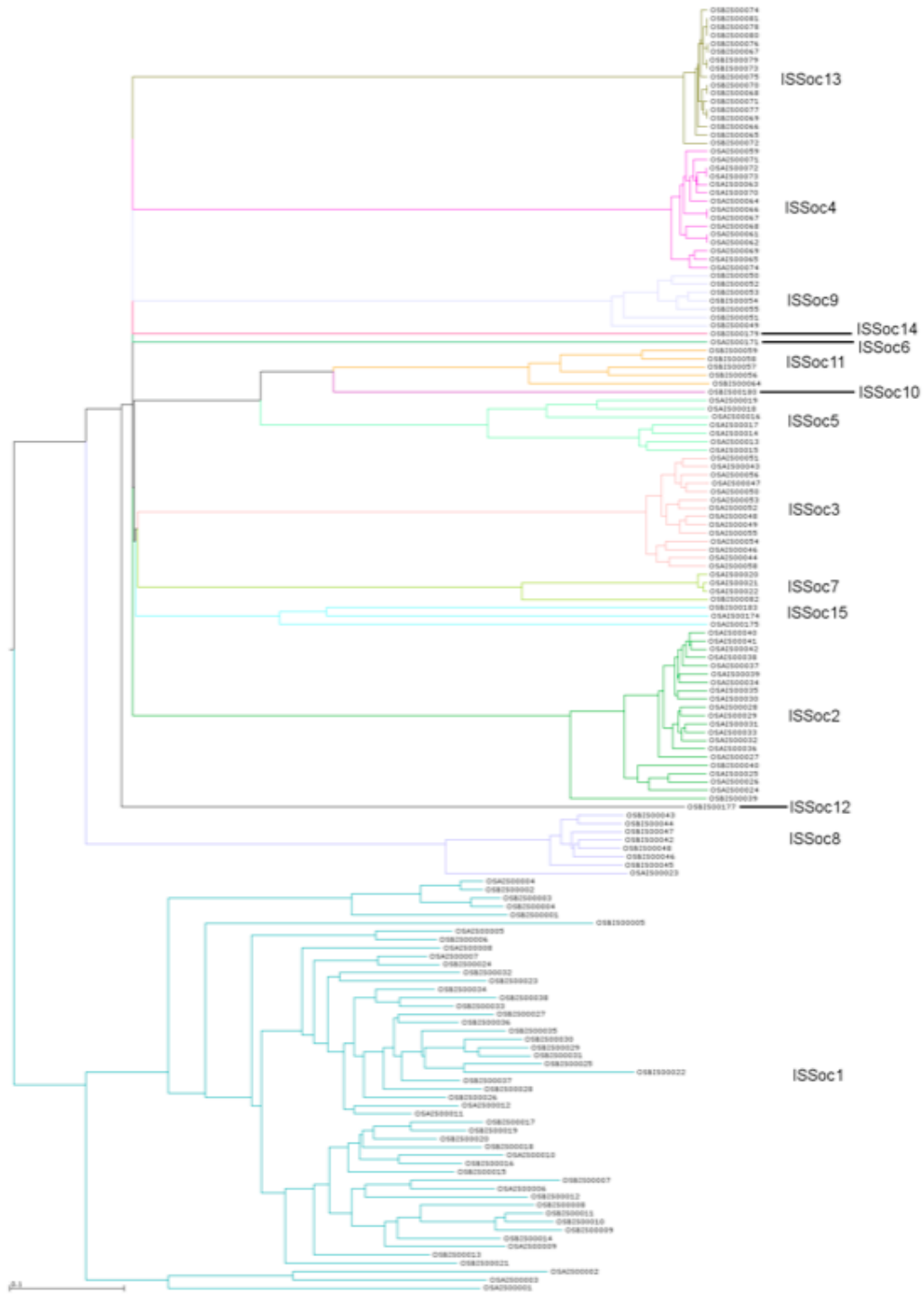
1 **B**



2

3 **Figure S1.** Genomic regions impacted by IS activity. **A** *Syn* OS-A; **B** *Syn* OS-B'. First  
4 ring (outermost): locations of ISs on the genome; *long bars*, full-length copies; *short*  
5 *bars*, truncated and fragmentary copies. Second ring: locations of IS insertion identified  
6 from metagenome read analysis. Third ring: locations of ISs absent from at least one  
7 metagenome read. ISSoc subfamilies are color coded: *blue* – ISSoc1, *red* – ISSoc2, *light*  
8 *green* – ISSoc3, *black* – ISSoc4, *brown* – ISSoc5, *gray* – ISSoc6, *dark green* – ISSoc7,  
9 *cyan* – ISSoc8, *orange* – ISSoc9, *violet* – ISSoc10, *gold* – ISSoc11, *blue-green* –  
10 ISSoc12, *magenta* – ISSoc13, *pink* – ISSoc14, *olive* – ISSoc15.

11



1  
 2 **Figure S2.** Phylogenetic tree defining ISSoc families. Neighbor-joining tree of full-  
 3 length ISSoc sequences from *Syn OS-A* and *Syn OS-B'*. Families are denoted by colored

- 1 branches and names to the right. See Materials and Methods for details of distance
- 2 calculation.

**Table S1. ISSoc features identified in *Synechococcus* sp. JA-3-3-Ab**

end5	end3	Locus	Description
33408	33129	IS00161	ISSoc6, internal deletion
34503	35503	IS00065	ISSoc4
52701	51685	IS00066	ISSoc4
65846	63988	IS00054	ISSoc3
75886	75586	IS00083	ISSoc2, internal deletion family 1
89608	88301	IS00001	ISSoc1
136843	135967	IS00134	ISSoc6, internal deletion
141502	141202	IS00084	ISSoc2, internal deletion family 1
152299	154104	IS00047	ISSoc3
187528	187803	IS00136	ISSoc6, internal deletion
230618	229303	IS00022	ISSoc7
232006	232306	IS00085	ISSoc2, internal deletion family 1
259952	260231	IS00162	ISSoc6, internal deletion
264127	262279	IS00053	ISSoc3
345342	346462	IS00014	ISSoc5, internal deletion
364613	362782	IS00037	ISSoc2
365405	364737	IS00137	ISSoc6, internal deletion
369831	369571	IS00138	ISSoc6, truncated
378689	378389	IS00086	ISSoc2, internal deletion family 1
412093	410286	IS00029	ISSoc2
443719	443656	IS00110	ISSoc1, truncated
457697	455888	IS00171	ISSoc6
464121	464293	IS00139	ISSoc6, truncated
476100	475825	IS00140	ISSoc6, internal deletion
516978	518194	IS00130	ISSoc6, internal deletion
525485	525602	IS00141	ISSoc6, truncated
526263	526551	IS00120	ISSoc4, fragment
526795	527074	IS00142	ISSoc6, internal deletion
552605	552694	IS00143	ISSoc6, truncated
563217	565052	IS00049	ISSoc3
569353	569148	IS00107	ISSoc1, internal deletion
571697	571997	IS00087	ISSoc2, internal deletion family 1
606500	608283	IS00026	ISSoc2
619570	619305	IS00075	ISSoc2, internal deletion family 2
631254	629959	IS00008	ISSoc1
640755	641901	IS00015	ISSoc5, internal deletion
644749	645025	IS00088	ISSoc2, internal deletion family 1
674863	675203	IS00115	ISSoc1, fragment
682541	681943	IS00144	ISSoc6, truncated
693043	693097	IS00089	ISSoc2, fragment
693249	694539	IS00004	ISSoc1
698151	697942	IS00111	ISSoc1, truncated
699277	697942	IS00010	ISSoc1
705189	704913	IS00090	ISSoc2, internal deletion family 1
713718	712423	IS00007	ISSoc1
723806	723840	IS00119	ISSoc3, fragment

