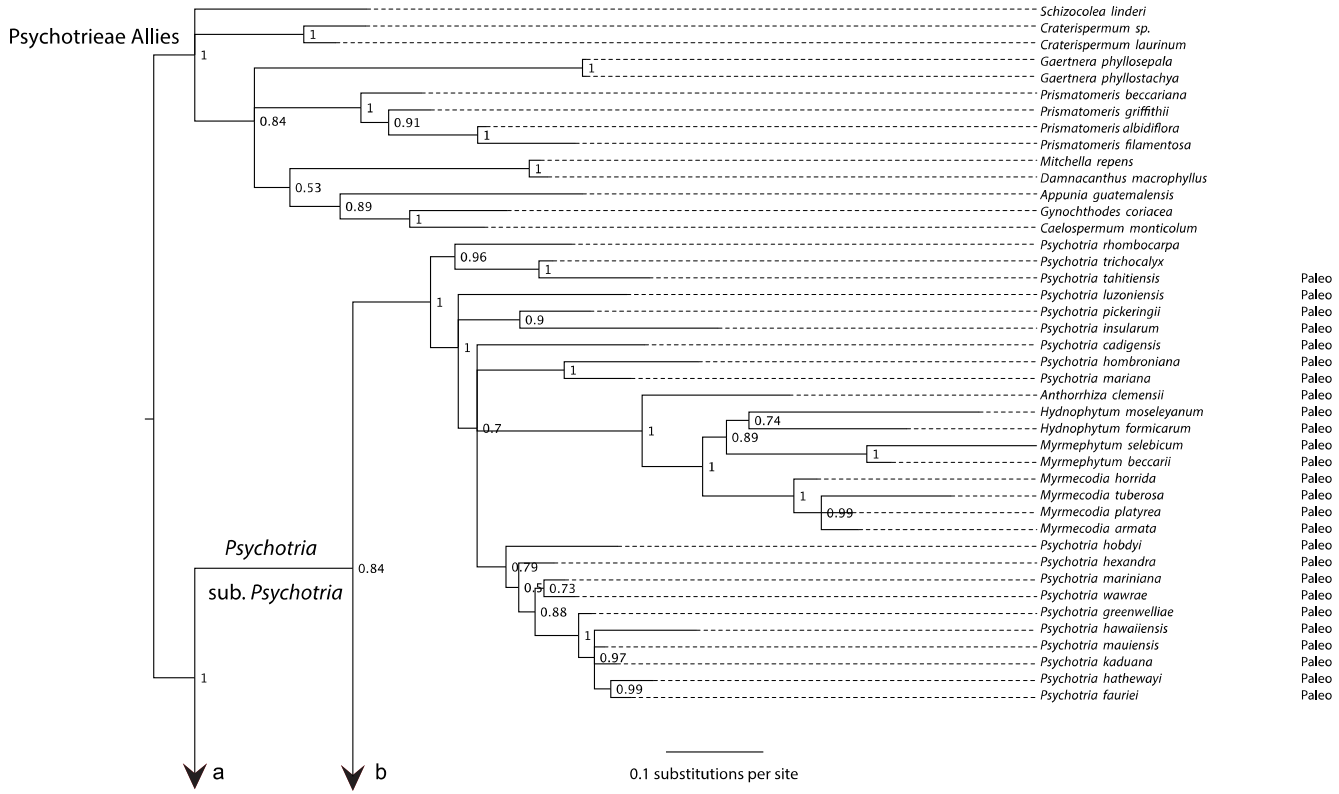
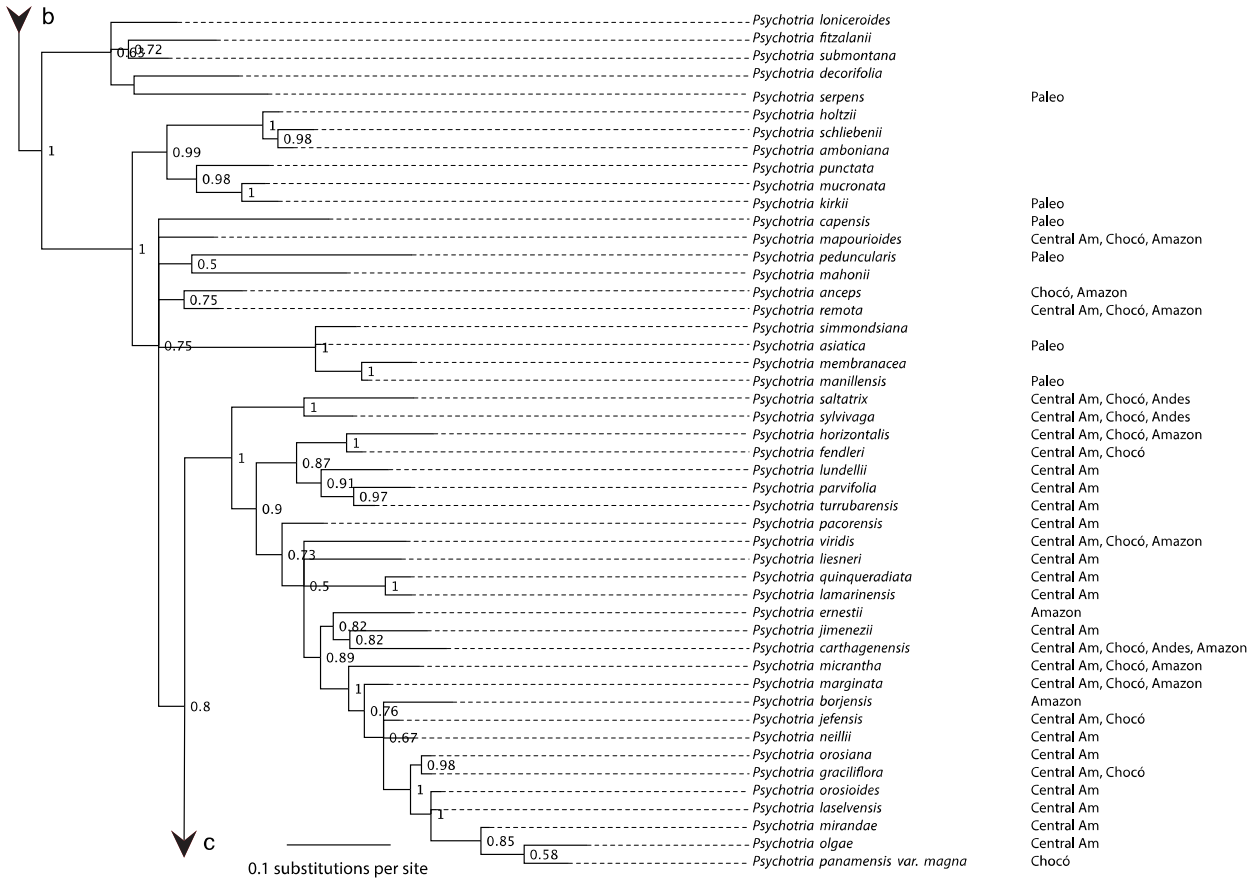
