

Report on the 2nd Meeting of the
Council of the World Flora Online
(WFO)
Thursday and Friday 26-27 June, 2014
Komarov Botanical Institute, Russian Academy of Sciences, Saint
Petersburg, Russia

Host: Dr. Dmitry Geltman, Komarov Botanical Institute, Russian Academy of Sciences

Chair: Dr. Peter Wyse Jackson (President, Missouri Botanical Garden/Chair GPPC)

Participants: See Annex 1

1.0 INTRODUCTION

Host Dmitry Geltman welcomed participants and was recognized for his efforts in organizing the meetings in Saint Petersburg. As Chair of the World Flora Online Council, Peter Wyse Jackson then welcomed participants and introduced the meeting with a brief overview of the Midterm Review for the Global Strategy for Plant Conservation (GSPC), specifically those items concerning the WFO. He discussed the technical background meeting document that had been prepared and submitted to the Convention on Biological Diversity (CBD), which had noted that the CBD regards target 1 as achievable by 2020. He reported that at the CBD's SBSTTA meeting in Montreal in June, 2014, 29 countries had made comments with regard to progress on all targets. Notably, WFO is seen as having made significant progress and as on track to achieve target 1 by 2020. In a recommendation from SBSTTA, the WFO initiative was specifically welcomed and more countries were encouraged to participate. There were concerns over lack of progress on various other GSPC targets though. He commented on opinions expressed at the CBD meeting that there is a need to more closely align the GSPC with biodiversity action plans and strategies at a national level, a need for more resources and capacity building, need for disaggregation of indicator information on plants, a need for a greater role on indigenous communities. There was also a question as to how the WFO may be relevant in the future to the IPBES (Intergovernmental Platform on Biodiversity and Ecosystem Services). Recommendations from SBSTTA will now go to COP in Korea. Concerns were expressed regarding the positive comments about progress on the WFO, and if the comments would hinder possible funding.

It was agreed that a "Road Map" for the WFO should be set out so that the group can determine progress and if it is on target. Paul Wilkin proposed that the "Road Map" task be brought forward to day 1 of the Council meeting, and that the road map be set forth for the next 3 years. Katherine Willis agreed to this. It was agreed that a white paper/road map should be a product of the Council meetings in Saint Petersburg.

1.1 Adoption of documents

The draft agenda was adopted, with the addition that the “Road Map” be discussed at 2:00 PM on day 1. Draft minutes from the November 2013 meeting in Edinburgh were adopted, with the addition of Nicky Nicolson to the attendee list, and changing year on page 14 to 2013. All were in favor, none in opposition.

1.2 Apologies

Apologies were received from the following Council members who were not able to attend the meeting: Warren Wagner (Smithsonian Institution, Washington, DC); Judy West (Australian National Botanic Gardens, Canberra).

2.0 WORKING GROUP PRESENTATION SUMMARIES

2.1 Technical Working Group Report

Presenter: Chuck Miller, Missouri Botanical Garden, USA

Chuck Miller reported on the work of the Technical Working Group since the last WFO meeting in Edinburgh in November 2013. He reported that 40 hours had been spent on the data model, and that members of the Technical Working Group had come to agreement and accepted that the WFO is a synoptic Flora, not a full specimen based flora and that it is to support plant conservation, but not just for conservationists. He re-emphasized that the WFO is not just a technology project, but also that the taxonomy project cannot go online without the support of the technology.

Accomplishments of the Technical Working Group:

The following accomplishments achieved since the November 2013 meeting were outlined:

- Use cases were extended
- Two prototypes have been developed (MO and Kew)
- The data model for ingestion has been completed, with just a few details to smooth out, including metadata
- Data expectations were refined, stemming from the joint sessions with the Taxonomy Working Group
- Functional architecture was extended
- Portal development options have been considered

Results of Joint Sessions with Taxonomy Working Group:

- Backbone/taxonomic vision was discussed and decisions from the Taxonomy Working Group were provided to the Technology Working Group including:
 - minimal descriptive data requirements
 - minimal taxonomic data requirements:
 1. Identify homotypic & heterotypic synonyms
 2. Include basionyms
 3. Include typification text, if provided
 4. Homonyms under wide definition of synonym
 5. Higher classifications from the WFO backbone
 6. Exclusion of secondary references
- Taxonomy Working Group is to review use cases for the taxonomist user

Recommendations:

Recommendation 1: Adopt the Darwin Core Archive Model contained in Attachment 1 for content data ingestion to WFO.

Recommendation 2: Adopt ISO 3166 standard for country codes and boundary definitions.

Recommendation 3: Accept the following content requirements (also recommended by the Taxonomic Working Group) for the taxonomic information to be included on a WFO Taxon Page in the WFO Public Portal.

