

# Palaeontology Collection Policy

Björn Kröger<sup>‡</sup>, Anniina Kuusijärvi<sup>§</sup>, Leena Myllys<sup>‡</sup>, Pasi Sihvonen<sup>¶</sup>, Gunilla Ståhls-Mäkelä<sup>¶</sup>,  
Henry Väre<sup>‡</sup>, Markku J Oinonen<sup>‡</sup>, Aino Juslén<sup>¶</sup>, Leif Schulman<sup>#</sup>, Marko-Tapio Hyvärinen<sup>‡</sup>

<sup>‡</sup> Natural Sciences Unit, Finnish Museum of Natural History, Helsinki, Finland

<sup>§</sup> Biodiversity Informatics Unit, Finnish Museum of Natural History, Helsinki, Finland

<sup>‡</sup> Botany Unit, Finnish Museum of Natural History, Helsinki, Finland

<sup>¶</sup> Zoology Unit, Finnish Museum of Natural History, Helsinki, Finland

<sup>#</sup> Finnish Museum of Natural History, Helsinki, Finland

Corresponding author: Björn Kröger ([bjorn.kroger@helsinki.fi](mailto:bjorn.kroger@helsinki.fi))

Reviewable v 1

Received: 05 Jan 2021 | Published: 19 Feb 2021

Citation: Kröger B, Kuusijärvi A, Myllys L, Sihvonen P, Ståhls-Mäkelä G, Väre H, Oinonen MJ, Juslén A, Schulman L, Hyvärinen M-T (2021) Palaeontology Collection Policy. Research Ideas and Outcomes 7: e62808.  
<https://doi.org/10.3897/rio.7.e62808>

## Abstract

The Paleontological Collection (PalCo) is one of partial collections of the Finnish Museum of Natural History Luomus. General principles and guidelines for the collections are defined in the General Collection Policy of Luomus. The PalCo Policy is subordinate to the General Collection Policy of Luomus, clarifying its content with reference to the special characteristics of the paleontological collections. The PalCo includes fossil plant, invertebrate and vertebrate specimens worldwide in scope and from all geologic ages to support Finnish research and educational projects. The coverage emphasizes Paleozoic and Quaternary specimens from Finland, the Baltic countries and Scandinavia. The PalCo Policy defines the purpose of the collections, the objectives, the distribution of responsibilities for collection management and maintenance in the organisation, and the principles of collection accumulation, preservation, accessibility and use.

## Keywords

collections management, natural history collections, fossils, best practices, University of Helsinki

# **1. Status, purpose and implementation of the Palaeontology Collection Policy at the Finnish Museum of Natural History**

## **Status and implementation of the Collection Policy**

The Collection Policy of the Finnish Museum of Natural History Luomus is hierarchically organised. General principles and guidelines have been defined in the General Collection Policy (Hyvärinen et al. 2020). Collection policies for the partial collections, subordinate to the General Collection Policy (and also known as “separate collection policy documents”), adhere to and implement the General Collection Policy while clarifying its guidelines and instructions with the special characteristics of the partial collections in mind. The Palaeontology Collection (PalCo) Policy is one of these separate policy documents and it directs all activities related to the paleontological collections.\*1

This policy document has been drafted in the Natural Sciences Unit, reviewed by the Collections Steering Group and approved by the Luomus Management Group on May 4 2020.

The Collection Policy is implemented and executed by the team that manage the geological collections in the Natural Sciences Unit, as well as by every team member and visiting researcher using the collections, while working on behalf of Luomus and with its collections.

## **Goals of the Collection Policy**

The goal of the Collection Policy is to ensure the high scientific quality of the collections and associated data as well as to provide optimal physical and digital access to the collections for scientific research purposes.

The policy document defines the purpose of the collections, the objectives and content of related activities, the distribution of responsibilities for collection management and maintenance in the organisation, and the principles of collection accumulation, preservation, accessibility and use on a general level. Related specific practices and processes have been separately described in the operational instructions for the teams (MuseoWiki or equivalent).

## **Definition of a collection**

A collection is a compilation of systematically organised specimens and their associated metadata from which the specimens can be located either based on the collection data or on the physical organisation of the specimens. Specimens, which have not been thus organised into the collection, are not considered part of it.

Datasets included in collections (e.g., specimen databases) can also be stored and organised together with data that do not make part of the collection (e.g., observational data). The Digital Data Policy of Luomus applies to all kinds of data mentioned above.

Thus, collection databases are governed by two data policies, those for collections and that for digital datasets.

