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**ROLE OF SERICULTURE IN RECLAMATION OF USAR SOIL THROUGH
MULBERRY CULTIVATION AND GENERATE EMPLOYMENT**

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ABSTRACT

Mulberry leaves are diaphoretic and emollient and infusion of leaves causes drop in blood sugar and reduction in arterial pressure. Mulberry wood is utilized mainly for manufacture of sports goods because of its elasticity such as hockey sticks, tennis rackets, badminton and cricket stumps etc. to generate employment, whereas mulberry fruits are eaten fresh or used for pickle preparation which checks thirst and cools the blood. The fruits are also used as medicine. Deoxyjirimycin (DNJ), an alkaloid is extracted from the root bark of *Morus nigra* which, is supposed to be effective against AIDS virus. An experimental study was undertaken, growing mulberry (*Morus alba. L*) plants in 104 x150 feet of usar land, which have pH 9.5 in year 1997. Results obtained were 7.39 pH, OC. 0.40, E.C 0.54, potash 220.03 and phosphate 19.50 in year 2001.

Key words: Morus species, Reclamation, Usar soil.

INTRODUCTION

The plantation of any crop or trees depends largely on the condition of the soil on which they are grown. Edaphic factors are detrimental to the survivability and good growth of the flora. It directly affects the

physiology and nutrition in plants. Fertility of the soil is thus very important, but all the land available is not fertile and to support the rising human population the waste and semi dry, dry, saline land has to be utilized. The

state of Uttar-Pradesh is most populous state in India and has the maximum pressure on its fertile land, thus the need arises to reclaim the waste and usar effected land in the state. Mulberry is a heterozygous perennial plant that can be grown in a wide range of climatic conditions and in a variety of soils in various agro climatic conditions like arid and semi-arid areas. Mulberry has various roles in production process. Maximum mulberry cultivation is only for foliage production because mulberry is only the food source for silkworm *Bombyx mori L.* The other uses of mulberry are as follows: mulberry leaves are diaphoretic and emollient. An infusion of leaves causes drop in blood sugar and reduction in arterial pressure. Mulberry wood is utilized mainly for manufacture of sports goods because of its elasticity such as hockey sticks, tennis rackets, badminton and cricket stumps etc whereas mulberry fruits are eaten fresh or used for pickle preparation which checks thirst and cools the blood. The fruits are also used as medicine. Deoxyjirimycin (DNJ), an alkaloid is extracted from the root bark of *Morus nigra* which is supposed to be effective against AIDS virus. The stem bark is used as a purgative and vermifuse [1, 2]. The mulberry plants grown in the garden also check the soil erosion and this plant also help to keep the land fertile. Sericulture employs

many hands and has intensive backward and forward linkages in India.

In India about 71 hectare of land is barren, the maximum area of that land is found in Uttar Pradesh [2]. In the state of Uttar Pradesh about 64,230 km square area comes under semi-arid land [3] and according to the Agriculture Department of U.P. about 12 lakh hectare of land is affected to the usar problem. In Lucknow, about 0.213 million-hectare land is effected by salinity problem (*U.P. Council of Agricultural Research Bulletin No. 21989*). These lands can be used for establishing sericulture on it. This can be done by planting the mulberry plants, which is a hardy perennial plant and can be moderately grown in adverse land of Uttar Pradesh. It has also been reported that mulberry cultivation is benefiting the flood affected farmers where the farmers are not only losing a wealth of crore rupees by flood in terms of crop loss but are also losing the valuable land area. However, barren land can also be reclaimed through biological as well as chemical means and can be utilized for high bush type of mulberry plantation. Utilizing this land leads to an increase in the national production [1]. Mulberry plants grown on usar land shall serve our needs of the environment concerns and will also lead to the Eco-sustainable development. The need of the hour is thus

solving the dual problems of environmental degradation and unemployment. Sericulture, which if practiced in harmony with nature can solve our problems of keeping the environment clean and side by side will also provide the much needed employment to our unemployed rural as well as unemployed educated youths. This Sericulture (especially mulberry sericulture) requires leaves for the feeding of silkworms would provide the required green patch to the landscape. The mulberry gardens if established near the outskirts of the cities would add to the air purifying capacity of the existing flora.

