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## 2019 Update Mtg: Weed Management for 2019

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# WEED MANAGEMENT for 2019

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Hilary Sandler and Katie Ghantous

UMass Cranberry Station

Update Meeting: January 31, 2019

Special thanks to:

Krystal, Nancy, Lindsay, and Mika!



# Topics for Today

- Vine Stress and Herbicides
- Decisions: Save money? Control weeds?
- Kerb - Section 18 Update
- New Dodder Project
- No-till Planting project
- Brief History of Herbicides in Cranberry

# Weed Control is Challenging

- Target and crop are biologically similar!!
- Control may be delayed
- May need multiple applications



# **HERBICIDE INJURY: SYMPTOMS, MINIMIZING**

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# Weeds can be Indicators!





Evital Damage

from afar that  
has progressed





# Evital Damage





# Evital Damage associated with Poverty Grass



# Spot-treating with Evital

- If targeting 160 lb/A (max rate) = even app of 1 TBsp per sq yard.
- Not a lot!!!
- Typical coffee scoop ~2 TBsp





**Distribution**  
**160 lb/A**



# Yellow Vine – Water stress





# Yellow Vine symptoms





# Callisto-treated Dodder





# Flashing following Callisto





# Flashing following Callisto



Inset photo from New Brunswick Ag, Aqua, and Fish



# Weeds can Irritate!

Poison Ivy



St Johns Wort – Sun Sensitivity!



# Cost of Controlling Weeds

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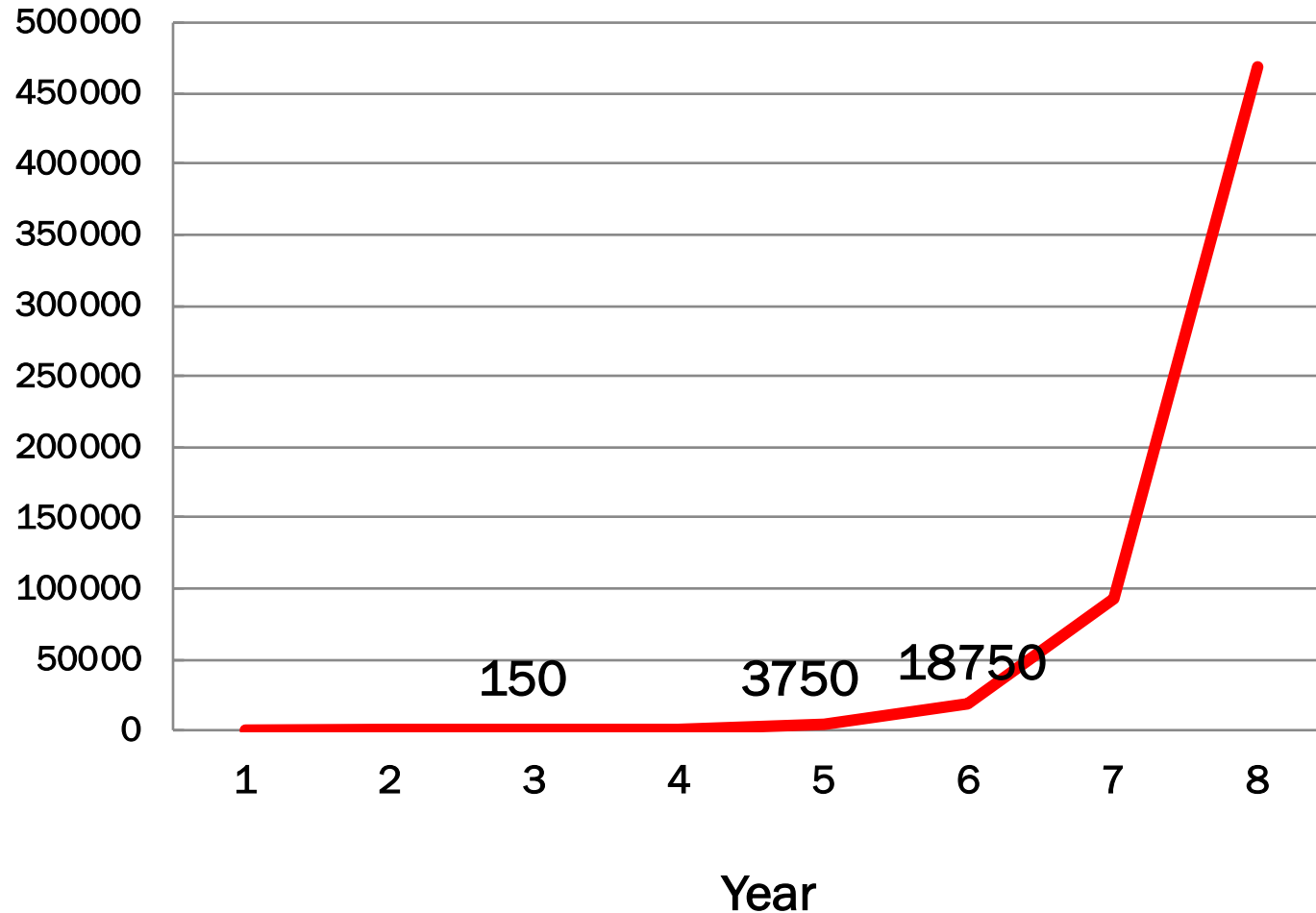
- Devrinol 2XT..... \$130-\$200/A (12-18 qt/A)
- Evital..... \$370-\$740/A (80-160 lb/A)
- Casoron..... \$75-\$250/A (30-100 lb/A)
- Callisto..... \$32/A (8 oz/A)
  - Syngenta generic: Explorer, even less
- Intensity One..... \$11/A (16 oz/A)
- Poast..... \$60/A (using 40 GPA spot)
- Handweeding..... \$12-18/hr/person



