

Ornamental Section

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A PRODUCTION BUDGET FOR CRAPE MYRTLE IN FLORIDA¹

CECIL N. SMITH, DENNIS B. MCCONNELL, AND
ROBERT E. L. GREENE
*IFAS Food and Resource Economics and
Ornamental Horticulture Departments,
University of Florida,
Gainesville, FL 32611*

and the estimated variable and fixed costs for producing plants in 1-gallon containers. Total costs per plant for producing 10,000 salable plants were estimated at \$1, with 45¢ consisting of variable costs, 15¢ comprising fixed costs, and the remaining 40¢ being made up of overhead costs, parts of which could either be considered in the variable or fixed category.

Abstract. Budgets for crape myrtle and a group of other container-grown ornamental plants have been prepared as a part of Florida's contribution to the S-103 Regional Project. The preliminary budget for crape myrtle presented in this paper shows the estimated labor and material requirements

The Technical Committee of the S-103 Regional Project is studying input-output relationships and production costs for 7 nursery plants—pin oak (*Quercus palustris*), azaleas (*Rhododendron spp.*), Burford holly (*Ilex cornuta* 'Burfordii'), forsythia (*Forsythia spp.*), dogwood (*Cornus florida*), pfitzer juniper (*Juniperus chinensis* 'pfitzerana'), and

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Table 1. Labor and equipment requirements for producing 10,000 salable crape myrtle plants in 1-gallon containers for the first growing season in Florida, 1977.

Month	Operation	Equipment	Time or costs	
			Labor	Equipment
			Hours or costs (\$)	
<u>Propagation:</u>				
	Propagate with mist system under 40% saran cover (spaced 2" x 2") (300 sq. ft.) in transit bench—2 cu. yds. soil (perlite and peat)		\$15.00 cu. yd.	
June 16-Aug. 15	Cut, trim, and stick 12,059 cuttings (assume 85% survival)	Contract	\$9.00/1000	
June 16-Sept. 15	Haul cuttings from field	Contract	\$1.00/1000	
June 16-Sept. 15	Apply fungicide (3 times/.33 hr each)	Hand sprayer	1.0	1.0
June 16-Sept. 15	Checking and observing (1 hr week for 12 weeks)		12.0	
June 16-Sept. 15	Operation of mist system			172.2
<u>Field operations:</u>				
	Clear fields for plants, lay down new plastic, replace old	Man labor Cart-tractor	7.5	4.0
	Prepare potting soil mix (peat-sand-bark) fertilizer added ^a —30.75 cu. yds. soil mix (potting mix cost \$11.50/cu. yd. and fertilizer and mixing \$3.50/cu. yd.)		\$15.00 cu. yd.	
Sept.-Oct.	Pot in 1-gal. containers and move to field bed (10,250 plants)			
	Potting—4 man crew	Potting machine Conveyor Cart-tractor	61.5	15.5 15.5 15.5
Oct. through Sept.	Move to field bed	Cart-tractor	61.5	20.0
	Spray with insecticide and fungicide combination:			
	Insecticide (malathion-1 1/2 tsp./gal.); Fungicide—(dithane M-45 1 1/2 lb./100 gal.)			
	Hand spray—1 time	Hand sprayer	3.5	3.5
	Power sprayer—5 times	Sprayer-tractor	2.0	2.0
	Fertilize—6 times	Hand; cart-tractor	82.0	20.0
	Apply herbicide—6 times	Hand gun	4.1	4.1
	Hand weed—1 time		13.7	
	Hand pruning—2 times		41.0	
	Irrigation—82 times		97.0	97.0

^aFertilizer in 1 cu. yd. of potting mix:

Kind	Amount (pounds)
6-6-4 (organic)	5.0
Superphosphate	6.0
Lime	7.0
Minor elements (fritted trace)	0.125

Table 2. Labor and equipment requirements for selecting, hauling, and loading 10,000 salable crape myrtle plants in 1-gal plastic containers, Florida, 1977.

