The Future of Weeds in Oregon Vegetables

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- Identifying new herbicide uses
- Finding new uses for some very old herbicides
- Fine-tuning old uses
- Integrated/alternative strategies
- What's in the cards

20 secs

THE TIME BETWEEN INFAMY AND MISERY

Oregon State Beaver Football Program

Beaver evolution

19th century

20th century

21st century

Willamette Valley drainage basin

Willamette Valley Vegetable Profile

Processed vegetables 40,000 A

- sweet corn, snap beans, broccoli, cauliflower, quinoa

Fresh market ~5000 A

- turnip, rutabaga, cilantro, oriental cabbages, rhubarb, many traditional veggies (green onions, cucumbers, etc)
- Conventional and organic

Vegetable seed crops ? $30 mil

- radish, **radish cover crop seed**, winter squash, brassicas, coriander, Swiss chard, onions, garlic, carrot


Sweet corn
<20,000 A

Processing squash
Golden Delicious
Confectionary seeds
4000 A


Rolling up
butternut squash

Fresh Market Vegetables

Cilantro
Aurora, OR

Challenges

Return on investment

Labor

Land use/right to farm

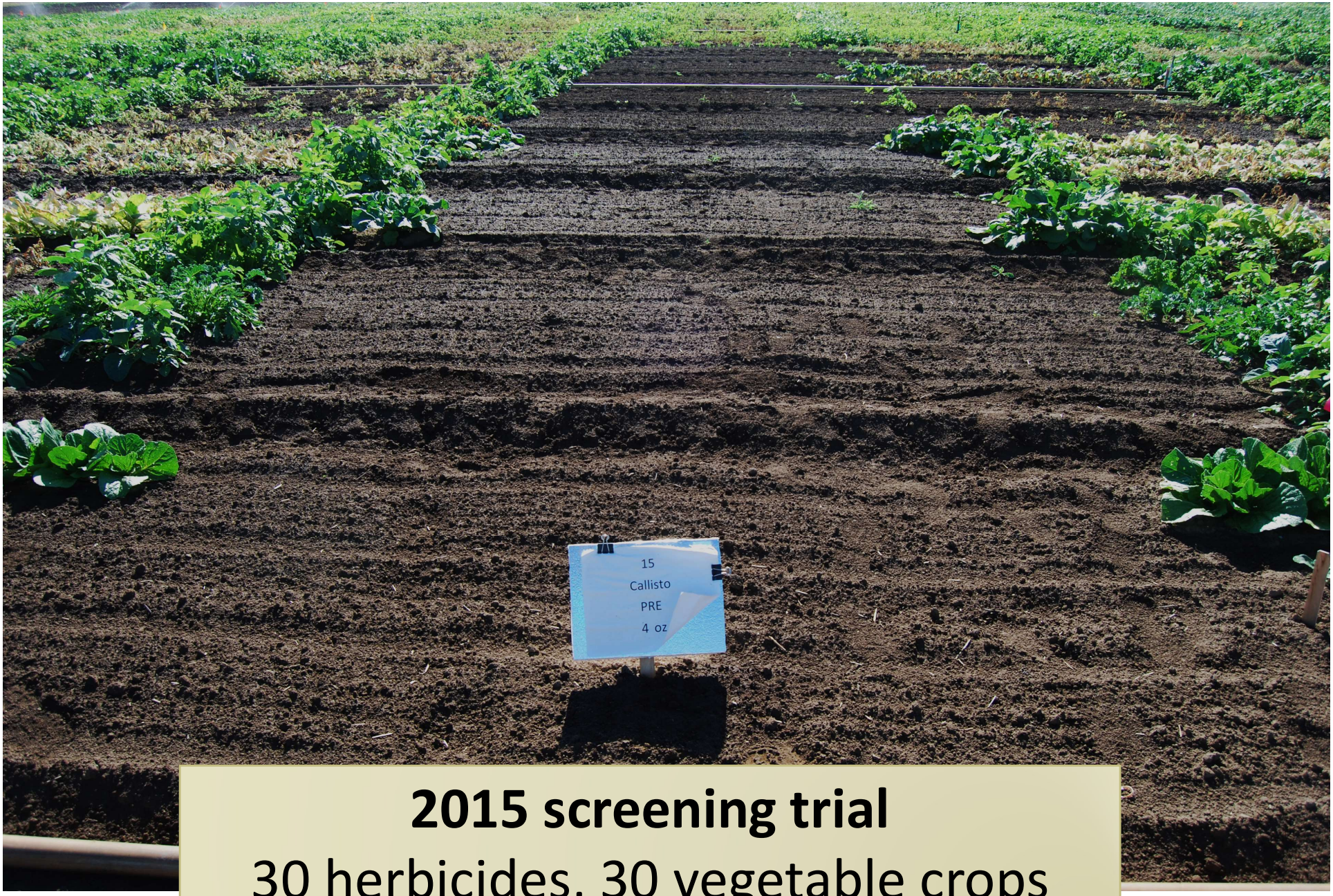
Pest control lower priority, with exceptions

Nutsedge in storage onion

Strategies

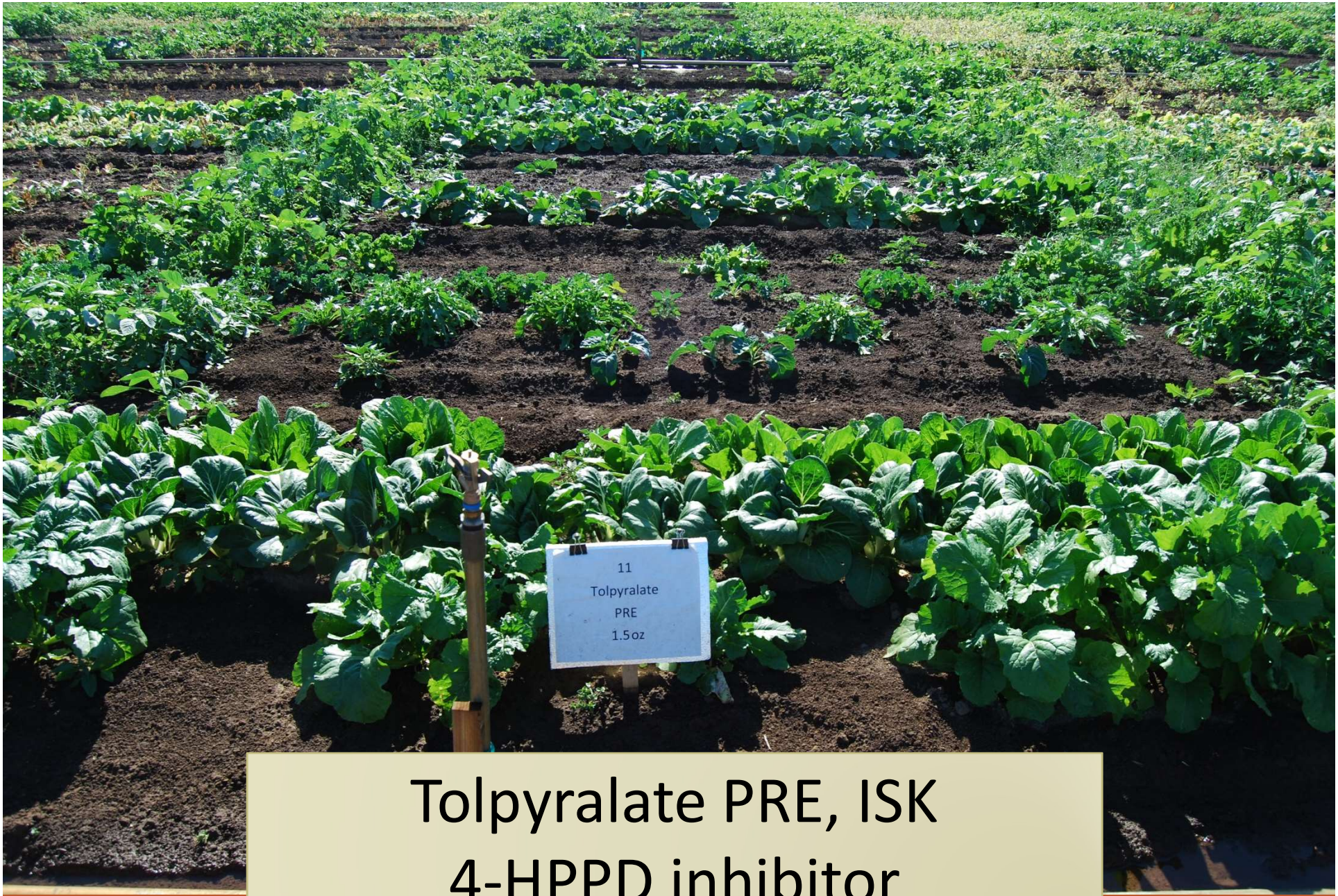
- Identifying new herbicide uses
- Finding new uses for some very old herbicides
- Fine-tuning old uses
- Integrated/alternative strategies
- What's in the cards

