WINTER RESIDENT RETURNS AND LONGEVITY AND WEIGHTS OF PUERTO RICAN BIRDS

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Many recent banding studies have increased our knowledge of tropical birds (Karr, 1971; Loftin, 1975; Leck, 1975; Karr, Willson, and Moriarty, 1978) and of North American breeding birds that winter in tropical environments (summarized by Loftin, 1977). While conducting various ecological studies, we have systematically sampled the birds of seasonally dry vegetation in the Guanica Forest, Puerto Rico, in six of the past seven winters (1972–1978). We have also made several visits to similar vegetation on Mona Island off the west coast of Puerto Rico. In this paper we present data and discuss briefly the following topics: (1) patterns in the return of temperate breeding species to Puerto Rican wintering grounds, (2) the longevity of Puerto Rican resident birds as analyzed by return records, and (3) weights of resident and winter resident birds from Puerto Rico and Mona Island.

STUDY AREAS AND METHODS

The study areas were originally selected because they represent nearly identical vegetation on a species-poor island (Mona Island) and a relatively species-rich island (Puerto Rico). Some of the ecological characteristics of the avifaunas of these two areas are discussed in Terborgh and Faaborg (1973) wherein the vegetation of both areas is pictured and described in detail. Basically, both areas are covered with sclerophyllous vegetation of about 20 ft in height with numerous arboreal cacti. These areas receive 30–40 in of annual rainfall but are greatly affected by low winter rainfall, drying winds, and sparse soils on a limestone substrate.

During the study, net lines were operated in homogeneous stands of vegetation in the manner described by Terborgh and Faaborg (1973). In both areas two lines of 16 nets each (NEBBA type ATX) were erected, although in the initial year of study only one of these lines was operated. Each line was operated from two to four consecutive days from dawn to dusk. Banding dates for the Guanica Forest were 25 to 28 January 1972, 6 to 12 February and 12 to 14 June 1973, 3 to 5 February 1974, 20 to 22 January 1975, 4 to 5 January 1976, and 6 to 8 January 1978. Dates of banding on Mona Island were 2 to 4 February 1972, 14 to 20 February and 17 to 19 June 1973, 13 to 14 May 1974, and 31 December 1975 to 2 January 1976.

All birds captured were marked, measured, and released unharmed. Weights were taken with Pesola scales. Because of the low structure of the vegetation, nearly all species observed in the area were netted. In most cases netting success dropped sharply after the first day such that the third day of netting was often unproductive. This drop in capture rate is indicative of a bird population with well defined home ranges and was a characteristic of both resident and winter resident birds (Ter-

TABLE 1.
Number of winter resident species banded in the Guanica study area each year.

Species	1972	1973	1974	1975	1976	1978
Black-and-white Warbler	6	7 (2)[1]	8 (1)	2 (2)	4	4
Prothonotary Warbler					1	2 (1)
Parula Warbler	4		7	5	8	5
Cape May Warbler				9	3	1
Prairie Warbler	4	2	13	8 (2)	6	5
Ovenbird		3	4	1 (1)	1	4
Northern Waterthrush					1	
Hooded Warbler				1		
Wilson's Warbler						1
American Redstart	2	7	8	4 (1)	6	6 (1)
Indigo Bunting					5	

[1] The number of individuals recaptured from previous years is shown in parentheses.

borgh and Faaborg, 1973). We recorded the net number of each capture so that we could get some measure of the distance between recaptures. This value is recorded in the tables in "number of nets;" the nets were placed end to end.

All nomenclature follows Bond (1971) and scientific names of all the species are listed in Appendix 1.

RESULTS AND DISCUSSION

Patterns of Winter Resident Returns

Eleven winter resident species were captured in the Guanica Forest study area (Table 1). Three species were captured in all six winters and two others were captured in five of the years. All the other species were captured in the late years of the study after drought conditions had decimated resident bird populations. Although possible ecological reasons for this are discussed elsewhere (Faaborg, Ms), two of these late appearing species were relatively abundant during at least one winter. One, the Indigo Bunting, is a regular winter resident on islands to the west of Puerto Rico. Thus, it appears that certain of the winter residents are regular residents of dry forest whereas others enter it more sporadically.

