

# Seed, clone, or tissue culture propagation: which is best?



The cannabis industry uses three means of propagation: seed, clone, and tissue culture propagation. **Thomas Walker** examines the pros and cons of all three.

**M**ost commercial medicinal cannabis operations use seed from a licensed supplier. These suppliers provide traceability for their products, a requirement for compliance in a medicinal cannabis market. A particular genotype (strain) is chosen for production by either the off-taker or licence holder.

## SEEDS

To start with, I always suggest a minimum of 50 seeds from each selected genotype. The more seeds of each genotype used, the better the chance of finding one that can produce consistent, high-quality yields and has excellent pest and pathogen resistance.

After a keeper phenotype has been selected, there is no need for more seeds. Mother plants are raised from the keepers and cloned for scaled production.

My suggestion is not to use plants propagated directly from seed for scaled production. This is due to the differences or phenotypes exhibited by seeds from the same genotype.

### • Pros

Production plants derived from seed can exhibit hybrid vigour, which is the increase of characteristics such as growth rates, fertility, size, and yield.

### • Cons

Phenotype variances in any particular genotype will result in varying requirements of nutrition and fertigation frequency.

Also, the time taken to propagate from seed severely restricts the attainable amount of harvest cycles per year.

## CLONES

Most commercial cannabis producers choose cloning. This is due to the

low capital expenditure, ease of use, and speed at which clones can be produced. Clones can also be sourced from external producers.

Cuts from a donor or mother plant are dipped into a cloning gel or powder, which forces the plant to produce roots while in a high-humidity clone dome.

Clones are hardened off for a maximum of one week; they are then ready to be moved to the vegetation area.

Cloning usually takes between seven and 14 days, depending on the genotype.

## THE TIME TAKEN TO PROPAGATE USING TISSUE CULTURE CAN BE PROHIBITIVE

### • Pros

It requires low capital expenditure; has a fast turnaround time; the result is an exact genetic replica of the mother plant, which facilitates homologous and consistent production; and it has a very small footprint in the cultivation facility.

### • Cons

Pathogens and pests can easily be transferred from mother to clone.

## TISSUE CULTURE

Plant tissue culture is a collection of techniques used to grow or store plant tissue, cells or organs in sterile conditions.

Tissue culture allows for the replication of much smaller pieces of living tissue. It is used to increase germination rates for older seeds, gives better results from varieties that are difficult to clone, and is extremely useful for eliminating pests and pathogens from existing genetics.

Sterilisation and creation of aseptic conditions are key in tissue culture, because any micro-organisms, pathogens or bacteria will proliferate if these steps are not taken before starting the culture.

For this reason, tissue culture is the most expensive of the three methods of propagation to set up and requires a high degree of knowledge and operational experience.

The drawback of tissue culture is that it takes months to propagate from plant cells, and if your aim is to clean an existing library, it can take up to a year.

### • Pros

It is possible to propagate genotypes that are difficult to clone via traditional means; it eliminates pests and pathogens from existing genetics; and propagation can be achieved using only a small piece of the plant.

### • Cons

The time taken to propagate using tissue culture can be prohibitive.

## SUMMARY

Phenotyping of genetics can only be accomplished by propagating via seed, but once a keeper phenotype has been found, it does not make sense to further propagate via seed.

Cloning is the most cost-effective and efficient means of propagation once mother stock has been established.

Tissue culture is the only choice for cleaning up and storing genetics.

Each propagation method has its place, but a combination of all three will ensure a strong start in growing plants free of viruses and pathogens.

*Thomas Walker is the founder of Walker Cultivation, a consulting firm specialising in commercial cannabis production.*

*Email him at [thomas@walkercultivation.com](mailto:thomas@walkercultivation.com). Subject line: Cannabis post. **FW***