

Body mass, cloacal temperature, morphometrics, breeding and molt of birds of the Serra das Araras region, Mato Grosso, Brazil

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RESUMO. Peso, temperatura cloacal, morfometria, reprodução e muda de aves da região da Serra das Araras, Mato Grosso, Brasil. Neste trabalho, listamos os pesos, muda e temperaturas cloacais de aves de 86 espécies da Serra das Araras e vizinhanças, em Mato Grosso, Brasil. A reprodução ocorre na segunda metade do ano, seguido da muda.

PALAVRAS-CHAVE: Brasil, morfometria, peso, Serra das Araras.

KEY WORDS: Brazil, morphometrics, body mass, Serra das Araras.

Bird body masses are used in a wide range of disciplines such as avian physiology, morphology, theoretical modeling, ecology and community structure (Dunning 1993). However, only recently have body masses of Brazilian birds started to become available (Oniki 1978, 1980 a, b, 1986, Bierregaard 1988, Graves and Zusi 1990, Silva *et al.* 1990, Novaes and Lima 1991, Oniki and Willis 1991, 1993, Marini *et al.* 1997).

Here we report on body mass, cloacal temperatures and measurements for live birds of 86 species for several areas of Mato Grosso State, southwestern Brazil. We also report on brood patches, breeding, and molt.

Studies were conducted at the Ecological Station of Serra das Araras (15°38'S, 57°12'W) on 15 February - 15 March, 11-30 June, 22-29 July, 23 September - 5 October 1987, and 24-26 January 1988. Some data were obtained at Fundação Evangelista Buriti (15°25'S, 55°48'W) on 14-15 July 1987 and near the city of Pontes e Lacerda (15°20' S, 59°25' W) on 19 January 1988. Details of the vegetation of the areas and lists of birds are in Silva and Oniki (1988) and Willis and Oniki (1990).

Birds were captured in mist nets, weighed with Pesola scales to the nearest 0.2 g and cloacal temperatures measured with a quick measuring Schultheis thermometer. Other morphological measurements such as length of bill (chord from feather), tarsus, tail (between central feathers) and wing (unflattened chord) were obtained; sex and age of the bird were determined when possible. Molt of remiges, rectrices and contour feathers was checked. We also checked for vascularized, featherless or wrinkled (regressing) brood patches. Measurements were taken according to methods described in Oniki and Willis (1991). Most birds were released after measurement, but some are in the collection of the Departamento de Biologia, Universidade Federal do Mato Grosso, Cuiabá, MT. Classification follows Meyer de Schauensee (1970) in most cases.

Table 1 shows body mass and measurements. Body masses for *Uropelia campestris*, *Formicivora rufa* and *Hemitriccus striaticollis* are new for the literature (Dunning 1993).

Table 2 shows tail, wing and body molt, plus presence or absence of brood patch. Columbidae had very worn tail and wing feathers, plus pinfeathers on the body in February-March, but two *Columbina talpacoti* had heavily worn tails in July while tail and wing feathers were new and body pinfeathers were still present in others. Trochilidae had tail and wing new in June-July but in September, one *Eupetomena macroura* had a very worn tail and one *Thalurania furcata* was in wing and body molt. In January-March, many species showed scaly or wrinkled brood patches, sometimes with feathers growing on the sides of the bare area, or were caring for young out of the nest.

We captured young of *Crypturellus parvirostris* (March), *Geotrygon montana* (March), *Todirostrum latirostre* (Feb.), *Campylorhynchus turdinus* (Feb.), and *Cissopis leveriana* (Jan.). *Icterus icterus* was feeding a large young in a nest late in February but it was out of the nest in March. We found one nest of *Leptotila verreauxi* with two eggs on 26 September; one *Pitangus sulphuratus* nest had at least one young on 11 January; one adult *Columbina passerina* was flushed from a nest with two white eggs on 21 June, and one nest of *Coragyps atratus* had a nearly grown black young on 4 October. A female *Claravis pretiosa* had a shelled egg in the oviduct on 24 February, and individuals of *Furnarius rufus*, *Euphonia violacea*, and *Cacicus cela* were building nests on 22 September.

It seems that birds are nesting June-October, some to January-March, while in February-March, young are out of the nest, some with parents. The adult tail, wing and contour feathers are worn or in molt mostly in February-March.

