Summary Report on the 12th Meeting of the World Flora Online Council

Organized by the Missouri Botanical Garden (MBG), St. Louis, Missouri, USA

18th – 22th November 2019

This meeting was preceded by meetings of the WFO Working Groups from Monday 18th to Wednesday 20th April, including Joint Sessions to discuss common topics. The Council meetings were held on Thursday 21th and Friday 22th November in the same location. Over the five days, 24 individuals participated, representing 13 institutions, organizations or projects.

The following is a summary report of the meeting and decisions adopted.

Peter Wyse Jackson (Co-chair) opened the 12th Meeting of the WFO Council welcoming everybody to the Missouri Botanical Garden. All participants introduced themselves, apologies were noted and a particular welcome was given to those participating for the first time in the Council meeting. A list of attendees is attached at the end of this document.

The report from the previous Council Meeting in Istanbul, Turkey on April 2019 and the proposed agenda for this meeting (with corrections) were accepted with the following corrections:
>   a. Nye Hughes instead of Nye Huges
>   b. Remove Marianne Le Roux from the Apologies section (She attended the meeting).

The Agenda for the Council Meeting was adopted.

MEMBERSHIP
Peter Wyse Jackson (Co-chair) reported that no new members had joined since the last Council meeting (currently 41), but there were a couple of expressions of interest to follow up from Singapore Botanic Garden and Central Botanic Garden at Minsk, Belarus.

RECOMMENDATIONS ACCEPTED
The following recommendations were considered by the WFO Council:

TAXONOMIC WORKING GROUP RECOMMENDATIONS
Mark Watson presented the Taxonomic Working Group Recommendations.
1. Council agrees that deviations from the 'standard' published high-level classifications can be made when requested by TENs, endorsed by the Taxonomic WG and approved by WFO Council.

2. Council approves the use of WCVP to update the Taxonomic Backbone in 2020 as resources permit. Chairs of WGs to form task group to explore how WCVP can best be utilised.
3. Council approves the 10 TENs as proposed by the Taxonomic WG.
4. Council delegates responsibility to develop TEN FAQs to a subgroup, to include TEN Manager, Jim Miller, and others.
5. Council to nominate representative(s) to Catalogue of Life Advisory Board. Pierre-André Loizeau was nominated.
6. Council endorses the recommendation that static versions of the Taxonomic Backbone should be produced, to be called 'WFO Plant List <YEAR>', and requests RBG Edinburgh to lead on developing a prototype for Meise.
7. Council approves the list of primary sources for adding Content as proposed by the Taxonomic Working Group.
8. Council to form an 'About Pages Task Group' to take on the revision of the About pages, including members of the Communications WG. Peter Wyse Jackson to lead this Task Group.

TECHNICAL WORKING GROUP RECOMMENDATIONS
Chuck Miller presented the Technical Working Group Recommendations.
1. Ask IPNI to include WFO IDs.
2. Substitute Follow Us with a "Data" link to WFO About page
3. Data paper of the WFO Backbone data with a DOI. Use this DOI for backbone download.
4. Taxonomic WG – Check "How to Cite" on Download Page, Taxon Page and footer ribbon. Also, change "is an ambiguous" to "is ambiguous". – Tax. WG would discuss and recommend.
5. First priority for development in Botalista should be a Name Matching service. - Accepted
6. Explore the use of Frictionless Data for backbone data ingestion – No objection
7. Assess addition of Annual Snapshot download – "WFO Plant List 2020", without causing user confusion – Accepted
8. Assess addition of TEN webpages to About portal – Not approved, deferred to "About Portal Subgroup
9. Assess addition of Families list page with attributes for each. – Deferred.

REPORT FROM THE CHAIRS OF THE WFO WORKING GROUPS

Report from the Taxonomic Working Group
Mark Watson presented the Taxonomic Working Group Report on the Action Items.
TAXON PAPER (Action Item #17)
- Thomas Borsch has led this and circulated a final draft for comment in early November to all authors. Comments and corrections were received and incorporated in the manuscript by Thomas and it was submitted on Nov. 19. It was noted that the results from the Catalogue of Life collaboration and other refinements can be added during the post-review. This was considered good timing because we can now demonstrate achievements and show we are ready

to spread the word, which should be helpful for our communication strategy for 2020.

TAXONOMIC BACKBONE DEVELOPMENT

- **High Level Classification (Action Item #12):**
  It was informed that Pteridophytes, Gymnosperms and Angiosperms were done but still needed to check that Pteridophytes families against PPGI (Pteridophyte Phylogeny Group 2016). In the case of Bryophytes, mosses are in process, liverworts and hornworts should be extracted from the Bryophyte TEN in Tropicos; John Brinda would coordinate this with William Ulate and Michelle Price (Rec. #1).

- **Updates using Kew's World Checklist of Vascular Plants (WCVP):**
  All names from WCVP, but 200K 'new' ones, currently have IPNI IDs. In addition to the report from the Geneva meeting, it was also mentioned that WCSP families will be retired in 2020 and replaced by WCVP. The addition of TDWG Level 3 distributions into WCVP will be completed by mid 2020, and then WCSP will be retired.

  The Taxonomic Working Group would like to improve the Taxonomic Backbone for non-TEN groups using the revised WCVP. This would help deduplication, improve the completeness and help bring it up to date.

  The question of new names was addressed indicating that IPNI would be the nomenclator for APG and Tropicos would be for Bryophytes.

  WCVP is one source of data to update the backbone, Catalogue of Life could be another. Other sources could be considered later, like Michael Hassler's data, which might have additional distribution information. The Council should decide what sources to use and how to dedicate our limited resources to take actions. It was clarified that this doesn't preclude other datasets to be used in the future, but it was noted that, in 2020, the Council would approve this one-time event (not a recurring one) of adding new names from WCVP, not deleting any.

  A task group (including Alan Elliott, William Ulate and Rob Turner) was proposed to look into what could be done balancing the cost/benefits against the pressing need to improve Content in WFO. The priority would be to add new names since TPL, assign the corresponding IPNI IDs, and updating the classification for groups we need in order to provide initial data to TENs. Alan Elliott would coordinate this with such TENs (Rec. #2).

- **Deduplication (Action Item #44 & #60)**
  The solution of high-confidence duplicates is now more complicated. The few (7) duplicate names with descriptive data associated have been reviewed and updated and further deduplication would be deferred to after the updates from WCVP are done.

- **Dealing with Unchecked Names**
  The reduction in numbers of unchecked names should be assessed after the updates of the WFO Taxonomic Backbone from WCVP because this step will likely reduce the number of unchecked names.

- **Autonyms**
  Autonyms should be created when an infraspecific taxon (or 'autonym generating' name at other ranks) is included in the WFO backbone and they should be given a WFO-ID. Although, theoretically, autonyms should not be given a 'hard coded' Taxonomic Status – if infraspecific (or equivalent) taxa are accepted then the autonym is accepted, otherwise it is equivalent to the accepted species – in WFO, TENs are required to provide information on how autonyms are to be handled. Include checks for autonyms to be done by TENs on how autonyms are handled can be undertaken. Autonyms should be excluded from synonymy because it doesn't make sense.

- **Isonyms and Orthographic Variants**
  The Taxonomic Working Group indicated that Isonyms and Orthographic Variants should also be given a WFO-ID because most of these names have been all Effectively Published. In WFO they are treated as 'synonyms' and linked to accepted names but also marked as 'excluded' so they can be available for the "name matching" process and, at the same time, not displayed in the WFO Portal.

- **Taxonomic Status of Ranks above Species**
  Theoretically, synonymy above the rank of species is a consequence of the taxonomic placement of included accepted species names and dependent on the placement of the type taxon only. It was argued that generic synonyms should not be shown because, technically, the synonym applies only to the type for the genus and not necessarily to all the currently accepted species, even when many treatments (and some TENS) do include the synonymy. This applies also to sections, series and subgenera as well.

  The 'hard coding' of Taxonomic Status for these names in WFO has caused data integrity issues (e.g. accepted species linked to generic names that are flagged as synonyms). In TPL, this is avoided by not giving taxonomic status for these taxa.

  One suggested potential solution, following The Plant List example, is not to show Taxonomic Status in the Portal for ranks of genus and above. In WFO the Taxonomic Status for names above the rank of species is shown in the search results page but not on the Taxon Pages. The Taxonomic Working Group recognises that this is largely a data problem in WFO and when data is corrected then this would not be such an issue anymore.

  The Taxonomic Working group proposed to review the cost/benefit of supressing the display of Taxonomic Status for these names in the search results and adding them to the Taxon Pages at the next Council meeting.

- **Authorized Taxonomic Expert Networks (TEN) – progress**

Taxon	# spp.	Stage	Contacts
Nepenthaceae (Caryophyllales)	90	Uploaded	W. Berendsohn (B)
Solanaceae	2,450	New version almost ready	S. Knapp (BM)
Irvingeaceae	10	Ready for upload	D. Harris (E)
Picramniaceae	45	Waiting revision	W. Thomas (NY)
Cordiaceae	450	Name checking/correcting	J. Miller (MO)

Zingiberaceae	2,100	Name checking/correcting	M. Newman (E)
Begoniaceae	1,900	Name checking/correcting	M. Hughes (E)
Hypericum	370	Name check pending	S. Crockett (Graz); N. Robson (BM)
Gesneriaceae `	3,540	Under revision	H. Atkins (E)
Conifers	620	Under revision	M. Gardner (E)
Styracaceae	160	Waiting Botalista	P. Fritsch (BRIT)
Dipterocarpaceae	720	Waiting WCVP update	M. Newman (E)
Sapotaceae	1,800	Waiting WCVP update	P. Wilkie (E)
Brassicaceae	3,400	Pending	M. Koch (Heidelberg)

- **Taxonomic Backbone Data from Regional Datasets**
  Endemic families from Catalogue of the Plants of Madagascar reviewed for incorporation:
    - Asteropeiaceae – MADCAT now an authority within Caryophyllales TEN
    - Barbeuiaceae – data included within Caryophyllales TEN
    - Physenaceae – data included within Caryophyllales TEN
    - Sarcolaenaceae (79 species) – proposed as MADCAT TEN
    - Sphaerosepalaceae (14 species) – proposed as MADCAT TEN.

