



GALAPAGOS RESEARCH

Journal of Science and Conservation in the Galapagos Islands

No. 69

This is the "online-first" publication version of an article to be published in *Galapagos Research* 69. It will receive full pagination and citation details when published in print.

This online-first version may be cited as:

R.W. Tindle. 2017.

Flamingos in Galapagos: Sr Jacinto Gordillo's misplaced report.
Galapagos Research 69, published online-first on 31 May 2017.

Published by the Charles Darwin Foundation for the Galapagos Islands *a.i.s.b.l.*

GALAPAGOS COMMENTARY

FLAMINGOS IN GALAPAGOS: SR JACINTO GORDILLO'S MISPLACED REPORT

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SUMMARY

In a report which has only recently come to light, Jacinto Gordillo described his observations on the flamingo of the Galapagos archipelago, starting *c.* 45 years ago. His findings and inferences are in accord with the results of detailed studies subsequently carried out by others.

RESUMEN

Flamencos en Galápagos: el informe perdido del Sr. Jacinto Gordillo. En un informe que sólo recientemente ha salido a la luz, Jacinto Gordillo describe sus observaciones sobre el flamenco del archipiélago de Galápagos empezando *c.* 45 años atrás. Sus conclusiones e inferencias concuerdan con los resultados de estudios detallados efectuados subsecuentemente por otros.

A report compiled from observations made between 1967 and *c.* 2007, but which had remained overlooked since then, came to light in 2016. The report is by Jacinto Gordillo, a warden in the Galapagos National Park Service for much of his working life, who also spent some time as an employee of the Charles Darwin Research Station. The report is in two parts. The first part addresses the biology of the American Flamingo *Phoenicopterus ruber* in the Galapagos archipelago from studies carried out during 1967–72. The second part addresses management and conservation issues of the flamingo population during 1978–2007. Little was known of the flamingo in Galapagos prior to Jacinto's studies apart from the occasional censuses carried out by the National Park Service and the Charles Darwin Research Station. The first census in 1968 recorded a population of *c.* 500 adult and juvenile birds.

We, and others with whom we had discussed the Galapagos flamingos, were unaware of this report prior to our 1976–9 study of these birds and thereafter, and in fact we do not know when the first part was actually written up in report form. Thus, the report is not acknowledged in Tindle *et al.* (2016), though we did cite what appears to be an early abridged version (Gordillo 1973).

Although Jacinto does not give details of the methods he used, it can be gleaned that he made frequent visits to lagoons where flamingos were recorded, and apparently some longer visits, particularly to sites where breeding occurred. He recorded his observations on the distribution, feeding ecology and breeding biology, and

hypothesized that the flamingos moved among islands in the archipelago in search of suitable feeding and breeding lagoons. He deduced that conditions for breeding persisted for about nine months of the year, and showed that low water level in lagoons was the principal determinant of the onset of breeding and that flooding of nests (by rainwater) contributed significantly to breeding failure. He noted the similarities in the feeding ecology and reproduction of *P. ruber* in Galapagos to what had been reported on the *P. ruber* populations in the Caribbean (Allen 1956, Rooth 1965). Anatomical and genetic studies have since shown that the Caribbean *P. ruber* is the likely parent population of *P. ruber* in Galapagos (Frias-Soler *et al.* 2014).

Unlike Jacinto, we had the benefit of spending much more time, *c.* 14,500 nest-h of observation, at all major colonies, with up to 20 h of observation per day. But analysis of these more substantial data upheld all of the inferences and predictions that Jacinto had made from his limited data. Our methods of course also allowed us to touch upon areas which Jacinto was unable to address, including the direct association between the spatial and temporal availability of food items and the distribution of flamingos, the differing breeding behaviour between lagoons where parents fed and those from which parents "commuted" to distant lagoons to feed, the duration of attentive periods at the nest by individual male and female parents, and the timing of parental feeding of offspring.

Jacinto's attention to detail was exemplary. Nowhere was this more apparent than in his description of the

flamingo group display which heralds the onset of breeding. Group display is a complicated affair, with which avian ethologists did not get to grips until Studer-Thiersch's (1975) detailed analysis on captive *P. ruber*. Jacinto, in his report, had identified many of the display movements under the much more difficult circumstance of observations in the wild.

Perhaps influenced by the observation that the breeding success of small isolated populations of flamingos is lower than that of larger populations (summarised in Duplaix-Hall & Kear 1975), Jacinto was pessimistic about the future of *P. ruber* in Galapagos. After all, he witnessed "colonies" with as few as three nests! Our later population dynamics data, and the quasi-annual censuses over the succeeding c. 45 years, have indicated that his fears were largely groundless. Those fears were also driven by the threats that Jacinto witnessed, from man and introduced animals, to the largest concentration of flamingos on southern Isabela island, where he did much of his work. At Quinta Playa lagoon, introduced cats, dogs and pigs took flamingo chicks and trampled nests. However, flamingos nesting on a small mud islet in the centre of the lagoon, rather than at the edge of the lagoon, were safe from the predators (A. Tupiza pers. comm.).

Las Salinas lagoon is among the network of lagoons close to the village of Villamil. As its name suggests it was used by the local people as a source of the salt deposited by sea-water evaporation, which they used for domestic purposes and salting fish. Later, in 1978, an amplification and redistribution of the power network of Villamil village saw electric cables erected at a height of 8 m in the direct flight path of flamingos coming into the lagoon. The number of flamingo fatalities caused by flying into the cables was considerable. Jacinto records the multiple skeletal injuries sustained by one such unfortunate bird. In accord with the wishes the National Park, the overhead wires were later replaced by subterranean wires. More human incursion was yet to come, including the construction of a road to the lagoon to encourage tourists, the allocation of land for human habitation alongside the lagoon, and a proposal for sewage management. Fortunately, today, < 5% of the flamingo population is directly impacted by human activities, and the flamingo population, though likely constrained by availability of suitable feeding habitat within the archipelago, is more stable than Jacinto had imagined.

Jacinto's report is a testament to this intelligent man. Though he did not have the opportunity of a formal education in wildlife and conservation, many of us more fortunate in this regard have much to learn from his acute powers of observation and dedication. It is fitting that accolades from wildlife scientists around the world poured in when he passed away in 2016. His report (Gordillo 1967–2007) has now found its rightful home in the library of the Charles Darwin Research Station.

ACKNOWLEDGMENTS

Jacinto Gordillo's report was brought to our attention by Sylvia Harcourt, who kindly assisted with verifying dates.

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