

## Controlled Release Fertilizers Evaluations – 1999 9 & 12 Month Products

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Controlled release fertilizers are constantly being improved to meet the needs of Georgia container nursery producers. Evaluation of these products can establish their value to our growers. Proper release of controlled release fertilizers can improve growth while reducing pollution potential to surface and ground waters.

### **Nature of Work:**

Small established trade gallons were top dressed with 9 and 12 month products at a medium and a high rate. Each fertilizer product was applied at an equal rate of nitrogen per pot within each treatment. The crops, Snow Azalea and Compacta Holly, were fertilized on April 21, 1999 with the 12 month products at the medium rate of 3.2g nitrogen / pot and the high rate of 4.25g nitrogen / pot. An extra treatment using supplemental potassium ( 1/2 teaspoon muriate of potash per pot) was applied on August 27, 1999 using the 12 month control fertilizer. The 9 month products were applied to the same taxa on June 1, 1999 at the medium rate of 2.7g nitrogen / pot and the high rate of 3.4g nitrogen / pot. The fertilizers included in this evaluation are listed below.

### **12 Month Fertilizers:**

Nutricote	17-6-8	Type 360
Multicote	17-5-11	12 mo.
Wilbro	15-4-9	10-12 mo.
Osmocote Pro	22-4-7	Control
Osmocote Pro + K	22-4-7	Control + Potassium Boost for Winter Leaf Retention Azalea Crop Only

### **9 Month Fertilizers:**

Nutricote	17-7-8	Type 180
Nutricote	17-7-8	Type 270
Multicote	18-6-12	9 mo.
Wilbro	16-5-10	9 mo.
High N	22-4-6	Control

On April 21, 1999 all plants were spaced on 12" centers and two guard rows of border plants were placed around the randomized treatments. The hollies with the 12 month products were further spaced on August 27 due to their size. In mid summer 10g of magnesium sulfate and calcium sulfate were top dressed on all plants to supply calcium and magnesium. Crops were grown under standard nursery conditions with appropriate irrigation and pest control.

For evaluation plants were separated into treatments on October 12, 1999. A quality rating was conducted by nurserymen of all treatments on October 13. Ten replicates were harvested on October 19, 1999, dried and weighed to determine total top growth. Leaf tissue and potting mix samples from the replicates were collected on the same date and submitted to the UGA Soil Testing Laboratory for analyses. Ten plants of each treatment are being held over until February 2000 and will be evaluated again for quality. This February evaluation helps determine the effectiveness of these products in holding plant quality until spring. Results will be reported at that time.

## **Results and Discussion:**

The potting media analysis for the Snow Azalea collected on October 19, 1999 are presented in Table 1. The pH was strongly acidic with most treatments below 4.5. The soluble salts (below .75), NO<sub>3</sub> (below 40 ppm), potassium (below 50 ppm) and calcium (below 70 ppm) values were low for all treatments. The phosphorous levels (above 4 ppm) were acceptable for the 12 month Multicote 17-5-11 at 3.2#N/pot and 4.25#N/pot; the 12 month Wilbro 15-4-9 at 4.25#N/pot; the 9 month Multicote 18-6-12 at 2.7#N/pot and 3.45#N/pot; and Nutricote 17-6-8 Type 270 at 3.45#N/pot. The magnesium levels (above 30 ppm) were acceptable for Scotts High N 22-4-6 at 2.7#N/pot; Nutricote 17-6-8 Type 180 and Type 270 at 3.45#N/pot; and Wilbro 16-5-10 at 3.45#N/pot.

The tissue analysis for the Snow Azalea (collected at the same time as the media) are presented in Table 2. The nitrogen, calcium, magnesium, manganese, iron, boron and zinc levels were adequate for all treatments. The copper levels were low for all treatments. See Table 7 for the suggested ranges. The phosphorous (above 0.2 %) was acceptable for the 12 month Multicote 17-5-11 at 3.2#N/pot and 4.25#N/pot rates; the 12 month Wilbro 15-4-9 at 4.25#N/pot; the 9 month Multicote 18-6-12 at 2.7#N/pot and 3.45#N/pot; and the 9 month Wilbro 16-5-10 at 2.7#N/pot. The potassium (above 0.8) was acceptable for the 12 month Multicote at 3.2#N/pot and 4.25#N/pot; and the Osmocote Pro 22-4-7 + K at the 4.25#N/pot rate.

The top growth dry weights for Snow Azalea were analyzed by ANOV and showed no statistical differences within the 12 month treatments or within the 9 month treatments (Figure 1 and 3). There were no differences between the products or the rates. The 12 month products produced more growth than the 9 month treatments. Table 3 lists the product top growth dry weight means as well as the visual quality rankings.

The quality rankings were developed by nurserymen on October 13, 1999 by observing the same plants that are harvested for dry weight. A ranking score of 5.0 was excellent, 4.0 good, 3.0 acceptable, 2.0 marginal and 1.0 was poor. Both the 9 month and 12 month products were ranked from 4.6 to 4.9 (Figure 2 and 4). The higher rates were not noticeably better quality and the 12 month products were not visually better than the 9 month products. Therefore, there was no growth or quality advantage of exceeding the medium rate on Snow Azalea. The extra fertilizer costs more and did not produce significantly more growth. The costs of the fertilizer products would be important in selecting one for use.

