Supporting Information

**Table S1**. Stomata anatomical traits (SD = stomatal density, SP = pore length), stomatal conductance (), and leaf area (LA) for all the species under the well-watered (WW) and severe water deficit (WD) treatments. Parameters shown are the sum (SD) or average (SP) of both leaf surfaces. Stomatal conductance () measured with gas-exchange analyzer under experimental conditions. Each entry gives the mean SE () where SE is the standard error and is the sample size. See Table 1 for species codes.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Species | Treatment | SD | SP |  | LA |
|  |  | m |  | mol O | mm |
| ANT | WD | 87.1 4.94 (4) | 28.9 1.02 (4) | 0.083 0.0235 (3) | 597 107 (4) |
| ANT | WW | 100 7.71 (4) | 25.1 1.26 (4) | 0.254 0.046 (4) | 701 71.9 (5) |
| BAR | WD | 152 22.5 (4) | 24 1.35 (4) | 0.255 0.0564 (4) | 279 31.7 (4) |
| BAR | WW | 117 7.17 (4) | 27.6 0.733 (5) | 0.403 0.0527 (5) | 486 29.5 (4) |
| BIF | WD | 100 13.9 (4) | 29.7 1.49 (4) | 0.165 0.0328 (4) | 994 60.5 (5) |
| BIF | WW | 115 4.15 (3) | 22.9 1.48 (3) | 0.269 0.0171 (4) | 1097 48.7 (5) |
| COM | WD | 116 5.9 (4) | 27.1 0.769 (4) | 0.228 0.0234 (3) | 328 20.5 (5) |
| COM | WW | 112 3.45 (4) | 26.7 1.11 (4) | 0.402 0.0453 (4) | 377 24 (5) |
| EJU | WD | 85.2 3.52 (4) | 23.5 1 (4) | 0.103 0.0227 (4) | 1309 73.4 (5) |
| EJU | WW | 95 4.99 (4) | 23.3 1.75 (4) | 0.235 0.0253 (4) | 1320 115 (5) |
| GIB | WD | 107 2.96 (3) | 27.9 1.16 (4) | 0.0954 0.0144 (3) | 382 47.3 (4) |
| GIB | WW | 123 6.96 (4) | 30.6 0.63 (4) | 0.306 0.0377 (5) | 488 47.6 (5) |
| GRO | WD | 107 7.21 (4) | 28.1 0.796 (4) | 0.103 0.0301 (3) | 467 50.2 (5) |
| GRO | WW | 119 4.75 (4) | 28.6 0.828 (4) | 0.233 0.0589 (5) | 527 26.1 (4) |
| LEO | WD | 97.2 7.02 (4) | 29.3 1.25 (4) | 0.157 0.0349 (4) | 1198 88.8 (4) |
| LEO | WW | 109 5.43 (4) | 22.5 1.1 (4) | 0.18 0.0186 (4) | 788 78.2 (4) |
| MAG | WD | 93.9 9.74 (4) | 25 1.52 (3) | 0.139 0.0265 (4) | 954 21.9 (4) |
| MAG | WW | 114 11.9 (4) | 24.5 0.73 (4) | 0.243 0.0272 (4) | 821 42 (5) |
| RET | WD | 81.7 9.11 (4) | 25.7 1.44 (4) | 0.051 0.0152 (3) | 1242 89.7 (5) |
| RET | WW | 93.3 4.98 (3) | 27.6 2.65 (3) | 0.183 0.0121 (4) | 991 149 (4) |

