Supplementary Information for:

The legacy of 4,500 years of polyculture agroforestry in the eastern Amazon

S. Yoshi Maezumi[1*], Daiana Alves[1], Mark Robinson[1], Jonas Gregorio de Souza[1], Carolina Levis[4,5], Robert Barnett[2], Edemar Almeida de Oliveira[6], Dunia Urrego[2], Denise Schaan[3], Jose Iriarte[1]

correspondence to: *s.y.maezumi@exeter.ac.uk*

Author Affiliations

[1]*Department of Archaeology, College of Humanities, University of Exeter, Laver Building, North Park Road, Exeter EX4 4QE, United Kingdom*

[2]*Department of Geography, College of Life and Environmental Sciences, University of Exeter, Amory Building, Rennes Drive. Exeter, EX4 4RJ, United Kingdom*

[3]*Department of Anthropology, Federal University of Pará, Belém 66075-110, Brazil*

[4]*Programa de Pós-Graduação em Ecologia, Instituto Nacional de Pesquisas da Amazônia–INPA, Av. André Araújo, 2936, Petrópolis, Manaus, AM, 69067-375, Brazil*

[5]*Forest Ecology and Management Group, Wageningen University & Research, Wageningen, the Netherlands*

[6]*Universidade do Estado de Mato Grosso, Campus of Nova Xavantina, Mato Grosso State, Brazil*

Supplementary Information

Contents:

Supplementary Tables

Site name	Latitude	Longitude	presence (cal B.P.)	
Lake San Pablo	0.22	-78.22	~4900	Athens et al. 2016[1]
Lake Ayauch	-3.04	-78.03	~6000	Bush et al. 1989[2]
Lake Sauce	-6.7	-76.21	~ 6320	Bush et al. 2016[3]
Abeja	-0.57	-72.4	~ 5500	Mora et al. 1991[4]
Huaypo	-13.4	-72.13	~ 2800	Mosblech et al. 2012[5]
Lake Gentry	-12.33	-68.87	~ 3630	Bush et al. 2007[6]
Lake Rogaguado	-13	-65.93	~ 6500	Brugger et al. 2016[7]
Parmana	7.86	-65.77	~1600	Roosevelt 1980[8]
Monte Castelo	-12.55	-63.09	~4310	Hilbert et al. 2017[9]
Geral	-1.64	-53.59	~4030	Bush et al. 2000[10]

Table S1. Site *metadata for Figure 1 documenting the early presence of maize in the Amazon.*

Method	Depth	^{210}Pb (Bq kg^{-1})	^{210}Pb (Bq kg^{-1})	Cal. Age (2σ)
	(m)	(supported)	(excess)	(yrs BP)
^{210}Pb	0.005 ±0.005	509.09 ±11.05	421.93 ±11.61	-62.9 ±
^{210}Pb	0.015 ±0.005	552.61 ±20.50	465.45 ±20.81	-60.4 ±
^{210}Pb	0.025 ±0.005	657.43 ±23.43	570.27 ±23.70	-57.3 ±
^{210}Pb	0.045 ±0.005	610.75 ±21.61	523.59 ±21.90	-48.2 ±2.7
^{210}Pb	0.065 ±0.005	709.05 ±26.33	621.88 ±26.57	-36.5 ±4.8
^{210}Pb	0.085 ±0.005	384.40 ±14.81	297.24 ±15.23	-21.5 ±7.2
^{210}Pb	0.105 ±0.005	295.22 ±12.41	208.06 ±12.91	-13.1 ±8.9
^{210}Pb	0.125 ±0.005	163.75 ±7.11	76.59 ±7.95	-6.0 ±10.9
^{210}Pb	0.145 ±0.005	394.06 ±16.48	306.90 ±16.86	5.6 ±15.4
^{210}Pb	0.165 ±0.005	196.66 ±7.83	109.50 ±8.60	42.2 ±45.2
		Lab Code	**^{14}C yrs BP**	
^{14}C	0.30 ±0.005	Beta-469035	1030 ±30	941 ±107
^{14}C	0.60 ±0.005	Beta-469036	1130 ±30	1067 ±105
^{14}C	0.80 ±0.005	Beta-469037	2350 ±30	2394 ±68
^{14}C	0.100 ±0.005	Beta-469038	1830 ±30	1752 ±113
^{14}C	0.115 ±0.005	Beta-427240	4340 ±30	4936 ±91
^{14}C	0.205 ±0.005	Beta-424296	7700 ±40	8492 ±83

Table S2. *Lago Caranã Dates used in age-depth model.*

Site name	14C yr BP	Laboratory number	Reference
Porto	3830 ± 30	Beta-388953	this study
Lago do Jacaré 1	3800 ± 70	Beta-186952	Gomes 2011[11]
Zenóbio	3680 ± 50	Beta-186960	Gomes 2011
Lago do Jacaré 1	3660 ± 70	Beta-186955	Gomes 2011
Lago do Jacaré 1	3660 ± 40	Beta-186956	Gomes 2011
Lago do Jacaré 1	3600 ± 70	Beta-186957	Gomes 2011
Porto	3530 ± 30	Beta-388955	this study
Lago do Jacaré 1	3260 ± 50	Beta-187492	Gomes 2011
Porto	3260 ± 30	Beta-322223	Alves 2014[12]
Porto	3070 ± 30	Beta-386143	this study
Porto	3060 ± 30	Beta-322221	Alves 2012
Porto	3050 ± 30	Beta-386145	this study
Porto	3030 ± 30	Beta-388950	this study
Porto	3030 ± 30	Beta-388954	this study
Aldeia	3000 ± 40	Beta-283902	Gomes 2011
Porto	2912 ± 56	WK6836	Quinn 2004[13]
Porto	2900 ± 30	Beta-322219	Alves 2012
Água azul	2880 ± 30	Beta-293284	Martins 2012[14]
Porto	2820 ± 30	Beta-386138	this study
Lago do Jacaré 1	2740 ± 60	Beta-186958	Gomes 2011
Terra Preta	2490 ± 80	Beta-180713	Gomes 2011
Aldeia	2370 ± 60	Beta-248482	Gomes 2011
Porto	2270 ± 63	WK6834	Quinn 2004
Serraria Trombetas	2200 ± 30	Beta-324198	Martins 2012

Aldeia	2040 ± 40	Beta-248485	Gomes 2011
Terra Preta	1840 ± 50	Beta-186959	Gomes 2011
Aldeia	1800 ± 40	Beta-283903	Gomes 2011
Maguari	1680 ± 30	Beta-433636	this study
Porto	1550 ± 30	Beta-386144	this study
Terra Preta	1320 ± 60	Beta-178443	Gomes 2011
Porto	1260 ± 30	Beta-386139	this study
Fé em Deus	1220 ± 30	Beta-324179	this study
Iruçanga	1220 ± 30	Beta-324179	Schaan 2016[15]
Terra Preta	1220 ± 60	Beta-178442	Gomes 2011
Porto	1210 ± 30	Beta-388952	this study
Maguari	1190 ± 30	Beta-433633	this study
Porto	1140 ± 30	Beta-386135	this study
Lago do Jacaré 1	1020 ± 50	Beta-186954	Gomes 2011
Porto	960 ± 30	Beta-322202	Alves 2012
Terra Preta	910 ± 60	Beta-178444	Gomes 2011
Serraria Trombetas	890 ± 30	Beta-293289	Martins 2012
Serraria Trombetas	780 ± 30	Beta-324188	Martins 2012
Alvorada	680 ± 50	Beta-293282	Martins 2012
Porto	664 ± 57	WK6844	Quinn 2004
Porto	660 ± 30	Beta-386141	this study
Porto	652 ± 56	WK6837	Quinn 2004
Porto	650 ± 59	WK6843	Quinn 2004
Porto	640 ± 30	Beta-386134	this study
Porto	590 ± 30	Beta-386136	this study
Bom Futuro	586 ± 30	Ua-46306	Stenborg 2016[16]

Porto	586 ± 56	WK6839	Quinn 2004
Porto	583 ± 57	WK6833	Quinn 2004
Serraria Trombetas	580 ± 30	Beta-324187	Martins 2012
Cedro	550 ± 30	Beta-324192	Schaan 2016
Bom Futuro	540 ± 30	Ua-46305	Stenborg 2016
Porto	537 ± 58	WK6840	Quinn 2004
Porto	512 ± 59	WK6846	Quinn 2004
Porto	500 ± 30	Beta-386140	this study
Bom Futuro	497 ± 30	Ua-46304	Stenborg 2016
Porto	490 ± 30	Beta-386148	this study
Maguari	470 ± 30	Beta-433637	this study
Fazenda Cacau	460 ± 30	Beta-293286	Martins 2012
Porto	460 ± 30	Beta-386142	this study
Porto	455 ± 63	WK6845	Quinn 2004
Porto	452 ± 57	Wk6837	Quinn 2004
Maguari	430 ± 30	Beta-433632	this study
Porto	425 ± 56	WK6841	Quinn 2004
Porto	418 ± 59	WK6842	Quinn 2004
Porto	413 ± 56	WK6838	Quinn 2004
Porto	410 ± 30	Beta-386146	this study
Porto	400 ± 30	Beta-386147	this study
Porto	400 ± 30	Beta-388951	this study
Maguari	390 ± 30	Beta-433631	this study
Maguari	390 ± 30	Beta-433630	this study
Porto	386 ± 62	WK6832	Quinn 2004
Maguari	380 ± 30	Beta-433629	this study

Porto	380 ± 64	WK6835	Quinn 2004
Bom Futuro	350 ± 30	Beta-324178	Schaan 2016
Maguari	330 ± 30	Beta-433635	this study
Amapá	300 ± 30	Beta-324176	Schaan 2016
Maguari	300 ± 30	Beta-433634	this study
Maguari	290 ± 30	Beta-433628	this study
Cedro	240 ± 30	Beta-324193	Schaan 2016

Table S3. *Dates for local and regional archaeology.*

Individual sum				Sites		
Species	**Non-ADE2**	**Non-ADE3**	**Non-ADE5**	**ADE 1**	**ADE 3**	**ADE 6**
Abarema auriculata Fabaceae	4	2	0	0	0	0
Abuta sp. Menispermaceae	1	0	0	0	0	0
Acrocomia aculeata Arecaceae	0	0	0	0	0	2
Agonandra silvatica Opiliaceae	0	0	0	0	0	0
Amphiodon effusus Fabaceae	2	1	2	0	1	0
Anacardiaceae Anacardiaceae	1	0	0	0	0	2
Aniba panurensis Lauraceae	0	0	1	0	0	0
Aniba rosaeodora Lauraceae	1	0	0	1	0	0
Anthodon sp. Celastraceae	0	0	0	0	0	0
Aparisthmium cordatum Euphorbiaceae	0	0	0	0	0	0
Apuleia leiocarpa Fabaceae	1	0	0	3	0	1
Aspidosperma discolor Apocynaceae	0	0	0	0	0	0
Aspidosperma spruceanum Apocynaceae	0	1	0	0	0	0
Astrocaryum aculeatum Arecaceae	0	0	0	0	0	1
Astrocaryum vulgare Arecaceae	0	0	0	0	0	6
Astronium graveolens Anacardiaceae	0	0	0	0	0	0
Astronium lecointei Anacardiaceae	0	0	0	0	1	0
Attalea microcarpa Arecaceae	0	0	0	0	5	0
Attalea speciose Arecaceae	0	0	0	2	0	4
Bagassa guianensis Moraceae	0	0	0	0	0	0
Bauhinia sp. Fabaceae	0	0	0	1	0	0
Bauhinia ungulate Fabaceae	0	0	0	0	0	0
Bellucia dichotoma Melastomataceae	0	0	0	0	0	0

