

JACQ

a

botanical

collection management system



universität
wien



naturhistorisches
museum wien





Beginnings (mid 80ies)

Availability

Physical Access – „If you want to know what we have come and visit us.“

vs.

Everything – Allways – Everybody – Everywhere

Nomenclature and Taxonomy

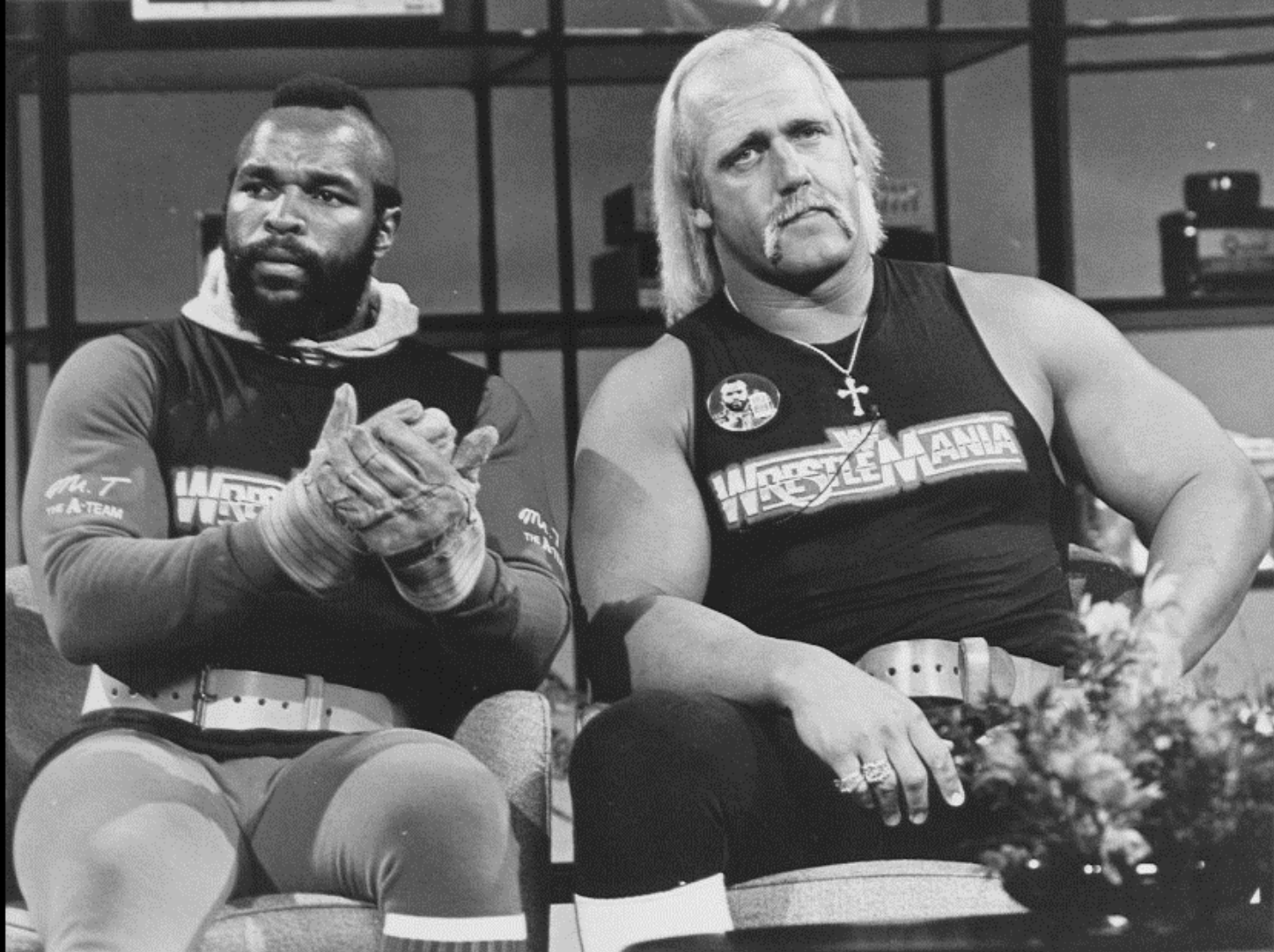
High percentage of Type material in Vienna (certain groups 80 % unmarked)

Synonymy (homo- and heterotypic) for indexing of material

Catalogue + Foto(Copy)/Slide

Condition of material and validation of transcribed information

Beginnings (mid 80ies)



Preconditions and Background (late 90ies)



Preconditions and Background (late 90ies)

Institutional Structure

Precursors: Imperial k.k. Hof- & Naturalienkabinett & k.k. Hofgärten & University

