

Hop Quarantine Important for Hop Powdery Mildew Control

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With spring field activities here, a reminder on important quarantine rules is especially timely as growers plan for future expansion, source planting materials, and move forward.

Over the past several years, the hop commissions in Washington, Oregon, and Idaho have worked together and with their departments of agriculture to strengthen quarantine rules in an intelligent way that ensures consistency amongst state regulations. The quarantine rules allow for distribution of hop plants and planting materials within Washington, Oregon, and Idaho. ***Import of these materials from outside the Pacific Northwest is prohibited, with the exception of kiln dried cones.*** The rules are science-based and grounded in protecting the industry against novel strains of the powdery mildew fungus that do not exist in the Pacific Northwest, but are widely distributed outside of the region.

Powdery mildew has been present on hops in the Northwestern U.S. for nearly two decades now, so why are quarantine measures still needed?

A little background on the disease biology is helpful to understand the rationale and science behind the quarantine rules.

The fungus that causes hop powdery mildew exists in two forms called mating types, somewhat like male and female forms. Recent research documented that only one of the two mating types of the fungus are present in the Pacific Northwest, but both mating types are widely distributed in all other areas where the disease is known to occur. Therefore, if hop materials or rhizomes are imported and have powdery mildew—a common problem in greenhouses and nurseries—the plants likely will harbor both mating types of the fungus. This fine point in the pathogen biology could have massive implications for disease management. Because just one mating type of the fungus occurs here at present, we only find the pathogen surviving the winter on live hop plants, in only a handful of yards, and only at a very low level. At present, growers can nearly or entirely eliminate powdery mildew from yards in spring with their pruning practices, greatly limiting the extent and severity of later disease outbreaks. When both mating types are present, however, overwintering mildew becomes impossible to eliminate with cultural practices alone and early season disease outbreaks become more widespread. With only one mating type, infested crop debris isn't a concern for powdery mildew. With both mating types present, shattered cones and infested crop debris from the previous season becomes a new source of mildew in spring, and the disease cycle is kicked off in *every yard that had mildew the previous year* and not just those few yards with flag shoots. The potential impact is earlier, more widespread, and in general more severe disease outbreaks.

Individual growers and the industry as a whole have compelling motivation to adhere to quarantine rules. An outstanding resource for foundation plant materials free of the most serious disease threats

to profitability is the National Clean Plant Network for Hops at WSU-Prosser (healthyplants.wsu.edu/hop-program-at-cpcnw/).

Even in the absence of powdery mildew, planting high quality root stock pays. The data is overwhelming that certain viruses and viroids dramatically reduce yield, alpha, and can negatively impact brewing quality. Lethal strains of the Verticillium wilt pathogen also occur outside the region and if introduced could eliminate production of certain susceptible varieties in the U.S. Sourcing planting material derived from the National Clean Plant Network ensures that growers won't introduce yet another new disease threat onto their farm or to our industry.



Powdery mildew and its pigmented cleistothecia on a hop a leaf. Cleistothecia allow the powdery mildew fungus to survive on infested leaves, cones, and other crop debris remaining in the field. At present, cleistothecia are absent from the Pacific Northwest. *Photo courtesy of Doug Whitener.*