

Table S3. Demographic and genomic characteristics of the *E. ludwigii* isolates used for the phylogenomic analysis.

Strain	Collection Year	Location	Isolation Source	Isolation type	AMR genotypes ¹	BioSample	NCBI Accession Number	Contigs/Scaffolds	N50 (bp)	Length (bp)
JP6	2011	China	rhizosphere soil	environmental/ other	<i>bla</i> _{ACT} , <i>catA</i> *, <i>fosA</i> , <i>oqx</i> <i>B</i>	SAMN11415570	NZ_CP040256	1	4681598	4681598
JP9	2011	China	soil	environmental/ other	<i>bla</i> _{ACT} , <i>catA</i> *, <i>fosA</i> , <i>oqx</i> <i>B</i>	SAMN11415807	NZ_CP040527	1	4681542	4681542
I42	2015	China	<i>Lycium barbarum</i> rhizosphere soil	environmental/ other	<i>bla</i> _{ACT} , <i>catA</i> *, <i>fosA2</i> , <i>oqx</i> <i>B</i>	SAMN11415809	NZ_CP040606	1	4719369	4719369
120152	2019	China	human blood	clinical	<i>bla</i> _{ACT} , <i>catA</i> *, <i>fosA2</i> , <i>oqx</i> <i>B</i>	SAMN19316194	JAHEUQ000000000	27	685439	4722419
WCHEL090041	2016	China	human	clinical	<i>bla</i> _{ACT} , <i>catA</i> *, <i>fosA</i> , <i>oqx</i> <i>B</i>	SAMN09845216	RXRU000000000	38	486168	4783603
A3203	n.a.	USA	rhizosphere	environmental/ other	<i>bla</i> _{ACT} , <i>catA</i> *, <i>fosA2</i> , <i>oqx</i> <i>B</i>	SAMN05589724	MSDM000000000	17	792170	4812349
WCHEL090017	2017	China	human	clinical	<i>aph</i> (3'')-Ibtype, <i>aph</i> (6)-Id, <i>bla</i> _{ACT} , <i>catA</i> *, <i>fosA2</i> , <i>oqx</i> <i>B</i>	SAMN09845195	RXRA000000000	87	250730	5167660
JGM43	2015	USA	kitchen B	environmental/ other	<i>bla</i> _{ACT} , <i>catA</i> *, <i>fosA2</i>	SAMN17146117	JAERJF000000000	97	190941	5302774
DSM16688T	n.a.	Germany	n.a.	n.a.	<i>bla</i> _{ACT} , <i>catA</i> *, <i>fosA</i> , <i>oqx</i> <i>B</i>	SAMEA104113918	FYBD000000000	26	544330	4908609
LecVs2	n.a.	Italy	n.a.	n.a.	<i>ampC</i> *, <i>oqx</i> <i>B</i> , <i>vat</i> *	SAMEA3213012	CEFR000000000	197	62320	5285925
EnVs2	n.a.	Italy	n.a.	n.a.	<i>ampC</i> *, <i>oqx</i> <i>B</i>	SAMEA3213011	CEFQ000000000	108	393305	5079786
GN02454	2005	USA	human bodily fluid	clinical	<i>bla</i> _{ACT} , <i>catA</i> *, <i>fosA</i> , <i>oqx</i> <i>B</i>	SAMN03732707	LEDW000000000	22	586033	4715527
AA4	2012	USA	<i>Zea mays</i> root	environmental/ other	<i>bla</i> _{ACT} , <i>catA</i> *, <i>fosA</i> , <i>oqx</i> <i>B</i>	SAMN06130962	CP018785	1	4799256	4799256
GN02730	2008	USA	human	clinical	<i>bla</i> _{ACT} , <i>catA</i> *, <i>fosA2</i> , <i>oqx</i> <i>B</i>	SAMN03732724	LEER000000000	75	322082	5204500
GN02226	2003	USA	human bodily fluid	clinical	<i>bla</i> _{ACT} , <i>catA</i> *, <i>fosA</i> , <i>oqx</i> <i>B</i>	SAMN03732688	LEEO000000000	36	276882	4836923
