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Supplementary Materials for

Repeated divergent selection on pigmentation genes in a rapid finch radiation

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This PDF file includes:

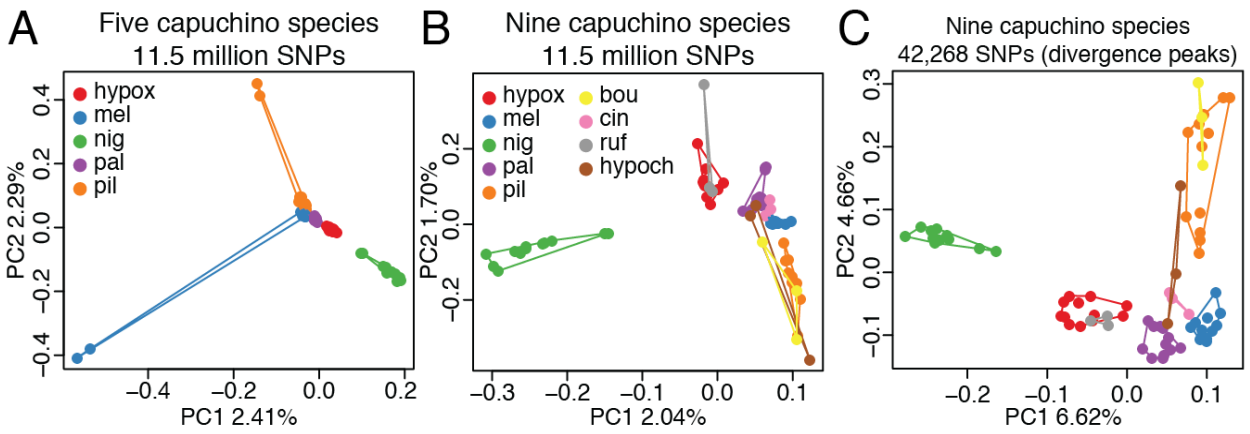

fig. S1. Clustering of individuals by species. (**A**) PCA including 60 individuals of five species genotyped at ~11.5 million SNPs. The percentages of variation explained by PC1 and PC2 are indicated on each axis. The four individuals (two pil and two mel) that are divergent from the remaining birds of their species were omitted from the PCA in Fig. 1A. Note that despite being divergent, these birds did not overlap with other species. The outlier birds were males that did not show an unusual phenotype with respect to other birds of their species. Their average depth of coverage, alignment rates and mapping quality were comparable to other samples included in this study. (**B**) PCA including 68 individuals of nine species genotyped for the SNPs in (A). This PCA includes three individuals of bou, cin, hypoch and ruf which show some overlap with the species with larger sample sizes (nig, pil, pal, hypox, mel). The four outlier individuals mentioned above were also removed before conducting this PCA. (**C**) PCA including 72 individuals of nine species genotyped for the ~42 thousand SNPs found under the 25 divergence peaks identified in nig, pil, pal, hypox, and mel. We observe some overlap especially between hypox and ruf (red and gray) and pil and bou (orange and yellow). It is possible that there are divergent areas of the genome between these overlapping species that we have not identified because we did not use the species with small sample sizes to find peaks.

