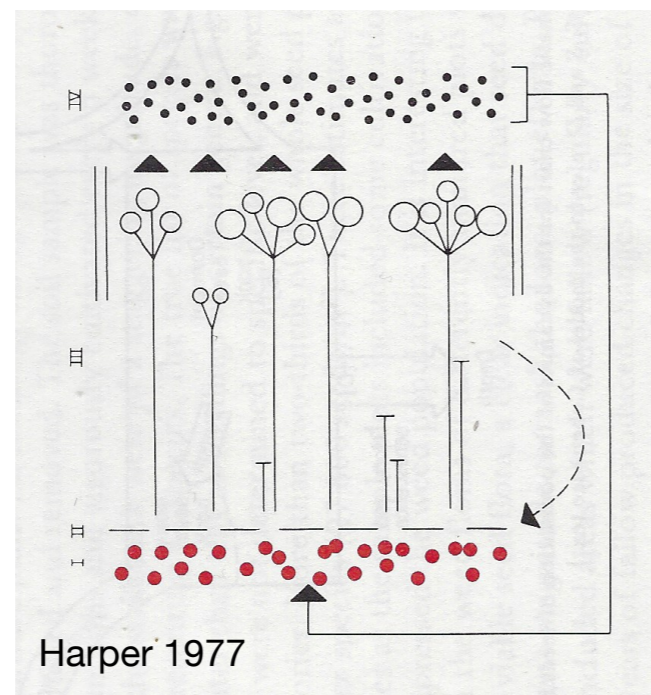


Testing predictions of bet hedging models with intraspecific variation in seed banks of a California annual

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Talk Outline
Background
Questions
