Propagation of *Cannabis sativa* for Commercial Production

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IPPS
Sharing Plant Production Knowledge Globally

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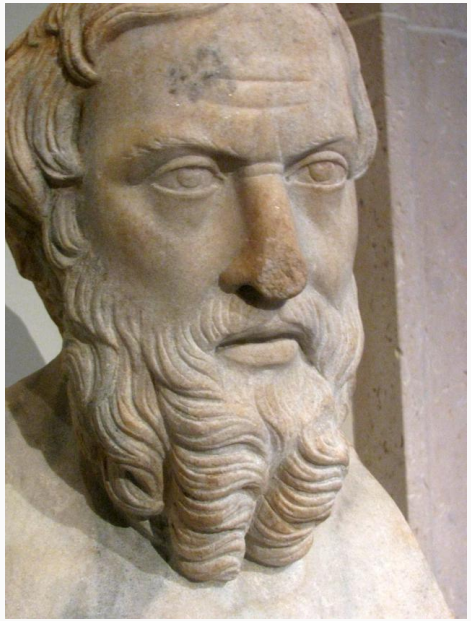
History of *Cannabis*

Cannabis has been an important crop throughout history, primarily due to the varied uses in industries that include, agricultural, chemical, and oil industries. Cannabis is native to most temperate parts of the world, and therefore use of cannabis has been observed worldwide.

History of *Cannabis*

Cannabis use has been dated back to 440 B.C. and the oldest written record of the plant is mentioned by Greek historian Herodotus. In 1545, the Spanish imported cannabis for fiber production, eventually finding its way to North America.



Botanical Description

The cannabis plant is a semi-herbaceous annual, dioecious flowering herb that includes three subspecies: *C. sativa*, *C. indica*, and *C. ruderalis*. There is a high emphasis, and importance on sex of the plant, depending on crop usage.

Botanical Description

Mature plant size can range in size from .6 to 1.8 m (2 to 6 ft). The leaves are compound and decussate-opposite with leaves having 3 to 7 leaflets, a serrate leaf margin, and glabrous or pubescent leaf surface. Mature plants develop a woody stem, flower, and then senesce.

Propagation Methods

Propagation methods for *C. sativa* include both sexual and asexual propagation methods, two of which will be discussed in detail.

Three primary propagation methods exist:

- Clonal propagation of leafy cuttings in sterile media
- Rooting of leafy cuttings using an aeroponic machine
- Seed germination

Seed Method

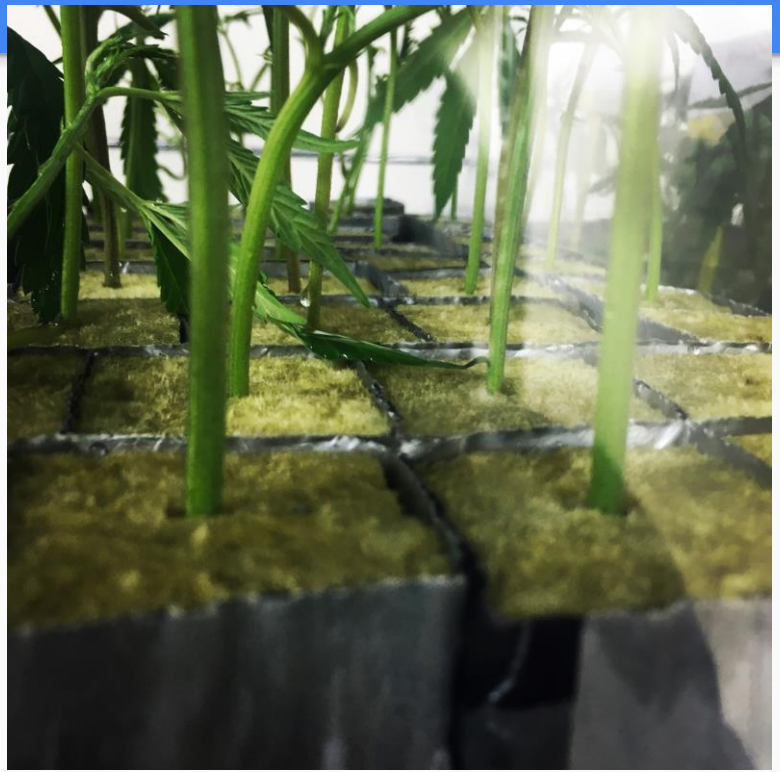
C. sativa seeds typically are obtained from hybrids of parent cultivars that come from near isogenic lines (NILs), therefore the offspring are variable. Propagation via seed does not ensure the sex of seedlings. The seed method also requires the use of viable seeds.

