

**2007 Turfgrass Weed Control Summary - Postemergence Broadleaf
Ronald Calhoun and Aaron Hathaway
Dept. of Crop and Soil Sciences
Michigan State University**

Sixteen postemergence broadleaf weed control trials were conducted at the HTRC in 2006. Dandelion (*Taraxacum officinale*), white clover (*Trifolium repens*) were well represented in each of the trials conducted at the Hancock Turfgrass Research Center (HTRC) in East Lansing, MI. Broadleaf plantain (*Plantago major*) control was evaluated if it was uniform in the trial area. Dandelion and buckhorn plantain (*Plantago lanceolata*) were well represented in trials conducted at the Evergreen Cemetery in Lansing, MI. Other trials were conducted to evaluate control of specific broadleaf weeds, such as, common chickweed (*Stellaria media*) and ground ivy (*Glechoma hederacea*). Percent control was determined for each species using the Henderson-Tilton pre-count/post-count method.

The Adjuvant Efficacy for Broadleaf Weed Control Trial was treated on September 15, 2006 at the HTRC. A treatment list and results for this trial are shown in Table 1. The addition of adjuvants (AAA and BBB) to Trimec Classic (amine) and Super Trimec (ester) applied in the fall seemed to improve white clover control, but proved ineffective for improvement of dandelion control in this trial. The addition of 20% v/v AAA to 1 pt/A Trimec Classic and 20 and 10% v/v AAA to 0.5 pt/A Trimec Classic significantly improved control of white clover 24 DAT. 24 DAT AAA did not improve the efficacy of Super Trimec, however, 3 pt/A Super Trimec did not differ from 0.375 pt/A Super Trimec + BBB. On April 24, 2007, all treatments provided excellent control of white clover, except for 0.5 pt/A Trimec Classic and AAA applied alone.

The only treatments that provided adequate control of dandelion 221 DAT were 3 pt/A Super Trimec and 2 pt/A Trimec Classic + AAA. All other treatments either did not significantly differ from the untreated or provided inadequate control of dandelion. All Trimec Classic treatments that included 20% v/v AAA and Super Trimec + BBB caused turf injury on September 21, 2006, 6 DAT, however, the injury was very tolerable and short-lived.

Treatments for The PC (Petro Canada) Turf RTU (Ready to Use) vs. Concentrate Trial and The PC Turf Concentrate – Differing Application Volumes Trial were applied on May 21, 2007. The first trial compared PC RTU and Concentrate applied at differing application volumes (sprayer outputs), while the second trial only evaluated PC Concentrate at differing rates and application volumes.

The PC Turf RTU vs. Concentrate Trial: On June 18, 28 DAT, most treatments provided average control of dandelion with the PC Turf Concentrate applied at 107 gal/A (10% v/v) providing the best control (Table 2). PC Turf RTU applied at 30 gal/A and Trimec Classic at 0.6 pt/A did not differ from the untreated. 50 DAT, PC Turf Concentrate applied at 107 gal/A (10% v/v) was still providing good control as well as the PC Turf RTU applied at the two highest sprayer outputs, 107 and 200 gal/A. However, the recommended rate of Trimec Classic (4 pt/A) provided 100% control 50 DAT, and no other treatment was comparable.

On June 18, 2007, 28 DAT, PC Turf Concentrate and RTU at the highest sprayer output (200 gal/A) provided excellent buckhorn plantain control (Table 2). The RTU at 64 and 107 gal/A and the Concentrate at 107 gal/A also provided good control at 28 DAT. While the RTU and Concentrate were still providing good control 50 DAT, Trimec Classic at the recommended amount provided 100% control 50 DAT and, again, no other treatment compared.

The PC Turf products both performed better when applied at the higher sprayer outputs for buckhorn plantain and dandelion control. However, turf injury (Table 3) was also at intolerable levels at these highest sprayer outputs. On May 23, only 2 DAT, turf injury caused by the RTU and Concentrate was highly evident. This injury was again noticed on May 30, 9 DAT, and did not fade to tolerable levels until June 5, 15 DAT. Much of this injury could have been due to herbicide volatility caused by unseasonably hot temperatures in Michigan in the spring of 2007 as temperatures reached to highs of 88° F (31° C) often in the month of May.

PC Turf Concentrate – Differing Application Volumes Trial: This trial, although initiated mere feet away from the aforementioned trial, produced very different results. On both weed population evaluation dates, no treatments provided different results from the untreated for dandelion or buckhorn plantain control. However, very similar turf injury was noticed just 2 DAT and 9 DAT for the concentrate treatments at the high sprayer outputs (107 and 200 gal/A) and at the highest herbicide rate (20 % v/v) (Table 4). Because no statistical weed control differences were seen the results are not shown in this report.

Overall, the addition of these adjuvants provided some added control of broadleaf weeds, however, the trade-off of this small amount of addition control and the potential for turf injury may not be worth the risk. The PC Turf RTU Concentrate provided good, not excellent, control in some trials, but did not compare to Trimec Classic in the 2007 trial. Furthermore, while they did provide good control it was more often when these products were applied at very high sprayer outputs that are very uncommon and unrealistic in turf herbicide application.

The 2007 Broadleaf Weed Control with Dimension + Florasulam and/or Penoxulam was conducted at the HTRC and treatments were applied on May 8. Table 5 contains the complete treatment list and results for this trial.

Dandelion: On June 13, 36 DAT, E2350-29H and E2350-29J provided moderate control of dandelion, while every other treatment did not differ from the untreated for dandelion control. However, by July 9, 62 DAT, none of the treatments provided control of dandelion that differed from the untreated.

