Plantentuin Meise

A brief overview of research and collections of Meise Botanic Garden

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225 years

EXPORT
BYRRH

A center of excellence for plant biodiversity research

- 150 staff members, 120 volunteers and guides
- Extensive collections
  - library
  - herbarium
  - seed bank
  - living collection
- Science centres on:
  - Collection-based studies of plant diversity, evolution and ecology
  - Plant conservation and sustainable development
  - Public outreach: plants and their environment

Collections

Public outreach

Research

A ·DOE·DAT··· project | My profile | EN

·DOE·DAT··· Plants of South Africa (V)

Skip | Create forum topic | Tutorial

BR0000013755935.jpg

Barcode BR0000013755935 Tweet

Barcode: BR0000013755935
Taxon: ASTER. Metalasia pulcherrima

1. Identification Shrink

Scientific name as given *

Vernacular name

Uses

2. Collection data

Collector(s) as given *

Collector (standard) *

3. Spatial data

Locality as given *

Altitude from - to

www.doedat.be

Living collections and seed bank

Biodiversity conservation

Ex-situ conservation: endangered plant species of Belgium and central Africa

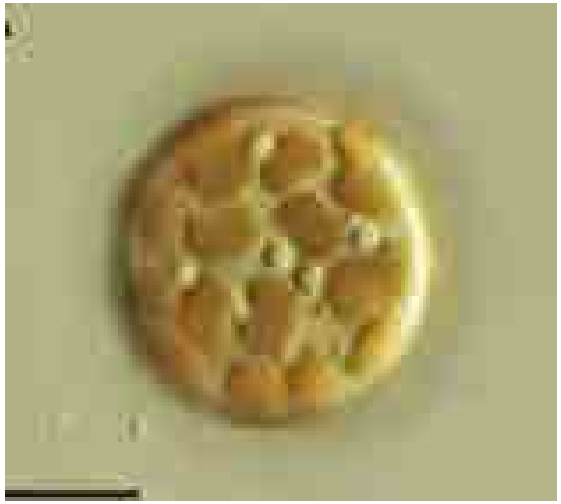
Re-introductions and ecological restoration