733179	731372	IS00036	ISSoc2
743191	745124	IS00023	ISSoc8, interrupted
776053	774758	IS00012	ISSoc1
783940	782524	IS00018	ISSoc5
795401	794258	IS00017	ISSoc5, internal deletion
819963	818204	IS00025	ISSoc2
824114	824221	IS00167	ISSoc7, fragment
833912	834096	IS00145	ISSoc6, truncated
840838	840514	IS00146	ISSoc6, truncated
859880	860093	IS00108	ISSoc1, fragment
867509	867741	IS00091	ISSoc2, truncated
889223	888942	IS00076	ISSoc2, internal deletion family 2
893366	894638	IS00009	ISSoc1
930638	930897	IS00147	ISSoc6, truncated
935895	935779	IS00163	ISSoc6, truncated
936241	935957	IS00112	ISSoc1, fragment
981415	982543	IS00013	ISSoc5, internal deletion
995542	994252	IS00006	ISSoc1
996115	996415	IS00092	ISSoc2, internal deletion family 1
1E+06	999896	IS00093	ISSoc2, internal deletion family 1
1E+06	1012500	IS00072	ISSoc4
1E+06	1055043	IS00002	ISSoc1
1E+06	1060166	IS00094	ISSoc2, internal deletion family 2
1E+06	1118210	IS00133	ISSoc6, internal deletion
1E+06	1152163	IS00148	ISSoc6, truncated
1E+06	1153515	IS00073	ISSoc4
1E+06	1155442	IS00044	ISSoc3
1E+06	1160003	IS00043	ISSoc3
1E+06	1198043	IS00021	ISSoc7
1E+06	1270021	IS00095	ISSoc2, internal deletion family 1
1E+06	1290348	IS00063	ISSoc4
1E+06	1300200	IS00062	ISSoc4
1E+06	1321997	IS00069	ISSoc4
1E+06	1322730	IS00096	ISSoc2, internal deletion family 1
1E+06	1326808	IS00097	ISSoc2, internal deletion family 1
1E+06	1336185	IS00129	ISSoc6, internal deletion
1E+06	1367741	IS00128	ISSoc6, truncated
1E+06	1368756	IS00068	ISSoc4
1E+06	1368757	IS00124	ISSoc5, fragment
1E+06	1386736	IS00039	ISSoc2
1E+06	1388212	IS00098	ISSoc2, internal deletion family 1
1E+06	1409430	IS00099	ISSoc2, internal deletion family 1
1E+06	1444810	IS00100	ISSoc2, internal deletion family 1
1E+06	1445162	IS00024	ISSoc2
1E+06	1446917	IS00173	ISSoc14, truncation
1E+06	1478612	IS00042	ISSoc2
1E+06	1480563	IS00149	ISSoc6, truncated
2E+06	1526456	IS00127	ISSoc6, truncated
2E+06	1596112	IS00005	ISSoc1

2E+06 1606710 IS00164 ISSoc6, internal deletion  
2E+06 1611587 IS00077 ISSoc2, internal deletion family 2  
2E+06 1613074 IS00067 ISSoc4  
2E+06 1646079 IS00041 ISSoc2  
2E+06 1664897 IS00061 ISSoc4  
2E+06 1707532 IS00125 ISSoc5, truncated  
2E+06 1753391 IS00168 ISSoc7, fragment  
2E+06 1763744 IS00003 ISSoc1  
2E+06 1765143 IS00101 ISSoc2, internal deletion family 1  
2E+06 1780637 IS00028 ISSoc2  
2E+06 1817200 IS00078 ISSoc2, internal deletion family 2  
2E+06 1871252 IS00135 ISSoc6, truncated  
2E+06 1897462 IS00033 ISSoc2  
2E+06 1914942 IS00102 ISSoc2, internal deletion family 1  
2E+06 1924288 IS00048 ISSoc3  
2E+06 1950381 IS00040 ISSoc2  
2E+06 1968124 IS00019 ISSoc5  
2E+06 1970549 IS00050 ISSoc3  
2E+06 1996573 IS00020 ISSoc7  
2E+06 2003516 IS00079 ISSoc2, internal deletion family 2  
2E+06 2017846 IS00035 ISSoc2  
2E+06 2027903 IS00059 ISSoc4  
2E+06 2042722 IS00080 ISSoc2, internal deletion family 2  
2E+06 2051364 IS00175 ISSoc15  
2E+06 2083964 IS00051 ISSoc3  
2E+06 2101201 IS00074 ISSoc4  
2E+06 2102454 IS00150 ISSoc6, truncated  
2E+06 2112863 IS00176 ISSoc15, truncation  
2E+06 2129459 IS00126 ISSoc5, truncated  
2E+06 2171930 IS00011 ISSoc1  
2E+06 2230942 IS00121 ISSoc4, internal deletion  
2E+06 2231068 IS00169 ISSoc7, truncation  
2E+06 2235962 IS00052 ISSoc3  
2E+06 2258720 IS00038 ISSoc2  
2E+06 2276244 IS00151 ISSoc6, fragment  
2E+06 2291428 IS00081 ISSoc2, internal deletion family 2  
2E+06 2350512 IS00116 ISSoc1, fragment  
2E+06 2354169 IS00152 ISSoc6, fragment  
2E+06 2361295 IS00046 ISSoc3  
2E+06 2377017 IS00165 ISSoc6, internal deletion  
2E+06 2404603 IS00032 ISSoc2  
2E+06 2404707 IS00114 ISSoc1, fragment  
2E+06 2427960 IS00055 ISSoc3  
2E+06 2433339 IS00031 ISSoc2  
2E+06 2435428 IS00153 ISSoc6, internal deletion  
2E+06 2435515 IS00117 ISSoc1, fragment  
2E+06 2450111 IS00154 ISSoc6, truncated  
2E+06 2451928 IS00027 ISSoc2  
2E+06 2484591 IS00016 ISSoc5, internal deletion

2E+06 2498800 IS00155 ISSoc6, fragment  
3E+06 2524752 IS00156 ISSoc6, truncated  
3E+06 2525692 IS00103 ISSoc2, internal deletion family 1  
3E+06 2554452 IS00157 ISSoc6, truncated  
3E+06 2577007 IS00158 ISSoc6, internal deletion  
3E+06 2591904 IS00159 ISSoc6, internal deletion  
3E+06 2600183 IS00030 ISSoc2  
3E+06 2605975 IS00056 ISSoc3  
3E+06 2609445 IS00058 ISSoc3  
3E+06 2617825 IS00131 ISSoc6, internal deletion  
3E+06 2626932 IS00082 ISSoc2, internal deletion family 2  
3E+06 2631096 IS00122 ISSoc4, truncated  
3E+06 2634827 IS00104 ISSoc2, internal deletion family 1  
3E+06 2653678 IS00071 ISSoc4  
3E+06 2652282 IS00045 ISSoc3, interrupted  
3E+06 2656746 IS00160 ISSoc6, internal deletion  
3E+06 2659412 IS00166 ISSoc6, internal deletion  
3E+06 2668401 IS00170 ISSoc7, truncation  
3E+06 2700565 IS00172 ISSoc2, truncated  
3E+06 2702028 IS00174 ISSoc15, degenerate  
3E+06 2711305 IS00034 ISSoc2  
3E+06 2711399 IS00113 ISSoc1, fragment  
3E+06 2714155 IS00132 ISSoc6, internal deletion  
3E+06 2714271 IS00123 ISSoc4, truncated  
3E+06 2729491 IS00070 ISSoc4  
3E+06 2741003 IS00060 ISSoc4  
3E+06 2738564 IS00057 ISSoc3  
3E+06 2863528 IS00064 ISSoc4  
3E+06 2879170 IS00105 ISSoc2, internal deletion family 1  
3E+06 2909429 IS00106 ISSoc2, internal deletion family 1



