UCD Earth Institute
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Ecology and mode-of-life explain lifespan variation in birds and mammals

Kevin Healy, Sive Finlay, Thomas Guillerme, Adam Kane, Seán B.A. Kelly, Deirdre McClean, David J. Kelly, Ian Donohue, Andrew L. Jackson and Natalie Cooper.

School of Natural Sciences, Trinity College Dublin, Irelans. healyke@tcd.ie. @healyke

Backround

In pursuit of cures for human ageing, science has looked to the animal kingdom and the wide range of lifespans in vertebrates. While much of this variation can be explained by body size, some species, such as microbats appear to live far longer than predicted given their body size. Consequently, much attention is now focussed on these taxa with the goal being to discover the genetic and cellular basis of their longevity so as to inform human treatments. We aimed to understand the ecology associated with such unusual species. In particular we investigated whether triats that reduce extrinsic mortality such as the ability to fly are associated with longer lifespans.

Data Collection

To test whether species with traits associated with lower extrinsic mortality have longer maximum lifespans, we collected data on maximum lifespans (Anage) volancy (ability to fly), fossoriality (ability to burrow), daily activity (nocturnality) And envirnment (aquatic, terrestrial) for 1325 birds and mammal species. We used the bird Phylogeny from Jetz et al (2011) and the maamal one from Brina-Edrawsa (2009).

Analysis

We corrected for phylogeny using 500 randomly combined bird and mammal phylogenies. Using MCMCglmm we corrected tested three models;

1: Model of effect of ability to fly
Longevity = f(Mass + Flight capablity + Mass:Flight capablity)

2: Model of volant species only
Longevity = f(Mass + Foraging Envirnment + Activity Period)

3: Model of nonvolant species
Longevity = f(Mass + Foraging Envirnment + Fossoriality + Activity Period)

Results & Discussion

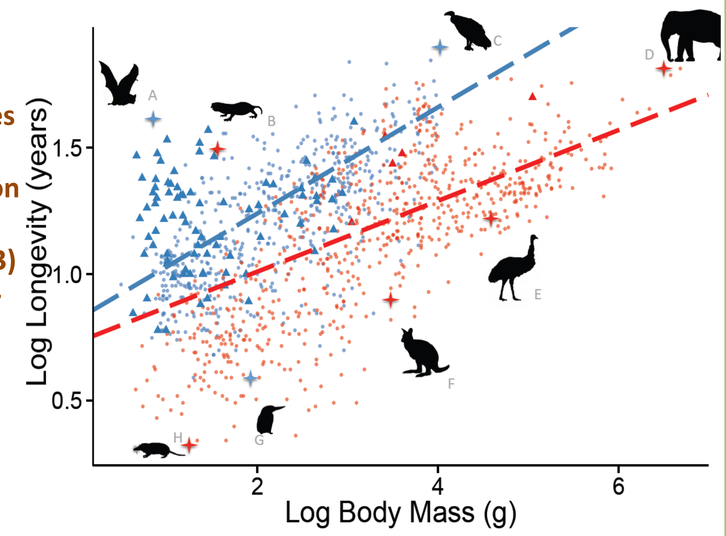
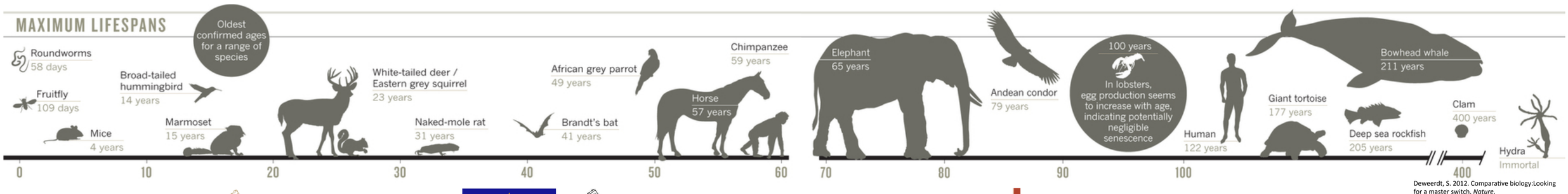


Figure 1.
Blue = volant species (N= 623; slope=0.21 intercept=0.82). Red = non volant species (N= 702; slope=0.14, intercept =0.73)
(A) Brant's bat (B) Naked mole rat, (C) Andean condor, (D) African Elephant, (E) Emu, (F) Papua forest wallaby, (G) Pied kingfisher, (H) Forest shrew.

Our results show that increased longevity is associated with the ability to flying (Fig 1). A long lifespan was also associated with fossorial and. arboroeal species. Of particular note in our findings is that contrary to current thinking, the prolonged lifespans of most bats are not exceptional, given their volant mode -of-life. By considering the evolutionary pressures that shape species lifespan, future avenues in treating human aging can be uncovered



Deweerdt, S. 2012. Comparative biology:Looking for a master switch. *Nature*.

Ireland's EU Structural Funds Programmes 2007 - 2013
Co-funded by the Irish Government and the European Union
European Regional Development Fund
An Roinn Post, Fiontar agus Nuálaíochta
Department of Jobs, Enterprise and Innovation
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