EnVs6	n.a.	Italy			<i>ampC</i> *, <i>oqx</i> <i>B</i> , <i>vat</i> *	SAMEA3213010	CEFO000000000	64	208468	5220112
MGYG-HGUT-02503	n.a.	Australia	human gut	clinical	<i>bla</i> _{ACT} , <i>catA</i> *, <i>fosA2</i> , <i>oqx</i> <i>B</i>	SAMEA5852008	CABMNI000000000	26	332883	4697885
BIDMC121	n.a.	USA	human	clinical	<i>bla</i> _{ACT} , <i>catA</i> *, <i>fosA</i> , <i>oqx</i> <i>B</i>	SAMN08148284	JACRRX000000000	30	284260	5224129
EcWSU1	2007/2008	USA	onion bulbs	environmental/ other	<i>bla</i> _{ACT} , <i>catA</i> *, <i>fosA2</i> , <i>oqx</i> <i>B</i>	SAMN02604307	CP002886	2	4734438	4798091
OLC-1682	2014	Canada	n.a.	food	<i>bla</i> _{ACT} , <i>catA</i> *, <i>oqx</i> <i>B</i>	SAMN03292329	JXWK000000000	1341	5354	4910606
e1617	2007	United Kingdom	human blood	clinical	<i>bla</i> _{ACT} , <i>catA</i> *, <i>fosA</i> , <i>oqx</i> <i>B</i>	SAMEA2273503	FJZU000000000	37	229677	4784689
e864	2004	United Kingdom	human blood	clinical	<i>bla</i> _{ACT} , <i>catA</i> *, <i>fosA</i> , <i>oqx</i> <i>B</i>	SAMEA2273255	FKHG000000000	36	234939	4786532
PDC34	n.a.	USA	n.a.	n.a.	<i>bla</i> _{ACT} , <i>catA</i> *, <i>fosA</i> , <i>oqx</i> <i>B</i>	SAMN05428986	FRCI000000000	19	697266	4683223
Hanford	2008	USA	water Sample	environmental/ other	<i>bla</i> _{ACT} , <i>bla</i> _{TEM-116} , <i>catA1</i> , <i>catA</i> *, <i>fosA</i> , <i>oqx</i> <i>B</i>	SAMN02212350	ATCK000000000	62	640760	4832153
MGH160	2015	USA	human	clinical	<i>bla</i> _{ACT} , <i>bla</i> _{FONA} , <i>catA</i> *, <i>fosA</i> , <i>oqx</i> <i>B</i>	SAMN04521909	NGRN000000000	59	233137	4925300
DLL7524	2015	Australia	human feces	clinical	<i>bla</i> _{ACT} , <i>catA</i> *, <i>fosA2</i> , <i>oqx</i> <i>B</i>	SAMN08374129	PQCT000000000	26	332883	4697885
P101	n.a.	USA	switchgrass	environmental/ other	<i>bla</i> _{ACT-12} , <i>catA</i> *, <i>fosA2</i> , <i>oqx</i> <i>B</i>	SAMN02641647	NZ_CP006580	1	5369929	5369929
e1026	2005	United Kingdom	human blood	clinical	<i>bla</i> _{ACT} , <i>catA</i> *, <i>fosA2</i> , <i>oqx</i> <i>B</i>	SAMEA2273485	FJWD000000000	27	494790	4725159

e2350	2010	United Kingdom	human blood	clinical	<i>bla</i> _{ACT} , <i>bla</i> _{NMC-A} , <i>catA</i> *, <i>fosA</i> , <i>oqx</i> <i>B</i>	SAMEA2273452	FKCG00000000	40	491260	4963845
EN-119	n.a.	China	human	clinical	<i>bla</i> _{ACT} , <i>catA</i> *, <i>fosA</i> , <i>oqx</i> <i>B</i>	SAMN05787341	NZ_CP017279	2	4857439	4952770
E8	2015	Germany	cucumber	environmental/ other	<i>bla</i> _{ACT} , <i>catA</i> *, <i>fosA</i> , <i>oqx</i> <i>B</i> , <i>tel</i> (A)-type	SAMN12560200	VTUA00000000	140	496749	4848102
