



TETTRIs

Transforming European Taxonomy through Training, Research, and Innovations

Milestone MS1

Definition, scope, purpose and
stakeholder needs of reference collections

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Abstract: This document presents the initial findings from the surveys used to identify deals the definition, scope, purpose and stakeholder needs regarding reference collections. The information, partly gathered through surveys, will be used to produce a roadmap aimed at improving and optimizing awareness and accessibility of reference collections across Europe.

Keywords: Reference Collection, Definition, Scope, Stakeholder Needs, Accessibility, Taxonomic Expertise

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Table of contents

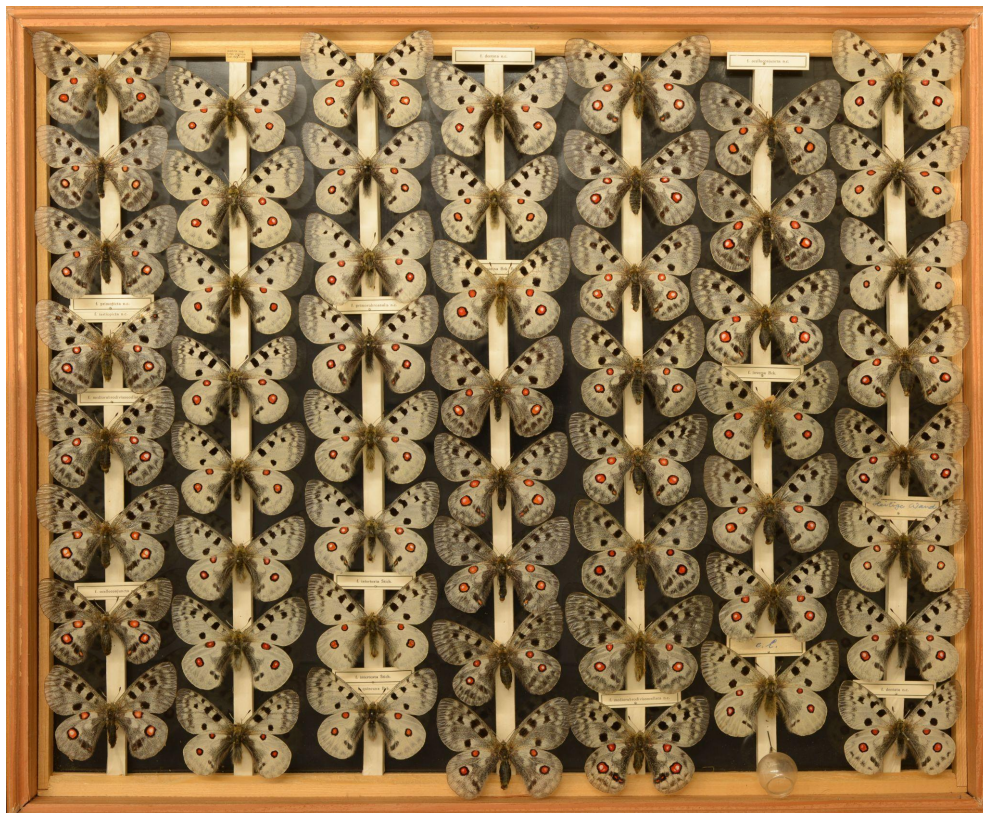
1. INTRODUCTION	6
2. OBJECTIVE	6
3. APPROACH	7
4. RESULTS	8
5. ROADMAP TO SET UP REFERENCE COLLECTIONS	12
References	13
APPENDIX 1	14

1. INTRODUCTION

Natural history collections, private or funded, local or national, have one thing in common: identified specimens. Identified specimens are the result of applying taxonomic knowledge and as such form an indirect tool to distribute this knowledge by offering insights in how to recognize taxa. Identified specimens also form the base for a wide array of research topics linked to biodiversity. In the context of using natural history collections, the term “reference collection” is applied. Optimizing awareness and accessibility to reference collections is essential for improving access to taxonomic expertise across Europe in general and for biodiversity hotspots in particular. This is also the key objective of work package 1 of TETTRIs.

