Package 'ForIT'

February 19, 2015

Type Package

Title Functions from the 2nd Italian Forest Inventory (INFC)

Version 1.0

Date 2014-07-04

Author Nicola Puletti, Marco Mura, Cristiano Castaldi, Maurizio Marchi, Ugo Chiavetta, Roberto Scotti

Maintainer Nicola Puletti <nicola.puletti@gmail.com>

Description This package provides estimates of tree volume and biomass from Italian NFI models

License GPL-3

LazyLoad yes

LazyData yes

NeedsCompilation no

Repository CRAN

Date/Publication 2014-07-05 10:01:58

R topics documented:

ForIT-package   *Functions for Italian Tree species Volume and Biomass*

Description

The ForIT package is the implementation of the biomass and volume models carried out by Gasparini and Tabacchi (2011) and Tabacchi et al. (2011a) during the 2nd Italian National Forest Inventory. An English description of the methodology is provided by Tabacchi et al. (2011b). This package is intended as the close translation in R of the literature cited above.

Details

Package:	ForIT
Type:	Package
Version:	1.0
Date:	2014-07-04
License:	What license is it under?

Author(s)

Nicola Puletti, Marco Mura, Cristiano Castaldi, Maurizio Marchi, Ugo Chiavetta, Roberto Scotti

Maintainer: Nicola Puletti <nicola.puletti@gmail.com>

References

Gasparini, P., Tabacchi, G.(eds), 2011. *L'Inventario Nazionale delle Foreste e dei serbatoi forestali di Carbonio INFC 2005. Secondo inventario forestale nazionale italiano. Metodi e risultati.* Edagricole. 653 pp. [ITA, ita]

Tabacchi G., Di Cosmo L., Gasparini P., Morelli S., 2011a. *Stima del volume e della fitomassa delle principali specie forestali italiane. Equazioni di previsione, tavole del volume e tavole della fitomassa arborea epigea. Stima del volume e della fitomassa delle principali specie forestali italiane. Equazioni di previsione, tavole del volume e tavole della fitomassa arborea epigea.* 412 pp. [ITA, ita]

Tabacchi G., Di Cosmo L., Gasparini P., 2011b. *Aboveground tree volume and phytomass prediction equations for forest species in Italy.* European Journal of Forest Research 130: 6 911-934 [ENG, eng]

Examples

```
# one single tree
INFCvpe('Acca', 22, 14, mod='v', freq=2, aggr=FALSE)

# a list with ten trees of the same specie
```

```
INFCvpe(rep('Acca',10),d=c(10,15,20,30,32,24,36,40,8,18),
    h=c(7,9,12,20,21,18,21,22,8,12), mod='v', aggr=TRUE)

# a list of different species
species <- rep(c('Abal','Piab'),2)
dbh <- c(10,41,20,30)
heigths <- c(12,14,13,15)
frequences <- c(2,6,5,4)
data.frame(species, dbh, heigths, frequences)

# single-tree estimates
INFCvpe(species, dbh, heigths, mod='v', frequences, aggr=FALSE)

# estimates aggregated at species level
INFCvpe(species, dbh, heigths, mod='v', frequences, aggr=TRUE)
```

INFCdomain   *The range of applicability of* INFCvpe() *function*

Description

A `data.frame` containing the "range of applicability" (or "domain") of INFCvpe() function

Format

A data frame with 18228 observations and 2 columns

References

Tabacchi G., Di Cosmo L., Gasparini P., Morelli S., 2011a. *Stima del volume e della fitomassa delle principali specie forestali italiane. Equazioni di previsione, tavole del volume e tavole della fitomassa arborea epigea. Stima del volume e della fitomassa delle principali specie forestali italiane. Equazioni di previsione, tavole del volume e tavole della fitomassa arborea epigea.* 412 pp. [ITA, ita]

INFCstats   *Equation statistics*

Description

A `data.frame` containing values for variance and covariance matrices

Format

A data frame with 220 observations on the following 21 variables.

Details

The list of species and of their spg-codes is:

Abies alba:	Abal
Acer campestre:	Acca
Acer monspessolanum:	Acmo
Acer opalus:	Acop
Acer pseudoplatanus:	Acps
Alnus cordata:	Alco
Alnus glutinosa:	Algl
Carpinus orientalis:	Caor
Cupressus spp:	Cusp
Eucalyptus occidentalis:	Euoc
Fagus sylvatica:	Fasy
Fraxinus angustifolia:	Fran
Fraxinus excelsior:	Frex
Fraxinus ornus:	Fror
Laburnum alpinum:	Laal
Larix decidua:	Lade
Ostrya carpinifolia:	Ossp
Picea abies:	Piab
Pinus cembra:	Pice
Pinus halepensis:	Piha
Pinus nigra var. laricio:	Pila
Pinus nigra var. nigra:	Pini
Pinus pinaster:	Pips
Pinus pinea:	Pipi
Pinus radiata:	Pira
Pinus strobus:	Pist
Pinus sylvestris:	Pisy
Populus canescens:	Poca
Populus nigra:	Poni
Populus tremula:	Potr
Prunus avium:	Prav
Pseudotsuga menziesii:	Psme
Quercus cerris:	Quce
Quercus ilex:	Quil
Quercus pubescens:	Qupu
Robinia pseudoacacia:	Rops
Salix alba:	Saal
Salix caprea:	Saca
Sorbus aria:	Soar
Tilia cordata:	Tico
Tilia platyphyllos:	Tipl
Ulmus minor:	Ulmi