I. IDENTIFYING NEW HERBICIDE USES



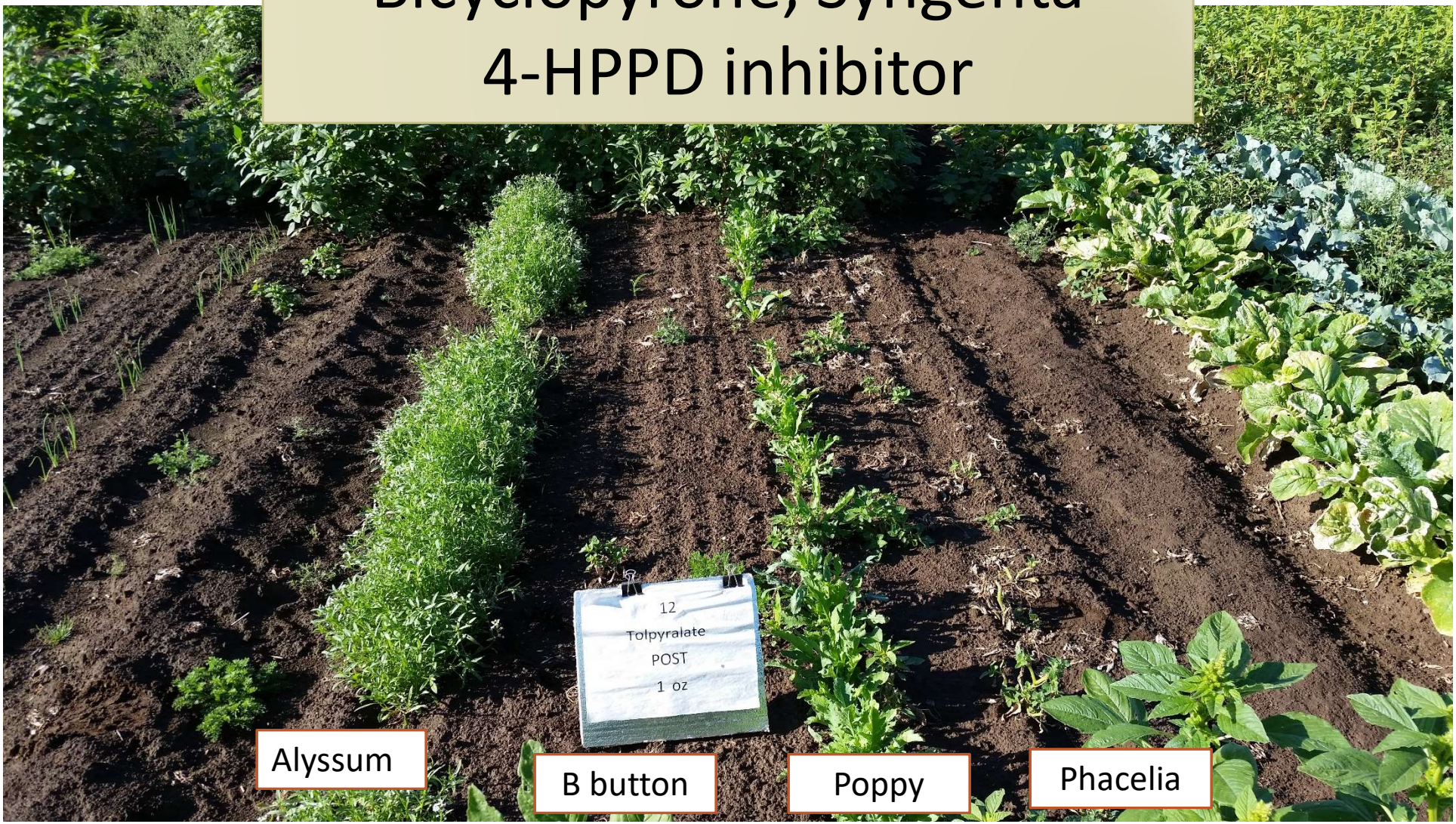
2015 screening trial

30 herbicides, 30 vegetable crops



Tolpyralate PRE, ISK
4-HPPD inhibitor

Bicyclopyrone, Syngenta
4-HPPD inhibitor

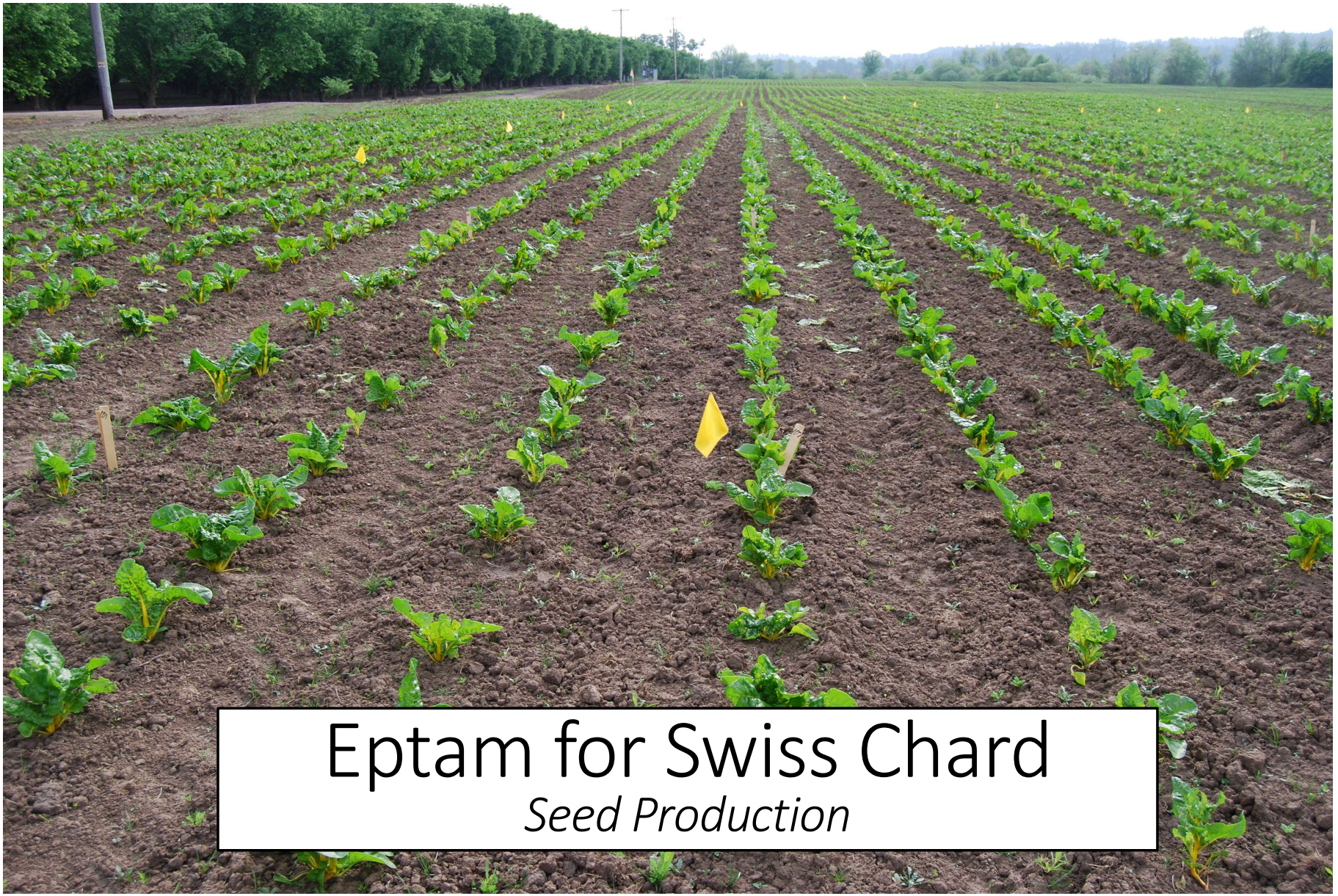


Brassicaceae, Asteraceae, Papaveracea, Boraginaceae

II. Finding New Uses for Old herbicides

