**Supplementary Materials**

*1. Estimating Post-Fire tree Mortality*

Two compatible tree-level mortality models are provided in this article offering opportunities for several forest management applications. The models are based on data easy to measure/derived from the forest inventories. The *PdTree2* (AIC=1370.6) depends on a descriptor of a competitive measure *dbh/dg* affecting density, and was found to be negatively related with tree mortality indicating that larger diameter trees are less likely to die in case of fire. Factors that individually have been shown to strongly affect mortality at individual tree- scale due to both the fire damage and the stress before the fire event [1].

**Table S1.** *PdTree2* mortality model predicting the probability of an individual tree to die due a forest fire, which includes estimates of mixed-effects parameter and random effects variances ($\sigma_i^2$) and covariances ($\sigma_{i,j}$) ($n$ = 2520).

| Effect | Variables | Estimate | SE | *z* value | *p* value |
|---|---|---|---|---|---|
| $\beta_0$ | Intercept | 2.892 | 0.7631 | 3.789 | <0.0001 |
| $\beta_1$ | *Ec* | 2.559 | 0.6599 | 3.480 | <0.0001 |
| $\beta_2$ | *Con* | 3.089 | 0.4721 | 6.657 | <0.0001 |
| $\beta_3$ | *dbh/dg* | −1.298 | 0.4158 | −3.122 | 0.0018 |
| $\sigma_{\beta_0}^2$ | | 13.06 | | | |
| $\sigma_{\beta_3}^2$ | | 4.49 | | | |
| $\sigma_{\beta_0,\beta_3}$ | | −0.125 | | | |

The area under de ROC curve from PdTree2 is 0.675. Tree size characteristics and competition index are not significant ($z$ value > 0.05) when included together in the same model.

*2. Cut-off Point Value Selection*

The most appropriate cut-off points were calculated for the model PsDead predicting whether mortality will occur in a stand (Table S2).

**Table S2.** Prediction parameters depending on the cut-points used to transform a continuous probability into a 0–1 dichotomous value predicting whether there is mortality in a stand or not.

| Cut-off Point | CCR (%) | Sensitivity (%) | Specificity (%) | False Dead (%) | No Dead (%) | Classified as dead (%) | Classified as survival (%) |
|---|---|---|---|---|---|---|---|
| 0.31 | 73.0 | 98.0 | 30.7 | 28.9 | 0.10 | 84.6 | 15.4 |
| 0.33 | 74.7 | 95.4 | 35.2 | 28.1 | 18.4 | 82.9 | 17.0 |
| 0.35 | 75.1 | 95.4 | 40.9 | 26.2 | 0.16 | 81.2 | 18.3 |
| 0.37 | 75.5 | 94.1 | 43.1 | 25.7 | 19.1 | 80.1 | 19.5 |
| 0.39 | 75.9 | 92.8 | 46.5 | 24.8 | 21.2 | 78.4 | 21.6 |
| 0.41 | 76.8 | 92.2 | 50.0 | 23.8 | 21.4 | 76.8 | 23.2 |
| 0.43 | 77.2 | 91.5 | 52.3 | 23.1 | 22.0 | 75.5 | 24.5 |
| 0.45 | 76.8 | 90.8 | 52.3 | 23.2 | 23.3 | 75.1 | 24.9 |
| **0.47** | **76.8** | **89.5** | **54.6** | **22.6** | **25.0** | **73.4** | **26.6** |
| 0.49 | 75.9 | 87.6 | 55.7 | 22.5 | 27.9 | 71.8 | 28.2 |
| 0.51 | 75.1 | 86.3 | 55.7 | 22.8 | 30.0 | 71.0 | 29.1 |
| 0.53 | 74.7 | 85.0 | 56.8 | 22.6 | 31.5 | 69.7 | 29.5 |
| 0.55 | 74.7 | 83.0 | 60.2 | 21.6 | 32.9 | 67.2 | 32.7 |
| **0.57** | **74.7** | **79.1** | **67.1** | **19.3** | **35.2** | **62.2** | **37.8** |
| 0.59 | 73.4 | 76.5 | 68.2 | 19.3 | 37.5 | 60.1 | 39.8 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.61 | 73.4 | 75.8 | 6.93 | 18.9 | 37.8 | 59.3 | 40.7 |
| 0.63 | 73.0 | 73.9 | 71.6 | 18.1 | 38.8 | 57.3 | 42.7 |
| **0.64** | **72.6** | **71.9** | **73.9** | **17.3** | **39.8** | **55.2** | **44.8** |
| 0.65 | 72.6 | 71.2 | 75.0 | 16.8 | 41.0 | 54.4 | 45.6 |
| 0.67 | 72.2 | 69.9 | 76.1 | 16.4 | 40.7 | 53.1 | 46.8 |
| 0.69 | 72.2 | 69.3 | 77.3 | 15.9 | 40.9 | 52.7 | 47.7 |
| 0.71 | 73.0 | 68.0 | 81.8 | 13.3 | 40.5 | 49.8 | 50.2 |

CCR, Correct Classification rate. The percentage of observed plots where occurred tree mortality was 63.48%.

The cut-off point at which the sensitivity and specificity curves crossed was approximately 0.64. Using this value led to a CCR of 73%. In this case the percentage of stands classified as having mortality is 55%. Using this cut-off point, 42% of the stands classified as not having mortality presented some dead trees (i.e., false survival). On the other hand, when the average observed percentage of event occurrence [2] was used, a cut-value of 0.57 would be chosen. This cut-off point classifies 37.8% of stands as stands where no mortality did occur; this value is very close to the real observed rate (i.e., 36.5%) and shows a correct classification rate (CCR) of 74.7. However, in this case the number of false negatives is 35.2%.

## References


1. González, J.R.; Trasobares, A.; Palahi, M.; Pukkala, T. Predicting Stand Damage and Tree Survival in Burned Forests in Catalonia (North-East Spain). *Ann. For. Sci.* **2007**, *64*, 733–742.
2. Monserud, R.A.; Sterba, H. Modeling Individual Tree Mortality for Austrian Forest Species. *For. Ecol. Manag.* **1999**, *113*, 109–123.