

## SILVICULTURAL RESEARCH NOTE I

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**Growing *Cupressus arizonica* with drip system of irrigation.** To find out whether drip system of irrigation could be usefully employed to raise trees at Ziarat (2440 m A.S.L.), av. ann. rainfall 380 mm, average maximum and minimum temperatures 18.3°C and 4.1°C respectively, a study was started in May, 1976 using *Cupressus arizonica* as the test species. The method involves supply of water direct to the plant roots through sub-surface irrigation. Since there would be no loss of water due to evaporation or seepage, the plants are supplied with a quantity just sufficient for their survival and growth.

A plot 15×18 m in size in the compound of Forest lodge was selected. The lay out consisted of 2m long pieces of G.I. Pipes, 2 cm in dia joined together with T-joint of the same dia. The pipe was laid along one side of the plot. The open mouths of all the T-joints were kept on one side i.e., towards the plot where planting was to be done. Nipple prepared by welding 10 cm long pieces of copper tubing (dia 8 mm) with rivets of 2 cm dia were screwed tightly in the open mouths of T-joints.

At 2×2 m spacing 90 pits of 45 cm dia and the same depth were dug in the plot. Polythene tubing 8 mm dia was stretched from the nipples to the last pit in straight lines having a sag in each pit. A pin hole was made in the centre of the sag with a hot sewing needle. One end of the polythene tube was connected to the nipple and the other end was sealed. G.I. Pipe was connected with the tap with a hose pipe through a water metre to know the quantity of water being supplied. Efficiency of the system was checked by making the water flow through the G.I. Pipe upto the sealed ends of the polythene tubing, water dripping out from each pin hole. It was observed that water passed through the water meter at the rate of 2 gallons per minute.

On 2-5-1976, one year old 22 cm long plants of *Cupressus arizonica* were planted. The plant was put in the pit after removing the polythene tubing. The plant was held erect in such a way that the sagged tube rested beside the ball of earth. The tube around the pin hole was covered with small pebbles above and below it. The pebbles were covered with a piece of polythene sheet. This arrangement was necessary for preventing choking of pin holes with earth. The pit was filled back and rammed thoroughly. Polythene tube was buried at the depth of about 10 cm.

For the first 2 days irrigation was allowed for half an hour each day releasing 120 gallons for 90 plants. This quantity was gradually reduced to 10 gallons per week. Up to the end of October, 1976 each plant had received 4.3 gallons of water.

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Heights of the plants were measured at one month interval. At the end of growing season all the plants were surviving with an average growth of 45 cm. No irrigation was given in 1977 (412 mm rain, 965 mm snow) and 1978 (353 mm rain, 340 mm snow).

The experiment was converted into a randomised complete block design on 8-10-1976 and besides control two other treatments replicated 5 times were added:

T <sub>1</sub>	Control
T <sub>2</sub>	Stone mulch
T <sub>3</sub>	Green branches of bushes under stones

30 plants died due to severe winter of 1976-77 and two during 1977-78. The min. temperature went down to  $-10^{\circ}\text{C}$  in both the years. Following survivals were recorded on 30-11-1978:

Replications	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	Total
I	3	6	5	14
II	3	5	3	11
III	4	2	4	10
IV	4	2	6	12
V	5	3	3	11
Total:	19	18	21	58

The treatments are not significant. No snow/frost heaving occurred in any of the treatments. Av. height of the plants at the end of 1978 was 1-34 m.

**Observations on the fruiting of *Olea europea*.** Production of fruit from Khairimurat olive orchard has been quite erratic in the past. It has ranged from 58.6 kg in 1978 to a maximum of 926 kg in 1972. In order to find out whether it was possible to increase fruiting by addition of fertilizers, an experiment was laid out in February, 1978. 432 pairs of olive trees having almost uniform crown and standing in the same row were selected for this study. One plant in each pair was fertilized with 1 kg of ammonium sulphate, 1 kg of superphosphate and 0.2 kg of potassium sulphate. In addition to it 10 kg of farmyard manure was also added. The mixed fertilizer and manure was spread under the crown of the marked trees in a radius of 1-3 m depending on the crown width. The soil was well worked down to 15 cm for thorough mixing of the fertilizer. No irrigation was applied as it had rained the previous night. One irrigation only was given to the commandable area during June, 1978. Total quantity of rain received during 1978 was 1479 mm as compared to 891 mm during 1977.

