# Propagation of *Hydrangea macrophylla* With Controlled-Release Fertilizer©

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## INTRODUCTION

Traditional softwood propagation has generally involved the use of single or blended media components such as peat, perlite, pumice, sand, coir, rice hulls, and liquid fertilizer. Often in greenhouse and propagation settings, conventional growers use liquid fertilizer as a source of nutrition for their crops. The process of rooting a cutting producing a quality liner is as much a science as an art. To create uniform crops, growers generally wait until all cuttings are rooted before making a fertilizer application. However, demand for premium rooted-liners has put pressure on growers to look for innovative ways to produce the same high-quality plants in less time.

**Objectives.**

1) The primary objective of this study was to incorporate controlled-release fertilizer (CRF) into media of *Hydrangea macrophylla* 'Bailmer', Endless Summer® hydrangea The Original, providing nutrition as required by the liner.
2) Our second objective was to find a CRF product that stops releasing nutrients during the fall and winter, yet provides adequate amounts of nutrients during the following spring.
3) Thirdly, we were looking for a product that provided a consistent rooting and overwintering success rate of at least 90%.

## MATERIALS AND METHODS

In the Summer of 2009 we incorporated three homogeneous CRF products at two different rates (Table 1). The media was comprised of coarse perlite, coconut coir, fine bark, and peat (11 : 3 : 3 : 3, by vol.) plus 15.5 lb of a starter package per yard. Rates were calculated according to the label and with assistance from our manufacturing and sales representatives. For each treatment, 1/4 yard of medium was mixed by hand with the corresponding fertilizer rate weighed on a digital scale using grams as the unit of measurement. This helped insure the volume and consistency of media and CRF were accurate. Ten flats of 38-cell trays were planted with *H. macrophylla* 'Bailmer', Endless Summer® hydrangea The Original on 29 July 2009 with each CRF treatment and rate.

The hydrangea cuttings were misted for 20 days (August 17) and then weaned accordingly for the next 14 days. On Day 27 a 4.7N–16$P_2O_5$–3.2$K_2O$ + micronutrients liquid fertilizer was applied to the crop. On Day 34 (31 Aug. 2009), the mist was turned off and the plants were allowed to grow on their own newly developed roots. On Days 37 and 47 a liquid fertilizer blend of 8.1N–4$P_2O_5$–8$K_2O$ + micronutrients was applied to all cuttings. The control group received only liquid fertilizer, while the test group received both incorporated CRF and supplemental liquid feed.

Media analysis was conducted in-house via the pour-through method on the control and CRF-incorporated treatments. The leachates were tested with a Hanna

**Table 1.** Controlled-release fertilizer blends, rates, and product information.

| Controlled-release fertilizer blend | Rate | Longevity | Micronutrient package |
|---|---|---|---|
| APEX 16N–5$P_2O_5$–11$K_2O$ Woody Plant | 3 lb/yd$^3$ | 18 month | No |
| APEX 16N–5$P_2O_5$–11$K_2O$ Woody Plant | 5 lb/yd$^3$ | 18 month | No |
| APEX 15N–6$P_2O_5$–11$K_2O$ NPK MAX | 3 lb/yd$^3$ | 12–13 month | Yes |
| APEX 15N–6$P_2O_5$–11$K_2O$ NPK MAX | 5 lb/yd$^3$ | 12–13 month | Yes |
| APEX 7N–28$P_2O_5$–7$K_2O$ Custom Blend | 3 lb/yd$^3$ | 12 month | No |
| APEX 7N–28$P_2O_5$–7$K_2O$ Custom Blend | 5 lb/yd$^3$ | 12 month | No |

**Table 2.** Controlled-released fertilizer blends with EC, pH, and rooting percentages.

| Controlled-released fertilizer blend | 10/7/09 EC | 10/7/09 pH | 3/15/10 EC | 3/15/10 pH | 4/15/10 EC | 4/15/10 pH | 4/15/10 rooting (%) |
|---|---|---|---|---|---|---|---|
| APEX 16N–5$P_2O_5$–11$K_2O$ @ 3lb/yd$^3$ | 0.45 | 6.8 | 0.66 | 7.2 | 0.72 | 7.2 | 97 |
| APEX 16N–5$P_2O_5$–11$K_2O$ @ 5lb/yd$^3$ | 0.61 | 6.9 | 0.66 | 7.1 | 0.95 | 7 | 94 |
| APEX 15N–6$P_2O_5$–11$K_2O$ @ 3lb/yd$^3$ | 0.55 | 6.9 | 0.76 | 7.1 | 0.93 | 7.1 | 92 |
| APEX 15N–6$P_2O_5$–11$K_2O$ @ 5lb/yd$^3$ | 0.49 | 7.2 | 0.86 | 7.1 | 0.9 | 7.1 | 90 |
| APEX 7N–28$P_2O_5$–7$K_2O$ @ 3lb/yd$^3$ | 0.52 | 6.8 | 0.64 | 6.9 | 1.2 | 6.7 | 95 |
| APEX 7N–28$P_2O_5$–7$K_2O$ @ 5lb/yd$^3$ | 0.37 | 6.8 | 0.79 | 6.6 | 1.02 | 6.7 | 89 |
| Control | 0.39 | 7.2 | 0.55 | 7.2 | 0.88 | 7.1 | 90 |

Instruments (HI 9813-6) portable meter. Data was collected once during the fall on 7 Oct. 2009 and twice during Spring 2010 (15 March 2010 and 15 April 2010). Rooted percentages and overwintering success were calculated on 15 April 2010.

## RESULTS AND FINDINGS

Of the six treatments, we found the hydrangeas with APEX 16N–5$P_2O_5$–11$K_2O$ Woody Plant CRF incorporated, had overall higher rooting percentages, better media analysis, and better color than the other treatments, including the control (Table 2). On average, the CRF incorporated media had an accelerated spring flush and a higher rooting and overwintering success than the control.

To be sure the CRF's nutrient release slowed down in the fall and winter, we tested the electrical conductivity (EC) and pH on 7 Oct. 2009 (Table 2). Testing the media in October indicated that all treatments had similar EC and pH levels, all of which were acceptable to our production practices. Pour-through samples were taken and collected on 15 March 2010 and 15 April 2010 (Table 2). Based on our finding no corrections or leaching were necessary for our production cycle.

## CONCLUSION AND DISCUSSION

Overall, CRF can assist growers in cutting propagation. Controlled-released fertilizer provides nutrition based on the plant needs rather than solely relying on growers' time to monitor, test, apply, and calculate liquid fertilizer rates. Controlled-released fertilizer has the possibility to create a more consistent uniform crop and in our study it increased rooting percentage and overwintering success. However, none of these claims can be made for all growers in each unique situation. Experimenting with various CRF blends based on climate, plant material, propagation production cycles, and facilities are to the benefit of each grower. Working with local manufacturers can ensure a higher rate of success with CRF in propagation.

Looking forward, we have conducted a similar study during Summer 2010. Since it is still ongoing, results are not available. With the information gathered in 2009 we were better able to select CRFs that fit our crops and production cycle. With the increase in comfort from our 2009 study, we expanded the experiment to more genera in 2010. Areas that need further discussion and evaluation include; a cost study of liquid vs. CRF in propagation. Once blends and rates are better defined, we will draw economic comparisons between the two methods. Another area of interest, will be determining if one process utilities nutrients more efficiently than the other. How much liquid fertilizer is lost between flats and pots? Questions still remain on the role of CRF within propagation; however the success of this trial justifies further investigation.