Month	Operation	Equipment	Time required	
			Labor	Equipment
			Hours	
Oct.-Dec.	Select 10,000 plants and haul to the shipping area Load on semi-trailer (4,400 gal containers to a load) -7 men	Truck	75.0	18.8
		Conveyor	50.0	10.0

crape myrtle (*Lagerstroemia indica*). This study is being done by economists and horticulturists in the cooperating agricultural experiment stations of 9 southern states. The budgets (i.e., input-output and production cost studies) are being developed to determine the time and costs for

Table 3. Estimated capital requirements for 6 acre (5.3 acres in production) crape myrtle nursery producing the equivalent of 87,750 salable plants per year in 1-gal. containers, Florida, 1977.

Item	Description	Unit	Number	Cost per unit	Total initial cost or value	Salvage value	Useful life
Land		Acre	6	2,000	12,000		
Buildings:							
Office	20'x20'	Sq. ft.	400	20	8,000		20
Potting and packing shed	35'x50'	Sq. ft.	1,750	6	10,500		20
Concrete floor	35'x50'x.33'	Cu. yds.	21.4	26	556		20
Saran area (for propagation):							
40% chicopee shade cloth		Sq. ft.	3,000	0.27	810		10
Propagation benches		Ea.	30	165	4,950		3
Frame (combination concrete reinforcement rod and galvanized pipe)		Ea.	1	1,500	1,500		10
Sub-total					26,316		
Machinery and equipment:							
Tractor—Ford 1000	23 HP	Ea.	1	4,400	4,400	880	10
Tractor—Ford 2600	32 HP	Ea.	1	6,500	6,500	1,300	8
Front end loader		Ea.	1	2,000	2,000	200	10
Cart	Flat bed		6	400	2,400		15
Truck—Ford	1/2 ton flat bed	Ea.	1	4,500	4,500	300	10
Soil shredder		Ea.	1	4,000	4,000	300	15
Soil sterilizer		Ea.	1	4,100	4,100	200	20
Potting machine	1-2 gal.	Ea.	1	7,500	7,500	750	10
Conveyor	20 ft.	Ea.	2	325	650	50	10
Sprayer	Hand	Ea.	2	40	80		3
Sprayer	200 gal.	Ea.	1	3,000	3,000	100	6
Mist system							
3/4 in. solenoid		Ea.	30	25	750		10
25 ft. bench section		Ea.	30	40	1,200		10
Day-night timer		Ea.	1	15	15		5
Cyclic timer		Ea.	1	22	22		5
Mist nozzles		Ea.	100	6	600		10
Irrigation system							
Well	8 in.—500 ft.	Ft.	500	6	3,000		25
Casing		Ft.	100	6	600		25
Pump and motor	7.5 HP	Ea.	1	5,000	5,000		25
PCV pipe, risers, heads, etc.		Acre	5.3	1,500	7,950		10
Miscellaneous							
Hand tools				500	500		5
Sub-total					58,767		
Grand total					97,083		

growing these plants to salable sizes in the various climatic zones in which the participating states are located. Results of this phase of the project will form an essential part of a future planned study on interregional competition in the southern nursery industry. It will also be useful to nurserymen for making decisions on whether or not to enter the nursery industry and in evaluating the relative efficiency of production programs for crape myrtle.

This paper contains preliminary data relating only to Florida. The data reflect typical inputs and production costs of nursery operators with high levels of technology and good management practices.

Procedure and Assumptions

Several interviews were held with a major cooperating nurseryman to determine his production methods, labor inputs, and necessary physical facilities. Visits were made to other nurserymen producing crape myrtles so that the data presented relate to a synthesized "typical" operation rather than to a single nursery.

The Technical Committee agreed to convert data into

Table 4. Estimated variable costs of producing 10,000 salable crape myrtles in 1-gal. containers for the first growing season in Florida, 1977.

