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 (REF NEEDED), we derived equations for mean variation of phenotype on our model.

We have for variations of phenotype, under weak selection:

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

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

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

and

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

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

Using LANDE 2009 (REF NEEDED), under weak selection we have:

$$\Delta\overline{z} = \frac{d \log \overline{\lambda}(\overline{z})}{d\overline{z}} = \frac{1}{\overline{\lambda}(\overline{z})} \frac{d\overline{\lambda}(\overline{z})}{d\overline{z}} \tag{3}$$

And we have:

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

with $\overline{a_{ij}}$ the expected values of the coefficent of the transition matrix. Thus,

$$\begin{aligned}\overline{\lambda}(\overline{z}) =& v_I u_I \left[\overline{f_1}(\overline{z}) m s_0 + (1-m)\overline{s_I}(\overline{z})\right] \\ &+ v_I u_M s_0 \overline{f_2}(\overline{z}) + v_M u_I m s_M + v_M u_M s_M\end{aligned} \tag{4}$$

Results

Subheading1

Subheading2

Discussion

Authors Contributions and Acknowledgments

References