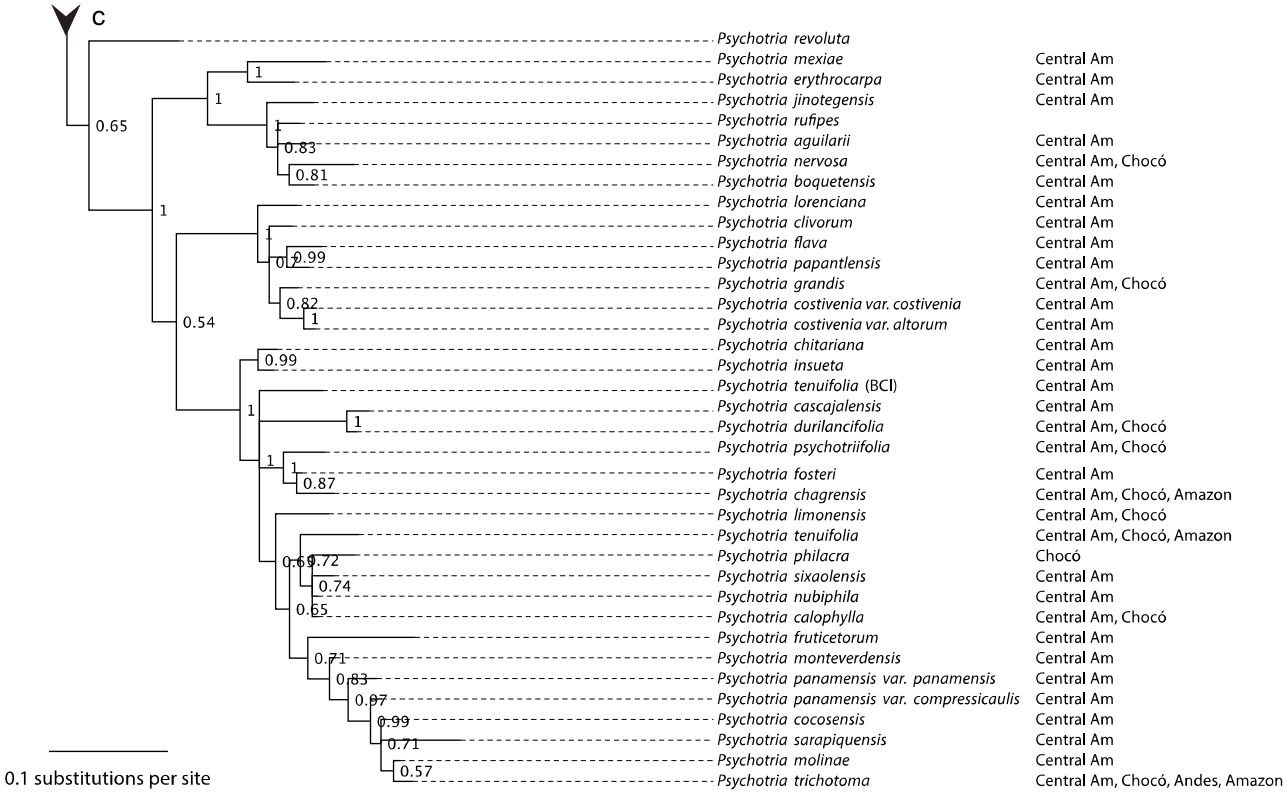


