Principles of Herbicide Application

- Before you spray:
  1) Do you really have a problem?
     - Competition
     - Grazing
     - Quality

     - Musk Thistle
     - Bull Thistle
     - Horsenettle
     - Buffalobur
     - Multiflora Rose
     - Ironweed
     - Vervains
     - Sericea Lespedeza
     - Curly Dock

     \[\text{Spines that discourage grazing}\]

     \[\text{Bitter Taste and/or Poor Palatability}\]
Principles of Herbicide Application

• Before you spray:
  2) Weeds can have nutritional value

<table>
<thead>
<tr>
<th>Pure Ragweed</th>
<th>CP = 16; ADF = 26; NDF = 29</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pure Ironweed</td>
<td>CP = 12; ADF = 31; NDF = 45</td>
</tr>
<tr>
<td>Pure Fescue</td>
<td>CP = 9; ADF = 38; NDF = 58</td>
</tr>
</tbody>
</table>
Principles of Herbicide Application

• Before you spray:

3) Poisonous or on the noxious list

- Black Cherry
- Black Locust
- Black Nightshade
- Bouncing-Bet
- Cocklebur
- Field Horsetail
- Jimsonweed
- Johnsongrass
- Milkweeds
- Perilla Mint
- Poison Hemlock
- Pokeweed
- Snow-on-the-Mountain
- White Snakeroot
- Wild Indigo
- Woolly Croton
Poison Hemlock

- Leaves divided & fern-like
- Stems smooth, hollow & purple-spotted
- White, umbrella-like flowers
- All parts toxic (coniine)
- Biennial
Woolly Croton

- Covered with short, dense hairs
- Oil in plant is toxic
- Toxic only in large quantities
- Annual
Wild Indigo

- Shrub-like growth
- Inflated seed pods
- All parts “moderately” toxic
- Perennial legume
Jimsonweed

- Distinct foul odor
- Seeds contain greatest amount of toxin
- Toxin remains in dry hay
- No reported safe feeding quantity
- Annual
Perilla Mint

- Skunky smell
- Square stem
- Underneath side of leaves are purplish
- Summer annual
Other Considerations

- **Goals and needs**
- Impact on neighbor relations?
- Fencing and equipment
- Are there legumes present?
- Will you be overseeding with legumes in the near future?
Selecting The Right Herbicide

- **IDENTIFY THE WEED FIRST**
  - Lack of weed response

<table>
<thead>
<tr>
<th>Untreated</th>
<th>2 pts Remedy Ultra</th>
<th>6 fl ozs Milestone</th>
</tr>
</thead>
</table>

UNIVERSITY OF MISSOURI Extension
Selecting The Right Herbicide

- IDENTIFY THE WEED FIRST
  - Lack of weed response
  - Cheaper option
  - Right equipment/protective wear
  - Timing/life cycle of weed
Application Timing

- **Winter Annuals:** Young & actively growing (fall or early spring)
  - Henbit
  - Horseweed
  - Deadnettle
  - Chickweed
  - Virginia Pepperweed
  - Shepherdspurse
Application Timing

- **Summer Annuals**: Young & actively growing (usually spring)
  - Common Cocklebur
  - Bitter sneezeweed
  - Smartweed
  - Perilla Mint
  - Redroot Pigweed
  - Jimsonweed
  - Lambsquarter
  - Ragweed

Photo by Marisa Williams
Application Timing

- **Biennials:** Rosette stage (fall or early spring)
  - Common Burdock
  - Wild Carrot
  - Common Mullein
  - Thistles
  - Poison Hemlock
  - Spotted Knapweed
Application Timing

- **Perennials:** Pre-bloom to bloom stage/ Fall?
  - Curly Dock
  - Goldenrod
  - Stinging Nettle
  - Chicory
  - Common Pokeweed
  - Common Milkweed
  - Passion Flower
  - Trumpet creeper
  - Blackberry
Selecting the Right Herbicide

- Restricted vs. Non-restricted
  - Toxicity & risk to water

- Non-selective vs. Selective
  - Selective = 2,4-D
  - Non-Selective = Glyphosate (Roundup)
Herbicide Ladder

Group 4

Pyridine Acid

Triclopyr

Remedy

=
Herbicide Ladder

- Groups are numerical and are categorized by the mode or site of action that kills the plant
- Families kill the plant in the same method but use different chemical formulations
- Many pasture herbicides = Group 4 Herbicides
  - Growth Regulators
  - Phenoxy-acetic acids (2,4-D), benzoic acids (Banvel), and the pyridines (Tordon, Grazon)
Common Pasture Herbicides

