

Figure S2. Depiction of measurements of floral traits taken herbarium specimens. Species values for many of these traits are given in Table S1. The remaining traits were combined to provide more informative values (i.e., volumes, areas, and ratios that provide shape information), and these values are present in Table S1. The combined characters include: include ovary length and ovary width (together, ovary volume); anther length and anther width (together, anther area); the three values of corolla width (combined into three separate ratios); and corolla length (curved) (combined with corolla length straight to determine the curvature ratio). Photos are of *Siphocampylus orbignianus* A. DC. and *Centropogon yungasensis* Britton (inset) by L. Lagomarsino.

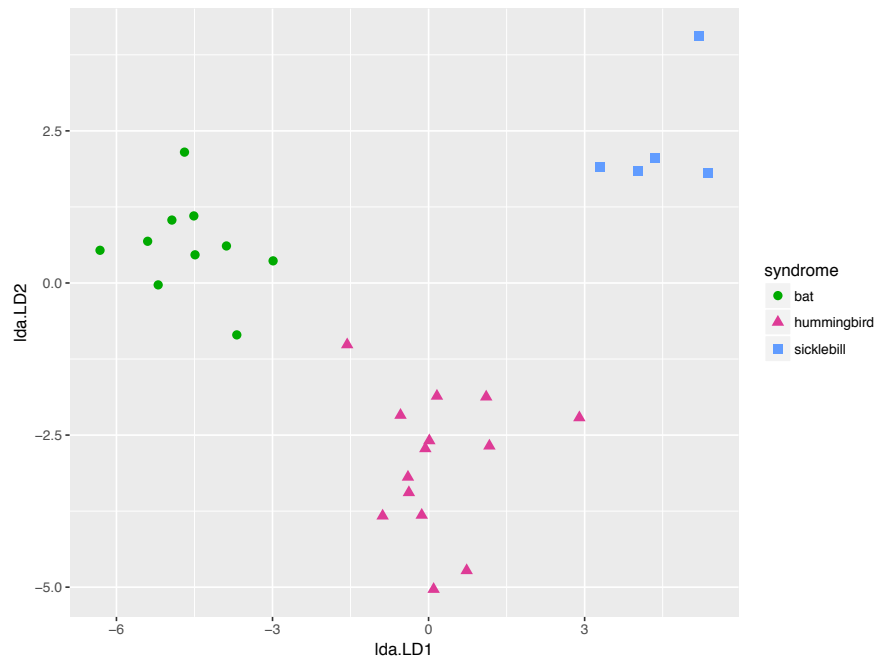


Figure S3. Distribution of training set for predictive discriminant analysis of centropogonid species based on 11 floral traits. Each data point represents the placement of a species with a known pollinator into morphological space, which was best defined by two linear functions. The most important traits in the first linear discriminant function (LD1; x-axis) are: corolla curvature (coefficient of linear discriminant: -69.02), corolla flare (2.75), distal inflation (-2.74), basal constriction (-2.38), corolla width (-0.23), and corolla tube length (0.11). The most important traits in the second linear discriminant function (LD2; y-axis) are: corolla curvature (-59.37), distal inflation (-7.26), corolla flare (6.09), basal constriction (-1.40), corolla width (-1.10), and anther area (0.03). These functions were used to predict pollination syndrome based on morphological data (see Table S3). Data points are shaped and colored according to pollination syndrome (bat: green circles; straight-billed hummingbird: pink triangles; sicklebill hummingbird: blue squares).