# Cost of **NOT** Controlling Weeds

- Weed Science Society of America study showed corn and soybean yields would be cut by ~50% if weed control measures were not implemented in US, Canada (Dille 2016)
- “1 year of seeds is worth 7 of weeds”
  - Certainly true for dodder
- Perennial weeds get “entrenched”; can grow exponentially (dewberries)

1 dewberry plant produces 5 daughter plants Year 1.  
Left unchecked, in 8 years, almost 0.5 million plants!

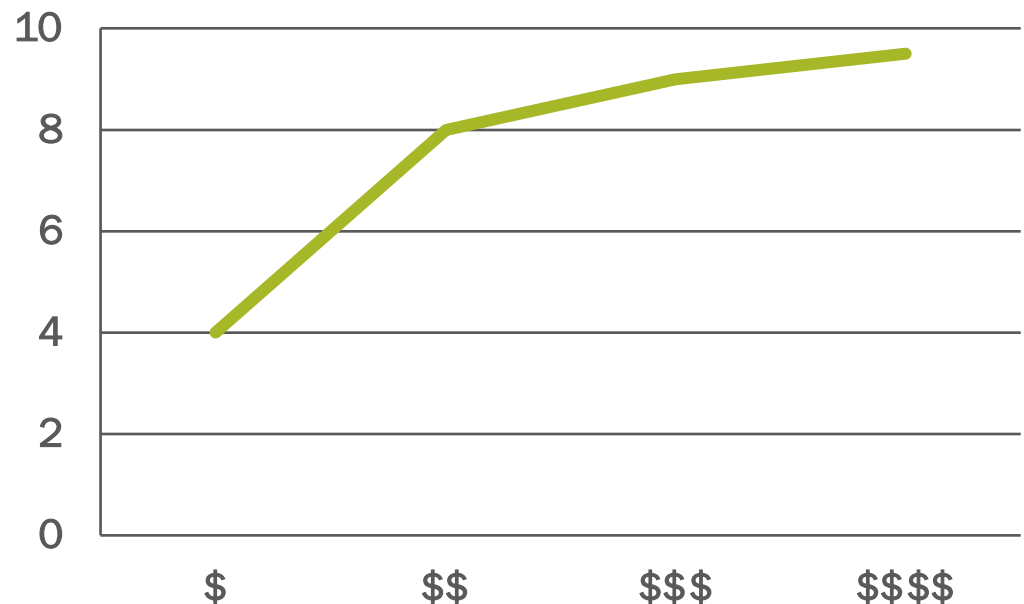
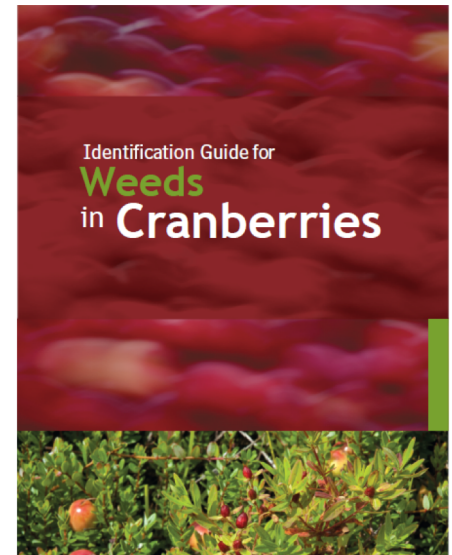


