

Alternatives to Oust in Bareground

2015 Roadside Vegetation
Management Training Seminar
State College, PA

Oust XP, Oust Extra, Throttle XP (All Sulfometuron methyl products) Label Changes 2013

GROUND APPLICATIONS

- Applications with wind speeds greater than 10 miles per hour are prohibited.
- Applications into temperature inversions are prohibited.
- Apply spray at the lowest height that is consistent with pest control objectives.
- **When applying liquid sprays the following directional buffers are required to protect aquatic vegetation in sites (including lakes, reservoirs, rivers, streams, marshes, ponds, estuaries, commercial fish ponds), or water used as an irrigation source, or crops.**

50 feet - All broadcast applications other than railroad and roadside rights-of-way.

25 feet - Broadcast applications to railroad and roadside rights-of-way.

15 feet - All handheld spot treatment applications.

- Applications must be made using equipment delivering an extremely coarse or coarser droplet size spectrum as defined by

ASABE S572.1.

Considerations for Bareground Weed Control

- **Herbicide Mixtures**
- **Site Characteristics**
- **Vegetation**
 - Including species of concern
- **Application Timing**

Herbicide Characteristics

- **Broad Spectrum Residual**
- **Preemergence**
- **Postemergence**

Residual potency

PURZENALS



Spike

Hyvar X
Krovar I
Velpar
Method

Oust XP
Oust Extra
Landmark XP

Karmex XP
Plateau

Pendulum
Esplanade
Surflan
Payload

ANZALS

Trade Name	Chemical Name	Avg. Half-life
Spike 20P	tebuthiuron	12-15 mos.
Throttle XP, Portfolio	sulfentrazone	12-18 mos.
Karmex XP	diuron	90 d.
Oust XP, Oust Extra, Landmark XP	sulfometuron	20-28 d.
Arsenal	imazapyr	25-142 d.
Escort XP, Oust Extra	metsulfuron	30 d.
Esplanade	indaziflam	38 d.
Telar, Landmark XP	chlorsulfuron	40 d.
Velpar	hexazinone	90 d.
Pendulum AQ	pendimethalin	44 d.
Method	aminocyclopyrachlor	68 d.

Broad Spectrum Residual

- **Potent**
- **Preemergence and postemergence activity**
- **Greater potential for off-site damage**

Broad Spectrum Residual Herbicides

- **Oust XP** *sulfometuron*
 - Oust Extra (+escort), Landmark II (+telar), Throttle XP (+telar, +sulfentrazone)
- **Arsenal, Sahara DG** *imazapyr*
- **Krovar I** *bromacil (+ diuron)*
- **Method** *aminocyclopyrachlor*
 - PennDOT Custom Blend, Streamline (+Escort), Perspective (+Telar), Viewpoint (+Arsenal, + Escort)
- **Spike 20P** *tebuthiuron*

Preemergence Herbicides

- **Less soluble, less mobile**
- **Effective against weeds from seed**
- **Less potential for off-site damage**

Preemergence Herbicides

- **Karmex DF** *diuron*
- **Pendulum 3.3** *pendimethalin*
- **Endurance** *prodiamine*
- **Plateau** *imazapic*
- ***Esplanade*** *indaziflam*

*Diuron containing products require dust mist respirator.

Postemergence - non selective

- **Systemic - translocate, control perennials**

Rodeo, Accord XRT, *glyphosate*
Glyphomate 41

- **Contact - only injure contacted tissue**

Reward (Tribune) diquat

Glyphosate Comparison

product	lb acid/gal	rate/ac	cost/gal	cost/ac
Rodeo	4	48	16.29	6.11
Accord XRT	4	48	17.85	6.69
Glyphomate 41	2.8	69	19.00	10.24

Rodeo & Accord XRT use added surfactant, \$1-\$2/ac

Selective Postemergence Products

- **Many**
- **e.g. 2,4-D Amine; Escort XP; Garlon 3A; Vanquish; Triplet; Transline; Vista; Krenite S; Velpar; Overdrive...**

Target Areas

- Guiderails
- Sign Posts
- Stock Yards
- Concrete Islands and Barriers
- Bridge Abutments
- Roadway Shoulders
- Inlets



Credit: Mike Maurer



Know Your Weeds and Their Life Cycle

- **Annuals & biennials**
 - Flower, set seed, then die
- **Herbaceous perennials**
 - Non-woody
 - Reproduce by seed or vegetatively
- **Brush**

Herbicide Resistant Weeds

Kochia (*Kochia scoparia*)



Giant foxtail (*Setaria faberī*)



