



**TETTRIs**

**The TETTRIs Cookbook**  
Recipes for building  
taxonomic capacity

Photo by Michael Magee





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# FOREWORD



**Humanity is at a pivotal moment**, as biodiversity faces unprecedented pressures, the need for skilled taxonomists, and for innovative, collaborative approaches to understanding life on Earth, has never been greater. The TETTRIs project was created in the spirit of renewal: to strengthen expertise, spark creativity, and empower a new generation of practitioners to explore, describe and protect Europe's rich biodiversity.

This booklet, our 'Cookbook' is a collection of 'recipes' designed not as fixed instructions, but as starting points. Each recipe **shares practical methods**, proven approaches and inspiring examples drawn from training activities, research experiences and **innovative tools** developed across the TETTRIs community. They are intentionally adaptable; inviting you to adjust, refine, experiment and ultimately make them your own.

We hope these recipes serve as catalysts: to encourage taxonomists, institution, citizens scientists etc. to try new techniques, enabling researchers to deepen their practice, and **inspiring teams to design fresh ideas** and collaborative projects. Whether you are just beginning your journey in taxonomy or contributing decades of experience, this booklet offers resources to support your growth, biodiversity conservation and ignite your imagination.

Most importantly, we invite you to carry these ideas forward. Share them, build upon them, and help us continue **transforming the way taxonomy is taught**, studied and applied across Europe. Together, through innovation and curiosity, we can shape a more resilient, informed and biodiverse future.

**The TETTRIs Consortium**

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# HOW TO ORGANISE AN ADVANCED BLENDED COURSE ON TAXONOMY



Scan to view the  
full recipe online





## Target group

Early-stage researchers and university students (B.Sc., M.Sc., and Ph.D. levels) representing the next generation of taxonomists.



## Goal

To increase the taxonomy workforce and build capacity in Taxonomy, by continuously developing the **competencies** and skills of the taxonomic community. This includes **fostering innovative** methods and digital solutions to improve taxonomic **knowledge**, support integrative taxonomy, accelerate species discovery and description, and make collections and data more widely **accessible**.



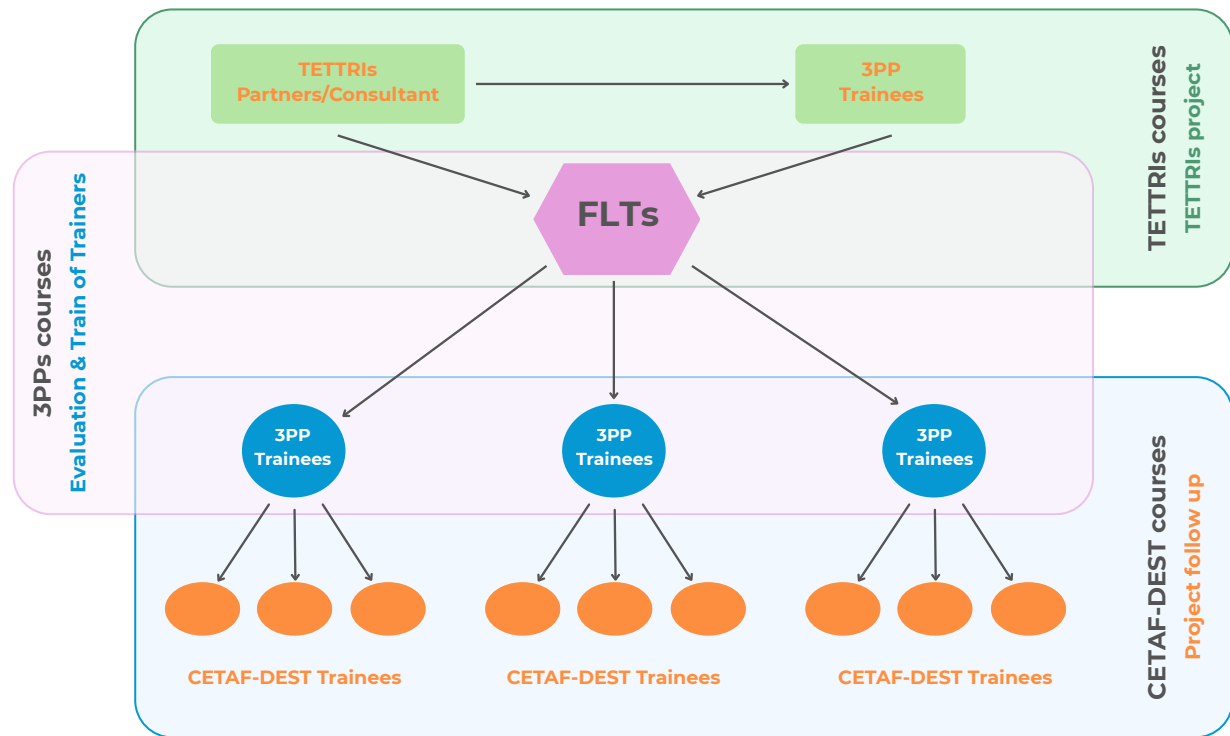
## Summary/Description

The community of facilities, collections, and experts within the **Consortium of European Taxonomic Facilities (CETAF)** envisions that the taxonomic knowledge and expertise needed to study, protect, and manage Europe's biological and geological **diversity** are openly and easily accessible, sustained over time, and integrated into decision-making processes.

The training course is based on the **Train the Trainers (TTT)** methodology (Figure 1) and employs a blended learning approach that combines online and in-person components. Trainees are trained by experts to become **Future Local Trainers (FLT)**s, who then act as multipliers by organising their own courses (Figure 1). Hosting these courses through the CETAF-DEST (<https://cetaf.org/dest/>) infrastructure ensures the sustainability of the training, and this is actively encouraged.



Figure 1:



The Train the Trainers (TTT) model for the capacity building in taxonomy through the TETTRIs project: a) The TETTRIs partners and consultants train the third party projects (3PPs) trainers on how to implement the TETTRIs courses on taxonomy. Then both train the Future Local Trainers (FLTs) (green box). b) The FLTs add learning material to the TETTRIs courses, developing the 3PPs courses, which they then teach to the 3PPs' trainees. c) The 3PPs trainees become the trainers of the courses delivered through the CETAF-DEST infrastructure, after the TETTRIs project's lifespan, as follow-up activities (blue box).



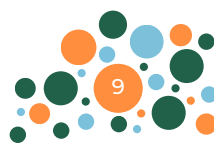
## You Will Need

- **Expert taxonomists-trainers**, many of whom can be found in the CETAF community (<https://cetaf.org>).
- **A Learning Management System (LMS)** for asynchronous learning, where all the theoretical knowledge will be uploaded. The TETTRIs e-learn platform will be integrated into CETAF-DEST, after the end of the project.
- **A tool for synchronous distance learning**, e.g. Zoom, Teams, Webex, etc.
- **Laboratory infrastructure** for the in-person components, including stereomicroscopes, microscopes, lab consumables, projectors, molecular analysis tools etc.
- **An appropriate natural area** for the field part(s) of the course.
- **Transportation** for the field part(s) of the course.
- **Optional items:** food supply, accommodation, and a consent form for the use of photos and videos.



## Steps to implement the Course

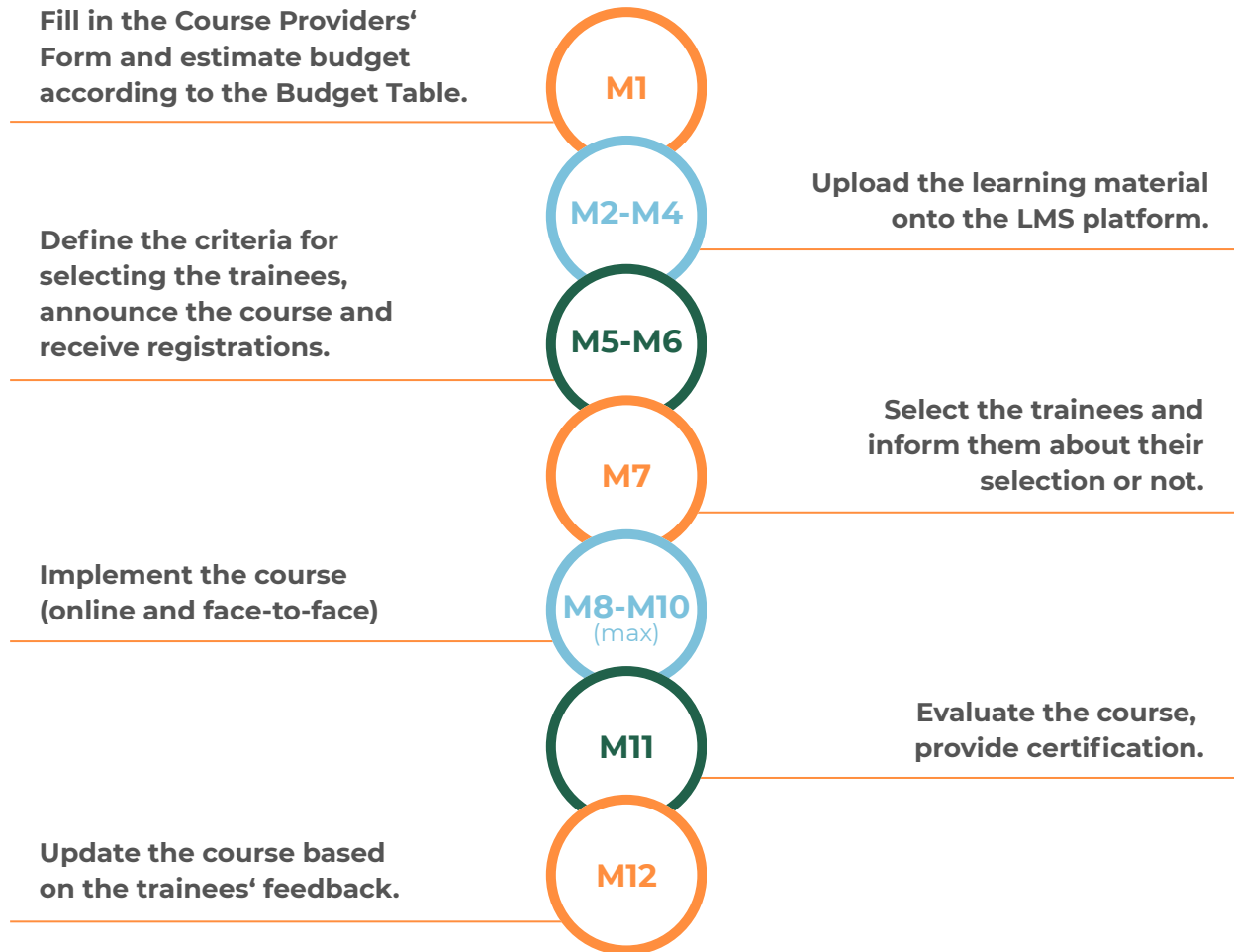
- 1** **Fill in the Course Providers' Form** (see Annex, 1).
- 2** **Estimate the budget** using the Budget Table (see Annex, 2).
  - The budget may vary depending on the host country, required infrastructure, transportation to the field, laboratory facilities, accommodation, food, etc.
  - Cost can range from a few hundred to several thousand Euros per participant.
  - Example: the SoilMATs course has cost approximately EUR 5 000 per participant, covering all expenses for 15 days in-person training across three countries (transportation, learning materials, field trips, lab infrastructure, accommodation, and three meals per day).
- 3** **Upload the learning materials** on the Learning Management System platform. For the TETTRIs e-learn platform, follow the Quick Start Guide for Teachers (see Annex 3).
- 4** **Define trainee selection criteria** according to diversity, gender, and inclusivity guidelines. (see Annex 4).
- 5** **Announce the course** and upload relevant information, preferably on the [CETAF-DEST](#) website.
- 6** **Receive registrations**, ensuring compliance with your institutions Ethics' Rules (sex and gender equality, inclusiveness, etc) (see Annex 4).
- 7** **Select the trainees** based on the defined criteria.
- 8** **Inform the applicants** about their selection, or non-selection.
- 9** **The trainers and the trainees complete the Consent Form for Photos and Videos** (see Annex 5).
- 10** **Implement the course** both online and in-person.
- 11** **Send the evaluation form** to the trainees **and the course report** to the trainers for completion.
- 12** **Distribute the certificates** to all trainees.





## Timeframe

The timeframe is 10 to 12 months, depending on the curriculum of the course. An example of the timeframe could be as follows:





## Complementary information: Related TETTRIs deliverables and additional resources

- ANNEX: Forms and tables to be filled in
- Prior Informed Consent Form (PICF)

### 1. The course providers' form

#### TETTRIs COURSE PROVIDERS' FORM

Training Course details	
Title	
Description	
Trainers' details (names, affiliation, short CV)	
Duration (number of days and total hours)	
Dates of Training period(s)	
Location	
Course's language	
Target audience	
Mode of trainees' assessment (test, group work, project)	
Participant quota (min and max number of trainees)	
Number of waivers/scholarships	
External funding/sponsoring (explain what is included)	
The training course will be managed and advertised by DEST	
The training course will be only advertised in DEST website	
Fee (explain what is included)	

#### TETTRIs EVALUATION FORM: TRAINERS

Please fill in the Trainers' evaluation report

Title of the course	
Dates of Training period	
Location	
Contact person	
Institution/Organisation	
Final number of trainees	
Final number of trainers	
Describe any deviations between the plan and the execution during the course implementation:	
Recommend suggestions for improvement for a next iteration of this course:	
Any other comments/suggestions:	

### 2. Estimated Budget (Indicative)

#### TETTRIs BUDGET TABLE

TRAINING COURSE MAIN BUDGET CATEGORIES		COST in euros (including taxes)				Total	notes
		Trainer 1	Trainer 2	Trainer 3	Trainer 4		
Reimbursement of trainers outside the host institution	preparation of the course (structure and teaching material)						
	delivery of teaching and daily allowance						
	travel						
Reimbursement of trainers of the host institution	accommodation						
	preparation of the course (structure and teaching material)						
	delivery of teaching						
	accommodation						
Administration/Organisation of the course							
Overhead (possible administration and financial cost of the hosting institution)							
Teaching materials (flash disks, hard copies, etc)							
Venue rental	rental of rooms						
	renting of supporting technical and digital facilities						
	human resources (outside the trainers) needed to support the implementation of the course						
	Transportation for trainees (in case of field trip, e.g. bus, train, cars)						
Coffe breaks, lunch, dinner							
DEST fee (50 euros/trainee)							
<b>TOTAL BUDGET</b>							
TOTAL BUDGET divided with the average number of participants (the course fee)							



### 3. TETTRiS e-learn platform: Quick start guide for teachers

The detailed information for this section can be found via the QR code on the front page of the recipe, which links to the digital version.

### 4. Ethics' rules (sex and gender equality, inclusiveness, etc)

[TETTRiS-Gender-Grid - Google Docs](#)

Gender & Diversity Grid		
The integration of the gender & diversity dimension into research and innovation content has become a requirement by default across the Horizon Europe programme. TETTRiS project pays particularly attention to ensuring gender balance in the composition of the beneficiaries of the calls consortium and among the participants to the project activities. The Gender and Diversity grid has been prepared to help you meet EU requirements on this topic in your project. You will find questions to be answered before the project start and two questions to address at the end of the project. For more information on the Gender dimension context in the European Research Area and research projects see <a href="https://research-and-innovation.ec.europa.eu/strategy/strategy-2020-2024/democracy-and-rights/gender-equality-research-and-innovation_en">https://research-and-innovation.ec.europa.eu/strategy/strategy-2020-2024/democracy-and-rights/gender-equality-research-and-innovation_en</a>		
Project leader name and surname		
Project title		
Contact person email		
Question to address	Yes/No/Partially/NA	Comments
Is the selection of participants open to any gender or origin?		
Before starting the selection of participants, did you consider the possibility of a gender gap in the number of participants?		
Are the training & meeting times appropriate for participants with family commitments?		
Have possible barriers to gender equality been taken into account in the design of the training/project activities?		
Does the project ensure that participants with any gender identity and from any origin can provide inputs, access, and participate in project activities?		
Are the practical and strategic needs of gender adequately addressed in the equipment and materials used for the project?		
Are sex-disaggregated data and/or gender equality performance indicators used (where possible) throughout the project?		
Are the language and images used during the training gender sensitive?		
Do the project activities include a gender-sensitive approach, especially with regard to information, documentation and results?		
Is gender expertise required from the trainers and other resource persons?		
Did the objective of promoting gender and diversity equality influence the activities and outcomes of the project?		
If a gender gap was present among the project consortium and participants, did you adjust your criteria and methods to reduce it?		

### 5. Evaluation of the course by the trainees

After the end of the course the trainees fill in the evaluation form [here](#).

**EVALUATION FORM: TRAINEES**

Dear Trainee,  
We would greatly appreciate your feedback concerning the Training Course you followed. Your answers are anonymous and will serve to improve future Training Courses. Thank you for your collaboration!

**CONTENT METHODOLOGY AND ORGANIZATION STATEMENTS**

1. The Training Course educational material/resources helped you understand the subject matter  
Strongly Agree    Agree    Disagree    Strongly Disagree

2. The work required of you was appropriate based on the Training Course objectives  
Strongly Agree    Agree    Disagree    Strongly Disagree

3. The Training Course stimulated your interest in the subject matter and encouraged you to think critically  
Strongly Agree    Agree    Disagree    Strongly Disagree

4. The Training Course was well organized in terms of its daily program  
Strongly Agree    Agree    Disagree    Strongly Disagree

5. The Training Course was well organized in terms of its infrastructure  
Strongly Agree    Agree    Disagree    Strongly Disagree

**SUMMARY STATEMENTS**

1. Overall rating of the level that your original personal expectations about the Training course, were covered  
Excellent    Good    Satisfactory    Poor

2. Overall rating of knowledge, skills and competences gained from the Training Course related to your personal expectations  
Excellent    Good    Satisfactory    Poor

3. Overall rating of the Training Course  
Excellent    Good    Satisfactory    Poor

4. Would you recommend this Training Course to others?  
Yes    No    Maybe

**FREE RESPONSE QUESTIONS**

1. What did you like about the Training Course and/or the instructor? Please give examples

2. What aspects of the Training Course and/or the instructor could be improved? Please explain

3. What aspects of the instructor's methods could be improved? Please give examples

4. Please list additional comments and/or suggestions

**TRAINEE INFORMATION**

1. Gender  
Male    Female    Other

2. Age  
20-30    30-40    40-50    50-60    60-70

3. Position  
Graduate student    MSc student    PhD student    Postdoc    Staff  
Other .....

4. If you are a staff member or affiliated in your institution, please mark your position  
Director    Manager    Researcher    Curator    Technician    Officer    Free Lancer  
Other .....