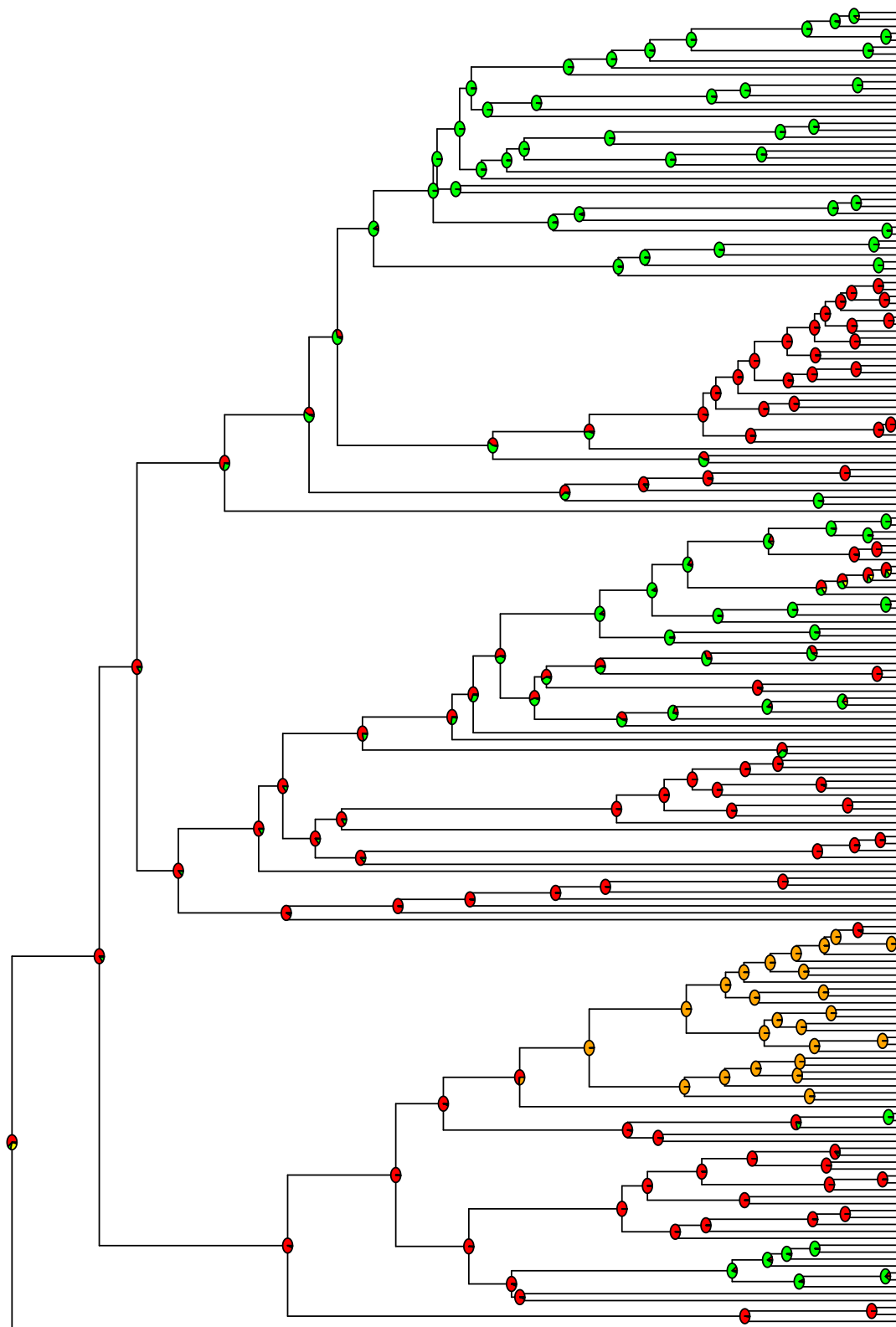


Figure S4. Maximum likelihood reconstruction of pollination syndromes in the centropogonid clade. Pie charts at nodes represent ancestral states that were calculated as the marginal likelihood of each pollination syndrome: straight-bill hummingbird (red), bat (green), and sicklebill hummingbird (orange). Inferred number of transitions in the ML ancestral state reconstruction is presented in Table 4. For Bayesian stochastic character mapping see Figure 3 and Table S4.

Table S1. Trait values of floral characters used in phylogenetic comparative methods for all species sampled. L= length, measurements in mm; A= area, measurements in mm²; Vol, measurements in mm³; PC= principal component, values given for the first four principal component axes. A visual representation of these measurements is given in Figure S1.

Species	Syndrome	Color	Bot: mid	Mid: top	Bot: top	Pedun-cule L (mm)	Corolla L (mm)	Corolla Tube L (mm)	Ovary V (mm ³)	Anther A (mm ²)	Opening L (mm)	Stamen L (mm)	PC1	PC2	PC3	PC4
<i>Burmeistera parviflora</i>	straight	bright	1.82	0.34	0.62	25.00	9.50	3.50	12.50	3.00	4.00	8.50	-7.77	-5.89	-4.36	1.28
<i>Centropogon aequatorialis</i>	straight	bright	0.73	1.09	0.80	65.50	37.20	32.00	328.56	21.96	6.00	45.50	0.13	-0.29	2.97	-1.78
<i>C. argutus</i>	straight	bright	0.50	0.75	0.38	20.00	45.00	37.00	500.00	12.00	8.00	45.00	0.39	2.94	-0.83	0.15
<i>C. asclepiadeus</i>	straight	bright	0.58	0.89	0.52	23.00	34.00	30.00	320.00	12.00	8.00	44.00	-1.26	1.61	0.57	-0.31
<i>C. cf weberbaueri</i>	straight	bright	0.62	0.81	0.50	75.00	54.00	41.00	720.00	16.00	4.00	48.00	2.81	1.77	0.17	-0.38
<i>C. coccineus</i>	straight	bright	0.40	1.34	0.54	60.00	46.00	30.00	250.00	15.00	7.00	41.00	-0.03	2.26	4.24	-0.65
<i>C. comosus</i>	straight	bright	0.96	0.67	0.65	37.00	47.00	35.00	864.00	27.00	9.00	52.00	1.93	-0.27	-1.15	-1.51
<i>C. cordifolius</i>	straight	bright	0.46	0.87	0.40	55.00	40.00	31.00	245.00	17.50	8.00	43.00	-0.04	2.00	-0.30	0.48
<i>C. cornutus</i>	straight	bright	0.65	1.04	0.67	50.00	45.00	35.00	180.00	30.00	12.00	65.00	2.02	1.54	1.12	-2.96
<i>C. costaricae</i>	straight	bright	0.32	0.94	0.30	35.00	35.00	24.00	72.00	12.00	3.00	25.00	-2.67	2.21	1.01	2.45
<i>C. erythraeus</i>	straight	bright	0.82	0.74	0.60	28.50	40.20	34.00	874.64	15.80	7.00	48.00	0.51	0.45	-1.35	-1.36
<i>C. featherstonei</i>	straight	bright	0.72	0.81	0.59	50.00	34.00	25.00	245.00	21.00	4.00	25.00	-2.00	-0.71	0.50	1.00
<i>C. ferrugineus 1</i>	straight	bright	0.38	0.63	0.23	77.00	36.00	38.50	90.75	10.50	7.50	44.00	0.42	2.98	-1.75	1.98
<i>C. ferrugineus 2</i>	straight	bright	0.46	0.72	0.33	60.00	36.00	20.00	311.04	14.00	2.00	36.00	-1.36	0.92	-0.71	2.53
<i>C. glabrifilis</i>	straight	bright	0.40	0.77	0.31	32.00	35.00	29.00	320.00	13.00	6.00	43.00	-0.93	2.50	-0.55	1.53
<i>C. grandidentatus</i>	straight	bright	0.36	0.89	0.32	32.00	32.00	27.00	245.00	16.00	8.00	52.00	-0.86	2.80	-1.38	0.13
<i>C. gutierrezii</i>	straight	bright	0.47	0.80	0.37	61.00	60.00	42.50	1024.00	19.80	8.50	65.00	4.69	3.31	-0.39	-0.54

