

S2 Table. Primers used in this study

Primer name	Sequence (5' → 3')	Description
BBC374	TGGCAAAAAGCGAGAGAAGAAG	ΔluxO F1
BBC375	gtcgacggatccccggaatCATGAGGACATATTTTGTTC CTGC	ΔluxO R1
BBC376	gaagcagctccagcctacaTAAGCGATGAGAGAATGGAT CAAC	ΔluxO F2
BBC377	TCACACCCGAATTTCCATCATGC	ΔluxO R2
ABD344	GATTAGCAACGATTCTAGCGCAGGAG	ΔVC1807 F1
ABD340	gtcgacggatccccggaatACGTTTCATTAGTCACCTCTA TTGT TAACTTGTTTC	ΔVC1807 R1
ABD341	gaagcagctccagcctacaTAGTCGAAAATAAAAAAAG AGG CTCGCCTC	ΔVC1807 F2
ABD345	CTTGCTAACCGTTGGTGTACCAGC	ΔVC1807 R2
pilA S81C F	AAAATAATATTGAAGATTATATTGCGACAGAAG GC TgTTTTCTGCAACAACCTGCAGG	pilA S56C F
pilA R2	CATTAATCGCGGTTTCAAAGTGCA	pilA S56C R2
DOG0400	ACTTCTGGCTGAAGGTCAATTTTC	ΔpilT/U F1
DOG0401	gtcgacggatccccggaatCATTTAAATTCCTTAATAAAG TCTG GC	ΔpilT R1
DOG0402	gaagcagctccagcctacaTAGGTAGGTAAAGACAGATG GAG	ΔpilT F2
DOG0403	TCACGTGTTTCGGCCAAAATC	ΔpilT/U R2
HQP0001	GGGCTCGGGTgctTCGACGACCTTGCGG	PilT ^{K136A} R1
HQP0002	CGCCAAGGTCGTGCAgacACCCGAGCCC	PilT ^{K136A} F2
BBC2508	GTTTCTTGGTCACGCAGagCACCCGACGAGGATCA C	PilT ^{E204A} R1
BBC2509	GTGATCCTCGTCGGTGctCTGCGTGACCAAGAAA C	PilT ^{E204A} F2
BBC401	ACCAGCAAAGCTAATAAAATCGAG	ΔpilA F1
BBC402	gtcgacggatccccggaatGAGCATATGCCTTGCTACAC AAG	ΔpilA R1
BBC403	gaagcagctccagcctacaACTGCAGGTGCAACAATTAA CTAA	ΔpilA F2
BBC404	CGCCATACTAACCCAATACACTC	ΔpilA R2
BBC1752	CTGAATGATTTCCATGAGACG	ΔflaA F1
BBC1753	gtcgacggatccccggaatCATAGTTTGCTCTCCTATCG AG	ΔflaA R1
BBC1754	gaagcagctccagcctacaTTGCAGTAGTTCACGGTACC TTC	ΔflaA F2
BBC1755	TTATACGCTCTTTTGCGTGATGG	ΔflaA R2
BBC1450	CACTCAACGAGCTCAATACG	ΔmshA F1
ABD653	gtcgacggatccccggaatCATCTCTCTTTTCATGTGAATA CGCA GC	ΔmshA R1
ABD654	gaagcagctccagcctacaGCGCAATAATTTAAATATGG CTCG TGC	ΔmshA F2

BBC1453	ATAGCCTTGCTGTTCAATTTGG	ΔmshA R2
BBC2022	TGCCGATCTCGTTTATGGACG	Δvps-rbmA locus F1
BBC2023	gtcgacggatccccggaatTGCCATTTTGATTGCCTCTG G	Δvps-rbmA locus R1
BBC2024	gaagcagctccagcctacaCAAAGAGAGCCTTATTAGGC TCTC	Δvps-rbmA locus F2
BBC2025	TGAAAGAGGTTGCTCTAGAACTCG	Δvps-rbmA locus R2
BBC1457	TTTCAAGACTTTGGGCAATAG	ΔtcpA F1
BBC1968	gtcgacggatccccggaatCTGTTTTAATAATTGCATATT TATA TAACTCCACC	ΔtcpA R1
BBC1969	gaagcagctccagcctacaTTTGGTAACAGTTAATCTAC ACCAT TATCTTG	ΔtcpA F2
BBC1463	TTGAATTCGTCCATCATCTAAG	ΔtcpA R2
BBC1833	GATATCCATGTCCATGTCCCAG	comEA-mCherry F1
BBC1834	cttgctcactccaccactccacctgcTAACAAGATCCTTGCG GCATTG	comEA-mCherry R1
