



**Meise
Botanic Garden**

Zenodo

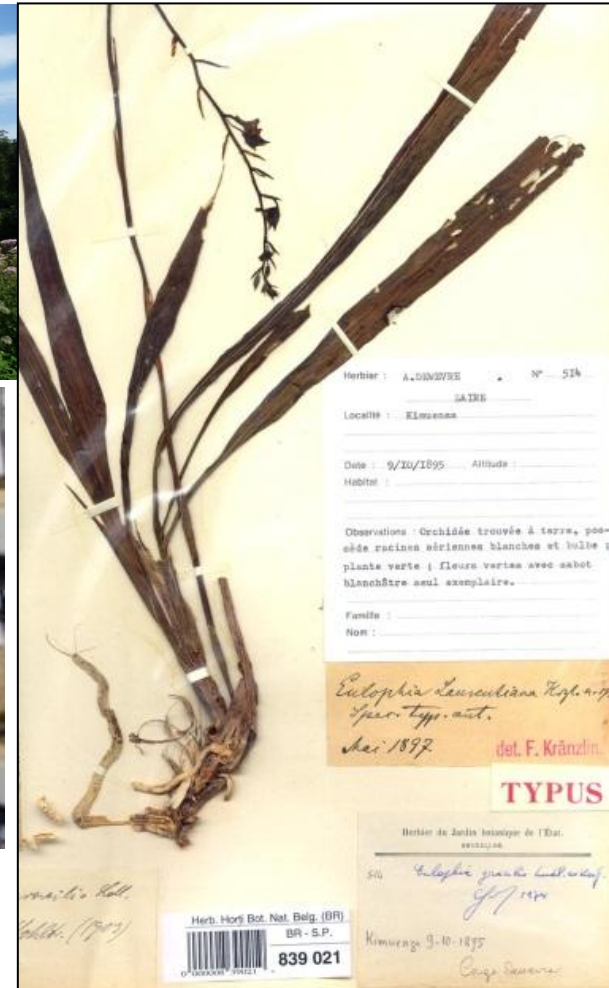
a research data
repository and archive

Mathias Dillen



FAAD-studiedag 2023-03-06

Meise Botanic Garden



Meise Botanic Garden: Herbarium

- 4 million specimens in herbarium collection
- Almost 75% digitized
- Media archived at meemoo
 - TIFF on tape storage
- Data made available on the web
 - Not archived, continuously updated
- Media also stored locally as JPEG2000
 - Consultable for the public through IIP on <https://www.botanicalcollections.be>

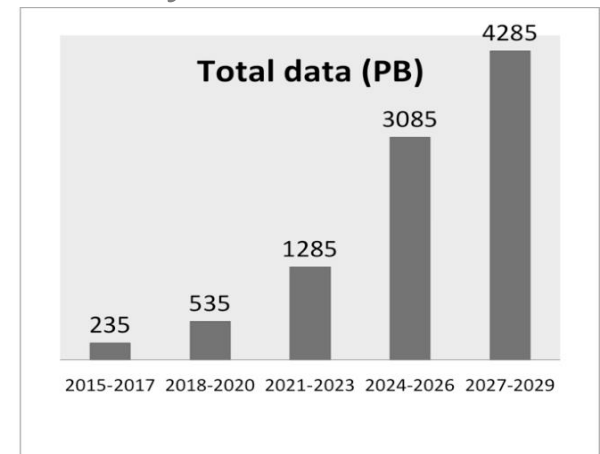


What is Zenodo?

The Zenodo logo consists of the word "zenodo" in a white, lowercase, sans-serif font, centered on a solid blue rectangular background.

<https://zenodo.org>

- Archive + Repository for Scientific Research
 - Free and open (closed is possible)
- Flexible content
 - Data, publications, software, media...
- Hosted by CERN
 - Drip in an ocean growing 30-50+ PB/y
- Long-term commitment
 - 20 years+
 - DOI stability



Meise Botanic Garden

<http://dx.doi.org/10.1088/1742-6596/664/4/042006>

Meise Botanic Garden: Zenodo

- Research data and other products (ppts...) may be archived on Zenodo
- Older physical journals or books scanned and archived on Zenodo
- Experiments to make use of Zenodo as an effective archiving solution for digitized natural history specimens
 - Not necessarily for us: we already have one, but for other, smaller institutions with less means



March 6, 2021

Report Open Access

Final report of the Green Pioneers project

Sofie Meeus; Sofie De Smedt; Ann Bogaerts; Jutta Kleber; Quentin Groom

Editor(s)

Naomi Bousson

A report on the results and outcome of the Green Pioneers (NL: Groene Pioniers) project (2019-2020), a citizen science project by Meise Botanic Garden, to increase awareness on invasive species and to increase quality and quantity of invasive species data. This project was financed by the Flemish government, Department of Economy, Science and Innovation (EWI).

