



# Helper effects on body mass senescence in the Seychelles warbler

Senescence is the gradual decline in survival and fecundity with age resulting from an accumulation of cellular damage. Senescence is widely observed in many taxa including birds, but the onset and rate of senescence vary greatly inter-species, intra-species and between-traits within the same individual. The disposable soma theory states that senescence results from an energy trade-off between reproduction and somatic repair, thus many long-term studies on senescence focus on quantifying senescence of fitness traits such as survival and fecundity to test for this trade-off. However, there are relatively few studies quantifying senescence in morphological traits, which are important indicators of body condition. As body condition directly affects survival probability and fitness of an organism, body condition senescence directly provides information on the trade-off between reproduction and somatic repair. Furthermore, the presence of helpers in the natal group, whether an individual helps and the presence of helpers when breeding may all alter senescence trajectories by changing energy allocations/expenditure.

In this project, you will test for helper effects on body mass senescence, while controlling for selective disappearance. You will work with long-term data from a population of Seychelles Warblers (*Acrocephalus sechellensis*) on Cousin Island, Seychelles. The whole population has been intensively monitored since 1997 through bi-yearly fieldwork. Individuals are ringed with a unique combination of colour rings and a BTO metal ring for identification. Due to intensive monitoring and virtually no migration in and out of the island, there is near complete (96%) life-history data of the whole population of warblers, which is rare in wild populations. You will have access to this exceptional long-term database and potential to participate in fieldwork. The results from your study will contribute to the understanding of senescence in the Seychelles warblers.

## Methods:

You will test for helper effects on senescence in body mass. This project will involve:

- Data from an extensive Access database spanning >30 years of data
- Statistical analyses in R: Ideal candidates should have R skills. Supervision will be provided.
- Fieldwork possibility on Cousin Island, Seychelles for ~2 months (Jan-Mar or June-Sep): you must be motivated and experienced in conducting fieldwork in a harsh environment and in bird handling
- Writing up the results to a journal for publication



From this project, you will gain: 1) Experience in handling and wrangling large datasets using R and MS Access, 2) Mixed effects modelling skills in R, 3) An understanding of the evolutionary ecology of ageing, 4) Scientific writing skills and a high likelihood of getting your research published in a scientific journal, and 5) Potential for fieldwork on a tropical island providing bird handling, ringing and observation experience.

## Further Reading:

Chesterton et al 2023, Evolution, <https://doi.org/10.1093/evolut/qp4d199>  
Hammers et al 2015, Exp Gerontol <https://doi.org/10.1016/j.exger.2015.08.019>  
Hammers et al 2019, Nat Comms <https://doi.org/10.1038/s41467-019-09229-3>  
Maklakov and Chapman 2019, Phil trans R Soc B <https://doi.org/10.1098/rspb.2019.1604>  
Nussey et al 2011, Ecology, <https://doi.org/10.1890/11-0308.1>  
Sparks et al 2022, Evol Letters: <https://doi.org/10.1002/evl3.300>

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**Type of project:**  Bioinformatics  Fieldwork  Laboratory  Theoretical  Data analysis  
**MSc program:**  Biology  Ecology and Evolution  Marine Biology  
 Biomedical Sciences  Behavioural and Cognitive Neurosciences  
**ECTS:**  30  40 **Language:**  Dutch  English

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