Minutes from the 9th European GBIF Nodes Meeting and ALA Technical Workshop

8-11 May 2017, Swedish Museum of Natural History, Stockholm

All presentations can be found and downloaded from https://archive.org/download/PresentationsGBIFStockholm2017. The excursion checklist is available at https://archive.org/download/ExcursionSpeciesList_201706.

I. **Opening session by GBIF-Sweden** (Anders Telenius)

II. **Introduction**
   A. Tour de table
   B. Preparatory Survey (Anne-Sophie Archambeau) ***(Presentation 01)*** (See also: Capacity Self Assessment for GBIF Participants http://www.gbif.org/resource/82277)
   C. Presentation by the Election Committee of the proposed candidates for the positions as European Representative and Deputy Representative in the Nodes Steering Group (Wouter Addink) ***(Presentation 02). Votes will be cast before 24 May 2017, the result disseminated thereafter. The new delegates will take up position at GB24.***

III. **Update from the Secretariat**
   A. Strategic Plan 2017-2021 (Kyle Copas) **(*Presentation 03)***
   B. 2017 update (Kyle Copas) ***(Presentation 04)***

C. Update by Tim Hirsch (via Skype) on the LifeWatch 1st General assembly and presentation on the outcome of the discussions there.

IV. Collaborations & reporting and new opportunities

A. CESP reporting
   1. CESP EU BIREME (Wouter Addink)
   2. CESP Living Atlases Community (Anne-Sophie Archambeau) ***(Presentation 05)***
   3. CESP France Canadensys around ALA (Anne-Sophie Archambeau) ***(Presentation 05)***
   4. CESP mentoring France Benin (Anne-Sophie Archambeau) ***(Presentation 05)***
   5. CESP 2016 AgroTraining (Rui Figueira) ***(Presentation 06)*** Presentation file
   6. CESP Course on "Participatory Biodiversity Monitoring" (Cristina Villaverde) ***(Presentation 07)***
   7. CESP Regional capacity enhancement to Latin America by establishing Chile's node (Cristina Villaverde) ***(Presentation 07)***

B. DiSSCo (Wouter Addink) ***(Presentation 08)***
C. EUBON Conclusions and any following project (Anders Telenius) ***(Presentation 09)***
D. CETAF (Anders Telenius) ***(Presentation 09)***
E. Biodiversity Informatics Curriculum (Anders Telenius) ***(Presentation 09)***
F. Synthesys (Irene Bisang) ***(Presentation 10)***
G. COST Actions (Anne-Sophie Archambeau) ***(Presentation 11a)***; (Cristina Villaverde) ***(Presentation 11b)***
H. TrIAS (Dimitri Brosens) ***(Presentation 12:*** https://osf.io/7dpgr/wiki/Summary/***)***
I. Plazi (Donat Agosti) ***(Presentation 13)***
J. CoL Plus (Wouter Addink) ***(Presentation 14)***
K. DINA Collection management system (Stefan Daume) ***(Presentation 15)***

V. Thematic discussions

A. Nodes portals (and other tools)
   1. Update on ALA and Living Atlases (Dave Martin) ***(Presentation 16: pending reception)*** Atlas of Living Spain update (Cristina Villaverde) ***(Presentation 17)***
   2. Biodiversity Data Portal of Portugal (Rui Figueira) ***(Presentation 18)***
   3. Bioatlas.se (Manash Shah/Markus Skyttner ***(Presentation 19***: https://bioatlas.github.io/workshop-2017/slides/bioatlas-intro/ https://bioatlas.github.io/workshop-2017/slides/docker-101/***)***
   4. Presentation of the community Living Atlases (Marie-Elise Lecoq) ***(Presentation 20: pending reception)***
   5. Presentation of CKAN-based Belgian Data Portal (Maxime Coupremanne: http://data.biodiversity.be/)

NOTES from the 8th EU nodes portal session 2016: https://docs.google.com/document/d/1UuvXbfrU73MurfVntWgqihDbMi4jcYWYEIcAxts-ZBg/edit?usp=sharing
NOTES from GB22 nodes portal session 2015 (GBIF Community Site): http://community.gbif.org/pg/pages/view/49268/work-plan-group-green-sharing-and-jointly-developing-nodes-portal-solutions

