

Species information available via the NBN Atlas Web API

What is the NBN Atlas Web API?

The NBN Atlas Web API allows users to pull information from the Atlas and directly into external programs (e.g., R, Python), through various NBN Atlas web services.

This guide covers the useful NBN Atlas web services for pulling species information from the NBN Atlas.

Species profile web services:

- **Species search** – Can be used to pull information on species names, e.g., current accepted scientific name, synonym names, common names, Taxon Version Keys, Atlas species groups, and UKSI taxon groups and habitat groups.
- **Species lookup with GUID** (TVK) – Can be used to pull information on species names, like Species search, but returns data in a different format and includes additional information for common and synonym names.
- **Species download** - Can be used to download information on species names. Unlike Species search web service, you can specify which fields (i.e., data) should be included.

See the full list of Species profile web services and their parameters [here](#) (all other web services are also listed here).

*All Web Services covered in this guide support **HTTP GET** requests and return **JSON** data, unless specified otherwise.*

The **Species search web service** allows you to search for a species, as you would search for a species on the NBN Atlas, i.e., <https://species.nbnatlas.org>

The web service: [https://species-ws.nbnatlas.org/search?](https://species-ws.nbnatlas.org/search)

Useful Parameters:

q	Query parameter – format query as <i>FIELD:VALUE</i> . For this web service, always use a catch all query, which means querying all fields and all values. Supply * for the <i>FIELD</i> and <i>VALUE</i> to return all fields and all values (i.e., q=*:*).
fq	Filter query parameter – format as <i>FIELD:VALUE</i> . Apply idxtype:TAXON to only return species information, as species-ws does not explicitly include species information.
facets	Facets parameter can be used to return taxon counts for any of the indexed fields.
pageSize	Supply an integer value between 1 and 1000 to determine number of results returned for query (this does not affect the number of facet results returned), the default is 10.

Example uses:

1. Get species information for the common name, Atlantic Puffin:

https://species-ws.nbnatlas.org/search?q=*&fq=idxtype:TAXON&fq=commonName:“Atlantic Puffin”

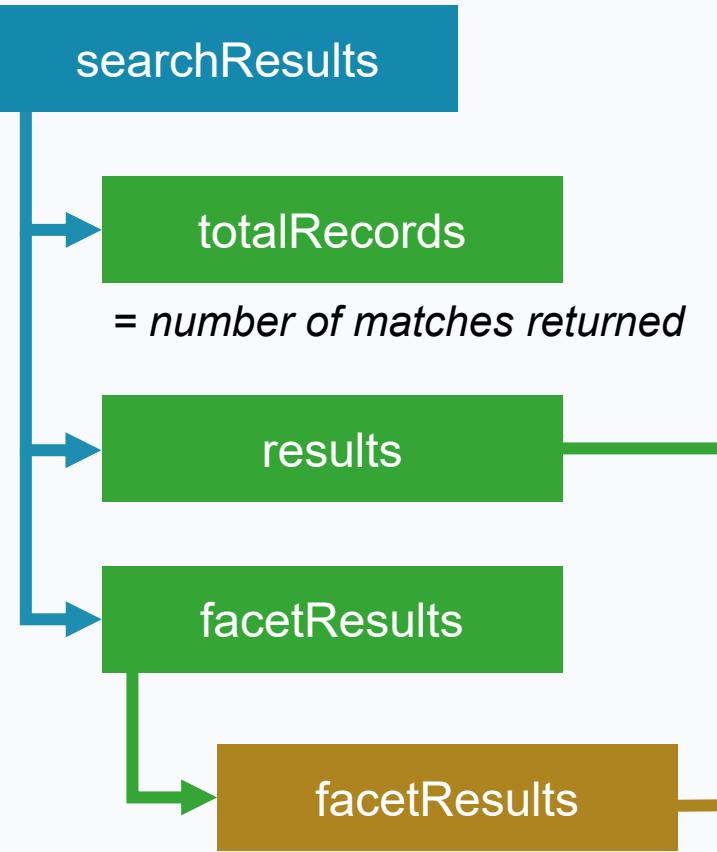
Wrap the name string in quotation marks to search for an exact match

