

Natural Science collections and curation

- A natural science collection is a compilation of systematically organised natural science specimens and their metadata



Luomus General Collections Policy

- Geology collection policy
- Live plant collection policy
- Plant and fungi herbarium collection policy
- Invertebrate collection policy
- Vertebrate collection policy
- DNA and tissue sample collection policy
- Palaeontology collection policy

Luomus collections



- The collections constitute an archive of biological and geological diversity and of the changes in our environment caused by natural phenomena and human intervention as well as the connections between them.
- The purpose of the collections is to offer **reliable, high-standard research material** for the future needs of humanity.

Accumulation principles

- 1) Scientifically valuable specimens of a high technical quality which support the strengths of Luomus and are **important for current or future research**
- 2) Specimens which **complement existing scientifically valuable collections and increase their scope** (e.g., represent missing stages of development, add to time series or increase 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 exhibition of biodiversity

Accepting specimens

- What is the number of specimens, and how much space do they require?
 - Do the specimens have scientific significance or historical value?
 - Do the specimens genuinely expand the content of the collection, or do they duplicate existing collections?
 - How do the specimens promote Luomus' strengths and the goals laid down in its collection and research policies?
 - Is the data associated with the specimens reliable and sufficient as defined in the collection-specific policies?
 - Were the specimens collected in an ethical and legal manner?
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- In addition, the following aspects must be considered before deciding to accept large collections:
 - To what extent will these collections be stored in Luomus?
 - How will the specimens be preserved before their addition to the collection?
 - How much time and resources will be needed to curate the new collection?
 - What are the long-term overall costs of the collection's maintenance, curation, storage and metadata management?
 - What are the logistics required to receive the collection, what are its costs, and how will funding be arranged?

Enhancing the content of the collections

- **Enhancing the content of the collections** seeks to increase their scientific value in a way that is financially sustainable.
- The content of the collections is enhanced through **quality criteria** which guide accumulation and deaccessioning and pertain to specimens and their metadata.
- The scientific and perceived value of the Luomus collections is ultimately dependent on their **accessibility**.

Preservation

- The **preservation** of the national collections as a reliable, high-quality research resource is one of the **duties set for Luomus** in the **Universities Act**.



Use of the collections

- The collections are to be used primarily for **scientific research and university teaching**, and secondarily for other types of education and environmental 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.

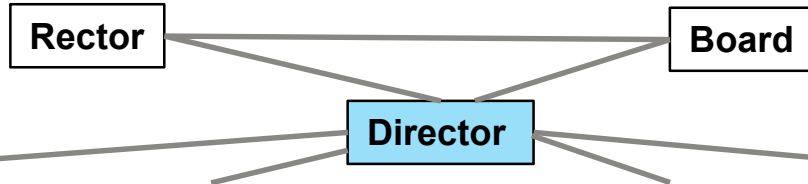
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- Before lending Luomus collection specimens to other organisations, the **person responsible** for the loan must determine that the **person receiving the loan represents a scientific institution** or is otherwise undeniably qualified to handle the specimens and to use them for scientific purposes.

Deaccessing specimens

- The purpose of deaccessing is to **remove poor-quality** material from the collections and thus streamline collections maintenance and the use of space **without compromising the scientific value** of the collection.
- Before deaccessing, it should be considered whether an **image of the specimen** could be created and its metadata stored.
- Deaccessing may also seek to **reduce duplicates**, in which case the deaccessed specimens can be used for **swaps**

LUOMUS Zoology collections





General Services	Unit Director Botany	Unit Director Zoology	Unit Director Natural Sciences
Management → →	Vascular Plant Team (herbarium collections, research, teaching)	Entomology Team (collections, research, teaching)	Chronology Team (Laboratory of Chronology, research, teaching)
Public Outreach & Customer Service → →	Mycology and Bryology Team (herbarium collections, research, teaching)	Metazoa Team (collections, research, teaching, taxidermy)	Geology Team (geological and palaeontological collections, research, teaching)
Systematics Laboratory → →	Plant Mapping Team (mapping, survey, research, teaching)	Monitoring Team (monitoring, mapping, survey, research, teaching)	
Administration & Communication (University Services) → →	Horticulture Team (living collections, seed bank, public outreach)		

