

# Package ‘forestdata’

November 25, 2024

**Type** Package

**Title** Download Forestry Data

**Version** 0.2.1

**Description**

Functions for downloading forestry and land use data for use in spatial analysis. This package offers a user-friendly solution to quickly obtain datasets such as forest height, forest types, tree species under various climate change scenarios, or land use data among others.

**License** GPL (>= 3)

**Encoding** UTF-8

**LazyData** true

**Imports** rvest, sf, stringr, tibble, tidyr, dplyr, purrr, terra,  
stringi, rlang, archive, foreign, crayon, lifecycle

**RoxygenNote** 7.3.2

**Depends** R (>= 2.10)

**Collate** 'utils-not-exported.R' 'GLAD.R' 'allometry.R'  
'canopy-height.R' 'chorological-maps.R' 'data.R' 'eutrees4f.R'  
'forest-country.R' 'forest-inventory.R' 'forestdata-package.R'  
'globals.R' 'land-cover.R' 'pathogens.R'

**Suggests** aws.s3, RODBC, odbc, giscoR, testthat (>= 3.0.0), rmarkdown

**Config/testthat/edition** 3

**URL** <https://cidree.github.io/forestdata/>

**NeedsCompilation** no

**Author** Adrián Cidre González [aut, cre]

**Maintainer** Adrián Cidre González <adrian.cidre@gmail.com>

**Repository** CRAN

**Date/Publication** 2024-11-25 18:50:02 UTC

## Contents

|                                   |    |
|-----------------------------------|----|
| fd_allometry_tallo . . . . .      | 2  |
| fd_canopy_height . . . . .        | 3  |
| fd_forest_chorological . . . . .  | 4  |
| fd_forest_eutrees4f . . . . .     | 6  |
| fd_forest_extent_glad . . . . .   | 8  |
| fd_forest_france . . . . .        | 9  |
| fd_forest_glad . . . . .          | 11 |
| fd_forest_spain_mfe50 . . . . .   | 12 |
| fd_inventory_spain . . . . .      | 13 |
| fd_landcover_copernicus . . . . . | 14 |
| fd_landcover_esri . . . . .       | 16 |
| fd_pathogens_defid2 . . . . .     | 17 |
| metadata_forestdata . . . . .     | 18 |

|              |           |
|--------------|-----------|
| <b>Index</b> | <b>20</b> |
|--------------|-----------|

---

|                    |                       |
|--------------------|-----------------------|
| fd_allometry_tallo | <i>TALLO database</i> |
|--------------------|-----------------------|

---

## Description

Downloads the TALLO database, a global tree allometry and crown architecture database. Over 500,000 data points of individual trees with several measurements

## Usage

```
fd_allometry_tallo(
  country = NULL,
  spatial = FALSE,
  metadata_path = NULL,
  quiet = FALSE
)
```

## Arguments

|               |  |
|---------------|--|
| country       | a character vector with either ISO2 codes, ISO3 codes or full country names (not mixed) to filter out the data                                       |
| spatial       | logical. Whether to retrieve a tibble or a sf object   |
| metadata_path | a character string of length 1 with the path to store the metadata and bibliography. The default path_metadata = NULL does not download the metadata |
| quiet         | if TRUE, suppress any message or progress bar  |

## Value

a tibble or a sf object

## References

Tallo: A global tree allometry and crown architecture database. [doi:10.1111/gcb.16302](https://doi.org/10.1111/gcb.16302)

## Examples

```
## Download full database as tibble
tallo_tbl <- fd_allometry_tallo()

## Download full database as sf
tallo_sf <- fd_allometry_tallo(spatial = TRUE)

## Download data as sf for Czechia and Germany
tallo_cz_ge_sf <- fd_allometry_tallo(country = c("Czechia", "Germany"))
```

---

|                  |                             |
|------------------|-----------------------------|
| fd_canopy_height | <i>Forest Canopy Height</i> |
|------------------|-----------------------------|

---

## Description

Download the ETH Global Sentinel-2 10m Canopy Height (2020) or the Meta High Resolution 1m Global Canopy Height Map

## Usage

```
fd_canopy_height(  
  x = NULL,  
  lon = NULL,  
  lat = NULL,  
  model = "eth",  
  layer = "chm",  
  crop = FALSE,  
  mask = FALSE,  
  quiet = FALSE  
)
```

