2007
Annual Research Report

Refinement of Roadside Vegetation Management Practices in Oklahoma

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Introduction

The intent of this research report is to supply ODOT personnel with the latest evaluation of products being developed for use in roadside vegetation management programs. Each of these studies have products or treatments being evaluated that could potentially have a beneficial impact on ODOT roadside vegetation management programs. All of the research presented in this report has been conducted using today's most modern research techniques and procedures and every attempt has been made to minimize research error so that product performance may be evaluated. All research studies were conducted on state highway system roadsides and under normal roadside conditions. As with all herbicide research conducted under field conditions, there are many variables that influence the effects of the various herbicide treatments other than the products themselves. Every attempt has been made to evaluate both positive and negative treatment results taking into consideration the specific field conditions at each study site. All data collected from treated plots were compared to nearby untreated plots for comparison. All data collected was completely unbiased as to product and manufacturer.

Final Results from the 2006 Cattail Control Demonstration

Trial ID: 2006 Cattail Control Demo **Study Dir.:** Montgomery/Evans
Location: Logan, County **Investigator:** Dr. Dennis Martin

Objective: To evaluate the effectiveness of Habitat® and Aquamaster® in controlling cattails.

APPLICATION DESCRIPTION

	A	B
Application Date:	5/3/2006	5/3/2006
Time of Day:	8:50 a.m.	9:20 a.m.
Application Method:	high volume	low volume
Application Timing:	handgun	backpack
Applic. Placement:	trt 1	trt 2
Air Temp., Unit:	68 F	68 F
% Relative Humidity:	58	58
Wind Velocity, Unit:		
Dew Presence (Y/N):	n	n
Soil Temp., Unit:	68 F	68 F
Soil Moisture:	good	good
% Cloud Cover:	40	40

APPLICATION EQUIPMENT

	A	B
Appl. Equipment:	handgun	backpack
Operating Pressure:	40	30
Nozzle Type:	disc	flat fan
Nozzle Size:		80015E
Nozzles/Row:	1	1
Carrier Rate:	100 GPA	20 GPA
Carrier:	water	water

Trt No	Treatment Application Comment
1	Aquamaster® at 1% V/V + non-ionic surfactant at 1% V/V, high volume handgun, 100 GPA
2	Habitat® at 1% V/V + methlyated seed oil at 1% V/V, low volume backpack, 20 GPA
3	untreated check

Results & Discussion: This demonstration of cattail control with Habitat® and Aquamaster® herbicides was treated in May of 2006 and was highlighted as a tour stop at the 2006 Roadside Vegetation Management Bus Tour. The results from these two distinctly different treatments were quite dramatic. To summarize the 2006 results, 4 weeks after application the Aquamaster® treatment had already produced 95% brownout of cattails while the Habitat® treatment was only producing 35% brownout or yellowing. It took the Habitat® treatment nearly 10 weeks after application to produce an acceptable level of cattail control (85%). The main difference we have found in these two herbicides is that Aquamaster® can produce a quick result compared to Habitat®, but the 2007 final cattail control results reveal Habitat® is much better in the long term. One year after the treatments had been applied the Habitat® treatment had produced and maintained 98% control of cattails while the Aquamaster® treatment had maintained only 60%. The Aquamaster® treated area would require retreatment the following year to remove the new cattail infestation while the Habitat® treated area would not require any retreatments. To control cattails in an aquatic roadside site it is recommended that Habitat® at a 1% V/V solution plus methlyated seed oil or non-ionic surfactant be used to provide for long-term control. If Habitat® is used ODOT crews must be patient and give the herbicide the 10 weeks it needs to produce the visual evidence that it has controlled the cattails. If quick short-term cattail control is desired then Aquamaster® plus non-ionic surfactant would be the treatment of choice.

Brush Control Study with Garlon 4® Ultra®®

Trial ID: 4-H-72-07 **Study Dir.:** Montgomery/Evans
Location: Payne, County **Investigator:** Dr. Dennis Martin

Objective: To evaluate the effectiveness of Garlon 4 Ultra® in controlling several brush species when applied as a basal bark and cut-surface treatment.

APPLICATION DESCRIPTION

	A	B
Application Date:	2/26/2007	2/26/2007
Time of Day:	11:00 a.m.	11:00 a.m.
Application Method:	low volume	low volume
Application Timing:	basal bar	cut surface
Applic. Placement:	trt 1-2	trt 3-4
Air Temp., Unit:	60 F	60 F
% Relative Humidity:	29	29
Wind Velocity, Unit:	23 mph	23 mph
Dew Presence (Y/N):	n	n
Soil Temp., Unit:	49 F	49 F
Soil Moisture:	good	good
% Cloud Cover:	0	0

APPLICATION EQUIPMENT

	A	B
Appl. Equipment:	backpack	bottle
Operating Pressure:	30	
Nozzle Type:	flat fan	cone
Nozzle Size:	80015E	
Nozzles/Row:	1	1
Carrier:	basal oil	basal oil

Trt No	Treatment Application Comment
1	Garlon 4 Ultra®, low volume basal-bark, 20% solution, basal oil carrier
2	Garlon 4®, low volume basal-bark, 20% solution, basal oil carrier
3	Garlon 4 Ultra®, low volume cut-surface, 20% solution, basal oil carrier
4	Garlon 4®, low volume cut-surface, 20% solution, basal oil carrier
5	Untreated check, Cut
6	Untreated check, no Cut

Results & Discussion: Garlon 4® has long been a useful herbicide in controlling unwanted trees or preventing resprouting of cut trees growing along the roadside. This past year Dow AgroSciences, the manufacturer of Garlon 4®, announced they were replacing Garlon 4® herbicide with Garlon 4 Ultra® herbicide. The active ingredient, triclopyr, will remain the same but the inert ingredients will change. With this change in formulation it was important to evaluate the new Garlon 4 Ultra® herbicide and make sure it will continue to provide the beneficial brush control that the old Garlon 4® produced. All of the treatments in this study were applied on February 26 to target trees. All cut-surface treatments were applied to tree stumps within 30 minutes and were applied with a squirt bottle. All basal bark treatments were applied using a backpack sprayer. Garlon 4 Ultra® and Garlon 4® treatments were applied to post oak, hickory, and winged elm to evaluate the new product. Visual brush control evaluations were taken May 18 and July 25.

Brush control data indicates that both of these products performed very well at controlling each of the brush species in this study. Whether the tree was removed first (followed by a cut-surface treatment) or treated in place (dormant basal bark treatment) near 100% control was achieved for

each technique and both products. It appears from this study that the new formulation of Garlon 4 Ultra® will provide the same excellent levels of brush control as its predecessor Garlon 4®. The new formulation of Garlon 4 Ultra® no longer has the kerosene component which will make it a safer and more environmentally friendly product. The Garlon 4 Ultra® product will be recommended for inclusion on the 2008 ODOT Approved Herbicide and Adjuvant List.

Preemergence Kochia Control Study

Trial ID: 4-H-73-07 **Study Dir.:** Montgomery/Evans
Location: Kingfisher, County **Investigator:** Dr. Dennis Martin

Objective: To evaluate Diuron 80 DWG (Loveland Industries) for preemergence control of kochia and other roadside weeds.

