

In using the frames we just set the wooden flats of plants on the arms cross ways and slide each flat into the angle-iron corner at the back. The thick board ends of the flats are at the sides. We use 6 regular, old fashioned building laths 4 ft. long for the supports to hold the flats all together. Two laths are stapled onto each of the flats, one diagonal strip across the face, and another diagonal across one end. We have given up using a hammer and nails for securing the racks although they work fine and are currently using a compressed air staple gun. It is so much faster.

A rack of plants thus constructed is surprisingly sturdy and easily handled. We use 40 to 50% soil or sand in most of our rooting or growing media, so a 4 ft. rack of plants is about as much weight as can be conveniently handled. Two or three of these racks fit nicely into the bucket of our tractor for easy loading into a truck.

## **CUTTING PROPAGATION COSTS FOR FRASER PHOTINIA AND TAM JUNIPER**

WILBUR L. BLUHM and JOHN BURT

Oregon State University Extension Service

3180 Center Street N.E.

Salem, Oregon 97301

Dallas, Oregon 97338

**Abstract.** Cutting propagation costs for *Photinia* × *Fraseri* Dress. and *Juniperus sabina* L. 'Tamariscifolia' were determined to be 20.5 and 13.1 cents per saleable rooted cutting, respectively. Sticking, rooting, and growing cuttings was 71.2 and 73.3 percent of total cost. Securing cuttings was 13.2 and 9.2 percent, overhead 10.7 percent for both, and operating capital interest 4.9 and 6.9 percent of total propagation cost. Labor was the largest single cost in producing cuttings.

### **INTRODUCTION**

Nursery production cost studies have been made in the United States and elsewhere, but few propagation cost studies are reported. Baldwin and Stanley (2) discussed propagation costs, their discussion in part based upon this study. They cover various inputs and provide a suggested propagation cost worksheet.

This study is in response to the request by a group of Willamette Valley, Oregon nursery growers for information on propagation and production costs. They were concerned that production cost information was inadequate for pricing of their stock.

Procedures used in this study are not unique. They have been very successfully used to determine production costs of many diverse agricultural enterprises in Oregon for many years. These procedures are easily adapted to the unique characteristics of various enterprises and they adapted well to this propagation cost study.

## METHODS AND MATERIALS

A meeting was held with interested growers. They shared ideas on needed cost information and propagation procedures. A worksheet, "Computing Costs of Plant Propagation," was then developed and sent to participating growers in the spring of 1980.

Two commonly propagated nursery plants were selected for this study. *Juniperus sabina* L. 'Tamariscifolia' is easily propagated from cuttings. *Photinia* × *Fraseri* Dress. is more difficult. Each is typical of many plants propagated by nursery growers in the Willamette Valley.

Six growers provided cost data for the juniper, filling out the worksheet, and five provided data for the photinia. All data was then compiled and summarized.

This study was updated in August, 1983. Input costs were changed to reflect inflationary increases since the original study was made.

## RESULTS

Results of the 1983 updated study are given in the following tables.

**Table 1.** Summary of cutting propagation costs of Fraser photinia.<sup>1</sup>

Operation	Average cost, cents per cutting	Cost range, cents per cutting	Percent of total propagation cost
Cost of cuttings before sticking	2.7	2.4- 6.7	13.2%
Rooting and growing cuttings	14.6	8.7-18.4	71.2
Overhead costs	2.2	0.8- 4.1	10.7
Operating capital interest	1.0	0.3- 2.2	4.9
Total	20.5	16.4-27.1	100.0

<sup>1</sup> summary of 5 growers

**Table 2.** Cost of Fraser photinia cuttings before sticking.

Cutting source	Average cost, cents per cutting	Cost range, cents per cutting
Cuttings from plants away from nursery, or from other than stock plants	1.9¢	0.7-2.7¢
Cuttings from stock plants	2.5	2.2-2.9
Purchased cuttings	3.8	(one grower)

**Table 3.** Cost of rooting and growing cuttings of Fraser photinia.

Cost item	Average cost, cents per cutting	Cost range, cents per cutting	Percent of total propagation cost
A. Housing and equipment	2.8¢	1.8- 5.3¢	13.7%
B. Propagation media <sup>1</sup>	1.7	0.7- 4.6	8.3
C. Preparing and sticking cuttings	4.6	2.4- 7.3	22.4
D. Rooting and growing cuttings <sup>2</sup>	1.4	0.3- 2.3	6.8
E. Harvesting cuttings	1.9	0.6- 3.7	9.3
F. Waste disposal and cleanup	0.6	0.4- 0.8	2.9
G. Utilities	1.6	0.3- 4.6	7.8
Total	14.6	8.7-18.4	71.2

<sup>1</sup> includes components and labor for mixing, cleaning, and placing.

<sup>2</sup> includes labor and materials for disease and insect control, plant shaping, diseased and dead plant removal, fertilization, environmental control, growth regulators, etc.