2. OBJECTIVE

In order to enhance the use of natural history collections and maximize the benefit these collections can offer to the research community and to biodiversity, a roadmap to set up physical and virtual reference collections will be produced. For the Roadmap, deployment of hybrid (physical and virtual) frameworks for generating and curating reference collections of specific taxonomic or functional groups will be considered. This Milestone summarizes the definition, scope and purpose of the reference collections and the stakeholder needs concerning them, as they will be identified in the Roadmap.



Date: 23/11/2003 Doc version: v02

3. APPROACH

To start with, information was gathered about the definition, scope, purpose and stakeholder needs of physical and virtual reference collections, also looking into challenges and possible solutions for improvements. Partner institutions and the CETAF collection group were consulted, in order to identify essential concepts and questions. Two stakeholder groups were distinguished: 1) collection managers and researchers actively working with natural history collections and 2) NGO's, site-managers of natural reserves, whose work is not tightly affiliated with collections. Based on the initial information gathered, two surveys were prepared in order to collect opinions and views from the stakeholders. An extensive survey was prepared for the first-mentioned group and a concise one for the latter group.

The surveys were distributed in September 2023 and were open for responses from 10th of September until 7th of October. The extensive survey was sent out to 1824 contacts and the concise survey to 410 contacts.

Besides questions linked to the roadmap document, the extensive survey was also distributed among collection facilities to gather more information about existing collections of three pollinator groups (butterflies, bees, hoverflies), in preparation of the subsequent pilot projects (Tasks 1.2 and 1.3). In these projects, the setting up of physical and virtual reference collections will be piloted. Full results of the surveys will be presented and discussed in the Deliverable 1.1 "Roadmap to set up reference collections", which will be produced by March 2025 (M16).



Date: 23/11/2003 Doc version: v02

4. RESULTS

In total 192 responses were received to the extensive survey and 33 responses to the concise survey. In anticipation of the roadmap document, the definition, scope, purpose and stakeholder needs of reference collections are outlined here shortly, and the most relevant survey results clarifying the stakeholders' views will be presented.

Definition

Reference collection can be defined as *a collection of objects maintained for the purpose of study and specimen identification*. More specifically, the definition can vary from strict (benchmark collection to assist and confirm identifications) to broad (identified specimens forming the basis for research). According to the survey results, stakeholders clearly are not unanimous whether the definition is one of the aforementioned (56% of the respondents in favour of the strict and 39% in favour of the broad definition; or something else/in between (5% of the respondents).