2. Get facet counts for species groups used by the NBN Atlas (i.e., the number of species per species group)

https://species-ws.nbnatlas.org/search?q=*&fq=rank:“species”&facets=speciesGroup&pageSize=0

Set pageSize to 0, to only return facet results

When using the Species search web service, the results are returned using the following structure:



There are 40+ fields stored in Results, see the table below for example fields:

Field name	Description
guid	Taxon name's Taxon Version Key (TVK)
acceptedConceptName	The accepted (UKSI) taxon name (only returned if search result is a synonym)
acceptedConceptID	The accepted taxon name's TVK (only returned if search result is a synonym)
scientificName	The scientific name
author	Scientific name's authorship
nomenclaturalStatus	Status of a scientific name, e.g., sensu lato/sensu stricto
nameComplete	Full scientific name with authorship and nomenclatural status
commonName	String of common names for the taxa (if there are any and are only returned with the accepted name, not a synonym)
commonNameSingle	Preferred common name (if the taxa has one and is only returned with the accepted name, not a synonym)
taxonomicStatus	States if the matched name is the accepted name or a synonym
taxonGroup_s	Taxon group which the taxa has been assigned to
speciesGroup	Species groups used on the NBN Atlas (not derived from the UKSI)
habitat_s	Habitat group which taxa has been assigned to
occurrenceCount	Number of occurrence records for the taxon
synonymComplete	String of complete scientific name synonyms (only included if taxon has synonym names)

The facet fields returned include:

Field name	Description
label	Field value name, e.g., species group name
count	The number of species assigned to the field value (in label field)

Species search – Example using web service in R

Getting the species information for common name, “Atlantic puffin”:

```
# The species search query – same as completing a search on species.nbnatlas.org
jsondata <- content(GET('https://species-ws.nbnatlas.org/search/', # species search web service
  query = list(q='*:*', # the catch all query (return all fields and values)
               fq='commonName:"Atlantic Puffin"'),
  type = 'text', # specifying data type returned, JSON = text data
  encoding = 'UTF-8') # data returned is always 'UTF-8' encoded
```

Web services in this guide (unless specified otherwise) return **JSON**. Use [fromJSON](#) function from the [jsonlite](#) package to flatten the **JSON**

```
# Flattening the results for species information
species_info <- fromJSON(jsondata, flatten = T)$searchResults$results
```

Web services in this guide support `httr` GET requests. Can use [GET](#) function to send `HTTR` requests and [content](#) function for specifying what data is expected to be returned, both in the [httr](#) package

Indexing which list should be flattened, species information fields are stored in **Results** list.

Species search on NBN Atlas:

Atlantic Puffin

Fratercula arctica (Linnaeus, 1758) – Puffin
Species, Bird, Marine
Atlantic Puffin, buthaid, buthaidean, buthaigre, buthaigrean, fachach, fachaich, Pal, Palod
Occurrences: 73,833

scientificName	scientificNameAuthorship	nameComplete		
Fratercula arctica	(Linnaeus, 1758)	Fratercula arctica (Linnaeus, 1758)		
commonName	commonNameSingle	occurrenceCount	rank	rankID
Puffin, Atlantic Puffin, buthaid,	Puffin	73824	species	7000
taxonGroup_s	establishmentMeans	habitat_s	habitat_m_s	speciesGroup
bird	Native	marine	marine	Birds

Species search – Example using web service in R (using the facets parameter)

Getting record counts for species groups on the NBN Atlas:

```
# Retrieving species facet counts for NBN Atlas species groups
jsondata <- content(GET('https://species-ws.nbnatlas.org/search/', # Species search web service
  query = list(q='*:*',
    facets='speciesGroup',
    pagesize=0),
  type = 'text',
  encoding = 'UTF-8')
```

Set pageSize to 0, to only return facet counts (i.e., no species information)

Using the **facets** parameter to return number of taxon per species group on the NBN Atlas. You can retrieve facet counts for all species-ws indexed fields [\[xlsx\]](#)

You can apply more than one facet parameter to a request. Meaning you need to specify which facet table you want to flatten (this example contains only one facet, so we flatten the first table stored in **fieldResult**).