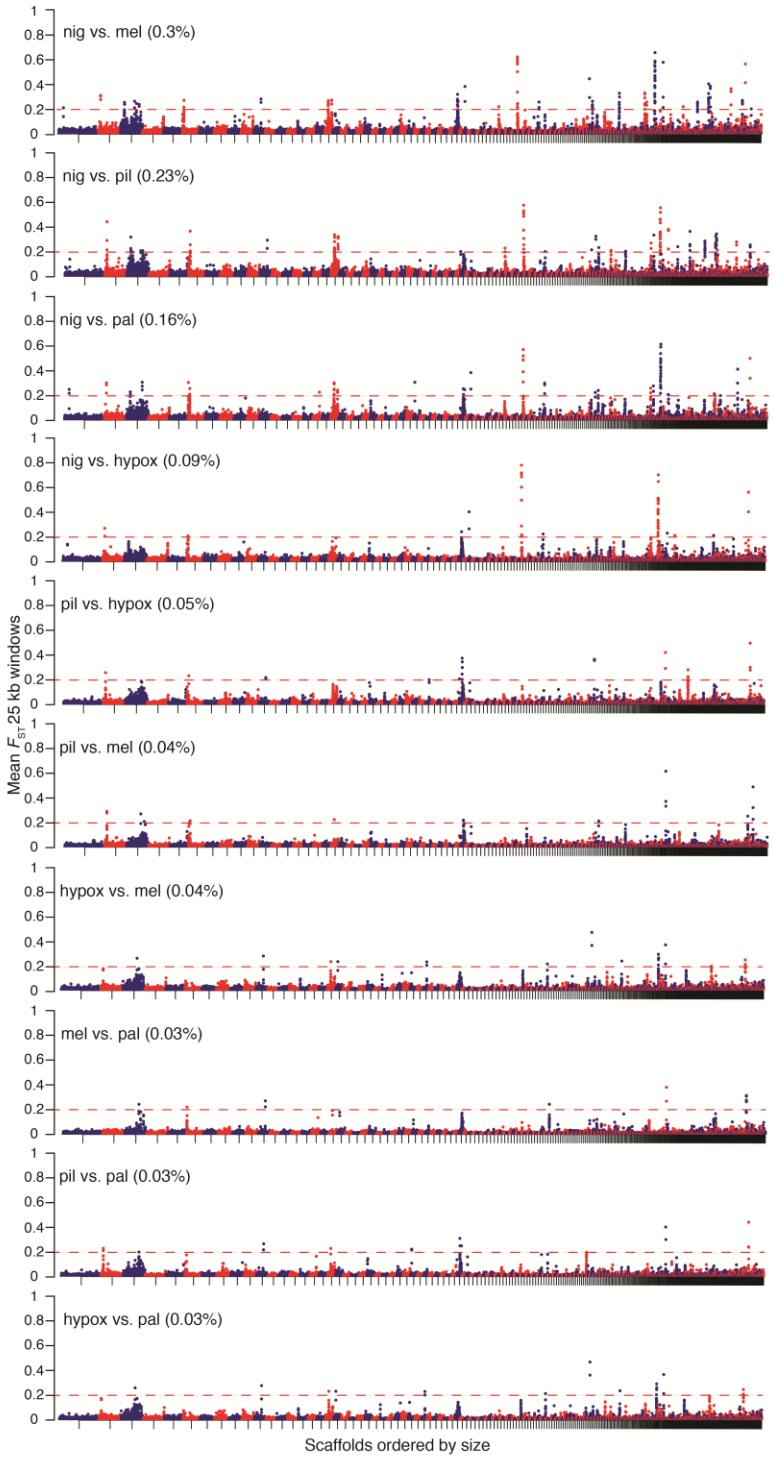

fig. S2. Genomic landscapes of differentiation in 10 pairwise comparisons of five species. Manhattan plots for all the possible comparisons among five species. We sorted the comparisons by decreasing percentage of non-overlapping 25 kb windows that are elevated above the established threshold. Other details as in Fig. 1C.

