



## The Safety and Efficacy of Slow Release Diuron.

Mark A. Czarnota  
 University of Georgia, Dept. of Horticulture  
 Griffin, GA 30223

**Index Words:** *Buddleia* (*Buddleia davidii nanhoensis* ‘Nanho Purple’), Devrinol (napropamide), Diuron, Doublefile Viburnum (*Viburnum plicatum tomentosum* ‘Shasta’), Large crabgrass (*Digitaria sanguinalis*), Preemergent Herbicides, Snapshot (isoxaben / trifluralin), Treflan (trifluralin), Woodsorrel (*Oxalis stricta* and *O. corniculata*).

**Nature of Work:** Weed control in containers, particularly in the Southeast, still remains a challenge for much of the nursery industry. We currently have many excellent preemergent herbicides on the market, but here in the Southeast, we are fortunate to get a preemergent herbicides to last longer than 2 months. A similar situation existed with conventional fertilizers, but with the advent of slow release technology in the 70’s, fertilizer applications no longer have to be made monthly. We now have single fertilizers applications that can last up to nine months. The Pursell’s company have been pursuing using the same technology with pesticide applications. This study compared the efficacy and safety of 3 different granular slow release herbicides containing diuron to several conventional herbicides.

On August 31<sup>st</sup>, 2006 at the Center for Applied Nursery Research, 88 one gallon pots of each of the following were assembled: *Buddleia* (*Buddleia davidii nanhoensis* ‘Nanho Purple’) and Doublefile Viburnum (*Viburnum plicatum tomentosum* ‘Shasta’). These plants were sized up from 2 inch by 2 inch liners on the week of April 17<sup>th</sup>, 2006. Pots were filled with Fafard 52 mix (an industry standard). Fafard 52 has a bulk density of 17 to 20 pounds per cubic feet, and a pH range is 5.5 to 6.5. The mix contains processed pine bark, peat moss, vermiculite, and perlite. Eight, one gallon pots of each species was than placed in a 6 ft. x 6 ft. area. Before treatments were applied, all pot received 1/4 teaspoon of a weed seed mix. This seed mix contained equal amounts of woodsorrel (seed from both *Oxalis stricta* (yellow woodsorrel) and *O. corniculata* (creeping woodsorrel)) and large crabgrass (*Digitaria sanguinalis*). This seed mix was then spread over the surface of the container. Herbicide applications were than made to the 8 pots placed into a 6' x 6' area. Granular herbicides were pre-weighed for treating a 36 ft<sup>2</sup> area, and uniformly applied with a cheese shaker jar. The diuron spray was applied with a CO<sub>2</sub> backpack sprayer calibrated to deliver 20 gallons per acre (GPA). After seeding and treatments were applied, pots were moved to assigned test area where they were arranged in a randomized complete block (RCB) design. Each treatment contained 4 replications, and each replication contained 2 subsample (2 pots of each species = 8 pots of each species per rep). The process was continued for each herbicide treatment. Watering occurred two times a day for approximately 30 minutes (this represented approximately 1/2 to 1 inch of water per day). The treatment list was as follows:

Treatment#	Treatment	Active ingredient	Rate
1	Diuron (T-1) 0.5 GR	Diuron	200 lb pr/A (1.0 lb ai/A)
2	Diuron (T-2) 0.5 GR	Diuron	200 lb pr/A (1.0 lb ai/A)
3	Diuron (T-3) 0.5 GR	Diuron	200 lb pr/A (1.0 lb ai/A)
4	Diuron (T-1) 0.5 GR	Diuron	400 lb pr/A (2.0 lb ai/A)
5	Diuron (T-2) 0.5 GR	Diuron	400 lb pr/A (2.0 lb ai/A)

6	Diuron (T-3) 0.5 GR	Diuron	400 lb pr/A (2.0 lb ai/A)
7	Diuron 4 SL	Diuron	6 qt/A (6.0 lb ai/A)
8	Treflan 5 GR	Trifluralin	80 lb pr/A (4.0 lb ai/A)
9	Devrinol 2 GR	Napropamide	300 lb pr/A (6.0 lb ai/A)
10	Snapshot 2.5 GR	Isoxaben / Trifluralin	150 lb pr/A (3.75 lb ai/A)
11	UTC		

Weed control and plant injury was taken at 2, 6, and 9 weeks after treatment (WAT). Weed control and plant injury were taken on a (0-100 scale) and numbers represented the following:

Value	Plant Symptoms
0	No visual injury present
10-30	Minimal injury to desirable plant. Less than 10% of the plant leaf service area showing chlorosis and necrosis.
40-70	More noticeable plant injury or stunting. Greater than 50% of the leaf area showing symptoms of chlorosis and/or necrosis.
80-90	Plants severally injured. Most of the leaves and leaf surface showing signs of chlorosis and necrosis.
100	Plant appears dead. No signs of regrowth.

### Results and Discussion:

Except for the sprayable formulation of diuron, no treatments caused any injury to the viburnum or buddleia during the rating periods (Tables 1 and 2). Injury with the sprayable formulation diuron was significant and recorded during the first 2 ratings (2 and 6 WAT). No injury was recorded with any of the treatments at 9 WAT.

All of the treatments provided significantly better control of than the UTC during all rating periods. The diuron formulations at 200 lb pr/A (treatments 1-3) provided between 60 and 74% control of crabgrass (table 3) and between 80 and 95% control of woodsorrel (table 4) during all rating periods. As expected, diuron at 400 lb pr/A provided better control across the board. With treatments 4–6, crabgrass control ranged between 81 and 100% (table 3) and woodsorrel control was between 85 and 100% (table 4). The sprayable formulation of diuron provided 100% control of both weed species during all rating periods. Both the Treflan and Devrinol treatments provided greater than 75% control of both weed species during all rating dates. Snapshot provided greater and 95% of both species during all rating dates.

