
Cover Crops
Management --terminating
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Seed source

- Many different varieties of each cover crop
- Major development being done on varieties

- VNS– means variety not stated
  - You have no idea what is in the bag
- Use tested varieties in you area
- Know your seed dealer if they have experience

Cover crops
Be able to spray when needed!!

- Be ready to spray no matter what conditions
- Target cover crop growth stage to meet your needs
  - Nitrogen
  - Root growth
  - Weed control
- Consider multiple herbicide applications
  - Not always need, but be prepared
- Consider non glyphosate control options


GPS
Foam marker

Cover Crop Control

Radish	Winter kills
Cereal rye	glyphosate, Gramoxone, corn herbicides
Hairy vetch	2,4-D; no glyphosate!
Annual ryegrass	glyphosate, done correctly, 2x Gramoxone Axiom, BasisBlendQ, SteadfastQ
Crimson clover	glyphosate, 2,4-D
Rapeseed	glyphosate,2,4-D; dicamba,corn herbicides
Spring oats	winter kills
Triticale	same as cereal rye

Brassica control

- Sulfonylurea– chlorimuron, nicosulfuron
- Imidazolinone- Pursuit
- Triazines--atrazine
- Phenoxy– 2,4-D
- Substituted Ureas—linuron, Lorox
- Bentazon- Basagran

Herbicide Carry over Issues

- Brassicas very sensitive
  - Classic, Pursuit, Scepter, and mixes like Canopy with chlorimuron
  - Little guidance on labels need at least 60 days
- Late post application may kill all cover crops
  - Including grasses, legumes

Rapeseed

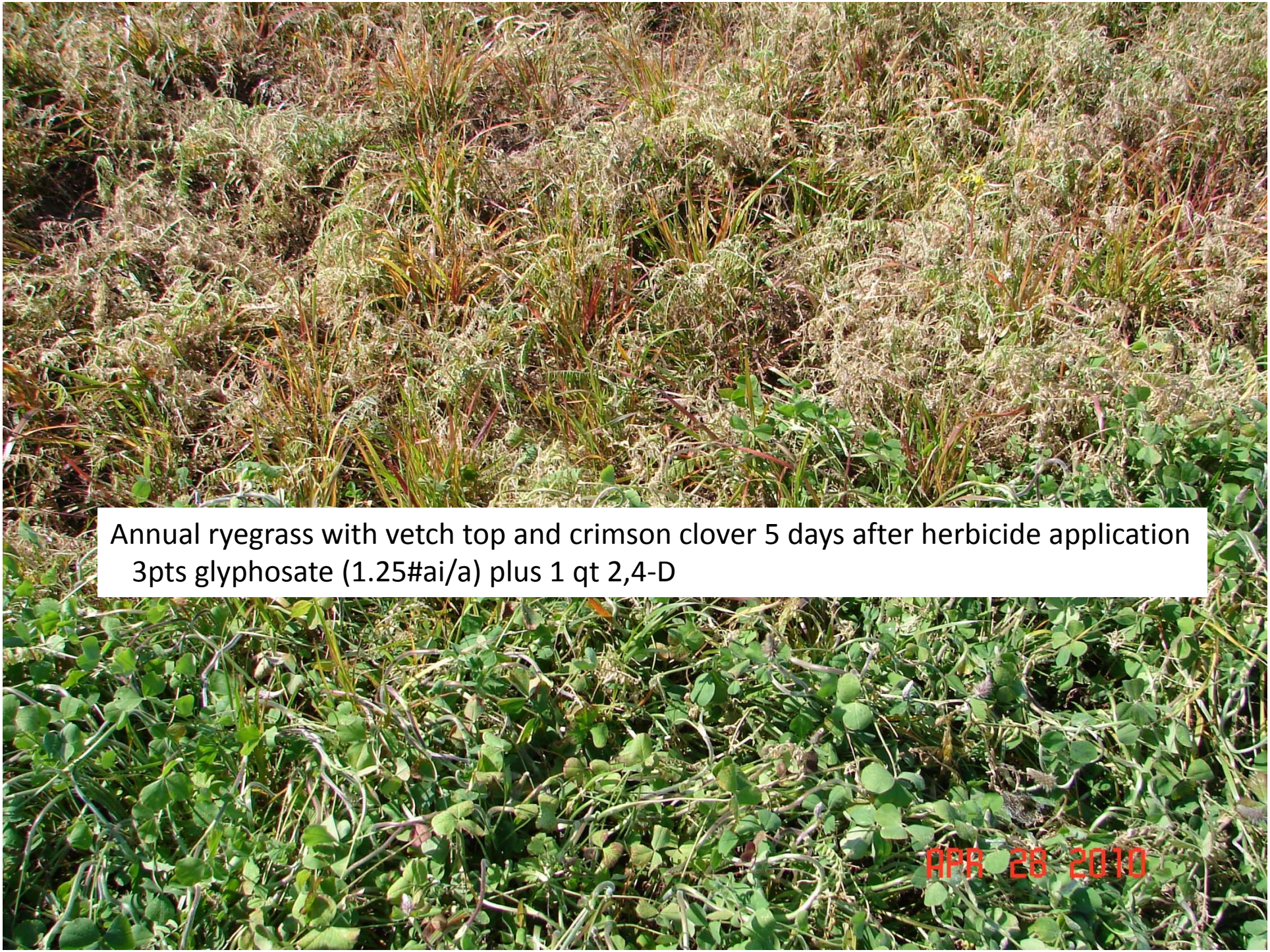
- Varieties being developed for increased effects
  - Essex is currently preferred variety
  - Excellent on soybean cyst nematode, significantly reduces SDS and other diseases
- Narrow seeding window for winter hardiness
  - September 10-20 for this area
- Seeding rate 5-10#/a
- Controlled by 2,4-D , glyphosate, or corn herbicides