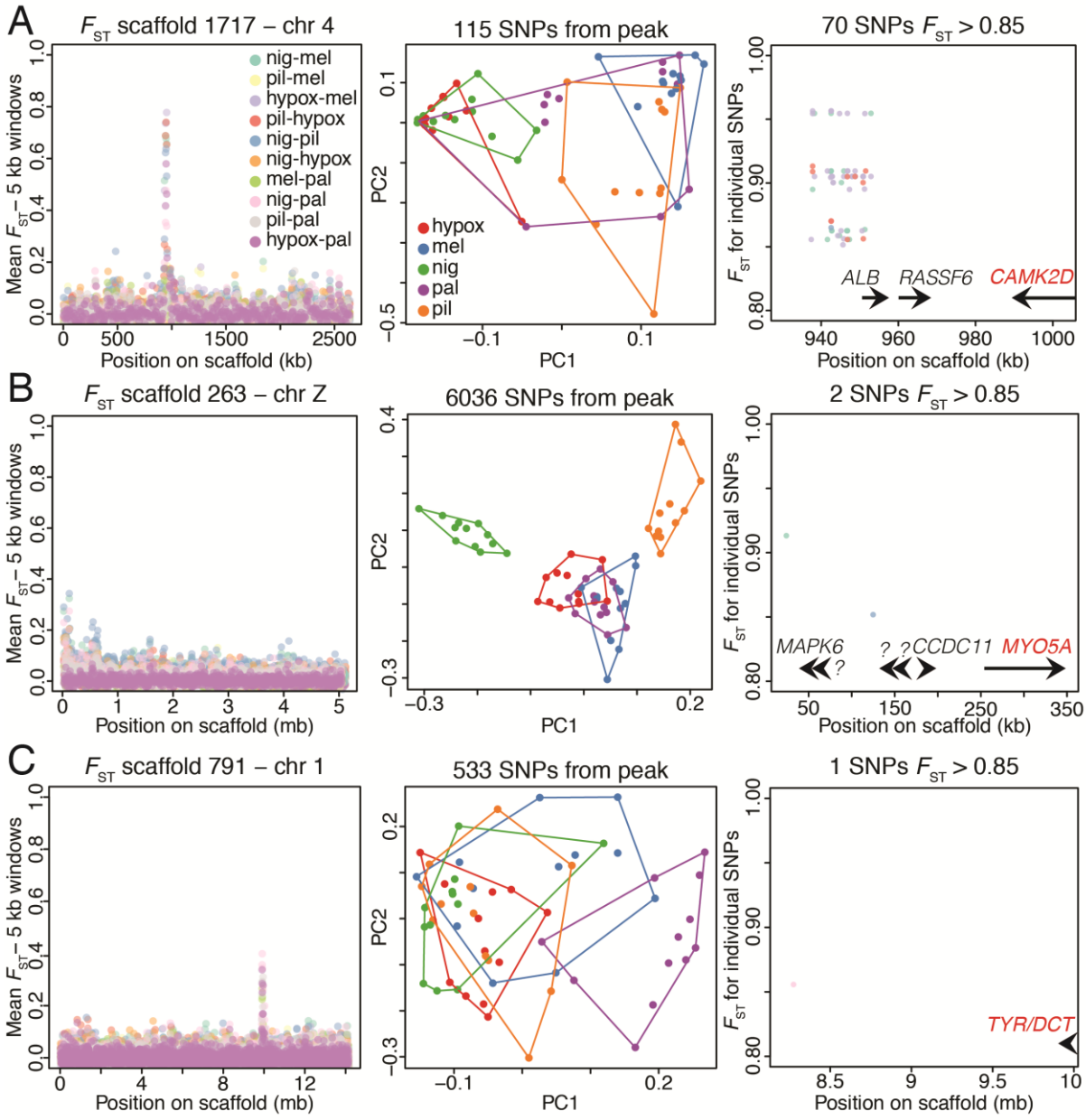

fig. S3. Repeated selection on pigmentation genes in different capuchino species II. (**A**) Divergence peak for scaffold 1717 (left), PCA obtained from SNPs under the peak (center), and F_{ST} values for highly divergent SNPs with gene annotations (right). Annotations in red correspond to genes in the melanogenesis pathway (see Table 1). Other details as in Fig. 2. (**B** and **C**) Same as above for peaks on scaffold 263 and 791, respectively. The annotation in the right panel of (C) was based on partial protein similarity with both the *TYR* and *DCT* gene products.

