

The International Committee on Taxonomy of Viruses

Taxonomy Proposal Form, 2025

**Part 1a: Details of taxonomy proposals**

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| **Title:** | Reinstatement of the species *Pepevirus spumicola* |
| **Code assigned:** | 2025.060B.Pepevirus\_1ns | |

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| **Author(s), affiliation and email address(es):** | | | | |
| **Given name (+middle initial(s))** | **Surname** | **Affiliation** | **Email address** | **Corr. author(s)** |
| Jānis | Rūmnieks | Dept. of Structural Biology, Latvian Biomedical Research and Study Center, Riga, Latvia | j.rumnieks@biomed.lu.lv | X |
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**Part 1b: Taxonomy Proposal Submission**

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| **ICTV Subcommittee:** | | | |
| Animal DNA Viruses and Retroviruses |  | Bacterial viruses | **X** |
| Animal minus-strand and dsRNA viruses |  | Fungal and protist viruses |  |
| Animal positive-strand RNA viruses |  | Plant viruses |  |
| Archaeal viruses |  | General - |  |

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| **List the ICTV Study Group(s) that have seen or have been involved in creating this proposal:** |
| *Leviviricetes* Study Group |

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| **Optional – complete only if formally voted on by an ICTV Study Group:** | | | |
| **Study Group** | **Number of members** | | |
| **Votes in support** | **Votes against** | **No vote** |
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| **Submission date:** | 16/06/2025 |

**Part 1c: Feedback from ICTV Executive Committee (EC) meeting**

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| **Executive Committee Meeting Decision code:** | **X** |
| A – Accept |  |
| Ac – Accept subject to revision by relevant subcommittee chair. No further vote required |  |
| U – Accept without revision but with re-evaluation and email vote by the EC |  |
| Uc – Accept subject to revision and re-evaluation and email vote by the EC |  |
| Ud – Deferred to the next EC meeting, with an invitation to revise based on EC comments |  |
| J - Reject |  |
| W - Withdrawn |  |

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| **Comments from the Executive Committee:** |
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**Part 1d: Revised Taxonomy Proposal Submission**

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| **Response of proposer:** |
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| **Revision date:** |  |

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

<https://ictv.global/taxonomy/templates>

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| **Taxonomic changes proposed:** | | | |
| Establish new taxon | **X** | Split taxon |  |
| Abolish taxon |  | Merge taxon |  |
| Move taxon |  | Promote taxon |  |
| Rename taxon |  | Demote taxon |  |
| Move and rename |  |

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| **Etymology (origin) of proposed taxonomic names:** | |
| **Taxon name** | **Etymology of the term** |
| *Pepevirus spumicola* | *Pepevirus*: an existing genus, phonetically named after *Pseudomonas* virus PP7  *spumicola*: L. fem n.,*spuma*, foam; N.L. masc./fem. suff. *cola*, an inhabitant of; N.L. fem. n. *spumicola*, associated with water. Reflects that LeviOr01, the exemplar virus of the proposed species, was isolated from hospital wastewater [1]. |

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| **Abstract of Taxonomy Proposal:** |
| *Taxonomic rank(s) affected*:  Genus *Pepevirus*  *Description of current taxonomy*:  Genus *Pepevirus* currently holds six genera of bacterial single-stranded RNA viruses (*class Leviviricetes*). *Pseudomonas* virus LeviOr01 had previously been assigned to species *Pepevirus spumicola,* but this species is now abolished and in accordance with the current taxonomy, LeviOr01 is an unclassified *Pepevirus*.  *Proposed* *taxonomic change(s):*  Create species “*Pepevirus spumicola”* with *Pseudomonas* virus LeviOr01 as the exemplar virus.This wouldeffectively reinstate a previously abolished species.  *Justification*:  Sequence analysis suggests that the abolishment of species *Pepevirus spumicola* was unjustified: according to the currently adopted demarcation criteria for *Leviviricetes*, *Pseudomonas* virus LeviOr01 belongs to genus *Pepevirus* but cannot be assigned to any of the currently recognized constituent species. |