**Table S2**. Rubisco kinetic parameters for each species: Rubisco carboxylase specific activity () and specificity factor (). See Table 1 for species codes. The left columns are calculated from the raw data; the right columns beginning with ‘Model’ are estimated from a Bayesian multilevel model treating Species as a random effect and Rubisco kinetic parameters as correlated multivariate Gaussian responses (see Materials and Methods for further detail). Model-based parameter estimates are used in figures and statistical analyses. Each entry gives the mean SE () where SE is the standard error and is the sample size.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Species |  |  | Model | Model |
|  |  | mol |  | mol |
| ANT | 2.38 0.0504 (3) | 112 1.8 (6) | 2.41 0.135 | 113 1.58 |
| BAR | 3.43 0.0964 (3) | 106 2 (5) | 3.38 0.135 | 109 2.21 |
| BIF | 2.41 0.0832 (4) | 112 1.83 (10) | 2.44 0.117 | 113 1.41 |
| COM | 3.34 0.209 (3) | 112 2.14 (5) | 3.26 0.143 | 111 1.93 |
| EJU | 1.97 0.164 (4) | 116 3.23 (5) | 2.01 0.118 | 115 1.88 |
| GIB | 2.54 0.0832 (5) | 112 2.53 (5) | 2.55 0.104 | 113 1.63 |
| GRO | 2.88 0.0932 (4) | 113 3.29 (6) | 2.85 0.118 | 112 1.55 |
| LEO | 2.75 0.113 (4) | 110 1.12 (5) | 2.75 0.116 | 111 1.69 |
| MAG | 2.58 0.0736 (3) | 111 2.89 (7) | 2.6 0.137 | 112 1.53 |
| RET | 2.05 0.132 (5) | 121 1.44 (7) | 2.05 0.107 | 117 2.24 |

**Table S3**. Water deficit treatment (WD) had no significant effect on stomatal densith (SD) or pore length (SP) in Limonium. Fixed effects of the WD treatment on both traits were small and not statistically significant based on 95% Highest Posterior Density (HPD) intervals and -values. SE is the standard error. Other model parameters not shown.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Estimate | SE | 95% HPD Interval |  |
| SD Intercept | 109 | 5.01 | 99.2 - 119 | <0.001 |
| Effect of WD on SD | -6.23 | 3.95 | -14 - 1.8 | 0.117 |
| SP Intercept | 26.1 | 0.746 | 24.6 - 27.6 | <0.001 |
| Effect of WD on SP | 0.914 | 0.675 | -0.391 - 2.25 | 0.171 |

**Table S4**. Average anatomical maximum stomatal conductance to water vapor ( [mol O ]) based on Bayesian multilevel model estimates from stomatal density and size (see Materials and Methods). There was no significant effect of WD treatment on stomatal anatomy, therefore only value per species is reported. See Table 1 for species codes. SE = standard error. 95% HPD Interval is the 95% highest posterior density interval.

|  |  |  |  |
| --- | --- | --- | --- |
| Species |  | SE | 95% HPD Interval |
|  | mol O |  |  |
| ANT | 1.78 | 0.107 | 1.57 - 1.99 |
| BAR | 2.34 | 0.127 | 2.10 - 2.60 |
| BIF | 1.96 | 0.116 | 1.74 - 2.19 |
| COM | 2.08 | 0.111 | 1.86 - 2.30 |
| EJU | 1.50 | 0.103 | 1.31 - 1.72 |
| GIB | 2.31 | 0.127 | 2.07 - 2.57 |
| GRO | 2.17 | 0.119 | 1.94 - 2.40 |
| LEO | 1.85 | 0.108 | 1.64 - 2.06 |
| MAG | 1.75 | 0.109 | 1.53 - 1.96 |
| RET | 1.65 | 0.117 | 1.42 - 1.88 |

**Table S5**. Severe water deficit treatment (WD) lowered stomatal conductance (), but did not alter the effect of on in Limonium based on 95% Highest Posterior Density (HPD) intervals and -values. SE is the standard error. Other model parameters not shown.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Estimate | SE | 95% HPD Interval |  |
| Intercept | -2.14 | 0.323 | -2.76 - -1.5 | <0.001 |
| Effect of WD on | -0.701 | 0.0935 | -0.883 - -0.52 | <0.001 |
| Effect of on | 0.38 | 0.151 | 0.0836 - 0.675 | 0.016 |

**Table S6**. Greater leaf area (LA) is associated lower stomatal density (SD) in Limonium, but has no effect on pore length (SP) based on 95% Highest Posterior Density (HPD) intervals and -values. SE is the standard error. Other model parameters not shown.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Parameter | Estimate | SE | 95% HPD Interval |  |
| SD Intercept | 128 | 7.32 | 112 - 142 | <0.001 |
| SP Intercept | 27 | 1.4 | 23.9 - 29.5 | <0.001 |
| Effect of LA on SD | -0.0281 | 0.00843 | -0.0437 - -0.0103 | 0.0045 |
| Effect of LA on SP | -0.000602 | 0.00164 | -0.00349 - 0.00297 | 0.659 |