

# Study on the Control of Ripe Rot Disease of Grape

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李斗珩：포도晚腐病防除에 관한 試驗

## Introduction

Grape cultivation in Korea is increasing because the grape is one of the most desirable fruits and does well under Korean climatic conditions. Ripe rot is considered a limiting factor in grape production and the most serious grape disease in Korea.

Formerly "rot years" were fairly common in Korea and occurred whenever the seasons were warm and humid. During these seasons repeated applications of Bordeaux mixture failed to control the disease. But it was apparent that if the cultivation of grapes was to be increased in the Republic of Korea an efficient and economic control of ripe rot must be found.

The objective of this experiment was to determine the most effective control for ripe rot of grapes and to prepare recommendations to the farmer for his use.

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## Material and Method.

### 1. The variety of grape used.

The variety, Campbell Early, was used in the trials planted on land managed by the Pomology Section of the Horticultural Experiment Station.

### 2. Experimental design.

There were three single vine replications and two main treatments with five sub-plots

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making thirty vines in all.

The treatments were arranged in a split plot, randomized by design the orchard.

### 3. Treatments

#### a. Main treatment

A0...Bunches not covered with news paper bag.

A1...Bunches covered with news paper bag.

#### b. Sub-treatment

B0...Phaltan-wp 50%

2 lbs in 100 gallons of water.

B1...Tuzet.wp 80%

0.5 lbs "

B2...Delan-wp 75%

1.7 " "

B3...Bordeaux mixture

5-5-100 gallons of water.

B4...Control.

All fungicides were applied liquid form with a small power knapsack sprayer. Dipterex, an insecticide was added to each spray to control the insects. Applications were made June 15 and 24, July 4, 14, and 24, and Aug. 4 and 14, 1962.

All plots were subject to natural infections.

Hannong spreader was added with 3.6 cc to 5 gallons of fungicide of each spray.

4. The percentage of ripe rot was determined by counting the healthy and diseased berries, of each bunch and calculating the percentages of ripe rot per bunch (Table 1).

Four groups were set up based on the percentage of infection as follows: (Table 4)

1.....0 disease

2.....1.....5% disease

3.....6.....30% disease

4.....3.....100% disease

Counts were made Aug. 30 for the non-bagged vines and Sept. 7 for the bagged vines.

## Results of Experiment

1. Effect of paper bagging and application of fungicides on the infection of ripe rot on berries of grape.

In the following tables are presented the results of the paper bagging and fungicides application.

**Table 1.** Effect of paper bagging and application of fungicides on the ripe rot of grape expressed in terms of percent of the berry infected.

Main plot Rep. No.	Fungicides					
	B0	B1	B2	B3	B4	
A0	1	41.96	0.56	4.13	9.33	35.34
	2	49.71	1.65	3.09	1.25	53.12
	3	37.70	8.83	6.47	23.77	24.55
	Sum	129.37	11.04	13.69	39.35	113.01
	Mean*	43.65	2.56	4.10	14.31	40.84
A1	1	0.06	0.0	0.0	0.74	3.53
	2	0.0	0.0	0.0	10.68	4.51
	3	0.28	0.0	0.0	1.42	6.14
	Sum	0.34	0.0	0.0	12.84	14.18
	Mean*	0.09	0.0	0.0	2.11	5.18

Remark\* Mean of each treatment calculated from  $\frac{\text{Total No. of diseased berries of each treatment}}{\text{Total No. of berries of each treatment}} \times 100$

The percentage of ripe rot of grape were so small as 0 %, the following data was transformed by following formula of the square root transformation.

$$\sqrt{X + \frac{1}{2}} \quad x: \text{Attacked percentage of ripe rot berries.}$$

**Table 2.** Data in transformed by the square root transformation from Table 1.

Main plot Rep. No.	Fungicides					
	B0	B1	B2	B3	B4	
A0	1	6.25	1.03	2.15	3.14	5.99
	2	7.09	1.47	1.89	1.32	7.32
	3	6.18	3.05	2.64	5.31	4.99
	Sum	19.79	5.55	6.68	9.77	18.30
	Mean	6.60	1.85	2.23	3.26	6.10
A1	1	0.75	0.71	0.71	1.11	2.01
	2	0.71	0.71	0.71	3.34	2.24
	3	0.88	0.71	0.71	1.26	2.58
	Sum	2.34	2.13	2.13	5.71	6.83
	Mean	0.78	0.71	0.71	1.90	2.28

**Table 3.** Means of each treatment of Split-plot experiment on grape rot control.

Main plot	Fungicides					
	A0	B1	B2	B3	B4 Mean	
A0	0.80	1.85	2.23	3.26	6.10	4.01
A1	0.78	0.71	0.71	1.90	2.28	1.28
Mean	3.69	1.28	1.47	2.58	4.19	2.64

Remarks 1. 5% level L.S.D. 0.76, difference between treatment A0 and A1.

