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SUPPORTING INFORMATION

Geographical variation in ant foraging activity and resource use is driven by climate and net primary productivity

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Appendix S2 – Tables

Table S2.1. Representation of temperature data from the nearest climatic station (NCS) from our sampling transects for different Brazilian biomes. Data were extracted in Instituto Nacional de Meteorologia (<https://portal.inmet.gov.br/>). Here we also specify the location of our NCS and the average distance from our transects for each biome. NCS sampling days temperature is based on measure for the exact days in each month and year we carried out the sampling. This measure is the mean of the hourly temperature across the days of sampling, accounting only the morning periods (07:00 AM – 12:00 AM) for all biomes, except for caatinga, that was extracted for the afternoon (01:00 PM – 17:00 PM). We pointed out the mean values of the total temperature range (mean), the mean of the maximum temperature (Max. mean) and the mean of minimum temperature (Min. mean). SD is the standard deviation of those means across the hours and days.

Biome	Nearest climatic station (NCS)	Average distance of NCS from the sampling points	NCS sampling days temperature
Amazon	Rio Branco – AC Lat: -9.750839° Lon: -67.647458°	32 km	Mean = 23 °C (SD = 1.82) Max. mean = 23.13 °C (SD = 1.81) Min. mean = 22.33 °C (SD = 1.43)
Atlantic Rainforest	Itapeva – SP Lat: -24.307536° Lon: -48.412762°	55 km	Mean = 20.90 °C (SD = 1.06) Max. mean = 21.12 °C (SD = 1.14) Min. mean = 20.30 °C (SD = 0.76)
Caatinga	Arcoverde – PE Lat: -8.54168° Lon: -37.253093°	24 km	Mean = 20.86 °C (SD = 0.82) Max. mean = 21.54 °C (SD = 0.78) Min. mean = 19.85 °C (SD = 0.76)
Cerrado	Brasília – DF Lat: -15.96575° Lon: -47.886521°	15 km	Mean = 20.82 °C (SD = 1.66) Max. mean = 21.01 (SD = 1.74) Min. mean = 20.07 °C (SD = 1.19)
Pampa	Uruguaiana – RS Lat: -30.179853° Lon: -57.498731°	55 km	Mean = 19.55 °C (SD = 2.27) Max. mean = 19.75 °C (SD = 2.21) Min. mean = 18.62 °C (SD = 1.70)
Pantanal	Cuiaba – MT Lat: -16.508505° Lon: -56.41628°	93 km	Mean = 24.86 °C (SD = 0.95) Max. mean = 25.07 °C (SD = 0.88) Min. mean = 24.39 °C (SD = 0.52)

Table S2.2. Model selection considering the ant foraging activity in control tubes (distilled water) and controlling for the relative distilled water use, using the Dredge function (Barton, 2015) based on the Akaike information criterion (AICc) ranking, across six Brazilian biomes (n =60). For question 1 and 2, the generalized linear mixed models were constructed with the explanatory variables: temperature (monthly mean temperature, MMTemp), precipitation (monthly precipitation, MPrec), temperature seasonality (TSeas), net primary productivity (NPP). Biome was the random variable. In question 2, the models were ran separately for four resources types represented as a solution (distilled water/volume) of: 1% sodium (NaCl), 20% sugar (CHO, made with sucrose), 20% amino acid (AA, made with unflavored whey protein isolate), and only distilled water as control. To control for relative distilled water use in other resources (NaCl, CHO and AA), we also added the relative use of distilled water (Control) as an additional explanatory variable, in order to verify if patterns remain the same. We only considered and pointed out models equal or lower than $\Delta AICc = 2$. Degrees of freedom of the model (d.f.), differences in AICc-values ($\Delta AICc$) and Akaike weight (ω). Marginal R² is the coefficient of determination of fixed effects (ecological drivers) and Conditional R² is the coefficient of determination of fixed effects plus random effects (biomes).