## **Purpose of the collections**

The Palaeontology collection includes fossil plant, invertebrate and vertebrate specimens worldwide in scope and from all geologic ages to support Finnish research and educational projects. The coverage emphasizes Paleozoic and Quaternary specimens from Finland, the Baltic countries and Scandinavia.

Legislation, general principles and strategic policies related to the Luomus collections are discussed in the General Collection Policy. In accordance with the Universities Act, the PalCo belongs to the national natural science collections of Luomus. For their part, the collections implement the mission of Luomus, which is to be “responsible for the preservation, accumulation and exhibition of the national natural history collections and for research and education relating to them”.

## **2. Principles of accessioning material**

### **Material to be accessioned into the collections**

Specimens are accessioned into the collection through fieldwork and research of Luomus and University of Helsinki researchers and students, private donations, bequests, exchanges, and (rarely) purchases. The primary means of collection growth is active, high-quality collection-based research. In addition, collections may be accumulated by exchange of specimens with other collection units. As a rule, all material relating to research, theses or dissertations completed at Luomus must be documented and submitted to the relevant collection. Final decisions on adding specimens to a collection are, however, made by the scientific curator of the PalCo (short: curator). The PalCo will not accept specimens with restrictions on use that might interfere with its mission and goals.

The quality of the collection is constantly being improved by identifying and cataloguing backlogged material, until the work is completed, and by the addition of new specimens.

The PalCo will not knowingly accept or acquire specimens that have been illegally collected or imported into Finland. Every reasonable attempt will be made to ensure that items being considered for acquisition have been collected and imported legally. The PalCo will refuse to accept items that were collected in such a way as to impair their scientific value (e.g., with inadequate stratigraphic and geographic data) or destroy or contribute to the destruction of a site.

Specimens acquired for the collection should be obtained free and without restrictions as to use or future disposition. The PalCo will not guarantee to a donor that specimens will be retained permanently, placed on display permanently, or remain together as a group in storage.

In general, specimens to be accessioned into the collections are prioritised as follows:

1. Scientifically valuable specimens of a high technical quality, which support the focus areas of Luomus and are important for current or future research.
2. Specimens that complement existing scientifically valuable collections and increase their scope (e.g., represent missing developmental stages, expand time series, or broaden the geographical or taxonomic scope of the collection).
3. Specimens with no immediate research value, but which may serve other social interests, such as environmental education or the public outreach in exhibitions of biodiversity.

Specimens may also be accessioned into the collections if they form a coherent whole with other Luomus collections.

### Focus areas and areas of responsibility of the collection

The focus areas guiding the accumulation of the PalCo are based on the purpose of the collection, and on ongoing and future published research of Helsinki University researchers and Luomus staff, this includes:

- Paleozoic fossils from glacial erratics from Finland and from outcrops at the Åland islands
- vertebrate (especially carnivore) fossils worldwide
- plant fossils and subfossils from Finland

Areas of responsibility guiding the accumulation of collections are:

- Type specimens from published research of Luomus and Helsinki University researchers
- fossils of Finland
- documenting the distribution of fossils in Finland and adjacent regions

Post-glacial subfossil material of metazoan animals from Finland is, however, generally deposited in the zoological collection of Luomus, where appropriate recent comparative material is at hand.

### Quality criteria for specimens

The evaluation procedure should consider the following criteria:

1. *Collection priorities*: Is the specimen or collection consistent with collection priorities as described in the collection policy?
2. *Uniqueness*: Is the specimen or collection so unusual that it should be given preferential consideration?

3. *Ethical and legal considerations:*
  1. Was the matter obtained legally? Were private landowners and/or governmental entities consulted about collecting activities (i.e., valid collecting permits)?
  2. Is there documentation?
  3. Does the transferor have full and clear title to the specimens and all associated materials?
  4. Was the specimen (collection) obtained ethically?
4. *Documentation:* Is there adequate scientific documentation (e.g., field notes, labels, maps) accompanying the specimens or collection? If not, is there some specific reason to obtain the specimen (e.g., rarity, quality)?
5. *Conservation considerations:* Will the specimen (collection) require special conservation or preparation treatments (does the physical condition permit storage in the collection without special treatment)?
6. *Resources:* Will acceptance of this specimen (collection) require extraordinary resources now (financial, staff time, space, equipment) or become beyond the means of Luomus in the future?
7. *Restrictions:* Has the donor set any unusual encumbrances on the specimen (collection) such as permanent (or long-term) loan, restricted use, intellectual property rights (copyright, trademark, etc.)?
8. *Encumbrances:* Are there things in the nature of the specimen (collection) itself, which might encumber it (e.g., hazardous material)?

