

IBERGRID 2019

Improving access and use of GBIF through infrastructure cooperation at the Iberian level

Rui Figueira, Cristina Villaverde, Vicente Ruiz Jurado, Tainan Messina



rede portuguesa do GBIF

Gbif.es

Living Atlases



FCT Fundação
para a Ciência
e a Tecnologia



CSIC



REAL JARDIN
BOTANICO

May 6, 2019 - News headlines - IPBES Global Assessment Preview



Is nature over? Maybe

Analysis by **John D. Sutter**, CNN

🕒 Updated 1625 GMT (0025 HKT) May 6, 2019



Source: CNN

1 million species threatened with extinction by humans 02:05

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Home Video World UK Business Tech Science Stories Entertainment & Arts Health World News TV More

BBC REEL THE ARGENTINIAN ARTIST TRANSFORMING TRASH INTO TREASURE [WATCH NOW](#)


Science & Environment

Nature loss: Report to show scale of 'silent crisis'

By Matt McGrath
Environment correspondent, Paris

🕒 6 May 2019

[f](#) [t](#) [w](#) [e](#) [s](#)


SARAH HANSON

The world's most comprehensive, and damning, report on the state of nature will be released on Monday in Paris.

Top Stories

Pakistan hotel attack gunmen shot dead
🕒 3 hours ago

Mexican wrestler dies at London bout
🕒 4 hours ago

Brexit talks will fail - sacked UK minister
🕒 7 hours ago

BBC REEL IS THIS ITALY'S SMALLEST LIBRARY? [WATCH NOW](#)

May 6, 2019 - News headlines - IPBES Global Assessment Preview



NEWS | 6 MAY 2019

Data mobilization and capacity building essential for addressing global biodiversity crisis

GBIF Executive Secretary urges increased investment in open data community of practice in response to IPBES Global Assessment



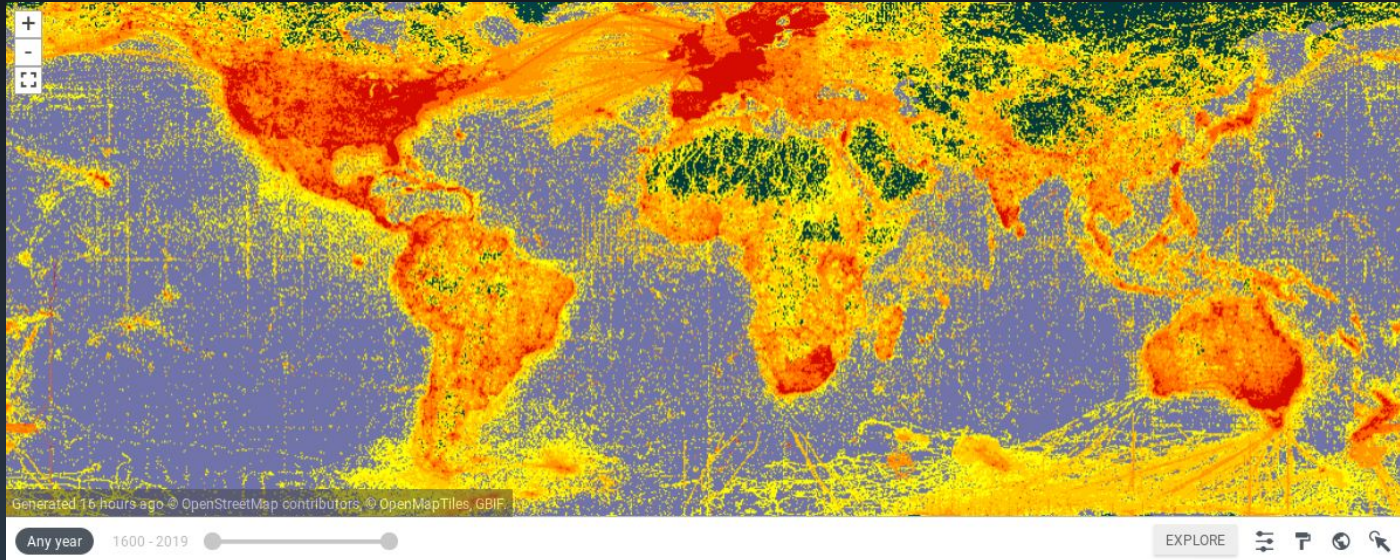
Compsus vindivittatus. Photo 2019 Sebastian Serna Muñoz via iNaturalist Research-grade Observations, licenced under CC BY-NC 4.0.

GBIF mediated data essential to many of the scientific papers and indicators cited in the IPBES



Global Biodiversity Information Facility (GBIF)

GBIF—the Global Biodiversity Information Facility—is an international network and research infrastructure funded by the world's governments and aimed at providing anyone, anywhere, open access to data about all types of life on Earth.





BY THE NUMBERS
19 Sept 2019

Species occurrence records

1,352,869,981

*Country
participants*

59

*Organizational
participants*

39

*Average records served per
month (Jan-May 2019)*

32.7 billion

Datasets

46,400

Publishers

1,467

*Average monthly user session
(Jan-Jun 2019)*

187,547





Data classes

- Occurrence
- Sampling event
- Checklists
- Metadata

Data access and use (FAIR data)

- Persistent identifiers
- Rich metadata
- Standard data format
- Machine readable licenses
- Citable (DOI)
- QC issues annotations
- API services



Attribution and tracking use of data

GBIF reports data usage to publishers

OCCURRENCE DATASET | REGISTERED 4 MAY 2015

Flora-On: occurrence data of the flora of mainland Portugal

Published by Sociedade Portuguesa de Botânica

253,310 OCCURRENCES | 31 CITATIONS

DATASET PROJECT METRICS ACTIVITY DOWNLOAD HOME PAGE

BECAUSE YOU ARE TRUSTED CONTACT

Last ingestion a success HISTORY INGEST NOW LOGS

This dataset results from the data gathered in the platform Flora-On (<http://www.flora-on.pt/>), which contains observation records of vascular plants within mainland Portugal, made by an array of collaborators. Observations are uploaded directly by collaborators, who are either experienced botanists/naturalists, or occasional collaborators. In this latter case, the observations are first validated by the Editorial Board before publication. The Editorial Board is committed to ensure that only t... [More](#)

flora-on

Metadata last modified: 18 August 2016
Data last changed: 22 February 2016
Hosted by: [Sociedade Portuguesa de Botânica](#)
License: CC BY-NC 4.0

[How to cite](#) DOI: 10.15468/gi6aum

SEARCH RESOURCES | 31 RESULTS

ALL LITERATURE

Read more about literature, how it's distributed

A modelled global distribution of the seagrass biome

Literature

Jayatilake, D. Costello, M. (2018) Biological Conservation

Seagrasses form one of the most ecologically important and productive three-dimensional habitats in coastal seas. Knowing the global distribution of seagrass meadows is essential for conservation and blue carbon estimates. Here, we modelled the global distribution of seagrass using 43,037 occurrence...