Library, art collection and archives

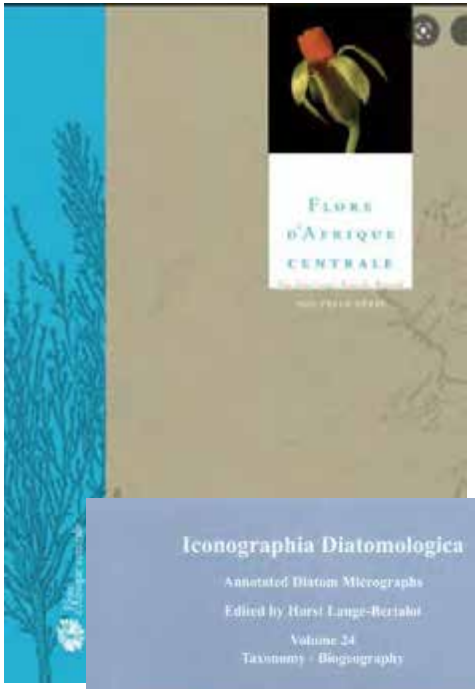
Economic botany collection

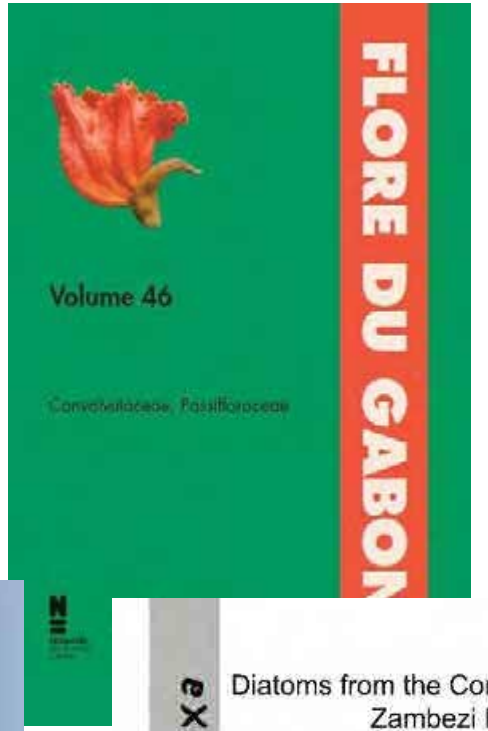
Herbarium

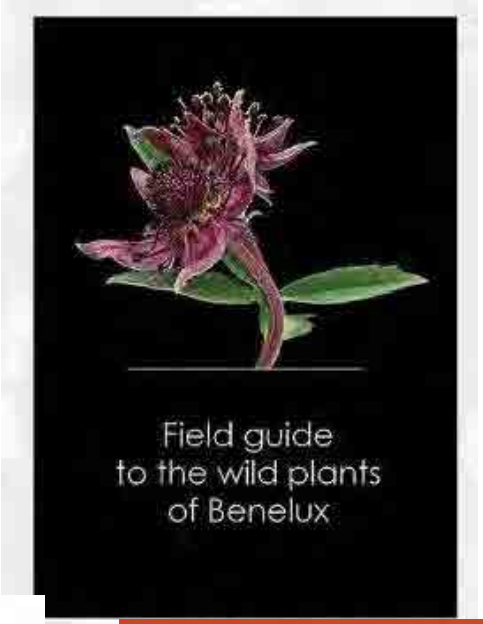
Taxonomy

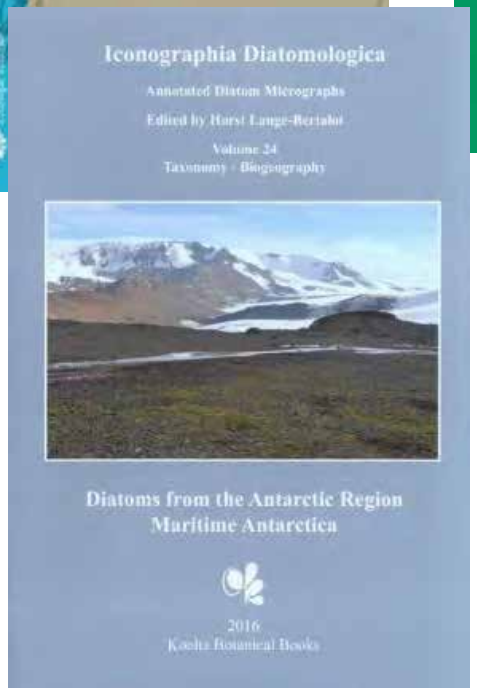


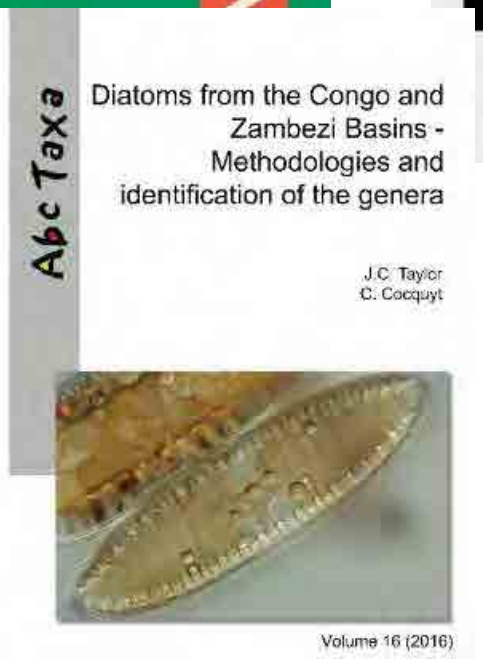
Flora's

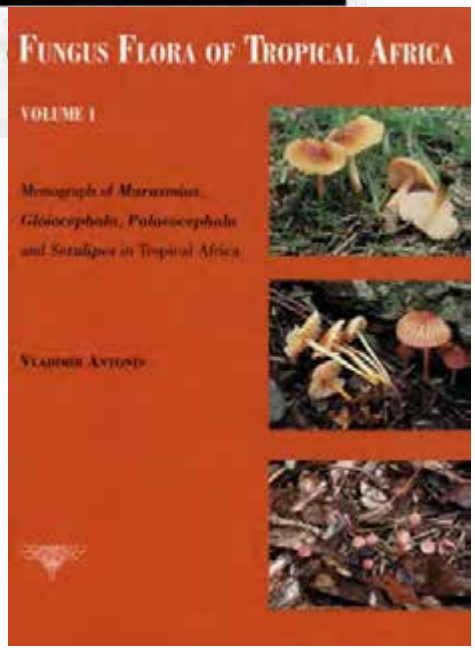

Flore
d'Afrique
centrale


FLORE DU GABON
Volume 46
Convolvulaceae, Passifloraceae


Field guide
to the wild plants
of Benelux


Iconographia Diatomologica
Annotated Diatom Micrographs
Edited by Horst Lange-Bertalot
Volume 24
Taxonomy · Biogeography
