

# DaRWIN and associated APIs

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# 2025 situation

- Open-source Collection Management System
  - Biological collections
  - Geological collections
  - (+ bibliographies)
- PHP 8
  - (Fork and update of Symfony 1)
  - Public interface in AngularJS
- PostgreSQL / PostGIS
- GitHub repository  
[https://github.com/naturalsciences/natural\\_heritage\\_darwin](https://github.com/naturalsciences/natural_heritage_darwin)

# Public URLs

- Africamuseum (Tervuren):
  - <https://darwinweb.africamuseum.be/>
    - c.a. 827 800 records / 2 637 000 physical specimens
- Royal Belgian Institute for Natural Sciences
  - <https://darwin.naturalsciences.be>
    - c.a 890 000 records / 3 950 000 physical specimens



### Specimens Search Result

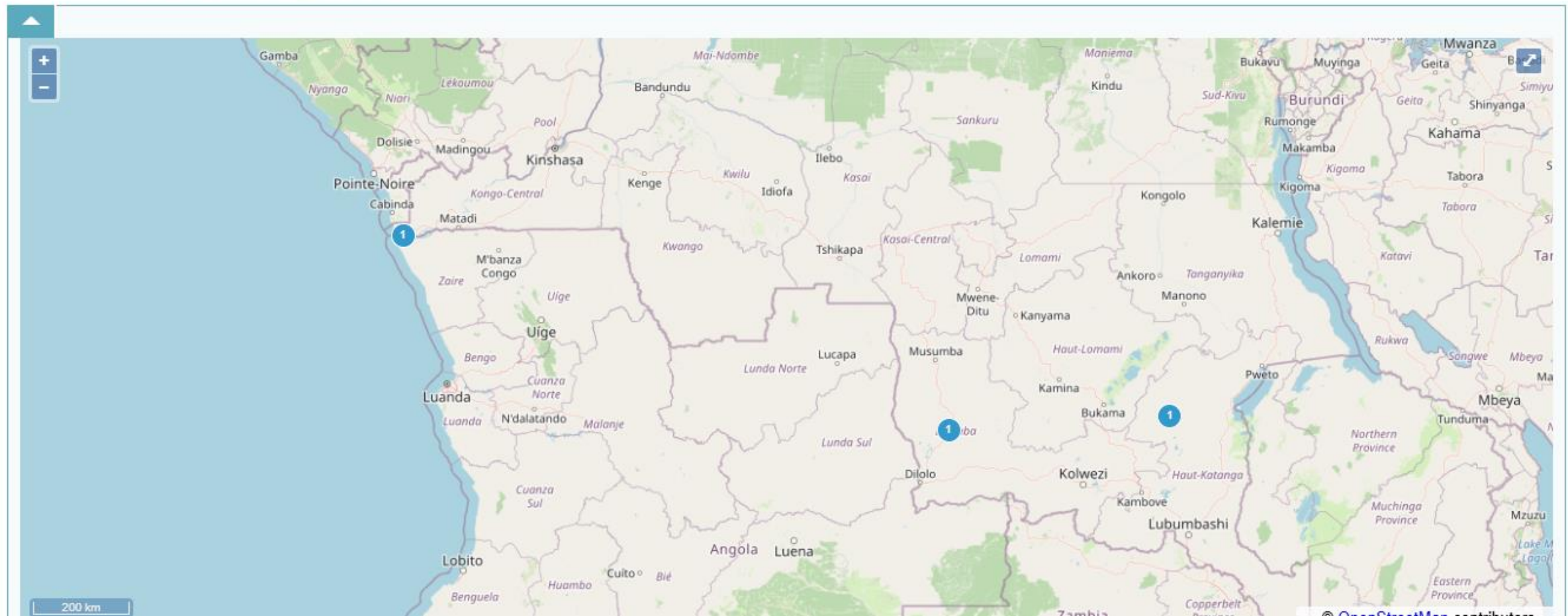
[Back to criteria](#) [Print](#) [Thermic print](#)

