

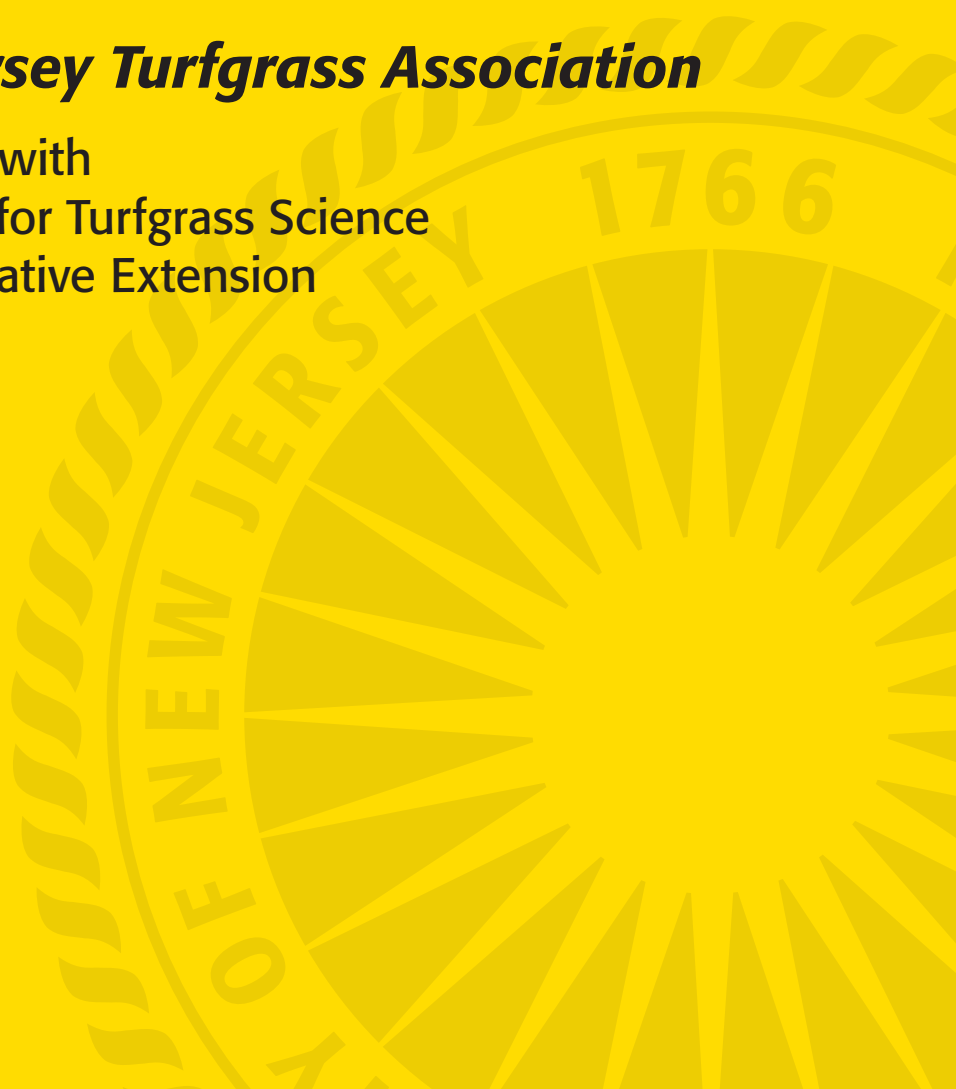
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This publication includes lecture notes of papers presented at the 2007 New Jersey Turfgrass Expo. Publication of these lectures provides a readily avail-

able source of information covering a wide range of topics and includes technical and popular presentations of importance to the turfgrass industry.

This proceedings also includes research papers that contain original research findings and reviews of selected subjects in turfgrass science. These papers are presented primarily to facilitate the timely dissemination of original turfgrass research for use by the turfgrass industry.

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Dr. Ann Brooks Gould, Editor
Dr. Bruce B. Clarke, Coordinator

NEW OPTIONS FOR BROADLEAF WEED CONTROL IN RESIDENTIAL TURFGRASS

Patrick McCullough and Steve Hart¹

As spring approaches, lawn and landscape managers will begin to prepare herbicide programs for postemergence broadleaf weed control. However, clopyralid, one of the most effective active ingredients for broadleaf weed control, may no longer be applied on residential turfgrass. Clopyralid is found in several herbicide products such as Confront®, which has been pulled from the residential turf market due to its persistence in compost composed primarily of grass clippings. Consequently, practitioners have lost a very effective herbicide for broadleaf weeds, especially white clover control, in residential turfgrass.

Recently, a new herbicide has been introduced to the turf industry for broadleaf weed control called Spotlight®, which contains the active ingredient fluroxypyr. Preliminary field experiments with Spotlight noted effective broadleaf weed control during cool weather, which suggests that turf managers have a greater window for weed control during early spring. The herbicide also has good levels of safety on established bentgrass, Kentucky bluegrass, perennial ryegrass, and various fescue species. However, Spotlight is not a stand alone product. The most effective incorporation of Spotlight into residential turfgrass weed control will likely be in tank-mixtures with ester formulations of other herbicides. In New Jersey, experiments were conducted to investigate Spotlight efficacy with and without tank-mixture combinations in various spring application timings for broadleaf weed control in residential turfgrass areas.