## Arguments

|       |  |
|-------|--|
| x     | a sf or SpatVector object. It will retrieve the necessary tiles to cover the area (if lat and lon are specified, this argument is ignored)   |
| lon   | a number specifying the longitude of the area where we want the tile   |
| lat   | a number specifying the latitude of the area where we want the tile  |
| model | a string specifying the model to download. One of "eth" or "meta" (see details)  |
| layer | a string for the layer to download (valid only for eth). The default "chm" downloads the Canopy Height Model, while "std" downloads the standard deviation. If you want both layers, use "all" |

|       |  |
|-------|--|
| crop  | when x is specified, whether to crop the tile(s) to the object |
| mask  | when x is specified, whether to mask the tile(s) to the object |
| quiet | if TRUE, suppress any message or progress bar                  |

## Details

There are currently two global canopy height models available within this function.

- **eth**: the ETH Global Sentinel-2 10m Canopy Height from the year 2020. Visit <https://www.research-collection.ethz.ch/handle/20.500.11850/609802> for more information
- **meta**: the Meta High Resolution 1m Global Canopy Height. Visit [doi:10.1016/j.rse.2023.113888](https://doi.org/10.1016/j.rse.2023.113888) for more information

Data may be freely used for research, study, or teaching, but be cited appropriately (see references below).

## Value

A SpatRaster

## References

Lang, Nico, Walter Jetz, Konrad Schindler, and Jan Dirk Wegner. "A high-resolution canopy height model of the Earth." arXiv preprint arXiv:2204.08322 (2022).

Tolan, J., Yang, H.I., Nosarzewski, B., Couairon, G., Vo, H.V., Brandt, J., Spore, J., Majumdar, S., Haziza, D., Vamaraju, J. and Moutakanni, T., 2024. Very high resolution canopy height maps from RGB imagery using self-supervised vision transformer and convolutional decoder trained on aerial lidar. Remote Sensing of Environment, 300, p.113888.

## Examples

```
## Get 10m resolution CHM
eth_model <- fd_canopy_height(lon = -7.27, lat = 42.43)

## Get 1m resolution CHM
meta_model <- fd_canopy_height(lon = -7.27, lat = 42.43, model = "meta")
```

---

fd\_forest\_chorological

*Download the Chorological Maps*

---

## Description

Download the Chorological Maps for the main European Woody Species.

**Usage**

```
fd_forest_chorological(species, range = "nat", quiet = FALSE)
```

**Arguments**

|         |   |
|---------|---|
| species | a character vector with the Latin name of a tree species contained in the Chorological Maps database (see details)  |
| range   | the default "nat" downloads the probable native range of the species, while "syn" downloads the synanthropic range (i.e. the introduced and naturalized area and isolated population since Neolithic) |
| quiet   | if TRUE, suppress any message or progress bar   |

**Details**

Data may be freely used for research, study, or teaching, but be cited appropriately (see references below).

The chorological maps provide a general overview of the distribution of the main European woody species. The geodatabase was formed by the combination of numerous and heterogeneous data for a continental-scale overview of the species' distribution range. There are a total of 4 versions available, and the function will get the most recent version for each of the species. This means for instance that some species may be on version 2, and therefore, the data from that version will be retrieved.

**Value**

sf object

**References**

Caudullo, G., Welk, E., San-Miguel-Ayanz, J., 2017. Chorological maps for the main European woody species. Data in Brief 12, 666. DOI: doi.org/10.1016/j.dib.2017.05.007

**See Also**

[metadata\\_forestdata](#) for a list of possible species

**Examples**

```
# Download data for sweet chestnut
chestnut_nat_sf <- fd_forest_chorological(species = "Castanea sativa", range = "nat")

# Plot the data
plot(chestnut_nat_sf$geometry)
```

---

 fd\_forest\_eutrees4f *EU-Trees4F Database*


---

### Description

Download data for tree species distribution in Europe for current (2005) distribution, and future distribution (2035, 2065, 2095).