Item	Description	Unit	Quantity	Price per unit	Cost	
					Total	Per salable plant
					Dollars	Cents
Containers	1-gal. plastic pot	Each	10,250	.13	1,332.50	13.325
Shade cloth	40% chicopee cloth	Sq. yd.	300	.27	81.00	.810
Soil mixture	Propagation	Cu. yd.	2	15.00	30.00	.300
	Potting	Cu. yd.	30.75	15.00	461.25	4.612
Plastic cover	4 mil black polyethylene	Sq. yd.	5,979	.02	119.58	1.196
Fertilizer	6-6-4 (2 applications of .25 oz./container)	Lb.	320	.05	16.02	.160
	12-6-6 (4 applications of .25 oz./container)	Lb.	640	.15	96.00	.960
Insecticide	Malathion	Oz.	43	.12	5.16	.052
Fungicide	Dithane M-45	Lb.	2.6	1.90	4.94	.049
Herbicide	Treflan	Lb.	308	.28	86.24	.863
Machinery and equipment (repairs, fuel, oil, etc.)	Tractor	Hour	61.5	1.28	78.72	.787
	Cart	Hour	59.5	.10	5.95	.059
	Potting machine	Hour	15.5	.50	7.75	.078
	Hand sprayer	Hour	8.6	.04	.34	.003
	Power sprayer	Hour	2.0	.83	1.66	.017
	Conveyor	Hour	15.5	.02	1.66	.017
	Mist system	Hour	172.2	.09	15.50	.155
	Irrigation system	Hour	97.0	.22	21.34	.213
	Miscellaneous hand tools	Hour	163.0	.01	1.63	.016
	Truck ²	Hour	80.0	1.28	81.28	.813
Sub-total					215.83	2.158
Labor:						
Propagation:						
Cut, trim, stick	Contract	Each	12,059	.009	108.53	1.085
Haul cuttings		Each	12,059	.001	12.06	.121
Man labor		Hour	13	3.00 ²	39.00	.390
Field labor:						
Man labor		Hour	433.3	3.00	1,218.90	12.189
Sub-total					1,378.49	13.785
Interest on operating capital	6 months @ 7.5%				143.51	1.435
Total variable cost to end of first growing season					3,970.52	39.705

¹Proportional part of truck cost.

²Labor at \$3.00 per hour includes Social Security of 5.85% and workmen's compensation.

terms of standard acreages and numbers of containers in order to bring maximum comparability of data for different commodities, states, and climatic zones. The operation synthesized was assumed to be a 6-acre nursery with 5.3 acres in production. The cost of growing 10,000 salable plants in 1-gallon containers was determined.

In this budget it is assumed that plants are propagated from cuttings and grown in a raised bed under saran cover from 8 to 12 weeks. In early fall the plants from the propagation bed are potted in gallon containers. The gallon containers are then placed in field beds, each of which has 35,000 square feet. Thirty thousand 1-gallon containers are placed in each bed, with each plant occupying 1.167 square feet of space. Thus 5 beds have the capacity for 150,000 gallon containers.

Plants stay in the field roughly from October to the next September. The major proportion of the plants are sold in the following October to December period, with sales continuing through the winter and spring months. Thus a bed cannot be completely refilled with new plants each year. It is assumed that 18,000 new plants are replaced in each bed.

Some plants in gallon containers are repotted into 7-gallon containers after the first growing season, grown for a second year, and sold during the next fall (October-December) or later. It is assumed that approximately 10%

of the plants in 1-gallon containers would be repotted into 7-gallon containers. One 7-gallon container occupies as much space as 3 1-gallon cans.

Many of the results are based on assumptions, e.g., the buildings and equipment listed are necessary to operate a 6-acre nursery, with labor requirements and costs being those for producing 10,000 salable plants. The survival rate for cuttings is assumed to be 85 percent and for plants in the field to be 97.5 percent. Thus, to have 10,000 salable plants, it would be necessary to place 12,059 cuttings in the propagation beds.

Results

Labor and equipment required to produce 10,000 salable crape myrtles in 1-gallon containers to the end of the first growing season are shown in Table 1. The requirements for selecting, hauling, and loading 10,000 plants are given in Table 2. A separate table is used because some of the plants in gallon containers are not sold prior to the end of the first growing season. Others are sold later and still others are repotted into 7-gallon containers.

The estimated capital requirements for land, buildings, and equipment for a nursery with approximately 5 acres in production are presented in Table 3. The grand total is

Table 5. Estimated annual fixed and overhead costs of producing 10,000 salable crape myrtle plants in 1-gal. containers, Florida, 1977.

