Supplementary material

Figure S1. Sample size (number of trees per species) used for the wood anatomical analyses.

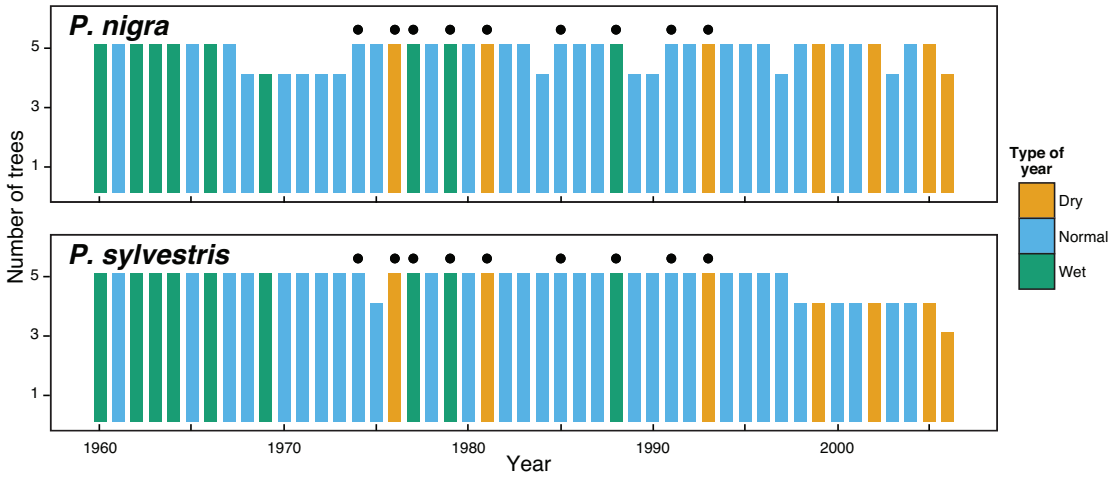

Figure S1. Number of trees per species and year used for the anatomical analysis between 1960 and 2006. Different bar colors show whether the year was considered dry, average or wet. Black circles indicate the nine years used for stable isotope analysis. For the latter analysis, three trees of each species were used.

Figure S2. Measurement of cell-wall thickness and lumen diameter in tracheids.

