



Eucalyptus plantation and birds conservation



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Introduction. The expansion of planted forests is increasing fast in the last years, exceeding 70 million ha in the tropics, which are composed by 50% *Eucalyptus* plantations. Therefore, an important goal of biological conservation issue is understanding of this plantation habitat by different bird species.

Material and method. A bird community was investigated in areas of Savannah biome (“Cerrado”), composed mainly by savannah forested fragments (“cerradão”) and eucalypt plantation with point count method (Figures 1, 2 and 3). It was carried out in three periods: August 2008, November 2008 and March 2009, 10 min/point/campaign. The plantation understory density in each point was visually estimated into categories (grades), from zero to two. Zero was given to a plantation of absent understory and two to a dense one.

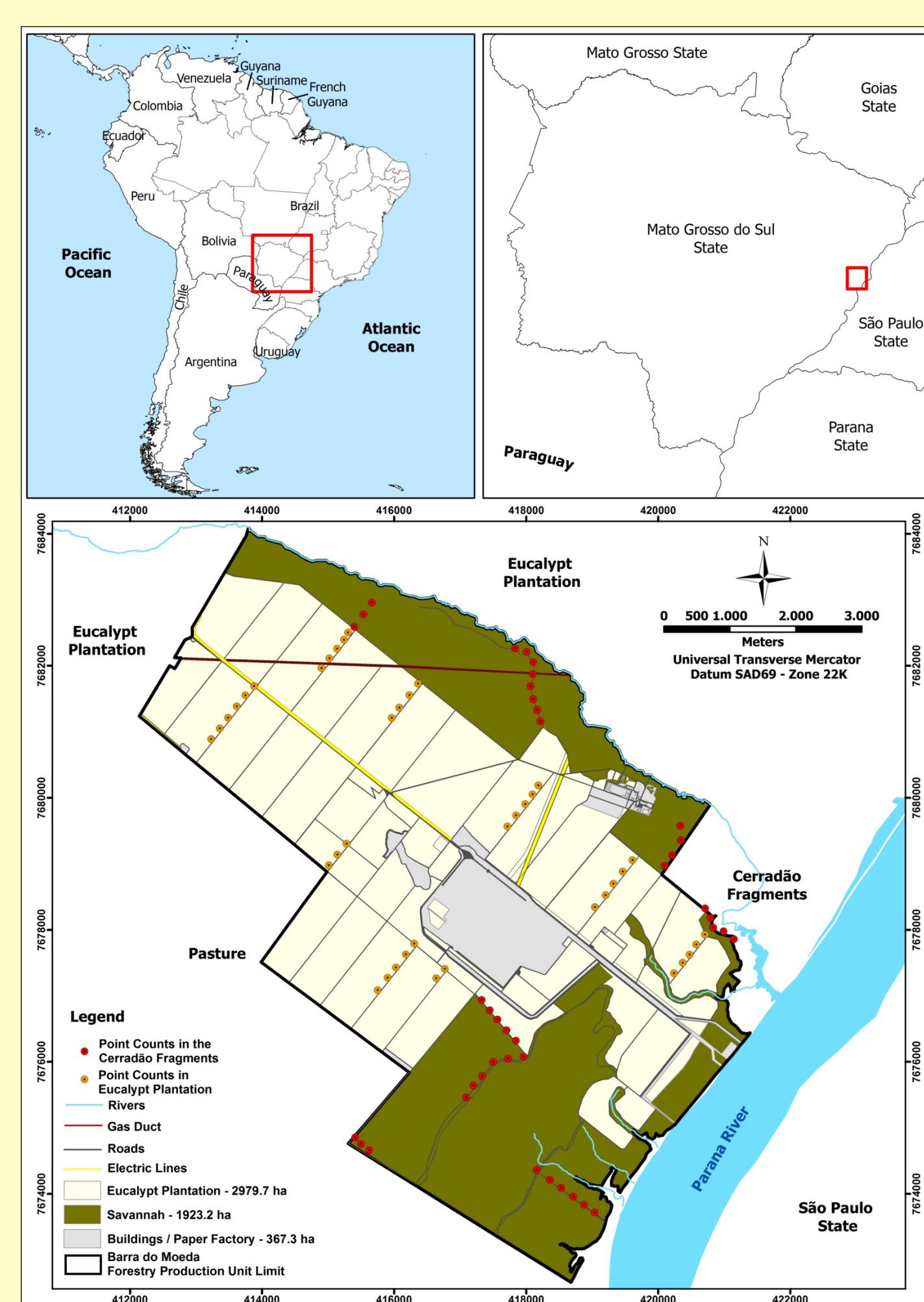


Figure 1. Study area. Barra do Moeda Forestry Production Unit (Fibria Celulose S. A. Company), Três Lagoas, MS, Brazil.