« < [1] :: 2 :: 3 :: 4 :: 5 :: 6 :: 7 :: 8 :: 9 :: 10 :: 11 :: 12 :: 13 :: 14 :: 15 > » 1 /82782 go

**i** Your query retrieved :

- 827812 records
- 44886 distinct records based on I.G.
- 2637945 physical records (minimal estimate)
- 2638189 physical records (maximal estimate)

Records per page: 10 ▾



# Assets - 1

- Strong emphasis on taxonomic integrities
  - Search on synonyms
  - Several hierarchies
- Batch importation from tab delimited files with quality-check / avoidance of duplicates
  1. Taxonomy
  2. People
  3. Localities
  4. Specimens
  5. Images
  6. Links
  7. Links between specimen (e.g. parasite/host)
  8. Labels
  9. DNA vouchers

Imports : ⓘ

Filename

State

All ▾

Show finished

Filter

« [1] :: 2 :: 3 :: 4 :: 5 » 1 /15 go

Your query retrieved 150 records Records per page: 10 ▾

id ▲	Filename	Taxonomical hierarchy	Status	Last system check ▲	Progression	Actions
1474	Darwin_import_forms_6_DNA_taxo.txt	RBINS Reference	Finished	04/10/2024 13:54	4 on 4	
1468	Tables generes par le templateDarwin_import_forms_6_DNA_Greek_Snails_taxo.txt	RBINS Reference	Finished	30/09/2024 10:04	39 on 39	
1443	Darwin_import_forms_T&F_IRSNB_Pisces_2024_taxo.txt	RBINS Reference	Finished	19/09/2024 11:52	9568 on 9568	
1403	Darwin_import_forms_Canathist_taxo.txt	Invertebrates	Finished	12/06/2024 11:56	3 on 3	
1380	taxo2.txt	Acari	Finished	04/12/2023 15:54	556 on 556	
1358	Darwin_import_forms_DNA_RBINS_1.0_taxo.txt	RBINS Reference	Loaded	29/11/2023 14:33	n/a	NOT EDITABLE <a href="#">Check import</a>
1340	Darwin_import_forms_DNA_RBINS_1.0_taxo.txt	RBINS Reference	Finished	17/10/2023 16:31	12 on 12	
1311	Darwin_import_forms_RMCA_5.2_data_taxo.txt	RBINS Reference	Finished	05/07/2023 15:15	6 on 6	
1295	Coleoptera_Dytiscidae_Arm215_Holotype_Darwin_jim_taxo.txt	RBINS Reference	Finished	15/02/2023 13:46	111 on 111	
1287	T&F_IRSNB_Mammalia_202_taxob.txt	RBINS Reference	Finished	27/06/2022 11:44	1857 on 1857	

« [1] :: 2 :: 3 :: 4 :: 5 » 1 /15 go

Import Taxons



Control of taxonomic hierarchies at import (comparison with reference hierarchies) + batch import possible (on several sessions)

686276	Haliophis	genus	2110	FALSE	taxonomic_conflict	<p><b>Staging hierarchy</b> /Pisces (class)/Perciformes (order)/Pseudochromidae (family)/Haliophis (genus)/</p> <p><b>Darwin hierarchy</b> /Eucaryota (domain)/Animalia (kingdom)/Chordata Bateson, 1885 (phylum)/Vertebrata (sub phylum)/Gnathostomata (super class)/Actinopterygii (class)/Neopterygii (sub class)/Teleostei (infra class)/Acanthopterygii (super order)/Perciformes (order)/Percoidei (sub order)/Percoidea (super family)/Pseudochromidae (family)/Haliophis (genus)/</p>	<a href="#">Create taxon</a>
686277	Haliophis praelongus	species	2110	FALSE	taxonomic_conflict	<p><b>Staging hierarchy</b> /Pisces (class)/Perciformes (order)/Pseudochromidae (family)/Haliophis (genus)/Haliophis praelongus (species)/</p> <p><b>Darwin hierarchy</b> /Eucaryota (domain)/Animalia (kingdom)/Chordata Bateson, 1885 (phylum)/Vertebrata (sub phylum)/Gnathostomata (super class)/Actinopterygii (class)/Neopterygii (sub class)/Teleostei (infra class)/Acanthopterygii (super order)/Perciformes (order)/Percoidei (sub order)/Percoidea (super family)/Pseudochromidae (family)/Haliophis (genus)/Haliophis praelongus (species)/</p>	<a href="#">Create taxon</a>