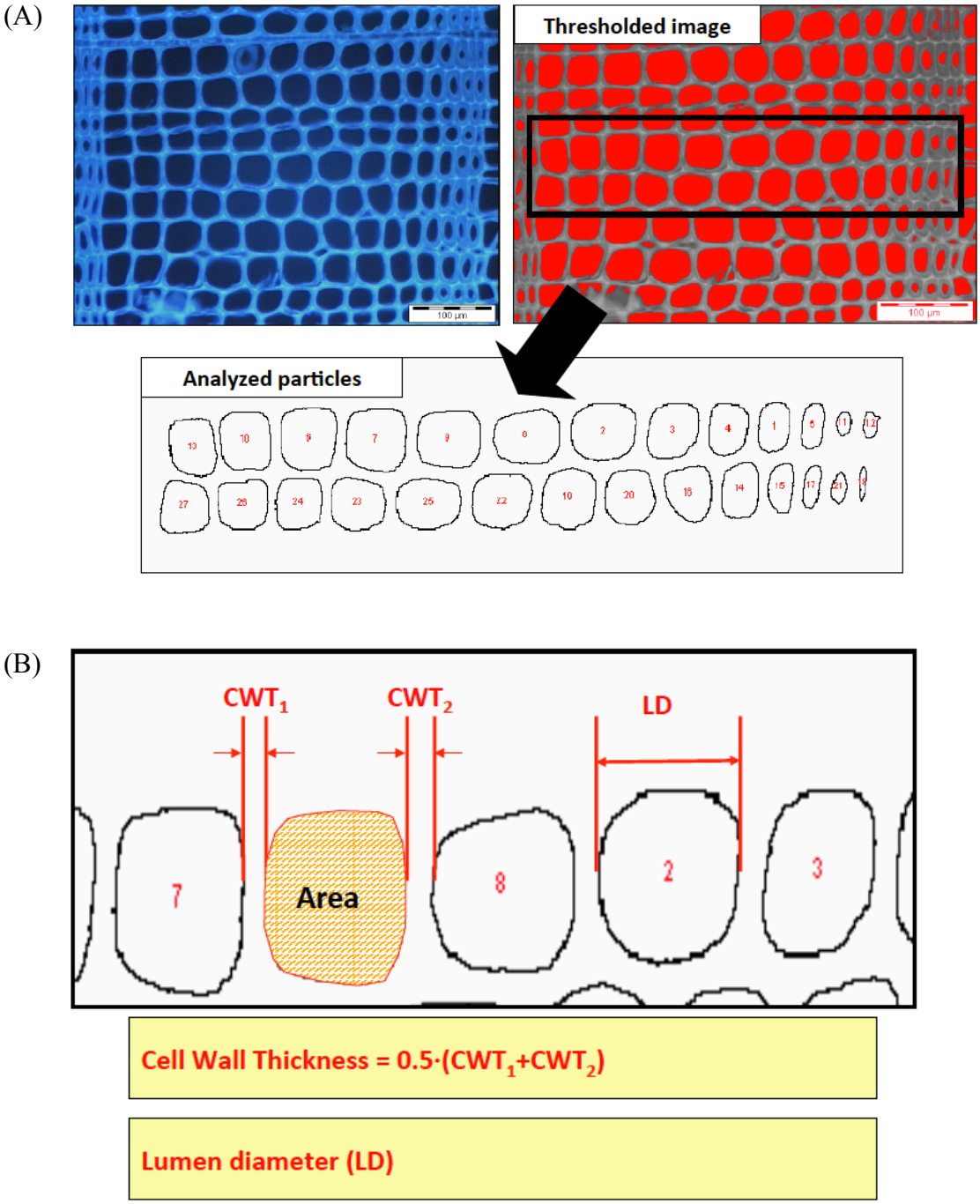

Figure S2. Example of the cell-wall thickness and lumen diameter measurement in two tracheid files from an image taken under the microscope and UV reflected light. Xylem growth is from left to right (A) Image threshold, particle detection, isolation and identification; and (B) estimation of the cell-wall thickness (CWT) and lumen diameter (LD) for tracheid number 9 in the image above.

A described in sub-section 2.2 of Material and Methods (Dendrochronological and wood anatomical methods), cell wall thickness (CWT) and lumen diameter (LD) were measured in five tracheid files per ring. cell wall thickness of each individual tracheid was calculated as $CWT_i=0.5\cdot(CWT_{i-1}+CWT_{i+1})$, where CWT_{i-1} and CWT_{i+1} represent the distance between left (i-1) and right (i+1) side tracheid lumen to the specific tracheid (i) (Filion and Cournoyer 1995). Here we show and example of the calculations for several tracheids. As can be seen in this example and in the formula above, CWT for each tracheid is calculated as the average of the double cell wall of the tracheid with the preceding (CWT_{i-1}) and and following tracheids (CWT_{i+1}).

Because for the first and last tracheids in each tree ring there is no preciding or fooling cell in that ring, we modified the formula above to use only the cell wall thickness of tracheid (i) so we have $CWT_{first}= CWT_{i+1}$ and $CWT_{last}= CWT_{i-1}$.

Cell in which $CWT\cdot 4 \geq LD$ were considered as latewood (Filion and Cournoyer 1995). In the image in Figure S1, the ring had a late wood made of three to four cells depending on the tracheid file selected.

Figure S3. Changes in DBH and Basal area of the analyzed trees from 1964 to 2008.

