



Evaluation of Agrium (a poly coated urea) by Scotts

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

Nature of Work:

Agrium (a poly coated urea with suggested 2-3 month release) 47-0-0 can be used as a fertilizer supplement on container nursery crops. The product was combined with Scotts 18-5-9 (a 12 month material with minors) at the rate of 5# Agrium per 50 # of Osmocote Pro 18-5-9. The combination of Predit + Osmocote Pro 18-5-9 was compared with Osmocote Pro 18-5-9 at the rate of 2.52# actual nitrogen per cubic yard (14# /yd³ Osmocote Pro 18-5-9, the suggested medium rate). Both treatments were incorporated into a 6:1 pine bark:sand potting mix.

Uniform 2 1/4" liners of Pink Pearl Azalea, Compacta Japanese Holly and Sizzling Pink Loropetalum were potted in to trade gallons on June 1, 2000. The potting mix was amended with 4# of dolomitic lime. The treatments were completely randomized within each crop with 25 single plant replicates for each treatment. A double border row was placed around the randomized blocks of each crop to eliminate any edge effects. Plants were grown under standard nursery practices and were maintained in good health and pest free.

The leachate soluble salts pH were measured from samples collected by the VTEM pour-through method every two weeks initially and then every four weeks in late summer by sampling ten plants from each treatment. The soluble salt levels should show the rates of release of the fertilizer salts and their effect on the potting mix pH. Results were statistically analyzed for treatment effects.

A complete nutrient analysis of the potting mix and leaf tissue samples were done in July 25, 2000 and again on October 31, 2000 at the end of the trial. A combined sample from three pots in each treatment were collected for both the potting mix and the leaf samples. Sampled plants were removed from the trial. These analysis should more fully show the nutritional status of the media and the plants at mid season and at the seasons end.

A visual quality rating by nurserymen and myself were done on twenty plants of each treatment for each crop. The quality ratings help to determine if the treatments would be acceptable for sale in the nursery trade. The quality ratings were completed at the end of the growing season on October 31, 2000.

The crops were harvested in October with 15 replicates for each treatment. All top growth was removed at the soil line, placed in paper bags and placed in a walk-in dryer for two weeks at 120°F. The plant stems and leaves were completely dry and were weighed to record the plant dry weight. This dry weight accurately reflects the growth of the crops during the production season and is used to statistically compare growth of the treatments.

Results and Discussion:

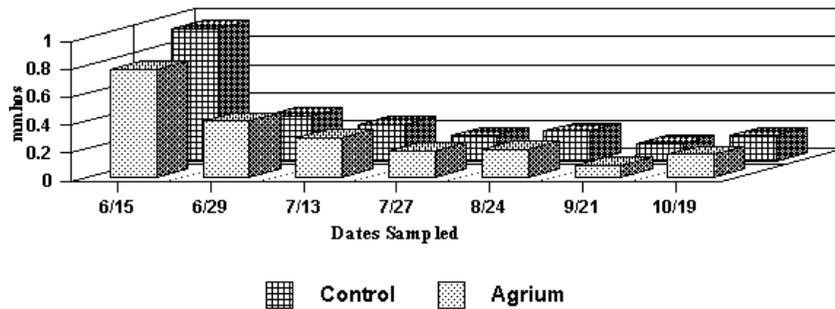
Soluble salts were collected seven times during the year starting June 15, 2000, two weeks after the plants were initially potted. Sampling continued on June 29, July 13, July 27, August 24, September 21 and ended on October 19. Analysis of the data using Analysis of Variance showed no differences between the Agrium and the Control treatments for all three crops. There were differences between the dates of sampling in all three crops (Table 1 for Azalea crop). The June 15 date always produces significantly higher soluble salt levels than the later dates. The level of soluble salts continued to decline with time.

Sample Date	Mean Soluble Salts (mmhos)	Non-Significant Range*
June 15, 2000	0.86	a
June 29, 2000	0.36	b
July 13, 2000	0.27	c
July 27, 2000	0.20	cd
August 24, 2000	0.18	de
September 21, 2000	0.17	de
October 19, 2000	0.10	e

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

Figure 1. Azalea Soluble Salt Means

Effect of Agrium on Leachate Soluble Salts



Although there were no statistical differences between the Control and the Agrium treatments, Figure 1 shows a higher soluble salt level for the Control on June 15 and slightly higher level for the Agrium treatment on June 29. The Osmocote 18-5-9 is releasing a higher level of salts in the first two weeks after planting and the Agrium is releasing a slightly higher level of salts at the four week sampling date (6/29). This trend shows on the Azalea, Holly and Loropetalum graph of the soluble salt means. The amount of Agrium being added to the Osmocote 18-5-9 was relative small and its effects would be expected to be small as well.

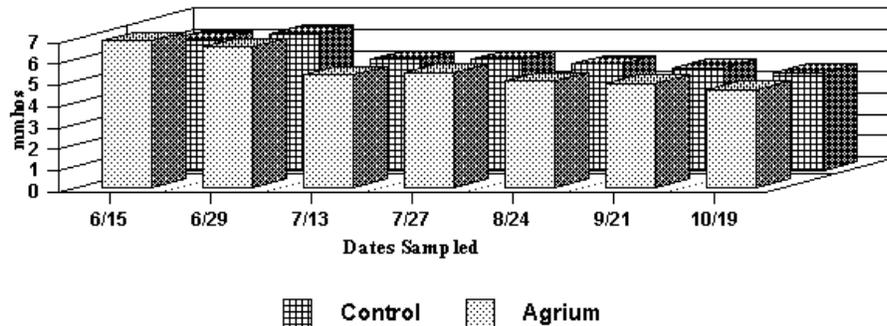
The pH of the leachate did show significant fertilizer treatment effects as well as sampling date effects for all three crops. The Agrium treatment had significantly higher pH levels than the Control for all crops. The Osmocote 18-5-9 with the higher soluble salt release on June 15 resulted in lower pH levels for all crops on this date. The pH levels started about 6.5 and declined through out the trial for all crops (Table 2 for Azaleas). The pH levels of the late season sampling dates had the Control and Agrium treatments nearly equal for all crops. The early season differences were more pronounced as illustrated in Figure 2 using the Azalea means.

