



Evaluation of MycorTM for use in Woody Ornamental Nursery Production

Dr. Jean L. Williams-Woodward
Department of Plant Pathology

Dr. Jim Midcap
Department of Horticulture
University of Georgia

Funded by: Plant Health Care, Inc.

Objective:

To evaluate MycorTM Nursery/Media Mix on plant growth on four woody ornamental plant species grown in containers using full and half-rate fertilization.

Methods:

Ten single plant replications of four plant species [Flowering dogwood (*Cornus florida* × Cherokee Brave), Tea Olive (*Osmanthus* sp.), Savannah Holly (*Ilex* × *attenuata*), and Japanese Anise (*Illicium parviflorum*)] per media treatment were grown in containers containing a 9:1 pine bark:sand mixture amended with micronutrients and lime. Media treatments consisted of fertilizer (Scotts 15-9-12) incorporated at either 14 or 7 lbs./cu.yd with or without the addition of MycorTM at 1.0 lb/cu.yd. All media amendments were incorporated using a portable cement mixer at transplanting into 1-gal containers for *Osmanthus*, *Ilex*, and *Illicium* and 3-gal containers for *Cornus*.

Each plant species was grouped separately and treatments were arranged in a completely randomized design within each grouping. Plant height, foliage dry weight (after 5 days at 80 C) and stem caliper measurements (1 inch from the soil line for *Osmanthus*, *Ilex*, and *Illicium*) were collected in November 1999. Foliage dry weight was not collected for *Cornus* because of the large amount of visible variability among treatment replications. Because of variability in *Cornus* plant size at the trial initiation, plant height was measured in May and November and the change in plant height over the trial period is reported. Tissue nutritional analysis was also completed on a composite sample for each plant species per media treatment.

Five replications of each plant and media treatment were planted at the University of Georgia Horticulture Farm in Watkinsville, GA. Treatments are arranged in a randomized block design. Plants are drip irrigated and mulched. Plant height and stem caliper were measured in November 1999. Plant growth (height and stem caliper) will be measured in the spring and fall of 2000, 2001, and 2002 to determine if the incorporation of Mycor will affect plant establishment and growth in landscapes.

Results:

Osmanthus sp.

Plant height was significantly greater for plants receiving full rate fertilization (14 lb/cu.yd) compared to half rate (7 lb/cu.yd) regardless of the incorporation of MycorTM to the soil medium (Table 1). However, foliage dry weight was significantly increased by the incorporation of MycorTM using full rate fertilization compared to full-rate fertilization alone. Although MycorTM incorporation did not affect plant height, it did contribute to the plants being visually fuller in appearance and in dry weight.

Table 1: Response of container-grown *Osmanthus* sp. to full and half-rate fertilization and MycorTM incorporation

Media Treatment	Plant Height (cm) 1	Stem Caliper (mm) 2	Foliage Dry Weight (g) ³
Full-rate fertilizer	20.7 a ⁴	7.9 a	22.5 b
Full-rate fertilizer + Mycor TM	20.6 a	8.6 a	32.0 a
Half-rate fertilizer	14.4 b	6.0 b	8.7 c
Half-rate fertilizer +Mycor TM	13.3 b	7.6 ab	12.2 c

¹ Height of plant from soil line to uppermost leaves.

² Diameter of stem 1 inch above the soil line.

³ Average dry weight of entire plant (stems and leaves) after 5 days at 80 C.

⁴ Numbers followed by the same letter within each column are not significantly different from each other based upon Tukey's HSD for plant height and stem caliper and Student-Newman-Keuls for foliage dry weight mean separation tests ($P= 0.05$).

Illicium parviflorum

Plant height was significantly greater for plants receiving full rate fertilization (14 lb/cu.yd) compared to half rate (7 lb/cu.yd) regardless of the incorporation of MycorTM to the soil medium (Table 2). However, foliage dry weight was significantly increased by the incorporation of MycorTM using full rate fertilization compared to full-rate fertilization alone. Although MycorTM incorporation did not significantly affect plant height, it did contribute to the plants being visually fuller in appearance and in dry weight. MycorTM also significantly increased stem caliper when combined with full-rate fertilization compared to full-rate fertilization alone. However, it did not affect stem caliper at half-rate fertilization.

Table 2: Response of container-grown *Illicium parviflorum* to full and half-rate fertilization and MycorTM incorporation.

Media Treatment	Plant height (cm) 1	Stem Caliper (mm) 2	Foliage Dry Weight (g) ³
Full-rate fertilizer	27.2 a ⁴	10.1 b	27.7 b
Full-rate fertilizer + Mycor TM	27.9 a	11.6 a	38.4 a
Half-rate fertilizer	16.4 b	8.3 c	10.4 c
Half-rate fertilizer +Mycor TM	16.5 b	8.6 c	10.1 c

¹ Height of plant from soil line to uppermost leaves.

² Diameter of stem 1 inch above the soil line.

³ Average dry weight of entire plant (stems and leaves) after 5 days at 80 C.

⁴ Numbers followed by the same letter within each column are not significantly different from each other based upon Tukey's HSD for plant height and stem caliper and Student-Newman-Keuls for foliage dry weight mean separation tests ($P= 0.05$).