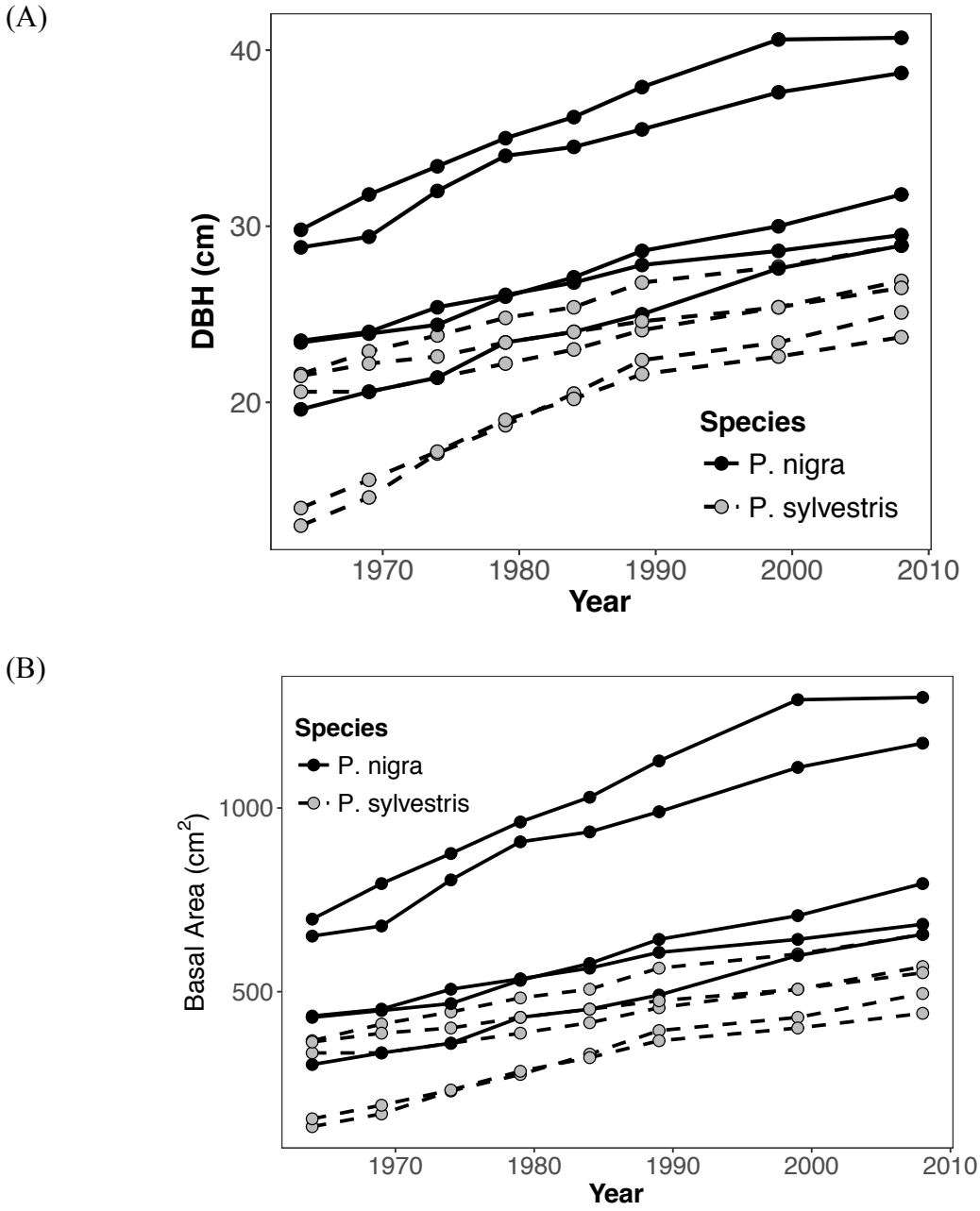

Figure S3. Change during the study period of (A) diameter at breast height (DBH) and (B) basal area in trees of *P. nigra* y *P. sylvestris* used in the study. Both DBH and basal area were calculated from data measured in 8 inventories conducted at the site from 1964 to 2008.

Tracheidogram standardization

Because cell number differed within and between growth rings (Figure 2), tracheidograms were standardized from the original measurements for each radial file to allow direct comparison between cells in different cell files, rings, and trees. In tracheidograms, all radial files are converted to constant standardized number of cells (25 cells) by a weighted mean of the cell dimension within the file. We chose 25 cells because it was close to the mean number of cells for the rings for the years studied (Figure 2).

We briefly describe the process of tracheidogram standardization (for a detailed description of the method see Vaganov 1989). Given a radial file $\{d_i\}$ with *N* tracheids $\{1, \dots, N\}$, it is first converted into a new sequence $\{d_i^*\}$ with *K* elements $\{1, \dots, K\}$ where $K=N \cdot j$, and *j* is the number of cells in the standard tracheidogram

$$d_i^* = \frac{1}{N}\left(\underbrace{d_1, \dots, d_1}_{j\ times}, \underbrace{d_2, \dots, d_2}_{j\ times}, \dots, \underbrace{d_N, \dots, d_N}_{j\ times}\right) \quad (1)$$

Then those *K* elements are transformed into the final sequence

$$\{d_i^H\} = \frac{1}{N} \sum_{j=N(j-1)+1}^{N_i} d_j^*$$

This standardization is realized for the *i* different files per ring. For each tree ring we obtained a value of lumen diameter and cell wall thickness for each of the 25 cells in the tracheidogram. We chose 25 cells because it was close to the mean number of cells for the rings for the years studied (Figure 2). This procedure is similar to converting distance from the beginning of each ring to relative distances (i.e. the first, 10th and 25th cells will be at 4%, 40% and 100% of the distance from the beginning of the ring, respectively).