

First Report on the Incidence of Mixed Infections of *Impatiens necrotic spot virus* (INSV) and *Tomato spotted wilt virus* (TSWV) in Tobacco Grown in Georgia, South Carolina, and Virginia

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Fig. 1. Typical systemic spotted wilt symptoms in K326 tobacco 45 days after transplanting (Bowen Farm, Tift County, Georgia).

Tomato spotted wilt caused by *Tomato spotted wilt virus* (TSWV) continues to be a serious disease problem on tobacco (*Nicotiana tabacum* L.) (Fig. 1), peanut (*Arachis hypogaea* L.), tomato (*Lycopersicon esculentum* Mill.), and pepper (*Capsicum annuum* L.) in the southeastern United States (2). *Impatiens necrotic spot virus* (INSV, formerly known as TSWV-I) is an emerging virus found mostly in greenhouse production of ornamentals and is also vectored by thrips (1). A few years ago INSV was detected in peanut in Georgia and Texas (3) and its occurrence appears to be increasing

(4). Mixed infections of TSWV and INSV in tobacco have been observed within the last two years in North Carolina and Kentucky (J. W. Moyer and W. Nesmith, *personal communications*). Our objective was to sample several locations in Georgia, Florida, South Carolina and Virginia to confirm and report the presence of natural TSWV and INSV mixed infections in tobacco.

A total of six counties located in Georgia (Tift County: K326 number of samples tested [n] = 33, NC71 n = 300), Florida (Columbia County: K326 n = 90; Suwannee County: NC72 n = 90), South Carolina (Williamsburg County: JA732 n = 60, JA858 n = 15, NC2326 n = 15; Darlington County: tobacco cv. Xanthi n = 52, JA732 n = 9) and Virginia (Dinwiddie County: NC71 n = 100, NC72 n = 50) were sampled at different times during 2002. Tobacco tissues used for virus testing consisted mostly of roots from mature plants collected between mid-July and late August, except for one mid-May sampling (45 days after transplanting) in Georgia and an early October sampling in South Carolina, where leaves were used. Tissues were tested by DAS-ELISA with commercial antisera for each virus (Agdia Inc., Elkhart, IN).

Several asymptomatic samples (ranging from 8 to 34%, depending on the site) tested positive for TSWV, confirming previous observations of virus infections not expressing typical Tomato spotted wilt symptoms (2). The occurrence of mixed infections of TSWV and INSV was confirmed in Georgia (K326 = 30%), South Carolina (JA732 = 8.33%, JA858 = 40%, NC2326 = 6.66%,

Xanthi = 11.54%) and Virginia (NC72 = 22%, NC71 = 1%). Only single TSWV infections were detected for both locations in Florida, one site in Virginia (NC71 = 24%), and one site in Georgia (NC71 = 58%). Single TSWV infections were detected in all other fields sampled with an incidence ranging from 16 to 94%. Single INSV infections were not detected in any of the tobacco samples tested in the four states.

Preliminary data suggests that in many instances where INSV tested positive, most plants also had high ELISA titers of TSWV, indicating that the expression of some severe symptoms could be the result of mixed infections (Fig. 2) and INSV might be acting as a helper virus. There are single infections of INSV present in weeds around tobacco fields (*unpublished data*) and we presume they are present in tobacco as well but currently at very low levels. Perhaps INSV development in the thrips vectors or the susceptible hosts depends on the presence of prior infections with TSWV. Presently there is not enough information to understand the significance of TSWV-INSV dual infections and our efforts are focusing towards future research on their individual and simultaneous transmission by thrips.



Fig. 2. K326 tobacco field trial (eight middle rows) with 94% incidence of spotted wilt and 30% average occurrence of mixed infections with TSWV and INSV (Bowen Farm, Tift County, Georgia).

Literature Cited

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