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# Wing Length and Mass Measurements During Spring and Fall Migration at Inglewood Bird Observatory, Alberta, 1995-2020

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## ABSTRACT

*At the Inglewood Bird Observatory (IBO), in Calgary, Alberta, we banded 40,033 birds of 119 species: 7,565 during spring (1995-2020) and 32,468 during fall (2002-2020) migration. We present summary statistics for wing length and body mass for 68 species or subspecies. When sample sizes permitted, we analyzed both metrics by age and sex class. Data are presented in three ways: (1) the interquartile range (IQR: the range of the middle 50% of the data), (2) the range of all IBO data for that species, and (3) plus-or-minus two standard deviations (SD) of the mean, which is intended to capture the middle 95% of wing lengths. For most species our wing length ranges are similar to those of Pyle (1997, 2008) and Mulvihill et al. (2004), while mass ranges are more variable compared to Mulvihill et al. (2004) and Dunning (2008). We found that in 42% of the species or subspecies that we analyzed, mean wing lengths were significantly different for adults than for juveniles: 38% were longer while 4% were shorter. Mean male wing length was significantly greater than for females for 90% of our species: 83% of these were longer while 7% were shorter. Sex was a bigger predictor of body mass than age: in 54% of the species males were significantly heavier than females, while in 32% of the species adults were significantly heavier than juveniles. We suggest that whenever possible, identification guides and studies should differentiate between adult and juvenile wing length and body mass ranges, as well as between the sexes.*

## INTRODUCTION

Morphometric data from long-term banding studies are frequently used to determine age and sex-related differences (e.g., Clark 1979), geographic variation, migratory patterns (e.g., Kissner et al. 2003), and migratory distance (Wiedenfeld 1991, Rushing et al. 2014) in birds. The evolution of longer or more pointed wings in species and/or populations that migrate greater distances may be adaptations for more efficient flight (Winkler and Leisler 1992, Newton 2008). Wing length is highly sexually dimorphic in some species, but this may be confounded by age. Body mass is a reflection of the overall size of an organism (Dunning 2008), but can vary, sometimes widely between sexes and seasonally, and is commonly used to calculate the “condition” of a bird (Mulvihill et al. 2004).

Our objective here is to report morphometric data (wing length and body mass) for birds banded during spring and fall migration at the Inglewood Bird Observatory (IBO), a long-term monitoring station in Calgary, Alberta. Whenever possible, we examined our data with respect to age and sex

## METHODS

**Study site.** The IBO is operated by the Calgary Bird Banding Society within the Inglewood Bird Sanctuary, a 36-ha (89 ac) area of the Federal Migratory Bird Sanctuary (gazetted in 1929) along the Bow River within the city of Calgary, Alberta. Since 1970, this core area of mostly natural habitat on the west side of the river has been owned and

managed by the City of Calgary. The sanctuary is roughly triangular in shape, bounded on two sides by the Bow River, and on the third side by a multi-use pathway. IBO operates in a reserve area (approximately 4 ha or 9 ac) at the southern end (51° 01' N, 114° 01' W), closed to the public, and enclosed by chain-link fencing except on the river side. The general habitat is mature riverine balsam poplar (*Populus balsamifera*) forest with a well-developed shrub understory along the banks of the river. Shrubs include Saskatoon (*Amelanchier alnifolia*), wolf willow (*Elaeagnus commutata*), willow (*Salix* sp.), buffaloberry (*Shepherdia canadensis*), snowberry (*Symphoricarpos* sp.), and the non-native cotoneaster (*Cotoneaster* sp.). Because of its location on the banks of the river, IBO is subject to fluctuating water levels due to upstream dam releases and, in rare circumstances, uncontrolled flooding.

**Capture and banding.** Fall migration monitoring was initiated in 1995, and spring migration monitoring was allowed beginning in 2002. The standardized operating dates are 1 May to 6 June and 28 July to 6 October. Monitoring is conducted each day within those periods, unless inclement weather or unavailability of a Bander-in-Charge precludes operation. Birds are captured passively using 12 mist nets (12-m long x 2.6-m high; 30-mm mesh), operated in permanent net lanes for six hours each day, beginning at sunrise. During spring and fall 2012, we had significantly reduced hours due to high water levels. Catastrophic flooding in June 2013 resulted in no fall banding, and spring banding in 2014 was significantly delayed until residual safety concerns at the site were resolved. Activities in fall 2014 were shut down early because of heavy snowfall which resulted in significant tree damage and loss of access to the site, again due to safety concerns.

Except for hummingbirds (released unbanded), all birds captured were identified to species, age, and sex and, if unbanded, were banded with a uniquely-numbered USGS aluminum leg band. Each bird captured was aged and sexed using criteria in Pyle (1997, 2008). Unflattened wing chord was recorded to the nearest mm, while body weight (mass) was recorded to the nearest 0.1 g.

**Data analyses.** The data was cleaned by deleting all records that either did not have a wing chord, mass or sex for their respective analyses, or the measurement was unrealistic (e.g., 30 mm wing length when all others are in the 70 mm range), or the bird was local, as the wing feathers may not be fully grown yet. Individuals which were sexed by wing length were also removed from analyses by sex. As numerous studies have shown that juveniles (HY = hatch year) and subadults (SY = second year) average shorter wings than adults (e.g., Alatalo et al. 1984, Furness and Furness 2016), we analysed our data by age class when sample size permitted. For age analyses we deleted after hatch year (AHY = after hatch year) birds from spring captures, as SY birds would still have juvenile remiges, but not from fall captures unless active molt was evident as these birds have completed their post-breeding molt before fall migration monitoring began. In addition, some species (e.g., tyrant flycatchers) molt on the wintering grounds, so it was necessary to remove AHY individuals from fall data in these cases as well (Pyle 1997). AHY and after second year (ASY) were considered adult, and HY or SY were considered juvenile. As per Pyle (1997), we only included species for which there were at least 30 individuals for undifferentiated wing length (i.e., not segregated by age or sex), although when comparing age or sex classes, or mass by sex, if one class had at least 30 individuals, we included the other class, as long as it had at least 10 individuals. This excludes species or classes for which small sample sizes would provide a less meaningful distribution of data.

Wing length and mass data are presented in three ways: 1) the interquartile range (IQR: the range of the middle 50% of the data), 2) the range of all IBO data for that species, and 3) plus-or-minus two standard deviations (SD) of the mean, which is intended to capture 95% of the variation in wing lengths (Pyle 1997, French et al. 2016). These ranges are then compared with those in Pyle (1997, 2008) and Mulvihill et al. (2004) for wing length, and with Mulvihill et al. (2004) and Dunning (2008) for mass. Mean wing length and mass, by age and by sex where sample sizes permitted, were compared using t-tests assuming unequal

variances (Fowler and Cohen 1996). All results were considered significant if  $P < 0.05$ .

Common and scientific names follow the 61<sup>st</sup> American Ornithological Union (AOU) supplement (Chesser et al. 2020). Whenever possible we compare our data to the subspecies or geographic groupings as per range descriptions in Pyle (1997, 2008); when more than one subspecies could be represented in the data, we combine the appropriate measurements given in Pyle. Yellow-rumped Warbler (see Table 1 for all scientific names) includes both Myrtle and Audubon's warblers as well as undifferentiated individuals, but we also compare the two subspecies separately. Similarly, Traill's Flycatcher includes both Alder and Willow flycatchers, if we were unable to differentiate them using measurement criteria in Pyle (1997). Other races were not separated by plumage characteristics at the time of banding.

## RESULTS

During the 26 years of this study we banded 40,033 birds of 119 species: 7,565 during spring and 32,468 during fall. We present summary statistics for wing length and body mass (Table 1) for 68 species or subspecies which met our sample size criteria.

Adult wing length was longer than juvenile wing length for 46 of 55 (84%) species or subspecies for which we had sufficient data for comparison (Table 2), significantly so for 21: Downy Woodpecker, Eastern Kingbird, Western Wood-Pewee, Least Flycatcher, Red-breasted Nuthatch, House Wren, Swainson's Thrush, American Robin, Gray Catbird, Cedar Waxwing, Pine Siskin, White-crowned Sparrow, Gambel's White-crowned Sparrow, Baltimore Oriole, Common Grackle, Orange-crowned Warbler, Common Yellowthroat, Yellow Warbler, Yellow-rumped Warbler, Myrtle Warbler, and Wilson's Warbler. Of the seven species for which wing length was longer in juveniles than adults, only Ovenbird and Tennessee Warbler were significantly longer.

Male wing length was longer than female wing length for 28 of 30 (93%) species or subspecies (Table 2), significantly so for 25: Eastern Kingbird, Tree Swallow, Red-breasted Nuthatch White-

breasted Nuthatch, Ruby-crowned Kinglet, Swainson's Thrush, American Robin, Cedar Waxwing, American Goldfinch, Clay-colored Sparrow, Dark-eyed Junco, Slate-colored Junco, Baltimore Oriole, Red-winged Blackbird (only juveniles compared), Brown-headed Cowbird, Tennessee Warbler, Orange-crowned Warbler, Common Yellowthroat, American Redstart, Yellow Warbler, Blackpoll Warbler, Yellow-rumped Warbler, Myrtle Warbler, Wilson's Warbler, and Western Tanager. Only adult female Belted Kingfisher and juvenile female Downy Woodpecker had significantly longer wings compared to males within the same age class.

Adult body mass was greater than juvenile body mass for 41 of the 49 (84%) species or subspecies for which we had sufficient data for the comparison (Table 3), significantly so for 15: Downy Woodpecker, Traill's Flycatcher, House Wren, Ruby-crowned Kinglet, American Robin, Cedar Waxwing, Clay-colored Sparrow, White-throated Sparrow, Song Sparrow, Tennessee Warbler, Orange-crowned Warbler, Yellow Warbler, Yellow-rumped Warbler, Myrtle Warbler, and Wilson's Warbler. Of the eight species for which body mass was greater in juveniles than adults, only Eastern Kingbird was significantly greater.

Male body mass was greater than female body mass for 25 of the 31 (81%) species or subspecies for which we had sufficient data for the comparison (Table 3), significantly so for 17: Downy Woodpecker, Tree Swallow, Ruby-crowned Kinglet, Clay-colored Sparrow, Dark-eyed Junco, Slate-colored Junco, Baltimore Oriole, Red-winged Blackbird (juveniles), Brown-headed Cowbird, Orange-crowned Warbler, Common Yellowthroat, American Redstart, Yellow Warbler, Blackpoll Warbler, Yellow-rumped Warbler, Myrtle Warbler, and Wilson's Warbler. Of the six species for which female body mass exceeded male body mass, three were significant: Sharp-shinned Hawk, American Robin, and Cedar Waxwing.

## DISCUSSION

We had sufficient sample sizes to analyze wing length and mass for 49% and 45%, respectively, of the species that we captured at IBO. Most of the

captures at IBO occur during fall migration (81%). During spring and fall migration there is seldom breeding evidence to use for sexing individuals, but we were able to analyze wing length and body mass by sex for 44% (30 of 68) and 46% (31 of 68), respectively, of our species or subspecies, primarily using dimorphic plumage, although sample sizes were sometimes small.

For most species our wing length ranges are similar to those of Pyle (1997, 2008) and Mulvihill et al. (2004). There were a few species (e.g., Yellow-rumped Warbler) where our wing length range was shorter ( $IBO \pm 2 SD = 66-78$ ; Pyle 1997 = 65-83), which may be the result of capturing significantly more juveniles ( $N=5,389$ ) than adults ( $N=1,423$ ), the former which had shorter wings, or because of the more diverse geographical coverage of Pyle compared to our catchment area (Hobson et al. 2015, Kardynal et al. 2018).

With the exception of a few species, identification guides such as Pyle (2007) combine all age classes when providing wing length ranges (P. Pyle, pers. comm.). We found that 42% (23 of 55) of our species or subspecies, mean wing lengths were significantly different for adults than for juveniles: 38% were longer while 4% were shorter. Mean male wing length was significantly different than for females for 90% (27 of 30) of our species: 83% were longer while 7% were shorter. A couple of interesting examples from our data: (1) adult female Belted Kingfisher had significantly longer wings than adult males, but there was no difference between juvenile females and males, and (2) there was no difference between adult female and male Downy Woodpeckers, but juvenile females had longer wings than juvenile males. We suggest that whenever possible, detailed identification guides should differentiate between adult and juvenile wing length ranges, as well as between the sexes.

Sex was a bigger predictor of body mass than age: in 54% of the species males were significantly heavier than females, while 32% of the species had significantly heavier adults than juveniles. Overall, there was more variability between our body mass data and those reported in Dunning (2008) and Mulvihill et al. (2004). This may

be predominantly because of geographical catchment area differences. Our catchment area was northwestern Canada and Alaska (Hobson et al. 2015, Kardynal et al. 2018), whereas Mulvihill et al. (2004) captured birds from eastern North America, and while Dunning (2008) reported from across the continent, many of the studies referenced were from geographically specific populations that might have wildly varying weights. Both of these studies also include breeding season data, which would include heavier gravid females, and individuals that would not be subject to the rigors of migration at the time of capture.

In our study, both wing length and body mass were greater for males than females. Sexual size dimorphism in birds has many influences, including geographic region, clutch size, nest characteristics, competition for prey, sperm competition and migratory status, but some of the strongest evidence is for different social mating systems, particularly between monogamous and polygynous taxa (see review in Dunn et al. 2001).

As with any long-term study there were changes in personnel over the years, and we cannot rule out possible inter-observer variability in measurements. Fortunately, both wing chord and mass measurements are relatively easy to replicate accurately such that any variance due to observers should be small. Nevertheless, some caution should be exercised in comparing our data to other studies, particularly for species with lower sample sizes (Barrett et al. 1989).