NR1491	2013	Japan	n.a.	n.a.	<i>bla</i> _{ACT} -54, <i>bla</i> _{NMC-A} , <i>catA</i> *, <i>fosA</i> , <i>oqx</i> <i>B</i>	SAMD00184384	BKZO00000000	32	456530	4785407
ES-1	2015	USA	soil	environmental/ other	<i>bla</i> _{ACT} , <i>catA</i> *, <i>fosA</i> , <i>oqx</i> <i>B</i>	SAMN11281800	SZVD00000000	95	129134	4858644
AS012248	2015	USA	human lung	clinical	<i>bla</i> _{ACT} , <i>catA</i> *, <i>fosA</i> , <i>oqx</i> <i>B</i>	SAMN12250567	VLNN00000000	739	71890	5204705
AS012244	2015	USA	human lung	clinical	<i>bla</i> _{ACT} , <i>catA</i> *, <i>fosA</i> , <i>oqx</i> <i>B</i>	SAMN12250563	VLNO00000000	548	209857	4972320
D42-sc-1712201	n.a.	Switzerland	n.a.	n.a.	<i>bla</i> _{ACT} , <i>catA</i> *, <i>fosA</i> 2, <i>oqx</i> <i>B</i>	SAMN15300311	NZ_CP056119	1	4875486	4875486
FDAARGOS 1436	2004	Germany	human mid-stream urine	clinical	<i>bla</i> _{ACT} , <i>fosA</i> , <i>oqx</i> <i>A</i> , <i>oqx</i> <i>B</i>	SAMN16357578	CP077223	1	4943437	4943437
K37	2020	China	human faeces	clinical	<i>bla</i> _{ACT} , <i>fosA</i> 2, <i>oqx</i> <i>A</i> , <i>oqx</i> <i>B</i>	SAMN14389561	JAASIR00000000	17	667499	4902033
K32	2020	China	human faeces	clinical	<i>bla</i> _{ACT} , <i>fosA</i> 2, <i>oqx</i> <i>A</i> , <i>oqx</i> <i>B</i>	SAMN14389555	JAASIL00000000	18	721734	4736013
K31_2	2020	China	human faeces	clinical	<i>bla</i> _{ACT} , <i>fosA</i> 2, <i>oqx</i> <i>A</i> , <i>oqx</i> <i>B</i>	SAMN14389554	JAASIK00000000	15	721734	4736350
FDAARGOS_1475	2002	Greece	soil from a land farm for treatment of refinery waste sludge	environmental/ other	<i>bla</i> _{ACT} , <i>fosA</i> 2, <i>oqx</i> <i>A</i> , <i>oqx</i> <i>B</i>	SAMN20888892	CP082860	1	4730716	4730716
FDAARGOS_1498	2002	Greece	soil from a land farm for treatment of refinery waste sludge	environmental/ other	<i>bla</i> _{ACT} , <i>catA</i> *, <i>fosA</i> 2, <i>oqx</i> <i>B</i>	SAMN21218854	CP083640	1	4730711	4730711
UW5	1994	Canada	soil	environmental/ other	<i>bla</i> _{ACT} , <i>catA</i> *, <i>fosA</i> , <i>oqx</i> <i>B</i>	SAMN03743787	NZ_CP011798	1	4904981	4904981
2485STDY5438318	n.a.	United Kingdom	human	clinical	<i>bla</i> _{ACT} , <i>catA</i> *, <i>fosA</i> , <i>oqx</i> <i>B</i>	SAMEA1964557	UNVN00000000	35	539931	4810044
2485STDY5438320	n.a.	United Kingdom	human	clinical	<i>bla</i> _{ACT} , <i>catA</i> *, <i>fosA</i> , <i>oqx</i> <i>B</i>	SAMEA2053720	UNVX00000000	23	540025	4761804
EC57	2018	Japan	human blood	clinical	<i>bla</i> _{ACT} , <i>catA</i> *, <i>fosA</i> , <i>oqx</i> <i>B</i>	SAMN16911616	JADRHX00000000	32	314090	4721280