5. Degree of Expertise  
Secondary School    Technological Degree    University    MSc    PhD

6. Scientific Diploma background  
General Biology    Botany and Agriculture    Zoology    Earth Sciences (Geology, Paleontology, etc.)  
Other .....

7. How would you rate communication with the course provider?  
Excellent    Good    Satisfactory    Poor

## 6. Consent Form for the use of Photos and Videos



### CONSENT FORM FOR TAKING PHOTOS/VIDEOS

**Full name:** .....

To take photos/videos for:

**A.** posts on the websites of the (*institute giving the course*)  
 ....., on the respective social media (such as Facebook, Instagram, etc.), on news sites or television stations, with the aim of promoting and informing the educational community and the public about the activities of the course.

- Yes, I give my consent
- No I do not give my consent

(fill in accordingly)

**B.** ... to be included in printed materials (information material, posters, souvenir albums, etc.) to promote and inform the educational community and the public about the activities of the course.

- Yes, I give my consent
- No I do not give my consent

(fill in accordingly)

Place and date,

.....

Signature

.....



## 7. Evaluation of the course by the trainers

After the end of the course, the trainers write a report of the course by filling in the table [here](#).



## COURSE PROVIDERS' FORM

Training Course details	
Title	
Description	
Trainers' details (names, affiliation, short CV)	
Duration (number of days and total hours)	
Dates of Training period(s)	
Location	
Course's language	
Target audience	
Mode of trainees' assessment (test, group work, project)	
Participant quota (min and max number of trainees)	
Number of waivers/scholarships	
External funding/sponsoring (explain what is included)	
The training course will be managed and advertised by DEST	
The training course will be only advertised in DEST website	
Fee (explain what is included)	

### 8. Certification

Certificate should be provided according to the [European standards](#) for a quality education and training for all. An example is given [here](#).

Logos

## CERTIFICATE OF ATTENDANCE

This is to certify that

.....

has completed successfully the Training Course

.....

provided by: .....

Online training (..... hours; from ..... to .....)

Face-to-face Workshops (..... hours) in:

.....

Total Learning Effort: ..... hours, equivalent to ..... ECTS/ECVET credits

Trainer 1	Trainer 2
Title .....	Title.....

SOILMATS course, tardigrade | Photo by Edoardo Massa



A [Europass Certificate supplement](#) would also be important and useful. An example in English is [here](#).



europass

## Certificate supplement

<https://europass.europa.eu/en/document-library/certificate-supplement-example-united-kingdom>

### 1. Title of the certificate <sup>1</sup>

### 2. Translated title of the certificate <sup>2</sup>

### 3. Profile of skills and competences

List the skills and competences acquired by the holder of the certificate. This list should start as follows: "A typical holder of the certificate is able to:" and should include a list of about 5 to 15 items using action verbs to describe skills and competences.

### 4. Range of occupations accessible to the holder of the certificate <sup>3</sup>

### 5. Official basis of the certificate

Body awarding the certificate

Authority providing accreditation / recognition of the certificate

Level of the certificate (national or European) <sup>1</sup>

Grading scale / Pass requirements

Access to next level of education / training <sup>1</sup>

International agreements on recognition of qualifications<sup>1</sup>

Legal basis

### 6. Officially recognised ways of acquiring the certificate

Replace with a description of the way the certificate can be acquired (apprenticeship, school/training centre-based or workplace-based, accredited prior learning) and/or complete the table below.

Description of vocational education and training	Percentage of total programme (%)	Duration (hours/weeks/months/years)
School/training centre-based		
Workplace-based		
Accredited prior learning		
Total duration of the education / training leading to the certificate		

<sup>1</sup> In the original language. | <sup>2</sup> If applicable. This translation has no legal status. | <sup>3</sup> If applicable.

The Certificate supplement provides additional information about the certificate and does not have any legal status in itself. Its format is based on the Decision (EU) 2018/646 of the European Parliament and of the Council of 18 April 2018 on a common framework for the provision of better services for skills and qualifications (Europass) and repealing Decision No 2241/2004/EC.

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### 7. Additional information

Entry requirements <sup>1</sup>

More information (including a description of the national qualifications system)

National Europass Centre



SOILMATS course | Photo by Iasmi Stathi



2

# SOUNDS RIGHT NATURE-MUSIC EXCURSIONS FOR YOUTH ENGAGEMENT



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### Target group

This recipe is for educators, museums, NGOs, youth organisations, and **nature-engagement practitioners** who aim to connect young people (ages 13 to 29) with nature and attract them into biodiversity-focused Citizen Science.



### Goal

The goal is to use music and sensory experiences to strengthen **Nature Connectedness** and introduce species recognition apps as a pathway into Citizen Science participation.



### Summary/Description

This recipe describes how to host a nature excursion that brings together a musician, a biologist, and a youth group to explore biodiversity through **sound**, **creativity**, and **species discovery**. The method is based on the global [Sounds Right](#) campaign that frames nature as an artist. The excursion strengthens Nature Connectedness and encourages participation in biodiversity monitoring.

Photo by Kate Evans





## You Will Need

- A **musician familiar** with or aligned with the Sounds Right campaign (or inspired by nature).
- A **taxonomist or biologist comfortable** with species recognition tools.
- **Access to nature** such as a park, forest, or quiet urban green area.
- **Participants** (15–25 people, ideally recruited through social media or school partners).
- **Public transport access** or funds for a bus.
- A **species recognition app** such as [iNaturalist](#).
- **Space** for a short performance.
- **Optional:** sound equipment, photography or media team, screens for showing the Sounds Right video.

Photo by Kate Evans





## Steps to implement the Course

- 1 Measure Nature Connectedness**

Use the Inclusion of Nature in Self (INS) scale at the very start of the activity (Figure 1). Collect each participant's name, age, and response so that pre- and post-scores can be compared, being sure to comply with [General Data Protection Regulations \(GDPR\) regulations](#)

---

- 2 Introduction and Framing'**
  - a. Welcome the group and explain the workshop. Introduce the Sounds Right campaign and show the campaign video, if possible.
  - b. The musician shares how nature influences their creative process.
  - c. The biologist introduces the biodiversity crisis, the importance of naming species, the challenge of nature disconnect, and the species recognition app to be used that day.
  - d. End with a quick name round.

---

- 3 Nature Walk and Solo Reflection**
  - a. Walk together briefly, then ask each participant to find a quiet place and sit alone for 15 minutes to listen and observe through all their senses.
  - b. After regrouping, participants share what they heard and felt. The musician plays a key role in encouraging open expression.

---

- 4 Species Discovery**
  - a. Walk again, this time the participants focus on finding a plant, fungus, or animal of interest.
  - b. Help participants identify their species using the app, where necessary.

---

- 5 Reflection**

Encourage reflection on when they felt most connected to nature.

---

- 6 Final Sharing and Musical Performance**

Gather everyone to share their species findings and reflections. The musician performs a short piece: a known song, an improvised response, or a collaborative creation based on the group's reflections. The aim is to create an emotional link between music and nature.

---

- 7 Final Measurement and Next Steps**
  - a. Administer the INS scale again to measure change in Nature Connectedness.
  - b. Show participants how they can continue using the species recognition app in local Citizen Science projects.



## Timeframe

- **Preparation:** 1–3 weeks (recruitment, planning, coordination with the musician and school or youth group)
- **Excursion duration:** 90 minutes
- **Follow-up** (optional media editing, reporting): 1–2 weeks



## Estimated Budget (Indicative)

Category	Estimated cost (EUR)	Notes
Personnel	200–400	Coordination, facilitation, musician fee, biologist time
Travel and logistics	0–300	Transport, site access, light catering
Materials and equipment	0–200	Optional sound equipment for performance
Dissemination	0–100	Photos, videos, social media promotion
Other (e.g., participation in events or festivals)	0–300	Joining partner events can increase reach
<b>Total (indicative)</b>	<b>200–1,300</b>	Highly variable depending on musician, site, and transport

**Note:** Adapt to local context and available funding.



## What went well / Even better if



### What went well

The **Sounds Right framework** provided a strong cultural hook: linking music, nature, and community.

**Collaboration** with professional communication partners amplified the visibility of the model.

A memorable hashtag (**#SoundsRight**) supported sharing via social media.

**Participants experienced measurable** increases in Nature Connectedness and positive emotional responses.



### Even better if

Recruitment of **young people** is easier when the musician promotes the event directly through their social channels.

**Additional funding** would support higher-quality production, films, broader reach, and more inclusive participation.

**Clearer expectations for participants** before arriving can prevent uncertainty and improve turnout.





## Outputs and Indicators

### Outputs:

- A tested model for using music and sound-based reflection to connect young people with nature.
- Media content (videos, photos, recordings) for communication and replication.
- Partnerships between musicians, educators, ecologists, and youth organisations.
- Increased awareness of Citizen Science tools such as species recognition apps.

### Indicators:

- Number of participants, diversity of participants, and number of partner organisations.
- Media reach: social media impressions, shares, and engagement metrics.
- Changes in Nature Connectedness (INS scores before and after).
- Participant and organiser feedback.
- Continued use of species recognition apps after the workshop.
- Replication, adaptation, or scaling of the Sounds Right model.



## Related Deliverables or Resources

- Sounds Right global campaign <https://www.soundsright.earth/>
- Biodiversity observation apps such as iNaturalist <https://www.inaturalist.org/>
- Research on Nature Connectedness (Lumber et al., Richardson et al., Schultz)
- Lumber, R. Richardson, M & Sheffield, D. (2017). *Beyond knowing nature: Contact, emotion, compassion, meaning, and beauty are pathways to nature connection*. PlosOne. <https://doi.org/10.1371/journal.pone.0177186>
- Richardson, M. (2025). *Modelling Nature Connectedness Within Environmental Systems: Human-Nature Relationships from 1800 to 2020 and Beyond*. Earth 6(3) <https://doi.org/10.3390/earth6030082>
- Schultz, P.W. (2002). *Inclusion with Nature: The Psychology Of Human-Nature Relations*. In: Schmuck, P., Schultz, W.P. (eds) *Psychology of Sustainable Development*. Springer, Boston, MA. [https://doi.org/10.1007/978-1-4615-0995-0\\_4](https://doi.org/10.1007/978-1-4615-0995-0_4)

Photos by Michael Magee



3

# HOW TO BUILD A REFERENCE COLLECTION



Scan to view the  
full recipe online





## Target group

Taxonomists, curators, researchers, students, natural history collections, biodiversity **monitoring** networks, citizen scientists, policymakers, funders and other stakeholders.



## Goal

To provide a **practical guide** for developing physical and/or virtual reference collections that support accurate **species identification**, biodiversity monitoring and biological research.



Finnish hoverflies VRC *Cheilosia fraterna* male habitus dorsal



## Summary/Description

Reference collections are **curated sets of specimens or data** that act as authoritative sources for reliable species identification and taxonomic verification.

They serve as the physical and digital benchmarks that enable researchers and citizen scientists to **verify species identities, track biodiversity change, and inform conservation priorities**. It is therefore of great strategic importance to develop and maintain well-curated, standardized reference resources that can underpin taxonomic capacity building and support evidence-based environmental policy across Europe.

This guide provides practical, step-by-step instructions for **building reference collections** (physical and virtual) within a coordinated, multi-institutional framework. Drawing on experience gained within the TETTRIs project, including that of third-party projects (ARCADE, Balkan Pollis and INC-STEP). It highlights not only the technical and curatorial foundations of specimen management but also the collaborative dimension of distributed reference collections, where multiple institutions contribute specimens, data, and expertise to create a unified, integrated resource. By following this blueprint, organisations can **strengthen the accuracy, accessibility, and sustainability** of reference collections that collectively advance Europe's biodiversity knowledge and biodiversity monitoring capacity.

## Types:

- **Physical:** preserved zoological and botanical specimens (e.g. pinned insects, herbarium sheets, etc.) and associated metadata
- **Virtual:** high-quality digital images (photographs, 3D scans, etc.) of biological specimens and associated metadata

Physical collections enable direct examination and verification, while virtual collections improve global accessibility and scalability.

**Note:** Reference collections may be distributed across several institutions, forming a **coordinated network of holdings rather than a single-site repository**. This model applies to both physical and virtual assets. Distributed collections improve resilience, coverage, and accessibility, but require clear governance, harmonised metadata, and integrated infrastructure. Distributed collection requires a shared catalogue that is not only accessible for all holding institutes, but also for interested users from all stakeholder groups.



## You Will Need

### General:

- Clear goals and scope (taxa, geographic area, user community).
- Institutional support, space and resources.
- If using amalgamated collections, designate a coordinating institution or lead partner to oversee standards, workflows, and data integration across sites.
- Defined metadata and curation standards that align with FAIR principles (Findable, Accessible, Interoperable, Reusable).
- Taxonomic experts for authoritative identification.
- Data infrastructure and collection management software.
- Outreach and engagement capacity.

### Physical collections:

- Curators and technicians skilled in collection management.
- Cabinets and secure storage (if necessary, climate-controlled).
- Labelling, preservation, and mounting equipment.
- Legal permissions for collecting and holding specimens.
- In distributed networks, ensure agreements for specimen loans, exchange, or shared custody among partner institutions are in place.

### Virtual collections:

- Digital data specialists for database management, digitisation workflows, and integration with digital infrastructures.
- Imaging or scanning equipment and software (e.g. microscopes, cameras).
- Data platforms for storage and sharing data.
- High-quality metadata per record
- Taxonomic, format, and access standards (e.g. [Darwin Core](#)).
- Connection to a maintained taxonomic backbone for accuracy and consistency (e.g. [GBIF](#), [Catalogue of Life](#)).
- For distributed virtual collections, ensure compatibility between partner databases (e.g. publishing to GBIF) and establish a shared access portal to unify distributed data sources.



## Steps to implement the Course

### 1 Define Scope

- Identify target taxa, geographic focus, and users.
- Decide on physical, virtual, or integrated collection.
- Clarify purpose: e.g. research, monitoring, a resource for biodiversity inventories, engagement.
- Consider whether the collection will be held in a single-institution or distributed across multiple partners.

**Insight from Balkan Pollis:** “Clearly defining taxonomic focus from the start ensures efficient prioritisation of resources and reduces duplication”.

### 2 Assess Existing Resources and Gaps

- Inventory of existing specimens and data
- Perform gap analyses within taxonomic scope. Are specimens verified, digitised, accessible? What is the taxonomic and geographic coverage available?
- What taxonomic expertise is available locally or via partnerships?
- Identify constraints (e.g. financial and human resources at institution level), to enable prioritisation of actions)

**Note:** When assessing existing resources, include partner institutions that may hold complementary material; mapping the distributed network from the outset helps coordinate future integration.

**Insight from Balkan Pollis:** “Differences in partner resources can slow standardisation, but early specimen mapping and the use of shared tools or remote collaboration help streamline processes and prevent duplicated effort”.

### 3 Develop Standards and Policies

- Agree on labelling, data, access, and handling protocols
- Ensure traceability and verifiability
- Adopt interoperable metadata standards (e.g. Darwin Core)
- Apply FAIR principles (Findable, Accessible, Interoperable, Reusable)

**Insight from Balkan Pollis:** “Consistent handling and labelling protocols across institutions simplify data integration and long-term curation”.

### 4 Assemble the Collection

#### Physical collections:

- Select representative, high-quality specimens (considerations may include prioritising well-preserved and mounted specimens that display the diagnostic characters clearly, and represent each sex and significant geographic variation).
- If possible, arrange for field-sampling of new specimens, prioritised according to gaps identified in Step 2 (e.g. taxonomic, geographic) to maximise collection completeness.
- Prepare, label, mount, and store specimens securely.
- Ensure authoritative identification of specimens by experienced taxonomists.
- Record specimen metadata and provenance.



**Note:** Distributed Physical Collections: If partners each contribute specimens, establish a shared catalogue linking holdings across institutions. Agree on a unified identifier system and metadata format that are aligned with international standards, so the distributed holdings function as one reference resource.

**Insight from ARCADE:** “Working in a network of institutions allows experts to share information, provide support, and exchange materials to strengthen collections. For instance, a museum with a comprehensive collection of a particular taxon can share specimens with other institutions. This ensures that the taxon is represented in multiple locations, improving accessibility and safeguarding against total loss”.

**Insight from INC-STEP:** “Technical collection tasks (e.g. sorting and consolidation of specimens) took ~3× longer than taxonomic verification. Factor this into scheduling and resourcing”.

**Insight from Balkan Pollis:** “Engaging students and young researchers for label creation and basic data entry allowed experts to focus on complex identifications, improving efficiency”.

#### Virtual collections:

- Select representative, high-quality specimens (see considerations above)
- Include only authoritatively identified specimens, or flag uncertainty
- Digitise specimens using high quality images, including those of distinguishing characteristics (digital photography, 3D scanning, etc.)
- Complete metadata per specimen/image
- Tag the digitised specimen to a virtual collection in collections management database
- Upload to searchable, user-friendly platforms (institutional and global, e.g. [GBIF](#), [DiSSCo](#))
- Link names to a reliable, maintained, versioned and citable, taxonomic backbone for consistency

**Note:** Distributed Virtual Collections: Digital assets may be stored in different institutions. Ensure interoperability, central indexing, and consistent data structures so users can navigate seamlessly between holdings.

**Insight from Balkan Pollis:** “Standardising imaging protocols ensures consistent, high-quality specimen images, facilitating comparison, analysis, and long-term data preservation (<https://balkanpollis.pmf.uns.ac.rs/virtual-type-collection/>). User-friendly interfaces make it easier for people to access, explore, and use the collection”.

## 5 Connect and Share

- For distributed collections, establish a shared portal or metadata aggregator linking all partner holdings. GBIF is the most obvious and cost-effective option because it is free, already widely used by museums, supports standard biodiversity data formats, integrates with common collection management systems, and provides a stable global platform for sharing and discovering specimen metadata.
- Promote to user groups.
- Integrate with national and/or international infrastructures.
- Ensure long-term access and attribution.
- Encourage reuse, citation, and community input.

## 6 Engage Stakeholders

- Include researchers, educators, students, NGOs, citizen science groups.
- Invite input on design, priorities, and usability.
- Identify champions for awareness and use.

**Insight from ARCADE:** Regular training courses aimed at different competency levels are highly engaging to new students wanting to learn taxonomy.

**Insight from Balkan Pollis:** Workshops and hands-on training improve volunteer contributions and help build a local expertise network.

## 7 Sustain and Evaluate

- Routine curation, review, and metadata updates.
- Track usage, downloads, citations, or ID queries.
- Build partnerships to maintain funding and staff.
- Evaluate if goals are met.

**Note:** For distributed collections, include periodic review of partner data synchronisation and shared governance structures to ensure the network remains cohesive and interoperable.

