JOB ROLE – SOLANACEOUS CROP CULTIVATOR

Sector – Agriculture

(Qualification Pack Code: AGR/Q0402)

PPT's for Class IX

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UNIT 3: FIELD PREPARATION AND TRANSPLANTING IN SOLANACEOUS CROPS

Session 1: Soil and Field Preparation

Content

Session Objectives

The students will be able to:

- Describe the soil and its importance
- Describe soil types
- Explain soil testing
- Know about the importance of Soil Health Card Scheme
- Demonstrate field preparation

Introduction

Soil is important and easily available growing medium for plants. Soils are of different types, depending upon their chemical and physical properties. Soil provides nutrients and moisture to plants, which are necessary for their growth and development. Manures and fertilisers are added to the soil to maintain its nutrient value. This ensures the availability of nutrients to plants and maintains productivity, as well as, fertility of the soil. Judicious use of fertiliser is always recommended to avoid crop and soil hazards. This may be achieved through testing of the soil and expert opinion.

Soil

Soil is derived from the Latin word *Solum*. It may be defined as a natural body developed as a result of weathering of rocks, in which plants and other forms of life grow and prosper. It is the upper loose layer of the earth crust rich in nutrients and minerals on which plants grow. Soil is composed of minerals (45–50%), organic matters (0.5–5%), water (25%) and a large number of plants, animals and microbes.

Importance of Soil

Soil provides nutrients to plants for help in their growth. It provides support to growing plants by holding their roots. It holds moisture and water for a long time and serves as a habitat for many micro and macroorganisms. Soil also provides heat, air and water to growing organisms living in or over it. It is the most important natural resource of a country.

Types of Soil

There are different types of soil in India, which can be classified on the basis of their colour and characteristics.

Black soil

These soils are poor in nitrogen, phosphate and organic matter but rich in potash, calcium and magnesium . The pH of black soil is 6.8.

Types of Soil

Red soil

These are porous, friable and neutral to acidic in nature. These soils are poor in nitrogen, phosphate, lime and humus. pH of red soil is more than 5.

Types of Soil

Lateritic (laterite)

It is acidic character with pH of 5 to 6. Soils are porous and have low water holding capacity. Lateritic soils are deficient in nitrogen, phosphorus, potash, magnesium and lime. Found in the states of Karnataka, Kerala and Tamil Nadu.

Types of Soil

Alluvial soil

These are productive soils which are formed due to the deposition of silt by the Ganga and Brahmaputra rivers due to meandering of the river course, a rich deposit of alluvial soil develops. The pH of alluvial soil ranges from 6.5 to 8.4

Types of Soil

Desert soil

Theses soils are sandy and found in low rainfall areas. These are alkaline soils with high pH value and are unproductive. The pH ranges from 7.6 to 8.4

Types of Soil

Forest and hilly soil

Soils of higher and lower elevation found on hills. These are stony and infertile. The pH of such soil is 4.

Peat and marshy land

Soils are highly acidic in nature and black in colour. Excessive wetness of the soil, causing decay and degradation of dead vegetation, forms a layer of partially decomposed organic matter.

Soil Particles

Soil particles are classified according to their size.

Clay particles are the finest and are smaller than 0.002 mm in diameter. Loam particles are 0.002–0.02 mm in diameter. Silt particles have 0.02–2.0 mm diameter. Particles larger than 2 mm are sand, gravel or stones.

Proportion of Sand, Silt and Clay in Various Soils

Soil Type	Sand (%)	Silt (%)	Clay(%)
Sandy loam	50-80	0-50	0-20
Loam	30-50	30-50	0-20
Clay loam	20-50	20-50	20-30
Silt clay loam	0-30	50-80	20-30

Soil Testing

Soil testing is one of the methods to determine the fertility status of a soil. A complete soil test programme essentially consists of three basic steps, which are soil sampling, soil testing and soil test interpretation and fertilizer recommendations.

Why is soil testing required?

It help in the evaluation and improvement of soil productivity. Soil testing is determine the nature of soil, i.e., alkaline, saline, acidic, etc., and suggest corrective measures. It reveal the condition of a soil so that it can be improved with proper application of nutrients and other management practices.

Soil Sampling

Samples are taken randomly identified different locations in a field by using soil auger, soil tube, spade, etc. Soil is collected from pits (15–20 cm depth) and composited. Samples should not be taken from the boundary of a field. Shady, marshy, near irrigation source and fertiliser applied areas are also avoided. The soil is mixed thoroughly and spread on a clean sheet of paper or on a piece of cloth. It is divided into four equal parts by drawing a cross sign with the help of a wooden stick. Two opposite quarters are rejected and samples from the other two are mixed.

