Supplemental Information


# A Statistical Description

# of Plant Shoot Architecture

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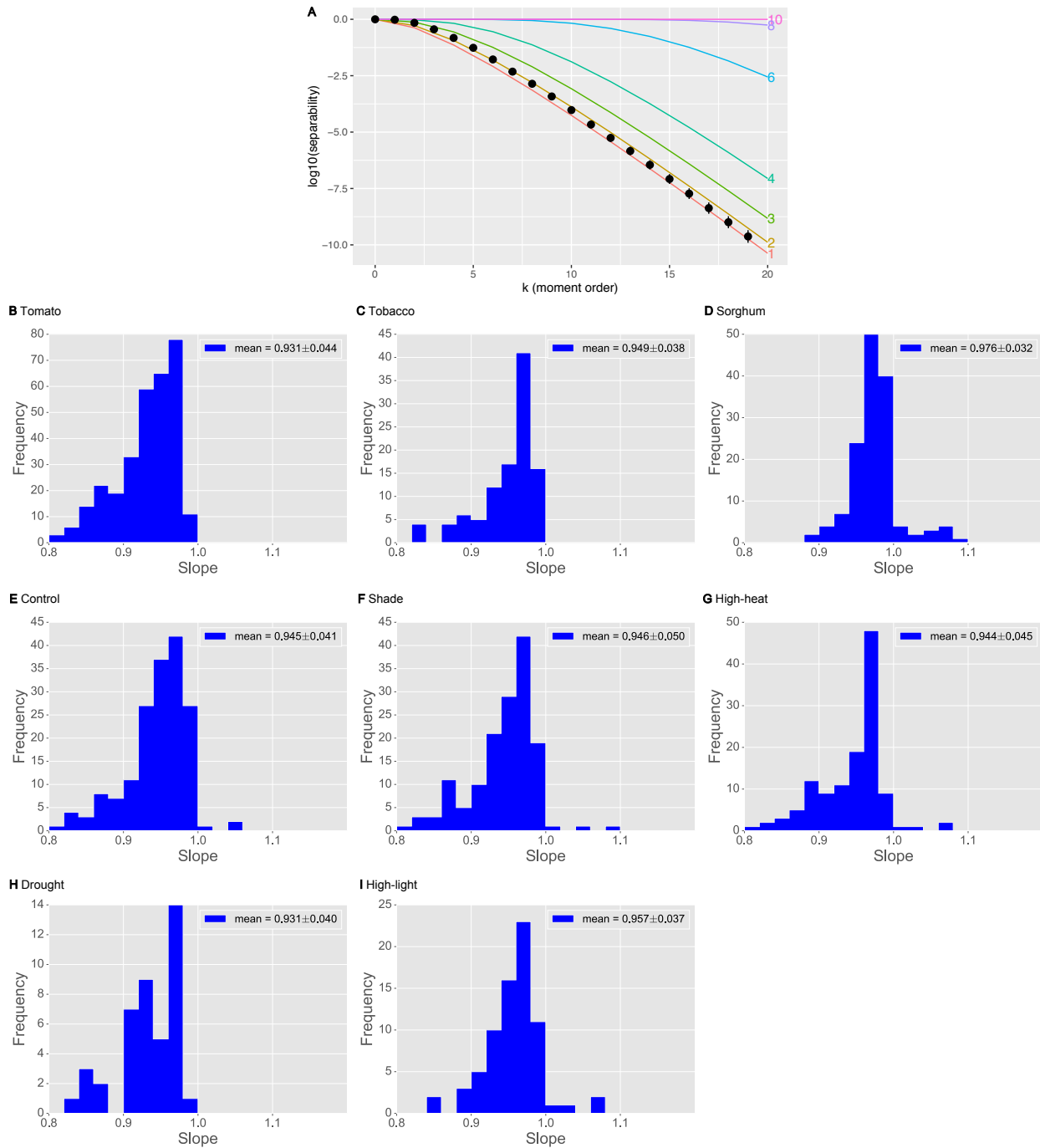
Figure S1: **Separability analysis. Related to Figure 2.** A) Depature from true separability of plants matches what would be expected by a Gaussian truncated at roughly 2 standard deviations. B–D) Separability by species. E–I) Separability by condition.
