Evaluation of Excelsa Coffee Germination and Adaptation

This document outlines a project to evaluate the germination and adaptation of Excelsa coffee seeds in Nicaragua. The study aims to assess germination rates, seedling vigor, and pest incidence in nurseries to support sustainable coffee production and target specialty markets. The project involves setting up a germinator bed, transplanting seedlings, and managing a nursery to gather data on this coffee variety's potential.

Introduction and Objectives

The evaluation of germination and adaptation of coffee varieties is essential to ensure the sustainability and profitability of coffee production. By selecting suitable varieties, resources can be optimized, product quality enhanced, and environmental conservation supported.

1

Evaluate Germination

To evaluate the germination of Excelsa coffee seeds

2

Assess Seedling Vigor

To determine the capacity to produce vigorous seedlings in nurseries

3

Monitor Pest Incidence

To assess the incidence of pests in coffee nurseries

Project Justification and Materials

Considering that Nicaragua has a wide range of regions with favorable soil and climate conditions for coffee cultivation, this project has established a nursery for the Excelsa variety. This will provide reliable data to develop a small-scale agricultural venture with this variety, targeting specialty markets.

Seed Selection

Variety: Excelsa, Coffea liberica var. Deweveri.

Quantity: 2,745 coffee seeds.

Origin: Philippines

Germinator Preparation

Dimensions and Materials: The germinator was built with an area structure measuring 4.2 m in length, 1.2 m in width, and 0.5 m in height, with a total area of 2.5 m^2. Materials used included wooden boards, nails, and river sand.

Substrate Preparation

The substrate consisted of washed and disinfected river sand. Ideal temperature, humidity, and light conditions were provided for the germinator.

Environmental Conditions

Ideal temperature, humidity, and light conditions were provided for the germinator. **See Annex 1**

