

NON-MAJOR ELECTIVE-II

Title Of The Paper : Plants And Human Welfare-II

UNIT-1

Horticulture :- Importance and scope of Horticulture, Classification of horticultural crops – fruits, vegetables crops, climate, soil, water, nutrition needs of horticultural crops,

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UNIT-I HORTICULTURE

IMPORTANCE AND SCOPE OF HORTICULTURE

Horticulture is the branch of agriculture that deals with the art, science and business of plant cultivation. This includes plants that are edible and ornamental. It also includes conservation of plants, restoration, landscape, design and construction. Since agriculture is a basic need for humans, there is always a lot of scope in this field of study. The study of Horticulture includes propagation of plants and cultivation. Their main aim is to improve plant growth, yield, nutritional value, quality and resistance to insects and diseases. With the advent of technology and developments there has been a wide variety of job opportunities in both public and private enterprises Such as

- Vegetables, Flowers and Fruits Production and sales of the same
- Operating a business or managing cultivable land for catering plants-production of vegetable and fruits seedlings
- Operating a business for fruits processing and preservation.
- Public Gardens: Managing landscapes and Topiary
- Marketing: Involves the sale of fresh or processed fruits, flowers and vegetables
- Research and development: Developing ways to improve the yield and quality of the plant produce
- Teaching in schools and colleges and to all people who are open to learn the new ideas of horticulture
- Agricultural engineering which deals with the conservation of soil and water and farm structures
- Pest Management

Growing of **horticultural** crops is an art as well as science which help in mental development of farmers. The fruits and vegetables are chief source of vitamins and minerals which help in proper health and resistant to disease.

CLASSIFICATION OF HORTICULTURAL CROPS - FRUITS, AND FLOWERS VEGETABLES

Branches of Horticulture

Pomology-Fruit culture-production, harvesting, processing, preservation, storage and marketing of Fruits and nuts.

Olericulture- production, harvesting, processing, preservation, storage and marketing of vegetables

Floriculture- The Science and practice of Growing, handling, storing, processing and marketing of flowers

Arboriculture-It is the cultivation and management and study of individual trees and shrubs.

Ornamental and landscape Horticulture- The art of designing Gardens, establishing Lawns, Installing plants and planting the ornamental in the lawns

Viticulture- It includes the production and marketing of grapes.

Oenology- It includes all the aspects of wine and winemaking.

Silviculture- It is the practice of controlling the establishment, Growth, composition, Health and quality of forests

Classification of Vegetables

a) Annuals: Plants which complete their life cycle in one season or one year are called as annuals. e.g. Tomato, Balsam, Marigold etc.

b) Biennials: Plants which complete their life cycle in two seasons or two years are known as biennials. e.g. Onion, Cabbage, Tuberose etc.

c) Perennials: Plants which require more than two years to complete their life cycle are called perennials. The perennials necessarily do not die after flowering.

Classification of Trees

a) Woody perennials: These plants have hard and fibrous trunk and branches. e.g. Apple, Citrus, Guava, Mango etc

b) Herbaceous perennials: These plants have soft succulent stems. e.g. Banana, Chrysanthemum etc.

Classification of Fruits

Fruits are divided into

- Major fruits-widely exploited fruits-Grapes, sweet oranges,Mango,Banana,pineapple
- Minor Fruits -under exploited fruits Sapota, water melon, papaya and custard Apple

Soil and climate of Horticulture crops

The Climate and soil have important role played in growth of the plant. growing. Horticulture crops cannot be grown in all type of soil and climate. Hence zone wise cultivation is important. Climate includes a number of parameters like temperature, rainfall, atmospheric humidity, wind, hail, light, whereas soil covers such factors as moisture supply, texture, chemical composition and soil temperature.

SOIL (Soil and climate of Horticulture crops)

Horticulture crops require soils as growing medium. It provides mechanical support, nutrients and water to the plant growth. The demand of Horticultural crops is mainly water, nutrients and growth hormones. The number of factors affects roots absorbing nutrients and moisture. To ensure development of an efficient root growth.The soils must contain adequate supply of air, water and low bulk density. Most of the Horticulture crops need well drained soil and cannot tolerate water logging. Therefore deep and well drained soils, free from hard sub soils, are needed for growth of the plant. While examining the soil, more attention is paid to its physical conditions rather than its chemical composition. Soil may defined as “ superficial earth crust which function as store house of reservoir of water and nutrient at the same time providing the necessary physical support to the plant”.

Properties of soil: (Soil and climate of Horticulture crops)

Soil are mainly classified as physical as well as chemical properties of mostly influenced mineral matter of the soil and by the soil particles like sand, silt and clay. Sandy soils feel gritty when rubbed between your fingers. Silts feel smooth a little like flour most clays are sticky and mouldable. (Soil and climate of Horticulture crops)

Sand Particles

Course sand = 0.2 to 2 mm in diameter.

Fine sand = 0.02 to 0.2 mm in diameter

Silt = 0.002 to 0.02 mm in diameter.

Clay = < 0.002 mm in diameter.

On account of small size and relatively large surface area they exhibit colloids property and are capable of increasing the water as well as nutrient retention capacity of the soil. In a typical soil there should be proper proportion of these soil particles. It is possible to alter the physical condition of the soil by adding organic matter. This improves the structure and texture of the soil.

Physical properties of soil: (Soil and climate of Horticulture crops)

Soil structure:

Soil structure should be uniform favorable for water penetration, soil aeration and drainage. It has different layers therefore soil profile pits have to be taken and examined the structure.