White Clover: E2350-29E, E2350-29H, and E2350-29J provided excellent control of white clover on June 13, 36 DAT. E2350-29B and E2350-29G provided moderate control of white clover on this date and E2350-29A and E2350-29C did not differ from the untreated. On July 9, 62 DAT, E2350-29H and E2350-29J provided moderate control of white clover and E2350-29D was the only other treatment that differed from the untreated for white clover control.

Turf injury was not noticed in any plot for the duration of the trial.

The 2007 Right of Way Broadleaf Weed Control Trial was conducted in Holt, MI at a park and ride maintained by the city of Lansing. The turf in the trial area was about 12 inches in height during the trial period and is typically only mowed 1 to 2 times per year. Wild carrot (*Daucus carota*) and buckhorn plantain were well represented in the trial area. Initial plant counts were made in each plot and percent control was evaluated on September 25 using the Henderson-Tilton pre-count/post-count method. All treatments, except Trimec Classic, included a nonionic surfactant at 0.25% v/v. Treatments were applied August 15, 2007. Table 6 contains the complete treatment list and results for this trial.

On September 25, 41 DAT, all treatments provided moderate control of wild carrot. Only Trimec Classic, Garlon 3A, Amino/Tric (aminopyralid triisopropanolammonium + triclopyr-triethylammonium) at 8 pt/A significantly differed from the untreated providing moderate control of buckhorn plantain. No turf injury was noticed during the trial period.

The 2007 Postemergence Broadleaf Weed Control with Echelon Trial applications A and B were treated on May 8 and June 25, respectively, at the HTRC. Table 7 contains the complete treatment list and results for this trial.

Dandelion: No treatments provided any significant dandelion control on either rating date as no treatment differed from the untreated at any time.

White clover: Thirty-seven DAT, although there were differences between treatments for white clover control, the results are very mixed – Granular Echelon at 0.375 lb ai/A and Granular Echelon on Fertilizer at 0.375 lb ai/A differed from the untreated, however, the double application of Granular Echelon at 0.375 lb ai/A and Granular Echelon on Fertilizer at 0.375 lb ai/A did not differ from the untreated. On July 25, there were no differences for white clover control.

No turf injury was noticed during the trial period.

The 2007 Postemergence Broadleaf Weed Control with Dismiss Trial was treated on June 15 at the HTRC. Table 8 contains the complete treatment list and results for this trial.

Dandelion: Dismiss treatments did not differ from the untreated for dandelion control. Turflon Ester provided excellent dandelion control 40 DAT.

White Clover: All Dismiss treatments provided moderate control of white clover, however, Turflon and Trimec Classic controlled 100% control of white clover 40 DAT.

In 2007, Dismiss 4F did not provide adequate control of broadleaf weeds in East Lansing, Michigan. No turfgrass injury was observed throughout the trial period.

The LCO Programs Trial was conducted at Evergreen Cemetery. Percent control was determined for dandelion and white clover using the Henderson-Tilton pre-count/post-count method. Crabgrass evaluations are presented as crabgrass centers which represent circular areas with 1 inch approximate radii. Four successive herbicide applications were made for each treatment in 2007: April 18 (A) (typical crabgrass preemergence timing in Michigan), May 30 (B), June 11 (C), and September 13 (D). The complete treatment list and results are shown in Tables 9 and 10.

Dandelion: Sixty-one DAT-A and 19 DAT-B, treatments 2-4 were providing good control of dandelion while treatments 1 and 6 were providing moderate control of dandelion. Treatments 5 and 7 never differed from the untreated for dandelion control. By September 13, 94 DAT-C, treatments 2-4 and 6 were still providing good dandelion control, while treatment 1 provided moderate dandelion control.

Buckhorn Plantain: Treatments 3,4 and 6 stood out providing good control of buckhorn plantain 19 DAT-B and 7 DAT-C. However, on July 2 and September 13, all treatments, except for treatment 7, were providing excellent control of buckhorn plantain.

Crabgrass: 2007 was an unusual year for crabgrass in Michigan as it was very hot and dry which pushed much of the crabgrass germination and growth to later in the year. Since the trial area was not irrigated and so little rainfall occurred during the hot summer, crabgrass stayed in the 1-3 leaf stage for much of the summer and didn't develop until late summer/early fall. As unusual as the year was for crabgrass, treatments 1-6 performed very well all year providing excellent control. Treatments 1 and 2, on August 14, though, did not significantly differ from the untreated for crabgrass control. On September 13 all treatments, except for treatment 7, provided excellent crabgrass control.

No injury was noticed on any of the treated plots throughout the trial period. All treated plots, however, did exhibit similar increased quality relative to the untreated plots due to the addition of fertilizer throughout the trial period (data not shown).

The General Broadleaf Weed Control Trial was treated on May 29 at the HTRC. Trimec Classic was included in this trial as a comparison treatment to the otherwise all granular treatments. A complete treatment list and results from this trial are shown in Table 11.

Dandelion: S-13046 provided the best dandelion control on both dates. S-13044 and S-13045 provided good control of dandelion 57 DAT. S-13042, S-13043, and Trimec Classic provided only moderate control of dandelion and did not statistically differ from each other 57 DAT. S-12912 showed very little efficacy for dandelion control and did not differ from untreated.

White Clover: On both rating dates every treatment, except S-12912, provided excellent control of white clover. These treatments controlled 100% of white clover 57 DAT. S-12912 provided only moderate control of white clover.