**Table S2. ISSoc features identified in *Synechococcus* sp. JA-2-3B'a(2-13)**

end5	end3	Locus	Description
23094	21287	IS00039	ISSoc2
31563	33322	IS00040	ISSoc2
40103	40392	IS00086	ISSoc2, internal deletion family 2
53728	52409	IS00028	ISSoc1
66656	65848	IS00069	ISSoc13
69386	69479	IS00185	ISSoc15, truncation
86127	87575	IS00059	ISSoc11
95061	96351	IS00047	ISSoc8
102732	104034	IS00022	ISSoc1
106931	106655	IS00087	ISSoc2, internal deletion family 1
124002	123702	IS00088	ISSoc2, internal deletion family 1
147103	146827	IS00089	ISSoc2, internal deletion family 1
164876	164595	IS00162	ISSoc9, truncation
186187	186765	IS00188	ISSoc15, truncation
204534	204823	IS00090	ISSoc2, internal deletion family 2
210373	211181	IS00076	ISSoc13
215248	214440	IS00070	ISSoc13
241569	242841	IS00014	ISSoc1
262388	260847	IS00054	ISSoc9
269482	270772	IS00048	ISSoc8
284980	284921	IS00189	ISSoc15, truncation
325204	324928	IS00091	ISSoc2, internal deletion family 1
346998	345726	IS00010	ISSoc1
351603	351327	IS00092	ISSoc2, internal deletion family 1
358470	358267	IS00150	ISSoc1, internal deletion
363672	363948	IS00093	ISSoc2, internal deletion family 1
369721	371262	IS00053	ISSoc9
393380	393656	IS00094	ISSoc2, internal deletion family 1
446995	447054	IS00156	ISSoc4, partial
481515	482805	IS00013	ISSoc1
491163	491452	IS00095	ISSoc2, internal deletion family 2
505930	506230	IS00096	ISSoc2, internal deletion family 1
512424	513151	IS00166	ISSoc9, internal deletion
534298	532781	IS00050	ISSoc9
544226	546054	IS00180	ISSoc10
548449	548240	IS00167	ISSoc10, internal deletion
559599	560888	IS00043	ISSoc8
605477	606766	IS00012	ISSoc1
629405	630724	IS00015	ISSoc1
638559	639872	IS00029	ISSoc1
651471	652288	IS00072	ISSoc13
673207	672907	IS00097	ISSoc2, internal deletion family 1
679607	679391	IS00140	ISSoc1, internal deletion
718303	718603	IS00098	ISSoc2, internal deletion family 1
727330	727724	IS00168	ISSoc10, internal deletion
727502	727603	IS00173	ISSoc11, fragment

788968	789138	IS00178	ISSoc12, truncation
804039	804315	IS00099	ISSoc2, internal deletion family 1
844082	842517	IS00055	ISSoc9
864863	864587	IS00100	ISSoc2, internal deletion family 1
939521	939777	IS00149	ISSoc1, internal deletion
1E+06	1016273	IS00008	ISSoc1
1E+06	1025344	IS00101	ISSoc2, internal deletion family 2
1E+06	1044553	IS00102	ISSoc2, fragment
1E+06	1064954	IS00025	ISSoc1
1E+06	1071202	IS00182	ISSoc6, truncation
1E+06	1084448	IS00033	ISSoc1
1E+06	1092078	IS00183	ISSoc15
1E+06	1099260	IS00169	ISSoc10, truncation
1E+06	1126176	IS00056	ISSoc11
1E+06	1128615	IS00073	ISSoc13
1E+06	1136026	IS00103	ISSoc2, internal deletion family 1
1E+06	1138885	IS00181	ISSoc4, degenerate
1E+06	1169047	IS00104	ISSoc2, internal deletion family 1
1E+06	1176527	IS00147	ISSoc1, truncated
1E+06	1176729	IS00187	ISSoc15, truncation
1E+06	1191891	IS00027	ISSoc1
1E+06	1228467	IS00105	ISSoc2, internal deletion family 1
1E+06	1232790	IS00106	ISSoc2, internal deletion family 1
1E+06	1236738	IS00044	ISSoc8
1E+06	1246026	IS00018	ISSoc1
1E+06	1256764	IS00084	ISSoc2, truncated
1E+06	1268997	IS00019	ISSoc1
1E+06	1297698	IS00107	ISSoc2, internal deletion family 2
1E+06	1316308	IS00021	ISSoc1
1E+06	1332137	IS00067	ISSoc13
1E+06	1342010	IS00108	ISSoc2, internal deletion family 1
1E+06	1344728	IS00109	ISSoc2, internal deletion family 1
1E+06	1358108	IS00030	ISSoc1
1E+06	1379068	IS00153	ISSoc1, truncated
1E+06	1384261	IS00011	ISSoc1
2E+06	1501779	IS00110	ISSoc2, internal deletion family 1
2E+06	1518849	IS00161	ISSoc7, fragment
2E+06	1521371	IS00031	ISSoc1
2E+06	1525991	IS00111	ISSoc2, internal deletion family 1
2E+06	1530943	IS00112	ISSoc2, internal deletion family 1
2E+06	1566414	IS00113	ISSoc2, internal deletion family 1
2E+06	1639002	IS00074	ISSoc13
2E+06	1663902	IS00179	ISSoc14
2E+06	1673609	IS00114	ISSoc2, internal deletion family 2
2E+06	1682606	IS00148	ISSoc1, internal deletion
2E+06	1750132	IS00066	ISSoc13
2E+06	1764649	IS00003	ISSoc1
2E+06	1803068	IS00037	ISSoc1
2E+06	1824931	IS00045	ISSoc8