Diatoms from the Antarctic Region
Maritime Antarctica
2016
Koeltz Botanical Books


Abc Taxa
Diatoms from the Congo and
Zambezi Basins -
Methodologies and
identification of the genera
J.C. Taylor
C. Cocquyt
Volume 16 (2016)


Fungus Flora of Tropical Africa
VOLUME 1

Herbaria: dusty backwaters of plant science?

Herbaria: Open Data *avant la lettre*

A reappraisal of the herbarium specimen

Data of specimens themselves

- Genomic data
- Biochemical data
- Morphological data

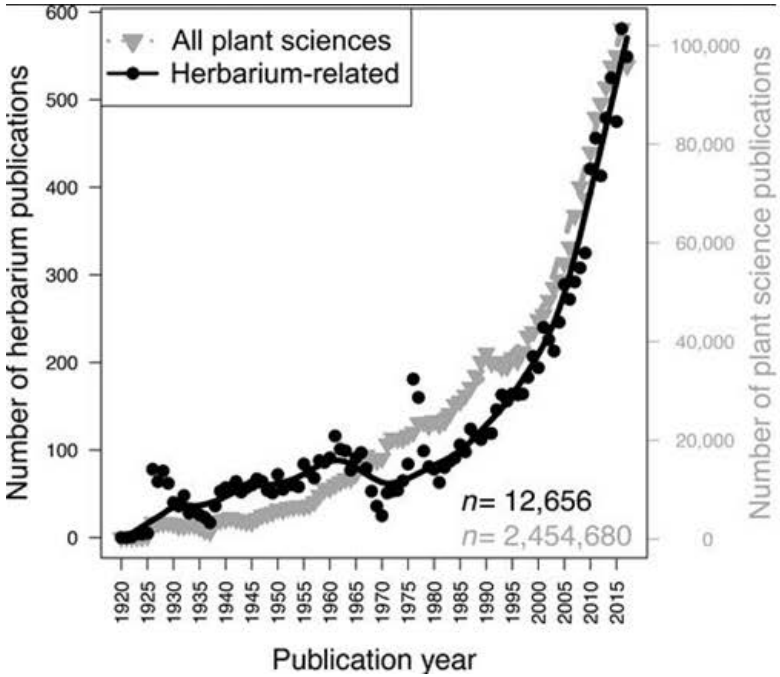
- Geological data
- Ecological data
- Species interaction data
- Taxonomic information

