**Strain names and accession numbers of the genomes used in the study**

**Table S1:** Accession numbers and strain names of 530 *pks* positive NCBI genomes used in the study

(Genomes denoted in italics (pksp001 to pksp023) represents the newly sequenced genomes for the study. Genomes belonging to ST95 (n=110) are denoted with \* in their IDs.)

| **ID** | **Strain** | **Assembly** |
| --- | --- | --- |
| *pksp001* | *NA147* | JADBJB000000000 |
| *pksp002* | *NA150* | JADBJA000000000 |
| *pksp003* | *NA258* | JADNRJ000000000 |
| *pksp004* | *NA266* | JADBIZ000000000 |
| *pksp005* | *NA280* | JADBIY000000000 |
| *pksp006* | *NA310* | JADBIX000000000 |
| *pksp007* | *NA334* | JADBIW000000000 |
| *pksp008* | *NA336* | JADBIV000000000 |
| *pksp009* | *NA608* | JADBIU000000000 |
| *pksp010* | *NA611* | JADBIT000000000 |
| *pksp011* | *NA623* | JADBIS000000000 |
| *pksp012* | *NA651* | JADBIR000000000 |
| *pksp013* | *NA664* | JADBIQ000000000 |
| *pksp014* | *NA666* | JADBIP000000000 |
| *pksp015* | *NA675* | JADBIO000000000 |
| *pksp016* | *NA695* | JADBIN000000000 |
| *pksp017* | *NA698* | JADBIM000000000 |
| *pksp018* | *NA706* | JADBIL000000000 |
| *pksp019* | *NA733* | JADBIK000000000 |
| *pksp020* | *NA744* | JADBIJ000000000 |
| *pksp021* | *NA749* | JADBII000000000 |
| *pksp022* | *NA786* | JADBIH000000000 |
| *pksp023* | *NA792* | JADBIG00000000 |
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| pksp027 | MS 153-1 | GCA\_000164435.1 |
| pksp028 | MS 200-1 | GCA\_000164535.1 |
| pksp029 | MS 185-1 | GCA\_000164575.1 |
| pksp030 | MS 60-1 | GCA\_000164595.1 |
| pksp031 | NC101 | GCA\_000179795.1 |
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| pksp033\* | H397 | GCA\_000241975.1 |
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| pksp036 | J96 | GCA\_000295775.2 |
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| pksp038 | LCT-EC59 | GCA\_000317395.1 |
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| pksp040 | KTE16 | GCA\_000350765.1 |
| pksp041 | KTE39 | GCA\_000350865.1 |
| pksp042 | KTE187 | GCA\_000350945.1 |
| pksp043 | KTE188 | GCA\_000350965.1 |
| pksp044 | KTE189 | GCA\_000350985.1 |
| pksp045 | KTE191 | GCA\_000351005.1 |
| pksp046 | KTE201 | GCA\_000351045.1 |
| pksp047 | KTE205 | GCA\_000351085.1 |
| pksp048 | KTE206 | GCA\_000351105.1 |
| pksp049 | KTE214 | GCA\_000351205.1 |
| pksp050 | KTE220 | GCA\_000351245.1 |
| pksp051 | KTE224 | GCA\_000351265.1 |
| pksp052 | KTE230 | GCA\_000351305.1 |
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| pksp058 | KTE67 | GCA\_000351645.1 |
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| pksp061 | KTE87 | GCA\_000351825.1 |
| pksp062 | KTE93 | GCA\_000351845.1 |
| pksp063 | KTE169 | GCA\_000352025.1 |
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| pksp065 | KTE43 | GCA\_000352225.1 |
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| pksp067\* | KTE59 | GCA\_000352365.1 |
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| pksp073 | KTE183 | GCA\_000352905.1 |
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| pksp079\* | KTE229 | GCA\_000353165.1 |
