

Sweet Corn Weed Management

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Muscatine Island Research & Demonstration Farm

1935 75th Anniversary 2010



Why Is Weed Control Important?

- Weeds compete with crop for water, nutrients & sunlight – reducing crop yield & quality.
- Weeds make disease & insect control more difficult.
- Weeds can interfere with harvest.
- Weeds that reproduce create problems for next crop.



Use Integrated Practices – Weed Management Is More Than Just Choosing The Right Herbicide

- Planning.
- Prevention.
- Crop Rotation.
- Cultural Practices.
- Mechanical Tillage.
- Herbicides.



Weed Management Components 'Planning'

- Develop your weed control strategy before planting.
- Scout fields to identify problem weeds and develop effective control strategies (know your weeds!).
- Soil type and sweet corn hybrid may determine type of herbicide and rates to use.
- Herbicide crop rotation restrictions need to be considered.



Weed Management Components 'Prevention'

- Plant weed-free seed.
- Clean equipment between fields.
- New weeds usually start in small patches – eradicate before spreading.
- After sweet corn harvest destroy weeds before they reproduce and cause problems in next crop.

Photo: Johnsongrass (*Sorghum halepense*),
University of Missouri Extension.



Weed Management Components 'Crop Rotation'

- Crop rotation utilizing different cultural methods disrupt weed growth cycles.
- Crops like soybeans, forages, winter cereals provide good weed control and reduce weed pressure for subsequent sweet corn crop.



Weed Management Components 'Cultural Practices'

- Good cultural practices encourage healthy, vigorous, crop plants that out-compete weeds.
 - Soil pH 6.0 to 6.8.
 - Proper fertility.
 - Irrigation management.
 - Pest control.
 - Plant population resulting in quick ground shading.



Weed Management Components 'Mechanical Tillage'

- Tillage before planting prepares seedbed and kills emerged weeds.
- Weeds emerging after planting can be controlled with cultivation.
- Cultivating right before canopy closure and ground shading will reduce late season weeds.



Weed Management Components 'Herbicides'

- Type of herbicide:
 - Selective
 - Nonselective
- Herbicide application timing:
 - Preplant incorporated (PPI)
 - Preemergence (PRE)
 - Postemergence (POST)



Where To Find Herbicide Information:

- **Midwest Vegetable Production Guide for Commercial Growers.** This bulletin includes recommended weed control practices and products, herbicide effectiveness table, crop rotations restrictions, PHI's, and more. Internet: www.btny.purdue.edu/Pubs/ID/ID-56/.
- Pesticide labels: <http://www.cdms.net/LabelsMsd/LMDefault.aspx?ms=1,2,3,4> (or Google "CDMS labels").
- Herbicide company websites.
- Agricultural Extension Service.

Sweet Corn Herbicides – 'Amide' Family

Examples: Dual II Magnum (s-metolachlor), Lasso (alachlor), Frontier/Outlook (dimethenamid), Define (flufenacet), etc.

- Applied PPI, PRE, or early POST.
- Often applied to soil surface right after planting and work best when shallowly incorporated by rainfall or irrigation.
- Excellent control of grass and several small-seeded broadleaves.
- Inhibit root and shoot growth, must be present at weed seed germination or early growth to be effective.
- Can be tank-mixed with atrazine or Callisto to broaden weed control spectrum in sweet corn.



Photo: Corn with Define herbicide injury, Kevin Bradley, Univ. of Missouri.

Sweet Corn Herbicides – ‘Amide’ Family

Several acetochlor products are now labeled to use on sweet corn.

- **Acetochlor:** Degree, Harness, Surpass, TopNotch.
- **Acetochlor + Atrazine** premixes: Degree Xtra, Fulltime, Harness Xtra, Keystone.
- See labels for sweet corn usage instructions.
 - Do not use postemergence.
 - Usage restrictions to prevent ground water contamination.
 - Crop rotational restrictions.

Atrazine

- Can be used PPI, PRE or POST.
- Controls many annual grass and broadleaf weeds, usually tank-mixed with other herbicides.
- Good corn safety but crop rotation restrictions.
- RUP – restricted use pesticide, check label for usage restrictions to avoid ground water contamination.
- Resistant weeds have developed in certain areas because of continual use.
- EPA reviewing atrazine use and safety concerns.

Callisto, Impact and Laudis

Group 24 triketone family, HPPD-inhibitor herbicides, prevent pigment production necessary for photosynthesis resulting in a bleaching or whitening of plant.



