



Herbicide Safety to Bigleaf Hydrangeas (*Hydrangea macrophylla* 'Nikko Blue').

Mark Andrew Czarnota
Department of Horticulture - Griffin
The University of Georgia

Nature Of Work: Determine the safety of registered and unregistered preemergent herbicides to bigleaf hydrangeas (*Hydrangea macrophylla*) when applied to dormant plants.

Introduction: Many species of hydrangeas are very popular in the nursery industry. Bigleaf hydrangeas (*Hydrangea macrophylla*) are one of the most sought after hydrangeas, and myriads of cultivars are available. Unfortunately, bigleaf hydrangeas are often injured with preemergent herbicides. The goal of the project is to determine the amount of phytotoxicity or growth reduction exhibited by preemergent herbicides applied over the top of dormant hydrangeas.

Material and Methods: On March 13, 2004 at the Center for Applied Nursery Research, 234 one gallon pots of Bigleaf hydrangea (*Hydrangea macrophylla* 'Nikko Blue') were assembled. Eighteen, one gallon pots of each species were placed in a 6 ft. x 6 ft. area. Herbicide treatments were then applied, and pots were moved to assigned test area where they were arranged in a randomized complete block (RCB) design. Two experiments utilizing the below treatments were preformed simultaneously. Each of the treatment contained 3 replications, and each replication contained 3 subsamples. The process was continued for each herbicide treatment. Sprays were applied with a CO₂ backpack sprayer calibrated to deliver 20 gallons per acer (GPA). Watering occurred on an as needed basis, and this represented approximately ½ to 1 inch of water per day. The treatment list was as follows:

Treatment#	Treatment	Rate
1	Barricade 65 WG	1.5 (lb ai/A)
2	Dimension 1 SL	0.5 (lb ai/A)
3	Gallery 75 WP	1.0 (lb ai/A)
4	Pennant Magnum 7.62 SL	2.5 (lb ai/A)
5	Hurdle 3.8 SL	4.0 (lb ai/A)
6	Surflan 4 SL	4.0 (lb ai/A)
7	Ronstar 2 GR	200 (lb product/A)
8	Correl 2.68 GR	114 (lb product/A)
9	Rout 3.0 GR	100 (lb product/A)
10	OH2 3.0 GR	100 (lb product/A)

11	RegalKade 0.37 GR	406 (lb product/A)
12	Snapshot 2.5 GR	150 (lb product/A)
13	Check	

Injury ratings were taken at 6 and 18 weeks after treatment (WAT). At the termination of the study, 25 WAT, plant heights and shoot biomass was collected from each treatment. Average plant height were recorded in centimeters among the 3 subsamples. Shoots from each subsample were collected, dried, and weighted. Plant injury was 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: At 6 weeks after treatment (6 WAT), Barricade, Dimension, and Hurdle gave rise to significant visual injury (> 33%, Table 1). At 16 WAT, only the Barricade was proving significant injury to bigleaf hydrangea (*Hydrangea macrophylla* 'Nikko Blue'). Although not significant, notable growth reduction and injury was still being seen with Dimension and Hurdle (Table 1). At 16 WAT, no significant reduction in height and dry weight was recorded with any of the herbicide treatments (Table 2).

Significance To Industry: The only products labeled for use on bigleaf hydrangea (*Hydrangea macrophylla* 'Nikko Blue') are Barricade, Pennant Magnum, and OH2. All of the other herbicides in the test are not labeled for use on bigleaf hydrangeas and were used for comparison. From these studies, it is aparent that it is not a wise decision to use the sprayable formulation of Barricade over-the-top of bigleaf hydrangea (*Hydrangea macrophylla* 'Nikko Blue'). There are several other weed control options that will provide good weed control with minimal effect on hydrangea. Most preemergent herbicides do a good job of controlling weeds, but can also cause a reduction in growth and visual injury symptoms. It is the degree of injury to the ornamental plant that will determine labeling of a product. Minimal growth reduction and injury symptoms often accompanying herbicide applications are not a serious issue for most containerized

nurseries, and are tolerated because of the weed control provided. However, care should be taken when using preemergent herbicides on hydrangeas during any stage of growth. Test a new herbicide on a small number of plants and look for injury symptoms. Damage and growth reduction often takes 2 or 3 weeks to develop on treated plants. Support research at the University and Industrial level, as much research needs to be performed on bigleaf hydrangeas and many other ornamental plants.

Table 1. Injury to Bigleaf Hydrangea (*Hydrangea macrophylla* 'Nikko Blue') at 6 and 16 WAT 2004.

Treatment#	Treatment	Rate	Hydrangea Injury Ratings (0-100)*	
			6 WAT	16 WAT
1	Barricade 65 WG	1.5 (lb ai/A)	50.0b	53.3b
2	Dimension 1 SL	0.5 (lb ai/A)	76.7a	16.7a
3	Gallery 75 WP	1.0 (lb ai/A)	7.3d	3.3a
4	Pennant Magnum 7.62 SL	2.5 (lb ai/A)	13.3bc	0.0a
5	Hurdle 3.8 SL	4.0 (lb ai/A)	33.3bc	33.3a
6	Surflan 4 SL	4.0 (lb ai/A)	13.3cd	0.0a
7	Ronstar 2 GR	200 (lb product/A)	3.3d	3.3a
8	Correl 2.68 GR	114 (lb product/A)	3.3d	0.0a
9	Rout 3.0 GR	100 (lb product/A)	13.3cd	0.0a
10	OH2 3.0 GR	100 (lb product/A)	1.7d	6.7a
11	RegalKade 0.37 GR	406 (lb product/A)	6.7d	3.3a
12	Snapshot 2.5 GR	150 (lb product/A)	5.0d	0.0a
13	Check		0.0d	0.0a
LSD			23.76	37.88

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

Table 2. Shoot Height and Shoot Dry Weight of Bigleaf Hydrangea (*Hydrangea macrophylla* 'Nikko Blue') at 16 WAT 2004.

Treatment #	Treatment	Rate	Hydrangea Height in centimeters 16 WAT*	Hydrangea Shoot Dry Weight in grams 16 WAT*
1	Barricade 65 WG	1.5 (lb ai/A)	43a	139a
2	Dimension 1 SL	0.5 (lb ai/A)	62.3a	102.5a
3	Gallery 75 WP	1.0 (lb ai/A)	72.7a	156.0a
4	Pennant Magnum 7.62 SL	2.5 (lb ai/A)	88.3a	134a
5	Hurdle 3.8 SL	4.0 (lb ai/A)	63.3a	120a
6	Surflan 4 SL	4.0 (lb ai/A)	88.7a	85a
7	Ronstar 2 GR	200 (lb product/A)	84.3a	158a
8	Correl 2.68 GR	114 (lb product/A)	84.7a	138a
9	Rout 3.0 GR	100 (lb product/A)	90.3a	99a
10	OH2 3.0 GR	100 (lb product/A)	71.3a	127a
11	RegalKade 0.37 GR	406 (lb product/A)	85a	98a
12	Snapshot 2.5 GR	150 (lb product/A)	88.7a	84a
13	Check		83a	154a
LSD			30.48	75

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