PLANT SYSTEMATICS WORLD

Edited by Vicki Funk

PREPARING THE NEW *SHENZHEN CODE*

The Nomenclature Section (hereafter "Section") of the XIX International Botanical Congress met from 17 to 21 July 2017 in Shenzhen, China, to decide on proposals to amend the *International Code of Nomenclature for algae, fungi, and plants*. Of the 397 published proposals to amend the *Melbourne Code* (McNeill & al. in Regnum Veg. 154. 2012), 113 were accepted, 103 were referred to the Editorial Committee, and 7 new proposals were accepted from the floor of the Section. A detailed report of the Section's work was published on 14 August 2017, 16 days after the closing ceremony of the Congress (Turland & al. in Taxon 66: 1234–1245. 2017). The full, day-to-day proceedings of the Section will form a separate publication, planned to appear in late 2018 or 2019. The audio recordings of the Section have already been transcribed by Pacific Transcription (Indooroopilly, Australia), co-ordinated by Editorial Committee member Anna M. Monro and financially supported by the IAPT. The transcription will be edited into the usual indirect speech format of previous Section reports (see, e.g., Flann & al. in PhytoKeys 45: 1–341. 2015; and 41: 1–289. 2014).

The decisions made in Shenzhen will result in the new *Shenzhen Code*, which is planned for publication in mid-2018. The amended provisions of the new *Code* became effective on 29 July 2017, upon acceptance of a resolution at the closing plenary session of the Shenzhen Congress that the decisions and appointments of the Section be approved. This is not as alarming as it may sound! There are three new rules that will impact valid publication of algal and fungal names, legitimacy of fungal names, and effectiveness of typifications of fungal names, but these will not take effect until 1 January 2019 (see Turland & al. in Taxon 66: 1238. 2017).

The Section not only voted on proposals but also appointed a new Editorial Committee charged with preparing the *Shenzhen Code.* The members are persons who were present at the Section, including the Rapporteur-général and Vice-Rapporteur as the Chair and Secretary, respectively. The size of the Committee was increased from the previous 14 members to 16 members to ensure representation from each continent, to ensure expertise in the main groups of organisms (vascular plants, bryophytes, fungi, algae) as well as in fossils, and to improve, if not actually achieve, gender balance (there are now three women on the Committee, compared with one previously). The 16 members are as follows: Fred R. Barrie, Werner Greuter, David L. Hawksworth, Patrick S. Herendeen, Sandra Knapp, Wolf-Henning Kusber, De-Zhu Li, Karol Marhold, Tom W. May, John McNeill, Anna M. Monro, Jefferson Prado, Michelle J. Price, Gideon F. Smith, Nicholas J. Turland (Chair), and John H. Wiersema (Secretary).

The Editorial Committee has a mandate to deal with matters specifically referred to it, to incorporate into the new *Code* the changes agreed by the Section, to clarify any ambiguous wording so long as the meaning is not changed, to ensure consistency and optimal placement of provisions while retaining the present numbering insofar as possible, and to add (or remove) Examples to best illustrate the provisions.

The Committee convened on 11–15 December 2017 at the Botanischer Garten und Botanisches Museum Berlin, Germany, for five days of hard work. We worked on the basis of a draft of the text of the main body of the *Code*, prepared between August and October 2017 by eight members of the Committee, who carefully incorporated the changes decided in Shenzhen. This draft was distributed to the Committee by e-mail in advance of the meeting, in mid-October, and had already been updated according to comments received from members.

The first day of the meeting, Monday, was not without its frustrations, as many of us were still jet-lagged, and we became severely mired in "wordsmithing" the amended rules on replacement names in Article 6. Fortunately, the jet-lag evaporated overnight and on Tuesday we were able to overcome the hurdle of Art. 6 and move on. Over the following four days we stayed on-schedule and were able to complete our very full agenda by the end of business on Friday afternoon. We scrutinized the whole *Code*, reviewing existing wording as well as the changes made in Shenzhen and the Examples referred to us, and finding new Examples where necessary.

One of our more intricate tasks was deciding how exactly to implement the new Chapter that brings together the provisions of the *Code* that deal solely with names of organisms treated as fungi.

The Editorial Committee at work.