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**Table 1. Wing length (mm) and body mass (g) statistics by age and sex class for 68 species or subspecies banded at IBO, 1995-2020, compared to ranges in Pyle (1997, 2008), Mulvihill et al. (2004) and Dunning (2008), as appropriate. "IQR" = the interquartile range, "SD" = the standard deviation, "All" = all age and/or sex classes together, "Juv" = juvenile, "F" = female, and "M" = male.**

	Spotted Sandpiper ( <i>Actitis macularia</i> )						Solitary Sandpiper ( <i>Tringa solitaria</i> )					
	Wing length			Body Mass			Wing length			Body Mass		
	All	Adult	Juv	All	Adult	Juv	All	Adult	Juv	All	Adult	Juv
No. of observations	101	20	50	100	20	50	145	16	98	132	13	93
Mode	104	99	99	34.2	34.2		128	123	127	32.4	45.1	39.2
Median	103	103	103	39.2	39.2	38.5	127	127	127	38.9	46.6	45.1
Mean	103	102	103	40	40.0	38.4	128	127	128	40.0	49.2	46.5
SD	4.5	4.7	4.8	6.2	6.2	6.6	5.7	6.3	5.5	6.5	7.0	6.1
IQR	100-106	99-106	99-106	35.5-43.1	34.2-41.0	35.3-43.0	124-131	124-130	124-131	42.6-50.0	39.22-47.5	42.4-45.5
IBO Mean ± 2SD	94-112	93-111	93-113	27.6-52.4	25.2-51.6	27.1-52.9	117-139	114-140	117-139	34.6-59.8	35.2-63.2	34.3-58.7
IBO Range	92-113	92-109	93-113	23.7-59.4	23.7-54.8	31.6-59.4	107-144	110-137	107-144	36.4-69.3	42.0-64.6	36.4-69.3
Pyle (1997)	95-110						121-147					
Mulvihill et al. (2004)				28.5-53.6	32.8-53.6					37.4-77.5	41.9-77.5	37.4-74.8
Dunning (2008)				29.4-59.8						31.1-65.1		

  

	Sharp-shinned Hawk ( <i>Accipiter striatus velox</i> )					
	Wing length			Body Mass		
	All	Adult	Juv	All	Female	Male
No. of observations	60	10	47	51	18	33
Mode	175		175	91.8	-	91.8
Median	177	187	175	98.5	163.4	93.7
Mean	184	189	182	118.09	158.9	95.8
SD	16.2	16.0	15.5	33.63	22.0	7.8
IQR	172-201	175-202	172-197	93.0-155.8	55.1-167.1	91.8-98.5
IBO Mean ± 2SD	152-216	157-221	151-213	50.8-185.4	14.9-202.9	80.2-111.4
IBO Range	161-215	170-213	161-215	80.0-180.0	80.0-180.0	83.0-113.3
Pyle (1997)	160-214					
Mulvihill et al. (2004)				88.3-195.7	02.5-195.7	88.3-120.5
Dunning (2008)				82.0-208.0		

  

	Belted Kingfisher ( <i>Megasceryle alcyon</i> )													
	Wing length							Body mass						
	All	Adult	Juv	Female	Male	Juv F	Juv M	All	Adult	Juv	Female	Male	Juv F	Juv M
No. of observations	178	28	146	92	69	75	56	152	21	128	79	59	68	47
Mode	162	163	162	162	157	162	157	136.9		136.9	141.8	136.9	141.8	136.9
Median	160	159	160	160	159	159	160	144.1	142.8	144.8	146.5	143.4	146.2	146.7
Mean	159	159	159	160	159	159	159	146.9	147.3	146.8	147.9	146.6	147.1	148.2
SD	4.7	4.7	4.7	4.5	4.9	4.5	5.0	15.5	18.8	15.2	15.6	15.3	14.7	15.9
IQR	157-162	159-163	157-162	157-162	157-162	157-162	157-163	136.2-154.9	131.1-155.6	136.9-154.5	137.1-155.9	134.1-154.0	138.4-154.8	135.6-155.4
IBO Mean ± 2SD	150-168	150-168	150-168	151-169	149-169	150-168	149-169	115.9-177.9	105.7-184.9	116.4-177.2	116.7-179.1	116.0-177.2	117.7-176.5	116.4-180.0
IBO Range	141-170	149-170	141-170	142-170	141-170	142-166	141-170	115.5-185.6	122.5-181.6	115.5-185.6	115.5-184.5	122.1-185.6	115.5-184.5	63.5-122.1
Pyle (1997)	145-171			149-171	145-169									
Mulvihill et al. (2004)								115.7-186.6	132.8-186.6	115.7-183.1	122.4-176.6	115.7-186.6	122.4-175.6	115.7-183.1
Dunning (2008)								125.0-215.0						

  

	Downy Woodpecker ( <i>Dryobates pubescens medianus</i> )*									
	Wing length									
	All	Adult	Juv	Female	Male	Adult F	Adult M	Juv F	Juv M	
No. of observations	269	44	220	138	97	26	18	111	75	
Mode	96	96	96	98	96	96	95	98	96	
Median	96	97	96	96	96	97	97	96	96	
Mean	96	97	96	96	96	97	97	96	95	
SD	3.2	2.6	3.3	3.4	2.9	2.6	2.6	3.6	2.9	
IQR	94-98	95-98	94-98	94-99	94-97	96-98	95-98	94-99	93-97	
IBO Mean ± 2SD	90-102	92-102	89-103	89-103	90-102	92-102	92-102	89-103	89-101	
IBO Range	83-108	92-103	83-108	83-108	88-104	93-103	92-101	83-108	88-104	
Pyle (1997)	86-101			86-101	86-101					
Mulvihill et al. (2004)										
Dunning (2008)										

\* subspecies chosen by wing length

	Downy Woodpecker ( <i>Dryobates pubescens medianus</i> )*									
	Body mass									
	All	Adult	Juv	Female	Male	Adult F	Adult M	Juv F	Juv M	
No. of observations	241	42	194	123	87	25	17	97	66	
Mode	27.0	27.4	27.0	27	27.2	24.9	27.1	26.4	27	
Median	26.8	27.3	26.6	26.5	27.1	27.0	28.4	26.4	26.9	
Mean	26.8	27.4	26.6	26.6	27.1	27.1	28.2	26.4	26.9	
SD	1.7	2.1	2.5	3.3	2.7	2.6	1.3	2.4	2.5	
IQR	25.7-27.6	25.5-27.4	25.7-27.5	25.5-27.4	26.2-27.9	25.5-27.4	27.2-28.9	25.5-27.3	26.0-27.7	
IBO Mean ± 2SD	23.3-30.3	23.2-31.6	21.6-31.6	20.0-33.2	21.7-32.5	22.0-32.2	25.7-30.7	21.6-31.2	21.9-31.9	
IBO Range	22.0-37.9	13.2-24.7	22.0-32.7	10.7-22.0	22.0-32.7	24.7-37.9	25.7-30.0	22.7-31.3	22.0-32.7	
Pyle (1997)										
Mulvihill et al. (2004)	20.8-32.0	22.2-31.9	21.7-32.0	21.7-32.0	23.2-31.8	22.2-28.5	26.0-31.5	21.7-32.0	23.2-31.8	
Dunning (2008)	22.2-29.1					22.2-28.5	26.0-29.1			

\* subspecies chosen by wing length

	Northern Flicker ( <i>Colaptes auratus collaris/luteus</i> ), plus intergrades									
	Wing length									
	All	Adult	Juv	Female	Male	Adult F	Adult M	Juv F	Juv M	
No. of observations	122	30	85	46	64	13	14	30	47	
Mode	168	153	164	161	168	158	164	161	165	
Median	163	163	163	162	165	162	165	163	165	
Mean	162	161	162	162	163	162	162	163	163	
SD	6.5	7.4	6.1	5.7	6.7	7.3	7.2	5.3	6.6	
IQR	156-167	157-166	157-167	159-166	157-168	158-166	157-167	160-166	157-168	
IBO Mean ± 2SD	149-175	146-176	150-174	151-173	150-176	147-177	148-176	152-174	150-176	
IBO Range	145-174	146-174	145-173	146-174	145-174	146-174	151-174	152-172	145-173	
Pyle (1997)	148-174			148-174	148-174					
Mulvihill et al. (2004)										
Dunning (2008)										

	Northern Flicker ( <i>Colaptes auratus collaris/luteus</i> ), plus intergrades									
	Body mass									
	All	Adult	Juv	Female	Male	Adult F	Adult M	Juv F	Juv M	
No. of observations	116	27	83	46	59	13	13	31	43	
Mode	123.0	133.4	141.1	133.4	147.2	133.4	147.2	138.8	142.5	
Median	144.2	143.2	144.3	141.2	146.5	141.3	146.6	141.1	146.5	
Mean	143.6	143.4	144.2	142.9	144.8	143.4	144.0	142.8	145.5	
SD	13.6	14.9	13.1	13.0	12.9	12.9	17.5	13.3	11.4	
IQR	135.0-152.6	134.5-152.2	136.5-152.8	133.4-152.4	38.6-152.1	33.4-152.5	139.5-151.8	134.8-150.6	140.9-152.2	
IBO Mean ± 2SD	116.4-170.8	113.6-173.2	118.0-170.4	116.9-168.9	19.0-170.6	17.6-169.2	109.0-179.0	116.2-169.4	122.7-168.3	
IBO Range	108.8-176.5	113.9-176.5	108.8-171.7	115.3-170.0	13.9-176.5	24.6-166.7	113.9-176.5	115.3-170.0	120.9-171.7	
Pyle (1997)										
Mulvihill et al. (2004)	103.8-162.6	104.3-162.6	103.8-157.6	103.8-160.3	05.3-162.6	04.3-156.7	105.9-162.6	103.8-156.8	114.0-157.6	
Dunning (2008)	121.0-167.0					104.0-137	106.0-143.0			

\*Given as YSFL

	Eastern Kingbird ( <i>Tyrannus tyrannus</i> )													
	Wing length							Body mass						
	All	Adult	Juv	Female	Male	Adult F	Adult M	All	Adult	Juv	Female	Male	Adult F	Adult M
No. of observations	218	83	122	35	42	28	30	210	78	119	50	45	32	38
Mode	112	118	112	111	111	111	118	40.2	38.0	40.2	40.1	41.0	39.3	39.1
Median	114	116	112	114	115	115	118	39.8	39.1	40.1	39.3	39.5	39.0	39.1
Mean	114	116	112	114	114	114	119	39.6	39.1	40.0	39.0	39.3	38.6	39.1
SD	5.0	4.1	4.6	3.2	3.4	3.4	3.3	2.6	2.4	2.7	2.3	2.4	2.6	2.5
IQR	111-117	114-120	109-115	111-116	117-121	111-116	117-121	38.2-41.1	37.6-40.5	38.5-41.4	37.8-40.3	38.0-41.0	37.5-40.2	37.2-40.3
IBO Mean ± 2SD	104-124	108-124	103-121	108-120	107-121	107-121	112-126	34.5-44.7	34.3-43.9	34.6-45.4	34.4-43.6	34.5-44.1	33.4-43.8	34.1-44.1
IBO Range	98-125	108-125	98-120	108-121	106-125	108-121	111-125	28.5-50.1	28.5-45.2	28.8-50.1	28.5-42.6	32.5-45.2	28.5-42.6	32.5-45.2
Pyle (1997)	106-128			106-120	113-128									
Mulvihill et al. (2004)								33.0-44.4	36.9-44.4	38.0-42.7	36.9-39.7	39.6-43.0	36.9-39.7	
Dunning (2008)								33.0-54.7					33.0-45.8	33.3-54.7

	OSFL*		Western Wood-Pewee ( <i>Contopus sordidulus</i> )						Traill's Flycatcher ( <i>Empidonax alorum/trailii</i> ), plus indeterminates							
	Wing length		Body mass		Wing length			Body mass			Wing length			Body mass		
	All	All	All	Adult	Juv	All	Adult	Juv	All	Adult	Juv	All	Adult	Juv		
No. of observations	40	37	301	16	171	286	83	166	1188	10	883	1119	159	839		
Mode	105	31.6	80	87	80	13.0	13.0	12.7	69	69	73	69	13.0	12.3		
Median	105	32.2	82	87	81	13.0	13.1	13.0	70	70	73	70	13.2	12.7		
Mean	104	32.6	82	86	81	13.0	13.3	13.0	70	70	73	70	13.3	12.8		
SD	3.8	2.33	3.3	2.4	2.8	1.3	1.6	1.1	3.3	3.3	4.3	3.0	1.4	1.1		
IQR	102-106	30.9-34.0	80-85	85-87	79-83	12.4-13.8	12.6-14.0	12.3-13.6	68-72	70-75	68-72	12.2-13.6	12.5-14.1	12.0-13.4		
IBO Mean ± 2SD	96-112	27.9-37.3	75-89	81-91	75-87	10.5-15.5	10.1-16.5	10.8-15.2	63-77	64-82	64-76	10.5-15.3	10.5-16.1	10.6-15.0		
IBO Range	97-115	29.2-38.8	75-90	81-90	75-89	8.0-23.3	8.0-23.3	9.5-18.1	57-90	64-78	60-82	7.0-21.8	9.3-21.8	7.0-17.8		
Pyle (1997)	96-112		77-92						61-77							
Mulvihill et al. (2004)		25.8-41.2										10.5-17.6	10.5-16.4	10.5-17.6		
Dunning (2008)		26.7-42.2				11.0-14.9							10.0-16.4			

\* Olive-sided Flycatcher (*Contopus cooperi cooperi*)