The Common Chickweed Control Trial was also conducted at the HTRC. Treatments were applied on April 20, which is nearing the natural end of common chickweed's lifecycle, as it is a winter annual. So, in the month or so following treatment application it was difficult to know if the common chickweed was being affected by the treatments or if it was reaching the

natural end of its lifecycle. It would also be difficult to spray earlier because new spring growth must be somewhat present for postemergence application. Common chickweed evaluations were made on May 15 (25 DAT) and June 5 (46 DAT) again using the Henderson-Tilton pre-count/post-count method. Common chickweed center count means will also be displayed to show the actual amounts of common chickweed on the evaluation dates. Control of dandelion was also evaluated on June 5 using the Henderson-Tilton pre-count/post-count method. A complete treatment list and results from this trial are shown in Table 12.

Dandelion: Population evaluation was very similar to that from the General Broadleaf Trial. S-13046, S-13044, and S-13045 again provided the best dandelion control. S-12912 did not differ from the untreated and S-13042 and S-13043 provided moderate dandelion control.

Common Chickweed: On May 15, 25 DAT, Trimec Classic provided the best common chickweed control. All the other treatments provided good control on this date, except for S-13045. The actual common chickweed population (centers) in every plot declined by 25 DAT, but every treatment caused a more significant decline than the untreated. Although the results are somewhat inconclusive about herbicide efficacy for common chickweed control, it does show that herbicide application for common chickweed control in the spring of 2007 was somewhat pointless. These findings reiterate our teachings to control winter annual weeds in the fall rather than the spring in Michigan.

The Ground Ivy Control Trial was conducted at a residential site in Howell, MI, located 30 miles east of the HTRC. This heavily shaded site was mowed at 3 inches and received no fertilization throughout the year. The trial was treated on June 21. Every treatment provided excellent control of ground ivy, except for S-12912 (Table 13), which was also the weak link for dandelion and white clover control. Although we saw great results in 2007, it is rare we see 100% control of ground ivy with Trimec Classic as triclopyr is, in our experience, a better fit for ground ivy control.

The Advan General Broadleaf Weed Control Trial was conducted at the HTRC. The A timing treatments were applied on May 29 and the B timings were applied on June 12. Soon after the trial was initiated it was realized that there was no need to stagger the application dates by 30 days for postemergence weed control, so the second application was applied after that realization and the protocol was amended to add ADV-4001 at a half-rate as a treatment. A complete treatment list and results from this trial are shown in Table 14.

Dandelion: ADV-4001 at both rates and Drive provided good to excellent dandelion control 57 DAT-A. However, 91 DAT-A, only Drive and the high rate of ADV-4001 were still providing good dandelion control. As predicted, Barricade and Dimension never differed from the untreated for dandelion control.

White Clover: Both ADV-4001 rates and Drive provided excellent control of white clover. Barricade provided little, albeit some, control of white clover on the last two evaluation dates, while Dimension never differed from the untreated.

Broadleaf Plantain: No significant broadleaf plantain control was provided by any herbicide. No turf injury was ever evident in this trial.

Two Adjuvant Efficacy in Broadleaf Weed Control Trials were conducted at the Evergreen Cemetery. Because these trials were treated at 3 and 2 different times, statistics were only run for the applied treatments on corresponding evaluation dates, which accounts for the empty data cells in the tables 15-17.

Adjuvant Efficacy with Escalade Low Odor (LO) – 3 Timings: The three treatments were made on May 11 (A), May 31(B), and June 15 (C), 2007. A treatment list and results from this trial are shown in Table 15.

The addition of all adjuvants to Escalade LO early slightly, yet significantly, improved dandelion control 28 DA-A and buckhorn plantain control 38 DAT-A (days after treatment A). Simplex and

Transport Ultra significantly improved the efficacy of Escalade LO for dandelion control from treatment B, 18 DAT-B. Although the addition of adjuvants seemed to increase the speed of Escalade LO efficacy on dandelion, by August 21, all treatments provided excellent control of dandelion. Although most treatments provided good control of buckhorn plantain, buckhorn plantain proved to be a little tougher than dandelion. Treatment B provided the poorest control of buckhorn plantain on August 21: Escalade LO and Escalade LO + Microyl provided poor control, however, the addition of Simplex and Transport Ultra to Escalade LO improved buckhorn plantain efficacy for treatment B.

Adjuvant Efficacy with Trimec Classic (amine) and Super Trimec (ester) – 2 Timings:

The two treatments were made on May 16 (A) and June 15 (B), 2007. On August 21, the dandelion population in this trial had significantly dwindled even in the untreated plots due to extreme temperatures and lack of rainfall in the summer of 2007. Therefore, dandelion control data is not shown for August 21. A treatment list and results from this trial are shown in Tables 16 (dandelion control) and 17 (buckhorn plantain control).

For treatment A, 23 DAT-A, Trimec Classic + Simplex, Super Trimec, and Super Trimec + Transport Ultra were already providing excellent control of dandelion. Thirty-three DAT-A, though, all early treatments provided excellent dandelion control and did not significantly differ from each other. No treatments significantly differed from each other 55 DAT-A for both timings (A and B). Overall, there seemed to be a little better efficacy from treatment timing B (June 15 application) for both dandelion and buckhorn plantain control. Ninety-seven DAT-A, all treatments, except Super Trimec + Delux (timing A) provided excellent control of buckhorn plantain.

Overall, in both trials, the addition of adjuvants to these three herbicides seemed to slightly increase the speed to which visual injury could be seen, but they did not change the long run outcome of each herbicide for dandelion or buckhorn plantain control. However, results could

be different if the applications were made in the fall when plants begin to harden off for the winter.