Item	Description	Annual cost
		Dollars
Fixed costs		
Land	Annual taxes	27
Buildings	Depreciation	323
	Interest	127
	Insurance and taxes	60
Machinery and equipment	Depreciation	560
	Interest	300
	Insurance and taxes	129
Sub-total		1,526
Overhead costs		
General overhead	Electricity	157
	Telephone	125
	General repairs and maintenance	285
	Advertising	63
	Licenses and bonds	57
	Travel and entertainment	171
	Miscellaneous cash expenses	285
	Supervisor's salary	1,094
	Operator's salary	1,709
	Sub-total	
Total		5,472

slightly in excess of \$97,000 with \$12,000 in land, \$26,300 in buildings and related areas, plus the remaining almost \$59,000 in equipment.

Estimated variable production costs to the end of the first growing season are shown in Table 4. The total cost per plant is estimated at 39.7¢, with 13.3¢ in containers, 0.81¢ in shade cloth, 1.2¢ in plastic cloth, 2.1¢ in fertilizer, herbicides, etc., 2.16¢ in machinery and equipment, 13.78¢ for labor, and 1.5¢ in interest on operating capital.

Additional variable production costs until the plants are sold amounted to an estimated 5.26¢, with 1.27¢ of this being production costs for an average of 1.5 months and 4¢ constituting the costs of selecting and loading plants. (These data are not shown in any of the tables.)

The estimated annual fixed and overhead costs of producing 10,000 salable plants in 1-gallon containers are shown in Table 5. These amounted to 54.72¢ per plant, with the vast majority of this amount consisting of general overhead, including salaries of the supervisor and operator. In view of the large proportion of the total made up by overhead costs, data on them are presented separately in this report. Since some of the items in overhead costs may be treated as variable and others as fixed, a decision concerning their treatment must be made later by the S-103 Technical Committee.

The estimated total cost per plant, with assumptions of 100, 85, and 75% of capacity, for producing 10,000 crape myrtles in 1-gallon containers is illustrated in Table 6. In every instance, overhead costs comprised a higher share of the costs than variable items. Total estimated costs ranged from \$1 to \$1.23 per plant, with fixed and overhead costs comprising a smaller share of the total as full capacity was reached.

Table 6. Estimated total costs of producing 10,000 salable crape myrtle plants in 1-gal. containers, Florida, 1977.

Condition	Percent capacity*	Cost per 10,000 plants sold				Total cost per plant sold
		Variable	Fixed	Overhead	Total	
Dollars						
87,750 equivalent plants sold [†]	100	4,497	1,526	3,946	9,969	1.00
74,588 equivalent plants sold [†]	85	4,497	1,795	4,642	10,934	1.09
61,425 equivalent plants sold [†]	70	4,497	2,180	5,637	12,314	1.23

*An estimated capacity of 100% assumes that the level of sales on the 5.3 acre nursery is at the maximum production level postulated in the budget. The 85 and 70% levels assume that sales are at lower levels.

[†]An equivalent plant is a 1-gal. plant or a third of a 7-gal. plant.

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DETERMINING WHICH CONTAINER PLANTS TO PRODUCE

DAN L. GUNTER

G120 McCarty Hall,

IFAS, Food and Resource Economics Department,

University of Florida,

Gainesville, FL 32611

JOHN A. OTTE

IFAS, Food and Resource Economics Department,

Agricultural Resource and Education Center,

Bradenton, FL 33505

nursery records by "renting" the production space to the individual plants. The grower can select the profitable plants by comparing the estimated production costs and the expected selling prices. This report demonstrates the plant cost estimation method and explains how managers may use the information in making production decisions.

Determining which of the many container plant varieties and sizes to produce requires both horticultural expertise and management ability. Usually, nurserymen should grow only those plants which contribute to overall nursery profits. Growers can identify more profitable plants by determining the production cost of each plant grown in the nursery and comparing the cost to the selling price.

Typically, nurserymen have only those records to report taxes. This report shows nurserymen how to approximate

Abstract. Knowledge of individual plant costs allows production decisions to be based on potential profits. Individual plant costs can be approximated with present

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