

## Abbreviations for bacterial and fungal virus species names

### C. M. Fauquet<sup>1</sup> and C. R. Pringle<sup>2</sup>

<sup>1</sup>ILTAB/Danforth Plant Science Center, University of Missouri, St. Louis, Missouri, U.S.A. <sup>2</sup>Biological Sciences Department, University of Warwick, Coventry, U.K.

Plant virologists have taken the initiative in the development of a standardized system of abbreviation of virus names in response to the particular problems associated with the naming of plant viruses [1, 2, 5]. There is now a compelling case for extending these efforts to embrace all viruses irrespective of their hosts. Increasing awareness of the diversity of viruses and greater reliance on storage of information in electronic databases call for standardization of abbreviations to avoid ambiguity.

To extend this process, we have previously compiled lists of abbreviations of the names of the currently recognized species of viruses that infect invertebrate or vertebrate organisms [3, 4]. To complete this process we are now presenting lists of abbreviations of the names of the currently recognized species of viruses that infect bacteria or fungi, as recorded in the 7th Report of the International Committee on Taxonomy of Viruses (ICTV) [7]. The lists of abbreviations for bacterial, fungal, invertebrate and vertebrate viruses differ from the list of abbreviations for plant viruses in that they are restricted to approved species names and exclude tentative names and synonyms.

A total of 1,550 individual virus species are recognized by the ICTV, and are listed in the 7th Report [7]. Ninety of these species are of viruses that infect bacteria and another seventy-five are of viruses that infect fungi. These lists of recommended abbreviations for bacterial and fungal virus species names are being published as a reference document to reduce the risk of duplication when new abbreviations for virus names are proposed. Although the ICTV is responsible for controlling, approving and recording the names of virus taxa, and has a formal International Code [6] that guides this activity, it has no constitutional responsibility for assigning abbreviations. Nonetheless it does assign in its Reports (e.g. [7]) a recommended abbreviation for every virus name. It is obviously a desirable aim that a standard abbreviation should be used for any particular virus in all publications.

Three principles have governed the assignment of abbreviations for the names of viruses that infect plants, invertebrates or vertebrates. These principles are that the abbreviations should be the simplest possible, that an abbreviation must not duplicate any other abbreviation previously assigned and that is still in current usage; and that the word "virus" in a name is abbreviated as "V". Plant virologists have compiled guidelines [2] that indicate

how the abbreviations used in the 7th ICTV Report [3] were derived, and that advise virologists how they should proceed when creating new abbreviations. Several of the guidelines refer to the specific pathogenic effects of plant viruses on their hosts, and therefore are not applicable to bacterial and fungal viruses. However, the following do apply to all viruses: (1) abbreviations that use the same letters, but differ only by the case used (upper or lower) should be avoided; (2) abbreviations for single words should not normally exceed two letters; (3) abbreviations in current and widespread usage should be retained, except where their use could cause confusion; and (4) secondary letters in abbreviations should be avoided whenever their use would make the abbreviation excessively long, i.e. normally in excess of five letters. However, for abbreviating the names of bacterial and fungal viruses, it has often been necessary to ignore the last stipulation.

 Table 1. Listing of abbreviations of bacterial virus species names. The bacterial virus species names listed in the

 7th Report of the ICTV [7] with their recommended abbreviations, are arranged by family and according to genome type. Names of tentative species, strain, serotype, genotype, clade or isolate, are not listed

