

Managing Invasive and Resistant Weeds
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Weed management of invasive and resistant weeds is just as important in annual row crops and vegetables as perennial strawberry patches or apple orchards. The cropping systems may have different tools in their pockets, but the main concepts behind weed management programs are the same. Weeds will compete with the crop for sunlight, nutrients and water, and may also pose as reservoirs for other pests, including insects and disease. There has been growing concern across the country about invasive and resistant weeds, in particular weed resistance to glyphosate (Roundup). The number of weed biotypes with resistance to various herbicide mechanism-of-action (MOA) or site of action has increased to 146 in the United States as of January 1, 2015 and a total of 438 throughout the world (source <http://www.weedscience.org>). In addition, the number of weeds with multiple sites of resistance has also increased to a total of 78 species. This has brought much attention to herbicide resistance and national summits held by the Weed Science Society of America in Washington, DC, to address the issues and identify ways in which the impact of herbicide resistance can be minimized on the agricultural community.

Best management practices for effective weed control and resistance management have been developed by Norsworthy, et al. (2011). They include:

1. Understand weed biology
2. Prevent weed seed production and reduce soil seedbank
3. Plant into weed-free fields and keep them as weed free as possible
4. Plant weed-free seed
5. Scout regularly
6. Use multiple herbicide Mechanisms of Action (MOA's)
7. Apply labelled rate of herbicide for weed size
8. Implement cultural practices that increase crop competitiveness
9. Use mechanical and biological options when available
10. Prevent weed seed/propagule movement
11. Manage weed seed at harvest
12. Manage field borders to reduce influx of weeds

By implementing a diverse and integrated weed management program that includes cultural, mechanical, and biological practices in addition to chemical programs the development of weed resistance can be delayed. The use of several herbicides with different mechanisms of action and overlapping control at the labeled rate for each weed species and size will reduce the selection pressure as compared to use of only a single practice. The WSSA has developed a herbicide classification system according to mechanism of action and this classification is now be used on most herbicide labels to assist growers in selecting herbicides with different MOA's.

As of today, in New York only four documented biotypes have been identified with herbicide resistance all of which to the Triazine herbicide group (#5). Pennsylvania has two documented cases of glyphosate resistance (common ragweed and palmer amaranth), and undocumented reports of glyphosate resistance populations of ragweed, horseweed and waterhemp have been reported in New York, so it may only be a matter of time before New York has officially documented glyphosate resistance weed populations. This further makes the case for the entire agricultural community to be on the lookout and proactively utilize a diverse tool box in their weed management programs.