# WEED CONTROL IN PASTURE BASED BEEF OPERATIONS

TRI-STATE BEEF CONFERENCE

AUGUST 8, 2013
ABINGDON, VIRGINIA
SCOTT HAGOOD, VIRGINIA TECH

# ACC FOOTBALL SINCE EXPANSION

(THROUGH 2012 SEASON)

| | BC | CLE | DK | FSU | GT | MD | MIA | NCS | UNC | UVA | VT | WF | TOT | % | ACC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VT | 7–3 | 2–3 | 9–0 | 2–3 | 7–2 | 5–0 | 6–3 | 3–1 | 7–2 | 9–0 | --- | 4–0 | 60–17 | 78 | 4 |
| FSU | 5–3 | 4–5 | 6–0 | --- | 1–2 | 7–2 | 6–3 | 5– | 2–1 | 3–2 | 3–2 | 5–4 | 47–28 | 63 | 2 |
| CLE | 4–4 | --- | 4–1 | 5–4 | 3–7 | 6–3 | 2–2 | 8–1 | 2–1 | 2–1 | 3–2 | 7–2 | 46–28 | 62 | 1 |
| GT | 2–1 | 7–3 | 9–0 | 2–1 | --- | 3–1 | 4–5 | 3–2 | 7–2 | 4–5 | 2–7 | 3–1 | 47–30 | 61 | 1 |
| MIA | 2–2 | 2–2 | 8–0 | 3–6 | 5–4 | 1–2 | --- | 2–2 | 4–5 | 4–5 | 3–6 | 4–0 | 38–34 | 53 | 0 |
| BC | --- | 4–4 | 2–1 | 3–5 | 1–2 | 6–2 | 2–2 | 5–3 | 0–3 | 3–0 | 3–7 | 5–3 | 34–32 | 52 | 0 |
| UNC | 3–0 | 1–2 | 8–1 | 1–2 | 2–7 | 2–2 | 5–4 | 4–5 | --- | 4–5 | 2–7 | 2–3 | 34–38 | 47 | 0 |
| WF | 3–5 | 2–7 | 8–1 | 4–5 | 1–3 | 4–5 | 0–4 | 5–4 | 3–2 | 2–1 | 0–4 | --- | 32–41 | 44 | 1 |
| UVA | 0–3 | 1–2 | 5–4 | 2–3 | 5–4 | 5–4 | 5–4 | 2–2 | 5–4 | --- | 0–9 | 1–2 | 31–41 | 43 | 0 |
| NCS | 3–5 | 1–8 | 1–1 | 4–5 | 2–3 | 5–4 | 2–2 | --- | 5–4 | 2–2 | 1–3 | 4–5 | 30–42 | 42 | 0 |
| MD | 2–6 | 3–6 | 2–1 | 2–7 | 1–4 | --- | 2–1 | 4–5 | 2–2 | 4–5 | 0–4 | 5–4 | 27–45 | 38 | 0 |
| DK | 1–2 | 1–4 | --- | 0–6 | 0–9 | 1–2 | 0–8 | 1–1 | 1–8 | 4–5 | 0–9 | 1–8 | 10–62 | 14 | 0 |

Much of the information contained in this discussion will involve the proper use of selective herbicides. This is not, however, to deemphasize the importance of cultural and mechanical weed control techniques. Variety selection, establishment practices, soil pH, fertility, and grazing and/or haying management must be optimized to insure maximum competition with weeds by the forage species (or animals). Selective herbicides alone cannot provide a substitute for management, and weed control programs relying solely on these herbicides will not be successful.

# VT Weed Science Web Page

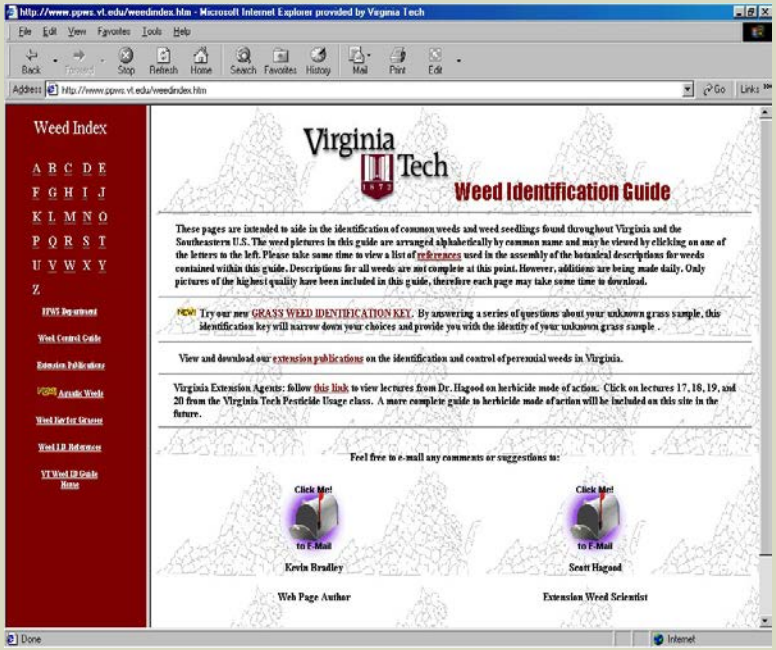
WEED ID GUIDE

AQUATIC WEEDS

E-MAIL ACCESS TO SPECIALISTS

EXTENSION PUBLICATIONS

- HONEYVINE MILKWEED
- HORSENETTLE
- TRUMPETCREEPER
- HEMP DOGBANE
- ANNUAL RYEGRASS
- MUGWORT
- COMMON PASTURE/HAYFIELD WEEDS
- ITCHGRASS




