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# Weed Management Research Update

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# Weed Management Research Update

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Katherine Ghantous and Hilary Sandler  
UMass Cranberry Station

# Overview

Weed biology and ecology

- Dodder and PG
- Changes and obstacles to control

Deer-tongue grass – an emerging problem

Herbicide screening program

# Weed consistencies

Dodder remain on growers'  
“most problematic” list for decades...



# Weed shifts

Poverty grass jump from not rated to  
“most problematic” list in 5 years!



# Dodder – obligate parasite



Dodder has little surface area for herbicide contact

- No apparent leaves
- Thin stems
- Waxy cuticle

POST herbicides like Quinstar translocated through the host plant into the dodder

- Must not be metabolized by cranberry, but also not injurious



Prolific seeder

Long-lived seeds bank

- some spp. +60 yrs



# Dodder love cranberry (?)

Dodder prefers non-woody hosts

- Why is dodder so successful on farms?
- Nutrients?
- Fungicide programs?





# Are we changing dodder biology?

## 2015 grower survey

- 49% (n=83) used Casoron (dichlobenil) for 10+ yrs for dodder control
- 83% used 30-40# (max rate is 100#)

Some of these same growers reported poor control with 40#...yet continue the practice

- cost of increasing rate
- fear of crop injury

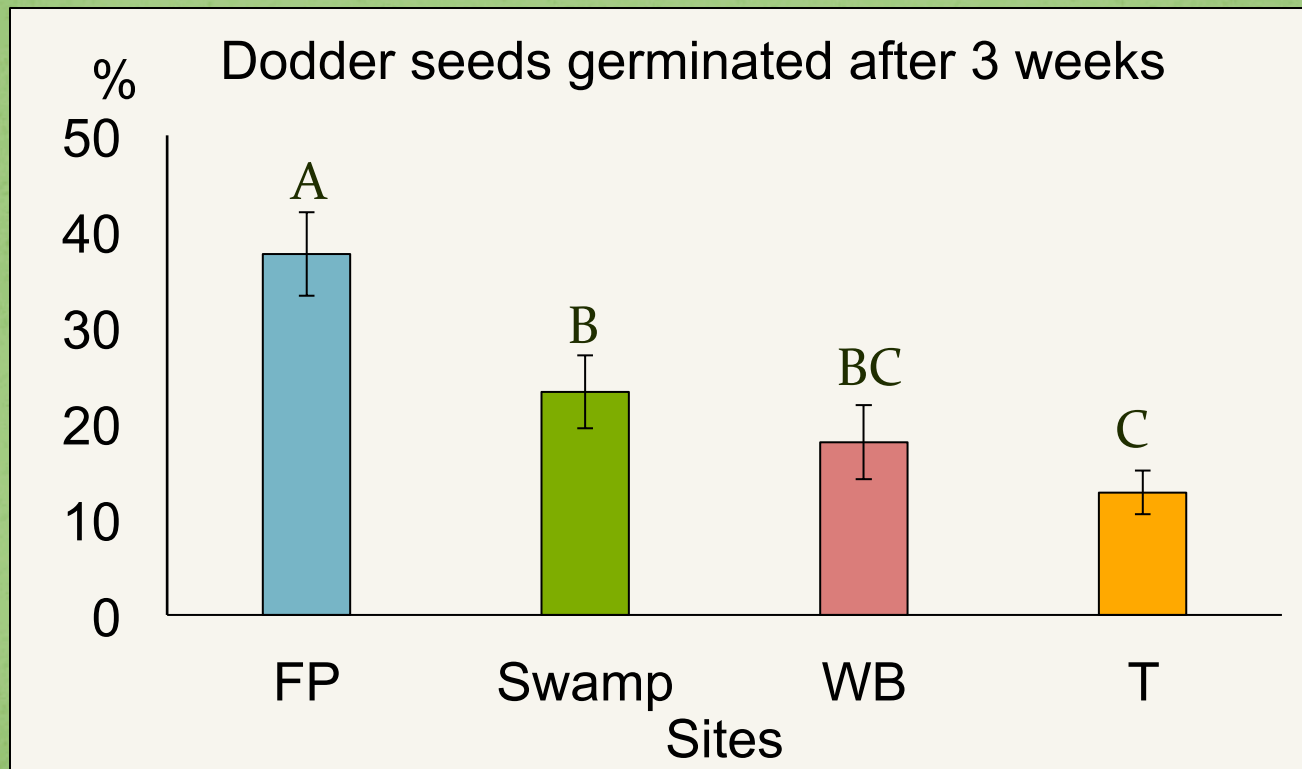


# Casoron PRE



# Constant selection pressure

- What are we selecting for?
  - Longer germination windows?
  - Less dormancy?



