

## Correct taxonomic and typographic usage

(adapted from M. H. V. van Regenmortel)

Virologists work with and handle concrete objects called viruses that are placed for convenience in certain taxonomic groups. The names of these viruses are written in lower-case Roman (i.e. non-italic) script without capitals, for instance measles virus or tomato chlorosis virus. In terms of taxonomy, viruses are said to be members of a species, a genus or a family, as membership of such groups is the only way to establish a link between concrete entities (viruses) and abstract taxonomic constructions. In their experiments, virologists of course work with viruses and not with conceptual, abstract entities such as genera and species.

There is, however, an unfortunate tendency, especially among plant virologists, to confuse viruses with man-made taxonomic species and to write that *Species X* (written in italics) has been isolated from a host, is the causal agent of disease Y, has been sequenced etc., instead of saying correctly that it is virus X (written in Roman script) that is being investigated and has these properties. As virus strains and isolates are also entities that virologists handle experimentally, it is correct to write that a strain (i.e. a member) of the species *Tomato chlorosis virus* has been sequenced, although it is incorrect to say that the species or the genus has been sequenced.

One of the reasons that many authors have difficulty distinguishing between virus and species is that their names are the same, the only difference being that the species name is written in italics and the virus name is written in Roman script.

The first letter of the name of a virus species, genus or family is capitalized and the name is written in italics. Other words in a species name are not capitalized unless they are proper nouns, e.g. *West Nile virus*. The name of the taxonomic category should precede the name of the taxonomic unit, for instance the species *Measles virus*, the genus *Morbillivirus*, the family *Paramyxoviridae*. The use of italics when referring to the name of a species as a taxonomic entity signals that it has the status of an officially recognized species in the 8th ICTV Report (Fauquet *et al.*, 2005). This Report should be consulted to ascertain which names have been approved as official species names.

It should be stressed that the taxonomic entities written in italics are conceptual constructions invented by taxonomists for the purpose of creating some order in the bewildering variety of viruses. For example, the species *Tomato chlorosis virus*, which is a man-made taxonomic concept, cannot infect a host or be visualized under a microscope.

When vernacular genus and family names are used, they are written in lower-case Roman script and are not capitalized. If the taxonomic category is included, it should follow the vernacular name, for instance the picornavirus family, the enterovirus genus. It is also correct to use vernacular names, such as closteroviruses, criniviruses, papillomaviruses and rhinoviruses, written in lower-case Roman script.

As it is the names of viruses that are used repeatedly in a text, they are the names that need to be abbreviated and not the names of species. Abbreviations in current use pertain to virus names, not to species names as is sometimes assumed.

Additional background information on how to distinguish between viruses and virus species can be found in the papers by van Regenmortel (2003) and van Regenmortel & Mahy (2004).

## References

- Fauquet, C. M., Mayo, M. A., Maniloff, J., Desselberger, U. & Ball, L. A. (editors) (2005). *Virus Taxonomy: Eighth Report of the International Committee on Taxonomy of Viruses*. San Diego, CA: Elsevier Academic Press.
- van Regenmortel, M. H. V. (2003). Viruses are real, virus species are man-made taxonomic constructions. *Arch Virol* **148**, 2481–2488.
- van Regenmortel, M. H. V. & Mahy, B. W. (2004). Emerging issues in virus taxonomy. *Emerg Infect Dis* **10**, 8–13.