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WORKSHOP ON TRAINING PROGRAMME DEFINITION

Grant Agreement Number: 823827 / Acronym: SYNTHESYS PLUS

Call: H2020-INFRAIA-2018-2020

Start date: 01/02/2019 / Duration: 48 months

Work Package: WP NA2 / Task NA2.3

Work Package Lead: CETAF / Task Lead: MNHN, RBINS

Delivery date: 01/02/2021

MILESTONE MS26

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Summary

The capacity of individuals to manage, access and use Natural Science Collections (NSC) data is fundamental to the vision of DiSSCo. Within the WP2 of the EC-funded **SYNTHESYS+** project, the task **NA2.3 (Develop focused training activities)** - with a single deliverable, **D2.3 (Catalogue of Training modules)**, due after 24 months (February 2021) - propose to develop a '**DiSSCo training programme**' to align with future DiSSCo requirements. The CETAF initiative **DEST** (Distributed European School of Taxonomy) will be used as the platform through which the training modules reach the collections workforce.

The milestone **MS26 (Workshop on Training Programme Definition)**, due after 12 months (February 2020), consisted of gathering SYNTHESYS+ Partners and stakeholders to lay the groundwork for the operational activities for the DiSSCo training programme. This report describes the content of the lunch-to-lunch workshop held at the **MNHN (Paris) on January 22nd-23rd, 2020**. During the workshop, a team of scientists explored the training modules available across Natural History institutions, and **constructed a catalogue of training modules**. This catalogue led to the **identification of gaps in training activities** for the development of a robust and comprehensive 'DiSSCo training programme'.

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Introduction and Scope

Designed to lay the groundwork for the operational training activities of the new DiSSCo RI, the task **NA2.3 (*Develop focused training activities*)** of the **EC-funded SYNTHESYS+ project** aims to support, develop, and disseminate through the DEST platform the **training activities** useful to the future DiSSCo RI users.

The DiSSCo RI works for the digital unification of all European natural science assets under common curation and access policies and practices that aim to make the data easily Findable, more Accessible, Interoperable and Reusable (FAIR).

In that respect, the task NA2.3 **will focus** on a **broad range** of formal and professional **training activities** and **catalogue** the trainings enabling NSC users to embark on data-intensive science research in bio- and geo-diversity. This includes, but is not limited to: trainings supporting the community in acquiring digital skills to speed up the data mobilisation of NSC; the use of ELViS (*European Loans and Visits System*) platform to handle loans, visits and digitization on demand; the use of software for collection management following e-Recolnat experience; trainings expanding digital workforce skills in big data processing, artificial intelligence and specimen data refinery; trainings accelerating digital transformation, such as data carpentry, data architecture, or data fabric; the use of cyber security assessment tools; trainings on bio- and geodiversity policy and legislation; data standards and interoperability; multispectral and 2D+/3D digitisation; DNA barcoding and metabarcoding; crowdsourcing and citizen science and; open science.

On January 22nd-23rd 2020, **partners of the SYNTHESYS+ Task NA2.3** along with the **CETAF-DEST, TDWG and GBIF**, met at the National Museum of Natural History (MNHN) in Paris, France, **to work on the edification of a DiSSCo Training Programme.** This workshop **(MS26)** was a contribution to the effort of the bio- and geodiversity community **to develop scientifically relevant and internationally applicable training programme for managing and using NCS assets**. The concertation aimed to provide a common vision, road map, and set of priorities for the development of an efficient training programme meeting DiSSCo training Services. The main output from the workshop will be a catalogue of trainings disseminated through the DEST platform (D2.3), and a list of gaps with suggested strategies to fill them in.

