

Avian communities from urban and non-urban riparian habitats

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Salt River (SR)

Introduction

Riparian ecosystems are important habitats to bird species by providing water, shade, food, and nesting sites. As urbanization increases, the quality and extent of the riparian areas will likely decrease. Some urban ecosystems may be rehabilitated by planting native vegetation.

Objective

We were interested in how urbanization and rehabilitation affects bird communities. The purpose of our research is to compare diversity, abundance, species richness and microhabitat at three types of urban and non-urban riparian habitats.



Figure 1. Photographs of riparian study sites: SR (in title bar) is wildland, BTA is non-urban and non-native oasis, and RS is urban rehabilitated.

Methods

Bird counts

- 8 point count stations at 25 m intervals at SR, BTA, and RS (Fig. 1)
- Visited each station 6 times beginning at sunrise, March to May 2010
- Record birds heard and observed within a 50 m radius, for 12 minutes

Vegetation measurements

- Established 3 plots (25 m x 8 m) randomly at SR, BTA, and RS
- Recorded density of trees and shrubs
- Recorded canopy height of trees and shrubs using a meter stick and an inclinometer
- Recorded canopy cover with concave densiometer
- Recorded ground cover type (woody, bare soil, etc.)
- Calculated plant diversity, tree and shrub abundance, and species richness

Analysis

- Statistical analysis using one-way ANOVA or non-parametric tests

Results

Avian diversity and species richness did not differ among locations (df=17, F=6, P=0). However, avian abundance was 30% greater at SR compared to RS and BTA (Table 1). Among avian guilds (Fig. 2) aquatic species were four times more abundant at SR compared to the other two sites. Microhabitat characteristics were similar among the locations (Table 2) except for canopy cover was greatest at BTA (Fig. 3).

Table 1

	Locations			Results		
	Rio Salado	Salt River	BTA	df	F	P
Abundance	9.5 (±1.03) ^a	12.6 (±1.04) ^b	9.1 (±0.52) ^a	17	6.254	0.017
Richness	4.8 (±0.30)	5.7 (±0.25)	5.1 (±0.23)	17	1.896	0.20
Diversity H'	2.3 (±0.08)	2.3 (±0.08)	2.3 (±0.12)	17	0.322	0.732

