

Report from the 40th meeting of the Executive Committee of the International Committee of Taxonomy of Viruses

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Received: 8 May 2009 / Accepted: 5 July 2009 / Published online: 19 July 2009
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Abstract The Executive Committee (EC) of the International Committee on Taxonomy of Viruses (ICTV) held its 40th meeting at the Istanbul Convention and Exhibition Centre in Istanbul, Turkey, from August 7 to 9, 2008. This was just prior to the XIV International Congress of Virology (ICV), part of the joint meeting organized by the International Union of Microbiological Societies (IUMS), also in Istanbul, Turkey, from August 11 to 15, 2008. Most of the EC meeting was concerned with the discussion of taxonomic proposals. This communication reports the principal items of business discussed at the meeting.

Taxonomic proposals from EC39

As published separately [1], for the first time, taxonomic proposals approved at the EC39 meeting and awaiting ratification were sent to members of ICTV via e-mail with a request to vote by return e-mail within 1 month. Members of ICTV include Life Members, the various Subcommittee Members, and National Representatives. The response rate to this request was about 37%, and all proposals were accepted. ICTV continues to work to improve the lines of communication with its members, especially with the National Representatives, to improve this response rate. It is anticipated that future ratification votes will be carried out by e-mail.

ICTVon-line

The ICTV Database (ICTVdb) SC is primarily responsible for developing and maintaining a database of virus isolates (see “[ICTVdatabase](#)” below) but has taken on the additional task of developing the official ICTV web site. The ICTVdb Subcommittee (SC) presented information about the new ICTV official web site <http://www.ictvonline.org>, where information about current virus taxonomy can be obtained. There are also links to the ICTV database pages, news and information, a directory of ICTV committee members, and all taxonomic proposals. A second ICTV discussion site has also been implemented at <http://talk.ictvonline.org/>, where detailed information about ICTV and the submission of taxonomic proposals is provided. This forum provides an opportunity for users to discuss and comment on any ICTV issue. Registration is free. Viewers are encouraged to click on “Join” in the upper right-hand window and follow the instructions. All virologists are particularly encouraged to read and comment on new taxonomic proposals as they appear on-line.

ICTV has also prepared a template module for taxonomic proposals and a help file, both of which are available at <http://talk.ictvonline.org/>. This module is designed to assist Study Groups (SGs) to prepare and submit to Subcommittee (SC) chairs taxonomic proposals in a consistent and complete format. At EC40, it was strongly resolved that SC chairs need to ensure that new submissions conform to an acceptable standard before they can be presented to the EC for discussion or posted on-line. SC chairs must be aware of the International Code of Virus Classification and Nomenclature and ensure that these rules of classification and nomenclature are followed. This is essential if the increasing numbers of new submissions are to receive proper scientific scrutiny within the time available for EC

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meetings. The code document is available on-line at http://ictvonline.org/codeOfVirusClassification_2002.asp.

Subcommittee reports and taxonomic proposals

Once taxonomic proposals are submitted, usually by the SC chairs, it becomes a monumental task to follow their development as they are presented to and discussed by the EC. ICTV is committed to making all taxonomic proposals available for public review and strongly encourages comments from the wider virology community. Overseeing this process is the major responsibility of the Proposals Secretary, who has developed a new file reference numbering system as described in the general taxonomic proposal 2008.006G.U and presented on ICTVonline. In summary, proposals will be dated according to the year in which they first appear on the EC meeting agenda. Each proposal will have a numeric code followed by a single letter indicating the specific subcommittee which has made the proposal (V—Vertebrate Virus SC; I—Invertebrate Virus SC; P—Plant Virus SC; B—Prokaryote Virus SC; F—Fungal Virus SC; G—General). The current 01–05 levels are being phased out and are being replaced by two kinds of file extension: N, U, R or A, indicating “new”, “under consideration”, “rejected” and “formally approved”, respectively; and v1, v2, v3, etc., indicating the version number for each proposal. All proposals will be posted on-line for review (rejected proposals will be deleted from ICTVonline). If a proposal does not have an extension, it will mean that the review and ratification process has been completed successfully and the proposed taxonomy is officially accepted.

At EC40, there were a total of 20 proposals presented from the Vertebrate Virus Subcommittee SC, six proposals from the Invertebrate Virus SC, 54 proposals from the Prokaryote Virus SC, 37 proposals from the Plant Virus SC and three proposals from the Fungal Virus SC. There were also five general proposals. All of these proposals have been posted on-line and can be reviewed on the ICTVonline web site. For some of the proposals put forward by some subcommittees, there was a lot of discussion, so additional comments are presented here.