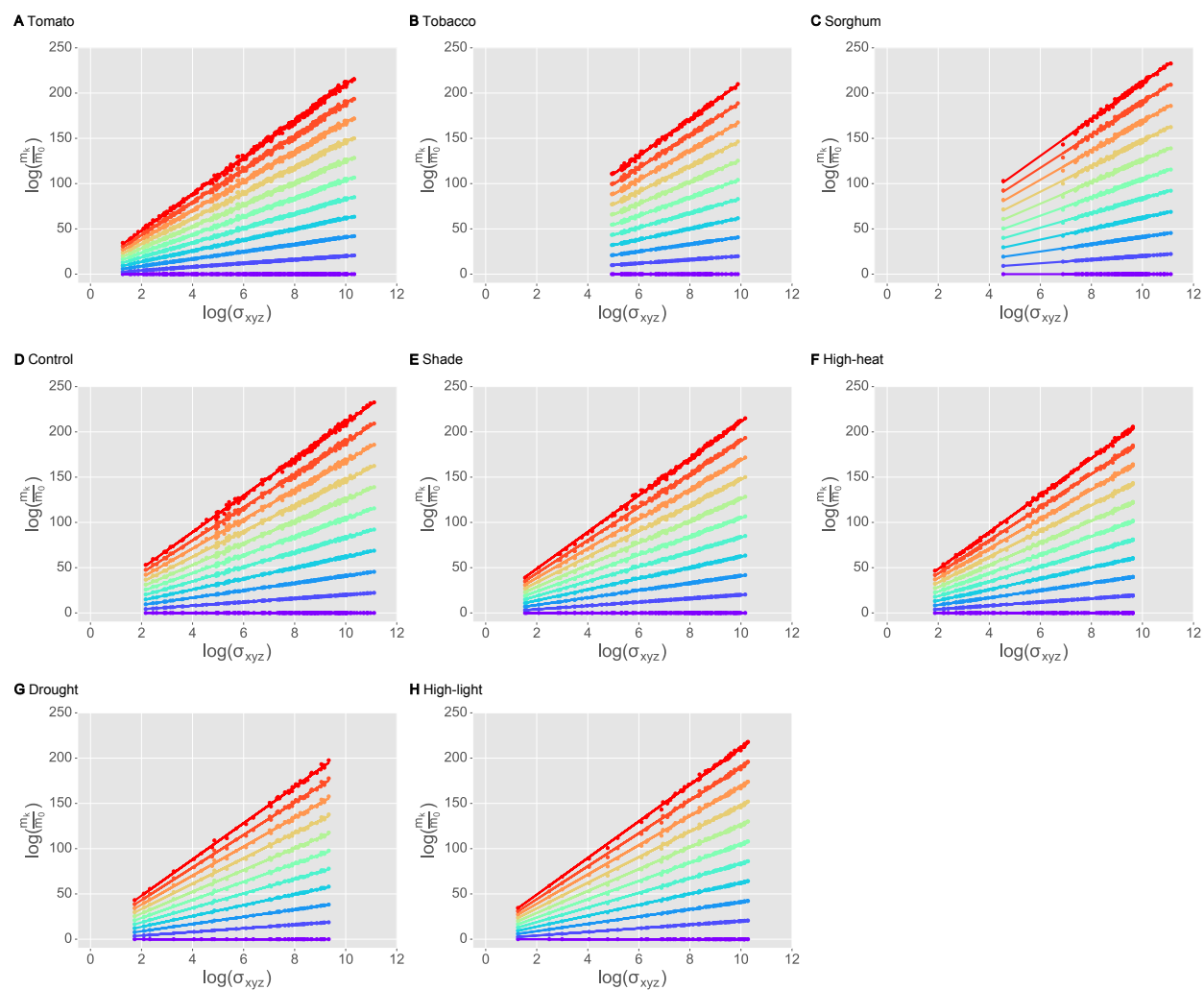
Figure S2: First test of self-similarity. Related to Figure 3. The first telf-similarity grouped A–C) by species, and D–H) by condition.