TO BE INCLUDED

- Rank
- Author(s), abbreviated based on modernized Brummit and Powell: IPNI Authors of Plant Names
- Original publication, abbreviated based on BPH and TL2
- Typification statement, if available (but not mandatory)
- All Synonyms based on WFO Backbone, separated into Homotypic and Heterotypic if available
- Basionym from WFO Backbone, indicated in parentheses to make cases of nom nov easier to understand
- All Homonyms based on WFO Backbone, included under a wide definition of what is a synonym
- Hierarchical classification based on WFO Backbone - Major lineages (such as angiosperms, bryophytes), orders, family
- Nomenclatural note, e.g. nom. cons
- Annotation/Taxonomic note, if provided. Could be used to record important misapplied names, known circumscription issues, conflicting opinions.

NOT REQUIRED

- Author(s) spelled out
- Original publication, spelled out
- Synonyms according to data source

- Basionyms according to data source
- Orthographic variants and isonyms
- Homonyms according to data source
- Hierarchical classification according to data source
- Data sources that do not accept the name accepted by WFO Backbone
- Data sources that also accept the name accepted by WFO Backbone
- Specimens cited
- Secondary references to names from data source
- Misapplied names

Recommendation 4: Intellectual Property Rights for images should be as open as possible. Derived products must respect the license for the image.

Recommendation 5: Adopt the TDWG standard, Structured Descriptive Data (SDD), as the standard format for interactive/matrix keys.

Recommendation 6: Adopt the Use Case Technical Report, Version 7.

Next steps:

The following next steps/continuing work were proposed by the Technical Working Group:

- Data Export Format including more analysis of workflow expectations, including data content workflow and the taxonomy/backbone workflow.
- Public Portal User Interface, including prototypes, and further discussion of the portal design. Council input on preferences will be helpful.
- Specialists Portal User Interface
- Systems Design and Development
 - Technical Architecture
 - Taxonomic Management System
 - Markup
 - Data Ingestion/Staging Coordination
 - Web Services
 - Data Export
 - Administrative
 - Project Management in the form of plans, schedules, status, gaps, and assignments

The Chairman asked Chuck Miller to prepare a list of questions for specific answers/guidance from the Council, and the following questions were presented:

- 1) What are the Intellectual Property Rights requirements for content data? Copyright, licenses.
- 2) What are the Intellectual Property Rights requirements for images? Copyright, licenses

2.2 Use Case Report

Presenter: Mark Watson, Royal Botanic Garden, Edinburgh, U.K.

Mark Watson presented a summary of the work completed with the Use Case report over the past 6 months, since the last WFO meeting in Edinburgh.

The following points were made:

Simple statements of how the WFO portal will be used by different groups:

Consumers

- Conservationists
- Plant taxonomists
- Other scientists
- General interest groups

Contributors

- Primary data providers
- Information converters and taxonomic curators
- Expert taxonomic reviewers
- Technical data and systems managers

Other stakeholders

- Institutional interests
- Taxonomic research planners and evaluators

Actions from November 2013 Meeting:

- Circulate draft Use Case Report to Council members (January 2014 – with Minutes)
- Seek reviews from applied users in conservation
- Double check and validate Use Cases
- Rank Use Cases to inform Phase 1 implementation (what is core/not core)
- Statement of what WFO is going to do functionally

Feedback on the Use Cases:

- Satisfaction that main Use Cases are covered
- Refinement on 'conservation status' to include IUCN assessments and CITES listing
- Reinforced requirement for inclusion of vernacular names in WFO
- More feedback possible when prototypes available to try out
- Future versions of the Use Case Report will include additional Use Cases to inform the portal interface, but are unlikely to add to the underlying data elements

Ranking of the Use Cases

- Use Cases were individually rated by members of the Technical Working Group

- A consensus rating (First Phase/Later Phase) was ascribed during the meeting on 24th June
- Council adopts the revised Use Case Report
- Use Cases were double checked and validated
- Use Cases deemed not to be essential for Phase 1 include:
- User annotation/comment mechanisms
- Advice to users on data conflict
- Statistics on life form, habitat, uses, etc.
- Taxonomist specific Use Cases (some)
- Ecologist specific Use Cases (all)
- 'Other Specialist' specific Use Cases (all)

Results:

- Use Case Report updated to include additional use cases
- Use Case Report updated with refinements to definitions
- Use Case Report annotated to include statements on the intended functionality of the first phase of the WFO Portal
- Use Case Report now considered complete

A discussion was begun about the end user of the WFO, and the question was raised as to whether children would be considered. The Chairman pointed out that the WFO project will be used to guide the achievement of GSPC target 1, and that supporting research and conservation of plants must be a primary objective. Katherine Willis suggested that broadening our "stakeholder" audience may make it easier to fundraise, and it was discussed that funding opportunities will be different for each country involved.

After Mark Watson's presentation, the Use Case Report was circulated to the group by email for comments, and a vote to Adopt was taken on day two of the meetings. The Use Case document was ADOPTED by the Council on Friday 27th June.

