MEASLES IN GRAPES: STUDIES ON DAMAGE AND CONTROL MEASURES

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ABSTRACT

From 1976-1981, two Thompson Seedless vineyards have been mapped for incidence of measles. In both locations and in 5 wine grape vineyards similarly examined, levels of measles were greatest in 1978 and 1979. These two years were characterized by having precipitation totals above average. This leads to speculation that measles may be influenced by environmental factors. Within the mapped vineyards, no patterns of occurrence which indicated vine to vine spread of measles was observed. Even severely affected vines sometimes appeared to recover to full vigor. The percent of vines showing symptoms in two consecutive years varied (28-92%) but averaged 49%. In 1981 a study using Thompson Seedless vines grown near Fresno showed measles is associated with per vine yield losses averaging 10, 57, and 67% for slight, moderate, and severe cases, respectively. Sodium arsenite used as a dormant treatment in two Thompson Seedless vineyards in 1981. It was applied in each case @ 3 quarts/100 gal to drip off. Shortly after application it rained. In neither case did sodium arsenite treatment appear to reduce measles. Possibly the rain influenced control efficency.

OBJECTIVES

1. To establish by surveys of affected areas if there are any relationships between measles incidence and cultivar, vine age, cultural practices, soil type, irrigation method, or water source.

2. To re-evaluate sodium arsenite as a control measure and to examine if any carryover effect is evident.

3. To estimate yield losses related to measles symptoms.

PROCEDURE

1. Mapping study: Vineyards with known incidence of measles have been identified by the co-investigator and other U C farm advisors. In each vineyard (6 Thompson Seedless vineyards in 1981) approximately 400 vines are examined for evidence of measles by an experienced observer. Examinations are made usually a few weeks before harvest to allow maximum symptom development. Each vine is rated for severity: 0 = no measle symptoms, S = less than 25% of vine affected, M = 25-75% of vine affected, H = greater than 75% of vine affected. The history of the vineyard, its age, trellis type, irrigation method, soil type, and other details of cultural practice are recorded.

2. Sodium arsenite studies: Two fungicide trials were conducted to evaluate the effectiveness of dormant treatments with sodium arsenite to control measles. Both tests were conducted in Fresno, Co., using Thompson Seedless vines. In one test LACCO brand sodium arsenite was applied @ 3 quarts/100 gal using a Mitchell air blast sprayer without fan. It was applied on 24 Feb. 1981. The test contrained 5 replicated blocks of treated and untreated vines with about 39 vines/block. Care was taken to set up blocks such that the same number of measled vines appeared in each block in 1980. In the second test, 5 replications of 139 vines were made of each of the following: application of sodium arsenite to vine, application to soil only, and no treatment. The chemical was applied in a similar manner to the first test on 25 Feb. 1981. Shortly after application it rained.

3. Field study: A Thompson Seedless vineyard located at KHFS which was being used by W. M .Kliewer for a study on the influence of trellis type, vineyard floor management, and nitrogen fertilization on yield was observed to show measles on about 10% of the vines. Each vine was rated for measles severity and fruit yield was weighed separately.

RESULTS

1. Mapping study: From 1976-1981, two Thompson Seedless vineyards have been mapped each year for measles (Figs. 1, 2). In both locations and in 5 wine grape vineyards similarly examined, levels of measles were greatest in 1978 and 1979. Weather records show that no gross temperature patterns such as warm springs or cold winters seem to be associated with variations in measles incidence. However, 1976 and 1977 were drought years and 1978 and 1979 were characterized by above normal precipitation. This leads to speculation that high levels of measles may follow wet winter seasons.

The patterns of incidence within the fields do not appear to be consistent with vine to vine spread (Figs. 3, 4). Even severely affected vines appear to recover to full vigor. The percent of vines showing symptoms in two consecutive years varied (28-92%) but averaged 49% (Table 1).

Thus, far, no cultural practice has been identified as being strongly associated with measles. A wider ranging study also examining healthy vineyards is needed.

2. Sodium arsenite studies: The results of both tests failed to demonstrate the effectiveness of sodium arsenite for measles control. In the first trial, 10.3% of vines in the treated blocks and 11.0% in the untreated areas showed symptoms. This difference is not statistically significant. In the second test 6.9, 12.6, and 10.3% showed symptoms in the vine sprayed, soil sprayed, and untreated areas, respectively. Again the trial did not show statistical differences.

3. Yield studies: Preliminary results show that the incidence of measles was not affected by trellis type (single vs double curtain), floor management (french plow, herbicide, or sod), or nitrogen fertilization (0, 100, 200, 400 lb/A). Compared to apparently healthy vines, the yield of slightly affected vines was reduced by 10% and for moderately and severely affected it was reduced by 57 and 67%, respectively.

