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A life-history perspective on the demographic drivers of structured population dynamics in changing environments

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CORRIGENDUM

Corrigendum for Koons *et al.* (2016)

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This article corrects:

A life-history perspective on the demographic drivers of structured population dynamics in changing environments.

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During the review process of our manuscript, it was recommended that we cancel the denominator of eqn S1.1 because, in the case where absolute abundances are replaced with normalized abundances ($\hat{\mathbf{n}}_t$), the denominator sums to one. But one should not simplify symbolic equations based on unique numerical situations until the final stages of calculation. Doing so prematurely can yield incorrect solutions to the sensitivity of $\lambda_{\text{realized},t}$ to changes in each unique demographic parameter.

As such, lines 6–19 of Appendix S1 should be replaced with the following text:

“Given that the realized finite population growth rate at any time step can be expressed as

$$\lambda_{\text{realized},t} = \|\mathbf{A}_t \mathbf{n}_t\| / \|\mathbf{n}_t\|,$$

one can expand the right-hand side of this expression for any time-variant matrix population model \mathbf{A}_t using matrix algebra. For the 2-stage matrix population model presented in eqn 9 of the main text, the expansion is

$$\lambda_{\text{realized},t} = \frac{S_{J,t} \times (1 - \gamma) \times n_{J,t} + \rho_t \times n_{A,t} + S_{J,t} \times \gamma \times n_{J,t} + S_{A,t} \times n_{A,t}}{n_{J,t} + n_{A,t}} \quad (\text{S1.1})$$

In turn, this allows for straightforward calculation of the first derivatives of $\lambda_{\text{realized},t}$ with respect to changes in each unique demographic parameter on the right-hand side of eqn S1.1 using symbolic calculus (e.g. with R, Matlab, or Maple). Alternatively, one could use matrix calculus, which would be particularly useful for models of larger dimension (Caswell 2007). Below, we provide the solutions to single time-step sensitivities of the realized population growth rate to change in underlying vital rates and normalized abundances for the 2-stage model.”

For the same reason, the code in Appendix S2 on line 1 of page 6 should be replaced with:

```
gr <- expression(((Sj*(1-gamma)*nj)+
(rho*na)+(Sj*gamma*nj)
+(Sa*na)) / (nj + na))
```

Fortunately, the solutions to the sensitivities shown in Appendix S1 and all corresponding results presented in our paper are not affected by this clerical error because we correctly based our calculations on the complete version of eqn S1.1 (that shown here and that immediately preceding eqn S1.1 in the printed version of the paper).

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