Search for all species on the NBN Atlas:

Lifeforms	Chromista (5,716)	Spiders and allies (1,367)
Insects (34,915)	Worms (5,395)	Mammals (432)
Fungi (23,519)	Molluscs (3,924)	Myriapods (339)
Plants (16,848)	Birds (2,165)	Reptiles (81)
Crustaceans (6,258)	Fishes (1,519)	Amphibians (64)

Note that this is a snippet of the data frame in r, more species groups were returned

label	count	fieldValue	fq
Insects	34915	Insects	speciesGroup:Insects
Fungi	23519	Fungi	speciesGroup:Fungi
Plants	16848	Plants	speciesGroup:Plants
Crustaceans	6258	Crustaceans	speciesGroup:Crustaceans

Species look up with GUID (TVK)

You can also **retrieve species information using the Taxon Version Key** for an accepted or synonym name, using the [Species lookup with GUID](#) web service. This web service returns information as stored on a species page on the NBN Atlas, e.g., <https://species.nbnatlas.org/species/NBNSYS0000000013>

The web service: <https://species-ws.nbnatlas.org/species/{TVK}>

This web service returns similar fields to the [Species search](#) web service, with some additional fields included for taxa synonyms and common names. There over 20 fields returned, and the table below highlights some of those returned:

Field name	Description
guid	Taxon name's Taxon Version Key (TVK)
acceptedConceptID	This field is <u>returned if the result contains synonym names</u> , and is the <u>accepted name TVK</u> for the taxa
nameString	Scientific name without authorship and nomenclature status
nameComplete	Full scientific name with authorship and nomenclatural status
author	Scientific name's authorship
nomenclaturalStatus	Status of a scientific name, e.g., sensu lato/sensu stricto
taxonomicStatus	States if the matched name is the accepted name or a synonym
taxonGroup_s	Taxon group which the taxa has been assigned to
habitat_s	Habitat group which taxa has been assigned to
occurrenceCounts	A list containing an integer named 'ocurrenceCount'
Classification	A list containing searched taxa's taxonomic rank and all lower rank names and TVKs.
synonyms	A data frame containing synonym related fields, e.g., synonym name string, authorship
commonNames	A data frame containing common name related fields, e.g., common name string, status (e.g., preferred common name)

Species look up with GUID (TVK) – Data structure returned

When using [Species lookup with GUID](#) to look up an accepted name TVK a list of over 20 fields are returned. The diagram highlights information which is unique to this webservice:

classification

= returns list of classification fields (taxonomic rank's name and TVK) from lowest taxonomic rank (i.e., kingdom) to taxonomic rank of taxa which you have supplied the TVK for.

synonyms

= returns synonyms fields for accepted name, if the taxa has any synonyms

commonNames

= returns common names fields for accepted name, if the taxa has any common names

This web service returns additional fields for synonyms compared to results returned by Species search web service. Useful fields returned include:

Field name	Description
nameString	Synonym name, without authorship or nomenclature
nameComplete	Synonym name, with authorship and nomenclature
nameGuid	Synonym name's TVK

This web service returns additional fields for common names compared to results returned by Species search web service. Useful fields returned include:

Field name	Description
nameString	Common name
status	Whether the common name is classified as the preferred, a common or local name
priority	A ranking assigned to the common name. Preferred status = 300, common status = 200, and local status = 100
language	Abbreviation for language of the common name, e.g., en = English, cy = Welsh, gd = Scots Gaelic

Species look up with GUID (TVK) – Example using web service with R

Get Common names for Puffin (*Fratercula arctica*):

```
# Retrieve data frame of common names for Puffin
fromJSON('https://species-ws.nbnatlas.org/species/NBNSYS00000000013')$commonNames
```

Web service is a direct URL, so only need to use the **fromJSON** function

Can use Species search web service to get the accepted name TVK for a taxa

nameString	status	priority	language
Puffin	preferred	300	en
Atlantic Puffin	common	200	en
Pal	local	100	cy
Palod	local	100	cy
buthaid	local	100	gd

