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White rust on *Portulaca*

It's not your typical rust disease

Cooler, wet conditions are conducive for Oomycete diseases such as downy mildews and Phytophthora and Pythium root and foliage blights. Recently, hanging baskets of moss-rose purslane (*Portulaca grandiflora*) were declining within a greenhouse. About half of the plants within each basket were thinning, wilting, and the leaves were light-colored with raised white blotches (Figures 1 and 2). At first, it was assumed that the raised spots might be oedema, a physiological disorder that causes raised, scab-like growths due to plant cells bursting due to high internal water pressure during wet, humid, overcast weather. However, microscopic examination of the raised blotches identified the growth to be rupturing pustules filled with white spores (Figures 4, 5 and 6). It looked like a leaf rust disease, but it was white. The plant problem was identified as white rust caused by the pathogen, *Wilsoniana portulacae* (formerly *Albugo portulacae* or *A. portulacae*).



Figure 1: Plants within hanging baskets of moss-rose purslane were off-color, wilting and declining due to white rust infection. (Image by Jeff Cook)

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Figure 2: Initially purslane plants were light-colored and thinning. White pustules on the leaves could be seen with close examination. (Image by Jeff Cook)



Figure 3: Raised, white blisters or pustules could be seen on the upper and lower leaf surfaces within the plant canopy. (Image by Jeff Cook)

Although the pustules look like a rust disease, the causal organism is not a true rust nor is it a fungus. White blister rusts pathogens are oomycetes and are related to *Pythium*, *Phytophthora*, and downy mildews. White rusts are usually not common on greenhouse crops. They are very common on some weed species, in particular morning glory, bindweed, and pigweed. White rusts have been reported on sweet alyssum, stocks, dusty miller, *Rudbeckia*, *Echinacea*, nasturtium, cleome, gerbera daisy, sunflower, and purslane. They also infect agronomic crops such as many *Brassica* spp., spinach, and sweet potato.

White rust pathogens can be species specific with a limited host range. They were in the genus, *Albugo*, but some species have been reclassified in the genera *Pustula* and *Wilsoniana*. White rusts produce sporangia beneath the host epidermis. The infected area becomes blistered and can be seen on either the upper or lower leaf surface (Figures 3 and 4). The pustule ruptures exposing the light-colored, roughly circular sporangia (Figures 4, 5 and 6) that are then water-splashed to adjacent plants. Symptoms appear days after infection and infected leaves will die shortly thereafter. Infected leaves can be difficult to see until the whole plant shows symptoms and collapses. The pathogen also produces survival spores (oospores) that are produced within the infected leaf tissues and can survive within the dried leaf debris within the greenhouse or landscape. Sanitation and removal of infected plants is important in reducing white rust occurrence.

Once plants are infected, there is no control other than to discard the plants to reduce the spread and survival of the pathogen within the greenhouse. On future crops, inspect plants closely and weekly, especially during cooler, wet, humid conditions in the spring and fall to find the initial symptoms of infection. Since white rusts are oomycetes and

related to downy mildews, fungicides labeled to control downy mildew might provide some control and slow the spread of the disease within the crop. In sunflower, mefenoxam and azoxystrobin were effective in reducing infection. However, there are no fungicides labeled to specifically control white rust (*Albugo*, *Wilsoniana*, *Pustula*) on ornamental crops.

Select references:

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Figure 4: Rupturing white rust pustules on the underside of purslane leaves. (Image by Jeff Cook)

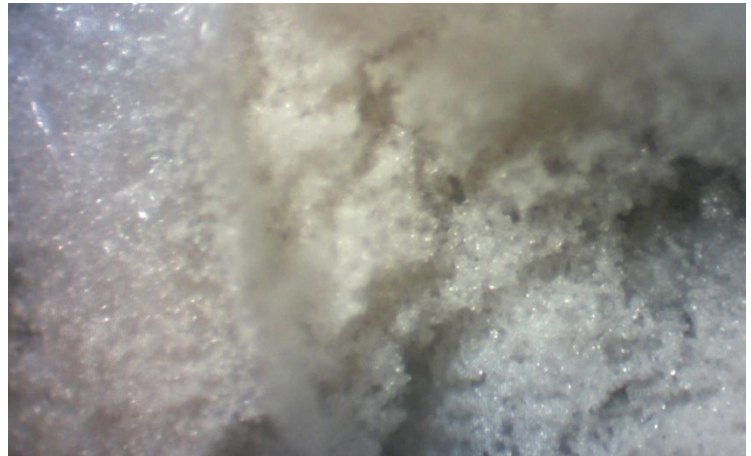


Figure 5: Rupturing white rust pustule under 40X magnification showing the light-colored (white) sporangia produced in chains below the leaf epidermis. (Image by Jeff Cook)

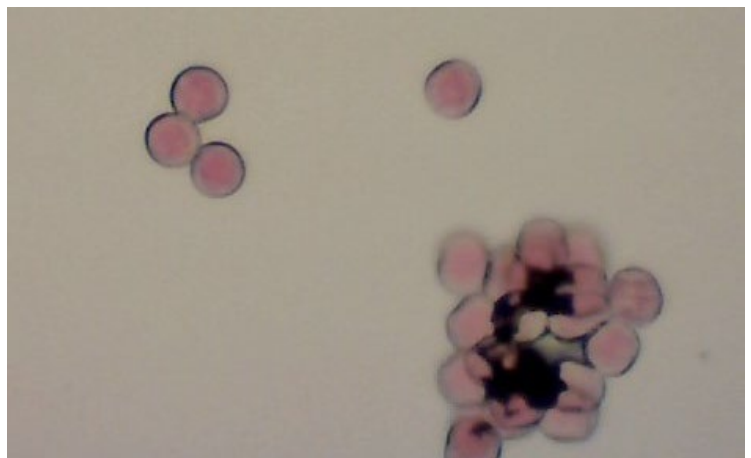


Figure 6: Roughly circular sporangia viewed under 100X magnification. The light-colored sporangia are stained pink from acid fuchsin stain to aid in their viewing. (Image by Jeff Cook)

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