

GENE FLOW FROM IMIDAZOLINONE RESISTANT DOMESTICATED SUNFLOWER TO COMMON SUNFLOWER AND PRAIRIE SUNFLOWER. Rafael A. Massinga and Kassim Al-Khatib, Research Associate and Associate Professor, Department of Agronomy, Kansas State University Manhattan, KS 66506.

Imidazolinone (IMI)-resistant gene flow from domesticated sunflower to IMI-susceptible common sunflower (*Helianthus annuus*) and prairie sunflower (*H. petiolaris*) was studied. Under greenhouse conditions, pollen from IMI-resistant domesticated sunflower was applied to flower heads of IMI-susceptible common and prairie sunflower. In addition, field studies were conducted in 2000 and 2001 near Manhattan Kansas, to evaluate IMI-resistant gene flow from IMI-resistant domesticated sunflower to common and prairie sunflower under natural conditions. Common and prairie sunflower were planted in concentric circles at distances of 2.5, 5, 15 and 30 meters around a densely planted IMI-resistant domesticated sunflower species. For both greenhouse and field studies, IMI-resistant gene flow was determined by treating the progeny of both wild species with 40 g ai ha⁻¹ imazamox to determine presence of imidazolinone resistance. The outcrossing rate was 92% for common sunflower and 90% for prairie sunflower. The plants that survived the treatment with imazamox were allowed to grow in greenhouse and were backcrossed to the corresponding wild parents. The progeny of the backcross showed a 1:1 ratio segregation of resistant and susceptible plants. In the field, resistance to imazamox was detected up to 30 m from the pollen source for both species. In addition, resistance to imazamox decreased as distance from the pollen source increased. In 2000, the resistance ranged from 11 to 22% at 2.5 m from the pollen source and from 0.3 to 5.6% at 30 m. In 2001, the levels of resistance did not exceed 7% and 2% at 2.5 and 30 m from the pollen source, respectively. Overall greater levels of resistance in the field were observed in prairie sunflower than in common sunflower. The results of this study showed that IMI-resistant domesticated sunflower outcrosses with common sunflower and prairie sunflower and backcross of resistant hybrids to wild parents occur successfully increasing the potential for resistance spread.