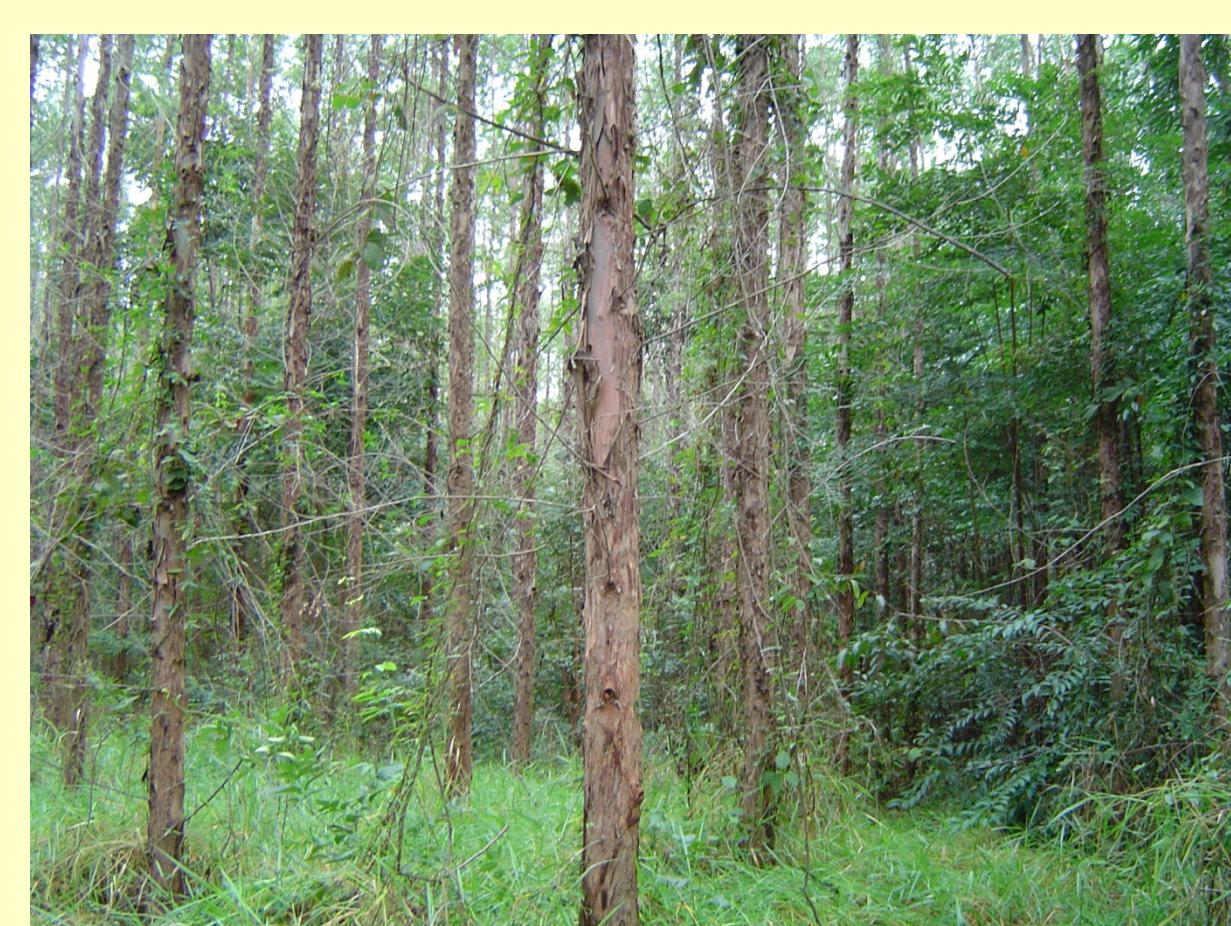


Figure 2. Eucalypt plantation.