Bellucia grossularioides Melastomataceae	0	1	0	0	0	0
Bertholletia excelsia Lecythidaceae	1	1	0	3	2	4
Bignoniaceae Bignoniaceae	0	0	0	0	1	0
Bowdichia nitida Fabaceae	0	1	0	0	0	0
Bowdichia sp1 Fabaceae	0	0	0	1	0	0
Bowdichia sp2 Fabaceae	0	0	0	0	0	0
Brosimum acutifolium Moraceae	0	0	0	0	0	0
Brosimum lactescens Moraceae	2	1	0	0	0	0
Buchenavia tetraphylla Combretaceae	1	0	0	0	0	0
Buchenavia viridiflora Combretaceae	0	0	0	0	1	0
Byrsonima crispa Malpighiaceae	0	1	0	0	0	0
Cardiopetalum calophyllum Annonaceae	0	0	0	0	0	1
Cariniana rubra Lecythidaceae	0	0	0	1	0	0
Caryocar villosum Caryocaraceae	0	0	0	0	0	0
Casearia commersoniana Salicaceae	0	0	0	1	0	0
Casearia gossypiosperma Salicaceae	0	0	0	1	0	1
Casearia sp1 Salicaceae	1	0	0	0	0	0
Casearia sp2 Salicaceae	0	0	0	2	0	0
Cathedra acuminate Olacaceae	0	1	2	0	0	0
Cecropia ficifolia Urticaceae	0	0	0	4	5	0
Cecropia sciadophylla Urticaceae	0	1	0	0	0	0
Cedrela odorata Meliaceae	0	0	0	0	0	2
Ceiba pentandra Malvaceae	0	0	0	0	0	0
Celtis iguanaea Cannabaceae	0	0	0	0	1	0
Clarisia racemosa Moraceae	0	0	0	0	0	0

Coccoloba sp. Polygonaceae	0	0	0	1	2	0
Cochlospermum orinocense Bixaceae	0	0	0	0	0	0
Connarus perrottetii Connaraceae	0	0	0	0	0	0
Copaifera sp. Fabaceae	0	0	2	0	0	0
Cordia sp. Boraginaceae	0	1	1	2	4	0
Couepia sp. Chrysobalanaceae	0	0	0	0	0	0
Couratari stellate Lecythidaceae	1	0	2	0	0	0
Coussarea duckei Rubiaceae	1	0	0	0	0	0
Coussarea paniculata Rubiaceae	8	16	0	0	0	0
Crepidospermum goudotianum Burseraceae	0	0	0	0	0	0
Croton sp. Euphorbiaceae	0	0	0	3	0	0
Cupania scrobiculata Sapindaceae	0	0	0	0	0	0
Dialium guianense Fabaceae	1	2	1	1	7	1
Dimorphandra parviflora Fabaceae	1	0	0	0	0	0
Dinizia excelsa Fabaceae	0	0	1	0	0	0
Diospyros cavalcantei Ebenaceae	0	0	0	0	0	0
Diospyros guianensis Ebenaceae	0	1	0	0	0	0
Diplotropis sp1 Fabaceae	0	0	1	0	0	0
Diplotropis sp2 Fabaceae	0	0	0	0	1	0
Dipteryx odorata Fabaceae	0	1	0	0	0	0
Duguetia echinophora Annonaceae	2	4	0	0	0	0
Duguetia Annonaceae	0	0	0	1	0	0
Duroia genipoides Rubiaceae	1	0	0	0	0	0
Duroia macrophylla Rubiaceae	0	1	0	0	0	0
Enterolobium schomburgkii Fabaceae	0	1	0	0	0	0

Ephedranthus parviflorus Annonaceae	0	0	0	0	0	0
Eriotheca globosa Malvaceae	0	0	0	0	2	1
Erisma calcaratum Vochysiaceae	1	0	0	0	0	0
Erisma uncinatum Vochysiaceae	2	10	2	0	0	0
Eschweilera coriacea Lecythidaceae	8	5	7	3	0	1
Eschweilera grandiflora Lecythidaceae	1	4	2	1	0	0
Eschweilera obversa Lecythidaceae	0	0	0	0	0	0
Eugenia cupulata Myrtaceae	0	1	0	0	0	0
Eugenia patens Myrtaceae	0	0	0	0	1	0
Eugenia sp1 Myrtaceae	0	0	0	0	1	0
Eugenia sp2 Myrtaceae	0	0	1	0	0	0
Euphorbiaceae-1 Euphorbiaceae	0	0	0	0	0	0
Euphorbiaceae-2 Euphorbiaceae	0	0	0	0	0	0
Exostyles amazonica Fabaceae	0	0	0	1	0	0
Fabaceae-1 Fabaceae	0	0	1	1	0	0
Fabaceae-2 Fabaceae	0	0	0	1	0	0
Fabaceae-3 Fabaceae	1	0	0	0	0	0
Fabaceae-4 Fabaceae	0	0	0	0	1	0
Ficus sp1 Moraceae	0	0	0	0	0	1
Geissospermum urceolatum Apocynaceae	2	1	1	0	0	0
Glycydendron amazonicum Euphorbiaceae	1	2	0	0	0	0
Guatteria poeppigiana Annonaceae	1	0	1	1	0	0
Guatteria sp1 Annonaceae	0	0	0	0	0	0
Guatteria sp2 Annonaceae	0	0	0	0	0	0
Guazuma ulmifolia Malvaceae	0	0	0	0	0	0

Gustavia augusta Lecythidaceae	0	0	0	0	2	0
Gustavia longepetiolata Lecythidaceae	0	0	0	0	1	0
Handroanthus capitatus Bignoniaceae	0	0	0	0	0	0
Handroanthus incanus Bignoniaceae	0	0	0	0	0	0
Heisteria sp. Olacaceae	0	1	0	0	0	0
Helicostylis elegans Moraceae	0	0	0	0	1	0
Helicostylis tomentosa Moraceae	0	1	0	1	1	0
Hevea brasiliensis Euphorbiaceae	0	0	0	0	0	12
Homalium racemosum Salicaceae	2	0	1	0	0	0
Hymenaea courbaril Fabaceae	0	0	0	0	1	0
Inga alba Fabaceae	2	0	0	1	0	2
Inga edulis Fabaceae	0	0	0	0	3	0
Inga laurina Fabaceae	0	0	1	0	0	0
Inga marginata Fabaceae	0	0	0	0	1	0
Inga nobilis Fabaceae	0	0	0	0	1	1
Inga sp1 Fabaceae	0	1	0	0	0	0
Inga sp2 Fabaceae	0	0	1	0	0	0
Iryanthera juruensis Myristicaceae	0	0	0	0	0	0
Jacaranda copaia Bignoniaceae	1	0	0	0	0	0
Jacaratia spinosa Caricaceae	0	0	0	0	2	0
Lacmellea arborescens Apocynaceae	0	1	0	2	0	0
Lauraceae-1 Lauraceae	2	0	0	0	0	0
Lauraceae-2 Lauraceae	0	0	1	0	0	0
Lauraceae-3 Lauraceae	0	0	1	0	0	0
Lecythis lurida Lecythidaceae	1	0	1	0	0	0
Lecythis Pisonis Lecythidaceae	0	0	0	0	0	0

Leonia sp. Violaceae	0	1	0	0	0	0
Licania kunthiana Chrysobalanaceae	0	0	0	0	0	0
Licania polita Chrysobalanaceae	1	0	1	3	1	0
Licaria guianensis Lauraceae	0	0	0	0	0	0
Lonchocarpus sp. Fabaceae	0	0	0	0	1	0
Luehea cymulosa Malvaceae	1	0	0	2	0	1
Machaerium amplum Fabaceae	1	0	0	0	0	0
Machaerium isadelphum Fabaceae	0	0	0	0	1	1
Machaerium sp1 Fabaceae	0	0	0	0	0	0
Machaerium sp2 Fabaceae	0	0	0	0	0	0
Machaerium sp3 Fabaceae	0	0	0	0	0	0
Machaerium sp4 Fabaceae	1	0	0	0	0	0
Maclura tinctoria Moraceae	0	0	0	0	0	0
Malpighiaceae Malpighiaceae	0	0	0	0	0	1
Malvaceae 1 Malvaceae	0	0	0	0	0	0
Matayba guianensis Sapindaceae	0	0	0	0	0	0
Matayba sp. Sapindaceae	1	0	0	0	0	0
Matayba spruceana Sapindaceae	2	1	0	0	0	0
Mezilaurus itauba Lauraceae	1	0	1	0	1	0
Miconia affinis Melastomataceae	0	0	0	0	1	0
Miconia egensis Melastomataceae	1	0	0	0	0	0
Miconia regelii Melastomataceae	1	0	0	0	0	0
Miconia tomentosa Melastomataceae	1	0	0	0	0	0
Minquartia guianensis Olacaceae	1	0	1	0	0	0
Mouriri grandiflora Melastomataceae	0	0	0	0	0	0
Mouriri sp. Melastomataceae	0	0	0	0	0	0

Moutabea sp. Polygalaceae	0	0	0	0	0	0
Myrcia sp1 Myrtaceae	1	0	0	1	0	0
Myrcia sp2 Myrtaceae	0	0	0	0	0	0
Myrciaria floribunda Myrtaceae	1	0	0	0	0	0
Neea oppositifolia Nyctaginaceae	1	1	1	2	5	0
NI-1 NI-1	0	0	0	0	0	1
NI-2 NI-2	0	0	0	0	0	0
NI-3 NI-3	0	0	0	0	0	0
NI-4 NI-4	0	0	0	0	1	0
NI-5 NI-5	0	0	0	0	1	0
NI-6 NI-6	0	0	1	0	0	0
Ocotea camphoromoea Lauraceae	1	1	0	0	0	0
Ocotea cujumary Lauraceae	0	0	3	0	0	0
Ocotea cymbarum Lauraceae	0	0	0	3	0	1
Ocotea floribunda Lauraceae	0	0	1	0	0	0
Ocotea glomerata Lauraceae	0	0	0	0	0	0
Ocotea longifolia Lauraceae	0	0	0	0	0	0
Ocotea pauciflora Lauraceae	0	1	3	0	0	0
Ocotea sp1 Lauraceae	1	0	0	0	0	0
Ocotea viburnoides Lauraceae	1	0	0	0	0	0
Oenocarpus distichus Arecaceae	2	0	6	1	0	0
Olacaceae Olacaceae	0	0	1	0	0	0
Onychopetalum amazonicum Annonaceae	0	0	0	0	0	0
Ormosia sp. Fabaceae	0	0	5	0	0	0
Ouratea sp. Ochnaceae	2	0	0	0	0	0

