TERRAMOR TECHNOLOGIES
PRECISION LAB TESTING

Hop Latent Viroid in Cannabis Plants ~ HLVd

Cannabis is a well known plant that includes both Hemp and Marijuana. They each have many known and accepted medical purposes. They are now allowed to be grown in many states for both medical and recreational uses. The more knowledge we have of the Cannabis plant, the more important it is to understand it's health. This is a brief introduction to Hop Latent Viroid or HLVd .

HLVd is a virus that slowly and gradually reduces the quality of flowers produced by the plant. It is similar to a viral flu that attacks the human body, hampering its physical and mental performance until treated. The viroid (HLVd) itself, is based on a single strand of circular, infectious RNA that multiply instantly depending on the metabolism of the host plant. It's name comes from Hop Latent Viroid , but Cannabis is Hop's close relative and the virus can easily infect both types of plants. Whether you are growing Cannabis for recreational purposes or medical benefits, a plant with reduced quality and quantity of flowers can be both costly and disappointing.

How does is affect the Plant ?

The affect of HLVd is called dudding. This is a cumulative name given to a range of symptoms observed in the cannabis plant which can often include :

- Stunting
- Brittle Stem
- Reduction in yield
- Reduced Trichomes and Oil Production
- Reduced Flower Mass
- Reduced potency
- Morphology changes
- Loss of vigor

Many researchers claim that the virus has already spread far and wide yet due to the unique nature of the pathogen, many growers of the cannabis plant are unaware of the deadly virus appearing in their plants.

One interesting insight from researchers is the fact that many plants can also be asymptomatic, showing no symptoms yet gradually succumbing to the virus, resulting in reduced yield and potency. The name of the virus suggests its ability to remain latent and hidden from the naked eye. The plant won't curl or display yellow leaves. In other cases, it might remain dormant for an extended period of time until it shows symptoms. This also hinders any preventive measures that can be taken on the first sight of the

virus since the damage has already been done. Even the most experienced growers struggle to find HLVd in their plants due to it's nature and lack of warning signs.

If left untreated, the virus can gradually and severely harm the plant's potency and yield. The financial impact is also evident as many crops can be rendered sub potent or not worthy of production.

The cannabinoid content within the plant also reduces due to the HLVd infection. It isn't deadly enough to kill your plant entirely, but it certainly damages it to the point of removal from any growing areas.

There are some viruses that are contagious and can easily spread through contact. The fact that this virus remains hidden, showing few or no symptoms whatsoever, ensures that it can easily spread throughout the plant and others. Clones propagated from a mother plant that have been infected can easily stem clonal dudding.

Without testing, the virus can go undetected and can subsequently attack the entire crop gradually. If the virus is never fully eradicated, the clones have an even lower chance of rooting success. Even if they root well, during the growth phase the plant may get highly infected with the virus through an environmental stressor such as heat, wind or high humidity.

How Does it Spread ?

Research regarding exactly how the virus spreads is still in ongoing but existing literature and studies show us that the virus can easily spread through contact. This can include mechanical transmission which implies that even while using tools that have previously been in contact with an infected plant, can transfer the virus to the healthy plant, wherever used next. This method has also been recognized as one of the most efficient methods of transmission. You should always sterilize your pruning tools before working on each individual plant. Transmission can also take place through the seeds of the plant yet research can not claim any statements regarding the rate with which it spreads in those seed samples.

How to Prevent HLVd

There are methods that can help you effectively prevent the virus.

The following tips can be used as a check list,

- Sanitize all of your tools prior to propagation
- Use a diluted bleach solution instead of alcohol. 10% Bleach is the accepted amount
- Consider quarantining and carefully inspecting any new varieties you receive before adding them to the rest of your plant stock
- Use fresh gloves each time you handle a new plant and sterilize tools often
- Screen mother plants with qPCR or RPA tests
- Screen incoming clones with qPCR or RPA assays

How to Treat it ?

Despite conscientious effort, your plant may get infected with the virus. Since, HLVd has the ability to remain hidden, implying that the plants would not show any signs of infection, it is necessary to carry out routine screening tests. These tests have been claimed as the fastest way of detecting the viroid. In case a plant is infected, it should immediately be removed from the grow room or area, to avoid any unnecessary transmission through contact. Even other plants kept nearby should be quarantined and tested, incase if the viroid had already been transmitted to the other plants.

On the other hand, it the entire proprietary strain or the entire mother block of the grow area is found to be infected, then the only method to remove the virus from the plants is

through tissue culture. The entire process helps in eradicating only the particular strain infected by the virus, leaving the plant healthy and growing. Since the process itself is a long and laborious process, it should only be limited to experienced cultivators.

Testing with PCR vs. RPA

Polymerase Chain Reaction (PCR) methods offer high sensitivity and specificity but require expensive technology. Recombinase Polymerase Amplification (RPA) methods are efficient isothermal methods that eliminates the need for a thermal cycler and has a high deployment potential to resource-limited settings.

Cannabis can be used for both recreational and medicinal purposes which makes it more important to be prone towards a routine testing. HLVd is a latent and asymptomatic infection that may harm humans upon consumption. No matter what the purpose is behind your cultivation of cannabis plants, each plant may be prone to the virus and requires screening to detect it effectively.