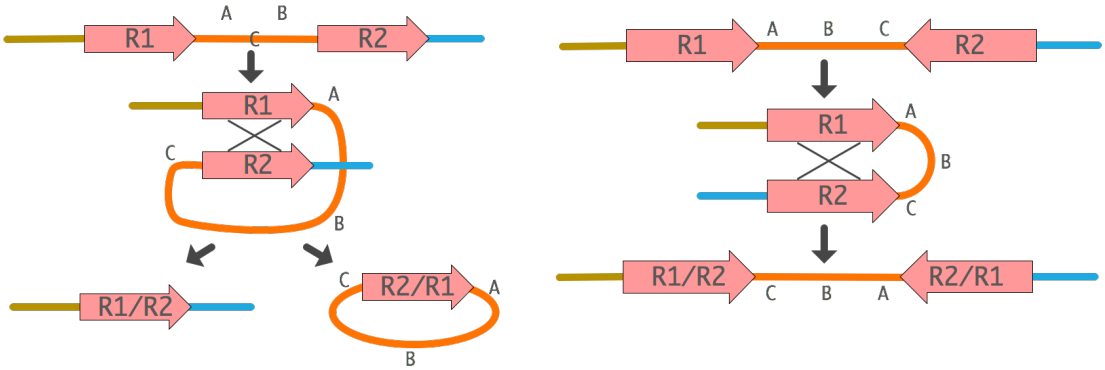
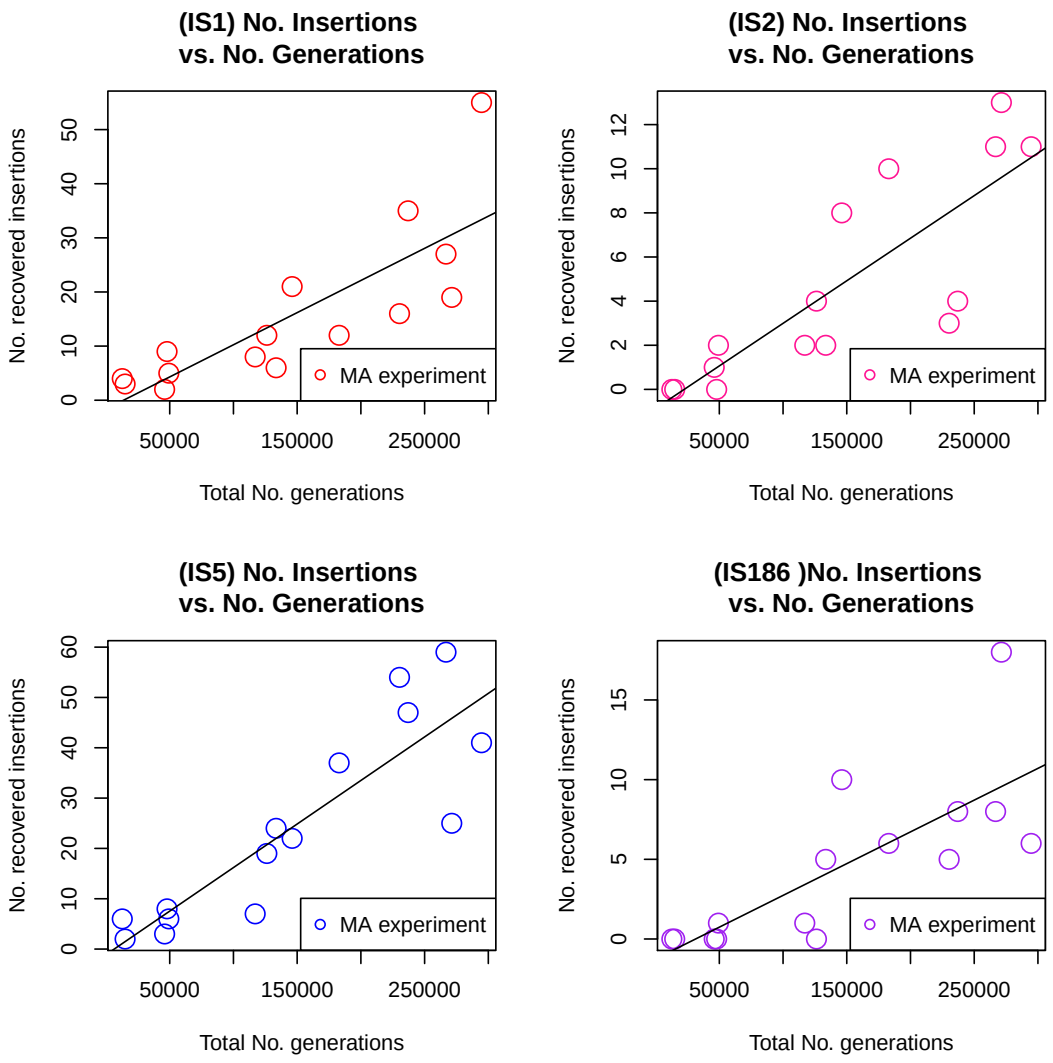
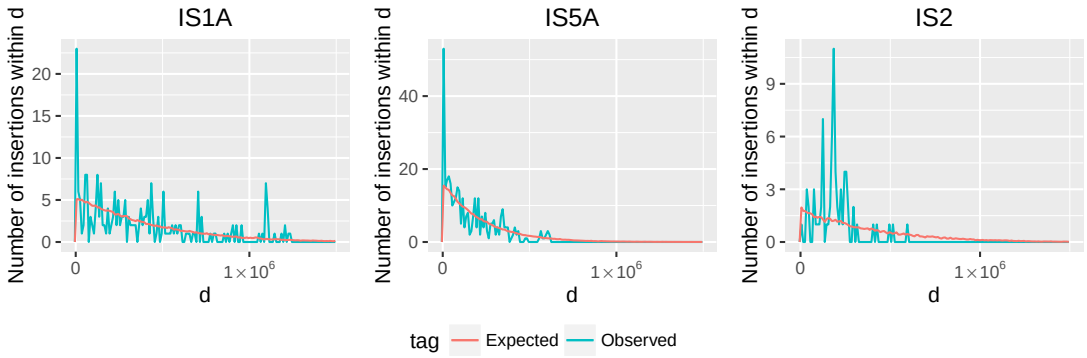
SUPPLEMENTARY MATERIAL



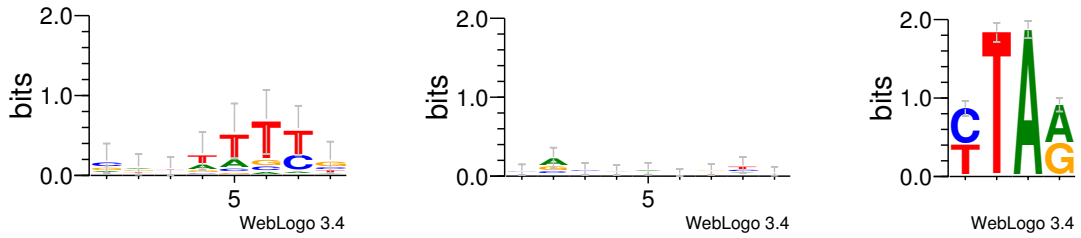
S1 Figure. Homologous recombination may occur between two direct copies (left) or two inverted copies (right) of IS elements. Recombination between inverted copies inverts the intervening segment; as a result, the set of paired-end shotgun reads obtained from the genome with or without the recombination remains the same as long as the length of the intervening segment is greater than the insert size of the paired-end reads. Therefore, our analysis here focuses on the recombination between direct repeats.



S2 Figure. The IS insertion rates in all MA experiments for each of the four most active IS families. IS*1* (1.2×10^{-4}, $R^2 = 0.63$, $p = 2.73 \times 10^{-4}$), IS*2* (3.9×10^{-5}, $R^2 = 0.66$, $p = 1.45 \times 10^{-4}$), IS*5* (1.7×10^{-4}, $R^2 = 0.75$, $p = 1.96 \times 10^{-5}$) and IS*186* (4.0×10^{-5}, $R^2 = 0.55$, $p = 9.60 \times 10^{-4}$)

