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PARASITISM BY THE SHINY COWBIRD IN THE INTERIOR PARTS OF PUERTO RICO

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The Shiny Cowbird (*Molothrus bonariensis*), a brood parasite originally confined to South America and the islands of Trinidad and Tobago, has been spreading northwest through the Caribbean region since the end of the last century. Although first reported from Puerto Rico in 1955 (Grayce 1957), it was probably introduced earlier (Post and Wiley 1977a).

In South America the Shiny Cowbird parasitizes more than 100 species of birds. In Chile, Johnson (1967) reported that the Shiny Cowbird parasitizes 8 species, preferring the Common Diuca Finch (*Diuca diuca*). In Argentina the brood-parasite prefers the Rufous-collared Sparrow (*Zonotrichia capensis*) (Fraga 1978, King 1973). In Puerto Rico the cowbird parasitizes 11 species in coastal areas. All studies have found the Yellow-shouldered Blackbird (*Agelaius xanthomus*) to be the main host for the Shiny Cowbird (Cruz et al. 1985; Post and Wiley 1976, 1977b; Wiley 1985).

Shiny Cowbirds can be observed in large numbers in the southwest coastal zone of Puerto Rico from June to September (Post and Wiley 1977b), months that correspond with the breeding season of the Yellow-shouldered Blackbird in southern Puerto Rico (Post and Wiley 1977b, Post 1981). In the interior of the island the Yellow-shouldered Blackbird is scarce (Pérez-Rivera 1978, 1980). In the same areas, the cowbird is common throughout the year, mainly around dairy farms. Nevertheless, the Shiny Cowbird is not known to breed in the central parts of the island.

The purpose of this study was to determine if the Shiny Cowbird breeds in the Puerto Rican interior and if so, to determine its host species, frequency of parasitism, and nesting season.

STUDY AREAS

The study was conducted at Cayey, Cidra, Caguas, Gurabo, Utuado, and Adjuntas (Fig. 1). According to Holdridge's classification of ecological life zones, the first five localities are Subtropical Moist Forest with an annual rainfall of 1000–2000 mm and a temperature between 18 and 24°C, while Adjuntas is a Subtropical Wet Forest with a mean annual rainfall of 2260 mm and temperature of 20°C (Ewell and Whitmore 1973). Most of the study area has been deforested at one time or another and the research was done mainly in open areas around towns, dairy farms, experimental rice plantations, orchards, and abandoned coffee plantations.

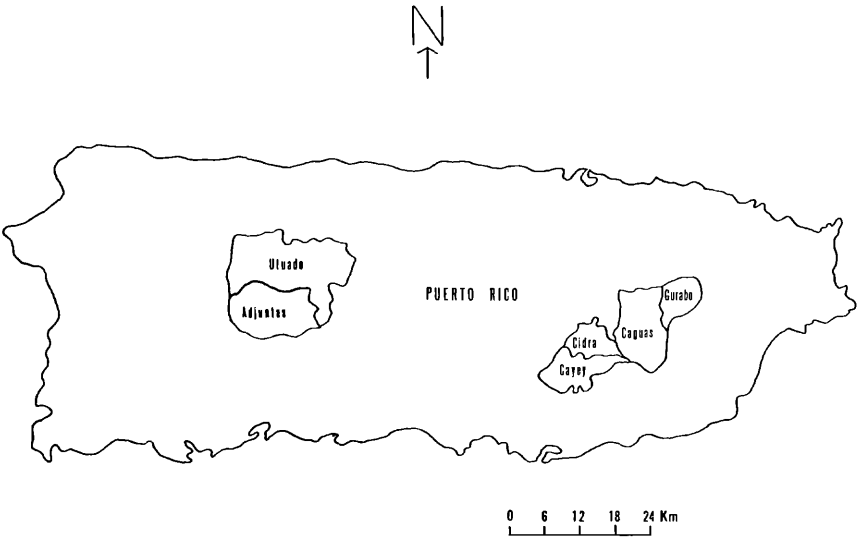

FIGURE 1. Study areas in the interior of Puerto Rico.