Radish- which one do you want

Crimson Clover and pea control

- In full bloom stage, easy to control with tillage or crimping or close mowing
- Vegetative control
  - Glyphosate + 2,4-D
  - Gramoxone + 2,4-D+ atrazine, corn herbicides
  - Dicamba, or mixed with corn herbicides

Winter pea, Austrian winter pea easily controlled



Annual ryegrass with vetch top and crimson clover 5 days after herbicide application
3pts glyphosate (1.25#ai/a) plus 1 qt 2,4-D

Vetch

- Hairy, woolypod vetch
  - 2,4-D excellent control
  - Glyphosate---NO control, been used to clean weeds out of vetch
  - Gramoxone, corn herbicides + 2,4-D
  - Crimping only at full bloom and heavy crimper
- Common vetch– not winter hardy
- Chickling vetch not winter hardy most years
  - Use 2,4-D
- Will have hard seed to germinate for 5-20 years


Right stage to crimp
Plant first then crimp

Cereal rye, wheat, triticale control

- Fairly easy
  - Glyphosate (.75#/a) 1 qt. 41%
  - Gramoxone + atrazine mix (corn herbicides)
  - Crimping/mowing at pollination

Rye at pollination, only time to get good control by crimping– ave. 95+%

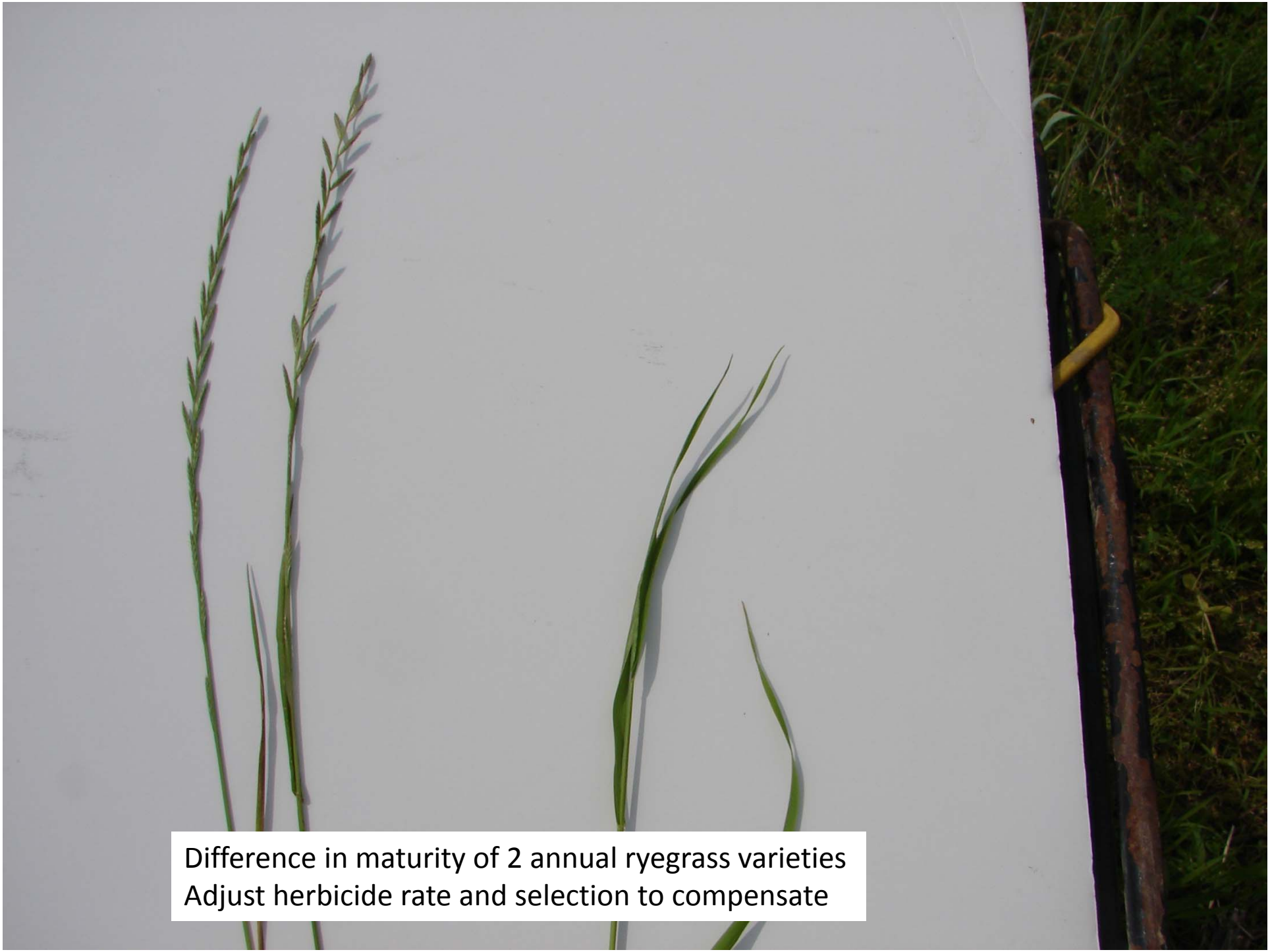

Drilling and crimped
Or crimped and drilled?

Rye, ryegrass, or annual ryegrass

- Most don’t know the difference
- Rye is a cereal grain crop
- Ryegrass is a forage grass that may be perennial, biennial like or a winter annual
- Early maturing diploid annual ryegrass is what is used for a cover crop

Species

- Cereal rye-- Secale cereale
- Perennial ryegrass—Lolium perenne
- Annual ryegrass—Lolium multiflorum


Difference in maturity of 2 annual ryegrass varieties
Adjust herbicide rate and selection to compensate

Annual ryegrass is
7-9 months old April 1
With extensive root system

Variety also determines
Size, condition, uptake

Treat it like an established
Forage grass

Spring Management

- **Annual ryegrass is easiest to kill pre-joint**
  - Jointing occurs at 6-10” in height
  - Warm weather greatly increases control (herbicide can translocate)
  - Date varies with location and season
- **Early control**
  - maximizes nitrogen release and decomposition rate
  - makes easier planting, conserves moisture

