

- J. Amer. Soc. Hort. Sci. 104:335-338.
4. Jones, H. C. 1971. Effects of container size, fertilization level and water frequency on growth, roots/shoot ratio, chemical composition and establishment in a roadway stress environment of *Ligustrum japonicum* and *Juniperus chinensis* 'Pfitzer Blue'. Thesis, Univ. of Fla.
  5. Ingram, D. L., C. R. Johnson and J. N. Joiner. 1979. Effects of shade, nitrogen and potassium levels on container grown azaleas and

- ligustrum. Proc. SNA Research Conf. 1979. P. 65-66.
6. Milks, R. R., J. N. Joiner, L. A. Garard, C. A. Conover and B. Tjia. 1979. Influence of acclimatization on carbohydrate production and translocation of *Ficus benjamina* L. J. Amer. Soc. Hort. Sci. 104:410-413.
7. Poole, Richard T. and Charles A. Conover. 1980. Influence of light and fertilization levels on production and acclimatization of *Pittosporum spp.* HortScience. 15:201-203.

Proc. Fla. State Hort. Soc. 93:74-75. 1980.

## 'MALAYAN DWARF' COCONUT PALM FERTILIZATION TESTS AND RECOMMENDATIONS<sup>1</sup>

HENRY M. DONSELMAN  
University of Florida, IFAS,  
Agricultural Research Center,  
3205 S.W. 70 Ave., Ft. Lauderdale, FL 33314

*Additional index words.* 'Malayan Dwarf', foliar feeding, palm nutrient deficiencies, microelement deficiencies.

**Abstract.** Florida has imported over a million 'Malayan Dwarf' seed coconuts from Jamaica and has several hundred thousand of these planted in the landscape. Of the three 'Malayan Dwarf' varieties (gold, yellow, and green), the golden variety is predominant. Because it requires more care than the lethal yellowing susceptible 'Jamaican Tall' coconut and, by nature, has a lighter green color and golden petioles, many people feel this palm is less desirable and some have even mistaken its normal coloration for lethal yellowing.

To demonstrate the importance of nutrition in the growth of golden 'Malayan Dwarf' coconut palms, a test was set up in Crandon Park on Key Biscayne, Florida. Both foliar and granular fertilizers were formulated to provide the specific nutrient requirements of the 'Malayan Dwarf'. A program for establishing 'Malayan Dwarf' coconut palms was determined using foliar and granular fertilizer for the initial six months and granular fertilizer alone at 3-4 month intervals to maintain fertility. 'Malayan Dwarf' coconut palms respond dramatically to fertilization and, with proper care, are a valuable addition to the tropical look of south Florida.

The 'Malayan Dwarf' coconut palm (*Cocos nucifera* L. 'Malayan Dwarf') is known to require more care and fertilization than the 'Jamaican Tall' (Midcap 1975). Early introductions during the 1950's in Dade and Monroe County have survived lethal yellowing, but many of the palms appear to be nutrient deficient. Public acceptance of the 'Malayan Dwarf' coconut palm has been lower than anticipated because the horticultural requirements of the palm are different than the common 'Jamaican Tall'.

Of the three types of 'Malayan Dwarf' coconut palm (golden, yellow, and green) the green appears to be horticulturally the best adapted for south Florida. Early importations of 'Malayan Dwarfs' were predominately of the golden

type. Although the golden 'Malayan Dwarf' grows well and is almost totally resistant to lethal yellowing its natural golden cast and lighter green color makes it appear to be "underfed". In the past few years the public's preference for green 'Malayan Dwarfs' and the Jamaican Coconut Industry Board's willingness to sort out and ship Florida seed-nuts of this type has made this green coconut very popular. With proper care all 'Malayan Dwarf' coconut palms will thrive in south Florida.

'Malayan Dwarf' coconut palms require the most care during their first few years. When young they may be a little less cold tolerant than the 'Jamaican Tall' and require a well drained soil, good nutrition, and adequate irrigation. The most critical step in determining the success of 'Malayan Dwarf' coconut palms in the landscape is during the establishment phase after transplanting. Good care during the first 6-12 months after the palm is planted will alleviate many of the problems that can occur later.