EPTAM

REFLEX



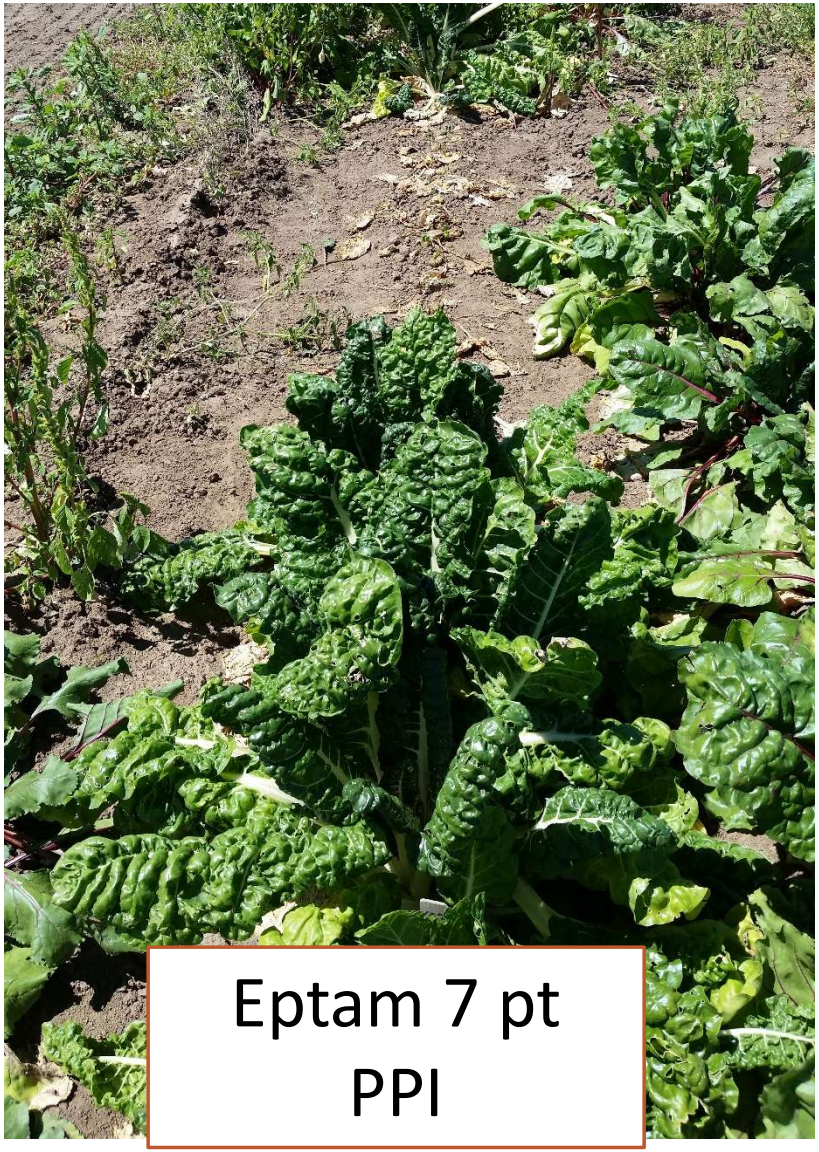
Eptam for Swiss Chard

Seed Production

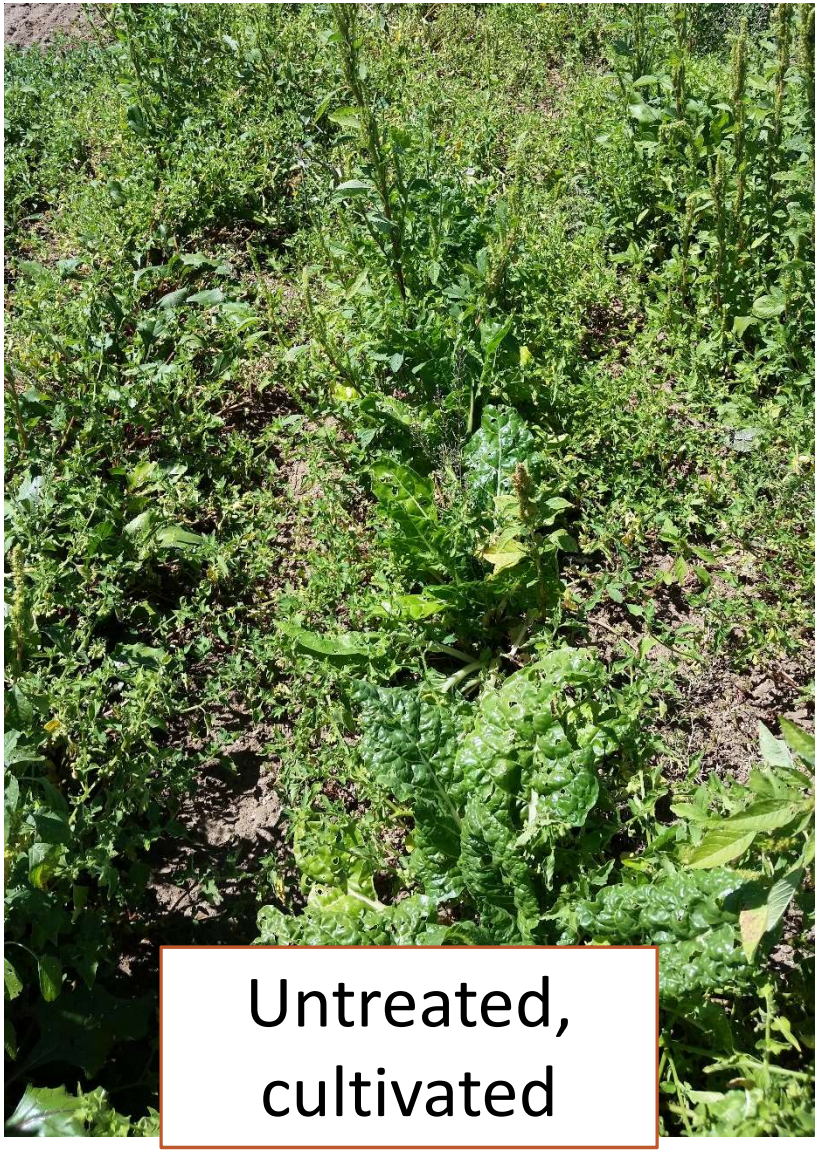
Swiss Chard Tolerance to Eptam

2017

- Timing
  - Preplant incorporated
  - Post plant
    - Immediately before irrigation
    - Delayed irrigation
- Formulation
  - 7E vs 20G



