WHAT ARE YOUR HERBICIDE STRATEGIES:

CAN YOU DO BETTER?

Hopefully, some of this not…

Reasons why weed control is important

- Moisture stress
- Nutritional stress especially nitrogen
- Animal habitat (voles & rabbits)
- Insect habitat (good & bad)
- Worker comfort

Especially Young Trees or Replants

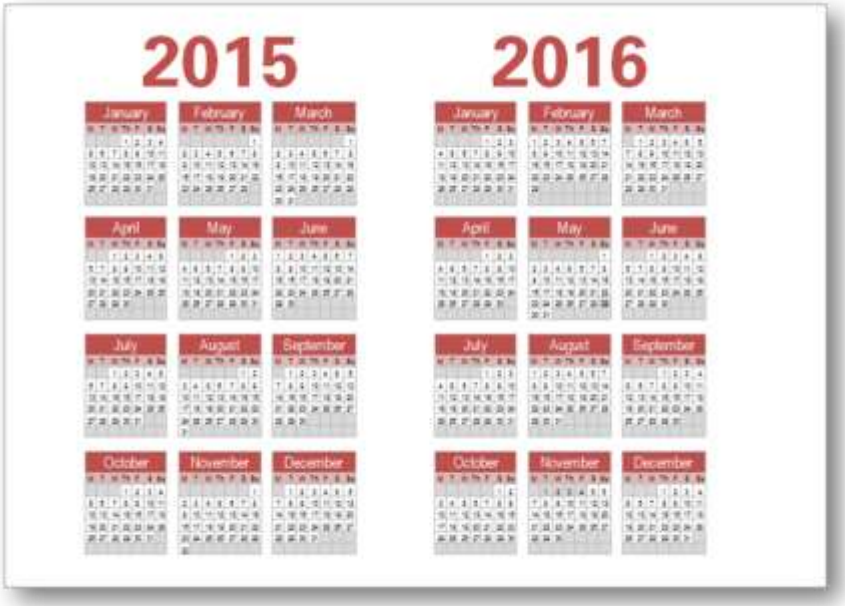
Is This Your Herbicide Strategy?

A Plan of Attack

- How long in advance do you think about your weed control program?

Point # 1

- Develop a multi-year strategy/approach
  - Prevents weed resistance development
  - At a minimum plan for two seasons



How do you decide?

- Do You Scout the Orchard for Weeds?
  - You scout for disease and insects on a regular basis
- When do you scout for insects & diseases?
  - Usually look them a regular basis
- How often should you scout for weeds?
  - Early April
  - Around June drop
  - Late August

Point # 2

Know your orchard and the weeds

- Annuals vs. Perennials
- Soil types – clay vs sandy
- Weed dispersal methods
- No one method will control all weeds

Orchard Documentation

- ID and record weeds
- Rate severity of weeds
- Look for trends or new species
- Note soil moisture conditions

Identification Tools/Aids

Phone Aps

- BASF Weed ID
- Savvy WeedID (need to register)
- Weed ID (Monsanto's)
- Scannable (image)
- Photo

Penn State **Extension**

WSSA

A Non-Profit Professional Society Promoting Research, Education, and Awareness of Weeds in Managed and Natural Ecosystems

WEED SCIENCE SOCIETY OF AMERICA

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- Agronomic Crop Weeds
- Turfgrass Weeds
- Noxious Weeds
- Aquatic Weeds

Agronomic Crop Weeds

- Auburn University – Weed ID Database
- Colorado State University – Common Weeds Identification Page
- Iowa State University – Weed Identification Resources
- Kansas Department of Agriculture – Weed Photo Gallery
- Kansas State University – Weed Identification
- Michigan State University – Identifying Weeds in Field Crops
- New Mexico State University – Weed Information
- Noble Foundation – Plant Image Gallery
- Northeastern Weed Science Society – Weed Identification Pages
- Oregon State University – PNW Weed Identification Module
- Ohio State University – Weed Identification
- Oregon State University – Weed Identification
- Penn State University – Weed Identification
- Purdue University – NRCA – Weed Identification
- Rutgers University – New Jersey Weed Gallery

Most Popular Pages

Composite List of Weeds
2018 Annual Meeting
Meetings
Weed Science Jobs
Weeds
Publications
Herbicide Resistance
Biological Control
Herbicides
Society