HERBICIDE MODE OF ACTION - WEED RESISTANCE

DIAGNOSTICS VIA DIGITIZED IMAGES

ACCESS TO ALL 2013 PEST MANAGEMENT GUIDES

~1,200 EXTERNAL SITES LINK TO THIS VT SITE

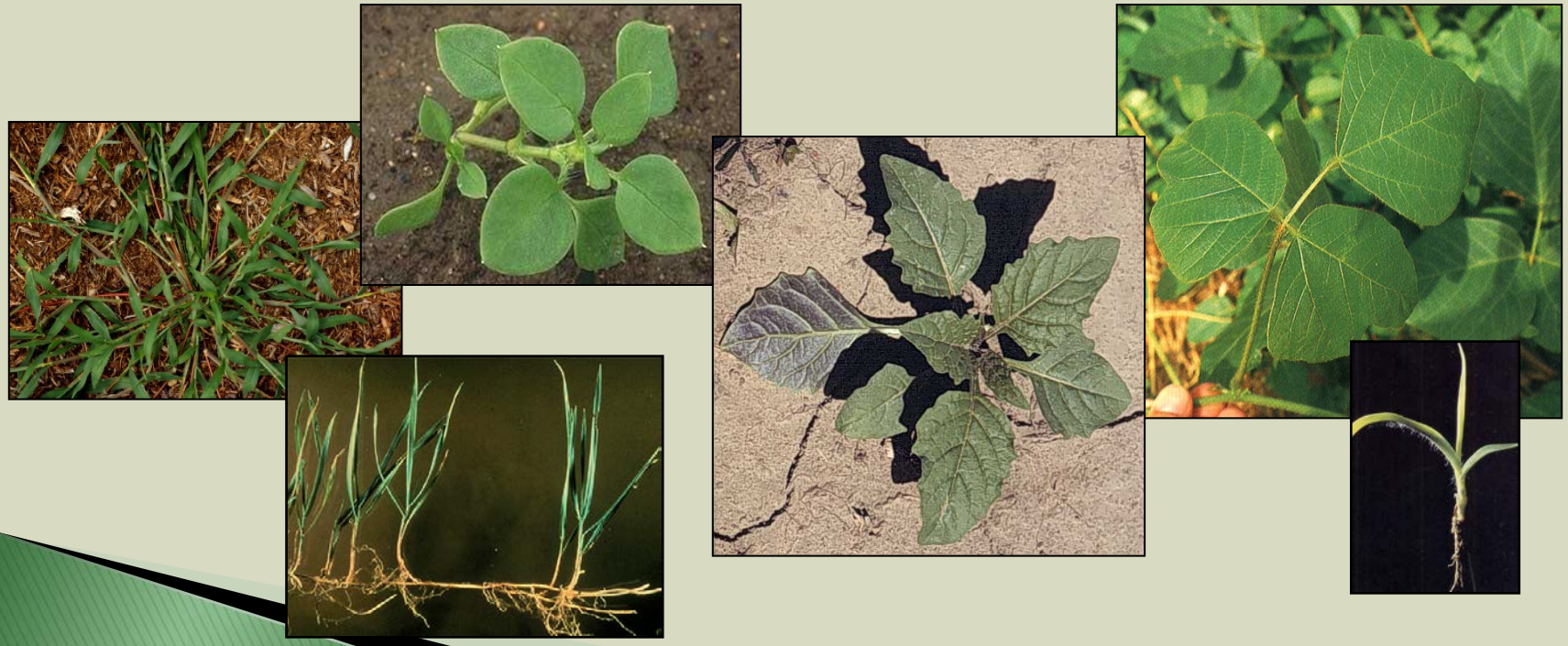
~8,000,000 “HITS” ANNUALLY

# Weed Life Cycles

ANNUAL – SUMMER vs. WINTER

BIENNIAL – SEEDLING / ROSETTE / FLOWERING

PERENNIAL – HERBACEOUS vs. WOODY



# Herbicide Fate In Plants

ROOT UPTAKE

SHOOT UPTAKE

FOLIAR UPTAKE

TRANSLOCATION

- APOPLASTIC
- SYMPLASTIC
- NO TRANSLOCATION

METABOLISM

CONJUGATION

# TIMING OF WEED CONTROL

- Whether mechanical or chemical, weed control measures must be scheduled to coincide with the time of optimum weed susceptibility.
- With actively translocated hebicides, as essentially all pasture herbicides are, application should be made to minimize the amount of herbicide required. Optimum timings are:
- Annuals – young and actively growing
- Biennials – seedling or overwintering rosette stage
- Perennials – prebloom when downward translocation to underground perennial structures is maximized.

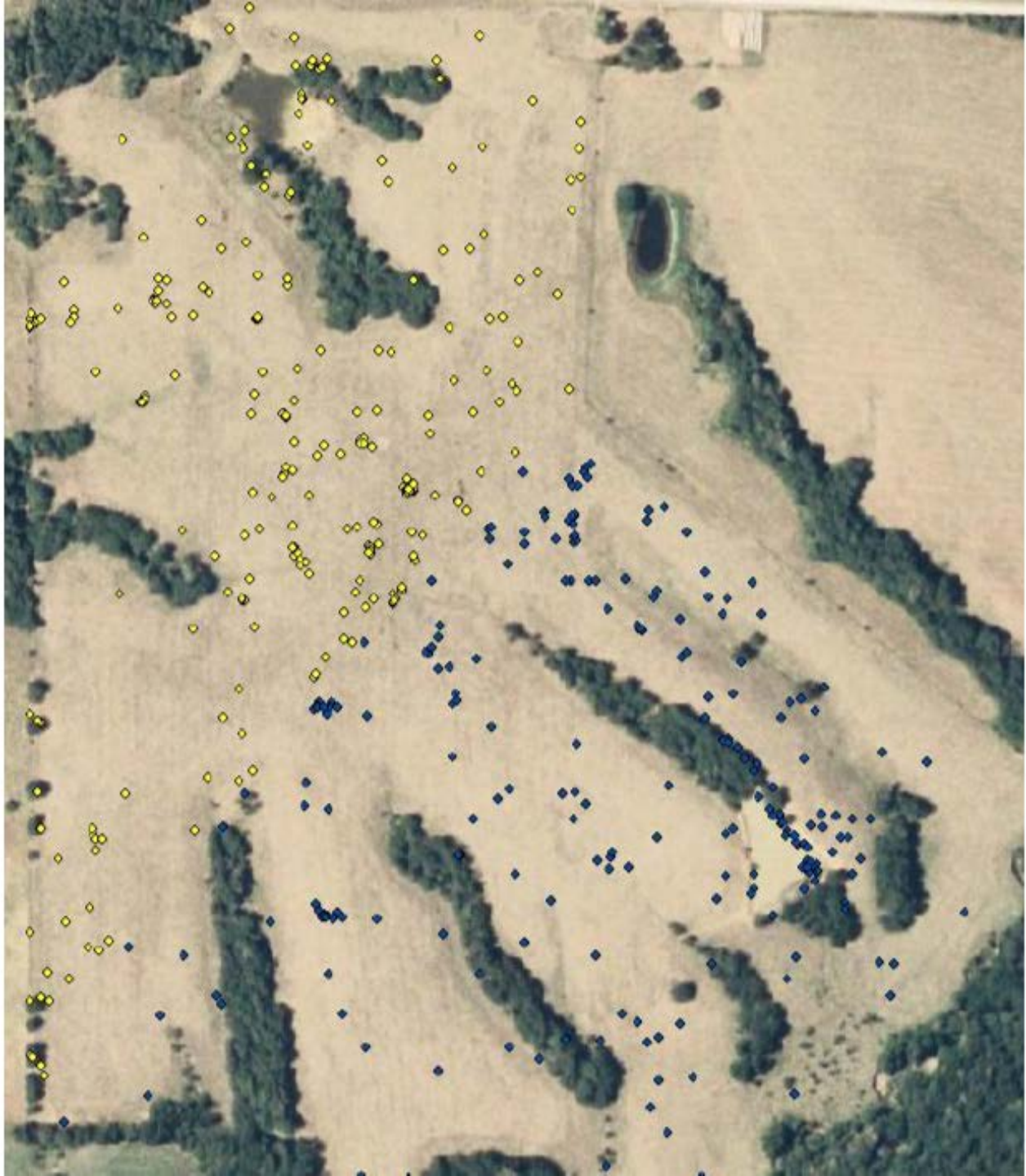
# EFFECTS OF HERBICIDE TREATMENTS ON CATTLE GRAZING PREFERENCE
## DR. KEVIN BRADLEY – UNIVERSITY OF MISSOURI –2009

# Albany

## Fix Points Prior to Application (7/8-7/29)

- Treated – 53% (250 fixes)
- Untreated – 47% (225 fixes)

Cattle allowed to graze pasture before application and grazing pattern recorded



# Albany

**Fix Points 1 Month After Application (7/30-8/25)**

Treated – 51%
(295 fixes)

Untreated – 49%
(283 fixes)

Fairly even distribution of grazing 1 month after application

# Albany

**Fix Points 3 Months After Application (9/30-10/27)**

- Treated – 84% (1043 fixes)
- Untreated – 16% (202 fixes)