Methods
Results

Clarkia xantiana is a winter annual with a seed bank



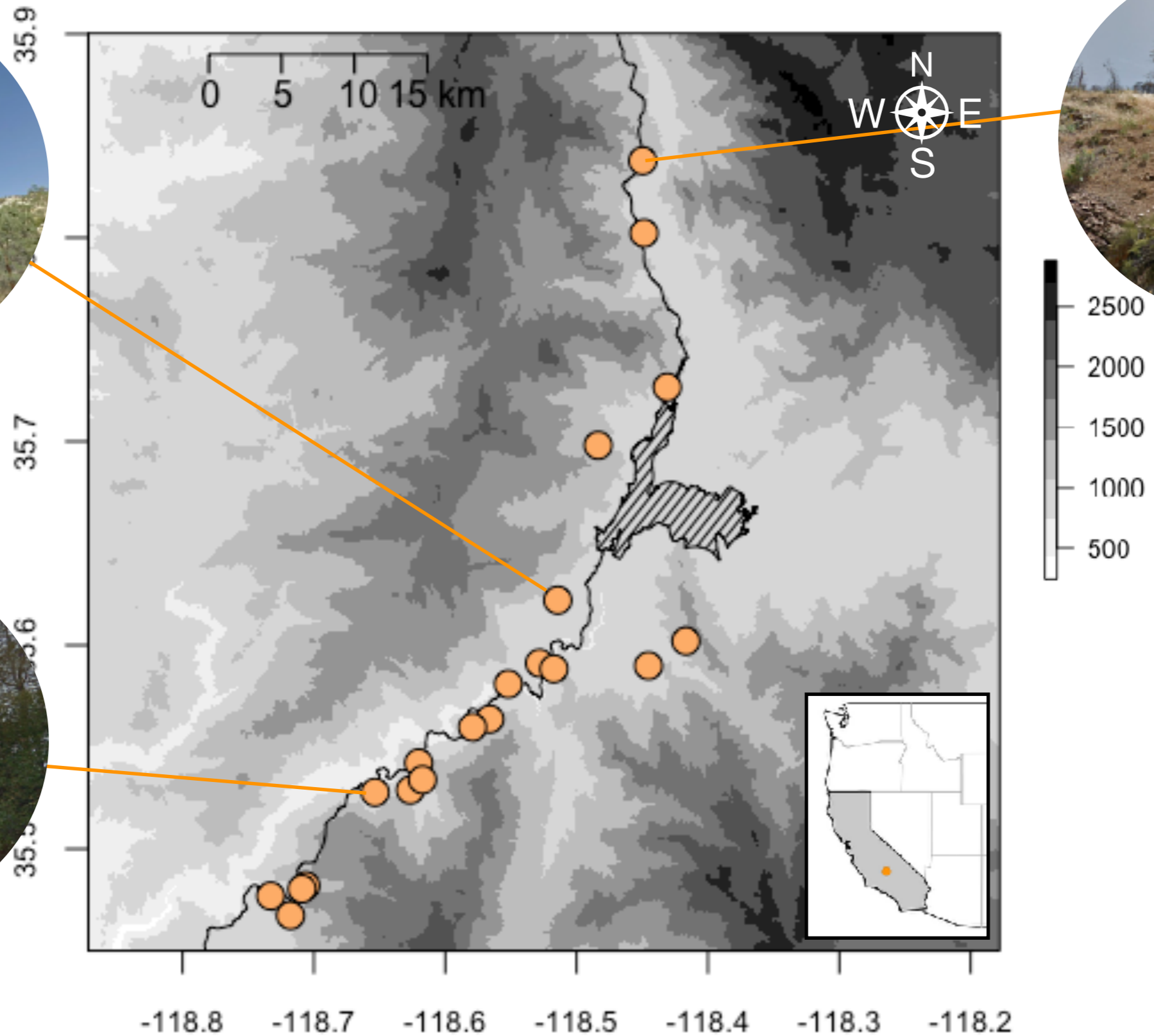
Seeds of *Clarkia* may remain viable for at least 5 years in the laboratory when stored under dry conditions at room

