

**Meeting:** 1003, Atlanta, Georgia, SS 18A, AMS-SIAM Special Session on Recent Advances in Mathematical Ecology, I

1003-92-1661      **Andrea Mathias\*** ([amathias@ucdavis.edu](mailto:amathias@ucdavis.edu)), One Shields Ave., Section of Evolution and Ecology, University of California, Davis, Davis, CA 95616, and **Peter Chesson**. *How the diversity of seed dormancy cycles contributes to the coexistence of desert winter annuals?*

The timing of germination is of key importance for annual plants since their seeds in the soil are the only means for future reproduction. If germination occurs in a season that is unsuitable for reproduction, several seasons of reproductive failure leads to soil seed bank depletion and extinction. To ensure germination only at times when reproduction is expected to be successful the seeds exhibit dormancy-nondormancy cycles. The seeds of winter annuals are dormant in summer and germinate in the winter rainy season. In the Chihuahuan desert some winter annuals germinate only in autumn and the seeds become dormant in winter while others germinate in winter. The origin and role of the diversity of dormancy cycles is not understood. We use a modeling approach to study the joint effects of predictable seasonal temperature change, unpredictable rainfall variation and resource competition. The model consists of a differential equation system of the growth of biomass and the change of soil water content through the growing season. We find that the covariance between environment and competition is a key mechanism which is both driving the life history evolution of the dormancy cycles and contributes to the coexistence of species in winter annual communities. (Received October 06, 2004)