2E+06 1839091 IS00075 ISSoc13  
2E+06 1842308 IS00007 ISSoc1  
2E+06 1864218 IS00115 ISSoc2, internal deletion family 1  
2E+06 1871241 IS00116 ISSoc2, internal deletion family 1  
2E+06 1884903 IS00117 ISSoc2, internal deletion family 1  
2E+06 1918469 IS00004 ISSoc1  
2E+06 1943445 IS00118 ISSoc2, internal deletion family 1  
2E+06 1954817 IS00034 ISSoc1  
2E+06 2005255 IS00119 ISSoc2, internal deletion family 1  
2E+06 2047985 IS00120 ISSoc2, internal deletion family 1  
2E+06 2128022 IS00001 ISSoc1  
2E+06 2166057 IS00080 ISSoc13  
2E+06 2166468 IS00160 ISSoc7, truncation  
2E+06 2168317 IS00032 ISSoc1  
2E+06 2182531 IS00071 ISSoc13  
2E+06 2205525 IS00141 ISSoc1, internal deletion  
2E+06 2210837 IS00024 ISSoc1  
2E+06 2220475 IS00002 ISSoc1  
2E+06 2229012 IS00155 ISSoc4, internal deletion  
2E+06 2231639 IS00121 ISSoc2, internal deletion family 1  
2E+06 2248570 IS00006 ISSoc1  
2E+06 2262045 IS00151 ISSoc1, internal deletion  
2E+06 2277213 IS00082 ISSoc7, truncated  
2E+06 2278652 IS00142 ISSoc1, internal deletion  
2E+06 2286492 IS00122 ISSoc2, internal deletion family 1  
2E+06 2290815 IS00143 ISSoc1, internal deletion  
2E+06 2310594 IS00123 ISSoc2, internal deletion family 1  
2E+06 2328009 IS00064 ISSoc11, truncation  
2E+06 2340327 IS00124 ISSoc2, internal deletion family 1  
2E+06 2346577 IS00125 ISSoc2, internal deletion family 1  
2E+06 2353694 IS00079 ISSoc13  
2E+06 2355425 IS00126 ISSoc2, internal deletion family 2  
2E+06 2367987 IS00051 ISSoc9  
2E+06 2380444 IS00154 ISSoc4, truncated  
2E+06 2397661 IS00144 ISSoc1, internal deletion  
2E+06 2400802 IS00127 ISSoc2, internal deletion family 1  
2E+06 2423598 IS00057 ISSoc11  
2E+06 2438143 IS00139 ISSoc1, internal deletion  
2E+06 2443342 IS00145 ISSoc1, internal deletion  
2E+06 2444994 IS00128 ISSoc2, internal deletion family 1  
2E+06 2460875 IS00170 ISSoc10, internal deletion  
3E+06 2506257 IS00078 ISSoc13  
3E+06 2508073 IS00005 ISSoc1  
3E+06 2519873 IS00129 ISSoc2, internal deletion family 2  
3E+06 2543309 IS00146 ISSoc1, internal deletion  
3E+06 2552223 IS00130 ISSoc2, internal deletion family 1  
3E+06 2553342 IS00023 ISSoc1  
3E+06 2560852 IS00190 ISSoc2, internal deletion family 2  
3E+06 2566888 IS00009 ISSoc1

3E+06 2571762 IS00077 ISSoc13  
3E+06 2582579 IS00058 ISSoc11  
3E+06 2592441 IS00171 ISSoc10, truncation  
3E+06 2592449 IS00174 ISSoc11, truncation  
3E+06 2621137 IS00020 ISSoc1  
3E+06 2644143 IS00036 ISSoc1  
3E+06 2660078 IS00186 ISSoc15, fragment  
3E+06 2661631 IS00016 ISSoc1  
3E+06 2667568 IS00131 ISSoc2, internal deletion family 1  
3E+06 2680483 IS00176 ISSoc13, fragment  
3E+06 2692174 IS00081 ISSoc13  
3E+06 2712681 IS00132 ISSoc2, internal deletion family 1  
3E+06 2729658 IS00159 ISSoc7, interrupted  
3E+06 2728157 IS00133 ISSoc2, internal deletion family 1  
3E+06 2729207 IS00065 ISSoc13  
3E+06 2745241 IS00046 ISSoc8  
3E+06 2746611 IS00175 ISSoc11, fragment  
3E+06 2751213 IS00068 ISSoc13  
3E+06 2766950 IS00134 ISSoc2, internal deletion family 1  
3E+06 2783358 IS00177 ISSoc12  
3E+06 2789851 IS00042 ISSoc8  
3E+06 2798022 IS00026 ISSoc1  
3E+06 2805993 IS00049 ISSoc9  
3E+06 2816514 IS00135 ISSoc2, internal deletion family 1  
3E+06 2830318 IS00038 ISSoc1  
3E+06 2860580 IS00136 ISSoc2, internal deletion family 2  
3E+06 2886838 IS00152 ISSoc1, fragment  
3E+06 2920153 IS00137 ISSoc2, internal deletion family 1  
3E+06 2934714 IS00017 ISSoc1  
3E+06 2937805 IS00184 ISSoc15, truncation  
3E+06 2939386 IS00085 ISSoc2, internal deletion family 1  
3E+06 2946545 IS00138 ISSoc2, internal deletion family 1  
3E+06 3009892 IS00035 ISSoc1  
3E+06 3016626 IS00172 ISSoc10, internal deletion  
3E+06 3023155 IS00165 ISSoc9, truncation  
3E+06 3023155 IS00052 ISSoc9

**Table S3A. Metagenomic sequences showing IS-interrupted genes in *Syn* OS-A**

Seq accession	IS subfamily	IS insertion location	Locus	end5	end3	gene symbol
CYOBH86TF	ISSoc2	27805	CYA_0029	29534	27153	
YMACD71TR	ISSoc2	112226	CYA_0117	111443	113350	
CYPDM60TF	ISSoc2	172793	CYA_0175	173593	171491	
CYMA525TR	ISSoc2	172794	CYA_0175	173593	171491	
CYPL096TR	ISSoc4	291451	CYA_0283	290261	291658	
CYPK208TR	ISSoc4	375396	CYA_0358	375971	375090	
YMBBQ71TF	ISSoc4	468191	CYA_0448	467763	469085	
CYPKG48TR	ISSoc1	693519	CYA_0687	693323	694534	
CYPLQ57TF	ISSoc2	818165	CYA_0806	818223	817918	
YMAAD92TR	ISSoc2	818165	CYA_0806	818223	817918	
YMBDM47TF	ISSoc2	818165	CYA_0806	818223	817918	
YMBD089TF	ISSoc2	1245461	CYA_1234	1245414	1245695	
YMBDE66TF	ISSoc2	1245461	CYA_1234	1245414	1245695	
CYPI671TF	ISSoc2	1378964	CYA_1366	1376917	1378974	<i>napA</i>
YMBB060TR	ISSoc2	1378964	CYA_1366	1376917	1378974	<i>napA</i>
YMBDU81TR	ISSoc1	1448523	CYA_1441	1448585	1447464	
CYOBL27TR	ISSoc4	1480664	CYA_2966	1480672	1480586	
CYOAU66TR	ISSoc4	1510427	CYA_1501	1510564	1510331	
YMABX48TF	ISSoc2	1562749	CYA_1552	1561867	1562946	<i>pstS-2</i>
YMJAW91TR	ISSoc1	1594232	CYA_1584	1594466	1593438	
CYPDK64TR	ISSoc3	1601713	CYA_1592	1601950	1601699	
YMAAS38TF	ISSoc3	1601713	CYA_1592	1601950	1601699	
YMBBC46TR	ISSoc3	1601713	CYA_1592	1601950	1601699	
YMBBL63TF	ISSoc3	1601713	CYA_1592	1601950	1601699	
YMBE135TF	ISSoc3	1601713	CYA_1592	1601950	1601699	
YMBE624TF	ISSoc3	1601713	CYA_1592	1601950	1601699	
YMBEP52TF	ISSoc3	1601713	CYA_1592	1601950	1601699	
YMIA916TF	ISSoc4	1613496	CYA_1605	1613624	1613457	
CYMAE93TR	ISSoc2	1626911	CYA_1623	1627374	1626880	<i>dgkA</i>
CYNA634TF	ISSoc2	1663856	CYA_1660	1662980	1663897	
CYPEK12TF	ISSoc2	1663856	CYA_1660	1662980	1663897	
YMBEN88TF	ISSoc2	1663856	CYA_1660	1662980	1663897	
YMAAP39TR	ISSoc2	1670629	CYA_1667	1670101	1670631	<i>purE</i>
CYOCH25TR	ISSoc3	1724942	CYA_1719	1724940	1725356	
CYPD711TR	ISSoc3	1724942	CYA_1719	1724940	1725356	
YMAAD05TF	ISSoc3	1724947	CYA_1719	1724940	1725356	
YMBAU35TR	ISSoc4	1762889	CYA_1757	1762664	1763645	
YMBDR53TF	ISSoc2	1763295	CYA_1757	1762664	1763645	
YMAC288TF	ISSoc4	1809683	CYA_1807	1809849	1808788	
CYOC019TF	ISSoc4	1877025	CYA_1872	1876803	1877120	
YMIAS55TR	ISSoc2	2020366	CYA_2003	2021053	2019791	
YMACF93TR	ISSoc2	2020367	CYA_2003	2021053	2019791	
GYSAP86TF	ISSoc4	2087937	CYA_2067	2087286	2088311	
YMBBZ12TF	ISSoc4	2087937	CYA_2067	2087286	2088311	
CYPGD68TF	ISSoc2	2153520	CYA_2141	2154880	2153498	
YMBCO07TR	ISSoc2	2153520	CYA_2141	2154880	2153498	

