

Supplementary Figures and Tables

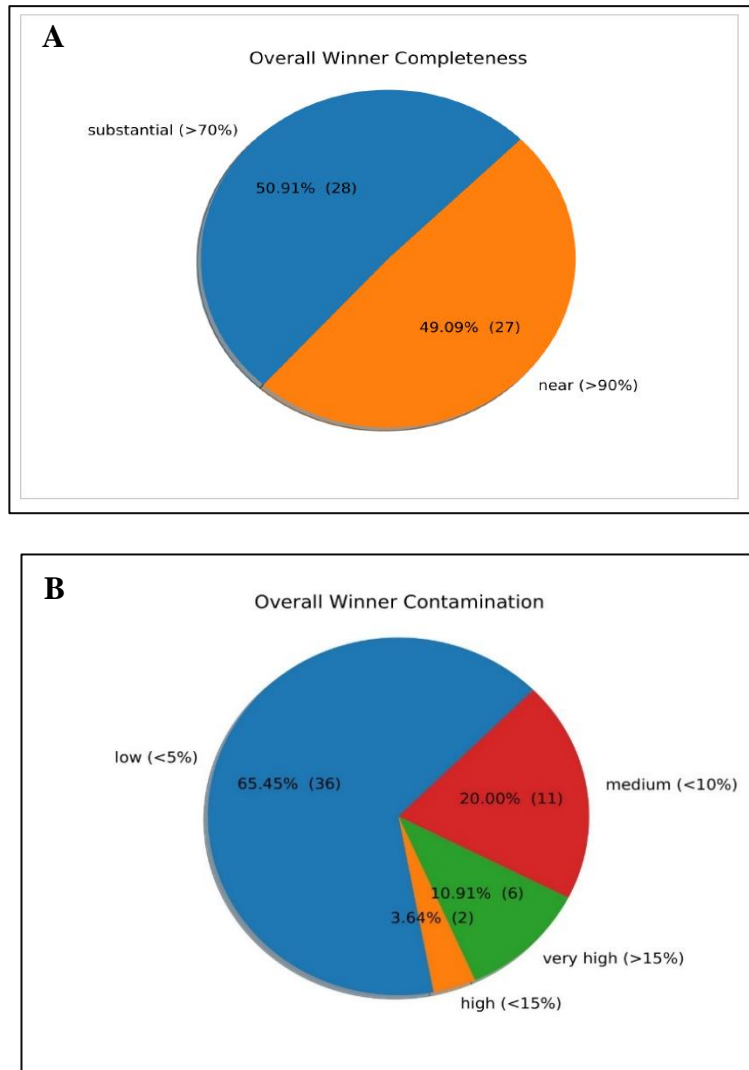


Figure S1. Overall winner MAGs produced from the SRS soils. About 254 individual bins were recovered from the SRS soil samples; however, 49 MAGs were selected based on the >75 completion (A) and < 25 contamination level (B).

Table S1 Winning Genome information with Marker lineage reconstructed after dRep analysis on the MAG generated from SRS samples with varying uranium concentrations collected at different seasons. 55 MAGs with completeness >75% and contamination <25%, accounting for 21.6% of the total MAGs were reconstructed.

genome	Marker lineage	completeness	contamination	strain_heterogeneity	length
soil-summer-high-uranium-results-MEGAHIT-group-0.13.fa	p__Actinobacteria (UID1454)	95.73	1.42	33.33	3083233
soil-summer-high-uranium-results-MEGAHIT-group-0.14.fa	o__Rhizobiales (UID3447)	86.38	2.74	80	2682434
soil-summer-high-uranium-results-MEGAHIT-group-0.17.fa	k__Bacteria (UID1452)	89.81	3.81	0	2330232
soil-summer-low-uranium-results-MEGAHIT-group-0.11.fa	k__Bacteria (UID3187)	93.16	11.59	20.83	5392018
soil-summer-low-uranium-results-MEGAHIT-group-0.12.fa	k__Bacteria (UID1452)	92.75	2.42	50	3127523
soil-summer-low-uranium-results-MEGAHIT-group-0.15.fa	k__Archaea (UID2)	75.49	0.97	0	2104794
soil-summer-low-uranium-results-MEGAHIT-group-0.21.fa	p__Actinobacteria (UID1454)	94.44	3.16	14.29	2333606
soil-summer-low-uranium-results-MEGAHIT-group-0.24.fa	p__Euryarchaeota (UID3)	99.2	1.6	0	2661188
soil-summer-low-uranium-results-MEGAHIT-group-0.3.fa	p__Euryarchaeota (UID49)	98.53	2.61	0	2895156
soil-summer-low-uranium-results-MEGAHIT-group-0.5.fa	o__Rhizobiales (UID3447)	75.79	3.31	50	2771185
soil-summer-low-uranium-results-MEGAHIT-group-0.6.fa	k__Archaea (UID2)	91.75	2.91	0	2256961