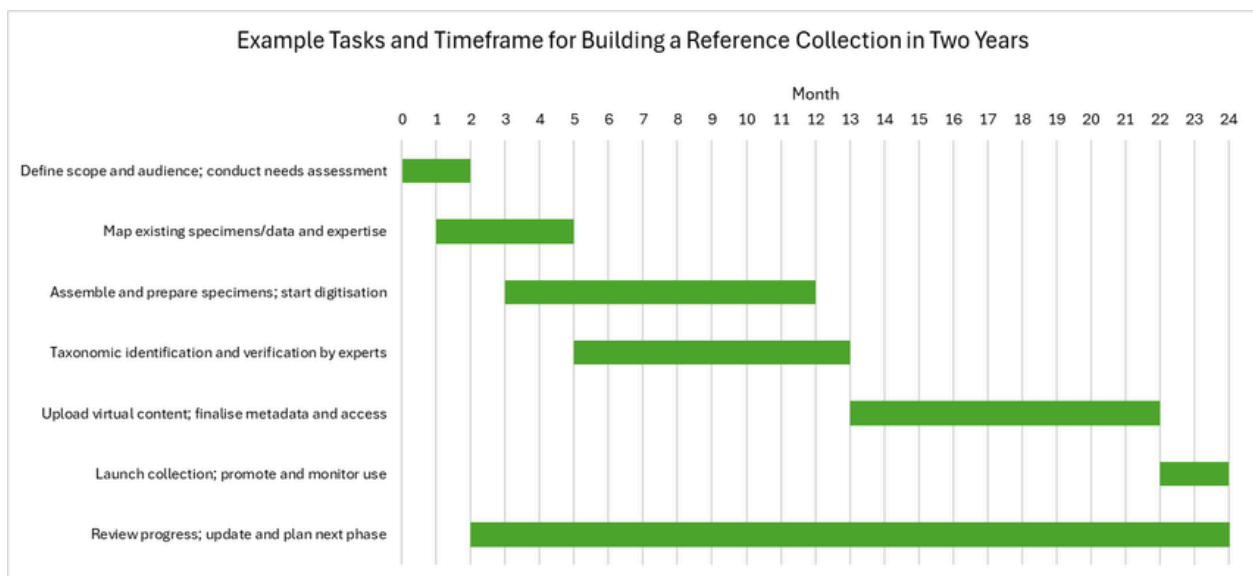
**Insight from Balkan Pollis:** Keeping track of quality and having clear rules for updates, backups, and linking collections makes workflows easier and avoids future issues.



## Timeframe

A full reference-collection project may take **6–24 months** or longer, depending on scope and available resources.

An example of the tasks and two-year timeframe for building a reference collection is shown below in **Figure 1**.



**Figure 1:** Timeline for building a taxonomic reference collection.

**Note:** Taxonomic verification can be a bottleneck. Ensure access to qualified experts and plan their involvement early in the project.

**Insight from ARCADE:** Another bottleneck in historical collections is the historical reconstruction of each sub-collection and specimen data.



## Proposed Budget Structure

The following budget structure is provided as a suggested framework for planning a reference collection project. Individual users may find that some cost categories, roles, or tasks are not applicable to their specific context and can adjust allocations accordingly.

### Personel

This will be the largest cost and is dependent on the size and type (physical or virtual) of the reference collection.

Role/Task	Function/Description	Person-Months	Notes
Taxonomists	Verification and identification of specimens, expert input on metadata	6-12	Taxonomic verification can be a bottleneck; distribute across taxa/partners
Curators/Technicians	Sorting, handling, basic data entry, labelling, field sampling support	12-16	Supports taxonomists, includes labeling, mounting, organizing cabinets
Digitisation/Data Specialists	High-resolution imaging, 3D scans, database entry, metadata curation	6-12	Ensures FAIR principles are applied; standardization for virtual collections
Project Coordinator/Manager	Planning, progress tracking, liaison between partner institutions	4-8	Critical for distributed collections and network coordination
Outreach/Dissemination Staff	Workshops, training, website and portal content, user engagement	2-4	Engage Stakeholders

### Materials and supplies

These costs will depend on the collection size and type (physical or virtual).

Category	Description	Estimated Cost (EUR)	Notes
Cabinets & Storage	Entomology drawers, herbarium sheets, cabinets	5,000–15,000	Essential for long-term preservation
Labelling & Preservation	Labels, mounting pins, chemicals	1,000–3,000	Includes consumables for handling specimens
Digitisation Equipment	Cameras, microscopes, computers	10,000–25,000	Specific to virtual collections
Field Sampling	Collecting equipment, permits	500–2,000	Only if new specimen collection is planned

### Travel and logistics

Travel is important for collection consolidation, partner coordination and field sampling, where appropriate. Costs will depend on whether collections are distributed and require new sampling.

Purpose	Estimated Cost (EUR)	Notes
Inter-institution visits/workshops	500–2,000	Coordination, training, standards harmonisation
Field trips/specimen collection	1,000–5,000	Transport, accommodation etc.

### Outreach and dissemination

Outreach ensures the collection is used and cited, including training and digital communication.

Activity	Estimated Cost (EUR)	Notes
Workshops/Training	2,000–5,000	For students, volunteers, citizen scientists
Digital content	1,000–3,000	Photos, videos, virtual exhibitions, website updates
Publication	500–2,000	User guides, identification sheets
Open Access/Portal Maintenance	1,000–3,000	For virtual collections



### Lessons Learned



#### What worked

- Having a well-identified taxonomic and/or geographic focus.
- High-quality specimens and metadata increased value and usability.
- Networked collaboration across institutions (distributed collections) enabled broader taxonomic coverage and resilience.
- Active stakeholder engagement ensured relevance and uptake.

**Insight from ARCADE:** The project produced updated national checklists for key taxa. It promoted collaboration among institutions to improve knowledge of the targeted groups and helped identify gaps in existing collections. These gaps were then filled through field sampling and exchange of specimens between institutions.

**Insight from INC-STEP:** The project delivered updated national checklists for focal taxa, in addition to illustrated identification sheets for hard-to-distinguish species of pollinators, enhancing long-term usefulness.

**Insight from Balkan Pollis:** Effective teamwork, with each member knowing their role, strong communication, and a systematic approach, ensured smooth coordination and successful outcomes.

## ! Challenges

- Technical preparation (sorting, mounting, databasing) can take significantly longer than taxonomic verification.
- Taxonomic verification is essential and differs in difficulty according to taxa.
- Digitisation requires both equipment and expertise.
- Institutional fragmentation can hinder interoperability.
- In distributed models, data normalisation, synchronisation, and governance can be complex. Clear agreements and standardisation early on can mitigate these challenges.
- Long-term funding for ongoing curation of reference collections is often uncertain.

**Insight from ARCADE:** One major challenge is interpreting and reconstructing historical data from older collections and specimens. Additionally, limited taxonomic expertise in certain taxa continues to hinder authoritative specimen verification.

**Insight from INC-STEP:** Physical collections were distributed across five museums. Normalising data across institutions posed challenges. Early adoption of consistent formats and metadata standards improves interoperability.

**Insight from Balkan Pollis:** Uneven partner resources and experience slowed data collection, standardisation and digitisation, highlighting the need for good communication to maintain consistent project quality.

## 💡 Even better if

- Start with a small pilot to demonstrate value.
- Invest early in data standards and identification quality.
- Use collaborative platforms to avoid duplication.
- Pair physical collections with accessible digital content to maximise reach.
- Define distributed collections governance early (who maintains which parts, how updates propagate, and how users perceive the collection as one coherent resource).



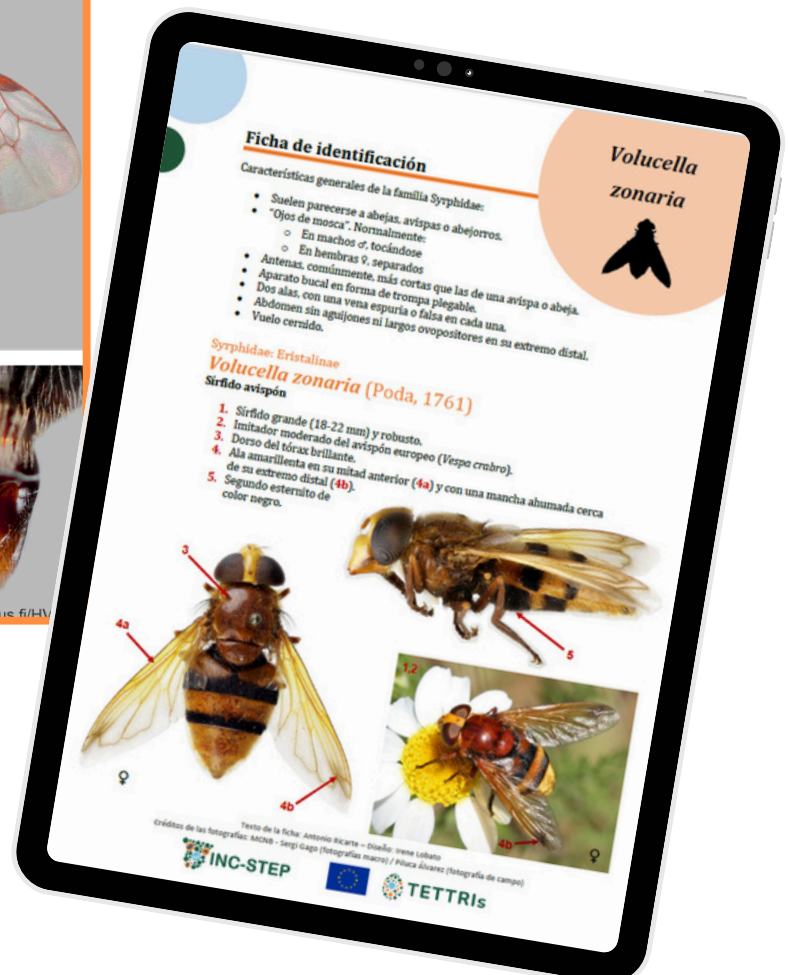
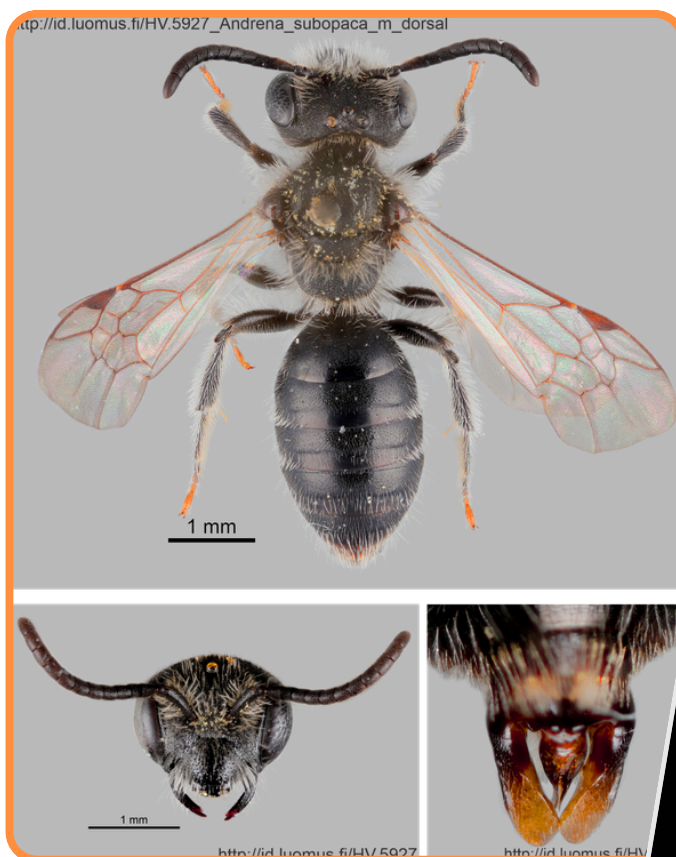
## Outputs and Indicators

- Number and completeness of specimens/taxa included.
- Completeness in terms of life stages (e.g. instars, larvae, adults) and sexes represented.
- Proportion of specimens verified by taxonomic experts.
- Availability of metadata (e.g. localities, seasonal occurrence etc.).
- Online access statistics.
- Updated species checklists or catalogues.
- Illustrated identification sheets for hard-to-distinguish species.
- User feedback and application in research/monitoring.



## Related Deliverables or Resources

- [Roadmap to set up Reference Collections](#)
- TETTRIs Policy Brief 1: [The Power of Reference Collections for Biodiversity Monitoring](#)
- ARCADE: [Overview](#)
- Balkan PolliS: [Overview](#)
- INC-STEP: [Overview](#)
- Infrastructures and Standards: GBIF, DiSSCo, Darwin Core



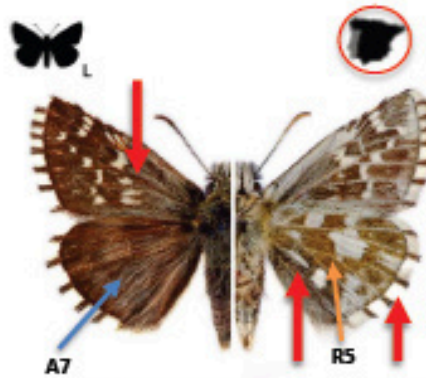
# Características principales de cada especie para su identificación

● anverso
 ● reverso

Las características se presentan de forma resumida para facilitar una identificación rápida a partir de esta lámina. Para una descripción detallada, se recomienda consultar la ficha correspondiente a cada especie



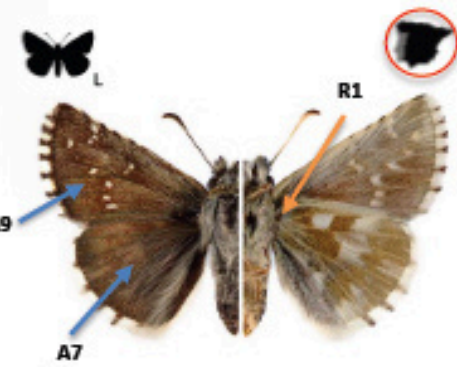
*Pyrgus alveus*



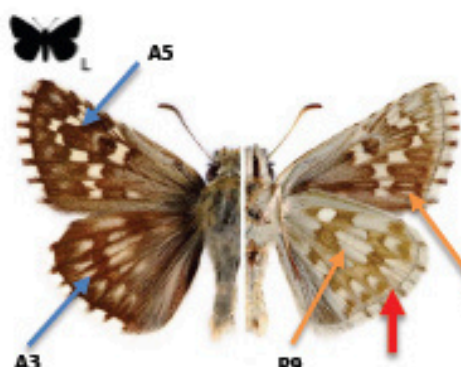
*Pyrgus andromedae*



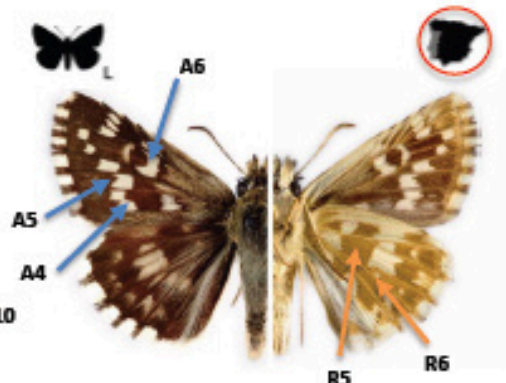
*Pyrgus armoricanus*



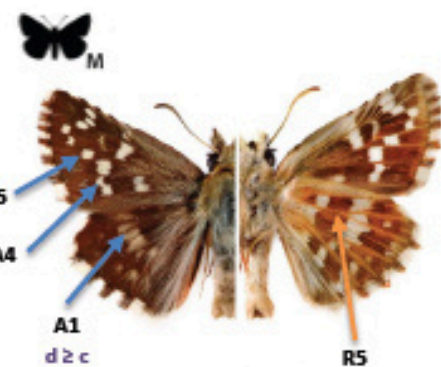
*Pyrgus cacaliae*



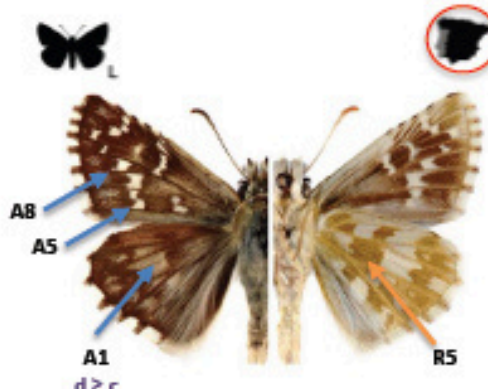
*Pyrgus carthami*



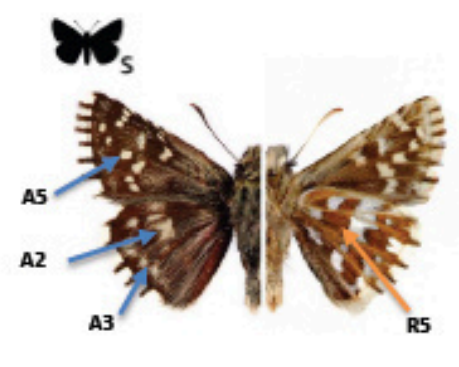
*Pyrgus cinarae*



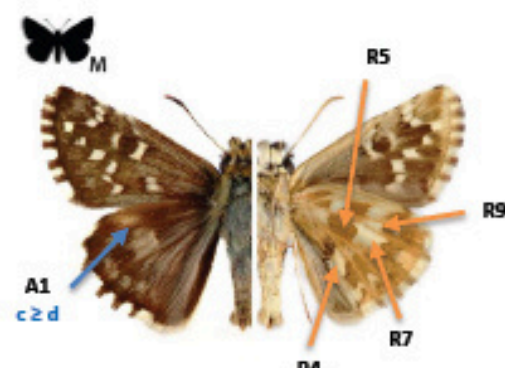
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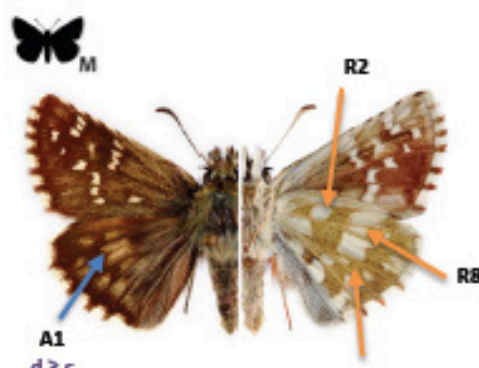
*Pyrgus foulquieri*



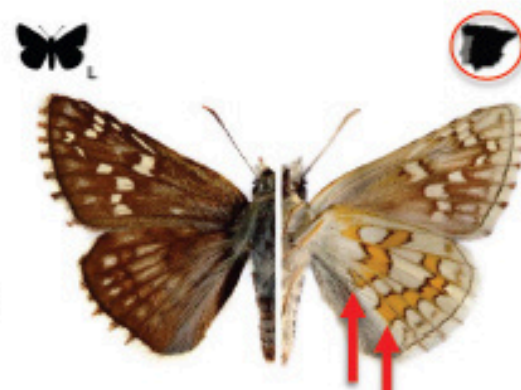
*Pyrgus malvoides*



*Pyrgus onopordi*



*Pyrgus serratulae*



*Pyrgus sidae*

4

# HOW TO COLLABORATE TO DEVELOP IMAGE RECOGNITION TOOLS FOR COLLECTIONS



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full recipe online





## Target group and goal

This recipe is for natural history institutions, museums, universities, biodiversity centres, NGOs, and citizen science groups aiming to **cooperate** on developing image recognition for collection objects.



