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2021 Pesticide Safety April 27: An Herbicide Review!

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Herbicides and Weed Management

Katherine Ghantous and Hilary Sandler

April 2021

University of
Massachusetts
Amherst

Special (supplemental) Labels:

- 24(c) – “Special Local Needs”
- Section 18 – Emergency Use Permit

UMass Cranberry Station Website, point of sale
- under “services”, “special pesticide labels”

The screenshot shows a web browser displaying the UMass Cranberry Station website. The URL is <https://ag.umass.edu/cranberry/services/special-pesticide-labels>. The page features a dark red header with the University of Massachusetts Amherst logo and navigation links for 'Visit', 'Apply', and 'Give'. Below the header, the page title is 'Center for Agriculture, Food, and the Environment' and 'UMass Cranberry Station'. A search bar labeled 'Search CAFE' is visible. The main navigation menu includes 'Cranberry Station Home', 'About', 'Projects', 'Research & Extension', 'Publications & Resources', 'Services' (highlighted), and 'News & Events'. A yellow 'Make a Gift' button is also present. The 'Services' section is expanded, showing a list of links: 'Weather Summaries', 'Frost Tolerance Reports', 'Keeping Quality Forecast', 'Soil and Plant Nutrient Testing for Cranberries', and 'Groundwater Protection Regulations (Zone II)'. The 'Special Pesticide Labels' section is highlighted, with a sub-header and a description: 'These are cranberry-specific labels that supplement existing product labels. Click on the link to view the label.' Below this, there are four links: 'Kerb SC Herbicide Applicator Report Form 2021 fillable', '2021 Kerb SC Section 18 MA', 'Callisto® Herbicide Spot Treatment Application for Weed Control in Cranberry', and 'Pronamide Cranberry (Recertification) 21MA01'. At the bottom, there is a link for 'Zeus XC Herbicide Label.MA accepted March 23, 2020'.



Special Local Needs Label (24c)

- Active Ingredient: Sulfentrazone, a PPO inhibitor Group 14
- For control of moss and other susceptible weeds
- Zone II restricted
- NJ, PNW, and Canada also planning on use in 2021

Zeus XC Use Patterns

- Apply prior to cranberry breaking dormancy
 - Spring dormant through cabbage head
 - We recommend applying **before** cabbage head
- Injury occurs when Zeus contacts **actively growing** plant tissue

When bud scales are closed, tissue is protected

Spring dormant



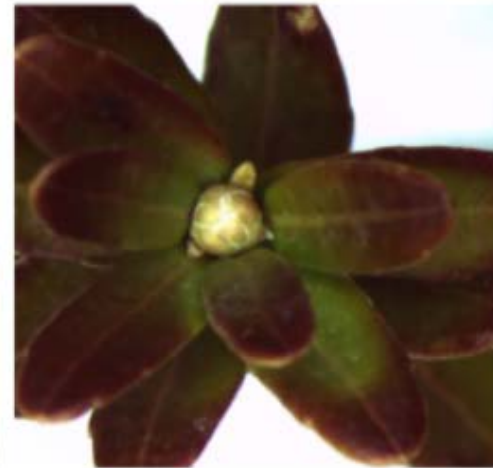
Buds are tight and red.

White bud stage



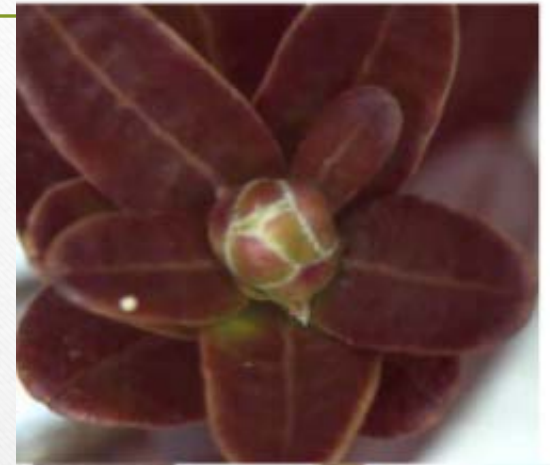
Buds are still tight but losing red color, giving a 'white'

Bud swell stage



Bud has expanded to cover leaf bases, increase in size from 'white bud'.