Zoology Unit

Permanent staff 31

- 3 senior curators, 6 curators
- DNA laboratory manager
- 5 coordinators (monitoring, taxidermy, collection and digitization)
- 14 senior museum technicians
- 2 taxidermists

- 10-20 fixed-term external funding: Post docs, Phd students, research assistants
- 20 visiting researchers, i.e. personal grants, emeritus staff

Collections

- **Vertebrate collections** ca. 140 000 specimens
- A majority of the vertebrate samples are from Finland
- The museum also hosts a large, internationally valuable bird egg collection
- A frozen tissue collection of vertebrate material has been started for purposes of DNA analyses/genome collection
- Approximately 90 % of the specimens are digitized



- **The entomological collections** ca. 9 million specimens
- Lepidoptera, Coleoptera, Hymenoptera and Diptera are the best represented groups
- Internationally valuable collections from e.g. Africa
- The majority of the specimens are pinned or mounted on cards
- Ca. 2 % digitized



<http://id.luomus.fi/GAC.16249>
 CHINA Shaanxi Qin Lin Shan Mt.
 wgs:84dms: 33.51 N, 106.47 E
 7-19.VII.1996
 Kleinfeld & Schütze leg.

PARATYPUS
Pterostichus
(Sinoreophilus)
strigosus n. sp.
 Sciaky & Wrase des. 1997

Photographed
 2016
 Pekka Malinen

CHINA (Shaanxi)
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 S Xian 2350-2500 m
 7-19. VII. 1996
 Kleinfeld & Schütze

- **The invertebrate collection** (excluding insects) currently comprises ca. 400 000 labeled samples
- Most of those are stored in ethanol
- Best represented are spiders, mites, molluscs, oligochaetes and turbellarians
- Ca. 30 % of the material digitized



Examples of preservation techniques

- Zoological collections include:
- **Entomology collections:** pinned and card mounted insects
- **Spirit specimens:** animals preserved in fluid
- **Taxidermy specimens:** mounted (stuffed) animals
- **Study skins:** skins of animals, not mounted
- **Dry material:** shells, skeletal material, bird eggs, corals, etc.
- **Microscope slides:** animal parts, small insects, etc.