Names tab on [Puffin species page](#):

Overview Gallery **Names**

Common Name

Puffin	preferred
Atlantic Puffin	
Pal	Welsh local

Get synonym names for Blushing Rosete (*Abortiporus biennis*):

```
# Retrieve data frame of synonyms for Blushing Rosete
fromJSON('https://species-ws.nbnatlas.org/species/NHMSYS0001472726')$synonyms
```

nameString	nameComplete	nameGuid	taxonomicStatus	nomenclaturalStatus
Abortiporus biennis	Abortiporus biennis (Bull. ex Fr.) Singer	NBNSYS0000020901	synonym	NA
Abortiporus distortus	Abortiporus distortus (Schwein.) Murrill	BMSSYS0000042046	synonym	NA

Names tab on [Blushing Rosete species page](#):

Overview Gallery **Names**

Synonym

Abortiporus biennis (Bull. ex Fr.) Singer	synonym
Abortiporus distortus (Schwein.) Murrill	synonym
Boletus biennis Bull.	synonym

Species information can also be download using the API. The [Species download web service](#) allows you to download a CSV for species information. This replicates the behaviour when you complete a species search on the NBN Atlas and click the **Download** button:

Showing 1 - 20 of 113643 results

Results per page Sort by Sort order

The web service: <https://species-ws.nbnatlas.org/download?>

Useful parameters:

q	Query parameter – format query as <i>FIELD:VALUE</i> . For this web service, always use a catch all query, which means querying all fields and all values. Supply * for the <i>FIELD</i> and <i>VALUE</i> to return all fields and all values.
fq	Filter query parameter – format as <i>FIELD:VALUE</i> . Apply idxtype:TAXON to only return species information, as species-ws does not explicitly include species information.
file	Can specify a file name to use for the download (don't include the file extension, i.e., '.csv'). Default file name is species
fields	You can supply a string of fields to be included, see species-ws indexed fields spreadsheet [xlsx] for fields you can include. If no fields are specified, the default fields are included: <i>taxonConceptID</i> , <i>rank</i> , <i>scientificName</i> , <i>establishmentMeans</i> , <i>rk_genus</i> , <i>rk_family</i> , <i>rk_order</i> , <i>rk_class</i> , <i>rk_phylum</i> , <i>rk_kingdom</i> , <i>datasetName</i>

Example use:

Download a list of accepted species name, with the default fields –

<https://species-ws.nbnatlas.org/search?q=&fq=idxtyp:TAXON&fq=taxonomicStatus:"accepted"&fq=rank:"species">

Species download – Example using web service with R

Downloading species information for all accepted species names included on the NBN Atlas and including a specified set of fields:

```
# String of fields to be supplied for fields parameter
fields <- 'guid,scientificName,nomenclaturalStatus,taxonGroup_s,commonName,habitat_s,occurrenceCount,datasetName')

# Download species information from the NBN Atlas for all accepted species names
url <- URLencode(paste0('https://species-ws.nbnatlas.org/download?q=*:*,',
  '&fq=taxonomicStatus:accepted', # Filter to only include accepted names
  '&fq=idxtaxa:TAXON', # Filter to only return taxon information
  '&fq=rank:"species"', # Filter to only return names for the taxonomic rank species
  '&fields=', fields))
```

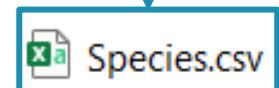
Use this function to encode the URL, converting characters into a format that can be transmitted over the internet

Pastes the `fields` string. Alternatively, you can supply the string directly into this URL string, but specifying the fields on a separate line of code can help the readability of the code.

Can include any species-ws indexed fields [xlsx]

```
# Downloading species information using the URL string created above
curl::curl_download(url = url, destfile = "Species.csv")
```

Pastes the built url string



This is an example row from the download file

taxonID	scientificName	Nomenclatural Status	taxonGroup_s	commonName	Habitat	occurrenceCount	datasetName
NHMSYS0020825291	Chara hispida	sensu stricto	stonewort	Bristly Stonewort	terrestrial/freshwater	225	UKSI