Unit 4

Field Preparation and Cultural Operations

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Introduction

Before taking flower crops in an open field situation, there are various tasks to be performed for the sustainability of land and other resources. One of these actions involves initial land preparation and various cultural operations, which should be done prior to sowing or transplanting of the plant material. The main purpose of land preparation is to provide necessary soil conditions and enable the plant escape biotic and abiotic stress. This will enhance the successful establishment of the crop and ensure quality produce.

Session 1: Selection of Site for Cultivation of Ornamental Crops

Selection of site

Climate, soil and location are the prime natural components in choosing a site on which the future of flowers depends. It is not a simple task but careful site selection results in the success of flower cultivation. Climate includes several factors, such as temperature, rainfall, atmospheric humidity, altitude, wind and hailstorms, which are mostly encountered. However, high and low temperatures, as well as, hailstorms

are encountered mostly in subtropical plains. Low temperatures and winds are mostly encountered in hilly areas. The location of the site determines its distance from the market, exposure of the Sun, nearness to the road, availability of irrigation water, topography, etc. Distance from the market will determine which particular flowers can be grown and which marketing facilities are available nearby. The land with a gentle slope is more suitable for successful and profitable flower cultivation. Facility of easily available labour and transportation for economic production of crop are also essential.

Necessity for selection of site

Knowledge about the effect of climatic conditions and various types of soil on flower cultivation is important for successfully growing flowers. Different flower crops differ widely in their soil and climatic requirements. Distance from the market will determine which particular flowers can be grown and which marketing facilities are available close by. Soil for open flower cultivation should be fertile and rich in organic matter, nearness to a soft water source and well-drained. Soil pH range should also be neutral or near to neutral. The availability of certain nutrients is strongly influenced by pH as micro-nutrients, such as manganese, iron, copper and zinc become less available in highly alkaline soils. In such soils, the concentration of sodium salts is above 0.1%.

Optimum conditions for the cultivation of flower crops

Ornamental flower crops grow at or above 40° C, such as celosia, amaranth, *kochia*, gaillardia, gomphrena, zinnia, torch lily, cosmos, etc. But most of the commercial crops grow comfortably at a temperature from 15 to 30° C, such as rose, carnation, gerbera, gypsophila, statice, marigold, chrysanthemum, heliconia, bird of paradise, amaryllis and hippeastrum, and so on. Usually, for flower crop cultivation, sandy loam soils with ample humus and a pH range of 5.5–7.5 and roughly EC 1 is preferred. Such soils are easily

workable, have more beneficial soil microbial activity, good soil porosity, and ample water retention capacity, along with a provision for easy access to drainage.

Importance of soil

Soil is one of the most important natural resources of any country. It is the prime structure that provides the necessary environment to support establishment, growth and development of plants. It provides essential nutrients and moisture to the plant for growth and production, holds the root system of growing plants, and allows their stems to grow against gravity. It provides favourable environment of heat, air and water to the growing organism within or over it. Soil serves as a habitat for many micro and macroorganisms.

Soil and its properties

Soil is the upper loose layer of the earth crust rich in nutrients and minerals upon which plants grow and depend for nourishment. The branch of science concerned with formation, nature, ecology and classification of soil is known as 'Soil Science' or 'Pedology'.

Soil may be defined as a natural body developed as a result of pedogenesis (relating to or denoting the process occuring in soil or leading to the formation of soil) processes that take place during and after the weathering of rocks, in which plants and other forms of life can grow.

Pedologist James Samuel Joffe defined soil as—"The soil is a natural body of minerals and organic constituents differentiated into horizons of variable depth, which differs from the materials below, in morphology, physical make up, chemical properties, composition and biological characteristics."

Properties of soil

Soil can be identified or classified according to various characteristics exhibited by it. The properties of soil are helpful in understanding the nature and kind of the soil. Properties of soil can be categorised as physical, chemical and biological.

Physical properties

Soil colour

Soil surfaces, generally, show black, yellow, red and gray hues. The colours of the soil are due to the presence of organic matter minerals and colour of the parent rock. The colour of the surface soil might differ from the colour of its lower layers. Soil colour is an indicator of organic matter content, soil fertility, soil reaction, drainage, aeration and the ecosystem living beneath it.

Soil texture

It refers to the size of soil particles that make the soil. Soil, according to the particle size can be classified as sand, silt, loam and clay. Soil with big size particles is known as 'sand'. The diameter of sand particles is more than 0.2 mm. When the size of soil particles is 0.2–0.02 mm, it is called 'silt'. Loam particles are of 0.02 to 0.002 mm. Clay is the finest particle less than 0.002 mm in diameter. Loamy and clayey soils have good water-holding capacity and are more suitable for the cultivation of flower crops.

