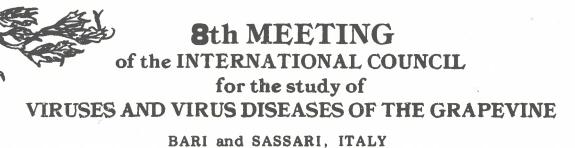


# ABSTRACTS OF PAPERS



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Virus-like Diseases and Viruses of Grapevines: some problems and concepts in researching them.

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An overview.

Knowledge of viruses and virus diseases of grapevines has advanced substantially over the relatively short life of The International Council for the study of Viruses and Virus Diseases of the Grapevine. Each of you are to be commended for your contributions.

Unresolved is the nature of the pathogen(s) of each of the virus-like diseases such as fleck, line pattern, vein necrosis, yellow dwarf, yellow speckle etc. So are they viruses, viroids, prions or ????

Other challenges include: 11- fully characterize each of the viruses of grapevine and for that many of the other plant viruses too in order that they will fit into a classification and nomenclature scheme for all viruses; 2- map the genome of each of the grapevine viruses i.e. determine the genes, their function and location on the virus chromosome in view of elucidating virus-host interactions; and 3- because the interactions can be virus on host or host on virus, determine the genes of grapevine that interact with virus(es) and the chromosome location of each in view of engineering and/or breeding for resistance to the virus or viruses.

Methods for determining and identifying the pathogens of virus-like diseases and for characterizing viruses are established. The sequence of nucleotides of several plant viruses has been determined. Futhermore, methods for locating genes of grapevine that interact with viruses and also their chromosome location are available.

"If there is a will, there is a way".

In researching these grapevine virus problems, do be imaginative, enlarge on your concepts, be bold, explore the byways, ask penetrating questions, construct creative-possibility models and in doing so, draw on research in all of virology, genetics, genetic engineering and the impinging sciences.

### 8th MEETING

of the INTERNATIONAL COUNCIL
for the study of
VIRUSES AND VIRUS DISEASES OF THE GRAPEVINE

BARI and SASSARI, ITALY

SESSION 1

NOVEL VIRUSES AND VIRUS DISEASES. NEW DATA
ON KNOWN DISEASES AND THEIR AGENTS

REACTIONS OF HOST PLANTS TO THE PRESENCE OF GRAPEVINE BUL-GARIAN LATENT VIRUS IN MIXED INFECTIONS WITH OTHER VIRUSES OF THE GRAPEVINE

#### B. Dimitrijevic

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During investigations on the host range of a newly discovered virus of grapevine in Yugoslavia, which has been identified as grapevine Bulgarian latent virus (GBLV) unusual reactions of tomato (Lycopersicon esculentum), thorn apple (Datura stramonium), black nightshade (Solanum nigrum) and other herbaceous test plants were noticed, which were not typical of GBLV infections. In the grapevines from which GBLV had been isolated tobacco mosaic virus (TMV) was also present together with another virus whose identification is in progress. According to preliminary experimental data, it appears likely that this virus may be tomato black ring (TDR (TBRV), which had not been previously recorded from grapevine in Yugoslavia. The presence of this complex of viruses could probably explain the occurrence of certain reactions of infected grapevines which could not be ascribed to the effect of GBLV infections alone.

#### OCCURRENCE OF GRAPEVINE YELLOW MOSAIC IN ISRAEL

#### E. Tanne

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Grapevine yellow mosaic is a component of the grapevine fanleaf syndrome. The symptoms occurring on the leaves of affected vines are characteristic and different from those of fanleaf, i.e. chrome yellow mottle of the foliage in early spring, yellow vein netting and vein banding. The chrome yellow mottling usually appears in spring time and fades away later in the summer. This disease is widespread in the world but the first records from Israel were in 1970-71. Infected plants were rouged out. Ten years later numerous new cases of yellow mosaic-dieseased grapevines were found in many vineyards of the Zamarian region. The disease occurs in vineyards planted twenty or more years ago with imported propagation material, as well as in vineyards planted with virus-free propagation material. The high number of Xiphinema index found in these plantations may account for the reinfection of young vineyards. The agent of the disease was mechanically transmitted to herbaceous hosts causing typical symtoms. Agar gel diffusion tests confirmed the serological relationship with different isolates of fanleaf virus.