**Common ragweed
(*Ambrosia artemisiifolia*)**



**Horseweed/Marestail
(*Conyza canadensis*)**



Herbicide MOA

Mode of Action	Trade Names
ALS inhibitors	Escort XP, Oust XP, Landmark XP, Arsenal, Plateau
Growth regulator (synthetic auxins)	Transline, Garlon, Triplet SF, Vanquish, Overdrive, Milestone, Method
Photosystem II inhibitors	Karmex XP, Krovar I DF, Velpar, Spike 20P
EPSP synthase inhibitor (glycines)	Glyphomate 41, Aquaneat
Root inhibitor	Pendulum AQ
PPO inhibitor	Throttle XP (<i>sulfentrazone</i>)
CB Inhibitor	Esplanade

Herbicide Families with Reported Resistance*

- **ALS (acetolactate synthase inhibitors)**
 - Oust, Arsenal, Escort, Telar, Plateau
- **UA (Ureas & Amides)**
 - diuron
- **PSII (photosystem II inhibitors)**
 - bromacil, Velpar

Herbicide Families with Reported Resistance*

- **GLY (glycines)**
 - glyphosate
- **AUX (synthetic auxins)**
 - dicamba
 - fluroxypyr

Resistant biotypes in North America

Weed	Mode of Action
kochia	ALS inhibitors, Photosystem II (PSII) inhibitors, synthetic auxins, glycines
lambsquarters	ALS & PSII inhibitors
common ragweed	ALS, PSII, glycines, PPO
marestail	ALS, PSII, glycines
giant foxtail	ALS, PSII
barnyardgrass	PSII, ALS, synthetic auxins

TVC - Limited Options

- Until recently we have relied heavily on three MOA for bareground weed control
 - ALS - Oust, Arsenal, Escort, Telar, Plateau
 - PS II - Krovar I, Karmex, Velpar
 - Glycines - glyphosate
- All three MOA have reports of resistance

7712 - Bare Ground

- ***Primarily* preventive - soil application**
- **Mixture of herbicides**
 - control vegetation that is present
 - prevent germination for entire growing season
 - cost efficient
 - example - glyphosate, Oust Extra, and Karmex
 - prevent development of resistant biotypes

Treatment Rotation

- **Annual application**
 - **Primary, Limited Access**
 - **Cleaner**
- **Two-year cycle**
 - **Secondaries**
 - **More weed pressure**

Treatment Scheme

- **Primaries first**
- **Secondaries later to improve postemergence activity**

Timing

- early application prevents vegetation from establishing.
- later applications have both advantages and disadvantages:
 - shorter period of residual activity required.
 - greater leaf area of the target vegetation, which increases postemergence activity.
 - tall dead weeds are unsightly and draw unnecessary attention to the program.
 - dead weed stalks can interfere with drainage.

Misses

- Use 7713 (Selective Weed and Brush) to your benefit.
 - Traveling same routes as before
 - Utilize mix or injection that can pickup misses



2013 Bareground Treatment Comparison I-99/SR26 & Skytop



Materials and Methods

- Two trial sites (I99/SR26 & Skytop)
- All treatments included glyphosate @ 2 qts/ac & non-ionic surfactant @ 0.25% v/v
- Applied at 50 GPA
- Treatments made using CO₂ sprayer with ULV wand and OC-08 nozzle.
- Treatments applied April 23 & 25, 2013 I99/SR26 & Skytop, respectively.

trt	product	rate (oz/ac)	trt	product	rate (oz/ac)
1	untreated	---	9	Esplanade Oust Extra	3.5 4
2	Roundup Pro Max	64	10	Esplanade Oust Extra	5 4
3	Esplanade	5	11	Proclipse PDT Blend	32 8
4	Esplanade Milestone VM Oust Extra	5 7 4	12	Proclipse Oust Extra	32 4
5	Esplanade Streamline	5 8	13	Pendulum AC PDT Blend	134 8
6	Esplanade Streamline Oust XP	3.5 4.75 3	14	Pendulum AC Oust Extra	134 4
7	Esplanade PDT Blend	5 8	15	Diuron Oust Extra	128 4
8	Esplanade Perspective	5 8			

Evaluations

- I99/SR26 Site
 - Rated for percent total vegetative cover and cover by kochia, 4, 31, 91, and 153 DAT.
 - Other predominate species included marestail and prostrate spurge.
- Skytop Site
 - Rated for percent total cover on 2, 32, 91, and 155 DAT.
 - Predominate species included sweetclover, common evening primrose, and common ragweed

