

Effects of Invasive Green Iguanas (*Iguana iguana*) on Seed Germination and Seed Dispersal Potential in Southeastern Puerto Rico

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Supplementary Materials

Focal Plant Species

Annona glabra (or Pond Apple) is a deciduous tree native to Puerto Rico, is primarily dispersed by water, and has fleshy fruits up to 15 cm long containing more than 100 seeds (up to 1.6 cm long) per fruit (Little et al. 1974; Weaver 1997; Infante Mata and Moreno-Casasola 2005). *Pterocarpus* spp. refers to *Pterocarpus indicus* (introduced to Puerto Rico from Southeast Asia) and *Pterocarpus officinalis* (native to Puerto Rico; Little et al. 1974), and both species have similar dry, winged fruit ~ 4 cm in diameter (Little et al. 1974; Weaver 1997). *Ficus* spp. refers to *Ficus citrifolia* (native to Puerto Rico) and *Ficus benjamina* (introduced to Puerto Rico from Southeast Asia; Little et al. 1974; Bronstein and Patel 1992; Veneklaas et al. 2002), and both species contain similar fleshy fruits ~ 1-1.5 cm in diameter with a single seed (Little et al. 1974). *Peltophorum pterocarpum* is a non-native tree with dry, winged fruits ~ 3.5 x 11.5 cm that are likely dispersed by air (Little et al. 1974; Salah et al. 2005).

Seed Germination Treatments

Results from previous studies using only two treatments, uningested seeds without fruit pulp and ingested seeds without feces, provide information on the chemical and mechanical effects of the gut on seed germination but not on the effect of seeds being separated from fruit pulp (Samuels and Levey 2005). Removing the fruit pulp can enhance germination by reducing high osmotic pressure caused by sugar levels and eliminating germination inhibitors (Evensen

1949; Cipollini and Levey 1997). Including the treatment of uningested seeds with fruit pulp provides information on the effect of the removal of fruit pulp during seed passage (Samuels and Levey 2005). Similarly, including the treatment of ingested seeds with feces may help interpret if Green Iguanas are altering germination by providing nutrient-rich microenvironment in the scat. The effect of feces on germination may be independent from either removing fruit pulp or the effects of gut passage. Including these four treatments is a robust way to evaluate the overall effect of Green Iguana gut passage on seed germination.

References

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Supplementary Table 1 Minimum distances from scat samples to the nearest tree and the radius of the overstory canopy of mature trees (mean \pm SD, range) for the focal tree species that are consumed by Green Iguanas at the Natural Reserve of Humacao in Puerto Rico. Average minimum dispersal distance was calculated by subtracting the average canopy radius from the average minimum distance from scat to nearest trunk, which was calculated using the Near Distance Tool in ArcGIS (ESRI 2011). *Ficus* spp. may include the native *Ficus citrifolia* and non-native *Ficus benjamina*. *Pterocarpus* spp. may include the native *Pterocarpus officinalis* and non-native *Pterocarpus indicus*.

| Tree species | N | Minimum distances from scat to tree (m) | N | Overstory canopy radius (m) | Average minimum dispersal distance (m) |
|--------------------------------|----|---|----|-----------------------------|--|
| <i>Annona glabra</i> | 23 | 33.0 \pm 17.3 (0.9-58.2) | 10 | 2.2 \pm 0.8 (1.0-3.5) | 30.8 |
| <i>Ficus</i> spp. | 21 | 9.9 \pm 15.5 (0.7-73.8) | 10 | 0.8 \pm 0.3 (0.5-1.6) | 9.1 |
| <i>Peltophorum pterocarpum</i> | 5 | 7.7 \pm 2.2 (6.0-11.5) | 10 | 4.4 \pm 1.6 (2.6-7.0) | 3.3 |
| <i>Pterocarpus</i> spp. | 5 | 20.0 \pm 31.3 (3.5-75.8) | 3 | 8.3 \pm 1.2 (6.9-9.2) | 11.7 |