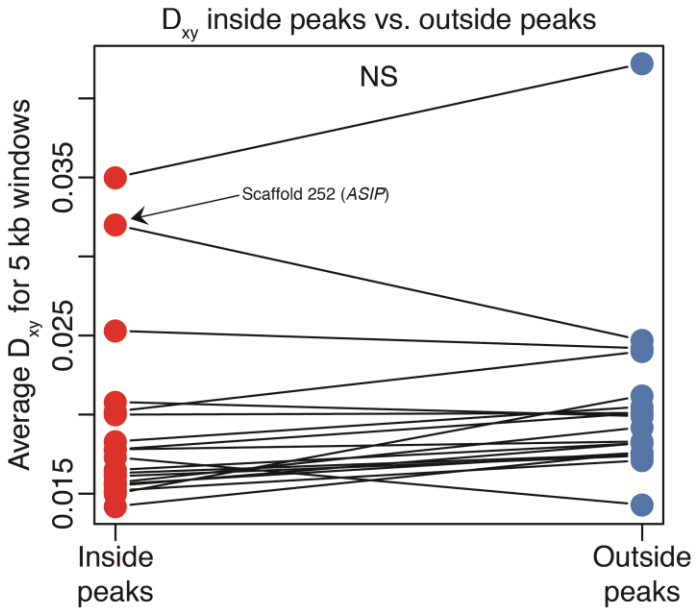

fig. S4. Absolute sequence divergence inside and outside of peak areas. On average the absolute sequence divergence (measured by Dxy) did not differ between the regions under divergence peaks and those outside of these areas on the same scaffold (t = -1.9889, df = 18, *P* = 0.06214). We conducted this analysis for the two taxa showing the largest divergence (nig vs mel) and did not treat multiple peaks on the same scaffold as independent. Note that the greatest increase in sequence divergence inside a peak (compared to outside of this region) corresponds to scaffold 252, which contains *ASIP*.

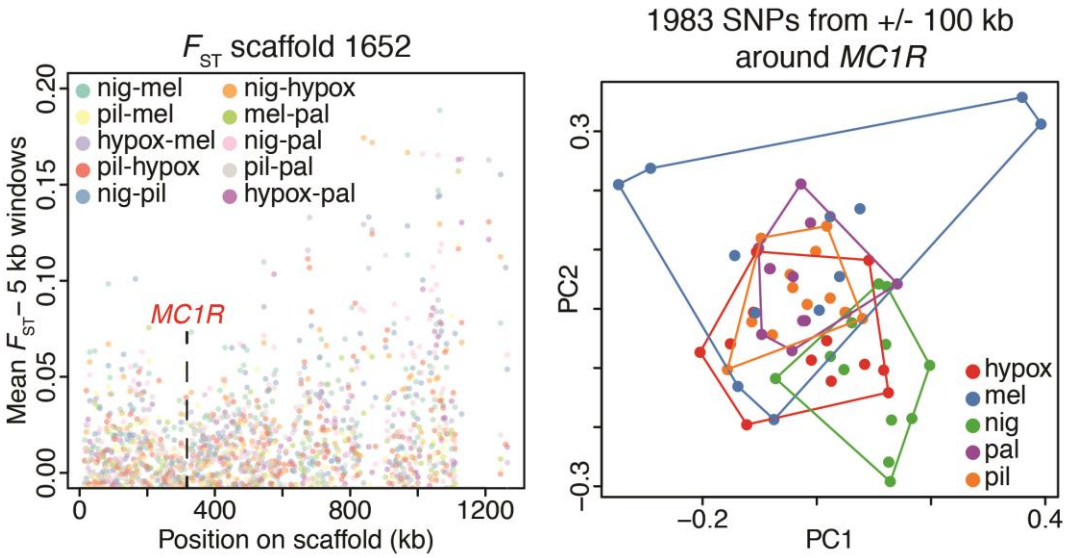

fig. S5. *MC1R* is not differentiated in capuchinos. The region of scaffold 1652 containing *MC1R* does not show differences in the five southern capuchino species that we studied. Details as in Fig 2.

fig. S6. Structural variants found comparing two capuchino species (hypox and pil). Putative inversions, deletions and insertions present in pil that were found in a comparison to the hypox reference genome. We identified the number of annotated genes that were encompassed by the different rearrangements. The red dots indicate the four structural variants that were located in divergence peaks.

table S1. Details on the samples used in this study.