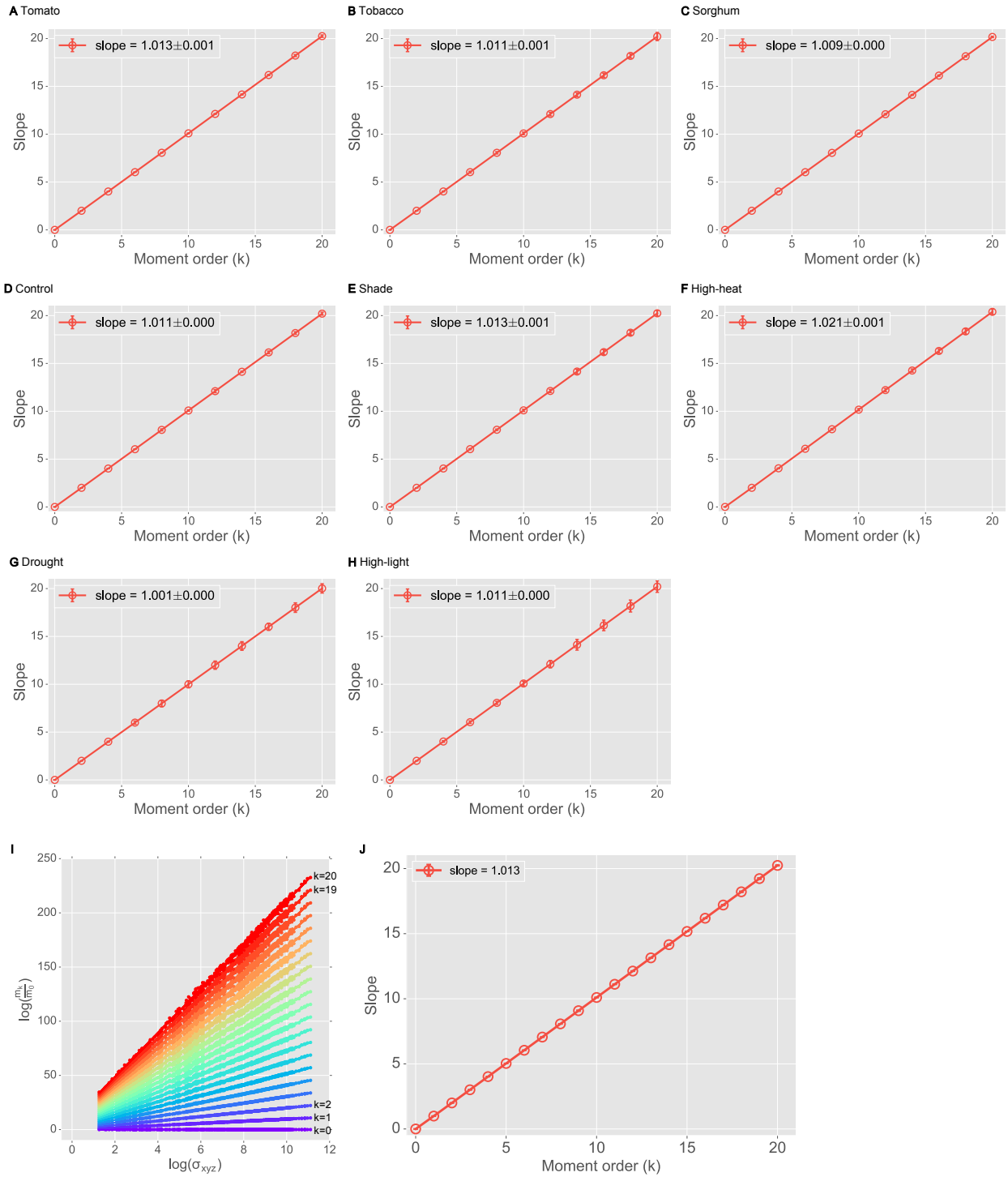
Figure S3: **Second test of self-similarity.** **Related to Figure 4.** The second test of self-similarity grouped A–C) by species, and D–H) by condition. I–J) Calculating self-similarity of all the plants using even and odd moments together does not affect our conclusions.