CONCLUSIONS

Measles is reported to be caused by the fungus Fomes igniarius, a heart rot pathogen. The pattern of appearance in one year and apparent full recovery in the following year is not consistent with the behavior of heart rot pathogens. Thus, the cause of measles is unknown. Increased incidence of measles may be linked with wet winters, but no other environmental factor associated with the disease has been identified. Our tests failed to demonstrate that sodium arsenite is an effectvie control; however, rain occurred shortly after application and may have interferred with the action of the chemical. The detrimental effect of measles on yield has been clearly identified. Losses ranging from 10-67% per vine were found. This implied that a vineyard with an incidence of 30% might sustain from 3 to 20% yield loss.

Table 1. Incidence of measles in two Thompson Seedless vineyards

Year	Percent Vines with Measles		Percent Vines Showing Symptoms in Consecutive Years	
	V 1	V 2	V 1	V 2
1976	15.8	21.5		
1977	14.9	20.5	31.9	41.2
1978	42.3	90.9	43.8	92.4
1979	42.2	82.5	47.2	84.9
1980	28.1	33.0	27.9	33.4
1981	23.0	27.0	42.2	49.1

FIGURE 1

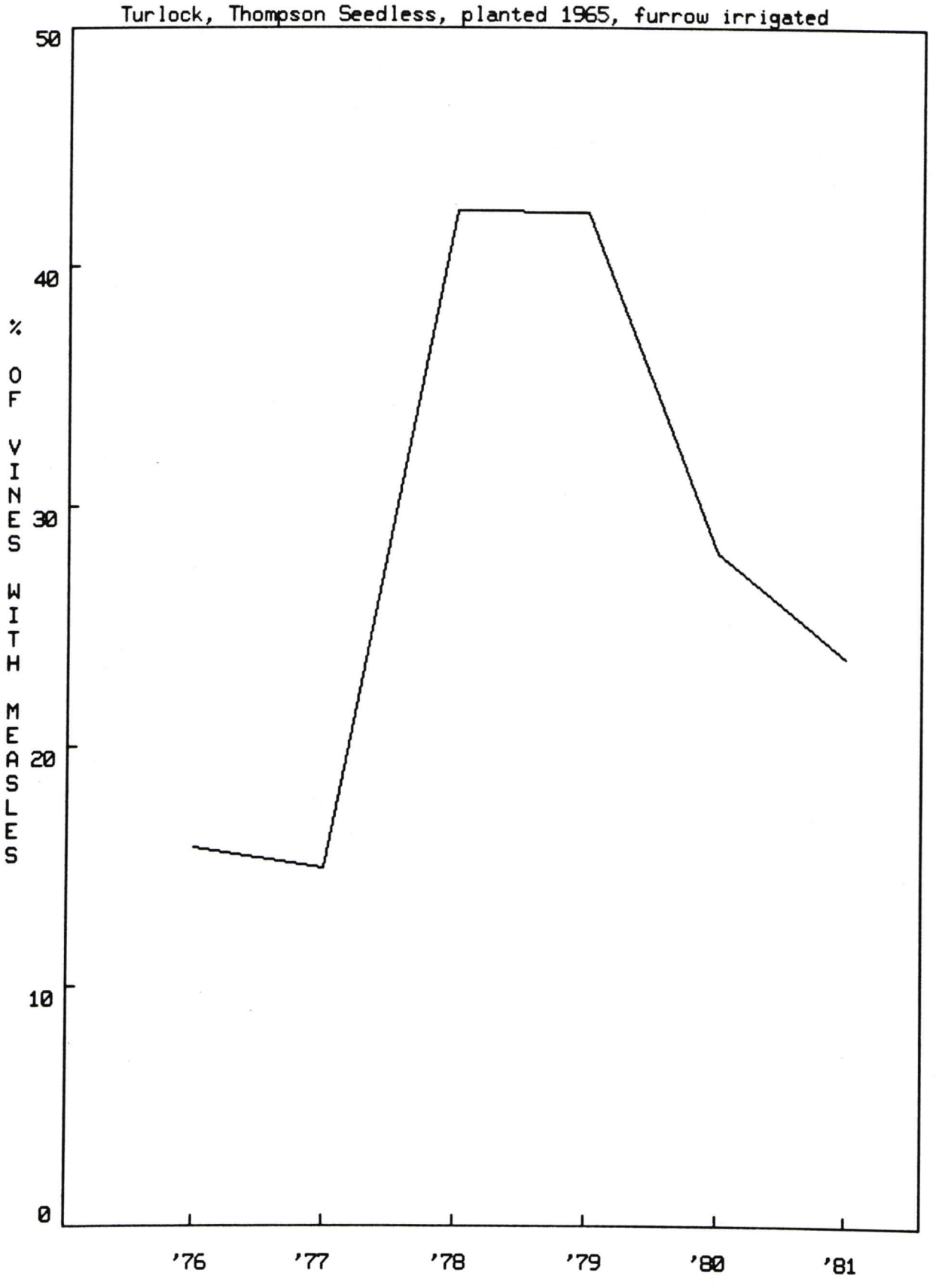

Turlock, Thompson Seedless, planted 1965, furrow irrigated
% OF VINES WITH MEASLES
50
40
30
20
10
0
'76
'77
'78
'79
'80
'81

FIGURE 2

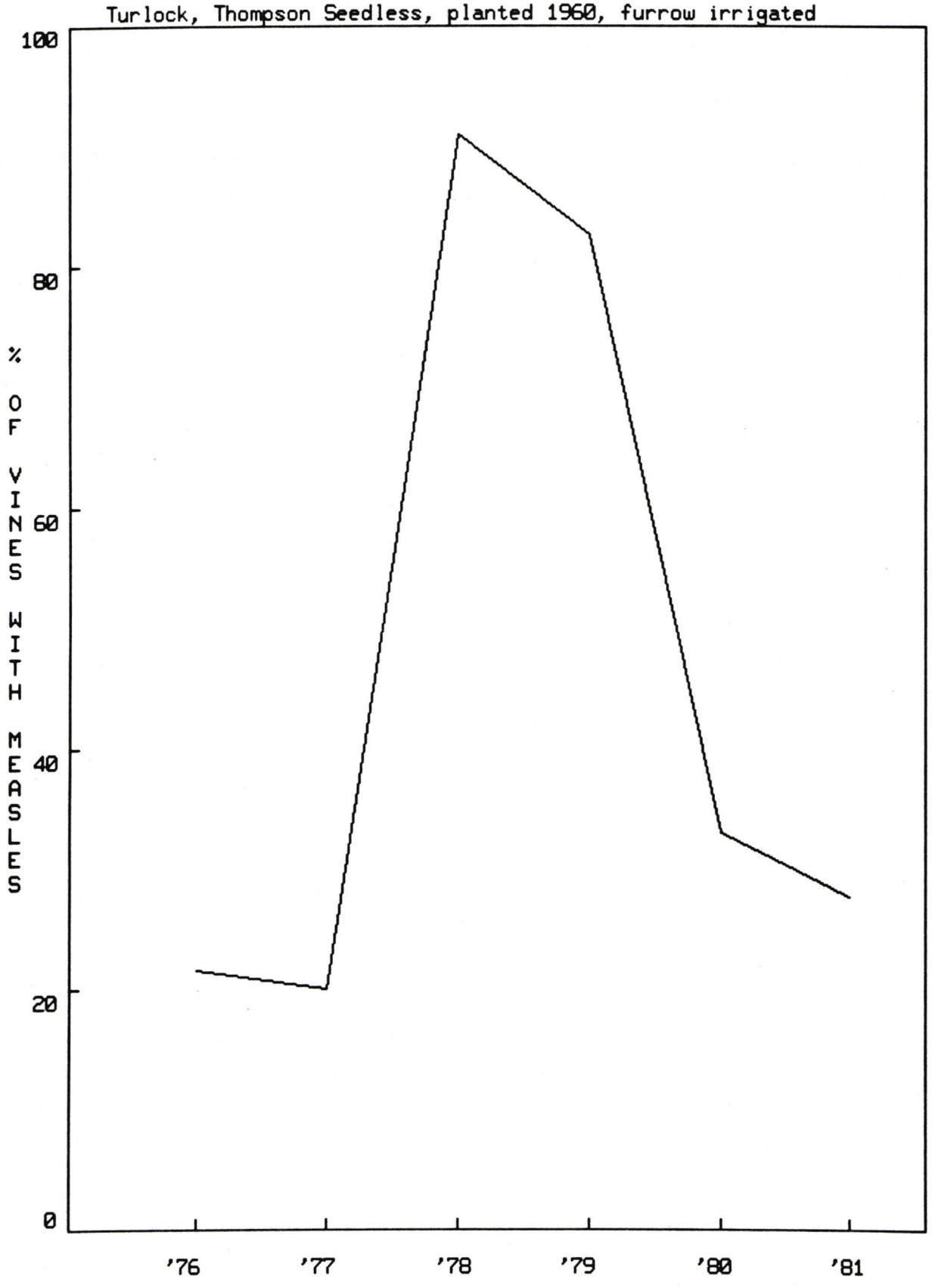

Turlock, Thompson Seedless, planted 1960, furrow irrigated
100
80
60
40
20
0
% OF VINES WITH MEASLES
'76
'77
'78
'79
'80
'81

Fig. 3. Measles incidence in Thompson Seedless vineyard. Black square represents vine with symptoms.

