Weed Management in Vegetables:

Updates and current issues

Jed Colquhoun

Professor and Extension Specialist, Horticulture

Interim Associate Dean for Extension and Outreach, CALS

University of Wisconsin

Weed management in vegetables

- Getting ready for synthetic auxin herbicide-resistant crops near vegetables
- Diquat: registration review update
- Linuron: use on coarse-textured soils and registration status
- Future of minor crop weed management: any hope for new tools?
  - League: an example in potato, tomato and pepper

An overview of synthetic auxin herbicide-resistant crops, with a focus on Wisconsin

- Why the interest in this technology?
- What are the potential implications for nearby specialty crops?
- What's the current regulatory status?
- What's the situation where resistant crops have been introduced?

Glyphosate resistance update in Wisconsin

- Confirmed cases:
  - Common waterhemp:
    - Eau Claire County: 10x resistance
    - Pierce County: 13x resistance
  - Palmer amaranth
  - Giant ragweed
  - Horseweed
- Suspected cases:
  - Common ragweed

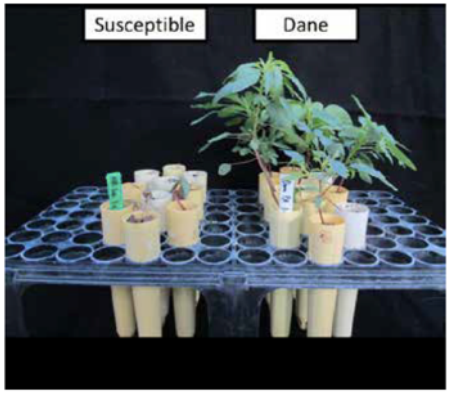


Figure 1. Comparison of ten susceptible plants versus ten Dane County Palmer amaranth plants. Pictures taken at 21 days after application.