Question 1: How do ecological drivers influence ant foraging activity?							
Model	d.f.	AICc	$\Delta AICc$	ω	Log Likelihood	Marginal R²	Conditional R²
MPrec	4	96.8	0.00	0.17	-44.01	0.25	0.81
MPrec + TSeas	5	97.0	0.26	0.15	-42.95	0.44	0.80
TSeas + NPP	5	97.7	0.99	0.10	-43.31	0.45	0.74
TSeas	4	98.0	1.21	0.09	-44.62	0.35	0.74
MPrec + TSeas + NPP	6	98.5	1.70	0.07	-42.43	0.48	0.77

Question 2: How do ecological drivers influence relative resource use of foraging ants?							
Distilled water relative use (Control)							
Model	d.f.	AICc	$\Delta AICc$	ω	Log Likelihood	Marginal R²	Conditional R²
MMTemp + MPrec	5	-225.4	0.00	0.20	118.25	0.12	0.12
MPrec	4	-225.2	0.20	0.19	116.96	0.08	0.08
MPrec + TSeas	5	-223.6	1.77	0.08	117.37	0.09	0.09
Null Model	3	-223.4	1.97	0.07	114.93	-	-

CHO							
Model	d.f.	AICc	$\Delta AICc$	ω	Log Likelihood	Marginal R²	Conditional R²
MPrec + TSeas + NPP	6	132.7	0.00	0.41	-59.57	0.46	0.46
MMTemp + MPrec + TSeas + NPP	7	134.4	1.67	0.18	-59.12	0.47	0.47

AA							
Model	d.f.	AICc	$\Delta AICc$	ω	Log Likelihood	Marginal R²	Conditional R²
MMTemp + TSeas + NPP	6	173.6	0.00	0.29	-79.98	0.32	0.32

NaCl							
Model	d.f.	AICc	$\Delta AICc$	ω	Log Likelihood	Marginal R²	Conditional R²
MPrec + TSeas + NPP	6	164.2	0.00	0.30	-75.29	0.51	0.51
MPrec + TSeas	5	165.3	1.12	0.17	-77.09	0.48	0.50
MMTemp + MPrec + TSeas + NPP	7	165.6	1.43	0.15	-74.72	0.52	0.52

Table S2.3. Number of tubes visited by at least one ant individual at different biomes and different solutions (distilled water/ volume) of resources: 1% sodium (NaCl), 20% sugar (CHO, made with sucrose), 20% amino acid (AA, made with unflavored whey protein isolate), and lipid (extra virgin olive oil) and distilled water, as a control. For each resource type, there were 50 tubes placed in each biome. Each entry in the table represent the number of visits in each resource per biome and in branches is the relative use of a given resource per biome.

	CHO	Lipids	AA	NaCl	Control	Total visits per biome
Amazon	48	46	44	47	9	194
Atlantic rainforest	38	46	13	16	1	114
Caatinga	32	38	4	4	0	78
Cerrado	29	40	7	31	4	111
Pampa	35	20	3	2	1	61
Pantanal	45	38	11	9	1	104
Percentage of visited tubes across the study	34%	34%	12%	17%	3%	

Table S2.4. Ant species list sampled in six Brazilian biomes: Amazon, Atlantic rainforest, Caatinga, Cerrado, Pampa and Pantanal.