Mulberry gardens can not only cater to the demands of the rearing houses that are established near them but can also provide cattle feed during the off season of the rearing, which is during the adverse summer and winter season in Northern India.

MATERIALS AND METHODS

A plot area of 50 ft X 50 ft was selected in the university campus. It was kept in mind that selected area was a usar land having a good water drainage system and also sunlight was available throughout the year. The field area was labelled after monsoon. The land was tilted deep by means of a crow bar to acquire the required depth of 30 to 50 cm. The weeds and gravels were removed and the soil was brought to a fine tilth by repeated ploughing.

Good deep ploughing was done to ensure deep rooting of mulberry plants. After preparation of land, the pits of standard size of 40 X 40 X 50 cm (LX WX D) deep were made. The plants were kept at a distance of 1.2 m. After performing all these operations, Kanva-2 variety of mulberry was selected from the nursery for the experimental study. Before planting of the saplings nematicides, Bordeaux mixture (1%) was applied in and around the pit area in order to save the plants from fungal and nematode infections. The mulberry saplings which were one year old were uprooted and care was taken that the roots were not damaged. Now these uprooted mulberry saplings were buried 1.5cm below the ground level. The basal portion of the sapling was covered with soil and the area around the saplings was leveled (care was taken that no air space was left). The plant saplings were then irrigated with sufficient quantity of water. After one week, the saplings were cut to average size. The height of the sapling was left to 20cm uniformly.

The intercultural operations were done after every two-week interval. The plants were irrigated twice a week in the winter season and on every consecutive day during the summer season. In the rainy season the plants were watered according to the requirement. For the experimental study of the soil,

samples were collected and studied for their fertility status. Soil samples collected at 0-30cm depth from mulberry garden during August 97 were processed and passed through 2mm sieve and preserved [4]. The soil pH was recorded with soil water suspension (in the ratio 1:2.5w/v) by glass electrode using digital pH meter, and organic carbon content (O/C) was estimated by Walkley and Black wet oxidation method [5]. Soil micronutrient status of mulberry gardens was estimated in relation to the pH and organic carbon contents [6]. Phosphate and potassium tests were

performed by flame photometer and Olsen's method (kg/hect).

RESULT

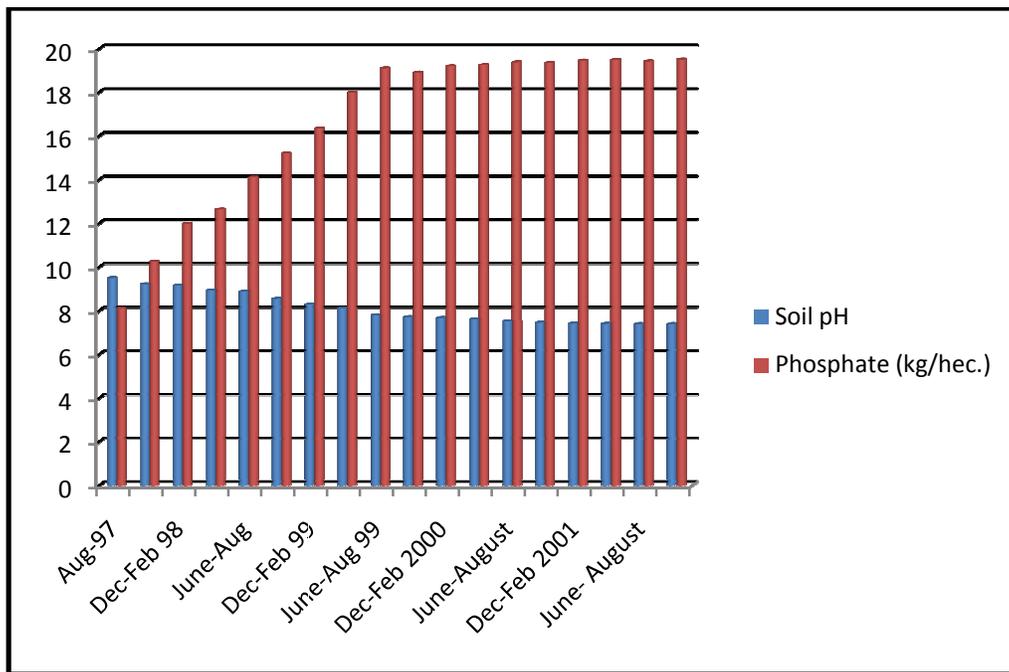
The results obtained by analyzing the soil samples, indication are that mulberry plants (*Morus* spp) Kanva-2 variety grows well in usar soil, [7] as the pH of soil was reduced slightly. The pH decreases (**Graph 1**) and the O/C, E.C (Electrical conductivity), potash and phosphate content in the soil showed an increase as shown in **Graph 2**. The various observations recorded are given in the **Table 1**.

