

The availability of primates is key for the prevalence of fleshy fruited species in tropical lowlands

Diego F. Correa

Esteban Álvarez, Ana M. Aldana, Natalia Umaña, Angela Cano, Pablo R. Stevenson



Species with fleshy fruits



Clarisia racemosa



Tetragastris panamensis



Endlicheria bracteolata

Importance of fleshy fruits in tropics

Table 2 Present woody plants exhibiting morphological adaptations for dispersal^a

Location	Annual precipitation (mm)	Plant form	Percent species dispersed by:				
			Vivivores (Doby fruits)	Wind	Water	Self	Other
Temperate Deciduous Forests:							
1) Jennings Co., Ind.	1300	trees (> 1" dbh)	25	38	0	0	38 ^b
		shrubs & woody vines	100	0	0	0	0
2) Orange Co., Ind.	1091	trees (> 1" dbh)	24	29	0	0	48 ^b
		shrubs & woody vines	85	0	0	0	13 ^d
3) SW Ohio	1015	canopy trees	10	38	0	0	52 ^b
Neotropical Amazonian Forests:							
4) Alto Yurua, Colombia	5530	trees	89	3	—	—	8 ^d
Neotropical Wet Forests:							
5) La Selva, Heredia Prov., Costa Rica	4000	canopy trees	85	13	—	—	3 ^d
		sub-canopy trees	98	2	—	—	—
6) Rio Palenque, Ecuador	2630	canopy trees	93	4	1	2	—
		sub-canopy trees	91	5	2	2	—
		lianas	63	33	1	4	—

Howe & Smallwood 1982

Importance of frugivores

Escape

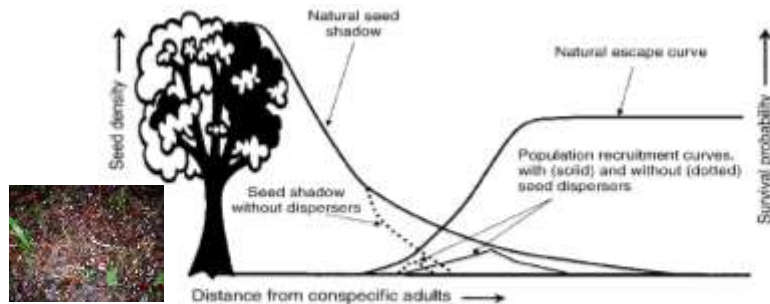
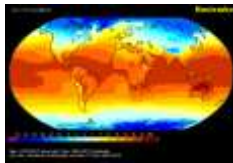


FIG. 1. Janzen-Connell model (Janzen 1970, Connell 1971) with modifications leading to predictions described in the text. The x-axis represents distance from the focal tree, and the y-axis (relative scale) represents the density of seeds falling to the ground (seed shadow) or the proportion of seeds surviving to maturity (escape curves).

The prevalence of species with fleshy fruits change in relation to environmental gradients