The Broadleaf Plantain Control Trial was conducted at the HTRC. The trial was made up of 3 different herbicides, Turflon Ester (triclopyr), Trimec Classic (2,4-D, MCPP, dicamba), and Lontrel (clopyralid) and included three application timings, May 8 (A), May 31 (B), July 5 (C), and September 13 (D), 2007. Broadleaf plantain has proven to be a more difficult to control weed than first anticipated, so trial was set up in an area with a large plantain population, however, control of dandelion and white clover was also evaluated. A complete treatment list and results from this trial are shown in Table 18.

Early Trimec Classic and Turflon Ester treatments (A) provided poor control of broadleaf plantain on each rating date, however, Lontrel provided excellent control of plantain even 97 DAT-A. All other treatments on every rating date provided excellent control of broadleaf plantain. Weed populations will again be evaluated in the spring.

The Trimec Fall Timings Trial was initiated at the HTRC. The trial is made up of 4 application timings and 2 herbicides, Trimec Classic (amine) and Super Trimec (ester). Applications were made on October 19 (A), 25 (B), November 1 (C), and 11 (D), 2007. Initial weed populations were counted before application and weed population evaluations will be made in the spring of 2008 to determine treatment efficacy.

Table 1 – Adjuvant Efficacy in Broadleaf Weed Control Trial – Fall of 2006

HTRC, East Lansing, MI

Treatment	Rate	White Clover	White Clover	Dandelion
		Oct. 9, 2006 24 DAT	April 24, 2007 221 DAT	April 24, 2007 221 DAT
		percent control		
Trimec Amine*	4 pt/A	93 ab	100 a	45 bc
Trimec Amine	2 pt/A	85 abc	100 a	22 c-g
Trimec Amine	1 pt/A	61 d-g	97 ab	34 cd
Trimec Amine	0.5 pt/A	65 c-f	72 b	4 fg
Trimec Amine AAA	2 pt/A 20 % v/v	95 ab	100 a	60 ab
Trimec Amine AAA	1 pt/A 20 % v/v	97 a	98 a	30 cde
Trimec Amine AAA	0.5 pt/A 20 % v/v	93 ab	100 a	15 d-g
Trimec Amine AAA	0.5 pt/A 10 % v/v	95 ab	100 a	23 c-f
Trimec Amine AAA	0.5 pt/A 5 % v/v	82 a-d	100 a	18 d-g
Trimec Amine BBB	0.5 pt/A 20 % v/v	84 abc	93 ab	22 c-g
Trimec Ester**	3 pt/A	97 a	100 a	81 a
Trimec Ester	0.75 pt/A	77 a-e	100 a	26 c-f
Trimec Ester	0.375 pt/A	57 efg	97 ab	5 fg
Trimec Ester AAA	0.75 pt/A 20 % v/v	75 b-f	98 a	17 d-g
Trimec Ester AAA	0.375 pt/A 20 % v/v	55 fg	86 ab	11 d-g
Trimec Ester BBB	0.375 pt/A 20 % v/v	93 ab	100 a	19 d-g
AAA	20 % v/v	30 h	19 cd	5 fg
AAA	10 % v/v	43 gh	32 c	7 efg
Untreated		0 i	0 d	0 g
LSD (p≤0.05)		21	25	23

† Means followed by same letter do not significantly differ (P≤0.05, LSD).

* Trimec Classic (amine)

** Super Trimec (ester)

Table 2: PC Turf RTU vs. Concentrate Trial – Weed Control – 2007

Evergreen Cemetery, Lansing, MI

Treatment	Rate	Spray Output gal/A	Dandelion		Buckhorn Plantain	
			June 18 28 DAT	July 10 50 DAT	June 18 28 DAT	July 10 50 DAT
			percent control			
PC RTU	100 % v/v	30	38 bc	34 de	54 a-d	34 d
PC RTU	100 % v/v	64	57 ab	49 bcd	87 ab	48 cd
PC RTU	100 % v/v	107	64 ab	74 abc	82 abc	79 abc
PC RTU	100 % v/v	200	78 a	85 ab	90 a	88 ab
PC Conc.	10 % v/v	30	71 ab	54 bcd	63 a-d	39 d
PC Conc.	10 % v/v	64	73 ab	40 cd	65 a-d	46 cd
PC Conc.	10 % v/v	107	89 a	77 ab	80 a-d	63 bcd
PC Conc.	10 % v/v	200	52 ab	50 bcd	91 a	82 ab
Trimec Classic PC Adj. 06	0.6 pt/A 10 % v/v	64	53 ab	48 bcd	43 cd	36 d
Trimec Classic	0.6 pt/A	64	36 bc	36 de	42 d	44 d
Trimec Classic	4 pt/A	64	72 ab	100 a	48 bcd	100 a
Untreated			0 c	0 e	0 e	0 e
LSD (p≤0.05)			41	37	40	33

† Means followed by same letter do not significantly differ (P≤0.05, LSD).

Table 3: PC Turf RTU vs. Concentrate Trial – Turf Injury – 2007
 Evergreen Cemetery, Lansing, MI

Treatment	Rate	Spray Output gal/A	Turf					
			May 23 2 DAT	May 30 9 DAT	injury (1-9*)		June 5 15 DAT	
PC RTU	100 % v/v	30	3.0 b-e	2.7 ab			1.7	
PC RTU	100 % v/v	64	1.7 de	1.3 b			1.0	
PC RTU	100 % v/v	107	4.7 ab	4.3 a			2.3	
PC RTU	100 % v/v	200	3.7 a-d	2.7 ab			1.3	
PC Conc.	10 % v/v	30	2.0 cde	1.3 b			1.3	
PC Conc.	10 % v/v	64	2.3 cde	1.7 b			1.0	
PC Conc.	10 % v/v	107	4.0 abc	2.7 ab			1.7	
PC Conc.	10 % v/v	200	5.3 a	4.3 a			3.0	
Trimec Classic PC Adj. 06	0.6 pt/A 10 % v/v	64	2.7 b-e	1.7 b			1.3	
Trimec Classic	0.6 pt/A	64	1.0 e	1.3 b			1.0	
Trimec Classic	4 pt/A	64	1.3 e	1.7 b			1.0	
Untreated			1.0 e	1.0 b			1.0	
LSD (p≤0.05)			2.2	1.7			NS	

† Means followed by same letter do not significantly differ (P≤0.05, LSD).