Figure 3. Cerradão (savannah forest) fragment.

Results and discussion. A total of 115 species were recorded (Index of Abundance Point, IAP = 11.7) in the cerradão fragment. The richness was significantly higher than in the plantation, where 55 (IAP = 4.5) species were registered (Figure 4, Table 1). The average of birds per point was significantly higher in the fragment than in the plantation too (Figure 5). The richness and abundance of dependent and semi-dependent forest species were notably lower in the plantation than in the fragment (Figure 6, Table 2). The Sorenson Index was 67.8% and the Morisita-Horn Index was 72.8%.

Regression models showed that understory density has influenced positively on the total richness and abundance, on the dependent forest richness and abundance in the eucalypt plantation (Figure 7). The distance between the plantation point counts and the fragments did not affect the avifauna.

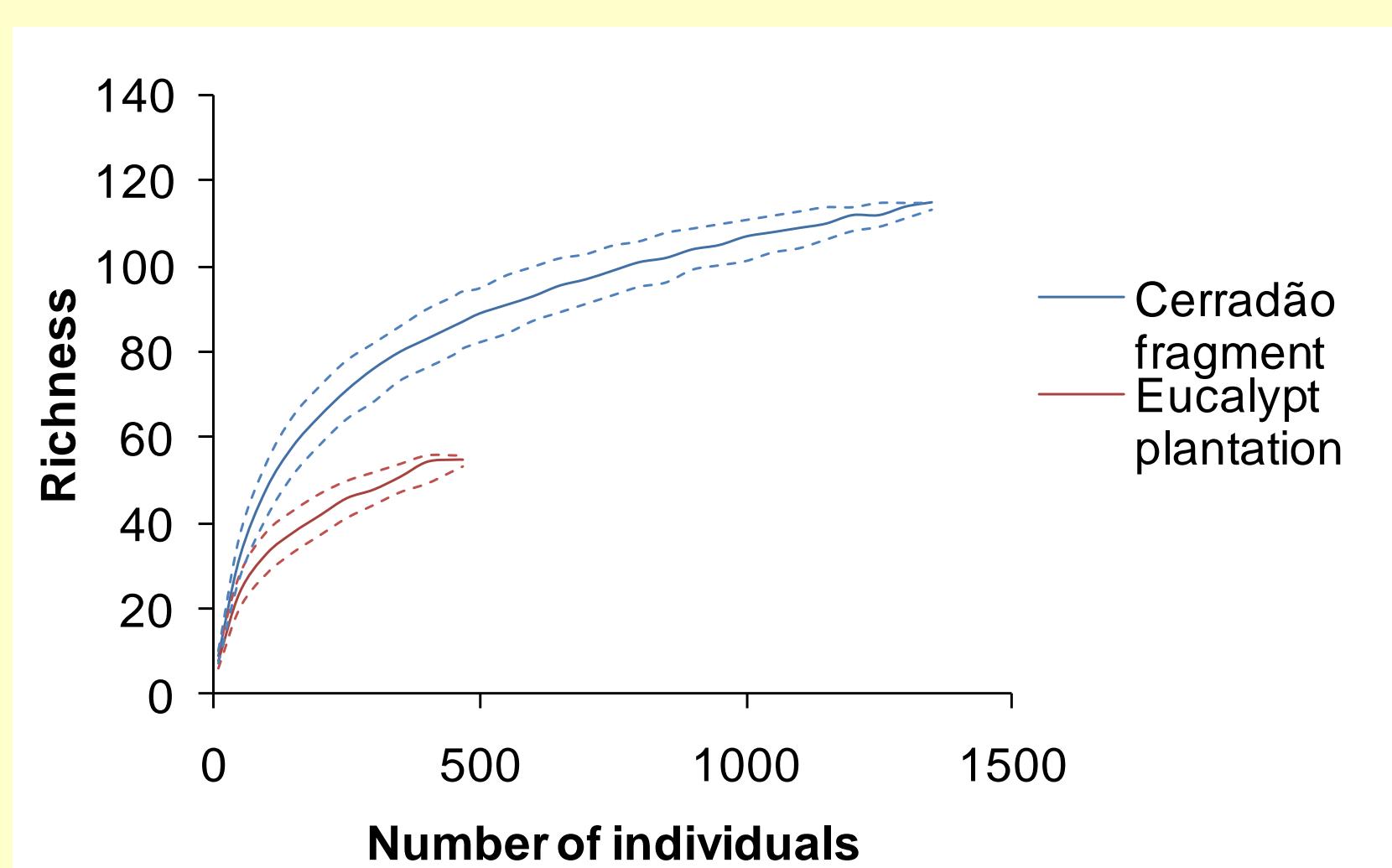


Figure 4. Rarefaction curve made by numbers of individuals per species.

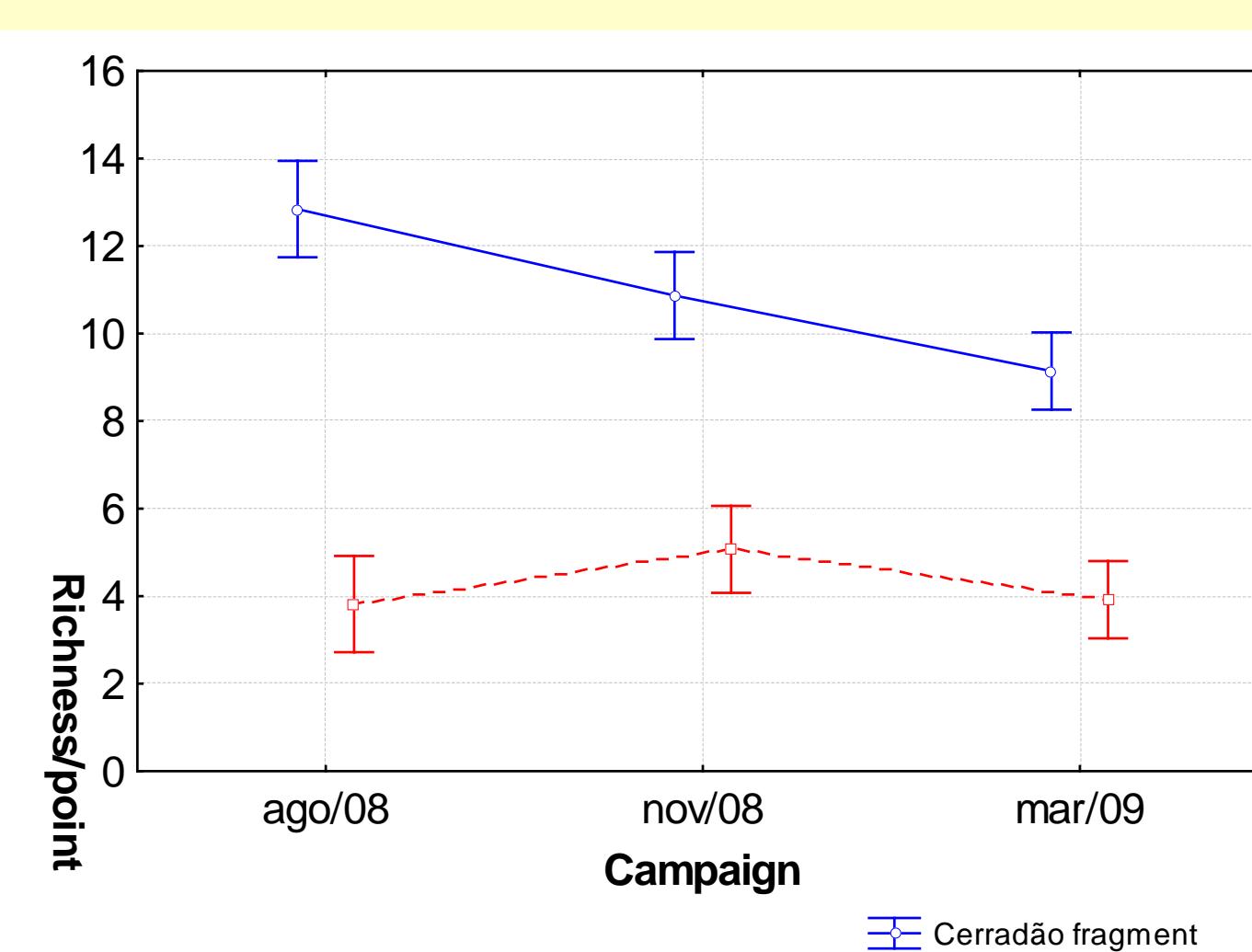


Figure 5. Number of species by points count along the campaigns.