www.uvm.edu

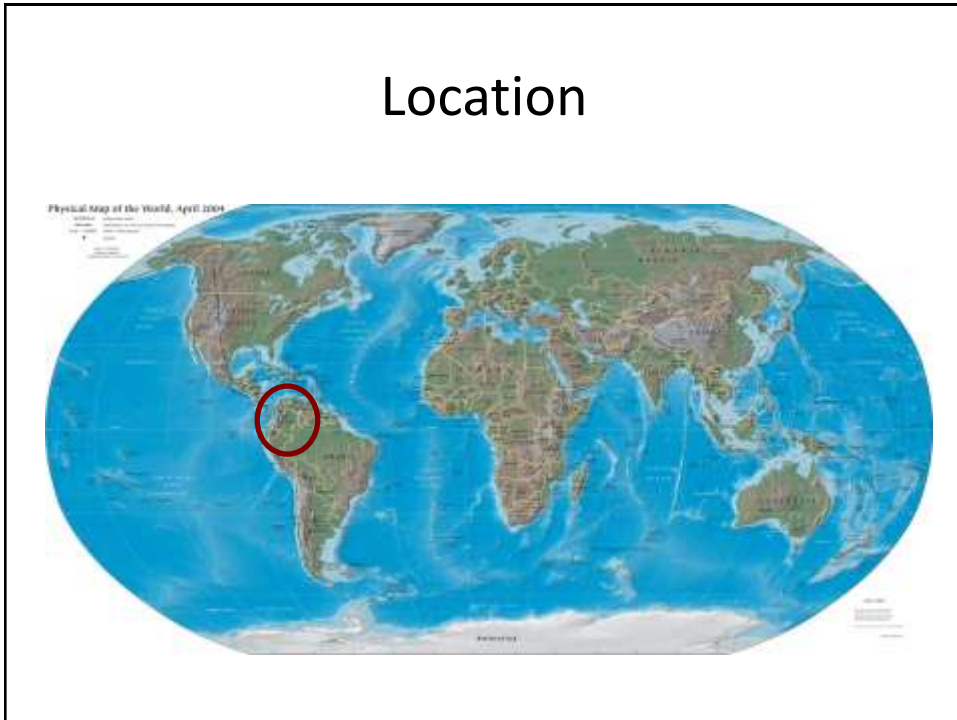


Howe & Smallwood 1982, Gentry 1983, Willson *et al.* 1989, Herrera 1992, Jordano 2000, Tabarelli *et al.* 2003, Butler *et al.* 2007, Almeida-Neto *et al.* 2008

Research question

1. What is the influence of environmental variables and the availability of frugivores for the prevalence of fleshy fruited species in Colombian tropics?

Location



Vegetation plots



- 101 vegetation plots (1-ha each one)
- Diameter at Breast Height ≥ 10 cm

Range of values

	<u>Min</u>	<u>Max</u>
Annual mean temperature (°C)	12.9	28.4
Precipitation (mm)	985	8441
Soil total Nitrogen density (g/m²)	662	2783



8 Holdridge life zones (1967):

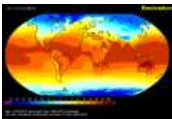
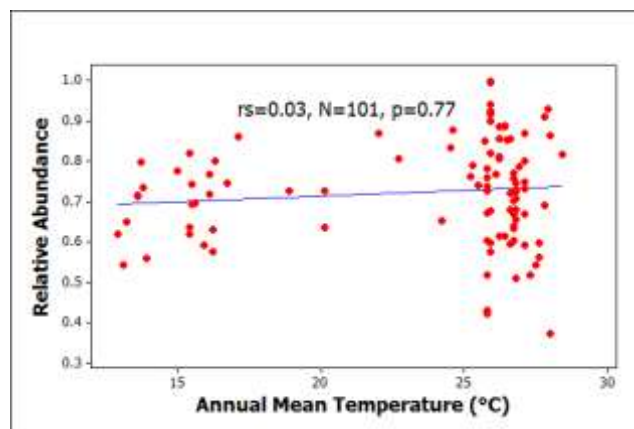
tropical dry forest (TDF)
 tropical moist forest (TMF),
 tropical wet forest (TWF),
 tropical rain forest (TRF),

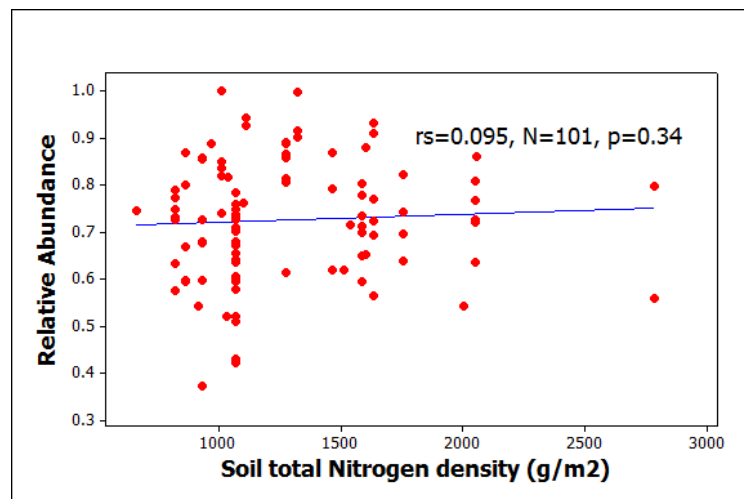
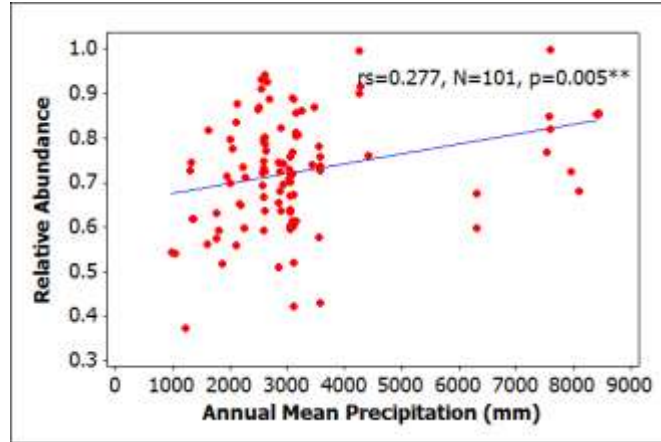
premontane moist forest (PMF)
 premontane wet forest (PWF)
 lower montane moist f. (LMMF)
 lower montane wet f. (LMWF).

