

Table S1. Identified prophage regions of *Pseudomonas* sp. D3.

Region	Region Length	Completeness	Score	# Total Proteins	Most Common Phage	GC %
1	65.1Kb	intact	150	83	PHAGE_Vibrio_VP882_NC_009016(15)	58.74%
2	26.9Kb	incomplete	50	15	PHAGE_Burkho_phi1026b_NC_005284(2)	57.51%
3	42.8Kb	questionable	82	49	PHAGE_Pseudo_Dobby_NC_048109(27)	57.39%
4	44.1Kb	intact	110	33	PHAGE_Pseudo_YMC11/02/R656_NC_028657(12)	59.21%
5	23.2Kb	questionable	90	17	PHAGE_Pseudo_YMC11/02/R656_NC_028657(3)	56.26%
6	40.8Kb	incomplete	40	37	PHAGE_Pseudo_phiPsa17_NC_047747(15)	54.01%
7	6.7Kb	incomplete	40	7	PHAGE_Salmon_SJ46_NC_031129(3)	51.71%
8	41.8Kb	questionable	70	54	PHAGE_Pseudo_MD8_NC_031091(11)	58.32%
9	44Kb	intact	150	53	PHAGE_Pseudo_F10_NC_007805(14)	58.35%
10	30.1Kb	incomplete	40	15	PHAGE_Escher_500465_1_NC_049342(5)	58.95%
11	22.2Kb	incomplete	30	6	PHAGE_Klebsi_ST147_VIM1phi7.1_NC_049451(2)	59.47%

Total: 11 prophage regions have been identified, of which 3 regions are intact, 5 regions are incomplete, and 3 regions are questionable.

■ Intact (score > 90)

■ Questionable (score 70-90)

■ Incomplete (score < 70)

Region: The number assigned to the region.

Region Length: The length of the sequence of that region (in bp).

Completeness: A prediction of whether the region contains an intact or incomplete prophage based on the above criteria.

Score: The score of the region is based on the above criteria.

Total Proteins: The number of ORFs present in the region.

Most Common Phage: The phage(s) with the highest number of proteins most similar to those in the region.

GC %: The percentage of GC nucleotides of the region.

Table S2. Pairwise comparisons of *Pseudomonas* sp. D3 and *Pseudomonas* sp. G11 genomes vs. type strain genomes.