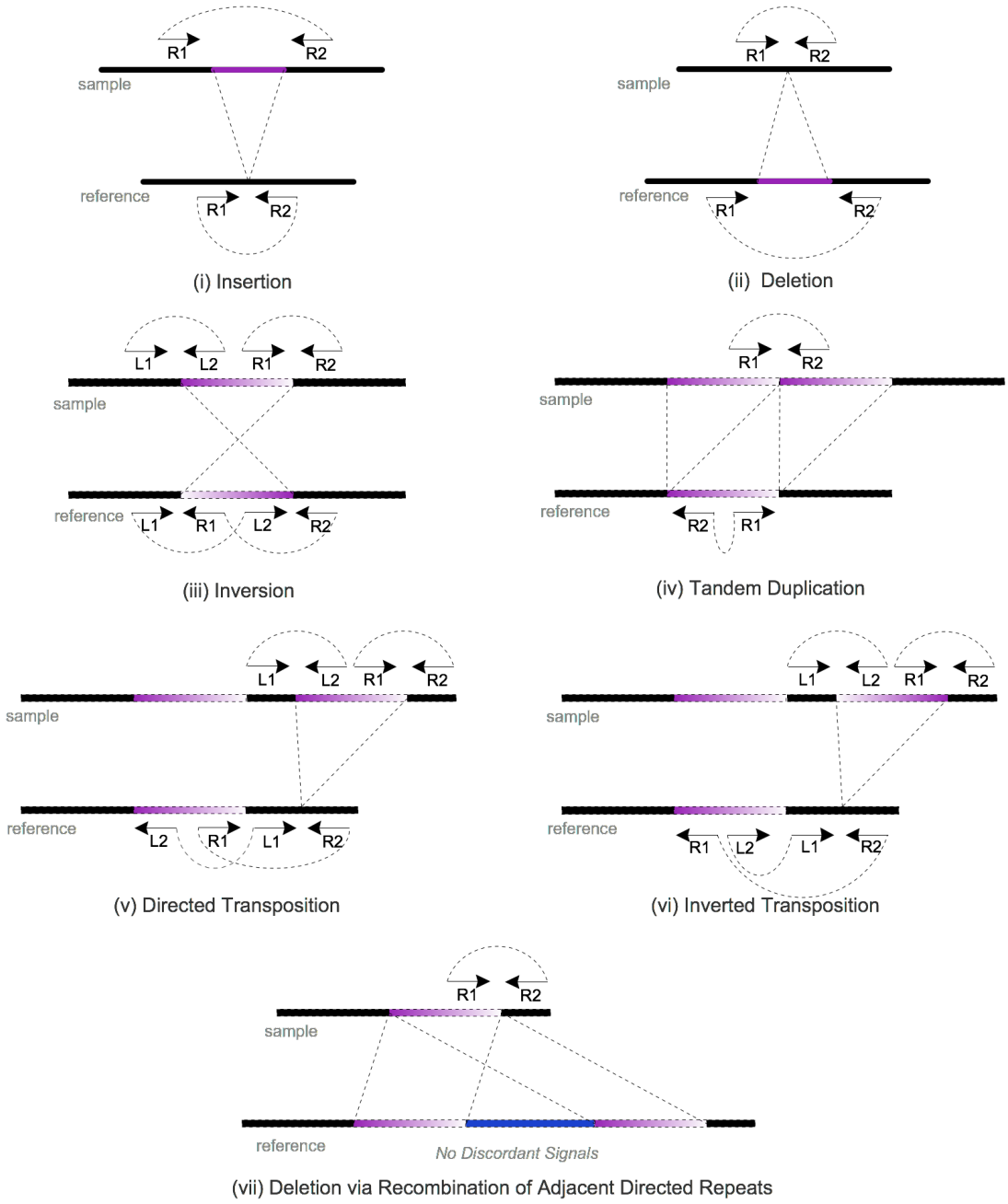


S3 Figure. Distribution of IS insertions respect to a distance threshold d. Insertions recovered data are shown in blue (observed) and average counts using the 1000-permutation test are shown in red (expected). A bin size of 10,000 bp were used to plot the distributions. IS*1*A and IS*5*A exhibit bias for nearby insertions and IS*2* shows bias for distant insertions.



(a) (b) (c)

S4 Figure. Sequence logos of the reconstructed TSDs of IS*1* with the 8 (a) and 9 (b) bps of TSDs, and IS*5* (c).



S5 Figure. Paired-end discordant signals used to identify structural rearrangement events. (i) and (ii) show simple cases requiring only a single breakpoint cluster and (iii)-(vi) shows complex cases requiring two breakpoint clusters to be correctly identified. (vii) shows that no discordant signal is generated for recombination of two existing direct repeats. GRASPER also uses coverage depletion information along with the discordant signals to confirm all deletion events (including the ones induced by recombination).

S1 Table. Number of IS elements of different families in the *E. coli* genome

IS Family	No. of copies in K-12 MG1655	No. of copies in PFM2
IS*1*A*	6	5
IS*1*B*	1	1
IS*2*	6	6
IS*3*	5	5
IS*4*	1	1
IS*5*A*	10	10
IS*5*B*	1	1
IS*30*	3	3
IS*150*	1	1
IS*186*	3	4
IS*609*	1	1
IS*X*	1	1
IS*Z*	1	1
IS*600*	1	1
Total	41	41

* IS*1* and IS*5* families have been further divided into their subfamilies based on sequence divergence of greater than 5%. Note that subfamily classification is automatically done by the *A*-Bruijn graphconstructed by GRASPER.

S2 Table. IS element insertions found in *E. coli* MA data

Strain	Description	No. of Lines	Generations per line	IS*1*A	IS*1*B	IS*2*	IS*3*	IS*4*	IS*5*A	IS*5*B	IS*150*	IS*186*	Total	Rate* ($\times 10^{-4}$)
PFM2	WT	38	3080	8	0	2	2	1	7	0	0	1	21	1.79
PFM2	WT-6k	21	6356	6	0	2	0	0	24	1	1	5	39	2.92
PFM2	WT on min	44	6166	19	0	13	7	0	25	0	1	18	83	3.10
PFM5	*mutL*	34	375	4	0	0	0	0	6	0	0	0	10	7.84
PFM101	*umuDC dinB*	39	6078	35	0	4	0	1	47	0	0	8	95	4.03
PFM133	*umuDC dinB polB*	43	6204	27	0	11	0	2	59	1	0	8	108	4.07
PFM35	*uvrA*	23	6350	20	0	8	0	2	23	0	0	10	63	4.37
PFM40	*alkA tagA*	37	6225	16	2	3	1	0	54	0	0	5	81	3.56
PFM88	*ada ogt*	47	6269	55	0	11	0	0	41	0	0	6	113	3.88
PFM180	*xthA nfo*	40	3155	12	1	4	0	1	19	0	0	0	37	2.95
PFM61	*mutT*	25	599	3	0	0	0	1	2	0	0	0	6	4.62
PFM6	*mutY*	25	1972	5	0	2	0	0	6	0	0	1	14	2.96
PFM22	*nth nei*	50	920	2	0	1	0	0	3	0	0	0	6	1.43
PFM91	*nfi*	29	6308	12	0	10	0	0	37	0	0	6	65	3.60
PFM94	*mutY mutM*	25	1916	9	0	0	0	0	8	0	0	0	17	3.70

* per genome per generation

S3 Table. IS element recombinations found in *E. coli* MA data

Strain	Description	No. of Lines	Generations per line	IS*1*A	IS*1*B	IS*2*	IS*3*	IS*4*	IS*5*A	IS*5*B	IS*30*	IS*150*	IS*186*	Total	Rate* ($\times 10^{-5}$)
PFM2	WT	38	3080	0	0	0	0	0	1	0	0	0	0	1	0.854
PFM2	WT-6k	21	6356	0	0	0	0	0	2	0	0	0	0	2	1.59
PFM2	WT on min	44	6166	2	0	0	0	0	6	0	0	0	0	8	2.99
PFM5	*mutL*	34	375	0	0	0	0	0	1	0	0	0	0	1	7.84
PFM101	*umuDC dinB*	39	6078	6	0	0	0	0	6	0	0	0	0	12	5.09
PFM133	*umuDC dinB polB*	43	6204	6	0	0	0	0	6	0	0	0	0	12	4.52
PFM35	*uvrA*	23	6350	1	0	1	0	0	5	0	0	0	0	7	4.85
PFM40	*alkA tagA*	37	6225	6	1	0	0	0	9	0	0	0	0	16	7.04
PFM88	*ada ogt*	47	6269	11	0	0	0	0	5	0	0	0	0	16	5.50
PFM180	*xthA nfo*	40	3155	5	0	1	0	0	6	0	0	0	0	12	9.58
PFM61	*mutT*	25	599	0	0	0	0	0	0	0	0	0	0	0	-
PFM6	*mutY*	25	1972	2	0	0	0	0	0	0	0	0	0	2	4.23
PFM22	*nth nei*	50	920	0	0	0	0	0	0	0	0	0	0	0	-
PFM91	*nfi*	29	6308	2	0	0	0	0	3	0	0	0	0	5	2.77
PFM94	*mutY mutM*	25	1916	2	0	0	0	0	2	0	0	0	0	4	8.71

* per genome per generation

S4 Table. IS*186* insertion TSDs with flaking bases

Number of insertions	TSD Length	Insertion direction	Position	TSDs with flanking bases
1	4	+	2151681	GGGG(TTTC)CCCC
1	5	-	2599802	GGGG(AGGAT)CCCC
4	6	+/-	838449	GGGG(CCTGCG)CCCC
2	6	-	944131	GGGG(TTTCGG)CCCC
1	6	+	1201165	GGGG(CTTGCG)CCCC
8	6	+/-	2373845	GGGG(AGATCT)CCCC
5	6	+/-	2953112	GGGG(TTTCCC)CCCC
1	6	-	4231411	GGGG(ATTCAG)CCCC
16	6	+/-	4541627	GGGG(CCGCAA)CCCC
4	7	+/-	272209	GGGG(CCCATAC)CCCC
2	7	+	458010	GGGG(GAAACAT)CCCC
1	7	+	1301334	GGGG(TTGTTAT)CCCC
1	7	+	1349217	GGGG(CGCTTTT)CCCC
1	7	+	1391476	GGGG(AGATTGT)CCCC
1	7	-	1716529	GGGG(AAAATAG)CCCC
3	7	-	2373845	GGGG(AGATCTC)CCCC
1	6*	+	357269	GTGG(ATGTAG)CCCC
1	6*	+	2306769	GTGG(ATGAAA)CCCC
2	6*	-	2599802	AGGG(GATCCT)CCCC
1	7*	-	730878	GGGG(CTGGTCA)CCCA
2	7*	+/-	3075731	CTGG(AGCCCAT)CCCC

* indicates sites differing by 1 or 2-bases in GGGG/CCCC flanking sequences.

