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## WEIGHTS OF MIGRANTS AND RESIDENT BIRDS IN PANAMA

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This note summarizes field weights of North American migrants and tropical birds, with weights for some species previously unrecorded in the literature. Data were gathered during bird-banding studies in the spring of 1968 at Volcan de Chiriqui Field Station of the Florida Audubon Society near Cerro Punta (elev. 5,400 ft.) in western Panama, and during the winter months of 1968-69 at Barro Colorado Island (elev. 100 ft.) in the Canal Zone. All birds were caught in mist nets, banded, and weighed within 20 minutes, and released. The Chiriqui Station is surrounded by agricultural activities with only small patches of humid montane forest, whereas Barro Colorado remains a protected lowland rain-forest with small clearings. In both areas weights were taken with an Ohaus triple-beam balance while birds were retained in small plastic bags.

*Highland Report.* Seasonal weight comparisons can be used to test for weight gains by North American birds prior to their northward migration departures (Table 1; species 1-5). Substantial changes in weights with the deposition of premigratory fat might be expected. All five migrant species showed increases in weight, although the increase was of high statistical significance in only two, the Indigo Bunting (*Passerina cyanea*) and Swainson's Thrush (*Catharus ustulata*). There was an unfortunately small sample of two thrush weights for May (31.6 and 44.2) because the May 4th date was late for the species (most thrushes had departed by the end of April). Most fortuitously however, the lighter bird (banded) had a previous capture date (28 April) and a known weight (25.0g) at that time. This individual showed a 26% weight gain in six days, which suggests that this species (and probably other migrants) can add "energy reserves" very rapidly just prior to departure. Throughout the period migrant thrushes heavily exploited fruiting shrubs (Leck and Hilty, *Bird-Banding*, 34: 318, 1968). The migrant with the least weight gain was the Summer Tanager (*Piranga rubra*).

Comparison of fall and spring weights for two residents showed unexplained results - a small frugivorous flycatcher, the Paltry Tyrannulet (*Tyranniscus vilissimus*), lacked seasonal change whereas the insectivorous Brown-capped Vireo (*Vireo leucophrys*) lost weight. I also obtained weights from Cerro Punta for subsamples of 10 individuals of eight species in March 1968. The data are summarized in Table 2.

TABLE 1.  
Weights for free-living birds at Cerro Punta

Species	Period		n	$\bar{x}$ (g)	SD	t test <sup>1</sup>
1. <i>Piranga rubra</i>	March	1968	3	27.0	2.3	n.s.
	April	1968	7	30.3	2.3	
2. <i>Vireo philadelphicus</i>	March	1968	9	11.4	0.7	$P < .25$
	April	1968	5	12.0	0.7	
3. <i>Wilsonia pusilla</i>	Sept.-Oct.	1967	15	7.6	0.6	$P < .25$
	March	1968	12	8.0	0.8	
4. <i>Passerina cyanea</i>	March	1968	15	13.8	0.9	$P < .005$
	April	1968	8	15.4	1.3	
5. <i>Catharus ustulata</i>	April	1968	219	29.6	0.8	$P < .001$
	May	1968	2	38.0	8.8	
6. <i>Tyranniscus vilissimus</i>	Sept.	1968	4	9.5	0.7	n.s.
	March	1968	11	9.8	0.9	
7. <i>Vireo leucophrys</i>	Sept-Oct.	1967	8	12.8	0.7	$P < .02$
	Mar.-Apr.	1968	8	11.7	0.9	

<sup>1</sup> = Unaccounted variables include age and sex, as they affect weight.

*Lowland Report.* All weights on Barro Colorado Island were taken during the period from November 1968 to February 1969, with the majority in December. The data are summarized in Table 3. Karr (*Ecol. Monogr.*, **41**: 207-233, 1971) gives comparable weights for seven of the above species captured in other parts of Panama, except for *Thraupis episcopus*. His 29.2 g average for that tanager is below my weights and the 33-38 g range reported for the species by Haverschmidt ("Birds of Surinam," London, 1968).

TABLE 2.  
Additional weights of birds from Cerro Punta

Species	n	$\bar{x}$ (g)	SD	range
<i>Elaenia frantzii</i>	10	19.4	1.4	18.1-20.8
<i>Myioborus miniatus</i>	10	9.1	0.5	8.5-9.8
<i>Spinus xanthogaster</i>	10	12.7	0.9	10.8-13.8
<i>Atlapetes brunneinucha</i>	10	40.0	3.4	33.4-44.0
<i>A. gutturalis</i>	10	34.6	1.9	31.7-37.2
<i>Pselliophorus tibialis</i>	10	30.0	2.3	26.8-34.8
<i>Zonotrichia capensis</i>	10	21.1	1.5	18.7-23.2
( <i>Vermivora peregrina</i> ) <sup>1</sup>	10	8.6	0.6	7.9-9.8

<sup>1</sup>Migrant in parenthesis; other species are residents.

Weights for North American migrants at Barro Colorado are given with sample size (when greater than one), mean weight, and standard deviation: *Vermivora peregrina* (2, 8.4, 0.2), *Dendroica pensylvanica* (8.6), *Dendroica castanea* (10.0), *Seiurus novebor-*

TABLE 3.  
Weights of resident species at Barro Colorado Island

Species	n	$\bar{x}$ (g)	SD
<i>Piaya cayana</i>	1	108.6	
<i>Glyphorhynchus spirurus</i>	1	15.0	
<i>Thamnophilus punctatus</i>	4	21.7	0.8
<i>Manacus vitellinus</i>	3	17.2	0.4
<i>Megarhynchus pitangus</i>	1	77.0	
<i>Pipromorpha oleaginea</i>	2	10.0	0.3
<i>Coereba flaveola</i>	1	8.9	
<i>Tanagra fulvicrissa</i>	6	11.1	0.7
<i>Tangara inornata</i>	6	17.8	1.8
<i>Thraupis episcopus</i>	2	37.2	2.4
<i>T. palmarum</i>	1	37.8	
<i>Sporophila aurita</i>	2	10.7	0.5

*censis* (15.7), and *Piranga rubra* (4, 27.9, 1.2). In view of repeated suggestions that many temperate migrants may benefit by wintering in the habitat patches of higher elevations (e.g. Willis, *The Living Bird*, 5: 187-231, 1966), it is interesting and perhaps surprising that there is no significant difference between the lowland (Barro Colorado Island) and highland (Cerro Punta) weights of the two testable species, *Vermivora peregrina* and *Piranga rubra*.

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