PRESENCE OF GRAPEVINE VEIN NECROSIS AND A VEIN MOSAIC DISEASE IN THE EMILIA ROMAGNA REGION (NORTHERN ITALY)

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Indexing tests on <u>Vitis rupestris</u> x <u>V.berlandieri</u> 110 R have proved that 34 out of 62 clones of <u>V.vinifera</u> L., belonging to 24 cultivars growing in the Emilia Romagna region, carry a latent infection of vein necrosis.

A preliminary investigation of a vein mosaic disease occurring frequently in several cultivars has also been reported. Foliar symptoms, variable in appearance and intensity according to cultivars and years, mainly consist of light green discolorations along the veins. These usually develop in early summer on a few young, expanding leaves and in recently matured ones and remain visible until autumn. No cane abnormalities are associated with infected vines and the disease does not visibly reduce shoot growth.

Mechanical transmission tests on herbaceous plants have been unsuccessful. The leaf disorder has been transmitted by grafting onto Mission, LN 33, V.rupestris x V.berlandieri 110 R, V.riparia cv Gloire. No symptoms were observed on St.George. On the basis of symptomatology and indexing tests, we consider the disease similar to Grapevine vein mosaic first described by Vuittenez (1966) in France. It also bears close resemblance to Grapevine summer mottle more recently described by Krake and Woodham in Australia (1978).

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A leaf disorder akin to vein banding disease occurs in Sardinia in all areas where cv Cannonau is cultivated. It may reach, in some vineyards, an incidence higher that 25%. The symptoms, which sometimes are very severe, are erratically shown. Selfrooted and grafted (on virusfree rootstocks) vines propagated from plants that were symptomless in the place of origin, developed symptoms when grown in other localities, though in an inconsistent manner. The field symptomatology was reproduced, again erratically, on woody indicators (Mission and LN 33) during indexing for sanitary selection. Mission was more sensitive than LN 33 although some negative responses were obtained using material from symptomatic vines. The inconsistency of symptom expression does not seem to depend on the different environmental conditions under which the vines are grown. In twelve varietes other than 'Cannonau', the same disease was present in latent form, as shown by the response of woody indicators. No consistent association was found between vein banding-like symptoms and presence of grapevine fanleaf virus in any of the varietes under study, including 'Cannonau'. This prompts us to speculate that the vein banding-like condition observed in Sardinia may result from the interaction of different factors, among which the one involved in the genesis of Australian yellow speckle, which is considered to be widespread in the world. Further studies are in progress but it appears that international cooperation would represent a most sensible approach for the aetiological definition of this and similar diseases.

### ISOLATION AND PURIFICATION METHODS FOR GRAPEVINE FANLEAF VIRUS

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#### CHARACTERISATION OF A GRAPEVINE ISOLATE OF BROAD BEAN WILT VIRUS

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A virus which proved to be serologically related to broad bean wilt virus (BBWV), was isolated in 1982 by inoculation of sap from South African grapevines. Purified preparations of this virus contained three classes of isometric particles c. 28 nm in diameter, with sedimentation coefficient of 58 S (T), 94 S ( $\overline{M}$ ) and 117 S (B) and containing 0, 24 and 34% nucleic acid, respectively. At equilibrium in cesium sulphate gradients, the buoyant densities of M and B components were 1.41 and 1.43 g/cm<sup>3</sup>, respectively. Particle preparations contained two species of single stranded RNA with mol. wt 1.7  $\times$  10 $^6$  (RNA-2) and 2.5  $\times$  10 $^6$ (RNA-1) daltons. Under denaturing conditions the coat protein dissociated into two polypeptides which, in polyacrylamide gel electrophoresis migrated as two bands with mol. wt of 45.000 and 23.000. In immunodiffusion tests, purified virus preparations formed specific precipitin lines with the homologous antiserum (titre 1:512) and with antisera to a southern Italian isolate of BBWV and to serotype 1 of BBWV. No reactions were seen with antisera to Lamium mild mosaic virus and serotype 2 of BBWV. Comparable results were obtained with immunoelectron microscopy tests using the same antisera as above. In thin-sectioned broad bean and Chenopodium quinoa tissues, cytoplasmic inclusion bodies were present which were made up of accumulations of membranous and electron-dense granular material. These inclusions were very similar to those typically induced by BBWV.