S5 Table. Primers used to confirm IS insertions

Name	IS	Forward Primer (5′-> 3′)	Reverse Primer (5′-> 3′)	Forward Primer (5′,3′)-positions	Reverse Primer (5′,3′)-positions
M35-108	5	GTAGCTGCCCCAGGATGTAC	TTGGGATATTAGCGGCGGTC	153759,153778	154344,154325
wt1	5	GCCCCATTTTTCTCGGGGCA	TGGTAGTGACCCCGACCCCG	294084,294103	294483,294464
mutL25	5	TTTCCCGCGCCGAATCTGCC	ACCATTCGTCGCAAACAGTCCAC	317003,317022	317412,317390
mutL38	5	TGCATCCACCGCCAGTTGGG	GCACAAACCGTGGTTCCGCC	318491,318510	318841,318822
wt99	5	CGGCGCGTACGTGGAGCTAA	ACGCGTCCGGGAACATCACG	330381,330400	330718,330699
M133-061	2	TGTGGAAAAATGGCTTCGCG	GCTTGAGTGCGATGCGTAAG	343948,343967	344521,344502
wt16	1	GCGGGACGCACAAAATCGTCC	CCTGGAGCGAAAACACCGGCA	431505,431525	431874,431854
M88-44	2	CGTGCAAGAGGGAAAGGGAT	AGAGCACTTATCGCCTGCTG	568887,568906	569617,569598
wt16	4	ATCGAGCCTGTCGGTGCGCT	ACGCCTTCGCTTTATGCGCCA	840246,840265	840607,840587
mutL32	5	CCCCCGTTTTGACTAAAATGCGCC	CGCTCTGTGCGTAACCGCCA	849410,849433	849778,849759
M2m-25	1	TGCCACTGCCGTCAATAAGT	ATCTATTTGCAACCCCGCCA	986240,986259	986728,986709
wt83	1	AAGCGAGGTCGCTCCGTCAA	ACAGCACCAGAGCCAGAATCCCA	1094838,1094857	1095231,1095209
M88-29	5	GTCATGGTTCCAGCCCAACT	CGGCGAATGCTACTTTACGC	1101283,1101302	1102042,1102023
wt7	1	TGATGTCGCCAGGTGCTGCG	AAGCTGGGCGCGAGAAGCAG	1370930,1370949	1371310,1371291
wt92	5	TCGTGGTTTCTTCCCACGTAGCG	AAACCACGGGTTGCCCCGGT	1489012,1489034	1489264,1489245
M88-76	5	GTGAAGTTTTGCAGCCCTGG	GTTGCGGTGGTTGTAACTGG	1543407,1543426	1544037,1544018
M91-02	2	TAGGCTGCTGTGGTGACATC	TTGGCGGTACGGGAATACAC	1588469,1588488	1589182,1589163
wt76	2	CGCCGTGGCCGTCATAACCA	GGACGGTTCCCACGGTGTCG	1594892,1594911	1595145,1595126
M101-009	1	AATACAGACAGCACACGCCC	AGTTGTCAATGTGACTCGCCA	1701971,1701990	1702659,1702639
wt7	5	ACCTCCCTATTCCATGAGCAAGCA	TCCTGTGAGTCGCATACGGAACC	1777330,1777353	1777634,1777612
M88-39	2	TTCAACACCTTCCCGCAAGA	GGCGTACCAAAGATCGACCA	1806898,1806917	1807592,1807573
wt80	5	CCCACAGCCACAACCGTCCC	GTCGCAATTGCTATCGCCACCA	1856634,1856653	1856960,1856939
mutL54	1	GCCCACCGTTTGGCTTCGGT	CAGCTGACATTGTTGCCTGG	1923303,1923322	1923580,1923561
wt5	5	GCCGTTGCTCCAGTCGCCA	TCTTGGCCTTGATGGTTTTAGCGT	2000840,2000858	2001130,2001107
M88-10	5	TGCAACCTGCTGGTCTTTCA	GAAACCGTTCTTCGCTGCTG	2188807,2188826	2189492,2189473
M91-30	2	GAAAGCACACGATATGCGCC	TTGCGCATTTTCATCTCCGC	2313180,2313199	2313921,2313902
M2m-53	5	TCAGTCCCAAAACCGACACC	GCCTCTTCAATTCGTTCGCC	2362173,2362192	2362721,2362702
wt1	3	GCCCAGTACGCTCACAGCCA	CCGGCAGCATGGGACCCAAC	2487315,2487334	2487632,2487613
M91-30	1	GTCAGGCAACCAGTATGCGA	ACATTGCCACAGGCAGAAGA	2627316,2627335	2627853,2627834
mutL75	5	AAAATGAGGTGCGTCGCGCT	GGAGCAACACCCCACAGACTCG	2755277,2755296	2755584,2755563

Continued on next page

S5 Table – continued from previous page

Name	IS	Forward Primer (5′-> 3′)	Reverse Primer (5′-> 3′)	Forward Primer (5′,3′)-positions	Reverse Primer (5′,3′)-positions
mutL2	5	CGAAGAAGTTGAAGGTACCTGGCCT	ACTAAAGCAACAGGTTAGGGGGAGT	2786452,2786476	2786817,2786793
M180-90	1	GTAATGAACGGCAACGCTCC	GGCGAACGAATGGGCTAAAC	2980053,2980072	2980765,2980746
M88-16	5	TCGTTCACATTCGGTCCAACA	GGGCATTGTGTGTATGTGCG	2986166,2986186	2986899,2986880
M101-017	186	GTTCAAATACGCGCAGACGG	GTATGTGCTGATGAAGCCGC	3075418,3075437	3076096,3076077
mutL15	1	GCCACGCCTGGTGCGAGAAT	TTCAAAACACCGGTTTCCCTGCT	3077162,3077181	3077453,3077431
mutL75	1	CGCACACGCAGACGCAGAGT	AAACGCTGGCGATCCGGCTT	3119469,3119488	3119818,3119799
wt99	2	TCACCACAGGCGATCATTCCCA	CAATGCGTTGTCCGGTGCGA	3361222,3361243	3361578,3361559
M101-081	1	ATCAAGCTACCGCCAGGAAC	CTTTAGTTGGTGCAGGTGCG	3435743,3435762	3436397,3436378
wt16	1	AAGCCAGATGCCAGCCCTCCT	TGGACGGACTGGTCAGCGGTA	3455055,3455075	3455390,3455370
wt71	1	CTACCCCGGGCCCATGATGC	TGTCGTCGTTCTGGCTGGAAATCA	3630991,3631010	3631471,3631448
M101-007	5	AAGCCTGAACGATAGCTGGG	GCAACCCGACGATAAACAGC	3654505,3654524	3655126,3655107
M40-25	5	GCCGCCAGCTCATAACTCTC	TGCTGTCTAAGTGCGACCTG	3718499,3718518	3721249,3721230
M35-051	5	ACGCCAGAAAAACCCAGTGA	ACAGGTGGCTAATCCCAAGG	3766159,3766178	3766860,3766841
M88-75	5	GGCTATGTGGGCTGGAATGA	TCCCGATCCAGGGAGAGATG	3896444,3896463	3896971,3896952
mutL36	1	TGCCACGAAGAACGGCTGGG	TGACCCGTCTCCGGCAACCA	3914175,3914194	3914484,3914465
wt93	1	CCACTATCACGGAGTCGCTGGC	CCACGCGCTTGCGTCTCTCA	4001014,4001035	4001501,4001482
M88-09	2	GTAGCAGTAAAACGCTCGCC	TCAGATCGCTGGTTTGGGTG	4002362,400238	4003089,4003070
M133-009	1	CCCCACAGTGCTGATTTTGC	CAGGTCGATATACCCCTGCG	4248503,4248522	4249043,4249024
M101-097	1	AAACGCTGACCACCCACAAA	ACGAGCATATTGACCAGCCG	4274842,4274861	4275363,4275344
M40-21	5	GCTGGGCATCGTCAAAATCC	CGCTTTATTGCCGCCTCATC	4304431,4304450	4304994,4304975
M40-21	2	CGTGGAAGTAGCCTGTCTGG	CACACCTGCCGTAACAAAGC	4341016,4341035	4341877,4341858
wt83	1	CTGGGGCGGGATTGCACTGG	AGCGATTGCGGCACGGTTCA	4410232,4410251	4410512,4410493
M2m-39	186	GGCGGACTGGATTGAGTTGA	ACAGCACGAAACCACAGTCA	4432453,4432472	4433177,4433158
M88-46	1	CCCGATGGGCGATAGAACTC	TTATCCCGCATCACCCTGTG	4495371,4495390	4496164,4496145
M6-20	5	TGCGCTCCATGAAATAGCCA	CAAAACCACACGAATGGCGT	4538560,4538579	4539427,4539408
M91-06	186	CATCTAAAGCCGCTGTTGCC	TCTCCCACGGAAAGCACATC	4541403,4541422	4542082,4542063