Lewis 1953

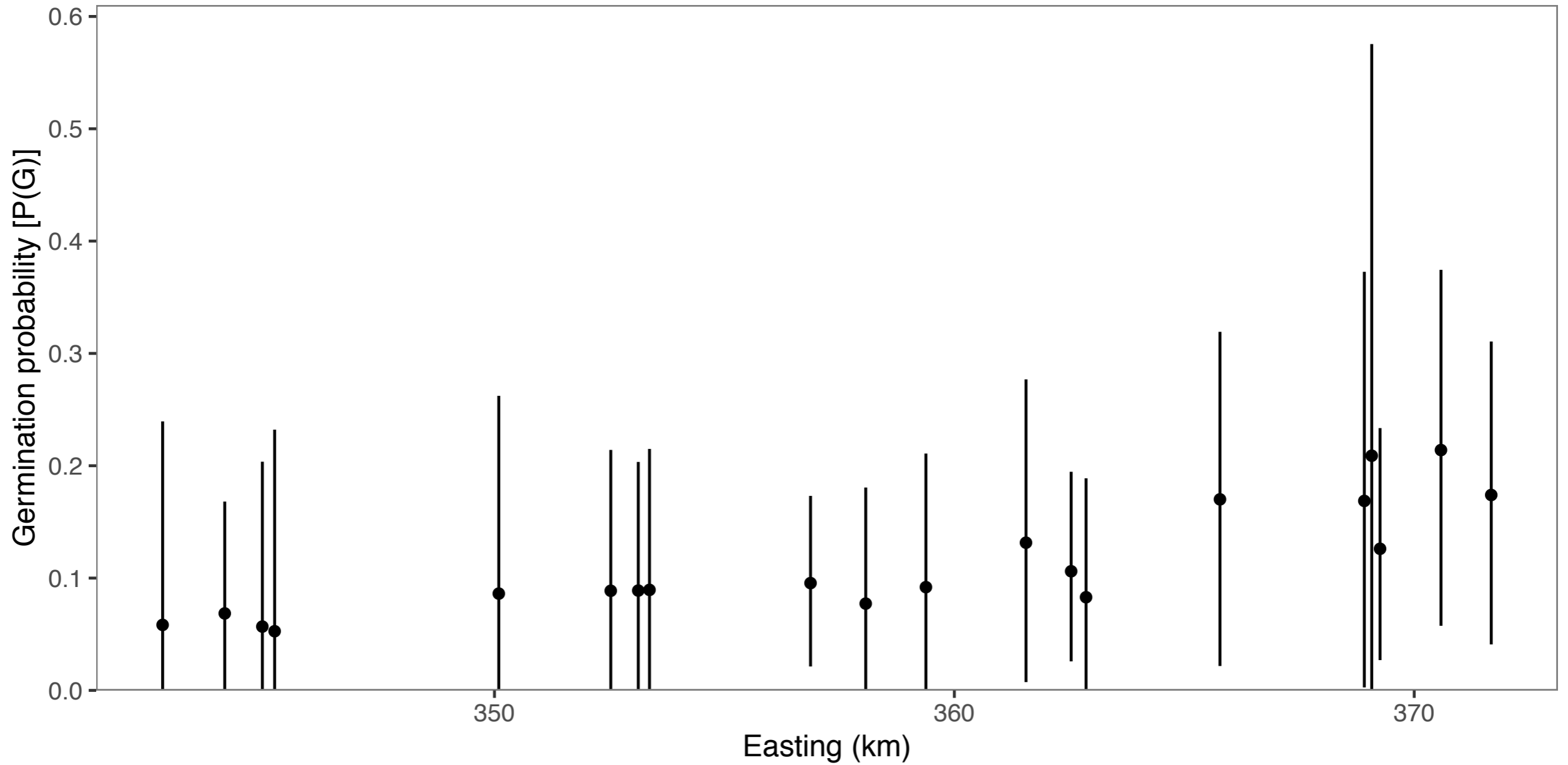


Eckhart et al. 2011

Clarkia xantiana populations occur across a short but steep environmental gradient



Germination probability varies across *Clarkia xantiana*'s geographic range



Theory suggests seed banks allow plants to deal with uncertainty and risk by delaying germination

Two major strategies that contribute to evolution of a seed bank

1. **Bet hedging** proposes that seed banks allow plants to spread risk through time, reducing the variance in fitness over time (Cohen 1966)
2. **Predictive germination** suggests that seed banks enable a plastic response, allowing germination into favorable environments (Cohen 1967)

Is variation in *Clarkia xantiana* germination consistent with predictions of **density-independent models of bet hedging?**

These models connect germination, seed bank survival, and variation in per-capita reproductive success:

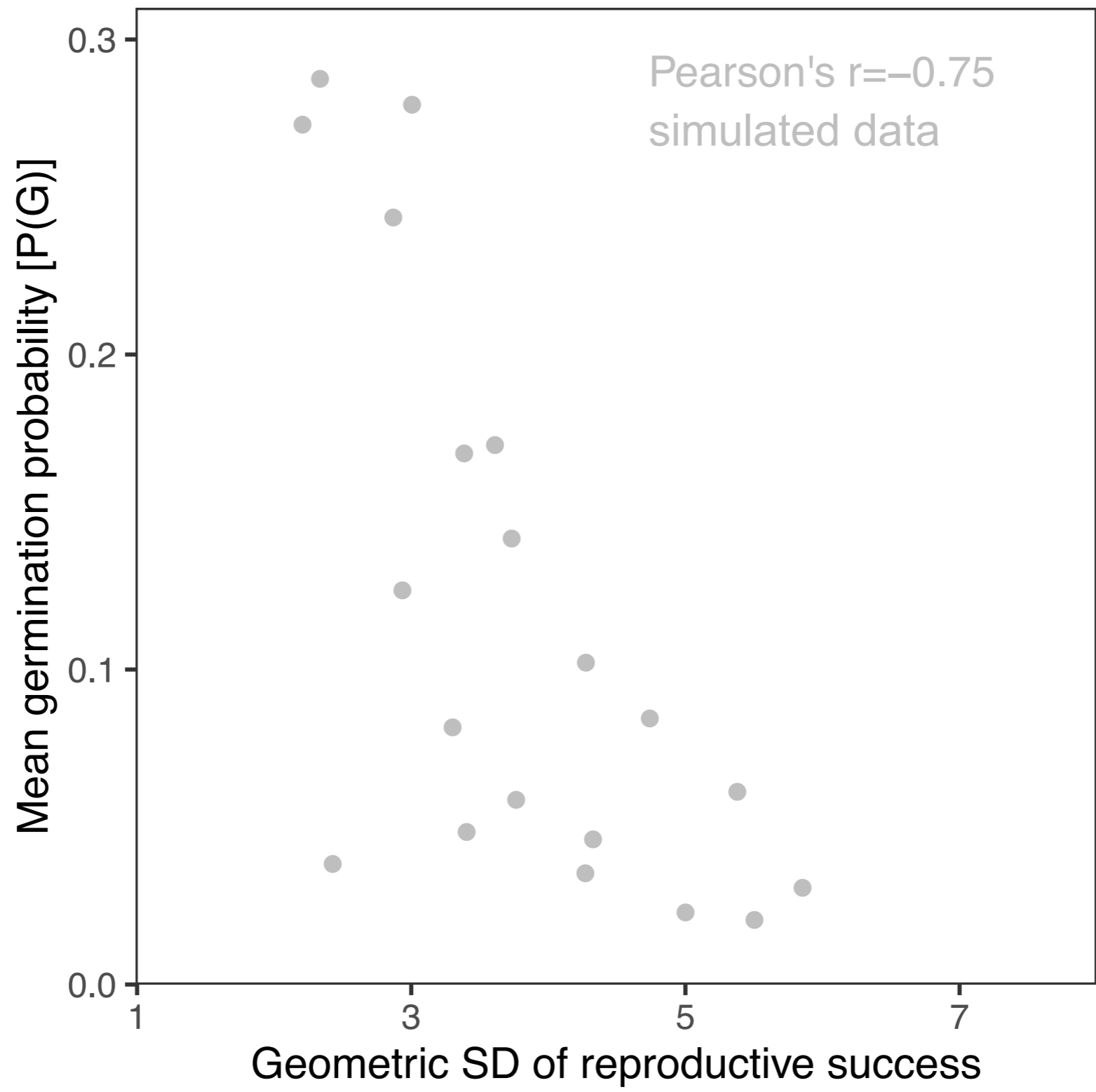
$$\lambda = gY(t)s_0 + (1-g)s_1$$

germinate & produce seeds

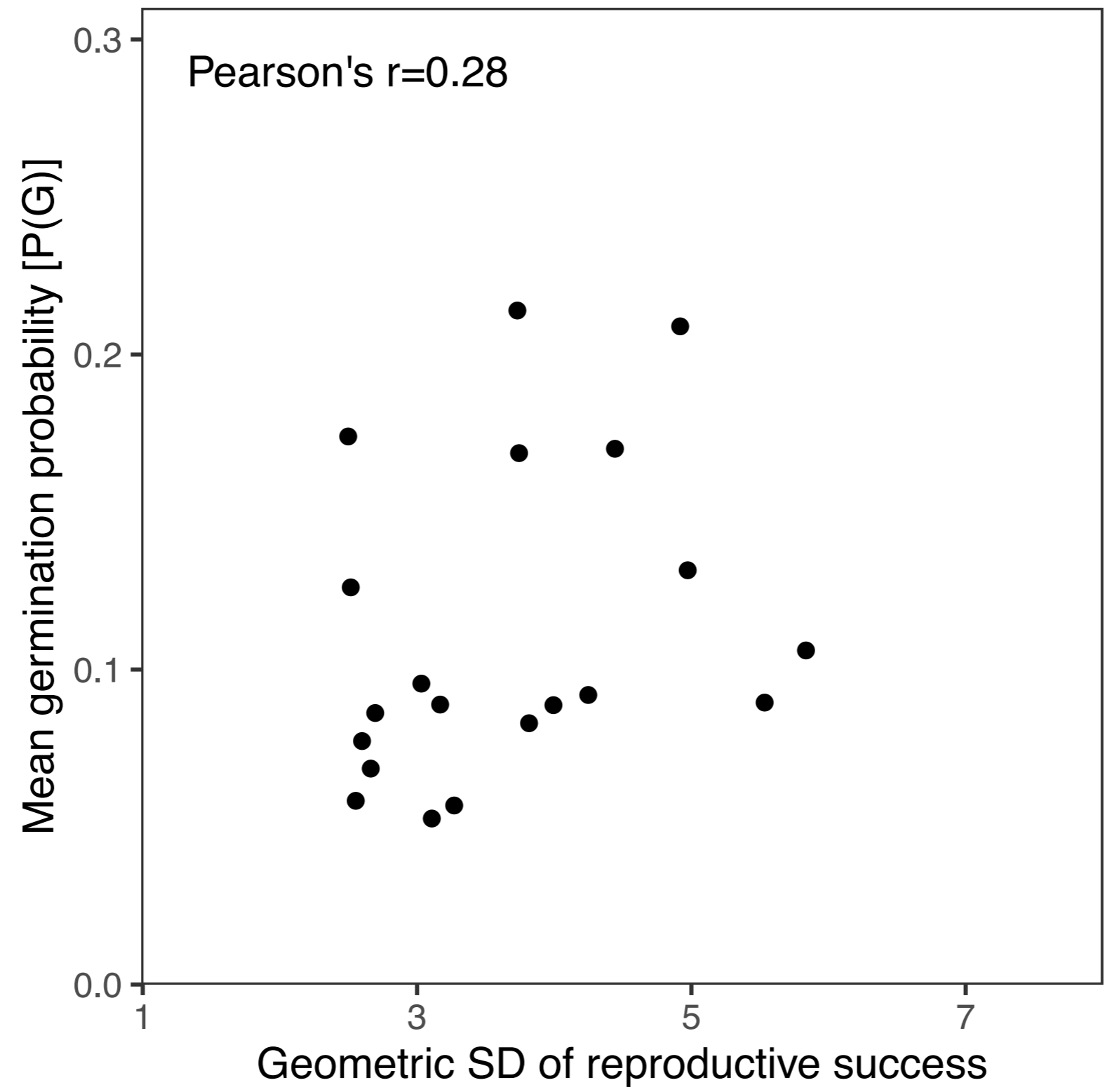
persist in the seed bank

To test predictions, we characterize seed bank parameters (germination, survival) with **3 years of seed burial experiments** and per-capita reproductive success with **12 years of observations on survival and fecundity.**