Soil Sampling

The procedure is repeated till the desired size of the sample is obtained (1/2 kg), which is collected in a paper bag and later packed in a plastic bag. This bag containing the sample is labeled and sent to the nearest soil testing laboratory of the Department of Agriculture, ICAR institutes, KVKs and SAUs, along with an inforsmation sheet.

Information sheet required for soil testing

- Name of the farmer
- Identification or the number of the field
- Date of sampling
- Depth of sampling

Soil Sampling

Information sheet required for soil testing

- Address of the farmer
- Type of land unirrigated, irrigated, waterlogged
- Source of irrigation (canal, well, tank, etc.)
- Topography (level, sloppy, undulated)
- Crop rotation followed
- Previous crop
- Next crop to be cultivated
- Details of manures or soil amendments applied earlier
- Any other remark
- Signature or thumb impression of the farmer

Soil Types on the Basis of Soil pH

S. No.	Soil type	Soil reaction
1.	Acidic	Below 7.0
2.	Neutral	7.0
3.	Neutral to saline	7.0- 8.5
4.	Tending to alkaline	8.6- 9.0
5.	Alkaline	Above 9.0

Soil Types on the Basis of Soil Electro-conductivity (EC)

S. No.	Category	EC (milli-mhos/cm)
1.	Normal	Below 1.0
2.	Critical for germination	1.0-2.0
3.	Critical for the growth of salt sensitive crops	2.0- 3.0
4.	Injurious to most crops	Above 3.0

Rating of Soil on The Basis of Nutrient Availability

S. No.	Nutrient	Low	Medium	High
1.	Organic carbon	Below 0.5%	0.5-0.75%	Above 0.75%
2.	Available nitrogen (N)	Below 280 kg/ha	280-560 kg/ha	Above 560kg/ha
3.	Available phosphorus (P)	Below 10kg/ha	10-25 kg/ha	Above 25kg/ha
4.	Available potassium (K)	Below 110 kg/ha	110-280 kg/ha	Above 280 kg/ha

Soil Health Card Scheme

- Scheme launched by the Government of India in February 2015.
- Under this scheme, Soil Health Card is issued to farmers.
- It contains information about the different nutrients present in a crop and fertilisers recommended for a farm.
- It helps farmers to improve their crop's productivity through judicious use of fertilisers and other resources.
- The results and suggestions are displayed in the cards for farmers to understand the nature of the soil and its suitability to cultivate a particular crop.

Field Preparation

Selection of field

The soil must be fertile with continuous supply of nutrients and proper drainage facility. Light soils are preferred for early crop and loam or clayey soils for a higher yield. The optimum soil pH for tomato is 6–7. It can tolerate a little soil acidity up to 5.5. Brinjal can tolerate slightly acidic soil, pH ranging from 5.5 to 6.8. For chilli cultivation, the soil pH must be 6.5–7.5. Chillies are grown on heavy black cotton soil during the rainy season, particularly dry chilli.

Field Preparation

Land prepration

The soil is dug out to a certain depth, resulting in big clods (ploughing), which are further broken down to make the soil fine and smooth with the required tilth. This facilitates weed management, ploughing back of crop residues, water infiltration, soil aeration, and root penetration and development. Land preparation includes ploughing, crushing of clods, levelling, harrowing etc.

Field Preparation

Procedure for land preparation

A field should be ploughed up to a depth of 30 cm or more. After this, discing or harrowing in two directions should be done using disc harrows. The bed height is determined by the type of the soil, irrigation method and intended crop. Raised beds must ensure the drainage of excessive water, rapid drying of soil surface and early soil warming, less chances of soil-borne diseases, and improved soil aeration.

Ploughing of a field

Field Preparation

Procedure for land preparation

Manure and other compost in the soil must be applied at the time of land preparation. Heavy soils often break in clods and lumps. Heavy clods and lumps can be crushed with the use of a heavy roller. Rotavator mellowing improves the soil structure by breaking up the clods and ploughing out the weeds that emerge after pre-plant irrigation. The final seed bed preparation can be done with the help of a bed roller, planker or laser leveler. It may be done manually by using a spade, hand hoe, etc.

Summary

In this session, you have learnt about the soil and its importance, soil types, soil testing and nutrient recommendation, importance of Soil Health Card Scheme and field preparation for solanaceous crops.

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