SUPPLEMENTARY INFORMATION

SUPPLEMENTARY TABLES

Table S1: Plant species and number of individual trees included in fruit biomass calculations. Of all plants recorded during transect sampling, only species included in our monthly phenology surveys and individual plants with a DBH (diameter at breast height) greater than the species-specific threshold were used in biomass calculations of fruit abundance. Plants below a certain size do not produce ripe fruit or support the weight of a monkey. We calculate the threshold as the minimum DBH for that plant species that we have observed capuchins to forage in (Melin *et al.*, 2014a).

Species	Threshold DBH (cm)	# Foraging Records Used to Calculate Threshold DBH	# Trees in Transects	# Trees Used for Biomass Calculation
Alibertia edulis	0.95	74	1639	1219
Allophylus occidentalis	5.41	62	476	123
Annona reticulata	7.96	96	112	60
Bromelia pinguin		168	739	739
Bromelia plumieri		986	476	476
Bursera simaruba	10.19	481	633	290
Byrsonima crassifolia	6.37	333	432	282
Cassia grandis	10.00	1	1	1
Castilla elastica	14.97	39	51	4
Cecropia peltata	12.41	134	26	18

Cordia guanacastensis	1.13	98	1248	965
Cordia panamensis	6.68	53	349	159
Curatella americana	8.12	37	108	43
Diospyros salicifolia	3.18	43	344	205
Diphysa americana	20.94	13	25	5
Dipterodendron costaricensis	15.60	95	59	15
Eugenia salamensis	8.28	160	187	85
Ficus cotinifolia	29.73	126	2	2
Ficus hondurensis	18.52	57	12	5
Ficus morazaniana	32.47	26	2	1
Ficus ovalis	26.42	95	4	2
Genipa americana	5.41	1041	351	183
Guettarda macrosperma	8.59	97	269	155
Jacquinia nervosa	2.99	59	126	64
Karwinskia calderonii	16.89	191	71	25
Licania arborea	46.52	1	64	6
Maclura tinctoria	11.11	705	8	6

Malvaviscus arboreus	1.91	101	1021	488
Manilkara chicle	12.41	423	393	76
Miconia argentea	2.23	108	7	5
Muntingia calabura	9.55	22	4	1
Ficus goldmani	13.37	3	0	0
Ficus obtusifolia	15.92	28	0	0
Psidium guajava	3.71	50	27	14
Randia monantha	3.18	427	725	317
Randia thurberi	2.23	43	249	131
Sapium glandulosum	22.92	66	49	2
Sciadodendron excelsum	43.61	132	9	1
Simarouba glauca	8.91	179	239	57
Sloanea terniflora	19.41	129	40	7
Spondias mombin	9.57	357	241	163
Spondias purpurea	5.41	16	37	21
Stemmadenia obovata	3.19	300	848	412
Tabebuia ochracea	15.92	25	1025	80

Trichilia americana	35.97	5	47	1
Trichilia martiana	11.78	28	35	8
Vachellia collinsii	0.95	83	4715	2845
Zuelania guidonia	4.51	209	190	109

Table S2: Ethogram used during behavioral data collection, together with frequency of behaviors recorded. One behavioral state depicting the behavior of the majority of group members was recorded on the hour and half-hour while following wild white-faced capuchin monkeys. 912 scans were recorded over the study period.

Code	**Name of State Behavior**	**Description**	**Number Records**	**% Group Scans**
GFFL	Foraging flowers	Group is in a food patch where flowers are being consumed	3	0.33
GFFR	Foraging fruit	Group is in a food patch where ripe fruit are being consumed	139	15.24
GFIN	Foraging insects	Group is in a food patch where clumped insects (caterpillars, eggs, embedded invertebrates) are being consumed	7	0.77
GFOT	Foraging other	Group is in a food patch where other foods (seeds, pith, vertebrates, bromeliad leaves) are being consumed	6	0.66
GOTH	Other	Other behaviors, including intergroup interactions, predator mobbing	2	0.22
GRES	Resting	Inactive and not in contact with other monkeys	91	9.98
GSAC	Social active	Grooming or play behavior	3	0.33

GSAG	Social agonistic	Agonistic behaviors, including biting, chasing, threat displays, submissive gestures	1	0.11
GSRE	Social resting	Inactive and resting in contact with other monkeys	106	11.62
GSSS	Self-directed	Self-directed behaviors, grooming	12	1.32
GTRA	Traveling	Relatively fast-paced and direct group movement, without visual foraging	18	1.97
GVFO	Visually foraging	Gleaning insects from surfaces of leaves, bark, ground, branches typically while moving	517	56.69
GVIG	Vigilant	Alert scanning of environment beyond arm's reach	7	0.77

Table S3: Sampling details for fecal samples collected from white-faced capuchin monkeys in Sector Santa Rosa, Costa Rica. All sampling bouts occurred within 2014.

