

**Part 1:** **TITLE, AUTHORS, APPROVALS, etc**

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| **Code assigned:** | **2020.116B** |  |
| **Short title:** Create one new genus (*Bcepfunavirus*) and create nine new species in the genus *Pbunavirus* (*Caudovirales*: *Myoviridae*) | | |
|  | | |

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**List the ICTV Study Group(s) that have seen this proposal**

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| *Caudovirales* Study Group, Bacterial and Archaeal Viruses Subcommittee |

**ICTV study group comments and response of proposer**

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**Authority to use the name of a living person**

|  |  |  |
| --- | --- | --- |
| **Taxon name** | **Person from whom the name is derived** | **Permission attached (Y/N)** |
|  |  |  |
|  |  |  |
|  |  |  |

**Submission dates**

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| --- | --- |
| Date first submitted to SC Chair | April 2020 |
| Date of this revision (if different to above) |  |

**ICTV-EC comments and response of the proposer**

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**Part 3:** **TAXONOMIC PROPOSAL**

**Name of accompanying Excel module**

|  |
| --- |
| 2020.116B.R.Pbunavirus.xlsx |

**Abstract**

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| The *Pb1likevirus* (renamed *Pbunavirus*) taxon was created by Taxonomy Proposal 2009.001a-gB and originally consisting of *Pseudomonas phage PB1, Pseudomonas phage SN Pseudomonas phage 14-1, Pseudomonas phage LMA2, Pseudomonas phage LBL3*  *Pseudomonas phage F8*, and *Burkholderia phage BcepF1*. *Pseudomonas virus PB1* was chosen as the type species. Since 2009 numerous other PB1-like phages have been isolated; and mistakes have entered the VMR. |

**Text of proposal**

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**Supporting evidence**

The *Pb1likevirus* (renamed *Pbunavirus*) taxon was created by Taxonomy Proposal 2009.001a-gB and originally consisting of *Pseudomonas phage PB1, Pseudomonas phage SN Pseudomonas phage 14-1, Pseudomonas phage LMA2, Pseudomonas phage LBL3*

*Pseudomonas phage F8*, and *Burkholderia phage BcepF1*. *Pseudomonas phage PB1* was chosen as the type species. Since 2009 numerous other PB1-like phages have been isolated; and mistakes have entered the VMR.

Our NCBI colleague, Igor Tolstoy, has pointed out several problems with the current structure of the *Pbunavirus* genus including: (a) the species *Burkholderia virus BcepF1* is significantly different from *Pseudomonas virus PB1*; (b) *Pseudomonas virus 141* and *Pseudomonas virus CEBDP1* are incorrectly named; and, (c) new species have been deposited with GenBank.

**Proposal 1:** To remove *Burkholderia virus BcepF1* from the *Pbunavirus* *and assign it as the type species in a new genus, Becepfunavirus.* Rationale: BcepF1 only shares 11.7% DNA sequence relatedness to PB1 [1-3].

**Source of the name of this taxon:** The name of this genus is derived from the name of the first phage of its type, *Burkholderia* phage BcepF1.

**History:** *Burkholderia* phage BcepF1 was added to the Pb1likevirus genus in ratified proposal 2009.001a-gB.

**GenBank Summary:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Phage name | RefSeq No. | INSDC | Size (Kb) | GC% | Protein | tRNA |
| BcepF1 | [NC\_009015.1](https://www.ncbi.nlm.nih.gov/nuccore/NC_009015.1) | [EF153632.1](https://www.ncbi.nlm.nih.gov/nuccore/EF153632.1) | 72.41 | 55.9 | [127](https://www.ncbi.nlm.nih.gov/genome/browse/#!/proteins/5920/456600|Burkholderia virus BcepF1/viral segment Unknown/) | 0 |

**BLASTN homologs:** BcepF1 is a genomic orphan and only distantly related to Pseudomonas phage PB1 [1-3].

**Electron micrograph:** None available.

**Phylogeny:** The phylogenetic tree was constructed using the large subunit terminase of BcepF1 and protein homologs and related phages with phylogeny.fr in “one click” mode [8]. "The "One Click mode" targets users that do not wish to deal with program and parameter selection. By default, the pipeline is already set up to run and connect programs recognized for their accuracy and speed (MUSCLE for multiple alignment and PhyML for phylogeny) to reconstruct a robust phylogenetic tree from a set of

sequences." It also includes the use of Gblocks to eliminate poorly aligned positions and divergent

regions. "The usual bootstrapping procedure is replaced by a new confidence index that is much

faster to compute. See: Anisimova M., Gascuel O. Approximate likelihood ratio test for branches:

A fast, accurate and powerful alternative [9] for details."