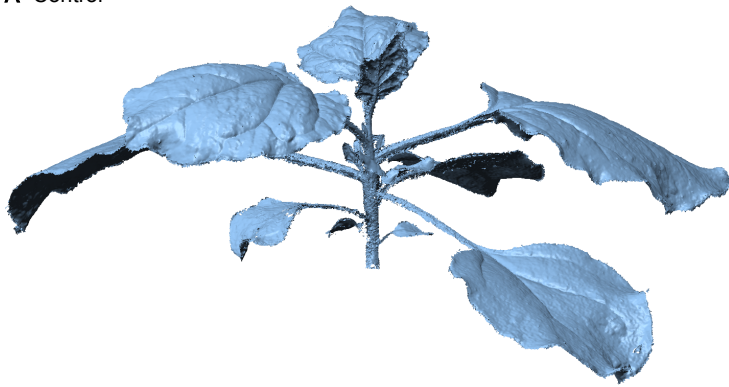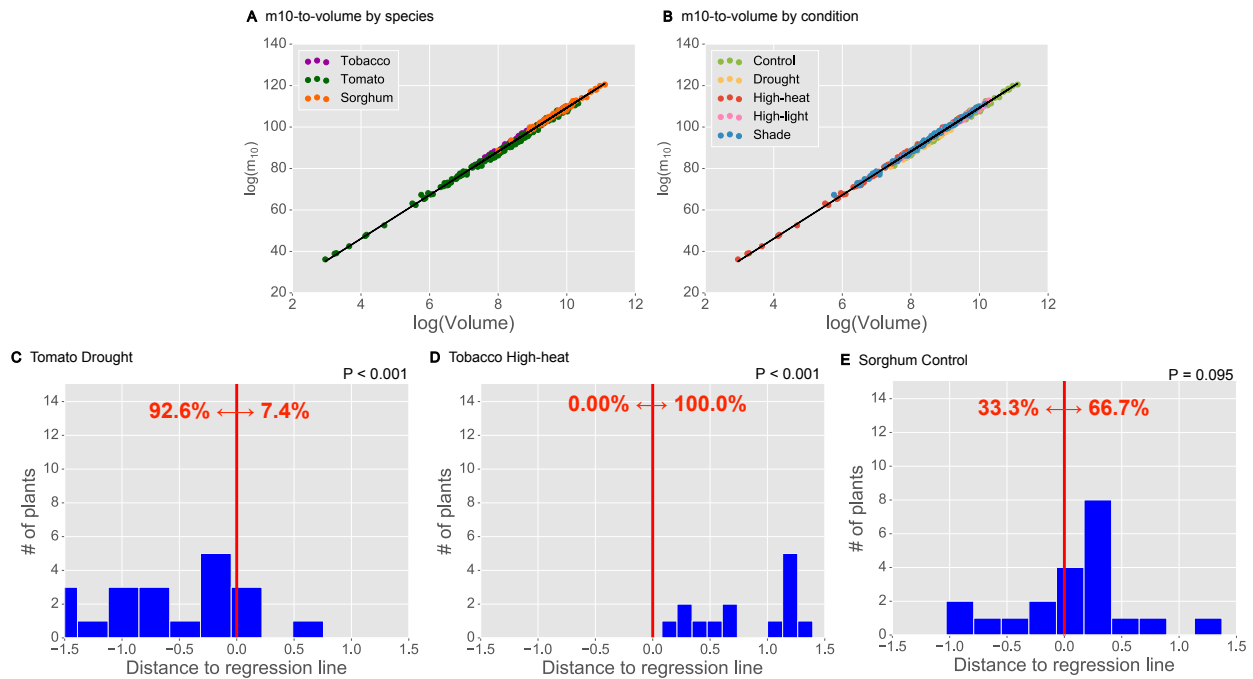
Figure S4: 3D scans of tobacco. Related to Figure 1. Two scans of a tobacco plant grown in A) control, and B) high-heat conditions on day 20. The control plant occupies a much larger convex hull volume than the plant grown in high-heat.

