

The Living Atlases: from the Atlas of Living Australia to a global GBIF collaboration

Francisco Pando
GBIF-Spain / CSIC

Launch event for the
Vlaams Biodiversiteitsportaal

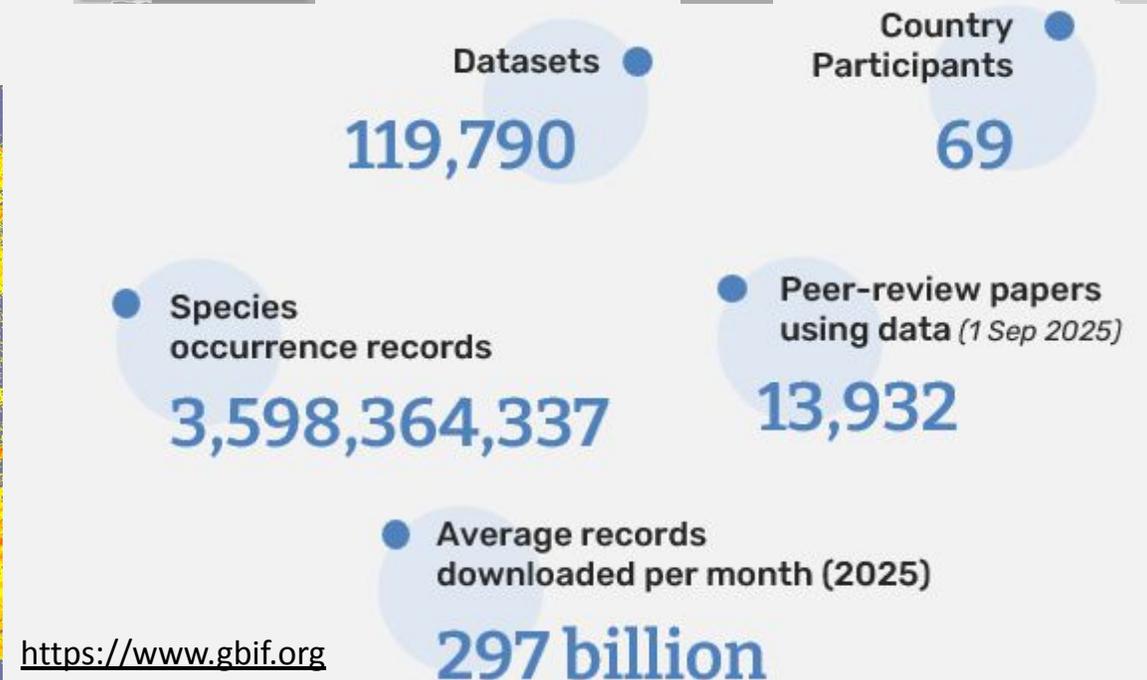
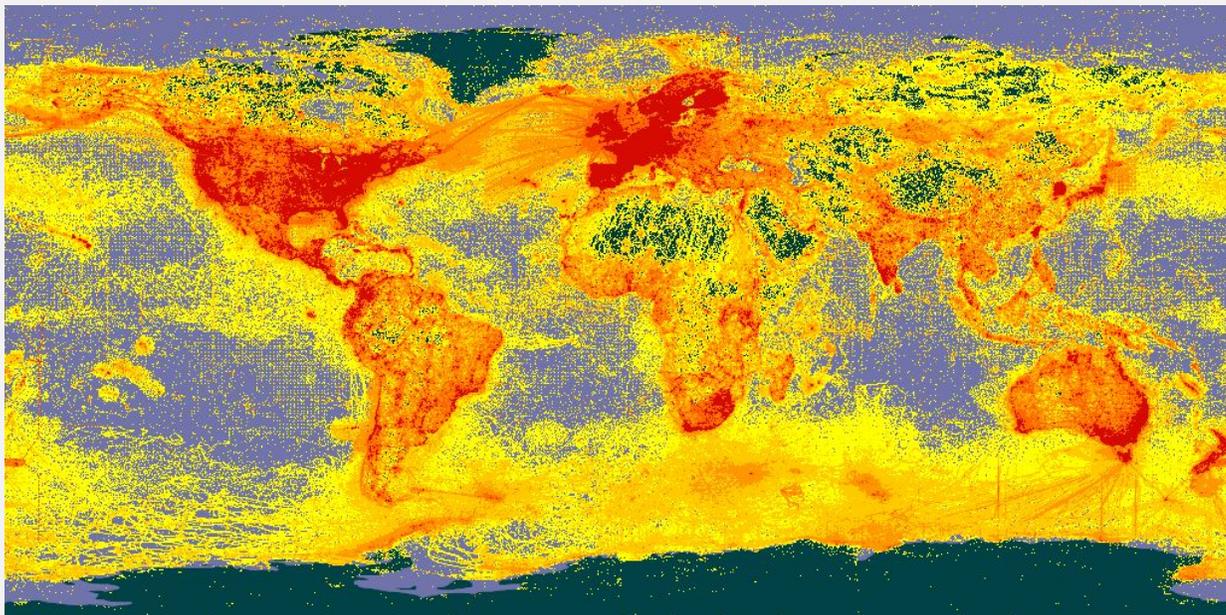
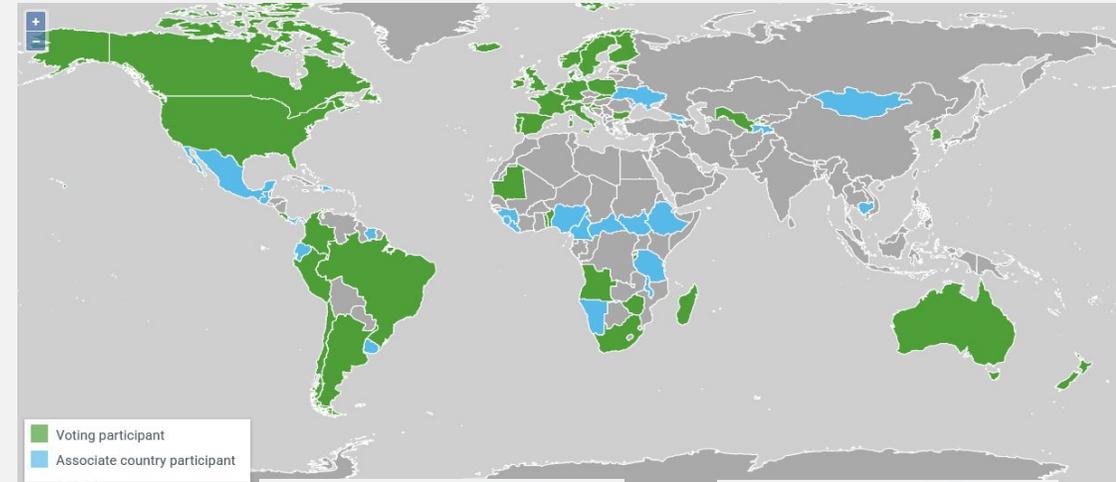
Herman Teirlinck Building, Brussel
February 11, 2026



What is GBIF?



