ECONOMICS OF PARAQUAT TREATMENT OF SLASH PINES FOR OLEORESIN ENHANCEMENT

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In this study we've used the best available data published to date.

Basis: cost of treatment per acre of slash pine.

Wood furnish data:

Acre yields an average of 20 cords of pulp wood (1)
Cord averages 5080 lbs wet 2540 lb. OD pulp wood (2)
Cord produces 0.72 tons pulp (unbleached)

Enhancement data: Based on harvest, 21 mo. after treatment w/4% paraquat solution. (3)

	C.T.O. (Rosin Acid)	C.S.T. (Turpentine)
Acre produces		
w/Paraquat treatment	3073.40	899.15
Control (no treatment)	497.84	162.55
Net increase in lbs.	2575.56	736.50
Net increase, ton	1.288	
Net increase, gallons		102.3

Recovery data:

Assume 50% losses due to storage time and average recovery efficiency. (4)

Net yields from the mill per acre:

C.T.O. 1.288 ton X 0.50 = 0.644 ton
C.S.T. 102.3 gallon X 0.50 = 51.15 gal.

PARAQUAT TREATMENT COST

METHOD I Personnel on foot with Jim Gem.

Labor, cost/acre

2 acre/man day @ $7.00/hr. (2)	$28.00	
Service crew @ 20%	5.60	
		$33.60

Equipment, cost/acre

Jim Gem @ $84 each for 1400 hrs.	$ 0.06	
Parts & associated equipment	0.25	
Equipment maintenance	0.55	
		$ 0.71
O & P @ 25%		8.58
		$42.89

Chemical, cost/acre

Paraquat 1/2 ml @ 8 injections each tree 300 trees/acre X 0.5 ml X 8 = 1200 ml/acre Assume 20% handling loss Volume 4% paraquat solution required = 1440 ml	$ 2.53		
Insect repellent	2.00		
		$ 4.53	
		$47.42	
Supervision 20% (by contractor)		$ 9.48	
			$56.90

METHOD II

Tractor/streaker

Equipment cost

Tractor MF 255 or F-4600	$12,583.00
Streaker attachment est.	5,000.00
Sprayer attachment	454.00
	$18,037.00

Equipment cost/hour

Amortize; 10,000 hours (7 yrs.); $18,037/10,000 hr		$ 1.80
Operating cost		
Interest insurance & taxes	$ 0.25	
Fuel, 2 gal. @ $0.75	1.50	
Lube oil 0.067 gal @ $1.50	0.10	
Hydraulic oil 0.033 gal @ $1.50	0.05	
Grease 0.02 lbs. @ $5.00/lb.	0.10	
Filters (oil & fuel) @ $4.50	0.03	
Maintenance & repair @ 90% of Deprec.	1.62	
Skidder tires @ $1,600/set-4,500 hrs.	0.38	
		4.03
Labor Tractor operator, 2 @ $8.00		16.00
O & P 40% of equipment & labor cost/hour		8.73
		$30.56

Tractor work

Speed @ 2 mph = 10560 ft./hr.
Acre = 43,560 ft.^{2}
Trees, average spacing, 14.5 ft. in 10 ft. rows or 300 trees/acres.
Tractor will cover:

$$*\frac{7 \text{ hrs.} \times 2 \text{ mph} \times 5280 \text{ ft.} \times 20 \text{ ft}}{43{,}560 \text{ ft.}^2/\text{acre}} \times 0.833 \text{ eff.} = 28.3 \text{ acre/day}$$

28.3 acre/day - 8 hr. = 3.54 acre/hr.
cost/acre: 30.56/hr - 3.54 acre/hr. $ 8.73

Chemical cost/acre

Paraquat: 30% active paraquat solution @ $50.00/gallon
Required solution, (volume & %)/streak = 20 ml @ 4%
2 streaks/tree x 20 ml/streak x 300 trees/acre = 12000 ml/acre

Volume 4% solution/gallon 30% active paraquat

$$\frac{.3 \times 3875}{.04} = 28390 \text{ ml/gallon}$$

$$\text{Gallons/acre} = \frac{12000 \text{ ml/acre}}{28390 \text{ ml/gal}} = 0.422$$

Assume 10% handling loss 0.422 X 1.1 = 0.465 gal required

Paraquat, cost/acre			
$50.00/gallon X 0.465/gal/acre =	23.25		
Insect repellent cost, est.	5.00		
Market & indicator solution est.	2.00		
		$30.25	
Supervision @ 20% (by contractor)		7.78	
			$46.65

* Assumes 1/2 hr @ beginning and end of day for chemical loading and clean up.