Table 1: Soil Fertility Status during August 1997 to November 2001

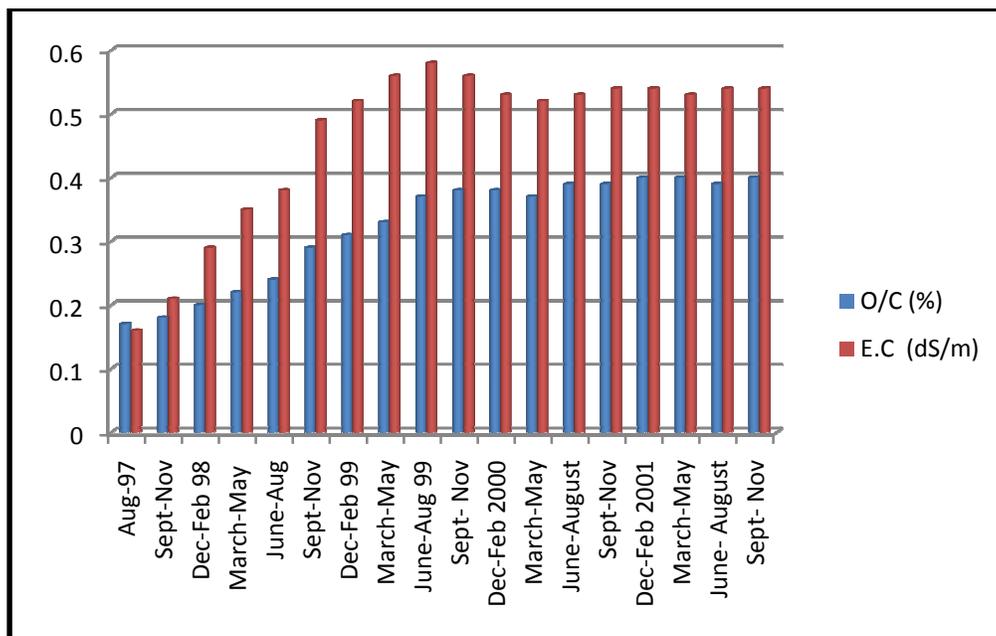
Month	Soil pH	O/C %	E.C. (ds/m)	Potash (kg/hect.)	phosphate (kg/hect.)
Aug-97	9.50	0.17	0.16	179.20	8.10
Sept-Nov	9.21	0.18	0.21	180.00	10.25
Dec-Feb 98	9.15	0.20	0.29	188.00	11.99
March-May	8.92	0.22	0.35	194.00	12.64
June-Aug	8.87	0.24	0.38	197.22	14.12
Sept-Nov	8.54	0.29	0.49	201.60	15.21
Dec-Feb 99	8.29	0.31	0.52	208.90	16.35
March-May	8.11	0.33	0.56	215.10	17.99
June-Aug 99	7.79	0.37	0.58	217.24	19.10
Sept- Nov	7.71	0.38	0.56	218.21	18.91
Dec-Feb 2000	7.67	0.38	0.53	217.89	19.20
March-May	7.61	0.37	0.52	218.45	19.25
June-August	7.51	0.39	0.53	220.00	19.38
Sept-Nov	7.45	0.39	0.54	219.56	19.35
Dec-Feb 2001	7.41	0.40	0.54	220.00	19.45
March-May	7.40	0.40	0.53	219.86	19.48
June- August	7.39	0.39	0.54	220.00	19.42
Sept- Nov	7.39	0.40	0.54	220.03	19.50

Note: O/C= Organic carbon content; E.C= Electron conductivity (dS/m)

