

# rgbif vignette - Search and retrieve data from the Global Biodiversity Information Facility (GBIF)

## About the package

rgbif is an R package to search and retrieve data from the Global Biodiversity Information Facility (GBIF). rgbif wraps R code around the [GBIF API](#) to allow you to talk to GBIF from R.

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## Install rgbif and dependencies

```
install.packages("devtools")
library(devtools)
install_github("rgbif", "ropensci", ref = "newapi")
```

## Load rgbif and dependencies

```
library(rgbif)
library(XML)
library(RCurl)
library(plyr)
library(ggplot2)
library(maps)
```

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## Get number of occurrences for a set of search parameters

Search by type of record, all observational in this case

```
occ_count(basisOfRecord = "OBSERVATION")
```

```
[1] 286071783
```

Records for Puma concolor with lat/long data (georeferenced) only

```
occ_count(nubKey = 2435099, georeferenced = TRUE)
```

```
[1] 2541
```

All georeferenced records in GBIF

```
occ_count(georeferenced = TRUE)
```

```
[1] 3.55e+08
```

### Records from Denmark

```
occ_count(country = "DENMARK")
```

```
[1] 8628822
```

### Records from France

```
occ_count(hostCountry = "FRANCE")
```

```
[1] 17272175
```

### Number of records in a particular dataset

```
occ_count(datasetKey = "9e7ea106-0bf8-4087-bb61-dfe4f29e0f17")
```

```
[1] 4591
```

### All records from 2012

```
occ_count(year = 2012)
```

```
[1] 31483292
```

### Records for a particular dataset, and only for preserved specimens

```
occ_count(datasetKey = "8626bd3a-f762-11e1-a439-00145eb45e9a", basisOfRecord = "PRESERVED_SPECIMEN")
```

```
[1] 550849
```

---

### Get possible values to be used in taxonomic rank arguments in functions

```
taxrank()
```

```
[1] "kingdom"      "phylum"     "class"        "order"  
[5] "family"       "genus"        "species"      "infraspecific"
```

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## Search for taxon information

### Search for a genus

```
head(name_lookup(query = "Cnaemidophorus", rank = "genus", return = "data"))
```

	key	nubKey	parentKey	parent	kingdom	phylum	clazz
1	116755723	1858636	110614854	Pterophoridae	Animalia	Arthropoda	Insecta
2	1858636	1858636	8863	Pterophoridae	Animalia	Arthropoda	Insecta
3	125802004	1858636	125793784	Pterophoridae	<NA>	<NA>	Insecta
4	124531302	1858636	NA	<NA>	<NA>	<NA>	<NA>
5	126862804	1858636	126783981	Pterophoridae	Animalia	Arthropoda	Insecta
6	115123697	1858636	NA	<NA>	<NA>	<NA>	<NA>

	order	family	genus	kingdomKey	phylumKey	classKey
1	Lepidoptera	Pterophoridae	Cnaemidophorus	116630539	116762374	116686069
2	Lepidoptera	Pterophoridae	Cnaemidophorus	1	54	216
3	Lepidoptera	Pterophoridae	Cnaemidophorus	NA	NA	125831175
4	<NA>	<NA>	Cnaemidophorus	NA	NA	NA
5	Lepidoptera	Pterophoridae	Cnaemidophorus	126774927	126774928	126775138
6	<NA>	<NA>	Cnaemidophorus	NA	NA	NA

	orderKey	familyKey	genusKey	canonicalName	authorship	nameType
1	116843281	110614854	116755723	Cnaemidophorus	Wallengren, 1862	WELLFORMED
2	797	8863	1858636	Cnaemidophorus	Wallengren, 1862	WELLFORMED
3	125810165	125793784	125802004	Cnaemidophorus	Wallengren, 1862	WELLFORMED
4	NA	NA	124531302	Cnaemidophorus		WELLFORMED
5	126775421	126783981	126862804	Cnaemidophorus		WELLFORMED
6	NA	NA	115123697	Cnaemidophorus		WELLFORMED

	rank	numOccurrences
1	GENUS	0
2	GENUS	0
3	GENUS	0
4	GENUS	0
5	GENUS	0
6	GENUS	0

### Search for the class mammalia

```
head(name_lookup(query = "mammalia")$data)
```

	key	nubKey	parentKey	parent	phylum	clazz
1	125798198	359	125828859	Chordata	Chordata	Mammalia
2	116665331	359	116842680	Chordata	Chordata	Mammalia
3	359	359	44	Chordata	Chordata	Mammalia
4	125826646	359	125828859	Chordata	Chordata	Mammalia
5	125775548	359	125775547	Macroscelidea	Chordata	Macroscelidea
6	102402290	359	102545028	Chordata	Chordata	Mammalia

