Table 1. Results of the best-fitting mixed-effects model for the effects of diameter at the ground of the focal trees (DIA), neighborhood tree species richness (NSR), neighborhood height index (NHI) and neighborhood specific root length dissimilarity (SRL\_diss) on foliar intrinsic water use efficiency of Chinese fir (*Cunninghamia lanceolata* (Lamb.) Hook). Neighborhood tree species composition (NSC) and plot were used as random effects. The variance was explained by the fixed effects alone (marginal R2) and by both the fixed and random effects combined (Conditional R2). All predictors were standardized, that is, subtract their means and then divided by their standard deviations.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Fixed effects | Estimate | s.e. | df | t value | P-value |
| Intercept | 4.589 | 0.001 | 35.3 | 467.0 | < 0.001 |
| DIA | -0.003 | 0.008 | 255.7 | -0.364 | 0.716 |
| NSR | 0.001 | 0.009 | 43.5 | -0.90 | 0.373 |
| SRL\_diss | 0.018 | 0.007 | 224.6 | 2.656 | 0.008 |
| NHI | -0.045 | 0.008 | 253.4 | -5.80 | < 0.001 |
| SRL\_diss\*NHI | 0.018 | 0.005 | 238.7 | 3.747 | 0.001 |
|  |  |  |  |  |  |
| Random effects | Variance | s.d. |  |  |  |
| NSC | 0.002 | 0.043 |  |  |  |
| Plot | 0.003 | 0.057 |  |  |  |
| Residual | 0.004 | 0.062 |  |  |  |
| Marginal R2 | 0.24 |  |  |  |  |
| Conditional R2 | 0.56 |  |  |  |  |
| n(trees) | 270 |  |  |  |  |

Figure. 1. Standardized effects of neighborhood trait or phylogenetic dissimilarities on foliar intrinsic water use efficiency (iWUE) of Chinese fir (*Cunninghamia lanceolata* (Lamb.) Hook) based on linear mixed-effects models. Circles and lines show the means and 95% confidence intervals of the coefficients, respectively (solid circles indicate statistically significant effects if the 95% confidence intervals exclude zero). The vertical axes show different neighborhood dissimilarity indices associated with traits or phylogeny.