Prokaryote virus SC

The EC recognized that this subcommittee has done a great deal of work in updating the taxonomy of this group of viruses but thought that there was still room for improvement by way of avoiding unconventional terminology and adopting the correct format for virus nomenclature as prescribed by the International Code of Virus Classification and Nomenclature. In addition, the EC recommended

specifying more clearly the species demarcation criteria used and providing references to published data to support some of the details of the proposals. There was also agreement that the removal of the current illegal terminology of genus names using “-like viruses” must be done as soon as possible, once the reorganization of the order *Caudovirales* is completed.

Plant virus SC

The proposal to classify the beta satellites of geminiviruses was discussed at length. The EC encourages further examination of the status of these satellites and the associated begomoviruses, since the submitted proposal suggested that the satellites could be considered a part of the genome of the naturally circulating viruses. The EC questioned whether it was possible to decrease the number of begomovirus species by broadening the demarcation criteria (to include more than sequence relatedness), and whether this might rationalize the position of the current beta satellites as genome components. The EC thought that perhaps they were being asked to confer species status on variants of a gene and questioned what practical purpose would be served by giving names to these molecules.

General taxonomic proposals

There was extensive discussion of general proposals to generally modify the definition of virus species and to remove the necessity of having a named virus for every virus species. These continue to be topics of discussion for ICTV both on-line and in the literature with, in most cases, a limited number of discussants. The EC decided to post the proposals on-line and review the comments at EC41.

The general proposal to create a new order called *Retrovirales* to include all viruses using a reverse transcriptase was noted to require input from three different SCs (Vertebrate, Plant and Fungal Virus SCs) through several different SGs that deal with the *Retroviridae*, *Hepadnaviridae*, *Caulimoviridae*, *Pseudoviridae* and *Metaviridae*. Formation of a new SG was initiated to look at the proposal and to report back at EC41 through the Fungal Virus SC.

ICTVdatabase

The ICTV database (<http://www.ictvdb.org>) continues to evolve as a comprehensive on-line resource for taxonomic and biological data on viruses. It provides descriptive information for viral species and has also been designed to store detailed information on the properties of individual virus isolates. The database has been based on the DELTA specification (DEscription Language for TAXonomy) for

storing and providing information on biological taxa. At its core, DELTA utilizes lists of information (text files) to specify taxa and their defining characteristics. DELTA has been engineered to uniquely suit the needs of the worldwide taxonomic community, but the software used to search and process files stored in the DELTA format is no longer being developed. In addition, updates to the ICTV database currently require a highly trained curator with an in-depth knowledge of DELTA, which makes the ICTV database difficult to maintain. Publishing the ICTV database is a time-consuming process that requires the use of specialized programs, scripts and hand editing. Further, it has been a general complaint that the user interface for searching the ICTVdb is too complex. Therefore, a project was begun to modernize the ICTV database and move it from the file-based DELTA system to a modern relational database. This project consists of four phases:

1. Database construction and migration of the existing data set.
2. Development of a web-based application for database queries and information display.
3. Development of web-based tools for data submission and curation.
4. Review and revision of all species description records to correct errors and provide up-to-date information

Phases 1 and 2 are essentially complete, and phase 3 is nearing completion. Phase 4 is underway and is expected to be a continuous process of information review. Dr. Charlie Calisher manages this review of species information, and each ICTV SG chair is responsible for checking the species descriptions covered by their particular SG and reviewing those descriptions for accuracy and updating them as necessary.

The new ICTV database consists of a completely redesigned architecture where the DELTA files have been translated to their equivalents in a relational database schema. To facilitate user interaction, a multi-tiered web application has been developed that, when implemented, will process user queries entered on the ICTV database web pages, read the relational database containing ICTV database data to obtain the results of the user queries, and then create a customized web page that will provide back to the user the information of interest.

The new ICTV database relational database schema was designed to preserve many of the features of the DELTA format, including natural language translation that provides human-readable records for display on the ICTV database web site. The database organizes the data into a form that is maintainable, searchable and easily expandable. Programs were written to translate the original DELTA data files into a format that could be imported into the relational database.

Care was taken to preserve all data and the logical associations between data.

The new ICTV database and web interface is expected to replace the old DELTA-based system in 2009. The new data submission and curation tools are currently being tested and should be available for use sometime in the summer of 2009.

Dr. Charlie Calisher (Colorado State University) has assumed the role of lead curator of the database information. He is coordinating the distribution and editing of existing species description files and the creation of descriptions of newly defined species by ICTV SG chairs. He reviews all updated files and then coordinates their import into the system by the database technical personnel.

