Model 3PGN-BW tree species parameter

Variable name	Unit	Beech	Pine	Description of parameter	Reference
Biomass partitioning and turnover					
pFS2	-	0.7	0.7	Foliage:stem partitioning ratio @ D=2 cm	Forrester et al. (2017)
pFS20	-	0.06	0.21	Foliage:stem partitioning ratio @ D=20 cm	Forrester et al. (2017)
aWS	-	0.18	0.13	Constant in the stem mass v. diam. relationship	Forrester et al. (2017)
nWS	-	2.39	2.27	Power in the stem mass v. diam. relationship	Forrester et al. (2017)
pRx	-	0.7	0.7	Maximum fraction of NPP to roots	Forrester et al. (2017)
pRn	-	0.3	0.3	Minimum fraction of NPP to roots	Forrester et al. (2017)
gammaF1	1/month	0.02	0.015	Maximum litterfall rate	Forrester et al. (2017)
gammaF0	1/month	0.001	0.001	Litterfall rate at t = 0	Forrester et al. (2017)
tgammaF	months	60	60	Age at which litterfall rate has median value	Forrester et al. (2017)
gammaR	1/month	0.015	0.004	Average monthly root turnover rate	Forrester et al. (2017)
leafgrow	month	4	0	If deciduous, leaves are produced at end of this month	Forrester et al. (2017)
leaffall	month	11	0	If deciduous, leaves all fall at start of this month	Forrester et al. (2017)
NPP and conductance modifiers					
Tmin	deg. C	-5	-5	Minimum temperature for growth	Forrester et al. (2017)
Topt	deg. C	20	15	Optimum temperature for growth	Forrester et al. (2017)
Tmax	deg. C	25	35	Maximum temperature for growth	Forrester et al. (2017)
kF	days	1	1	Days production lost per frost day	Forrester et al. (2017)
SWconst	-	0.7	0.7	Moisture ratio deficit for fq = 0.5	Forrester et al. (2017)
SWpower	-	9	9	Power of moisture ratio deficit	Forrester et al. (2017)
fCalpha700	-	1	1	Assimilation enhancement factor at 700 ppm	Forrester et al. (2017)
fCg700	-	1	1	Canopy conductance enhancement factor at 700 ppm	Forrester et al. (2017)
m0	-	0	0	Value of 'm' when FR = 0	Forrester et al. (2017)
fN0	-	0.5	0.2	Value of 'fNutr' when FR = 0	Forrester et al. (2017)
fNn	-	1	1	Power of (1-FR) in 'fNutr'	Forrester et al. (2017)

MaxAge	years	300	350	Maximum stand age used in age modifier	Forrester et al. (2017)
nAge	-	4	4	Power of relative age in function for fAge	Forrester et al. (2017)
rAge	-	0.95	0.95	Relative age to give fAge = 0.5	Forrester et al. (2017)
Mortality					
gammaN1	%/year	0	0	Mortality rate for large t	Forrester et al. (2017)
gammaN0	%/year	0	0	Seedling mortality rate (t = 0)	Forrester et al. (2017)
tgammaN	years	0	0	Age at which mortality rate has median value	Forrester et al. (2017)
ngammaN	-	1	1	Shape of mortality response	Forrester et al. (2017)
wSx1000	kg/tree	400	400	Max. stem mass per tree @ 1000 trees/hectare	Forrester et al. (2017)
thinPower	-	1.5	1.5	Power in self-thinning rule	Forrester et al. (2017)
mF	-	0	0	Fraction mean single-tree foliage biomass lost per dead tree	Forrester et al. (2017)
mR	-	0.2	0.2	Fraction mean single-tree root biomass lost per dead tree	Forrester et al. (2017)
mS	-	0.4	0.4	Fraction mean single-tree stem biomass lost per dead tree	Forrester et al. (2017)
Canopy structure and processes					
SLA0	m2/kg	24.72	4.29	Specific leaf area at age 0	Forrester et al. (2017)
SLA1	m2/kg	19.40	4.29	Specific leaf area for mature leaves	Forrester et al. (2017)
tSLA	years	35	1.00	Age at which specific leaf area = (SLA0+SLA1)/2	Forrester et al. (2017)
k	-	0.42	0.38	Extinction coefficient for absorption of PAR by canopy	Forrester et al. (2017)
fullCanAge	years	10	10	Age at canopy closure	Forrester et al. (2017)
MaxIntcptn	-	0.24	0.39	Maximum proportion of rainfall evaporated from canopy	Forrester et al. (2017)
LAImaxIntcptn	-	3	3	LAI for maximum rainfall interception	Forrester et al. (2017)
cVPD	-	5	5	LAI for 50% reduction of VPD in canopy	Forrester et al. (2017)
alphaCx	molC/mol PAR	0.050	0.049	Canopy quantum efficiency	Forrester et al. (2017)
Y	-	0.47	0.47	Growth respiration ratio	Forrester et al. (2017)
Q10_aut	-	2	2	Temperature sensitivity of maintenance respiration	Gracia et al. (2003)
Raut_f	-	0.21	0.21	Maintenance respiration ratio of foliage	Gracia et al. (2003)

