**Supplementary Tables:**

#### **Table 1:** Type II ANOVA showing χ2, degree of freedom, and p-values from mixed effects model results fit using treatments as fixed effect predictors for soil temperature. The bolded and italicized values are significant at P < 0.05. R2m: Marginal r-square value; R2c: Conditional r-squared value.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Categorical fixed effect predictors | χ2 | Df | P | R2m/R2c |
| OTC | 1.48 | 1 | 0.22 | 0.23/0.32 |
| Residue | 17.18 | 1 | ***< 0.001*** |
| Irrigation | 18.51 | 1 | ***< 0.001*** |
| OTC: Residue | 0.58 | 1 | 0.44 |  |
| OTC: Irrigation | 0.03 | 1 | 0.87 |  |
| Residue: Irrigation | 0.34 | 1 | 0.56 |  |
| OTC: Residue: Irrigation | 0.03 | 1 | 0.85 |  |

#### **Table 2:** Type II ANOVA showing χ2, degree of freedom, and p-values from mixed effects model results fit using treatments as fixed effect predictors for daily temperature range. The bolded and italicized values are significant at P < 0.05. R2m: Marginal r-square value; R2c: Conditional r-squared value.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Categorical fixed effect predictors | χ2 | Df | P | R2m/R2c |
| OTC | 7.05 | 1 | ***0.007*** | 0.20/0.66 |
| Residue | 80.15 | 1 | ***< 0.001*** |
| Irrigation | 1.83 | 1 | 0.18 |
| OTC: Residue | 1.91 | 1 | 0.17 |
| OTC: Irrigation | 0.23 | 1 | 0.63 |
| Residue: Irrigation | 0.03 | 1 | 0.86 |
| OTC: Residue: Irrigation | 0.35 | 1 | 0.55 |

#### 

#### **Table 3:** Type II ANOVA showing χ2, degree of freedom, and p-values from mixed effects model results fit using treatments as fixed effect predictors for volumetric water content. The bolded and italicized values are significant at P < 0.05. R2m: Marginal r-square value; R2c: Conditional r-squared value.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Categorical fixed effect predictors | χ2 | Df | P | R2m/R2c |
| OTC | 2.65 | 1 | 0.10 | 0.08/0.71 |
| Residue | 8.56 | 1 | ***0.003*** |
| Irrigation | 3.49 | 1 | 0.06 |
| OTC: Residue | 5.69 | 1 | ***0.017*** |
| OTC: Irrigation | 5.52 | 1 | ***0.019*** |
| Residue: Irrigation | 0.47 | 1 | 0.49 |
| OTC: Residue: Irrigation | 4.96 | 1 | ***0.026*** |

#### **Table 4:** Type II ANOVA showing χ2, degree of freedom, and p-values from mixed effects model results fit using treatments as fixed effect predictors air temperature. The bolded and italicized values are significant at P < 0.05. R2m: Marginal r-square value; R2c: Conditional r-squared value.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Categorical fixed effect predictors | χ2 | Df | P | R2m/R2c |
| OTC | 498.31 | 1 | ***< 0.001*** | 0.42/0.95 |
| Residue | 3.59 | 1 | 0.058 |
| Irrigation | 12.64 | 1 | ***< 0.001*** |
| OTC: Residue | 0.28 | 1 | 0.59 |
| OTC: Irrigation | 11.09 | 1 | ***< 0.001*** |
| Residue: Irrigation | 3.29 | 1 | 0.069 |
| OTC: Residue: Irrigation | 1.69 | 1 | 0.19 |

#### **Table 5:** Type II ANOVA showing χ2, degree of freedom, and p-values from mixed effects model results fit using a) categorical variables as fixed effect predictors b) continuous variables as fixed effect predictors for soil organic matter. The bolded and italicized values are significant at P < 0.05.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Categorical fixed effect predictors | χ2 | Df | P | R2m/R2c |
| OTC | 0.96 | 1 | 0.33 | 0.44/0.70 |
| Residue | 2.19 | 1 | 0.14 |
| Irrigation | 8.04 | 1 | ***0.005*** |
| OTC: Residue | 0.22 | 1 | 0.64 |
| OTC: Irrigation | 0.44 | 1 | 0.50 |
| Residue: Irrigation | 0.18 | 1 | 0.68 |
| OTC: Residue: Irrigation | 0.41 | 1 | 0.52 |

b)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Continuous fixed effect predictors | χ2 | Df | P | R2m/R2c |
| Volumetric water content | 0.77 | 1 | 0.38 | 0.05/0.69 |
| Temperature | 4.03 | 1 | **0.045** |

#### **Table 6:** Type II ANOVA showing χ2, degree of freedom, and p-values from mixed effects model results fit using a) categorical variables as fixed effect predictors b) continuous variables as fixed effect predictors for microbial biomass. The bolded and italicized values are significant at P < 0.05.