METHODS

Data were collected between 1976 and 1984. Research was conducted year-round from 1980–1983; in other years work was conducted during the avian breeding season. I averaged 2 d/wk in the field in the areas of Cidra and Cayey, 1 d/wk for Caguas and Gurabo and 1 d every 2 wks for Utuado and Adjuntas. I examined 948 nests representing the orders Columbiformes (3 species, n = 280), Cuculiformes (1 species, n = 12), Apodiformes (2 species, n = 16), Piciformes (1 species, n = 12) and Passeriformes (22 species, n = 628). Nests were found by regularly searching the study areas. Once located and plotted on maps of the study areas, the nests were inspected to determine the number of eggs and chicks of the host and parasite. Eggs were numbered with a pencil. Active nests (with at least one egg) were visited once a week until the eggs hatched. I was able to follow nests in Cidra, Cayey, and Caguas until the chicks fledged. Size of the species parasitized, type of nest constructed by the host, and color and size of host eggs were recorded.

RESULTS AND DISCUSSION

Of 29 bird species studied in the interior of Puerto Rico, 10 (34.5%) were parasitized by the Shiny Cowbird (Table 1). The Zenaida Dove, Common Ground Dove, Puerto Rican Vireo, Black-faced Grassquit, and Nutmeg Mannikin are new host species for the Shiny Cowbird in Puerto Rico, bringing to 16 the number of species on the island known to be parasitized by the cowbird.

TABLE 1. Characteristics of brood parasitism by the Shiny Cowbird in the interior parts of Puerto Rico.

Species	Nests examined	Nests parasitized	Cowbird eggs/ parasitized nest	$\bar{x}$	Range	Cowbird nestlings/parasitized nest	$\bar{x}$	Range
Zenaida aurita (Zenaida Dove)	222*	1 (0.4%)	1/1	1.0	0–1	0	—	—
Columbiana passerina (Common Ground Dove)	43	1 (2.3%)	1/1	1.0	0–1	0	—	—
Mimus polyglottos (Northern Mockingbird)	35	3 (8.5%)	3/3	1.0	0–1	0	—	—
Tyrannus dominicensis (Gray Kingbird)	46	4 (8.6%)	4/4	1.0	0–1	0	—	—
Vireo latimeri (Puerto Rican Vireo)	11	4 (36.3%)	2/1	2.0	0–2	5/3	1.66	1–2
Vireo altiloquus (Black-whiskered Vireo)	23	8 (34.7%)	6/2	3.0	0–3	8/6	1.33	1–2
Icterus dominicensis (Black-cowled Oriole)	28	17 (60.7%)	38/8	4.75	2–8	23/9	2.55	2–4
Quiscalus niger (Greater Antillean Grackle)	65	14 (21.5%)	10/6	1.60	1–3	11/8	1.37	1–2
Tiaris bicolor (Black-faced Grassquit)	49	2 (4.5%)	2/2	1.0	0–1	0	—	—
Lonchura punctulata (Nutmeg Mannikin)	11	1 (9.0%)	1/1	1.0	0–1	0	—	—
	$N = 533$	$\bar{x} = 10.3\%$ $\bar{x}^c = 19.8\%$	$\bar{x} = 2.34$ $\bar{x}^c = 2.44$			$\bar{x} = 1.73$		

[c] Excludes Columbiformes.
* No. of nests of Zenaida Dove studied since 1972.