University: Botanical Garden & Department of Botany and Biodiversity Research
(Federal Ministry of Science --> Education, Science and Research)

Professor of Systematic Botany = Director of Garden; today separate units within same Organisation

Natural History Museum Vienna (Federal Ministry of Culture --> Chancellery)

Federal Gardens (Federal Ministry of Agriculture --> Sustainability and Tourism)

Size – Coverage – Relevance

1.4 mio physical objects & 20k living plants / 5.5 mio objects / 80k living plants

global – within herbarium collections all groups curated in Botany dept.

local – regional – national – international – global

Synergies – Botanical Data ==> Biodiversity Information

Collections

Scientific – Public

Objects

Preserved – Living

Workflow / Principals / System

Workflow

Acquisition & Cataloguing of Material

Capture, Handling, Maintenance & Transfer of Data / MetaData

Principals

Client-Server

Institution(s) and its Collections + Subdivisions

Basic Information (Names & Taxa / Persons / Geo) & Objects (duplicates in botanical Collections) shared among participants

Collaboration of Taxonomists & Curators & Gardeners & Managers ==> Public Availability OpenSource & Linked (Open) Data

System

SW – IT-Development via direct interaction of sys-architects, users and developers

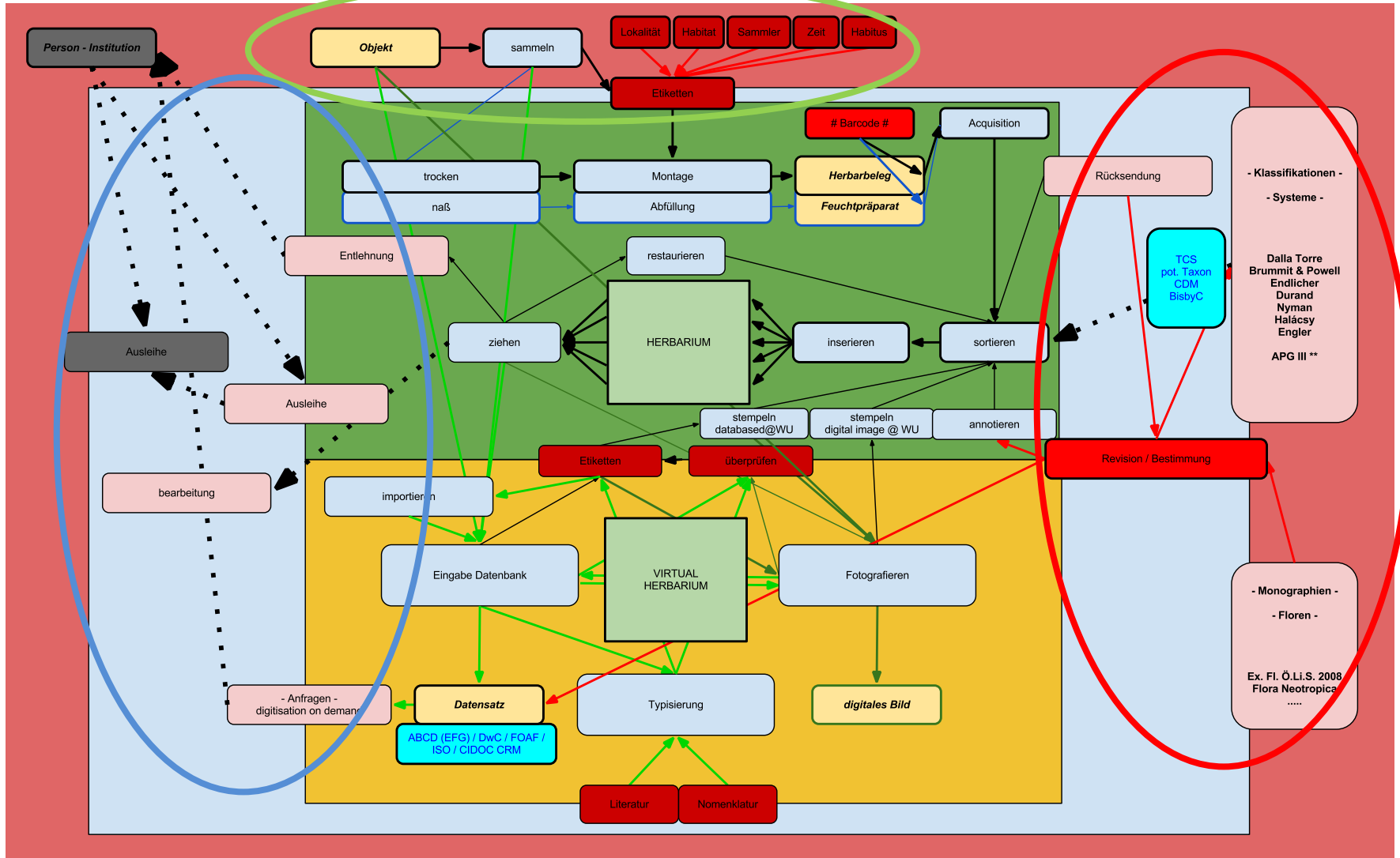
Atlassian: JIRA (ticketing system) & Confluence (discussion, documentation)