BBC1837	acgagctgtacaagtaaGCTGCAATCATGTGTCTCG	comEA-mCherry F2
BBC1838	GTCTTTCTATCAGTTCGGACTTAGTC	comEA-mCherry R2
BBC1835	gcaggtggaagtgggtggaGTGAGCAAGGGCGAGGAGG	mCherry (for comEAmCherry) F
BBC1836	gattgcagcTACTTGTACAGCTCGTCC	mCherry (for comEAmCherry) R
DOG0405	gtcgacggatccccggaatCATCTGTCTTTACCTACCTAA AATGC	ΔpilU R1
DOG0406	gaagcagctccagcctacaTAGCGATGGTTACTTTGTGC G	ΔpilU F2
JCP048	CAAGCCCCGATATGATTTgcATTGGTGAAATCC GCAGC	PilU ^{L199C} F
JCP049	GCTGCGGATTTACCAATgcAAATCATATCGGGG GCTTG	PilU ^{L199C} R
BBC2287	CATTGCGCTCGGCATTGCGTGAAGACCCAGATG TGATCtgtGTCCGTGAGCTGCGTGAC	PilT ^{L201C} F2
BBC2288	CGCAATGCCGAGCGCAATG	PilT ^{L201C} R1
BBC2369	GGCTGCCATAGTGGTCGAggcACCCGAACCGGTT GCGC	PilU ^{K134A} R1
BBC2347	GCGCAACCGGTTCCGGTgccTCGACCACTATGGC AGCC	PilU ^{K134A} F2
BBC2313	gcaggtggaagtgggtggaCATCATCATCATCACgcag gtggagcaggtgga	6xHis (for 6xHis-PilU/T) F
BBC2314	tccacctgtccacctgcGTGATGATGATGATGATGtccac cacttccacctgc	6xHis (for 6xHis-PilU/T) R
BBC2272	gcaggtggaagtgggtggagattataaagaccatgatggtgactaaa ggatcacgacattgattataaggatgacgatgacaaagcaggtggag caggtgga	3xFLAG (for 3xFLAG- PilU/T) F
BBC2273	tccacctgtccacctgcttgtcatcgtcatccttataatcaatgctgat cctttagtcaccatcatggtcttataatccaccacttccacctgc	3xFLAG (for 3xFLAG- PilU/T) R
JCP028	tccaccacttccacctgcCATCTGTCTTTACCTACCTAAA ATGC	X-PilU (N-term tags) R1

JCP029	gcaggtggagcaggtggaGAGTTGAATCAATATCTGGA TGGC	X-PilU (N-term tags OR BACTH TXX-pilU) F2
JCP026	tccaccacttccacctgcCATTAAATTCCTTAATAAAGTC TGGCTATG	X-PilT (N-term tags) R1
JCP027	gcaggtggagcaggtggaGATATCGCTGAGTTACTGGA ATTTAG	X-PilT (N-term tags or BACTH TXX-pilT) F2
ABD332	GGCTGAACGTGGTTGTGCGAAAATGAC	P _{tac} -PilT/U @lacZ F1
BBC244	CCCGGGATCCTGTGTGAAATTGTTATCCGC	P _{tac} -PilT/U @lacZ or @VC1807 R1
ABD255	TTAAGCTACTAAAGCGTAGTTTTTCG	P _{tac} -PilT/U @lacZ F2
ABD256	CAATTTACACAGGATCCCGGGAGGAGGTAACG TAATGGTGAGCAAAGGCCAAG	P _{tac} -PilT/U @lacZ R2
BBC1723	caattcacacaggatcccgggAGGAGGTATTTAAATGGA TATCGCTGAGTTAC	Amplify pilT (for P _{tac} -pilT) F
BBC1724	tgtaggctggagctgcttcCTAAAATGCTTTTAAATCCAAC TCG	Amplify pilT (for P _{tac} -pilT OR BACTH TXX-pilT) R
BBC1725	caattcacacaggatcccgggAGGAGGTAGACAGATGGA GTTGAATCAATATC	Amplify pilU (for P _{tac} -pilU) F
BBC1726	tgtaggctggagctgcttcCTACTCCATATCAATCTTCACA TTC	Amplify pilU (for P _{tac} -pilU OR BACTH TXX-pilU) R