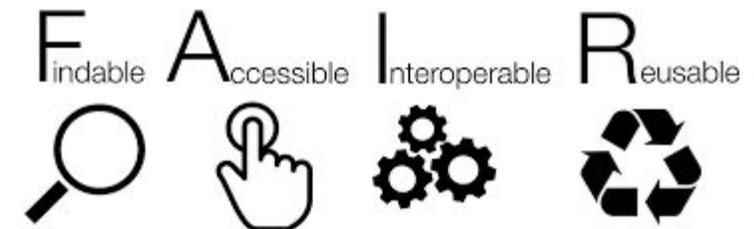
- Independent **intergovernmental organization**. Established in 2001, at the request of the OECD
- Supported by member countries, which implement "GBIF National **Nodes**"
- Created from science, for **science and society**; to support biodiversity science, environmental research, and evidence-based decision-making.
- Built network on common **standards**, best practices, and **open-source** tools
- **"Free and open access to biodiversity data"**... By everyone, for all



<https://www.gbif.org>

GBIF is an innovator and a reference

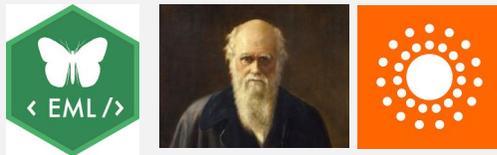
- A science initiative conceived as a research infrastructure since 2001
- Virtual, distributed
- Unified access, but data providers are credited and in control
- Data and metadata are standardized and fully indexed
- Pioneer and promoter of data papers
- DOIs for data sets and downloads since 2015
- Data under the FAIR* principles (since before they were invented)



Elements to make a difference



Unique and persistent identifiers that provide traceability and metrics



Standardized data and metadata



Standardized use licenses to facilitate data reutilization



Deep linking to any content and result instead of taking users to a generic page (such as the home page)

https://registros.gbif.es/occurrences/search?q=Tetraclinux+articulata#tab_mapView

DOIs (identifiers) ⇒ GBIF: credit, impact relevance

PUBLISHER | SINCE
CSIC-Real Jardín Botánico

ABOUT METRICS

305,440 OCCURRENCES WITH IMAGES

2,057,262 GEOREFERENCED RECORDS

Generated 16 hours ago © OpenStreetMap contributors, © OpenMapTiles, GBIF

Any year 1619-2019 EXPLORE

CITATIONS

921 citations

Read more about literature, how it's discovered and linked to GBIF-mediated data.

CONJUNTO DE DATOS DE REGISTROS BIOLÓGICOS | REGISTRADO

CSIC-Real Jardín Botánico-Colección de Plantas Vasculares (MA)

Publicado por Real Jardín Botánico (CSIC)
CSIC-Real Jardín Botánico

761.311 REGISTROS BIOLÓGICOS 2331 CITAS

CONJUNTO DE DATOS ESTADÍSTICAS ACTIVIDAD DESCARGA PÁGINA DE INICIO

CITAS

2331 citas

Leer más sobre literatura, cómo se descubre y cómo se relaciona con los datos mediados de GBIF.

634.090 eventos de descarga Descargar reporte

4 REGISTROS BIOLÓGICOS DE ESTE CONJUNTO DE DATOS

DOI 10.15468/dl.wgzjxy
Fecha: 5 de febrero de 2026
Formato: CSV

Registros de presencia: 3271
Conjuntos de datos implicados: 206

Climate change effects on habitat suitability of a butterfly in the past, present, and future: biotic interaction between *Parnassius apollo* and its host plant Literature

Sbaraglia, C. (2022)
In the alpine ecosystems across mountainous ranges, open areas are threatened by forest expansion, whether it is caused by natural succession or afforestation by human activities. During the last century, the abandonment of the grazing land and the banning of grazing by cattle in some areas, brought...

Thesis
Data referenced in study DOI 10.15468/dl.ps3mms DOI 10.15468/dl.s6dkxc

Future climates are predicted to alter the potential distributions of non-native conifer species in New Zealand Literature

Etherington, T. Peltzer, D. Wyse, S. (2022) *New Zealand Journal of Ecology*
Non-native conifers constitute a significant threat to the ecology and biodiversity of many of New Zealand's native ecosystems and species. From the top down, the potential distributions of non-native conifer species are governed by climate suitability, which alongside variables such as the availability of...

Mahalanobis distance • alien plant • climate change • convex hull • ecological niche modelling • fundamental niche
Journal article Peer-reviewed
Data referenced in study DOI 10.15468/dl.usz4af

First Glimpse on Spring Starflower Domestication Literature

Sassone, A. Blattner, F. Giussani, L. Hojsgaard, D. (2022) *Genes*
The cultivation and domestication of plants are human-driven processes that change the biology and attributes of a plant. *Ipheion uniflorum* is a bulbous geophyte known as Spring Starflower whose cultivation dates back to the first half of the 19th century. At least seven cultivars have been developed...

Allioideae • Amaryllidaceae • GBS • *Ipheion uniflorum* • SNPs • cultivation
Journal article Open access Peer-reviewed
Data referenced in study DOI 10.15468/dl.epcmy9

But...

Most scientific, policy, and management questions in the environmental domain require the integration of biodiversity data with environmental information.

Local context—such as administrative boundaries, protected areas, land use, or transport networks—is essential to address these questions effectively.

While GBIF delivers great value at the global scale, additional solutions are needed at national and regional levels.



And the Australians built a solution



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

Search & analyse ▾ Contribute

Open access to Australia's biodiversity

Researchers

Explore & contribute



Search and download records

Search occurrence records in the ALA by species, taxon, dataset, region, date, location, data provider...



Search datasets

Search data sets provided to the ALA by collecting institutions, individual collectors and community groups.



Explore your area

Enter a street address, GPS coordinates, postcode or place name to find out what species live near you.

Tools



galah

Install and use our R and Python packages that allows simple access to ALA data, tools and services.



ALA Labs

Experiments in code, data analysis & visualisation using data sourced from the ALA.



Spatial Portal

Map, visualise and analyse relationships between species, location and environment.

Government and land managers

Login

Explore & contribute



Explore your area

Enter a street address, GPS coordinates, postcode or place name to find out what species live near you.



Record a sighting

Upload your observations, identify species, and contribute to the ALA.



