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Biometry, molt and brood patch parameters of birds in southern Brazil

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RESUMO. **Biometria, muda e placa de incubação de aves no sul do Brasil.** Medidas da massa corporal, cúlmen, tarso, asa, cauda e dados de muda e placa de incubação de 335 espécimes de aves pertencentes a 55 espécies são apresentados. Atividades de campo para a captura das aves foram realizadas duas vezes a cada semana entre junho de 1998 e junho de 1999 em oito parques de Porto Alegre, Brasil. Biometria de espécies pouco conhecidas como *Thamnophilus ruficapillus, Syndactyla rufosuperciliata, Schoeniophylax phryganophila* e *Poospiza lateralis* são fornecidas. A presença de placa de incubação indica atividade reprodutiva entre setembro e fevereiro para grande número de espécies, após a qual ocorre a muda.
Palavras-Chave: aves, biometria, muda, placa de incubação, massa corporal, Brasil.
Key Words: birds, biometry, molt, brood patch, body mass, Brazil.

Bird biometry is very important in a variety of studies, especially those with taxonomic, physiological, ecological and evolutionary implications (Dunning 1993). Examples of studies that use bird measurements can be found in Blackburn *et al.* (1990), Blackburn and Gaston (1994), Cotgreave (1994), Thiollay (1994), Gaston and Blackburn (1995), and Greenwood *et al.* (1996). Among biometric data, body mass is the most accurate measurement of bird body size (Rising and Somers 1989, Sick 1997) and the majority of studies on biometry of neotropical birds are limited to this measure.

In South America most studies concern the Amazon rainforest area (Cavalcanti and Marini 1993). Few comprehensive studies have been published on the biometry of the Cerrado region (Marini *et al*. 1997) and Atlantic rainforest (see review in Reinert *et al*. 1996). Belton (1994) presents biometric data of the birds of Rio Grande do Sul state, and Salvador (1988) reports body masses of similar Argentine avifauna.

In this study we present the body mass and morphological measurements on the 335 birds belonging to 55 species and 16 families. Additional tail, wing, and body molts, and brood patch data are provided as well.

METHODS

The birds were mist-netted twice a week, in the morning, in eight urban parks of the city of Porto Alegre, Rio Grande do Sul state, Brazil (30º02'S; 51º12'W) between June 1998 and June 1999. The vegetation in Saint'Hilaire and Gabriel Knijnik Parks can be classified as secondary Semi-deciduous Forest (*sensu* IBGE 1986), the former with a massive presence of *Eucalyptus*. The vegetation in the Chico Mendes, Farroupilha, Maurício Sirotsky Sobrinho, Marinha do Brasil, Mascarenhas de Moraes, and Moinhos de Vento Parks can be classified as managed vegetation with a preponderance of exotic species.

Culmen, tarsus, wing and tail lengths were obtained according to Sick (1997) to the nearest mm. The culmen and tarsus measurements were taken with a Mitutoyo caliper, and wing and tail were measured with a metal ruler; body mass was measured with a Pesola scale to the nearest g.

The measurements were analysed searching for outliers according to Bierregaard (1988). The values that differed by more than 2.5 standard deviations were eliminated from the analysis because would be errors in transcript or cause misidentification in the field. The families and species were classified following Sibley and Monroe (1990).

Table 1. Body masses (g) and measurements (mm) of birds in eight urban areas of Porto Alegre, South Brazil. Mean ± standard deviation; range(n). For sample one and two precise values are given for each specimen.