S6 Table. Primers used to confirm IS recombinations

Name	IS	Forward Primer (5′-> 3′)	Reverse Primer (5′-> 3′)	Forward Primer (5′,3′)-positions	Reverse Primer (5′,3′)-positions
M88-19*	1	AAACGAAGGCGAAGTAGCCA	AACATGAGCGGCACGAGTAA	75096,75115	84502,84483
M133-042*	1	GCGTGACGAGGAACACAATG	CATGCCAGCAACGGTAACAC	278214,278233	290753,290734
M2m-32	5	TTGTGTCGTATCCGTCAGGG	GGATCTTGGAGTATGGGGCG	570770,570789	575140,575121
M35-076	5	TTGTGTCGTATCCGTCAGGG	AAATGCAGAAGTTTGGGCCG	570770,570789	575341,575322
M94-13	5	ATGTCACTGGCAGGTAAGCA	TCCCTCCGAACAGGACGATA	573422,573441	579459,579440
M101-073	5	GGTTACAGAAGGCTGAGGGC	CAGCCAAGAGCCATGAATAGG	573471,573490	576224,576204
WT-100*	5	GCCTTTTTCAGCACGTTCGAT	TCCCATATTTCGGCACGCTC	675702,675722	688540,688521
M6-1	1	AACAGGCATTGGGTGCAATC	TGCAGCTGGGTGTGTATTTTG	1195964,1195983	1198622,1198602
M40-11*	5	AATCGATAACGCCTGGGGTG	GGGCTGACTTAGGGGACCAC	1393709,1393728	1476854,1476835
M91-45*	5	AATCGATAACGCCTGGGGTG	ACAACCTGAACAAGTAAGGGCA	1393709,1393728	1432995,1432974
M101-075	1	ATGTTGACCCCTTTCGTCCC	TAAACGCATTCAGCGCAGTG	1751226,1751245	1753025,1753006
M88-61*	1	TCAAACGCTGTGCAAGTAGT	TGAGGAAAACTTCGAGCGGG	1976149,1976168	1989197,1989178
M88-47*	1	GCTGCAATAAGCAGAACCACC	CACGTTTTCACACCTGCTCG	1976331,1976351	1987405,1987386
M88-10*	5	GGCGTATCGGAGGAAGATCC	GGTGGGGATCGTGTTAGGAC	3117028,3117047	3129645,3129626
M40-28	1	ATTACGAGGCCATCAGGCAG	TTTTTCAGAACGTCGAACGGG	3579198,3579217	3582613,3582593
M88-50	1	ATTACGAGGCCATCAGGCAG	TTTTTCAGAACGTCGAACGGG	3579198,3579217	3582613,3582593
M91-69	1	ATTACGAGGCCATCAGGCAG	TTTTTCAGAACGTCGAACGGG	3579198,3579217	3582613,3582593
M94-10	1	ATTACGAGGCCATCAGGCAG	TTTTTCAGAACGTCGAACGGG	3579198,3579217	3582613,3582593
M133-105	1	GCGCGGGTGAAGTAAGATAG	TTTTTCAGAACGTCGAACGGG	3579635,3579654	3582613,3582593
M94-39	1	GAAGCACCGCTCAAGGAATC	CGGGGTACTAAGGTTAGCGG	3581124,3581143	3583114,3583095
M40-40*	2	GCCATAAAGCGACTCGAACG	TCGCCCGGAAACCATGAATA	4516205,4516224	4539124,4539105

* indicates amplicons in founder (no deletion) could not be amplified due to the large sizes.

S7 Table. 98 IS-associated recombinations

Type	Line	IS Family	Size	Start	End	CP4-6
E+E	mutL54	IS5A	35594	2065377	21009678	
E+N	wt70	IS5A	35580	274375	309954	
E+N	wt-100	IS5A	11032	676037	687068	
E+N	wt-63	IS5A	106106	274378	380483	
E+N	M6-7	IS1A	207	290629	290832	
N+N	M6-1	IS1A	2358	1196110	1198468	
E+N	M35-019	IS5A	259	3129370	3129628	
E+N	M35-016	IS5A	310	3364778	3365087	
E+N	M35-013	IS1A	2044	3579410	3581453	
E+N	M35-076	IS5A	2787	571023	573809	
E+N	M35-016	IS5A	8189	575013	583201	
E+N	M35-026	IS5A	36223	274376	310599	
E+N	M35-019	IS2	91872	1467283	1559154	
E+N	M40-11	IS5A	1138	3648917	3650054	
E+N	M40-28	IS1A	1944	3579505	3581448	
E+N	M40-16	IS5A	2593	2100974	2103566	
E+N	M40-33	IS5A	2895	575013	577907	
E+N	M40-42	IS5A	4481	3651258	3655738	
E+N	M40-11	IS5A	5594	3129366	3134959	
N+N	M40-50	IS5A	8654	1622501	1631155	
E+N	M40-33	IS5A	9274	677793	687066	
N+N	M40-55	IS1A	12924	1599005	1611929	
E+N	M40-40	IS1B	21624	4517263	4538886	
N+N	M40-16	IS1A	27545	2873737	2901282	
E+N	M40-35	IS5A	81352	1395267	1476618	
E+N	M40-11	IS5A	81353	1395267	1476619	
E+E	M40-11	IS1A	11473	279154	290625	Yes
E+E	M40-36	IS1A	11473	279154	290625	Yes
E+E	M40-56	IS1A	11473	279154	290625	Yes
E+N	M88-08	IS5A	849	3129373	3130221	
E+N	M88-50	IS1A	887	3580566	3581452	
E+N	M88-32	IS1A	1401	1977460	1978907	
E+N	M88-63	IS1A	1475	3579974	3581448	
E+N	M88-76	IS5A	1626	575014	576639	
E+N	M88-26	IS1A	1066	1975616	1977451	
E+N	M88-35	IS1A	3654	1972916	1977451	
E+N	M88-09	IS5A	4703	682368	687070	
E+N	M88-39	IS5A	5749	3651258	3657006	
E+N	M88-17	IS1A	7401	1977460	1984904	
N+N	M88-19	IS1A	8901	75303	84333	
E+N	M88-47	IS1A	9601	1977459	1987130	
E+N	M88-10	IS5A	10957	3117210	3128166	
E+N	M88-61	IS1A	11001	1977459	1988532	
E+N	M88-63	IS1A	13289	1963393	1977451	
E+N	M88-27	IS1A	16654	1959940	1977451	
E+N	M91-28	IS5A	465	3363109	3363574	
E+N	M91-28	IS1A	1031	3580420	3581450	
E+N	M91-69	IS1A	2005	3579448	3581452	
E+N	M91-70	IS5A	4815	3129368	3134182	

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S7 Table – continued from previous page

Type	Line	IS Family	Size	Start	End	CP4-6
E+N	M91-45	IS5A	36917	1395267	1432183	
E+N	M94-39	IS1A	560	3582221	3582780	
E+N	M94-10	IS1A	1959	3579491	3581449	
E+N	M94-13	IS5A	4056	575016	579071	
E+N	M94-54	IS5A	8746	3119418	3128163	
E+N	M101-017	IS5A	452	3649604	3650055	
E+N	M101-073	IS5A	986	575015	576000	
E+N	M101-033	IS5A	1083	3648975	3650057	
N+N	M101-075	IS1A	1379	1751513	1752892	
E+N	M101-049	IS1A	1411	3580043	3581453	
E+N	M101-043	IS1A	1826	3579625	3581450	
E+N	M101-085	IS5A	2258	3651260	3653517	
N+N	M101-083	IS1A	8863	3851135	3859998	
E+N	M101-035	IS5A	27991	1395269	1423259	
E+N	M101-039	IS5A	48286	2100976	2149261	
E+E	M101-079	IS1A	11473	279154	290625	Yes
E+E	M101-093	IS1A	11473	279154	290625	Yes
N+N	M133-113	IS1A	162	2379405	2379567	
E+N	M133-063	IS5A	453	3649603	3650055	
E+N	M133-115	IS5A	615	3364776	3365390	
E+N	M133-105	IS1A	1508	3579941	3581448	
E+N	M133-093	IS1A	1808	3579643	3581450	
N+N	M133-070	IS5A	3964	1632879	1636843	
N+N	M133-070	IS5A	6846	3764113	3770959	
N+N	M133-009	IS1A	7770	2481518	2489288	
E+N	M133-034	IS5A	10196	274376	284571	
E+N	M133-111	IS5A	28250	274377	302626	
E+E	M133-042	IS1A	11473	279154	290625	Yes
E+E	M133-092	IS1A	11473	279154	290625	Yes
N+N	M180-99	IS5A	177	89170	89347	
E+N	M180-85	IS2	230	2068300	2068529	
E+N	M180-88	IS5A	608	3364777	3365384	
E+N	M180-34	IS5A	1338	3648715	3650052	
E+N	M180-79	IS5A	1912	3364777	3366688	
E+N	M180-90	IS1A	1927	3579525	3581451	
E+N	M180-33	IS5A	2693	571117	573809	
E+E	M180-40	IS5A	35594	2065377	2100970	
E+E	M180-05	IS1A	11473	279154	290625	Yes
E+E	M180-38	IS1A	11473	279154	290625	Yes
E+E	M180-77	IS1A	11473	279154	290625	Yes
E+E	M180-83	IS1A	11473	279154	290625	Yes
E+N	M2m-41	IS5A	220	3363358	3363570	
E+N	M2m-44	IS5A	544	3364776	3365319	
E+N	M2m-39	IS1A	1941	3579510	3581450	
E+N	M2m-32	IS5A	2667	571144	573810	
E+N	M2m-33	IS5A	2667	571144	573810	
E+N	M2m-53	IS5A	4072	575012	579083	
E+N	M2m-41	IS5A	27441	274375	301815	
E+E	M2m-27	IS1A	11473	279154	290625	Yes

S8 Table. 758 IS insertions (*gene name if an insertion lands on a protein-coding gene, 'NC' otherwise.)