PROCEDURES

Three field experiments were conducted at the Rutgers Plant Biology and Pathology Research and Extension Farm in Adelphia, NJ in 2004 and 2005 for broadleaf weed control with spring herbicide applications. Experiment 1 was initiated 14 May, 2004 in Baron Kentucky bluegrass maintained as a home lawn at a 2.5-inch mowing height. Herbicide applications were made with a CO₂ pressured sprayer set to deliver 40 gal/acre with a three nozzle boom consisting of 11002VS Tee Jet® nozzles. Treatments (listed in Table 1) included Spotlight at 1 pt/acre, 2,4-D amine at 2 pt/acre, or Spotlight tank-mixed with three rates of 2,4-D. Air/soil temperatures the day of herbicide applications was 72/69°F.

Experiment 2 was initiated 14 April, 2005 in perennial ryegrass under similar maintenance as aforementioned. Herbicides, listed in Table 2, were applied in early spring, mid-spring, or late spring on 14 April, 28 April, and 27 May, respectively. Air/soil temperatures were 62/50, 62/57, and 76/61°F on 14 April, 28 April, or 27 May, respectively. Herbicides were applied with a single nozzle CO₂ pressurized sprayer calibrated to deliver 40 gal/acre with a 9504E nozzle.

Plots were arranged in a randomized complete block design with four replications of 5 x 12 ft and 3 x 10 ft plots in Experiments 1 and 2, respectively. Weed control was rated visually on a percent scale, where

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0 = no control to 100 = complete control. Turfgrass injury was rated on a percent scale, where 0 = no injury to 100 = completely dead turf. Injury levels of 20% or greater were considered unacceptable. Data were subjected to analysis of variance and means were separated with Fisher's Protected LSD test at the 0.05 probability level.

RESULTS AND DISCUSSION

Turfgrass injury did not result from any herbicide applications in both experiments conducted. In Experiment 1, Spotlight (fluroxypyr) alone provided 83% dandelion control by 25 days after treatment (DAT), but control was reduced to only 65% by 60 DAT (Table 1). Including 2,4-D with Spotlight gave 95 to 99% dandelion control 60 DAT while increasing rates of 2,4-D from 0.5 to 2 pt/acre did not enhance efficacy. Spotlight alone controlled white clover better than 2,4-D by 25 DAT. Including 2,4-D with Spotlight resulted in more rapid white clover control by 25 DAT compared to Spotlight alone, but final results were similar by 60 DAT. White clover control from 2,4-D alone declined to 0% by 60 DAT, while the efficacy of all other treatments was 99%.

In Experiment 2, early spring (April 14) applications of an experimental mixture of 2,4-D plus fluroxypyr plus dicamba acid resulted in more rapid herbicidal activity for dandelion and white clover control than Chaser and Triplet by 14 DAT (Table 2). The Chaser, Triplet, 2,4-D DMA plus fluroxypyr plus dicamba acid combination as well as Banvel plus 2,4-D plus Turflon Ester resulted in similar (97 to 99%) control of dandelion and buckhorn plantain. However, white clover control was significantly lower with Chaser (91%) compared to that of other herbicides (98 to 99%). Both application rates of the 2,4-D Ester plus Turflon Ester plus Banvel combination resulted in 99% control of plantain, dandelion, and white clover. When applied on April 14, Chaser efficacy was less than other herbicides for controlling plantain, dandelion, and white clover. Chaser and

Triplet provided approximately 20% less mouseear chickweed control than other treatments.

When applied April 28, 2,4-D plus fluroxypyr plus dicamba had quicker herbicidal activity 14 DAT for dandelion and white clover control than Chaser, Millennium Ultra, and Triplet (Table 2). Chaser and Millennium Ultra gave 70 and 74% mouseear chickweed control, respectively, while Triplet and the 2,4-D DMA plus fluroxypyr plus dicamba acid combination provided 92 and 99% mouseear chickweed control, respectively. Air temperatures on April 28 were comparable to the April 14th application date, but soil temperatures were warmer. 2,4-D plus fluroxypyr plus dicamba acid had substantially quicker activity for dandelion control 14 DAT when applied May 27 than all other herbicides tested and the combination had quicker activity for white clover control than Triplet. Triplet, 2,4-D plus fluroxypyr plus dicamba acid, and Millennium Ultra all provided comparable broadleaf weed control (91 to 99%) 60 DAT when applied at warmer temperatures, 76/61°F (air/soil), on May 27.