The Compacta Holly potting media nutrient analysis collected on October 19, 1999 are presented in Table 4. The soluble salts (below 0.75 mmhos), nitrates (below 40 ppm), potassium (below 50 ppm), and calcium (below 70 ppm) were low for all 9 and 12 month products. The phosphorous (above 4 ppm) was acceptable for Multicote 17-5-11 12 month and Multicote 18-6-12 9 month at all rates while all other treatments were low. The magnesium level (above 30 ppm) for Nutricote 17-6-8 Type 270 at 3.45#N/pot was acceptable, while all other levels were low.

The October 19 Compacta Holly leaf tissue analysis are presented in Table 5 with the suggested nutrient ranges in Table 8 (slightly different from the azalea table). The nitrogen, calcium, magnesium, manganese, iron, boron and zinc for all treatments were within the acceptable range. The phosphorous (below 0.2 %) was low for all treatments except Nutricote 17-6-8 Type 270 in the 9 month products. Copper (above 6.0 ppm) was low for all treatments except Nutricote 17-6-8 Type 180 and Type 270 in the 9 month materials. Potassium (below 1.5 %) was low for all treatments. The manganese and zinc levels appear to be elevated for all treatments.

The Compacta Holly top growth dry weights (Table 6 and Figure 5) for the 12 month products had Nutricote 17-6-8 Type 360 producing the least top growth. Osmocote Pro 22-4-7 produced more growth than Nutricote but was less than the Wilbro 15-4-9 and the Multicote 17-5-11. Wilbro and Multicote produced the most growth and were not different from each other. The high rate of 4.25 gN/pot produced more growth than the medium rate, 3.2 gN/pot. The 9 month products (Table 6 and Figure 7) had High N 22-4-6, Nutricote 17-6-8 Type 180 and Type 270 producing the same amount of growth. Wilbro 16-5-10 produced more growth than the above, while Multicote produced more growth than Wilbro. The high nitrogen rate of 3.45 gN/pot produced more growth than the medium rate of 2.7 gN/pot. The Compacta Holly was a much more vigorous feeder and grower than the Snow Azaleas; and responded to the higher nitrogen rates.

The quality rankings for the 12 month products (Table 6 and Figure 6) had the high rates of Wilbro 15-4-9 and Multicote 17-5-11 ranked 5.0 (Excellent). The 9 month treatments (Table 6 and Figure 8) had Multicote 18-6-12 at 2.7gN/pot and 3.45 gN/pot; Nutricote 17-6-8 Type 180 and Wilbro 16-5-10 at 3.45 gN/pot ranked at the high of 4.4. The higher rate almost always ranked higher than the medium rate for visual quality.

### **Significance to the Industry:**

The Snow Azalea potting media was low in most nutrient at the end of the production season while the plant tissues were adequate for most nutrients. The phosphorous was low except for the Multicote and the Wilbro products. The potassium was low except for the 12 month Multicote and the Osmocote Pro 22-4-7 with the extra potassium boost. There were no dry weight differences between the 9 month products or between the 12 month products. The medium rate produced as much growth as the high rates. The high rate of fertilization costs more and could contribute to nitrogen and phosphorous run off. The quality ranking of all treatments was excellent in October.

With the Compacta Hollies, many nutrients were low in October in the potting mix. The phosphorous was low for all treatments except Nutricote 17-6-8 Type 270 and copper was low for all except Nutricote 17-6-8 Type 180 and 270. In the 12 month products the Wilbro 15-4-9 and Multicote 17-5-11 produced the most dry weight. Both materials were ranked excellent (5.0) at the high rate. The 9 month products had Wilbro 16-5-10 very high and Multicote producing the most dry weight. The quality ranking placed Multicote 18-6-12 (medium rate and high rates), Nutricote 17-6-8 Type 180 (high rate), and Wilbro 16-5-10 (high rate) at the top at 4.4 rating. The growth and quality produced by the Multicote at the medium rate were equal to the other products at the high rate.

Overall, all products were excellent on the Snow Azalea crop. The medium rate is preferred based on economics. The heavier feeding Compacta Holly crop responded with more growth with higher rates. Products that performed the best were Multicote 17-5-11, Wilbro 15-4-9, Multicote 18-6-12 and Wilbro 16-5-10. All products will be evaluated for quality in February 2000, to determine how well the products hold the crop to the end of their release term.