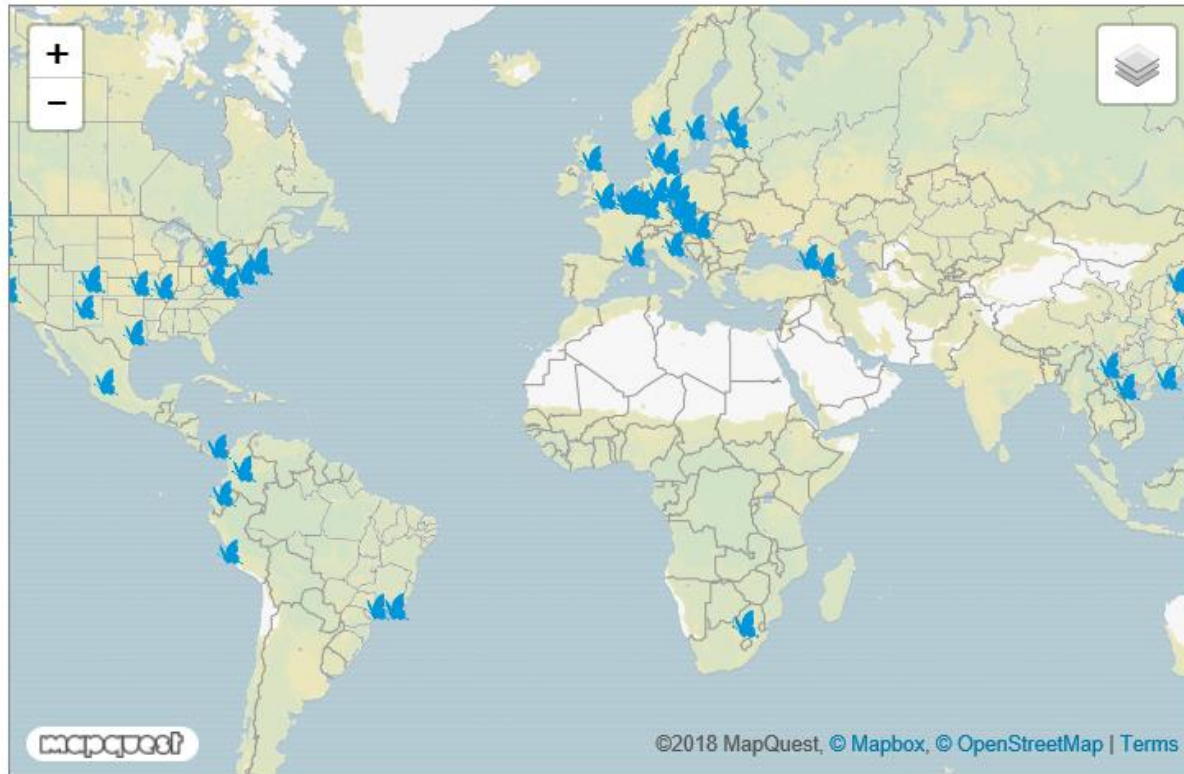
Genomic resources collection

Global Genome Biodiversity Network

GGBN Members

[Click butterflies or member logos to learn more](#)

[Member list](#) ☰



Monitoring schemes

- Bird censuses
- Monitoring of birds of prey
- Satellite tracking of birds
- Ringing of birds and bats
- Bat monitoring
- Flying squirrel monitoring
- Atlas of amphibians and reptiles in in Finland



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- tun.fi/HR.128

Botanical and mycological collections in Luomus

LUOMUS

Biological collections course
Summer / Autumn 2020
Marko Hyvärinen

Contents

- What is Luomus and what does it do?
- Why botanical collections and what is their profile?
- What and where are the botanical collections?
- What is a botanic garden?
- Different botanical and mycological collections
 - Kumpula botanic garden
 - Kaisaniemi botanic garden
 - Greenhouse collections
 - Herbarium collections (“botanical museum”)
 - Seed bank

What is Luomus and what does it do?

- Universities Act 72§: *The Finnish Museum of Natural History is attached to the University of Helsinki and is responsible for the preservation, accumulation and exhibition of the national natural history collections and for research and education relating to them.*
- Legally binding tasks also from
 - laws of nature protection, geographical information infrastructure, and information management
 - some intergovernmental treaties
- In addition, the duties of the Finnish Museum of Natural History include:
 - conduct research in its focal fields and provide teaching based on the research
 - serve as a comprehensive expert in chronological and isotopic methods
 - serve as a consulting specialist in society in its fields
 - provide its collection for use in research and teaching, particularly in the fields of zoology, geology, botany, and mycology
 - coordinate the collaboration of Finnish natural history museums and botanic gardens

LUOMUS

Why botanical collections and what is their profile?