Query strain	Subject strain	dDDH (d0, in %)	dDDH (d4, in %)	dDDH (d6, in %)
<i>Pseudomonas</i> sp. D3	<i>Pseudomonas veronii</i> DSM 11331	67.2	54.4	66.3
<i>Pseudomonas</i> sp. G11	<i>Pseudomonas grimontii</i> DSM 17515	55.8	37.4	51.5
<i>Pseudomonas</i> sp. G11	<i>Pseudomonas marginalis</i> DSM 13124	55.1	37.2	50.9
<i>Pseudomonas</i> sp. D3	<i>Pseudomonas fildesensis</i> KG01	58.1	37	53.2
<i>Pseudomonas</i> sp. D3	<i>Pseudomonas</i> sp. G11	51.8	36.8	48.1
<i>Pseudomonas</i> sp. D3	<i>Pseudomonas extremaustralis</i> 14-3	55	36.6	50.6
<i>Pseudomonas</i> sp. G11	<i>Pseudomonas fildesensis</i> KG01	54.2	36.5	49.9
<i>Pseudomonas</i> sp. G11	<i>Pseudomonas veronii</i> DSM 11331	55.2	36.2	50.6
<i>Pseudomonas</i> sp. D3	<i>Pseudomonas grimontii</i> DSM 17515	52.3	35.5	48
<i>Pseudomonas</i> sp. G11	<i>Pseudomonas aylmerensis</i> S1E40	49.5	35.5	45.9
<i>Pseudomonas</i> sp. G11	<i>Pseudomonas extremaustralis</i> 14-3	48.2	35.3	44.8
<i>Pseudomonas</i> sp. D3	<i>Pseudomonas marginalis</i> DSM 13124	51.3	35.3	47.2
<i>Pseudomonas</i> sp. D3	<i>Pseudomonas aylmerensis</i> S1E40	49.4	34.9	45.6
<i>Pseudomonas</i> sp. G11	<i>Pseudomonas cyclaminis</i> MAFF 301449T	48.5	34.8	44.9
<i>Pseudomonas</i> sp. G11	<i>Pseudomonas petroselini</i> MAFF 311094	51.9	34.7	47.5
<i>Pseudomonas</i> sp. G11	<i>Pseudomonas pergaminensis</i> 1008T	51	34.6	46.7
<i>Pseudomonas</i> sp. G11	<i>Pseudomonas allii</i> MAFF 301514	53.4	34.6	48.6
<i>Pseudomonas</i> sp. G11	<i>Pseudomonas azotoformans</i> LMG 21611	51.8	34.6	47.3
<i>Pseudomonas</i> sp. G11	<i>Pseudomonas marginalis</i> ICMP 3553	52.1	34.5	47.6
<i>Pseudomonas</i> sp. D3	<i>Pseudomonas petroselini</i> MAFF 311094	48.6	34.5	44.9
<i>Pseudomonas</i> sp. D3	<i>Pseudomonas azotoformans</i> LMG 21611	50.3	34.4	46.2
<i>Pseudomonas</i> sp. G11	<i>Pseudomonas extremorientalis</i> LMG 19695	52.5	34.4	47.8
<i>Pseudomonas</i> sp. D3	<i>Pseudomonas marginalis</i> ICMP 3553	50.8	34.4	46.5
<i>Pseudomonas</i> sp. D3	<i>Pseudomonas pergaminensis</i> 1008T	50.1	34.3	46
<i>Pseudomonas</i> sp. D3	<i>Pseudomonas extremorientalis</i> LMG 19695	51.3	34.2	46.8
<i>Pseudomonas</i> sp. D3	<i>Pseudomonas cyclaminis</i> MAFF 301449T	48.9	34.2	45
<i>Pseudomonas</i> sp. D3	<i>Pseudomonas allii</i> MAFF 301514	49.4	34.2	45.4
<i>Pseudomonas</i> sp. G11	<i>Pseudomonas antarctica</i> LMG 22709	45.5	33.8	42.2
<i>Pseudomonas</i> sp. G11	<i>Pseudomonas asgharzadehiana</i> SWRI132	52	33.8	47.2
<i>Pseudomonas</i> sp. G11	<i>Pseudomonas sivasensis</i> P7	49.1	33.8	45
<i>Pseudomonas</i> sp. G11	<i>Pseudomonas simiae</i> CCUG 50988	52.6	33.7	47.6
<i>Pseudomonas</i> sp. D3	<i>Pseudomonas simiae</i> CCUG 50988	53.8	33.6	48.5
<i>Pseudomonas</i> sp. D3	<i>Pseudomonas asgharzadehiana</i> SWRI132	53	33.6	47.9
<i>Pseudomonas</i> sp. D3	<i>Pseudomonas antarctica</i> LMG 22709	50.3	33.6	45.8
<i>Pseudomonas</i> sp. D3	<i>Pseudomonas sivasensis</i> P7	50.2	33.3	45.6
<i>Pseudomonas</i> sp. D3	<i>Pseudomonas kitaguniensis</i> MAFF 212408T	43.3	32.5	40
<i>Pseudomonas</i> sp. G11	<i>Pseudomonas kitaguniensis</i> MAFF 212408T	39.3	32.4	36.9

Table S3. The source of 95 strains of *Pseudomonas*.