Grazing distribution shifting more to treated area

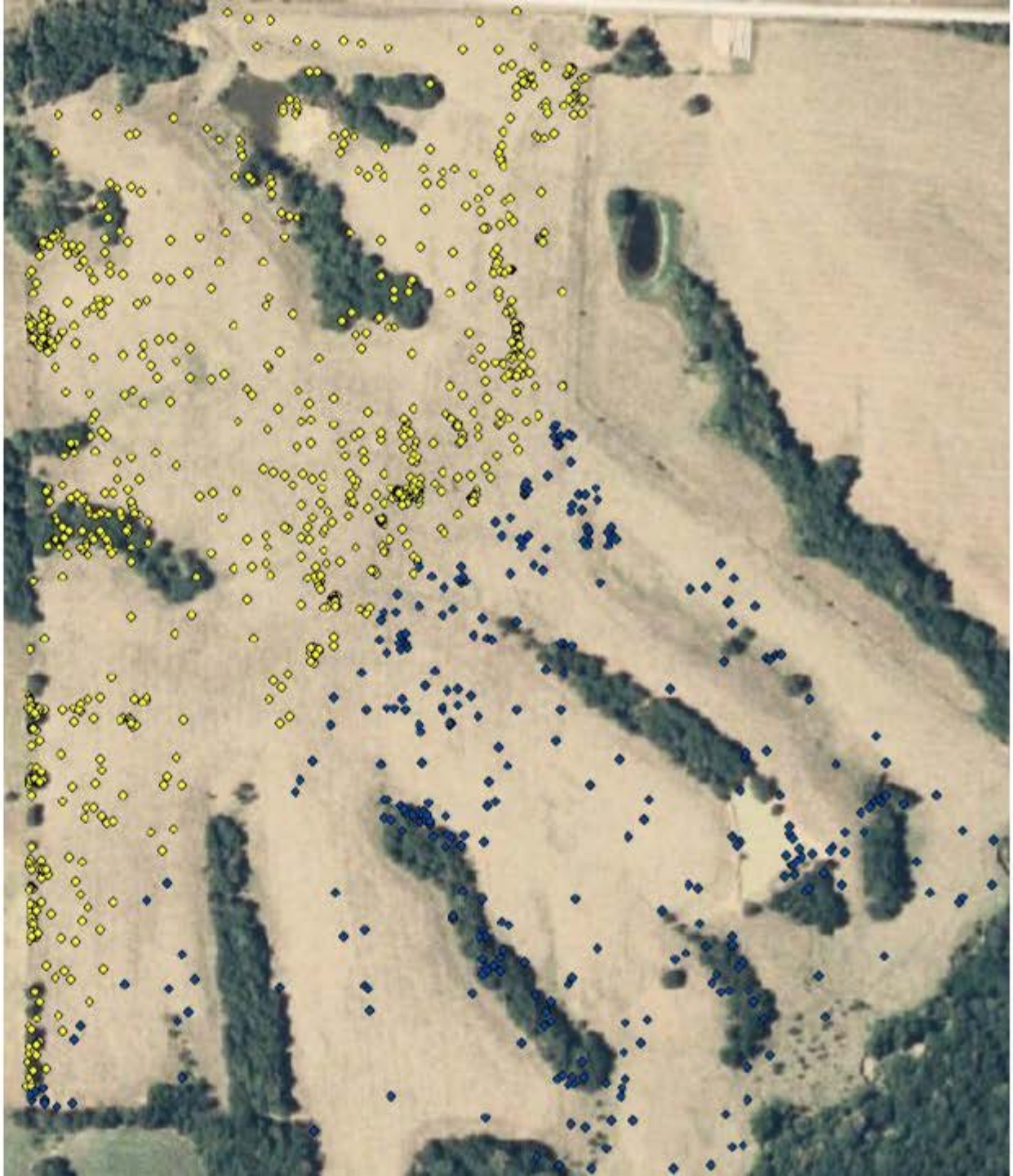
# Albany

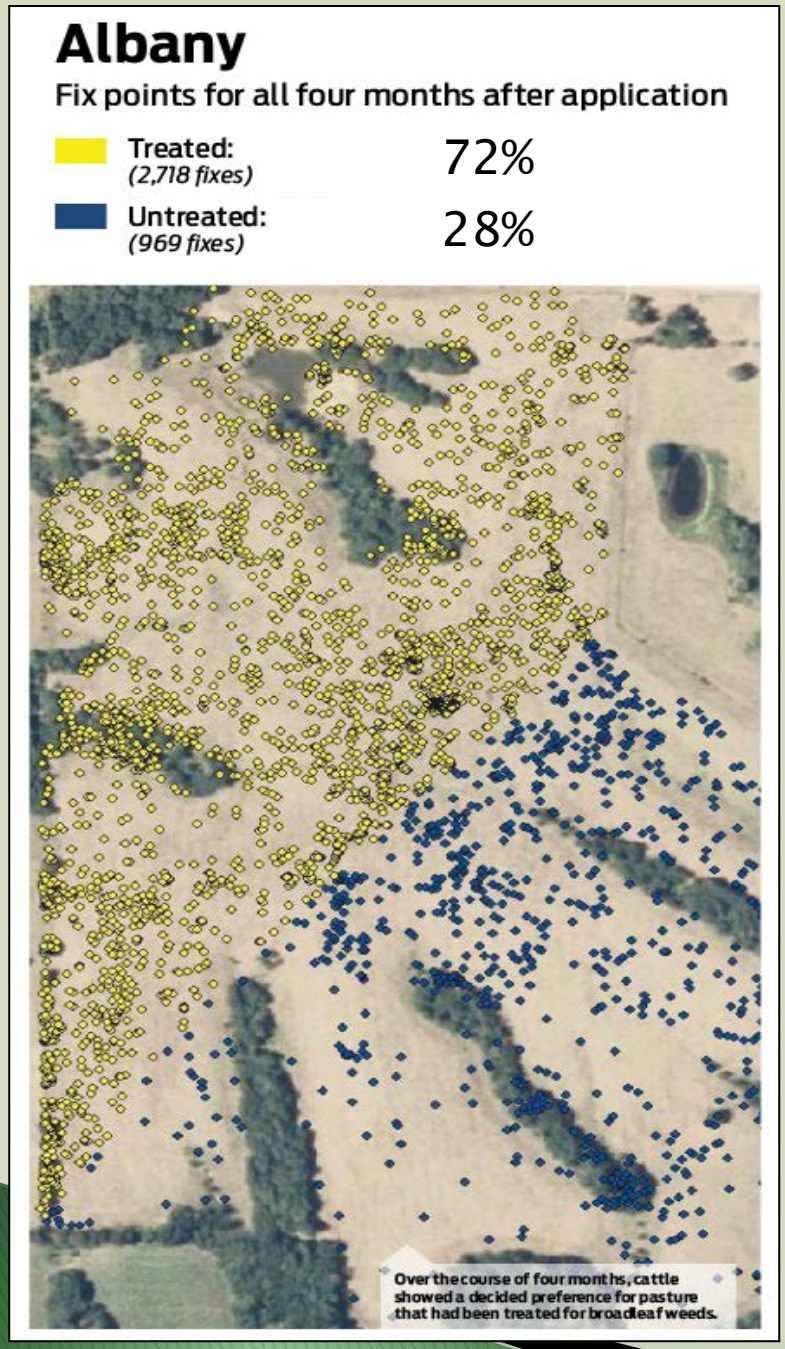
**Fix Points 4 Months After Application (10/28-11/24)**

Treated – 77%
(869 fixes)

Untreated – 23%
(328 fixes)

