2016

2016 Weed Research Update

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Improving weed control in cranberry with novel uses of registered herbicides

Perennial grasses increasingly problematic

2010 survey

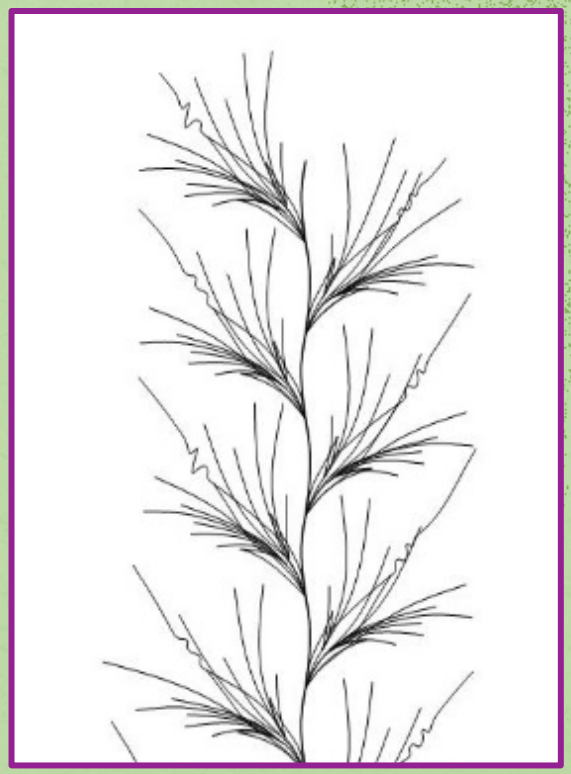
- 0% selected perennial grass as their most problematic weed

2015 survey

- 64% rated poverty grass (PG) as one of the four most common weeds
- 59% rated it one of the most difficult weeds to manage

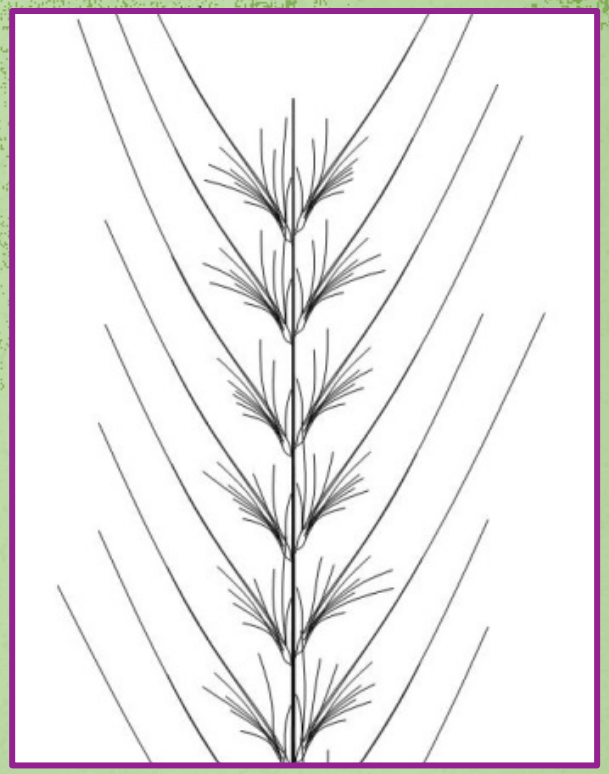
Poverty grass

- Broomsedge bluestem (*Andropogon virginicus)*
- Little bluestem (*Schizachyrium scoparium*)



Bent awns

Little bluestem



Straight awns

Broomsedge

Poverty Grass Growth

Very slow starter

- Populations seem to explode in August

Successful management

- Stop seedling establishment (PRE)
- Stop seed production (POST)
- Kill adult plants (POST)

JUNE 3

JUNE 24

JULY 10

JULY 29

Limited suite of herbicides

Many in use for decades, only three gained in past 20 years!

- 1950's - 2,4-D
- 1965 - Casoron (dichlobenil)
- 1976 - Evital (norflurazon)
- 1979 - Devrinol (napropamide)
- 1982 - Glyphosate
- 1986 – Poast (sethoxydim)
- 1996 – Stinger (clopyralid)
- 2002 – Select (clethodim)
- 2009 – Callisto (mesotrione)
- 2013 – QuinStar (quinclorac)

Novel uses of registered herbicides?