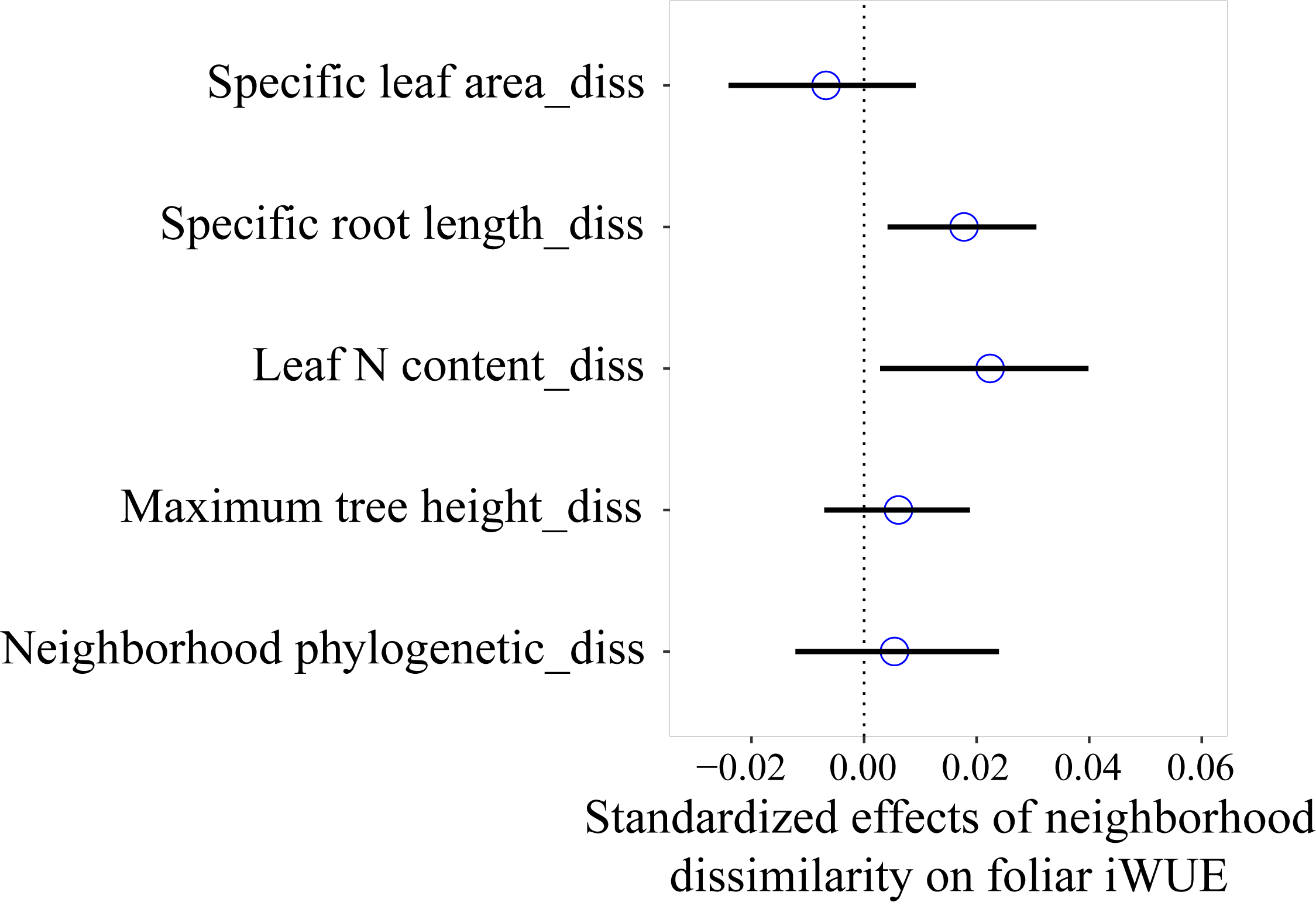
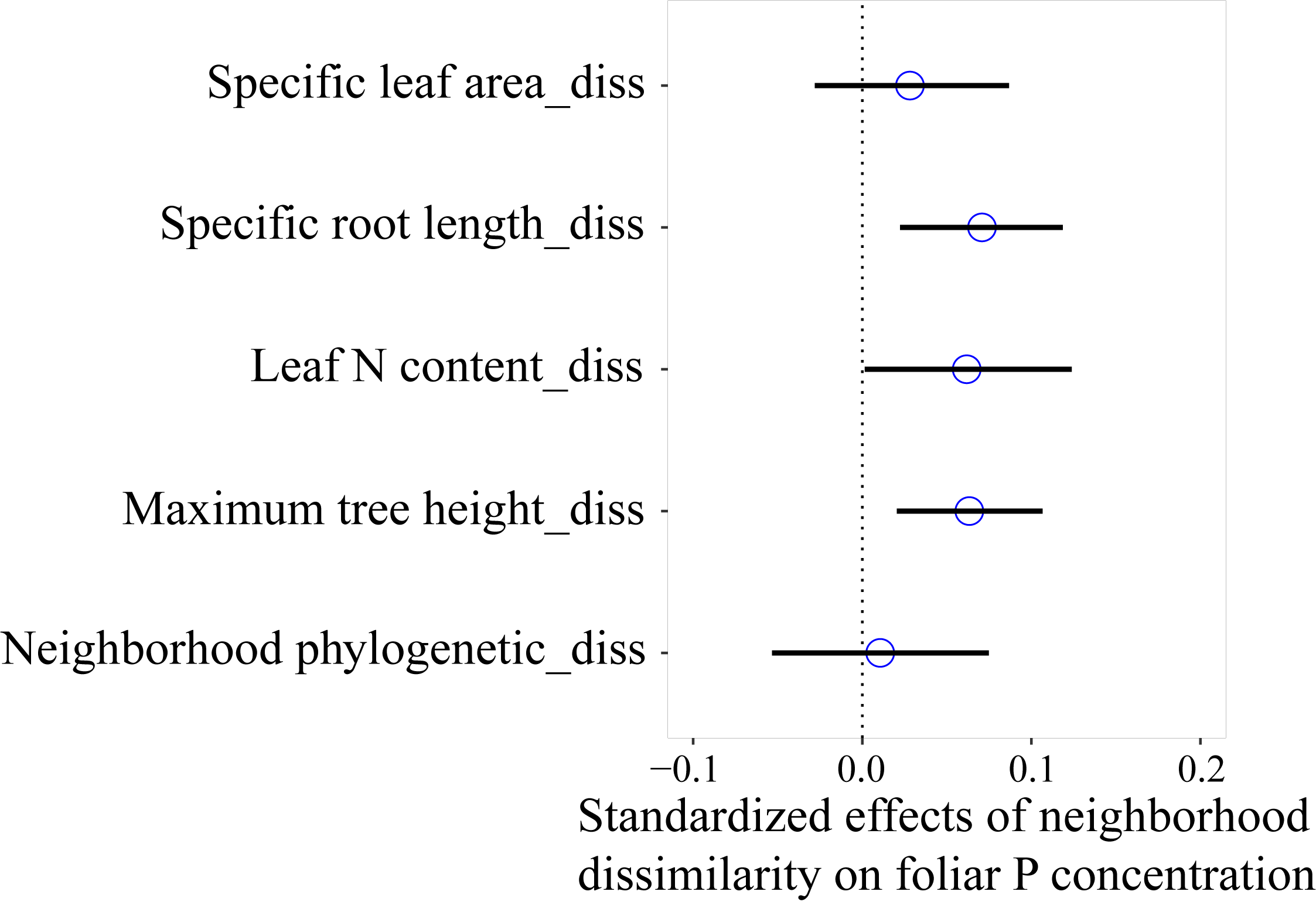