	Alder Flycatcher*		Willow Flycatcher^		Least Flycatcher ( <i>Empidonax minimus</i> )					
	Wing length		Body mass		Wing length			Body mass		
	All	All	All	All	All	Adult	Juv	All	Adult	Juv
No. of observations	205	202	24	24	728	28	572	681	54	566
Mode	73	12.3	65	11.4	63	63	63	10.5	10.3	10.2
Median	72	13.2	65	11.5	62	64	62	10.5	10.5	10.5
Mean	71	13.2	66	11.7	62	64	62	10.5	10.6	10.5
SD	2.6	1.22	5.0	1.27	2.7	1.9	2.6	0.88	0.9	0.9
IQR	70-73	12.4-14.1	62-68	10.9-12.4	60-64	63-65	60-64	9.9-11.0	10.0-11.2	9.9-11.0
IBO Mean ± 2SD	66-76	10.8-18.5	56-76	9.2-14.2	57-67	60-68	57-67	8.7-12.3	8.8-12.4	8.7-12.3
IBO Range	60-78	9.4-18.5	57-79	9.3-14.0	56-70	62-68	56-68	6.0-14.9	9.0-12.5	6.0-13.7
Pyle (1997)	66-77		61-72		56-67					
Mulvihill et al. (2004)								7.8-12.6	8.0-11.9	8.0-12.6
Dunning (2008)		10.0-14.5		11.3-16.4				7.8-12.2		

\* *Empidonax alorum* ^ *Empidonax trailii* (western form)

	Warbling Vireo ( <i>Vireo gilvus</i> )						Red-eyed Vireo ( <i>Vireo olivaceus</i> )						BBMA*	
	Wing length			Body mass			Wing length			Body mass			Wing length	Body mass
	All	Adult	Juv	All	Adult	Juv	All	Adult	Juv	All	Adult	Juv	All	All
No. of observations	353	119	219	338	81	246	63	15	48	59	15	44	43	27
Mode	69	70	68	14.5	13.7	13.9	79	78	79	17.6	18.0	17.6	198	
Median	68	69	68	13.7	13.8	13.6	78	78	78	18.0	18.1	18.0	200	189.7
Mean	68	68	68	13.6	13.9	13.5	78	77	78	18.2	18.3	18.2	201	192.8
SD	2.7	2.6	2.8	1.49	1.6	1.4	2.3	2.6	2.2	1.3	1.4	1.3	7.6	19.9
IQR	66-70	67-70	66-70	12.4-14.5	12.8-14.7	12.3-14.5	76-79	76-78	76-79	17.5-18.9	17.4-19.0	17.5-18.8	195-207	182.3-206.3
IBO Mean ± 2SD	63-73	63-73	62-74	10.6-16.6	10.7-17.1	10.7-16.3	73-83	72-82	74-82	15.6-20.8	15.5-21.1	15.6-20.8	186-216	153.1-232.5
IBO Range	61-77	61-74	62-77	9.9-19.2	10.5-19.2	10.3-17.4	72-85	72-83	73-85	15.0-21.8	16.5-21.8	15.0-21.1	186-217	147.7-226.7
Pyle (1997)	62-75						72-85						177-216	
Mulvihill et al. (2004)				11.3-17.3	13.6-15.7	11.3-17.3				12.6-30.5	14.0-24.2	12.6-30.5		
Dunning (2008)				9.9-18.4						14.0-21.0				135.0-209.0

\* Black-billed Magpie (*Pica hudsonia*)

	Tree Swallow ( <i>Tachycineta bicolor</i> )						NRWS^		Black-capped Chickadee ( <i>Parus atricapillus septentrionalis</i> )					
	Wing length			Body mass			Wing length	Body mass	Wing length			Body mass		
	All	Female	Male	All	Female	Male	All	All	All	Adult	Juv	All	Adult	Juv
No. of observations	429	82	201	405	79	194	93	82	412	63	324	391	60	310
Mode	117	110	120	20.6	19.3	21.2	110	13.8	66	65	66	11.5	11.7	11.5
Median	116	113	118	20.2	19.5	20.7	108	15.2	65	66	65	11.3	11.4	11.3
Mean	116	113	118	20.2	19.6	20.7	108	15.4	65	66	65	11.3	11.3	11.2
SD	5.22	3.73	3.75	1.78	1.51	1.44	4.3	1.2	2.3	2.7	2.2	0.7	0.8	0.7
IQR	113-119	110-115	115-120	19.2-21.3	18.6-20.4	19.8-21.7	105-111	14.6-16.1	64-67	64-67	64-67	10.7-11.8	10.8-11.7	10.7-11.8
IBO Mean ± 2SD	106-126	106-120	111-126	16.6-23.8	16.6-22.6	17.8-23.6	99-117	13.0-17.8	60-70	61-71	61-69	9.8-12.8	9.7-12.9	9.8-12.6
IBO Range	87-135	97-121	110-135	11.4-25.5	16.7-23.9	17.5-25.1	100-118	13.0-21.1	56-73	57-73	56-72	9.1-15.1	9.6-12.9	9.1-15.1
Pyle (1997)	106-125	106-122	110-125				95-118		62-73					
Mulvihill et al. (2004)				16.7-24.5	17.0-23.5	16.7-24.5		12.5-19.0				8.6-13.4	9.4-12.9	8.7-13.4
Dunning (2008)				17.0-25.5				10.3-18.3				8.6-12.9		

^ Northern Rough-winged Swallow (*Stelgidopteryx serripennis*)



	Red-breasted Nuthatch ( <i>Sitta canadensis</i> )									
	Wing length					Body Mass				
	All	Adult	Juv	Female	Male	All	Adult	Juv	Female	Male
No. of observations	96	31	52	34	54	88	29	48	30	50
Mode	65	69	65	65	69	10.8	10.0	10.8	10.8	10.4
Median	67	68	66	65	68	10.7	10.6	10.7	10.7	10.8
Mean	67	68	66	65	68	10.8	10.8	10.7	10.6	10.9
SD	2.21	2.36	2.07	1.89	2.03	0.9	1.0	0.8	0.9	0.9
IQR	65-68	66-69	65-68	64-66	66-69	10.3-11.2	10.1-11.2	10.3-11.0	10.0-10.9	10.4-11.3
IBO Mean $\pm$ 2SD	63-71	63-73	62-70	61-69	64-72	9.1-14.4	8.8-12.8	9.1-12.3	8.8-12.4	9.1-12.7
IBO Range	62-72	62-72	62-70	62-69	62-72	9.2-14.4	9.2-14.4	9.2-12.8	9.2-12.8	9.3-14.4
Pyle (1997)	60-73			60-70	64-73					
Mulvihill et al. (2004)						9.8-13.3			9.8-12.4	10.7-13.3
Dunning (2008)						8.0-12.7				

	White-breasted Nuthatch ( <i>Sitta carolinensis</i> )									
	Wing length									
	All	Adult	Juv	Female	Male	Adult F	Adult M	Juv F	Juv M	
No. of observations	126	63	52	44	62	16	43	28	19	
Mode	92	92	90	91	92	91	92	90	90	
Median	92	92	91	91	92	91	92	91	92	
Mean	92	92	92	92	92	91	93	92	92	
SD	2.2	2.0	2.2	2.1	1.9	1.9	1.8	2.2	2.1	
IQR	90-93	91-94	90-93	90-93	91-94	90-92	92-94	90-93	91-94	
IBO Mean $\pm$ 2SD	88-96	88-96	88-96	88-96	88-96	87-95	89-97	88-96	88-96	
IBO Range	86-97	88-97	87-96	88-96	88-97	88-94	90-97	88-96	88-96	
Pyle (1997)	80-96			80-94	82-96					
Mulvihill et al. (2004)										
Dunning (2008)										

	White-breasted Nuthatch ( <i>Sitta carolinensis</i> )									
	Body mass									
	All	Adult	Juv	Female	Male	Adult F	Adult M	Juv F	Juv M	
No. of observations	116	59	47	45	63	15	40	24	19	
Mode	20.5	21.8	20.5	20.8	21.5	20.3	19.6	20.5	20.5	
Median	21.4	21.5	21.3	21.0	21.5	21.0	21.6	20.9	21.5	
Mean	21.4	21.6	21.3	21.2	21.6	21.4	21.8	21.1	21.7	
SD	1.7	1.8	0.9	1.0	1.9	1.1	1.8	0.9	1.0	
IQR	20.6-22.1	20.7-22.2	20.6-21.9	20.5-21.8	20.8-22.3	20.6-21.8	20.9-22.2	20.5-21.7	20.8-22.4	
IBO Mean $\pm$ 2SD	18.1-24.7	18.0-25.2	19.5-23.1	19.2-23.2	17.8-25.4	19.2-23.5	18.2-25.4	19.3-22.9	19.7-23.7	
IBO Range	12.4-29.0	16.0-29.0	19.4-23.6	19.4-24.0	12.4-29.0	19.9-14.0	19.4-29.0	19.4-22.8	20.2-23.6	
Pyle (1997)										
Mulvihill et al. (2004)	17.7-24.0	18.8-23.5	17.7-24.0	17.7-23.6	18.3-24.0	18.8-22.3	18.9-23.5	17.7-23.6	19.5-24.0	
Dunning (2008)	18.3-23.2									

	House Wren									
	Wing length					Body Mass				
	All	Adult	Juv	Female	Male	All	Adult	Juv	Female	Male
No. of observations	1908	308	1432	44	32	1803	292	1367	44	31
Mode	50	50	50	52	52	10.4	10.4	10.1	11.2	10.3
Median	51	51	51	51	51	10.5	10.7	10.5	10.7	10.6
Mean	51	51	51	51	51	10.6	10.8	10.5	10.7	10.6
SD	1.78	1.99	1.71	1.8	2.0	0.7	0.7	0.7	0.9	0.7
IQR	50-52	50-52	50-52	50-52	50-52	10.1-11.0	10.3-11.2	10.1-11.0	10.1-11.2	10.2-11.1
IBO Mean $\pm$ 2SD	47-55	47-55	48-54	47-55	47-52	9.2-12.0	9.4-12.2	9.1-11.9	8.9-12.5	9.2-12.0
IBO Range	45-63	46-63	45-63	47-55	47-56	7.3-13.4	9.0-13.4	7.3-13.1	9.2-13.1	9.0-11.9
Pyle (1997)	42-52			42-50	44-52					
Mulvihill et al. (2004)						8.7-13.9	9.1-12.9	9.3-13.2	9.8-13.9	9.7-12.1
Dunning (2008)						9.8-13.1			9.8-13.1	9.8-12.1

	Ruby-crowned Kinglet ( <i>Regulus calendula calendula</i> )								
	Wing length								
	All	Adult	Juv	Female	Male	Adult F	Adult M	Juv F	Juv M
No. of observations	288	60	59	132	130	33	56	94	71
Mode	56	59	56	56	59	56	59	56	59
Median	58	58	57	56	59	56	59	56	59
Mean	58	58	58	56	59	56	59	56	60
SD	2.29	2.21	2.3	1.65	1.85	1.55	1.76	1.71	1.9
IQR	56-59	56-60	56-59	55-57	58-64	55-57	58-60	55-57	58-61
IBO Mean $\pm$ 2SD	53-63	54-62	53-63	53-59	55-63	53-59	55-63	53-59	56-64
IBO Range	47-64	51-62	47-64	47-60	51-64	52-59	51-62	47-60	56-64
Pyle (1997)	52-63			52-59	55-63				
Mulvihill et al. (2004)									
Dunning (2008)									

	Ruby-crowned Kinglet ( <i>Regulus calendula calendula</i> )								
	Body mass								
	All	Adult	Juv	Female	Male	Adult F	Adult M	Juv F	Juv M
No. of observations	262	83	169	120	117	31	52	84	62
Mode	6.2	6.5	6.2	6.4	6.8	6.0	6.7	6.4	6.8
Median	6.4	6.5	6.3	6.2	6.7	6.2	6.8	6.2	6.6
Mean	6.4	6.6	6.4	6.2	6.7	6.3	6.7	6.2	6.6
SD	0.5	0.5	0.5	0.4	0.5	0.4	0.5	0.4	0.5
IQR	6.0-6.8	6.2-6.9	6.0-6.7	5.9-6.4	6.3-7.0	6.0-6.5	6.5-7.1	5.9-6.4	6.2-7.0
IBO Mean $\pm$ 2SD	5.4-7.4	5.6-7.6	5.4-7.4	5.4-7.0	5.7-7.7	5.4-7.2	5.7-7.7	5.4-7.0	5.6-7.6
IBO Range	4.9-7.8	5.0-7.7	5.4-7.8	5.5-7.5	4.9-7.8	5.6-7.5	5.0-7.7	5.5-7.1	5.5-7.8
Pyle (1997)									
Mulvihill et al. (2004)	4.9-9.2	5.3-8.5	5.1-8.4	4.9-8.3	5.4-9.2	5.4-7.7	5.8-8.5	5.1-7.9	5.5-8.4
Dunning (2008)	5.4-7.1					5.4-6.8	5.8-7.1		

