

Is Powdery Mildew Systemic?

Little divides growers more than powdery mildew (PM), one of marijuana's most notorious pathogens. Some believe PM is a systemic pathogen that permeates the plant's vascular system. Others say it's a superficial pest that spreads across the plant's surface. The results of tests conducted by Medicinal Genomics (US) indicate that is unclear whether PM is systemic. Here's what we do know.

The PM that infects cannabis is a novel organism

The PM species that infects cannabis is different to the one that infects plants like tomatoes or cucumbers. Genetically-sequenced infected cannabis plants from the US and Canada were studied and it was found that their DNA didn't match any known PM sequences. There is also the possibility that is more than one PM species infecting cannabis, but samples from Europe and Asia are needed to sort that out. There is no published research into how this novel PM organism infects cannabis. We can only look at studies on how other PM species infect other plants for clues. But until similar studies are conducted on cannabis, we can't be sure how the pathogen behaves.

Powdery mildew can create an invisible network before spores are visible

PM is an obligate biotroph, (cannot survive without taking nutrients from a host). A 2012 study showed how the *Golovinomyces orontii* species of PM does just that. After dyeing an infected leaf, researchers noted that spores penetrate the leaf and cell wall with a taproot called an haustorium, also its primary feeding mechanism. The pathogen then forms secondary taproots into nearby cells, creating a mycelium network over several days before producing the dreaded white powder. Yes, *Golovinomyces orontii* is not the same organism that infects cannabis. But, tests on a 4mm leaf punch detected the unique DNA signature of the PM species that infects cannabis. PM detection assays (an analysis of a substance) can even detect PM DNA from cannabis leaves that show no visual signs. Likely, we are detecting the DNA from the mycelium network that the pathogen creates before sporulation. This early detection is useful; growers can quarantine infected plants so they do not further infect the grow room.

Powdery Mildew can be detected elsewhere in an infected plant

If PM penetrates the plant, does it get into the plant's vasculature and infect other parts of the plant? No published literature supports that - it is probable that the mycelium network is made externally. However, four samples were taken from visually clean leaves off a plant that had visual PM elsewhere on it. Of those four, three tested positive. Now, this isn't proof that PM can travel through the plant's vascular system. Maybe the other parts of the plant were infected at a different time. It may also be that PM DNA gets into the plant's bloodstream when the haustorium penetrates it.

Cannabis can be bred for powdery mildew resistance

PM does not affect all cannabis strains equally. Some cannabis strains are resistant, others are susceptible to PM. We also know that some hops variants are resistant (marijuana and hops are related). Either way, PM resistance can be selected. Using early detection technology, like a PM assay, growers can screen plants for infection before visual signs are present. By continuing to screen, and selecting against plants that test positive, breeders will improve their resistance.

Conclusions

As with most pathogens, the best defense is prevention: strict environmental controls, periodic screenings of grow rooms, and screening of incoming clones.

Greenthumb Hydroponics recommends using Eco-Lyte to treat or prevent PM: <https://gthydro.co.za/products/1467-eco-lyte-2l-anolyte-ntl-sanitizer.html>