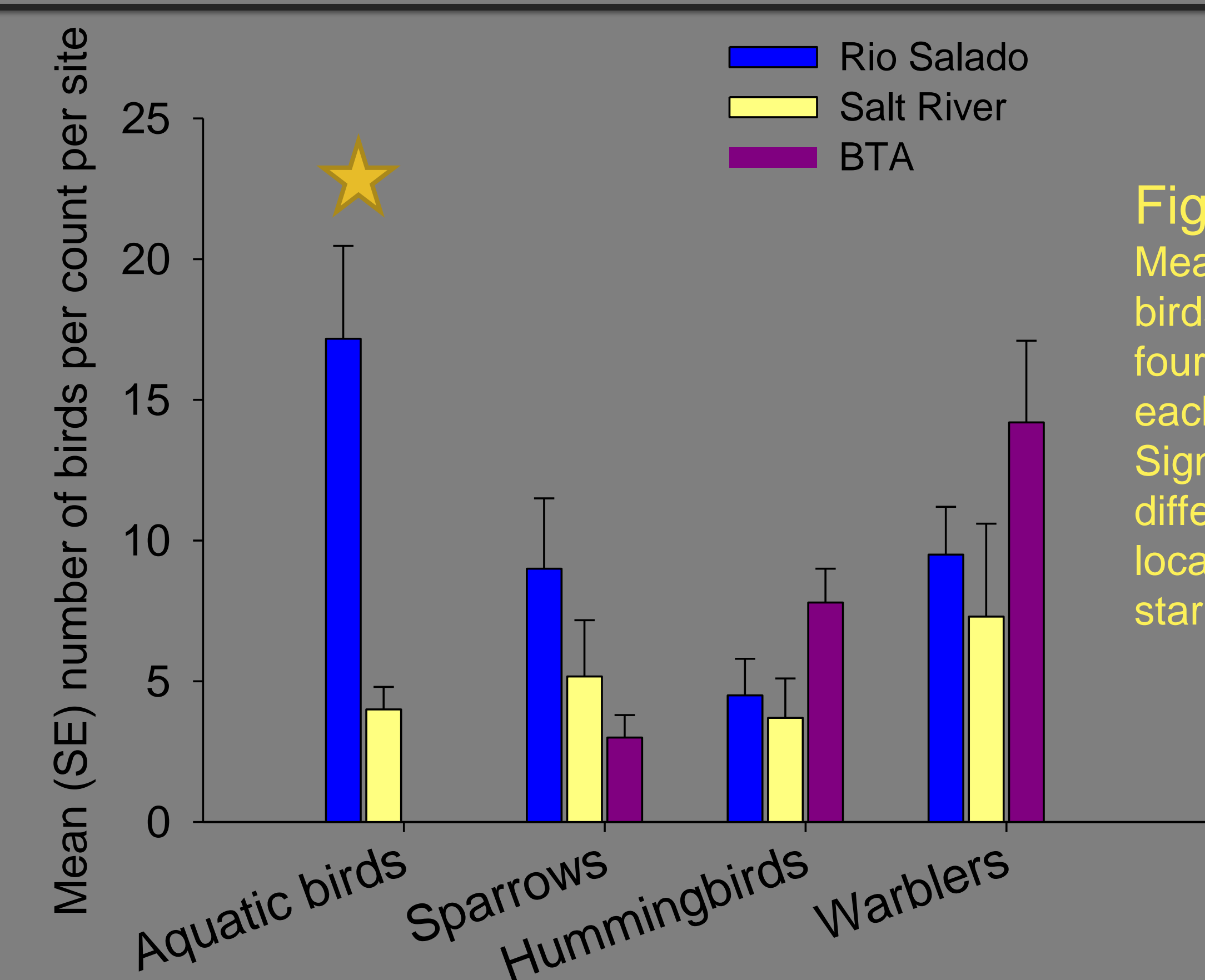


Figure 2. Mean number of birds observed in four guilds at each location. Significant difference among locations is starred.

Table 2

	Locations			Results		
	Rio Salado	Salt River	BTA	df	F	P
Number of Tree Sp.	3.3 (±0.88)	3.3 (±0.67)	3.3 (±0.88)	8	0	1.0
Tree Count	8.0 (±5.03)	4.4 (±0.33)	9.3 (±1.33)	8	0.739	0.517
Tree Height (m.)	4.0 (±1.80)	5.1 (±0.38)	4.6 (±0.70)	8	0.223	0.807
Tree Diameter	2.9 (±0.64)	4.7 (±0.55)	4.4 (±0.36)	8	3.336	0.106
Tree H'	1.0 (±0.19)	1.1 (±0.22)	0.9 (±0.28)	8	0.253	0.784
Number of Shrub Sp.	1.7 (±0.88)	4.0 (±1.00)	3.3 (±0.33)	8	2.294	0.182
Shrub Count	17 (±11.6)	20 (±8.60)	20 (±8.00)	8	0.045	0.956
Shrub Height	0.7 (±0.38)	1.8 (±0.4)	2.1 (±0.25)	nonparametric		0.286
Shrub Volume	2.3 (±2.05)	3.1 (±1.18)	16 (±6.56)	7	3.129	0.131
Shrub H'	0.3 (±0.19)	1.1 (±0.28)	0.9 (±0.16)	8	6.181	0.06