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| pksp096 | KTE88 | GCA\_000326625.1 |
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| pksp105 | TOP498 | GCA\_000397405.1 |
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| pksp107 | TOP550-3 | GCA\_000397465.1 |
| pksp108 | TOP550-4 | GCA\_000397485.1 |
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| pksp110 | TOP2662-1 | GCA\_000397645.1 |
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| pksp113 | TOP2662-4 | GCA\_000397705.1 |
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| pksp118 | KTE195 | GCA\_000408125.1 |
| pksp119 | KTE226 | GCA\_000408285.1 |
| pksp120 | KTE89 | GCA\_000408505.1 |
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| pksp124 | HVH 4 (4-7276109) | GCA\_000456065.1 |
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| pksp200 | HVH 216 (4-3042952) | GCA\_000459355.1 |
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| pksp202 | HVH 220 (4-5876842) | GCA\_000459415.1 |
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| pksp206 | KOEGE 30 (63a) | GCA\_000459615.1 |
| pksp207\* | KOEGE 32 (66a) | GCA\_000459635.1 |
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| pksp209 | KOEGE 44 (106a) | GCA\_000459715.1 |
| pksp210 | KOEGE 56 (169a) | GCA\_000459735.1 |
| pksp211 | KOEGE 58 (171a) | GCA\_000459755.1 |
| pksp212 | KOEGE 61 (174a) | GCA\_000459775.1 |
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| pksp245\* | UMEA 3298-1 | GCA\_000461155.1 |
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| pksp273 | UMEA 3342-1 | GCA\_000488155.1 |
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| pksp283 | BIDMC 83 | GCA\_000633655.1 |
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| pksp285 | UCD\_JA17\_pb | GCA\_000714915.1 |
| pksp286 | UCD\_JA23\_pb | GCA\_000715035.1 |
| pksp287\* | SCB12 | GCA\_000817355.1 |
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| pksp292 | 8-415-05\_S4\_C2 | GCA\_000711365.1 |
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| pksp295 | 4-203-08\_S1\_C3 | GCA\_000713975.1 |
| pksp296 | 8-415-05\_S3\_C3 | GCA\_000713455.1 |
| pksp297 | 8-415-05\_S3\_C1 | GCA\_000713495.1 |
| pksp298 | 8-415-05\_S3\_C2 | GCA\_000713585.1 |
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| pksp301 | upec-91 | GCA\_000776855.1 |
| pksp302 | upec-9 | GCA\_000776795.1 |
| pksp303 | upec-87 | GCA\_000776745.1 |
| pksp304 | upec-85 | GCA\_000776455.1 |
| pksp305 | upec-84 | GCA\_000776215.1 |
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| pksp316 | upec-60 | GCA\_000776505.1 |
| pksp317\* | upec-51 | GCA\_000776965.1 |
| pksp318 | upec-48 | GCA\_000777025.1 |
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| pksp327 | upec-277 | GCA\_000777605.1 |
| pksp328 | upec-276 | GCA\_000777625.1 |
| pksp329 | upec-261 | GCA\_000777845.1 |
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| pksp331 | upec-258 | GCA\_000777975.1 |
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| pksp343 | upec-228 | GCA\_000778815.1 |
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| pksp345 | upec-225 | GCA\_000778955.1 |
| pksp346\* | upec-209 | GCA\_000778465.1 |