Agenda for the meeting

1- Introduction
2- Presentation of DEST, link to CETAF and to SYNTHESYS+
3- Presentation of European Training Modules
4- Round table 1: Identification of DiSSCo key training areas and training needs
5- Round table 2: Identification of DiSSCo training gaps
6- Round table 3: Setting up a 2020 work plan to disseminate existing European trainings through the DEST
7- Conclusion: to the long term, propose/develop a multi-annual DiSSCo Training program

All the progress on the task can be followed on a Google Drive Excel file:
https://docs.google.com/spreadsheets/d/1z3wiIOm5PRTQxMfXYnahtDgBxOt-Z87NAxdiI-KdZaM/edit#gid=0

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2. Attendees

Represented Institutions: **MNHN** (Magalie Castelin, Guillaume Billet, Vanessa Demanoff, Florian Ragot, Pierre-Yve Gagné, Jonathan Blettery); **RBINS** (Carole Paleco, Han de Koeijer); **MfN** (Peter Giere) ; CSIC (Begoña Sánchez); **NHMW** (Nesrine Akkari) ; **NRM** (Dan Holtstam), **RBGK** (Tim Fulcher), **UGOT-GGBC** (Heléne Aronsson), **RMCA** (Larissa Smirnova, Franck Theeten, Jean-Marc Herpers).

Represented Organisation: **CETAF** (Ana Casino, Laura Tilley); **DEST** (Catherina Voreadou, Frédéric Legendre); **GBIF** (Sophie Pamerlon).

Excused Institution: **HNHM**

3. Workshop Overview
Workshop Day 1

1. **[13:00-13:30] Opening & setting the agenda**

Round table: Introduction of every participants (Name, Institution and field of activity).

Presentation MNHN, M Castelin (MC) [Aim of the workshop & organization]
This workshop corresponds to the Milestone (MS26) of the Network Activity Task 2.3 (*Develop focused training activities*). The objective of this MS is to set up a work plan to execute the Deliverable 2.3 (*Catalogue of training module*), due in February 2021. The objective is a catalogue of training modules - to be run under the DEST and that addresses the identified needs of DiSSCo RI users and supplier.

MC recall DiSSCo RI main objectives, DiSSCo Scientific mission, and DiSSCo Challenges:
 Providing Remote Access Services
  Implementing digitization processes
  Facilitating digital collection management
  Expanding crowdsourcing & citizen science
  Developing AI and data refinery processes
 Enabling NSC users to embark on data-intensive science research in bio- and geo-diversity
  Optimizing data mobilization, processing, analysis, and cloud storage
  Disseminating bio- & geodiversity policies, best practices & data standards

MC proposes primary list of identified DiSSCo RI Training Needs, to be discussed during the WS:
 1) Improving digital skills and competencies in big-data mobilization, processing, analysis
 2) Disseminating best practices and policies
 3) Make the data FAIR: improving the efficiency of access through **digitisation**

MC presents NA2.3 Workshop overview:
 Action 1: Understanding DEST missions
 Action 2: Cataloguing existing training modules and map them to DiSSCo Key Training Areas

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Action 3: Listing gaps toward DiSSCo needs and seek agreement on prioritization of training topics

Action 4: Produce a 2020 work plan to concretizing the trainings, their dissemination and cloud storage

MC stress that we are not starting from scratch: i.e., **DiSSCo Aligned Projects**

Similarity of WP among DiSSCo Projects:

WP/WG: Policy harmonisation & International coordination

WP/WG: Standards and other common resources

WP/WG: Data models, management, publishing pipelines & services

WP/WG: Digitisation

WP/WG: Training & capacity enhancement

Recall of NA2.3 Task progress:

February 2018: Survey to NA2.3 partners -> Primary list of existing European trainings (34 Trainings)

February 2019: SYNTHESYS+ Kick Off Meeting -> Alignment with DiSSCo Training Needs

November 2019: NA2.3 Virtual Meeting -> 37 Trainings + Collaboration with DEST

December 2019: Dissemination of Workshop (Poster: https://cetaf.org/news/synthesys-workshop-training-needs)

January 2020: Workshop to training program definition

Presentation of NA2.3 Workshop Program (See Annex I)

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2. [13:30-14:00] Introduction of the DEST

Presentation RBINS, C Paleco (CP) [NA2.3: Promote and facilitate training modules for the community]
Our tasks: **Inventory of existing trainings, Refine categories according to content, duration, cost models, host, etc.** => Visibility to the community

Promotion and uptake through the DEST platform
The institutions proposing the training modules are responsible for the course development, including teaching resources, supporting material, logistics and audience management

