

Virus Taxonomy 1996 – A Bulletin from the Xth International Congress of Virology in Jerusalem

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Dual Anniversary

The Xth International Congress of Virology (ICV), held in Jerusalem from 11th–16th August 1996, was the occasion of a dual anniversary for virus taxonomy. Thirty years ago at the International Congress of Microbiology in Moscow in 1966 an International Committee on Nomenclature of Viruses (ICNV) was established in order to introduce some degree of order and consistency into the naming of viruses. Seven years later the ICNV became the International Committee on Virus Taxonomy (the ICTV), which assumed the broader aim of developing a system of virus classification and nomenclature that would become a universally accepted taxonomy of viruses. Since then the ICTV has developed into an organisation comprising an executive committee of 4 officers, 14 members, six sub-committees supervising the activities of 45 study groups involving over 400 participating virologists.

Over the years the ICTV has issued a series of six reports; progressing from the first which took the form of a 65 page mini-catalogue of viruses arranged according to a tentative taxonomy, to the most recent, a 586 page volume listing almost 4,000 recognised virus species in the context of a now universally accepted taxonomy. The 6th Report, published by Springer-Verlag in mid-1995 under the title “Virus Taxonomy”, is a comprehensive account of the taxonomy of viruses at its present stage of development. In addition, “Virus Taxonomy” provides a well-illustrated and authoritative account of current understanding of the nature of viruses which can be used for both reference purposes and as an instruction manual.

The Xth ICV in Jerusalem was also the occasion of the 10th Plenary Meeting of the full ICTV membership (executive committee, plus national and life members) and the 25th Meeting of the Executive Committee of the ICTV; this bulletin is presented as a summary of the proceedings of these meetings. This dual anniversary was an occasion to take stock of the current status and health of virus taxonomy. Publication of the 6th Report represents a significant event in virus taxonomy. The extended format of the 6th Report will facilitate more rapid revision and dissemination of taxonomic decisions, and facilitate restoration of the original intention of producing reports at three yearly intervals in synchrony with the ICVs. In Jerusalem the Executive Committee resolved to begin

preparation of a Seventh Report which should be available for distribution at the next International Congress of Virology to be held from 9th to 14th August 1999 in Sydney, Australia. It is envisaged that beyond that point there will be rapid transition to up-dating of the ICTV reports by electronic means as quickly as development of the ICTVdB project will allow. Earlier this year a detailed description of the ICTVdB project and an up-date on progress, prepared by Cornelia Buchen-Osmond and Mike Dallwitz, appeared in the *Virology Division News* and that report should be consulted for further information [Arch Virol (1996) 141: 392–399].

A New President for the ICTV

Successive Presidents of the ICTV have made their own particular contributions and the Presidency of Fred Murphy has been marked by a dramatic expansion of the scope of the activities of the ICTV, culminating in publication of the radically revised 6th Report. The Presidency for the next term now passes from Fred Murphy, Dean of the School of Veterinary Medicine at the University of California, Davis, to Marc H. V. van Regenmortel of the Institut de Biologie Moleculaire et Cellulaire, Strasbourg. Marc van Regenmortel is no stranger to virus taxonomy, and among other things is responsible for the current definition of the virus species – see “The concept of virus species” by van Regenmortel, Maniloff and Calisher [Arch Virol (1991) 120: 313–314].

At the ICTV meetings in Jerusalem warm tributes were paid to Fred Murphy and he will remain associated with the ICTV as one of five newly elected Life Members. The four others elected to Life Membership of the ICTV in recognition of their contributions to virus taxonomy are; Hans-Wolfgang Ackermann (Quebec), a retiring committee member honoured for his contribution to the development of phage taxonomy, Jordi Casals (New York) for his work in establishing a scientific base for arbovirus taxonomy, Adrian Gibbs (Canberra) for his formative influence over the whole field of virus taxonomy, and Bryan Harrison (Invergowrie) for his many contributions to plant virus taxonomy.

Other changes in membership of the Executive Committee are the appointment of Mary K. Estes (Houston) to serve as Chair of the Vertebrate Virus Sub-committee in succession to R. W. Compans (Atlanta), and the election of D. J. Bamford (Helsinki), S. M. Lemon (Chapel Hill), D. J. McGeoch (Glasgow) and Colin Ward (Melbourne) as committee members in place of H.-W. Ackermann, L. Berthiaume (Montreal), C. H. Calisher (Fort Collins) and R. Goldbach (Wageningen).