2.3 Taxonomic Working Group Report

Presenter: Thomas Borsch, Botanischer Garten und Botanisches Museum Berlin-Dahlem, Zentraleinrichtung der Freien Universität Berlin

Thomas Borsch presented an update of the work of the Taxonomic Working Group since the last meeting in November 2013, including work done during Working Group meetings held prior to the Council meetings in Saint Petersburg. In a general recommendation on behalf of the Taxonomic Working Group, Thomas Borsch stated that the WFO will not, at this point, deal with direct links of specimens to character data, protologues, illustrations or specimen images etc. but rather link back to the source systems. WFO will simply adopt treatments that include a taxonomy and a descriptive treatment that matches. Creating direct links is a task for the expert networks. A definition here will clearly describe the interface between the WFO and expert networks while ensuring that there are no conflicting interests between the WFO and such

networks and emphasizing that both are complementary. WFO could be a chance for the community to unite behind a given project to attract major.

RECOMMENDATIONS:

Recommendation 1 regarding the management of the taxonomic backbone:

- The basis is The Plant List unless there is a taxonomic expert group currently revising.
- Global taxonomic slicing is the ultimate management goal, if applicable.
- There should be a default view but also (to accommodate deviating taxonomic concepts for which no consensus can be achieved throughout the respective scientific community) the possibility to show alternative taxonomies.
- There has to be a format/workflow to integrate the taxonomic group backbones back into the general backbone and thus the WFO portal, meaning, if an expert network accepts global coordination, by default the floristic list contributors (regional specialists) should be networked directly as well.
- Editing should take place where the data are curated. Also, general users of the WFO portal should be directed to the taxonomic editors, if they have suggested changes.
- The taxonomic management system for the WFO needs to allow for edits to curated and non-curated data.

Recommendation 2 regarding a mandate for taxonomic networks:

- We view a taxonomic network as a group of experts who work towards the goal of a global taxonomic synthesis of a group of plants.
- Taxonomic networks can provide sources of information for WFO in a similar way to regional syntheses (e.g. Floras).
- The taxonomic networks can provide content and can also review content.
- A contact (e-mail) for each taxonomic network should be published on the WFO portal to facilitate interaction.
- Taxonomic networks should be formally recognized by the WFO. Having such a mandate could also help to apply for decentralized funding in the context of the WFO.
- A list of expert networks should be communicated through the WFO Portal, and will also promote the creation of further expert networks.
- Delimitation of taxa that are “adopted” by an expert group should reflect the current classification. All genera should be placed into a family in the WFO.
- In cases where there are no active networks but experts who are willing to review taxonomic data sets, this could still be facilitated and will hopefully stimulate the creation of networks for ‘unadopted’ taxonomic groups in the future.

Recommendation 3 regarding data management:

- WFO should harvest and wrap up data from different technical platforms that already exist and integrate them into a standardized output format (portal).
- WFO can ensure that certain data standards are used.

- Wherever possible, the WFO will encourage data providers to use standard data formats.

Recommendation 4 regarding format for taxon treatments as initial standard test match to data sources:

There are several data blocks in the output format:

- Accepted name – author and place of publication [mandatory], type(s) [if available], source of the accepted name (expert network, literature citation or TPL, but a reference in each time). Intraspecific ranks at the level of subspecies or varieties may be permitted if they come with a description that allows their clear recognition.
- Synonym(s) – author and place of publication [mandatory; however this would have to be added in some cases as some floras as original data sources do not have this information], type(s) [if available], arranged in homo- and heterotypic synonyms if indicated (e.g. by taxonomic experts).
- Descriptive data. For practical reasons it includes all descriptions on morphology and ecology as they are available. If descriptions are based on structured data, this data block can be subdivided.
- Distribution data. There may be a data block coming from published sources that can simply be provided and referenced. In addition an assignment to a current list of countries may be desired but requires sustainable data curation. Status information (native, introduced) should be provided and referenced.
- Images. Images of living plants should be vouchered if possible (or at least stated whether image is/has a voucher or not).
- Caveats. Stage of knowledge on taxonomy as text provided by the expert(s). This may span from taxon concepts to misapplied names.
- Vernacular names/language: A separate field that is optional to be filled.
- Conservation status. To be completed if data exist. Should have reference/year. Also, linkage to more comprehensive conservation status assessments should be considered.
- Keys. Published keys should be made available (but keep format, but also linking is possible to existing keys). In those cases, taxonomic networks provide structured descriptive data, interactive keys could be available with WFO linking to it (however, the character data sets and interactive keys will be maintained and curated by the expert network).

Recommendation 5 regarding data standards:

- WFO should adopt existing data standards used in taxonomic treatments/databases (e.g. Kew WCSPF, Tropicos, EDIT/CDM, DwC-A, Scratchpads, TDWG)
- The level of coverage in the different data blocks (and qualities) by the respective networks/sources/ and the WFO would allow to monitor work progress/carry out gap analyses

Recommendation 6 regarding integration of regional work:

- The information from regional syntheses made available electronically through the WFO should be provided to the taxonomic networks as a basis for them to work efficiently.
- Taxonomic networks should feed back information to the regional projects to achieve mutual benefits.

Recommendation 7 regarding WFO philosophy/approach:

- This recommendation serves as a preamble to the contributors guidelines
- An overarching assumption will be made, that if accepted names match, descriptions match
- Because taxon concepts may be narrower or wider in some cases, descriptions taken from synonyms will need scrutiny by taxonomic experts

Recommendation 8 regarding contributors' guidelines:

- Will come out of the agreed upon format needs

The report of the Taxonomic Working Group and its recommendations were ADOPTED.