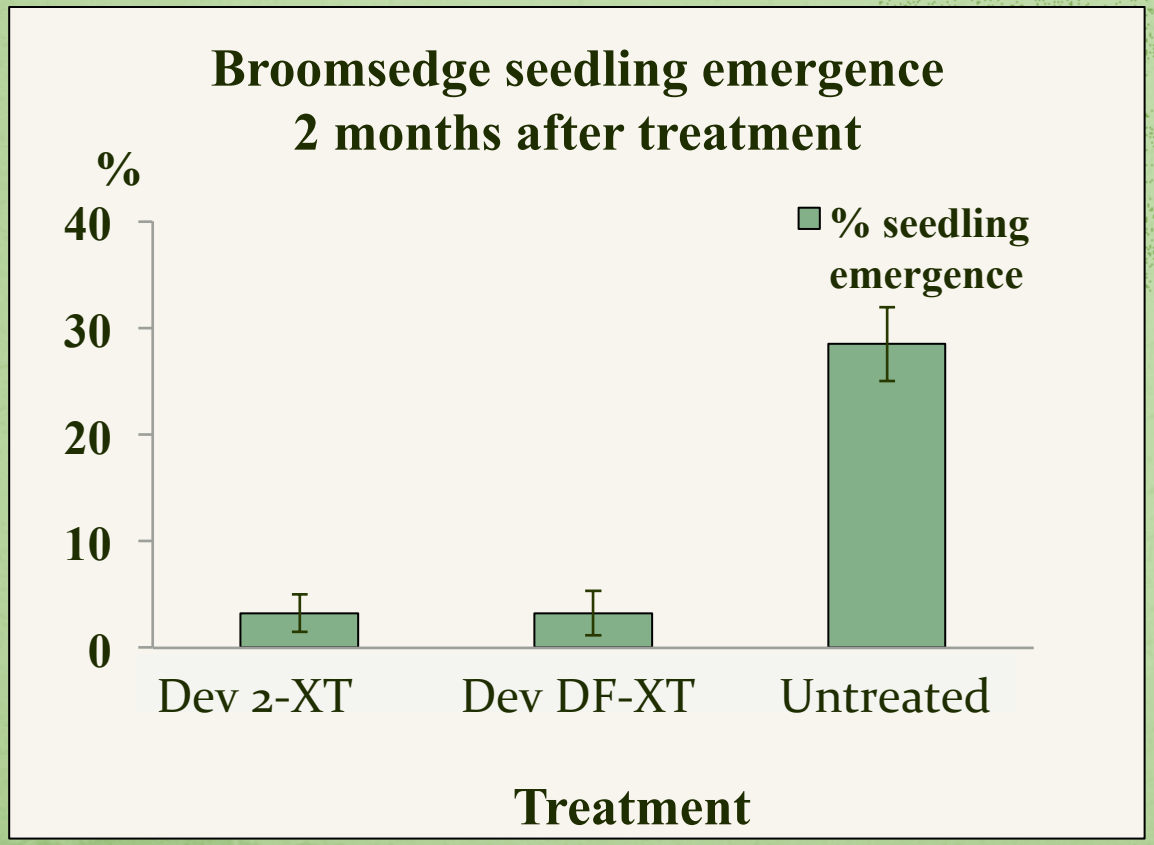
Think outside the box, but stay inside the box?

