

# Chrysanthemum White Rust

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Chrysanthemum white rust (CWR) can be a serious disease of chrysanthemum crops. Growers need to know its symptoms and methods of control so they can take action when they see early signs of the disease.

CWR is a different disease from the red rust disease also found on chrysanthemums. It was introduced into Australia more recently. CWR is a more serious disease and is harder to control.

## WHAT DOES IT LOOK LIKE?

The early symptoms of CWR are pale green to yellow spots on the upper surface of the leaves. The centres of these spots turn brown with age. On the underside of the leaves there are brownish cream to pink waxy pustules or blisters, one to match each spot on the upper surface. These pustules become lighter in colour as they get older and are finally white and quite distinct. The pustules can form and produce spores in as little as 10 days.

Severely infected leaves become distorted and may shrivel. Usually only the leaves are affected, but there are reports of pustules forming on bracts, stems and flowers. When plants are severely infected, the leaves are almost completely covered with pustules and flower quality is poor.

## WHAT CAUSES IT?

The fungus *Puccinia horiana* causes CWR. This fungus survives only on chrysanthemums and has no other hosts. Although detailed studies have not been made, it is likely that CWR occurs as a number of races in Australia, each with a distinctive cultivar range, which can



**Underside of a chrysanthemum leaf showing white rust pustules**

change with time. Therefore, lists of resistant varieties can be unreliable.

## HOW DO PLANTS GET INFECTED?

The white rust fungus produces spores in the pustules. These are carried to new plants by water splash, on equipment, or on clothing - so it is probably wise to change your clothing after visiting the markets or other farms. The disease also spreads through cuttings and cut flowers from infected plants. The fungus can survive on mother plants and in year-round crops.

## WHAT CONDITIONS FAVOUR THIS DISEASE?

Cool, damp weather, high humidity and wet foliage favour CWR. Spores of the fungus only germinate when humidity is above 70%. However, spores can stay alive for almost a month at lower levels of relative humidity of 32%. For

plants to be infected, the leaves must stay wet for at least five hours and the temperature must be between 13-22 °C.

*Inspect crops regularly when these conditions exist.*

Plants can be infected but show no symptoms. For example, the fungus may be dormant during warm weather and may only show up when there is a cool change.

### **WHAT CROPS ARE AFFECTED?**

Some chrysanthemum cultivars are tolerant and unlikely to become infected. Other cultivars are only slightly affected, while most are completely susceptible.

### **HOW DO YOU CONTROL IT?**

- Plant only healthy plants, bought from a reliable source.
- Check your crop at least once a week. Remember to look at leaves in the middle of the crop where it is most humid.
- Grow cultivars known to be resistant to CWR. Reputable propagators will usually know which varieties are resistant. However, it pays to keep your own records. If you notice that

#### **DISCLAIMER**

The information contained in this publication is based on knowledge and understanding at the time of writing (January 2003). However, because of advances in knowledge, users are reminded of the need to ensure that information upon which they rely is up to date and to check currency of the information with the appropriate officer of New South Wales Department of Agriculture or the user's independent adviser.

Recognising that some of the information in this document is provided by third parties, the State of New South Wales, the author and the publisher take no responsibility for the accuracy, currency, reliability and correctness of any information included in the document provided by third parties.

#### **ALWAYS READ THE LABEL**

Users of agricultural chemical products must always read the label and strictly comply with directions on the label. Users are not absolved from compliance with the directions on the label by reason of any statement made, or omitted to be made, in this publication.