APPLICATION DESCRIPTION

	A
Application Date:	3/7/2007
Time of Day:	7:20a.m.
Application Method:	SPRAY
Application Timing:	PREPOS
Applic. Placement:	BROFOL
Air Temp., Unit:	35 F
Wind Velocity, Unit:	2 MPH
Dew Presence (Y/N):	n
Soil Temp., Unit:	43 F
Soil Moisture:	adequate
% Cloud Cover:	10

APPLICATION EQUIPMENT

	A
Appl. Equipment:	co2 bicycle
Operating Pressure:	25
Nozzle Type:	turbojet
Nozzle Size:	11002
Nozzle Spacing, Unit:	20 inch
Nozzles/Row:	3
Band Width, Unit:	8 ft
Ground Speed, Unit:	1.8 mph
Carrier:	water
Spray Volume, Unit:	25 gpa
Propellant:	CO2

WEED STAGE AT APPLICATION

	A
Weed 1 Code, Stage:	downy brome
Stage Scale:	1-4 inch
Density, Unit:	good
Weed 2 Code, Stage:	corn gromwell
Stage Scale:	1-3 inch
Density, Unit:	low
Weed 3 Code, Stage:	cereal rye
Stage Scale:	1-4"
Density, Unit:	good

Results & Discussion: The objective of this study was to evaluate a specific formulation of diuron, Diuron 80 WDG from Loveland, for its ability to control annual roadside weeds. This specific formulation currently includes rates of use on its federal label recommended by OSU for roadside weed control. This eliminates the need for additional state labeling as was necessary with past diuron products. Diuron is a herbicide that was previously recommended for ODOT use under the trade name of Karmex®. The evaluation of this product is at the request of ODOT Field Divisions 2 & 6.

Applications were made on March 7, 2007 to plots and were activated approximately 4 days later with a 0.5 inch rain event. Diuron, provides both preemergence and postemergence control, but to begin controlling weeds preemergence it must have rainfall to move the herbicide into the top layer of soil and activate the product. At the time of application several winter annual weeds were actively growing which included; cereal rye, downy brome, and corn gromwell. The specific research site was selected in early March because of the abundance of kochia and

pigweed plant remnants that remained from the previous year with the intention that a uniform crop of kochia and pigweed would emerge this spring/summer. This would allow for the herbicide treatments to be evaluated for preemergence control of the later emerging kochia and pigweed, as well as any other summer weeds. The first six months of 2007 have been extremely wet. In May and June this research site had approximately 9 and 14 inches of rainfall, respectively. While rainfall is important to promote weed germination and growth, flooding conditions can cause problems. Part of the experimental area was located in the bottom of the roadside ditch and was under water for much of May and June. This compromised the data from this study in two ways, one is that the herbicide diuron is considered to be moderately soluble in water so it is likely much of the diuron moved down and out of the soil profile making it unavailable for long-term weed control, and secondly most plants do not produce active growth and development when growing under conditions where soil water is greater than field capacity. These conditions reduce oxygen levels in soils and can prevent both weed seed germination and reduced weed growth. Considering both the solubility of diuron and soil water capacities the beneficial weed control from the treatments in this study only lasted for about 2 months instead of the 3 to 4 months that was expected. Nevertheless, weed control evaluations were taken as scheduled and recommendations on the use of this product can be made based on the data from this study.

At 33 & 64 days-after-application (DAA) all treatments which included Campaign® + AMS provided excellent control of cereal rye and downy brome. The lower rate of Diuron 80 WDG alone provided only suppression of these winter annual grassy weeds. The higher rate of Diuron 80 WDG did provide good to excellent control of winter annual grassy weeds, however, it would be more cost efficient to lower the Diuron rate and include the Campaign®+ AMS component to winter annual grassy weed control. All treatments provided excellent control of corn gromwell (winter annual broadleaf) at both 33 & 64 DAA evaluations. Weed control evaluations were attempted for the summer annual weeds crabgrass, pigweed, and kochia, however as explained earlier data was erratic because of the soil moisture conditions within the study area during May and June. While it is unfortunate that some data was not available it is the opinion of the OSU RVM Team that the product under evaluation, Diuron 80 WDG, performed up to expectations considering the conditions during which it was evaluated. In saying this, OSU will recommend that the product, Diuron 80 WDG from Loveland Industries, be added to the 2008 ODOT Approved Herbicide and Adjuvant List (available in January 2008).

Table. 1. Preemergence kochia control study (4-H-73-07).

Trial ID: 4-H-73-07 Study Dir.: Montgomery/Evans
Location: Kingfisher, County Investigator: Dr. Dennis Martin

Weed Code				cereal rye	cereal rye	downy brome	downy brome	corn gromwell	corn gromwell	common bermudagrass	common bermudagrass
Rating Data Type				control	control	control	control	control	control	greenup	greenup
Rating Unit				%	%	%	%	%	%	%	%
Rating Date				4/9/2007	5/10/2007	4/9/2007	5/10/2007	4/9/2007	5/10/2007	4/9/2007	5/10/2007
Trt-Eval Interval				33 DA-A	64 DA-A	33 DA-A	64 DA-A	33 DA-A	64 DA-A	33 DA-A	64 DA-A
Trt No.	Treatment Name	Product Rate	Product Rate Unit								
1	Untreated Check			0	0	0	0	0	0	48	100
2	Diuron 80 WDG	3	lb/a	40 c	52 b	40 c	55 b	94 a	100 a	35 a	100 a
	surf king surfactant	0.25	% v/v								
3	Diuron 80 WDG	5	lb/a	78 b	89 a	80 b	91 a	98 a	100 a	30 a	100 a
	surf king surfactant	0.25	% v/v								
4	Diuron 80 WDG	3	lb/a	99 a	99 a	99 a	99 a	91 a	98 a	43 a	100 a
	Campaign®	32	fl oz/a								
	ammonium sulfate	17	lb/100 gal								
5	Diuron 80 WDG	5	lb/a	99 a	99 a	99 a	99 a	98 a	100 a	38 a	100 a
	Campaign®	32	fl oz/a								
	ammonium sulfate	17	lb/100 gal								
6	Milestone VM®	4	fl oz/a	99 a	91 a	99 a	92 a	98 a	100 a	50 a	100 a
	Campaign®	32	fl oz/a								
	ammonium sulfate	17	lb/100 gal								
LSD (P=.10)				17.1	16	17.2	14.9	NS	NS	NS	0
Standard Deviation				11.3	10.5	11.3	9.8	5.6	1.3	12.4	0
CV				13.55	12.28	13.61	11.28	5.8	1.35	31.66	0
Replicate F				2.579	1.38	2.602	1.866	0.925	0.771	20.573	0
Replicate Prob(F)				0.1367	0.3057	0.1348	0.2162	0.4466	0.4942	0.0007	1
Treatment F				15.624	10.446	15.292	10.482	0.851	0.862	1.161	0
Treatment Prob(F)				0.0008	0.0029	0.0008	0.0029	0.5416	0.5256	0.3958	1

Means followed by same letter do not significantly differ (P=.10, LSD).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
Untreated treatment(s) 1 excluded from analysis.

Preemergence & Postemergence Kochia Control Study

Trial ID: 4-H-74-07 **Study Dir.:** Montgomery/Evans
Location: Woods County **Investigator:** Dr. Dennis Martin

Objective: To continue the development of Milestone VM® by evaluating its ability to provide preemergence and postemergence kochia control.