Callisto (mesotrione) Syngenta

- May be used PRE or POST.
- Burn-down and residual weed control.
 - Broadleaf weeds (velvetleaf, lambsquarter, pigweed)
 - No grass control (except crabgrass)
- Low usage rates (max of 7.7 oz per season).
 - 6.0-7.7 fl oz preemergence
 - 3.0 fl oz postemergence
- Tank-mixing with atrazine improves weed control.

Precautions!

Callisto Use In Sweet Corn

- Adjuvant directions different from field corn.
 - Use NIS or COC
 - No UAN or AMS - may cause crop injury
- Don't apply with carbamate or organophosphate insecticides.
- **Crop rotation restrictions!!!**
 - 10 month - potato, soybean
 - 18 month - cucurbits, peas, snap beans, red clover

Sweet Corn Herbicide Study, 2005.

Preemergence treatments: Dual II Magnum 1.33 pt, Aatrex 4L 2.0 pt, Callisto 6.0 oz

Treatment	Dozen Ears	Ear Length	Ear Wt lb
Dual II Mag	831	8.1	.41
Dual + Aatrex	1585	8.5	.51
Dual + Callisto	1991	8.5	.55
Dual + Aatrex + Callisto	1914	8.7	.53

Providence planted 5/3/05. PRE trts 5/4. Harvest 7/28.
Muscatine Island Research Farm, Fruitland, IA.

Dual II Magnum PRE 1.33 pint



Dual II Magnum (1.33 pint) + Aatrex 4L (2.0 pint) PRE



Dual II Magnum (1.33 pint) + Callisto (6.0 oz.) PRE



2005 Sweet Corn Herbicide Study

Dual II Magnum 1.33 pt/A, Aatrex 4L 1.0 pt/A, Callisto 3.0 oz/A.

Treatment	Dozen Ears	Ear Length	Ear Wt lb
Dual PRE Aatrex POST	1798	8.4	0.50
Dual PRE Callisto POST	2069	8.6	0.52
Dual PRE Aatrex+Callisto Post	2107	8.6	0.54
POST D + A + C	2011	8.6	0.53
Late POST D + A + C	1779	8.5	0.50

Providence planted 5/3/05. PRE 5/4, POST 5/30, late POST 6/10.

2005 Herbicide Study Conclusions

- Good, season-long weed control achieved with tank mix of Dual II Magnum + Callisto or Dual II Magnum + Aatrex 4L + Callisto applied PRE.
- Good weed control with no crop injury also achieved by applying Dual II Magnum PRE followed with early POST (V3 crop stage) application of Callisto or Aatrex 4L + Callisto.
- Early POST application of Dual II Magnum + Aatrex 4L + Callisto resulted in better weed control and yield than late POST application.

Callisto Residual Study 2005-2006, Ames, Iowa

- Strike snap bean direct-seeded May 16, 2006, into sweet corn herbicide plots established 2005.
- Carry-over herbicide injury noted in certain plots including chlorosis, reduction in vine growth and pod yield.
- Injury most severe in treatments with Atrazine (PRE) + Callisto (POST) and high rates of Callisto (POST).



Callisto Residual Study 2005-2006, Ames, Iowa

- Turbo cucumber seeded May 24, 2006, thru black plastic mulch.
- Visible injury noted after germination due to herbicide carryover.
- Reduction in fruit number and size in plots where Callisto was applied POST @ 6 oz to sweet corn in 2005.



Impact (topramezone) AMVAC

- Postemergence use only @ 0.75 oz/acre.
- Broadleaf weed control including: Velvetleaf, cocklebur, pigweed, lambsquarter, ragweed, waterhemp.
- Control or suppression of several grass weeds including: barnyardgrass, crabgrass, foxtails, shattercane, etc.
- Tankmix with atrazine improves weed control.
- Crop rotation restrictions – 18 months for cucurbits, tomatoes & most vegetables.
- Supplemental use directions for rotating to dry bean, snap bean and sugarbeet (9 months).