1978 was a poor seed year for *Olea europea* in Khairimurat—only 50 out of 2010 trees in the orchard were bearing more than 0.5 kg fruit each, with a few fruits each on another 290 trees. Out of the 432 pairs selected for the study, only eleven pairs were such that one



tree of a pair bore over 0.5 kg fruit each. The fruit was collected from these trees on 25-9-1978, weighed at site and packed separately in polythene bags. The results were as follows:

Pair No.	Fertilized		Non-fertilized	
	Tree No.	Yield	Tree No.	Yield
1	24	0	23	0.7
2	7	0	8	0.5
3	30	0.5	29	0.2
4	42	0	43	1.0
5	44	0.5	45	0
6	20	5.4	19	3.2
7	22	3.7	21	3.3
8	64	0	63	1.0
9	4	0	5	0.4
10	7	0	6	0.2
11	11	0.6	12	0

Thus fertilizer application did not influence the yield of olive fruit.

## SILVICULTURAL RESEARCH NOTE II

**Cost of raising Eucalyptus plants in polythene tubes.** A study was conducted in the months of March-April, 1978 to work out the cost of Eucalyptus plants raised in polythene bags. The detail of work is tabulated (Appendix). Expenditure has been summarised below:

Number of plants raised = 34715

	Qty/Number	Rate (Rs)	Cost Rs.
Labour engaged	214	10	2140/-
Cost of polythene bags	234 lbs	8/50	1990/-
Sand cost	L/S	L/S	10/-
Transportation charges	L/S	L/S	50/-
Labour for loading and unloading	4	10	40/-
Soil (One truck load)			100/-
Land rent	One kanal	200/-	200/-
		Total:	4530
Over head (Staff) Charges		10%	453
		Grand Total:	4983

$$\text{Cost of one plant} = \frac{4983}{34715} = \text{about 15 paisa.}$$

Date	Labourers (total)	Labour punching of tubes	Labour on filling of tubes	Tubes filled	Labourers on trans- planting	Tubes Transplan- ted	Labourers on shifting of tubes	Tubes shifted	Labou- rers on Watering
12-3-78	6	1	5	1770	—	—	—	—	—
13-3-78	6	1	5	1800	—	—	—	—	—
14-3-78	6	1	5	2400	—	—	—	—	—
15-3-78	6	1	5	2500	—	—	—	—	—
16-3-78	5	1	4	1800	—	—	—	—	—
17-3-78	—	—	—	—	—	—	—	—	—
18-3-78	5	1	2	1200	2	2200	—	—	—
19-3-78	6	1	5	1700	—	After 12.00 a.m.	—	—	—
20-3-78	6	1	5	2000	—	After 12.00 a.m.	—	—	—
21-3-78	6	1	3	1500	2	2167	—	—	—
22-3-78	6	1	3	1400	2	2500	—	—	—
23-3-78	6	1	3	1000	2	2400	—	—	—
24-3-78	6	1	3	1000	2	2300	—	—	—
25-3-78	6	1	3	1000	2	2030	—	—	—
26-3-78	6	1	2	700	2	2200	1	1500	—
27-3-78	6	1	3	1000	2	2136	—	—	—
28-3-78	6	1	2	600	2	2038	1	1200	—
29-3-78	6	1	3	900	2	2000	—	—	—
30-3-78	6	1	2	700	2	2000	1	1550	—
31-3-78	5	1	1	400	1	—	2	2500	—
1-4-78	5	1	2	600	2	2144	—	—	—
2-4-78	6	1	2	700	1	1000	1	1500	4
3-4-78	6	1	2	800	1	300	1	1500	1
4-4-78	6	1	3	1000	—	—	2	2800	—
5-4-78	5	1	3	1000	—	—	—	1200	—
6-4-78	5	1	3	1000	—	—	1	1200	—
7-4-78	5	1	3	800	1	1000	1	1500	—
8-4-78	6	1	3	1200	1	1200	1	1800	—
9-4-78	6	1	2	600	2	Labourers with truck	—	—	1
10-4-78	6	1	2	700	2	2300	—	—	1
11-4-78	6	1	2	700	2	2000	—	—	1
	174	30	91	34470	34	34715	14	17850	5*

\* Another 40 labourers will have to be employed for hand watering of these plants till the end of August when plants would be ready for outplanting.