soil-summer-medium-uranium-results-MEGAHIT-group-0.10.fa	f__Micrococcaceae (UID1631)	78.77	1.8	100	3504281
soil-winter-high-uranium-results-MEGAHIT-group-0.17.fa	c__Betaproteobacteria (UID3971)	95.79	3.48	36.36	4120679
soil-winter-high-uranium-results-MEGAHIT-group-0.19.fa	k__Bacteria (UID3187)	78.13	3.99	0	4960548
soil-winter-high-uranium-results-MEGAHIT-group-0.23.fa	k__Bacteria (UID3187)	91.88	5.27	12.5	8053684
soil-winter-high-uranium-results-MEGAHIT-group-0.26.fa	k__Bacteria (UID3187)	83.12	3.42	0	4773232
soil-winter-high-uranium-results-MEGAHIT-group-0.3.fa	k__Bacteria (UID3187)	81.99	18.66	11.11	6349288
soil-winter-high-uranium-results-MEGAHIT-group-0.33.fa	p__Bacteroidetes (UID2591)	94.88	2.64	37.5	3768066
soil-winter-high-uranium-results-MEGAHIT-group-0.35.fa	k__Bacteria (UID1452)	91.36	4.63	16.67	2805076
soil-winter-high-uranium-results-MEGAHIT-group-0.36.fa	c__Alphaproteobacteria (UID3305)	79.17	3.39	71.43	2336408
soil-winter-high-uranium-results-MEGAHIT-group-0.40.fa	c__Gammaproteobacteria (UID4202)	92.77	3.83	23.81	3661217
soil-winter-high-uranium-results-MEGAHIT-group-0.5.fa	c__Alphaproteobacteria (UID3305)	96.3	3.07	30	4186502
soil-winter-high-uranium-results-MEGAHIT-group-0.51.fa	k__Bacteria (UID1452)	91.67	1.57	0	4442876
soil-winter-high-uranium-results-MEGAHIT-group-0.52.fa	k__Bacteria (UID3187)	90.17	3.47	16.67	4854587

soil-winter-high-uranium-results-MEGAHIT-group-0.55.fa	k__Bacteria (UID3187)	82.92	5.91	12.5	1912464
soil-winter-high-uranium-results-MEGAHIT-group-0.61.fa	k__Bacteria (UID3187)	92.07	9.96	31.82	5211487
soil-winter-high-uranium-results-MEGAHIT-group-0.63.fa	k__Bacteria (UID1452)	77.2	1.85	33.33	2663546
soil-winter-high-uranium-results-MEGAHIT-group-0.7.fa	k__Bacteria (UID1452)	88.99	0.92	0	2628606
soil-winter-low-uranium-results-MEGAHIT-group-0.12.fa	k__Bacteria (UID3187)	97.15	2.56	0	6711185
soil-winter-low-uranium-results-MEGAHIT-group-0.3.fa	k__Bacteria (UID203)	84.72	3.67	0	7524572
soil-winter-low-uranium-results-MEGAHIT-group-0.32.fa	k__Bacteria (UID203)	81.82	21.29	51.35	3265507
soil-winter-low-uranium-results-MEGAHIT-group-0.33.fa	k__Bacteria (UID2495)	85.03	24.28	44.44	4172680
soil-winter-low-uranium-results-MEGAHIT-group-0.38.fa	k__Bacteria (UID203)	91.23	5.5	75	5025612
soil-winter-low-uranium-results-MEGAHIT-group-0.47.fa	c__Gammaproteobacteria (UID4202)	94.57	8.5	20	3319549
soil-winter-low-uranium-results-MEGAHIT-group-0.53.fa	c__Alphaproteobacteria (UID3305)	79.75	2.2	50	3748426
soil-winter-low-uranium-results-MEGAHIT-group-0.55.fa	p__Euryarchaeota (UID3)	94.5	15.59	17.65	2867787
soil-winter-low-uranium-results-MEGAHIT-group-0.56.fa	k__Bacteria (UID1452)	97.73	9.05	7.69	4126511