### Usage

```
fd_forest_eutrees4f(
  species,
  model = "clim",
  period = "all",
  scenario = "rcp45",
  type = "bin",
  distrib = "pot",
  quiet = FALSE
)
```

### Arguments

|          |  |
|----------|--|
| species  | a character vector of length 1 with the Latin name of the tree species (genus and species)   |
| model    | a character vector of length 1 with the name of the ensemble projection. One of 'clim' or 'sdms' (see details)   |
| period   | a numeric or character vector of length 1 with the center of the 30-year time period used for the model. One of '2005', '2035', '2065', '2095', or 'all' (see details) |
| scenario | a character vector of length 1 with the climate change scenario used. One of 'rcp45' or 'rcp85' (see details)  |
| type     | a character vector of length 1 with the type of output layer. One of 'bin', 'prob' or 'std' (see details)  |
| distrib  | a character vector of length 1 with the type of distribution. One of 'nat', 'pot', 'disp' or 'disp_lu' (see details)   |
| quiet    | if TRUE, suppress any message or progress bar  |

### Details

Data may be freely used for research, study, or teaching, but be cited appropriately (see references below).

The data of EU-Trees4F database represent the distribution of the main woody species in Europe at 5 arc-minutes (~ 10 km) spatial resolution, in the Lambert Azimuthal Equal Area (EPSG:3035) CRS. The possible models to download are the following:

**Model:** type of model used

- clim: climatic ensemble. A ensemble mean model that projects a consensus model from biomod2 into future conditions using the average of 11 Regional Climate Models (RCM).
- sdms: Species Distribution Model (SDM) ensemble. A model that projects the consensus model for every single RCM, and then it averages the output of then 11 SDMs.

**Period:** 30-year time period

- 2005: for current projections. This option ignores the scenario argument. They are not available for model = 'sdms' with type = 'std'.
- 2035: average of 2020-2050
- 2065: average of 2050-2080
- 2095: average of 2080-2110
- all: get the four periods (or three for std type). Note that for some species or configurations this might fail, because the raster extent might not match in different periods

**Scenario:** climate change scenario

- rcp45: a climate change scenario that assumes moderate emissions reductions
- rcp85: a climate change scenario with high greenhouse gas emissions and limited mitigation efforts

**Type:** type of output layer

- bin: binary distribution map, where 1 represents presence of the tree species, while 0 represents absence of the tree species, derived from the prob map
- prob: probability distribution map (0-1000). Represents the probability of being the potential distribution of the species
- std: standard deviation of prob map. Only available for model = 'sdms'.

**Distrib:** type of species distribution

- nat: realized distribution (masked with native range). Only available with type = 'bin'
- pot: potential distribution
- disp: natural dispersal model (migclim). Only available with type = 'bin'
- disp\_lu: natural dispersal model clipped by forest areas. Only available with type = 'bin'

**Value**

A single-band or multi-band SpatRaster

**References**

Mauri, Achille; Cescatti, Alessandro; GIRARDELLO, MARCO; Strona, Giovanni; Beck, Pieter; Caudullo, Giovanni; et al. (2022). EU-Trees4F. A dataset on the future distribution of European tree species.. figshare. Collection. <https://doi.org/10.6084/m9.figshare.c.5525688.v2>

**See Also**

[metadata\\_forestdata](#) for a list of possible species

**Examples**

```
# Download data for Betula pendula
betula_pendula_sr <- fd_forest_eutrees4f(species = "Betula pendula")
```

---

fd\_forest\_extent\_glad *Forest Extent*

---

**Description**

**[Deprecated]** This function is deprecated in favour of [fd\\_forest\\_glad](#). Download the Forest Extent raster from the Global Land Analysis & Discovery by using a vectorial object or a pair of coordinates (latitude, longitude).

**Usage**

```
fd_forest_extent_glad(
  x = NULL,
  lon = NULL,
  lat = NULL,
  year = 2020,
  crop = FALSE,
  quiet = FALSE,
  ...
)
```

**Arguments**

|       |  |
|-------|--|
| x     | a sf or SpatVector object. It will retrieve the necessary tiles to cover the area (if lat and lon are specified, this argument is ignored) |
| lon   | a number specifying the longitude of the area where we want the tile   |
| lat   | a number specifying the latitude of the area where we want the tile  |
| year  | year of the forest extent data. One of 2000, 2020 or 'all'   |
| crop  | when x is specified, whether to crop the tiles(s) to the object  |
| quiet | if TRUE, suppress any message or progress bar  |
| ...   | additional arguments passed to the <a href="#">crop</a> function   |

**Details**

The Forest Extent Map is a product offered by the Global Land Analysis & Discovery organization. The spatial resolution of the product is 0.00025° (approximately 30 meters at the Equator), and it's distributed in tiles of 10°x10°. Pixels with forest height > 5 meters are classified as the forest class.

