

# Chrysanthemum White Rust



## Pest Alert



INFECTED PLANT



### CHRYSANTHEMUM WHITE RUST (CWR)

(*Puccinia horiana*)

Signs of CWR infection are: small dimpled spots that will gradually turn yellow then brown. Those spots will form pustules on the underside of the leaf. These originally appear as buff to pink-colored. As they age, they become white. Pustules are most common on leaves and flower bracts. CWR is indigenous to China and Japan. CWR has become established in Africa, Europe, and throughout Western Europe, including Scandinavia. After spreading throughout Europe, CWR reached South America, Australia, New Zealand and Mexico.

### LOCAL HISTORY

Local outbreaks of white rust have occurred in North America during the last two decades. Incidents associated with smuggling of cuttings by amateur growers and handling of off-shore cut flowers inside greenhouses where chrysanthemums were grown; the source of CWR was not determined in every incident. Since detection and eradication action in California in 1991, there have been repeated incidents of white rust in several coastal California counties. More recently there have been outbreaks in commercial nurseries in New Jersey, Oregon and Washington State (1995-1997), and in New York (2003-04) and Pennsylvania (2006).

### IDENTIFICATION

The first symptoms of white rust are yellow spots on upper leaf surfaces, up to 4mm in diameter. These may become sunken and necrotic. Prominent pustules develop subsequently on the lower surface of leaves. Pinkish or buff colored at first, pustules mature to a waxy white. Pustules may also develop on stems, bracts, or even flowers. Severely infected leaves dry up and hang along the stem. Microscopic observation of two-celled teliospores in pustules is required to confirm a diagnosis. A teliospore is produced when pustules remain attached to leaves, germinating in a place to produce the next generation of basidiospores when conditions of temperature and humidity are favorable.



CWR SPORES



CWR SPORES



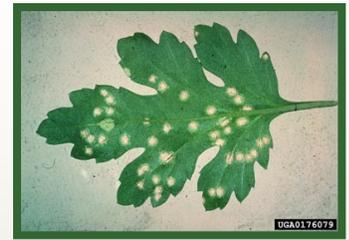
NY CAPS INSPECTOR,  
SURVEYING NURSERY

### INJURY & HOST PLANTS

- Crown Chrysanthemum
- Pyrethrum Chrysanthemum
- Marguerite Daisy
- Ox-Eye Daisy
- Shasta Daisy
- Corn Marigold
- Pot Mums
- Spray Mums
- Garden Mums
- Nippon Daisy
- High Daisy
- C. Pacificum

# DISEASE CYCLE

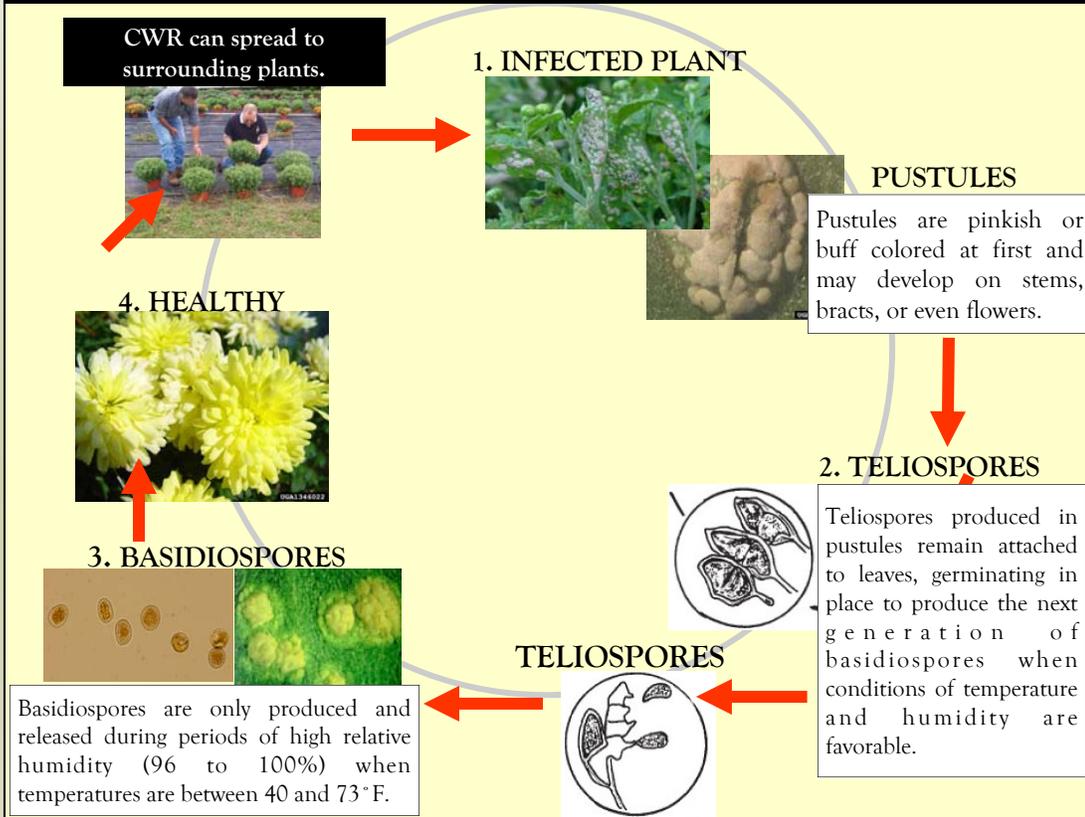
New infections are initiated by basidiospores released from pustules during periods of high relative humidity (96 to 100%) when temperatures between 40° and 73°F. Spores landing on a plant surface can germinate and penetrate in as little as two hours at optimum temperatures. A film of free water is required for infection. For 5 to 14 days after infection the fungus grows within the plant as a latent infection, after which chlorotic (yellow) spots, and ultimately pustules appear.



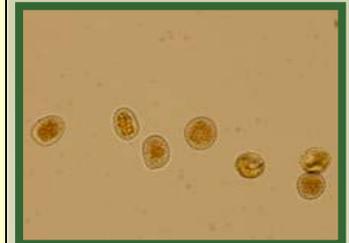
CWR INFECTED LEAF

## CHRYSANTHEMUM WHITE RUST - LIFE CYCLE

Design by: New York State Department of Agriculture & Markets



Distinction from Brown Rust of Chrysanthemum. Brown rust of chrysanthemum, is present in the U.S. but rarely causes heavy losses. Chocolate brown pustules on both surfaces of leaves contrast with white rust. Uredospores found in common rust pustules are easily distinguished from the teliospores of white rust.



CWR SPORES MAGNIFIED

# MANAGEMENT

Chrysanthemums are scheduled for inspection approximately four to six weeks prior to sale when symptoms may be apparent. For hardy mums (fall sales) inspections occur in August and September. Florist mums are scheduled according to projected sales dates. Cropping data is obtained from the grower during certification inspections. Inspectors will note and record comments on greenhouse/nursery sanitary precautions. A minimum of 10% of the crop is inspected around the perimeters and on a diagonal pattern in blocks. Inspectors will examine the upper surfaces of lower leaves, interior and exterior, for pale green or whitish blotches. When chlorotic blotches are detected, the inspector will examine the lower surface of the leaf, searching for pinkish buff pustules. When CWR is detected, the inspector will issue a quarantine certificate, contact Plant Industry in Albany. A sample is taken and shipped to Cornell University Diagnostic lab for confirmation.




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