

Modeling feral alfalfa (*Medicago sativa* subsp. *sativa* L.) occurrence using topographical and environmental variables

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Because alfalfa is a perennial species cross pollinated by bees and can establish along roadsides and ruderal areas, there is concern that feral plants can serve as reservoirs and conduits for transgenic genes. The objective of this study was to survey feral alfalfa in alfalfa seed production areas in Fresno Co., CA, Canyon Co., ID, and Walla Walla Co., and test for the occurrence of the Round Up Ready (RRA) transgene. Because the survey occurred 4-6 months after the February 2011 deregulation of RRA, occurrence of the transgene in feral plants could be attributed to escape during the first deregulation (2006-2007). Feral plant occurrence was modeled using topographical, environmental, and crop occurrence variables. Survey sites were randomly selected along rural roads using the Spatially Balanced Sample Design tool from ARC GIS 10. Leaf and seed samples were collected from alfalfa plants growing at the site. Leaf and seed were tested for the RRA transgene with RUR immunotest strips and positive tests confirmed with PCR. At each site data on topography, climate, cropping pattern, roadside weed management and habitat were obtained. Chi square tests and logistic regression models were used to test the influence of variables on feral plant occurrence. Feral-RRA populations were detected at each study location which suggested that the RRA transgene can persist in the environment. In Fresno and Canyon Counties, out of 814 and 699 sites visited, 130 (Fresno) and 88 (Canyon) sites had feral plants, and out of those sites, 53 (Fresno) and 12 (Canyon) sites were positives. In Walla Walla Co., although 128 sites had feral plants out of 787 sites visited, only 10 sites were positives. Frequency of RRA transgene was similar in Walla Walla and Canyon counties, but higher frequency in Fresno Co. Seed-mediated gene flow may also be significant since feral-RRA plants occurred along arterial roads. Feral-RRA sites were also located away from seed production areas, suggesting hay production may be a source of feral-RRA escapes. The chi square test results showed significant relationship between crops adjacent, bees obstructing structure, vegetation cover, roadside weed management, species diversity, and feral plant occurrence. The logistic regression model showed no significant relationship between elevation, slope, aspect, and feral plant occurrence in Canyon Co. Pending completion of the analysis, further results will be presented.