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ICTV Code

The International Code of Virus Classification and Nomenclature

October 2018

1. Statutory Basis for the International Committee on Taxonomy of Viruses (ICTV)

1.1

The International Committee on Taxonomy of Viruses (ICTV) is a committee of the Virology Division of the International Union of Microbiological Societies. ICTV activities are governed by Statutes agreed with the Virology Division.

1.2

The Statutes define the objectives of the ICTV. These are:

(i) to develop an internationally agreed taxonomy for viruses; (ii) to develop internationally agreed names for virus taxa; (iii) to communicate taxonomic decisions to the international community of virologists; (iv) to maintain an Index of agreed names of virus taxa.

> Comment: The Index is currently maintained online as the Master Species List, accessible at http://ictv.global/msl

1.3

The Statutes also state that classification and nomenclature will be subject to Rules set out in an International Code.

Comment: Ratified taxonomic changes will be published in Virology Division News Section in Archives of Virology, and in subsequent ICTV Reports.

2. Principles of Nomenclature

2.1

The essential principles of virus nomenclature are:

(i) to aim for stability; (ii) to avoid or reject the use of names which might cause error or confusion; (iii) to avoid the unnecessary creation of names.

2.2

Nomenclature of viruses is independent of other biological nomenclature. Virus taxon nomenclature is recognized as an exception in the proposed International Code of Bionomenclature (BioCode).

2.3

The primary purpose of naming a taxon is to supply a means of referring to the taxon, rather than to indicate the characters or history of the taxon.

2.4

The name of a taxon has no official status until it has been approved by the ICTV.

Comment: see section 3.7

3. Rules of Classification and Nomenclature

I - General Rules

The universal scheme

3.1

Virus classification and nomenclature shall be international and shall be universally applied to all viruses.

3.2

The universal virus classification system shall employ the hierarchical levels of realm, subrealm, kingdom, subkingdom, phylum, subphylum, class, subclass, order, suborder, family, subfamily, genus, subgenus and species.

> Comment: It is not obligatory to use all levels of the taxonomic hierarchy. The primary classification is of viruses into species that are assigned to genera. When justified, it is customary to assign lower-level taxa within the applicable higher-level taxa.
>
> An example of the classification of a positive-sense RNA virus is: species *Gill-associated virus*; subgenus *Tipravirus*; genus *Okavirus*; subfamily *Okanivirinae*; family *Roniviridae*; suborder *Ronidivirineae*; order *Nidovirales*.

Scope of the classification

3.3

The ICTV is not responsible for classification and nomenclature of virus taxa below the rank of species. The classification and naming of serotypes, genotypes, strains, variants and isolates of virus species is the responsibility of acknowledged international specialist groups.

> Comment: A variety of subspecific grouping may be identified within the members of a single virus species. These may be described as viruses with alternative names (e.g. blackeye cowpea mosaic virus and peanut stripe virus, which are both classified in the species *Bean common mosaic virus*, genus *Potyvirus*, family *Potyviridae*), or as serotypes, genotypes, clades, strains, variants, isolates etc. Naming of such entities is not the responsibility of the ICTV but of international specialty groups. It is the responsibility of ICTV Study Groups to consider how these entities may best be classified into species.

3.4

Artificially created viruses and laboratory hybrid viruses will not be given taxonomic consideration. Their classification will be the responsibility of acknowledged international specialist groups.

Limitations

3.5

Taxa will be established only when representative member viruses are sufficiently well characterized and described in the published literature so as to allow them to be identified unambiguously and the

taxon to be distinguished from other similar taxa.

3.6

Names will only be accepted if they are linked to taxa at the hierarchical levels described in Rule 3.2 and which have been approved by the ICTV.

II - Rules about naming Taxa

Status of Names

3.7

Names proposed for taxa are "valid names" if they conform to the Rules set out in the Code and they pertain to established taxa. Valid names are "accepted names" if they are recorded as approved International Names in the 8th ICTV Report or have subsequently become "accepted names" by an ICTV vote of approval for a taxonomic proposal.

> Comment: A valid taxon name is one that has been published, one that is associated with descriptive material, and one that is acceptable in that it conforms to the Rules in the Code. Accepted names will be kept in an "Index" by the ICTV.

3.8

Existing names of taxa shall be retained whenever feasible.

> Comment: A stable nomenclature is one of the principal aims of taxonomy and therefore changes to names that have been accepted will only be considered if the accepted name conflicts with the Rules or if a change is necessary to remove ambiguities or confusion.

3.9

The Rule of priority in naming taxa shall not be observed.

