Landscape and climate influence the patterns of genetic diversity and inbreeding in Cerrado plant species

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Table S1. Species or subspecies, number of microsatellite locus and reference article used to obtain the genetic parameters: Observed Heterozygosity (H_O), Expected Heterozygosity (H_E), Allelic Richness (*AR*), and inbreeding coefficients (*Fis*) for Cerrado plant populations.

Species or Subspecies	Number of locus	Reference
Annona coriacea	10	Ribeiro, Priciane Cristina Correa, et al. "Transferability and characterization of nuclear microsatellite markers in populations of *Annona coriacea* (Annonaceae), a tree from the Brazilian Cerrado." *Brazilian Journal of Botany* 37.3 (2014): 353-356.
Annona crassiflora	10	Collevatti, Rosane G., et al. "Contrasting spatial genetic structure in *Annona crassiflora* populations from fragmented and pristine savannas." Plant systematics and evolution 300.7 (2014): 1719-1727.
	10	Pereira, M. F., et al. "Development of microsatellite markers in *Annona crassiflora* Mart., a Brazilian Cerrado fruit tree species." Molecular ecology resources 8.6 (2008): 1329-1331.
Aspidosperma polyneuron	16	Ferreira-Ramos, Ronai, et al. "Microsatellite markers for *Aspidosperma polyneuron* (Apocynaceae), an endangered tropical tree species." *American journal of botany* 98.11 (2011): e300-e302.
Campomanesia adamantium	7	Crispim, Bruno do Amaral, et al. "Relationship between genetic variability and land use and land cover in populations of *Campomanesia adamantium* (Myrtaceae)." *Diversity* 10.4 (2018): 106.
Caryocar brasiliense	10	Collevatti, Rosane G., et al. "Short-distance pollen dispersal and high self-pollination in a bat-pollinated neotropical tree." *Tree Genetics & Genomes* 6.4 (2010): 555-564.
Copaifera langsdorffii	8	Antiqueira, Lia Maris Orth Ritter, et al. "Genetic structure and diversity of *Copaifera langsdorffii* Desf. in Cerrado fragments of the São Paulo State, Brazil." *Revista Árvore* 38.4 (2014): 667-675.
	8	Carvalho, Ana Cristina Magalhães de, et al. "Diversidade genética, endogamia e fluxo gênico em pequena população fragmentada de *Copaifera langsdorffii*." *Brazilian Journal of Botany* (2010): 599-606.
	8	Sebbenn, A. M., et al. "Low levels of realized seed and pollen gene flow and strong spatial genetic structure in a small, isolated and fragmented population of the tropical tree *Copaifera langsdorffii* Desf." *Heredity* 106.1 (2011): 134-145.
Dimorphandra mollis	19	Souza, Helena Augusta Viana E., et al. "A large historical refugium explains spatial patterns of genetic diversity in a Neotropical savanna tree species." *Annals of botany* 119.2 (2017): 239-252.
	9	Souza, Helena AV, et al. "Development of microsatellite markers for *Dimorphandra mollis* (Leguminosae), a widespread tree from the Brazilian cerrado." *American journal of botany* 99.3 (2012): e102-e104.

	9	Telles, M. P. C., et al. "Discovery and characterization of new microsatellite loci in *Dipteryx alata* vogel (Fabaceae) using next-generation sequencing data." *Genetics and Molecular Research* 16.2 (2017).
Dipteryx alata	8	Tarazi, Roberto, et al. "High levels of genetic differentiation and selfing in the Brazilian cerrado fruit tree *Dipteryx alata* Vog. (Fabaceae)." *Genetics and Molecular Biology* 33.1 (2010): 78-85.
	11	Soares, Thannya Nascimento, et al. "Development of microsatellite markers for the neotropical tree species *Dipteryx alata* (Fabaceae)." *American journal of botany* 99.2 (2012): e72-e73.
Eugenia dysenterica	10	Zucchi, Maria Imaculada, et al. "Genetic structure and gene flow in *Eugenia dysenterica* DC in the Brazilian Cerrado utilizing SSR markers." Genetics and Molecular Biology 26.4 (2003): 449-457.
Euterpe edulis	18	Gaiotto, Fernanda A., Dario Grattapaglia, and Roland Vencovsky. "Genetic structure, mating system, and long-distance gene flow in heart of palm (*Euterpe edulis* Mart.)." *Journal of Heredity* 94.5 (2003): 399-406.
Ficus eximia	11	Nazareno, Alison Gonçalves, et al. "Transferability and characterization of microsatellite markers in two Neotropical Ficus species." *Genetics and Molecular Biology* 32.3 (2009): 568-571.
Hancornia speciosa cuyabensis	7	Collevatti, Rosane G., et al. "Unravelling the genetic differentiation among varieties of the Neotropical savanna tree *Hancornia speciosa* Gomes." *Annals of botany* 122.6 (2018): 973-984.
Hancornia speciosa gardinerii	7	Collevatti, Rosane G., et al. "Unravelling the genetic differentiation among varieties of the Neotropical savanna tree *Hancornia speciosa* Gomes." *Annals of botany* 122.6 (2018): 973-984.
Hancornia speciosa pubescens	7	Collevatti, Rosane G., et al. "Unravelling the genetic differentiation among varieties of the Neotropical savanna tree *Hancornia speciosa* Gomes." *Annals of botany* 122.6 (2018): 973-984.
Hancornia speciosa speciosa	7	Collevatti, Rosane G., et al. "Unravelling the genetic differentiation among varieties of the Neotropical savanna tree *Hancornia speciosa* Gomes." *Annals of botany* 122.6 (2018): 973-984.
Handroanthus serratifolius	6	Collevatti, Rosane Garcia, et al. "High genetic diversity and contrasting fine-scale spatial genetic structure in four seasonally dry tropical forest tree species." *Plant systematics and evolution* 300.7 (2014): 1671-1681.
Handroanthus chrysotrichus	6	Collevatti, Rosane Garcia, et al. "High genetic diversity and contrasting fine-scale spatial genetic structure in four seasonally dry tropical forest tree species." *Plant systematics and evolution* 300.7 (2014): 1671-1681.
Handroanthus impetiginosus	6	Collevatti, Rosane Garcia, et al. "High genetic diversity and contrasting fine-scale spatial genetic structure in four seasonally dry tropical forest tree species." *Plant systematics and evolution* 300.7 (2014): 1671-1681.
Hymenaea courbaril	6	Feres, Juliana Massimino, et al. "Microsatellite diversity and effective population size in a germplasm bank of *Hymenaea courbaril* var. *stilbocarpa* (Leguminosae), an endangered tropical tree: recommendations for conservation." *Genetic resources and crop evolution* 56.6 (2009): 797-807.
Manihot esculenta	9	Siqueira, M. V. B. M., et al. "Microsatellite polymorphisms in cassava landraces from the Cerrado biome, Mato Grosso do Sul, Brazil." *Biochemical Genetics* 48.9-10 (2010): 879-895.
Metrodorea nigra	9	Guidugli, M. C., et al. "Genetic diversity of *Metrodorea nigra* (Rutaceae) from a small forest remnant in Brazil assessed with microsatellite markers." *Genetics and Molecular Research* 11.1 (2012): 10-16.