3.4 Report on Guidelines for Contributors

Presenter: Jim Miller, Missouri Botanical Garden, USA

Jim Miller presented on guidelines for contributors. Draft guidelines will be edited and harmonized with suggestions from the technical working group, the use case document, and the report from the taxonomic working group. The revised guidelines will be circulated for comment within a few weeks after returning from Saint Petersburg.

4.0 PROTOTYPE PRESENTATIONS

4.1 World Flora Online Web Based Prototype from Missouri Botanical Garden

Presenter: Chuck Miller, Missouri Botanical Garden, USA

Chuck Miller presented an updated version of the WFO Prototype developed at MBG that had been originally demonstrated at the July 2012 meeting in St. Louis. The purpose of the WFO Prototype is to demonstrate example methods for delivering the use cases via a web-based graphical user interface. The prototype utilizes a backbone taxonomy based on Tropicos and includes 60,000 taxon descriptions collated from eFlorans contained in Tropicos, including Flora of China, Flora of North America, Flora of Nicaragua, Flora Mesoamericana, Flora of Chile and 13 others. The sample data is sufficiently broad to enable representative views of how the user interfaces would look in a full WFO Portal with multiple sources for a single species. The updated WFO Prototype expanded the July 2012 pages and added additional features that can be explored at www.worldfloraonline.org. It is organized into four main parts – Home Page, Explore, Discover and Collaborate plus an About page and placeholders for Help and Contact pages. The Home Page demonstrates: 1) information about the WFO Project

(Project Description, News, Partners, and other information), 2) navigation to the other sections of the Portal, and 3) Search and Browse functions to access the WFO data. The About page demonstrates information about the WFO Project including GSPC Target 1, history of project activities and progress. The Explore page demonstrates additional search features like "Boolean" search, graphs of statistics about the WFO content like counts of species pages, counts of pages for endangered species, identification keys, and answers to questions about what sources are included in WFO or what sources are planned to be included. The Discover Page demonstrates creation of a list of species for a chosen country, mapping of distribution for a chosen taxon, browsing of endangered taxa, or browsing of images for selected groups of endangered taxa. The Collaborate page demonstrates self-service contribution of descriptive datasets with supporting tools and information to assist the content contributor to prepare their data, export of data from WFO, and a link to a digitized document markup and workflow system. The taxon page is organized with a header showing the backbone taxon name, name authors, original publication and source of the taxon's status and 7 tabs: Overview, Detail, Conservation, Images, Taxonomy, Distribution, and Subtaxa. The prototype taxon page demonstrates examples of how to navigate more complex content data such as showing many descriptions for one taxon with attribution of the sources via expand/collapse controls, showing alternate acceptance opinions with expand/collapse or via drop-down controls, and showing alternate hierarchical classifications via drop-down controls. One example demonstrated by Chuck Miller was *Poa annua* L. <http://www.worldfloraonline.org/NameDetail.aspx?nameid=25509881>. This prototype should be examined for the overall potential portal pages organization, look and feel, navigation, functions provided for the various users – such as conservationists and taxonomists, and the various approaches to data presentation and visualization along with the use case documents.

4.2 Kew Prototype for the World Flora Online (Proof of Concept)

Presenter: Nicky Nicolson, Royal Botanic Garden, Kew, UK

Nicky Nicolson presented a proof of concept portal developed by Kew to advance discussions on data transfer, portal design, and how to meet the use cases. It can be explored at wfo.kew.org. The Kew proof of concept portal is based on eMonocot (www.e-monocot.org), and the backbone taxonomy from the World Checklist of Selected Plant Families system, SolanaceaeSource and ILDIS. The proof of concept portal includes digitized legacy floras, global e-taxonomic resources, and “born digital” floras. The main components of the overall system are 1) the content creators/curators, who are distributed worldwide; 2) the portal that provides functionality for data providers and is where content owners can register their datasets; 3) the portal that provides discovery, search and downloading functionality for the end-users; and 4) the harvester, which accesses datasets in Darwin Core Archive format over HTTP, ingests content and indexes it. The content demonstrated in the Kew proof of concept portal included higher taxonomy, backbone taxonomy, descriptive data and accessibility features such as keys, images, maps, common names, and phylogenies. Data could be populated by self-service – users would need to ask for a login. Data on the taxon page includes a

description (general description), distribution map, included species, synonyms, common names and bibliography (where information is drawn from, copyright status). The Kew proof of concept portal would enable scientists to contribute descriptive data, keys, phylogenies, and images. Biodiversity information standards would be utilized, including Darwin Core Archives. . The proof of concept portal could work with any data management system to harvest datasets from many sources such as digitized floras, born digital, and e-taxonomic sources using a harvest to portal model. Data would be treated in such a way that it remains the property of the contributor. It would be harvested, indexed and presented online, and fully credited with attribution and re-use of data with the license determined by the contributor. The components of the Kew proof-of-concept portal are: account management, dataset harvesting, data integration and indexing and data matching, portal presentation including search/browse/maps/keys/phylogenies/data explorer, downloads, and a comment/feedback feature. It may be worth looking at this proof of concept portal along with the use case documents.