Eptam 7 pt
PPI



Untreated,
cultivated

Weed Control with Eptam in Swiss Chard

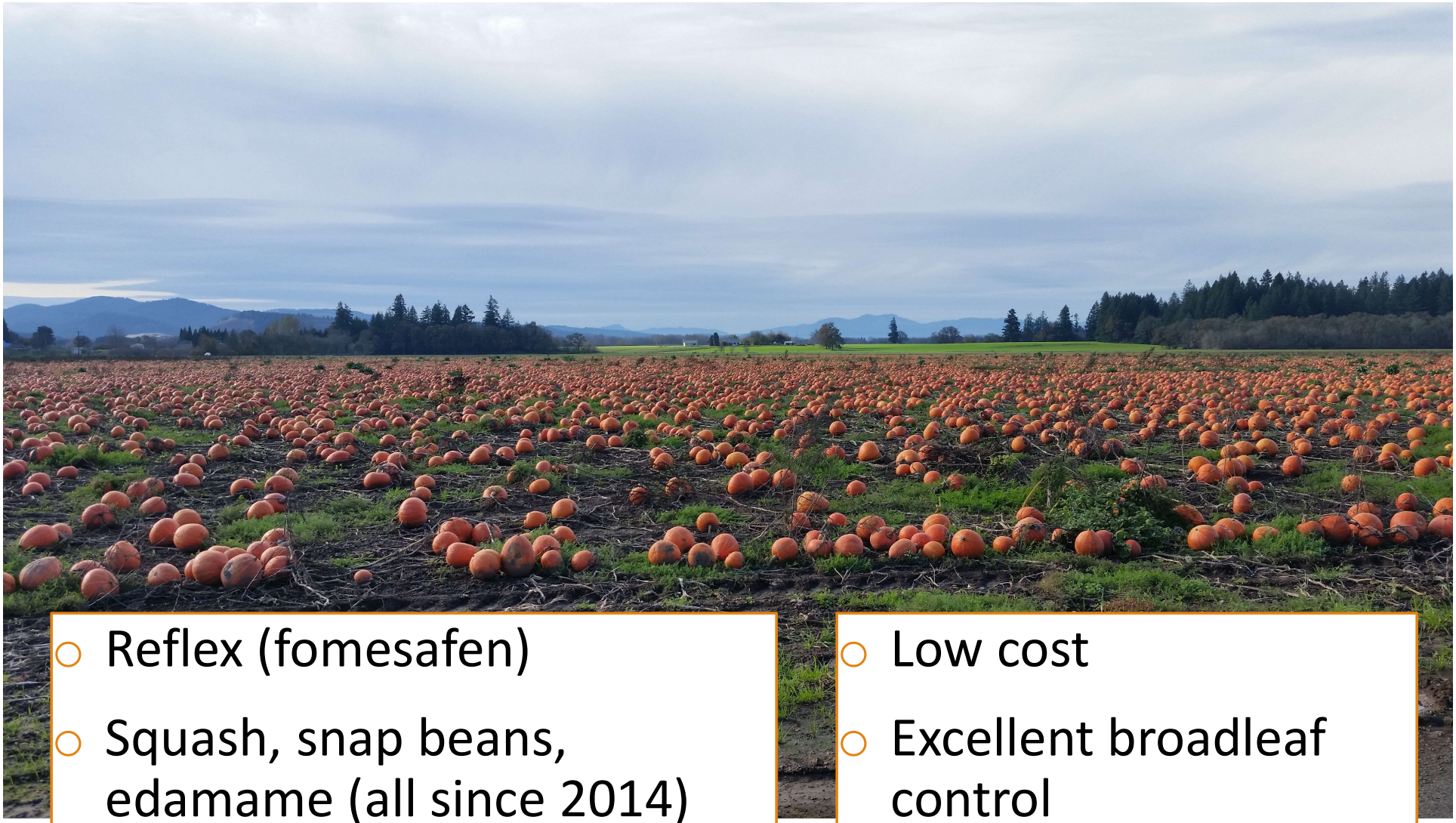
	Herbicide treatment			Overall weed control
1	7E	3.5 pts	PPI	60
3	7E	3.5 pt	2hr before irrigation	82
5	20G	15.3 lb	2hr before irrigation	85
12	Dual Magnum	2/3 pt	PPS	97
	Eptam	3.5 pt	PPS	

Good crop safety (carrots as well)

Gowan has indicated support for project

Reflex Herbicide

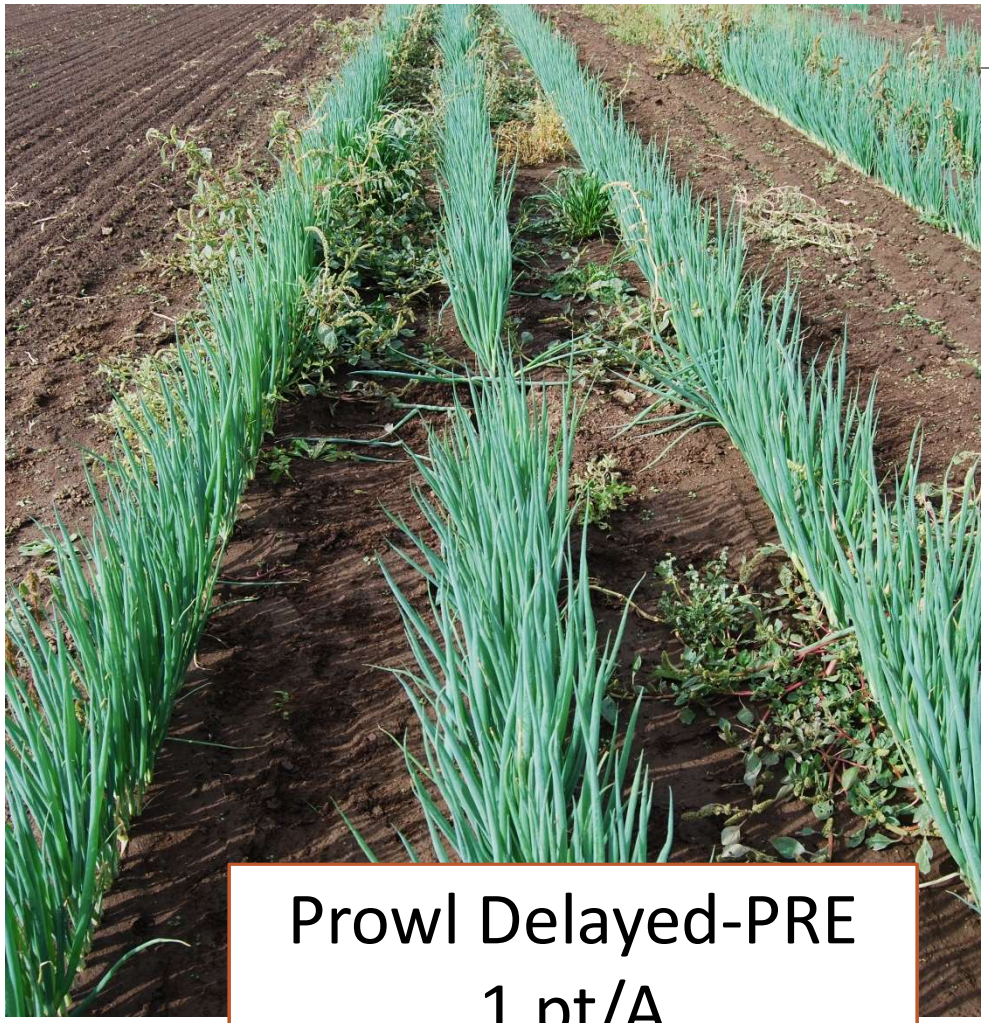
SOMETIMES THE RULES CHANGE



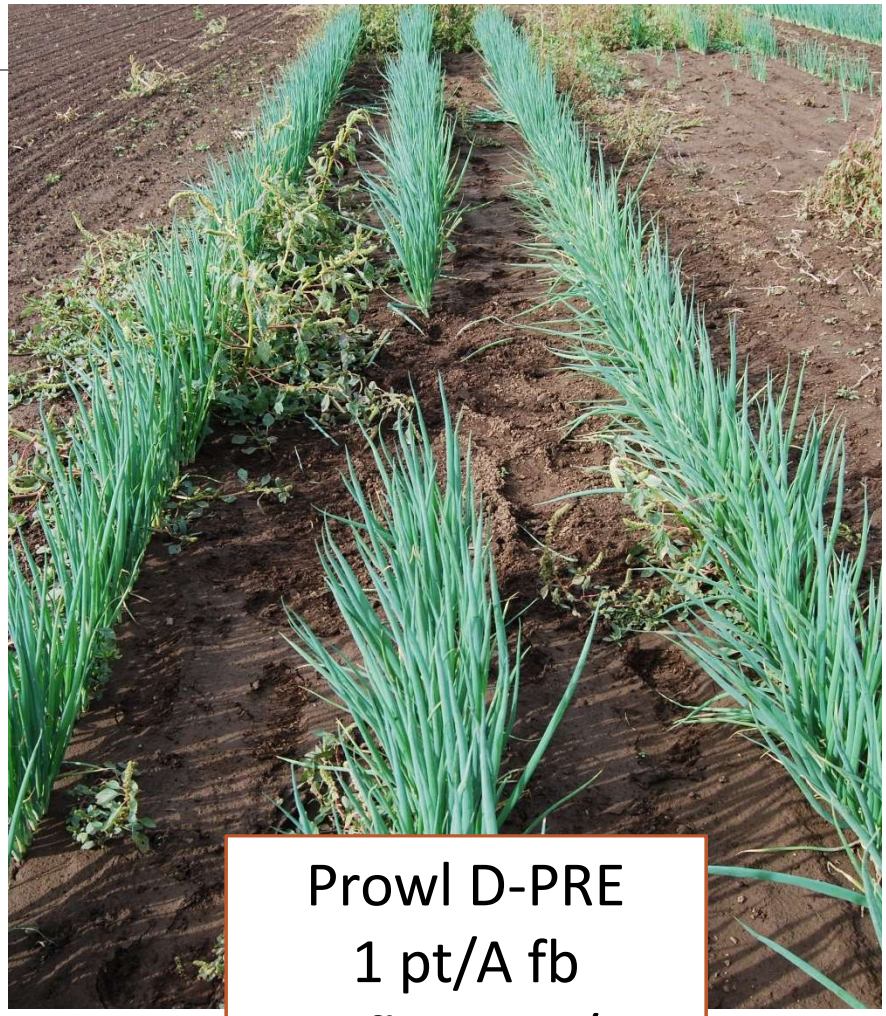
- Reflex (fomesafen)
- Squash, snap beans, edamame (all since 2014)