Sampling Bout			
SB 1	**SB 2**	**SB 3**	**SB 4**
Late Dry	**Early Wet**	**Middle Wet**	**Early Dry**
April 29 - 30	June 3	July 29	November 25 -26
May 1 - 5	June 13 -14	September 3	December 3 - 4
May 6 - 7	June 24 -25	Aug 17 -18	December 9 - 10

Table S4: Carbohydrate binding module categories from www.cazypedia.org

Alpha-Glucans

CBM20, CBM21, CBM24, CBM25, CBM26, CBM34, CBM41, CBM45, CBM48, CBM53, CBM58

Cellulose

CBM1, CBM2, CBM3, CBM4, CBM6, CBM10, CBM16, CBM30, CBM37, CBM44, CBM46, CBM49,CBM63,CBM64

Chitin

CBM1, CBM2, CBM3, CBM5, CBM12, CBM14, CBM18, CBM19, CBM37, CBM50, CBM55,

Fructans

CBM38

Mammalian Glycans

CBM32, CBM47, CBM51, CBM57

Plant Cell Wall - Other

CBM4, CBM6, CBM13, CBM16, CBM22, CBM32, CBM35, CBM39, CBM42, CBM43, CBM52, CBM61, CBM62

Xylan

CBM2, CBM4, CBM6, CBM13, CBM22, CBM31, CBM35, CBM36, CBM37, CBM44, CBM54, CBM60

Bacterial Cell Wall Sugars

CBM35, CBM39, CBM50

Table S5: Total Representation of Bacterial Phyla

Phylum	Taxa
Firmicutes	884
Proteobacteria	823
Actinobacteria	583
Bacteroidetes	327
Acidobacteria	171
Planctomycetes	130
Chloroflexi	69
Verrucomicrobia	52
Armatimonadetes	21
Candidate Division WPS2	17
Fusobacteria	17
Thaumarchaeota	15
Gemmatimonadetes	11
Euryarchaeota	10
Deinococcus-Thermus	4
Candidate Division WPS1	3
Chlamydiae	3
Nitrospirae	3
Synergistetes	3
Tenericutes	3
Aminicenantes	1
BRC1	1
Deferribacteres	1
Hydrogenedentes	1
SR1	1

Table S6: Significant differences in 10 most abundant genera between season and sampling bouts Tukey's HSD adjusted p-value: *** < 0.001; ** p < 0.01; p < 0.05*

Genus	**Pattern**	**Anova**	**Tukey's HSD**
Streptococcus	Rainfall	p < 0.001; F = 21.8	1>2***, 1>3***, 4>2***, 4>3***
Bifidobacterium	Fruit	p < 0.001; F = 8.3	1>2***, 1>3**, 1>4*
Rothia		NS	NS
Olsenella	Fruit	p < 0.01; F = 5.1	1<4** 2<4**
Clostridium XIVa	Fruit	p < 0.001; F = 32.0	1<4***, 2<4***, 3<4***
Megamonas	Fruit	p < 0.001; F = 9.9	1<3*, 1<4***, 2<4**
Escherichia/Shigella	Rainfall	NS	NS
Lactobacillus		NS	NS
Lactococcus	Fruit	p < 0.01; F = 6.0	1>2**, 1>3**, 1>4**
Weisella	Fruit	NS	NS
Alpha Diversity	**Pattern**	**Anova**	**Tukey's HSD**
Observed	Rainfall	p < 0.001	1<2***, 1<3**, 4<2***
Shannon	Fruit	p < 0.001	1<4***, 2<4**

Table S7: Relative abundances of CAZymes and functional groups (see separate dataset)