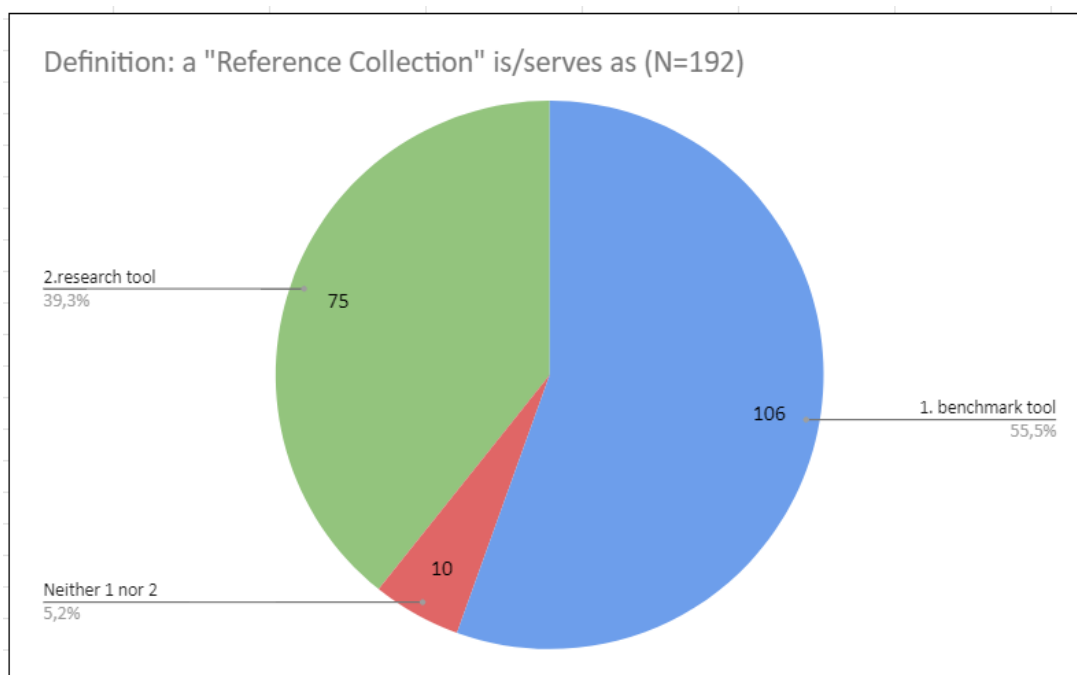


Figure 1. Answers collected to the question: "The term 'Reference Collection' is used in TETTRIs. Which one of the following definitions, according to you, applies best?".

Based on the survey results, both groups of stakeholders are familiar with the existence of reference collections in their region/country but less so with information about their composition or staff.

Scope

According to Meineke et al. (2018), the scope of natural history collections is enormous and their diversity is as manifold as there are repositories housing them. Similarly, the content of the reference collections can vary from a minimal part of the collection (for instance types only or reliably identified specimens from a specific taxon/region) to all identified specimens in a collection.

Purpose

The survey results show that stakeholders use collections for more than one purpose (Fig. 2). Many respondents are using collections mostly for research purposes (38% of the respondents are using over 50% of the total time they spend in collections for research purposes). However, almost all of the respondents also use collections for identification work (only 2% do not use them for identification at all). When asked about the reason to visit the collections, most of the respondents stated their primary reason being research purposes (74%; Fig. 3). According to the collection managers, research is the most important reason why collections are being visited (Fig. 4). In particular, taxonomic studies were considered as the most important reason for collection visits (58% stated this purpose to be the most important), while non-taxonomic studies were stated as the second most important reason for a visit by most (39% of the respondents).

