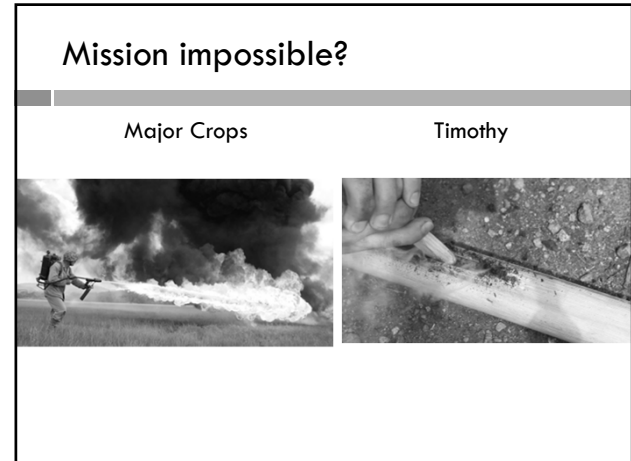
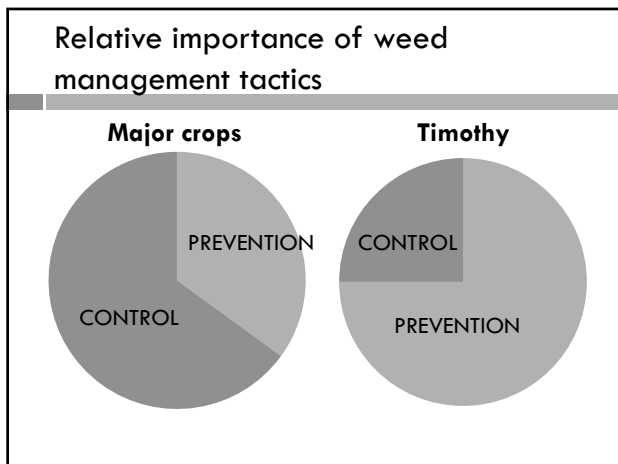


1




2



3

Weed prevention for timothy growers

1. Control problem weeds BEFORE you plant
2. Establish/maintain a competitive stand




“An ounce of prevention is worth a pound of cure”

4

1. Control problem weeds BEFORE you plant


- Start with a clean field
- Be careful about weed seed production after crop harvest



5

2. Establish and maintain a competitive stand

- Fertilize according to soil test results
- Plant proper amount of seed at the proper depth
- Plant at the proper time
- Minimize weed competition during establishment
- Harvest management
 - Corm fill and carbohydrate storage in stubble



6

Before we talk about specific herbicides...

- Remember to ALWAYS read and follow label directions!!!
 - ▣ Many different formulations, label updates, special exceptions, unique circumstances on your farm, etc.
 - ▣ Labels can and do change!
- Really nice database at www.cdms.net

7

Mechanism of action for timothy herbicides

Growth Regulators

- Clopyralid (Stinger)
- 2,4-D
- Dicamba (Banvel/Clarity)
- Fluroxypyr (Starane)
- MCPA

Cellulose inhibitors

- Indaziflam (Alion)

Amino Acid Synthesis Inhibitors

- Metsulfuron (Escort/Cimarron)

PPO inhibitors

- Carfentrazone (Aim)

Microtubule assembly inhibitor

- Pendimethalin (Prowl H2O)

Premixes

- Dicamba + diflufenzopyr (Overdrive)
- Flufenacet + metribuzin (Axiom DF)
- Bromoxynil + pyrasulfotole (Huskie)

8

Growth Regulator Herbicides

- Upset the normal hormonal balance in plants
- Impact cell division, cell enlargement, protein synthesis, and respiration
- Vascular tissues are plugged



9

Growth Regulators

- MCPA – Some broadleaves. Weaker than 2,4-D on larger weeds
- 2,4-D – Many broadleaves. Better than MCPA and dicamba on lambsquarters, Russian thistle, mustards, nightshades, and sowthistle
- Dicamba (Banvel) – Many broadleaves. Better than MCPA and 2,4-D on filaree and bedstraw
- Clopyralid (Stinger) – Canada thistle, some annual broadleaves.
- Fluroxypyr (Starane) – Kochia, annual broadleaves.

10

Auxin transport inhibitor

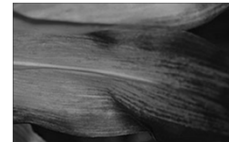
- Blocks movement of natural auxins and growth regulators
 - ▣ Synergy with growth regulators
- Dicamba + diflufenzopyr (Overdrive) – Many broadleaves. Controls kochia, Canada thistle, field bindweed. Timothy injury potential at higher rates.



