

# Package ‘parseGBIF’

November 19, 2023

**Type** Package

**Title** An R package for parsing species occurrence records

**Version** 2.0.0

**Date** 2023-06-04

**Maintainer** Pablo Melo <pablopains@yahoo.com.br>

**Description** parseGBIF package is designed to convert GBIF species occurrence data to a more comprehensible format to be used for further analysis, e.g. spatial.

The package provides tools for verifying and standardizing species scientific names and for selecting the most informative species records when duplicates are available.

**License** GPL (>= 2) | file LICENSE

**Encoding** UTF-8

**LazyData** true

**LazyDataCompression** xz

**Roxygen** list(markdown = TRUE)

**RoxygenNote** 7.2.3

**Imports** plyr,  
readxl,  
dplyr,  
tidyr,  
readr,  
stringr,  
textclean,  
googledrive,  
rvest,  
lubridate,  
rnatualearthdata,  
jsonlite,  
sqldf,  
DT,  
downloader,  
tidyselect,  
utils

**Remotes** github::pablopains/parseGBIF

**Depends** R (>= 3.5.0)

R topics documented:

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collectors_get_name	<i>Get the last name of the main collector</i>
---------------------	--

---

**Description**

Get the last name of the main collector in recordedBy field

**Usage**

collectors\_get\_name(x)

**Arguments**

x                      recordedBy field

**Details**

Returns the last name

**Value**

last name of the main collector

**Author(s)**

Pablo Hendrigo Alves de Melo, Nadia Bystriakova & Alexandre Monro

**See Also**

[collectors\\_prepare\\_dictionary](#), [collectors\\_update\\_dictionary](#)

**Examples**

```
help(collectors_get_name)

collectors_get_name('Melo, P.H.A & Monroe, A.')

collectors_get_name('Monroe, A. & Melo, P.H.A')
```

---

`collectors_prepare_dictionary`

*Prepare the list with the last name of the main collector*

---

**Description**

Returns the list with the last name of the main collector associated with the unique key recordedBy. A necessary step for parsing duplicate records is generating a robust key for each unique collecting event (aka ‘gathering’) that will support the recognition of duplicate records. For this purpose we generate a string combining the plant family name + first collector’s surname + the collection number. It is therefore essential to consistently record the collector surname and for this purpose we provide a collector dictionary. To extract the surname of the main collector based on the recordedBy field and assemble a list relating the last name of the main collector and the raw data from the recordedBy, use the `collectors_prepare_dictionary` function.

It is recommended to check the main collector’s last name in the `nameRecordedBy_Standard` field. Our goal is to standardize the main collector’s last name, which is automatically extracted from the `recordedBy` field. We do so by standardizing the text string so that it begins with an uppercase character and to replace non-ascii characters, so that collector responsible for a collection event is always recorded using the same string of characters. If the searched `recordedBy` entry is present in the collector’s dictionary, the function retrieves the last name of the main collector with reference to the `recordedBy` field (in which case the `CollectorDictionary` field will be flagged as ‘checked’), otherwise, the function will return the last name of the main collector, extracted automatically from the `recordedBy` field .

Once verified, the collector’s dictionary can be reused in the future.

**Usage**

```
collectors_prepare_dictionary(
    occ = NA,
    collectorDictionary_file =
    "https://raw.githubusercontent.com/pablopains/parseGBIF/main/collectorDictionary/CollectorsDi
    silence = TRUE
)
```

**Arguments**

`occ` GBIF occurrence table with selected columns as `select_gbif_fields(columns = 'standard')`

`collectorDictionary_file` Collector dictionary file - point to a file on your local disk or upload via git at <https://raw.githubusercontent.com/pablopains/parseGBIF/main/collectorDictionary/CollectorsDictionary.csv>

`silence` if TRUE does not display progress messages

**Details**

If `recordedBy` is present in the collector's dictionary, it returns the checked name, if not, it returns the last name of the main collector, extracted from the `recordedBy` field. If `recordedBy` is present in the collector's dictionary, returns the main collector's last name associated with the single `recordedBy` key, otherwise, returns the main collector's last name, extracted from the `recordedBy` field. It is recommended to curate the main collector's surname, automatically extracted from the `recordedBy` field. The objective is to standardize the last name of the main collector. That the primary botanical collector of a sample is always recognized by the same last name, standardized in capital letters and non-ascii characters replaced

**Value**

`Ctrl_nameRecordedBy_Standard`, `Ctrl_recordedBy`, `Ctrl_notes`, `collectorDictionary`, `Ctrl_update`, `collectorName`, `Ctrl_fullName`, `Ctrl_fullNameII`, `CVStarrVirtualHerbarium_PersonDetails`

**Author(s)**

Pablo Hendrigo Alves de Melo, Nadia Bystriakova & Alexandre Monro

**See Also**

[collectors\\_get\\_name](#), [generate\\_collection\\_event\\_key](#)

**Examples**

```
help(collectors_prepare_dictionary)

occ <- prepare_gbif_occurrence_data(gbif_occurrence_file = 'https://raw.githubusercontent.com/pablopains/parseGBIF/main/collectorDictionary/CollectorsDictionary.csv',
                                   columns = 'standard')

collectorsDictionaryFromDataset <- collectors_prepare_dictionary(occ = occ,
                                                                collectorDictionary_file = 'https://raw.githubusercontent.com/pablopains/parseGBIF/main/collectorDictionary/CollectorsDictionary.csv')

colnames(collectorsDictionaryFromDataset)
head(collectorsDictionaryFromDataset)

collectorDictionary_checked_file <- paste0(tempdir(), '/', 'collectorsDictionaryFromDataset.csv')

collectorDictionary_checked_file

write.csv(collectorsDictionaryFromDataset,
          collectorDictionary_checked_file,
          row.names = FALSE,
          fileEncoding = "UTF-8",
          na = "")
```

---

collectors\_prepare\_dictionary\_v2

*Prepare the list with the last name of the main collector*


---

## Description

Returns the list with the last name of the main collector associated with the unique key recordedBy. A necessary step for parsing duplicate records is generating a robust key for each unique collecting event (aka ‘gathering’) that will support the recognition of duplicate records. For this purpose we generate a string combining the plant family name + first collector’s surname + the collection number. It is therefore essential to consistently record the collector surname and for this purpose we provide a collector dictionary. To extract the surname of the main collector based on the recordedBy field and assemble a list relating the last name of the main collector and the raw data from the recordedBy, use the collectors\_prepare\_dictionary function.

It is recommended to check the main collector’s last name in the nameRecordedBy\_Standard field. Our goal is to standardize the main collector’s last name, which is automatically extracted from the recordedBy field. We do so by standardizing the text string so that it begins with an uppercase character and to replace non-ascii characters, so that collector responsible for a collection event is always recorded using the same string of characters. If the searched recordedBy entry is present in the collector’s dictionary, the function retrieves the last name of the main collector with reference to the recordedBy field (in which case the CollectorDictionary field will be flagged as ‘checked’), otherwise, the function will return the last name of the main collector, extracted automatically from the recordedBy field .

Once verified, the collector’s dictionary can be reused in the future.

## Usage

```
collectors_prepare_dictionary_v2(
  occ = NA,
  collectorDictionary_file =
    "https://raw.githubusercontent.com/pablopains/parseGBIF/main/collectorDictionary/CollectorsDictionary.csv"
  silence = TRUE
)
```

## Arguments

occ	GBIF occurrence table with selected columns as select_gbif_fields(columns = 'standard')
collectorDictionary_file	Collector dictionary file - point to a file on your local disk or download via git at <a href="https://raw.githubusercontent.com/pablopains/parseGBIF/main/collectorDictionary/CollectorsDictionary.csv">https://raw.githubusercontent.com/pablopains/parseGBIF/main/collectorDictionary/CollectorsDictionary.csv</a>
silence	if TRUE does not display progress messages

## Details

If recordedBy is present in the collector’s dictionary, it returns the checked name, if not, it returns the last name of the main collector, extracted from the recordedBy field. If recordedBy is present in the collector’s dictionary, returns the main collector’s last name associated with the single recordedBy key, otherwise, returns the main collector’s last name, extracted from the recordedBy field. It is recommended to curate the main collector’s surname, automatically extracted from the recordedBy

field. The objective is to standardize the last name of the main collector. That the primary botanical collector of a sample is always recognized by the same last name, standardized in capital letters and non-ascii characters replaced

### Value

Ctrl\_nameRecordedBy\_Standard, Ctrl\_recordedBy, Ctrl\_notes, collectorDictionary, Ctrl\_update, collectorName, Ctrl\_fullName, Ctrl\_fullNameII, CVStarrVirtualHerbarium\_PersonDetails

### Author(s)

Pablo Hendrigo Alves de Melo, Nadia Bystriakova & Alexandre Monro

### See Also

[collectors\\_get\\_name](#), [generate\\_collection\\_event\\_key](#)