* injury measured where 1= no injury and 9= dead turf.

Table 4: PC Turf Concentrate – Differing Application Volumes Trial – Turf Injury – 2007
 Evergreen Cemetery, Lansing, MI

Treatment	Rate	Spray Output gal/A	Turf		
			May 23 2 DAT	May 30 9 DAT	June 5 15 DAT
			injury (1-9*)		
PC Conc.	10 % v/v	30	2.7 b	1.7 cd	1.0
PC Conc.	10 % v/v	64	1.7 bc	1.0 d	1.0
PC Conc.	10 % v/v	107	4.7 a	2.3 bc	1.0
PC Conc.	10 % v/v	200	5.7 a	3.7 a	1.0
PC Conc.	20 % v/v	64	5.7 a	3.0 ab	1.0
PC Conc.	5.7 % v/v	64	2.0 bc	1.3 d	1.0
PC Conc.	3 % v/v	64	1.0 c	1.0 d	1.0
Untreated			1.0 c	1.0 d	1.0
LSD (p≤0.05)			1.5	0.7	NS

† Means followed by same letter do not significantly differ (P≤0.05, LSD).

* injury measured where 1= no injury and 9= dead turf.

Table 5: Broadleaf Weed Control – Dimension + Florasulam and/or Penoxulam – 2007
 HTRC, East Lansing, MI

Treatment	Dandelion		White Clover	
	June 13 36 DAT	July 9 62 DAT	June 13 36 DAT	July 9 62 DAT
	percent control			
E2350-29A	12 bc	9	2 e	0 d
E2350-29B	10 c	0	72 abc	19 cd
E2350-29C	0 c	0	4 e	15 cd
E2350-29D	4 c	0	51 cd	37 bc
E2350-29E	15 bc	0	91 ab	23 cd
E2350-29F	10 c	0	36 d	19 cd
E2350-29G	0 c	1	66 bc	30 cd
E2350-29H	65 a	15	95 a	73 a
E2350-29J	35 b	5	94 a	65 ab
Untreated	0 c	0	0 e	0 d
LSD (p≤0.05)	24.3	NS	26.1	32.4

† Means followed by same letter do not significantly differ (P≤0.05, LSD).

NS indicates not significant.

*All treatments applied 150 lb/A.

Table 6: General Right of Way Broadleaf Weed Control – 2007
Park and Ride, Holt, MI

Treatment	Rate	Wild Carrot	Buckhorn Plantain
		September 25 41 DAT	
		percent control	
Amino/Tric	4 pt/A	63 a	11 bc
Amino/Tric	6 pt/A	57 a	29 abc
Amino/Tric	8 pt/A	73 a	67 a
Milestone	5 fl oz/A	76 a	6 bc
Garlon 3A	32 fl oz/A	45 a	49 ab
Trimec Classic	4 pt/A	62 a	58 a
Untreated		0 b	0 c
LSD (p≤0.05)		43.1	45.8

† Means followed by same letter do not significantly differ (P≤0.05, LSD).

*All treatments, except Trimec Classic, included a nonionic surfactant at a rate of 0.25 % v/v.

Table 7: Postemergence Broadleaf Weed Control with Echelon - 2007

HTRC, East Lansing, MI

Treatment	Rate (lb ai/A)	App. Timing	Dandelion		White Clover	
			June 14 37 DAT-A	July 25 78 DAT-A 30 DAT-B	June 14 37 DAT-A	July 25 78 DAT-A 30 DAT-B
			percent control			
Dismiss	0.188	A	6	58	16 a	47
Echelon	0.375	A	3	41	1 ab	27
Echelon	0.570	A	10	44	4 ab	27
Echelon	0.750	A	4	49	5 ab	31
Echelon	0.375	A	10	53	13 a	35
Echelon	0.375	B				
Echelon Gran	0.375	A	0	57	0 a	34
Echelon Gran	0.570	A	0	35	8 ab	25
Echelon Gran	0.750	A	2	32	6 ab	8
Echelon Gran	0.375	A	8	20	2 bc	5
Echelon Gran	0.375	B				
Echelon Gran Fert	0.375	A	10	39	0 ab	24
Echelon Gran Fert	0.570	A	0	44	1 ab	22
Echelon Gran Fert	0.750	A	4	39	6 ab	28
Echelon Gran Fert	0.375	A	19	19	9 bc	21
Echelon Gran Fert	0.375	B				
Barricade	0.500	A	0	22	1 bc	8
Dimension	0.500	A	1	40	0 ab	14
Untreated			0	0	0 c	0
LSD (p≤0.05)			NS	NS	31	NS

†Means in a column followed by the same letter do not significantly differ (P≤0.05, LSD).

NS indicates not significant.

Table 8: Postemergence Broadleaf Weed Control Dismiss - 2007

HTRC, East Lansing, MI

Treatment	Rate (lb ai/A)	Dandelion		White Clover	
		July 9 24 DAT	July 35 40 DAT	July 9 24 DAT	July 35 40 DAT
		percent control			
Dismiss	0.125	30 bc	32 bc	49 b	21 cd
Dismiss	0.375	36 bc	45 b	63 ab	49 bc
Dismiss	0.570	24 bc	24 bc	50 b	0 d
Turflon	0.750	96 a	88 a	100 a	100 a
Trimec Classic	0.375	52 b	90 a	100 a	87 ab
Untreated		0 c	0 c	0 c	0 d
LSD (p≤0.05)		37	35	38	38

†Means in a column followed by the same letter do not significantly differ (P≤0.05, LSD).