TEN ENGAGEMENT

- **TENs Proposed for approval (Task #11):**

Taxon	# spp.	TEN Focal Point
Ericaceae	4,500	Alan Elliott, Edinburgh
Dioscoreaceae	870	Lauren Raz, Bogota
Quiinaceae	50	Georg Zizka, Schenkenburg
Aquifoliaceae	480	Pierre-André Loizeau, Geneva
Asteraceae	23,600	Global Compositae Alliance
Aracaeae	2,400	Bill Baker/WCSP, Kew
Alooideae	520	Ronell Klopper, SANBI
Musaceae	80	Thomas Haevermans, Paris
Bryophytes	20,000	John Brinda, Missouri & Michelle Price, Geneva
MADCAT Endemic Families	93	Peter Phillipson, Missouri/Paris
	[**Total 52,000**]	

The Council approved these 10 TENs (Rec. #3).

- **Potential TENs (Task 56 & 57):**

Taxon	# spp.	Contacts
Annonaceae	2,400	Heimo Rainer, Vienna
Apocynaceae	5400	David Middleton, Singapore Botanic Garden
Bruniaceae	75	Ronell Klopper, SANBI (with German co-workers)
Cycads	355	John Donaldson, SANBI/Patrick Griffith, Montgomery
Euphorbia	2,000	Ricarda Riina, Paris
Fabaceae	16,400	Joe Miller, GBIF
Fagaceae	1,100	Chuck Canon, Morton
Lauraceae	2,900	Jens Rohwer, Hamburg
Orchidaceae	27,000	Mike Fay, Kew/Hassan Rankou, Kew
Pteridophytes	12,000	Michael Hassler/WCVP Maarten Christenhusz
Rubiaceae	12,000	Charlotte Taylor, Missouri & Meise team
Australian Endemic Families	100	Sue Fyfe, Canberra

[**Total 81,000**]

- **Prospective TENs:**

Taxon	# spp.	Comments	Contacts
Euphorbiaceae *s.l.* (excl. *Euphorbia*)	4,500	Initial contact made	G. Levin (ILL)
Melastomataceae	5,150	Initial contact made	F. Michelangeli (NY)
Poaceae	10,550	Yes but no funds to update	R. Soreng (US); M. Vorontsova (K)
Juncaceae	440	Species Plantarum Project	W. Thomas (NY)
Chrysobalanaceae	531	Species Plantarum Project	W. Thomas (NY)
Lecythidaceae	311	CoL GSD W. Thomas (NY)	
Cyperaceae	5,000		W. Thomas (NY)
Balsaminaceae	1,000		E. Smets (L)
Mycoheterotrophic plants			Vincent Merckx, Leiden
Santalales	2,200		Dan Nickrent (Peter F to contact)
Myrtaceae	5,000	*Syzygium, Eugenia & Eucalyptus*	To be confirmed
Seagrasses	72	4 families	Michelle Waycott, Adelaide

- **TENs Expectations:**

  All names in the WFO Taxonomic Backbone (including Effectively Published but not Validly Published names) are to be included in the dataset submitted by a TEN (as this dataset entirely replaces that in the Taxonomic Backbone for the TEN group. It is not expected that TENs will be able to have complete scrutiny of all names, especially in the short term, and that names can be left as 'Unchecked'

- **Prospective TEN Survey (Task 11, 13, 52 & 53):**

  A Family Gap Analysis (FGA) is being prepared for publication. Current TENs are included and prospective TENs will be included in the internal version of the FGA. WCSP reviewers will be included in the internal version of the FGA.

- **TEN FAQ:**

  Following Jim Miller's work, an FAQ for TENs needs to be compiled, as an extension to the general FAQs. It should be general, not time bound, including post-2020 plans, highlighting the benefits for people to be involved in TENs. This was approved by the Council (Rec. #4).

COLLABORATION WITH CATALOGUE OF LIFE

- A joint WFO/CoL/GBIF meeting was held in Geneva, 28-30 October 2019, working towards WFO being a 'Super-GSD' proving data for all living plants covered by WFO but further work is needed to assess the implications for CoL in terms of Completeness (CoL has an additional attribution level).

- It was mentioned that, in order to address the latency for incorporation of new names and the taxonomic review of these names there needs to be more work on pipelines to/from nomenclators (IPNI, etc). Future Registration of new names will help address this.

- Col+ Clearinghouse / extended dataset may be a source of Content

- A WFO Representative, and a deputy, need to be nominated by the Council for the CoL Advisory Board. WFO participation in the CoL Taxonomic and Technical Working Groups is also desirable to share experience and tool development. Chairs of WFO Working Groups would be the point of contact for this (Rec. #5).

WFO PLANT LIST/TAXONOMY BROWSER
- A demo of a 'Normative Taxonomy' viewer produced by Roger Hyam (Edinburgh) was presented. This viewer could be used to view current dynamic Taxonomic Backbone, archived downloads, and/or an annual WFO Plant List.

- It was agreed that an annual snapshot, 'WFO Plant List 2020' (with year changed as appropriate), should be established, but there needs to be clarity on what this is and no confusion with users with respect to the dynamic Taxonomic Backbone. The first version of a WFO Plant List should only be produced when the Backbone data is of comparable quality to WCVP (and Catalogue of Life) by the end of 2020 (Rec. #6).

- These views will be included in a separate tab on the Portal (as is done for the About Pages), and RBG Edinburgh offers to develop and maintain this area of the Portal

- The assignment of DOIs to datasets needs to be reviewed to avoid duplication/confusion.

REGISTRATION OF NOMENCLATURAL ACTS (Task 47 & 51):
- IPNI is re-implementing a Registration system in Spring 2020. A Bryophyte Registration system is being discussed based on Tropicos. It remains to be seen if there is a role for WFO in Registration.

ENHANCING CONTENT
- The criteria for judging authorisation of potential Content Providers was **deferred to next meeting in May 2020.**   We need to generate criteria for evaluating content offers from non-consortium members but at the same time, we need to get more content in to increase coverage taxonomically and geographically.

- Two stages of completeness with Content upload were recognised:
    - Stage 1: Upload only Content for names which were matched in the first name-matching process (requires no/little input from Content Provider)
    - Stage 2: Content Provider resolves problems resulting from the name-matching process and Content for additional names can be ingested

- It was suggested that WFO gives percentages of what data have been uploaded from what is published for each source of Content.

- Consortium Members should be contacted by Co-chairs of Council to solicit offers for new Content.

- **Priority Sources** (Rec. #7):
    - Fl. Helvetica (descriptions in French and German) – Pierre-André Loizeau (G)
        - Name matching completed (90% matched), awaiting descriptions

- Fl. Central Africa – Meise
  - Name matching underway
- Fl. Malesiana   - Eric Smets to follow up, included in EDIT Platform
- Euro+Med - Walter Berendsohn, included in EDIT Platform
- Fl. Nepal – Mark Watson (E)
- eMonocot descriptions - Alan Paton (K) [already have PalmWeb included]
- Endemic Flora of Chile – Martin Gardner (E)
- Fl. Pakistan - James Miller, included in TROPICOS (MO)
- Moss Flora of China - James Miller, included in TROPICOS (MO)
- Moss Flora of Central America - James Miller, included in TROPICOS (MO)
- African Plant Database – Geneva (G)
- Fl. Ireland – John Parnell (TCD)

- **Other Sources:**
  - Digital Flora Philippines   Agreed text can be used, but not digital images
  - eFloraMaghreb.org   6,400 species, to check
  - Fl. Somalia   Mats Thulin, agreed (will be in Kew POWO)
  - Fl. Marquesas   Smithsonian
  - Fl. Hawaii   Smithsonian, offered
  - Fl. Gabon   Naturalis, in EDIT Platform
  - Fl. Guianas   Naturalis, In EDIT Platform
  - Fl. Iberica   Verbal agreement to Jim Miller
  - Fl. Arabia   Tony Miller, Edinburgh
  - Rhododendron monograph   Alan Elliott, Edinburgh
  - Illustrated Treatments for Korea: Cyperaceae, Poaceae, Pteridophyta, Coniferae (descriptions in Korean) – Kaesun Chang, Korea National Arboretum

WFO PORTAL INTERFACE

- **Use Case Gap Analysis (Task 9):**
  The previous internal review (2017) was updated for priority use cases needed for 2020, a severity of gap advised and the next step is to pass the updated spreadsheet to the Tech WG for advice.

- **Portal Interface Review (Task 63):**
  It was decided to delay the external consultation on user experience until the data was updated.

- **Name Status Display:**
  On Taxon Page revise wording as follows [with underlined words hyperlinked/popup to definitions/glossary]:
  – Accepted: 'This name is reported by <TEN Name> as an <u>accepted</u> name'
  – Synonym 'This name is reported by <TEN Name> as a <u>synonym</u> of <ACCEPTED NAME>'
  – Ambiguous 'This name is reported by <TEN Name> as <u>ambiguous</u>'
  – Unchecked 'This name is currently <u>unchecked</u> and awaiting taxonomic scrutiny'

  Ambiguous names to appear on the portal, not to be 'excluded'

The review of the display of Taxonomic Status for names above the rank of species on both the Search Results page and the Taxon Page was **deferred to Meise**.

- **Citation Display:**
  Taxon Page
    - Cite this taxon page as 'WFO (2019): Taxus L. Published on the Internet; http://www.worldfloraonline.org/taxon/wfo-4000037650. Accessed on: <DATE>'
    - Can the scientific name be italicised in this citation?

  Data Download
    - For current data: Cite this as 'WFO (2019): World Flora Online Taxonomic Backbone (20190513). Published on the Internet; http://www.worldfloraonline.org. Accessed on: [DATE]' – to include date automatically as in Taxon Page so it can be cut/paste by users
    - Include a header page with data downloads to give citation, license, attribution, etc. This would cover citation of archived versions without being explicit for each one on the website.
    - Give DOIs whenever possible

  FAQs
    - Suggest the deletion of the FAQ on the About Pages referring to Citation of WFO.
    - Review when the About Pages are revised.

- **General Redesign**
  A redesign of the Portal to make it more user friendly and engaging should be post-2020 and not detract from the priority to increase Content and improve the quality of the Taxonomic Backbone. Plans for a future redesign should continue to be developed as costed work packages to include in funding bids

- **About Pages**
  The 'About Pages' need urgent major revision to be more engaging and informative, and support awareness-raising communication drive in 2020. Chuck Miller will look into giving permission to external editors for the About Pages on the MO server (otherwise move outside MO firewall, e.g. to the Google Cloud). Council to form an 'About Pages Task Group' to take on the revision of the About pages, including members of the Communications Working Group (Rec. #8)

Peter Wyse Jackson thanked Mark Watson and the Taxonomic Working Group for their work.

Report from the Technical Working Group
Chuck Miller presented the Technical Working Group Report.