### Examples

```
help(collectors_prepare_dictionary)

occ <- prepare_gbif_occurrence_data(gbif_occurrence_file = 'https://raw.githubusercontent.com/pablopains/par
                                columns = 'standard')

collectorsDictionaryFromDataset <- collectors_prepare_dictionary(occ = occ,
                                collectorDictionary_file = 'https://raw.githubusercontent.com/pa

colnames(collectorsDictionaryFromDataset)
head(collectorsDictionaryFromDataset)

collectorDictionary_checked_file <- paste0(tempdir(), '/', 'collectorsDictionaryFromDataset.csv')

collectorDictionary_checked_file

write.csv(collectorsDictionaryFromDataset,
          collectorDictionary_checked_file,
          row.names = FALSE,
          fileEncoding = "UTF-8",
          na = "")
```

---

download\_gbif\_data\_from\_doi

*Download GBIF occurrence data from DOI*

---

### Description

Download and unzip GBIF occurrence data from DOI to be used by ParsGBIF functions

**Usage**

```
download_gbif_data_from_doi(  
  gbif_doi_url,  
  folder = "",  
  keep_only_occurrence_file = TRUE,  
  overwrite = FALSE  
)
```

**Arguments**

gbif_doi_url	The url of the GBIF DOI
folder	Save folder
keep_only_occurrence_file	Keep only occurrence.txt file
overwrite	overwrite files
subfolder	Save in subfolder

**Details**

Download GBIF occurrence data downloaded from DOI

**Value**

list of downloaded and unzipped files

**Author(s)**

Pablo Hendrigo Alves de Melo, Nadia Bystriakova & Alexandre Monro

**See Also**

[prepare\\_gbif\\_occurrence\\_data](#), [extract\\_gbif\\_issue](#)

**Examples**

```
library(ParsGBIF)  
  
help(download_gbif_data_from_doi)  
  
download_gbif_data_from_doi(gbif_doi_url='https://www.gbif.org/occurrence/download/0151470-230224095556074'  
  folder = 'c://dataGBIF//Achatocarpaceae')
```

---

EnumOccurrenceIssue	<i>Enumeration GBIF issue An enumeration of validation rules for single occurrence records.</i>
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---

## Description

There are many things that can go wrong and we continuously encounter unexpected data. In order to help us and publishers improve the data, we flag records with various issues that we have encountered. This is also very useful for data consumers as you can include these issues as filters in occurrence searches. Not all issues indicate bad data. Some are merely flagging the fact that GBIF has altered values during processing. On the details page of any occurrence record you will see the list of issues in the notice at the bottom.

## Usage

```
data(EnumOccurrenceIssue)
```

## Format

A data frame with 69 rows and 9 columns

## Details

**constant** GBIF issue constant

**description** GBIF issue description

**definition** Our definition for classifying geographic issues

**type** Type issue

**priority** Impact of the issue for the use of geospatial information

**score** Impact, in number, of the issue for the use of geospatial information

**selection\_score** Value used to calculate the quality of the geospatial information according to the classification of the issue

**reasoning** Reasoning of the impact of the theme for the use of geospatial information

**notes** Notes

## Source

- [GBIF Infrastructure: Data processing](#)
- [An enumeration of validation rules for single occurrence records](#)



export\_data

*Export of results***Description**

For each unique collection event key, complete or incomplete, outputs will be created which combine information from duplicate records and generate a single unique collection event record to replace them. The main output fields relating to taxonomic identification and geographic coordinates:

- parseGBIF\_sample\_taxon\_name = scientific name chosen as taxonomic identification for unique collection event
- parseGBIF\_number\_taxon\_names = number of scientific names found in duplicates of unique collection event
- parseGBIF\_sample\_taxon\_name\_status = status of choice of 'identified', 'divergent identifications', 'unidentified'
- parseGBIF\_unidentified\_sample = if unique collection event has taxonomic identification
- parseGBIF\_decimalLatitude = latitude in decimal degrees
- parseGBIF\_decimalLongitude = longitude in decimal degrees
- parseGBIF\_useful\_for\_spatial\_analysis = whether the coordinates are useful for spatial analysis. **How is the taxon binomial attributed to the unique collection event selected?**

1. Where the unique collection event key is complete: The accepted TAXON\_NAME selected is that which is most frequently applied to the duplicate vouchers at or below the rank of species. Where two named are applied with equal frequency then a mechanical approach, using alphabetical order, is applied, the first listed TAXON\_NAME being chosen. Where there is no identification, at or below the rank of species, then the unique collection event, the unique collection event is indicated as unidentified.
2. Where the unique collection event key is incomplete: Where the unique collection event key is incomplete, then each record is treated as a unique collection event. If there is no identification, at or below the rank of species, then the unique collection event is classified as unidentified. **\_\_Geospatial information \_\_** If the master voucher does not have geographic coordinates, we will seek coordinates from the duplicate records associated with it. Finally, the records are separated into three sets of data: **useable\_data** - Where unique collection event with taxonomic identification and geographic coordinates are complete. This represents the useable dataset. **unusable\_data** - Where unique collection event without taxonomic identification and/or geographic coordinates. **duplicates** The duplicates of unique collection events complete / incomplete

With this, it is possible to perform: Merge information between fields of duplicates of a unique collection event to create a synthetic record for each unique collection event, Compare the frequency of content in fields Generate a work package summary

For each complete unique collection event key, data fields that are empty in the digital voucher record will be populated with data from the respective duplicates. During content merging, we indicate fields associated with the description, location, and data of the unique collection event. By default, fields\_to\_merge parameter of export\_data function contains:

- Ctrl\_fieldNotes
- Ctrl\_year

- Ctrl\_stateProvince
- Ctrl\_municipality
- Ctrl\_locality
- Ctrl\_countryCode
- Ctrl\_eventDate
- Ctrl\_habitat
- Ctrl\_level0Name
- Ctrl\_level1Name
- Ctrl\_level2Name
- Ctrl\_level3Name

### Usage

```
export_data(
  occ_digital_voucher_file = "",
  occ_digital_voucher = NA,
  merge_unusable_data = FALSE,
  fields_to_merge = c("Ctrl_fieldNotes", "Ctrl_year", "Ctrl_stateProvince",
    "Ctrl_municipality", "Ctrl_locality", "Ctrl_countryCode", "Ctrl_eventDate",
    "Ctrl_habitat", "Ctrl_level0Name", "Ctrl_level1Name", "Ctrl_level2Name",
    "Ctrl_level3Name"),
  fields_to_compare = c("Ctrl_gbifID", "Ctrl_scientificName", "Ctrl_recordedBy",
    "Ctrl_recordNumber", "Ctrl_identifiedBy", "Ctrl_dateIdentified",
    "Ctrl_institutionCode", "Ctrl_collectionCode", "Ctrl_datasetName",
    "Ctrl_datasetName", "Ctrl_language", "wcvp_plant_name_id", "wcvp_taxon_rank",
    "wcvp_taxon_status", "wcvp_family", "wcvp_taxon_name", "wcvp_taxon_authors",
    "wcvp_reviewed", "wcvp_searchNotes"),
  fields_to_parse = c("Ctrl_gbifID", "Ctrl_bibliographicCitation", "Ctrl_language",
    "Ctrl_institutionCode", "Ctrl_collectionCode", "Ctrl_datasetName",
    "Ctrl_basisOfRecord", "Ctrl_catalogNumber", "Ctrl_recordNumber", "Ctrl_recordedBy",
    "Ctrl_occurrenceStatus", "Ctrl_eventDate", "Ctrl_year", "Ctrl_month", "Ctrl_day",
    "Ctrl_habitat", "Ctrl_fieldNotes", "Ctrl_eventRemarks", "Ctrl_countryCode",
    "Ctrl_stateProvince", "Ctrl_municipality", "Ctrl_county", "Ctrl_locality",
    "Ctrl_level0Name", "Ctrl_level1Name", "Ctrl_level2Name",
    "Ctrl_level3Name",
    "Ctrl_identifiedBy", "Ctrl_dateIdentified", "Ctrl_scientificName",
    "Ctrl_decimalLatitude", "Ctrl_decimalLongitude", "Ctrl_nameRecordedBy_Standard",
    "Ctrl_recordNumber_Standard", "Ctrl_key_family_recordedBy_recordNumber",
    "Ctrl_geospatial_quality", "Ctrl_verbatim_quality", "Ctrl_moreInformativeRecord",
    "Ctrl_coordinates_validated_by_gbif_issue", "wcvp_plant_name_id", "wcvp_taxon_rank",
    "wcvp_taxon_status", "wcvp_family", "wcvp_taxon_name", "wcvp_taxon_authors",
    "wcvp_reviewed",
    "wcvp_searchNotes", "parseGBIF_digital_voucher",
    "parseGBIF_duplicates", "parseGBIF_num_duplicates",
    "parseGBIF_non_groupable_duplicates", "parseGBIF_duplicates_grouping_status"),
  silence = TRUE
)
```