Ratification of Taxonomic Proposals from the ICTV Study Groups

Bacterial Viruses

A concerted effort has been initiated by the Bacterial Virus Sub-committee to bring the taxonomy of bacterial viruses, beginning with the tailed phages, into line with that of other viruses, and this will be considered in detail in a future article in *Virology Division News*. The following proposals were formally approved in Jerusalem:

- To establish a new species, *Listeria* phage A511, in the family *Myoviridae*.

- To establish 7 new species of phages of *Acinetobacter*:
 - *Acinetobacter* phage species A3/2, E14, BS46 and A10/45 in the family *Myoviridae*;
 - *Acinetobacter* phage species E13 and 531 in the family *Siphoviridae*;
 - *Acinetobacter* phage species A36 in the family *Podoviridae*.
- To establish 9 new species of phages of *Bacillus*:
 - *Bacillus* phage species Bace-11, CP-54, and SPy-3 in the family *Myoviridae*;
 - *Bacillus* phage species B1715V1, TP-15, Tb10 and SN45 in the family *Siphoviridae*;
 - *Bacillus* phage species BA1 in the family *Podoviridae*.
- To establish 3 new species of phages of *Staphylococcus*:
 - *Staphylococcus* phage species 392, 1139 and 1154A.
- To establish 4 new genera in the family *Myoviridae*:
 - Genus: P1-like phages
 - Genus: P2-like phages
 - Genus: Mu-like phages
 - Genus: SPO1-like phages
- To establish 4 new genera in the family *Siphoviridae*:
 - Genus: T5-like phages
 - Genus: T1-like phages
 - Genus: c2-like phages
 - Genus: L5-like phages
- To establish 2 new genera in the family *Podoviridae*:
 - Genus: 29-like phages
 - Genus: P22-like phages

Plant Viruses

The following taxonomic proposals from the Plant Virus Sub-committee, affecting the families *Potyviridae* and *Tombusviridae*, were approved:

- Family *Potyviridae*:
 - To designate the former bean common mosaic virus serotype A (BCMV-A) as a distinct species;
 - To name the species typified by BCMV-A as bean common mosaic necrosis virus (acronym BCMNV);
 - To designate isolates of BCMV previously collectively known as serotype B as a distinct species;
 - To name the species typified by BCMV-B as bean common mosaic virus (acronym BCMV).
- Family *Tombusviridae*:
 - To include the genera *Dianthovirus*, *Necrovirus* and *Machlomovirus* in the family *Tombusviridae*;
 - To upgrade to family status the genus *Closterovirus* by establishing a new family;
 - To name the new family *Closteroviridae*;

- To establish the genus *Closterovirus*;
- To designate beet yellows virus as the type species of the genus *Closterovirus*;
- To establish an as yet unnamed genus in the family *Closteroviridae* typified by lettuce infectious yellows virus (LIYV); and to designate LIYV as the type species of this genus.

Invertebrate Viruses

The following taxonomic proposals from the Invertebrate Virus Sub-committee, affecting the families *Iridoviridae*, *Baculoviridae* and *Nodaviridae*, were approved:

- Family *Iridoviridae*:
 - That the current genus “Goldfish virus-like” be removed from the current classification and that Goldfish virus 1 be classified as an unassigned virus.
- Family *Baculoviridae*:
 - That the type species for the genus *Granulovirus* be designated as *Cydia pomonella granulovirus* (CpGV);
 - That the shrimp baculovirus, *Penaeus monodon nucleopolyhedrovirus* (PemoNPV), be added to the list of Tentative Species in the genus *Nucleopolyhedrovirus*.
- Family *Nodaviridae*:
 - That a new genus be created to accommodate the nodaviruses isolated from fish. (The creation of this genus was approved, but the name proposed was rejected and the matter referred back to the Study Group).
- That the following viruses be assigned to this new genus:
 - striped jack nervous necrosis virus (SJNNV),
 - tiger puffer nervous necrosis virus (TPNNV),
 - barfin flounder nervous necrosis virus (BFNNV),
 - Japanese flounder nervous necrosis virus (JFNNV),
 - redspotted grouper nervous necrosis virus (RGNNV),
 - *Dicentrarchus labrax* encephalitis virus (DIEV),
 - *Lates calcarifer* encephalitis virus (LcEV).
- That striped jack nervous necrosis virus be designated the type species for this new genus.

