

SUSCEPTIBILITY OF DIFFERENT *SOLANUM* SPECIES TO PVX AND TSWV

P.A. TAKÁCS, G. KAZINCZI, J. HORVÁTH & D. PRIBÉK

University of Veszprém, Georgikon Faculty of Agriculture

Institute for Plant Protection

H-8360 Keszthely, Deák F. str. 16, Hungary

SUMMARY

Examinations were carried out to study the susceptibility of six *Solanum* species (*Solanum capsicastrum* Link & Schauer, *S. comatum* Sendt, *S. dulcamara* L., *S. luteum* Mill., *S. malacoxylon* Sendt and *S. nigrum* L.) to potato X potexvirus (PVX) and tomato spotted wilt tospovirus (TSWV).

Plants were mechanically inoculated with PVX and TSWV, and TSWV was also transmitted by thrips (*Thrips tabaci* Lindemann). Inoculated plants were symptomatologically and serologically (DAS-ELISA) investigated.

Out of the species *S. capsicastrum* and *S. malacoxylon* to PVX, *S. capsicastrum*, *S. comatum* and *S. dulcamara* to TSWV showed the highest resistance (immunity). Symptoms could not be seen on plants and the virus could be detected neither serological nor in biological tests. *Solanum comatum*, *S. dulcamara*, *S. luteum* and *S. nigrum* were susceptible to PVX. *Solanum luteum*, *S. malacoxylon* and *S. nigrum* showed susceptibility to TSWV.

INTRODUCTION

Potato is one of our most important crop because of its role in supplying with food. All over the world it is a very big problem, that out of the cultivated plants, potato has the most virus pathogens. Out of the pathogens, viruses cause severe yield losses and degeneration of the cultivars.

Solanum weeds as virus reservoirs play an important role in Hungary. Viruses can be easily transmitted from reservoir weeds to the cultivated plants by vectors, therefore to study virus susceptibility of weeds is of great importance.

Tomato spotted wilt tospovirus (TSWV) was found in potato in Hungary by Horváth et al. (2000). The objective of this study was to identify new host-virus relations which has importance both in plant protection and virology.

MATERIALS AND METHODS

Reaction of *Solanum capsicastrum* Link & Schauer, *S. comatum* Sendt, *S. dulcamara* L., *S. luteum* Mill., *S. malacoxylon* Sendt and *S. nigrum* L. to potato X potexvirus (PVX) and tomato spotted wilt tospovirus (TSWV) was investigated. Plants were mechanically inoculated at 8-10 leaf stage with PVX and TSWV, and TSWV was also transmitted by thrips (*Thrips tabaci* Lindemann). The inoculated plants were symptomatologically checked for

infection and five weeks after inoculation the species were tested using direct double-antibody sandwich enzyme linked immunosorbent assay (DAS-ELISA), after Clark and Adams (1977). Substrate absorbance was spectrophotometrically measured. The ELISA kit originated from LOEWE Biochemica. Substrate absorbance was measured at 405 nm on Labsystem Multiscan RC ELISA reader. *Nicotiana tabacum* L. cv. Samsun for PVX and *Nicotiana benthamiana* L. for TSWV were used for back inoculation. Samples were considered negative, if symptoms could not be seen on them, biological tests were unsuccessful and the absorbance values of the infected samples did not exceed twice than that of the healthy control samples.

RESULTS AND DISCUSSIONS

New host-virus relations have been reported, which has great importance both in plant protection and virology. Out of the species *S. capsicastrum* and *S. malacoxylon* to PVX, *S. capsicastrum*, *S. comatum* and *S. dulcamara* to TSWV showed the highest resistance (immunity). Symptoms could not be seen on plants and the virus could be detected in them neither by serological nor by biological tests. *Solanum comatum*, *S. dulcamara*, *S. luteum* and *S. nigrum* were susceptible to PVX. *Solanum luteum*, *S. malacoxylon* and *S. nigrum* showed susceptibility to TSWV. Symptoms (mosaic and leaf deformation) could be seen after inoculation and the absorbance values (DAS-ELISA) exceeded twice than that of the healthy control samples during the serological tests (Tables 1 and 2).

It is known, that TSWV can be easily transmitted from reservoir hosts to cultivated plants (e.g., tobacco, tomato, potato, etc.) by thrips, therefore to study the virus susceptibility of weeds is of great importance.

This study and our preliminary examinations confirm the importance of wild *Solanum* species in virology (Takács *et al.* 2000). Reaction of the most species and accessions to different viruses is unknown, therefore to study their resistance characteristics is necessary in future.

ACKNOWLEDGEMENTS

The work was supported by a National Science Foundation (OTKA F029353).

LITERATURE

- Clark, M.F. - Adams, A. N. (1977). Characteristics of the mikroplate method of enzyme-linked immunosorbent assay for the detection of plant viruses. *J. Gen. Virol.* 34, 475-483.
- Horváth, J. - Kazinczi, G. - Takács, A. - Gáborjányi, R. (2000). Occurrence of tomato spotted wilt virus on potato. *Növényvédelmi Tud. Napok, Budapest 2000.* p. 101.

Takács, A., Horváth, J., Kazinczi, G., Pribék, D. (2000). Die Virusanfälligkeit verschiedener Unkräuter der Gattung *Solanum*. Z. PflKrankh. PflScutz, Sonderh. XVII, 173-175.

Table 1. Reaction of wild *Solanum* species to PVX

Solanum species	Symptom*		Absorbance	Biotest
	Local	Systemic		
<i>Solanum capsicastrum</i>	-	-	0.245	-
<i>Solanum comatum</i>	-	Mo	1.319	+
<i>Solanum dulcamara</i>	-	-	1.115	+
<i>Solanum luteum</i>	Mo	Mo, Ldef	1.308	+
<i>Solanum malacoxylon</i>	-	-	0.178	-
<i>Solanum nigrum</i>	Mo	Mo	1.369	+
+ control			1.515	
- control			0.165	

*Mo: mosaic, Ldef: leaf deformation, (-): negative reaction, (+): positive reaction

Table 2. Reaction of wild *Solanum* species to TSWV

Solanum species	Symptom*		Absorbance	Biotest
	Local	Systemic		
<i>Solanum capsicastrum</i>	-	-	0.210	-
<i>Solanum comatum</i>	-	-	0.276	-
<i>Solanum dulcamara</i>	-	-	0.238	-
<i>Solanum luteum</i>	-	Mo, Ldef	0.980	+
<i>Solanum malacoxylon</i>	-	-	0.489	+
<i>Solanum nigrum</i>	-	-	0.360	+
+ control			1.252	
- control			0.183	

*Mo: mosaic, Ldef: leaf deformation, (-): negative reaction, (+): positive reaction