Oryza glumaepatula	18	Abreu, Aluana Gonçalves, et al. "SSR characterization of *Oryza glumaepatula* populations from the Brazilian Amazon and Cerrado biomes." *Genetica* 143.4 (2015): 413-423.
Plathymenia reticulata	9	Cruz, Mariana V., et al. "Isolation and characterization of microsatellite markers for *Plathymenia reticulata* (Fabaceae)." *American Journal of Botany* 99.5 (2012): e210-e212.
Qualea grandiflora	8	Antiqueira, Lia Maris Orth Ritter, and Paulo Yoshio Kageyama. "Genetic diversity of four populations of *Qualea grandiflora* Mart. in fragments of the Brazilian Cerrado." *Genetica* 142.1 (2014): 11-21.
	10	de Oliveira Buzatti, Renata Santiago, José Pires de Lemos-Filho, and Maria Bernadete Lovato. "Development of microsatellite markers in *Qualea grandiflora* (Vochysiaceae) and transferability to congeneric species, typical trees of the Brazilian savanna." *Biochemical Systematics and Ecology* 56 (2014): 75-79.
Qualea multiflora	10	de Oliveira Buzatti, Renata Santiago, José Pires de Lemos-Filho, and Maria Bernadete Lovato. "Development of microsatellite markers in *Qualea grandiflora* (Vochysiaceae) and transferability to congeneric species, typical trees of the Brazilian savanna." *Biochemical Systematics and Ecology* 56 (2014): 75-79.
Qualea parviflora	10	de Oliveira Buzatti, Renata Santiago, José Pires de Lemos-Filho, and Maria Bernadete Lovato. "Development of microsatellite markers in *Qualea grandiflora* (Vochysiaceae) and transferability to congeneric species, typical trees of the Brazilian savanna." *Biochemical Systematics and Ecology* 56 (2014): 75-79.
Solanum crinitum	5	de Moura, Tania Maria, et al. "Genetic diversity and spatial genetic structure in fragmented populations of *Solanum* spp. from the Brazilian savannah, based on microsatellite loci." *Scientia Forestalis* 37.82 (2009): 143-150.
Solanum lycocarpum	5	de Moura, Tania Maria, et al. "Genetic diversity and spatial genetic structure in fragmented populations of *Solanum* spp. from the Brazilian savannah, based on microsatellite loci." *Scientia Forestalis* 37.82 (2009): 143-150.
Tabebuia aurea	10	Braga, A. C., and R. G. Collevatti. "Temporal variation in pollen dispersal and breeding structure in a bee-pollinated Neotropical tree." *Heredity* 106.6 (2011): 911-919.
Tabebuia roseoalba	6	Collevatti, Rosane Garcia, et al. "High genetic diversity and contrasting fine-scale spatial genetic structure in four seasonally dry tropical forest tree species." *Plant systematics and evolution* 300.7 (2014): 1671-1681.
	8	Feres, J. M., et al. "Mating system parameters at hierarchical levels of fruits, individuals and populations in the Brazilian insect-pollinated tropical tree, Tabebuia roseo-alba (Bignoniaceae)." *Conservation Genetics* 13.2 (2012): 393-405.
Vellozia gigantea	6	Martins, Ana Paula V., et al. "Microsatellite markers for *Vellozia gigantea* (Velloziaceae), a narrowly endemic species to the Brazilian campos rupestres." *American Journal of Botany* 99.7 (2012): e289-e291.

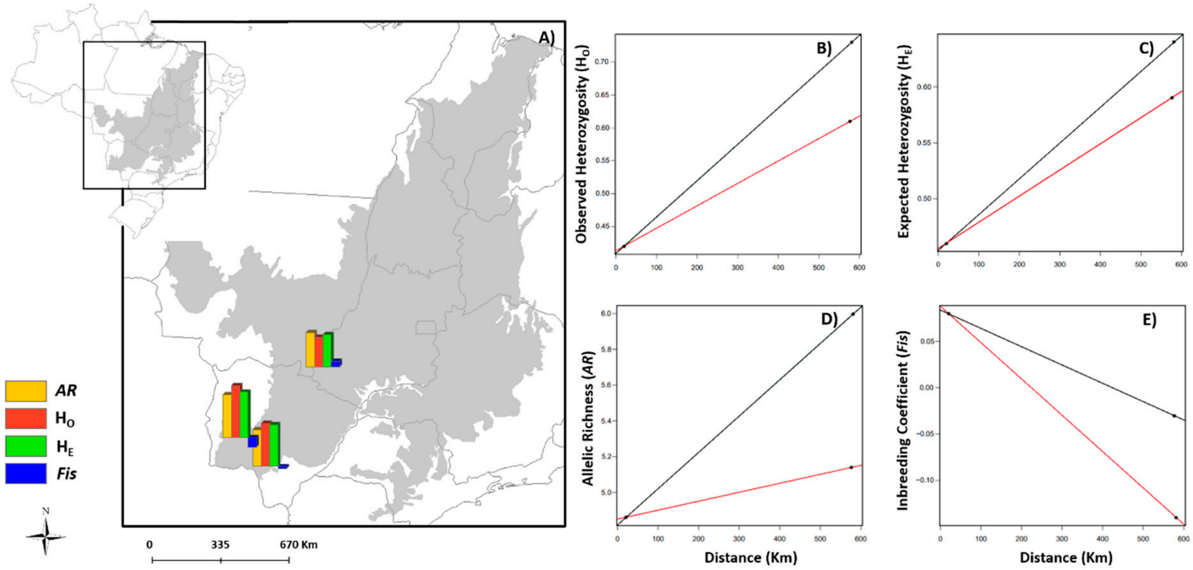

Figure S1. Distribution of genetic diversity indices and the inbreeding coefficient for the *Campomanesia adamantium* populations sampled in the Cerrado biome (A). Quantile regression for the relationships between the Observed (Ho) and Expected Heterozygosity (HE), Allelic Richness (*AR*), and inbreeding coefficient (*Fis*), and the distance from the centroid of the Cerrado. Figures B, C, D, and E show the triangle-shaped envelopes of the 0.05 (red line) and 0.99 (black line) quantile fits.