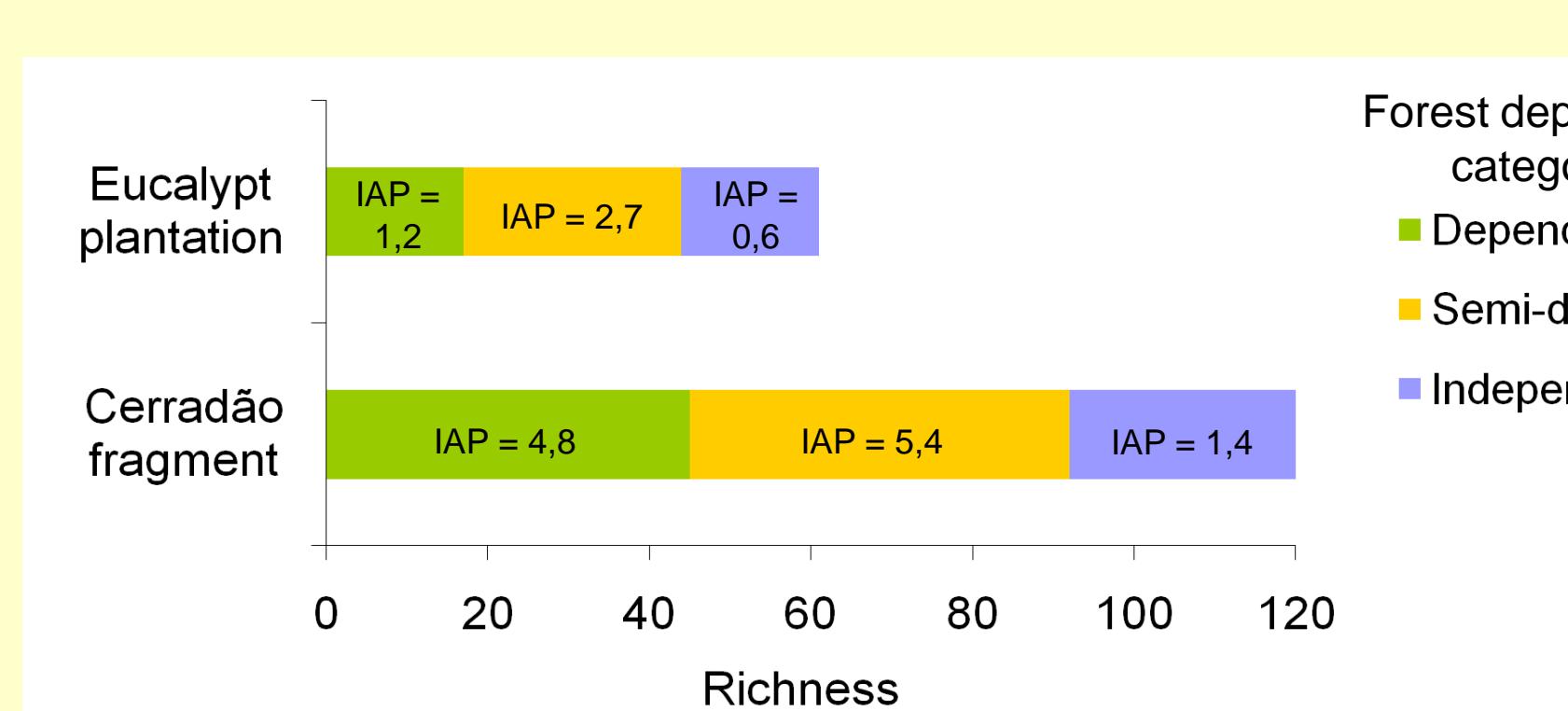


Figure 5. Richness and abundance (IAP) of forest dependent, semi-dependent and independent species in the eucalypt plantation and the cerradão fragment.