As bud scales spread apart,
chance of Zeus contacting
growing tissue...chance of
injury



More of the leaf
base is covered.
Bud is rounder,
scales are
parting.

Time applications for max crop safety!

- Unlike other herbicides that we time based on the weed growth stage, time Zeus for any time before cabbagehead
- What is “too early”?
 - Probably not an issue
 - May lose a little efficacy to heavy rain/frost/water, but even growers who ran for 10 hours the night after application in 2020 still saw moss control

Zeus XC Use Patterns

- Single application of 8-12 oz/A
- Zeus XC is active in the soil
 - if no rain or irrigation within 14 days of application it may need to be watered in
- Potential for injury if not applied at the correct time (uprights stunted, new foliage injured)
- Data from research plots in New Jersey suggests safe for application 2 years in a row

Moss injury will develop over time – not fast acting!

- Some effects on moss apparent within a month of treatment, but full effect can take months to develop
- Not recommended on new plantings yet (research needed)
- No data on use after late water, not recommended

Untreated Moss in June
Haircap moss - lush and making spores
(State Bog 6/25/20)



Treated Moss in June

(State Bog Moss Treated 4/15/20)

May / 1 Month after Zeus



June / 2.5 Months after Zeus



Control lasts for whole season

Moss on State Bog 8 months after treatment

Treated 4/15/20, photos 12/13/20

Treated w/ 12 oz/A in April



Untreated



2020 Grower Experience with Zeus

Surveyed 37 grower, 14 respondents

Cranberry varieties:

- Ben Lear (1)
- Crimson Queen (1)
- Demoranville (1)
- Early Black (4)
- Grygleski (1)
- Howes (4)
- Mullica Queen (4)
- Stevens (9)

Application dates ranged from 3/29 to 5/10

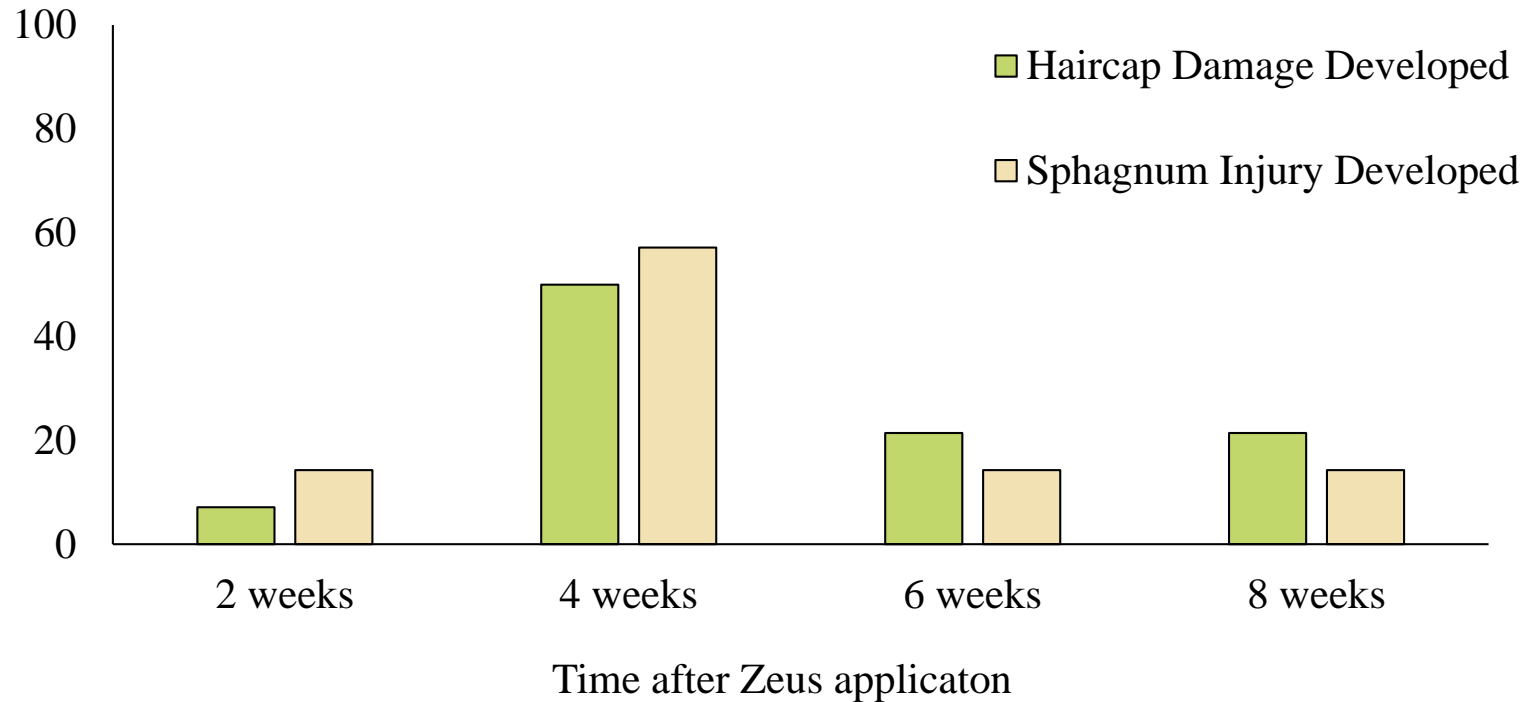
- most applications in April (71%), 1 in March, 3 in early May