> Comment: The earlier of candidate names for a taxon may be chosen as a convenience to virologists, but the Rule ensures that it is not possible to invalidate a name in current use by claiming priority for an older name that has been superseded.

3.10

A person's name may be used when devising a name for new taxon. If the person is alive at the time of the proposal, the person's written consent for use of his/her/their name must be provided together with the official taxonomic proposal. Whether the use of a person's name for taxon naming is appropriate will be judged by the responsible ICTV Study Group, the respective ICTV Subcommittee, and the ICTV Executive Committee and approved or disapproved following established taxonomic proposal procedures. Furthermore, a) An individual may not propose his/her/their own name as the basis for any new taxon name; and, b) A taxon may not be named wholly or in part after any current member of an ICTV Study Group or Committee.

3.11

Names for taxa shall be easy to use and easy to remember. Euphonious names are preferred.

> Comment: In general, short names are desirable and the number of syllables should be kept to a minimum.

3.12

Ligatures, diacritical marks, punctuation marks (excluding hyphens), subscripts, superscripts, oblique bars and non-Latin letters (i.e. those not included in the ISO basic Latin alphabet) may not be used in taxon names. Numbers and hyphens are allowed but hyphens should not be used when attaching numbers or letters to the end of a series of species names and should never be used in names of genera, subfamilies, families or orders.

> Comment: The Rule is intended to make text unambiguous and easy to sort electronically; its application should often make names more pronounceable, in agreement with Rule 3.11.

3.13

New names shall not duplicate approved names. New names shall be chosen such that they are not closely similar to names that are in use currently or have been in use in the recent past.

> Comment: The name selected for a new taxon should not sound indistinguishable from the name of another taxon at any rank or from any taxon. For example, the existence of the genus *Iridovirus* means that forms of new name such as "irodovirus" or "iridivirus" are discouraged as they are too easily confused with an approved name. Confusion can also be between species and genus names as both end in "-virus". Thus, for example, a genus typified by the imaginary species *Omega virus* should not be named *Omegavirus*because species and genus would then be too readily confused.

3.14

Sigla may be accepted as names of taxa, provided that they are meaningful to virologists in the field, normally as represented by study groups.

> Comment: Sigla are names comprising letters and/or letter combinations taken from words in a compound term. The name of the genus *Comovirus*has the sigla stem "Co-" from cowpea and "-mo-" from mosaic; the name of the family *Reoviridae*has the sigla stem "R" from "Respiratory, "e" from "enteric" and "o" from "orphan".

Decision making

3.15

In the event of more than one candidate name being proposed, the relevant Subcommittee will make a recommendation to the Executive Committee of the ICTV, which will then decide among the candidates as to which to recommend to ICTV for acceptance.

> Comment: When there is more than one candidate name for the same taxon, the choice of name to be approved will usually be based on the recommendations of a particular Study Group working on behalf of the ICTV. The Study Group will be expected to consult widely, so as to ensure the acceptability of names, subject to the Rules in the Code. The policy of the ICTV is that, as far as is possible, decisions on questions of taxonomy and nomenclature should reflect the majority view of the appropriate virologic constituency.

3.16

New names shall be selected such that they, or parts of them, do not convey a meaning for the taxon which would either (1) seem to exclude viruses which lack the character described by the name but which are members of the taxon being named, or (2) seem to exclude viruses which are as yet undescribed but which might belong to the taxon being named, or (3) appear to include within the taxon viruses which are members of different taxa.

3.17

New names shall be chosen with due regard to national and/or local sensitivities. When names are universally used by virologists in published work, these or derivatives shall be the preferred basis for creating names, irrespective of national origin.

3.18

All relevant ICTV Subcommittees and Study Groups will be consulted prior to a decision being taken on any taxonomic proposal submitted to the Executive Committee of the ICTV.

Comment: Proposals concerning a family containing genera whose member viruses infect diverse types of host (e.g. plants and vertebrates, fungi and plants, and so on) must be considered by the Subcommittees responsible for viruses of each host type (i.e. Plant viruses, Vertebrate viruses, and so on). For example, taxonomic proposals concerned with the family *Partitiviridae* would be considered by the Fungal Virus Subcommittee and one of its Study Groups but because some genera in the family contain viruses of plants, proposals affecting the family would also be considered by the Plant Virus Subcommittee.

III - Rules about Species

Definition of a virus species

3.19

Species shall be created in accordance with the following definition:

"A species is the lowest taxonomic level in the hierarchy approved by the ICTV. A species is a monophyletic group of viruses whose properties can be distinguished from those of other species by multiple criteria."