Soil aeration and drainage:

Soil aeration which is helpful for growth of aerobic organism. In the soil to promote metabolic activities of these organisms. Fruit and vegetables required well drained soil. Poor performance observed due to poor aeration and drainage. Therefore well drained soil is essential. Extreme wet and dry soil should be avoided.

Water Table:

Availability of water at a certain depth is called as water table. High percentage of water can rise into water logging which is affect on growth of the plants. Therefore water depth should not more than 2m throughout the year.

Soil depth and Organic matters:

Heavy soil caused water logging and poor aeration. light soils are infertile due to leaching of nutrients therefore the soils should 2 to 2.5 m deep for growing of fruits and vegetables. Successfully organic matters influenced on physical and chemical properties of soils. Whenever soil contain more amount of organic matter which will increase the production of fruits and vegetables. The case of Horticulture crops generally required medium textured soil. Fine and coarse textured soil should be avoided.

Soil Temperature:

Soil temperature affects the root activity and is influenced by aeration and drainage. In cold soils chemical and biological activities are slow and availability of nutrients like N, P, S and Ca is limited. Nitrification would not start when the temperature is 4°C for successful growth of horticultural plants the soil temperature should be within the range of 26 to 36°C. Due to low temperature absorption and transport of water and nutrient is adversely affected.

Chemical Properties of soil: (Soil and climate of Horticulture crops)**Soil fertility:**

Soil fertility depends on nutrients contain such as N,P,K, Ca, Mg and S are important elements required for growth development of plants. Micro-nutrients like Fe, Mn, Zn, Bo, Cu, Mo etc are also required.

Soil reaction:

Soil analysis is important to find out the chemical composition of soil. The safe PH range is from 6 to 8. Some soils are Problematic for plant growth like saline and alkaline soils. In Alkaline soils concentration of sodium salts above 0.1% is harmful. Boron is deficient in alkaline soils and is unavailable in acidic soils. Iron is available in acidic soils whereas calcium and magnesium are deficient. In alkaline soils K, Mn, Fe, and Boron are deficient.

Soil Salinity:

Information on salt tolerance is necessary to select salt tolerant varieties and to adopt proper soil management practices.

1) Salt tolerant Crops: Date palm, Phalsa, Sapota, Fig, Grape, Aonla, Wood apple, Ber, Chikory, Potato, Sweet potato, Watermelon etc.

2) Moderate salt tolerant crops: Pomegranate, Grape fruit, Lemon, apple, Pear, Plum, Beans, Cucumber, Brinjal, Garlic, Radish, Pea, Tomato, Turnip.

3) Salt Sensitive crops: Orange, Peach, avocado, strawberry, Asparagus, Beet, Cabbage, Cauliflower, Palak, Leek, Lettuce. In general it may be stated that soils for fruit growing should be porous deep and aerated. They should not be water logged, marshy, saline, or acidic and there should be no hard pan at the bottom layers.

CLIMATE (Soil and climate of Horticulture crops)

Climate is defined as the whole of average atmosphere phenomenon for a certain region calculated for a period of thirty years.

Temperature:

Each and every Horticulture crops having its optimum temperature requirement which is suitable for their growth. It has range of temperature to which it is tolerant and below or above which the plant of that variety are liable to be injured to a more or less extent. Growth of banana is influenced by temperature. It grows well with a mean monthly temperature of 26.5°C. When the temperature goes below mean temperature owing to reduced rate of leaf production and delayed the harvesting. Therefore it is important for growers not only to know the minimum temperature of the region where the fruit crops are to be grown but also the approximate minimum temperature that the particular plant or crop can withstand at different stage of growth.

Atmospheric Humidity:

The atmospheric humidity also influences growth and development of plants. Low humidity has drying effect and enhances water requirement whereas high humidity favors fungal diseases, tastelessness and low keeping quality. High humidity and low humidity are suitable for following crops; like high humidity favorable for Sapota , Banana, Mangosteen, Jackfruit and Breadfruit. Whereas low humidity suitable for Ber, Grape, Datepalm, Pomegranate, Citrus, Aonla and Guava.

Rainfall:

Water requirement of the crops is dependent on soil type and evaporation transpiration rate. For crop production it is not the total rainfall but its distribution is more important and in Indian subcontinent we have rains mainly confined to June to September , thereby fruit culture in India had to be supported by irrigation or one has to select crop where fruiting is confined to water availability periods and trees remains dormant during stress. Excessive rains occurring in short periods are generally unfavorable to fruits as it leads to water logging and at blooming time may wash away pollens and thereby inhibit pollination. In low rainfall regions, cultivation of fruit crops is difficult if adequate and cheap irrigation facilities are not available.

Wind:

It is also one of the climatic factors influencing the plant growth. A situation which is exposed to wind causes evaporation of soil moisture and thereby necessitates more frequent irrigation. Hot wind at the time of blossoming may cause failure of pollination due to drying of stigmatic fluid and reduced activities of the pollinating insects. In the case of deserts, valleys for avoidance of high speed wind windbreaks and shelter belts are suggested. Wind direction and velocities have significant influence on crop growth both mechanically as well as physiologically. Mechanically effects on flower pollination, seed dispersal, tearing of leaves, lodging of plants, fruit drop, and uprooting of plants. Same like physiological effects like transpiration increase, plant desiccation, reduce plant height because of reduction in cell elongation.

Hail:

It is very rare in Maharashtra, in northern India the fruit crops are greatly affected by hail. They cause shedding of young fruits and flowers while maturing fruits become almost unmarketable.

Sunlight:

The sunlight is found to affect the quality of the horticulture crops like fruits exposed to light are found better in quality as compared to those receiving less sunlight. This is because of more amounts of carbohydrates prepared in the leaves.