



Decreasing pH on Glory Blue Hydrangea

James T. Midcap
Department of Horticulture
The University of Georgia
Athens, GA 30602

Nature of Work:

The blue bract color of the blue blooming *Hydrangea macrophylla* require a pH of 5.5 or less, and available aluminum. Aluminum sulfate is used to reduce the pH and insure the proper color. However the amount of lime added to different potting mixes vary as does the quality of the irrigation water. The fertilizer source and rate can also affect the pH as the season progresses.

Rooted cuttings of Glory Blue Hydrangea in 4" pots were potted into 3 gallons in early winter. The potting mix was pine bark:sand (6:1), with 5# of dolomitic lime, 14 # of Osmocote Pro 23-4-8 and 1.5# of Micromax. Plants were held in a shade house until mid winter and then they were moved into an unheated poly house for the remainder of the winter. Plants were moved back to the shade house in early spring.

The treatments included aluminum sulfate applied as a topdress on the media surface on March 23, 2000. Rates included 0, 1.5, 2.5, 3.5 and 4.5 ounces per three gallon pot. An application of flowable lime was applied as a drench at 0 or 80 grams of actual lime in approximately 3 quarts of water. Media pH of the leachate from ten pots of each treatment was monitored three times; March 9 prior treatment, April 14, and May 5 just before flowering. Soluble salts were monitored on April 14 and May 5. The flower colors of the treatments were recorded on May 10 and May 30.

Results and Discussion:

The pH of all plants was recorded on March 9 prior to any treatment. The pH was not different for any plants, averaging 5.79. This was expected. On April 14, about four weeks after treatment there were significant differences between the lime and aluminum sulfate treatment pH and soluble salt levels. The 80 g. Flowable Lime treatment mean, 5.24 was much greater than the 0 g. Lime treatment mean, 4.33.

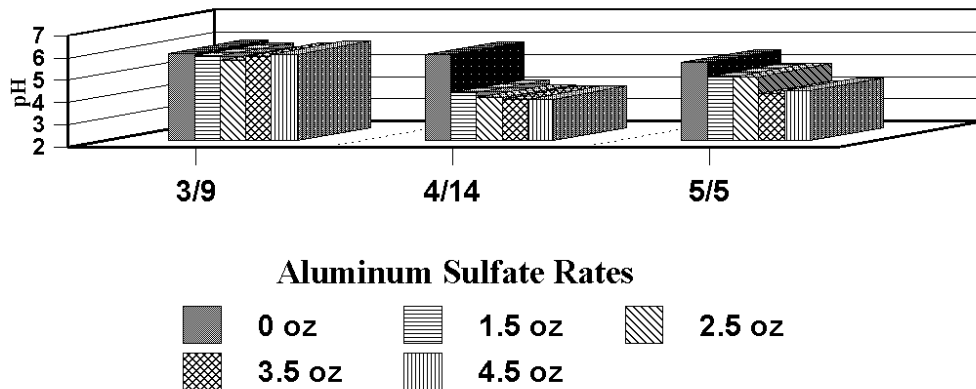
The pH strongly declined with all applications of aluminum sulfate (Table 1). The 0 oz. AlSO_4 had the highest pH, followed by the 1.5 oz. rate, which was higher than the remaining rates. Figure 1 shows how the AlSO_4 treatments at 1.5 oz. and higher, all dropped to below pH 4 on April 14. By May 5 the 1.5 and 2.5 oz. treatments had rebounded to above pH 4. Figure 2 shows the effect of the lime addition on March 23 which was after the March 9 data. The pH of all the AlSO_4 treatments never fell below pH 4 and all treatments rebounded somewhat by May 5. As expected the lime application buffered the effects of the AlSO_4 . With 80 g. Lime treatment, the 1.5 oz. AlSO_4 treatment still put the pH below 5.5, which should be acceptable to get blue flowers on Glory Blue Hydrangea.