B. Sequence Data (Fredrik Ronquist, Ingimar Erlingsson, Niclas Gyllenstrand) ***(Presentation 21)***

C. Event-based data (Dag Endresen) ***(Presentation 22)***

1. Update from the GBIF sample-based data publishing interest group: http://community.gbif.org/pg/groups/47949/samplebased-data-publishing-interest-group/ (Pre-ENM 8 2016 workshop on sample-based data topics available here: https://goo.gl/oqg2OR)
2. Event core for trait data: Capacity of European Node helpdesks to support publishing Agrobiodiversity Crop trait experimental datasets using **Event Core** and OBIS **extended MoF**? (*See also*: OBIS **extended MoF extension** reporting experimental data (Darwin Core: MeasurementOrFact) with an Event Core dataset:
https://github.com/iobis/env-data/tree/master/extension
https://github.com/iobis/env-data/wiki/eMoF-data-standardization
http://rs.gbif.org/extension/obis/extended_measurement_or_fact.xml
https://www.slideshare.net/OBIS-IOC/expanding-obis-beyond-species-occurrence-data-including-sampling-event-facts-and-measurements-related-to-the-environment ,
De Potter *et al.* (2017) Toward a new data standard for combined marine biological and environmental datasets - expanding OBIS beyond species occurrences. *Biodiversity Data Journal* **5**: e10989. https://doi.org/10.3897/BDJ.5.e10989 and
NOTES from the 8th EU data use and science-policy interface session 2016:
https://drive.google.com/open?id=15D5qwWQcnY0oirpx8kIS11iTqCuxCCuq-CvI1qEvg0U

VI Conclusions and Strategic planning

A. Conclusions from plenary, thematic and workshop sessions.

B. Strategic planning: European Nodes Workplan update 2017-2018
Defining goals, Priorities and Actions for the coming 12 months
Regional issues and correlation with strategic plans (André)

C. Strategic planning
Summary of action points - Conclusions from day 2:
GBIF is essential and a base for other international initiatives. A a lot of work remains to be done and we would like to ensure that the countries understand that they must pay their fees: support must be upheld.
Practical issues raised during the discussion:

- Presence/absence data: this is still an issue, and an update on what has been done or is already tried would be most welcome.
- Introducing "occurrenceStatus" = "absent" is really important
http://dev.gbif.org/issues/browse/POR-2864?jql=text%20~%20%22occurrenceStatus%22
https://github.com/gbif/portal16/issues/308
- Traits´ data are in great demand and should be prioritized
- Sequence data integration should be prioritized
- Linking specimens to publications should be prioritized: See https://demo.gbif.org/occurrence/1500371066 for an example of Linking data and papers published (*Remark by Tykarski:* Note that this is an example of a one-way, indirect connection: this way you can find but one reference connected with a specimen. If we look at this more generally, this should work both ways: to facilitate finding all papers

connected with a specimen and all specimens mentioned by a paper. More than this: eventually it could be done more directly, without a need to browse through the content of all relevant records)./(*Remark by Agosti*: I agree, this should be not a one2one relationship, but many2one. the information is already there, but the tools not, that allow to query for the articles, in which the specimen has been cited.)
Notably, GBIF is involved in a meeting on data mobilization including publications on June 28-30, 2017

- Sample event based datasets: Support by portal (e.g. allow to browse the sampling event)
- Continue to highlight publications correlated with GBIF-mediated data. Note the positive and nice way to show the work still needed based on a gap analysis initiative: See: Ebbe Nielsen Challenge 2016: Mind the gaps https://demo.gbif.org/news/82807/2016-gbif-ebbe-nielsen-challenge-targets-data-gaps-and-biases.
- Secretariat staff: Better communication of the roles of each staff member asked for. Make sure that we have a contact for nodes and for what purpose (and note the difference between technical and participation aspects)
- Noticing and celebrating GBIF reaching 1 billion records - which is due in not too distant a future - calls for attention. Perhaps a note in Nature/Science should be considered (by someone - Science Committee?), and/or a giant (meta)data paper on GBIF elsewhere?
- In connection to this: should GBIF:s communications strategy be reconsidered? Progress has been made in the past few months but still more effective ways of communication to different user groups are needed.
- Implications of developing DISSCo (http://dissco.eu/): Clarification of GBIF:s role in this project needed from the secretariat. GBIFS and nodes involvement is not obvious to all, and the European nodes might help DiSSCo in its current role by implementation of GBIF tools, training activities and playing a future role in connecting DiSSCo data with new users (e.g. EU reporting mechanisms etc.) and by linking GBIF to countries in EU that are part of DiSSCo but not yet of GBIF. A Tour e Table reveals considerable differences in level of engagement among nodes meeting meeting participants:
    - **Belgium**: many institutes are involved, but as far as we know, the node is not directly involved. Will give support whenever able and asked to do do.
    - **Denmark**: No definitive information available but the director of the Ntural History Museum of Denmark is an institutional member of the steering committee, and took part in the steering committee meeting in March.
    - **France**: in contact with IR Recolnat, the French contribution of DISSCo, but not directly involved at the moment due to the changes of organisation inside the MNHN. Will try to stay in the loop.
    - **Ireland**: not currently involved but will make efforts to put together a national consortium in order to join.
    - **Luxembourg**: with the GBIF node located at the natural history museum (which is the only institution managing natural