- Low cost
- Excellent broadleaf control
- Nutsedge suppression

Green Onions



Prowl Delayed-PRE
1 pt/A



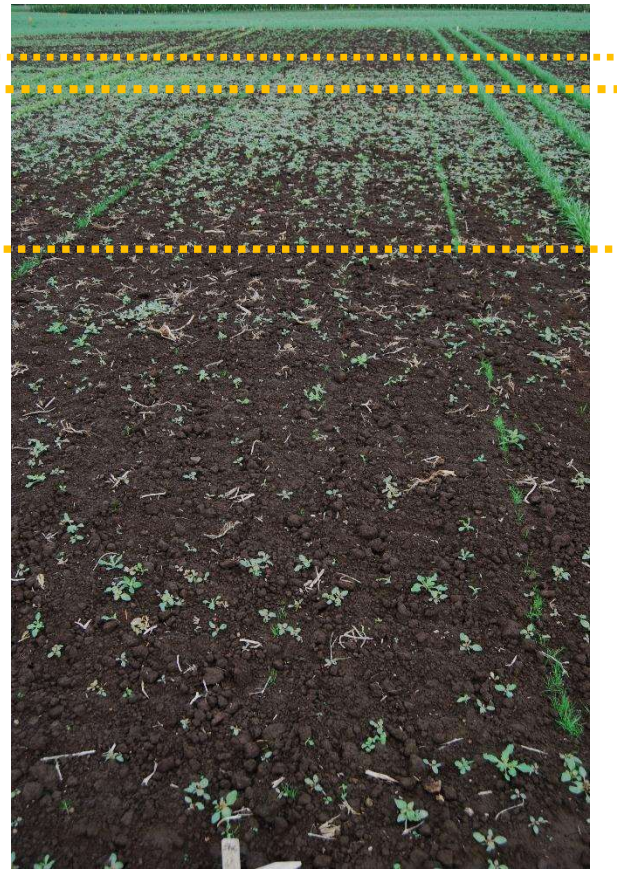
Prowl D-PRE
1 pt/A fb
Reflex 8 oz/A

REFLEX CARRYOVER

5 MONTHS AFTER APPLICATION

Reflex applied May, 2014; Follow crops planted Oct 10

Ann ryegrass



Bentgrass

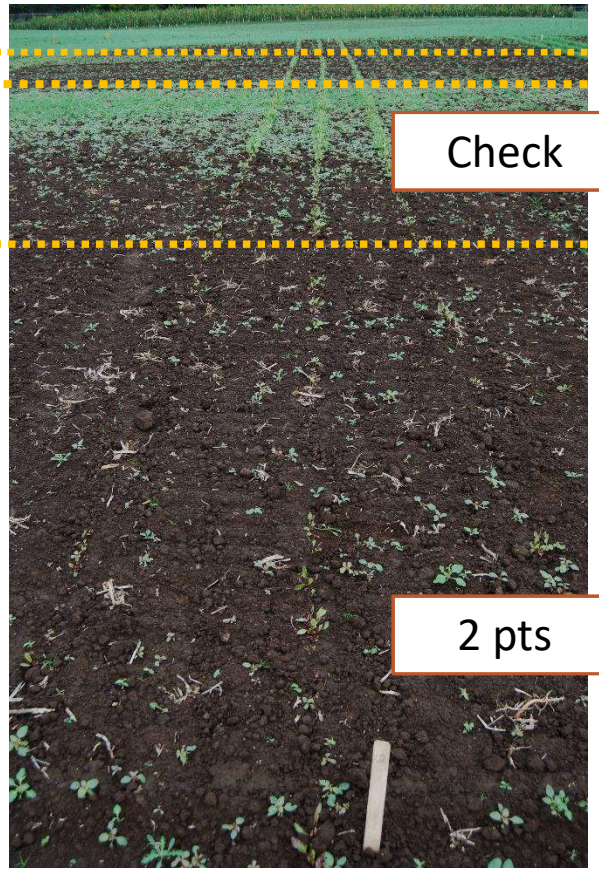


Table beets

Herbicide carryover

Complicates rotations and interseeding efforts

Planted July 7

Tall fescue + crimson clover
November 4

III. Fine tuning

UPBEET AND INTEGRATED STRATEGIES

Weed control in beets and chard

The effect of Roundup ready beets

- Pyramin gone
- Sugarbeet mix/Betamix gone
- Spin-Aid still intact
- Ro-Neet here for now

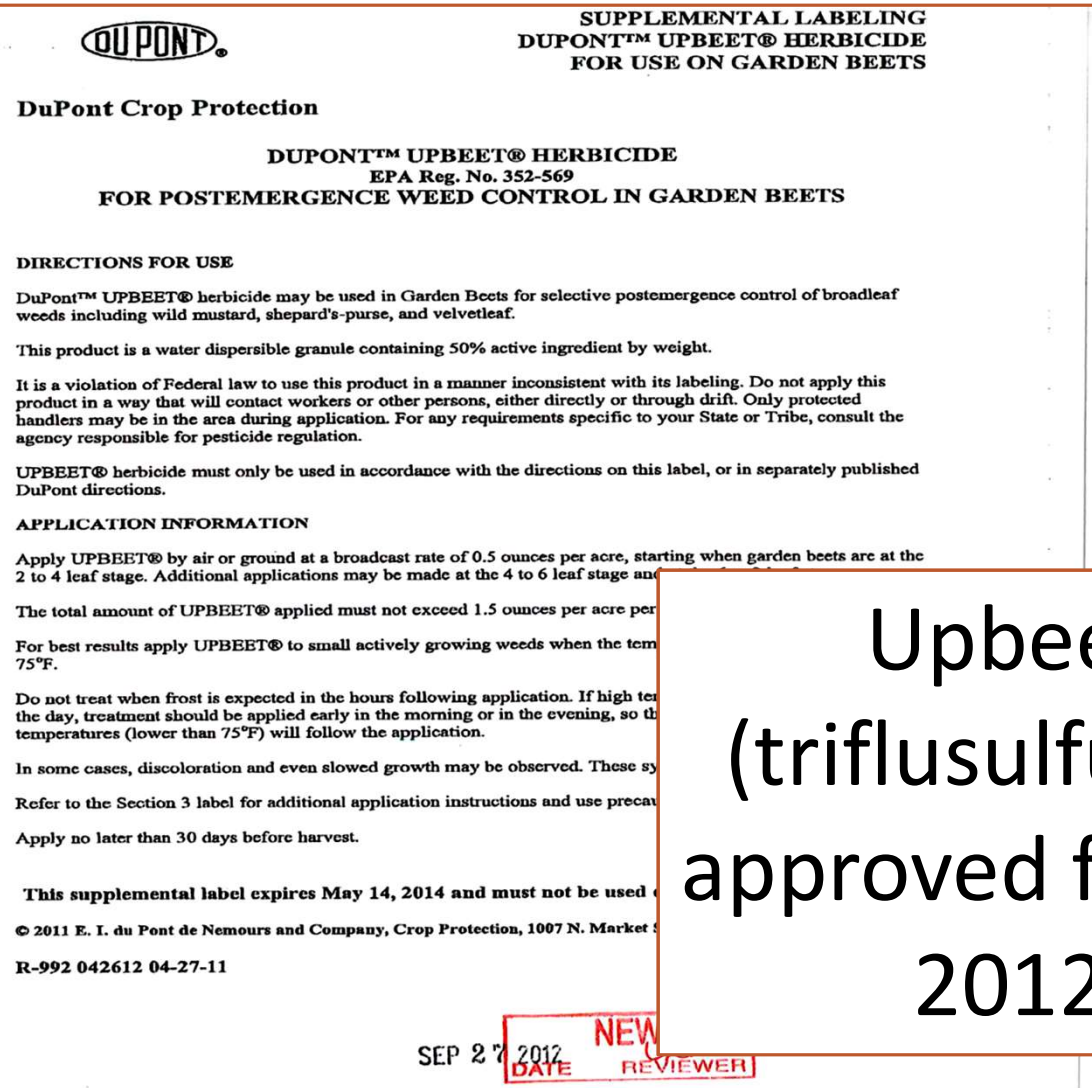
Nothing has more strength than dire necessity

Euripides c. 484-407

What doesn't kill you…..

