Supplementary Material

**Supplementary Tables**

**Supplementary Table 1.** Estimates of genomic heritability ($h\_{g}^{2}$) and pedigree-based heritability ($h\_{a}^{2}$) of the Spectral Reflectance Indices (SRIs) calculated in adult leaves of cyanogenic eucalypt.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **SRIs**  | **Name**  | **Formula** | $$h\_{g}^{2}$$ | $$h\_{a}^{2}$$ | **Reference**  |
| ARI  | Anthocyanin Reflectance Index  | (1/R550) - (1/R700)  | 0.54 | 0.34 | (Gitelson et al., 2001)  |
| ARI2  | Anthocyanin Reflectance index 2  | R800(1/R550) - (1/R700)  | 0.49 | 0.38 | (Gitelson et al., 2001) |
| BGI  | Blue Green Pigment Index  | R450/R550  | 0.52 | 0.35 | (Zarco-Tejada et al., 2005)  |
| Boochs  | Single Band 703 Boochs  | D703  | 0.36 | 0.38 | (Boochs et al., 1990)  |
| Boochs2  | Single Band 720 Boochs 2  | D720  | 0.37 | 0.43 | (Boochs et al., 1990) |
| BRI  | Browning Reflectance Index  | R450/R690  | 0.54 | 0.35 | (Zarco-Tejada et al., 2005) |
| CAI  | Cellulose Absorption Index  | 0.5 \* (R2000 + R2200) – R2100  | 0.29 | 0.30 | (Nagler et al., 2003)  |
| CARI  | Chlorophyll Absorption Ratio Index  | R700 \* abs(a \* 670 + R670 + b)/R670 \* (a2 + 1)0.5  | 0.37 | 0.44 | (McMurtrey Iii et al., 1994)  |
| Carter  | Carter  | R695/R420  | 0.46 | 0.36 | (Carter, 1994)  |
| Carter2  | Carter 2  | R695/R760  | 0.39 | 0.43 | (Carter, 1994) |
| Carter3  | Carter 3  | R605/R760  | 0.41 | 0.44 | (Carter, 1994) |
| Carter4  | Carter 4  | R710/R760  | 0.38 | 0.45 | (Carter, 1994)  |
| Carter5  | Carter 5  | R695/R670  | 0.39 | 0.28 | (Carter, 1994)  |
| Carter6  | Carter 6  | R550  | 0.43 | 0.40 | (Carter, 1994) |
| CI  | Coloration Index  | R675 \* R690/R2683  | 0.32 | 0.33 | (Zarco-Tejada et al., 2003)  |
| CI2  | Coloration Index 2  | R760/R700 - 1  | 0.38 | 0.44 | (Gitelson et al., 2003)  |
| ClAInt | - |  | 0.40 | 0.44 | (Oppelt and Mauser, 2004)  |
| CRI 1 | Carotenoid Reflectance Index 1  | 1/R515 - 1/R550  | 0.44 | 0.38 | (Gitelson et al., 2003) |
| CRI 2 | Carotenoid Reflectance Index 2  | 1/R515 - 1/R770  | 0.49 | 0.37 | (Gitelson et al., 2003) |
| CRI 3 | Carotenoid Reflectance Index 3  | 1/R515 - 1/R550 \* R770  | 0.43 | 0.44 | (Gitelson et al., 2003) |
| CRI 4 | Carotenoid Reflectance Index 4  | 1/R515 - 1/R700 \* R770  | 0.44 | 0.41 | (Gitelson et al., 2003) |
| D1 | Derivative index 1 | D730/D706  | 0.32 | 0.44 | (Zarco-Tejada et al., 2003) |
| D2 | Derivative index 2 | D705/D722  | 0.37 | 0.47 | (Zarco-Tejada et al., 2003) |
| Datt1 | Datt  | (R850 - R710)/(R850 - R680)  | 0.39 | 0.47 | (Datt, 1999)  |
| Datt2 | Datt 2  | R850/R710  | 0.39 | 0.46 | (Datt, 1999) |
| Datt3 | Datt 3  | D754/D704  | 0.31 | 0.40 | (Datt, 1999) |
| Datt4 | Datt 4  | R672/(R550 \* R708)  | 0.41 | 0.31 | (Datt, 1998)  |