Most Recent Posts

- PhD/MS Graduate Research Assistantship in IWM with Texas A&M University, College Station
- PhD Graduate Research Assistantship in UAV for weed management with Texas A&M

http://wssa.net/wssa/weed/weed-identification/weed-id-pages/

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Soil factors in Relation to Herbicides

- Soil residual herbicides that are mobile may be taken up by roots
- Lighter soils (i.e. containing more sand) have the potential for tree damage
- Soil residual not very mobile generally are safer for younger trees
- Heavy soils (i.e. containing clay) may bind herbicides up more reducing length of control

Point # 3

Product choices depend upon

- Species / variety of tree
  - Apples & pears more options
  - Gala G. Delicious more sensitive to 2,4-D?
  - Cherries & other stone fruits
- Age of trees
  - Contact materials
  - Tree guards
  - Residual materials

Products having the same mode of action

HRAC	Product	Site of Action
1	Fusilade, Select Max, Poast	ACCase inhibitors
2	Sandea, Matrix, Solida, Pruvin	ALS inhibitors
9	Roundup, Touchdown plus others	EPSP Synthase inhibitor
4	Stinger, Starane Ultra, 2,4-D	Auxin receptors
5	Simazine,Sinbar	Photosystem II inhbiitors
7	Karmex, Diuron	Photosystem II inhbiitors
10	Cheetah, Glufosinate 280, Liberty, Rely etc.	Glutamine synthetase inhibitor
12	Solicam	PDS inhibitor
27	Broadworks	HPPD inhibitor
14	Aim, Broadstar, Chateau, Zeus Prime XE, Treevix, Goal, Galligan, GoalTender	PPO inhibitor
22	Gramoxone, Reglone	Photosystem I electron diverter
3	Kerb, Surflan, Prowl, Pendimethalin, Prowl H2O	Microtubule inhibitor
21	Gallery	Cellulose inhibitor Site B
29	Alion	Cellulose inhibitor Unspecified site

Considerations for ***annual*** weeds

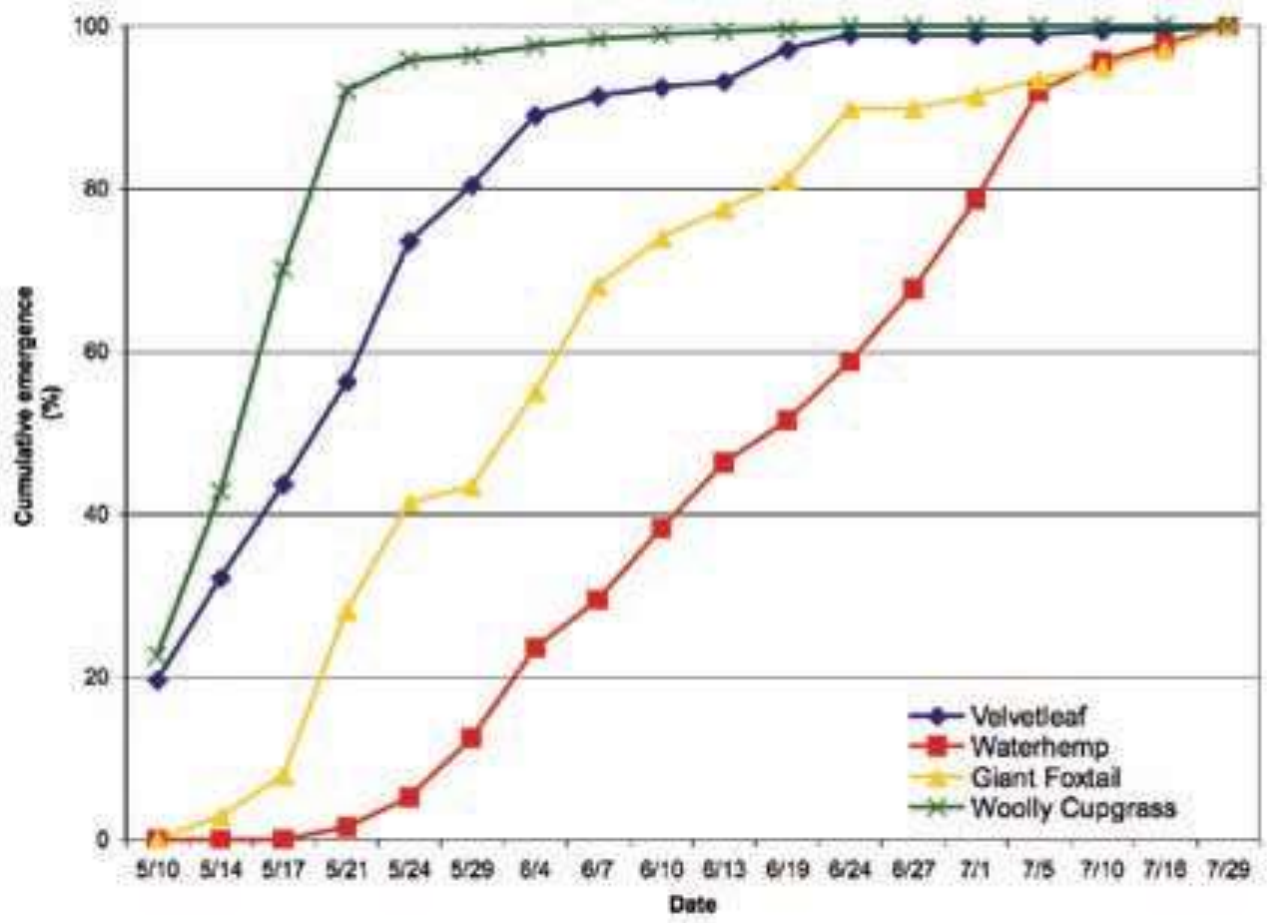
- Prevent seed production in tree rows
- Prevent seed production in drive rows = mowing more often

