THE IMPORTANCE OF WEEDS IN THE ESTABLISHMENT IRIS YELLOW SPOT VIRUS; MANAGEMENT IMPLICATIONS FOR WISCONSIN

Russell L. Groves, Extension Entomology Specialist, Department of Entomology, University of Wisconsin-Madison

Tomato spotted wilt virus (TSWV), Impatiens necrotic spot virus (INSV), and Iris yellow spot virus (IYSV), and other closely related tospoviruses are serious threats to many agricultural, ornamental, and greenhouse crops worldwide. IYSV was first recorded in the western United States in 1989 with the first collections of the virus in Idaho and eastern Oregon. In the last six to eight years, IYSV incidence has increased rapidly in throughout many areas of the western US onion production regions and has been discovered in eastern production areas; specifically Georgia (2004) and New York (2006) (Gent et al. 2006). It is hypothesized that importation of both IYSV-infected and onion thrips-infested transplant materials may have contributed to these recent introductions. Currently it is unknown whether endemic inoculum sources of this virus have become established in non-crop plant (weed) species in these recently affected regions.

Worldwide, the Tospoviruses are transmitted by at least nine thrips species (Whitfield et al. 2005). In onions, the only documented vector of IYSV is the onion thrips, Thrips tabaci (Lindeman). Thrips acquire IYSV by feeding on infected plants as first instar larvae with a subsequent latent period of approximately 3 to 7 days before transmission of the virus can occur when the insect has reached the adult stage. Infected or viruliferous adults are considered competent vectors for the remainder of their lives. Thus, only those plants that sustain virus infections and serve as suitable reproductive hosts for the vector can be considered important sources for spread of IYSV.

In comparison to other viruses in the Tospovirus group, IYSV has a narrow host range including less than 50 plant species from natural collections (Gent et al. 2006). Many plants which are reportedly susceptible to IYSV may not support thrips reproduction and could thus be considered a “dead-end” for virus spread. A more complete understanding of the sources of vector reproduction and IYSV infection is warranted to determine which plant species may serve as both reproductive hosts for vectors and the primary inoculum sources for TSWV spread.

In a study conducted in North Carolina, Groves et al. (2003) attempted to systematically identify, through field collections, wild plant species supporting both vector reproduction and natural TSWV infection in North Carolina. Clearly, understanding the relative importance of different potential transmission cycles is critical to optimizing any management strategy aimed at reducing the abundance of IYSV inoculum and spread into and potentially from crops. To more clearly identify those plant species likely of greatest importance in the transmission cycles of TSWV, Groves et al. (2002) consolidated information from surveys on suitability for thrips reproduction and frequency of infection with TSWV into a single relative inoculum potential index (RIP) value for each plant species. It provides a basis for comparing the relative potential of various weeds included in our survey to serve as a source of inoculum for spread of TSWV in the areas and years in which we conducted our surveys. Vegetation management to reduce TSWV inoculum requires knowledge of the inoculum source
within an area and of the dispersal of viruliferous thrips from that source. The implications of these and other research findings relative to recent detection(s) and the widespread occurrence of IYSV in eastern onion production areas will be discussed.

