WEED MANAGEMENT IN GLYPHOSATE RESISTANT ALFALFA

Observations During Three Years

Background

- CP4 gene is now in alfalfa: first perennial agronomic crop with this gene
- RR alfalfa varieties being developed by Forage Genetics and Monsanto
- Marketing in 2004 anticipated

Annual vs. Perennial Crop

- Can use glyphosate in same crop for several seasons
- Brings new questions:
 - Will this extend the stand life?
 - ▶ How often might glyphosate be applied?
 - Will all weeds (even dandelions) be controlled?

Features of RR Alfalfa

- No temperature restrictions
- Friendly harvest interval
- Can treat anytime in the growing season
- No risk of crop injury
- Can not be used if grass/alfalfa mix desired

This Trial

- Used seed of event not being developed commercially
- Allowed for an early in-field evaluation
- Planted Apr. 19, 2000
- Glyphosate applied in 2000 and 2001
- Harvested through May 2002

Main Comparisons

Three seeding methods

- Direct seeded with glyphosate resistant variety
- Companion seeded with glyphosate resistant variety
- Direct seeded with conventional variety

Various times and rates of glyphosate applications and standard herbicides

Direct Seeded Glyphosate Resistant Variety

	lb ae/a	date
1. Glyphosate 3 times	.75	6/15/00, 10/00, 10/01
2. Glyphosate 3 times	1.125	6/15/00, 10/00, 10/01
3. Pursuit	0.047	6/3/00
4. Check		

Companion Seeded Glyphosate Resistant Variety

	lb ae/a	date
5. Check (oatlage)		6/13/00
Glyphosate	0.75	10/01
6. Glyphosate twice	0.75	6/3/00, 10/00
glyphosate once	1.125	10/01
7. Glyphosate twice	0.75	6/3/00, 10/01
8. Select	0.125	6/3/00

Direct Seeded - Conventional Variety

	lb ae/a	date
9. Pursuit	0.047	6/3/00
10. Poast Plus	0.140	6/15/00
11. Pursuit +	0.047	6/15/00
Poast Plus	0.140	6/15/00

Data Taken

2000

alfalfa population and height weed control ratings biomass in 1st and 2nd cuttings

2001 and 2002 alfalfa vigor weed pressure biomass

Annual Weed Control* - 2000 Gly. Resistant Variety

Treatment	bdleaf	grass
1. Gly .75 lb	100	100
2. Gly 1.125 lb	100	99
3. Pursuit	100	96
4. Check	0	0
5. Oatlage	83	30
8. Poast Plus	0	100

^{*} At time of first cutting

Quackgrass Pressure Direct Seeded - Gly. Resistant Variety

Treatment	2000	20	01	2002
	Oct	May	Oct	May
1. Gly .75 lb 3x's	0	0	0	0
2. Gly 1.125 lb 3x's	0	0	0	0
3. Pursuit 2000	6	12	12	19
4. Check	3	7	12	12