Journal article | Peer-Reviewed

Data used in study DOI: 10.15468/dl.0e8tmu DOI: 10.15468/dl.0lmgun DOI: 10.15468/dl.1jcm8o DOI: 10.15468/dl.1nqjll

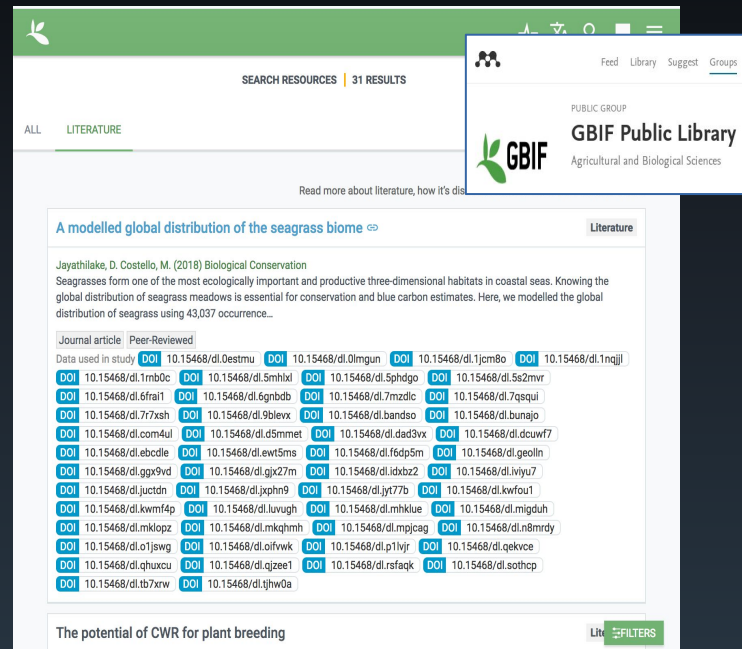
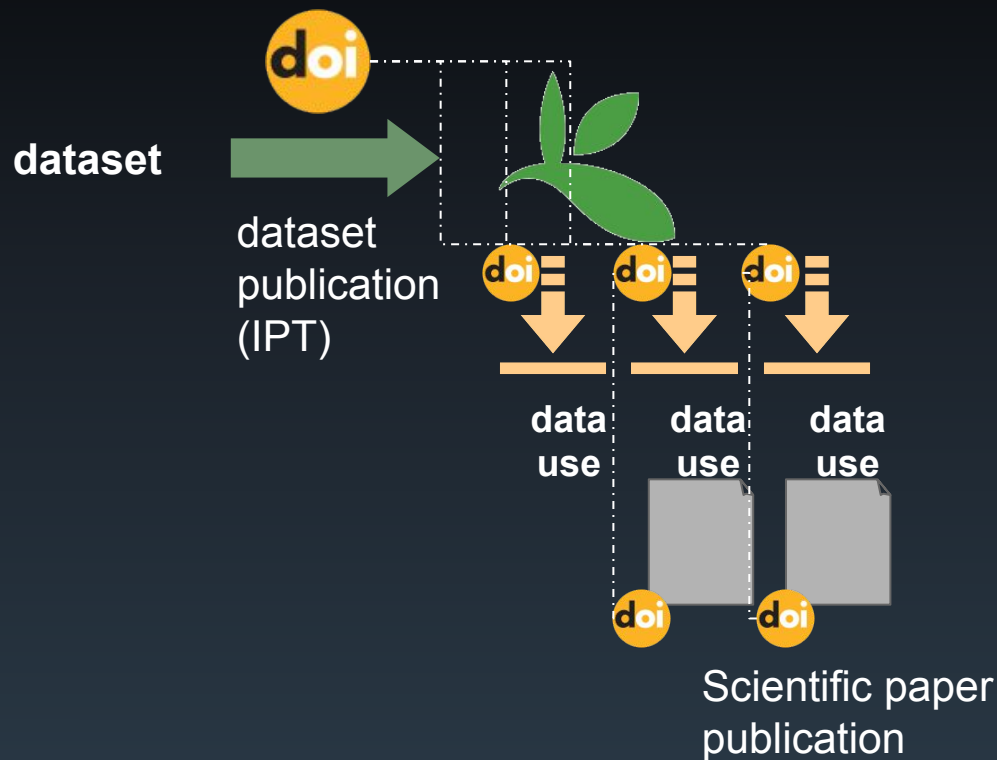
DOI: 10.15468/dl.1mb0c DOI: 10.15468/dl.5mhlxl DOI: 10.15468/dl.5phdgo DOI: 10.15468/dl.5s2mvr
DOI: 10.15468/dl.6frail DOI: 10.15468/dl.6gnbdb DOI: 10.15468/dl.7mzdlc DOI: 10.15468/dl.7qsqui
DOI: 10.15468/dl.77xsh DOI: 10.15468/dl.9blevx DOI: 10.15468/dl.bandso DOI: 10.15468/dl.bunajo
DOI: 10.15468/dl.com4ul DOI: 10.15468/dl.d5mmet DOI: 10.15468/dl.dad3vx DOI: 10.15468/dl.dcuw7f
DOI: 10.15468/dl.ebcdle DOI: 10.15468/dl.ewt5ms DOI: 10.15468/dl.f6dp5m DOI: 10.15468/dl.geoln
DOI: 10.15468/dl.ggx9vd DOI: 10.15468/dl.gjxz7m DOI: 10.15468/dl.idxbz2 DOI: 10.15468/dl.lvyu7
DOI: 10.15468/dl.juctdn DOI: 10.15468/dl.jxphn9 DOI: 10.15468/dl.jyt77b DOI: 10.15468/dl.kwfou1
DOI: 10.15468/dl.kwmf4p DOI: 10.15468/dl.luvugh DOI: 10.15468/dl.mhklue DOI: 10.15468/dl.migduh
DOI: 10.15468/dl.mklpaz DOI: 10.15468/dl.mkqhmh DOI: 10.15468/dl.mpicag DOI: 10.15468/dl.n8mrdy
DOI: 10.15468/dl.o1jswg DOI: 10.15468/dl.oifvkw DOI: 10.15468/dl.p1hjr DOI: 10.15468/dl.qekvce
DOI: 10.15468/dl.qhuxcu DOI: 10.15468/dl.qjzee1 DOI: 10.15468/dl.rsfagk DOI: 10.15468/dl.sothcp
DOI: 10.15468/dl.tb7xrw DOI: 10.15468/dl.tjhw0a

The potential of CWR for plant breeding

Lit FILTERS

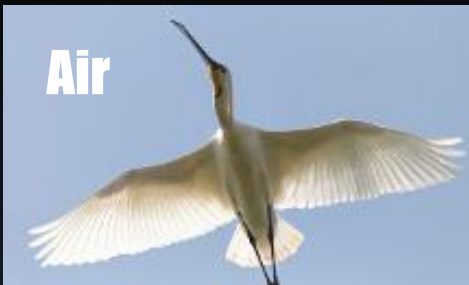
Attribution and tracking use of data

GBIF reports data usage to publishers



GBIF mediated data:

All environments



Air



Land



Sea

All ecologies



Interactions



Invasive



Pollution

Many uses



Research



Conservation



Support decision

Decision Making

CHALLENGE:

Biodiversity Research - ranges from global to local

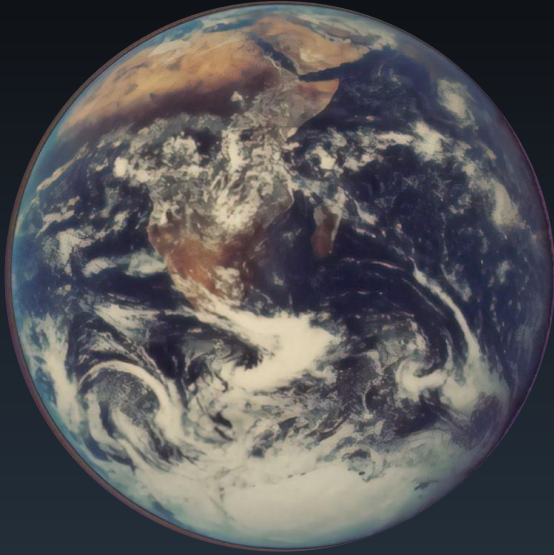


Photo by [The New York Public Library](#) on [Unsplash](#)