IS Family	Line	Strand	Position	Gene name*
IS1A	M180-27	+	7594	yaaJ
IS1A	M101-037	-	11035	yaaW
IS1A	M35-009	-	42482	fixA
IS1A	M88-19	+	75303	thiB
IS1A	M88-44	-	83776	NC
IS1A	M88-19	+	84333	NC
IS1A	M91-15	+	84678	leuO
IS1A	M35-039	-	84705	leuO
IS1A	M88-27	+	85491	NC
IS1A	M133-022	+	154379	htrE
IS1A	M133-020	-	155485	ecpD
IS1A	M101-013	+	161295	sfsA
IS1A	M6-7	+	290832	NC
IS1A	M180-32	+	293053	yagL
IS1A	M35-069	-	317550	NC
IS1A	M88-10	+	318779	ykgC
IS1A	M94-38	+	377810	frmA
IS1A	M88-16	+	399314	ddlA
IS1A	M35-004	-	401220	phoA
IS1A	M61-32	-	414970	sbcC
IS1A	wt16	-	431673	yajI
IS1A	M101-077	-	480454	NC
IS1A	M180-90	-	535220	hyi
IS1A	M133-085	+	537033	ybbW
IS1A	M101-019	+	579323	NC
IS1A	M94-13	+	603627	mscM
IS1A	M40-37	+	637896	NC
IS1A	M22-47	+	651354	NC
IS1A	M94-24	-	676048	ybeR
IS1A	M35-090	-	678186	ybeT
IS1A	M88-09	-	819897	NC
IS1A	M35-026	+	819959	NC
IS1A	M2m-15	-	875583	yliF
IS1A	M133-056	+	915463	NC
IS1A	M2m-83	+	955517	ycaO
IS1A	M2m-25	-	986477	NC
IS1A	M133-073	-	996857	NC
IS1A	M180-96	+	1016986	ycbZ
IS1A	M40-41	+	1031468	hyaA
IS1A	M88-18	-	1049314	insA
IS1A	M88-64	-	1071695	rutB
IS1A	wt83	+	1095049	NC
IS1A	M88-18	+	1103090	NC
IS1A	M91-19	-	1107603	opgC
IS1A	M133-073	+	1108045	opgC
IS1A	M133-056	-	1119478	solA
IS1A	M88-50	+	1168513	bhsA
IS1A	M88-37	+	1180206	ycfZ

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S8 Table – continued from previous page

IS Family	Line	Strand	Position	Gene name*
IS1A	M6-1	+	1196110	ymfD
IS1A	M6-1	+	1198468	lit
IS1A	M94-33	-	1208829	NC
IS1A	M2m-84	-	1278062	narK
IS1A	M40-72	+	1293106	tdk
IS1A	wt-63	-	1298535	NC
IS1A	M101-069	-	1307695	kch
IS1A	M88-60	+	1314403	NC
IS1A	M2m-35	+	1333083	NC
IS1A	M2m-12	-	1333523	NC
IS1A	wt7	+	1371109	ycjN
IS1A	M133-071	+	1391916	mppA
IS1A	M35-016	+	1431986	NC
IS1A	M101-029	-	1480237	NC
IS1A	M133-087	+	1484652	hrpA
IS1A	M35-069	-	1524995	yncH
IS1A	M133-103	+	1529480	NC
IS1A	M88-30	-	1541563	narU
IS1A	M88-08	+	1543552	NC
IS1A	M94-12	-	1554589	NC
IS1A	M88-27	+	1584831	NC
IS1A	M40-55	+	1599005	lsrR
IS1A	M40-55	+	1611929	sad
IS1A	M88-36	-	1615003	NC
IS1A	M35-008	-	1621354	ydeH
IS1A	M101-023	-	1630351	NC
IS1A	M35-099	-	1647693	dicB
IS1A	M101-019	-	1659520	ynfF
IS1A	M2m-44	-	1687922	ydgA
IS1A	M88-17	+	1696213	malI
IS1A	M101-009	-	1702189	ydgJ
IS1A	M91-20	-	1728908	lhr
IS1A	M101-075	+	1751513	ydhV
IS1A	M88-54	-	1751531	ydhV
IS1A	M91-08	+	1752298	ydhY
IS1A	M61-22	+	1752603	NC
IS1A	M101-075	+	1752892	NC
IS1A	M88-36	-	1771721	ydiN
IS1A	M101-039	-	1776544	ydiP
IS1A	M88-30	+	1777191	ydiP
IS1A	M88-45	+	1823991	astE
IS1A	M88-45	+	1853873	ydjG
IS1A	M35-090	+	1857238	ydjK
IS1A	M101-083	-	1905942	NC
IS1A	mutL54	-	1923445	NC
IS1A	M61-28	-	1949069	yecD
IS1A	M2m-78	+	1950895	cmoA
IS1A	M88-43	-	1953080	torZ
IS1A	M101-012	+	1956052	torY
IS1A	M88-27	+	1959940	NC

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S8 Table – continued from previous page

IS Family	Line	Strand	Position	Gene name*
IS1A	M88-63	+	1963393	flhB
IS1A	M88-35	+	1972916	cheA
IS1A	M88-26	+	1975616	flhC
IS1A	M88-32	+	1978907	otsA
IS1A	M88-47	+	1987130	ftnA
IS1A	M88-61	+	1988532	tyrP
IS1A	M88-13	+	2097920	gnd
IS1A	M133-032	-	2105551	glf
IS1A	M88-41	+	2127423	wcaE
IS1A	M35-008	-	2147228	yegI
IS1A	M91-27	+	2149127	NC
IS1A	M2m-35	-	2149358	yegJ
IS1A	M88-62	+	2211087	yehU
IS1A	M101-043	-	2232120	preB
IS1A	M88-11	-	2236555	mglA
IS1A	M88-31	-	2253295	NC
IS1A	M2m-78	-	2272956	yejB
IS1A	M101-019	+	2342314	NC
IS1A	M133-133	+	2379405	elaA
IS1A	M133-133	+	2379567	NC
IS1A	M88-17	+	2421159	yfcI
IS1A	M101-003	-	2432818	NC
IS1A	M35-107	-	2472660	yfdQ
IS1A	M133-016	+	2473070	yfdR
IS1A	M101-033	+	2475433	dsdC
IS1A	M91-29	-	2480126	emrY
IS1A	M133-009	+	2481518	NC
IS1A	M2m-14	-	2484328	evgS
IS1A	M180-96	+	2488911	oxc
IS1A	M133-009	+	2489288	oxc
IS1A	M88-20	-	2491631	NC
IS1A	M91-22	+	2507040	glk
IS1A	M101-047	-	2626709	yfgF
IS1A	M88-16	+	2627161	NC
IS1A	M91-30	-	2627540	NC
IS1A	wt-41	+	2651608	NC
IS1A	wt-65	-	2660634	trmJ
IS1A	M88-31	+	2698161	shoB
IS1A	M88-45	-	2771275	NC
IS1A	M35-026	+	2802237	nrdF
IS1A	M40-29	+	2858396	pphB
IS1A	M40-16	+	2873737	cysD
IS1A	M2m-83	-	2880158	casC
IS1A	M40-16	+	2901282	ygcE
IS1A	M180-90	-	2980363	NC
IS1A	M35-013	+	2985438	NC
IS1A	M180-01	+	3005309	ygeW
IS1A	M133-097	+	3028965	NC
IS1A	M40-51	+	3030853	yqfG
IS1A	mutL15	+	3077317	cmtB

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IS Family	Line	Strand	Position	Gene name*
IS1A	mutL75	-	3119617	NC
IS1A	M6-1	-	3134179	pitB
IS1A	M101-077	+	3144682	yghW
IS1A	M88-31	-	3165634	ygiS
IS1A	wt42	-	3165745	NC
IS1A	M88-27	+	3170473	NC
IS1A	M88-49	+	3183240	NC
IS1A	wt-12	-	3188661	yqiI
IS1A	M2m-35	+	3251332	NC
IS1A	M180-19	+	3263727	tdcB
IS1A	M91-08	+	3292196	lpoA
IS1A	M40-47	-	3319577	yhbX
IS1A	M88-36	+	3346660	yrbL
IS1A	M22-64	+	3359599	gltF
IS1A	M101-081	+	3436016	NC
IS1A	wt16	+	3455186	gspD
IS1A	M35-013	+	3579410	yhhY
IS1A	M91-69	+	3579448	yhhY
IS1A	M94-10	+	3579491	yhhY
IS1A	M40-28	+	3579505	yhhY
IS1A	M2m-39	+	3579510	yhhY
IS1A	M180-90	+	3579525	yhhY
IS1A	M101-043	+	3579625	yhhY
IS1A	M133-093	+	3579643	yhhY
IS1A	M133-105	+	3579941	yhhZ
IS1A	M88-63	+	3579974	yhhZ
IS1A	M101-049	+	3580043	yhhZ
IS1A	M91-28	+	3580420	yhhZ
IS1A	M88-50	+	3580566	yhhZ
IS1A	M2m-92	-	3580582	yhhZ
IS1A	M94-39	+	3582780	NC
IS1A	M88-08	-	3595996	NC
IS1A	wt71	+	3631241	NC
IS1A	M133-022	-	3633174	yhiM
IS1A	M94-51	+	3669487	yhjB
IS1A	M2m-38	-	3672012	yhjD
IS1A	wt-62	-	3706523	NC
IS1A	M2m-83	-	3724195	wecH
IS1A	M180-77	-	3724785	wecH
IS1A	M88-16	-	3767039	NC
IS1A	M101-009	-	3767663	NC
IS1A	M101-005	-	3767988	NC
IS1A	M35-009	-	3795444	rfaL
IS1A	M40-33	+	3798227	NC
IS1A	M2m-04	+	3799251	rfaJ
IS1A	M2m-93	-	3803049	rfaS
IS1A	M101-083	+	3851135	NC
IS1A	M101-083	+	3859998	NC
IS1A	M40-45	+	3887994	tnaA
IS1A	mutL36	-	3914303	atpD