Platymiscium sp. Fabaceae	1	0	0	0	0	0
Poeppigia procera Fabaceae	0	0	0	0	0	2
Polygalaceae Polygalaceae	0	0	0	0	0	0
Pouteria campanulata Sapotaceae	0	0	0	1	1	0
Pouteria decorticans Sapotaceae	4	2	1	3	0	0
Pouteria glomerata Sapotaceae	0	0	0	0	0	0
Pouteria sp1 Sapotaceae	1	0	0	1	1	0
Pouteria sp2 Sapotaceae	0	6	0	0	0	0
Pouteria sp3 Sapotaceae	0	2	0	0	0	0
Pouteria speciosa Baehni Sapotaceae	2	1	0	0	1	0
Pouteria torta Sapotaceae	0	0	0	0	0	0
Pouteria venosa Sapotaceae	1	2	0	3	2	1
Protium aracouchini Burseraceae	0	0	1	0	0	0
Protium gallosum Burseraceae	1	0	0	0	0	0
Protium hebetatum Burseraceae	2	1	8	0	0	0
Protium robustum Burseraceae	0	2	0	0	1	0
Protium sp1 Burseraceae	1	0	1	0	0	0
Protium sp2 Burseraceae	0	0	1	0	0	0
Protium unifoliolatum Burseraceae	0	0	0	0	0	3
Pseudolmedia laevigata Moraceae	0	1	0	0	0	0
Pseudolmedia macrophylla Moraceae	0	0	0	0	1	0
Pseudopiptadenia suaveolens Fabaceae	0	0	0	0	0	0
Psidium sp. Myrtaceae	0	0	0	0	0	0
Pterocarpus sp. Fabaceae	0	0	0	1	0	0
Qualea sp. Vochysiaceae	0	0	0	0	0	0
Quiina amazonica Ochnaceae	0	1	0	0	0	0

Rinoreocarpus ulei Violaceae	2	0	3	4	0	0
Salicaceae Salicaceae	0	1	0	0	0	0
Sapindus saponaria Sapindaceae	0	0	0	0	0	2
Sapium glandulosum Euphorbiaceae	0	0	0	0	0	1
Sarcaulus brasiliensis Sapotaceae	1	0	1	0	1	0
Schefflera morototoni Araliaceae	0	1	1	0	0	1
Senegalia polyphylla Fabaceae	0	0	0	0	0	5
Sloanea floribunda Elaeocarpaceae	0	0	0	0	0	0
Sloanea obtusifolia Elaeocarpaceae	0	0	0	0	1	0
Solanum acanthodes Solanaceae	0	0	0	1	0	0
Sorocea sp1 Moraceae	1	0	0	2	0	0
Spondias mombin Anacardiaceae	0	0	0	0	7	9
Sterculia apetala Malvaceae	0	0	0	0	0	0
Stryphnodendron pulcherrimum Fabaceae	0	0	0	0	1	0
Stryphnodendron sp. Fabaceae	0	0	0	0	0	0
Swartzia sp. Fabaceae	0	0	0	0	0	0
Tabernaemontana sp. Apocynaceae	0	0	0	0	0	0
Tachigali chrysophylla Fabaceae	2	2	3	0	3	0
Tachigali melanocarpa Fabaceae	7	6	9	0	0	0
Tachigali paniculata Fabaceae	0	0	0	0	2	0
Tachigali paniculata Fabaceae	9	7	6	0	0	0
Talisia cerasina Sapindaceae	1	0	0	2	2	1
Talisia veraluciana Sapindaceae	0	0	0	0	0	0
Terminalia dichotoma Combretaceae	0	0	1	0	0	0
Tetragastris altissima Burseraceae	0	0	0	2	0	0

Tetragastris panamensis Kuntze Burseraceae	0	0	2	0	0	1
Tetragastris sp. Burseraceae	0	0	5	0	0	0
Theobroma obovatum Malvaceae	0	1	0	0	0	0
Theobroma speciosum Malvaceae	1	1	0	5	5	0
Trattinnickia boliviana Burseraceae	0	0	0	0	1	0
Trema micrantha Cannabaceae	0	0	0	1	0	0
Trichilia micrantha Meliaceae	0	0	0	1	0	0
Vatairea sericea Fabaceae	0	0	0	0	0	0
Vataireopsis sp. Fabaceae	0	0	0	0	0	0
Violaceae Violaceae	0	0	0	0	0	1
Virola michelii Myristicaceae	12	6	8	0	2	0
Virola sebifera Myristicaceae	1	0	1	0	0	0
Vismia japurensis Hypericaceae	0	0	0	0	0	0
Vitex orinocensis Lamiaceae	0	0	0	0	0	0
Vochysia maxima Vochysiaceae	1	0	0	0	0	0
Vochysia obidensis Vochysiaceae	0	2	0	0	0	0
Xylopia frutescens Annonaceae	0	0	0	0	0	1
Xylopia nitida Annonaceae	0	1	1	1	0	0
Xylopia polyantha Annonaceae	2	1	0	0	1	0
Zanthoxylum rhoifolium Rutaceae	0	0	0	0	0	0
Zanthoxylum sp. Rutaceae	0	0	0	0	0	0
Total	**130**	**117**	**111**	**80**	**94**	**76**

Table S4. *Complete botanical inventory data*

Genus	Species	Family	Type of food	Edible
Achyranthes	*aspera*	Amaranthaceae	vegetable	edible
Acrocomia	*aculeata*	Arecaceae	fruit	edible
Agave	spp.	Agavaceae	beverage	edible
Aiphanes	*aculeata*	Arecaceae	fruit	edible
Alibertia	*edulis*	Rubiaceae	fruit	edible
Alibertia	*myrciifolia*	Rubiaceae	food	edible
Alternanthera	*bettzickiana*	Amaranthaceae	vegetable	edible
Amaranthus	*spp.*	Amaranthaceae	grain and vegetables	edible
Ambelania	*acida*	Apocynaceae	fruit	edible
Anacardium	*giganteum*	Anacardiaceae	fruit	edible
Anacardium	*occidentale*	Anacardiaceae	fruit	edible
Ananas	*comosus*	Bromeliaceae	fruit	edible
Aniba	*rosiodora*	Lauraceae	oil of wood as food additive	edible
Annona	*montana*	Annonaceae	fruit	edible
Annona	*montana*	Annonaceae	fruit	edible
Annona	*muricata*	Annonaceae	fruit	edible
Annona	*reticulata*	Annonaceae	fruit	edible
Annona	*squamosa*	Annonaceae	fruit	edible
Aphandra	*natalia*	Arecaceae	fruit	edible
Arachis	*hypogaea*	Fabaceae	seed	edible
Astrocaryum	*aculeatum*	Arecaceae	fruit	edible
Astrocaryum	*murumuru*	Arecaceae	fruit	edible
Astrocaryum	*vulgare*	Arecaceae	fruit	edible
Attalea	*maripa*	Arecaceae	fruit	edible

Attalea	*phalerata*	Arecaceae	fruit	edible
Attalea	*speciosa*	Arecaceae	fruit	edible
Bactris	*gasipaes*	Arecaceae	fruit	edible
Bactris	*guineensis*	Arecaceae	fruit	edible
Bellucia	*grossularioides*	Melastomataceae	fruit	edible
Bertholletia	*excelsa*	Lecythidaceae	nut	edible
Bixa	*orellana*	Bixaceae	colorant	edible
Bixa	*urucurana*	Bixaceae	colorant	edible
Borojoa	*sorbilis*	Rubiaceae	fruit	edible
Brosimum	*alicastrum*	Moraceae	edible nut	edible
Bunchosia	*armeniaca*	Malpighiaceae	fruit	edible
Byrsonima	*crassifolia*	Malpighiaceae	fruit	edible
Byrsonima	*verbascifolia*	Malpighiaceae	fruit	edible
Calathea	*allouia*	Marantaceae	root	edible
Campomanesia	*aromatica*	Myrtaceae	fruit	edible
Campomanesia	*lineatifolia*	Myrtaceae	fruit	edible
Campsiandra	*comosa*	Fabaceae	fruit	edible
Canavalia	*ensiformis*	Fabaceae	seed	edible
Canavalia	*plagiosperma*	Fabaceae	seed	edible
Canna	*edulis*	Cannaceae	root	edible
Capsicum	*baccatum*	Solanaceae	condiment and spice	edible
Capsicum	*chinense*	Solanaceae	condiment and spice	edible
Carica	*papaya*	Caricaceae	fruit	edible
Caryocar	*brasiliense*	Caryocaraceae	fruit	edible
Caryocar	*glabrum*	Caryocaraceae	nut	edible
Caryocar	*microcarpum*	Caryocaraceae	kernels	edible

Caryocar	*nuciferum*	Caryocaraceae	nut	edible
Caryocar	*villosum*	Caryocaraceae	fruit	edible
Caryodendron	*orinocense*	Euphorbiaceae	nut	edible
Casearia	*decandra*	Flacourtiaceae	fruit	edible
Cassia	*leiandra*	Fabaceae	fruit	edible
Castilla	*ulei*	Moraceae	fruit	edible
Cecropia	*peltata*	Urticaceae	fruit tree	edible
Celtis	*iguanaea*	Cannabaceae	fruit	edible
Celtis	*morifolia*	Cannabaceae	fruit	edible
Celtis	*occidentalis*	Cannabaceae	fruit	edible
Celtis	*reticulata*	Cannabaceae	fruit	edible
Chrysobalanus	*icaco*	Chrysobalanaceae	fruit	edible
Chrysophyllum	*argenteum*	Sapotaceae	fruit	edible
Chrysophyllum	*oliviforme*	Sapotaceae	fruit	edible
Chrysophyllum	*venezuelanense*	Sapotaceae	fruit	edible
Cissus	*gongylodes*	Vitaceae	fruit and stems	edible
Coccoloba	*latifolia*	Polygonaceae	fruit	edible
Conceveiba	*guianensis*	Euphorbiaceae	aril	edible
Couepia	*bracteosa*	Chrysobalanaceae	fruit	edible
Couepia	*chrysocalyx*	Chrysobalanaceae	fruit	edible
Couepia	*edulis*	Chrysobalanaceae	nut	edible
Couepia	*guianensis*	Chrysobalanaceae	seeds	edible
Couepia	*longipendula*	Chrysobalanaceae	nut	edible
Couepia	*subcordata*	Chrysobalanaceae	fruit	edible
Couma	*guianensis*	Apocynaceae	fruit	edible
Couma	*macrocarpa*	Apocynaceae	fruit	edible

Couma	*utilis*	Apocynaceae	fruit, latex	edible
Cucurbita	*maxima*	Cucurbitaceae	vegetable	edible
Cucurbita	*moschata*	Cucurbitaceae	vegetable	edible
Curatella	*americana*	Dilleniaceae	fruit	edible
Cyclanthera	*pedata*	Cucurbitaceae	vegetable	edible
Cyperus	sp.	Cyperaceae	condiment	edible
Desmoncus	*polyacanthos*	Arecaceae	fruit	edible
Dialium	*guianense*	Fabaceae	fruit	edible
Dioscorea	*dodecaneura*	Ebenaceae	root	edible
Dioscorea	*trifida*	Ebenaceae	root	edible
Diospyros	*praetermissa*	Ebenaceae	food	edible
Dipteryx	*odorata*	Fabaceae	food flavouring	edible
Dipteryx	*punctata*	Fabaceae	food flavouring, spice	edible
Duroia	*eriophila*	Rubiaceae	fruit	edible
Elaeis	*oleifera*	Arecaceae	fruit	edible
Endopleura	*uchi*	Humiriaceae	fruit	edible
Erisma	*japura*	Vochysiaceae	fruit	edible
Eryngium	*aquaticum*	Apiaceae	vegetable	edible
Eryngium	*foetidum*	Apiaceae	flavouring, vegetables	edible
Erythroxylum	*coca*	Erythroxylaceae	stimulant	edible
Eschweilera	*Lecythidaceae*	Eschweilera	coriacea	seeds
Eschweilera	*Lecythidaceae*	Eschweilera	grandifolia	seeds
Eugenia	*stipitata*	Myrtaceae	fruit	edible
Eugenia	*uniflora*	Myrtaceae	fruit	edible
Eupatorium	*ayapana*	Asteraceae	condiment	edible
Euterpe	*oleracea*	Arecaceae	fruit	edible