Table 9: Pre and Post Crabgrass and Broadleaf Weed Control – LCO Programs – 2007

Evergreen Cemetery, Lansing, MI

		Dandelion						Buckhorn Plantain			
Treatment	Rate	App. Timing	May 30	June 18	July 2	Sept 13	May 30	June 18	July 2	Sept 13	
			42 DA-A	61 DA-A 19 DA-B 7 DA-C	75 DA-A 33 DA-B 21 DA-C	148 DA-A 106 DA-B 94 DA-C	42 DA-A	61 DA-A 19 DA-B 7 DA-C	75 DA-A 33 DA-B 21 DA-C	148 DA-A 106 DA-B 94 DA-C	
percent control											
1	AND7023 AND7030 x3	4 lb/M	A BCD	35	66 ab	80 a	56 b	36 bc	77 b	95 a	92 a
2	AND7010 AND7031 x3	4 lb/M	A BCD	35	82 ab	88 a	69 ab	24 c	73 b	96 a	89 a
3	AND7024 AND7032 x3	4 lb/M	A BCD	30	86 a	94 a	73 ab	47 ab	93 a	97 a	99 a
4	AND7028 AND7031 x3	4 lb/M	A BCD	47	86 a	92 a	80 ab	55 a	88 a	97 a	93 a
5	AND7012 AND7039 x3	4 lb/M	A BCD	18	10 c	20 b	8 c	18 cd	75 b	97 a	94 a
6	Dimension* AND7038 Triplet Sensitive AND7038 AND7038 Triplet Sensitive AND7038	4 lb/M 4 pt/A 4 lb/M 4 lb/M 4 pt/A 4 lb/M	A A B C D D	23	57 b	77 a	86 a	21 c	89 a	100 a	100 a
7	AND7038 x4	4 lb/M	ABCD	19	21 c	10 b	17 c	0 d	4 c	15 b	38 b
8	Untreated			0	0 c	0 b	0 c	0 d	0 c	0 c	0 c
LSD (p≤0.05)				NS	27.7	29.9	29.2	18.1	8.1	9.0	26.0

† Means followed by same letter do not significantly differ (P≤0.05, LSD).

NS indicates not significant.

*Dimension 2EW applied at 0.374 lb ai/A.

Table 10: Pre and Post Crabgrass and Broadleaf Control – LCO Programs – 2007
Evergreen Cemetery, Lansing, MI

				Crabgrass		
Treatment	Rate	App. Timing	crabgrass centers			
			July 2	August 14	Sept 13	
			75 DA-A	118 DA-A	148 DA-A	
			33 DA-B	76 DA-B	106 DA-B	
			21 DA-C	64 DA-C	94 DA-C	
1	AND7023 AND7030 x3	4 lb/M	A BCD	0.7 b	5.0 bc	0.3 b
2	AND7010 AND7031 x3	4 lb/M	A BCD	1.0 b	6.3 bc	2.3 b
3	AND7024 AND7032 x3	4 lb/M	A BCD	0.3 b	2.0 c	0.0 b
4	AND7028 AND7031 x3	4 lb/M	A BCD	0.0 b	2.0 c	0.0 b
5	AND7012 AND7039 x3	4 lb/M	A BCD	0.0 b	1.3 c	0.3 b
6	Dimension*		A			
	AND7038	4 lb/M	A			
	Triplet Sensitive	4 pt/A	B			
	AND7038	4 lb/M	B	0.0 b	3.0 c	0.0 b
	AND7038	4 lb/M	C			
	Triplet Sensitive	4 pt/A	D			
	AND7038	4 lb/M	D			
7	AND7038 x4	4 lb/M	ABCD	24.7 a	19.7 a	31.7 a
8	Untreated			25.3 a	14.0 ab	28.0 a
LSD (p≤0.05)				10.00	9.33	19.59

† Means followed by same letter do not significantly differ (P≤0.05, LSD).

*Dimension 2EW applied at 0.374 lb ai/A.

Table 11: General Broadleaf Weed Control Trial - 2007

HTRC, East Lansing, MI, Michigan State University

Treatment	Rate (lb ae/A)	Dandelion		White Clover	
		July 6 38 DAT	July 25 57 DAT	July 6 38 DAT	July 25 57 DAT
percent control					
S-13042	0.075	34 e	38 b	98 a	100 a
S-13043	0.1	63 d	49 b	100 a	100 a
S-13044	0.125	76 bc	79 a	99 a	100 a
S-13045	0.150	83 ab	86 a	100 a	100 a
S-13046	0.200	94 a	90 a	99 a	100 a
S-12912	2.25	12 f	4 c	65 b	54 b
Trimec Classic	1.38	66 cd	55 b	92 a	100 a
UNTREATED		0 f	0 c	0 c	0 c
LSD ($p \leq 0.05$)		12	21	10	16

†Means followed by same letter do not significantly differ ($P \leq 0.05$, LSD).