HW – Master-Slave DBMS + distributed Image Servers & Viewers

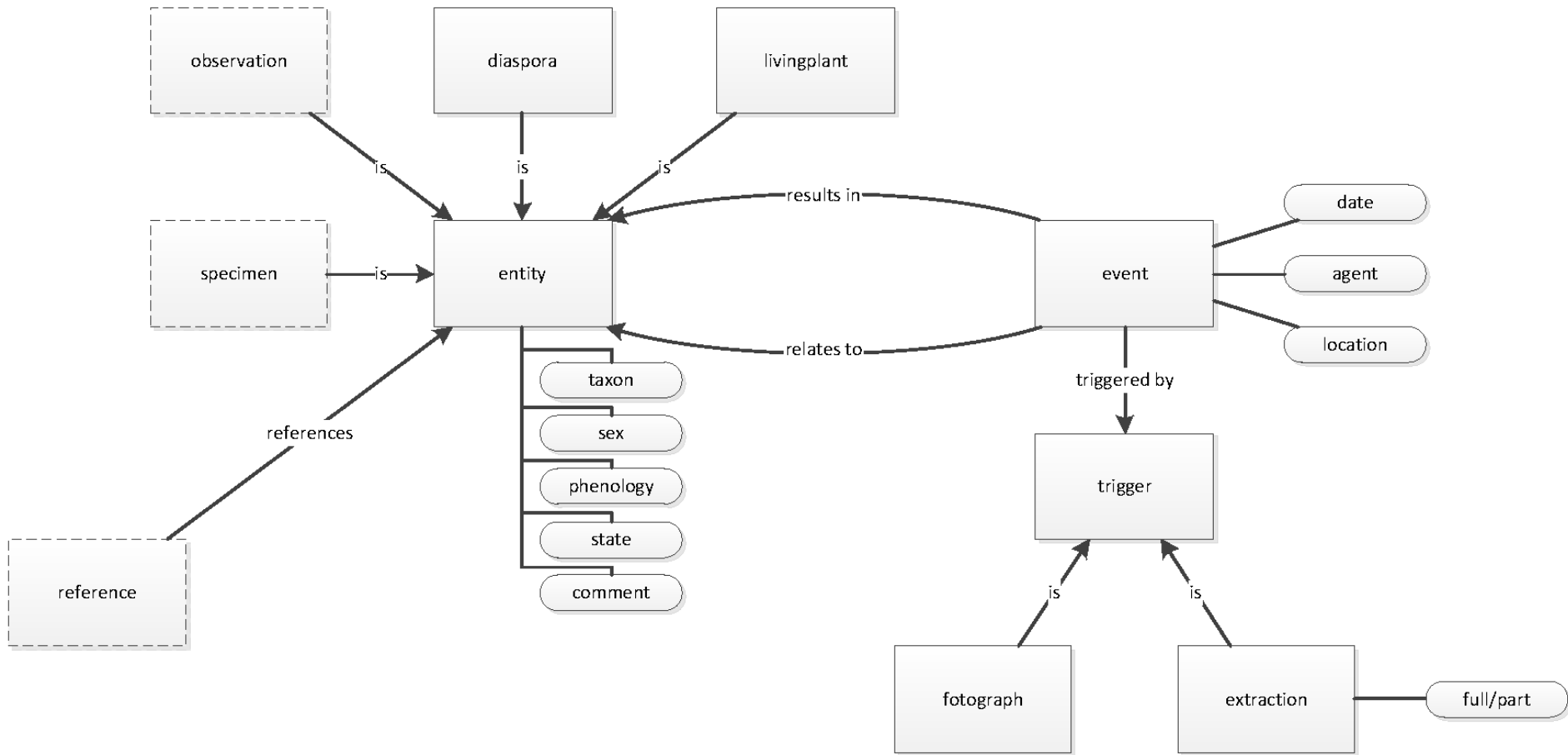
MariaDB 5.5.7 + djatoka, FSI, etc.

