# Chrysanthemum White Rust

Floriculture FACTSHEET

## What is Chrysanthemum white rust?

Chrysanthemum white rust is a serious disease of chrysanthemum caused by a fungus called *Puccinia horiana.* It spreads very quickly through the crop, covering the plants with pustules. It is a quarantine disease in Canada which means that its presence must be reported to the Canadian Food Inspection Agency (CFIA).

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|---|---|---|
| Kelowna | 250 | 470-4884 |
| New Westminster | 604 | 666-2891 |
| Victoria | 250 | 363-3618 |

## What does it look like?

Chrysanthemum white rust produces small white to yellow spots up to 4 mm wide on the upper surface of the leaf, Figure 1. These may be slightly dimpled. These spots become brown over time. Pustules form on the underside of the leaf, beneath the small spots, Figures 2 and 3. These originally appear as buff to pink-coloured. As they age, they become white. Pustules are most common on young leaves and flower bracts but can be found on any green tissue and flowers.

**Figure 1.**

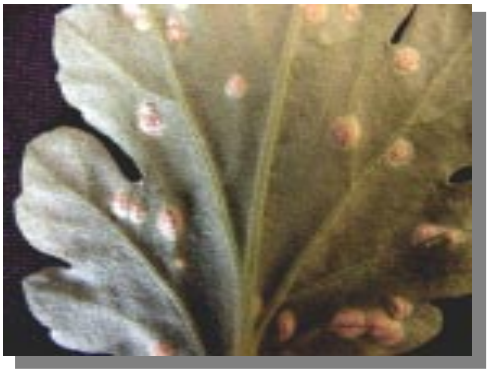

**Figure 2.**

**Figure 3.**

BRITISH COLUMBIA

**Ministry of Agriculture, Food and Fisheries**
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November, 2001

## Do infected plants always have symptoms?

- No, infected plants may be symptomless, especially during hot and dry conditions. Symptoms usually appear during cooler, wet weather.
- Fungicide applications may suppress disease development.
- It may take up to 8 weeks before infected plants show symptoms during periods of hot weather.

## Where does it occur?

Chrysanthemum white rust originated in eastern Asia. It is now established in Europe, Africa, Australia, Central America and South America. It has not established in Canada or the United States. Although there have been outbreaks in Canada and the United States, these have been eradicated or are being eradicated. In countries where chrysanthemum white rust occurs, the disease requires weekly fungicide sprays as part of its management.

## What plants does chrysanthemum white rust infect?

Twelve species of chrysanthemum are susceptible hosts, including potmums, spraymums, and gardenmums (*Dendranthema X grandiflorum = Chrysanthemum morifolium*). Other hosts are the Nippon daisy (*Nipponicanthemum nipponicum = C. nipponicum*), High daisy, and *C. pacificum = Ajania pacifica*. Species that appear to be resistant include the annual chrysanthemum (*C. carinatum*), crown (*C. coronarium*), pyrethrum (*Tanacetum coccineum = C. coccineum*), marguerite daisy (*Argyanthemum frutescens*), ox-eye daisy (*Leucanthemum vulgare*), shasta daisy (*Leucanthemum X superbum = C. maximum*), and the corn marigold (*C. segetum*).

## How does it spread?

- The fungus produces two types of spores. The first kind is called a teliospore. Teliospores are produced on the pustule and remain on the pustule unless they are aggressively brushed off. Under moist conditions (96% to 100% relative humidity) for at least 3 hours, teliospores produce basidiospores.
- Basidiospores are quite fragile in comparison to other fungal spores such as *Botrytis*. However, basidiospores can cause an epidemic if conditions are right. They spread from plant to plant by splashing water and they must have a film of water on the plant surface for infection. Infection can occur in as little as 2 hours at the optimal temperature of 17°C. Basidiospores can also travel short distances (700 metres) by wind currents during moist weather.
- Symptoms usually develop within 5 to 14 days after infection.
- The fungus itself will only grow and reproduce on susceptible plants. It does not develop outside the plant.
- Teliospores can survive up to 8 weeks if they remain in pustules on detached leaves at 50% RH or less. They die sooner under moist conditions. Basidiospores survive:
    - For 5 minutes when the relative humidity is 80% or below
    - For 60 minutes when the relative humidity is 81 to 90%.

## Can I spread it on my clothes or hands?

The basidiospores are fragile and do not survive long. However, it is possible to spread the disease if you have walked through a wet infected crop, and then walk into a healthy crop. It is therefore a sound precaution to wear coveralls and booties when going into an infested greenhouse. Change clothes, wash hands, and wash or change footwear before going into a clean greenhouse if you must go in.

To minimize potential spread within greenhouse blocks, use separate staff for propagation areas, for rooting areas and for different growing areas where feasible.

## How do infections occur?

Infections occur when infected cuttings are brought into a greenhouse or when viable spores are introduced. Infected cuttings may appear normal even though the fungus is present.

## How can I prevent infections?

- Buy healthy cuttings and regularly inspect them, especially when the weather becomes cooler and wetter. In British Columbia's Fraser Valley, this change in the weather usually starts in late August to early September. Symptomless but infected plants start to show symptoms around this time.
- Meet with staff to discuss pest management in the crop. Explain that garden mums in their home could be a source of contamination for the greenhouse and that they need to use extreme care when moving between the two sites. Discuss the importance of early detection. Explain the early symptoms.
- Place a poster about chrysanthemum white rust that shows pictures of symptoms in the lunch room.
- Install a **footbath** this year. A container with a foam mat is effective. Use disinfectants such as Virkon S* diluted to 1% (1:100) or Chemprocide (DDAC)* at 15 mL/L. Change solutions and clean pads at least every week. Use test strips to ensure the product concentration is maintained. Post strict signage on use.
- Restrict casual visitor access to greenhouse and where necessary, require the use of disposable or washable coveralls at all times. Insects and disease organisms are carried on clothing.

## What fungicides can I use?

Contact the floriculture specialist (Christine Koch) or plant pathologist (Leslie MacDonald) at the British Columbia Ministry of Agriculture, Food and Fisheries at 604 556-3001 for information on available fungicides.

## How do I disinfect after chrysanthemum white rust is found?

- Follow CFIA protocols on eradication. Contact the CFIA at the phone numbers listed on the first page for a copy.
- Remove debris on walkways and headerhouse floors with detergents and water before applying disinfectants. Note: If high levels of organic debris are present on surfaces being treated with products that work through oxidation such as bleach*, hydrogen peroxide and Virkon S*, their efficacy is significantly reduced.
- Wash down walkways and headerhouse floors with Chemprocide (DDAC)* at 8 mL/L or 5% Virkon S* (1:20).
- Power wash the structure and glass with a cleaner. Use registered products and follow label directions.
- Disinfect the structure with Virkon S* at 0.5% (1:200) or Chemprocide (DDAC)* at 8 mL/L.
- Disinfect all benches, crop support wires, watering lines, heating pipes, poles, equipment, flats and tanks. Pressure wash with a mild soap detergent followed by Virkon S* at 1% (1:100) or Chemprocide (DDAC)* at 8 ml/L.
- Disinfect carts/tools/tractor tires etc. with Chemprocide (DDAC)* at 15 ml/L or 1% Virkon S*. Rinse well.

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* *Mention of a product name does not imply endorsement, and omission does not imply that a product is not effective. Products mentioned are examples only.*

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Plant Pathologist

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