PROGRESS REVIEWED
- The Technical Working Group has had 3 Conference Calls since the Meeting in Istanbul.
- The IPNI Names have been matched with WFO at 68%.
- As requested previously, a Data Download Page was added to the Portal.
- The modifications requested for the About page in the Portal were implemented: the list of TENs was updated and the list of Floras Online was added.

- Content is now 366 thousand species descriptions for a total of 113 thousand species
- Reviewed the use and assignment of WFOIDs.
- Google Cloud account is being spent at $1600/mo, there are still $40K remaining
- Reviewed language of the TPL message redirecting to WFO
- Botalista progress and functions were discussed in the Technical Working Group
- Discussed some issues with the name matching process
- Discussed the pros and cons of Darwin Core Archive versus the newer Frictionless Data method.
- Commented on Paris offer of 20GB Sharepoint for server storage
  Received a presentation by Laurence Benichou on e-publication data and the European Journal of Taxonomy.

ACTION ITEMS REVIEW
- **Presentations about WFO** (item #1)**:**
  – Biodiversity_Next Conference: WFO Symposium – Leiden, Oct 2019 - Walter & Chuck
  – Colombian Botanical Congress, August 2019 – Lauren Raz
  – Checklist of Alpine Countries, Bern, Switzerland, November 2019 – Pierre-André Loizeau
  – Flora of Cuba, Havana, March 2020 - Walter
- **Test Harvester with new Data Types** (Item #34) **-** Done
- **Endemic families from Madagascar** were added to backbone (Item #36).
- **WFO Backbone text in TPL** (Item #49): The text was added to the home page of TPL.
- **Adding complete data download to TPL portal** (Item #50): this was recommended to be canceled.
- **Authoritative information on accepted names and synonyms from a well-defined geographic area** (Item #36)**:** The following sources were integrated into the WFO backbone:
  – Madagascar endemics
  – Colombian endemics (in progress).
- **New Names** (Item #42):
  – IPNI IDs are in progress (New IPNI names will be loaded with Status of Unchecked).
  – New TEN names will be loaded with Status of Accepted, Synonym or Ambiguous
- **Duplicates** (Item #44): High-confidence duplicates are done, the low-confidence duplicates remain to be resolved.
- **Data ingestion** (Item #54). The following tasks were all done:
  – Deprecate use of namePublishedInID
  – Implement use of nameAccordingToID
  – Implement "exclude" field in Backbone input file
  – Include 'ex authors'
- **Enhance Production Portal with Descriptive Data** (Item #6)
  – **Reharvest flora datasets to capture descriptions for new names or newly matched names** (Item #6.1):
    i. Solanaceae Source – Pending New Reharvest
    ii. eFlora of China – Reharvest for more content

        iii.   NYBG – Flora of NE US – Still pending 35,000 descriptions
        iv.   Flora of West Tropical Africa – Need to combine divided descriptions.
        v.   Flora Tropical East Africa – Need to combine divided descriptions.
        vi.   IUCN Conservation Status – Pending Reharvest
        vii.   Images from Solanaceae & Flora of China – Pending Reharvest

– **Continue to load remaining and new datasets** (Item #6.2):
        i.   Flora de Colombia (monographs) - Done
        ii.   Catalogo de las Plantas de Colombia – 26K species - Name matching in progress (4K unmatched)
        iii.   Australian Floras – Names for vascular flora received and matched. No descriptive data received yet.
        iv.   Flora of Nepal – No data received.
        v.   Illustrated Flora of Turkey – New version in 2020.
        vi.   Illustrated Treatments for Korea: No response
        vii.   Fl. Helvetica – Name matching in progress. Waiting for descriptions
        viii.   Flora do Brazil – more descriptions present – Provider lacks resources
        ix.   eMonocot descriptions (Kew) – Got PalmWeb descriptions, pending reharvest
        x.   eFlora of North America – Done. <u>New FNA data (James Macklin)?</u>
        xi.   Flora of Central Africa (Meise) – Names matched, waiting for descriptions
        xii.   African Plants Database – (distributions, ecology, biology) 200K names, 78K taxa – <u>Approval needed</u>
        xiii.   eFloramaghreb.org - 6400 taxa – <u>Approval needed</u>

- **Implement BOTALISTA software** (Item #10)
  – **Interrelated subject areas**:
        i.   Name matching tool (for backbone and content provider seeing name quality control and eventually WFO-IDs)
        ii.   Backbone editing tool (for TEN using Botalista)
        iii.   Backbone ingestion workflow tools
           1.   For external TEN
           2.   For Botalista TEN
        iv.   TEN Management Tool
           1.   Structured communication workflows between Botalista processes, data providers, and TEN Manager
  – **Priority:** Name Matching Tool (with communication between Geneva, St. Louis and backbone contributors

- **Code modifications as requested in Istanbul** (Item #48).
The following code modifications are done:
  – Add URL Link to External Links higher taxon names to Angiosperm Phylogeny Website (orders and above) and explore similar link for Bryophyte higher ranks. Done for APG.
  – Add TPL's "Major Plant Groups" to supra-family hierarchy. Done.
  – Move 'Name accepted by xxx' under the protologue citation. Done.

- Change background of statistics counts on home page to white, eliminate "Explore" and change all characters to blue. Done.
- Add a list of online floristic information as a download from the WFO About pages. Done.
- Include [This taxon page should be cited as]... Done.
- Combine 3 kinds of synonyms together under a single 'Synonym' checkbox. Done.
- Provide option for users to have more synonym details displayed. Done.
- Delete 'Identification Keys' in statistics bar as none in there.

The following code modifications are pending, ongoing or deferred:
- Add Acknowledgements section to About page. No Acknowledgements received. Change Objectives tab to Acknowledgements.
- Add responsive GUI.
- Assess if order of Descriptions can be prioritized (for display).
- Assess how to provide page hit statistics by data provider.
- Add 'Accepted species' number to statistics bar. First reported Ongoing, later done.
- Supporting the OwnCloud server at Google. OwnCloud server was upgraded.
- Software Developer Staffing. Needed for major functional changes to Portal.

Chuck also presented suggestions of how to set the banner in The Plant List's Home Page and Taxon Page, and where to include the Backbone Viewer that would be developed by Edinburgh.

- **Next Steps for 2020.** The following next steps were proposed:
  - Load More Content Data.
  - Fix geo server display.
  - Synchronize WFO Backbone WFOIDs with IPNI IDs.
  - Add new names from IPNI.
  - Load More Backbone Data from TENs
  - Complete Botalista - Geneva
  - Evaluate use of DOIs for uploaded datasets and downloads
  - Resolve gaps in Portal function by changing code as resources allow
  - Resolve insufficient software development staffing

- **Pending, Ongoing or Deferred**. The following items were left as they were previously:
  - Create a Harvester administration/operations guide (Item #7). - Ongoing
  - Complete gap analysis of the portal use cases (Item #9). – Ongoing
  - Update Guides for contributors (Item #14). – Once more ongoing (name matching)
  - Develop markup tools for a toolkit (Item #15). – Deferred
  - DOIs for datasets and downloads (Item #29). - Ongoing (requires code change)
  - WFO Darwin Core extensions (Item #30) - Deferred
  - Formal request to GBIF for WFO-tailored versions of IPT and DwCA Validator (Item #31). – Ongoing
  - Implementation task: Reveal hidden fields (e.g. Basionym) (Item #35a). – Deferred
  - Implementaton task: Enable alternate classifications (Item #35b). – Deferred

- Source' should be used to provide authors of individual accounts, giving the full bibliographic citation (Item #54). - Ongoing

In closing, Peter Schalk from Naturalis offered harvesting ETI content (with Copyright) to use for WFO. William estimated that they will be ready to harvest that in 6 months.

As a closing remark, Pierre-André indicated that it's important to get funding. Dr. Wyse Jackson agreed

REPORT FROM COMMUNICATIONS WORKING GROUP
It was pointed out that the Communications Working Group had not being active recently and will discuss later.

WFO/GBIF/CATALOGUE OF LIFE (COL+) COLLABORATION
Olaf Banki gave a presentation on the Catalogue of Life and mentioned that there has already been some previous interaction: in May 2017, WFO and Species 2000 / CoL signed an MoU for collaboration, then Olaf was in the WFO Council Meeting in Dublin too. Later Chuck attended the CoL meeting and more recently there has been a meeting in Geneva. The annual 2019 checklist consists of 172 taxonomic databases with global or regional coverage. The Catalogue of Life retains the GSD's own classification below points of connection and uses the consensus management classification above. Currently, there are 366,474 plant species from 17 GSDs, including fossils. The Col+ project (2017 – 2019) is a new infrastructure for the Catalogue of life powered by GBIF that includes the functionality of the GBIF Backbone Taxonomy: extends CoL, separates names & taxonomy and provides some avenues for (infrastructural) support to content authorities.

The Catalogue of Life Plus 1st phase project focuses on 4 milestones:
1. Monthly editions public. COL assembly in production and updated data by Q4 2019
2. Extended Catalogue of Life assembled. Functionality of GBIF backbone taxonomy integrated
3. COL portalNew public portal in production
4. GBIF adoption by Summer of 2020.

The Catalogue of Life Plus is seen as an incubator project of the Alliance for Biodiversity Knowledge. This Alliance supports the vision that globally we have to come towards a more integrated biodiversity data landscape based on shared biodiversity informatics infrastructure components. See more information at www.biodiversityinformatics.org

CoL+ proposal for a towards a global taxonomic inventory for plants is to organize a joint workshop with WFO, COL, GBIF, and others to come to a vision towards a global taxonomic inventory of plants and following this workshop, there would be a more technical workshop and finally a white paper describing the WFO/CoL/GBIF collaboration.

The outcomes of the WFO/GBIF/CoL Workshop in Geneva were a Report from the workshop on the vision towards a global plant taxonomic inventory in the form of a Paper and the plan to develop a workplan for WFO/GBIF/CoL up to mid 2020 as input for a white paper describing the collaboration at the end of 2020.

Olaf presented a draft WFO/GBIF/CoL workplan, up to mid-2020, to explore the collaborations concerning:

- **Governance:** Reciprocal Representation WFO and COL and clarity in what COL, WFO, and GBIF are doing in respect to taxonomic names services (user categories, products, stakeholders)
- **Taxonomic:** Gap analysis and Higher classification (APG IV classification)
- **Technical:** Technical systems, roadmaps, and interactions; Data standards (assessment of the CoL Data Package format), Coverage/Scope analysis of WFO and CoL holdings; Attributions, citation, licensing; and Open contributions)

After mid-2020 start to develop the agreed WFO/GBIF/COL white paper describing the collaboration.