Cranberry phenology

- 71% of applications when cranberry had tight buds
- 29% when buds were swollen

Grower observation of moss damage becoming visually apparent

% of growers



69% reported that control improved over time (moss injury got worse)
23% felt it stayed consistent throughout the season
8% felt that the control lessened (moss recovered)

Noticeable impacts to cranberry

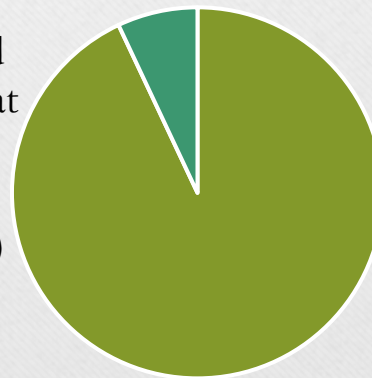
2 growers
reported mild
stunting:
Stevens
Ben Lear



86% No
noticeable
impacts

Impacts to fruit yield

1 grower reported
yield was somewhat
decreased
(Stevens, and also
reported stunting)



93% no
noticeable
effect on
yield

When asked about impacts to weeds other than moss:

- Sedges
- Yellow loosestrife
- Grasses
- One said Zeus was only herbicide and had good weed control all season

Zeus Poll Questions

Grass herbicides **ONLY** work on grasses

- sethoxydim (Poast) and clethodim (Intensity, Select, etc.)
- Is it really a grass, or sedge/rush?