**Table 4.** Overhead costs for propagation of Fraser photinia cuttings.

Cost item	Average cost, cents per cutting	Cost range, cents per cutting	Percent of total propagation cost
A. Advertising and promotion	0.3¢	0.06-0.9¢	1.5%
B. Dues, licenses, and fees	0.2	0.2 <sup>1</sup>	1.0
C. Accounting, bookkeeping, and secretarial services	0.4	0.12-1.2	1.9
D. Miscellaneous travel expense	0.5	0.1 -0.9	2.4
E. Labor management <sup>2</sup>	0.2	0.1 -0.4	1.0
F. Operation management <sup>3</sup>	0.6	0.2 -1.7	2.9
Total	2.2	0.8 -4.1	10.7

<sup>1</sup> costs identical for all growers

<sup>2</sup> 20 percent of hired labor costs for rooting and growing cuttings, plus hired labor for secretarial, accounting, and bookkeeping services, but not for services not involving hiring labor by nursery management; a cost for managing hired labor.

<sup>3</sup> cost for managing the nursery operation; 15 percent of total cash costs for rooting and growing plus overhead cash costs.

**Table 5.** Summary of cutting propagation costs of tam juniper.

Operation	Average cost, cents per cutting	Cost range, cents per cutting	Percent of total propagation cost
Cost of cuttings before sticking	1.2¢	0.2- 2.1¢	9.2%
Rooting and growing cuttings	9.6	3.3-14.3	73.3
Overhead costs	1.4	0.3- 3.3	10.7
Operating capital interest	0.9	0.2- 1.8	6.9
Total	13.1	5.1-20.0	100.0

**Table 6.** Cost of tam juniper cuttings before sticking.

Cutting source	Average cost, cents per cutting	Cost range, cents per cutting
Cuttings from plants away from nursery, or from other than stock plants	1.1¢	0.2-1.5¢
Cuttings from stock plants	0.7	0.6-0.8
Purchased cuttings	1.7	1.4-2.1

**Table 7.** Cost of rooting and growing cuttings of tam juniper.

Cost Item	Average cost, cents per cutting	Cost range, cents per cutting	Percent of total propagation cost
A. Housing and equipment	1.3¢	0.1- 2.4¢	9.7%
B. Propagation media <sup>1</sup>	0.6	0.2- 1.1	4.9
C. Preparing and sticking cuttings	3.5	1.1- 7.3	27.0
D. Rooting and growing cuttings <sup>2</sup>	0.9	0.1- 2.3	6.9
E. Harvesting cuttings	1.5	0.5- 3.7	11.8
F. Waste disposal and cleanup	0.3	0.1- 0.8	2.6
G. Utilities	1.4	0.1- 3.7	10.3
Total	9.6	3.3-14.3	73.3

<sup>1</sup> see note 1, table 3<sup>2</sup> see note 2, table 3**Table 8.** Overhead costs for propagation of tam juniper.

Cost Item	Average cost, cents per cutting	Cost range, cents per cutting	Percent of total propagation cost
A. Advertising and promotion	0.1¢	0.01-0.4¢	0.9%
B. Dues, licenses, and fees	0.02	0.01-0.1	0.2
C. Accounting, bookkeeping, and secretarial services	0.2	0.1 -0.3	1.5
D. Miscellaneous travel expense	0.4	0.01-1.3	3.4
E. Labor management <sup>1</sup>	0.3	0.02-0.7	2.3
F. Operation management <sup>2</sup>	0.3	0.02-1.1	2.5
Total	1.4	0.3 -3.3	10.7

<sup>1</sup> see note 2, table 4<sup>2</sup> see note 3, table 4

## DISCUSSION

Labor is the principal cost factor in propagation of cuttings of tam juniper and Fraser photinia. More than 50% of total cost was found to be labor. Hired labor accounted for about 80% of total labor cost.

The high labor requirement procedures in the propagation operation are responsible for the cost distribution in summary Tables 1 and 5. The preparation, sticking, rooting, and growing

of cuttings, referred to above as "rooting and growing," with intensive labor requirements, is more than 70% of total cost of producing saleable rooted cuttings. Labor merits the most consideration for improving efficiency and reducing costs in propagating cuttings.

Purchased cuttings were the most costly. Since the price of cuttings is not the major cost factor in cutting propagation purchasing cuttings may still result in greater overall efficiency in some nursery operations.

The cost of producing saleable rooted cuttings of Fraser photinia increased by 33.1% from 1980 to 1983, and tam juniper by 12.0%. Some of this increase reflects corrections in previous reporting by growers, but much is attributed to inflationary cost increases. The 1983 figures are considered substantially more accurate than those for 1980.

The tables illustrate a wide cost range for most operations and production items, for both direct and indirect costs. This reflects the inherent differences between growing operations and management styles. Most are designed and organized to use a production system unique to the nursery and to provide certain efficiencies in the operation.

Several growers participating in this study were surprised to learn the actual cost of producing saleable rooted cuttings. Some were selling or inventorying them below cost.

**Note:** A form has been prepared for use by plant propagators in determining their propagation costs. It consists of 5 sections. Section I is for determining costs of cuttings before they are stuck. Sections II, III, and IV are for determining costs in rooting and growing cuttings to a salable size. Section V brings costs of all sections together for a total per cutting cost at salable size. This form is available free of charge by writing to the senior author, Wilbur Bluhm, 743 Linda Ave., N.E. Salem, Oregon 97303.

#### LITERATURE CITED

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