

わが国におけるgrape viruses の検定

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Indexing Grapes in Japan for Viruses

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田中彰一：わが国における grape viruses の検定

Abstract

The author carried out indexing experiments of grape viruses using four indicator plants, Mission, Baco 22A, LN-33, and Rupestris St. George, during the period, 1965 to 1970. Eleven varieties grown in Japan were proved to carry leafroll virus and five varieties to carry corky bark virus. Two varieties appeared to be infected by both viruses simultaneously. Fanleaf virus was not detected in the experimental indexing.

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Introduction

After a survey trip to California in 1963, the author noticed that certain grape varieties grown in Japan exhibit symptoms resembling leafroll or corky bark. He undertook to transmit such symptoms using standard indicator plants introduced from California. Cuttings from suspected grape varieties were mainly collected from Yamanashi Prefecture, the center for grape growing in Japan. Tissue graft inoculation tests were made at the experimental farm of Tamagawa University from 1965 to 1970. The present paper reports on results of the indexing tests.

Materials and Method

Indicator plants of four varieties were introduced from the University of California at Davis in 1964. These varieties are:

<i>Name of Variety</i>	<i>Indicator for-</i>
Rupestris St. George	fanleaf
Baco 22A	leafroll
Mission	leafroll
LN-33	corky bark

Each year in April budwood of the indicator varieties was cut into short pieces bearing three buds and placed into wet saw dust in wooden boxes. One to two months later the cuttings were transplanted to earthen pots. Some twenty varieties suspected of carrying viruses were collected at the experimental farms of Yamanashi Fruit Tree Experiment Station (Y), Suntory Research Station (S), Sadoya Winery Vineyard (SA) in Yamanashi Prefecture, and Okayama Agricultural Experiment Station (O) in Okayama Prefecture. Graft inoculations were carried out from June to July. Symptoms, typical for leafroll or corky bark were checked from August to October.

Results

Indexing for leafroll virus

In the first experiment conducted in 1965, some Mission plants expressed symptoms of leafroll virus about two months after inoculation. These were early reddening and downward rolling of the leaf blade. A typhoon in the fall, however, caused early defoliation of the plants and final results were not clear. In 1966, additional cuttings along with cuttings from two additional varieties from Sadoya Winery Vineyard (SA) were collected. Buds from these were grafted on Mission where they caused distinct symptom of leaf reddening. The third experiment was carried out from 1967 to 1970. Results of the three experiments are shown in the Table 1.

Table 1—Results of indexing for Leafroll virus on Mission

Varieties tested	Indexing results		
	Exp. 1 (1965)	Exp. 2 (1966)	Exp. 3 (1967-70)
Baily Alicante(S)**	1/6*		
Cabernet Sauvignon(S)	2/7		
Semillon(S)	4/4		
Grand noir(Y)	2/3		
Scilla(Y)	0/3		
Malbeck(Y)	0/3		
Van Buren(Y)	0/4		
Hertford(Y)		1/3	1/3
SanJaku × Muscat Angel(S)		1/3	...
Kooshu × Muscat Angel(S)		1/4	...
Merlou(S)		2/2	1/4
Black Queen(S)		3/3	2/5
Gamays Teinturies(SA)		1/3	...
Alphonse Laval(SA)		1/4	...

*Denominator and numerator stand for number of trees tested and infected respectively.

**S stands for Suntory Research Station, Y for Yamanashi Fruit Tree Experiment Station, and SA for Sadoya Winery Vineyard

According to Table 1, grape varieties, such as, Baily Alicante, Cabernet Sauvignon, Merlot, Black Queen, Alphonse Laval, Gamays Teinturies, Hertford, and certain hybrids, were demonstrated to carry leafroll virus when indexed on Mission.

On the other hand grafted Baco 22A plants did not express symptoms in the first year but in 1966 they showed distinct symptoms of stunting and yellowing leaves. In the second experiment in 1970 Baco 22A plants expressed leafroll symptoms more rapidly. Results are shown in Table 2.

Results from leafroll virus indexing on the two indicators, Mission and Baco 22A, were the same with exception of two varieties, Semillon and Grand noir. These two varieties caused distinct reaction on Mission but not on Baco 22A. According to results from Table 1 and Table 2, Mission seems to be more sensitive to leafroll virus than Baco 22A. Baco 22A seems to be a bit later to react but symptoms are remarkably distinct.

Indexing for corky bark virus

The indicator plant, LN-33 was used for this experiment. In 1965 four varieties

Table 2 Results of indexing for Leafroll virus on Baco 22A

Varieties tested	Indexing results	
	Exp. 1 (1965-67)	Exp. 2 (1970)
Merlot(S)**	2/3*	1/3*
Black Queen(S)	2/3	2/3
Semillon(S)	0/4	0/3
Hertford(S)	4/4	...
Grand noir(Y)	0/5	...

*Denominator and numerator stand for number of trees tested and infected respectively.

