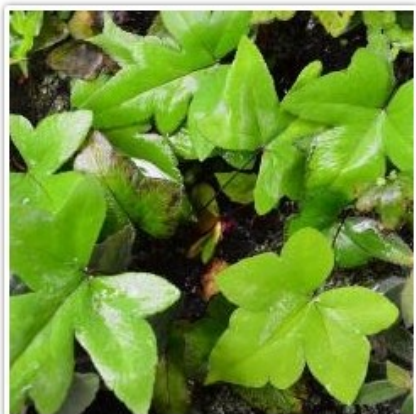




Using GBIF as an Early Alert System to Invasive Alien Plant Species

Rui Figueira, GBIF.PT
Inês Paulino, GBIF.PT
Francisco Pando, GBIF.ES



Quelques Ptéridacées d'Afrique tropicale

Le continent africain est très pauvre en Ptéridophytes comparé aux autres grandes surfaces tropicales. Ainsi, si on le compare à Madagascar, sa diversité est 40 fois plus petite. Par ailleurs, l'Afrique tropicale, et notamment les zones de forêt, constituent un « point-chaud » de la biodiversité mondiale. Cependant, cette diversité n'est pas encore assez bien connue et il s'avère donc nécessaire d'avoir plus de connaissances sur la richesse spécifique et la distribution des différents groupes taxinomiques pour atteindre une conservation objective.

Nombre de spécimens 3847

Chef de mission [Celinemtp](#)

Ouverture 10 août 2014

[Contribuer](#)

29 août 2014



Merci à vous !!

Les 1000 premiers spécimens de la mission ont déjà été vus ! Jusqu'à présent seul un spécimen du Sénégal a été repéré mais c'est déjà une information précieuse car cette espèce n'a jamais été citée pour le Sénégal! Merci à vous!!!

32

membres

8870

contributions



Quelques Ptéridacées d'Afrique tropicale

 [Pellaea viridis](#)
 [MNHN/P/P01269336](#)

 Photo inutilisable

[spécimen suivant](#) ➔

Pour résoudre le conflit, cliquez sur le symbole


Pays

Aide ?

Sélectionnez un pays ▾

- ☐ Je l'ai déduit
☐ J'hésite
☐ Pas d'information

[Valider](#)

Région

Niveau 2 requis

Aide ?

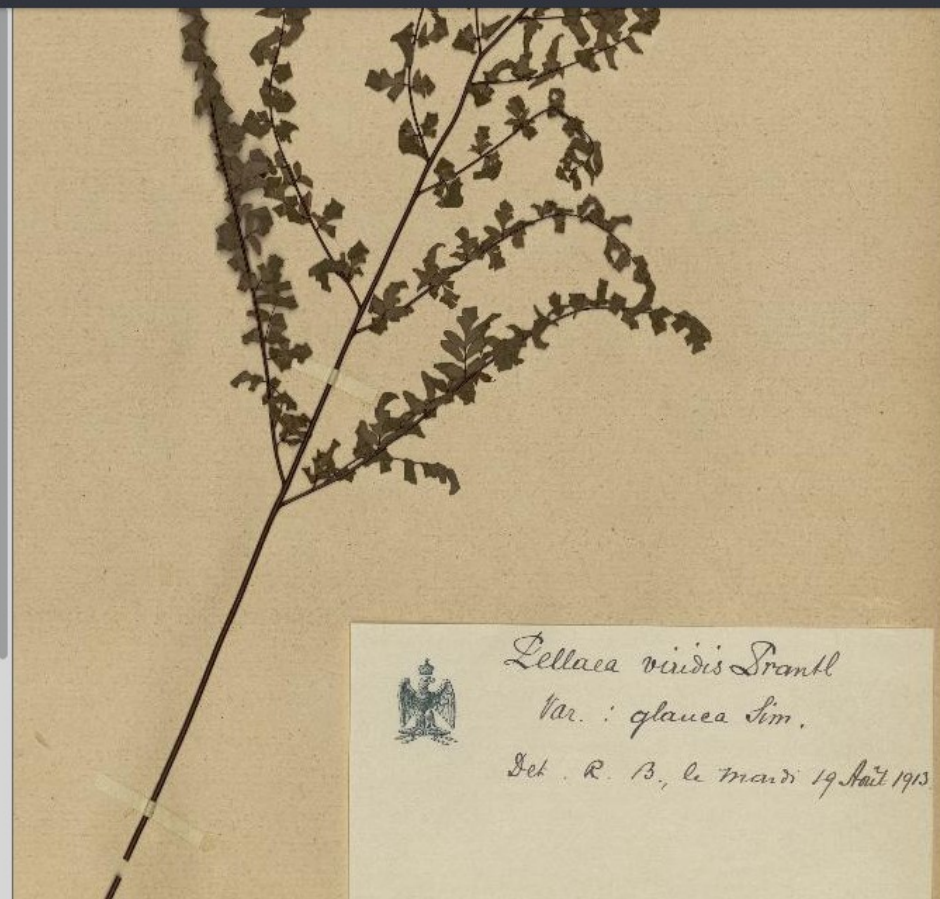
Date

Niveau 3 requis

Aide ?

Botanistes

Aide ?