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S8 Table – continued from previous page

IS Family	Line	Strand	Position	Gene name*
IS1A	M133-111	+	3984410	NC
IS1A	wt93	-	4001320	rarD
IS1A	M101-061	+	4059991	yihM
IS1A	M6-24	+	4077818	yiiF
IS1A	M101-079	+	4084986	NC
IS1A	M133-093	-	4085987	yiiG
IS1A	M94-17	-	4086695	frvR
IS1A	M88-45	+	4090966	NC
IS1A	M180-62	+	4111500	uspD
IS1A	M88-76	-	4119933	hslV
IS1A	M88-33	+	4219036	arpA
IS1A	M91-22	+	4220056	arpA
IS1A	M101-069	-	4220952	iclR
IS1A	M180-34	+	4233547	NC
IS1A	M133-009	+	4248632	NC
IS1A	M40-64	+	4258555	yjbL
IS1A	M133-022	+	4258719	yjbM
IS1A	M101-097	-	4275133	soxS
IS1A	M101-043	-	4280003	yjcF
IS1A	M101-012	-	4280920	yjcF
IS1A	M88-75	-	4333405	eptA
IS1A	M133-054	+	4350160	yjdJ
IS1A	M40-62	+	4359339	cadC
IS1A	M40-41	+	4381840	NC
IS1A	wt83	-	4410383	yjfL
IS1A	M35-048	+	4457272	pmbA
IS1A	M35-013	+	4495303	NC
IS1A	M88-46	-	4495844	NC
IS1A	M133-111	+	4524185	sgcR
IS1A	M101-061	-	4538681	NC
IS1A	M88-46	-	4539894	NC
IS1A	M101-079	-	4567036	NC
IS1A	wt-66	+	4597007	opgB
IS1A	M133-001	-	4604005	yjjZ
IS1A	M35-013	+	4609115	NC
IS1B	M40-06	-	2627081	NC
IS1B	M180-71	+	4067287	yihQ
IS1B	M40-40	+	4538886	NC
IS150	wt-62	+	3720098	NC
IS150	M2m-04	+	4596946	opgB
IS186	M133-095	-	272215	NC
IS186	M35-026	-	272216	NC
IS186	M88-19	-	272216	NC
IS186	M91-35	+	272216	NC
IS186	M88-43	+	357276	cynR
IS186	M133-003	+	458017	NC
IS186	M35-078	+	458017	NC
IS186	M101-015	-	730884	rhsC
IS186	M101-005	+	838455	NC
IS186	M101-033	-	838456	NC

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S8 Table – continued from previous page

IS Family	Line	Strand	Position	Gene name*
IS186	M40-47	+	838456	NC
IS186	M91-06	-	838456	NC
IS186	M2m-38	-	944137	NC
IS186	M133-081	-	944138	NC
IS186	M35-076	+	1201171	ymfJ
IS186	M2m-44	-	1237442	dadA
IS186	M2m-28	+	1301341	oppB
IS186	M2m-14	+	1349224	NC
IS186	M2m-93	+	1391483	mppA
IS186	M40-51	+	1501223	NC
IS186	M2m-93	-	1716536	anmK
IS186	M35-099	-	2011383	fliF
IS186	wt-63	+	2151686	NC
IS186	M35-026	+	2295405	ccmA
IS186	M133-011	+	2306776	alkB
IS186	M2m-47	+	2370465	arnT
IS186	M35-004	+	2373851	menC
IS186	M133-007	-	2373852	menC
IS186	M2m-26	+	2373852	menC
IS186	M2m-32	-	2373852	menC
IS186	M2m-33	-	2373852	menC
IS186	M2m-43	-	2373852	menC
IS186	M35-051	-	2373852	menC
IS186	M40-36	-	2373852	menC
IS186	M88-19	+	2373852	menC
IS186	M91-35	+	2373852	menC
IS186	wt92	-	2373852	menC
IS186	M88-18	-	2599808	hyfA
IS186	M2m-12	-	2599809	hyfA
IS186	wt-41	-	2599809	hyfA
IS186	M35-016	+	2836343	ascG
IS186	M2m-09	-	2953118	recB
IS186	M2m-79	+	2953118	recB
IS186	M91-20	-	2953118	recB
IS186	wt-44	+	2953118	recB
IS186	M133-101	+	2953119	recB
IS186	M101-017	-	3075738	cmtA
IS186	M35-048	+	3075739	cmtA
IS186	M88-64	-	4231417	NC
IS186	M2m-39	-	4432836	cpdB
IS186	M133-115	-	4438272	ytfL
IS186	M101-019	+	4541633	fimA
IS186	M101-073	+	4541633	fimA
IS186	M2m-18	-	4541633	fimA
IS186	M2m-78	+	4541633	fimA
IS186	M40-36	+	4541633	fimA
IS186	M40-72	+	4541633	fimA
IS186	M6-19	-	4541633	fimA
IS186	M91-06	+	4541633	fimA
IS186	M101-005	-	4541634	fimA

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S8 Table – continued from previous page

IS Family	Line	Strand	Position	Gene name*
IS186	M133-001	+	4541634	fimA
IS186	M2m-51	-	4541634	fimA
IS186	M35-099	-	4541634	fimA
IS186	M88-32	+	4541634	fimA
IS186	M91-27	+	4541634	fimA
IS186	wt-06	-	4541634	fimA
IS186	wt-62	-	4541634	fimA
IS186	M101-063	+	4628606	NC
IS2	M133-050	+	292152	yagK
IS2	M88-17	+	310225	matA
IS2	M133-061	-	344127	yahL
IS2	M133-018	+	562856	sfmF
IS2	M101-083	+	563142	fimZ
IS2	M88-44	-	569302	ybcK
IS2	M22-03	+	570267	ybcL
IS2	M91-01	-	571223	ybcM
IS2	M2m-38	+	571894	ybcN
IS2	M35-077	+	572190	ninE
IS2	M101-075	-	573487	quuD
IS2	wt-17	+	585418	envY
IS2	M2m-91	+	602860	mscM
IS2	M2m-53	+	629110	NC
IS2	M88-31	-	948765	ycaN
IS2	M2m-12	+	1037565	appC
IS2	wt-62	-	1207435	tfaP
IS2	M35-076	+	1208994	pinE
IS2	M2m-12	-	1215540	ymgA
IS2	M35-069	+	1216280	NC
IS2	M180-99	-	1432220	ynaE
IS2	M133-087	+	1541753	narU
IS2	M35-019	+	1559154	ddpA
IS2	M88-47	-	1585983	ydeR
IS2	M40-06	-	1587517	NC
IS2	M133-052	+	1587600	NC
IS2	M35-008	+	1588643	NC
IS2	M91-02	+	1588719	NC
IS2	M133-070	-	1594220	NC
IS2	M2m-05	+	1594416	NC
IS2	wt76	-	1595034	NC
IS2	M133-071	+	1630901	NC
IS2	M88-60	+	1635420	ydfO
IS2	M35-016	-	1641890	ydfU
IS2	M91-33	+	1647723	dicB
IS2	M2m-11	+	1649169	NC
IS2	M88-41	+	1649992	NC
IS2	M2m-39	+	1650326	NC
IS2	M6-17	+	1650376	NC
IS2	M88-26	-	1650557	NC
IS2	M2m-01	-	1669981	NC
IS2	M91-68	+	1771328	ydiN

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IS Family	Line	Strand	Position	Gene name*
IS2	M40-41	-	1801481	NC
IS2	M91-45	+	1801772	NC
IS2	M88-39	-	1807370	NC
IS2	M133-050	+	1840207	NC
IS2	M35-069	-	1868629	yeaI
IS2	M88-44	-	2036931	NC
IS2	M180-85	+	2068529	NC
IS2	M2m-93	+	2285899	NC
IS2	M91-30	+	2313675	rcsD
IS2	M180-38	-	2318097	atoS
IS2	M101-013	+	2363391	ais
IS2	M180-19	+	2379151	elaA
IS2	M133-009	-	2468821	NC
IS2	M2m-05	+	2758783	yfjJ
IS2	M91-02	+	2764555	rnlA
IS2	M91-52	-	3289743	yraK
IS2	wt99	-	3361375	yhcD
IS2	M35-009	-	3361721	yhcD
IS2	M101-019	+	3363402	NC
IS2	M6-1	-	3364814	NC
IS2	M2m-91	+	3365126	yhcF
IS2	M88-38	+	3900420	bglB
IS2	M88-09	-	4002843	NC
IS2	M40-21	+	4341448	melB
IS2	M91-33	+	4346539	dcuB
IS2	M133-011	+	4383823	yjeO
IS2	M91-69	+	4537728	NC
IS2	M2m-91	+	4540332	fimE
IS2	M133-070	+	4569664	NC
IS3	M2m-78	-	292033	yagK
IS3	wt90	+	315698	NC
IS3	M2m-78	+	1200206	xisE
IS3	M2m-26	+	1636134	NC
IS3	M2m-83	+	1905625	NC
IS3	wt1	-	2487459	yfdV
IS3	M2m-95	-	2771070	NC
IS3	M2m-33	+	3580281	yhhZ
IS3	M2m-84	+	3768435	yibH
IS3	M40-07	+	3795898	rfaL
IS4	M133-020	+	415409	sbcD
IS4	wt16	+	840455	fiu
IS4	M101-039	+	884429	ybjH
IS4	M61-27	-	3383859	NC
IS4	M35-077	-	3480628	yheS
IS4	M133-046	-	3929199	NC
IS4	M180-36	+	3929199	NC
IS4	M35-107	+	3929200	NC
IS5A	M180-99	+	89170	NC
IS5A	M180-99	+	89347	NC
IS5A	M91-32	+	149838	yadC

