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The Razorbill *Alca torda* does not incubate two eggs

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Why do some bird species lay only one egg, while others lay two, three or even twenty? Among the hypotheses proposed to explain variation in avian clutch sizes, the best known is that of Lack (e.g. 1954): the number of eggs corresponds to the highest number of young which the parent birds are able to rear successfully. This hypothesis has been tested experimentally by adding extra eggs or young to the nest and then following the hatching success, growth and survival of the young.

About ten years ago, in early June, I made nine artificial 2-egg clutches in a Razorbill *Alca torda* colony in the archipelago of SW Finland. The egg-laying had just started so that the birds from which I took an egg for my experiments were able to lay a replacement.

During my next visit, 12 days later, I found the Razorbills incubating one egg only. In some of the nests the other egg had been rolled away, but if this had been prevented by the walls of the nest cavity, the adults incubated only one of the eggs. The other egg was cold.

In late July I observed that only one chick had hatched in each of the artificial 2-egg clutches. On examining the unhatched eggs, I found a small embryo in one of them, which indicated that to begin with both eggs had been incubated, but apparently not simultaneously.

Next I created two 2-chick broods by moving a newly hatched chick from one nest to another with a chick of the same age. I was not able to make more experimental twins, since my small daughters did not approve of my experiments and were crying besides me. After a week, when alone, I found that the young had gained in weight as follows:

	Weight of the young (g)	
	Just hatched	One week old
Artificial twins		
Clutch 1		
Chick A	55	118
Chick B	63	80
Clutch 2		
Chick A	58	124
Chick B	63	120
Young reared alone		
Clutch 1		
Chick A	66	142
Clutch 2		
Chick A	(in egg)	147

When one week old, the twins weighed roughly 15 to 45 % less than the single chicks. From my small sample I deduce that the Razorbill is incapable of hatching two eggs instead of the normal one, and possibly also incapable of successfully rearing two young.

Similar observations have been made with some other sea-bird species. Rice & Kenyon (1962) found that the Laysan Albatross *Diomedea immutabilis* incubated only the normal single egg, and that artificially twinned broods produced far fewer fledglings than one-chick broods. The Giant Petrel *Macronectes giganteus* may occasionally lay two eggs, but they rarely both hatch and the two chicks never both survive to fledging (Warham 1962). However, Nelson (1964) found in the Gannet *Sula bassana* that hatching success in artificial 2-egg clutches was as high as in normal clutches of one egg, and that the fledging success of twins was not greatly inferior to that of single chicks.

It might be argued, however, that in experiments of this kind the change in the clutch and brood size is too great to throw real light on the reasons for the small clutch. Doubling the number of offspring is a drastic experiment, as the adaptation to a one-egg strategy affects the entire breeding performance of a bird, including its physiology and behaviour.

Selostus: **Ruokki ei haudo kahta munaa**

Erään teorian mukaan lintujen munamäärä vastaa suurinta poikasmäärää, jonka emot pystyvät kasvattamaan hyväkuntoisiksi jälkeläisikseen. Ruokilla on normaalisti yksi muna ja poikanen. Keinotekoisista kaksimunaisista pesyeistä ruokki hautoi vain yhtä munaa, ja vain yksi poikanen kuoriutui. Kun vastakuoriutuneista poikasista tehtiin keinotekoisesti kahden poikasen pesiä, poikasten kasvu oli hitaampaa kuin normaaleilla yksin kasvaneilla poikasilla. Tästä ei voida kuitenkaan päätellä, että ruokilla on vain yksi muna, koska se ei pysty kunnolla kasvattamaan kahta poikasta. Munatai poikasmäärän kaksinkertaistaminen on liian raju koe, jotta se voisi paljonkaan kertoa pienen munamäärän adaptatiivisista syistä.

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