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## NEW BIRD RECORDS FROM THE GALÁPAGOS ASSOCIATED WITH THE EL NIÑO-SOUTHERN OSCILLATION<sup>1</sup>

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Colonization is a critical element of biogeographical processes (MacArthur and Wilson 1967). However, even for the avifauna of the Galápagos Islands, which has been the focus of many studies of evolutionary change, speciation, and community structure (Grant 1984a), the frequency of colonization remains poorly documented. Here we report on records associated with the El Niño-Southern Oscillation (ENSO) event of 1982-1983 for three bird species new to the Galápagos. We suggest that such rare climatic events have an important influence on the archipelago's avifauna by increasing the frequency with which birds reach the archipelago, disperse among the islands, and become successfully established.

Between October 1982 and July 1983, the Galápagos Archipelago experienced unusually heavy rain and strong winds associated with an extraordinarily strong ENSO event (Philander 1983, Grant 1984b). Many of the biological effects of these conditions have been discussed elsewhere (e.g., papers in Robinson and del Pino 1985). We conducted field studies in the Galápagos between 31 December 1982 and 23 June 1983 on Genovesa, a small isolated island in the northeast corner

of the archipelago (89°57'W 0°18'N). Storms producing unprecedented rainfall occurred throughout this period (Grant 1984b, Curry 1985). We made additional observations on Genovesa between 13 December 1983 and 5 May 1984, and on several other islands in both 1983 and 1984. Our fieldwork was part of continuing long-term studies of finch and mockingbird breeding biology begun in 1978.

On 29 and 30 January 1983, both of us observed a Black Tern, *Chlidonias niger*, flying over the beach and tidal lagoon below our camp on Genovesa, when it was hawking for insects over low scrub (mostly *Cryptocarpus pyriformis*). In winter plumage, the bird was predominantly white with a dusky nape, a small dark ear covert spot, and a slightly forked tail; these characters are visible in our photographs of the bird (copy on file, Division of Birds, Museum of Zoology, University of Michigan). A Common Tern (*Sterna hirundo*) present on the same days, also in winter plumage, was noticeably larger.

Our sightings coincided with a period of severe weather, with 109 mm of rain falling between 28 and 30 January, strong winds from various directions, and unusually heavy surf. Both terns may therefore have been blown off course toward the Galápagos from their normal wintering range. The Black Tern is a common winter resident on the Pacific coast of Colombia (Hilty and Brown 1986), occurring more rarely south to Ecuador (Butler 1979) and Peru as far south as Lima (Koeppke 1970, Parker et al. 1982). The sole previous record of this species for the Galápagos was a dead immature bird (Harris 1982).

We observed at least two Rose-breasted Grosbeaks, *Pheucticus ludovicianus*, on Genovesa in 1983. On 12 April, Stoleson saw a male, in winter plumage, with

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an incompletely black head, a whitish bill, and a conspicuous rose breast patch; the latter field mark was especially noticeable as most of Genovesa's small resident landbirds, including three ground-finches (*Geospiza* spp.), the Warbler Finch (*Certhidea olivacea*), and the Galápagos Mockingbird (*Nesomimus parvulus*), lack brightly colored plumage. This bird, and the others we saw, gave the species' distinctive *clink* call while moving through woodland in the island's interior. The habitat here, dominated by *Bursera graveolens*, *Croton scouleri*, and *Cordia lutea*, was unusually lush at this time because vegetation grew rapidly in the continuously wet conditions that had prevailed since November 1982 (Grant and Grant 1987). We saw solitary grosbeaks on four occasions between 15 and 19 April in the same 0.5-km<sup>2</sup> area, and on both 25 and 27 April, Stoleson saw two individuals together: one was a male in nearly complete breeding (alternate) plumage, while the other was a female. Therefore, as many as three individuals may have been present.

We know of no previous published reports of Rose-breasted Grosbeaks in the Galápagos, but another individual of this species was seen on Fernandina in early 1983 (T. de Roy, pers. comm.). *Pheucticus ludovicianus* is a common winter visitor west of the Andes in Columbia (Hilty and Brown 1986), occurring less frequently in western Ecuador and Peru (Butler 1979, Parker et al. 1982). As with the tern, unusual ENSO-related weather may account for the appearance of these birds in the Galápagos; our first sighting occurred at the end of a stormy week with high winds and heavy rain.

On 29 January 1984, roughly 6 months after the 1982–1983 ENSO storms ended, Curry observed an Eared Dove, *Zenaida auriculata*, from close range (<20 m) on the grounds of the Charles Darwin Research Station (CDRS) on Santa Cruz. The bird was easily distinguishable from the endemic Galápagos Dove (*Z. galapagoensis*) by the olive-brown color of its back and breast (reddish in *Z. galapagoensis*), lack of a bluish eye ring, black-spotted wings (with no white), and longer, wedge-shaped tail. The bird also had white-tipped remiges, suggesting that it belonged to one of the western Colombian, Ecuadorean, or Peruvian subspecies (e.g., *Z. a. hypoleuca*) rather than the more northern russet-tipped forms (e.g., *Z. a. stenura*, Hilty and Brown 1986).