# Assets-2

- Embedded extraction of tab delimited files
- Possibility to bookmark searches
- Linking to thermic printer (Zebra/Avry Dennisson)
- Loans + report loans (Pentaho)
- View to DarwinCore / GBIF IPT
- Internal trace of update and deletion
- Creation of permanent and stable IDs (UUID) - resolvable



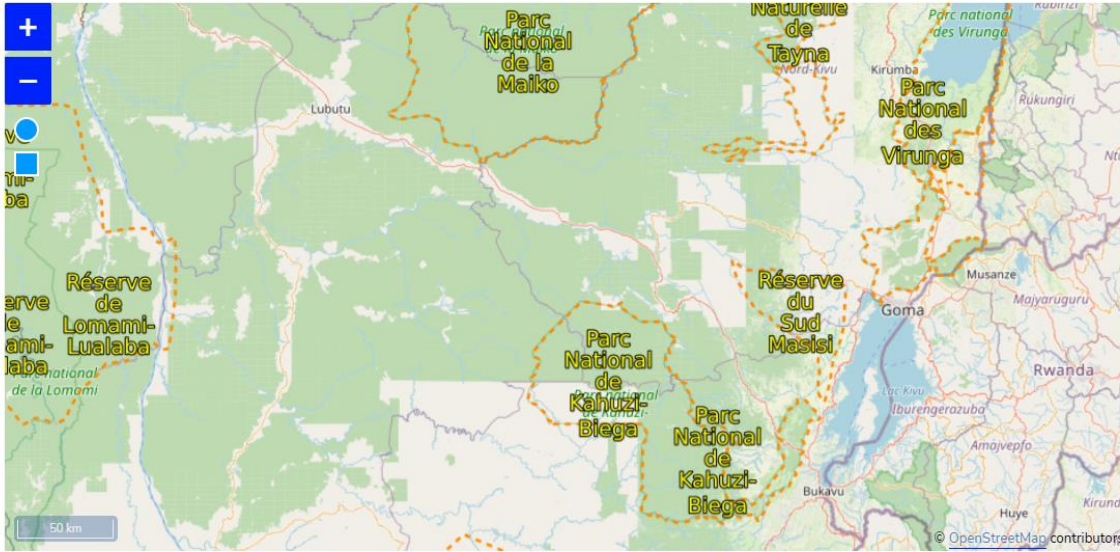
# Assets - 3

- Linking of collections/people/ places to registries of identifiers (dynamic)
  - GRID
  - GrSciColl (GBIF)
  - ORCID
  - Geonames places
  - Etc..

# Assets - 4

- Linking with WMS/WGS (GeoServer) for complex queries
  - Autocomplete from (copied) OSM layers
  - Easy search in polygons (e.g. marine EEZ, watersheds, buffered rivers)
- Public JSON search API
- Heuristic to do fuzzy matching on place names

Move map Draw box Free polygon Clean selection



List of available map servers (WMS/WFS)

Open Street Map

Browse layers

Available maps

CongoRDC\_parcs\_rgc\_2019

Add layer on map Clean WFS layers

Click on map or use autocomplete to get map cover data

blic/form/?hide\_taxo=true&collection=geodoc&wfs=rbins\_osm&wfs\_layer=osm\_belgium\_20200505\_4\_municipalities