Laudis (tembotrione) Bayer CropScience

- Postemergence control of broadleaf & grass weeds.
- Use 3 fl oz/acre with adjuvants (COC + AMS).
- Apply to sweet corn from emergence to V7.
- Can be tankmixed with atrazine.
- Formulated with safener for improved crop safety.
- Crop rotation restrictions.
 - 8 months – soybeans
 - 10 months – peas, potatoes, snap beans, tomato
 - 18 months – cucurbits, sugar beets and other crops

Crop Safety of Callisto, Impact & Laudis

- Sweet corn cultivars generally tolerant, but a few are sensitive.
- Injury symptoms include bleaching or chlorosis of leaves.
- Injury aggravated by herbicide rate, extreme weather, OP insecticides, type of adjuvant (COC, UAN, etc).
- Sweet Corn Hybrid Disease Nursery – 2009, Jerald Pataky, et. al, includes cultivar injury ratings after applying Callisto, Laudis herbicides. *Midwest Vegetable Trial Report for 2009*. www.extension.purdue.edu/store



Herbicide Study

Evaluate POST herbicide use on sweet corn and potential for residual injury to cucumber, snap bean, pepper & tomato – Muscatine Island Research Farm, Fruitland.

2008 POST Herbicide Treatments

- ½ X (0.38 oz) Impact
- 1X (0.75 oz) Impact
- 2X (1.50 oz) Impact
- 1X Impact (0.75 oz) + Aatrex (1.0 pt)
- 2X Impact (1.5 oz) + Aatrex (2.0 pt)
- 1X Callisto (3.0 oz) + Aatrex (1.0 pt)
- 2X Callisto (6.0 oz) + Aatrex (2.0 pt)
- 1X Laudis (3.0 oz) + Aatrex (1.0 pt)
- 2X Laudis (6.0 oz) + Aatrex (2.0 pt)



2008 Herbicide Study Results

- No herbicide treatments caused injury to BC 0805 sweet corn.
- No yield differences between herbicide treatments.
- Weed control ratings support using Impact at label rate of 0.5 oz or greater.
- Tank-mixing Impact with atrazine improved weed control.

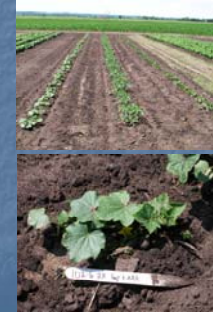


Herbicide Study, 2009 - Residual Effects of Callisto, Impact, and Laudis on Selected Vegetable Crops

- Spring, 2009, herbicide plots fertilized and disked.
- Strike snap beans seeded May 10.
- Alliance pepper, Mountain Spring tomato, Turbo cucumber transplanted on May 19.
- Well-drained, dark-colored, loamy sand soil with 2.5% organic matter.
- Monthly rainfall totals, April – August, 2009: 4.8, 7.0, 8.5, 5.2 & 10.2 inches.

2009 Herbicide Study Results

- No evidence of carryover herbicide injury to any vegetables, even at 2X rates of Callisto, Impact or Laudis.
- High rainfall probably caused herbicide breakdown & leaching.
- Crop rotation restrictions on herbicide labels not too short – vegetable crop injury should not be a concern if label directions followed.



Sweet Corn Weed Control Example

- Crop rotation to reduce weeds (example: RR soybean/sweet corn/wheat).
- Soil test to determine lime and fertilizer needs for crop.
- Tillage before planting sweet corn to prepare seed bed and kill emerged weeds.
- Choose well-adapted, vigorous, cultivar and use plant population that will quickly shade ground but still maintain ear size.



Sweet Corn Weed Control Example

- If weed pressure low or moderate a PPI or PRE herbicide application should provide season-long weed control. Tank mix an amide family herbicide (Dual, Harness, Outlook, etc.) + Atrazine + Callisto.
 - Premixes available (Syngenta – Lexar, Lumax).
 - A 'layby' cultivation just before canopy closure can be used if weed escapes become a problem.
- If a POST herbicide application is planned:
 - PPI or PRE use amide herbicide + atrazine.
 - POST when sweet corn 6-12" tall (V3-V6) apply Callisto (or Impact or Laudis) + Atrazine.
 - Note: because of usage restrictions don't use Callisto PPI or PRE if planning to use Callisto, Impact or Laudis POST.
- Check labels for herbicide rates and usage restrictions.
- After sweet corn harvest destroy late season weeds before reproducing and contributing to weed problems in next crop.

Before Using Any Pesticide **STOP** Read The Label

All pesticides can be harmful to health and environment if misused. Read the label carefully and use only as directed.

Good Luck!

2008 Herbicide Study: Control plot vs PRE herbicide treatment of Dual II Magnum + Aatrex 4L + Callisto.