Species	Abbreviation	Genus	Family
dsDNA Viruses			
Acinetobacter phage 133	(133)	"T4-like viruses"	Myoviridae
Aeromonas phage 40RR2.8t	(40RR2.8t)	"T4-like viruses"	Myoviridae
Aeromonas phage Aeh1	(Aeh1)	"T4-like viruses"	Myoviridae
Enterobacteria phage SV14	(SV14)	"T4-like viruses"	Myoviridae
Enterobacteria phage T4	(T4)	"T4-like viruses"	Myoviridae
Pseudomonas phage 42	(42)	"T4-like viruses"	Myoviridae
Vibrio phage nt-1	(nt-1)	"T4-like viruses"	Myoviridae
Aeromonas phage 43	(43)	"P1-like viruses"	Myoviridae
Enterobacteria phage P1	(P1)	"P1-like viruses"	Myoviridae
Enterobacteria phage P1D	(P1D)	"P1-like viruses"	Myoviridae
Enterobacteria phage P2	(P2)	"P2-like viruses"	Myoviridae
Haemophilus phage HP1	(HP1)	"P2-like viruses"	Myoviridae
Enterobacteria phage Mu	(Mu)	"Mu-like viruses"	Myoviridae
Bacillus phage SP01	(SP01)	"SPO1-like viruses"	Myoviridae
Halobacterium phage $\phi\phi H$	( <b>\$</b> H)	"oH-like viruses"	Myoviridae
Enterobacteria phage $\lambda$	(λ)	"λ-like viruses"	Siphoviridae
Enterobacteria phage T1	(T1)	"T1-like viruses"	Siphoviridae
Enterobacteria phage T5	(T5)	"T5-like viruses"	Siphoviridae
Vibrio phage $\Phi$ 149 (type IV)	(Ф149)	"T5-like viruses"	Siphoviridae
Mycobacterium phage L5	(L5)	"L5-like viruses"	Siphoviridae
Lactococcus phage c2	(c2)	"c2-like viruses"	Siphoviridae
Methanobacterium phage \vmyM1	(ψM1)	"\psi M-like viruses"	Siphoviridae
Enterobacteria phage T7	(T7)	"T7-like viruses"	Podoviridae
Kluyvera phage Kvp1	(Kvp1)	"T7-like viruses"	Podoviridae
Pseudomonas phage gh-1	(gh-1)	"T7-like viruses"	Podoviridae
Enterobacteria phage P22	(P22)	"P22-like" viruses	Podoviridae
Bacillus phage $\phi 29$	(\$29)	"¢29-like viruses"	Podoviridae
Bacillus phage GA-1	(GA-1)	"φ29-like viruses	Podoviridae
Kurthia phage 6	(6)	"¢29-like viruses"	Podoviridae
Streptococcus phage Cp-1	(Cp-1)	"\$29-like viruses"	Podoviridae