Among the host species in the interior of Puerto Rico, four are larger (Zenaida Dove, Gray Kingbird, Northern Mockingbird, and Greater Antillean Grackle), two are similar in size (Black-cowled Oriole and Common Ground Dove) and four are smaller (Puerto Rican Vireo, Black-whiskered Vireo, Black-faced Grassquit, and Nutmeg Mannikin) than the brood parasite. Seven of the parasitized species build open nests and the other three construct domed (e.g., Black-cowled Oriole) or closed nests (e.g., Black-faced Grassquit and Nutmeg Mannikin). The Yellow-shouldered Blackbird, the main host of the Shiny Cowbird in coastal areas, generally builds open nests (Post and Wiley 1976, 1977b; Post 1981). Host egg size ranged from 30 × 23 mm (Zenaida Dove) to 16 × 13 mm (Black-faced Grassquit). Egg color varied from white (e.g., Zenaida Dove) to green (e.g., Greater Antillean Grackle). All 67 cowbird eggs that I found were white uniformly speckled with reddish-brown. The amount of speckling varied from egg to egg. The mean length of 11 cowbird eggs was 20.1 × 17 mm. The eggs of the Black-cowled Oriole, Puerto Rican Vireo, and Black-whiskered Vireo resembled the eggs of the Shiny Cowbird. These species were commonly parasitized by the cowbird.

The number of cowbird eggs found per parasitized nest varied from 1 to 8 ($\bar{x} \pm SE = 2.34 \pm 0.56$). At La Parguera and Ceiba, both coastal localities, Post and Wiley (1977b) have reported an average of 2.9 and 3.9 cowbird eggs per nest, respectively. Species parasitized less than 10% averaged 1.0 cowbird egg per nest, and were never observed to hatch it. Parasitized nests were abandoned by Black-faced Grassquits, Nutmeg Mannikins, and a Northern Mockingbird. Other parasitized species hatched the cowbird's eggs and raised its chicks.

Parasitized species that inhabit the Puerto Rican interior can be arranged in three groups: a group with a low rate of parasitism (0.4–9.0%), an intermediate group (21.5–36.3%), and highly parasitized species (60.7%). This differs from Wiley's work (1985) at coastal zones, where he reports two marked tendencies: (a) low rate (2–17%) and (b) high rate (75–100%) of parasitism. Species found in coastal areas as well as the interior (e.g., the Black-whiskered Vireo, Black-cowled Oriole) are more heavily parasitized at the coast than inland. On the coast 82% of the Black-whiskered Vireos and 100% of the Black-cowled Orioles are parasitized (Wiley 1985), versus 34.7% and 60.7% for both species respectively, at my study area. Cruz et al. (1985) report that 61% of all passerine nests are parasitized in mangrove communities. Wiley (1985) also reports a higher incidence of brood parasitism (42%) among the 26 species studied (Columbiformes were not included) at coastal areas, if his data are contrasted with the 19.7% I found in the interior of Puerto Rico. These differences may account for the greater abundance of cowbirds at coastal localities than in the interior of the island.

In La Parguera, Post and Wiley (1977b) report egg laying by the Shiny Cowbird from 7 May–8 September, and at Ceiba from 1 May–24 June. In the interior parts of Puerto Rico, the first cowbird egg was

found on 10 March (Cayey) and the last one, 28 October (Gurabo), with a breeding peak during the months of June and July. This encompasses the breeding season of most passerines in the Puerto Rican interior.

SUMMARY

A study of brood parasitism by the Shiny Cowbird (*Molothrus bonariensis*) was conducted in the Puerto Rican interior, 1976–1984. A total of 948 nests belonging to 29 species of birds (representing 5 orders) were examined to determine brood parasitism. Ten species were parasitized (34.5%) by the cowbird. *Zenaida aurita, Columbiana passerina, Vireo latimeri, Tiaris bicolor,* and *Lonchura punctulata* were new reports for Puerto Rico. The number of cowbird eggs per nest ranged from 1–8 ($\bar{x}$ = 2.34). The incidence of brood parasitism was low ($\bar{x}$ = 10.3, or 19.8% if Columbiformes are excluded from the data) if compared with findings in coastal areas (42%). Even the most commonly parasitized species at my study area (*Icterus dominicensis,* 60.7%), showed a lower rate of parasitism than at coastal locations (100% of nests parasitized). Frequency differences may account for the higher abundance of cowbirds at coastal locations than in the interior of the island. Finally, the cowbird breeds from March through October in the interior parts of Puerto Rico.

