THRIPS TRANSMISSION OF TSWV TO DIFFERENT *SOLANUM* SPECIES

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SUMMARY

Tomato spotted wilt *tospovirus* (TSWV) causes significant yield losses in tobacco, tomato, and pepper plantations, and it has become increasingly important in potato plantations in Hungary. We established that *Thrips tabaci* is able to transmit TSWV from tobacco to different *Solanum* species. The economic role of TSWV increases, because of its very broad host range, the current worldwide spread by *Thrips tabaci* in solanaceous crops.

INTRODUCTION

Tomato spotted wilt *tospovirus* (TSWV) has a worldwide distribution, causing significant yield loss in important horticultural, vegetable and legume plants in tropical, subtropical and temperate climate zones. The presence of the virus was also detected in ornamental plants, for example *Chrysantemum, Alstroemeria, Gerbera, Cyclamen, Primula* and *Begonia* species (Verhoeven, 1990; Hausbeck et al., 1992). Last years the occurrence of TSWV increases in the greenhouses and under field conditions in Hungary. It causes serious yield losses mainly in tobacco, tomato, and pepper plantations. TSWV has become increasingly important in potato plantations in the North-Eastern part of Hungary (Horváth et al., 2000).

TSWV is a member of the arthropod-borne Bunyaviridae (Milne and Francki, 1984). Among plant viruses, this virus is unique in its genom structure and transmission. The TSWV is the only virus transmitted by thrips species. Two Thysanoptera species [*Thrips tabaci* Lindeman and *Frankliniella occidentalis* (Pergandel)] are known as vectors of TSWV in Hungary. *T. tabaci* is a native species, it occurs both in the fields and greenhouses. *F. occidentalis* is an introduced species, it occurs in high population density in greenhouses and in the flowers of different cultivated and weed plants in the surrounding of greenhouses. Both species are able to live continuously in the greenhouses in the winter period, but only *T. tabaci* adults can hibernate in the fields. Both species have wide host range and some of these herbaceous plants are common host plants for thrips as well as for TSWV.

The aim of this study was to prove thrips transmission of TSWV from infected tobacco to different *Solanum* species and to examine reservoir role of wild *Solanum* species for TSWV.

MATERIAL AND METHOD

Last autumn *T. tabaci* were collected from TSWV infected tobacco and weed plants in Eastern Hungary. TSWV infection of the source plants was identified symptomatologically (*Nicotiana benthamiana*) and serologically (DAS-ELISA). *T. tabaci* vectors (three adults and two larvae) were transferred from infected leaves to one *Solanum* plant. We examined five plants per *Solanum* species (Table 1.). After two day's feeding period the acceptor plants were sprayed with an insecticide (pirimicarb) and kept in a vector free greenhouse until assessment. 45 days later the *Solanum* species were checked by DAS-ELISA using commercially available polyclonal antisera of TSWV (BR-01 serotype), after Clark and Adams (1977).

RESULTS AND DISCUSSIONS

Some species produced high absorbance values by DAS-ELISA with polyclonal antiserum of TSWV BR-01 isolate (Table 1.). *Solanum malacoxylon, S. nigrum, S. luteum* showed susceptibility to TSWV. Symptoms could not be seen on plants, but the virus could be detected in them by serological tests. DAS-ELISA absorbance values exceeded twice than that of the healthy control samples during the serological test. TSWV could be detected by biological tests, too. During the biological tests we used *Nicotiana benthamiana* plants. Test plants produced local and systemic reactions few days after mechanical inoculation. The infection resulted chlorotic local symptoms on leaves, later systemic chlorotic spots appeared on the upper, non inoculated parts of *N. benthamiana*.

The economic role of tomato spotted wilt virus seems increase, because of its very broad host range, the current worldwide spread by most common vector, *Thrips tabaci* in solanaceous crops. We established that *Thrips tabaci* is able to transmit TSWV between tobacco and different *Solanum* species. It is known, that TSWV can overwinter both in the adult thrips and reservoir host plants. Further studies need to determine which Solanum plants species are reservoirs of TSWV.

Table 1. Reaction of wild Solanum species to TSWV

Solanum species	Symptom	Absorbance	Biotest
Solanum aethiopicum	-	0.190	-
Solanum anguivi	-	0.215	-
Solanum capsicastrum	-	0.198	-
Solanum cervantesii	-	0.199	-
Solanum citrullifolium	-	0.221	-
Solanum citrullifolium ssp. citrullifolium	-	0.206	-
Solanum comatum	-	0.215	-
Solanum dulcamara	-	0.195	-
Solanum diflorum	-	0.230	-
Solanum lariocarpum	-	0.198	-
Solanum luteum	-	0.980	+
Solanum malacoxylon	-	0.489	+
Solanum melongena	-	0.231	-
Solanum nigrum	-	0.360	+
Solanum scabrum	-	0.209	-
+ control		1.252	
- control		0.183	

- : negative reaction + : positive reaction

LITERATURE

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