Residual materials and length

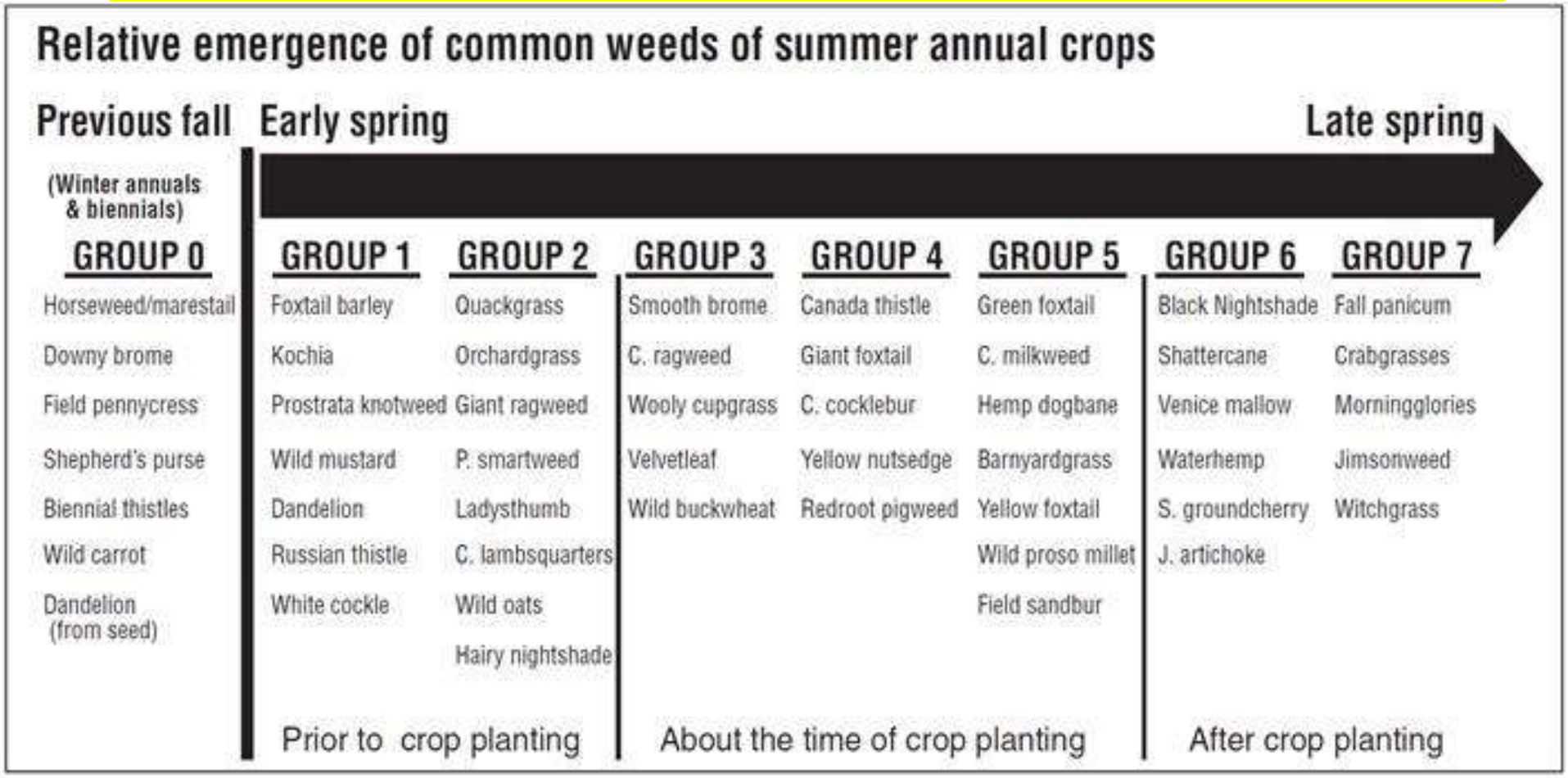
- Karmex – 6-8 weeks
- Simazine – 6-8 weeks
- Solicam – 4-6 weeks
- Prowl – 4-6 weeks
- Surflan – 4-6 weeks
- Goal – 6-8 weeks
- Kerb – 4-6 weeks
- Sinbar – 8-10 weeks
- Casoron – 6-8 weeks
- Matrix – 3-4 weeks
- Sandea – 3-4 weeks
- Chateau – 3-4 weeks
- Alion - > 10 weeks