90  
W -180 180 E  
-90  
S

Draw on map

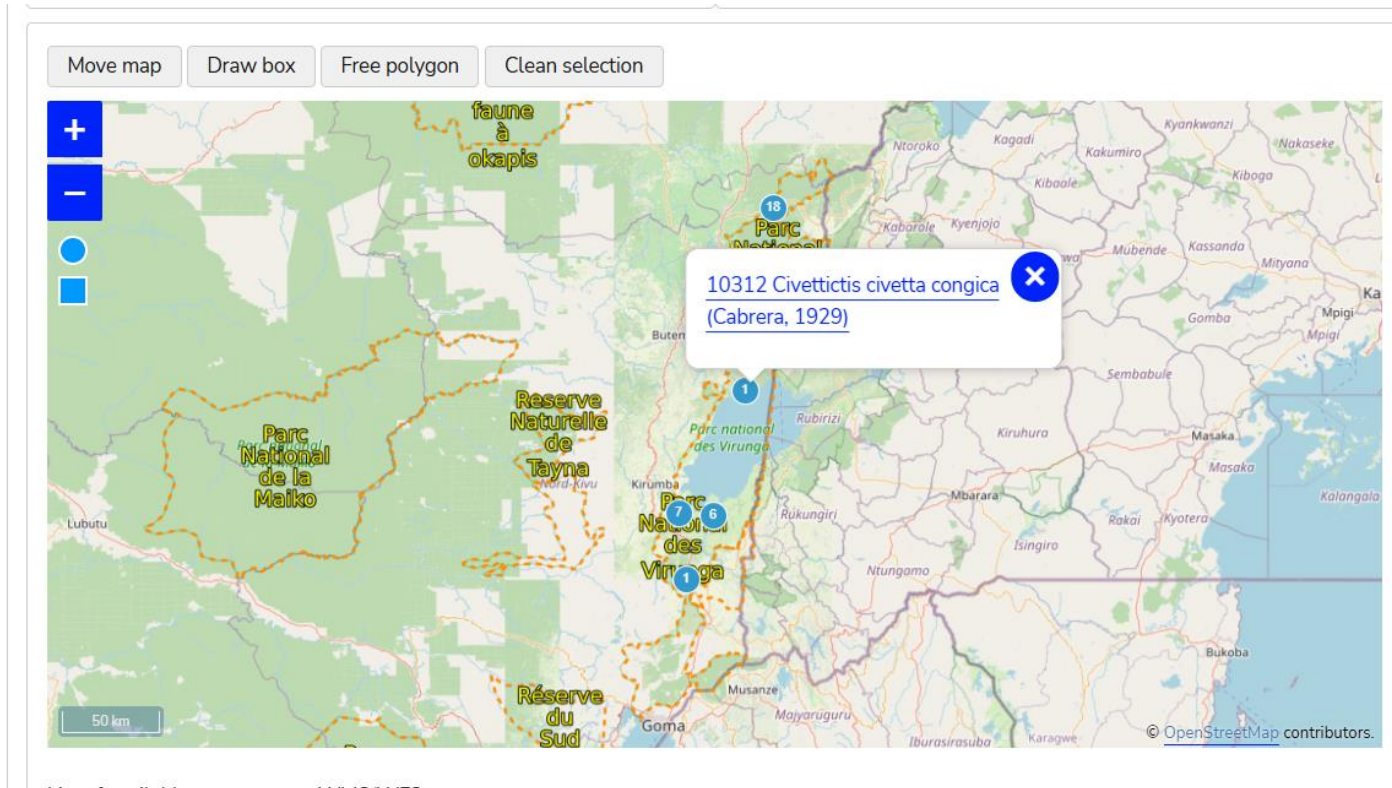
90°0'0"  
W 180°0'0" 180°0'0" E  
90°0'0"  
S

Move map Draw box Free polygon Clean selection



List of available map servers (WMS/WFS)

# WMS / WFS linking



# Service for geographical fuzzy search

End points :

- Africamuseum (targeting African localities)

[https://darwinweb.africamuseum.be/dw\\_georef/ws.php?](https://darwinweb.africamuseum.be/dw_georef/ws.php?)