Australian iconic species

Browse Australia's most recognisable species.

Tools



DigiVol

Contribute to science by transcribing historical museum records and images.



BioCollect

Create surveys, capture data in the field, and manage your biodiversity, ecological and NRM data.

Community and schools

Explore & contribute



Explore regions

Browse pre-defined state territory, local government areas, biogeographic regions etc, using a map-based biodiversity discovery tool.



Share your data

Upload your biodiversity data to the ALA: occurrence data, images, sound files, genomic data, museum specimens, and more.

Tools



BioCollect

Create surveys, capture data in the field, and manage your biodiversity, ecological and natural resource management data.



Spatial Portal

Map, visualise and analyse relationships between species, location and environment.

Præaeolidia ianthina

by Peter (CC-BY-N)

A big country investment



Australia's National
Science Agency

- In **2010**, the Atlas of Living Australia (ALA) was established by the Australian Government's National Collaborative Research Infrastructure Strategy (NCRIS) to provide researchers, decision makers and community groups a **one-stop-shop for biodiversity data**.
- The ALA was established as a major Australian Government initiative with an initial budget of approximately **A\$60–65 million**.
- The Atlas of Living Australia (ALA) operates as a national research facility with an annual budget of over \$5 million (AUD) as of 2023. Atlas of Living Australia (ALA) operates as a national research facility with **an annual budget**.
- Funded by **NCRIS** and **CSIRO**.
- Operational Scale: The organization employs approximately **40 staff** members to maintain its digital infrastructure.

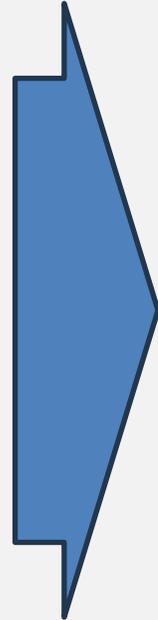
ALA is the Australian node of the Global Biodiversity Information Facility (GBIF).

Nothing comes out from nothing

OUR COUNTRY OUR FUTURE

Statement on the Environment
The Hon. R. J. L. Hawke, A.C.
Prime Minister of Australia
July 1989

landmark policy
announcement to
address environmental
degradation
pledging over \$320
million (later rising to
over \$1 billion)



Environmental
Resources
Information
Network

- to provide a **network of environmental spatial information systems** for use by environmental planners, managers, educators and decision makers;
- to ensure availability of **relevant data sets and draw together**, upgrade and supplement information about the natural environment;
- to **co-ordinate national efforts** to collect relevant information on the environment in cooperation with Commonwealth, State, Territory and other agencies;
- to provide a **framework** for assessing the implications for policy and management of environmental change or of particular actions involving environmental resource use;
- To enhance **public awareness** of Australia's natural environment.



“The Atlas of Living Australia (ALA) is probably one of the more advanced bioenvironmental portals in the world and is unique in having interfaces that appeal to audiences ranging from primary school education to citizen scientist to postgraduate research”

Lee Belbin & Kristen J Williams

**Towards a national bio-environmental data facility:
experiences from the Atlas of Living Australia**

Lee Belbin  & Kristen J Williams

Pages 108-125 | Received 10 Jan 2015, Accepted 27 Jul 2015, Published online: 26 Aug 2015

<http://dx.doi.org/10.1080/13658816.2015.1077962>

“ I want one, can I have one?”

2013: GBIF's Mentoring project

Atlas of Living Australia (ALA) and
GBIF – Costa Rica



John La Salle --ALA

María Mora -INBio



2013: Mentoring project

Atlas of Living Australia (ALA) and
GBIF – Costa Rica

Invitation to other GBIF Nodes



2014: GBIF Secretariat helps the community to organize and advance to implement ALA Tools for National Biodiversity data Portals