Supplementary Figure S1 50% majority rule Bayesian consensus tree. Geographic distribution is indicated for species included in the ancestral area reconstruction, wherein the following abbreviations are used: Cent Am—Central America and the Caribbean; Chocó—the Chocó region of western Colombia and Ecuador, the Darién region of eastern Panama, and Magdalena Valley, Colombia;

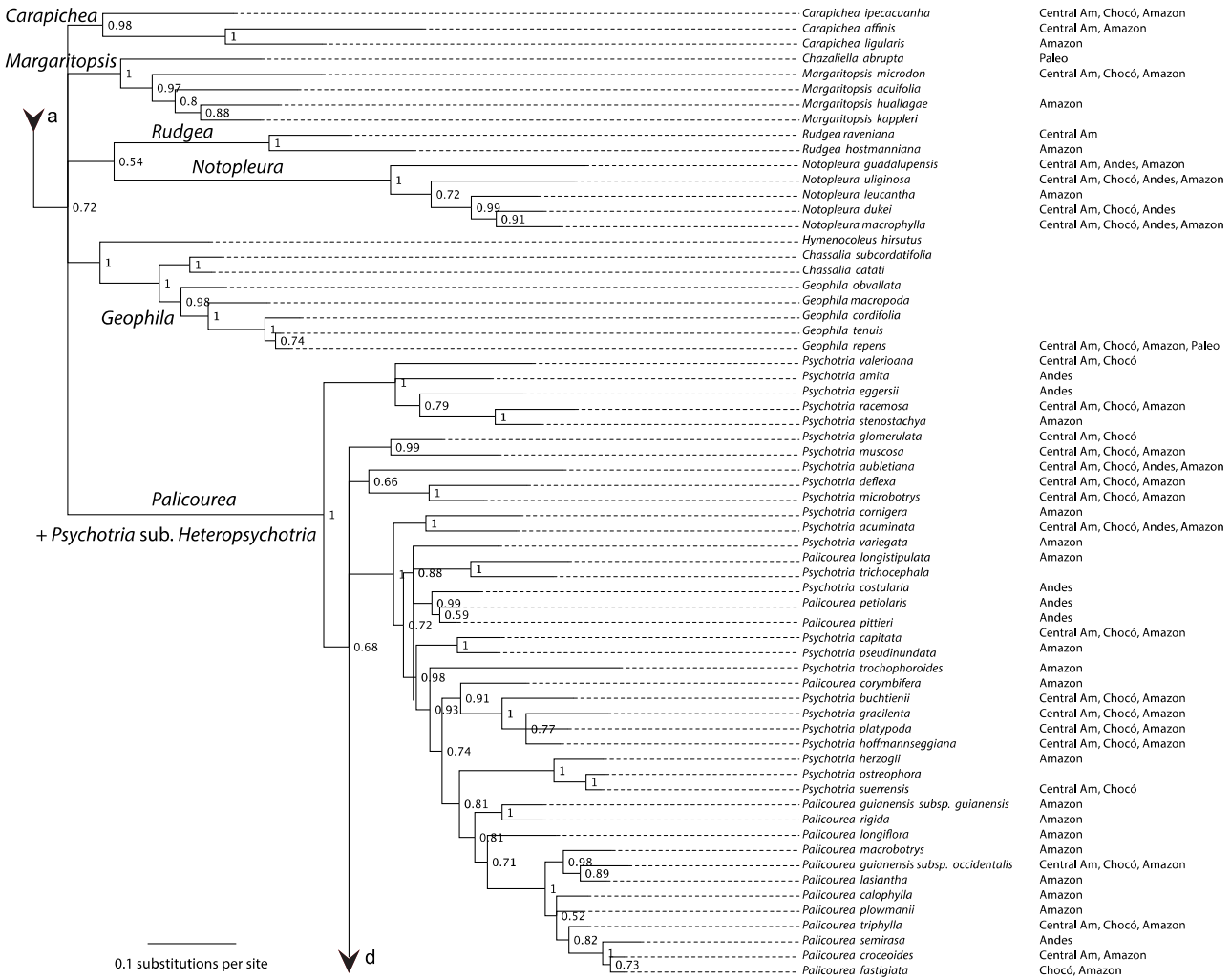
Andes—Andean montane forests above 1500 m in elevation; Amazon—the bulk of northern South America east of the Andes, including the Amazon Basin, the Guiana Shield, and eastern Brazil; Paleo—Asia, Africa, and Pacific islands.