4.3 Discussion of Portal Prototypes

The discussion of the portal prototypes began with Wayt Thomas stating that he thought the two systems presented gave a “wealth of opportunity” for the group. Eduardo Dalcin questioned whether a search engine could be built, and then each institution could build its own interface in their native language, citing that the Brazil checklist is using a collaborative environment. He feels that a portal needs to be decided by consensus and by a collaborative process, and that by deciding what components are already in place and seeing who can contribute, this will really emphasize that WFO is a consortium. Alan Paton agreed with Eduardo Dalcin, but believes that the WFO needs to move quickly to demonstrate real progress. Wayt Thomas stated that he had already talked to Melissa Tulig about generating data and exporting it. The data model just needs to be completed and then it'll be a question of where it needs to go. Marianne LeRoux agreed that the data will be ready to go wherever it can. Jim Miller noted that there is a not a huge amount of pressure to get something online, but most people who want to be involved just want to get work done. Thomas Borsch stated that the project needs help with resource mobilization, and Peter Wyse Jackson said that a blueprint must be developed to determine which pieces could be funded separately. Katherine Willis stated that the UK would not fund a database housed in Missouri. Pierre Andre Loizeau emphasized that collaboration on any part of the project would be key.

5.0 Institution Presentations

5.1 Muséum National d'Histoire Naturelle, France

Presenter: Thomas Haevermans

Thomas Haevermans began his presentation by discussing the possible contributions that MNHN could make to the World Flora Online project. He described the massive restoration project that the herbarium has undergone and noted that almost all vascular plants in their collection had been scanned. He stated that the new space has 1 million

newly mounted plants, organized according to APGIII, and that 6+ million specimens were also scanned. He also pointed out that they continue to add images of a certain number of additional specimens, and that they have an automatic scanning process in place. The images will be available for the WFO project. Thomas is confident that MNHN will be able to contribute to the WFO about 90,000 species, and perhaps as many as 110,000. He discussed herbonautes and said that the aim was 60,000 specimen in Caledonia. They are using peer review of names, and stated that perhaps this could be modified to the WFO project. MNHN had found the peer review process to be very efficient and that lots of people are willing to contribute. He also stated that a professional version of herbonautes was coming. Thomas Haevermans then discussed TAXREF and said that conservation status was being added to each plant growing in the areas covered. He stated that Flora of Cambodia, Laos and Vietnam, Flora of Madagascar, and Flora of New Caledonia were all in process, and that Flora Gallica should be done in 2014.

5.1.1 Muséum National d'Histoire Naturelle, France

Presenter: Visotheary Ung

Visotheary Ung gave a presentation on the Xper2 and Xper3 systems that are currently being used at MNHN for storing and editing descriptive data online. She emphasized that it is possible to share your data with other users, making collaborative descriptive data possible.

5.2 Moscow Main Botanical Garden, Russian Academy of Sciences, Moscow, Russia

Presenter: Misha Ignatov

Misha Ignatov gave a presentation on the moss flora of Russia.

5.3 Institute of Botany, Chinese Academy of Sciences (CAS), Beijing

Presenter: Qin Hai-Ning

Qin Hai-Ning gave a presentation on the plants species informatics in China. He reviewed the International Conference on Biodiversity Information that was held in 2004, and then reviewed the major projects at CAS at the Species level: Chinese Virtual Herbarium, Plant Photo Back of China, Catalogue of Life – China, BHL China Node and Red List of China Higher Plants. He then talked about the Online Flora of China, and the mobile product that has been developed for developing collection sheets and for finding nearby plants.

5.4 South African National Biodiversity Institute (SANBI)

Presenter: Marianne LeRoux

Marianne LeRoux gave a presentation on the progress of the E-Flora of South Africa Project and how the project can contribute to Target 1. SANBI believes that it can make a unique contribution of $\pm 3\%$ to the world flora. They have established a team and the

project will be conducted in two phases: phase one which will be completed before 2020, and phase two which will be complete after 2020, or upon achieving phase one.

5.5 Missouri Botanical Garden

Presenter: Chuck Miller

Chuck Miller gave a presentation on the progress of the ingestion tool, which will be the data collection facility for the WFO and is 100% web based. Adobe toolset is being used for the project. Chuck Miller showed the dashboard, which shows progress, and showed the markup page. He discussed the steps for markup and said that a coarse markup would be done first before the granular markup. The project page will show workflow, and each project can be at a different point in the process. The ingestion tool will help keep track of it all. Chuck Miller hopes that the tool will be ready for others to use it by the end of 2014. Peter Wyse Jackson stated that he hoped this will be available for use by the next WFO Council meeting.