<i>C. incanus (pink)</i>	straight	bright	1.00	0.90	0.90	77.00	42.00	22.00	1635.9 3	55.00	15.00	42.00	2.47	-4.52	1.77	-0.32
<i>C. leucocarpus</i>	straight	bright	0.53	0.75	0.40	30.00	37.00	25.00	100.00	10.00	3.00	31.00	-2.21	1.46	-0.52	1.40
<i>C. llanganatensis</i>	straight	bright	0.48	0.70	0.34	49.50	19.50	14.50	81.65	5.95	7.00	25.00	-4.39	0.19	-0.67	3.46
<i>C. luteus</i>	straight	bright	0.59	0.69	0.41	59.00	42.00	36.00	600.00	12.00	7.00	46.00	0.96	1.73	-0.98	0.67
<i>C. luteynii</i>	straight	bright	0.57	0.76	0.43	50.00	36.00	26.00	125.00	10.00	3.00	30.00	-1.92	0.93	-0.23	1.49
<i>C. macbridei</i>	straight	bright	0.53	0.78	0.41	74.00	54.00	41.50	661.25	34.00	7.00	54.50	3.92	1.99	-0.13	0.17
<i>C. magnificus</i>	straight	bright	0.79	0.83	0.66	128.00	44.00	30.00	1611.5	81.25	11.50	60.00	6.33	-3.51	1.28	1.24
<i>C. mandonis 1</i>	straight	bright	0.76	0.81	0.62	183.00	44.40	28.00	2704.5	58.50	11.50	57.00	7.34	-4.42	1.30	2.89
<i>C. mandonis 2</i>	straight	bright	1.00	0.78	0.78	151.00	51.00	32.00	1454.8	70.00	12.00	65.88	7.10	-3.93	0.93	-0.24
<i>C. minimus</i>	straight	bright	0.43	0.94	0.40	14.50	13.90	12.31	29.40	3.92	3.30	13.20	-6.57	0.34	1.14	3.12
<i>C. nervosus</i>	straight	bright	0.33	1.00	0.33	70.00	57.00	35.00	180.00	30.00	7.00	54.00	2.90	3.28	1.45	0.36
<i>C. palmanus</i>	straight	bright	0.65	0.69	0.45	65.00	35.00	25.00	137.50	8.75	6.50	30.50	-1.79	0.31	-0.70	1.66
<i>C. pichinchensis</i>	straight	bright	0.67	1.19	0.80	62.50	30.50	27.50	650.25	15.75	6.00	29.00	-1.69	-0.98	3.64	-0.63
<i>C. preslii</i>	straight	bright	0.38	0.77	0.30	104.00	37.00	32.00	700.00	14.00	8.00	49.00	1.46	1.73	-1.49	1.68
<i>C. reticulatus</i>	straight	bright	0.56	0.61	0.34	75.00	49.00	34.00	576.00	24.00	8.00	50.00	2.41	1.54	-1.61	1.34
<i>C. salviiformis</i>	straight	bright	0.60	0.73	0.43	50.20	26.00	22.50	356.40	12.94	4.50	26.00	-2.80	-0.10	-0.65	2.23
<i>C. sodiroanus</i>	straight	bright	0.48	0.72	0.34	41.00	49.00	47.00	324.00	10.00	6.00	52.00	1.95	4.01	-1.04	-0.41
<i>C. solanifolius</i>	straight	bright	0.55	0.71	0.39	21.50	47.00	40.00	433.50	40.00	14.00	54.00	2.28	2.41	-2.25	-0.78
<i>C. solanifolius</i>	straight	bright	0.64	0.65	0.41	35.00	38.00	30.00	256.00	19.60	17.00	46.00	-0.31	1.39	-2.75	-0.11
<i>C. sp.</i>	straight	bright	0.55	0.73	0.40	57.00	34.20	29.00	786.50	14.40	8.00	43.00	-0.05	0.93	-0.57	1.58
<i>C. subandinus</i>	straight	bright	0.70	0.65	0.45	143.00	54.00	42.50	729.00	35.00	10.00	61.00	5.75	0.41	-0.76	0.63
<i>C. talamancensis</i>	straight	bright	0.71	0.76	0.54	70.50	74.00	49.00	1378.1 3	31.90	5.00	64.50	7.08	2.02	-0.46	-1.91
<i>C. tesmannii</i>	straight	bright	0.50	0.57	0.29	16.00	48.00	42.00	324.00	12.00	7.00	48.00	1.01	3.77	-2.45	0.25
<i>C. trichoides</i>	straight	bright	0.45	0.86	0.39	56.00	32.75	29.00	158.40	17.92	6.70	46.00	-0.63	1.85	-1.02	0.32
<i>C. unduavensis</i>	straight	bright	0.56	0.83	0.46	59.00	30.00	23.00	814.31	21.45	11.00	43.50	-0.48	-0.01	0.33	1.68
<i>C. valerii</i>	straight	bright	0.41	0.81	0.33	69.00	27.00	23.00	245.00	13.20	8.00	37.00	-1.74	1.11	0.17	2.72
<i>C. weberbaueri</i>	straight	bright	0.69	0.87	0.60	45.00	36.50	29.50	496.38	13.00	4.00	35.00	-1.07	0.24	0.73	0.01

<i>C. yarumalensis</i>	straight	bright	0.53	0.88	0.47	36.00	36.00	30.00	405.00	17.25	7.00	45.00	-0.51	1.59	0.12	0.04
<i>Siphocampylus andinus</i>	straight	bright	0.46	0.80	0.37	47.00	52.05	39.50	64.00	15.40	7.00	55.00	1.85	3.65	-0.33	-0.49
<i>S. angustiflorus</i>	straight	bright	0.40	0.75	0.30	7.00	32.00	20.00	24.00	15.00	6.00	23.00	-3.65	1.67	-0.64	2.65
<i>S. antioquianus</i>	straight	bright	0.27	0.92	0.25	108.00	52.00	43.00	900.00	30.40	13.00	58.00	4.85	3.08	0.97	1.62
<i>S. aureus</i>	straight	bright	0.44	0.74	0.32	53.25	53.00	42.50	67.20	6.75	7.50	51.50	1.75	4.12	-0.85	-0.16
<i>S. betulaeifolius</i>	straight	bright	0.45	0.98	0.45	46.00	46.00	40.00	36.00	12.00	5.00	46.00	0.57	3.33	1.19	-0.73
<i>S. bilabiatus</i>	straight	bright	0.84	0.68	0.58	65.00	58.00	32.00	405.00	27.00	8.00	58.00	3.00	0.54	-0.98	-1.32
<i>S. boliviensis</i>	straight	bright	0.47	0.84	0.39	79.00	50.00	40.00	180.00	16.00	2.00	39.00	1.46	2.48	0.44	0.75
<i>S. brevicalyx</i>	straight	bright	0.38	0.73	0.28	80.00	60.00	52.00	108.00	18.00	9.00	70.00	5.04	5.13	-0.89	-0.81
<i>S. citrinus</i>	straight	bright	0.45	1.04	0.47	29.00	38.00	20.50	256.00	12.00	6.00	40.50	-1.81	1.67	1.80	0.51
<i>S. clotho</i>	straight	bright	0.57	0.60	0.34	40.00	67.00	37.00	98.00	27.00	5.00	55.00	3.26	3.15	-2.03	-0.44
<i>S. convolvulaceus</i>	straight	bright	0.36	0.95	0.34	100.00	48.00	40.00	144.00	21.00	7.80	40.00	1.89	2.62	1.43	1.40
<i>S. correoides</i>	straight	bright	1.25	0.80	1.00	25.00	28.00	14.00	190.13	10.00	4.00	33.00	-3.94	-3.62	0.52	-2.34
<i>S. corymbiferus</i>	straight	bright	0.39	0.87	0.34	45.00	44.00	32.00	75.00	14.00	4.50	49.00	0.27	3.17	0.29	0.54
<i>S. corymbiferus</i>	straight	bright	0.63	1.00	0.63	37.00	41.00	30.00	88.00	8.25	6.00	39.62	-1.24	1.39	1.71	-1.09
<i>S. dependens</i>	straight	bright	0.73	0.62	0.45	75.00	47.00	30.00	567.00	21.00	6.00	48.00	1.64	0.42	-1.67	0.67
<i>S. elfredii</i>	straight	bright	0.74	1.00	0.74	45.00	45.00	30.00	384.00	24.00	7.00	43.00	0.27	-0.01	1.98	-1.60
<i>S. fiebrigii</i>	straight	bright	0.36	1.04	0.38	62.00	47.00	40.00	125.00	12.00	6.00	49.00	1.24	3.74	1.72	-0.13
<i>S. flagelliformis</i>	straight	bright	0.57	0.91	0.52	19.00	30.00	21.00	55.69	11.00	4.50	36.00	-3.06	0.98	0.81	0.44
<i>S. fulgens</i>	straight	bright	0.42	1.19	0.50	37.00	44.00	35.00	200.00	10.00	8.00	47.00	-0.04	3.19	2.90	-1.06
<i>S. krauseanus</i>	straight	bright	0.46	0.96	0.44	25.00	31.00	21.00	45.38	24.00	6.00	33.00	-2.54	1.02	1.31	1.34
<i>S. longipedunculatus</i>	straight	bright	0.60	0.77	0.46	80.00	53.00	40.00	700.00	24.00	4.00	51.00	3.26	1.58	-0.16	0.05
<i>S. lycioides</i>	straight	bright	0.57	1.00	0.57	66.00	35.00	25.00	182.25	8.00	7.00	34.00	-1.73	0.54	1.95	0.50
<i>S. macropodus</i>	straight	bright	0.38	0.93	0.36	45.00	55.00	49.00	108.00	17.50	4.00	49.00	2.39	4.57	0.28	-0.97
<i>S. nematosepalus</i>	straight	bright	0.45	0.61	0.28	35.00	51.00	38.00	144.00	28.00	3.00	55.00	2.16	3.34	-1.94	0.51
<i>S. nemoralis</i>	straight	bright	0.79	1.00	0.79	22.00	22.00	10.00	84.61	4.20	3.50	19.50	-5.79	-1.92	2.13	0.10
<i>S. nitidus</i>	straight	bright	0.68	0.74	0.50	26.00	43.00	35.00	90.75	19.60	6.00	49.00	0.23	1.86	-0.70	-0.90

