TABLE 1. Comparison of the growth of two nest-mate Rufous Hummingbirds and three tropical species (Ricklefs 1976, Ibis 118: 179–207). See text for definition of symbols.

Species	A	K	t_i	Residual mean square
Selasphorus rufus				
Older chick	3.62	0.372	6.34	0.045
Younger chick	3.45	0.388	6.55	0.054
Amazilia fimbriata (Surinam)	4.0	0.256	—	—
A. tobaci (Trinidad)	4.2	0.332	—	—
A. tzacatl (Panama)	5.0	0.362	—	—

21 days, somewhat shorter than the 26 days that Lack (1968, Ecological adaptations for breeding in birds, Methuen, London, p. 187) gives as the usual fledging period for hummingbirds.

Changes in body weight are shown in Fig. 1. After hatching from eggs of 0.70 g each (weighed 1 day prior to hatching), chicks lost weight for 1 or 2 days; one chick's weight decreased to 0.44 g. I did not record the weight of chicks immediately after hatching. Weight loss by 2 days averaged 22% of egg weight. From 3 to 12 days of age, growth was rapid (0.293 g/day) and fairly constant. This growth rate was more than twice the average over the entire nestling period of 0.133 g/day. By 12 days of age, body weight had increased to 3.5 g. From 12 to 21 days, weight of the chicks fluctuated about 3.4 g, with an asymptote of approximately 3.6 g at 18 days. Thus, the body weight at which fledging eventually occurred was attained at a point 55% of the way between hatching and fledging. The asymptotic weight of these nestlings was similar to the weight of adult female Rufous Hummingbirds ($\bar{x}$ = 3.68 g, SD = 0.27, n = 11), which I captured at local feeding stations, a fact indicating that virtually all body weight is acquired during the nestling stage.

For future comparisons, the weight data were fitted to the following logistic equation (using SAS procedure NLIN):

$$w(t) = A/(1 + e^{-K(t-t_i)})$$

where $w(t)$ is weight (g) at age t (days), A is asymptote (g), K is growth rate constant (days^{-1}), and t_i is age at inflection point ($w = \frac{1}{2}A$). Although the resultant least squares fit (Table 1) suggests that the Rufous Hummingbird grows faster than three tropical species, generalizations regarding the tropical-temperate comparison await further study.

Further Observations on Ecological Release in Mona Island Birds

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Ecological release is expected when a species occurs in a situation with reduced competition in which it may increase its density, foraging height, breadth of habitat, and so forth. Most studies of ecological release have been comparisons between islands or between islands and the mainland, and most have focused on the density aspects of this phenomenon (termed density compensation). By looking simply at numbers and not size of birds, guild membership, or resource and habitat characteristics, studies have found islands with more birds than mainland areas (Crowell 1962, Grant 1966, MacArthur et al. 1972), fewer birds than mainland areas (Diamond 1971, MacArthur et al. 1973, Yeaton 1974, Wright in press), or similar densities to mainland areas (Yeaton 1974, Yeaton and Cody 1974, Cox and Ricklefs 1977). Models of overexploitation and interference competition have been proposed to explain this variation in patterns (Case et al. 1979).

An earlier paper (Terborgh and Faaborg 1973) analyzed the ecological release-density compensation phenomenon by comparing the frugivorous birds sampled by nets in seemingly identical vegetation on Mona Island and in the Guanica Forest of southwestern Puerto Rico. We found that each species in the depauperate Mona Island avifauna exhibited ecological release through an increase in density but that the total bird community on Mona Island was smaller in numbers than the Puerto Rican bird community. Yet, because the Mona species were larger than those found in Puerto Rico, the Mona community had greater bird biomass. Only the total metabolic demand of the Mona Island frugivore community approximately equaled that of the diverse Puerto Rican community. This paper reports further observations on density relationships between the insectivorous and nectarivorous birds of the two areas.

