Statistics summary table

Table 1. Summary statistics. INCLUDE UNITS.

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| --- | --- | --- | --- | --- | --- |
| **Full Data** |  |  |  |  |  |
| **Method** | **N = 28** | **Mean** | **Median** | **SD** | **Range** |
| Vcmax |  |  |  |  |  |
| DAT | 28 | 32.9 | 28.3 | 17.6 | 9.8 – 75.0 |
| Traditional | 28 | 34.0 | 26.9 | 18.0 | 11.0 – 82.4 |
| Jmax |  |  |  |  |  |
| DAT | 28 | 49.4 | 48.0 | 22.4 | 9.5 – 102.1 |
| Traditional | 28 | 59.7 | 52.0 | 25.7 | 24.0 – 114.6 |
| **Without Overshoot** |  |  |  |  |  |
| **Method** | **N = 20** | **Mean** | **Median** | **SD** | **Range** |
| Vcmax |  |  |  |  |  |
| DAT | 20 | 31.0 | 26.3 | 16.7 | 9.8 – 75.0 |
| Traditional | 20 | 31.4 | 26.0 | 14.5 | 11.0 – 63.4 |
| Jmax |  |  |  |  |  |
| DAT | 20 | 52.8 | 48.0 | 20.6 | 23.6 – 102.0 |
| Traditional | 20 | 57.7 | 52.0 | 21.6 | 24.0 – 106.0 |

Table 2. Wilcoxon signed-rank paired t-tests.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Comparisons** | **V** | **P (>|V|)** | **Cohen’s d** | **CI** |
| **Method** | **No TPU (N = 28 Pairs)** | | | |
| DAT vs. steady-state | **V** | **P (>|V|)** | **Cohen’s d** | **CI** |
| Vcmax | 108 | 0.0298 \* | -0.063 | -2.87 – -0.17 |
| Jmax | 15 | < 0.0001\*\*\* | -0.412 | -13.03 – -4.58 |
| **Method** | **TPU Fit (N = 28 Pairs)** | | | |
| DAT vs. steady-state | **V** | **P (>|V|)** | **Cohen’s d** | **CI** |
| Vcmax | 143 | 0.1782 |  | -1.57 – 0.44 |
| Jmax | 15 | < 0.00001\*\*\* |  | -7.56 – -3.42 |
| **Method** | **TPU vs. No TPU, DAT only (N = 33 pairs)** | | | |
| TPU vs. No TPU | **V** | **P (>|V|)** | **Cohen’s d** | **CI** |
| Vcmax | 15 | 0.0023\*\* |  | -7.44 – -0.81 |
| Jmax | 77 | 0.1117 |  | -16.52 - 0.57 |
| **Method** | **TPU vs. No TPU, Pooled data (N = 66 pairs; DAT and Traditional)** | | | |
| TPU vs. No TPU | **V** | **P (>|V|)** | **Cohen’s d** | **CI** |
| Vcmax | 26 | 0.0004 \*\*\* |  | -5.21 – -0.83 |
| Jmax | 111 | 0.013 \* |  | -10.77 – -1.54 |
| **Method** | **No TPU: Curves without Overshoot (N = 20 pairs)** | | | |
| DAT vs. steady-state | **V** | **P (>|V|)** | **Cohen’s d** | **CI** |
| Vcmax | 58 | 0.083 |  | -2.43 – 0.28 |
| Jmax | 162 | 0.314 |  | -14.75 – 4.52 |
|  |  |  |  |  |

TO DO:

* Note which distributions used “exact = TRUE” and which didn’t. Make sure this makes sense.
* Apply the calculations to get an r effect size for the mann whitney test.
* Run comparison of TPU
* Look for outliers/sensitivity

Impact of DAT on photosynthetic parameters Vcmax and Jmax

DAT method yields “comparable” Vcmax parameter estimates but underestimates Jmax compared to steady-state method in a species-rich tropical forest

**FULL DATA -----------------------------------------**

Levene’s: Data variances are not significantly different from each other, so we have met the assumption of equal variances.