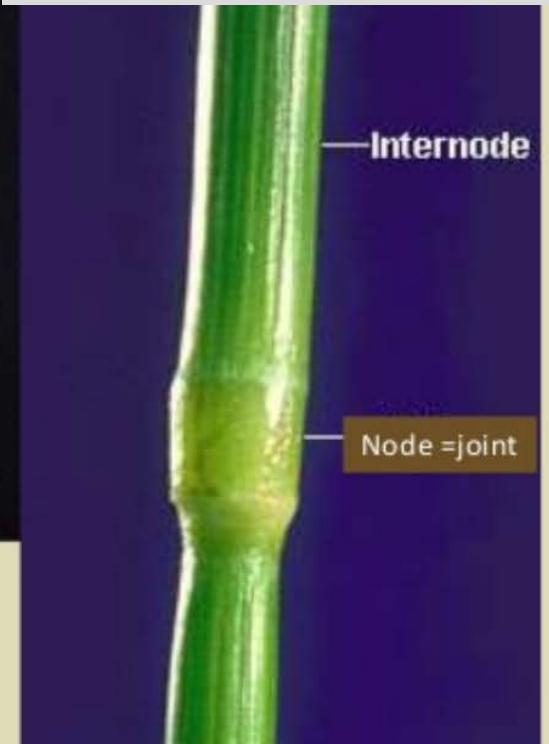
Sedges have edges



Rushes are round

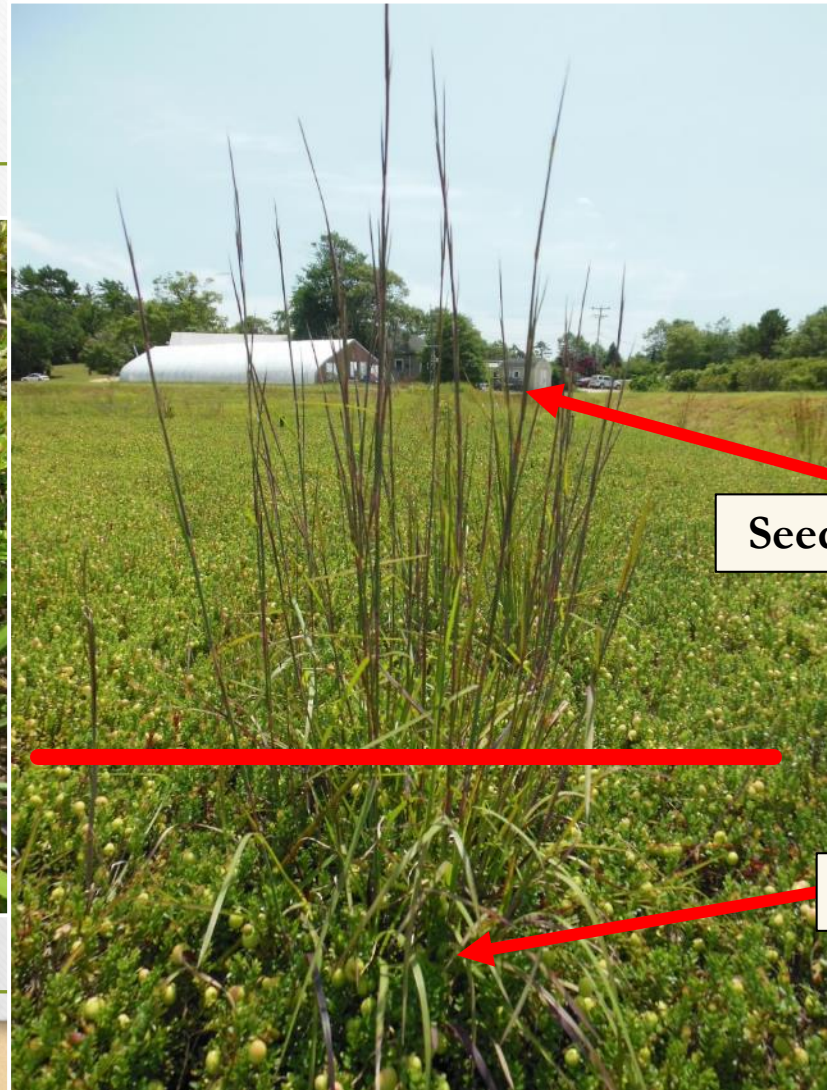


Grasses have nodes/joints from their tips to the ground



Timing Grass herbicides

They work on **ACTIVELY** growing grass **before** seeds are made



Seed stems

Leaves



Poverty Grass

Warm season

(*Andropogon virginicus*)

(*Schizachyrium scoparium*)

WARM SEASON GRASSES

winter

spring

summer

fall

winter



American-Lawns.com

SHOOT GROWTH

ROOT GROWTH

COOL SEASON GRASSES

winter

spring

summer

fall

winter



American-Lawns.com

SHOOT GROWTH

SHOOT GROWTH

ROOT GROWTH

ROOT GROWTH

Deer-Tongue Grass

Cool season

(*Dichanthelium clandestinum*)

