

POPULATION EFFECTS OF GENE FLOW FROM TRANSGENIC SUNFLOWER TO WILD *HELIANTHUS ANNUUS*. Diana Pilson, Helen M. Alexander, and Allison A. Snow; University of Nebraska, Lincoln, NE 68588; University of Kansas, Lawrence, KS 66045; and Ohio State University, Columbus, OH 43210. (187)

Although many studies have examined the probability that transgenes will move into wild populations, far fewer have evaluated the potential ecological consequences of such gene flow. In a long-term study we have been evaluating the effect of increased seed production (as would occur if a Bt transgene for lepidopteran resistance moved into wild populations) on the size and persistence of wild sunflower populations. In wild sunflower, *Helianthus annuus*, population size (and seed production) in one year is positively correlated with population size in the following year at our Nebraska field site but not at our Kansas field site. This result indicates that at least some sunflower populations are seed limited. Now we show that in Nebraska this effect persists, through the survival of dormant seeds in the seed bank, for at least five years. In 2000 and 2001 we initiated experimental populations that dispersed between 2000 and 20,000 seeds in the year of establishment, but that were prevented from dispersing additional seeds in the following years. In populations initiated in 2000 population size in 2001, 2002, 2003, 2004 and 2005 were all positively correlated with seed dispersal in 2000. In the 2001 populations, which dispersed fewer seeds, there was almost no germination in 2002 (due to a severe drought), but population size in 2003, 2004, and 2005 were each positively correlated with seed dispersal in 2001. Thus, the dynamics of local sunflower populations are controlled by seed production, and this effect persists for several years. Because sunflower requires a recent disturbance to germinate, our results suggest that the larger-scale dynamics of sunflower are a complex function of disturbance pattern, environmental conditions, and population size (and seed production) in (at least) the previous five years. Although long survival in the seedbank is common, this study is the first to document such long-lasting effects of the seedbank on the dynamics of a wild plant population. Our results suggest that if a Bt transgene were to become established in wild *Helianthus annuus*, local populations could be larger and that this effect could persist (in the seedbank) for at least several years.