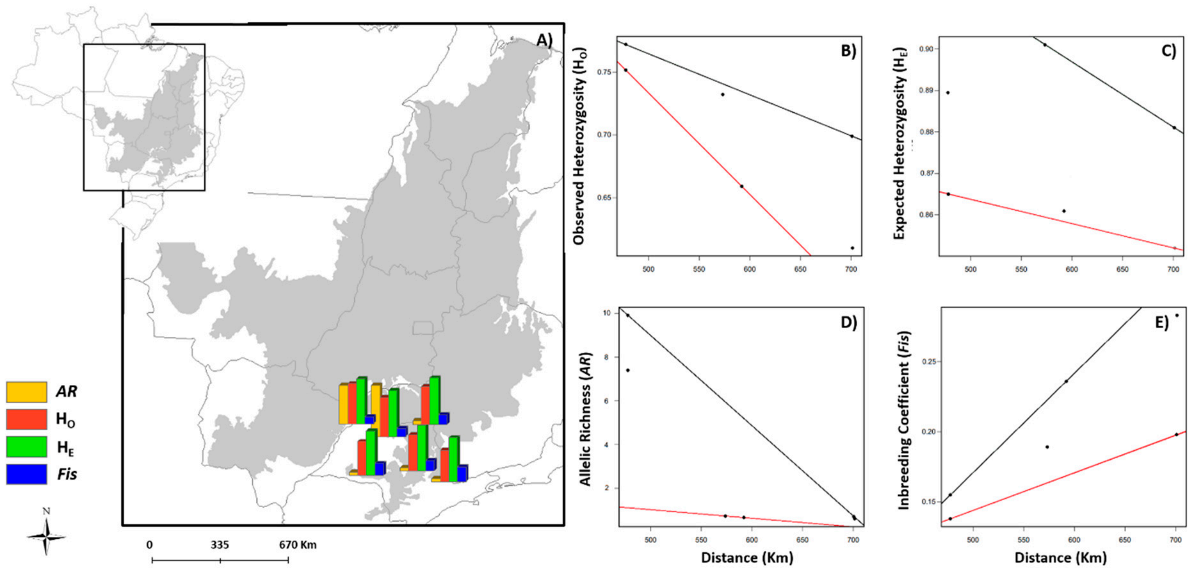

Figure S2. – Distribution of the genetic diversity indices and inbreeding coefficients of the *Copaifera langsdorffii* populations sampled in the Cerrado biome (A). Quantile regression for the relationships between the Observed (Ho) and Expected Heterozygosity (HE), Allelic Richness (*AR*), and inbreeding coefficient (*Fis*), and the distance from the Cerrado centroid. Figures B, C, D, and E show the triangle-shaped envelopes of the 0.05 (red line) and 0.99 (black line) quantile fits.

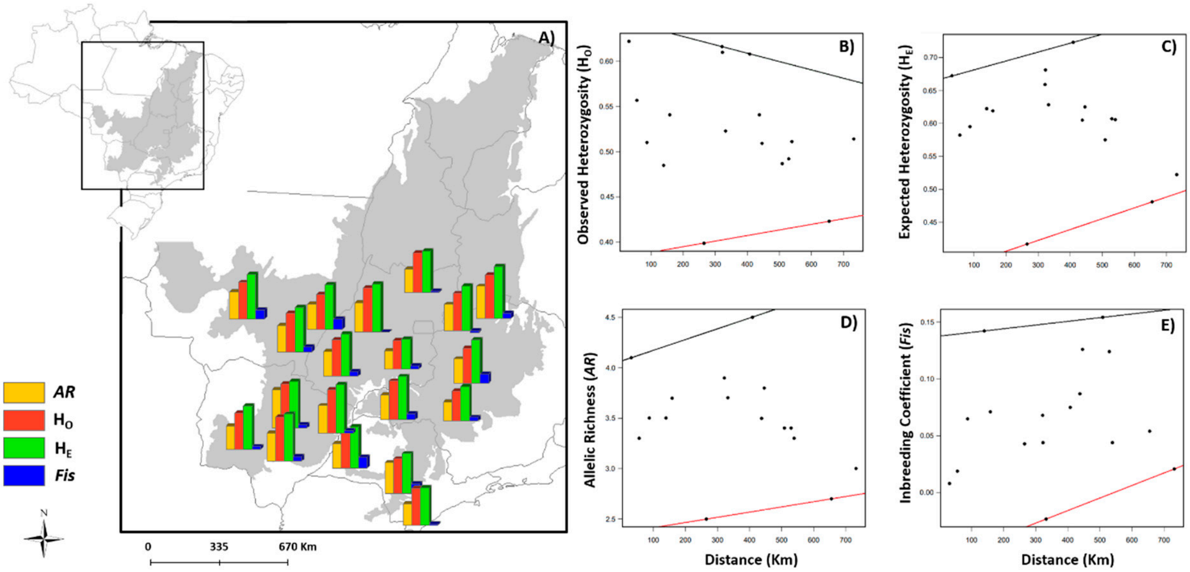

Figure S3. Distribution of the genetic diversity indices and inbreeding coefficients for the *Dimorphandra mollis* populations sampled in the Cerrado biome (A). Quantile regression for the relationships between the Observed (HO) and Expected Heterozygosity (HE), Allelic Richness (*AR*), and inbreeding coefficient (*Fis*), and the distance from the centroid of the Cerrado. Figures B, C, D, and E show the triangle-shaped envelopes of the 0.05 (red line) and 0.99 (black line) quantile fits.