history collections in Luxembourg) GBIF and DISSCO would be closely integrated. However Luxembourg is not yet a member of DISSCO (“I learned about DISSCO at the GBIF EU Nodes meeting in Stockholm and immediately sent a mail with a description of the project and MoU to the director of the Museum and to our contact at the ministry of Culture letting them know that the deadline for signature of MoU is 15th of May (very short notice). So far I received a very encouraging response to participate in DISSCO from the ministry. I will try to see the director tomorrow and let’s hope he signs soon.”)

- **Netherlands**: Naturalis already involved as one of the leaders in the proposal and with the steering committee chair, and Species 2000 by a signed letter of intent for collaboration.
- **Poland**: only recently the ministry has started the process of evaluating ESFRI proposals but the GBIF Participant Node coordinates DiSSCo-related activities in the country and DiSSCo would assumingly be implemented by the consortium of institutions that cooperate with GBIF (data nodes).
- **Portugal**: The node is involved by the national point contact of DISSCO. National participation channels in effect through the national RIs PRISC and PORBIOTA.
- **Spain**: several institutes in Spain are involved and want to join DiSSCo, but currently the ministry does not support DiSSCo/will not join DISSCo.
- **Sweden** : MoU signed meaning lending support the nomination for an ESFRI but without the Swedish Museum of Natural History committing itself to participation in the presumptive ICEDIG* DISSCo component.

* **Innovation and consolidation for large scale digitisation of natural heritage – ICEDIG**
Child of DEDDI (2014 proposal title) Design of a European Distributed Digitisation Infrastructure for natural heritage.Response to http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/infradev-01-2017.html
Call INFRADEV-01-2017. Opening date 08 December 2016. Deadline: 29 March 2017. Maximum EU contribution 3 million €. **12 Partners**. University of Helsinki Finland (Coordinator); Naturalis Biodiversity Center,The Netherlands; Picturae BV, The Netherlands; Agentschap Plantentuin Meise, Belgium; Tartu Ülikool, Estonia; Centre Informatique National de l’Enseignement Supérieur, France; Natural History Museum, United Kingdom, Cardiff University, United Kingdom, Consortium of European Taxonomic Facilities, Belgium; Muséum national d’histoire naturelle France; Royal Botanic Gardens Kew, United Kingdom; Plazi GmbH, Switzerland

Abstract
Modern science requires digital access to data. Europe’s biological collections contain over one billion objects. Only

around 10% of these have been digitally catalogued and 1-2% imaged, rendering their information underused. The community largely agrees on their digitisation, but the methods, costs, and organisation need to be clarified. However, it is clear that digitising the collections with traditional methods will not scale to required level. Therefore, strengthening of the technological development capacity and efficiency of digitisation of scientific collections is needed.
The challenge is being tackled by the new ESFRI initiative Distributed System of Scientific Collections (http://dissco.eu/). Through digitising, aggregating and linking the collections, DiSSCo will enable critical new insights from the integrated digital data to address some of the world's greatest challenges, such as biodiversity loss and impacts of climate change. However, new research and technological innovation will be required to solve the technical challenges of digitising and seamlessly accessing over one billion objects, which will form a data pool of petabyte scale.