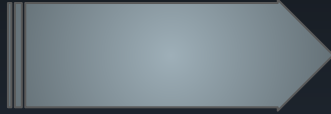


Photo by [Daria Nepriakhina](#) on [Unsplash](#)

Conservation in Europe - directives

Habitat and Bird directive reports, while done nationally, require regional approaches



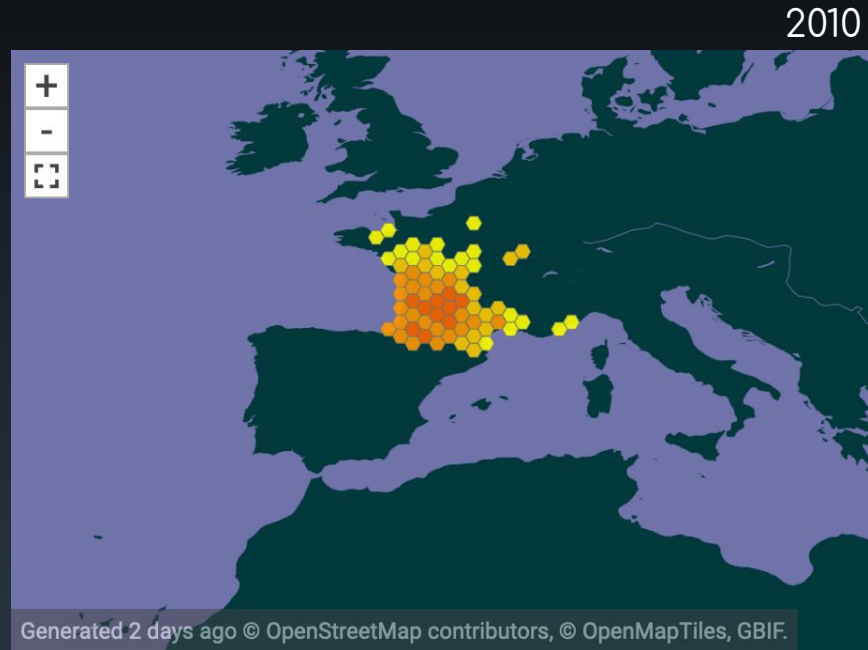
Invasive species

Yellow-legged Asian hornet (*Vespa velutina*) expansion in Europe



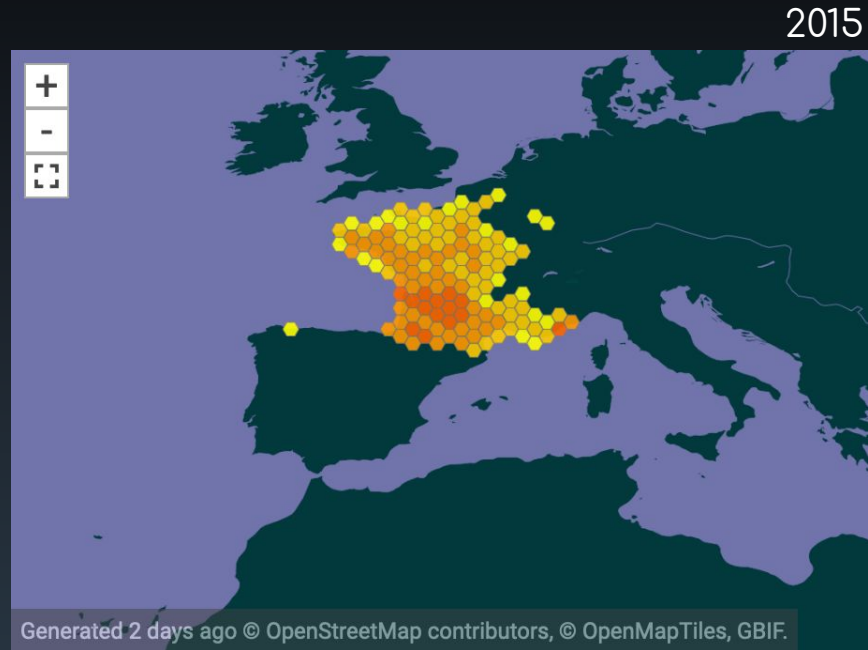
Invasive species

Yellow-legged Asian hornet (*Vespa velutina*) expansion in Europe



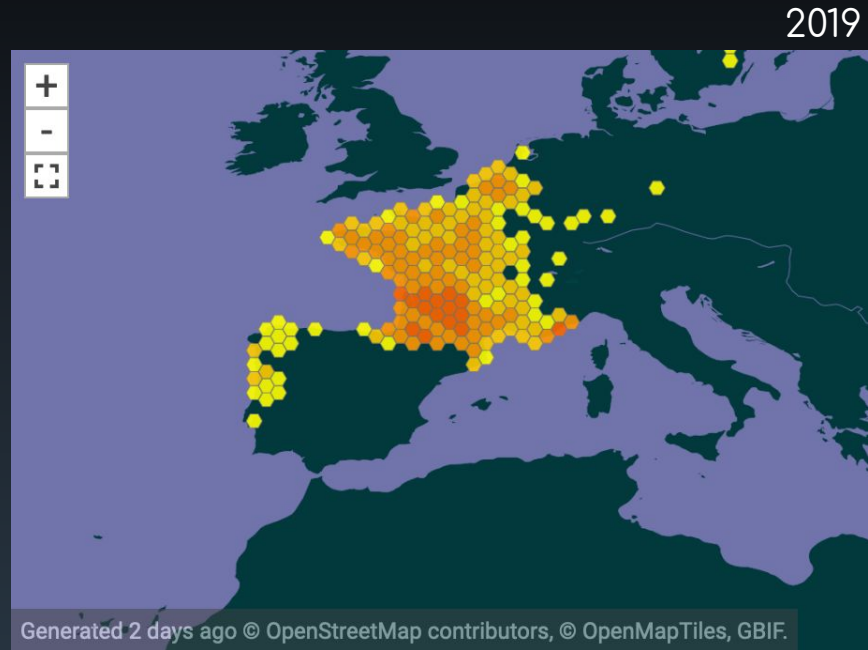
Invasive species

Yellow-legged Asian hornet (*Vespa velutina*) expansion in Europe



Invasive species

Yellow-legged Asian hornet (*Vespa velutina*) expansion in Europe



Challenges: biodiversity research community

Data requirements / biogeographic levels / conservation / legislation



Community challenges

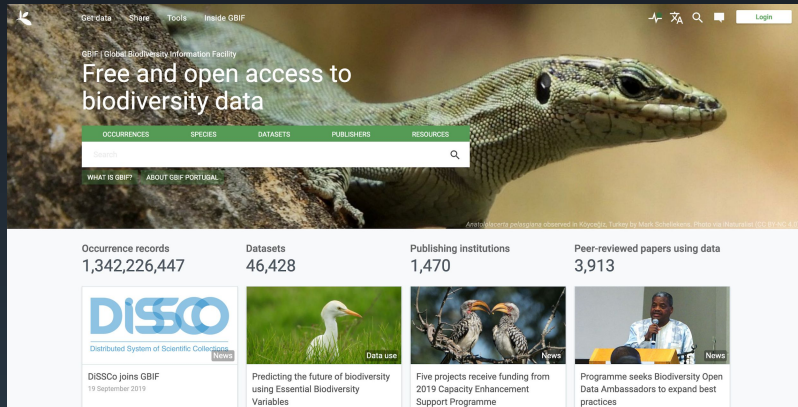
Need for front-office easy to use applications that
unleash power of data and computational resources