CCTCC No.	Name*	Isolated_from	Country
CCTCC S2012104	<i>Pseudomonas baetica</i>	Soil	Arctic Ny-Alesund
CCTCC S2012113	<i>Pseudomonas reinekei</i>	Soil	Arctic Ny-Alesund
CCTCC S2012311	<i>Pseudomonas koreensis</i>	Soil	Arctic Ny-Alesund
CCTCC S2012564	<i>Pseudomonas punonensis</i>	Soil	Arctic
CCTCC S2012668	<i>Pseudomonas pelagia</i>	Soil	Arctic Ny-Alesund
CCTCC S2013037	<i>Pseudomonas cedrina</i>	Soil	Fildes Peninsula, Antarctica
CCTCC S2013231	<i>Pseudomonas brenneri</i>	Soil	Arctic Ny-Alesund
CCTCC S2013262	<i>Pseudomonas extremaustralis</i>	Soil	Arctic Ny-Alesund
CCTCC S2013472	<i>Pseudomonas psychrotolerans</i>	Feces	Fildes Peninsula, Antarctica
CCTCC S2013652	<i>Pseudomonas cedrina</i> subsp.	Soil	Fildes Peninsula, Antarctica
CCTCC S2013668	<i>Pseudomonas flavescens</i>	Soil	Antarctica
CCTCC S2013684	<i>Pseudomonas taeanensis</i>	Soil	Antarctica
CCTCC S2014069	<i>Pseudomonas thivervalensis</i>	Soil	Fildes Peninsula, Antarctica
CCTCC S2014099	<i>Pseudomonas brenneri</i>	Soil	Fildes Peninsula, Antarctica
CCTCC S2014108	<i>Pseudomonas antarctica</i>	Soil	Fildes Peninsula, Antarctica
CCTCC S2014299	<i>Pseudomonas syringae</i>	Soil	Fildes Peninsula, Antarctica
CCTCC S2014340	<i>Pseudomonas brenneri</i>	Soil	Fildes Peninsula, Antarctica
CCTCC S2014342	<i>Pseudomonas poae</i>	Soil	Fildes Peninsula, Antarctica
CCTCC S2014365	<i>Pseudomonas baetica</i>	Soil	Fildes Peninsula, Antarctica
CCTCC S2014426	<i>Pseudomonas syringae</i>	Soil	Fildes Peninsula, Antarctica
CCTCC S2014584	<i>Pseudomonas avellanae</i>	Soil	Arctic Ny-Alesund
CCTCC S2014754	<i>Pseudomonas meridiana</i>	Soil	Arctic Ny-Alesund
CCTCC S2014863	<i>Pseudomonas azotoformans</i>	Soil	Fildes Peninsula, Antarctica
CCTCC S2014901	<i>Pseudomonas protegens</i>	Flowers	Arctic Ny-Alesund
CCTCC S2014926	<i>Pseudomonas avellanae</i>	Flowers	Arctic Ny-Alesund
CCTCC S2015032	<i>Pseudomonas graminis</i>	Soil	Arctic Longyear
CCTCC S2015124	<i>Pseudomonas chlororaphis</i> subsp. <i>piscium</i>	Soil	Arctic Longyear
CCTCC S2015145	<i>Pseudomonas chlororaphis</i> subsp. <i>piscium</i>	Soil	Arctic Ny-Alesund
CCTCC AB2015149	<i>Pseudomonas piscium</i>	Soil	South Shetland Islands, Antarctica
CCTCC S2015157	<i>Pseudomonas ficuserectae</i>	Soil	Arctic Ny-Alesund
CCTCC S2015203	<i>Pseudomonas rhizosphaerae</i>	Flowers	Arctic Ny-Alesund
CCTCC S2015248	<i>Pseudomonas gessardii</i>	Feces	Antarctica Fildes Peninsula
CCTCC S2015249	<i>Pseudomonas guineae</i>	Feces	Antarctica Fildes Peninsula
CCTCC S2015252	<i>Pseudomonas caeni</i>	Feces	Antarctica Fildes Peninsula
CCTCC S2015320	<i>Pseudomonas salomonii</i>	Soil	South Shetland Islands, Antarctica
CCTCC S2015388	<i>Pseudomonas brenneri</i>	Soil	Arctic Longyear
CCTCC S2015407	<i>Pseudomonas frederiksbergensis</i>	Soil	Arctic Longyear
CCTCC S2015434	<i>Pseudomonas beteli</i>	Reindeer droppings	Arctic Ny-Alesund
CCTCC S2015441	<i>Pseudomonas beteli</i>	Reindeer droppings	Arctic Ny-Alesund
CCTCC S2015639	<i>Pseudomonas meridiana</i>	Soil	South Shetland Islands, Antarctica
CCTCC S2015652	<i>Pseudomonas libanensis</i>	Soil	Arctic Ny-Alesund
CCTCC S2015847	<i>Pseudomonas libanensis</i>	Soil	Arctic
CCTCC AB 2016039	<i>Pseudomonas fragi</i>	Soil	Arctic
CCTCC S2016218	<i>Pseudomonas chlororaphis</i>	Moraine	Arctic Ny-Alesund
CCTCC S2016494	<i>Pseudomonas cryoconiti</i>	Soil	Antarctica
CCTCC S2016531	<i>Pseudomonas chlororaphis</i> subsp. <i>piscium</i>	Soil	Antarctica