**Table 1. 1999 Snow Azalea Controlled Release Fertilizer Evaluations  
Potting Media Nutrient Analysis / October 19,1999**

<b>Treatment (12 Month)</b>	<b>Rate</b>	<b>pHw*</b>	<b>SS</b>	<b>NO<sub>3</sub></b>	<b>NH<sub>4</sub></b>	<b>P</b>	<b>K</b>	<b>Ca</b>	<b>Mg</b>
Nutricote 17-6-8 T 360	3.2gN/pot	4.5	.26	3.0	8	1.7	5.8	11.5	9.4
Wilbro 15-4-9	3.2gN/pot	4.0	.29	1.0	6	2.9	11.5	9.9	12.2
Multicote 17-5-11	3.2gN/pot	4.2	.29	1.0	8	6.0	11.2	10.3	12.2
Osmocote Pro 22-4-7	3.2gN/pot	3.9	.39	<1.0	11	2.3	8.9	15.5	15.1
Osmocote Pro 22-4-7 + K	3.2gN/pot	3.8	.39	1.0	9	1.8	18.2	14.5	12.5
Nutricote 17-6-8 T 360	4.25gN/pot	4.0	.26	<1.0	5	1.6	6.3	10.2	9.6
Wilbro 15-4-9	4.25gN/pot	4.1	.53	3.0	6	5.9	22.8	25.5	20.0
Multicote 17-5-11	4.25gN/pot	4.1	.32	<1.0	11	6.2	11.6	9.0	10.5
Osmocote Pro 22-4-7	4.25gN/pot	4.2	.52	4.0	18	2.9	11.0	29.4	19.5
Osmocote Pro 22-4-7 + K	4.25gN/pot	4.1	.33	2.0	10	2.6	23.9	6.9	10.1
<b>(9 Month)</b>									
Nutricote 17-6-8 T 180	2.7gN/pot	4.3	.40	7.0	7	2.5	10.7	25.3	22.2
Nutricote 17-6-8 T 270	2.7gN/pot	4.4	.37	8.0	8	2.7	8.1	20.8	19.0
Wilbro 16-5-10	2.7gN/pot	4.2	.53	1.0	16	3.6	19.6	32.2	24.3
Multicote 18-6-12	2.7gN/pot	4.0	.31	<1.0	9	5.3	9.1	13.8	9.5
Scotts High N 22-4-6	2.7gN/pot	4.1	.71	9.0	15	2.9	11.1	45.2	54.8
Nutricote 17-6-8 T 180	3.45gN/pot	4.2	.68	16.0	17	2.8	11.4	40.4	41.6
Nutricote 17-6-8 T 270	3.45gN/pot	4.4	.73	10.0	17	4.8	17.7	43.2	34.0
Wilbro 16-5-10	3.45gN/pot	4.0	.59	3.0	8	2.9	14.8	31.7	32.9
Multicote 18-6-12	3.45gN/pot	4.0	.43	2.0	9	6.9	12.8	20.0	16.8
Scotts High N 22-4-6	3.45gN/pot	3.9	.62	10.0	18	3.1	11.8	24.0	27.7

\* Saturation Extract Method. pHw (water pH, SS (Soluble Salts) in mmhos, NO<sub>3</sub>, NH<sub>4</sub>, P, K, Ca and Mg in ppm.



**Table 2. 1999 Snow Azalea Controlled Release Fertilizer Evaluations  
Leaf Tissue Nutrient Analysis / October 19,1999**

<b>Treatment (12 Month)</b>	<b>Rate</b>	<b>N*</b>	<b>P</b>	<b>K</b>	<b>Ca</b>	<b>Mg</b>	<b>Mn</b>	<b>Fe</b>	<b>B</b>	<b>Cu</b>	<b>Zn</b>
Nutricote 17-6-8 T 360	3.2gN/pot	2.25	.16	.56	1.22	.42	501	102	50	2.8	68
Wilbro 15-4-9	3.2gN/pot	2.36	.18	.65	1.10	.33	312	98	29	5.1	41
Multicote 17-5-11	3.2gN/pot	2.31	.33	.86	.84	.41	347	108	39	2.3	41
Osmocote Pro 22-4-7	3.2gN/pot	2.12	.13	.57	1.20	.44	589	67	42	4.6	51
Osmocote Pro 22-4-7 + K	3.2gN/pot	1.96	.16	.79	1.17	.40	449	63	43	4.9	43
Nutricote 17-6-8 T 360	4.25gN/pot	2.01	.13	.70	1.28	.42	418	90	56	4.6	46
Wilbro 15-4-9	4.25gN/pot	2.27	.25	.73	1.09	.40	415	70	39	3.5	39
Multicote 17-5-11	4.25gN/pot	2.49	.30	.86	.93	.41	269	87	39	3.7	37
Osmocote Pro 22-4-7	4.25gN/pot	2.07	.15	.57	1.09	.41	402	77	42	5.1	43
Osmocote Pro 22-4-7 + K	4.25gN/pot	1.96	.14	.82	1.04	.36	438	55	41	3.7	41
<b>(9 Month)</b>											
Nutricote 17-6-8 T 180	2.7gN/pot	2.02	.09	.65	1.35	.44	455	73	54	4.4	48
Nutricote 17-6-8 T 270	2.7gN/pot	2.00	.13	.48	1.18	.38	288	83	51	3.7	36
Wilbro 16-5-10	2.7gN/pot	1.88	.21	.68	1.18	.43	554	65	36	3.7	45
Multicote 18-6-12	2.7gN/pot	2.14	.25	.66	1.03	.43	285	96	37	2.8	42
Scotts High N 22-4-6	2.7gN/pot	1.89	.09	.32	1.12	.34	382	84	42	3.7	40
Nutricote 17-6-8 T 180	3.45gN/pot	2.05	.14	.58	1.16	.34	387	66	48	3.7	43
Nutricote 17-6-8 T 270	3.45gN/pot	1.99	.15	.51	1.16	.36	278	91	56	2.1	37
Wilbro 16-5-10	3.45gN/pot	2.16	.19	.55	1.00	.36	303	181	36	3.7	38
Multicote 18-6-12	3.45gN/pot	2.19	.27	.56	.91	.36	224	65	34	1.6	35
Scotts High N 22-4-6	3.45gN/pot	2.04	.11	.43	1.28	.41	497	93	58	2.3	49