Plant growth stage Issues

- Most difficult to control at reproductive stage
  - at boot development to emergence
  - Easier after head emergence, BUT may produce viable seed
- Grasses tend to be more difficult after 2nd joint to heading;
  - Just requires doing it right…

Controlling annual ryegrass
What we have learned

- Systemic herbicides are VERY temperature sensitive
  - Plant must be actively growing to work
  - Annual ryegrass does not translocate when temperatures are <40 and/or weather is cloudy
- Glyphosate products require translocation

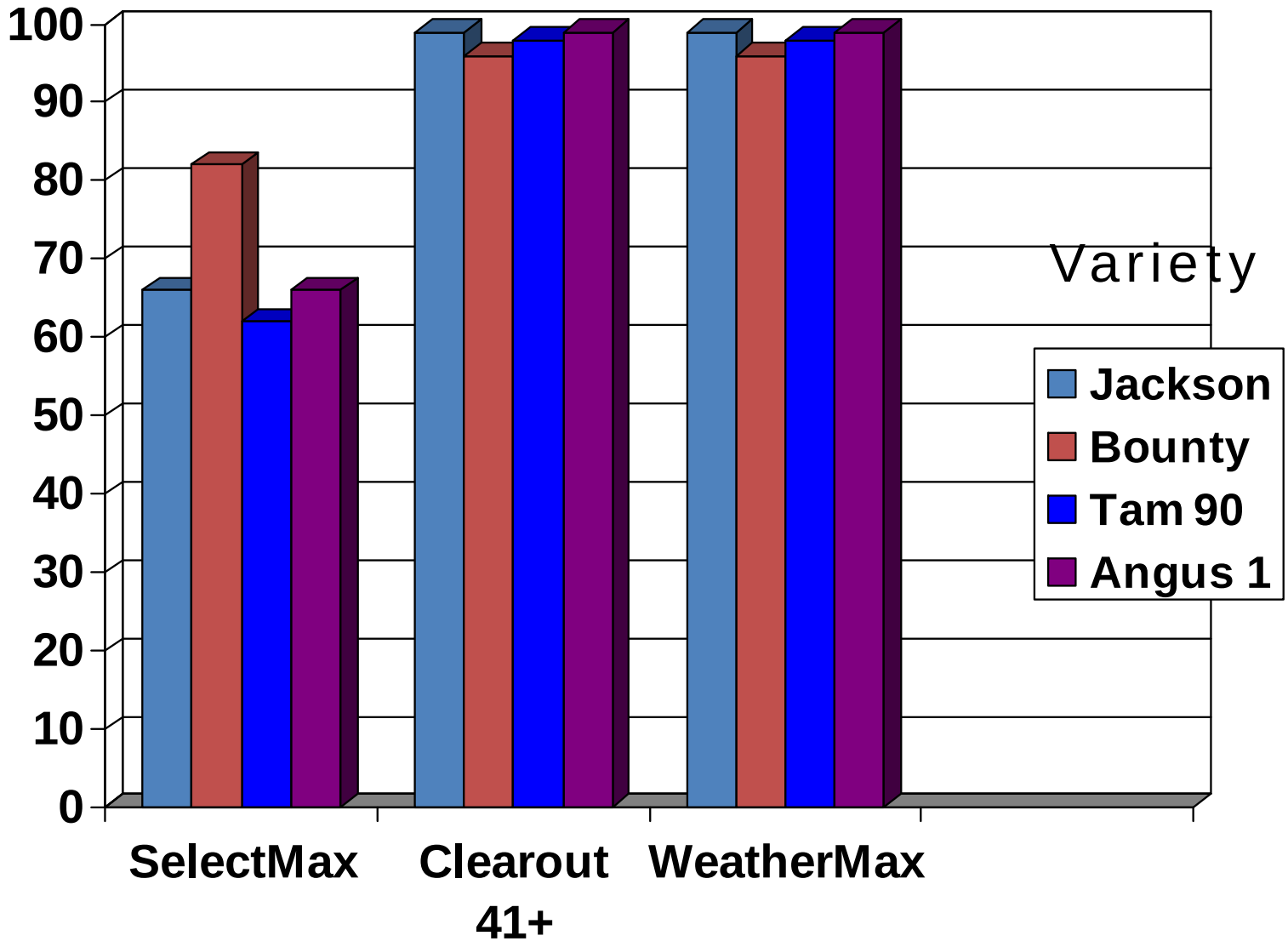
  for over **4 hours before sunset** after application **Which means no spraying after 2pm in cold weather**

What YOU should DO !!

