THE STRATEGIC SIGNIFICANCE OF THE SEEDBANK. Edward C. Luschei, Assistant Professor, Department of Agronomy, University of Wisconsin – Madison, Madison, WI 53706.

From a demographic viewpoint, the formation of persistent seedbank is a risk-reducing or bet-hedging strategy that trades the potential fitness advantage of a short generation time with the certainty of a floor on the minimum population growth rate. The minimum population growth rate is often as high as 0.5 for many annual weeds, making local extinction times, without immigration and with 100% plant mortality, on the order of decades. The fundamental questions of this symposium are (1) if management actions could lower the floor on the growth rate, would those actions make sense as a way to invest our management resources? (2) given that most seeds are relatively invulnerable to physical and chemical attack, what methods might we employ to lower the floor on their growth-rate? We investigate one aspect of the first of these two points by considering the population biology of horseweed. More specifically, we demonstrate how the seedbank and immigration influence the time required before resistance allele frequencies, ρ_r, achieve their half-saturation point (T_{50}). While seed immigration rates at the early stages of invasion function as spatial refugia, reducing ρ_r directly by diffusive dilution, both the seedbank and resistance management strategies create temporal refugia capable of lengthening the T_{50}. For this reason, the strategic advantage of a seedbank for annual weeds, namely maximizing long-run fitness by establishing a floor on the growth rate, can also be viewed as "built in" resistance management strategy. Using analytical work on resistance from the 1970s and 80s, as well as individual based models, we explore this trade-off using current best estimates for horseweed demographic rates.

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