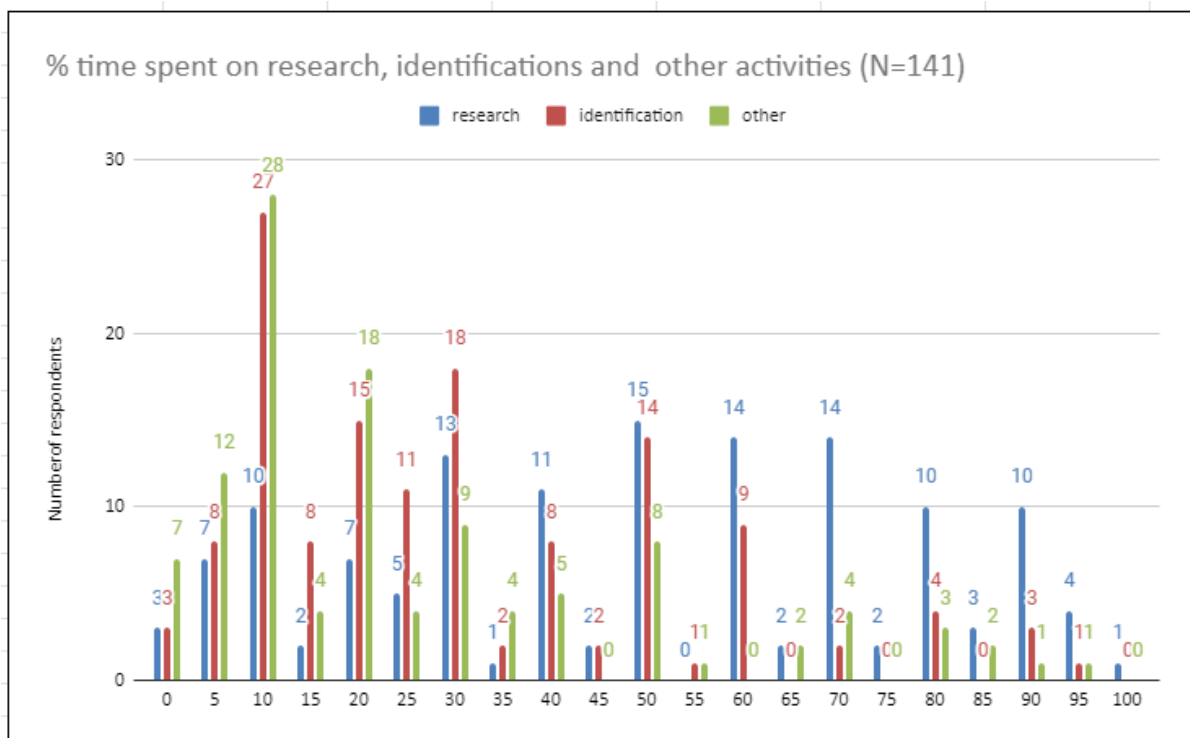


Figure 2. Answers to the question: “Please indicate an estimate of the percentage time you are using collections for a) research, b) assist with identifications or c) other goals (total should add up to 100%).”

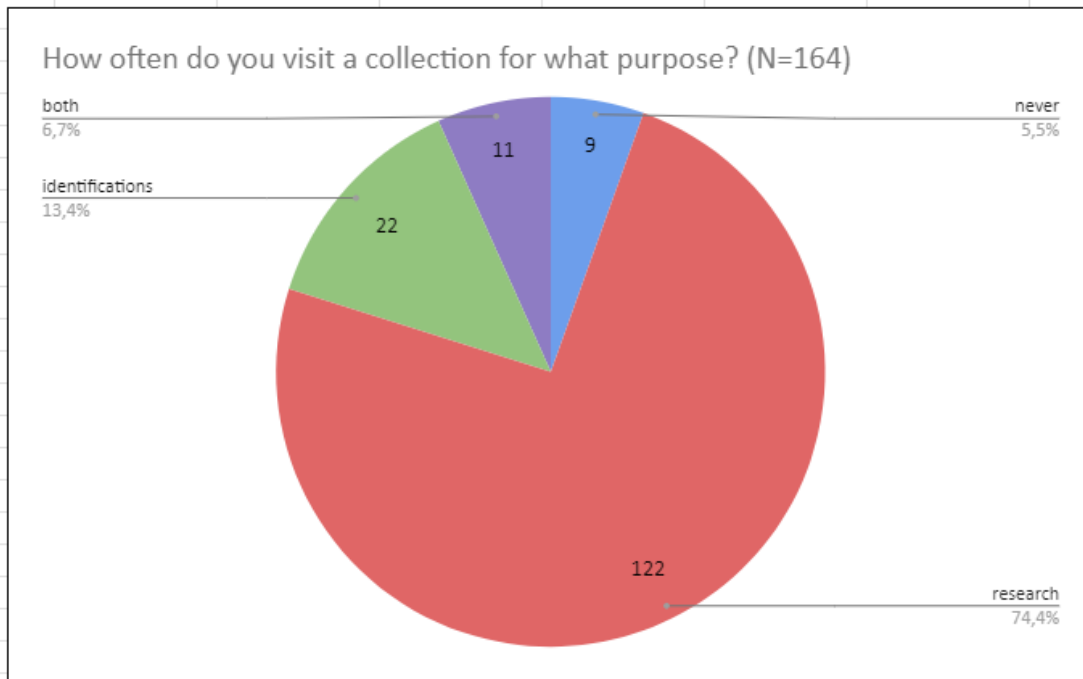


Figure 3. Answers to the question: "For what reason do you visit collections (only one allowed)."