DEST is under the umbrella of CETAF
- To foster the direct involvement of the CETAF scientific community in providing the highest-level quality of training and to reach out the broadest audience possible
- Current institutions :

Natural History Museum of Crete**, University of Crete, Greece**
Royal Belgian Institute of Natural Sciences**, Belgium**
Naturalis Biodiversity Center**, The Netherlands**
Natural History Museum**, University of Oslo, Norway**
Hungarian Natural History Museum**, Hungary**
Consortium of European Taxonomic Facilities**, Belgium**

Presentation CETAF-DEST, C Vaureadou (NHMC) [Connectivity and Support of CETAF DEST in SYNTHESYS+ Training Program]

DEST - Distributed European School of Taxonomy
Active since 2011 (under the coordination of RBINS)
From 2018 DEST sits under the umbrella of Consortium of European Taxonomic Facilities (CETAF) as a pivotal priority into CETAF Strategic Development Plan
Offers Education and Training in the field of taxonomy, biodiversity, geodiversity and conservation to:
Students (graduates, MSc, PhD, postdocs); Professionals; Citizen science community; Educational community (teachers, senior education staff)
Connectivity of CETAF DEST in SYNTHESYS+ Training Program
A - Dissemination – Outreach
Presentation of DEST website + Facebook, Twitter
DEST communication lists (trainers, trainees, other stakeholders)
CETAF member's communication lists (big network including specific target groups)
DEST involvement in MOBILISE Training School, Sofia, March 2019
Workshop in BIODIVERSITY NEXT: CETAF DEST E-TRAINING COURSE "Biodiversity in a changing climate: e-learn more"
Synergies with: GBIF, iDigBio, Relevant Training Initiatives in Europe (FoRBio, Transmitting Science)
B - Administration
DEST has the experience to handle: Contact with Training Providers; Registrations and questions from learners; Evaluation, selection of learners (in consultation with training providers) announcement of selection results, course logistics etc.; Courses' evaluation
Training Certificates (ECTS credits, ECVET units, Europass Certificate Supplement)
C - Financial management

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DEST can support all financial issues: Economic transactions with the learners (registration fees, invoices etc.); Contract and economic transactions with the training providers reimbursement transfer of the course fees amount)

D - Course curriculum

The course curriculum involves content, resources & program; learning methods and tools evaluation of learning. **OECD: Organization for Economic Co-operation and Development.**
Concept Note: Attitude and Values for 2030:
http://www.oecd.org/education/2030-project/teaching-and-learning/learning/attitudes-and-values/Attitudes_and_Values_for_2030_concept_note.pdf

Interactivity - Learning on my own/Inquiry Based Learning methodology
http://biotalent.ucdc.uoc.gr/

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3. **[14:00-17:30] Presentation of NA2.3 Partners: Existing Trainings. See Annexe II for exhaustive Table of the Trainings.**

Presentation MfN, P Giere (PG) [NA2.3: Trainings targeting Collection Care: for Physical collections] PG presents 13 Trainings available in MfN (content, length, support, language, targeted attendees): Natural History Collections, Basic collection techniques, Disaster preparedness, Integrated Pest Management, Shipping Workshop, Access and Benefit Sharing, Care of wet collections, Moving collections, Digitization techniques, Data management, long term data storage, data standards in natural sciences, Specify/DINA. https://www.dina-project.net/wiki/Welcome_to_DINA

Presentation RMCA, L Smirnova (LM) [NA2.3: Former Synthesys training program including summer school] LS presents former Trainings from RMCA: wood biology, Training course on FishBase and fish taxonomy, Training Conservation of museum zoology collections. LM stress that they have educational material (ca. 6Go) that could be deposited on iDigBio (cf. CV's presentation). In addition, material from EDIT could be transferred to the DEST.