CCTCC S2016797	<i>Pseudomonas marginalis</i>	Soil	Antarctica
CCTCC S2016804	<i>Pseudomonas koreensis</i>	Soil	Antarctica
CCTCC S2017030	<i>Pseudomonas arsenicoxydans</i>	Soil	Antarctic Penguin Island
CCTCC S2017091	<i>Pseudomonas ficuserectae</i>	Soil	Fildes Peninsula, Antarctica
CCTCC S2017137	<i>Pseudomonas migulae</i>	Soil	Fildes Peninsula, Antarctica
CCTCC S2017165	<i>Pseudomonas frederiksbergensis</i>	Soil	Fildes Peninsula, Antarctica
CCTCC S2017205	<i>Pseudomonas taetrolens</i>	Soil	Fildes Peninsula, Antarctica
CCTCC S2017300	<i>Pseudomonas yamanorum</i>	Soil	Fildes Peninsula, Antarctica
CCTCC S2017306	<i>Pseudomonas weihenstephanensis</i>	Soil	Fildes Peninsula, Antarctica
CCTCC S2017310	<i>Pseudomonas simiae</i>	Soil	Fildes Peninsula, Antarctica
CCTCC AB 2018326	<i>Pseudomonas simiae</i>	Reindeer droppings	Arctic Ny-Alesund
CCTCC AB 2018332	<i>Pseudomonas</i> sp. D3	Soil	Fildes Peninsula, Antarctica
CCTCC AB 2018339	<i>Pseudomonas guineae</i>	Marine sediments	Arctic Longyear
CCTCC AB 2018340	<i>Pseudomonas fluorescens</i>	Soil	Fildes Peninsula, Antarctica
CCTCC AB 2018344	<i>Pseudomonas baetica</i>	Marine sediments	Arctic Longyear
CCTCC S2019025	<i>Pseudomonas coronafaciens</i>	Soil	Fildes Peninsula, Antarctica
CCTCC S2019058	<i>Pseudomonas frederiksbergensis</i>	Soil	Fildes Peninsula, Antarctica
CCTCC S2019077	<i>Pseudomonas mandelii</i>	Soil	Fildes Peninsula, Antarctica
CCTCC S2019263	<i>Pseudomonas arsenicoxydans</i>	Soil	Norway
CCTCC S2019297	<i>Pseudomonas frederiksbergensis</i>	Soil	Arctic
CCTCC S2019309	<i>Pseudomonas silesiensis</i>	Soil	Arctic
CCTCC S2019310	<i>Pseudomonas prosekii</i>	Soil	Arctic
CCTCC S2019316	<i>Pseudomonas avellanae</i>	Soil	Arctic
CCTCC S2019358	<i>Pseudomonas guineae</i>	Glacier	Arctic Yellow River Station
CCTCC S2019381	<i>Pseudomonas grimontii</i>	Nectar	Arctic Yellow River Station
CCTCC S2019393	<i>Pseudomonas extremaustralis</i>	Nectar	Arctic Yellow River Station
CCTCC S2019471	<i>Pseudomonas proseki</i>	Glacier	Arctic Yellow River Station
CCTCC S2019472	<i>Pseudomonas simiae</i>	Glacier	Arctic Yellow River Station
CCTCC S2019473	<i>Pseudomonas canadensis</i>	Glacier	Arctic Yellow River Station
CCTCC S2020027	<i>Pseudomonas nabeulensis</i>	Flowers	Arctic Yellow River Station
CCTCC S2021003	<i>Pseudomonas marginalis</i>	Glacier	Arctic Yellow River Station
CCTCC S2021058	<i>Pseudomonas kitaguniensis</i>	Glacier	Arctic Yellow River Station
CCTCC S2021174	<i>Pseudomonas antarctica</i>	Marine sediments	Arctic
CCTCC S2021176	<i>Pseudomonas spelaei</i>	Marine sediments	Arctic
CCTCC S2021179	<i>Pseudomonas gessardii</i>	Marine sediments	Arctic
CCTCC S2021183	<i>Pseudomonas fluorescens</i>	Marine sediments	Arctic
CCTCC S2021184	<i>Pseudomonas arsenicoxydans</i>	Marine sediments	Arctic
CCTCC S2021189	<i>Pseudomonas prosekii</i>	Marine sediments	Arctic
CCTCC S2021190	<i>Pseudomonas migulae</i>	Marine sediments	Arctic
CCTCC S2021192	<i>Pseudomonas yamanorum</i>	Marine sediments	Arctic
CCTCC S2021193	<i>Pseudomonas piscium</i>	Marine sediments	Arctic
CCTCC S2022057	<i>Pseudomonas frederiksbergensis</i>	Soil	Arctic Svalbard
CCTCC S2022058	<i>Pseudomonas migulae</i>	Soil	Arctic Svalbard
CCTCC S2022059	<i>Pseudomonas mucoides</i>	Soil	Arctic Svalbard
CCTCC S2022060	<i>Pseudomonas silesiensis</i>	Soil	Arctic Svalbard
CCTCC AB2022412	<i>Pseudomonas</i> sp. G11	Soil	Arctic Svalbard
CCTCC S2022062	<i>Pseudomonas yamanorum</i>	Soil	Arctic Svalbard
CCTCC S2019477	<i>Pseudomonas proseki</i>	Glacier	Arctic Yellow River Station

