

DARWIN'S FINCH "PLOUGHS" FOR WATER

by

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In the Galapagos Islands fresh water is usually scarce despite the occasional El Niño event, yet it is essential to sustain life, whether of plants, animals or the human race. In an article in *Noticias* 34, D. Duffy (1981) described how members of the Galapagos National Park Service and scientists working in the field have found methods to collect drinkable water from holes hidden under vast and barren lava fields, or from mist, fog and occasional rains on the slopes and rims of the higher volcanos. Not much information, however, seems to be available on the methods used by native Galapagos land-vertebrates to obtain their vital water supply. The same appears to be true for introduced animals such as goats and cats, which live on a number of islands that are bone-dry for most of the year, and thus — at first sight — under conditions which seem to threaten their existence. Questions as to where and how they find their water more often than not are met by rather generalized and hence disappointing answers, such as that land-birds drink dew in the morning, that reptiles derive their water from their food and (always repeated but never scientifically proven) that feral goats walk down from the dry hills to the sea shore and drink pure salt water. Some of these explanations, however incomplete, are possibly true, while others are pure speculation or downright wrong. A good deal more sound ecological research is needed on the Galapagos before any such simple answers can be accepted.

Having asked for more studies in this important and interesting field of investigation, I would like to present here a preliminary report on recent observations on the drinking habits of one of Darwin's Finches.

In June 1982, while my family and I were camped at Punta Suarez, on Española (Hood) Island, our camp, as usual, was crowded by a large flock of inquisitive and mischievous Hood Mockingbirds, *Nesomimus macdonaldi*, and a number of the less impertinent Large Cactus Finches, *Geospiza conirostris*. Anyone who has camped on Española, knows about the many problems of how to keep the "mockers" away from tents, kitchen, scientific equipment, chairs, table, water and food, lest it all be messed up by scores of probing bills and countless droppings. Therefore, in order not to attract an even larger number of birds, great pains are normally taken to hide all food carefully away and to avoid spilling any of the water stored in plastic containers around camp.

One day, however, while pouring water into a pot, I tripped and some of our precious drinking water spilled on the sandy soil. As I stood watching, speculating jokingly whether my carelessness would jeopardize our stay on Española, mockingbirds rushed in from all directions to drink. Soon, however, the puddle of water changed into a muddy patch from which no mockingbird's beak was apparently capable of extracting any more water. Then, to my astonishment, one of the Large Cactus Finches drew nearer. As soon as the mockingbirds had lost their interest and were leaving the wet spot, the finch took a close look at it. Suddenly, creeping forward in a hunched posture, he started to "plough" through the moist sand with his beak, digging furrow after furrow not unlike a farmer ploughing a field. The only explanation for this behaviour is — I think — that by "ploughing" the bird drew in moisture through the sides of his seemingly closed beak: in fact, the finch was drinking!

In November 1984, when filming for Survival Anglia's television series on the natural history of the Galapagos Islands, our crew camped on the same site and I was able to repeat my observation of this peculiar drinking behaviour. This time I spilled some water intentionally and, as I had dared to predict, a Large Cactus Finch approached as soon as the mockingbirds had left and "ploughed" the wet sand in the way described above.

This "ploughing" for water by the Large Cactus Finches on Española Island is clearly distinguished from their "bill-bracing" technique, by means of which they dig into loose ground to expose food (De Benedictis, 1966) and by means of which the Sharp-billed Ground Finch, *Geospiza difficilis*, on Wolf (Wenman) Island has become a very efficient thief of booby eggs (Köster & Köster-Stoewesand, 1983). When "bill-bracing", the beak is firmly stuck into the ground or braced against a rock, while legs and feet are forcefully kicked backwards; when "ploughing", the finch pushes the beak forward along a straight line through the wet soil.

Thus, apart from obviously being able to drink from open water sources like puddles on the ground, or waterholes in cracks and crevices in the lava rocks, or dew on grass and leaves, the Large Cactus Finches on Española — and the future may show that other Darwin's Finches do the same — have developed an additional and rather special way of drinking by extracting water from moist ground.

Admittedly, my observations were made under partly artificial conditions, as I provided the water which the finches then extracted by "ploughing". However, I believe that their very spontaneous and obviously experienced behaviour warrant the conclusion that "ploughing" for water is not merely a behaviour adopted by those finches hanging around a campsite on Española, waiting for someone accidentally to spill some water. By being capable of extracting water from moist soil, these finches must benefit from occasional rains much longer than other birds possibly can. Even after all open water has evaporated or has disappeared into the ground, damp soil remains for quite a time after the rain under bushes, trees, rocks and ledges. It is in these places that I expect the Large Cactus Finch to "plough" under completely natural conditions.

Darwin's Finches are remarkably resourceful. Probing with a stick for insect larvae hidden in dead wood (Gifford, 1913/19); drinking boobies' blood from their growing feathers (Bowman & Billeb, 1965); "bill bracing" to extract food from the soil (De Benedictis, 1966); stealing and drinking booby eggs (Köster & Köster-Stoewesand, 1983); and now "ploughing" for water: what other tricks have this amazing group of drab-coloured birds invented in their struggle to survive in the Galapagos?

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