Table 2. Results of the repeated measures ANOVA.

Sources of variation	df	F	P
Habitat	1	159.1	< 0.01
Campaing	2	11.0	< 0.01
Habitat x campaign	2	12.7	< 0.01

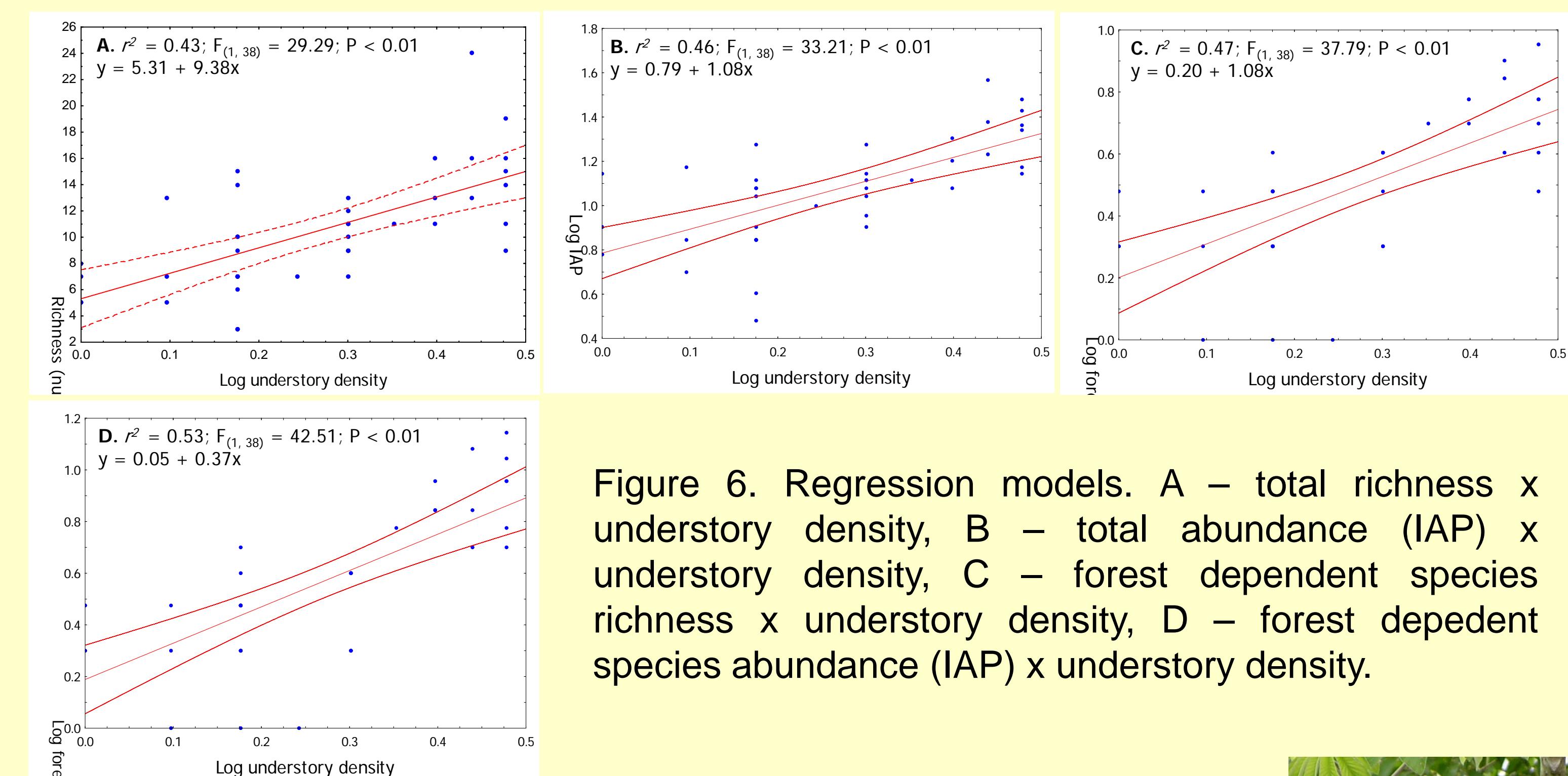


Figure 6. Regression models. A – total richness x understory density, B – total abundance (IAP) x understory density, C – forest dependent species richness x understory density, D – forest dependent species abundance (IAP) x understory density.