2. 5% level L.S.D. 1.81, difference between each fungicide.

3. 5% level L.S.D. 1.74, difference between paper bagging and no paper bagging in each fungicide.

The percentages of ripe rot of grape are given in Table 3. Paper bagging was significantly better than non-paper bagging. But there were no differences between Tuzet or Delan with paper bagging and Tuzet or Delan without paper bagging. Therefore we can conclude that application of Tuzet or Delan will control ripe rot without paper bagging.

Differences between fungicides are variable. Tuzet and Delan were quite effective in controlling of ripe rot in comparison with the other treatments. Bordeaux mixture resulted in relative good control of ripe rot. Phaltan was not effective in controlling of ripe rot of grape.

2. Effect of fungicides on the infection of bunches of grape.

**Table 4.** The effect of fungicidal sprays on the healthy bunches and infected bunches for grape ripe rot control.

Fungicides	Healthy bunches①		Infected bunches②	
	Percentage $\sqrt{X + \frac{1}{2}}$ ③	Percentage $\sqrt{X + \frac{1}{2}}$	Percentage $\sqrt{X + \frac{1}{2}}$ ③	Percentage $\sqrt{X + \frac{1}{2}}$
Tuzet	100.0	10.02	④0.0	0.71
Delan	90.04	9.52	3.19	1.89
Bordeaux mixture	75.12	8.70	21.89	4.73
Phaltan	28.90	5.42	46.33	6.84
Control	16.41	4.11	80.00	8.99

Remarks. ① Healthy bunches mean up to 5% infection The small amount of infection does not reduce the market value.

② Infected bunches mean over 30% infected berries per bunch.

③ Data calculated by the square root transformation.

④ Significance 5% level of the Duncan's new multiple test.

According to the Table 4. there is 1% level

significance between treatments.

It is clear from the above that application of Tuzet and Delan on ripe rot control of grape significantly better than the other treatments.

### Discussion and Conclusion

Numerous studies have been made on the method of infection by the ripe rot organism in an attempt to develop successful control for the ripe rot.

Yano (6) reported that *Glomerella cingulata* overwinters beneath the bark of the vine, in which it develops spores in the spring. Rapid distribution of spores must be explained on the basis of washing and wind-blown combined with favorable weather condition.

Infection does not occur until fairly late in the growing season. Although the green fruits do not become readily infected fungicides should be applied earlier than the general schedule which we usually follow.

A detailed report of the life history of the organism by Yokohama (8) is verified Yano's findings.

Ko (5) concluded that paper bagging of bunch grape could satisfactorily control ripe rot of grape. In this experiment bagging the bunches of grape immediately after blooming, June 15, effectively protected the grapes from ripe rot.

Danaka (1) reported that Pickering mixture and Basic copper compound were not only effective for the control of ripe rot but also stimulated shoot growing and produced a more desirable color. He concluded that Basic copper compound could be used for ripe rot control during the summer rainy season. But Basic copper compound has not been generally used. Most grape growers have continued to use Bordeaux mixture, though its use is not been justified in light of the results.

Yano (7) and Isiyi (3) recently reported that Monzet was very effective in the control of ripe rot of grape. Isiyi (4) reported that Captan is also very effective in controlling ripe rot, but it

is not entirely satisfactory because it suppresses the normal formantion organism. Finally he conculed that Monzet was the most effective for controlling grape ripe rot and suggested that it can be used on grapes up to three weeks prior to harvest. This experiment indicated that Tuzet and Delan-wp were most effective in the control of ripe rot of grapes either with or without bagging in 1962.

### Summary

Ripe rot, caused by *Glomerella cingulata* is the most destructive disease of grapes in korea. this experiment was to determine the most effective control teratment for ripe rot of grapes.

The variety, Campbell Early, was used in the trials planted on land managed by the Pomology Section of the Horticultural Experiment Station.

This experiment indicated that Tuzet and Delan-wp were most effective in the control of ripe rot of grapes either with or without bagging in 1962.

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**摘 要**

晚腐病은 포도의 着色期부터 장마가 오면 激發하는 病害로서 우리나라에 있어서 被害가 甚함은 勿論 防除가 어려운 것으로서 本試驗은 被袋와 藥劑撒布를 兼하는 것과 藥劑撒布만을 하여 그 效果를 比較코져 園藝試驗場 果樹科 포도원에서 品種 켄벨얼리를 供試하여 試驗하

였다.

1. 有袋區는 無袋區보다 藥劑間이나 無處理間에 있어서 포도晚腐病을 防除하는데 效果의 이었다.

