REACTION OF *SOLANUM STOLONIFERUM* SCHLECHTD. ET BCHE AND *SOLANUM DEMISSUM* LINDL. ACCESSIONS TO TOMATO SPOTTED WILT *TOSPOVIRUS* AND SOWBANE MOSAIC *SOBEMOVIRUS*

HORVÁTH, J., KAZINCZI, G.

Pannon University of Agricultural Sciences, Institute for Plant Protection, Keszthely, Hungary

SUMMARY

Reaction of fifteen accessions both of *Solanum stoloniferum* and *Solanum demissum* to tomato spotted wilt *tospovirus* (TSWV) and sowbane mosaic *sobemovirus* (SoMV) have been studied. Neither accessions of *S. stoloniferum* nor *S. demissum* were susceptible to SoMV. Out of *S. stoloniferum* accessions PI. 161160, 545792 and 545800 were susceptible to TSWV. Symptoms could not be seen on the diseased plants, but the presence of virus could be proved by DAS-ELISA serological method and back inoculation.

INTRODUCTION

Tomato spotted wilt *tospovirus* (TSWV) is one of the most serious plant viruses of the word, causing 50-90% yield loss (Mumford et al., 1996). It has a broad host range, including more than 600 plant species (German et al., 1992). The presence of TSWV has been documented since 1972 from tobacco plantations in Hungary (Ligeti and Nagy, 1972). TSWV is considered to be one of the new pathogens, which play important role in pepper decline in Hungary (Gáborjányi et al., 1997).

The host range of sowbane mosaic *sobemovirus* (SoMV) includes 14 natural and 59 artificial hosts from 16 families (Bennett and Costa, 1961; Kado, 1967; Šarić and Juretić, 1980; Bos and Huijberts, 1996; Teakle, 1996). Natural occurrence of SoMV on *Chenopodium hybridum* L. from weed-potato ecosystem in Hungary was first reported by Horváth et al. (1993).

Because the natural occurrence of TSWV and SoMV on potato (*Solanum tuberosum* L.) and its weeds is well known (Costa and Kiehl, 1938; de Bokx and van der Want, 1987; Hooker, 1981; Latham and Jones, 1995; Salazar, 1996), their spreading and injury can be expected in potato in future. The different accessions of wild *Solanum* species have natural resistance genes against potato viruses, e.g. potato leaf roll *luteovirus* (Ross, 1986; Horváth et al., 1987), potato Y *potyvirus* (Horváth, 1968; Cockerham, 1970; Horváth, 1988; Jones, 1990; Horváth and Wolf, 1991; Bősze et al., 1996), potato X *potexvirus* (Cockerham, 1970; Horváth et al., 1988), potato A *potyvirus* (Ross, 1986), potato M *carlavirus* (Dziewonska and Ostrowska, 1978; Uhrig et al., 1992) and potato S *carlavirus* (Makarov, 1975; Ross, 1986). Reaction of wild *Solanum* species to TSWV and SoMV is unknown.

Therefore the aim of our study was to investigate reactions of fifteen accession both of *Solanum stoloniferum* and *Solanum demissum* to TSWV and SoMV infection.

MATERIALS AND METHODS

Fifteen accessions both of *Solanum stoloniferum* and *Solanum demissum* were inoculated at 8-10 leaf stage with the TSWV and SoMV viruses five weeks after sowing. Previously TSWV and SoMV was propagated on *Nicotiana benthamiana* Domin. and *Chenopodium quinoa* Willd., respectively. The *Solanum* accessions were inoculated mechanically with tissue sap of the virus infected *N. benthamiana* and *C. quinoa*. Seven plants of each accessions were inoculated. The inoculated plants were symptomatologically checked for infection every seven days. Five weeks after mechanical inoculation the accessions were tested using direct double-antibody sandwich ELISA (DAS-ELISA) method, after Clark and Adams (1977). The presence of the viral antigen was monitored using polyclonal antibody and alkaline-phosphatase (AP)-conjugated antibody. Substrate absorbance was measured forty minutes after adding the substrate, at 405 nm wavelenght on Dynatech ELISA reader. Of the seven plants of each accessions the highest absorbance value was recorded. Test samples were considered positive if their absorbance values exceeded twice that of the healthy control samples. In latent host-virus relations back inoculatoin was also carried out to *N. benthamiana* and *C. quinoa*, as indicator plants.

RESULTS AND DISCUSSION

All accessions of *S. stoloniferum* and *S. demissum* were found to be resistant to SoMV. Neither the inoculated nor the non-inoculated leaves showed symptoms and the virus could not be detected in them by serological and biological tests.

Out of *S. stoloniferum*, three accessions (PI. 161160, 545792 and 545800) showed systemic latent susceptibility due to infection with TSWV. The inoculated plants were symptomless, but the presence of TSWV could be proved during serological diagnosis (Table 1 and 2).

Table 1. Reaction of *Solanum stoloniferum* accessions to SoMV and TSWV

		Absorbance	
PI number	Symptoms*	SoMV	TSWV
160225	-	0.207	0.246
161152	-	0.237	0.258
161160	-	0.213	0.556
243458	-	0.237	0.244
255534	-	0.298	0.283
283109	-	0.182	0.357
545737	-	0.244	0.258
545792	-	0.237	0.713
545800	-	0.243	1.162
545805	-	0.198	0.274
547740	-	0.226	0.278
558453	-	0.217	0.283
558465	-	0.204	0.270
558466	-	0.215	0.307
558471	-	0.218	0.348
Negative control		0.281	0.271
Positive control		1.332	2.000

*-, no reaction (no symptoms)

Table 2. Reaction of *Solanum demissum* accessions to SoMV and TSWV

PI number	Symptoms*	Absorbance SoMV	TSWV
160208	-	0.213	0.288
161149	-	0.205	0.342
161366	-	0.233	0.363
161715	-	0.371	0.263
205514	-	0.271	0.383
205516	-	0.251	0.349
275211	-	0.219	0.313
498012	-	0.197	0.379
558052	-	0.225	0,290
558386	-	0.210	0.280
558387	-	0.237	0.264
558389	-	0.253	0.436
558390	-	0.309	0.444
558391	-	0.244	0.306
558463	-	0.281	0.370
Negative control		0.281	0.271
Positive control		1.332	2.000

*-, no reaction (no symptoms)

Biotests confirmed the results of serological examinations. Bősze et al. (1996) reported hypersensitive reaction of *S. stoloniferum* accession PI. 161160, local and systemic susceptibility of *S. stoloniferum* accession PI. 545792 and extreme resistance (immunity) of *S. stoloniferum* accession PI. 545800 to NTN strain of potato Y *potyvirus*. *S. demissum* accessions were resistant to TSWV. In earlier studies an accession of *Solanum demissum* (PI. 275211) showed hypersensitivity against a mixture of four strains of potato Y *potyvirus* (C, normal, anomalous and R strain) (Horváth, 1966a, b, 1967a, b, 1968, 1970). Later Bősze et al. (1996) reported that among the fifteen *S. demissum* accessions studied - included the above mentioned accession - no resistant to the NTN strain of potato Y *potyvirus* were found; all accessions were systemic susceptible.

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