Soil density

Soil consists of various particles. It has certain percentage of pore space through which air and water movement takes place. The density of soil is weight per unit volume and it can be shown in two ways — bulk density and particle density.

Particle density: It refers to the actual density of soil solids. It is defined as mass per unit volume of soil solid only. The average value of particle density is about 2.65 g/cm^3.

Bulk density: It is defined as the mass per unit volume, which includes the volume occupied by solids, as well as, pore space. It is, usually, expressed grams per cubic centimetre (g/cm^3).

Porosity

Soil comprises soil particles of different sizes. When soil particles aggregate, some empty spaces are formed between them. These inter-particle spaces of soil are

pores and carry air and water. The quantity and size of pores show porosity of the soil. Soil having more or large pores is called 'porous soil'. Such soils have good drainage and aeration. Soil with small but more pores shows better water-holding capacity. Such soils are water stagnant and are not good for cultivation.

$$\% \text{ Pore space} = 100 - \frac{\text{Bulk density}}{\text{Particle density}} \times 100$$

Soil consistency

The ability of the soil to change the shape or moulding when wet is known as 'soil consistency'. It also ensures pulverising action by implements when dry or the resistance of soil particles to crushing. Soil firmness leads to good tilth and has both micro-pores and macro-pores in more or less equal proportion.

Soil structure

Soil structure refers to the way individual soil particles are arranged to make up the mass of soil (Fig. 4.1).

Practically, soil structure can be described under the following heads:

(1) Platy: Horizontally arranged particles are placed one above the other around a plane
(2) Prism-like or prismatic: Vertically arranged particles or aggregates around a vertical axis
(3) Columnar: These structures are similar to prismatic except slightly rounded vertical faces
(4) Spheroidal or franular: Particles arranged around a point with a curved or an irregular surface

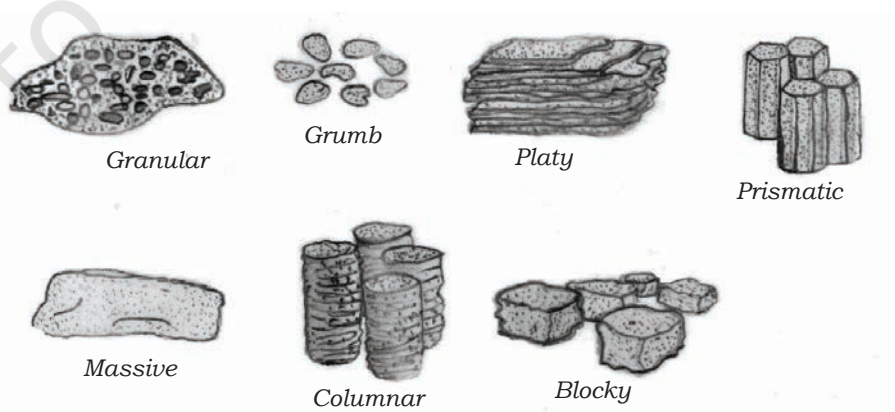

Fig.4.1: Types of soil structure

(5) Block-like or blocky: Particles arranged around a point with a round or flat surface

Soil temperature

It is regulated by the Sun and it helps in the decomposition process within the soil. Low, as well as, high soil temperatures are found harmful for crops. The crops slow down their growth as the temperature falls below 9° C and ceases when it reaches 50° C. Microorganisms of the soil are very active at a range of 27° C to 32° C. There are various factors which include the colour of soil, vegetative cover, soil moisture and slope of the land.

Chemical properties

These properties govern soil fertility. It is related with the ability of the soil to supply nutrients to plants. It depends on the chemical composition of the soil. Chemical properties can be exhibited by soil pH, buffering capacity, soil colloids and cation exchange capacity.

Soil pH

pH of soil shows potentiality of H+ ion. It determines acidic or alkaline reaction of the soil. Hydrogen ion (H+) concentration shows the acidic nature of soil, while concentration of hydroxyl (OH-) ion represents alkaline nature. Slightly acidic soils are more suitable for plant growth. Maximum plant nutrients are available to the crops, when the pH ranges from 6.5 to 7.0. The pH of soil can be measured by soil pH metre, pH scale, etc. pH scale has a range from 0–14pH. A pH of 7 indicates equal concentration of H+ and OH- ions. As the value decreases, it indicates higher concentration of H+ ion. Soils with minimum pH are more acidic. Similarly, as the pH increases above 7, alkaline reaction of the soil increases with the concentration of OH-ion. Such soil is called alkaline soil.