ABD342	ATTTTTCAGTTGGCCTACAATGCTTTCC	P _{tac} -PilT/U @VC1807 F1
BBC719	CACCATACCCACGCCGAAACAAGGATTTTGAATT AAACGTTTCATTAGTC	P _{tac} -PilT/U @VC1807 R1
BBC243	TTGTTTCGGCGTGGGTATGGTG	P _{tac} -PilT/U @VC1807 F2
BBC2667	tccaccacttccacctgcCATTACGTTACCTCCTCCCG	P _{tac} -X-PilT/U (X is 3xFLAG or 6xHis) R
BBC2513	gaagcagctccagcctacaGATCCCCGGGTACCTAAGT AAC	BACTH pKT25-X F
BBC2512	tccacctgctccacctgcCTCTAGAGTCGACCCTGCAG	BACTH pKT25-X R
BBC2515	gaagcagctccagcctacaCCGAGCTCGAATTCATCGAT ATAAC	BACTH pUT18C-X F
BBC2514	tccacctgctccacctgcCTCTAGAGTCGACCCTGCAG	BACTH pUT18C-X R
BBC2518	gcaggtggagcaggtggaAAAGCGACCCAAACCTTACC	BACTH TXX-PilC F
BBC2524	tgtaggctggagctgcttcTTAACCCAATACACTCATTAA GTAAAG	BACTH TXX-PilC R
BBC2358	GGTATATCTCCTTCTTAAAGTTAAACAAAATTATT TCTAGAGGGGAATTGTTATCC	pHisTev-X F
BBC2360	cggatccGGCTGCTAACAAAGCCCGAAAGGAAGCT GAGTTGGCTGCTGC	pHisTev-X R
BBC2478	TTTTGTTTAACTTTAAGAAGGAGATATACCATGgc aggtggaagtgggga	Amplify 6xHis-pilT or 6xHis-PilU to clone into pHistev F
BBC2479	CTTTTCGGGCTTTGTTAGCAGCCggatccgCTAAA TGCTTTTAAATCCAACCTCG	Amplify 6xHis-pilT to clone into pHistev R
BBC2480	CTTTTCGGGCTTTGTTAGCAGCCggatccgCTACTC CATATCAATCTTCACATTCTG	Amplify 6xHis-pilU to clone into pHistev R
BBC706	CCACACATTATACGAGCCGATG	P _{const} -tfoX R1
BBC2226	catcggctcgtataatgtgtggaGGGGAACGTGATTAAAGG A	P _{const} -tfoX F2

ABD332	GGCTGAACGTGGTTGTCGAAAATGAC	Δ lacZ::lacIq F1
ABD331	GAACATGGGGTGTACGGCAGTGCTATTTAACGAT GTGCGGGTTTTGCCAATCTTG	Δ lacZ::lacIq R1
ABD255	gaagcagctccagcctacaCCACAATAAGCCAGAGAGC CTTAAG	Δ lacZ::lacIq F2
ABD256	CCCAAATACGGCAACTTGCG	Δ lacZ::lacIq R2
ABD841	GGCACTGCCGTACACCCCATGTTCCGGTACCCG ACACCATCGAATG	Amplify lacIq F
ABD842	GGCTCTCTGGCTTATTGTGGGGGGAAACCTGTC GTGCCAGCTGC	Amplify lacIq R
DOG0175	AAACTATCCAGATAAGGGAAAGC	comP (<i>A. baylyi</i>) F1
CE87	GAAGTTGTCGTACATTTCCAacaTACAGCGCCAC TAGCATATG	comP T129C (<i>A. baylyi</i>) R1
CE88	CATATGCTAGTGGCGCTGTATGTTGGAAATGTAC GACAACCTC	comP T129C (<i>A. baylyi</i>) F2
DOG0178	AGGATCTGTAATGACGGGTTGAG	comP (<i>A. baylyi</i>) R2
DOG0176	gtcgacggatccccggaatCATAAAATTTCTCCACCAATG TTG	Δ comP (<i>A. baylyi</i>) R1
DOG0177	gaagcagctccagcctacaTGATAGTAGTACTATATGGC TTTAAAAG	Δ comP (<i>A. baylyi</i>) F2
BBC1934	GTTACAAAGTCAGGGACGTAAAG	pilT or pilU (<i>A. baylyi</i>) F1
