

A proposal to change existing virus species names to non-Latinized binomials

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Abstract A proposal has been posted on the ICTV website (2011.001aG.N.v1.binomial_sp_names) to replace virus species names by non-Latinized binomial names consisting of the current italicized species name with the terminal word “virus” replaced by the italicized and non-capitalized genus name to which the species belongs. If implemented, the current italicized species name *Measles virus*, for instance, would become *Measles morbillivirus* while the current virus name measles virus and its abbreviation MeV would remain unchanged. The rationale for the proposed change is presented.

Introduction

The current species names approved by the ICTV are written in italics and capitalized but are otherwise the same as the English vernacular names of viruses written in Roman. This has resulted in considerable confusion among virologists who must differentiate in their writing, only on the basis of typography, between a species (a taxonomic construct created by taxonomists) and a virus (a molecular genetic parasite usually causing a disease) [1–4].

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It is important not to confuse a virus species (which is a taxonomic construct or concept which does not have a sequence and cannot be isolated, transmitted to a host or otherwise manipulated) with a virus (a physical entity) that can be isolated and manipulated experimentally and always exists in the form of many mutants, variants and strains possessing different genome sequences. For the same reason, other taxonomic constructs such as a family or a genus also cannot be transmitted to a host or be sequenced. It is incorrect to write, as is often done, that the species *Measles virus* (italics) or *Cucumber mosaic virus* (italics) has been isolated, transmitted to a host or sequenced.

In biology, many animals, plants and microorganisms do not have vernacular names in English or other languages. As a result scientists will write that *Escherichia coli* (the italicized species name) has been infected by a bacterial virus, falsely implying that a taxonomic entity could be infected. In virology this undesirable practice can be avoided since all viruses have vernacular names and these names (in Roman) can therefore be used if one wants to refer to the infectious agent rather than to the species into which it has been placed. Unfortunately at present many virologists do not use available correct typography and write that a virus species (italicized typography) can be transmitted or sequenced [5].

Rationale for introducing non-Latinized binomial species names

Binomial Latin names have been proposed for virus species [6, 7] although virologists have traditionally been opposed to the introduction of Latin names [8–10]. This would require the creation of new Latin names for more than

2,000 virus species and reaching agreement on such names is unlikely to be easy [11]. In contrast, introducing non-Latinized binomial species names would be simple since they are obtained by combining existing English virus names with accepted genus names without involving the creation of new names.

Very few virus species are not yet assigned to a genus and are therefore excluded from the proposed system [12]. Only in a small number of cases will it be necessary to change existing genus names, mostly because these names do not follow the ICTV rule that genus names must end in “virus” [13–15]. For instance the species *Enterobacteria phage T1* is currently placed in a genus called “T1-like viruses” in the family *Siphoviridae* and a proper genus name would have to be introduced to make the binomial system applicable. However, the need to create proper genus names in such cases is already recognized by the ICTV. In the case of bacterial viruses, the word “phage” could be deleted from the species name altogether. For instance, the virus enterobacteria phage M13 which is a member of the genus *Inovirus* could be placed into a species with the name *Enterobacteria M13 inovirus*.

Since the species name, which is written in italics with a capital initial, would be obtained by replacing the terminal word “virus” in the virus name with the genus name to which the species belongs, it would be appropriate to have species names such as *Human papilloma 32 alphapapillomavirus* and *Influenza A alphainfluenzavirus*. If the species name contains “-virus” as a suffix as in *Rotavirus A*, the suffix can be removed to avoid repeating “virus” twice in the binomial species name which then becomes *Rota A rotavirus*. Such word repetition is also frequent in the species names of organisms, for instance *Rattus rattus* (roof rat), *Ciconia ciconia* (white stork) and *Gorilla gorilla gorilla* (Western Lowland Gorilla).

The current proposal does not aim to provide a solution for these cases which should be addressed by the relevant ICTV Study Groups, once the principle of binomial species names has been accepted. However, these few problems are not a valid reason for rejecting the proposal.

Adopting the proposed binomial species names implies that a name change would have to occur when species are moved from one genus to another. However, by drawing attention to a new taxonomic placement this is probably a clarifying advantage rather than an alleged disadvantage [12]. Such changes are common in animal, plant and bacterial taxonomy.

Since all species names of animals, plants and microorganisms are binomials that always include a genus designation, virus species binomials will be easily recognizable as species names. The vernacular virus names in different languages (measles virus; virus de la rougeole; Masernvirus, etc.) will be recognized as virus names rather

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than species names and this will make it easier to distinguish between the two.

A major advantage of the proposed system is that inclusion of the genus affiliation in the species name indicates relationships with other viruses and provides additional information about the properties of members of the species. The advantage of a binomial name exists also when the genus affiliation appears at the end of the binomial species name instead of at the beginning. For instance, it would be immediately obvious that hepatitis A, B and C viruses are very different infectious agents belonging to different genera if the corresponding species names were *Hepatitis A hepatovirus*, *Hepatitis B orthohepadnavirus* and *Hepatitis C hepacivirus*. Since all such binomial names for virus species end with the suffix -virus present in the genus name, they also clearly indicate that the names refer to viral entities. This is an advantage compared to the Latin names used in biology which do not indicate to the uninitiated whether the organism referred to is an animal, a plant or a microorganism.

