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EFFECT OF DIFFERENTIAL FERTILIZERS ON THE GROWTH OF HYBRID POPLAR

by

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EFFECT OF CHEMICAL FERTILIZERS ON THE GROWTH OF HYBRID POPLAR

IN

CHANGA MANGA PLANTATION

BY

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1. ABSTRACT:-

The trial was laid out at Changa Manga to determine the effect of fertilizer application on the rate of growth of hybrid poplar. Due to good and fertile soil there has been no respond of fertilizer application.

1. INTRODUCTION:-

In pakistan there is an alarming shortage of timber and industrial wood and near famine conditions are prevailing. The present annual production of about 319 thousand m^3 of timber from the state forest is extremely small and cannot meet the entire requirements of the wood based industry. Recent study has indicated that the annual yield per Hectare from the irrigated plantations is only 1 to 2m^3 per annum. It clearly shows that the yield per unit area is extremely low. As a result of this situation wood in many forms has to be imported at a heavy cost in foreign exchange. The necessity to accelerate the rate of growth and increased volume production per unit area, therefore, cannot be over emphasized.

The necessity is/exist

This low yield per unit area is attributable mainly to the slow rate of growth of our indigenous species and to the deteriorated soil conditions as a result of nutrient deficiency. The yield per unit area could, therefore, be increased by introducing fast growing species in our irrigated plantations and by using chemical fertilizers. Artificial fertilization of the forest soils is further necessitated by the fact that the supply of irrigation water is limited and we have to use it very economically for raising trees. Hybrid poplar, which is a very fast growing tree and is being introduced in irrigated plantations, requires very fertile and well worked soils. It is an industrial tree species and is used in the manufacture of paper pulp, matches, plywood, packing cases and chip board etc. In order, therefore, to obtain the best possible growth of this species in a quick manner a study was started in Changa Manga plantation in March, 1975 to find out the effect of different dozes of various chemical fertilizers on its growth rate.

2. REVIEW OF LITERATURE:-

In many advanced countries, use of fertilizer has been practised to accelerate the rate of growth of forest trees for the last seventy years or so. In most of the cases positive results have been achieved. The only work on tree fertilization reported from pakistan is by Sheikh and Choudry (1967) (5). This is based on the results of two Experiments carried out at the Forestry Research Station, Jallo (Lahore) during the year 1964 and 1965.

The study was started to accelerate the rate of growing of species like Melaelia saluberica, Tamarix articulata and some Eucalypts and also correlate the growth with the physical and chemical properties of the soil. Use of ammonium sulphate at the rate of 0.1 Kg. per plant gave significat results.

Blackmon and White (2) in the USA obtained volume increases of 200% over unfertilized controls in a 7-year old Populus deltoides plantation. This was on a site that was once very fertile but continuous cropping had created a severe nitrogen deficiency.

(Contd.....)

3. MATERIALS AND METHODS:-

The poplar (populus euramericana CV-I-214) planted in Cpt.60 of Changa Manga Plantation during March,1972 at a spacing of 18x16ft. was taken up for this experiment. The following treatments were studied in a randomised block design in 4 replications:-

A).	Urea	1 Lb per plant.
B).	Urea	2 Lb per plant.
C).	D.A.P.	1 Lb per plant.
D).	D.A.P.	2 Lb per plant.
E).	Urea+D.A.P.	½+½Lb per plant.
F).	Urea+D.A.P.	1+1Lb per plant.
G).	Control.	Hoed and operated.
H).	Control.	Non operated.

There were 32 square plots in all and area of each plot was about 0.5 acre. Thus making the total area of the experiment 15.5 acres. Each plot had 64 plants i.e. 8 plants in each of the 8 rows. The measurable plants in each plot were 36 after ignoring 20 trees as surround of every plot. The prescribed dozes of fertilizers were applied each year during April, 1975,76,77 and 1978. Every plant was hoed around in a circle of 3 ft. diameter and fertilizer was spread in this circle. Irrigation was given immediately after the application of the fertilizer. On an average 15 irrigations were given every year during summer from April to October. Data regarding survival,diameter and height of the tree was collected every year during winter.