**Arguments**

occ_digital_voucher_file	CSV file result of function select_digital_voucher()\$occ_digital_voucher
occ_digital_voucher	data frame result of function select_digital_voucher()\$occ_digital_voucher
merge_unusable_data	include records unique collection events incomplete in merge processing
fields_to_merge	fields to merge
fields_to_compare	fields to compare content frequency
fields_to_parse	all fields
silence	if TRUE does not display progress messages

**Details**

Each data frame should be used as needed

**Value**

list with 10 data frames

- **all\_data** All records processed, merged Unique collection events complete / incomplete and their duplicates
- **useable\_data\_merge** Merged Unique collection events complete
- **useable\_data\_raw** Raw Unique collection events complete
- **duplicates** Duplicates of unique collection events complete / incomplete
- **unusable\_data\_merge** Merged Unique collection events incomplete, It is NA if merge\_unusable\_data is FALSE.
- **unusable\_data\_raw** Raw Unique collection events incomplete
- **parseGBIF\_general\_summary**
- **parseGBIF\_merge\_fields\_summary**
- **parseGBIF\_merge\_fields\_summary\_useable\_data**
- **parseGBIF\_merge\_fields\_summary\_unusable\_data** It is NA if merge\_unusable\_data is FALSE

**Author(s)**

Pablo Hendrigo Alves de Melo, Nadia Bystriakova & Alexandre Monro

**See Also**

[batch\\_checkName\\_wcvp](#), [extract\\_gbif\\_issue](#)

## Examples

```

help(export_data)

results <- export_data(occ_digital_voucher_file = file.occ_digital_voucher,
                      merge_unusable_data = TRUE)

names(results)

results$parseGBIF_general_summary
results$parseGBIF_merge_fields_summary
results$parseGBIF_merge_fields_summary_complete
NROW(results$all_data)
NROW(results$unique_collection_event_complete_merge)
NROW(results$unique_collection_event_incomplete_raw)
NROW(results$duplicates)

```

---

export\_data\_v2.3

*Export of results*

---

## Description

For each unique collection event key, complete or incomplete, outputs will be created which combine information from duplicate records and generate a single unique collection event record to replace them. The main output fields relating to taxonomic identification and geographic coordinates:

- parseGBIF\_sample\_taxon\_name = scientific name chosen as taxonomic identification for unique collection event
- parseGBIF\_number\_taxon\_names = number of scientific names found in duplicates of unique collection event
- parseGBIF\_sample\_taxon\_name\_status = status of choice of 'identified', 'divergent identifications', 'unidentified'
- parseGBIF\_unidentified\_sample = if unique collection event has taxonomic identification
- parseGBIF\_decimalLatitude = latitude in decimal degrees
- parseGBIF\_decimalLongitude = longitude in decimal degrees
- parseGBIF\_useful\_for\_spatial\_analysis = whether the coordinates are useful for spatial analysis. **How is the taxon binomial attributed to the unique collection event selected?**

1. Where the unique collection event key is complete: The accepted TAXON\_NAME selected is that which is most frequently applied to the duplicate vouchers at or below the rank of species. Where two named are applied with equal frequency then a mechanical approach, using alphabetical order, is applied, the first listed TAXON\_NAME being chosen. Where there is no identification, at or below the rank of species, then the unique collection event, the unique collection event is indicated as unidentified.
2. Where the unique collection event key is incomplete: Where the unique collection event key is incomplete, then each record is treated as a unique collection event. If there is no identification, at or below the rank of species, then the unique collection event is classified as

unidentified. \_\_Geospatial information \_\_ If the master voucher does not have geographic coordinates, we will seek coordinates from the duplicate records associated with it. Finally, the records are separated into three sets of data: **useable\_data** - Where unique collection event with taxonomic identification and geographic coordinates are complete. This represents the useable dataset. **unusable\_data** - Where unique collection event without taxonomic identification and/or geographic coordinates. **duplicates** The duplicates of unique collection events complete / incomplete

With this, it is possible to perform: Merge information between fields of duplicates of a unique collection event to create a synthetic record for each unique collection event, Compare the frequency of content in fields Generate a work package summary

For each complete unique collection event key, data fields that are empty in the digital voucher record will be populated with data from the respective duplicates. During content merging, we indicate fields associated with the description, location, and data of the unique collection event. By default, fields\_to\_merge parameter of export\_data function contains:

- Ctrl\_fieldNotes
- Ctrl\_year
- Ctrl\_stateProvince
- Ctrl\_municipality
- Ctrl\_locality
- Ctrl\_countryCode
- Ctrl\_eventDate
- Ctrl\_habitat
- Ctrl\_level0Name
- Ctrl\_level1Name
- Ctrl\_level2Name
- Ctrl\_level3Name

## Usage

```
export_data_v2.3(
  occ_digital_voucher_file = "",
  occ_digital_voucher = NA,
  merge_unusable_data = FALSE,
  fields_to_merge = c("Ctrl_fieldNotes", "Ctrl_year", "Ctrl_stateProvince",
    "Ctrl_municipality", "Ctrl_locality", "Ctrl_countryCode", "Ctrl_eventDate",
    "Ctrl_habitat", "Ctrl_level0Name", "Ctrl_level1Name", "Ctrl_level2Name",
    "Ctrl_level3Name"),
  fields_to_compare = c("Ctrl_gbifID", "Ctrl_scientificName", "Ctrl_recordedBy",
    "Ctrl_recordNumber", "Ctrl_identifiedBy", "Ctrl_dateIdentified",
    "Ctrl_institutionCode", "Ctrl_collectionCode", "Ctrl_datasetName",
    "Ctrl_datasetName", "Ctrl_language", "wcvp_plant_name_id", "wcvp_taxon_rank",
    "wcvp_taxon_status", "wcvp_family", "wcvp_taxon_name", "wcvp_taxon_authors",
    "wcvp_reviewed", "wcvp_searchNotes"),
  fields_to_parse = c("Ctrl_gbifID", "Ctrl_bibliographicCitation", "Ctrl_language",
    "Ctrl_institutionCode", "Ctrl_collectionCode", "Ctrl_datasetName",
    "Ctrl_basisOfRecord", "Ctrl_catalogNumber", "Ctrl_recordNumber", "Ctrl_recordedBy",
    "Ctrl_occurrenceStatus", "Ctrl_eventDate", "Ctrl_year", "Ctrl_month", "Ctrl_day",
```

```

    "Ctrl_habitat", "Ctrl_fieldNotes", "Ctrl_eventRemarks", "Ctrl_countryCode",
    "Ctrl_stateProvince", "Ctrl_municipality", "Ctrl_county", "Ctrl_locality",
    "Ctrl_level0Name", "Ctrl_level1Name", "Ctrl_level2Name",
    "Ctrl_level3Name",
    "Ctrl_identifiedBy", "Ctrl_dateIdentified", "Ctrl_scientificName", "Ctrl_taxonRank",
    "Ctrl_decimalLatitude", "Ctrl_decimalLongitude", "Ctrl_nameRecordedBy_Standard",
    "Ctrl_recordNumber_Standard", "Ctrl_key_family_recordedBy_recordNumber",
    "Ctrl_geospatial_quality", "Ctrl_verbatim_quality", "Ctrl_moreInformativeRecord",
    "Ctrl_coordinates_validated_by_gbif_issue", "wcvp_plant_name_id", "wcvp_taxon_rank",
    "wcvp_taxon_status", "wcvp_family", "wcvp_taxon_name", "wcvp_taxon_authors",

    "wcvp_reviewed", "wcvp_searchedName", "wcvp_searchNotes",
    "parseGBIF_digital_voucher", "parseGBIF_duplicates", "parseGBIF_num_duplicates",
    "parseGBIF_non_groupable_duplicates", "parseGBIF_duplicates_grouping_status",
    "parseGBIF_unidentified_sample", "parseGBIF_sample_taxon_name",
    "parseGBIF_sample_taxon_name_status", "parseGBIF_number_taxon_names",
    "parseGBIF_useful_for_spatial_analysis", "parseGBIF_decimalLatitude",
    "parseGBIF_decimalLongitude", "parseGBIF_wcvp_plant_name_id",
    "parseGBIF_wcvp_taxon_rank",
    "parseGBIF_wcvp_taxon_status",
    "parseGBIF_wcvp_family", "parseGBIF_wcvp_taxon_name", "parseGBIF_wcvp_taxon_authors",
    "parseGBIF_wcvp_reviewed", "parseGBIF_dataset_result"),
  silence = TRUE
)

```

## Arguments

`occ_digital_voucher_file`  
 CSV file result of function `select_digital_voucher()`  
`occ_digital_voucher`  
 data frame result of function `select_digital_voucher()`  
`merge_unusable_data`  
 include records unique collection events incomplete in merge processing  
`fields_to_merge`  
 fields to merge  
`fields_to_compare`  
 fields to compare content frequency  
`fields_to_parse`  
 all fields  
`silence`  
 if TRUE does not display progress messages

