

White *Phalaenopsis* Ringspots – Mystery Solved¹

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INTRODUCTION: Since 2000, orchid growers have sent white *Phalaenopsis* spp. orchids with necrotic/chlorotic target spot symptoms (Fig. 1) to the Division of Plant Industry (DPI). The samples always arrived during the late fall and early winter. Although it was suspected that these plants were infected with a virus, all serological tests for known orchid viruses were negative. The cause of these particular symptoms on white *Phalaenopsis* orchids has remained a mystery until now. Samples from two different nurseries have tested positive for two tospovirus species. One sample tested positive for *Tomato spotted wilt virus* (TSWV) and another tested positive for *Impatiens necrotic spot virus* (INSV).



Fig. 1. Symptoms of *Tospovirus* infection in white *Phalaenopsis* spp (Photography credit: Jeffrey Lotz)

PATHOGEN: Tospoviruses (Adkins *et al.* 2005) belong to the virus family Bunyviridae, which are primarily animal-infecting viruses. The genus tospovirus is the only plant-infecting member of the Bunyviridae. Fifteen to 18 different species of tospoviruses have been recognized including TSWV and INSV.

TSWV has a large host range (800 plant species) and is mostly, but not exclusively, a viral disease found in field crops. INSV has a smaller host range and is mostly a virus found infecting ornamental greenhouse-grown crops. Both viruses have been reported in orchids since the early 1990s (Hu *et al.* 1993, Koike and Mayhew 2001).

VECTOR: Tospoviruses are transmitted from plant to plant by several species of thrips. The most common species that vectors these viruses is the western flower thrips (*Frankliniella occidentalis*).

DETECTION AND DIAGNOSIS: The diagnosis of these viruses in *Phalaenopsis* orchids has proven difficult. These viruses do not appear to spread systemically in this orchid host. Serological tests with non-symptomatic leaves of infected plants are negative. The lesions, though spectacular on some plant leaves,

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appear to be local lesions and the titer of virus is low and decreases with time. This means that serological testing should be done soon after the appearance of symptoms.

Historically, the symptoms have disappeared during the summer and then reappeared in the fall to early winter when the plants were blooming.

CONTROL: The best control of a plant virus is always avoidance of infection. Obtain orchids from clean sources and grow orchids away from any host that could harbor these two viruses or their thrips vectors (Pottorff and Newman 2006). This would include plants such as chrysanthemums, which are susceptible to both TSWV and INSV, and impatiens and prayer plants which are susceptible to INSV. The control of weeds that could harbor either virus or the thrips vector is also warranted. Any plants with symptoms should be removed or at least separated from plants without symptoms.

SUMMARY: Although early serological diagnosis is possible, this appears to be one situation where a viral diagnosis can be made with symptoms. White *Phalaenopsis* orchids with the symptoms shown in Fig.1 apparently have been visited by thrips carrying one of two tospoviruses, TSWV or INSV.

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