## Summary/Description

Image recognition is increasingly a successful tool for the **identification** of plants, fungi and animals in the field. Development of similar tools for museum collections is lagging behind. The main reason for this is the scarcity of training data. Cooperation between natural history museums would allow **constructing databases** with training data at relatively low cost.



## Introduction

The success of biodiversity portals in combination with image recognition has in the past decade resulted in a strong increase of both the number of observers and the number of records of **species**. **Image recognition tools** could also be useful for identifying objects in collections. However the creation of image recognition models for museum objects lags behind mainly due to the lack of sufficient training data. **Cooperation** between natural history museums would allow constructing databases with training data at **relatively low cost**. Image recognition for museum objects will not work for all species groups. In general species groups that do not lose colour and of which the structure remains largely the same after being collected will result in more **successful recognition models**. This means that groups such as bees and flies in which the structure of the object is partly determined by how they are mounted are less suitable.



Cepea hortensis | Photo by Amelie Höcherl

Also groups like dragonflies which tend to lose their colour will be less likely to result in successful recognition models. Groups where image recognition for museum objects is likely to be the most successful are butterflies and moths (colours remain well preserved) and molluscs (both colours and structure of the object remain largely the same after collecting). Especially for molluscs developing image recognition seems promising as there is a high diversity of often difficult to recognise species. Also for molluscs there are, relatively, many large and well curated collections available throughout Europe.

Be aware that building image recognition models based on images from and for collected specimens can not often be used for images of the same species taken in the field or at last lead to poorer results.



## You Will Need

- **Clear project objectives**
- **Species checklist.** Comprehensive list of species to be included
- **Organising team**
- **Students** and or **volunteers**
- **Training data** from various collections that have the targeted species or group
- **Photographic equipment** to take high-quality images
- **Database** with standardized metadata
- **Global Biodiversity Information Facility (GBIF) Metadata standards**
- **Modeller and modelling software**





## Steps to implement the Course

### 1 Define your objectives & create a checklist

Make sure to clearly define the group for which you would like to make an image recognition model. This can either be a selection based on taxonomy or a selection based on distribution (or a combination thereof). Include potential confusing species from other groups. Based on this a checklist of species to be included needs to be drawn up. This checklist will be used throughout the project to track progress and will be used in Step 2 to invite team members to the project.

### 2 Assemble the organising team

The following roles should be embedded in your team:

- Role/task: coordination
- Role/task: training data collecting
- Role/task: quality control
- Role/task: publication on Global Biodiversity Information Facility ([GBIF](#))
- Role/task: model building
- Role/task: model publication & deployment

One person can have multiple roles. The role of training data collecting will ideally be shared by multiple persons from multiple institutes.

**Coordination.** This person should take the lead in the project by organising regular meetings and keeping track of progress. Part of this is keeping track of the checklist being used, keeping track of progress and maintaining the drive in which the images are shared. The coordinator should also make an inventory of expectations. This includes for instance discussing potential publication and reaching agreement on who might be the lead author of a publication.

**Training data collecting.** Depending on the selection of species to be included multiple persons, it is likely that multiple institutes will have the role of collecting training data. For each collection/institute this role should be taken by the person coordinating the work at that particular institute/collection. The actual work of digitising material can be done by others, such as students or volunteers. Part of collecting the training data is creating a database with metadata of the objects. This should be aligned with the metadata needed for the upload to GBIF.

**Quality control.** It is important that the images created are of a good enough quality and are not too different between institutes. This person is responsible to create - before the digitising starts - guidelines on the digitalisation (which magnification, which background, which angles, how many images per object, etc). During the process this person should regularly check if the guidelines are applied properly.

**Publication on GBIF.** When all data is digitised all the metadata and the images should be combined and made available through GBIF. This ensures that the data is available for other usages as well.



**Model building.** This could be an employee of a natural history museum but ideally a computer scientist. Provided that this person has a relevant background, building a model will be relatively straightforward. It is however important that this person understands the aims of the project and is capable of translating the result to the others involved in the project (for instance information on the limitations of a model and the possibilities to address these by creating additional training data).

**Model publication & deployment.** This would likely be the same person as the model builder. This person is responsible for the Findable Accessible Interoperable Reuseable (FAIR) publication of the model and thus ensuring that the model can be used by others.

### 3 **Finetune the checklist & divide digitalisation work**

With the experts of the different institutes the checklist of taxa included should be finetuned. Do all persons involved use the same taxonomy and do they use the same species definition? Based on that an inventory needs to be made of which collection has material of which taxa. This overview will lead to insights on which institute needs to digitise which part of the collection.

### 4 **Digitalisation & quality control**

The digitalisation is the most time consuming part of the project. It is best to try to limit this step to a period of six months as otherwise the project will drag on. During this period it is important that the persons doing the digitalisation (often students or volunteers) receive feedback. This is not only for quality control but also to keep them engaged. Quality control must take place during digitalisation and should include checks on the correct identification of objects.

### 5 **Building a model & upload of data to GBIF**

These steps can take place at the same time. The person building the model will probably be a student or employee of a university of computer science. It is important to align their availability with the deliverable of the training data.

### 6 **Testing & deployment**

After the model is ready the results are discussed between the AI specialist, the involved taxonomist(s) and where possible the people carrying out the digitalisation work in this process as it will make it more likely that they are willing to engage in future projects. It should be discussed:

- a. Is the model good enough for publication?
- b. Does the model need a warning to users (for instance: includes all species of islands X except for A, B and C)?
- c. Does the model need to be updated with more training data?

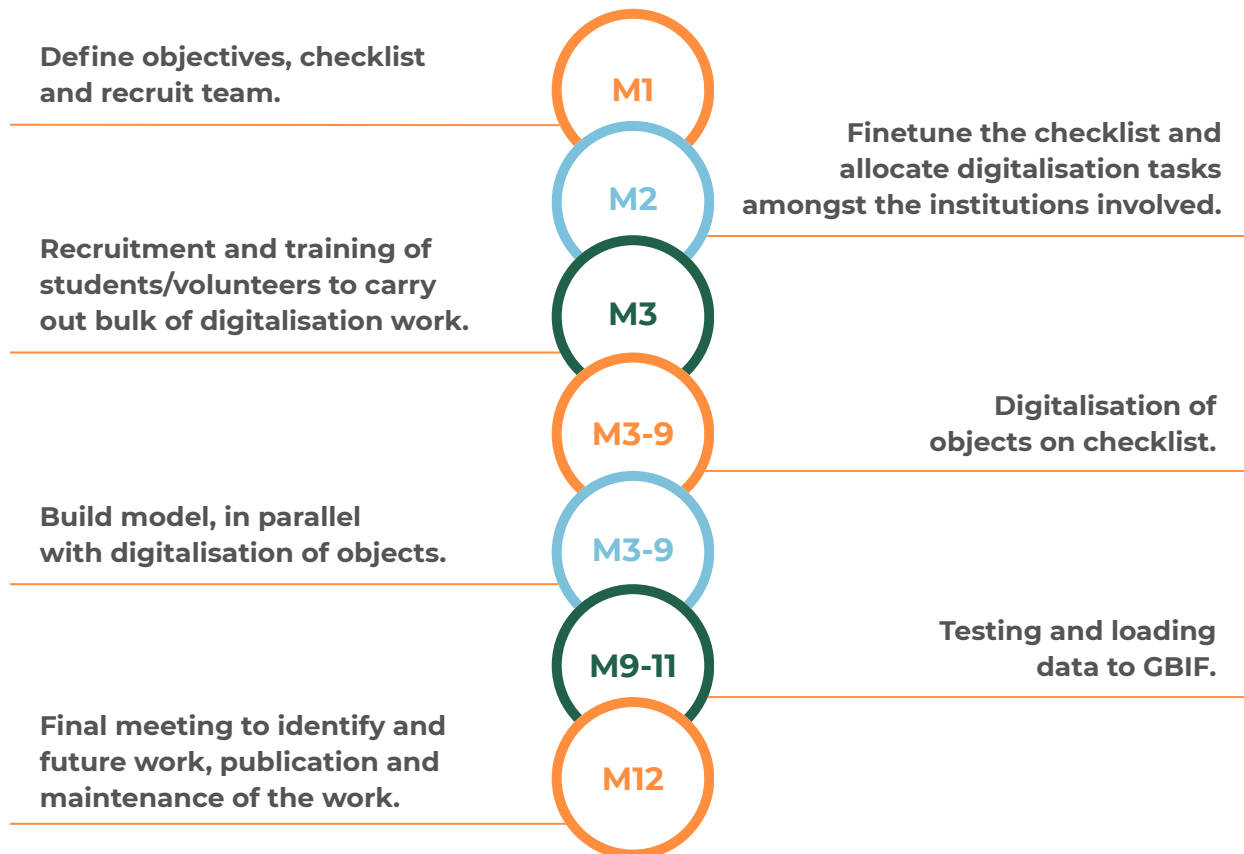
### 7 **Publish, announce, reflect and sustain**

The model should be published in a repository and if possible deployed so that people can easily make use of it. Reflect on the project and determine if the work should/can continue to increase the selection of taxa. Consider writing a paper announcing the availability of the model.



## Timeframe

The timeframe is dependent on the number of taxa included in a project. Ideally the timeframe should be a maximum of a year. If the number of taxa included in a project is too large, the timespan of the project will likely become too long, resulting in the risk that the project loses its traction. Therefore, we suggest creating a year-long project, and then build upon it with subsequent projects.



## Estimated Budget (Indicative)

Assuming that the involved institutes have imaging equipment in place nearly all costs consist of working hours dedicated to the project. By far the **highest time investment is the digitalisation** itself. Rarely institutes will have personnel available to take on this job and it is likely that it will be needed to cover this part of the work with student projects or with volunteers. Involving volunteers can be highly rewarding but does take time. Best would be for natural history museums **not to try to deploy volunteers** on an ad hoc basis but instead invest in a core team of dedicated long-term volunteers.

Time needed for the digitalisation depends on the number of taxa included and the number of images made per taxon. In the case of **molluscs** two or three images per object are needed and ideally at least ten specimens for each taxon. Based on the minimum of ten specimens it should be possible for **one person to digitise the needed training data** for one to two taxa in a single day.

The time needed for the other roles is dependent on the scope of project and the expertise of the person taking on the role.



## Even Better if

Building image recognition models for museum objects are especially promising for molluscs. **Europe has over 2000 species of molluscs**, thus the identification of species in species rich areas is only possible for specialists. Proper information on distribution and conservation requirements is therefore absent for many taxa. The only way to allow a larger group of people to identify these species is by **building image recognition models** and the quickest way of doing so is using museum collections. As colours and shape of mollusc change little after collecting these models can be used both on collected material and on material (mainly empty shells/snails) found in the field.

Setting up a larger and longer **cooperation between institutes and specialists** throughout Europe aimed at building image recognition in a modular way (stepwise for regions or taxonomic groups) is the only way to rapidly increase knowledge on snails on a European level.



## Outputs and Indicators

### Indicators:

The following indicators can be used to assess the impact of your project:

- Number of images and records made available on GBIF
- The number of taxa included in the model
- The number of uses of the model, e.g. does the model lead to improved identification in museum collections.
- The number of dedicated volunteers
- The use of your model post creation



## Related Deliverables or Resources

Examples of already published image recognition models for European molluscs can be found at:

- Classification model for the genus *Vertigo*:  
<https://gitlab.com/arise-biodiversity/DSI/algorithms/tettris-classification-vertigo>
- Classification model for the terrestrial mollusc of Tenerife  
<https://gitlab.com/arise-biodiversity/DSI/algorithms/tettris-classification-tenerife>



SOILMATS course | Photo by Iasmi Stathi

5

# HOW TO USE THE TAXONOMIC EXPERTISE AND SERVICES MARKETPLACE



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full recipe online





## Target group

- **Providers:** Taxonomic experts, institutions, and developers of digital e-services.
- **Users:** Taxonomic experts, researchers, citizen scientists, biodiversity informatics developers, biomonitoring coordinators, and environmental consultants.



## Goal

To provide a trusted, European-level entry point for **discovering, connecting** to, and **mobilising** taxonomic expertise and e-services, thereby improving the alignment between the supply of taxonomic capacity and societal, scientific, and policy-driven demand.





## Summary/Description

The **Taxonomic Expertise and Services Marketplace** (<https://marketplace.cetaf.org>) is a European, curated index of taxonomic e-services, tools and expertise. It is an online platform providing structured information about taxonomic experts and e-Services that aims to streamline the discovery and access to them, and to **connect the supply of taxonomic knowledge** with demand for biological identification. This recipe explains how to "plug in" to this ecosystem.

The Marketplace is designed to address a **long-standing challenge in the biodiversity** knowledge landscape: the fragmentation and limited discoverability of taxonomic capacity. By offering harmonised FAIR-aligned (Findability, Accessibility, Interoperability, and Reusable) descriptions of expertise and services, it improves visibility and comparability, while remaining open, free to use, and community driven.

The platform functions as a discovery and connection layer. It does not deliver taxonomic expertise or services directly, but enables users from **research, policy, conservation, education**, and applied sectors to identify and contact relevant experts or service providers, who remain responsible for the delivery, quality, and conditions of their work.

The recipe explains how different audiences interact with the Marketplace. For **Providers**, it outlines the steps to make their skills and /or e-services visible, ensuring their expertise is citable and discoverable. For **Users**, it provides functionalities for navigating the index to find the right human expert or automated tool for a specific project or query. By following these steps, users ensure that taxonomic science is mobilized as a high-impact, instrumental service for biodiversity monitoring and protection.



## You Will Need

### If you are an e-Service Provider:

- **Digital Identity:** An active **ORCID** (for individuals) or **ROR** (for institutions).

### For developers:

- **Service Metadata:** A clear description of the service technical specs (APIs, input/output formats).
- **Licensing preference:** Decisions on how your service can be used (e.g., CC-BY).

### If you are a taxonomic expert provider:

- An active **ORCID**, or an **email address**.

### If you are a Marketplace user:

- **Resource Type** Knowledge whether you need a taxonomic expert (e.g. for verification of identifications) or an e-service (e.g. a rapid AI identification service or an identification key to guide you).



## Steps to implement the Course

### 1 Finding Services and Expertise

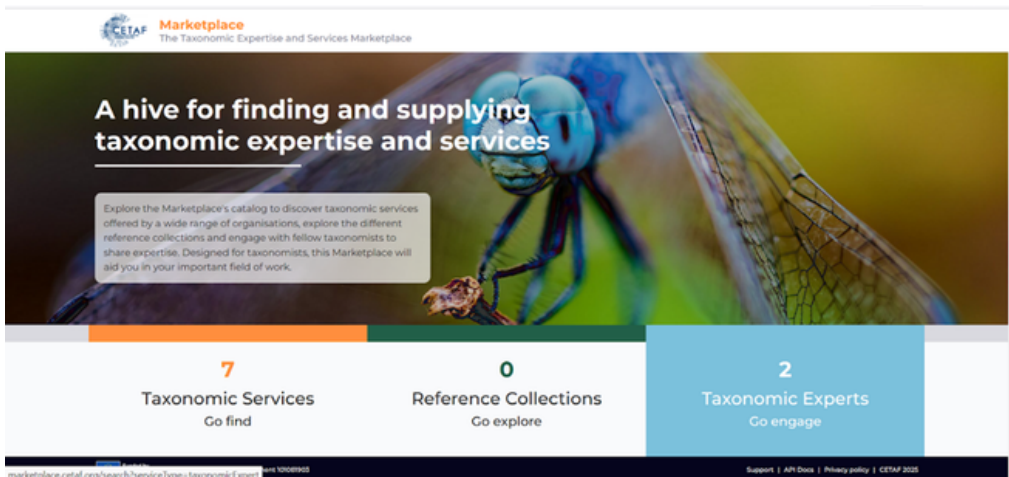
**Actions:**

1. Enter a search string or use the filters to narrow down to your target group. There are filters for e.g. taxonomic group and service type.
2. Browse the results.

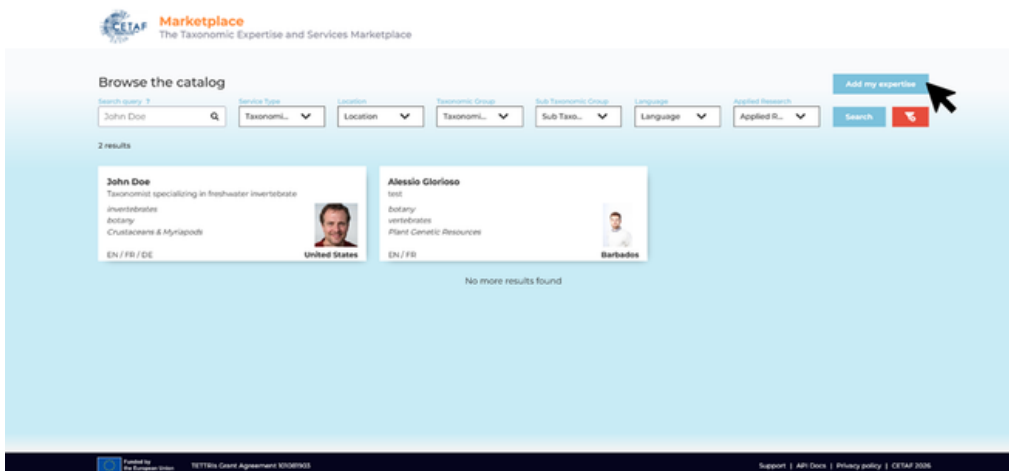
**Insight from TETTRIs Pilot:** "Using the Marketplace search is potentially more efficient than a Google search because it only returns vetted, professional-grade results verified by CETAF. However the Marketplace is currently in pilot phase and contains very limited data."

### 2 For registering taxonomic expertise and e-Services

1. For an expert to register themselves manually they need to go to the marketplace (<https://marketplace.cetaf.org/>). On the front page click on the Taxonomic Experts tap.



