

Figure. S1 Carbon dioxide concentrations under SSP126, SSP245, and SSP585 scenarios from CMIP6.

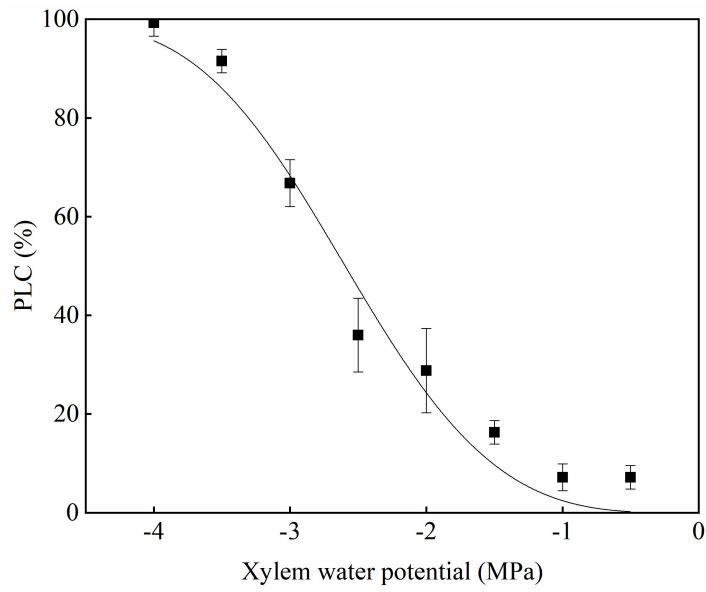


Figure. S2 Stem vulnerability curve of *Pinus tabuliformis* L. plantations. The solid line represents the fit with a Weibull function. PLC, percentage loss of xylem hydraulic conductivity.

Table S1 Major parameters of the BBGC-Sperry model for *Pinus tabuliformis* L.

plantations

| Parameter | values |
|---|--------------------|
| (a) Biome-BGC model | |
| Transfer growth period fraction of growing season (%) | 0.3 |
| Litterfall fraction of growing season (%) | 0.3 |
| Annual leaf and fine root turnover fraction (yr ⁻¹) | 0.35 |
| Annual live wood turnover fraction (yr ⁻¹) | 0.7 |
| Allocation new fine root C:new leaf C | 0.9 |
| Allocation new stem C:new leaf C | 2.51 |
| Allocation new live wood C:new total wood C | 0.059 ^a |
| Allocation new root C:new stem C | 0.29 |
| Allocation current growth proportion (%) | 0.5 |
| C:N of leaves | 33.1 ^b |
| C:N of leaf litter | 132.0 ^b |
| C:N of fine roots | 38 |
| C:N of live wood | 50 |
| C:N of dead wood | 1400 |
| Leaf litter labile proportion | 0.26 ^b |
| Leaf litter cellulose proportion | 0.49 |
| Leaf litter lignin proportion | 0.25 |
| Fine root labile proportion | 0.25 ^c |
| Fine root cellulose proportion | 0.5 |
| Fine root lignin proportion | 0.25 |
| Dead wood cellulose proportion | 0.71 |
| Dead wood lignin proportion | 0.29 |
| Canopy light extinction coefficient | 0.50 ^d |
| All-sided to projected leaf area ratio | 2.6 |
| Specific leaf area (m ² kg ⁻¹ C) | 12.7 ^f |
| Ratio of shaded SLA:sunlit SLA | 2 |
| Fraction of leaf N in Rubisco | 0.05 |
| Maximum stomatal conductance (m s ⁻¹) | 0.003 ^d |
| Cuticular conductance (m s ⁻¹) | 0.00001 |
| Boundary layer conductance (m s ⁻¹) | 0.01 |
| Leaf water potential: start of conductance reduction (MPa) | -0.5 ^a |
| Leaf water potential: complete conductance reduction (MPa) | -2.2 ^a |
| VPD: start of conductance reduction (Pa) | 50 ^e |
| VPD: complete conductance reduction (Pa) | 2500 ^e |
| (b) Sperry model | |
| Weibull function <i>b</i> and <i>c</i> for root, stem, leaf | b=2.9, c=3.5 |
| Maximum whole-plant hydraulic conductance per leaf area (mmol s ⁻¹ m ⁻² MPa ⁻¹) | 2.4 |

| | |
|--|------|
| Maximum diffusive conductance ($\text{mmol s}^{-1} \text{m}^{-2}$) | 37.9 |
| Average resistance in rhizosphere (%) | 50 |
| Root depth coefficient | 0.98 |
| Number of root and soil layers | 5 |

Note: C = carbon; N = nitrogen; LAI = leaf area index; SLA = specific leaf area; VPD = vapor pressure deficit

^a = Pietsch et al. (2005);

^b = Berg et al. (1984);

^c = Aber et al. (1990);

^d = Zhang et al. (2024a);

^e = Kellomäki and Wang (1997);

^f = Ouyang et al. (2014).

References

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