

DEVELOPING AN HERBICIDE RESISTANT WEED MANAGEMENT PLAN

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Abstract

The recent threat of glyphosate-resistant Palmer amaranth (*Amaranthus palmeri*) has brought renewed national attention to the issue of herbicide resistance. However, it is important to remember that herbicide resistance in weeds is not a new phenomenon. The first documented case of herbicide resistance occurred in 1968 when a biotype of common groundsel (*Senecio vulgaris*) was discovered to be resistant to simazine (Princep). The main cause of herbicide resistance in weeds is repeated applications of herbicides with the same site of action. Additionally, herbicide resistance is more likely to develop in annual weeds that occur in high populations, are widely distributed, are prolific seed producers, and have efficient gene (seed or pollen) dissemination. Since the reasons for the evolution of herbicide resistance are well known and history has proven that it will happen, it seems logical that it should be delayable. Unfortunately, there are several reasons why long-term herbicide resistant weed management plans have not been routinely implemented. A few of these reasons include economics, a reluctance to change production practices, a denial that the problem exists, and the belief that chemical companies will develop “new” herbicides. Components of a successful herbicide resistant weed management plan include the following: 1) incorporating the use of control strategies that reduce the sole dependence on herbicides i.e. crop rotation, tillage, cover crops, mechanical cultivation, and narrow row spacing ; 2) knowing the modes of action of the herbicides that are used at the farm level; 3) rotating herbicide modes of action; 4) using tank-mixtures or pre-mixtures of herbicides; 5) using residual herbicides on every acre; 6) rogueing weed escapes before seed production; and 7) managing post-harvest weed populations in geographical areas that have early harvests and late killing frosts. The future of current popular herbicides, such as flumioxazin (Valor), fomesafen (Reflex), and glufosinate (Ignite), may be in jeopardy unless they become incorporated into a total herbicide resistant weed management plan.