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**Proposal 2:** To rename *Pseudomonas virus 141* to *Pseudomonas virus 14-1* based on the correct exemplar isolate name. Hyphen are allowed between numerals.

**Proposal 3:** To rename *Pseudomonas virus CEBDP1* to *Pseudomonas virus DP1*, based on the correct exemplar isolate name.

**Proposal 4:** To create 10 new species within the genus *Pbunavirus*.

**Species demarcation criteria:** We have chosen 95% DNA sequence identity as the criterion for demarcation of species in this new genus. Each of the proposed species differs from the others with more than 5% at the DNA level as confirmed with the BLASTN algorithm.

**Source of the name of this taxon:** The name of this genus is derived from the name of the first phage of its type, *Pseudomonas* phage PB1.

**History:** The Pb1likevirus genus was created and ratified by proposal 2009.001a-gB.

**GenBank Summary:**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Phage name | RefSeq No. | INSDC | Size (Kb) | GC% | Protein | Overall DNA sequence identity (\*) | % common proteins (\*\*) |
| *Pseudomonas* phage PB1 | [NC\_011810.1](https://www.ncbi.nlm.nih.gov/nuccore/NC_011810.1) | [EU716414.1](https://www.ncbi.nlm.nih.gov/nuccore/EU716414.1) | 65.76 | 54.9 | 93 | 100 | 100 |
|  |  |  |  |  |  |  |  |
| *Pseudomonas* phage EPa61 |  | [MK317959.1](https://www.ncbi.nlm.nih.gov/nuccore/MK317959.1) | 65.91 | 55.1 | 92 | 94.3 | 94.6 |
| *Pseudomonas* phage vB\_PaeM\_SCUT-S1 |  | [MK340760.1](https://www.ncbi.nlm.nih.gov/nuccore/MK340760.1) | 66.09 | 55.4 | 94 | 89.7 | 95.7 |
| *Pseudomonas* phage R26 |  | [LC472882.1](https://www.ncbi.nlm.nih.gov/nuccore/LC472882.1) | 65.74 | 55.1 | 93 | 93.9 | 95.7 |
| *Pseudomonas* phage BrSP1 |  | [MF623055.1](https://www.ncbi.nlm.nih.gov/nuccore/MF623055.1) | 66.19 | 55.7 | 94 | 86.4 | 92.5 |
| *Pseudomonas* phage PA01 |  | [AP019535.1](https://www.ncbi.nlm.nih.gov/nuccore/AP019535.1) | 66.22 | 55.4 | 92 | 92.1 | 93.5 |
| *Pseudomonas* phage vB\_PaeM\_LS1 |  | [MG897799.1](https://www.ncbi.nlm.nih.gov/nuccore/MG897799.1) | 66.1 | 55.7 | 93 | 87.1 | 94.6 |
| *Pseudomonas* phage vB\_PaeM\_E215 | [NC\_042080.1](https://www.ncbi.nlm.nih.gov/nuccore/NC_042080.1) | [MF490241.1](https://www.ncbi.nlm.nih.gov/nuccore/MF490241.1) | 66.79 | 55.6 | 95 | 86.8 | 94.6 |
| *Pseudomonas* phage SL1 |  | [MF768470.1](https://www.ncbi.nlm.nih.gov/nuccore/MF768470.1) | 65.85 | 55.6 | 90 | 86.3 | 92.5 |
| *Pseudomonas* virus PA8P1 |  | [MN131142.1](https://www.ncbi.nlm.nih.gov/nuccore/MN131142.1) | 65.69 | 55.7 | 93 | 84.6 | 93.6 |
| *Pseudomonas* phage R12 |  | [LC472881.1](https://www.ncbi.nlm.nih.gov/nuccore/LC472881.1) | 65.42 | 55.4 | 90 | 87.6 | 87.1 |

**\* Determined using BLASTn at NCBI [1-3]**

**\*\* Determined using CoreGenes 3.5 at** [**http://binf.gmu.edu:8080/CoreGenes3.5/**](http://binf.gmu.edu:8080/CoreGenes3.5/) **[6]**