- Most pasture herbicides are translocated in plant:
  - Observation of results is slower
  - Movement of chemicals occur within the plant
  - Most broadleaf pasture herbicides fit here
- 2,4-D
  - Ester vs. Amine
  - Amine is less volatile but can be less effective
- Picloram* ≈ Tordon 22K, Trooper 22K
- Triclopyr ≈ Remedy & Garlon 4
- Dicamba ≈ Banvel & Clarity
- Aminopyralid ≈ Milestone
- Metsulfuron ≈ Cimarron & Escort
Combining Chemicals

- Increases the spectrum of weed controlled
  - **2,4-D**
    - + picloram* = Grazon P+D, HiredHand
    - + triclopyr = Crossbow
    - + dicamba = WeedMaster & Range Star
    - + Aminopyralid = GrazonNext

- 2,4-D can be added to many products that are not already pre-mixed

- Check the active ingredients and label instructions before adding 2,4-D
Adjuvants

- Are any substance in or added to a herbicide that improves herbicide activity, performance, or application characteristics
  - Surfactants, emulsifiers, diesel fuel, and kerosene
  - Compatibility, buffering, antifoam, and drift control agents
  - Can increase absorption and rainfastness
  - **Surfactants** reduce the surface tension
  - **Emulsifiers** help diesel mix with water
  - Decrease photodegradation
  - Do not add extra! Follow label instructions
Good General Purpose Brush Spray

0.25% Remedy
+
1% Grazon P+D
+
0.25% Nonionic Surfactant
Example of 20-gallon Mix for Fencerow Weed Control

8 oz. Tordon 22K*

+  

8 oz. Remedy

+  

24 oz. 2,4-D

+  

6.5 oz. Nonionic Surfactant

*Restricted Use Herbicide
Weed Prevention

• Fertility Pasture and Hay Fields:
  – Grass vigor & competition
  – Grazing & haying techniques

• If buying hay, know where it is coming from

• Clean haying and brush hogging equipment
Spotted Knapweed Identification

- Biennial
- Bolts in early summer
- Flowers from early June to October

- Flowers are pink to purple and rarely white
- Plant height = 8 to 48 inches
Replacement of Grass by Spotted Knapweed Over Time

Influence of Herbicides and Application Timing on Spotted Knapweed Control 1 Year After Treatment

Spotted Knapweed Control (1 & 2- YAT)
Rosette/Bolting Growth Stage Application

* 1 YAT Evaluations average of 5 locations: Montana (3), Idaho (1), Washington (1); 2 YAT, Montana (1)
   No significant difference
   LSD (P=0.05)
## Control Methods

### Herbicides

<table>
<thead>
<tr>
<th>Herbicide</th>
<th>Active Chemical</th>
<th>Rate</th>
<th>Plant Growth Stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tordon 22K*</td>
<td>Picloram</td>
<td>1 pt/ac</td>
<td>-spring rosette to <strong>bud</strong> -fall rosette</td>
</tr>
<tr>
<td>Milestone</td>
<td>Aminopyralid</td>
<td>5-7 oz/ac</td>
<td>-spring rosette to <strong>bud</strong> -fall rosette</td>
</tr>
<tr>
<td>Grazon P+D*</td>
<td>Picloram + 2,4-D</td>
<td>4 pt/ac</td>
<td>-spring rosette to <strong>bud</strong> -fall rosette</td>
</tr>
<tr>
<td>Banvel + 2,4-D</td>
<td>Dicamba + 2,4-D</td>
<td>4-6 pt/ac</td>
<td>-spring rosette to <strong>bud</strong> -fall rosette</td>
</tr>
</tbody>
</table>

*Restricted Use Herbicide

**ALWAYS READ AND FOLLOW LABEL INSTRUCTIONS**
Questions or Comments?

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Noxious Weeds of Missouri

- Musk Thistle
- Canada Thistle
- Scotch Thistle
- Field Bindweed
- Johnsongrass
- Multiflora Rose
- Purple Loosestrife
- Marijuana
- Common & Cutleaf Teasel ('01)
- Kudzu ('01)
- Spotted Knapweed (8/28/08)

http://ppp.missouri.edu/