NEW REGISTRATION FOR THE BIOCONTROL PLANTSHIELD HC
AGAINST HYPHODERMA GUMMOSIS OF CITRUS*

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PlantShield HC by BioWorks, Inc. received a Special Local Need registration in California for management of Hyphoderma gummosis of citrus. The Section 24C was issued in July 2008. The active ingredient is a patented fungus, *Trichoderma harzianum* strain T-22, that protects plants from many plant pathogens. The product PlantShield HC is sold in California as a biological soil amendment for nursery and ornamental crops and now the label has been expanded to allow foliar and branch treatments of citrus trees in production. Specifically, the label allows the biological control material to be a treatment of wood-exposing wounds of citrus in California.

The pathogen *Hyphoderma sambuci* causes the disease Hyphoderma gummosis of citrus trees. Hyphoderma gummosis has only recently been described causing disease on lemons and potentially other citrus crops in California. Symptoms include yellowing of leaves, branch cankers and dieback of entire scaffold branches, as well as eventual tree death. The organism is a wood decay fungus that belongs to the Basidiomycota and enters woody plants through wood-exposing wounds. Air-borne basidiospores are actively released from fruiting bodies, deposited on pruning wounds or other injuries, and germinate in wet environments. The colorless, thin-walled spores are not long-lived, however, once the fungus is established in the wood of the tree, the organism can persist for years producing numerous annual fruiting bodies (and more spores!). Although research has been conducted on the use of wound-protecting fungicides against wood decaying fungi, fungicides are not systemic in wood and only provide a superficial barrier that can be breached by the fungus. As the wounds heal, drying occurs and subsequent cracks in the wound expose untreated areas.

In our research, treatments with this biological control PlantShield HC were very successful in protecting wood-exposing wounds from the wood decay pathogen *H. sambuci* due to its ability to colonize host tissue and allow for natural wound healing and preventing invasion by the pathogen. Thus, the biological control organism provides protection by excluding the pathogen as a primary colonizer. *Trichoderma* species are also known mycoparasites. Thus, these species can parasitize other fungi. Thus, parasitism is an additional mechanism of plant protection.

Currently, Plant Shield HC is an EPA-registered and OMRI-approved organic product for use on selected crops in the United States including California. The new use of the biological control is for protecting tree wounds where wood is exposed. The Section 24C label is for most citrus-producing counties in California including: Fresno, Imperial, Kern, Kings, Madera, Riverside, San Bernardino, San Diego, Stanislaus, Tulare, and Ventura. The treatment is applied with a non-air-assisted (high-volume) sprayer or hand application with a paint brush following pruning or other wood exposing injuries. Pruning wounds and other wood exposing injuries should be treated as soon as possible after pruning or within 4 to 5 days (application should be done at temperatures above 48F). A total of one to two applications can be made to wood-exposing injuries. There are no restrictive entry interval (REI) requirements. PlantShield HC should not be applied within 30 days of harvest of lemons. For specific directions on usage and disposal follow the current label.

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