**Phylogeny:** The phylogenetic tree was constructed using the terminase large subunit protein homologs of PB1 and related phages with phylogeny.fr in “one click” mode [8]. "The "One Click mode" targets users that do not wish to deal with program and parameter selection. By default, the pipeline is already set up to run and connect programs recognized for their accuracy and speed (MUSCLE for multiple alignment and PhyML for phylogeny) to reconstruct a robust phylogenetic tree from a set of sequences." It also includes the use of Gblocks to eliminate poorly aligned positions and divergent regions. "The usual bootstrapping procedure is replaced by a new confidence index that is much faster to compute. See: Anisimova M., Gascuel O. Approximate likelihood ratio test for branches: A fast, accurate and powerful alternative [9] for details."

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**Strain table**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Phage** | **Accession No.** | **Strain in:** | | | |
| Pseudomonas phage Epa6 | MT108726.1 | *Pseudomonas virus EPa61* | | | |
| Pseudomonas phage Epa39 | MT118303.1 | *Pseudomonas virus EPa61* | | | |
| Pseudomonas phage chumba | MT119375.1 | *Pseudomonas virus EPa61* | | | |
| Pseudomonas phage SPM-1 | KF981875.1 | *Pseudomonas virus F8* | | | |
| Pseudomonas phage Gallinipper | KT372690.1 | *Pseudomonas virus PB1* | | | |
| Pseudomonas phage Nemo | KT372694.1 | *Pseudomonas virus PB1* | | | |
| Pseudomonas phage Smee | KT372697.1 | *Pseudomonas virus PB1* | | | |
| Pbunalikevirus phiFenriz | KT254133.1 | *Pseudomonas virus PB1* | | | |
| Pbunalikevirus phiMoody | KT254131.1 | *Pseudomonas virus PB1* | | | |
| Pseudomonas phage Jollyroger | KT372691.1 | *Pseudomonas virus PB1* | | | |
| Pbunalikevirus phiHabibi | KT254132.1 | *Pseudomonas virus PB1* | | | |
| Pseudomonas phage Triton | KT372698.1 | *Pseudomonas virus PB1* | | | |
| Pseudomonas phage Nessie | KT372695.1 | *Pseudomonas virus PB1* | | | |
| Pseudomonas phage Kula | KT372693.1 | *Pseudomonas virus PB1* | | | |
| Pseudomonas phage Poseidon | KT372696.1 | *Pseudomonas virus PB1* | | | |
| Pseudomonas phage Kraken | KT372692.1 | *Pseudomonas virus PB1* | | | |
| Pbunalikevirus phiVader | KT254130.1 | *Pseudomonas virus PB1* | | | |
| Pseudomonas phage E79 | MH536736.1 | *Pseudomonas virus PB1* | | | |
| Pseudomonas phage misfit | MT119367.1 | *Pseudomonas virus PB1* | | | |
| Pseudomonas phage billy | MT133563.1 | *Pseudomonas virus PB1* | | | |
| Pseudomonas phage cory | MT119372.1 | *Pseudomonas virus PB1* | | | |
| Pseudomonas phage elmo | MT119364.1 | *Pseudomonas virus PB1* | | | |
| Pseudomonas phage steven | MT119370.1 | *Pseudomonas virus PB1* | | | |
| Pseudomonas phage DL52 | KR054028.1 | *Pseudomonas virus PB1* | | | |
| Pseudomonas phage DRL-P1 | MN564818.1 | *Pseudomonas virus PB1* | | | |
| Pseudomonas phage KPP22 | LC105987.1 | *Pseudomonas virus KPP12* | | | |
| Pseudomonas phage KPP22M1 | LC105988.1 | *Pseudomonas virus KPP12* | | | |
| Pseudomonas phage Epa25 | MT118299.1 | | *Pseudomonas virus LMA2* | | |