### 3. Accepting specimens and adding them to the collection

#### Adding and databasing specimens

New specimens become part of the collection only when formally accessioned. When a new specimen is accessioned into the collection, its data are entered into the collection management system (CMS) Kotka (Heikkinen et al. 2019), and it receives a unique identifier. Material previously accessioned is part of the collection even if it is not yet digitally registered. Cataloguing or digitising this type of existing material is not considered as collection growth.

New sample lots or private collections offered to and accepted by the museum will nevertheless be registered into the CMS as separate larger entities (donations) already before they are potentially accessioned into the collections. This enables the monitoring of incoming material from donations. Metadata on sample lots expected to be acquired in the future can also be registered in the CMS.

#### Decision-making

Adding of specimens to the collections requires a decision by the scientific curator of the PalCo or by their deputy or superior in the case of absences. These decisions are made in accordance with the principles of the General Collection Policy and this document. The

curator may delegate decisions on individual specimens to other collection staff, in accordance with written instructions. The Director of Luomus will decide whether to accept extensive collections on the presentation of the Unit Director. All collection accumulation must adhere to the general quality criteria (see above).

### **Terms related to accepted specimens**

As a rule, no such specimens or collections are accepted, whose delivery is subject to terms other than collection permit practices. If the material is exceptionally valuable, Luomus may agree with the person or organisation submitting it to respect awaiting embargo period of a maximum of two years before making the material openly available. Such an agreement must be approved by the Director of Luomus at the presentation of the Unit Director. The acquisition process follows the protocol established in the CMS.

## **4. Collection management**

The goal of collection management is to preserve the value and utility of specimens in the collection so that they may be used to increase knowledge of our natural heritage. The curator will make every effort to adhere to professional standards and ethics for collections management. In order to meet this goal, it is necessary to:

1. manage the specimens individually as well as collectively relative to available resources (staff, space, equipment, etc.),
2. maintain documentation that describes procedures, fulfills legal requirements, preserves specimen data, and builds a record of specimen use and history, and
3. ensure sound conservation principles are followed to slow biological, chemical and mechanical deterioration of specimens and accessory materials.

### **Metadata**

Metadata related to the structure of the PalCo documenting the division of the collections into subcollections, as well as the content, size and location of the collections, are specified on a general level in the CMS. Persons in charge of subcollections will also be registered in the system. These metadata are openly available.

Historical documentary material related to a collection, such as personal field notes, photographs, or measurements, makes part of the collection, and the responsibility for such material is carried by the team managing that collection. Decisions on access to the material will be based on practicality.

### **Specimen data and the collection management system**

Data related to individual museum specimens must be recorded in specimen labels, collection documents, and in the CMS. Specific collection and origin data on all new specimens will be entered into the CMS. Collection management aims to register the entire

museum collection into this single database. Usage history and the physical consequences of specimen use are also recorded in the CMS.

Specimens will be clearly marked with labels containing the most essential information on their origin, as well as an identifier adhering to common standards, which connects them to the CMS. When labels are changed, all original labels and labels containing information different from the new practices will be kept.

### **Specimen-specific data to be recorded**

Collection location and time are the most important information required for specimens. Specimens with no location data are usually not part of any collection.

The following information is the minimum requirement for new specimens to be entered into the database (quality criteria):

- Discovery location (state, locality, coordinates)
- Stratigraphic information
- Collection date (precise date or time period)
- Collector's identity
- Number of individual specimens comprising the sample/batch (or estimate)

Information on type specimen status and the publication on which the status is based

### **Physical organisation of the collections**

The PalCo have been physically divided into collections covering plants, invertebrates and vertebrates. These subcollections have been further organised according to taxonomy, geographical location and storage methods, in addition to which certain historical entities are stored separately (separately kept collections). The organisation of collections and specimens is based on ease of access. The method of organisation for each individual collection is described in their metadata.

## **5. Collection maintenance**

The care of collections follows international standards for the care of scientific collections. The aim is to ensure the preservation of specimens for centuries for the use of the scientific community. This requires specialised methods for storage, pest control, specimen handling as well as the security of the collections facilities.

### **Collection storage**

Conditions in the collection facilities are adjusted for the optimal preservation of the collections. Practical and, when available, standardised storage systems and containers will be used in the collections. Various storage systems and their development needs have been specified in the collection maintenance instructions (MuseoWiki or equivalent).

## Current state of collections maintenance

The collection contains more than 30,000 specimens. Among them are more than 500 type specimens and referred specimens.