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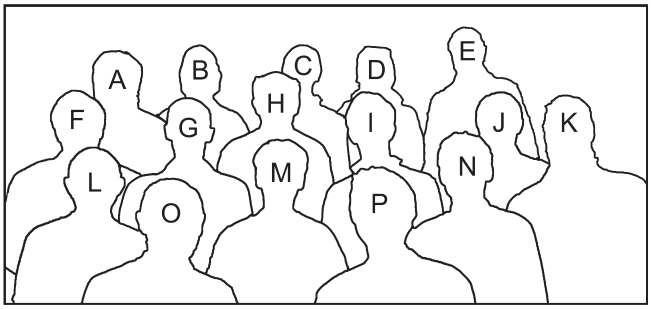

Editorial Committee: **A,** Fred R. Barrie; **B,** Anna M. Monro; **C,** Sandra Knapp; **D,** Michelle J. Price; **E,** Werner Greuter; **F,** John McNeill; **G,** Gideon F. Smith; **H,** David L. Hawksworth; **I,** Patrick S. Herendeen; **J,** Karol Marhold; **K,** Tom W. May; **L,** Jefferson Prado; **M,** Wolf-Henning Kusber; **N,** De-Zhu Li; **O,** John H. Wiersema (Secretary); **P,** Nicholas J. Turland (Chair).

This is now Chapter F, where the "F", of course, stands for fungi. It follows Art. 62 and precedes Chapter H, the former Appendix I on hybrid names. There then follows the new and expanded Division III, on governance of the *Code*, and finally the Glossary. In response to a proposal referred to the Editorial Committee, we also restructured Art. 60 on orthography, arranging the Articles more logically and converting the two "back-door rules" (Articles that make Recommendations mandatory) into normal rules.

Moving the fungal provisions of the *Code* to Chapter F means that Articles 15 and 59 are now empty. Rather than re-number the entire *Code* from Art. 16 onwards, we retained the empty Articles with cross-references to Chapter F. Moving App. I to Chapter H requires re-numbering the other Appendices. We minimized this by moving App. VI, on suppressed works, to become App. I and re-numbering App. VII and VII, on binding decisions, as App. VI and VII, respectively.

It was an intense but highly productive week, pleasantly satisfying to achieve so much, and this was no doubt helped by our being sequestered from our usual, hectic working environments.

Following the meeting, a revised draft of the *Code* was sent to the Committee members on 13 January for checking and further editing. A further month of scrutiny followed, with members sending copious comments to the Rapporteur, who updated the draft and distributed a nearly final version to the Committee on 20 February. After proofreading, by 31 March, this version will be sent to Franz Stadler, the Production Editor of *Regnum Vegetabile*, who will do the final formatting and page layout. The *Shenzhen Code* is expected to appear in late June or early July 2018, with more or less simultaneous print publication by Koeltz Botanical Books and online publication on the IAPT website.

On behalf of the Editorial Committee, I would like thank the council and officers of IAPT, including its successive Presidents, Vicki Funk and Patrick Herendeen, Secretary-General Karol Marhold, and Managing Secretary Eva Senková for maintaining IAPT's traditional commitment to nomenclature by funding the Editorial Committee meeting in Berlin. We also thank Thomas Borsch, Director of the Botanischer Garten und Botanisches Museum Berlin, Freie Universität Berlin, for generously hosting the meeting.

Keywords *Code*; *International Code for Nomenclature of algae, fungi, and plants*; *ICN*; Shenzhen; Editorial Committee

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■ THE LARGEST DIGITAL HERBARIUM IN RUSSIA IS NOW AVAILABLE ONLINE!

The Moscow University Herbarium (MW) is the second-largest herbarium in Russia after the Komarov Institute (LE) in St. Petersburg. As of January 2018, it holds 1,030,669 specimens of vascular plants and bryophytes. We recently employed new technical staff to facilitate further growth of herbarium. As a result, we added 22,013 specimens in 2016 and 19,416 specimens in 2017 creating the most actively growing herbarium in the post-Soviet countries. In 2017 we incorporated 5.5K new accessions from Eastern Europe, 3.2K from Asian Russia, 2.5K from Middle Asia, 1.6K from Caucasus, 0.9K from South Asia, 0.8K from Africa, 0.7K from Western Europe, 0.7K from the Crimea, etc. These figures include both the results of our current field activities and the processing of the herbarium backlog. Moscow University is now acting more as an international institution in the field of systematic botany with sixteen new species of flowering plants described in 2016 by the staff members. These new species were from all over the world (but 0 from Russia!).