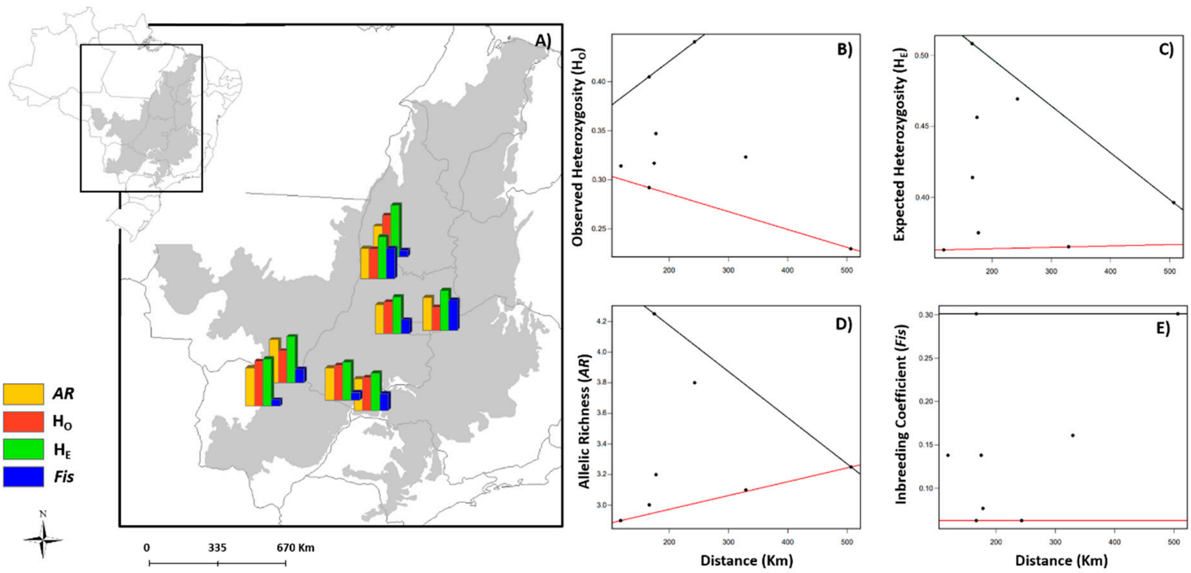

Figure S4. Distribution of genetic diversity indices and inbreeding coefficients of the populations of *Dipteryx alata* sampled in the Cerrado biome (A). Quantile regression for the relationships between the Observed (HO) and Expected Heterozygosity (HE), Allelic Richness (*AR*), and inbreeding coefficient (*Fis*), and the distance from the centroid of the Cerrado. Figures B, C, D, and E show the triangle-shaped envelopes of the 0.05 (red line) and 0.99 (black line) quantile fits.

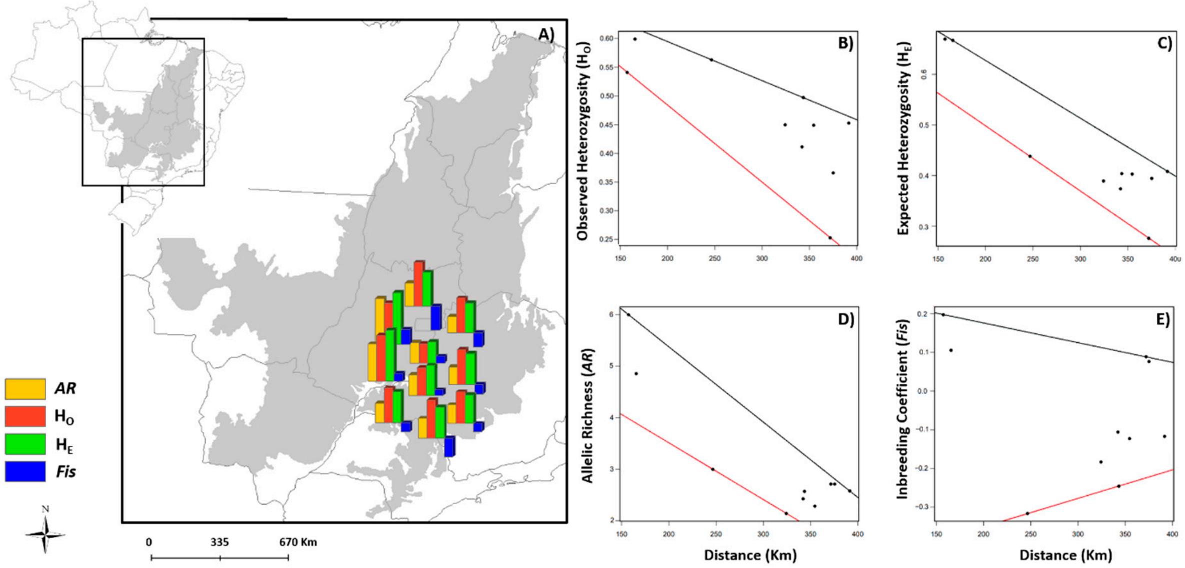

Figure S5. Distribution of the genetic diversity and inbreeding coefficients of the *Eugenia dysenterica* populations sampled in the Cerrado biome (A). Quantile regression for the relationships between the Observed (HO) and Expected Heterozygosity (HE), Allelic Richness (*AR*), and inbreeding coefficient (*Fis*), and the distance from the centroid of the Cerrado. Figures B, C, D, and E show the triangle-shaped envelopes of the 0.05 (red line) and 0.99 (black line) quantile fits.