The proposed binomial system is not a new idea. The system was used to index the viruses in the 2nd, 3rd and 4th ICTV reports published in 1976, 1979 and 1982, respectively [16–18], because the benefits of referring to entries like bluetongue orbivirus and West Nile flavivirus must have been obvious already at the time. In the 5th ICTV report published in 1991 [19] the binomials were retained only for the indexing of plant viruses. In the 6th ICTV report [20], the binomials were dropped altogether because certain animal virologists, for no declared reason, were opposed to their use. Binomial names for referring to viruses rather than to species have always been popular with plant virologists and they have been used in many books [21–24]. Some animal virologists also find it helpful to use binomials to refer to viruses such as Bunyamvera orthobunyavirus [25]. When coining new virus names, the ICTV plant virus Study Groups have always been careful to avoid redundancies between virus names and genus names and, as a result, the proposed binomial species names would lead to very few problems with plant viruses [11, 14, 15].

When the proposal was first made in 1998, most members of the ICTV Executive Board who actually were not plant virologists, were opposed to the introduction of non-Latinized binomial species names [10]. By 2004, half the ICTV Executive Board no longer objected to the system, but when asked about their opinion on binomial names, only a minority of the 80 Study Groups responded [26]. Although in the past, the ICTV often has ratified decisions by accepting that a no answer vote was a vote in favor, this practice was not followed in this case. Surveys conducted in 2002 among laboratory virologists showed that more than 80% of those who responded were in favor of the binomial system [10, 12, 15, 27].

Table 1 Examples of non-Latinized binomial species names for vertebrate viruses

Virus name	Binomial species name
California encephalitis virus	<i>California encephalitis orthobunyavirus</i>
hepatitis A virus	<i>Hepatitis A hepatovirus</i>
hepatitis B virus	<i>Hepatitis B orthohepadnavirus</i>
hepatitis C virus	<i>Hepatitis C hepacivirus</i>
hepatitis E virus	<i>Hepatitis E hepevirus</i>
lassa virus	<i>Lassa arenavirus</i>
louping ill virus	<i>Louping ill flavivirus</i>
measles virus	<i>Measles morbillivirus</i>
mumps virus	<i>Mumps rubulavirus</i>
rabies virus	<i>Rabies lyssavirus</i>
rubella virus	<i>Rubella rubivirus</i>
sendai virus	<i>Sendai respirovirus</i>
Sindbis virus	<i>Sindbis alphavirus</i>
Sin Nombre virus	<i>Sin Nombre hantavirus</i>
West Nile virus	<i>West Nile flavivirus</i>

Table 2 Examples of possible virus non-Latinized binomial species names

Species name	Unchanged virus name
The dsDNA viruses	
Family: <i>Tectiviridae</i>	
–genus <i>Tectivirus</i>	
<i>Enterobacteria PRD1 tectivirus</i>	enterobacteria phage PRD1
Family: <i>Corticoviridae</i>	
–genus <i>Corticovirus</i>	
<i>Pseudoalteromonas PM2 corticovirus</i>	pseudoalteromonas phage PM2
Family: <i>Plasmaviridae</i>	
–genus <i>Plasmavirus</i>	
<i>Acholeplasma L2 plasmavirus</i>	acholeplasma phage L2
Family: <i>Lipothrixviridae</i>	
–genus <i>Alphalipothrixvirus</i>	
<i>Thermoproteus tenax1 alphalipothrixvirus</i>	thermoproteus tenax virus 1
Family: <i>Rudiviridae</i>	
–genus <i>Rudivirus</i>	
<i>Sulfolobus islandicus rod-shaped 2 rudivirus</i>	sulfolobus islandicus rod-shaped virus 2
Family: <i>Fuselloviridae</i>	
–genus <i>Fusellovirus</i>	
<i>Sulfolobus spindle-shaped 1 fusellovirus</i>	sulfolobus spindle-shaped virus 1
Family: <i>Poxviridae</i>	
–genus <i>Orthopoxvirus</i>	
<i>Vaccinia orthopoxvirus</i>	vaccinia virus

Table 2 continued

Species name	Unchanged virus name
<i>Ectromelia orthopoxvirus</i>	ectromelia virus
<i>Variola orthopoxvirus</i>	variola virus
–genus Parapoxvirus	
<i>Orf parapoxvirus</i>	orf virus
–genus Avipoxvirus	
<i>Fowlpox avipoxvirus</i>	fowlpox virus
<i>Turkeypox avipoxvirus</i>	turkeypox virus
–genus Capripoxvirus	
<i>Sheeppox capripoxvirus</i>	sheeppox virus
<i>Lumpy skin disease capripoxvirus</i>	lumpy skin disease virus
–genus Leporipoxvirus	
<i>Myxoma leporipoxvirus</i>	myxoma virus
<i>Rabbit fibroma leporipoxvirus</i>	rabbit fibroma virus
–genus Suipoxvirus	
<i>Swinepox suipoxvirus</i>	swinepox virus
–genus Molluscipoxvirus	
<i>Molluscum contagiosum molluscipoxvirus</i>	molluscum contagiosum virus
–genus Yatapoxvirus	
<i>Yaba monkey tumor yatapoxvirus</i>	Yaba monkey tumor virus
–genus Alphaentomopoxvirus	
<i>Melolontha melolontha alphaentomopoxvirus</i>	melolontha melolontha entomopoxvirus
–genus Betaentomopoxvirus	
<i>Amsacta moorei betaentomopoxvirus</i>	amsacta moorei entomopoxvirus
–genus Gammaentomopoxvirus	
<i>Chironomus luridus gammaentomopoxvirus</i>	chironomus luridus entomopoxvirus
Family: Asfarviridae	
–genus Asfivirus	
<i>African swine fever asfivirus</i>	African swine fever virus
Family: Iridoviridae	
–genus Iridovirus	
<i>Invertebrate iridescent 6 iridovirus</i>	invertebrate iridescent virus 6
–genus Chloriridovirus	
<i>Invertebrate iridescent 3 chloriridovirus</i>	invertebrate iridescent virus 3
–genus Ranavirus	
<i>Frog 3 ranavirus</i>	frog virus 3
–genus Lymphocystivirus	
<i>Lymphocystis disease 1 lymphocystivirus</i>	lymphocystis disease virus 1
Family: Phycodnaviridae	
–genus Chlorovirus	
<i>Paramecium bursaria Chlorella 1 chlorovirus</i>	paramecium bursaria chlorella virus 1