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Table 1. Body masses (g), cloacal temperatures ($^{\circ}$ C), and morphometrics (mm) of birds of Serra das Araras.

Species	Sex ^a	Age ^b	Body mass	Temperature	Bill	Tarsus	Tail	Wing
			\bar{x} +SD(n)max-min	\bar{x} +SD(n)max-min	\bar{x} +SD(n)max-min	\bar{x} +SD(n)max-min	\bar{x} +SD(n)max-min	\bar{x} +SD(n)max-min
Tinamidae								
<i>Crypturellus parvirostris</i>			163	38.8	17	30	34	112
Anhingidae								
<i>Anhinga anhinga</i>		A	820	-	69	38	60	335
Accipitridae								
<i>Rostrhamus sociabilis</i>		Y	284	-	31	47	166	334
Columbidae								
<i>Columba speciosa</i>	F	A	295	-	20	24	90	179
<i>Columbina talpacoti</i>	B	B	43.5 \pm 3.48(3)39.5-46	41.7 \pm 0.8(3)41-42.6	12 \pm 0	17.3 \pm 0.06(3)17-18	64.3 \pm 1.16(3)6.3-6.5	89.7 \pm 2.08(3)88-92
<i>Uropelia campestris</i>	F	A	35.2	42.5	11	17	75	72
<i>Claravis pretiosa</i>	M	A	71.0 \pm 8.1(48)58-103	42.6 \pm 1.0(45)40.4-44.4	14.2 \pm 1.5(47)13-20	18.9 \pm 0.88(47)17-21	76.8 \pm 3.2(47)70-82	114 \pm 2.7(47)107-120
	F	B	65.6 \pm 9.2(52)41-93	42.7 \pm 1.1(49)40-44.7	14.3 \pm 1.6(52)11.5-20	18.4 \pm 1(52)16-20	72.1 \pm 5.5(52)57-83	110 \pm 5.3(52)87-117
	M	Y	67.5 \pm 6.3(5)60.5-73	42.2 \pm 0.9(5)41.3-43.2	14 \pm 0.8(4)13-15	17.8 \pm 1.1(5)16-19	77.2 \pm 1.64(5)75-79	113 \pm 17.9(5)111-115
<i>Leptotila verreauxi</i>	B		139.4 \pm 29(4)104-170	42.6 \pm 0.9(3)41.6-43.4	16.5 \pm 1(4)15-17	28 \pm 4.1(4)22-31	102 \pm 10.5(4)87-111	133.8 \pm 8.5(4)122-140
<i>Geotrygon montana</i>	M	Y	75.5	-	18	30	57	126
Psittacidae								
<i>Brotogeris versicolurus</i>		A	67	41	17	11	84	115
Cuculidae								
<i>Crotophaga ani</i>	B	B	92.4 \pm 7.1(4)84-101	40.8-41.1	30.2 \pm 1.5(4)29-32	35 \pm 2.5(4)32-37	160 \pm 47(4)92-200	147 \pm 7.9(4)140-155
<i>Tapera naevia</i>	M	A	46.6	40.2	17	30	160	120
Caprimulgidae								
<i>Nyctidromus albigollis</i>	M	A	64.7	39.6	12	25	165	180