6.0 Network Organization

There was a discussion about the organization of the WFO network and how to develop it. There were questions about funding at each institution, and how it would be determined what is needed at each. Thomas Borsch suggested that a full-time minimum position to oversee the network, in addition to the other curative work is needed. The Chairman indicated that he believed that the WFO Consortium would be happy to give endorsement to projects that will contribute to the WFO, and that this was part of developing the "mosaic". There was a question (Walter Berendsohn) regarding the procedure for endorsement. An example given was what oversight the Council will have to determine who can contribute / what is the threshold for non-participation before a task is given to other institutions. Dr. Wyse Jackson suggested that a registry may be developed and the Council could decide which project would be endorsed. Other members of the Council responded by suggesting that the Council should allow the communities to handle their own decisions on endorsement and that micromanagement should not be practiced. The Chairman proposed that an expert registry be created, not a global network. Paul Wilkin commented that taxonomic communities should decide who would be the chair or leader of their own group and that this should not be determined by the Council. Some said that a taxonomic expert registry was counterproductive, and Jim Miller stated that the list he developed of taxonomic experts on each plant group was simply informational at this point (i.e. who and which groups are currently working on particular plant groups), and there was no intention or proposal for the Council to dictate who would be the coordinators of such efforts. Chuck Miller stated that a registry would help eliminate/identify overlap.

With regard to funding, there was a concern expressed by Thomas Haevermans that if there are no modules to provide context, then proposals for funding cannot be submitted. Jim Miller stated that no impediment would be placed on individual institutions by the Council on applications for funding. Thomas Haevermans then said that he would never send a proposal for funding without being able to offer some sort of

recognition for the funder. Walter Berendsohn suggested that, because there have been some prior conflicts in the taxonomic community with regard to support, there needs to be some rules or procedures in place and needs to be a process by the governing body to help with funding. The Chairman suggested that it is likely the Council will be happy to support any projects that want to produce a proposal that supports the ultimate achievement of a WFO, and that it is not up to the Council to micro manage individual institutional funding requests. A request was made by Walter Berendsohn that a mandate be given to the Chair of the WFO that he may support any such proposal for funding from an MOU organization.

Formal proposal to the Council (by Walter Berendsohn): The Chair of the Council will be willing to write supportive letters and keep a list of proposals that are developed/submitted by MOU Institutions. **ADOPTED** (proposed by Walter Berendsohn / Second by Wayt Thomas)

Alan Paton and Paul Wilkin asked which major floras are willing to contribute to the WFO and what are the partners' interests in vs. what is needed. If this information is found, then the Council can look at gaps. Wayt Thomas stated that we need to separate what exists from what is in people's heads. Chuck Miller stated that this discussion is creating another registry. The information that could be contained in this registry are: Taxonomic slicing, Gaps, Existing Publications/Data, Proposals, New Work in Progress, and Possible New Work. Peter. Wyse Jackson agreed that it is clear that a new matrix with the above information is needed, but that the matrix may not be able to be created at the Saint Petersburg meeting. He asked the taxonomic working group to put together a matrix that can be worked on remotely and circulated for comments/additions over the next months. Thomas Borsch added that the matrix should be used for groups as well as individuals. Peter. Wyse Jackson noted that the group should use Jim Miller's guide for contributors and include support for proposals. Paul Wilkin noted that potential contributors should be pointed toward existing taxonomic communities to which they may be able to contribute. Thomas Borsch emphasized that the process for involving individual contributors needed to be transparent and that a well understood structure needs to be in place. Mark Watson suggested, as he had in previous meetings that the 45 plant orders should be assigned to coordinators and that this seems more manageable than trying to have one person do it. Jim Miller stated that assignments seem kind of idealistic because some networks are very well organized while others are not. Most orders need a network. Alan Paton said that the Council needs to be practical and look at what commitments the WFO has now and start its work. He suggested that the group can talk theoretically about what may be needed. Nevertheless there are probably about 10 or so fully functioning networks that could do some really useful and relevant work during the next couple of years. The Chairman stated that it would be very helpful if the taxonomy working group could look at this issue and put forward some practical suggestions on how these individual and collective contributions to the WFO can be brought together in a coherent framework over the next few months.

A Communications Strategy for the WFO was discussed, and the Chairman suggested that he would be willing to put a first draft communications strategy together and circulate it for comment. Walter Berendsohn asked if we needed a task to think about relationships with regional networks relating to this entire project. Perhaps we should outline how we are thinking about this. It would be helpful to have guidance on some of the regional / national floras to which the Council would like to reach out. Walter Berendsohn asked all participants to talk to their local flora organizations, in order to get more people on board. Jim Miller said that we can accumulate the Floras organizations that are willing to contribute. The Chairman suggested that each member of the Council should act as an ambassador for the WFO.

Dr. Wyse Jackson asked who would be attending the CBD's COP in South Korea. He stated he would be willing to organize a side-event on the WFO.

It was suggested that after this meeting that an email be sent around naming current members of each working group, with emails included, inviting others to participate. Additional members of the "governance" group will be addressed as well. Also there is a need to ask recipients if they are not willing to continue their current membership of any of the working groups.

Proposal: A Formal Mandate to Wayt Thomas to continue discussions with Google to see what cooperation between the WFO and Google might be possible and what proposal could be forthcoming. Council agrees to give Wayt Thomas that mandate.

