

FACTORS AFFECTING WEED SEED SURVIVAL IN SOIL SEEDBANKS. James Iannuzzi, Adam S. Davis* and Karen A. Renner, Undergraduate Research Intern, Research Associate and Professor, Michigan State University, East Lansing, MI 48824.

Population models indicate that managing agroecosystems to reduce weed seed survival in soil seedbanks has the potential to decrease weed populations. A series of bioassays was conducted in soil collected from the Long Term Ecological Research site at the Kellogg Biological Station in Hickory Corners, MI. We determined the effect of 1) contrasting agricultural management, 2) burial method, 3) surface sterilization, and 4) mechanical damage to seed coats on the proportion of weed seeds surviving a 28 d incubation in soil at 25 C and 330 kPa matric potential. Weed species included common lambsquarters, field pennycress, giant foxtail, kochia, velvetleaf, and yellow foxtail. Each of the four factors studied significantly ($P < 0.05$) affected weed seed survival. Seed mortality rates of both giant foxtail and velvetleaf were 20 to 40% lower in soils managed with low or no chemical input compared to conventionally managed soils. Burying seeds in mesh bags, a common experimental practice, increased velvetleaf seed mortality due to an increase in fatal germination, but had the opposite effect on giant foxtail seeds. Surface sterilization of the seed coat with 5% bleach for 5 minutes decreased velvetleaf seed survival by 7%, but increased giant foxtail seed survival by 40%. Survival of all six weed species was reduced by mechanical damage to the seed coat, with large declines in velvetleaf and kochia seed survival (77 and 83%, respectively). The wide range of weed seed survival rates in response to altered abiotic and biotic conditions holds promise for the development of agricultural management practices that reduce weed seed survival in soil seedbanks.