<i>S. oblongifolius</i>	straight	bright	0.58	0.86	0.50	23.00	39.00	28.00	56.00	15.00	3.50	44.00	-1.16	1.75	0.32	-0.32
<i>S. orbignianus</i>	straight	bright	0.68	0.90	0.61	30.00	41.00	31.00	108.00	15.00	7.00	54.81	-0.06	1.57	0.69	-1.77
<i>S. pubescens</i>	straight	bright	0.31	0.93	0.29	39.00	39.00	30.00	364.50	14.00	9.00	42.00	-0.49	3.02	0.20	1.24
<i>S. rosmarinifolius</i>	straight	bright	0.44	1.24	0.55	40.00	36.00	22.50	73.94	13.00	4.00	32.00	-2.42	1.38	3.63	0.24
<i>S. scandens</i>	straight	bright	0.48	0.78	0.37	10.00	39.00	30.00	101.53	10.50	5.00	45.00	-1.21	2.89	-0.64	0.26
<i>S. sceptrum</i>	straight	bright	0.79	1.21	0.96	45.50	41.20	18.00	130.93	13.64	5.90	40.00	-1.88	-1.23	4.06	-2.62
<i>S. sp.</i>	straight	bright	0.83	1.27	1.05	55.00	41.00	39.00	320.00	24.00	7.00	44.00	0.48	-0.61	4.75	-4.00
<i>S. antonellii</i>	straight	bright	0.82	0.61	0.50	40.00	45.00	31.00	225.00	12.00	9.00	45.00	0.00	0.94	-1.75	-0.41
<i>S. siberiensis</i>	straight	bright	1.00	0.75	0.75	84.00	37.00	22.00	128.00	12.75	9.00	38.00	-1.13	-2.00	0.18	-0.56
<i>S. sparsipilus</i>	straight	bright	0.40	0.92	0.37	15.00	46.00	30.00	294.00	27.00	5.50	51.77	0.61	2.95	0.50	0.09
<i>S. tupaeformis</i>	straight	bright	0.67	1.00	0.67	25.00	35.00	22.00	320.00	21.00	4.50	40.00	-1.72	-0.02	1.79	-0.63
<i>S. virgatus</i>	straight	bright	0.34	1.31	0.44	40.00	30.00	19.00	32.00	6.00	3.00	26.00	-3.77	1.80	4.07	1.32
<i>S. werdermannii</i>	straight	bright	0.47	1.06	0.50	85.00	41.00	22.63	81.00	12.00	9.00	42.00	-0.54	1.08	2.39	0.74
<i>S. westinianus</i>	straight	bright	0.48	0.86	0.41	40.00	41.00	30.00	108.00	24.00	5.00	32.00	-0.82	1.60	0.49	1.26
<i>B. almedae</i>	bat	dull	1.73	0.43	0.75	30.00	37.00	14.00	180.00	18.00	9.70	40.00	-2.30	-4.18	-3.89	-2.08
<i>B. ceratocarpa</i>	bat	dull	1.52	0.58	0.88	43.00	25.00	9.00	144.00	24.00	13.00	34.00	-3.54	-5.22	-1.52	-1.13
<i>B. chiriquiensis</i>	bat	dull	1.50	0.27	0.40	100.00	28.00	12.00	324.00	24.00	12.50	25.00	-2.09	-4.68	-4.60	2.99
<i>B. crebra</i>	bat	dull	1.67	0.26	0.43	65.00	26.00	14.00	52.94	22.61	10.50	29.00	-2.89	-4.25	-5.12	1.55
<i>B. cyclostigmata</i>	bat	dull	2.75	0.50	1.38	35.00	33.00	7.00	216.00	20.00	10.00	35.00	-3.68	-10.08	-2.57	-6.23
<i>B. dendrophila</i>	bat	dull	2.14	0.30	0.64	51.00	32.00	18.00	225.00	29.25	12.00	52.00	-0.81	-5.19	-5.23	-2.11
<i>B. domingensis</i>	bat	dull	1.20	0.49	0.58	37.00	20.00	20.00	94.30	17.94	9.00	24.50	-3.90	-2.73	-2.55	0.98
<i>B. mcvaughii</i>	bat	dull	1.83	0.38	0.70	70.00	25.00	8.00	96.00	21.00	11.00	21.00	-3.98	-6.31	-3.55	0.51
<i>B. microphylla</i>	bat	dull	2.02	0.35	0.71	30.00	7.00	15.00	48.00	12.00	7.00	22.00	-5.97	-5.97	-4.33	-0.54
<i>B. morii</i>	bat	dull	2.46	0.30	0.74	37.00	20.00	11.00	100.00	15.00	7.00	21.00	-5.11	-7.43	-5.21	-1.44
<i>B. obtusifolia</i>	bat	dull	2.90	0.31	0.89	43.00	35.00	15.00	441.00	24.50	11.50	32.00	-2.37	-8.73	-5.44	-3.85
<i>B. racemiflora</i>	bat	dull	1.00	0.48	0.48	48.40	34.00	21.20	168.54	28.70	12.00	39.00	-1.09	-1.45	-2.68	1.07
<i>B. refracta</i>	bat	dull	2.58	0.30	0.77	45.00	25.00	9.00	252.00	42.00	16.00	38.00	-2.53	-8.43	-5.29	-2.06