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IS Family	Line	Strand	Position	Gene name*
IS5A	M101-079	-	149940	yadC
IS5A	M40-61	-	152393	yadM
IS5A	M35-108	-	153896	htrE
IS5A	M35-026	-	234050	gloB
IS5A	M40-07	-	246341	dinJ
IS5A	M91-37	+	252775	yafP
IS5A	M91-20	-	253159	yafP
IS5A	M6-26	-	259409	NC
IS5A	M133-034	+	284571	NC
IS5A	M133-046	-	292080	yagK
IS5A	M88-38	+	292373	NC
IS5A	wt1	+	294308	NC
IS5A	M2m-41	+	301815	NC
IS5A	M133-111	+	302626	yagU
IS5A	wt70	+	309954	NC
IS5A	M35-026	+	310599	NC
IS5A	M133-046	-	310602	NC
IS5A	wt-41	+	310603	NC
IS5A	M88-33	+	310889	NC
IS5A	M88-17	-	316004	NC
IS5A	mutL25	-	317205	ykgB
IS5A	M35-076	+	318093	ykgC
IS5A	mutL38	+	318692	ykgC
IS5A	M40-68	-	319407	NC
IS5A	M88-41	-	319407	NC
IS5A	M91-06	+	324785	NC
IS5A	wt99	-	330568	betT
IS5A	M180-50	+	344143	yahL
IS5A	M2m-84	+	345651	NC
IS5A	wt-63	+	380483	NC
IS5A	M88-33	-	380553	NC
IS5A	M40-36	-	384388	NC
IS5A	M94-33	-	393573	NC
IS5A	M40-35	-	484961	NC
IS5A	M35-048	+	512570	ybaT
IS5A	M91-58	+	515838	ybbM
IS5A	M133-113	+	538411	allB
IS5A	M101-039	-	542746	ylbA
IS5A	M133-009	+	543612	allC
IS5A	M133-028	+	568268	ybcK
IS5A	M180-88	+	569816	NC
IS5A	M35-076	+	571023	ybcM
IS5A	M180-33	+	571117	ybcM
IS5A	M2m-32	+	571144	ybcM
IS5A	M2m-33	+	571144	ybcM
IS5A	M101-073	+	576000	NC
IS5A	M35-008	+	576002	NC
IS5A	M88-76	+	576639	essD
IS5A	M40-33	+	577907	borD
IS5A	M94-13	+	579071	NC

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IS Family	Line	Strand	Position	Gene name*
IS5A	M2m-53	+	579083	NC
IS5A	M35-016	+	583201	appY
IS5A	M88-39	-	602647	mscM
IS5A	M133-097	+	636972	NC
IS5A	M180-01	-	654493	dcuC
IS5A	wt-41	-	654988	dcuC
IS5A	wt-100	+	676037	ybeR
IS5A	M40-33	+	677793	djlB
IS5A	M88-09	+	682368	hscC
IS5A	M101-041	-	728703	NC
IS5A	M6-14	-	735420	ybfC
IS5A	M133-073	-	735559	NC
IS5A	M88-38	+	737806	ybfD
IS5A	M35-014	-	820139	ybhM
IS5A	mutL32	-	849642	NC
IS5A	M101-041	+	872016	gsiD
IS5A	wt-38	-	888893	ybjL
IS5A	M40-17	+	988273	NC
IS5A	M101-023	-	1005000	pyrD
IS5A	M40-23	+	1050567	NC
IS5A	M101-049	+	1050689	cspG
IS5A	M91-08	+	1051003	NC
IS5A	M88-21	-	1078536	putP
IS5A	M88-62	-	1092122	ycdT
IS5A	mutL25	-	1094885	NC
IS5A	M40-47	-	1101438	csgE
IS5A	M88-29	+	1101672	csgE
IS5A	M94-35	+	1101672	csgE
IS5A	M6-1	+	1102662	NC
IS5A	M133-030	-	1104947	ymdA
IS5A	M91-40	-	1108383	NC
IS5A	M40-40	+	1120203	NC
IS5A	M133-097	+	1122273	yceB
IS5A	M91-30	+	1195750	NC
IS5A	M133-069	-	1196401	ymfD
IS5A	M180-36	+	1196603	ymfD
IS5A	M91-35	+	1208408	NC
IS5A	M35-107	+	1211928	ycgX
IS5A	M40-55	+	1213536	ycgF
IS5A	M40-39	+	1221485	NC
IS5A	M133-054	+	1241368	NC
IS5A	M2m-93	-	1255915	NC
IS5A	M35-113	+	1292421	NC
IS5A	M101-017	-	1306984	yciY
IS5A	M101-037	-	1313111	yciE
IS5A	M61-1	-	1313414	yciF
IS5A	M94-47	-	1342761	NC
IS5A	M91-01	+	1366158	pspA
IS5A	M91-45	-	1369478	ycjM
IS5A	M91-32	-	1370154	ycjN

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IS Family	Line	Strand	Position	Gene name*
IS5A	M40-10	+	1380950	NC
IS5A	M22-71	-	1397616	NC
IS5A	M133-001	+	1402892	abgR
IS5A	M101-035	+	1423259	trkG
IS5A	M133-067	+	1430513	tfaR
IS5A	M133-069	+	1430513	tfaR
IS5A	@M40-28	-	1430513	tfaR
IS5A	M91-45	+	1432183	ynaE
IS5A	M2m-32	+	1432191	ynaE
IS5A	M91-33	+	1432191	ynaE
IS5A	M133-103	-	1468984	NC
IS5A	M2m-51	+	1475141	ydbD
IS5A	M40-35	+	1476618	ynbB
IS5A	M40-11	+	1476619	ynbB
IS5A	M40-55	-	1476620	ynbB
IS5A	wt92	-	1489145	cybB
IS5A	M91-38	-	1489869	ydcA
IS5A	wt-44	-	1490568	trg
IS5A	M40-45	+	1527780	NC
IS5A	M40-11	-	1528257	ydcD
IS5A	M2m-83	-	1543202	NC
IS5A	M88-76	+	1543754	NC
IS5A	M133-111	-	1565420	NC
IS5A	M180-90	+	1570156	NC
IS5A	M35-004	+	1576881	yddA
IS5A	M133-032	-	1579046	ydeN
IS5A	M88-64	-	1580960	ydeO
IS5A	M133-034	+	1596484	NC
IS5A	M88-09	-	1596567	NC
IS5A	M35-107	+	1613897	yneK
IS5A	M133-009	+	1620585	NC
IS5A	M94-15	-	1621914	NC
IS5A	M88-36	-	1622498	ydeI
IS5A	M40-50	+	1622501	ydeI
IS5A	M133-054	-	1622556	NC
IS5A	M40-50	+	1631155	ydfK
IS5A	M133-070	+	1632879	tfaQ
IS5A	M133-070	+	1636843	NC
IS5A	M88-46	+	1636846	NC
IS5A	M180-15	-	1637300	rzpQ
IS5A	M180-27	+	1645300	NC
IS5A	M88-20	-	1650215	NC
IS5A	M40-56	-	1674487	pntA
IS5A	M133-052	-	1690399	uidC
IS5A	M2m-05	-	1708440	rsxG
IS5A	M133-093	-	1751464	ydhV
IS5A	wt7	+	1777498	NC
IS5A	M101-043	+	1785537	ppsR
IS5A	M88-49	-	1789622	cdgR
IS5A	M2m-94	+	1816668	chbR