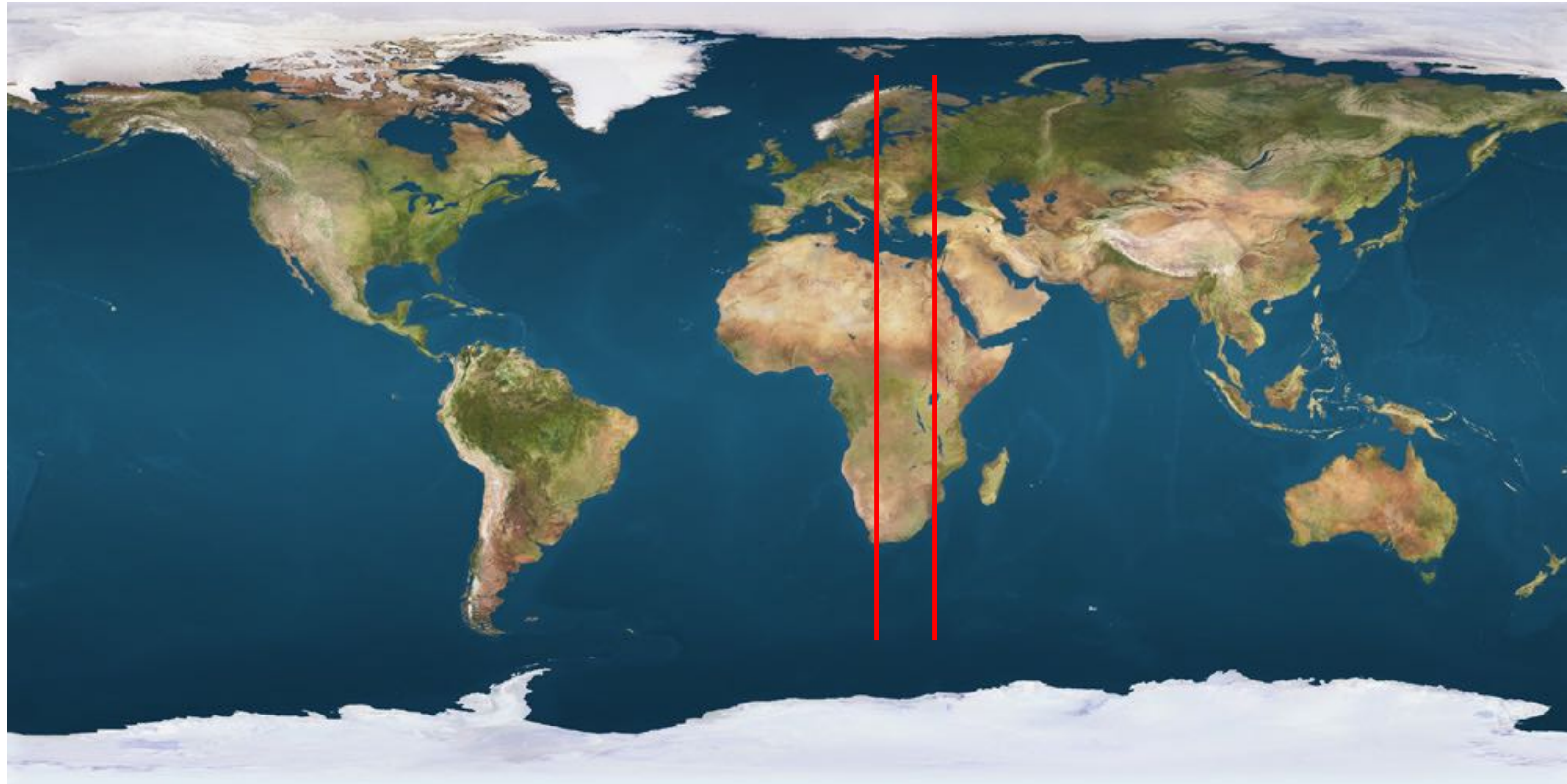
Luomus as a whole is profiling three equally important sectors:

1. scientific collections and datasets, i.e., research infrastructure
2. research (and teaching)
3. expert functions (including public education)