Table 2. Azalea pH Statistical Analysis		
Fertilizer Treatment	Mean pH	Non-Significant Range*
Control (Osmocote 18-5-9)	5.33	a
Agrium (+ Osmocote 18-5-9)	5.52	b
Sample Dates		
June 15, 2000	6.49	a
June 29, 2000	6.47	a
July 13, 2000	5.27	b
July 27, 2000	5.32	b
August 24, 2000	4.97	c
September 21, 2000	4.88	c
October 19, 2000	4.60	d
*Treatments means sharing the same letter are not significantly different using the Student-Newman-Keuls test.		

The potting mix nutritional status shows a strong decline in pH from July to October for all crops. The soluble salts release is much stronger in October with the Osmocote Control higher than the Agrium treatment. This late in the season the Agrium is gone and only the remaining amount of Osmocote is releasing. Most of the July nutrient levels are low while the October levels are mostly acceptable on all crops. In July the NO₃ levels are slightly higher for the Agrium treatment (probably due to the end of the Agrium release curve). By October the

Figure 2. Azalea pH Means

Effect of Agrium on Leachate pH



Osmocote Control is releasing higher levels of nitrogen, phosphorous and potassium compared to July for all crops. The Osmocote Control is releasing greater levels than the Agrium treatment for all crops as well (due to the dilution factor).

The leaf tissue nutrient analysis was also conducted in July and October. The nitrogen levels in the Azalea crop for the Control and Agrium treatments were the same for July and for October. The phosphorous, potassium and minor elements levels were lower for the Agrium treatment. Agrium 47-0-0 does not supply any of these elements. The nitrogen and phosphorous levels were mostly low in both July and October.

The same patterns of nearly equal levels of nitrogen for the Control and Agrium treatments, slightly lower levels of phosphorous and potassium for the Agrium treatments and slightly lower levels of the minor elements for the Agrium treatments occurred on both the Holly and *Loropetalum* crops. The phosphorous and potassium levels were low for both fertilizer treatment in July and October.

The quality ratings range from the high score of 100 for all excellent plants, a medium score of 60 for all average plants and a low score of 20 for all poor plants. The results of evaluating 20 plants from each treatment in October 2000 are presented in Table 3. The Control was ranked better for the Azalea and *Loropetalum* crop. The Agrium treatment was ranked better for the Holly crop, by the narrowest margin of the three crops. All plants were ranked about average or

above average. There appears to be little advantage for the incorporation of Agrium into the Osmocote 18-5-9, based on the plant quality in October.

Table 3. Azalea, Holly & Loropetalum Quality Ratings*		
Treatment	Control Osmocote 18-5-9	Agrium (+ Osmocote)
Azalea	61.7	54.0
Holly	67.3	68.3
Loropetalum	76.7	71.0
*Excellent = 100, Good = 80, Average = 60, Questionable = 40 and Poor = 20		

The plant dry weights (grams) were recorded at the end of the production season on 15 replicates of each treatment for each crop. The Azalea, Holly and Loropetalum crops showed no statistical differences between the Control (Osmocote 18-5-9) treatment and the Agrium (+Osmocote) treatment. Therefore, on these woody nursery crops which are produced over a period of six to nine months, there seems to be little advantage of adding an early, quick release nitrogen boost to the controlled release fertilizer.

Summary:

Agrium 47-0-0 was used as a supplemental nitrogen source in Osmocote Pro 18-5-9. This combination was compared to Osmocote 18-5-9 as the Control on Azalea, Holly and Loropetalum 2.52# Nitrogen / yd³.

Soluble salts and pH measurements were taken from leachate samples seven times during the production season. There were no significant soluble salt differences between fertilizer treatments. However, examination of the means suggests that Agrium was increasing soluble salts four week after planting. The soluble salts started high in June and continued downward until October for all crops.

The Agrium treatment pH was significantly higher for all crops. The pH gradually declined from June to October with both treatments.

Evaluation of the potting media nutritional status indicates the Agrium treatment NO₃ levels were slightly higher than the Control in July but lower in October. The leaf tissue analysis in July and October had nearly equal levels of nitrogen suggesting that no accumulation in the tissue resulted from the higher July Agrium NO₃ levels. The Phosphorous, potassium and minor element levels were usually slightly lower for the Agrium treatment in July and October for all crops. Agrium 47-0-0 provides none of these elements to the media for plant uptake.

The nursery quality ratings placed the Control better for the Azalea and Loropetalum crops. The Agrium treatment was judged slightly better for the Holly crop.

The top growth dry weight was determined in October for both treatments on all crops. There was no difference between the Control and the Agrium treatment on all crops. The Agrium treatment did not improve top growth of any of the crops produced.

On woody nursery crops produced in 6 to 12 months, there seems to be little advantage for an early season nitrogen boost when used with Osmocote 18-5-9. The Osmocote 18-5-9 appears to have a very strong early release of its own.