<u>Peter Wyse Jackson</u> thanked Peter Schalk and Olaf Banki for attending the meeting.

PRESENTATION: "Flora of Australia" and "Australia's National Species List"
Sue Fyfe from Canberra presented on the Flora of Australia & Australia's National Species List.
The Flora of Australia is produced by the Australian Biological Resources Study in collaboration with Australasian botanists, it has been in hard-copy volumes since 1981 to 2015 (half of the 60 volumes planned), since then it's been available in static pdf treatments online and there's a digital platform since 2017 (**www.ausflora.org.au**). Currently, ABRS funds new treatments for priority taxa, treatments for unpublished hard copy volumes and updating existing treatments. The data includes descriptions, habitat and notes, entered manually for expert authors, reviewers and editors, it's linked to images, distribution maps and dichotomous keys. The Nomenclature and Taxonomy is managed by the Australian Plant Name Index & Australian Plant Census. The National Species list is a single point of access to names and taxonomy for native and naturalised Australian biota based on published names and concepts for Australia's flora and fauna with an appropriate, agreed, implemented governance model actively curated and updated by experts that allows for the change of concepts over time. Out of the estimated 26,000 vascular plants in Australia and New Zealand, the National Species List contains 24,751 accepted species (95%) and the Flora of Australia has more than 15,000 profiles of 10,455 species (58%).

PRESENTATION: "Enhancing taxonomic publications for dynamic data exchange and navigation"
Laurence Benichou, from Museum national d'histoire naturelle & *EJT* consortium, presented on the way they have joined other institutions to improve their publication process to allow a dynamic exchange of data and navigation of their articles. With over 1,500 titles in the Catalogue covering all fields related to the Museum, the Museum Press currently publishes 9 journals and 9 series of monographs including Floras like the Flora of Gabon or the Flora of Cameroun. The EJT is a peer-reviewed international e-only fast-track collaborative journal in descriptive taxonomy, founded in 2011, that belongs to 10 institutions. A team of professional editors and desk editors optimize data extraction using the *EJT* Standard format to mine a PDF and produce semantically enhanced data. The presentation was shared with each of the Working Groups and the Council, in one of them, it was suggested by Lauren that we could work together for post-2020 on developing discovery tools (and if necessary a pipeline) to help get data of interest into WFO. Names will be at the heart of any such effort.

Mark asked about other journals joining this initiative. Pensoft journals have also adopted the standard. Other journals that are not in Europe can participate as well.

UPDATE: Post-2020 Global Biodiversity Framework, the Global Strategy for Plant Conservation and potential World Flora Online next steps for inclusion (Peter Wyse Jackson and Maïté Delmas).
Global Partnership for Plant Conservation conference was held in Aug. 2018 in SANBI (Cape Town), after which the CBD Secretariat convened a liaison group meeting with reps of the COP and GPPC to consider what the next GSPC post-2020 might be like. At COP14, GPPC was tasked with creating a progress report on the current GSPC, and to try to connect a new GSPC with a new Global Biodiversity Framework to be adopted in Kunming, China, next year. A new GSPC is in the works; a draft has been circulated to the GPPC members (in Oct), with 18 proposed targets for post-2020 with their indicators and alignment of current and future targets. There's no certainty that there will be an interest amongst the Parties to the CBD for a new post-2020 Plant Conservation Framework. But it is hoped that megadiverse countries will support the creation of a new GSPC, which would encourage support from other countries. Maite is co-chair of GPPC. On the Plants2020 website there is a report on the case of the WFO. Hopefully, GSPC will be accepted as part of the Global Biodiversity Framework. In the Report of progress of the GSPC worldwide, out of 16 GSPC targets, Target 1 is the only one likely to be achieved.

There will be an IUCN World Conservation Congress in Marseille next year with session organized by GPPC titled "Saving Plants, Saving the World" and another SBSTTA meeting in June, and GSPC will likely be included in the agenda. Another working group in Bogotá in July. COP15 in Kunming China in November. By then we hope to have an updated strategy for the next decade. China has already launched its own National Plant Conservation Strategy for 2020-2030. If there is another GSPC, then the targets will be much more closely linked to those of the Global Biodiversity Framework currently being negotiated.

Further discussion will be needed on how to declare victory on Target 1 of the current GSPC during 2020, even though it is recognized that this will be a continuing project after 2020.

ARRANGEMENTS FOR THE NEXT MEETING OF THE WFO COUNCIL
• The 13th meeting will be held at the Meise Botanic Garden, Belgium 25-29 May, 2020.
• Marc Sosef made a presentation about the Meise meeting, including the history, location, collections, research and publications of Meise Botanic Garden.
• Sue Fyfe confirmed the plan to host the 14th meeting in Canberra, Australia.

ELECTION OF CHAIRS OF THE COUNCIL AND WORKING GROUPS
The chairs of the Council and Working Groups were all unanimously reelected.
• WFO Council Chairs – Peter Wyse Jackson and Pierre-André Loizeau
• Taxonomic Working Group Chairs – Mark Watson, Wayt Thomas, Thomas Borsch, and Thomas Haavermans
• Technical Working Group Chairs – Chuck Miller and Walter Berendsohn
• Communications Working Group Chairs – Barbara Thiers, Eduardo Dalcin, and John Parnell

CONCLUSION AND CLOSE OF MEETING
Peter Wyse Jackson and Pierre-André Loizeau acknowledged all the co-Chairs of Working Groups for their coordination and hard work. They were very grateful for the work from Sunitha, William and Alan. They were also grateful for the Missouri Botanical Garden Team, Kathy Farris, and Jim Miller's and Chuck Miller's teams.

Pierre Andre thanked Peter for the hospitality and the accommodations and the Missouri Team, as well as thanks for leading the meeting.

With no other business items, the 12th Meeting of the World Flora Online Council was closed.

REVIEW OF ACTION ITEMS

The following action items from the Istanbul meeting were reviewed and updated.

#	TASKS	WHO?	WHEN?	COMMENTS
1.	**Presentations on WFO.** Take advantage of the meetings we attend to promote the WFO.	All	*Continuously .* *Upload to WFO Presentations folder in ownCloud.*	*Next presentations:* *- Biodiversity Next Meeting in Netherlands, October* *Please upload presentations to ownCloud folder*
2.	**Update current signatories.** Update the list of Consortium members on the website. *Maintain an archive of hard copies of the Agreements between Data Providers and the World Flora Online stored at the Secretariat.*	Peter Wyse Jackson	*As new members join.*	
3.	**Update Facebook page.** Keep updating FB page with news and current information. - *Included in the Communications Strategy*	Communic. Committee	Richelle will update FB, send photographs to her.	*Refer to Communications WG. for Communications Strategy.* *Any member may suggest a volunteer to Co-Chairs.*
5.	**Videos.** *It was recommended that we include the links to videos of institutions on Website*.	All	*Continuously*	*- Anyone with videos in their institution relevant to WFO, please provide.*
6.	**Enhance Production Portal with Descriptive Data.** Production portal should be enhanced with descriptive data content as advised by the Data Content subgroup for the Nov. meeting. *Send a tweet as content is loaded to Production.*	William	*Ongoing task.* *When ready, William Ulate will touch base with the intermediary contacts of the Content providers for the next digital resources to bring into the WFO Portal, as determined by the Taxonomic WG in order to increase the diversity*	*Re-harvest flora datasets to capture descriptions for new names or newly matched names:* - *Solanaceae Source* - *eFlora of China* - *NYBG – Flora of NE US* - *Plants of the World Online -* - *POWOP data on Flora of West Tropical Africa* - *IUCN Conservation Status* - *Images from Solanaceae & Flora of China* *Continue to load remaining and new datasets:*

#	TASKS	WHO?	WHEN?	COMMENTS
			of content and geographic coverage. *The Taxonomic Working Group will define the criteria (scientific credibility, completeness, substantial contribution, currency, etc.), similar to those used for assessing TENs, to judge the authorization of potential Content Providers during the next meeting*	- *Flora of Colombia* - *Australian Floras* - *Flora of Nepal* - *Illustrated Flora of Turkey* - *Illustrated Treatments for Korea: Cyperaceae, Poaceae, Pteridophyta, Coniferae (descriptions in Korean) – Kaesun Chang* - *Fl. Helvetica (descriptions in French and German) – Pierre-André Loizeau* - *Fl. Trop. East Africa (Kew, TBC)* - *eMonocot descriptions (Kew, TBC)*
7.	**Create a Harvester administration/operations guide.** The development of a Harvester administration/operation guide should be carried out immediately through testing and collaboration.	William	*Ongoing task*	*New updates should be included.*
9.	**Complete gap analysis of the portal use cases.** Complete a full analysis of the portal use case gaps, including severity of the gap, difficulty to remediate, resources to mediate and a prioritization.	Mark, Chuck	*In Progress*	*Conduct simple survey with generic questions about usability, functionality, user experience (e.g. alternate classifications)*
10.	**Implement Botalista software.** Work together to further develop Botalista as collaborative tool for expert networks to contribute backbone data.	Pierre-André and Raoul	June 2020	*Project delayed.* *Raoul would test the ingestion to Botalista of the full version of the taxonomical backbone.*
11.	**Make a Survey of existing global taxonomic networks.** Make a Survey of existing global taxonomic	*TEN Manager*	*In Progress*	*Continuing as we build the list of actual and potential list of TENs*

#	TASKS	WHO?	WHEN?	COMMENTS
	networks and the systems used and ask if they are willing to be responsible to match names to treatments.			
12.	**Provide standards for genus and species of angiosperms and gymnosperms. Address suprafamily classification.**	*Taxonomic. WG*	*- Mark Watson will lead the update of families and higher ranks, liaising with the Technical Working Group for instructions on how this can be done (within Botalista).*	*Tax WG discussed at Colombia, recommended following up APG IV. Barbara has touched base with her contacts on indications on how to solve taxonomic problems for non-APG groups (ferns and bryophytes).* *- A new family classification proposed in writing to the Taxonomic Working Group should be accompanied by its higher classification.*
13.	**Taxonomic Expert Networks (TENs).** Identify specialists to review parts of the taxonomic backbone. When no networks exist, identify specialists to review parts of the taxonomic backbone and/or assess the quality of the treatment in the current WFO backbone.	*TEN Manager*	*In Progress* *Created first draft on the "**World Flora Online Collaboration Model and Workflow for Contributors to the WFO Taxonomic Backbone** for discussion* *The list of TENs will be worked by the Taxonomic Working Group during the next meeting.*	*List of 9 TENs approved by the Council at Colombia:* *1. Begoniaceae - M. Hughes (E)* *2. Cordiaceae - J. Miller (MO)* *3. Caryophyllales - T. Borsch (B)* *4. Dipterocarpaceae - M. Newman (E)* *5. Hypericum - S. Crockett (Graz); N. Robson (BM)* *6. Picramniaceae - W. Thomas (NY)* *7. Sapotaceae - P. Wilkie (E)* *8. Solanaceae - S. Knapp (BM)* *9. Zingiberaceae - M. Newman (E)* *Set up a dedicated email address for WFO TENs Manager at RBGE, Aaron Elliott.* *Mark Watson, Wayt Thomas and Jim Miller will include potential contacts/institutions into the shortlist of 60 large to medium size*