## Details

Each data frame should be used as needed

## Value

list with 10 data frames

- **all\_data** All records processed, merged Unique collection events complete / incomplete and their duplicates
- **useable\_data\_merge** Merged Unique collection events complete

- **useable\_data\_raw** Raw Unique collection events complete
- **duplicates** Duplicates of unique collection events complete / incomplete
- **unusable\_data\_merge** Merged Unique collection events incomplete, It is NA if merge\_unusable\_data is FALSE.
- **unusable\_data\_raw** Raw Unique collection events incomplete
- **parseGBIF\_general\_summary**
- **parseGBIF\_merge\_fields\_summary**
- **parseGBIF\_merge\_fields\_summary\_useable\_data**
- **parseGBIF\_merge\_fields\_summary\_unusable\_data** It is NA if merge\_unusable\_data is FALSE

### Author(s)

Pablo Hendrigo Alves de Melo, Nadia Bystriakova & Alexandre Monro

### See Also

[batch\\_checkName\\_wcvp](#), [extract\\_gbif\\_issue](#)

### Examples

```
help(export_data)

results <- export_data(occ_digital_voucher_file = file.occ_digital_voucher,
                      merge_unusable_data = TRUE)

names(results)

results$parseGBIF_general_summary
results$parseGBIF_merge_fields_summary
results$parseGBIF_merge_fields_summary_complete
NROW(results$all_data)
NROW(results$unique_collection_event_complete_merge)
NROW(results$unique_collection_event_incomplete_raw)
NROW(results$duplicates)
```

---

extract_gbif_issue	<i>Extracting GBIF issues</i>
--------------------	-------------------------------

---

### Description

Extract GBIF validation rules for occurrence records

GBIF recognises and documents several issues relating to the data fields for an individual record. The issue field stores terms that represent an enumeration of GBIF validation rules. Issues can lead to errors or unexpected data. The issues fields are therefore a valuable source of information when assessing the quality of a record. In order to help GBIF and the data publishers improve the data, GBIF flag records with various issues that they have encountered. These issues can be used as filters applied to occurrence searches. Not all issues indicate bad data, some flag the fact that GBIF has altered values during processing. The values of EnumOccurrenceIssue will be used by the function `extract_gbif_issue` as a model to tabulate the GBIF issues of each record, individualizing them, in columns. TRUE or FALSE, flagging whether the issue applies or not for each record.

## Usage

```
extract_gbif_issue(occ = NA, enumOccurrenceIssue = NA)
```

## Arguments

**occ** GBIF occurrence table with selected columns as `select_gbif_fields(columns = 'standard')`

**enumOccurrenceIssue** An enumeration of validation rules for single occurrence records by GBIF file, if NA, will be used, `data(EnumOccurrenceIssue)`

## Details

<https://gbif.github.io/parsers/apidocs/org/gbif/api/vocabulary/OccurrenceIssue.html>

## Value

list with two data frames: `summary`, with the frequency of issues in the records and `occ_gbif_issue`, with issues in columns with TRUE or FALSE for each record.

## Author(s)

Pablo Hendrigo Alves de Melo, Nadia Bystriakova & Alexandre Monro

## See Also

[prepare\\_gbif\\_occurrence\\_data](#), [select\\_gbif\\_fields](#)

## Examples

```
library(ParsGBIF)

help(extract_gbif_issue)

occ_file <- 'https://raw.githubusercontent.com/pablopains/ParsGBIF/main/dataGBIF/Achatocarpaceae/occurrence'

occ <- prepare_gbif_occurrence_data(gbif_occurrence_file = occ_file,
                                   columns = 'standard')

data(EnumOccurrenceIssue)

colnames(EnumOccurrenceIssue)

head(EnumOccurrenceIssue)

occ_gbif_issue <- extract_gbif_issue(occ = occ)

names(occ_gbif_issue)

head(occ_gbif_issue$summary)

colnames(occ_gbif_issue$occ_gbif_issue)

head(occ_gbif_issue$occ_gbif_issue)
```



---

generate\_collection\_event\_key

*Generating the collection event key*


---

## Description

This generates a key to identify the physical and digital duplicates, of a given collection event. It combines the primary collector's surname, the collector's number and the botanical family, a key is created (family + recordByStandardized + recordNumber\_Standard) that allows grouping the duplicates of the same unique collection event.

It also identifies new collectors to be added to the collector dictionary and that can be reused in the future.

Include recordedByStandardized field with verified main collector's last name. Include recordNumber\_Standard field with only numbers from recordNumber. Create the collection event key to group duplicates in the key\_family\_recordedBy\_recordNumber field, composed of the fields: family + recordedByStandardized + recordNumber\_Standard.

## Usage

```
generate_collection_event_key(
  occ = NA,
  collectorDictionary_checked_file = NA,
  collectorDictionary_checked = NA,
  collectorDictionary_file =
    "https://raw.githubusercontent.com/pablopains/parseGBIF/main/collectorDictionary/CollectorsDiction
  silence = TRUE
)
```

## Arguments

occ	GBIF occurrence table with selected columns as select_gbif_fields(columns = 'standard')
collectorDictionary_checked_file	Verified collector dictionary file - point to a file on your local disk (use file or data frame)
collectorDictionary_checked	Verified collector dictionary data frame (use file or data frame)
collectorDictionary_file	Collector dictionary file - point to a file on your local disk or upload via git at <a href="https://raw.githubusercontent.com/pablopains/parseGBIF/main/collectorDictionary/CollectorsDictionary">https://raw.githubusercontent.com/pablopains/parseGBIF/main/collectorDictionary/CollectorsDictionary</a>
silence	if TRUE does not display progress messages

## Details

Fields created for each incident record: nameRecordedBy\_Standard, recordNumber\_Standard, key\_family\_recordedBy\_Standard, key\_year\_recordedBy\_recordNumber

**Value**

list with three data frames: `occ_collectorsDictionary`, with update result fields only, summary and `CollectorsDictionary_add`, with new collectors that can be added to the collector dictionary that can be reused in the future.

**Author(s)**

Pablo Hendrigo Alves de Melo, Nadia Bystriakova & Alexandre Monro

**See Also**

[collectors\\_get\\_name](#), [prepare\\_collectorsDictionary](#)

**Examples**

```
collectorsDictionaryFromDataset <- prepare_lastNameRecordedBy(occ=occ,  
  collectorDictionary_checked_file='collectorDictionary_checked.csv'  
  
names(collectorsDictionaryFromDataset)
```

---

parseGBIF\_app

*parseGBIF App*

---

**Description**

parseGBIF App

**Usage**

```
parseGBIF_app()
```

**Value**

CSV files

**Author(s)**

Pablo Hendrigo Alves de Melo,

**See Also**

[batch\\_checkName\\_wcvp](#), [extract\\_gbif\\_issue](#)

**Examples**

```
parseGBIF_app()
```

---

parseGBIF_summary	<i>Selecting the master digital voucher</i>
-------------------	---

---

**Description**

...

**Usage**

```

parseGBIF_summary(
  parseGBIF_all_data = NA,
  file.parseGBIF_all_data = "",
  fields_to_merge = c("Ctrl_fieldNotes", "Ctrl_year", "Ctrl_stateProvince",
    "Ctrl_municipality", "Ctrl_locality", "Ctrl_countryCode", "Ctrl_eventDate",
    "Ctrl_habitat", "Ctrl_level0Name", "Ctrl_level1Name", "Ctrl_level2Name",
    "Ctrl_level3Name")
)

```

**Arguments**

parseGBIF_all_data	
...	
file.parseGBIF_all_data	
...	
fields_to_merge	fields to merge
fields_to_compare	fields to compare content frequency
fields_to_parse	all fields
silence	if TRUE does not display progress messages

**Details**

...

