



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

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**Nature of Work:** Determine the safety of registered preemergent herbicides to bigleaf hydrangeas (*Hydrangea macrophylla*) when applied to actively growing 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, particularly when herbicides are applied after hydrangea leaves emerge. The goal of the project is to determine the amount of phytotoxicity or growth reduction exhibited by preemergent herbicides applied over the top of actively growing hydrangeas.

**Material and Methods:** On July 27, 2003 at the Center for Applied Nursery Research, 72 three gallon pots of Bigleaf hydrangea (*Hydrangea macrophylla* 'Nikko Blue') were assembled. Nine, three 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. Each treatment contained 3 replications, and each replication contained 3 subsamples. The process was continued for each herbicide treatment. Sprays were applied with a CO<sub>2</sub> 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	Surflan 4 SL	4.0 (lb ai/A)
6	RegalKade 0.37 GR	406 (lb product/A)
7	Ronstar 2 GR	200 (lb product/A)
8	Check	

Injury ratings were taken at 4, 8, and 12 weeks after treatment (WAT). At the termination of the study, 12 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 surface 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 severely injured. Most of the leaves and leaf surface showing signs of chlorosis and necrosis.
100	Plant appears dead. No signs of regrowth.

**Results:** All treatments gave rise to either growth reduction or visual injury symptoms, some symptoms were worse than others. At 4 weeks after treatment (4 WAT), bigleaf hydrangea (*Hydrangea macrophylla* 'Nikko Blue') were significantly injured with all but the Pennant Magnum, RegalKade, and Ronstar treatment (Table 1). By 8 WAT, only Barricade, Dimension, and Gallery were the only treatments causing significant injury to hydrangeas (Table 1). At 12 WAT, visual differences were noted, but no significant injury was recorded by any of the treatments. The average height of the control was 540 centimeters (cm), and Barricade, Dimension, Gallery, Pennant Magnum, and Surflan treatments all caused significant height reductions (Table 2). All treatments but Pennant Magnum and Ronstar caused significant differences in dried shoot weight (Table 2).

**Significance to Industry:** This test showed that preemergent herbicides labeled for weed control in hydrangeas can cause plant growth reduction and/or visual injury symptoms. Obviously, minimal growth reduction is not a serious issue for most containerized nursery, and often times welcomed. However, care should be taken when using preemergent herbicides after hydrangeas have broken bud. More research needs to be performed in order to determine injury / growth reduction that occurs to hydrangeas when preemergent herbicides are applied after foliage has emerged.

**Table 1.** Injury to Bigleaf Hydrangea (*Hydrangea macrophylla* 'Nikko Blue') at 4, 8, and 12 WAT 2003.

Treatment#	Treatment	Rate	Hydrangea Injury Ratings (0-100)*		
			4 WAT	8 WAT	12 WAT
1	Barricade 65 WG	1.5 (lb ai/A)	26.7a	30.0ab	13.3a
2	Dimension 1 SL	0.5 (lb ai/A)	26.7a	46.7a	20.0a
3	Gallery 75 WP	1.0 (lb ai/A)	30.0a	40.0a	20.0a
4	Pennant Magnum 7.62 SL	2.5 (lb ai/A)	6.7bc	10.0c	6.7a
6	Surflan 4 SL	4.0 (lb ai/A)	23.3ab	13.3bc	10.0a
7	RegalKade 0.37 GR	406 (lb product/A)	16.7abc	13.3bc	13.3a
8	Ronstar 2 GR	200 (lb product/A)	16.7abc	3.3c	3.3a
9	Check		0.0c	0.0c	0.0a
LSD			16.82	17.57	14.86

\*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 12 WAT 2003.

<b>Treatment#</b>	<b>Treatment</b>	<b>Rate</b>	<b>Hydrangea Height in centimeters 12 WAT*</b>	<b>Hydrangea Shoot Weight in grams 12 WAT*</b>
1	Barricade 65 WG	1.5 (lb ai/A)	383.3 c	48.7 cd
2	Dimension 1 SL	0.5 (lb ai/A)	386.7 c	40.7 d
3	Gallery 75 WP	1.0 (lb ai/A)	366.7 c	47.2 cd
4	Pennant Magnum 7.62 SL	2.5 (lb ai/A)	396.7 c	63.5 ab
6	Surflan 4 SL	4.0 (lb ai/A)	436.7 bc	56.2 bc
7	RegalKade 0.37 GR	406 (lb product/A)	516.7 ab	60.8 ab
8	Ronstar 2 GR	200 (lb product/A)	516.7 ab	53.0 bc
9	Check		540.0 a	69.4 a
LSD			92.71	11.67

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