Makes you stronger

The only good news in a decade!



DUPONT

SUPPLEMENTAL LABELING
DUPONT™ UPBEET® HERBICIDE
FOR USE ON GARDEN BEETS

DuPont Crop Protection

DUPONT™ UPBEET® HERBICIDE
EPA Reg. No. 352-569
FOR POSTEMERGENCE WEED CONTROL IN GARDEN BEETS

DIRECTIONS FOR USE

DuPont™ UPBEET® herbicide may be used in Garden Beets for selective postemergence control of broadleaf weeds including wild mustard, shepard's-purse, and velvetleaf.

This product is a water dispersible granule containing 50% active ingredient by weight.

It is a violation of Federal law to use this product in a manner inconsistent with its labeling. Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.

UPBEET® herbicide must only be used in accordance with the directions on this label, or in separately published DuPont directions.

APPLICATION INFORMATION

Apply UPBEET® by air or ground at a broadcast rate of 0.5 ounces per acre, starting when garden beets are at the 2 to 4 leaf stage. Additional applications may be made at the 4 to 6 leaf stage an

The total amount of UPBEET® applied must not exceed 1.5 ounces per acre per

For best results apply UPBEET® to small actively growing weeds when the tem 75°F.

Do not treat when frost is expected in the hours following application. If high te the day, treatment should be applied early in the morning or in the evening, so th temperatures (lower than 75°F) will follow the application.

In some cases, discoloration and even slowed growth may be observed. These sy

Refer to the Section 3 label for additional application instructions and use precau

Apply no later than 30 days before harvest.

This supplemental label expires May 14, 2014 and must not be used

R-992 042612 04-27-11

SEP 27 2012 DATE NEW REVIEWER

Upbeet (triflusulfuron) approved for use 2012

Weaknesses of Upbeet

- Barely and herbicide
- Only works on very small weeds
- Weak on lambsquarters at current use pattern
  - 2 leaf beets, 0.5 oz/A
- Upbeet must supplement main practices

Table Beet Tolerance to Upbeet

Upbeet timing	Upbeet rate (oz)
Cotyledon	0.5
Cotyledon	1
Cotyledon	2
2 lf	0.5
2 lf	1
2 lf	2
4 lf	0.5
4 lf	1
4 lf	2

Currently labeled


No Upbeet
Dual Magnum +
Nortron PRE
Hairy nightshade
Lambsquarters


Upbeet ½ oz
Post (cotyledon beets)


Upbeet 1 oz
Post (cotyledon beets)