Presentation RMCA, F Theenen (LM) [NA2.3: QGIS] FT presents current trainings of RMC: QGIS for distribution data, QGIS advanced (raster treatment and watershed detection), PostGIS and WMS protocoles (GeoServer), Acoustic signal analysis with R. FT notices Moodle (Open-source): https://moodle.org/ and DaRWIN database developed by RBINS https://darwin.naturalsciences.be/

Presentation NHMW, N Akkari (NA) [NA2.3: Trainings targeting Collection Care: for Physical collections, Digitalization DCOLL and targeting Nagoya Protocol]. NA presents Trainings available at NHMW: Training in Scientific Imaging for microscopic objects, Basics and exercise on implementing EU ABS regulations 511/2014, Handling historical and fragile museum specimens and types for scientific research, DNA sampling techniques of Museum specimens, Scientific illustrations: scientific drawing, multifocus imaging and scanning electron microscopy, Textile archaeology workshop (Archeology) – maybe not relevant, Recognition of impact structures on Earth – Shock metamorphism in quartz (Geology), Meteorite identification and classification (Geology), Text and Media production in the Natural History Museum, Good practice of cultural mediation, Due Diligence for utilizing genetic resources in the context of the Nagoya-Protocol. NA states that Edmun Schiller give a 4h training on Nagoya Protocol.

Presentation MNHN-GBIF, S Pamerlon (NA) [NA2.3: BID Capacity Enhancement Workshop: Biodiversity Data Mobilization]. SP presents the trainings activities led by GBIF Network. Main goal of these trainings is to promote and improve free and open access to biodiversity data. More info https://www.gbif.org/programme/82243/bid-biodiversity-information-for-development

Presentation UGOT-GGBC, H Aronsson (HA) [NA2.3: Trainings targeting barcoding/biology/bioinformatics]. HA present UGOT trainings: Citizen Science, Python for Biologists (advanced course in data science), Handling spatial data in R (basic course) [same as 2018_3], Python for Biologists (basic course) [same as 2018_2], Forest data analysis, SuperSmartR, Plankton ToolBox and Nordic Microalgae, Spatial R, Machine learning in applications of biodiversity informatics, Collection data management using IrisBG, Access biodiversity data through web services.

Presentation RGBK, T Fulcher (TF) [NA2.3: Courses available at Royal Botanic Gardens, Kew]. TF presents RGBK trainings: Use and Curation of Biocultural (ethnobiological) Collections: Last offered 2013, Understudied category of biological collection, Diverse materials with strong cultural element,

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Practical & ethical challenges, Unique depth of expertise at Kew. Content (4 days): History, Acquisitions, Legal and ethical aspects, Cataloguing and data standards, Imaging, Raw materials + hazards, Conservation, Storage, User communities, developing research.

Best practice in plant tissue collection and preservation:

Seed Banking: The Millennium Seed Bank of the Royal Botanic Gardens, Kew (RBG Kew) provides training, technical support and information, to ensure that MSBP partners and collaborators have the skills, facilities and knowledge needed to successfully conserve seeds to a high standard and meet critical global seed conservation targets. Our training courses aim to combine our partners' knowledge of their native floras with the seed conservation skills gained over 40 years by RBG Kew. Research and innovation - cryopreservation but also basics such as Germination and dormancy and Seed storage behavior and viability.

Botanical nomenclature (Coordinator: Katherine Challis): Taught by Kew specialists with extensive practical experience. The one week course looks in detail at the essential principles of plant nomenclature according the Code of Nomenclature for algae, fungi and plants (ICN). By the end of the week, participants will be able to apply good nomenclatural practice when undertaking taxonomic revisions, compiling checklists etc. This will be achieved by lectures illustrated with examples from the ICN, together with workshop sessions applying what has been learned to "real life" cases, and by encouraging participants to discuss nomenclatural problems they have encountered.

DNA and Tissue Banking: This includes field collection techniques. CITES and CAPS – awareness and where to find the information. Bear in mind your field trip may be no further than the nearest botanic garden, but there are still restrictions on sampling living collections. Talking to the curators of other collections. Suggestions for field sampling, recommendations for sampling herbarium specimens – common workflows. Obvious things such as Store in an airtight container once dry (24-48 hours) in a double sealed bag. Use only acid free paper and archival quality material for all labelling and bagging. We only use a small amount of indicating silica. However, specimens without data are useless. So a database is an INTEGRAL part of collection. Databasing to GGBN standards. Minimum of Field ID, Collector name, number and date, locality info incl GPS, source of the material. Significance of GPS – third decimal is about 11m for instance. Different methods of extracting DNA from various plant tissues – one of the biggest issues is isopropanol precipitation step. Using root tissue to avoid secondary metabolites, issues encountered. Storage best practice – our experience over 40 years. When fully dried (usually 24 – 48 hours) plant material has a brittle texture and is ready to be transferred into un-buffered glassine envelopes.

