Recommended parameter values

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Schelhaas, M.-J., Eggers, J., Lindner, M., Nabuurs, G.J., Päivinen, R., Schuck, A., Verkerk, P.J., Werf, D.C. van der, Zudin, S. (2007). Model documentation for the European Forest Information Scenario model (EFISCEN 3.1.3). Alterra report 1559 and EFI technical report 26. Alterra and European Forest Institute, Wageningen and Joensuu, p. 118.

1. Introduction

This document provides recommended parameter values to initialise and/or run EFISCEN 4.1. The parameters are described in detail by Schelhaas et al. (2007).

2. Parameters for matrix initialisation

To initialise EFISCEN with forest inventory data, a user needs to specify the parameter *r*, which is the correlation between volume per hectare and ln(age) for a forest type (see Schelhaas et al. 2007, page 27). Recommended parameter values are given in Table 1.

Table 1: Recommended values for parameter *r* in different situations (Attebring et al. 1989).

Species	All forests	Separate site classes	Forests well stocked	Separate site classes and forests well stocked
Spruce, beech	0.55	0.6	0.65	0.7
Pine, oak	0.45	0.5	0.55	0.6
Others	0.5	0.55	0.6	0.65

3. Parameters for modelling regrowth after thinnings and regeneration

To model regrowth after thinnings and regeneration, a user needs to specify a young forest coefficient (see Schelhaas et al. 2007, page 31), a growth boost and a thinning history (see Schelhaas et al. 2007, page 30). Recommended parameter values are given in Table 2.

Table 2: Recommended parameter values for the young forest coefficient and thinning parameters (Schelhaas et al. 2007)

	Young forest coefficient - slow growing broadleaves	Young forest coefficient -fast growing broadleaves (birch, willow, alder)	Young forest coefficient -Conifers	Thinning history	Regrowth	
Alpic	0.4	0.8	0.7	0.2	0.5	Austria
	0.4	0.8	0.7	0.2	0.5	Switzerland
Atlantic	0.5	0.9	0.8	0.1	0.5	United Kingdom
	0.5	0.9	0.8	0.1	0.5	Ireland
Baltic	0.3	0.7	0.6	0.2	0.4	Estonia
	0.3	0.7	0.6	0.2	0.4	Latvia
	0.3	0.7	0.6	0.2	0.4	Lithuania
Central	0.4	0.8	0.7	0.2	0.4	Czech Republic
	0.4	0.8	0.7	0.2	0.4	Germany
	0.4	0.8	0.7	0.2	0.4	Denmark
	0.4	0.8	0.7	0.2	0.4	Poland
	0.4	0.8	0.7	0.2	0.4	Slovak Republic
Med. East	0.3	0.7	0.6	0.1	0.3	Bulgaria
	0.3	0.7	0.6	0.1	0.3	Greece
	0.3	0.7	0.6	0.1	0.3	Turkey
Med. Middle	0.3	0.7	0.6	0.1	0.3	Albania
	0.3	0.7	0.6	0.1	0.3	Bosnia-Herzegovina
	0.3	0.7	0.6	0.1	0.3	Croatia
	0.3	0.7	0.6	0.1	0.3	Italy
	0.3	0.7	0.6	0.1	0.3	Macedonia
	0.3	0.7	0.6	0.1	0.3	Slovenia
	0.3	0.7	0.6	0.1	0.3	Serbia
Med. West	0.3	0.7	0.6	0.1	0.3	Spain
	0.3	0.7	0.6	0.1	0.3	Portugal
Northern	0.3	0.7	0.6	0.3	0.4	Finland
	0.3	0.7	0.6	0.3	0.4	Norway
	0.3	0.7	0.6	0.3	0.4	Sweden
Pannonic	0.4	0.8	0.7	0.2	0.4	Hungary
	0.4	0.8	0.7	0.2	0.4	Romania
Sub-Atlantic	0.5	0.9	0.8	0.2	0.4	Belgium - Luxembourg
	0.5	0.9	0.8	0.2	0.4	France
	0.5	0.9	0.8	0.2	0.4	Netherlands

4. Parameters for estimating soil carbon stocks

To estimate soil carbon stocks, a user needs to specify parameters of the soil carbon module for reference conditions (see Schelhaas et al. 2007, page 37). Recommended parameter values are given in Table 3.

Table 3: Parameters of the soil carbon module for the reference conditions for the two different methods to determine temperature sensitivity (Liski et al., 2005).

Parameter	Value	Value
Method	Average annual temperature	Temperature sum
Reference conditions		
T_{ref}	4 °C	1903 °C days
D_{ref}	-50 mm	-32 mm
Temperature and drought sensitivity		
α_1	0.0937	0.000387
α_2	0.00229	0.00325
Humus decreased temperature sensitivity		
s_{hum1}	0.6	0.6
s_{hum1}	0.36	0.36
Invasion rates of woody litter by microbes (year)		
a_{nwl}	1	1
a_{fwl}	0.5	0.54
a_{cwl}	0.05	0.053
Litter composition		
c_{nwlsol} for conifers	0.27	0.27
c_{nwlcel} for conifers	0.51	0.51
c_{fwlsol} for conifers	0.03	0.03
c_{fwlcel} for conifers	0.65	0.65
c_{cwlsol} for conifers	0.03	0.03
c_{cwlcel} for conifers	0.69	0.69
c_{nwlsol} for deciduous trees	0.38	0.38
c_{nwlcel} for deciduous trees	0.36	0.36
c_{fwlsol} for deciduous trees	0.03	0.03
c_{fwlcel} for deciduous trees	0.65	0.65
c_{cwlsol} for deciduous trees	0.03	0.03
c_{cwlcel} for deciduous trees	0.75	0.75
Decomposition rates (per year)		
k_{sol} for conifers	0.5	0.48
k_{sol} for deciduous trees	0.8	0.82
k_{cel}	0.3	0.3
k_{lig}	0.15	0.22
k_{hum1}	0.013	0.012
k_{hum2}	0.0012	0.0012
Formation of more complex compounds in decomposition (proportion of decomposed mass)		
p_{sol}	0.15	0.2
p_{cel}	0.15	0.2
p_{lig}	0.18	0.2
p_{hum1}	0.18	0.2

Explanation: nwl – non-woody litter, fwl – fine woody litter, cwl – coarse woody litter, sol – soluble compounds, cel – cellulose, hum1 – first humus compartment, hum2 – second humus compartment

References

Attebring, Nilsson and Sallnäs 1989. A model for long-term forecasting of timber yield - a description with special reference to the forest study at SUA-IIASA. Systems Analysis Modelling Simulation 6 (3): 171-180.

Liski, J., Palosuo, T., Peltoniemi, M. & Sievänen, R. 2005. Carbon and decomposition model Yasso for forest soils. Ecological Modelling 189(1-2): 168-182.

Schelhaas, M.-J., Eggers, J., Lindner, M., Nabuurs, G.J., Päivinen, R., Schuck, A., Verkerk, P.J., Werf, D.C.v.d., Zudin, S., 2007. Model documentation for the European Forest Information Scenario model (EFISCEN 3.1.3). Alterra report 1559 and EFI technical report 26. Alterra and European Forest Institute, Wageningen and Joensuu, p. 118.