Comment: The criteria by which different species within a genus are distinguished shall be established by the appropriate Study Group. These criteria may include, but are not limited to, natural and experimental host range, cell and tissue tropism, pathogenicity, vector specificity, antigenicity, and the degree of relatedness of their genomes or genes. The criteria used should be published in the relevant section of the ICTV Report and reviewed periodically by the Study Group.

Construction of a name

3.20

A species name shall consist of as few words as practicable but be distinct from names of other taxa. Species names shall not consist only of a host name and the word "virus".

Comment: Species names normally comprise more than one word (e.g. *Bunyamwera orthobunyavirus*).

3.21

A species name must provide an appropriately unambiguous identification of the species.

Comment: Species names should be distinctive. They should not be in a form that could be easily confused with the names of other taxa.

IV - Rules about Ranks other than Species

3.22. Every individual virus is a physical entity and treated as belonging to a number of taxa of hierarchical ranks, some of which may remain undefined.

3.23. Other than species, the ranks currently in use in virus taxonomy, from most to least diverse, are realm, subrealm, kingdom, subkingdom, phylum, subphylum, class, subclass, order, suborder, family, subfamily, genus and subgenus. The names for these ranks shall be single words ending with the suffixes “-viria”, “-vira”, “-virae”, “-virites”, “-viricota”, “-viricotina”, “viricetes”, “-viricetidae”, “-virales”, “-virineae”, “-viridae”, “-virinae”, “-virus" and “-virus”, respectively.

Comment: No ranks other than those specified in Rule 3.23 are currently approved by ICTV

3.24. The classification of a virus at the species and genus ranks is mandatory. Classification may also encompass any further number of taxa at higher hierarchical ranks

3.25. Approval of a new genus must be accompanied by the approval of a type species.

V - Rules about Sub-viral Agents

Viroids and satellite nucleic acids

3.26

Rules concerned with the classification of viruses shall also apply to the classification of viroids and satellite nucleic acids.

3.27

The formal endings for taxa of viroids are the suffixes "-viroidia" for realms, "-viroida" for subrealms, "-viroidiae" for kingdoms, "-viroidites" for subkingdoms, "-viroidicota" for phyla, "-viroidicotina" for subphyla, "-viroidicetes" for classes, "-viroidicetidea" for subclasses, "-viroidales" for orders, "-viroidineae" for suborders, "-viroidae" for families, "-viroidinae" for subfamilies, "-viroid" for genera and subgenera, and the word "viroid" for species.

Comment: For example, the species *Potato spindle tuber viroid* is classified in the genus *Pospiviroid*, and the family *Pospiviroidae*.

3.28

The formal endings for taxa of satellite nucleic acids are the suffixes "-satellitia" for realms, "-satellita" for subrealms, "-satellitiae" for kingdoms, "-satellitites" for subkingdoms, "-satelliticota" for phyla, "-satelliticotina" for subphyla, "-satelliticetes" for classes, "-satelliticetidea" for subclasses, "-satellitales" for orders, "-satellitineae" for suborders, "-satellitidae" for families, "-satellitinae" for subfamilies, and "-satellite" for subgenera and genera.

Comment: For example, the species *Ageratum yellow vein betasatellite* is classified in the genus *Betasatellite*, and the family *Tolecusatellitidae*.

Other Sub-viral Agents

3.29

Retrotransposons are considered to be viruses in classification and nomenclature.

VI - Rules for Orthography

3.30

In formal taxonomic usage, the accepted names of virus, viroid and satellite realms, subrealms, kingdoms, subkingdoms, phyla, subphyla, classes, subclasses, orders, suborders, families, subfamilies, genera and subgenera are printed in italics and the first letters of the names are capitalized.

Comment: See Rule 3.7 for the definition of an "accepted" name.

3.31

Species names are printed in italics and have the first letter of the first word capitalized. Other words are not capitalized unless they are proper nouns, or parts of proper nouns.

Comment: The species names *Tobacco mosaic virus* and *Murray Valley encephalitis virus* are in the correct form and typographical style. Examples of incorrect forms are Ustilago maydis virus H (not italicized), *Murray valley encephalitis virus* (Valley is a proper noun) or tobacco mosaic virus (not capitalized or italicized).

When taxon names are used informally, italics and capital initial letters are not needed. This applies at all taxonomic levels; examples are: (1) "the tobacco mosaic virus polymerase", when

describing the properties of the polymerase in members of the species *Tobacco mosaic virus* and (2) "three pestiviruses", to describe viruses that are members of the genus *Pestivirus*.