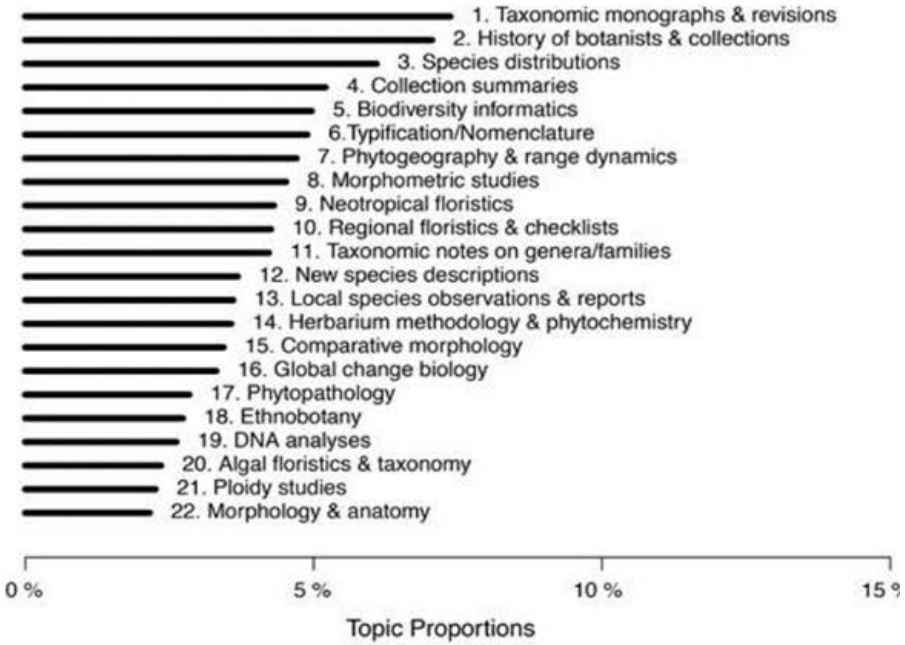
Label data

Jointly this represents various evidence for biodiversity

Based on Dimitris Koureas "DiSSCo - building a world-class research infrastructure on RDA outputs"

Herbaria are still relevant today

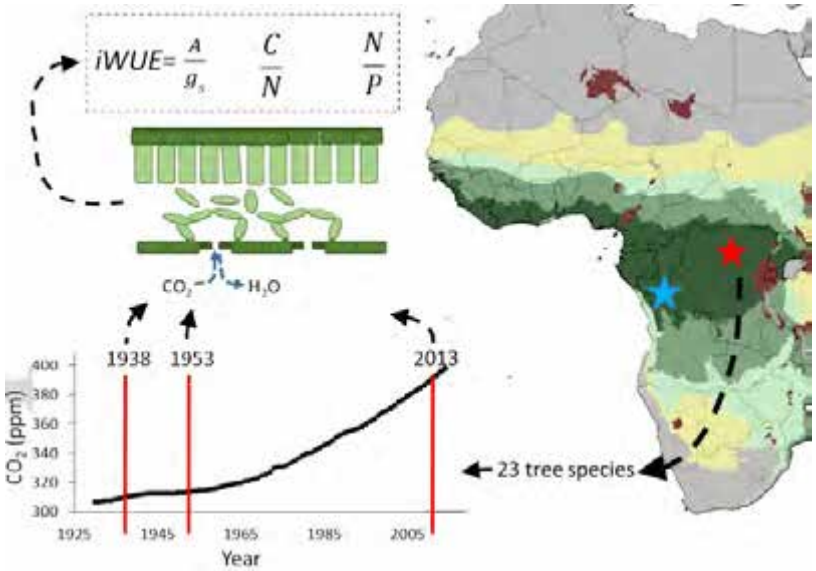


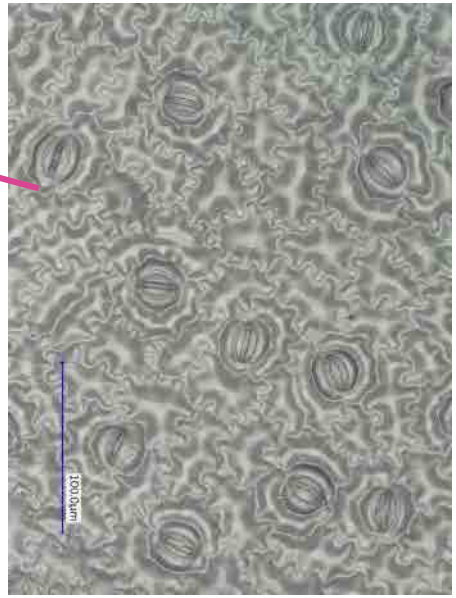


Heberling *et al*. 2019. The Changing Uses of Herbarium Data in an Era of Global Change. Bioscience 69: 812-22.