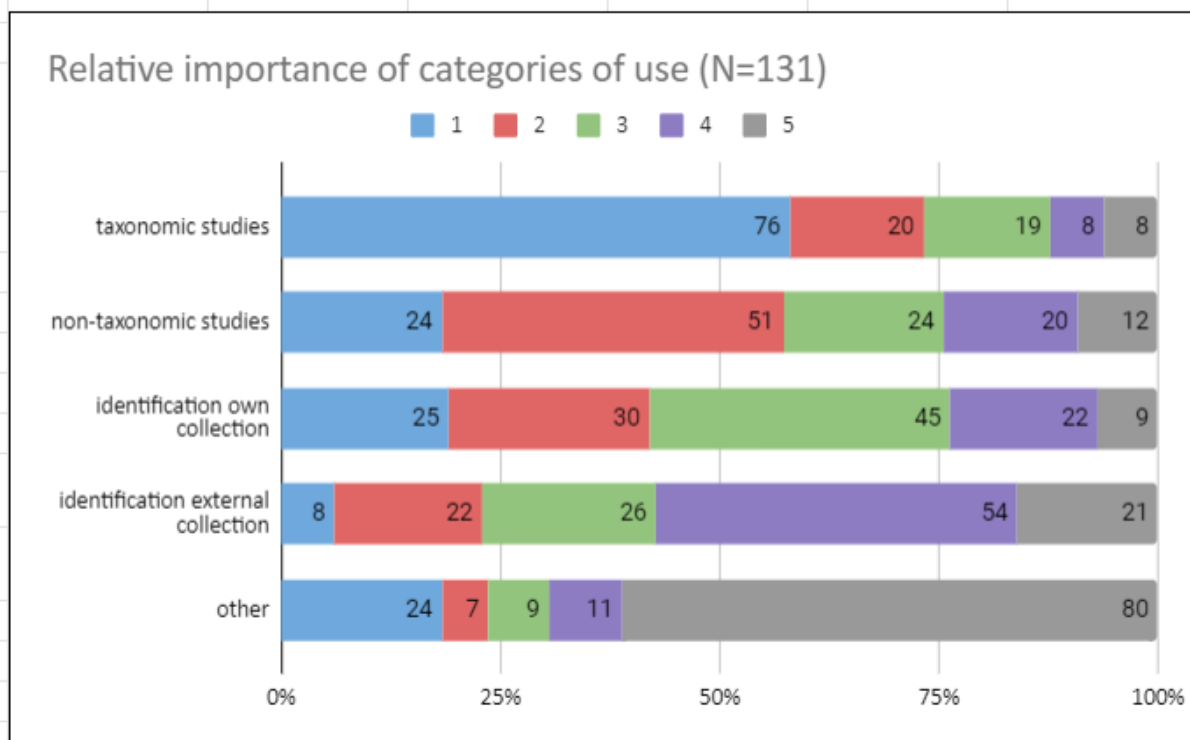


Figure 4. Answers to the question: "Regarding the collection you are responsible for, please rank the below 5 categories of use in order of importance from 1 (most important) to 5 (least important)."

Needs of the stakeholders

A number of features can be assigned to reference collections like publicness and reputation, reliability of identifications, findability of material in a collection, accessibility of the facility, completeness and logistics, each contributing to the overall “usefulness” of a natural history collection to serve as reference collection. Respondents of the survey were asked about the relative importance of such features and about suggestions/ideas linked to these or other features and what can be improved.

According to the survey, while stakeholders consider research papers as the most important resource for specimen identification, reference collections are considered equally useful as other resources/tools such as the input from specialists, popular books and artificial intelligence-based tools. According to the stakeholders, the most important characteristics of reference collections are the reliability of specimen identifications (49% of the respondents stated it as the most important feature) and findability of species or specimens in the collections (36% of the respondents stated it as the most important feature; Fig. 5).