Species	Catalogue number[a]	Collection year	Locality	Latitude	Longitude	Sex
S. bouvreuil	MZUSP 1158	-	Captive; Brazil	-	-	M
S. bouvreuil	MZUSP 84088	2009	Fazenda Fartura, Santana do Araguaia, Pará, Brazil	-9.30	-50.29	M
S. bouvreuil	MZUSP 85409	2009	Fazenda Eldorado, Barra do Garças,Mato Grosso, Brazil	-15.58	-52.22	M
S. pileata	KUNHM 3664	1996	San Rafael National Park, Itapuá, Paraguay	-26.52	-55.80	M
S. pileata	KUNHM 3687	1996	San Rafael National Park, Itapuá, Paraguay	-26.52	-55.80	M
S. pileata	KUNHM 3691	1996	San Rafael National Park, Itapuá, Paraguay	-26.52	-55.80	M
S. pileata	KUNHM 3699	1996	San Rafael National Park, Itapuá, Paraguay	-26.52	-55.80	M
S. pileata	MACN 6537	2012	Captive; Argentina	-	-	M
S. pileata	MZUSP 77832	2007	Santa Gertrudes, São Paulo, Brazil	-22.46	-47.53	M
S. pileata	MCP 3627	2013	Itararé, São Paulo, Brazil	-24.11	-49.33	M
S. pileata	MCP 3628	2013	Itararé, São Paulo, Brazil	-24.11	-49.33	M
S. pileata	MCP 4222	2013	Chapadão do Céu, Goiás, Brazil	-18.40	-52.67	M
S. pileata	MCP 4850	2012	Broa, São Paulo, Brazil	-22.20	-47.87	M
S. pileata	MCP 4851	2013	Dourado, São Paulo, Brazil	-22.12	-48.34	M
S. pileata	MCP 4852	2013	Dourado, São Paulo, Brazil	-22.12	-48.34	M
S. hypoxantha	MACN 3103	2005	El Bagual, Formosa, Argentina	-26.17	-58.93	M
S. hypoxantha	MACN 3105	2005	El Bagual, Formosa, Argentina	-26.17	-58.93	M
S. hypoxantha	MACN 4970	2009	El Bagual, Formosa, Argentina	-26.17	-58.93	M
S. hypoxantha	MACN 4971	2008	El Bagual, Formosa, Argentina	-26.17	-58.93	M
S. hypoxantha	MACN 4972	2008	El Bagual, Formosa, Argentina	-26.17	-58.93	M
S. hypoxantha	MACN 3098	2005	El Bagual, Formosa, Argentina	-26.17	-58.93	M
S. hypoxantha	MACN 4975	2009	El Bagual, Formosa, Argentina	-26.17	-58.93	M
S. hypoxantha	MACN 3254	2007	El Bagual, Formosa, Argentina	-26.17	-58.93	M
S. hypoxantha	MACN 5177	2009	Iberá, Corrientes, Argentina	-27.86	-56.70	M
S. hypoxantha	MACN 5234	2009	Iberá, Corrientes, Argentina	-27.86	-56.70	M
S. hypoxantha	MACN 3272	2007	Estero Catalina, Formosa, Argentina	-25.11	-58.15	M
S. hypoxantha	MACN 3258	2007	El Bagual, Formosa, Argentina	-26.17	-58.93	M

S. melanogaster	MCP 2312	2008	Bom Jesus, Rio Grande do Sul, Brazil	-28.66	-50.44	M
S. melanogaster	MCP 2318	2008	Bom Jesus, Rio Grande do Sul, Brazil	-28.66	-50.44	M
S. melanogaster	MCP 2073	2007	Bom Jesus, Rio Grande do Sul, Brazil	-28.66	-50.44	F
S. melanogaster	MCP 2074	2007	Bom Jesus, Rio Grande do Sul, Brazil	-28.66	-50.44	M
S. melanogaster	MCP 2076	2007	Bom Jesus, Rio Grande do Sul, Brazil	-28.66	-50.44	M
S. melanogaster	MCP 2078	2008	Bom Jesus, Rio Grande do Sul, Brazil	-28.66	-50.44	M
S. melanogaster	MCP 2296	2007	Bañado Água Branca, Bom Jesus, Rio Grande do Sul, Brazil	-28.60	-50.41	M
S. melanogaster	MCP 2298	2007	Bañado Água Branca, Bom Jesus, Rio Grande do Sul, Brazil	-28.60	-50.41	M
S. melanogaster	MCP 2306	2006	Bañado Rio Santana, Bom Jesus, Rio Grande do Sul Brazil	-28.48	-50.72	M
S. melanogaster	MCP 2311	2008	Bañado Água Branca, Bom Jesus, Rio Grande do Sul Brazil	-28.60	-50.41	M
S. melanogaster	MCP 2315	2008	Coxilha Rica, Lages Santa Catarina, Brazil	-28.31	-50.28	M
S. melanogaster	MCP 2075	2007	Bom Jesus, Rio Grande do Sul, Brazil	-28.66	-50.44	M
S. palustris	MACN 3118	2006	Iberá, Corrientes, Argentina	-27.86	-56.7	M
S. palustris	MZUSP 94877	-	Captive; Brazil	-	-	M
S. palustris	MACN 5173	2009	Iberá, Corrientes, Argentina	-27.86	-56.7	M
S. palustris	MACN 5175	2009	Iberá, Corrientes, Argentina	-27.86	-56.7	M
S. palustris	MACN 5178	2009	Iberá, Corrientes, Argentina	-27.86	-56.7	M
S. palustris	MACN 5179	2009	Iberá, Corrientes, Argentina	-27.86	-56.7	M
S. palustris	MACN 5168	2009	Iberá, Corrientes, Argentina	-27.86	-56.7	M
S. palustris	MACN 5240	2009	Iberá, Corrientes, Argentina	-27.86	-56.7	M
S. palustris	MCP NN1	-	Captive; Brazil	-	-	M
S. palustris	MCP NN2	-	Captive; Brazil	-	-	M
S. palustris	MACN 3117	2007	Gualeguaychú, Entre Ríos, Argentina	-33.01	-58.52	M
S. palustris	MACN 3372	2007	Gualeguaychú, Entre Ríos, Argentina	-33.01	-58.52	M
S. cinnamomea	MACN 3121	2006	Iberá, Corrientes, Argentina	-27.86	-56.70	M
S. cinnamomea	MACN 3122	2007	Gualeguaychú, Entre Ríos, Argentina	-33.01	-58.52	M
S. cinnamomea	MACN 5192	2009	Iberá, Corrientes, Argentina	-27.86	-56.70	M
S. hypochroma	MACN 3131	2007	Gualeguaychú, Entre Ríos, Argentina	-33.01	-58.52	M
S. hypochroma	MACN 5229	2009	Iberá, Corrientes, Argentina	-27.86	-56.70	M
S. hypochroma	MZUSP SP25	-	Captive; Brazil	-	-	M