Figure S5: **Variation in m_{10} to volume to across species and conditions.** **Related to Figure 5.** A–B) The scaling relationship between volume and m_{10}, the 10th moment, by species and condition. C–E) There is significant variation (above versus below the regression line) in the tomato-drought and tobacco-high-heat plants, but not in the sorghum-control plants. The direction of variation for each of these species-condition pairs is similar to the variation observed for them using a lower order moment, m_0 (Figure 5 in the main text). Thus, differences in plant form extend beyond just simple length-to-volume measurements, though it remains an open problem to understand what precise biological structure the 10th moment encodes.
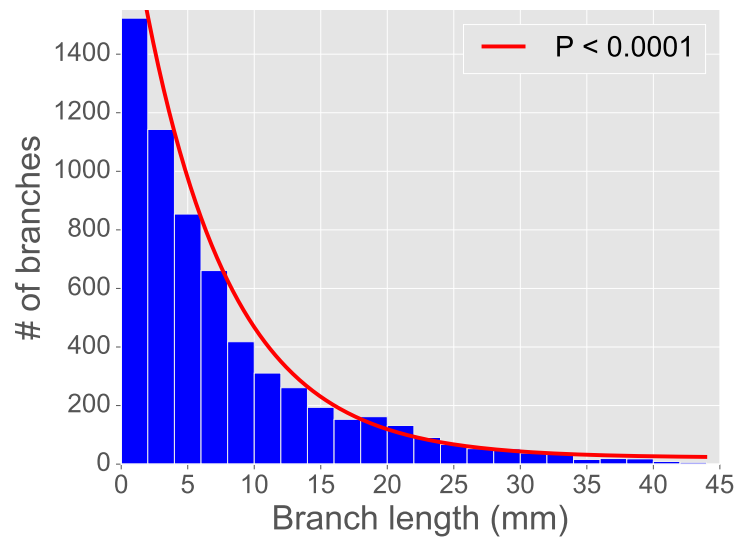
Figure S6: Frequency histogram of branch lengths. Related to Table 1. The distribution of branch lengths, accumulated over all 557 architectures. Red line shows fit to an exponential curve with Kolmogorov-Smirnov P-value shown in the legend.

Table S1: **Summary of experiments.** Related to Table 1.

Experiment	Species	Condition	Time-points	Replicates
Expt. 1	Tomato	Ambient	D00 − D34	2
Expt. 1	Tomato	Shade	D00 − D34	3
Expt. 1	Tomato	High-heat	D00 − D21	3
Expt. 2	Tomato	Ambient	D00 − D30	3
Expt. 2	Tomato	Drought	D00 − D30	3
Expt. 2	Tomato	High-light	D00 − D30	3
Expt. 3	Tobacco	Ambient	D00 − D30	3
Expt. 3	Tobacco	Shade	D00 − D26	3
Expt. 3	Tobacco	High-heat	D00 − D22	2
Expt. 4	Sorghum	Ambient	D00 − D22	3
Expt. 4	Sorghum	Shade	D00 − D22	3
Expt. 4	Sorghum	High-heat	D00 − D22	3
Expt. 4	Sorghum	High-light	D00 − D20	3