#	TASKS	WHO?	WHEN?	COMMENTS
				families not covered by WCSP to prioritize and circulate this list to the Taxonomic Working Group for comment and then distribute among the members of the Consortium.
14.	**Update guidelines for contributors**. Guidelines for contributors available (June 2014) need to be updated.	*Walter, William*	*In Progress*	*Updates to the three guidelines are completed, posted on OwnCloud, and awaiting final approval by Council.*
15.	**Develop markup Tools for a Toolkit.** Consolidate the Markup Tools being used; develop them to integrate them into a toolkit. *- SANBI has developed Markup tools and are available for others to use. Available from GitHub:* github.com/rudivs/SpeciesMarkupAddIn	*Technical WG*	Ongoing	*No current update, not priority for 2019, but continue for future*
16.	**Communicate document on web strategy based on CBD CHM work.** Create a document on web strategy for the next meeting based on the work being done by the CBD CHM. Suggest ideas on materials like meetings where WFO should present a keynote or at least a Symposium on WFO. *- Communications Committee will define Communication plan as a bigger topic.* *- Put someone in charge of the Social Media*	*Comm. WG.* *(Eduardo Dalcin, Barbara Thiers, John Parnell)*	*In Work* *Draft Web Strategy created.* *– The Communications Working Group should work in a Communications Strategy that identifies the target audiences (TENs, General Public, Taxonomic Community and others) and bring as a discussion point in Dublin.*	*We need to have a clear strategy on how the WFO is integrated into all of the outcomes of CBD, which requires an understanding on how the CBD works and a lot of promotion of the WFO within the CBD Mechanisms.* *- Install a Content Management System (CMS) on Google Cloud (WordPress). Defer to next meeting the recommendation to adopt a CMS for the About page.* *- Make the About web page (currently in HTML) easier to*

#	TASKS	WHO?	WHEN?	COMMENTS
	- Separate production of content from the website administration, tailor-make the strategy for each group in order to facilitate the prioritization. *- Launch of our communications strategy to raise awareness when we have a portal that people could use. Communicate key advances and specific strategy.* *- Demonstrate a joint Consortium web site to promote fundraising.* *-For a Strategy define Who they are? What to tell them? How to tell them? Who's going to tell them? And when are they going to be told?*			*update by multiple partners (migrating to a CMS).* *- Reassess About page content. Put together some guidelines about an Acknowledgements section and submit them to the Council for acceptance in principle.* *For the Communication Strategy, define what WFO is doing in the next 6 months to be able to know what to communicate. We need to define what audience we want to attend first and use appropriate platforms to reach them. Peter Wyse Jackson may send a message to the Council asking for names of specialists who could collaborate on a Communication Plan, once we know what we want to communicate.*
17.	**Prepare short paper for TAXON.** Prepare a draft explaining the WFO taxonomic backbone approach, describing the acknowledgement structure and the available technological tools (for ingestion). *- Edit, polish and distribute to the group and external people who may have something to add.*	*Taxonomic Working Group*	*Finalized and open for comments to both Tech and Tax lists soon.* *Thomas Borsch will finalize the manuscript of the TAXON paper with Marc Sosef and Mark Watson and submit it by the end of January 2019.*	*Underway, excellent progress. Close to being able to submit.as discussed in the Taxonomic Working Group report.*
18.	**Save the Dates.** Save the dates for the 12th & 13th meetings	*Peter Wyse Jackson*	12th Meeting – St. Louis, MO, USA Nov 18-22, 2019 13th Meeting – Meise, Belgium, May 25-29, 2020.	*Post the report of the previous Council Meeting on the WFO website*

#	TASKS	WHO?	WHEN?	COMMENTS
			14ᵗʰ Meeting – Canberra, Australia, late 2020	
19.	**Create a list of institutions relevant to promote WFO and interact with.**	*Barbara will compile* *All: Send suggestions and contacts to Barbara*	*Some work done on this already.*	*Create a list of who we should approach to make the point of the importance of WFO and market our initiative.* *- Handle in context of the Communications Strategy.*
29.	**DOIs for datasets and downloads.** Evaluate using GBIF-generated DOIs for WFO contributed datasets and downloads	*Technical Working Group*	*Pending code change*	*Creation of metadata for downloads for DOI.* *Evaluate the adding DOIs to uploaded datasets and downloaded reports.*
30.	**WFO Darwin Core extensions.** **WFO Terms not included in Darwin Core standard:** 1. **localID:** Record identifier used by the data contributor. E.g. Tropicos ID, Flora of S Africa ID, EDIT ID 2. **Alternate Taxon/Name IDs:** E.g. Catalogue of Life ID 3. **taxonomicStatusReference:** Accepted or Synonym status by/according to publication. E.g. Accepted according to GrassBase 4. **sourceCitation (of the name record):** Not namePublishedIn or bibliographicCitation. E.g. Solanaceae Source is source of the Backbone name record. 5. **VerbatimSpecimenList:** Currently using Specimens extension. 6. **VerbatimDistribution:** Using "Distribution" Description Type in Descriptions.txt file	*Technical Working Group*	*Ongoing*	- Write a white paper on Darwin Core extensions needed for WFO - Formally request Darwin Core extensions from TDWG for WFO

#	TASKS	WHO?	WHEN?	COMMENTS
	7. **Protologue:** Using Description Type of Original Publication in Descrriptions.txt file 8. **nomenclaturalNote**			
31.	**Send formal request to GBIF for WFO-tailored versions of IPT and DwCA Validator, involving SANBI and Flora do Brasil**	*Technical Working Group*	*Ongoing*	*Botalista replaces tailored version of DwCA Validator.* *Tailored IPT still needed for taxonomic and descriptive data.*
33.	**Resolve insufficient resources to support:** **a) Software development staffing.** **b) Institution to maintain OwnCloud**	*WFO Council*	*Defer to next meeting in Istanbul*	*a) Missouri is committed to providing William's role, but we have an issue with software development staffing* *b)- Defer decision to St. Louis.*
34.	**Test Harvester with new Data Types** as advised by the Council during the Nov. meeting in Paris.	*William*	*Ongoing.* *Distribution data needs more work.*	*- Harvest distribution data into the Portal* *- Trial harvesting identification keys into the Portal*
35.	**Implement the following tasks** (not high-priority): *1. Reveal hidden fields (e.g. Basionym)* *2. Enable alternate classifications*	*William*	*When possible. Requires code change.*	*To achieve with limited resources, whenever possible* *1. Pending* *2. Pending*
36	**Integrate authoritative information on accepted names and synonyms from a well-defined geographic area into the WFO backbone,** and thereby improve the overall quality of the latter. Prior to engaging Taxonomic Expert Networks (TENs) for a taxon-by-taxon review of the backbone information.	*William Pete Lowry*	*Ongoing*	Use the taxonomic backbone of the *Catalogue of the Plants of Madagascar* project as a test case. *(Endemics from Madagascar and African Plants Database)*

#	TASKS	WHO?	WHEN?	COMMENTS
38	**Formalize relation with IAPT**	WFO *Council*	Defer to next meeting.	- IAPT is now a Member of the Council. Patrick S. Herendeen, new IAPT chair, was interested, according to Michelle Price and collaboration was examined during their last meeting in October.
39	**Catalogue of Life**	*Marc Sosef, Mark Watson and Thomas Borsch*	Marc Sosef will coordinate the task force for COL with Mark Watson and Thomas Borsch to take forward work on a white paper that will discuss collaboration between WFO and COL, including a proper mechanism to develop a technical partnership. To be addressed in St. Louis.	*The Council indicated that in-depth discussions are needed on how we could possible work if there are rival taxonomic backbones in use. The task force with to take forward work on a white paper that will discuss collaboration between WFO and COL. A proper mechanism to develop a technical partnership should be included.*
42	**New Names.** Implement a mechanism to deal with new names coming from Content Providers or IPNI and updating the Taxonomic Backbone, as recommended by the Taxonomic Working Group. *A 'new name' is an Effectively Published name not already in the Taxonomic Backbone. Content Providers only provide one name, their accepted name of the taxon for which they are providing content*	*Technical Working Group*	The Technical WG suggests we need to be deferred due to limitations of eMonocot ingestion process Deferred to next meeting in St. Louis	- *Create a feedback mechanism as needed to alert TENs when a new name is incorporated in the pre-harvesting Taxonomic Backbone (eventually Botalista).* - *Make an agreement with IPNI to receive their annual updates of new names and new combinations.* - *Treat new names from IPNI as if coming from a non-TEN Content Provider* - *Export new names in the backbone in a data format appropriate for the TENs to incorporate into their own system.*
44	**Duplicates.** There are 17.7k name duplications in the Taxonomic Backbone (TPL artifacts)	*Taxonomic Working Group*	In progress Significantly reduced.	- *William will provide the list of 17.7k name duplicates for assessment including the taxonomic status*

#	TASKS	WHO?	WHEN?	COMMENTS
				- Wayt Thomas will work with Chuck and William to review the spreadsheets of duplicate names, dividing the task between Consortium members.
47.	**Nomenclatural Registration.**	*Mark Watson, Jim Miller and Pierre-André*	Ongoing.	*The subcommittee will be in charge to express an interest of WFO to become a Registration Centre to the Nomenclatural Registration Committee.*
48.	**Make modifications to the Portal** 1. Add Acknowledgements section to About page – Defer to St. Louis 4. Add URL Link to External Links higher taxon names to Angiosperm Phylogeny Website (orders and above) and explore similar link for Bryophyte higher ranks. 6. Add TPL's "Major Plant Groups" to supra-family hierarchy. 14. Add responsive GUI (size auto adjustable, upgrade to Bootstrap 4) (code change) low priority 15. Change background of statistics counts on home page to white, eliminate "Explore" and change all characters to blue. 16. Assess if order of Descriptions can be prioritized (for display). 17. Assess how to provide page hit statistics by data provider. 18. Add a list of online floristic information as a download from the WFO About pages. Add a note indicating WFO is not necessarily endorsing the sources. 19. On the Taxon Page change 'Preferred Names' to	*Technical Working Group*	Ongoing	1. *Ongoing* 4. *Ongoing* 6. *Ongoing* 14. *Ongoing* 15. <mark>*Done*</mark> 16. *Ongoing* 17. *Ongoing* 18. *Ongoing* 19. <mark>*Done*</mark> 20. <mark>*Done*</mark> 21. *Ongoing* 22. *Ongoing* 23. *Ongoing* 24. *Ongoing* 25. *Ongoing* 26. *Ongoing*