Figure 2. Standardized effects of neighborhood height index (NHI; fixed at its median) (a) and neighborhood specific root length dissimilarity (SRL\_diss; fixed at its median) (b) on the foliar iWUE of focal Chinese fir (*Cunninghamia lanceolata* (Lamb.) Hook). The solid red lines correspond to a linear mixed-effects model fit (Table 1) with shaded area indicating the 95% confidence interval. (c) NHI-dependent effect of SRL\_diss on foliar iWUE. Values are mean and bootstrapped 95% confidence intervals generated by coefficient estimates from simultaneous model fit presented in Table 1; filled circle represents the effect of SRL\_diss at the average NHI experienced by the focal species in this study; and difference in response slopes between NHI levels is significant at α =0.05 if their confidence intervals do not overlap the other’s mean.



Figure 3. Standardized effects of neighborhood trait or phylogenetic dissimilarities on foliar P concentrations of Chinese fir (*Cunninghamia lanceolata* (Lamb.) Hook) based on linear mixed-effects models (a). Effect of neighborhood specific root length dissimilarity (SRL\_diss; fixed at its median) on the foliar phosphorus (P) concentration of focal Chinese fir (*Cunninghamia lanceolata* (Lamb.) Hook) (b). The solid red line corresponds to a linear mixed-effects model fit with shaded area indicating the 95% confidence interval.



a



b

Figure 4. Relationships between foliar iWUE and (a) N concentrations, (b) P concentrations, and (c) δ18O of focal Chinese fir (*Cunninghamia lanceolata* (Lamb.) Hook). Red lines show the fitted relationships, with shaded areas show the 95% credible intervals from similar linear regression.



Figure 5. Arrows with solid lines represent significant paths in a fitted multigroup structural equation model depicting the effects of neighborhood tree species richness (NSR), neighborhood height index (NHI) and neighborhood dissimilarities in specific root length (SRL\_diss), phylogeny (NP\_diss) and leaf nitrogen content (LNC\_diss) on foliar intrinsic water use efficiency (Foliar iWUE) of Chinese fir (*Cunninghamia lanceolata* (Lamb.) Hook). Blue arrows represent positive relationships, while red arrows represent negative relationships. Numbers on arrows correspond to standardized coefficients, with asterisks indicating level of significant (\*P < 0.05, \*\* P < 0.01, \*\*\* P < 0.001). Dashed lines represent insignificant relationships.