Buffering capacity of soil

The capacity of soil that resists sudden change in the pH of soil is called buffering capacity of soil. Change in pH may affect nutritional balance in the soil, as well

as, microbial activities. Carbonates, bicarbonates and phosphates play buffering agents in the soil.

Soil colloids

These may be clay or humus. Various types of clay found in soil are known as inorganic colloids; while humus is 'organic colloid'. The soil colloids attract positively charged cations because they are negatively charged (anions). Cations hold the water, which is present on the surface of the clay particles until replaced by other cations. Hydrogen ions are the most powerful replacer of cations, which are held by colloids. More the presence of clay particles in the soil, higher is the cation exchange capacity.

Cation exchange capacity

It is the measure of the potential of a soil to hold nutrient cation, such as potassium (K^+), calcium (Ca_2+), magnesium (Mg_2+), sodium (Na+) aluminum (Al_3+), iron (Fe_2+), manganese (Mn_2+), zinc (Zn_2+), hydrogen (H+) and copper (Cu_2+) for plant absorption. Cation Exchange Capacity is a measure of the quantity of cations that can be absorbed and held by a soil. Highly fertile soils, containing high organic matter have more cation exchange capacity. Soil fertility increases with increase in cation exchange capacity.

Biological properties

The soil is inhabited by various types of small living organisms and microorganisms. These are crabs, snails, earthworms, mites, millipedes, centipedes, fungi, bacteria, actinomycetes, protozoa and nematodes. These living organisms feed on plant residues. They make channels and burrow inside the soil, and thus, increase aeration and enhance the percolation of water due to their activities. Their excreta in the form of wastes add to the organic matter of the soil. Bacteria predominate neutral soils, while fungi are more in acidic soils. Moist and shady soils favour the growth of algae.

Soils of India

Soils can be classified as black, red, laterites, alluvial, desert, forest and hilly, peaty and marshy and saline and alkaline soil.

Alluvial soil

This soil is ideal for horticultural production. These soils are found along rivers. They consist of material deposited by rivers during flood situation. These are very productive soils. These greatly differ in colour, texture, drainage conditions, presence or absence of sodium salts, etc. These are suitable for the cultivation of vegetables, flowers and fruits. These soils are found in all States along the rivers. The Indo-Gangetic alluvial soils are the best example.

Black soil

Deep black to light black soils ranges from very fertile to very poor. These are rich in clay (montmorillonite) particles. These have an alkaline reaction. These are rich in bases, lime and calcium as cation. The pH of black soil varies from 7.2 to 8.5. These soils are poor in nitrogen, phosphate and organic matter but rich in potash, calcium and magnesium. These soils are extremely soft when wet, but when dry, they form hard blocks and develop deep cracks. Black soils range from heavy clay (ill-drained) to loams (well-drained), very deep to quite shallow. Black soils are predominant in Maharashtra, Madhya Pradesh, western Andhra Pradesh, southern Tamil Nadu and northern Karnataka.

Desert soil

These soils are sandy in nature and found in low rainfall areas. These are alkaline soils with high pH value and are unproductive. These are rich in soluble salts and poor in nitrogen and organic matter content. Physical conditions of these soils are unfavourable. These soils are found in semi-arid areas of Bihar and parts of Rajasthan.

Forest and hilly soil

These are very shallow soils of higher and lower elevation on the hills. These are stony and infertile for the production of crops. These are low in bases and slightly acidic in reaction.

Lateritic soil (laterite)

These soils form *in-situ* under high rainfall conditions with alternating wet and dry periods. These are red to reddish-yellow in colour. Heavy rains cause the leaching of bases and silica from surface to deep in the soil. These show acidic character with pH of 5 to 6. These are poor in nitrogen, phosphorus, potash, magnesium and lime. These soils are porous and well-drained with poor water-holding capacity. These are found in eastern Andhra Pradesh, Karnataka, Kerala, Madhya Pradesh, Odisha, Assam and Ratnagiri district of Maharashtra.

Peat and marshy land

These soils are highly acidic in nature and black in colour. Excessive wetness of soil, causing decay and degradation of dead vegetation, forms a layer of partially decomposed organic matter. This gives rise to marshy and peaty soil. These are, generally, found in parts of Bihar, Tamil Nadu and Uttar Pradesh.