Table 2 continued

Species name	Unchanged virus name
–genus Prasinovirus	
<i>Micromonas pusilla SP prasinovirus</i>	micromonas pusilla virus SP
–genus Phaeovirus	
<i>Ectocarpus siliculosus 1 phaeovirus</i>	ectocarpus siliculosus virus 1
Family: Baculoviridae	
–genus Granulovirus	
<i>Cydia pomonella granulovirus</i>	cydia pomonella granulovirus
Family: Herpesviridae	
–genus Simplexvirus	
<i>Human herpes 1 simplexvirus</i>	human herpesvirus 1
–genus Varicellovirus	
<i>Human herpes 3 varicellovirus</i>	human herpesvirus 3
–genus Cytomegalovirus	
<i>Human herpes 5 cytomegalovirus</i>	human herpesvirus 5
–genus Muromegalovirus	
<i>Murid herpes 1 muromegalovirus</i>	murid herpesvirus 1
–genus Roseolovirus	
<i>Human herpes 6 roseolovirus</i>	human herpesvirus 6
–genus Lymphocryptovirus	
<i>Human herpes 4 lymphocryptovirus</i>	human herpesvirus 4
–genus Rhadinovirus	
<i>Saimiriine herpes 2 rhadinovirus</i>	saimiriine herpesvirus 2
–genus Ictalurivirus	
<i>Ictalurid herpes 1 ictalurivirus</i>	ictalurid herpesvirus 1
Family: Adenoviridae	
–genus Mastadenovirus	
<i>Human adeno C mastadenovirus</i>	human adenovirus C
–genus Aviadenovirus	
<i>Fowl adeno A aviadenovirus</i>	fowl adenovirus A
–genus Rhizidiovirus	
<i>Rhizidiomyces rhizidiovirus</i>	rhizidiomyces virus
Family: Polyomaviridae	
–genus Polyomavirus	
<i>Simian 40 polyomavirus</i>	simian virus 40
Family: Papillomaviridae	
–genus Alphapapillomavirus	
<i>Human papilloma 32 alphapapillomavirus</i>	human papillomavirus 32
–genus Betapapillomavirus	
<i>Human papilloma 5 betapapillomavirus</i>	human papillomavirus 5
–genus Gammapapillomavirus	
<i>Human papilloma 4 gammapapillomavirus</i>	human papillomavirus 4
Family: Polydnviridae	
–genus Bracovirus	

Table 2 continued

Species name	Unchanged virus name
<i>Cotesia melanoscela bracovirus</i>	cotesia melanoscela bracovirus
–genus Icnovirus	
<i>Campoletis sonorensis ichnovirus</i>	campoletis sonorensis ichnovirus
Family: Ascoviridae	
–genus Ascovirus	
<i>Spodoptera frugiperda asco 1a ascovirus</i>	spodoptera frugiperda ascovirus 1a
The ssDNA viruses	
Family: Inoviridae	
–genus Inovirus	
<i>Enterobacteria M13 inovirus</i>	enterobacteria phage M13
<i>Enterobacteria X-2 inovirus</i>	enterobacteria phage X-2
<i>Enterobacteria C-2 inovirus</i>	enterobacteria phage C-2
<i>Enterobacteria SF inovirus</i>	enterobacteria phage SF
<i>Vibrio CTX inovirus</i>	vibrio phage CTX
<i>Vibrio VSK inovirus</i>	vibrio phage VSK
<i>Pseudomonas Pfl inovirus</i>	pseudomonas phage Pfl
<i>Xanthomonas Cf16 inovirus</i>	xanthomonas phage Cf16
<i>Xanthomonas Xf inovirus</i>	xanthomonas phage Xf
–genus Plectrovirus	
<i>Acholeplasma L51 plectrovirus</i>	acholeplasma phage L51
<i>Spiroplasma 1-KC3 plectrovirus</i>	spiroplasma phage 1-KC3
–genus Microvirus	
<i>Enterobacteria phiX 174 microvirus</i>	enterobacteria phage phiX 174
–genus Spiromicrovirus	
<i>Spiroplasma 4 spiromicrovirus</i>	spiroplasma phage 4
–genus Bdellovirovirus	
<i>Bdellovibrio MAC 1 bdellovirovirus</i>	bdellovibrio phage MAC 1
–genus Chlamydia microvirus	
<i>Chlamydia 1 chlamydia microvirus</i>	chlamydia phage 1
Family: Geminiviridae	
–genus Mastervirus	
<i>Maize streak mastrevirus</i>	maize streak virus
<i>Sugarcane streak mastrevirus</i>	sugarcane streak virus
<i>Tobacco yellow dwarf mastrevirus</i>	tobacco yellow dwarf virus
–genus Curtovirus	
<i>Beet curly top curtovirus</i>	beet curly top virus
–genus Topocuvirus	
<i>Tomato pseudo-curly top topocuvirus</i>	tomato pseudo-curly top virus
–genus Begomovirus	
<i>Bean golden mosaic begomovirus</i>	bean golden mosaic virus
<i>Cowpea golden mosaic begomovirus</i>	cowpea golden mosaic virus

