© 2008 Plant Management Network.
Accepted for publication 29 May 2008. Published 11 July 2008.

Characterization of *Iris yellow spot virus* from Onion in Arizona

Hanu Pappu, Department of Plant Pathology, Washington State University, Pullman 99164; and **Michael Matheron**, Yuma Agricultural Center, University of Arizona, Yuma 85364

Corresponding author: H. R. Pappu. hrp@wsu.edu

Pappu, H. R., and Matheron, M. E. 2008. Characterization of *Iris yellow spot virus* from onion in Arizona. Online. Plant Health Progress doi:10.1094/PHP-2008-0711-01-BR.

Iris yellow spot virus (IYSV; genus *Tospovirus*, family *Bunyaviridae*) is an economically important pathogen affecting both bulb and seed onion crops in the US and several parts of the world (1). New reports of IYSV continue to appear from different states in the US and different countries in the world. Most recently, IYSV was confirmed in Michigan (2) and Ontario, Canada (3).

In January 2008, two commercial onion fields in Yuma Co., AZ, had plants with symptoms suggestive of IYSV infection. Both fields were started from bulbs and were being grown for seed. At the time of sampling, the plants were producing flower heads, but the flower heads were immature and had not opened. Disease incidence in the field located in the southwestern part of the county was approximately 25%, whereas the incidence in the other field (56 km northeast of the first field) was in the range of 1 to 2%. Symptoms on leaves included diamond-shaped or near-diamond shaped lesions. Lesions were as few as one per leaf or more than six per leaf. Leaves with several lesions showed yellow streaks due to the coalescing of individual lesions. Diamond-shaped lesions were more pronounced on scapes compared to those on leaves (Fig. 1).

Fig. 1. Symptoms of *Iris yellow spot virus* infection on onion leaves (top) and scapes (bottom) collected from commercial onion fields in Yuma Co., AZ, in January 2008.

IYSV infection was confirmed by ELISA using a commercially available kit (Agdia Inc., Elkhart, IN). The virus infection was further verified by reverse transcription-polymerase chain reaction. Total nucleic acids were prepared from symptomatic tissue and primers specific to the small (S) RNA of IYSV (5'-TAA AAC AAA CAT TCA AAC AA-3' and 5'-CTC TTA AAC ACA TTT AAC AAG CAC-3') were used to amplify ca. 1.2 kb region of the S-RNA that flanked the complete nucleocapsid (N) gene (4). The amplicon was sequenced which contained the 822 bp N gene. GenBank searches confirmed the identity of the amplicon as that of IYSV. There were no significant sequence differences between isolates

collected from the two fields. Cluster dendrogram consisting of the IYSV isolate from Arizona and selected IYSV isolates from other parts of the US and the world showed that the Arizona isolate formed a clade with the one from Canada and within the larger cluster of isolates from North America (Fig. 2).

Fig. 2. Phylogram based on the nucleocapsid protein sequence of the *Iris yellow spot virus* isolate from Yuma Co., AZ (designated in the tree as 'Arizona'). A Neighbor-Joining consensus tree was generated based on 1000 boot strap replications.

Reducing the impact of IYSV requires the adoption of multiple tactics in an integrated disease management program. Some of the tactics that seem to reduce the final incidence include ensuring adequate plant vigor by avoiding stressors such as drought and poor soil fertility (1). Maintaining uniform plant stand, managing thrips populations and weed hosts, separating bulb and seed crops to avoid the green bridge, observing field sanitation practices such as reducing the volunteer onions could also help manage the disease.

Literature Cited

1. Gent, D., du Toit, L. J., Fichtner, S. F., Krishna Mohan, S., Pappu, H. R., and Schwartz, H. F. 2006. *Iris yellow spot virus*: An emerging threat to onion bulb and seed production. *Plant Dis.* 90:1468-1480.
2. Hausbeck, M. 2007. *Iris yellow spot virus*: A New Threat to Michigan Onion Producers? Great Lakes Fruit, Vegetable & Farm Market EXPO. December 4-6, 2007. Grand Rapids, MI.
3. Hoepting, C. A., Allen, J., Vanderkooi, K., Hovius, M., Pappu, H. R., and McDonald, M. R. 2008. First Report of *Iris yellow spot virus* on Onion in Canada. *Plant Dis.* 92:318.
4. Pappu, H. R., du Toit, L. J., Schwartz, H.F., and Mohan, S. K. 2006. Sequence diversity of the Nucleoprotein gene of *Iris yellow spot virus* (genus *Tospovirus*, family *Bunyaviridae*) isolates from the western region of the United States. *Arch. Virol.* 151:1015-1023.