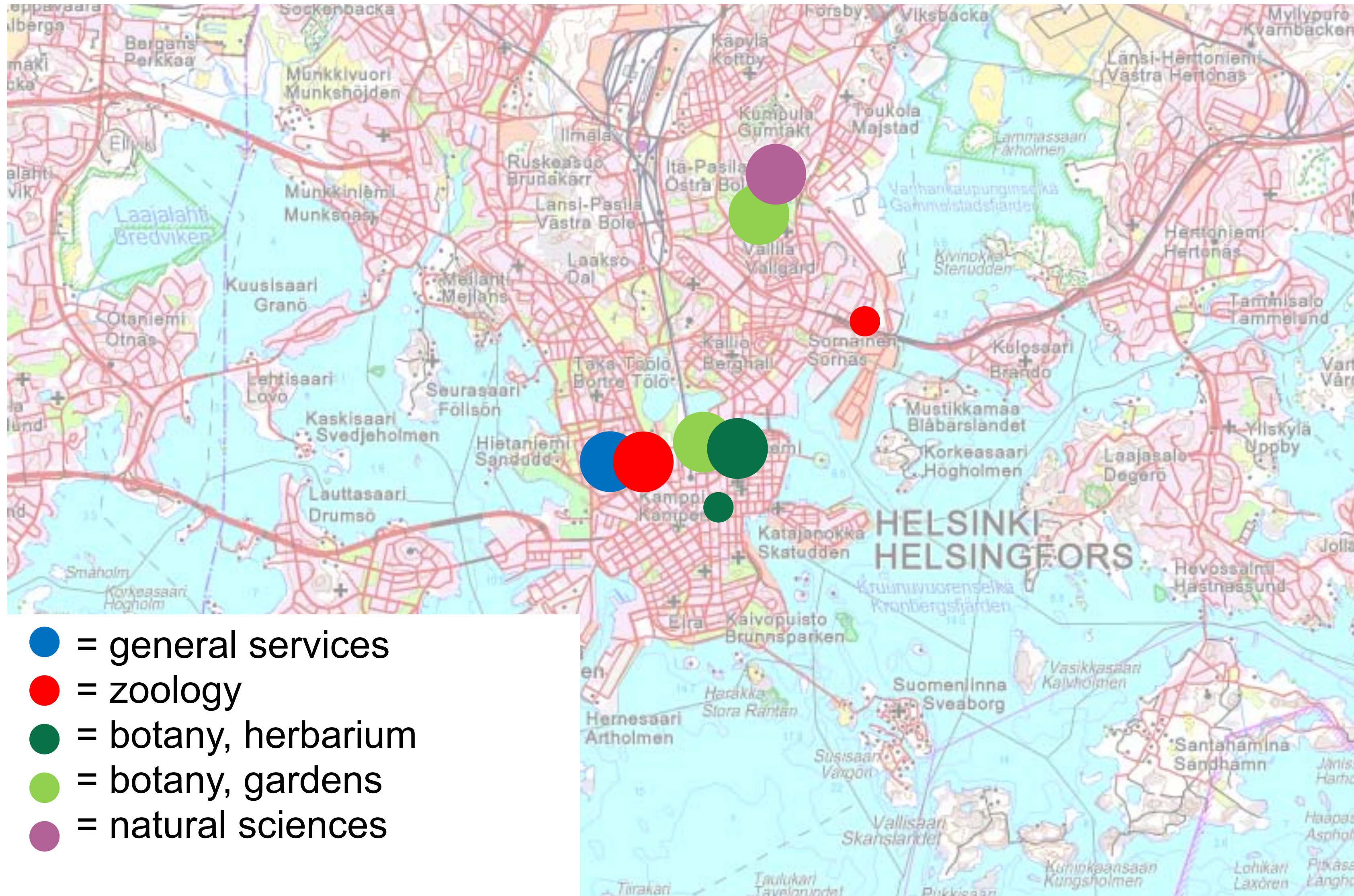
Botanical collections largest in Finland, internationally significant

- global coverage in herbarium collection (botanical and mycological)
- in outdoor living collections Southern Finland and similar climatic areas
- in greenhouse collections — the longitude rule (especially in tropics)
- these are defined in collection policies:
 - General collection policy
 - Living collections policy
 - Herbarium collection policy

The longitude rule (from 21°E to 29°E)



What and where are the botanical collections?



LUONNUS

LUONNONTIETEELLINEN KESKUSMUSEO
NATURHISTORISKA CENTRALMUSEET
FINNISH MUSEUM OF NATURAL HISTORY

What is a botanic garden?

Definition of a botanic garden by BGCI

A reasonable degree of permanence

An underlying scientific basis for the collections

Proper documentation of the collections, including wild origin

Monitoring of the plants in the collections

Adequate labelling of the plants

Open to the public

Communication of information to other gardens, institutions and the public

Exchange of seed or other materials with other botanic gardens, arboreta or research institutions

