Regenerate & Preserve

Segra
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Ensure the continuity of your business, no matter what, by guaranteeing your valuable cultivars are protected and available whenever you need them.

What is "Regenerate & Preserve"?

- "Regeneration" is the process of pathogen remediation, and "Preservation" involves the ongoing storage of clean-stock material.
- Segra's proprietary cultivar regeneration process remediates pathogens and restores vigor, then securely stores your clean specimens.
- Once the process is complete, regenerated plantlets are ready for your exclusive use for future plantlet production, research, and breeding projects.
- Successful initiation into tissue culture takes between 6 and 12 months, cultivar dependent, after which cultivars can be preserved and maintained in our laboratory.

Why is it so important?

Clonal plants through traditional vegetative propagation naturally see diminished performance over time due to inevitable pathogenic contamination that may include intracellular bacteria, fungi, viruses and viroids. This problem is nothing new in agriculture and horticulture industries. Most established clonal crop industries, from strawberries to bamboo, have evolved to utilize plant tissue culture technologies to manage ongoing pathogen risks. This is critical to indefinitely maintaining high-value cultivars for production and breeding purposes.

The Regenerate and Preserve Process:

1 Quality Assurance

PATHOGEN SCREENING
Our best-in-class quality assurance practices ensure there are no pathogens detected before plantlets are shipped to your facility. Utilizing in-house and third-party tests, Segra currently screens for a broad panel of known cannabis plant pathogens, including Hop Latent Viroid (HLVd), Hop Stunt Viroid, Tomato Bushy Stunt Virus, Beet Curly Top Virus, *Botrytis cinerea*, *Phytopthora infestans*, *Sclerotinia sclerotiorum*, *Fusarium oxysporum*.

DNA FINGERPRINTING
Our DNA Fingerprinting technology allows for extensive internal auditing of plant batches to minimize any risks of cultivars getting mixed up in production. Every cultivar submitted to Segra is fingerprinted upon arrival and assigned a unique "Variety Identification Code" to identify the specific cultivar. Additionally, every order shipped from our facilities is fingerprinted to ensure the correct cultivar is provided to the client every time.

2 Regenerate

Segra implements two specific tissue culture methods concurrently with every cultivar regeneration project.

APICAL MERISTEM PROPAGATION
True apical meristems are extracted from a mother plant. This process offers the highest probability of pathogen remediation, as the true apical meristem is essentially "floating" and is not attached to the plant's vascular system. This means that plantlets regenerated from meristem is insulated from pathogen contamination, including viruses and viroids. This process takes from 9–12 months, depending on the cultivar.

SHOOT TIP PROPAGATION
Conducted in parallel to Apical Meristem propagation. In this process, explants about one centimetre long are collected from mother stock plants and remediated using various chemical treatments. In many cases, this process can be completed in as few as six months and, assuming the batch passes all pathogen screening, can offer a "fast track" to returning clean-stock material to the grower. However, this material would never be used for long-term stock development and maintenance as it does not offer the same quality guarantee as the meristematic process.

3 Preserve

Segra's preservation services allow for the preservation of cultivars in our secure laboratory environment indefinitely. Off-site storage provides the grower with ultimate peace of mind that clean-stock material can be called into production at any time. Segra maintains a minimum of 50 aseptic "shootlets" for any cultivar in this program. Access is provided to Segra's online dashboard containing real-time updates on your R&P cultivars.

4 Re-initiation

Some cultivars may experience somaclonal variation in the tissue culture process. This occurs when slight mutations happen under the *in vitro* environment. If somaclonal variation is detected, the grower has the option for Segra to re-initiate the cultivar. This process involves growing a vegitative plant from a tissue culture plantlet and repeating the initiation process.

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What is "Verified Segra Stock™"?

IDENTITY GUARANTEED

Every cultivar is DNA fingerprinted and assigned a unique identification code. This code helps to confirm cultivar identity across the supply chain and inform decision-making for plant breeding.


CERTIFICATE OF GENETIC IDENTITY

IN RECOGNITION OF THE
GENETIC FINGERPRINT ANALYSIS OF THE PLANT DNA SAMPLE
RECEIVED ON November 22, 2019

THIS CERTIFICATE OF GENETIC IDENTITY CONFIRMS
THAT THE CULTIVAR DEFINED BY THE ASSET HOLDER AS
OGS1-B
IS ASSIGNED A VARIETY IDENTITY CODE (VIC)
daa5a157ae7640e20d41f9343ece5812
THIS January 8, 2020