# How low can you go?

- **WEEDS:** You must manage:
  - Dodder: Prevent seed formation. POST treatments can be more targeted than PRE applications.
  - Dewberries: will kill cranberry vines. Control the perimeters; prevent exponential growth.
  - Poverty Grass: Multiple, POST treatments best.

# Decision Tree

- Know what weeds you have
- Control the perimeter
- Control seed deposition
- If short on time, use broadcast and/or carefully target problem areas



# minimize Vine Stress

# MAXimize Weed Control

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- Plants should be well watered
- Treat right growth stage
  - Usually small plants easier to control
- Select correct herbicide
  - Apply correct amount!
- Avoid hot, humid days
- Use known, labeled adjuvant



# **SECTION 18s and KERB Petition**

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**For 2019 Dodder Control**

# Section 18: What's involved

- Must establish there is an **EMERGENCY** condition, under their criteria. For example:
- Substantial failure of registered pesticides
- Pest causes significant economic losses
- Situation must be identified as “non-routine” event
- Pest problem rises to the level of an emergency.



Types of Regulations under FIFRA

## Section 18: What we did

- Significant input from growers, support from industry and registrants
- Presented packet to MDAR Pesticide Board Sub Committee in late November 2018
- Packet sent to EPA early December 2018
- EPA sent notice of initial “non-approval” on 19 Dec 2018
  - Allowing an opportunity to address concerns
  - EPA appreciated that dodder may be a difficult pest to manage but felt it is a “routine” condition.



# Next Steps

- Need data/testimonials from YOU!
- Resubmit ASAP
- Impact of Shutdown??
  - PRIA date was mid-May 2019
- Anticipating full Section 3 label in 2020

**Kerb<sup>®</sup> SC**

**HERBICIDE**



# **DOCUMENTING GENETIC VARIATION OF DODDER SPECIES TO OPTIMIZE EFFICACY OF MANAGEMENT**

**Hilary Sandler, Ana Caicedo (UMass Biology), Katie Ghantous,  
and Jacob Scott (UMass Undergrad student)**

*Supported by Center for Ag, Food, and the Environment  
Integrated Research and Extension Grant*



# Dodder Survey

In 2011, we surveyed dodder to find out what species we have

At least 2 species:

*Cuscuta gronovii* and *C. campestris*

2018+ - Working with genetics lab on campus

- ▶ What makes dodder “weedy”?
- ▶ Even if it is the same species, is the dodder on bogs different from other dodder?
- ▶ Possible implications for management



# Collecting dodder from variety of sites

- ▶ Cultivated cranberry bogs - Carver, Plympton, Wareham, Rochester, Plymouth, Middleboro, Brewster, Barnstable, Bourne, Duxbury, Taunton, Halifax
- ▶ “Wild” dodder (swamps, streams, homeowners)





# In Summer 2018....

- Collected 426 dodder samples from 32 different commercial bogs and 6 non-Ag sites in MA.
  - We observed variation in stem diameter and stem color across collected samples.
- Obtained 80 dodder samples from New Jersey (8 sites, 3 of which were native wetlands), and 16 samples from Wisconsin (8 commercial sites).
- Developed in-house genotyping-by-sequencing (GBS) protocol







# Impacts and Goals (1 year)

- Examine population structure, diversity, and sources of dodder in commercial bogs.
- Assess correlations between genetic diversity and environment where different dodders occur.
- Disseminate information to you regarding which dodder(s) are present and use YOUR feedback to inform future field and lab experiments.
- Identify funding sources to support continued research and extension efforts

**Collect more samples! Can you help?**

# Long-term Goals (>2 yr)

- Determine relationships between dodders in commercial cranberry and non-Ag sites.
- Evaluate susceptibility of different dodders to different management practices.
- Develop BMPs for dodder.
- Offer dodder ID services at Cranberry Station.
- Leverage results to engage external scientists and obtain additional external funding.