Amazon		
Ant species	Number of individuals	Number of visits in baited tubes
<i>Brachymyrmex</i> sp. 3	47	3
<i>Brachymyrmex</i> sp. 9	1	1
<i>Camponotus depressus</i>	2	2
<i>Camponotus</i> sp. 3	17	2
<i>Camponotus</i> sp. 7	21	2
<i>Cephalotes atratus</i>	59	2
<i>Cephalotes pavonii</i>	2	1
<i>Crematogaster</i> aff. <i>snellingi</i>	24	1
<i>Crematogaster brasiliensis</i>	1	1
<i>Crematogaster carinata</i>	1556	22
<i>Crematogaster flavosensitiva</i>	173	4
<i>Crematogaster</i> gr. <i>limata</i> sp. 1	808	13
<i>Crematogaster limata</i>	21	4
<i>Crematogaster</i> sp. 3	138	1
<i>Dolichoderus debilis</i>	115	2
<i>Dolichoderus septemspinus</i>	211	4
<i>Ectatomma brunneum</i>	5	4
<i>Ectatomma edentatum</i>	2	2
<i>Gigantiops destructor</i>	1	1
<i>Labidus</i> sp. 1	5	1
<i>Mayaponera constricta</i>	1	1
<i>Megalomyrmex emeryi</i>	34	2
<i>Megalomyrmex</i> aff. <i>balzani</i>	217	10
<i>Mycetomoellerius bugnioni</i>	2	2
<i>Mycetomoellerius</i> sp. 10	1	1
<i>Neoponera obscuricornis</i>	1	1
<i>Neoponera unidentata</i>	2	1
<i>Nylanderia fulva</i>	9	2
<i>Nylanderia</i> sp. 1	92	5
<i>Nylanderia</i> sp. 3	56	15
<i>Nylanderia</i> sp. 4	3	1
<i>Ochetomyrmex semipolitus</i>	236	14
<i>Odontomachus haematodus</i>	1	1
<i>Pachycondyla crassinoda</i>	3	1
<i>Pheidole</i> aff. <i>bufo</i> sp. 1	8	1
<i>Pheidole</i> aff. <i>bufo</i> sp. 2	5	2
<i>Pheidole</i> aff. <i>laevifrons</i>	85	1

<i>Pheidole</i> aff. <i>radoszkowskii</i> sp. 1	255	19
<i>Pheidole biconstricta</i>	315	3
<i>Pheidole bruesi</i>	6	2
<i>Pheidole cataractae</i>	1	1
<i>Pheidole fimbriata</i>	1	1
<i>Pheidole lemur</i>	1	1
<i>Pheidole midas</i>	345	4
<i>Pheidole sensitiva</i>	50	5
<i>Pheidole</i> sp. 1	295	2
<i>Pheidole</i> sp. 1b	1	1
<i>Pheidole</i> sp. 1c	48	4
<i>Pheidole</i> sp. 3	2	1
<i>Pheidole</i> sp. 5a	43	1
<i>Pheidole</i> sp. 10	18	1
<i>Pheidole</i> sp. 12	31	2
<i>Pheidole</i> sp. 17	3	1
<i>Pheidole</i> sp. 19	1	1
<i>Pheidole synarmata</i>	36	6
<i>Pheidole</i> cf. <i>trageri</i>	194	6
<i>Pheidole</i> cf. <i>wallacci</i>	91	6
<i>Pheidole zelata</i>	46	1
<i>Pseudomyrmex tenuis</i>	1	1
<i>Solenopsis bicolor</i>	107	3
<i>Solenopsis</i> sp. 1	459	33
<i>Solenopsis</i> sp. 9	88	1
<i>Solenopsis virulens</i>	2	1
<i>Wasmannia auropunctata</i>	601	18
Total	7,006	

Atlantic rainforest		
Ant species	Number of individuals	Number of visits in baited tubes
<i>Brachymyrmex</i> sp. 7	15	1
<i>Gnamptogenys striatula</i>	6	4
<i>Heteroponera mayri</i>	1	1
<i>Megalomyrmex iheringi</i>	49	2
<i>Nylanderia</i> sp. 4	5	3
<i>Oxyepoecus punctifrons</i>	1	1
<i>Pachycondyla striata</i>	7	5
<i>Pheidole ambigua</i>	174	1
<i>Pheidole aper</i>	1	1
<i>Pheidole</i> aff. <i>longiseta</i> sp. 1	391	15
<i>Pheidole lucculenta</i>	1	1