\* N, P, K, Ca and Mg are expressed as percent,  
Mn, Fe, B, Cu, Zn are expressed as ppm



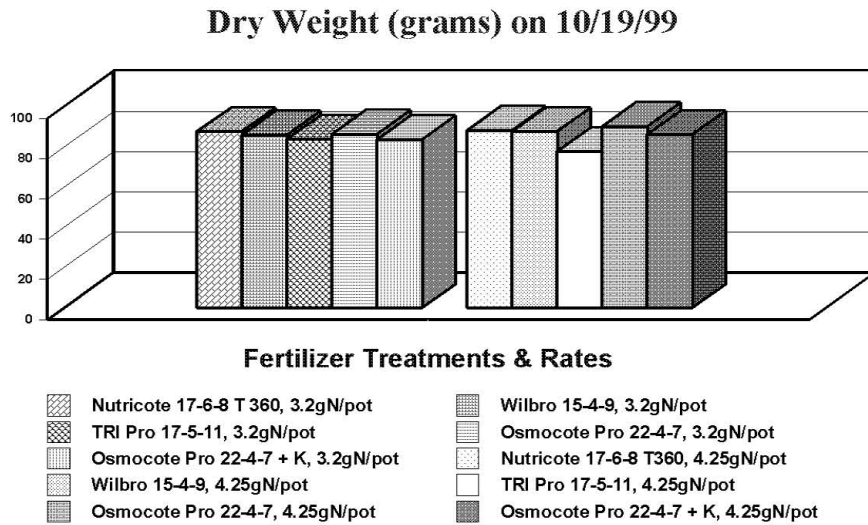


**Table 3. Snow Azalea Average Dry Weights and Quality Rankings**

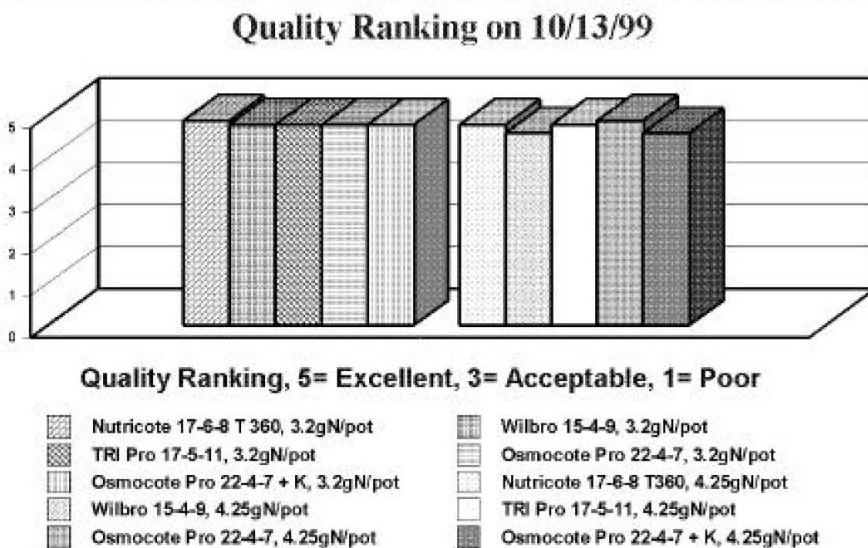
<b>Fertilizer Treatments</b>	<b>Rates</b>	<b>Mean Weight</b>	<b>Mean Quality Rank*</b>
<b><u>(12 Month)</u></b>			
Nutricote 17-6-8 T 360	3.2gN/pot	87.8 g	4.9
Wilbro 15-4-9	3.2gN/pot	86.0 g	4.8
Multicote 17-5-11	3.2gN/pot	83.9 g	4.8
Osmocote Pro 22-4-7	3.2gN/pot	86.5 g	4.8
Osmocote Pro 22-4-7 + K	3.2gN/pot	83.7 g	4.8
Nutricote 17-6-8 T 360	4.25gN/pot	88.4 g	4.8
Wilbro 15-4-9	4.25gN/pot	87.8 g	4.6
Multicote 17-5-11	4.25gN/pot	77.8 g	4.8
Osmocote Pro 22-4-7	4.25gN/pot	90.2 g	4.9
Osmocote Pro 22-4-7 + K	4.25gN/pot	86.2 g	4.6
<b><u>(9 Month)</u></b>			
Nutricote 17-6-8 T 180	2.7gN/pot	76.9 g	4.8
Nutricote 17-6-8 T 270	2.7gN/pot	77.2 g	4.7
Wilbro 16-5-10	2.7gN/pot	75.5 g	4.7
Multicote 18-6-12	2.7gN/pot	79.2 g	4.6
Scotts High N 22-4-6	2.7gN/pot	77.1 g	4.9
Nutricote 17-6-8 T 180	3.45gN/pot	75.8 g	4.9
Nutricote 17-6-8 T 270	3.45gN/pot	77.2 g	4.7
Wilbro 16-5-10	3.45gN/pot	75.6 g	4.9
Multicote 18-6-12	3.45gN/pot	77.4 g	4.7
Scotts High N 22-4-6	3.45gN/pot	77.7 g	4.7