	Swainson's Thrush ( <i>Catharus ustulatus</i> )									
	Wing length					Body Mass				
	All	Adult	Juv	Female	Male	All	Adult	Juv	Female	Male
No. of observations	1166	311	702	36	71	1127	303	687	33	56
Mode	98	99	97	94	101	30.0	30.0	31.0	29.1	30.0
Median	97	98	97	96	100	30.8	30.5	31.2	29.9	30.5
Mean	97	98	97	96	100	31.3	31.2	31.6	29.9	30.3
SD	3.51	3.60	3.44	3.2	3.49	3.2	3.2	3.3	2.0	2.2
IQR	95-100	96-100	95-99	94-98	97-102	29.0-33.3	29.1-33.1	29.2-33.8	28.9-30.8	29.2-31.9
IBO Mean $\pm$ 2SD	90-104	91-105	90-104	90-102	93-107	24.9-37.7	24.8-37.6	25.0-38.2	25.9-33.9	25.9-34.7
IBO Range	81-108	86-108	81-107	90-102	91-108	20.8-44.2	20.8-42.9	24.1-44.2	24.9-36.2	24.4-35.5
Pyle (1997)	87-104			87-100	91-104					
Mulvihill et al. (2004)						22.4-49.6	24.9-49.6	22.4-49.2	26.4-32.7	26.6-36.3
Dunning (2008)						25.1-36.1				

	Hermit Thrush ( <i>Catharus guttatus</i> )						Gray Catbird ( <i>Dumetella carolinensis</i> )					
	Wing length			Body mass			Wing length			Body mass		
	All	Adult	Juv	All	Adult	Juv	All	Adult	Juv	All	Adult	Juv
No. of observations	182	17	162	164	14	148	330	80	217	315	79	204
Mode	88	87	88	29.7		29.7	89	91	89	35.0	37.2	37.5
Median	91	91	91	29.0	30.1	28.9	89	91	89	36.6	36.6	36.9
Mean	91	91	91	28.7	29.7	28.6	90	91	89	36.6	36.7	36.8
SD	3.2	4.1	3.1	2.5	3.0	2.4	2.94	3.74	2.38	2.5	2.6	2.4
IQR	88-93	87-93	89-93	27.3-30.3	29.2-31.6	27.3-30.2	88-91	89-93	88-91	35.0-38.2	35.0-38.1	35.1-38.3
IBO Mean $\pm$ 2SD	85-97	83-99	85-97	23.7-33.7	23.7-35.7	23.8-33.4	84-96	84-98	84-94	31.7-41.5	31.5-41.9	32.0-41.6
IBO Range	84-99	85-98	84-99	19.0-34.5	23.3-34.4	19.0-34.5	78-98	78-97	83-98	25.9-44.2	31.9-44.2	25.9-42.9
Pyle (1997)	84-98						81-99					
Mulvihill et al. (2004)				24.1-39.4	24.4-39.4	24.1-39.3				27.3-54.0	27.3-54.0	27.7-53.0
Dunning (2008)				26.1-36.4						27.3-43.5		

American Robin ( <i>Turdus migratorius propinquus/migratorius</i> )									
Wing length									
	All	Adult	Juv	Female	Male	Adult F	Adult M	Juv F	Juv M
No. of observations	1501	261	1117	230	251	71	77	126	135
Mode	130	132	130	130	132	132	134	130	132
Median	131	132	131	130	132	130	134	129	132
Mean	131	132	131	130	133	131	133	129	133
SD	4.66	5.43	4.5	4.09	4.6	4.69	5.24	3.68	4.28
IQR	128-135	129-136	128-134	127-132	130-136	127-134	130-137	127-134	130-136
IBO Mean ± 2SD	122-140	121-143	122-140	122-138	124-142	122-140	123-143	122-136	124-142
IBO Range	110-146	110-145	110-146	117-140	121-146	117-140	121-144	119-138	122-146
Pyle (1997)	115-145			115-140	119-145				
Mulvihill et al. (2004)									
Dunning (2008)									

American Robin ( <i>Turdus migratorius propinquus/migratorius</i> )									
Body mass									
	All	Adult	Juv	Female	Male	Adult F	Adult M	Juv F	Juv M
No. of observations	1379	237	1035	210	234	67	70	114	130
Mode	85.0	84.3	85.0	90.5	83.0	90.5	84.3	77.0	84.0
Median	84.2	85.2	83.9	88.4	82.8	88.1	83.0	88.7	82.7
Mean	84.1	85.2	83.9	87.4	82.8	86.8	83.1	88.1	82.8
SD	6.2	6.3	6.1	6.6	4.7	6.6	5.3	6.2	4.3
IQR	80.1-88.2	81.6-89.4	79.8-88.0	84.2-91.6	80.0-85.5	84.0-90.4	79.8-86.0	84.6-92.0	80.1-85.4
IBO Mean ± 2SD	71.8-96.4	72.6-97.8	71.7-96.1	74.2-100.6	73.4-92.2	73.5-100.1	72.5-93.7	75.7-100.5	74.2-91.4
IBO Range	57.1-105.6	57.1-105.6	59.2-104.9	57.1-104.9	67.7-96.4	57.1-100.7	67.7-95.9	72.0-104.9	72.9-96.4
Pyle (1997)									
Mulvihill et al. (2004)	60.1-93.3	66.1-91.7	60.1-93.3	66.9-90.5	63.1-86.4	66.9-89.4	66.1-86.2	72.6-87.4	63.1-83.3
Dunning (2008)	56.0-112.0								

	House Finch ( <i>Haemorhous mexicanus</i> )						Pine Siskin ( <i>Spinus pinus</i> )					
	Wing length			Body mass			Wing length			Body mass		
	All	Adult	Juv	All	Adult	Juv	All	Adult	Juv	All	Adult	Juv
No. of observations	152	30	117	145	31	110	78	17	61	77	16	61
Mode	78	74	78	20.4	20.8	20.6	70	73	70	12.8	12.8	12.8
Median	78	78	77	20.8	21.1	20.7	71	73	71	13.1	13.3	12.8
Mean	77	77	77	20.9	21.3	20.8	72	72	71	13.0	13.3	12.9
SD	2.68	2.47	2.71	1.4	1.3	1.4	1.85	2.09	1.72	1.0	0.9	1.0
IQR	75-79	76-79	75-79	20.0-21.7	20.7-22.0	20.0-21.6	70-73	72-73	70-72	12.3-13.7	12.8-13.9	12.2-13.6
IBO Mean ± 2SD	72-82	72-82	72-82	18.1-23.7	18.7-23.9	18.0-23.6	68-76	68-76	68-74	11.0-15.0	11.5-15.1	10.9-14.9
IBO Range	69-89	72-82	69-89	16.4-26.5	18.9-24.1	16.4-26.5	67-77	67-77	68-75	10.1-15.2	10.1-15.2	10.1-15.2
Pyle (1997)	70-83						66-77					
Mulvihill et al. (2004)				17.4-26.0	18.4-26.0	18.1-25.9				10.8-18.9	10.9-18.5	10.8-18.0
Dunning (2008)				19.0-25.5						11.7-14.7		

Cedar Waxwing ( <i>Bombycilla cedrorum</i> )									
Wing length									
	All	Adult	Juv	Female	Male	Adult F	Adult M	Juv F	Juv M
No. of observations	1272	408	808	339	322	190	175	126	131
Mode	92	92	92	92	92	92	94	89	92
Median	92	92	92	92	93	92	93	91	93
Mean	92	93	92	92	93	92	93	91	93
SD	2.85	2.69	2.87	2.85	2.62	2.68	2.48	2.90	2.65
IQR	91-94	91-94	90-94	90-94	92-95	89-91	92-95	89-93	91-94
IBO Mean ± 2SD	86-98	88-98	86-98	86-98	88-98	87-97	88-98	85-97	88-98
IBO Range	74-102	83-101	74-102	83-102	84-101	83-100	87-101	83-102	84-99
Pyle (1997)	88-100			88-99	90-100				
Mulvihill et al. (2004)									
Dunning (2008)									

Cedar Waxwing ( <i>Bombycilla cedrorum</i> )									
Body mass									
	All	Adult	Juv	Female	Male	Adult F	Adult M	Juv F	Juv M
No. of observations	1193	379	759	321	306	177	163	121	127
Mode	31.7	31.2	30.6	31.0	31.7	36.3	29.8	30.0	29.9
Median	31.7	32.0	31.5	32.5	31.2	33.3	31.4	31.8	30.8
Mean	32.1	32.8	31.8	33.0	31.8	33.8	32.0	32.1	31.5
SD	3.1	3.6	2.9	3.5	3.3	3.7	3.3	3.1	3.3
IQR	30.1-33.5	30.4-34.5	30.0-33.2	30.6-34.9	29.7-32.7	31.2-35.9	29.8-32.9	30.0-34.3	29.5-32.5
IBO Mean ± 2SD	35.9-38.3	25.6-40.0	26.0-37.6	26.0-40.0	25.2-38.4	26.4-41.2	25.3-38.7	25.9-38.3	24.9-38.1
IBO Range	18.7-47.1	27.0-47.1	18.7-45.5	26.4-47.1	18.7-44.9	27.0-47.1	27.0-44.9	26.4-45.5	18.7-42.7
Pyle (1997)									
Mulvihill et al. (2004)	23.4-51.1	25.6-51.1	25.6-42.8	25.6-51.1	25.6-43.4	26.4-51.1	25.6-43.4	25.6-42.3	26.8-42.8
Dunning (2008)	25.6-39.9					26.4-39.6	25.6-39.9		

  

American Goldfinch ( <i>Spinus tristis pallida</i> )						American Tree Sparrow ( <i>Spizelloides arborea ochracea</i> )				
Wing length			Body Mass			Wing length			Body mass	
All	Female	Male	All	Female	Male	All	Adult	Juv	All	
No. of observations	68	30	35	67	30	34	62	11	51	47
Mode	70	70	71	13.9	13.9	13.5	72	70	72	16.0
Median	71	70	72	13.4	13.9	13.5	72	72	72	16.0
Mean	71	69	72	13.4	13.7	13.3	73	73	73	16.4
SD	1.95	1.69	1.42	1.2	1.6	0.9	2.66	3.6	2.5	2.1
IQR	70-72	68-70	71-73	12.4-14.2	12.4-15.0	12.5-13.8	71-75	71-76	71-75	15.2-17.0
IBO Mean ± 2SD	67-75	66-72	69-75	10.9-15.9	10.5-16.9	11.5-15.1	68-78	66-80	68-78	12.2-20.2
IBO Range	67-75	67-74	69-75	11.1-16.8	11.1-16.8	11.7-15.1	67-79	67-79	68-78	14.2-26.5
Pyle (1997)	68-79	68-75	70-79				71-82			
Mulvihill et al. (2004)				9.0-18.7	9.4-16.7	9.0-18.7				14.5-25.1
Dunning (2008)				9.7-16.5	10.0-15.6	9.7-16.5				

  

Chipping Sparrow ( <i>Spizella passerine arizonae</i> )										
Wing length					Body Mass					
All	Adult	Juv	Female	Male	All	Adult	Juv	Female	Male	
No. of observations	1860	161	1630	39	24	1736	152	1523	37	24
Mode	68	67	68	67	72	12.0	12.1	12.0	12.1	13.8
Median	69	69	69	67	72	12.1	12.2	12.0	12.1	12.7
Mean	69	69	69	67	72	12.2	12.3	12.1	12.0	12.6
SD	2.4	2.6	2.3	2.0	3.4	0.9	0.9	0.9	0.7	1.2
IQR	67-68	67-71	67-70	66-68	70-73	11.3-12.1	11.6-12.9	11.5-12.7	11.6-12.5	11.5-13.5
IBO Mean ± 2SD	64-74	64-74	64-74	63-71	65-79	10.3-14.1	10.5-14.1	10.3-13.9	10.6-13.4	10.2-15.0
IBO Range	58-79	58-77	58-79	61-72	62-79	9.0-19.0	10.3-15.8	9.0-19.0	10.5-13.6	9.89-14.5
Pyle (1997)	64-77			64-74	66-77					
Mulvihill et al. (2004)						9.7-15.2	9.7-15.1	9.7-14.9	9.7-14.7	10.4-15.2
Dunning (2008)						10.3-14.5				

  

Clay-colored Sparrow ( <i>Spizella palida</i> )										
Wing length					Body Mass					
All	Adult	Juv	Female	Male	All	Adult	Juv	Female	Male	
No. of observations	833	192	509	21	33	768	180	474	31	40
Mode	60	60	60	57	62	11.2	11.5	10.5	10.5	11.4
Median	60	60	60	57	62	10.9	11.1	10.9	10.6	11.2
Mean	60	60	60	58	62	10.9	11.1	10.9	10.7	11.3
SD	2.38	2.73	2.32	1.48	1.81	0.9	0.9	0.7	0.8	0.8
IQR	58-61	59-62	58-61	57-59	61-63	10.4-11.4	10.5-11.5	10.4-11.3	10.5-11.1	10.6-11.4
IBO Mean ± 2SD	55-65	55-65	55-65	55-61	58-66	9.2-12.6	9.3-12.9	9.5-12.3	9.1-12.3	9.7-12.9
IBO Range	54-70	54-70	54-70	55-60	58-65	7.4-17.0	9.0-16.2	8.6-13.4	9.0-12.7	9.9-13.5
Pyle (1997)	56-67			56-62	59-67					
Mulvihill et al. (2004)										

	Dark-eyed Junco ( <i>Junco hyemalis cismontanus/hyemalis/montanus</i> )									
	Wing length					Body Mass				
	All	Adult	Juv	Female	Male	All	Adult	Juv	Female	Male
No. of observations	136	26	98	52	35	130	25	93	48	32
Mode	74	72	74	74	78	17.6	17.0	17.6	17.0	17.9
Median	74	75	74	74	78	17.9	18.1	17.7	17.7	18.6
Mean	75	75	75	74	77	18.1	18.4	17.9	17.8	19.0
SD	3.01	3.22	2.96	2.45	2.5	2.8	2.1	1.5	1.1	1.8
IQR	73-77	72-78	73-77	72-75	75-79	17.2-19.0	17.2-19.0	17.2-18.9	17.1-18.7	17.8-19.5
IBO Mean ± 2SD	69-81	69-81	69-81	69-79	74-84	12.6-23.6	14.2-22.6	14.9-20.9	15.6-20.0	15.4-22.6
IBO Range	70-84	70-82	70-84	70-80	72-83	11.2-23.5	13.7-23.5	11.2-22.8	15.7-20.4	16.6-23.5
Pyle (1997)	69-84			69-79	73-84					
Mulvihill et al. (2004)						15.0-30.2	15.1-29.9	15.0-30.2	15.0-28.5	15.3-30.2
Dunning (2008)						15.2-26.0			15.2-23.0	15.6-24.1