GBIF data for global to local analysis

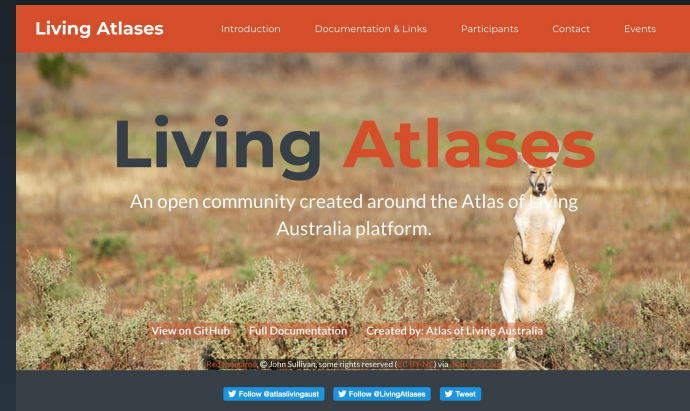
GBIF.org - global portal

- services designed for the global community

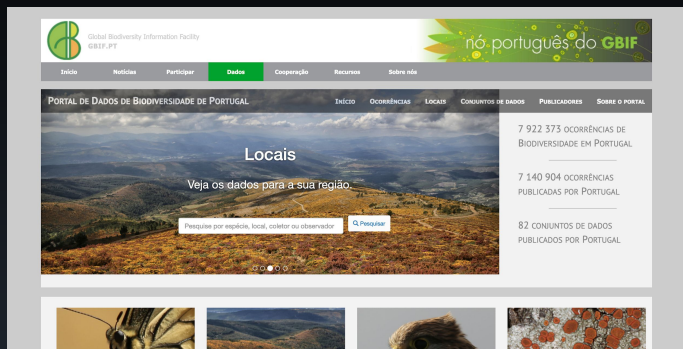


National portals

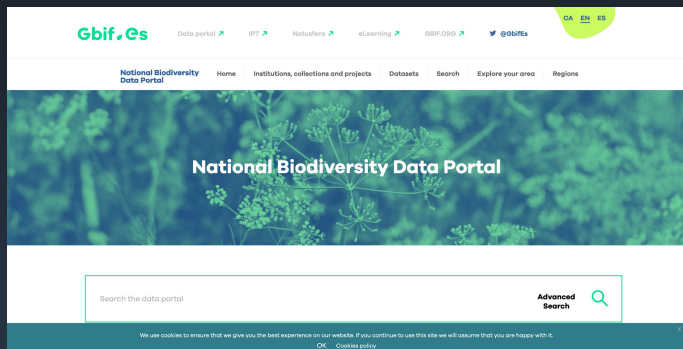
- customised services to support national priorities



GBIF National biodiversity portals



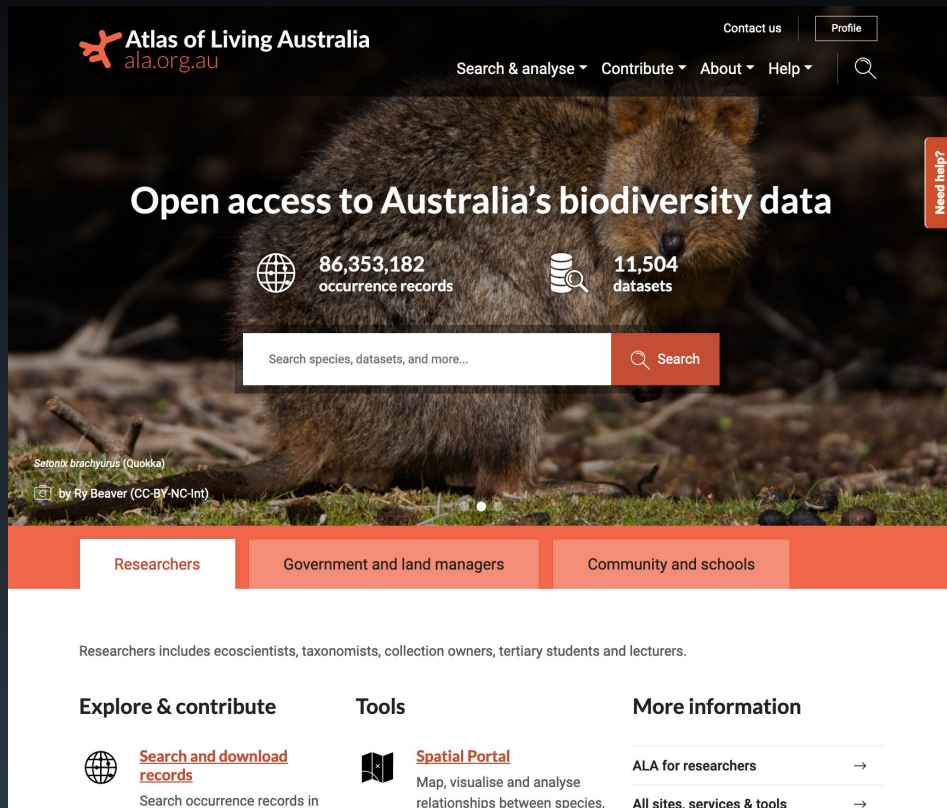
GBIF Portugal - <http://dados.gbif.pt>



GBIF Spain - <http://datos.gbif.es>

- national species list
- endemic species
- invasive species
- national protected areas
- national reports to international conventions
- national legislation (EIA)
- national / local initiatives (local administration / citizen science / ONGAs)

Atlas of Living Australia (ALA)



Atlas of Living Australia
ala.org.au

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Search & analyse ▾ Contribute ▾ About ▾ Help ▾

Open access to Australia's biodiversity data

86,353,182 occurrence records 11,504 datasets

Search species, datasets, and more... Search

Setonix brachyurus (Quokka)
by Ry Beaver (CC-BY-NC-Int)

Researchers Government and land managers Community and schools

Researchers includes ecoscientists, taxonomists, collection owners, tertiary students and lecturers.

Explore & contribute **Tools** **More information**

Search and download records
Search occurrence records in

Spatial Portal
Map, visualise and analyse relationships between species,

ALA for researchers →
All sites, services & tools →

Free and open source IT infrastructure for the aggregation and delivery of biodiversity data.

<https://www.ala.org.au/>

<https://github.com/AtlasOfLivingAustralia>

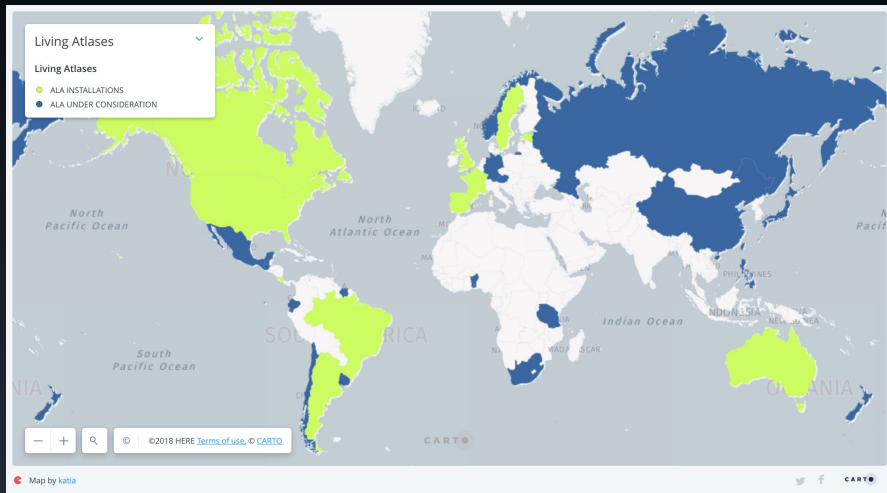
Living Atlases community



A community of practice formed by GBIF countries and organizations that adopted ALA platform to implement the national portal.