RELATIVE SUSCEPTIBILITY OF AMERICAN, FRENCH HYBRID AND EUROPEAN GRAPE CULTIVARS TO INFECTION BY PEACH ROSETTE MOSAIC VIRUS.

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In 1974, own-rooted 1-year-old scion and rootstock cultivars were planted beneath peach rosette mosaic virus- (PRMV) infected cv. Concord grapevines in a southwestern Michigan vineyard. All source vines were first tested using Chenopodium quinoa indicator plants and serologically tested to confirm infection by PRMV. Soil samples for the presence of Xiphinema americanum revealed c. 30/100 cc soil. Five test vines of each test cv. plus a single known susceptible cv. Concord vine were planted next to an infected source vine. All vines were indexed annually for infection by PRMV using C. quinoa until 1977, when ELISA was used annually thereafter. The following test vines evaluated through 1984 were found to be infected: Aurore (\$5279), Baco Noir (Baco #1), Concord, Elvira, Niagara, Vidal 256, Couderc 1212, C. 1613, C. 3306, C. 3309, Kober 5 BB and Riparia Gloir. Test vines which did not become infected over the 10-year period, even though the cv. Concord companion vine did become infected were as follows: Chancellor (\$7053), Chelois (\$10876), Delaware, Rougeon (S5895), White Reisling, C. 1202 and C. 1616. Test vines in which neither the test vine nor the companion cv. Concord vine became infected were: Cascade, Colobel (S8357) DeChaunac (S9549), Foch (Kuhlman 188-2), Pinot Noir, Seyval Blanc (SV 5-276). Vignoles (Ravat 51) and Oppenheim (S04).

### AN UNREPORTED VIRUS-LIKE DISEASE OF CV ITALIA GRAPEVINES IN SICILY

#### G: Granata

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Virus-like symptoms on vines of cv Italia have been detected since 1981 in a vineyard of Montedoro (Sicily) and, later in several localities of the Caltanissetta and Agrigento provinces. The disease seems to be limited to cv Italia in which it induces the following symptoms: chlorotic spots of the leaves from June onward, necrosis of foliar tissues and cracks similar to those reported for the dise ase known as "infectious necrosis", deformation of the the leaf blades, cork formation on berries, shoots and bunch stalks. Affected plants are less vigorous than normal, their bunches are shorter and may show severe dropping off of ber ries: The leaf symptoms observed in the field have been re produced by cutting propagation and grafting diseased wood onto virus free Vitis vinifera. Graft transmission tests to some differential Vitis indicators and herbaceous plants have been carried out for establishing the nature of the disease.

#### GRAPEVINE VIRUS DISEASES IN KRASNOVAR REGION OF THE USSR

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#### AETIOLOGY AND DIAGNOSIS OF GRAPEVINE FLECK

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#### STEM PITTING AND STEM GROOVING SYMPTOMS IN GRAPEVINE

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STEM GROOVING (STEM PITTING, LEGNO RICCIO)-LIKE SYMPTOMS IN VINES OF THE VARIETY KERNER IN GERMANY