Ilex H attenuata

There was no significant difference in plant height among media treatments (Table 3). Full rate fertilization did significantly increase stem caliper and foliage dry weight compared to half-rate fertilization regardless of incorporation of MycorTM into the soil medium. MycorTM incorporation did not appear to affect *Ilex* growth as it did for *Osmanthus* and *Illicium*.

Table 3: Response of container-grown *Ilex H attenuata* to full and half-rate fertilization and MycorTM incorporation

Media Treatment	Plant Height (cm) ¹	Stem Caliper (mm) 2	Foliage Dry Weight (g) ³
Full-rate fertilizer	24.0 a ⁴	10.9 a	43.4 a
Full-rate fertilizer + Mycor TM	23.1 a	11.2 a	43.1 a
Half-rate fertilizer	21.5 a	8.9 b	18.2 b
Half-rate fertilizer + Mycor TM	21.3 a	8.5 b	17.4 b

¹ Height of plant from soil line to uppermost leaves.

² Diameter of stem 1 inch above the soil line.

³ Average dry weight of entire plant (stems and leaves) after 5 days at 80 C.

⁴ Numbers followed by the same letter within each column are not significantly different from each other based upon Tukey's HSD for plant height and stem caliper and Student-Newman-Keuls for foliage dry weight mean separation tests ($P= 0.05$).

Cornus florida

No significant differences were seen in plant growth as measured by the change in plant height from May to November (Table 4). Lack of statistical difference may be due to the amount of plant size variability that existed within treatment replications. Full rate fertilization did significantly increase stem caliper compared to half-rate fertilization. MycorTM incorporation did not appear to affect *Ilex* growth as it did for *Osmanthus* and *Illicium*.

Table 4: Response of container-grown *Cornus florida* >Cherokee Brave= to full and half-rate fertilization and MycorTM incorporation

Media Treatment	Change in plant height (cm) ¹	Stem Caliper (mm) ²
Full-rate fertilizer	8.5 a ³	14.3 a
Full-rate fertilizer + Mycor TM	7.2 a	13.3 ab
Half-rate fertilizer	9.3 a	12.0 b
Half-rate fertilizer + Mycor TM	7.2 a	11.7 b

¹ Change in plant height from soil line to uppermost leaves from May to November.

² Diameter of stem 12 inches above the soil line.

³ Numbers followed by the same letter within each column are not significantly different from each other based upon Tukey's mean separation test ($P= 0.05$).

Nutritional Analysis:

A nutritional analysis was conducted in November 1999 on all plant and treatment combinations. Because the sample was a composite sample from dried leaf tissue, no statistical analysis could be performed on the data. From the data, it does not appear that the fertilization level or the incorporation of MycorTM had any major effect on the nutrient level within the plant foliage at the conclusion of the test (Table 5).

Table 5: Nutritional Analysis of Plant Foliage

<i>Osmanthus</i>	%					ppm			
Treatment	N	P	K	Mg	Ca	Mn	Fe	B	Zn
Full fertilization	1.407	0.132	0.999	0.144	0.452	287	40.2	14.0	52.96
Full + Mycor TM	1.511	0.186	1.127	0.156	0.502	342	52.9	15.5	67.51
Half fert.	1.021	0.116	0.908	0.151	0.508	459	45.8	11.9	58.78
Half + Mycor TM	1.050	0.085	0.919	0.157	0.529	488	35.6	11.6	58.78
<i>Illicium</i>	%					ppm			
Treatment	N	P	K	Mg	Ca	Mn	Fe	B	Zn
Full fertilization	1.785	0.159	1.210	0.187	0.207	423	57.0	12.5	1.75
Full + Mycor TM	2.236	0.182	0.996	0.224	0.281	491	64.2	20.2	<0.40
Half fert.	1.672	0.140	0.865	0.229	0.269	547	44.3	15.7	<0.40
Half + Mycor TM	1.488	0.136	0.938	0.229	0.298	423	63.2	18.3	<0.40
<i>Ilex</i>	%					ppm			
Treatment	N	P	K	Mg	Ca	Mn	Fe	B	Zn
Full fertilization	1.072	0.101	0.696	0.315	1.71	16.2	66.9	69.2	4.07
Full + Mycor TM	1.158	0.097	0.737	0.398	2.29	14.0	74.6	75.3	3.49
Half fert.	0.966	0.074	0.671	0.446	2.13	12.7	63.1	53.5	2.33
Half + Mycor TM	0.918	0.058	0.663	0.404	2.07	12.4	52.9	59.4	2.91
<i>Cornus</i>	%					ppm			
Treatment	N	P	K	Mg	Ca	Mn	Fe	B	Zn
Full fertilization	1.936	0.248	0.766	0.287	0.56	1003	35.64	37.6	325.9
Full + Mycor TM	2.239	0.171	0.648	0.363	0.60	1061	37.23	42.1	421.9
Half fert.	1.933	0.225	0.813	0.287	0.71	1029	39.89	41.5	425.4
Half + Mycor TM	1.816	0.194	0.729	0.298	0.67	1202	38.22	42.5	424.3
Normal Range for woody ornamentals	2.00-4.50	0.20-0.60	1.50-3.50	0.30-1.00	0.50-2.50	30-300	50-300	30-50	30-75