Note that each tile is stored as a raster file of 1.5 GB, so for big extensions the function might take some time to retrieve the data.



**Value**

SpatRaster object

**References**

Potapov P., Hansen M.C., Pickens A., Hernandez-Serna A., Tyukavina A., Turubanova S., Zalles V., Li X., Khan A., Stolle F., Harris N., Song X.-P., Baggett A., Kommareddy I., Kommareddy A. (2022) The global 2000-2020 land cover and land use change dataset derived from the Landsat archive: first results. *Frontiers in Remote Sensing* doi:[10.3389/frsen.2022.856903](https://doi.org/10.3389/frsen.2022.856903)

**Examples**

```
# Get tile for Galicia (Spain)
galicia_forest_extent <- fd_forest_extent_glad(lon = -7.8, lat = 42.7, year = 2020)
```

---

|                  |                 |
|------------------|-----------------|
| fd_forest_france | <i>BD Forêt</i> |
|------------------|-----------------|

---

**Description**

Download the BD Forêt data for a French Department. This function downloads the polygons of forest vegetation in France.

**Usage**

```
fd_forest_france(department, path_metadata = NULL, version = 2, quiet = FALSE)
```

**Arguments**

|               |  |
|---------------|--|
| department    | a character string of length 1 with the name of a French department (see examples)   |
| path_metadata | a character string of length 1 with the path to store the metadata of the BD Forêt database. The default path_metadata = NULL does not download the metadata |
| version       | the version number of the BD Forêt data. Either 1 or 2 (see details)   |
| quiet         | if TRUE, suppress any message or progress bar  |

**Details**

The BD Forêt is a database where the forest cover of France is stored by department, with the spatial distribution of tree species in the country.

The BD Forêt version 1 was developed by photointerpretation of infrared color aerial images with a minimum mapped area of 2.25 hectares. The year of reference for each department varies between 1987 and 2002. The version 1 contains the following variables:

- ID: surface object identifier

- CODE\_TFV: alphanumeric code of the vegetation formation
- TFV: vegetation formation type
- TFV\_G11: type of coverage and predominant composition of the vegetation in 11 groups
- ESSENCE: description of tree species according to the unique basic nomenclature for all departments

The BD Forêt version 2 was developed between 2007 and 2018 by photointerpretation of color infrared images from the BD ORTHO. It assigns a vegetation formation type to each mapped area larger than  $5,000m^2$ . This version contains the variables:

- DEP: department name
- CYCLE: order number of the departmental revision
- ANREF: year of reference of the data
- TFIFN: code of the departmental type of vegetation cover. The nomenclature is specific to each department
- LIBELLE: departmental type of vegetation cover. The nomenclature is specific to each department
- LIBELLE2: departmental type of vegetation cover in capital letters. The nomenclature is specific to each department
- TYPN: code of the national type of vegetation cover
- NOMB\_TYPN: national type of vegetation cover

For more information, download the metadata using the argument `path_metadata` (information in French).

### Value

A sf object with POLYGON geometry

### References

<https://geoservices.ign.fr/bdforet>

### See Also

[metadata\\_forestdata](#) for a list of possible Department names

### Examples

```
# Download BD Foret V2 for the department of Ardèche
ardeche_bdforet1_sf <- fd_forest_france(department = "Ardèche", version = 1)
```

fd\_forest\_glad

*Global Land Analysis & Discovery datasets***Description**

Download data from GLAD database including forest extent, forest height, and land cover at ~30m spatial resolution

**Usage**

```
fd_forest_glad(
  x = NULL,
  lon = NULL,
  lat = NULL,
  model = "extent",
  year = 2020,
  crop = FALSE,
  mask = FALSE,
  quiet = FALSE
)
```

**Arguments**

|       |  |
|-------|--|
| x     | a sf or SpatVector object. It will retrieve the necessary tiles to cover the area (if lat and lon are specified, this argument is ignored) |
| lon   | a number specifying the longitude of the area where we want the tile   |
| lat   | a number specifying the latitude of the area where we want the tile  |
| model | a character vector of length 1 indicating the model to retrieve (see details)  |
| year  | year of the data (see details)   |
| crop  | when x is specified, whether to crop the tile(s) to the object   |
| mask  | when x is specified, whether to mask the tile(s) to the object   |
| quiet | if TRUE, suppress any message or progress bar  |