Red soil

Such soils result from weathered material of metamorphic rocks. These are porous and friable neutral to acidic in reaction. These soils are poor in humus, nitrogen, lime and phosphate. These are found in parts of Tamil Nadu, Karnataka, NE Andhra Pradesh, eastern parts of Madhya Pradesh, Bihar, West Bengal and Rajasthan.

Acidic and salt affected soil

Acidic soil

Such soils are a result of the parent material. These develop from the weathering of acidic rock, like granite. Sometimes agro-climatic factor, like high rainfall, is responsible for soil acidity. Bases and lime present in the upper layers of soil leached down deep in the soil due to high rainfall or heavy irrigation and make it unavailable. The availability of aluminum increases. Sometimes the addition of fertilisers, such as ammonium sulphate and ammonium chloride, is also responsible for increasing the soil acidity. Microorganisms in the soil decompose organic matter into organic acids.

Soil acidity has a toxic effect on root tissues and affects the permeability of cations. Soil acidity lowers calcium and potassium content and affects the availability of phosphorus, copper and zinc. The balance between base and acidic constitution of plant is disturbed, which affects enzymatic changes. Elements, like aluminum, manganese and iron become toxic in acidic medium. Beneficial activities of soil microorganisms are affected.

Saline soil

These are mostly found in arid and dry regions, where the rate of evaporation is too high. Soluble salts from the lower layer of soils come up and get accumulated due to evaporation of soil moisture. In the catchments, the salts are accumulated by collection of washing of surrounding slopes. Poor drainage and high water table also increases salinity. Irrigation by saline water also causes accumulation of salts in the upper layer of the soil. In saline soils, the presence of white incrustation of salts on the surface is commonly seen. Salinity of soil is due to excess of calcium and magnesium chlorides, sulphates and carbonates. It contains enough soluble salts to interfere with the growth of most crop plants. High evaporation of moisture from soil and low rainfall are the main causes of soil salinity. The exchangeable sodium in saline soil is less than 15% and the pH is below 8.5. The name of electrical conductivity is 4 m mhos/cm, or more at 25° C.

Saline-alkaline soils

Soils show white incrustation of salts on the surface. Such soils are, generally, infertile and poor in drainage. These result from saline irrigation water, and over irrigation for long time, which raises the water table of the soil. These are rich in sodium content and are imporous. Deposition of sodium, magnesium and calcium may be seen on the soil surface. Uttar Pradesh, Punjab, Rajasthan, Kerala, coastal Odisha and Sunderban region of West Bengal form large patches of such soils. These are soils containing soluble salts in sufficient quantities and exchangeable sodium

are more than 15%. The pH of saline-alkaline soil is 8.5 or more. The value of Electrical Conductivity is more than 4 m mhos/cm at 25° C.

Reclamation of soil

- Acid Soil: by adding lime
- Saline Soil: Leaching/ drainage
- Sodic or alakline soil: by adding pyrite/ gypsum

Alkaline soil

These are poor in aeration and drainage. The pH of the soil lies between 8.5 and 10. The exchangeable sodium is more than 15%. The value of Electrical Conductivity is less than 4 m mhos/cm at 25° C. High sodium content is often toxic for crop growth.

Practical Exercises

Activity 1

Identify different soil structure.

Material required: Different types of soil sample, pen, pencil, notebook, etc.

Procedure

1. Visit your vicinity for collecting soil samples.
2. List the soil samples with coding.
3. Write down their physical properties.
4. Identify the types of soil structure.

Activity 2

Determine the nature of soil by pH paper method.

Material required: Conical flask, beaker of 100 ml capacity, distilled water, filter paper, funnel, pH paper, soil sample, etc.

Procedure

1. In a clean conical flask, prepare a solution of given soil sample in distilled water.
2. Filter this solution through filter paper in a beaker.
3. In the filtrate, dip a strip of pH paper. The paper will show change in colour.
4. Compare the colour change with the chart provided over the leaf of pH paper strip packing.
5. Note down the matching reading.
6. Determine the nature by comparing it on pH scale.

Check your Progress

Fill in the Blanks

1. The colour of the soil depends on _____and _____.
2. Transformation of rocks into agricultural land is called _____.
3. The soil can be classified as per the size of soil particles. This is termed as_____.
4. The inter-particle spaces of soil are known as _____.
5. The capacity of the soil to resist sudden change in pH is called _____ capacity of soil.
6. A soil type ideal for horticultural crop is _____.
7. Soil acidity can be corrected by the application of _____ to the soil.
8. Soil science is also known as _____.