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Kerner, a new white berried grapevine variety, obtained by crossing Vitis vinifera cultivars Trollinger and White Riesling, was registered in 1969 and released for cultivation in Germany. Because of its valuable characteristics and high yield, Kerner was favourably accepted by growers and consumers so that, in 1983, 6.4% of the German viticultural area was planted with it. The spread of this variety has now come to a stop because of a devastating disease, which will be referred to as "Kerner disease" (KD), unknown to other cultivars. During the vegetative period KD progresses as follows: shortly before blooming leaves and inflorescences begin to wither and dry up slowly while the foliage turns reddish brown. In vines that become diseased during summer the leaves turn yellow, the bunches shrivel and, eventually, dessiccate. Withered shoots and grapes remain attached to the canes till autumn. Diseased vines always die, usually when bunches begin to ripen. In KD-affected vineyards, the number of dead vines ranges fro 5 to 20% with peaks of up to 75%. KD occurs in all viticultural areas of Germany, especially in the valleys of Rhine, Nahe and Mosel. KD is characterized by alterations of the wood. Canes and trunk exhibit longitudinal grooves of varying depth. Depressions (pits) of the woody cylinder contain pegs of dead bark. The wood of the rootstock is discoloured whereas that of the scion keps its normal light colour. These symptoms are similar to those of stem pitting (legno riccio) but with some differences. In diseased vines, rootstocks dry up gradually. Their woody cylinder, which sometimes may be longitudinally split, becomes at first in part, and later totally dark brown. The Kerner scion has a bigger diameter and is swollen, especially just above the graft union. Its surface, when the bark is removed, appears wrinkled. Because of these alterations, water uptake is limited. The Kerner scion responds to water shortage by developing superficial adventitious roots which, however, are unable to supply enough water for the vine to survive during prolonged dry periods. Death of the vine ensues. The origin of Kerner disese is unknown.

### STUDIES ON THE TRANSMISSION OF RUGOSE WOOD (LEGNO RICCIO) BY GRAFTING

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In 1974, a study was initiated for assessing the suscep tibility to rugose wood (legno riccio) of the most important grapevine cultivars grown in Bulgaria and the transmission pattern to healthy vines following graft inoculation. The inoculum was derived from vines of cv Bolgar, Cabernet Sauvignon and Rcatzitelli showing evident symptoms of stem pitting. Inoculations were made in 1974, grafted vines were transplanted in the field and final readings were made in 1980. At this time, 47% of graft-inoculated vines had died. Of the survivors, 83% showed rugose wood symptoms but 17% did not exhibit apparent alterations of the woody cylinder either on the component deriving from infected donor plants or on the originally healthy stock onto which infected buds had been grafted. This result may support the view expressed by some authors that the causal agent of rugose wood is irre gularly distributed in the buds of the same cane.

INVESTIGATIONS ON THE YIELD OF 'MONICA' AND 'ITALIA' VINES AFFECTED BY LEGNO RICCIO (STEM PITTING)

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In studies carried out in southern Sardinia, the yield of vines of cv Monica and Italia naturally affected by legno riccio (stem pitting) with ot without the presence of grapevine fanleaf virus (GFV), was compared with the yield of presumably healthy vines of the same cultivars (controls) for seven and five years, respectively. The results have shown that in cv Monica, GFV is more frequent (c. 70%) in legno riccio-affected plants than in apparently healthy ones. Moreover, in spite of the high variability, affected plants produced significantly less than the controls with a yield loss of about 35%. This value exceeded 55% if legno ricciodiseased plants were also infected by GFV, as ascertained by biological (inoculation to herbaceous hosts) and/or ELISA tests. On the contrary, no differences in yield were detected in 'Italia' vines regardeless of the presence or not of legno riccio symptoms. The presence of GFV in these vines was erratic and inconsistently detected by biological tests.