Presentation RBINS, H de Koeijer (HK) [NA2.3: Training Module on implications of the Nagoya Protocol for researchers]. Modules under development with CETAF (Exercises with prepared material + Exercises with researchers own plans).

Development of the training module: Entry into force of the Nagoya protocol 2016, Information sessions with researchers of RBINS on implications for their work, Information sessions with collection managers on implications NP, CETAF guidelines for collection managers, FAQ on NP for researchers. 2016 – 2020: Information sessions for Africa Museum and Meise Botanical garden; Every 2 years information session with RBINS researchers and collection managers; Guest lectures at Belgian Universities.

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Nagoya protocol implications for research: A bit of context; Convention on Biological Diversity; Nagoya Protocol; Transposition into relevant national and international law; EU Regulation; Belgian federal and regional laws. Implications for research: In or out of scope; Scopes (What utilization and material, temperal and geographical scope); Exclusions. Due diligence (What, How, Check, Declarations). Up next: Issues with the Protocol; New developments in Science; Synthetic biology; Digital sequence information (DSI).

Using the ABS-CH; Practical training: ABS-CH, What does it stand for? Why use ABS-CH? How to use it

Conclusion CETAF, A Casino (AC) [NA2.3: Conclusion].

Workshop Day 2

4. [08:30-10:00] Mapping Existing Trainings to potential DiSSCo Key Training Area - Agreeing on which training topics must be prioritized (Round Table Discussions)

Mapping the Trainings to Key Training Area (KTA) turned out to be a difficult task as a single training usually covers different Key Areas. Based on the list of the available trainings, we agreed on defining four main KTA: "Specimen", "Data", "Bio- and geodiversity policy and legislation", and "Citizen Science". Each of these KTA, can further offers a set of specific trainings as described below:

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specimen > specimen based research > Collecting in the field
specimen > specimen based research > Taxonomy
specimen > specimen based research > Ecology
specimen > specimen based research > Evolution

specimen > curation
specimen > digitization > databasing metadata
specimen > digitization > data quality/(cleaning from literature, checking geo references,
specimen > digitization > imaging (Multispectral digitization and 2D+/3D digitization)

Data > Data curation
Data > Data standards and interoperability
Data > Data processing
Data > Data processing for publication
Data > Software skills

Bio- and geodiversity policy and legislation (Nagoya/CBD/ABS: CETAF work in progress)

Citizen Science
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The evolution of KTA definition can be followed here:

https://docs.google.com/spreadsheets/d/1z3wiIOm5PRTQxMfXYnahtDgBxOt-Z87NAxdiI-KdZaM/edit#gid=1515267520

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5. [10:15-11:00] Identification of gaps toward DiSSCo needs (Round Table Discussions)

Listing the existing trainings and mapping them to KTA showed that all KTA are already well represented among the different Institutions. However, some KTA are less developed than others. Here bellow is a primary list of the identified gaps toward DiSSCo Training needs.

The obvious needs are:

- Collection assessment (e.g., CSAT, How to use the CSAT or other such tools for smaller collections holders or not familiar with the system? Which tool should be used? Is CSAT in the Scope of DiSSCo Needs?) (Might help: RMCA, MfN, NHM)
- Use and development of ELViS platform (Might help: JRA1) -> Trainings in Data carpentry, Data architect, Data fabric
- Training in data Standards
- Crowdsourcing and citizen science: Need Both: Train the trainer and Train the citizen (Might help: NA2.3 partners to add more: UGOT; RBINS; Meise; MNHN (Recolnat); NMHW; Mfn; NHM)
- ABS: Train the trainer, Harmonize trainings
- Open Science policy: Dissemination of Harmonized policies (How to use WikiData; see workshop MOBILISE : ask to Meise)
- Geodiversity courses (NA2.3 partners to add more)
- Bio- and geodiversity policy and legislation; (ABS: Train the trainer - training in standards for DiSSCo)