Canberra Meeting

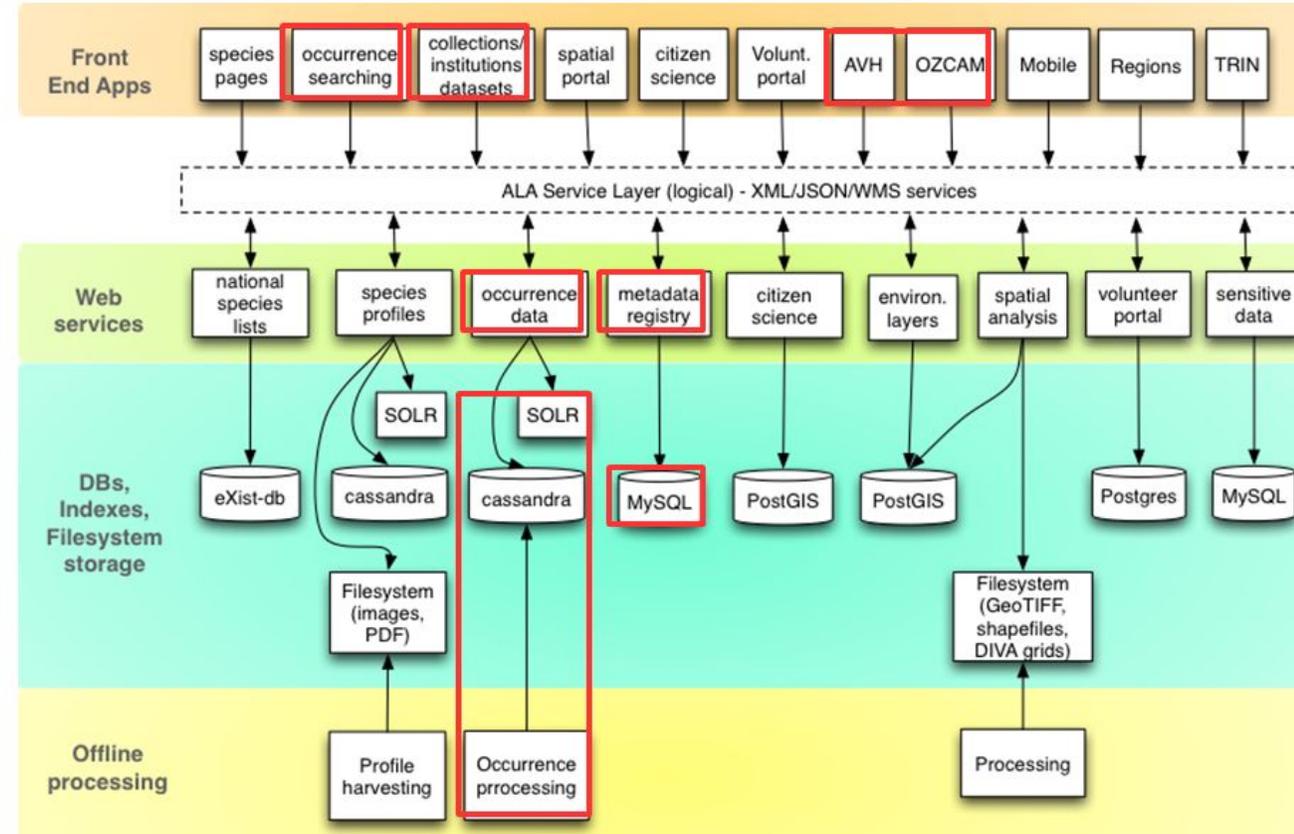


2014 other highlights

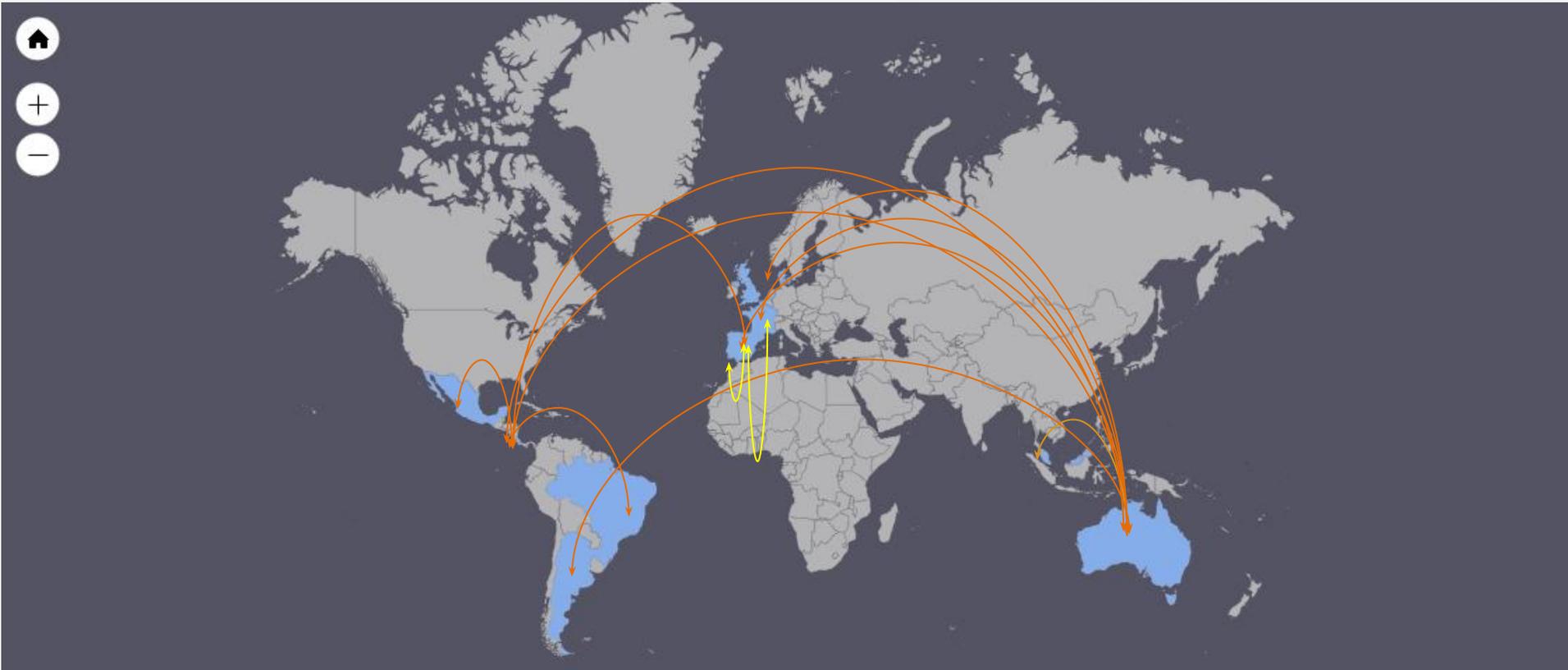
- Working group,
- List doc exchange
- Development of the ANSIBLE installation

- De-australazing ALA
- Internationalization
- Documentation

ALA ARCHITECTURE:



2014: Mentoring between France, Portugal and Spain adapts to take advantage of this emerging opportunity



2014-2015: CoopBioPlat. A ERANET-LAC Pilot Coordination Action



Nov. 2014: It can be done

? Aprende cómo consultar datos de biodiversidad.

Buscar en el portal de datos

Búsqueda avanzada

Instituciones, colecciones y proyectos



Información de todas las entidades españolas que publican datos en GBIF (p.ej.: descripción, contacto, registros en línea, portal institucional).

Juegos de datos



Información de los juegos de datos de las instituciones y proyectos participantes en GBIF, detalles de los registros, licencias de uso, citación...

Datos georreferenciados



Mapa de los registros con coordenadas. Filtre, visualice y descargue los datos por nombre científico, grupo taxonómico, área geográfica...

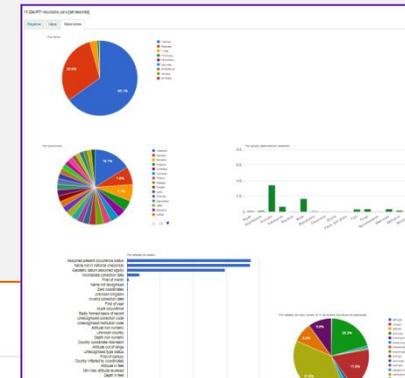
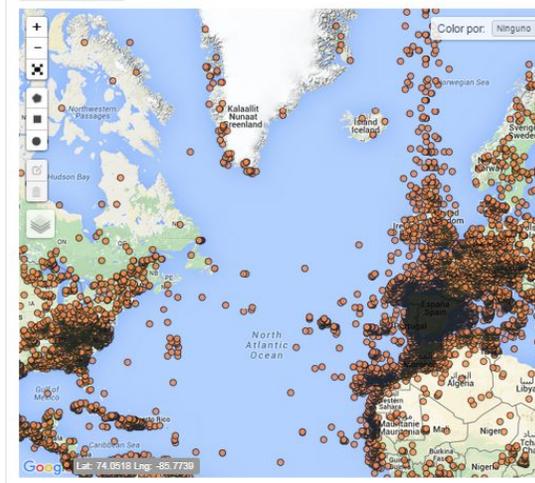
Información accesible a través del Portal de Datos de GBIF.ES.