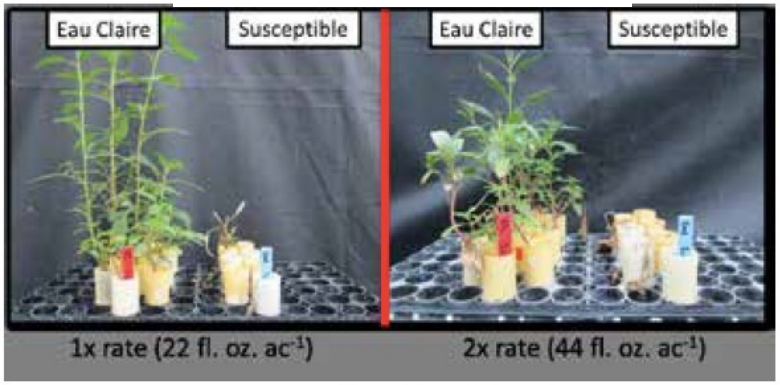
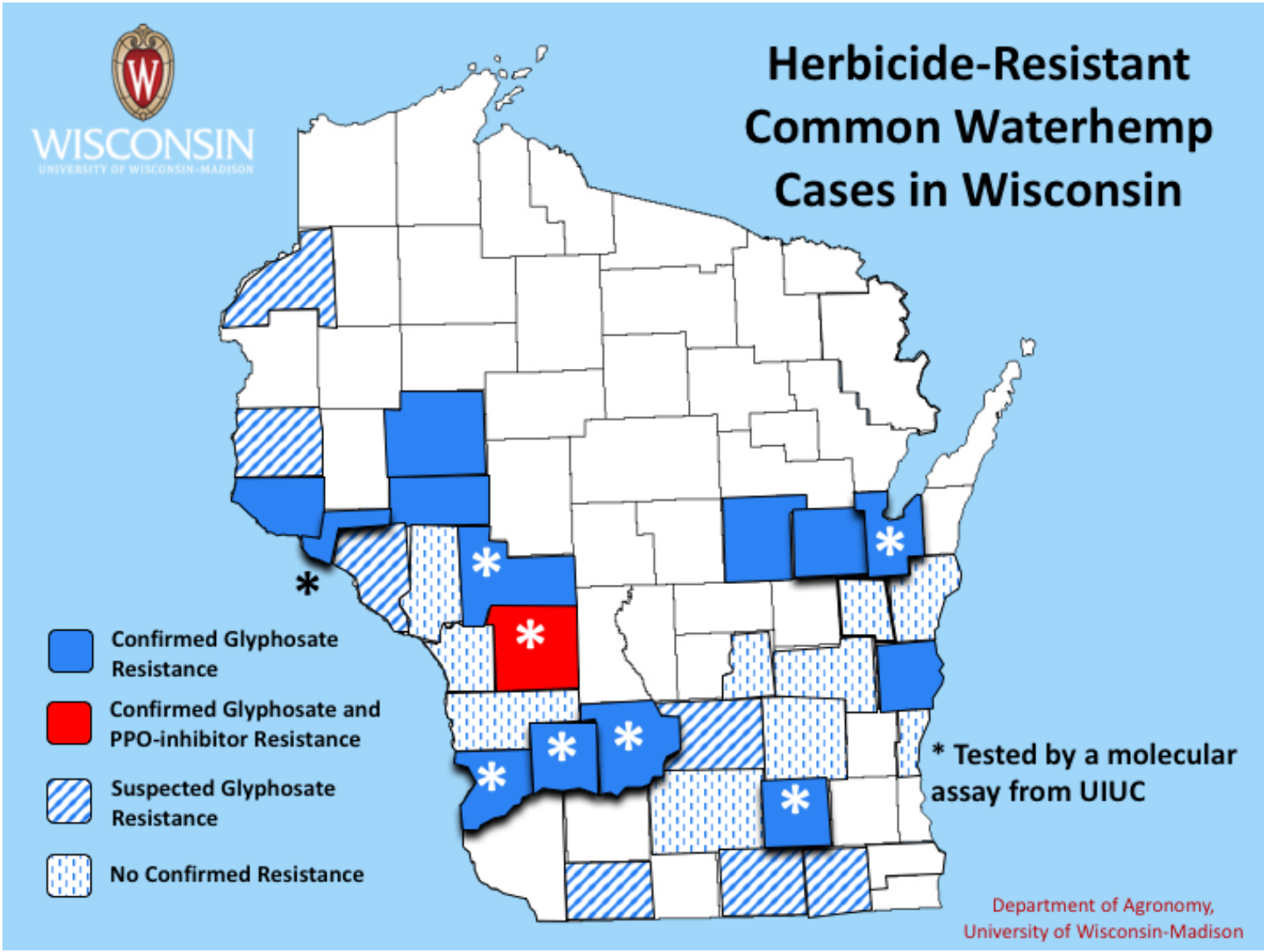
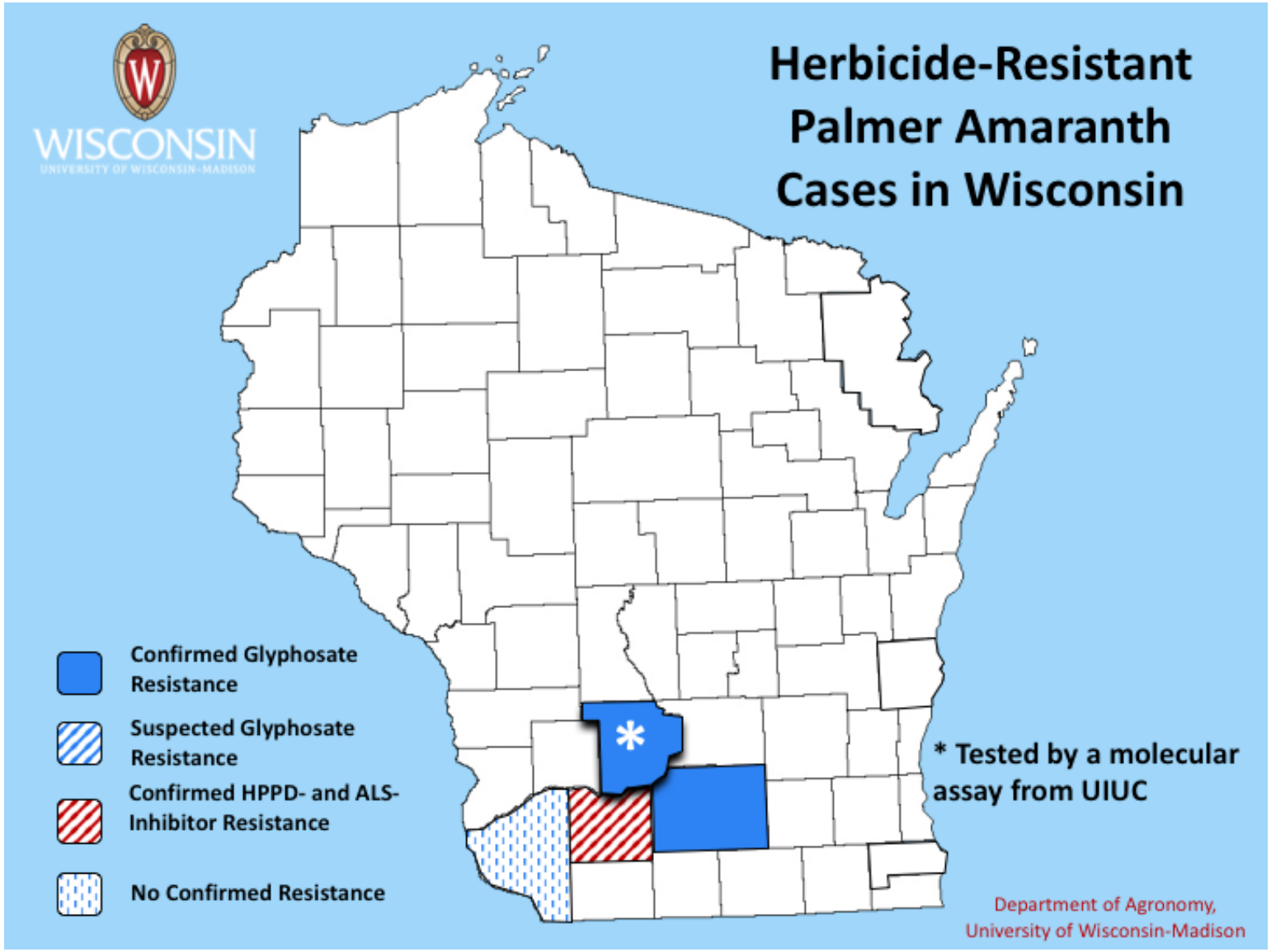