The areas studied and methods used are described in detail in Terborgh and Faaborg (1973). The study was done in seemingly identical vegetation in the Guanica Forest, southwest Puerto Rico and on Mona Island, 48 km west of Puerto Rico. Both areas are situated on limestone and receive seasonal rainfall, resulting in sclerophyllous vegetation with many arboreal cacti. Birds were sampled by the use of mist nets. Two lines of 16 12-m nets (NEBBA type ATX) were operated over 2–4 consecutive days from dawn to dusk. Birds captured were marked, measured, and released. In addition to the 1972 study, nets were operated in the Guanica Forest on 6–12 February 1973, 11–14 June 1973, 3–5 February 1974, 20–22 January 1975, 4–5 January 1976, and 6–8 January 1978. Mona Island birds were netted on 14–20 February 1973, 17–20 June 1973, 13–14 May 1974, and 31 December 1975 through 2 January 1976.

Table 1 lists the insectivorous birds netted on the study areas over a 7-yr period and during 3-day samples in June. Both the flycatching Grey Kingbird (*Tyrannus dominicensis*) and the gleaning Mangrove Cuckoo (*Coccyzus minor*) are much more abundant on Mona Island than in the Guanica Forest. The increased frequency of capture of *Tyrannus* may reflect both an increase in density and a foraging shift. In the Guanica Forest, *Tyrannus* nearly always forages above the canopy, while on Mona Island it forages regularly within the canopy and thus within the range of nets. Yet, although these species exhibit ecological release, they do not compensate for the Guanica Forest insectivores in total numbers, energy,

TABLE 1. Comparison of netted samples of insectivorous birds of the Guanica Forest (G) and Mona Island (M) for both total netting effort (Guanica = 592 net-days, Mona Island = 368 net-days) and for 3-day samples (32 nets/day in each area) taken in June 1973.

Species	Total capture		Number captured in summer		Mean weight (g)	Total biomass (g)[a]		Metabolic demand (kcal/day)[a,b]	
	G	M	G	M		G	M	G	M
Gleaning insectivores									
Puerto Rican Lizard Cuckoo (*Saurothera vielloti*)	7		4		77.1	308.4		56.0	
Mangrove Cuckoo (*Coccyzus minor*)	1	20	1	7	63.6	63.6	445.2	11.8	82.6
Puerto Rican Vireo (*Vireo latimeri*)	21		5		11.2	56.0		34.5	
Black-whiskered Vireo (*Vireo altiloquus*)	10		10		18.9	189.0		96.0	
Adelaide's Warbler (*Dendroica adelaidae*)	51		10		6.7	67.0		50.0	
Black-cowled Oriole (*Icterus dominicensis*)	4				37.2				
Subtotal	94	20	30	7		684.0	445.2	248.3	82.6
Flycatching insectivores									
Puerto Rican Tody (*Todus mexicanus*)	41		8		5.4	43.2		15.2	
Stolid Flycatcher (*Myiarchus stolidus*)	121		20		22.9	458.0		216.0	
Grey Kingbird (*Tyrannus dominicensis*)	2	25		14	43.8		613.2		221.2
Subtotal	164	25	28	14		501.2	613.2	231.2	221.2
Grand total	258	45	58	21		1,185.2	1,058.4	479.5	303.8

[a] For the summer sample.
[b] From Kendeigh (1972).

or biomass. The flycathing *Tyrannus* does exceed the total sample of flycatching birds at Guanica in total biomass in the summer sample and nearly equals the energy used by the numerous, small flycatchers of Guanica in the summer sample. The gleaning *Coccyzus* falls far short of this, utilizing only about 33% of the energy used by the the Guanica assemblage of gleaning insectivores.

Although one Bananaquit (*Coereba flaveola*) was caught on Mona Island in 1972, no other nectarivores were caught or seen in subsequent visits. In contrast, there are two common nectarivores in the Guanica avifauna [*Coereba,* with 262 total captures and 21 in June 1973, and the Antillian Mango (*Anthracothorax dominicus*) with 40 total captures and 5 in the summer] and the uncommon Puerto Rican Emerald (*Chlorostilbon maugaeus*), which was only captured twice.

From the above material and that presented earlier, it is apparent that the ability of a reduced number of species to compensate in density, biomass, or metabolic demand to the level of a more diverse set of species varies depending upon a number of factors. A preponderance of large birds in depauperate faunas affects numerical compensation. The resources used may be very important, such that the one gleaning insectivore on Mona Island, while able to become much more abundant, still achieves only a fraction of the density and metabolic demand of the Guanica Forest insectivores. The two abundant species of netable Mona Island frugivores and the one Mona Island flycatcher seem to be harvesting resources at levels approximately equal to those harvested by their more diverse and numerous Guanica counterparts. Nectarivores are totally absent from the Mona Island avifauna.