GUI Language: scientific & technical

Workflow Diagram



Data Model



System – Functionality and Content

Data Access & Visibility – according to function and affiliation

Gardener / Scientist

External / Internal

Taxonomic Expertise

Standards

ABCD (DarwinCore) / TCS / EDM / ISO – OGC – FOAF – DC

Data Handling & Transfer

Individual Object, Batches, Inventories, Index Seminum, ...

CSV various formats & BIOCASe API

Certificates

IPEN / phytosanitary / CITES / ABS /

Data Licences – depending object classes follow Creative Commons

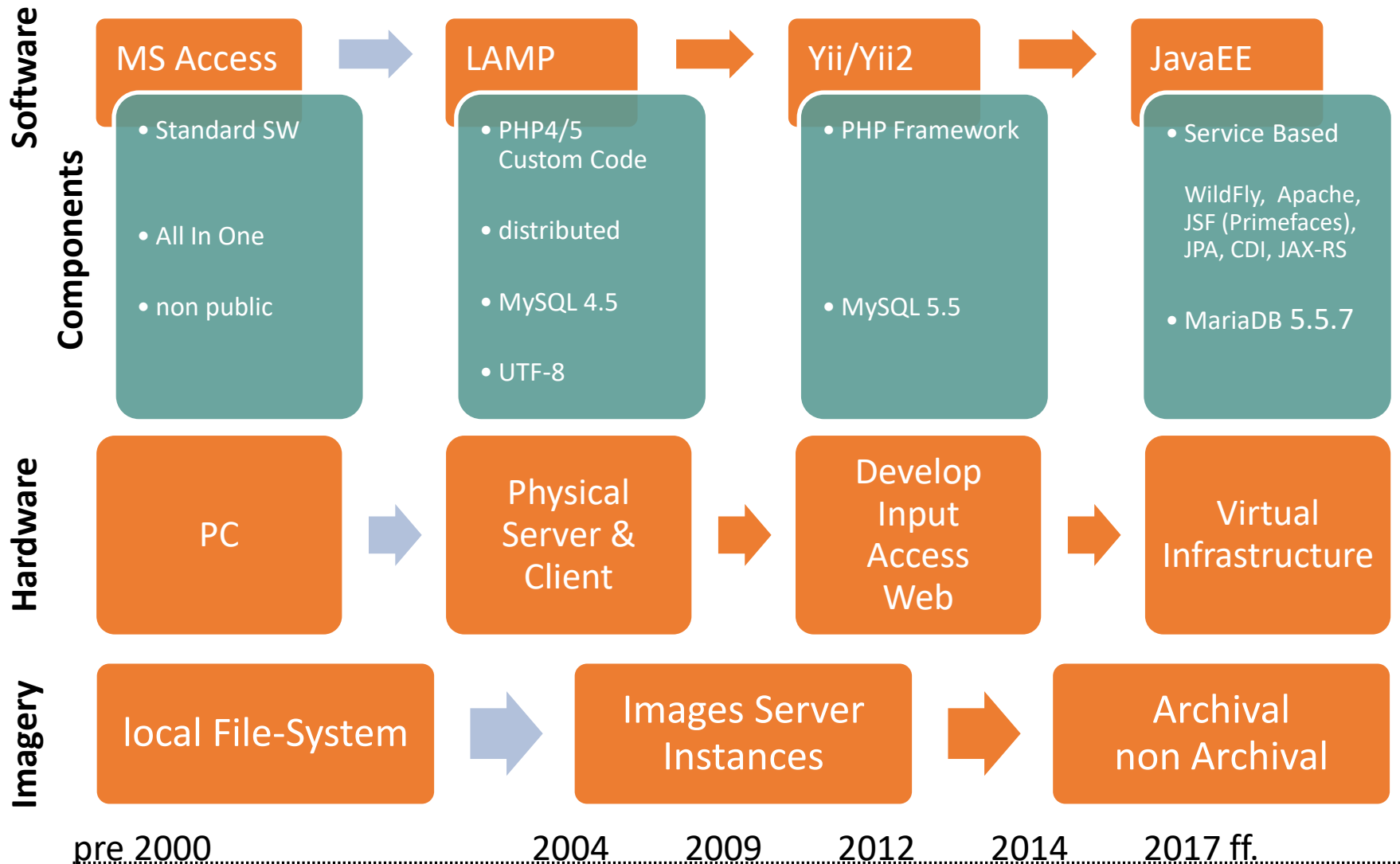
CC0 metadata

CC-BY-SA scientific data / images of specimens