Figure 1. Comparison of ten Eau Claire County common waterhemp versus seven susceptible plants. Pictures taken at 14 days after application.

Photos: V. Davis


WISCONSIN
UNIVERSITY OF WISCONSIN-MADISON
Herbicide-Resistant Common Waterhemp Cases in Wisconsin
Confirmed Glyphosate Resistance
Confirmed Glyphosate and PPO-inhibitor Resistance
Suspected Glyphosate Resistance
No Confirmed Resistance
* Tested by a molecular assay from UIUC
Department of Agronomy, University of Wisconsin-Madison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*
* Tested by a molecular assay from UIUC
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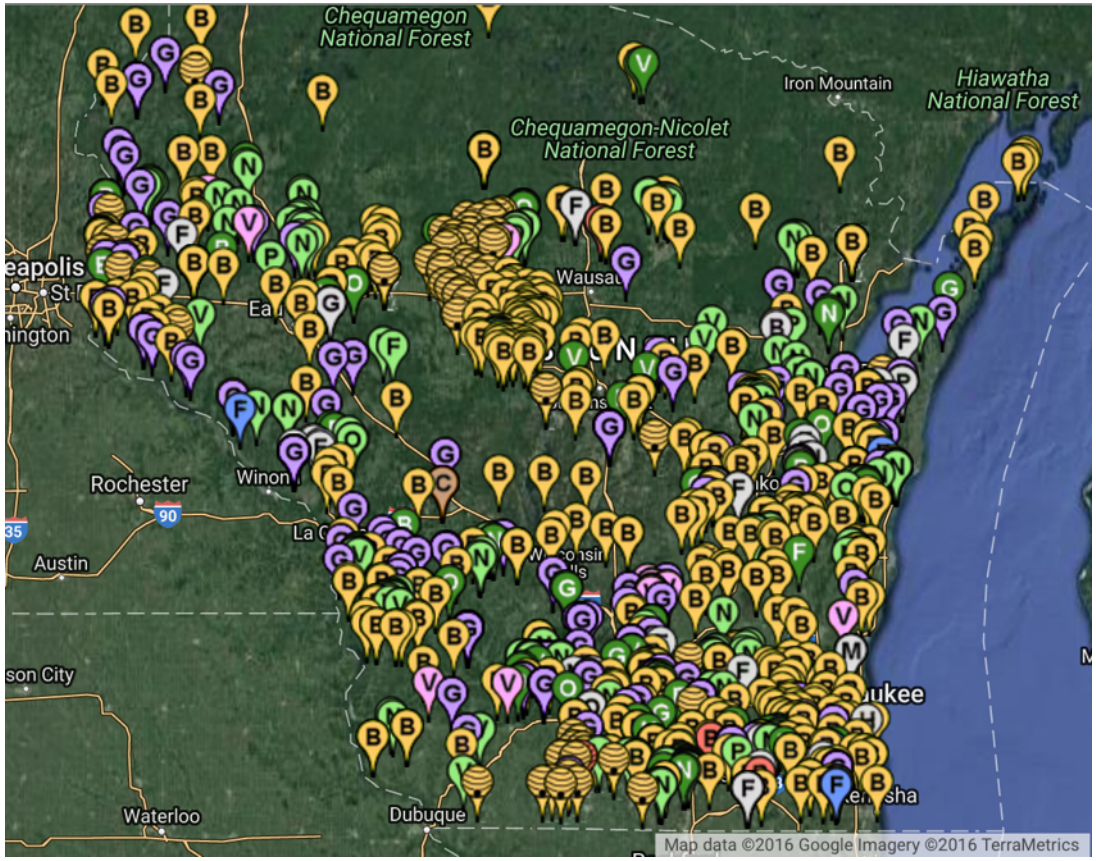
Wisconsin specialty crops