Species	Sex	Culmen	Tarsus	Wing	Tail	Weight
Picidae						
Celeus flavescens	F	30.5	30.5	160	93	166
Cerylidae						
Chloroceryle amazona	F	63.1	14.3	144	88	136
Crotophagidae						
Crotophaga ani	I	30	38	146	173	102
Guira guira	I	28.1-29.6	38.9±0.7;38.1-39.3(3)	177±5.3;171-181(3)	213.7±12.7;199-12(3)	171.0±28.4;149-203(3)
Trochilidae						
Hylocharis chrysura	I	22.5	4.6	55	30	5
Columbidae						
Columbina talpacoti	F	12.7±0.2;12.5-12.9(4)	17.4±1;16.6-18.6(3)	89.0±3.2;86-93(4)	66.3±4.6;61-71(4)	52.5±4.4;48-58(4)
	M	12.6±0.5;12-13.2(5)	17.3±1.5;15.5-19.2(5)	92.0±2.3;90-95(5)	65.0±3;61-68(5)	52.4±4.6;48-59(5)
Columbina picui	F	11.7±0.5;11-12.1(4)	16.6±0.5;16.2-17.2(4)	90±3.5;85-93(4)	77.0±1.8;75-79(4)	48.0±4.2;42-51(4)
	M	*	16.9	92	*	*
	I	11.9±0.9;11-12.7(3)	15.9±3.5;11.4-20.2(6)	93.0±2.8;88-96(6)	74.0±1.7;73-76(3)	47.3±3.1;44-50(3)
Leptotila verreauxi	I	16.8	33.3	165	112	213
Accipitridae						
Buteo magnirostris	I	28.7	71.3	251	160	*
Tyrannidae						
Todirostrum plumbeiceps	I	10.2±0.5;9.4-11(8)	19.0±1.1;18-21.5(8)	41.9±1.8;40-45(9)	36.0±2.2;33-40(9)	6.0±0.7;5-7(5)
Serpophaga subcristata	I	8.4	15.6	42	42	7
Phylloscartes ventralis	I	11.5±1.8;10.1-13.6(3)	20.5±1.9;18.6-22.4(3)	56.3±5.5;51-62(3)	57.0±2.6;55-60(3)	9.0±1;8-10(3)
Platyrinchus mystaceus	F	9.6	15.9	50	31	8
	M	9-11.1	18.5-16	55-51	34-28	14-9
Myiophobus fasciatus	I	11.8-10	16.8-16.5	64-58	52-54	13-11
Lathrotriccus euleri	I	11.9±0.9;10.1-13(7)	14.7±2.8;10-17.9(7)	64.3±2.3;62-69(7)	57.6±3;55-62(7)	11.6±1.1;10-13(7)
Xolmis irupero	I	14	25	108	80	40
Machetornis rixosus	I	16.6	29.5	96	82	34
Tyrannus melancholicus	I	21.6-21	18.5-20.3	113-110	90-86	45-41
Pitangus sulphuratus	I	25.3±2.3;20.8-27.1(6)	29.3±2.2;25.5-32.7(19)	120.3±5.3;112-134(20)	90.8±3.3;88-97(6)	64.7±3.7;62-72(6)
Chiroxiphia caudata	F	10.1±1.1;9-11.5(4)	21.4±1.4;20.2-23.1(4)	76.0±2.8;74-80(4)	52.7±3.1;50-56(3)	24.8±1.5;23-26(4)
	M	9.4±1.1;8-11.4(7)	21.9±1.4;20.1-24.3(8)	76.1±3;72-80(8)	57.1±4.3;52-66(8)	25.0±1.4;23-27(8)
Thamnophilidae						
Thamnophilus caerulescens	F	14.9±0.8;13.9-15.9(5)	23.7±1.6;21.6-25.4(5)	69.0±1.9;67-71(5)	64.8±2.6;62-69(5)	21.2±1.8;20-24(5)
	M	14.9±1.1;13.6-16.1(4)	24.3±0.7;23.5-25.1(4)	72.8±2.5;70-76(4)	67.5±3;65-71(4)	20.5±1;20-22(4)

Continued

Table 1. Continued.