- certain varieties have been badly infected with CWR, do not plant them again next year.
- Check your crops regularly. Remove and destroy any severely diseased plants. Remember that if you plough in an infected crop, spores can stay infective in the soil for up to about three months - and spores can be transmitted on clothing, tools and machinery.
- Reduce humidity in the crop - ensure greenhouses are well ventilated and increase row spacing for field crops. Space plants and rows well apart to ensure fungicides penetrate the canopy thoroughly.
- Avoid overhead watering - do not let leaves stay wet for prolonged periods. Use drip irrigation if you can. Otherwise, water in the morning, so the leaves will dry before the evening. Apply pesticides early in the morning so the spray can dry quickly.
- Dispose of infected plants by burial or via industrial waste collection services.
- Take cuttings from healthy stock plants. If you do need to take cuttings from an infected crop, you should remove and destroy all old foliage. Do this by spraying plants with a contact herbicide or cut stems back to ground level. Remove and burn all old plant material. Use the new shoots to make cuttings.
- Protect crops by regular spraying with appropriate fungicides, especially when weather conditions are favourable for white rust disease. Begin to spray about a month after planting and repeat every 10-14 days. Rotate the fungicides you use to avoid resistance problems.
- Avoid incompatibility problems. Before mixing any chemicals together, check the specific label advice. You may need to contact the manufacturer for more details.
- When spraying to control CWR, make sure that the plants are completely wet. The chemicals must be applied under high pressure (a hand-pumped backpack type sprayer will not do the job).
- Destroy plants once the last flowers have been picked, unless you plan to take cuttings for future crops. Cut back plants you want to keep and spray new shoots for CWR.
- If you are having control problems, do some checking. Is your spray equipment working correctly? Are you wetting plants thoroughly? Is your spray program adequate? Are you using the right chemicals at the right time?

## HOW DO I KNOW IT IS WHITE RUST?

Commercial growers can forward samples for diagnosis to [NSW Agriculture's Plant Health Diagnostic Service](#). Please see the web site for a list of street and postal addresses.

Sydney region growers can contact the Plant Health Diagnostic Service at the Elizabeth Macarthur Agricultural Institute, PMB 8, Camden NSW 2570, telephone 02-4640 6428.

## WHAT CHEMICALS CAN I USE TO CONTROL CWR?

Your local agricultural chemical supplier should be able to advise you on a range of registered products to control CWR. There are several regularly updated sources of information on pesticides that you can refer to.

These sources include [InfoPest](#), a pest management information system published on CD-ROM by the Queensland Department of Primary Industries. For details, contact the InfoPest Manager, DPI, Animal and Plant Health Services, GPO Box 46, Brisbane, Qld 4001.

Completing an accredited training course in the use of farm chemicals, such as [SMARTtrain](#), will provide you with the skills to achieve competencies in the use of farm chemicals.

Because the registered chemicals available for a particular crop and disease change from time to time, this Agnote does not list particular products. Because correct and safe application of farm chemicals is required by law, you are responsible for choosing the correct chemical and rate of application.

## FUNGICIDES

Fungicides can be grouped according to whether they act as protectants or specifics.

**Protectant fungicides** inhibit germination and growth of fungal spores by blocking several biochemical reactions of the fungus. They must be applied on a regular program to maintain a protective cover on the plant surfaces. Protectant fungicides will not eradicate established infections.

**Specific fungicides** block only a single biochemical reaction of the fungus. The advantage of specific fungicides is that they have systemic action and, if applied soon after an infection period, they can prevent further development of the disease. Specifics also have some protectant properties but as fungi can develop resistance to them they should only be used strategically during periods of high disease risk and rotated with other specific fungicides from different chemical groups.

Ideally, mix a specific together with a protectant. Always follow the manufacturer's advice when mixing and applying chemicals. Whenever you plan to use a fungicide for the first time, test it on a small area of your chrysanthemums first to make sure there are not phytotoxicity problems. Some chemicals used to control CWR have been associated with leaf and bud burn.

## PUBLICATIONS AVAILABLE

For a complete list of NSW Agriculture Agfacts, Agnotes and Farm Enterprise Budgets on the Web, please see this Web site:

[www.agric.nsw.gov.au/publications](http://www.agric.nsw.gov.au/publications)

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