#	TASKS	WHO?	WHEN?	COMMENTS
	'Nationally Preferred Names', and 'Local Names' to 'Other Local Names' 20. Change section title 'General Description' to 'General Information' as this gives a better distinction from 'Morphology' 21. 'Name accepted by xxx' should be moved to under the protologue citation. 22. Include [This taxon page should be cited as 'http://worldfloraonline.org/taxon/wfo-0001031908, 25 April 2019'] near the top of the Taxon Page, e.g. where current 'Name accepted by...' is placed, above first description. 23. Combine 3 kinds of synonyms together under a single 'Synonym' checkbox. Displaying three kinds of synonyms (Heterotypic, Homotypic, Synonym) in the Search Page filter options is confusing/not necessary 24. Provide option for users to have more synonym details displayed. Do not separate heterotypic/homotypic/synonym in the general view. 25. Delete 'Identification Keys' in statistics bar as none in there 26. Add 'Accepted species' number to statistics bar			
49.	**Add WFO Backbone text to home page of TPL**. *Text to be drafted and approved by Council by email*	*Technical Working Group*	Done.	

#	TASKS	WHO?	WHEN?	COMMENTS
50.	**Add complete data download to TPL** with data quality warning in webpage and metadata.	*Technical Working Group*	Ongoing. Put warning: This has not been revised.	
51	**MO & G take lead for a Nomenclator for Bryophytes.**	*MO & G*	Ongoing.	MBG has names list for the mosses. Formation of a TEN.
52.	**Update List of TENs Spreadsheet** with APGIV orders and families, WCSP coverage, TENs and post on WFO website to encourage take up by TENs	*Taxonomic Working Group*	Ongoing After Istanbul Meeting.	
53.	**Compile a list of WCSP Reviewers for potential TENs**, and report to St. Louis meeting.	*TEN Manager*		

54	**Data Ingestion:**
	1. Deprecate use of namePublishedInID.
	2. Implement use of nameAccordingToID.
	  • Modify code as needed.
	  • Add Taxonomic Status Reference box above Bibliography.
	  • Display bibliographicCitation for nameAccordingTo.
	3. Implement "exclude" field in Backbone input file.
	  • Used to tag names as "Do Not Process".
	4. Include 'ex authors' in the author citation of scientific names
	5. 'Source' should be used to provide authors of individual accounts, giving the full bibliographic citation "X & Y (date). In A & B (eds), Flora of xx: p. 34-55." and hyperlink to online account if we have it.
		William		1. *Ongoing*
				2. *Ongoing*
				3. *Ongoing*
				4. *Ongoing*
				5. *Ongoing*

#	TASKS	WHO?	WHEN?	COMMENTS
55	**Change Content Contributor Guidelines to add how to add Authors, Editors, or other attributions to Descriptive Data.** • Embed in Source reference Bibliographic Citation	*Walter, William, Chuck*		
56	**Explore links with COL GSDs as potential WFO TENS**	*TEN Manager with Yuri Roskov*		
57	**Explore links with Michael Hassler and using his fern dataset as a TEN for ferns**	Walter B.		
58	**Assess adding the BGCI Threat Search database** as this includes national level and non-standard conservation assessments	*William*		
59	**Re-run IPNI-WFO Name Matching after the WCSP/IPNI Update** to improve the number of matching names from 68% and analyse the results. **Update Protologue information for matched names using IPNI data**	*William*		
60	**Advise on the de-duplication of 7 remaining duplicate names with descriptive data.**	*Taxonomic Working Group*	Done	*All duplicates with descriptive data resolved.*
61	**Review the quality of other data types in GTA and report to Council before inclusion in WFO**	*Taxonomic Working Group*		
62	**Advise on display options to have descriptive data on the Taxon Page with alternate views: order by**	*Technical Working Group*		

#	TASKS	WHO?	WHEN?	COMMENTS
	content provider vs by description type.			
63	**Review the portal interface prior to and discuss at next Council meeting**	*Taxonomic Working Group*		
64	**Consider using an equal area map projection for Geographical Coverage on About page.**	*Technical Working Group*		

LIST OF ATTENDEES

Attendees:

1.	Peter Wyse Jackson, Missouri Botanical Garden, Council co-Chair
2.	Pierre-André Loizeau, Conservatory and Botanical Garden of Geneva, co-chair WFO Council
3.	Maïté Delmas, Museum national d'histoire naturelle, Paris (MNHN)
4.	Visotheary Ung, Museum national d'histoire naturelle, Paris (MNHN)
5.	Thomas Haavermans, Museum national d'histoire naturelle, Paris (MNHN)
6.	Richelle Weihe, Missouri Botanical Garden (MBG), WFO Project
7.	Murat Aydinkal, Editor of Illustrated Flora of Turkey
8.	Sue Fyfe, Australian Government Department of the Environment and Energy
9.	Jim Miller, Head of Science and Conservation, Missouri Botanical Garden (MBG)
10.	Mark Watson, Royal Botanic Garden Edinburgh, co-Chair Taxonomical Working Group
11.	Walter Berendsohn, Berlin Botanic Garden and Botanical Museum (BGBM)
12.	Laurence Bénichou, Museum national d'histoire naturelle & EJT consortium
13.	Lauren Raz, Universidad Nacional de Colombia, Bogotá
14.	Alan Elliott, Royal Botanic Garden Edinburgh, TEN Manager
15.	Raoul Palese, Conservatory and Botanical Garden of Geneva
16.	Marc Sosef, Meise Botanical Garden, Belgium
17.	Adil Güner, Editor of Illustrated Flora of Turkey
18.	Peter Fritsch, Director of Research, Botanical Research Institute of Texas (BRIT)
19.	Sunitha Katabathuni, Missouri Botanical Garden (MBG), WFO Project
20.	William Ulate, Missouri Botanical Garden (MBG), Gatekeeper, WFO Project
21.	Alan Paton, Royal Botanic Gardens, Kew, (K)
22.	John Parnell, Trinity College, Dublin.
23.	Chuck Miller, Missouri Botanical Garden (MBG), co-Chair Technical Working Group

Also present (later):
24.	Peter Schalk, Naturalis, Catalogue of Life
25.	Olaf Banki, Catalogue of Life +

Regrets:
Wayt Thomas
Gideon Smith
Barbara Thiers
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ACTION ITEMS CARRIED FORWARD TO NEXT MEETING IN MEISE, BELGIUM

#	TASKS	WHO?	WHEN?	COMMENTS
1	**Presentations on WFO.** Take advantage of the meetings we attend to promote the WFO.	All	*Standing Item* *Please upload presentations to WFO Presentations folder in ownCloud.*	*Recent and next presentations:* – *Biodiversity_Next Conference: WFO Symposium – Leiden, Oct 2019 - Walter & Chuck* – *Colombian Botanical Congress, August 2019 - Lauren* – *Checklist of Alpine Countries, Bern, Switzerland, November 2019 - Raoul* – *Flora of Cuba, Havana, March 2020 - Walter* *Please upload presentations to ownCloud folder*
2	**Update current signatories.** Update the list of Consortium members on the website. *Maintain an archive of hard copies of the Agreements between Data Providers and the World Flora Online stored at the Secretariat.*	Peter Wyse Jackson	*Standing Item*	No new signatories
3	**Update Facebook page.** Keep updating FB page with news and current information. - *Included in the Communications Strategy*	Communic. Committee	Richelle will update FB, send photographs to her.	*Refer to Communications WG. for Communications Strategy.* *Any member may suggest a volunteer to Co-Chairs.*
5	**Videos.** *It was recommended that we include the links to videos of institutions on Website.*	All	*Continuously*	- *Anyone with videos in their institution relevant to WFO, please provide.*
6	**Enhance Production Portal with Descriptive Data.** Production portal should be enhanced with descriptive data content as advised by Taxonomic WG/Council.	William	*Ongoing task.* *When ready, William Ulate will touch base with the intermediary contacts of the Content providers for the next*	See Tax WG report for revised priority list for harvesting. Initial harvesting of content for names matched in first name-matching process prioritized for as many datasets as possible (rather

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	Send a tweet as content is loaded to Production.		*digital resources to bring into the WFO Portal, as determined by the Taxonomic WG in order to increase the diversity of content and geographic coverage.* *The Taxonomic Working Group will define the criteria (scientific credibility, completeness, substantial contribution, currency, etc.), similar to those used for assessing TENs, to judge the authorization of potential Content Providers during the next meeting*	than resolving the residual un-matched names). • Tax WG to define criteria for assessing Content Providers at the Meise meeting • *Fl. Trop. East Africa (Kew, TBC) – Done, descriptions divided, need to be combined* • *IUCN Conservation Status – Pending new Version.* • *Improve Metadata for Images from Solanaceae & Flora of China - Pending* *Continue to load remaining and new datasets:* • *Solanaceae Source – New reharvest pending* • *eFlora of China - Done* • *NYBG – Flora of NE US – Still pending 35,000 descriptions* • *POWOP data on Flora of West Tropical Africa – Done, descriptions divided, need to be combined* • *Fl. Trop. East Africa (Kew, TBC) – Done, descriptions divided, need to be combined* • *IUCN Conservation Status - Done* • *Images from Solanaceae & Flora of China - Pending* • *Flora de Colombia (monographs) - Done* • *Catalogo de las Plantas de Colombia –26K names - Name matching in progress (4K unmatched)* • *Australian Floras – Names for vascular flora received and matched. No descriptive data received yet. Contact?* • *Flora of Nepal – No data received.* • *Illustrated Flora of Turkey – New version in 2020* • *Illustrated Treatments for Korea: No response*

