

## **SEMESTER – II**

### **MULBERRY CROP PROTECTION (UNIT 3)**

#### **FERTILIZER:**

Fertilisers are chemicals which contain a particular plant nutrient. Fertilizers are made in factories. Urea, ammonium sulphate, super phosphate, potash and NPK (Nitrogen, Phosphorus and Potassium) are examples of fertilizers.

Examples of naturally occurring organic fertilizers include manure, slurry, worm castings, peat, seaweed and guano. Green manure crops are also grown to add nutrients to the soil. Naturally occurring minerals such as mine rock phosphate, sulfate of potash and limestone are also considered Organic Fertilizers.

### **Types of Fertilizers**

There are six different types of fertilizers that are mentioned below:

#### **Inorganic Fertilizers**

Inorganic fertilizers are chemical fertilizers that contain nutrient elements for the growth of crops made by chemical means. The inorganic fertilizers are of the following types:

##### **Nitrogen Fertilizers**

Nitrogen fertilizers contain nitrogen necessary for the development of crops. Nitrogen is the main constituent of chlorophyll that maintains a balance in the process of photosynthesis. It is also a part of amino acids in plants and constitutes protein. Nitrogen fertilizers improve the production and quality of agricultural products.

##### **Phosphorus Fertilizer**

The main nutrient in a phosphorus fertilizer is phosphorus. The efficiency of fertilizer depends upon effective phosphorus content, methods of fertilizing, properties of soil and crop strains. Phosphorus found in the protoplasm of the cell plays an important role in cell growth and proliferation. The phosphorus fertilizer is beneficial for the growth of roots of the plants.

##### **Organic Fertilizers**

Organic fertilizers are natural fertilizers obtained from plants and animals. It enriches the soil with carbonic compounds essential for plant growth. Organic fertilizers increase the organic matter content of the soil, promotes the reproduction of microorganisms, and changes the physical and chemical properties of the soil. It is considered to be one of the main nutrients for green food.

Organic fertilizers can be obtained from the following products:

- Agricultural Waste
- Livestock Manure
- Industrial Waste
- Municipal Sludge

Nitrogen (N), Phosphorous (P), and Potassium (K) When you're talking about fertilizers, there are only 3 nutrients you really need to know about. These are nitrogen (N), phosphorous (P), and potassium (K). Every fertilizer contains one or all of these three nutrients, and each one affects your plants differently

Fertilizer is applied @ 25:25:25 (N:P:K) kg per hectare after 5-6 weeks when plants sprout well and the root system is established. In mulberry cultivation, saplings of about 80-90 days old can be used for planting. While uprooting the saplings, maximum care should be taken to avoid damage to the root system.

### Fertiliser Schedule for Irrigated Mulberry

	Row System	Pit System
1st Application	60 kg. N + 60 kg. P + 60 kg. K as complex fertiliser i.e. 7 bags of 17:17:17.	60 kg. N + 60 kg. P + 60 kg. K as complex fertiliser i.e. 7 bags of 17:17:17.
2nd Application	60 kg. N as straight fertiliser i.e. 6 bags of Ammonium sulphate or 2 <sup>3</sup> / <sub>4</sub> bags of Urea.	40 kg. N as straight fertiliser i.e. 4 bags of Ammonium sulphate or 1 <sup>3</sup> / <sub>4</sub> bags of Urea.
3rd Application	60 kg. N + 60 kg. P + 60 kg. K as complex fertiliser i.e. 7 bags of 17:17:17.	40 kg. N as straight fertiliser i.e. 4 bags of Ammonium sulphate or 1 <sup>3</sup> / <sub>4</sub> bags of Urea
4th Application	60 kg. N as straight fertiliser i.e. 6 bags of Ammonium sulphate or 2 <sup>3</sup> / <sub>4</sub> bags of Urea	60 kg. N + 60 kg. P + 60 kg. K as complex fertiliser i.e. 7 bags of 17:17:17.
5th Application	60 kg. N as straight fertiliser i.e. 6 bags of Ammonium sulphate or 2 <sup>3</sup> / <sub>4</sub> bags of Urea.	40 kg. N as straight fertiliser i.e. 4 bags of Ammonium sulphate or 1 <sup>3</sup> / <sub>4</sub> bags of Urea.
6th Application	—	40 kg. N as straight fertiliser i.e. 4 bags of Ammonium sulphate or 1 <sup>3</sup> / <sub>4</sub> bags of Urea.
Total	300 kg. N + 120 kg. P + 120 kg. K	280 kg. N + 120 kg. P + 120 kg. K.

