# Package 'taxadb'

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```
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clean\_names

Clean taxonomic names

# Description

A utility to sanitize taxonomic names to increase probability of resolving names.

```
clean_names(
  names,
  fix_delim = TRUE,
  binomial_only = TRUE,
  remove_sp = TRUE,
  ascii_only = TRUE,
  lowercase = TRUE,
  remove_punc = FALSE
)
```

common\_contains 3

# **Arguments**

names	a character vector of taxonomic names (usually species names)
fix_delim	Should we replace separators ., _, - with spaces? e.g. 'Homo.sapiens' becomes 'Homo sapiens'. logical, default TRUE.
binomial_only	Attempt to prune name to a binomial name, e.g. Genus and species (specific epithet), e.g. Homo sapiens sapiens becomes Homo sapiens. logical, default TRUE.
remove_sp	Should we drop unspecified species epithet designations? e.g. Homo sp. becomes Homo (thus only matching against genus level ids). logical, default TRUE.
ascii_only	should we coerce strings to ascii characters? (see stringi::stri_trans_general())
lowercase	should names be coerced to lower-case to provide case-insensitive matching?
remove_punc	replace all punctuation but apostrophes with a space, remove apostrophes

#### **Details**

Current implementation is limited to handling a few common cases. Additional extensions may be added later. A goal of the clean\_names function is that any modification rule of the name strings be precise, atomic, and toggle-able, rather than relying on clever but more opaque rules and arbitrary scores. This utility should always be used with care, as indiscriminate modification of names may result in successful but inaccurate name matching. A good pattern is to only apply this function to the subset of names that cannot be directly matched.

## **Examples**

```
clean_names(c("Homo sapiens sapiens", "Homo.sapiens", "Homo sp."))
```

common\_contains common name starts with

# Description

common name starts with

```
common_contains(
  name,
  provider = getOption("taxadb_default_provider", "itis"),
  version = latest_version(),
  db = td_connect(),
  ignore_case = TRUE
)
```

4 common\_starts\_with

#### **Arguments**

name vector of names (scientific or common, see by) to be matched against.

provider from which provider should the hierarchy be returned? Default is 'itis', which

can also be configured using options (default\_taxadb\_provider=..."). See

[td\_create] for a list of recognized providers.

version Which version of the taxadb provider database should we use? defaults to latest.

See tl\_import for details.

db a connection to the taxadb database. See details.

ignore\_case should we ignore case (capitalization) in matching names? Can be significantly

slower to run.

#### **Examples**

```
common_contains("monkey")
```

common\_starts\_with

common name starts with

#### **Description**

common name starts with

#### Usage

```
common_starts_with(
  name,
  provider = getOption("taxadb_default_provider", "itis"),
  version = latest_version(),
  db = td_connect(),
  ignore_case = TRUE
)
```

#### **Arguments**

name vector of names (scientific or common, see by) to be matched against.

provider from which provider should the hierarchy be returned? Default is 'itis', which

can also be configured using options (default\_taxadb\_provider=..."). See

[td\_create] for a list of recognized providers.

version Which version of the taxadb provider database should we use? defaults to latest.

See tl\_import for details.

db a connection to the taxadb database. See details.

ignore\_case should we ignore case (capitalization) in matching names? Can be significantly

slower to run.

filter\_by 5

# **Examples**

```
common_starts_with("monkey")
```

filter\_by

Creates a data frame with column name given by by, and values given by the vector x, and then uses this table to do a filtering join, joining on the by column to return all rows matching the x values (scientific-Names, taxonIDs, etc).

# Description

Creates a data frame with column name given by by, and values given by the vector x, and then uses this table to do a filtering join, joining on the by column to return all rows matching the x values (scientificNames, taxonIDs, etc).