# Continue collections this summer!

- ▶ If you have dodder, let us know!  
x 21 or x 47



Please fill out  
the GREEN  
survey!!

# Adaptation of no-till transplanting as an innovative method to improve cranberry farm sustainability (SARE FNE18-902)



Jeffrey LaFleur (PI) and H.A. Sandler (Technical Advisor)

Evaluate the use of no-till technology in a bog renovation from a mechanical, horticultural and economic perspective.



# No-Till Planter for Renovations

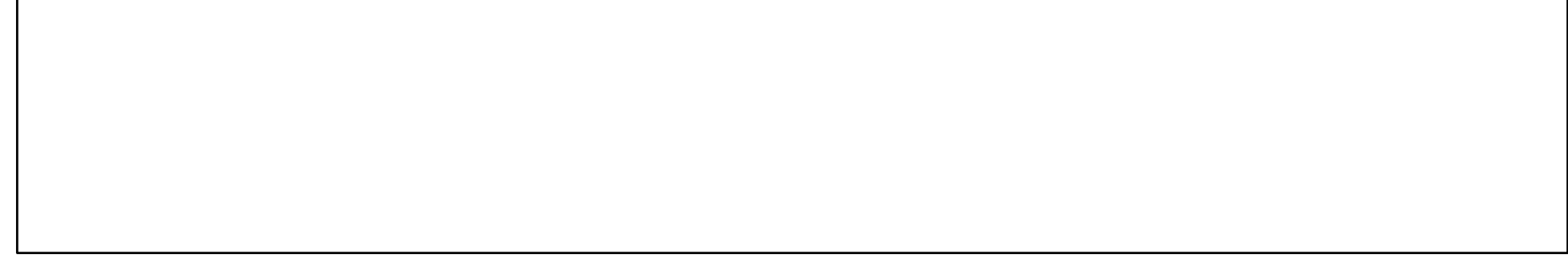
- Roundup applied 5/9/18 and 5/23/18 to kill planted vines, weeds; then mowed with flail mower (Howes): Thick Randall vine required mowing with hay mower and physical removal.
- Two plots: each ~0.5 acre. One planted through duff. Second mowed and 2-3" sand applied over duff.
- Randalls, Howes replanted with Crimson King (Valley Corp.)













# No-Till Planter for Renovations

- Sawbrier did emerge in the cuts
  - May need to be more aggressive in 1<sup>st</sup> season weed control and/or during pre-plant
- Fertilizer needs are different than in sand
- 1/3 the price of traditional renovation

Strong upright,  
runner growth of  
no-till plugs



# No-till Renovation

Mechanically: A traditional transplanter can be modified with a coulter and shank to slice and insert rooted plugs. Same machine utilized on no-till cucurbit and tobacco farms.

Horticulturally: Plants can thrive. Duff buffers irrigation similar to traditional no-till. Perennial weeds require alternative control measures or application timing. Fertilizer needs also different compared to traditional sand plantings.(Higher N rates required)

Economics: No-till ~1/3 the price of traditional renovation. Biggest cost was purchase of rooted plugs.