With support from the GBIF core work programme and members, is developing governance and technical support.

Living Atlases community



Youtube tutorials:

How to search and download biodiversity data in an Atlas

How to use regions/spatial module in an Atlas

More than 20 portals currently implemented, and 13 under consideration

Collective effort in support and collaboration (Slack), documentation and dissemination

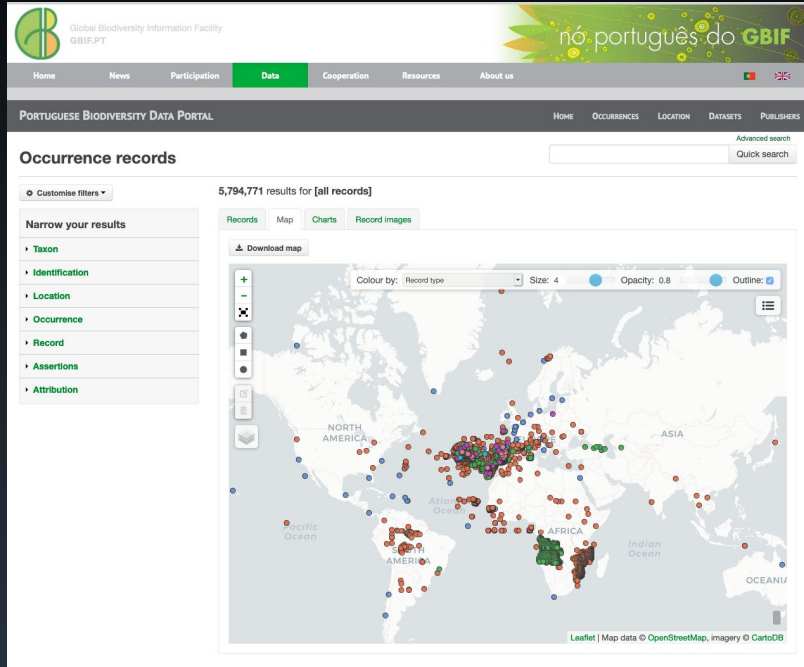
<https://living-atlases.gbif.org/>

ALA platform

Modules for

- species information
- occurrence (table, maps, advanced search), images
- datasets, collections and institution information
- logger (usage metrics)
- species lists
- regions (webGIS)
- spatial portal (spatial analysis)
- phylogenies (PhyloLink)
- biodiversity citizen science sighting (BioCollect)
- volunteer NH specimen label transcription (DigiVol)

Living Atlases modules/services



Occurrences

- occurrence data (list, map)
- specimen image (image module)
- data QC annotations (± 100 tests)
- preserves the original version of records
- large indexing field list
- extensive (customisable) filters
- occurrences "in your location"

Living Atlases modules/services

The screenshot displays the Portuguese Biodiversity Data Portal (GBIF PT) interface. At the top, there is a navigation bar with links for Home, News, Participation, Data (highlighted), Cooperation, Resources, and About us. Below this, the page title "PORTUGUESE BIODIVERSITY DATA PORTAL" is visible. The main section is titled "Occurrence records" and shows 5,794,771 results for all records. A sidebar on the left allows for narrowing results by Taxon, Identification, Location, Occurrence, Record, Assertions, and Attribution. The main content area displays a grid of specimen images from occurrence records, each with a label indicating the species and collector. The species names listed include Spirogyra Link., Bangia Lyngbye, Callithamnion venustissimum, Ceramium rubrum, Iridaea Bory de Saint-Vincent, Iridaea Bory de Saint-Vincent, Laurencia pinnatifida, Laurencia pinnatifida, Orlia utulata, Orlia utulata, Sphaerococcus multipartitus, Codium acaesense, Gelidium aculeatum, Gelidium aculeatum, Codium effatum, Codium decorticatum, Codium vermilara, Valoniopsis utricularia, and Codium vermilara. A "Show more images" link is at the bottom of the grid.

Occurrences

- occurrence data (list, map)
- specimen image (image module)
- data QC annotations (± 100 tests)
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- extensive (customisable) filters
- occurrences "in your location"

Living Atlases modules/services

Occurrences

Global Biodiversity Information Facility
GBIF.PT

nó português do GBIF

Home News Participation **Data** Cooperation Resources About us

PORTUGUESE BIODIVERSITY DATA PORTAL HOME OCCURRENCES LOCATION DATASETS PUBLISHERS

Explore Your Area

Enter your location or address:

Search E.g. a street address, place name, postcode or GPS coordinates (as lat, long)

Showing records for: **São Bento, 2480, Portugal**

Display records in a 5 km radius View all records Downloads

Group	Species	Species : Common Name	Records
All Species	445		
Animals	99		
Mammals	0		
Birds	92		
Reptiles	0		
Amphibians	0		
Fish	0		
Molluscs	0		
Arthropods	7		
Crustaceans	0		
Insects	7		
Plants	335		
Bryophytes	0		
Gymnosperms	0		
FernsAndAllies	0		
Angiosperms	0		
Monocots	0		
Dicots	0		
Fungi	11		
Chromista	0		
Protozoa	0		
Bacteria	0		
Algae	0		

1. *Acanthopora schleicheri* (Ach.) A. Massal. 2
2. *Accipiter gentilis* (Linnaeus, 1758) 1
3. *Accipiter nisus* (Linnaeus, 1758) 3
4. *Acer monspessulanum* 3
5. *Achillea ageratum* L. 5
6. *Aegilops geniculata* Roth 2
7. *Aegithalos caedatus* (Linnaeus, 1758) 2
8. *Agrimonia eupatoria* subsp. *eupatoria* 2
9. *Agrimonia eupatoria* 1
10. *Aluga iva* (L.) Schreb. 5
11. *Alauda arvensis* Linnaeus, 1758 33
12. *Alectoris rufa* (Linnaeus, 1758) 29
13. *Allium ampeloprasum* L., nom. cons. 1
14. *Allium paniculatum* L. 1
15. *Allium roseum* L. 5
16. *Allium sphaerocephalon* L. 1
17. *Ammoides pusilla* (Brot.) Breistr. 1
18. *Anacamptis apiculata* (Marsham, 1802) 1
19. *Anacamptis morio* subsp. *champagneuxii* (Barnéoud) 1
20. *Anacamptis pyramidalis* (L.) Rich. 3
21. *Anagallis arvensis* 2
22. *Anas platyrhynchos* Linnaeus, 1758 11

Map data ©2019 Imagery ©2019 TerraMetrics Terms of Use Report a map error

Tip: you can fine-tune the location of the area by dragging the red marker icon

- occurrence data (list, map)
- specimen image (image module)
- data QC annotations (± 100 tests)
- preserves the original version of records
- large indexing field list
- extensive (customisable) filters
- occurrences “in your location”

Living Atlases modules/services

Gbif.es Data portal IPT Natusfera eLearning GBIF.ORG @GbifEs

National Biodiversity Data Portal Home Institutions, collections and projects Datasets Search Explore your area Regions

España's natural history collections

Learn about the institution, the collections they hold and view records of specimens that have been databased. Currently only the collections of GBIF.ES partners are shown. Over time this list will expand to include all natural history collections in España.

Click a button to only show those organisms.

All collections
Show all 193 collections.

Fauna
Mammals, birds, reptiles, fish, amphibians and invertebrates.

Insects
Insects, spiders, mites and some other arthropods.

Microorganisms
Protists, bacteria, viruses, microfungi and microalgae.