# Usage

```
filter_by(
    x,
    by,
    provider = getOption("taxadb_default_provider", "itis"),
    schema = c("dwc", "common"),
    version = latest_version(),
    collect = TRUE,
    db = td_connect(),
    ignore_case = FALSE
)
```

## **Arguments**

X	a vector of values to filter on
by	a column name in the taxa_tbl (following Darwin Core Schema terms). The filtering join is executed with this column as the joining variable.
provider	from which provider should the hierarchy be returned? Default is 'itis', which can also be configured using options(default_taxadb_provider="). See [td_create] for a list of recognized providers.
schema	One of "dwc" (for Darwin Core data) or "common" (for the Common names table.)
version	Which version of the taxadb provider database should we use? defaults to latest. See tl_import for details.
collect	logical, default TRUE. Should we return an in-memory data.frame (default, usually the most convenient), or a reference to lazy-eval table on disk (useful for very large tables on which we may first perform subsequent filtering operations.)

filter\_common

db a connection to the taxadb database. See details.

ignore\_case should we ignore case (capitalization) in matching names? Can be significantly

slower to run.

## Value

a data.frame in the Darwin Core tabular format containing the matching taxonomic entities.

## See Also

```
Other filter_by: filter_common(), filter_id(), filter_name(), filter_rank()
```

# **Examples**

filter\_common

Look up taxonomic information by common name

# Description

Look up taxonomic information by common name

```
filter_common(
  name,
  provider = getOption("taxadb_default_provider", "itis"),
  version = latest_version(),
  collect = TRUE,
  ignore_case = TRUE,
  db = td_connect()
)
```

filter\_id 7

# Arguments

name	a character vector of common (vernacular English) names, e.g. "Humans"
provider	from which provider should the hierarchy be returned? Default is 'itis', which can also be configured using options (default_taxadb_provider="). See [td_create] for a list of recognized providers.
version	Which version of the taxadb provider database should we use? defaults to latest. See tl_import for details.
collect	logical, default TRUE. Should we return an in-memory data.frame (default, usually the most convenient), or a reference to lazy-eval table on disk (useful for very large tables on which we may first perform subsequent filtering operations.)
ignore_case	should we ignore case (capitalization) in matching names? Can be significantly slower to run.
db	a connection to the taxadb database. See details.
<b>5</b> –	slower to run.

## Value

a data.frame in the Darwin Core tabular format containing the matching taxonomic entities.

## See Also

```
Other filter_by: filter_by(), filter_id(), filter_name(), filter_rank()
```

# **Examples**

```
filter_common("Pied Tamarin")
```

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Return a taxonomic table matching the requested ids

# Description

Return a taxonomic table matching the requested ids

8 filter\_id

#### Usage

```
filter_id(
   id,
   provider = getOption("taxadb_default_provider", "itis"),
   type = c("taxonID", "acceptedNameUsageID"),
   version = latest_version(),
   collect = TRUE,
   db = td_connect()
)
```

#### **Arguments**

taxonomic id, in prefix format

provider from which provider should the hierarchy be returned? Default is 'itis', which can also be configured using options(default\_taxadb\_provider=..."). See [td\_create] for a list of recognized providers.

type id type. Can be taxonID or acceptedNameUsageID, see details.

version Which version of the taxadb provider database should we use? defaults to latest. See tl\_import for details.

collect logical, default TRUE. Should we return an in-memory data.frame (default, usually the most convenient), or a reference to lazy-eval table on disk (useful for very large tables on which we may first perform subsequent filtering operations.)

#### **Details**

db

Use type="acceptedNameUsageID" to return all rows for which this ID is the accepted ID, including both synonyms and and accepted names (since both all synonyms of a name share the same acceptedNameUsageID.) Use taxonID (default) to only return those rows for which the Scientific name corresponds to the taxonID.

a connection to the taxadb database. See details.

Some providers (e.g. ITIS) assign taxonIDs to synonyms, most others only assign IDs to accepted names. In the latter case, this means requesting taxonID will only match accepted names, while requesting matches to the acceptedNameUsageID will also return any known synonyms. See examples.