Table 2 continued

Species name	Unchanged virus name
<i>Mungbean yellow mosaic begomovirus</i>	mungbean yellow mosaic virus
<i>Squash leaf curl begomovirus</i>	squash leaf curl virus
<i>Tomato leaf curl begomovirus</i>	tomato leaf curl virus
<i>Tomato mottle begomovirus</i>	tomato mottle virus
Family: Circoviridae	
–genus Circovirus	
<i>Beak and feather disease circovirus</i>	beak and feather disease virus
<i>Porcine 1 circovirus</i>	porcine circovirus 1
–genus Gyrovirus	
<i>Chicken anemia gyrovirus</i>	chicken anemia virus
Family: Nanoviridae	
–genus Babuvirus	
<i>Banana bunchy top babuvirus</i>	banana bunchy top virus
–genus Nanovirus	
<i>Subterranean clover stunt nanovirus</i>	subterranean clover stunt virus
Family: Parvoviridae	
–genus Parvovirus	
<i>Mice minute parvovirus</i>	minute virus of mice
<i>Feline panleukopenia parvovirus</i>	feline panleukopenia virus
–genus Erythrovirus	
<i>Human parvo B19 erythrovirus</i>	human parvovirus B19
–genus Dependovirus	
<i>Adeno-associated 2 dependovirus</i>	adeno-associated virus 2
<i>Avian adeno-associated dependovirus</i>	avian adeno-associated virus
–genus Densovirus	
<i>Junonia coenia densovirus</i>	junonia coenia densovirus
–genus Iteravirus	
<i>Bombyx mori iteravirus</i>	bombyx mori densovirus
–genus Brevidensovirus	
<i>Aedes aegypti brevidensovirus</i>	aedes aegypti densovirus
–genus Amdovirus	
<i>Aleutian mink disease amdovirus</i>	Aleutian mink disease virus
–genus Bocavirus	
<i>Bovine parvo bocavirus</i>	bovine parvovirus
–genus Pefudensovirus	
<i>Periplaneta fuliginosa pefudensovirus</i>	periplaneta fuliginosa densovirus
Family: Anelloviridae	
–genus Alphatorquevirus	
<i>Torque teno 1 alphatorquevirus</i>	torque teno virus 1
Retrotranscribing DNA and RNA viruses	
Family: Hepadnaviridae	

Table 2 continued

Species name	Unchanged virus name
–genus Orthohepadnavirus	
<i>Hepatitis B orthohepadnavirus</i>	hepatitis B virus
–genus Avihepadnavirus	
<i>Duck hepatitis B avihepadnavirus</i>	duck hepatitis B virus
Family: Caulimoviridae	
–genus Caulimovirus	
<i>Cauliflower mosaic caulimovirus</i>	cauliflower mosaic virus
<i>Mirabilis mosaic caulimovirus</i>	mirabilis mosaic virus
–genus Petuvirus	
<i>Petunia vein clearing petuvirus</i>	petunia vein clearing virus
–genus Soymovirus	
<i>Soybean chlorotic mottle soymovirus</i>	soybean chlorotic mottle virus
–genus Cavemovirus	
<i>Cassava vein mosaic cavemovirus</i>	cassava vein mosaic virus
–genus Badnavirus	
<i>Banana streak badnavirus</i>	banana streak virus
<i>Commelina yellow mottle badnavirus</i>	commelina yellow mottle virus
–genus Tungrovirus	
<i>Rice tungro bacilliform tungrovirus</i>	rice tungro bacilliform virus
Family: Pseudoviridae	
–genus Pseudovirus	
<i>Saccharomyces cerevisiae Ty1 pseudovirus</i>	saccharomyces cerevisiae virus Ty1
–genus Hemivirus	
<i>Drosophila melanogaster copia hemivirus</i>	drosophila melanogaster copia virus
Family: Metaviridae	
–genus Metavirus	
<i>Saccharomyces cerevisiae Ty3 metavirus</i>	saccharomyces cerevisiae virus Ty3
–genus Errantivirus	
<i>Drosophila melanogaster gypsy errantivirus</i>	drosophila melanogaster gypsy virus
Family: Retroviridae	
–genus Alpharetrovirus	
<i>Avian leukosis alpharetrovirus</i>	avian leukosis virus
–genus Betaretrovirus	
<i>Mouse mammary tumor betaretrovirus</i>	mouse mammary tumor virus
–genus Gammaretrovirus	
<i>Murine leukemia gammaretrovirus</i>	murine leukemia virus
–genus Deltaretrovirus	
<i>Bovine leukemia deltaretrovirus</i>	bovine leukemia virus
–genus Epsilonretrovirus	
<i>Walleye dermal sarcoma epsilonretrovirus</i>	walleye dermal sarcoma virus