Plants
Vascular plants, algae, fungi, lichens and bryophytes.

193 collections in total.
188 collections are currently visible on the map.

Map **List**

Click on a map pin to see the collections at that location. Use the map controls to zoom into an area of interest. Or drag your mouse while holding the shift key to zoom to an area.

Indicates there are multiple collections at this location.

Collections

- institution list and description
- dataset list, description and dashboard
- usage statistics
- linked to occurrences

Living Atlases modules/services

NATIONAL BIODIVERSITY NETWORK NBN FORUM NBN ATLAS LOG IN

SEARCH JOIN OR DONATE NBN ATLAS NEWS CONTACT US LOG IN / REGISTER CHOOSE NBN ATLAS

NBNatlas SPECIES LOCATIONS ANALYSE GET INVOLVED DATA AND PARTNERS ABOUT HELP

Biota / Plantae / Tracheophyta / Magnoliopsida / Fagales / Fagaceae / Quercus / Quercus cerris

Quercus cerris L. JSON

TURKEY OAK

species Accepted Name authority: UKSI Establishment means: Non-native Establishment status: GB Establishment Status - Established

Overview Gallery Names Classification Records Literature Sequences Data Partners

5,224 records (5,225 in total)

This map contains both point- and grid-based occurrences at different resolutions

Verification: Unconfirmed Accepted

Leaflet | NBN Atlas, Map data © OpenStreetMap contributors, Imagery © CartoDB

Analyse data Interactive map View records

Receive alerts when new records are added

Datasets

69 datasets have provided data to the NBN Atlas for this species.

Browse the list of datasets and find organisations you can join if you are interested in participating in a survey for species like *Quercus cerris* L.

Online Resources

- JSON
- GBIF
- Encyclopaedia of Life
- Biodiversity Heritage Library
- PES

Species pages

- aggregates data on
 - species description
 - common names
 - taxonomy
 - image gallery
 - sequence data
 - bibliography
- provides access to occurrence records, spatial analysis

Living Atlases modules/services

NATIONAL BIODIVERSITY NETWORK | NBN FORUM | NBN ATLAS | LOG IN

SEARCH [] JOIN OR DONATE | NBN ATLAS NEWS | CONTACT US | LOG IN / REGISTER | CHOOSE NBN ATLAS

NBNatlas

SPECIES | LOCATIONS | ANALYSE | GET INVOLVED | DATA AND PARTNERS | ABOUT | HELP

Biota / Plantae / Tracheophyta / Magnoliopsida / Fagales / Fagaceae / Quercus / Quercus cerris

Quercus cerris L.

TURKEY OAK

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Overview Gallery Names Classification Records Literature Sequences Data Partners

5,224 records (5,225 in total)

This map contains both point- and grid-based occurrences at different resolutions

Photographer: Hammett Fothergill

Quercus cerris

"Austrian Oak" redirects here. For the bodybuilder with this nickname, see Arnold Schwarzenegger.

Quercus cerris, the Turkey oak or Austrian oak,^[1] is an oak native to south-eastern Europe and Asia Minor. It is the type species of *Quercus* sect. *Cerris*, a section of the genus characterised by shoot buds surrounded by soft bristles, bristle-tipped leaf lobes, and acorns that usually mature in 18 months.

Source: http://en.wikipedia.org/w/index.php?title=Quercus_cerris&oldid=862065940
Rights holder: Wikipedia authors and editors
Provided by: Encyclopædia of Life

Online Resources

- JSON
- GBIF
- Encyclopædia of Life
- Biodiversity Heritage Library
- PES

Analyse data Interactive map View records

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Species lists

- Support to species lists for detailed data analysis
 - different taxonomic criteria
 - endangered species
 - invasive species
 - thematic lists
 - national lists

Living Atlases modules/services

The screenshot shows the Gbif.es National Biodiversity Data Portal. The header includes the Gbif.es logo, navigation links (Data portal, IPT, Natusfera, eLearning, GBIF.ORG, @GbifEs), and language options (CA, EN, ES). The main navigation bar highlights 'National Biodiversity Data Portal' and includes links for Home, Institutions, collections and projects, Datasets, Search, Explore your area, and Regions. The 'Regions' section is active, displaying a 'Select a region to explore' heading and instructions. A sidebar on the left lists various region categories: Espacios Naturales Protegidos, Provincias, and Regiones Biogeográficas Estatol. Under the last category, several specific regions are listed, including 'Región Biogeográfica Atlántica'. A map of Spain is shown with the 'Región Biogeográfica Atlántica' highlighted. Map controls like zoom in/out and a search bar are visible. Below the map, there are checkboxes for 'All regions' and 'Selected region', both of which are checked.

Gbif.es Data portal IPT Natusfera eLearning GBIF.ORG @GbifEs CA EN ES

National Biodiversity Data Portal Home Institutions, collections and projects Datasets Search Explore your area **Regions**

Select a region to explore

Select the type of region on the left. Click a name or click on the map to select a region. Use map controls or shift-drag with your mouse to zoom the map. Click the region button to explore occurrence records, images and documents associated with the region.

Click on a region name to select an area

- ▶ Espacios Naturales Protegidos
- ▶ Provincias
- ▼ Regiones Biogeográficas Estatol
 - Región Biogeográfica Alpina
 - Región Biogeográfica Atlántica
 - Región Biogeográfica Macaronésica
 - Región Biogeográfica Mediterránea
 - Región Marina Atlántica
 - Región Marina Macaronésica
 - Región Marina Mediterránea
- ▶ Zona de Especial Protección para las Aves
- ▶ Red Natura 2000

Región Biogeográfica Atlántica Zoom to region Reset map

Región Biogeográfica Atlántica

Map controls: +, -, Search, Layers

Map data: Leaflet | Map data © OpenStreetMap, Imagery © CartoDB, Atlas of Living Australia

☒ All regions

☒ Selected region

Regions

- spatial layers
- summary reports per geographic area
- list of species with number of occurrences
- explore taxonomy

Living Atlases modules/services

Gbif.Es Data portal IPT Natusfera eLearning GBIF.ORG @GbifEs CA EN ES

National Biodiversity Data Portal Home Institutions, collections and projects Datasets Search Explore your area Regions

Región Biogeográfica Atlántica

Occurrence records (763,631)

Number of species (15,451)

Explore by species Explore by taxonomy

Group	species	records
▼ All Species		
1.	Abelia floribunda (Mart. & Gal.) Decne.	1
2.	Abelia rupestris Lindl.	1
3.	Abelia triflora R. Br. ex Wall.	2
4.	Abelia grandiflora (Rovelli ex Andre) Rehder	8
5.	Abies alba Mill.: abeto blanco	31
6.	Abies cephalonica Loudon.: abeto griego	4
7.	Abies cilicica (Antoine & Kotschy) Carrière	1
8.	Abies concolor Lindl. & Gord.	6
9.	Abies koreana E.H. Wilson.: abeto coreano	1
10.	Abies nebrodensis (Lojac.) Mattei.: Abeto de Sicilia	1
11.	Abies nordmanniana (Steven) Spach.: abeto de Nordmann	13
12.	Abies pinsapo Boiss.:	12