\* Nurserymen quality ranking with 5= Excellent, 4= Good, 3= Acceptable, 2= Marginal, 1= Poor

**Figure 1. Snow Azalea Fertilizer Evaluations  
12 Month Products – Top Growth**

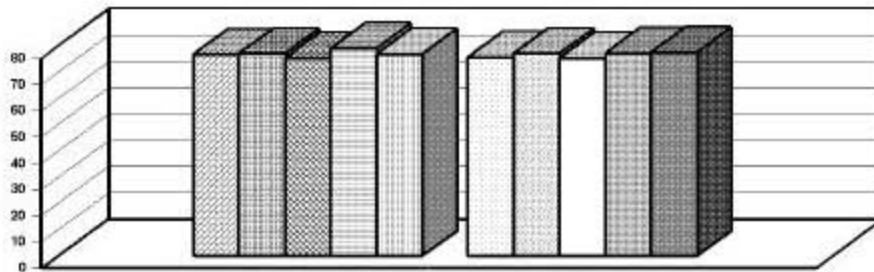


**Figure 2. Snow Azalea Fertilizer Evaluations  
12 Month Products – Visual Quality**



**Figure 3. Snow Azalea Fertilizer Evaluations  
9 Month Products – Top Growth**

**Dry Weight (grams) on 10/19/99**

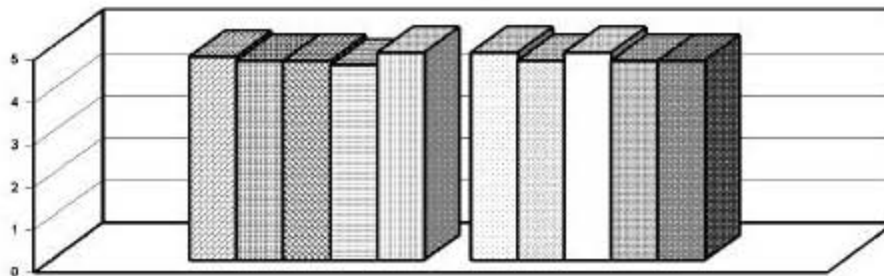


**Fertilizer Treatments & Rates**

- |                                    |                                    |
|------------------------------------|------------------------------------|
| Nutricote 17-6-8 T 180, 2.7gN/pot  | Nutricote 17-6-8 T 270, 2.7gN/pot  |
| Wilbro 16-5-10, 2.7gN/pot          | TRI Pro 18-6-12, 2.7gN/pot         |
| Scotts High N 22-4-6, 2.7N/pot     | Nutricote 17-6-8 T 180, 3.45gN/pot |
| Nutricote 17-6-8 T 270, 3.45gN/pot | Wilbro 16-5-10, 3.45gN/pot         |
| TRI Pro 18-6-12, 3.45gN/pot        | Scotts High N 22-4-6, 3.45N/pot    |

**Figure 4. Snow Azalea Fertilizer Evaluations  
9 Month Products – Visual Quality**

**Quality Ranking on 10/13/99**



**Quality Ranking, 5= Excellent, 3= Acceptable, 1= Poor**

- |                                    |                                    |
|------------------------------------|------------------------------------|
| Nutricote 17-6-8 T 180, 2.7gN/pot  | Nutricote 17-6-8 T 270, 2.7gN/pot  |
| Wilbro 16-5-10, 2.7gN/pot          | TRI Pro 18-6-12, 2.7gN/pot         |
| Scotts High N 22-4-6, 2.7N/pot     | Nutricote 17-6-8 T 180, 3.45gN/pot |
| Nutricote 17-6-8 T 270, 3.45gN/pot | Wilbro 16-5-10, 3.45gN/pot         |
| TRI Pro 18-6-12, 3.45gN/pot        | Scotts High N 22-4-6, 3.45N/pot    |



**Table 4. 1999 Compacta Holly Controlled Release Fertilizer Evaluations  
Potting Media Nutrient Analysis / October 19,1999**