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IS Family	Line	Strand	Position	Gene name*
IS5A	M88-38	+	1823981	astE
IS5A	M40-45	+	1854472	ydjH
IS5A	M2m-26	+	1854473	ydjH
IS5A	M133-085	+	1854494	ydjH
IS5A	M40-40	+	1854494	ydjH
IS5A	wt80	+	1856786	ydjJ
IS5A	wt-35	+	1878836	NC
IS5A	M91-38	+	1892440	yoaC
IS5A	wt-100	-	1892441	yoaC
IS5A	M40-21	-	1903339	NC
IS5A	M88-67	+	1970293	tar
IS5A	M35-019	+	1976906	insB
IS5A	M35-069	+	1977512	NC
IS5A	wt-29	-	1984781	NC
IS5A	wt5	+	2000983	fliC
IS5A	M40-28	-	2009993	NC
IS5A	M180-71	-	2022180	rcsA
IS5A	M101-019	+	2038746	yedZ
IS5A	M88-47	+	2039659	zinT
IS5A	M101-029	+	2066221	NC
IS5A	M101-013	-	2086869	yeeZ
IS5A	M133-018	-	2087870	NC
IS5A	M101-033	-	2101610	wbbK
IS5A	M40-06	+	2101610	wbbK
IS5A	M91-52	-	2101610	wbbK
IS5A	M40-16	+	2103566	wbbI
IS5A	M101-015	+	2104052	wbbI
IS5A	M101-031	+	2106664	rfbX
IS5A	M2m-24	+	2106665	rfbX
IS5A	M35-077	-	2121610	cpsB
IS5A	M180-09	+	2128306	wcaD
IS5A	M88-19	-	2135707	NC
IS5A	M88-41	-	2141236	NC
IS5A	M91-38	+	2149176	NC
IS5A	M101-039	+	2149261	yegJ
IS5A	M88-10	+	2189118	yehC
IS5A	M133-028	+	2202550	NC
IS5A	M101-021	+	2235650	mglC
IS5A	M101-003	-	2288500	NC
IS5A	M180-32	+	2341640	yfaL
IS5A	M2m-53	+	2362408	NC
IS5A	M2m-09	+	2362409	NC
IS5A	M22-58	-	2381846	elaD
IS5A	M2m-95	-	2384003	yfbL
IS5A	M94-34	+	2385898	yfbN
IS5A	M35-090	+	2404361	lrhA
IS5A	M133-003	-	2406416	alaA
IS5A	M40-28	+	2452816	NC
IS5A	M2m-33	+	2463291	NC
IS5A	M2m-32	+	2463292	NC

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IS Family	Line	Strand	Position	Gene name*
IS5A	M40-21	-	2468726	NC
IS5A	wt-38	-	2472006	NC
IS5A	M101-063	-	2474561	NC
IS5A	M88-08	+	2475749	NC
IS5A	wt-63	+	2488204	yfdV
IS5A	M2m-12	-	2492733	ypdI
IS5A	M40-43	+	2574058	NC
IS5A	M91-45	-	2574112	NC
IS5A	M133-095	+	2755508	NC
IS5A	mutL75	-	2755532	NC
IS5A	M40-72	+	2759036	yfjJ
IS5A	M101-067	-	2759254	NC
IS5A	M40-68	-	2759369	NC
IS5A	M35-009	+	2772577	yfjW
IS5A	M40-35	-	2772968	yfjW
IS5A	wt-14	-	2782939	NC
IS5A	M133-113	-	2785309	NC
IS5A	M133-050	-	2786476	NC
IS5A	mutL2	-	2786633	NC
IS5A	M133-061	-	2786785	NC
IS5A	M91-37	+	2786815	NC
IS5A	M133-067	-	2796704	NC
IS5A	M91-31	+	2796704	NC
IS5A	M91-70	+	2797405	alaE
IS5A	M88-62	+	2883864	ygcB
IS5A	M61-25	-	2900262	ygcE
IS5A	M180-15	+	2908300	mazG
IS5A	M101-109	-	2919375	gudP
IS5A	M133-083	-	2932246	NC
IS5A	M88-16	+	2986475	NC
IS5A	M180-09	-	2986993	yqeI
IS5A	M133-054	-	2989978	NC
IS5A	M101-085	+	2994208	NC
IS5A	M40-61	-	2997119	NC
IS5A	M101-015	-	3003180	ygeV
IS5A	M101-085	+	3009433	hyuA
IS5A	M133-095	+	3029943	ygfU
IS5A	M35-076	+	3066848	NC
IS5A	M88-10	+	3117210	NC
IS5A	M94-54	+	3119418	NC
IS5A	M35-019	+	3129628	yghQ
IS5A	M88-08	+	3130221	yghQ
IS5A	M91-70	+	3134182	pitB
IS5A	M40-11	+	3134959	gss
IS5A	M91-52	+	3184174	NC
IS5A	M133-001	-	3184180	NC
IS5A	M2m-84	-	3189724	NC
IS5A	M40-15	-	3255712	yhaO
IS5A	M40-40	+	3260643	tdcD
IS5A	M91-05	+	3264992	tdcA

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IS Family	Line	Strand	Position	Gene name*
IS5A	wt-45	-	3265171	NC
IS5A	M133-018	-	3265939	yhaB
IS5A	M180-01	-	3266281	yhaB
IS5A	M133-111	+	3267034	yhaC
IS5A	wt-65	+	3267456	yhaC
IS5A	wt-49	-	3271028	garL
IS5A	M91-38	-	3284384	agaI
IS5A	M40-16	-	3285202	NC
IS5A	M6-21	+	3285672	yraH
IS5A	M133-001	-	3286477	yraI
IS5A	M101-093	+	3338118	NC
IS5A	M101-021	+	3359472	gltF
IS5A	M91-28	+	3363109	yhcD
IS5A	M2m-41	+	3363358	NC
IS5A	M35-016	+	3365087	yhcF
IS5A	M2m-44	+	3365319	yhcF
IS5A	M180-88	+	3365384	yhcF
IS5A	M133-115	+	3365390	yhcF
IS5A	M180-79	+	3366688	yhcG
IS5A	M40-36	-	3436010	NC
IS5A	M101-015	-	3453860	gspC
IS5A	M40-64	+	3453860	gspC
IS5A	M91-45	-	3580635	yhhZ
IS5A	M40-32	+	3580871	yhhZ
IS5A	wt-50	-	3580871	yhhZ
IS5A	M91-02	+	3582414	NC
IS5A	M91-31	+	3592682	livM
IS5A	M22-78	+	3629165	yhiJ
IS5A	M2m-24	-	3629165	yhiJ
IS5A	M133-020	+	3630523	yhiJ
IS5A	M88-18	-	3631479	NC
IS5A	M91-05	-	3632765	NC
IS5A	M101-013	-	3633524	yhiM
IS5A	M91-15	-	3643233	NC
IS5A	M180-34	+	3648715	NC
IS5A	M40-11	+	3648917	NC
IS5A	M101-033	+	3648975	NC
IS5A	M133-063	+	3649603	NC
IS5A	M101-017	+	3649604	NC
IS5A	M101-085	+	3653517	yhiD
IS5A	M101-007	-	3654749	hdeA
IS5A	M40-42	+	3655738	NC
IS5A	M101-035	-	3656996	NC
IS5A	M88-39	+	3657006	NC
IS5A	M2m-09	-	3663310	gadX
IS5A	M101-063	+	3694400	NC
IS5A	M133-095	-	3694450	NC
IS5A	@M40-25	+	3718699	NC
IS5A	M88-50	+	3720188	NC
IS5A	M101-043	-	3729482	xylF

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IS Family	Line	Strand	Position	Gene name*
IS5A	M101-069	+	3749886	yiaT
IS5A	M133-070	+	3764113	rhsA
IS5A	M133-014	-	3764135	rhsA
IS5A	M35-051	+	3766621	yibG
IS5A	M40-59	-	3767589	NC
IS5A	M40-61	+	3767865	NC
IS5A	M133-070	+	3770959	mtlA
IS5A	M88-49	+	3791868	NC
IS5A	M101-079	-	3794975	rfaL
IS5A	M101-019	-	3795602	rfaL
IS5A	M133-092	+	3798207	rfaZ
IS5A	M101-063	+	3803148	NC
IS5A	M101-027	+	3857981	yidK
IS5A	wt-61	+	3874242	yidA
IS5A	wt-35	+	3888579	tnaB
IS5A	M88-75	+	3896707	yieK
IS5A	M35-078	-	3900193	bglH
IS5A	M101-013	-	3900194	bglH
IS5A	wt-17	+	3904192	bglG
IS5A	M91-28	+	3920528	NC
IS5A	wt-49	-	4044727	NC
IS5A	M101-037	-	4067274	yihQ
IS5A	M91-38	+	4087204	frvR
IS5A	M133-075	-	4240343	NC
IS5A	M91-27	-	4248742	NC
IS5A	M133-014	+	4248800	NC
IS5A	M133-056	-	4266663	NC
IS5A	M101-109	+	4302152	ytcA
IS5A	M40-21	+	4304754	NC
IS5A	wt-14	+	4304905	alsK
IS5A	wt-45	+	4304905	alsK
IS5A	M88-32	+	4335857	adiY
IS5A	wt-14	-	4347082	NC
IS5A	M88-09	+	4351279	lysU
IS5A	M40-47	-	4352849	NC
IS5A	M40-36	-	4358816	cadC
IS5A	M40-56	-	4425276	yjfZ
IS5A	M133-069	-	4440285	NC
IS5A	M133-056	-	4474824	yjgL
IS5A	M101-087	+	4478867	yjgN
IS5A	M91-01	+	4489801	idnT
IS5A	M6-27	-	4492643	NC
IS5A	wt-49	-	4495943	NC
IS5A	M101-015	+	4501717	NC
IS5A	M133-020	-	4501717	NC
IS5A	M133-028	-	4503748	yjhC
IS5A	M40-39	-	4503748	yjhC
IS5A	M91-29	-	4538455	NC
IS5A	M6-20	+	4538934	NC
IS5A	M88-67	+	4543809	fimD

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IS Family	Line	Strand	Position	Gene name*
IS5A	M88-63	+	4554026	yjiC
IS5A	M133-050	-	4554779	NC
IS5A	M2m-12	+	4574998	mcrC
IS5A	M40-23	-	4577383	NC
IS5A	M88-37	-	4577383	NC
IS5A	M94-33	-	4578791	hsdS
IS5A	M133-105	+	4589349	NC
IS5A	M88-20	+	4589349	NC
IS5B	wt-50	-	1753780	pykF
IS5B	M133-075	-	2931030	fucO