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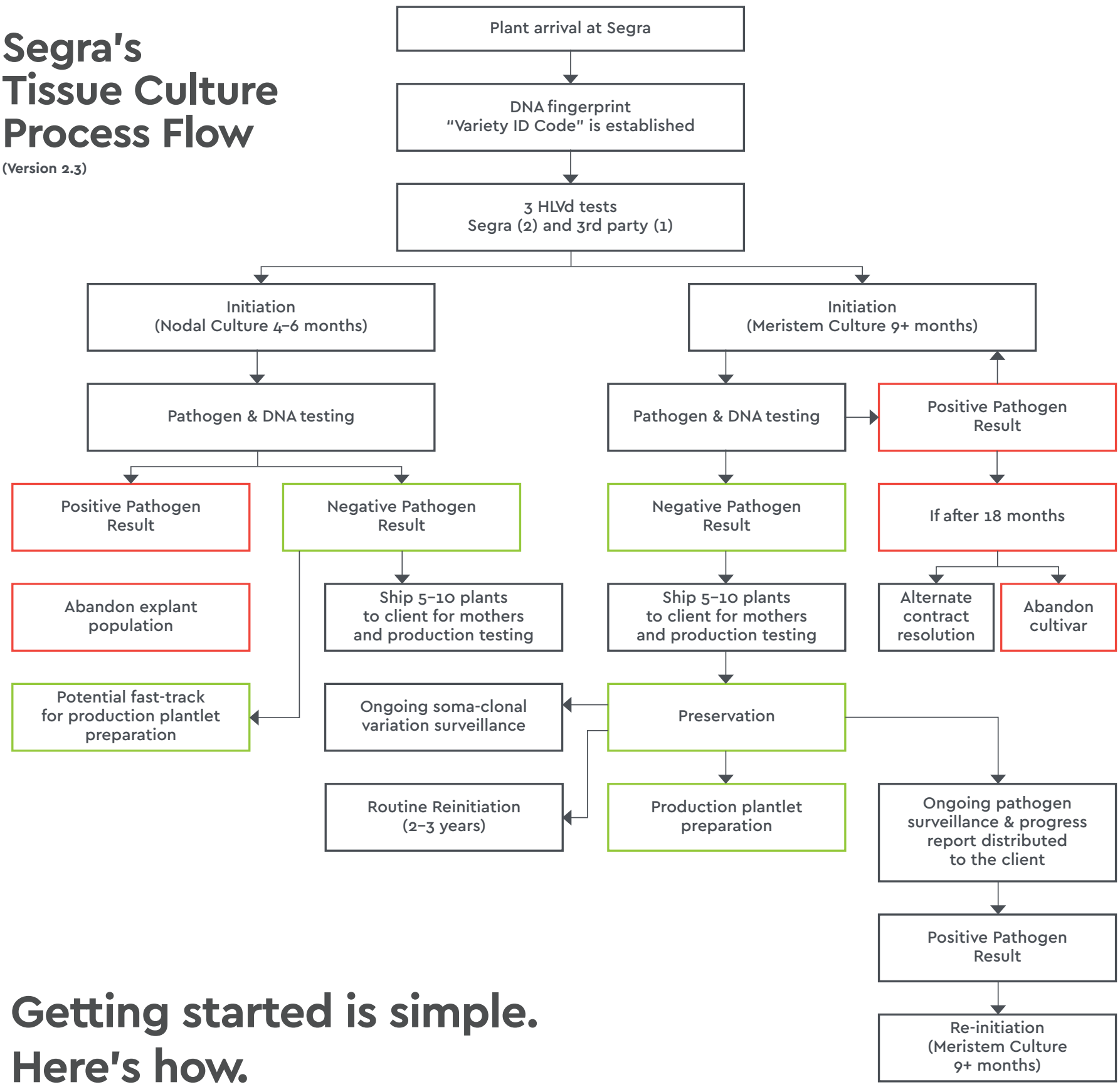
PATHOGEN TESTING

Segra's quality control systems feature best in class pathogen detection for an ever-expanding panel of known Cannabis viruses, viroids, and diseases leveraging both internal and external lab testing. The current in-house Segra pathogen panel includes:

- Hop Latent Viroid
- Beet Curly Top Virus
- Hop Stunt Viroid
- Tomato Bushy Stunt Virus
- *Botrytis cinerea*
- *Phytopthora infestans*
- *Sclerotinia sclerotiorum*
- *Fusarium oxysporum*

Segra's Tissue Culture Process Flow

(Version 2.3)



Getting started is simple. Here's how.

Stay ahead of wide-spread pathogen contamination and always have **Verified Segra Stock™** backup stock ready to go when you need it most.

- If you have a 2–3-month-old vegetative plant, Segra can accept it to get the process started.
- The process of regenerating your prized cultivars can take anywhere from 6–12 months.

If you're looking to reinvigorate core production cultivars and safely store your valuable IP, reach out to info@segra-intl.com for more information on how to get started.

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