## Value

a data.frame with id and name of all matching species

#### See Also

```
Other filter_by: filter_by(), filter_common(), filter_name(), filter_rank()
```

filter\_name 9

# Examples

```
filter_id(c("ITIS:1077358", "ITIS:175089"))
filter_id("ITIS:1077358", type="acceptedNameUsageID")
```

filter\_name

Look up taxonomic information by scientific name

# Description

Look up taxonomic information by scientific name

# Usage

```
filter_name(
  name,
  provider = getOption("taxadb_default_provider", "itis"),
  version = latest_version(),
  collect = TRUE,
  ignore_case = FALSE,
  db = td_connect()
)
```

# Arguments

name	a character vector of scientific names, e.g. "Homo sapiens"
provider	from which provider should the hierarchy be returned? Default is 'itis', which can also be configured using options(default_taxadb_provider="). See [td_create] for a list of recognized providers.
version	Which version of the taxadb provider database should we use? defaults to latest. See tl_import for details.
collect	logical, default TRUE. Should we return an in-memory data.frame (default, usually the most convenient), or a reference to lazy-eval table on disk (useful for very large tables on which we may first perform subsequent filtering operations.)
ignore_case	should we ignore case (capitalization) in matching names? Can be significantly slower to run. $\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$
db	a connection to the taxadb database. See details.

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#### **Details**

Most but not all authorities can match against both species level and higher-level (or lower, e.g. subspecies or variety) taxonomic names. The rank level is indicated by taxonRank column.

Most authorities include both known synonyms and accepted names in the scientificName column, (with the status indicated by taxonomicStatus). This is convenient, as users will typically not know if the names they have are synonyms or accepted names, but will want to get the match to the accepted name and accepted ID in either case.

#### Value

a data.frame in the Darwin Core tabular format containing the matching taxonomic entities.

#### See Also

```
Other filter_by: filter_by(), filter_common(), filter_id(), filter_rank()
```

#### **Examples**

filter\_rank

Get all members (descendants) of a given rank level

# Description

Get all members (descendants) of a given rank level

```
filter_rank(
  name,
  rank,
  provider = getOption("taxadb_default_provider", "itis"),
  version = latest_version(),
  collect = TRUE,
  ignore_case = TRUE,
  db = td_connect()
)
```

fuzzy\_filter 11

# Arguments

name	taxonomic scientific name (e.g. "Aves")			
rank	taxonomic rank name. (e.g. "class")			
provider	from which provider should the hierarchy be returned? Default is 'itis', which can also be configured using options(default_taxadb_provider="). See [td_create] for a list of recognized providers.			
version	Which version of the taxadb provider database should we use? defaults to latest. See tl_import for details.			
collect	logical, default TRUE. Should we return an in-memory data.frame (default, usually the most convenient), or a reference to lazy-eval table on disk (useful for very large tables on which we may first perform subsequent filtering operations.)			
ignore_case	should we ignore case (capitalization) in matching names? Can be significantly slower to run.			
db	a connection to the taxadb database. See details.			

# Value

a data.frame in the Darwin Core tabular format containing the matching taxonomic entities.

# See Also

```
Other filter_by: filter_by(), filter_common(), filter_id(), filter_name()
```

# Examples

```
filter_rank("Aves", "class")
```

fuzzy_filter	^
--------------	---

Match names that start or contain a specified text string

# Description

Match names that start or contain a specified text string

12 fuzzy\_filter

#### Usage

```
fuzzy_filter(
  name,
  by = c("scientificName", "vernacularName"),
  provider = getOption("taxadb_default_provider", "itis"),
  match = c("contains", "starts_with"),
  version = latest_version(),
  db = td_connect(),
  ignore_case = TRUE,
  collect = TRUE
)
```

#### **Arguments**

name vector of names (scientific or common, see by) to be matched against.

by a column name in the taxa\_tbl (following Darwin Core Schema terms). The

filtering join is executed with this column as the joining variable.

provider from which provider should the hierarchy be returned? Default is 'itis', which

can also be configured using options (default\_taxadb\_provider=..."). See

[td\_create] for a list of recognized providers.

match should we match by names starting with the term or containing the term any-

where in the name?

version Which version of the taxadb provider database should we use? defaults to latest.