	Slate-colored Junco ( <i>Junco hyemalis cismontanus/hyemalis/</i> )										SWSP*	
	Wing length					Body Mass					Wing length	Body mass
	All	Adult	Juv	Female	Male	All	Adult	Juv	Female	Male	All	All
No. of observations	72	11	56	33	27	65	10	51	30	24.0	36	31
Mode	74	76	74	73	78	17.0	18.1	17.8	17.0	18.1	60	16.2
Median	75	76	76	73	77	18.2	18.6	18.1	17.5	18.6	59	16.2
Mean	75	76	75	74	77	18.4	19.3	18.2	17.8	18.8	59	16.2
SD	3.07	3.13	3.05	2.11	2.51	1.5	2.0	1.3	1.1	1.5	2.29	1.42
IQR	73-77	75-79	73-77	72-75	75-79	17.3-19.2	18.1-20.2	17.2-19.2	17.0-18.7	17.8-19.5	58-60	14.9-17.1
IBO Mean ± 2SD	69-81	70-82	69-81	70-78	75-83	15.4-21.3	15.3-23.3	16.5-20.8	15.6-20.0	15.8-21.8	85-101	13.4-19.0
IBO Range	70-83	71-82	70-83	70-79	74-83	15.7-22.8	17.0-22.8	15.8-22.4	15.7-20.4	16.6-22.8	55-65	13.8-19.5
Pyle (1997)	68-83			68-79	73-83						52-65	
Mulvihill et al. (2004)						15.6-23.5	15.8-23.5	15.6-23.4	15.6-23.2	17.9-23.5		12.9-22.8
Dunning (2008)						15.8-20.2			15.8-19.0	17.9-20.2		13.1-19.2

\* Swamp Sparrow (*Melospiza georgiana*)

	White-crowned Sparrow ( <i>Zonotrichia leucophrys gambelii/oriantha</i> )						Gambel's White-crowned Sparrow ( <i>Zonotrichia leucophrys gambelii</i> )					
	Wing length			Body Mass			Wing length			Body Mass		
	All	Adult	Juv	All	Adult	Juv	All	Adult	Juv	All	Adult	Juv
No. of observations	548	154	336	506	147	304	309	83	180	290	147	304
Mode	75	74	74	22.8	25.4	22.2	76	74	72	26.1	25.4	22.2
Median	75	76	75	24.5	24.3	24.5	75	77	75	24.5	24.3	24.5
Mean	75	76	75	24.6	24.7	24.5	76	77	75	24.7	24.7	24.5
SD	2.96	3.01	2.81	2.3	2.1	2.3	3.00	3.04	2.81	0.1	2.1	2.3
IBO Mean ± 2SD	69-81	70-82	69-81	20.0-29.2	20.5-28.9	19.9-29.1	70-82	71-83	69-81	24.4-25.0	20.5-28.9	19.9-29.1
IQR	73-77	74-78	73-77	22.3-24.0	23.2-16.1	22.9-26.1	73-78	74-79	73-77	23.1-26.1	23.2-26.1	22.9-26.1
IBO Range	65-84	66-84	68-84	17.8-33.2	21.1-30.7	17.8-33.2	68-84	70-84	68-84	18.2-31.2	9.6-21.1	17.8-33.2
Pyle (1997)	69-84						69-83					
Mulvihill et al. (2004)				22.3-37.6	23.3-35.8	22.3-37.4				21.0-28.5		
Dunning (2008)				21.0-33.7								

	White-throated Sparrow ( <i>Zonotrichia albicollis</i> )						Savannah Sparrow ( <i>Passerculus sandwichensis anthinus/nevadensis</i> )					
	Wing length			Body Mass			Wing length			Body Mass		
	All	Adult	Juv	All	Adult	Juv	All	Adult	Juv	All	Adult	Juv
No. of observations	806	123	646	743	111	601	68	16	31	58	15	25
Mode	70	70	70	26.0	26.0	25.5	70	70	70	16.6	16.6	15.8
Median	72	72	72	25.4	26.0	25.3	70	70	70	17.3	17.2	16.8
Mean	72	72	72	25.3	25.8	25.3	70	70	69	17.6	17.8	16.9
SD	2.90	3.15	2.84	2.2	2.5	2.1	2.85	3.06	2.98	1.9	2.2	1.3
IQR	70-74	69-74	70-74	23.9-26.7	24.3-27.3	23.8-26.6	67-71	68-72	67-71	16.3-18.8	16.5	16
IBO Mean ± 2SD	66-78	66-78	66-78	20.9-29.7	20.8-30.8	21.1-29.5	64-76	64-76	63-75	13.8-21.4	13.4-22.2	14.3-19.5
IBO Range	64-82	66-79	64-82	15.5-34.0	17.1-34.0	15.5-32.0	62-76	66-76	62-75	14.8-24.2	18.9	17.5
Pyle (1997)	64-78						62-78					
Mulvihill et al. (2004)				18.8-38.7	19.2-35.3	18.8-37.9				15.0-21.6	15.8-21.5	15.0-21.6
Dunning (2008)				19.2-30.4						15.1-17.8		

	Song Sparrow ( <i>Melospiza melodia merrilli/juddi</i> )						Lincoln's Sparrow ( <i>Melospiza lincolni lincolni</i> )					
	Wing length			Body Mass			Wing length			Body Mass		
	All	Adult	Juv	All	Adult	Juv	All	Adult	Juv	All	Adult	Juv
No. of observations	342	73	241	325	71	226	1528	258	1004	1407	240	931
Mode	65	65	65	19.6	19.4	19.0	60	62	60	16.0	16.5	16.0
Median	65	65	65	20.1	20.8	19.8	61	61	61	16.4	16.4	16.4
Mean	65	65	65	20.2	20.7	20.0	61	61	61	16.5	16.4	16.5
SD	2.64	2.54	2.69	1.9	1.6	1.9	2.56	2.71	2.51	1.4	1.4	1.4
IQR	63-67	63-67	63-67	19.0-21.3	19.6-21.4	18.7-21.0	59-63	59-63	59-62	15.5-17.3	15.5-17.2	15.6-17.3
IBO Mean ± 2SD	60-70	60-70	60-70	16.5-23.9	17.5-23.9	16.2-23.8	56-66	56-66	56-66	13.7-19.3	13.6-19.2	13.7-19.3
IBO Range	58-78	60-71	58-78	14.5-32.5	16.9-26.7	14.5-32.5	48-75	51-72	53-75	10.6-12.0	11.5-20.5	10.6-23.0
Pyle (1997)	58-73						56-66					
Mulvihill et al. (2004)				16.9-28.0	17.1-24.7	16.9-28.0				13.0-22.5	13.6-22.5	13.0-22.5
Dunning (2008)				17.1-23.4						14.3-19.4		

	Baltimore Oriole ( <i>Icterus galbula</i> )									
	Wing length									
	All	Adult	Juv	Female	Male	Adult F	Adult M	Juv F	Juv M	
No. of observations	213	63	133	58	98	25	34	24	40	
Mode	95	93	95	90	95	93	95	89	95	
Median	93	95	93	90	95	92	97	90	95	
Mean	93	95	93	91	95	92	97	90	94	
SD	3.79	4.52	3.38	3.19	3.62	3.73	3.4	2.62	3.77	
IQR	91-95	92-98	90-95	89-93	94-97	90-93	95-100	89-91	93-96	
IBO Mean ± 2SD	85-101	86-104	86-100	85-97	88-102	85-99	90-104	85-95	86-102	
IBO Range	77-106	81-106	77-101	81-102	77-106	81-102	90-106	85-96	77-101	
Pyle (1997)	83-100			83-94	89-100					
Mulvihill et al. (2004)										
Dunning (2008)										

	Baltimore Oriole ( <i>Icterus galbula</i> )									
	Body mass									
	All	Adult	Juv	Female	Male	Adult F	Adult M	Juv F	Juv M	
No. of observations	203	64	124	58	92	27	35	31	52	
Mode	34.2	34.2	33.0	32.8	34.0	31.9	34.2	32.5	32.0	
Median	34.2	34.2	34.0	33.3	34.5	33.5	34.9	33.0	34.5	
Mean	34.3	34.5	34.1	33.8	34.8	34.0	35.0	33.7	34.7	
SD	2.4	2.4	2.4	2.5	2.3	2.4	2.3	2.6	2.2	
IQR	32.6-35.6	32.9-36.1	32.5-35.4	32.3-35.2	33.4-36.1	32.3-35.2	33.7-36.3	32.4-35.1	33.4-35.7	
IBO Mean ± 2SD	29.5-39.1	29.7-39.3	29.3-38.9	28.8-38.8	30.2-39.4	29.2-38.8	30.4-39.6	28.5-38.9	30.3-39.1	
IBO Range	28.6-42.4	29.7-41.5	28.6-42.0	29.1-41.2	30.1-42.0	29.7-40.1	30.1-41.5	29.1-41.2	31.1-42.0	
Pyle (1997)										
Mulvihill et al. (2004)	26.5-41.2	27.9-40.0	26.5-41.2	26.5-41.2	27.6-38.9	27.9-40.0	30.5-38.9	26.5-41.2	27.6-36.8	
Dunning (2008)	27.9-38.9					27.9-35.2	30.5-38.9			

	Red-winged Blackbird ( <i>Agelaius phoeniceus arctolegus</i> )								Common Grackle ( <i>Quiscalus quiscula versicolor</i> )			
	Wing length				Body mass				Wing length			Body Mass
	All	Juv	Juv F	Juv M	All	Juv	Juv F	Juv M	All	Adult	Juv	All
No. of observations	64	53	17	34	56	48	18	32	62	21	35	43
Mode	100	121	100	121	66.5	66.5	66.5	66.5	137	141	124	117.6
Median	119	119	101	122	67.2	67.2	43.1	70.0	134	141	130	102.4
Mean	114	115	101	122	60.7	61.1	42.9	70.0	134	138	131	104.5
SD	10.9	10.3	2.2	2.8	13.7	13.3	3.8	3.6	8.16	8.22	7.23	14.2
IQR	102-122	103-122	100-103	120-124	44.7-71.3	60.2-71.9	41.3-44.7	67.3-72.0	126-141	131-143	125-137	91.5-117.8
IBO Mean ± 2SD	92-136	95-136	97-105	116-128	33.3-88.1	34.5-87.7	35.3-50.5	62.8-77.2	118-150	122-154	117-145	76.1-132.9
IBO Range	92-133	98-128	98-105	115-128	33.5-80.5	33.5-80.5	33.5-50.2	63.5-80.5	120-148	120-148	120-145	84.4-126.1
Pyle (1997)	97-130								118-149			
Mulvihill et al. (2004)					34.5-84.3	36.4-84.0	36.4-51.1	53.4-84.0				80.4-150.8
Dunning (2008)					34.5-72.1							74.0-142.0

	Brown-headed Cowbird ( <i>Molothrus ater artemisiae</i> )										BAWW*	
	Wing length					Body Mass					Wing length	Body mass
	All	Adult	Juv	Female	Male	All	Adult	Juv	Female	Male	All	All
No. of observations	108	29	62	61	40	109	30	62	51	23	33	32
Mode	99	99	98	99	111	36.5	38.5	35.7	36.8	49.6	68	10.9
Median	102	101	103	100	110	39.8	40.5	40.5	38.4	48.8	68	10.9
Mean	103	104	103	100	110	40.5	42.3	40.3	38.0	49.0	68	10.9
SD	5.78	7.02	5.46	3.05	3.84	5.8	5.7	6.1	3.7	2.7	2.18	0.6
IQR	99-107	99-109	99-108	98-102	107-112	36.8-44.7	38.0-46.9	35.8-44.7	36.8-40.4	47.6-51.0	67-69	10.4-11.3
IBO Mean ± 2SD	91-115	90-118	92-114	96-104	102-118	28.9-52.1	30.9-53.7	28.1-52.5	30.6-45.4	43.6-54.4	64-72	9.7-12.1
IBO Range	90-120	93-120	90-113	90-105	101-120	25.6-54.3	32.9-54.3	25.6-51.6	25.6-46.0	42.8-54.3	63-73	9.8-12.2
Pyle (1997)	96-118			96-104	107-118						59-74	
Mulvihill et al. (2004)						27.5-58.5	32.3-58.5	31.4-58.4	27.5-45.2	36.0-58.5		8.6-13.2
Dunning (2008)						32.3-57.3			32.3-42.3	43.1-57.3		

\* Black-and-white Warbler (*Mniotilta varia*)