APPLICATION DESCRIPTION

	A	B
Application Date:	3/8/2007	5/17/2007
Time of Day:	9:30a.m.	10:00 a.m.
Application Method:	SPRAY	broadcast
Application Timing:	PREPRE	postemerg
Applic. Placement:	BROFOL	foliar
Air Temp., Unit:	46 F	62 F
% Relative Humidity:	18	66
Wind Velocity, Unit:	2 mph	2 mph
Dew Presence (Y/N):	n	y
Soil Temp., Unit:	43 F	68 F
Soil Moisture:	adequate	good
% Cloud Cover:	0	5

WEED STAGE AT EACH APPLICATION

	A	B
Weed 1 Code, Stage:	kochia	kochia
Stage Scale:	pre.-.25"	1-16 inch
Density, Unit:	good	high

APPLICATION EQUIPMENT

	A	B
Appl. Equipment:	co2 bicycle	co2 bicycle
Operating Pressure:	25	25
Nozzle Type:	turbojet	turbojet
Nozzle Size:	11002	11002
Nozzle Spacing, Unit:	20 inch	20 inch
Nozzles/Row:	3	3
Band Width, Unit:	8 feet	8 feet
Ground Speed, Unit:	2.2 mph	2.2 mph
Carrier:	water	water
Spray Volume, Unit:	20 gpa	20 gpa
Propellant:	CO2	CO2

Results & Discussion: The objective of this study was to continue the development of Milestone VM® by determining whether it could provide preemergence control of kochia, pigweed, and other annual broadleaf weeds. Comments made in January 2007, at the Southern Weed Science Society Annual Meeting in Nashville, by Pat Burch/Dow AgroSciences, suggested that Milestone VM® would provide control of kochia and pigweed if applications were made and activated prior to seedling emergence. This meant making applications earlier than those previously evaluated at OSU. An area was selected on March 5 with initial applications being made on March 8. The study received a 0.2 inch rain event on March 11 to activate all of the residual treatments. It is important to note that even at this early date of application, approximately 1-3 percent of kochia had emerged by the March 8 application day.

This is important because one of the parameters of this work was to apply and activate the treatments in this study prior to kochia and pigweed emergence. March was unseasonably warm in Oklahoma which likely triggered the earlier-than-expected kochia germination. Postemergence applications in this study were made on selected plots on May 17 to actively growing kochia and other weeds. Visual weed control evaluations were made on 15, 25, 55, 83, 112, and 140 days-after-application (DAA). Weed control data was taken on several broadleaf weed species, however, other than kochia weed densities were not high enough to allow statistical comparisons. A very dense stand of kochia comprised approximately 90% of the broadleaf weeds in this trial and allowed a good evaluation of kochia control. Growing conditions for both weeds and common bermudagrass were ideal throughout the duration of this study.

At 15 DAA kochia control from all treatments of Milestone VM® alone ranged from 20-52%. Similar Milestone VM® treatments that included Accord XRT® showed increased levels of early kochia control that ranged from 52-73% (Table 2a). Oust XP® alone was showing very little effect on emerging kochia. At 25 DAA kochia control for all treatments had increased, excluding Oust XP® . Kochia control for Milestone VM® alone treatments ranged from 43-52% while similar treatments including Accord XRT® provided good control ranging from 82-92%. By 55 DAA kochia control for Milestone VM® alone treatments increased slightly with control ranging from 62-73%. At this time similar Milestone VM® treatments that included Accord XRT® were producing less kochia control than previous evaluations making it apparent the initial benefits of postemergence kochia control with the Accord XRT® had diminished. Kochia control dropped at 83 DAA for all early treatments of Milestone VM® whether applied alone or with Accord XRT® . At this point in the kochia growing season it appears that the Milestone VM® alone treatments were producing approximately 40% suppression of the existing kochia population. The addition of Accord XRT® to Milestone VM® increased kochia suppression to approximately 55%. Also at this time postemergence treatments of Milestone VM® alone or the second split applications of Milestone VM® alone or tank-mixed with Accord XRT® provided only moderate levels of kochia control. By final 140 DAA evaluations, which followed a very wet June, it was apparent that the various Milestone VM® treatments in this study had produced consistent suppression of kochia populations in an area with severe kochia problems. Even with kochia suppression from some treatments as low as 20-30% there was enough kochia suppression for common bermudagrass to fill in many of the bare areas once occupied by kochia. The bermudagrass thickening in these areas was able to compete and limit the additional spread of kochia that was under suppression from Milestone VM®. It is also possible that if the early treatments in this study were applied two weeks earlier that kochia control or suppression would have been greater. Several species of broadleaf weeds within this study were present in low densities making data collection difficult. These species included marestail, giant ragweed, sunflower, and coreopsis and even in low densities observations taken showed they were susceptible to Milestone VM®. Common bermudagrass injury was evaluated throughout this study (Table 2b). No treatments produced any spring green-up delay or phytotoxicity to common bermudagrass with the exception of the early application of Oust XP®. It is well known that dormant applications of Oust XP® will cause significant spring green-up delays of common bermudagrass. While Oust XP® can produce good weed control results from dormant applications the severe green-up delay problem would prohibit its use in Oklahoma.

While initially targeted, pigweed emergence was sparce within this specific study area. Several of the amaranth species are becoming problems along state highways. While amaranth control data was not available from this study it was noted that nearby ODOT broadcast applications of Milestone VM® 4 oz./A applied in March with Campaign® + AMS treatments resulted in very little preemergence control or suppression of amaranth species.

Table 2a. Preemergence & postemergence kochia control study (4-H-74-07).

Trial ID: 4-H-74-07 Study Dir.: Montgomery/Evans
Location: Woods County Investigator: Dr. Dennis Martin

Weed Code					kochia		kochia		kochia		kochia		kochia		kochia	
Rating Data Type					control		control		control		control		control		control	
Rating Unit					%		%		%		%		%		%	
Rating Date					3/23/2007		4/2/2007		5/2/2007		5/30/2007		6/28/2007		7/26/2007	
Trt-Eval Interval					15 DA-A		25 DA-A		55 DA-A		83 DA-A		112 DA-A		140 DA-A	
Trt No.	Treatment Name	Product Rate	Product Rate Unit	Appl Code												
1	Milestone VM®	4	fl oz/a	A	35	cd	43	d	62	b	47	ab	43	abc	43	a
	Activator 90®	0.25	% v/v	A												
2	Milestone VM®	7	fl oz/a	A	40	c	68	bc	73	ab	43	abc	25	cd	28	a
	Activator 90®	0.25	% v/v	A												
3	Milestone VM®	4	fl oz/a	A	52	bc	82	ab	63	b	43	abc	53	abc	52	a
	Accord XRT®	6	fl oz/a	A												
	Activator 90®	0.25	% v/v	A												
4	Milestone VM®	7	fl oz/a	A	73	a	92	a	83	a	70	a	70	a	53	a
	Accord XRT®	6	fl oz/a	A												
	Activator 90®	0.25	% v/v	A												
5	Milestone VM®	4	fl oz/a	A	20	de	52	cd	62	b	30	bc	32	bcd	33	a
	Milestone VM®	3	fl oz/a	B												
	Activator 90®	0.25	% v/v	A												
6	Milestone VM®	4	fl oz/a	A	62	ab	88	ab	68	ab	67	a	63	ab	67	a
	Accord XRT®	6	fl oz/a	A												
	Milestone VM®	3	fl oz/a	B												
	Oust XP®	1	oz wt/a	B												
	Activator 90®	0.25	% v/v	A												
7	Oust XP®	0.5	oz wt/a	A	7	e	0	e	0	c	0	d	0	d	0	a
	Activator 90®	0.25	% v/v	A												
8	Milestone VM®	4	fl oz/a	B							25	bcd	53	abc	50	a
	Activator 90®	0.25	% v/v	B												
9	Milestone VM®	7	fl oz/a	B							15	cd	43	abc	38	a
	Activator 90®	0.25	% v/v	B												
10	Untreated Check				0		0		0		0		0		0	
LSD (P=.10)					18.7		21.6		20.0		29.4		31.7		NS	
Standard Deviation					12.9		14.9		13.7		20.7		22.3		29.7	
CV					31.23		24.48		23.41		54.68		52.27		73.2	
Replicate F					0.698		1.019		1.608		2.858		6.524		3.442	
Replicate Prob(F)					0.5168		0.3902		0.2405		0.0869		0.0085		0.0571	
Treatment F					9.799		14.237		11.621		3.676		2.766		1.241	
Treatment Prob(F)					0.0005		0.0001		0.0002		0.0128		0.0397		0.3380	

Means followed by same letter do not significantly differ (P=.10, LSD).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
Untreated treatment(s) 10 excluded from analysis.