<i>Pheidole sarcina</i>	331	47
<i>Pheidole senilis</i>	62	5
<i>Pheidole sospes</i>	162	10
<i>Pheidole</i> sp. 8a	29	1
<i>Pheidole</i> sp. 49a	183	1
<i>Pheidole</i> sp. 49	87	6
<i>Pheidole</i> sp. 54	47	6
<i>Pheidole</i> sp. 53	11	3
<i>Pheidole</i> sp. 53a	1	1
<i>Pheidole</i> sp. 53b	9	1
<i>Pheidole</i> sp. 53c	10	1
<i>Pheidole</i> sp. 54a	4	2
<i>Pheidole</i> sp. 54b	1	1
<i>Pheidole</i> sp. 55	7	6
<i>Pheidole</i> sp. 56	14	2
<i>Pheidole tristis</i>	285	5
<i>Solenopsis</i> sp. 10	76	10
<i>Solenopsis</i> sp. 3	5	4
<i>Solenopsis</i> sp. 7	267	2
<i>Solenopsis</i> sp. 8	9	5
<i>Solenopsis</i> sp. 4	3	1
<i>Wasmmania lutzii</i>	15	4
Total	2,269	

Caatinga		
Ant species	Number of individuals	Number of visits in baited tubes
<i>Camponotus crassus</i>	44	4
<i>Dinoponera quadriceps</i>	21	20
<i>Dorymyrmex</i> aff. <i>biconis</i>	482	9
<i>Ectatomma edentatum</i>	30	16
<i>Pheidole nubila</i>	179	12
<i>Pheidole</i> cf. <i>bruesii</i>	437	15
<i>Pheidole claviscapa</i>	6	1
<i>Pheidole</i> sp. 61	34	4
<i>Pheidole</i> sp. 63	88	6
<i>Pheidole</i> sp. 64	1	1
<i>Solenopsis</i> sp. 23	2	1
<i>Solenopsis</i> sp. 1	6	3
<i>Solenopsis</i> sp. 13	353	3
<i>Solenopsis</i> sp. 19	14	6
<i>Solenopsis tridens</i>	1	1
<i>Wasmmania auropunctata</i>	4	1
Total	1,704	

Cerrado		
Ant species	Number of individuals	Number of visits in baited tubes
<i>Blepharidatta conops</i>	4	2
<i>Camponotus arboreus</i>	20	1
<i>Camponotus crassus</i>	72	34
<i>Camponotus melanoticus</i>	6	2
<i>Camponotus renggeri</i>	2	2
<i>Camponotus</i> sp. 11	15	2
<i>Camponotus</i> sp. 17	15	5
<i>Camponotus novogranadensis</i>	2	2
<i>Cephalotes betoi</i>	1	1
<i>Cephalotes pusillus</i>	11	4
<i>Crematogaster</i> aff. <i>torosa</i>	1	1
<i>Ectatomma brunneum</i>	1	1
<i>Ectatomma edentatum</i>	2	1
<i>Gnamptogenys sulcata</i>	1	1
<i>Linepithema</i> pr. <i>gallardoii</i>	1	1
<i>Linepithema pulex</i>	4	1
<i>Nylanderia</i> sp. 7	1	1
<i>Pheidole</i> aff. <i>radoszkowskii</i> sp.3	92	8
<i>Pheidole gertrudae</i>	109	5
<i>Pheidole jujuyensis</i>	1	1
<i>Pheidole oxyops</i>	25	2
<i>Pheidole</i> sp. 5d	4	3
<i>Pheidole</i> sp. 5e	48	2
<i>Pheidole</i> sp. 5f	4	1
<i>Pheidole</i> sp. 5g	2	1
<i>Pheidole</i> sp. 5h	27	3
<i>Pheidole</i> sp. 5i	32	5
<i>Pheidole</i> sp. 28	99	3
<i>Pheidole</i> sp. 31	242	12
<i>Pheidole</i> sp. 31a	13	1
<i>Pheidole</i> sp. 32	1	1
<i>Pheidole</i> sp. 34	480	7
<i>Pheidole</i> sp. 37	2	1
<i>Pheidole</i> sp. 39	76	1
<i>Pheidole</i> sp. 40	3	1
<i>Pheidole susannae</i>	42	2
<i>Solenopsis</i> sp. 3	20	4
<i>Solenopsis</i> sp. 16	22	1
<i>Wasmannia auropunctata</i>	10	2