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| pksp348\* | upec-197 | GCA\_000779425.1 |
| pksp349 | upec-193 | GCA\_000779545.1 |
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| pksp353 | upec-172 | GCA\_000779995.1 |
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| pksp356 | upec-161 | GCA\_000780155.1 |
| pksp357 | upec-158 | GCA\_000780195.1 |
| pksp358\* | upec-157 | GCA\_000780215.1 |
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| pksp369\* | upec-129 | GCA\_000780925.1 |
| pksp370\* | upec-124 | GCA\_000781035.1 |
| pksp371 | upec-123 | GCA\_000781045.1 |
| pksp372\* | upec-120 | GCA\_000781095.1 |
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| pksp375 | upec-109 | GCA\_000781355.1 |
| pksp376\* | upec-106 | GCA\_000781385.1 |
| pksp377 | upec-10 | GCA\_000785355.1 |
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| pksp379\* | blood-11-0031 | GCA\_000780275.1 |
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| pksp382 | blood-10-1308 | GCA\_000778915.1 |
| pksp383 | blood-10-1126 | GCA\_000779125.1 |
| pksp384 | blood-10-1105 | GCA\_000779025.1 |
| pksp385\* | blood-10-0687 | GCA\_000781555.1 |
| pksp386\* | blood-10-0686 | GCA\_000781575.1 |
| pksp387\* | blood-09-0751 | GCA\_000782055.1 |
| pksp388 | blood-08-1203 | GCA\_000782635.1 |
| pksp389 | blood-08-0997 | GCA\_000782655.1 |
| pksp390\* | blood-08-0654 | GCA\_000782695.1 |
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| pksp393 | blood-08-0215 | GCA\_000782775.1 |
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| pksp396 | UPEC\_001 | GCA\_001651715.1 |
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| pksp398 | GSK2528 | GCA\_000807635.1 |
| pksp399 | SCB11 | GCA\_000817375.1 |
| pksp400 | GSK2522 | GCA\_000807575.1 |
| pksp401 | GSK2524 | GCA\_000807555.1 |
| pksp402 | GSK252FU | GCA\_000807655.1 |
| pksp403 | GSK252BU | GCA\_000800675.1 |
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| pksp406 | 502\_ECOL | GCA\_001057065.1 |
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| pksp408\* | 121\_ECOL | GCA\_001054095.1 |
| pksp409 | 1187\_ECOL | GCA\_001076105.1 |
| pksp410 | 11\_ECOL | GCA\_001052125.1 |
| pksp411\* | RS218 | GCA\_000817345.1 |
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| pksp414\* | LSPQ A134697 | GCA\_001262455.1 |
| pksp415 | BWH59 | GCA\_001030285.1 |
| pksp416 | MGH122 | GCA\_001030435.1 |
| pksp417 | BIDMC97 | GCA\_001030445.1 |
| pksp418\* | BIDMC114 | GCA\_001030665.1 |
| pksp419 | UCD-JA09 | GCA\_001306575.1 |
| pksp420 | UCD-JA19 | GCA\_001306585.1 |
| pksp421 | UCD-JA30 | GCA\_001306685.1 |
| pksp422\* | UCD-JA38 | GCA\_001306635.1 |
| pksp423 | 50639799 | GCA\_001463205.1 |
| pksp424 | 50870281 | GCA\_001463455.1 |
| pksp425 | STEC 1528 | GCA\_001608125.1 |
| pksp426\* | GN02005 | GCA\_001519135.1 |
| pksp427 | GN02007 | GCA\_001519115.1 |
| pksp428 | GN02009 | GCA\_001519125.1 |
| pksp429 | GN02045 | GCA\_001519215.1 |
| pksp430\* | GN02099 | GCA\_001519715.1 |
| pksp431 | GN02137 | GCA\_001519675.1 |
| pksp432\* | GN02148 | GCA\_001519755.1 |
| pksp433 | GN02163 | GCA\_001519475.1 |
| pksp434\* | GN02165 | GCA\_001519285.1 |