Table 2b. Preemergence & postemergence kochia control study (4-H-74-07).

Trial ID: 4-H-74-07 Study Dir.: Montgomery/Evans
Location: Woods County Investigator: Dr. Dennis Martin

Trt No.	Treatment Name	Product Rate	Product Rate Unit	Appl Code									
Crop Code					common bermudagrass		common bermudagrass		common bermudagrass		common bermudagrass		common bermudagrass
Rating Data Type					greenup		greenup		greenup		greenup		injury
Rating Unit					%		%		%		%		%
Rating Date					3/23/2007		4/2/2007		5/2/2007		5/30/2007		6/28/2007
Weed Stage													
Trt-Eval Interval					15 DA-A		25 DA-A		55 DA-A		83 DA-A		112 DA-A
1	Milestone VM®	4	fl oz/a	A	25	abc	60	b	100	a	100	a	0 a
	Activator 90® ®	0.25	% v/v	A									
2	Milestone VM®	7	fl oz/a	A	29	ab	75	a	100	a	100	a	0 a
	Activator 90®	0.25	% v/v	A									
3	Milestone VM®	4	fl oz/a	A	12	de	58	b	100	a	100	a	0 a
	Accord XRT®	6	fl oz/a	A									
	Activator 90®	0.25	% v/v	A									
4	Milestone VM®	7	fl oz/a	A	23	bc	68	ab	100	a	100	a	0 a
	Accord XRT®	6	fl oz/a	A									
	Activator 90®	0.25	% v/v	A									
5	Milestone VM®	4	fl oz/a	A	17	cd	57	b	100	a	100	a	0 a
	Milestone VM®	3	fl oz/a	B									
	Activator 90®	0.25	% v/v	A									
6	Milestone VM®	4	fl oz/a	A	35	a	67	ab	100	a	100	a	0 a
	Accord XRT®	6	fl oz/a	A									
	Milestone VM®	3	fl oz/a	B									
	Oust XP®	1	oz wt/a	B									
	Activator 90®	0.25	% v/v	A									
7	Oust XP®	0.5	oz wt/a	A	4	e	4	c	48	b	100	a	0 a
	Activator 90®	0.25	% v/v	A									
8	Milestone VM®	4	fl oz/a	B									0 a
	Activator 90®	0.25	% v/v	B									
9	Milestone VM®	7	fl oz/a	B									0 a
	Activator 90®	0.25	% v/v	B									
10	Untreated Check				24		68		100		100		0
LSD (P=.10)					11.5		14.6		4.2		NS		NS
Standard Deviation					7.9		9.9		2.9		0.0		0.0
CV					38.29		17.88		3.12		0.0		0.0
Replicate F					13.509		1.741		1.000		0.000		0.000
Replicate Prob(F)					0.0008		0.2203		0.3966		1.0000		1.0000
Treatment F					5.281		16.964		137.286		0.000		0.000
Treatment Prob(F)					0.0070		0.0001		0.0001		1.0000		1.0000

Means followed by same letter do not significantly differ (P=.10, LSD).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
Untreated treatment(s) 10 excluded from analysis.

Preemergence & Postemergence Weed Control Study

Trial ID: 4-H-75-07 **Study Dir.:** Montgomery/Evans
Location: Kingfisher County **Investigator:** Dr. Dennis Martin

Objective: To evaluate a new experimental herbicide for its ability to provide both preemergence and postemergence control of grassy and broadleaf weeds.

Results & Discussion: This study was performed under a confidentiality agreement between OSU Roadside Vegetation Management personnel and the manufacturer, BASF. Under the agreement, OSU cannot publish or share any data or study information until it is released by BASF. Agreements of this nature are standard operating procedure when a herbicide is in the early stages of development by the manufacturer. While OSU cannot share the data with ODOT at this point, OSU personnel will retain this data and at the earliest point possible will inform ODOT of the performance of any and all products evaluated in this study that have any significance to ODOT vegetation management programs. Results from this new product when applied earlier in the year did not provide the degree of positive results as when applied later in the year as a postemergence only application, we have encouraged the company to pursue further development of this new active ingredient but leaning more towards summer applications and not spring applications. BASF representatives have recently stated they will likely release this product in early 2008 with possible EPA labeling in 2010.

Postemergence Broadleaf Weed Control Study

Trial ID: 4-H-76-07 **Study Dir.:** Montgomery/Evans
Location: Garfield County **Investigator:** Dr. Dennis Martin

Objective: To evaluate a new experimental herbicide for its ability to provide postemergence broadleaf weed control.

Results & Discussion: This study was performed under a confidentiality agreement between OSU Roadside Vegetation Management personnel and BASF. Under the agreement, OSU cannot publish or share any data or study information until it is released by BASF. Agreements of this nature are standard operating procedure when a herbicide is in the early stages of development by the manufacturer. While OSU cannot share the data with ODOT at this point, OSU personnel will retain this data and at the earliest point possible will inform ODOT of the performance of any and all products evaluated in this study that have any significance to ODOT vegetation management programs. Results from this new product continue to be very positive as a summer postemergence herbicide, we have encouraged the company to pursue further development of this new active ingredient. BASF representatives have recently stated they will likely release this product in early 2008 with possible EPA labeling in 2010.

Johnsongrass Control Study

Trial ID: 4-H-77-07 **Study Dir.:** Montgomery/Evans
Location: Garfield County **Investigator:** Dr. Dennis Martin

Objective: To evaluate SFM E-Pro® for its ability to control johnsongrass and other summer weeds.

APPLICATION DESCRIPTION

	A
Application Date:	5/25/2007
Time of Day:	9:40 a.m.
Application Method:	broadcast
Application Timing:	postemerg
Applic. Placement:	foliar
Air Temp., Unit:	70 F
% Relative Humidity:	77
Wind Velocity, Unit:	2 mph
Dew Presence (Y/N):	y
Soil Temp., Unit:	68 F
Soil Moisture:	good
% Cloud Cover:	100

APPLICATION EQUIPMENT

	A
Appl. Equipment:	CO2 bicycle
Operating Pressure:	25
Nozzle Type:	flat fan
Nozzle Size:	8002
Nozzle Spacing, Unit:	20 inch
Nozzles/Row:	3
Boom Length, Unit:	5 feet
Boom Height, Unit:	16 inch
Ground Speed, Unit:	2.3 mph
Carrier:	water
Spray Volume, Unit:	20 gpa
Propellant:	CO2

WEED STAGE AT EACH APPLICATION

	A
Weed 1 Code, Stage:	johnsongrass
Stage Scale:	14-28"
Density, Unit:	high
Weed 2 Code, Stage:	field bindweed
Stage Scale:	3-6"
Density, Unit:	mod
Weed 3 Code, Stage:	prairie cupgrass
Stage Scale:	1-3"
Density, Unit:	mod.
Weed 4 Code, Stage:	marestail
Stage Scale:	2-6"
Density, Unit:	low
Weed 5 Code, Stage:	kochia
Stage Scale:	1-4"
Density, Unit:	low

Results & Discussion: The purpose of this study was to evaluate the weed control produced by SFM E-Pro® as compared to that of Oust XP® . These are similar products and Etigra, the manufacturer of SFM E-Pro®, has shown interest in placing the product on the ODOT Approved Herbicide and Adjuvant List (January 2008). The treatments were applied on May 25 to actively growing weeds and common bermudagrass. Treatments not including Roundup Pro Conc.® received a non-ionic surfactant at a rate of 0.25%V/V. Visual weed control evaluations were taken on johnsongrass, prairie cupgrass, and marestail at 14, 28, and 56 days-after-application (DAA).