Total	1,513
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Pampa		
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Ant species	Number of individuals	Number of visits in baited tubes
<i>Brachymyrmex</i> sp. 8	5	2
<i>Brachymyrmex</i> sp. 9	4	1
<i>Camponotus crassus</i>	2	2
<i>Camponotus mus</i>	1	1
<i>Camponotus punctulatus minutior</i>	2	2
<i>Camponotus renggeri</i>	29	2
<i>Crematogaster cisplatinalis</i>	1	1
<i>Crematogaster quadriformiformis</i>	11	2
<i>Linepithema humile</i>	5	1
<i>Nylanderia fulva</i>	297	9
<i>Nylanderia</i> sp. 7	4	1
<i>Pheidole humeridens</i>	219	3
<i>Pheidole laevinota</i>	425	15
<i>Pheidole</i> sp. 5j	19	2
<i>Pheidole</i> sp. 68	73	3
<i>Pheidole</i> sp. 69	27	1
<i>Pheidole</i> sp. 70	7	1
<i>Solenopsis</i> gr. <i>geminata</i> sp. 17	858	12
<i>Solenopsis</i> sp. 21	7	3
<i>Solenopsis</i> gr. <i>geminata</i> sp. 22	1	1
<i>Wasmannia auropunctata</i>	21	2
Total	2,018	

Pantanal		
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Ant species	Number of individuals	Number of visits in baited tubes
<i>Azteca</i> aff. <i>alfari</i>	9	1
<i>Brachymyrmex brasiliensis</i>	17	1
<i>Brachymyrmex</i> sp. 5	10	1
<i>Brachymyrmex</i> sp. 6	7	3
<i>Camponotus blandus</i>	1	1
<i>Camponotus senex</i>	11	1
<i>Camponotus</i> sp. 11	16	2
<i>Camponotus novogranadensis</i>	12	4
<i>Crematogaster</i> aff. <i>wardi</i>	23	6
<i>Dorymyrmex</i> sp. 1	23	2
<i>Ectatomma brunneum</i>	69	23
<i>Ectatomma edentatum</i>	10	4
<i>Ectatomma permagnum</i>	7	7

<i>Ectatomma planidens</i>	62	13
<i>Monomorium floricola</i>	1	1
<i>Neoponera verenae</i>	1	1
<i>Nylanderia</i> sp. 4	41	13
<i>Pachycondila harpax</i>	1	1
<i>Pheidole</i> aff. <i>radoszkowskii</i> sp. 2	13	4
<i>Pheidole fracticeps</i>	317	20
<i>Pheidole gigaflavens</i>	2	1
<i>Pheidole mendicula</i>	30	2
<i>Pheidole obscurithorax</i>	57	5
<i>Pheidole oxyops</i>	39	3
<i>Pheidole</i> sp. 1a	53	1
<i>Pheidole</i> sp. 1e	3	1
<i>Pheidole</i> sp. 5b	1	1
<i>Pheidole</i> sp. 5d	14	2
<i>Pheidole</i> sp. 22	1	1
<i>Pheidole subarmata</i>	46	1
<i>Pheidole tambopatae</i>	2	1
<i>Pseudomyrmex tenuis</i>	4	4
<i>Solenopsis</i> sp. 8	191	5
<i>Solenopsis</i> sp. 10	8	2
<i>Solenopsis</i> sp. 11	91	14
<i>Solenopsis</i> sp. 13	1	1
<i>Wasmannia auropunctata</i>	358	13
<i>Wasmannia rochai</i>	4	2
Total	1,557	