Green Pioneers is a citizen project of Meise Botanic Garden financed by the Flemish government, Department of Economy, Science and Innovation (EWI).

Preview



Files (5.3 MB)

Communities

Meise Botanic Garden

Remove

4

views

2

downloads

[See more details...](#)

Indexed in

OpenAIRE

Publication date:

March 6, 2021

DOI:

DOI 10.5281/zenodo.4587169

Keyword(s):

citizen science, alien species, invasive species, Meise Botanic Garden, Flanders, Belgium

Related identifiers:

References

[10.5281/zenodo.3882441](https://zenodo.org/record/4587169) (Other)<http://groenepioniers.be/> (Project deliverable)[10.3897/biss.3.37258](https://biss.3.37258) (Other)[10.3897/biss.3.37386](https://biss.3.37386) (Other)<https://www.youtube.com/watch?v=xaB3002LEQs> (Video/Audio)

Communities:

Meise Botanic Garden

License (for files):



Specifications of Zenodo

- Versioning of records
 - DOI for each version
- 50GB limit per record
 - no limit for # of records

Versions

Version 2	Nov 20, 2018
10.5281/zenodo.3697797	
Version 1	Nov 20, 2018
10.5281/zenodo.1492198	

Cite all versions? You can cite all versions by using the DOI [10.5281/zenodo.1492197](https://doi.org/10.5281/zenodo.1492197). This DOI represents all versions, and will always resolve to the latest one. [Read more.](#)

All versions

Access Right

Open (270637)

File Type

Jpg (270637)

Found 270637 results.

< 1 2 3 4 5 6 7 8 9 >

May 16, 2019 (v1) Photo Open Access

Erica tetralix L. (BR0000010708095)

Meise Botanic Garden;

Belgium Herbarium image of Meise Botanic Garden.

Uploaded on September 21, 2019

May 16, 2019 (v1) Photo Open Access



Meise Botanic Garden

Specifications of Zenodo

- Flexible metadata
 - Support for external data standards
- Supports many licenses
 - Currently [531](#)
- APIs and machine access
 - REST and OAI-PMH API
 - JSON representations and others

Export

[BibTeX](#) [CSL](#) [DataCite](#) [Dublin Core](#) [DCAT](#)
[JSON](#) [JSON-LD](#) [GeoJSON](#) [MARCXML](#)
[Mendeley](#)

Subject(s):

[PRESERVED_SPECIMEN](#) [Allium angulosum L.](#)

[SPECIES](#) [EE](#) [TU272285](#) [TU272285](#)

[Allium](#) [angulosum](#) [Estonia](#) [1931](#)

[1931-06-27](#)

Reval (=Tallinn): prope cimaeerium judaicum (=juudi sumuaia lähedal)

[J. Rubel](#) [1931-06-27](#) [J. Rubel](#)

[1931-06-27T00:00:00.000+0000](#) [TU272285](#) [6](#)

[27](#) [habitat: in prato \(=niidul\) satis copiose](#)

[31-132; 2118](#)

[Natural History Museum, University of Tartu](#) [4](#)

[Plantae](#) [Tracheophyta](#) [Asparagales](#)

[Amaryllidaceae](#) [Liliopsida](#) [TU](#)

[Viridiplantae; Anthophyta; Monocotyledonae; Alliaceae; Allium](#)

[Species](#) [UTE](#)

PR kategooria: mittehinnatav (NA); Ex Herbario Alberti Ueksipi

[PhysicalObject](#) [Specimen: plant](#)

[http://biocol.org/urn:lsid:biocol.org:col:34384](#)

[https://plutof.ut.ee/#/specimen/view/434111](#)

[689166](#) [2645](#) [606255](#) [688443](#)

[kantlauk](#) [lat](#)



Zenodo at Meise: Examples

- Meise Botanic Garden community
 - <https://zenodo.org/communities/meisebotanicgarden>

Meise Botanic Garden

Recent uploads

Search Meise Botanic Garden

March 2, 2021 (0.1.4) **Software** **Open Access**

AgentschapPlantentuinMeise/gardenNetwork: Adding references

Quentin Groom;

This references contains a list of the references and sources of data used in the published network.