**S for Suntory Research Station, Y for Yamanashi Fruit Experiment Station.

suspected of carrying virus were obtained from Yamanashi Fruit Tree Experiment Station and the grafting experiment was carried out in the same season. In 1966 a rootstock plant of a grape variety affected with dead arm disease (*Cryptosporella viticola*) was sent from Okayama Agricultural Experiment Station and the grafting test was conducted with its one year old shoots in 1967. The results of these experiments are shown in Table 3.

Table 3 Results of indexing for Corky Bark virus on LN-33

Varieties tested	Indexing results		
	Exp.1 (1965)	Exp.2 (1967)	Exp.3 (1968)
Sayve-Villard(Y)**	5/5*	...	...
Van Buren(Y)	2/2	...	...
Black Queen(Y)	3/4	...	...
Semillon(Y)	4/4	...	...
Rootstock(O)	...	4/4	1/7

*Denominator and numerator stand for number of trees tested and infected respectively.

**Y for Yamanashi Fruit Tree Experiment Station

O for Okayama Agricultural Experiment Station

According to Table 3, the five tested varieties produced distinct symptoms of corky bark, such as early reddening of leaf blades and swelling and cracking of stem bark. These are diagnostic symptoms of corky bark virus. Rootstock (O) caused particularly striking symptoms of virus and no causal fungus was found on stems of the indicator plants. Two varieties, Black Queen and Semillon were found to carry two kinds of virus, leafroll and corky bark.

Red leaf symptoms of the two viruses were similar but not identical. Symptoms of corky bark showed practically complete reddening of both leaf blade and veins; with leafroll the leaf veins remained green.

All varieties tested on St. George showed no symptoms of fanleaf. This suggests that fanleaf virus was not present in the plants tested.

Discussion

Field surveys in several vineyards in Japan showed symptoms of leafroll and corky bark in certain varieties. The author carried out grafting experiments with those varieties on indicator plants of Mission, Baco 22, LN-33 and St. George. The experiments showed that several varieties, including Black Queen, Semillon, Gamays Teinturies, Alphonse Lavallee, and some hybrids, carried leafroll virus. Some showed a low incidence of infection suggesting that the author may have failed with his grafting technique or that the incidence of leafroll was actually low. Because is one of the most common virus diseases of grapes worldwide, systematic indexing tests for its presence in Japan are needed.

The incidence of infection with corky bark was very high, especially in the leafroll rootstock (O) when indexed on LN-33. This means that diseased plantings with "dead arm" in Okayama very often carry corky bark virus. Symptoms of corky bark and the "dead arm" are very similar, and the two diseases may be closely related.

Based on the indexing tests, two varieties, Black Queen and Semillon, were shown to carry two viruses, leafroll and corky bark. The author is not sure whether the tests proves double infection or whether test results represent a differential response of the indicator plants used.

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Literature on Grape Virus Indexing

- 1) Seukman, E. F. and Goheen, A. C. (1965). Proc. Intern. Conf. Virus and Vector on Perennial Hosts : 164-166.
- 2) Boulas, D. 1970. Proc. 4th Meet. Intern. Council Study Viruses and Virus Diseases Grapevine : 27-30.
- 3) Bovey, R. (1968). Berich. 3 Tagung Intern. Arbeitsgruppe Viren und Viruskrankeiten Rebe : 500-501.
- 4) Goheen, A. C., Harman, F. N. and Weinberger J. H. (1958). Phytopathology 48 : 51-54.
- 5) Goheen, A. C., Hewitt W. B. and Alley C. J. (1959). Am. J. Enol. and Vitic. 10 : 78-84.
- 6) Goheen, A. C. (1965). Proc. Intern. Conf. Virus and Vector on Perennial Hosts : 135-138.
- 7) Goheen, A. C. (1968). Berich. 3 Tagung Intern. Arbeitsgruppe Studium Viren und Viruskrankeiten Rebe : 510-514.
- 8) Hewitt, W. B. (1954). Bull. Calif. Dept. Agric. 43 : 47-64.
- 9) Hewitt, W. B., Goheen, A. C., Raski, D. J. and Gooding G. V., Jr. (1962). Vitis 3 : 57-83.
- 10) Hewitt, W. B. (1968). Rev. appl. Mycol. 47 : 433-456.
- 11) Tanaka, S. and Ootake, H. (1966). Ann. Phytopath. Soc. Japan 32(2) : 41.
- 12) Tanaka, S. and Ootake, H. (1968). Ann. Phytopath. Soc. Japan 34(3) : 208.

和文摘要

わが国における grape viruses の検定

田 中 彰 一

Grape viruses の標準的な検定植物と認められている Mission, Baco 22A, LN-33, Rupestris St. George の4種を用い、1965～1970年の間、わが国に栽培されている凡そ20品種のブドウを接木接種により検定した。その結果11品種が leafroll virus を保毒し、5品種が corky bark virus を保毒していることを認めた。しかもその中2品種はこれら2種の virus に同時感染していることが推定された。しかし本実験の範囲内では fanleaf virus を検出することができなかった。なお所謂ブドウ蔓割病は corky bark と密接な関係があるものである。