Marked individuals of five winter resident species were recaptured in later years (Table 2). Four of these were regular winter resident species; the other was the Prothonotary Warbler. According to the summary of Loftin (1977), this is the first record of a Prothonotary Warbler returning to its wintering area. Although the Parula Warbler has been recaptured regularly on its wintering grounds in Jamaica (Diamond and Smith, 1973), none were recaptured here. The Black-and-white Warbler was most frequently recaptured, and it appears to be highly philopatric

TABLE 2.
Return data for winter resident birds banded at the Guanica Forest study site.

Species	No. banded	No. returned	Return interval (months)	Distance of return (nets)
Black-and-white Warbler	31	4	2 @ 12 2 @ 24	2 @ 8, 7, 1
Prothonotary Warbler	3	1	24	7
Parula Warbler	29	0		
Cape May Warbler	13	0		
Prairie Warbler	38	2	24, 12	3, 1
Ovenbird	13	1	12	3
Northern Waterthrush	1	0		
Hooded Warbler	1	0		
Wilson's Warbler	1	0		
American Redstart	33	2	12, 24	4, 0
Indigo Bunting	5	0		

throughout its wintering range (Loftin, 1977). As can be seen in the table, most of the birds were recaptured in close proximity to the original banding location and several were caught in the same or adjoining nets. Of the 24 winter residents captured on Mona Island, no recaptures were recorded. Although it is apparent that certain Puerto Rican winter residents do return to winter territories, only with much more extensive data could we analyze the regularity of philopatry on the wintering grounds.

The Longevity of Resident Puerto Rican Birds

Little is known of the life span of tropical birds in general and of insular tropical species in particular. Table 3 analyzes the return data we have accumulated for resident birds from the Guanica Forest and Mona Island. This shows the relative return rate for each species, the mean interval (in months) between returns, the longest recorded interval between returns for an individual (in years–months), and the mean distance between returns in number of nets. Few data in the literature compare with ours; the recapture and recovery data of Loftin (1975) list intervals for Panamanian resident birds that are similar to those listed here.

Weights of Puerto Rican Birds

Weights of birds can be important to the understanding of structure and competitive interactions in tropical communities (Terborgh, Faaborg, and Brockmann, 1978). Table 4 lists the mean weights of all the resident species netted in the Guanica Forest and Mona Island with statistical data compiled separately for each area. Because the sexes are similar in virtually all the species and because we know little of when

TABLE 3.

Return data for resident Puerto Rican birds from the Guanica Forest (G) and Mona Island (M).

Species	Location	Total banded	Total individuals returned	Total no. of returns	Mean interval (months)	Longest return (yrs–mos)	Mean distance of return (no. of nets)
American Kestrel	G	5	1	1	8	0-8	1
	M	1	0				
Zenaida Dove	G	3	0				
	M	6	0				
Common Ground Dove	G	102	3	3	20.0	2-0	4.0
	M	260	34	37	13.5	3-11	4.1
Key West Quail Dove	G	4	0				
Mangrove Cuckoo	G	1	0				
	M	18	2	2	9.5	1-3	1.0
Puerto Rican Lizard Cuckoo	G	5	2	2	4.0	0-4	3.5
Puerto Rican Emerald	G	2	0				
Antillean Mango	G	40	0				
Puerto Rican Tody	G	32	7	9	15.3	4-11	3.4
Puerto Rican Woodpecker	G	6	0				
Grey Kingbird	G	2	0				
	M	25	0				
Stolid Flycatcher	G	86	27	35	18.5	5-11	3.5

TABLE 3.
Continued.

