

Supplemental Material

(Re)Designing Urban Parks to Maximize Urban Heat Island Mitigation by Natural Means

Victor L. Barradas ^{1,*}, Jennifer A. Miranda ², Manuel Esperón-Rodríguez ³ and Monica Ballinas ²

¹ Laboratorio Interacción Planta-Atmósfera, Instituto de Ecología, Universidad Nacional Autónoma de México, Mexico City, 04510, Mexico

² Departamento de Arquitectura del Paisaje, Facultad de Arquitectura, Universidad Nacional Autónoma de México, Mexico City 04510, Mexico; arquicosmos.77@gmail.com

³ Hawkesbury Institute for the Environment, Western Sydney University, Richmond, NSW , Australia;

m.esperon-rodriguez@westernsydney.edu.au

⁴ Laboratorio de Entornos Sostenibles, Facultad de Arquitectura, Universidad Nacional Autónoma de México, Mexico City 04510, Mexico

* Correspondence: vlbarradas@ecologia.unam.mx (V.L.B.)

Supplemental Table S1. Mean values of mean annual temperature (MAT, °C), annual precipitation (AP, mm), maximum temperature of the warmest month (MTWM, °C), and precipitation of the driest quarter (PDQ, mm) for 15 dominant urban tree species based on their realized climatic niches.

| Species | MAT | MTWM | AP | PDQ |
|--------------------------------|------|------|--------|-------|
| <i>Acacia longifolia</i> | 16.2 | 24.5 | 937.7 | 119.9 |
| <i>Acer negundo</i> | 8.7 | 26.3 | 714.6 | 116.3 |
| <i>Alnus acuminata</i> | 13.3 | 18.5 | 1166.7 | 120.5 |
| <i>Buddleja cordata</i> | 15.3 | 24.0 | 866.7 | 30.5 |
| <i>Celtis occidentalis</i> | 10.5 | 28.0 | 945.2 | 163.5 |
| <i>Ficus benjamina</i> | 23.9 | 32.0 | 1410.6 | 106.4 |
| <i>Fraxinus uhdei</i> | 17.4 | 25.9 | 862.6 | 61.7 |
| <i>Lagerstroemia indica</i> | 20.1 | 31.4 | 1354.3 | 154.1 |
| <i>Ligustrum lucidum</i> | 18.5 | 31.5 | 950.5 | 157.5 |
| <i>Liquidambar styraciflua</i> | 15.7 | 29.7 | 1204.1 | 217.3 |
| <i>Populus alba</i> | 10.3 | 24.6 | 755.2 | 126.9 |
| <i>Populus deltoides</i> | 13.3 | 30.3 | 845.9 | 139.3 |
| <i>Quercus rugosa</i> | 13.8 | 24.2 | 893.3 | 35.4 |
| <i>Robinia pseudoacacia</i> | 10.7 | 25.5 | 915.9 | 173.6 |
| <i>Ulmus parvifolia</i> | 17.4 | 30.5 | 1104.0 | 153.8 |

Supplemental Table S2. Results of linear regression models used to assess relationships between two physiological traits (transpiration = E ; stomatal conductance = g_s) and four climate variables (mean annual temperature = MAT; annual precipitation = AP; maximum temperature of the warmest month = MTWM; precipitation of the driest quarter = PDQ) of 15 dominant tree species.

| Trait | Variable | R ² | Intercept | Slope | F-value | p-value |
|-------|----------|----------------|-----------|-----------------------|---------|---------|
| E | MAT | -0.03 | 0.01 | 0.005 | 0.57 | 0.46 |
| | MTWM | -0.07 | 0.02 | 0.0009 | 0.014 | 0.91 |
| | AP | 0.014 | 0.006 | 0.001 | 1.199 | 0.29 |
| | PDQ | -0.07 | 0.02 | 9.08×10^{-6} | 0.026 | 0.87 |
| g_s | MAT | -0.08 | 2.5 | -0.003 | 0.004 | 0.95 |
| | MTWM | -0.06 | 3.25 | -0.03 | 0.23 | 0.64 |
| | AP | -0.05 | 1.8 | 0.0006 | 0.32 | 0.58 |
| | PDQ | -0.07 | 2.24 | 0.002 | 0.12 | 0.75 |