Neither treatment of SFM E-Pro® or Oust XP® , alone, produced acceptable weed control for

any of the weed species evaluated throughout the duration of the study (Tables 3a & 3b). The low use rate was likely responsible for the lack of control, however, even at the low rate both products produced very similar growth suppression of targeted weeds and common bermudagrass. SFM E-Pro® and Oust XP® , when mixed with Roundup Pro Conc.®, produced excellent johnsongrass weed control at 14, 28, and 56 DAA. Both of these treatments also produced excellent control of prairie cupgrass up to 28 DAA. This particular summer annual grassy weeds had reinfested plots by 56 DAA. Both treatments produced good to excellent control of marestail throughout the duration of the study. Common bermudagrass injury is a major concern regarding treatments of this nature. Common bermudagrass injury from treatments of SFM E-Pro® or Oust XP® alone was minimal and would not be noticed by the average motorist. Common bermudagrass injury from treatments including Roundup Pro Conc.® was acceptable at 14 and 28 DAA and ranged from 24 - 33%. This is the highest level of injury that would be acceptable for roadside weed control programs. Common bermudagrass injury was not evident at the final 56 DAA evaluation.

It appears from the data collected in this study that the SFM E-Pro® product will provide ODOT herbicide programs with a similar level of weed control as Oust XP® . Pending the SFM E-Pro® product passing the compatibility testing this fall, SFM E-Pro® will be recommended for inclusion in the 2008 ODOT Approved Herbicide and Adjuvant List (January 2008). Final determination for SFM E-Pro® can be made after the fall 2007 Compatibility Testing at which time Etigra will be notified of the final results. Etigra will need to submit final AHAL Submission packets for the SFM E-Pro® product as soon as possible.

Table 3a. Johnsongrass control study (4-H-77-07).

Trial ID: 4-H-77-07 Study Dir.: Montgomery/Evans
Location: Garfield County Investigator: Dr. Dennis Martin

Weed Code				johnsongrass		johnsongrass		johnsongrass		prairie cupgrass		prairie cupgrass		prairie cupgrass	
Rating Data Type				control		control		control		control		control		control	
Rating Unit				%		%		%		%		%		%	
Rating Date				6/8/2007		6/22/2007		7/20/2007		6/8/2007		6/22/2007		7/20/2007	
Trt-Eval Interval				14 DA-A		28 DA-A		56 DA-A		14 DA-A		28 DA-A		56 DA-A	
Trt No.	Treatment Name	Product Rate	Product Rate Unit	1		2		3		4		5		6	
1	Untreated Check			0		0		0		0		0		0	
2	SFM E-Pro®	1.0	oz wt/a	15	b	15	b	0	c	0	b	0	b	0	b
	Red River NIS®	0.25	% v/v												
3	Oust XP®	1.0	oz wt/a	20	b	13	b	0	c	0	b	0	b	0	b
	Red River NIS®	0.25	% v/v												
4	SFM E-Pro®	1.0	oz wt/a	93	a	95	a	95	a	99	a	92	a	37	a
	Roundup Pro Conc.®	19	fl oz/a												
5	Oust XP®	1.0	oz wt/a	92	a	92	a	94	b	99	a	93	a	33	a
	Roundup Pro Conc.®	19	fl oz/a												
LSD (P=.10)				5.7		5.0		0.9		0.4		3.0		12.7	
Standard Deviation				3.6		3.1		0.6		0.3		1.9		8.0	
CV				6.56		5.82		1.22		0.65		4.03		45.67	
Replicate F				0.025		0.569		1.000		1.000		1.800		2.739	
Replicate Prob(F)				0.9750		0.5937		0.4219		0.4096		0.2441		0.1428	
Treatment F				433.839		642.278		26699.003		131869.013		2464.600		19.261	
Treatment Prob(F)				0.0001		0.0001		0.0001		0.0001		0.0001		0.0018	

Means followed by same letter do not significantly differ (P=.10, LSD).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
Untreated treatment(s) 1 excluded from analysis.

Table 3b. Johnsongrass control study (4-H-77-07).

Trial ID: 4-H-77-07 Study Dir.: Montgomery/Evans
Location: Garfield County Investigator: Dr. Dennis Martin

Weed Code				marestail		marestail		marestail		common bermudagrass		common bermudagrass		common bermudagrass	
Rating Data Type				control		control		control		injury		injury		injury	
Rating Unit				%		%		%		%		%		%	
Rating Date				6/8/2007		6/22/2007		7/20/2007		6/8/2007		6/22/2007		7/20/2007	
Trt-Eval Interval				14 DA-A		28 DA-A		56 DA-A		14 DA-A		28 DA-A		56 DA-A	
Trt No.	Treatment Name	Product Rate	Product Rate Unit												
1	Untreated Check			0		0		0		0		0		0	
2	SFM E-Pro®	1.0	oz wt/a	36	b	33	a	75	a	5	b	8	b	0	a
	Red River NIS®	0.25	% v/v												
3	Oust XP®	1.0	oz wt/a	35	b	58	a	50	a	6	b	11	b	0	a
	Red River NIS®	0.25	% v/v												
4	SFM E-Pro®	1.0	oz wt/a	85	a	99	a	99	a	26	a	33	a	0	a
	Roundup Pro Conc.®	19	fl oz/a												
5	Oust XP®	1.0	oz wt/a	88	a	99	a	99	a	24	a	28	a	0	a
	Roundup Pro Conc.®	19	fl oz/a												
LSD (P=.10)				17.3		NS		NS		2.1		5.6		0.0	
Standard Deviation				9.9		36.9		27.2		1.3		3.5		0.0	
CV				16.26		51.05		33.69		8.81		17.4		0.0	
Replicate F				2.079		1.852		0.844		0.138		0.060		0.000	
Replicate Prob(F)				0.2404		0.2502		0.4832		0.8734		0.9420		1.0000	
Treatment F				26.443		2.341		2.244		218.754		37.376		0.000	
Treatment Prob(F)				0.0043		0.1901		0.2011		0.0001		0.0003		1.0000	

Means followed by same letter do not significantly differ (P=.10, LSD).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
Untreated treatment(s) 1 excluded from analysis.

Johnsongrass Control Study

Trial ID: 4-H-78-07 **Study Dir.:** Montgomery/Evans
Location: Garfield County **Investigator:** Dr. Dennis Martin

Objective: To continue evaluation of potassium salt formulation's of glyphosate for control of johnsongrass.