Euterpe	*precatoria*	Arecaceae	fruit	edible
Garcinia	*brasiliensis*	Clusiaceae	fruit	edible
Garcinia	*gardneriana*	Clusiaceae	fruit	edible
Garcinia	*intermedia*	Clusiaceae	fruit	edible
Garcinia	*macrophylla*	Clusiaceae	fruit	edible
Garcinia	*madruno*	Clusiaceae	fruit	edible
Genipa	*americana*	Rubiaceae	fruit, colorant	edible
Grias	*neubertii*	Lecythidaceae	fruit	edible
Grias	*peruviana*	Lecythidaceae	fruit	edible
Hancornia	*speciosa*	Apocynaceae	fruit, latex	edible
Hedyosmum	*brasiliense*	Chloranthaceae	tea	edible
Helianthus	*annuus*	Asteraceae	seeds	edible
Heliconia	*hirsuta*	Heliconiaceae	root	edible
Hevea	*brasiliensis*	Euphorbiaceae	nut, latex	edible
Hevea	*spp.*	Euphorbiaceae	seed, latex	edible
Humiria	*balsamifera*	Humiriaceae	fruit	edible
Hymenaea	*courbaril*	Fabaceae	fruit	edible
Ilex	*guayusa*	Aquifoliaceae	stimulant	edible
Ilex	*paraguariensis*	Aquifoliaceae	stimulant tea	edible
Inga	*alba*	Fabaceae	fruit	edible
Inga	*cinnamomea*	Fabaceae	fruit	edible
Inga	*edulis*	Fabaceae	fruit	edible
Inga	*feuillei*	Fabaceae	fruit	edible
Inga	*heterophylla*	Fabaceae	seeds	edible
Inga	*ilta*	Fabaceae	fruit	edible
Inga	*ingoides*	Fabaceae	fruit	edible

Inga	*laurina*	Fabaceae	fruit	edible
Inga	*laurina*	Fabaceae	fruit	edible
Inga	*macrophylla*	Fabaceae	fruit	edible
Inga	*ornata*	Fabaceae	fruit	edible
Inga	*rubiginosa*	Fabaceae	fruit	edible
Inga	*stipularis*	Fabaceae	seeds	edible
Inga	*velutina*	Fabaceae	fruit	edible
Ipomoea	*batatas*	Convolvulaceae	root	edible
Isertia	*coccinea*	Rubiaceae	fruit	edible
Jacaratia	*spinosa*	Caricaceae	fruit	edible
Justicia	*pectoralis*	Acanthaceae	stimulant	edible
Lacistema	*aggregatum*	Lacistemataceae	fruit	edible
Lecythis	*corrugata*	Lecythidaceae	seeds	edible
Lecythis	*pisonis*	Lecythidaceae	nut	edible
Lecythis	*zabucajo*	Lecythidaceae	seeds	edible
Leersia	*hexandra*	Poaceae	seed	edible
Licania	*incana*	Chrysobalanaceae	fruit	edible
Licaria	*puchury-major*	Lauraceae	fruit used as spice	edible
Licaria	*triandra*	Lauraceae	food flavoring	edible
Macoubea	*guianensis*	Apocynaceae	fruit	edible
Macoubea	*witotorum*	Apocynaceae	fruit	edible
Mammea	*americana*	Clusiaceae	fruit	edible
Manicaria	*saccifera*	Arecaceae	fruit	edible
Manihot	*esculenta*	Euphorbiaceae	root	edible
Manilkara	*bidentata*	Sapotaceae	fruit	edible
Manilkara	*huberi*	Sapotaceae	fruit	edible

Mansoa	*alliacea*	Bignoniaceae	condiment	edible
Maranta	*arundinacea*	Marantaceae	root	edible
Maranta	*ruiziana*	Marantaceae	root	edible
Matisia	*cordata*	Malvaceae	fruit	edible
Mauritia	*flexuosa*	Arecaceae	fruit	edible
Mauritiella	*armata*	Arecaceae	fruit	edible
Mayna	*grandifolia*	Flacourtiaceae	fruit	edible
Melicoccus	*bijugatus*	Sapindaceae	fruit	edible
Melicoccus	*pedicellaris*	Sapindaceae	fruit	edible
Miconia	*ciliata*	Melastomataceae	fruit	edible
Miconia	*longifolia*	Melastomataceae	fruit	edible
Mouriri	*acutiflora*	Melastomataceae	fruit	edible
Mouriri	*crassifolia*	Melastomataceae	fruit	edible
Myrcia	*tomentosa*	Myrtaceae	fruit	edible
Myrciaria	*cauliflora*	Myrtaceae	fruit	edible
Oenocarpus	*bacaba*	Arecaceae	fruit	edible
Oenocarpus	*bataua*	Arecaceae	fruit	edible
Oenocarpus	*distichus*	Arecaceae	fruit	edible
Oenocarpus	*mapora*	Arecaceae	fruit	edible
Omphalea	*diandra*	Euphorbiaceae	seeds	edible
Ouratea	*parviflora*	Ochnaceae	fruit, oil	edible
Pachyrhizus	*tuberosus*	Fabaceae	root	edible
Parinari	*campestris*	Chrysobalanaceae	fruit, seeds	edible
Parinari	*montana*	Chrysobalanaceae	fruit, seeds	edible
Passiflora	*edulis*	Passifloraceae	fruit	edible
Passiflora	*quadrangularis*	Passifloraceae	fruit	edible

Paullinia	*cupana*	Sapindaceae	stimulant	edible
Paullinia	*yoco*	Sapindaceae	stimulant	edible
Persea	*americana*	Lauraceae	fruit	edible
Phaseolus	*lunatus*	Fabaceae	seed	edible
Phaseolus	*vulgaris*	Fabaceae	seed	edible
Platonia	*insignis*	Clusiaceae	fruit, seed	edible
Poraqueiba	*paraensis*	Icacinaceae	fruit	edible
Poraqueiba	*sericea*	Icacinaceae	fruit	edible
Posoqueria	*longiflora*	Rubiaceae	fruit	edible
Poupartia	*amazonica*	Anacardiaceae	fruit	edible
Pourouma	*cecropiifolia*	Urticaceae	fruit	edible
Pourouma	*guianensis*	Urticaceae	fruit	edible
Pourouma	*mollis*	Urticaceae	fruit	edible
Pouteria	*caimito*	Sapotaceae	fruit	edible
Pouteria	*glomerata*	Sapotaceae	fruit	edible
Pouteria	*guianensis*	Sapotaceae	fruit	edible
Pouteria	*lucuma*	Sapotaceae	fruit	edible
Pouteria	*macrocarpa*	Sapotaceae	fruit	edible
Pouteria	*macrophylla*	Sapotaceae	fruit	edible
Pouteria	*multiflora*	Sapotaceae	fruit	edible
Pouteria	*obovata*	Sapotaceae	fruit	edible
Pouteria	*pariry*	Sapotaceae	fruit	edible
Pouteria	*procera*	Sapotaceae	fruit	edible
Pouteria	*ucuqui*	Sapotaceae	fruit	edible
Pouteria	*venosa*	Sapotaceae	fruit	edible
Protium	*heptaphyllum*	Burseraceae	fruit	edible

Protium	*unifoliolatum*	Burseraceae	fruit	edible
Psidium	*acutangulum*	Myrtaceae	fruit	edible
Psidium	*guajava*	Myrtaceae	fruit	edible
Psidium	*guineensis*	Myrtaceae	fruit	edible
Psidium	*sartorianum*	Myrtaceae	fruit	edible
Randia	*ruiziana*	Rubiaceae	fruit	edible
Rhynchoryza	*subulata*	Oryzeae	grain	edible
Rollinia	*leptopetala*	Annonaceae	fruit	edible
Sagittaria	*latifolia*	Alismataceae	food	edible
Salacia	*impressifolia*	Celastraceae	fruit	edible
Sicana	*odorifera*	Cucurbitaceae	vegetable	edible
Siparuna	*guianensis*	Monimiaceae	fruit	edible
Solanum	*sessiliflorum*	Solanaceae	fruit	edible
Solanum	*splenden*	Solanaceae	fruit	edible
Solanum	*stramonifolium*	Solanaceae	fruit	edible
Spilanthes	*acmella*	Asteraceae	condiment	edible
Spilanthes	*oleracea*	Asteraceae	condiment	edible
Spondias	*mombin*	Anacardiaceae	fruit	edible
Sterculia	*apetala*	Malvaceae	seeds	edible
Sterculia	*excelsa*	Malvaceae	seeds	edible
Sterculia	*speciosa*	Malvaceae	fruit	edible
Syagrus	*cocoides*	Arecaceae	fruit	edible
Syagrus	*inajai*	Arecaceae	kernels	edible
Talinum	*triangulare*	Portulacaceae	vegetable	edible
Talisia	*esculenta*	Sapindaceae	fruit	edible
Tapirira	*guianensis*	Anacardiaceae	fruit	edible

Tetragastris	*altissima*	Burseraceae	fruit	edible
Theobroma	*bicolor*	Malvaceae	fruit, seed	edible
Theobroma	*cacao*	Malvaceae	stimulant	edible
Theobroma	*grandiflorum*	Malvaceae	fruit	edible
Theobroma	*microcarpum*	Malvaceae	fruit	edible
Theobroma	*speciosum*	Malvaceae	fruit	edible
Theobroma	*subincanum*	Malvaceae	fruit	edible
Vitex	*cymosa*	Verbenaceae	fruit	edible
Vitex	*gigantea*	Verbenaceae	fruit	edible
Vitex	*triflora*	Verbenaceae	fruit	edible
Xanthosoma	*brasiliense*	Araceae	vegetable	edible
Xanthosoma	*sagittifolium*	Araceae	root	edible
Ximenia	*americana*	Olacaceae	fruit, seeds	edible
Zea	*mays*	Poaceae	grain	edible
Zizania	*palustris*	Oryzeae	grain	edible

Table S5. *Edible plant classifications used in this study*

Genus	Family	Edible
**Aphelandra*	Acanthaceae	no
**Amaranthus*	Amaranthaceae	no
Apiaceae	Apiaceae	no
**Tabernaemontana*	Apocynaceae	no
Dracontium	Araceae	no
Dendropanax	Araliaceae	no
Didymopanax	Araliaceae	no
Oreopanax	Araliaceae	no
**Schefflera*	Araliaceae	no
Geonoma	Arecaceae	no
**Socratea*	Arecaceae	no
Ambrosia	Asteraceae	no
**Alnus*	Betulaceae	no
Arrabidaea	Bignoniaceae	no
**Jacaranda*	Bignoniaceae	no
**Lundia*	Bignoniaceae	no
Handroanthus	Bignoniaceae	no
**Cocholospermum*	Bixaceae	no
**Cordia*	Boraginaceae	no
Symphonia	Clusiaceae	no
NA	Combretaceae	no
Doliocarpus	Dilleniaceae	no
NA	Elaeocarpaceae	no
Acalypha	Euphorbiaceae	no
Alchornea	Euphorbiaceae	no