Novel uses for herbarium specimens

- Responses of tropical forest trees to global change
- Analysis of functional traits through time using herbarium specimens
  - → (stomatal density ~ intrinsic water use efficiency)

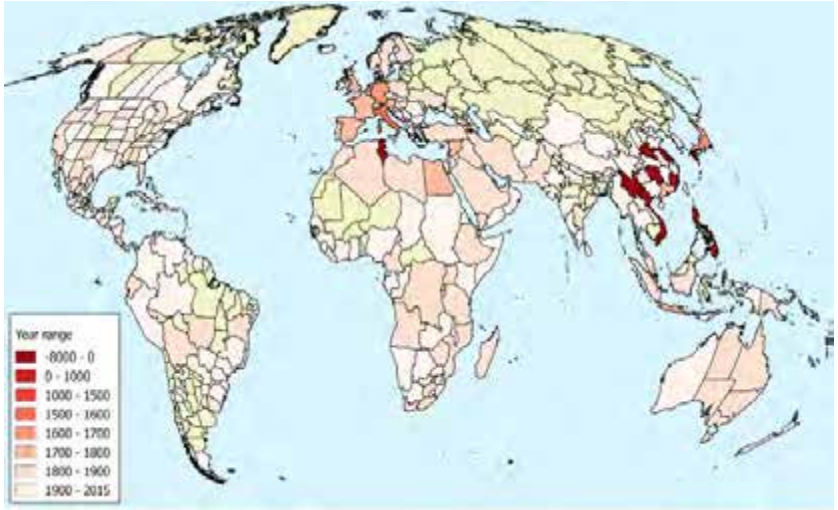




Bauters et al. 2020, https://doi.org/10.1111/gcb.15145

Novel uses for herbarium specimens

- Tracking the origin of the invasive *Oxalis corniculata* based on herbarium specimens, historic literature and archaeobotanical research
- Most likely origin: south–east Asia
- Likely that *O. corniculata* spread to Europe and perhaps Polynesia before the advent of the modern era through trade routes at that time



First observations of *Oxalis corniculata* based upon herbarium specimens, historic literature and archaeobotanical data