7.0 ADOPTION OF WORKING GROUP RECOMMENDATIONS

Chuck Miller presented the following recommendations to the Council for adoption:

Recommendation 1: Adopt the Darwin Core Archive Model contained in Attachment 1 for content data ingestion to WFO. **ADOPTED**

Recommendation 2: Adopt ISO 3166 standard for country codes and boundary definitions. **ADOPTED**

Recommendation 3: Accept the following content requirements (also recommended by the Taxonomic Working Group) for the taxonomic information to be included on a WFO Taxon Page in the WFO Public Portal. **ADOPTED**

TO BE INCLUDED

- Rank
- Author(s), abbreviated based on modernized Brummit and Powell: IPNI Authors of Plant Names
- Original publication, abbreviated based on BPH and TL2
- Typification statement, if available (but not mandatory)

- All Synonyms based on WFO Backbone, separated into Homotypic and Heterotypic if available
- Basionym from WFO Backbone, indicated in parentheses to make cases of nom nov easier to understand
- All Homonyms based on WFO Backbone, included under a wide definition of what is a synonym
- Hierarchical classification based on WFO Backbone - Major lineages (such as angiosperms, bryophytes), orders, family
- Nomenclatural note, e.g. nom. cons
- Annotation/Taxonomic note, if provided. Could be used to record important misapplied names, known circumscription issues, conflicting opinions.

NOT REQUIRED

- Author(s) spelled out
- Original publication, spelled out
- Synonyms according to data source
- Basionyms according to data source
- Orthographic variants and isonyms
- Homonyms according to data source
- Hierarchical classification according to data source
- Data sources that do not accept the name accepted by WFO Backbone
- Data sources that also accept the name accepted by WFO Backbone
- Specimens cited
- Secondary references to names from data source
- Misapplied names

Recommendation 4: Intellectual Property Rights for images should be as open as possible. Derived products must respect the license for the image. **ADOPTED**

Recommendation 5: Adopt the TDWG standard, Structured Descriptive Data (SDD), as the standard format for interactive/matrix keys. **ADOPTED**

Recommendation 6: Adopt the Use Case Technical Report, Version 7. **ADOPTED**

All of the taxonomic working group recommendations had been adopted on day one of the full council meetings.

8.0 QUESTIONS PRESENTED TO THE COUNCIL FOR RESOLUTION

Chuck Miller presented the following questions to the Council for resolution:

- 1) What are the Intellectual Property Rights requirements for content data?
Copyright, licenses.
- 2) What are the Intellectual Property Rights requirements for images? **Copyright, licenses**

The Chairman stated that if we are going to put information online that has derivatives, that we need limits and that perhaps the Taxonomic Working Group could be tasked with determining limits and restrictions. Chuck Miller disagreed, stating that this is an issue for the Council; limits on what will be accepted or not. If limits are placed, then the WFO may have to turn away content providers. Peter Wyse Jackson suggested that the taxonomic and technical working groups should sketch out plans for limits/no limits between now and the next meeting with the aim of those plans being included in the general work program for consideration by the Council at the next meeting.

9.0 TAXONOMIC BACKBONE

The Chairman asked for an update on the development of the Plant List. Alan Paton stated that the 2nd version had gone live, and they had seen an increase in accepted names of about 4% in the last year and have had over 2.5M visits/users to the Plant List website. There have been lessons learned about sustainable networks, but they don't have funding to incorporate feedback at this time. They have had various offers of updates for some families for next editions, but are not sure what to do in terms of an extraction. It is not sustainable right now and needs to be integrated with other information in the WFO. Chuck Miller stated that the biggest problem right now is that there are about 20% unresolved names. Peter Wyse Jackson inquired whether the Plant List might be a prime candidate for a funding application, and Alan Paton stated that he thought that using small groups as candidates for funding would be better than asking for large general funding application. Peter Wyse Jackson stated that Council endorsement could be helpful to finish the backbone, and Mark Watson said that the technical working group needs to discuss how it would function with various backbones linking with the Plant List. Thomas Borsch noted that the project needs to be in alignment with funding priorities from national agencies.

9.0 WFO WEBSITE

Wayt Thomas proposed that the WFO website be made live with more information, and Peter Wyse Jackson asked if we should go live with the WFO own website or continue to use the GSPC (plants2020.net). Marianne LeRoux stated that she felt that a bigger impact could be made with our own site. Wayt Thomas proposed to authorize the WFO Chairman to make things live without first checking with the Council. Peter Wyse Jackson noted that the website must be dynamic, meaning that things may be posted and could be removed if needed. Eduardo Dalcin suggested that a social media presence should be established for the WFO, and Chuck Miller agreed but stated that would need someone to monitor it. Peter Wyse Jackson stated that this would be a topic that could be included in the Communication Strategy too.