Shapiro-wilk: data vary from the normal distribution. Proceed with the Wilcoxon signed rank test.

DAT were grouped by unique leaf (means were taken for leaf repetitions; n = 5 total) to get equal number of DAT and traditional curves (n = 28).

**Vcmax process**:

Test: Wilcoxon signed rank test: V = 108, p = 0.02983, d = -0.063, CI = -2.87 – -0.17 (note CI does not cross 0, meaning that there is a high chance that the difference in median vcmax estimates is not 0). Power analysis revealed that to get our effect size at an alpha of 0.05 we had a 6.1% power.

**Jmax process**:

Test: Wilcoxon signed rank test: V = 15, p < 0.0001, d = -0.412, CI = -13.03 – -4.58 (note CI does not cross 0, meaning that there is a high chance that the difference in median vcmax estimates is not 0). Power analysis revealed that to get our effect size at an alpha of 0.05 we had a 55.6% power.

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**Comparing Photo with TPU to Photo without TPU:**

Separated data:

Note that of the DAT data, 11 curves were fit without TPU.

Vcmax: DAT v Trad not significant (V = 143, p-value = 0.1782, 95% CI = -1.57 – 0.44). CROSSES 0. (Wilcox test). N=28 of each type (DAT, Trad).

Jmax: DAT v Trad HIGHLY significant (V = 21, p-value = p < 0.00001, CI = -7.56 – -3.42). (Wilcox test). N=28 of each type (DAT, trad).

POOLED data:

Vcmax: compared ANOVA models. Most support for intercept model (AICc = 1064.7, AICcWt = 0.53, LL = -530.3).

Significant difference in Vcmax between all data fit with TPU and all data fit without TPU (paired Wilcoxon test, V = 26, p = 0.0004, CI = -5.21 – -0.83)

Significant difference in Jmax between all data fit with TPU and all data fit without TPU

(paired Wilcoxon test, V = 111, p = 0.013, CI = -10.77 – -1.54).

Filter such that we just look at DAT in TPU vs non-TPU:

Vcmax: No TPU vs TPU is significant (V = 15, p-value = 0.0023, CI: -7.44 – -0.81)

Jmax: No TPU vs TPU is not significant (V = 77, p-value = 0.1117, CI: -16.52 - 0.57)

**No-overshoot “nd” DATA ----------------------------------------------------------------**

11 DAT curves with overshoot were deleted, and then DAT data were grouped by leaf (n = 20).

8 Traditional curves were deleted to match the identity of the included DAT curves (n = 20).

**Vcmax process**:

Test: Wilcoxon signed rank test: V = 58, p = 0.083, d = -0.029, CI = -2.43 – 0.28 (note CI crosses 0, which means there is a high chance that the difference in median vcmax estimates is in fact 0). Power analysis revealed that to get our effect size at an alpha of 0.05 we had a 5.2% power.

**Jmax process**:

Test: Wilcoxon signed rank test: W = 162, p = 0.314, d = -0.227, CI = -14.75 – 4.52 (note CI crosses 0, meaning that there is a high chance that the difference in median vcmax estimates is in fact 0). Power analysis revealed that to get our effect size at an alpha of 0.05 we had a 16.1% power.

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**Comparing MG to Photo (just to note, probably don’t need to report stats):**

Vcmax by method not significant with pooled data

Vcmax by fit type (MG or photo) not significant with pooled data

Jmax by method not significant with pooled data

Jmax by fit type (MG or photo) not significant with pooled data

Vcmax: compared ANOVA models. Most support for the intercept model (AICc = 1041.1, AICcWt = 0.53, LL = -518.5).

Jmax: compared ANOVA models. Some support for ‘method’ model (AICc = 1114.9, AICcWt = 0.58, LL = -554.3).