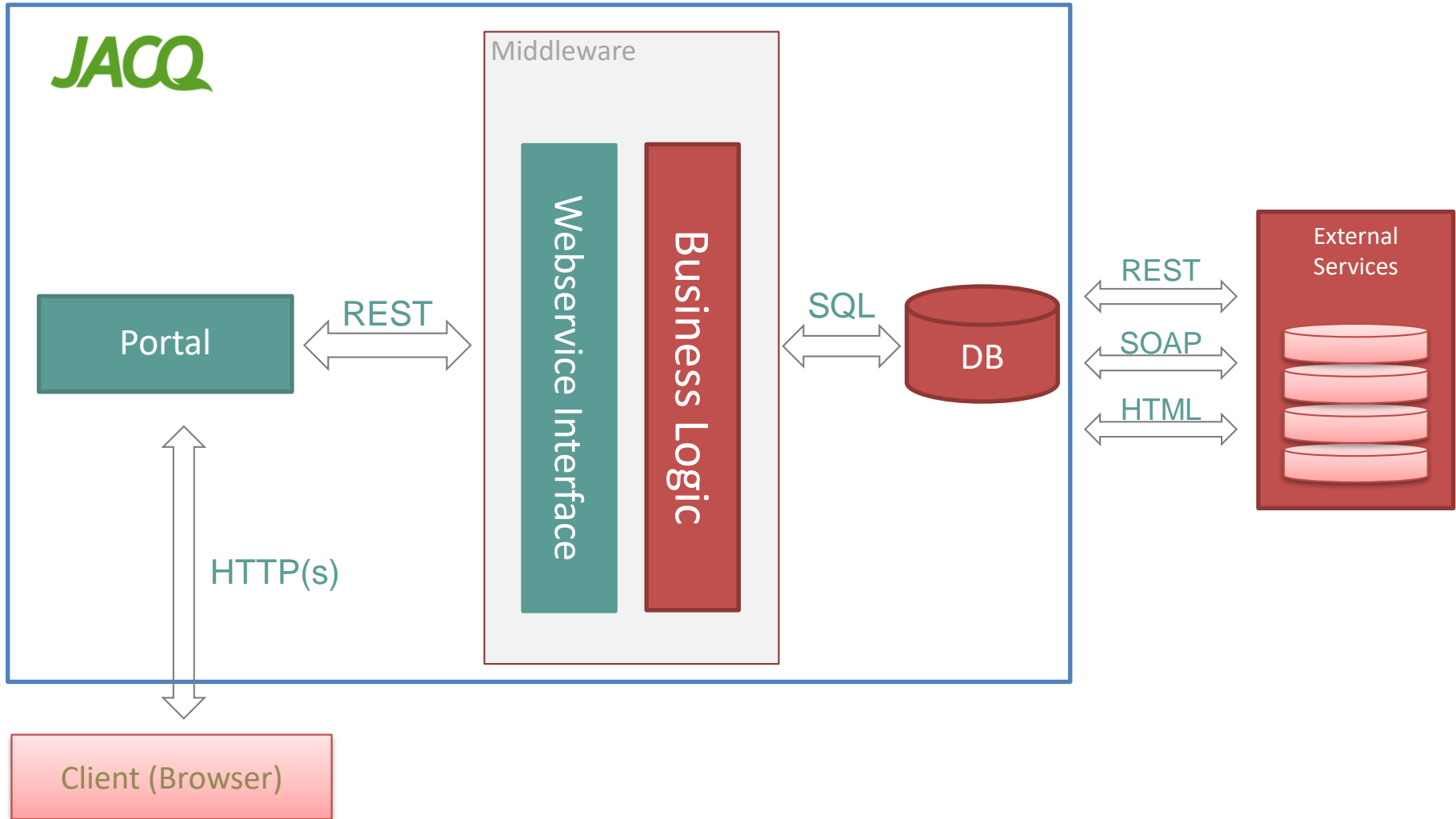
CC-BY-NC-SA images of living plants



System Chronology: SW, HW, Digital Imagery



System Architecture





JACQ Consortium

Herbaria

2000 **WU***[°]

2004 **W**[°]

2005 **GZU**[°] / (GJO)

2008 **HAL**[°] / **JE**[°] / HerbDrogMus / HerbPilsl

2009 **TGU**

2011 **MJG** / KUFS

2012 **BRNU** / **KFTA**[°] / **LAGU** / **LW**[°] / **LWKS**[°] / **LWS**[°] / **LZ** / Univ. Tunceli Turkey

2013 **BAK** / **CHER**[°] / **GAT** / **HERZ**[°] / **LECB**[°] / **PRC**[°]

2014 **B**[°] / **ERE**[°] / **NS** / **NSK**

2015 **FT**[°] / **TBI** / **TMRC** / **UBT**[°]