11

Amino Acid Synthesis Inhibitors

- Slow acting; Most have soil AND foliar activity
- Slow breakdown in soils with high pH
- Metsulfuron (Escort, Cimarron, Ally) – Several annual broadleaf weeds. Controls mustards, pigweed, prickly lettuce.

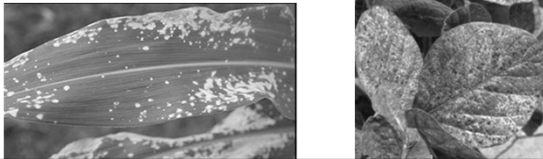


Photos: University of Missouri

12

Protoporphyrinogen oxidase (PPO) inhibitors

- Contact herbicide - Necrosis of leaf tissue
- Cool temps and wet soils increase injury
- Carfentrazone (Aim) – Controls annual broadleaves like kochia, nightshade, pigweed, lambsquarters, most mustards



13

Pendimethalin (Prowl H2O)

- Interferes with cell division
- Controls most annual grasses and some broadleaves
- Applied to soil and incorporated prior to weed germination
 - ▣ NO control of established weeds
 - ▣ Residual
- Dormant or between cuttings

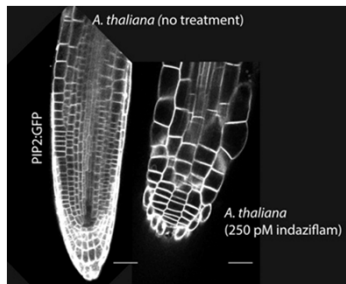


14

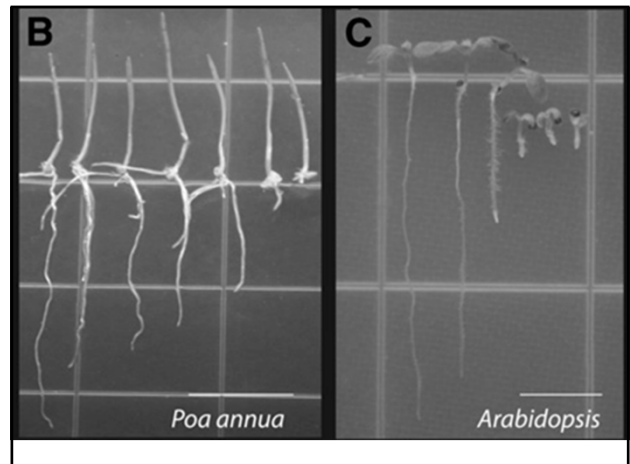
Alion (indaziflam)

- Cellulose inhibitors – stop cell division in developing root tip
- No known resistance

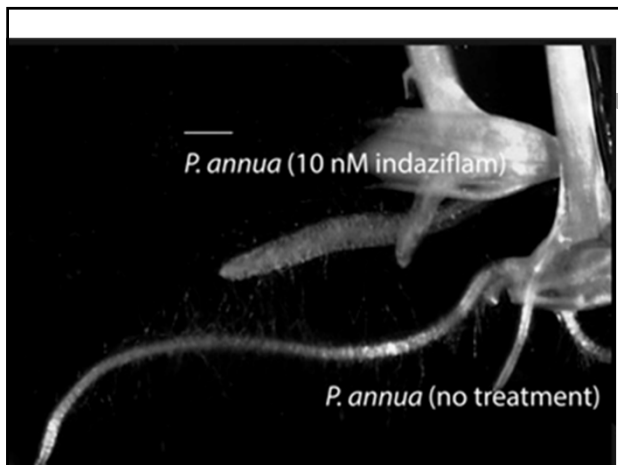
Photo: Brabham et al (2014)



15



16



17

Alion (indaziflam)

- Called EsplAnade in non-crop
- Alion use rate 2.0-3.0 oz/ac in timothy
 - ▣ 1.0-2.0 oz/ac west of Cascades
- Weeds controlled (3.5-6.5 oz/ac)
 - ▣ Barnyardgrass, annual bluegrass, crabgrass, foxtail (green, yellow, and giant), lovegrass, Italian ryegrass
 - ▣ Filaree, horseweed, groundsel, kochia, mustards, pigweeds, Russian thistle, plantain