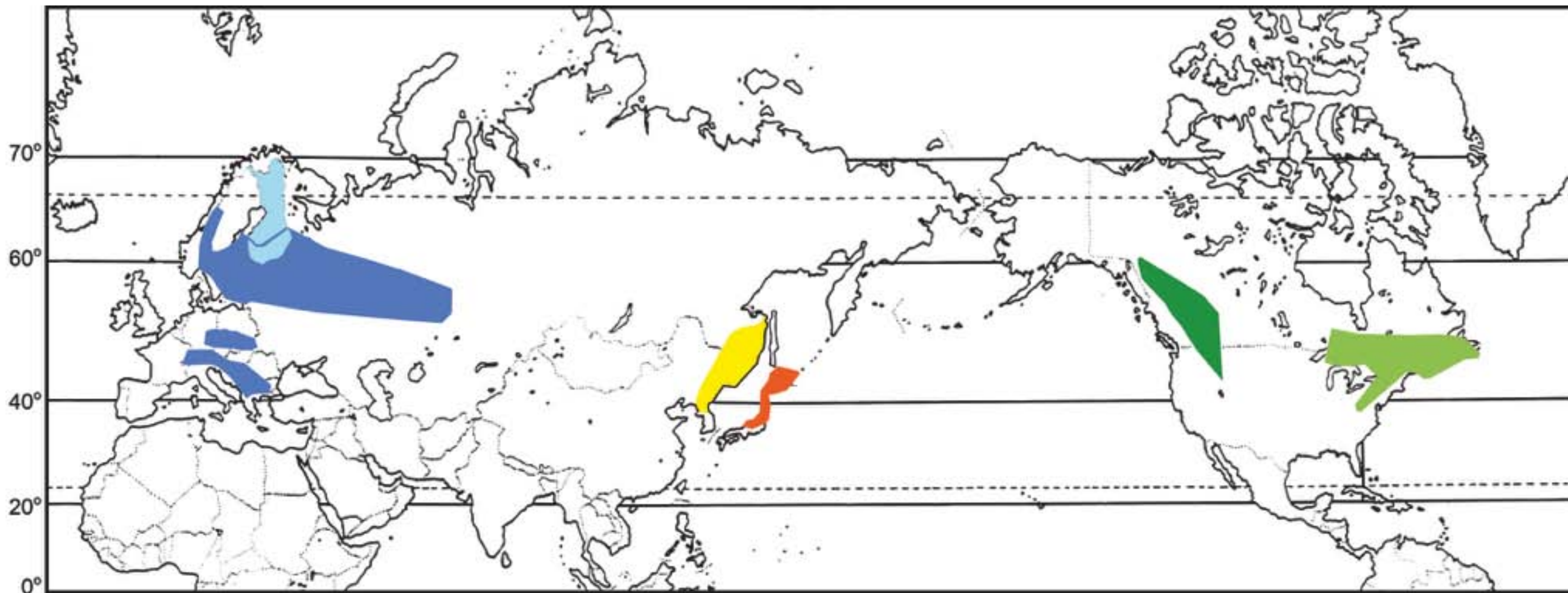
Undertaking of scientific or technical research on plants in the collections

Maintenance of research programs in plant taxonomy in associated herbaria.



Collections more in detail: Kumpula botanic garden

Geographic sections (Hortus geobotanicus) and economic plants + traditional medicinal garden (Hortus ethnobotanicus), *ex situ* conservation



Area: 6 ha
Accessions: 5320 (inc. seed collection)
Taxa: 2728



Of wild origin!

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NATURHISTORISKA CENTRALMUSEET
FINNISH MUSEUM OF NATURAL HISTORY



Kaisaniemi botanic garden

Evolution tree (systematic section)

Lichen garden

Moss garden

Rock garden

Sensory garden

Arboretum (trees)