- RBINS

[https://darwin.naturalsciences.be/dw\\_georef/ws.php](https://darwin.naturalsciences.be/dw_georef/ws.php)

## Parameters:

[https://darwinweb.africamuseum.be/dw\\_georef/ws.php?q="+encodeURIComponent\(place\)+"&country="+country+"&explode=true](https://darwinweb.africamuseum.be/dw_georef/ws.php?q=)

(country is optional)

e.g= [https://darwinweb.africamuseum.be/dw\\_georef/ws.php?q=Kamitungulu](https://darwinweb.africamuseum.be/dw_georef/ws.php?q=Kamitungulu)

darwinweb.africamuseum.be/dw\_georef/ws.php?q=Kamitungulu

pretty-print

```
{
  "ids": "503065",
  "station_numbers": "-0549/0932",
  "continent": "Africa",
  "country": "Congo Belge",
  "tag": "Kamitungulu, afflt. gauche Lusinga s/afflt. droit Lufira, alt.1760m.",
  "latitude": -8.93333,
  "longitude": 27.21007,
  "latitude_dms_degree": null,
  "latitude_dms_minutes": null,
  "latitude_dms_seconds": null,
  "latitude_dms_direction": null,
  "longitude_dms_degree": null,
  "longitude_dms_minutes": null,
  "longitude_dms_seconds": null,
  "longitude_dms_direction": null,
  "nb_records": "1",
  "specimen_count_min": "{ \"/Vertebrates/Amphibians/" : 1 }",
  "specimen_count_max": "{ \"/Vertebrates/Amphibians/" : 1 }",
  "from_first_date": "1947-03-07 00:00:00",
  "from_last_date": "1947-03-07 00:00:00",
  "to_first_date": null,
  "to_last_date": null,
  "coord_found": true,
  "query": "Kamitungulu",
  "query_country": "",
  "boost": 99999,
  "nb_searched_terms": 1,
  "nb_found_terms": 1,
  "searched_terms": "Kamitungulu",
  "found_terms": "Kamitungulu",
  "nb_matching_localities": 18
},
{
  "ids": "793873;793874",
  "station_numbers": "BE_RMCA_INS.Col.048158;BE_RMCA_INS.Col.048157",
  "continent": "Africa",
  "country": "Republic of the Congo",
  "tag": "riv. Kamitungulu",
  "latitude": null,
  "longitude": null,
  "latitude_dms_degree": null
```



# Service for geographical fuzzy search

	A	B	C	F	G	H	I	Z	AA	AB	AC
1	id_geo	searched	ids_darwin	country	tag	latitude	longitude	nb_searched_terms	nb_found_terms	searched_terms	found_terms
13	2	Mukono (Affl. r. droite Katango)	246395	Congo, D. R.	Kivu-N.,COD,P.N. Upemba mukono, affl. r. dr. Katongo, Country status: e	0.2	29.25	2	1	Mukono,Katango	Mukono
14	3	Kamitungulu	106888	Congo Belge	Kamitungulu, afflt. gauche de la riv. Lusinga et sous-afflt. droit de la riv. L	-8.93333	27.21667	1	1	Kamitungulu	Kamitungulu
15	3	Kamitunaulu	714232	Democratrische Republiek Conao	Conao belae P.N.U. Riv. Kamitunaulu (affl. Lusinaa)	0	0	1	1	Kamitunaulu	Kamitunaulu

Searched terms  
(extraction of most significant term with initcap and no initials)

Results from Darwin

Feedback : does the result match all the terms or only apart of them + ranking



# Service for geographical fuzzy search

A macro, in Google Sheet with a Macro in App script (specific JavaScript Engine of Google for its cloud products), has been coded to provide an human interface to the JSON endpoint.

