

## **Advice and guidelines to Study Groups on the implementation of binomial species names**

In March 2021, a proposal to establish a binomial nomenclature for virus species was ratified by the ICTV membership. The proposal had been debated extensively by the ICTV Executive Committee since 2016 and was the subject of various consultations with the virology community including a discussion paper published in November 2019 in *Archives of Virology* (Sidell *et al.*, 2019). The paper, which suggested three possible versions of the binomial species epithet (Latinized, alphanumeric and freeform), generated considerable discussion and commentary on the ICTV web site. Taking account of this and other feedback from the virology community, the ICTV Executive Committee approved binomial nomenclature for virus species with the freeform species epithet in October 2020.

Following ratification by the ICTV membership, ICVCN Rule 3.21 now reads:

"A species name shall consist of only two distinct word components separated by a space. The first word component shall begin with a capital letter and be identical in spelling to the name of the genus to which the species belongs. The second word component shall not contain any suffixes specific for taxa of higher ranks. The entire species name (both word components) shall be italicized.

*Comment: Latinized binomial species names following the style of Linnaean species names used in other biological taxonomies are permitted ([https://ictv.global/ictv/proposals/2018.001G.R.binomial\\_species.pdf](https://ictv.global/ictv/proposals/2018.001G.R.binomial_species.pdf)).*"

Furthermore, it was decided that Study Groups (SGs) would have until the 55<sup>th</sup> EC meeting (2023) to convert species names to the new binomial format. If SGs do not convert species names by this time, the Executive Committee will be tasked with implementation.

The EC believes that these changes will provide a better alignment with the rest of biology, facilitating taxonomic assignments by other bodies, and help clarify the distinction between viruses (concrete entities that we isolate, inoculate, purify, clone, etc.) and virus species (an abstract construct of the human mind) to virologists and non-virologist alike. It must be emphasized that the decision to implement binomials applies only to species names and has no impact whatsoever on the names of viruses.

### **Construction of the species name**

The use of the "freeform" species epithet provides freedom for the SGs to implement their preferred format. However, as was evident from the taxonomic proposals submitted in the 2021 cycle, the ICTV SGs interpreted Rule 3.21 in many ways. The intention of these guidelines is to provide SGs with a simple set of suggestions for the construction of species names. While reiterating that these are "advice and guidelines", we hope that SGs will see the merit in following them. The guidelines refer exclusively to the construction of the freeform species epithet. The genus component of the species name is as prescribed.

The guidelines:

- i) Use at least three letters/numbers/combination of letters and numbers

*Comment: if species epithets are allowed to consist only of one or two letters or numbers, the species name could be confused with the virus name (enterovirus A → *Enterovirus A*). Also, species name abbreviations as used in other biological taxonomies (*E. coli*, *P. troglodytes*)*

would become esthetically unpleasing, if not downright confusing, when applied to single character epithets (*Enterovirus A* → *E. A*).

ii) Do not use upper case letters

Comment: species epithets starting with an upper-case letter or consisting entirely of upper-case letters would generate species names that are not readily recognizable as species names, especially if the epithet mimics a virus name abbreviation. This guideline will ensure that virus species names follow a format that is recognizably similar to that used in the rest of biology.

iii) The species epithet should be readable as a word, or be easily spelled out

Comment: to facilitate oral communication. See also ICVCN Rule 3.12.

iv) Do not use punctuation or diacritical marks

Comment: most electronic databases cannot handle punctuation or diacritical marks. See also ICVCN Rule 3.13. Hyphens should not be used to join words.

v) The species epithet may be Latinized but Latinization is not mandatory.

#### Examples of species names submitted in 2021 that follow these guidelines:

TP	Species name	Format of species epithet
2021.036M	<i>Lyssavirus mokola</i>	from a component of the virus name (Mokola virus)
2021.036M	<i>Caligrhavirus caligus</i>	from a component of the virus name (Caligus rogercresseyi rhabdovirus)
2021.024M	<i>Alphainfluenzavirus influenzae</i>	Latinized, from the name of the disease
2021.001P	<i>Cytorhabdovirus cucurbitae</i>	Latinized, from the host name
2021.016P	<i>Apscaviroid aclsvd</i>	from the acronym, in lower case letters
2021.008D	<i>Bracovirus cotesiarubecula</i>	from the host species name, in lower case letters
2021.001S	<i>Pashepevirus balayan</i>	from Balayan et al., 1983 (first hepatitis E virus paper)
2021.001S	<i>Chirohepevirus wurhinchii</i>	from Wu et al., 2016, <i>Rhinolophus</i> and <u>China</u>
2021.001S	<i>Piscihepevirus heenan</i>	from Heenan Lake, the place of isolation

#### Examples of species names submitted in 2021 that DO NOT follow these guidelines:

TP	Species name	Format of species epithet
2021.005S	<i>Paguronivirus 1</i>	single number
2021.004P	<i>Anulavirus GLPV</i>	from the acronym, but with upper case letters
2021.010B	<i>Donellivirus G</i>	single letter, upper case
2021.010B	<i>Felixounavirus Mushroom</i>	first letter capitalized
2021.010B	<i>Goettingenvirus vBBmeMGoe8</i>	long, unpronounceable combination of letter and numbers, mixed upper- and lower-case letters