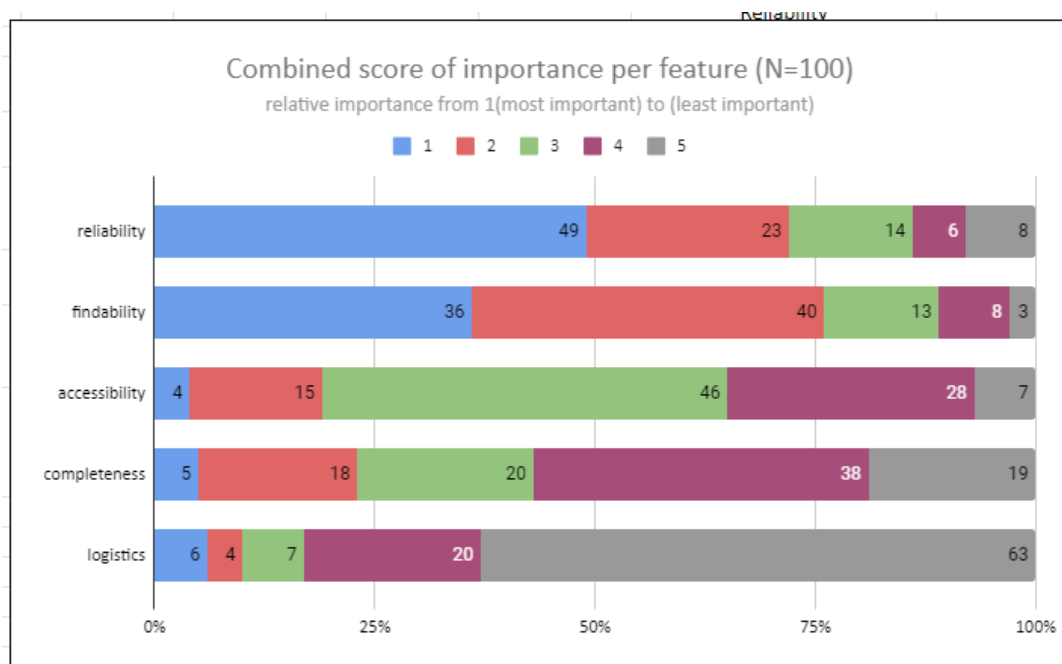


Figure 5. Answers to the question: “Please rank below features in order of importance for natural history collections from 1 (most important) to 5 (least important)”

Concerning the Task 1.2 in which setting up and improving physical reference collections of pollinators will be piloted, the survey revealed a number of collection facilities with important pollinator collections which will be contacted in the future.

5. ROADMAP TO SET UP REFERENCE COLLECTIONS



The survey results will be included in Deliverable 1.1 “Roadmap to set up reference collections”, which will be produced by March 2025. Presently (November 2023), the introduction and the concepts have been laid out in the Roadmap. Also most of the survey results have been incorporated into the text and taken into account in the results and inferences sections. The section outlining and discussing stakeholder needs is still to be finalized.

The survey results are yet to be included in the section concerning the steps needed to set up physical benchmark collections. Additionally, the sections concerning virtual benchmark collections are yet to be added. This includes steps to be taken to refine image libraries into virtual benchmark collections, to improve virtual benchmark collections at the collection facilities, and to improve the international infrastructure supporting virtual reference collections. In addition, insights for the blueprint and technical execution for setting up a virtual reference collection were gathered during the Biohackathon held in Barcelona in October 2023. These insights will also be utilized in the Roadmap.

References

Meineke EK, Davies TJ, Daru BH & Davis CC 2018. Biological Collections for Understanding Biodiversity in the Anthropocene. *Philosophical Transactions of the Royal Society B: Biological Sciences* 374 (1763): 20170386. <https://doi.org/doi:10.1098/rstb.2017.0386>.]

APPENDIX 1

ID	Reference or Related Document	Source or Link/Location
1	<i>Survey 1 for collection managers and researchers (Extensive)</i>	 2023 08 18 - TETTRIs WP1 long survey
2	<i>Survey 2 for other stakeholders (Concise)</i>	 20230828 - TETTRIs WP1 short survey
3	<i>Survey Results</i>	https://docs.google.com/document/d/1d_rz7Nvh5tR0Q5IY0X6oc3IsWt_zd8sHJNvGzEBywdil/edit