So why can we get weed control for the season?

Different weeds emerge at different times



Weed Germination Periodicity



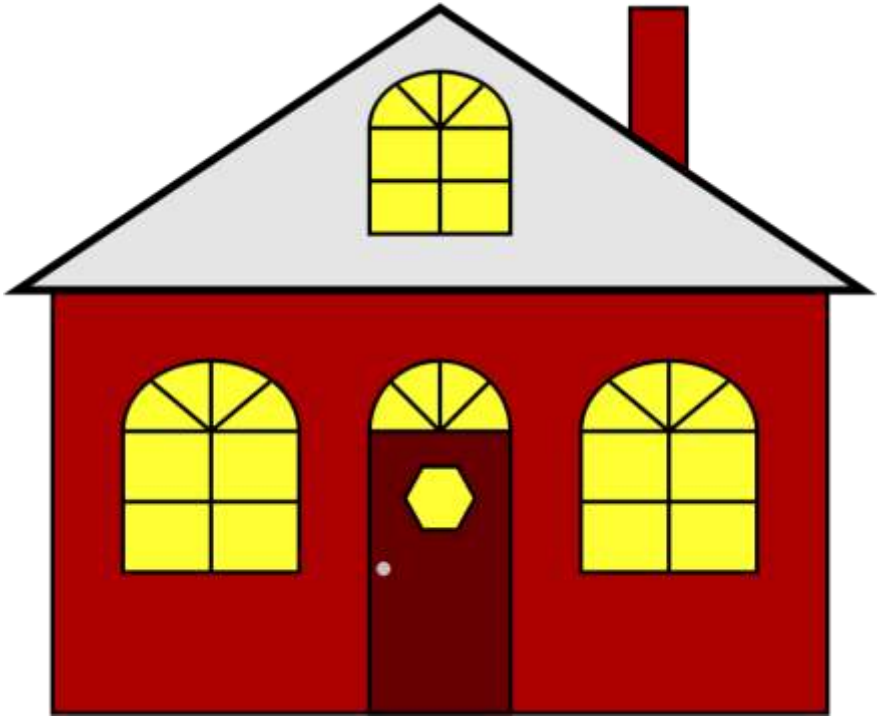
30 Year Average Germination

Weed	% Emergence	Landisville	Rock Springs
Large crabgrass	10%	8-May	17-May
Giant foxtail	10%	27-Apr	6-May
Yellow foxtail	10%	27-Apr	6-May
Lambsquarters	10%	23-Apr	30-Apr
Smooth pigweed	10%	11-May	19-May
Eastern black nightshade	10%	23-May	1-Jun
Common ragweed	10%	8-Apr	18-Apr
Velvetleaf	10%	27-Apr	6-May

Based on GDD base 48F

Point # 4

- You need to know what your weed population is!