MML25	2018	Japan	human blood	clinical	<i>bla</i> _{ACT} , <i>catA</i> *, <i>fosA</i> 2, <i>oqx</i> <i>B</i>	SAMN16911600	JADRIN00000000	22	697873	4737023
OLC-1683	2014	Canada	n.a.	food	<i>fosA</i> 2, <i>oqx</i> <i>B</i> -type	SAMN03292330	JXWL00000000	955	8888	5136359
AOUC-8/14	2014	Italy	human rectal swab from female	clinical	<i>bla</i> _{ACT} , <i>bla</i> _{NMC-A} , <i>catA</i> *, <i>fosA</i> 2, <i>oqx</i> <i>B</i>	SAMN03861996	LGIV00000000	15	695071	4766022
GN04920	2012	USA	n.a.	clinical	<i>bla</i> _{ACT} , <i>catA</i> *, <i>fosA</i> , <i>oqx</i> <i>B</i>	SAMN04572595	LVTW00000000	92	82088	4924730
NCR3	2014	Australia	<i>Carpobrotus rossii</i> rhizosphere	environmental/ other	<i>bla</i> _{ACT} , <i>catA</i> *, <i>fosA</i> 2, <i>oqx</i> <i>B</i>	SAMN05462048	MCGF00000000	23	771694	4779415
4928STDY7071139	2018	United Kingdom	human faecal	clinical	<i>bla</i> _{ACT} , <i>catA</i> *, <i>fosA</i> 2, <i>oqx</i> <i>B</i>	SAMEA104567250	CABGVX00000000	48	285987	5138127
4928STDY7071138	2018	United Kingdom	human faecal	clinical	<i>bla</i> _{ACT} , <i>catA</i> *, <i>fosA</i> 2, <i>oqx</i> <i>B</i>	SAMEA104567249	CABGVW00000000	47	209911	5136800
CEB04	2003	Sweden	human urinary tract catheters	clinical	<i>bla</i> _{ACT} , <i>catA</i> *, <i>fosA</i> , <i>oqx</i> <i>B</i>	SAMN11357407	NZ_CP039741	1	4892375	4892475
2021EL-00127	2020	USA	human urine	clinical	<i>bla</i> _{ACT} , <i>bla</i> _{NMC-A} , <i>catA</i> *, <i>fosA</i> 2, <i>oqx</i> <i>B</i>	SAMN18511098	JAGKLL00000000	20	585339	4892341
2020EL-00108	2020	USA	human peritoneum	clinical	<i>bla</i> _{ACT} , <i>bla</i> _{NMC-A} , <i>catA</i> *, <i>fosA</i> 2, <i>oqx</i> <i>B</i>	SAMN18511080	JAGKMD00000000	38	336354	4793318
4928STDY7071136	2018	United Kingdom	human faecal	clinical	<i>bla</i> _{ACT} , <i>catA</i> *, <i>fosA</i> 2, <i>oqx</i> <i>B</i>	SAMEA104567247	CABGVO00000000	47	286026	5137156

4928STDY7071140	2018	United Kingdom	human faecal	clinical	<i>bla_{ACT}, catA*, fosA2, oqxB</i>	SAMEA104567251	CABGVZ000000000	59	209917	5061284
I140	2017	USA	human hospital patient	clinical	<i>bla_{ACT-12}, catA*, fosA7, fosA, oqxB</i>	SAMN15689507	JACJHJ000000000	25	542092	5039619
Res13-Abat-PEB19-P1-02-A	2017	Canada	swab	Environmental/ other	<i>bla_{ACT-12}, catA*, fosA2, oqxB</i>	SAMN16304044	JADAJZ000000000	2	4656584	4661993
MGH216	n.a.	USA	human	clinical	<i>bla_{ACT}, catA*, fosA, oqxB</i>	SAMN08148254	JACRRJ000000000	35	252605	5225825