Multiple Choice Questions

1. Maximum plant nutrients are available, when the pH ranges from _____.
   (a) 8 to 8.5 (b) 6.5 to 7.00
   (c) 7 to 7.5 (d) 6 to 6.4
2. _____ predominates population of microbes in acidic soils.
   (a) Fungi (b) Algae
   (c) Bacteria (d) Protozoa
3. The pH of black soil varies from _____.
   (a) 7.2 to 8.5 (b) 4.2 to 6
   (c) 6 to 6.5 (d) 6.2 to 6.8
4. The ability of soil to change the shape or moulding when it is wet is due to _____.
   (a) soil structure (b) soil texture
   (c) buffering (d) soil consistency
5. Desert soils are sandy soils found in _____.
   (a) low rainfall
   (b) high rainfall
   (c) moderate rainfall
   (d) None of the above
6. Measuring the quantity of cations that can be absorbed and held by the soil is known as _____.
   (a) pH
   (b) temperature
   (c) buffering
   (d) cation exchange capacity

Subjective Questions

1. Describe the physical properties of soil.
2. Describe acidic soil.
3. What is saline soil? Give the causes of soil salinity.
4. Write the characteristics of the following soils of India:
   (a) alluvial soil
   (b) laterite soil
   (c) black soil
   (d) red soils

Match the Columns

A	B
1. Horizontally arranged particles	(a) 7 pH
2. High organic matter	(b) 8.5–10 pH
3. Neutral pH	(c) Platy structure
4. Alkaline soil	(d) More CEC

SESSION 2: TILLAGE AND CULTURAL OPERATIONS

Preparation of land is important for the cultivation of ornamental crops to ensure that the field is ready for planting. It covers various practices from ploughing to levelling of fields for cultivation.

Preparation of field (tillage)

Ploughing

For the cultivation of flowers, the field should be first dug out to a certain depth in order to improve aeration and drainage, and provide easy space for growth and development of roots. The digging of field is done through plough and the operation is known as 'ploughing'. Ploughing also uproots weeds and previous crop residues. The depth of ploughing should be kept 20–25 cm as superficial ploughing will not favour plant development, whereas, ploughing too deep will bury nutrients and make it beyond the reach of the root zone. Ploughing of the field two to three times across is recommended for better results.

Harrowing

The purpose of harrowing is to break clods after ploughing and smoothening the soil surface for growing ornamental crops. Different types of harrow are used as per the requirement. In general, manures are applied at the time of field preparation and thoroughly mixed by harrowing.

Levelling

After harrowing, the soil is planked to have a uniform level and slope. Levelling of land ensures better implementation of irrigation and planting of crop. Levelling is done to lower the higher parts of the field and soil from higher altitude is spread over the lower regions. After levelling of the land, the desired layout of specific dimensions used for planting, such as ridges and furrows or flat or raised bed, are prepared.

Special practices in flower cultivation

Weeding

It refers to the removal of all unwanted plants from the field, other than those planted or sown. Periodical removal of weeds is beneficial for the growth and development of crop as this prevents competition of weeds with the main crop for sunlight, water, air and nutrients. It is also necessary as weeds harbour many insect pests and diseases. Primary weeding is done to clear huge amounts of plants other than the main crop. In our country, weeding is, generally, carried out manually. Mechanical weeding may conveniently be carried out in those crops, which have been sown or planted as per specification and in rows. However, chemical weeding can be carried out anywhere in any crop, though it may have side effects on the environment. Therefore, mechanical weeding is always preferred. Mulching at the initial stage also minimises weed population.

Mulching

It is a process of covering the soil around plants with organic wastes, like straw, hay, dry grass or leaves, saw dust and crop residues, etc., or synthetic materials, like plastic sheets. This method of mulching is of recent origin. Mulching is a good cultural method that preserves soil moisture, soil erosion and protects weeds. It also helps in maintaining the soil temperature.

Staking

It is a practice to support plants growing straight and saving them from bending or lodging. Therefore, this operation is done at a time when plants are not too tall. It saves the plants from being blown over by winds, rains and due to the weight of their stems when in bloom or in fruiting. Bamboo stakes are most common, and other than this, branches of shrubs and trees, i.e., *neem*, *subabool*, *phalsa*, eucalyptus, etc., can also be used effectively for this purpose.

Earthing up

Digging and pulling the soil in between the rows and heaping it around the stem of plants is called earthing up. In case of bulbous ornamentals, this encourages the development of additional underground food storage structures, such as bulbs, corms, rhizomes or tubers as in case of tuberose, gladiolus, canna, begonia and dahlia.