- Diverse
- Valuable
- Dispersed



Source: wi.driftwatch.org

Snap bean response to simulated off-target herbicides

Treatment	Rate	Injury			Yield
	g ae/ha	%, 7 DAT	%, 14 DAT	%, 22 DAT	mt/ha
Non-treated	--	0 d	0 d	0 d	4.3 a
dicamba	1.4	6 c	38 b	28 b	0.7 b
dicamba	4.2	10 ab	48 a	40 a	0.1 b
dicamba	7.0	11 a	43 ab	29 b	0.1 b
2,4-D	1.4	8 bc	6 cd	5 cd	4.7 a
2,4-D	4.2	8 bc	6 cd	5 cd	4.2 a
2,4-D	7.0	8 bc	11 c	10 c	4.1 a
glyphosate	7.0	5 c	9 cd	6 cd	4.6 a

New 2,4-D and dicamba formulations and traits

2,4-D

- Enlist Duo® (glyphosate + 2,4-D)
  - 2,4-D choline formulation
  - Reduced volatility
  - Reduced particle drift risk
  - Reduced odor
- Enlist® crop traits
  - Cotton introduced in 2016
  - Enlist corn in ”stewarded” launch – awaiting import approvals
  - Enlist soybeans in seed production, potential broader intro in 2017 with import approvals
    - Source: Dow

dicamba

- VaporGrip® formulations of dicamba
  - Reduced volatility
  - No dicamba use registered over the top of soy in 2016
- Roundup Ready Xtend® Crop System
  - Cotton
  - Soy – Some seed available and planted in 2016, full trait launch anticipated in 2017 on up to 15 million acres
    - Source: Monsanto

In the news…

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Monsanto explains actions as dicamba drift fallout continues

Aiming to supply 15 million U.S. …

David Bennett | Delta Farm …

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Improper dicamba use leaves soybean farmers with drift cases

Investigations continue into possible dicamba drift cases in Missouri soybean fields.

Published on: **Aug 5, 2016**

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Improper dicamba use leaves Mid-South a multitude of drift cases

…tend soybeans being sprayed over-the-top

…vid Bennett | Delta Farm Press

Jul 21, 2016

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Food | Sep. 02, 2016 01:50PM EST

10 States Report Crop Damage From Illegal Dicamba Use on Monsanto's GMO Seeds

Lorraine Chow

Lorraine is a reporter for EcoWatch. She tweets @lorrainelchow

the salt WHAT'S ON YOUR PLATE

FOOD FOR THOUGHT

How Monsanto And Scofflaw Farmers Hurt Soybeans In Arkansas

August 1, 2016 · 7:00 AM ET

DAN CHARLES

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, DC 20460

OFFICE OF
ENFORCEMENT AND
COMPLIANCE ASSURANCE

COMPLIANCE ADVISORY

August 2016

High Number of Complaints Related to Alleged Misuse of Dicamba Raises Concerns

EPA and state agencies have received an unusually high number of reports of crop damage that appear related to misuse of herbicides containing the active ingredient dicamba. Investigations into the alleged misuse are ongoing. This Compliance Advisory is intended to provide information on the agricultural and compliance concerns raised by these incidents.