Can apply sethoxydim or clethodim multiple times per season

- Early season grasses, and later for species like PG and deer-tongue grass (apps min 14 days apart)
- Best on actively growing grass before flowers
- **Do not recommend** clethodim applications during roughneck!
- You **CAN** apply Intensity and Intensity One between hook and fruit-set (24 c)
- Use correct adjuvant with grass herbicides.
Needed for efficacy



Chemigating for Grass control

Intensity One ONLY

- Absorbed through the grass leaves.
 - Very limited soil activity, not taken up by roots.
 - Use a short injection time to leave maximum product on the leaves.
- Use an adjuvant! It is needed for product to work.
- Use correct timing for grass you are targeting.

Thinking about Pre- vs Post Herbicides...

- Little PRE herbicide being used
 - Casoron, Devrinol, Evital are all costly
 - Am I spending money on an “imaginary/future” problem with PRE?
 - Did they work? Did I really need them?



Thinking about Pre- vs Post Herbicides...

- Lots of POST being used
 - Callisto (generics mesotriones), Intensity
 - Overuse can lead to resistance problems
 - Fighting seen enemy (weeds) instead of unseen (seeds)
- Unlike bugs or diseases, a missed problems won't hit you hard right away
 - Weeds are a long game, creeping, ongoing, escalating
- Don't rely on POST only

Grass Poll Questions

Kerb (pronamide)

- No full label yet (EPA keeps delaying decision date)
- Section 18 label - emergency use in MA since 2019
 - For dodder control only
- Zone II restrictions
- Export issues, check with your handler before using

Kerb SC (pronamide)



- Single app. of 2.5 to 5.0 pints per acre
- Or, two sequential applications of 2.5 pints per acre
 - Minimum of 20 days between applications
 - Do not exceed a total of 5.0 pints of product per acre per season
- Apply prior to dodder emergence
 - 7-10 days after you see first emergence