Perennials !

sion

Point # 5

Considerations for ***perennial*** weeds

1. Manage to kill perennial portion
2. Prevent seed production
3. Utilize control tactics when root reserves are lowest
   - ✓ Bud to bloom
   - ✓ Late summer to fall
4. Need to combine both times of seasonal control

Seasonality

- Perennial weeds are best controlled in the fall as carbohydrates move to roots with storage sugars
- Controlling perennial weeds are tougher in the spring and harder to eliminate

Point # 6

A New Strategy ?

Fall Application of Herbicides

- Postharvest timing
  - General warming of fall & winter temperatures
- Winter annuals germinating
  - Chickweed, henbit, **marestail**, mustards, shepherd's purse, pennycress
- Good timing for perennial weed control
- Prevent weeds going to seed in early spring

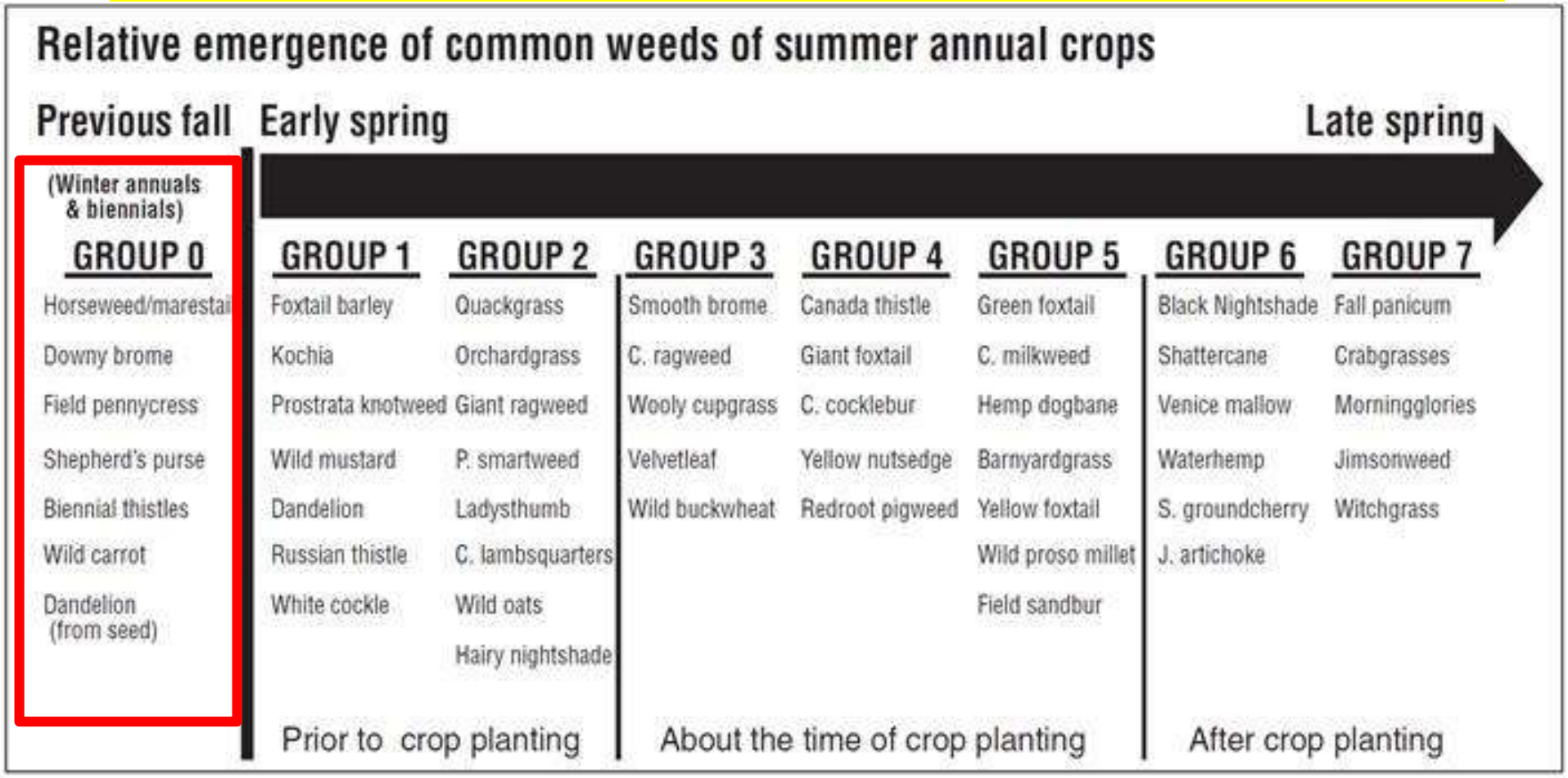
Fall Herbicides:

- Avoid the spring work crunch
- Reduce interfering vegetation that can reduce pre-emergent effectiveness
- Buys time for later pre-emergent applications
- Allows another window in case spring weather is not favorable
- Can be applied as long as ground is not frozen
- Cold winter temperatures can reduce herbicide degradation and extend control

Choice of Materials

- Burn down + residual
- New materials would be more effective
  - Alion, Matrix, Prowl, Goal, Chateau
- Older materials that fit this window
  - Surflan, Kerb,

Weed Germination Periodicity



Fall applications of Alion

Trt #	Description
1	Control
2	Alion 5 oz/ac applied 11/4/09
3	Alion 6.5 oz/ac applied 11/4/09
4	Alion 5 oz/ac plus Roundup Power Max 1qt/ac applied 5/25/10
5	Alion 5 oz/ac applied 11/4/09 and Alion 3.5 oz/ac plus Roundup Power Max 1qt/ac applied 5/25/10
6	Alion 5 oz/ac applied 11/4/09 and Alion 5 oz/ac plus Roundup Power Max 1qt/ac applied 5/25/10

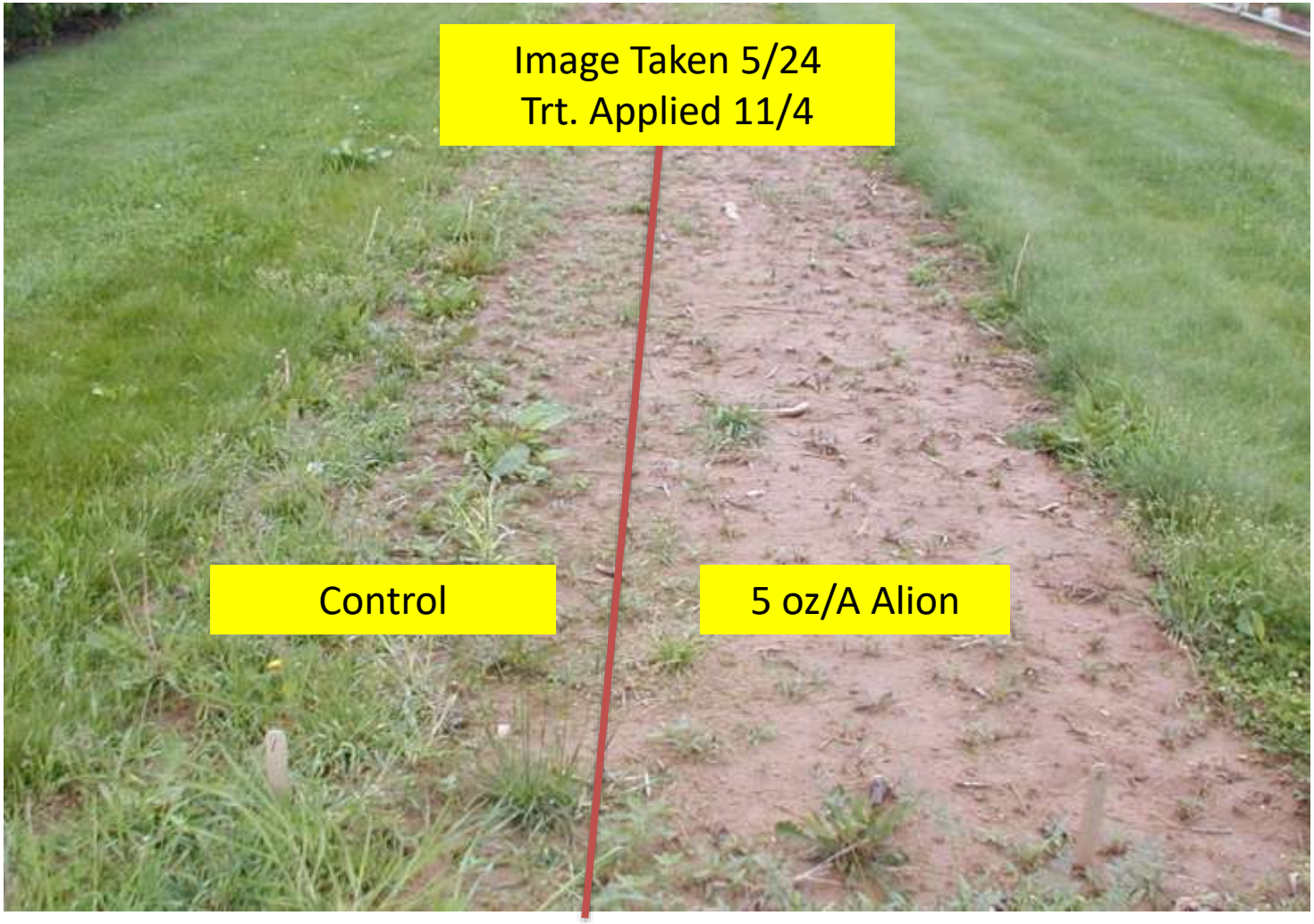


Image Taken 5/24
Trt. Applied 11/4
Control
5 oz/A Alion

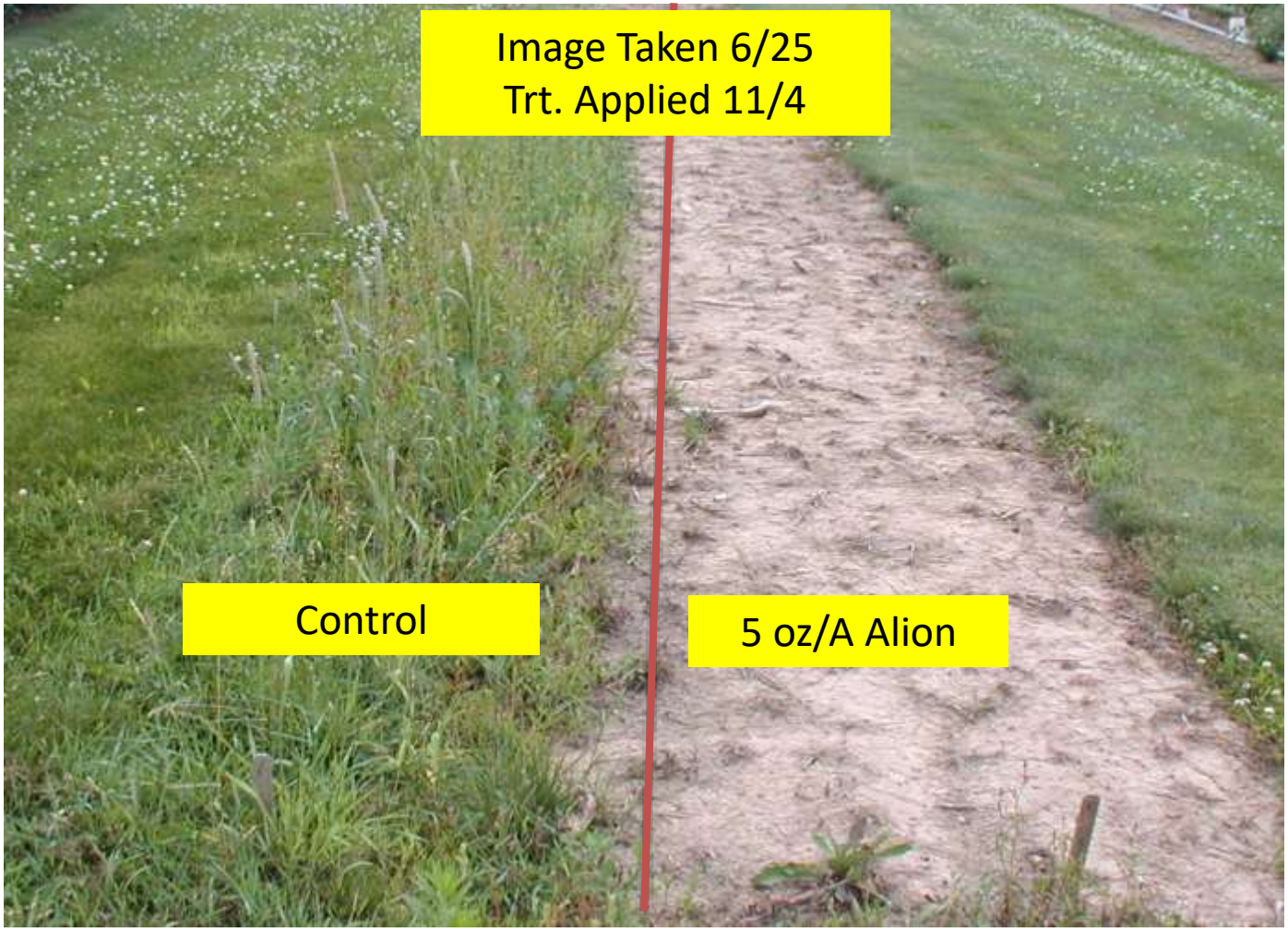


Image Taken 6/25
Trt. Applied 11/4
Control
5 oz/A Alion

Conclusions

- Reduction in Pa smartweed, woodsorel nightshade & grasses, white clover, chickweed, groundsel
- No control of dandelion
- Alion applied in the fall will not provide **season long** control next year
