



## Soil pH and Electrical Conductivity as Indicators of Host Plant Suitability for Sustainable Tropical Tasar Sericulture

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Soil properties play a crucial role in determining the growth, productivity, and sustainability of tropical tasar host plant plantations. The present study was conducted to evaluate soil pH and electrical conductivity (EC) as indicators of host plant suitability in tropical tasar sericulture. Soil samples were collected from 25 plantation plots and analyzed for pH and EC values. The pH values ranged from 4.60 to 5.28, while EC values ranged from 29.6 to 103.1  $\mu\text{S cm}^{-1}$ . The results indicated that the majority of plots possessed acidic soil conditions suitable for the growth of Arjun (*Terminalia arjuna*) and Asan (*Terminalia tomentosa*), the primary host plants of tropical tasar silkworm (*Antheraea mylitta*). Moderate EC values suggested low salinity stress and favorable nutrient availability. The study demonstrated that soil pH and EC can serve as reliable indicators for assessing host plant suitability and sustainability in tropical tasar ecosystems.

**Keywords:** Soil pH, Electrical Conductivity, Tropical Tasar Sericulture, Arjun, Asan, Host Plant Suitability, Soil Fertility, Sustainable Sericulture, *Antheraea mylitta*, Plantation Management

### Introduction

Tropical tasar sericulture is an important agroforestry-based livelihood activity that depends primarily on healthy host plant plantations. The tropical tasar silkworm, *Antheraea mylitta*, feeds mainly on Arjun (*Terminalia arjuna*) and Asan (*Terminalia tomentosa*) leaves. Therefore, soil quality directly influences host plant growth, leaf production, and cocoon productivity. Among various soil properties, pH and electrical conductivity (EC) are considered fundamental indicators of soil health. Soil pH affects nutrient availability, microbial activity, root development, and nutrient uptake by plants. Electrical conductivity reflects the concentration of soluble salts in soil and provides information regarding nutrient status and salinity levels. Acidic soils are generally preferred for Arjun and Asan plantations because they facilitate nutrient absorption and support healthy root growth. Excessively high EC values may reduce water uptake and negatively affect host plant performance. Therefore, regular monitoring of pH and EC is essential for sustainable tasar plantation management. The present study aimed to assess soil pH and EC in tasar host plant plantations and evaluate their suitability for sustainable tropical tasar sericulture.

### Materials and Methods

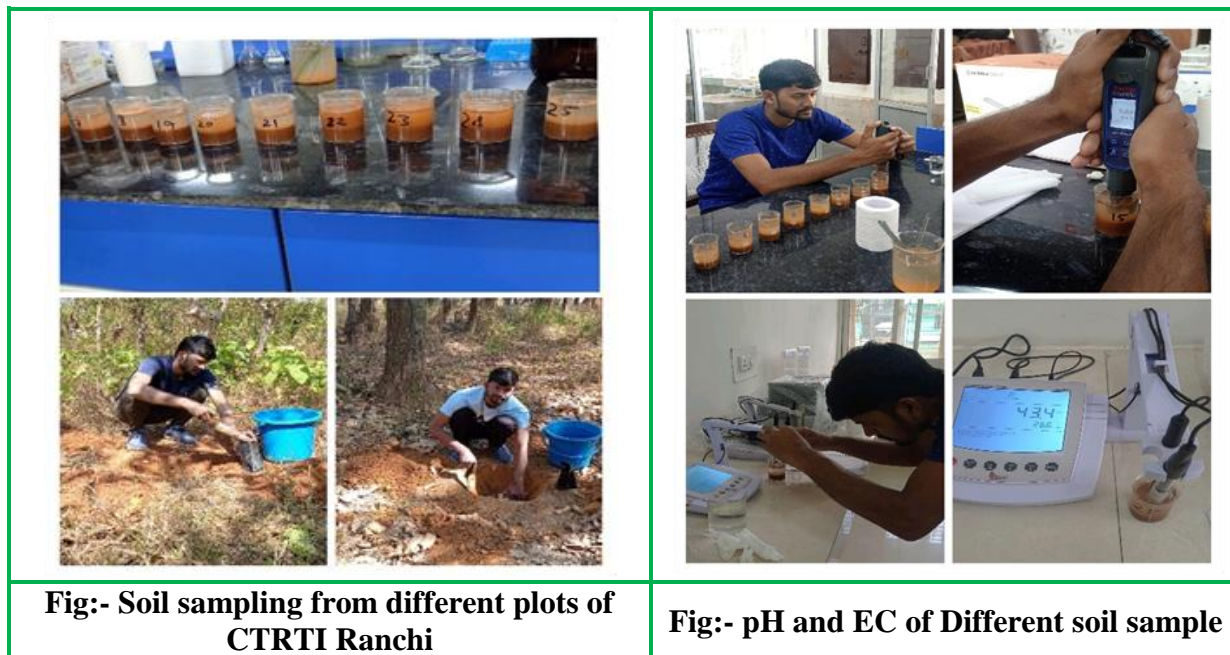
#### Study Area

The study was conducted in CTRTI Ranchi established tropical tasar host plant plantations. Soil samples were collected from 26 different plantation plots representing various field conditions.

#### Soil Sampling Procedure

- Soil samples were collected from the root zone (0–15 cm depth).
- Samples were collected from 26 plots.

- Composite samples were prepared from each plot.
- Samples were air-dried and sieved before laboratory analysis.