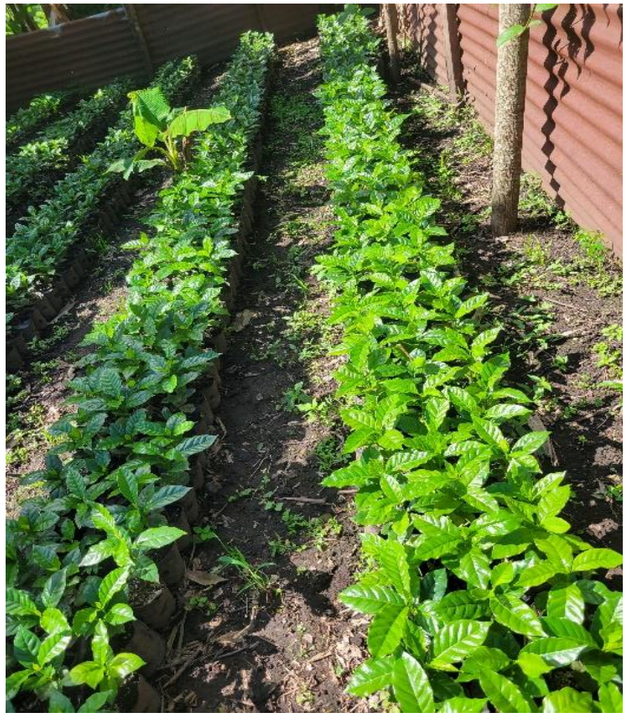
Transplanting and Nursery Setup

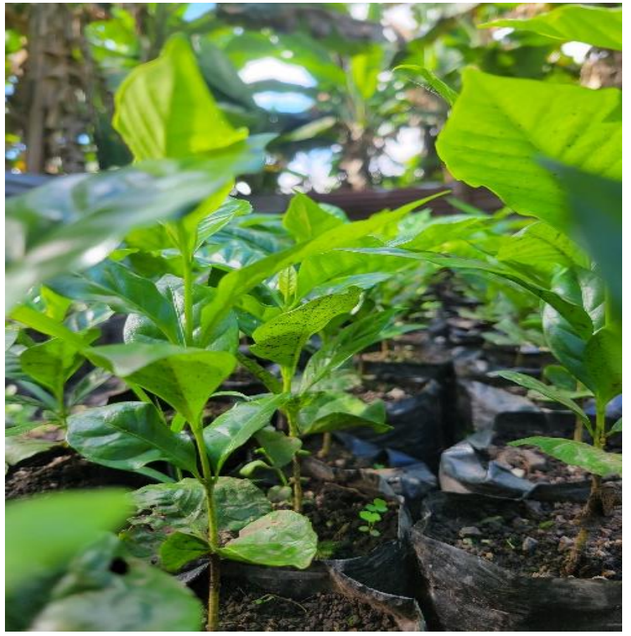
Transplanting to Containers (Bags): Black polyethylene bags capable of holding 1 kg of soil were used, ideal for maintaining plants in nurseries up to six months post-transplant. **See Annex 2**

Substrate Used: Virgin mountain topsoil rich in organic matter, using 1 kg per container.

Seedling Selection Criteria for Transplant: A total of 2,290 seedlings with well-developed cotyledon leaves and healthy root systems with a length of over 9 cm were transplanted. Transplanting occurred 75 days after seed germination.

Planting Density in Bags: One seedling was planted per bag, arranged in beds measuring 10 meters in length and four rows per bed. Partial shading was provided to protect freshly transplanted plants from direct sunlight. Shading was gradually removed to expose the beds to full light.





Nursery Management

1

Irrigation and Fertilization

Without protected structures, the nursery utilized rainwater; on non-rainy days, moisture levels were monitored to ensure adequate humidity. Each nursery plant received a total of 4 grams of diammonium phosphate (DAP, 18-46-0) in two applications to enhance root growth.

2

Pest and Disease Control

Damping-off Disease: A fungal disease causing stem rot and plant wilting was observed due to high soil humidity from prolonged rains. Control measures included completely removing the nursery's protective shade. Coffee Leaf Spot: Minor incidence observed on three leaves, posing no significant risk to plants.

3

Plant Growth Monitoring

Currently, plants are developing normally, averaging 16 cm in height with six pairs of leaves, indicating readiness for field transplanting. The root system is healthy, with an average root length of 17 cm. The longest roots were found in plants whose seeds were initially scarified, accelerating germination by up to 15 days.

Results and Conclusions

Germination: Despite the seed's approximate two-year shelf life, the germination rate reached 89.6%, an excellent result, yielding vigorous seedlings that ensure the establishment of healthy plants in the field. Germination proceeded normally, achieving development in the germinator within an average of 75 days before transferring to bag containers. See Annex 3

Diseases: No significant signs of diseases were observed in nursery plants. The primary issue was damping-off, attributed to high container humidity caused by frequent rains.

1

Successful Germination

The test data concludes that Excelsa coffee seeds, with the characteristics of the received batch, can produce plants with normal growth and development.

2

Healthy Root Systems

The plants' root systems exhibit favorable characteristics for establishing healthy plants in the field.

3

Minimal Disease Incidence

Foliar disease incidence is minimal. Damping-off disease showed higher incidence due to high humidity in containers, resulting from frequent rains.

Recommendations

It is vital to establish a plot with the coffee variety in the field to evaluate the following indicators over 3-5 years:

- Pest incidence and severity
- Productive yield
- Population density
- Cup quality
- Regrowth capacity after pruning
- Labor demand for harvesting

It is recommended to transplant nursery plants by December to leverage the last winter rains. If delayed, the root system could be compromised. Planting in May may lead to root bending as the plant outgrows the bag, resulting in a seemingly vigorous plant with reduced productivity potential.