- AMS– no substitute products
  - Agitate several minutes
- Use 10 gallons water/acre
- Use medium to fine spray droplet nozzles
- Spray only in mornings in cold weather
  - Stop 4-5 hours before sunset
- Try to spray on sunny days if cold
- If cold do Double Shot treatment
  - Burndown followed by 2nd treatment 2 weeks later
    - Gramoxone, followed by glyphosate, or post grass herbicide
    - Glyphosate, followed by grass herbicide or another burndown
    - Gramoxone, followed by Gramoxone and residual herbicides

Not all herbicides work well to kill cover crops in cool weather
19 varieties, different herbicides----576 plots

% control Sprayed April 16, 2007, all varieties jointed, rating 30 days after spraying



Ryegrass Herbicide Control

Gramoxone Inteon	3 pt	78%
Gramoxone Int / Aatrex /Princep	3 pt/2 qt/1 qt	85%
Round-up W.MAX	22 oz	98%
Round-up W.MAX / Degree Xtra	22 oz/3 qt	86%
Steadfast	.75 oz	47%
ClearOut 41 plus	1 qt.	93%
ClearOut 41 plus	1.5 qt	98%
ClearOut 41 plus /Basis	1.5 qt/.33 oz	98%

R.Hines, M.Plumer

Annual Ryegrass
Herbicide trial

treatment	Control at 36 das
gly51 22oz	97
gly 51 32oz +2,4-D 16oz	99
gly 51 32oz + calisto 7oz	63
gly51 32oz + Prowl H2O 3 pt	99
gly51 32oz + resolve 2 oz.	99
gly51 32 oz + Basis 1 oz	99
gly51 32oz + Balance Pro 4oz	99
gly 51 32 oz	99

LSD 0.05 0.6

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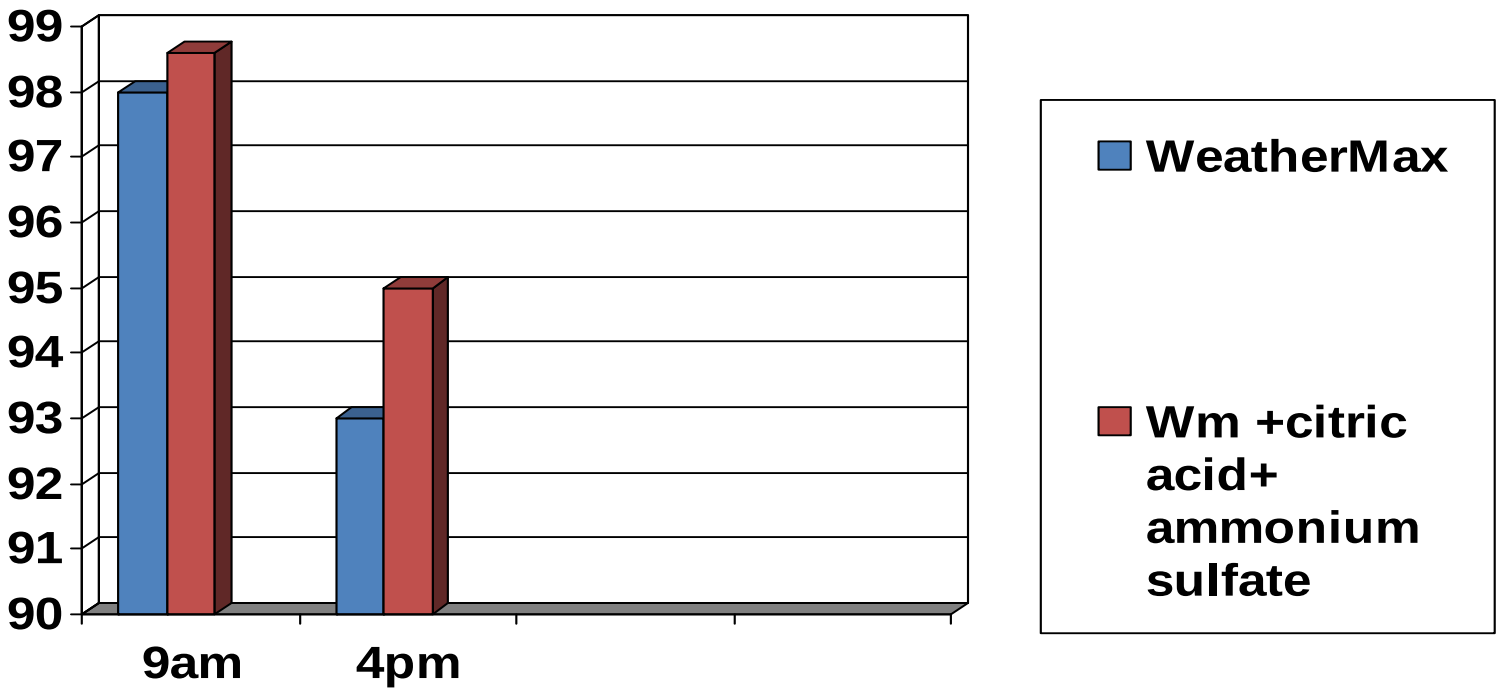
Sprayed at 1st to 2nd joint stage, mid April, 6 reps