BBC1935	gtcgacggatccccggaatATCCATATTTTCCCCGAAGAT CG	Δ pilT (<i>A. baylyi</i>) R1
BBC1936	gaagcagctccagcctacaTAAGAATAACGCTACTCGAT CTG	Δ pilT (<i>A. baylyi</i>) F2
BBC1939	GGTATTCAGATTGATCGTCAGTTAG	pilT or pilU (<i>A. baylyi</i>) R2
BBC1937	gtcgacggatccccggaatCATCGTATTGTTTTCTCTCA GATC	Δ pilU (<i>A. baylyi</i>) R1
BBC1938	gaagcagctccagcctacaCGCCGTAATCTCAAATAAAA GAG	Δ pilU (<i>A. baylyi</i>) F2
BBC2403	GCTGCAAGGGTGGTTGAagcACCGGAACCAAGTG G	pilT ^{K136A} (<i>A. baylyi</i>) R1
BBC2404	CCACTGGTTCCGGTgctTCAACCACCCTTGCAGC	pilT ^{K136A} (<i>A. baylyi</i>) F2
BBC2408	GGATGCCAAAGACGTGGAagcTCTGTACCAGTT GC	pilU ^{K137A} (<i>A. baylyi</i>) R1
BBC2409	GCAACTGGTACAGGAgctTCCACGTCTTTGGCAT CC	pilU ^{K137A} (<i>A. baylyi</i>) F2
BBC2807	caatttcacacaggatccccgggAGGAGGTGAAAATATGGA TATAACAGAATTACTCG	pilT amplify for insertion into P _{tac} construct (<i>A.</i> <i>baylyi</i>) F
BBC2808	tgtaggctggagctgcttcTTAGAACGACTCTGGAGATTT TG	pilT amplify for insertion into P _{tac} construct or pMMB67EH (<i>A. baylyi</i>) R
BBC2809	caatttcacacaggatccccgggAGGAGGTAATACGATGGA CTTTAATGATTTACTC	pilU amplify for insertion into P _{tac} construct (<i>A.</i> <i>baylyi</i>) F
BBC2810	tgtaggctggagctgcttcTTATTTGAGATTACGGCGTTG AC	pilU amplify for insertion into P _{tac} construct or pMMB67EH (<i>A. baylyi</i>) R

BBC2822	aatttcacacaggaacagaattcgagctcTTGTTTCGGCGT GGGTATGGTG	Clone P _{tac} -pilT or P _{tac} -PilU into pMMB67EH (<i>A. baylyi</i>) F
BBC2824	gagctcgaattctgtttcctgtgtgaaattTTTGCCAGAACCGTT ATGATGTC	Amplify pMMB67EH to clone P _{tac} -pilT or P _{tac} -pilU (<i>A. baylyi</i>) F
BBC2357	GGTACCCGGGGATCCTCTAGAGTCGACCTGCAG GCATGCAAGCTTGGC	Amplify pMMB67EH to clone P _{tac} -pilT or P _{tac} -pilU (<i>A. baylyi</i>) R
DOG0436	AAGCGTTCTGGTTCAATCACC	ΔMSHA locus (VC0399- VC0414) F1
DOG0434	gtcgacggatccccggaatCATTCTCTACCACTGCTATTT GGTTC	ΔMSHA locus (VC0399- VC0414) R1
BBC2129	gaagcagctccagcctacaTAATGATTAAGCACTCAATG GATCCAG	ΔMSHA locus (VC0399- VC0414) F2
BBC2130	TTTTGCATCAGCAAAATCACGC	ΔMSHA locus (VC0399- VC0414) R2
BBC2123	TGATGGTAACTACTATAGGGTCG	ΔTCP locus (VC0825- VC0838) F1
BBC2124	gtcgacggatccccggaatTAAATTAGGCTAGTGCCAGT CAG	ΔTCP locus (VC0825- VC0838) R1
BBC2125	gaagcagctccagcctacaACAGGAGTTGCAGAAAAATA ATGG	ΔTCP locus (VC0825- VC0838) F2
BBC2126	ACTAAGATAATTGCTTCACGCATG	ΔTCP locus (VC0825- VC0838) R2