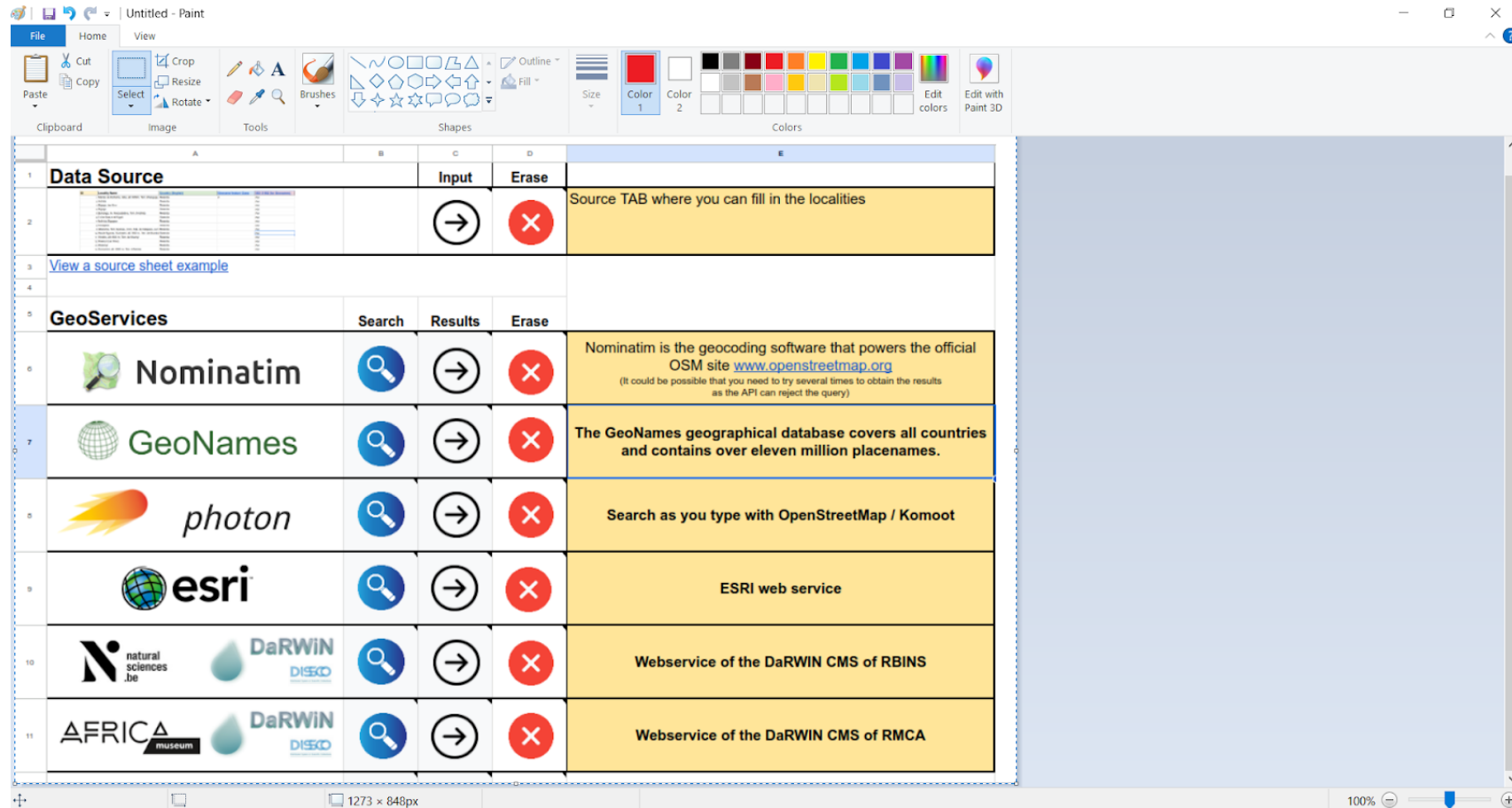
Its URL is

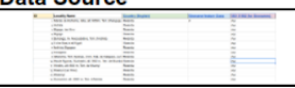






[https://docs.google.com/spreadsheets/d/1-MNB4EY\\_xaHACL7JR8yxzvzPx1zqspZegrXh4h5FnkE](https://docs.google.com/spreadsheets/d/1-MNB4EY_xaHACL7JR8yxzvzPx1zqspZegrXh4h5FnkE)

(user need to copy ot before using it), also available via the cANATHIST website :