2016 **MHES** / **SARAT**

2017 **ADMONT** / **DR** / **GJO** / **NBSI** / **PI**

Botanical Gardens

2014 University Vienna (Hortus botanicus Vindobonensis HBV)

2017 Federal Gardens Schönbrunn

2018 University of Salzburg

* abbreviations following Index Herbariorum <http://sweetgum.nybg.org/science/ih/>

[°] GPI grant holders

JACQ Virtual Herbaria / Gardens

content / 20180604

specimens 1.374.378 / 148.973 taxa / 320.243 specimens with images

living plants 39.224 / 12.414 taxa

Types 142.157 / typified names 82.165 (Genera, Species and infraspecific)

scientific names 382.456 / genera 38.158 / families 3.541

862.629 dicots / 221.319 monocots / 111.514 gymnosperms & ferns & crypto

nomenclatorial authors (incl. combinations) 109.752

collectors and teams 31.244 / 13.790

literature citations 32.496

synonyms 258.377 (= link from synonym to accepted taxon)

classifications 131.416 child-parent-relations from 2.883 references

JACQ Classifications

Dalla Torre & Harms (1900-1908; Englerian System) – families and higher ranks – finished

for selected groups (*Annonaceae*, *Ebenaceae*, *Myristicaceae*, *Poaceae*)
also infra-familial-classifications available

Cronquist 1981 – finished

Exkursionsflora von Österreich Ed. 3 (2008) – finished

Ed. 1 & 2 families and higher – finished

Flora Iranica – all accepted taxa – finished

APG I-IV + recent systems from Phytotaxa 2011 – finished

Lycopodiophyta & Ferns & Gymnosperms – Phytotaxa 2011 – finished

Soreng et al 201503 – Gramineae – finished

Funk et al. 2009 – Compositae – finished

Annonaceae – family GSD for CoL – work in progress

Ebenaceae, *Myristicaceae* – work in progress

Amaranthaceae, *Chenopodiaceae*, *Portulacaceae* (et al.) – work in progress

<http://legacy-living.jacq.org/index.php?r=dataBrowser/classificationBrowser/index>

Angiospermae A. Br. & Döll

- Amborellales Melikian, A. V. Bobrov & Zaytzeva
- Nymphaeales Salisb. ex Bercht. & J. Presl
- Austrobaileyales Takht. ex Reveal

Mesoangiosperms APG

Magnoliids APG

- Canellales Cronquist
- Piperales Bercht. & J. Presl

Magnoliales Bromhead

- 13 Myristicaceae R. Br. S
- 14 Magnoliaceae Juss.
- 15 Degeneriaceae I. W. Bailey & A. C. Sm.
- 16 Himantandraceae Diels
- 17 Eupomatiaceae Orb.
- 18 Annonaceae Juss. S

Chatrou, L. W., Pirie, M. D., Erkens, R. H. J., Couvreur, T. L. P., Neubig, K. M., Abbott, J. R., Mols, J. B., Maas, J. W., Saunders, R. M. K. & Chase (2012)

Anaxagoreoideae Chatrou, Pirie, Erkens & Couvreur

gen. Anaxagorea A. St.-Hil. S

Maas, P. J. M. & Westra, L. Y. T. (1985) Bot. Jahrb. Syst. 105 (2): 145-204.

- = Rhopalocarpus Teijsm. & Binn. ex Miq.
- = Pleuripetalum T. Durand
- = Eburopetalum Becc.

Anaxagorea allenii R. E. Fr.

Anaxagorea angustifolia Timmerman

Anaxagorea borneensis (Becc.) J. Sinclair

= Eburopetalum borneense Becc.

= Anaxagorea ramiflora Boerl.

Anaxagorea brachycarpa R. E. Fr. S

Anaxagorea brevipedicellata Timmerman

Anaxagorea brevipes Benth. S

Anaxagorea crassipetala Hemsl. S

Anaxagorea dolichocarpa Sprague & Sandwith S

Anaxagorea floribunda Timmerman

Anaxagorea gigantophylla R. E. Fr.



also used in:

Steyermark, J. A. & Berry, P. E. (1995) Fl. Venez. Guayana 2: 415-418, fig. 345-349. ↓ 🌐

actions

📖

Projects

- Global Plants Initiative – <http://plants.jstor.org>
2005-2015 botanical collections Online-Portal
- BHL-Europe – <http://www.bhl-europe.eu/>
Biodiversity Heritage Library
2009-2012 contribute and complement BHL
- OpenUp! – <http://www.open-up.eu/>
2011-2014 channel multimedia objects from natural history
collections to EUROPEANA <http://www.europeana.eu/>
incl. common names component