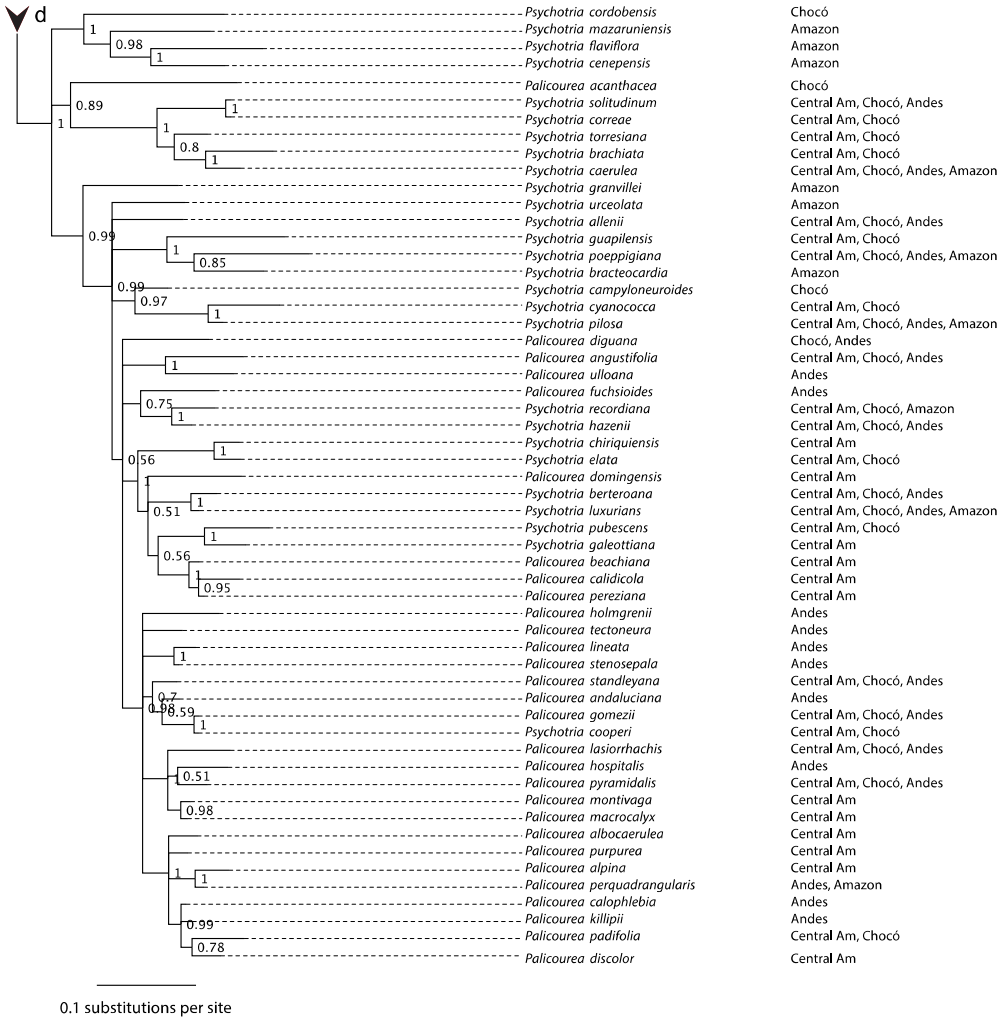
Supplementary Figure S1, *continued*.



