

Cold and isolated ectotherms: drivers of longevity of lizards - Mediterranean and global perspectives

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Animal lifespan is determined by extrinsic and intrinsic mortality causes. According to the evolutionary theories of senescence when mortality pressures are low animals delay reproduction. This enables them to grow more slowly and selection against harmful mutations in adulthood can occur, in turn, selecting for longer lifespans. Lizard physiology is affected by temperatures, which affect their metabolic rates, hence intrinsic causes of mortality. Moreover, in highly seasonal regions lizards hibernate, reducing both metabolic rates (intrinsic mortality) and predation (extrinsic mortality). We assembled a dataset on the maximum longevity, phylogenetic relationships, and relevant eco/morphological variables of 746 lizard species. We compared our global dataset to lizard species from Mediterranean biomes worldwide (n=79 of which 49 are from the Mediterranean basin). Correcting for phylogeny, we found that body mass explains a small proportion of the variance in reptile longevity. Species living on islands, and in cold, seasonal environments, live longer. However, Mediterranean-basin lizard longevity was only related to body mass, and the other predictors were not significant. Correcting for mass, there were no differences in longevity between Mediterranean lizards (average maximum lifespan 10.5 years) and other lizards (10.4 yr., n=667). We suggest that, for lizard species globally, reducing extrinsic and intrinsic mortality pressures by living in environments promoting lower predation pressure, lower metabolic rates and shorter activity periods result in increased longevity. For Mediterranean lizards low statistical power may also be an issue. However, we think that factors such as annual temperature or seasonality, may not differentially influence longevity for lizards from the Mediterranean Basin, because they are relatively similar across the region.