#### CORKY BARK AND "MADERA" RUGOSA" IN MEXICO

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The State of Aguascalientes is an important grape-growing region of Mexico. Corky bark and "madera rugosa" (stem pitting and grooving) are widely distributed in most of the cultivars grown in this State. Their distribution and effect on yield and on vine life were previously reported. Since then, continuous attempts have been made to detect virus particles in purified sap extracts, to mechanically inoculate various herbaceous hosts using different buffers, to look for viroids by polyacrylamide gel electrophoresis and to look for the association of large particles like those reported for fig mosaic and rose rosette, which are transmitted by eriophyd mites. So far we have not found any agent consistently associated with these diseases. In one case we found a very scarce number of isodiametric particles (30 nm in diameter), but could not repeat these results.

Very young vineyards (6-8-year-old) are being pulled out due to their improductiveness. Massal and clonal selection is being carried out since 1981. Selected plants from Aguascalientes and virus-free plants from La Laguna (State of Coahuila) were planted in a vineyard in Aguascalientes in 1982. This vineyard will be carefully managed so as to coexist with the disease and to produce profitable yields. Besides, infected LN-33 plants were interplanted in this vineyard fo detecting the occurrence and the rate of natural spread of the disease and its effect on plant vigour and productivity. So far, the plants of the vineyard have retained an apparent health. Healthy LN-33 interplanted in diseased vineyards show corky bark symptoms within one year. In four years (1979-1983), all healthy LN-33 plants interplanted in a diseased block showed corky bark and madera rugosa symptoms except for those planted at the periphery (50-100 m) of the block.

NATURAL SPREAD, IMPORTANCE AND DISTRIBUTION OF THE YELLOWS DISEASES, STEM PITTING AND ENATION DISEASE OF GRAPEVINE IN CERTAIN VITICULTURAL AREAS OF GREECE

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During an extensive field survey of virus and virus-like diseases of grapevine in Central and Northern Greece and the island of Crete, data were collected on the natural spread, importance and distribution of the diseases reported in this paper. The yellows-like disease of grapevine, characterized by symptoms similar to those of "flavescence dorée" and "black wood", has a limited distribution and little economic importance. It was found occasionally in a few vineyards infecting a low percentage (0.1 to 1%) of vines. Yield losses, however, were up to 20-30% in some cases. The natural spread of the disease and the inconsistency of the symptomatological expression were ascertained during a seven-year study in an infected vineyard. During this period (1977-1983), a 10-fold decrease of the disease incidence, a fluctuation of the recovered stocks between 29.3 and 74% and records of new infections between 19.2 and 92.6% were observed. The most susceptible cultivars were Razaki and Roditis.

Stem pitting disease is associated with severe yield losses and reduced longevity of several vineyards. Besides cvs Razaki and Sultana, which were found to be the most sensitive, severe symptoms were also observed in cvs Muscat de Hamburg, Savatiano, Roditis, Xynomavro Nausis and the American rootstocks 110 R, 99 R, Kober 5BB and 420 A.

Enation disease seems to be restricted to Crete, where it affects Razaki most seriously. The inconsistency of symptom expression of this disorder was studied during the period 1978-1983 in the same vineyard, where the disease incidence fluctuated between 1.5 and 5%.

#### EPIDEMIC YELLOWS IN VINEYARDS OF CV INZOLIA IN SICILY

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In summer 1980, in a grape-growing area of the province of Palermo (Sicily) a disease of the yellows type was dete cted in vines of the white-berried cv Inzolia. In a short time the disease spread in epidemic form so that now it is present in several areas of all the provinces of Sicily. The early symptoms in July appear as a a chlorosis along the veins, yellowing and necrosis of the leaves and wilting of the bunches. Infected shoots have a weeping appearance, ma ture irregularly or remain green. Immature portions of the canes turn black in winter. The disease has been observed also in a few plants of red-berried grapevine cultivars such as 'Nerello mascalese', 'Perricone' and 'Sangiovese' in which it induces reddening of the leaves. In some arbors ("tendone") the disease was found to affect up to 96% of the vines. The observed symptomatology resembles that reported for flaves cence dorée and black wood. Studies have been carried out since 1981 for determining: the aetiology of the disease, the distribution and epidemiology of the causal agent, the effect of pesticides as a preventive measure against a possible vector, indexing on thest plants.