Seed Method

Commercial use of seed propagation in the medical marijuana industry is not viable, and is time consuming. However, for hemp production, the seed method is the most economical and viable. It should be noted that, depending on crop usage, due to the dioecious character of cannabis, sex of the plant is an important factor to consider.

Clonal Propagation using Leafy Cuttings

The most common propagation method is clonal propagation using leafy cuttings. Stock plants, affectionately known as “mother plants,” are used to supply the plant material in a commercial operation. Use of sterile media (rockwool or peat pellets) is required.



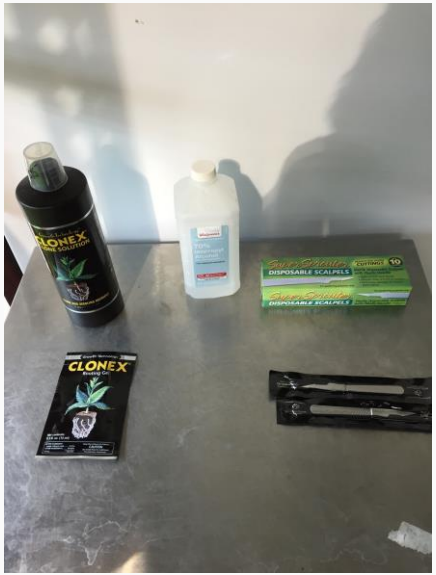
Clonal Propagation using Leafy Cuttings

Mother plants are allowed to produce several lateral shoots. Once sufficient shoots have developed, they are removed.

Clonal Propagation using Leafy Cuttings

Equipment that is typically required includes, but is not limited to:

- Scalpel
- Auxin gel
- Plant material
- Liquid auxin
- Water at pH 5.5
- Rooting medium



Clonal Propagation using Leafy Cuttings

Leafy cuttings are dipped into auxin gel formulation (Clonex™ gel) and placed in sterile medium (rockwool or peat moss pellets), and then misted regularly until roots develop (in about 7-14 days). Cuttings are typically placed in a humidity dome, or “mini greenhouse.”

Clonal Propagation using Leafy Cuttings

Clonal propagation via leafy cutting shows to have the higher rooting success, and produces healthy and disease-free plants with little to no transplant shock.

Aeroponic Cloning Method

The aeroponic method ensures vigorous and disease-free root growth, but is not the best method for producing vegetatively healthy plants. However, commercial aeroponic cloning has been around since the late 1960s. The first aeroponic cloning machine was developed in 1983, and was called the Genesis Machine, and variations of the machine continue to be used today.

Aeroponic Cloning Method

A rooting water temperature of 18 to 25˚C (65 to 77 ˚F) is required for successful rooting. Intermittent misting of cuttings 3 to 4 times daily during first 3 days aids in maintaining turgidity and reduces wilting damage. The use of liquid auxin (IBA) at a concentration of 100 ppm in the rooting solution is crucial to rooting success.

Aeroponic Cloning Method

The aeroponic cloning method has its downsides as well:

- Labor intensive
- Sensitive to pH and EC fluctuations
- Susceptible to power and pump failure
- Higher overall start-up and operating costs

Conclusions

All of the methods discussed are considerably behind when compared to the rest of the horticulture industry. However, these appear to be the methods that most cannabis growers are comfortable and familiar with. Every method discussed is viable in its own way. In my personal opinion, propagation via leafy cuttings in sterile media is the best.

Special Thanks

Special thanks goes out...

- @Hip2theCrop
- @Big.beans

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