	Ovenbird ( <i>Seiurus aurocapilla</i> )						Northern Waterthrush ( <i>Parus noveboracensis</i> )					
	Wing length			Body Mass			Wing length			Body Mass		
	All	Adult	Juv	All	Adult	Juv	All	Adult	Juv	All	Adult	Juv
No. of observations	368	60	300	353	60	285	1009	108	863	957	104	818
Mode	72	72	73	18.0	19.1	18.0	72	72	73	16.6	15.6	16.6
Median	73	72	73	18.9	18.8	18.9	73	72	73	16.6	16.9	16.6
Mean	73	73	74	18.9	18.7	19.0	73	73	73	16.7	16.9	16.7
SD	2.57	2.84	2.5	1.5	1.2	1.5	2.70	2.66	2.64	1.3	1.4	1.2
IQR	72-75	71-75	72-75	18.0-19.7	18.0-19.4	18.0-19.9	71-75	71-74	71-75	15.9-17.5	15.8-17.7	15.9-17.5
IBO Mean ± 2SD	68-78	67-79	69-79	16.0-21.9	16.3-21.1	16.0-22.0	68-78	68-78	68-78	14.2-19.2	14.1-19.7	14.3-19.1
IBO Range	67-80	67-79	67-80	15.2-26.8	15.6-21.3	15.2-26.8	57-83	64-79	47-83	9.7-23.0	12.0-23.0	9.7-20.8
Pyle (1997)	67-81						67-82					
Mulvihill et al. (2004)				14.7-30.0	15.4-27.2	14.7-30.0				13.3-24.7	14.5-23.4	13.3-24.7
Dunning (2008)				15.4-21.4						14.5-19.6		

	Tennessee Warbler ( <i>Leiothlypis peregrina</i> )													
	Wing length							Body mass						
	All	Adult	Juv	Female	Male	Adult F	Adult M	All	Adult	Juv	Female	Male	Adult F	Adult M
No. of observations	1404	217	1164	40	27	30	17	1267	215	1036	40	28	30	18
Mode	62	61	62	60	64	60	63	9.4	10.0	9.4	9.1	9.8	9.1	9.8
Median	62	62	62	61	64	61	64	9.5	9.8	9.4	9.5	9.8	9.6	9.8
Mean	62	62	63	61	64	61	64	9.6	9.8	9.5	9.6	9.8	9.7	9.8
SD	2.5	3.0	2.4	2.3	2.2	2.1	2.4	0.7	0.6	0.8	0.7	0.8	0.7	0.7
IQR	61-64	60-64	61-64	60-62	63-66	60-62	62-65	9.1-10.0	9.3-10.1	9.1-9.9	9.1-10.0	9.2-10.1	9.2-10.2	9.2-10.2
IBO Mean ± 2SD	57-67	56-68	58-68	56-66	60-68	57-65	59-69	8.1-11.1	8.6-11.0	7.9-11.1	8.2-11.0	8.2-11.4	8.3-11.1	8.4-11.2
IBO Range	51-70	51-69	54-70	55-65	59-68	55-65	59-68	7.2-14.0	8.1-11.7	7.2-14.0	8.3-11.7	8.6-11.9	8.3-11.7	8.7-11.1
Pyle (1997)	58-68			58-64	62-68									
Mulvihill et al. (2004)								6.8-15.8	7.7-15.8	6.8-15.8	6.9-15.2	7.8-15.8	7.7-12.3	8.4-15.1
Dunning (2008)								6.2-14.0						

	CONW*		MacGillivray's Warbler ( <i>Geothlypis tolmiei tolmiei</i> )					Mourning Warbler ( <i>Geothlypis philadelphia</i> )						
	Wing length		Wing length		Body Mass			Wing length			Body Mass			
	All	All	All	Adult	Juv	All	Adult	Juv	All	Adult	Juv	All	Adult	Juv
No. of observations	51	50	77	14	62	69	13	55	102	13	85	88	13	75
Mode	69	12.8	59	61	59	11.0	-	11.0	58	63	58	12.6	12.8	12.6
Median	69	13.6	59	60	59	11.5	11.4	11.5	59	60	59	12.1	12.0	12.1
Mean	69	13.8	59	60	59	11.7	11.6	11.8	60	60	60	12.0	12.1	12.0
SD	2.67	1.1	0.28	0.96	0.27	1.0	1.0	0.9	2.64	3.04	2.55	1.2	1.7	1.1
IQR	67-72	13.0-13.9	57-60	57-63	57-60	11.0-12.3	11.0-12.1	11.1-12.4	58-61	58-63	58-61	11.3-12.6	11.2-13.4	11.4-12.6
IBO Mean ± 2SD	64-74	11.6-16.0	58-60	58-62	58-60	9.8-13.6	9.6-13.6	10.0-13.6	54-65	54-66	55-63	9.6-14.4	8.7-15.5	9.8-14.2
IBO Range	64-75	11-16.6	54-67	55-67	54-64	10.1-14.7	10.1-13.5	10.1-14.7	54-70	56-66	54-70	8.0-15.2	9.1-14.5	8.0-15.2
Pyle (1997)	63-75		52-64						54-65					
Mulvihill et al. (2004)		11.0-26.8										9.6-15.3	9.7-15.3	10.1-15.0
Dunning (2008)		11.2-15.5				8.6-12.6						9.7-13.6		

\* Connecticut Warbler (*Oporornis agilis*)

Orange-crowned Warbler ( <i>Leiothlypis celata celata</i> )									
Wing length									
	All	Adult	Juv	Female	Male	Adult F	Adult M	Juv F	Juv M
No. of observations	2315	409	1845	732	928	94	234	646	697
Mode	61	62	61	58	61	58	62	58	61
Median	61	62	60	58	62	59	62	58	62
Mean	60	61	60	59	62	59	62	59	62
SD	2.44	2.18	2.46	1.99	2.07	1.93	1.79	1.95	2.1
IQR	59-62	60-63	58-62	57-60	60-63	58-61	61-63	57-60	60-63
IBO Mean $\pm$ 2SD	55-65	57-65	55-65	55-63	58-66	55-63	58-66	55-63	58-66
IBO Range	53-69	55-67	53-69	53-69	56-68	55-64	56-67	53-69	56-68
Pyle (1997)	54-65			54-62	57-65				
Mulvihill et al. (2004)									
Dunning (2008)									

Orange-crowned Warbler ( <i>Leiothlypis celata celata</i> )									
Body mass									
	All	Adult	Juv	Female	Male	Adult F	Adult M	Juv F	Juv M
No. of observations	2180	378	1748	691	866	82	208	599	644
Mode	9.5	9.3	9.0	9.0	9.3	9.1	9.3	9.0	9.6
Median	9.4	9.5	9.4	9.2	9.6	9.3	9.6	9.2	9.6
Mean	9.5	9.6	9.5	9.3	9.6	9.3	9.7	9.3	9.6
SD	0.8	0.8	0.8	0.8	0.7	0.6	0.8	0.8	0.7
IQR	9.0-10.0	9.1-10.0	9.0-9.9	8.8-9.7	9.2-10.0	8.9-9.8	9.2-10.1	8.8-9.7	9.2-10.0
IBO Mean $\pm$ 2SD	7.9-11.1	8.0-11.2	7.9-11.1	7.7-10.9	8.2-11.0	8.1-10.5	8.1-11.3	7.7-10.9	8.2-11.0
IBO Range	6.2-16.0	6.6-16.0	6.2-15.9	6.2-15.9	6.6-12.9	7.4-10.9	6.6-12.9	6.2-15.9	7.8-12.0
Pyle (1997)									
Mulvihill et al. (2004)	7.7-11.3	8.4-11.3	7.7-11.3	7.8-10.7	8.4-11.3		8.4-10.1	7.8-10.7	8.6-11.3
Dunning (2008)	7.0-11.6								

Common Yellowthroat ( <i>Geothlypis trichas campicola/yukonicola</i> )									
Wing length									
	All	Adult	Juv	Female	Male	Adult F	Adult M	Juv F	Juv M
No. of observations	231	49	160	50	139	13	36	30	91
Mode	55	56	55	54	56	56	56	53	55
Median	55	56	55	54	56	55	56	53	55
Mean	55	56	55	54	56	55	56	53	56
SD	2.16	1.61	2.15	2.28	1.68	1.80	1.37	2.28	1.67
IQR	54-56	55-57	53-56	42-55	55-57	54-56	56-57	52-57	55-57
IBO Mean $\pm$ 2SD	51-59	53-59	51-59	49-59	53-59	51-59	53-59	48-58	53-59
IBO Range	49-63	51-59	50-63	49-63	51-60	51-57	52-59	50-63	51-60
Pyle (1997)	48-59			48-56	51-59				
Mulvihill et al. (2004)									
Dunning (2008)									

Common Yellowthroat ( <i>Geothlypis trichas campicola/yukonicola</i> )									
Body mass									
	All	Adult	Juv	Female	Male	Adult F	Adult M	Juv F	Juv M
No. of observations	216.0	47.0	148.0	45.0	132.0	11.0	36.0	27.0	84.0
Mode	10.7	10.4	10.7	10.0	10.5	9.7	10.4	9.8	10.5
Median	10.5	10.4	10.5	10.1	10.7	9.9	10.6	10.2	10.7
Mean	10.5	10.5	10.5	10.2	10.7	10.2	10.6	10.2	10.8
SD	1.0	0.9	1.0	0.7	1.0	0.8	0.9	0.6	1.1
IQR	9.9-10.9	9.9-11.0	9.9-10.9	9.7-10.7	10.2-11.2	9.7-10.5	10.1-11.3	9.8-10.7	10.2-11.1
IBO Mean $\pm$ 2SD	8.6-12.4	8.7-12.3	8.5-12.5	8.8-11.6	8.7-12.7	8.5-11.9	8.8-12.4	9.0-11.4	8.6-13.0
IBO Range	8.5-17.7	8.5-13.5	8.5-17.7	8.6-12.0	8.5-17.7	9.1-12.0	8.5-13.5	9.2-11.5	8.5-17.7
Pyle (1997)									
Mulvihill et al. (2004)	7.3-15.9	7.8-15.9	7.3-14.4	7.3-14.0	7.9-15.9	7.8-14.0	8.1-15.9	7.3-12.3	7.9-14.4
Dunning (2008)	7.8-12.2					7.8-11.5	8.1-12.2		



	Magnolia Warbler ( <i>Setophaga magnolia</i> )						WPWA*			
	Wing length			Body Mass			Wing length			Body mass
	All	Adult	Juv	All	Adult	Juv	All	Adult	Juv	All
No. of observations	84	22	62	73	18	55	86	10.00	75	78
Mode	58	58	56	8.5	8.0	8.3	62	63.00	62	10.0
Median	58	59	58	8.5	8.5	8.5	63	64.00	63	10.1
Mean	58	59	58	8.6	8.5	8.7	64	64.00	64	10.2
SD	2.03	2.21	1.91	0.8	0.4	0.9	2.99	2.30	\$3.1	0.7
IQR	57-60	58-60	56-60	8.1-8.8	8.1-8.7	8.2-8.8	62-65	63-65	62-65	9.7-10.7
IBO Mean ± 2SD	54-62	55-63	54-62	7.0-10.2	7.7-9.3	6.9-10.5	58-70	59-69	58-70	8.8-11.6
IBO Range	55-66	56-66	55-62	7.3-12.3	7.9-9.6	7.3-12.3	59-78	61-69	59-78	8.5-12.0
Pyle (1997)	53-64						57-67			
Mulvihill et al. (2004)				6.4-12.3	6.6-12.3	6.4-12.3				7.8-12.7
Dunning (2008)				6.6-10.3						7.0-12.9
* Western Palm Warbler ( <i>Setophaga palmarum palmarum</i> )										
	American Redstart ( <i>Setophaga ruticilla</i> )									
	Wing length					Body Mass				
	All	Female	Male	Juv F	Juv M	All	Female	Male	Juv F	Juv M
No. of observations	256	99	124	66	105	240	92	117	60	100
Mode	60	60	62	60	62	8.4	8.1	8.8	8.1	8.4
Median	61	60	62	60	62	8.4	8.2	8.5	8.2	8.5
Mean	61	60	62	60	62	8.4	8.3	8.6	8.2	8.5
SD	2.02	1.66	1.93	1.5	1.8	0.6	0.5	0.6	0.5	0.5
IQR	59-62	59-61	60-63	49-61	60-63	8.0-8.8	8.0-8.6	8.2-8.8	8.0-8.5	8.2-8.8
IBO Mean ± 2SD	57-65	57-63	58-66	57-63	58-66	7.2-9.6	7.3-9.3	7.4-9.8	7.2-9.2	7.5-9.5
IBO Range	56-67	57-65	56-67	57-63	56-66	7.0-11.9	7.0-10.4	7.0-11.9	7.0-10.4	7.0-9.6
Pyle (1997)	55-69	55-66	58-69							
Mulvihill et al. (2004)						6.4-10.4	6.4-10.4	6.5-10.4	6.4-10.4	6.7-10.4
Dunning (2008)						6.5-10.2				
	Blackpoll Warbler ( <i>Setophaga striata</i> )									
	Wing length					Body Mass				
	All	Adult	Juv	Female	Male	All	Adult	Juv	Female	Male
No. of observations	263	44	210	52	46	246	42	196	46	43.00
Mode	73	71	73	70	75	11.8	12.0	11.8	12.0	12.00
Median	73	73	73	72	75	12.1	12.5	12.1	12.0	13.10
Mean	73	73	73	72	75	12.4	12.7	12.3	12.3	13.10
SD	2.45	2.83	2.4	2.24	1.83	1.2	1.5	1.1	1.3	1.40
IQR	71-75	71-76	71-75	70-73	74-76	11.7-13.0	11.7-13.6	11.7-12.9	11.4-12.5	12.0-14.0
IBO Mean ± 2SD	68-78	67-79	68-78	68-76	71-79	10.0-14.8	9.7-15.7	10.1-14.5	9.7-14.9	10.3-15.9
IBO Range	66-80	68-78	66-80	67-77	71-78	9.6-17.4	10.7-16.7	9.6-17.4	10.5-16.7	11.0-17.4
Pyle (1997)	67-78			67-75	71-78					
Mulvihill et al. (2004)						9.7-23.2	10.1-21.5	9.7-23.2	9.7-22.7	10.3-22.7
Dunning (2008)						10.3-13.3			10.3-12.5	11.5-13.3
	Yellow Warbler ( <i>Setophaga petechia</i> )									
	Wing length									
	All	Adult	Juv	Female	Male	Adult F	Adult M	Juv F	Juv M	
No. of observations	2465	404	2021	690	869	134	239	547	620	
Mode	60	62	60	60	62	60	63	59	62	
Median	60	62	60	59	62	60	63	59	62	
Mean	61	62	60	59	62	60	62	59	62	
SD	2.26	2.25	2.22	1.92	1.78	1.84	1.93	1.89	1.67	
IQR	59-62	60-63	59-62	58-60	61-63	59-61	61-64	58-60	61-63	
IBO Mean ± 2SD	56-66	58-67	56-64	55-63	58-66	56-64	58-66	55-63	59-65	
IBO Range	50-72	54-67	50-72	50-69	57-69	54-64	57-67	50-69	57-69	
Pyle (1997)	55-68			55-64	58-68					
Mulvihill et al. (2004)										
Dunning (2008)										