| Datt5 | Datt 5  | R672/R550  | 0.46 | 0.34 | (Datt, 1998) |
| Datt6 | Datt 6  | R860/(R550 \* R708)  | 0.42 | 0.45 | (Datt, 1998) |
| Datt7 | Datt 7  | (R860 - R2218)/(R860 - R1928)  | 0.26 | 0.23 | (Datt, 1998) |
| Datt8 | Datt 8  | (R860 - R1788)/(R860 - R1928)  | 0.26 | 0.36 | (Datt, 1998) |
| DD | Double Difference Index  | (R749 - R720) - (R701 - R672)  | 0.40 | 0.47 | le Maire, François, and Dufrêne, 2004 |
| DDn | New Double Difference Index  |  2 \* (R710 - R660 - R760)  | 0.33 | 0.36 | (Le Maire et al., 2008)  |
| DPI | Double Peak Index  | (D688 - D710)/D2697  | 0.35 | 0.36 | (Zarco-Tejada et al., 2003) |
| DWSI1 | Disease water stress index 1  | R800/R1660  | 0.27 | 0.35 | (Apan et al., 2004)  |
| DWSI2 | Disease water stress index 2  | R1660/R550  | 0.44 | 0.43 | (Apan et al., 2004)  |
| DWSI3 | Disease water stress index 3  | R1660/R680  | 0.40 | 0.39 | (Apan et al., 2004)  |
| DWSI4 | Disease water stress index 4  | R550/R680  | 0.43 | 0.32 | (Apan et al., 2004)  |
| DWSI5 | Disease water stress index 5  | (R800 + R550)/(R1660 + R680)  | 0.28 | 0.31 | (Apan et al., 2004)  |
| EGFN | Edge green first derivative normalized difference  | (max(D650:750) - max(D500:550))/ (max(D650:750) + max(D500:550))  | 0.50 | 0.35 | (Peñuelas et al., 1994)  |
| EGFNR | Edge green first derivative ratio  | max(D650:750)/ max(D500:550)  | 0.50 | 0.35 | (Peñuelas et al., 1994) |
| EVI | Enhanced Vegetation Index  | 2.5 \* ((R800 - R670)/(R800 - (6 \* R670) - (7.5 \* R475) + 1))  | 0.22 | 0.18 | (Huete et al., 1997)  |
| GDVI\_2 | Green Difference Vegetation Index 2  | (R2800 - R2680)/(R2800 + R2680)  | 0.40 | 0.40 | (Wu, 2014)  |
| GDVI\_3 | Green Difference Vegetation Index 3  | (R3800 - R3680)/(R3800 + R3680)  | 0.41 | 0.41 | (Wu, 2014)  |
| GDVI\_4 | Green Difference Vegetation Index 4  | (R4800 - R4680)/(R4800 + R4680)  | 0.42 | 0.42 | (Wu, 2014)  |
| GI | Greenness Index  | R554/R677  | 0.43 | 0.32 | (Smith et al., 1995) |
| Gitelson  | Gitelson  | 1/R700  | 0.38 | 0.45 | (Gitelson et al., 1999)  |
| Gitelson 2  | Gitelson 2  | (R750 - R800)/(R695 - R740) - 1  | 0.39 | 0.43 | (Gitelson et al., 2003)  |
| GMI1 | Gitelson and Merzlyak Index 1  | R750/R550  | 0.50 | 0.41 | (Gitelson and Merzlyak, 1998) |
| GMI2 | Gitelson and Merzlyak Index 2  | R750/R700  | 0.38 | 0.44 | (Gitelson and Merzlyak, 1998)  |
| Green\_NDVI | Green Normalized Difference Vegetation Index  | (R800 - R550)/(R800 + R550)  | 0.49 | 0.42 | (Gitelson et al., 1996)  |
| LRDSI1 | Leaf Rust Disease Severity Index 1  | 6.9\*(R605/R455)-1.2  | 0.58 | 0.33 | (Ashourloo et al., 2014)  |
| LWVI1 | Normalized Difference 1094/983 Leaf water VI 1  | (R1094 - R983) / (R1094 + R983)  | 0.26 | 0.31 | (Galvao et al., 2005)  |
| LWVI2 | Normalized Difference 1094/1205 Leaf water VI 2  | (R1094 - R1205) / (R1094 + R1205)  | 0.22 | 0.31 | (Galvao et al., 2005) |