# Poverty grass



Little bluestem (*Schizachyrium scoparium*)

Broomsedge bluestem (*Andropogon virginicus*)

# Weed shifts – Poverty grass

## 2010 survey

- 0% - selected perennial grass as most problematic weed



## 2015 survey

- 59% - one of most difficult weeds to manage
- 64% - one of the four most common weeds

# Changes in Herbicides

## Mesotrione (Callisto) reg. 2007

- Very effective for other weeds
- Left a void for PG to fill?



## Changes in practices

2007 - many farms renovate/replant

- Open space for colonization
- Introduce sand from other areas

# Changes in Herbicides

Preemergence herbicide use decreases over 10 years

- **Casoron** (dichlobenil) use decreases



- **Florflurazon** use decreases

- Fear crop damage
- Increasing cost

**Devrinol** (napropamide) formulation change

- Granular changed to DF/liquid
- Many growers feel granular worked better



**WARM SEASON GRASSES**





# Devrinol and PG



PG species are “warm season” grasses

- Adapted to thrive between 80° - 95° F
  - June, July, and August
- Seeds don't germinate unless soil is warm
  - + 60 ° F

Devrinol controlled PG seeds in greenhouse trials, but complaints of no field control

- Timing issue?

# Other grasses

## Some cool season grasses

- Quackgrass
- Redtop creeping bentgrass, rough bentgrass
- Rice cutgrass

## Other warm season grasses

- Barnyard grass
- Crabgrass
- Deer-tongue grass

# Deer-tongue grass

aka Broadleaved panicgrass  
*Dichanthelium clandestinum*

- Perennial warm season grass
- Leaves are ½” – 1 ¼ “ wide, 4-8” long
- Up to 2’ tall, but usually prostrate on bogs



Virginia Tech Weed ID Guide



- Leaf sheath and stem are hairy



Joshua Sulman [http://botany.wisc.edu/jsulman/JSulman\\_plantphotos/](http://botany.wisc.edu/jsulman/JSulman_plantphotos/)

# Deer-tongue grass

Is it becoming more common on bogs?

- Survey question

Which herbicides control?

- Greenhouse trials this summer
  - Existing herbicides (Devrinol, Callisto, etc.)
  - New compounds

# Herbicide Screening

## 1. Identify products to test

- Herbicides used in other crops
  - Professional meetings
  - Journal articles
  - Recommendation from company

## 2. Could it be a good fit?

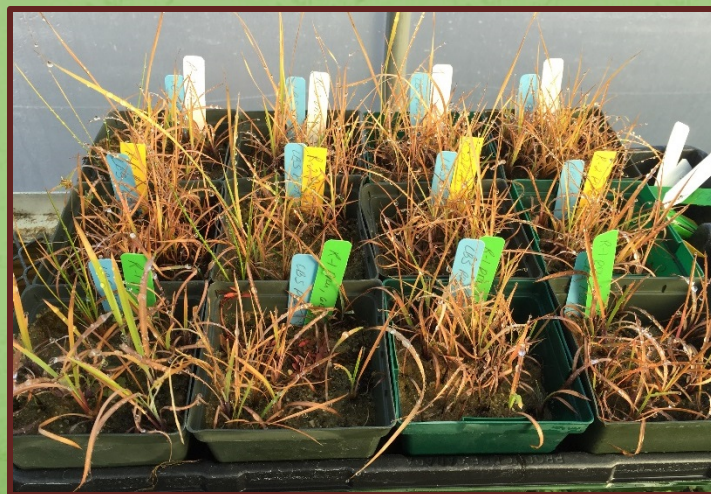
- Labeled use - spectrum of weed control
  - Look for overlap with our weeds