Table 12: Common Chickweed Control Trial - 2007

HTRC, East Lansing, MI, Michigan State University

Treatment	Rate (lb ae/A)	Common Chickweed					Dandelion
		May 15 25 DAT	June 5 46 DAT	April 20 0 DAT*	May 15 25 DAT	June 5 46 DAT	June 5 46 DAT
		percent control		centers			percent control
S-13042	0.075	72 ab	44	17.7	2.7	2.0	31 c
S-13043	0.1	74 ab	62	19.3	3.5	0.3	58 b
S-13044	0.125	77 ab	51	16.0	2.0	0.7	88 a
S-13045	0.150	50 b	25	11.7	2.3	1.0	79 a
S-13046	0.200	72 ab	58	23.3	3.3	0.3	90 a
S-12912	2.25	73 ab	33	18.7	2.7	2.3	17 cd
Trimec Classic	1.38	86 a	67	23.3	2.0	0.0	90 a
UNTREATED		0 c	0	13.0	7.0	2.7	0 d
LSD ($p \leq 0.05$)		32	NS	NS	NS	NS	21

†Means followed by same letter do not significantly differ ($P \leq 0.05$, LSD).

NS indicates not significant.

* data collected prior to treatment application to facilitate the Henderson-Tilton method

Table 13: Ground Ivy Control Trial - 2007

Residential Site – Howell, MI

Treatment	Rate (lb ae/A)	Ground Ivy		
		July 6	July 16	August 15
		percent control		
S-13042	0.075	83 ab	100 a	99 a
S-13043	0.1	82 ab	98 a	100 a
S-13044	0.125	86 a	99 a	99 a
S-13045	0.150	87 a	100 a	100 a
S-13046	0.200	9. a	100 a	100 a
S-12912	2.25	62 b	70 b	81 b
Trimec Classic	1.38	97 a	100 a	100 a
UNTREATED		0 c	0 c	0 c
LSD ($p \leq 0.05$)		23	12	5

†Means followed by same letter do not significantly differ ($P \leq 0.05$, LSD).

Table 14: Advan General Broadleaf Weed Control - 2007

HTRC, East Lansing, MI, Michigan State University

Treatment	Rate	App. Timing	Dandelion			White Clover			Broadleaf Plantain		
			July 7	July 25	August 28	July 7	July 25	August 28	July 7	July 25	August 28
			39 DAT-A 25 DAT-B	57 DAT-A 43 DAT-B	91 DAT-A 77 DAT-B	39 DAT-A 25 DAT-B	57 DAT-A 43 DAT-B	91 DAT-A 77 DAT-B	39 DAT-A 25 DAT-B	57 DAT-A 43 DAT-B	91 DAT-A 77 DAT-B
percent control											
Barricade	1 lb/A	A	0 c	11 b	0 c	7 c	35 b	34 b	8	0	0
ADV-4001	1.5 lb/A	B	24 bc	85 a	30 b	86 a	100 a	98 a	21	11	37
ADV-4001	3 lb/A	A	78 a	98 a	75 a	100 a	100 a	100 a	0	0	0
Dimension	1.5 pt/A	A	23 bc	11 b	6 c	24 b	15 bc	20 bc	17	19	33
Drive	1 lb/A	B	24 b	91 a	78 a	93 a	100 a	100 a	3	10	0
Untreated			0 c	0 b	0 c	0 c	0 c	0 c	0	0	0
LSD (p≤0.05)			24	21	24	16	28	32	NS	NS	NS

†Means followed by same letter do not significantly differ (P≤0.05, LSD).

NS indicates not significant.

Table 15 – Adjuvant Efficacy in Broadleaf Weed Control with Escalade – 3 Timings– 2007

Evergreen Cemetery, Lansing, MI

Treatment	App. Timing	Dandelion				Buckhorn Plantain			
		June 8	June 18	July 10	August 21	June 8	June 18	July 10	August 21
		28 DA-A 8 DA-B	38 DA-A 18 DA-B	60 DA-A 40 DA-B 25 DA-C	102 DA-A 82 DA-B 67 DA-C	28 DA-A 8 DA-B	38 DA-A 18 DA-B	60 DA-A 40 DA-B 25 DA-C	102 DA-A 82 DA-B 67 DA-C
percent control									
Escalade	A	98 b	100 a	99 ab	100 a	72 c	89 a	98 a	97 a
Escalade Microyl	A	100 a	100 a	100 a	100 a	86 b	97 a	100 a	100 a
Escalade Simplex	A	100 a	100 a	96 b	100 a	96 a	100 a	100 a	97 a
Escalade Transport Ultra	A	100 a	100 a	100 a	100 a	80 bc	95 a	100 a	100 a
Escalade	B		83 c	100 a	100 a		14 bc	82 ab	44 b
Escalade Microyl	B		91 bc	99 ab	100 a		19 bc	89 a	58 b
Escalade Simplex	B		93 ab	99 ab	100 a		22 b	97 a	91 a
Escalade Transport Ultra	B		92 ab	100 a	100 a		22 b	90 ab	86 a
Escalade	C			100 a	100 a			82 ab	100 a
Escalade Microyl	C			98 ab	91 b			82 abc	100 a
Escalade Simplex	C			100 a	100 a			63 c	98 a
Escalade Transport Ultra	C			100 a	100 a			73 bc	99 a
Untreated		0 c	0 d	0 c	0 c	0 d	0 c	0 d	0 c
LSD (p≤0.05)		1.5	8.9	3.8	7.3	9.6	20.4	19.2	24.8

† Means followed by same letter do not significantly differ (P≤0.05, LSD).