| Maccioni  | Maccioni  | (R780 - R710)/(R780 - R680)  | 0.38 | 0.46 | (Maccioni et al., 2001)  |
| MCARI | Modified Chlorophyll Absorption in Reflectance Index |  ((R700 - R670) - 0.2 \* (R700 - R550)) \* (R700/R670)  | 0.36 | 0.30 | (Daughtry et al., 2000)  |
| MCARI/OSAVI | MCARI2/OSAVI2  | MCARI2/OSAVI  | 0.39 | 0.42 | (Daughtry et al., 2000) |
| MCARI2 | Modified Chlorophyll Absorption in Reflectance Index 2 |  ((R750 - R705) - 0.2 \* (R750 -R550)) \* (R750/R705)  | 0.37 | 0.42 | (Haboudane et al., 2004)  |
| MCARI2/OSAVI2  | MCARI2/OSAVI2  | MCARI2/OSAVI2  | 0.40 | 0.38 | (Wu et al., 2008)  |
| mND705 | - | (R750-R705)/(R750 + R705-2\* R445) | 0.38 | 0.44 |  (Sims and Gamon, 2002) |
| mNDVI  | Modified NDVI  | (R800 - R680)/(R800 + R680 – 2 \* R445)  | 0.39 | 0.38 |  (Sims and Gamon, 2002) |
| MPRI | Modified Photochemical Reflectance Index  | (R515 - R530)/(R515 + R530)  | 0.44 | 0.40 | (Hernández-Clemente et al., 2011)  |
| mREIP  | Modified Red-Edge Inflection Point  | mREIP with inverted Gaussian fit on reflectance  | 0.40 | 0.45 |  (Miller et al., 1990)  |
| mSAVI  | Modified Soil Adjusted Vegetation Index  | 0.5 \* (2 \* R800 + 1- ((2 \* R800 + 1)2 – 8 \* (R800 - R670))0.5)  | 0.38 | 0.38 | (Qi et al., 1994)  |
| MSI | Moisture Stress Index  | R1600/R817  | 0.26 | 0.35 | (Hunt Jr and Rock, 1989)  |
| mSR | modified Simple Ratio  | (R800−R445)/(R680−R445)  | 0.39 | 0.36 |  (Sims and Gamon, 2002) |
|  mSR2  | modified Simple Ratio 2  | (R750/R705) -1/(R750/R705) + 1)0.5  | 0.38 | 0.43 | (Chen, 1996)  |
|  mSR705  | modified Simple Ratio 705  | (R750 - R445)/(R705-R445)  | 0.38 | 0.44 |  (Sims and Gamon, 2002) |
|  MTCI  | MERIS Terrestrial Chlorophyll Index  | (R754 - R709)/(R709 - R681)  | 0.37 | 0.45 | (Dash and Curran, 2004)  |
|  mTVI  | modified Triangular Vegetation Index  | 1.2 \* (1.2 \* (R800 - R550) - 2.5 \* (R670 - R550)) | 0.33 | 0.34 | (Haboudane et al., 2004) |
|  NDLI  | Normalized Difference Lignin Index  | (log(1/ R1754) - log(1/ R1680))/(log(1/ R1754) + log(1/ R1680)  | 0.28 | 0.34 | (Serrano et al., 2002)  |
|  NDNI  | Normalized Difference Nitrogen Index  | (log(1/ R1510) - log(1/ R1680))/(log(1/ R1510) + log(1/ R1680))  | 0.29 | 0.28 | (Serrano et al., 2002) |
| NDRE | Normalised difference red-edge | (R730 − R780)/(R730 + R780) | 0.37 | 0.46 |  (Gitelson and Merzlyak, 1994; Sims and Gamon, 2002)  |
| NDVI | Normalized Difference Vegetation Index  | (R800 - R680)/(R800 + R680)  | 0.38 | 0.39 | (Tucker, 1979)  |
| NDVI2 | Normalized Difference Vegetation Index 2  | (R750 - R705)/(R750 + R705)  | 0.38 | 0.44 | (Gitelson and Merzlyak, 1994)  |
| NDVI3 | Normalized Difference Vegetation Index 3  | (R682 - R553)/(R682 + R553)  | 0.45 | 0.33 | (Gandia et al., 2004)  |