Herbicide trial-vegetative growth

Clear Out 41+	3 pt./a	98
Weather Max	32oz./a	98
W.Max+ Degree Xtra	22 oz 3 qt./a	86
Gramoxone Inteon	3pts/a	78
Clear Out 41+ Basis	3pts 2.5	98
Gramone Inteon Atrazine+simazine	3pts/a 2qt+ 1qt	89

Time of day glyphosate



Temperatures 60 day and 40 night
3 replications

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Annual Ryegrass at boot stage of growth-note maturity difference of varieties

Variety	Gramoxone 48 oz	Liberty 32 oz	Power Max 40 oz	PowerMax Sharpen	PowerMax Corvus
Gulf	90	15	98	95	99
King	50	15	98	98	95
KB Royal	70	10	98	95	95
Marshall	45	10	98	98	95
Bounty	80	10	99	98	98

Plumer, 2012 rating 45 DAS

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Other Rate	Other Rate Unit	Growth Stage	Appl Code	LOLMG Root Max 5-15-13 Control Percent 28 DA-A	LOLMG Tamtbo 5-15-13 Control Percent 28 DA-A	LOLMG Maximus 5-15-13 Control Percent 28 DA-A	LOLMG Bounty 5-15-13 Control Percent 28 DA-A
	Crop Code												
	Crop Variety												
	Rating Date												
	Rating Type												
	Rating Unit												
	Trt-Eval Interval												
1	NONTREATED									0 d	0 g	0 f	0 g
2	ROUNDUP POWERMAX	4.5	SL	1	lb ae/a	28.4	fl oz/a	1NODE	A	95 a	93 cd	96 ab	87 cd
	NIS (ACTIVATOR 90)	100	SL	0.25	% v/v	0.25	% v/v	1NODE	A				
	AMS	100	SG	1.02	% w/w	8.5	lb/100 gal	1NODE	A				
3	ROUNDUP POWERMAX	4.5	SL	1.25	lb ae/a	35.6	fl oz/a	1NODE	A	95 a	93 cd	94 bc	86 d
	NIS (ACTIVATOR 90)	100	SL	0.25	% v/v	0.25	% v/v	1NODE	A				
	AMS	100	SG	1.02	% w/w	8.5	lb/100 gal	1NODE	A				
4	ROUNDUP POWERMAX	4.5	SL	1.5	lb ae/a	42.7	fl oz/a	1NODE	A	97 a	94 bcd	95 ab	91 bc
	NIS (ACTIVATOR 90)	100	SL	0.25	% v/v	0.25	% v/v	1NODE	A				