* The species showing the highest 16S rDNA gene sequence similarity

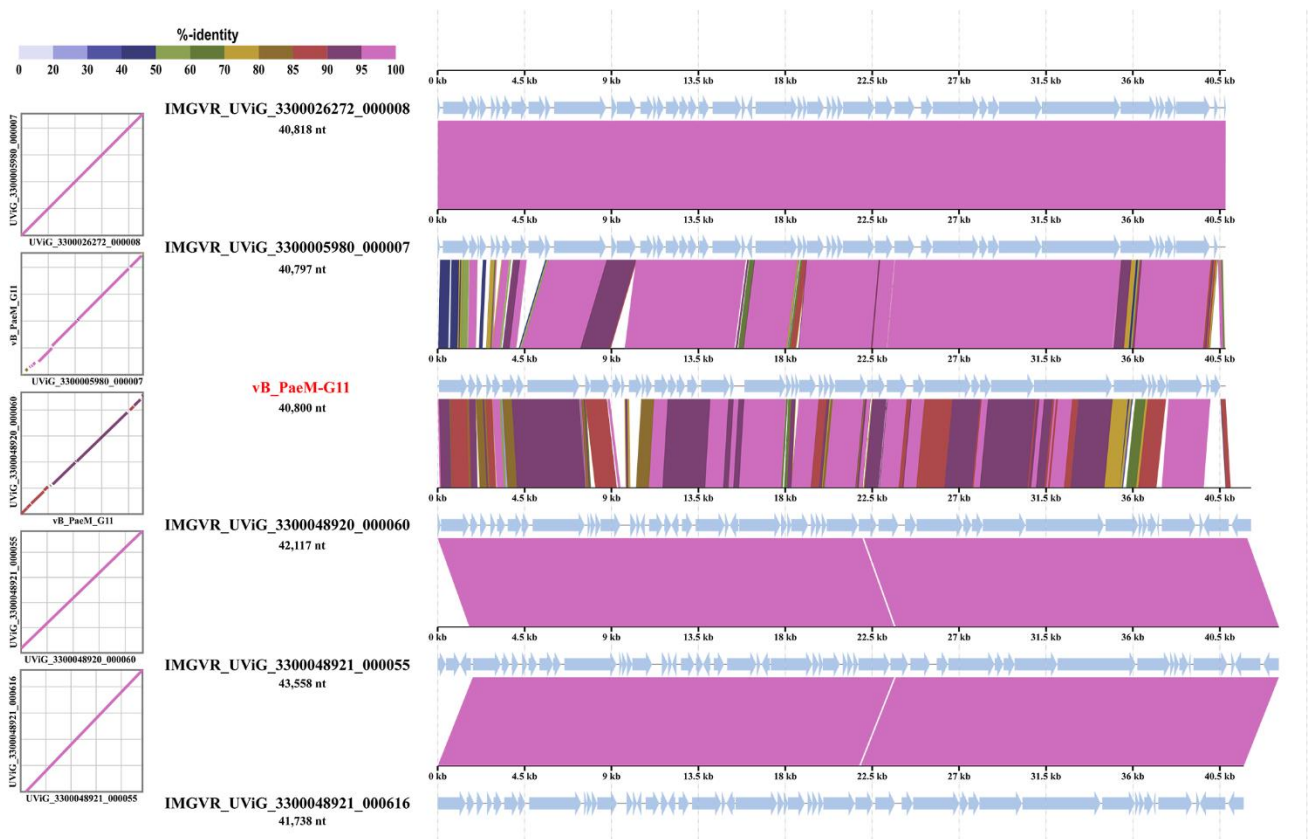


Figure S1. Genome comparison between vB_PaeM-G11 and five UViGs from IMG/VR. In the alignment, high-similarity regions detected by tBLASTx are color-coded based on the