Supplementary Figure S1, *continued*.



Supplementary Figure S1, *continued*.



Supplementary Figure S1, *continued*.

	Central America—Dry		Central America—Moist			
Site	Chamela, Mexico[49]	Guanacaste, Costa Rica[50]	Los Tuxtlas, Mexico[51]	Monteverde, Costa Rica[52]	La Selva, Costa Rica[53]	BCI, Panama[19]
Area (ha)	13,142	34,000	155,122	10,500	1,600	1,500
Psychotria s. str. [*Psychotria subg. Psychotria*]	*Ps. chamelaensis* ***Ps. horizontalis***	***Ps. carthagensensis*** ***Ps. horizontalis*** ***Ps. nervosa*** ***Ps. quinqueradiata*** ***Ps. psychotriifolia***	***Ps. clivorum*** ***Ps. costivenia var. costivenia*** ***Ps. chagrensis*** ***Ps. erythrocarpa*** ***Ps. flava*** ***Ps. graciliflora*** ***Ps. limonensis*** ***Ps. mexiae*** ***Ps. mirandae*** ***Ps. panamensis (var. panamensis)*** ***Ps. papatlensis*** ***Ps. quinqueradiata*** ***Ps. sarapiquiensis*** ***Ps. tenuifolia*** ***Ps. trichotoma***	*Ps. alfaroana* ***Ps. graciliflora*** ***Ps. grandis*** ***Ps. horizontalis*** ***Ps. jimenezii*** ***Ps. monteverdensis*** ***Ps. neillii*** ***Ps. mexiae*** ***Ps. orosiana*** ***Ps. panamensis*** ***Ps. parvifolia*** ***Ps. quinqueradiata*** ***Ps. sarapiquiensis*** ***Ps. sylvivaga***	*Ps. alfaroana* ***Ps. chagrensis*** ***Ps. graciliflora*** ***Ps. grandis*** ***Ps. laselvensis*** ***Ps. marginata*** ***Ps. panamensis (var. panamensis)*** ***Ps. psychotriifolia***	***Ps. chagrensis*** ***Ps. graciliflora*** ***Ps. grandis*** ***Ps. horizontalis*** ***Ps. limonensis*** ***Ps. marginata*** ***Ps. micrantha*** ***Ps. psychotriifolia*** ***Ps. tenuifolia***
Palicourea s. lat. [*Palicourea + Psychotria subg. Heteropsychotria*]		***Ps. pubescens***	***Ps. deflexa*** ***Ps. elata*** *Pa. faxlucens* *Pa. gardenioides* ***Ps. hoffmannseggiana*** *Pa. macrantha* ***Pa. padifolia*** *Ps. phanerandra* ***Ps. poepiggiana*** *Ps. simiarum* *Pa. sousae* *Pa. tetragona* *Ps. veracruzensis*	*Pa. adusta* ***Pa. albocaerulea*** *Ps. angustiflora* ***Ps. aubletiana*** ***Ps. chiriquiensis*** ***Ps. correae*** ***Ps. cyanococca*** ***Ps. deflexa*** ***Ps. elata*** *Pa. eurycarpa* *Pa. garciae* ***Pa. gomezii*** ***Ps. guapilensis***	***Ps. acuminata*** *Ps. angustiflora* ***Ps. brachiata*** ***Ps. buchtienii*** ***Pa. calidicola*** ***Ps. cooperi*** *Pa. crocea* ***Ps. cyanococca*** ***Ps. elata*** ***Ps. glomerulata*** ***Ps. gracilenta*** ***Ps. guapilensis*** ***Pa. guianensis***	***Ps. acuminata*** ***Ps. brachiata*** ***Ps. capitata*** ***Ps. cyanococca*** ***Ps. deflexa*** ***Ps. gracilenta*** ***Pa. guianensis*** ***Ps. hoffmannseggiana*** ***Ps. poeppigiana*** ***Ps. pubescens*** ***Ps. racemosa***