	AMS	100	SG	1.02	% w/w	8.5	lb/100 gal	1NODE	A				
5	ROUNDUP POWERMAX	4.5	SL	2	lb ae/a	57	fl oz/a	1NODE	A	96 a	95 abc	96 ab	95 ab
	NIS (ACTIVATOR 90)	100	SL	0.25	% v/v	0.25	% v/v	1NODE	A				
	AMS	100	SG	1.02	% w/w	8.5	lb/100 gal	1NODE	A				
6	ROUNDUP POWERMAX	4.5	SL	1.25	lb ae/a	35.6	fl oz/a	1NODE	A	79 b	79 e	79 d	79 e
	GRAMOXONE INTEON	2	SL	0.25	lb ai/a	16	fl oz/a	1NODE	A				
	NIS (ACTIVATOR 90)	100	SL	0.25	% v/v	0.25	% v/v	1NODE	A				
	AMS	100	SG	1.02	% w/w	8.5	lb/100 gal	1NODE	A				
7	ROUNDUP POWERMAX	4.5	SL	1.25	lb ae/a	35.6	fl oz/a	1NODE	A	95 a	92 d	95 ab	89 cd
	RAGE D-TECH	4.06	EC	0.38	lb ae/a	12	fl oz/a	1NODE	A				
	NIS (ACTIVATOR 90)	100	SL	0.25	% v/v	0.25	% v/v	1NODE	A				
	AMS	100	SG	1.02	% w/w	8.5	lb/100 gal	1NODE	A				
8	ROUNDUP POWERMAX	4.5	SL	1.25	lb ae/a	35.6	fl oz/a	1NODE	A	96 a	94 cd	92 c	89 cd
	GOAL 2XL	2	EC	0.047	lb ai/a	3	fl oz/a	1NODE	A				
	NIS (ACTIVATOR 90)	100	SL	0.25	% v/v	0.25	% v/v	1NODE	A				
	AMS	100	SG	1.02	% w/w	8.5	lb/100 gal	1NODE	A				

10	ROUNDUP POWERMAX	4.5 SL			1NODE A	2 d	0 g	0 f	3 g
	SEE COMMENT #9								
	SHARPEN	2.85 SC	0.0223 lb ai/a	1 fl oz/a	1NODE A				
	MSO (MSO ULTRA)	100 SL	1 % v/v	1 % v/v	1NODE A				
	AMS	100 SG	1.02 % w/w	8.5 lb/100 gal	1NODE A				
11	ROUNDUP POWERMAX	4.5 SL	1.25 lb ae/a	35.6 fl oz/a	1NODE A	96 a	95 abc	96 ab	90 bcd
	RESOLVE SG	25 SG	0.0156 lb ai/a	1 oz/a	1NODE A				
	NIS (ACTIVATOR 90)	100 SL	0.25 % v/v	0.25 % v/v	1NODE A				
	AMS	100 SG	1.02 % w/w	8.5 lb/100 gal	1NODE A				
12	ROUNDUP POWERMAX	4.5 SL	1.25 lb ae/a	35.6 fl oz/a	1NODE A	96 a	94 cd	95 ab	85 d
	ZIDUA	85 WG	0.16 lb ai/a	3 oz/a	1NODE A				
	NIS (ACTIVATOR 90)	100 SL	0.25 % v/v	0.25 % v/v	1NODE A				
	AMS	100 SG	1.02 % w/w	8.5 lb/100 gal	1NODE A				