Yellow Warbler ( <i>Setophaga petechia</i> )									
Body mass									
	All	Adult	Juv	Female	Male	Adult F	Adult M	Juv F	Juv M
No. of observations	2271	383	1850	641	804	131	224	502	570
Mode	9.5	10.0	9.5	9.1	9.5	10.0	9.5	9.1	9.5
Median	9.6	9.8	9.6	9.4	9.8	9.8	9.8	9.3	9.8
Mean	9.7	9.8	9.7	9.5	9.8	9.8	9.8	9.4	9.8
SD	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.7	0.7
IQR	9.2-10.1	9.4-10.1	9.2-10.1	9.0-9.9	9.4-10.2	9.3-10.2	9.4-10.1	9.0-9.8	9.4-10.2
IBO Mean $\pm$ 2SD	8.3-11.1	8.4-11.2	8.3-11.1	8.1-10.9	8.4-11.2	8.4-11.2	8.5-11.1	8.0-10.8	8.4-11.2
IBO Range	6.7-15.8	6.7-11.9	7.5-15.8	7.5-12.5	6.7-15.7	8.2-11.9	6.7-11.4	7.5-12.5	8.2-15.7
Pyle (1997)									
Mulvihill et al. (2004)	7.3-12.8	7.3-11.8	7.6-12.8	7.3-12.8	8.1-11.8	7.3-11.4	8.5-11.8	7.6-12.8	8.1-11.8
Dunning (2008)	7.3-13.5			7.3-11.1	8.5-11.5				

Yellow-rumped Warbler ( <i>Setophaga coronata</i> )*									
Wing length									
	All	Adult	Juv	Female	Male	Adult F	Adult M	Juv F	Juv M
No. of observations	7011	1423	5389	2211	2720	524	702	1621	1956
Mode	72	72	70	70	72	68	75	70	72
Median	72	72	72	70	74	70	74	70	73
Mean	72	72	71	70	74	70	74	70	73
SD	2.81	3.06	2.73	2.26	2.18	2.67	2.27	2.11	2.13
IQR	70-74	70-74	70-73	68-71	72-75	68-72	72-75	68-71	72-75
IBO Mean $\pm$ 2SD	66-78	66-78	66-76	65-75	70-78	65-75	69-79	66-74	69-77
IBO Range	52-81	58-81	52-81	54-79	59-81	58-78	59-81	54-79	61-81
Pyle (1997)	65-83			65-78	70-83				
Mulvihill et al. (2004)									
Dunning (2008)									

\* Includes Audubon's Warbler (*S. c. auduboni*), Myrtle Warbler (*S. c. coronata*) and indeterminates

Yellow-rumped Warbler ( <i>Setophaga coronata</i> )*									
Body mass									
	All	Adult	Juv	Female	Male	Adult F	Adult M	Juv F	Juv M
No. of observations	6370	1294	4897	2054	2520	492	643	1504	1821
Mode	12.0	12.0	12.0	11.5	12.5	11.9	12.0	11.5	12.5
Median	12.0	12.2	12.0	11.7	12.3	11.9	12.4	11.6	12.3
Mean	12.1	12.3	12.0	11.7	12.4	12.0	12.5	11.6	12.4
SD	0.9	1.0	0.9	0.8	0.9	0.8	1.0	0.8	0.9
IQR	11.5-12.6	11.7-12.8	11.4-12.5	11.2-12.2	11.8-12.4	11.5-12.4	11.9-13.1	11.1-12.1	11.8-12.9
IBO Mean $\pm$ 2SD	10.2-14.0	10.3-14.3	10.2-13.8	10.1-13.3	10.6-14.2	10.3-13.7	10.6-14.4	10.0-13.2	10.6-14.2
IBO Range	7.5-21.8	8.0-18.9	7.5-21.8	8.0-16.3	8.9-21.8	9.0-16.3	10.0-18.9	8.0-15.0	8.9-21.8
Pyle (1997)									
Mulvihill et al. (2004)	9.1-16.8	9.9-16.8	9.1-16.8	9.1-16.3	9.9-16.8	9.8-16.3	10.1-16.8	9.1-16.3	9.9-16.8
Dunning (2008)	10.0-16.0					9.8-14.0	10.0-16.0		

\* Includes Audubon's Warbler (*S. c. auduboni*), Myrtle Warbler (*S. c. coronata*) and indeterminates

Myrtle Warbler ( <i>Setophaga coronata coronata</i> )									
Wing length									
	All	Adult	Juv	Female	Male	Adult F	Adult M	Juv F	Juv M
No. of observations	4659	945	3561	1475	1687	363	423	1057	1223
Mode	73	72	70	70	74	68	72	70	74
Median	72	72	71	70	74	70	74	70	74
Mean	72	72	71	70	73	70	74	70	73
SD	2.78	2.95	2.73	2.26	2.2	2.68	2.21	2.10	2.19
IQR	70-74	70-74	70-74	68-71	72-75	68-72	72-75	68-71	72-75
IBO Mean $\pm$ 2SD	66-78	66-78	66-76	65-75	69-77	65-75	70-78	66-74	69-77
IBO Range	52-81	58-81	52-81	54-79	61-81	58-78	66-81	54-79	61-81
Pyle (1997)	65-80			65-75	70-80				
Mulvihill et al. (2004)									
Dunning (2008)									

Myrtle Warbler ( <i>Setophaga coronata coronata</i> )									
Body mass									
	All	Adult	Juv	Female	Male	Adult F	Adult M	Juv F	Juv M
No. of observations	4201.0	859.0	3202.0	1373.0	1559.0	338.0	388.0	959.0	1127.0
Mode	12.0	12.0	12.0	12.0	12.5	12.0	12.2	11.7	12.5
Median	12.0	12.2	12.0	11.7	12.4	12.0	12.5	11.6	12.4
Mean	12.1	12.3	12.0	11.8	12.5	12.0	12.5	11.7	12.4
SD	0.9	1.0	0.9	0.9	0.9	0.8	1.0	0.9	0.9
IQR	11.5-12.6	11.3-12.1	11.6-12.8	11.2-12.3	11.8-13.0	11.5-12.5	11.9-13.1	11.1-12.2	11.8-12.9
IBO Mean ± 2SD	10.2-14.0	10.3-14.3	10.2-13.8	10.0-13.6	10.7-14.3	10.3-13.7	10.6-14.4	9.9-13.5	10.6-14.2
IBO Range	7.5-17.6	8.0-16.9	7.5-17.6	8.0-15.0	8.9-17.1	9.0-15.0	10.0-16.9	8.0-15.0	8.9-17.1
Pyle (1997)									
Mulvihill et al. (2004)	11.2-16.8		11.2-16.8	12.5-15.0	11.7-16.8		12.3-16.8	12.5-15.0	11.7-15.2
Dunning (2008)									

	AUWA*		CAWA^		Rose-breasted Grosbeak ( <i>Pheucticus ludovicianus</i> )							
	Wing length	Body mass	Wing length	Body mass	Wing length				Body Mass			
	All	All	All	All	All	Adult	Juv	Female	Male	All	Adult	Juv
No. of observations	40	36	34	34	55	12	42	32	23	52	10	41.0
Mode	75	12.2	60	10.0	99	95	99	99	98	47.5	47.5	52.0
Median	75	12.2	63	10.4	99	98	99	99	100	46.0	45.6	46.0
Mean	75	12.4	63	10.3	99	99	99	99	100	46.0	46.2	45.9
SD	2.44	0.8	2.26	0.9	2.8	3.5	2.7	3.0	2.5	4.7	5.2	4.7
IQR	73-76	11.9-12.9	61-65	10.0-10.9	97-101	96-101	98-101	97-100	98-102	43.0-48.6	42.7-47.9	43.0-49.3
IBO Mean ± 2SD	70-80	10.9-13.9	58-68	8.5-12.1	93-105	92-106	94-104	93-105	95-105	36.7-55.3	35.8-56.6	36.5-55.3
IBO Range	70-81	11.0-14.0	59-67	8.1-12.2	94-105	94-104	94-105	94-104	96-105	31.1-55.4	38.6-55.2	31.1-55.4
Pyle (1997)	68-83		57-70		90-110			90-105	93-110			
Mulvihill et al. (2004)				8.1-13.4						34.0-71.8	34.4-67.9	34.0-71.8
Dunning (2008)		10.0-16.0		8.5-11.7						34.4-50.6		

\* Audubon's Warbler (*Setophaga coronata auduboni*)    ^ Canada Warbler (*Cardellina canadensis*)

Wilson's Warbler ( <i>Cardellina pusilla pileolata/pusilla</i> )									
Wing length									
	All	Adult	Juv	Female	Male	Adult F	Adult M	Juv F	Juv M
No. of observations	3020	509	2473	1107	1696	102	390	995	1295
Mode	56	58	55	55	57	55	58	55	57
Median	56	57	56	55	57	55	57	55	57
Mean	56	57	56	55	57	55	57	55	57
SD	1.86	1.84	1.83	1.43	1.57	1.53	1.53	1.42	1.56
IQR	55-57	56-58	55-57	54-56	56-58	54-56	57-58	54-56	56-58
IBO Mean ± 2SD	52-60	53-61	52-60	52-58	54-60	52-58	54-60	52-58	54-60
IBO Range	50-64	51-63	50-64	50-64	50-63	51-58	51-63	50-64	50-62
Pyle (1997)	46-62			46-58	50-62				
Mulvihill et al. (2004)									
Dunning (2008)									

Wilson's Warbler ( <i>Cardellina pusilla pileolata/pusilla</i> )									
Body mass									
	All	Adult	Juv	Female	Male	Adult F	Adult M	Juv F	Juv M
No. of observations	2884	490	2357	1057	1622	99	376	947	1237
Mode	7.5	8.0	7.5	7.5	7.8	7.5	8.0	7.5	7.8
Median	7.7	7.8	7.6	7.5	7.8	7.5	7.8	7.5	7.8
Mean	7.7	7.8	7.7	7.5	7.8	7.6	7.9	7.5	7.8
SD	0.6	0.6	0.5	0.5	0.5	0.5	0.6	0.5	0.5
IQR	7.4-8.0	7.5-8.0	7.3-8.0	7.2-7.8	7.5-8.1	7.3-7.8	7.5-8.1	7.2-7.8	7.5-8.1
IBO Mean ± 2SD	6.6-8.8	6.6-9.0	6.7-8.7	6.5-8.5	6.8-8.8	6.6-8.6	6.7-9.1	6.5-8.5	6.8-8.8
IBO Range	5.8-14.5	6.4-14.5	5.8-11.9	5.8-11.9	6.0-14.5	6.4-9.2	6.5-14.5	5.8-11.9	6.0-11.5
Pyle (1997)									
Mulvihill et al. (2004)	6.2-9.4	6.4-9.4	6.2-9.1	6.3-9.2	6.4-9.4	6.4-9.2	6.6-9.4	6.3-9.0	6.4-9.1
Dunning (2008)	6.0-8.0					6.1-7.1	6.0-7.0		

	Western Tanager ( <i>Piranga ludoviciana</i> )									
	Wing length					Body Mass				
	All	Adult	Juv	Female	Male	All	Adult	Juv	Female	Male
No. of observations	108	40	66	56	36	97	37	58	52	30
Mode	92	95	92	92	93	33.0	29.3	33.0	28.3	33.0
Median	92	92	92	91	93	31.7	31.7	31.6	31.1	32.0
Mean	92	92	92	91	93	31.6	31.7	31.6	31.3	31.8
SD	2.88	2.89	2.92	2.74	2.49	3.2	3.6	3.1	3.4	2.8
IQR	90-94	90-94	90-94	89-93	92-95	29.3-33.7	29.4-33.9	28.9-33.4	28.9-33.3	30.1-33.5
IBO Mean $\pm$ 2SD	86-98	86-98	86-98	86-96	88-98	25.2-38.0	24.5-38.9	25.4-37.8	24.5-38.1	26.2-37.4
IBO Range	85-98	87-98	85-98	85-96	88-98	22.1-41.3	22.1-41.3	25.6-38.0	22.1-41.3	24.0-36.7
Pyle (1997)	85-101			85-97	88-101					
Mulvihill et al. (2004)										
Dunning (2008)						22.5-34.5				

Table 2. Mean wing length was compared for 58 species or subspecies for which age and/or sex could be determined, and sample sizes fit our criteria. A positive t-statistic indicates that adult or male wing length was longer, while a negative number indicates that juvenile or female wing length was longer, depending on the comparison. Age and/or sex classes were combined unless specified. T-statistic, degrees of freedom (df), and P-value (< 0.05 in bold type) for each comparison are shown.