SUPPLEMENTARY FIGURES

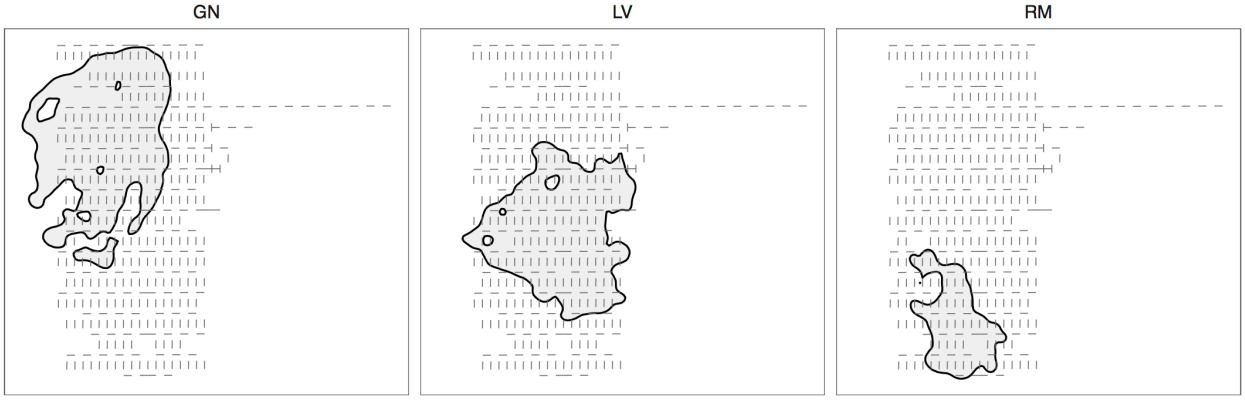

Figure S1: Home ranges of the three white-faced capuchin study groups (gray polygons), showing systematic placement of the 100-m long vegetation transects (small vertical and horizontal lines) used to calculate available fruit biomass.

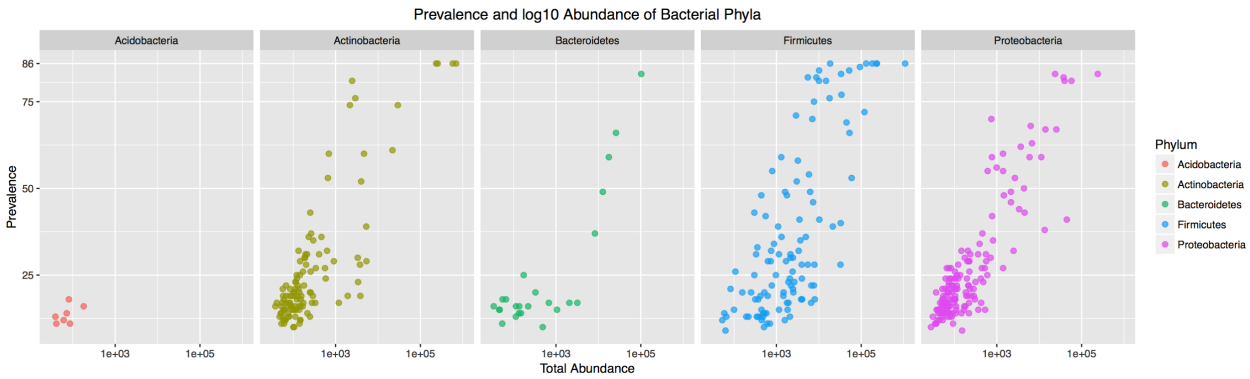

Figure S2: Prevalence and log10 abundance of bacterial phyla present at least once in 10% of samples. The gut of white-faced capuchins is dominated by Firmicutes, Proteobacteria, and Actinobacteria.