| Pseudomonas phage chunk | MT119376.1 | | *Pseudomonas virus LMA2* | | |
| Pseudomonas phage Epa12 | MT118291.1 | | *Pseudomonas virus LMA2* | | |
| Pseudomonas phage Epa21 | MT118298.1 | | *Pseudomonas virus LMA2* | | |
| Pseudomonas phage S12-1 | LC102730.1 | | *Pseudomonas virus LMA2* | | |
| Pseudomonas phage S12-3 | LC472883.1 | | *Pseudomonas virus LMA2* | | |
| Pseudomonas phage goodold | MT119365.1 | | *Pseudomonas virus LMA2* | | |
| Pseudomonas phage vB\_PaeM\_PAO1\_Ab27 | LN610579.1 | | *Pseudomonas virus LMA2* | | |
| Pseudomonas phage vB\_PaeM\_PAO1\_Ab29 | LN610588.1 | | *Pseudomonas virus LMA2* | | |
| Pseudomonas phage Epa15 | MT413450.1 | | *Pseudomonas virus LMA2* | | |
| Pseudomonas phage vB\_PaeM\_E217 | NC\_042079.1 | | *Pseudomonas virus LMA2* | | |
| Pseudomonas phage S50 | LC472884.1 | | *Pseudomonas virus LMA2* | | |
| Pseudomonas phage Epa20 | MT118297.1 | | *Pseudomonas virus LMA2* | | |
| Pseudomonas phage vB\_PaeM\_LS1 | NC\_048699.1 | | *Pseudomonas virus LMA2* | | |
| Pseudomonas phage debbie | MT119363.1 | | *Pseudomonas virus LMA2* | | |
| Pseudomonas phage PHW2 | MT349888.1 | | *Pseudomonas virus LMA2* | | |
| Pseudomonas phage vB\_Pae436M-8 | KX171208.1 | | *Pseudomonas virus LMA2* | | |
| Pseudomonas phage phiKTN6 | NC\_041865.1 | | *Pseudomonas virus LMA2* | | |
| Pseudomonas phage willy | MT133562.1 | | *Pseudomonas virus LMA2* | | |
| Pseudomonas phage vB\_PaeM\_CEB\_DP1 | NC\_041870.1 | | *Pseudomonas virus LMA2* | | |
| Pseudomonas phage shane | |  | | --- | | MT119368.1 | |  | |  | |  | | | | *Pseudomonas virus LMA2* | |
| Pseudomonas phage goonie | MT133561.1 | | | *Pseudomonas virus LMA2* | |
| Pseudomonas phage phiKT28 | KP340287.1 | | | *Pseudomonas virus LMA2* | |
| Pseudomonas phage vB\_PaeM\_USP\_2 | MT491205.1 | | | | Pseudomonas virus *BrSP1* |
| Pseudomonas phage vB\_PaeM\_USP\_3 | MT491206.1 | | | | Pseudomonas virus *BrSP1* |
| Pseudomonas phage Epa22 | MT108729.1 | | | | Pseudomonas virus *BrSP1* |
| Pseudomonas phage NP3 | KU198331.1 | | | | *Pseudomonas virus SN* |
| Pseudomonas virus PA8P1 | NC\_048806.1 | | | | *Pseudomonas virus SN* |
| Pseudomonas phage Epa11 | MT108727.1 | | | | *Pseudomonas virus SN* |
| Pseudomonas phage Epa10 | MT118290.1 | | | | *Pseudomonas virus SN* |
| Pseudomonas phage sortsol | MT119369.1 | | | | *Pseudomonas virus SN* |
| Pseudomonas virus PaP1\_EPu-2019 | MN131141.1 | | | | *Pseudomonas virus SN* |
| Pseudomonas virus PA11P1 | MN131143.1 | | | | *Pseudomonas virus SN* |
| Pseudomonas phage SL1 | NC\_048676.1 | | | | *Pseudomonas virus SN* |
| Pseudomonas phage vB\_PaeM\_fHoPae01 | MK318076.1 | | | | *Pseudomonas virus SN* |
| Pseudomonas phage jett | MT119366.1 | | | | *Pseudomonas virus SN* |
| Pseudomonas phage vB\_PaeM\_E215 | NC\_042080.1 | | | | *Pseudomonas virus SN* |
| Pseudomonas phage vB\_PaeM\_SMS29 | MN615702.1 | | | | *Pseudomonas virus SN* |
| Pseudomonas phage vB\_PaeM\_SMS12 | MN615700.1 | | | | *Pseudomonas virus SN* |
| Pseudomonas phage vB\_PaeM\_SMS21 | MN615701.1 | | | | *Pseudomonas virus SN* |

**References**

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