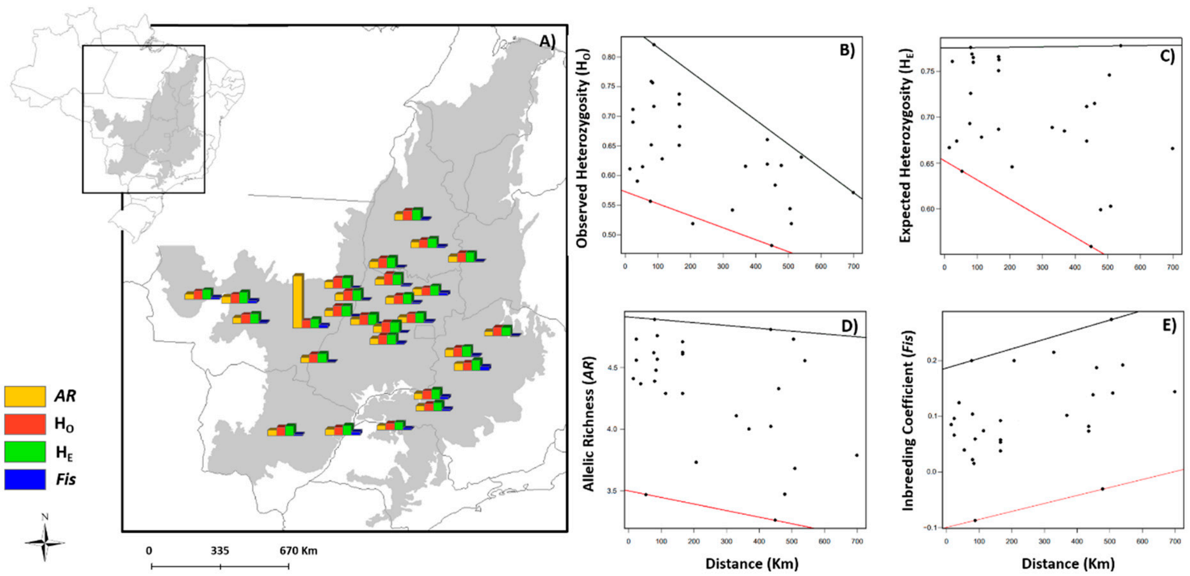

Figure S6. Distribution of the genetic diversity indices and the inbreeding coefficients of the populations of *Hancornia speciosa cuyabensis*, *Hancornia speciosa gardinerii*, *Hancornia speciosa pubescens*, and *Hancornia speciosa speciosa* sampled in the Cerrado biome (A). Quantile regression for the relationships between the Observed (HO) and Expected Heterozygosity (HE), Allelic Richness (*AR*), and inbreeding coefficient (*Fis*), and the distance from the centroid of the Cerrado. Figures B, C, D, and E show the triangle-shaped envelopes of the 0.05 (red line) and 0.99 (black line) quantile fits.

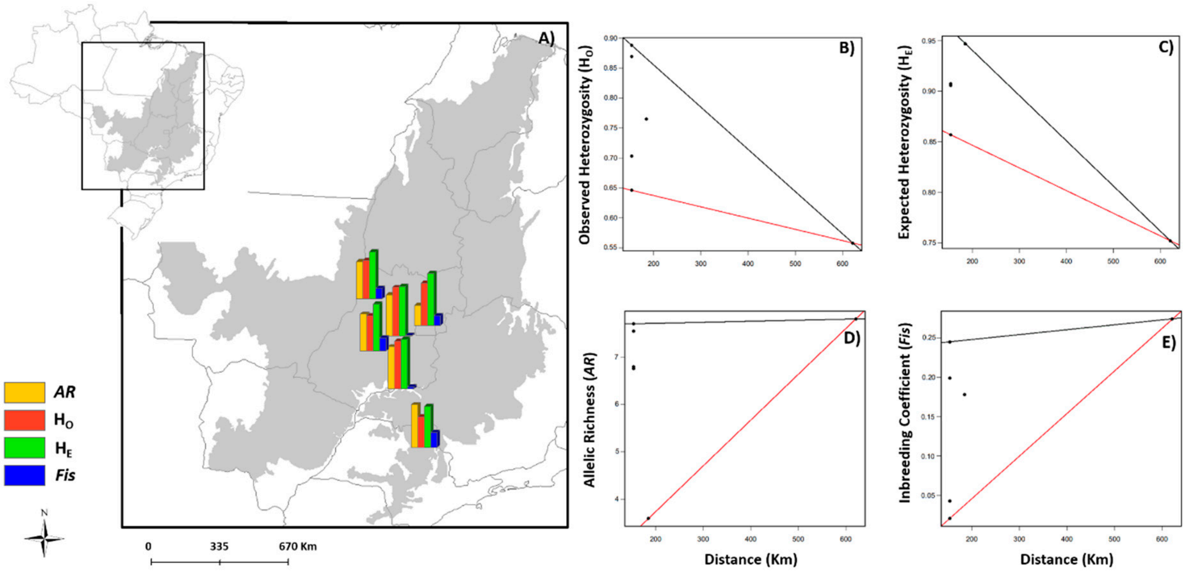

Figure S7. Distribution of the genetic diversity indices and inbreeding coefficients of the populations of *Handroanthus chrysotrichus*, *Handroanthus serratifolius*, *Handroanthus impetiginosus*, *Tabebuia aurea*, and *Tabebuia roseoalba* sampled in the Cerrado biome (A). Quantile regression for the relationships between the Observed (H_O) and Expected Heterozygosity (H_E), Allelic Richness (*AR*), and inbreeding coefficient (*Fis*), and the distance from the centroid of the Cerrado. Figures B, C, D, and E show the triangle-shaped envelopes of the 0.05 (red line) and 0.99 (black line) quantile fits.