Compliance Concerns

Based on cropping patterns and the number of acres of non-resistant crops adversely affected, extension experts across the country believe that illegal use of dicamba products on adjacent or nearby dicamba-resistant cotton and soybean crops caused the observed crop damage. *The EPA has not registered any dicamba herbicides for application at planting or over the top of growing cotton or soybean plants, including crops genetically modified to tolerate dicamba*. Therefore, any application of a dicamba product during the growing seasons of cotton or soybean crops is unlawful under FIFRA. Unlawful applications of dicamba products can result in residues on harvested crops and affect the yields of non-target crops.

Agricultural Concerns

To date, the Missouri Department of Agriculture has received approximately 117 complaints alleging misuse of pesticide products containing dicamba. Missouri growers estimate that more than 42,000 acres of crops have been adversely affected. These growers have reported damage on a number of crops including peaches, tomatoes, cantaloupes, watermelons, rice, cotton, peas, peanuts, alfalfa, and soybeans. Similar complaints alleging misuse of dicamba products have been received by Alabama, Arkansas, Illinois, Kentucky, Minnesota, Mississippi, North Carolina, Tennessee and Texas.

In the news…

MARKET NEWS | Tue Oct 25, 2016 | 6:28pm EDT

U.S. agency searches for proof of criminal use of herbicide dicamba

Oct 25 The U.S. Environmental Protection Agency executed search warrants in parts of southeastern Missouri earlier this month to look for signs of improper use of the herbicide dicamba, the agency said on Tuesday.

The searches stemmed from complaints that dicamba, which has only been approved for application on fields before planting season or after harvest, damaged 41,000 acres (16,600 hectares) of soybeans and other crops. The complaints allege that improperly applied dicamba drifted into neighboring fields.

Dicamba can injure crops that are not resistant to dicamba, reducing final yields.

The warrants were executed the week of Oct. 10 at sites in Cape Girardeau, Dunklin, New Madrid and Stoddard counties as part of a criminal investigation, the EPA said. The agency did not specify what sites it searched.

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CROP TALK

XtendiMax Label for Xtend Beans

A VERY good read ! Got this off the Chat 'n' Che w Cafe - Mark and Bill are 2 of ...[More]

Author: ECIN Posted: 11-26-2016

Sobering Look AT Dicamba On Soybeans

Here is a very good article on the up and down si de of the new dicamba formulations for soybean s. http://www.agriculture.com/crops/soybeans/what-you-need-to-know-about-dicamba-tolerant-soybeans-in-2017?utm_source=ag-newsletter&utm_medium=email&utm_campaign=todaysnews_111716&did=97707

Author: JimMeade Posted: 11-17-2016

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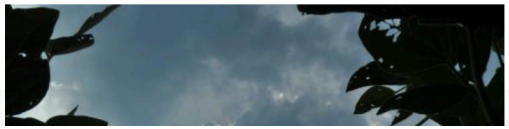
DICAMBA MOVEMENT PROMPTS ARKANSAS SHOOTING

ARGUMENT BETWEEN FARMERS RESULTS IN DEATH, SAYS AN ARKANSAS COUNTY SHERIFF.

By Gil Gullickson
10/28/2016

A dispute over over movement of dicamba herbicide has prompted a killing in Arkansas.



Diquat registration review

- Diquat undergoing normal EPA registration review required of all pesticides every 15 years
- Initial EPA review: use timing, number of applications and rate restrictions may be needed
- Open comment period: input from researchers and industry emphasized importance in potato desiccation
- Final EPA decision is overdue…

Linuron update

- Linuron use is restricted on coarse-textured, low organic matter soils
  - In Wisconsin, we have 24c Special Local Needs labels in potato and carrot that somewhat expand use, particularly where depth to groundwater is greater than 30 ft.
  - Also working with the registrant, with EPA guidance, on soil desorption studies to see if linuron poses a groundwater risk

- Linuron also undergoing registration review
  - Focused on human health and ecological risk assessment
  - Conservative approach taken with the absence of a specific thyroid study

