**SUPPLEMENTARY MATERIALS**

**Table S1. Description of the fixed effect variables not retained in the final model.**

**Table S2. Correlation matrix of the continuous explanatory variables considered in the study.**

**Table S3. Parameter estimates from the linear mixed model.**

**Table S4. Average fixed-effect residuals in the negative pointer years and in the five subsequent years when thinning was not performed.**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
|  | **Name** | **Description or formula** | **Unity** |
| **Stand level** | Dg | Mean quadratique diameter | cm |
| Age | Averaged age of the stand | years |
| Age² | Square of the stand age | years² |
| Age x ln(SBA) | Interaction between age and ln(SBA) | years.m².ha-1 |
|
| **Competition intensity** | RDI |  | unitless |
| Thin1 |  | unitless |
| Thin2 |  | unitless |
| **Tree level** | CBH | Circumference of the tree | cm |
| BAratio |  | unitless |
|  |  |  |  |

**Table S1**.

**Description of the fixed effect variables not retained in the final models.**

**Table S2.**

**Correlation matrix of the continuous explanatory variables considered in the study.** The variables are described in the main text and in Table S1.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Age** | **CBH** | **TBA** | **RDI** | **BAL** | **Dratio** | **ln(SBA)** | **Tthin** | **Dg** | **BAratio** |
| **Age** | 1 | 0.54 | 0.55 | 0.41 | 0.70 | 0 | 0.56 | 0.37 | 0.43 | 0.40 |
| **CBH** |  | 1 | 0.97 | -0.02 | 044 | 0.69 | -0.05 | 0.51 | 0.71 | 0.51 |
| **TBA** |  |  | 1 | -0.08 | 0.51 | 0.61 | -0.07 | 0.50 | 0.76 | 0.70 |
| **RDI** |  |  |  | 1 | 0.20 | 0.01 | 0.89 | -0.25 | 0.66 | 0.21 |
| **BAL** |  |  |  |  | 1 | 0.03 | -0.12 | 0.31 | 0.60 | 0.45 |
| **Dratio** |  |  |  |  |  | 1 | -0.04 | 0.04 | 0.03 | 0.04 |
| **ln(SBA)** |  |  |  |  |  |  | 1 | -0.32 | -0.08 | -0.42 |
| **Tthin** |  |  |  |  |  |  |  | 1 | 0.63 | 0.52 |
| **Dg** |  |  |  |  |  |  |  |  | 1 | 0.79 |
| **BAratio** |  |  |  |  |  |  |  |  |  | 1 |

**Table S3.**

**Parameter estimates from the linear mixed model**. SE is standard deviation. ρ(AR(1)) is the first-order autoregressive model parameter.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Estimate | Value | SE | t value | P value |
| Intercept | 3833.297 | 515.778 | 7.432067 | <0.001 |
| CC Co-dom | -893.277 | 116.1391 | -7.691441 | <0.001 |
| CC Inter | -1775.825 | 117.3771 | -15.129227 | <0.001 |
| CC Over | -2577.973 | 183.223 | -14.070141 | <0.001 |
| CC Sup  | -879.377 | 419.115 | -2.098176 | 0.0359 |
| SBA | -1867.395 | 125.2716 | -14.906765 | <0.001 |
| Dratio | 2148.442 | 108.5435 | 19.793383 | <0.001 |
| Tthin | -20.726 | 6.0494 | -3.426116 | 0.0006 |
| BAL | 0.045 | 0.0015 | 30.161568 | <0.001 |
| Tthin² | -2.522 | 0.5896 | 4.277217 | <0.001 |
| Dratio² | 325.877 | 35.3246 | 9.225216 | <0.001 |
| CC Co-dom : SBA | 419.219 | 28.2104 | 14.86042 | <0.001 |
| CC Inter : SBA | 882.929 | 31.3131 | 28.196764 | <0.001 |
| CC Over : SBA | 1319.777 | 60.7224 | 21.734585 | <0.001 |
| CC Sup : SBA | 794.365 | 148.322 | 5.355677 | <0.001 |
| CC Co-dom : Dratio | -345.821 | 68.4952 | -5.048839 | <0.001 |
| CC Inter : Dratio | -900.771 | 63.5549 | -14.173132 | <0.001 |
| CC Over : Dratio | -1265.624 | 67.1797 | -18.839378 | <0.001 |
| CC Sup : Dratio | -1436.495 | 64.7805 | -22.174799 | <0.001 |
| CC Co-dom : BAL | -0.004 | 0.0009 | -4.095354 | <0.001 |
| CC Inter : BAL | -0.013 | 0.0012 | -10.355674 | <0.001 |
| CC Over : BAL | -0.036 | 0.0037 | -9.659963 | <0.001 |
| CC Sup : BAL | -0.009 | 0.0085 | -1.108587 | 0.2676 |
|  |  |  |  |  |
| ρ(AR(1))  | 0.53 |  |  |  |