RESUMEN

Un estudio sobre la reproducción del tordo (*Molothrus bonariensis*) se llevó a cabo en las partes interiores de Puerto Rico entre 1976–1984. Un total de 948 nidos pertenecientes a 29 especies de aves y representando 5 ordenes, fueron examinados para determinar la presencia de huevos o pichones de tordo. Se encontraron parasitadas 10 especies de aves (34.5%), siendo neuvos informes para Puerto Rico, la tórtola cardosantera (*Zenaida aurita*), la rolita (*Columbiana passerina*), el bienteveo (*Vireo latimeri*), el chamorro prieto (*Tiaris bicolor*) y el pinzón acanelado (*Lonchura punctulata*). El número de huevos de tordo encontrados por nido varió de 1 a 8 ($\bar{x}$ = 2.34). La incidencia parasítica encontrada fue baja ($\bar{x}$ = 10.3% o 19.3% si se excluyen los Columbiformes) si se compara con lo informado en areas costaneras (42%). Inclusive la especies más altamente parasitada en mi área de estudio, la calándria (*Icterus dominicensis*) con una incidencia de 60.7% mostró una menor ocurrencia que en areas costaneras (100%). Las diferencias se pueden atribuir probablemente a una mayor abundancia de tordos en las partes costaneras que en los interiores du Puerto Rico. Finalmente, se encontró que el tordo se reproduce en las partes interiores de la isla desde marzo hasta octubre.

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LITERATURE CITED

CRUZ, A., T. MANOLIS, AND J. WILEY. 1985. The Shiny Cowbird: a brood parasite expanding its range in the Caribbean region. Pp. 607–620, *in* P. A. Buckley, M. Foster, E. Morton, R. Ridgely, and F. Buckley, eds. Neotropical Ornithology. Ornithol. Monogr. No. 36.

EWELL, J., AND J. WHITMORE. 1973. The ecological life zones of Puerto Rico and the U.S. Virgin Islands. Institute of Tropical Forestry of P.R. Research Paper ITF-18. 72 pp.

FRAGA, R. 1978. The Rufous-collared Sparrow as a host of the Shiny Cowbird. Wilson Bull. 90:271–284.

GRAYCE, R. L. 1957. Range extensions in Puerto Rico. Auk 74:106.

JOHNSON, A. W. 1967. The birds of Chile. Platt Establecimientos Gráficos S. A. Buenos Aires. p. 171.

KING, J. R. 1973. Reproductive relationships of the Rufous-collared Sparrow and the Shiny Cowbird. Auk 90:19–34.

PÉREZ-RIVERA, R. 1978. Notas sobre los Icteridos vulnerables o en peligro de extinción en Puerto Rico. Science-Ciencia 5.2:70–74.

———. 1980. Algunas notas sobre la biología y status de la mariquita (*Agelaius xanthomus*), con énfasis en la subespecie de Mona. Memorias del Segundo Coloquio sobre la Fauna de Puerto Rico. Univ. de P.R. Colegio Universitario de Humacao, pp. 54–63.

POST, W. 1981. Biology of the Yellow-shouldered Blackbird (*Agelaius xanthomus*) on a tropical island. Bull. Fl. State Mus. Biol. Sci. 26:125–202.

———, AND J. WILEY. 1976. The Yellow-shouldered Blackbird—present and future. Am. Birds. 30:13–20.

———, AND ———. 1977a. The Shiny Cowbird in the West Indies. Condor 79:119–121.

———, AND ———. 1977b. Reproductive interactions of the Shiny Cowbird and the Yellow-shouldered Blackbird. Condor 79:176–184.

WILEY, J. 1985. Shiny Cowbird Parasitism in two avian communities in Puerto Rico. Condor 87:165–176.

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