| trait  Table 1. Summary of typically observed variation in thermally-relevant leaf traits with canopy height and/or between sun and shade leaves | symbol | units | response | forest type(s) | reference(s)\* |
| --- | --- | --- | --- | --- | --- |
| **Leaf anatomy and morphological traits** | | | | | |
| leaf mass per area (or inverse of specific leaf area) | *LMA (or 1/SLA)* | g cm-2 | ↑ with height | TrB, TeB, TeN, BoN | 1, 7, 2, 3, 4, 6 |
|  |  |  | ↑ with light | TrB, TeB, TeN, BoN | 1, 7, 2, 3, 5, 6 |
| leaf density |  | g cm-3 | ↑ with height | TeB | 2 |
|  |  |  | ↑ with light | TrB, TeB | 6, 2 |
|  |  |  | ≈ with light | TeN | 5 |
| leaf area | *LA* | cm2 | ↓ with height | TrB, TeB, BoN | 7, 8, 10 |
|  |  |  | ↓ with light | TrB, TeB, BoN | 7, 8, 3, 10 |
| stomatal density | *Dstomata* | mm-2 | ↑ with height | TrB, TeB, TeN | 11, 12, 3, 13, 4 |
|  |  |  | ↑ with light | TrB, TeB | 12, 11, 3 |
| vein density | *VLA* | mm mm-2 | ↑ with height | TeB | 52 |
|  |  |  | ↑ with light | TeB | 52, 53 |
|  | *VLAmin* | mm mm-2 | ↑ with height | TeB | 14 |
|  |  |  | ↑ with light | TeB | 14, 53 |
| leaf thickness |  | µm | ↑ with height | TrB, TeB, TeN | 15, 11, 2, 13, 16 |
|  |  |  | ↑ with light | TrB, TeB, TeN | 11, 15, 2, 5 |
| trichome density |  | mm-2 | ↑ with height | TrB | 17 |
|  |  |  | ↑ with light | TrB, TeB | 17, 18, 19, 20 |
| blade inclination angle (vertical) | *φB* | ˚ | ↑ with height | TrB, TeB | 21, 22, 23 |
|  |  |  | ↑ with light | TrB, TeB | 21, 24, 23, 22, 54 |
| leaf packing |  | no./cm stem | ↑ with light | TeN | 25, 26 |
| pinnate lobation |  | cm2 | ↑ with height | TeB | 3 |
|  |  |  | ↓ with height | TeB | 8 |
|  |  |  | ↑ with light | TeB | 8, 3 |
| drip tip length |  | cm | ↓ with height | TrB | 27 |
|  |  |  | ↓ with light | TrB | 27 |
| upper cuticle thickness | *CT* | µm | ↑ with height | TrB, TeN | 27, 4 |
|  |  |  | ↑ with light | TrB, TeB | 27, 28 |
| adaxial leaf wettability (as drop contact angle) | *DCAad* | ˚ | ↑ with height | TeB | 13 |
|  | *duration of surface wetness* | % | ↓ with height | TrB | 29 |
|  | *DCA* | ˚ | ↑ with light | TeB | 13 |
| **Leaf biochemical and physiological traits** | | | | | |
| nitrogen content | *Narea* | g m-2 | ↑ with height | TrB, TeB, TeN, BoN | 7, 30, 31, 33, 32, 9 |
|  |  |  | ↑ with light | TrB, TeB, TeN, BoN | 15, 34, 31, 30, 33, 32, 9 |
|  | *Nmass* | mg g-1 | ≈↓ with height | TrB, TeB, TeN | 15, 7, 30, 31, 33, 35 |
|  |  |  | ≈↓ with light | TrB, TeB, TeN | 7, 36, 30, 31, 33, 5 |
| Phosphorous content | *Parea* | g m-2 | ↑ with height | TrB, TeB, TeN | 15, 37, 1, 38 |
|  |  |  | ↑ with light | TrB, TeB, TeN | 15, 5 |
|  |  |  | ≈ with light | TrB, TeB | 1 |
|  | *Pmass* | mg g-1 | ≈↓ with height | TrB | 15, 36, 1 |
|  |  |  | ≈ with light | TrB, TeB | 15, 36, 1 |
| xanthophyll cycle pigments | *VAZ* | µmol m-2 | ↑ with height | TrB, TeB | 39, 31, 22 |
|  |  |  | ↑ with light | TrB, TeB | 40, 31 |
| chlorophyll content | *Chl* | mg  cm-2 | ↓ with height | TrB, TeB | 41, 42 |
|  |  |  | ↓ with light | TrB, TeB | 43, 42 |