Grazing distribution shifting more to treated area






# EFFECT OF HERBICIDE TREATMENT ON CATTLE GRAZING PREFERENCE ALBANY, MISSOURI – 2009 DR. KEVIN BRADLEY

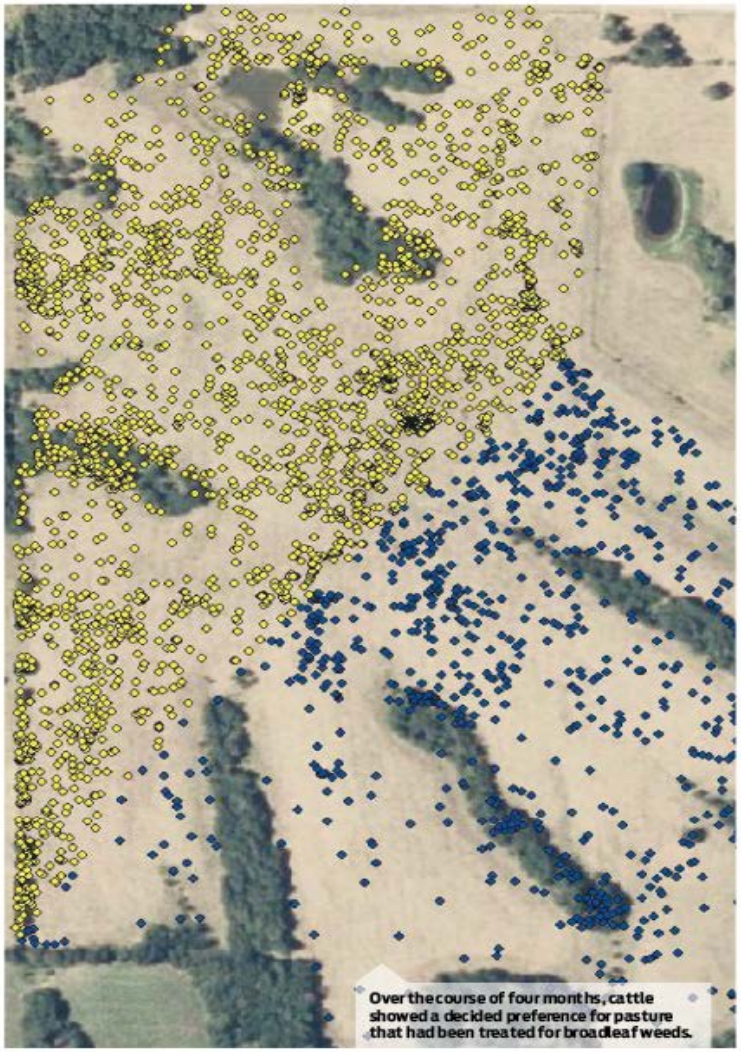
| TIME | HERBICIDE TREATED | NOT TREATED |
|---|---|---|
| (MAT) | GRAZING TIME (%) | |
| 0 | 53 | 47 |
| 1 | 51 | 49 |
| 2 | 76 | 24 |
| 3 | 84 | 16 |
| 4 | 77 | 23 |
| TOTAL | 72 | 28 |

"LET THE COWS VOTE"

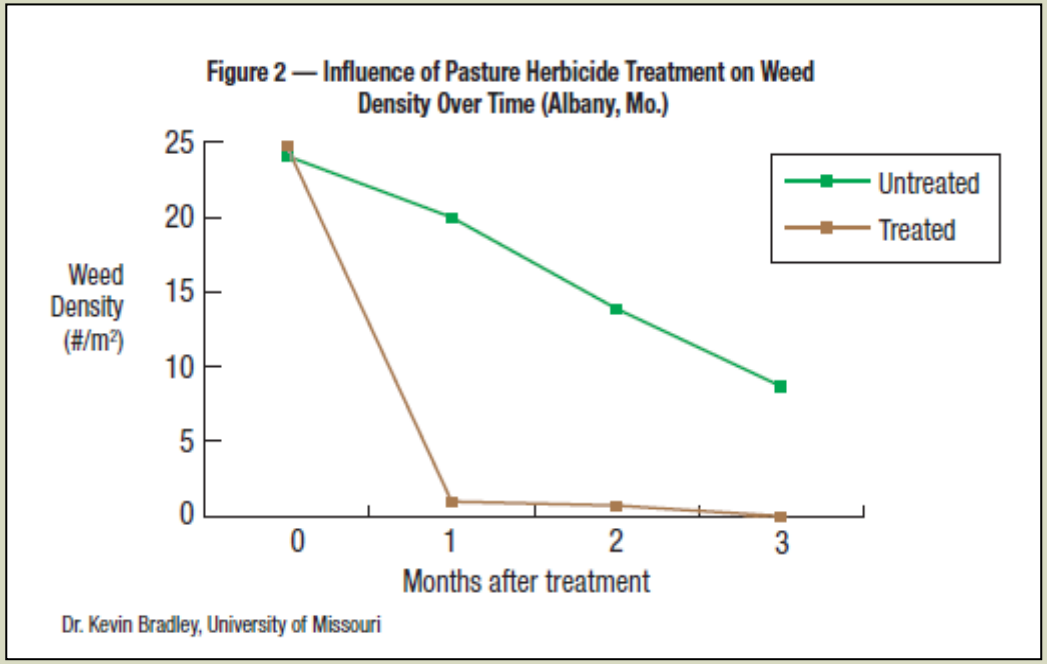
# Albany

Fix points for all four months after application

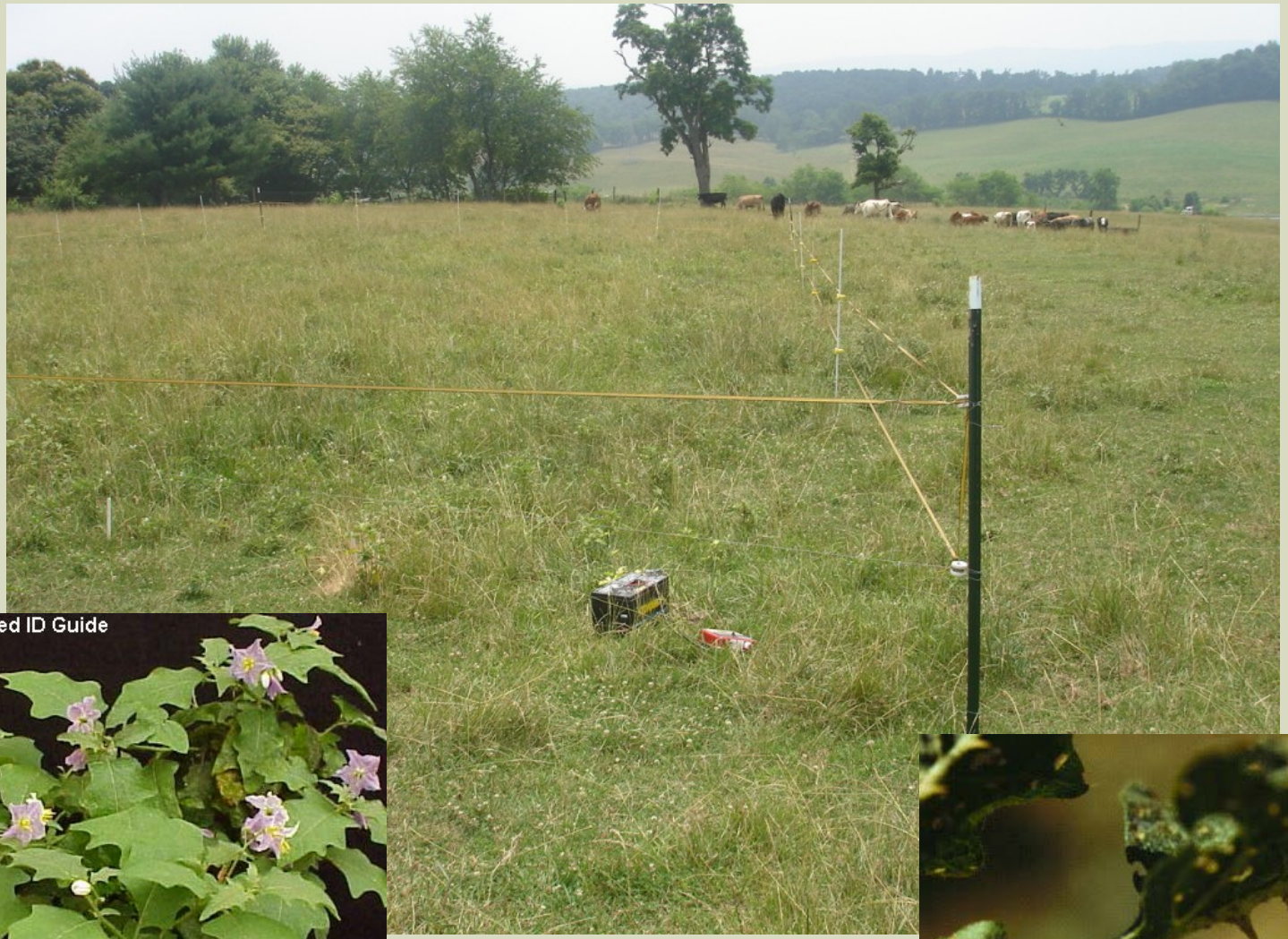
| | | |
|---|---|---|
| Treated: *(2,718 fixes)* | 72% |
| Untreated: *(969 fixes)* | 28% |



Over the course of four months, cattle showed a decided preference for pasture that had been treated for broadleaf weeds.