Groom et al. 2019, http://dx.doi.org/10.7717/peerj.6384

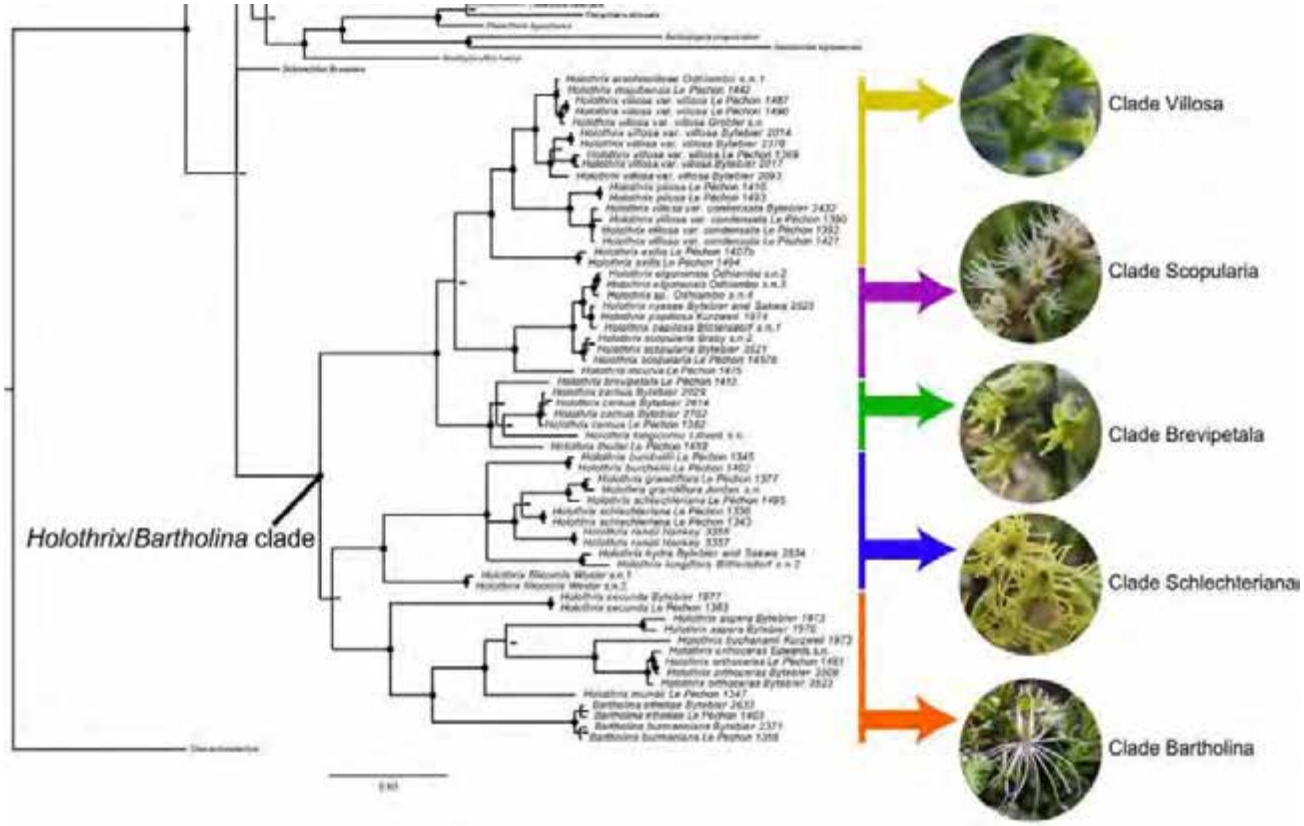
Novel uses for herbarium specimens

DNA from collections

Combine descriptive taxonomy, with molecular approaches

Evolutionary research: fundamental questions on the origins of biodiversity

- How do species arise?
- How have historical events shaped current biodiversity patterns?