Continued

Species	Abbreviation	Genus	Family
dsDNA Viruses			
Bacillus phage AP50	(AP50)	Tectivirus	Tectiviridae
Bacillus phage $\phi NS11$	(\$\phiNS11)	Tectivirus	Tectiviridae
Enterobacteria phage PRD1	(PRD1)	Tectivirus	Tectiviridae
Thermus phage P37-14	(P37-14)	Tectivirus	Tectiviridae
Alteromonas phage PM2	(PM2)	Corticovirus	Corticoviridae
Acholeplasma phage L2	(L2)	Plasmavirus	Plasmaviridae
Thermoproteus virus 1	(TTV1)	Lipothrixvirus	Lipothrixviridae
Thermoproteus virus 2	(TTV2)	Lipothrixvirus	Lipothrixviridae
Sulfolobus virus SIRV-1	(SIRV-1)	Rudivirus	Rudiviridae
Sulfolobus virus SIRV-2	(SIRV-2)	Rudivirus	Rudiviridae
Sulfolobus virus 1	(SSV-1)	Fusellovirus	Fuselloviridae
Sulfolobus virus SNDV	(SNDV)	"Sulfolobus SNDV-l	ike viruses"
ssDNA Viruses			
Enterobacteria phage If1	(If1)	Inovirus	Inoviridae
Enterobacteria phage Ike	(IKe)	Inovirus	Inoviridae
Enterobacteria phage I <sub>2</sub> -2	(I <sub>2</sub> -2)	Inovirus	Inoviridae
Enterobacteria phage M13	(M13)	Inovirus	Inoviridae
Enterobacteria phage X-2	(X-2)	Inovirus	Inoviridae
Enterobacteria phage C-2	(C-2)	Inovirus	Inoviridae
Enterobacteria phage X	(X)	Inovirus	Inoviridae
Enterobacteria phage PR64FS	(PR64FS)	Inovirus	Inoviridae
Enterobacteria phage SF	(SF)	Inovirus	Inoviridae
Enterobacteria phage tf-1	(tf-1)	Inovirus	Inoviridae
Vibrio phage 493	(493)	Inovirus	Inoviridae
Vibrio phage fs1	(fs1)	Inovirus	Inoviridae
Vibrio phage fs2	(fs2)	Inovirus	Inoviridae
Vibrio phage CTX	(CTX)	Inovirus	Inoviridae
Vibrio phage v6	(v6)	Inovirus	Inoviridae
Vibrio phage Vf12	(Vf12)	Inovirus	Inoviridae
Vibrio phage Vf33	(Vf33)	Inovirus	Inoviridae
Vibrio phage VSK	(VSK)	Inovirus	Inoviridae
Pseudomonas phage Pf1	(Pf1)	Inovirus	Inoviridae
Pseudomonas phage Pf2	(Pf2)	Inovirus	Inoviridae
Pseudomonas phage Pf3	(Pf3)	Inovirus	Inoviridae
Xanthomonas phage Cf1c	(Cf1c)	Inovirus	Inoviridae
Xanthomonas phage Cf1t	(Cf1t)	Inovirus	Inoviridae
Xanthomonas phage Cf16	(Cf16)	Inovirus	Inoviridae
Xanthomonas phage Cf1tv	(Cf1tv)	Inovirus	Inoviridae
Xanthomonas phage Lf	(Lf)	Inovirus	Inoviridae
Xanthomonas phage Xf	(Xf)	Inovirus	Inoviridae
Xanthomonas phage Xfo	(Xfo)	Inovirus	Inoviridae
Xanthomonas phage Xfv	(Xfv)	Inovirus	Inoviridae

 Table 1 (continued)

Continued

Species	Abbreviation	Genus	Family
ssDNA Viruses			
Acholeplasma phage MV-L51	(L51)	Plectrovirus	Inoviridae
Spiroplasma phage 1-KC3	(SpV1/KC3)	Plectrovirus	Inoviridae
Spiroplasma phage 1-aa	(SpV1-aa)	Plectrovirus	Inoviridae
Spiroplasma phage 1-R8A2B	(SpV1-R8A2B)	Plectrovirus	Inoviridae
Spiroplasma phage 1-C74	(SpV1-C74)	Plectrovirus	Inoviridae
Spiroplasma phage 1-T78	(SpV1-T78)	Plectrovirus	Inoviridae
Spiroplasma phage 1-S102	(SpV1-S102)	Plectrovirus	Inoviridae
Enterobacteria phage <i>\$\$174</i>	( <b>\$</b> X174)	Microvirus	Microviridae
Enterobacteria phage G4	(G4)	Microvirus	Microviridae
Enterobacteria phage S13	(S13)	Microvirus	Microviridae
Enterobacteria phage St-1	(St-1)	Microvirus	Microviridae
Spiroplasma phage 4	(Sp-4)	Spiromicrovirus	Microviridae
Bdellovibrio phage MAC 1	(MAC-1)	Bdellomicrovirus	Microviridae
Chlamydia phage 1	(Ch-1)	Chlamydiamicrovirus	Microviridae
dsRNA Viruses			
Pseudomonas phage ¢6	( <b>\$</b> 6)	Cystovirus	Cystoviridae
Positive sense ssRNA Viruses			
Enterobacteria phage BZ13	(BZ13)	Levivirus	Leviviridae
Enterobacteria phage FI	(FI)	Levivirus	Leviviridae
Enterobacteria phage MS2	(MS2)	Levivirus	Leviviridae
Enterobacteria phage $Q\beta$	(Qβ)	Allolevivirus	Leviviridae

Table 1 (continued)

