NEW HOST-VIRUS RELATIONS BETWEEN DIFFERENT *SOLANUM* SPECIES AND VIRUSES

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SUMMARY

We have studied the susceptibility or resistance of *Solanum capsicastrum* Link. et Schauer, *S. comatum* Sendt., *S. dulcamara* L., *S. luteum* Mill., *S. malacoxylon* Sendt. and *S. nigrum* L. to three aphid transmissible viruses [alfalfa mosaic *alfamovirus* (AMV), potato *M. carlavirus* (PVM) and potato S *carlavirus* (PVS)].
Out of the species, *S. capsicastrum*, *S. comatum*, *S. dulcamara*, *S. malacoxylon* and *S. nigrum* to AMV, *S. capsicastrum* and *S. malacoxylon* to PVM and *S. capsicastrum*, *S. luteum* and *S. nigrum* to PVS showed the highest resistance (immunity). Symptoms could not be seen on inoculated plants and the virus could be detected by them neither by serological nor biological tests. *Solanum luteum* plants were susceptible to AMV. *Solanum comatum*, *S. dulcamara*, *S. luteum* and *S. nigrum* showed susceptibility to PVM. *Solanum comatum* and *S. dulcamara* were susceptible to PVS. Symptoms (necrotic lesions, mosaic and chlorosis) could be seen after inoculation and the absorbance values (DAS-ELISA) exceeded twice that of the healthy control samples during the serological tests.

INTRODUCTION

Weeds influence the quality and quantity of crops not only directly but also indirectly as alternative hosts of various pathogens. Alternative hosts serve as food for the vectors of viruses, while the seeds and vegetative reproductive organs of certain weed species may play important role in the epidemiology of viruses. *Solanum* weeds as virus reservoirs play an important role in plant pathology and in weed controll. Viruses cause severe yield losses and degeneration of the cultivars. PVS, PVM and AMV are important virus pathogens of potato (Horváth 1981, 1987, 1990, Horváth and Hoekstra 1989, Horváth and Wolf 1994). These viruses cause serious yield losses in complex virus infection. Therefore we have studied the virus susceptibility of wild *Solanum* species.

MATERIALS AND METHODS

We have studied the susceptibility or resistance of *Solanum capsicastrum* Link. et Schauer, *S. comatum* Sendt., *S. dulcamara* L., *S. luteum* Mill., *S. malacoxylon* Sendt. and *S. nigrum* L. to alfalfa mosaic *alfamovirus* (AMV), potato M *carlavirus* (PVM) and potato S *carlavirus* (PVS).
Solanum plants were mechanically inoculated at 8-10 leaf stages with tissue sap of AMV, PVM and PVS infected potato (*Solanum tuberosum* L. ssp.

tuberosum) Sörensen phosphate buffer pH 7,2 in the ratio 1:1 was used. Seven plants of each species were inoculated.
The inoculated plants were symptomatologically checked for infection and five weeks after inoculation the *Solanum* species were tested using direct double-antibody sandwich ELISA (DAS ELISA) method, after Clark and Adams (1977). Kit for ELISA derived from Loewe Biochemica. Substrate absorbance was measured 405 nm wavelenght on Labsystem Multiscan ELISA reader.
In latent host-virus relations back inoculation was also carried out on test plants. *Nicotiana tabacum* cv. Xanthi to AMV, *Gomphrena globosa* to PVM, *Chenopodium amaranticolor* to PVS plants were used for back inoculation.

RESULTS AND DISCUSSIONS

Out of the species, *S. capsicastrum, S. comatum, S. dulcamara, S. malacoxylon* and *S. nigrum* to AMV, *S. capsicastrum* and *S. malacoxylon* to PVM and *S. capsicastrum, S. luteum* and *S. nigrum* to PVS showed the highest resistance (immunity). Symptoms could not be seen on plants and the virus could be detected by them neither by serological nor biological tests. It is possible a compatible host-virus relation with other virus isolates.
Solanum luteum plants were susceptible to AMV. *Solanum comatum, S. dulcamara, S. luteum* and *S. nigrum* showed susceptibility to PVM. *Solanum comatum* and *S. dulcamara* were susceptible to PVS. Symptoms (necrotic lesions, mosaic and chlorosis) could be seen after inoculation and the absorbance values (DAS-ELISA) exceeded twice that of the healthy control samples during the serological tests (Tables 1, 2 and 3).

Table 1. The reaction of *Solanum* species to alfalfa mosaic *alfamovirus* (AMV)

Solanum species	Symptoms*		ELISA	Biotest**
	Local	Systemic		
Solanum capsicastrum	-	-	0.113	-
Solanum comatum	-	-	0.111	-
Solanum dulcamara	-	-	0.125	-
Solanum luteum	-	-	1.496	+
Solanum malacoxylon	-	-	0.111	-
Solanum nigrum	-	-	0.120	-
Negative control			0.111	
Positive control			1.980	

* - : symptomless
** + : symptoms
- : symptomless

Table 2. The reaction of *Solanum* species to potato M *carlavirus* (PVM)

Solanum species	Symptoms*		ELISA	Biotest**
	Local	Systemic		
Solanum capsicastrum	-	-	0.098	-
Solanum comatum	-	Chl	0.813	+
Solanum dulcamara	Nl	Mo	0.504	+
Solanum luteum	Mo	Chl	0.428	+
Solanum malacoxylon	-	-	0.098	-
Solanum nigrum	Mo, Chl	Mo, Chl	0.512	+
Negative control			0.098	
Positive control			0.512	

* Mo : mosaic symptoms
Chl : Chlorotic lesions
Nl : necrotic lesions
** + : symptoms
\- : symptomless

Table 3. The reaction of *Solanum* species to potato S *carlavirus* (PVS)

Solanum species	Symptoms*		ELISA	Biotest**
	Local	Systemic		
Solanum capsicastrum	-	-	0.099	-
Solanum comatum	Nl	Mo	1.173	+
Solanum dulcamara	Chl	Chl	0.319	+
Solanum luteum	-	-	0.103	-
Solanum nigrum	-	-	0.138	-
Negative control			0.099	
Positive control			1.173	

* Mo : mosaic symptoms
Chl : Chlorotic lesions
Nl : necrotic lesions
** + : symptoms
\- : symptomless

New host-virus relations have been reported, which have great importance both in plant virology and weed biology.
This study and our preliminary examinations confirm the importance of wild *Solanum* species in virology (Kazinczi and Horváth 1994, Takács *et al.* 2000a,b). There are unknown reactions between *Solanum* species to different viruses, therefore to study their susceptibility and resistance characteristics is necessary in future.

ACKNOWLEDGEMENTS

The work was supported by the Hungarian Scientific Research Foundation (OTKA F029353).

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