

# Why do we age?

Blame the kids, say Tom Reed and Sarah Wanless.

Ever felt there might be a link between those premature grey hairs and the stresses of parenthood? This is a question that scientists interested in the biology of ageing have been pondering for some time. Ageing is a universal fact of life – or impending death. Far from being restricted to humans, tell-tale signs of senility (or ‘senescence’, the term used to describe poorer survival or breeding in older individuals) are apparent in a wide range of organisms, from bacteria to birds. Could the demands of rearing offspring early in life make things worse, particularly if environmental conditions are unfavourable?

Ecologists (and parents) have long appreciated that producing and rearing young is a costly business. Considerable energy goes into reproduction, leaving less available for other important biological functions, such as repairing damage to cells, or building a strong immune system to fend off disease. We might expect, therefore, that investing heavily in breeding early in life would compromise the chances of living to a ripe old age or of reproducing successfully when older. Surprisingly, little evidence exists from wild populations of birds to support this intuitively appealing idea. However, a recent doctorate study at the University of Edinburgh set out to test some key predictions.

The study focused on the common guillemot, the UK’s most numerous seabird and the subject of long-term research carried out by Mike Harris and colleagues at the Centre for Ecology & Hydrology (CEH). This work has revealed that guillemots can live for more than 30 years – making them older than many of the students studying them. However, while signs of ageing are obvious in humans (grey hairs, inability to recall where one left one’s glasses), the effects of old age are more subtle in wild birds.

Guillemots were followed throughout their lives by marking them with unique

combinations of colour rings. This painstaking research has generated information on the breeding history of 238 guillemots: an ideal dataset for exploring whether individuals show signs of depressed breeding performance in old age, a classic symptom of ageing.

We showed that guillemots are less successful at rearing chicks as they approach the end of their lives. This was an interesting result in itself as until relatively recently, it was thought that seabirds – renowned for their longevity – barely suffered from the effects of old age. Examination of individual variation in ageing rates highlighted a second important discovery: birds which reared many offspring when they were young paid the price when they were older. Thus, the more chicks they raised early on, the shorter their lives and the less likely it was that any chicks they produced later in life survived through the nestling period. This was presumably because these parents failed to provide the care and resources necessary to ensure the survival of their chicks. The final twist to the story was that guillemots also raised fewer chicks in their old age if they experienced poor conditions early in life. This raises the worrying possibility that if environmental conditions deteriorate in the future, for example, because of climate change, this might affect not only current breeding output, but also breeding performance many years down the line. Further studies of other long-lived species will help us understand how widespread these types of knock-on effects are in wild populations.

These findings make good sense in the light of existing evolutionary theories as to



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why animals age. They also indicate that, at least in guillemots, coping with the kids can take years off your life. 🌸

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**For more details see:**

Reed, T.E., Kruuk, L.E.B., Wanless, S., Frederiksen, M., Cunningham, E.J.A. and Harris, M.P. 'Reproductive senescence in long-lived seabirds: rates of decline in late-life performance are associated with varying costs of early reproduction'. *The American Naturalist*, Vol. 171, No. 2: E89-E101.