				Ps. hazenii ***Pa. lasiorrhachis*** ***Pa. macrocalyx*** ***Pa. montivaga*** ***Pa. padifolia*** ***Ps. pilosa*** ***Ps. pubescens*** ***Ps. solitudinum*** ***Pa. standleyana*** *Ps. steyermarkii* *Pa. tilaranensis* ***Ps. torresiana*** ***Ps. valerioana***	*Ps. hebeclada* ***Ps. luxurians*** ***Ps. pilosa*** ***Ps. poeppigiana*** ***Ps. racemosa*** *Pa. tetragona* *Ps. tsakiana*	

Supplementary Table S1. *Psychotria* and *Palicourea* species composition of thirteen Neotropical sites. Species included in the present study are indicated in boldface.

Chocó-Darién		Amazonia				Guiana
Bajo Calima, Colombia[54]	La Planada, Colombia[55]	Yasuní, Ecuador[55]	Allpahuayo-Mishana, Peru[56]	Yanamono, Peru[56]	Ducke, Brazil[57]	Saül, French Guiana[58]
80,000	25	50	57,600	200	10,000	134,000
Ps. megistophylla *Ps. monsalveae*	*Ps. rufiramea* ***Ps. saltatrix*** ***Ps. sylvivaga***	***Ps. remota*** *Ps. romolerouxiana* *Ps. sacciformis* ***Ps. viridis***	*Ps. alba* ***Ps. anceps*** *Ps. marcgraviella* ***Ps. remota***	*Ps. alba* *Ps. marcgraviella* ***Ps. marginata*** *Ps. romolerouxiana* *Ps. sacciformis* *Ps. trivialis*	***Ps. mapourioides***	***Ps. borjensis*** *Ps. cupularis* ***Ps. ernestii*** *Ps. ficigemma* ***Ps. mapourioides*** *Ps. perferruginea*
Pa. acanthacea ***Ps. acuminata*** ***Ps. allenii*** *Pa. amplissima* *Ps. aviculoides* ***Ps. campyloneuroides*** ***Ps. capitata*** *Ps. cincta* ***Ps. cooperi*** *Pa. conferta* ***Ps. cordobensis*** *Pa. grandistipula* ***Ps. glomerulata*** ***Pa. guianensis*** ***Ps. hoffmannseggiana*** ***Ps. luxurians*** ***Ps. pilosa*** ***Ps. platypoda*** ***Ps. poeppigiana***	***Ps. allenii*** ***Ps. aubletiana*** *Pa. demissa* *Pa. garciae* ***Pa. pyramidalis*** ***Pa. standleyana*** *Pa. stipularis* *Pa. tamaensis*	***Ps. buchtienii*** ***Ps. caerulea*** ***Ps. deflexa*** ***Ps. gracilenta*** *Pa. grandiflora* ***Pa. guianensis*** *Ps. huampamiensis* ***Pa. lasiantha*** *Pa. nigricans* *Ps. ostreophora* ***Ps. poeppigiana*** ***Ps. stenostachya***	*Pa. affinis* ***Ps. buchtienii*** ***Ps. cornigera*** *Pa. crocea* ***Ps. deflexa*** *Ps. japurensis* ***Pa. lasiantha*** *Ps. limitanea* *Ps. longicuspis* *Ps. lupulina* *Pa. mansoana* *Pa. nigricans* *Ps. peruviana* ***Ps. poeppigiana*** ***Ps. racemosa*** *Ps. rhodothamna* *Ps. spiciflora* ***Ps. stenostachya*** *Ps. stipulosa* ***Ps. trichocephala*** *Ps. williamsii*	*Pa. affinis* ***Ps. buchtienii*** ***Ps. cornigera*** *Pa. crocea* ***Ps. herzogii*** *Ps. iodotricha* ***Pa. lasiantha*** *Ps. limitanea* *Ps. lupulina* *Pa. mansoana* *Pa. nigricans* *Ps. ostreophora* ***Ps. poeppigiana*** *Ps. rhodothamna* *Ps. spiciflora* ***Ps. stenostachya*** *Pa. subspicata* ***Ps. trichocephala***	*Pa. amapaensis* *Pa. anisoloba* *Ps. apoda* *Ps. bremekampiana* *Ps. colorata* ***Pa. corymbifera*** ***Ps. deflexa*** *Ps. egensis* ***Ps. gracilenta*** ***Pa. guianensis*** ***Ps. hoffmannseggiana*** *Ps. humboldtiana* *Ps. iodotricha* *Ps. longicuspis* ***Pa. longiflora*** ***Pa. longistipulata*** *Ps. lupulina* *Ps. manausensis* ***Ps. microbotrys*** *Ps. paniculata*	***Ps. acuminata*** *Ps. alloantha* *Ps. apoda* *Pa. brachyloba* *Ps. bremekampiana* *Ps. callithrix* ***Pa. calophylla*** ***Ps. capitata*** *Ps. colorata* ***Ps. cornigera*** ***Pa. croceoides*** ***Ps. deflexa*** ***Ps. gracilenta*** ***Ps. granvillei*** ***Pa. guianensis*** ***Ps. hoffmannseggiana*** *Ps. iodotricha* ***Pa. longiflora*** ***Pa. longistipulata*** *Ps. medusula* ***Ps. microbotrys***