<b>Treatment (12 Month)</b>	<b>Rate</b>	<b>pHw*</b>	<b>SS</b>	<b>NO<sub>3</sub></b>	<b>NH<sub>4</sub></b>	<b>P</b>	<b>K</b>	<b>Ca</b>	<b>Mg</b>
Nutricote 17-6-8 T 360	3.2gN/pot	5.9	.26	1.0	<1	3.6	8.5	18.2	14.5
Wilbro 15-4-9	3.2gN/pot	6.1	.28	<1.0	1	3.4	13.6	21.1	9.0
Multicote 17-5-11	3.2gN/pot	5.3	.52	<1.0	1	7.0	14.3	41.4	27.2
Osmocote Pro 22-4-7	3.2gN/pot	5.7	.35	<1.0	<1	2.2	9.3	21.5	17.4
Nutricote 17-6-8 T 360	4.25gN/pot	6.0	.33	1.0	1	1.7	6.4	18.0	17.4
Wilbro 15-4-9	4.25gN/pot	6.1	.38	1.0	2	2.9	12.0	24.2	20.0
Multicote 17-5-11	4.25gN/pot	5.7	.26	1.0	2	11.5	13.2	14.9	12.2
Osmocote Pro 22-4-7	4.25gN/pot	5.7	.30	1.0	2	3.4	8.2	18.4	14.9
<b>(9 Month)</b>									
Nutricote 17-6-8 T 180	2.7gN/pot	6.3	.18	1.0	1	1.2	2.8	9.8	10.1
Nutricote 17-6-8 T 270	2.7gN/pot	6.2	.22	1.0	<1	1.1	3.8	12.5	11.9
Wilbro 16-5-10	2.7gN/pot	6.3	.19	1.0	1.6	6.2	11.7	8.2	
Multicote 18-6-12	2.7gN/pot	6.2	.19	<1.0	1	5.2	7.2	11.8	8.3
Scotts High N 22-4-6	2.7gN/pot	6.1	.33	<1.0	<1	3.7	7.0	23.0	19.5
Nutricote 17-6-8 T 180	3.45gN/pot	6.5	.43	<1.0	1	3.6	8.2	28.8	28.4
Nutricote 17-6-8 T 270	3.45gN/pot	6.6	.47	<1.0	1	3.8	7.1	39.6	32.8
Wilbro 16-5-10	3.45gN/pot	6.4	.19	<1.0	<1	3.8	5.2	15.8	9.7
Multicote 18-6-12	3.45gN/pot	6.2	.30	1.0	<1	6.8	8.9	24.5	16.2
Scotts High N 22-4-6	3.45gN/pot	6.3	.32	<1.0	<1	3.3	6.6	21.9	19.6

\* Saturation Extract Method. pHw (water pH, SS (Soluble Salts) in mmhos, NO<sub>3</sub>, NH<sub>4</sub>, P, K, Ca and Mg in ppm.



**Table 5. 1999 Compacta Holly Controlled Release Fertilizer Evaluations  
Leaf Tissue Nutrient Analysis / October 19,1999**

<b>Treatment (12 Month)</b>	<b>Rate</b>	<b>N*</b>	<b>P</b>	<b>K</b>	<b>Ca</b>	<b>Mg</b>	<b>Mn</b>	<b>Fe</b>	<b>B</b>	<b>Cu</b>	<b>Zn</b>
Nutricote 17-6-8 T 360	3.2gN/pot	2.35	.14	.71	.94	.54	741	141	49	4.2	361
Wilbro 15-4-9	3.2gN/pot	2.20	.16	1.01	.74	.41	780	122	32	1.4	248
Multicote 17-5-11	3.2gN/pot	1.86	.13	.78	.83	.47	821	118	45	1.2	208
Osmocote Pro 22-4-7	3.2gN/pot	2.10	.11	.54	.82	.50	778	76	43	2.8	326
Nutricote 17-6-8 T 360	4.25gN/pot	2.20	.14	.68	.83	.50	652	86	45	2.8	298
Wilbro 15-4-9	4.25gN/pot	2.39	.18	1.19	.69	.39	1038	98	32	2.3	150
Multicote 17-5-11	4.25gN/pot	2.19	.17	.85	.69	.43	837	75	34	2.8	206
Osmocote Pro 22-4-7	4.25gN/pot	2.19	.14	.48	.75	.48	797	110	41	5.6	322
<b>(9 Month)</b>											
Nutricote 17-6-8 T 180	2.7gN/pot	2.55	.18	.74	.84	.48	816	97	43	5.6	308
Nutricote 17-6-8 T 270	2.7gN/pot	2.48	.17	.69	.84	.54	634	71	47	5.6	334
Wilbro 16-5-10	2.7gN/pot	2.57	.15	.82	.79	.771	54	35	4.7	274	
Multicote 18-6-12	2.7gN/pot	2.09	.14	.70	.88	.44	855	72	33	3.7	242
Scotts High N 22-4-6	2.7gN/pot	2.36	.14	.54	.91	.56	711	80	44	4.2	424
Nutricote 17-6-8 T 180	3.45gN/pot	2.54	.17	.75	.86	.48	641	83	42	6.8	277
Nutricote 17-6-8 T 270	3.45gN/pot	2.68	.20	.69	.90	.50	688	80	45	8.2	268
Wilbro 16-5-10	3.45gN/pot	2.40	.16	.82	.79	.46	900	91	33	5.2	276
Multicote 18-6-12	3.45gN/pot	2.43	.14	.82	.85	.41	1086	71	34	3.8	250
Scotts High N 22-4-6	3.45gN/pot	2.37	.16	.49	.90	.51	751	69	40	4.9	335