2. Tuzet와 Delan은 有袋區나 無袋區에 있어서 다른 處理區보다 포도晚腐病防除에 效果의 이었다.

金命午·朴鍾聲·鄭厚燮 共著

**植物病理學** 菊版洋裝 350面

農林業의 發達과 植物疾病의 防除가 우리나라 產業發展의 基幹이 됨은 贅論을 不要하는 것이다. 本書는 植物病理學의 理論面보다 實際에 着重하여 著者가 拾數年間 大學에서 實驗한 豐富한 實

材料를 土臺로 하여 實例(高眞 500餘枚)를 들어 解說하였으며 우리나라 作物의 重要病害는 빠짐없이 詳細히 그 處理法까지 記述하였다. 主로 農科大學 學生과 文理科大學·師範大學의 生物科 學生들의 植物病理學 教科書 또는 參考書로서, 한 걸음 나가서는 實業高等學校 敎師와 農業試驗場의 技術者, 農事敎導師들의 技術指導書로서 企劃編纂한 것이지만 一般 農業技術者는 勿論 實際로 農業에 從事하는 여러분들에게도 도움이 될 줄 믿는다.

[內容] ① 緒論 ② 植物病理學의 發達史 ③ 植物疾病과 病徵 ④ 罹病植物의 解剖學的變化 및 生理的變化 ⑤ 病原의 種類와 性質 ⑥ 病原體에 對한 植物의 抵抗性과 抵抗性의 遺傳 ⑦ 植物疾病과 環境誘因 ⑧ 植物病害防除의 農藥 ⑨ 細菌病 ⑩ 粘菌病 ⑪ 植物病原真菌 ⑫ 藻菌病 ⑬ 不完全菌病 ⑭ 子囊菌·病 ⑮ 擔子菌病 ⑯ 藻類에 의한 病害 ⑰ 寄生種子植物 ⑱ 線蟲病 ⑲ 바이러스병 ⑳ 非寄生性疾病

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金文圭·梁樹承

**新 農 藥** 菊版洋裝 400面

人口의 急激한 膨脹으로 말미암아 食糧問題는 全世界의 重大事로 되었으며 食糧增産을 爲한 科學的營農이란 말은 口號의 域을 넘어 必로 強力한 實踐段階에 들어섰다 할 것이다. 營農에 있어서 單位面積當生産을 높이기 爲한 科學的農業技術中 農藥이

占하는 比重은 肥料와 함께 極히 큰 바 있으며 그 使用量과 使用範圍는 날로 增大해 가고 있어 農藥에 對한 知識없이 農産物의 增收을 期하기는 거의 不可能한 段階에 이르렀다. 現在 農科大學에서 農藥學이 必須 또는 選擇科目으로 採擇되어 眞摯히 研究되고 있는 所以로 이러한 時代的趨勢에 緣由함이다.

이 冊은 農科大學 學生들의 敎材로서 編纂한 것이지만 中추 以上の 篤農家라면 누구나 理解할 수 있도록 平易와 簡明을 爲主로 하였으므로 大學의 敎科書로는 勿論 農村指導者·農業技術者·實農家 여러분에게도 必備의 參考書籍이 되리라고 確信한다.

[內容] ◎ 農藥의 概說·分類·性質·作用機構·使用形態와 使用方法·調製法·撒布量과 使用時期·撒布 機具·毒性和 解毒法 ◎ 殺菌劑·殺蟲劑·殺蟎劑·殺線蟲劑·殺鼠劑·除草劑·補助劑·協力劑·植物生長 調整劑·其他附錄

白庚夏·崔範烈·李義淳 共著  
外 8 名

**農林害蟲學** 菊版洋裝 500面

豊饒한 國場과 鬱蒼한 森林이 害蟲의 發生으로 一朝에 絶滅의 危境에 빠지는 例는 許多하다. 害蟲은 農作의 大敵이요 增産의 癌이다. 本書는 우리나라의 온갖 農林害蟲 하나하나에 對하여 分布·性狀·形態·驅除方法 등을 일일이 精密昭詳하게 解說하였고

그 中 主要害蟲 300餘種에 對하여는 實物寫眞으로써 形態의 特徵과 可惡한 加害相을 如實히 보여 준 害蟲學寶典으로서 本社 既刊 植物病理學과 함께 農作物病蟲學의 雙璧을 이룬다. 文章이 平易하고 內容이 簡潔하여 大學敎材로는 勿論 農業技術者·農村指導者·實農家 必携의 好伴이다.

[內容] ◎ 昆蟲의 概說·分類·形態·生態·害蟲과 益蟲·害蟲의 發生과 豫察·防除法 ◎ 水稻害蟲·麥類害蟲·豆類害蟲·茶蔬害蟲·薯類害蟲·果樹害蟲·特用作物害蟲·貯藏穀物害蟲·林業害蟲·응애類·線蟲類

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