Citizen science initiatives

Portugal



In Spain



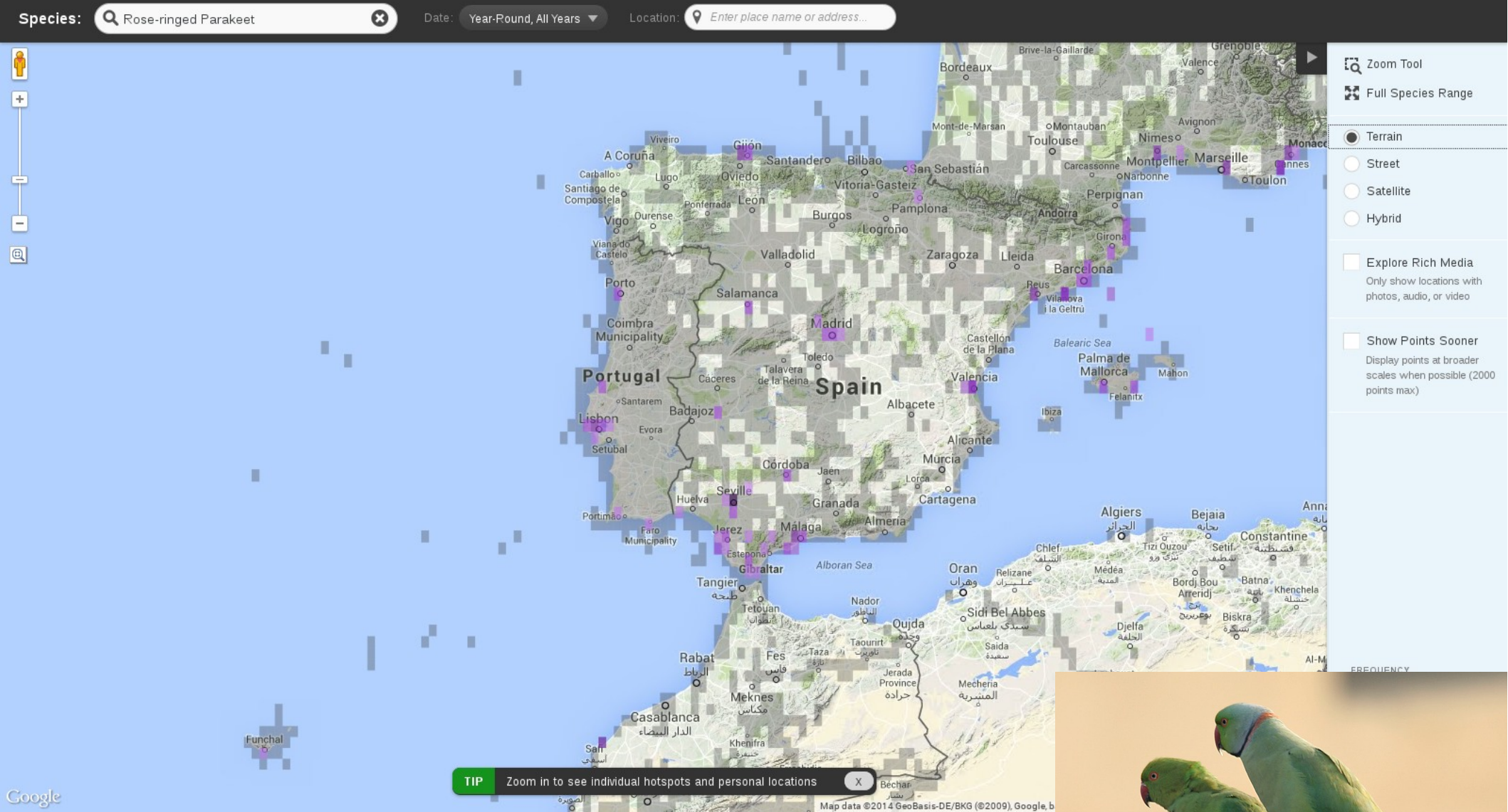
Aranzadi Science Society



Carl Faust Foundation

Iberian Spider Catalogue,
Morano and Cardoso

GBIF.ES is promoting a pilot study with several associations and CREAM to adapt iNaturalist



EBIRD provides more than 150 million records to GBIF,
about 230 000 to Portugal and 180 000 to Spain





The Invisible Prevalence of Citizen Science in Global Research: Migratory Birds and Climate Change

Caren B. Cooper^{1*}, Jennifer Shirk¹, Benjamin Zuckerberg²

¹ Cornell Lab of Ornithology, Ithaca, New York, United States of America, ² University of Wisconsin, Madison, Wisconsin, United States of America

Abstract

Citizen science is a research practice that relies on public contributions of data. The strong recognition of its educational value combined with the need for novel methods to handle subsequent large and complex data sets raises the question: Is citizen science effective at science? A quantitative assessment of the contributions of citizen science for its core purpose – *scientific research* – is lacking. We examined the contribution of citizen science to a review paper by ornithologists in which they formulated ten central claims about the impact of climate change on avian migration. Citizen science was never explicitly mentioned in the review article. For each of the claims, these ornithologists scored their opinions about the amount of research effort invested in each claim and how strongly the claim was supported by evidence. This allowed us to also determine whether their trust in claims was, unwittingly or not, related to the degree to which the claims relied primarily on data generated by citizen scientists. We found that **papers based on citizen science constituted between 24 and 77% of the references backing each claim**, with no evidence of a mistrust of claims that relied heavily on citizen-science data. We reveal that many of these papers may not easily be recognized as drawing upon volunteer contributions, as the search terms “citizen science” and “volunteer” would have overlooked the majority of the studies that back the ten claims about birds and climate change. Our results suggest that the significance of citizen science to global research, an endeavor that is reliant on long-term information at large spatial scales, might be far greater than is readily perceived. To better understand and track the contributions of citizen science in the future, we urge researchers to use the keyword “citizen science” in papers that draw on efforts of non-professionals.