REGISTROS: **11.224.977**
JUEGOS DE DATOS: **177**
INSTITUCIONES: **78**

11.224.977 resultados para [all records]

Registros Mapa Estadísticas

Descargar mapa



i Estamos ajustando algunas funcionalidades del portal. Disculpe las molestias que esto pueda ocasionar. Si observa cualquier incidencia agradeceríamos que nos la comunicase mediante mensaje a feedback@gbif.es

GBIF.ES es el **Nodo Nacional de Información sobre Biodiversidad**, patrocinado por el Ministerio Español de Economía y Competitividad y gestionado por el Consejo Superior de Investigaciones Científicas. El Portal de Datos de GBIF.ES se basa en el desarrollo de ALA y cuenta con el apoyo informático del IFCA, el asesoramiento de GBIF y el soporte de CrowdIn para las traducciones.

*Algunos derechos reservados. Imágenes usadas con permiso de los respectivos autores

CONTACTO

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DATOS

Instituciones, colecciones y proyectos
Juegos de datos
Explorar por área
Buscar

SERVICIOS

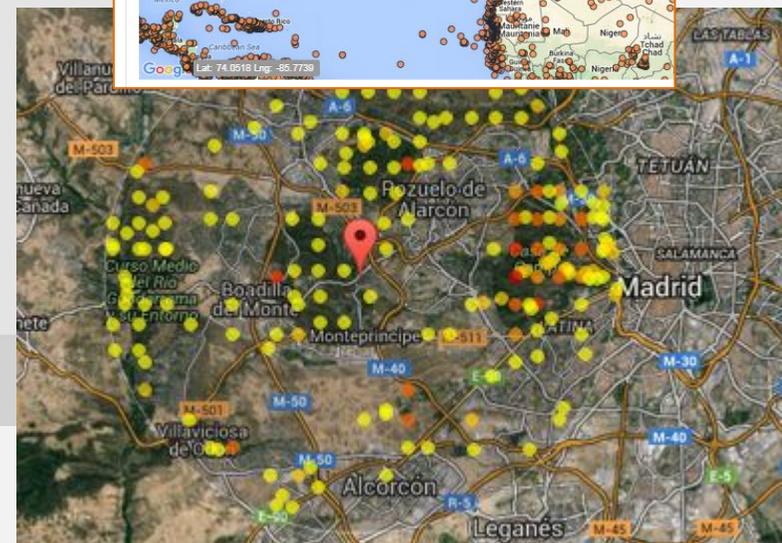
Publicación y alojamiento de datos: IPT
Alojamiento de imágenes
Formación

SOFTWARE

Herbar | Zoorbar | HZL | Darwin Test

RECURSOS

Condiciones de uso
Intercambio de datos
Uso de imágenes digitales
Datos sensibles
Guías GBIF



<http://datos.gbif.es>

2015-2018

- “Atlas of Living Europe Meeting”
- In association with the “GBIF European Nodes Meeting”
- “Encounter Bay”: translations, documentation , leaded by Belgium
- Sharing infrastructure : e.g. Andorra-Spain
- More countries interested



The Living Atlases Community formally starts



The international Living Atlases community

The Living Atlases community is a global network of countries that share and collaborate on biodiversity data. The community was conceived at the GBIF Governing Board Meeting at Kilkenny (Ireland), 2018. Founding members include Australia (ALA), Brazil, France, Portugal, Spain, and Sweden, plus GBIF Secretariat. GBIF has provided support for this emerging community in various ways, including a Community Coordinator (2019 – 2021), a Technical Coordinator (2019- present), and several CESP projects (e.g.): “Encounter Bay: easing ALA portal reusability” (BE) and “National Portals serving National Needs” (ES).

The Living Atlases community offers full news from and a current participat

[Visit living](https://living-atlases.gbif.org)

↑ The software infrastructure originally developed by the ALA now supports installations across the world.

- **The Kilkenny Accord - Living Atlas Community**

Conceived at the GBIF Governing Board Meeting at Kilkenny (Ireland), 2018

“Founding Members”: Australia (ALA), Brazil, France, Portugal, Spain and Sweden, plus GBIF Secretariat

GBIF has provided support for this emerging community in various ways:

- Community Coordinator (2019 – 2021)
- Technical Coordinator (2019- present)
- Several CESP projects (e.g.):
 - “Encounter Bay: easing ALA portal reusability” (BE)
 - “National Portals serving National Needs” (ES)

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

Living Atlases

The open community around the Atlas of Living Australia platform

Home Participants Resources News Projects Events

Technical resources

Name	Type	Year	Licence
ALA Quick Start Guide	Github wiki	On-going	NA
Living Atlases Toolkit	GitHub Repository	On-going	MPL-2.0
Living Atlas Ansible Generator	GitHub Repository	On-going	Apache-2.0
Base branding for new Living Atlas deployments	GitHub Repository	On-going	Apache-2.0
LA Development Guide	Github wiki	On-going	NA
Technical Wiki Documentation	Github wiki	On-going	NA
Technical support sessions for bootstrap and launch new LA national nodes	Document	On-going	NA
Instructions for Living Atlas technical bootstrap support	Document	On-going	NA

Support

The screenshot shows a GitHub Wiki page for 'AtlasOfLivingAustralia / documentation' with the title 'Testing Debian Packaging'. The page content includes:

- A paragraph: "This page describes the testing of Debian packaging system of ALA modules."
- A section 'ALA Debianizer' with a link: <https://github.com/living-atlases/living-atlases-debianizer>
- A section 'Testing branches' with two links: <https://github.com/living-atlases/ala-collectory/tree/debian-package/debian> and <https://github.com/living-atlases/image-service/tree/debian-package/debian>
- A section 'Using demo repository' with a code block:

```
echo "deb [arch=amd64] https://apt.gbif.es/ bionic main" > /etc/apt/sources.list.d/ala.list
apt-key adv --keyserver keyserver.ubuntu.com --recv-keys F697D8D2AD89E24A
apt update
```
- A section 'Testing ala-collectory service' with a code block:

```
apt install ala-collectory dbconfig-no-thanks
```

<https://github.com/AtlasOfLivingAustralia/documentation/wiki/Testing-Debian-Packaging>

The screenshot shows a GitHub repository page for 'living-atlases'. It features a list of packages with their update status and dates:

- bie-index @ badcbbc: Updated version, 4 months ago
- biocache-hubs @ 01d0336: Updated version, 4 months ago
- biocache-service @ f5dd356: Updated version, 4 months ago
- biocollect @ 34ef3f0: Updated version, 4 months ago
- collectory @ d172043: Updated version, 2 months ago
- crowdin-configs: Updated crowdin configs, 4 months ago
- debian: Updated version, 10 months ago

Below the list is a 'README' section for the 'ala-i18n' package:

Introduction

Translations of ALA modules is something crucial for non-English countries in the LA community but something of low priority for English countries.

This is a proposal for a better and faster management of translations in LA.