ICTV statute change

As ICTV continues to search for ways to financially support its activities, the possibility of generating a small revenue stream from on-line sources was discussed. In order to allow this, an amendment to the statutes was made, subject to approval by the IUMS Virology Division. Article 10.3 of the ICTV Statutes currently states that: "No publication of the ICTV shall bear any indication of sponsorship by a commercial agency, or institution connected in any way with a commercial company, except as an acceptable acknowledgement of financial assistance." This was changed to: "No publication of the ICTV shall bear any indication of sponsorship by a commercial agency, or institution connected in any way with a commercial company, except as an acceptable acknowledgement of financial assistance, unless approved by the Executive Committee on a case-by-case basis." This amendment was subsequently accepted by Virology Division and then by the ICTV membership at the Plenary Session of ICTV held during the ICV meeting in Istanbul.

Publication of the 9th ICTV report

A representative from Elsevier, a publisher of science and health information, presented a general proposal for updating the ICTV 8th report and publishing it on-line. They also indicated an interest in publishing the 9th ICTV report on-line. In their view, everything is moving on-line, and viewers do not distinguish between different content sources now, but are mostly concerned with accessibility. By publishing on-line, the content can be much more dynamic, links can be made to other databases, such as ICTVdb, NCBI, and PubMed, and updating can be done much more easily and more frequently to coincide with EC meetings and ratification votes on new taxonomic

proposals. The EC recognized that publishing the 8th report on-line would only make sense if the content were updated from the published book version. Given that the SG Chairs are largely responsible for writing the family descriptions, there was some concern that authors may not want to write two versions of their chapters—one an edited version of the 8th report content, and a second completely new chapter for the 9th report. There was also discussion about the value of the master species list prepared by ICTV, which now includes the complete list of virus taxa but does not include the extra information that is available in the report. Elsevier will do a market survey to determine, for example, whether viewers would prefer only on-line access or also a printed form of the report, how viewers currently use the 8th report, what functionality viewers might want, and the pricing structure. The EC was concerned about the royalty structure and how an on-line version might contribute to the revenue stream to support ICTV activities. The EC also recognized that it is important for ICTV to maintain control of the material that is produced through the work of the SCs with their SGs and the continuing development of the ICTVdb. The EC expressed the view that these materials need to remain in the public domain, but under the control of ICTV by copyright protection. The EC suggested that a deadline of 2 months after the EC41 meeting would be required for receipt of revised chapters if the 9th report were to appear in 2010.

Dr. L. Andy Ball agreed to become Editor-in-Chief for the 9th report. He will initially be responsible for negotiating a new contract with a publisher. Suggestions for the Editorial Board members included the ICTV President (*ex officio*), M. J. Adams, U. Desselberger, A.-L. Haenni, A. M. Q. King, P. Krell, E. J. Lefkowitz, and C. H. Calisher.

Financial support for ICTV

Like many scientific organizations, ICTV functions through the work of many dedicated volunteers whose expertise in virology contributes to the role that ICTV plays in virus taxonomy and nomenclature. The major expenses of ICTV relate to supporting the EC meetings. EC

members are encouraged to find their own resources to attend these meetings, but travel and local expenses are covered if necessary. These activities are financed by grants from IUMS through its Virology Division and any royalties that accrue from the sale of the ICTV reports. In addition, the American Society of Virology (USA) and the Society of General Microbiology (UK) have been very generous in providing financial assistance for ICTV. ICTV gratefully acknowledges their continuing financial support.

Membership of the EC for 2008–2011

SC Chairs re-elected at EC40 were Mike J. Adams (Plant viruses), James Van Etten (Fungal viruses), and Elliot J. Lefkowitz (Virus database). SC Chairs elected at EC40 were Andrew Davison (Vertebrate viruses), Peter Krell (Invertebrate viruses) and Rob Lavigne (Prokaryote viruses). EC members elected by the ICTV membership at the Plenary Session of ICTV at the Istanbul ICV were: Eric B. Carstens (President); John MacKenzie (Vice-President); Andrew M. Q. King (Proposals Secretary); and Alexander Gorbalenya (2nd term) (Netherlands), Nick Knowles (United Kingdom), Keizo Nagasaki (Japan), David Pragishvili (France), H el ene Sanfacon (Canada), H. S. Savithri (India), Stuart Siddell (United Kingdom), and Curtis Suttle (2nd term) (Canada) (Elected members). Anne-Lise Haenni continues her 6-year term as Minutes Secretary.

Next EC Meeting

Alexander Gorbalenya agreed to host the next EC meeting (EC41) in Leiden, The Netherlands, in June 2009.

References

1. Carstens EB, Ball LA (2009) Ratification vote on taxonomic proposals to the International Committee on Taxonomy of Viruses. *Arch Virol* 154(7):1181–1188