Traditional ornamentals

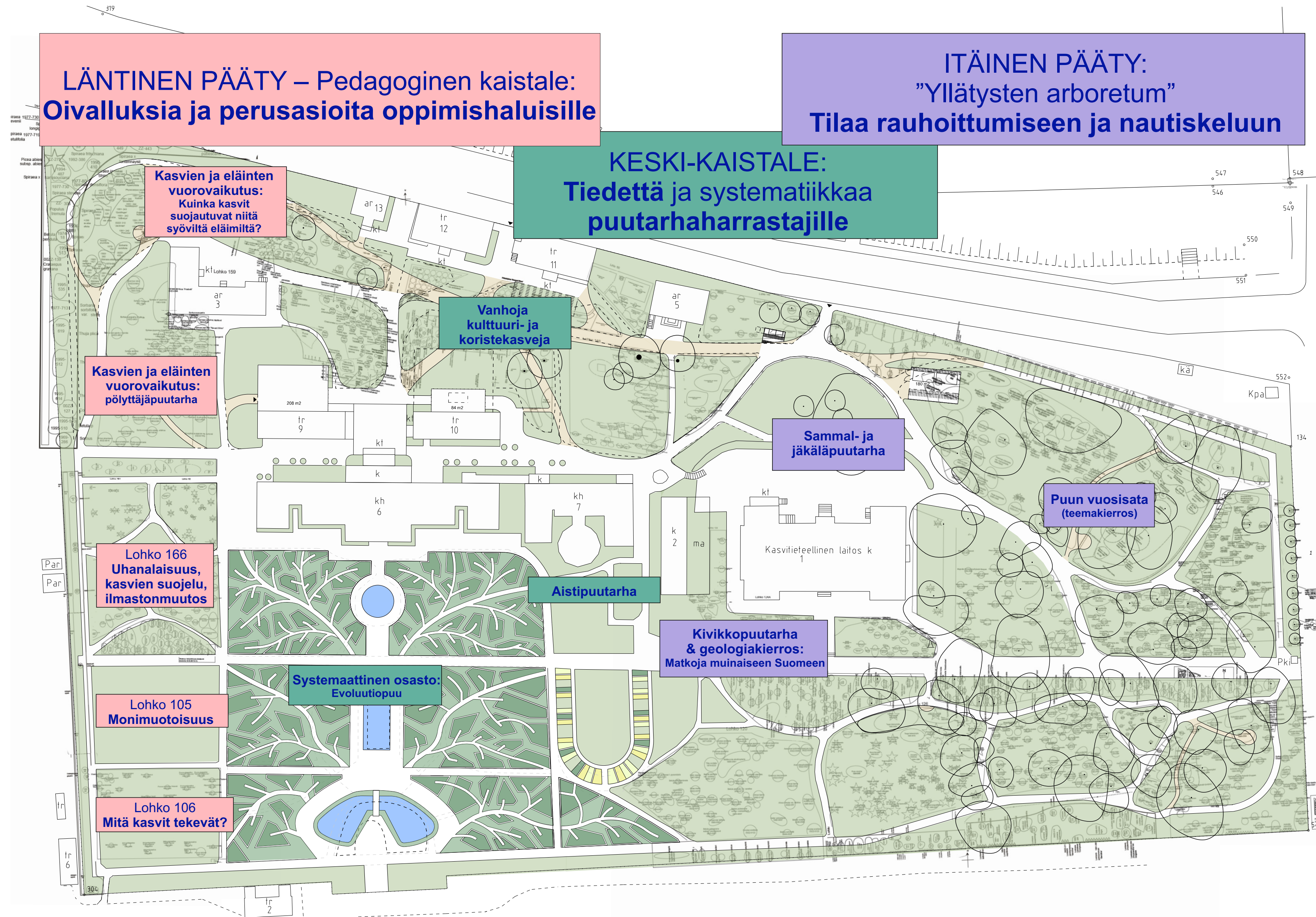
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Area: 5 ha
Accessions: 1288
Taxa: 818

Accessions: e.g.
through seed
exchange

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FINNISH MUSEUM OF NATURAL HISTORY



Greenhouse collections

Accessions: 1246

Taxa: 1096

Tropical rainforest

Palm house

Savanna

Dry forest

Island room

Victoria house

Mediterranean

Desert

Saintpaulia room (ex situ collection)

LUOMUS

The herbarium

Total no of specimens c. 3.5. million (rank 15. -17. in the world)

- Vascular plants c. 1.8 M
 - c. 20 000 type specimens
- Fungi (inc. lichens) c. 0.9 M
 - Separate collections: e.g. Erik Achariuses fungal collection, William Nylander's lichen collection
 - c. 19 000 type specimens (12 t lichenized, 7 t non-lichenized)
- Bryophytes c. 0.6 M
 - Separate collections: Viktor Ferdinand Brotherus, Sextus Otto Linberg
 - 25 000 type specimens



The seed bank

Accessions: 493
Taxa: 289



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FINNISH MUSEUM OF NATURAL HISTORY



Curation of collections

Scientific curation

- taxonomic and literature research
- work on scientific nomenclature
- re-organisation
- renaming
- relabelling etc.

Technical curation

- preparation
- re-organisation
- loans/exchange
- database management

Digital curation

- digitisation
- scientific
- re-organisation of databases

- changing/adding information on specimens and collections