Specimens housed in the collection can be defined by their relative significance for research and teaching with less emphasis placed on their exhibition quality, and by the level of supervision required for care and maintenance. *Strict supervision* includes specimens of greatest value for research purposes and intended for indefinite retention (permanent collection). They demand the highest level of supervision for use, management and conservation practices and the greatest security. Type specimens are included in this designation. *Moderate supervision* includes good quality specimens for use as reference material by the general public, for exhibit, for exchanges or for instructor use in educational programs. They demand supervised handling and careful management practices, but restrictions on use are not as strict as with the first category. Non-type, general taxonomic and stratigraphic, collections are included in this designation. *Low supervision* includes specimens that require minimal or no supervision for handling. This category includes specimens that have been deemed of no value for research or exhibit and may be used for hands-on teaching purposes.

## Maintenance routines

Conservation and collections care is carried out in accordance with practices agreed upon with the curator and team coordinators. Potential pest occurrence in the collections facilities is regularly monitored and controlled. Maintenance procedures and needs will be recorded on the subcollection level for the purposes of operational development. Changes in the condition of specimens and events essentially related to these changes will be recorded in the CMS.

## Safety

A safety coordinator has been appointed for the collections facilities. The staff has been familiarised with the rescue plan, which is also easily available in written form in the storage rooms. Occupational safety in general is controlled by the University's HR organisation.

Visitors working with the collections will also be familiarised with the most important safety instructions and working practices. Occupational ergonomics and safety are developed in cooperation with other parties at the University, in accordance with relevant instructions.

## Definition and scientific evaluation of the collections

Continued scientific evaluation of the collections by Luomus staff as well as support for the work of visiting researchers by making workspaces and facilities available are an important part of high-quality collections maintenance. The staff will organise collections primarily to a level where they are easily accessible by and available to experts.



## Digitisation strategy

The digital availability (section 6) and, increasingly, the photographic documenting of actual specimens are central to the accessibility of the collections. Currently, digitisation is among the most important operational lines of collections management.

A general guideline is to prioritise the digitisation of type specimens, historically or scientifically significant subcollections, and entities related to collection focus areas. The digitisation of actively used specimens (particularly those that are available for loan) is of primary importance. In order to promote the collection objectives in an efficient manner, the collection teams are drafting digitisation plans for the collections that prioritise digitisation needs.

## 6. Accessibility and use of the collections

The collections are to be used primarily for scientific research and university-level teaching, and secondarily for other types of education and environmental and science education. Research use of the collections takes place in Luomus' facilities, and collection material may be loaned outside Luomus free of charge according to international museum practices. (see Luomus General Collections Policy §13)

The PalCo provides access to the collection and associated data by 1) making data openly available, 2) written or verbal requests, 3) lending specimens, and 4) physical access to the specimens.

### Accessibility and access rights

Access to the collection is restricted to the curator, authorized staff and students, and visitors under supervision. Authorized staff and students are those who need to use the collections for teaching and research. Visitors wishing to use the collection must request an appointment in advance and be approved by the curator. Visitors must be accompanied by the curator or authorized staff or student at all times. The following criteria will be used to grant access to the collection:

1. the individual must have a legitimate reason for using the collection (e.g., scholarly research),
2. the individual must comply with security precautions and collection procedures,
3. the individual must be willing to work during regular departmental hours, and
4. the individual may be asked to demonstrate competence in the physical handling of specimens.

Visitors who have abused their status or damaged specimens may be denied access. Keys are not issued to non-Luomus personnel, except in rare cases and only with permission from the curator.

Non-academic requests (private collectors, hobbyists, clubs, commercial users, artists, etc.) will be reviewed individually. Visits will be granted as the curator's schedule permits, if at all. Such non-academic access (tours behind the scenes) will be closely supervised by the curator or authorized faculty or students. Research and photographic equipment, and preparation materials will be made available whenever possible.

## Openness of datasets

Metadata related to the collections and, as a rule, data already in digital form in the CMS are open data according to the Digital Data Policy of Luomus. They are available to the scientific community and the public through the Finnish Biodiversity Information Facility (FinBIF; [species.fi](https://species.fi)), as a rule according to the licence CC BY 4.0 or newer.

## Specimen loans

Specimens from the collection are lent to other collection organisations and research institutes by the decision of the curator in accordance with international practices.