Uploaded on March 2, 2021

3 more version(s) exist for this record

December 1, 1980 (v1) **Book** **Open Access**

Flore d'Afrique centrale - Spermatophyta - Myrsinaceae

Taton A.;

PDF version of treatment of Myrsinaceae in Flore d'Afrique centrale series

Uploaded on March 2, 2021

December 18, 1968 (v1) **Book** **Open Access**


Flore d'Afrique centrale - Spermatophyta - Myrtaceae

Boutique R.;

PDF version of treatment of Myrtaceae in Flore d'Afrique centrale series

Uploaded on March 2, 2021

Community



Meise Botanic Garden

Meise Botanic Garden

A community to share data and publications related to the collections and research from Meise Botanic Garden (Belgium).

Curated by:
MeiseBotanicGarden

Curation policy:
Not specified

Created:
November 23, 2020

Harvesting API:
[OAI-PMH Interface](#)



Zenodo at Meise: Examples

- Meise Botanic Garden community
 - Camera trap images from DoeDat platform

<https://www.doedat.be>


September 30, 2020 Photo Open Access Edit New version

DoeDat Camera Trap Project 6494189 (Meise Botanic Garden)

Meise Botanic Garden
Contact person(s)
Groom, Quentin

A project on the DoeDat platform of Meise Botanic Garden. Footage of camera traps is offered to volunteers for identification of the animals visible, if any. This deposition is an archive of the images in this project as well as the transcription results formatted in Darwin Core.

Preview



Files (2.8 GB)

Name	Size	Preview	Download
Project-6494189-DwC-occ.csv	390.7 kB		
md5:72e8b67b9bba2a3859aec7d3f12c5ee			

Indexed in **OpenAIRE**

Publication date: September 30, 2020
DOI: [10.5281/zenodo.4059335](https://doi.org/10.5281/zenodo.4059335)

Keyword(s): Biodiversity, Wildlife, Terrestrial, DoeDat, Citizen Science

Subject(s): Meise Botanic Garden, <https://ror.org/01h1jk91>, Camera trap images Meise Botanic Garden, Woodland, Machine Observation, <https://creativecommons.org/publicdomain/zero/1.0/legalcode>

BE



Zenodo at Meise: Examples

- Meise Botanic Garden community
 - Flore d'Afrique Centrale scanned books (pdf)

December 18, 1968 Book Open Access

Flore d'Afrique centrale - Spermatophyta - Myrtaceae

Boutique R.
PDF version of treatment of Myrtaceae in Flore d'Afrique centrale series

3 views 1 downloads
[See more details...](#)

Indexed in
OpenAIRE

Publication date:
December 18, 1968

DOI:
[10.5281/zenodo.4572735](https://doi.org/10.5281/zenodo.4572735)

Keyword(s):
[Flora](#) [Plants](#) [Identification](#) [Botany](#) [Taxonomy](#)
[Systematics](#) [Central Africa](#)
[Democratic Republic of the Congo](#) [Rwanda](#) [Burundi](#)

Published in:
Flore du Congo, du Rwanda et du Burundi, Spermatophytes., Jardin botanique national de Belgique, Bruxelles, pp. 1-33.

Communities:
[Flore d'Afrique centrale \(1948-\) in PDF](#)
[Meise Botanic Garden](#)

License (for files):
[Creative Commons Attribution 4.0 International](#)

Files (1.5 MB)

Name	Size	Preview	Download
FAC Myrtaceae.pdf	1.5 MB		

md5:5c2e49e9521b6800878c27435ee0d8b3

Citations 0

Show only: Citations (0) Previews (0) References (0) Related (0)

Versions

Version	Date
Version 1 10.5281/zenodo.4572735	Dec 18, 1968





ICEDIG pilots

- Herbarium specimen benchmark dataset
 - 1800 herbarium specimen images and data
 - <https://doi.org/10.3897/BDJ.7.e31817>
 - <https://zenodo.org/communities/icedigtest>
- Belgium herbarium specimens
 - 270.637 specimen images
 - <https://zenodo.org/communities/belgiumherbarium>




ICEDIG pilots: Benchmark dataset

- 1.800 JPEG images, lossless TIFF for 1400 of them
- ~ 225GB, in 32h through REST API
- Rich metadata, some ML training data added as well
- Re-used for other archiving solutions, e.g.
 - datafutures:
<https://www.hasdai.org/projects/icedigherberia>
 - internet archive:
<https://archive.org/details/herbarium-specimen-images-dillen-2018>