**Details**

The Global Land Analysis & Discovery (GLAD) includes several datasets which can be accessed through the model argument:

- **landcover**: global land cover and land use dataset. Dataset divided into 10°x10° tiles containing measures of bare ground and tree height inside and outside of wetlands, seasonal water percent, binary labels of built-up, permanent ice/snow, and cropland. Available for the years 2000, 2005, 2010, 2015, and 2020.
- **landcover-change**: changes of landcover from 2000 to 2020. Argument year is ignored.

- **extent:** dataset showing presence of forest, defined as wildland, managed, and planted tree cover including agroforestry and orchards. Includes areas where the vegetation is taller than 5 meters. Available for the years 2000 and 2020.
- **height:** dataset measuring the height of woody vegetation taller than 3 meters. Available for the years 2000 and 2020.

The spatial resolution of the product is 0.00025° (approximately 30 meters at the Equator), and it's distributed in tiles of 10°x10°.

Note that each tile is stored as a raster file of 1.5 GB, so for big extensions the function might take some time to retrieve the data.

### Value

SpatRaster object

### References

Potapov P., Hansen M.C., Pickens A., Hernandez-Serna A., Tyukavina A., Turubanova S., Zalles V., Li X., Khan A., Stolle F., Harris N., Song X.-P., Baggett A., Kommareddy I., Kommareddy A. (2022) The global 2000-2020 land cover and land use change dataset derived from the Landsat archive: first results. *Frontiers in Remote Sensing* doi:[10.3389/frsen.2022.856903](https://doi.org/10.3389/frsen.2022.856903)

P. Potapov, X. Li, A. Hernandez-Serna, A. Tyukavina, M.C. Hansen, A. Kommareddy, A. Pickens, S. Turubanova, H. Tang, C.E. Silva, J. Armston, R. Dubayah, J. B. Blair, M. Hofton (2020) Mapping and monitoring global forest canopy height through integration of GEDI and Landsat data. *Remote Sensing of Environment*, 112165. doi:[10.1016/j.rse.2020.112165](https://doi.org/10.1016/j.rse.2020.112165)

### Examples

```
# Get tile for Galicia (Spain)
galicia_forest_extent <- fd_forest_glad(lon = -7.8, lat = 42.7, year = 2020)
```

---

fd\_forest\_spain\_mfe50 *Forest Cover of Spain*

---

### Description

Download the MFE50 (Spanish Forestry Map 1:50,000) for a province. The MFE50 was built during 1997-2006.

### Usage

```
fd_forest_spain_mfe50(province, path_metadata = NULL, quiet = FALSE)
```

## Arguments

|               |  |
|---------------|--|
| province      | a character string of length 1 with the name of a Spanish province   |
| path_metadata | a character string of length 1 with the path to store the metadata of the MFE50. The default path_metadata = NULL does not download the metadata |
| quiet         | if TRUE, suppress any message or progress bar  |

## Details

The Spanish Forestry Map at scale 1:50,000 is a project that was undertaken during the years 1997-2006. The data contains the cartography of forest stands in Spain. The definition of the variables is contained in an excel file that can be downloaded by using the argument path\_metadata.

## Value

A sf object with POLYGON geometry

## References

<https://www.miteco.gob.es/es/biodiversidad/servicios/banco-datos-naturaleza/informacion-disponible/mfe50.html>

## See Also

[metadata\\_forestdata](#) for a list of possible species

## Examples

```
# Download MFE50 for the province of Lugo
lugo_mfe50_sf <- fd_forest_spain_mfe50(province = "Lugo")
```

---

fd\_inventory\_spain      *Spanish Forest Inventory*

---

## Description

Download the tables and SIG data from the Spanish Forest Inventory

## Usage

```
fd_inventory_spain(  
  province,  
  ifn = 4,  
  database = "field",  
  path_metadata = NULL,  
  quiet = FALSE  
)
```

**Arguments**

|               |  |
|---------------|--|
| province      | a character string of length 1 with the name of a Spanish province   |
| ifn           | number of Spanish Forest Inventory (from 2 to 4)   |
| database      | the name of the database (either 'field' or 'gis')   |
| path_metadata | a character string of length 1 with the path to store the metadata of the selected database. The default path_metadata = NULL does not download the metadata |
| quiet         | if TRUE, suppress any message or progress bar  |

**Details**

The IFN2 doesn't have 'gis' data for Asturias, Cantabria and Navarra.