**Croton*	Euphorbiaceae	no
**Mabea*	Euphorbiaceae	no
**Phyllanthus*	Euphorbiaceae	no
Sapium	Euphorbiaceae	no
**Sebastiana*	Euphorbiaceae	no
**Acacia*	Fabaceae	no
**Anadenanthera*	Fabaceae	no
Apuleia	Fabaceae	no
Bauhinia	Fabaceae	no
Bowdichia	Fabaceae	no
**Centrolobium*	Fabaceae	no
**Chamaecrista*	Fabaceae	no
Dalbergia	Fabaceae	no
**Desmodium*	Fabaceae	no
**Hymenea*	Fabaceae	no
Machaerium	Fabaceae	no
**Macrolobium*	Fabaceae	no
**Mimosa*	Fabaceae	no
Ormosia	Fabaceae	no
Pterogyne	Fabaceae	no
**Senna*	Fabaceae	no
**Swartzia*	Fabaceae	no
NA	Flacourtiaceae	no
Episcia	Gesneriaceae	no
**Vantanea*	Humiriaceae	no
*NA	Hymenophyllaceae	no

**Leretia*	Icacinaceae	no
NA	Lamiaceae	no
Utricularia	Lentibulariaceae	no
**Heteropteris*	Malpighiaceae	no
**Ceiba*	Malvaceae	no
*NA	Malvaceae	no
Pseudobombax	Malvaceae	no
**Cedrela*	Meliaceae	no
NA	Meliaceae	no
**Ruagea*	Meliaceae	no
NA	Moraceae	no
**Pseudolmedia*	Moraceae	no
**Sorocea*	Moraceae	no
**Stylogene*	Myrsinaceae	no
*NA	Myristicaceae	no
Virola	Myristicaceae	no
**Myrsine*	Myrsinaceae	no
**Podocarpus*	Podocarpaceae	no
**Polygala*	Polygalaceae	no
**Polygalaceae*	Polygalaceae	no
**Polygonum*	Polygalaceae	no
**Gouania*	Rhamnaceae	no
*NA	Rhizophoraceae	no
**Borreria*	Rubiaceae	no
Psychotria	Rubiaceae	no
**Spermacoce*	Rubiaceae	no

**NA*	Rutaceae	no
Simarouba	Simaroubaceae	no
**Luehea*	Tiliaceae	no
**Typha*	Typhaceae	no
**Trema*	Ulmaceae	No

Table S6. *Pollen taxa identified in this study with no documented edible Genus.* *Indicates pollen less than 5% and not included in pollen diagram.

Pollen Taxa	**Family**	**Putative Edible**	**Type of food**
Acanthaceae	Acanthaceae	*Justicia* spp.	stimulant
Agavaceae	Agavaceae	*Agave* spp.	beverage
Apiaceae	Apiaceae	*Eryngium* spp.	flavoring, vegetables
Apocynaceae	Apocynaceae	*Ambelania* sp.	fruit
Asteraceae	Asteraceae	*Eupatorium* sp.	condiment
Bignoniaceae	Bignoniaceae	*Mansoa* sp.	condiment
Cyperaceae	Cyperaceae	*Cyperus*	condiment
Lecythidaceae	Lecythidaceae	*Lecythis pisonis*	seed
Malvaceae	Malvaceae	*Sterculia apetala*	seed
Marantaceae	Marantaceae	*Maranta arundinacea, M. ruiziana*	root
Myrtaceae	Myrtaceae	*Campomanesia*	fruit
Melastomataceae	Melastomataceae	*Bellucia grossularioides*	fruit
Poaceae	Poaceae	*Leersia, Pharus, Oryzeae glumaepatula, O. alta*	grain
Sapindaceae	Sapindaceae	*Melicoccus*	fruit
Sapindaceae	Sapindaceae	*Talisia* sp.	fruit
Solanaceae	Solanaceae	*Capsicum* sp.	condiment, spice

Table S7. *Pollen taxa identified in this study identified to family level with known edible genus.*

Pollen Taxa	Family	Putative Edible	Common name	Type of food
Sagittaria	Alismataceae	*S. latifolia*	Arrowhead	food
Tapiria+	Anacardiaceae	*T. guianensis*	Wild mahogany	fruit
Spondias+*	Anacardiaceae	*S. mombin*	Hog plum, taperibá	fruit
Annona+*	Annonaceae	*A. mucosa, A. muricata*	Wild custard apple, biribá	fruit
Ilex	Aquifoliaceae	*I. guayusa*	Brazilian tea, mate	stimulant
Acrocomia +*	Arecaceae	*A. aculeata*	Mucajá, macaúba	fruit
Astrocaryum+*	Arecaceae	*A. vulgare, A. aculeatum*	Cumare palm, tucumã	fruit
Attalea+*	Arecaceae	*A. speciosa*	Babassu palm, babaçu	fruit, oil
*Bactris**	Arecaceae	*B. guineensis, B. gasipaes*	Peach palm, pupunha	fruit
Mauritia+	Arecaceae	*M. flexuosa*	Buruti palm, burití	fruit
Mauritiella+	Arecaceae	*M. carana*	Caraná, caranai	fruit
Oenocarpus+	Arecaceae	*O. distichus*	Bacaba	fruit
Protium+	Burseraceae	*P. unifoliolatum, P. heptaphyllum*	Breu, ràb kudjà re	fruit
Tetragastris+*	Burseraceae	*T. altissima*	Haiawa balli, ràb ti	fruit
Celtis+	Cannabaceae	*C. iguanaea*	Garabato blanco	fruit
Jacaratia+*	Caricaceae	*J. spinosa*	Barrigudo, mamoí	fruit
Caryocar+	Caryocaraceae	*C. villosum, C.glabum, C. microcarpum*	Butternut tree, pequiá	fruit

Licania+	Chrysobalanaceae	*Licania* spp.	Gopher apple, ajaru	fruit
Garcinia	Clusiaceae	*G. brasilensis,, G. gardneriana*	Bacupari	fruit
Erythroxylum	Erythroxylaceae	*E. coca*	Coca	stimulant
Hevea+*	Euphorbiaceae	*H. brasiliensis*	Para rubber tree, seringueira	seed
Cassia	Fabaceae	*C. leiandra*	Marimari	fruit
Dialium+*	Fabaceae	*D. guianense*	Jutaí pororoca	fruit
Dipteryx+ *	Fabaceae	*D. odorata*	Tonka beans, cumarú	fruit
Inga+*	Fabaceae	*I. alba, I. edulis, I. laurina*	Icecream bean, ingá cipo	fruit
Hymenaea+	Fabaceae	*H. courbaril*	Anime resin tree, jatobá	fruit
Heliconia+*	Heliconiaceae	*H. hirsuta*	Bico de papagaio	root
Humiria	Humiriaceae	*Humiria* sp.	Blackberry, umiri	fruit
Aniba+	Lauraceae	*A. rosaeodora*	Brazilian rosewood, páo rosa	food additive
Bertholletia+*	Lecythidaceae	*B. excelsa*	Brazil nut, castanha do Pará	edible nut
Eschweilera+	Lecythidaceae	*E. coriacea, E. grandiflora*	Matamatá branco	seeds
Byrsonima+	Malpighiaceae	*B. crassifolia, B. verbascifolia*	Golden spoon, murici	fruit
Theobroma+	Malvaceae	*T. cacao, T. grandiflorum, T. speciosum*	Cacao tree, cacau, cupuaçu	fruit

Brosimum+	Moraceae	*B. lactescens*, *B. alicastrum*	Breadnut tree, mauratinga	edible nut
Pourouma	Urticaceae	*P. cecropiifolia* *P. guianensis, P. edulis*	Amazon grape fruit, mapati	fruit
Coccoloba+*	Polygonaceae	*C. latifolia*	Papalón	fruit
Paullinia	Sapindaceae	*P. cupana*	Guaraná	stimulant
Pouteria+	Sapotaceae	*P. glomerata, P. venosa, P. caimito, P. lucuma*	Egg fruit, abiu	fruit
Solanum+	Solanaceae	*S. sessiliflorum, S. splenden*	Orinoco apple, cocona	fruit
Cecropia+	Urticaceae	*C. peltata*	Trumpet tree, embaúba	fruit

Table S8. *Pollen taxa identified to family level with known edible genus in ethnographic record and present in modern botanical inventory*. + indicates genera identified in the pollen record that are present in the modern botanical inventories and the botanical reconnaissance around Lake Caranã. * indicates pollen less than 5% and not included in edible sums with the exception of crop pollen which is presented as presence data.

Phytolith Taxa	Family/Taxonomic association
Mendoncia sp.	Acanthaceae
Annonaceae	Annonaceae
Arboreal	Arboreal
Asteraceae	Asteraceae
Bamboosoideae	Bamboosoideae
Cyperaceae	Cyperaceae
Commelinaceae	Commelinaceae
Heliconiaceae	Heliconiaceae
Trichomanes sp.	Hymenophyllaceae
Marantaceae	Marantaceae
Chloridoideae	Poaceae
Poaceae	Poaceae

Table S9. *Phytolith taxa identified in this study.*

Phytolith taxa	**Taxonomic association**	**Putatible edible**	**Common name**	**Type of food**
Arecaceae+	Arecaceae	Various incl. *Astrocaryum*, *Attalea*, etc.	Various	fruit
Olyreae	Bamboosoideae	Various incl. *O. latifolia*	takwari (Ka'apor tribe)	grain
Celtis sp.+	Cannabaceae	*Various incl. C. iguanaea, C. morifolia*	Parinari	fruit
Chusquea sp.	Poaceae	*C. culeou*	Culeu	grain
Pharus sp.	Poaceae	*P. ciliatus*	Arroz bravo	seed

Table S10. *Edible phytolith taxa identified in this study.* + indicates genera identified in the pollen record that are present in the modern botanical inventories and the botanical reconnaissance around Lake Caranã.

Supplementary Discussion

D1. Riverine high-stand. Although the region has a long record of human occupation that starts in the Late Pleistocene, our records detect the history of coupled human and environmental systems for the past ~ 5,500 years. Relative sea-level rise was ongoing throughout the early Holocene along the east coast of South America[17], culminating in a high-stand between ~ 5,700 and 5,100 cal B.P.[18–20]. Because the base of the river channel in the eastern half of the Amazon basin is near to sea-level (<2 m), relative sea-level rise would have resulted in a deeper inland penetration of the Atlantic tidal zone, in part damming the flow of the large rivers that drain into the lower reaches of the Amazon[19]. For the tidally influenced Tapajós River, higher sea-levels results in higher river levels, which likely inundated the LC study-area (Fig. 4a). Increased water levels account for the peak Fe, Ti, MS, and bulk density values during this phase. Decreasing relative sea-level and river inundation (~ 5,000 to 4,000 cal B.P.) caused numerous lakes to form in the lower Amazon[10,20]. This process is evidenced by a mix of terrestrial and hydrarch succession and is reflected in the Tapajós TAP-02 riverine pollen core[20] and other records in the Amazon[18,21].

LC Phase 1 is characterized by the highest levels of Ti and Fe coupled with record high magnetic susceptibility (MS) and bulk density values. Ca levels were below the level of detection, thus ratios for Ti/Ca and F/Ca could not be calculated. Coupled with MS and bulk density, geochemistry from LC Phase 2 indicates decreased Fe, Ti, bulk density and MS values, coupled with an increase in bulk sediment organic content indicating a shift to lacustrine conditions signaling the formation of the lake (Supplementary Fig. S2).