Linuron update

FIFRA 24(c) SPECIAL LOCAL NEED 24(C) LABEL

Lorox® DF

Agricultural Herbicide

FOR DISTRIBUTION AND USE ONLY WITHIN THE STATE OF WISCONSIN ON CARROTS GROWN ON COARSE-TEXTURED, LOW ORGANIC MATTER SOILS TO CONTROL BROADLEAF AND GRASS WEEDS

EPA Reg. No. 61842-23 EPA SLN No. WI-150004

This SLN expires and must not be distributed or used in accordance with this SLN registration after 12/31/2019

Directions for Use: It is a violation of Federal law to use this product in a manner inconsistent with its labeling. Follow all applicable directions, restrictions, Worker Protection Standard requirements and precautions on the EPA registered label. This labeling must be in the possession of the user at the time of pesticide application. This Section 24(c) SLN label contains new or supplemental instructions for use of this product, in Wisconsin, which do not appear on the EPA-registered label. Follow the instructions carefully.

Because carrot varieties vary in their resistance to herbicides, determine tolerance to LOROX DF prior to adoption as a field practice to prevent possible crop injury.

- **Do not exceed 4 lbs. LOROX DF per acre per year.**
- **Do not apply within 14 days of harvest.**
- **Do not apply by air.**

Do not apply LOROX DF to the following soils if the depth to groundwater is 30 feet or less:

- **Sand with less than 3% organic matter**
- **Loamy sand with less than 2% organic matter**
- **Sandy loam with less than 1% organic matter**

Do not apply LOROX DF in any manner that would contaminate irrigation water used for crops other than corn or water used for domestic purposes.

Do not apply LOROX DF within 150 feet of any well where depth to groundwater is 30 feet or less.

Carrot weed management

Prowl H_20, Vegetable Pro, Vegetable Pro*

Dual Magnum, Vegetable Pro, Vegetable Pro*

* Vegetable Pro applied with 0.5% NIS. Ethotron not registered for use in Wisconsin carrots. Read and follow the label prior to use of any herbicide.

Nurse crops

Prowl H_2O, 1.0 pt/a

Prowl H_2O, 2.0 pt/a

Vegetable Pro/Caparol: field observations

Compared to linuron:

- More carrot injury potential
- Takes longer for weeds to be controlled

PRE:

- 2.0 pt/a controlled ~85% of early redroot pigweed and common lambsquarters, but only ~50% or common ragweed
- 3.0 pt/a controlled ~75% of common ragweed
- Season-long pigweed control is difficult
- Prowl H_2O (2 pt) tank-mixed with Vegetable Pro/Caparol at various rates:
  - 1 pint ok, 2 pints some longer-term injury, 3 pints too much!

Vegetable Pro/Caparol: field observations

POST: carrots with a leaf or less most susceptible

- Use the correct surfactants and rates with POST applications
- Be a bit patient on weed control

Oat nurse crops:

- PRE rates at 3.0 or 4.0 pt/a significantly reduce growth
- Post applications at 2.0 pt/a may injure oats, but they recovered in 2015

Be careful of the rates on muck soils

Any hope for new minor crop weed management tools?

- 2016 research crops:
  - Potato
  - Sweet potato
  - Celery
  - Carrot
  - Onion
  - Pumpkin
  - Snap bean
  - Cabbage
  - Lima bean
  - Mint
  - Ginseng
  - Strawberry
  - Cranberry

League Herbicide: an example in melon, potato, tomato and pepper

- Active ingredient: imazosulfuron
- Registrant: Valent
- ALS inhibitor with PRE and early POST activity
- Rotational restrictions can be lengthy: up to 24 months for some crops

- Melon: row middle application
- Pepper: row middle and directed spray
- Tomato: pre-transplant, over-the-top, directed spray
- Potato: PRE or POST

League Herbicide: an example in melon, potato, tomato and pepper

- Weeds controlled PRE:
  - Wild buckwheat, pigweeds, common purslane, yellow nutsedge, common lambsquarters, common ragweed, shepherdspurse, giant foxtail, large crabgrass, barnyardgrass
- Weeds controlled POST:
  - Pigweeds, common purslane, yellow nutsedge
- Weeds suppressed POST:
  - Barnyardgrass, large crabgrass, PA smartweed