RR Alf - Check









RR Alf - Glyphosate 3 x's









RR Alf - Pursuit





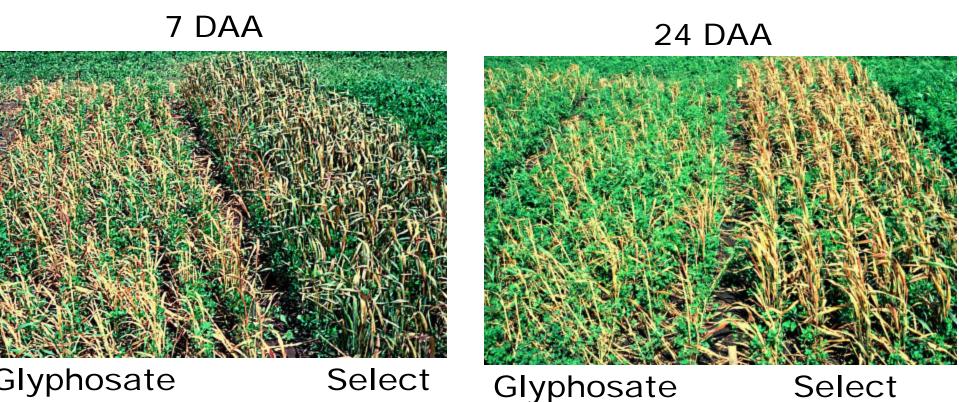




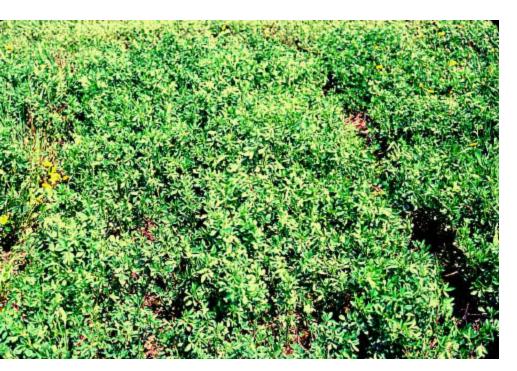
Quackgrass Pressure Companion Seeded - Gly. Resistant Variety

Treatment	2000	200	01	2002
	Oct	May	Oct	May
5. Oatlage 2000 Gly .75lb 10/01	3	7	8	0
6. Gly .75 lb 3x's	4	1	3	0
7. Gly .75 lb 2 x's	4	8	9	0
8. Select 6/00	3	6	12	8

RR Alf - Temporary Cover Crop



RR Alf - Temporary Cover Crop





Gly 6/00 and 10/01

Select 6/00

Quackgrass Pressure Direct Seeded - Conventional Variety

Treatment	2000	2001	2002
	Oct	May Oct	May
9. Pursuit 6/00	3	9 14	18
10. Poast + 6/00	9	9 14	20
11. Pursuit +	6	12 18	14
Poast Plus 6/00			

Conv. Alf - Standard Treatments

imazethapyr 6/00





Dandelion Pressure Direct Seeded - Gly. Resistant Variety

Treatment	2001	2002
	June* Oct	May
1. Gly .75 lb 3x's	0 9	0
2. Gly 1.125 lb 3x's	1 12	0
3. Pursuit 00	1 8	5
4. Check	3 5	6

^{*} Prior to second cutting

Dandelion Pressure Companion Seeded - Gly. Resistant Variety

Treatment	2001		2002
	June*	Oct	May
5. Oatlage 2000 Gly .75lb 10/01	18	8	0
6. Gly .75 lb 3x's	0	6	0
7. Gly .75 lb 2 x's	8	5	0
8. Select 6/00	15	10	10

^{*} Prior to second cutting

Relative Alfalfa Yields Direct Seeded - Gly. Resistant Variety

Treatment	2000	2001	2002
1. Gly .75 lb 3x's	78	95	100
2. Gly 1.125 lb 3x's	100	100	88
3. Pursuit 00	88	83	84
4. Check	45	87	77

Relative Alfalfa Yields Companion Seeded – Gly. Resistant Variety

Treatment	2000	2001	2002
5. Oatlage 6/00	24	79	54
Gly .75lb 10/01			
6. Gly .75 lb 3x's	67	91	78
7. Gly .75 lb 2 x's		86	75
8. Select 6/00	48	91	83

Relative Alfalfa Yields Direct Seeded - Conventional Variety

Treatment	2000	2001	2002
9. Pursuit 6/00	72	92	71
10. Poast + 6/00		85	69
11. Pursuit +		91	72
Poast Plus 6/00			

Conclusions

- No injury symptoms nor yield reduction with any glyphosate treatment
- Weed control was excellent following any glyphosate application
- Quicker oat kill with glyphosate
- Dandelions were controlled with fallapplied glyphosate

Questions That Remain

- Will glyphosate resistant varieties increase alfalfa stand life?
- How often and when might glyphosate be used in alfalfa?
 - Low rates annually?
 - Normal rates less frequently?
 - More than once a year?
 - Single fall application the best way?

Possible Scenario

- Apply glyphosate after seeding to weeds 3 to 4 inches tall
- Should not see weeds of consequence the rest of seeding year nor in following year
- Can use "treat as needed" strategy
- Fall apply glyphosate in third year and every fall thereafter until stand thins

Other Aspects of This Technology

- Should see an increase in no-till seedings
- Not feasible for forage/grass mixes
- May increase use of companion seeding as temporary cover crop
- Will have excellent way to kill volunteer wheat

Other Aspects of This Technology

- Will generate questions of how to kill these varieties
- Will it impact development of herbicide resistant weeds?
 - Not if they do not produce seeds
 - What about weeds that can flower in hay fields? Dandelion? Shepherd's purse? Chickweeds? Crabgrass?
 - Quack biotype shifts?