a)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Categorical fixed effect predictors | χ2 | Df | P | R2m/R2c |
| OTC | 1.07 | 1 | 0.30 | 0.36/0.39 |
| Residue | 10.73 | 1 | ***0.001*** |
| Irrigation | 4.74 | 1 | ***0.029*** |
| OTC: Residue | 7.37 | 1 | ***0.006*** |
| OTC: Irrigation | 0.66 | 1 | 0.42 |
| Residue: Irrigation | 0.14 | 1 | 0.71 |
| OTC: Residue: Irrigation | 0.86 | 1 | 0.35 |

b)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Continuous fixed effect predictors | χ2 | Df | P | R2m/R2c |
| Organic matter | 10.24 | 1 | ***0.001*** | 0.35/0.35 |
| Temperature | 0.13 | 1 | 0.72 |
| pH | 0.02 | 1 | 0.90 |
| NO3- | 7.42 | 1 | ***0.006*** |
| P | 0.002 | 1 | 0.99 |
| Volumetric water | 0.006 | 1 | 0.93 |

#### **Table 7:** Type II ANOVA showing χ2, degree of freedom, and p-values from mixed effects model results fit using a) categorical variables as fixed effect predictors b) continuous variables as fixed effect predictors for soil respiration. The bolded and italicized values are significant at P < 0.05.

a)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Categorical fixed effect predictors | χ2 | Df | P | R2m/R2c |
| OTC | 4.86 | 1 | ***0.03*** | 0.05/0.06 |
| Residue | 72.84 | 1 | ***< 0.001*** |
| Irrigation | 1.52 | 1 | 0.21 |
| OTC: Residue | 2.94 | 1 | 0.08 |
| OTC: Irrigation | 5.64 | 1 | ***0.02*** |
| Residue: Irrigation | 1.20 | 1 | 0.27 |
| OTC: Residue: Irrigation | 0.02 | 1 | 0.88 |

b)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Continuous fixed effect predictors | χ2 | Df | P | R2m/R2c |
| Volumetric water content | 2.42 | 1 | 0.12 | 0.01/0.026 |
| Temperature | 1.22 | 1 | 0.27 |  |
| Organic matter | 0.22 | 1 | 0.64 |  |
| pH | 22.33 | 1 | ***< 0.001*** |  |

#### **Table 8:** Type II ANOVA showing χ2, degree of freedom, and p-values from mixed effects model results fit treatments as fixed effect predictors for aboveground biomass. The bolded and italicized values are significant at P < 0.05.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Categorical fixed effect predictors | χ2 | Df | P | R2m/R2c |
| OTC | 1.50 | 1 | 0.21 | 0.66/0.81 |
| Residue | 0.29 | 1 | 0.58 |
| Irrigation | 22.62 | 1 | ***< 0.001*** |
| OTC: Residue | 0.12 | 1 | 0.73 |
| OTC: Irrigation | 0.52 | 1 | 0.47 |
| Residue: Irrigation | 0.31 | 1 | 0.58 |
| OTC: Residue: Irrigation | 1.29 | 1 | 0.25 |

#### **Table 9:** Type II ANOVA showing χ2, degree of freedom, and p-values from mixed effects model results fit treatments as fixed effect predictors for belowground biomass. The bolded and italicized values are significant at P < 0.05.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Categorical fixed effect predictors | χ2 | Df | P | R2m/R2c |
| OTC | 1.15 | 1 | 0.28 | 0.42/0.61 |
| Residue | 3.69 | 1 | ***0.05*** |
| Irrigation | 9.02 | 1 | ***0.002*** |
| OTC: Residue | 0.72 | 1 | 0.39 |
| OTC: Irrigation | 1.03 | 1 | 0.30 |
| Residue: Irrigation | 0.92 | 1 | 0.24 |
| OTC: Residue: Irrigation | 0.001 | 1 | 0.99 |

#### **Table 10:** Type II ANOVA showing χ2, degree of freedom, and p-values from mixed effects model results fit treatments as fixed effect predictors for seed cotton yield. The bolded and italicized values are significant at P < 0.05.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Categorical fixed effect predictors | χ2 | Df | P | R2m/R2c |
| OTC | 0.05 | 1 | 0.83 | 0.38/0.55 |
| Residue | 4.84 | 1 | ***0.03*** |
| Irrigation | 6.87 | 1 | ***0.008*** |
| OTC: Residue | 0.63 | 1 | 0.43 |
| OTC: Irrigation | 3.00 | 1 | 0.08 |
| Residue: Irrigation | 0.07 | 1 | 0.79 |
| OTC: Residue: Irrigation | 3.56 | 1 | 0.06 |