The ICEDIG project will support the innovation and consolidation phases of DiSSCo, and the work packages will be grouped in two streams accordingly. The consolidation stream will develop a shared governance model to support all aspects of service unification required by DiSSCo such as implementation of the open access principles, incentive schemes, planning and prioritisation, single sign-on, physical and digital access, and capacity development.
The technology stream will focus on the innovations that will be required to digitize a significant part of major collections in a foreseeable time and at acceptable cost. While advances have been made in recent years in industrializing the workflows of digitising botanical collections, similar results have not yet been introduced for other object types. Already now terabytes of data is being generated each day by automated imaging stations, and their inclusion and management in the European open science cloud is becoming a challenge. Capture of metadata from the images still is mostly manual work, which needs new approaches. Digitisation on-demand and remote access to physical objects need to be investigated. For these and other needs new methods need to be developed. They need to scalable and deployable for all major collections across Europe.

The work will be carried out in wide consultation with the larger community, which will be coordinated by the professional organisation CETAF. Partners in ICEDIG are major collections which already have experience in large-scale digitisation projects, and other partners with knowledge of emerging technologies such as big data management, cloud computing, robotics, and automation. The outputs will be prototypes, blueprints, novel workflows, new industry partnerships, and

citizen involvement, which will strengthen the technological development capacity and efficiency of digitisation of scientific collections and will pave the way for the successful construction of the DiSSCo research infrastructure.
https://docs.google.com/document/d/1BZhWqzsTiL8xVkA6ky_jFNArHXvcPeThEw1otO4LTvE/edit
Relevant documents repository:
GBIF GitHub: https://github.com/gbif
GBIF Portal GitHub: https://github.com/gbif/portal16
GBIF EU GitHub: https://github.com/GBIF-Europe

D. Preparation of the Global Nodes meeting in Helsinki (plenary discussion): https://docs.google.com/document/d/1Q07x-17qFwtHDbaqJpiDGuG_puze7DFBab9bSRZ41cE/edit#heading=h.myfivuttgzru
E. Tabular view of selected themes and actions with European GBIF nodes involved. Please make use of Community Site Nodes of Europe group and our European mailing list to communicate selected issues.The items shown below have been classified according to the strategic priorities included in the GBIF Strategic Plan 2017-2021.

General view:

Strategic priority: **DELIVER RELEVANT DATA**	
Topic	**Action wanted**
Sample-based data mobilization	• Feedback on the development • Identify use cases and potential publishers • Monitor and collaborate on the documentation (*Remark by Endresen*: DRAFT new version of the Sample based primer: • https://docs.google.com/document/d/1bJ8qyeFc6GPqPsPgFey3oIE5wZSWY3XCa0022SiV5Ek/edit#heading=h.gjdgxs) • Using Event core and the OBIS extended MoF for mobilizing trait/experiment data.
Strategic data mobilization	• Template for capturing use cases for connection with users and science-policy interface • Use the "suggest a dataset" tool on the website (Remark by Endresen: https://demo.gbif.org/tools/suggest-dataset) • Collect national/thematic strategies to mobilise data • Provide visualisation of gaps in gbif data • Needs for traits data, integration of sequences data, more general: linking occurrence data with all other kinds of connected data like traits, sequences, chemical analyses, experts, literature, multimedia
Strategic priority: **IMPROVE DATA QUALITY** (*Remark by Endresen:* **http://www.gbif.org/publishing-data/quality**)	
Data Validation tools	• Collaborative platform for development of shared algorithms (GitHub) • Document pre-publishing checks

	• Expose post publishing checks, fitness for use indicators
Strategic priority: **FILL DATA GAPS**	
Digitizing NHC	• Linking with possible future DISSCo activities ? • Closer cooperation with CETAF recommended (side by side meeting?) • Assess National Projects • Assess Users groups needs • Look for possible fundings • Assess technical expertise
Filling the gaps	• Disseminate Gap Analysis • Make Internal Gap Analysis • Showcase metadata only datasets • Encourage countries/DPs to join • Mobilization of citizen science data
Promoting open data in private sector	• Collect and share use-cases
Strategic priority: **ENHANCE BIODIVERSITY INFORMATION INFRASTRUCTURE**	
ALA portal	• Document overall architecture • Collect new nodes who are interested • How to manage transnational atlases? • Make sure the future of GRBio is secured, and if possible is integrated in other directories such as VIAF, institutions have a unique resolvable identifer (*Remark by Agosti*) • Setup project GovernanceGR • Use case
Linkage to literature	• Enhance existing connection between occurrence records and bibliography • Facilitate discovering records using bibliography fields (e.g. Dublin Core) as filters • Facilitate finding bibliography connected with records
National checklists	• Clear communication about checklist and update (dates) • Publish national + sub + thematic checklists • Seek EU funding
EBV's	• Keep an eye on it and look what is needed
Strategic priority: **EMPOWER GLOBAL NETWORK**	
EU Communication	• Communication from GBIFS about involvment on EU actions • Send EU Calls info to Secretariat • Anticipate future calls • Summary Directive/Regulation requirem ents • Setup proposals incubator