Species	Sex	Culmen	Tarsus	Wing	Tail	Weight
	I	11.8	23.3	65	66	24
Thamnophilus ruficapillus	F	15.7	26.6	62	62	21
	M	15.9±0.9;15.2-16.9(3)	27.2±0.6;26.6-27.7(3)	66.7±1.2;66-68(3)	67.0±3.6;64-71(3)	24.0±3;21-27(3)
Furnariidae						
Furnarius rufus	I	20.9±0.9;19.5-22(5)	35.2±2.2;30.6-38.9(28)	99.9±3.1;93-105(28)	73±2.3;70-75(5)	53.0±4.2;47-57(5)
Schoeniophylax phryganophila	I	11.3±1.1;10.5-12.5(3)	23.2±0.5;22.8-23.7(3)	60.3±2.1;58-62(3)	116.7±12;105-129(3)	17-15
Synallaxis cinerascens	I	10.5±0.8;9.1-11.8(11)	19.9±1.1;17.8-21.2(11)	53.8±2.5;49-57(11)	61.1±3.2;56-65(7)	13.8±1.7;12-16(11)
Certhiaxis cinnamomea	I	14.1±0.4;13.8-14.9(9)	20.7±1.1;18.8-22.7(9)	60.8±2.5;57-65(9)	58.4±5;50-63(8)	16.4±1.2;15-19(9)
Anumbius annumbi	I	18.4-16.4	28.6-25	84-86	77-*	38-*
Syndactyla rufosuperciliata	I	15.7±1.9;12.4-18(12)	24.0±1.5;21.7-26.4(12)	74.7±3.8;69-80(12)	72.5±4.8;65-80(10)	25.0±5.5;15-30(13)
Sclerurus scansor	I	21.6-22.5	22.8-23.3	89-89	67-65	36-35
Sittasomus griseicapillus	I	10.8±1.2;9.1-12.8(6)	18.5±0.7;17.7-19.3(5)	74.3±4.5;70-79(6)	70.3±5.6;62-78(6)	13.3±1;12-14(6)
Conopophagidae						
Conopophaga lineata	I	12.7±1.1;11-14.5(12)	30.7±1.2;28.7-32.6(12)	73.7±8.6;66-99(12)	48.1±3.5;42-53(9)	23.0±1.3;20-25(11)
Vireonidae						
Cyclarhis gujanensis	I	16.3±0.5;15.6-17(6)	24.8±1.8;22.8-28.1(6)	79.7±2.7;78-85(6)	70.3±1.4;69-73(6)	31.0±2.2;28-34(6)
Muscicapidae						
Turdus rufiventris	I	20.9±1.9;17.4-24.7(17)	35.5±1.5;31.6-40(61)	119.8±3.4;113-129(60)	97.3±4.2;90-105(16)	73.4±4.7;64-83(17)
Turdus amaurochalinus	I	19.1±1.6;16.3-22(9)	32.7±1.2;32-35.8(9)	115.3±3.7;109-120(9)	91.4±4.3;82-96(9)	65.0±2.9;62-70(6)
Turdus albicollis	I	19.5±1.7;16.4-24.1(24)	31.5±1.3;29.6-34.7(24)	113.6±4.1;104-122(23)	88.1±3.7;80-95(23)	64.7±5.2;54-78(23)
Sturnidae						
Mimus triurus	I	16.8	33	104	96	*
Certhiidae						
Troglodytes aedon	I	12.4-11.2	18.1±0.4;17.7-18.7(4)	50.8±1.1;49-52(5)	39	5
Hirundinidae						
Phaeoprogne tapera	I	11	13.7	127	65	36
Notiochelidon cyanoleuca	I	6.0±1.6;4.5-7.6(3)	11.1±0.4;10.7-11.4(3)	96.0±6.9;92-104(3)	48.0±2.6;45-50(3)	12-10
Fringillidae						
Zonotrichia capensis	I	12.3±0.7;11.5-13.1(5)	22.7±1;21.6-24.8(9)	69.1±2.9;64-72(9)	62.6±1.1;61-64(5)	22.5±0.6;22-23(4)
Parula pitiayumi	I	11-10	17.7-17.5	56-55	45-45	9-12
Geothlypis aequinoctialis	F	11.6	21.7	55	*	12
	M	10.9-11.1	20.9-21.7	57-57	*-57	11-13
	I	10.5	22.2	60	56	18
Basileuterus culicivorus	I	10.3±0.7;9-11.4(16)	19.8±0.9;18.4-21.9(16)	57.4±2;53-60(16)	54.2±2.1;50-58(15)	10.1±0.9;9-12(15)
Basileuterus leucoblepharus	I	10.9±0.9;9.1-12.9(34)	24.8±1.2;22.1-26.8(34)	65.2±2.8;60-71(35)	60.3±2.9;54-66(33)	16.9±1.1;15-19(34)

Continued

Table 1.Continued.