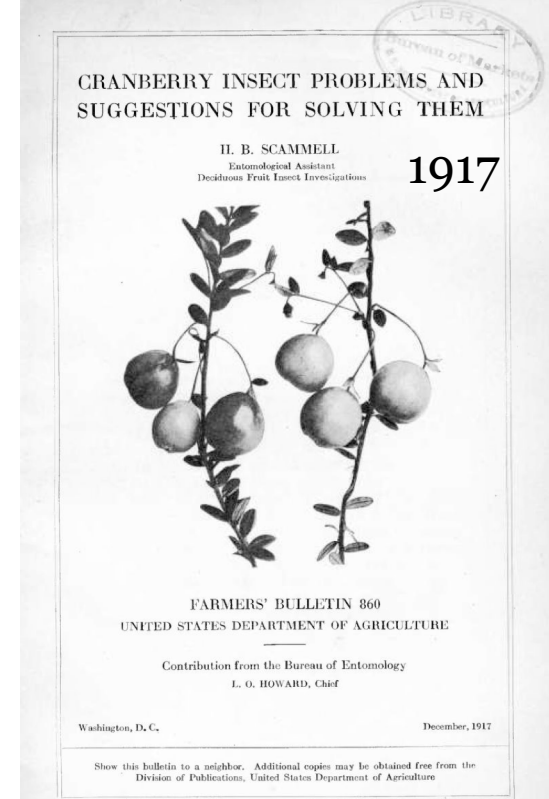
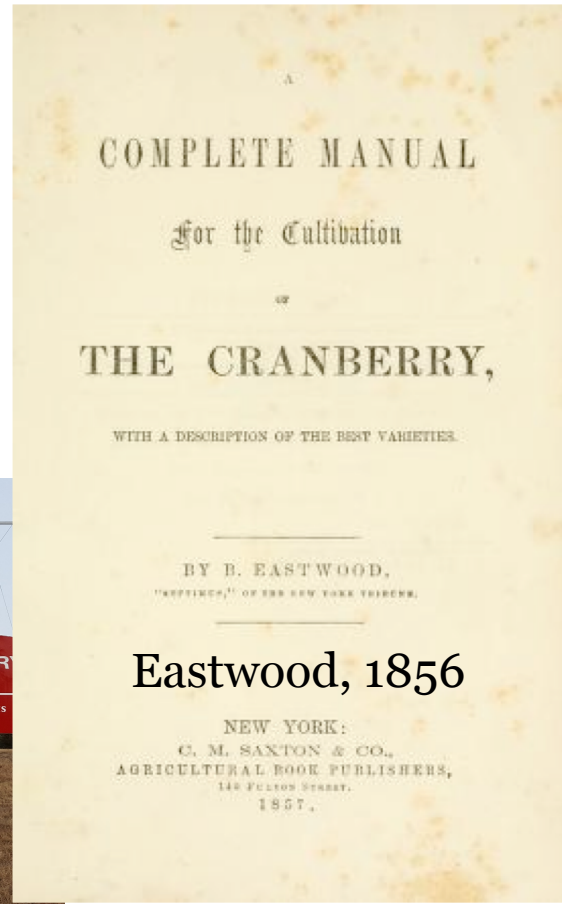
# **HISTORY OF HERBICIDES IN CRANBERRY**

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# Historical Documents

- Cranberry cultivation started in 1816
- Documents dating back to 1856
- Weed management
  - Handweeding
  - Sulfuric acid
  - Copper sulfate



<b>First Year</b>	<b>Active Ingredient</b>	<b>Brand Name(s)</b>	<b>Last Year</b>
1937	Kerosene		1990
1937	Copper sulfate		Still in use
1937	Ferrous sulfate	Iron (II) sulfate	2016
1937	Sodium arsenate		1955
1937	Sodium arsenite		1955
1937	Sodium chloride		Still in use
1937	Sodium nitrate		1978
1940	Ferric sulfate	Iron (III) sulfate	1952
1944	P-dichloro-benzene	PDB	1955
1947	Ammonium sulphamate	Ammate	1955
1950	2,4-D	amine salts	1951
1952	2,4-D	triethanolamine salt	1958
1954	Stoddard solvent		1992