reported %-identity. In addition, dot plots summarizing these high-similarity regions are shown beside the alignment.

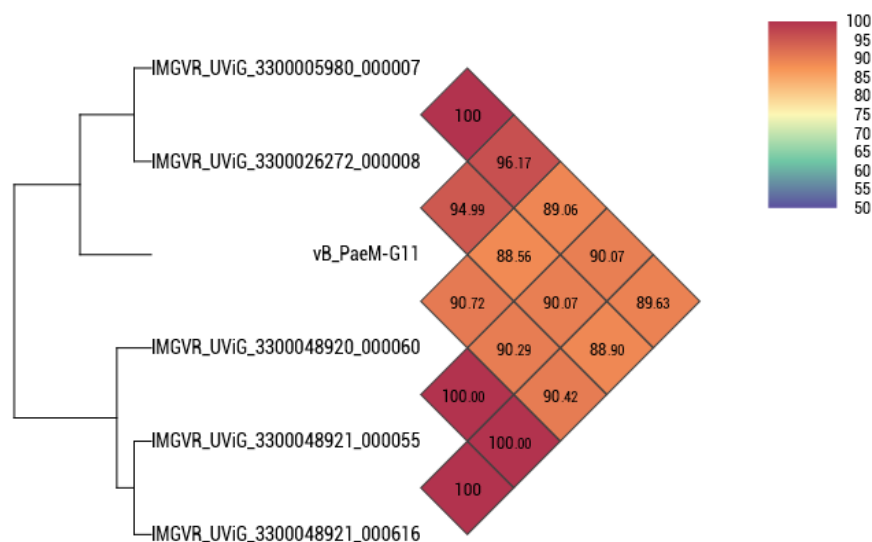


Figure S2. Heat map based on OrthoANI values calculated using OAT software about vB_PaeM-G11 and five UViGs from IMG/VR.