Citation: Cooper CB, Shirk J, Zuckerberg B (2014) The Invisible Prevalence of Citizen Science in Global Research: Migratory Birds and Climate Change. PLoS ONE 9(9): e106508. doi:10.1371/journal.pone.0106508

Editor: Robert Guralnick, University of Colorado, United States of America

EU Biodiversity Target 5

Target 5: Help combat Invasive Alien Species

By 2020, Invasive Alien Species (IAS) and their pathways are identified and controlled or eradicated or managed to prevent the introduction of new IAS.

European strategy on invasive alien species

Piero Genovesi a

Convention on the European Wildlife (Bern Convention)

Nature and env

Council of Europe P

Aichi Target 9

9: By 2020, invasive alien species and pathways are controlled or eradicated or managed to prevent the introduction of new IAS.



9106

DIÁRIO DA REPÚBLICA — I SÉRIE-A

N.º 295 — 21-12-1999

quim Augusto Nunes de Pina Moura — Luís Manuel Capoulas Santos — Elisa Maria da Costa Guimarães Ferreira — Manuel Maria Ferreira Carrilho — José Mariano Rebelo Pires Gago.

Fauna aquática dulciaquícola

Bacia do Minho

Peixes:

Micropterus salmoides — achigã;
Oncorhynchus mykiss — truta-arco-íris.

Promulgado em 29 de Novembro de 1999.

Publica-se

O P

O J

Guterr

Espéci

Inverte

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BOLETÍN OFICIAL DEL ESTADO



Núm. 298

Lunes 12 de diciembre de 2011

Sec. I. Pág. 132726

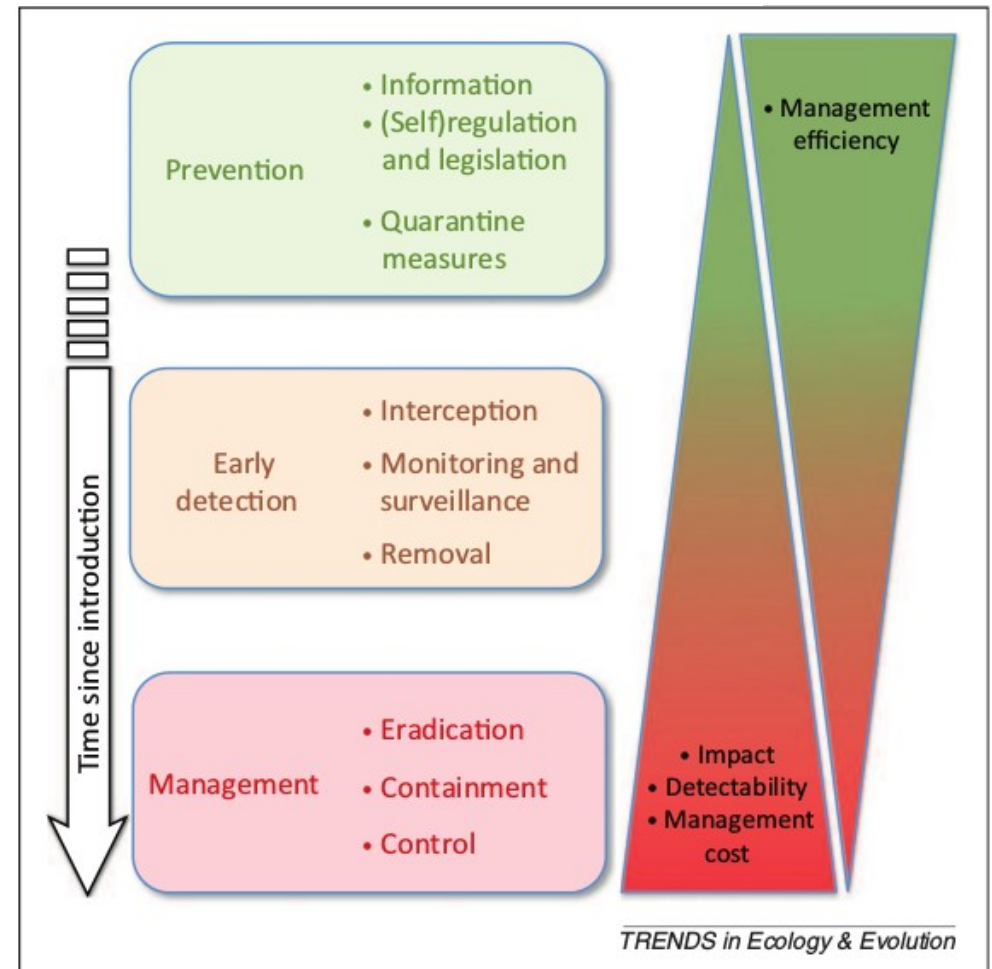
ANEXO I

Catálogo Español de Especies Exóticas Invasoras

Especie	Ámbito de aplicación	Nombre común
HONGOS		
<i>Batrachochytrium dendrobatidis</i> (Longcore, Pessier & D.K. Nichols, 1999).		
ALGAS		
<i>Asparagopsis armata</i> (Harvey, 1855).	Excepto Canarias.	
<i>Asparagopsis taxiformis</i> ((Delile) Trevisan de Saint-Léon, 1845).	Excepto Canarias.	
<i>Caulerpa racemosa</i> ((Forssk.) J.Agardh, 1873).		
<i>Caulerpa taxifolia</i> ((M.Vahl) C.Agardh, 1817).		
<i>Codium fragile</i> ((Suringar) Hariot, 1889).		
<i>Grateloupia turuturu</i> (Yamada, 1941).		
<i>Sargassum muticum</i> ((Yendo) Fensholt, 1955).		
<i>Styopodium schimperi</i> ((Buchinger ex Kützinger) Verlaque & Boudouresque, 1991).		
<i>Undaria pinnatifida</i> (Harvey) Suringar, 1873).		