2013 Bareground Treatment Comparison I-99 & SR 26, Bellefonte

trt	product	Rate (oz/ac)	Total Cover 7/23/13	KCHSC Cover 7/23/13	Total Cover 9/23/13	KCHSC Cover 9/23/13
1	untreated	---	45 a	42 a	56 a	50 a
2	Roundup	64	32 ab	28 ab	44 ab	32 ab
3	Esplanade	5	18 bc	18 bc	26 b-e	25 bc
4	Esplanade Milestone VM Oust Extra	5 7 4	1 c	1 c	4 def	4 cd
5	Esplanade Streamline	5 8	0c	0 c	1 f	1 d
6	Esplanade Streamline Oust XP	3.5 4.75 3	1 c	1 c	1 f	1 d
7	Esplanade PDT Blend	5 8	0 c	0 c	0 f	0 d

Bareground Treatment Comparison I-99 & SR 26, Bellefonte

trt	product	Rate (oz/ac)	Total Cover 7/23/13	KCHSC Cover 7/23/13	Total Cover 9/23/13	KCHSC Cover 9/23/13
8	Esplanade Perspective	5 8	0 c	0 c	0 f	0 d
9	Esplanade Oust Extra	3.5 4	12 bc	12 bc	15 c-f	15 bcd
10	Esplanade Oust Extra	5 4	10 bc	10 bc	18 c-f	18 bcd
11	Proclipse PDT Blend	32 8	0 c	0 c	3 ef	0 d
12	Proclipse Oust Extra	32 8	26 ab	26 ab	36 abc	34 ab
13	Pendulum AC PDT Blend	134 8	1 c	0 c	3 ef	0 d
14	Pendulum AC Oust Extra	134 4	16 bc	16 bc	26 bcd	26 bc
15	Diuron Oust Extra	128 4	17 bc	15 bc	29 bc	26 bc

199/SR26 Overview



2013/09/23
153 DAT

Esplanade @ 5 oz/ac Perspective @ 8 oz/ac



Esplanade @ 5 oz/ac
Oust Extra @ 4 oz/ac



Pendulum AC 134 oz/ac Oust Extra @ 4 oz/ac



2013 Bareground Treatment Comparison SR322, Port Matilda



product	rate (oz/ac)	Total Cover 7/25/13	Total Cover 9/27/13	product	rate (oz/ac)	Total Cover 7/25/13	Total Cover 9/27/13
untreated	---	19 a	25 a	Esplanade Oust Extra	3.5 4	1 b	1 b
Roundup Pro Max	64	19 a	21 a	Esplanade Oust Extra	5 4	1 b	1 b
Esplanade	5	3 b	4 b	Proclipse PDT Blend	32 8	1 b	2 b
Esplanade Milestone VM Oust Extra	5 7 4	0 b	1 b	Proclipse Oust Extra	32 4	0 b	1 b
Esplanade Streamline	5 8	1 b	1 b	Pendulum AC PDT Blend	134 8	2 b	3 b
Esplanade Streamline Oust XP	3.5 4.75 3	0 b	1 b	Pendulum AC Oust Extra	134 4	1 b	1 b
Esplanade PDT Blend	5 8	1 b	2 b	Diuron Oust Extra	128 4	1 b	1 b
Esplanade Perspective	5 8	1 b	1 b				

Skytop Overview



Conclusions

- Tank mixes that contained Esplanade plus *aminocyclopyrachlor* (Streamline, Perspective, or PennDOT Blend) or Milestone provided excellent season-long control of a variety of plant species, including kochia.
- Preemergence herbicides Esplanade, Proclipse, and Pendulum AC performed equally well when combined with PennDOT Blend.