<i>B. sodiroana</i>	bat	dull	2.52	0.42	1.05	66.00	32.00	18.00	250.00	24.00	11.00	40.00	-1.74	-8.07	-3.54	-4.29
<i>B. sp.</i>	bat	dull	2.58	0.28	0.73	14.00	20.00	11.00	392.00	12.00	11.50	24.50	-5.15	-7.41	-5.78	-2.03
<i>B. succulenta</i>	bat	dull	1.52	0.53	0.80	98.00	35.00	14.00	162.00	33.00	15.00	41.00	-0.60	-5.23	-1.77	-0.55
<i>B. tenuiflora</i>	bat	dull	1.60	0.59	0.94	85.00	24.00	14.50	192.00	24.00	10.00	31.00	-2.66	-6.06	-1.05	-1.02
<i>B. toroensis</i>	bat	dull	1.27	0.55	0.69	93.00	28.00	16.00	275.00	30.00	15.00	35.00	-1.35	-4.31	-1.56	0.82
<i>B. truncata</i>	bat	dull	1.66	0.40	0.67	80.00	45.00	20.00	145.00	66.00	10.00	37.00	1.35	-5.45	-3.17	-0.06
<i>B. utleyi</i>	bat	dull	1.72	0.40	0.68	100.00	28.00	10.00	150.00	28.00	8.00	29.00	-2.24	-6.18	-3.18	0.80
<i>B. variabilis</i>	bat	dull	1.33	0.32	0.42	44.00	31.50	22.00	151.25	28.00	12.00	35.50	-1.54	-2.31	-4.49	1.10
<i>B. vulgaris</i>	bat	dull	2.29	0.41	0.94	125.00	25.00	15.00	432.00	60.00	14.00	4.10	-1.87	-10.78	-2.45	0.64
<i>B. zurquiensis</i>	bat	dull	2.15	0.25	0.53	25.00	33.00	19.00	294.00	15.00	5.00	35.00	-2.57	-4.51	-6.06	-1.32
<i>C. brittonianus</i>	bat	dull	1.00	1.00	1.00	124.00	33.42	21.00	1859.00	90.00	18.00	59.88	5.17	-6.53	3.23	-0.13
<i>C. diana</i>	bat	dull	0.81	0.75	0.61	85.00	60.00	45.00	2880.00	45.00	8.00	54.00	7.42	-1.32	-0.19	0.14
<i>C. dombeyanus</i>	bat	dull	0.83	0.75	0.63	147.50	50.50	24.00	3364.00	94.50	9.00	46.50	8.36	-6.31	0.82	3.88
<i>C. eilserii</i>	bat	dull	0.90	0.53	0.47	150.00	62.00	45.00	2343.75	119.00	23.00	63.00	11.75	-3.94	-1.36	2.48
<i>C. incanus</i>	bat	dull	1.00	0.95	0.95	153.00	50.00	27.00	1936.00	78.00	19.00	59.00	6.98	-5.62	2.78	-0.27
<i>C. isabellinus</i>	bat	dull	1.08	0.48	0.51	150.00	65.00	30.00	4725.00	96.00	15.00	50.00	11.75	-7.03	-2.02	4.43
<i>C. macrocarpus</i>	bat	dull	1.71	0.39	0.66	164.00	27.00	11.50	1470.33	48.00	13.50	33.00	1.36	-8.48	-2.75	2.84
<i>C. perlongus</i>	bat	dull	1.12	0.53	0.59	135.00	75.00	38.00	3920.00	68.00	17.00	75.00	12.28	-3.97	-2.04	0.63
<i>C. peruvianus</i>	bat	dull	1.00	0.80	0.80	110.00	29.00	14.00	2704.00	55.00	18.00	42.00	2.74	-6.49	1.05	2.31
<i>C. rex</i>	bat	dull	1.66	0.44	0.72	139.00	49.00	25.00	1089.00	63.00	18.00	52.00	4.80	-6.16	-2.55	-0.11
<i>C. simulans</i>	bat	dull	1.00	0.59	0.59	120.00	38.00	11.00	3600.00	75.00	10.00	44.00	5.40	-7.30	-1.25	4.36
<i>C. smithii</i>	bat	dull	1.22	0.55	0.67	200.00	43.00	20.00	3757.00	120.00	21.00	56.00	10.43	-9.85	-0.51	4.66
<i>C. sp.</i>	bat	dull	1.02	0.55	0.56	160.00	43.00	23.00	3375.00	112.50	7.00	45.00	8.65	-7.94	-0.82	5.05

