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An adaptive trade-off between seed size and germination time

I consider a model of an annual plant where seedlings compete for patches that are just big enough to support one plant each. The seeds are characterized by two qualities, their size and the time of their germination. Both qualities affect the competitive ability of the seedlings: big seeds produce more competitive seedlings and early seedlings are more competitive than seedlings that emerge later. I do not assume any physiological trade-off between seed size and germination time. However, I show that there is a Nash equilibrium strategy such that there emerges nevertheless a correlation between the two. If we assume a large resident population and an initially rare mutant population, the Nash equilibrium is also an Evolutionarily Stable Strategy (ESS).

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