Time Controls and Map ⓘ

1850 1850 - 2019 2019

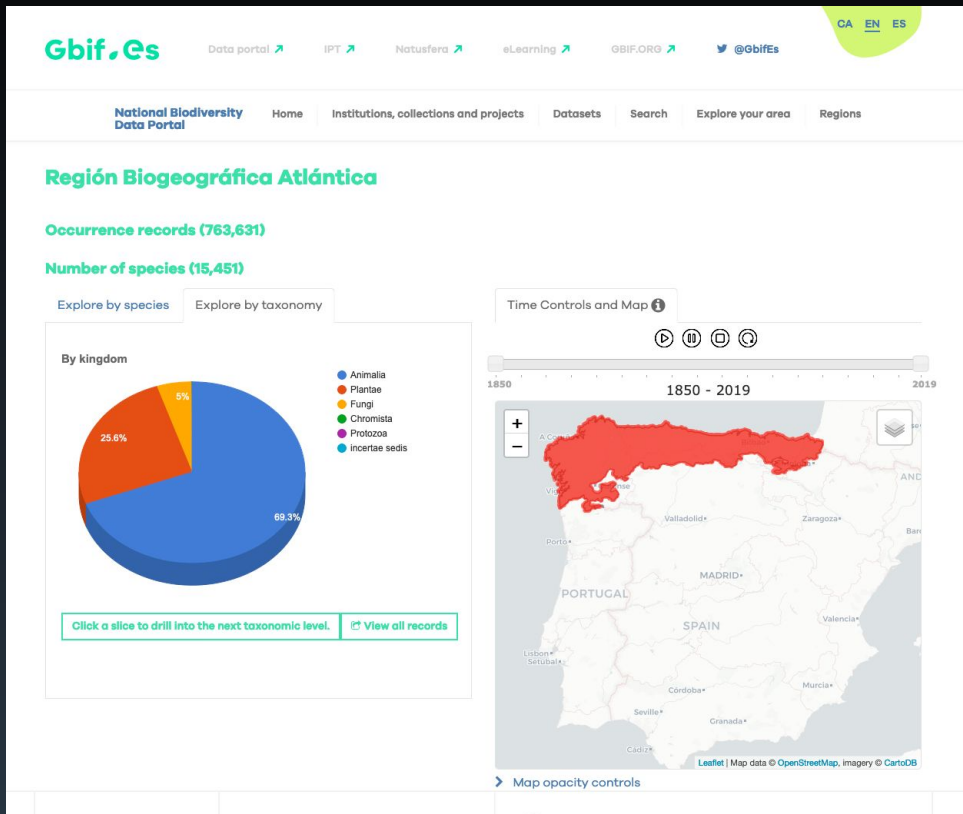
Map opacity controls

View records

Regions

- spatial layers
- summary reports per geographic area
- list of species with number of occurrences
- explore taxonomy

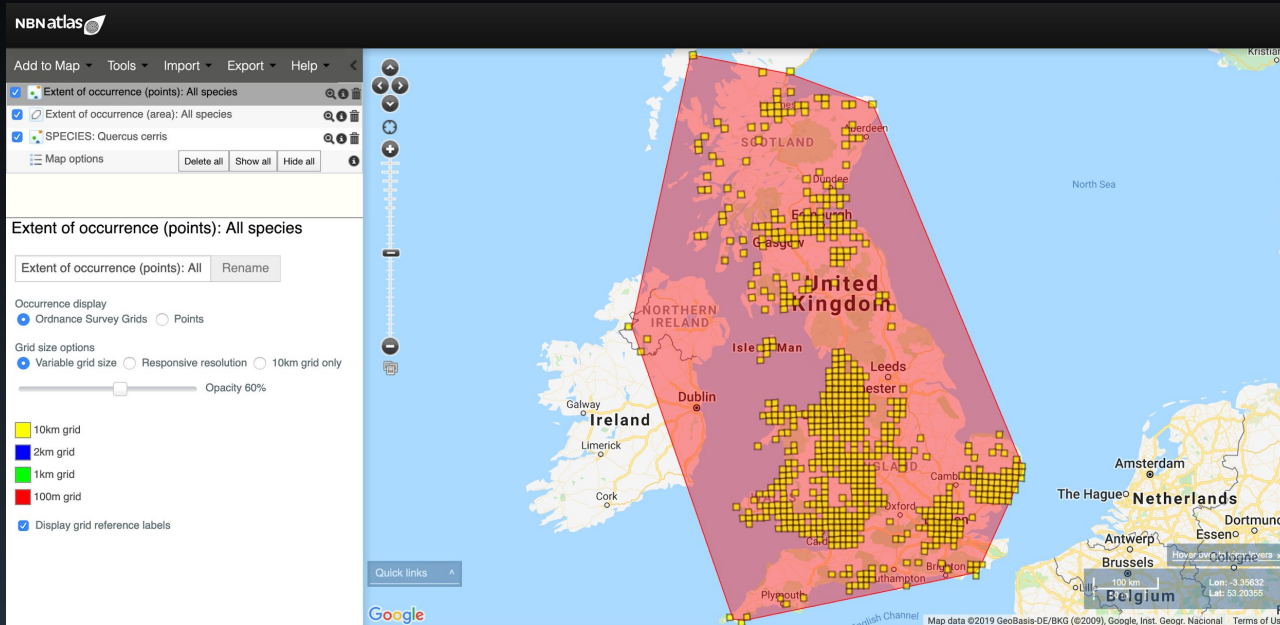
Living Atlases modules/services



Regions

- spatial layers
- summary reports per geographic area
- list of species with number of occurrences
- explore taxonomy

Living Atlases modules/services



Spatial Portal

- webGIS
- allows to define area for analysis
- import spatial layers
- several analysis

Living Atlases modules/services

Application support

- ALA API web services
- ALA4R available at CRAN

Other components

- Sightings (citizen science)
- DigiVol (crowdsourcing for label transcription by volunteers)
- Phyloking (analysis of phylogenies)
- BioCollect (field book for biologists, ecologists and natural resource managers)
- User authentication (CAS)