<i>C. viridiflorus</i>	bat	dull	1.00	0.81	0.81	85.00	60.00	25.00	2535.00	55.00	8.00	45.00	5.39	-4.24	0.72	0.14
<i>S. actinothrix</i>	bat	dull	1.00	1.00	1.00	75.00	30.00	11.00	108.00	40.00	5.00	40.00	-1.64	-4.30	2.84	-1.23
<i>S. affrictus</i>	bat	dull	1.00	0.87	0.87	120.00	51.00	21.00	891.00	36.90	15.00	40.00	2.28	-3.80	1.69	-0.37
<i>S. affinis</i>	bat	dull	0.55	0.79	0.44	85.00	28.00	22.00	405.00	24.00	6.00	12.00	-2.42	-1.26	0.61	3.80
<i>S. ayersiae</i>	bat	dull	1.27	1.00	1.27	30.50	20.58	8.00	222.35	17.85	5.60	39.25	-4.31	-5.27	2.78	-3.62
<i>S. chloroleucus</i>	bat	dull	0.64	0.69	0.44	10.70	23.50	12.50	44.55	16.32	7.75	28.50	-4.42	-0.28	-0.96	2.02
<i>S. corynoides</i>	bat	dull	1.24	1.14	1.42	110.00	35.00	30.00	1296.00	60.00	10.60	17.00	1.04	-7.71	5.28	-2.26
<i>S. giganteus</i>	bat	dull	0.87	0.75	0.66	115.00	77.00	40.00	4000.00	80.00	10.00	57.00	11.61	-3.83	0.16	1.17
<i>S. jelksii</i>	bat	dull	0.88	0.73	0.64	160.00	53.00	22.00	1573.00	80.00	7.00	36.00	5.56	-5.27	0.79	3.18
<i>S. matthiaei</i>	bat	dull	0.57	0.54	0.31	120.00	37.50	21.00	180.50	56.00	7.00	34.50	1.39	-1.61	-1.38	4.40
<i>S. obovatus</i>	bat	dull	1.20	0.78	0.94	12.20	17.50	9.50	130.70	18.00	5.00	36.50	-4.78	-3.81	0.28	-1.65
<i>S. rusbyanus</i>	bat	dull	0.85	0.76	0.65	90.00	42.00	12.00	175.00	18.00	7.00	28.00	-1.60	-2.36	0.38	1.30
<i>S. smilax</i>	bat	dull	1.54	0.40	0.62	23.00	28.50	16.97	303.07	28.88	11.75	33.94	-2.56	-3.82	-3.73	-0.22
<i>S. tunarensis</i>	bat	dull	1.44	0.83	1.20	129.00	28.00	15.00	700.00	32.00	8.00	41.50	-0.23	-7.12	1.91	-1.92
<i>S. umbellatus</i>	bat	dull	1.34	1.00	1.34	145.00	47.37	22.00	440.64	63.00	11.50	52.13	3.47	-6.85	3.78	-3.54
<i>S. vatkeanus</i>	bat	dull	1.32	0.53	0.69	135.00	43.00	17.00	845.00	50.00	15.00	56.00	3.25	-4.99	-1.63	0.50
<i>C. baezanus</i>	sicklebill	bright	1.31	0.50	0.65	20.00	45.00	35.00	320.00	27.30	15.00	36.00	-0.23	-1.20	-6.62	-3.70
<i>C. bangii</i>	sicklebill	bright	0.70	0.52	0.36	16.50	21.00	14.00	128.56	11.00	8.70	22.00	-4.96	-0.38	-5.73	1.25
<i>C. congestus</i>	sicklebill	bright	0.81	0.59	0.48	35.00	42.00	35.00	405.00	15.00	11.00	40.00	-0.29	1.11	-7.62	-3.09
<i>C. granulosis 1</i>	sicklebill	bright	0.90	0.50	0.45	15.00	38.00	33.00	180.00	20.00	6.00	38.00	-1.06	0.73	-5.30	-1.24
<i>C. granulosis 2</i>	sicklebill	bright	0.93	0.52	0.49	32.00	46.00	40.00	320.00	28.80	13.00	60.00	2.10	1.32	-5.34	-2.86
<i>C. granulosis 3</i>	sicklebill	bright	1.05	0.48	0.50	20.00	48.00	36.00	320.00	33.00	13.00	41.00	0.78	0.12	-5.61	-1.99
<i>C. granulosis</i>	sicklebill	bright	1.00	0.45	0.45	45.00	44.00	39.00	500.00	18.00	10.00	47.00	1.14	0.66	-5.73	-1.73
<i>C. macrophyllus</i>	sicklebill	bright	0.53	0.54	0.29	30.00	31.00	16.50	405.00	17.88	5.00	29.50	-2.62	0.34	-3.45	2.72
<i>C. panamensis</i>	sicklebill	bright	1.22	0.41	0.50	20.00	35.00	31.00	400.00	27.00	15.00	32.00	-1.34	-1.21	-8.25	-2.23
<i>C. pulcher</i>	sicklebill	bright	1.32	0.36	0.48	15.00	46.00	18.00	320.00	27.00	11.50	55.00	-0.15	-1.17	-8.48	-2.95

<i>C. roseus</i>	sicklebill	bright	0.71	0.43	0.30	15.00	42.00	21.00	245.00	12.00	5.00	33.00	-2.07	1.07	-7.87	-0.38
<i>C. trachyanthus</i>	sicklebill	bright	1.00	0.49	0.49	12.00	35.50	28.80	66.27	17.05	8.50	46.50	-1.61	0.64	-11.12	-4.93
<i>C. umbrosus</i>	sicklebill	bright	0.83	0.56	0.46	38.33	39.00	19.33	300.93	12.00	5.33	37.00	-1.77	-0.18	-4.77	-0.39
<i>C. urubambae</i>	sicklebill	bright	1.03	0.44	0.46	13.00	32.00	17.00	147.00	12.00	3.00	30.00	-3.51	-0.90	-6.49	-0.59
<i>C. vargasii</i>	sicklebill	bright	0.63	0.53	0.33	25.00	30.00	15.00	196.00	24.00	7.00	32.00	-2.83	-0.04	-4.96	1.41
<i>C. yungasensis</i>	sicklebill	bright	0.77	0.46	0.36	25.00	26.00	9.00	48.00	16.00	5.00	15.00	-5.03	-1.31	-5.47	2.21

Table S2. List of taxa and their known pollinators used as a training set in predictive linear discriminant analyses.