All other treatments

Proposed label rate adjustment

+ Apply ½ oz/A during cotyledon stage
+ Allow up to 1 oz/A Upbeet on 2-leaf

+ **Registrant is reluctant to proceed**

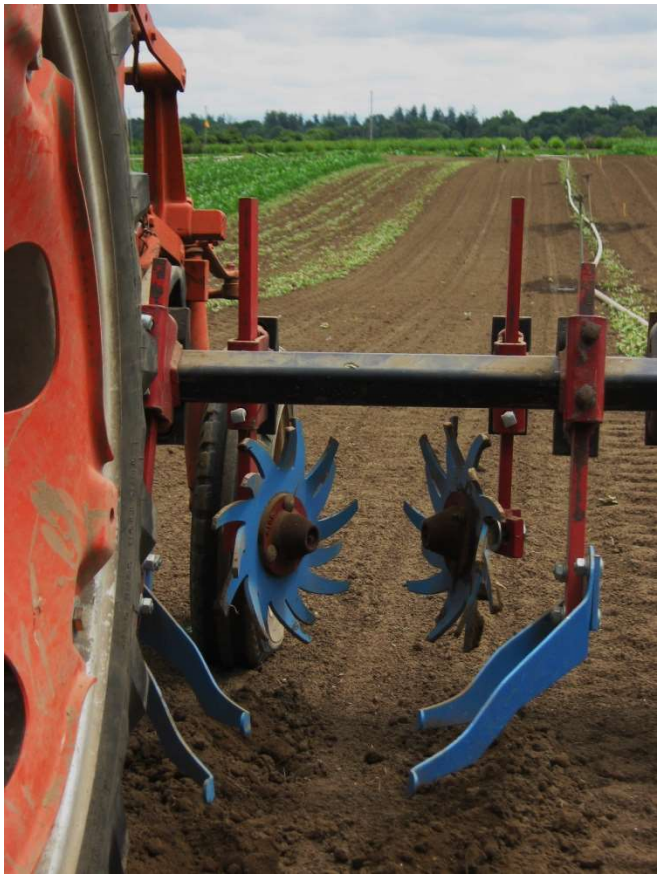
IV. Integrated Strategies

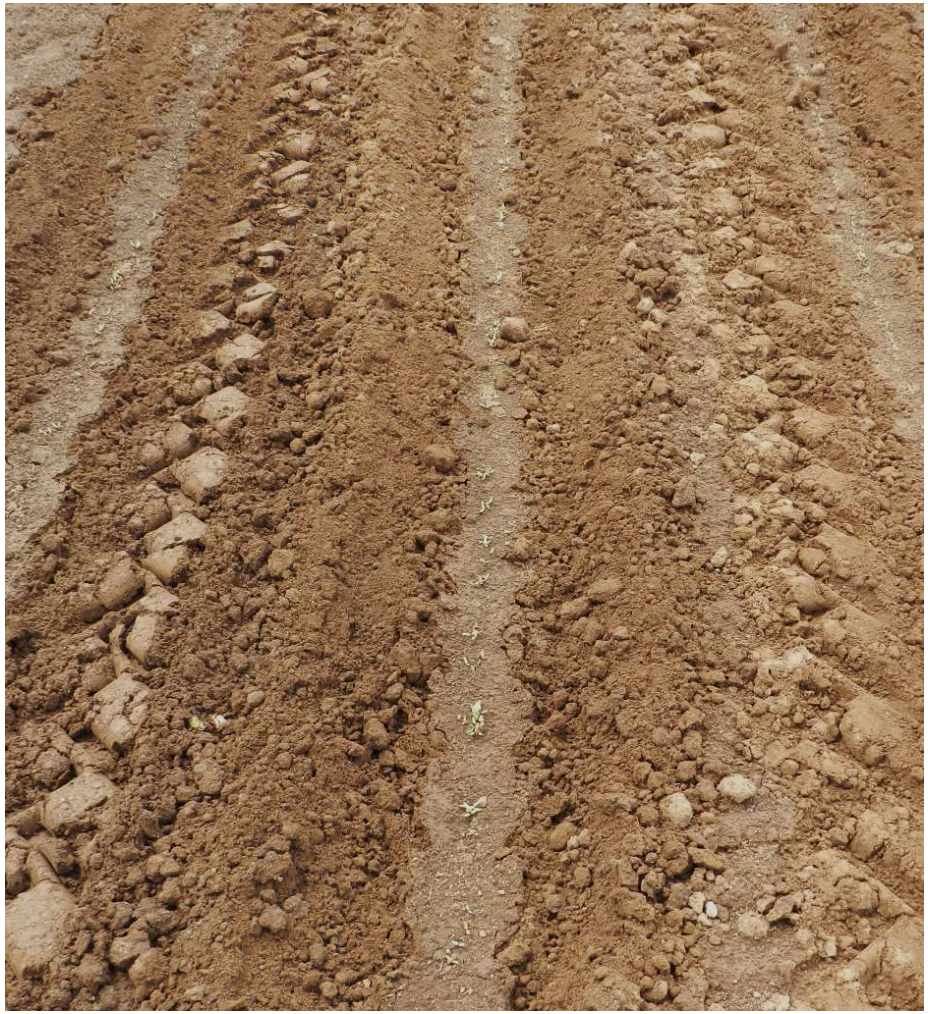
CULTIVATION AND HERBICIDES

FLAMING

ORGANIC HERBICIDES

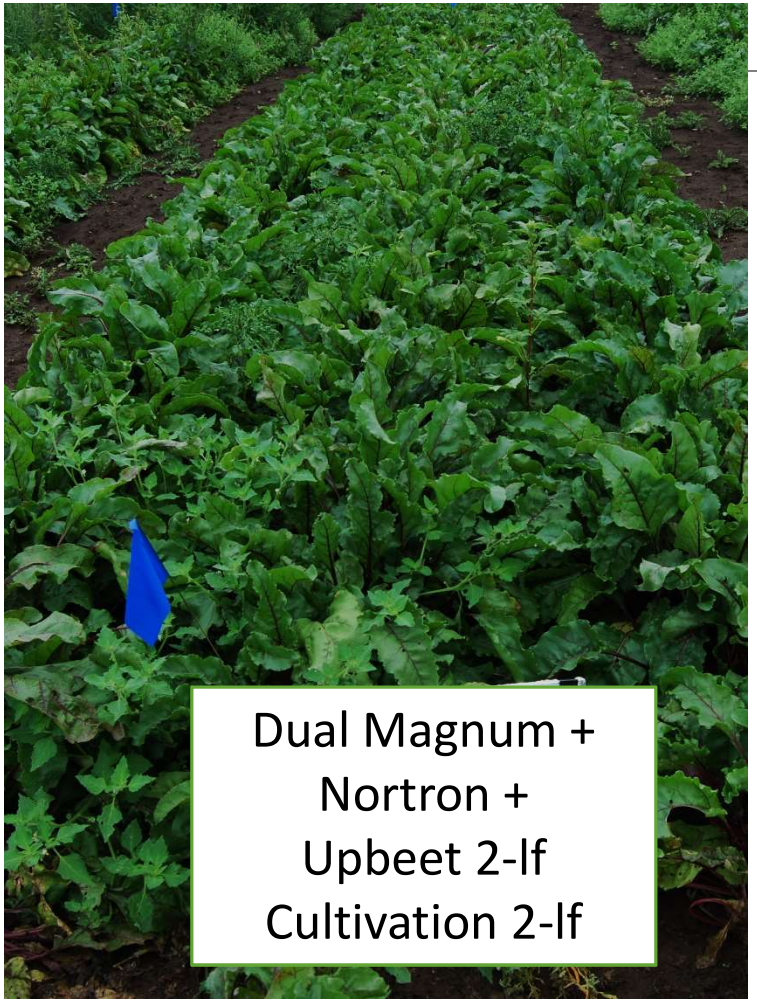
Combining Cultivation and PRE/Post Herbicides





Best weed control and yield

(32 t/A)



(30 t/A)

To maximize weed control and yield

If only using a Pre-herbicide…..

Upbeet + Spinaid was needed

If only using cultivation (no PRE)……

Upbeet + Spinaid was needed

If using PRE + 2lf cultivation…….

Only Upbeet was needed (32 t/A)

Spin-Aid tank mix actually reduced yield

Organic Burndowns

FLAME AND HERBICIDES

Time of flaming in snap beans

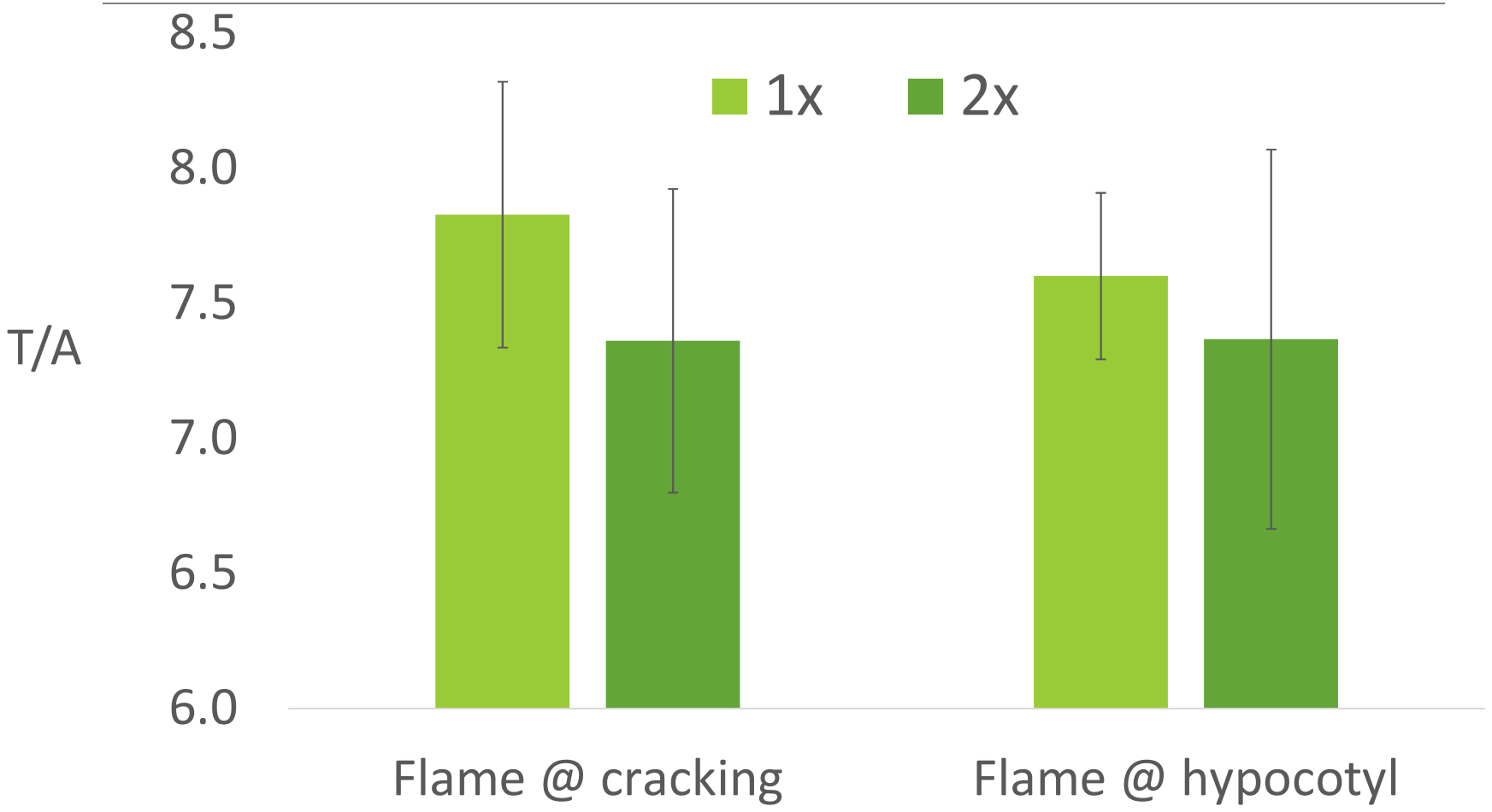
Crack stage

Crook stage

Flame and Org Herbicide Treatments

3	Flaming	Cracking (0.8% hyp)	1x
4	Flaming	Cracking	2x
5	Flaming	Hypocotyl (8 hrs later)	1x
6	Flaming	Hypocotyl	2x
8	Suppress (9%)	Cracking	1x
9	Suppress (9%)	Hypocotyl	1x
10	Suppress (18%)	Cracking	2x
11	Suppress (18%)	Hypocotyl	2x

Effect of Flaming on Snap Bean Yield



SUPPRESS®

HERBICIDE EC

FOR ORGANIC PRODUCTION

A Contact, Post-Emergent Non-Selective Herbicide for Use in Agricultural Food and Non-Food Crops

Active Ingredients:	
Caprylic Acid	47%
Capric Acid	32%
Other Ingredients:	21%
Total	**100%**

KEEP OUT OF REACH OF CHILDREN

WARNING/AVISO

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle.
(If you do not understand the label, find someone to explain it to you in detail.)