### Basal application of fertilizer:

Chemical fertilizers are applied as a basal dose and in the form of top dressing. The basal is applied just one day before sowing or planting and mixed or drilled in the

soil. The time of application of foliar feeding of nitrogen and micronutrients is when plants start showing deficiency symptoms.

### **MIXED FERTILIZER:**

Mixed fertiliser typically refers to a fertiliser containing two or more of the elements of nitrogen, phosphorus and potassium (NPK) which are essential for promoting plant growth and high crop yields. ... They can be incorporated in fertiliser mixtures.

### **Uses of Fertilizers**

- They are used to provide additional nutrients to the plants.
- They are added to improve the yield of the crops.
- Nitrogen-rich fertilizers are used for the greening of lawns.
- Organic fertilizers improve the texture and fertility of the soil.

### **Advantages of Fertilizers**

The advantages of fertilizers are mentioned below:

- They are easy to transport, store, and apply.
- For supplying a specific nutrient we can select a specific fertilizer due to its nutrient specific nature.
- They are water soluble and can easily dissolve in the soil. Hence, they are easily absorbed by the plants.
- They have a rapid effect on the crops.
- They increase the crop yield and provide enough food to feed the large population.
- They are predictable and reliable.

### **Disadvantages of Fertilizers**

Fertilizers have the following disadvantages:

- They are expensive.
- The ingredients in the fertilizers are toxic to the skin and respiratory system.
- Excessive use of fertilizers damages the plants and reduces soil fertility.
- Leaching occurs and the fertilizers reach the rivers causing eutrophication.
- Long term use reduces the microbial activity and disturbs the pH of the soil.

## Uses of Fertilizers

Fertilizers are used for various purposes. The uses of fertilizers are mentioned below:

- They are used to provide additional nutrients to the plants.
- They are added to improve the yield of the crops.
- Nitrogen-rich fertilizers are used for the greening of lawns.
- Organic fertilizers improve the texture and fertility of the soil.
- Gardeners use fertilizers to address certain needs of the plants such as nutritional needs.
- Fertilizers are added to potted plants to replace the lost nutrients.

## Importance of Fertilizers

It is very difficult to meet the demands of the increasing population with such less resources. Loss of soil fertility, pests, and lack of nutrients have resulted in a decrease in agricultural production. This has increased the importance of fertilizers in agriculture. Fertilizers can be important to the plants in the following ways:

- Fertilizers increase plants' tolerance towards pests. This has reduced their reliance on insecticides and herbicides, thereby, producing healthier crops. Consequently, diseases have reduced providing aesthetic value to the crops.
- Fertilizers improve the water holding capacity of the plants and increase root depth.
- The potassium content present in the fertilizers strengthens the straws and stalks of the plants.
- The phosphorus present in the fertilizers helps in the faster development of roots and formation of seeds in the plants.
- Nitrogen in the fertilizers enhances the growth of the plants which can be characterized by the green colour of the plants.

Since the chemical fertilizers adversely affect soil fertility, biofertilizers were brought into use. These are substances that contain living or latent cells, and even micro-organisms. They provide the soil with the necessary nutrients and microbes for the growth of the plants. They help the soil to retain its fertility. They are environment-friendly. They also destroy pathogenic components responsible for causing disease in plants. Acetobacter and Rhizobium are two such widely used biofertilizers.