JACQ

a

botanical collection management system
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

iDigBio 2018, Berkeley, 2018-06-05
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
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

**Software Components**
- **MS Access**
  - Standard SW
  - All In One
  - non public
- **LAMP**
  - PHP4/5
  - Custom Code
  - distributed
  - MySQL 4.5
  - UTF-8
- **Yii/Yii2**
  - PHP Framework
  - MySQL 5.5
- **JavaEE**
  - Service Based
  - WildFly, Apache, JSF (Primefaces), JPA, CDI, JAX-RS
  - MariaDB 5.5.7

**Hardware**
- **PC**
- **Physical Server & Client**
- **Develop Input Access Web**
- **Virtual Infrastructure**

**Imagery**
- **local File-System**
- **Images Server Instances**
- **Archival non Archival**

System Architecture

- **Portal**
  - REST
  - HTTP(s)

- ** Middleware**
  - Web Service Interface
  - SQL

- **Business Logic**

- **DB**
  - REST
  - SOAP
  - HTML

- **External Services**

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JACQ Consortium

Herbaria
2000 WU*
2004 W°
2005 GZU° / (GJO)
2008 HAL° / JE° / HerbDrogMus / HerbPilsI
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
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 mononcots / 111.514 gymnosperms & ferns & crypto
nomenclatoral 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
Classifications

Dalla Torre & Harms (1900-1908; Englerian System) – families and higher ranks – finished
for selected groups (Annonaceae, Ebenaceae, Myristicaceae, Poaceae)
also infra-familiar-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

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


Anaxagoreoideae Chatrou, Pirie, Erkens & Couvreur
- gen. Anaxagorea A. St.-Hil.

- Rhopalocarpus Teijsm. & Binn. ex Miq.
- Pleuripetalum T. Durand
- Ebro petrolum Becc.
- Anaxagorea allenii R. E. Fr.
- Anaxagorea angustifolia Timmerman
- Anaxagorea borneensis (Becc.) J. Sinclair
- Ebro petrolum borneense Becc.
- Anaxagorea ramiflora Boerl.
- Anaxagorea brachycarpa R. E. Fr.
- Anaxagorea brevipedicellata Timmerman
- Anaxagorea brevipes Benth.
- Anaxagorea crassipetala Hemsl.
- Anaxagorea dolichocarpa Sprague & Sandwith
- Anaxagorea floribunda Timmerman
- Anaxagorea gigantophylla R. E. Fr.

also used in:
Projects

• Global Plants Initiative – http://plants.jstor.org
  2005-2015  botanical collections Online-Portal

• BHL-Europe – http://www.bhl-europe.eu/
  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

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:
searching "Oncidium %" yields all data for Oncidium plus all data for transferred names, e.g. Cyrtochilium, 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, Paeziza badia Pers. or Picea balsamifera 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

Free and open access to biodiversity data

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

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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, GZ 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
  COST Action-MOBILISE
  Project: SYNTHESESYS+
  ESFRI: DiSSCo
  https://cetaf.org/
  http://www.cost.eu/COST_Actions/ca/CA17106
  http://www.dissco.eu/

• Analyses of Digitized Material
  Modelling (Traits); Barcoding; Cultural History in combination with Digital Humanities;
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