APPLICATION DESCRIPTION

	A
Application Date:	5/25/2007
Time of Day:	9:25a.m.
Application Method:	broadcast
Application Timing:	postemerg
Applic. Placement:	foliar
Air Temp., Unit:	70 F
% Relative Humidity:	77
Wind Velocity, Unit:	2 mph
Dew Presence (Y/N):	y
Soil Temp., Unit:	68 F
Soil Moisture:	good
% Cloud Cover:	100

WEED STAGE AT EACH APPLICATION

	A
Weed 1 Code, Stage:	johnsongrass
Stage Scale:	14-30"
Density, Unit:	high PLOT

APPLICATION EQUIPMENT

	A
Appl. Equipment:	CO2 bicycle
Operating Pressure:	25
Nozzle Type:	flat fan
Nozzle Size:	8002
Nozzle Spacing, Unit:	20 inch
Nozzles/Row:	3
Boom Length, Unit:	5 feet
Boom Height, Unit:	16 inch
Ground Speed, Unit:	2.3 mph
Carrier:	water
Spray Volume, Unit:	20 gpa
Propellant:	CO2

Results & Discussion: The purpose of this study was to continue development of new glyphosate formulations being produced by Monsanto and prepare ODOT for a Monsanto product line change for 2008. The past glyphosate, or Roundup Pro Concentrate®, market has changed over the last several years and the introduction of the new potassium-salt glyphosate formulations will likely change the glyphosate industry even more. These treatments were applied on May 25 to 14-30 inch tall actively-growing johnsongrass. Common bermudagrass was at 100% greenup and also actively growing. This trial was conducted under ideal johnsongrass and common bermudagrass growing conditions as above average rainfall occurred during the trial. Visual johnsongrass control and common bermdugrass injury ratings were taken at 6, 14 , 28, and 56 days-after-applications (DAA).

At 6 DAA all treatments were producing good johnsongrass control which ranged from 81-84% (Table 4). Johnsongrass control increased to 91-95% by 14 DAA with all treatments producing very similar levels of control. Johnsongrass control peaked at 28 DAA with all treatments producing 93-94% control. Since the treatments in this study were comprised of glyphosate only treatments it was anticipated that johnsongrass control could drop off at later evaluations, however, even at 56 DAA all treatments were maintaining 91-93% control of johnsongrass. As indicated by the data all of the treatments in this study produced and maintained similar levels of johnsongrass control. Common bermudagrass injury from all treatments was also similar throughout the study. At 6 DAA all treatments were just beginning to show bermudagrass yellowing which ranged from 5-8%. Common bermudagrass injury peaked at the 14 DAA evaluations and ranged from 19-23% which would be acceptable for roadsides. A small amount of yellowing was evident at 28 DAA and had completely diminished by 56 DAA.

It appears from this study, and past glyphosate formulations studies, that all currently-evaluated potassium salt formulations will provide similar levels of weed control and bermudagrass injury as the current standard product Roundup Pro Concentrate®. We look forward to Monsanto's decision as to which new glyphosate formulation they select to replace Roundup Pro Concentrate®. If and when this decision is made it will be necessary to conduct compatibility testing with the new glyphosate product prior to (and pending positive results) inclusion into an ODOT AHAL. The new product will also require changing the current herbicide contract verbiage from Roundup Pro Concentrate® specifications to those of the newly selected potassium salt glyphosate formulation. Because of the continued change in glyphosate formulation requiring subsequent use rate changes there will also be a need for state-wide applicator training on the new product.

Table 4. Johnsongrass control study (4-H-78-07).

Trial ID: 4-H-78-07 Study Dir.: Montgomery/Evans
Location: Garfield County Investigator: Dr. Dennis Martin

Weed Code					johnsongrass		johnsongrass		johnsongrass		johnsongrass		common bermudagrass		common bermudagrass		common bermudagrass	
Rating Data Type					control		control		control		control		injury		injury		injury	
Rating Unit					%		%		%		%		%		%		%	
Rating Date					5/31/2007		6/8/2007		6/22/2007		7/20/2007		5/31/2007		6/8/2007		6/22/2007	
Trt-Eval Interval					6 DA-A		14 DA-A		28 DA-A		56 DA-A		6 DA-A		14 DA-A		28 DA-A	
Trt No.	Treatment Name	Product Rate	Product Rate Unit	Appl Code														
1	Roundup Pro Conc.®	13	fl oz/a	A	84	a	92	a	94	a	91	a	7	a	21	a	8	a
2	MON 78270	10.8	fl oz/a	A	81	a	92	a	93	a	92	a	7	a	20	a	9	a
3	MON 76207	10.8	fl oz/a	A	84	a	95	a	93	a	93	a	8	a	23	a	9	a
4	MON 76302	10.8	fl oz/a	A	81	a	91	a	94	a	91	a	5	a	19	a	8	a
5	Untreated Check			A	0		0		0		0		0		0		0	
LSD (P=.10)					NS		NS		NS		NS		NS		NS		NS	
Standard Deviation					2.8		3.9		2.2		2.3		1.9		2.2		1.8	
CV					3.37		4.25		2.3		2.54		27.95		10.72		21.03	
Replicate F					1.329		0.555		8.425		1.800		4.200		1.508		2.426	
Replicate Prob(F)					0.3329		0.6011		0.0181		0.2441		0.0723		0.2947		0.1690	
Treatment F					1.429		0.666		0.353		0.431		1.600		1.829		0.452	
Treatment Prob(F)					0.3241		0.6028		0.7889		0.7386		0.2853		0.2424		0.7252	

Means followed by same letter do not significantly differ (P=.10, LSD).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
Untreated treatment(s) 5 excluded from analysis.

Postemergence Broadleaf Weed Control Study

Trial ID: 4-H-79-07 **Study Dir.:** Montgomery/Evans
Location: Kingfisher County **Investigator:** Dr. Dennis Martin

Objective: To evaluate the effectiveness of the new co-pac herbicide GF-1883 (Milestone VM Plus®) in controlling broadleaf weeds.

APPLICATION DESCRIPTION

	A
Application Date:	5/14/2007
Time of Day:	9:15 a.m.
Application Method:	broadcast
Application Timing:	postemerg
Applic. Placement:	foliar
Air Temp., Unit:	74 F
% Relative Humidity:	63
Wind Velocity, Unit:	6 mph
Dew Presence (Y/N):	n
Soil Temp., Unit:	73 F
Soil Moisture:	good
% Cloud Cover:	0

WEED STAGE AT EACH APPLICATION

	A
Weed 1 Code, Stage:	field bindweed
Stage Scale:	2-8 inch
Density, Unit:	med
Weed 2 Code, Stage:	annual sunflower
Stage Scale:	6-16 inch
Density, Unit:	low
Weed 3 Code, Stage:	pigweed
Stage Scale:	1-6 inch
Density, Unit:	low
Weed 4 Code, Stage:	marestail
Stage Scale:	4-6 inch
Density, Unit:	low

APPLICATION EQUIPMENT

	A
Appl. Equipment:	co2 bicyc
Operating Pressure:	24
Nozzle Type:	turbojet
Nozzle Size:	11002
Nozzle Spacing, Unit:	20 inch
Nozzles/Row:	3
Boom Length, Unit:	5 feet
Boom Height, Unit:	14 inch
Ground Speed, Unit:	2.3 mph
Carrier:	water
Spray Volume, Unit:	20 gpa
Propellant:	CO2

Results & Discussion: All treated plots in this study were 8 feet wide (this includes the 2.5 foot paired untreated check). At the 29 days-after-application (DAA) evaluation it was noticed that all paired checks and untreated plots were showing uniform signs of mild epinasty. An investigation revealed that a 48 acre pasture approximately 0.38 mile across and upwind from the trial had received an aerial application of Cimarron Maxx® herbicide(metsulfuron methyl + dicamba). We believe the pasture application volatilized and was moved down and over the research site. We believe the data collected on 16 DAA was uncompromised and the 29 DAA data, while showing mild drift injury to untreated plants, is representative of the weed control achieved by

the various individual treatments in this study. It is our opinion that weed control ratings at 59 and 90 DAA were compromised as untreated weeds in paired checks and untreated check plots continued to decline from the drift injury showing increased epinasty, severe chlorosis, and necrosis. At 59 and 90 DAA it was very difficult to separate weed control resulting from the study treatments and that resulting from the drift injury. This being said the following discussion of results will include weed control produced by the study treatments (16 & 29 DAA data) and as a result of the study treatments and drift injury (59 & 90 DAA data).