| pksp435\* | GN02172 | GCA\_001519235.1 |
| pksp436 | GN02183 | GCA\_001519315.1 |
| pksp437\* | GN02254 | GCA\_001519735.1 |
| pksp438\* | GN02260 | GCA\_001519555.1 |
| pksp439 | GN02289 | GCA\_001521215.1 |
| pksp440 | GN02314 | GCA\_001521195.1 |
| pksp441 | GN02323 | GCA\_001519595.1 |
| pksp442 | GN02350 | GCA\_001521225.1 |
| pksp443 | GN02370 | GCA\_001520015.1 |
| pksp444 | GN02392 | GCA\_001520055.1 |
| pksp445 | GN02411 | GCA\_001520895.1 |
| pksp446 | GN02529 | GCA\_001520215.1 |
| pksp447 | GN02547 | GCA\_001521355.1 |
| pksp448\* | GN02627 | GCA\_001520195.1 |
| pksp449 | GN02639 | GCA\_001519645.1 |
| pksp450 | GN02766 | GCA\_001520815.1 |
| pksp451 | GN02787 | GCA\_001521155.1 |
| pksp452 | GN02867 | GCA\_001521015.1 |
| pksp453\* | GN03324 | GCA\_001521575.1 |
| pksp454 | GN03398 | GCA\_001519485.1 |
| pksp455\* | GN03409 | GCA\_001520775.1 |
| pksp456 | GN03545 | GCA\_001520715.1 |
| pksp457 | GN03661 | GCA\_001521115.1 |
| pksp458 | GN03786 | GCA\_001521315.1 |
| pksp459\* | GN04262 | GCA\_001521455.1 |
| pksp460 | GN02748 | GCA\_001518355.1 |
| pksp461\* | GN02487 | GCA\_001524905.1 |
| pksp462 | UM149 | GCA\_001571585.1 |
| pksp463 | UM131 | GCA\_001571575.1 |
| pksp464\* | UM141 | GCA\_001571565.1 |
| pksp465 | UC37 | GCA\_001571745.1 |
| pksp466 | JPH264 | GCA\_001562835.1 |
| pksp467 | sheep1 | GCA\_001615225.1 |
| pksp468 | sheep6 | GCA\_001614495.1 |
| pksp469 | sheep17 | GCA\_001616475.1 |
| pksp470 | GN04499 | GCA\_001620985.1 |
| pksp471 | GN04772 | GCA\_001621225.1 |
| pksp472 | GN05109 | GCA\_001621345.1 |
| pksp473 | GN05681 | GCA\_001621675.1 |
| pksp474 | GN05963 | GCA\_001621885.1 |
| pksp475 | GN05992 | GCA\_001621915.1 |
| pksp476 | GN06113 | GCA\_001621995.1 |
| pksp477\* | GN06168 | GCA\_001622105.1 |
| pksp478 | NGF2 | GCA\_001683595.1 |
| pksp479 | NGF3 | GCA\_001683585.1 |
| pksp480 | NGF4 | GCA\_001683575.1 |
| pksp481 | 1.41E+09 | GCA\_001692775.1 |
| pksp482 | 1.41E+09 | GCA\_001692865.1 |
| pksp483 | 1.51E+09 | GCA\_001692805.1 |
| pksp484 | 1.51E+09 | GCA\_001692785.1 |
| pksp485 | Fec 67 | GCA\_001865185.1 |
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| pksp487\* | SF-452 | GCA\_001877805.1 |
| pksp488 | No.12 | GCA\_001865915.1 |
| pksp489 | 80//6 | GCA\_001865925.1 |
| pksp490 | B-11870 | GCA\_001865985.1 |
| pksp491\* | SF-491 | GCA\_001881225.1 |
| pksp492 | SF-495 | GCA\_001881235.1 |
| pksp493\* | SF-518 | GCA\_001881245.1 |
| pksp494\* | SF-522 | GCA\_001881055.1 |
| pksp495 | SF-523 | GCA\_001881275.1 |
| pksp496\* | SF-560 | GCA\_001881305.1 |
| pksp497\* | SF-567 | GCA\_001881315.1 |
| pksp498\* | SF-572 | GCA\_001881355.1 |
| pksp499\* | SF-596 | GCA\_001881345.1 |
| pksp500\* | SF-626 | GCA\_001881075.1 |
| pksp501\* | SF-095 | GCA\_001881385.1 |
| pksp502\* | SF-126 | GCA\_001881105.1 |
| pksp503\* | MVAST0098 | GCA\_001881125.1 |
| pksp504\* | MVAST0176 | GCA\_001881395.1 |
| pksp505 | MVAST0234 | GCA\_001881425.1 |
| pksp506\* | USVAST184 | GCA\_001881155.1 |
| pksp507\* | USVAST245 | GCA\_001881435.1 |
| pksp508\* | USVAST267 | GCA\_001881165.1 |
| pksp509\* | USVAST356 | GCA\_001881465.1 |
| pksp510\* | USVAST406 | GCA\_001881205.1 |