### OCCURRENCE OF FLAVESCENCE DOREE-LIKE SYMPTOMS ON WHITE RIESLING IN NEW YORK

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White Riesling grapevines in four locations in New York showed Flavescence doree-like symptoms in August 1983. Leaves of affected shoots were crisp, cupped downward, and ranged in color from metallic, yellow-green to green with chlorotic spots. Diseased-shoots were limp and rubbery and remained green when healthy shoots developed brown periderm. Small pimple-like pustules were found on the surface of diseased shoots. Clusters on affected shoots and the terminal portion of affected shoots were dead. The percentage of affected shoots on diseased vines ranged from 24-98. Affected shoots had fewer phloem fibers than healthy shoots. Transmission electron microscope studies of thin sections of petioles and leaf veins showed necrotic phloem tissue in affected tissue, but no evidence of microorganisms. Three affected vines were transplanted to pots in November 1983 and stored at 0°C until March 1984 when they were placed in the greenhouse. In May 1984 one vine was dead and one vine had a single live shoot attaits base. On the third vine, canes that showed symptoms in 1983 produced stunted shoots and clusters that died before bloom. Shoots arising from apparently healthy cames appeared normal until fruit set when portions of clusters died and the terminal portion of shoots died. These symptoms have not been described on White Riesling in New York although some of the symptoms are similar to "leaf curl and berry shrivel disease" on De Chaunac as described by Uyemoto (Uyemoto, J.K., J.R. Cummins, and G.S. Abawi, 1977. Am. J. Enol. Vitic. 28:131-136.). The Flavescence doree-like symptoms on White Riesling followed an unusually mild winter of 1982-83 and occurred in an exceptionally dry, warm summer. Graft transmission studies are in progress.

Closterovirus-like particles in extracts from diseased grapevines.

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Substrates of carbon-coated Parlodion-covered 200-mesh electron microscope grids made in Maryland, USA and sent, via air-mail, to Stellenbosch, RSA, were used for extracts from field-grown grapevines exhibiting symptoms of leafroll, stem-pitting, corky bark, "Merlotdisease", fanleaf complex (proper, veinbanding, yellow mosaic), fleck, yellow speckle and enations. The tissues, internodal bark, petioles, shoot apices and young leaves were extracted in 0.01M phosphate buffer containing 2.5% nicotine (final pH 9.8) and the extract negatively stained on the substrates with 2% ammonium molybdate, pH 5.0, applied dropwise. Electron microscopy, in Maryland, of such preparations detected closterovirus-like particles ca. 700 x 10 nm in extracts from grapevines exhibiting symptoms of leafroll, stem-pitting, corky bark and also in vines not exhibiting symptoms of disease. Extracts from Merlot vines showing symptoms of "Merlot-disease" contained, in addition to the closterovirus-like particles, spherical viral-like particles ca. 27 nm in diam. Long flexuous viral-like particles ca. 1300 x 8 nm were detected in extracts from a Oueen of the Vineyard vine exhibiting symptoms of corky bark. The results show that electron microscopy can detect viral-like particles in extracts from grapevines and that the preparation can be sent long distances through the mails (Postal Service). The detection of similar closteroviruslike particles in extracts from grapevines exhibiting symptoms of leafroll, stem-pitting, corky bark and in symptomless vines questions the closterovirus, per se, etiology for any single disease of grapevines whose agent(s) is only graft transmissible.