Impacts of biological invasions: what's what and the way forward

Daniel Simberloff¹, Jean-Louis Martin², Piero Genovesi³, Virginie Maris², David A. Wardle⁴, James Aronson^{2,5}, Franck Courchamp⁶, Bella Galil⁷, Emili García-Berthou⁸, Michel Pascal⁹, Petr Pyšek^{10,11}, Ronaldo Sousa^{12,13}, Eric Tabacchi¹⁴, and Montserrat Vilà^{15*}



Trends in Ecology & Evolution, vol. 28 (n° 1). pp. 58-66

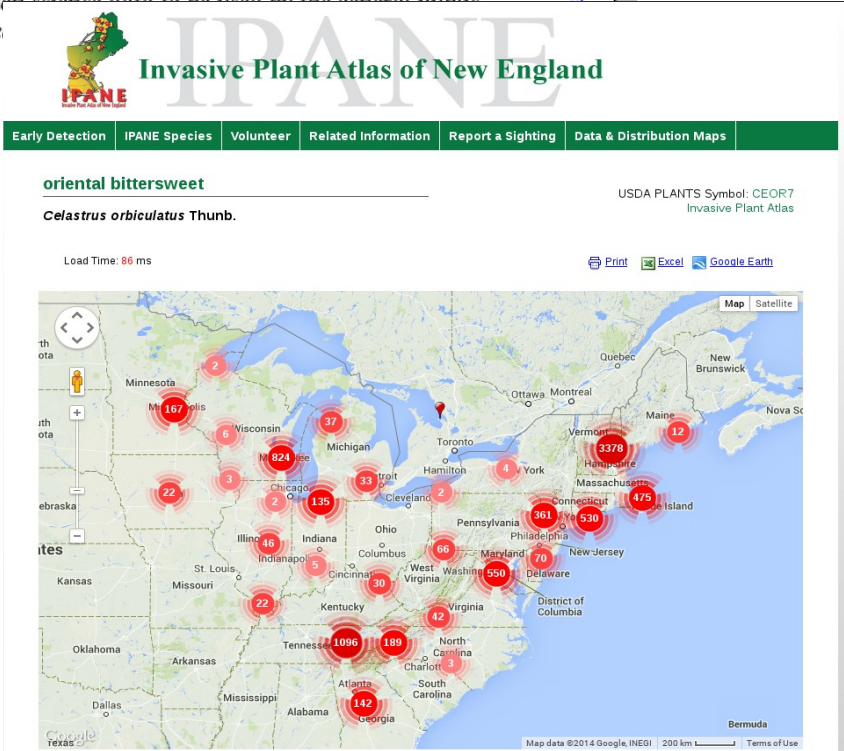
Figure 1. Management strategy against invasive species. The optimal strategy evolves with time since introduction, with management efficiency decreasing and management costs increasing with time since introduction.

Invasive Plant Atlas of New England: The Role of Citizens in the Science of Invasive Alien Species Detection

SARAH T. BOIS, JOHN A. SILANDER JR., AND LESLIE J. MEHRHOFF

In response to the global threat of invasive alien species, there has been a proliferation of volunteer-based monitoring programs. The valuable data sets collected through these programs facilitate large-scale, baseline population monitoring. The Invasive Plant Atlas of New England, created in 2001, was the first such regional database and is the only one in which both presence and true absence data have been collected. Building on the success of volunteer atlas projects for other taxa, the Web-based network uses trained volunteers, along with experts, to collect distribution data and detailed environmental information. The incorporation of true absence data allows for the building of robust statistical models, which contributes significantly to the invasive species literature. This collaborative database allows citizen science data to be used by the general public and as a data source for researchers and policymakers. As a template for other invasive plant projects in invasion ecology.

Keywords: citizen science, species distribution database, invasive species, IPANE, null data