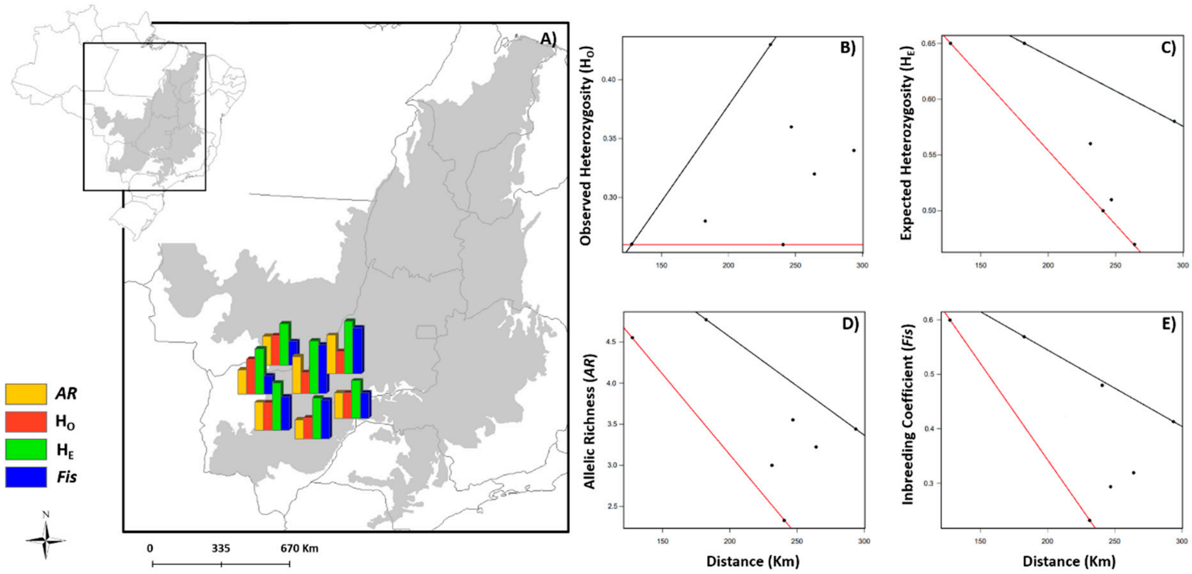

Figure S8. Distribution of the genetic diversity indices and inbreeding coefficients of the of *Manihot esculenta* populations sampled in the Cerrado biome (A). Quantile regression for the relationships between the Observed (H_O) and Expected Heterozygosity (H_E), Allelic Richness (*AR*), and inbreeding coefficient (*Fis*), and the distance from the centroid of the Cerrado. Figures B, C, D, and E show the triangle-shaped envelopes of the 0.05 (red line) and 0.99 (black line) quantile fits.

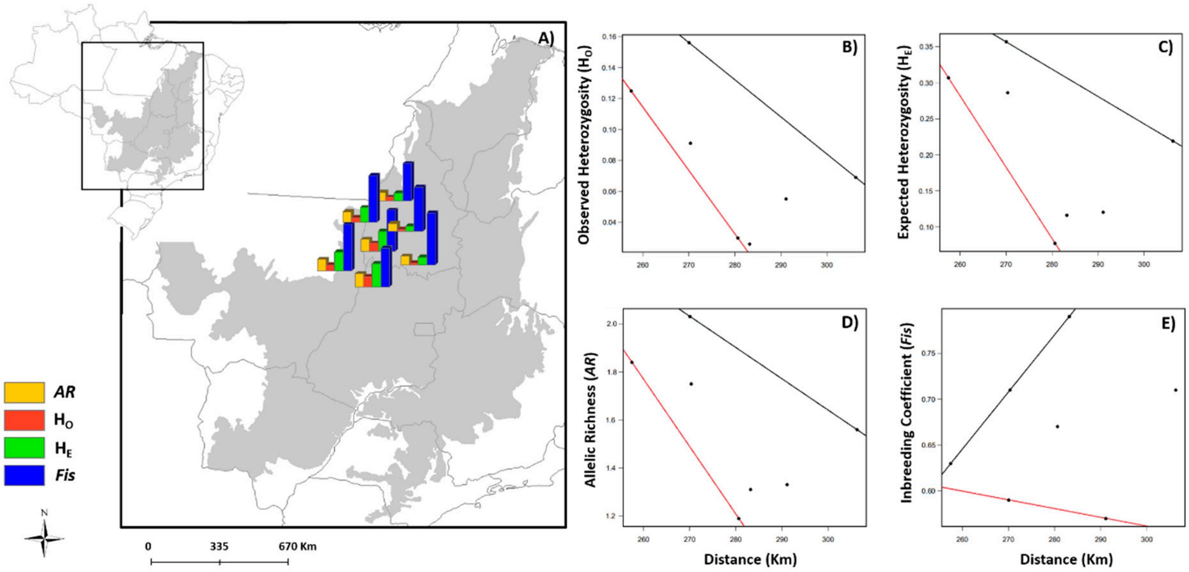

Figure S9. Distribution of the genetic diversity indices and inbreeding coefficients of the *Oryza glumaepatula* populations sampled in the Cerrado biome (A). Quantile regression for the relationships between the Observed (HO) and Expected Heterozygosity (HE), Allelic Richness (*AR*), and inbreeding coefficient (*Fis*), and the distance from the centroid of the Cerrado. Figures B, C, D, and E show the triangle-shaped envelopes of the 0.05 (red line) and 0.99 (black line) quantile fits.

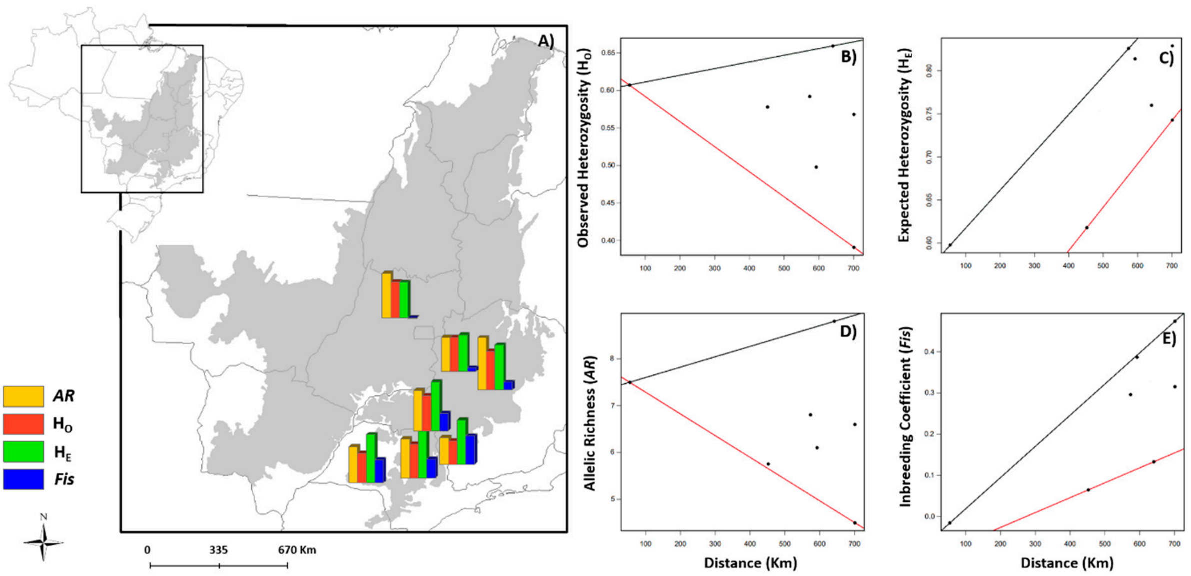

Figure S10. – Distribution of the genetic diversity indices and inbreeding coefficients off the populations of *Qualea grandflora*, *Qualea multiflora*, and *Qualea parviflora* sampled in the Cerrado biome (A). Quantile regression for the relationships between the Observed (HO) and Expected Heterozygosity (HE), Allelic Richness (*AR*), and inbreeding coefficient (*Fis*), and the distance from the centroid of the Cerrado. Figures B, C, D, and E show the triangle-shaped envelopes of the 0.05 (red line) and 0.99 (black line) quantile fits.