See inside booklet for First Aid and Precautionary Statements

SHAKE WELL BEFORE USING • APPLY WITH CONTINUOUS AGITATION

Manufactured by:
Westbridge
Agricultural Products
1260 Avenida Chelsea
Vista, CA 92081 USA
(800) 876-2767

EPA Reg. No. 51517-9
EPA Est. No. 51517-CA-1

OMRI LISTED
For Organic Use

Avenger Opti (d-limonene)

40 GPA, 14%

Avenger Opti
(2 times)

Check

The Future?

Robotics

Broadcast soil heating to kill weeds and pests

MVI_2595.wmv

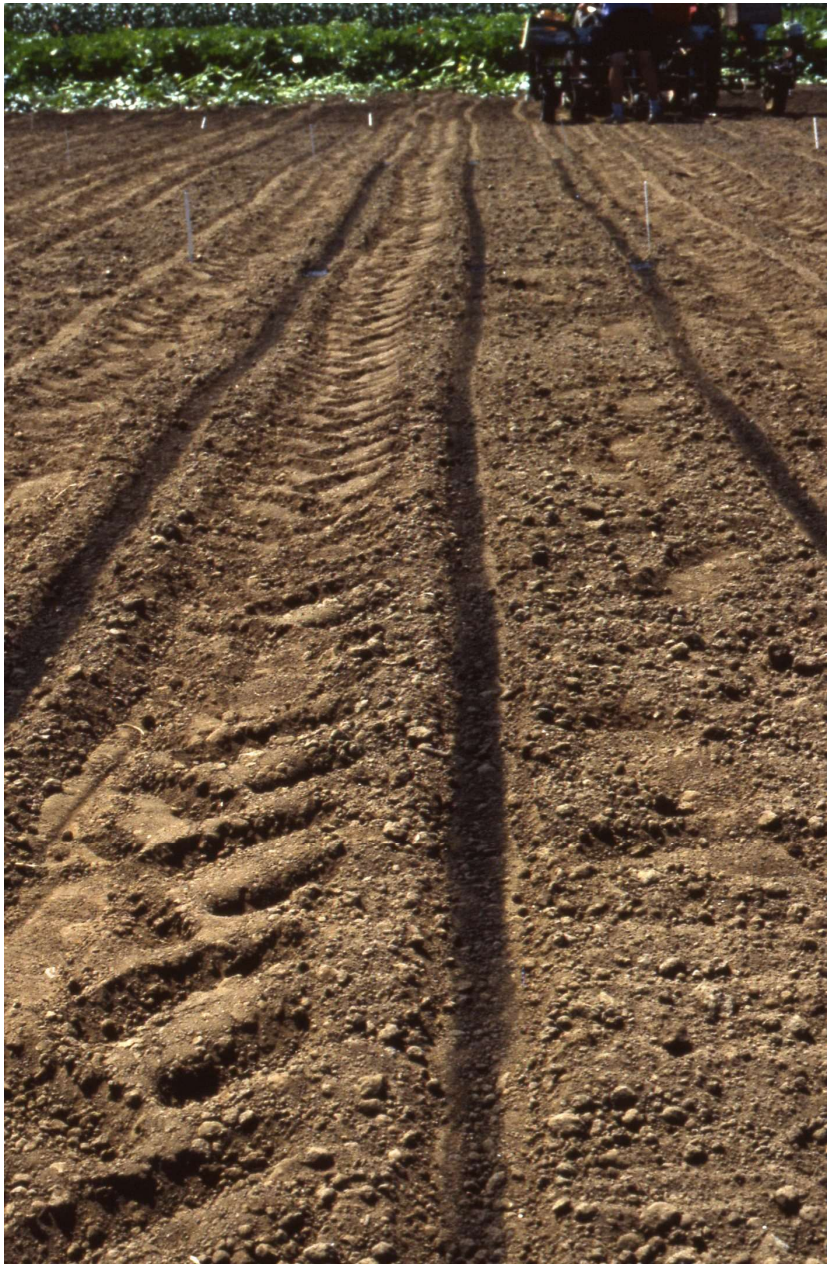
Robotic Steamer

Band heating/steaming in the row

2000 KW bed steamer with 13 tines


Thermal Soil Heating

Activated charcoal as an in-row protectant?



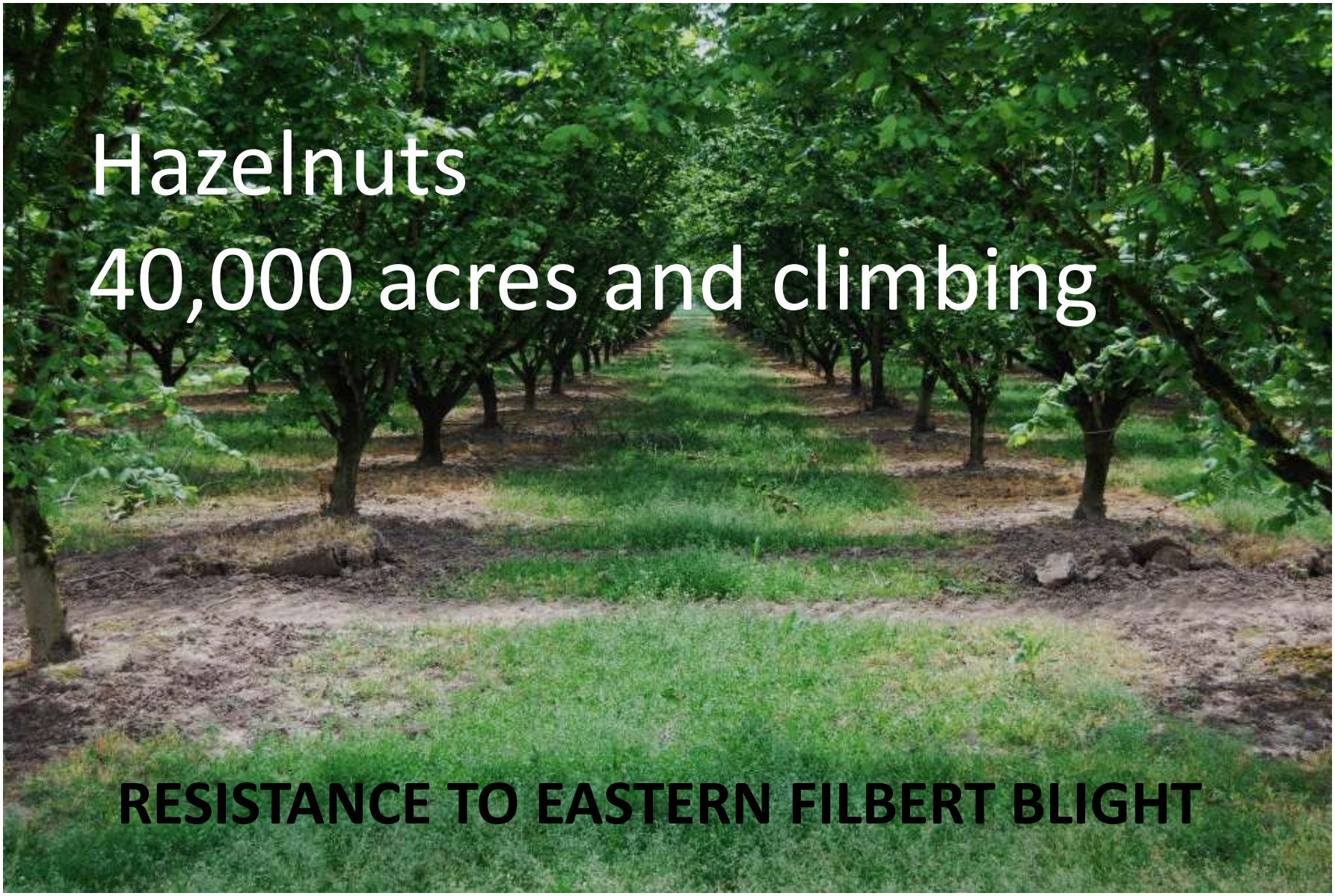
Hurdles for Oregon farmers

Highly diversified farms

Marginal return on investment

Cropping system is being transformed

- Loss of row crop acres
- Increase in hazelnut (filbert) acres


Hazelnuts
40,000 acres and climbing
RESISTANCE TO EASTERN FILBERT BLIGHT

Confident we can continue to:

- Unearth new uses
- Find new uses for old herbicides
- Refine currently labeled use patterns to improve weed control
- Demonstrate integrated strategies


Questions?
Comments?