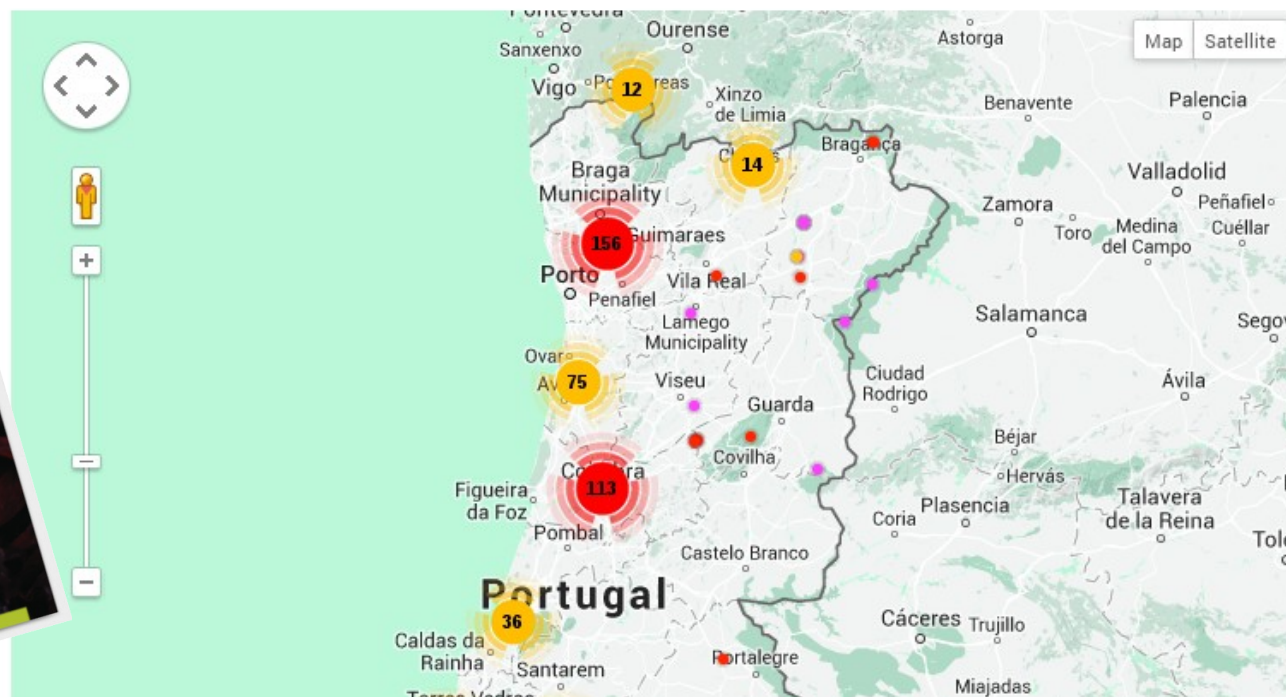


[Saiba mais sobre os objectivos deste mapa](#) | [Faça o Download da aplicação para Android](#) | [Download de fichas de Avistamentos em PDF](#) | [FAQ](#)

Vejam onde estão as invasoras em Portugal. Os avistamentos são submetidos por utilizadores voluntários que, de Norte a Sul, colocam no mapa as plantas invasoras que encontraram.

Apenas os ultimos 500 avistamentos validados são visíveis neste mapa. [Vejam o mapa com todas as submissões aprovadas.](#)

Mapa de avistamentos

[REGISTE-SE AQUI](#)
[LOGIN](#)
[NOVO AVISTAMENTO](#)




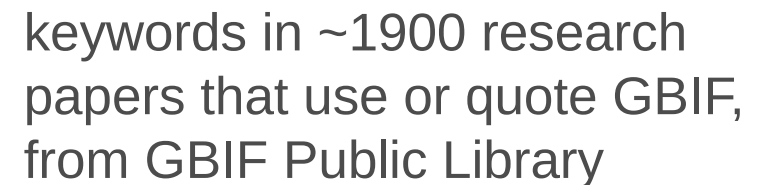
GBIF mission:

To allow anyone, anywhere to access data about all types of life on Earth, shared across national boundaries via the Internet.

There are no GBIF data? Data are simply published through GBIF.

- each data retains its original properties set by the publisher (intellectual property, license, quality, etc)
- occurrence data:
 - species, local, date, observer/collector
 - data portal supports 150 terms of the DwC standard
 - links with multimedia data types (sounds, videos, images)

GBIF is the *de facto* facility for global biodiversity data mobilisation and access





Global Biodiversity Information Facility

Free and Open Access to Biodiversity Data

513,396,996
OCCURRENCES

1,454,694
SPECIES

13,755
DATASETS

633
DATA PUBLISHERS

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Search occurrences

Use the filters to customize search results

362

Occurrences

[Download](#)**362 results**[Configure](#) ▾ [Add a filter](#)

COUNTRY

Portugal ✕

Spain ✕

SCIENTIFIC NAME

Azolla filiculoides Lam. ✕

	LOCATION	BASIS OF RECORD	DATE
781074930 · Cat. 76020-1 Azolla filiculoides Lam. Published in Universidad de Málaga: MGC-Cormof	Spain 40.71/0.59 Elevation: 0m Depth: 0m	Specimen	9 / 2012
894173843 · Cat. 68280 Azolla filiculoides Lam. Published in SANT herbarium vascular plants collection	Universidad de Málaga: MGC-Cormof Spain N/A	Specimen	11 / 2012
895215969 · Cat. 201307-1 Azolla filiculoides Lam. Published in Colección de plantas vasculares del herbario de la Universit...	Spain 39.40/-0.34 Elevation: 2m	Specimen	1 / 2009
894173848 · Cat. 59841 Azolla filiculoides Lam. Published in SANT herbarium vascular	Spain	Specimen	9 / 2008

www.gbif.org/occurrence



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You need to be logged in to use this part of the portal.

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[Annual Report](#)
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[GBIF Work Programme](#)
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[Developer blog](#)
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Download started

Your [download #0003574-140910143529206](#) is running

Please expect 10 to 15 minutes for the download to complete.

A notification email with a link to download the results will be sent to the following addresses once ready:

- rui.figueira@iict.pt

In your user home you can also see the status and link to [all your requested downloads](#).

Please visit this [page](#) to obtain information of how to use the downloaded data.

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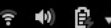
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- windows



citations.txt
2,4 kB



dataset
20 items



meta.xml
34,1 kB



metadata.xml
5,5 kB



multimedia.txt
134 bytes



occurrence.txt
256,2 kB



rights.txt
3,8 kB



verbatim.txt
171,5 kB

Rui Figueira

User account and personal settings

Account

Downloads

Your Downloads

FILTER [COUNTRY](#) [Spain](#)
[TAXON](#) [Azolla filiculoides Lam.](#)
STATUS Ready for [download](#) (100.0 kB 344 records - 20 datasets)
CREATED Sep 24, 2014

FILTER [COUNTRY](#) [Portugal, Spain](#)
[TAXON](#) [Azolla filiculoides Lam.](#)
STATUS Ready for [download](#) (109.4 kB 362 records - 24 datasets)
CREATED Sep 24, 2014

FILTER [DATASET](#) [iNaturalist research-grade observations](#)
STATUS Cancelled
CREATED Sep 23, 2014

FILTER [COUNTRY](#) [Portugal](#)
[TAXON](#) [Acacia dealbata Link](#)

Feedback

[http://www.gbif.org/occurrence/search?
COUNTRY=PT&COUNTRY=ES&TAXON_KEY=2650107](http://www.gbif.org/occurrence/search?COUNTRY=PT&COUNTRY=ES&TAXON_KEY=2650107)

Persistent query

Webservice API

version v1

Summary

Registry

Species

Occurrence

Maps

News

Introduction

The GBIF API provides registration, discovery and access and information services.