Species	Sex	Culmen	Tarsus	Wing	Tail	Weight
Coereba flaveola	I	11.7±0.6;10.5-12.4(13)	16.6±0.9;15-19.2(20)	57.8±2.1;54-61(20)	35.3±3;30-41(12)	10.2±1.1;9-12(13)
Thraupis sayaca	I	13.3±0.7;12-14.4(9)	20.2±0.8;19.3-21.5(9)	92.1±2.4;88-95(9)	63.4±3.1;60-69(9)	32.1±2.5;28-35(9)
Thraupis bonariensis	F	12.7±0.8;11.8-13.3(3)	23.7±1.1;22.4-24.5(3)	92.7±0.6;92-93(3)	72.3±2.1;70-74(3)	39.0±2.6;36-41(3)
Euphonia chlorotica	F	6.5	14.3	60	33	10
Haplospiza unicolor	F	11.1±0.4;10.8-11.5(3)	18.7±1.1;17.5-19.6(3)	60.0±2.6;58-63(3)	46.7±1.5;45-48(3)	16.3±0.6;16-17(3)
Poospiza nigrorufa	I	10.7	22.1	61	60	17
Poospiza lateralis	I	11.3±0.6;10.5-11.8(4)	22.3±1;21.4-23.6(4)	65.3±3.3;61-69(4)	65.0±3.5;60-68(4)	18.5±0.6;18-19(4)
Sicalis luteola	F	9.8±1.5;8.5-11.5(3)	15±2.6;12-16.6(3)	69.7±3.2;66-72(3)	46.0±1.7;45-48(3)	16.0±2;14-18(3)
	M	9.5±0.4;9-10(4)	16.4±2.1;13.5-18.3(4)	74.0±3.5;69-77(4)	51.3±3.6;48-56(3)	15.0±1.4;14-17(4)
Sporophila caerulescens	F	9.5	16.6	49	42	9
Leistes superciliaris	F	18.6±1;17.5-19.8(5)	29.9±1.2;28-31(5)	91.2±2.4;89-95(5)	53.4±4.2;50-60(5)	45.8±3.8;42-52(5)
	M	20.6±2.1;18-23.8(5)	31.7±1;30.7-33(5)	103.4±3.2;100-108(5)	60.6±1.1;59-62(5)	57.5±1.9;56-60(5)
Molothrus bonariensis	F	15.2±2.7;11.4-18.7(6)	26.9±1.1;25-27.7(6)	102.7±6.4;92-112(6)	70.0±2.3;68-74(6)	50.8±2.8;48-56(6)
	M	18.1±1.1;17.2-19.3(3)	29.0±3;25.7-31.6(3)	100-115	77.0±6.1;70-81(3)	54.0±4.9;48-57(3)

(F) Female, (M) Male, (I) Indeterminate, (*) data not obtained.

RESULTS AND DISCUSSION

The biometry of some species listed in table 1 are known from previous studies, especially those whose wide geographic distribution reaches the tropical rainforest in the northern part of South America, and Central America where several studies were performed (see references in Thomas 1982 and Oniki and Willis 1999). Species with extensive data from former studies include *Sittasomus griseicapillus*, C*oereba flaveola*, *Columbina talpacoti*, *Turdus albicollis* and *Cyclarhis gujanensis*. However, this study presents data about poorly known species such as *Thamnophilus ruficapillus, Sclerurus scansor, Syndactyla rufosuperciliata, Schoeniophylax phryganophila, Haplospiza unicolor, Poospiza lateralis, Leistes superciliaris* and *Celeus flavescens.*

Maurício and Dias (1998) consider the Rio Grande do Sul state the southernmost area of the distribution of *Conopophaga lineata* and *Platyrinchus mystaceus* (but see Maurício and Dias 2000). These species are widely distributed in the Neotropics (Sick 1997). These data would supply information for the detection of geographic variations such as those found by Collins (1972) for others species. However, comparing the body mass of *C. lineata* published concerning other localities (Oniki 1981, Storer 1989, Reinert *et al.* 1996 and Marini *et al.* 1997) it was not possible to detect substantial differences. Eighteen other species with substantial sample size (at least five specimens) were compared to body masses with data provided by Dunning (1993) (table 2). Large differences in body mass were detected for *Molothrus bonariensis* females, *Turdus albicollis, Columbina talpacoti* and *Certhiaxis cinnamomea,* and would be evidences of significant geographical variations. Another interesting pattern was the relatively larger body masses of birds from Porto Alegre (12 species *vs.* 6 species), in comparison with tropical areas such as Puerto Rico and Trinidad, apparently an effect of the Bergmann's rule.

Despite the small number of samples for some species, We detected differences in body size between sexes: *Chiroxiphia caudata* males have a slightly longer tails and heavier body mass than females; *Leistes superciliaris* males have greater measurements than females for all variables; *Molothrus bonariensis* males were also greater, except for wing measurements. Larger and heavier males is the general pattern for birds (Amadon 1959 *apud* Clark 1979). However, no measurement differences between sexes were detected for *Columbina talpacoti, Thamnophilus caerulescens* and *Sicalis luteola*.