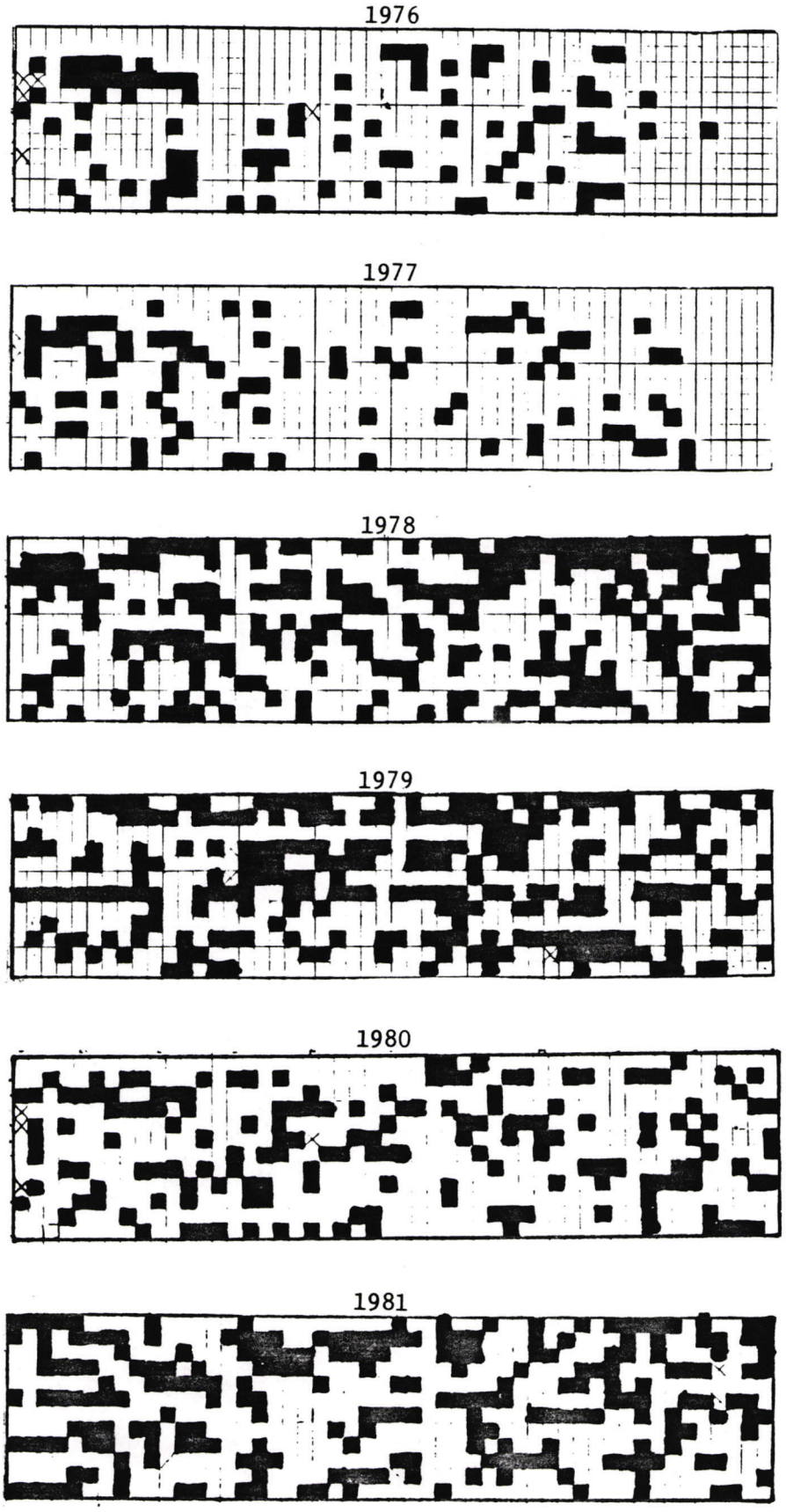


Fig. 4. Measles incidence in Thompson Seedless vineyard. Black square represents vine with symptoms.