\* N, P, K, Ca and Mg are expressed as percent,  
Mn, Fe, B, Cu, Zn are expressed as ppm





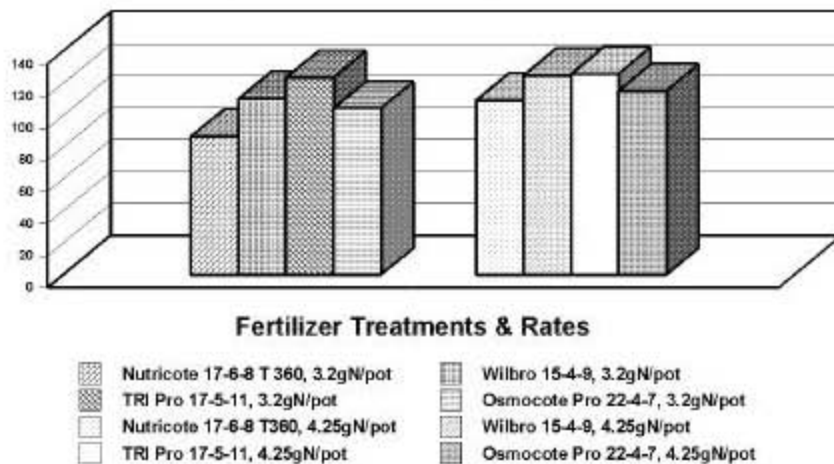
**Table 6. Compacta Holly Average Dry Weights and Quality Ranking**

<b>Fertilizer Treatments</b>	<b>Rates</b>	<b>Mean Weight</b>	<b>Mean Quality Rank*</b>
<b><u>(12 Month)</u></b>			
Nutricote 17-6-8 T 360	3.2gN/pot	86.9 g	3.7
Wilbro 15-4-9	3.2gN/pot	110.6 g	4.4
Multicote 17-5-11	3.2gN/pot	123.8 g	4.7
Osmocote Pro 22-4-7	3.2gN/pot	104.5 g	4.4
Nutricote 17-6-8 T 360	4.25gN/pot	109.4 g	4.3
Wilbro 15-4-9	4.25gN/pot	125.1 g	5.0
Multicote 17-5-11	4.25gN/pot	126.2 g	5.0
Osmocote Pro 22-4-7	4.25gN/pot	115.3 g	4.4
<b><u>(9 Month)</u></b>			
Nutricote 17-6-8 T 180	2.7gN/pot	73.9 g	3.8
Nutricote 17-6-8 T 270	2.7gN/pot	74.2 g	3.4
Wilbro 16-5-10	2.7gN/pot	79.9 g	4.0
Multicote 18-6-12	2.7gN/pot	101.1 g	4.4
Scotts High N 22-4-6	2.7gN/pot	69.2 g	3.6
Nutricote 17-6-8 T 180	3.45gN/pot	86.3 g	4.4
Nutricote 17-6-8 T 270	3.45gN/pot	77.3 g	4.2
Wilbro 16-5-10	3.45gN/pot	96.6 g	4.4
Multicote 18-6-12	3.45gN/pot	94.9 g	4.4
Scotts High N 22-4-6	3.45gN/pot	79.3 g	4.1

\* Nurserymen quality ranking with 5= Excellent, 4= Good, 3= Acceptable, 2= Marginal, 1= Poor

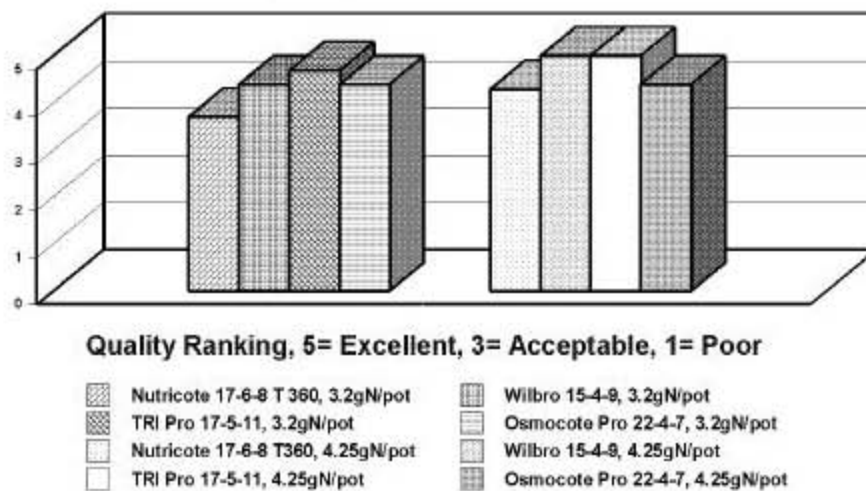
**Figure 5. Compacta Holly Fertilizer Evaluations  
12 Month Products – Top Growth**