608_ECLO	n.a.	USA	human	clinical	<i>bla_{ACT}, catA*, fosA, oqxB</i>	SAMN03197808	JVAG000000000	222	48185	4804191
GN03638	2010	USA	human	clinical	<i>bla_{ACT}, catA*, fosA2, oqxB-type</i>	SAMN04407776	LRCI000000000	167	47667	5003459
e558	2003	United Kingdom	human blood	clinical	<i>bla_{ACT}, catA*, fosA2, oqxB</i>	SAMEA2273189	FKEY000000000	62	158439	5091497
48	2017	Germany	human clinical specimen	clinical	<i>bla_{ACT}, catA*, fosA2</i>	SAMN12258083	VKFK000000000	200	203750	5134960
49	2017	Germany	human clinical specimen	clinical	<i>bla_{ACT}, catA*, fosA2</i>	SAMN12258084	VKFJ000000000	152	185970	5122530
AS012471	2015	USA	human lung	clinical	<i>bla_{ACT}, catA*, fosA, oqxB</i>	SAMN12250790	VLMA000000000	754	245975	5153193
INSAq77	2018	Portugal	<i>Sparus aurata</i>	environmental/ other	<i>bla_{ACT-88}, catA*, fosA, mcr-9.1, oqxB</i>	SAMN15015462	JABRPH000000000	225	74544	5276953
EC56	2018	Japan	human blood	clinical	<i>bla_{ACT}, catA*, fosA2, mcr-10.1, oqxB</i>	SAMN16911615	JADRHJ000000000	80	202845	5110004
EC49	2018	Japan	human blood	clinical	<i>bla_{ACT}, catA*, fosA2, oqxB</i>	SAMN16911589	JADRIY000000000	68	186338	4853579
11894	2011	China	human throat swab	clinical	<i>bla_{ACT}, catA*, fosA, mcr-10, oqxB</i>	SAMN18435831	JAGFWU000000000	120	141921	4749540
40513	2015	France	<i>Corvus</i>	environmental/ other	<i>aac(6')-Ib3, aadA2, ant(2'')-Ia, bla_{ACT}, bla_{CTX-M-9}, bla_{SHV-12}, catA1, catA*, fosA2, mcr-9.1, oqxB, qnrA1, sul1, tet(A)</i>	SAMN15925369	JAGDFR000000000	62	529698	5031188
40508	2015	France	<i>Pica pica</i>	environmental/ other	<i>aac(6')-Ib3, aadA2, ant(2'')-Ia, bla_{ACT}, bla_{CTX-M-9}, bla_{SHV-12}, catA1, catA*, fosA2, mcr-9.1, oqxB, qnrA1, sul1, tet(A)</i>	SAMN15925368	JAGDFS000000000	66	423627	5031210
Y05	2020	China	human faeces	clinical	<i>aac(6')-Ib-cr5, aadA16, aph(3'')-Ib, aph(6)-Id, arr-3, bla_{ACT}, dfrA27, fosA2, mph(A), oqxA, oqxB, qnrB6, sul1, tet(C)</i>	SAMN14389599	JAASKD000000000	49	281183	5549279
Y09	2020	China	human faeces	clinical	<i>aac(6')-Ib-cr5, aadA2, aph(3'')-Ib, aph(6)-Id, arr-3, bla_{ACT}, bla_{OXA-1}, catB3, dfrA12, dfrA14, fosA3, fosA, mph(A), oqxA, oqxB, qnrA1, qnrS1, sul1, sul2, tet(B), tet(D)</i>	SAMN14389603	JAASKH000000000	41	534659	5406832
AS012405	2016	Austria	human lung	clinical	<i>bla_{ACT-12-type}, fosA2-type, oqxA-type, oqxB-type</i>	SAMN12250724	VLMJ010000000	2375	182725	5650902

* (HMM): According with the NCBI Pathogen Detection (<https://www.ncbi.nlm.nih.gov/pathogens>), using hidden Markov models (HMMs) to identify protein families

n.a.: data not available