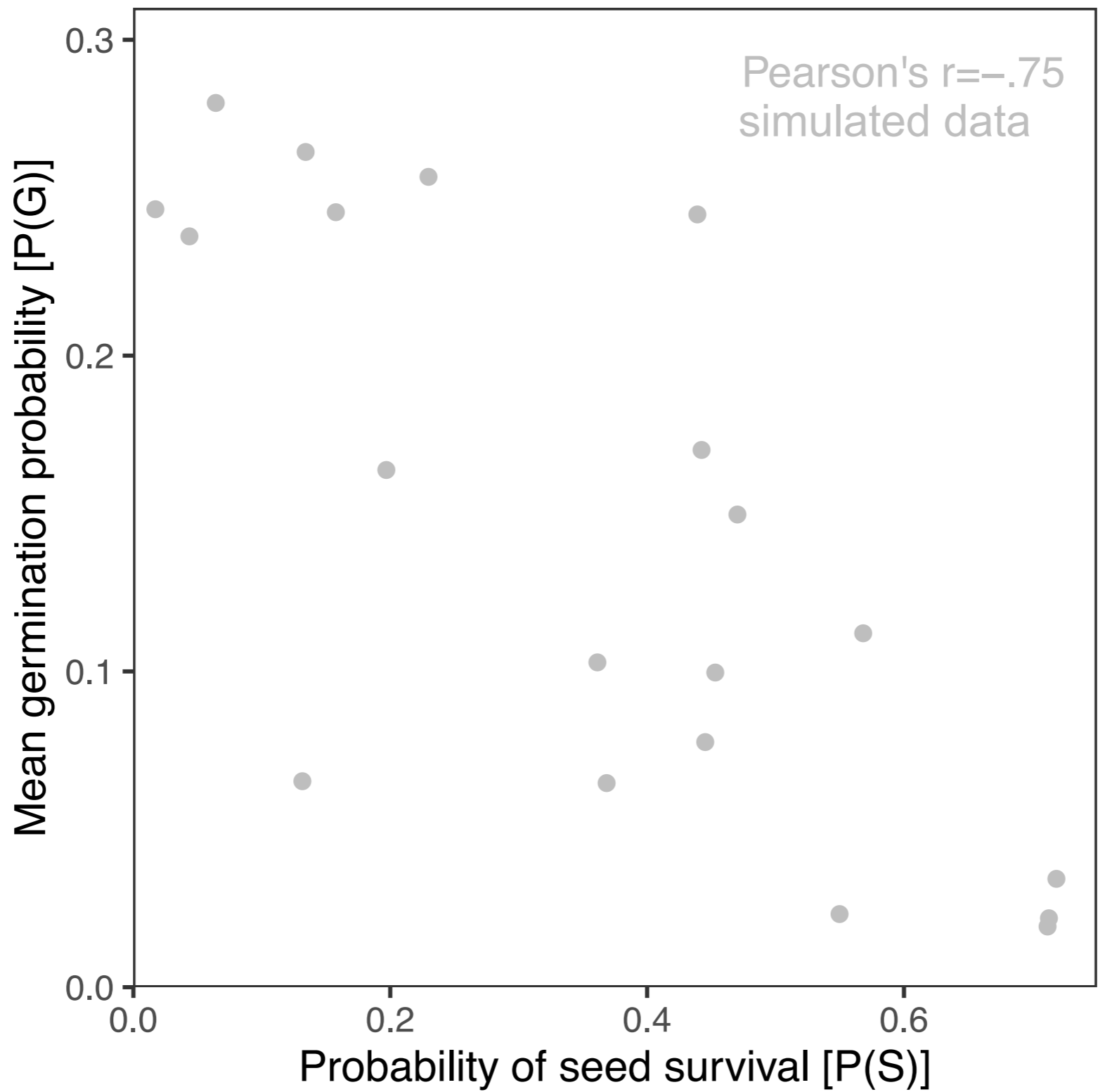
Prediction: germination probability is negatively correlated with the geometric standard deviation of reproductive-success