This repo is used to maintain, package and install ALA translations in `/opt/atlas/<appname>/i18n/messages*` directories of our servers up-to-date with crowdin.

This follows the `/opt/atlas` usage of `CAS` and new `images-service` version.

Packaging

We create an unique debian package like `ala-i18n` with all the apps translations together to simplify (also we can use `alien` to generate an equivalent RHEL package) and we add it to a debian public repo (see below).

This internationalization package is automatically build and released on each crowdin finished translation and will be quite independent of ALA apps releases.

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

Eight years and 1 pandemic later...

Participants with live data portals

Institution	Area	Language
Atlas of Living Australia	Australia	English
BioAtlas - Atlas bioraznolikosti Hrvatske	Croatia	Croatian & English
Biodiversitäts-Atlas Österreich	Austria	German & English
GBIF Andorra	Andorra	Catalan & Spanish
GBIF Benin	Benin	French
GBIF France	France	French
GBIF Portugal	Portugal	Portuguese
GBIF Spain	Spain	Spanish & English & Catalan
GBIF Togo	Togo	French
Israel Citizen Science Center, SMNH	Israel	Hebrew & English
Kew Data Portal	UK	English
NBN Atlas	United Kingdom	English
NBN Atlas Isle of Man	Isle of Man	English

22 Living Atlases portals running, and other parties considering, experimenting



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

<https://crowdin.com/project/ala-i18n>

gbif-informatics / ALA Internationalization

Search projects

Dashboard Sources Translations Screenshots Tasks Members Integrations Reports Activity Discussions Tools Settings

Search languages AZ

Pre-translation Buy Translations Joined View Strings

CZ Czech 99% • 0%	HR Croatian 96% • 0%	NL Dutch 82% • 0%	es-ES Spanish 75% • 51%	pt-BR Portuguese, Brazilian 75% • 6%
DE German 50% • 7%	de-AT German, Austria 50% • 7%	עברית Hebrew 50% • 0%	pt-PT Portuguese 48% • 23%	CA Catalan 44% • 41%
FR French 33% • 29%	sv-SE Swedish 30% • 0%	de-LU German, Luxembourg 25% • 7%	简体字 Chinese Simplified 20% • 20%	DK Danish 17% • 0%
es-MX Spanish, Mexico 13% • 6%	EU Basque 12% • 11%	fr-CA French, Canada 8% • 6%	fr-LU French, Luxembourg 5% • 0%	PY Russian 5% • 0%

Description
Atlas of Living Australia i18n

Details ID: 54276

Source language English
Project members 109
Words to translate 46 761

Created 12 years ago
Last activity 2 weeks ago
QA Checks OFF

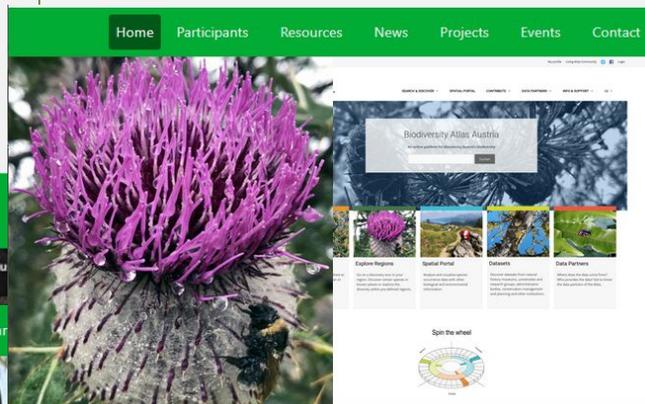
Managers

- GBIF Open Source Projects gbi... **Owner**
- Dave Martin djtfmartin **Contact**
- Pacopando **Contact**
- Rui Figueira rpfigueira **Contact**
- manashshah **Contact**

Living Atlases

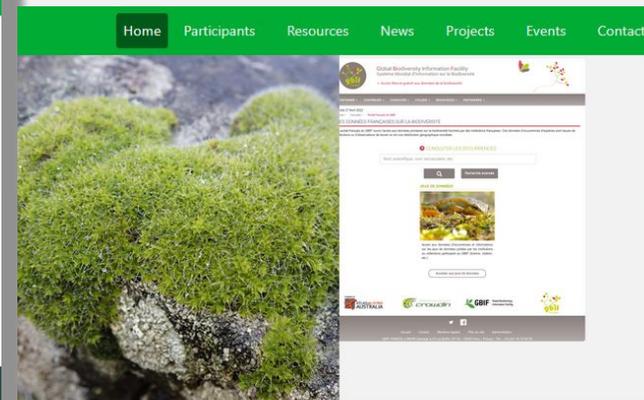
The open community around the Atlas of Living Australia platform

Home Participants Resources News Projects Events Contact About



Biodiversity Atlas Austria

Online platform for discovering Austria's biodiversity



GBIF France

Portail français du GBIF



SIBBr

Sistemas de Informações sobre a Biodiversidade Brasileira



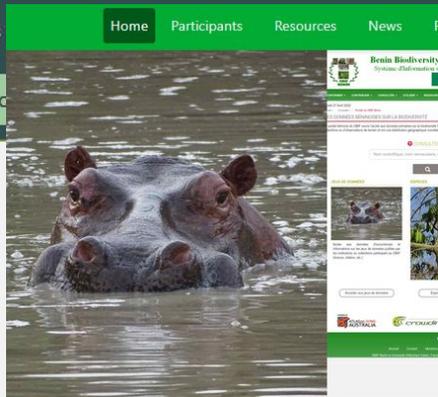
GBIF Portugal

Portal de Dados de Biodiversidade

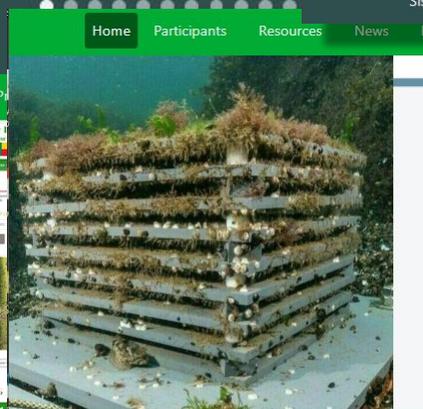
Atlas of Living Australia

Australia's

Read more



GBIF Benin



SBDI

Swedish Biodiversity Data Infrastructure

59.852.878 occurrences
622 datasets
121 institutions
154.573 species

VLAAMS BIODIVERSITEITSPORTAAL

Soorten: 24.344
Waarnemingen: 28.065.162
Datasets: 309
Soortlijsten: 41

It does...