References

Tabacchi G., Di Cosmo L., Gasparini P., Morelli S., 2011a. *Stima del volume e della fitomassa delle principali specie forestali italiane. Equazioni di previsione, tavole del volume e tavole della fitomassa arborea epigea. Stima del volume e della fitomassa delle principali specie forestali italiane.*

Equazioni di previsione, tavole del volume e tavole della fitomassa arborea epigea. 412 pp. [ITA, ita]

INFCvpe   *Volume and Phytomass Estimates*

Description

Estimate tree volume and phytomass per species from stem diameter at 1.3 m height (DBH) and total height (HT)

Usage

```
INFCvpe(spg, d, h, mod, freq, aggr = F)
```

Arguments

spg   a string or factor indicating the species.
                        Possible codes are:

Abies alba:	Abal
Acer campestre:	Acca
Acer monspessolanum:	Acmo
Acer opalus:	Acop
Acer pseudoplatanus:	Acps
Alnus cordata:	Alco
Alnus glutinosa:	Algl
Carpinus orientalis:	Caor
Cupressus spp:	Cusp
Eucalyptus occidentalis:	Euoc
Fagus sylvatica:	Fasy
Fraxinus angustifolia:	Fran
Fraxinus excelsior:	Frex
Fraxinus ornus:	Fror
Laburnum alpinum:	Laal
Larix decidua:	Lade
Ostrya carpinifolia:	Ossp
Picea abies:	Piab
Pinus cembra:	Pice
Pinus halepensis:	Piha
Pinus nigra var. laricio:	Pila
Pinus nigra var. nigra:	Pini
Pinus pinaster:	Pips
Pinus pinea:	Pipi
Pinus radiata:	Pira
Pinus strobus:	Pist

Pinus sylvestris:	Pisy
Populus canescens:	Poca
Populus nigra:	Poni
Populus tremula:	Potr
Prunus avium:	Prav
Pseudotsuga menziesii:	Psme
Quercus cerris:	Quce
Quercus ilex:	Quil
Quercus pubescens:	Qupu
Robinia pseudoacacia:	Rops
Salix alba:	Saal
Salix caprea:	Saca
Sorbus aria:	Soar
Tilia cordata:	Tico
Tilia platyphyllos:	Tipl
Ulmus minor:	Ulmi

d	a value or vector indicating the stem diameter at 1.3 m height (DBH) [cm]
h	a value or vector indicating the total stem height (HT) [m]
mod	a character: *v* for volume of the stem and large branches, *dw1* for phytomass of the stem and large braches, *dw2* for phytomass of the small branches, *dw3* for phytomass of the stump, *dw4* for phytomass of the whole tree
freq	the number of trees of the same spg with equal DBH and HT
aggr	a flag allowing estimates aggregated at spg level (when aggr is TRUE) or at tree level (when aggr is FALSE)

Value

Returns a list with the following objects:

$mainData	a data.frame with the following columns

spg	a string with the species group code
d130	a value indicating the stem diameter at 1.3 m height (DBH) [cm]
h_tot	a value indicating the total stem height (HT) [m]
freq	the number of trees of the same spg with equal DBH and HT"
mod	a character, the same as mod in arguments.
T_0	a value of the estimates for mod value. v is expressed in *dm^3* while dw1, dw2, dw3, dw4 are expressed in *kg*;
SEE	a value of Standard Error of the Estimates
dof	the degree of freedom
in.range	tree inside (y) or out of the range (n) of the sampled trees in Gasparini and Tabacchi (2011)

out.of.range	a data.frame listing the trees out of the range of application (domain)

Author(s)

Nicola Puletti <nicola.puletti@gmail.com>, Marco Mura, Cristiano Castaldi, Roberto Scotti

References

Gasparini, P., Tabacchi, G.(eds), 2011. *L'Inventario Nazionale delle Foreste e dei serbatoi fore-stali di Carbonio INFC 2005. Secondo inventario forestale nazionale italiano. Metodi e risultati.* Edagricole. 653 pp. [ITA, ita]

Tabacchi G., Di Cosmo L., Gasparini P., Morelli S., 2011a. *Stima del volume e della fitomassa delle principali specie forestali italiane. Equazioni di previsione, tavole del volume e tavole della fito-massa arborea epigea. Stima del volume e della fitomassa delle principali specie forestali italiane. Equazioni di previsione, tavole del volume e tavole della fitomassa arborea epigea.* 412 pp. [ITA, ita]

Tabacchi G., Di Cosmo L., Gasparini P., 2011b. *Aboveground tree volume and phytomass prediction equations for forest species in Italy.* European Journal of Forest Research 130: 6 911-934 [ENG, eng]

Examples

```
# one single tree
INFCvpe('Acca', 22, 14, mod='v', freq=2, aggr=FALSE)

# a list with ten trees of the same specie
INFCvpe(rep('Acca',10),d=c(10,15,20,30,32,24,36,40,8,18),
    h=c(7,9,12,20,21,18,21,22,8,12), mod='v', aggr=TRUE)

# a list of different species
species <- rep(c('Abal','Piab'),2)
dbh <- c(10,41,20,30)
heigths <- c(12,14,13,15)
frequences <- c(2,6,5,4)
data.frame(species, dbh, heigths, frequences)

# single-tree estimates
INFCvpe(species, dbh, heigths, mod='v', frequences, aggr=FALSE)

# estimates aggregated at species level
INFCvpe(species, dbh, heigths, mod='v', frequences, aggr=TRUE)
```

Index