Kerb Effects On Seedlings

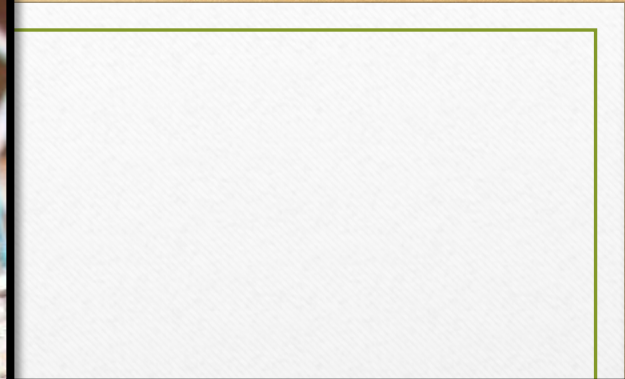
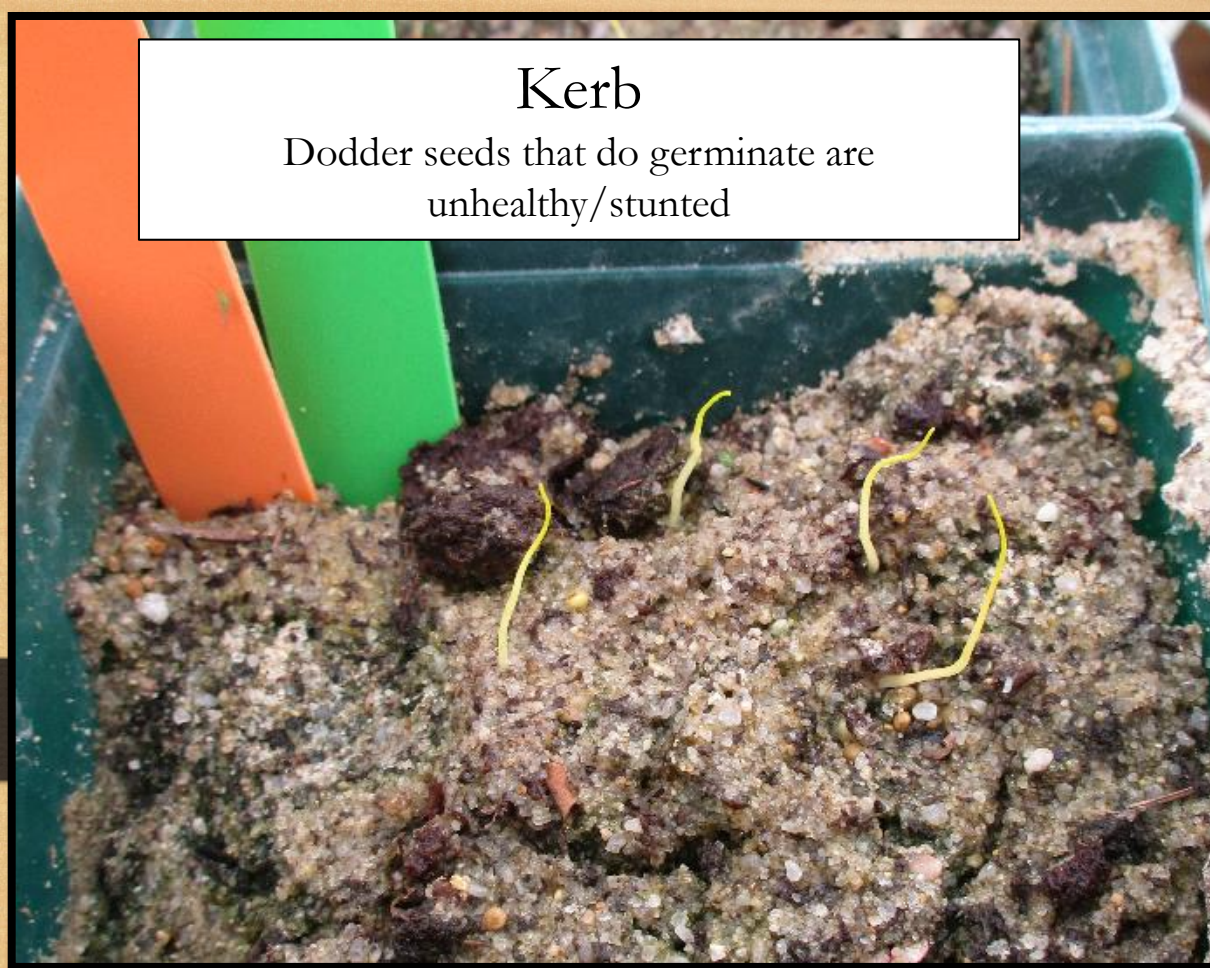
- Root stunting, inhibition of lateral roots



Photos courtesy of UC IPM <http://herbicidesymptoms.ipm.ucanr.edu/?selectedAI=1286>

