Hydrangea Flower Color and pH

Many Hydrangea macrophylla cultivars are characterized by having blue or pink flowers but often develop colors of lavender or purple, leaving customers disappointed. It isn't a problem with the plant but a chemical condition arising from the soil or media pH and the aluminum content in the sepals of the flower. This can be corrected but care must be taken not to over indulge or damage can occur to the plant.

Flower color of hydrangea is determined by the pigments present in the sepals. If no pigment is present then the color will be white, but Hydrangea macrophylla types contain a pigment and co-pigments which change color from pink to blue and various shades in between depending on the presence of aluminum (Al+3). To make things more interesting, Al+3 availability in soils is dependant on soil pH (this is a measure of acidity and alkalinity). Aluminum availability increases in acid soils (below pH 6.0) and decreases as the soil pH increases (above pH 6.0; pH of 7.0 is considered neutral). While Al+3 is toxic to many plants at higher concentrations, it binds with the anthocyanin delphinidin 3-monoglucoside and co-pigments to turn the sepals blue. Therefore, flowers of Hydrangea macrophylla cultivars turn blue in acid soils, as long as Al+3 is present, and pink in alkaline soils because Al+3 is tied up in the soil, limiting uptake by the plant. The Al+3 needs to be present at the time of flower bud production which could mean prior to them being visible.

Aluminum in soil is present in varying amounts depending on the minerals making up the soil. More often, customers are interested in blue flowers. Generally, decreasing the pH by using a sulfur product will turn the flowers blue. Often aluminum sulfate is recommended but should be used with caution as applying too much can cause a phytotoxic reaction such as plant stunting, leaf drop, and smaller flowers.

The first step in adjusting the soil pH is to take a soil sample and the soil tested by a reliable laboratory. Often your local Cooperative Extension Association can assist with this. If the pH is too alkaline and needs to be decreased, it is advisable to first try elemental sulfur or iron sulfate. If this fails to change the flower color to blue, then try applying aluminum sulfate (one ounce of aluminum sulfate in a gallon of water) around the roots of the hydrangea, but remember the change will not be instantaneous. It could be a year before the desired results are obtained. Where pink flowers are desired, the soil pH can be raised by applying a lime product.

Soiless media, as used in container production, generally does not contain Al+3, thus even if the pH is low, flower color will still be pink. This can be corrected by applying 1.5 ounces of aluminum sulfate per 3 gallon container as flower buds are developing. If the timing is incorrect, variable results will be realized.

It is much easier to obtain the desired flower color of Hydrangea macrophylla when planted in the landscape. Explain to your customer that after a year of two of being planted in the landscape, the flower color will be blue as long as the proper soil conditions exist.

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July 3, 2009