# ForeFront – Horsenettle Control and Forage Utilization




# Effect of herbicide treatments on horsenettle control and forage composition and utilization – 7 WAT – Montgomery Co., Virginia

| Treatment | Rate | Horsenettle Control (%) | Horsenettle Forage (%) | Fescue utilization |
|---|---|---|---|---|
| ForeFront | 1.5 pt | 80 b | 0.6 c | 70 a |
| ForeFront | 2.0 pt | 85 b | 1.2 bc | 78 a |
| ForeFront | 2.5 pt | 94 a | 1.5 bc | 80 a |
| 2,4-D Ester | 2.0 pt | 24 d | 9.2 ab | 36 b |
| Cimarron | .30 oz | 59 c | 5.1 abc | 45 b |
| Control | --- | 0 e | 12.7 a | 33 b |

# Pasture Herbicides

2,4 – D

BANVEL / CLARITY

CROSSBOW

STINGER

METSULFURON (ALLY)

CIMARRON PLUS

REDEEM

GRAZON P + D

REMEDY

SURMOUNT

PASTUREGARD

AIM

MILESTONE – FOREFRONT

There are no grazing restrictions for any of the herbicides listed above except for lactating dairy animals. Consult the VCE Pest Management Guide and product labels for haying intervals.

# Newer Pasture Herbicides

- Chaparral: Dow – Milestone + Ally
- DPX-MAT28: DuPont – aminocyclopyrachlor
- Pastora: DuPont – Accent + Ally
- Prowl $H_2O$ – No orchardgrass/fescue label – EPA denied label request pending new animal feeding studies. Request was for hay only, no forage or grazing.

# Prowl $H_2O$

## Cool Season Perennial Grasses

Letter requesting further consideration of this registration for the control of summer annual grasses in orchardgrass or fescue hay and/or pasture submitted in October, 2011 from all agronomic crop weed scientists in:

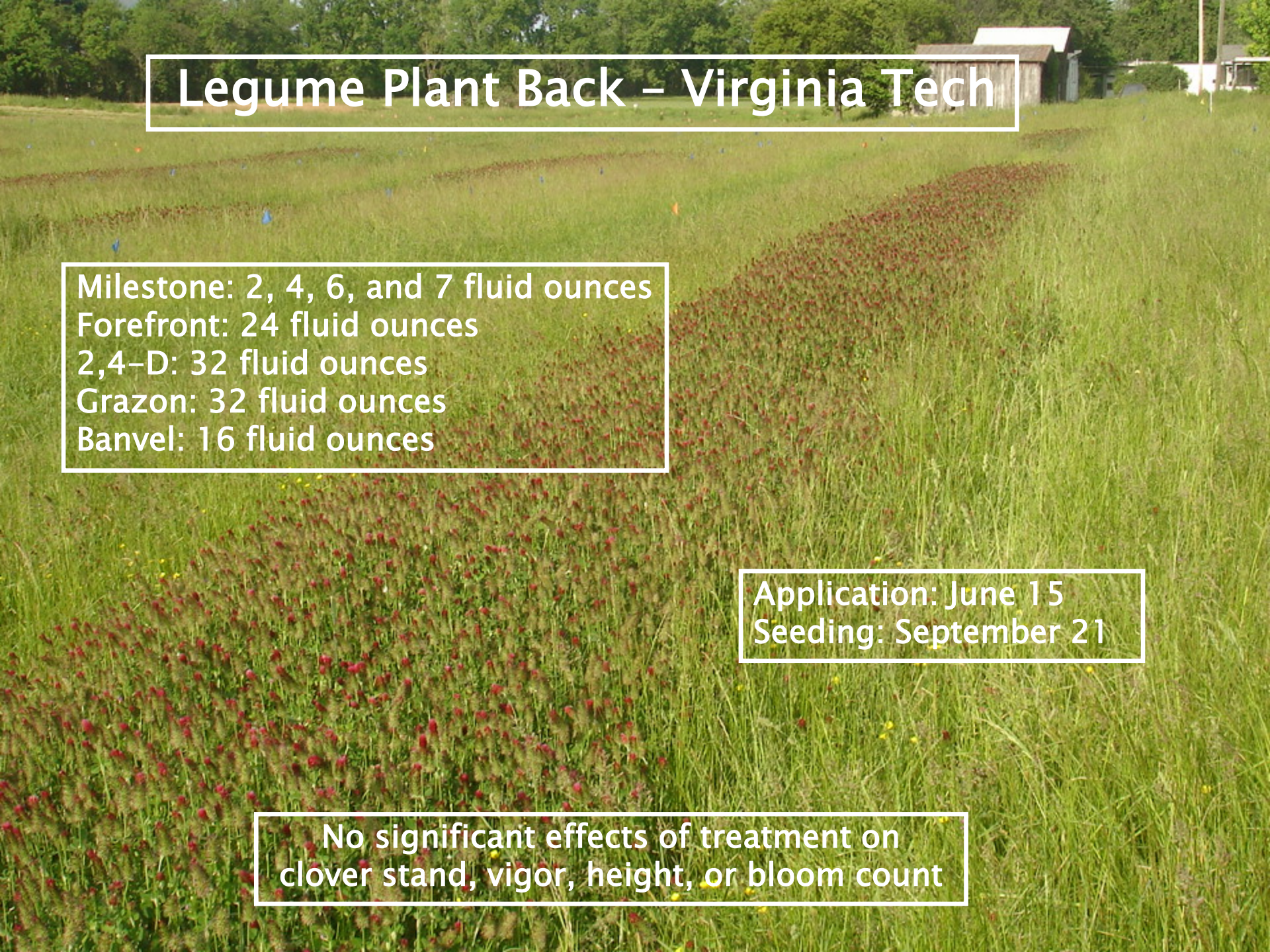
- Delaware
- Maryland
- Penn State
- Rutgers
- Virginia Tech
- West Virginia

# Pasture: Chaparral 71.6 D
# 1.0 -3.3 oz/acre (aminopyralid plus metsulfuron)

- Intended for broadleaf weed control in permanent grass pasture
- Apply in combination with crop oil concentrate or nonionic surfactant
- Do not use on Timothy hay or other cool-season grasses grown for hay
- Do not use more than 2 oz/A on tall fescue
- Carefully observe label directions regarding use of treated plant residue and manure and regarding rotational crop restrictions

WEEDS CONTROLLED : MILESTONE plus CIMARRON LISTS: Aster spp., bedstraw, biennial thistle spp., bittercress, bitter sneezeweed, black locust, black medic, black-eyed Susan, blackberry, brackenfern, burdock, buttercup spp., Canada thistle, Carolina geranium, chamomile, common chickweed, common purselane, common ragweed, common sunflower, common vetch, common yarrow, chicory, cinquefoil, clover spp., corn cockle, cocklebur, cowcockle, crownvetch, cutleaf eveningprimrose, dandelion, dewberry, dock, fiddleneck, filaree, fleabane, goldenrod spp., hawkweed spp., henbit, honey locust, honeysuckle, horsenettle, ironweed, knapweed spp., kudzu, lambsquarters, lespedeza spp., mayweed spp., mexicantea, mullien, mustard spp., multiflora rose, oxeye daisy, partridgepea, pigweed spp., plantain spp., ragwort, red sorrel, sowthistle spp., shepardspurse, sicklepod, sida spp., smartweed spp., Spanish needles, spiny amaranth, starthistle spp., teasel, yellow woodsorrel, wild carrot, wild parsnip, wooly croton, and others.

# Legume Plant Back – Virginia Tech



Milestone: 2, 4, 6, and 7 fluid ounces
Forefront: 24 fluid ounces
2,4-D: 32 fluid ounces
Grazon: 32 fluid ounces
Banvel: 16 fluid ounces

Application: June 15
Seeding: September 21

No significant effects of treatment on clover stand, vigor, height, or bloom count

# Waterpenny Farms – Grazon Treated Mulch

# New Label Wording ForeFront, Milestone

- **Do not move hay made from grass treated with ForeFront HL off farm unless allowed by supplemental labeling.**

- Supplemental labeling allows hay transfer and sale with the provision that the buyer be fully informed in writing of legal uses of hay and of dangers to non-target plants associated with improper use.