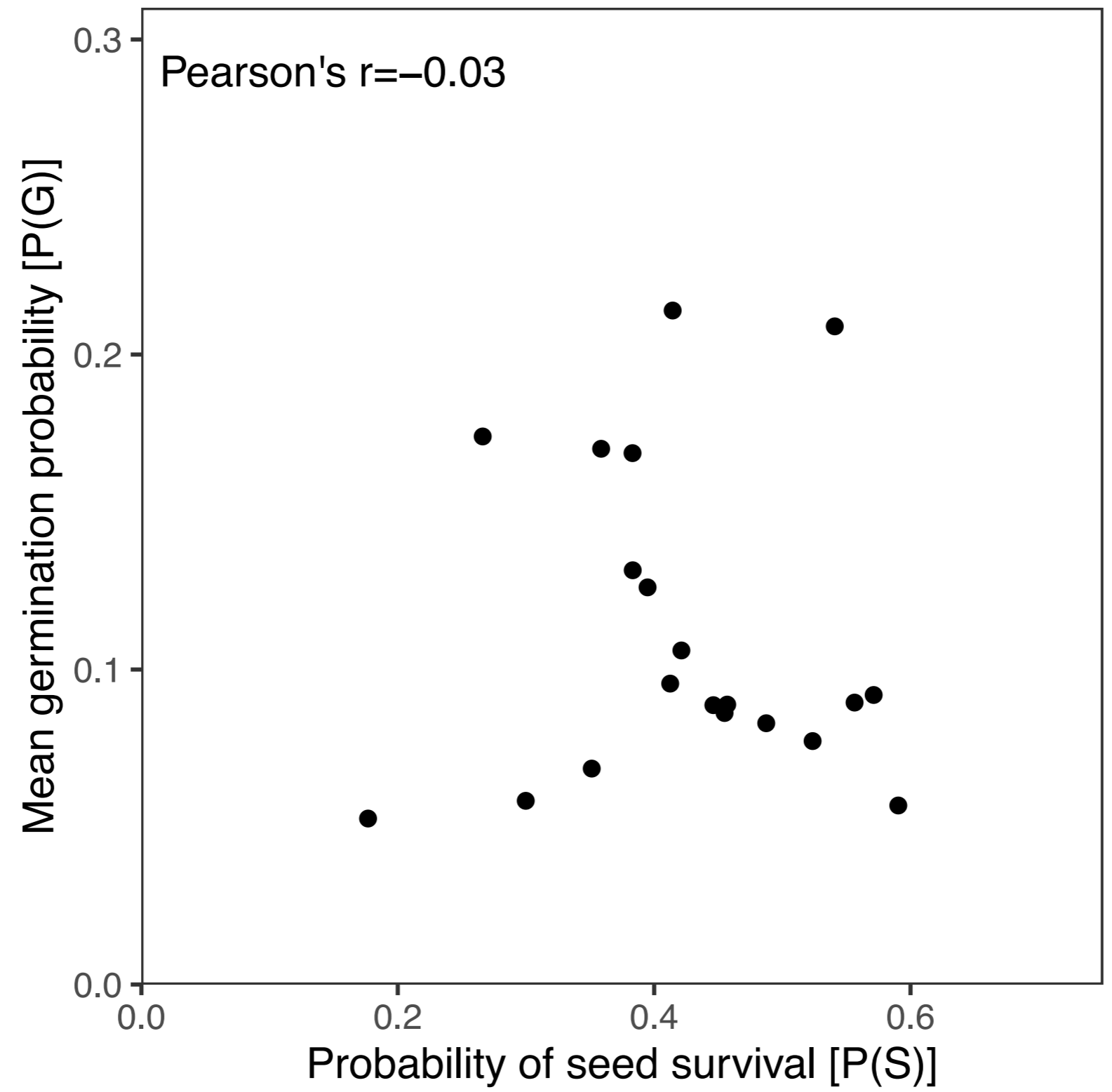
Germination is slightly positively correlated with temporal variation in reproductive success



Prediction: germination probability is negatively correlated with the probability that seeds survive the year in the seed bank



Germination is not correlated with the probability of seed survival in the seed bank



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Intraspecific variation in germination in *Clarkia xantiana* life history is **not consistent with predictions from density-independent models of bet hedging**

- Germination is **slightly positively correlated** with temporal variation in reproductive success
- Germination is **not correlated** with seed survival

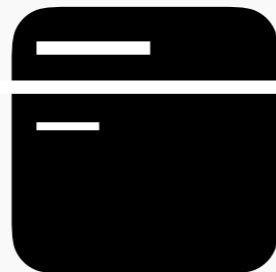
Next steps? Partitioning variation in reproductive success, incorporating density-dependence, and assessing evidence for predictive germination

Thank you for watching! Say hello in the Slack, or contact me with questions or feedback!

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