**Value**

- **parseGBIF\_general\_summary**
- **parseGBIF\_merge\_fields\_summary**
- **parseGBIF\_merge\_fields\_summary\_useable\_data**
- **parseGBIF\_merge\_fields\_summary\_unusable\_data**

**Author(s)**

Pablo Hendrigo Alves de Melo, Nadia Bystriakova &amp; Alexandre Monro

**See Also**[batch\\_checkName\\_wcvp](#), [extract\\_gbif\\_issue](#)

**Examples**

```

results <- export_data_v2.3(occ_digital_voucher_file = '',
occ_digital_voucher = occ_digital$all_data,
merge_unusable_data = TRUE,
silence = FALSE)

names(results)

head(results$occ_all)
colnames(results$occ_all)

```

---

```
prepare_gbif_occurrence_data
```

*Preparing occurrence data downloaded from GBIF for use by parseGBIF*

---

**Description**

Prepare occurrence data downloaded from GBIF to be used by ParsGBIF functions

**Usage**

```
prepare_gbif_occurrence_data(gbif_occurrence_file = "", columns = "standard")
```

**Arguments**

gbif_occurrence_file	The name of the file from which the with occurrence data downloaded from GBIF (by default "occurrence.txt")
columns	Character vector of strings to indicate column names of the GBIF occurrence file. Use 'standard' to select basic columns for use in the package, 'all' to select all available columns. The default is 'standard'

**Details**

Select data fields and rename field names prefixed with "Ctrl\_"

**Value**

data.frame with renamed selected fields with prefix "Ctrl\_"

**Author(s)**

Pablo Hendrigo Alves de Melo, Nadia Bystriakova & Alexandre Monro

**See Also**

[select\\_gbif\\_fields](#), [extract\\_gbif\\_issue](#)

**Examples**

```
library(ParsGBIF)

help(prepare_gbif_occurrence_data)

occ_file <- 'https://raw.githubusercontent.com/pablopains/ParsGBIF/main/dataGBIF/Achatocarpaceae/occurrence'

occ <- prepare_gbif_occurrence_data(gbif_occurrence_file = occ_file,
                                   columns = 'standard')

colnames(occ)

head(occ)
```

---

```
pre_diagnosis_collection_event_key_quality
```

*Pre-diagnosis of collection event key quality*

---

**Description**

Pre-diagnosis of collection event key quality

**Usage**

```
pre_diagnosis_collection_event_key_quality(
  occ = NA,
  n_occ_min = 10,
  n_show = 50
)
```

**Arguments**

occ	GBIF occurrence table with selected columns as <code>select_gbif_fields(columns = 'standard')</code>
n_occ_min	Minimum records per collector per collection
n_show	Inconsistency number to list

**Details**

Pre-diagnosis of collection event key quality

**Value**

Text report

**Author(s)**

Pablo Hendrigo Alves de Melo, Nadia Bystriakova & Alexandre Monro

**See Also**

[prepare\\_gbif\\_occurrence\\_data](#), [extract\\_gbif\\_issue](#)

**Examples**

```
library(ParsGBIF)

help(download_gbif_data_from_doi)

download_gbif_data_from_doi(gbif_doi_url='https://www.gbif.org/occurrence/download/0151470-230224095556074
                             folder = 'c://dataGBIF//Achatocarpaceae')
```

---

```
select_digital_voucher
```

*Selecting the master digital voucher*

---

**Description**

To group duplicates and choose the digital voucher: Unique collection events can result in many ‘duplicate’ GBIF records. We designate one of these ‘duplicate’ records as the master digital voucher, to which data from other duplicate vouchers can be merged (see `export_data`):

**Where the collection event key for grouping duplicates is complete**, then duplicates can be grouped / parsed. To do so, we evaluate record completeness. Record completeness is calculated based on data-quality scores for the information in the following fields: `recordedBy`, `recordNumber`, `year`, `institutionCode`, `catalogNumber`, `locality`, `municipality`, `countryCode`, `stateProvince` and `fieldNotes`. The spatial coordinates associated with each duplicate are ranked using a score for the quality of the geospatial information. This score is calculated using the issues listed in the GBIF table, `EnumOccurrenceIssue`. A score is calculated based on these issues (see above). The duplicate with the highest total score is assigned as the master voucher for the unique collection event. Missing information contained in duplicate records of the unique collection event can then be merged into the master digital voucher (see `export_data`).

**Where the collection event key is incomplete**, unique collection event duplicates cannot be parsed. In this case, each record is considered as a unique collection event, without duplicates. However, to know the integrity of the information, record completeness and quality of the geospatial information, are evaluated as described above.

**How is the quality score calculated?** `parseGBIF_digital_voucher` = The duplicate with the highest total score, sum of record completeness + quality of geospatial information.

**How is record completeness calculated?** The quality of the duplicate records associated with each collection event key is measured as the completeness of a record, using the sum of a number of flags (see below) equal to TRUE.

**Flags used to calculate record completeness**

- Is there information about the collector?
- Is there information about the collection number?
- Is there information about the year of collection?
- Is there information about the institution code?

- Is there information about the catalog number?
- Is there information about the locality?
- Is there information about the municipality of collection?
- Is there information about the state/province of collection?
- Is there information about the field notes?

**The quality of geospatial information is based on geographic issues raised by GBIF.** GBIF issues relating to geospatial data were classified into three classes based on the data quality scores that we assigned to each of the following GBIF issues recorded in the EnumOccurrenceIssue.

- Issue does not affect coordinating accuracy, with selection\_score equal to -1
- Issue has potential to affect coordinate accuracy, with selection\_score equal to -3
- Records with a selection\_score equal to -9 are excluded.

### Usage

```
select_digital_voucher(
  occ = NA,
  occ_gbif_issue = NA,
  occ_wcvp_check_name = NA,
  occ_collectorsDictionary = NA,
  enumOccurrenceIssue = NA,
  silence = TRUE
)
```

### Arguments

occ	GBIF occurrence table with selected columns as select_gbif_fields(columns = 'standard')
occ_gbif_issue	= result of function extract_gbif_issue()\$occ_gbif_issue
occ_wcvp_check_name	= result of function batch_checkName_wcvp()\$occ_wcvp_check_name
occ_collectorsDictionary	= result of function update_collectorsDictionary()\$occ_collectorsDictionary
enumOccurrenceIssue	An enumeration of validation rules for single occurrence records by GBIF file, if NA, will be used, data(EnumOccurrenceIssue)
silence	if TRUE does not display progress messages

### Details

- parseGBIF\_duplicates\_grouping\_status - "groupable", "not groupable: no recordedBy and no recordNumber", "not groupable: no recordNumber" or "not groupable: no recordedBy"
- parseGBIF\_num\_duplicates number of duplicates records
- parseGBIF\_duplicates TRUE/FALSE
- parseGBIF\_non\_groupable\_duplicates TRUE/FALSE

### Value

list with two data frames: occ\_digital\_voucher\_and: occ\_digital\_voucher, with all data processing fields and occ\_results, only result fields.

**Author(s)**

Pablo Hendrigo Alves de Melo, Nadia Bystriakova & Alexandre Monro

**See Also**

[batch\\_checkName\\_wcvp](#), [extract\\_gbif\\_issue](#)

**Examples**

```
help(select_digital_voucher)

head(occ)
head(res_gbif_issue$occ_gbif_issue)
head(res_checkName_wcvp$occ_wcvp_check_name)
head(res_collectorsDictionary$occ_collectorsDictionary)
res_digital_voucher_and_sample_identification <- select_digital_voucher(occ = occ,
                                                                       occ_gbif_issue = res_gbif_issue$occ_gbif_issue,
                                                                       occ_wcvp_check_name = res_checkName_wcvp$occ_wcvp_check_name,
                                                                       occ_collectorsDictionary = res_collectorsDictionary$occ_collectorsDictionary,
                                                                       enumOccurrenceIssue = EnumOccurrenceIssue)

names(res_digital_voucher_and_sample_identification)

head(res_digital_voucher_and_sample_identification$occ_digital_voucher)
colnames(res_digital_voucher_and_sample_identification$occ_digital_voucher)
```

---

select\_digital\_voucher\_v2.1

*Selecting the master digital voucher*

---

**Description**

To group duplicates and choose the digital voucher: Unique collection events can result in many ‘duplicate’ GBIF records. We designate one of these ‘duplicate’ records as the master digital voucher, to which data from other duplicate vouchers can be merged (see `export_data`):

**Where the collection event key for grouping duplicates is complete**, then duplicates can be grouped / parsed. To do so, we evaluate record completeness. Record completeness is calculated based on data-quality scores for the information in the following fields: `recordedBy`, `recordNumber`, `year`, `institutionCode`, `catalogNumber`, `locality`, `municipality`, `countryCode`, `stateProvince` and `fieldNotes`. The spatial coordinates associated with each duplicate are ranked using a score for the quality of the geospatial information. This score is calculated using the issues listed in the GBIF table, `EnumOccurrenceIssue`. A score is calculated based on these issues (see above). The duplicate with the highest total score is assigned as the master voucher for the unique collection event. Missing information contained in duplicate records of the unique collection event can then be merged into the master digital voucher (see `export_data`).

**Where the collection event key is incomplete**, unique collection event duplicates cannot be parsed. In this case, each record is considered as a unique collection event, without duplicates. However, to know the integrity of the information, record completeness and quality of the geospatial information, are evaluated as described above.



**How is the quality score calculated?** parseGBIF\_digital\_voucher = The duplicate with the highest total score, sum of record completeness + quality of geospatial information.

**How is record completeness calculated?** The quality of the duplicate records associated with each collection event key is measured as the completeness of a record, using the sum of a number of flags (see below) equal to TRUE.

#### Flags used to calculate record completeness

- Is there information about the collector?
- Is there information about the collection number?
- Is there information about the year of collection?
- Is there information about the institution code?
- Is there information about the catalog number?
- Is there information about the locality?
- Is there information about the municipality of collection?
- Is there information about the state/province of collection?
- Is there information about the field notes?