Ps. schunkei *Pa. seemannii* *Ps. timbiquensis*					***Ps. platypoda*** ***Ps. poeppigiana*** *Ps. polycephala* *Ps. prancei* *Ps. rhodothamna* *Ps. rhombibractea* *Pa. nitidella* *Ps. sphaerocephala* *Ps. stipulosa* *Ps. subundulata* ***Ps. trichocephala*** *Ps. turbinella* ***Ps. variegata*** *Pa. virens*	*Ps. oblonga* *Ps. officinalis* *Ps. paniculata* ***Ps. platypoda*** ***Ps. poeppigiana*** *Ps. pullei* ***Ps. racemosa*** ***Ps. trichophoroides*** *Ps. ulviformis* ***Ps. urceolata*** ***Ps. variegata*** *Ps. viridibractea*

Supplementary Table S1 *continued*. *Psychotria* and *Palicourea* species composition of thirteen Neotropical sites.

Supplementary Methods

Details of Laboratory Techniques and Protocols

DNA was extracted from fresh-collected, silica-dried material using either Qiagen DNeasy Plant Mini Kits or following the protocol of Alexander *et al.*[46], using a reciprocating saw and steel beads to pulverize leaf tissue and silica columns to recover DNA before elution in 10 mM Tris solution. Herbarium samples were extracted following a standard cetyl-trimethyl ammonium bromide (CTAB) protocol, except extractions were left for 2 or more weeks in isopropanol to allow the maximum amount of DNA to precipitate out of solution. Extractions of herbarium specimens were cleaned before amplification using Qiagen MiniElute columns. The ITS locus was amplified using polymerase chain reaction (PCR), primarily in the Carnegie Museum of Natural History biosystematics lab and secondarily in the molecular lab of S. Kalisz at the University of Pittsburgh and the molecular lab of A. Angert at Colorado State University. We used the LEU, ITS4, and ITS3B primers following Nepokroeff *et al.*[47]. Standard 25 μL reactions consisted of 16.6 μL sterile H_2O, 5 μL 10× buffer, 0.5 μL BSA (10 mg mL^{-1}), 0.5 μL DMSO, 0.5 μL DNTPs (10 mM), 0.25 μL 5' 20 μM primer, 0.25 μL 3' 20 μM primer, 0.13 μL Taq polymerase, and 1 μL genomic DNA. Standard ITS PCR amplification began with 94.0°C for 2 min, followed by 40 cycles of 94.0°C for 30 s, 48.0°C for 1 min, 72°C for 1 min, and a final elongation step at 72°C for 7 min. All DNA sequencing was performed at the University of Chicago Cancer Research Center. Both strands were sequenced using the same primers used for amplification. Sequence strands were assembled using Sequencher 4.5 (Gene Codes Corp., Ann Arbor, MI). We aligned DNA sequences using the MUSCLE algorithm[29] in the program Geneious[30], and made manual adjustments using Se-Al[48].

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