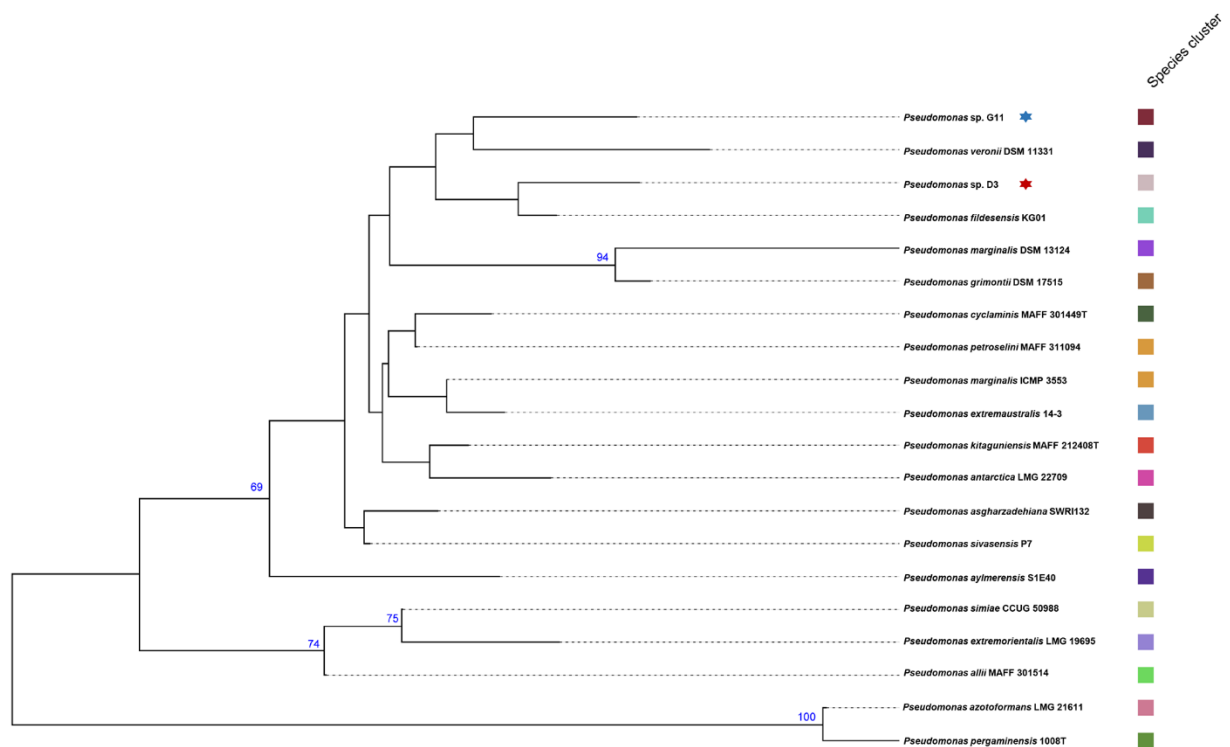


Figure S3. The phylogeny tree of GBDP based on 16S rDNA gene sequence of *Pseudomonas* sp. D3 and *pseudomonas* sp. G11. Tree inferred with FastME 2.1.6.1 from GBDP distances calculated from 16S rDNA gene sequences. The branch lengths are scaled in terms of GBDP distance formula d5. The numbers above branches are GBDP pseudo-bootstrap support values > 60 % from 100 replications. The tree was rooted at the midpoint.

Supplementary Data 1.

Region 6 DNA

CGTATTCTGTCAGAGAATGCTTAAAGTTGACCACCAATGAGCCCTAAGCCACGCAGCGTAAGGCTCTGACCATGAACAACCCCGCAATCCCTTGA
AGATTTCTAACAGTTTGTGTAGAGCTTGCCCGTCCTTATCTGTACAGGAGGGAGGGTCGTTATTCCTAAGAGTCCGCGTGAAGGGCTCCAAGGACA
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