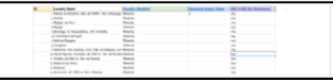






<https://canathist.naturalheritage.be/gazetteers/geotools>

# Service for Geographical fuzzy search



Data Source		Input	Erase		
		→	✖	Source TAB where you can fill in the localities	
<a href="#">View a source sheet example</a>					
GeoServices		Search	Results	Erase	
	Nominatim	🔍	→	✖	Nominatim is the geocoding software that powers the official OSM site <a href="http://www.openstreetmap.org">www.openstreetmap.org</a> <small>(It could be possible that you need to try several times to obtain the results as the API can reject the query)</small>
	GeoNames	🔍	→	✖	The GeoNames geographical database covers all countries and contains over eleven million placenames.
	photon	🔍	→	✖	Search as you type with OpenStreetMap / Komoot
	esri	🔍	→	✖	ESRI web service
	DaRWiN	🔍	→	✖	Webservice of the DaRWiN CMS of RBINS
	DaRWiN	🔍	→	✖	Webservice of the DaRWiN CMS of RMCA

Microsoft Paint window titled "Untitled - Paint" showing a screenshot of a web application interface. The interface is a table with columns for Data Source, GeoServices, Search, Results, Erase, and a description. The table is highlighted with a dashed blue border.

Data Source		Input	Erase	
		→	✖	Source TAB where you can fill in the localities
<a href="#">View a source sheet example</a>				
GeoServices		Search	Results	Erase
	Nominatim	🔍	→	✖
				Nominatim is the geocoding software that powers the official OSM site <a href="http://www.openstreetmap.org">www.openstreetmap.org</a> <small>(It could be possible that you need to try several times to obtain the results as the API can reject the query)</small>
	GeoNames	🔍	→	✖
				The GeoNames geographical database covers all countries and contains over eleven million placenames.
	photon	🔍	→	✖
				Search as you type with OpenStreetMap / Komoot
	esri	🔍	→	✖
				ESRI web service
	DaRWiN	🔍	→	✖
				Webservice of the DaRWiN CMS of RBINS
	DaRWiN	🔍	→	✖
				Webservice of the DaRWiN CMS of RMCA

docs.google.com/spreadsheets/d/1-MNB4EY\_xaHACL7JR8yxzvzPx1zqspZegrXh4h5FnkE/edit?gid=0

CANATHIST - GISTemplate dev\_map

File Edit View Insert Format Data Tools Extensions Help

100% | \$ % .0 .00 123 | Defaul... | - 10 + | B I A

	A	B	C	D	E	F
1	<b>ID</b>	<b>Locality Name</b>	<b>Country (English)</b>	<b>Geoname feature Class</b>	<b>ISO 31662 (for Geonames)</b>	<b>Map all sources</b>
2		1 Entebbe				<a href="#">link_to_viewer</a> dw
3		2 Walikale				<a href="#">link_to_viewer</a> dw
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						





Menu source esri geonames nominatim photon darwin\_rbins darwin\_rmca source example Country Names