Table 2 continued

Species name	Unchanged virus name
–genus Lentivirus	
<i>Human immunodeficiency 1 lentivirus</i>	human immunodeficiency virus 1
<i>Human immunodeficiency 2 lentivirus</i>	human immunodeficiency virus 2
<i>Simian immunodeficiency lentivirus</i>	simian immunodeficiency virus
–genus Spumaretrovirus	
<i>Simian foamy spumaretrovirus</i>	simian foamy virus
The dsRNA viruses	
Family: Cystoviridae	
–genus Cystovirus	
<i>Pseudomonas phi6 cystovirus</i>	pseudomonas phage phi6
Family: Reoviridae	
–genus Orbivirus	
<i>African horse sickness orbivirus</i>	African horse sickness virus
<i>Bluetongue orbivirus</i>	bluetongue virus 1
–genus Rotavirus	
<i>Rota A rotavirus</i>	rotavirus.A
<i>Simian SA 11 rotavirus</i>	simian rotavirus SA 11
–genus Coltivirus	
<i>Colorado tick fever coltivirus</i>	Colorado tick fever virus
–genus Aquareovirus	
<i>Aquareo A aquareovirus</i>	aquareovirus A
–genus Cypovirus	
<i>Cypo 1, Cypovirus</i>	Cypovirus 1
–genus Fijivirus	
<i>Fiji disease fijivirus</i>	Fiji disease virus
<i>Garlic dwarf fijivirus</i>	garlic dwarf virus
–genus Phytoreovirus	
<i>Wound tumor phytoreovirus</i>	wound tumor virus
–genus Oryzavirus	
<i>Rice ragged stunt oryzavirus</i>	rice ragged stunt virus
Family: Birnaviridae	
–genus Aquabirnavirus	
<i>Infectious pancreatic necrosis aquabirnavirus</i>	infectious pancreatic necrosis virus
–genus Avibirnavirus	
<i>Infectious bursal disease avibirnavirus</i>	infectious bursal disease virus
–genus Entomobirnavirus	
<i>Drosophila X entomobirnavirus</i>	drosophila X virus
Family: Totiviridae	
–genus Totivirus	
<i>Saccharomyces cerevisiae L-A totivirus</i>	saccharomyces cerevisiae virus L-A
–genus Giardia virus	
<i>Giardia lamblia giardiavirus</i>	giardia lamblia virus

Table 2 continued

Species name	Unchanged virus name
–genus <i>Leishmaniavirus</i>	
<i>Leishmania RNA 1–1 leishmaniavirus</i>	leishmania RNA virus 1–1
Family: <i>Hypoviridae</i>	
–genus <i>Hypovirus</i>	
<i>Cryphonectria hypo 1 hypovirus</i>	cryphonectria hypovirus 1
Family: <i>Chrysoviridae</i>	
–genus <i>Chrysovirus</i>	
<i>Penicillium chrysogenum chrysovirus</i>	penicillium chrysogenum virus
Family: <i>Partitiviridae</i>	
–genus <i>Partitivirus</i>	
<i>Atkinsonella hypoxylon partitivirus</i>	atkinsonella hypoxylon virus
–genus <i>Alphacryptovirus</i>	
<i>White clover cryptic 1 alphacryptovirus</i>	white clover cryptic virus 1
–genus <i>Betacryptovirus</i>	
<i>White clover cryptic 2 betacryptovirus</i>	white clover cryptic virus 2
The negative sense ssRNA viruses	
Family: <i>Bornaviridae</i>	
–genus <i>Bornavirus</i>	
<i>Borna disease bornavirus</i>	borna disease virus
Family: <i>Filoviridae</i>	
–genus <i>Marburgvirus</i>	
<i>Marburg marburgvirus</i>	Marburg virus
–genus <i>Ebolavirus</i>	
<i>Reston ebolavirus</i>	Reston virus
Family: <i>Paramyxoviridae</i>	
–genus <i>Respirovirus</i>	
<i>Human parainfluenza 1 respirovirus</i>	human parainfluenza virus 1
<i>Sendai respirovirus</i>	Sendai virus
–genus <i>Rubulavirus</i>	
<i>Mumps rubulavirus</i>	mumps virus
<i>Simian 5 rubulavirus</i>	simian virus 5
–genus <i>Avulavirus</i>	
<i>Newcastle disease avulavirus</i>	Newcastle disease virus
–genus <i>Morbillivirus</i>	
<i>Measles morbillivirus</i>	measles virus
<i>Rinderpest morbillivirus</i>	Rinderpest virus
–genus <i>Henipavirus</i>	
<i>Hendra henipavirus</i>	Hendra virus
–genus <i>Pneumovirus</i>	
<i>Human respiratory syncytial pneumovirus</i>	human respiratory syncytial virus