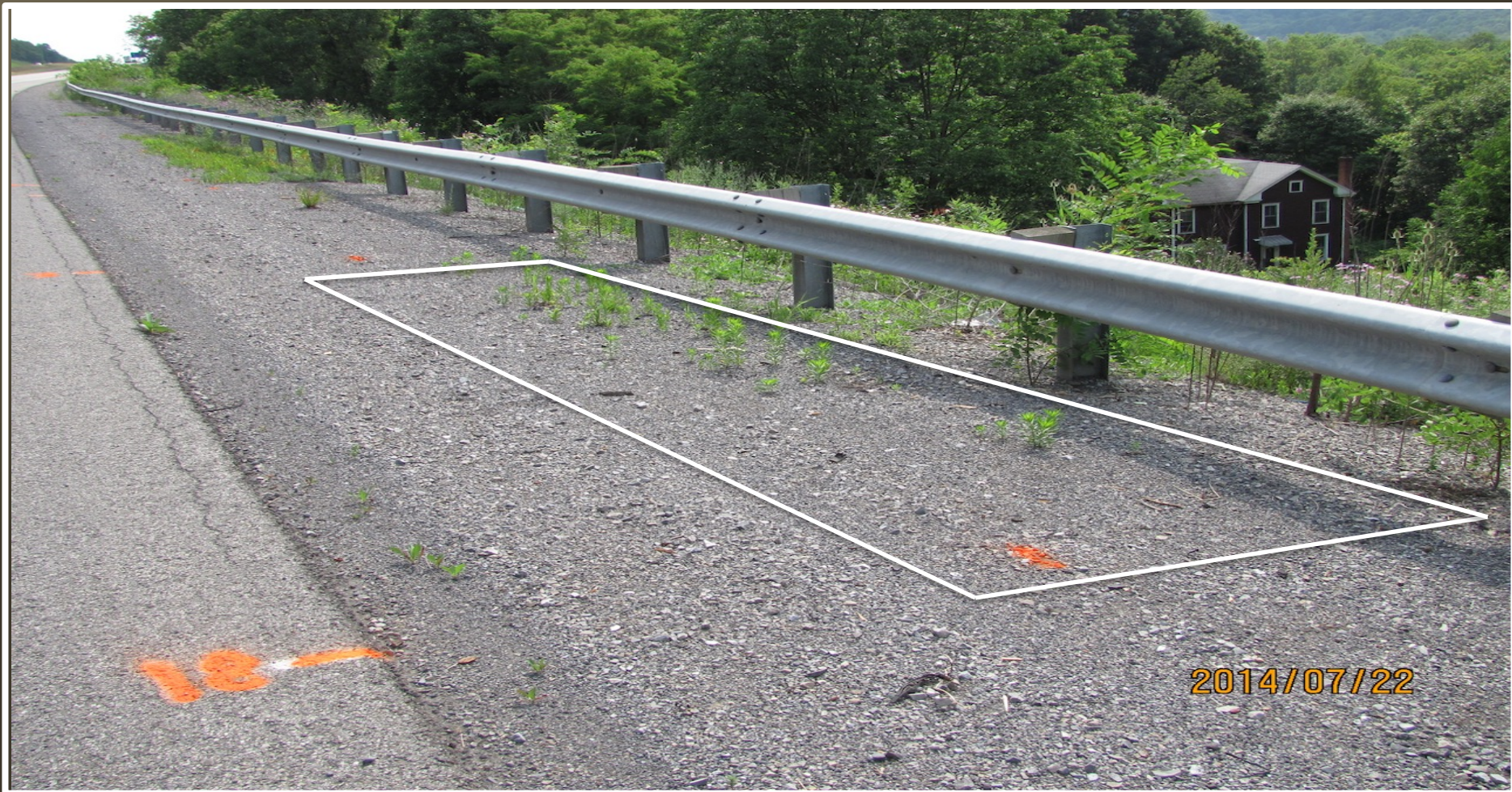
Conclusions

- Esplanade performed equally well at both 3.5 and 5 oz/ac, but higher rate more thoroughly tested and recommended.
- Esplanade should not be used alone for industrial sites and only in test for comparison.
- Treatments using Oust Extra in combination with Esplanade, Proclipse, Pendulum AC, or diuron controlled a large spectrum of weed species, but not significant impact on kochia control.

Considerations

- Caution advised with use of products containing aminopyralid or aminocyclopyrachlor where concerns exist for uptake by the root system of trees within R-O-W.
- Oust Extra now has label restrictions concerning the maintenance of buffers and that may be prohibitive.

2014 Bareground Treatment Comparison



2014 Bareground Treatment Comparison

- Applied April 24, 2014
- Added non-ionic surfactant at 0.25% v/v to all treatments.
- Razor Pro at 64 oz/ac added to treatments 2-19, (trt 15 only 48 oz).
- Accord XRT II at 48 oz/ac added to treatments 20 & 21.
- Applied at 50 gal/ac.
- Plot size 20 x 6 ft, 4 reps.

