Can Aqua-Gro G reduce water use?

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Nature Of Study:

Bark, particularly fresh, uncomposted bark, used for nursery container media may repel water and resist wetting because of waxes in the bark. Proper wetting of bark media and the uniform distribution of irrigation water in bark media may affect growth and irrigation frequency of nursery ornamentals. By improving water distribution in a container media, irrigation frequency and the amount of total irrigation water could be reduced. Potentially reducing the need for irrigation water is becoming more important as the drought in Georgia persists.

Poor aeration of bark media in containers may reduce growth and increase disease susceptibility of nursery ornamentals. Proper wetting of bark can improve drainage, increase aeration, increase growth, and reduce disease susceptibility.

A wetting agent or surfactant, like Aqua-Gro 2000 G (Scotts, Marysville, Ohio), might improve wetting, distribution, and retention of water in a bark container media. Simultaneously, Aqua-gro G may also increase aeration, thereby increasing growth and reducing disease problems.

Floriculture research has demonstrated that products similar to Aqua-Gro G have reduced plant drought stress, increased plant survival, increased plant growth, increased plant quality, increased uniformity of flowering, reduced diseases, and reduced watering requirements.

The object of this research is to determine if Aqua-Gro G affects growth or drought stress of two woody ornamentals.

Materials And Methods:

Rooted cuttings of *Camellia sasanqua* 'Leslie Ann' (camellia) and *Ilex crenata* 'Compacta' (Compact holly) were transplanted on April 24, 2001, into 1-gal containers containing a %100 bark media that had been amended with 4 lbs of dolomitic lime per cubic yard and 3.5 lbs of nitrogen per cu yd supplied by 18-6-12 Sierrablen plus minors. Aqua-Gro G was amended into the media at the rates of 1) 0, 2) 0.5, 3) 1.0, or 4) 2.0 lbs per cu. yd. The plants were placed in a greenhouse and, until May 22nd, watered as needed, which was typically every three days. The interval between watering in this experiment was longer than in typical nursery irrigation because the plants were grown in a greenhouse near a cooling pad where the air was cooler and moister. After May 22nd, half of the plants were watered every three days (irrigated treatment) and half of the plants were watered every four days (drought treatment). Plants were watered

with 250 milliters of water. Growth indices were measured on June 23 and Oct. 1. The growth index equaled the (((greatest crown width + the crown width at 90 degrees from the greatest crown width)/2) + height)/2. no growth index was determined on October 1 for the camellia plants because of their irregular shape. Plants were harvested for stem and leaf dry weights on October 24th. The experimental design was a randomized complete block with ten single-plant replications.

Results And Discussion:

Withholding water from the plants in the drought treatment significantly reduced growth. Waiting an extra day to water (from three to four days) reduced survival, growth indices, leaf weight and stem weight of camellia and Compacta holly (Table 1).

The June 23 growth indices indicate that the Aqua-Gro G could nullify the effect of a four week drought treatment on growth of camellia and Compacta holly. The June 23rd growth indices of the drought-1 lb Aqua-Gro camellia and Compacta holly plants were not significantly different from the irrigated control plants (no Aqua-Gro) (Table 1). The 1-lb rate is recommended by the producer. Comparing the leaf and stem weight results of the drought-1 lb Aqua-Gro camellia treatment with the insignificantly different irrigated control (no Aqua-Gro) results also indicates that Aqua-Gro is effective in limiting the effects of reduced irrigation on growth of camellia (Table 1).

The death of all of the drought-l lb Aqua-Gro Compacta holly plants (Table 1), for no apparent reason, confounded interpretation of the Compacta holly results. However, the growth indices, leaf weights, and stem weights of the drought-0.5- and -2.0-lb Aqua-Gro treatment plants, though less, were not significantly different from those of the irrigated control (no Aqua-Gro) (Table 1). This lack of difference indicates that amending containerized bark media with Aqua-Gro may reduce the effect of drought on growth of Compacta hollies.

Adding Aqua-Gro to the droughted or irrigated treatment plants increased all growth parameters measured for all dates for both taxa (Table 1). The mechanism for this increase was not assessed in this experiment, but studies on similar surfactants on greenhouse plants indicate that the surfactant increases water availability and aeration by reducing surface tension at the water/media interface. Water is more uniformly distributed in the media, enters smaller pores, and drains more readily from larger pores. The surfactant increase water availability and pore space, simultaneously.

Significance To The Industry:

Amending containerized nursery media with Aqua-Gro G may increase the growth of woody ornamentals and reduce irrigation requirements. A further study is planned to verify the results of this experiment and to explore the reasons for this increase in growth.