

WISCONSIN VEGETABLE WEED MANAGEMENT UPDATE

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While weed management across the Wisconsin vegetable acreage was generally quite good in the 2016 season, regulatory and resistance issues continue to loom and threaten management options in the very near future.

On the regulatory updates front, in September 2015 we learned that diquat would undergo federal registration re-evaluation as part of a required process carried out every 15 years by the Environmental Protection Agency (EPA). Diquat has been a mainstay for potato vine desiccation for many years, speeding up vine kill and enhancing skin set and reducing disease risk. Several restrictions were originally proposed by EPA in the diquat re-registration process, including limitations to the rate and number of applications, but by far the proposed application timing restrictions were most concerning for potato growers. The EPA draft risk assessment indicated that diquat use might need to be limited to fall and winter months, effectively eliminating use as a potato vine desiccant in our production region. The potato industry and research community entered many public comments reflecting the potential negative impact of such a restriction. Final decisions are still pending based on this input, but our voices have been heard. Our comments were justified with data from our recent vine desiccation research. Additionally, we've been investigating several alternative vine desiccation systems that will speed up vine kill and enhance skin set. Our work has targeted early season potato vine desiccation as the most challenging scenario, when vines remain healthy and actively growing.

For years, we've preached about avoiding weed resistance to herbicides and showed "gory" examples from other parts of the world. Well, we no longer need to travel far to show dramatic examples – unfortunately, we can just look in our back yard. In Wisconsin, we now have confirmed glyphosate resistance in horseweed, giant ragweed, Palmer amaranth and common waterhemp, with suspected cases involving additional species. Confirmed resistance to glyphosate is now quite widespread in species such as common waterhemp. Additionally, populations of this weed species have also been found in Wisconsin with resistance to multiple herbicide modes of action in a single plant. In vegetable crops, this makes our efforts to secure new weed management tools even more critical so that we can overcome resistance by diversifying our portfolio.

In response to widespread global glyphosate resistance in weeds, agronomic crops including soybean, cotton and corn with resistance to synthetic auxin herbicides such as 2,4-D and dicamba are in various stages of the approval and introduction process. In August 2016, the EPA issued a compliance advisory noting allegations of dicamba misuse on early commercial introductions of resistant soybean and cotton across 10 states (there were no legal uses of dicamba across the top of soybean or cotton during the 2016 growing season). Crop damage allegedly from off-target dicamba was reported on thousands of acres of nearby crops that ranged from melons and tomatoes to peaches. We can learn from this unfortunate situation as synthetic auxin-resistant soybean seed will increase in availability next growing season. Keep in mind that off-target herbicide movement happens in a number of ways that include volatility, spray drift at the time of application and tank contamination, and many of our broadleaf specialty crops are susceptible to these products.

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Our vegetable research in the 2016 growing season included potato, sweet potato, celery, carrot, onion, snap bean, lima bean, pumpkin and mint, among other crops. In several of these crops we have newer potential herbicides that are approaching registration and will greatly increase our weed management options. Our recent work in carrots is summarized below as an example.

Carrot growers remain challenged with a broad spectrum of weed species in a relatively uncompetitive crop and currently have few management options to remedy the situation. Furthermore, linuron, one of the more effective control options in carrots, is restricted in use on coarse-textured, low organic matter soils where the crop is often grown. With this in mind, our research over the past two years has been conducted to: 1) identify herbicide programs that provide season-long control; 2) evaluate preemergent herbicides on cereal nurse crops interseeded among carrots for wind erosion control; and, 3) identify carrot varieties that suppress weeds with rapid emergence and establishment.

Much of our work has focused on prometryn herbicide (trade name: Caparol or Vegetable Pro) as an alternative to linuron. In general and compared to linuron, prometryn has more potential for carrot injury (particularly when carrots have emerged but have fewer than 3 leaves) and takes longer to control weeds, so be patient! When applied pre-emergence at a product rate of 2.0 pints of product per acre, prometryn only controlled about 50% of common ragweed and about 85% of the early redroot pigweed and common lambsquarters. With those gaps in mind, many growers have chosen to use pendimethalin pre-emergence followed by prometryn post-emergence. In field observations, the standing oat nurse crop was injured by 2.0 pints prometryn product per acre but recovered enough to provide wind protection. Season-long redroot pigweed control remains a challenge in many fields.

Additionally, several carrot varieties were also evaluated for their ability to: (1) maintain yield in the presence of weeds; and, (2) suppress weeds through rapid establishment and canopy development. For example, 'Bolero' established a broad crop canopy sooner than most other varieties and maintained 95% of the weed-free carrot yield when weeds were present. In contrast, 'SFF' variety established slowly and never achieved full ground cover in canopy development. As a result, weed biomass was greater than in any other variety and the yield of the weedy carrots was only 72% of the weed-free yield. Carrot variety emergence and canopy development rates can be an important consideration in an integrated weed management program and require no additional crop inputs.

Pesticide labels change often. As always, read and follow the label prior to any pesticide use.