Analyses

- **Assignment of dispersal syndromes** per species (2262 taxa)
- **Response variable:** Relative abundance of individuals with fleshy fruits per plot.
- **Explanatory variables:** Annual mean temperature, Annual mean precipitation, soil total Nitrogen content, biomass of primates (subset of plots).
- Spearman rank correlations.

Correlations including all plots

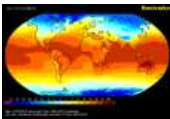
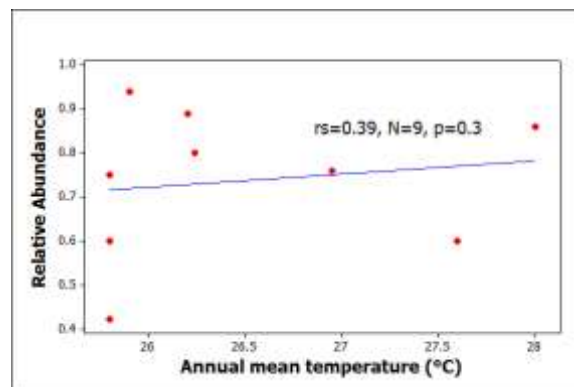


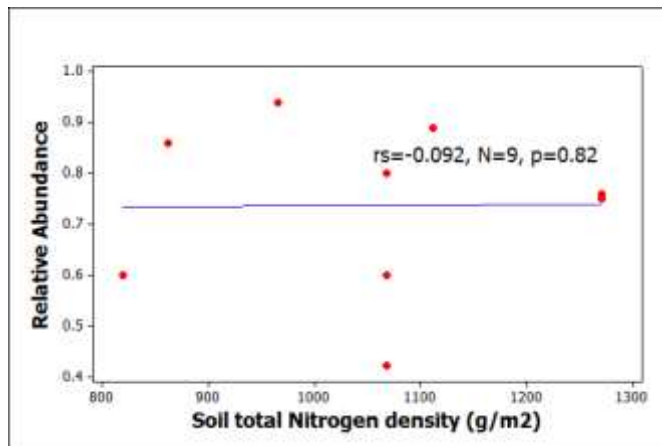
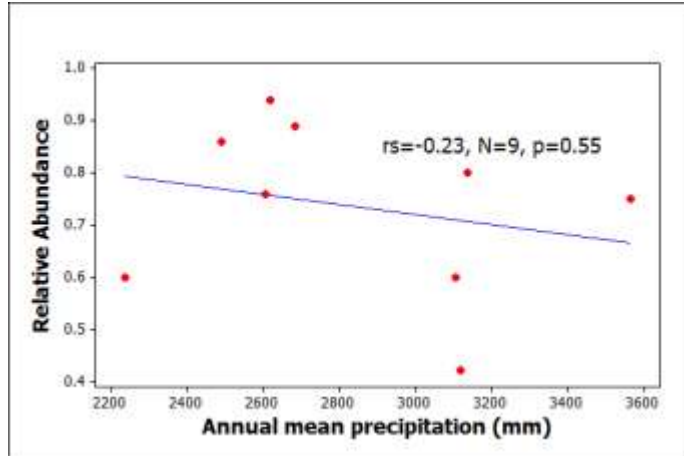


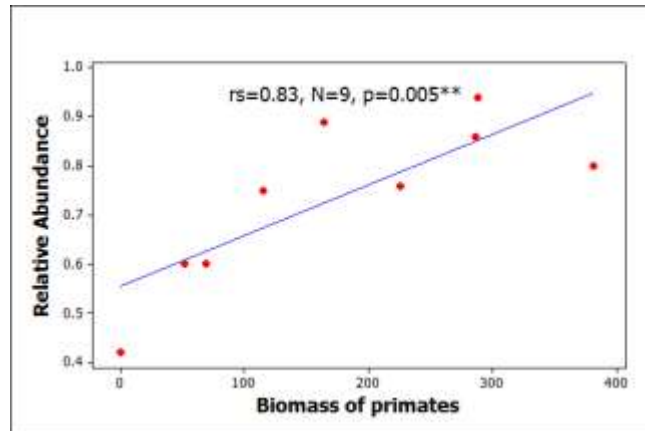
Biomass of primates

- Extraction of 20 vegetation plots with available information on primates biomass
- Collapse of nearby plots and obtaining of a total of 9 places with average response and explanatory variables

Correlations







Conclusions

- The availability of primates was related to the prevalence of fleshy fruited species in Colombian lowlands.
- It would be expected that the loss of effective frugivores, such as primates in tropical forests, would negatively impact the dispersal and persistence of species with fleshy fruits.
- More research is needed in order to generalize the influence of frugivores and environmental variables on the prevalence of fleshy fruited species over regional scales within the tropics.