**The quality of geospatial information is based on geographic issues raised by GBIF.** GIBF issues relating to geospatial data were classified into three classes based on the data quality scores that we assigned to each of the following GBIF issues recorded in the EnumOccurrenceIssue.

- Issue does not affect coordinating accuracy, with selection\_score equal to -1
- Issue has potential to affect coordinate accuracy, with selection\_score equal to -3
- Records with a selection\_score equal to -9 are excluded.

#### Usage

```
select_digital_voucher_v2.1(
  occ = NA,
  occ_gbif_issue = NA,
  occ_wcvp_check_name = NA,
  occ_collectorsDictionary = NA,
  enumOccurrenceIssue = NA,
  silence = TRUE
)
```

#### Arguments

occ	GBIF occurrence table with selected columns as select_gbif_fields(columns = 'standard')
occ_gbif_issue	= result of function extract_gbif_issue()\$occ_gbif_issue
occ_wcvp_check_name	= result of function batch_checkName_wcvp()\$occ_wcvp_check_name
occ_collectorsDictionary	= result of function update_collectorsDictionary()\$occ_collectorsDictionary
enumOccurrenceIssue	An enumeration of validation rules for single occurrence records by GBIF file, if NA, will be used, data(EnumOccurrenceIssue)
silence	if TRUE does not display progress messages

**Details**

- parseGBIF\_duplicates\_grouping\_status - "groupable", "not groupable: no recordedBy and no recordNumber", "not groupable: no recordNumber" or "not groupable: no recordedBy"
- parseGBIF\_num\_duplicates number of duplicates records
- parseGBIF\_duplicates TRUE/FALSE
- parseGBIF\_non\_groupable\_duplicates TRUE/FALSE

**Value**

list with two data frames: occ\_digital\_voucher\_and: occ\_digital\_voucher, with all data processing fields and occ\_results, only result fields.

**Author(s)**

Pablo Hendrigo Alves de Melo, Nadia Bystriakova & Alexandre Monro

**See Also**

[batch\\_checkName\\_wcvp](#), [extract\\_gbif\\_issue](#)

**Examples**

```
help(select_digital_voucher)

head(occ)
head(res_gbif_issue$occ_gbif_issue)
head(res_checkName_wcvp$occ_wcvp_check_name)
head(res_collectorsDictionary$occ_collectorsDictionary)
res_digital_voucher_and_sample_identification <- select_digital_voucher(occ = occ,
  occ_gbif_issue = res_gbif_issue$occ_gbif_issue,
  occ_wcvp_check_name = res_checkName_wcvp$occ_wcvp_check_name,
  occ_collectorsDictionary = res_collectorsDictionary$occ_collectorsDictionary,
  enumOccurrenceIssue = EnumOccurrenceIssue)

names(res_digital_voucher_and_sample_identification)

head(res_digital_voucher_and_sample_identification$occ_digital_voucher)
colnames(res_digital_voucher_and_sample_identification$occ_digital_voucher)
```

---

select\_digital\_voucher\_v2.2

*Selecting the master digital voucher*

---

**Description**

To group duplicates and choose the digital voucher: Unique collection events can result in many ‘duplicate’ GBIF records. We designate one of these ‘duplicate’ records as the master digital voucher, to which data from other duplicate vouchers can be merged (see export\_data):

**Where the collection event key for grouping duplicates is complete**, then duplicates can be grouped / parsed. To do so, we evaluate record completeness. Record completeness is calculated

based on data-quality scores for the information in the following fields: recordedBy, recordNumber, year, institutionCode, catalogNumber, locality, municipality, countryCode, stateProvince and fieldNotes. The spatial coordinates associated with each duplicate are ranked using a score for the quality of the geospatial information. This score is calculated using the issues listed in the GBIF table, EnumOccurrenceIssue. A score is calculated based on these issues (see above). The duplicate with the highest total score is assigned as the master voucher for the unique collection event. Missing information contained in duplicate records of the unique collection event can then be merged into the master digital voucher (see export\_data).

**Where the collection event key is incomplete,** unique collection event duplicates cannot be parsed. In this case, each record is considered as a unique collection event, without duplicates. However, to know the integrity of the information, record completeness and quality of the geospatial information, are evaluated as described above.

**How is the quality score calculated?** parseGBIF\_digital\_voucher = The duplicate with the highest total score, sum of record completeness + quality of geospatial information.

**How is record completeness calculated?** The quality of the duplicate records associated with each collection event key is measured as the completeness of a record, using the sum of a number of flags (see below) equal to TRUE.

#### Flags used to calculate record completeness

- Is there information about the collector?
- Is there information about the collection number?
- Is there information about the year of collection?
- Is there information about the institution code?
- Is there information about the catalog number?
- Is there information about the locality?
- Is there information about the municipality of collection?
- Is there information about the state/province of collection?
- Is there information about the field notes?

**The quality of geospatial information is based on geographic issues raised by GBIF.** GBIF issues relating to geospatial data were classified into three classes based on the data quality scores that we assigned to each of the following GBIF issues recorded in the EnumOccurrenceIssue.

- Issue does not affect coordinating accuracy, with selection\_score equal to -1
- Issue has potential to affect coordinate accuracy, with selection\_score equal to -3
- Records with a selection\_score equal to -9 are excluded.

#### Usage

```
select_digital_voucher_v2.2(
  occ = NA,
  occ_gbif_issue = NA,
  occ_wcvp_check_name = NA,
  occ_collectorsDictionary = NA,
  enumOccurrenceIssue = NA,
  silence = TRUE
)
```

**Arguments**

`occ` GBIF occurrence table with selected columns as `select_gbif_fields(columns = 'standard')`

`occ_gbif_issue` = result of function `extract_gbif_issue()``$occ_gbif_issue`

`occ_wcvp_check_name`  
= result of function `batch_checkName_wcvp()``$occ_wcvp_check_name`

`occ_collectorsDictionary`  
= result of function `update_collectorsDictionary()``$occ_collectorsDictionary`

`enumOccurrenceIssue`  
An enumeration of validation rules for single occurrence records by GBIF file, if NA, will be used, `data(EnumOccurrenceIssue)`

`silence` if TRUE does not display progress messages

**Details**

- `parseGBIF_duplicates_grouping_status` - "groupable", "not groupable: no recordedBy and no recordNumber", "not groupable: no recordNumber" or "not groupable: no recordedBy"
- `parseGBIF_num_duplicates` number of duplicates records
- `parseGBIF_duplicates` TRUE/FALSE
- `parseGBIF_non_groupable_duplicates` TRUE/FALSE

**Value**

list with two data frames: `occ_digital_voucher_and`: `occ_digital_voucher`, with all data processing fields and `occ_results`, only result fields.

**Author(s)**

Pablo Hendrigo Alves de Melo, Nadia Bystriakova & Alexandre Monro

**See Also**

[batch\\_checkName\\_wcvp](#), [extract\\_gbif\\_issue](#)

**Examples**

```
help(select_digital_voucher)

head(occ)
head(res_gbif_issue$occ_gbif_issue)
head(res_checkName_wcvp$occ_wcvp_check_name)
head(res_collectorsDictionary$occ_collectorsDictionary)
res_digital_voucher_and_sample_identification <- select_digital_voucher(occ = occ,
                                                                    occ_gbif_issue = res_gbif_issue$occ_gbif_issue,
                                                                    occ_wcvp_check_name = res_checkName_wcvp$occ_wcvp_check_name,
                                                                    occ_collectorsDictionary = res_collectorsDictionary$occ_collectorsDictionary,
                                                                    enumOccurrenceIssue = EnumOccurrenceIssue)

names(res_digital_voucher_and_sample_identification)

head(res_digital_voucher_and_sample_identification$occ_digital_voucher)
colnames(res_digital_voucher_and_sample_identification$occ_digital_voucher)
```

---

select_gbif_fields	<i>select_gbif_fields</i>
--------------------	---------------------------

---

## Description

Select columns in GBIF occurrence data

## Usage

```
select_gbif_fields(columns = "standard")
```

## Arguments

columns	'standard' basic columns about what, when, where, and who collected, 'all' all available columns or list column names
---------	---

## Details

"standard" : indicated by (**standard**)

or

'all':

- 'gbifID' (**standard**)
- 'abstract'
- 'accessRights'
- 'accrualMethod'
- 'accrualPeriodicity'
- 'accrualPolicy'
- 'alternative'
- 'audience'
- 'available'
- 'bibliographicCitation' (**standard**)
- 'conformsTo'
- 'contributor'
- 'coverage'
- 'created'
- 'creator'
- 'date'
- 'dateAccepted'
- 'dateCopyrighted'
- 'dateSubmitted'
- 'description'