Taxon	Known Pollinator Class	Citation
<i>Burmeistera ceratocarpa</i> LL15	bat	(Muchhala 2006)
<i>Burmeistera cyclostigmata</i> LL4	bat	(Muchhala 2003)
<i>Burmeistera sodiroana</i> LL77	bat	(Muchhala and Jarrín-V 2002)
<i>Burmeistera succulenta</i> LL210	bat	(Muchhala and Jarrín-V 2002)
<i>Burmeistera tenuiflora</i> LL36	bat	(Muchhala 2003)
<i>Burmeistera truncata</i> LL286	bat	(Muchhala and Jarrín-V 2002)
<i>Centropogon brittonianus</i> LL83	bat	pers. obs.
<i>Centropogon incanus</i> LL49	bat	pers. obs.
<i>Siphocampylus giganteus</i> LL74	bat	pers. obs.
<i>Siphocampylus umbellatus</i> LL100	bat	(Sazima et al. 1994)
<i>Burmeistera parviflora</i> LL20	hummingbird	pers. obs.
<i>Centropogon aequatorialis</i> LL63	hummingbird	(Muchhala and Thomson 2010)
<i>Centropogon cornutus</i> LL28	hummingbird	(Buzato et al. 2000)
<i>Centropogon costaricae</i> LL2	hummingbird	(Fenster 1991)
<i>Centropogon ferrugineus</i> LL1	hummingbird	(Tolozza-Moreno et al. 2015)
<i>Centropogon ferrugineus</i> LL33	hummingbird	(Tolozza-Moreno et al. 2015)
<i>Centropogon grandidentatus</i> LL47	hummingbird	(Colwell 1973)
<i>Centropogon solanifolius</i> LL200	hummingbird	(Muchhala and Thomson 2010)
<i>Centropogon solanifolius</i> LL26	hummingbird	(Muchhala and Thomson 2010)
<i>Centropogon talamancensis</i> LL27	hummingbird	(Colwell 1973)
<i>Centropogon valerii</i> 63	hummingbird	(Colwell 1973)
<i>Siphocampylus betulaefolius</i> 88	hummingbird	(Buzato et al. 2000)
<i>Siphocampylus nemoralis</i> LL116	hummingbird	(Galletto and Bernardello 2003)
<i>Siphocampylus westinianus</i> 150	hummingbird	(Sazima et al. 1996)
<i>Centropogon baezani</i> LL64	sicklebill	(Stein 1987)
<i>Centropogon granulosus granulosus</i> LL161	sicklebill	(Stein 1987)
<i>Centropogon granulosus</i> LL130	sicklebill	(Stein 1987)
<i>Centropogon granulosus</i> LL234	sicklebill	(Stein 1987)
<i>Centropogon granulosus</i> LL5	sicklebill	(Stein 1987)
<i>Burmeistera almedae</i> LL42	bat	pers. obs.

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Table S3. Predictions of pollination syndrome from two linear discriminant analyses based on morphological measurements from species with known pollinators (see Table S2), using both raw morphological measurements and PC loadings from a phylogenetic PCA. Posterior probabilities of the predictions are presented for those taxa for which there is conflict between pollination syndrome based on our color criterion (see first column) and the predictive LDAs.

Taxon	Pollination syndrome (Color)	LDA prediction (morphology)	Support for conflict
<i>Burmeistera racemiflora</i> _6	bat	hummingbird	0.7956
<i>Siphocampylus rusbyanus</i> _LL52	bat	bat	-
<i>Centropogon mandonis</i> _LL86	hummingbird	bat	1
<i>Siphocampylus affinis</i> _89	bat	hummingbird	1
<i>Siphocampylus obovatus</i> _LL173	bat	hummingbird	1
<i>Centropogon mandonis</i> _54	hummingbird	bat	1
<i>Centropogon subandinus</i> _LL71	hummingbird	bat	0.5211
<i>Centropogon incanus</i> _pink_LL87	hummingbird	bat	0.9999
<i>Centropogon magnificus</i> _LL107	hummingbird	bat	1
<i>Siphocampylus chloroleucus</i> _100	bat	hummingbird	1
<i>Burmeistera microphylla</i> _LL43	bat	hummingbird	0.9828
<i>Siphocampylus ayersiae</i> _LL88	bat	hummingbird	0.9891
<i>Centropogon diana</i> _LL195	bat	hummingbird	0.9976
<i>Burmeistera domingensis</i> _LL81	bat	hummingbird	0.9997
<i>Burmeistera almedae</i> _LL42	bat	bat	-
<i>Burmeistera chiriquiensis</i> _LL132	bat	bat	-
<i>Burmeistera crebra</i> _LL44	bat	bat	-
<i>Burmeistera dendrophila</i> _LL122	bat	bat	-
<i>Burmeistera mcvaughii</i> _LL123	bat	bat	-
<i>Burmeistera morii</i> _LL126	bat	bat	-
<i>Burmeistera obtusifolia</i> _LL32	bat	bat	-
<i>Burmeistera refracta</i> _LL79	bat	bat	-
<i>Burmeistera</i> _sp_LL204	bat	bat	-
<i>Burmeistera toroensis</i> _LL29	bat	bat	-
<i>Burmeistera utleyi</i> _LL121	bat	bat	-
<i>Burmeistera variabilis</i> _LL211	bat	bat	-
<i>Burmeistera vulgaris</i> _16	bat	bat	-
<i>Burmeistera zurquiensis</i> _LL38	bat	bat	-
<i>Centropogon argutus</i> _LL243	hummingbird	hummingbird	-
<i>Centropogon asclepius</i> _LL61	hummingbird	hummingbird	-

Centropogon_bangii_17	sicklebill	sicklebill	-
Centropogon cf weberbaueri LL174	hummingbird	hummingbird	-
Centropogon_coccineus_LL8	hummingbird	hummingbird	-
Centropogon_comosus_29	hummingbird	hummingbird	-
Centropogon_congestus_LL21	sicklebill	sicklebill	-
Centropogon_cordifolius_LL106	hummingbird	hummingbird	-
Centropogon_dombeyanus_LL163	bat	bat	-
Centropogon_eilserii_LL249	bat	bat	-
Centropogon_erythraeus_37	hummingbird	hummingbird	-
Centropogon_featherstonei_LL158	hummingbird	hummingbird	-
Centropogon_glabrifilis_41	hummingbird	hummingbird	-
Centropogon_guttierrezii_LL19	hummingbird	hummingbird	-
Centropogon_isabellinus_LL192	bat	bat	-
Centropogon_leucocarpus_LL127	hummingbird	hummingbird	-
Centropogon_llanganatensis_LL67	hummingbird	hummingbird	-
Centropogon_luteus_52	hummingbird	hummingbird	-
Centropogon_luteynii_LL125	hummingbird	hummingbird	-
Centropogon_macbridei_LL165	hummingbird	hummingbird	-
Centropogon_macrocarpus_53	bat	bat	-
Centropogon_macrophyllus_LL169	sicklebill	sicklebill	-
Centropogon_minimus_LL203	hummingbird	hummingbird	-
Centropogon_nervosus_LL193	hummingbird	hummingbird	-
Centropogon_palmanus_LL35	hummingbird	hummingbird	-
Centropogon_panamensis_LL129	sicklebill	sicklebill	-
Centropogon_perlongus_LL194	bat	bat	-
Centropogon_peruvianus_LL246	bat	bat	-
Centropogon_pichinchensis_56	hummingbird	hummingbird	-
Centropogon_preslii_57	hummingbird	hummingbird	-
Centropogon_pulcher_LL168	sicklebill	sicklebill	-
Centropogon_reticulatus_LL54	hummingbird	hummingbird	-
Centropogon_rex_LL207	bat	bat	-
Centropogon_roseus_LL216	sicklebill	sicklebill	-
Centropogon_salviiformis_LL70	hummingbird	hummingbird	-
Centropogon_simulans_LL248	bat	bat	-
Centropogon_smithii_LL6	bat	bat	-
Centropogon_sodiroanus_LL72	hummingbird	hummingbird	-
Centropogon_sp_LL238	hummingbird	hummingbird	-
Centropogon_sp_nov_LL176	bat	bat	-
Centropogon_tesmannii_LL73	hummingbird	hummingbird	-