Table 2 continued

Species name	Unchanged virus name
Family: <i>Rhabdoviridae</i>	
–genus <i>Vesiculovirus</i>	
<i>Vesicular stomatitis Indiana vesiculovirus</i>	vesicular stomatitis Indiana virus
–genus <i>Lyssavirus</i>	
<i>Rabies lyssavirus</i>	rabies virus
–genus <i>Ephemerovirus</i>	
<i>Bovine ephemeral fever ephemerovirus</i>	bovine ephemeral fever virus
–genus <i>Cytorhabdovirus</i>	
<i>Lettuce necrotic yellows cytorhabdovirus</i>	lettuce necrotic yellows virus
–genus <i>Nucleorhabdovirus</i>	
<i>Potato yellow dwarf nucleorhabdovirus</i>	potato yellow dwarf virus
Family: <i>Orthomyxoviridae</i>	
–genus <i>Alphainfluenzavirus</i>	
<i>Influenza A alphainfluenzavirus</i>	influenza virus A
–genus <i>Betainfluenzavirus</i>	
<i>Influenza B betainfluenzavirus</i>	influenza virus B
–genus <i>Gammainfluenzavirus</i>	
<i>Influenza C gammainfluenzavirus</i>	influenza virus C
–genus <i>Thogotovirus</i>	
<i>Thogoto thogotovirus</i>	Thogoto virus
–genus <i>Isavirus</i>	
<i>Infectious salmon anemia isavirus</i>	infectious salmon anemia virus
Family: <i>Bunyaviridae</i>	
–genus <i>Orthobunyavirus</i>	
<i>Bunyamwera orthobunyavirus</i>	Bunyamwera virus
–genus <i>Hantavirus</i>	
<i>Hantaan hantavirus</i>	Hantaan virus
<i>Sin Nombre hantavirus</i>	Sin Nombre virus
–genus <i>Nairovirus</i>	
<i>Dugbe nairovirus</i>	Dugbe virus
–genus <i>Phlebovirus</i>	
<i>Rift Valley fever phlebovirus</i>	Rift Valley fever virus
–genus <i>Tospovirus</i>	
<i>Tomato spotted wilt tospovirus</i>	tomato spotted wilt virus
Family: <i>Arenaviridae</i>	
–genus <i>Arenavirus</i>	
<i>Lymphocytic choriomeningitis arenavirus</i>	lymphocytic choriomeningitis virus
Unassigned Family	
–genus <i>Tenuivirus</i>	
<i>Rice stripe tenuivirus</i>	rice stripe virus
Unassigned genus	
–genus <i>Varicosavirus</i>	

Table 2 continued

Species name	Unchanged virus name
<i>Lettuce big-vein associated varicosavirus</i>	lettuce big-vein associated virus
The positive sense ssRNA viruses	
Family: <i>Leviviridae</i>	
–genus <i>Levivirus</i>	
<i>Enterobacteria BZ13 levivirus</i>	enterobacteria phage BZ13
Family: <i>Narnaviridae</i>	
–genus <i>Narnavirus</i>	
<i>Saccharomyces 20S RNA narnavirus</i>	saccharomyces 20S RNA narnavirus
–genus <i>Mitovirus</i>	
<i>Cryphonectria 1 mitovirus</i>	cryphonectria mitovirus 1
Family: <i>Picornaviridae</i>	
–genus <i>Enterovirus</i>	
<i>Human polio 1 enterovirus</i>	human poliovirus 1
–genus <i>Cardiovirus</i>	
<i>Encephalomyocarditis cardiovirus</i>	encephalomyocarditis virus
–genus <i>Aphthovirus</i>	
<i>Foot-and-mouth disease aphthovirus</i>	foot-and-mouth disease virus
–genus <i>Hepatovirus</i>	
<i>Hepatitis A hepatovirus</i>	hepatitis virus A
–genus <i>Parechovirus</i>	
<i>Human parecho parechovirus</i>	human parechovirus 1
–genus <i>Erbovirus</i>	
<i>Equine rhinitis B erbovirus</i>	equine rhinitis B virus
–genus <i>Kobuvirus</i>	
<i>Aichi kobuvirus</i>	Aichi virus
–genus <i>Teschovirus</i>	
<i>Porcine tescho teschovirus</i>	porcine teschovirus 1
Family: <i>Dicistroviridae</i>	
–genus <i>Cripavirus</i>	
<i>Crickets paralysis cripavirus</i>	cricket paralysis virus
Family: <i>Sequiviridae</i>	
–genus <i>Sequivirus</i>	
<i>Parsnip yellow fleck sequivirus</i>	parsnip yellow fleck virus
Family: <i>Comoviridae</i>	
–genus <i>Comovirus</i>	
<i>Cowpea mosaic comovirus</i>	cowpea mosaic virus
<i>Squash mosaic comovirus</i>	squash mosaic virus
–genus <i>Fabavirus</i>	
<i>Broad bean wilt 1 fabavirus</i>	broad bean wilt virus 1
–genus <i>Nepovirus</i>	
<i>Arabidopsis mosaic nepovirus</i>	arabidopsis mosaic virus
<i>Grapevine fanleaf nepovirus</i>	grapevine fanleaf virus
<i>Tobacco ringspot nepovirus</i>	tobacco ringspot virus
<i>Tomato black ring nepovirus</i>	tomato black ring virus