Vertebrate Viruses

The following taxonomic proposals from the Vertebrate Virus Sub-committee, affecting the families *Arteriviridae*, *Bornaviridae*, *Caliciviridae*, *Coronaviridae*, *Paramyxoviridae*, *Picornaviridae* and *Orthomyxoviridae* were approved, and the proposals affecting the families *Flaviviridae* and *Reoviridae* are in process of approval by postal ballot. The proposals relating to the families *Bornaviridae*, *Arteriviridae* and *Coronaviridae* are significant developments in virus taxonomy, since they mark the consolidation of the order *Mononegavirales* [see Arch Virol (1991) 117: 137–140], and the creation of a second order in virus taxonomy, the order *Nidovirales*.

- Family *Bornaviridae*
 - To establish a new family within the order *Mononegavirales*;

- To name this family, the family *Bornaviridae*;
- To establish a genus within the family;
- To name this genus, the genus *Bornavirus*;
- To designate Borna disease virus (BDV) as the type species of the genus *Bornavirus*.

- Family *Caliciviridae*:
 - that European brown hare virus be designated a new species within the genus *Calicivirus*.

- Family *Coronaviridae*:
 - To redefine the *Coronaviridae* to comprise the genera *Coronavirus* and *Torovirus*, and to create a new free-standing genus as the genus *Arterivirus*.

- Family *Arteriviridae*:
 - To reclassify the free-standing genus *Arterivirus* as an independent family containing a single genus *Arterivirus*;
 - To name the new family, the family *Arteriviridae*.

- Order *Nidovirales*:
 - To create an order to comprise the families *Arteriviridae* and *Coronaviridae*;
 - To name the order, the order *Nidovirales*.

- Family *Paramyxoviridae*:
 - To name the genus which contains Newcastle disease virus, several avian paramyxoviruses, mumps virus, SV5, La-Piedad-Michoacan-Mexico virus, and human parainfluenza virus types 2, 4A and 4B, as the genus *Rubulavirus*.
 - To designate Mumps virus as the type species of the genus *Rubulavirus*.
 - To establish a new genus within the sub-family *Pneumovirinae* of the family *Paramyxoviridae*. (The Executive Committee did not approve the genus name suggested by the Study Group, and the matter was referred back);
 - To designate turkey rhinotracheitis virus (TRTV) as the type species of this genus.

- Family *Picornaviridae*:
 - To establish a new genus to comprise human echovirus type 22 and human echovirus type 23. (The Executive Committee did not approve the genus name suggested by the Study Group, and the matter was referred back);
 - To transfer Vilyuisk human encephalomyelitis virus (VHEV) to the genus *Cardiovirus*.

- Family *Orthomyxoviridae*:
 - To designate Thogotovirus as the type species of a new genus;
 - To name this genus *Thogotovirus*;
 - To split the existing genus “influenza A, B virus” into two separate genera;
 - To designate the influenza A virus genus as *Influenzavirus A*;
 - To designate the influenza B virus genus as *Influenzavirus B*;
 - To designate the influenza C virus genus as *Influenzavirus C*.

- Family *Flaviviridae*:
 - To name the genus comprising the hepatitis C-like viruses as the genus *Hepacivirus*.

- Family *Reoviridae*:
 - To designate serotypes 13 and 14 as new species in the genus *Cypovirus*;
 - To designate Wongorr virus as a distinct species in the genus *Orbivirus*.

Miscellaneous Topics

Minor amendments were made to the Statutes of the ICTV to bring sub-viral agents and prions within the remit of the ICTV. The Rules for Virus Classification and Nomenclature have been thoroughly overhauled and given the status of a Code to conform with the practice adopted for other organisms. (A commentary on the Code will be published in a future issue of *Virology Division News*).

An ICTV World Wide Web home page is now in existence and has been transferred to the NCBI server for easier access, and eventually it will have hypertext links to other virology sites. The address is: <http://www.ncbi.nlm.nih.gov/ICTV/>. The ICTV WWW site is currently a repository of information on virus taxonomy, and includes the Index Virum – a collection of index files linking to lists containing all the virus family, genus and species names included in the 6th Report. Rapid expansion of the site is anticipated by the time of the next Congress.

Currently 32 national societies have nominated representatives to the ICTV, an increase of 6 since the last Congress, but more than 20 countries with microbiological societies recognised by the IUMS are still not represented. The Executive Committee invites the officers of societies in countries not yet represented to nominate a national member to the ICTV. There is no formal procedure, a letter to the Secretary is sufficient.

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