2. They will be navigated to a place below, on the top right hand-side of the screen users should click the add my expertise.



3. Users will need to log in either using their ORCID ID or their email address.

4. Once logged in, the user is presented with a registration form asking for them to fill in details about their expertise. The table below shows the list of fields they are asked to fill in.

### 3 For registering e-Services.

The process for registering e-Services is similar to registering taxonomic expertise, providers need to go to the Marketplace and click on the e-Service section, where they can access a registration form by clicking a button suggesting a service. Unlike the taxonomic expertise form, providers do not have to log in.

**Insight from WP3:** "The e-services and expert profiles are described in a standardised and machine readable format and get a persistent identifier, so they can be easily integrated with infrastructures like DiSSCo and GBIF."



## Timeframe

**Onboarding an Expert/Tool:** 15–30 minutes .

**Finding a Service:** 5–10 minutes using the advanced filters.



## Lessons Learned



### What worked

The market place improves findability of taxonomic expertise and services and makes the descriptions easily accessible for humans and machines, also additional resources can easily be added.



### Challenges

"Empty Profile Syndrome"  
Users often ignore expert profiles or service descriptions that don't have detailed data.



### Even better if

The marketplace could include a **"Request for Identification"** feature to broadcast a challenge to all experts in a specific group if you can't find a single specific contact.



SOILMATS course | Photo by Iasmi Stathi



## Indicators of Success

### Visibility:

- Is your profile/tool appearing in the top 10 search results for your taxa?

### Connectivity:

- How many requests have been initiated via your expert profile?

### Citation

- How many times has your e-service cited in a research paper or policy report and was the marketplace PID used to reference it?





6

## SPARTEXPLORES

EXPLORE  
SPECIES  
PARTITIONING  
ON A  
SINGLE-LOCUS  
DATASET IN JUST  
A FEW CLICKS



Scan to view the  
full recipe online





## Target group

The user spectrum includes integrative taxonomists, phylogeneticists and molecular ecologists.



## Goal

To develop a user-friendly web platform that facilitates integrative **species delimitation** by enabling researchers to efficiently explore, compare, and interpret multiple lines of evidence within a **unified interface**.



## Summary/Description

SPART EXPLORER is a user-friendly web platform intended to enable quick and easy online exploration of the **various possible competing species partitions hypotheses**. This first version implements two popular delimitation tools for single locus dataset (ABGD and ASAP), and provides an innovative graphic interface allowing visual and statistical comparisons of alternative species partitions.



SOILMATS course | Photo by Iasmi Stathi



## You Will Need

- A **single-locus DNA** alignment in fasta to be analysed by ASAP and/or ABGD
- Optionally, the **visualisation interface** also allows users to complement the set of ABGD and/or ASAP species partitions by uploading additional spart files (for instance obtained from other delimitation tools exporting results in spart files, or created by hand). To be compatible, these complementary spart files must present the same characteristics as those previously inferred (i.e. same number of individuals with identical identifiers).

**A web platform:** SPART EXPLORER is accessible at <https://spartexplorer.mnhn.fr/>. All its functionalities are free of charge and do not require the creation of a login account. All analyses launched have a unique url, valid for one month by default, but automatically renewed after each new access, therefore enabling users to return to the latest analysis status, whatever its state of progress. Users can also be notified by email in the event of analyses of large datasets that may take a long time to complete.



## Steps to implement the Course

- 1 Open your browser and go to <https://spartexplorer.mnhn.fr/>.
- 2 Click on the button « let's go » (Delimitation).
- 3 Upload your aligned fasta. file.
- 4 Choose a delimitation tool (ASAP and/or ABGD), with parameters by default or advanced options.
- 5 Click on « confirm » to launch the analysis.
- 6 Visualize your results, compare the alternative partitions inferred with the indexes calculated by LIMES and through an interactive graphical interface.
- 7 Export your results through various formats (species partitions in .spart, graphics in .svg and .png, and other kinds of results in .txt).
- 8 Optionally, you can load complementary .spart partitions at this stage to compare them with the newly inferred ones.



## Timeframe

The whole process usually takes **1 – 3 minutes**, depending on how heavy your dataset is.



## Estimated Budget (Indicative)

The service is free of charge.



## What went well / Even better if

If you notice any bugs or if you have any suggestion to improve the platform, please report them.

- via e-mail to [amiral@mnhn.fr](mailto:amiral@mnhn.fr) [puillandre@mnhn.fr](mailto:puillandre@mnhn.fr)



## Outputs and Indicators

You now possess one or several preliminary species partitions that provide support for evaluating your species hypotheses using an integrative approach.



7

# HOW TO USE A TAXONOMIC RESOLUTION ENGINE WIKIBASE



Scan to view the  
full recipe online





## Target group

Researchers interested in the linked data concepts that **underpin digital taxonomy**, such as digitally available type specimens, name registries and taxonomic treatments.



## Goal

The challenge of managing such links was addressed by TETTRIs using a custom Wikibase application, taking an explicit taxonomic focus. The data model was conceived with links between these different concepts in mind, as well as their provenance. The prime focus of the **Taxonomic Resolution Engine (TRE)** was to link **taxonomic names** to their reference type specimens, but the tool can be used to manage other key links as well, such as **material citations** in published taxonomic treatments, taxonomic authors or other parts of the Biodiversity Knowledge Graph ([Page 2016](#)).



*Cetonia aurata* | Photo by Amelie Höcherl



## Summary/Description

A [Wikibase](#) is a generic implementation of a linked open data platform, consisting mainly of items that are annotated with properties, which themselves can link to other items, string values or external data sources. A Wikibase comes with an intuitive user interface, several **Application Programming Interfaces (APIs)** for bulk modifications and exports, a strong versioning system for each item and various services **supporting communal contributions**, such as discussion pages and templates for certain types of items. It is designed as a secondary data source, always linking back to the original sources, while making relations between concepts explicit and easy to query for.

The **TRE** is a Wikibase set up with a primary focus of managing explicit links between taxonomic names and the specimens used as types to register these names. It includes tools to populate the Wikibase, validate links as data in the source systems changes and provenance mechanisms, including some fallback measures where the stability of source identifiers is unclear. The Wikibase was set up as a service hosted by the Wikibase.cloud platform, maintained by **Wikimedia Germany**. For more detailed background information, read [TETTRIs milestone 3](#).



## You Will Need

### Human resources:

- Data scientists with some familiarity with data wrangling and batch API requests in [Python](#).
- Taxonomic experts who understand the intricacies of taxonomy and can navigate the landscape of different data sources (often with their own intricacies).



## Steps to implement the Course

1

### Acquire an account on the Wikibase.

This can be done by signing up to the TRE on [this page](#). Please note that you may see a strange anime cat girl character first: this is normal, the figure is the mascot of the [Anubis website protection software](#), which is used by the maintainers of the Wikibase.cloud platform to block malicious and excessive use of some of their websites.

Accounts need to be approved by administrators of the TRE, to ensure the security and usability of the site.

2

### Define the initial scope

Draw out what you want to contribute. This can be a certain taxonomic group, or a more general dataset that you have worked on. Identify the different data elements that you want to publish and compare them to the data models in Milestone 3. The TRE currently has a strong focus on documenting type specimens, but this can be extended to include material citations in published taxonomic treatments, taxonomic authors or other parts of the [Biodiversity Knowledge Graph](#).

3

### Discuss any required extensions to the existing data model with input from diverse stakeholders

If new properties are needed, it requires community discussion and the involvement of the administrators. A community discussion can be opened on the Wikibase by [creating a new page](#) and opening a discussion. Only do this if a significant userbase is active on the TRE. If not, other discussion venues should be used, such as a CETAF working group like the CETAF Information Science & Technology Commission ([ISTC](#)).

#### 4 Acquire data from different sources

The TRE is designed to identify its key items through persistent identifiers. If these are not part of your dataset, or other key metadata is missing, you will need to acquire and harmonize it from different sources. Example R scripts that do this are available on [GitHub](#).

#### 5 Link the different data concepts

The TRE is designed with explicit links in mind. There are items for the different concepts (specimens, names, datasets) and there are items for the links between them (e.g. typification assertion of a specimen for a name). This allows the links to be easily updated if new information arises or the link was inaccurately claimed.

#### 6 Develop or modify the scripts and other modifications needed for automated import

Python scripts using the [wikibaseintegrator](#) package are available on [GitHub](#). These make use of the Wikimedia API and require an [OAuth 1.0a consumer](#) to be generated for the user's account.

Users can also make use of the [Quickstatements](#) module to load batch additions or modifications into the Wikibase from a CSV file. A user needs to have the status of "autoconfirmed" in order for them to be able to use the Quickstatements service. This can be accomplished by making 50 manual contributions or contacting an administrator.

#### 7 Execute the import and/or modification operations

It is recommended to set up the Wikimedia API script of the import with a limit of no more than 10 requests per second, and to work in batches of 10 to 40,000 changes. This makes a timeout less likely.

Quickstatements are directly set up as a job on the server itself and do not require a local script to run. It is recommended to work in smaller batches, though, closer to 10,000 at a time, as the current version of Quickstatements does not support request limiting and hence a large batch may cause the user to exceed an API limit.

#### 8 Set up a bot or cron job to periodically perform automatic updates

A fully automated pipeline can be set up, which periodically acquires data from different sources, links the concepts and publishes it to the TRE. The pipeline can and should also request data from the TRE through the SPARQL interface to look for duplicated or out-of-date information, such as broken links, changed metadata or drifting identifiers. An example of such a pipeline can be found (soon) on <https://github.com/matdillen/ttrypes>



## Timeframe

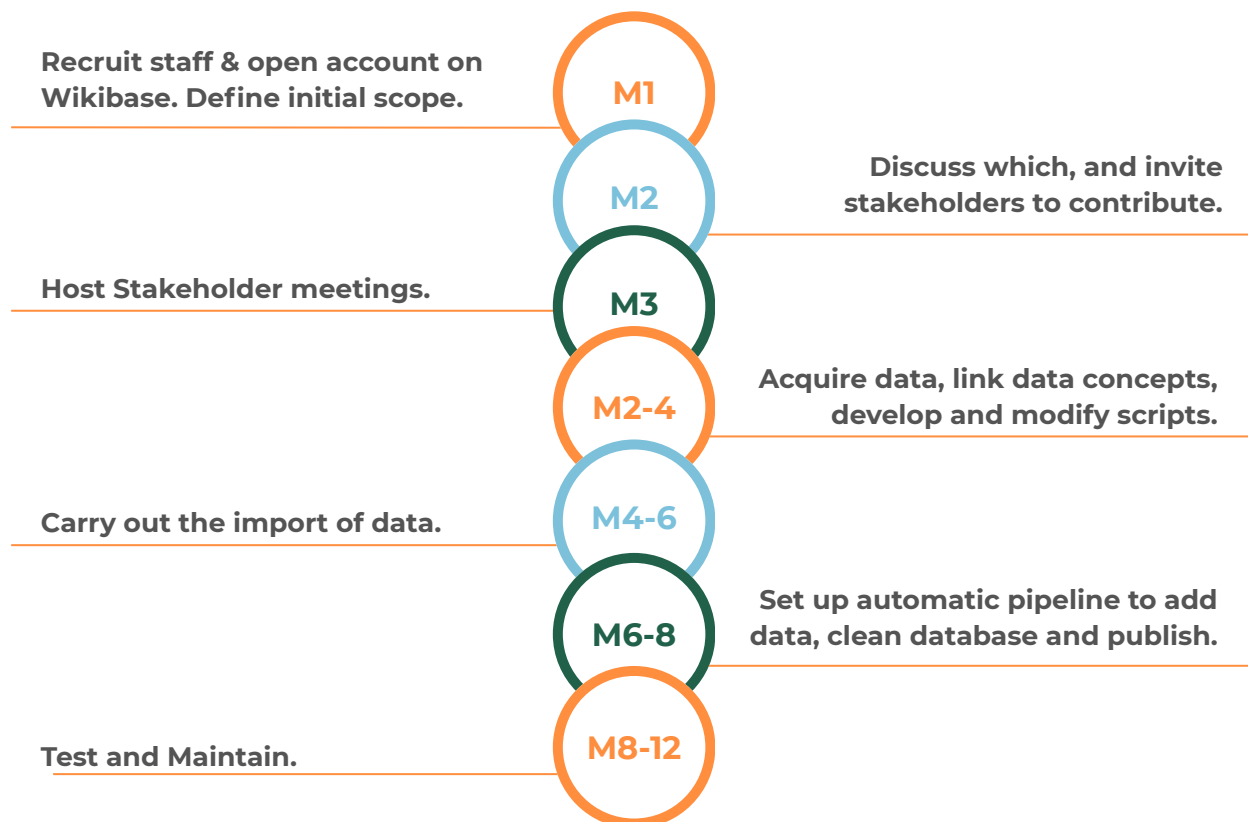
Estimating the time frame is very difficult. In theory, all of these steps can proceed very efficiently and the contribution to the TRE can be up and running with automated updating scripts after a few weeks. If the scripts are set up properly, 100,000 additions or updates can be reliably finalised **in the course of a day**.

In practice, there are many potential delays in every step and the ultimate setup workflow is more likely to take several months. Organising workshops with stakeholders is also likely to take weeks of **planning and finding dates to bring enough contributors together**. Data acquisition and linking can run very smoothly, but bridging different data models can cost extra time. In particular data stability and versioning across infrastructures may differ widely and introduce additional complications. A full year is a more realistic and safe time frame.

From the above: here is a rough timeframe to include in the cookbook:

### The timeframe is 3 - 12 months.

In theory, all of these steps can proceed very efficiently and the contribution to the TRE can be up and running with automated updating scripts after a few weeks. If the scripts are set up properly, 100,000 additions or updates can be reliably finalised in the course of a day. In practice there are potential delays in each step, thus we have given a 12 month time frame.





## Estimated Budget (Indicative)

Provide a simple cost estimate for implementing this recipe. Break it down by major categories such as:

### PERSONNEL

- Data scientist (for 1 year)
- Taxonomic expert (for 1 year)
- Site administrator (for 1 year)

### TRAVEL & LOGISTICS

- 3 stakeholder workshops. These could be virtual or fit into a larger event, reducing costs.
- Server hardware, cloud hosting or service hosting fees.
- Dedicated PC/server to perform the automated updates.



Meloe violaceus *Triangulos larvae* | Photo by Amélie Höcherl



## What went well / Even better if

- **Wikibase is a very powerful tool for this purpose.** It has the data structure, the APIs, the query engine, the user interface, customization features and more for what someone might want for a novel platform.
- **Using wikibase.cloud removed many potential complications, but also introduced a few others.** Occasional bugs slowed the development of the platform, sometimes taking weeks before the development team could address them. On the other hand, these issues could have crept up on a self-managed installation as well and then we might have needed to consult external support to address them - or spend extra time ourselves.
- **There are many intricacies with different data sources that complicate this process.** A lot but not all data is open and can thus be used freely. Other data sources however have overly restrictive licenses making them unavailable for ingestion in the TRE. Versioning and stability of records is still problematic. Identifiers for concepts are not always consistent, do not persist or multiply.
- **Wikibase is not too fast in ingesting data updates without direct backend access.** So a dedicated machine to perform the bulk updates and log retries is very important. Updates could be performed much more rapidly with a self-hosted Wikibase, through direct database access, but this is accompanied by a very significant risk of data corruption. The software stack behind a Wikibase is not a simple one and requires significant experience to manage properly.
- **Operate on an invite-only basis** (i.e. new accounts need admin approval to work, anonymous contributions are not allowed, which took up more staffing time). This was a necessary restriction as spammers and malicious users are everywhere and instances of the wikibase.cloud platform are trivial to locate.



## Optional: Related Deliverables or Resources

- [TRE test Wikibase.](#)



Meloe violaceus | Photo by Amelie Höcherl



8

**CHECKMYNAME**  
FIND THE  
RIGHT ONLINE  
MATCHING  
TOOL FOR  
CHECKING  
THE SCIENTIFIC  
NAMES OF  
ORGANISMS



Scan to view the  
full recipe online





## Target group

The user spectrum is broad, and includes, but not limited to:

- **Researchers and citizen scientists** who need to verify the spelling of names.
- **Data curators** who link names to taxonomic backbone services.
- **Taxonomists** preparing monographic treatments.



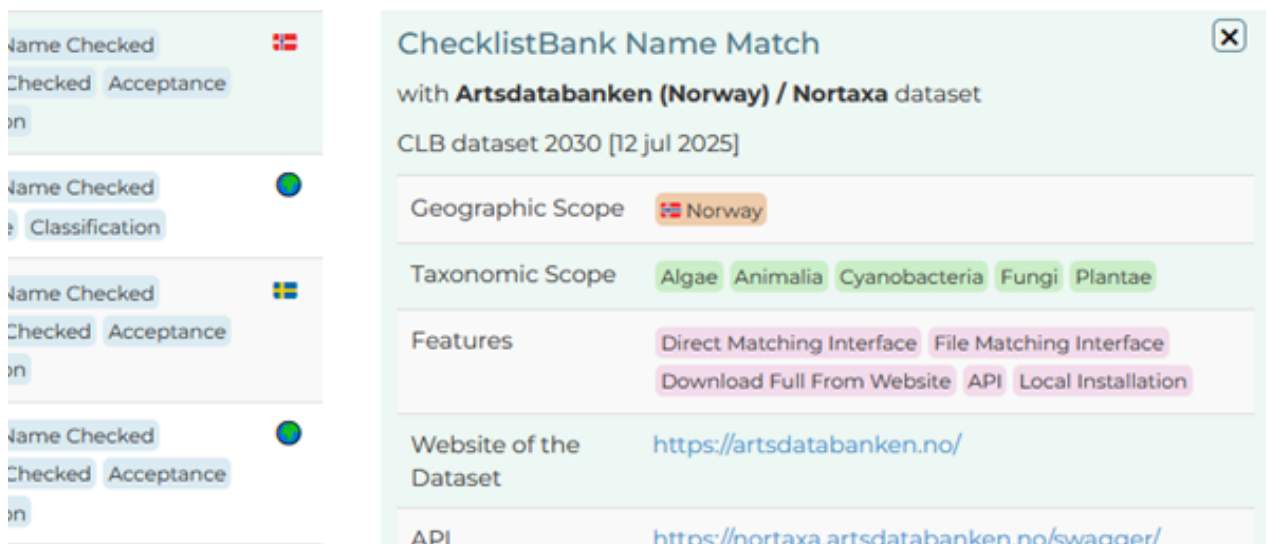
## Goal

To help users find the online **name-matching service** that best fits their needs, a task that can be difficult, especially for those not familiar with biodiversity informatics.