To determine the importance of nutrition in the growth of golden 'Malayan Dwarf' coconut palms a test was set up in Crandon Park on Key Biscayne, Florida.

### Materials and Methods

Because of the special microelement needs of most palms and the unique requirements of south Florida's high pH soils, a special formulation of granular fertilizer was developed (Table 1). This high microelement mix is slow

Table 1. Analysis of 'Malayan Dwarf' Coconut Palm Granular Fertilizer.

Plant Nutrient	Percent
Total Nitrogen <sup>2</sup>	10.00
Nitrate Nitrogen	.00
Ammoniacal Nitrogen	5.00
Water Sol. Org. Nitrogen (and/or Urea Nitrogen)	1.03
Water Insoluble Nitrogen	3.97
Available Phosphoric Acid <sup>2</sup>	5.00
Soluble Potash <sup>2</sup>	5.00
Chlorine (not more than)	1.00
Secondary Plant Nutrients <sup>2</sup>	
Total Magnesium as Mg	2.41
Water Sol. Magnesium as Mg	2.41
Manganese as Mn	1.55
Boron as B	.06
Iron as Fe	1.39
Zinc as Zn	.04
Combined Sulfur as S	8.56

<sup>2</sup>Primary Plant Nutrient Sources: Potassium magnesium sulfate, Ammonium sulfate, Granular sludge, Ureaform, Potassium sulfate, Diammonium phosphate.

<sup>2</sup>Secondary Plant Nutrient Sources: Magnesium sulfate, Manganese oxide, borate, Iron sulfate, Zinc sulfate.

<sup>1</sup>The author wishes to express his gratitude to Mr. Howard Bardsley (F.E.C. Fertilizer, Homestead, FL) for providing the granular and foliar fertilizer used in this experiment and to Mr. Dick Jones (Dade County Parks and Recreation Dept.) for allowing this demonstration in Crandon Park. Additional thanks are made to Mr. Astor Goodison (Jamaica Coconut Industry Board), Mr. Harry Britt and Mr. Tony Bushell (Crandon Park), Mr. Jesse Durko (ARC, Ft. Lauderdale), and DeArmand Hull (Dade County Extension Service), for their assistance. Additional demonstrations were made at Oglesby Nursery & Gulfstream Country Club.

to leach through sandy soils and improves the sandy soil structure and cation exchange. Since newly transplanted palms do not have an extensive root system a foliar spray was formulated to provide the plant with optimum nutrition during the establishment phase (Table 2).

Table 2. Analysis of 'Malayan Dwarf' Coconut Palm Micronutrient Foliar Spray.<sup>z</sup>

Nutrients	Percent
Secondary Plant Nutrients <sup>y</sup>	
Total Magnesium as Mg	6.69
Water Sol. Magnesium as Mg	6.69
Manganese as Mn	3.87
Zinc as Zn	2.41
Iron as Fe	4.00
Sulfur as S	4.24
Boron as B	.033
Sodium Molybdate as Mo	.0003

<sup>z</sup>The chemicals listed are formulated in the product FER-A-GROW® (Manufactured by F.E.C. Fertilizer Co., Homestead, FL). The final tank mix consisted of FER-A-GRO (17.46 g/L or 2.4 oz/gal), Tri-basic copper (1.19 g/L or .16 oz/gal), Urea (5.82 g/L or .8 oz/gal) and a spreader-sticker.

<sup>y</sup>Secondary Plant Nutrients Sources: Magnesium sulfate, Manganese sulfate, Sodium borate, Ferrous oxalate, Zinc sulfate, Sodium molybdate.

Since this test was designed to be a demonstration, an area with high visibility to the public was chosen. An area near the beach was planted with 37 golden 'Malayan Dwarf' coconut palms during the summer of 1978. An access road divides the plot with 23 palms on the west side and 14 on the east side. Minimal care was given to the palms until the initiation of this experiment on March 19, 1980. Previous fertilization was limited to that applied to the turf-grass. All of the golden 'Malayan Dwarf' coconut palms were healthy, although they were growing slowly and had the "typical" off-color of under-fertilized golden 'Malayan Dwarf' coconut palms.