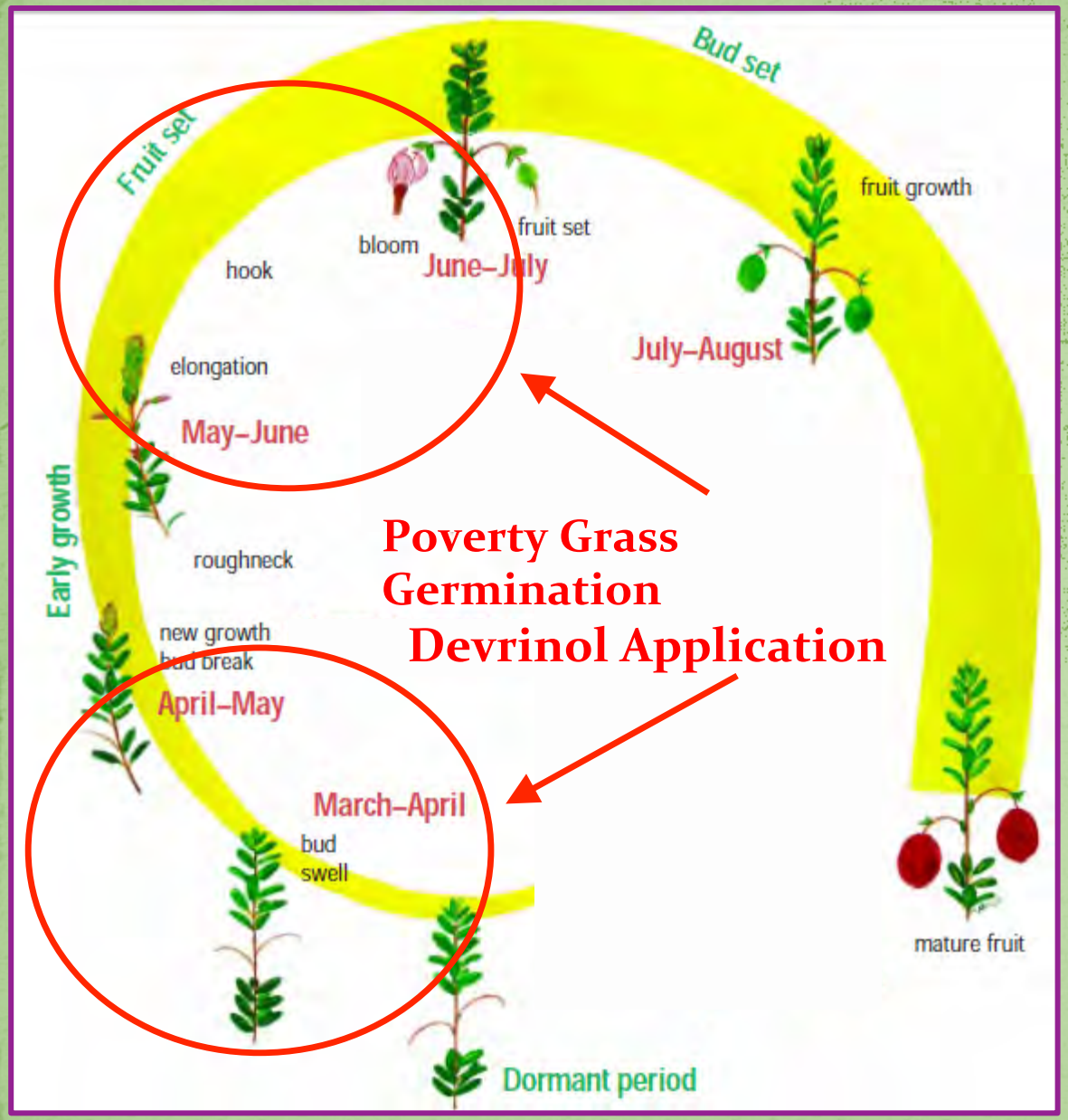
Poverty Grass controls?

Devrinol (napropamide)

Devrinol - preemergence herbicide

- Greenhouse trials – good controls of BS and LBS seeds
  - Control not seen when used in the field





Herbicide activity not overlapping with germination.

Devrinol labeled for application <u>before</u> spring growth begins…

Are later Devrinol apps safe for cranberry?