<i>Caprimulgus rufus</i>	F	A	99	-	13	17	115	194
Trochilidae								
<i>Glaucis hirsuta</i>	F	Y	2	-	29	4	33	61
<i>Phaethornis pretrei</i>	F	Y	4.2	37.8	30	3.5	68	55
<i>Eupetomena macroura</i>	F	A	7	40.6	23	5	68.5	68
<i>Colibri serrirostris</i>	F	Y	5	40	20	5	38	64
<i>Chlorostilbon aureoventris</i>	F	Y	2.7	40.2	17	4	29	49
<i>Thalurania furcata</i>	F		5.4 \pm 3(3)3.5-8.9	38.5 \pm 2.8(3)36-41.5	19.3 \pm 1.2(3)18-20	4 \pm 0(3)	30 \pm 2.9(3)27-32	50 \pm 1(3)49-51
Trogonidae								
<i>Trogon curucui</i>	M		54.8	39.4	15	14	121	122
Momotidae								
<i>Momotus momota</i>	B		10.9-11.2	39.7-41	33.0-34	28	100-153	126-130
Galbulidae								
<i>Galbula ruficauda</i>	F		24	42	49	16	8	8.6
Bucconidae								
<i>Bucco chacuru</i>	M		48-49.5	39-40.4	29-28	22-21	65-66	81-80
<i>Monasa nigrifrons</i>	B		87-97	40	30-35	23-22	120-124	130-132
Ramphastidae								
<i>Pteroglossus inscriptus</i>	F	A	142	-	68	30	118	122
Picidae								
<i>Melanerpes cruentatus</i>	B	B	58.9 \pm 12.8(3)44.3-68	43	23.3 \pm 3.8(3)19-26	20 \pm 1(3)19-21	53.7 \pm 5.1(3)48-58	112.3 \pm 15.9(3)94-122
<i>Veniliornis passerinus</i>	F		32.3-35	42	19-18	18-21	49	90-88
<i>Celeus lugubris</i>			118	41	27	26	8.8	14.6
<i>Picumnus albosquamatus</i>	M		11.5	42.4	12	13	32	56
Dendrocolaptidae								
<i>Sittasomus griseicapillus</i>	F	Y	13.3	43	12	15	75	75
<i>Xiphorhynchus guttatus</i>			60.5 \pm 4.5(5)56.9-68	43.1 \pm 0.2(5)42.7-43.3	36.8 \pm 1.5(5)35-39	27.8 \pm 3.6(5)24-33	96.8 \pm 4.7(5)91-103	116 \pm 6.2(5)109-125
Furnariidae								
<i>Furnarius rufus</i>	M	A	46.4	41.4	20	36	60	90
Thamnophilidae								
<i>Taraba major</i>	F		45.9	42.2	22	37	84	84
<i>Pyrgilena leuconota</i>	M		27.1	42.2	16	31	70	74
<i>Formicivora grisea</i>	B		10.4 \pm 1.4(3)9.5-12	40.9 \pm 1.0(3)40-42	14.7 \pm 3.8(3)12-19	22.7 \pm 1.2(3)22-24	49 \pm 0(3)	52 \pm 1(3)51-53
<i>Formicivora rufa</i>	B		10.4-11.5	41.2	13	23	58-60	52-55

