EXPERIMENT 6 FERTILIZER APPLICATION

Structure

6.1 INTRODUCTION

The purpose of the fertilizer application in a mulberry garden is to provide the required plant nutrients especially nitrogen, phosphorus and potash besides some micronutrients for its optimum growth and yield. Approximately, 16 elements (macro and micro) are required for the growth and reproduction of plants. Among these, the requirement of major elements like nitrogen, phosphorus and potash is maximum. Since all these are not available in the soil in sufficient quantity, their application to the soil is required from time to time in the form of fertilizers to fulfill the need of growth and production. Fertilizers bring quickest and most pronounced effect on mulberry and encourage vegetative growth and impart deep green colour to the leaves.

Objectives

After studying and performing this experiment, you should be able to:

- obtain good quality cocoons;
- understand the fertilizers with different trademark available in the market; and
- understand the method and quantity of fertilizers to be applied to mulberry.

6.2 EXPERIMENT

6.2.1 Principle

The fertilizer application to any crop plant is to provide balanced plant nutrients for healthy growth and to increase the crop yield and quality per unit area in the shortest possible duration.

Some of the points to be remembered during application of fertilizer are as follows:

- Under tropical condition, with special reference to South India, a mulberry garden is pruned 5 times in a year after establishment to harvest 5 crops. This results in the removal of huge quantities of leaves and stems which in turn removes great amount of nutrients from soil. Thus, to get continuous leaf yield,

chemical fertilizers (NPK) are applied within three weeks of every crop harvest and pruning to get optimum leaf yield and quality.

- Recommended dose of chemical fertilizer application in irrigated mulberry garden is 300 kg nitrogen, 120 kg phosphorus and 120 kg potash per hectare per year in five split doses.
- The fertilizers are applied in the form of complex or straight fertilizers (Urea / Ammonium Sulphate, Single Super Phosphate and Muriate of Potash for NPK).
- Straight fertilizers like Ammonium Sulphate and Urea contain 20 and 46% nitrogen respectively, while Single Super Phosphate (SSP) and Muriate of Potash (MoP) contain 16 and 60 % Phosphorus and Potassium, respectively.
- In complex fertilizers, the ratio of NPK varies with proportion of ingredients mixed.
- For first and third crops, 60 kg nitrogen, 60 kg phosphorus and 60 kg potassium is applied in every one hectare of mulberry garden. While for second, fourth and fifth crops only 60 kg nitrogen is applied in each crop in the form of straight nitrogen fertilizer. For this 133 kg urea or 300 kg Ammonium. Sulphate is required to be applied.
- In case of high yielding mulberry varieties (V_1 or S_{36}), annually 350 kg nitrogen, 140 kg phosphorus and 140 kg potassium is applied in every hectare of mulberry garden in five equal split doses.
- Thus, for the each dose 350 kg Ammonium Sulphate, 175 kg Single Super Phosphate and 47 kg Muriate of Potash is applied in every hectare of mulberry garden.
- However, application of chemical fertilizers can be minimized by the use of *Azotobacter* bio-fertilizer, VA-Mycorrhiza and Phosphate solubilizing bacteria and green manuring which are eco-friendly.

6.2.2 Requirements (Experiments/Machinery/Instrument & Chemical/Material Requirements)

- A well established mulberry garden with proper irrigation facilities
- Chemical fertilizers of three different types (NPK)
- Tractor with cultivator / Power tiller with cultivator / Country plough
- Farm implements like spade, hoe (kolgudali), harrower, sickle, secateur, pruning saw, iron pan or plastic basin etc.
- Farm workers
- Irrigation water

6.2.3 Procedure

- Make 5-8 cm deep furrows made by country plough in between the rows of mulberry as shown in the Fig. 6.1.
- Apply fertilizers in the furrow and cover it with the soil to minimize loss due to weathering as shown in the Fig. 6.1.
- Irrigate the garden immediately after fertilizer application.

Fig.6.1: Application of chemical fertilizers in the furrows made by bullock plough

6.2.4 Observations

The observations on plant growth and leaf yield due to application of chemical fertilizers should be carried out during each crop harvest and should be recorded in tabular form indicated below. The plant growth parameters will include height of the plants, number of shoots per plant, number and weight of leaves per plant etc. Finally, an assessment should be made from these parameters to understand the effect of chemical fertilizers. The soil should be analyzed to observe the effect of fertilizers. Silkworm rearing should be conducted to observe the cocoon production and quality. The cost of production of mulberry leaf should also be worked out.

Table 6.11: Calculate the Quantity of Fertilizers Required in kg

N:P:K	**Suphala**	**Vijay Complex**	**A. sulphate**	**Urea**	**SSP**	**MoP**
60:60:60 kg NPK /ha						
300:120:120 kg NPK/ha						
350:140:140 kg NPK/ha						
60:60:60 kg NPK /acre						
300:120:120 kg PK/acre						
350:140:140 kg NPK/acre						

Table 6.2: Growth Observations of Mulberry After Fertilizer Application

Sl. No. of Plants	**Growth Parameters**				**Soil Organic Carbon (%)**	**Soil NPK Status (%)**		
	Height of Plant (cm)	**No. of Shoots/ Plant**	**Leaf wt./ Plant (g)**	**No. of Leaves/ Plant**		**N**	**P**	**K**
1								
2								
3								
4								
5								

6.2.5 Calculations

The required quantity of fertilizer to be applied is calculated on the basis of ingredients (NPK) available in a fertilizer as shown below:

a) The quantity of Nitrogen to be applied = 60 kg

Form of fertilizer = Ammonium Sulphate (20 % N)

Amount of Ammonium Sulphate required = 100 ÷ 20 x 60 = 300 kg

b) The quantity of Phosphorus to be applied = 60 kg

Form of fertilizer = Single Super Phosphate (SSP 16 % P)

Amount of SSP required = 100 ÷ 16 x 60 = 375 kg

c) The quantity of Potassium to be applied = 60 kg

Form of fertilizer = Muriate of potash (MoP 60 % K)

Amount of MoP required = 100 ÷ 60 x 60 = 100 kg

6.2.6 Results

This experiment will allow you to know the quantity of fertilizers to be applied in mulberry garden to maintain the stability in the crop yield and soil fertility.

Amount of Ammonium Sulphate required = _____ kg

Amount of Single Super Phosphate required = _____ kg

Amount of Muriate of Potash required = _____ kg

6.3 PRECAUTIONS

- Fertilizers should be stored in a room to avoid contact with water, rain and sunlight.
- Apply fertilizers 20-25 days after pruning / leaf harvest.
- Do not use more fertilizers. Use correct dose of fertilizers for optimum leaf yield.
- Irrigation is a must after application of fertilizers.
- Weeds should be removed before fertilizer application.
- Use organic manure judiciously for better utilization of fertilizer by plants.