10.0 NEXT MEETING AND OTHER OPPORTUNITIES TO PROMOTE WFO

The Chairman proposed that it would be helpful for the Council to meet every 6-8 months. Pierre Andre Loizeau offered to host the next meeting of the Council in

Geneva and that it is likely that some sponsorship for local costs will be available. He suggested the beginning of 2015 (January or February) and the program would be held in their new building. Wayt Thomas stated that the New York Botanical Garden would like to host a meeting at a time when it is convenient for the consortium. Eduardo Dalcin stated that Brazil would propose to have a meeting in Rio de Janeiro and that the proposal is fully supported by the President of Rio BG and that they would be glad to host the Council anytime. The Chairman suggested the Autumn of 2015 for a Council meeting in Brazil. Marianne LeRoux said that SANBI would like to host a meeting, perhaps in Cape Town, and Qin Haining stated that China would also like to host a meeting.

ADOPTED: Tentative Program Schedule:

| | |
|-------------|----------------------|
| Spring 2015 | Geneva |
| Fall 2015 | Rio de Janeiro |
| Spring 2016 | New York |
| Fall 2016 | Cape Town (proposed) |
| Summer 2016 | China (proposed) |

Other key opportunities to promote WFO:

UNESCO – Nairobi 2017 (keeping this flexible)

Taxon – August Issue – Karol Marhold stated that a report on the WFO meeting could be included in Taxon and could be as long as needed. Karol Marhold then offered to put information on the WFO on the Taxon website.

There was a discussion of reaching out to other journals, and what modified message could be sent to other journals. It was decided that the website needs to be up before heavy communication to journals begins. Eduardo Dalcin suggested that a white paper on the WFO architecture should be developed by the technical working group. The Chairman agreed, and stated that a peer-reviewed Council Supported paper needed to be written to outline the WFO project and progress achieved. Eduardo Dalcin also suggested that WFO should reach out to IPBES (International Platform on Biodiversity and Environmental Services, specially the Data and Knowledge Task Force). The Chairman agreed to do this.

The logo options developed on behalf of the WFO Consortium by the Missouri Botanical Garden were discussed. The Chairman agreed to circulate the options to the members of the Consortium. A consensus will be asked for and feedback will be taken into account before the Chairman finalizes the agreed option.

11.0 ELECTIONS

Peter Wyse Jackson stated that he would be willing to continue as Chair of the WFO. Wayt Thomas proposed for Peter Wyse Jackson to continue / Pierre Andre Loizeau seconded the proposal. The proposal was adopted.

Thomas Borsch stated that he was willing to continue as Chair of the Taxonomic Working Group, with David Simpson as co-chair. Wayt Thomas proposed to re-elect these two candidates / Jim Miller seconded the proposal. The proposal was adopted.

Chuck Miller stated that he was willing to continue as Chair of the Technical Working Group. Mark Watson proposed that he be re-elected. Dmitry Geltman seconded the proposal. The proposal was adopted.

Missouri Botanical Garden will continue to provide secretariat support of the Consortium.

12.0 PENDING ISSUES

There were several issues pending as the meeting drew to a close:

- Work programs for the Taxonomy and Technical Working Groups needed to be determined
- Clear direction in terms of a matrix of contributors (Taxonomy Working Group)
- Wayt Thomas will continue negotiations with Google
- Communications Strategy to be drafted
- Technical Working Groups architecture plan
- Next meetings need to be solidified
- Need to reach out to more partners
- Need clear roadmap for organizational plan
- Need Taxonomy Working Group to have a plan for the taxonomic backbone and how it relates to the sustainability of the project

13.0 CONCLUSION

The Chairman reiterated the thanks of the Council to the hosts, Komarov Botanical Institute of the Russian Academy of Sciences and in particular he thanked Dr. Dmitry Geltman for all he had done to support the meeting and make it a great success.

MEETING ADJOURNED

ANNEX 1
World Flora Online
June, 2014, Saint Petersburg
Attendee List

Beijing Chinese Academy of Sciences – Institute of Botany
PEOPLE'S REPUBLIC OF CHINA
Haining Qin

*Botanischer Garten und Botanisches Museum Berlin-Dahlem,
Zentraleinrichtung der Freien Universität Berlin*
GERMANY
Walter Berendsohn
Thomas Borsch

Conservatoire et Jardin botaniques de la Ville de Genève
SWITZERLAND
Pierre-Andre Loizeau

Institute of Botany, Slovak Academy of Sciences
SLOVAKIA
Karol Marhold

Instituto de Pesquisas Jardim Botânico do Rio de Janeiro
BRAZIL
Eduardo Dalcin

Komarov Botanical Institute
RUSSIA
Dmitry Geltman

Missouri Botanical Garden
UNITED STATES OF AMERICA
Chuck Miller
Jim Miller
Richelle Weihe
Peter Wyse Jackson

Muséum National d'Histoire Naturelle
FRANCE
Thomas Haevermans
Visotheary Ung

New York Botanical Garden
UNITED STATES OF AMERICA
Wayt Thomas
Melissa Tulig

Royal Botanic Garden Edinburgh
UNITED KINGDOM
Mark Watson

Royal Botanic Gardens Kew
UNITED KINGDOM
Nicky Nicolson
Alan Paton
Paul Wilkin
Katherine Willis

South African National Biodiversity Institute
SOUTH AFRICA
Marianne LeRoux

Tsitsin Main Botanical Garden, Russian Academy of Sciences
RUSSIA
Misha Ignatov