At the initiation of the demonstration the height of the palms was recorded by measuring from the ground to the tip of the newest fully expanded leaf (Figure 1). Notation was also made of the general color and appearance of the palms. Palms on the west side of the access road were left untreated as a comparison. Irrigation and turf grass maintenance remained the same for both groups.

Nutritional treatments for the 23 palms on the east side of the road consisted of a 2.25 kg. (5 lb.) application of the granular fertilizer evenly distributed around the palm 59 cm. (19 in.) from the base. The palms were also sprayed until run-off with the soluble foliar solution. The palms were re-treated after 3 months (June 18, 1980) in an identical manner. Measurements presented in this paper (Fig. 1) were made after 7 months (October 20, 1980).

### Results and Discussion

Results of the increased growth of golden 'Malayan Dwarf' coconut palms with increased fertility are presented in Fig. 1. In addition to the increased growth there was a

highly visible difference in the color and vigor of the treated palms. Additional tests at a commercial wholesale nursery and on a golf course showed similar results.

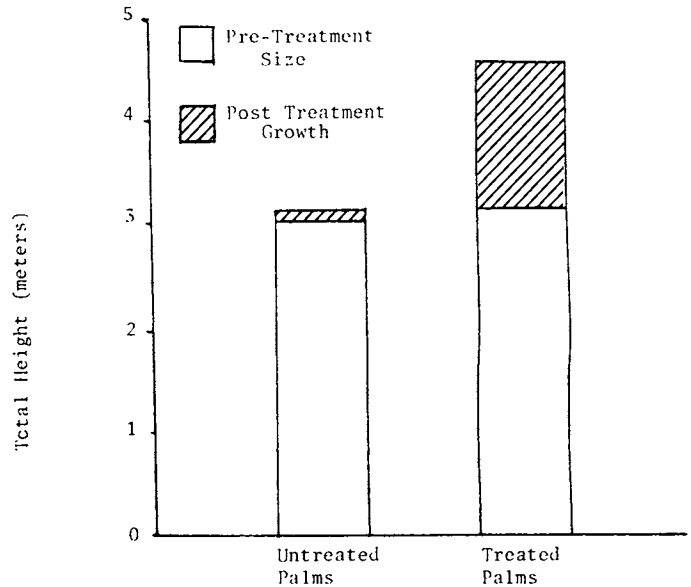


Fig. 1. Comparison of the growth of 'Malayan Dwarf' coconut palms before and after fertilization. Shaded area represents 7 months growth.

Demonstrations such as this point out the importance of adequate fertilization for the establishment and maintenance of 'Malayan Dwarf' coconut palms. Nurserymen and homeowners should be aware that these palms were responding to their optimum nutrient requirements. Although the granular fertilizer used in this experiment was formulated with the specific requirements of the 'Malayan Dwarf' coconut palm in mind, many of the commercial "high micronutrient" fertilizers would probably elicit similar results. Similarly, there are other foliar sprays that would bring about the same results. Granular rates used for this experiment were determined by the size of the palms. Larger palms would require as much as 4.5 kg. (10 lbs) applied three times a year, while smaller palms would require considerably less. Foliar sprays are not required once optimum fertility of the palm is obtained. Foliar sprays are beneficial primarily for those palms that are newly transplanted or nutrient deficient.

With the increased popularity of the lethal yellowing resistant 'Malayan Dwarf' coconut palms it is important that homeowners and nurserymen alike be aware of their nutritional needs. With the same care that most homeowners are willing to provide for their shade trees or fruit trees the 'Malayan Dwarf' can thrive and replace the tropical atmosphere in south Florida that has been lost due to lethal yellowing.

### Literature Cited

1. Midcap, J. T. and R. D. Martyn. 1975. *The 'Malayan Dwarf' Circular 404*. Univ. of Fl. Gainesville.