

## Holly Response to Phosphorus in Controlled-Release Fertilizer<sup>®</sup>

Tom Yeager and Claudia Larsen

Department of Environmental Horticulture, IFAS, University of Florida,  
Gainesville, Florida 32611

Email: yeagert@ufl.edu

### INTRODUCTION

Controlled-release fertilizers (CRFs) labeled with more than 3% P<sub>2</sub>O<sub>5</sub> are often applied to container-grown plants. Soluble phosphorus (P) leaches rapidly in substrates composed mostly of pine bark (Yeager and Barrett, 1984). Thus, one approach to achieving a reduction in P loss from the nursery is to reduce the amount of P applied. Midcap (2004) determined that application of CRFs labeled as 2% or 6% P<sub>2</sub>O<sub>5</sub> and applied at P rates of 71 or 136 g·m<sup>-3</sup> (54 or 104 g/yd<sup>3</sup>) of substrate, respectively, resulted in similar growth of *Hydrangea macrophylla* (Thunb.) Ser. ('Nikko Blue' and 'Bailmer', Endless Summer™ hydrangea). The purpose of this research was to evaluate holly plant growth response when the substrate was amended with CRF containing different amounts of P.

### MATERIALS AND METHODS

Multiple-branched liners of *Ilex cornuta* 'Dwarf Burford' (syn. 'Burfordii Nana') Lindl. & Paxt., *I. crenata* 'Helleri' Thunb., and *I. vomitoria* 'Nana' Ait. (dwarf yaupon) potted 15 Aug. 2006 in 10-L (#3) containers were grown in a substrate of 2 pine bark : 1 Canadian peat : 1 sand (by volume). The substrate was amended with 4.2 and 0.9 kg·m<sup>-3</sup> (7 and 1.5 lb/yd<sup>3</sup>) of dolomitic limestone and Micromax<sup>®</sup> micronutrients (The Scotts Company, Marysville, Ohio), respectively. The container substrate was then amended with one of the following CRFs which varied only in P content: 18N-0P-10K, 18N-0.4P-10K, 18N-1.3P-10K, or 18N-2.6P-10K (Harrell's Inc., Lakeland, Florida). Each of the four CRFs, was applied at 46 g per container (7.8 lb/yd<sup>3</sup>) which supplied P at the respective rates of 0, 20, 60, or 120 g·m<sup>-3</sup> (0, 15.3, 46, or 92 g/yd<sup>3</sup>). Twenty plants were grown with each CRF in a randomized complete block arrangement (one plant per treatment in each of 20 blocks) under natural lighting. Each container was irrigated via one 18-cm-diameter Dribble Ring (Dramm Corp., Manitowoc, Wisconsin) placed on substrate surface. Approximately 400 ml of water was applied when irrigation was needed (once or twice a week after experiment initiation to daily at termination). The experiment was conducted in Gainesville, Florida (82.35 W longitude, 29.69 N latitude). Plants were covered with plastic sheet each evening when there was the potential for frost the following morning. Plastic was removed the following morning after frost dissipated.

The height and widths of all plants were measured once every 2 months. Measurements from the substrate surface to the top of each plant (plant height), the plant width at the widest point, and the plant width perpendicular to the widest point were recorded until plants obtained size specification designated as Florida Fancy according to *Grades and Standards for Nursery Plants* published by the Florida Division of Plant Industry (Anon, 1998). 'Burfordii Nana' is an upright spreading plant that meets Florida Fancy standards when shoots are 46 cm (18 in.) high and

36 cm (14 in.) wide for plant in 10-L (#3) container. 'Helleri' and dwarf yaupon are semi-broad spreading plants that meet Florida Fancy standards when shoots are 18 cm high (7 in.) and 41 cm (16 in.) wide for plant in 10-L (#3) container.

## RESULTS AND DISCUSSION

'Burfordii Nana', 'Helleri', and dwarf yaupon fertilized with 18N-0.4P-10K at a P rate of 20 g·m<sup>-3</sup> (15.3 g/yd<sup>3</sup>) were Florida Fancy grade at 13, 11, and 13 months, respectively, after potting and had heights and average widths similar to plants fertilized with 18N-1.3P-10K or 18N-2.6P-10K at P rates of 60 or 120 g·m<sup>-3</sup> (46 or 92 g/yd<sup>3</sup>), respectively. Midcap (2004) found a similar response for hydrangea in that plants grown with P at 71 g·m<sup>-3</sup> (54 g/yd<sup>3</sup>) had similar shoot growth to plants grown in substrate amended with P at 136 g·m<sup>-3</sup> (104 g/yd<sup>3</sup>).

Considering these results and those of Midcap (2004), it is suggested that producers evaluate CRFs with 0.4%–1.3% P for different species. In this study, we applied 18N-0.4P-10K and 18N-1.3P-10K at P rates of 20 or 60 g·m<sup>-3</sup> (15.3 or 46 g/yd<sup>3</sup>), respectively. Their use in lieu of a CRF with a higher P content would be considered a best management practice.

## DISCLAIMER

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## LITERATURE CITED

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