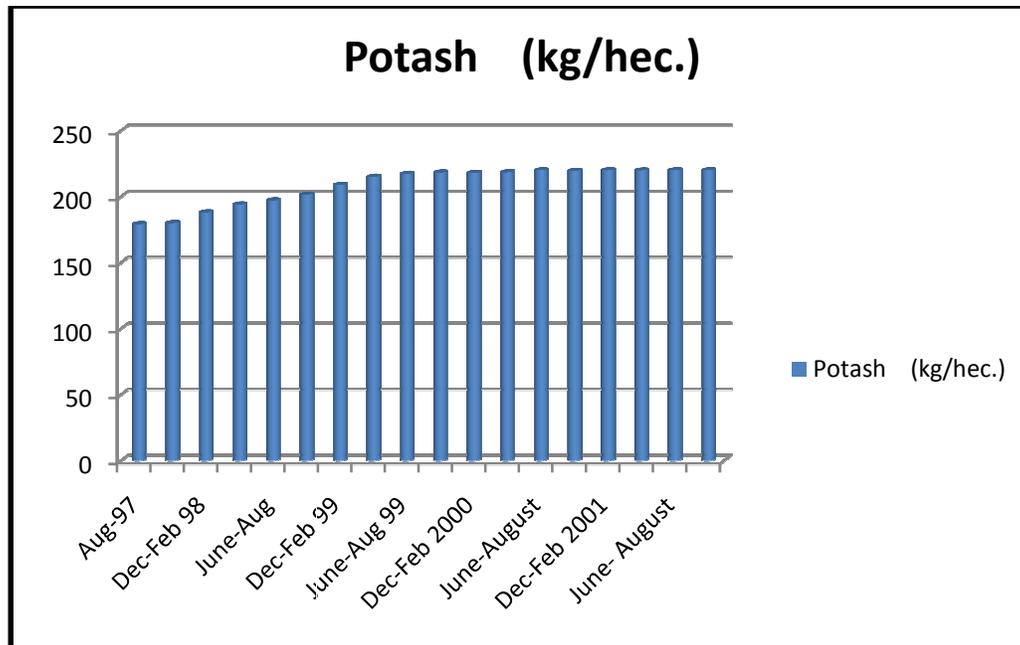
Graph 1: Showing the Decrease in Soil pH and Increase in Phosphate Concentration in Soil



Graph 2: Showing the Increase the Organic Carbon Content and Electron Conductivity in Soil



Graph 3: Showing the Increase in the Potash Concentration in Soil



DISCUSSION

In the present study, a plot of usar land was selected at Babasaheb Bhimrao Ambedkar University, Lucknow in which mulberry saplings were planted. Later samples of soil were collected to study their fertility status. It is clear from the data obtained that soil pH goes on decreasing from 9.5 during Aug-97 to 7.79 during June-August'99 which shows considerable reduction in soil pH in the two years making the soil fertile. Reduction in soil pH promotes availability of nutrients. Soil becomes enriched with several nutrients, which are essential for the plant to grow well. Soil organic Carbon content and electrical

conductivity increased from 0.17 to 0.37% and 0.16 to 0.58 ds/m respectively, which further increase the fertility in soil. Increased soil Organic matter influences sustainable crop productivity [8]. An increase in electrical conductivity during the two years causes an increase in mineral absorption capacity of the soil thereby providing the plants with all essential nutrients that a plant needs to grow. It has also been seen during the study that Potash content increases from 179.2 kg/hectare (during Aug-97) to 217.24 kg/hectare (during June-Aug-99) and Phosphate content increases from 8.1

kg/hectare (during Aug-97) to 19.10 kg/hectare (during June-Aug-99).

Hence it proves that the result of mulberry plantation on usar land is that it causes the soil to become fertile. As a result, the usar land which becomes fertile can be used for several other activities like cultivation of several other crops *viz* tea, coffee and coconut which require increased contents of P, K, C can easily be grown as an intercrop along with mulberry thus creating employment opportunity for several people.

According to [1] barren land can be reclaimed through biological as well as chemical means but this study proves that usar / barren land

can be directly reclaimed through mulberry cultivation.

It is well known fact that mulberry fruits are edible, its timber has various uses. Its leaves and roots have medicinal importance, and sericulture, which is dependent on mulberry, is very potent source of employment for the masses. At present study was undertaken at Babasaheb Bhimrao Ambedkar University; Lucknow; capital of Uttar Pradesh to ascertain the novel importance of mulberry as a plant for the reclamation of usar soil as well as source of income for rural and unemployed educated youth.

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