The API is a RESTful JSON based API. The base URL for v1 you should use is:

- <http://api.gbif.org/v1>

The API is split into logical sections to ease understanding:

- **Registry:** Provides means to create, edit, update and search for information about the datasets, organizations (e.g. data publishers), networks and the means to access them (technical endpoints). The registered content controls what is crawled and indexed in the GBIF data portal, but as a shared API may also be used for other initiatives
- **Species:** Provides services to discover and access information about species and higher taxa, and utility services for interpreting names and looking up the identifiers and complete scientific names used for species in the GBIF

Quick links

- [Common operations](#)
- [Authentication](#)
- [Roadmap to v2](#)
- [GBIF API users mailing list](#)

O Webservice API (application programming interface) permite que os dados publicados através do GBIF possam ser pesquisados de forma automática


```

{"offset":0,"limit":20,"endOfRecords":false,"count":362,"results":
[{"key":781074930,"datasetKey":"962ccea-f762-11e1-
a439-00145eb45e9a","publishingOrgKey":"7fadb370-f921-11dd-
af50-b8a03c50a862","publishingCountry":"ES","protocol":"DIGIR","lastCrawled":"2014-05-19T10:
26:29.416+0000","lastParsed":"2014-05-29T16:58:25.296+0000","extensions":
{},"basisOfRecord":"PRESERVED_SPECIMEN","taxonKey":2650107,"kingdomKey":6,"phylumKey":59,"cl
assKey":7228684,"orderKey":7229405,"familyKey":2376,"genusKey":2650103,"speciesKey":2650107,
"scientificName":"Azolla filiculoides
Lam.,"kingdom":"Plantae","phylum":"Pteridophyta","order":"Salviniales","family":"Azollaceae
","genus":"Azolla","species":"Azolla
filiculoides","genericName":"Azolla","specificEpithet":"filiculoides","taxonRank":"SPECIES",
"decimalLongitude":0.5853,"decimalLatitude":40.7067,"elevation":0.0,"elevationAccuracy":0.0,
"depth":0.0,"depthAccuracy":0.0,"stateProvince":"T","year":2012,"month":9,"day":9,"eventDate
":"2012-09-08T22:00:00.000+0000","issues":
["GEODETIC_DATUM_ASSUMED_WGS84"],"lastInterpreted":"2014-06-05T14:48:40.858+0000","identifie
rs":[],"facts":[],"relations":
[],"geodeticDatum":"WGS84","class":"Polypodiopsida","countryCode":"ES","country":"Spain","gb
ifID":"781074930","institutionCode":"MGC","catalogNumber":"76020-1","recordedBy":"T.
Herrera & N. Bonada","locality":"Amposta; R  o Ebro a su paso por
Amposta","collectionCode":"MGC-Cormof","identifiedBy":"O. Gavira"},
{"key":894173843,"datasetKey":"1c334170-7ed1-11df-
8c4a-0800200c9a66","publishingOrgKey":"def87a70-0837-11d9-
acb2-b8a03c50a862","publishingCountry":"ES","protocol":"TAPIR","lastCrawled":"2014-07-10T13:
26:28.000+0000","lastParsed":"2014-05-20T21:45:28.680+0000","extensions":

```

[http://api.gbif.org/v1/occurrence/search?](http://api.gbif.org/v1/occurrence/search?COUNTRY=PT&COUNTRY=ES&TAXON_KEY=2650107)
[COUNTRY=PT&COUNTRY=ES&TAXON_KEY=2650107](http://api.gbif.org/v1/occurrence/search?COUNTRY=PT&COUNTRY=ES&TAXON_KEY=2650107)

```

{
  offset: 0,
  limit: 20,
  endOfRecords: false,
  count: 362,
  results: [
    {
      key: 781074930,
      datasetKey: "962ccee-f762-11e1-a439-00145eb45e9a",
      publishingOrgKey: "7fadb370-f921-11dd-af50-b8a03c50a862",
      publishingCountry: "ES",
      protocol: "DIGIR",
      lastCrawled: "2014-05-19T10:26:29.416+0000",
      lastParsed: "2014-05-29T16:58:25.296+0000",
      extensions: { },
      basisOfRecord: "PRESERVED_SPECIMEN",
      taxonKey: 2650107,
      kingdomKey: 6,
      phylumKey: 59,
      classKey: 7228684,
      orderKey: 7229405,
      familyKey: 2376,
      genusKey: 2650103,
      speciesKey: 2650107,
      scientificName: "Azolla filiculoides Lam.",
      kingdom: "Plantae",
      phylum: "Pteridophyta",
      order: "Salviniales",
      family: "Azollaceae",
      genus: "Azolla",
      species: "Azolla filiculoides",
      genericName: "Azolla",
      specificEpithet: "filiculoides".
    }
  ]
}

```

JSON (JavaScript Object Notation - Notação de Objetos JavaScript) é uma formatação leve de troca de dados. Para seres humanos, é fácil de ler e escrever. Para máquinas, é fácil de interpretar e gerar.

http://api.gbif.org/v1/occurrence/search?COUNTRY=PT&COUNTRY=ES&TAXON_KEY=2650107



Open Refine (ex-Google Refine) is a standalone open source desktop application for data cleanup and transformation to other formats

Best way to potentialities of Open Refine is to view introductory videos (also available at <http://openrefine.org/>):

Google Refine 2.0 – Introduction (http://www.youtube.com/watch?v=B70J_H_zAWM)

Google Refine 2.0 - Data Transformation (http://www.youtube.com/watch?v=cO8NVCs_Ba0)

Google Refine 2.0 - Data Augmentation (<http://www.youtube.com/watch?v=5tsyz3ibYzk>)

Refine

search

Permalink

Facet / Filter

Undo / Redo

Using facets and filters

Use facets and filters to select subsets of your data to act on. Choose facet and filter methods from the menus at the top of each data column.