Digitisation

In late 2014, we had received funds for the digitisation of the herbarium (MW) as part of the *National Depository Bank of Live Systems Initiative* launched by Moscow University. Having a stable budget for four years, we decided to scan all specimens at 300 dpi in 2015–2018, to digitise 4.8K type specimens at 600 dpi, to scan 77K labels from bryophyte envelopes, and finally to database and georeference label data from as many specimens as possible until the funds were exhausted (Seregin, 2016). As of January 2018, 910,816 sheets from MW have been imaged by a commercial partner. These represent 89% of our collections. We did not scan those from Western Europe and Australia which largely represent well studied floras or are duplicates from large digitised herbaria. Unfortunately, because of economic reasons (scanning of fragile unmounted specimens is 20 times more expensive) we left unimaged the important historical collections by G.F. Hoffmann, J.F. Ehrhart, C.B. Trinius, I. and G. Forster and the small *Herbarium Linnaeanum* (Balandin & al., 2001).

Online access

Our goal was to facilitate free full online access to all imaged specimens from the Moscow University Herbarium. In August 2016, we introduced a trial access to a new web-portal named *Moscow Digital Herbarium* (https://plant.depo.msu.ru/). As far as we can tell, it is the seventh-largest imaged herbarium in the world fully available on the web after Paris (P; https://science.mnhn.fr/institution/mnhn/collection/p/item/search/form) – 5.4M, Leiden (L; http://bioportal.naturalis.nl/) – 4.6M, New York (NY; http://sweetgum.nybg.org/science/vh/) – 1.7M, Beijing (PE; http://pe.ibcas.ac.cn/en/) – 1.7M, Washington, D.C. (US; https://collections.nmnh.si.edu/search/botany/) – 1.5M and Mexico City (MEXU; https://datosabiertos.unam.mx/) – 1.2M. Meise [BR] also has a large digitised collection, but we have not been able to find it published online.

Digitised specimens from MW herbarium are fully available through four different web-addresses. Each point of access has a number of tools and services for effective interaction between a researcher and the content (Fig. 1).