| Table 1. Glory Blue pH & Soluble Salts April 14, 2000 Statistical Analysis | | | | |
|--|---------|------------------------|--------------------|------------------------|
| Treatment | Mean pH | Non-Significant Range* | Mean Soluble Salts | Non-Significant Range* |
| 0 g. Flowable Lime | 4.33 | a | 2.36 | a |
| 80 g. Flowable Lime | 5.24 | b | 1.83 | b |
| | | | | |
| 0 oz. AlSO ₄ | 6.34 | a | 0.60 | a |
| 1.5 oz. AlSO ₄ | 4.78 | b | 1.56 | b |
| 2.5 oz. AlSO ₄ | 4.32 | c | 2.14 | c |
| 3.5 oz. AlSO ₄ | 4.25 | c | 2.99 | d |
| 4.5 oz. AlSO ₄ | 4.19 | c | 3.18 | d |

*Treatments means sharing the same letter are not significantly different using the Student-Newman-Keuls test.

Figure 1. Glory Blue Hydrangea pH Means

Aluminum Sulfate Rate Effect on Leachate pH



The soluble salts were different for the April 14 date for both the Lime and AlSO_4 treatments (Table 1). The 80 g. Lime treatment reduced the soluble salt levels by tying up some of the AlSO_4 ions. The soluble salts increased as the level of AlSO_4 increased. All salt levels above 2.5 mmhos are considered high. By May 5, the soluble salt levels were all low (Figure 3). The 80 g. Lime buffered the soluble salt levels for all April 14 treatments.

The flower color was very consistent for all treatments. All treatments that had no aluminum added were bright pink. The treatment with 0 oz. Aluminum Sulfate and 0 g. Lime had a pH of 5.5 while the 80 g. Lime treatment was 6.5 on May 5. All treatments with Aluminum Sulfate were blue on May 5 and the pH ranged from 4.1 to 5.6. The plants with the higher Aluminum Sulfate rates were very stressed. There was plant stunting, some leaf drop and smaller inflorescences. The high soluble salt levels early after application was detrimental to plant growth.

Summary:

Glory Blue *Hydrangea macrophylla* requires aluminum to develop blue flowers. The 1.5 oz. per 3 gallon pot appear to be adequate unless the pH is excessively high. Higher levels of aluminum sulfate should be used with caution since they can interfere with crop development.

Figure 2. Glory Blue Hydrangea pH Means

Aluminum Sulfate Rate + Lime Effect on Leachate pH

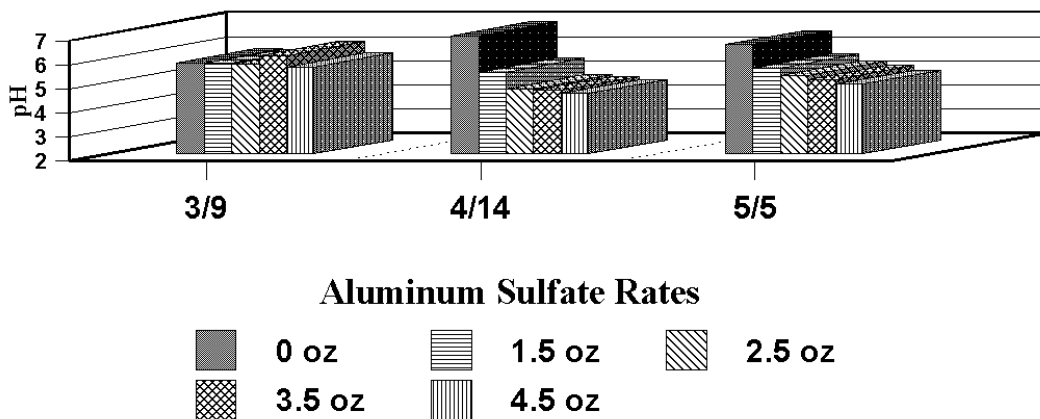


Figure 3. Glory Blue Hydrangea Soluble Salt Means

Aluminum Sulfate Rate Effect on Leachate Soluble Salts