Treatments were applied on May 14 in this trial to field bindweed (2-8" tall), pigweed (2-8" tall), and sunflower (6-16" tall). Climate conditions were ideal throughout the duration of this study providing active grass and broadleaf weed growth as well as herbicide uptake and translocation. At 14 DAA all treatments were providing good control of field bindweed that ranged from 82-90%, excluding the Milestone VM® treatment (Table 5a.). By 29 DAA all treatments were producing excellent field bindweed control that ranged from 90-95% except for Milestone VM® which was producing moderate control at this time. Good to excellent field bindweed control was produced and maintained through 59 and 90 DAA evaluations for all treatments excluding the lowest rate of the GF-1883 which did not maintain field bindweed control at the later evaluations. AT 16 DAA pigweed control was moderate to good for all treatments with the highest rate of GF-1883 producing the highest level of control at 78%. By 29 DAA pigweed control had increased for all treatments with the highest rate of GF-1883 and Vanquish® producing excellent control (95%) and all other treatments producing moderate control (50-68%). By 59 and 90 DAA pigweed control had increased for all treatments nearly to the point of complete control. It is our opinion that some of the 59 and 90 DAA pigweed control was due to the drift injury. At 16 DAA only the two higher rates of GF-1883 were producing moderate sunflower control of 65 & 77% (Table 5b.). All other treatments at this time were producing moderate to poor sunflower control (25-53%). By 29 DAA sunflower control had increased with all treatments producing good to excellent control (88-99%). By 59 and 90 DAA evaluations, all treatments had produced complete control of sunflower. It is our opinion that most of the sunflower control at these dates was due to the study treatments. However, the complete sunflower control achieved by some of the treatments was likely due to both the study treatments and drift injury. Common bermudagrass injury was evaluated throughout the duration of the study. At 16 DAA evaluations only a small amount of noticeable phytotoxicity was present for all treatments (1-5%). This level of injury is acceptable for bermudagrass roadsides and was not evident at later evaluations.

The GF-1993 product produced good to excellent broadleaf weed control in this study. Since the beginning of this study the GF-1883 product has received a federal EPA-approved label as Milestone VM Plus®. It is our suggestion to Dow AgroSciences to consider evaluating lower Milestone VM Plus® product rates in future studies to make this product more economical.

Table 5A. Postemergence Broadleaf Weed Control Study

Trial ID: 4-H-79-07 Study Dir.: Montgomery/Evans
Location: Kingfisher County Investigator: Dr. Dennis Martin

Weed Code				field bindweed	field bindweed	field bindweed	field bindweed	pigweed	pigweed	pigweed	pigweed
Rating Data Type				control	control	control	control	control	control	control	control
Rating Unit				%	%	%	%	%	%	%	%
Rating Date				5/30/2007	6/12/2007	7/12/2007	8/15/2007	5/30/2007	6/12/2007	7/12/2007	8/15/2007
Trt-Eval Interval				16 DA-A	29 DA-A	59 DA-A	90 DA-A	16 DA-A	29 DA-A	59 DA-A	90 DA-A
Trt No.	Treatment Name	Product Rate	Product Rate Unit								
1	GF-1883	4.0	pt/a	86 a	90 a	57 b	33 b	43 b	68 b	100 a	98 a
	Red River 90 Surfactant®	0.25	% v/v								
2	GF-1883	6.0	pt/a	90 a	95 a	100 a	93 a	52 b	67 b	100 a	100 a
	Red River 90 Surfactant®	0.25	% v/v								
3	GF-1883	8.0	pt/a	93 a	95 a	98 a	96 a	78 a	95 a	100 a	100 a
	Red River 90 Surfactant®	0.25	% v/v								
4	Milestone VM®	5	fl oz/a	30 b	68 a	98 a	96 a	32 b	50 b	95 a	100 a
	Red River 90 Surfactant®	0.25	% v/v								
5	Garlon 3A®	32	fl oz/a	82 a	93 a	57 b	93 a	33 b	67 b	100 a	100 a
	Red River 90 Surfactant®	0.25	% v/v								
6	Vanquish®	16	fl oz/a	84 a	93 a	93 a	88 a	40 b	95 a	100 a	100 a
	Red River 90 Surfactant®	0.25	% v/v								
7	Untreated Check			0	32	0	0	0	18	10	72
LSD (P=.10)				34.7	NS	20.9	36.9	21.2	25.0	NS	NS
Standard Deviation				23.4	13.9	14.1	25.0	14.3	16.9	3.5	1.2
CV				30.27	15.63	16.85	29.95	30.84	22.99	3.57	1.18
Replicate F				0.295	1.438	3.846	0.803	2.286	1.460	1.000	1.000
Replicate Prob(F)				0.7508	0.2826	0.0577	0.4749	0.1522	0.2778	0.4019	0.4019
Treatment F				3.035	1.661	6.754	2.970	4.354	3.345	1.000	1.000
Treatment Prob(F)				0.0636	0.2312	0.0053	0.0673	0.0230	0.0492	0.4651	0.4651

Means followed by same letter do not significantly differ (P=.10, LSD).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
Untreated treatment(s) 7 excluded from analysis.

Table 5b.Postemergence Broadleaf Weed Control Study

Trial ID: 4-H-79-07 Study Dir.: Montgomery/Evans
Location: Kingfisher County Investigator: Dr. Dennis Martin

Weed Code				sunflower	sunflower	sunflower	sunflower	common bermudagrass	common bermudagrass
Rating Data Type				control	control	control	control	injury	injury
Rating Unit				%	%	%	%	%	%
Rating Date				5/30/2007	6/12/2007	7/12/2007	8/15/2007	5/30/2007	6/12/2007
Trt-Eval Interval				16 DA-A	29 DA-A	59 DA-A	90 DA-A	16 DA-A	29 DA-A
Trt No.	Treatment Name	Product Rate	Product Rate Unit						
1	GF-1883	4.0	pt/a	53 b	90 b	100 a	100 a	3 a	0 a
	Red River 90 Surfactant®	0.25	% v/v						
2	GF-1883	6.0	pt/a	65 ab	92 ab	100 a	100 a	5 a	0 a
	Red River 90 Surfactant®	0.25	% v/v						
3	GF-1883	8.0	pt/a	77 a	88 bc	100 a	100 a	4 a	0 a
	Red River 90 Surfactant®	0.25	% v/v						
4	Milestone VM®	5	fl oz/a	25 c	88 bc	100 a	100 a	4 a	0 a
	Red River 90 Surfactant®	0.25	% v/v						
5	Garlon 3A®	32	fl oz/a	25 c	80 c	100 a	100 a	4 a	0 a
	Red River 90 Surfactant®	0.25	% v/v						
6	Vanquish®	16	fl oz/a	45 bc	99 a	100 a	100 a	1 a	0 a
	Red River 90 Surfactant®	0.25	% v/v						
7	Untreated Check			0	25	37	100	0	0
LSD (P=.10)				22.4	8.5	NS	NS	NS	NS
Standard Deviation				15.1	5.7	0.0	0.0	2.2	0.0
CV				31.2	6.42	0.0	0.0	62.6	0.0
Replicate F				0.143	2.563	0.000	0.000	0.556	0.000
Replicate Prob(F)				0.8683	0.1263	1.0000	1.0000	0.5905	1.0000
Treatment F				5.894	3.415	0.000	0.000	1.215	0.000
Treatment Prob(F)				0.0086	0.0465	1.0000	1.0000	0.3695	1.0000

Means followed by same letter do not significantly differ (P=.10, LSD).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
Untreated treatment(s) 7 excluded from analysis.

