
EXPERIMENT 11 SURVEY AND SCORING OF MULBERRY DISEASES – A CASE STUDY

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11.1 INTRODUCTION

Foliar diseases of mulberry affect the leaf production especially during rainy and winter seasons, whereas, soil-borne diseases affect foliage production throughout the year. Proper scoring of the diseases is most essential to know the distribution and incidence of diseases during different months for timely control.

Objectives

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

- understand the incidence and severity of different diseases of mulberry; and
- understand the distribution of the diseases during different seasons of the year.

11.2 EXPERIMENT

11.2.1 Principle

Disease incidence or prevalence is defined as the number of diseased units (*i.e.*, plants, leaves, stem, *etc.* that show the symptoms) in relation to the total number of units examined. Yield loss is the portion of yield that is either destroyed directly by the disease or not produced by the plants due to the infection. Thus, the yield loss is the difference between attainable yield and the actual yield.

11.2.2 Requirements

- Mulberry garden
- Data sheets
- Hand lens

11.2.3 Procedure

(I) Scoring of Foliar Diseases

- Record the disease incidence under natural condition.
- Select minimum 50 plants (10 plants each at 4 corners of the garden and 10 at the centre) for recording the disease severity. If area is less than one acre, select only 25 plants.
- Select 3 branches / plant randomly for calculating the disease incidence. Count the total number of leaves and the number of leaves infected with disease in the selected branches.
- Classify the infected garden based on DI as follows.

Disease Index	Disease Incidence (%)	Severity of Mulberry Garden
1	0	Disease free
2	0.1-5	Mild
3	5.1-20	Moderate
4	20.1-50	Severe
5	> 50	Very Severe

(II) Scoring of Soil-borne Diseases:

(a) Nursery Diseases

- The incidence of these diseases can be scored on the basis of per cent survivability of saplings.
- The total number of stem-cuttings planted and number of saplings survived are recorded after 90 days of cutting plantation.

(b) Root Knot

- Determine the severity of root knot (*Meloidogyne incognita*) disease in mulberry by randomly collecting the samples of infested root (ten each) from 4 corners of the garden and centre of the garden (total 50 samples).
- Wash the samples with tap water and count the number of galls/plant.
- Calculate the disease severity on the basis of average number of galls/plant following rating scale (1-5). Based on index, the infected mulberry gardens can be categorized into different levels of disease severity.

Disease Index	No. of Galls/plant	Severity of Mulberry Garden
1	Nil	Disease free
2	0 -10	Mild
3	10.1-30	Moderate
4	30.1-100	Severe
5	>100	Very Severe

(c) Root Rot

- Calculate the disease intensity based on foliar infections by counting the total number of leaves and number of wilted leaves/plant and root infections by taking the weight of rotten roots from the whole root system.

- From the per cent foliar and root infection, the root rot disease index is estimated by using a rating scale (1-5). On the basis of this index, the infected mulberry gardens can be categorized into different levels of disease severity.

Disease Index	Foliar Infection (%)	Root Infection (%)	Severity of Mulberry Garden
1	No wilting	No rotting of root	Disease free
2	0 - 25 wilting	0-25 rotting	Mild
3	25.1-50 wilting	25.1-50 rotting	Moderate
4	50.1-75 wilting	50.1-75 rotting	Severe
5	> 75 wilting	> 75 rotting	Very Severe

11.2.4 Observations

(I) Scoring Sheet for Foliar Diseases

Temperature: _____ °C RH: _____ % Rainfall: _____ mm

Plant	Branches	Total no. of Leaves	No. of infected leaves #			Severity of Garden
			Leaf Spot	Powdery Mildew	Leaf Rust	
1	1					
	2					
	3					
Total						
Disease incidence (%)						

Add or Delete the name of the disease as per the requirement.

(II) Scoring of Soil-borne Diseases

(a) Scoring Sheet for Nursery Diseases

Soil temperature: _____ °C Soil moisture (%): _____ Soil pH: _____ Soil types: _____

Sl. No.	Total no. of Cuttings	No of Sprouted Cuttings 30 DAP	Sprouting of Cuttings (%)	No. of Survived Cuttings 90 DAP	Survival of Cuttings (%)

Note: DAP- Days after Planting

(b) Scoring Sheet for Root Knot Disease

Soil temperature: _____ °C Soil moisture (%): _____ Soil pH: _____ Soil types: _____

Plant no.	Plant Height (cm)	Leaf Yield/ha	Galls/plant	Disease Index	Severity of Garden

(c) Scoring sheet for root rot disease

Soil temperature: Soil moisture (%): Soil pH: Soil types:

Plant no.	Foliar Infection (%)	Root Infection (%)	Disease Index	Severity of Garden

11.2.5 Calculations

(I) Scoring of Foliar Diseases

Calculate the disease incidence (DI) by the following formula:

$$\text{Disease incidence (\%)} = \frac{\text{No. of infected leaves}}{\text{Total no. of leaves}} \times 100$$

(II) Scoring of Soil-borne Diseases

a) Nursery Diseases

Percentage of disease incidence is calculated by the following formula:

$$\text{Disease incidence (\%)} = \frac{\text{Number of dead cuttings}}{\text{Total cuttings planted}} \times 100$$

b) Root Rot

$$\text{DI (foliar infection)} = \frac{\text{No. of wilted leaves}}{\text{Total no. of leaves}} \times 100$$

$$\text{DI (root infection)} = \frac{W1 - W2}{W1} \times 100$$

Where,

W1 = Weight of whole root system

W2 = Weight of healthy root system

11.2.6 Results

- a) The disease incidence (DI) observed for leaf spot/powdery mildew/leaf rust is _____.
- b) Number of the galls/plant noticed is _____.
- c) Percentage of foliar and root infections for root rot are _____.

11.3 PRECAUTIONS

- Categorization of infected leaves should be done carefully.