**Table 2.** Listing of abbreviations of fungal virus species names. The fungal virus species names listed in the

 7th Report of the ICTV [7] with their recommended abbreviations, are arranged by family and according to genome type. Names of tentative species, strain, serotype, genotype, clade or isolate, are not listed

Species	Abbreviation	Genus	Family
dsDNA Viruses			
Paramecium bursaria Chlorella virus 1	(PBCV-1)	Chlorovirus	Phycodnaviridae
Paramecium bursaria Chlorella virus AL1A	(PBCV-AL1A)	Chlorovirus	Phycodnaviridae
Paramecium bursaria Chlorella virus AL2A	(PBCV-AL2A)	Chlorovirus	Phycodnaviridae
Paramecium bursaria Chlorella virus BJ2C	(PBCV-BJ2C)	Chlorovirus	Phycodnaviridae
Paramecium bursaria Chlorella virus CA4A	(PBCV-CA4A)	Chlorovirus	Phycodnaviridae
Paramecium bursaria Chlorella virus CA4B	(PBCV-CA4B)	Chlorovirus	Phycodnaviridae
Paramecium bursaria Chlorella virus IL3A	(PBCV-IL3A)	Chlorovirus	Phycodnaviridae
Paramecium bursaria Chlorella virus NC1A	(PBCV-NC1A)	Chlorovirus	Phycodnaviridae
Paramecium bursaria Chlorella virus NE8A	(PBCV-NE8A)	Chlorovirus	Phycodnaviridae
Paramecium bursaria Chlorella virus NY2A	(PBCV-NY2A)	Chlorovirus	Phycodnaviridae
Paramecium bursaria Chlorella virus NYs1	(PBCV-NYs1)	Chlorovirus	Phycodnaviridae
Paramecium bursaria Chlorella virus SC1A	(PBCV-SC1A)	Chlorovirus	Phycodnaviridae
Paramecium bursaria Chlorella virus XY6E	(PBCV-XY6E)	Chlorovirus	Phycodnaviridae
Paramecium bursaria Chlorella virus XZ3A	(PBCV-XZ3A	Chlorovirus	Phycodnaviridae

200

 Table 2 (continued)