Table 1. (cont.)

Species	Sex ^a	Age ^b	Body mass	Temperature	Bill	Tarsus	Tail	Wing
			\bar{x} +SD(n)max-min	\bar{x} +SD(n)max-min	\bar{x} +SD(n)max-min	\bar{x} +SD(n)max-min	\bar{x} +SD(n)max-min	\bar{x} +SD(n)max-min
Tyrannidae								
<i>Tityra semifasciata</i>	M	A	81.6	-	26	28	68	126
<i>Pipra fasciicauda</i>	B	B	15.8±0.5(7)15.2-16.5	41.1±1.0(6)39.8-42.5	9.7±0.5(7)9-10	16.7±1(7)15-18	29.2±1.9(7)27-33	64.6±1.7(7)62-67
<i>Manacus manacus</i>	B		15.8±1.2(4)14.5-17	40.8±1.9(4)38.1-42	9.2±0.5(4)9-10	20±1.8(4)18-22	32.5±2.1(4)30-35	52.2±2.1(4)50-54
<i>Machaeropterus pyrocephalus</i>	B		9.6±0.5(8)9-10.3	41.4±0.9(6)40-42.2	8.8±0.2(8)8-13	15.2±1(8)13-16	21.8±1.5(8)20-24	51.5±1.4(8)50-54
<i>Phaeomyias murina</i>	M		10.1-10.9	42.2	9	12-18	52-54	57-58
<i>Sublegatus modestus</i>	F		11	42.2	10	18	61	77
<i>Myiopagis viridicata</i>	F		9.3-9.8	42.2	8	16	52-51	81-80
<i>Elaenia flavogaster</i>	M	A	21.6-25	43.2-44.2	9-13	21-22	67-65	81-80
<i>Elaenia albiceps</i>	M		13.8±0.7(4)12.9-14.5	41.3±1.8(3)39.3-42.7	9.5±0.6(4)9-10	20.2±1.0(4)19-21	62.8±1.9(4)60-64	77.5±2.4(4)75-80
<i>Elaenia chiriquensis</i>	B		15.2-16.2	41.0-41.6	9-11	19-17	65-58	79-70
<i>Mionectes oleagineus</i>	F		9.3	40.7	11	17	44	58
<i>Leptopogon amaurocephalus</i>	M		12	-	12	16	55	68
<i>Hemitriccus striatocollis</i>	B		9.7±0.7(3)8.9-10.1	40.9±1.6(3)39.8-42	12±0(3)	19.3±1.2(3)18-20	40.3±4(3)36-44	50.7±2.5(3)48-53
<i>Todirostrum latirostre</i>			6.2-7.7	39.3	12	20-19	32	45-48
<i>Tolmomyias sulphurescens</i>	M		14	-	11	18	54	66
<i>Cnemotriccus fuscatus</i>	M		11.6	40.6	13	19	61	67
<i>Attila bolivianus</i>	F		39.5	42.3	23	27	75	97
<i>Casiomis rufa</i>	B		21.8±1.4(3)21-23.5	42.5±0.8(3)41.8-43.4	15.7±2.1(3)14-18	20.7±0.6(3)20-21	77.7±3.2(3)74-80	85.7±1.5(3)84-87
<i>Myiarchus swainsoni pelzelni</i>	B		24.9±2.7(6)22.5-29.2	43.1±0.6(5)42.2-43.8	17.2±1.6(6)16-20	21.8±1.2(6)20-23	82.7±4.6(6)77-88	92.7±5.2(6)85-98
<i>Myiarchus swainsoni swainsoni</i>	M		25.8	43	15	21	86	96
<i>Myiarchus tyrannulus</i>	B		25.7±1.3(4)24.5-27.5	42.0±0.9(4)40.8-43	18±2.2(4)15-20	22.2±2.2(4)19-24	83.2±4.6(4)79-89	92.5±4.9(4)87-98
<i>Myiarchus tuberculifer</i>			18.0	44.2	19	18	69	77
<i>Megarynchus pitangua</i>			61.8	43.2	31	22	84	118
Hirundinidae								
<i>Stelgidopteryx ruficollis</i>	F		11.5-14.5	38.2	7	11-12	50-42	103-97
Corvidae								
<i>Cyanocorax cyanomelas</i>	M		205	-	33	47	156	183