Data for annual year-round molt and brood patches are shown in table 3. Evidence of reproductive activities (brood incubation patch) were observed between September and February for many species, corresponding to spring/summer and showing clear indications of seasonality of bird nesting in this subtropical latitude.

The wing, tail and body molts occur predominantly between January and March, coinciding with the final breeding period. The same pattern was found in Mato Grosso, Brazil (Oniki and Willis 1999). The post-nuptial or complete molt (*sensu* Sick 1997) occurs after the end of the

Table 2. Body mass (g) comparisons between this study (Porto Alegre, Brazil) and Dunning (1993) (several localities). Values are mean ± standard deviation; range(n). Species with four or less individuals were not included. Sex: (B) Both, (F) Female, (I) Indeterminate.

Species	Sex	This study	Dunning (1993)	Location	% Difference *
Columbina talpacoti	B	52.4±4.2; 48-59(9)	46.5; 35.5-56.5(74)	Trinidad	+12.7
Todirostrum plumbeiceps	I	6.0±0.7; 5-7(5)	5.7; 5.4-6(7)	Several	+5.3
Lathrotriccus euleri	I	11.6±1.1; 10-13(7)	12; 9.5-14(28)	Trinidad	-3.3
Pitangus sulphuratus	I	64.7±3.7; 62-72(6)	61±4.07; 53.5-67.5(15)	Venezuela	+6.1
Chiroxiphia caudata	B	24.9±1.4; 23-27(12)	25.6; 20.5-30(43)	São Paulo	-2.7
Thamnophilus caerulescens	B	21.2±1.7; 20-24(10)	21.4(12)	São Paulo	-0.9
Furnarius rufus	I	53.0±4.2; 47-57(5)	56.5; 48.5-65(9)	Several	-6.2
Certhiaxis cinnamomea	I	16.4±1.2; 15-19(9)	14.8±1.99; 12-18.6(17)	Several	+10.8
Syndactyla rufosuperciliata	I	25.0±5.5; 15-30(13)	27.7(9)	Peru	-9.7
Conopophaga lineata	I	23.0±1.3; 20-25(11)	22.1; 20-25(11)	Several	+4.1
Cyclarhis gujanensis	I	31.0±2.2; 28-34(6)	28.8; 22.5-35(26)	Trinidad	+7.6
Turdus amaurochalinus	I	65.0±2.9; 62-70(6)	63.1(17)	Paraguay	+3.0
Turdus albicollis	I	64.7±5.2; 54-78(23)	54.1; 45-62.5(45)	Trinidad	+19.6
Basileuterus culicivorus	I	10.1±0.9; 9-12(15)	10.5; 9.5-12(22)	Trinidad	-3.8
Basileuterus leucoblepharus	I	16.9±1.1; 15-19(34)	16.3; 14-21(7)	São Paulo	+3.7
Coereba flaveola	I	10.2±1.1; 9-12(13)	9.4±0.8; 7.4-12.5(136)	Puerto Rico	+8.5
Thraupis sayaca	I	32.1±2.5; 28-35(9)	32; 27.9-34.4(27)	?	+0.3
Molothrus bonariensis	F	50.8±2.8; 48-56(6)	31.9±1.04(670)	Puerto Rico	+59.2

* Percentile difference between means of this study and means of Dunning (1993).

breeding season, and is characteristic of many species that have only one molt per year (Welty 1964). Despite this, body molt also takes place in other months, a pattern similar to the birds of São Paulo (Oniki and Willis 2001).

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Table 3. Molt and brood patch of birds throughout the year in eight urban areas in Porto Alegre, Brazil. Molt: (W) wing, (T) Tail, (B) Body, (bp) brood patch. Sex: (F) Female, (M) Male, (I) Indeterminate, (B) Both.