SPECIES	ADULT vs. JUVENILE			MALE vs. FEMALE		
	t-stat	df	P	t-stat	df	P
Spotted Sandpiper	-0.57	36	0.57			
Solitary Sandpiper	-0.79	19	0.44			
Sharp-shinned Hawk	1.31	13	0.21			
Belted Kingfisher	0.21	38	0.83	-1.08	139	0.28
Belted Kingfisher (adults)				-4.25	23	<b>&lt;0.01</b>
Belted Kingfisher (juveniles)				0.41	110	0.69
Downy Woodpecker	2.57	72	<b>0.01</b>	-1.92	225	0.06
Downy Woodpecker (adults)				2.08	28	0.05
Downy Woodpecker (juveniles)				-2.09	178	<b>0.04</b>
Northern Flicker	-0.47	42	0.64	0.44	104	0.66
Northern Flicker (adults)				0.27	25	0.79
Northern Flicker (juveniles)				0.25	71	0.80
Eastern Kingbird	13.03	154	<b>&lt;0.01</b>	4.73	74	<b>&lt;0.01</b>
Eastern Kingbird (adults)				5.40	55	<b>&lt;0.01</b>
Western Wood-Pewee	7.59	19	<b>&lt;0.01</b>			
Trail's Flycatcher	2.08	9	0.07			
Least Flycatcher	6.21	32	<b>&lt;0.01</b>			
Warbling Vireo	0.75	257	0.46			
Red-eyed Vireo	-0.49	20	0.63			
Tree Swallow				11.37	151	<b>&lt;0.01</b>
Black-capped Chickadee	1.04	78	0.30			
Red-breasted Nuthatch	3.06	54	<b>&lt;0.01</b>	5.26	74	<b>&lt;0.01</b>
White-breasted Nuthatch	1.67	104	0.10	2.43	87	<b>0.02</b>
White-breasted Nuthatch (adults)				2.89	26	<b>0.01</b>
White-breasted Nuthatch (juveniles)				0.45	40	0.66
House Wren	3.56	409	<b>&lt;0.01</b>	0.88	61	0.38
Ruby-crowned Kinglet	1.65	176	0.10	14.14	256	<b>&lt;0.01</b>
Ruby-crowned Kinglet (adults)				8.32	74	<b>&lt;0.01</b>
Ruby-crowned Kinglet (juveniles)				11.24	142	<b>&lt;0.01</b>
Hermit Thrush	0.36	18	0.72			
Swainson's Thrush	3.98	571	<b>&lt;0.01</b>	5.67	76	<b>&lt;0.01</b>
American Robin	2.58	350	<b>0.01</b>	7.92	479	<b>&lt;0.01</b>
American Robin (adults)				3.55	146	<b>&lt;0.01</b>
American Robin (juveniles)				6.85	257	<b>&lt;0.01</b>
Gray Catbird	3.00	105	<b>&lt;0.01</b>			
Cedar Waxwing	4.30	863	<b>&lt;0.01</b>	6.97	658	<b>&lt;0.01</b>

Table 2 cont'd

SPECIES	ADULT vs. JUVENILE			MALE vs. FEMALE		
	t-stat	df	P	t-stat	df	P
Cedar Waxwing (adults)				5.61	361	<0.01
Cedar Waxwing (juveniles)				5.28	248	<0.01
House Finch	0.65	48	0.52			
Pine Siskin	3.02	24	<0.01			
American Goldfinch				6.22	57	<0.01
Chipping Sparrow	1.70	188	0.09			
Clay-colored Sparrow	1.57	300	0.12	9.60	49	<0.01
American Tree Sparrow	0.82	12	0.94			
Dark-eyed Junco	0.46	36	0.65	4.99	58	<0.01
Slate-colored Junco	0.94	14	0.36	5.83	59	<0.01
White-crowned Sparrow	3.62	280	<0.01			
Gambel's White-crowned Sparrow	4.23	148	<0.01			
White-throated Sparrow	0.95	161	0.35			
Savannah Sparrow	1.05	27	0.30			
Song Sparrow	-0.15	124	0.88			
Lincoln's Sparrow	1.17	381	0.24			
Baltimore Oriole	3.63	93	<0.01	6.37	118	<0.01
Baltimore Oriole (adults)				5.52	49	<0.01
Baltimore Oriole (juveniles)				4.26	61	<0.01
Red-winged Blackbird (juveniles)				28.73	41	<0.01
Brown-headed Cowbird	0.64	42	0.53	13.30	43	<0.01
Common Grackle	3.56	39	<0.01			
Ovenbird	-2.31	77	0.02			
Northern Waterthrush	-0.57	133	0.57			
Tennessee Warbler	-2.04	275	<0.01	6.67	57	<0.01
Tennessee Warbler (adults)				4.55	30	<0.01
Orange-crowned Warbler	7.08	660	<0.01	28.56	1597	<0.01
Orange-crowned Warbler (adults)				11.11	158	<0.01
Orange-crowned Warbler (juveniles)				27.40	1339	<0.01
MacGillivray's Warbler	1.69	14	0.11			
Mourning Warbler	1.37	13	0.20			
Common Yellowthroat	4.98	113	<0.01	6.00	69	<0.01
Common Yellowthroat (adults)				2.53	18	0.02
Common Yellowthroat (juveniles)				5.04	40	<0.01
American Redstart	1.47	72	0.15	7.26	220	<0.01
American Redstart (juveniles)				7.48	159	<0.01
Magnolia Warbler	2.07	31	0.05			
Yellow Warbler	9.30	572	<0.01	29.71	1423	<0.01
Yellow Warbler (adults)				12.55	286	<0.01
Yellow Warbler (juveniles)				26.84	1098	<0.01
Blackpoll Warbler	0.87	56	0.40	6.95	88	<0.01
Western Palm Warbler	0.47	14	0.65			
Yellow-rumped Warbler	8.21	2058	<0.01	59.07	4662	<0.01
Yellow-rumped Warbler (adults)				26.62	1021	<0.01
Yellow-rumped Warbler (juveniles)				51.93	3465	<0.01
Myrtle Warbler	5.96	1405	<0.01	46.52	3078	<0.01
Myrtle Warbler (adults)				20.47	703	<0.01
Myrtle Warbler (juveniles)				41.12	2254	<0.01
Wilson's Warbler	9.24	730	<0.01	37.74	2513	<0.01
Wilson's Warbler (adults)				13.65	158	<0.01
Wilson's Warbler (juveniles)				33.67	2224	<0.01
Western Tanager	0.08	80	0.94	4.02	80	<0.01
Rose-breasted Grosbeak	-0.68	15	0.51	2.03	52	0.05

Table 3. Mean body mass was compared for 54 species or subspecies for which age and/or sex could be determined, and sample sizes fit our criteria. A positive t-statistic indicates that adult or male body mass was greater, while a negative number indicates that juvenile or female body mass was greater, depending on the comparison. Age and/or sex classes were combined unless specified. T-statistic, degrees of freedom (df), and P-value (< 0.05 in bold type) for each comparison are shown.

SPECIES	ADULT vs. JUVENILE			MALE vs. FEMALE		
	t-stat	df	P	t-stat	df	P
Spotted Sandpiper	-0.89	34	0.38			
Solitary Sandpiper	1.33	15	0.21			
Sharp-shinned Hawk				-11.77	19	<b>&lt;0.01</b>
Belted Kingfisher	0.12	24	0.90	-0.50	126	0.62
Belted Kingfisher (juveniles)				0.35	94	0.72
Downy Woodpecker	2.50	51	<b>0.02</b>	2.28	197	<b>0.02</b>
Downy Woodpecker (juveniles)				1.95	137	0.05
Northern Flicker	-0.24	40	0.81	0.74	96	0.46
Northern Flicker (juveniles)				0.90	58	0.37
Eastern Kingbird	-2.24	179	<b>0.03</b>	0.74	91	0.46
Eastern Kingbird (adults)				1.00	62	0.32
Western Wood-Pewee	1.72	123	0.09			
Traill's Flycatcher	4.56	197	<b>&lt;0.01</b>			
Least Flycatcher	0.55	90	0.59			
Warbling Vireo	1.32	221	0.19			
Red-eyed Vireo	0.26	22	0.8			
Tree Swallow				5.41	139	<b>&lt;0.01</b>
Black-capped Chickadee	0.08	79	0.94			
Red-breasted Nuthatch	0.42	48	0.68	1.34	60	0.19
White-breasted Nuthatch	1.05	91	0.30	1.13	97	0.26
White-breasted Nuthatch (adults)				1.05	41	0.30
White-breasted Nuthatch (juveniles)				1.95	35	0.06
House Wren	4.81	415	<b>&lt;0.01</b>	-0.48	73	0.64
Ruby-crowned Kinglet	2.95	154	<b>&lt;0.01</b>	7.20	222	<b>&lt;0.01</b>
Ruby-crowned Kinglet (adults)				4.70	69	<b>&lt;0.01</b>
Ruby-crowned Kinglet (juveniles)				5.26	116	<b>&lt;0.01</b>
Swainson's Thrush	-1.66	586	0.10	0.92	74	0.36
Hermit Thrush	0.43	17	0.67			
American Robin	2.96	345	<b>&lt;0.01</b>	-8.48	370	<b>&lt;0.01</b>
American Robin (adults)				-3.60	126	<b>&lt;0.01</b>
American Robin (juveniles)				-7.42	200	<b>&lt;0.01</b>
Gray Catbird	0.39	131	0.70			
Cedar Waxwing	4.59	634	<b>&lt;0.01</b>	-4.73	625	<b>&lt;0.01</b>
Cedar Waxwing (adults)				-4.83	338	<b>&lt;0.01</b>
Cedar Waxwing (juveniles)				-1.68	246	0.09
House Finch	1.97	51	0.05			
Pine Siskin	1.57	27	0.13			
American Goldfinch				-1.17	44	0.25
Chipping Sparrow	1.74	182	0.08	2.05	35	0.05
Clay-colored Sparrow	3.66	652	<b>&lt;0.01</b>	2.94	66	<b>&lt;0.01</b>
Dark-eyed Junco	1.38	116	0.17	3.11	46	<b>&lt;0.01</b>
Slate-colored Junco	1.61	11	0.14	2.42	41	<b>0.02</b>

Table 3 cont'd

SPECIES	ADULT vs. JUVENILE			MALE vs. FEMALE		
	t-stat	df	P	t-stat	df	P
White-crowned Sparrow	0.88	449	0.38			
Gambel's White-crowned Sparrow	0.71	448	0.48			
White-throated Sparrow	2.07	141	<b>0.04</b>			
Song Sparrow	3.00	143	<b>&lt;0.01</b>			
Lincoln's Sparrow	-0.76	361	0.45			
Baltimore Oriole	1.20	125	0.23	2.44	114	<b>0.02</b>
Baltimore Oriole (adults)				1.65	55	0.10
Baltimore Oriole (juveniles)				1.80	55	0.08
Red-winged Blackbird (juveniles)				23.36	25	<b>&lt;0.01</b>
Brown-headed Cowbird	1.58	61	0.12	4.76	60	<b>&lt;0.01</b>
Ovenbird	-1.57	105	0.12			
Northern Waterthrush	1.08	124	0.28			
Tennessee Warbler	4.75	370	<b>&lt;0.01</b>	0.85	52	0.40
Tennessee Warbler (adults)				0.44	36	0.66
Orange-crowned Warbler	3.54	529	<b>&lt;0.01</b>	8.50	1378	<b>&lt;0.01</b>
Orange-crowned Warbler (adults)				4.41	190	<b>&lt;0.01</b>
Orange-crowned Warbler (juveniles)				7.71	1166	<b>&lt;0.01</b>
MacGillivray's Warbler	-0.58	17	0.57			
Mourning Warbler	0.06	14	0.95			
Common Yellowthroat	0.12	87	0.91	4.05	115	<b>&lt;0.01</b>
Common Yellowthroat (adults)				1.63	18	0.12
Common Yellowthroat (juveniles)				3.32	81	<b>&lt;0.01</b>
American Redstart				3.47	207	<b>&lt;0.01</b>
American Redstart (juveniles)				2.92	125	<b>&lt;0.01</b>
Magnolia Warbler	-1.18	61	0.24			
Yellow Warbler	2.76	605	<b>&lt;0.01</b>	8.28	1376	<b>&lt;0.01</b>
Yellow Warbler (adults)				-0.62	248	0.53
Yellow Warbler (juveniles)				9.50	1068	<b>&lt;0.01</b>
Blackpoll Warbler	1.83	51	0.07	3.14	86	<b>&lt;0.01</b>
Yellow-rumped Warbler	9.10	1969	<b>&lt;0.01</b>	25.93	4532	<b>&lt;0.01</b>
Yellow-rumped Warbler (adults)				10.86	1115	<b>&lt;0.01</b>
Yellow-rumped Warbler (juveniles)				23.67	3341	<b>&lt;0.01</b>
Myrtle Warbler	6.15	1312	<b>&lt;0.01</b>	20.35	2878	<b>&lt;0.01</b>
Myrtle Warbler (adults)				8.07	724	<b>&lt;0.01</b>
Myrtle Warbler (juveniles)				19.03	2095	<b>&lt;0.01</b>
Wilson's Warbler	5.24	636	<b>&lt;0.01</b>	14.82	2372	<b>&lt;0.01</b>
Wilson's Warbler (adults)				5.95	185	<b>&lt;0.01</b>
Wilson's Warbler (juveniles)				13.12	2063	<b>&lt;0.01</b>
Western Tanager	0.16	68	0.87	0.77	71	0.45
Rose-breasted Grosbeak	0.16	13	0.88			