Table 2 continued

Species name	Unchanged virus name
Family: <i>Potyviridae</i>	
–genus <i>Potyvirus</i>	
<i>Potato Y potyvirus</i>	potato virus Y
<i>Bean common mosaic potyvirus</i>	bean common mosaic virus
<i>Henbane mosaic potyvirus</i>	henbane mosaic virus
<i>Johnsongrass mosaic potyvirus</i>	johnsongrass mosaic virus
<i>Lettuce mosaic potyvirus</i>	lettuce mosaic virus
<i>Papaya ringspot potyvirus</i>	papaya ringspot virus
<i>Plum pox potyvirus</i>	plum pox virus
<i>Sugarcane mosaic potyvirus</i>	sugarcane mosaic virus
<i>Tobacco etch potyvirus</i>	tobacco etch virus
<i>Watermelon mosaic potyvirus</i>	watermelon mosaic virus
–genus <i>Ipomovirus</i>	
<i>Sweet potato mild mottle ipomovirus</i>	sweet potato mild mottle virus
–genus <i>Macluravirus</i>	
<i>Maclura mosaic macluravirus</i>	maclura mosaic virus
–genus <i>Rymovirus</i>	
<i>Ryegrass mosaic rymovirus</i>	ryegrass mosaic virus
–genus <i>Tritimovirus</i>	
<i>Wheat streak mosaic tritimovirus</i>	wheat streak mosaic virus
–genus <i>Bymovirus</i>	
<i>Barley yellow mosaic bymovirus</i>	barley yellow mosaic virus
Family: <i>Caliciviridae</i>	
–genus <i>Lagovirus</i>	
<i>Rabbit hemorrhagic disease lagovirus</i>	rabbit hemorrhagic disease virus
–genus <i>Norovirus</i>	
<i>Norwalk norovirus</i>	Norwalk virus
–genus <i>Sapovirus</i>	
<i>Sapporo sapovirus</i>	Sapporo virus
–genus <i>Vesivirus</i>	
<i>Swine vesicular exanthema vesivirus</i>	swine vesicular exanthema virus
Family: <i>Astroviridae</i>	
–genus <i>Mamastrovirus</i>	
<i>Human astro mamastrovirus</i>	human astrovirus 1
Family: <i>Nodaviridae</i>	
–genus <i>Alphanodavirus</i>	
<i>Flock House alphanodavirus</i>	Flock House virus
Family: <i>Tetraviridae</i>	
–genus <i>Betatetravirus</i>	
<i>Trichoplusia ni betatetravirus</i>	trichoplusia ni virus
–genus <i>Omegatetravirus</i>	
<i>Helicoverpa armigera stunt omegatetravirus</i>	helicoverpa armigera stunt virus

Table 2 continued

Species name	Unchanged virus name
Family: Luteoviridae	
–genus Luteovirus	
<i>Barley yellow dwarf MAV luteovirus</i>	barley yellow dwarf MAV virus
–genus Polerovirus	
<i>Potato leafroll polerovirus</i>	potato leafroll virus
–genus Enamovirus	
<i>Pea enation mosaic 1 enamovirus</i>	pea enation mosaic virus 1
Family: Tombusviridae	
–genus Carmovirus	
<i>Carnation mottle carmovirus</i>	carnation mottle virus
–genus Dianthovirus	
<i>Carnation ringspot dianthovirus</i>	carnation ringspot virus
–genus Machlomovirus	
<i>Maize chlorotic mottle machlomovirus</i>	maize chlorotic mottle virus
–genus Necrovirus	
<i>Tobacco necrosis A necrovirus</i>	tobacco necrosis virus A
–genus Panicovirus	
<i>Panicum mosaic panicovirus</i>	panicum mosaic virus
–genus Tombusvirus	
<i>Cymbidium ringspot tombusvirus</i>	cymbidium ringspot virus
<i>Tomato bushy stunt tombusvirus</i>	tomato bushy stunt virus
Family: Coronaviridae	
–genus Bafnivirus	
<i>White Bream bafnivirus</i>	white bream virus
–genus Torovirus	
<i>Equine toro torovirus</i>	equine torovirus
Family: Arteriviridae	
–genus Arterivirus	
<i>Equine arteritis arterivirus</i>	equine arteritis virus
Family: Flaviviridae	
–genus Flavivirus	
<i>Louping ill flavivirus</i>	louping ill virus
<i>Dengue flavivirus</i>	dengue virus 1
<i>St. Louis encephalitis flavivirus</i>	St. Louis encephalitis virus
<i>West Nile flavivirus</i>	West Nile virus
<i>Yellow fever flavivirus</i>	yellow fever virus
–genus Pestivirus	
<i>Bovine viral diarrhea 1 pestivirus</i>	bovine viral diarrhea virus 1
–genus Hepacivirus	
<i>Hepatitis C hepacivirus</i>	hepatitis virus C
Family: Togaviridae	
–genus Alphavirus	
<i>Chikungunya alphavirus</i>	chikungunya virus
<i>Semliki Forest alphavirus</i>	Semliki Forest virus