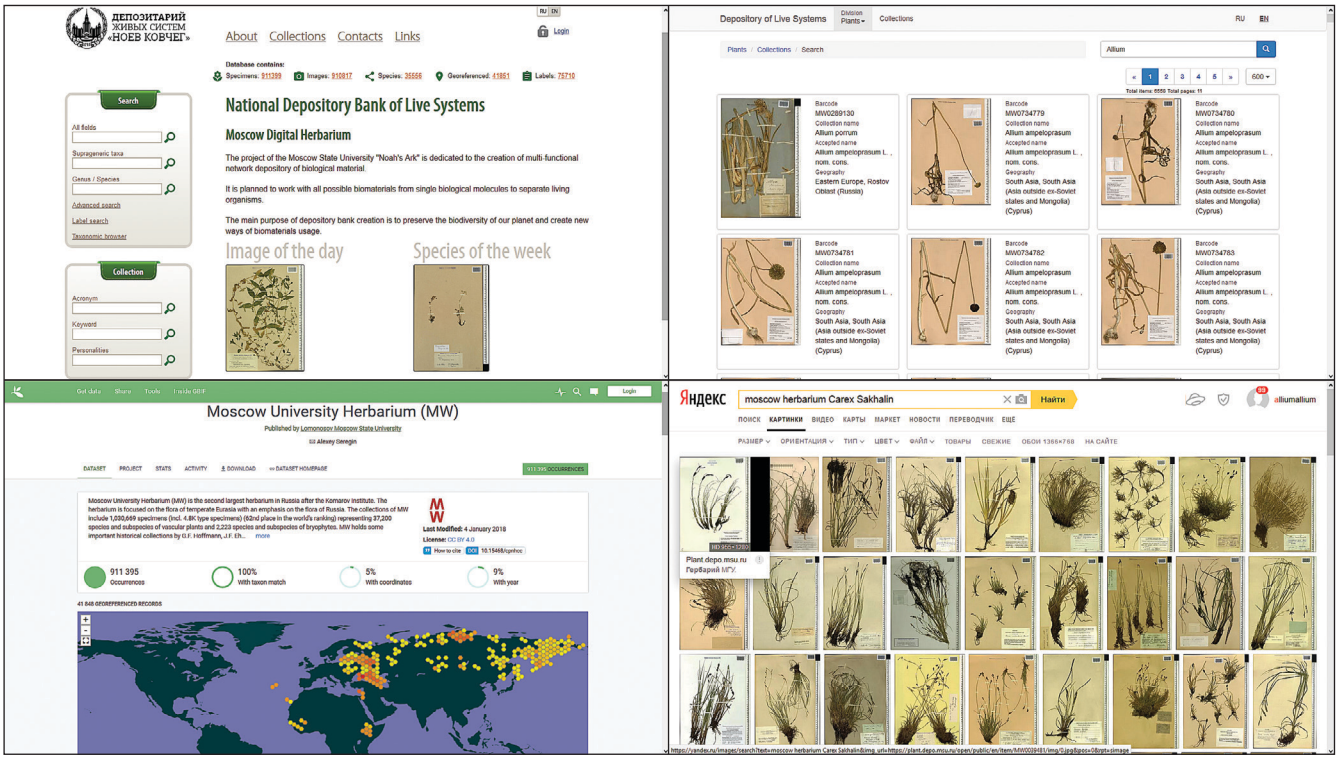

Fig. 1. Four services used for publication of Moscow Digital Herbarium images. **Top left,** Homepage of the operational version; **Top right,** Search results in open version; **Bottom left,** MW dataset in Global Biodiversity Information Facility; **Bottom right,** OCR search results in Yandex.Images.

(1) *Moscow Digital Herbarium (https://plant.depo.msu.ru/).* – This is an operational version with a number of search tools like label search, geosearch, search on taxonomic tree, search by Latin and vernacular names, etc. Data administrators at MW are managing the content and editing the data. IT staff are incorporating new large datasets like labels, georeferences, taxonomic treatments, etc. The content of the portal is hidden from search robots, but users can download XLSX-files with general metadata. One can see basic statistics of the Moscow Digital Herbarium right on the homepage.

(2) *Open version (https://plant.depo.msu.ru/open/).* – This portal is optimised for computers, tablets, and mobile platforms. The content is updated by MW once a day. The open version allows search robots to access the text and JPG images as well as quick simple searches through all fields of the database. The content is accessable 24/7 even if we are updating the system or content. One can see search results in the form of small icons and search criteria could be saved as a unique URL.

(3) *Global Biodiversity Information Facility (https://www.gbif.org/dataset/902c8fe7-8f38-45b0-854e-c324fed36303).* – Our data are fully available in GBIF without any limitations (Seregin, 2017). Since 2 November 2017 we have been updating the GBIF-mirror once a week. Loading the data into GBIF helps us check data consistency and find mistakes like coordinate swapping, inaccurate georeferencing, errors in dates, etc. The GBIF portal is still the only place where one can see our geodata on a map. However, the real advantage of GBIF is that it delivers our information to a wider community. As of January 2018, the Moscow University Herbarium is the largest Russian data GBIF donor holding 68% of records from the Russian institutions and 22% of all records from Russia.

(4) *Yandex.Images (https://yandex.ru/images/).* – *Yandex* is the most popular web search engine in Russia with efficient web-service working with Cyrillic script. *Yandex* made a complete OCR of all images available in the Moscow University Herbarium. All printed symbols were used for detailed indexation of scans. We use this site if we need to quickly find some collections with labels that are not yet databased. Hopefully, we will make an internal semi-automatic OCR of our labels in near future for preliminary sorting of images before label capturing.

Data availability and geographical scope

Currently 828K specimens of flowering plants have been scanned on planetary scanners as TIFF-files at 300 dpi with a scale bar and 4.8K type specimens were scanned at 600 dpi with an additional standard colour checker. Labels of 77K specimens of mosses and liverworts were scanned as JPG-files without showing the plants themselves. Only JPG-images without any quality reduction are available online through the Moscow Digital Herbarium. Each image has at least four identifiers – a barcode (ID), a collection name, one of 60 herbarium geographical areas, and a country name. Each herbarium geographical area could be either a part of the larger country like Russia, Kazakhstan, Ukraine, etc. or it may cover several countries. Moscow Digital Herbarium covers mainly the former U.S.S.R. territory and some adjacent countries. Currently, we hold the largest imaged plant collections from Russia (634K), Ukraine (30K), Mongolia (27K), Georgia (17K with Abkhazia and South Ossetia), Azerbaijan (15K), Belarus (6K), Moldova (4K), Latvia (3K), Lithuania (1K), as well as from Middle Asian republics of Kazakhstan, Kyrgyzstan, Uzbekistan, Turkmenistan, and Tajikistan (99K all together). Also, the Moscow Digital Herbarium is the second-largest hub of scanned herbarium collections from Armenia (11K), Mali (1.2K), Cyprus (1K), North Korea (0.5K), and the third largest from Vietnam (4K). We are also among top-10 suppliers of imaged herbarium specimens from Ethiopia, Seychelles, Estonia, Afghanistan, Guinea, Turkey, Iran, Israel, and Xinjiang Province of China.