2014 Bareground Treatment Comparison

trt	product	rate (oz/ac)	trt	product	rate (oz/ac)
1	untreated	---	12	Esplanade Viewpoint	5 13
2	Razor Pro	64	13	Esplanade PDT Blend	5 8
3	Esplanade Oust XP	5 3	14	Esplanade PDT Blend Plateau	5 8 8
4	Esplanade FSN+IMS+TCM	5 3	15	Esplanade PDT Blend Journey Razor Pro	5 8 32 48
5	Esplanade FSN+IMS+TCM	5 6	16	Esplanade PDT Blend Oust Extra	5 8 3
6	Esplanade Plateau	5 8	17	Esplanade Perspective	5 8
7	Esplanade Matrix	5 4	18	Plateau Perspective	12 8
8	Esplanade Viewpoint	5 16	19	Plateau Streamline	12 8
9	Esplanade Streamline	5 8	20	Plateau PDT Blend	12 8
10	Esplanade Streamline Oust XP	5 8 3	21	Esplanade Milestone Escort XP	5 7 1
11	Diuron Oust Extra	128 4			

Common Weeds

Spotted knapweed



Prostrate spurge



trt	product	Rate (oz/ac)	Percent Bareground 9/22/14	Knapweed Cover 9/22/14
1	untreated	---	89	6.5
2	Razor Pro	64	88	3.1
3	Esplanade Oust XP	5 3	97	1.4
4	Esplanade FSN+IMS+TCM	5 3	98	2
5	Esplanade FSN+IMS+TCM	5 6	97	1.8
6	Esplanade Plateau	5 8	94	3
7	Esplanade Matrix	5 4	97	2.4
8	Esplanade Viewpoint	5 16	100	0
9	Esplanade Streamline	5 8	99	0.8
10	Esplanade Streamline Oust XP	5 8 3	100	0
11	Diuron Oust Extra	128 4	97	0.7

trt	product	Rate (oz/ac)	Percent Bareground 9/22/14	Knapweed Cover 9/22/14
12	Esplanade Viewpoint	5 13	100	0.1
13	Esplanade PDT Blend	5 8	100	0
14	Esplanade PDT Blend Plateau	5 8 8	100	0
15	Esplanade PDT Blend Journey Razor Pro	5 8 32 48	99	0
16	Esplanade PDT Blend Oust Extra	5 8 3	99	0.3
17	Esplanade Perspective	5 8	98	0
18	Plateau Perspective	12 8	94	0.9
19	Plateau Streamline	12 8	93	1.5
20	Plateau PDT Blend	12 8	91	1.5
21	Esplanade Milestone Escort XP	5 7 1	99	0.1

What do I use??



Herbicide Mixtures

- **A good Basic Mix will cover the majority of your sites**
- **Rotate Mixes to prevent resistance issues**
- **'Special Areas' can be dealt with separately**

Non-Selective (7712)

Products	Rate(s)	Products	Rate(s)
Karmex Oust XP Glyphosate	9 lbs/ac 3 oz/ac 2 qts/ac	Throttle XP Journey Karmex Glyphomate 41	12.5 oz/ac 32 oz/ac 6 lb/ac 1.5 qts/ac
Karmex Oust Extra Glyphomate 41	7.5 lb/ac 4 oz/ac 2 qts/ac	Throttle XP Plateau Karmex Glyphomate 41	12.5 oz/ac 10 oz/ac 6 lb/ac 2 qts/ac
Oust Extra Plateau Glyphomate 41	4 oz/ac 12 oz/ac 2 qts/ac	Throttle XP Plateau Velpar DF Glyphomate 41	12.5 oz/ac 12 oz/ac 1 lb/ac 2 qts/ac

Broad Spectrum Residuals	Preemergence	Postemergence (selective)	Postemergence (non-selective)
Oust XP	Journey	Triclopyr 3	Accord XRT
Oust Extra	Pendulum Aquacap	Garlon 3A	Glyphomate 41
Throttle XP	Esplanade 200SC	DMA 4 IVM	Rodeo
Polaris (imazapyr)	Plateau	Aquasweep	Tribune (Reward)
Arsenal Powerline		Vanquish	
Milestone VM		Overdrive	
Custom Blend		Triplet LO	
Streamline		Escort XP	
Perspective			
Velpar DF			

Possible Mixes Using New Chemistry

product	rate (oz/ac)	product	rate (oz/ac)
Esplanade	5	Perspective	8
Oust XP	3	6.3 MAT+1.7 Telar	
		*Esplanade	5
Esplanade	5	Streamline	8
Oust Extra	4	6.3 MAT+1.7 Escort	
		*Esplanade	5
Throttle XP	12.5	Custom Blend	8
Journey	32	7.66 MAT+0.34 Escort	
Esplanade	5	*Esplanade	5
Throttle XP	12.5	Milestone VM	7
Plateau	12	Esplanade	5
Esplanade	5	Escort XP	1
Throttle XP	12.5	Oust Extra	4
Plateau	12	Plateau	12
Velpar DF	16		

* Can substitute Pendulum AquaCap @ 134 oz/ac

QUESTIONS?



06/08/2010