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Honeybees as novel herbicide delivery systems. Forcella, F.[1,*] [1]USDA-ARS, Morris, MN. The fecundity of several invasive weeds is dependent upon honeybees. Such bee-pollinated species include yellow starthistle (*Centaurea solstitialis*) and many other temperate and tropical species. Because bees already transport a granular formulation of gametes (pollen) to flowers, we may ask whether they also could transport granular formulations of gameticides (inhibitors of seed development). As bees exit beehives, can they be dusted with dry formulations of a gameticide, which then is carried to flowers of invasive weeds? If this is possible, then gameticide facsimiles of pollen might eliminate seed production and thereby improve the long term management of invasive weeds. Several herbicides are non-toxic to bees and are good candidates as gameticides. Preliminary tests on yellow starthistle show that glufosinate inhibits seed development by more than 95% when applied at rates as low as 2 nanograms to individual flower heads (capitula). Preliminary tests with honeybees show appreciable overlap between loadings of dry formulations of 2% glufosinate on bees and glufosinate efficacies for seed inhibition. If bees can be used to transport efficacious gameticides, then we will have a novel solution to managing yellow starthistle. This is especially important in natural areas, parks, and amenity and waste areas near human habitation, as well as in rangelands, vineyards, and elsewhere. Using honeybees to vector "microsite-specific" gameticides would pose little health risk to the public or to other non-target organisms. Additionally, it capitalizes on the natural and intense synergy between introduced honeybees and important invasive plants. (311)

Interspecific hybridization in Asteraceae: case studies in Ambrosia, Conyza and Helianthus. Zelaya, I.A.[1] and Owen, M.D.[1,*] [1]Iowa State University, Ames, IA. When evaluating herbicide resistance and the potential for resistance dissemination within agroecosystems, most studies focus on biotic factors as weed seed production, viability and dispersal, the species mating system, and the genetics associated with the resistance trait. However, far less attention is centered on the potential for resistance spread though interspecific hybridization (introgression). Some studies have chronicled the transgenic flow and successful transmission of herbicide resistance alleles from cultivated crop species to their weedy congeners; nevertheless, fewer data exists regarding the between weed species gene flow. Considering the representation of Asteraceae weed species within US agroecosystems, introgression of herbicide resistant alleles was investigated in the important genii *Ambrosia*, *Conyza* and *Helianthus*. For the study, the cross resistant triazolopyrimidine sulfonanilide and sulfonylurea (SU) giant ragweed (*A. trifida* L.; 2n = 24) and imidazolinone and SU common sunflower (*H. annuus* L.; 2n = 34) populations from Iowa were utilized, in addition to a glyphosate resistant horseweed (*C. canadensis* L. Cronq.; 2n = 18) population from Delaware. The herbicide susceptible common ragweed (*A. artemisiifolia* L.; 2n = 36), Jerusalem artichoke (*H. tuberous* L.; 2n = 102), and dwarf fleabane (*C. ramosissima* Cronq.; 2n = 18) populations originated from Iowa. In all three genii evaluated, herbicide resistance was expressed as a nuclear allele, partially dominant (*Ambrosia* and *Helianthus*) or over dominant (*Conyza*) trait in first filial interspecific hybrid generation (F1H). Herbicide transfer frequency in the F1H ranged from 40 to 60%, 0 to 9%, and 30 to 50% in Ambrosia, Conyza, and Helianthus, respectively. Inheritance of herbicide resistance in the selfed F1H generation (F2H) followed the monofactorial model in all evaluated genii; F1H backcrosses confirmed successful introgression of the herbicide resistance allele to either parent. Interspecific hybridization therefore represents a potentially important avenue for the dissemination of herbicide resistance and the promotion of genetic diversity, thus complicating the containment of herbicide resistance in current (312)

Pollen dispersal and hybridization between giant ragweed and common ragweed. Volenberg, D.S.[1,*], Rayburn, L.A.[1] and Tranel, P.J.[1] [1]Department of Crop Sciences, Urbana, IL. A field study was conducted to determine the pollen dispersal characteristics of giant ragweed (*Ambrosia trifida*). Plants of a biotype resistant to acetolactate synthase (ALS)-inhibiting herbicides were surrounded by plants of a sensitive biotype in concentric circles having radii of 5, 10, 20, 40, and 60 m. Progeny obtained from herbicide-sensitive plants were screened for resistance to an ALS inhibitor to establish pollen dispersal from resistant plants. The majority of giant ragweed pollen was dispersed within 5 m and pollen dispersal declined rapidly as the distance increased. The mean percentage of herbicide resistant progeny—which presumably received pollen from the resistant plants-was 31, 11, 8, 4, and 5% at 5, 10, 20, 40, and 60 m, respectively. Pollen was uniformly dispersed in all directions, except for the true west direction in which herbicide resistant progeny were $<$5% at all distances. Some of the progeny plants displayed peculiar leaf morphology which resembled that of common ragweed (*A. artemisiifolia*). These plants were further investigated as well as representative plants of giant and common ragweed using flow cytometry (DNA content), root squashes (chromosome counts), and pollen viability. Results of flow cytometry suggested that these peculiar plants are hybrids of giant and common ragweed. The DNA content of the hybrids was 3.03 pg, whereas the DNA content of giant and common ragweed was 3.94 and 2.36 pg, respectively. Chromosome counts revealed that the hybrid plants contained on average 30 chromosomes (range 29 to 31), whereas giant and common ragweed contained 24 (range 23 to 24) and 36 (range 35 to 36) chromosomes, respectively. Pollen germination tests demonstrated a mean germination rate of 26% for giant ragweed, compared to rates of 5 and $<$1% for common ragweed and the hybrid, respectively. Hybrid ragweed pollen grains varied in size, whereas the pollen grains of giant and common ragweed were uniform in size. Hybrid ragweed plants crossed to either common or giant ragweed plants produced seeds. Our laboratory is currently investigating the potential of these seeds to germinate and produce progeny. (313)

When gene flow occurs between Clearfield rice and red rice. Burgos, N.R.[1,*], Shivrain, V.K.[1], Moldenhauer, K.K.A.[2] and Moore, J.W.[3] [1]Dept. of Crop, Soil, and En-