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6. **[11:30-12:30] Work plan to implement the trainings and their dissemination (Round Table Discussions).**

2020	Jan	Workshop at MNHN
	Feb 3-29th	Task 1: Check with your institution the other available training. Task 2: Check the gaps within the "needed training" sheet. Task 3: On the google drive match the trainings you offer "existing trainings" with the categories see spreadsheet "categories" 1/ April 2020
	Feb 29th	Partners have been contacted individually to make sure training table is up to date: 1- Provide all the training with max of information (Audience; cost, ECTS); 2-Match them to Key Training Areas;
	Early Mar	DEST reopen & provide Templates to NA2.3 Partners
	Mid Mar	Virtual Meeting: Coordination NA2.3 Partners - DEST
	Mar- Apr	T2.3 Leaders contact WP leaders individually and check according to agenda point 5 (Dissco Gaps) which are the needs not yet covered
	Apr- Jun	Templates filled & uploading trainings contents to DEST Platform
	Jun	Virtual Meeting: Where do we stand on the uploading?
	Oct	Virtual Meeting: Last chance to final Action
2021	Jan	Virtual Meeting : Finalization of the Deliverable 2.3

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Annex I: Task 2.3 workshop program

Organization of the workshop:

One-day workshop, broken up into two half days:

Day 1	12:15 – 12:30	**Arrival of participants**	
	13:00 – 13:15	Introduction of the Task 2.3 and the aim of the workshop	Magalie Castelin (MNHN)
	13:15 – 13:30	Link between SYNTHESYS+ and DEST	Carole Paleco (RBINS)
	13:30 – 13:50	Connectivity and support of CETAF DEST in SYNTHESYS+ Training Programme	Catherina Voreadou (NHMC)
	13:50 – 14:10	Trainings targeting Collection Care: for Physical collections	Peter Giere (MfN)
	14:10 – 14:30	Former Synthesys training program including summer school	Larissa Smirnova (RMCA)
	14:30 – 14:50	QGIS training	Franck Theeten (RMCA)
	14:50 – 15:10	Trainings targeting Collection Care: for Physical collections, Digitalization DCOLL and targeting Nagoya Protocol	Nesrine Akkari (NHMW)
		Coffee Break	
	15:40 – 16:00	BID Capacity Enhancement Workshop: Biodiversity Data Mobilization	Sophie Palermon (MNHN – GBIF)
	16:00 – 16:20	Trainings targeting barcoding/biology/bioinformatics	Heléne Aronsson (UGOT-GGBC)
	16:20 – 16:40	Presentation of training modules	Tim Fulcher (RBGK)
	16:40 – 17:00	Training Module on implications of the Nagoya Protocol for researchers	Han de Koeijer (RBINS)
	17:00 – 17:15	Conclusion	Ana Casino (CETAF)
Day 2	8:30 – 09:30	**Round-Table Discussion 1**: -Listing the key training areas (i.e. trainings that fulfill the achievement of final goals of the Task). -Agreeing on which training topics must be prioritized.	
	09:30-10:00	Coffee Break	
	10:00 – 11:00	**Round-Table Discussion 2**: - Listing the gaps and settling a discussion about how to fill these gaps	
	11:00 – 11:30	Coffee Break	
	11:30 – 12:30	**Round-Table Discussion 3**: How to concretize the trainings and their diffusion? -open online packages and make the selected Trainings widely available to the scientific community. -When appropriate, can supporting videos be provided to create a growing repository of visual training material?	
	12:30 – 13:00	Conclusion	

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Annex II: Task 2.3 Available Trainings

Please note that for convenience display all the columns (e.g. Audience; cost, ECTS) are not represented here but can be found following the above link. The evolution of that catalogue can be followed here:

https://docs.google.com/spreadsheets/d/1z3wiIOm5PRTQxMfXYnahtDgBxOt-Z87NAxdiI-KdZaM/edit#gid=0

