

The current naming of plant viruses: a critical appraisal

J. Dijkstra¹ and J. A. Khan²

¹Laboratory of Virology, Wageningen University, Wageningen, The Netherlands

²National Botanical Research Institute, Lucknow, India

The revised *International Code of Virus Classification and Nomenclature* [7] followed by the *Seventh Report of the International Committee on Taxonomy of Viruses* (ICTV) [9] have generated a lot of criticism [2, 4–6]. The main causes of criticism are (i) use of monomials instead of non-latinized binomials, as has been practice for some time in the past, e.g., tobacco mosaic tobamovirus, tobacco ringspot nepovirus etc. (ii) *in toto* italicization of official virus names. Following the expression of different views among virologists on this issue, it is being debated and an opportunity has been provided for reconsideration of the revised ICTV code [1, 8, 10]. This note attempts to analyse the existing criticisms being raised and justifies the continuation of the present ICTV code.

Monomials

In the period when non-latinized binomials were advocated, nobody had foreseen that names of groups (later: genera) would change so drastically and frequently. Gibbs [6] states that ‘... a quick glance at Bos’ latest textbook shows the great value of the present binomial system of plant virus names for non-specialist readers ...’. However, if the textbook of Bos [3] had appeared two years earlier than it did, hundreds of virus names in the book would have become obsolete, as between 1995 and 1998 thirty new genera were created. For example, *Beet necrotic yellow vein virus* was previously classified in the genus *Furovirus* whereas now it is placed in the new genus *Benyvirus*. And only recently, *Narcissus latent virus* previously considered to be a carlavirus, is now classified in the genus *Macluravirus* of the family *Potyviridae* on the basis of its inducing pinwheel inclusions in infected plants.

There is no reason to expect that such changes will be less in the future. On the contrary, thanks to the fast developments in molecular biology, more and more knowledge of the intrinsic properties of viruses, i.e., those concerned with their genome, is being acquired. Therefore, we would prefer the present ICTV-approved species names (monomials) to those in which the genus name is incorporated in the species name, as is the case with the non-latinized binomials.

In order to inform the reader about the affiliation of a virus, the official virus name may be followed by the genus name. For instance, ‘*Tobacco mosaic virus*, a tobamovirus, has been shown to ...’. And in case of an enumeration of viruses in a text we may write:

'*Tobacco mosaic virus, Tobacco rattle virus, Potato virus X and Potato virus Y* (tobamo-, tobra-, potex- and potyvirus, respectively)'.

In non-English publications, the virus name should be in the local language, but when it is used for the first time, the official name and affiliation should be added in parentheses, e.g., in a publication in Dutch: 'Bieterhizomanievirus (*Beet necrotic yellow vein virus, een benyvirus*)...'.

***In toto* italicization of virus names**

In toto italicization with the first letter capitalized was introduced to show the status of virus species as taxonomic entities. This orthography may conflict with codes of biological nomenclature. However, viruses, although biological entities, are not organisms. Hence, a deviation from the general rules for greater convenience should be acceptable.

At first sight, the fact that *in toto* italicization makes a distinction between Latin names of host plants or other organisms impossible, seems to be a serious drawback. For instance, *Ourmia melon virus*, which has the appearance of a Latin name, but is the name of a place in Iran.

However, another reason why the ICTV had decided in favour of *in toto* italicization was that many virus names include names of plants whose genus names are the same in botanical Latin and in English. Examples are, iris, crocus, petunia, dahlia, clematis, etc. As in many cases, it was not clear which name should be italicized, subjective decisions were made. In practice, the disadvantage of *in toto* italicization is, however, small. There might be a problem if the English name of a plant is the same as the botanical name of another plant. An example is nasturtium (English for *Tropaeolum majus*), but also the botanical name of water-cress (*Nasturtium officinale*). But this ambiguity has already been removed, as the once existing nasturtium mosaic virus has been renamed as a virus of *Tropaeolum*.

Another theoretical problem could be when a virus of *Pelargonium* is described as a geranium (popular English for *Pelargonium*) virus, as the botanical *Geranium* is a genus that contains different plants (mainly cranesbills). However, such a problem has not yet turned up and, if it happens, the ICTV should correct the proposed name. The only real drawback of *in toto* italicization is that no distinction can be made between a botanical name and a geographic name. For plant virologists, we do not consider that a great drawback as the number of plant virus species including geographical names is very limited. However, animal virologists may have a different opinion about it, as many animal viruses, especially those in the family *Rhabdoviridae* carry geographical names.

Conclusions

The principle of virus nomenclature is to create names that should be (i) practical, i.e., easy to use and to remember; (ii) stable, i.e., not subject to frequent changes; (iii) unambiguous, i.e., not giving cause for confusion. According to us, the present ICTV-approved plant virus names meet these three points. There is a feeling among a few virologists that the ICTV has negotiated the *Revised Code* in an undemocratic way. We feel there is some justification in the criticism. However, the ICTV has recognized this shortcoming and has made available a website to all for suggestions and comments [10]. Conclusively, for plant

virologists the present orthographic rules have more advantages than disadvantages, and hence should be kept.

References

1. Agut H (2002) Back to Latin and tradition: a proposal for an official nomenclature of virus species. *Arch Virol* 147: 1465–1470
2. Bos L (1999a) The naming of viruses: an urgent call to order. *Arch Virol* 144: 631–636
3. Bos L (1999b) *Plant viruses, unique and intriguing pathogens – a textbook of plant virology*. Backhuys Publishers, Leiden
4. Bos L (2000) Structure and typography of virus names. *Arch Virol* 145: 429–432
5. Bos L (2002) International naming of viruses: a digest of recent developments. *Arch Virol* 147: 1471–1477
6. Gibbs AJ (2000) Virus nomenclature descending into chaos. *Arch Virol* 145: 1505–1507
7. Mayo MA, Horzinek MC (1998) A revised version of the International Code of Virus Classification and Nomenclature. *Arch Virol* 143: 1645–1654
8. Van Regenmortel MHV (2000) On the relative merits of italics, Latin and binomial nomenclature in viral taxonomy. *Arch Virol* 145: 433–441
9. Van Regenmortel MHV, Fauquet CM, Bishop DHL, Carstens EB, Estes MK, Lemon SM, Maniloff J, Mayo MA, McGeoch DJ, Pringle CR, Wickner RB (2000) *Virus Taxonomy*. Seventh Report of the International Committee on Taxonomy of Viruses. Academic Press, New York San Diego
10. Van Regenmortel MHV (2001) Perspectives on binomial names of virus species. *Arch Virol* 146: 1637–1640

Authors' address: J. A. Khan, National Botanical Research Institute, Rana Pratap Marg, Lucknow 226001, India, Fax +91 522 205836; E-mail: jawaidkhan@satyam.net.in