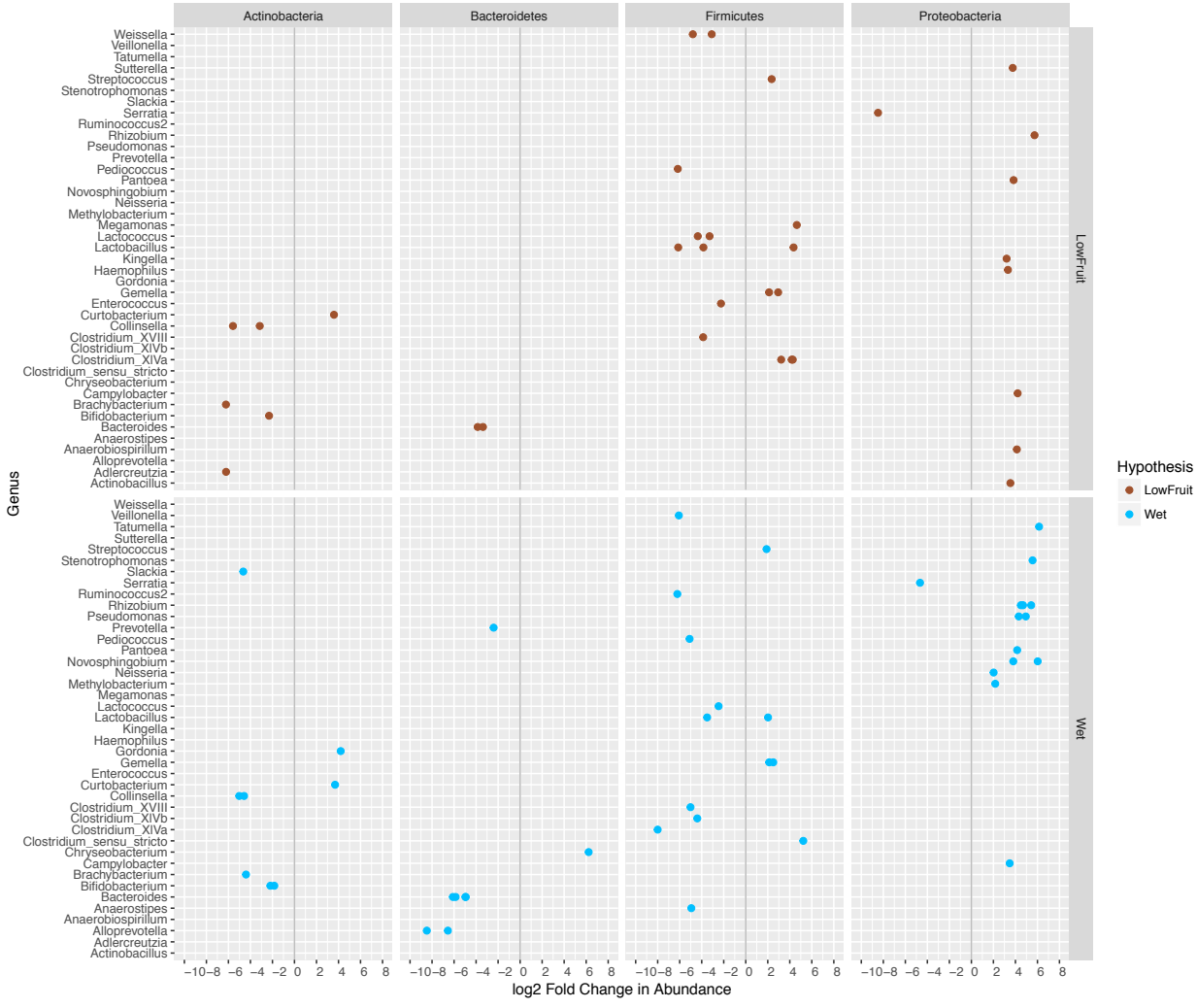

Figure S3: ASVs with significantly different log2 fold abundance changes in wet and fruit scarcity seasons by genera. Each point is a 16s V4 amplicon sequence variant with a significant (adjusted $p < 0.001$) difference in abundance during A) fruit scarcity (SB 2,3,4) season and B) the wet (SB 2 and 3) season.