YMJA625TF	ISSoc2	2153522	CYA_2141	2154880	2153498
YMBDE13TR	ISSoc4	2162507	CYA_2150	2162611	2162126
YMBD941TF	ISSoc2	2202853	CYA_2183	2203076	2200785
YMBB509TF	ISSoc2	2331002	CYA_2327	2331320	2330706
YMACA93TR	ISSoc4	2445195	CYA_2435	2444148	2445353
CYPHF56TR	ISSoc1	2470966	CYA_2459	2467680	2471015
CYPLS52TR	ISSoc1	2470966	CYA_2459	2467680	2471015
YMIB162TR	ISSoc4	2629814	CYA_2613	2629189	2629848
GYRAA04TR	ISSoc2	2764044	CYA_2743	2763846	2764490
YMBDI18TR	ISSoc2	2764044	CYA_2743	2763846	2764490
CYPCZ93TR	ISSoc2	2764045	CYA_2743	2763846	2764490
YMBER09TR	ISSoc2	2764045	CYA_2743	2763846	2764490
YMACH78TR	ISSoc2	2802390	CYA_2782	2801731	2802735
YMBDH21TR	ISSoc2	2802390	CYA_2782	2801731	2802735
YMBDY81TF	ISSoc2	2802390	CYA_2782	2801731	2802735
CYPKV31TR	ISSoc2	2841882	CYA_2823	2841219	2841914
YMBDS69TF	ISSoc2	2841882	CYA_2823	2841219	2841914
YMAB758TR	ISSoc2	2865884	CYA_2850	2865498	2866601
YMACD53TR	ISSoc2	2865884	CYA_2850	2865498	2866601
CYPAL17TF	ISSoc2	2865886	CYA_2850	2865498	2866601
CYPMC06TR	ISSoc2	2865886	CYA_2850	2865498	2866601
YMAB758TF	ISSoc2	2865886	CYA_2850	2865498	2866601
CYMAA36TF	ISSoc2	2882385	CYA_2864	2882792	2882340

gene product

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peptidase, M48B family  
endonuclease/exonuclease/phosphatase family protein  
nitrate reductase, authentic point mutation  
nitrate reductase, authentic point mutation  
ATPase, AAA family  
cation transporter, voltage-gated ion channel (VIC) family  
CobQ/CobB/MinD/ParA nucleotide binding domain protein  
ISSoc1, transposase  
hypothetical protein  
hypothetical protein  
hypothetical protein  
hypothetical protein  
hypothetical protein  
transporter, monovalent cation:proton antiporter-2 (CPA2) family  
transporter, monovalent cation:proton antiporter-2 (CPA2) family  
carbohydrate uptake ABC transporter-1 (CUT1) family, ATP-binding protein  
ISSoc6, transposase orfB, fragment  
hypothetical protein  
phosphate ABC transporter, phosphate-binding protein  
Tat (twin-arginine translocation) pathway signal sequence/basic membrane protein  
conserved hypothetical protein  
conserved hypothetical protein  
conserved hypothetical protein  
conserved hypothetical protein  
conserved hypothetical protein  
conserved hypothetical protein  
conserved hypothetical protein  
conserved hypothetical protein  
conserved hypothetical protein  
diacylglycerol kinase  
conserved domain protein  
conserved domain protein  
conserved domain protein  
phosphoribosylaminoimidazole carboxylase, catalytic subunit  
conserved hypothetical protein  
conserved hypothetical protein  
conserved hypothetical protein  
ISSoc1, transposase, fragment  
ISSoc1, transposase, fragment  
hypothetical protein  
hypothetical protein  
conserved hypothetical protein  
conserved hypothetical protein  
conserved hypothetical protein  
conserved hypothetical protein  
sugar transporter, glycoside-pentoside-hexuronide (GPH):cation symporter family  
sugar transporter, glycoside-pentoside-hexuronide (GPH):cation symporter family