Dry Weight (grams) on 10/19/99



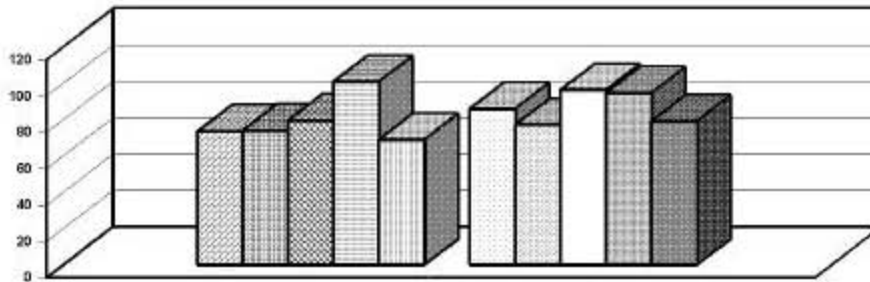
**Figure 6. Compacta Holly Fertilizer Evaluations  
12 Month Products – Visual Quality**

Quality Ranking on 10/13/99



**Figure 7. Compacta Holly Fertilizer Evaluations  
9 Month Products – Top Growth**

**Dry Weight (grams) on 10/19/99**

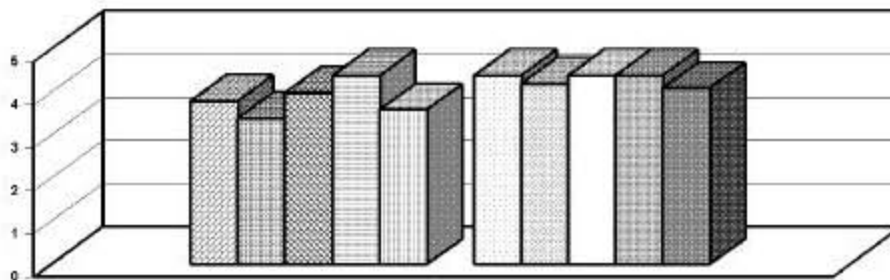


**Fertilizer Treatments & Rates**

- |                                    |                                    |
|------------------------------------|------------------------------------|
| Nutricote 17-6-8 T 180, 2.7gN/pot  | Nutricote 17-6-8 T 270, 2.7gN/pot  |
| Wilbro 16-5-10, 2.7gN/pot          | TRI Pro 18-6-12, 2.7gN/pot         |
| Scotts High N 22-4-6, 2.7N/pot     | Nutricote 17-6-8 T 180, 3.45gN/pot |
| Nutricote 17-6-8 T 270, 3.45gN/pot | Wilbro 16-5-10, 3.45gN/pot         |
| TRI Pro 18-6-12, 3.45gN/pot        | Scotts High N 22-4-6, 3.45N/pot    |

**Figure 8. Compacta Holly Fertilizer Evaluations  
9 Month Products – Visual Quality**

**Quality Ranking on 10/13/99**



**Quality Ranking, 5= Excellent, 3= Acceptable, 1= Poor**

- |                                    |                                    |
|------------------------------------|------------------------------------|
| Nutricote 17-6-8 T 180, 2.7gN/pot  | Nutricote 17-6-8 T 270, 2.7gN/pot  |
| Wilbro 16-5-10, 2.7gN/pot          | TRI Pro 18-6-12, 2.7gN/pot         |
| Scotts High N 22-4-6, 2.7N/pot     | Nutricote 17-6-8 T 180, 3.45gN/pot |
| Nutricote 17-6-8 T 270, 3.45gN/pot | Wilbro 16-5-10, 3.45gN/pot         |
| TRI Pro 18-6-12, 3.45gN/pot        | Scotts High N 22-4-6, 3.45N/pot    |

**Table 7. Azalea Suggested Nutrient Concentration Ranges\***

<b>Nutrient</b>	<b>Range</b>
Nitrogen (N)	1.50-3.00 %**
Phosphorous (P)	0.20-0.60 %
Potassium (K)	0.80-1.60 %
Calcium (Ca)	0.20-1.60 %
Magnesium (Mg)	0.17-0.50 %
Manganese (Mn)	30-300 ppm
Iron (Fe)	50-150 ppm
Boron (B)	20-100 ppm
Copper (Cu)	6-15 ppm
Zinc (Zn)	15-60 ppm

\*From Plant Analysis Handbook for Georgia, C. Owen Plank, 1989, Cooperative Extension Service, The University of Georgia.

\*\*Modified from Plant Analysis Handbook II, Harry A. Mills and J. Benton Jones Jr., 1996, MicroMacro Publishing.

**Table 8. Holly Suggested Nutrient Concentration Ranges\***

<b>Nutrient</b>	<b>Range</b>
Nitrogen (N)	1.50-3.50 %
Phosphorous (P)	0.20-0.60 %
Potassium (K)	1.50-3.50 %
Calcium (Ca)	0.50-2.50 %
Magnesium (Mg)	0.20-1.00 %
Manganese (Mn)	30-300 ppm
Iron (Fe)	50-300 ppm
Boron (B)	30-50 ppm
Copper (Cu)	6-40 ppm
Zinc (Zn)	30-75 ppm

\*From Plant Analysis Handbook for Georgia, C. Owen Plank, 1989, Cooperative Extension Service, The University of Georgia.