Species	Location	Total banded	Total individuals returned	Total no. of returns	Mean interval (months)	Longest return (yrs–mos)	Mean distance of return (no. of nets)
Caribbean Elaenia	G	1	0				
Northern Mockingbird	G	4	0				
Pearly-eyed Thrasher	G	60	5	5	24.0	3-0	3.2
	M	326	17	19	12.3	2-11	5.5
Red-legged Thrush	G	27	6	7	25.3	4-7	6.0
Puerto Rican Vireo	G	14	4	7	13.0	2-0	4.3
Black-whiskered Vireo	G	10	0				
Adelaide's Warbler	G	37	11	14	15.8	2-7	2.6
Bananaquit	G	219	36	43	19.0	4-7	4.0
Blue-hooded Euphonia	G	2	0				
Stripe-headed Tanager	G	9	3	3	9.3	1-0	5.0
Black-cowled Oriole	G	2	1	2	24.0	2-0	3.5
Troupial	G	31	2	2	18.0	2-0	3.5
Puerto Rican Bullfinch	G	216	30	38	13.7	3-0	3.8
Yellow-faced Grassquit	G	1	0				
Black-faced Grassquit	G	100	5	5	11.4	2-11	3.5

TABLE 4.
Weights (g) of resident birds of the Guanica Forest (G) and Mona Island (M).

Species	Location	Number sampled	Mean weight	Standard deviation	Range
American Kestrel	G	3	107.6	9.7	98–118
	M	1	88	—	—
Zenaida Dove	G	2	153	—	150–156
	M	5	173.6	19.4	148–190
Common Ground Dove	G	66	35.4	2.5	30.5–41.2
	M	218	28.5	2.4	22.4–38.5
Key West Quail Dove	G	4	171.0	21.2	148–199
Mangrove Cuckoo	G	1	71	—	—
	M	18	63.6	10.8	50–85.5
Puerto Rican Lizard Cuckoo	G	4	77.1	7.6	69.2–87
Puerto Rican Emerald	G	2	2.8	0.4	2.5–3.0
Antillean Mango	G	30	5.4	0.8	4.0–7.2
Puerto Rican Tody	G	26	5.4	0.4	4.8–6.0
Puerto Rican Woodpecker	G	5	54.6	6.5	46.6–63.0
Grey Kingbird	G	1	47.6	—	—
	M	25	43.8	3.5	37–51.2
Stolid Flycatcher	G	46	22.9	1.3	20.5–26.3
Caribbean Elaenia	G	1	22.0	—	—
Northern Mockingbird	G	4	43.8	2.2	40.9–46
Pearly-eyed Thrasher	G	28	100.7	8.4	88.8–120
	M	283	100.2	8.4	81–128
Red-legged Thrush	G	14	74.5	4.3	67–82.4
Puerto Rican Vireo	G	10	11.2	0.6	10.2–12.2
Black-whiskered Vireo	G	9	18.9	1.4	17.1–21.0
Adelaide's Warbler	G	23	6.7	0.6	5.3–8.0
Bananaquit	G	136	9.4	0.8	7.4–12.5
Blue-hooded Euphonia	G	1	15.7	—	—
Stripe-headed Tanager	G	11	29.7	2.6	24.5–33.0
Black-cowled Oriole	G	1	37.2	—	—
Troupial	G	19	72.2	6.1	60.9–83.8
Puerto Rican Bullfinch	G	128	32.1	3.9	24.5–43.3
Yellow-faced Grassquit	G	1	7.0	—	—
Black-faced Grassquit	G	59	9.7	0.7	7.8–11.2

molt to adult plumages occurs, all full grown birds are lumped together. Table 5 lists the mean weights of winter resident species captured during our study and combines data from both areas. Once again sexes are

TABLE 5.

Weights of winter resident birds from both the Guanica Forest and Mona Island study sites.

