



This form should be used for all taxonomic proposals. Please complete all those modules that are applicable (and then delete the unwanted sections). For guidance, see the notes written in blue and the separate document "Help with completing a taxonomic proposal"

Please try to keep related proposals within a single document; you can copy the modules to create more than one genus within a new family, for example.

MODULE 1: **TITLE, AUTHORS, etc**

<b>Code assigned:</b>	<b>2015.002aG</b>	(to be completed by ICTV officers)
<b>Short title: Abolish ICVCN Rule 3.35 to allow classification of satellite viruses and other virus-related agents</b>		
two new species (e.g. 6 new species in the genus <i>Zetavirus</i> )		
<b>Modules attached</b> (modules 1 and 10 are required)	1 <input checked="" type="checkbox"/> 6 <input type="checkbox"/>	2 <input type="checkbox"/> 7 <input type="checkbox"/>
	3 <input type="checkbox"/> 8 <input type="checkbox"/>	4 <input type="checkbox"/> 9 <input checked="" type="checkbox"/>
		5 <input type="checkbox"/> 10 <input checked="" type="checkbox"/>

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**List the ICTV study group(s) that have seen this proposal:**

A list of study groups and contacts is provided at <http://www.ictvonline.org/subcommittees.asp>. If in doubt, contact the appropriate subcommittee chair (fungal, invertebrate, plant, prokaryote or vertebrate viruses)

**ICTV Study Group comments (if any) and response of the proposer:**

Date first submitted to ICTV: June 15, 2015  
Date of this revision (if different to above): July 30, 2015

**ICTV-EC comments and response of the proposer:**

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MODULE 9: **NON-STANDARD**

Template for any proposal not covered by modules 2-8.

non-standard proposal

Code

**2015.002aG**

(assigned by ICTV officers)

**Title of proposal: Abolish ICVCN Rule 3.35 to allow classification of satellite viruses and other virus-related agents**

**Text of proposal:**

Satellites are not systematically classified by the ICTV, in accordance with Rule 3.35 of the International Code of Virus Classification and Nomenclature (ICVCN), which states that

*“Satellites and prions are not classified as viruses but are assigned an arbitrary classification as seems useful to workers in the particular fields”.*

There are two classes of satellites: (i) satellite viruses, which encode their own capsid proteins and form virions, and (ii) satellite nucleic acids which do not encode capsid proteins of their own but are instead encapsidated into virions of helper viruses. Although neither satellite viruses nor satellite nucleic acids are considered to be viruses, they display clear evolutionary relationships with *bona fide* viruses. Like most viruses, satellite viruses encode their own capsid proteins, while some groups of satellite nucleic acids (e.g., alpha-satellites) encode genome replication proteins which are closely related to the corresponding viral proteins [1].

The reason not to consider satellite viruses as “full-fledged” members of the viral world probably stems from their inability to replicate in the absence of a helper virus, i.e., due to the lack of “autonomy”. However, it should be considered that dependence for replication on other entities, be it a host cell or a co-infecting virus, is a fundamental property of all viruses. Even for the most complex viruses known, such as mimiviruses or pandoraviruses, certain functions have to be supplied from outside. Thus, from a functional standpoint, it does not appear justified to consider satellite viruses as being lesser viruses.

Furthermore, Rule 3.35 is not applied consistently. For example, adenovirus-associated satellite viruses (AAVs) that depend on members of the families *Herpesviridae*, *Adenoviridae* or *Poxviridae* for replication have been assigned to the genus *Dependoparvovirus* included in the family *Parvoviridae*, whereas satellite hepatitis delta virus (HDV) which uses hepatitis B virus (family *Hepadnaviridae*) as a helper, is classified as a member of the genus *Deltavirus*. Notably, although HDV uses the envelope proteins of the helper virus, it also encodes two proteins, S-HDAg and L-HDAg, which form a ribonucleocapsid, thereby adhering to the definition of a satellite virus. By contrast, none of the remaining satellite viruses, some of which are considerably more complex than AAVs and HDV, have undergone proper taxonomic classification. For example, as of the latest, Ninth Report of the ICTV [8], the Sputnik virophage, a satellite virus associated with giant viruses of the *Mimiviridae* family, has a complex  $T=27$  virion and 18 kb dsDNA genome that encodes structural and DNA replication proteins [2], but is nevertheless labelled a sub-viral agent.

Similarly, whereas satellite nucleic acids are not classified by the ICTV, viroids which are non-encapsidated parasitic ssRNA molecules, undergo proper classification.

In our opinion, such separation of satellites from the rest of the viral world is unsubstantiated

and should be rectified. More generally, we fail to see the need for a rule specifying what kinds of infectious agents should not be classified. Accordingly, we propose to abolish ICVCN Rule 3.35 to allow classification of these, and other, virus-related agents.

Proper classification of satellites would not only pay justice to this interesting group of entities, but would also improve the consistency of virus classification.

MODULE 10: **APPENDIX**: supporting material

additional material in support of this proposal

**References:**

1. King AMQ, Adams MJ, Carstens EB, Lefkowitz EJ (2011) Virus Taxonomy. Ninth Report of the International Committee on Taxonomy of Viruses. Elsevier Academic, London
2. La Scola B, Desnues C, Pagnier I, Robert C, Barrassi L, Fournous G, Merchat M, Suzan-Monti M, Forterre P, Koonin E, Raoult D (2008) The virophage as a unique parasite of the giant mimivirus. Nature 455:100-104