D2. Archaeology. The earliest known archaeological evidence in the Lower Amazon is the Palaeoindian occupation of Pedra Pintada Cave (~ 13,000 cal B.P.)[22]. Archaic occupations in the region are represented by the Taperinha shell-midden, which contains the earliest ceramics in the Amazon (~ 7,900 cal B.P.)[23]. The Formative Period occurs between ~ 4500 and 1000 cal B.P.[24] followed by the Late pre-Columbian Tapajo Period (LPTP) from ~ 1000 to 400 cal B.P.[25]. The LPTP is a distinctive Amazonian tradition characterized by elaborate pottery vessels typically decorated with representational and geometric plastic and painted designs, anthropomorphic and zoomorphic adornos displayed in caryatid and neck vessels, as well as polished-stone figurines representing various animals and humans locally called "muiraquitas"[26,27]. Roosevelt [28] argues for a chiefdom-level society, which may have control over a territory of 23 km^2 with densely populated settlements encompassing a population of several thousand, whose capital site of the LPTP lies at the confluence of the Tapajós and the Amazon River. However, recent regional studies propose heterarchical models of political organization, either supporting the hypothesis of a centralized organization encompassing independent communities[29] or a non-centralized polity based on a collaborative network integrating the region[13,30].

The sum of probability distributions of the available radiocarbon dates from the Santarém region and its surroundings (Fig. 2D) provide a unique setting to understand the origin, development and agricultural use of ADEs. The area exhibits some of the highest densities of ADE sites[14], including Black ADEs and Brown ADEs (traditionally known as *terra preta* and *terra mulata*), located in a diversity of settings

along both major waterways (Tapajós and Amazon rivers) and in *terra firme* rainforest along the Belterra Plateau (130 to 180 m.a.s.l)[26,31,32] (Fig. 1A). The word mulata has a pejorative meaning of miscegenation and impurity. *Mulata* refers to interethnic breeding that resulted largely from rapes during the 354 years (1534 to 1888 A.D.) of black slavery in Brazil[33–35]. Considering the etymology of the word, the ethical choice of this work is to refuse the nomenclature *terras mulatas* as a category of classification of the lighter form of dark soils. Thus, the terminologies adopted in this study are Black ADE and Brown ADE. While Black ADEs developed as the result of village middens, the lighter Brown ADEs, devoid of artifacts are the result of cultivation practices[31,36]. The earliest ADE site is from Lago do Jacare I, located in the bluff of a *terra firme* lake dated from ~ 4405 to 3920 cal B.P.[12]. Riverine ADEs date to as early as ~ 4295 to 3990 cal B.P. and ADEs on the BTP are later dating from ~ 555 to 500 cal B.P. and represent the more recent intensification of human occupation on the plateau. The regional intensification begins ~ 1500 cal B.P. and peaks ~ 500 cal B.P. (Fig. 2D). The LPTP is also characterized by a network of ditch and causeway trails and natural ponds, which have been artificially enhanced as reservoirs. Our study site, Serra do Maguari 1 (SDM1) is a ~ 15 ha mounded village with a central plaza surrounded by a mosaic of ADE sites (Supplementary Fig. S4). Mound construction and ADE formation at SDM1 occurred between ~ 530 and 450 cal B.P. during the late phase of the LPTP. The ceramic materials and the site are characteristic of the late pre-Columbian Tapajos Period[37].

Supplementary Figures

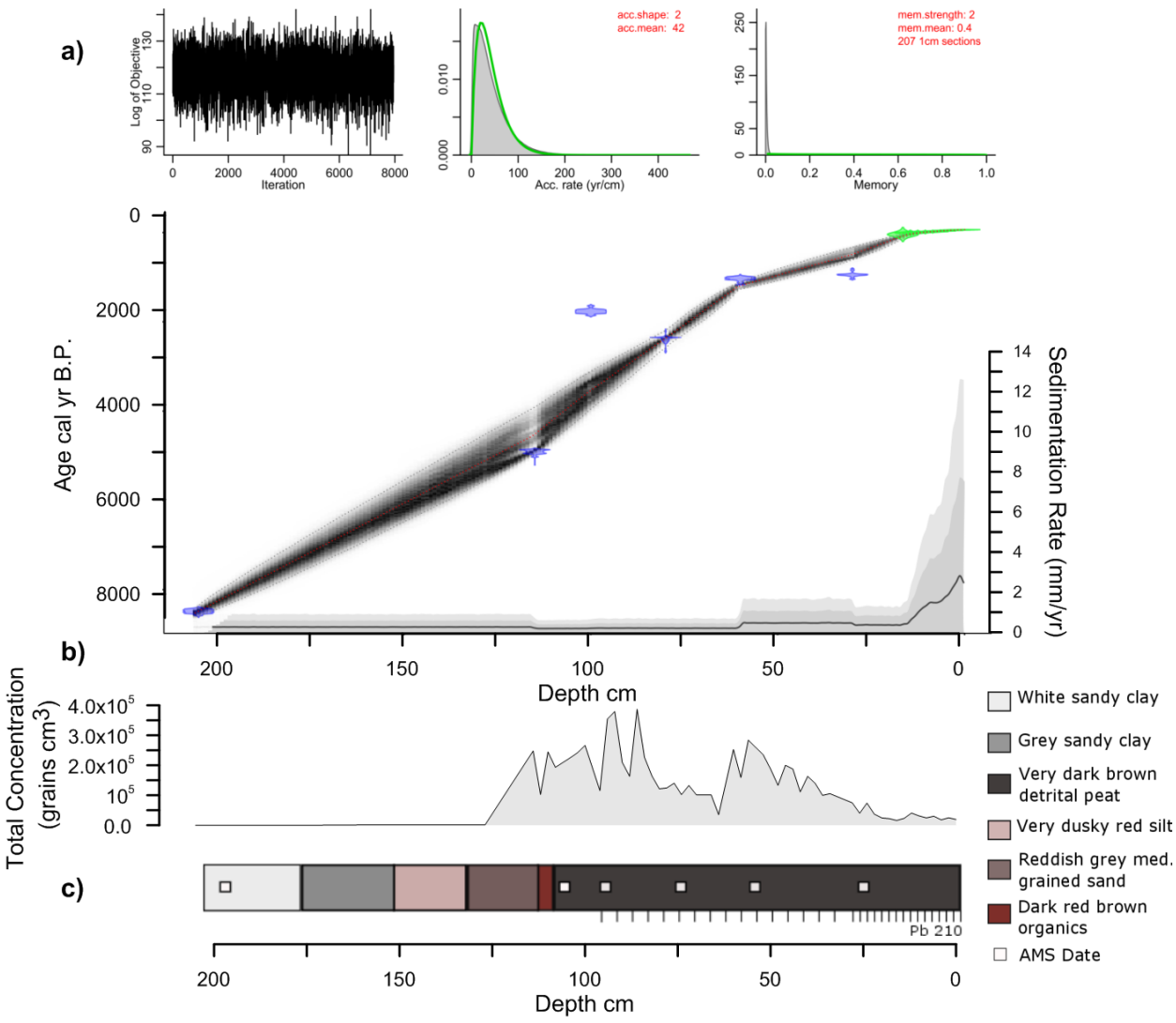

Fig. S1. Lake Caranã age-model. a) Age-depth model with MCMC iterations (top left) and priors (green curves) and posteriors (grey histograms) for accumulation rate (top middle) and memory (top right). The age model iterations (black hatching) are based on radiocarbon ages (blue pdfs) and ^{210}Pb ages (green pdfs), with model mean (red dashed) and 2σ (black dashed) distributions. b) Total pollen concentration from sediment core. c) Sediment core lithology. AMS dates indicated by the white squares, ^{210}Pb indicated by tick marks. Note: Low pollen concentration prior to ~4,700 cal yr B.P. is attributed to a combination of sandy sediments and low organics that likely reduced pollen preservation.

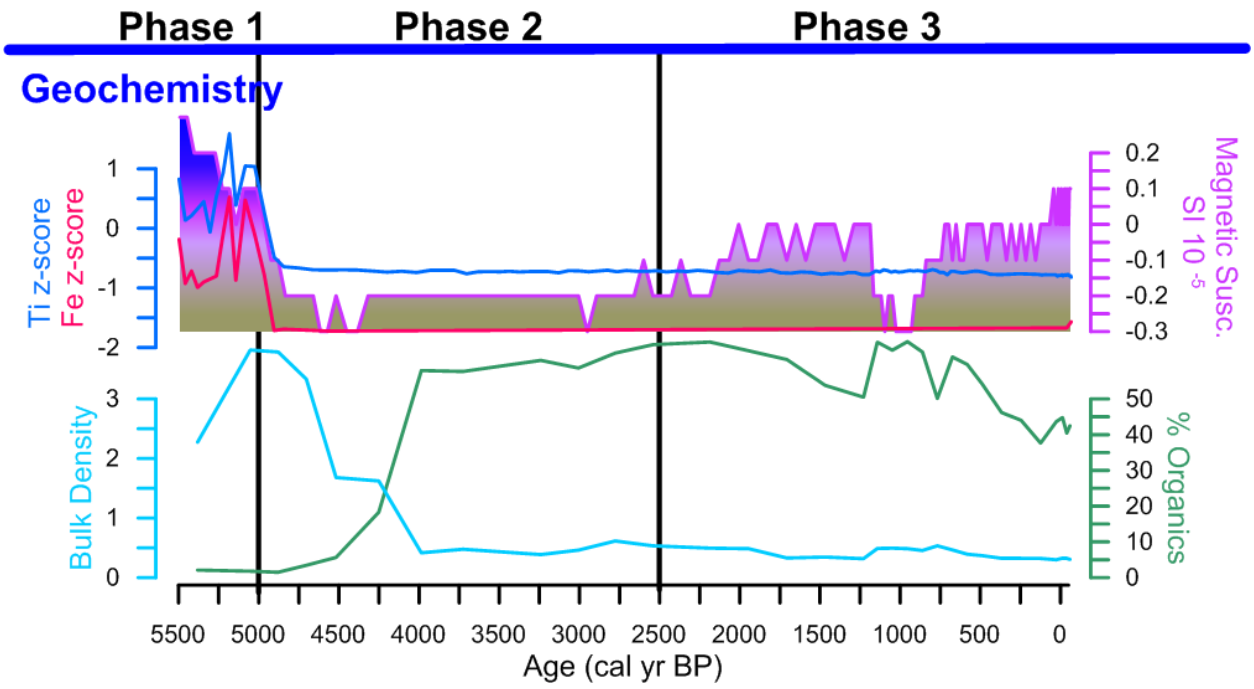

Fig. S2. Lake Caranã geochemistry. Z-score Ti (blue) and Fe (pink) XRF data. Magnetic susceptibility (purple) is represented in $SI^{10\text{-}5}$, bulk density (teal) and % organics from loss-on-ignition (green) indicated the transition from organic poor to organic rich lacustrine conditions between Phase 1 and Phase 2.