ICEDIG pilots: Benchmark dataset

A benchmark dataset of herbarium specimen images with label data

 All versions

Found 1801 results. < 1 2 3 4 5 6 7 8 9 > Sort by: Most recent
 asc

Access Right

Open (1801)

File Type

Jpg (1800)
 Json (1800)
 Tif (1400)
 Png (250)
 Csv (1)

Keywords


Biodiversity (1800)
 Herbarium Sheet (1800)
 Biodiversity, Herbarium Sheet (1)

Type

Image (1800) +
 Dataset (1)

November 20, 2018 (v3) Dataset Open Access View

A benchmark dataset of herbarium specimen images with label data: Summary

 Dillen Mathias;

This landing page contains a CSV file compiling all data associated with herbarium specimens that are part of this dataset, as they could be found on GBIF, JACQ or FinBIF. A CSV file with and without Darwin Core extension data is available, as some CSV readers have trouble with the JSON format that

Uploaded on March 21, 2022

2 more version(s) exist for this record

November 14, 2018 (v2) Photo Open Access View

Herbarium specimen image of Allium angulosum L., part of the collection of Natural History Museum, University of Tartu

Natural History Museum, University of Tartu;

Part of a training dataset of scanned herbarium specimens. The data paper and a summary landing page will be published on Zenodo as it gets published. Content of this deposition: - A JSON-LD datafile listing the label data associated with this herbarium specimen. The Darwin and Dublin Core data st

Uploaded on November 20, 2018

1 more version(s) exist for this record

November 14, 2018 (v2) Photo Open Access View

Herbarium specimen image of Linnaea borealis L., part of the collection of Natural History Museum, University of Tartu

Natural History Museum, University of Tartu;

Part of a training dataset of scanned herbarium specimens. The data paper and a summary landing page will be published on Zenodo as it gets published. Content of this deposition: - A JSON-LD datafile listing the label data associated with this herbarium specimen. The Darwin and Dublin Core data st



ICEDIG pilots: Belgium Herbarium

- 270.637 specimen images
- JPEG, no rich metadata
- ~ 1TB in ~ 12 days
 - Some time-outs and other technical problems
 - Unexpected high traffic caused bottlenecks



ICEDIG pilots: Belgium Herbarium

Belgium Herbarium of Meise Botanic Garden

All versions

Found 270637 results. < 1 2 3 4 5 6 7 8 9 > Sort by: Most recent asc.

Access Right

Open (270637)

File Type

Jpg (270637)

Keywords

Biodiversity (270637)

Herbarium (270637)

Taxonomy (270637)

Terrestrial (270637)

Gramineae (26856)

Compositae (23098)

Cyperaceae (14454)

Leguminosae-papilionaceae (13512)

Cruciferae (13336)

Labiatae (12461)

Type

Image (270637) +

May 16, 2019 (v1) Photo Open Access View

Erica tetralix L. (BR0000010708095)
Meise Botanic Garden;
Belgium Herbarium image of Meise Botanic Garden.
Uploaded on September 21, 2019

May 16, 2019 (v1) Photo Open Access View

Epipactis helleborine (L.) Crantz (BR0000012078165)
Meise Botanic Garden;
Belgium Herbarium image of Meise Botanic Garden.
Uploaded on September 21, 2019

May 16, 2019 (v1) Photo Open Access View

Erica cinerea L. (BR0000012301478)
Meise Botanic Garden;
Belgium Herbarium image of Meise Botanic Garden.
Uploaded on September 21, 2019

May 16, 2019 (v1) Photo Open Access View

Equisetum x litorale Kühlew. ex Rupr. (BR0000012382910)
Meise Botanic Garden;
Belgium Herbarium image of Meise Botanic Garden.
Uploaded on September 21, 2019



Other examples

- Plazi: <https://zenodo.org/communities/biosyslit>



> 1M records

Extract taxonomic treatments from scientific articles and make them openly available (if legal)



Link natural
history specimens
to the world's
collectors

- [Bionomia](#): Citizen science web app to connect specimens to the people who collected them
 - Users have the option to archive their contributions on Zenodo as frictionless data
- Github: Option to auto-archive each new release of a repository



Meise Botanic Garden

Conclusion

- Free and flexible archiving solution
 - Easy access to archived content
 - Versioned DOIs to cite
- Long-term sustainability as guaranteed by CERN policy
- Scalability of APIs for large datasets?
 - Other solutions may be negotiated for big projects, e.g. FTP or providing material on disk/tape