Table 1. Index of Abundance Point (IAP) of birds in the cerradão fragment and eucalypt plantation, Três Lagoas (MS), Brazil.

Family	Species	English name	Forest dependence	Cerradão fragment		Eucalypt plantation	
				ago/08	nov/08	ago/08	Mar/09
Tinamidae	<i>Crypturellus parvirostris</i>	Smaller Tinamou	I	0.05	0.08	0.05	
	<i>Crypturellus torquatus</i>	Tinamou	D	0.05	0.18	0.03	
	<i>Crypturellus undulatus</i>	Undulated Tinamou	D	0.10	0.08		
Craeidae	<i>Penelope superciliaris</i>	Rufous-margined Guan					
Threskiornithidae	<i>Theristicus caudatus</i>	Buff-necked Ibis	I	0.03	0.03		
Accipitridae	<i>Buteo magnirostris</i>	Roadside Hawk	I	0.03	0.03		
Falconidae	<i>Caracara plancus</i>	Laughing Falcon	S		0.03		
	<i>Herpetotheres cachinnans</i>	Blue-ground Dove	D	0.23	0.20	0.05	0.05
Columbidae	<i>Claravis pretiosa</i>	Scaled Dove	I	0.03	0.03	0.03	0.03
	<i>Columbina squammata</i>	Ruddy Ground-Dove	D	0.03	0.13	0.03	0.03
	<i>Columbina jalisco</i>	Ruddy Quail-Dove	D	0.05			
	<i>Geotrygon montana</i>	Gray-fronted Dove	D	0.03	0.10		
	<i>Geotrygon mystacea</i>	Dove	D	0.03	0.10		
	<i>Lophotilapia verreauxii</i>	White-tipped Dove	S	0.45	0.38	0.05	0.08
	<i>Patagioenas cayennensis</i>	Pale-vented Pigeon	D	0.05			
	<i>Patagioenas picazuro</i>	Picazuro Pigeon	S	0.63	0.38	0.50	0.40
Psittacidae	<i>Araatinga aurea</i>	Peach-fronted Parakeet	I	0.03	0.03	0.03	
	<i>Brotogeris chiriri</i>	Yellow-chevroned Parakeet	S	0.03	0.05	0.05	
	<i>Forpus xanthopterygius</i>	Blue-winged Parrotlet	I				0.03
	<i>Platynis mensatrix</i>	Blue-headed Parrot	S	0.03			
Cuculidae	<i>Cluecyclus melacoryphus</i>	Dark-knobbed Cuckoo	S		0.03		
	<i>Dromococcyx pavoninus</i>	Guacharo	D	0.03			
	<i>Playapex palmarum</i>	Squirrel Cuckoo	S	0.05	0.03		
	<i>Tapera naevia</i>	Striped Cuckoo	I	0.03			
Strigidae	<i>Megascops choliba</i>	Tropical Screech-Owl	S		0.03		
Caprimulgidae	<i>Nyctiphrynus albicollis</i>	Pauraque	I		0.03		
Apodidae	<i>Tachornis squamata</i>	Fork-tailed Flycatcher	S	0.15	0.05	0.15	0.18
Trochilidae	<i>Amazilia fimbriata</i>	Glittering-throated Emerald	S	0.03	0.05	0.03	0.03
	<i>Anthrachloris nigricollis</i>	Black-throated Mango	S	0.15	0.05	0.03	0.05
	<i>Chlorostilbon lucidus</i>	Glittering-bellied Emerald	S	0.15	0.05	0.03	0.05
	<i>Colibri serrirostris</i>	White-wedged Violet-ear	S	0.73	0.03		0.03
	<i>Colibri thalassinus</i>	Gilded Sunangel	S	0.43	0.23	0.20	0.25
	<i>Phaeoptila pretrei</i>	Plumbeous Hummingbird	S	0.05	0.03		0.30
	<i>Trochilidae indeterminado</i>	Hummingbird					
Trogonidae	<i>Trogon surrucura</i>	Surucua Trogon	D	0.28	0.13	0.05	
