

SINGLE-LOCUS AND MULTI-LOCUS ESTIMATES OF OUTCROSSING IN HELIANTHUS ANNUUS L. Charles Lay and James Gerdes, Alex Kahler, and Richard Whalen, Plant Science Dept., South Dakota State University, Brookings, SD, 57007 USA. Biological Sciences Manager, Garst Seed Co. P.O. Box 500, Slater, Iowa 50244. Biology Dept., South Dakota State University, Brookings, SD, 57007 USA.

Beginning in 1983, two thousand plants of Germplasm Pool II were allowed to random mate in isolation. An equal number of seeds from each of one-hundred randomly selected plants was bulked to form the next cycle. This process was repeated for two more years. Twelve seeds from each of thirty-five plants selected at random from the 100 plants making up the next cycle were analyzed for eight enzyme loci using starch gel electrophoresis. The loci assayed were *Idh2* (isocitrate dehydrogenase 2), *Mdh1* (malate dehydrogenase 1), *Acp2* (acid phosphatase 2), *Prx3* (peroxidase 3), *Pgm4* (phosphoglucumutase 4), *Gpi2* (glucose phosphate isomerase 2), *Pgd1* (6-phosphogluconate dehydrogenase), and *Sdh3* (shikimate dehydrogenase 3).

Single-locus estimates for outcrossing averaged over all loci were 0.80 (+/-0.03), 0.89 (+/-0.04), and 0.88 (+/-0.03) in each of the three years. Assortative mating for *Prx3* favoring homogametic mating was observed all three years. One possible explanation is a preference for the homozygote of this particular genotype by the pollinator. Other reasons could be poor germination of plants heterozygous for this loci, and a nonuniform pollen pool. Multi-locus estimates of outcrossing for these same three years were 0.88 (+/-0.03), 0.98 (+/-0.03), and 0.94 (+/-0.02), with an overall estimate of outcrossing of 0.93 indicating a selfing rate of 0.07.