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TRANSMISSION OF THREE ISOLATES OF GRAPEVINE FANLEAF NEPOVIRUS TO GRAPEVINE SPECIES AND ROOTSTOCK HYBRIDS BY TWO POPULATIONS OF *XIPHINEMA INDEX*

by
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Summary. Grapevine species and rootstocks, including *Vitis vinifera* x *Muscadinia rotundifolia* hybrids, were tested in pots for resistance to the transmission of grapevine fanleaf nepovirus (GFLV) by *Xiphinema index*. All rootstocks were exposed to two populations of *X. index*. Three isolates of GFLV were equally well transmitted by the two nematode populations and detected by DAS- ELISA test in all species and rootstocks tested.

Resistance to the transmission of grapevine fanleaf nepovirus (GFLV) by *Xiphinema index* Thorne *et* Allen was found in *Muscadinia* (*Vitis*) *rotundifolia* Small (Boubals and Pistre, 1978; Bouquet, 1981) and some hybrids with this species in its parentage are reported to be resistant to transmission of the virus by its nematode vector in pots (Staudt and Kassemeyer, 1990) as well as in the field (Lider and Goheen, 1986; Walker *et al.*, 1989).

However, it is known that different populations of longidorid nematodes vary in their efficiency of transmission of different virus strains (Brown and Taylor, 1981) including GFLV (Catalano *et al.*, 1989) and that grapevine rootstocks may react differently to different populations of *X. index* (Coiro *et al.*, 1990).

This paper reports the results of transmission trials of three GFLV isolates by two populations of *X. index* to *Vitis* species and hybrids including four hybrids *V. vinifera* x *M. rotundifolia* of the series E of Olmo (1971).

Materials and methods

Healthy two-bud cuttings of the species or hybrids, obtained from the collection of the Dipartimento di Protezione delle Piante dalle Malattie, were rooted and kept four months in a sterilized sand bed in a glasshouse; in June, 1988 they were transplanted singly into six litre clay pots filled with sandy loam mixed with an appropriate amount of nematode infested soil to give a population density of 500 *X. index* per pot.

Of the two populations of *X. index* used, one had been collected from a GFLV-infected «Italia» vineyard at Rutigliano, Bari and was used directly as inoculum in the trials. The other population collected from the rhizosphere of a fig tree near Bari, was cultured for four months on GFLV-infected *V. vinifera* L., either cv. Cannonau, from Sardinia or cv. St. Anna, from Gioia del Colle, Bari (both from the cololection of the Dipartimento di Protezione delle Piante dalle Malattie) before being used as inoculum.

The controls consisted of two nematode — free pots of healthy plants for each species or hybrid tested (Table I) and two healthy *V. rupestris* cv. St. George in pots infested with the GFLV — infected *X. index* population from Rutigliano or the population from Bari cultured on GFLV — infected cv. Cannonau or cv. St. Anna.

All pots were maintained, in a randomized block design, in a screenhouse until July 1991, and receveid the usual cultural care throughout the duration of the experiment.

Each plant was tested at least three times a year, during different growth stages, to detect the presence of GFLV. Shoot tips, leaves and woody canes were assayed in DAS-ELISA (Clark and Adams, 1977) using an antiserum to GFLV produced locally. The concentration of γ-globulin was 1 g/ml and the coniugate dilution was 1 : 1000. The reactions were read with a Titertek Multiskan MK II at 405 μm.

At the end of the experiment, July 1991, 200 ml of soil were collected by six auger cores around each plant and nematodes were extracted by the Cobb wet sieving technique to determine population densities of *X. index*. Root systems were examined for evidence of nematode feeding.

Results and discussion

Roots of all the plants grown in pots infested by *X. index* were awollen and distorted at the tip, indicating that nematode feeding had occurred.

When the experiment was discontinued, July 1991, all the surviving plants in the nematode infested pots gave positive reactionss to the ELISA test (Table I), whereas only negative absorbance values were observed on samples taken from plants in the uninfested pots. Many plants gave positive ELISA absorbance values after only one year's exposure to nematode infestation and, particularly on *V. rupestris* cv. St. George, there were typical symptoms of GFLV infection in the young foliage.

Positive evidence of virus transmission through the ELISA test was most often obtained in the second year of the experiment (Table I); but in one case not until the third year indicating that GFLV may spread at different rates in different host. Thus, to give conclusive results, serological testing of nematode inoculated viruses should not be performed too early after exposure to viruliferus vectors.

In all the pots *X. Index* increased several folds from the initial population density, but no difference were observed amongst plant host or population origin. No differences were observed in the efficiency of transmission of the various isolates of GFLV. Therefore it can be concluded that, under the conditions of the trials, none of the species or hybrids tested are resistant to transmission of GFLV by *X. index* nor resistant to the nematode itself.

TABLE I - *Response of the ELISA tests on grapevine rootstocks exposed to viruliferous populations of* Xiphinema index *carrying three isolates of grapevine faleaf nepovirus (GFLV) (positive/tested).*

Nematote population	Bari						Rutigliano		
Virus isolate	Cannonau			St. Anna			Italia		
Year	1989	1990	1991	1989	1990	1991	1989	1990	1991
Species and hybrids									
V. vinifera x *M. rotundifolia* hybrid E1	0/1	1/2	2/2	2/2	3/3	3/3	1/4	1/4	3/3
E2	0/2	1/2	1/1	1/3	2/3	2/3	0/4	1/4	4/4
E5-110	1/2	2/2	1/1	1/2	3/3	3/3	2/3	2/3	3/3
E5-124	0/2	1/2	1/1	0/2	3/3	3/3	1/3	3/4	1/2
Gold x El Salvador	1/2	2/2	2/2	1/3	2/3	3/3	2/3	3/4	4/4
Grezot (16-16 Couderc x Rup. du Lop x Aramon 1)	0/1	2/2	2/2	2/3	3/3	3/3	2/4	2/4	4/4
Concord (*V. labrusca*)	1/2	1/2	2/2	2/3	1/2	1/1	2/4	1/4	4/4
V. silvestris	0/1	1/2	1/1	1/3	2/3	3/3	0/3	4/4	4/4
El Salvador (*Vitis* sp.)	1/2	2/2	2/2	1/2	3/3	3/3	2/3	2/3	2/3
Jacques (*V. aestivalis* x *V. cinerea* x *V. vinifera*)	0/2	0/2	1/1	1/4	3/4	4/4	0/4	3/4	3/3
V. tiliaefolia	1/2	1/2	2/2	2/3	1/3	3/3	1/3	3/3	3/3
V. rupestris «St. George»	2/2	2/2	2/2	2/2	2/2	2/2	2/2	2/2	2/2

Dead plant indicated where the number of tested plants descreases with respect to the previous year.

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