Not sure how to get started?
[Watch these screencasts](#)

300 records

Extensions: undefined

Show as: rows records Show: 5 10 25 50 records

« first < previous 1 - 25 next > last »

		key	class	order	genus	family	gbifID	phylum	country	kingdom	species	classKey	protocol	taxonKey	genusKey	
☆	🗨	1.	781074930	Polypodiopsida	Salviniales	Azolla	Azollaceae	781074930	Pteridophyta	Spain	Plantae	Azolla filiculoides	7228684	DIGIR	2650107	265
☆	🗨	2.	894173843	Polypodiopsida	Salviniales	Azolla	Azollaceae	894173843	Pteridophyta	Spain	Plantae	Azolla filiculoides	7228684	TAPIR	2650107	265
☆	🗨	3.	895215969	Polypodiopsida	Salviniales	Azolla	Azollaceae	895215969	Pteridophyta	Spain	Plantae	Azolla filiculoides	7228684	DWC_ARCHIVE	2650107	265
☆	🗨	4.	894173848	Polypodiopsida	Salviniales	Azolla	Azollaceae	894173848	Pteridophyta	Spain	Plantae	Azolla filiculoides	7228684	TAPIR	2650107	265
☆	🗨	5.	895202702	Polypodiopsida	Salviniales	Azolla	Azollaceae	895202702	Pteridophyta	Spain	Plantae	Azolla filiculoides	7228684	DWC_ARCHIVE	2650107	265
☆	🗨	6.	894173844	Polypodiopsida	Salviniales	Azolla	Azollaceae	894173844	Pteridophyta	Spain	Plantae	Azolla filiculoides	7228684	TAPIR	2650107	265
☆	🗨	7.	232639153	Polypodiopsida	Salviniales	Azolla	Azollaceae	232639153	Pteridophyta	Spain	Plantae	Azolla filiculoides	7228684	TAPIR	2650107	265
☆	🗨	8.	137502528	Polypodiopsida	Salviniales	Azolla	Azollaceae	137502528	Pteridophyta	Spain	Plantae	Azolla filiculoides	7228684	DWC_ARCHIVE	2650107	265
☆	🗨	9.	111303901	Polypodiopsida	Salviniales	Azolla	Azollaceae	111303901	Pteridophyta	Spain	Plantae	Azolla filiculoides	7228684	TAPIR	2650107	265
☆	🗨	10.	932706302	Polypodiopsida	Salviniales	Azolla	Azollaceae	932706302	Pteridophyta	Spain	Plantae	Azolla filiculoides	7228684	DWC_ARCHIVE	2650107	265
☆	🗨	11.	575066229	Polypodiopsida	Salviniales	Azolla	Azollaceae	575066229	Pteridophyta	Portugal	Plantae	Azolla filiculoides	7228684	DWC_ARCHIVE	2650107	265
☆	🗨	12.	211620116	Polypodiopsida	Salviniales	Azolla	Azollaceae	211620116	Pteridophyta	Spain	Plantae	Azolla filiculoides	7228684	TAPIR	2650107	265

javascript:()

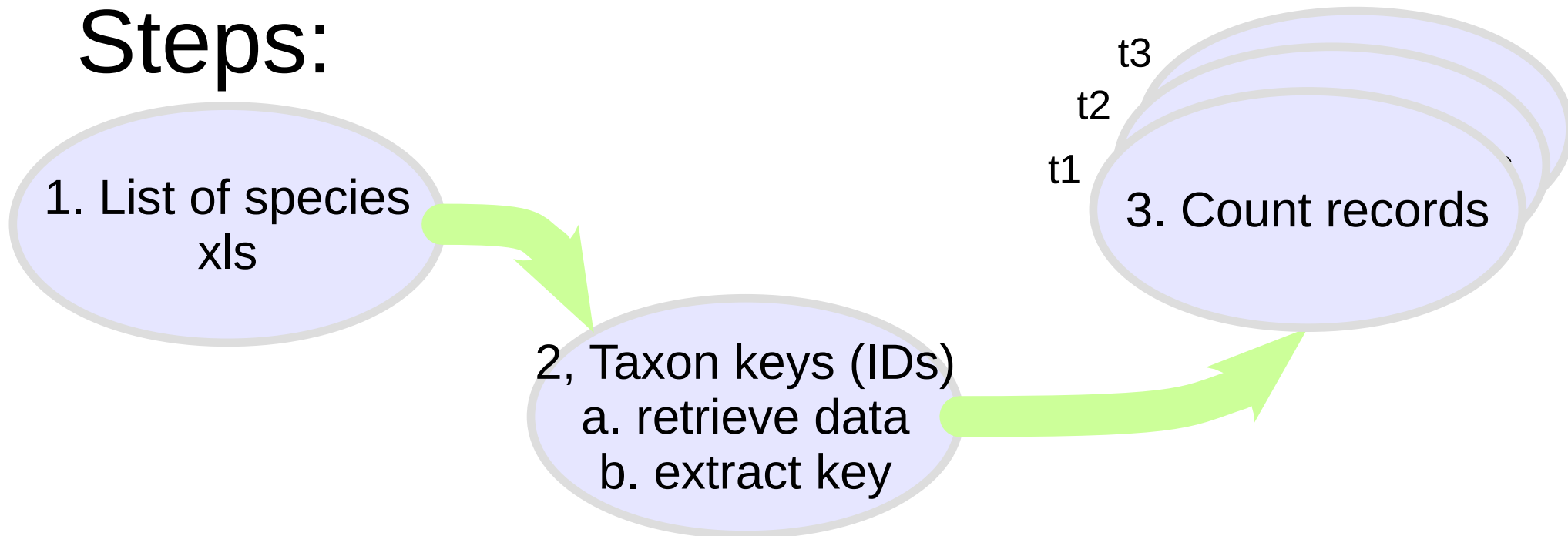
Open refine allows to retrieve Json data from GBIF webservices, parse and show in in tabular format. Data can be exported in spreadsheet format or as a project transferable to other.