Deshooting

It is the removal of all side shoots (offshoots/offsets) emerging from the base of the plant. The main purpose of deshooting is to divert the energy of the plant towards the development of shoots or buds.

Disbudding

It is the removal of floral buds when a large flower on a plant is desired, as in chrysanthemum and dahlia.

In this way, the energy saved by disbudding is diverted towards the development of retained bud so the flowers become large and vigorous. Generally, it is followed in large-flowered varieties. In carnation, disbudding is practised to obtain long stalk with larger blooms.

Pinching

It is removal of the growing tips of the vegetative buds to promote bushy growth for more flowering in case of chrysanthemum. It is the removal of 3–5 cm growing tips when the plants are 8–10 cm tall, i.e., when the plants are about one-month old and the second pinching about three weeks after the first pinching. Pinching is also a common practice in carnation and marigold.

Training

It is the shaping of plants at an early stage, conforming to a particular form, commensurate to the plant's requirement. This gives the plant a desired height, shape and strong framework with desired number of properly distributed branches and eliminates weak crotch development.

Pruning

The planned removal of twigs, branches, shoots, limbs, or roots is termed as pruning. Pruning is done with a view to increase the usefulness of the plant.

Principles of pruning

(i) The main principle of pruning is to reduce the apical dominance so that lateral branches are encouraged for quality blooms with long stems as in roses. The ratio between roots and top and vice versa influences the vegetative growth, flowering and fruiting of a plant to a considerable extent. The principle is to strike a balance between shoot and root growth.

(ii) All dead, diseased or insect-infested wood and weaker branches are removed.
(iii) The stronger the growth, the lighter the pruning, and the lighter the growth, the severe is the pruning.

Objectives of pruning

(i) To give a definite direction and shape to the plant
(ii) To develop a strong framework. At an early stage of growth only wide-angled scaffold branches should be retained by proper training.
(iii) To utilise the available space effectively
(iv) To impart dwarfing in the plant and invigorating its growth
(v) To influence productiveness and quality of the produce
(vi) To impart definite objective, such as development of a dense top growth in a shady tree or to keep neat and impenetrable hedge
(vii) To penetrate necessary light and air to inner portion of the plant
(viii) To remove all dead, diseased and interlacing twigs or branches

Time of pruning

(i) The plant bearing flower on last season's growth is, generally, pruned immediately after flowering.
(ii) Those plants flowering on current season's growth are pruned sufficiently ahead of the flowering season.

Practical Exercises

Activity 1

Demonstrate mulching in ornamental crops.

Material required: Different types of mulching material (organic and inorganic)

Procedure

1. Identify and select the mulching material.
2. Apply mulching material in ornamental crops or plots.
3. Observe weed population after two weeks.

Activity 2

Demonstrate pruning.

Material required: Pruning knife, secateur and desired plant.

Procedure

1. Identify and select a plant for pruning.
2. Note down the name, age and stage of the plant
3. Perform pruning with the help of appropriate tools.
4. Observe the growth of the plant after 15 days of pruning.

Check your Progress

Fill in the Blanks

1. Weeding refers to the removal of all _____ plants from the field.
2. Digging and pulling the soil in between the rows and heaping it around the stem of plants is called _____.
3. The main principle of pruning is to reduce the _____.
4. The removal of all side shoots is known as _____.

Multiple Choice Questions

1. Inorganic mulch is _____.
   (a) straw (b) dry grass
   (c) saw dust (d) plastic sheets
2. Earthing up is a common practice in _____.
   (a) rose (b) marigold
   (c) gladiolus (d) carnation
3. Pinching in plants promotes _____.
   (a) plant height (b) flower size
   (c) bushy growth (d) root growth
4. Giving difinite direction and shape to the plant is known as _____.
   (a) pruning (b) pinching
   (c) disbudding (d) deshooting

Subjective Questions

1. What are the various practices for land preparation?
2. Describe in detail the practices followed in flower cultivation.

Match the Columns

A	B
1. Earthing up	(a) removal of unwanted plant
2. Deshooting	(b) planned removal of twigs, limbs, shoots
3. Mulching	(c) acquire desired shape of plant
4. Staking	(d) removal of the growing tips
5. Disbudding	(e) removal of all side shoots
6. Pinching	(f) removal of floral buds
7. Training	(g) support to plant
8. Pruning	(h) bulbous ornamental
9. Weeding	(i) covering exposed soil