- No supplemental label for VA or NC but supplemental label is in place for KY and TN.

# Effect of DPX-MAT 28 Treatments on Rotational Legume Establishment – Initial Treatment: June 2009

Three months after treatment

| Rate | Fall Seeding – September 2009 Stand (% of Control) | | | |
|---|---|---|---|---|
| | Alfalfa | B'foot Trefoil | Ladino Clover | Red Clover |
| 0.5 oz | 73 B | 75 B | 72 B | 80 B |
| 1.0 oz | 45 C | 53 C | 45 C | 50 C |
| 2.0 oz | 20 D | 33 CD | 21 D | 29 D |
| 4.0 oz | 5 D | 18 D | 11 D | 6 E |
| Control | 100 A | 100 A | 100 A | 100 A |

# Effect of DPX-MAT 28 Treatments on Rotational Legume Establishment – Initial Treatment: June 2009

Ten months after treatment

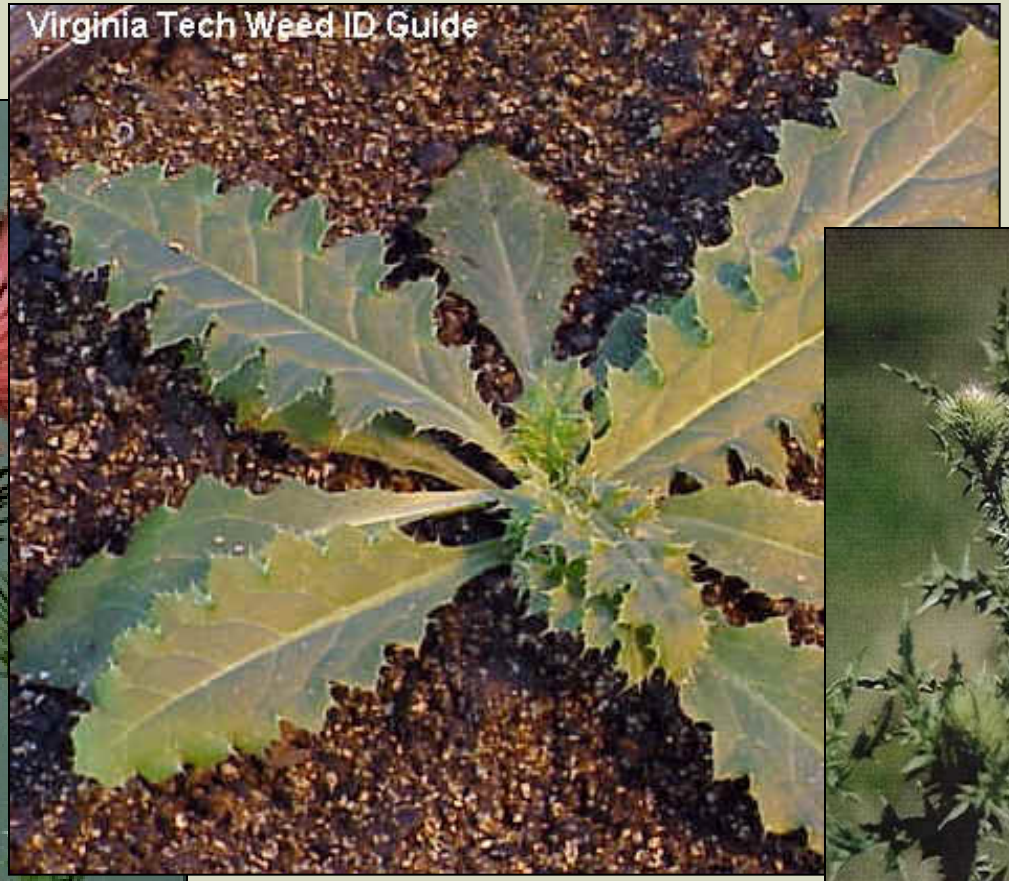
| Rate | Spring Seeding – April 2010 Stand (% of Control) | | | |
|---|---|---|---|---|
| | Alfalfa | B'foot Trefoil | Ladino Clover | Red Clover |
| 0.5 oz | 100 A | 100 A | 100 A | 100 A |
| 1.0 oz | 95 A | 95 A | 69 B | 65 B |
| 2.0 oz | 90 A | 94 A | 38 C | 20 C |
| 4.0 oz | 53 B | 65 B | 8 D | 8 C |
| Control | 100 A | 100 A | 100 A | 100 A |

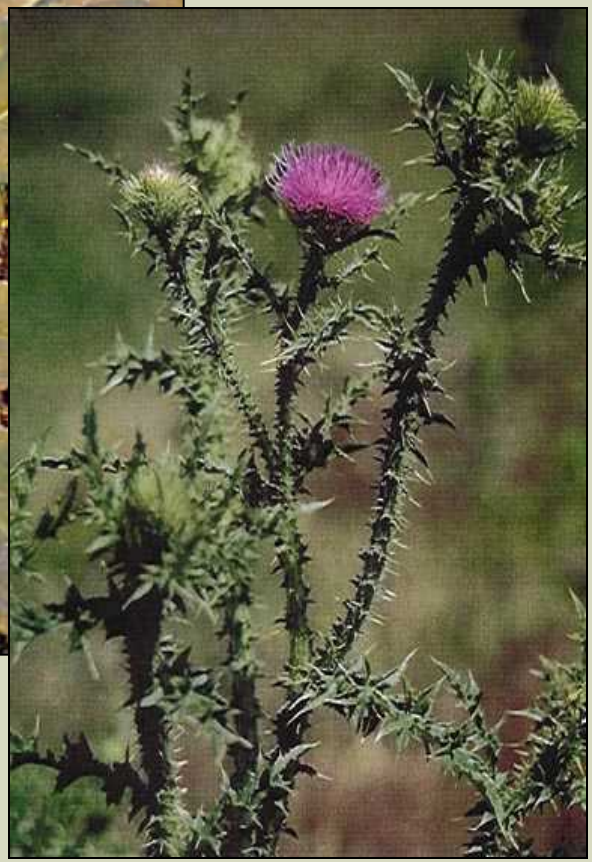
# Effect of DPX-MAT 28 Treatments on Rotational Legume Establishment – Initial Treatment: June 2009

Fifteen months after treatment

| Rate | Fall Seeding – September 2010 Stand (% of Control) | | | |
|---|---|---|---|---|
| | Alfalfa | B'foot Trefoil | Ladino Clover | Red Clover |
| 0.5 oz | 100 A | 100 A | 100 A | 100 A |
| 1.0 oz | 100 A | 100 A | 100 A | 100 A |
| 2.0 oz | 100 A | 100 A | 100 A | 100 A |
| 4.0 oz | 100 A | 100 A | 100 A | 100 A |
| Control | 100 A | 100 A | 100 A | 100 A |

# Plumeless Thistle *Carduus acanthoides*



# Bull Thistle

*Cirsium vulgare*

An erect biennial with spines on the leaves and stems. Found throughout the United States, primarily a weed of pastures.

Spiny-winged stems and leaves with rough hairs on the upper surface and softer whitish hairs below. This weed is often confused with Musk Thistle (*Carduus nutans*), but the leaves of mature musk thistle plants usually lack hairs. Additionally, Canada Thistle (*Cirsium arvense*) is a perennial from rhizomes, and young plants do not develop as a rosette, unlike bull thistle.

