WISCONSIN POTATO AND VEGETABLE WEED MANAGEMENT UPDATE

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Regulatory updates:
We're still waiting on some national regulatory reregistration decisions that may affect herbicides used in potato and vegetables, including diquat and linuron. Stay tuned for updates on any label changes that may result from that process. Additionally, the Wisconsin special local need labels for a few herbicides expired in 2017, including Dual Magnum on several vegetable crops and Tough on mint (as well as Stinger on strawberry and cranberry in the fruit world). In each of these cases the registrant has or is submitting a new special local needs request that will be evaluated by WI DATCP.

At a national level, much attention has been directed toward alleged cases of off-target dicamba and resulting injury to susceptible crops, including non-dicamba tolerant soybean and specialty crops. As a result, the U.S. Environmental Protection Agency has issued new rules for dicamba use in resistant crops, including classifying the dicamba products used on these crops as restricted use, requiring specific training and detailed record keeping, reducing the wind speed allowance, outlining specific tank-cleaning procedures to avoid contamination and reducing the times during the day in which applications can be made. EPA will monitor the success of these and other new requirements in the 2018 growing season.

Research updates:
From a research standpoint, the future looks bright. The 2017 growing season was very busy but productive for our program thanks to the dedicated work of Dan Heider and Rich Rittmeyer. This research pays dividends for vegetable growers and the industry by optimizing production, reducing risk and securing new economically solvent and efficient management tools. Selected highlights include:

- In potato, we're currently working four active ingredients toward registration. All four of these active ingredients pose particularly low risk of weed resistance development and are unique sites of action in potato. Three of the four are very near registration (one has now been registered for use in Canada with the US following, for one the registrant is conducting residue work to establish a potato tolerance, and one would be an expansion of a regional label to include Wisconsin). We're now refining the use patterns for these herbicides to establish the optimum timing, rates and tank-mixes for more holistic integrated management programs.

  We conduct similar research on the vegetables grown in rotation in potato. In recent years, this has included replicated field studies in horseradish, onion, celery, beans (dry, lima and snap), cabbage, carrot, pea, garden beet, sweet potato, processing and ornamental pumpkin and mint. This process typically starts with a multi-species herbicide screen, where we take a first look at many herbicide active ingredients across more than a dozen vegetable crops. Those that show promise are moved on to crop-specific replicated studies, and if there remains to be crop safety, added value for weed control and registrant interest, we then conduct refined studies to evaluate crop

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variety/type tolerance, weed control spectrum, multiple soil types and viable use patterns (timing, rate, adjuvants, tank-mixes, etc.).

- We continued work to identify potential new potato vine desiccants and alternative vine management strategies that can be integrated with herbicides. In the past year we completed a multi-year research project looking at various mechanical and physical vine management strategies with a particular focus on early fresh market potato production, where vines can be most challenging but market incentives are typically high. This work included yellow-fleshed and red-skinned varieties and investigated the influence of vine management on tuber yield and size distribution, skinning and stolon separation at harvest and after three weeks of storage. Strategies such as flail-chopping the top third of the potato plant eight days prior to diquat application adequately pre-disposed the vines to better kill with herbicides. Additionally, non-chemical strategies such as flame burning followed by flail-chopping adequately managed vines and would be applicable to organic production.
- We've spent much time in recent years investigating the effect of off-target herbicides, such as through tank contamination, on potato seed crops and commercial production in the year after exposure. This continues to be a significant issue in commercial production, where we've observed fields with emergence reduced up to 85%. This is particularly problematic when potato is grown in rotation with nearby grain crops, where many of the herbicides are long-lasting and very active at low doses. In many cases the herbicide symptoms aren't visible in the seed crop but appear in the following year, making detection a challenge. In our current work we're looking at simple, affordable ways to detect non-visual stress in winter grow outs with a hand-held NDVI sensor - in essence, creating an NDVI "signature" for herbicide-damaged seed.
- In carrot, we've conducted much research recently to find ways to manage weeds by making the crop more competitive. Strategies in development include the selection of new varieties that rapidly emerge and form a dense canopy, new seeding configurations and timing to favor the crop over weeds, and using small amounts of gibberellic acid to enhance top growth without reducing root yield. We have few herbicides in carrot and weed resistance is becoming problematic, so an approach that integrates multiple strategies will be needed.
- Our work has expanded beyond the pest management realm by grower and industry request and with creative opportunities to advance production. As such, we continue to develop and manage the Wisconsin Water Stewards program to customize and optimize farm-specific water use in the Central Sands, we're evaluating the carbon and water footprints of new vs. older potato varieties and we're working on a "big data" machine learning project that will allow growers to move precision agriculture from decision support to decision making.

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