Table 16: Adjuvant Efficacy in Broadleaf Weed Control with Trimec Classic and Super Trimec 2007 – Dandelion Control

Evergreen Cemetery, Lansing, MI

Treatment	Rate	App. Timing	Dandelion		
			June 8 23 DA-A	June 18 33 DA-A	July 10 55 DA-A 25 DA-B
			percent control		
Trimec Classic	4 pt/A	A	62 d	95 a	100 a
Trimec Classic Simplex	4 pt/A 0.5 % v/v	A	98 a	67 a	67 a
Trimec Classic Delux	4 pt/A 1.25 % v/v	A	86 abc	97 a	100 a
Trimec Classic Transport Ultra	4 pt/A 0.5 % v/v	A	86 abc	84 a	100 a
Super Trimec	3 pt/A	A	95 ab	84 a	100 a
Super Trimec Simplex	3 pt/A 0.5 % v/v	A	77 bcd	99 a	100 a
Super Trimec Delux	3 pt/A 1.25 % v/v	A	68 cd	95 a	90 a
Super Trimec Transport Ultra	3 pt/A 0.5 % v/v	A	90 ab	97 a	99 a
Trimec Classic	4 pt/A	B			99 a
Trimec Classic Simplex	4 pt/A 0.5 % v/v	B			84 a
Trimec Classic Delux	4 pt/A 1.25 % v/v	B			96 a
Trimec Classic Transport Ultra	4 pt/A 0.5 % v/v	B			84 a
Super Trimec	3 pt/A	B			100 a
Super Trimec Simplex	3 pt/A 0.5 % v/v	B			80 a
Super Trimec Delux	3 pt/A 1.25 % v/v	B			67 a
Super Trimec Transport Ultra	3 pt/A 0.5 % v/v	B			100 a
Untreated			0 e	0 b	0 b
LSD (p≤0.05)			19.5	41.8	40.4

† Means followed by same letter do not significantly differ (P≤0.05, LSD).

* Trimec Classic (amine)

** Super Trimec (ester)

Table 17: Adjuvant Efficacy in Broadleaf Weed Control with Trimec Classic and Super Trimec 2007 – Buckhorn Plantain Control – Evergreen Cemetery, Lansing, MI

Treatment	Rate	App. Timing	Buckhorn Plantain			
			June 8	June 18	July 10	August 21
			23 DA-A	33 DA-A	55 DA-A 25 DA-B	97 DA-A 67 DA-B
percent control						
Trimec Classic	4 pt/A	A	52	94 a	100 a	96 a
Trimec Classic Simplex	4 pt/A 0.5 % v/v	A	46	72 a	95 ab	97 a
Trimec Classic Delux	4 pt/A 1.25 % v/v	A	46	90 a	97 ab	93 a
Trimec Classic Transport Ultra	4 pt/A 0.5 % v/v	A	36	75 a	97 ab	95 a
Super Trimec	3 pt/A	A	45	81 a	96 ab	90 a
Super Trimec Simplex	3 pt/A 0.5 % v/v	A	46	85 a	99 a	99 a
Super Trimec Delux	3 pt/A 1.25 % v/v	A	49	81 a	89 abc	65 b
Super Trimec Transport Ultra	3 pt/A 0.5 % v/v	A	54	88 a	100 a	95 a
Trimec Classic	4 pt/A	B			57 de	100 a
Trimec Classic Simplex	4 pt/A 0.5 % v/v	B			64 de	100 a
Trimec Classic Delux	4 pt/A 1.25 % v/v	B			73 bcd	100 a
Trimec Classic Transport Ultra	4 pt/A 0.5 % v/v	B			55 de	99 a
Super Trimec	3 pt/A	B			56 de	93 a
Super Trimec Simplex	3 pt/A 0.5 % v/v	B			60 de	99 a
Super Trimec Delux	3 pt/A 1.25 % v/v	B			46 e	96 a
Super Trimec Transport Ultra	3 pt/A 0.5 % v/v	B			65 cde	93 a
Untreated			0	0 b	0 f	0 c
LSD (p≤0.05)			NS	22.8	24.8	19.0

† Means followed by same letter do not significantly differ (P≤0.05, LSD).

NS indicates not significant.

* Trimec Classic (amine)

** Super Trimec (ester)

Table 18: Broadleaf Plantain Control – 3 Active Ingredients & 4 Application Timings - 2007
 Evergreen Cemetery, Lansing, MI

Treatment	Rate (pt/A)	App. Timing	Broadleaf Plantain			Dandelion		White Clover	
			June 20	July 16	Aug 13	June 20	Aug 13	June 20	Aug 13
			43 DA-A 20 DA-B	69 DA-A 46 DA-B	97 DA-A 74 DA-B 39 DA-C	43 DA-A 20 DA-B	97 DA-A 74 DA-B 39 DA-C	43 DA-A 20 DA-B	97 DA-A 74 DA-B 39 DA-C
percent control									
Turflon Ester	2	A	39 cd	20 b	36 b	28 b	53 d	100 a	61 a
Trimec Classic	4	A	44 bcd	0 b	25 bc	75 a	75 bc	100 a	83 a
Lontrel	1.33	A	91 ab	77 a	80 a	87 a	93 ab	100 a	100 a
Turflon Ester	2	B	97 a	98 a	83 a	93 a	100 a	98 a	67 a
Trimec Classic	4	B	100 a	99 a	91 a	94 a	67 cd	98 a	100 a
Lontrel	1.33	B	82 abc	92 a	97 a	95 a	91 ab	100 a	100 a
Turflon Ester	2	C			100 a		100 a		100 a
Trimec Classic	4	C			100 a		100 a		100 a
Lontrel	1.33	C			100 a		100 a		100 a
Turflon Ester	2	D							
Trimec Classic	4	D							
Lontrel	1.33	D							
Untreated			0 d	0 b	0 c	0 c	0 e	0 b	0 b
LSD (p≤0.05)			48.4	26.8	29.2	21.5	19.3	3.0	44.6

† Means followed by same letter do not significantly differ (P≤0.05, LSD).
 NS indicates not significant.