Table 2 continued

Species name	Unchanged virus name
<i>Sindbis alphavirus</i>	Sindbis virus
<i>Western equine encephalitis alphavirus</i>	western equine encephalitis virus
–genus Rubivirus	
<i>Rubella rubivirus</i>	rubella virus
Family: Bromoviridae	
–genus Alfamovirus	
<i>Alfalfa mosaic alfamovirus</i>	Alfalfa mosaic virus
–genus Bromovirus	
<i>Brome mosaic bromovirus</i>	brome mosaic virus
<i>Cowpea chlorotic mottle bromovirus</i>	cowpea chlorotic mottle virus
–genus Cucumovirus	
<i>Cucumber mosaic cucumovirus</i>	cucumber mosaic virus
<i>Peanut stunt cucumovirus</i>	peanut stunt virus
–genus Ilarvirus	
<i>Apple mosaic ilarvirus</i>	apple mosaic virus
<i>Hydrangea mosaic ilarvirus</i>	hydrangea mosaic virus
<i>Prune dwarf ilarvirus</i>	prune dwarf virus
<i>Tobacco streak ilarvirus</i>	tobacco streak virus
–genus Oleavirus	
<i>Olive latent 2 oleavirus</i>	olive latent virus 2
Family: Closteroviridae	
–genus Ampelovirus	
<i>Grapevine leafroll-associated 3 ampelovirus</i>	grapevine leafroll-associated virus 3
–genus Closterovirus	
<i>Citrus tristeza closterovirus</i>	citrus tristeza virus
–genus Crinivirus	
<i>Lettuce chlorosis crinivirus</i>	lettuce chlorosis virus
Family: Tymoviridae	
–genus Tymovirus	
<i>Okra mosaic tymovirus</i>	okra mosaic virus
<i>Turnip yellow mosaic tymovirus</i>	turnip yellow mosaic virus
<i>Wild cucumber mosaic tymovirus</i>	wild cucumber mosaic virus
–genus Maculavirus	
<i>Grapevine fleck maculavirus</i>	grapevine fleck virus
–genus Marafivirus	
<i>Maize rayado fino marafivirus</i>	maize rayado fino virus
Family: Alphaflexiviridae	
–genus Potexvirus	
<i>Cymbidium mosaic potexvirus</i>	cymbidium mosaic virus
<i>Hydrangea ringspot potexvirus</i>	hydrangea ringspot virus
<i>Papaya mosaic potexvirus</i>	papaya mosaic virus
<i>Potato X potexvirus</i>	potato virus X
<i>White clover mosaic potexvirus</i>	white clover mosaic virus

Table 2 continued

Species name	Unchanged virus name
–genus <i>Allexivirus</i>	
<i>Shallot X allexivirus</i>	shallot virus X
Family: <i>Betaflexiviridae</i>	
–genus <i>Foveavirus</i>	
<i>Apple stem pitting foveavirus</i>	apple stem pitting virus
–genus <i>Carlavirus</i>	
<i>Carnation latent carlavirus</i>	carnation latent virus
<i>Hop mosaic carlavirus</i>	hop mosaic virus
<i>Pea streak carlavirus</i>	pea streak virus
<i>Potato S carlavirus</i>	potato virus S
–genus <i>Capillovirus</i>	
<i>Apple stem grooving capillovirus</i>	apple stem grooving virus
–genus <i>Vitivirus</i>	
<i>Grapevine A vitivirus</i>	grapevine virus A
–genus <i>Trichovirus</i>	
<i>Apple chlorotic leaf spot trichovirus</i>	apple chlorotic leaf spot virus
Family: <i>Virgaviridae</i>	
–genus <i>Tobamovirus</i>	
<i>Odontoglossum ringspot tobamovirus</i>	odontoglossum ringspot virus
<i>Ribgrass mosaic tobamovirus</i>	ribgrass mosaic virus
<i>Tobacco mosaic tobamovirus</i>	tobacco mosaic virus
<i>Tomato mosaic tobamovirus</i>	tomato mosaic virus
<i>Cucumber green mottle mosaic tobamovirus</i>	cucumber green mottle mosaic virus
–genus <i>Tobravirus</i>	
<i>Tobacco rattle tobravirus</i>	tobacco rattle virus
–genus <i>Hordeivirus</i>	
<i>Barley stripe mosaic hordeivirus</i>	barley stripe mosaic virus
–genus <i>Furovirus</i>	
<i>Soil-borne wheat mosaic furovirus</i>	soil-borne wheat mosaic virus
–genus <i>Pomovirus</i>	
<i>Potato mop-top pomovirus</i>	potato mop-top virus
–genus <i>Pecluvirus</i>	
<i>Peanut clump pecluvirus</i>	peanut clump virus
Unassigned Family	
–genus <i>Benyvirus</i>	
<i>Beet necrotic yellow vein benyvirus</i>	beet necrotic yellow vein virus
–genus <i>Ourmiavirus</i>	
<i>Ourmia melon ourmiavirus</i>	ourmia melon virus
–genus <i>Idaeovirus</i>	
<i>Raspberry bushy dwarf idaeovirus</i>	raspberry bushy dwarf virus

Species names in biology are never abbreviated in the form of acronyms. Since virus species names are used sparingly, they also do not deserve abbreviations.

Abbreviations are useful for virus names but these are not affected by the present proposal. Although the ICTV is not responsible for devising appropriate abbreviations, it has published several lists of recommended virus name abbreviations [28–31]. Although one list [31] refers to abbreviations of virus species, these recommendations do all pertain to abbreviations of virus names.

Some non-Latinized binomial species names for vertebrate viruses are shown in Table 1. Many examples of possible binomial species names together with the unchanged current virus names are provided as a guideline in Table 2. In this list, the species names are grouped by family and genus. All family, genus and species names are written in italics. Unchanged virus names are written in Roman without capitals except for proper names. This list compiled by Claude Fauquet does not include all the species, genera and families presently recognized by the ICTV since the list only serves to illustrate that the binomial system is widely applicable. Although in many cases such as the ssRNA plant viruses these species names will not be controversial, in a limited number of cases the relevant ICTV Study Groups will have to decide which binomial species names should be adopted.

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