Species	Abbreviation	Genus	Family
dsDNA Viruses			
Paramecium bursaria Chlorella virus XZ4A	(PBCV-XZ4A)	Chlorovirus	Phycodnaviridae
Paramecium bursaria Chlorella virus XZ4C	(PBCV-XZ4C)	Chlorovirus	Phycodnaviridae
Paramecium bursaria Chlorella virus Al	(PBCV-A1)	Chlorovirus	Phycodnaviridae
Hydra viridis Chlorella virus 1	(HVCV-1)	Chlorovirus	Phycodnaviridae
Micromonas pusilla virus SP1	(MpV-SP1)	Prasinovirus	Phycodnaviridae
Chysochromulina brevifilum virus PW1	(CbV-PW1)	Prymnesiovirus	Phycodnaviridae
Ectocarpus fasciculatus virus a	(EfV-a)	Phaeovirus	Phycodnaviridae
Ectocarpus siliculosus virus 1	(EsV-1)	Phaeovirus	Phycodnaviridae
Ectocarpus siliculosus virus a	(EsV-a)	Phaeovirus	Phycodnaviridae
Feldmannia irregularis virus a	(FiV-a)	Phaeovirus	Phycodnaviridae
Feldmannia species virus	(FsV)	Phaeovirus	Phycodnaviridae
Feldmannia species virus a	(FsV-a)	Phaeovirus	Phycodnaviridae
Hincksia hinckiae virus a	(HhV-a)	Phaeovirus	Phycodnaviridae
Myriotrichia clavaeformis virus a	(McV-a)	Phaeovirus	Phycodnaviridae
Rhizidiomyces virus	(RZV)	Rhizidiovirus	Unassigned
Reverse transcribing viruses			
Physarum polycephalum Tp1 virus	(PpoTp1V)	Pseudovirus	Pseudoviridae
Saccharomyces cerevisiae Tyl virus	(SceTv1V)	Pseudovirus	Pseudoviridae
Saccharomyces cerevisiae Ty2 virus	(SceTv2V)	Pseudovirus	Pseudoviridae
Saccharomyces cerevisiae Tv4 virus	(SceTv4V)	Pseudovirus	Pseudoviridae
Volvox carteri Osser virus	(VcaOssV)	Pseudovirus	Pseudoviridae
Saccharomyces cerevisiae Ty5 virus	(SceTy5V)	Pseudovirus	Pseudoviridae
Cladosporium fulvum T-1 virus	(CfuT1V)	Metavirus	Metaviridae
Saccharomyces cerevisiae Ty3 virus	(SceTy3V)	Metavirus	Metaviridae
Schizosaccharomyces pombe Tf1 virus	(SpoTf1V)	Metavirus	Metaviridae
Schizosaccharomyces pombe Tf2 virus	(SpoTf2V)	Metavirus	Metaviridae
Tribolium castaneum Woot virus	(TcaWooV)	Metavirus	Metaviridae
Tripneustis gratilla SURL virus	(TgrSurV)	Metavirus	Metaviridae
dsRNA Viruses			
Helminthosporium victoriae virus 190S	(HvV190S)	Totivirus	Totiviridae
Saccharomyces cerevisiae virus L-A (L1)	(ScV-L-A)	Totivirus	Totiviridae
Saccharomyces cerevisiae virus L-BC (La)	(ScV-L-BC)	Totivirus	Totiviridae
Ustilago maydis virus H1	(UmV-H1)	Totivirus	Totiviridae
Giardia lamblia virus	(GLV)	Giardiavirus	Totiviridae
Leishmania RNA virus 1 – 1	(LRV1-1)	Leishmaniavirus	Totiviridae
Leishmania RNA virus 1 – 2	(LRV1-2)	Leishmaniavirus	Totiviridae
Leishmania RNA virus 1 – 3	(LRV1-3)	Leishmaniavirus	Totiviridae
Leishmania RNA virus 1 – 4	(LRV1-4)	Leishmaniavirus	Totiviridae
Leishmania RNA virus 1 – 5	(LRV1-5)	Leishmaniavirus	Totiviridae
Leishmania RNA virus 1–6	(LRV1-6)	Leishmaniavirus	Totiviridae
Leishmania RNA virus 1 – 7	(LRV1-7)	Leishmaniavirus	Totiviridae
Leishmania RNA virus 1 – 8	(LRV1-8)	Leishmaniavirus	Totiviridae
Leishmania RNA virus 1 – 9	(LRV1-9)	Leishmaniavirus	Totiviridae
Leishmania RNA virus 1 – 10	(LRV1-10)	Leishmaniavirus	Totiviridae
Leishmania RNA virus 1 – 11	(LRV1-11)	Leishmaniavirus	Totiviridae

Continued

Species	Abbreviation	Genus	Family
dsRNA Viruses			
Leishmania RNA virus 1 – 12	(LRV1-12)	Leishmaniavirus	Totiviridae
Leishmania RNA virus 2 – 1	(LRV2-1)	Leishmaniavirus	Totiviridae
Cryphonectria hypovirus 1-EP713	(CHV1-EP713)	Hypovirus	Hypoviridae
Cryphonectria hypovirus 2-NB58	(CHV2-NB58)	Hypovirus	Hypoviridae
Agaricus bisporus virus 4	(AbV-4)	Partitivirus	Partitiviridae
Aspergillus ochraceous virus	(AoV)	Partitivirus	Partitiviridae
Atkinsonella hypoxylon virus	(AhV)	Partitivirus	Partitiviridae
Gaeumannomyces graminis virus 019/6-A	(GgV-019/6-A)	Partitivirus	Partitiviridae
Gaeumannomyces graminis virus T1-A	(GgV-T1-A)	Partitivirus	Partitiviridae
Penicillium stoloniferum virus S	(PsV-S)	Partitivirus	Partitiviridae
Rhizoctonia solani virus	(RsV)	Partitivirus	Partitiviridae
Penicillium brevicompactum virus	(PbV)	Chrysovirus	Partitiviridae
Penicillium chrysogenum virus	(PcV)	Chrysovirus	Partitiviridae
Penicillium cyaneo-fulvum virus	(Pc-fV)	Chrysovirus	Partitiviridae
Naked RNA viruses			
Crvphonectria parasitica mitovirus 1-NB631	(CpMV1-NB631)	Mitovirus	Narnaviridae
Saccharomyces cerevisiae narnavirus 20S RNA	(ScNV-20S)	Narnavirus	Narnaviridae
Saccharomyces cerevisiae narnavirus 23S RNA	(ScNV-23S)	Narnavirus	Narnaviridae
ssRNA Viruses			
Mushroom bacilliform virus	(MBV)	Barnavirus	Barnaviridae