Troglodytidae								
<i>Campylorhynchus turdinus</i>		B	32.6±5.1(5)26.5-36.5	42.4±0.7(5)41.6-43.4	19.6±1.3(5)19-22	29.2±0.4(5)29-30	78.4±7.8(5)69-88	84.6±5.5(5)77-90
<i>Thryothorus genibarbis</i>	B		17.7±2.1(6)15.2-20.5	42.3±0.7(6)41.4-43.4	14.8±2.4(6)10-16	23.7±2.6(6)20-26	53.7±3.4(6)48-56	61.8±3.2(6)59-67
Turdidae								
<i>Turdus leucomelas</i>	B		62.2±5.3(3)57-67.5	40.6-43.4	19±0(3)	32.3±0.6(3)32-33	95.7±6.4(3)91-103	119±8.5(3)110-127
Vireonidae								
<i>Cyclarhis gujanensis</i>	F		31	42.8	16	26	56	79
<i>Vireo olivaceus</i>	B		12.7±0.7(3)12-13.3	41.6±1.2(3)40.5-42.8	11.7±1.2(3)11-13	18.3±0.6(3)18-19	47.3±2.3(3)46-50	68±3.5(3)66-72
Emberizidae								
<i>Cacicus cela</i>			69-96	43.5-42.2	29-33	33-34	85-106	127-157
<i>Gnorimopsar chopi</i>	B		65.9±4.8(10)59-75	42±1.0(9)40.2-43.4	21.6±1.0(10)20-23	31.4±0.7(10)30-32	81.6±4.9(10)74-87	116.4±6.8(10)106-127
<i>Icterus icterus</i>	B		46-57	42.8-43.6	20-24	30	90-97	102
<i>Basileuterus flaveolus</i>	B		10.5-14.9	42.4-43.6	12-11	24-25	61-60	61-63
<i>Basileuterus hypoleucus</i>	F		11.5	43	10	21	53	60
<i>Ramphocelus carbo</i>	B	B	24.5±3.4(7)19.6-29.1	42.8±0.5(7)42.2-43.4	14.7±2.3(6)13-19	21.2±0.4(6)21-22	81.5±1.4(6)80-83	82±1.4(6)80-84
<i>Trichothraupis penicillata</i>		A	27-28	43-41.9	13-15	24-25	80-76	90-85
<i>Tachyphonus rufus</i>	B		29.9±2.2(5)26.1-31.5	42.1±1.7(5)39.6-43.6	16.6±0.5(5)16-17	21.6±2.8(5)17-24	80±6.0(5)72-89	86.2±3.6(5)81-91
<i>Cissopis leveriana</i>	B	B	66.6±10.7(5)51.5-78	43.4±1.1(3)42.2-44.4	16±1.6(5)14-18	29.6±2.1(5)27-32	134±6.3(5)123-138	109±6.8(5)102-117
<i>Schistochlamys melanopsis</i>	B	B	28.9±2.1(7)26.5-32.2	43.4±1.4(6)40.8-44.8	13.9±0.7(7)13-15	23.1±1.1(7)22-25	73±3.3(7)67-77	81.3±1.8(7)79-84
<i>Saltator maximus</i>	B		40.5-47.7	42.2	18-19	25-24	84-90	95-106
<i>Saltator atricollis</i>	B		54.8±4.4(5)50.1-59.5	43±1(3)42-44	18±1.6(5)16-20	29.4±1.1(5)28-31	90.2±6.4(5)81-99	88.6±3.7(5)82-91
<i>Paroaria capitata</i>			22	-	-	-	-	-
<i>Volatinia jacarina</i>	B		10.3±0.5(3)10-10.8	41.5±1.3(3)40-42.6	9±1(3)8-10	17.3±0.6(3)17-18	46±1(3)45-47	50±2(3)48-52
<i>Tiaris fuliginosa</i>	F		14.3	-	10	16	42	55
<i>Oryzoborus angolensis</i>	F		9.7-14.5	42.6-43.4	11-12	16-17	51-52	60
<i>Coryphospingus cucullatus</i>	M		15.0	43.4	10	21	59	64
<i>Myospiza humeralis</i>		B	15.8±0.5(4)15-16.2	41.9±1.2(4)40.2-42.9	10.5±0.6(4)10-11	21±0(4)	45±1.4(4)43-46	55.8±1.3(4)54-57