**Fig:- Soil sampling from different plots of CTRTI Ranchi**

**Fig:- pH and EC of Different soil sample**

### Determination of Soil pH

Soil pH was measured using a calibrated digital pH meter.

#### Procedure

1. Soil and distilled water were mixed in a 1:2.5 ratio.
2. The suspension was stirred thoroughly.
3. Samples were allowed to settle.
4. pH readings were recorded using a digital pH meter.

### Determination of Electrical Conductivity

Electrical conductivity was measured using a digital EC meter.

#### Procedure

1. Soil-water extract was prepared.
2. EC was measured in  $\mu\text{S cm}^{-1}$ .
3. Readings were recorded for all plots.

### Statistical Analysis

The following parameters were calculated:

- Mean pH
- Minimum pH
- Maximum pH
- Mean EC
- Minimum EC
- Maximum EC

### Results

#### Soil pH Status

The pH values observed among plots ranged from 4.60 to 5.28.

**Table 1. Soil pH Observations**

Parameter	Value
Minimum pH	4.60
Maximum pH	5.28
Average pH	4.89

The results indicate that the plantation soils were moderately acidic.

### Electrical Conductivity Status

Electrical conductivity values ranged from 29.6 to 103.1  $\mu\text{S cm}^{-1}$ .

**Table 2. Electrical Conductivity Observations**

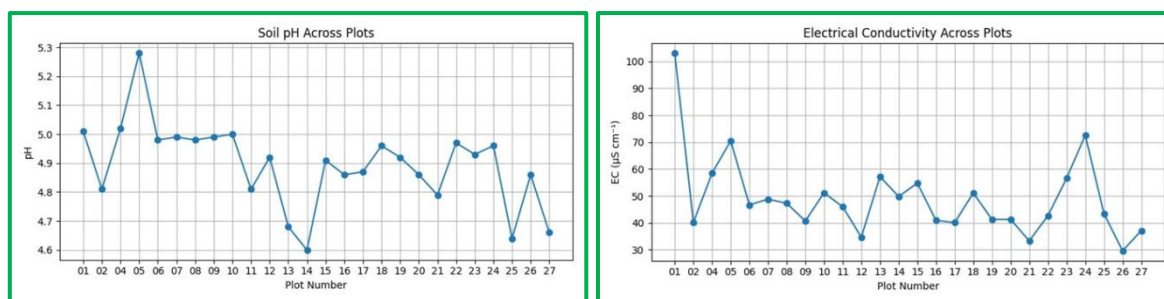
Parameter	Value
Minimum EC	29.6 $\mu\text{S cm}^{-1}$
Maximum EC	103.1 $\mu\text{S cm}^{-1}$
Average EC	49.84 $\mu\text{S cm}^{-1}$

The EC values indicate non-saline soil conditions suitable for host plant growth.

### Distribution of Soil pH and EC

**Table 3. Summary of Soil Characteristics**

Soil Parameter	Range	Interpretation
pH	4.60–5.28	Moderately acidic
EC	29.6–103.1 $\mu\text{S cm}^{-1}$	Low salinity
Soil Suitability	Favorable	Suitable for tasar host plants



**Fig :- Comparison of Soil pH and EC of all plot (Graphically)**

### Discussion

The present investigation revealed that the plantation soils possessed acidic characteristics, with an average pH of 4.89. Such acidic conditions are generally favorable for the growth of Arjun and Asan plantations commonly used in tropical tasar sericulture.

Soil acidity influences nutrient solubility and microbial activity. Moderate acidity enhances the availability of micronutrients such as iron, manganese, and zinc, which are essential for healthy host plant development. The observed pH range is therefore considered suitable for sustainable tasar plantation management.

Electrical conductivity is an important indicator of soluble salt concentration in soil. The average EC value of 49.84  $\mu\text{S cm}^{-1}$  indicates low salinity conditions. Low EC values facilitate efficient water uptake and nutrient absorption by host plants. Excessive salinity can reduce root activity and leaf productivity, but such conditions were not observed in the present study.

Plot 01 recorded the highest EC value (103.1  $\mu\text{S cm}^{-1}$ ), while Plot 26 showed the lowest value (29.6  $\mu\text{S cm}^{-1}$ ). Despite these variations, all plots remained within acceptable limits for host plant cultivation.

The combined evaluation of pH and EC suggests that the plantation soils are capable of supporting healthy host plant growth and sustainable tasar silkworm rearing. These parameters can therefore be used as practical indicators for site selection, plantation monitoring, and soil management in tasar sericulture.

### Conclusion

The study demonstrated that soil pH and electrical conductivity are reliable indicators of host plant suitability for sustainable tropical tasar sericulture.

The major findings include:

1. Soil pH ranged from 4.60 to 5.28, indicating favorable acidic conditions.
2. Electrical conductivity ranged from 29.6 to 103.1  $\mu\text{S cm}^{-1}$ , reflecting low salinity stress.

3. Average soil pH (4.89) and EC (49.84  $\mu\text{S cm}^{-1}$ ) were suitable for Arjun and Asan plantations.
4. The studied plantation sites possess favorable soil conditions for tropical tasar host plant cultivation.
5. Regular monitoring of pH and EC can improve plantation productivity and sustainability.

The findings support the use of soil pH and electrical conductivity as effective tools for evaluating and managing tasar host plant plantations.