

HOW DOES A SHEARWATER CHICK HATCH?

¿Cómo eclosiona un polluelo de fardela?

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Egg shape varies between bird species, typically being more or less pyriform and having a blunt and a pointed end. When hatching, the chick of ordinary species punctures the eggshell with its egg-tooth, and it does so effectively along the shortest stretch required, *i.e.* along a circumference close to the egg's "equator". Of the two shell fractions produced, the one with the blunt end becomes shorter than the other one. However, this is not so for those shearwater species which I happen to know to some extent: Cory's Shearwater (*Calonectris borealis*) with > 30 cases on Alegranza/Canary Islands and Desertas/Madeira, Scopoli's Shearwater (*Calonectris diomedea*; Fig. 1) > 100 on Dionisades/Crete, Pink-footed Shearwater (*Puffinus creatopus*) > 30 on Isla Mocha/Chile, and Yelkouan Shearwater (*Puffinus yelkouan*) with eight cases on four Aegean islands. In these species the

eggshell is cut along a circumference through the blunt and pointed ends of the egg, resembling a "meridian through north and south pole". This way, shell halves of almost identical shape result (Fig. 2).

I do not find this different strategy described in the petrels reference book by Warham (1990). And I do not find it in the Manx Shearwater (*Puffinus puffinus*) monograph by Brooke (1990) either, so I have some reservations whether the drawing on his page 93 where a hatching chick is shown in the ordinary way, is realistic.

Birkhead (2016) in his general review on hatching describes variations in pipping perforation tracks among several bird genera, yet there is no special mention of the shearwaters' performances. To be aware of such differences is not just of academic interest only: Guicking (1999) saw halves of Pink-footed Shearwater eggshells at



Figure 1. Scopoli's Shearwater (*Calonectris diomedea*) nest with the adult female and the chick on 10 July 1997 on Dionisades/Crete. The nest was at the end of a narrow limestone cave (≈ 4 m in length). Photo: Dietrich Ristow.

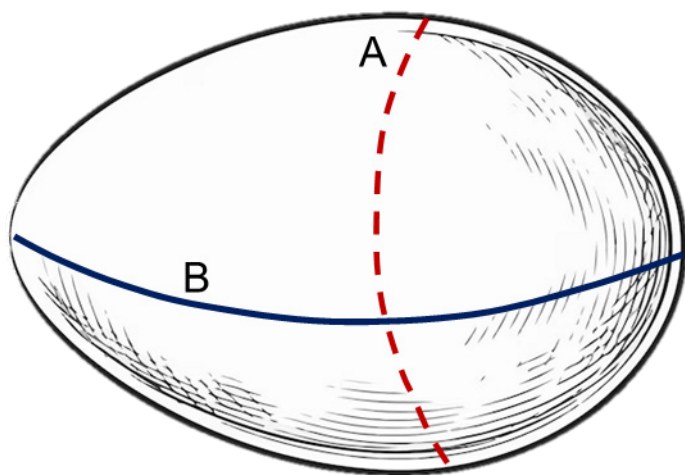


Figure 2. Schematic of an egg's shape to demonstrate two strategies for cutting the eggshell. A. The dashed line indicates the shortest convenient circumference ("equator"), *i.e.* minimum of work with the egg tooth. B. The full line ("meridian") results in two halves of equal size.

the burrow entrances and misinterpreted them as remains of rats' repast, thereby implying misleading conservation suggestions.

When hatching starts, the chick pips the shell membrane of the air cell, which is at the blunt end, and gets its first intake of oxygen therefrom. I would guess in order to obtain more oxygen that it would be convenient for a chick to continue with puncturing the eggshell right there "at the north pole". Whilst this would apply for shearwaters, this is not the rule for the majority of bird species. So, I wonder whether a study of perforation tracks across many bird genera when combined with their evolutionary tree could provide some hint as to the factors involved which cause these variations.

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