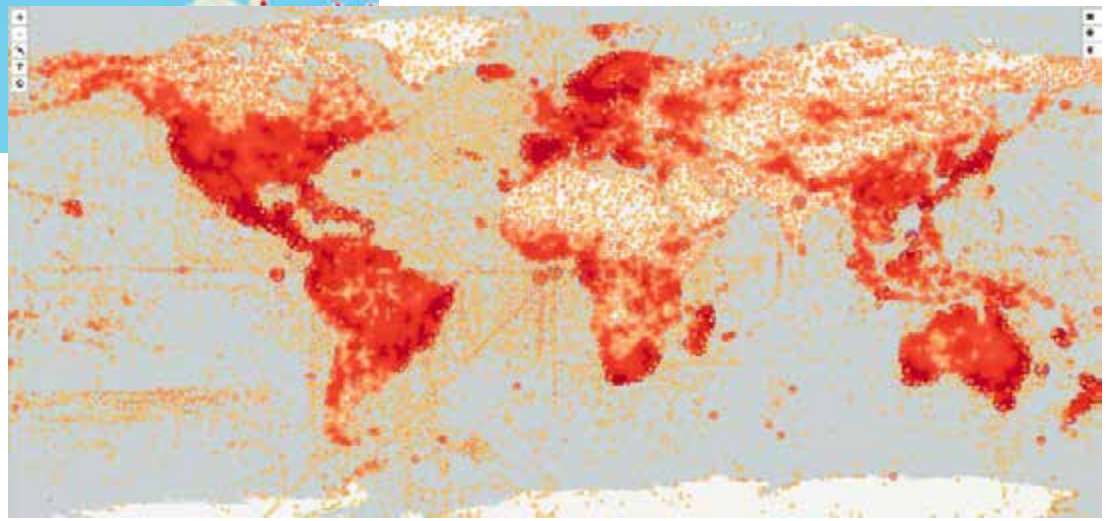


Taxonomy and sustainable development

Bring collections out of the dark

Index herbariorum: 3522 official herbaria, c. 397 million specimens

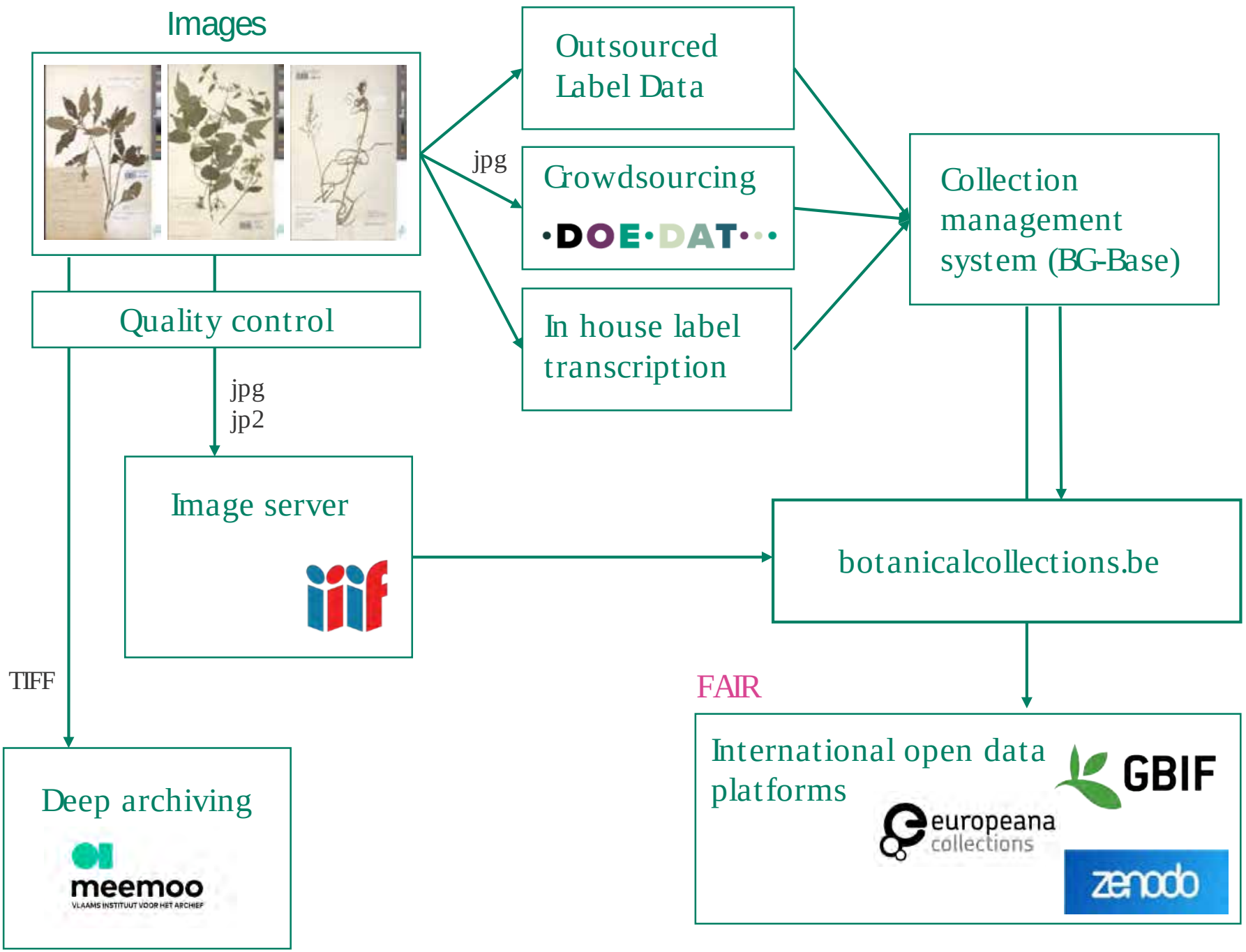
GBIF: c. 100 million preserved specimens of Plantae & Fungi



Mass digitization

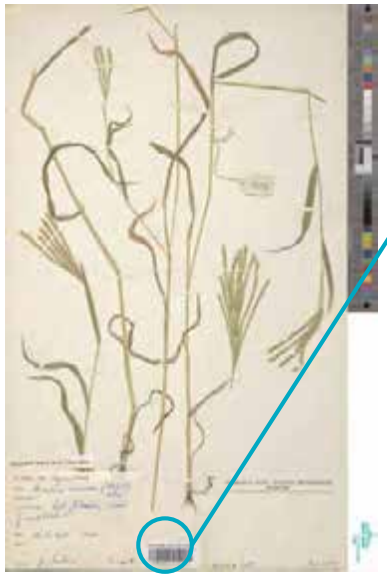
- In house digitization + mass digitization: collaboration with Picturae
- 2.6 million sheets

PICTURAE


Images
Outsourced Label Data
jpg
Crowdsourcing
DOE DAT
Collection management system (BG-Base)
Quality control
In house label transcription
jpg
jp2
Image server
botanicalcollections.be
TIFF
FAIR
International open data platforms
GBIF
europeana collections
zenodo
Deep archiving
meemoo
VLAAMS INSTITUUT VOOR HET ARCHIEF

DiSSCo: Distributed System of Scientific Collections

The extended specimen



Globally unique persistent identifier

BR5010122625505V

http://www.botanicalcollections.be/specimen/BR5010122625505V

Literature

Classification

Field photographs

Species profiles (traits, geographical range, etc.)