1. The relevant departments serve as the contractual parties: PalCo loans will only be granted to persons holding official permanent positions in recognized institutions/organizations. Students or temporary researchers will only receive loans under the approved address and signature of their position supervisor. This person will be responsible for the care and return of all loaned units. Should the borrower leave their receiving institution, either permanently or for an extended period, all loaned units must be returned.
2. PalCo loans for commercial purposes are discretionary and will incur a fee.
3. Without exception, loans and related terms will be recorded in a written agreement and information about all incoming and outgoing loans is permanently entered into the CMS.
4. Loaned specimens must be handled as carefully as all collection specimens. The loan period is always defined by the agreement. By default, the period is 12 months, or 6 months in the case of type specimens. Renewal of loans must be completed in written form with an agreement equivalent to the original. Collection managers will send regular reminders of overdue loans.
5. Specimens may not be prepared, sampled or altered in any way without prior written approval of the curator. General and case-specific restrictions may be set particularly for the lending of type specimens or other exceptionally valuable specimens. The sending of digital images instead of actual specimens is recommended.
6. As a rule, material to be loaned is digitised by imaging before sending. This applies to all particularly valuable material. Original labels will not be supplied with PalCo specimens, although digital copies can be provided upon request.
7. The PalCo should be notified of any taxonomic changes or re-identifications especially for primary types. Any published or popular works, commercial products,

- public exhibitions, education and outreach materials or media publicity resulting from or involving PalCo loan units must carry due institutional acknowledgement.
8. Luomus must receive credit in any publications based upon the use of specimens from the collection. Authors shall make the curator aware of and provide, if possible, the DOI assigned to any publication based in whole or in part upon material loaned from PalCo.

## **Destructive sampling**

The recovery of museum specimens in their original condition is usually expected when loaning them. A separate agreement on, for example, breaking up a specimen for mounting on a slide must be drafted in connection with a loan, and the entire original specimen and preparations originating from it must, as a rule, be returned.

## **Other use**

The guidelines of the General Collection Policy will be observed when using specimens in exhibitions or lending them to parties other than scientific research or collections organisations.

## **7. Deaccessioning**

Deaccessioning is always based on the guidelines in the General Collections Policy and approved by the Unit Director, and decisions on deaccessioning individual specimens are made by the person in charge of the scientific value of the collection (usually the team leader). (see Luomus General Collections Policy §14)

The deaccession process shall be cautious, deliberate and scrupulous. The term 'deaccession' applies to any specimen or specimen lot brought into the repository for research purposes whether or not it is catalogued. Before specimens can be disposed of, reasonable effort shall be made to ascertain that the PalCo has clear title to and is free to dispose of the specimens. If there is any question as to encumbrances on the specimen(s), the PalCo will seek advice of a legal counsel of the University of Helsinki.

The curator will use the following criteria when removing a catalogued specimen or an uncatalogued lot:

1. the material does not fall within the scope of the collection as described in this policy,
2. the material lacks physical integrity or has deteriorated beyond usefulness,
3. the material is redundant and no alternative use can be determined,
4. the material is occupying space and using valuable resources that could be better used to improve or strengthen the collection in order to further the PalCo goals.

Type specimens, figured or illustrated specimens, or specimens described in any professional or scientific publication may not be deaccessioned.

According to the General Collection Policy, deaccessioning is based on guidelines created by the Unit Director. Decisions on deaccessioning individual specimens are made by the collection manager in cooperation with the Unit Director or other supervisor.

Any reliable specimen observation data will be stored when deaccessioning specimens. Reliable observations and identifications will be stored in the collection database even if the deaccessioned specimens are in poor condition. When possible, the material will be digitised also by photography or other imaging system before deaccessioning.

## Acknowledgements

We are grateful to Tiffany Adrain (University of Iowa, Iowa City, USA) and Jan Ove Ebbestad (Uppsala University, Uppsala, Sweden) for discussions and support during the early stages of the preparation of this collection policy. We thank Laurence Livermore (London, UK) for his invaluable technical help in the publication process.

## References

- Heikkinen M, Riihikoski V, Kuusijärvi A, Talvitie D, Lahti T, Schulman L (2019) Kotka - A national multi-purpose collection management system. Biodiversity Information Science and Standards 3 <https://doi.org/10.3897/biss.3.37179>
- Hyvärinen M, Väinölä R, Väre H, Ståhls-Mäkelä G, Sihvonen P, Kuusijärvi A, Myllys L, Kröger B, Heikkinen M, Juslén A, Oinonen M, Schulman L (2020) General Collections Policy of the Finnish Museum of Natural History. Research Ideas and Outcomes 6 <https://doi.org/10.3897/rio.6.e58167>

## Endnotes

- \*1 This collection policy was drafted partly by using the published version of the Collection Policy, Paleontology Repository, Department of Geoscience, The University of Iowa (<https://fossils.its.uiowa.edu/paleo/CollnPolicy.html#general>), accessed in May, 2018.