## Summary/Description

Using scientific names based on globally recognised rules of biological nomenclature enables precise and effective communication about the living world. A key requirement for this is the ability to **connect names across different sources** (particularly with taxonomic data aggregators), which relies on name-matching. The data used in the application covers large-scale taxonomic datasets and online name matching services that access them. This recipe describes how to use a simple online tool to identify **name-matching services** suited to your specific requirements. The website uses a short questionnaire to define the filter conditions which are then applied to the underlying data. The result is a list of dataset/service combinations that can serve your needs.



The screenshot displays the 'ChecklistBank Name Match' interface. On the left, there is a list of datasets with filters for 'Name Checked', 'Checked', and 'Acceptance'. The main panel shows the following details:

- ChecklistBank Name Match** (with a close button)
- with **Artsdatabanken (Norway) / Nortaxa** dataset
- CLB dataset 2030 [12 jul 2025]
- Geographic Scope:** Norway
- Taxonomic Scope:** Algae, Animalia, Cyanobacteria, Fungi, Plantae
- Features:** Direct Matching Interface, File Matching Interface, Download Full From Website, API, Local Installation
- Website of the Dataset:** <https://artsdatabanken.no/>
- API:** <https://nortaxa.artsdatabanken.no/swaqaer/>



Photo by NHMC-UoC



## You Will Need

### Understanding of your name checking requirements:

- You will need to know which kind of names you want to check (geographic and taxonomic scope),
- Decide what you want to check them for: (just the spelling, with author names, the accepted status, the higher classification),
- Determine whether you need persistent identifiers for the names (and if so, whether they need to be resolvable),
- Be aware of the technical context of your setup (do you want to upload the names via file or user interface, or do you need to embed it into a more technical workflow).

The precise details are asked by the filter form during the selection process, but having a good understanding beforehand will speed up this process.

**A web browser:** the tool is a simple website that can be accessed here: <https://cetaf-eu.github.io/CheckMyName/>

**An editing environment** to apply the corrected names. The correction process itself is not part of this recipe, as it varies widely depending on the field of work and the user's technical expertise. Some users prefer to work in spreadsheet software, whereas other use more complex environments that can call external libraries or an API (Application Programming Interface).



## Steps to implement the Course

- 1 Open your browser and go to <https://cetaf-eu.github.io/CheckMyName/>
- 2 In the user interface, select the filters that correspond to your name checking needs.
- 3 In the list of the remaining name checking services with the corresponding source datasets, click on the individual entries to see further details and remarks about the service/dataset.
- 4 Choose the entry that you consider most suitable for your dataset.
- 5 Click on the link to that service and follow the instructions there to check the taxonomic names in your data.



## Timeframe

The whole process usually takes **15 – 60 minutes**, depending on how many service suggestions remain after the filtering and how thoroughly you evaluate the remaining candidates.



## Estimated Budget (Indicative)

The service is free of charge.



## What went well / Even better if

If you notice any gaps or inaccuracies in the data of the service, please report them

- via the Github Issue tracker at <https://github.com/CETAF-EU/CheckMyName/issues>
- or via e-mail to [d.fichtmueller@bgbm.org](mailto:d.fichtmueller@bgbm.org).



## Outputs and Indicators

You will now have a dataset that contains **valid taxonomic names**, perhaps even with persistent identifiers for those names.



## Check My Name

### Taxonomic Name Matching Service Explorer

Using scientific names based on globally recognized rules of biological nomenclature enables precise and effective communication about the living world. One goal of the TETTRIS project is to integrate taxonomic resources to support cross-domain data linkage. A key requirement for this is the ability to connect names across different sources (particularly with taxonomic data aggregators), which relies on name-matching. This prototype tool helps biodiversity data curators identify name-matching services suited to their specific needs.

#### Filters

▶ Geographic Scope

▶ Taxonomic Scope

▶ Number of records

▶ Purpose

▶ Data Linkage

▶ Technical Requirements

#### Suitable Matching Services and Datasets (56)

<b>ChecklistBank Name Match</b> Catalogue of Life	Algae Animalia Bacteria Cyanobacteria Fungi Plantae Virus	Direct Matching Interface File Matching Interface Download Full From Website Download Dataset API Local Installation	Canonical Name Checked Full Name Checked Acceptance Classification	●
<b>ChecklistBank Name Match</b> Catalogue of Life eExtended Release	Algae Animalia Bacteria Cyanobacteria Fungi Plantae Virus	Direct Matching Interface File Matching Interface Download Full From Website Download Dataset API Local Installation	Canonical Name Checked Full Name Checked Classification	●
<b>GBIF Species Matcher</b> GBIF Backbone Taxonomy (2023)	Algae Animalia Bacteria Cyanobacteria Fungi Plantae Virus	File Matching Interface Download Full From Website API	Canonical Name Checked	●
<b>WFO Plant List</b> World Flora Online Plant List	Plantae	Direct Matching Interface File Matching Interface OpenRefine Reconciliation Interface Download Full From Website Download Dataset API Local Installation	Canonical Name Checked Full Name Checked Classification	●

#### Filters

▼ Geographic Scope

- Global
- Europe
  - Austria
  - Belgium
  - Bulgaria
  - Croatia
  - Cyprus
  - Czech Republic
  - Denmark

▼ Taxonomic Scope

- Multiple or unknown
- Animals
- Plants
- Algae
- Fungi
- Bluegreen algae
- Bacteria
- Virus
- Testate fossils

▼ Number of records

Number of names to be check simultaneously:

In the User Interface (add items via copy & paste)

less or equal 5000

more than 5000

Via file upload

less or equal 5000

more than 5000

▼ Purpose

I want to check ...

Orthography of canonical name (name without author / year)

Orthography of full name (also checking author abbreviations and year)

Acceptance (if it is a taxon name, or a synonym of another name, or taxonomically unresolved)

Classification (inclusion in higher taxa according to the dataset's hierarchy)

▶ Data Linkage

▶ Technical Requirements

#### Suitable Matching Services and Datasets (10)

<b>ChecklistBank Name Match</b> Catalogue of Life	Algae Animalia Bacteria Cyanobacteria Fungi Plantae Virus	Direct Matching Interface File Matching Interface Download Full From Website Download Dataset API Local Installation	Canonical Name Checked Full Name Checked Acceptance Classification	●
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9

# CASCADE GRANT MECHANISM (FINANCIAL SUPPORT TO THIRD PARTIES-FSTP)



Scan to view the  
full recipe online





## Target group and goal

This recipe is intended for EU project coordinators, consortium partners, innovation managers, and organisations planning to design or implement a Cascade Funding (FSTP) mechanism within an EU-funded project.

It is particularly relevant for projects that **aim to distribute small grants to external third parties** who want to test and validate models developed within their project.

The aim of this recipe is to provide a practical, experience-based guide on how to set up, manage, and complete a **cascade funding mechanism** within an EU project.

It summarises the lessons learned in TETTRIs and translates them into clear, actionable steps that can be reused by future projects or organisations facing similar tasks.

By following this recipe, the user will be able to:

- **Understand the core components** and requirements of setting up a cascade grant scheme in line with EU rules (FSTP).
- **Plan and implement a transparent** and efficient selection process for third-party beneficiaries.
- **Establish the necessary documentation,** communication, and monitoring framework.
- **Avoid common pitfalls** and adopt best practices drawn from the TETTRIs experience.
- **Successfully deliver a compliant,** well-managed, and high-impact cascade funding programme within their own project context.

Rana temporaria | Photo by Amelie Höcherl





## Summary/Description

This recipe explains how to **design and implement a cascade funding mechanism** within an EU project, based on the experience of TETTRIs. It provides a concise overview of the key steps, tools, and decisions needed to distribute financial support to third parties effectively and compliantly.



## You Will Need

- **Approved budget** for Financial Support to Third Parties.
- **Project consortium members** contributing expertise, evaluation, or outreach.
- **External evaluators** or advisory committees.
- **Strong administrative resources** and management for coordinating evaluation and technical and financial monitoring.
- **Online application platform.**
- **Communication tools** (website, newsletters, social media).
- A **secure system for document storage** and beneficiary data management.

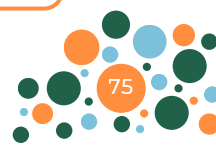


Photo by Iasmi Stathi



## Steps to implement the Course

- 1 Define the Cascade Funding Framework and Requirements**  
Clarify objectives, target beneficiaries, eligibility rules, selection criteria, funding amounts, reporting needs, and the implementation timeline. Ensure full alignment with the Grant Agreement and internal consortium agreement.
- 2 Prepare the Documentation and Infrastructure**  
Create the Open Call text, guidelines for applicants, application form, evaluation templates, grant contracts, and monitoring requirements. Set up the online application platform, secure storage, and communication tools.
- 3 Launch and Promote the Open Call**  
Publish the call across consortium channels and external networks. Use the project website, social media, newsletters, and multipliers to maximise outreach. Provide clear contact points, FAQs, and webinars to support applicants.
- 4 Evaluate, Select, and Contract Beneficiaries**  
Coordinate designated evaluators to assess applications transparently. Finalise the ranking list, communicate results, perform due diligence, and sign grant contracts with selected third parties.
- 5 Support Third Parties During Implementation**  
Provide onboarding sessions, clarify deliverables, timelines, and reporting requirements. Offer technical or consultancy support (if foreseen) and maintain regular communication to guide beneficiaries through the implementation phase. sustainability.
- 6 Monitor Progress and Validate Deliverables**  
Track technical and financial progress through periodic updates, documentation reviews, and milestone checks. Ensure compliance with agreed activities and support corrective actions when necessary.
- 7 Process Payments and Administrative Follow-Up**  
Execute payments according to the funding scheme (e.g., pre-financing, interim, final payment) upon validation of deliverables. Maintain accurate financial records and ensure documentation meets audit and reporting requirements.
- 8 Collect Final Reports and Close the Grant Contracts**  
Review final reports and outputs from each third party, confirm the completion of all obligations, and formally close their sub-grant. Update internal records and ensure all documentation is stored securely.
- 9 Report to the European Commission**  
Integrate the results, financial data, and impact evidence from the funded third parties into the project's periodic and final reports. Demonstrate how the cascade mechanism contributed to the project's objectives and key project indicators (KPIs).
- 10 Reflect on Lessons Learned and Share Results**  
Document challenges, successes, and practical insights from the cascade funding process. Share these findings with the consortium, the broader community, and future projects ensuring the experience supports improved replication and sustainability.



- 6 Monitor Progress and Validate Deliverables**  
Track technical and financial progress through periodic updates, documentation reviews, and milestone checks. Ensure compliance with agreed activities and support corrective actions when necessary.

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- 7 Process Payments and Administrative Follow-Up**  
Execute payments according to the funding scheme (e.g., pre-financing, interim, final payment) upon validation of deliverables. Maintain accurate financial records and ensure documentation meets audit and reporting requirements.

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- 8 Collect Final Reports and Close the Grant Contracts**  
Review final reports and outputs from each third party, confirm the completion of all obligations, and formally close their sub-grant. Update internal records and ensure all documentation is stored securely.

---

- 9 Report to the European Commission**  
Integrate the results, financial data, and impact evidence from the funded third parties into the project’s periodic and final reports. Demonstrate how the cascade mechanism contributed to the project’s objectives and key project indicators (KPIs).

---

- 10 Reflect on Lessons Learned and Share Results**  
Document challenges, successes, and practical insights from the cascade funding process. Share these findings with the consortium, the broader community, and future projects ensuring the experience supports improved replication and sustainability.

 **Timeframe**

The estimated timeline for implementing a full cascade funding cycle can vary greatly depending on the overall aim, budget and timeframe of the funding project. In general terms, we can estimate that the process usually takes from 12 to 32 months from preparation to closure depending on the budget, scope and amount of projects granted funding. A typical breakdown is:

Designing the framework and preparing documentation.	1-2 months
Setting up the platform and internal procedures.	1 month
Launching and promoting the open call.	1-2 months
Evaluation, selection, and contracting; ◦ dependent on number of projects selected	2-4 months
Implementation period for third parties.	6-20 months
Monitoring, payments, and administrative follow-up: runs in parallel.	
Final reporting and closure.	1-3 months



## Estimated Budget (Indicative)

*Note: This budget is indicative and should be adapted to local contexts and available funding schemes.*

While the financial support to third parties is fully covered by the budget allocated in the Grant Agreement, several additional internal costs should be planned for to ensure smooth and compliant implementation of the cascade funding mechanism:

### 1. Administrative and Coordination Support

If in-house capacity is insufficient, a dedicated administrative or project management resource may need to be hired. The budget should cover tasks such as application management, contracting, monitoring, and financial follow-up.

### 2. Mentoring, Technical Support, or Consultancy

The mother project may need to allocate staff time, travel expenses or external expertise to guide third parties, validate methods, and ensure alignment with project objectives.

### 3. Costs for Maintaining Involvement of Third Parties

Even after their funded activities are completed, third parties may be invited to participate in project events, conferences, workshops, or the final project meeting. The budget should cover travel, logistics, and coordination if these costs are not included in the third parties grants.

### 4. Communication and Dissemination Expenses

Additional communication resources may be required to promote the open call, create dedicated materials (visuals, brochures, social media campaigns), and communicate results. Setting aside a specific communication budget for the FSTP component can ensure proper visibility and outreach.



## What went well / Even better if

Cascade funding is highly impactful but resource-intensive. With strong coordination, clear guidance, and sustained engagement, grantees become not just recipients of funding but meaningful contributors to the project's long-term outcomes.

What We Learned and What We Recommend:

### 1. Do not underestimate the administrative and managerial burden

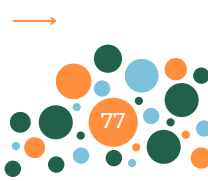
Implementing a cascade funding mechanism requires significantly more coordination than expected. Administrative staff, consultants, project staff, and communication teams all face a continuous workload.

**Recommendation:** Plan sufficient internal resources early, distribute responsibilities clearly, and secure backup capacity to avoid bottlenecks.

### 2. Maintain stable and proactive communication with grantees

Third-party beneficiaries often work remotely, outside the daily operations and culture of the main project. Without consistent communication, there is a high risk of misalignment, isolation, or losing sight of the project's overarching goals. TETTRIs addressed this by creating a dedicated consultant role to maintain regular contact and guide the grantees.

**Recommendation:** Establish a clear communication plan from the start (regular check-ins, shared channels, response time expectations) and ensure someone is explicitly responsible for ongoing engagement and alignment.



### 3. Create clear guidance and replication frameworks for EC requirements

Grantees may not be familiar with the administrative, financial, general requirements and reporting obligations of EU-funded projects. They benefit greatly from structured, easy-to-follow instructions that mirror the mother project's own compliance requirements; it will also greatly facilitate the mother project's reporting duties.

**Recommendation:** Provide templates, examples, checklists, and step-by-step instructions. Walk grantees through the rules during onboarding and verify understanding before implementation begins.

### 4. Organise interim meetings to build cohesion and shared purpose

Group interactions are essential for motivation, visibility, and alignment. Allowing grantees to meet one another and connect with the main project team reinforces a sense of belonging and shared impact, which in turn improves quality and engagement.

**Recommendation:** Host at least one joint interim meeting or workshop, encourage peer exchange, and create opportunities for beneficiaries to present progress and challenges to the broader group.



## Outputs and Indicators

### Outputs

These are the tangible results generated by implementing the cascade funding mechanism:

#### a) Open Call Documentation and Processes

- Open Call text, guidelines, templates, and evaluation criteria.
- Online submission platform fully operational.

#### b) Third-Party Selection

- Number of applications received.
- Number of third parties selected and contracted.
- Diversity and geographic distribution of grantees.

#### c) Implementation by Third Parties

- Deliverables completed by grantees (pilots, prototypes, studies, reports).
- Milestones achieved on time.

Mentoring/technical support sessions delivered.

#### d) Monitoring and Reporting

- Consolidated technical and financial monitoring reports.
- Grand contract documentation stored and auditable.

#### e) Dissemination and Engagement

- Communication materials produced (brochures, newsletters, website posts).
- Third parties participating in project events, workshops, or conferences.

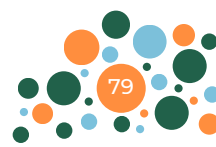


## Outputs and Indicators

### Indicators

These are measurable parameters to track the success and impact of the cascade funding process:

Category	Indicator	Target/Measure
Process efficiency	Number of days from call launch to contract signature	$\leq X$ weeks (project-defined)
Participation	Number of applications received	$\geq X$ (target per call)
Diversity	Geographic spread, type of organizations (SMEs, research, NGOs)	Balanced distribution aligned with project goals
Implementation quality	% of deliverables submitted on time	$\geq 90\%$
Beneficiary satisfaction	Feedback collected via surveys	$\geq 80\%$ positive
Contribution to mother project	Alignment of sub-project outputs with main project objectives	All outputs mapped and integrated
Dissemination impact	Number of dissemination activities involving grantees	$\geq X$ events / publications





## Optional: Related Deliverables or Resources

Deliverable 7.1 - Documentation package for the Call for Proposal for Third Party Projects

### **EU Grants: Good practices for implementing FSTP in EU grants (V1.0, 15 June 2025)**

Official EC good practice guide for cascade funding / FSTP. [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/common/guidance/guidance\\_fstp-good-practices\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/common/guidance/guidance_fstp-good-practices_en.pdf)

### **Guidance on Financial Support to Third Parties (FSTP)**

EC guidance document announced and linked by several NCPs (complements the Annotated Grant Agreement):

- Horizon Europe Portal (CZ NCP overview): <https://www.horizontevropa.cz/en/you-might-interested/legal-financial-aspects>
- News item with link to the guidance (TR NCP): <https://ufukavrupa.org.tr/en/news/guidance-financial-support-third-parties-fstp-published>

### **NCP Flanders – Infosheet “Cascade Funding Calls / Financial support to third parties (FSTP)”**

Practical infosheet for coordinators:

<https://ncpflanders.be/infosheets/cascade-funding-calls-financial-support-to-third-parties-fstp>

### **FundingBox – “A FundingBox Approach to Cascade Funding” (whitepaper)**

Whitepaper from a major cascade-funding operator (PDF):

<https://fundingbox.com/wp-content/uploads/2022/06/FB-White-1.pdf>

### **Annotated Grant Agreement (AGA) – Horizon Europe**

AGA itself links to FSTP guidance a good-practices guide (see pages 110):

[https://sfe.inl.infn.it/wp-content/uploads/2025/04/aga-1-4-2025\\_en.pdf](https://sfe.inl.infn.it/wp-content/uploads/2025/04/aga-1-4-2025_en.pdf)

Links to other TETTRIs satellite projects:

- [SoilMATs – Soil Meiofauna Advanced Taxonomy school](#)
- [CRYPTERS – Untangling the cryptic diversity of the Vesubia jugorum spiders](#)
- [iSedge – An integrative, appealing and dynamic digital platform for sedges](#)
- [TrAILSID – Training Artificial intelligence models for land snail identification](#)
- [TNLS – Taxonomic Name Linking Services](#)
- [INC-STEP – Creating a National Reference Collection for Spain's Threatened Pollinators](#)
- [Balkan PolliS – Providing access to pollinators in the Balkan Peninsula](#)
- [FOOTPRINTS-CITSCI – Taxonomic ID from Photo Recognition, Integrated Species distribution modelling, and Citizen Science](#)
- [ARCADE – Aligning Reference Collections with taxonomic Development Efforts for pollinator conservation in Portugal](#)
- [L.U.C.E. – Lighting up the understudied charismatic fireflies of Europe](#)
- [NEXTRAD – focuses on Macaronesian Lotus](#)
- [TEOSS – Training for the European Orthoptera Sound System](#)





10

# CITIZEN SCIENCE INITIATIVE FOR BIODIVERSITY MONITORING



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full recipe online





## Target group and goal

Citizen science practitioners and people interested in citizen science for the purpose of **biodiversity monitoring** (including citizen scientists). The aim would be for the practitioners to take inspiration from this existing project to create their own project on **biodiversity observation** aided by **AI** instruments.