	• Improve on internal communication to new node managers? • Cost Action
Coordinate capacity enhancement in Europe	• Coordinate and strategize efforts around training for Nodes staff • Coordinate efforts around calls for proposals (e.g. CESP)
Recruiting new Participants in Europe	• Liaise with the Secretariat on recruitment of key participants and share information with the group • See also: Data hosting services: https://github.com/gbif/ipt/wiki/dataHostingCentres (*Remark by Endresen*)
Biodiversity informatics curriculum	• Sharing information on courses going on • Liaise with the global group

Detailed view

Themes	Actions	Nodes	Responsible	Secretariat
ALA portal	Document overall architecture (on going staff but basics are there)	ES+FR	**Marie-Elise (FR)**	Dave Martin
	Assess ALA portal Collect new nodes who are interested (continuing) List from the Madrid workshop	Adopters, hesitators or rejecters	**Jörg (DE), Anders (SE)**	Tim Robertson
	Investigate feasibility of shared back-end (not possible because political issues)	ES+AD+ PT+DE	**Cristina & Santiago (ES)**	Tim Robertson
	Setup project Governance (on going)	ES+FR+ PT+DE	**Santiago (ES)** in coordination with Dave Martin	Tim Robertson
	Use case	FR	**Marie Elise (FR)**	Aisha
	Additional coordination meetings with D. Martin (before June 2017)	ES + FR + SE + PT	**Cristina (ES)**	Dave Martin
Digitizing NHC	Assess National Projects	all	**Wouter (NL)**	Siro Masinde
	Assess Users groups needs	all	**Wouter (NL)**	Siro Masinde
	Look for possible fundings	all	**Wouter (NL)**	Siro Masinde
	Assess technical expertise	all		Siro Masinde

National checklists	Publish national + sub + thematic checklists => CoL Plus	all	**Wouter (Species2000), Dag (NO)**	Kyle Braak, Jan Legind (support when publishing), Markus Döring
	Assess reporting (BIREME proposal)	all	**André (BE)**	Aisha
	Seek EU funding	all		Donald Hobern
EU Communication	Send EU Calls info to Secretariat	all		Tim Hirsch
	Anticipate future calls	all	all	
	Summary Directive/Regulation requirements	all	**André (BE)**	Dmitry Schigel
	Setup proposals incubator	all	**Eric (FR)**, **André (BE)**	Tim Hirsch
	Cost Action CA on ALA CA IAS + CS	ad-hoc group	**Anne-Sophie (FR)** **Cristina (SP)** **Anne-Sophie**	
Data Validation tools	Collaborative platform for development of shared algorithms (GitHub)	Data Quality Group	**Dag (NO), all**	
	Document pre-publishing checks (GitHub)	all	**Christian (NO)**	Dmitry Schigel
	Expose post publishing checks, fitness for use indicators (GitHub)	Data Quality Group	**Dag (NO)**	Dmitry Schigel
Filling the gaps	Disseminate Gap Analysis		**Isabel (DK),**	Dmitry Schigel
	Make Internal Gap Analysis	all		Siro Masinde
	Showcase metadata only datasets	all		Siro Masinde
	Encourage countries/DPs to join	all	**Rui Figueira (PT)**	Tim Hirsch
	Mobilization of citizen science data	all	**Nils (NO)**	Siro Masinde
(Transversal)	Cloud documents repository	all	**Tania (LU)**	Alberto González