Species	Number sampled	Mean weight	Standard deviation	Range
Yellow-bellied Sapsucker	1	40.0	—	—
Black-and-white Warbler	28	9.7	0.6	8.6–10.8
Prothonotary Warbler	3	13.0	1.6	11.4–14.5
Parula Warbler	29	7.4	0.7	6.0–8.6
Cape May Warbler	18	10.0	0.7	9.0–11.0
Yellow-rumped Warbler	3	10.2	1.2	8.9–11.0
Prairie Warbler	47	6.9	0.6	5.9–7.3
Ovenbird	14	18.7	0.8	17.8–20.1
Northern Waterthrush	1	15.0	—	—
Common Yellowthroat	1	9.0	—	—
Hooded Warbler	2	11.0	—	—
Wilson's Warbler	1	9.0	—	—
American Redstart	29	7.2	0.6	6.0–8.0
Indigo Bunting	4	13.2	0.9	12.5–14.0

lumped. Despite drought conditions through part of the study, no changes in the mean weights of resident birds were seen. The winter resident weights were also apparently maintained at a constant level through the winter, because they did not vary from year to year or day to day. These weights are generally lighter than those listed by Holmes and Sturges (1975) for many of these species on the breeding grounds, although these authors do not list enough data for statistical comparisons. Few other weights for winter resident birds appear in the literature.

SUMMARY

Data are presented covering seven years of banding in dry vegetation at Guanica Forest, Puerto Rico, and on Mona Island. Of 11 winter resident species captured, 5 appeared regularly. Five winter resident species were recaptured on the same areas one or two years after banding. Data are presented on the longevity of resident species along with weights of all the birds captured.

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APPENDIX 1

Scientific names of species mentioned in the text or tables.

American Kestrel (*Falco sparverius*)
Zenaida Dove (*Zenaida aurita*)
Common Ground Dove (*Columbina passerina*)
Key West Quail Dove (*Geotrygon chrysia*)
Mangrove Cuckoo (*Coccyzus minor*)
Puerto Rican Lizard Cuckoo (*Saurothera vieilloti*)
Puerto Rican Emerald (*Chlorostilbon maugaeus*)
Antillean Mango (*Anthracothorax dominicus*)
Puerto Rican Tody (*Todus mexicanus*)
Puerto Rican Woodpecker (*Melanerpes portoricensis*)
Yellow-bellied Sapsucker (*Sphyrapicus varius*)
Grey Kingbird (*Tyrannus dominicensis*)
Stolid Flycatcher (*Myiarchus stolidus*)
Caribbean Elaenia (*Elaenia martinica*)
Northern Mockingbird (*Mimus polyglottos*)
Pearly-eyed Thrasher (*Margarops fuscatus*)
Red-legged Thrush (*Mimocichla plumbea*)
Puerto Rican Vireo (*Vireo latimeri*)
Black-whiskered Vireo (*Vireo altiloquus*)
Black-and-white Warbler (*Mniotilta varia*)
Prothonotary Warbler (*Protonotaria citrea*)
Parula Warbler (*Parula americana*)
Cape May Warbler (*Dendroica tigrina*)
Yellow-rumped Warbler (*Dendroica coronata*)
Adelaide's Warbler (*Dendroica adelaidae*)
Prairie Warbler (*Dendroica discolor*)
Ovenbird (*Seiurus aurocapillus*)
Northern Waterthrush (*Seiurus noveboracensis*)
Common Yellowthroat (*Geothlypis trichas*)
Hooded Warbler (*Wilsonia citrina*)
Wilson's Warbler (*Wilsonia pusilla*)
American Redstart (*Setophaga ruticilla*)
Bananaquit (*Coereba flaveola*)
Blue-hooded Euphonia (*Euphonia musica*)
Stripe-headed Tanager (*Spindalis zena*)
Black-cowled Oriole (*Icterus dominicensis*)
Troupial (*Icterus icterus*)
Indigo Bunting (*Passerina cyanea*)
Puerto Rican Bullfinch (*Loxigilla portoricensis*)
Yellow-faced Grassquit (*Tiaris olivacea*)
Black-faced Grassquit (*Tiaris bicolor*)