Soil:- The soil of the experimental area is deep and fertile, well drained and loamy. The parent material is alluvium. The soil samples were taken from 0-30, 30-60 and 60-90 cm depth and were got analysed by Assistant Agricultural Chemist, Niaz Baig Thokar, Lahore. The soils are non-saline (TSS 0.05 - .08%) and have a pH range of 8.0 - 8.2. The content of organic matter is quite satisfactory (0.56 to 3.2 %) and the soil has got enough available phosphorus.

4. RESULTS AND DISCUSSION:-

The data collected during January, 1979 has been compiled and the results are as under (the abstract of the data is given in App:).

HEIGHT GROWTH

S.No.	Treatment	Average Height (Ft)
1.	Urea 1 Lb per plant.	63.97 ft.
2.	Urea 2 Lb per plant.	62.75 "
3.	D.A.P. 1 Lb per plant.	63.11 "
4.	D.A.P. 2 Lb per plant.	62.46 "
5.	Urea+D.A.P. ½+½ Lb per plant.	62.93 "
6.	Urea+D.A.P. 1+1 Lb per plant.	62.50 "
7.	Control (Hoed and Operated).	62.21 "
8.	Control.	63.22 "

DIAMETER GROWTH

S.No.	Treatment.	Average Diameter(Inches)
1.	Urea 1 Lb per plant.	10.36
2.	Urea 2 Lb per plant.	10.48
3.	D.A.P. 1L b per plant.	10.66
4.	D.A.P. 2 Lb per plant.	10.35
5.	Urea+D.A.P. ½+½ Lb per plant.	10.35
6.	Urea+D.A.P. 1+1 Lb per plant.	10.31
7.	Control(Hoed and Operated).	10.33
8.	Control.	10.03

(Contd.....)

From the diameter and height of poplar under different treatments it appears that neither nitrogenous nor the combined nitrogen and phosphorus fertilizers have had any favourable effect on the growth of the poplar crop. This is naturally due to the high fertility level of the soil in Changa Manga plantation. Soil pH, texture, total soluble salts and content of organic matter all indicate a very good soil containing enough nitrogen content for the growth of poplar crop. If any of these elements was deficient then the crop would have responded to the application of fertilizer.

5. CONCLUSION:-

In good and rich soils like that of Changa Manga plantation (compartment No. 60) there is no need of any fertilizer application. The soil already contains enough food for supporting poplar crop.

APPENDIX

A B S T R A C T

DATA COLLECTED IN DECEMBER, 1978 / JANUARY, 1979

POPLAR FERTILIZER EXPERIMENT ON T.S.O. CHANDA MANDA PLANTATION.

Treatments:	A		B		C		D		E		F		G		H	
Replications:	1,13,22,31		2,9,21,30		3,10,17,29		4,11,18,25		8,12,19,26		7,16,20,27		6,15,24,28		5,14,23,32	
	Ht.	Dia	Ht.	Dia	Ht.	Dia	Ht.	Dia	Ht.	Dia	Ht.	Dia.	Ht.	Dia	Ht.	Dia.
	60.57	9.92	60.86	9.53	61.33	10.48	59.89	10.16	63.47	10.04	59.07	10.14	56.41	9.04	57.17	9.94
	63.11	10.53	60.42	10.51	62.96	10.46	62.77	10.25	63.46	10.79	67.07	10.92	62.85	10.51	63.94	10.65
	62.91	10.58	65.30	11.61	64.00	10.80	63.16	10.61	63.14	10.15	61.54	10.55	62.00	10.45	64.65	10.60
	64.39	10.69	65.23	10.59	66.15	10.89	64.00	10.59	64.63	10.41	62.33	9.76	67.56	11.30	67.12	11.31
	251.88	41.42	251.01	41.90	252.42	42.63	249.84	41.41	251.70	41.39	250.01	41.25	248.82	41.30	252.88	42.50
	62.97	10.36	62.75	10.48	63.11	10.66	62.46	10.35	62.93	10.35	62.50	10.31	62.21	10.33	63.22	10.63