### Significance to Industry:

Results of this study have shown that granular formulation of diuron provided fair to good control of 2 major weed species. More formulations of this diuron technology need to be created and tested to see if diuron or the slow release herbicide technology can be successful in the nursery industry.

**Table 1.** Injury to Buddleia (*Buddleia davidii nanhoensis* ‘Nanho Purple’) at 2, 6 and 9 Weeks After Treatment.

Treatment#	Treatment	Rate	Buddleia Injury		
			2 WAT	6 WAT	9 WAT
1	Diuron (T-1) 0.5 GR	Diuron	0 b	0 b	0 a
2	Diuron (T-2) 0.5 GR	Diuron	0 b	0 b	0 a
3	Diuron (T-3) 0.5 GR	Diuron	0 b	0 b	0 a
4	Diuron (T-1) 0.5 GR	Diuron	0 b	0 b	0 a
5	Diuron (T-2) 0.5 GR	Diuron	0 b	0 b	0 a
6	Diuron (T-3) 0.5 GR	Diuron	0 b	0 b	0 a
7	Diuron 4 SL	Diuron	86 a	23 a	0 a
8	Treflan 5 GR	Trifluralin	0 b	0 b	0 a
9	Devrinol 2 GR	Napropamide	0 b	0 b	0 a
10	Snapshot 2.5 GR	Isoxaben / Trifluralin	0 b	0 b	0 a
11	UTC		0 b	0 b	0 a
LSD			3.3	2.2	0.0

\*Means followed by same letter do not significantly differ (P=0.05, LSD)

**Table 2.** Injury to Doublefile Viburnum (*Viburnum plicatum tomentosum* ‘Shasta’) at 2, 6 and 9 Weeks After Treatment.

Treatment#	Treatment	Rate	Doublefile <i>Viburnum</i> Injury		
			2 WAT	6 WAT	9 WAT
1	Diuron (T-1) 0.5 GR	Diuron	0 b	0 b	0 a
2	Diuron (T-2) 0.5 GR	Diuron	0 b	0 b	0 a
3	Diuron (T-3) 0.5 GR	Diuron	0 b	0 b	0 a
4	Diuron (T-1) 0.5 GR	Diuron	0 b	0 b	0 a
5	Diuron (T-2) 0.5 GR	Diuron	0 b	0 b	0 a
6	Diuron (T-3) 0.5 GR	Diuron	0 b	0 b	0 a
7	Diuron 4 SL	Diuron	85 a	30 a	0 a
8	Treflan 5 GR	Trifluralin	0 b	0 b	0 a
9	Devrinol 2 GR	Napropamide	0 b	0 b	0 a
10	Snapshot 2.5 GR	Isoxaben / Trifluralin	0 b	0 b	0 a
11	UTC		0 b	0 b	0 a
LSD			2.5	3.6	0.0

\*Means followed by same letter do not significantly differ (P=0.05, LSD)

**Table 3.** Control of Large crabgrass (*Digitaria sanguinalis*) at 2, 6 and 9 Weeks After Treatment.

Treatment#	Treatment	Rate	Large Crabgrass Control		
			2 WAT	6 WAT	9 WAT
1	Diuron (T-1) 0.5 GR	Diuron	63 c	65 c	60 c
2	Diuron (T-2) 0.5 GR	Diuron	65 bc	73 bc	70 c
3	Diuron (T-3) 0.5 GR	Diuron	74 abc	73 bc	65 c
4	Diuron (T-1) 0.5 GR	Diuron	97 a	98 a	100 a
5	Diuron (T-2) 0.5 GR	Diuron	88 abc	90 ab	96 ab
6	Diuron (T-3) 0.5 GR	Diuron	81 abc	87 ab	90 ab
7	Diuron 4 SL	Diuron	100 a	100 a	100 a
8	Treflan 5 GR	Trifluralin	92 abc	88 ab	78 bc
9	Devrinol 2 GR	Napropamide	93 abc	94 a	100 a
10	Snapshot 2.5 GR	Isoxaben / Trifluralin	96 ab	96 a	98 a
11	UTC		0 d	0 d	0 d
LSD			31.7	18.2	18.9

\*Means followed by same letter do not significantly differ (P=0.05, LSD)

**Table 4.** Control of Woodsorrel (*Oxalis stricta* and *O. corniculata*) at 2, 6 and 9 Weeks After Treatment.

Treatment#	Treatment	Rate	Woodsorrel Control		
			2 WAT	6 WAT	9 WAT
1	Diuron (T-1) 0.5 GR	Diuron	95 ab	83 bc	78 bc
2	Diuron (T-2) 0.5 GR	Diuron	85 ab	80 bc	90 abc
3	Diuron (T-3) 0.5 GR	Diuron	83 b	89 abc	95 abc
4	Diuron (T-1) 0.5 GR	Diuron	100 a	100 a	100 a
5	Diuron (T-2) 0.5 GR	Diuron	90 ab	93 abc	99 ab
6	Diuron (T-3) 0.5 GR	Diuron	85 ab	93 abc	98 ab
7	Diuron 4 SL	Diuron	100 a	100 a	100 a
8	Treflan 5 GR	Trifluralin	83 b	78 c	75 c
9	Devrinol 2 GR	Napropamide	85 ab	80 bc	83 abc
10	Snapshot 2.5 GR	Isoxaben / Trifluralin	96 ab	95 ab	100 a
11	UTC		0 c	0 d	0 d
LSD			15.7	16.2	22.1

\*Means followed by same letter do not significantly differ (P=0.05, LSD)