Evaluated 18 pt/A (simulated chemigation)

Applied at various cranberry stages
(pre-budbreak, roughneck, hook stage, bloom, fruit set)

Each plot (1-m^2) received a single treatment
Replicated four times

Results

Cranberry fruit was collected from 1 ft^2 quadrat in each plot

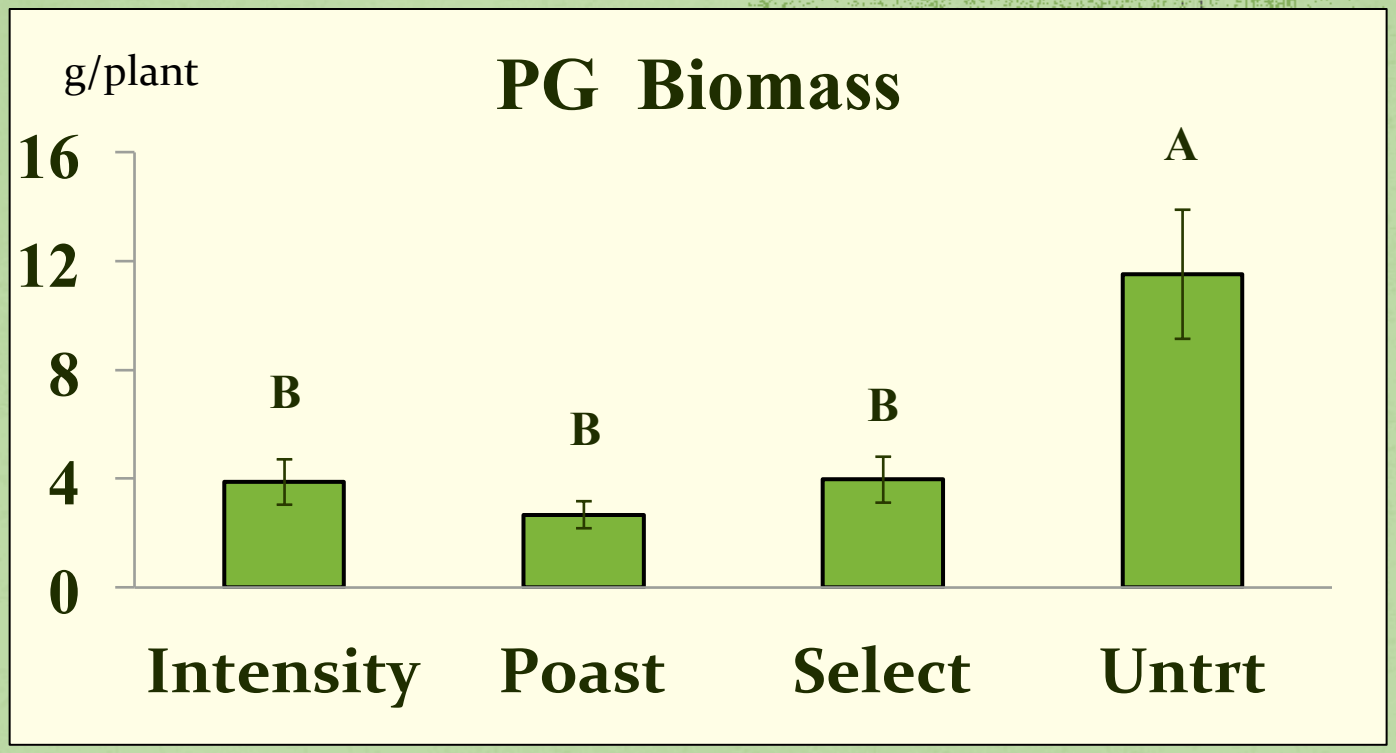
- Evaluated for number and weight of sellable fruit
  - ✓ No differences between any treatment and untreated control
- Fruit samples will be analyzed for residue
  - Pending outcome, UPI will support a 24-C label

Clethodim for POST grass control

- Shown to be effective in GH and field trials
- Most effective when PG is actively growing
  - Cranberry fruit is present during this time
  - Treating with sprayer caused damage from foot traffic
- 4 apps allowed (9 -16 fl. oz per app, max 64 oz/A) … many growers not using any!

Poverty grass – spot treating

- Grass herbicides
- Best on actively growing grass before seeds form



Treated once (7/22/14), plants harvested 9/12/14
No treated plants made seeds

Many growers not using good tool!

