

EEB 485 Discussion 09: Storage Effect

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Adler et al. (2009) examine how plant species coexistence within a community can occur due to the storage effect. The storage effect occurs when competing species experience fitness advantages during favorable periods and fitness disadvantages during unfavorable periods. In order for the storage effect to occur, three conditions need to be satisfied: 1. Organisms must persist during bad environmental periods; 2. Species must respond differently to environmental variability, 3. Competition must limit population growth in favorable years due to the effects of intraspecific competition. The authors tested for evidence of these conditions within a sagebrush steppe community using a combination of field data and model simulations. Testing for evidence of the storage effect, however, does not quantify its strength. The authors then used an invasibility approach to test for the strength of coexistence under climatic variability. The authors conclude that there is no evidence of competition during favorable years (condition 3), making storage effects unlikely to mediate the coexistence of these plant species in this environment. Finally, the authors discuss other factors in the sagebrush steppe environment that may explain the contrasting results obtained in the Kansan prairie plant community, namely that the sagebrush steppe community displayed species level response to climate.

Pre-Discussion Questions

1. Why do you think the authors looked for evidence of the storage effect in a sagebrush steppe community? What are some characteristics of this ecosystem that would make utilizing the storage effect a beneficial strategy for plants?
2. Briefly define the invasibility approach and why it was used? Explain the results. Do you think the invasibility approach achieved the stated objectives of the authors?
3. Think back to last week and the evolution of life history traits. What is the conceptual link, if any, between the storage effect and bet hedging? Compare and contrast the species specific life-history traits of the plants under study. How might selective pressure for bet hedging impact the likelihood of the storage effect acting as a coexistence mechanism?