ALA architecture

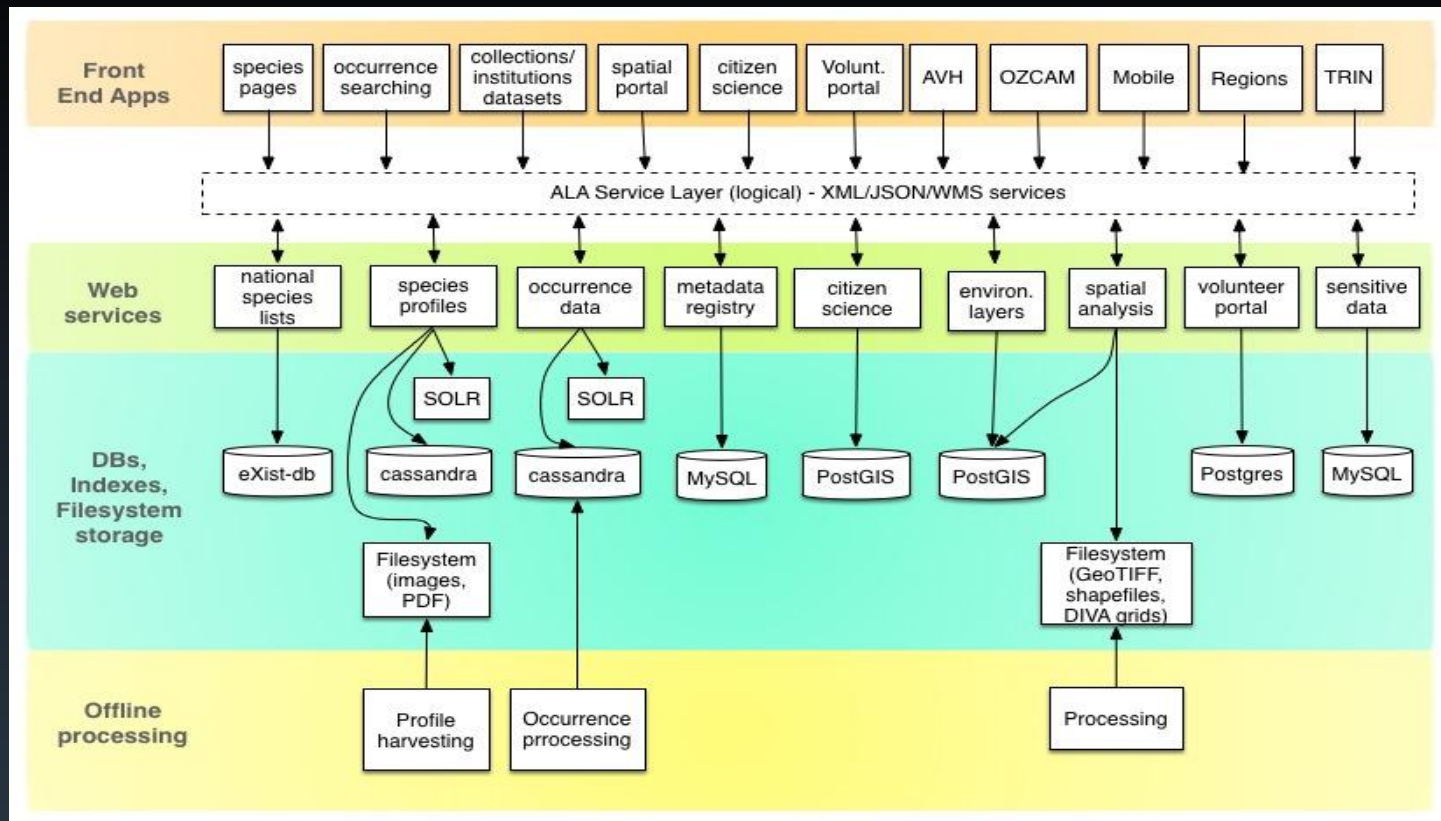


image by David Martin (ALA)

Living Atlases technologies

Languages



Web applications

WAR

Databases



PostgreSQL



Indexing



Web server

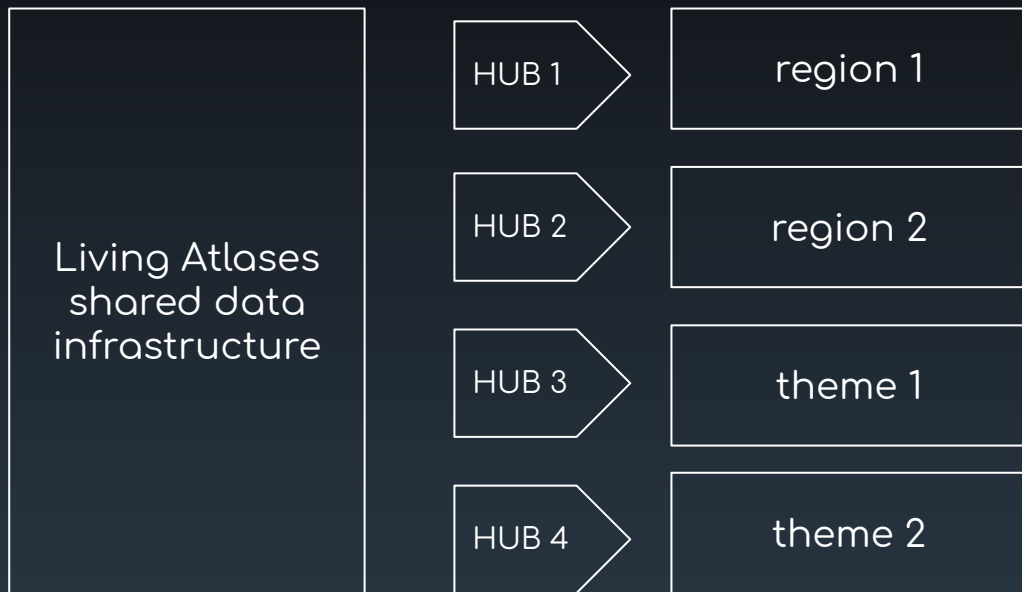


Implementation



Living Atlases - Data HUBs - sharing infrastructure

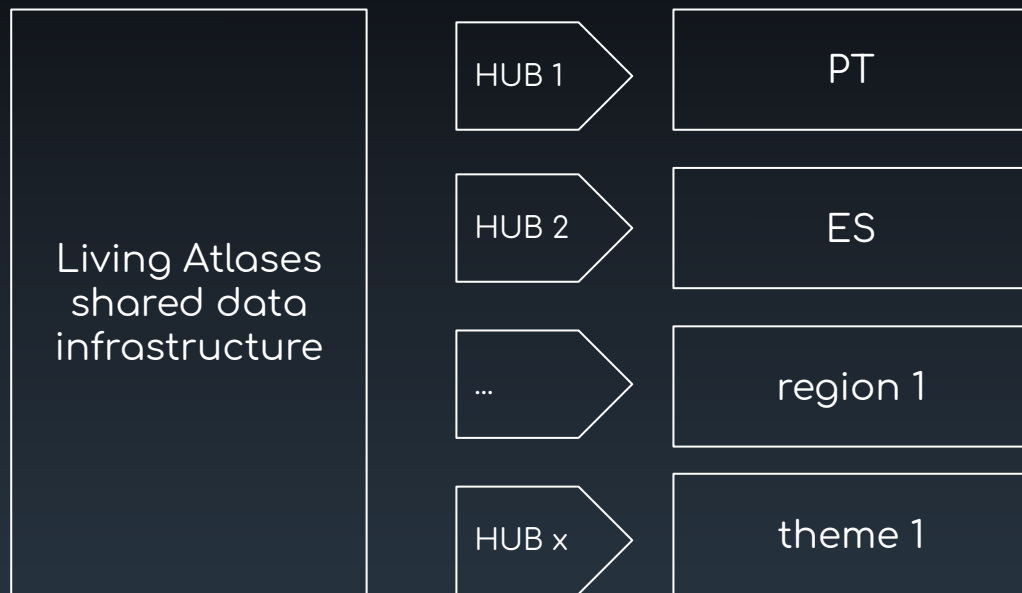
Build different front-office web applications using the same shared infrastructure - faceting data



Example:

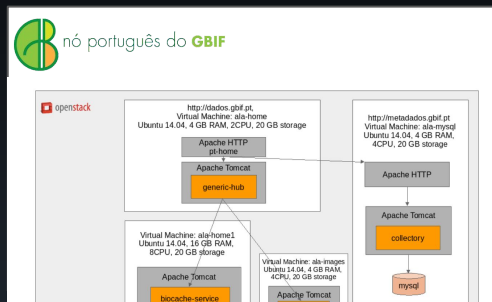
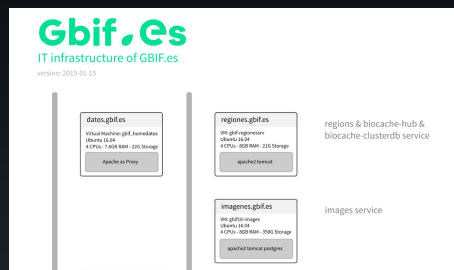


Living Atlases - sharing infrastructure at Iberian level



invasive species, endangered species,
Iberian floras and faunas...

Living Atlases - vision - sharing infrastructure at Iberian level



- improve analysis
- improve availability
- improve biodiversity management
- help sound and better science

in the scope of



and





Gbif.es



BY THE NUMBERS

Species occurrence records

$$27.7 + 7.1 = 34.8 \text{ M}$$

Datasets

$$309 + 82 = 391$$

Publishers

$$102 + 21 = 123$$



Thank you!



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