By following this recipe the readers will be able to fulfill their own project idea, either by taking inspiration from this successful story and thus **creating their own** or by replicating it step by step.

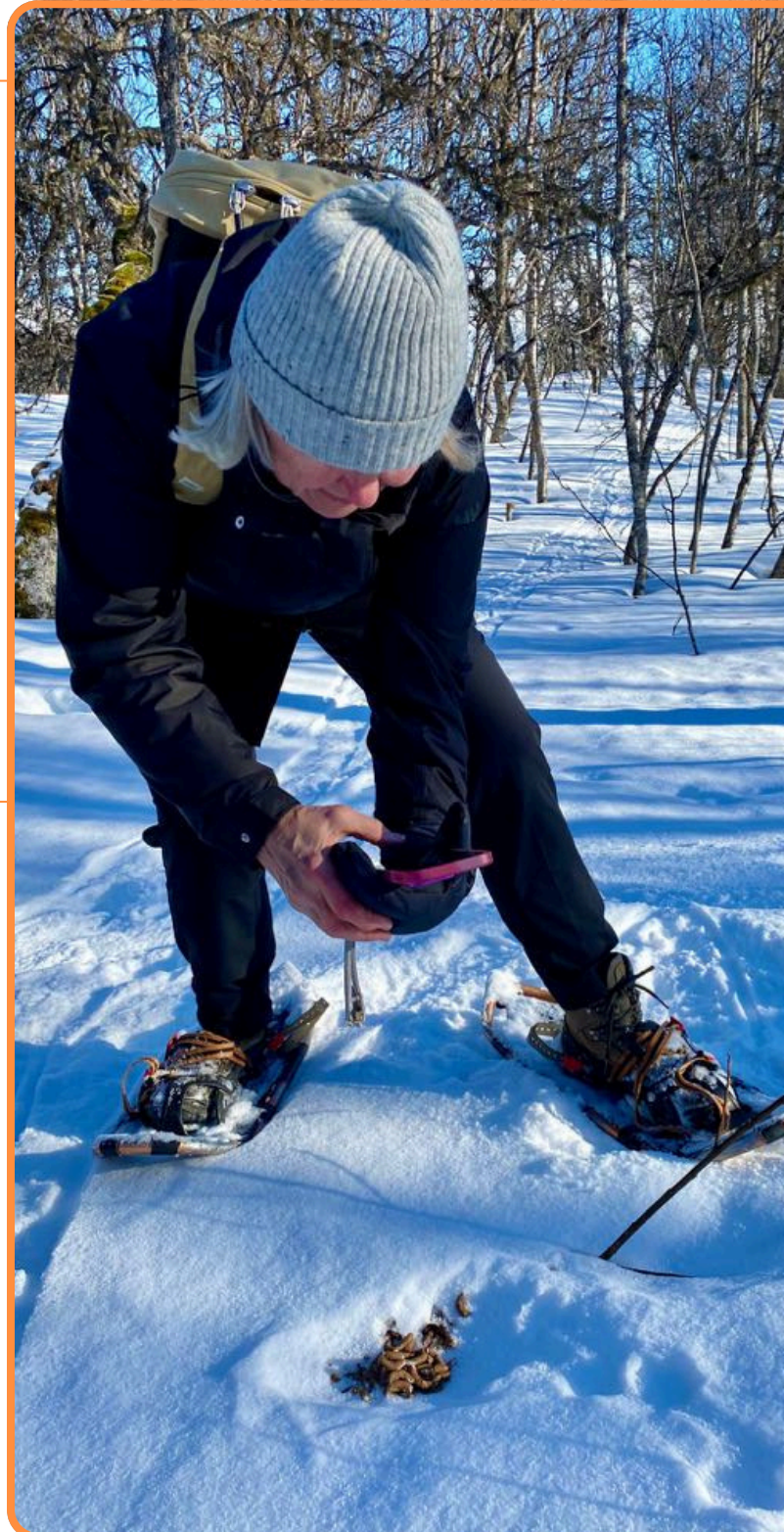


## Summary/Description

This recipe is based on the TETTRIs-funded FOOTPRINTS citizen science project, dedicated to the **observation** of animals in winter by using the photos of their footprints in the snow to identify them.

This in turn is used to understand the **distribution of these animals** in the region where the data is gathered.

The following recipe is a **pathway** to build your own biodiversity-centred citizen science initiative.





## You Will Need

- 1 research **question**.
- 1 or more **hypotheses**.
- **Background information** on the species you want to study (e.g. what species do you expect to find? Where? When? How can you identify them?).
- 1 or more **open source models for AI** (Artificial Intelligence) recognition.
- 1 **web based or app** linked to a repository to help with the data storage.
- 2 or more “**experts**” to validate the knowledge and the data.
- 5 or more **people** to help you gather the data - the more involved the merrier!
- **Communication** and outreach resources and plan.



## Steps to implement the Course

- 1 Specify your research question.
- 2 Find people that can help you answer this question: are there researchers in your area that study this topic? Are there any initiatives already looking at this? Do you know anyone who is also interested in answering this question?
- 3 Gather the resources you need: refer to the list above for likely things you will need.
- 4 Plan your actions.
- 5 Make sure you invite as many people as possible to the sampling campaigns, anyone can join. It is important that your outreach efforts use concise and simple language that anyone can understand (think about people whose mother tongue is not the local language or people with neurodiversities). Think about inclusion: are you accidentally excluding someone from participating? Can you change the setting to include them? (it is not always possible to include everyone, but it certainly makes a difference if you try).
- 6 Train your participants: The time you need to train them depends on how simple or difficult the tools are to use and tasks to undertake. This is important to ensure high data quality and thus the usability of the data.
- 7 Data analysis: don't forget to include your participants in the data analysis as well (principle of CS number 4).
- 8 Inform your participants about the results (principle of CS number 5): Do it in a way everyone can understand.
- 9 If you are going to publish results, do it in a way that complies with the FAIR principles and open science principles. Acknowledge your participants (principle of CS number 7).



## Timeframe

Preparation phase: between **3 to 6 months** to prepare for data collection, establishing protocols, testing the instruments:

**Preparation phase:** between 3 to 6 months to prepare for data collection, establishing protocols, testing the instruments:

- Pilot testing of the AI app, with the goal of designing appropriate instructions for participants to take the most effective photos and preparing a data management plan.
- Make contact with schools/target groups for guided events, and start promoting participation to the public more broadly.
- For school/guided event groups, develop educational materials to integrate the data collection into an education program suitable for the target audience(s).

**Implementation phase:** it depends on the season/species, for Footprints this is winter but for a different species/climate, it could be indefinite. Minimum viable time around 3-4 months:

- Implement and evaluate guided outings
- Continue promoting public participation, supported by regular newsletter communication and availability to answer questions, etc.

**Data analysis phase** - 2-3 months:

Ideally this is ongoing and updated whenever necessary by stakeholder partners who set the hypotheses at stage 1 of development. A minimum viable timeline to timetable 2 months analysing the data after a 3-4 month season of data collection. Longer may be required for longer date collection seasons.

To follow the more **structured repeat-sampling format** that the Footprints' team adopted for one of their two research areas, as they concluded that this is the most innovative and promising way to use the tools developed by **Footprints**, you want to build in more intensive outreach and training of participants to help them understand how to choose sites, how often to resample, and how to share their more structured data/metadata with project coordinators.



## Estimated Budget (Indicative)

In the case of Footprints, the team worked for two years with a total budget of EUR 150 000; they were a small team of professionals based in Norway with other forms of employment, thus this budget covered a designated percentage of their salaries. Moreover, the amounts required for personnel, travel and logistics, are dependent on where the team is located. The following figures are taken from the Footprints budget, and thus must be cautiously considered as the costs will vary with project:

<p><b>Personnel</b> (e.g. trainers, coordinators, administrators)</p>	<ul style="list-style-type: none"> <li>• EUR 45 000 for the development of an AI tool (mostly salary of the developer);</li> <li>• EUR 10-15 000 for salaries in the location where the unstructured/opportunistic approach to sampling was followed.</li> <li>• EUR 20-25 000 in the location where the structured approach was used instead.</li> </ul>
<p><b>Travel and logistics</b> (e.g. fieldwork, workshops)</p>	<p>Highly dependent on the sampling area size, species of interest and location of the study.</p>
<p><b>Materials and equipment</b> (e.g. lab tools, field kits, digital tools)</p>	<p>See under personnel costs for the development of the AI tool; no specific equipment is required from participants other than their phones or cameras to take pictures.</p>
<p><b>Dissemination</b> (e.g. website, printing, videos)</p>	<p>If the website needs to be done from scratch this could be between EUR 2-5,000; printing and video production costs for the Footprints team totalled less than 300 euros, as they had in-house expertise and equipment for taking pictures and producing videos.</p>

**Note:** This budget is indicative and should be adapted to local contexts and available funding schemes.



## What went well / Even better if

### What did we learn?

We learned there's a lot of interest in citizen science programs that make new types of nature observation possible! We also affirmed that it is possible to successfully ask participants to take on more structured monitoring, and that it is possible to integrate citizen science into educational programming tailored to different audiences.

Along these lines, our work affirmed that clear communication is critical when describing research protocols. Similarly it was important to be accessible for regular two-way communication to answer questions, affirm participants, share results, and create a sense of community among participants

### What challenges did we encounter?

Weather is a challenge, and we learned that we needed back-up plans to keep participants engaged when the weather meant there were longer than anticipated gaps in between times of active participation.

Another challenge: we found there was no existing off-the-shelf tool (at least not that we could find) that supported the type of data collection we collected georeferenced photos, linked to a gpx line showing movement along a route, with various metadata fields. We solved this by using two different tools simultaneously (iNaturalist + Survey123) linked together in one set of instructions in a google doc. But it would be easier for both project leaders and participants if there was one tool that served this purpose.



## Outputs and Indicators

**Participation indicators** could include the number of participants, number of public/school presentations, average number of replicate surveys per participant.

**Data indicators** could include the number of sites sampled and resampled, quality metrics (e.g., self-assessment by participants of survey completeness), evenness of habitat sampled.

**Outputs** can include educational programs/lesson plans that integrate citizen science, and data that is relevant for occupancy modeling, species distribution modeling, or other analytical purposes co-designed with intended data end users and stakeholders.



## Optional: Related Deliverables or Resources

- [Prototype ID app](#)
- [Instructions for participants](#)
- [ECSA 10 Principles of Citizen Science](#)
- [ECS platform](#)
- [ECS Academy](#)







11

# HOW TO ORGANISE A BIOBLITZ



Scan to view the  
full recipe online





## Target group

This recipe is designed for **biodiversity researchers, local NGOs, educators, and community leaders** aiming to collect local biodiversity data while engaging the public in nature observation and citizen science.



## Goal

The goal is to organise a short-term, collaborative “Bioblitz” event that **generates useful biodiversity records**, promotes learning about local ecosystems, and builds **community engagement in environmental conservation**. The strength of a Bioblitz lies in its place-based nature, which fosters a sense of stewardship for that location.



## Summary/Description

‘Bio’ means ‘life’ and ‘Blitz’ means **‘doing something quickly and intensively’**. Together they form ‘Bioblitz’, a collective race against the clock to record as much information as possible about plants or other organisms within a defined location and time period. The name **‘Bioblitz’** has gained international recognition in the media as an exciting and fun way to help people discover nature. This recipe provides a structured approach to planning and implementing such an event to maximize scientific outcomes, community engagement, and educational value.



Photo by Jasmi Statni



## You Will Need

- **Human resources:** taxonomists and naturalists, biodiversity experts, educators, volunteers, communication coordinators.
- **Data tools:** mobile phone biodiversity recording platforms (e.g., [iNaturalist](#), [Pl@ntNet](#), [ObsIdentify](#)).
- **Partners:** universities, museums, local authorities, NGOs, schools, park administrators.
- **Infrastructure:** suitable site (urban park, nature reserve, campus), logistics for participant coordination, safety measures.
- **Materials:** identification guides, microscopes, sampling kits, signage, IT support, promotional materials.
- **Preconditions:** permissions for site access, communication plan, data-sharing agreement.



## Steps to implement the Course

### 1 Define objectives and location

Choose the bioblitz site (e.g., park, wetland) and clarify key aims - biodiversity inventory, education, community engagement and/or promotion of an organisation.

### 2 Form partnerships and recruit experts

Collaborate with local biodiversity institutions and NGOs. Assign roles (scientific lead, communication lead, logistics).

### 3 Prepare and promote

Set a date (often a weekend in spring or autumn) on or around [International Day Biological Diversity](#) (22nd May) and Taxonomy Recognition Day (23rd May) is ideal. Publicise the event via local media, social media, and local community channels. Provide registration and training materials on how to record species using your chosen mobile phone apps.

### 4 Conduct the Bioblitz

During the 24–48-hour event, run guided walks, species hunts, and educational workshops. Record data digitally (e.g., via iNaturalist) and engage both on-site experts and online communities for identifications.

### 5 Follow-up and data publication

Validate and upload observations to biodiversity databases (e.g., [GBIF](#)). Thank participants, share results publicly, and encourage continued biodiversity recording.

### 6 Evaluate and sustain engagement

Measure participation, learning, and follow-up activity. Plan for future or repeated bioblitzes to strengthen long-term involvement.





## Timeframe

- **Preparation:** 6 months (planning, partnerships, permissions, outreach).
- **Implementation:** 1–3 days (event duration).
- **Follow-up:** 1–2 months (data validation/record identification, reporting, dissemination).



## Estimated Budget (Indicative)

Bioblitzes can vary greatly in size and duration, ranging from small gatherings to events with thousands of participants, and from a few hours to several days. This estimated budget is **based on a relatively large Bioblitz: the 2022 Bioblitz at Meise Botanic Garden** (Belgium), which was held over 36 hours, welcomed approximately 3,000 visitors where 40 experts documented biodiversity across the 92-hectare site of the botanical garden using the ObsIdentify app.

Beyond its scientific mission, the event offered something for everyone, including a local market, food trucks, children's activities, and a **science village** featuring guided tours and expert talks. Securing sponsorships can help keep the budget manageable and also increase interest in the event.



Photo by Kate Evans

Category	Estimated cost (EUR)	Notes
Personnel	20 000	Coordination, communication, preparing the program (e.g. guided tours, children's activities, talks, market, food trucks), training volunteers,
Travel and logistics	1500	Catering was foreseen during 36 hours for all supporting staff and experts.
Materials and equipment	1000	Tents, microscopes, WIFI hotspots, goodiebags, multiple screens to show results of the bioblitz across the domain. Really depends on the resources already available.
Dissemination	2500	Media content, posters, website, logo, promotional video, online promotion, banners, photography, hats with logo for staff, experts and volunteers
Other	2500	Security, sanitation service
<b>Total (indicative)</b>	<b>27 500</b>	<b>Sponsoring can help to keep the budget low.</b>

**Note:** This budget is indicative and should be adapted to local contexts and available funding schemes.



## What went well / Even better if

### Engage a public ambassador

Involve a well-known or respected figure (a local “champion”) to promote the event through their networks and media channels. This significantly increases visibility and participation.

### Build and maintain expert relationships

Stay in touch with the invited experts after the event by asking them about their new discoveries and identifications of specimens collected during the bioblitz. Ideally, a bioblitz is not a one-off activity, therefore sustaining these collaborations helps to strengthen the expert network and supports future bioblitzes or related initiatives.

### Ensure consistent and open data management

Make sure all records are uploaded to the same biodiversity database —preferably an open and interoperable platform (e.g., GBIF, iNaturalist). This allows for data verification, long-term accessibility, and further scientific analysis.



## Outputs and Indicators

A successful Bioblitz should result in a comprehensive set of biodiversity observations, active community participation, and long-term engagement with nature recording. Key measurable outputs include:

- Number of participants or app users actively contributing observations.
- Number of observations (biological records) collected during the event.
- Number of species recorded, noting that species identifications often continue after the event and the final count may increase over time.
- New species discoveries, such as taxa newly recorded for the site, region, or country.
- Online engagement metrics, including website visits, social media reach, followers, likes, and shares, if digital platforms are used for outreach.



## Related Deliverables or Resources

Sofie Meeus, Iolanda Silva-Rocha, Tim Adriaens, Peter M J Brown, Niki Chartosia, Bernat Claramunt-López, Angeliki F Martinou, Michael J O Pocock, Cristina Preda, Helen E Roy, Elena Tricarico, Quentin J Groom, More than a Bit of Fun: The Multiple Outcomes of a Bioblitz, *BioScience*, Volume 73, Issue 3, March 2023, Pages 168–181, <https://doi.org/10.1093/biosci/biac100>

Tim Adriaens, Niki Chartosia, Bernat Claramunt-López, Sofie Meeus, Michael Pocock, Cristina Preda, Elena Tricarico, & Quentin Groom. (2021). Recommendations on improving the value of bioblitzes for science, engagement and learning. Zenodo. <https://doi.org/10.5281/zenodo.5810398>



Photo by Iasmi Stathi



Photo by Iasmi Stathi

Photo by Iasmi Stathi

12

# HOW TO ORGANISE A STAKEHOLDER LAB



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full recipe online





## Target group

The scientific taxonomic community, e.g., **natural history collections**.



## Goal

Raise **awareness** with non-traditional external stakeholders and lay groundwork for potential collaborations.