Challenge:

Obtain the number of records in GBIF for a list of 20 species

`http://api.gbif.org/v1/occurrence/count?country=PT&taxonKey=2650107` → *Azolla filiculoides* Lam.

Steps:



Steps:

1. List of species names xls
2. Open refine -> new project from xls
3. Prepare names to obtain data from GBIF API
 1. Separate genus and species names – column split

2. Query GBIF API

```
"http://api.gbif.org/v1/species/search?q="+cells["Especies  
1"].value+"%"+value+"&rank=SPECIES"
```

3. Interpret data to obtain species key

```
with(value.parseJson().results[0], item, item.key)
```

4. Obtain counts

```
"http://api.gbif.org/v1/occurrence/count?country=PT&taxonKey="+value"
```


Facet / Filter

Undo / Redo 6

Extract... Apply...

Filter:

0. Create project

1. Split 21 cell(s) in column Especie into several columns by separator

2. Create column json data at index 3 by fetching URLs based on column Especie 2 using expression grel:"http://api.gbif.org/v1/species/search?q="+cells["Especie 1"].value+"%"+value+"&rank=SPECIES"

3. Create new column key based on column json data by filling 17 rows with grel:with(value.parseJson()).results[0], item, item.key)

4. Create column count at index 5 by fetching URLs based on column key using expression grel:"http://api.gbif.org/v1/occurrence/count?country=PT&taxonKey="+value

5. Create column count_ES at index 5 by fetching URLs based on column key using expression grel:"http://api.gbif.org/v1/occurrence/count?country=ES&taxonKey="+value

6. Remove column json data

javascript:{}

21 rows

Extensions: undefined

Show as: rows records Show: 5 10 25 50 rows

« first < previous 1 - 21 next > last »

All	Especie	Especie 1	Especie 2	key	count_ES	count	Especie 3	Especie 4	Especie 5	Especie 6	Especie 7	Especie 8
☆ 🔊	1. Azolla filiculoides Lam.	Azolla	filiculoides	2650107	344	18	Lam.					
☆ 🔊	2. Arundo donax L.	Arundo	donax	2703041	10486	31	L.					
☆ 🔊	3. Cortaderia selloana (J. A. & J. H. Schultes)	Cortaderia	selloana	2704523	466	0	(J.	A.	&	J.	H.	Schultes)
☆ 🔊	4. Eichornia crassipes (C. F. P. Mart.) Solms. (Pontederia crassipes Mart.)	Eichornia	crassipes	131478814	0	0	(C.	F.	P.	Mart.)	Solms.	(Pontederia
☆ 🔊	5. Agave americana L.	Agave	americana	2767031	2548	10	L.					
☆ 🔊	6. Datura stramonium L.	Datura	stramonium	125792016	0	0	L.					
☆ 🔊	7. Datura innoxia Miller	Datura	innoxia	125808372	0	0	Miller					
☆ 🔊	8. Acacia saligna	Acacia	saligna	2978552	185	15						
☆ 🔊	9. Acacia longifolia	Acacia	longifolia	116629126	0	0						
☆ 🔊	10. Acacia melanoxylon R. Br.	Acacia	melanoxylon	116838158	0	0	R.	Br.				
☆ 🔊	11. Acacia dealbata Link	Acacia	dealbata				Link					
☆ 🔊	12. Pittosporum undulatum Vent.	Pittosporum	undulatum	2986239	50	20	Vent.					
☆ 🔊	13. Carpobrotus edulis (L.) N. E. Br.	Carpobrotus	edulis				(L.)	N.	E.	Br.		
☆ 🔊	14. Arctotheca calendula (L.) Levyns	Arctotheca	calendula				(L.)	Levyns				
☆ 🔊	15. Ailanthus altissima (Miller) Swingle	Ailanthus	altissima	125796042	0	0	(Miller)	Swingle				
☆ 🔊	16. Spartina densiflora Brongn.	Spartina	densiflora				Brongn.					
☆ 🔊	17. Myriophyllum aquaticum	Myriophyllum	aquaticum	125790040	0	0						
☆ 🔊	18. Opuntia ficus-indica (L.) Miller	Opuntia	ficus-indica	125809580	0	0	(L.)	Miller				
☆ 🔊	19. Acanthus mollis	Acanthus	mollis	116695984	0	0						
☆ 🔊	20. Hakea sericea Schrader	Hakea	sericea	7287606	1	20	Schrader					
☆ 🔊	21. Hakea salicifolia (Vent.) B. L. Burt	Hakea	salicifolia	7287627	7	6	(Vent.)	B.	L.	Burt		

Final remarks

- Citizen science initiatives are an important source of information
- The botanical gardens may play a role in training volunteers in identifying IAS
- GBIF, through its network of nodes, helps in mobilizing data
- GBIF aggregates information in a coherent, service oriented platform
- Automated methods may be implemented on top of GBIF webservices to facilitate early alert of invasive species' occurrence



Thank you

Rui Figueira, GBIF.PT
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Francisco Pando, GBIF.ES