- 'educationLevel'
- 'extent'
- 'format'
- 'hasFormat'
- 'hasPart'
- 'hasVersion'
- 'identifier'
- 'instructionalMethod'
- 'isFormatOf'
- 'isPartOf'
- 'isReferencedBy'
- 'isReplacedBy'
- 'isRequiredBy'
- 'isVersionOf'
- 'issued'
- 'language' (**standard**)
- 'license'
- 'mediator'
- 'medium'
- 'modified'
- 'provenance'
- 'publisher'
- 'references'
- 'relation'
- 'replaces'
- 'requires'
- 'rights'
- 'rightsHolder'
- 'source'
- 'spatial'
- 'subject'
- 'tableOfContents'
- 'temporal'
- 'title'
- 'type'
- 'valid'
- 'institutionID'
- 'collectionID'
- 'datasetID'
- 'institutionCode' (**standard**)

- 'collectionCode' (**standard**)
- 'datasetName' (**standard**)
- 'ownerInstitutionCode'
- 'basisOfRecord' (**standard**)
- 'informationWithheld' (**standard**)
- 'dataGeneralizations' (**standard**)
- 'dynamicProperties'
- 'occurrenceID' (**standard**) # occ\_search(occurrenceId='BRA:UNEMAT:HPAN:6089')
- 'catalogNumber' (**standard**)
- 'recordNumber' (**standard**)
- 'recordedBy' (**standard**)
- 'recordedByID'
- 'individualCount'
- 'organismQuantity'
- 'organismQuantityType'
- 'sex'
- 'lifeStage'
- 'reproductiveCondition'
- 'behavior'
- 'establishmentMeans'
- 'degreeOfEstablishment'
- 'pathway'
- 'georeferenceVerificationStatus' (**standard**)
- 'occurrenceStatus' (**standard**)
- 'preparations'
- 'disposition'
- 'associatedOccurrences'
- 'associatedReferences'
- 'associatedSequences'
- 'associatedTaxa'
- 'otherCatalogNumbers'
- 'occurrenceRemarks'
- 'organismID'
- 'organismName'
- 'organismScope'
- 'associatedOrganisms'
- 'previousIdentifications'
- 'organismRemarks'
- 'materialSampleID'
- 'eventID'

- 'parentEventID'
- 'fieldNumber'
- 'eventDate' (**standard**)
- 'eventTime'
- 'startDayOfYear'
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- 'year' (**standard**)
- 'month' (**standard**)
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- 'verbatimEventDate'
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- 'samplingProtocol'
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- 'island' (**standard**)
- 'countryCode' (**standard**)
- 'stateProvince' (**standard**)
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- 'municipality' (**standard**)
- 'locality' (**standard**)
- 'verbatimLocality' (**standard**)
- 'verbatimElevation'
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- 'minimumDistanceAboveSurfaceInMeters'
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- 'locationAccordingTo'
- 'locationRemarks' (**standard**)
- 'decimalLatitude' (**standard**)
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- 'coordinateUncertaintyInMeters'



- 'coordinatePrecision'
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- 'georeferencedDate'
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- 'level2Gid'
- 'level2Name' (**standard**)
- 'level3Gid'
- 'level3Name' (**standard**)
- 'iucnRedListCategory'

## Value

list of the columns names

**Author(s)**

Pablo Hendrigo Alves de Melo, Nadia Bystriakova & Alexandre Monro

**See Also**

[extract\\_gbif\\_issue](#), [prepare\\_gbif\\_occurrence\\_data](#)

**Examples**

```
# select_gbif_fields()

help(select_gbif_fields)

col_sel <- select_gbif_fields(columns = 'all')

col_sel <- select_gbif_fields(columns = 'standard')
```

---

```
standardize_scientificName
      standardize_scientificName
```

---

**Description**

standardize binomial name, variety, subspecies, form and hybrids, authorship to allow comparison with names of taxa in the World Checklist of Vascular Plants (WCVF) database

**Usage**

```
standardize_scientificName(
  searchedName = "Alomia angustata (Gardner) Benth. ex Baker"
)
```

**Arguments**

searchedName      scientific name, with or without author

**Details**

Standardize scientific name according to WCVF format. Separate generic epithet, specific epithet, variety, subspecies, form, hybrid and author, in the scientific name, if any. Standardize, according to WCVF, abbreviation of infrataxon, if any: variety to var., subspecies to subsp., FORM to f., hybrid separator separate x from the specific epithet.

**Value**

searchedName, standardizedName, taxonAuthors, taxonAuthors\_last

**Author(s)**

Pablo Hendrigo Alves de Melo, Nadia Bystriakova & Alexandre Monro

**See Also**

[get\\_wcvp](#), [checkName\\_wcvp](#)

**Examples**

```
standardize_scientificName('Leucanthemum ×superbum (Bergmans ex J.W.Ingram) D.H.Kent')
standardize_scientificName('Alomia angustata (Gardner) Benth. ex Baker')
standardize_scientificName('Centaurea ×aemiliae Font Quer')
```

---

wcvp_check_name	<i>Check species names against World Checklist of Vascular Plants (WCVp) database</i>
-----------------	---

---

**Description**

Use the **World Checklist of Vascular Plants WCVp database** to check accepted names and update synonyms.

The World Checklist of Vascular Plants (WCVp) database is available from the **Royal Botanic Gardens, Kew**. It can be downloaded to a folder of the user's choice or into memory using the `get_wcvp` function. The output has 33 columns.

**Usage**

```
wcvp_check_name(
  searchedName = "Hemistylus brasiliensis Wedd.",
  wcvp_names = "",
  if_author_fails_try_without_combinations = TRUE
)
```

**Arguments**

<code>searchedName</code>	scientific name, with or without author
<code>wcvp_names</code>	WCVp table, <code>wcvp_names.csv</code> file from <a href="http://sftp.kew.org/pub/data-repositories/WCVp/">http://sftp.kew.org/pub/data-repositories/WCVp/</a> If NA, automatically load the latest version of the database by the function <code>parseGBIF::wcvp_get_data(read_only_to_memory = TRUE)\$wcvp_names</code> .
<code>if_author_fails_try_without_combinations</code>	option for partial verification of the authorship of the species. Remove the authors of combinations, in parentheses

**Details**

About the World Checklist of Vascular Plants <https://powo.science.kew.org/about-wcvp> search-Notes values:

- Accepted - When only one authorless scientific name is present in the list of TAXON\_name with and TAXON\_STATUS equal to "Accepted", `verified_speciesName` = 100.
- Accepted among homonyms - When more than one authorless scientific name is present in the TAXON\_name list, but only one of the homonyms displays TAXON\_STATUS equal to "Accepted", `verified_speciesName` = number of matches/100.

- Homonyms - When more than one authorless scientific name is present in the TAXON\_name list and more than one, or none among the homonyms, display TAXON\_STATUS equal to "Accepted", verified\_speciesName = number of matches/100. Before searching for homonyms, there was a failure in trying to find the matching match between authorless scientific name in TAXON\_name and author in TAXON\_AUTHORS, in these cases verified\_author equal to 0 (zero),
- Not Found: When the authorless scientific name is not present in the TAXON\_NAME LIST
- Unplaced: o When only one authorless scientific name is present in the list of TAXON\_name with and TAXON\_STATUS = "Unplaced"
- Updated: When only one authorless scientific name is present in the list of TAXON\_name and ACCEPTED\_PLANT\_NAME\_ID are not empty (and ACCEPTED\_PLANT\_NAME\_ID is different from the ID of the species consulted) taxon\_status\_of\_searchedName, plant\_name\_id\_of\_searchedName and taxon\_authors\_of\_searchedName values:
  - When searchNotes equals "Updated" – The fields record the information of the scientific name originally consulted.
  - When searchNotes equals "Homonyms" - Fields record the information of homonymous synonyms separated by "|".
- verified\_author values:
  - When value equal to 100 – when there is matched match between authorless scientific name in TAXON\_name and author in TAXON\_AUTHORS.
  - When value equal to 50 – when there is combined correspondence between authorless scientific name in TAXON\_name and author, without (combination), in TAXON\_AUTHORS.
  - When value equal to 0 – regardless of the correspondence between authorless scientific name in TAXON\_name, author is not present in TAXON\_AUTHORS.