## Summary/Description

The aim of stakeholder engagement can be to raise awareness about taxonomy, its role and importance, in sectors which are not very aware of the discipline and to identify needs of stakeholders and thus identify any gaps for the taxonomy community to address and visa versa, as well as potential synergies for future collaboration. A **Stakeholder Lab (STHL - Figure 1) is an interactive workshop**, which brings together different internal (i.e. taxonomic community) and external stakeholders and results in **concrete measures** to be undertaken for further engagement. It is an **in-person event** which is preceded by other forms of stakeholder engagement to lay the groundwork for a fruitful STHL. Follow-ups depend on the synergies and potential collaborations identified in the lab.

Photo by Haeusler





## You Will Need

- One or two **strong communicators**, with enthusiasm for innovation and cross-sectoral collaboration and a background in taxonomy or who work in close collaboration with taxonomists.
- An **attractive venue** which is accessible to the target audience.
- Strong **allies** in both targeted sectors, e.g. taxonomy & industry who support the potential collaboration (these can be identified in the stakeholder engagement precluding the STHL, but ideally there are some previous connections)
- **Speakers for lightning/impulse talks.**
- **Speakers for a panel discussion.**
- **Members** of both sectors willing to actively participate in the audience.





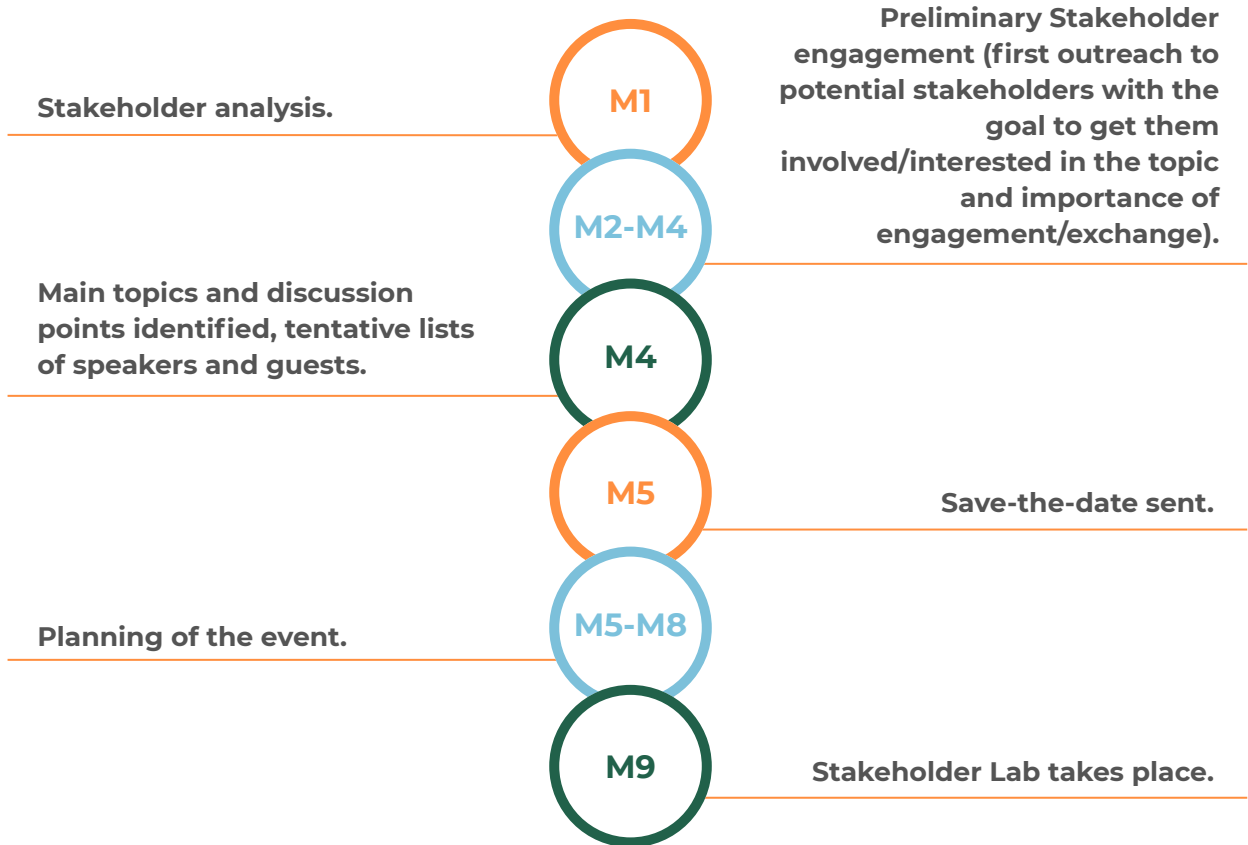
## Steps to implement the Course

- 1** Stakeholder analysis: Identify which stakeholders you would like to engage and how to engage them. This could be done by a stakeholder matrix or map.
- 2** Stakeholder engagement - first outreach: Contact members of both stakeholder groups previous to the event, generate interest in the topic and stakeholder process, and interview them on their previous knowledge of biodiversity/taxonomy and the needs and synergies which they can identify.
- 3** Structure the STHL accordingly: Analyse the results of the first stakeholder engagement step and identify the main topics and discussion points for the STHL
- 4** Plan the program for the STHL:
  - Identify speakers you would like to invite for talks, ideally high-level speakers with a strong representation in the public and a connection to both sectors, who will exemplify the potential synergies
  - Identify interesting high-level speakers to invite to the panels (ideally those targeted in the preliminary stakeholder engagement, so that they are already aware of the topic).
- 5** Send a save-the-date to relevant stakeholders with short and interesting information on the event.
- 6** Advertise the STHL, its topics and relevance with the internal stakeholders, gather feedback and identify potential areas of controversy or challenges you may face during the STHL so that you are prepared.
- 7** Plan the main discussion points for the event.
- 8** Plan for catering.
- 9** Plan for conversation starters during the breaks - i.e. different objects, such as insect boxes at the tables, with questions about these objects. These will help the two different audiences to start conversations about these objects and increase networking opportunities
- 10** Brief the speakers and panellists before the event in detailed meetings.
- 11** Align everything with a moderator who needs to be briefed accordingly.
- 12** Make sure the STHL is documented (e.g. by video) for future reporting, referencing and use.



## Timeframe

The minimum timeframe is **6 months**, but could be extended to 12 months. An exemplary timeframe could be as follows:





## Estimated Budget (Indicative)

Category	Notes
Personnel	<ul style="list-style-type: none"> <li>Stakeholder engagement &amp; coordination personnel: minimum 0,5 FTE for ~ 9 months.</li> <li>Moderation of the event.</li> <li>Coordination and technical support in preparation of and during the event.</li> </ul>
Travel and logistics	Potentially plan to cover travel costs for invited speakers/ important guests
Materials and equipment	<ul style="list-style-type: none"> <li>An appealing venue (present in many natural history collections).</li> <li>Catering.</li> <li>Nametags, goodies, etc.</li> <li>Some thematic objects to frame the lab and as conversation starter.</li> </ul>
Dissemination	Printing of flyers, information and branding materials



Photo by Haeusler



## What went well / Even better if

The STHLs in TETTRIs were performed with different sectors, but focused mainly on the industry sector (external stakeholder) and the taxonomic scientific community (internal stakeholder). The importance of the **preliminary stakeholder engagement**, in this case via interviews and bilateral meetings, cannot be understated. The rather low awareness of taxonomy in the industry sector and the language barrier regarding technical terms between both communities represented some challenges to overcome.

The STHLs achieved **raising the awareness for biodiversity and taxonomy** in the industry field, but identifying specific needs was a challenge as the industry stakeholders were not fully aware of the capabilities and **skills of taxonomists as scientists and biodiversity experts** - and how, and what, they could contribute to their companies. For mitigating this, role models of taxonomists working in applied fields showing case studies of the application of taxonomic expertise in industrial contexts, as well as presenting concrete personas from the scientific community, such as "**Toni taxonomist**", who present their skillset and expertise helped bridge this gap. A productive balance between talks, networking and discussion is important to guarantee that a specific output of the STHL is generated. Including more workshop formats in which groups of participants collaborate on solving a specific task may help in producing tangible results.



## Outputs and Indicators

A concrete output, such as a list of synergies and needs on both sides should be produced and should also include potential barriers to be overcome. This can be via a board on which ideas are collected by all participants, different workshop formats, or via a post-event survey - or all of the above. Prototypes for new programs could be conceptualised.



## Related Deliverables or Resources

Deliverable D5.1 and its appendixes give a detailed description of the stakeholder engagement and STHLs which took place in TETTRIs.





Photo by Haeusler

13

# HOW TO PRODUCE AND AMPLIFY TAXONOMY RECOGNITION DAY



Scan to view the  
full recipe online





## Target group and goal

This recipe is for natural history institutions, museums, universities, biodiversity centres, NGOs, and citizen science groups aiming to increase public understanding of taxonomy. **The goal is to create a repeatable model for running Taxonomy Recognition Day** (May 23rd), raising awareness of taxonomy's societal value and celebrating the work of taxonomists.

By following the steps in this recipe, organisations will be able to design, run, and amplify an event or campaign that **strengthens recognition of taxonomy** among the public, policymakers, and the scientific community.



## Summary/Description

Taxonomy Recognition Day is an annual event launched within the TETTRIs project to highlight taxonomy's vital role in biodiversity science and conservation. This recipe outlines how to plan an in-person event and **run a successful online campaign**, drawing from the experiences during the 2025 pilot that reached more than 700,000 people.



Photo by Università di Firenze



Photo by National History Museum of Crete (NHMC-UoC)





## You Will Need

- A **coordinating institution** (museum, university, biodiversity centre)
- **Taxonomists** or researchers willing to participate
- **Communication** staff or volunteers
- A **venue** for public activities or talks
- **Posters, banners, or digital graphics**
- A **social media plan** centred on #NameItToSaveIt
- Basic **budget** for materials, refreshments, promotion
- Collaboration **partners** (schools, NGOs, policymakers, community groups)



## Steps to implement the Course

### 1 Define your objectives

Decide whether your focus will be public engagement, celebrating taxonomists, showcasing collections, or influencing policy discussions.

### 2 Assemble the organising team

Include roles for coordination, communication, logistics, and outreach. Engaging taxonomists, volunteers, and students early is key to success

### 3 Plan the event format

Select suitable activities such as public talks, open labs, mini-exhibitions, live demonstrations, guided tours, games, or a standalone social media campaign.

### 4 Engage partners and participants

Reach out to taxonomists, NGOs, schools, policymakers, and citizen science organisations to co-create content and expand reach.

### 5 Communicate your event

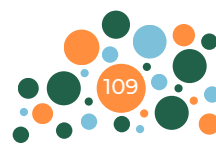
Prepare clear and accessible promotional materials such as posters, press releases, and scheduled social media content.

### 6 Celebrate and document

Run the event around May 23rd. Capture photos, videos, and testimonies. Post widely using #NameItToSaveIt for trackable engagement.

### 7 Reflect and sustain

Collect feedback, document lessons learned, and begin planning for next year's Taxonomy Recognition Day.





## Timeframe

- **Preparation:** (longer prep increases visibility) 2–3 months
- **Implementation:** Main activity on or around May 23rd 1-3 days
- **Follow-up and reporting:** 1 week



## Estimated Budget (Indicative)

Category	Estimated cost (EUR)	Notes
Personnel	0-2 000	Coordination and communication support
Travel and logistics	0.300	Venue setup, local travel, refreshments
Materials and equipment	100-200	Posters, banners, displays
Dissemination	0-100	Videos, ads, or printed materials
Other	0-300	Festival fees or collaborative event costs
<b>Total</b>	<b>100-2 800</b>	<b>Highly adaptable to scale</b>





What went well / Even better if

✔ What went well

Events in multiple countries created strong visibility.

Communication professionals improved design and impact.

The #NameItToSaveIt hashtag unified the campaign and increased reach.

💡 Even better if

Earlier communication would increase participation.

More short videos and personal stories from taxonomists would enhance engagement.

Additional funding could support higher quality materials and wider reach.



Photo by National History Museum of Crete (NHMC-UoC)



## Outputs and Indicators

### Outputs:

- A Taxonomy Recognition Day event or campaign
- Photos, videos, and outreach materials
- Stronger partnerships across institutions and networks
- Increased public and policy recognition of taxonomy

### Indicators:

- Number of events, partners, and attendees
- Social media reach and engagement
- Press and media coverage
- Qualitative feedback from participants
- Year-on-year growth of the initiative



## Related Deliverables or Resources

- TRD Info Package
- TRD General Press Release
- TRD Flyer (Canva preview)
- TRD Planning Document
- TETTRIs Communication Materials
- Brand24 analytics on #NameItToSaveIt
- TETTRIs PDER (Plan for Dissemination and Exploitation Results)
- Name it to Save It: how the TETTRIs project is transforming taxonomy in Europe: <https://www.europeandissemination.eu/article/name-it-to-save-it-how-the-tettris-project-is-transforming-taxonomy-in-europe/24195>





14

**ETHICS  
MATTER**  
FROM  
THE FIELD TO  
COLLECTION



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full recipe online





## Target group and goal

The recipe is intended for researchers and citizen scientists conducting fieldwork to discover new species or locate **known species** in new geographic areas. The researchers will likely be accompanied by students or citizen scientists assisting with the mission/project. While developing their project, the researchers and their participants must ensure their activities comply with the **ethics rules** for people, animals, plants, and related data. Data should be **collected voluntarily and with consent**, then securely stored to ensure fairness, transparency, accountability and accessibility in line with FAIR principles (Findable, Accessible, Interoperable, and Reusable).



## Summary/Description

When carrying out on-site citizen science activities, the researcher and/or project leader will collect personal data, from the participants or from people met and **involved in the activity on-site**, such as through Prior Informed Consent Forms (PICF). It is important that any personal data collected are **managed ethically**, stored and made accessible in a secured manner. In addition whenever specimens are collected, the **protocols for sampling** and inventory techniques from the host institution will be referred to and implemented.





Photo by Meise Botanic Garden



## You Will Need

If people on-site are involved in the activity, the local General Data Protection Regulation (GDPR) legislation and institutional personal data protection **procedures will need to be checked in order to verify if the activity is compliant**. Also, regarding the involvement of any citizen scientists and on-site people, an Informed Consent Form on the collection and process of their personal data will need to be filled in BEFORE joining the citizen science on-site activity. Any collected **personal data will need to be kept securely** with, for example, access control mechanisms. Also, the researcher will have to ensure that any publication of data (including publication on the internet) does not lead to a breach of the agreed confidentiality and anonymity.

- **List of all resources**, partners etc. needed for the activity.
- **GDPR** legislation.
- **Institutional personal data** protection procedures.
- **Institutional rules and regulations** for specimen collection.
- **Securement of any collecting permits** prior to field work.
- **Consent from land owners** to visit area and collect specimens, where necessary.
- **Prior Informed Consent Forms** (PICF).
- **Secure procedures** for data safely.
- **Risk assessment** where necessary.
- **Check insurance** requirements and take out if necessary.



## Steps to implement the Course

### 1 When the activity involves collection of personal data from on-site people, then you need to:

- 1.1. Consult the local GDPR legislation and institutional personal data protection procedures to check how your activity complies with them.
- 1.2. Ensure you collect Prior Informed Consent from each participant for data collection and processing BEFORE they join the citizen science on-site activity.
- 1.3. Ensure that any collected personal data are kept securely with, for example, access control mechanisms.
- 1.4. Ensure that any publication of data (including publication on the internet) does not lead to a breach of agreed confidentiality and anonymity.

### 2 When the activity involves active contribution by the participants:

- 2.1. A Prior Informed Consent Form (PICF) is mandatory and essential in most studies involving human subjects as it is a primary vehicle for disclosure of information and documentation of consent.
- 2.2. Carry out a thorough risk assessment to assess if the activity raises any health or safety risks to the participants.
- 2.3. If specimens are to be collected in the field, comply with the protocols for sampling and inventory techniques of the host institution to serve as reference.



## Timeframe

**Preparation phase: 2-4 weeks prior to the on-site field trip.** The preparation phase will consist of:

1. **Communicating with the participants on:**
  - a. the tasks to be performed.
  - b. the importance of compliance with GDPR rules when collecting personal data, and the importance of compliance with on-site protocols when collecting specimens.
  - c. Clear communication of the requirement of the Prior Informed Consent Forms (PICF) to be received prior to participation in the activity.
2. **Train researchers/project leaders** about techniques for handling conflict, threats, abuse or compromising situations.
3. **Carry out a risk assessment.**
  - a. Ensure insurance cover is in place.
  - b. If the activity involves endangered or protected fauna and/or flora and/or protected areas, you will need to consult related legislation and ensure the planned activity is compliant.
4. **Secure any necessary permits/permissions.**
  - a. Authorities formally notified of activities being conducted in the area.
5. Plan transport to and from the activity for all participants.

**On-site: Dependent on the length of the planned activity.**

- All on-site **data collected** requires safe storage procedures and access. The citizen scientists PICFs done during the preparation phase, will enable a smooth and easy treatment of the personal data and the pictures and/or videos taken during the activity.
- If any **risks** were identified during the risk assessment then ensure all participants have gone through the risk assessment and thus can adhere to the precautions and procedures put in place.
- Ensure you have a good **communication** option to keep in touch with the home base (mobile phone coverage to be checked at the site, and if not available another means of communication to be employed).
- **Report** any health and safety incidents as soon as possible.



Photo by Università di Firenze



## Estimated Budget (Indicative)

The budget needed to implement this recipe is fundamentally the additional staff time required and does not include the costs for any planned fieldwork and citizen science activities. As staff time varies throughout the EU and institutions, we have included the estimated staff time required.

To be informed on the relevance of the ethics procedures for the project or task.	2-3 hours
To collect the documents, such as, PICFs during the training at an introductory session, and in the field.	1 hours
To monitor the implementation of the procedures. Duration of the planned activity and thus included in activity costs.	
Training on how to avoid conflict on the field.	2 hours
Evaluation of the progress made between the start and the end of the project by both the trainer and the trainee. Estimation for the supervising and monitoring 1/5 time of the project duration.	



## What went well / Even better if

We have learned that ethics rules are mainly about taking care of people, their safety and the prevention of any form of abuse. By ensuring this you ensure a smooth research activity by avoiding any issues during the activity and lack of respect for the integrity of people, environment and information.

Photo by Meise Botanic Garden



## Outputs and Indicators

You now possess one or several preliminary species partitions that provide support for evaluating your species hypotheses using an integrative approach.



## Related Deliverables or Resources

- **Practical Guide to Ethics Procedures WP10**
- **Ethics on the TETTRIs website:** <https://tettris.eu/ethics-and-gender/>
- TETTRIs **Deliverable 10.3 First Independent Ethics Advisor Report with Annexes**
- TETTRIs **Deliverable 10.1 - Overview of ethics issues Requirement n°1**
- **Gender & Diversity check.**
- **Ethical check.** [Ethical issue table](#)
- Prior Informed Consent Form (PICF)



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