18

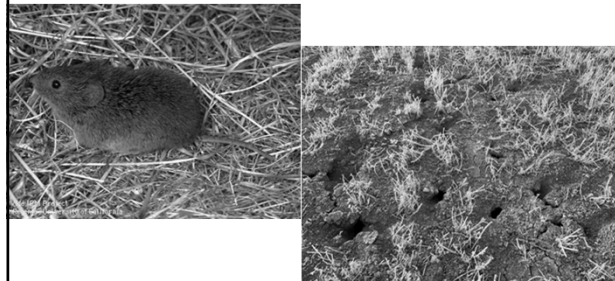
Alion (indaziflam)

- Must be established for 1+ year and been through a harvest for seed or hay
- Do not apply more than once per year
- Do not apply within 2 years of rotation to another crop
- Do not cut hay within 30 days of application

19

Alion (indaziflam)

- Do not apply when there are exposed roots or open channels



20

Alion (indaziflam)

- 1 year of control at low rates labelled in timothy (many years at higher rates in other crops)
- Controls some annual grasses and broadleaves
- Incredible selectivity if established
 - Doesn't control emerged weeds
- This is a pre-germination inhibitor (not preemergence!)
- Practically non-soluble – doesn't move
- No sunlight breakdown

21

Premixes -

- Axiom DF (flufenacet + metribuzin)
- Flufenacet – inhibits fatty acid synthesis
 - Metribuzin – Inhibits photosynthesis
 - Apply at 4-10 oz/acre, depending on soil type
 - Controls some grass and broadleaf weeds
 - Including Ventenata
 - Apply and incorporate prior to weed emergence
 - Can have activity up to 2-leaf stage
 - Apply prior to November 15th
 - Cutting height in fall prior to application no less than 3.5 inches

22

Premixes

- Huskie (pyrasulfotole + bromoxynil)
- Pyrasulfotole - HPPD
 - Bromoxynil – Inhibits photosynthesis
 - Controls emerged annual broadleaf weeds
 - Up to 4-6 leaves
 - AMS can be added to increase weed control.
 - Do not use if crop injury is a concern

23

When to apply to Timothy

- Clopyralid, 2,4-D, Dicamba, MCPA, Overdrive, Huskie
“Apply to established grasses”
- Carfentrazone (Aim) – Emergence to jointing
- Fluroxypyr (Starane) – 2 leaf to early boot
- Pendimethalin (Prowl) – More than 6 tillers
- Metsulfuron (Escort)– 12 mo after establishment and 6 in tall
- Axiom and Alion – 12 mo after establishment and at least 1 cutting

24

Preharvest Intervals (PHI)

Grazing and haying restrictions

	Graze	Hay
Carfentrazone (Aim)		
Clopyralid (Stinger)		
Diflufenzopyr + dicamba (Overdrive)	0	0
Metsulfuron (Escort)		
Pendimethalin (Prowl)		
Fluroxypyr (Starane)	0	7
Dicamba (Banvel)	7	0-37*
MCPA	7	21
2,4-D	7	30
Bromoxynil + pyrasulfotole (Huskie)	7	30
Flufenacet + metribuzin (Axiom DF)	--	120

**0 days for non-lactating, and 37 days for lactating

25

Crop rotation restrictions

- Most have minor restrictions (30 d or less)
- Some have major restrictions
 - Huskie – 9 months for most crops
 - Axiom DF – up to 12 months for many crops
 - Pendimethalin (Prowl) – up to 18 mo with some crops
 - Clopyralid (Stinger) – up to 18 months in alfalfa, beans, potatoes
 - Metsulfuron (Escort) – can persist up to 34 mo in high pH soils; requires field bioassay
 - Alion – 24 months!
- See label

26

Other considerations

- Special restrictions on clopyralid (Stinger)
 - DO NOT use hay or manure from treated areas for compost or mulch
 - 7 day cleanout for livestock
 - Cutting after application can't be exported
 - Do fall application right after last harvest, no export restriction next spring

27

Other considerations

- Can I use a range & pasture herbicide if “timothy” is not specifically mentioned on the label?
 - Label must have a provision for cutting for hay
 - Distinction between grazing and haying
 - Drying process may concentrate herbicide residues
 - Also, check for any wording that prohibits use of product on timothy

28

Timothy weed control take home messages:

- Weed prevention is critical
 - Take care of problem weeds BEFORE you plant
 - Establish/maintain a healthy, vigorous stand
- Recent grass herbicide options – Prowl, Axiom, Alion
- Chemical options exist to control most broadleaf weeds
 - Fit product or combination to problem weed(s)
 - ALWAYS read and follow label directions!!!
- Remember: **STRESS increases injury to timothy!!**

29

Questions?

Earl Creech
 Extension Agronomist
 Utah State University
 4820 Old Main Hill
 Logan, UT 84322
 435.797.7319
 earl.creech@usu.edu

30