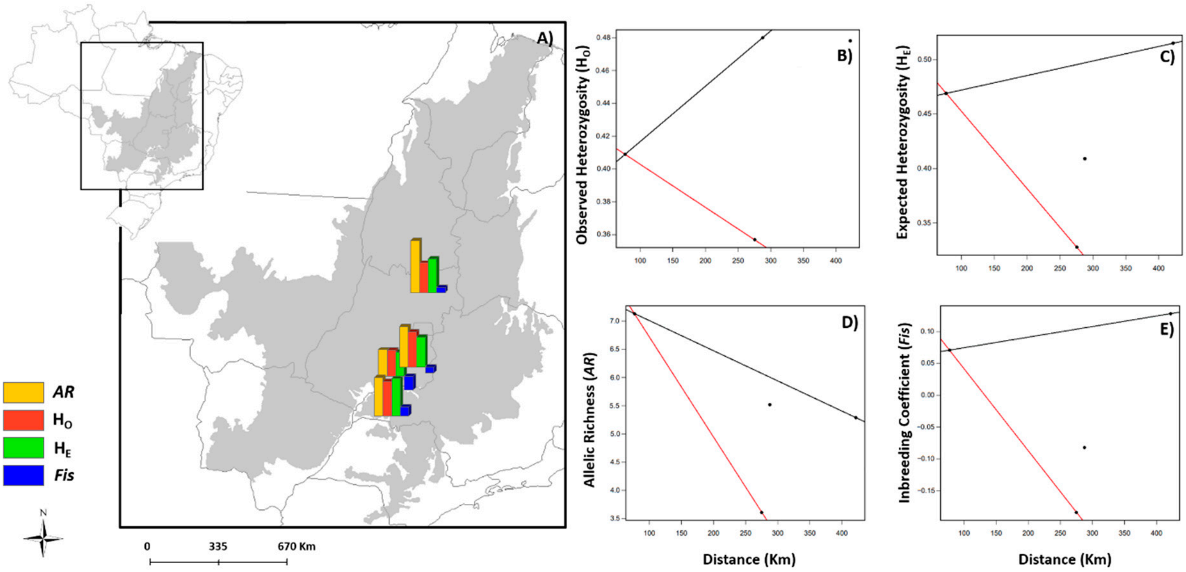

Figure S11. Distribution of the genetic diversity indices and inbreeding coefficients for the populations of *Solanum crinitum* and *Solanum lycocarpum* sampled in the Cerrado biome (A). Quantile regression for the relationships between the Observed (H_O) and Expected Heterozygosity (H_E), Allelic Richness (*AR*), and inbreeding coefficient (*Fis*), and the distance from the centroid of the Cerrado. Figures B, C, D, and E show the triangle-shaped envelopes of the 0.05 (red line) and 0.99 (black line) quantile fits.

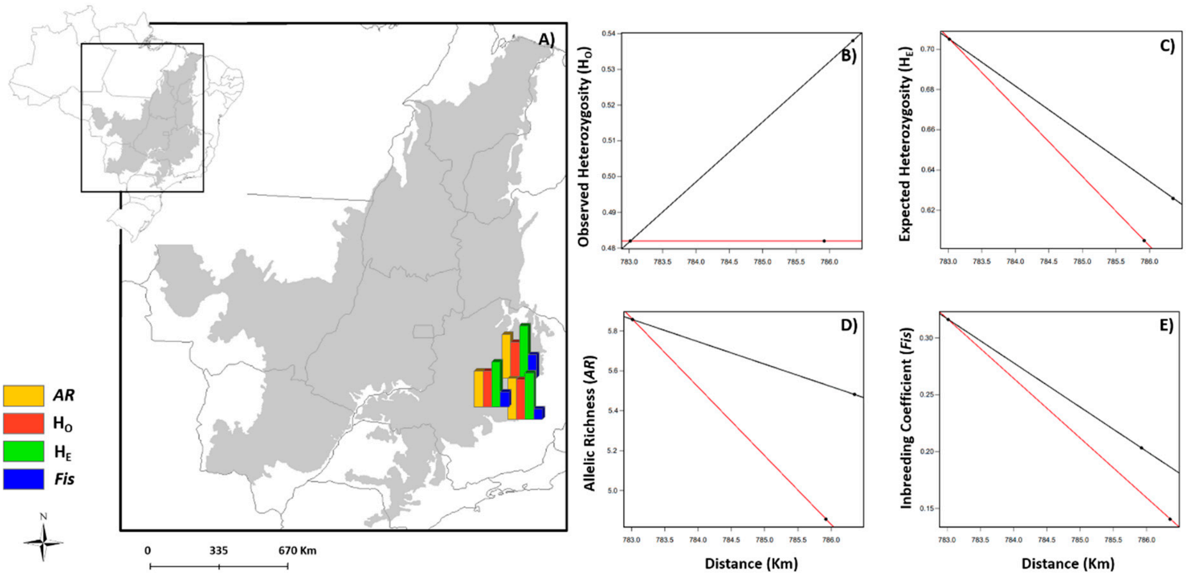

Figure S12. Distribution of the genetic diversity indices and inbreeding coefficients recorded in the populations of *Vellozia gigantea* sampled in the Cerrado biome (A). Quantile regression for the relationships between the Observed (H_O) and Expected Heterozygosity (H_E), Allelic Richness (*AR*), and inbreeding coefficient (*Fis*), and the distance from the centroid of the Cerrado. Figures B, C, D, and E show the triangle-shaped envelopes of the 0.05 (red line) and 0.99 (black line) quantile fits.