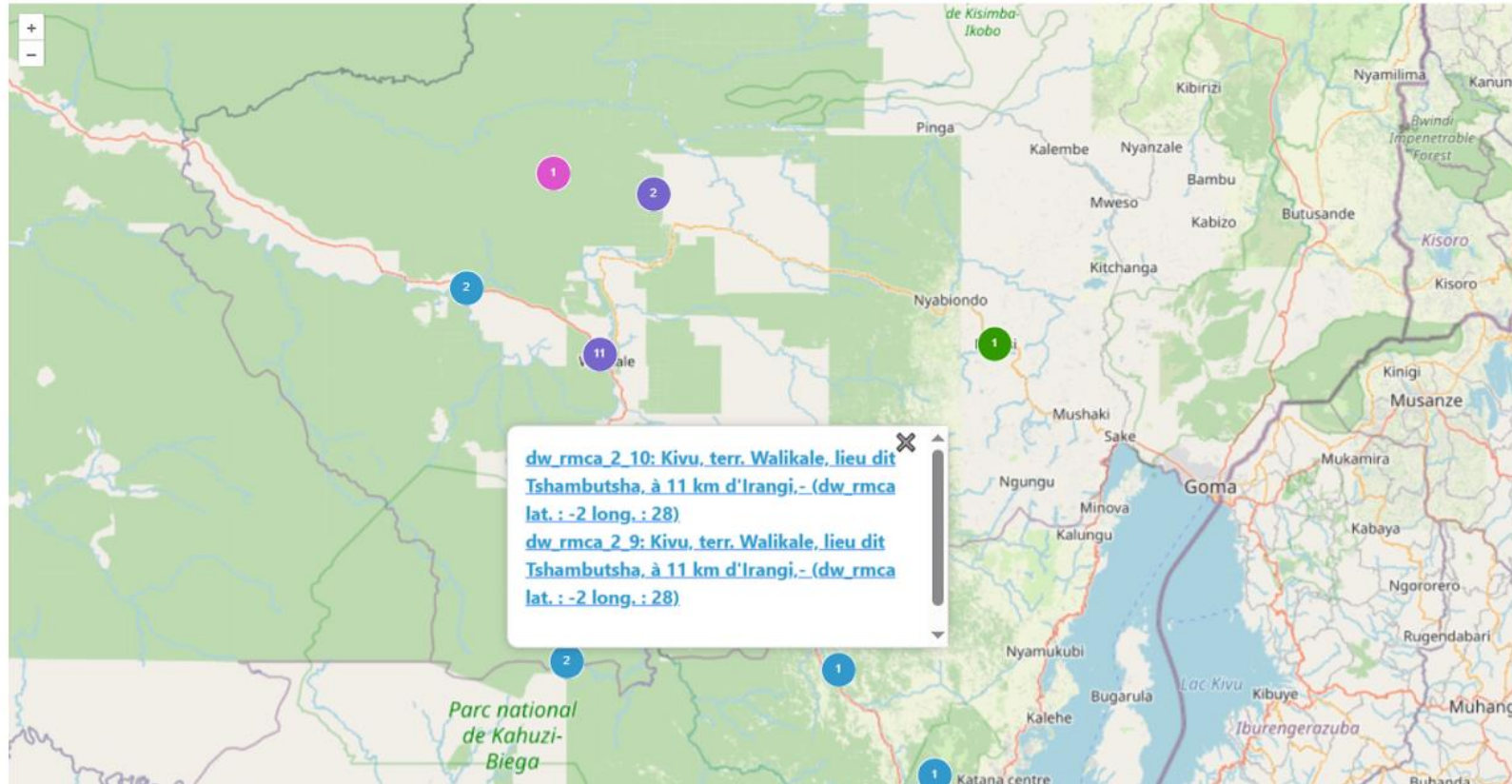
# Service for geographical fuzzy searches

E	F	G	H	I	J	K	L	M	N
nominatim_name	nominatim_country	display_name	place_id	osm_id	class	type	importance	lon	lat
Entebbe City	Uganda	Entebbe City, Ce	37737114	14723820	boundary	administrative	0.496811499	32.4698564	0.06117
Walikale	République démocratique du Congo	Walikale, Nord-K	33449786	5327798	boundary	administrative	0.3060101739	27.97536975	-1.07280
Walikale	République démocratique du Congo	Walikale, Nord-K	33681388	626734473	place	town	0.1600400008	28.0764028	-1.43008

*Example of reply (here Nominatim)*

ColorSource

	dw_rmca	<input checked="" type="checkbox"/>
	dw_rbins	<input checked="" type="checkbox"/>
	esri	<input checked="" type="checkbox"/>
	osm	<input checked="" type="checkbox"/>



# Thanks

- ICT Team Tervuren
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  - Lore Esselens
  - Garin Cael
  - Mathys Rotonda
  - +Miguël Parrent / Christophe Allarf
- Collections RBINS
  - Patrick Semal
  - Jean-Marc Herpers (contact person RBINS + DNA template)
  - Gontran Sonet
  
  - + Paul-André Duchesne/  
Mariel Adan / Brice Maron /  
Yann Chambert