**Table S3B. Metagenomic sequences showing IS-interrupted genes in *Syn OS-B'***

Seq accession	IS subfamily	IS insertion location	Locus	end5	end3	gene symbol
YMJAD41TF	ISSoc1	28762	CYB_0023	28679	30397	<i>ureC</i>
CYPI195TR	ISSoc1	30035	CYB_0023	28679	30397	<i>ureC</i>
YMJAZ45TF	ISSoc1	30035	CYB_0023	28679	30397	<i>ureC</i>
YMJAL79TF	ISSoc1	34684	CYB_0028	37646	34638	
YMBBJ02TR	ISSoc2	52408	CYB_0042	51934	52434	
CYPBB72TF	ISSoc1	124799	CYB_0110	124924	124796	
CYPCF43TF	ISSoc1	124799	CYB_0110	124924	124796	
CYPIN86TR	ISSoc1	124799	CYB_0110	124924	124796	
CYPB865TR	ISSoc1	124800	CYB_0110	124924	124796	
CYPC503TR	ISSoc1	162858	CYB_0145	162062	162862	
CYOBW49TR	ISSoc1	162859	CYB_0145	162062	162862	
CYPKM27TF	ISSoc1	162859	CYB_0145	162062	162862	
CYOAP38TF	ISSoc8	191215	CYB_0179	191204	192235	
YMIB347TR	ISSoc8	191215	CYB_0179	191204	192235	
CYPA074TR	ISSoc8	222158	CYB_0213	222487	221972	
YMIAS77TR	ISSoc8	222158	CYB_0213	222487	221972	
CYPDA46TR	ISSoc1	243874	CYB_0234	243545	244477	
CYPDG38TF	ISSoc1	243874	CYB_0234	243545	244477	
CYPDV20TF	ISSoc8	269041	CYB_0254	269121	268915	
CYOAE26TR	ISSoc8	269046	CYB_0254	269121	268915	
CYOBX92TR	ISSoc8	269046	CYB_0254	269121	268915	
CYPK606TR	ISSoc8	269046	CYB_0254	269121	268915	
CYOCH10TR	ISSoc13	285747	CYB_0269	284955	285965	
CYOAJ84TR	ISSoc1	285853	CYB_0269	284955	285965	
CYPIY23TF	ISSoc1	285854	CYB_0269	284955	285965	
YMJAK32TF	ISSoc1	331502	CYB_0315	331757	330804	
YMIA045TF	ISSoc1	331503	CYB_0315	331757	330804	
YMBAQ74TF	ISSoc1	347310	CYB_0330	347858	346995	
YMBCL57TF	ISSoc1	347310	CYB_0330	347858	346995	
YMBE905TF	ISSoc1	347310	CYB_0330	347858	346995	
YMBDA12TR	ISSoc1	347854	CYB_0330	347858	346995	
YMJAW91TR	ISSoc1	406469	CYB_0391	406703	405675	
CYPAL17TR	ISSoc1	525491	CYB_0512	525407	526018	
CYPDM80TF	ISSoc1	525491	CYB_0512	525407	526018	
YMBD280TR	ISSoc1	525491	CYB_0512	525407	526018	
CYPE934TR	ISSoc10	544218	CYB_0528	542837	544225	
YMIAV03TF	ISSoc8	620939	CYB_0609	620887	621535	
CYPD932TF	ISSoc2	621352	CYB_0609	620887	621535	
CYPL170TR	ISSoc13	654070	CYB_0643	654602	653484	
CYOC470TR	ISSoc1	689504	CYB_0676	688191	689507	
CYPKQ30TR	ISSoc1	720898	CYB_0703	722103	720895	
CYPKQ30TR	ISSoc1	720898	CYB_0704	719294	720901	
YMIA719TR	ISSoc1	720898	CYB_0703	722103	720895	
YMIA719TR	ISSoc1	720898	CYB_0704	719294	720901	
YMIB680TR	ISSoc1	760351	CYB_0736	760643	760347	
YMBAU75TF	ISSoc1	771263	CYB_0747	771275	770421	

CYNA725TR	ISSoc2	778453	CYB_0757	779665	778412	
CYOB567TF	ISSoc2	778453	CYB_0757	779665	778412	
YMBD323TF	ISSoc2	778453	CYB_0757	779665	778412	
CYPF664TR	ISSoc13	782622	CYB_0761	782480	783010	
CYOBA77TR	ISSoc1	821653	CYB_0796	821600	822274	
CYOAE81TR	ISSoc1	821787	CYB_0796	821600	822274	
CYOAE81TF	ISSoc1	822242	CYB_0796	821600	822274	
CYOAF14TF	ISSoc1	826560	CYB_0799	825915	826820	
CYOBS08TF	ISSoc1	826560	CYB_0799	825915	826820	
CYPAU13TF	ISSoc1	826561	CYB_0799	825915	826820	
CYPFZ90TR	ISSoc1	840000	CYB_0811	841399	839996	
CYOA343TR	ISSoc1	907240	CYB_0879	907215	908729	
CYOBW46TF	ISSoc1	907240	CYB_0879	907215	908729	
CYPJB02TR	ISSoc1	907240	CYB_0879	907215	908729	
CYOAC73TR	ISSoc1	989617	CYB_0951	989839	989324	
CYOAR17TR	ISSoc1	1072087	CYB_1029	1072024	1072998	
CYPBN09TR	ISSoc1	1072087	CYB_1029	1072024	1072998	
CYPD075TF	ISSoc1	1072087	CYB_1029	1072024	1072998	
CYPF822TR	ISSoc1	1072087	CYB_1029	1072024	1072998	
CYOAR17TF	ISSoc1	1072569	CYB_1029	1072024	1072998	
CYPGJ33TR	ISSoc1	1072569	CYB_1029	1072024	1072998	
CYPK867TR	ISSoc1	1092073	CYB_1054	1090989	1092098	
CYPI007TF	ISSoc11	1126269	CYB_1090	1126479	1126243	
YMIAE77TR	ISSoc2	1147146	CYB_1111	1148619	1147123	
CYPDR10TR	ISSoc13	1177181	CYB_1140	1177398	1176691	
CYPER93TR	ISSoc13	1177184	CYB_1140	1177398	1176691	
CYPI550TR	ISSoc8	1225120	CYB_1186	1223892	1225124	
CYPK490TF	ISSoc8	1295158	CYB_1248	1296829	1295153	<i>nadE</i>
CYOBT59TR	ISSoc1	1319032	CYB_1261	1317828	1319036	
CYPKO43TR	ISSoc10	1324332	CYB_1267	1325515	1324328	
CYPEQ90TF	ISSoc2	1324349	CYB_1267	1325515	1324328	
CYPGF46TF	ISSoc2	1324350	CYB_1267	1325515	1324328	
YMIAW54TF	ISSoc2	1324350	CYB_1267	1325515	1324328	
YMJA950TR	ISSoc2	1324350	CYB_1267	1325515	1324328	
CYPFP18TR	ISSoc13	1341974	CYB_1286	1340741	1342003	
YMIAV01TF	ISSoc1	1345822	CYB_1289	1344744	1345835	<i>lpxD</i>
YMBDA78TR	ISSoc2	1349593	CYB_1293	1352222	1349487	
YMIB123TR	ISSoc2	1366621	CYB_1304	1368746	1366407	<i>dnaX</i>
CYPA495TF	ISSoc13	1390614	CYB_1328	1390128	1390676	
CYPE830TR	ISSoc2	1395400	CYB_1334	1395356	1397422	
CYPGO09TR	ISSoc1	1434127	CYB_1364	1433861	1434175	
YMJAQ84TR	ISSoc1	1457601	CYB_1385	1457260	1457724	
YMJAA81TR	ISSoc1	1513698	CYB_1443	1513710	1512796	
CYPBZ86TR	ISSoc1	1605061	CYB_1526	1605052	1605321	
CYPCZ78TF	ISSoc1	1627373	CYB_1552	1627427	1627317	
CYPF768TR	ISSoc2	1663250	CYB_1591	1662796	1663902	
CYPM862TF	ISSoc1	1680000	CYB_1609	1682515	1679987	<i>gyrA</i>
CYPM850TF	ISSoc8	1719946	CYB_1648	1721137	1719941	
YMJA575TR	ISSoc1	1755656	CYB_1679	1756076	1755423	