ASSOCIATION OF A CLOSTEROVIRUS WITH GRAPEVINES INDEXING POSITIVE FOR GRAPEVINE LEAFROLL DISEASE AND EVIDENCE FOR ITS NATURAL SPREAD IN GRAPEVINE

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#### SUMMARY

Electron microscope examination of negative stained preparations of root extracts of grapevine sources showed an association of grapevine leafroll disease with the presence of closterovirus-like particles. Similar particles were present in root extracts of LN-33 indicators showing grapevine leafroll disease symptoms two seasons following planting healthy vines in a grapevine leafroll infected Tinta Barocca vineyard. No closteroviruslike particles were observed from vines infected with grapevine stemgrooving (legno riccio) disease. Virus transmitted from grapevine leafroll infected vines by Planococcus ficus (Signoret) to Nicotiana clevelandii Gray was shown to be serologically similar or identical to grapevine virus A. This virus was also demonstrated in root extracts of grapevines infected with grapevine leafroll disease, root extracts of interplanted LN-33 vines, showing grapevine leafroll symptoms, and extracts of P. ficus that had fed on a grapevine leafroll source. Grapevine virus A and serologically distinct closterovirus-like particles were transmitted by  $\underline{P}$ .  $\underline{\text{ficus}}$  from a Shiraz vine infected with the so-called "Shiraz disease" to N. clevelandii. Lack of spread of a severe strain of grapevine leafroll disease over a five year period to Waltham Cross vines, carrying a mild strain, suggests a form of cross-protection similar to that operating for citrus tristeza virus.

ASSOCIATION OF A CLOSTEROVIRUS WITH GRAPEVINES INDEXING POSITIVE FOR GRAPEVINE LEAFROLL DISEASE AND EVIDENCE FOR ITS NATURAL SPREAD IN GRAPEVINE

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There appears to be a significant correlation with grape vine leafroll (GLR) diseased grapevines and the presence of a closterovirus in the root extracts. In 'Waltham Cross' root extracts the virus was found serologically related to grapevine virus A (GVA). The virus was also present in root extracts of LN-33, interplanted 3 years previously in a GLR infected 'Tinta Barocca' vineyard. Evidence will be presented that Planococcus ficus is a vector of GVA.

### SEROLOGICAL DETECTION OF TWO DIFFERENT VIRUSES IN LEAFROLL DISEASED GRAPEVINES

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Leafroll-diseased grapevines of various geographical origin (dignosed in the country of origin) were tested serologycally by ELISA for the presence of the leafroll-asso ciated potyvirus and a closterovirus. There was no cross reaction between the potyvirus and the closterovirus antiserum, but in ELISA tests both viruses were detected in leafroll infected grapevines. Twenty one leafroll-diseased grapevine stocks were tested for the presence of the potyvirus, some throughout a 2 year period, and some sporadically. All diseased stocks reacted positively with the antipotyvirus serum. Fourteen of these stocks were tested concurrently also for the presence of a closterovirus and reacted positively as well. Immunosorbent electron microscopy studies corroborated these findings. The titer of the potyvirus in grapevine leaves appears to be high in young leaves in June and later on when symptoms develop.

### CLOSTEROVIRUSES ASSOCIATED WITH LEAF ROLL AND STEM PITTING IN GRAPEVINE

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Previous work led to the isolation of a closterovirus from one stem pitting-diseased grapevine. Using the antiserum to this virus, provisionally called grapevine stem pitting associated virus (GSP-AV) and immuno electron microscopy (IEM), we tested for virus presence both leaf roll- (LR) and stem pitting- (SP) diseased grapevines of different cultivars. Similar tests were carried out in the Plant Virus Laboratories of Braunschweig, West Germany, and Bet-Dagan, Israel, to which the GSP-AV antiserum had been sent. These investigations led to the detection of both GSP-AV and another serologically distinct closterovirus in plants with both type of symptoms. Consequently, we suggest changing the name "grapevine stem pitting associated virus" to grapevine virus A (GVA), and referring provisionally to the second virus as grapevine virus B (GVB).

The present results of the IEM screening, although limited in number, point to a closer association of both GVA and GVB (in mixed infection) with LR than with SP symptoms, especially with the Italian material.

Repeated attempts to return GVA to grapevine seedlings by different means, and to isolate GVB in herbaceous hosts have not so far succeeded.