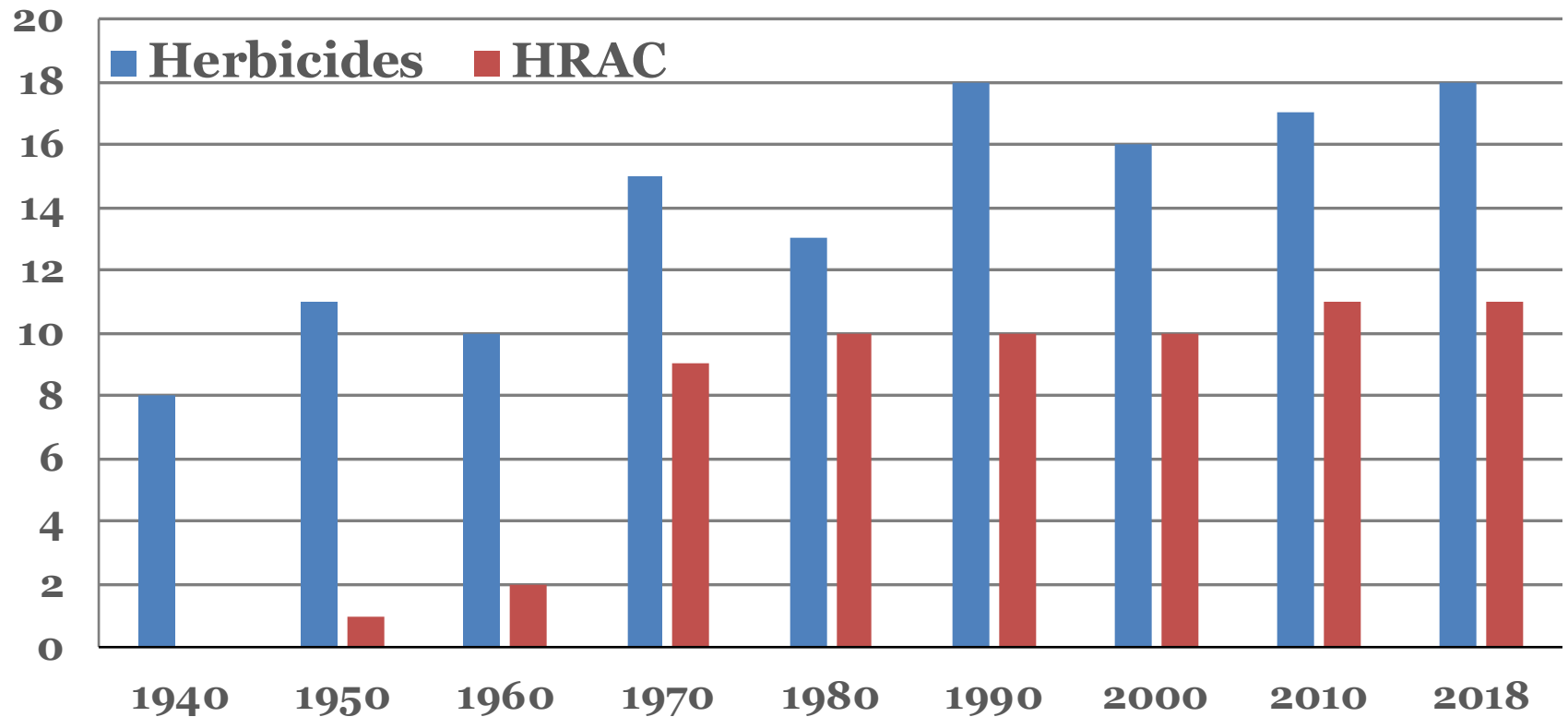
*Sandler, 2018. Agriculture 8, 138. Doi: 10.3390/agriculture/809138*

1950	2,4-D	amine salts	1951
1952	2,4-D	triethanolamine salt	1958
1954	Stoddard solvent		1992
1955	Metam sodium	Vapam	Still in use
1956	2,4,5-T	low volatile ester	1970
1956	2,4-D +2,4,5-T	Ester brush killer/Esteron BK (1984)	1970/1990
1957	2,4,5-TP	Silvex	1979
1957	Fuel oil	Fuel oil No. 2	1964
1958	Copper sulfate + lime	Bordeaux mixture	1958
1958	Aminotriazole	Amitrole	1959
1958	2,4-D	dimethylamine salt/Weedar 64 (1980)	1959/still in use
1959	Dalapon		1959/1990
1962	Simazine	Princep/Simazine	2005/still in use
1963	Chlorpropham	Chloro-IPC	1990
1965	Dichlobenil	Casoron, Norosac	Still in use
1965	Naptalam	Alanap	1975
1969	Naptalam+Chlorpropham	Morcran	1979

1976	Norflurazon	Evital	Still in use
1976	Diquat (dibromide)	Reward/Reglone (since 2002)	Still in use
1979	Napropamide	Devrinol	Still in use
1982	Glyphosate	Roundup (on-bog), Rodeo (aquatic)	Still in use
1983	Triclopyr	Garlon	1983
1984	Fluazifop-butyl	Fusilade (non-bearing only)	Still in use
1986	Sethoxydim	Poast	Still in use
1986	Maleic hydrazide	Royal MH-30	1995
1993	Dazomet	Basamid	Still in use
1996	Clopyralid	Stinger	Still in use
1998	Pronamide	Kerb (Section 18 permit)	2007
2002	Clethodim	Select	Still in use
2009	Mesotrione	Callisto	Still in use
2011	Quinoline carboxylic acid	Quinstar	Still in use
2018	Carfentrazone-ethyl	Aim	Still in use



# Registered Herbicides and HRAC Mode of Action



# Poverty Grass Seeds

QUESTIONS?

GO PATS



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