Sample-based data mobilization	Feedback on the standards and the guidelines (ongoing)		**Anders (NO), Dag (NO)**	Kyle Braak
	Identify use cases and potential publishers		Anders (SE), all	Kyle Braak
	Monitor and collaborate on the documentation	all	**Anders (NO), Dag (NO), all**	Kyle Braak, Kyle Copas
Coordinate capacity enhancement in Europe	Coordinate and strategize efforts around training for Nodes staff		**Cristina (ES)**	Alberto González
	Coordinate efforts around calls for proposals (e.g. CESP)		**Cristina (ES)**	Mélianie Raymond
Recruiting new Participants in Europe	Liaise with the Secretariat on recruitment of key participants and share information with the group			Tim Hirsch
Promoting open data in private sector	Collect and share use-cases	PT	**Rui Figueira (PT)**	Tim Hirsh, Siro Masinde
Strategize data mobilization	Template for capturing use cases for connection with users and science-policy interface		**Ofer (IL)**	Dmitry Schigel
	Template for capturing contact with new data publishers (Suggest a dataset)		**Dag (NO), Anders (SE)**	Siro Masinde
Biodiversity informatics curriculum	Sharing information on courses going on	ES, PT, SE	**Cristina Villaverde (ES)**	Alberto González
Empower Global network	Translation of documents/materials to french, spanish, portuguese	ES,FR,BE,PT		Kyle Copas

VII Side events

A. **ALA technical Workshop**; beyond the common introductory thematic session under section V A. above according to a separate agenda see below):

ALA Technical Workshop

Session 1 Introduction

A. Introduction of ALA and current status including deployments
B. Docker Fundamentals - What is it and why use it?
C. Comparison of deployment models (Ansible, Docker) and when each one is suitable
D. Building and Releasing using Continuous Integration processes

1. Current method using maven, github, Travis and GBIF maven repository
2. Adaptations used in BioAtlas - make, docker, Docker Hub, Travis

E. Changing and rolling out ALA components using Docker
1. Customizing ALA components and packaging using Docker - experiences from BioAtlas.se in Sweden - for example building a Docker Image for the collectory service
2. Upgrading individual ALA components to new releases - for example how to upgrade only the collectory service, or to add non-core components to provide additional functionality such as HTTPS

Session 2 **Customizing portals**

A. Experiences from internationalization (I18N) and national customizations of ALA modules - recommendations and lessons learnt from tools and practices used so far in national deployments (Marie-Elise Lecoq/Santiago Martinez de la Riva)
B. Building a nationally customized taxonomic backbone based on the Atlas name indexing module - approx 45' (David Martin/Marksu Skyttner/Manash Shah)

Session 3 **Non-core components**

A. Adding "non-core" components to the system composition such as components that run backups etc (Markus Skyttner/Manash Shah)
B. Tools for testing performance and scanning system components (Markus Skyttner)
C. Integrating Mirroreum - a web-based biodiversity analysis platform for reproducible research (Markus Skyttner)
    1. ALA4R setup customized to use data from a national portal

Session 4 **Open Session on other relevant topics and current questions**

Session 5 **Hands-on session**

Building a taxonomic backbone using national data sources (David Martin/Manash Shah/Markus Skyttner)

Session 6 **Spatial Portal - recommended practices for setting up layers etc**

A. Architectural overview (David Martin)
B. Work done in France - experiences and lessons learnt in the area of the Spatial Portal (Marie-Elise Lecoq)

Session 7 **Hands-on session**

A. Spatial components and/or Species Lists

Session 8 **Discussions and Future Directions**

A. Discussions - Overview of Work in progress and Future Works

Further link

A. Workshop webpage: https://bioatlas.github.io/workshop-2017/ https://docs.google.com/document/d/15nRV7eQ2atXs0mzDmlEoNIHtf1zMWmCCBzkrlQycegA/edit).

B. Excursions

During the meeting two excursions were offered: one morning excursion for early birds (a guided tour in the National City Park Haga-Brunnsviken with two participants), and one full-day visit to Malaise´s udde (Simpnäs - 59.881444,19.069090) by car/mini-bus, and by foot (13 participants). A list of species observations from Malaise´s udde available via GBIF may be found here: ***(Checklist 01)***. Observations made during both events have been made publicly available as an iNaturalist project (http://www.inaturalist.org/projects/gbif-european-nodes-meeting-2017-bioblitz).

VIII. List of participants at the 9th European GBIF Nodes Meeting and ALA Technical workshop:

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