Postemergence Broadleaf Weed Control Study

Trial ID: 4-H-80-07 **Study Dir.:** Montgomery/Evans
Location: Garfield County **Investigator:** Dr. Dennis Martin

Objective: To evaluate MSM E-Pro® for its ability to control broadleaf weeds.

APPLICATION DESCRIPTION

	A
Application Date:	5/16/2007
Time of Day:	7:15 a.m.
Application Method:	broadcast
Application Timing:	postemerg
Applic. Placement:	foliar
Air Temp., Unit:	51 F
% Relative Humidity:	50
Wind Velocity, Unit:	1 mph
Dew Presence (Y/N):	y
Soil Temp., Unit:	64 F
Soil Moisture:	good
% Cloud Cover:	10

WEED STAGE AT EACH APPLICATION

	A
Weed 1 Code, Stage:	field bindweed
Stage Scale:	2-5 inch
Density, Unit:	moderate
Weed 2 Code, Stage:	marestail
Stage Scale:	2-6 inch
Density, Unit:	low
Weed 3 Code, Stage:	prairie cupgrass
Stage Scale:	seedling, 2-4 leaf
Density, Unit:	moderate

APPLICATION EQUIPMENT

	A
Appl. Equipment:	co2 bicycle
Operating Pressure:	24
Nozzle Type:	turbojet
Nozzle Size:	11002
Nozzle Spacing, Unit:	20 inch
Nozzles/Row:	3
Boom Length, Unit:	5 feet
Boom Height, Unit:	12 inch
Ground Speed, Unit:	2.3 mph
Carrier:	water
Spray Volume, Unit:	20 gpa
Propellant:	CO2

Results & Discussion: The objective of this study was to evaluate MSM E-Pro® (generic metsulfuron methyl) for its ability to control roadside weeds. MSM E-Pro®, and its manufacturer Etigra, are seeking inclusion in the 2008 ODOT Approved Herbicide and Adjuvant List. This study will compare the broadleaf weed control produced by the MSM E-Pro® product to the original EPA approved Escort XP®. Treatments were applied on May 16, 2007 to actively growing field bindweed, marestail, and prairie cupgrass. Visual weed control data was collected for each weed species at 14, 27, and 58 days-after-applications (DAA). Bermudagrass injury data was also collected at each of the evaluation dates.

Field bindweed control at 14, 27 and 58 DAA was very similar for both MSM E-Pro® or Escort

XP® when applied alone, however, an acceptable level of field bindweed control was not achieved for either treatment (>90%). This is not completely a shock as field bindweed is a difficult-to-control deep-rooted perennial broadleaf and given the amount of rainfall this spring bindweed growth was agressive. The addition of Roundup Pro Conc.® to each of these treatments produced and maintained an acceptable level of field bindweed control through 58 DAA. However, the addition of the Roundup Pro Conc.® also produced an unacceptable amount of bermudagrass injury at 14 and 27 DAA. All bermudagrass injury had diminished by 58 DAA. Only marestail control observations were taken, as populations were low, and it appeared that the MSM E-Pro® treatments produced similar control to that achieved from Escort XP treatments. Prairie cupgrass is a native annual grass that was unaffected by either MSM E-Pro® or Escort XP applied alone. The addition of Roundup Pro Conc.® to both products produced excellent control of prairie cupgrass through 58 DAA evaluations.

It appears from the data collected in this study that the MSM E-Pro® product will provide ODOT herbicide programs with a similar level of weed control as Escort XP®. Pending the MSM E-Pro® product passing the compatibility testing this fall, MSM E-Pro® will be recommended for inclusion in the 2008 ODOT Approved Herbicide and Adjuvant List (January 2008). Final determination for MSM E-Pro® can be made after the fall 2007 Compatibility Testing at which time Etigra will be notified of the final results. Etigra will need to submit final AHAL Submission packets for the MSM E-Pro® product as soon as possible.

Table 6. Postemergence broadleaf weed control study (4-H-80-07).

Trial ID: 4-H-80-07 Study Dir.: Montgomery/Evans
Location: Garfield County Investigator: Dr. Dennis Martin

Weed Code				field bindweed	field bindweed	field bindweed	prairie cupgrass	prairie cupgrass	prairie cupgrass	common bermudagrass	common bermudagrass
Rating Data Type				control	control	control	control	control	control	injury	injury
Rating Unit				%	%	%	%	%	%	%	%
Rating Date				5/30/2007	6/12/2007	7/13/2007	5/30/2007	6/12/2007	7/13/2007	5/30/2007	6/12/2007
Trt-Eval Interval				14 DA-A	27 DA-A	58 DA-A	14 DA-A	27 DA-A	58 DA-A	14 DA-A	27 DA-A
Trt No.	Treatment Name	Product Rate	Product Rate Unit								
1	Untreated check			7	17	0	0	0	0	2	0
2	MSM E-Pro®	1.0	oz wt/a	35 b	63 a	72 a	7 b	0 b	0 b	5 b	0 b
	Red River NIS	0.25	% v/v								
3	Escort XP®	1.0	oz wt/a	38 b	76 a	72 a	0 c	0 b	0 b	3 b	2 b
	Red River NIS	0.25	% v/v								
4	MSM E-Pro®	1.0	oz wt/a	60 a	93 a	90 a	100 a	95 a	90 a	43 a	47 a
	Roundup Pro Conc.®	19	fl oz/a								
5	Escort XP®	1.0	oz wt/a	55 a	93 a	93 a	100 a	95 a	90 a	52 a	52 a
	Roundup Pro Conc.®	19	fl oz/a								
LSD (P=.10)				12.7	NS	NS	4.6	0.4	4.0	8.8	7.9
Standard Deviation				7.7	15.5	15.3	2.9	0.3	2.5	5.5	5.0
CV				16.45	19.04	18.68	5.59	0.68	5.56	21.4	20.0
Replicate F				8.889	1.555	0.331	1.000	1.000	1.000	1.909	1.000
Replicate Prob(F)				0.0226	0.2984	0.7303	0.4219	0.4096	0.4219	0.2282	0.4219
Treatment F				7.535	2.609	1.743	1124.000	121411.012	1296.000	62.636	94.000
Treatment Prob(F)				0.0265	0.1639	0.2574	0.0001	0.0001	0.0001	0.0001	0.0001

Means followed by same letter do not significantly differ (P=.10, LSD).
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
Untreated treatment(s) 1 excluded from analysis.