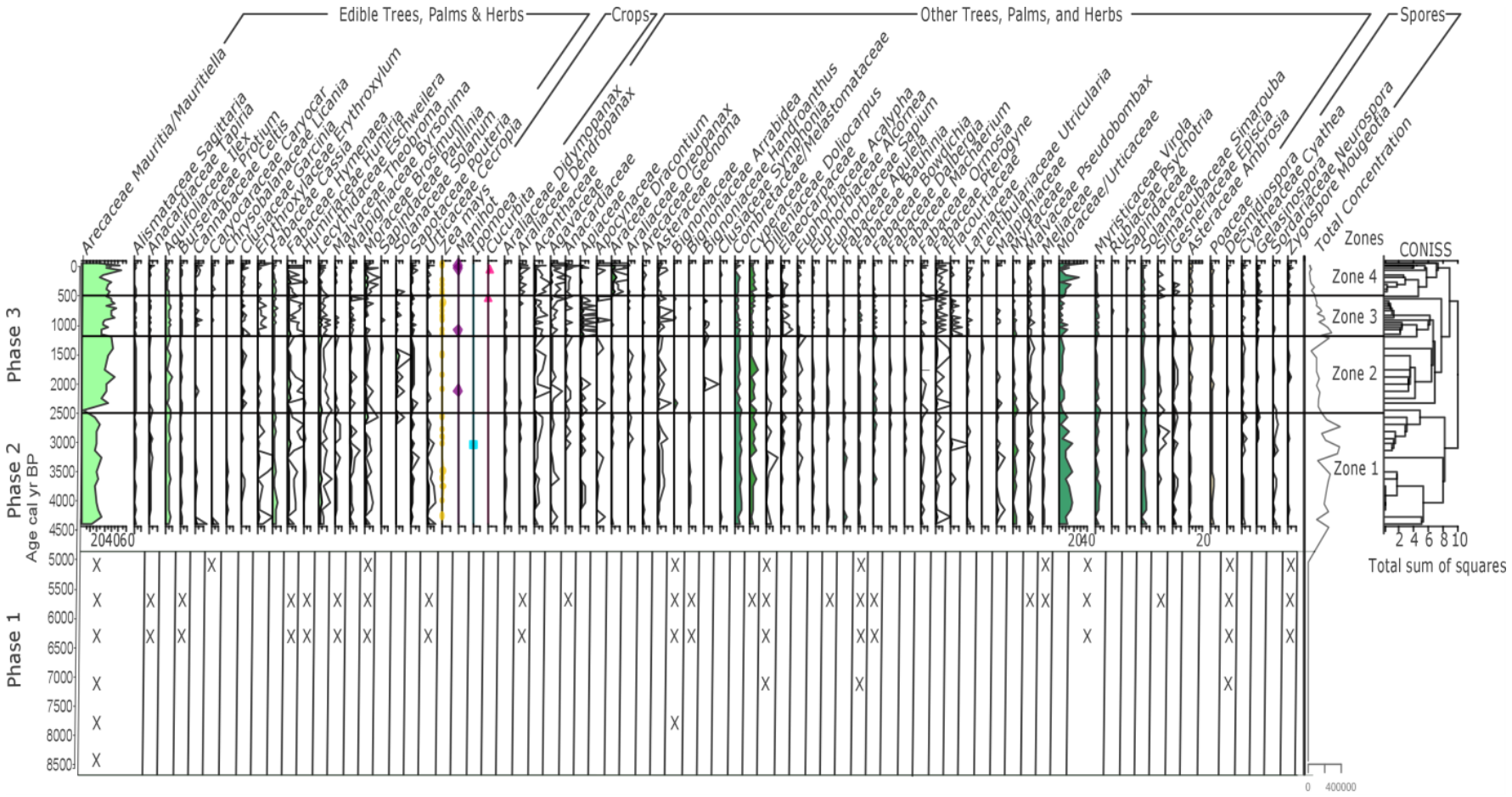

Fig. S3. Lake Caranã pollen data. Percentage pollen diagram (silhouettes show 10X exaggeration curves); Pollen Zones determined in Phase 2 and 3 from CONISS. Light green represents edible plants, dark green represents other trees, palms and herbs, symbols represent total counts of crop pollen: yellow circle *Zea mays*, purple diamond *Manihot*, blue square *Ipomoea*, pink triangle *Cucurbita*). In Phase 1 (8500 to 5000 cal yr B.P.) pollen data are shown in presence data (X) due to low concentrations indicated by total concentration data on the far right of the graph.

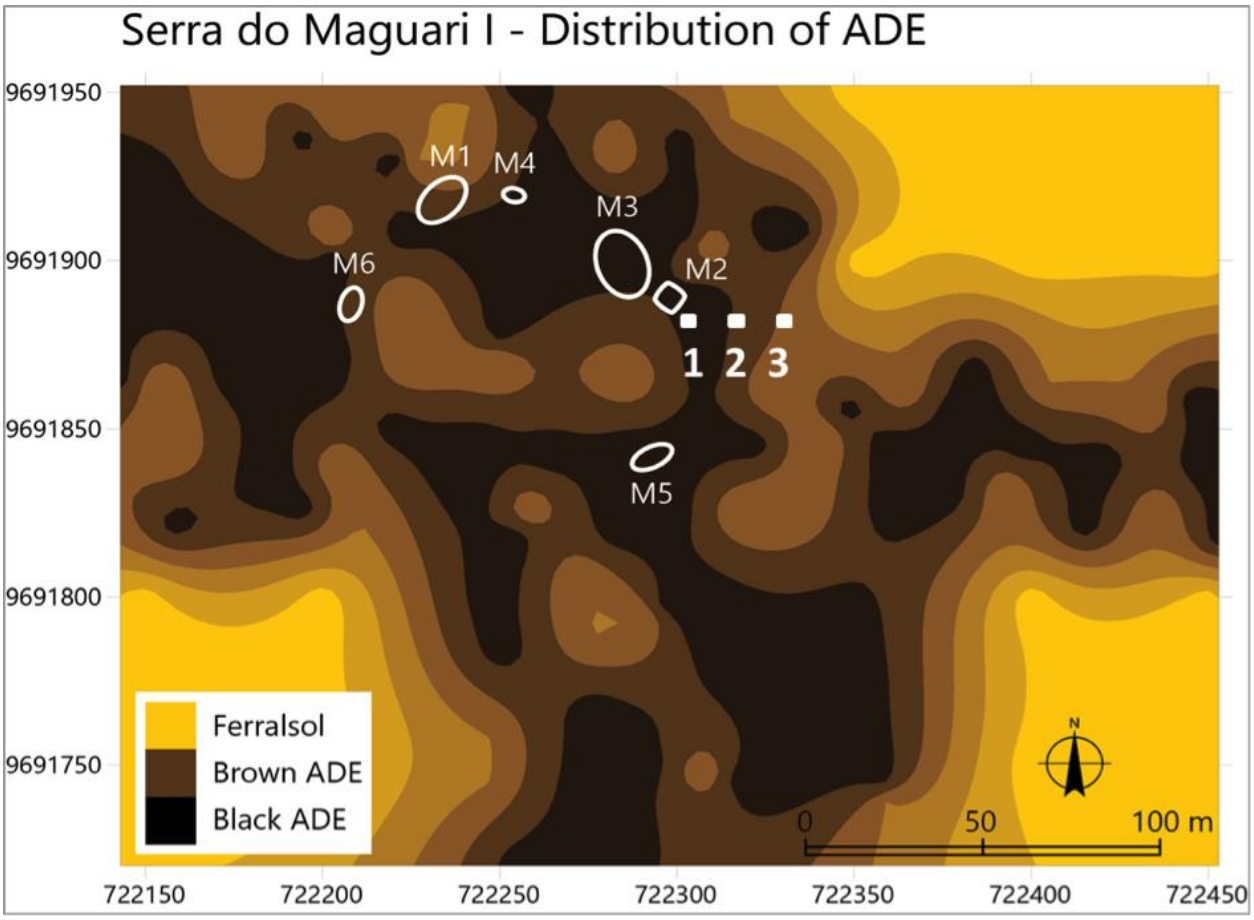

Fig. S4. Serra do Maguari-1 site map. ADE-ferralsol distribution map at Serra do Maguari-1. White circles indicate archaeological mound features (M1-6). Soil profile locations indicated by white squares (1-3).

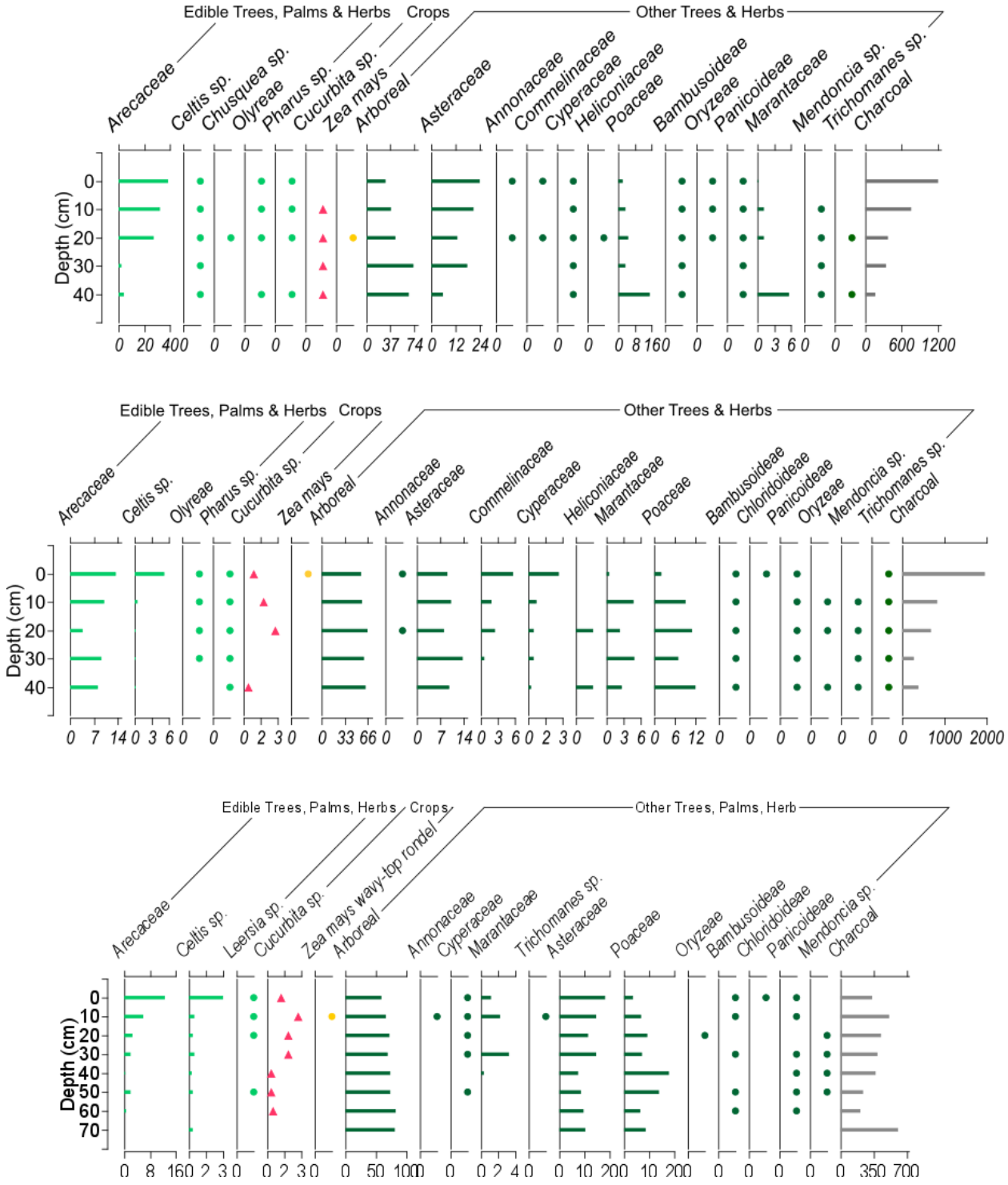

Fig. S5. Serra do Maguari phytolith soil profiles. Phytolith percentage diagrams from soils profiles (SP). Symbols represent total counts where percentage data were very low. Light green represents edible plants, dark green represents other trees and herbs. Light green circles represent total counts for edible plants, dark green circles indicate total counts of other trees and herbs, pink triangles indicate *Cucurbita* and yellow circle indicate *Zea mays.* Total soil charcoal counts grey bars.