| NDWI | Normalized Difference Water Index | (R857-R2130)/(R857-R2130) | 0.25 | 0.39 | (Gao, 1996) |
| NPCI | Normalized Pigment Chlorophyll Index  | (R680 - R430)/(R680 + R430)  | 0.46 | 0.40 | (Peñuelas et al., 1994) |
| NPQI | Phaeophytinization Index  | (R415-R435)/(R415+R435)  | 0.35 | 0.35 | (Zarco-Tejada et al., 2001)  |
| NRI | Nitrogen Reflectance Index  | (R570 - R670)/(R570 + R670)  | 0.44 | 0.32 | (Eaton et al., 2013)  |
| OSAVI | Optimized Soil Adjusted Vegetation Index  | (1 + 0.16) \* (R800-R670)/(R800 + R670 + 0.16)  | 0.39 | 0.39 | (Rondeaux et al., 1996)  |
| OSAVI2 | Optimized Soil Adjusted Vegetation Index 2  | (1 + 0.16) \* (R750-R705)/(R750 + R705 + 0.16)  | 0.38 | 0.44 | (Wu et al., 2008) |
| RARS |  Ratio Analysis of Reflectance Spectra  | R746/R513  | 0.45 | 0.39 | (Chappelle et al., 1992) |
| PNC | Plant Nitrogen Concentation | R700/R670 | 0.39 | 0.29 |  (McMurtrey Iii et al., 1994) |
| PRI | Photochemical Reflectance Index  | (R531 - R570)/(R531 + R570)  | 0.40 | 0.35 | (Gamon et al., 1992) |
| PRI\*CI2 | PRI\*CI2 | PRI\*CI2  | 0.37 | 0.29 | (Garrity et al., 2011)  |
| PRI\_norm | normalized PRI  | PRI \* (-1)/(RDVI \* R700/R670)  | 0.41 | 0.39 | (Zarco-Tejada et al., 2013)  |
| PSND | Pigment specific normalised difference  | (R800 - R470)/(R800 + R470)  | 0.48 | 0.42 | (Blackburn, 1998) |
| PSRI | Plant Senescence Reflectance Index  | (R678 - R500)/R750  | 0.47 | 0.34 | (Merzlyak et al., 1999) |
| PSSR | Pigment specific simple ratio  | R800/R635  | 0.39 | 0.41 | (Blackburn, 1998)  |
| PWI | Plant Water Index  | R900/R970  | 0.31 | 0.37 | (Peñuelas et al., 1997) |
| RDVI | Renormalized Difference Vegetation Index  | (R800 - R670)/SQRT(R800 + R670)  | 0.36 | 0.38 | (Roujean and Breon, 1995)  |
| REP\_LE | - | Red-edge position through linear extrapolation  | 0.40 | 0.48 | (Cho and Skidmore, 2006)  |
| REP\_Li | - | 700 + 40 · ((Rre − R700)/(R740 − R700)) | 0.41 | 0.47 | (Guyot and Baret, 1988)  |
| RGI | Red/Green Index  | R690/R550  | 0.48 | 0.34 | (Zarco-Tejada et al., 2005)  |
| SAVI | Soil Adjusted Vegetation Index  | (1 + L) \* (R800 - R670)/(R800 + R670 + L)  | 0.38 | 0.39 | (Huete, 1988)  |
| SIPI | Structure Intensive Pigment Index  | (R800 - R445)/(R800 - R680)  | 0.38 | 0.39 | (Peñuelas et al., 1995) |
| SPVI | Spectral Polygon Vegetation Index  | 0.4 \* (3.7 \* (R800  | 0.37 | 0.43 | (Vincini et al., 2006)  |
| SR | Simple Ratio  | R800/R680  | 0.38 | 0.38 | (Jordan, 1969)  |
| SR1 | Simple Ratio 1  | R750/R700  | 0.39 | 0.43 | (Gitelson and Merzlyak, 1997) |
| SR10 |  Simple Ratio 10  | R685/R655  | 0.41 | 0.41 | (Zarco-Tejada et al., 2003) |
| SR2 | Simple Ratio 2  | R752/R690  | 0.38 | 0.41 | (Gitelson and Merzlyak, 1997)  |
| SR3 | Simple Ratio 3  | R750/ R550  | 0.50 | 0.40 | (Gitelson and Merzlyak, 1997)  |
