Local vs landscape drivers of primate occupancy in a Brazilian fragmented region

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Table 1 Candidate occupancy models and associated predictor variables

Candidate occupancy models	Model name
Landscape predictors	
Habitat amount & Fragmentation	Ψ(*Hab*+*Fragm*)p(.)
Habitat amount	Ψ(*Hab*)p(.)
Fragmentation	Ψ(*Fragm*)p(.)
Local predictors	
Canopy height & Canopy openness	Ψ(*Can_height*+*Can_openness*)p(.)
Canopy height	Ψ(*Can_height*)p(.)
Canopy openness	Ψ(*Can_openness*)p(.)
Global model	Ψ(*Hab*+*Fragm*+*Can_height*+*Can_openness*)p(.)
Constant model	Ψ(.)p(.)

In model specifications, Ψ denotes occupancy and p is detection probability. The notation (.) indicates that parameter is kept constant, while names within brackets indicate that parameter is modeled as function of a covariate.

Table 2 Detection models for the black-fronted titi monkey and the black-pencilled marmoset.

Species	Model	AIC	ΔAIC	AIC*wt*
Titi monkey	Ψ(.)p(.)	64.01	0.00	0.44
	Ψ(.)p(*Ppt*)	64.97	0.96	0.27
	Ψ(.)p(*Vel*)	65.89	1.88	0.17
	Ψ(.)p(*Ppt*+*Vel*)	66.77	2.76	0.11
Marmoset	Ψ(.)p(.)	102.87	0.00	0.53
	Ψ(.)p(*Ppt*)	104.85	1.97	0.21
	Ψ(.)p(*Vel*)	104.85	1.98	0.19
	Ψ(.)p(*Ppt*+*Vel*)	106.81	3.94	0.07

Detection probabilities were modeled as function of weather covariates *Ppt* (atmospheric precipitation) and *Vel* (wind velocity). AIC is Akaike's information criterion. ΔAIC is the difference from top-ranking model and AIC*wt* is the weight of evidence in favor of a model. Models with constant occupancy - Ψ(.)p(.) - worked as well as models containing weather covariates ($\Delta AIC<2$) for both species.

Table 3 Occupancy models for black-fronted titi monkey and black-pencilled marmoset in forest patches of a Brazilian fragmented landscape.

Models	# par	AICc	ΔAICc or ΔQAICc	AICcw*t* or QAICc*wt*	LL or QuasiLL
Titi monkey					
Ψ(*Can_height*+*Can_openness*)p(.)	4	55.33	0.00	0.4153	-22.67
Ψ(*Canopy_height*)p(.)	3	55.75	0.41	0.3376	-24.30
Ψ(*Canopy_openness*)p(.)	3	56.61	1.28	0.2188	-24.74
global	6	61.54	6.21	0.0187	-22.44
constant	2	64.56	9.22	0.0041	-30.01
Ψ(*Hab*)p(.)	3	65.46	10.12	0.0026	-29.16
Ψ(*Fragm*)p(.)	3	65.90	10.57	0.0021	-29.38
Ψ(*Hab*+*Fragm*)p(.)	4	67.90	12.57	0.0008	-28.95
Marmoset					
constant	3	83.79	0.00	0.3157	-38.32
Ψ(*Can_height*+*Can_openness*)p(.)	5	84.63	0.84	0.2075	-37.34
Ψ(*Canopy_height*)p(.)	4	84.70	0.92	0.1996	-38.13
Ψ(*Fragm*)p(.)	4	86.26	2.47	0.0918	-38.32
Ψ(*Canopy_openness*)p(.)	4	86.62	2.83	0.0767	-38.32
Ψ(*Hab*)p(.)	4	86.65	2.86	0.0756	-37.57
Ψ(*Hab*+*Fragm*)p(.)	5	88.40	4.61	0.0315	-37.62
global	7	94.52	10.73	0.0015	-34.41

Set of single-season models fitted to detection/non-detection data. Occupancy (Ψ) was kept constant (constant model) or modeled as function of local predictors (*Canopy height* and *Canopy openness*) or landscape predictors (*Habitat amount* and *Fragmentation*). Global models indicate that occupancy is modeled as function of all predictors. The number of parameters (# par) is given for each model. AICc is Akaike's information criterion corrected for small sample sizes and QAICc is its correction for overdispersion. Model likelihood (LL) or quasi-likelihood (QuasiLL) values are also given. For a complete description of parameters and modeling procedures, please see text and Figure 3.

Table 4 Hypothesis about local vs landscape effects on occupancy, hypothesis regarding specific relationships between occupancy and predictor variables, and the evidence found in our analysis.

	Titi monkey		Marmoset	
	Hypothesis	Response	Hypothesis	Response
Landscape / Local	landscape & local	local	landscape	local
Habitat amount	+ correlated	no evidence	- correlated	no evidence
Fragmentation	- correlated	no evidence	+ correlated	no evidence
Canopy height	+ correlated	+ correlated	- correlated	no evidence
Canopy openness	- correlated	- correlated	+ correlated	no evidence