Momotidae	<i>Momotus momota</i>	Blue-crowned Motmot	D	0.33	0.33	0.20	
Galbulidae	<i>Galbulula ruficauda</i>	Rufous-billed Jacamar	S	0.05	0.05	0.03	
Buccidae	<i>Monasa nigrifrons</i>	Black-fronted Nunbird	D	0.20	0.18	0.13	
Ramphastidae	<i>Nystalus chacuru</i>	White-eared Puffbird	I	0.03	0.08	0.03	
	<i>Pteropsglossus castaneoventris</i>	Chestnut-eared Aracari	D	0.03	0.03		
Picidae	<i>Kampaphaga melanotos</i>	Toco Toucan	D	0.08	0.03	0.08	
	<i>Colaptes melanochloros</i>	Green-banded Woodpecker	I	0.03	0.03		0.03
	<i>Picus puniceus</i>	White-wedged Piculet	S	0.18	0.05	0.15	
	<i>Veniliornis passerinus</i>	Little Woodpecker	S	0.08	0.13	0.05	0.03
Thamnophilidae	<i>Herpsilochmus longirostris</i>	Large-billed Antshrike	S	0.10	0.08		
	<i>Thamnophilus doliatus</i>	Rufous-winged Antshrike	D	0.25	0.23	0.13	
	<i>Thamnophilus torquatus</i>	Red-billed Antshrike	I	0.03	0.03		
Dendrocolaptidae	<i>Campylorhamphus trochilirostris</i>	Red-billed Manakin	D	0.03	0.03	0.03	
	<i>Campephilus guatemalensis</i>	White-bellied Woodpecker	I	0.05	0.08	0.10	
	<i>Sitomelus proteiceps</i>	Olivaceous Woodpecker	D	0.30	0.13	0.23	
Furnariidae	<i>Syndactyla frontalis</i>	Sooty-fronted Spinetail	D	0.10	0.08	0.05	0.03
Tyrannidae	<i>Campylorhynchus obsoletus</i>	Russell-mantled Flycatcher	I	0.18	0.03	0.05	0.05
	<i>Casiornis rufus</i>	Rufous Casiornis	D	0.38	0.08	0.23	0.08
	<i>Cnemotriccus fuscatus</i>	Fuscous Flycatcher	D	0.53	0.35	0.43	0.08
	<i>Colonia colonus</i>	Long-tailed Tyrant	D	0.05	0.03		
	<i>Contopus cinereus</i>	Fusco-collared Flycatcher	D	0.03	0.03		0.05
	<i>Elaenia churquensis</i>	Lesser Elaenia	I		0.05		
	<i>Elaenia obscurior</i>	Plain-backed Elaenia	S	0.18	0.18	0.18	0.03
	<i>Elaenia albiceps</i>	Yellow-bellied Elaenia	S	0.25	0.10		
	<i>Elaenia mesoleuca</i>	Olivaceous Elaenia	D	0.10	0.13		
	<i>Empidonax varius</i>	Variegated Flycatcher	S	0.05	0.03		0.08
	<i>Griseotyrannus aurantiocephalus</i>	Crowned Slaty Flycatcher	S	0.43	0.35	0.10	0.20
	<i>Hemicircus margaritaceiventer</i>	Pearly-vented Flycatcher	D	0.08	0.18	0.25	0.08
	<i>Latrochroa euleri</i>	Euler's Flycatcher	D	0.08	0.18	0.25	0.08
	<i>Leptopogon amarucocephalus</i>	Sepia-capped Flycatcher	S	0.08	0.03	0.03	0.05
	<i>Megarynchus pitangua</i>	Boat-billed Flycatcher	S	0.23	0.20	0.15	0.10
	<i>Myiarchus ferrugineus</i>	Short-crested Flycatcher	S	0.70	0.20	0.38	0.65
	<i>Myiarchus cephalotes</i>	Brown-chested Flycatcher	D	0.05	0.03		
	<i>Myiobius senegalensis</i>	Streaked Flycatcher	D	0.10	0.03		0.28
	<i>Myiobius virgatulus</i>	Greenish Elaenia	D		0.03		0.08
	<i>Myiotheretes cayanensis</i>	Brained Flycatcher	I		0.13	0.28	0.03
	<i>My</i>						