Because I was unable to measure actual resource levels, I cannot say whether the differences between Mona Island and Puerto Rico in the bird populations supported by various resources reflect differences in resource levels or differences in the abilities of the birds to harvest what is available. That frugivores and some insectivores show differences is not surprising, for other studies have shown a general deficiency of resident insectivores in West Indian bird communities (Terborgh and Faaborg in press, Faaborg and Terborgh in press). Many of the dominant Mona Island trees have bird-dispersed fruits, and the slight increase in fruit and seed consumption on Mona Island could reflect a relative increase in avian-dispersed species in the Mona Island vegetation. The reduced number of insectivores may reflect a greatly reduced insect resource, which would not be surprising considering the fact that insects show area-species patterns and limited ability for density compensation (Janzen 1973). It also could reflect an inability of populations of small insectivorous birds to survive on an island the size of Mona despite average densities of insects equal to the densities found in Puerto Rico. In either regard, it is interesting to note the great increase in lizard (*Anolis*) densities on Mona Island, an increase that Wright (in press) feels is correlated with the absence of avian competitors.

Nectarivores are totally absent on Mona Island, while members of this guild are important components of most tropical bird communities. The Bananaquit is widespread throughout the West Indies and has been introduced to Mona Island on several occasions (*fide* Frank Wadsworth). In all cases, it has become quickly extinct, suggesting that the nectar resource on Mona Island is insufficient to support a bird species. In parallel to the lizard-bird situation, we have found a significant increase in carpenter bees (*Xylocopa brasilianorum*) on Mona Island. While no counts were taken, I would net only three or four bees daily at Guanica but had to remove them continually on Mona and easily caught several dozen a day.

I feel strongly that, to increase our knowledge of patterns in the density of island birds, future studies must take a closer look at both the available resources and the characteristics of the birds involved. Mona Island is undoubtedly an extreme case in this regard, but it is clear that a simple comparison of the density of Mona Island birds with those of the Guanica Forest would have shed little insight into the real ecological stresses found on that tiny island. Certain of the reported cases of undercompensation and overcompensation of island faunas might be quickly explained by shifts in the predominant bird sizes found in the depauperate community. In other cases, perhaps we should not expect any form of compensation due to a change in resources. While this does not negate the possible effects of overexploitation or interference competition models (Case et al. 1979), in many cases much simpler explanations may exist.

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First Specimen Record of the Little Stint (*Calidris minuta*) for North America

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The Little Stint (*Calidris minuta*) breeds in the north-central Palaearctic, from northeastern Norway to the central Russian arctic as far as the Indigirka River at 150°E (Dement'ev et al. 1969); it has also recently been reported to breed in some years eastwards to the Chukchi Peninsula (Glutz et al. 1975). It winters mainly in Africa and eastwards to southern Asia (Vaurie 1965, Glutz et al. 1975). Its general distribution is, thus, far removed from the Nearctic, and the only records from this region to date are photographic ones involving single birds on Bermuda in 1975 (Pellow 1976) and near Barrow, Alaska in 1976 (Myers and Greenberg 1978), as well as several sight records from Antigua in 1975 and 1976 (Holland and Williams 1978, E. Eisenmann pers. comm.). This note reports the first record of the species for Canada and the collection of the first specimen for North America.

On 10 July 1979, I noted a small *Calidris* sandpiper, with bright rufous plumage on the upper parts, head, neck, and upper breast, with a small group of Semipalmated Sandpipers (*Calidris pusilla*) near North Point (51°29'N, 80°27'W), on the southwest coast of James Bay, 27 km northeast of Moosonee, Ontario. The birds were feeding on the short grass ("goose grass," *Puccinellia phryganodes* (Trin.) Scribn. & Merr.) salt marsh and around pools near the junction of the vegetated area with the tidal flats. The sandpiper's field characters—particularly the conspicuous orange-rufous wash on the head, cheeks, nape, and sides of the neck that spreads across the upper area of the breast below the throat to form a gorget; the rich rufous upper parts (with a somewhat indistinct "V" marking); the black legs; the black, fine, almost straight bill; and the similar but slightly smaller size than that of the nearby Semipalmated