# Effect of Herbicide Treatments on Bull Thistle (*Cirsium vulgare*) Control in Pasture

| TREATMENT | % CONTROL 15 DAT | % CONTROL 60 DAT | % CONTROL 90 DAT |
|---|---|---|---|
| DPX-MAT 28 @ 0.25 OZ | 32 D | 78 C | 100 A |
| DPX-MAT 28 @ 0.50 OZ | 32 D | 87 B | 100 A |
| DPX-MAT 28 @ 1.0 OZ | 52 C | 100 A | 100 A |
| DPX-MAT 28 @ 1.5 OZ | 50 C | 92 AB | 100 A |
| DPX-MAT 28 @ 2.0 OZ | 68 B | 97 A | 100 A |
| MILESTONE @ 5.0 OZ | 94 A | 100 A | 100 A |


Pyridine herbicides, as well as metsulfuron containing herbicides and 2,4-D are very effective on biennial thistles

# Horsenettle

*Solanum carolinense*

Perennial. Extensive, deep, creeping rootstocks. Stems and leaves have conspicuous prickles. Leaves of a mature plant are alternate, with wavy lobes on the margin and star-shaped hairs on both surfaces.

Purplish or white flowers in clusters from stem ends. Smooth, large, yellowish-orange berries. Found in cultivated fields and wastelands, pastures, roadsides.

# HORSENETTLE CONTROL – PASTURE

| TREATMENT | HORSENETTLE CONTROL 42 DAT | HORSENETTLE CONTROL 71 DAT |
|---|---|---|
| GRAZON 3 PT | 98 a | 100 a |
| MILESTONE 5 FL OZ | 88 ab | 94 a |
| MILESTONE 7 FL OZ | 84 ab | 91 a |
| DPX-MAT 28 1 OZ | 79 b | 75 b |
| DPX-MAT 28 2 OZ | 75 b | 86 ab |
| DPX-MAT 28 4 OZ | 76 b | 91 ab |
| CONTROL | 0 c | 0 c |

Pyridine herbicides are excellent for control of horsenettle. A perennial – apply in pre to early bloom stage.

# Canada Thistle

*Cirsium arvense*

Perennial by rhizomes, 2 to 6 feet in eight. Often a persistent spreading weed of many pastures.

Cotyledons are club shaped, dull green in color and relatively thick. Young leaves covered with short hairs. Leaf margins are wavy with spines. Shoots that emerge from rhizomes lack cotyledons.

Stems are also spineless unlike Bull Thistle (*Cirsium vulgare*) or Musk Thistle (*Carduus nutans*).

Pyridines provide excellent control

# Buttercup Control

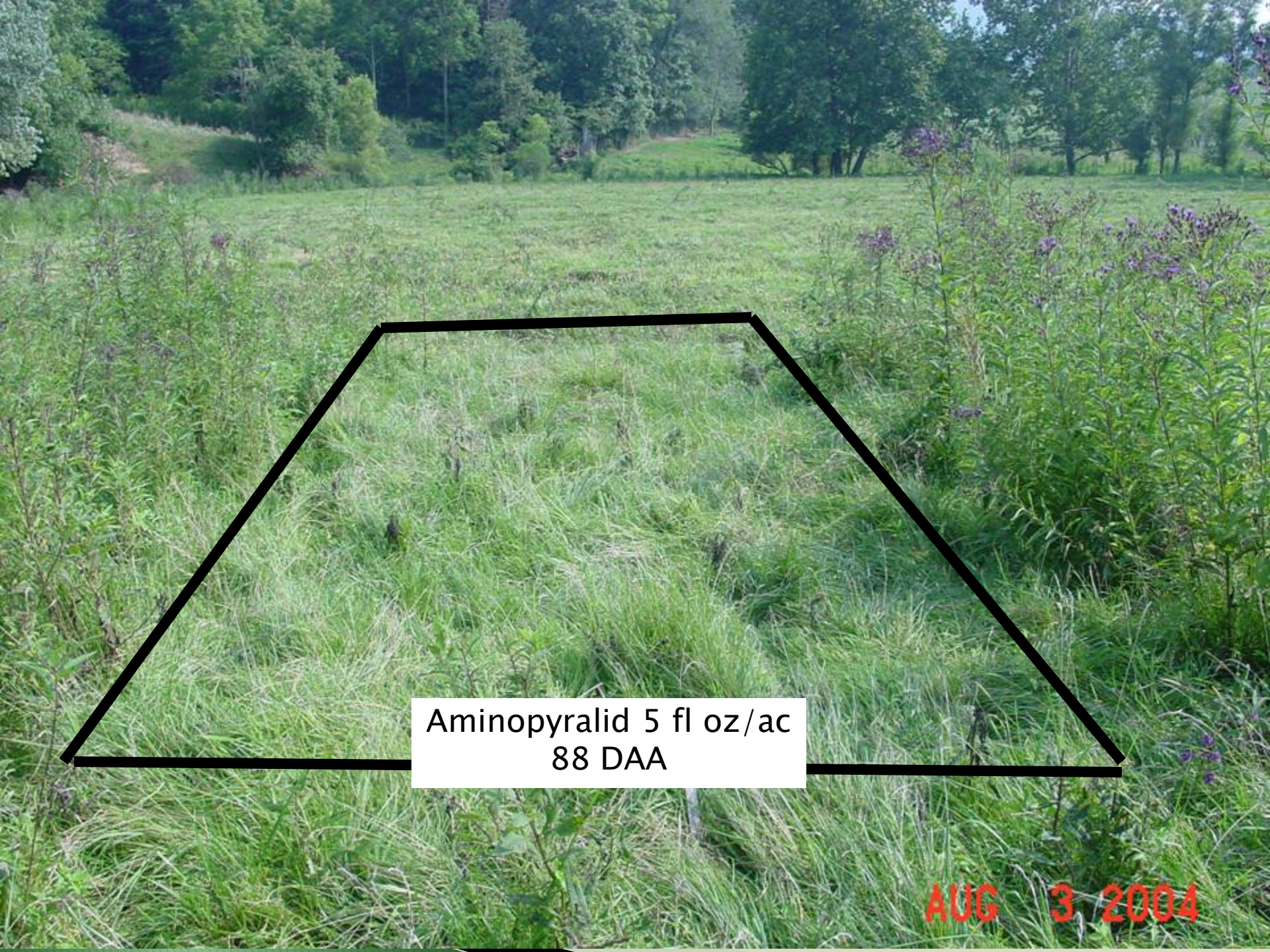
2,4-D – Sequential applications


Grazon – Single Application
ForeFront – Single Application

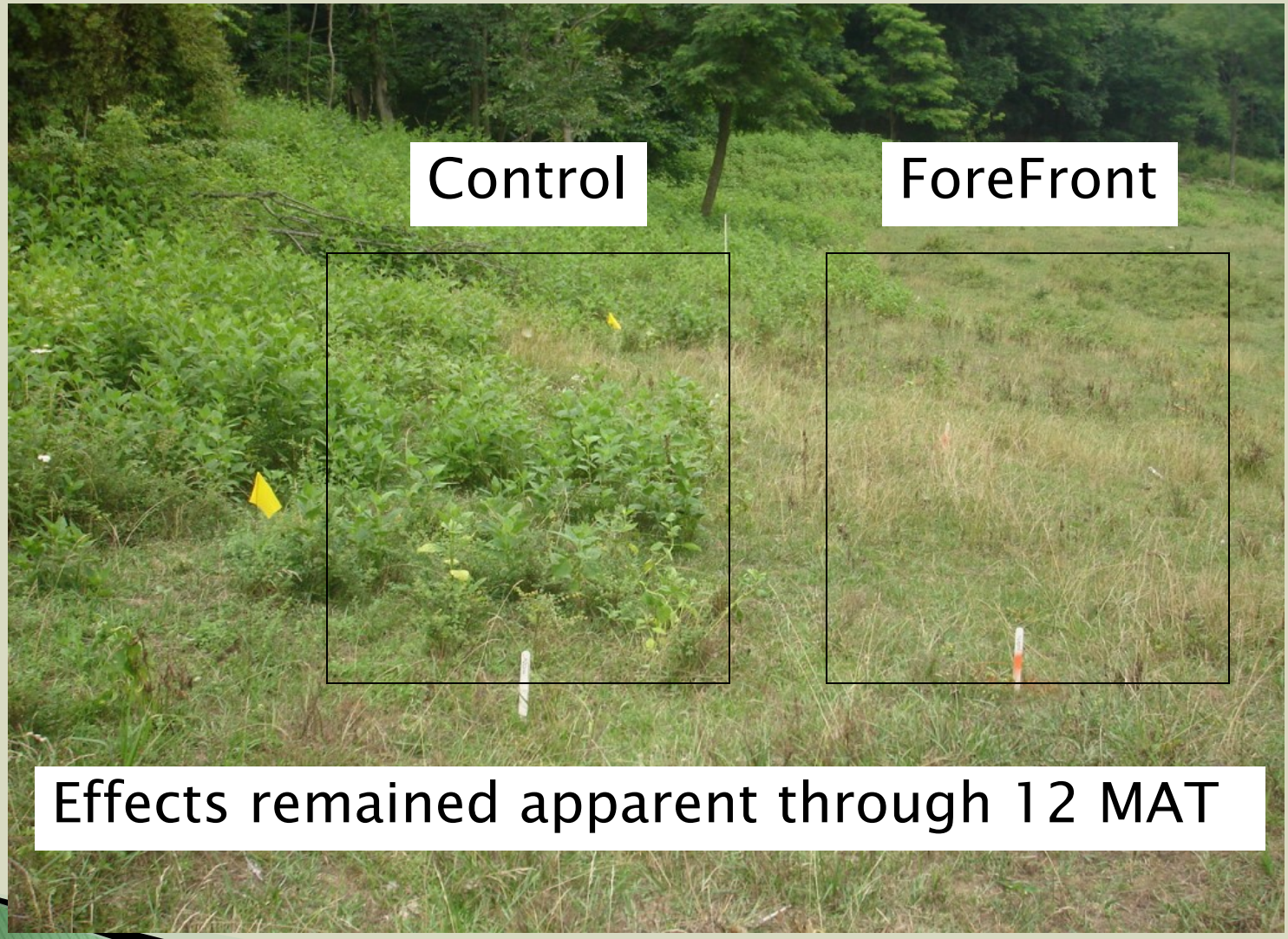
# Tall Ironweed (*Vernonia altissima*)