There are no previous published accounts of *Z. auriculata* in Galápagos, but T. Grant and P. R. Grant saw an individual of the same species over several days in August 1980, on Champion (P. R. Grant, pers. comm.). *Z. auriculata* is abundant in the subtropical and temperate zones of Columbia, Ecuador, and Peru (Butler 1979, Parker et al. 1982, Hilty and Brown 1986). The bird seen in 1984 may have arrived during the ENSO event of 1982–1983 and persisted, perhaps for as long as 2 years; an Eared Dove was present at CDRS on 10 August 1985 (P. R. Grant, in litt.).

Conditions associated with ENSO events may therefore favor the displacement of mainland species to the archipelago by disrupting migration routes or wintering ranges. We also know of a sighting of an Eastern Kingbird (*Tyrannus tyrannus*) on Genovesa in May 1983 (M. Jones, pers. comm.), another new species record

for the Galápagos. Other rare species in the islands seem to occur most frequently during years of ENSO events. The only Blackpoll Warbler (*Dendroica striata*) recorded for Galápagos was seen in 1976 (Boag and Ratcliffe 1979), an ENSO year (Grant 1985). In late January 1987, during the most recent ENSO event, a Cedar Waxwing (*Bombycilla cedrorum*) was sighted on Genovesa (P. R. Grant, in litt.). This species, also new to the Galápagos, rarely winters south of Panamá (AOU 1983), but was recorded in Columbia during the ENSO of 1983 (Hilty and Brown 1986). Other species whose occurrence in the archipelago may be associated with ENSO events include Purple Gallinule (*Porphyrio martinica*); Curry saw one repeatedly at El Junco crater lake on San Cristóbal in March 1984, constituting the fourth record for the Galápagos; Laughing Gull (*Larus atricilla*); we recorded up to 35 on Genovesa in 1983; Common Nighthawk (*Chordeiles minor*); Curry heard one on Genovesa in March 1983; and Sooty Shearwater (*Puffinus griseus*); we saw one bird off Genovesa on 31 December 1982. All these species have previously been observed in the Galápagos principally or exclusively during or just after ENSO events in 1953, 1957, 1965, 1972–1973, and 1976 (Leveque et al. 1966; Harris 1973, 1982; Grant 1985). Laughing Gulls normally occur over warm water north of the archipelago; in 1983, perhaps because water temperatures in the Galápagos were exceptionally high (Kogelschatz et al. 1985) Laughing Gulls seemed to replace Franklin's Gulls (*L. pipixcan*) as the most common wintering gull in the Galápagos.

Severe weather and unusual wind directions of ENSO-associated storms may also redistribute resident species. Dark-billed Cuckoos (*Coccyzus melacoryphus*), Cattle Egrets (*Bubulcus ibis*), Smooth-billed Ani (*Crotophaga ani*), and Medium Ground-Finches (*Geospiza fortis*), and Paint-billed Crakes were all observed on Genovesa in 1983 (Grant and Grant 1987; our observ.), none of which are normally resident there (Harris 1973, 1982). At least two cuckoos remained on Genovesa, where they nested and successfully fledged one chick in 1984 (Stoleson, pers. observ.), the first breeding record of this species on Genovesa. Dark-billed Cuckoos were also present on Española in December 1983, and on Champion in March 1984 (Curry, pers. observ.), new records for these islands. At least 10 cuckoos were present on Daphne during the winter of 1983, and one or more was still present until mid-February 1984 (Stoleson, pers. observ.; H. L. Gibbs, pers. comm.); only one cuckoo had been recorded previously from Daphne, in 1981 (Millington and Price 1982). Crakes may also have persisted on Genovesa following the 1982–1983 ENSO; Stoleson saw individuals there in January and February 1984. Curry observed a Cattle Egret on 28 March 1983 on Champion, the first record of the species for this island. A Galápagos Mockingbird, observed and color-banded on 15 June 1983 on Daphne, persisted until October 1983 (H. L. Gibbs, pers. comm.; Stoleson, pers. observ.). The only other mockingbird recorded from Daphne was observed by the Academy expedition in July 1906 (Gifford 1919); seasonality was unusual in that year as landbirds were found to be breeding on the northern islands in August (Gifford 1919), but it is not known if an ENSO event occurred in 1906.

Accidental arrivals of new species will rarely have any impact on the resident avifauna. As in the case of the grosbeak and tern we saw, individuals that are blown off course or that wander to the islands will usually leave or die without either reproducing or having any significant impact on the resident species. Very rarely, however, arrivals become established as colonists and, even more rarely, become permanent members of the avifauna. This seems to have occurred in recent history in the case of anis on Santa Cruz (*Crotophaga ani* and possibly *C. sulcirostris*, Harris 1982; F. Köster, pers. comm.) and, possibly, Paint-billed Crakes on several islands. Cattle Egrets, though not yet known to have bred in the archipelago, are now regular visitors or have become resident there (Harris 1973, 1982). Though ENSO events as strong as the one occurring in 1983 are extremely unusual (Grant 1985), they may be critically important to the evolution of the avifauna by increasing the chances that new species will arrive in the islands while conditions are temporarily hospitable. The profuse growth of vegetation associated with heavy rainfall (Grant and Grant 1987) probably enhances establishment of new species.

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