Data from: Seed-dispersal networks in tropical forest fragments: area effects, remnant species, and interaction diversity

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Abstract

Seed dispersal interactions involve key ecological processes in tropical forests that help to maintain ecosystem functioning. Yet this functionality may be threatened by increasing habitat loss, defaunation and fragmentation. However, generalist species, and their interactions, can benefit from the habitat change caused by human disturbance while more specialized interactions mostly disappear. Therefore changes in the structure of the local, within fragment, networks can be expected. Here we investigated how the structure of seed-dispersal networks changes along a gradient of increasing habitat fragmentation. We analysed 16 bird seed-

dispersal assemblages from forest fragments of a biodiversity-rich ecosystem. We found significant species-, interaction- and network-area relationships, yet the later was determined by the number of species remaining in each community. The number of frugivorous bird and plant species, their interactions, and the number of links per species decreases as area is lost in the fragmented landscape. In contrast, network nestedness has a negative relationship with fragment area, suggesting an increasing generalization of the network structure in the gradient of fragmentation. Network specialization was not significantly affected by area, indicating that some network properties may be invariant to disturbance. Still, the local extinction of partner species, paralleled by a loss of interactions and specialist-specialist bird-plant seed dispersal associations suggests the functional homogenization of the system as area is lost. Our study provides empirical evidence for network-area relationships driven by the presence/absence of remnant species and the interactions they perform.

Methods

We compiled 16 studies of avian plant-frugivore interactions sampled at the community level along the Atlantic Forest biome, a hotspot of biodiversity highly threaten by increasing human pressure (Ribeiro et al. 2009, Joly et al. 2014; Fig. 1, Table S1). The study areas varied from 0.66 to 42,000 ha, along a gradient of disturbance from semi-pristine Biological Reserves and State Parks to secondary forest fragments and restored private lands. The matrix surrounding the fragments is variable, including sugar cane fields, crop plantations, secondary forest, and urban areas.

Usage Notes

Overall the studies included here originally aimed to record bird-eating-fruit interactions and not necessarily effective seed dispersal; therefore we carefully checked every dataset and removed any interaction that would not characterize plant dispersal events, such as seed predation. In the particular case of parrots we excluded them from the analysis despite some rare evidences pointing to their role in effective seed dispersal of large nuts (Tella *et al.* 2016); in most cases we could not establish in the original papers whether the frequency of interactions involving parrots actually implied legitimate dispersal. We updated and standardized plant and bird species names using the taxize package (Chamberlain & Szocs, 2013) in R (R Development Core Team 2014).

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Keywords

Frugivory, Species Interactions, human disturbance, defaunation, forest fragmentation, network-area relationship, Atlantic Forest

Files

16 files for this dataset

n10_Athie_RC.csv	1.31 kB	text/csv
n11_fe15_quanti.csv	853 B	text/csv
n12_fe25_quanti.csv	2.30 kB	text/csv
n13_fe57_quanti.csv	877 B	text/csv
n14_Hasui.csv	2.07 kB	text/csv
n15_vivian_quanti.csv	1.04 kB	text/csv
n16_Rafael_UFRJ.csv	1.61 kB	text/csv
n1_Wesley.csv	35 kB	text/csv
n2_Botelho.csv	5.15 kB	text/csv
n3_Castro_Cardoso.csv	2.81 kB	text/csv
n4_Correia_PcAntas.csv	2.33 kB	text/csv
n5_Kaiser_original.csv	1.61 kB	text/csv
n6_Fadini_MG.csv	2.35 kB	text/csv
n7_Kindel.csv	1.31 kB	text/csv
n8_Galetti_Pizo.csv	3.18 kB	text/csv
n9_pizo_quanti.csv	2.75 kB	text/csv

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