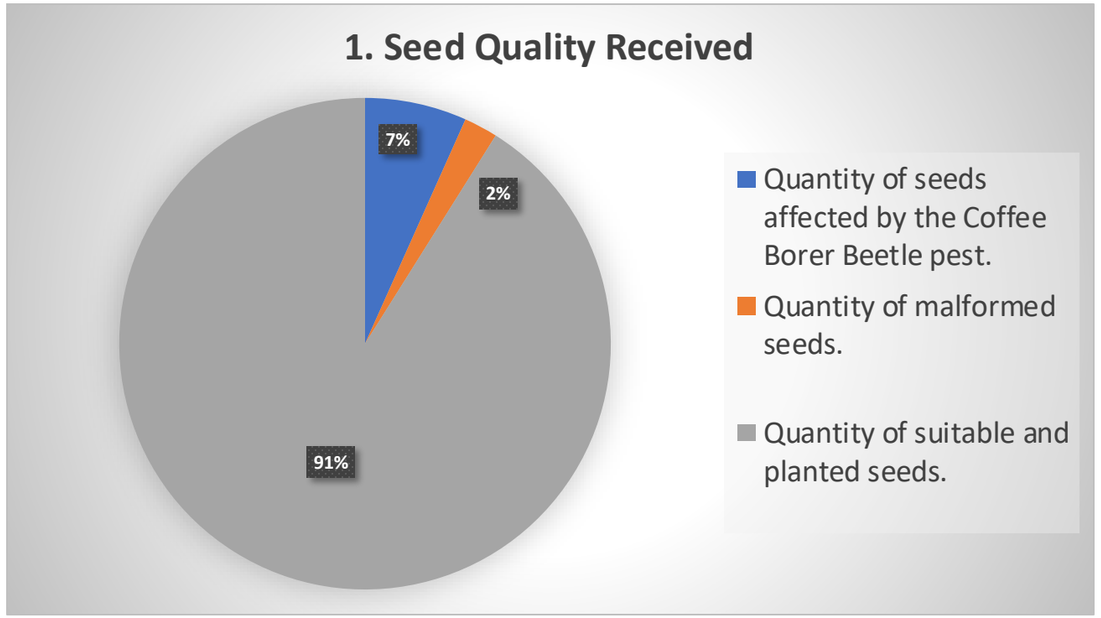
Annexes

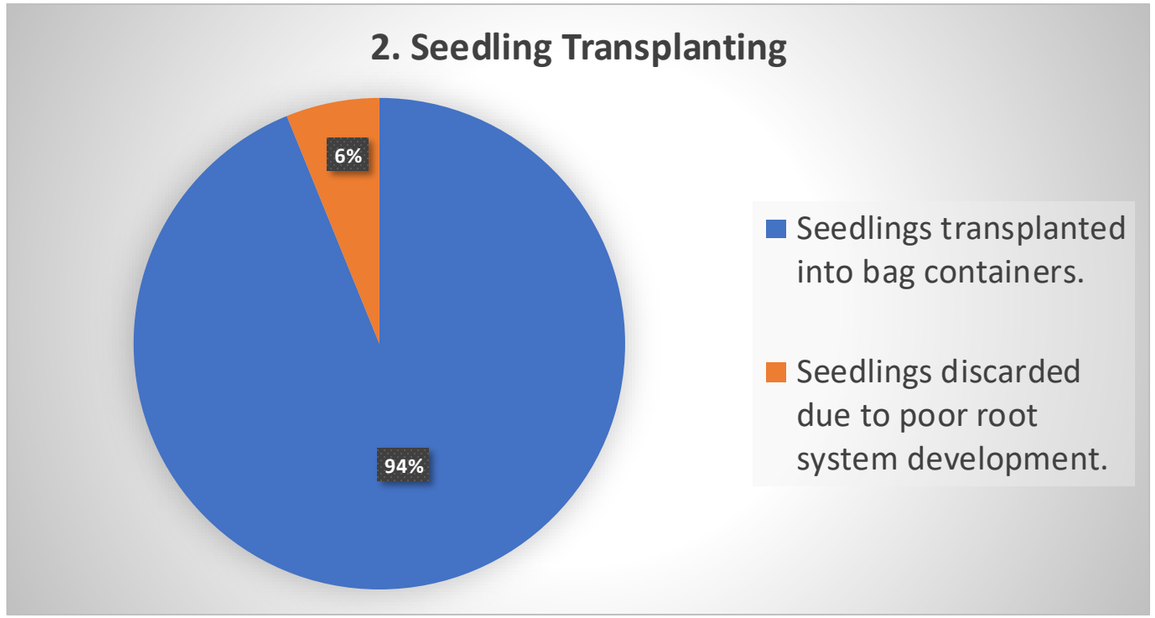
The following annexes are included in the report:

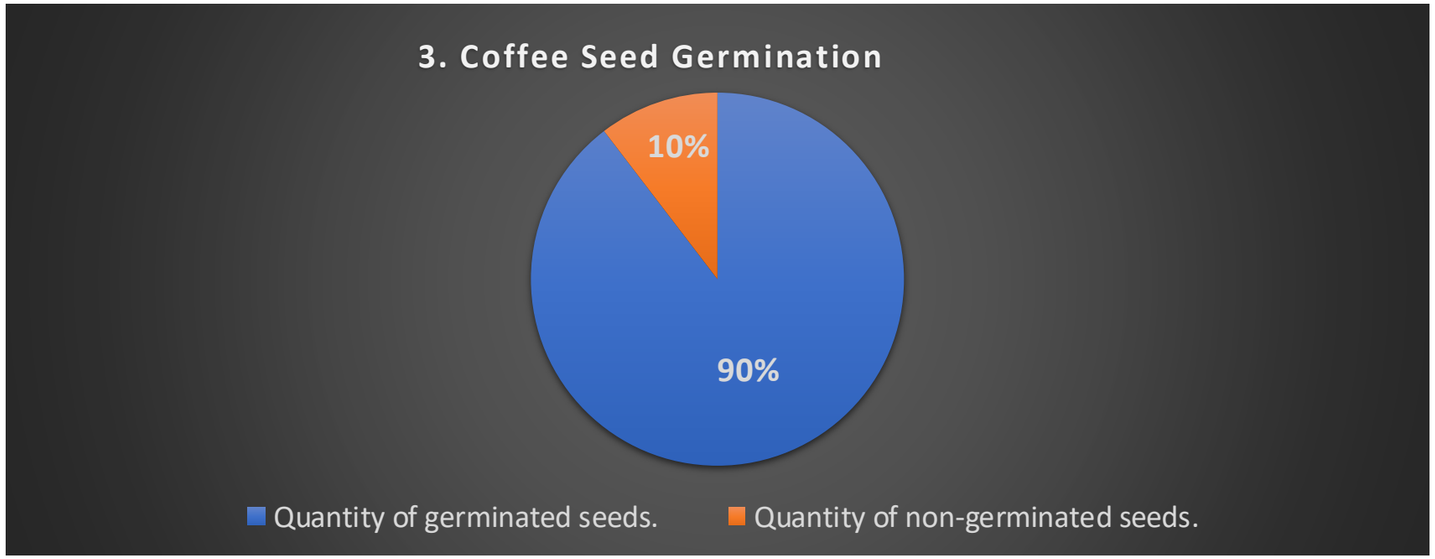
1. Seed Quality Received
2. Seedling Transplanting
3. Coffee Seed Germination

Note: It should be added that the costs of maintenance, transportation, and transplanting should be included in a new proposal, which will be shared once the exact location for transplanting is determined. Alternatively, a fixed monthly cost for nursery maintenance can be proposed, excluding transportation.

Annexes


1. Seed Quality Received
7%
2%
91%
Quantity of seeds affected by the Coffee Borer Beetle pest.
Quantity of malformed seeds.
Quantity of suitable and planted seeds.


2. Seedling Transplanting
6%
94%
Seedlings transplanted into bag containers.
Seedlings discarded due to poor root system development.


3. Coffee Seed Germination
10%
90%
Quantity of germinated seeds.
Quantity of non-germinated seeds.