Label capturing and georeferencing

In August 2017, we began publishing label details captured from the scans. As of January 2018, labels of 75,710 specimens are completely databased. There are three main sources of text data for the label database—(1) commercial contract for capturing of 20K labels from the Crimea and 25K labels from the Caucasus; (2) datasets of Russian orchids (6K; Efimov, unpub.) and Taimyr plants

Table 1. The number of herbarium specimens with fully captured label in the Moscow Digital Herbarium by top-10 geographical areas (as of early 2018).

Geographical area	Number of captured labels
Crimea	20,268
Middle Russia (excluding Moscow area)	6,365
Central Siberia (mainly Taimyr)	6,026
Central part of Northern Caucasus	5,730
Krasnodar Krai & Adygeya	4,250
Azerbaijan	2,880
Black Sea Coast of Russian Caucasus	2,761
Armenia	2,347
Moscow area	2,281
Latvia	2,237

Table 2. The number of georeferenced specimens in the Moscow Digital Herbarium by top-10 geographical areas (as of early 2018).

	Number of georeferences		
Geographical Area	Total	Manual	Automatic
Crimea	12,824	6,777	6,047
Middle Russia (excluding Moscow area)	6,224	6,013	211
Central Siberia (mainly Taimyr)	5,949	5,949	0
Chukotka & Kamchatka	1,678	1,640	38
Krasnodar Krai & Adygeya	1,388	1,204	184
Central part of Northern Caucasus	1,355	1,008	347
Ethiopia	1,196	729	467
Rostov Oblast	1,186	1,186	0
Armenia	979	698	281
Cyprus	938	938	0

(5.9K; Pospelova & Pospelov, 2007 and further records); (3) xls-spreadsheets of plant collections made by herbarium staff members in the last few decades (6.6K). Geographical structure of the label database is given in Table 1. As of January 2018, 41,852 specimens received georeferences. Russia, Mediterranean, and Ethiopia were selected for priority geocoding (Table 2).

Approximately 32.5K georeferences were either captured directly from the labels or inserted manually by staff members, researchers, and volunteers, whereas coordinates for 9.3K specimens were identified automatically by ISTRA system. ISTRA (Intellectual System of Toponymic Reading and Attribution) was launched for machine georeferencing of preliminary grouped specimens with captured labels. Two algorithms of further specimen grouping were programmed—(1) by matching of the collector/date pair; and (2) by matching of textual description of the collection site. As soon as an operator manually inserts coordinates for at least one specimen from the group, other specimens receive an automatic georeference with a clear disclaimer.

Digitisation of the Moscow University Herbarium is a valuable contribution to the collections already imaged all over the globe. Our web-portal is the only place where one can consult the images of hundreds of species described from Russia and adjacent countries. Further databasing of these materials will fill large gaps in electronic distributional data for vascular plants and bryophytes of this large area.

Acknowledgments

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■ LOAN OF TYPES FROM PARIS HERBARIUM (P & PC)

Employees of the Australian Department of Agriculture recently destroyed ca. 100 herbarium specimens of the genus *Lagenophora* (Asteraceae), including six types, which had been sent on loan by the Paris Herbarium (Muséum national d'Histoire naturelle, MNHN) to the herbarium in Brisbane.

As a result of the destruction of this material, the President of the MNHN decided, on 30 May 2017, to forbid all loans of type specimens from all of the Muséum's collections. Types may still be requested on loan, but only under exceptional situations. Such requests will be submitted to the Muséum's Director General of Collections and must be accompanied by a detailed argument as to why none of the alternatives (preparation of high resolution images, examination of specimens in Paris) would be sufficient to carry out the project for which the loan request was made. If an exceptional loan is authorized, the type specimens sent will be accompanied by a declaration of their value, the shipment will be insured, and it will be handled by a private courier service. All of the associated costs (insurance and shipping) will be the responsibility of the institution requesting the loan.

Staff of the Paris Herbarium (P & PC)
Muséum national d'Histoire naturelle, Institut de Systématique, Evolution, Biodiversité, UMR7205, Herbier National, CP39, 16 rue Buffon, 75231 Paris cedex 05, France

Several hundred thousand type specimens are found at P and PC showing the "TYPE" designation and the sheet barcode. (Photo by G. Rouhan, 2018)