

Article

Annual Abundance and Population Structure of Two Dung Beetle Species in a Human-Modified Landscape

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Supplementary Material

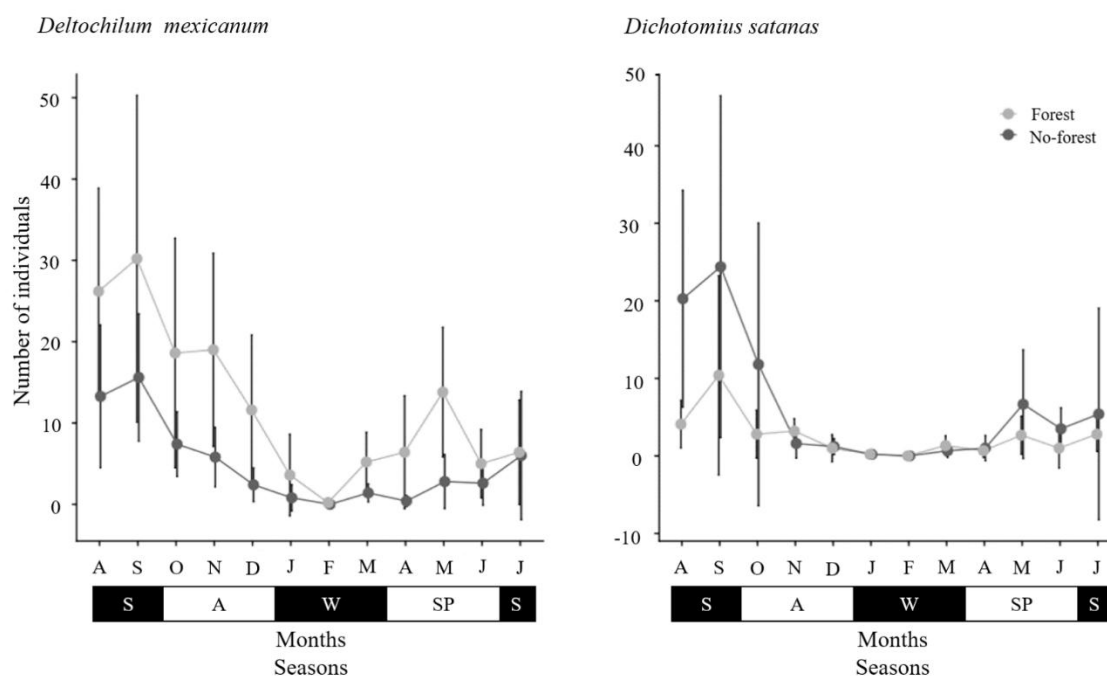


Figure S1. Temporal variation in the mean number of individuals ($\pm 95\%$ CI) of *Deltochilum mexicanum* and *Dichotomius satanas* populations considering the type of vegetation cover (forest or no-forest) in a human-modified cloud forest landscape in Veracruz, Mexico. Seasons: S = summer, A = autumn, W = winter, and SP = spring.

Table S1. Generalized linear models (GLM) with a negative binomial distribution and simple linear models (Lm) for evaluating the relationship between the net abundance (N_{Net}) of *Deltochilum mexicanum* and *Dichotomius satanas* and environmental variables at a landscape level and type of vegetation cover (forested or non-forested) in a human-modified cloud forest landscape in Veracruz, Mexico. N_{Net} = Net abundance of species. Cover = cover type (forested or non-forested). Mon = months of sampling. AP = accumulated monthly precipitation (mm). T = monthly temperature (T °C). H = monthly relative humidity (% RH).

Species	Analysis level	Variables	Model (Interaction between variables)	P- Shapiro	AICc	\hat{c}	R ²	P	F	
<i>D. mexicanum</i>	Landscape	Vegetation cover	Null model	0.0000	2048.8 8					
			GLM ($N_{\text{net}} \sim \text{cover}$)	0.0053	850.45	1.1737				
			GLM ($N_{\text{net}} \sim \text{cover}*\text{mon}$)	0.0048	780.87	1.3041				
			GLM ($N_{\text{net}} \sim \text{cover}+\text{mon}$)	0.25	764.93	1.2071				
	Forested area	Accumulated precipitation Temperature Humidity	Lm ($N_{\text{net}} \sim \text{AP}$)	0.0716	223.71		0.19	0.0259	5.788	
			Lm ($N_{\text{net}} \sim \text{T}$)	0.24	118.07		0.27	0.0517	5.022	
	Non-forested area	Temperature Humidity	Lm ($N_{\text{net}} \sim \text{H}$)	0.6621	120.49		0.11	0.1678	2.251	
			Lm ($N_{\text{net}} \sim \text{T}$)	0.0200	105.07		0.17	0.1173	3.001	
	<i>D. satanas</i>	Landscape	Vegetation cover	Lm ($N_{\text{net}} \sim \text{H}$)	0.3075	99.362		0.50	0.0086	11.17
				Null model	0.00	1865.7				
GLM ($N_{\text{net}} \sim \text{cover}$)				0.00	667.16	1.0717				
Forested area		Accumulated precipitation Temperature Humidity	GLM ($N_{\text{net}} \sim \text{cover}*\text{mon}$)	0.35	638.68	1.2315				
			GLM ($N_{\text{net}} \sim \text{cover}+\text{mon}$)	0.07	619.8	1.1302				
			Lm ($N_{\text{net}} \sim \text{AP}$)	0.0014	208.89		0.22	0.0167	6.810	
Non-forested area	Temperature Humidity	Lm ($N_{\text{net}} \sim \text{T}$)	0.0011	96.09		0.09	0.1904	2.005		
		Lm ($N_{\text{net}} \sim \text{H}$)	0.0075	97.850		-0.06	0.5554	0.375		
Non-forested area	Temperature Humidity	Lm ($N_{\text{net}} \sim \text{T}$)	0.0002	114.68		0.23	0.0786	3.930		
		Lm ($N_{\text{net}} \sim \text{H}$)	0.23	115.51		0.17	0.1178	2.999		

P-Shapiro—the normality of the residuals using Shapiro test; AICc—second-order Akaike information criterion for small samples < 30; \hat{C} —overdispersion coefficient.