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				• *Fl. Helvetica – Name matching in progress. Waiting for descriptions* • *Flora do Brazil – more descriptions present – Provider lacks resources* • *eMonocot descriptions (Kew, TBC) – Got PalmWeb descriptions, pending* • *eFlora of North America – Done. New FNA data (James Macklin)?* • *Flora of Central Africa (Meise) – Names matched, waiting for descriptions* • *African Plants Database – (distributions, ecology, biology) 200K names, 78K taxa – Approval needed* • *eFloramaghreb.org - 6400 taxa – Approval needed*
7	**Create a Harvester administration/operations guide.** The development of a Harvester administration/operation guide should be carried out immediately through testing and collaboration.	William	*Ongoing*	*New updates should be included. Created documentation for "Name-Matching" process and made code and SQL Stored Procedures available for Geneva in Github (private MBG-CBI repository)*
9	**Complete gap analysis of the portal use cases.** Complete a full analysis of the portal use case gaps, including severity of the gap, difficulty to remediate, resources to mediate and a prioritization.	Technical Working Group	*Ongoing*	Priority Use Cases were assessed against the portal by the Tax WG during the St Louis meeting and report passed to the Tech WG for comment
10.	**Implement Botalista software.** Work together to further develop Botalista as collaborative tool for expert networks to contribute backbone data.	Pierre-André and Raoul	June 2020	*Project delayed.* *Raoul would test the ingestion to Botalista of the full version of the taxonomical backbone.* *Interrelated subject areas:* 1. *Name matching tool (for backbone and content provider seeing name quality*

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				control and eventually WFO-IDs)
				2. *Backbone editing tool (for TEN using Botalista)*
				3. *Backbone ingestion workflow tools*
				• *For external TEN*
				• *For Botalista TEN*
				4. *TEN Management Tool*
				• *Structured communication workflows between Botalista processes, data providers, and TEN Manager*
				Priority: Name matching tool
				Needs intense communication between Geneva, St. Louis and backbone contributors
				St. Louis made local Name Matching application's Code and SQL Stored Procedures available for Geneva in Github (private MBG-CBI repository)
11.	**Make a Survey of existing global taxonomic networks.** Make a Survey of existing global taxonomic networks and the systems used and ask if they are willing to be responsible to match names to treatments.	*TEN Manager*	*Ongoing*	Standing Item: continuing activity as we build the list of actual and potential list of TENs Update and publish the Family coverage/gap analysis
12.	**Provide standards for genus and species of angiosperms and gymnosperms. Address suprafamily classification.**	*TEN Manager*	Nearly complete. Taxonomic Backbone to be updated by Meise	Remaining tasks are for Pteridophytes to be checked against PPGI, finish the updates to mosses, and update liverworts & hornworts with data to be provided by John Brinda (MO)

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13.	**Taxonomic Expert Networks (TENs).** Identify specialists to review parts of the taxonomic backbone. When no networks exist, identify specialists to review parts of the taxonomic backbone and/or assess the quality of the treatment in the current WFO backbone.	*TEN Manager*	*Ongoing* *The list of TENs will be worked by the Taxonomic Working Group during the next meeting.*	10 TENs approved by Council in St Louis (see Taxonomic WG Report). Gap analysis for plant families to be updated for higher classifications and for pteridophytes and bryophytes for Meise meeting. Made available online with potential contacts removed (but kept in internal version).
14.	**Update guidelines for contributors.** Guidelines for contributors available (June 2014) need to be updated.	*Walter, William*	*Completed*	*Updates to the three guidelines are completed, posted on OwnCloud and About page.* *A few omissions were noted when trying Flora Helvetica (Geneva) Brittonia (NYBG) and Rhododendron (Edinburgh) that need to be included in the General Guidelines and Guidelines for Content Providers*
15.	**Develop markup Tools for a Toolkit.** Consolidate the Markup Tools being used; develop them to integrate them into a toolkit. *- SANBI has developed Markup tools and are available for others to use. Available from GitHub: github.com/rudivs/SpeciesMarkupAddIn*	*Technical Working Group*	Deferred at St Louis	*No current update, not priority for 2020, but continue for future*
16.	**Communicate document on web strategy based on CBD CHM work.** Create a document on web strategy for the next meeting based on the work being done by the CBD CHM. Suggest ideas on materials like	*Comm. WG.* *(Eduardo Dalcin, Barbara Thiers,*	*In Work* *Draft Web Strategy created.* *– The Communications Working Group should*	*We need to have a clear strategy on how the WFO is integrated into all of the outcomes of CBD, which requires an understanding on how the CBD works and a lot of*

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	meetings where WFO should present a keynote or at least a Symposium on WFO. - *Communications Committee will define Communication plan as a bigger topic.* - *Put someone in charge of the Social Media* - *Separate production of content from the website administration, tailor-make the strategy for each group in order to facilitate the prioritization.* - *Launch of our communications strategy to raise awareness when we have a portal that people could use. Communicate key advances and specific strategy.* - *Demonstrate a joint Consortium web site to promote fundraising.* -*For a Strategy define Who they are? What to tell them? How to tell them? Who's going to tell them? And when are they going to be told?*	*John Parnell)*	*work in a Communications Strategy that identifies the target audiences (TENs, General Public, Taxonomic Community and others) and bring as a discussion point in Dublin.* • *Draft Web Strategy created. - Istanbul* • *ResearchGate WFO project was set up. Done - Istanbul.* • *FAQs have been added to About portal. Done - Istanbul.*	*promotion of the WFO within the CBD Mechanisms.* - *Install a Content Management System (CMS) on Google Cloud (WordPress). Defer to next meeting the recommendation to adopt a CMS for the About page.* - *Make the About web page (currently in HTML) easier to update by multiple partners (migrating to a CMS).* - *Reassess About page content. Put together some guidelines about an Acknowledgements section and submit them to the Council for acceptance in principle.* *For the Communication Strategy, define what WFO is doing in the next 6 months to be able to know what to communicate. We need to define what audience we want to attend first and use appropriate platforms to reach them. Peter Wyse Jackson may send a message to the Council asking for names of specialists who could collaborate on a Communication Plan, once we know what we want to communicate.*
17.	**Prepare short paper for TAXON.** Prepare a draft explaining the WFO taxonomic backbone approach, describing the acknowledgement structure and the available technological tools (for ingestion). - *Edit, polish and distribute to the*	*Taxonomic Working Group*	Done, submitted November 2019.	

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	group and external people who may have something to add.			
18.	**Save the Dates.** Save the dates for the 13th & 14th meetings	*Peter Wyse Jackson*	*13th Meeting – Meise. Belgium. May 25-29.* *14th Meeting – Canberra, Australia, late 2020 (pending pandemic)*	*Post the report of the previous Council Meeting on the WFO website*
19.	**Create a list of institutions relevant to promote WFO and interact with.**	*Barbara will compile* *All: Send suggestions and contacts to Barbara*	*Some work done on this already.*	*Create a list of who we should approach to make the point of the importance of WFO and market our initiative.* *- Handle in context of the Communications Strategy.*
29.	**DOIs for datasets and downloads.** Evaluate using GBIF-generated DOIs for WFO contributed datasets and downloads (related to #68 and #75)	*Technical Working Group*	*Ongoing (requires code change)*	*Creation of metadata for downloads for DOI.* *Evaluate the adding DOIs to uploaded datasets and downloaded reports.*
30.	**WFO Darwin Core extensions.** **WFO Terms not included in Darwin Core standard:** 9. **localID:** Record identifier used by the data contributor. E.g. Tropicos ID, Flora of S Africa ID, EDIT ID 10. **Alternate Taxon/Name IDs:** E. g. Catalogue of Life ID 11. **taxonomicStatusReference:** Accepted or Synonym status by/according to publication. E.g. Accepted according to GrassBase 12. **sourceCitation (of the name record):** Not namePublishedIn or bibliographicCitation. E.g.	*Technical Working Group*	*Deferred at St Louis*	- Write a white paper on Darwin Core extensions needed for WFO - Formally request Darwin Core extensions from TDWG for WFO

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	Solanaceae Source is source of the Backbone name record. 13. **VerbatimSpecimenList:** Currently using Specimens extension. 14. **VerbatimDistribution:** Using "Distribution" Description Type in Descriptions.txt file 15. **Protologue:** Using Description Type of Original Publication in Descrriptions.txt file 16. **nomenclaturalNote**			
31.	**Send formal request to GBIF for WFO-tailored versions of IPT and DwCA Validator, involving SANBI and Flora do Brasil**	*Technical Working Group*	*Ongoing*	*Botalista replaces tailored version of DwCA Validator.* *Tailored IPT still needed for taxonomic and descriptive data.*
33.	**Resolve insufficient resources to support:** **a) Software development staffing.** **b) Institution to maintain OwnCloud**	*WFO Council*	*Defer to next meeting in Meise*	*a) Missouri is committed to providing William's role, but we have an issue with software development staffing* *b)- Defer decision to Meise.*
34.	**Test Harvester with new Data Types as advised by the Council during the 2017 meeting in Paris.**	*William*	*Done.*	
35.	**Implement the following tasks** (not high-priority): *3. Reveal hidden fields (e.g. Basionym)* *4. Enable alternate classifications*	*William*	*When possible. Requires code change.*	*To achieve with limited resources, whenever possible* *3. Deferred at St Louis* *4. Deferred at St Louis*
36	**Integrate authoritative information on accepted names and synonyms from a well-defined geographic area into the WFO backbone, and thereby improve the overall quality of the latter.**	*WFO Gatekeeper & TEN Manager*	*Ongoing/Done*	*The taxonomic backbone of the Catalogue of the Plants of Madagascar project was used as a test case, with endemic families Barbeuiaceae and Physenaceae integrated into Caryophyllales TEN, and MADCAT approved as*

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	Prior to engaging Taxonomic Expert Networks (TENs) for a taxon-by-taxon review of the backbone information.			*TEN for Asteropeiaceae, Sarcolaenaceae, and Sphaerosepalaceae* • ***Madagascar endemics loaded*** • ***Colombian endemics in progress***
38	**Formalize relation with IAPT**	WFO *Council*	Defer to next meeting.	- IAPT is now a Member of the Council. Patrick S. Herendeen, new IAPT chair, was interested, according to Michelle Price and collaboration was examined during their last meeting in October.
39	**Catalogue of Life/GBIF**	Pierre-André Loizeau	Ongoing	WFO/CoL/GBIF meeting held in Geneva October 2019 (see Taxonomic WG Report for summary). GBIF will conduct a comparison between WFO taxonomy and CoL Pierre-André Loizeau designated as the WFO representative on CoL Advisory Board
42	**New Names.** Implement a mechanism to deal with new names coming from Content Providers or IPNI and updating the Taxonomic Backbone, as recommended by the Taxonomic Working Group. *A 'new name' is an Effectively Published name not already in the Taxonomic Backbone. Content Providers only provide one name, their accepted name of the taxon for which they are providing content*	*Technical Working Group*	The Technical WG suggests we need to be deferred due to limitations of eMonocot ingestion process St Louis status: • IPNI IDs in progress. Name Matching done, awaiting corrections. • New IPNI names will be loaded with Status of Unchecked. • New TEN names will be loaded with Status	*Create a feedback mechanism as needed to alert TENs when a new name is incorporated in the pre-harvesting Taxonomic Backbone (eventually Botalista).* *- Make an agreement with IPNI to receive their annual updates of new names and new combinations.* *- Treat new names from IPNI as if coming from a non-TEN Content Provider* *- Export new names in the backbone in a data format appropriate for the TENs to incorporate into their own system.*