^aM = male, F = female, B = both^bY = young, A = adult, B = both

TABLE 2. Molt* and brood patch (number with patch/total examined) for birds of Serra das Araras and region.

Species	Jan	Feb	Mar	Jun	Jul	Sep	Oct
<i>Crypturellus parvirostris</i>			aad 0/1	0/1			
<i>Anhinga anhinga</i>			caa 0/1				
<i>Columba speciosa</i>					aad 3/3 caa, cba		
<i>Columba talpacoti</i>							
<i>Uropelia campestris</i>	caa 0/1			bad 0/1	3/3	bba 1/1	
<i>Claravis pretiosa</i>		baa 7/8 2 bad	7aad 20/91 baa, 2bad, 7 bba 2 bbd, 16 caa, 3 cad cba, 6 cca, cda, daa				
<i>Leptotila verreauxi</i>		ccd 0/3	aad 0/1				
<i>Geotrygon montana</i>			0/1	daa 1/1	aad 2/2	cca 0/1	aad 0/1
<i>Crotophaga ani</i>			0/1				
<i>Tapera naevia</i>						0/1	
<i>Nyctidromus albicollis</i>							
<i>Caprimulgus rufus</i>			0/2				
<i>Brotogeris versicolurus</i>		0/1				aad 1/1 caa 0/1	
<i>Glaucis hirsuta</i>							
<i>Phaethornis pretrei</i>							
<i>Eupetomena macroura</i>				aad 1/1			
<i>Colibri serrirostris</i>					aad 1/1		
<i>Chlorostilbon aureoventris</i>				1/1	aad 1/1	add 1/1	
<i>Thalurea furcata</i>				1/1			
<i>Trogon curucui</i>		2dda 0/2					
<i>Momotus momota</i>					bad 0/1		
<i>Galbula ruficauda</i>				dda, daa 0/2			
<i>Bucco chacuru</i>					0/1	caa 1/1 baa 0/1	
<i>Monasa nigrifrons</i>						aad 0/2	
<i>Pteroglossus inscriptus</i>							
<i>Melanerpes cruentatus</i>	bbd 0/1			aad, bbd 2/2		1/1	
<i>Veniliornis passerinus</i>							
<i>Celeus lugubris</i>					add 1/1 0/1		
<i>Picumnus albosquamatus</i>					0/2		
<i>Sittasomus griseicapillus</i>	ddd 0/1	baa, bad 1/2				0/1	
<i>Xiphorhynchus guttatus</i>							
<i>Furnarius rufus</i>							1/1
<i>Taraba major</i>	1/1						
<i>Pyriglena leuconota</i>				baa 2/2			
<i>Formicivora grisea</i>	aad 1/1			baa 1/2			
<i>Formicivora rufa</i>						1/1	
<i>Tityra semifasciata</i>		1/2		1/3	1/2	aad 1/1	1/1
<i>Pipra fasciicauda</i>	1/1			1/1	1/1	1/1	2/2
<i>Manacus manacus</i>						2/2	
<i>Machaeropterus pyrocephalus</i>	0/2	1/1	0/1			1/2	
<i>Phaeomyias murina</i>						aad 1/1	2/2
<i>Sublegatus modestus</i>							
<i>Myiopagis viridicata</i>							
<i>Elaenia flavogaster</i>	cca 0/1			0/1		1/4	
<i>Elaenia albiceps</i>						aad 0/2	
<i>Elaenia chiriquensis</i>							1/1
<i>Mionectes oleagineus</i>							aad 1/1
<i>Leptopogon amaurocephalus</i>							
<i>Hemitriccus striaticollis</i>	bad 1/1	add 1/2 0/1				0/1	
<i>Todirostrum latirostre</i>					1/1		dad 1/1
<i>Tolmomyias sulphurescens</i>							
<i>Cnemotriccus fuscatus</i>		ada 1/1					aad 1/1
<i>Attila bolivianus</i>					baa 0/1	1/1	1/1
<i>Casiornis rufa</i>						baa, caa 5/6	1/1
<i>Myiarchus swainsoni</i>				aad 1/3			1/1
<i>Myiarchus tyrannulus</i>					1/1		
<i>Myiarchus tuberculifer</i>				1/1			
<i>Megarynchus pitangua</i>						0/1	
<i>Stelgidopteryx ruficollis</i>			aad 0/1			cca 1/1	
<i>Cyanocorax cyanomelas</i>		dda 0/4	0/1				0/1
<i>Campylorhynchus turdinus</i>		ada 0/2		ada 0/3			
<i>Thryothorus genibarbis</i>		cad 0/1			2/2		
<i>Turdus leucomelas</i>		dad 1/2					0/1
<i>Cyclarhis gujanensis</i>						0/2 0/1	
<i>Vireo olivaceus</i>					0/4		
<i>Cacicus cela</i>	dda 1/1		aad daa, 2 ddd, 0/4				
<i>Gnorimopsar chopi</i>		2 dda 0/2 1/3					
<i>Icterus icterus</i>					baa 0/2 0/1		
<i>Basileuterus flaveolus</i>					aad 1/7		
<i>Basileuterus hypoleucus</i>					baa 0/2		baa 0/1
<i>Ramphocelus carbo</i>					baa, bad 1/4		
<i>Trichothraupis penicillata</i>						daa 0/2	
<i>Tachyphonus rufus</i>		2aad 0/3				2bba, caa, cca, 1/4	
<i>Cissopis leveriana</i>				baa, bba 0/2			
<i>Schistochlamys melanopus</i>	cbd 0/1				aad 0/2		
<i>Saltator maximus</i>				caa 0/1			cad 1/1
<i>Saltator atricollis</i>				dda 0/1			
<i>Volatinia jacarina</i>	0/1				1/3		
<i>Tiaris lulinosa</i>			2 aca 1/2				
<i>Oryzoborus angolensis</i>				0/1			
<i>Coryphospingus cucullatus</i>							
<i>Myospiza humeralis</i>	3 aad, caa 0/4						
Total examined	5/17	14/40	21/107	12/31	20/49	21/49	13/17

*no molt or wear; b - light wear; c - heavy wear; d - molt; tail-wing-body in that order, preceded by number if more than one individual; "aaa" individuals omitted

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