

**Supplementary Table 4.** Trait-mediated effects on tree survival in model 5 with parameter estimates and credible intervals.

| Trait | Term     | Estimate | Est_Error | CI_Lower | CI_Upper | Category   | significance |
|-------|----------|----------|-----------|----------|----------|------------|--------------|
| Hmax  | Hmax     | 0.038    | 0.1148    | -0.255   | 0.339    | Overall    |              |
|       | Hmax: NC | -0.022   | 0.0265    | -0.087   | 0.046    | Overall    |              |
|       | TC       | 0.051    | 0.0339    | -0.039   | 0.134    | Overall    |              |
|       | TD       | 0.102    | 0.0488    | -0.020   | 0.234    | Overall    | *            |
|       | Hmax     | 0.395    | 0.5025    | -0.890   | 1.718    | Understory |              |
|       | Hmax: NC | 0.203    | 0.0867    | -0.018   | 0.424    | Understory | *            |
|       | TC       | 0.167    | 0.1162    | -0.134   | 0.459    | Understory |              |
|       | TD       | -0.058   | 0.1644    | -0.462   | 0.370    | Understory |              |
|       | Hmax     | -0.106   | 0.1804    | -0.624   | 0.350    | Canopy     |              |
|       | Hmax: NC | -0.035   | 0.0501    | -0.161   | 0.090    | Canopy     |              |
|       | TC       | 0.025    | 0.0420    | -0.078   | 0.134    | Canopy     |              |
|       | TD       | 0.114    | 0.0691    | -0.059   | 0.295    | Canopy     |              |
|       | WD       | 0.383    | 0.1280    | 0.050    | 0.724    | Overall    | **           |
|       | WD: NC   | 0.048    | 0.0270    | -0.021   | 0.116    | Overall    |              |
|       | TC       | -0.107   | 0.0297    | -0.183   | -0.031   | Overall    | **           |
|       | TD       | 0.076    | 0.0542    | -0.061   | 0.218    | Overall    |              |
| WD    | WD       | 0.702    | 0.1942    | 0.208    | 1.225    | Understory | **           |
|       | WD: NC   | 0.033    | 0.0390    | -0.067   | 0.129    | Understory |              |
|       | TC       | -0.132   | 0.0452    | -0.247   | -0.018   | Understory | **           |
|       | TD       | 0.034    | 0.0828    | -0.185   | 0.247    | Understory |              |
|       | WD       | 0.118    | 0.2250    | -0.508   | 0.719    | Canopy     |              |
|       | WD: NC   | 0.041    | 0.0644    | -0.121   | 0.204    | Canopy     |              |
|       | TC       | -0.012   | 0.0576    | -0.157   | 0.136    | Canopy     |              |
|       | TD       | -0.071   | 0.1104    | -0.354   | 0.216    | Canopy     |              |
| SLA   | SLA      | -0.194   | 0.0860    | -0.408   | 0.027    | Overall    | *            |
|       | SLA: NC  | -0.026   | 0.0223    | -0.084   | 0.032    | Overall    |              |
|       | TC       | 0.057    | 0.0280    | -0.012   | 0.128    | Overall    | *            |
|       | TD       | 0.018    | 0.0479    | -0.109   | 0.139    | Overall    |              |
|       | SLA      | -0.361   | 0.1277    | -0.715   | -0.023   | Understory | **           |
|       | SLA: NC  | 0.039    | 0.0355    | -0.048   | 0.128    | Understory |              |
|       | TC       | 0.049    | 0.0410    | -0.056   | 0.160    | Understory |              |
|       | TD       | -0.066   | 0.0724    | -0.247   | 0.125    | Understory |              |
|       | SLA      | -0.045   | 0.1293    | -0.395   | 0.303    | Canopy     |              |
|       | SLA: NC  | -0.063   | 0.0326    | -0.149   | 0.027    | Canopy     |              |
|       | TC       | 0.071    | 0.0392    | -0.033   | 0.172    | Canopy     |              |
|       | TD       | 0.119    | 0.0653    | -0.047   | 0.292    | Canopy     |              |
|       | LDMC     | 0.160    | 0.0988    | -0.106   | 0.425    | Overall    |              |
|       | LDMC: NC | -0.009   | 0.0245    | -0.072   | 0.053    | Overall    |              |
|       | TC       | -0.004   | 0.0270    | -0.069   | 0.064    | Overall    |              |
|       | TD       | 0.016    | 0.0453    | -0.099   | 0.134    | Overall    |              |
| LDMC  | LDMC     | 0.238    | 0.1571    | -0.208   | 0.634    | Understory |              |
|       | LDMC: NC | -0.057   | 0.0332    | -0.147   | 0.024    | Understory |              |
|       | TC       | -0.050   | 0.0386    | -0.149   | 0.051    | Understory |              |