| pksp511\* | F-18 | GCA\_001854565.1 |
| pksp512 | CFT073 | GCA\_000007445.1 |
| pksp513\* | UTI89 | GCA\_000013265.1 |
| pksp514 | 536 | GCA\_000013305.1 |
| pksp515\* | IHE3034 | GCA\_000025745.1 |
| pksp516 | ABU 83972 | GCA\_000148365.1 |
| pksp517 | UM146 | GCA\_000148605.1 |
| pksp518 | clone D i2 | GCA\_000233875.1 |
| pksp519 | clone D i14 | GCA\_000233895.1 |
| pksp520 | PMV-1 | GCA\_000493595.1 |
| pksp521 | Nissle 1917 | GCA\_000714595.1 |
| pksp522 | ATCC 25922 | GCA\_000743255.1 |
| pksp523 | RS218 | GCA\_000800845.2 |
| pksp524\* | SF-166 | GCA\_001280385.1 |
| pksp525\* | SF-173 | GCA\_001280405.1 |
| pksp526 | NGF1 | GCA\_001660585.1 |
| pksp527 | ECONIH2 | GCA\_001675145.1 |
| pksp528 | K-15KW01 | GCA\_001683435.1 |
| pksp529 | UPEC 26-1 | GCA\_001693315.1 |
| pksp530 | D8 | GCA\_001900395.1 |
|  |  |  |

**Table S2:** Strain names and accession IDs of ST95 *pks* negative genomes from NCBI

| **ID** | **Strain** | **Assembly** |
| --- | --- | --- |
| 95N001 | H252 | GCA\_000190895.1 |
| 95N002 | DSM 30083 | GCA\_000690815.1 |
| 95N003 | KTE4 | GCA\_000350645.1 |
| 95N004 | KTE5 | GCA\_000350665.1 |
| 95N005 | KTE62 | GCA\_000351605.1 |
| 95N006 | KTE3 | GCA\_000407685.1 |
| 95N007 | KTE7 | GCA\_000407705.1 |
| 95N008 | KTE27 | GCA\_000407885.1 |
| 95N009 | KTE240 | GCA\_000408305.1 |
| 95N010 | HVH 5 (4-7148410) | GCA\_000456085.1 |
| 95N011 | HVH 32 (4-3773988) | GCA\_000456505.1 |
| 95N012 | HVH 59 (4-1119338) | GCA\_000456885.1 |
| 95N013 | HVH 73 (4-2393174) | GCA\_000457025.1 |
| 95N014 | HVH 102 (4-6906788) | GCA\_000465155.1 |
| 95N015 | HVH 104 (4-6977960) | GCA\_000457455.1 |
| 95N016 | HVH 148 (4-3192490) | GCA\_000495015.1 |
| 95N017 | HVH 170 (4-3026949) | GCA\_000458555.1 |
| 95N018 | HVH 178 (4-3189163) | GCA\_000495055.1 |
| 95N019 | HVH 180 (4-3051617) | GCA\_000458685.1 |
| 95N020 | HVH 191 (3-9341900) | GCA\_000458875.1 |
| 95N021 | HVH 201 (4-4459431) | GCA\_000459075.1 |
| 95N022 | HVH 203 (4-3126218) | GCA\_000459115.1 |
| 95N023 | HVH 217 (4-1022806) | GCA\_000459375.1 |
| 95N024 | HVH 222 (4-2977443) | GCA\_000459455.1 |
| 95N025 | UMEA 3140-1 | GCA\_000460295.1 |
| 95N026 | UMEA 3203-1 | GCA\_000460775.1 |
| 95N027 | UMEA 3206-1 | GCA\_000460795.1 |
| 95N028 | UMEA 3662-1 | GCA\_000461495.1 |
| 95N029 | UMEA 3702-1 | GCA\_000461595.1 |
| 95N030 | UMEA 3893-1 | GCA\_000461775.1 |
| 95N031 | 597 | GCA\_000503475.1 |
| 95N032 | HVH 214 (4-3062198) | GCA\_000507665.1 |
| 95N033 | AL505 | GCA\_001499595.1 |
| 95N038 | BIDMC 49b | GCA\_000522365.1 |
| 95N039 | BIDMC 49a | GCA\_000522385.1 |
| 95N040 | ATCC 11775 | GCA\_000734955.1 |
| 95N041 | upec-185 | GCA\_000779695.1 |
| 95N042 | 50857972 | GCA\_001463405.1 |
| 95N043 | GN02476 | GCA\_001520875.1 |
| 95N044 | GN04665 | GCA\_001621085.1 |
| 95N045 | GN04676 | GCA\_001621125.1 |
| 95N046 | GN05696 | GCA\_001621665.1 |
| 95N047 | 018PP2015 | GCA\_001700095.1 |
| 95N048 | SF-501 | GCA\_001881045.1 |
| 95N049 | MVAST0326 | GCA\_001881145.1 |
| 95N034 | SF-088 | GCA\_001280325.1 |
| 95N035 | SF-468 | GCA\_001280345.1 |
| 95N036 | APEC O1 | GCA\_000014845.1 |
| 95N037 | S88 | GCA\_000026285.1 |