- *REFLORA* – Brazilian Online Herbarium

<http://www.herbariovirtualreflora.jbrj.gov.br>

Virtual Herbaria

JACQ

Home

General Information

Collections

Reference systems

Institution:	<input type="text"/>	Herbar #:	<input type="text"/>
Collection:	<input type="text"/>	Collection #:	<input type="text"/>
Family:	<input type="text"/>	Taxon:	<input type="text"/>
ident. history:	<input type="text"/>	incl. syn.	<input checked="" type="checkbox"/>
Collector:	<input type="text"/>	Series:	<input type="text"/>
Collector #:	<input type="text"/>	Country:	<input type="text"/>
Continent:	<input type="text"/>	State/Province:	<input type="text"/>
Region:	<input type="text"/>	Locality:	<input type="text"/>

All records Type records only

Display only records containing images: Yes No

Search

Reset

Last database update 2015-06-05

Search Tips

general

search is not case sensitive

fields are automatically linked by AND

for partial strings the % sign can be used as a wildcard

taxon search

queries for a genus can be sent as "genus name" "blank space" and the "%" sign:

searchstring "Oncidium %" yields all data for *Oncidium* plus all data for transferred names, e.g. *Cyrtochilum*, etc.

typing the initial letters for "genus" and "epithet" are sufficient as search criteria:

"p bad" yields all taxa where genus starts with "p" and epithet starts with "bad" results include e.g. *Parmelia badia* Hepp, *Peziza badia* Pers. or *Poa badensis* Haenke ex Willd.

search on synonymy has been implemented for nomenclatural & taxonomic questions / for this purpose the "incl. syn." checkbox is activate as a standard; if you want to get data for the exact search string uncheck "incl. syn."

NETWORKS - GBIF



GBIF | Global Biodiversity Information Facility

Free and open access to biodiversity data

OCCURRENCES

SPECIES

DATASETS

PUBLISHERS

RESOURCES

search



WHAT IS GBIF?

ABOUT GBIF UNITED STATES

Cosmolestes picticeps by budak via iNaturalist. Photo licensed under CC BY-NC 4.0.

Occurrence records
984,540,055

Publishing institutions
1,195

Datasets
39,089

Species
Learn more about the number of species covered by data in GBIF.org.

www.gbif.org

Biodiversity Data via national nodes or individual institutions/datasets

iDigBio 2018, Berkeley, 2018-06-05



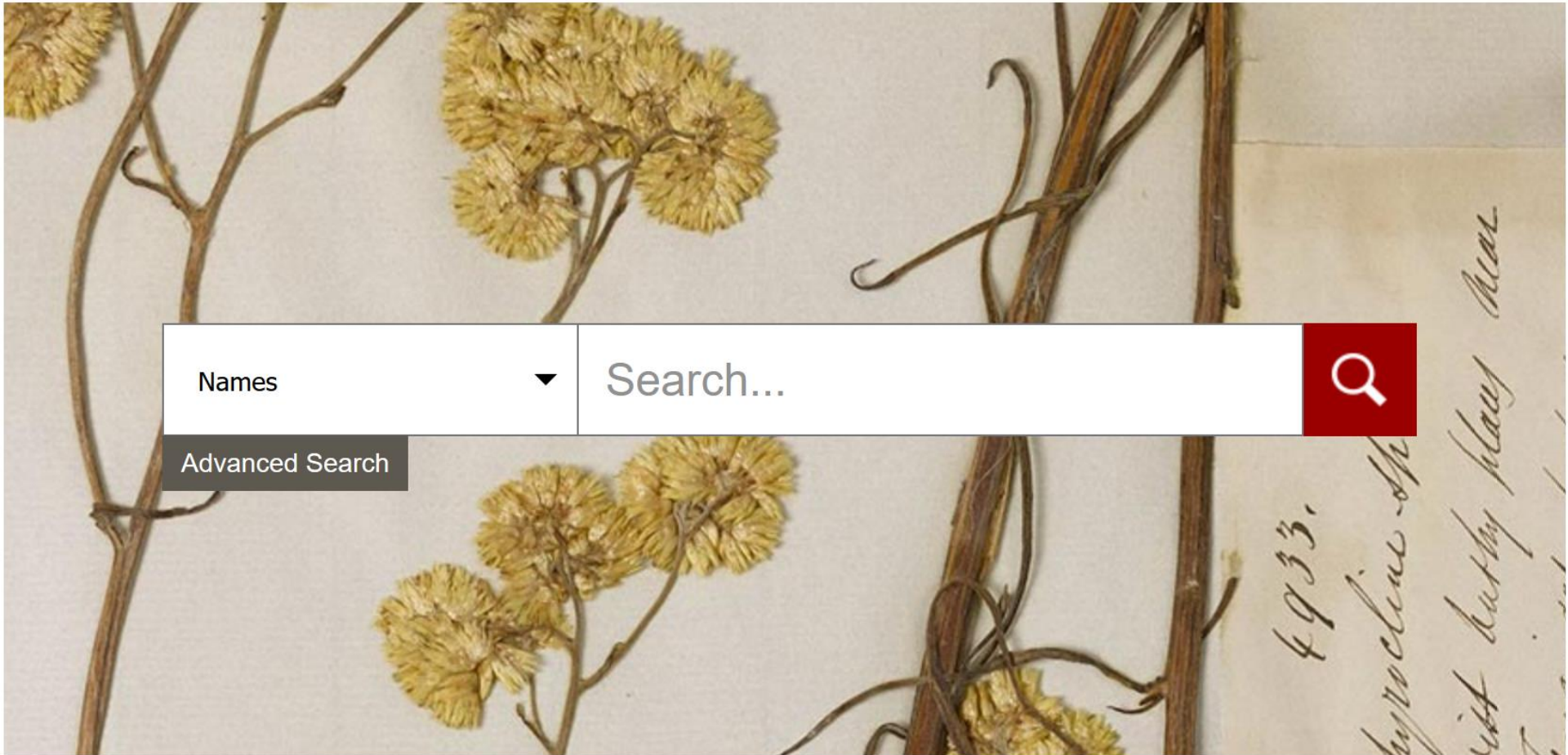
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Global Plants