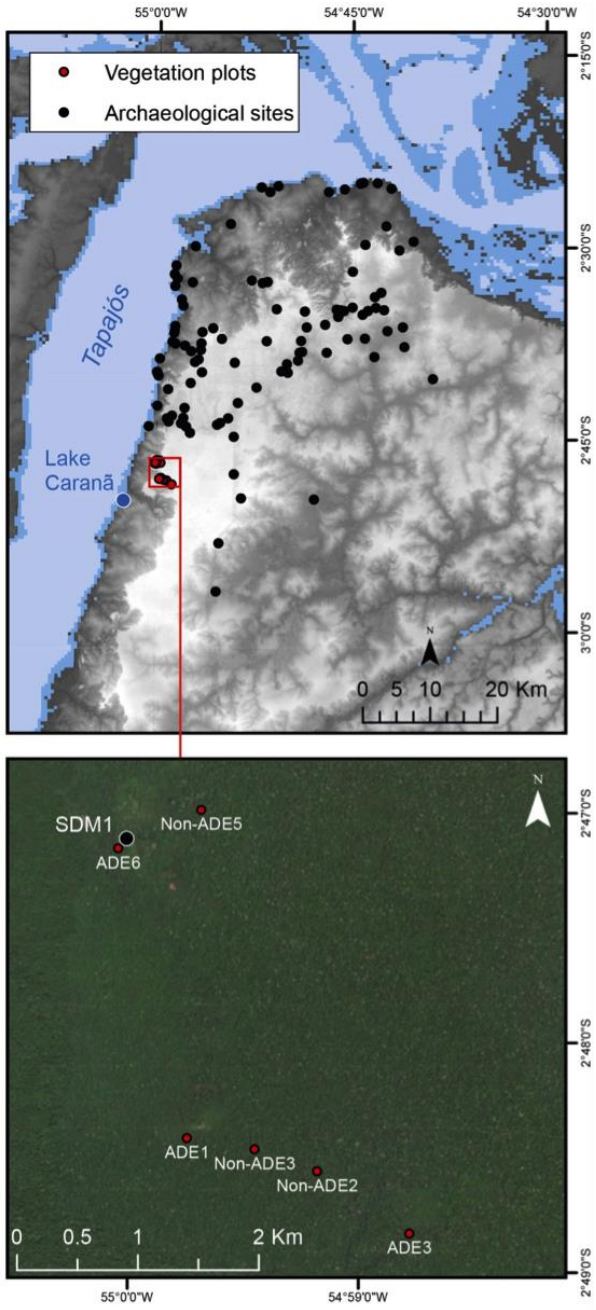

Fig. S6 Map of modern vegetation plots: Top panel indicating the location of vegetation plots in relation to Lake Caranã**,** Serra do Maguari, and other archaeological sites. Bottom insert indicates the location of ADE and non-ADE plots used in the modern vegetation survey in relation to Serra do Maguari.

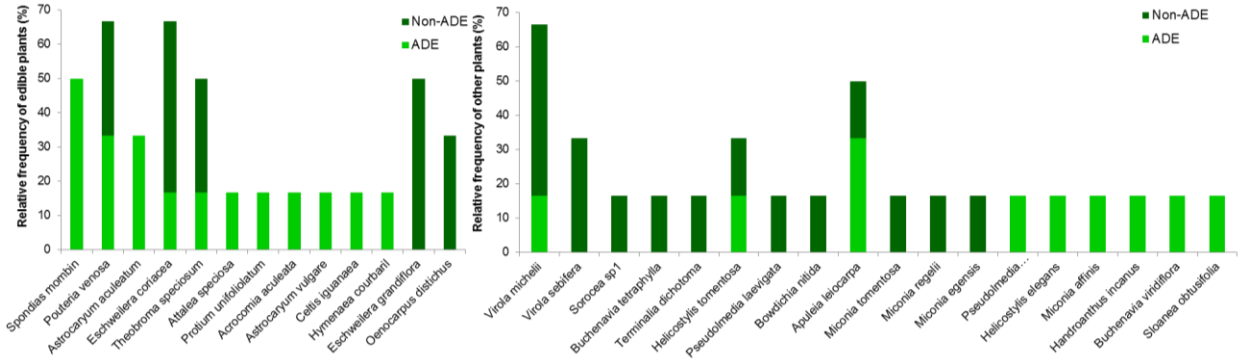

Fig. S7. Relative frequency of modern vegetation inventories: Relative frequency (%) of edible and other trees, palms, and lianas identified in ADE (light green) and non-ADE (dark green) forest plots.

Supplementary References

1. Athens, S. J. *et al.* Early Prehistoric Maize in Northern Highland Ecuador. *Lat. Am. Antiq.* **27,** 3–21 (2016).
2. Bush, M. B., Dolores, R. P. & Colinvaux, P. A. A 6,000 year history of Amazonian maize cultivation. *Nature* **340,** 303–305 (1989).
3. Bush, M. B. *et al.* A 6900-year history of landscape modification by humans in lowland Amazonia. *Quat. Sci. Rev.* **141,** 52–64 (2016).
4. Mora, S., Herrera, L. F., Cavalier, I. & Rodríguez, C. *Cultivars, anthropic soils, and stability: a preliminary report of archaeological research in Araracuara, Colombian Amazonia*. (1991).
5. Sublette Mosblech, N. A., Chepstow-Lusty, A., Valencia, B. G. & Bush, M. B. Anthropogenic control of late-Holocene landscapes in the Cuzco region, Peru. *The Holocene* **22,** 1361–1372 (2012).
6. Bush, M. B. *et al.* Holocene fire and occupation in Amazonia: Records from two lake districts. *Philos. Trans. R. Soc. Lond. B. Biol. Sci.* **362,** 209–18 (2007).
7. Brugger, S. O. *et al.* Long-term man–environment interactions in the Bolivian Amazon: 8000 years of vegetation dynamics. *Quat. Sci. Rev.* **132,** 114–128 (2016).
8. Roosevelt, A. C. *Parmana: prehistoric maize and manioc subsistence along the Amazon and Orinoco*. (Academic Press, 1980).
9. Hilbert, L. *et al.* Evidence for mid-Holocene rice domestication in the Americas. *Nat. Ecol. Evol.* **1,** 1693–1698 (2017).
10. Bush, M. B., Miller, M. C., Oliveira, P. E. De & Colinvaux, P. A. Two histories of environmental change and human disturbance in eastern lowland Amazonia. **5,** 543–553 (2000).
11. Gomes, D. C. Cronologia e conexões culturais na Amazônia: as sociedades formativas na região de Santarém, PA. *Rev. Antropol.* **54,** 268–314 (2011).
12. Alves, D. T. Ocupação Indígena na Foz do Rio Tapajós (1610 a.a. - 1020 d.c.). *Novas Edições Acadêmicas, Saarbrücken* 245 (2014).
13. Quinn, E. R. Excavating "Tapajó" ceramics at Santarém: Their age and archaeological context. *Unpubl. Dr. Thesis, Univ. Illinois Chicago, Chicago.[Links]* (2004).
14. Martins, C. M. P. Sobre contatos e fronteiras: Um enfoque arqueológico. *Amaz. - Rev. Antropol.* **4,** (2012).
15. Schaan, D. P. *Discussing centre-periphery relations within the Tapajó domain, Lower Amazon*. *Beyond Waters: Archaeology and Environmental History of the Amazonian Inland* (GOTARC (Gothenburg Archaeological Studies), Series A University of Gothenberg, 2016).
16. Stenborg, P. *Archaeological research at hinterland sites on the Belterra Plateau, Pará. Beyond Waters: Archaeology and Environmental History of the Amazonian Inland* (GOTARC (Gothenburg Archaeological Studies), Series A University of Gothenberg, 2016).
17. Milne, G. A., Long, A. J. & Bassett, S. E. Modelling Holocene relative sea-level observations from the Caribbean and South America. *Quat. Sci. Rev.* **24,** 1183–1202 (2005).
18. Behling, H., Keim, G., Irion, G., Junk, W. & Mello, J. N. De. Holocene environmental changes in the Central Amazon Basin inferred from Lago Calado (Brazil). *Palaeogeogr. Palaeoclimaology, Palaeoecol.* **173,** 87–101 (2001).
19. Angulo, R. J., Lessa, G. C. & Souza, M. C. de. A critical review of mid- to late-Holocene sea-level fluctuations on the eastern Brazilian coastline. *Quat. Sci. Rev.* **25,** 486–506 (2006).
20. Irion, G. *et al.* A multiproxy palaeoecological record of Holocene lake sediments from the Rio Tapajós, eastern Amazonia. *Palaeogeogr. Palaeoclimatol. Palaeoecol.* **240,** 523–535 (2006).
21. Weng, C., Bush, M. B. & Athens, J. S. Holocene climate change and hydrarch succession in lowland Amazonian Ecuador. *Rev. Palaeobot. Palynol.* **120,** 73–90 (2002).
22. Roosevelt, A. C. *et al.* Paleoindian cave dwellers in the Amazon: the peopling of the Americas. *Science.* **272,** 373–384 (1996).
23. Roosevelt, A. C., Housley, R. A., Da Silveira, M. I., Maranca, S. & Johnson, R. Eighth millennium pottery from a prehistoric shell midden in the Brazilian Amazon. *Science.* **254,** 1621–

1624 (1991).
24. Schaan, D. Long-term human induced impacts on Marajó Island landscapes, Amazon estuary. *Diversity* **2,** 182–206 (2010).
25. Stenborg, P., Schaan, D. P. & Lima, M. A. Precolumbian land use and settlement pattern in the Santarém region, lower Amazon. *Amazônica* **4,** 222–250 (2012).
26. Nimuendajú, C. *In pursuit of a past Amazon: archaeological researches in the Brazilian Guyana and in the Amazon region*. (Elanders Infologistik, 2004).
27. Palmatary, H. C. *The archaeology of the lower Tapajós Valley, Brazil*. **50,** (American Philosophical Society, 1960).
28. Roosevelt, A. C. *Arqueologia Amazônica. História dos índios no Brasil*. (FAPESP, São Paulo, 1992).
29. Gomes, D. M. C. Politics and ritual in large villages in Santarém, lower Amazon, Brazil. *Cambridge Archaeol. J.* **27,** 275–293 (2017).
30. Troufflard, J. A Reflection on Archaeology and Sustainability in the Brazilian Amazon. in *The 3rd World Sustainability Forum* 1–12 (2013).
31. Sombroek, W. G. *Amazon soils*. (Centre for agricultural publications and documentation Wageningen, 1966).
32. Woods, W. I. & McCann, J. M. The anthropogenic origin and persistence of Amazonian dark earths. in *Yearbook. Conference of latin americanist Geographers* 7–14 (JSTOR, 1999).
33. Caldwell, K. I. A. L. *Negras in Brazil*. (Rutgers University Press, 2007). at <http://www.jstor.org/stable/j.ctt5hhwqb>
34. Carneiro, S. in *Race in contemporary Brazil: from indifference to inequality* (ed. Reichmann, R.) (Pennsylvania State University Press, 1999).
35. Carneiro, S. *Racismo, Sexismo e desigualdade no Brasil: consciência em debate São Paulo*. (2011).
36. Arroyo-Kalin, M. Slash-burn-and-churn: Landscape history and crop cultivation in pre-Columbian Amazonia. *Quat. Int.* **249,** 4–18 (2012).
37. Gomes, D. M. C. O uso social da cerâmica de Parauá, Santarém, baixo Amazonas: uma análise funcional. *Arqueol. Sul-Americana* **4,** 4–33 (2008).