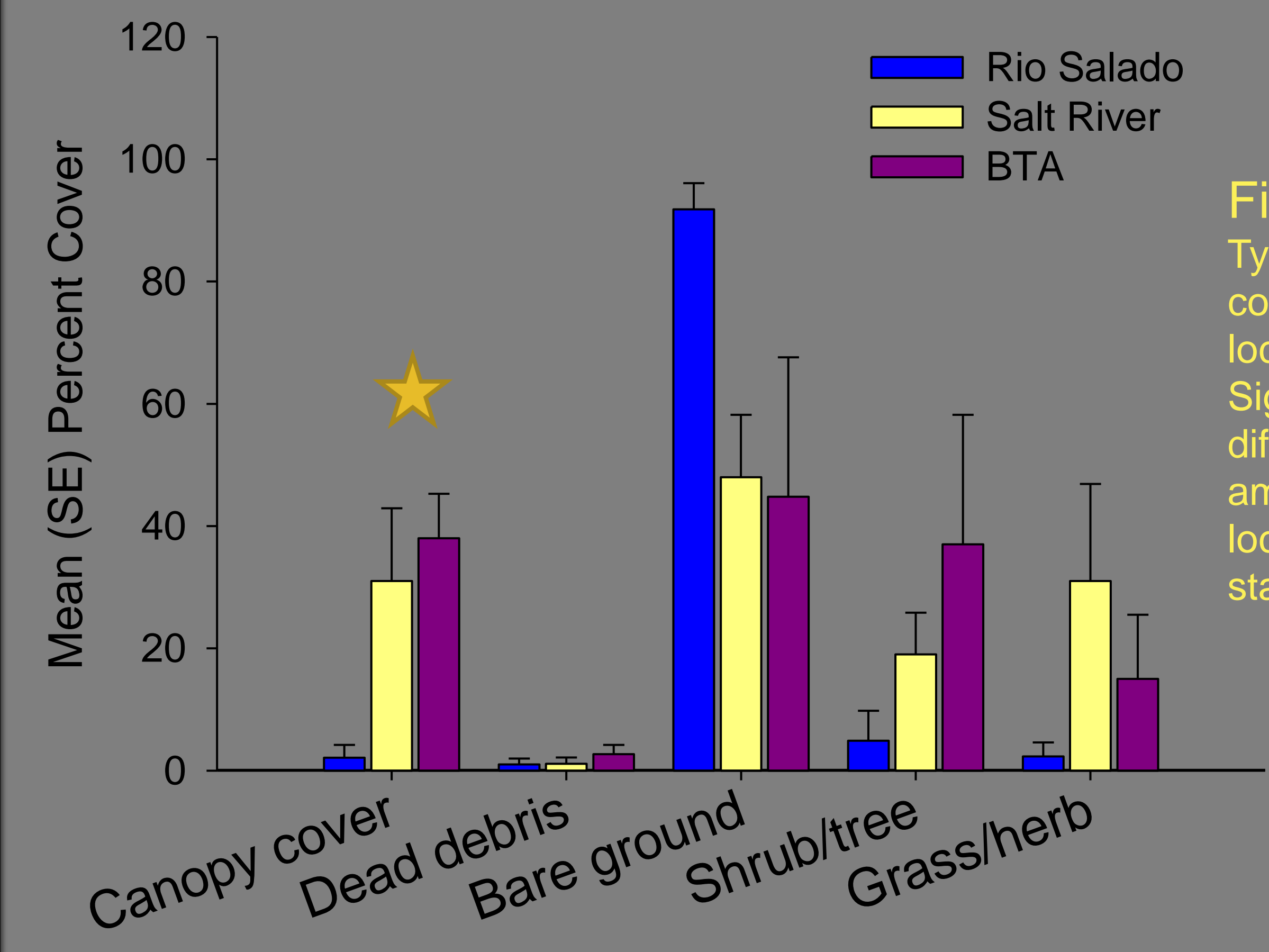


Figure 3. Type of ground cover at each location. Significant difference among locations is starred.

Conclusion

These results suggest that our urban and non-urban locations were similar in avian diversity and vegetation characteristics, with some differences in avian abundance. Others have documented that woody debris is important habitat substrate for urban riparian birds (Green & Baker 2003). By comparing habitat of rehabilitated and non-rehabilitated riparian ecosystems, this work can provide information to resource managers on how urbanization and rehabilitation impact avian communities. Further research shows that parks and other non-native landscaped areas do not sufficiently support indigenous avian communities and a network of native-habitat patches must be incorporated through out urban developed regions (Germaine et al. 1998). A novel method of assessing the growing effects of human activities on bird communities is to assign values to specific bird species and their tolerance of degrading habitats. One could understand the changes of an ecosystem due to the avian census in that neighborhood (Croonquist & Brooks 1991).

Acknowledgments

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