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Access provided by
Naturhistorisches Museum
Wien Botanische Abteilung

[Login](#)



plants.stor.org

NETWORKS - EUROPEANA



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SPRACHE ▾

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Erkunden

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Girls in a Rowing Boat, Albert Edelfelt
Finnish National Gallery

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www.europeana.eu

Multimedia Data of Natural History Insitutions

Outlook 2018

- Dedicated website for living plants incl. images
- Transfer of remaining legacy code parts to new environment
- Integration of external sources for floristic, taxonomic, biographic and geographic data via microservices
- Evaluation / Implementation of IIIF compliant imagery

Future / Vision

- **JACQ level – Mass Digitization vs. Project Driven Approach**
Potential
W 5.5, WU 1.4, GZU 1.2, GJO 600 k; PRC 2.2, BRNU 634k;
B 3.8, JE 3.5, HAL 450k, DR 350k, LZ 170k; PI 300k , FT 220k; LECB 800k, KFTA 200k; LW 270k, LWS 141k; ... ==>
22 mio objects
OCR & **HTR** (+60% handwritten labels) READ project & Transkribus SW package
<https://read.transkribus.eu/>
- **National Level – Mass Digitization**
D-Coll; AUT, CZE, ITA, RUS, UKR ==> opt-Out
- **European level – CETAF** <https://cetaf.org/>
COST Action-MOBILISE http://www.cost.eu/COST_Actions/ca/CA17106
Project: SYNTHESYS+
ESFRI: DiSSCo <http://www.dissco.eu/>
- **Analyses of Digitized Material**
Modelling (Traits); Barcoding; Cultural History in combination with Digital Humanities;

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CURATORS

A, ALCB, AAU, AMAZ, B, BAB, BH, BIGU, BM, BOLV, BP, BR, BSC, C, CAS, CAY, CEN, CHAPA, COAH, COL, CR, CUVC, CUZ, CVRD, DS, E, EAP, ECON, EHH, ENCB, F, FDG, FHO, FI, FT, G, GB, GH, GJO, GOET, GUA, GUAT, GUAY, HAC, HAJB, HAL, HB, HPPR, HRB, HUA, HUEFS, IAN, IBGE, ICA, IJ, INB, INPA, IPA, IRAN, JAUM, JE, JEPS, K, L, LAGU, LE, LI, LINN, LL, LOJA, LPB, LZ, M, MA, MBM, MEDEL, MEXU, MG, MICH, MO, MY, NA, NY, OXF, P, PH, PI, PMA, PORT, PR, PRC, QCA, QCNE, R, RB, S, SCZ, SEL, SP, SPB, SPF, STRI, TEFH, TEX, TFAV, TO, U, UB, UBT, UC, UCWI, ULM, UPS, US, USM, USZ, UVAL, VEN, W, WAG, WIS, WRSL, WU, XAL, Z, ZT

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A close-up photograph of several bright orange flowers. The central flower is in full bloom, showing five petals and several stamens with white anthers. A small, clear, glistening droplet is visible on the central pistil. To the left, another flower is partially visible. Below the main flower, a green, unopened bud is attached to a stem. The background is a soft, out-of-focus green.

Thank You