Species	Sex	Jan	Feb	Mar	Apr	May	Jun	Aug	Sep	Oct	Nov	Dec
Picidae												
Celeus flavescens	F										WT 0/1; Bbp 1/1	
Cerylidae												
Chloroceryle amazona	F					WTBbp 0/1						
Crotophagidae												
Crotophaga ani	I										WB 1/1; Tbp 0/1	
Guira guira	I								WTbp 0/3; B 2/3			
Trochilidae												
Hylocharis chrysura	I					WTbp 0/1; B 1/1						
Columbidae												
Columbina talpacoti	F							WTBbp 0/1	WTbp 0/3; B 2/3			
	M		WTbp 0/1; B 1/1					WTbp 0/2; B 2/2	WTbp 0/1; B 1/1		WTbp 0/1; B 1/1	
Columbina picui	B		Wbp 0/2; TB 1/2	WTbp 0/2; B 2/2		W 1/3; B 2/3; Tbp 0/3						
Leptotila verreauxi	I					WTbp 0/1; B 1/1						
Accipitridae												
Buteo magnirostris	I											WBbp 0/1; T 1/1
Tyrannidae												
Todirostrum plumbeiceps	I		WB 1/1; Tbp 0/1	WTbp 0/2; B 2/2	WTBbp 0/1	WTBbp 0/1				WTB 0/1; bp 1/1		WTbp 0/2; B 1/2
Serpophaga subcristata	I	WTbp 0/1; B 1/1								WTB 0/1; bp 1/1		
Phylloscartes ventralis	I	WTbp 0/1; B 1/1	WTbp 0/1; B 1/1		Wbp 0/1; TB 1/1							

Continued

Table 3. Continued.

Species	Sex	Jan	Feb	Mar	Apr	May	Jun	Aug	Sep	Oct	Nov	Dec
Platyrinchus mystaceus	B		WTbp 0/1; B 1/1		WTbp 0/2; B 2/2							
Myiophobus fasciatus	I			WTbp 0/1; B 1/1					WTBbp 0/1			
Lathrotriccus euleri	I								WTBbp 0/5			WT 0/2; B 1/2; bp 2/2
Xolmis irupero	I											WTbp 0/1; B 1/1
Machetornis rixosus	I		WTB 1/1; bp 0/1									
Tyrannus melancholicus	I	WTB 0/1; bp 1/1		Wbp 0/1; TB 1/1								
Pitangus sulphuratus	I					WTbp 0/6; B 3/6						
Chiroxiphia caudata	F		Wbp 0/1; TB 1/1	WTbp 0/1; B 1/1	WTbp 0/1; B 1/1				WTBbp 0/1			
	M			WTbp 0/1; B 1/1	WTbp 0/2; B 2/2	WTbp 0/1; B 1/1				WTbp 0/4; B 1/4		
Thamnophilidae												
Thamnophilus caerulescens	F		WB 1/1; Tbp 0/1	WB 2/2; T 1/2; bp 0/2						WTBbp 0/1		WT 0/1; Bbp 1/1
	M	WTBbp 1/1		WTB 2/2; bp 0/2					WTbp 0/1; B 1/1			
Thamnophilus ruficapillus	B	WTbp 0/1; B 1/1	WBbp 1/1; T 0/1						WBbp 0/1; T 1/1	WTBbp 0/1		
Furnariidae												
Furnarius rufus	I					WTBbp 0/5						
Schoeniophylax phryganophila	I					WTbp 0/1		WTBbp 0/2				
Synallaxis cinerascens	I	WTB 1/1; bp 0/1	WTbp 0/2; B 2/2						Wbp 0/3; T 1/2; B 1/3	WTB 0/2; bp 1/2	WTBbp 0/1	W 1/2; TBbp 0/2
Certhiaxis cinnamomea	I		WT 1/2; B 2/2; bp 0/2			WTBbp 0/1		WTBbp 0/2	WTbp 0/3; B 2/3			WTbp 0/1; B 1/1
Anumbius annumbi	I		WT 1/2; B 2/2; bp 0/2									
Syndactyla rufosuperciliata	I	WT 1/2; B 2/2; bp 0/2	WT 0/1; Bbp 1/1	WTbp 0/2; B 1/2	WTBbp 0/1				WTB 0/2; bp 1/2	WTBbp 0/1		WTB 1/1; bp 0/1
Sclerurus scansor	I		WT 0/2; B 2/2; bp 1/2									
Sittasomus griseicapillus	I		Wbp 0/2; T 1/2; B 2/2						WTBbp 0/1	WTB 0/1; bp 1/1	WTB 0/2; bp 1/2	

Continued

Table 3. Continued.