soil-winter-low-uranium-results-MEGAHIT-group-0.8.fa	k__Archaea (UID2)	75.24	0.49	0	1042614
soil-winter-low-uranium-results-MEGAHIT-group-0.9.fa	k__Bacteria (UID3187)	94.02	6.41	0	8036188
soil-winter-medium-uranium-results-MEGAHIT-group-0.1.fa	k__Bacteria (UID2570)	88.4	1.09	0	2532248
soil-winter-medium-uranium-results-MEGAHIT-group-0.15.fa	k__Bacteria (UID2495)	84.52	4.76	0	2537901
soil-winter-medium-uranium-results-MEGAHIT-group-0.2.fa	k__Bacteria (UID3187)	95.22	6.09	0	6095384
soil-winter-medium-uranium-results-MEGAHIT-group-0.25.fa	k__Bacteria (UID3187)	78.85	5.98	25	4805942
soil-winter-medium-uranium-results-MEGAHIT-group-0.26.fa	k__Bacteria (UID203)	81.03	5.17	25	5115929
soil-winter-medium-uranium-results-MEGAHIT-group-0.27.fa	k__Bacteria (UID3187)	77.22	7.29	13.33	5487845
soil-winter-medium-uranium-results-MEGAHIT-group-0.29.fa	k__Bacteria (UID3187)	83.96	3.18	50	2404073
soil-winter-medium-uranium-results-MEGAHIT-group-0.3.fa	k__Bacteria (UID1452)	91.09	3.47	75	2893218
soil-winter-medium-uranium-results-MEGAHIT-group-0.36.fa	k__Archaea (UID2)	79.61	2.75	75	958102
soil-winter-medium-uranium-results-MEGAHIT-group-0.37.fa	k__Bacteria (UID3187)	94.87	4.7	16.67	6098353
soil-winter-medium-uranium-results-MEGAHIT-group-0.39.fa	k__Bacteria (UID1452)	91	1.39	0	2674289
soil-winter-medium-uranium-results-	k__Bacteria (UID203)	86.99	20.82	16	3330858

MEGAHIT-group-0.40.fa					
soil-winter-medium-uranium-results-MEGAHIT-group-0.41.fa	p__Euryarchaeota (UID3)	89.49	1.66	33.33	1648859
soil-winter-medium-uranium-results-MEGAHIT-group-0.44.fa	c__Betaproteobacteria (UID3959)	76.13	2.65	27.27	3859939
soil-winter-medium-uranium-results-MEGAHIT-group-0.46.fa	k__Bacteria (UID3187)	92.36	18.8	25	5449853
soil-winter-medium-uranium-results-MEGAHIT-group-0.62.fa	k__Bacteria (UID3187)	82.28	12.89	29.17	8189196

Table S2. Analysis performed on the MAGs of *Arthrobacter oryzae* using the KBase bioinformatics pipeline.

Function Role	Gene count	Subsystem Name	Subsystem Class
ATP-dependent DNA helicase RecQ	6	DNA repair, bacterial RecFOR pathway	DNA processing
ATP-dependent DNA helicase SCO5183	2	DNA repair, bacterial RecBCD pathway	DNA processing
ATP-dependent DNA helicase SCO5184	4	DNA repair, bacterial RecBCD pathway	DNA processing
DNA integrity scanning protein DisA	2	DNA repair, bacterial	DNA processing
DNA polymerase like protein MT3142	4	DNA repair, bacterial	DNA processing
DNA recombination and repair protein RecF	2	DNA repair, bacterial RecFOR pathway	DNA processing
DNA recombination and repair protein RecO	2	DNA repair, bacterial RecFOR pathway	DNA processing
DNA recombination protein RmuC	2	DNA repair, bacterial	DNA processing
DNA repair helicase	2	Potential DNA repair cluster	DNA processing
DNA repair protein RadA	2	DNA repair, bacterial	DNA processing
DNA repair protein RecN	2	DNA repair, bacterial rRNA modification related cluster including tlyA	DNA processing
Endonuclease VIII	4	DNA repair base excision	DNA processing
Error-prone repair protein UmuD	2	DNA repair, bacterial UmuCD system	DNA processing
Excinuclease ABC subunit A	4	DNA repair, UvrABC system	DNA processing
Excinuclease ABC subunit A parlog of unknown function	6	DNA repair, UvrABC system	DNA processing
Excinuclease ABC subunit B	4	DNA repair, UvrABC system	DNA processing
Excinuclease ABC subunit C	2	BarA-UrvY(SirA) two component regulatory system DNA repair, uvrABC system	Regulation and Cell signaling DNA processing

Table S3. Number and types of specialized genes found in the MAG of *Arthrobacter oryzae*.

	Source	Genes
Antibiotic Resistance	CARD	2
Antibiotic Resistance	PATRIC	32
Drug Target	DrugBank	6
Drug Target	TTF	2
Transporter	TCDB	1
Virulence Factor	PATRIC_VF	4
Virulence Factor	Victors	1