See tl\_import for details.

db a connection to the taxadb database. See details.

ignore\_case should we ignore case (capitalization) in matching names? Can be significantly

slower to run.

collect logical, default TRUE. Should we return an in-memory data.frame (default, usu-

ally the most convenient), or a reference to lazy-eval table on disk (useful for very large tables on which we may first perform subsequent filtering operations.)

#### **Details**

Note that fuzzy filter will be fast with an single or small number of names, but will be slower if given a very large vector of names to match, as unlike other filter\_ commands, fuzzy matching requires separate SQL calls for each name. As fuzzy matches should all be confirmed manually in any event, e.g. not every common name containing "monkey" belongs to a primate species.

This method utilizes the database operation %like% to filter tables without loading into memory. Note that this does not support the use of regular expressions at this time.

```
## match any common name containing:
name <- c("woodpecker", "monkey")</pre>
```

13 get\_ids

```
fuzzy_filter(name, "vernacularName")
## match scientific name
fuzzy_filter("Chera", "scientificName",
             match = "starts_with")
```

get\_ids

get\_ids

#### **Description**

A drop-in replacement for [taxize::get\_ids()]

## Usage

```
get_ids(
  names,
  provider = getOption("taxadb_default_provider", "itis"),
  format = c("prefix", "bare", "uri"),
  version = latest_version(),
  taxadb_db = td_connect(),
  ignore_case = FALSE,
  warn = TRUE,
  db = NULL,
)
```

#### **Arguments**

version

names a list of scientific names (which may include higher-order ranks in most author-

ities).

provider abbreviation code for the provider. See details.

Format for the returned identifier, one of format

> • prefix (e.g. NCBI: 9606, the default), or • bare (e.g. 9606, used in taxize::get\_ids()),

• uri (e.g. http://ncbi.nlm.nih.gov/taxonomy/9606).

see [avialable\_releases()] for details.

taxadb\_db Connection to from [td\_connect()].

should we ignore case (capitalization) in matching names? default is TRUE. ignore\_case

should we display warnings on NAs resulting from multiply-resolved matches? warn

(Unlike unmatched names, these NAs can usually be resolved manually via

Which version of the taxadb provider database should we use? defaults to latest.

filter\_id())

db previous name for provider argument, now deprecated

additional arguments (currently ignored)

14 get\_names

#### **Details**

Note that some taxize authorities: nbn, tropicos, and eol, are not recognized by taxadb and will throw an error here. Meanwhile, taxadb recognizes several authorities not known to [taxize::get\_ids()]. Both include itis, ncbi, col, and gbif.

Like all taxadb functions, this function will run fastest if a local copy of the provider is installed in advance using [td\_create()].

#### Value

a vector of IDs, of the same length as the input names Any unmatched names or multiply-matched names will return as NAs. To resolve multi-matched names, use [filter\_name()] instead to return a table with a separate row for each separate match of the input name.

## See Also

```
filter_name
Other get: get_names()
```

# Examples

```
get_ids("Midas bicolor")
get_ids(c("Midas bicolor", "Homo sapiens"), format = "prefix")
get_ids("Midas bicolor", format = "uri")
```

get\_names

get\_names

# Description

Translate identifiers into scientific names

```
get_names(
  id,
  provider = getOption("taxadb_default_provider", "itis"),
  version = latest_version(),
  format = c("guess", "prefix", "bare", "uri"),
```