# Herbicide Screening

## 3. Greenhouse trials

- No crop destruct
  - More controlled
- Select weeds to test (PG, dodder, etc.)
  - Find source of seeds (*preemergence* herbicides)
  - Find or grow weeds (*postemergence* herbicides)
- Grow cranberry plants for crop safety test



# Herbicide Screening

## 4. Select herbicide rates and application timing

### *Preemergence*

- Weeds seeds - assess germination
- Cranberry
  - Dormant
  - Cabbage head
  - Roughneck

### *Postemergence*

- Weeds – actively growing
  - Visually assess damage
  - Collect biomass
- Cranberry
  - Roughneck
  - Bloom

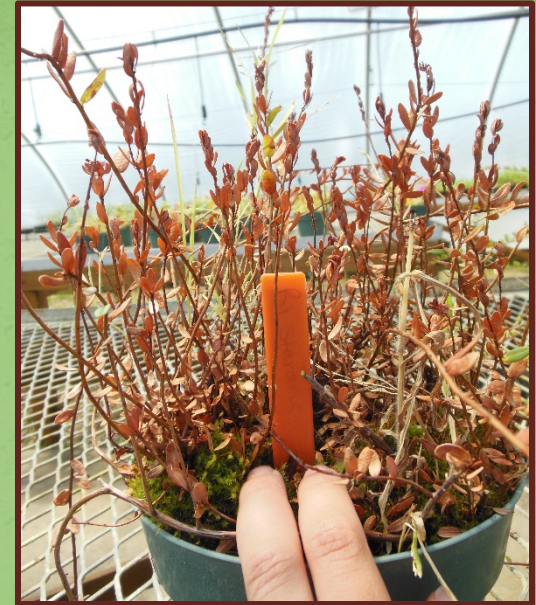




# Herbicide Screening

## 5. Identify promising compounds

- Control target weeds
- Safe on cranberry



## 6. Communicate results to chemical company

- Are they supportive of our work?

# Herbicide Screening

## 7. Field trials - Phase 2 of screening

Can work MUCH differently in the field than in the greenhouse!

- Just because an herbicide CAN control a weed, it doesn't mean it WILL control a weed
  - Soil type and texture, pH
  - Chemicals breakdown with light, environmental factors, microbes, etc.



# Herbicide Screening

## 8. Communicate with chemical company

Are they willing to support IR-4?

- IR-4
  - Facilitates the regulatory approval of crop protection chemicals for specialty crops
  - Funded by USDA, headquartered at Rutgers
- If yes, CI assists with submitting the product to IR-4 for testing
- If no, we can not proceed



# Herbicide Screening

## 9. IR-4 trials

- Focus is on food safety, residues
  - Establish application protocol, PHIs
- One pesticide for cranberry per year (by CI)

## 10. The manufacturer must submit application to EPA for registration in cranberry

- Greenhouse 2016
- Field 2017
- IR-4 2018
- Might start IR-4 trials 2019
- IR-4 data to chemical company
- If residues are acceptable 3-4 years for label...

# 2015 screening trials

We typically screen 5- 10 new products a year

Field trials - Product identified in 2014 greenhouse trials

- Preemergence, dodder
- Good control, good crop safety!

Unfortunately....

- Attempted to submit to IR-4, but were unable to nominate the chemical for cranberry (EPA hold, no new uses)
- Keep on the backburner until 2019 when then chemical has registration review

# 2015 screening trials

Identified some promising compounds

#1 - Worked well PRE on dodder and PG!

- Also labeled for moss control, and many other weeds
- Fall and spring applied field trials underway

#2 - Worked well on dodder POST

- Good control (July, dodder flowering)
- Possible growth regulator effect on cranberry
- Need to test alternate timings



# Chemigation of iron sulfate for moss control

Recommendations from West Coast:

- Use 80 to 100 lbs/A of the water soluble form (the powdered form)
- Dissolve it well (dissolves best in warm water if possible)
- Continue to stir as you inject
- Use a slow injection time - can clog system (intakes/valves/sprinklers) if you dissolve too much at once or go too fast.
- You might need to do more than one application.

Questions?