In the future a function to process the data will be added.

**Value**

A list with the tables

**References**

<https://www.miteco.gob.es/es/biodiversidad/temas/inventarios-nacionales/inventario-forestal-nacional.html>

**See Also**

[metadata\\_forestdata](#) for a list of possible species

**Examples**

```
# Download MFE50 for Canary Islands
canarias_ifn4_lst <- fd_inventory_spain("Canarias")

cantabria_ifn3_gis_lst <- fd_inventory_spain("cantabria", ifn = 3, database = "gis")
```

---

fd\_landcover\_copernicus

*Global Land Cover*

---

**Description**

Download a SpatRaster from the Global Land Cover from the Copernicus Global Land Service.

**Usage**

```
fd_landcover_copernicus(
  x,
  lon = NULL,
  lat = NULL,
  year = 2019,
  layer = "forest",
  crop = FALSE,
  ...
)
```

**Arguments**

|       |   |
|-------|---|
| x     | an sf or SpatVector object. It will retrieve the necessary tiles to cover the area (if lat and lon are specified, this argument is ignored) |
| lon   | a number specifying the longitude of the area where we want the tile  |
| lat   | a number specifying the latitude of the area where we want the tile   |
| year  | year of the land cover data. One of 2015:2019 or 'all'  |
| layer | a character vector of the layer(s) to use from the Global Land Cover. See details   |
| crop  | when x is specified, whether to crop the tile(s) to the object  |
| ...   | additional arguments passed to the <a href="#">crop</a> function  |

**Details**

There are 14 different layers that can be downloaded:

- **"discrete"**: land cover discrete classification
- **"classification"**: land cover classification probability
- **"bare"**: cover fraction of bare and sparse vegetation
- **"builtup"**: cover fraction of builtup
- **"crops"**: cover fraction of cropland
- **"tree"**: cover fraction of forest
- **"grass"**: cover fraction of herbaceous vegetation
- **"mosslichen"**: cover fraction of moss and lichen
- **"seasonalwater"**: cover fraction of seasonal inland water
- **"shrub"**: cover fraction of shrubland
- **"snow"**: cover fraction of snow and ice
- **"permanentwater"**: cover fraction of permanent inland water
- **"forest"** (default): forest types. (0): unknown; (1): evergreen needle leaf forest; (2): evergreen broad leaf forest; (3): deciduous needle leaf; (4): deciduous broad leaf; (5): mix of forest types
- **"datadensityindicator"**: input data density

**Value**

SpatRaster object

**References**

Buchhorn, M.; Smets, B.; Bertels, L.; De Roo, B.; Lesiv, M.; Tsendbazar, N. - E.; Herold, M.; Fritz, S. Copernicus Global Land Service: Land Cover 100m: collection 3: epoch 2019: Globe 2020. DOI 10.5281/zenodo.3939050

**Examples**

```
# Get tile for Galicia (Spain) and year 2019
galicia_forest_extent <- fd_landcover_copernicus(
  lat = 42.7,
  lon = -7.8,
  year = 2019
)
# Get forest and discrete classification tiles for all years
galicia_forest_extent <- fd_landcover_copernicus(
  lat = 42.7,
  lon = -7.8,
  year = "all",
  layer = c("forest", "discrete")
)
```

---

fd\_landcover\_esri      *Download data from the ESRI Land Cover Explorer*

---

**Description**

Download an UTM tile of the ESRI Land Cover Explorer for a specified year

**Usage**

```
fd_landcover_esri(utm_code, year, quiet = TRUE)
```

**Arguments**

|          |  |
|----------|--|
| utm_code | a character string of length 1 with an UTM code (e.g. "29N")   |
| year     | an integer or vector of integers corresponding to the base year of the land cover tile. The option year = 'all' downloads all the available images (2017:2023) |
| quiet    | if TRUE (the default), suppress status messages, and the progress bar  |

**Value**

A SpatRaster



## References

<https://livingatlas.arcgis.com/en/home/>

## Examples

```
# Download Land Cover for UTM tile 29N year 2023
lc <- fd_landcover_esri("29N", year = 2023)

# Download Land Cover for UTM tile 29N for all years
lc <- fd_landcover_esri("29N", year = "all")
```

---

fd\_pathogens\_defid2    *Download the DEFID2 database*

---

## Description

Download the Database of European Forest Insect and Disease Disturbances.