 Table 2 (continued)

Table 1 is a list of the recommended abbreviations for the names of the ninety species of bacterial viruses listed in the most recent ICTV Report [7]. The names of tentative species, serotypes, strains and synonyms have been excluded. The taxonomy of bacterial viruses is at an early stage of development and, although an order, several families and genera have been defined, the number of ratified species is still relatively small. However, this situation is likely to change rapidly as another 478 names of bacterial viruses (with recommended abbreviations) are listed in the 7th Report. Many of these are the names of tentative species that may in due course be elevated to the status of virus species as knowledge accumulates. The immediate aim is to provide a basic catalogue of unique abbreviations for the names of authentic bacterial virus species. A limitation in the naming of virus species has been the absence of agreed international names for the genera of tailed phages. In Table 1, the temporary names of these genera have the extension "-like viruses".

Table 2 comprises a list of the recommended abbreviations for the seventy-five species of fungal viruses currently recognized [7]. As in Table 1, the names of tentative species, serotypes, strains and synonyms have been excluded. It is likely that this list will expand quickly as knowledge of the nature of the viruses of fungi accumulates. The 7th ICTV Report lists another 63 names of fungal viruses (together with their recommended abbrevi-

ations), many of which have the status of tentative species, and may be elevated to virus species status in due course.

The publication of the lists in Tables 1 and 2 concludes the cataloguing of the recommended abbreviations for the names of the 1,550 species of viruses recognized as distinct taxonomic entities by the ICTV [2–4]. It is our intention to merge and up-date these lists regularly to provide an accessible reference resource to facilitate the designation of unambiguous abbreviations of virus species names.

### Acknowledgement

CF is supported by IRD (formerly ORSTOM).

#### References

- 1. Fauquet CM, Martelli GP (1995) Up-dated ICTV list of names and abbreviations of viruses, viroids and satellites infecting plants. Arch Virol 140: 393–413
- 2. Fauquet CM, Mayo MA (1999) Abbreviations for plant virus names 1999. Arch Virol 144: 1249-1273
- Fauquet CM, Pringle CR (1999) Abbreviations for vertebrate virus species names. Arch Virol 144: 1865– 1880
- Fauquet CM, Pringle CR (1999) Abbreviations for invertebrate virus species names. Arch Virol 144: 2265– 2271
- Hull R, Milne RG, Van Regenmortel MHV (1991) A list of proposed standard acronyms for plant viruses and viroids. Arch Virol 120: 151–164
- Mayo MA, Horzinek M (1998) A revised version of the International Code of Virus Classification and Nomenclature. Arch Virol 143: 1645–1654
- Van Regenmortel MHV, Fauquet CM, Bishop DHL, Carstens E, Estes MK, Lemon S, Maniloff J, Mayo MA, McGeoch D, Pringle CR, Wickner RB (eds) (2000) Virus Taxonomy. Seventh Report of the International Committee on Taxonomy of Viruses. Academic Press, New York San Diego (in press)

Authors' address: Dr. C. M. Fauquet, ILTAB/Danforth Plant Science Center, University of Missouri, 8001 Natural Bridge Road, St. Louis, Missouri 63121-4499, U.S.A.