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| * **Text of Taxonomy proposal:** |
| *Taxonomic rank(s) affected*:  Genus *Pepevirus*  *Description of current taxonomy*:  The genus *Pepevirus* belongs to family *Fiersviridae* within order *Norzivirales*, class *Leviviricetes*, phylum *Lenarviricota* and kingdom *Orthornavirae* in the *Riboviria* realm. The genus *Pepevirus,* along with 427 other genera, was established with proposal [2020.095B.R.Leviviricetes](https://ictv.global/ictv/proposals/2020.095B.R.Leviviricetes.zip) which replaced the existing single-stranded RNA (ssRNA) phage taxonomy at the time. Within *Pepevirus*, two species were created, *Pepevirus rubrum* with *Pseudomonas* phage PP7 as the exemplar virus, and *Pepevirus spumicola*, represented by *Pseudomonas* phage LeviOr01. A subsequent proposal [2023.001B.Leviviricetes\_reorg](https://ictv.global/ictv/proposals/2023.001B.Leviviricetes_reorg.zip) further reorganized the ssRNA phage taxonomy, during which five new *Pepevirus* species (*Pepevirus faecenecus, Pepevirus faecicola, Pepevirus faecihabitans, Pepevirus faecivicinum* and *Pepevirus faecivivens*) were created while *Pepevirus spumicola* was abolished. *Pseudomonas* phage LeviOr01 was not assigned to any of the new species.  *Proposed* *taxonomic change(s)*:  Create species “*Pepevirus spumicola”* in genus *Pepevirus,* assign *Pseudomonas* virus LeviOr01 (GenBank accession no. LT821717) as the exemplar virus.  *Demarcation criteria:*  The currently adopted demarcation criteria for *Leviviricetes* are < 50 % pairwise amino-acid identity (PAAI) of the viral RdRp protein for establishing genera and < 80% RdRp PAAI for establishing species [2].  *Justification*:  Alignment of RdRp sequences from *Pseudomonas* phage LeviOr01 and exemplars from the currently recognized *Pepevirus* species (Figure 1) shows that the LeviOr01 RdRp is 52 to 54% identical to the other proteins (Table 1). According to the demarcation criteria, these results suggest that *Pseudomonas* phage LeviOr01 represents a separate species within genus *Pepevirus* and that the previous abolishment of species *Pepevirus spumicola* was unjustified. To address this issue, it is proposed that the taxonomy of the genus is updated with addition of a new species representing LeviOr01, which would effectively reinstate the previously abolished species. Since the species name “*Pepevirus spumicola”* has already been used in the scientific literature [3], to avoid further confusion, it is proposed that the same previously used name is chosen for the newly created species. |

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| **References:** |
| [1] Pourcel, C., Midoux, C., Vergnaud, G., Latino, L., 2017. A carrier state is established in *Pseudomonas aeruginosa* by phage LeviOr01, a newly isolated ssRNA levivirus. J Gen Virol 98, 2181-2189  [2] Callanan, J., Stockdale, S.R., Adriaenssens, E.M., Kuhn, J.H., Rumnieks, J., Pallen, M.J., Shkoporov, A.N., Draper, L.A., Ross, R.P., Hill, C., 2021. *Leviviricetes*: expanding and restructuring the taxonomy of bacteria-infecting single-stranded RNA viruses. Microb Genom 7, 000686  [3] Bae, H.-.W., Ki, H.-.J., Choi, S.-.Y., Cho, Y.-.H., 2025. Pilin regions that select for the small RNA phages in *Pseudomonas aeruginosa* type IV pilus. J Virol 99, e0194924 |

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| **Tables, Figures:** |

<Start here>A screenshot of a computer

Description automatically generated**Figure 1.** Alignment of RdRp protein sequences from *Pseudomonas* virus LeviOr01 and those from exemplar viruses of the genus *Pepevirus*. The alignment was generated using mafft (v7.526) with the E-INS-I algorithm.

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| **RdRp from exemplar virus** | **PAAI with LeviOr01 RdRp (SLL96484.1)** |
| UJQ85693.1 (*Pepevirus faecenecus*) | 54.3 |
| UJQ85823.1 (*Pepevirus faecicola*) | 54.2 |
| UJQ85841.1 (*Pepevirus faecihabitans*) | 53.8 |
| UJQ85563.1 (*Pepevirus faecivicinum*) | 52.1 |
| UJQ85639.1 (*Pepevirus faecivivens*) | 52.7 |
| CAA56475.1 (*Pepevirus rubrum*) | 54.1 |

**Table 1.** Pairwise amino acid identity (PAAI) between the RdRp of *Pseudomonas* virus LeviOr01 and those from exemplar viruses of the genus *Pepevirus.*