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```
taxadb_db = td_connect(),
db = NULL
)
```

#### **Arguments**

id a list of taxonomic identifiers.

provider abbreviation code for the provider. See details.

version Which version of the taxadb provider database should we use? defaults to latest.

see [avialable\_releases()] for details.

format Format for the returned identifier, one of

• prefix (e.g. NCBI: 9606, the default), or

• bare (e.g. 9606, used in taxize::get\_ids()),

• uri (e.g. http://ncbi.nlm.nih.gov/taxonomy/9606).

taxadb\_db Connection to from [td\_connect()].

db previous name for provider argument, now deprecated

#### **Details**

Like all taxadb functions, this function will run fastest if a local copy of the provider is installed in advance using [td\_create()].

#### Value

a vector of names, of the same length as the input ids. Any unmatched IDs will return as NAs.

#### See Also

```
Other get: get_ids()
```

```
get_names(c("ITIS:1025094", "ITIS:1025103"), format = "prefix")
```

name\_starts\_with

name\_contains

return all taxa in which scientific name contains the text provided

# Description

return all taxa in which scientific name contains the text provided

## Usage

```
name_contains(
  name,
  provider = getOption("taxadb_default_provider", "itis"),
  version = latest_version(),
  db = td_connect(),
  ignore_case = TRUE
)
```

## **Arguments**

name vector of names (scientific or common, see by) to be matched against.

provider from which provider should the hierarchy be returned? Default is 'itis', which

can also be configured using options (default\_taxadb\_provider=..."). See

[td\_create] for a list of recognized providers.

version Which version of the taxadb provider database should we use? defaults to latest.

See tl\_import for details.

db a connection to the taxadb database. See details.

ignore\_case should we ignore case (capitalization) in matching names? Can be significantly

slower to run.

## **Examples**

```
name_contains("Chera")
```

name\_starts\_with

scientific name starts with

#### **Description**

scientific name starts with

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#### Usage

```
name_starts_with(
  name,
  provider = getOption("taxadb_default_provider", "itis"),
  version = latest_version(),
  db = td_connect(),
  ignore_case = TRUE
)
```

#### **Arguments**

name vector of names (scientific or common, see by) to be matched against.

provider from which provider should the hierarchy be returned? Default is 'itis', which

can also be configured using options (default\_taxadb\_provider=..."). See

[td\_create] for a list of recognized providers.

version Which version of the taxadb provider database should we use? defaults to latest.

See tl\_import for details.

db a connection to the taxadb database. See details.

ignore\_case should we ignore case (capitalization) in matching names? Can be significantly

slower to run.

## **Examples**

```
name_starts_with("Chera")
```

taxadb\_dir

Show the taxadb directory

#### **Description**

Show the taxadb directory

#### Usage

```
taxadb_dir()
```

#### **Details**

NOTE: after upgrading duckdb, a user may need to delete any existing databases created with the previous version. An efficient way to do so is unlink(taxadb::taxadb\_dir(), TRUE).

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# **Examples**

```
## show the directory
taxadb_dir()
## Purge the local db
unlink(taxadb::taxadb_dir(), TRUE)
```

taxa\_tbl

Return a reference to a given table in the taxadb database

## **Description**

Return a reference to a given table in the taxadb database

#### Usage

```
taxa_tbl(
  provider = getOption("taxadb_default_provider", "itis"),
  schema = c("dwc", "common"),
  version = latest_version(),
  db = td_connect()
)
```

## **Arguments**

provider	from which provider should the hierarchy be returned? Default is 'itis', which can also be configured using options(default_taxadb_provider="). See [td_create] for a list of recognized providers.
schema	One of "dwc" (for Darwin Core data) or "common" (for the Common names table.)
version	Which version of the taxadb provider database should we use? defaults to latest. See tl_import for details.
db	a connection to the taxadb database. See details.