Species	Sex	Jan	Feb	Mar	Apr	May	Jun	Aug	Sep	Oct	Nov	Dec
Conopophagidae												
Conopophaga lineata	I	W 2/4; T 1/4; B 4/4; bp 0/4	WT 1/2; B 2/2; bp 0/2	WTbp 0/2; B 1/2	WTbp 0/2; B 2/2		WTBbp 0/1		WTBbp 0/1			
Vireonidae												
Cyclarhis gujanensis	I	WB 1/1; Tbp 0/1	WB 1/2; T 2/2; bp 0/2	W 1/2; Tbp 0/2; B 2/2	WTbp 0/1; B 1/1							
Muscicapidae												
Turdus rufiventris	I					WTbp 0/13; B 2/13	WTbp 0/4; B 1/4					
Turdus amaurochalinus	I		WTB 1/1; bp 0/1	Wbp 0/1; TB 1/1		WTBbp 0/1				WTBbp 0/1	WTBbp 0/1	WTB 0/3; bp 1/3
Turdus albicollis	I	Wbp 0/1; TB 1/1	W 1/4; T 3/4; B 4/4; bp 0/4	WTbp 0/3; B 1/3		Wbp 0/2; T 1/2; B 2/2	WTbp 0/2; B 1/2		WTbp 0/3; B 1/3	WTBbp 0/3	WTbp 0/2; B 1/2	WB 0/3; Tbp 1/3
Sturnidae												
Mimus triurus	I						WTBbp 0/1					
Certhiidae												
Troglodytes aedon	I					WTBbp 0/1						
Hirundinidae												
Phaeoprogne tapera	I											WTBbp 0/1
Notiochelidon cyanoleuca	I		WTbp 0/3; B 1/3									
Fringillidae												
Zonotrichia capensis	I			W 1/3; Tbp 0/3; B 2/3	WTBbp 0/2							
Parula pitiayumi	I		WTbp 0/1; B 1/1			WTBbp 0/1						
Geothlypis aequinoctialis	B	WTbp 0/1; B 1/1		WBbp 0/1				WTBbp 0/1		WTBbp 0/1		

Continued

Table 3. Continued.

Species	Sex	Jan	Feb	Mar	Apr	May	Jun	Aug	Sep	Oct	Nov	Dec
Basileuterus culicivorus	I		WTBbp 0/3	WTbp 0/6; B 2/6			WTBbp 0/1		WTBbp 0/1	WTBbp 0/1	WT 0/3; B 2/3; bp 1/3	WTB 1/1; bp 0/1
Basileuterus leucoblepharus	I	W 1/5; Tbp 0/5; B 3/5	WTbp 0/3; B 2/3	WTBbp 0/8	WTBbp 0/1		WTBbp 0/3		WTB 0/5; bp 1/5	WTBbp 0/3	WTbp 0/3; B 2/3	WT 3/4; B 4/4; bp 0/4
Coereba flaveola	I		W 2/4; T 1/4; B 4/4; bp 0/4	WT 2/6; B 6/6; bp 0/6		WTBbp 0/2	WTBbp 0/1					
Thraupis sayaca	I		W 2/5; T 4/5; B 5/5; bp 0/5	Wbp 0/1; TB 1/1;		WTBbp 0/3						
Thraupis bonariensis	F			WTbp 0/2; B 2/2		WTBbp 0/1						
Euphonia chlorotica	F		WTbp 0/1; B 1/1									
Haplospiza unicolor	F								WTbp 0/1; B 1/1	WTbp 0/2; B 2/2		
Poospiza nigrorufa	I									WTBbp 0/1		
Poospiza lateralis	I			WTbp 0/1; B 1/1	WTbp 0/1; B 1/1				WTBbp 0/1	WTBbp 0/1		
Sicalis luteola	F										WT 0/3; B 1/3; bp 2/3	
	M										WTBbp 0/4	
Sporophila caerulescens	F		WTbp 0/1; B 1/1									
Leistes superciliaris	F										WTB 0/4; bp 2/4	WBbp 0/1; T 1/1
	M										WTBbp 0/4	WTBbp 0/1
Molothrus bonariensis	F		WB 1/1; Tbp 0/1						WTBbp 0/3	WTBbp 0/1	WTBbp 0/1	
	M								WTBbp 0/2		WTBbp 0/1	
Total birds examined		20	52	42	15	45	13	8	42	26	32	25

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