Application is a major hurdle

- Can be applied by backpack, mist blower, or aerial (were allowed)
- Can NOT be applied by chemigation
  - Main method of pesticide application for MA cranberry growers

Clethodim chemigation - cranberry crop safety

16 oz/A clethodim (12.8% a.i.) with NIS at 0.25% v/v

Broadcast applications (BC) - 30 gal/A (281 L/ha)
Chemigation applications (CH) - 400+ gal/A (3,742 L/ha)

<u>11 treatments</u>

1x BC or CH

- roughneck
- after bloom
- 14 days after bloom

2 x BC or CH

- roughneck + after bloom
- after bloom + 14 days later

untreated control

Clethodim Chemigation Results

Cranberry fruit was collected from 1 ft^2 in each plot

- Evaluated for number and weight of sellable fruit
  - ✓ No differences between any treatment and untreated control
  - ✓ No differences between BC and Chem plots

Clethodim Results

- Plots visually monitored throughout the season
  - No injury
  - Some floral deformities in roughneck treatments
  - Most severe in Howes
  - No yield difference in our experiment
  - Have had a grower report crop loss from roughneck apps on Howes

Conclusion

- Crop safety for :
  - Devrinol applications later in the season
  - Chemigation of clethodim
    - May want to avoid roughneck applications of clethodim, esp. on Howes

- Are there *other* ways to think outside the box inside the box?

Herbicides on large-fruited varieties

- Crop safety is based on older varieties
- There may be differences in varietal response
- Five newer large-fruited varieties tested
  - Crimson Queen
  - Demoranville
  - GH#1
  - Mullica Queen
  - Stevens

	Treatment	Rate	Active Ingredient	Application Method
1	**Untreated**	N/A	N/A	N/A
2	**Callisto - Spot 2x**	8 oz/A	mesotrione	Broadcast
3	**Callisto - Chem 2x**	8 oz/A	mesotrione	Chemigation
4	**Casoron**	60 lbs/A	dichlobenil	Granular
5	**Devrinol**	18 qt/A	napropamide	Chemigation
6	**QuinStar - Chem 2x**	8.4 oz/A	quinclorac	Chemigation
7	**Intensity One**	16 oz/A	clethodim	Broadcast
8	**Evital (Fall) – 2016**	80 lbs/A	norflurazon	Granular
9	**Evital (Spring) - 2017**	80 lbs/A	norflurazon	Granular

So far, so good!

- No injury was observed for any herbicide, except:
  - Some Stevens' Callisto chemigation plots showed slight whitening of cranberry tips (treated 6/6/16)
  - No symptoms in these plots when retreated 6/28/16

- By August, Yellow Vine Syndrome (YVS) Casoron plots of all varieties
  - Damage rated as being between minor and moderate
  - Stevens most impacted

- Evaluated for number and weight of sellable fruit
  - ✓ No differences between any treatment and untreated control

Iron sulfate for moss

Chemigating iron sulfate for moss

Spot-treating at 1 to 3 oz/ft²

- ***A LOT*** of product (2,700 – 8,100 lbs/A)
- Some concern for vine injury at high rates

Powdered form can be dissolved in water

- West coast growers chemigate 100 lb/A for moss

Our experience chemigating iron sulfate for moss

Equipment

40 gallon Venturi mixing tank

Goal of 100 lb/A

- Only got out approx. 50 lb/A
- Even injected over 2-3 hr period
- Still saw efficacy at the lower rate

Treating ~ 6 acres x 100 lbs = 12 bags!!!!

Our experience chemigating iron sulfate for moss

Iron sulfate does **NOT** dissolve completely

- Always a little sludge

Mixing in tank the sludge settles, clogs injector

1. Dissolve in water in a separate container
    - Dissolves better in larger quantities of water
        - 50 lb bag into 4 5-gallon buckets
        - Mixed, poured off
2. Allow sludge to settle
3. Pour off liquid into tank for injection
    - If a lot of sludge in bucket, we added more water and mixed again

Sludge can settle to bottom

Dissolved iron sulfate can be moved into mixing tank

Herbicides Screening

Herbicides (5 used in other food crops)

- Greenhouse germination tests:
  - dodder seeds
  - grass seeds: broomsedge (BS), deer-tongue grass (DTG), and little bluestem (LBS)
- Postemergence greenhouse tests:
  - Perennial grasses (BS, DTG, and LBS)
- Postemergence field tests with herbicides to evaluate control of dodder
- 2 we would like to do field trials with next year

2017 IR-4 trial for an herbicide!

- Preemergence
- Moss, dodder germination, PG seed germination

Questions?