MNHN	Paris	Integrative taxonomy in the "big data" era
MNHN	Paris	Introduction to NGS Data Analysis
MNHN	Paris	Training in Morphometry and morphological analysis
MNHN	Paris	Training in Scientific Imaging and Segmentation
MNHN	Paris	Scientific Illustration
MNHN	Paris	BID Capacity Enhancement Workshop: Biodiversity Data Mobilization
RBINS	Brussels	An introducing to "Access and Benefit Sharing" in public research
RBINS	Brussels	Virtual Collections: How to begin? Getting started with the introduction course to 2D+ and 3D techniques
RBINS	Brussels	Creating 3D digital twins of your collection specimens at a budget: Hands-on training on photogrammetry for beginners
MNCN-CSIC	Madrid	Best practice advice on implementing Cultural Heritage policy mandates
MNCN-CSIC	Madrid	Best practice advice on implementing ABS policy mandates
NRM	Stockholm	Training in determination of minerals by the aid of different analytical equipment, organizing a large systematic mineral collection and handling of toxic and radioactive minerals in such a collection.
NHMW	Wien	Training in Scientific Imaging for microscopic objects
NHMW	Wien	Basics and exercise on implementing EU ABS regulations 511/2014
NHMW	Wien	Handling historical and fragile museum specimens and types for scientific research
NHMW	Wien	DNA sampling techniques of Museum specimens
NHMW	Wien	Scientific illustrations: scientific drawing, multifocus imaging and scanning electron microscopy
NHMW	Wien	Textile archaeology workshop (Archeology) – maybe not relevant
NHMW	Wien	Recognition of impact structures on Earth – Shock metamorphism in quartz (Geology)
NHMW	Wien	Meteorite identification and classification (Geology)
NHMW	Wien	Text and Media production in the Natural History Museum
NHMW	Wien	Good practice of cultural mediation
NHMW	Wien	Due Diligence for utilizing genetic resources in the context of the Nagoya-Protocol
UGOT	Gothenburg	Citizen Science
UGOT	Gothenburg	Python for Biologists (advanced course in data science)
UGOT	Gothenburg	Handling spatial data in R (basic course) [same as 2018_3]
UGOT	Gothenburg	Python for Biologists (basic course) [same as 2018_2]
UGOT	Gothenburg	Forest data analysis
UGOT	Gothenburg	SuperSmartR

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UGOT	Gothenburg	Plankton ToolBox and Nordic Microalgae	
UGOT	Gothenburg	Spatial R	
UGOT	Gothenburg	Machine learning in applications of biodiversity informatics	
UGOT	Gothenburg	Collection data management using IrisBG	
UGOT	Gothenburg	Access biodiversity data through web services	
RBG Kew	London	Plant Nomenclature	
RBINS	Brussels	Zoological nomenclature	
RBG Kew	London	Use and Curation of Biocultural (ethnobiological) Collections	
RBG Kew	London	Best practice in plant tissue collection and preservation	
RBG Kew	London	Seed Banking	
RMCA	Tervuren, Belgium	Training on wood biology	
RMCA	Tervuren, Belgium	Training course on FishBase and fish taxonomy	
RMCA	Tervuren, Belgium	Training Conservation of museum zoology collections	
RMCA	Tervuren, Belgium	QGIS for distribution data	
RMCA	Tervuren, Belgium	QGIS advanced (raster treatment and watershed detection)	
RMCA	Tervuren, Belgium	PostGIS and WMS protocoles (GeoServer)	
RMCA	Tervuren, Belgium	Acoustic signal analysis with R	
MfN	Berlin	Natural History Collections	
MfN	Berlin	Basic collection techniques	
MfN	Berlin	Disaster preparedness	
MfN	Berlin	Integrated Pest Management	
MfN/SNSB	Berlin/Munich	Shipping Workshop	
MfN/SNSB	Berlin/Munich	Access and Benefit Sharing	
MfN/SNSB	Berlin/Munich	Care of wet collections	
MfN	Berlin	Moving collections	
MfN	Berlin	Digitization techniques	
MfN	Berlin	Data management	
MfN	Berlin	long term data storage	
MfN	Berlin	data standards in natural sciences	
MfN	Berlin	Specify/DINA	

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