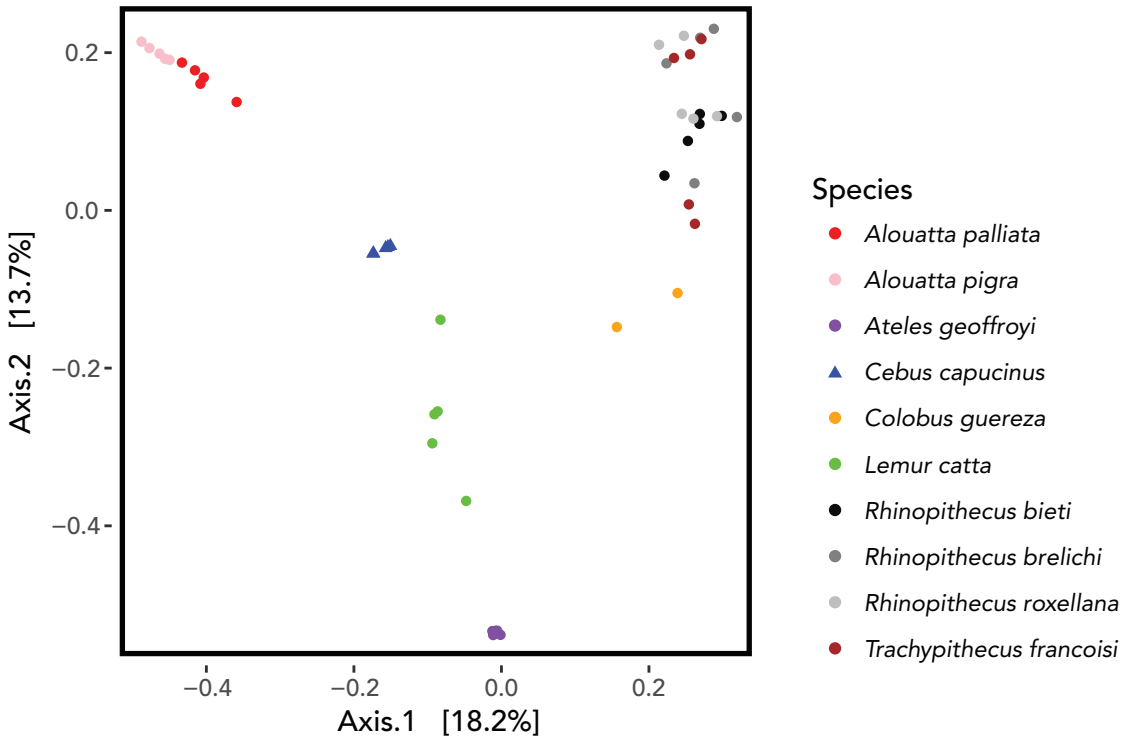

Figure S4: PCA of *Cebus capucinus* and other primate gut microbiomes. We processed all reads identically with DADA2 and ordinated them with PCA in phyloseq using Bray-Curtis distances and relative abundances. All five capuchin samples cluster tightly together to the exclusion of other primates. Data collected from [55, 56, 57].

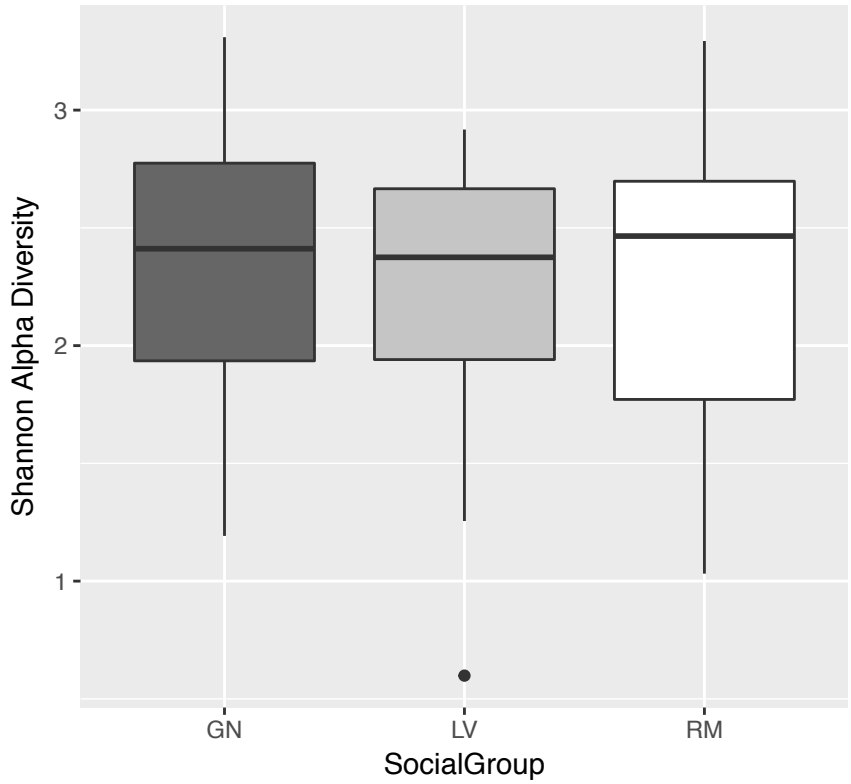

Figure S5: Shannon Alpha diversity does not vary by social group at SSR.