The ironweeds are perennials with showy purple flowers. They were given the name ironweeds because of their stout stems that often persist throughout the winter. The ironweeds are primarily weeds of pastures, hay fields, and roadsides and are distributed throughout most of the southeastern United States.

ForeFront and other pyridine containing herbicides afford very good control.


Aminopyralid 5 fl oz/ac
88 DAA
AUG 3 2004

# Stickweed Control – Montgomery Co.



# Common Mullein Control





Metsulfuron required for control.

# Common Mullein Control

| Treatment | % Control 21 DAT | % Control 46 DAT |
|---|---|---|
| Chaparral 2oz + nis | 68 abc | 100 a |
| Chaparral 3oz + nis | 71 abc | 100 a |
| Chaparral 2oz + mso | 57 abcd | 100 a |
| Chaparral 3oz + mso | 51 bcd | 100 a |
| Chaparral 2oz + Syl-tac | 48 cd | 100 a |
| Chaparral 3oz + Syl-tac | 75 abc | 100 a |
| Chaparral 2oz + ams + nis | 84 a | 100 a |
| Chaparral 2oz + 2,4-D + nis | 62 abc | 100 a |
| Cimarron + Weedmaster | 53 abcd | 100 a |
| Cimarron Plus | 83 ab | 100 a |
| Chaparral 2oz + coc | 63 abc | 100 a |
| Control | 0 e | 0 b |

## Japanese Knotweed


Milestone or
ForeFront
Higher Rates

## Japanese Honeysuckle


glyphosate
Crossbow
Remedy

# Multiflora Rose Control
# Timing of Application – Montgomery County

| Treatment | May (%) | Sept (%) | Treatment | May (%) | Sept (%) |
|---|---|---|---|---|---|
| PastureGard 4 pints | 100 a | 50 cd | Grazon 4 pints | 43 de | 25 g |
| PastureGard 6 pints | 92 a | 52 cd | Grazon + Remedy 4 + 1 pints | 100 a | 52 cd |
| Surmount 4 pints | 100 a | 87 ab | Cimarron 0.3 oz | 97 a | 100 a |
| Surmount 6 pints | 100 a | 80 b | Milestone 7 fl oz | 58 c | 32 fg |
| ForeFront 2.6 pints | 53 cd | 37 ef | Control | 0 h | 0 h |

Metsulfuron containing treatments often best for woody perennials, especially with fall applications.

# Woody Brush Control

| Treatment | Rate (% v/v) | Black Hawthorne | Multiflora Rose | Autumn Olive |
|---|---|---|---|---|
| Crossbow | 1.5 % | 100 a | 100 | 100 a |
| Grazon + Remedy | 1.0 % + 0.5 % | 100 a | 100 a | 100 a |
| Cimarron | 1 oz/100 gal | 100 a | 100 a | 30 b |
| Control | --- | 0 b | 0 b | 0 c |


# Black Locust Control


| Treatment | % Control |
|---|---|
| ForeFront 2 pt | 100 a |
| ForeFront 2.6 pt | 100 a |
| ForeFront 2 pt<br>Remedy 1 pt | 100 a |
| ForeFront 2 pt<br>Crossbow 4 pt | 100 a |
| ForeFront 2 pt<br>Remedy 2 pt | 100 a |
| Crossbow 4 pt | 100 a |
| ForeFront 2.6 pt<br>Remedy 2 pt | 100 a |
| Control | 0 b |

# Blackberry Control

| Treatment | % Control |
|---|---|
| Chaparral 2 oz | 98 a |
| Chaparral 3 oz | 100 a |
| Chaparral 2 oz + Remedy 1 pt | 98 a |
| Chaparral 3 oz + Remedy 1 pt | 99 a |
| Cimarron 0.5 oz | 98 a |
| ForeFront 2.6 pt + Remedy 1 pt | 100 a |
| ForeFront 2.6 pt + Remedy 2 pt | 100 a |
| Milestone 7 oz + Remedy 2 pt | 100 a |
| Remedy 2 pt | 100 a |
| Milestone VM Plus 9 oz | 100 a |
| ForeFront 2.6 pt + PastureGard 2 pt | 100 a |
| Control | 0 b |


JOHNSON FARM
J
OPERATIONS, INC.


SURRY COUNTY, NC
CONTROL
HORSENETTLE, BROADLEAF DOCK, MARESTAIL,
VIRGINIA PEPPERWEED, COMMON RAGWEED, SPINY PIGWEED


DPX-MAT28
1.0 OAA
2,4-D AMINE
7.6 OAA


DPX-MAT28
2.00 OAA
2,4-D AMINE
15.2 OAA


DPX-MAT28
1.78 OAA
DPX-T6376
0.27 OAA


DPX-MAT28
1.11 OAA
DPX-M6376
0.17 OAA


FOREFRONT
2.0 PT/A


CONTROL

# Aim – Pastures

- Aim (carfentrazone) – 2.0 lb ae/gallon
- 0.5 to 2 fluid oz/acre
- No grazing or haying restrictions
- Zero day recrop for berries, corn, cotton, grapes, grasses, potato, small grains, sorghum, soybeans, tobacco, and tree fruit. 12 months for all others.
- Bedstraw, bittercress, black nightshade, common mallow, fixweed, kochia, annual mustard spp., pigweed spp., velvetleaf, wild buckwheat, and others
- Does not control clover

# Small Grain Herbicides

HARMONY EXTRA SG
HARMONY SG
FINESSE
PEAK
OSPREY
POWERFLEX

2,4-D
BANVEL/CLARITY

HOELON
AXIAL XL

BUCTRIL

AIM

PROWL $H_2O$
AXIOM

FINESSE GRASS AND BROADLEAF

# Small Grain Herbicides – Forage Use*

HARMONY EXTRA SG

~~HARMONY SG~~

FINESSE

PEAK

OSPREY

POWERFLEX

2,4-D

BANVEL/CLARITY

~~HOELON~~

AXIAL XL

BUCTRIL

AIM

PROWL $H_2O$

AXIOM

FINESSE GRASS AND BROADLEAF

*Consult specific labels for grazing, haying, and forage intervals.

QUESTIONS?