CYPKX86TF	ISSoc1	1755657	CYB_1679	1756076	1755423
CYPK359TR	ISSoc13	1774441	CYB_1697	1773629	1774444
CYPBL22TF	ISSoc13	1774444	CYB_1696	1779645	1774441
CYOCT11TR	ISSoc13	1776177	CYB_1696	1779645	1774441
CYNAN52TF	ISSoc1	1780162	CYB_1699	1780362	1780159
YMJAU18TR	ISSoc1	1805755	CYB_1724	1804652	1807450
CYPM318TF	ISSoc2	1860519	CYB_1774	1861027	1860440
YMIB732TF	ISSoc2	1860519	CYB_1774	1861027	1860440
YMIB732TR	ISSoc2	1860522	CYB_1774	1861027	1860440
CYPHH51TR	ISSoc2	1860957	CYB_1774	1861027	1860440
CYPGV73TR	ISSoc1	1894858	CYB_1811	1896346	1894838
CYPD391TF	ISSoc1	1903666	CYB_1817	1903831	1902974
YMJA432TF	ISSoc1	1903666	CYB_1817	1903831	1902974
CYPCH28TF	ISSoc2	1937474	CYB_1853	1937296	1937502
CYPKF04TF	ISSoc2	1937474	CYB_1853	1937296	1937502
YMJB328TR	ISSoc2	1937474	CYB_1853	1937296	1937502
CYPIN09TF	ISSoc2	1937475	CYB_1853	1937296	1937502
CYPEQ02TR	ISSoc1	1948158	CYB_1865	1949674	1948151
CYOBS11TR	ISSoc1	1948159	CYB_1865	1949674	1948151
CYPAF02TR	ISSoc1	1948159	CYB_1865	1949674	1948151
YMI AH14TF	ISSoc1	1957355	CYB_1873	1956264	1957358
YMIA233TR	ISSoc1	1961505	CYB_1876	1961839	1961105
CYPHW36TF	ISSoc1	1962903	CYB_1878	1964065	1962899 <i>aspC</i>
CYPH933TR	ISSoc1	1976421	CYB_1889	1976131	1976796
CYPHT85TR	ISSoc1	1977952	CYB_1892	1978208	1977945
CYPM251TR	ISSoc1	1977953	CYB_1892	1978208	1977945
CYPKZ47TR	ISSoc1	1990942	CYB_1905	1991085	1990897
CYPK083TF	ISSoc1	1991047	CYB_1905	1991085	1990897
CYPFT44TF	ISSoc1	2008433	CYB_1923	2010232	2008418
CYPFT44TF	ISSoc1	2008433	CYB_1924	2007301	2008440
YMIB605TR	ISSoc1	2032185	CYB_1940	2031905	2032189
YMJAN44TR	ISSoc1	2032186	CYB_1940	2031905	2032189
YMIAG96TF	ISSoc1	2092769	CYB_1988	2092936	2090888
YMIAG96TR	ISSoc1	2092769	CYB_1988	2092936	2090888
CYOC942TF	ISSoc8	2092935	CYB_1988	2092936	2090888
CYPD604TF	ISSoc13	2120701	CYB_2015	2120771	2119497
CYPFL42TR	ISSoc13	2120706	CYB_2015	2120771	2119497
CYOCL94TF	ISSoc2	2123207	CYB_2017	2123138	2123965
CYOCL94TF	ISSoc2	2123208	CYB_2017	2123138	2123965
YMJAS15TF	ISSoc2	2149318	CYB_2049	2149242	2149673
CYPBD30TF	ISSoc1	2168996	CYB_2071	2169515	2168361
CYPDB41TF	ISSoc1	2170007	CYB_2072	2169715	2170011
CYOAN10TF	ISSoc1	2175682	CYB_2079	2176580	2175462
CYOB462TF	ISSoc1	2175682	CYB_2079	2176580	2175462
CYPBH47TF	ISSoc1	2175682	CYB_2079	2176580	2175462
CYPC853TF	ISSoc1	2175682	CYB_2079	2176580	2175462
CYPEO84TF	ISSoc1	2175682	CYB_2079	2176580	2175462
CYPHM82TR	ISSoc1	2175682	CYB_2079	2176580	2175462
CYOA921TF	ISSoc1	2175891	CYB_2079	2176580	2175462

CYOAN10TR	ISSoc1	2175891	CYB_2079	2176580	2175462	
CYPF877TF	ISSoc1	2175891	CYB_2079	2176580	2175462	
CYPFM34TR	ISSoc1	2175891	CYB_2079	2176580	2175462	
CYPHA87TF	ISSoc1	2202568	CYB_2109	2203542	2202565	<i>ddlB</i>
YMIAA04TF	ISSoc1	2202568	CYB_2109	2203542	2202565	<i>ddlB</i>
YMIAA04TR	ISSoc1	2202569	CYB_2109	2203542	2202565	<i>ddlB</i>
CYPMF85TF	ISSoc1	2261025	CYB_2159	2260449	2261117	
YMJB301TR	ISSoc1	2261025	CYB_2159	2260449	2261117	
YMJB361TR	ISSoc1	2261025	CYB_2159	2260449	2261117	
CYOA017TF	ISSoc13	2335085	CYB_2230	2334541	2335089	
YMIA028TR	ISSoc8	2342859	CYB_2234	2340849	2342864	
YMIA028TF	ISSoc8	2342862	CYB_2234	2340849	2342864	
CYOAU57TF	ISSoc1	2355512	CYB_2252	2356333	2355470	
CYPLS52TR	ISSoc1	2413851	CYB_2303	2410495	2413935	
CYPHI23TF	ISSoc13	2421213	CYB_2309	2421423	2419549	
CYPFC67TR	ISSoc13	2421217	CYB_2309	2421423	2419549	
CYPAI09TR	ISSoc1	2466913	CYB_2360	2468069	2466909	
CYOBK93TF	ISSoc1	2466914	CYB_2360	2468069	2466909	
CYPLD82TR	ISSoc1	2466914	CYB_2360	2468069	2466909	
CYPET32TR	ISSoc1	2486873	CYB_2384	2487725	2486295	
CYPM803TR	ISSoc13	2491285	CYB_2389	2491971	2491282	<i>upp-2</i>
CYPBV07TF	ISSoc2	2505223	CYB_2406	2505025	2505474	
CYOB846TF	ISSoc2	2508017	CYB_2410	2506709	2508056	
CYPBV07TF	ISSoc2	2508017	CYB_2410	2506709	2508056	
CYPD007TR	ISSoc2	2508017	CYB_2410	2506709	2508056	
YMIA117TF	ISSoc2	2508017	CYB_2410	2506709	2508056	
YMJAK76TR	ISSoc1	2565149	CYB_2466	2564782	2565153	
CYPCV63TF	ISSoc13	2578951	CYB_2480	2578957	2577464	<i>nadB</i>
CYPFM82TF	ISSoc1	2604588	CYB_2510	2603950	2604660	
CYPM021TR	ISSoc1	2604588	CYB_2510	2603950	2604660	
YMJAS15TF	ISSoc2	2613615	CYB_2517	2613613	2615805	<i>glyS</i>
YMIA863TR	ISSoc1	2675907	CYB_2572	2676627	2675800	
YMIA863TF	ISSoc1	2678317	CYB_2574	2678328	2676757	
CYPM802TR	ISSoc1	2694323	CYB_2595	2696505	2694268	
CYOCJ16TR	ISSoc1	2724880	CYB_2634	2725314	2724877	
CYOCJ16TF	ISSoc1	2724881	CYB_2634	2725314	2724877	
CYPBD12TR	ISSoc2	2729595	CYB_2640	2729254	2729634	
CYPEG48TR	ISSoc2	2729595	CYB_2640	2729254	2729634	
YMIAU31TF	ISSoc2	2729595	CYB_2640	2729254	2729634	
CYPAM12TF	ISSoc1	2754586	CYB_2667	2753886	2754590	
CYPDP87TF	ISSoc1	2754586	CYB_2667	2753886	2754590	
CYPFV13TF	ISSoc1	2754586	CYB_2667	2753886	2754590	
CYPGN14TR	ISSoc1	2754586	CYB_2667	2753886	2754590	
CYPBK90TF	ISSoc1	2754587	CYB_2667	2753886	2754590	
CYPDG80TR	ISSoc1	2754587	CYB_2667	2753886	2754590	
YMJAD31TF	ISSoc1	2754587	CYB_2667	2753886	2754590	
CYPB881TF	ISSoc13	2809353	CYB_2716	2809421	2807448	
CYPCO85TR	ISSoc13	2846070	CYB_2751	2845498	2847735	
CYPH056TF	ISSoc13	2865707	CYB_2766	2865694	2865831	

