

Summary

Introduction

Materials and Methods

Basic explanation of the models. We modeled a stage-structured population in two stages: immatures and matures. The demography is given by a transition matrix, with...

From Engen et al. (2011), we derived equations for mean variation of phenotype on our model.

We have for variations of phenotype, under weak selection:

$$\Delta \bar{z} = (\theta_f - \bar{z}) \left[\frac{v_I u_I G_I s_0 m \bar{f}_1}{\lambda(P_I + \omega_f)} + \frac{v_I u_M G_M s_0 \bar{f}_2}{\lambda(P_M + \omega_f)} \right] + (\theta_s - \bar{z}) \left[\frac{v_I u_I G_I \bar{s}_I (1 - m)}{\lambda(P_I + \omega_s)} \right] \quad (1)$$

Within the square brackets, we see weighting average of fecundity and survival. Thus, we define them as γ_f and γ_s such as:

$$\gamma_f = \frac{v_I u_I G_I s_0 m \bar{f}_1}{\lambda(P_I + \omega_f)} + \frac{v_I u_M G_M s_0 \bar{f}_2}{\lambda(P_M + \omega_f)} \quad (2a)$$

and

$$\gamma_s = \frac{v_I u_I G_I \bar{s}_I (1 - m)}{\lambda(P_I + \omega_s)} \quad (2b)$$

We supposed an auto-correlated fluctuating environment influencing optimum such as $\theta_f = \bar{\theta}_f + \alpha_f \epsilon_t$. With $\epsilon_{t+1} = (1 - \rho)\bar{\epsilon} + \rho\epsilon_t + \xi$ with ξ a gaussian noise vector with variance σ_ξ^2 and mean 0.

Using Lande (2009), under weak selection we have:

$$\Delta \bar{z} = \frac{d \ln \bar{\lambda}(\bar{z})}{d \bar{z}} = \frac{1}{\bar{\lambda}(\bar{z})} \frac{d \bar{\lambda}(\bar{z})}{d \bar{z}} \quad (3)$$

And we have:

$$\begin{aligned} \bar{\lambda}(\bar{z}) &= \sum_{i,j} v_i u_j \bar{a}_{ij} \\ &= v_I u_I \bar{a}_{II} + v_I u_M \bar{a}_{IM} + v_M u_I \bar{a}_{MI} + v_M u_M \bar{a}_{MM} \end{aligned}$$

With \bar{a}_{ij} the expected values of the coefficient of the transition matrix. Thus,

$$\begin{aligned} \bar{\lambda}(\bar{z}) &= v_I u_I [\bar{f}_1(\bar{z}) m s_0 + (1 - m) \bar{s}_I(\bar{z})] \\ &\quad + v_I u_M s_0 \bar{f}_2(\bar{z}) + v_M u_I m s_M + v_M u_M s_M \end{aligned} \quad (4)$$

$$\begin{aligned} \frac{d \bar{\lambda}(\bar{z})}{d \bar{z}} &= v_I u_I \left[\frac{d \bar{f}_1(\bar{z})}{d \bar{z}} m s_0 + (1 - m) \frac{d \bar{s}_I(\bar{z})}{d \bar{z}} \right] \\ &\quad + v_I u_M s_0 \frac{d \bar{f}_2(\bar{z})}{d \bar{z}} \end{aligned} \quad (5)$$

Results

Subheading1

Subheading2

Discussion

Authors Contributions and Acknowledgments

References

(Barfield et al., 2011)

References

- Barfield, M., Holt, R. D. and Gomulkiewicz, R. (2011). Evolution in Stage-Structured Populations (2 versions). *The American Naturalist* 177, 397--409.
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