```
## default schema is the dwc table
taxa_tbl()

## common names table
taxa_tbl(schema = "common")
```

td\_connect 19

Connect to the taxadb database
--------------------------------

#### **Description**

Connect to the taxadb database

# Usage

```
td_connect(dbdir = NULL, driver = NULL, read_only = NULL)
```

## **Arguments**

dbdir Path to the database. no longer needed

driver deprecated, ignored. driver will always be duckdb.

read\_only deprecated, driver is always read-only.

#### **Details**

This function provides a default database connection for taxadb. Note that you can use taxadb with any DBI-compatible database connection by passing the connection object directly to taxadb functions using the db argument. td\_connect() exists only to provide reasonable automatic defaults based on what is available on your system.

For performance reasons, this function will also cache and restore the existing database connection, making repeated calls to td\_connect() much faster and more failsafe than repeated calls to DBI::dbConnect

## Value

Returns a DBI connection to the default duckdb database

```
## OPTIONAL: you can first set an alternative home location,
## such as a temporary directory:
Sys.setenv(TAXADB_HOME=file.path(tempdir(), "taxadb"))
## Connect to the database:
db <- td_connect()</pre>
```

20 td\_create

td\_create

create a local taxonomic database

# Description

create a local taxonomic database

## Usage

```
td_create(
  provider = getOption("taxadb_default_provider", "itis"),
  schema = c("dwc", "common"),
  version = latest_version(),
  overwrite = NULL,
  lines = NULL,
  dbdir = NULL,
  db = td_connect()
)
```

# Arguments

provider	a list (character vector) of provider(s) to be included in the database. By default, will install itis. See details for a list of recognized provider. available provider automatically.
schema	One of "dwc" (for Darwin Core data) or "common" (for the Common names table.)
version	Which version of the taxadb provider database should we use? defaults to latest. See tl_import for details.
overwrite	Should we overwrite existing tables? Default is TRUE. Change to "ask" for interactive interface, or TRUE to force overwrite (i.e. updating a local database upon new release.)
lines	number of lines that can be safely read in to memory at once. Leave at default or increase for faster importing if you have plenty of spare RAM.
dbdir	a location on your computer where the database should be installed. Defaults to user data directory given by [tools::R_user_dir()].
db	connection to a database. By default, taxadb will set up its own fast database connection.

## **Details**

Authorities currently recognized by taxadb are:

- itis: Integrated Taxonomic Information System, https://www.itis.gov
- ncbi: National Center for Biotechnology Information, https://www.ncbi.nlm.nih.gov/taxonomy

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- col: Catalogue of Life, http://www.catalogueoflife.org/
- gbif: Global Biodiversity Information Facility, https://www.gbif.org/
- ott: OpenTree Taxonomy: https://github.com/OpenTreeOfLife/reference-taxonomy
- iucn: IUCN Red List, https://iucnredlist.org
- itis\_test: a small subset of ITIS, cached locally with the package for testing purposes only

#### Value

path where database has been installed (invisibly)

# Examples

```
## Install the ITIS database
td_create()
## force re-install:
td_create( overwrite = TRUE)
```

td\_disconnect

Disconnect from the taxadb database.

## **Description**

Disconnect from the taxadb database.

# Usage

```
td_disconnect(db = td_connect())
```

## **Arguments**

db

database connection

#### **Details**

This function manually closes a connection to the taxadb database.

```
## Disconnect from the database:
td_disconnect()
```

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Import taxonomic database tables

## **Description**

Downloads the requested taxonomic data tables and return a local path to the data in tsv.gz format. Downloads are cached and identified by content hash so that tl\_import will not attempt to download the same file multiple times.

# Usage

```
tl_import(
  provider = getOption("tl_default_provider", "itis"),
  schema = c("dwc", "common"),
  version = latest_version(),
  prov = prov_cache()
)
```

# **Arguments**

provider	from which provider should the hierarchy be returned? Default is 'itis', which can also be configured using options(default_taxadb_provider="). See [td_create] for a list of recognized providers.
schema	One of "dwc" (for Darwin Core data) or "common" (for the Common names table.)
version	Which version of the taxadb provider database should we use? defaults to latest. See tl_import for details.
prov	Address (URL) to provenance record

## **Details**

tl\_import parses a schema.org record to determine the correct version to download. If offline, tl\_import will attempt to resolve against it's own provenance cache. Users can also examine / parse the prov JSON-LD file directly to determine the provenance of the data products used.

## Value

path(s) to the downloaded files in the cache

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