Centropogon_trachyanthus_LL75	sicklebill	sicklebill	-
Centropogon trichoides 62	hummingbird	hummingbird	-
Centropogon_umbrosus_LL172	sicklebill	sicklebill	-
Centropogon_unduavensis_LL108	hummingbird	hummingbird	-
Centropogon_urubambae_LL171	sicklebill	sicklebill	-
Centropogon_vargasii_LL244	sicklebill	sicklebill	-
Centropogon_viridiflorus_LL180	bat	bat	-
Centropogon_weberbaueri_LL157	hummingbird	hummingbird	-
Centropogon_yarumalensis_LL202	hummingbird	hummingbird	-
Centropogon_yungasensis_LL188	sicklebill	sicklebill	-
Siphocampylus_actinothrix_LL190	bat	bat	-
Siphocampylus_aff_rictus_LL166	bat	bat	-
Siphocampylus_andinus_LL94	hummingbird	hummingbird	-
Siphocampylus_angustiflorus_LL196	hummingbird	hummingbird	-
Siphocampylus_antioquianus_LL197	hummingbird	hummingbird	-
Siphocampylus_aureus_LL111	hummingbird	hummingbird	-
Siphocampylus_bilabiatu_LL51	hummingbird	hummingbird	-
Siphocampylus_boliviensis_LL90	hummingbird	hummingbird	-
Siphocampylus_brevicalyx_LL76	hummingbird	hummingbird	-
Siphocampylus_citrinus_LL179	hummingbird	hummingbird	-
Siphocampylus_clotho_LL245	hummingbird	hummingbird	-
Siphocampylus_convolvulaceus_101	hummingbird	hummingbird	-
Siphocampylus_correoides_103	hummingbird	hummingbird	-
Siphocampylus_corymbiferus_106	hummingbird	hummingbird	-
Siphocampylus_corymbiferus_LL91	hummingbird	hummingbird	-
Siphocampylus_corynoides_LL175	bat	bat	-
Siphocampylus_dependens_LL156	hummingbird	hummingbird	-
Siphocampylus_elfredii_LL185	hummingbird	hummingbird	-
Siphocampylus_fiebrigii_LL113	hummingbird	hummingbird	-
Siphocampylus_flagelliformis_LL92	hummingbird	hummingbird	-
Siphocampylus_fulgens_112	hummingbird	hummingbird	-
Siphocampylus_jelksii_LL159	bat	bat	-
Siphocampylus_krauseanus_LL250	hummingbird	hummingbird	-
Siphocampylus_longipedunculatus_121	hummingbird	hummingbird	-
Siphocampylus_lycioides_122	hummingbird	hummingbird	-
Siphocampylus_macropodus_123	hummingbird	hummingbird	-
Siphocampylus_matthiaei_LL155	bat	bat	-
Siphocampylus_nematosepalus_LL30	hummingbird	hummingbird	-
Siphocampylus_nitidus_126	hummingbird	hummingbird	-

Siphocampylus_oblongifolius_LL114	hummingbird	hummingbird	-
Siphocampylus_orbignianus_LL93	hummingbird	hummingbird	-
Siphocampylus_pubescens_LL223	hummingbird	hummingbird	-
Siphocampylus_rosemarinifolius_LL162	hummingbird	hummingbird	-
Siphocampylus_scandens_131	hummingbird	hummingbird	-
Siphocampylus_sceptrum_132	hummingbird	hummingbird	-
Siphocampylus_smilax_LL95	bat	bat	-
Siphocampylus_sp_LL164	hummingbird	hummingbird	-
Siphocampylus_sp_nov_LL189	hummingbird	hummingbird	-
Siphocampylus_sp_nov1_LL102	hummingbird	hummingbird	-
Siphocampylus_sparsipilus_LL96	hummingbird	hummingbird	-
Siphocampylus_tunarensis_LL97	bat	bat	-
Siphocampylus_tupaiformis_144	hummingbird	hummingbird	-
Siphocampylus_vatkeanus_LL119	bat	bat	-
Siphocampylus_virgatus_LL167	hummingbird	hummingbird	-
Siphocampylus_werdermannii_LL101	hummingbird	hummingbird	-

Table S4. Inferred mean number of transitions between pollination syndromes in the centropogonid. Values calculated from Bayesian stochastic character mapping on a random subset of 100 trees from the BEAST posterior distribution, performed using an “ARD” model with the make.simmap function in the phytools package. Sicklebills are a subset of hummingbirds in the genus *Eutoxeres*.

Ancestor	Descendant	Mean
Straight-billed hummingbird	Bat	16.43
Straight-billed hummingbird	Sicklebill hummingbird	1.18
Bat	Straight-billed hummingbird	13.94
Bat	Sicklebill	0
Sicklebill hummingbird	Straight-billed hummingbird	2.85
Sicklebill hummingbird	Bat	0

Table S5. Estimates of functional trait optima (mean theta values) and their standard errors for species with different pollination syndromes from OUwie analysis. Values in given in units of mm (L), mm² (area), or mm³, except for ratios, which are unitless.

Trait	Theta (Straight-bill)	SE (Straight-bill)	Theta (Sicklebill)	SE (Sicklebill)	Theta (Bat)	SE (Bat)
Ratio_BotMid	0.59	0.06	0.59	0.06	1.68	0.09
Ratio_MidTop	0.87	0.02	0.48	0.05	0.52	0.03
Ratio_BotTop	0.48	0.02	0.47	0.04	0.75	0.03
Peduncule	52.21	4.33	26.73	10.61	91.04	5.44
L_corolla	41.13	1.62	38.96	3.25	35.78	2.31
L_corollaTube	30.36	1.05	26.82	2.77	18.33	1.34
Vol_ovary	290.63	138.12	286.65	193.88	1040.82	221.31
Area_anther	18.65	2.19	18.8	2.71	46.16	3.13
L_stamen	43.13	1.57	38.98	3.62	38.39	2.02
Curvature	1	0	0.9	0	1	0
PC1	0.06	0.52	-0.35	0.93	0.41	0.7
PC2	1.23	0.23	0.56	0.54	-5.87	0.31
PC3	0.49	0.24	-6.45	0.56	-1.94	0.32
PC4	0.16	0.22	-0.69	0.63	0.2	0.27