Raut_s	-	0.000612	0.000612	Maintenance respiration ratio of stems and roots	Gracia et al. (2003)
MinCond	m/s	0	0	Minimum canopy conductance	Forrester et al. (2017)
MaxCond	m/s	0.02	0.02	Maximum canopy conductance	Forrester et al. (2017)
LAIgcx	-	3.33	3.33	LAI for maximum canopy conductance	Forrester et al. (2017)
CoeffCond	1/mBar	0.057	0.05	Defines stomatal response to VPD	Forrester et al. (2017)
BLcond	m/s	0.2	0.2	Canopy boundary layer conductance	Forrester et al. (2017)
Wood and stand properties					
fracBB0	-	0.75	0.75	Branch and bark fraction at age 0	Forrester et al. (2017)
fracBB1	-	0.15	0.15	Branch and bark fraction for mature stands	Forrester et al. (2017)
tBB	years	2	2	Age at which fracBB = (fracBB0+fracBB1)/2	Forrester et al. (2017)
rhoMin	g/cm3	0.567	0.395	Minimum basic density - for young trees	Forrester et al. (2017)
rhoMax	g/cm3	0.567	0.395	Maximum basic density - for older trees	Forrester et al. (2017)
tRho	years	1	1	Age at which rho = (rhoMin+rhoMax)/2	Forrester et al. (2017)
aH	-	3.042	2.14	Constant in the stem height relationship	Expert assessment
nHB	-	0.597	0.69	Power of DBH in the stem height relationship	Expert assessment
nHC	-	0	0	Power of competition in the stem height relationship	Forrester et al. (2017), expert assessment
Soil parameters					
klmax	1/month	0.021	0.0315	Decomposition rate constant for the young and labile pool	Xenakis et al. (2008), Jacob et al. (2010)
krmax	1/month	0.0033	0.0042	Decomposition rate constant for the young and refractory pool	Xenakis et al. (2008), Müller-Using and Bartsch (2009)
komax	1/month	0.0005	0.0005	Decomposition rate constant for the old pool	Xenakis et al. (2008)
hc	-	0.2	0.2308	Humification coefficient	Xenakis et al. (2008), Kätterer and Andrén (2001)
qir	-	305	334.29	Quality, C:N ratio of refractory litter input	Xenakis et al. (2008), Husmann et al. (2018)
qil	-	50	49.08	Quality, C:N ratio of labile litter input	Xenakis et al. (2008), Jacob et al. (2010)

qihc	-	28	23.63	C:N ratio of humification	Xenakis et al. (2008), Minunno et al. (2010)
qbc	-	7.7	2.21	C:N ratio of soil organism biomass	Xenakis et al. (2008), Joergensen et al. (1995)
el	-	0.2	0.25	Efficiency of labile pool	Xenakis et al. (2008), Minunno et al. (2010)
er	-	0.2	0.56	Efficiency of refractory pool	Xenakis et al. (2008), Minunno et al. (2010)
Ncf	%	2.66	1.48	Foliage nitrogen concentration	Xenakis et al. (2008), Bauer et al. (1997)
Q10_soil	-	1.5 – 2.5	1.5 – 2.5	Temperature sensitivity of soil respiration	Lee et al. (2020)
alpha_moist	-	0.5 – 1.5	0.5 – 1.5	ASW sensitivity of soil respiration	Lee et al. (2020)
k_soil	-	-0.06	-0.06	Coefficient of LAI on soil surface temperature	Paul et al. (2004)
a_summer	-	0.856	0.856	Slope of air temperature v. soil surface temperature relationship in summer months	Toy et al. (1978)
a_fall	-	1.023	1.023	Slope of air temperature v. soil surface temperature relationship in fall months	Toy et al. (1978)
a_spring	-	1.052	1.052	Slope of air temperature v. soil surface temperature relationship in spring months	Toy et al. (1978)
a_winter	-	0.656	0.656	Slope of air temperature v. soil surface temperature relationship in winter months	Toy et al. (1978)
b_summer	deg. C	6.3928	6.3928	Intercept of air temperature v. soil surface temperature relationship in summer months	Toy et al. (1978)
b_fall	deg. C	1.2856	1.2856	Intercept of air temperature v. soil surface temperature relationship in fall months	Toy et al. (1978)
b_spring	deg. C	1.0239	1.0239	Intercept of air temperature v. soil surface temperature relationship in spring months	Toy et al. (1978)
b_winter	deg. C	2.3967	2.3967	Intercept of air temperature v. soil surface temperature relationship in winter months	Toy et al. (1978)

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