| β-carotene and lutein |  | µmol m-2 | ↑ with height | TrB, TeB, BoN | 31, 43, 6 |
|  |  |  | ↑ with light | TrB, TeB, BoN | 31, 39, 6 |
| chlorophyll a/b ratio | *chl a/b* | mol mol-1 | ↑ with height | TrB, TeB, BoN | 43, 31, 6 |
|  |  |  | ↑ with light | TrB, TeB, BoN | 43, 31, 40, 22, 6 |
| carbon isotope composition | *δ13C* | ‰ | ↑ with height | TrB, TeB, TeN | 7, 44, 32 |
|  |  |  | ↑ with light | TrB, TeB, TeN | 7, 30, 32 |
| Intercellular CO2 concentration | *Ci* | µmol mol-1 | ↓ with height | TeB | 31, 45 |
|  |  |  | ↓ with light | TeB | 31, 45 |
| PAR absorptance | *ABS* | % nm | ≈ with height | TrB | 43, 46 |
|  |  |  | ≈↑ with light | TrB | 43, 46 |
| absorptance efficiency | *ABS* | % g-1 | ↓ with height | TrB | 43, 46 |
|  |  |  | ↓ with light | TrB | 43, 46 |
| PAR transmittance |  | % | ↓ with height | TrB | 43, 46 |
|  |  |  | ↓ with light | TrB | 43, 46 |
| Reflectance |  | % | ≈ with height | TrB | 43, 46 |
|  |  |  | ↑ with height | BoN | 6 |
|  |  |  | ≈ with light | TrB | 43, 46 |
|  |  |  |  |  |  |
| **VOC production** |  |  |  |  |  |
| isoprene emission  (in emitting species) | *I* | nmol m-2s-1 | ↑ with height  (peak in mid-canopy) | TrB | 47 |
|  |  |  | ↑ with light  (peak in mid-canopy) | TrB | 47 |
|  |  |  | ↑ with height | TeB | 33, 48 |
|  |  |  | ↑ with light | TeB | 33, 49, 50 |
| monoterpenoid emissions | *MT* | µg m-2s-1 | ↓ with height | TeB | 51 |
|  |  |  | ↓ with light | TeB | 51 |

**\* 1.** Mau et al. 2018; **2.** Coble and Cavaleri 2014; **3.** Sack et al. 2006; **4.** Chin and Sillett 2019; **5.** Wyka et al. 2012; **6.** Atherton et al. 2017; **7.** Kenzo et al. 2015; **8.** Kusi and Karasi 2020; **9.** Dang et al. 1997; **10.** Gebauer et al. 2015; **11.** Marenco et al. 2017; **12.** Kafuti et al. 2020; **13.** Van Wittenberghe et al. 2012; **14.** Zhang et al. 2019; **15.** Weerasinghe et al. 2014; **16.** Oldham et al. 2010; **17.** Ichie et al. 2016; **18.** Gregoriou et al. 2007; **19.** Levizou et al. 2005; **20.** Liakoura 1997; **21.** Fauset et al. 2018; **22.** Niinemets et al. 1998, **23.** Ishida et al. 1998; **24.** Millen and Clendon 1979; **25.** Smith and Carter, 1988; **26**. Hadley and Smith 1987; **27.** Panditharathna et al. 2008; **28.** Baltzer and Thomas 2005; **29.** Dietz et al. 2007; **30.** Coble et al. 2016; **31.** Scartazza et al. 2016; **32.** Duursma and Marshall, 2006; **33.** Harley et al. 1996; **34.** Hernandez et al. 2020; **35.** Turnbull et al. 2003; **36.** Chen et al. 2020; **37.** van de Weg et al. 2012; **38.** M.A Cavaleri et al. 2008;  **39.** Koniger et al. 1995; **40.** Mastubara et al. 2009; **41.** Harris and Medina 2013; **42.** Hansen et al. 2001; **43.** Poorter et al. 1995; **44.** Coble et al. 2017; **45.** Niinemets et al. 2004; **46.** Poorter et al. 2000; **47.** Taylor et al. 2021; **48.** Harley et al. 1997; **49.** Niinemets and Sun, 2014; **50.** Sharkey and Monson, 2014; **51.** Saimpraga et al. 2013; **52.** Zwieniecki et al. 2004; **53.** Sack and Scoffoni, 2013; **54.** Ball et al., 1988