## Usage

```
fd_pathogens_defid2(
  agent = "all",
  host = "all",
  symptoms = "all",
  country = "all",
  geometry = "polygon",
  quiet = TRUE
)
```

## Arguments

|          |   |
|----------|---|
| agent    | a character vector with the desired forest insect(s) and/or disease(s). The default 'all' retrieves every agent |
| host     | a character vector with the desired host tree(s) species. The default 'all' retrieves every tree                |
| symptoms | a character vector with the desired symptom(s). The default 'all' retrieves every symptom                       |
| country  | a character vector with the desired country(ies). The default 'all' retrieves every country                     |
| geometry | a string with 'polygon' to retrieve polygon data, or 'point' to retrieve point data                             |
| quiet    | if TRUE (the default), suppress status messages, and the progress bar   |

## Details

Data may be freely used for research, study, or teaching, but be cited appropriately (see references below).

This function will download the DEFID2 database to the temporary directory once per session. After it's downloaded, the queries to the database are faster than the first time.

Note that 99.6% of the observations correspond to *Picea abies*. Also, 99.3% of the observations are in Czechia.

The data comprises over 650,000 georeferenced records, which can be retrieved as points or polygons, representing insects and diseases that occurred between 1963 and 2021 in European Forests.

Please, cite the data with the reference below.

## Value

sf object with MULTIPOLYGON or POINT geometry

## References

Forzieri G, Dutrieux LP, Elia A, Eckhardt B, Caudullo G, Taboada FÁ, Andriolo A, Bălăcenoiu F, Bastos A, Buzatu A, Castedo Dorado F, Dobrovolný L, Duduman M, Fernandez-Carillo A, Hernández-Clemente R, Hornero A, Ionuț S, Lombardero MJ, Junttila S, Lukeš P, Marianelli L, Mas H, Mlčoušek M, Mugnai F, Nețoiu C, Nikolov C, Olenici N, Olsson P, Paoli F, Paraschiv M, Patočka Z, Pérez-Laorga E, Quero JL, Rüetschi M, Stroheker S, Nardi D, Ferenčík J, Battisti A, Hartmann H, Nistor C, Cescatti A, Beck PSA (2023). The Database of European Forest Insect and Disease Disturbances: DEFID2. *Global Change Biology*

## Examples

```
# Get the entire database (takes some seconds/minutes)
defid2_sf <- fd_pathogens_defid2()

# Get data for Spain and Portugal
defid2_iberia_sf <- fd_pathogens_defid2(country = c("Spain", "Portugal"))
```

---

metadata\_forestdata    *Metadata for forestdata functions*

---

## Description

A list with the names of tree species or regions depending on the dataset.

## Usage

```
metadata_forestdata
```

**Format**

A list of 7 elements:

**chorological\_species** Latin name of tree species for fd\_forest\_chorological

**eutrees4f\_species** Latin name of tree species for fd\_forest\_eutrees4f

**bdforet\_tbl\_departments** Departments of France for fd\_forest\_france

**mfe\_provinces** Province names for fd\_forest\_spain\_mfe50

**spain\_ifnx** Province names for fd\_inventory\_spain

# Index

## \* datasets

- metadata\_forestdata, [18](#)
  
- crop, [8](#), [15](#)
  
- fd\_allometry\_tallo, [2](#)
- fd\_canopy\_height, [3](#)
- fd\_forest\_chorological, [4](#)
- fd\_forest\_eutrees4f, [6](#)
- fd\_forest\_extent\_glad, [8](#)
- fd\_forest\_france, [9](#)
- fd\_forest\_glad, [8](#), [11](#)
- fd\_forest\_spain\_mfe50, [12](#)
- fd\_inventory\_spain, [13](#)
- fd\_landcover\_copernicus, [14](#)
- fd\_landcover\_esri, [16](#)
- fd\_pathogens\_defid2, [17](#)
  
- metadata\_forestdata, [5](#), [7](#), [10](#), [13](#), [14](#), [18](#)