

## ACID STIMULATION HAS NO ADVERSE EFFECT ON CHIR PINE (*Pinus roxburghii*) GROWTH

Mahmood Iqbal Sheikh\*

**Summary.** 500 trees, at two localities were treated with different concentrations of  $H_2SO_4$  in solution and paste form in conjunction with American bark hack method. The conventional French method of tapping with and without 10% sodium chloride solution was also used. Increase in diameter of the trees under each treatment was measured after 5 years and it turned out that acid treatments had not adversely affected the tree growth. Also no tree died due to acid treatment.

*Pinus roxburghii* (chir pine) is the only source of resin in Pakistan. The tree grows from 800 to 1800 m above sea level and is distributed in the outer ranges of Himalayas. The absolute maximum temperature goes from 32°C to slightly over 38°C and the absolute minimum falls below freezing point. Annual rainfall varies from 700 mm to 1000 mm, the bulk of which is received during July and August. In 1974 a study was started on 500 trees at 2 different sites with the objective of finding out whether the yield of resin from *Pinus roxburghii* could be increased by applying different stimulants and what could be the effect of stimulants on the health and growth of trees.

500 trees 27.5 to 42 cm in diameter, were selected at Batrasi and Baz Khan. The trees were divided into 5 blocks of 50 trees each. During the tapping period June to November, 1974 all the trees were worked under the French system of tapping for calibration of yield.

In 1975, use of chemicals was introduced. 40% sulphuric acid solution, 60% sulphuric acid paste and solution were used in conjunction with American bark chipping method, while for sodium chloride solution and control, French blazes were employed. Highest yield was produced with 40% sulphuric acid solution.

The trees were given the same treatments in 1976, 1977 and 1978. The results of first year were confirmed in all these years. The average yield per tree over the four years was 5.5 kg with 40% sulphuric acid treatment against 2.1 kg per tree for control. The year-wise average yield are given below:

\*Author is Director of Forestry Research Division in the Pakistan Forest Institute, Peshawar.

Table 1

Treatment	Batrasi				Baz Khan			
	1975	1976	1977	1978	1975	1976	1977	1978
(Av. yield per tree, nearest 100 gms)								
A. 10% NaCl solution	1.8	2.0	1.9	1.7	2.0	2.0	2.0	1.9
B. 60% H <sub>2</sub> SO <sub>4</sub> paste	3.1	3.4	3.5	3.2	4.0	3.4	3.6	3.5
C. 40% H <sub>2</sub> SO <sub>4</sub> solution	4.6	5.6	5.7	5.6	4.7	6.0	6.1	5.9
D. 60% H <sub>2</sub> SO <sub>4</sub> solution	3.8	4.1	4.2	4.0	4.4	4.5	4.6	4.5
E. Control	2.4	2.2	2.3	1.9	2.2	2.2	2.0	1.8

At the end of 5 years, average increase in diameter of the trees at both the sites was measured to find out how far different methods had affected the growth of the trees.

Table 2

*Average diameter increase (cm) over a period of 5 years at Batrasi*

Block	A	B	C	D	E
I	1.00	1.50	1.20	1.50	1.10
II	0.85	0.95	1.65	1.40	1.00
III	1.50	0.95	1.25	1.00	1.15
IV	1.30	1.30	0.85	0.55	1.20
V	1.35	1.40	1.40	0.80	1.45
Treatment Total:	6.00	6.10	6.35	5.25	5.90
Treatment mean:	1.20	1.22	1.27	1.05	1.18



Table 3

*Average diameter increase (cm) over a period of 5 years at Baz Khan*

Block	A	B	C	D	E
I	1.30	0.95	1.00	1.65	1.35
II	1.25	1.40	0.90	1.30	1.15
III	1.40	1.45	1.40	1.25	1.25
IV	1.35	1.60	1.50	1.15	1.25
V	0.95	1.15	1.25	0.90	1.15
Treatment total:	6.25	6.55	6.05	6.25	6.15
Treatment mean:	1.25	1.31	1.21	1.25	1.23

Statistical analysis shows that diameter growth during the period of study was not adversely affected by the application of stimulants.

Looking into the effect of acid treatment on the health of the trees, it was found that only at Batrasi, 3 trees became "dry face" i.e., they stopped yielding resin when treated with acid and three trees became dry face in French method of tapping. No tree became a dry fact at Baz Khan. Actually no tree died under any treatment implying that acid treatment did not have any adverse effect on the trees. All the trees are still living.

**Acknowledgement.** The author is grateful to Raja Walayat Hussain, Forest Mensuration Officer for statistical analysis of the data. Mr. Fazle Subhan helped collection of data.

The study has been conducted with the funds allocated under a PL-480 Project.