| SR4 | Simple Ratio 4  | R700/ R670  | 0.39 | 0.30 | (McMurtrey Iii et al., 1994) |
| SR5 | Simple Ratio 5  | R675/R700  | 0.40 | 0.30 | (Chappelle et al., 1992)  |
| SR6 |  Simple Ratio 6  | R750/R710  | 0.38 | 0.45 | (Zarco‐Tejada and Miller, 1999)  |
| SR7 |  Simple Ratio 7  | R440/R690  | 0.53 | 0.37 | (Lichtenthaler et al., 1996)  |
| SR8 |  Simple Ratio 8  | R515/R550  | 0.49 | 0.33 | (Hernández-Clemente et al., 2012) |
| SR9 |  Simple Ratio 9  | R690/R655  | 0.48 | 0.36 | (Zarco-Tejada et al., 2003) |
| SRPI | Simple Ratio Pigment Index  | R430/R680  | 0.48 | 0.39 | (Pen Uelas et al., 1995)  |
| SRWI | Simple Ratio 850/1240  | R850/R1240  | 0.25 | 0.39 | (Zarco-Tejada et al., 2003) |
| Sum\_Dr1 | - | $$\sum\_{i=626}^{795}D1\_{i}$$ | 0.26 | 0.37 |  (Elvidge and Chen, 1995) |
| Sum\_Dr2 | - | $$\sum\_{i=680}^{780}D1\_{i}$$ | 0.30 | 0.38 | (Filella and Peñuelas, 1994)  |
| SWIRFI | Shortwave-infrared | ((R2133)2 / R2225)\*(R2209)3 | 0.35 | 0.30 |  (Levin et al., 2007)  |
| SWIRLI | Shortwave-infrared  | 3.87\*(R2210 - R2090) - 27.51\*(R2280 - R2090) - 0.2  | 0.37 | 0.28 | (Lobell et al., 2001) |
| SWIRSI | Shortwave-infrared  | −41.59 · (R2210 − R2090)+1.24 · (R2280 − R2090) + 0.64 | 0.45 | 0.37 | (Lobell et al., 2001) |
| SWIRVI | Shortwave-infrared  | 37.72\*(R2210 - R2090) + 26.27\*(R2280 - R2090) + 0.57  | 0.44 | 0.31 | (Lobell et al., 2001) |
| TCARI | Transformed Chlorophyll Absorbtion Ratio  | 3 \* ((R700 -R670) - 0.2 \* (R700 -R550) \* (R700/R670))  | 0.39 | 0.41 | (Haboudane et al., 2002) |
| TCARI/OSAVI |      TCARI/OSAVI |  TCARI/OSAVI  | 0.42 | 0.46 | (Haboudane et al., 2002) |
| TCARI2 | Transformed Chlorophyll Absorbtion Ratio 2  | 3 \* ((R750 - R705) - 0.2 \* (R750 -R550) \* (R750/R705)) | 0.40 | 0.41 | (Wu et al., 2008) |
| TCARI2/OSAVI2 |      TCARI2/OSAVI2 | TCARI2/OSAVI2  | 0.45 | 0.34 | (Wu et al., 2008) |
| TGI | Triangular greenness index  | -0.5 \* (190 \* (R670 - R550) – 120 \* (R670 -R480))  | 0.46 | 0.33 | (Hunt Jr et al., 2013) |
| TVI | Transformed Vegetation Index  | 0.5 \* (120 \* (R750 - R550) – 200 \* (R670 - R550))  | 0.32 | 0.34 | (Broge and Leblanc, 2001) |
| Vogelmann |  Vogelmann indices  | R740/R720  | 0.37 | 0.45 | (Vogelmann et al., 1993) |
| Vogelmann2 | Vogelmann indices 2  | (R734 -R747)/(R715 + R726)  | 0.36 | 0.45 | (Vogelmann et al., 1993) |
| Vogelmann3 | Vogelmann indices 3  | D715/D705  | 0.39 | 0.46 | (Vogelmann et al., 1993)  |
| Vogelmann4 | Vogelmann indices 4  | (R734 - R747)/(R715 + R720)  | 0.36 | 0.45 | (Vogelmann et al., 1993) |
| VS | Vegetation Stress ratio  | R725/ R702  | 0.38 | 0.43 | (Smith et al., 2004)  |
| WI |  Water Index  | R900/R970  | 0.31 | 0.37 | (Peñuelas et al., 1993) |

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