- No difference between 5 oz. vs. 6.5 oz./A

Point # 7

Know Your Contact Materials

- Contact systemic not soil active
  - glyphosate
  - important tool for perennials in older orchards
- Contact systemic some soil activity
  - 2,4-D, clopyralid, fluroxypyr
  - watch for water influxes resulting in uptake
- Contact not systemic no soil activity
  - paraquat, glufosinate ammonium, pyraflufen-ethyl
  - multiple applications needed

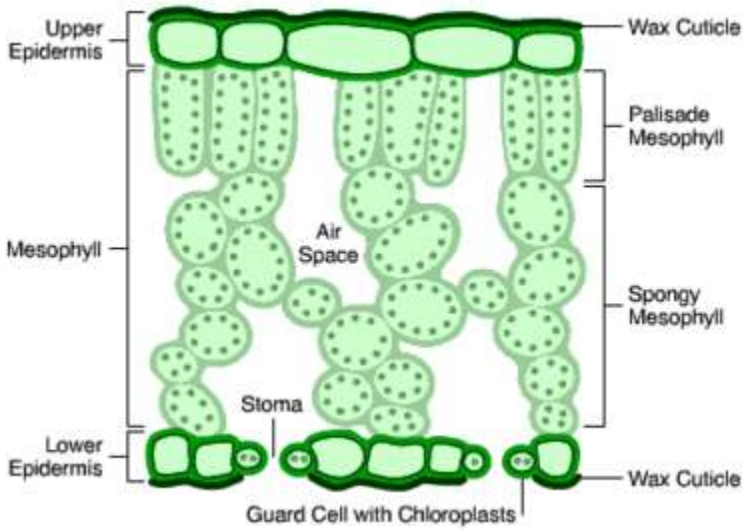
- Contact materials – kill above ground portions only (perennials)
- Weather during and after application
- Systemic move from foliage to roots
  - Potential for absorption by tree roots

Contact materials

- Know the proper leaf stage (height) to apply
  - Smaller weeds (≤ 4”) are more easily controlled
  - Take into consideration leaf size & characteristics
  - Necessity of proper adjuvant

What affects post emergent herbicide absorption?

- **Amount and type of leaf wax**
- **Temperature affecting drying**
- **Wetting characteristic of herbicide solution**



Why do we recommend applying post emergent materials to non-stressed plants?

- **Plants exude more wax onto the leaf surface when they are under water stress. A defensive response to limit water loss through evapotranspiration**