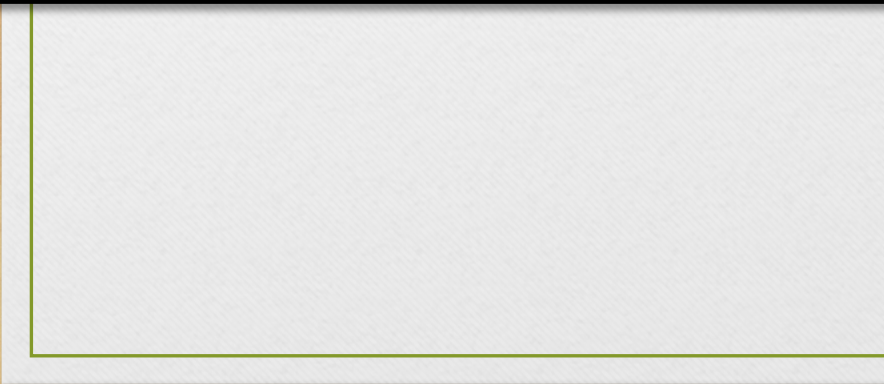
Kerb

Dodder seeds that do germinate are
unhealthy/stunted



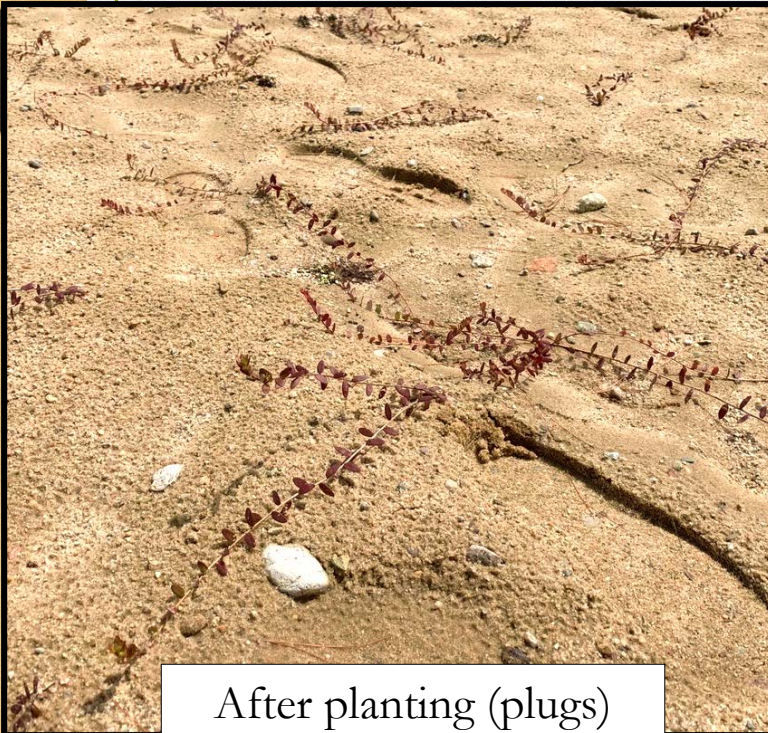
Untreated

Dodder seedling elongated,
searching for host



Weed Control Critical During Establishment

- Weeds hinder cranberry colonization
 - Physical barrier to runners rooting
 - Competition for nutrients, space, etc.
 - Poor weed management during initial years has long-lasting impacts



After planting (plugs)
(6/12/19)



2.5 Months after planting
(w/poor weed management. 8/28/19)

Available Options for New Plantings

- Devrinol (napropamide)
 - SLN renewed for 2XT (allows multiple apps on new plantings)
 - Effective, but costly
- Callisto (mesotrione)
 - Effective, but over-used in cranberry
- Casoron (dichlobenil)
 - Root inhibitor, low rates appear safe but may not provide adequate control of all weeds
- ✗ Evital (norflurazon) not considered safe during establishment
- ✗ Zeus XC (sulfentrazone) safety on new plantings unknown
- ✗ QuinStar???

2019 Field Study: Kerb On New Plantings, Carver MA

- Site 1: disced-in vines (var. Mullica Queen) approx. 1 year before Kerb treatments



- Site 2: rooted cuttings (var. Haines) approx. 2 weeks prior to treatments







1 app 2.5 pt/A

2020 Greenhouse Study



- ‘Stevens’
- 4” cuttings planted in sand 3 weeks before treatment
- 4 plants per trt/rep

Treatments (5 reps, 2 runs):

1. Untreated
2. 2.5 pt/A applied 1x
3. 5 pt/A applied 1x
4. 2.5 pt/A applied 2x (3 weeks between apps)



- Plants harvested 3 MAT
- Above and below ground separated (roots washed thoroughly) for biomass determination
- No visual difference between treated and untreated (at any eval or at harvest)
- No significant differences (shoot, root, or total plant biomass)

Conclusions

- Kerb likely safe for new plantings (when we get label)
 - Unrooted cuttings
 - Transplanted rooted plugs
 - Establishing beds (1+ yr)
- Current use under Section 18 label for dodder only, but we hope to have full label in 2022
- Current MRL issues for fruit exported to EU
 - Use on new plantings would not create residues and likely would not be restricted by handlers



Questions?