CC is Crown class, Dom is Dominant, Co-dom is Co-dominant, Inter is Intermediate, Over is Overtopped, Sup is Suppressed, for the other abbreviations see main text.

**Table S4.**

**Average fixed-effect residuals in the negative pointer years (underlined) and in the five subsequent years when thinning was not performed.** Numbers in parentheses are years since the last thinning. Within a given crown class and a given year or period, values with different Latin letter differed significantly (at the 5% probability level in a type I test). The bold values mark a noticeable pattern. The overtopped and the suppressed classes showed no significant differences (data not shown).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |
|  |  |  | **Average of the fixed effect residuals** |
|  |  |  | Plot 1 | Plot 2 | Plot3 | Plot 4 |
|  | **Dominant class** | 1994 | **470.4a (3)** | -250.5b (3) | -4.4b (3) | -17.2b |
| 1995 | **327.8a (4)** | -97.2b (4) | 99.3b (4) | 51.3b |
| 1995 - 1999 | **154.3a** | -48.2b |  | 17.6b |
| 1997 | 10.2 (6) | -76.4 (6) | -35.6 (6) | -169.5 |
| 1998 | -19.5 (7) | -94.8 (7) | -74.7 (7) | -111.4 |
| 1998-2002 | **320.4a** |  |  | 9.8b |
| 2002 | -209.5b (11) | **315.5a (2)** | -34.9b (4) | -168.4b |
| 2003 | **44.7a (1)** | -310.8b (3) | -193.5b (5) | -39.1b |
| 2003-2007 |  | -185.2 | -170.7 | -105.2 |
| 2005 | -97.2 (3) | -38.9 (5) | -48.5 (7) | -139.3 |
| 2006 | -22.2 (4) | -94.8 (6) | -95.7 (8) | -281.5 |
| 2006-2010 | -62.3 | 31.7 | -103.7 | -43.2 |
|  | **Co-dominant class** | 1994 | **448.2a (3)** | -183.4b (3) | -46.3b (3) | -61.6b |
| 1995 | **237.5a (4)** | -64.5b (4) | 28.1b (4) | -0.9b |
| 1995 - 1999 | **70.2a** | -10.3b |  | -12.3b |
| 1997 | -27.0 (6) | -41.2 (6) | -52.7(6) | -99.3 |
| 1998 | -68.1 (7) | -41.9 (7) | -2.7 (7) | 1.2 |
| 1998-2002 | **217.2a** |  |  | 37.6b |
| 2002 | -263.9b (11) | **79.3a (2)** | -118.7b(4) | -160.8b |
| 2003 |  | -53.8 (3) | -83.5 (5) | -77.0 |
| 2003-2007 |  | -31.8 | -65.2 | -83.1 |
| 2005 |  | 70.6a (5) | 21.5 (7) | -143.6 |
| 2006 |  | 22.7 (6) | -133.5 (8) | -171.1 |
| 2006-2010 |  | 18.2 | -57.2 | -45.1 |
|  | **Intermediate class** | 1994 |  | -106.8 (3) | -91.4 (3) | -89.0 |
| 1995 |  | -51.4(4) | -27.9(4) | -15.5 |
| 1995 - 1999 |  | 10.4 |  | 17.6 |
| 1997 |  | -29.0 (6) | -95.2 (6) | -35.4 |
| 1998-2002 |  | 23.7 (7) | 14.8 (7) | 7.1 |
| 2002 |  |  | 23.9 (4) | -69.7 |
| 2003 |  |  | -99.8 (5) | -51.3 |
| 2003-2007 |  |  | -8.5 | -86.0 |
| 2005 |  |  | 120.0 (7) | -49.6 |
| 2006 |  |  | 9.9 (8) | -100.3 |
| 2006-2010 |  |  | -5.7 | -87.6 |
|  |  |  |  |  |  |  |