Recommendation:

- Residual + Contact material
- Combinations to cover weaknesses
  - Simazine controls wide range of weeds but weak on grasses
  - Solicam is weak on broadleaves but effective on summer grasses
  - Neither is great on deep rooted perennials
  - Combined they provide a broader range of control

Point # 8

Know Herbicide Characteristics

1. Contact, Systemic & Not Soil Active
2. Contact, Systemic & Some Soil Activity
3. Contact & Not Systemic Not Soil Active
4. **Residual & Potentially Mobile**
5. **Residual & Not Very Mobile**

Residual Materials

- Potentially mobile, actively taken up by roots
  - simazine, diuron, terbacil
  - solicam, Casaron
- Not very mobile, not likely to be taken up by roots
  - indaziflam, rimsulfuron, oryzalin, pendimethalin, oxyfluorfen, pronamide
  - “weaker materials”
  - more precise directions
  - need to use in combination

Combinations

1. Simazine + Solicam
2. Matrix + pendimethalin
3. Alion + simazine
4. Others…

All should add glyphosate for perennials

Point # 9

How often do you check your herbicide sprayer?

- Have a good set of nozzles on the sprayer
- If two nozzles need replaced, replace all of them
- Applicators do not change nozzles often enough
- Use label specified nozzle

www.extension.psu.edu/sprayer-calibration-information

Questions ?