

Chrysanthemum White Rust

Puccinia horiana

EPMS 008

Quick Facts

- Chrysanthemum white rust is caused by a microcyclic rust fungus (*Puccinia horiana*). Microcyclic rusts do not need an alternate host to complete their life cycle.
- Chrysanthemum white rust is a federally quarantined pest.
- In areas where chrysanthemum white rust has been found, eradication efforts are employed.
- Infection incidence of chrysanthemum white rust has been increasing since 1990.
- Humidity levels at 80% or lower can kill the fungal teliospores in less than 5 minutes.

plants and the quarantine issues related to transportation of plant material from an infected greenhouse are the basis for classifying this disease as an exotic pest. Also, in the cases where this disease has been found, expensive eradication efforts and protective fungicide sprays are commonplace.

Symptoms:

Chrysanthemum white rust infections appear initially as small light green to yellow spots on the upper leaf surfaces (Figure 1) and beige to pink rust pustules are present on the underside of the leaf. The pustules become white over time (Figure 2) followed by necrosis and abscission of diseased tissue. Although the symptoms are most evident on leaf tissue, all above ground tissue is susceptible to infection including: leaf, stem, and inflorescence. Chrysanthemum cultivars that appear to be resistant or tolerant of white rust are Albert Heijn (Royal and White), Finmark, Freedom, Hawaii, Helsinki, Kes, Majesty, Paso Doble, Statesman, Tiger, Tiggerrag, and Westland (Winter and Yellow).



Photograph Courtesy: Joshi Vippen, P. Ag
Figure 1. Light green infections spots on upper leaf surface of an infected chrysanthemum.

Chrysanthemum white rust is a federally quarantined disease that is increasing in incidence within the United States. Since the early 1990s, chrysanthemum white rust has been found in some chrysanthemum greenhouse operations in the Pacific Northwest. This rust only infects chrysanthemums and has the potential to result in 100% loss in an infected greenhouse. The devastating loss of all chrysanthemum



Photograph Courtesy: Joshi Vippen, P. Ag
Figure 2. Close up photograph of beige rust pustules on the underside of an infected chrysanthemum leaf.

Causal Agent:

Chrysanthemum white rust is caused by the microcyclic rust fungus, *Puccinia horiana*. High humidity, free water and moderate temperatures favor this rust. Rust fungi are grouped into two broad classes, macrocyclic and microcyclic. Macrocyclic rust fungi require two host plants to complete their lifecycle; therefore, in the absence of one of the host plants, infections will not occur. Microcyclic rust fungi may infect more than a single type of host plant, but they can complete their lifecycle on a single host. The basidiospores of *Puccinia horiana* infect leaves of chrysanthemum. And after a few weeks produce the characteristic symptoms including the rust pustules. The pustules mature and erupt through the leaf tissue surface producing teliospores. Teliospores do not infect anything but germinate to produce basidia, a club shaped structure. Basidiospores are produced on the basidia and subsequently released to infect new chrysanthemum tissue. Basidiospores are microscopic and able to remain viable for short periods of time in the absence of a suitable host. The ability of the basidiospores to survive in the absence of a host results in difficulty eradicating the disease

once it has entered a greenhouse or growing operation.

Control:

Due to the quarantine issues and plant loss because of infection, it is best to obtain clean non-infected plant material from a reliable source that includes testing for white rust in their standard disease testing procedures. Additionally, growing those cultivars that are listed as resistant or tolerant will decrease potential infections and total loss of chrysanthemum inventory in the event that chrysanthemum white rust is introduced to a growing operation.

In the event of introduction of infected plants, prompt removal and destruction of infected plants and fallen leaves is essential. Reducing humidity and overhead irrigation and increasing plant spacing to encourage airflow will reduce new infections. Also, avoid recycling soil or planting susceptible plants in the same soil within 8 weeks.

Chemical Controls:

1. Banner MAXX at 8 to 12 oz/100gal water may help. 24-hr REI.
2. Contrast (70 WSP) at 3 to 6 oz/100gal water. 12-hr REI.
3. Daconil Weather Stik at 1.4 pints/100gal water. Daconil (12.5%) can be used in home gardens 48-hr REI.
4. Fore (80% mancozeb) at 1.5 lb/100gal water. 24-hr REI.
5. Heritage at 1 to 4 oz/100gal plus a non-silicone based wetter sticker. 4-hr REI.
6. Immunox at 1 fl oz/gal water. Can be used in home gardens.
7. Spectro (90 WDG) (chlorothalonil plus thiophanate methyl) at 1 to 2 lb/100gal water. 48-hr REI.

8. Systhane(WSP) (or Eagle WSP for landscape use) at 4 oz/ 100 gal water. Do not use more than 6 oz/A per

application or more than 5 lb/A/year. 24-hr REI.

9. Terraguard (50WP) at 2 to 4 ox/100gal water. 12-hr REI.

**Information compiled and presented by:
Scott C. Ockey M.S. / Senior Research Associate
Sherman V. Thomson Ph. D. / Extension Plant Pathologist Emeritus**

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Information needed for Chrysanthemum white rust samples.

Grower Information

Name:

Address:

Farm Location:

Crop Information:

Type of plant material received:

Origin of propagation material/plants:

Plant and Variety:

Source of irrigation water

Irrigation type and frequency:

Soil type: recycled/contaminated/sterilized

If sterilized, method of sterilization:

Have fumigants been applied specifically for chrysanthemum white rust: yes/no

If yes, which pesticide combinations were applied:

Has the incidence of infection changed: yes/no

Crop rotation history (current and previous 4 years):

Miscellaneous:

Pesticides applied:

Fertilizers applied:

Neighboring greenhouses/farms with host plants: yes/no

Do neighboring farms have a history of chrysanthemum rust: yes/no