CONCLUSIONS

Ester formulations of herbicide mixtures containing Spotlight (fluroxypyr) gave exceptional control of common dandelion, buckhorn plantain, and white clover during early spring with rapid levels of herbicidal activity. Although not tested in these field experiments, Spotlight also effectively controls bindweed, ground ivy, woodsorrel, and other selected weeds (Table 3). Spotlight should not be used on fine turf areas such as golf greens or tees and should not be applied to turfgrasses under stress. Small plot testing of Spotlight with herbicide combinations for turfgrass safety is always recommended prior to broadcast applications. Overall, Spotlight has rapid activity on broadleaf weeds from early to late spring, especially when used with 2,4-D, and appears to be a good alternative herbicide to clopyralid-containing products for residential turfgrass weed control.

Table 1. Common dandelion and white clover control with Spotlight in combination with 2,4-D in field experiments, Adelphia NJ.

Treatment ¹	Rate (pt/acre)	-----Weed Control (%)-----			
		-----Dandelion-----		-----White Clover-----	
		25 DAT ²	60 DAT	25 DAT	60 DAT
Spotlight	1	83	65	88	99
2,4-D Amine 4	2	84	96	35	0
Spotlight + 2,4-D Amine 4	1 + 0.5	92	99	99	99
	1 + 1	95	95	96	99
	1 + 2	96	99	95	99
Untreated	—	0	0	0	0
LSD at 5% =		6	6	8	0

¹Herbicides were applied May 14, 2004. The active ingredient in Spotlight (1.5 EC) is fluroxypyr.

²DAT = days after treatment

Table 2. Broadleaf weed control in perennial ryegrass, 2005, Adelphia, NJ.

Application Date	Treatment ¹	Rate (pt/acre)	-----Weed Control (%)-----							
			-----Plaintain-----		-----Dandelion-----		-----White Clover-----		Mouseear -----Chickweed-----	
			14 DAT ²	60 DAT	14 DAT	60 DAT	14 DAT	60 DAT	14 DAT	60 DAT
April 14	Chaser (3EC)	3.0	46	97	58	99	34	91	5	79
	2,4-D (3.2L) + fluroxypyr (0.4EC) + dicamba acid (0.4EC)	3.0	50	99	78	99	48	99	8	99
	2,4-D Ester (L) + Turflon Ester (4EC) + Banvel (4SL)	1.5 0.5 0.2	50	99	63	99	36	99	11	95
	2,4-D Ester (L) + Turflon Ester (4EC) + Banvel (4SL)	2.0 0.75 0.25	53	99	66	99	45	99	18	99
	Triplet SF (3.23EC)	3.5	46	99	46	97	36	98	8	79
	Untreated	—	0	0	0	0	0	0	0	0
	LSD at 5% =		8	5	11	4	8	7	8	11
April 28	Chaser (3EC)	3.0	45	98	45	86	30	74	12	70
	Millennium Ultra (3.75EC)	2.7	54	99	43	94	38	98	18	74

(Continued)

Table 2 (continued).

Application Date	Treatment ¹	Rate (pt/acre)	-----Weed Control (%)-----							
			-----Plaintain-----		-----Dandelion-----		-----White Clover-----		Mouseear -----Chickweed-----	
			14 DAT ²	60 DAT	14 DAT	60 DAT	14 DAT	60 DAT	14 DAT	60 DAT
April 28 (continued)										
	2,4-D (3.2L) + fluroxypyr (0.4EC) + dicamba acid (0.4EC)	3.0	52	99	72	97	53	99	30	99
	Triplet SF (3.23EC)	3.5	54	99	58	92	40	99	21	92
	Untreated	—	0	0	0	0	0	0	0	0
	LSD at 5% =		9	1	10	6	8	6	16	7
May 27										
	Millennium Ultra (3.75EC)	2.7	63	99	66	97	48	99	40	99
	2,4-D (3.2L) + fluroxypyr (0.4EC) + dicamba acid (0.4EC)	3.0	66	99	94	96	50	99	45	99
	Triplet SF (3.23EC)	3.5	63	99	69	91	43	97	40	99
	Untreated	—	0	0	0	0	0	0	0	0
	LSD at 5% =		5	0	5	8	7	1	11	0

¹ Active ingredients in herbicides applied were Chaser 3EC (triclopyr + 2,4-D); Turflon Ester 4EC (triclopyr); Banvel 4SL (dicamba); Triplet SF 3.23EC (2,4-D + dicamba + MCPA); Millennium Ultra 3.75EC (dicamba + 2,4-D + clopyralid)

² DAT = days after treatment

Table 3. Weeds listed as controlled on the Spotlight (fluroxypyr) herbicide label.

Common Name	Latin Name
bindweed, field	<i>Convolvulus arvensis</i> L.
buttonweed, Virginia	<i>Diodia virginiana</i> L.
chickweed	<i>Cerastium</i> spp.
deadnettle, purple	<i>Lamium purpureum</i> L.
henbit	<i>Lamium amplexicaule</i> L.
ivy, ground	<i>Glechoma hederacea</i> L.
knotweed, prostrate	<i>Polygonum aviculare</i> L.
medic, black	<i>Medicago lupulina</i> L.
plantain, broadleaf	<i>Plantago major</i> L.
plantain, buckhorn	<i>Plantago lanceolata</i> L.
speedwell, slender	<i>Veronica filiformis</i> Sm.
woodsorrel, common	<i>Oxalis</i> spp.



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