## Value

Data frame with WCVF fields

## Author(s)

Pablo Hendrigo Alves de Melo, Nadia Bystriakova & Alexandre Monro

## See Also

[wcvp\\_check\\_name\\_batch](#), [wcvp\\_get\\_data](#)

## Examples

```
# These examples take >10 seconds to run and require 'parseGBIF::wcvp_get_data()'

library(parseGBIF)

help(wcvp_check_name)

wcvp_names <- wcvp_get_data(read_only_to_memory = TRUE)$wcvp_names

# 1) Updated
wcvp_check_name(searchedName = 'Hemistylus brasiliensis Wedd.',
                 wcvp_names = wcvp_names,
                 if_author_fails_try_without_combinations = TRUE)
```

```

# 2) Accepted
wcvp_check_name(searchedName = 'Hemistylus boehmerioides Wedd. ex Warm.',
                 wcvp_names = wcvp_names,
                 if_author_fails_try_without_combinations = TRUE)

# 3) Unplaced - taxon_status = Unplaced
wcvp_check_name(searchedName = 'Leucosyke australis Unruh',
                 wcvp_names = wcvp_names,
                 if_author_fails_try_without_combinations = TRUE)

# 4) Accepted among homonyms - When author is not informed. In this case, one of the homonyms, taxon_status is ac
wcvp_check_name(searchedName = 'Parietaria cretica',
                 wcvp_names = wcvp_names,
                 if_author_fails_try_without_combinations = TRUE)

# When author is informed
wcvp_check_name(searchedName = 'Parietaria cretica L.',
                 wcvp_names = wcvp_names,
                 if_author_fails_try_without_combinations = TRUE)

# When author is informed
wcvp_check_name(searchedName = 'Parietaria cretica Moris',
                 wcvp_names = wcvp_names,
                 if_author_fails_try_without_combinations = TRUE)

# 5) Homonyms - When author is not informed. In this case, none of the homonyms, taxon_status is Accepted
wcvp_check_name(searchedName = 'Laportea peltata',
                 wcvp_names = wcvp_names,
                 if_author_fails_try_without_combinations = TRUE)

# When author is informed
wcvp_check_name(searchedName = 'Laportea peltata Gaudich. & Decne.',
                 wcvp_names = wcvp_names,
                 if_author_fails_try_without_combinations = TRUE)

# When author is informed
wcvp_check_name(searchedName = 'Laportea peltata (Blume) Gaudich.',
                 wcvp_names = wcvp_names,
                 if_author_fails_try_without_combinations = TRUE)

```

---

wcvp\_check\_name\_batch *In batch, use the WCVp database to check accepted names and update synonyms*

---

## Description

Species' names can be checked against WCVp database one by one, or in a batch mode. To verify individual names, the function wcvp\_check\_name is used.

## Usage

```
wcvp_check_name_batch(
```

```

occ = NA,
wcvp_names = "",
if_author_fails_try_without_combinations = TRUE,
wcvp_selected_fields = "standard",
silence = TRUE
)

```

### Arguments

occ	GBIF occurrence table with selected columns as <code>select_gbif_fields(columns = 'standard')</code>
wcvp_names	get data frame in <code>parseGBIF::wcvp_get_data(read_only_to_memory = TRUE)\$wcvp_names</code> or configure function to save a copy on local disk to optimize loading, see details in <code>help(wcvp_get_data)</code>
if_author_fails_try_without_combinations	option for partial verification of the authorship of the species. Remove the authors of combinations, in parentheses.
wcvp_selected_fields	WCVP fields selected as return, 'standard' basic columns, 'all' all available columns. The default is 'standard'
silence	if TRUE does not display progress messages

### Details

See `help(checkName_wcvp)`

- [about WCVP database](#)
- [World Checklist of Vascular Plants](#)
- [WCVP database](#)
- [\(about WCVP\)](#)

### Value

list with two data frames: summary, species list and `occ_wcvp_check_name`, with WCVP fields

### Author(s)

Pablo Hendrigo Alves de Melo, Nadia Bystriakova & Alexandre Monro

### See Also

[wcvp\\_get\\_data](#), [wcvp\\_check\\_name](#)

### Examples

```
# These examples take >10 minutes to run and require 'parseGBIF::wcvp_get_data()'

```

```
library(parseGBIF)

```

```
help(wcvp_check_name_batch)

```

```
occ_file <- 'https://raw.githubusercontent.com/pablopains/parseGBIF/main/dataGBIF/Achatocarpaceae/occurrence'

```



```

occ <- prepare_gbif_occurrence_data(gbif_occurrence_file = occ_file,
                                   columns = 'standard')

# wcvp_names <- wcvp_get_data(read_only_to_memory = TRUE)$wcvp_names
data(wcvp_names_Achatocarpaceae)

head(wcvp_names)

res_wcvp_check_name_batch <- wcvp_check_name_batch(occ = occ,
                                                  wcvp_names = wcvp_names,
                                                  if_author_fails_try_without_combinations = TRUE,
                                                  wcvp_selected_fields = 'standard',
                                                  show_process = TRUE)

names(res_wcvp_check_name_batch)

head(res_wcvp_check_name_batch$summary)

head(res_wcvp_check_name_batch$occ_wcvp_check_name)

```

---

wcvp_get_data	<i>Get WCVF database</i>
---------------	--------------------------

---

## Description

Download World Checklist of Vascular Plants (WCVF) database

## Usage

```

wcvp_get_data(
  url_source = "http://sftp.kew.org/pub/data-repositories/WCVF/",
  read_only_to_memory = FALSE,
  path_results = "C:/parseGBIF",
  update = FALSE,
  load_distribution = FALSE,
  load_rda_data = FALSE
)

```

## Arguments

url_source	http://sftp.kew.org/pub/data-repositories/WCVF/
read_only_to_memory	TRUE to in-memory read-only, not writing a copy to local disk
path_results	download destination folder, if read_only_to_memory FALSE
update	TRUE to update and load files, FALSE to keep local version and load files, if read_only_to_memory FALSE
load_distribution	TRUE to load file with geographical distribution of species, if read_only_to_memory FALSE

`load_rda_data` Load the WCVF name database from the rda file distributed with the package. To ensure updates, it is recommended to reinstall the package frequently.

### Details

<http://sftp.kew.org/pub/data-repositories/WCVF/> This is the public SFTP (Secure File Transfer Protocol) site of the Royal Botanic Gardens, Kew. This space contains data resources publicly accessible to the user 'anonymous'. No password required for access. Use of data made available via this site may be subject to legal and licensing restrictions. The README in the top-level directory for each data resource provides specific information about its terms of use.

### Value

list with two data frames: `wcvp_names` and `wcvp_distribution`

### Author(s)

Pablo Hendrigo Alves de Melo, Nadia Bystriakova & Alexandre Monro

### See Also

[wcvp\\_check\\_name](#), [wcvp\\_check\\_name\\_batch](#)

### Examples

```
# load package
library(parseGBIF)

help(wcvp_get_data)

# Download wcvp database to local disk
path_data <- tempdir() # you can change this folder

wcvp <- wcvp_get_data(url_source = 'http://sftp.kew.org/pub/data-repositories/WCVF/',
                      read_only_to_memory = FALSE,
                      path_results = path_data,
                      update = FALSE,
                      load_distribution = TRUE)

names(wcvp)

head(wcvp$wcvp_names)
colnames(wcvp$wcvp_names)

head(wcvp$wcvp_distribution)
colnames(wcvp$wcvp_distribution)
```

---

wcvp\_get\_data\_v2.1      *Get WCVF database*


---

## Description

Download World Checklist of Vascular Plants (WCVF) database

## Usage

```
wcvp_get_data_v2.1(
  url_source = "http://sftp.kew.org/pub/data-repositories/WCVF/",
  read_only_to_memory = FALSE,
  path_results = "C:/parseGBIF",
  update = FALSE,
  load_distribution = FALSE,
  load_rda_data = FALSE
)
```

## Arguments

url_source	http://sftp.kew.org/pub/data-repositories/WCVF/
read_only_to_memory	TRUE to in-memory read-only, not writing a copy to local disk
path_results	download destination folder, if read_only_to_memory FALSE
update	TRUE to update and load files, FALSE to keep local version and load files, if read_only_to_memory FALSE
load_distribution	TRUE to load file with geographical distribution of species, if read_only_to_memory FALSE
load_rda_data	Load the WCVF name database from the rda file distributed with the package. To ensure updates, it is recommended to reinstall the package frequently.

## Details

<http://sftp.kew.org/pub/data-repositories/WCVF/> This is the public SFTP (Secure File Transfer Protocol) site of the Royal Botanic Gardens, Kew. This space contains data resources publicly accessible to the user 'anonymous'. No password required for access. Use of data made available via this site may be subject to legal and licensing restrictions. The README in the top-level directory for each data resource provides specific information about its terms of use.

## Value

list with two data frames: wcvp\_names and wcvp\_distribution

## Author(s)

Pablo Hendrigo Alves de Melo, Nadia Bystrakova & Alexandre Monro

## See Also

[wcvp\\_check\\_name](#), [wcvp\\_check\\_name\\_batch](#)

**Examples**

```
# load package
library(parseGBIF)

help(wcvp_get_data)

# Download wcvp database to local disk
path_data <- tempdir() # you can change this folder

wcvp <- wcvp_get_data(url_source = 'http://sftp.kew.org/pub/data-repositories/WCVP/',
                      read_only_to_memory = FALSE,
                      path_results = path_data,
                      update = FALSE,
                      load_distribution = TRUE)

names(wcvp)

head(wcvp$wcvp_names)
colnames(wcvp$wcvp_names)

head(wcvp$wcvp_distribution)
colnames(wcvp$wcvp_distribution)
```

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