<https://espacial.gbif.es/#>

Biodiversity data
(observations-distribution)

Environmental layers
(Climate)

Polygons
(Protected areas)

Algorithms

Persistence

The screenshot shows the Gbif.es web application interface. At the top, there are navigation menus: 'Añadir', 'Utilidades', 'Importar', 'Exportar', and 'Ayuda'. The 'Utilidades' menu is circled in orange. Below the menus, there is a list of layers and data sources, each with a checkbox and a search icon. The layers are: 'Tetraclinis articulata (World)' (checked, circled in purple), 'WorldClim 10m Max Temperature of Warmest Month' (checked), 'Espacios Naturales Protegidos' (unchecked, circled in green), and 'WorldClim 10m Annual Precipitation' (checked, circled in blue). Below the layers list, there are buttons for 'Eliminar selección', 'Descargar datos', and 'Descargar imagen'. A scatter plot titled 'Tetraclinis articulata (World)' is displayed, showing the relationship between 'WorldClim 10m Max Temperature of Warmest Month' (y-axis, 25.5 to 32.0) and 'WorldClim 10m Precipitation of Driest Quarter' (x-axis, 0 to 150). The plot shows a positive correlation between temperature and precipitation. On the right side, there is a map of Spain and North Africa with various data points. A metadata panel is open, showing details for 'Reino' (Spain), 'Familia' (Cupressaceae), 'Proveedor de datos' (GBIF ES IPT), 'Latitud & Longitud' (40.4118, -3.6801), and 'Creado' (08 / 2020). There are also buttons for 'Ver registro' and 'Lista de registros en este momento'. At the bottom right, there is a table with two rows of data: 'WorldClim 10m Max Temperature of Warmest Month' with value '29.469499588012695' and 'WorldClim 10m Annual Precipitation' with value '405.0'. In the top right corner, the buttons 'Guardar' and 'Cargar' are circled in red. A red arrow points from the 'Cargar' button to the 'Persistence' label on the left. A green arrow points from the 'Espacios Naturales Protegidos' layer to the 'Polygons (Protected areas)' label. A blue arrow points from the 'WorldClim 10m Annual Precipitation' layer to the 'Environmental layers (Climate)' label. An orange arrow points from the 'Tetraclinis articulata (World)' layer to the 'Algorithms' label. A purple arrow points from the 'Tetraclinis articulata (World)' layer to the 'Biodiversity data (observations-distribution)' label.

It does... species

Top Interactions

- Area report – interactive
- Scatterplot – single
- Scatterplot – multiple
- Compare points
- Compare areas
- Calculate AOO y EOO
- Restore prior analysis

Informe del área - RB Cuencas Altas de los Ríos Manzanares Lozoya y Guadarrama

Área (km2)	1404.04	Información
Número de especies	8092 Lista	View Records
Número de especies - sólo las válidas espacialmente	8086 Lista	View Records
Número de especies endémicas	8092 Lista	View Records
Número de especies endémicas - sólo las válidas espacialmente	8086 Lista	View Records
Observaciones o especímenes	509619 Mapear todo Muestra	View Records
Observaciones o especímenes - sólo los válidos espacialmente	509613 Mapear todo Muestra	View Records
Especies invasoras	37 Lista Mapear todo Muestra	View Records
Especies amenazadas	290 Lista Mapear todo Muestra	View Records
Especies migratorias - EPBC	0 Lista completa	
Especie emblemática de Australia	0 Lista completa	
Algae	2 Lista Mapear todo Muestra	View Records

[Cerrar](#)

GBIF.ES

Añadir ▾ Utilidades ▾ Importar ▾ Exportar ▾ Ayuda ▾

- Loniceria periclymenum
- Euphydryas aurinia
- Cuencas Altas de los Ríos Manzanares Lozoya y Guadarrama
- Opciones de mapa

Euphydryas aurinia

Nombre de la capa:

Mostrar como: Cuadrícula de densidad Puntos

Filtro:

Tamaño: 4

Opacidad: 75%

Mostrar la incertidumbre espacial como un

Loniceria periclymenum

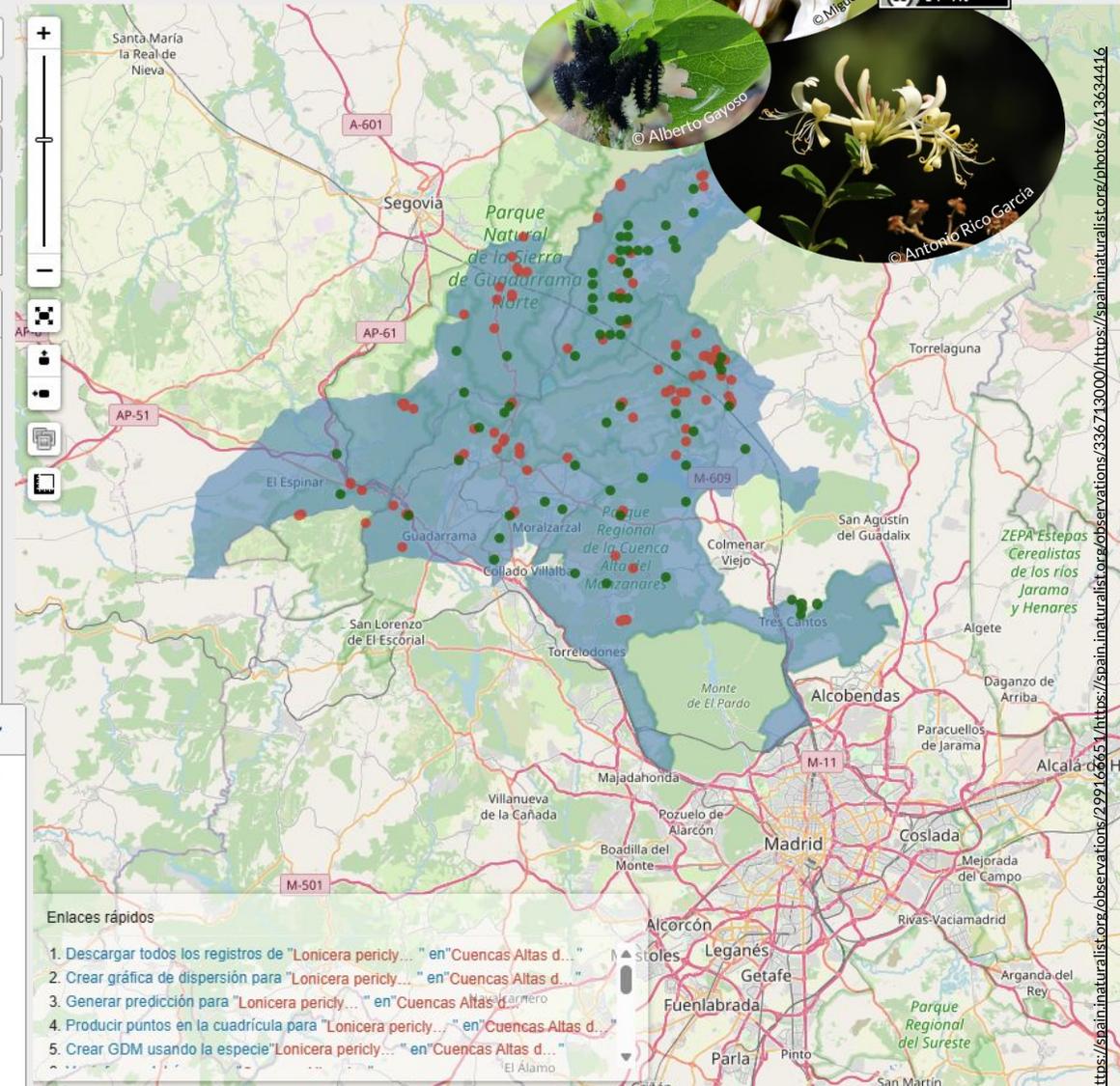
Nombre de la capa:

Mostrar como: Cuadrícula de densidad Puntos

Filtro:

Tamaño: 4

Opacidad: 86%



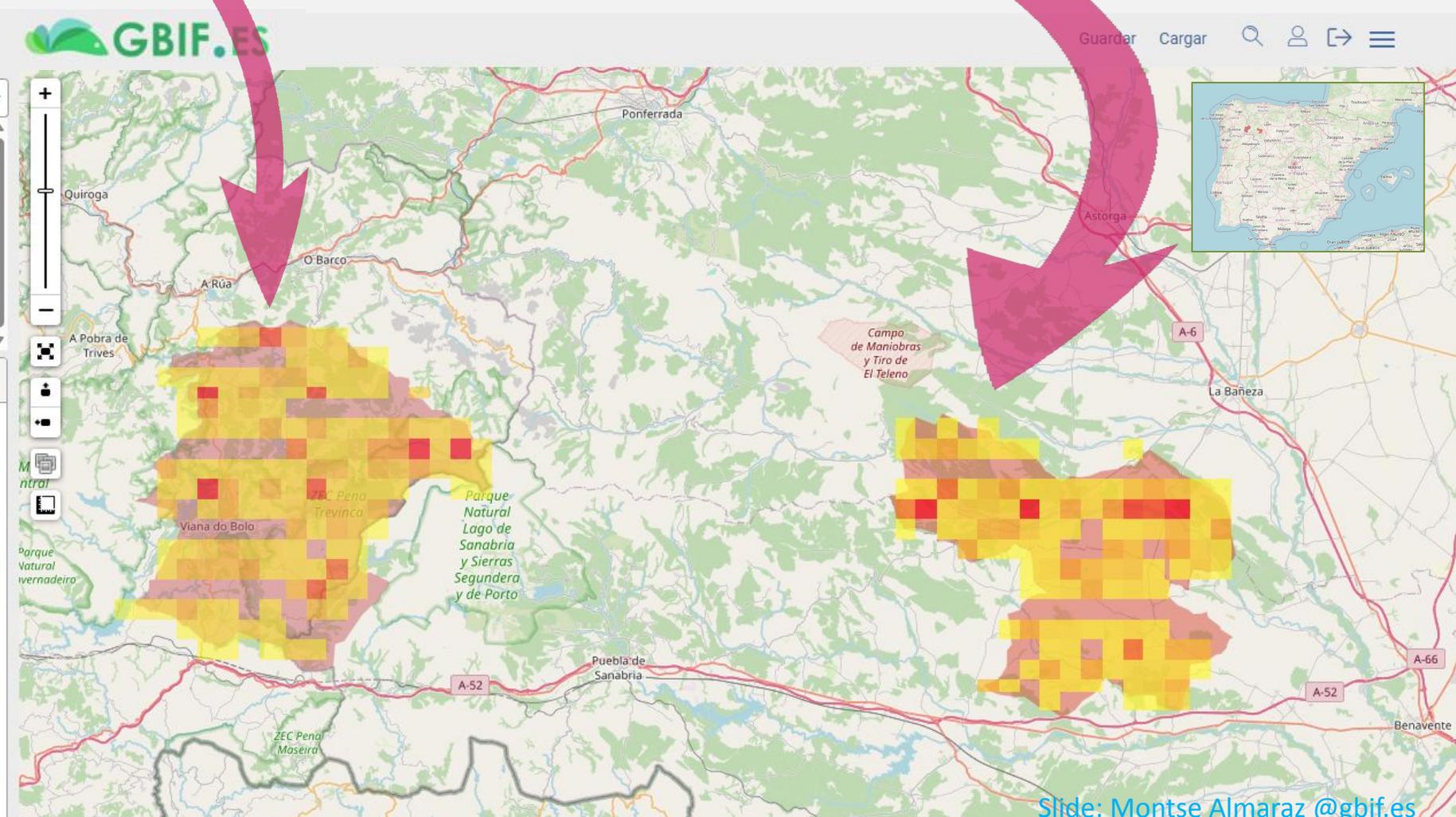
- Enlaces rápidos
1. Descargar todos los registros de "Loniceria pericly..." en "Cuencas Altas d..."
 2. Crear gráfica de dispersión para "Loniceria pericly..." en "Cuencas Altas d..."
 3. Generar predicción para "Loniceria pericly..." en "Cuencas Altas d..."
 4. Producir puntos en la cuadrícula para "Loniceria pericly..." en "Cuencas Altas d..."
 5. Crear GDM usando la especie "Loniceria pericly..." en "Cuencas Altas d..."

It does... decision

Species	Area name	Sq km	Occurrences
Todas las especies	IN_POL1	696.45	12540
Todas las especies	IN_POL2	568.99	9914
Species found in IN_POL1		1952	
Species found in IN_POL2		1278	
Species found in both areas		662	



Fires in this area...
<https://sites.research.google/gr/wildfires/>



The last slide

- Biodiversity information is complex and “dirty”, Biodiversity Portals are not easy
- Biodiversity Portals are not “one shot” operations; they require constant evolution and maintenance to address users’ needs, adopting new technological capabilities and counteract emerging threats
- However, as we have seen, a community of initiatives and countries are working together to have advanced biodiversity portals

This is the power of open source/data and collaboration

It is the power of the vision and generosity of many, but first of all of the people involved in Atlas of Living Australia

It is the power of GBIF



Living Atlases
Workshop.
Madrid 2025

Francisco Pando

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CSIC

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<https://www.gbif.es/>, <https://datos.gbif.es>, <https://elearning.gbif.es>

