

Variable	Description
d_{ij}	number of seeds per plant individual i at site j
λ_{ij}	fecundity of individual i at site j
w_{ij}	individual i germination outcome at site j
r_{ij}	individual i germination probability at size j
f	a suitable link function for regression (e.g., logit, probit, log)
\mathbf{x}_j	covariates (e.g., temperature, precipitation) at site j
$\boldsymbol{\mu}_{ij}$	individual i phenotype at site j
μ_{jq}	phenotypic process associated with site j , individual i , and trait q
γ_r	regression coefficients for the static, dynamic, and phenotypic aspects of the ecological component involving germination
γ_λ	regression coefficients for the static, dynamic, and phenotypic aspects of the ecological component involving fecundity
$\boldsymbol{\alpha}, \boldsymbol{\alpha}_\mu, \boldsymbol{\alpha}_h$	regression coefficients for the phenotypic model component
$\boldsymbol{\beta}_l$	regression coefficients for the static, dynamic, and genetic aspects of the genetic model component
$\boldsymbol{\Sigma}_y$	phenotypic covariance that can account for similarity among individuals and/or sites
σ_q^2	unstructured phenotypic variance for trait q
p_{jq}	phenotypic data associated with site j , individual i , and trait q
\mathbf{g}_{ji}	aggregated genetic data associated with site j and individual i
g_{jil}	genetic data associated with site j for individual i at locus l (e.g., minor allele frequencies)
σ_g^2	spatial variance term associated with gene flow

Table 1: Description of variables in hierarchical model.

Index	Description
i	individual i
j	site j
q	trait q
l	locus or SNP l

Table 2: Description of indices for variables in hierarchical model.