	phylumKey	classKey	canonicalName	authorship	nameType	rank
1	125828859	125798198	Mammalia		WELLFORMED	CLASS
2	116842680	116665331	Mammalia	Linnaeus, 1758	WELLFORMED	CLASS
3	44	359	Mammalia	Linnaeus, 1758	WELLFORMED	CLASS
4	125828859	125826646	Mammalia	Linnaeus, 1758	WELLFORMED	CLASS
5	116842680	125775547	Mammalia		WELLFORMED	ORDER
6	102545028	102402290	Mammalia		WELLFORMED	CLASS

	numOccurrences	kingdom	kingdomKey	order	orderKey
1	0	<NA>	NA	<NA>	NA
2	0	Animalia	116630539	<NA>	NA
3	0	Animalia	1	<NA>	NA
4	0	<NA>	NA	<NA>	NA
5	0	Animalia	116630539	Mammalia	125775548
6	0	Animalia	101719444	<NA>	NA

Look up the species *Helianthus annuus*

```
head(name_lookup("Helianthus annuus", rank = "species")$data)
```

	key	nubKey	parentKey	parent	kingdom	order
1	116845199	3119195	116853573	Helianthus	Plantae	Asterales
2	3119195	3119195	3119134	Helianthus	Plantae	Asterales
3	125790787	3119195	125809269	Helianthus	<NA>	Asterales
4	106239436	3119195	106239325	Helianthus	Viridiplantae	Asterales
5	121635316	3119195	124573711	Helianthus	<NA>	<NA>
6	111449704	3119195	111449703	Helianthus	Plantae	<NA>

	family	genus	kingdomKey	orderKey	familyKey	genusKey
1	Asteraceae	Helianthus	116668764	110610447	116856030	116853573
2	Asteraceae	Helianthus	6	414	3065	3119134
3	Asteraceae	Helianthus	NA	125833882	125799038	125809269
4	Asteraceae	Helianthus	106147210	106237428	106237535	106239325
5	<NA>	Helianthus	NA	NA	NA	124573711
6	Compositae	Helianthus	111449174	NA	111442813	111449703

	canonicalName	authorship	nameType	rank	numOccurrences
1	Helianthus annuus	L.	WELLFORMED	SPECIES	0
2	Helianthus annuus	L.	WELLFORMED	SPECIES	0
3	Helianthus annuus	L.	WELLFORMED	SPECIES	0
4	Helianthus annuus		WELLFORMED	SPECIES	0
5	Helianthus annuus		WELLFORMED	SPECIES	0
6	Helianthus annuus	L.	WELLFORMED	SPECIES	0

	phylum	clazz	phylumKey	classKey
1	<NA>	<NA>	NA	NA
2	Magnoliophyta	Magnoliopsida	49	220
3	<NA>	<NA>	NA	NA
4	Streptophyta	<NA>	106171079	NA
5	<NA>	<NA>	NA	NA
6	Spermatophyta	Dicotyledones	111449175	111449177

Get data for a single occurrence. Note that data is returned as a list, with slots for metadata and data, or as a hierarchy, or just data.

Just data

```
occ_get(key = 773433533, return = "data")
```

	name	key	longitude	latitude
1	Helianthus annuus L.	773433533	-117	32.85

## Just taxonomic hierarchy

```
occ_get(key = 773433533, return = "hier")
```

	name	key	rank
1	Plantae	6	kingdom
2	Magnoliophyta	49	phylum
3	Magnoliopsida	220	clazz
4	Asterales	414	order
5	Asteraceae	3065	family
6	Helianthus	3119134	genus
7	Helianthus annuus L.	3119195	species

## All data, or leave return parameter blank

```
occ_get(key = 773433533, return = "all")
```

```
$hierarchy
```

	name	key	rank
1	Plantae	6	kingdom
2	Magnoliophyta	49	phylum
3	Magnoliopsida	220	clazz
4	Asterales	414	order
5	Asteraceae	3065	family
6	Helianthus	3119134	genus
7	Helianthus annuus L.	3119195	species

```
$data
```

	name	key	longitude	latitude
1	Helianthus annuus L.	773433533	-117	32.85

## Get many occurrences. occ\_get is vectorized

```
occ_get(key = c(773433533, 101010, 240713150, 855998194, 49819470), return = "data")
```

	name	key	longitude	latitude
1	Helianthus annuus L.	773433533	-117.00	32.85
2	Platydoras costatus (Linnaeus, 1758)	101010	-70.07	-4.35
3	Pelosina	240713150	163.58	-77.57
4	Sciurus vulgaris Linnaeus, 1758	855998194	12.04	58.41
5	Phlogophora meticulosa Linnaeus, 1758	49819470	13.28	55.72