S. ruficollis	MACN 3128	2007	Gualeguaychú, Entre Ríos, Argentina	-33.01	-58.52	M
S. ruficollis	MACN 3129	2007	Gualeguaychú, Entre Ríos, Argentina	-33.01	-58.52	M
S. ruficollis	MACN 3130	2007	Argentina	-	-	M
S. nigrorufa	MZUSP 98660	2014	Vila Bela Da Santíssima Trindade, Mato Grosso, Brazil	-15.05	-59.92	M
S. nigrorufa	MZUSP 98639	2014	Vila Bela Da Santíssima Trindade, Mato Grosso, Brazil	-15.05	-59.92	M
S. nigrorufa	MZUSP 98590	2014	Vila Bela Da Santíssima Trindade, Mato Grosso, Brazil	-15.05	-59.92	M
S. nigrorufa	MZUSP 98661	2014	Vila Bela Da Santíssima Trindade, Mato Grosso, Brazil	-15.05	-59.92	M
S. nigrorufa	MZUSP 98662	2014	Vila Bela Da Santíssima Trindade, Mato Grosso, Brazil	-15.05	-59.92	M
S. nigrorufa	MZUSP 98637	2014	Vila Bela Da Santíssima Trindade, Mato Grosso, Brazil	-15.05	-59.92	M
S. nigrorufa	MCP 4719	2014	Vila Bela Da Santíssima Trindade, Mato Grosso, Brazil	-15.05	-59.92	M
S. nigrorufa	MCP 4720	2014	Vila Bela Da Santíssima Trindade, Mato Grosso, Brazil	-15.05	-59.92	M
S. nigrorufa	MCP 4723	2014	Vila Bela Da Santíssima Trindade, Mato Grosso, Brazil	-15.05	-59.92	M
S. nigrorufa	MCP 4724	2014	Vila Bela Da Santíssima Trindade, Mato Grosso, Brazil	-15.05	-59.92	M
S. nigrorufa	MCP 4725	2014	Vila Bela Da Santíssima Trindade, Mato Grosso, Brazil	-15.05	-59.92	M
S. nigrorufa	MCP 4727	2014	Vila Bela Da Santíssima Trindade, Mato Grosso, Brazil	-15.05	-59.92	M

[a]MZUSP, Museu de Zoologia da Universidade de São Paulo; KUNHM, University of Kansas Museum of Natural History; MCP, Coleção de Aves do Museu de Ciências e Tecnologia da Pontifícia Universidad Católica do Rio Grande do Sul; MACN, Museo Argentino de Ciencias Naturales “Bernardino Rivadavia”.