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			of Accepted, Synonym or Ambiguous	
44	**Duplicates.** There are 17.7k name duplications in the Taxonomic Backbone (TPL artifacts)	*Taxonomic Working Group*	In progress Significantly reduced.	− High value duplicates done. − Low value duplicates remain to be resolved Duplicate names will be reviewed following the update of the Taxonomic Backbone with WCVP
47.	**Nomenclatural Registration.**	*Pierre-André Loizeau*	Ongoing	Expression of interest to become a Registration Centre made. Further work pending future developments in other Registration Centres
48.	**Make modifications to the Portal** 1. Add Acknowledgements section to About page – Defer to St. Louis 4. Add URL Link to External Links higher taxon names to Angiosperm Phylogeny Website (orders and above) and explore similar link for Bryophyte higher ranks. 6. Add TPL's "Major Plant Groups" to supra-family hierarchy. 27. Add responsive GUI (size auto adjustable, upgrade to Bootstrap 4) (code change) low priority 16. Assess if order of Descriptions can be prioritized (for display). 17. Assess how to provide page hit statistics by data provider. 18. Add a list of online floristic information as a download from the WFO About pages.	Technical Working Group	Ongoing	1. No Acknowledgements received. Change Objectives tab to Acknowledgements (see #16) 4. APG done. Bryophytes ongoing 6. Done 14. Deferred 16. Not started. 17. Pending 18. Done 21. Done 22. Done 23. Done 24. Done 25. Done 26. Ongoing

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	Add a note indicating WFO is not necessarily endorsing the sources.			27. Ongoing
21.	'Name accepted by xxx' should be moved to under the protologue citation.			
22.	Include [This taxon page should be cited as 'http://worldfloraonline.org/taxon/wfo-0001031908, 25 April 2019'] near the top of the Taxon Page, e.g. where current 'Name accepted by…' is placed, above first description.			
23.	Combine 3 kinds of synonyms together under a single 'Synonym' checkbox. Displaying three kinds of synonyms (Heterotypic, Homotypic, Synonym) in the Search Page filter options is confusing/not necessary			
24.	Provide option for users to have more synonym details displayed. Do not separate heterotypic/homotypic/synonym in the general view.			
25.	Delete 'Identification Keys' in statistics bar as none in there			
26.	Add 'Accepted species' number to statistics bar			
27.	On Taxon Page revise wording as follows [with underlined words hyperlinked/popup to definitions/glossary]: • Accepted: 'This name is reported by <TEN Name> as an <u>accepted</u> name' • Synonym 'This name is reported by <TEN Name> as a <u>synonym</u> of <ACCEPTED NAME>'			

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	• Ambiguous 'This name is reported by <TEN Name> as <u>ambiguous</u>' • Unchecked 'This name is currently <u>unchecked</u> and awaiting taxonomic scrutiny'			
50.	**Add complete data download to TPL** with data quality warning in webpage and metadata.	Technical Working Group	Cancelled. No data download decided at St Louis.	
51	**MO & G take lead for a Nomenclator for Bryophytes.**	MO & G	Done	Bryophyte TEN approved
52.	**Update List of TENs Spreadsheet** with APGIV orders and families, WCSP coverage, TENs and post on WFO website to encourage take up by TENs	Taxonomic Working Group	Done	Further activity for this task is now rolled into #11
53.	**Compile a list of WCSP Reviewers for potential TENs,** and report to St. Louis meeting.	TEN Manager	Done	Further activity for this task is now rolled into #11
54	*Data Ingestion* *1. Deprecate use of namePublishedInID* *2. Implement use of nameAccordingToID* *3. Implement "exclude" field in Backbone input file* *4. Include 'ex authors'* *5. Source' should be used to provide authors of individual accounts, giving the full bibliographic citation*	William	1. Done 2. Done 3. Done 4. Done 5. Ongoing	
55	**Change Content Contributor Guidelines to add how to add Authors, Editors, or other attributions to Descriptive Data.**	Walter, William, Chuck		*Ongoing*

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	• Embed in Source reference Bibliographic Citation			
56	**Explore links with COL GSDs as potential WFO TENS**	*TEN Manager with Yuri Roskov*	Ongoing	Some GSD custodians already contacted
57	**Explore links with Michael Hassler and using his fern dataset as a TEN for ferns**	Walter B.	Done	Discussions with Hassler at the Geneva meeting October 2019 explored the links. Further work on this is rolled into #11
58	**Assess adding the BGCI Threat Search database** as this includes national level and non-standard conservation assessments (Related to #83).	*William*		*Related to #82*
59	**Re-run IPNI-WFO Name Matching after the WCSP/IPNI Update** to improve the number of matching names from 68% and analyse the results. **Update Protologue information for matched names using IPNI data**	*William*		*Related to #44 and #77*
60	**Advise on the de-duplication of 7 remaining duplicate names with descriptive data.**	Taxonomic Working Group	Done	All duplicates with descriptive data resolved.
61	**Review the quality of other data types in Global Tree Search and report to Council before inclusion in WFO**	Taxonomic Working Group	Done	Country-level distribution in BGCI's Global Tree Search to be included in the development of future mapping in WFO
62	**Advise on display options to have descriptive data on the Taxon Page with alternate views: order by**	*Technical Working Group*		*Pending*

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	content provider vs by description type.			
63	**Review the portal interface prior to and discuss at next Council meeting**	*Taxonomic Working Group*	Deferred to Meise	
64	**Consider using an equal area map projection for Geographical Coverage on About page.**	*Technical Working Group*		*Pending*
65	**Fix geo server in the Portal**	*Technical Working Group*		
66	**Negotiate with Kew to add a WFO link to IPNI name pages.**	*WFO Council*		
67	**Add "Data" link to WFO About page where "Follow Us" is currently**	*Technical Working Group*		
68	**Create a data paper of the WFO Backbone data with a DOI. Use this DOI for backbone download.** (related to #29)	*Technical Working Group*		
69	**Explore use of Frictionless Data for backbone data ingestion**	*Technical Working Group*	William	Walter is interested. *Pending*
70	**Assess addition of Annual Snapshot download – "WFO Plant List 2020" - without causing user confusion**	*Technical Working Group*		*Available in Data Download?*
71	**Static versions of the Taxonomic Backbone should be produced, to be called 'WFO Plant List <YEAR>'. RBG Edinburgh to lead on developing a prototype for Meise**	*RBG Edinburgh*		*Related to #72 and #70* *The first version of a WFO Plant List should only be produced when the Backbone data is of comparable quality to WCVP (and Catalogue of Life) - end of 2020?* •

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72	**Develop prototype 'WFO Plant List' and Taxonomic Backbone viewer**	Roger Hyam (Edinburgh)	To present to Council at Meise	*Related to #70 and #71* *These views to be included in a separate tab on the Portal (as is done for the About Pages), and RBG Edinburgh offers to develop and maintain this area of the Portal*
73	**Redevelop the 'About Pages' on the WFO Portal**	*'About Pages' Subgroup*	To present to Council at Meise	Peter Wyse Jackson to lead Task Group, including John Parnell, Alan Elliott, and others Chuck Miller to enable external editing of web About pages held on MO server.
74	**Assess addition of Families list page with attributes for each**		Deferred	*Is this an alternate view of #52, a list of all TENs including the gap of all orders and families that do not have TENs? Or a separate list of just the Families?*
75	**Check How to Cite on Download Page, Taxon Page and footer ribbon**	*Taxonomic Working Group*		St Louis Meeting results: **Taxon Page** • Cite this taxon page as 'WFO (2019): Taxus L. Published on the Internet; http://www.worldfloraonline.org/taxon/wfo-4000037650. Accessed on: <DATE>' Done. • Can the scientific name be italicised in this citation? Pending **Data Download** • For current data: Cite this as 'WFO (2019): World Flora Online Taxonomic Backbone (20190513). Published on the Internet; http://www.worldfloraonline.org. Accessed on: [DATE]' – to include date automatically as in

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				Taxon Page so it can be cut/paste by users - Done • Include a header page with data downloads to give citation, license, attribution, etc. This would cover citation of archived versions without being explicit for each one on the website • Give DOIs whenever possible. Pending. (Related to #29) **FAQs** • Suggest the deletion of the FAQ on the About Pages referring to Citation of WFO. • Review when the About Pages are revised
76	**Update the Taxonomic Backbone with data from Kew's WCVP** – task group to advise on how this can be done	WCVP Update Task Group	Procedure to be agreed and test families updated	Aiming to update the Taxonomic Backbone by end of 2020 so that the WFO Plant List will be at least as good as WCVP
77	**Cost/benefit of supressing the display of Taxonomic Status for names above Species in the search results and Taxon Page and adding them to the Taxon Pages**	*Taxonomic Working Group*	To be reviewed at the Meise meeting	
78	**Develop FAQs for TENs for inclusion in the About pages**	TEN Manager	2020 Q1	
79	**Provide TEN webpages, linked to the TEN table on About pages, to give more detailed information on TENs (e.g. membership) for those who do not have their own website. Order TEN table – to be included in About Pages redesign**	'About Pages' Subgroup		Related to #52

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80	**Develop Criteria for judging authorisation of potential Content Providers**	*Taxonomic Working Group*	Deferred to Meise meeting	
81	**WFO to give percentages of what data have been uploaded from what is published for each source of Content**	*Technical Working Group*		
82	**Life form display in the Portal is from BGCI's Global Tree Search, not from the Global Tree Assessment** *(see #61)*– **the WFO reference sources need to be updated to reflect this.** *(related to #83)*	*Technical Working Group*		
83	**Look into incorporating BGCI Global Tree Search country-level distribution data into mapping in WFO when this functionality is developed**.	*Technical Working Group*		*Related to #82*
84	**Contact Consortium Members to solicit additional Content datasets**	*WFO Council Co-chairs*	To have feedback to present at Meise	
85	**Review results of the comparison of WFO Taxonomic Backbone with CoL**	Taxonomic Working Group	Once GBIF have completed the comparison of the two datasets	Related to #39