Response of Field-Grown *Ligustrum* to Granular and Solution Fertilizer

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Nature of work: Plants grown in native soils are typically fertilized with about 6 lb. N/1000 sq. ft. per year (1) applied in multiple applications broadcast to the soil surface at the plant base. However, fertilizer placement or method of delivering the fertilizer to the root zone could necessitate altering the application rate. Application rates are based on the crop nutrient requirement or plant response that is achieved with a particular application method and fertilizer placement. The following study was conducted to determine if the broadcast nitrogen application rate (8.6 lb N/1000 sq. ft. per application) currently used by a central Florida nursery should be altered or supplemented with solution fertilizer to achieve optimal plant response.

In September 1995, one-gallon *Ligustrum japonicum* were planted in Myakka fine sand (siliceous, hyperthermic Aeric Haplaquods) at Ellenton Nursery, Parrish, Florida. Plants were spaced 10 ft. within a row and 20 ft. between each of 27 rows each containing about 60 plants. The 27 rows were split among three adjoining fields each containing 8, 9, and 10 rows of plants (Fields 1, 2, and 3, respectively). After planting, one-third gallon of Polystart [(8-30-5) 4 pt./100 gal., Morse Enterprises Limited, Inc., Miami, Florida] and 0.5 lb. Florganic fertilizer [6-3-0, derived from digested sewage sludge, Florida Favorite

Fertilizer (FFF), Lakeland, Florida] were applied to soil in a 7 sq. ft. area around base of each plant. In October, 0.25 lb. 12-4-12 granular fertilizer (FFF) was applied to the 7 sq. ft. area at the base of each plant and in January 1996, 12-0-12 granular fertilizer (FFF) was applied at 0.25 lb. per plant in Fields 1 and 2, and 0.5 lb. per plant in Field 3. The later fertilizer did not contain phosphorus because soil test revealed very high phosphorus in the soil. Subsequently, each plant in each of three random treatment rows of each field received the 12-0-12 at rates of 0.25, 0.5, or 1.0 lb. per plant applied uniformly to the 7 sq. ft. area per plant (except for the 0.25 lb. rate in which there were four rows in Field 3 and two rows of the 0.25 lb rate in Field 1). Each rate was equivalent to about 4.3, 8.6, and 17 lb. N/1000 sq. ft., respectively, per application. The 12-0-12 was applied in April, June, August, and October of 1996, and April and September of 1997. The 0.25 lb rate was applied to all plants in December 1997. Prior to initiation of this study, 0.5 lb. of 12-4-12 per plant applied at six-week intervals was standard protocol for the nursery. All plants were irrigated with pressure compensating Netafim emitter [(1 gal./hr.) Netafim Irrigation, Altamonte Springs, Florida]. Plants in Fields 1 and 2 were irrigated with water containing 30-35 ppm N (derived from ammonium nitrate) while plants in Field 3 did not receive fertilizer in the irrigation water. Irrigation water in Field 1 was applied in two applications on days when needed, while one continuous application on days when needed was used for Fields 2 and 3. For example, Fields 2 and 3 received irrigation for 3 consecutive hours, while Field 1 received irrigation the first hour, then off for one hour, then on for one hour. Field 1 was irrigated for two-thirds the duration of Fields 2 or 3, but Field 1 had a non-irrigated time interval between irrigation applications. The non-irrigated interval was equal to the length of time for one of the irrigation intervals. This

irrigation regime was initiated in October 1995 and is referred to as cyclic irrigation. In November 1995, March 1997, and January 1998 the height, widest width and perpendicular width were measured for ten plants near the center of each row. A growth index was calculated as height plus average width.

Results and Discussion: Plants within each field that received 0.25 or 0.5 lb. of 12-0-12 per 7 sq. ft. per application had similar growth indices in March and January regardless of fertilization rate (Table 1). Supplementing the 0.25 and 0.5 lb. granular fertilization rates with cyclic or continuous fertigation, did not result in plants with growth indices larger than plants receiving only granular fertilization. These data indicate that 0.5 lb of 12-0-12 per 7 sq. ft. per application surpassed the nutrient requirements for *Ligustrum japonicum* in view of a similar plant response for the 0.25 lb. rate. These results may have been different at lower application rates of granular fertilizer.

Significance to Industry: Plant response to nitrogen application rate may vary due to factors such as plant species, soil type, fertilizer application method, rate, and placement. Nursery operators should conduct tests to evaluate plant response to fertilizer under cultural conditions at the nursery. Data from this study indicate that *Ligustrum japonicum* could be fertilized with at least one half the granular fertilizer application rate (8.6 lb N/1000 sq. ft. per application) commonly used by the nursery.

Literature Cited

1. University of Florida Extension Soil Testing Laboratory. Gainesville, Florida.

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Table 1. Data are growth indices [GI = height (meters) + average width (meters)] for field-grown *Ligustrum japonicum* that received 0.25, 0.50, or 1.00 lb. of 12-0-12 per plant per application in addition to fertigation or no fertigation during Oct. 1995 to Jan. 1998.

Date	Field 1			Field 2			Field 3		
	Fertigation Cycled + Granular Fertilizer (lb. granular fert. / app.)			Fertigation + Granular Fertilizer (lb. granular fert. / app.)			No Fertigation + Granular Fertilizer (lb. granular fert. / app.)		
	0.25	0.50	1.00	0.25	0.50	1.00	0.25	0.50	1.00
Nov. 1995	0.6 ± 0.1	0.6 ± 0.1	0.6 ± 0.1	0.7 ± 0.1	0.7 ± 0.1	0.7 ± 0.1	0.4 ± 0.1	0.5 ± 0.1	0.4 ± 0.1
March 1997	2.7 ± 0.2	2.4 ± 0.4	2.2 ± 0.4	2.6 ± 0.3	2.5 ± 0.4	2.5 ± 0.5	2.4 ± 0.5	2.4 ± 0.5	1.9 ± 0.4
Jan. 1998	3.7 ± 0.4	3.5 ± 0.8	3.4 ± 0.5	3.8 ± 0.6	4.0 ± 0.4	3.7 ± 0.7	4.0 ± 0.5	3.9 ± 0.5	3.4 ± 0.6

n = 30 ± standard deviation. Granular fertilizer (12-0-12) was applied in April, June, August, and October of 1996 and April and September of 1997 (see text regarding other granular fertilizer applications). Granular fertilizer was applied to 7 sq. ft. of soil surface at base of plant. Fertigation (approximately 35 ppm N) was delivered by 1 gal./hr. pressure compensating emitter at base of plant. Field 1 receive two-thirds the fertigation or irrigation duration of Fields 2 and 3.