Economics of Ethrel Treatment for Oleoresin Enhancement

In this study we've used the only data we have to date, from a test in progress, Reference DFC 165, "Dinsmore Ethrel Needle Spray Study 12803". We've included this method only for its possibilities as the best method of application. Other ethrel-"Fenac" studies are in progress this date.

Basis; Cost of treatment per acre of splash pine.

Wood furnish data:

Acre yields an average of 20 cords of pulp wood (1)
Cord averages (5080 lbs wet) 2540 lbs OD pulp wood (2)
Cord produces 0.72 tons unbleached Kraft pulp

Enhancement data based on harvest 2 months after treatment.

acre produces	CTO (rosin acid)	CST (turpentine)
ethrel	1615	366
control	1153	249
Net increase in lbs.	462	117
Net increase, tons	0.23	
Net increase, gallons		16.2

Recovery data:

Assume 50% losses due to wood storage time and average recovery efficiency. (4)

Net yields from mill per acre

C.T.O.	0.231	x 0.50	=	0.155 tons
C.S.T.	16.25	x 0.50	=	8.125 gallon

Ethrel treatment cost

Method IV

Applied by crop duster (400 acres/hr. application rate)

Labor & equipment cost/acre

Aircraft	2.00	
Service crew @ 20%	0.40	
O & P @ 25%	0.60	
		3.00

Chemicals cost/acre

Ethrel required:

20 ml @ 10% solution x 300 trees = 0.413

0.413 gal/acre x $25.00/gal. 10.33

Supervision @ 10% (By Contractor) 1.33

Recovery data: (50% loss assumed) 14.66

Net value to mill/acre

CTO 0.155 tons x _____/ton = $_____

CST 8.12 gal x _____/gal = $_____

Method IV - Ethrel spray via crop duster

Value to the mill $_____

Method IV Cost -_____

Excess of income over expenses $_____

TABLE 1

CST - CTO ENHANCEMENT METHODS

METHODS/AND APPLICATION	CHEMICAL % & VOLUME	TREATMENT COST/PER ACRE	NET OLEORESIN VALUE	ENHANCEMENT TIME -- MONTHS
I Jim Gem personnel on foot	4% paraquat 8-10 ½ ml injections/tree	$56.90	0.644 Ton C.T.O. 51 gal. CST	21
II Tractor-Streaker 2 Operators w/tractor	4% paraquat 20 ml/streak 2 streak/tree	$46.10	0.644 Ton C.T.O. 51 gal CST	21
IV Spray via crop duster	10% Ethrel 10 ml/tree 0.41 gal/acre	$17.82	0.155 Ton C.T.O. 8.12 gal CST	3

Reference

(1) George Park et. al. St. Regis Forestry Dept., Jacksonville, Florida in private conversation, Feb. 1979

(2) Dr. S. R. Boyette, Crude Tall Oil Recovery paper, P.C.A. Sept. 28, 1977

(3) Drew Forest Chemicals Report No. 143 "Orange Park Insect Repellent Study 03721 January 1979

(4) Sulfate Turpentine Recovery, P.C.A. New York, J. Drew, J. Russell H. W. Bajak, 1971 Ch 7, "Effect of Wood Storage on Sulfate Turpentine".

(5) C. W. Rothrock, Jr. & J. B. Rhyne, "Pilot Plant & Mill Experience & Paraquat Treated Slash Pine Trees" 1976

(6) Drew, J. & Joyce, E. R., Glidden-Durkee. "Report of twelve day mill trial using varying percentages of paraquat treated wood at St. Regis' Mill, Jacksonville, Florida", Mar. 26, 1976

(7) Massey Furgerson & Ford Tractor Sales Co. private conversation March 1979.

(8) Hubert Vanzant, tree planter, Hilliard, Florida February 1979.

NOTES