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## Maps

### Static map using the ggplot2 package

Make a map of **Puma concolor** occurrences

```
key <- name_backbone(name = "Puma concolor", kingdom = "plants")$speciesKey
dat <- occ_search(taxonKey = key, return = "data", limit = 300, minimal = FALSE)
gbifmap(input = dat)
```

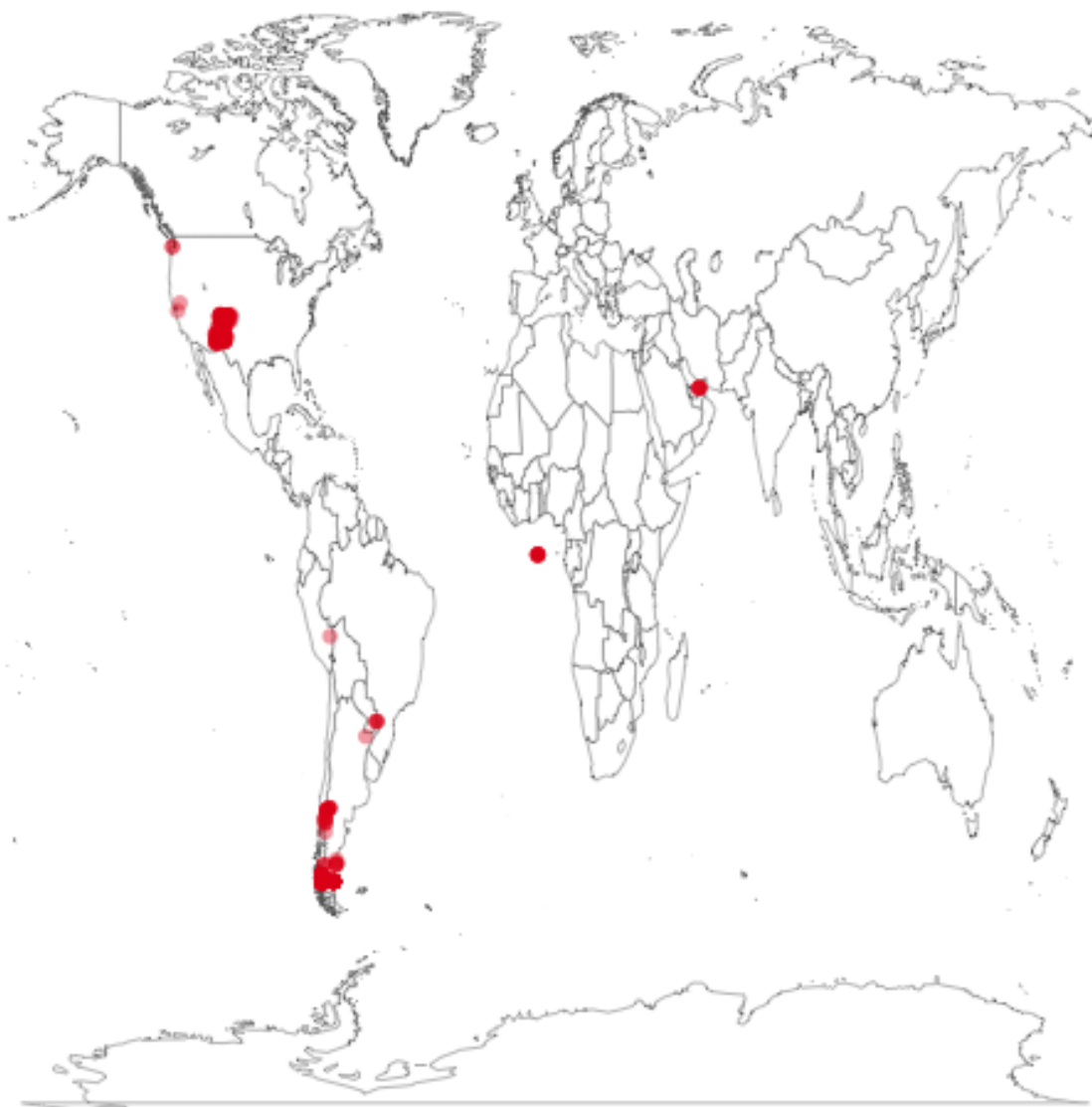


Figure 1: plot of chunk gbifmap1