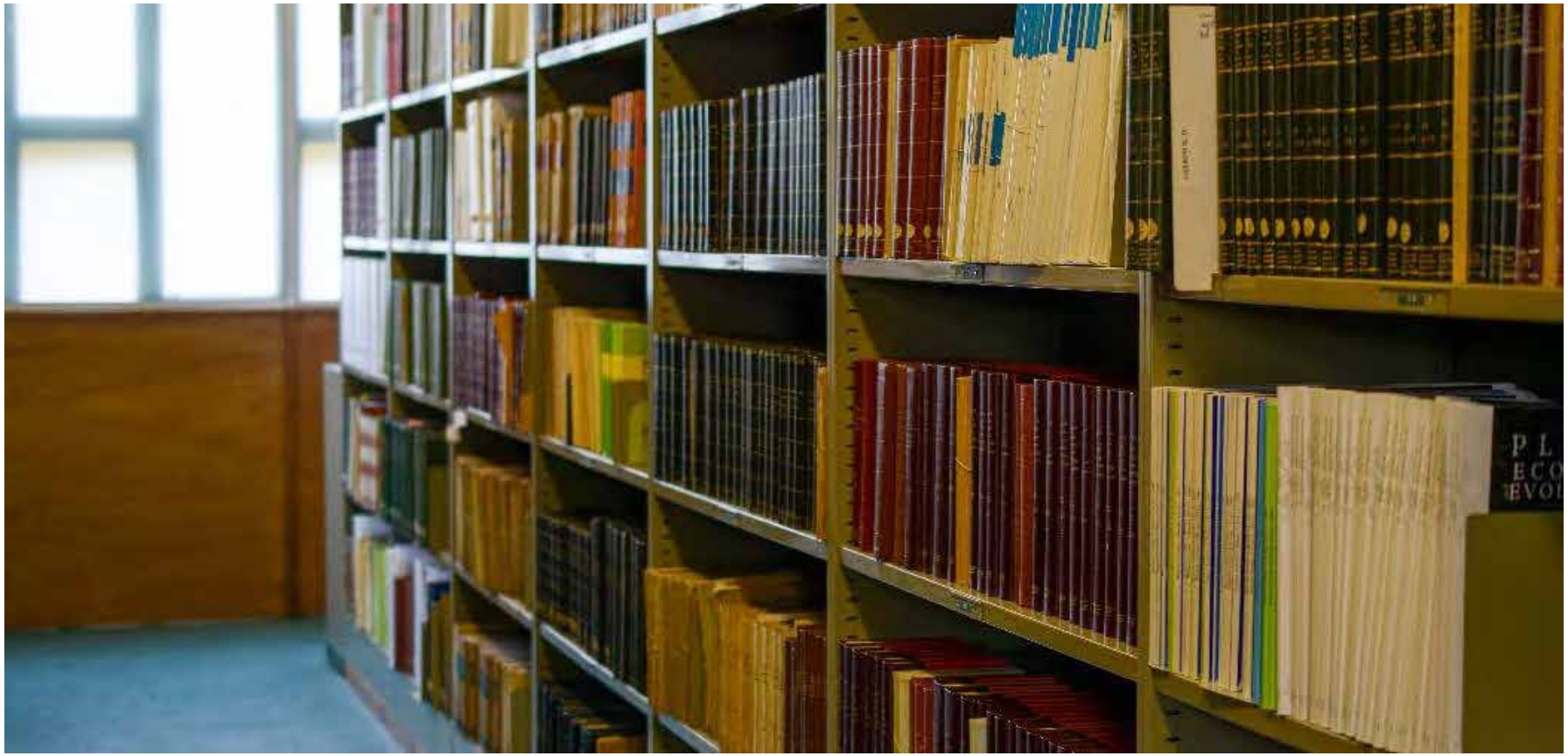
DNA sequences

other specimens
- silica
- slides
- wet-preserved
- …

PLAZI
TAKING CARE OF FREEDOM

PENSOFT

zenodo

Biodiversity Heritage Library

- Collections are still relevant today, and their uses are expanding.
- We must keep curating collections, both physical and digital
- Digitization of collections and integration of data will have a significant impact on plant sciences in the future