Table S2. Values referring to parameter β (b_1) and significance (*P*) obtained in quantile regressions (quantiles 0.05 and 0.99) relating genetic diversity data, Observed Heterozygosity (H_O), Expected Heterozygosity (H_E), Allelic Richness (*AR*), and inbreeding coefficients (*Fis*) and distance (km) of plant species populations, in relation to the center of the Cerrado biome. Positive and significant β values indicate an increase in values, with an increase in distance, and negative and significant β values indicate a decrease in values, with an increase in distance.

Species or Subspecies	**H_O**		**H_E**		***AR***		***Fis***	
	0.05	**0.99**	**0.05**	**0.99**	**0.05**	**0.99**	**0.05**	**0.99**
Annona coriacea and *Annona crassiflora*	b_1 = -0.00003, P = 0.04670	b_1 = -0.02623, P = 0.00764	b_1 = 0.00004, P = 0.05872	b_1 = -0.03199, P = 0.00224	b_1 = -0.00006, P = 0.00630	b_1 = -0.00339, P = 0.00114	b_1 = 0.04690, P = 0.00264	b_1 = 0.00002, P = 0.06780
Campomanesia adamantium	b_1 = 0.00023, P = 0.00080	b_1 = 0.00033, P = 0.00008	b_1 = 0.00027, P = 0.00012	b_1 = 0.00038, P = 0.00025	b_1 = 0.00006, P = 0.02347	b_1 = 0.00022, P = 0.00134	b_1 = -0.00006, P = 0.00080	b_1 = -0.00003, P = 0.00274
Copaifera langsdorffii	b_1 = -0.00026, P = 0.00000	b_1 = -0.00012, P = 0.00044	b_1 = -0.00007, P = 0.03267	b_1 = -0.00014, P = 0.00236	b_1 = -0.00003, P = 0.00620	b_1 = -0.00142, P = 0.00000	b_1 = 0.00016, P = 0.00000	b_1 = 0.00023, P = 0.00074
Dimorphandra mollis	b_1 = 0.00006, P = 0.05480	b_1 = -0.00009, P = 0.01774	b_1 = 0.00016, P = 0.01008	b_1 = 0.00014, P = 0.00000	b_1 = 0.00051, P = 0.03834	b_1 = 0.00106, P = 0.00000	b_1 = 0.00011, P = 0.00631	b_1 = 0.00003, P = 0.02571
Dipteryx alata	b_1 = -0.00018, P = 0.02519	b_1 = 0.00046, P = 0.00002	b_1 = 0.00001, P = 0.91231	b_1 = -0.00033, P = 0.00017	b_1 = 0.00090, P = 0.00253	-0.00301, P = 0.00121	b_1 = 0.00000, P = 1.00000	b_1 = 0.00000, P = 1.00000
Eugenia dysenterica	b_1 = -0.00134, P = 0.00000	b_1 = -0.00068, P = 0.00000	b_1 = -0.00129, P = 0.00000	b_1 = -0.00114, P = 0.00000	b_1 = -0.01103, P = 0.00001	b_1 = -0.01463, P = 0.00000	b_1 = 0.00073, P = 0.00090	b_1 = -0.00051, P = 0.02568
Hancornia	b_1 = -0.00020, P = 0.00005	b_1 = -0.00041, P = 0.00000	b_1 = -0.00021, P = 0.00036	b_1 = 0.00000, P = 0.41288	b_1 = -0.00053, P = 0.00321	b_1 = -0.00023, P = 0.00036	b_1 = 0.00014, P = 0.00000	b_1 = 0.00017, P = 0.00101
Handroanthus and *Tabebuia*	b_1 = -0.00018, P = 0.00000	b_1 = -0.00043 P = 0.00000	b_1 = -0.00036, P = 0.00012	b_1 = -0.00062, P = 0.00026	b_1 = 0.00048, P = 0.00031	b_1 = 0.00000, P = 0.31278	b_1 = 0.00036, P = 0.00000	b_1 = 0.00007, P = 0.00120
Manihot esculenta	b_1 = 0.00000, P = 1.00000	b_1 = 0.00164, P = 0.00008	b_1 = -0.00133, P = 0.00125	b_1 = -0.00063, P = 0.00127	b_1 = -0.01963, P = 0.00000	b_1 = -0.01197, P = 0.00012	b_1 = -0.00354, P = 0.00022	b_1 = -0.00140, P = 0.00132
Oryza glumaepatula	b_1 = -0.00410, P = 0.00218	b_1 = -0.00240, P = 0.00001	b_1 = -0.00993, P = 0.00014	b_1 = -0.00381, P = 0.00071	b_1 = -0.02807, P = 0.00036	b_1 = -0.01298, P = 0.00004	b_1 = -0.00095, P = 0.36452	b_1 = 0.00623, P = 0.00124

Qualea	b_1 = -0.00033, P = 0.00487	b_1 = 0.00009, P = 0.02715	b_1 = 0.00050, P = 0.00039	b_1 = 0.00044, P = 0.00009	b_1 = -0.00464, P = 0.00530	b_1 = 0.00222, P = 0.00001	b_1 = 0.00036, P = 0.04584	b_1 = 0.00076, P = 0.00007
Solanum	b_1 = -0.00034, P = 0.00576	b_1 = 0.00021, P = 0.00587	b_1 = -0.00067, P = 0.00321	b_1 = 0.00013, P = 0.00593	b_1 = -0.00038, P = 0.00000	b_1 = -0.00021, P = 0.00037	b_1 = -0.00052, P = 0.00324	b_1 = 0.00012, P = 0.00463
Vellozia gigantea	b_1 = 0.00003, P = 0.10230	b_1 = 0.00036, P = 0.00000	b_1 = -0.00039, P = 0.00087	b_1 = -0.00026, P = 0.01735	b_1 = -0.05497, P = 0.00000	b_1 = 0.01922, P = 0.00001	b_1 = -0.00028, P = 0.00000	b_1 = 0.00017, P = 0.00012
All species ± SD	b_1 = 0.00081, P = 0.00000	b_1 = -0.00035, P = 0.00000	b_1 = 0.00032, P = 0.00029	b_1 = -0.00012, P = 0.00000	b_1 = 0.00216, P = 0.06613	b_1 = -0.03935, P = 0.00000	b_1 = -0.00008, P = 0.67009	, b_1 = -0.00060, P = 0.02590