|                       |                            |        |        |        |        |            |    |
|-----------------------|----------------------------|--------|--------|--------|--------|------------|----|
|                       | TD                         | -0.089 | 0.0661 | -0.255 | 0.088  | Understory |    |
|                       | LDMC                       | 0.067  | 0.1339 | -0.311 | 0.417  | Canopy     |    |
|                       | LDMC: NC                   | 0.027  | 0.0370 | -0.069 | 0.117  | Canopy     |    |
|                       | TC                         | 0.055  | 0.0397 | -0.041 | 0.158  | Canopy     |    |
|                       | TD                         | 0.102  | 0.0643 | -0.065 | 0.267  | Canopy     |    |
|                       | SWC <sub>branch</sub>      | -0.191 | 0.1101 | -0.485 | 0.092  | Overall    |    |
|                       | SWC <sub>branch</sub> : NC | -0.048 | 0.0254 | -0.113 | 0.017  | Overall    |    |
|                       | TC                         | 0.051  | 0.0289 | -0.026 | 0.124  | Overall    |    |
|                       | TD                         | 0.104  | 0.0451 | -0.012 | 0.221  | Overall    | *  |
| SWC <sub>branch</sub> | SWC <sub>branch</sub>      | -0.311 | 0.2478 | -0.972 | 0.330  | Understory |    |
|                       | SWC <sub>branch</sub> : NC | -0.056 | 0.0509 | -0.186 | 0.075  | Understory |    |
|                       | TC                         | 0.067  | 0.0580 | -0.073 | 0.217  | Understory |    |
|                       | TD                         | 0.093  | 0.0878 | -0.130 | 0.323  | Understory |    |
|                       | SWC <sub>branch</sub>      | -0.199 | 0.1592 | -0.596 | 0.215  | Canopy     |    |
|                       | SWC <sub>branch</sub> : NC | -0.020 | 0.0405 | -0.125 | 0.080  | Canopy     |    |
|                       | TC                         | 0.008  | 0.0424 | -0.096 | 0.117  | Canopy     |    |
|                       | TD                         | 0.077  | 0.0686 | -0.099 | 0.253  | Canopy     |    |
|                       | Tpca1                      | 0.267  | 0.1053 | -0.003 | 0.541  | Overall    | *  |
|                       | Tpca1: NC                  | 0.041  | 0.0246 | -0.020 | 0.106  | Overall    |    |
|                       | TC                         | -0.072 | 0.0281 | -0.141 | 0.002  | Overall    | *  |
|                       | TD                         | 0.088  | 0.0463 | -0.026 | 0.207  | Overall    |    |
| Tpca1                 | Tpca1                      | 0.630  | 0.1942 | 0.137  | 1.162  | Understory | ** |
|                       | Tpca1: NC                  | -0.012 | 0.0433 | -0.126 | 0.100  | Understory |    |
|                       | TC                         | -0.144 | 0.0497 | -0.265 | -0.016 | Understory | ** |
|                       | TD                         | -0.068 | 0.0830 | -0.274 | 0.144  | Understory |    |
|                       | Tpca1                      | 0.171  | 0.1617 | -0.274 | 0.591  | Canopy     |    |
|                       | Tpca1: NC                  | 0.050  | 0.0425 | -0.061 | 0.159  | Canopy     |    |
|                       | TC                         | -0.037 | 0.0422 | -0.144 | 0.074  | Canopy     |    |
|                       | TD                         | 0.111  | 0.0706 | -0.079 | 0.291  | Canopy     |    |
|                       | Tpca2                      | 0.106  | 0.1078 | -0.184 | 0.396  | Overall    |    |
|                       | Tpca2: NC                  | -0.033 | 0.0265 | -0.098 | 0.034  | Overall    |    |
|                       | TC                         | 0.096  | 0.0341 | 0.014  | 0.181  | Overall    | ** |
|                       | TD                         | 0.063  | 0.0438 | -0.046 | 0.177  | Overall    |    |
| Tpca2                 | Tpca2                      | 0.260  | 0.2291 | -0.336 | 0.828  | Understory |    |
|                       | Tpca2: NC                  | -0.051 | 0.0440 | -0.161 | 0.060  | Understory |    |
|                       | TC                         | 0.153  | 0.0610 | -0.006 | 0.297  | Understory | *  |
|                       | TD                         | 0.011  | 0.0786 | -0.184 | 0.220  | Understory |    |
|                       | Tpca2                      | -0.056 | 0.2094 | -0.585 | 0.523  | Canopy     |    |
|                       | Tpca2: NC                  | 0.045  | 0.0583 | -0.111 | 0.190  | Canopy     |    |
|                       | TC                         | 0.065  | 0.0531 | -0.069 | 0.199  | Canopy     |    |
|                       | TD                         | 0.122  | 0.0766 | -0.076 | 0.319  | Canopy     |    |

**Note:** In the table, **Estimate** represents the posterior mean of the parameter estimates, **Est\_Error** is the standard error of the posterior estimates, and **CI\_Lower** and **CI\_Upper** denote the lower and upper bounds of the 99% credible interval, respectively. Parameters are considered significant if their credible intervals exclude zero, with \*\* indicating significance at the 99% level and \* indicating significance at the 95% level. **NC** is the neighborhood crowding index; **Trait:NC** is the interaction term between a specific trait and crowding, i.e., the effect of crowding depends on focal tree trait values; **TC** represents the neighborhood trait competition; and **TD** represents the neighborhood trait dissimilarity.