Sweetlife Flora Biotech

Tissue Culture Lab Design & Capacity Plan

Commercial Houseplant Micropropagation Facility

Purpose of This Document

This document describes the design logic, functional layout, and initial production capacity of the Sweetlife Flora Biotech tissue culture laboratory. It demonstrates how capital is converted into predictable, scalable plantlet output suitable for downstream greenhouse finishing and commercialization.

The lab is designed as a manufacturing environment, not a research facility.

Design Objectives

The tissue culture lab is engineered to meet five core objectives:

1. **Commercial Throughput** – batch sizes and workflows sized for revenue production
2. **Biosecurity & Contamination Control** – risk minimization through physical separation and SOPs
3. **Repeatability** – standardized processes over bespoke experimentation
4. **Labor Efficiency** – specialized tasks mapped to trained roles
5. **Scalability** – capacity expansion without full redesign or relocation

Functional Lab Layout (Zoned Design)

The lab is organized into distinct, physically separated zones to maintain sterility and workflow efficiency:

1. **Mother Stock & Explant Preparation Zone**
   - Source plants maintained under controlled, monitored conditions
   - Dedicated preparation surfaces and tools
   - Entry point for genetic material

   Purpose:

   Maintain clean, healthy source material and minimize upstream contamination risk.

2. **Media Preparation & Sterilization Zone**
    - Media formulation and dispensing
    - Autoclave-based sterilization
    - Storage for sterile consumables

    Purpose:

    Centralize sterilization and ensure consistency across all production batches.

3. **Aseptic Transfer & Inoculation Zone**
    - Laminar flow hoods
    - Sterile workstations
    - Controlled personnel access

    Purpose:

    Primary contamination control point; optimized for precision and repeatability rather than speed alone.

4. **Multiplication & Growth Chamber Zone**
    - Multi-tier culture shelving with controlled LED lighting
    - Temperature and photoperiod control
    - Batch-labeled culture tracking

    Purpose:

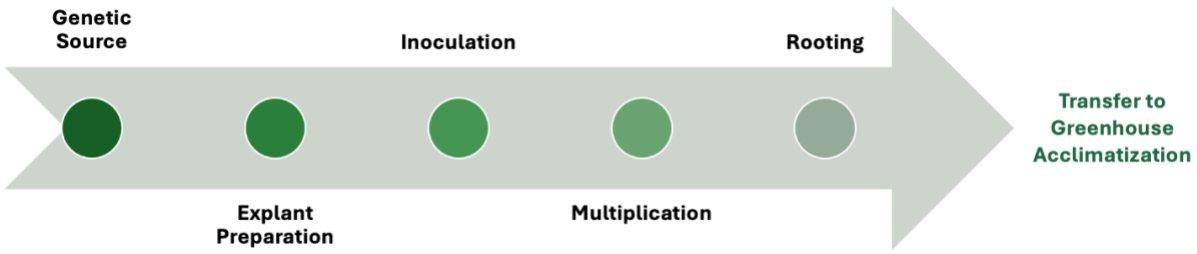
    Scale plantlet numbers efficiently while maintaining uniformity.

5. **Rooting & Pre-Acclimatization Zone**
    - Adjusted media and environmental parameters
    - Preparation for transition out of sterile conditions

    Purpose:

    Reduce shock during transfer to greenhouse acclimatization.

Production Workflow



Key characteristics:

- Linear, unidirectional flow
- No cross-backtracking of materials
- Batch-based tracking and QA checkpoints

This structure minimizes contamination risk and simplifies quality management.

Initial Capacity Assumptions (Base Case)

The lab is designed to operate on a commercial base case rather than maximum theoretical output.

Production Assumptions:

1. Production cycles: continuous, staggered batches
2. Average multiplication factor per cycle: conservative, industry-aligned
3. Loss rate assumptions: conservative, improving with SOP maturity
4. Output aligned to greenhouse finishing capacity, not speculative overproduction

Initial Annual Output (Base Case)

Tens of thousands of plantlets annually, scalable through:

- additional shelving
- extended operating shifts
- incremental staffing

The objective is sell-through alignment, not idle inventory.

(Exact numeric outputs are detailed in the **Financial Model** and **Unit Economics** documents.)

Staffing Model (Lab-Specific)

Initial lab operation is supported by:

- 1 x Lead Tissue Culture Technician / Lab Manager
- 1–2 x Propagation Technicians

Roles are functionally specialized:

- inoculation and transfer
- media prep and sterilization
- monitoring and batch tracking

This division improves efficiency and reduces error rates.

Quality Control & Biosecurity

The lab incorporates multiple, redundant contamination controls:

- physical separation of sterile and non-sterile zones
- restricted access protocols
- batch labeling and traceability
- routine monitoring and discard protocols
- SOP-driven corrective actions

Loss rates are actively managed and decline as production stabilizes.

Scalability & Expansion Pathway

The lab is intentionally modular:

- shelving density can be increased
- lighting intensity adjusted by species
- staffing scaled linearly with throughput
- additional zones can be replicated without redesign

This enables:

- incremental capacity growth
- rapid response to demand
- future replication at additional sites

Strategic Value to the Platform

The tissue culture lab provides:

- control over genetics and availability
- predictable upstream supply for finishing
- reduced dependency on imports and third parties
- data-driven production planning

It is the engine of the Sweetlife Flora Biotech platform.

Investor Takeaway

This lab is not designed to prove that tissue culture works.

That is already established science.

It is designed to apply that science commercially, at the right scale, with the right controls, to serve a market that currently lacks domestic supply.