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Other Rate	Other Rate Unit	Growth Stage	Appl Code	LOLMG Root Max 5-15-13 Control Percent 28 DA-A	LOLMG Tamtbo 5-15-13 Control Percent 28 DA-A	LOLMG Maximus 5-15-13 Control Percent 28 DA-A	LOLMG Bounty 5-15-13 Control Percent 28 DA-A
	Crop Code									LOLMG	LOLMG	LOLMG	LOLMG
	Crop Variety									Root Max	Tamtbo	Maximus	Bounty
	Rating Date									5-15-13	5-15-13	5-15-13	5-15-13
	Rating Type									Control	Control	Control	Control
	Rating Unit									Percent	Percent	Percent	Percent
	Trt-Eval Interval									28 DA-A	28 DA-A	28 DA-A	28 DA-A
13	ROUNDUP POWERMAX	4.5	SL	1.25	lb ae/a	35.6	fl oz/a	1NODE	A	96 a	94 bcd	96 ab	90 bcd
	SURPASS EC	6.4	EC	2.4	lb ai/a	48	fl oz/a	1NODE	A				
	NIS (ACTIVATOR 90)	100	SL	0.25	% v/v	0.25	% v/v	1NODE	A				
	AMS	100	SG	1.02	% w/w	8.5	lb/100 gal	1NODE	A				
14	SELECT MAX	0.97	EC	0.152	lb ai/a	20	fl oz/a	1NODE	A	71 c	71 f	73 e	67 f
	MSO (MSO ULTRA)	100	SL	0.5	% v/v	0.5	% v/v	1NODE	A				
	32% UAN	100	SL	2.5	% v/v	2.5	% v/v	1NODE	A				
15	GRAMOXONE INTEON	2	SL	0.75	lb ai/a	48	fl oz/a	1NODE	A	97 a	98 a	98 a	98 a
	NIS (ACTIVATOR 90)	100	SL	0.25	% v/v	0.25	% v/v	1NODE	A				
	SELECT MAX	0.97	EC	0.152	lb ai/a	20	fl oz/a	10DA-A	B				
	MSO (MSO ULTRA)	100	SL	0.5	% v/v	0.5	% v/v	10DA-A	B				
	32% UAN	100	SL	2.5	% v/v	2.5	% v/v	10DA-A	B				
16	GRAMOXONE INTEON	2	SL	0.75	lb ai/a	48	fl oz/a	1NODE	A	97 a	97 ab	98 a	96 a
	NIS (ACTIVATOR 90)	100	SL	0.25	% v/v	0.25	% v/v	1NODE	A				
	GRAMOXONE INTEON	2	SL	0.75	lb ai/a	48	fl oz/a	10DA-A	B				
	NIS (ACTIVATOR 90)	100	SL	0.25	% v/v	0.25	% v/v	10DA-A	B				
	LSD (P=.05)									3.0	3.1	3.1	5.2
	Standard Deviation									1.8	1.9	1.9	3.1
	CV									2.24	2.38	2.35	4.09
	Replicate F									6.143	4.748	11.118	2.690
	Replicate Prob(F)									0.0058	0.0162	0.0002	0.0842
	Treatment F									974.828	866.682	887.243	286.772
	Treatment Prob(F)									0.0001	0.0001	0.0001	0.0001

Double Shot tmt

What to mix?

- NEVER mix atrazine or calisto reduces control by 30-50%
- Can mix these herbicides;
  - Basis BlendQ
  - Resolve Q
  - 2,4-D
  - Princep
  - Sharpen -NO --too much damage stops translocation
  - Corvus –still in trials

HOW to **FAIL** in Ryegrass Control

- Spray in afternoon with cold or cloudy weather
- Use AI nozzles with coarse droplets
- Use AMS substitute product
- Use 15-20 gallons of water per acre
- Dump glyphosate in before AMS
- Mix other herbicides with glyphosate

Fixing a poor spray job in cold weather

- Don’t respray glyphosate?
  - Damaged plant may not translocate
- Full rate of Gramoxone in 30 gallon water
- Followup spray in 2-3 weeks when weather is warmer

What to mix?

- NEVER mix atrazine or calisto
- Can mix these herbicides;
  - Basis Blend
  - Resolve Q
  - 2,4-D
  - Princep

Control of ryegrass in Wheat

- Glyphosate or Gramoxone burn down before planting
  - Axiom before 2 leaves

- PowerFlex or Osprey in early spring

More information

www.ryegrasscovercrop.com

www.mccc.msu.edu