CYPDQ07TR	ISSoc1	2872851	CYB_2779	2874769	2872847	<i>speA</i>
CYPL317TR	ISSoc1	2872851	CYB_2779	2874769	2872847	<i>speA</i>
CYPHQ15TF	ISSoc1	2937356	CYB_2839	2937063	2937359	
YMIAF65TR	ISSoc10	2979670	CYB_2881	2982314	2979666	<i>leuS</i>
CYPK015TF	ISSoc1	2994373	CYB_2896	2994861	2994283	
YMBBA53TF	ISSoc1	2994373	CYB_2896	2994861	2994283	
YMBDN93TR	ISSoc1	2994373	CYB_2896	2994861	2994283	
YMBE747TF	ISSoc1	2994373	CYB_2896	2994861	2994283	
CYPDV53TR	ISSoc2	3006242	CYB_2907	3006351	3006229	
CYOC855TF	ISSoc1	3006371	CYB_2908	3006428	3006327	
YMAB677TR	ISSoc1	3006371	CYB_2908	3006428	3006327	
YMABN85TF	ISSoc1	3006371	CYB_2908	3006428	3006327	
YMACF17TF	ISSoc1	3006371	CYB_2908	3006428	3006327	
YMBE375TR	ISSoc1	3006371	CYB_2908	3006428	3006327	
CYOC027TR	ISSoc11	3016126	CYB_2917	3016169	3016047	

gene product

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urease, alpha subunit  
urease, alpha subunit  
urease, alpha subunit  
sensory box histidine kinase  
conserved hypothetical protein  
hypothetical protein  
hypothetical protein  
hypothetical protein  
hypothetical protein  
manganese/zinc/iron chelate ABC transporter (MZT) family, ATP-binding protein  
manganese/zinc/iron chelate ABC transporter (MZT) family, ATP-binding protein  
manganese/zinc/iron chelate ABC transporter (MZT) family, ATP-binding protein  
iron-sulfur cluster-binding protein  
iron-sulfur cluster-binding protein  
putative plasmid stability protein, authentic point mutation  
putative plasmid stability protein, authentic point mutation  
polyamine/opine/phosphonate uptake ABC transporter (POPT) family, permease protein  
polyamine/opine/phosphonate uptake ABC transporter (POPT) family, permease protein  
hypothetical protein  
hypothetical protein  
hypothetical protein  
hypothetical protein  
conserved hypothetical protein  
conserved hypothetical protein  
conserved hypothetical protein  
peptidase, M48B family  
peptidase, M48B family  
xanthine dehydrogenase accessory factor, putative  
xanthine dehydrogenase accessory factor, putative  
xanthine dehydrogenase accessory factor, putative  
xanthine dehydrogenase accessory factor, putative  
membrane protein, bmp family  
conserved hypothetical protein  
conserved hypothetical protein  
conserved hypothetical protein  
sugar transporter, glycoside-pentoside-hexuronide (GPH): cation symporter family  
conserved hypothetical protein, authentic frameshift  
conserved hypothetical protein, authentic frameshift  
radical SAM domain protein  
conserved hypothetical protein  
glycosyl transferase, group 1 family protein  
hypothetical protein  
glycosyl transferase, group 1 family protein  
hypothetical protein  
conserved hypothetical protein  
peptidase, M28A family

putative membrane protein  
putative membrane protein  
putative membrane protein  
conserved domain protein  
isochorismatase family protein  
isochorismatase family protein  
isochorismatase family protein  
hypothetical protein  
hypothetical protein  
hypothetical protein  
glycosyl transferase, group 2 family protein  
conserved hypothetical protein  
conserved hypothetical protein  
conserved hypothetical protein  
conserved hypothetical protein, authentic frameshift  
YihY family protein  
YihY family protein  
YihY family protein  
YihY family protein  
YihY family protein  
YihY family protein  
dockerin type I repeat protein  
ISSoc11, transposase orfB  
CobN/magnesium chelatase domain protein  
IS891-like transposase, IS200/IS605 family, IS1341 group, truncation  
IS891-like transposase, IS200/IS605 family, IS1341 group, truncation  
oligopeptide ABC transporter, permease protein  
NAD<sup>+</sup> synthetase  
coenzyme F420 hydrogenase/dehydrogenase family protein  
iron-sulfur cluster-binding protein, Rieske family  
iron-sulfur cluster-binding protein, Rieske family  
iron-sulfur cluster-binding protein, Rieske family  
iron-sulfur cluster-binding protein, Rieske family  
iron-sulfur cluster-binding protein, Rieske family  
conserved hypothetical protein  
UDP-3-O-[3-hydroxymyristoyl] glucosamine N-acyltransferase  
macrocin-O-methyltransferase domain protein  
DNA polymerase III, subunits gamma and tau  
conserved hypothetical protein  
arsenite-antimonite (ArsAB) efflux family transporter, ATP-binding protein  
hypothetical protein  
lipoprotein, putative  
putative arylamine N-acetyltransferase  
conserved hypothetical protein  
hypothetical protein  
ISSoc14, transposase  
DNA gyrase, A subunit  
aminotransferase, class V  
ATPase, histidine kinase-, DNA gyrase B-, and HSP90-like domain protein





polyamine ABC transporter, ATP-binding protein  
polyamine ABC transporter, ATP-binding protein  
polyamine ABC transporter, ATP-binding protein  
D-alanine--D-alanine ligase B  
D-alanine--D-alanine ligase B  
D-alanine--D-alanine ligase B  
conserved hypothetical protein  
conserved hypothetical protein  
conserved hypothetical protein  
conserved hypothetical protein  
hydantoinase/oxoprolinase family protein  
hydantoinase/oxoprolinase family protein  
arginase family protein  
hypothetical protein  
transporter, small conductance mechanosensitive ion channel (MscS) family  
transporter, small conductance mechanosensitive ion channel (MscS) family  
SpoIID/LytB domain protein  
SpoIID/LytB domain protein  
SpoIID/LytB domain protein  
pyruvate kinase barrel domain protein  
uracil phosphoribosyltransferase  
conserved hypothetical protein, interruption-N  
ISSoc1, transposase, authentic point mutation  
ISSoc1, transposase, authentic point mutation  
ISSoc1, transposase, authentic point mutation  
ISSoc1, transposase, authentic point mutation  
conserved hypothetical protein  
L-aspartate oxidase  
hypothetical protein  
hypothetical protein  
glycyl-tRNA synthetase, beta subunit  
DnaJ domain protein  
radical SAM domain protein  
hypothetical protein  
conserved hypothetical protein  
conserved hypothetical protein  
ISSoc7, transposase, interruption-C  
ISSoc7, transposase, interruption-C  
ISSoc7, transposase, interruption-C  
conserved hypothetical protein  
conserved hypothetical protein  
conserved hypothetical protein  
conserved hypothetical protein  
conserved hypothetical protein  
conserved hypothetical protein  
conserved hypothetical protein  
peptidase M3B family, nonpeptidase homolog  
putative methyl-accepting chemotaxis protein  
hypothetical protein

