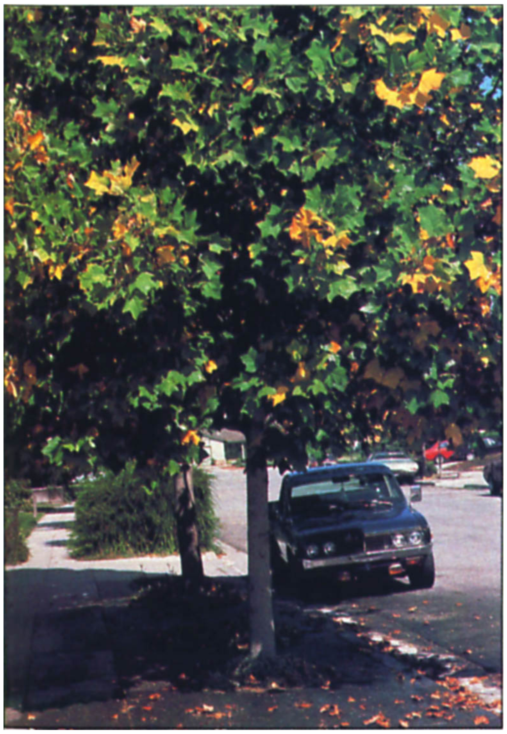

Aphid honeydew and sooty mold accumulation beneath a Berkeley street-side tuliptree. Below: Levels of oakworm feeding damage to coast live oak leaves.

Thrips damage in Chenin blanc grapes

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Jennifer Flynn □ Julie Horenstein

Feeding slowed early growth, but this vigorous variety recovered

Thrips can cause berry scarring, leaf distortion, and shoot stunting in grapes. One or two insecticide sprays may be applied each season in northern California, where shoot stunting is the major damage of concern to growers. Because no work had been done to determine economically important levels of thrips injury to shoot growth, we studied the effects of thrips populations on grape foliage at different times during the growing season and the resulting effect, if any, on grape quality.

The tests were performed in Chenin blanc wine grapes in Linden, California, during 1982 and 1983. Thrips populations were allowed to develop in untreated plots at three periods: one to three weeks after bud-break (end of March 1983); at bloom (end of May 1982); and during berry softening (August 1982).

Thrips were sampled weekly, except during the 1983 test, when three samples were taken biweekly. The species composition of 200 thrips gathered weekly from the vineyards for identification was also recorded. Shoots were measured weekly. Berry sugar content was determined at harvest (the first week in September in 1982 and 1983) with a refractometer. We used a random berry-sampling technique developed by University of California researchers M. A. Amerine and E. B. Roessler in the 1950s. Results of the tests were statistically analyzed.

Post bud-break injury

Four rows of 10 protected vines were in alternate rows (blocks) with four rows of 10 unprotected vines. Thrips were suppressed in the protected plot after post bud-break with a dimethoate application on March 20, 1983. During the rest of the season, thrips populations were suppressed with a dimethoate treatment applied (for grape leafhopper control) on June 15 to both protected and unprotected plots.

One primary shoot from five vines was selected randomly from each row, tagged, and measured each week. Five terminals per row were selected at random on each sampling date and examined visually for thrips. A terminal was defined as the growing tip plus the first unfurling leaf.

All the adult thrips sampled in March 1983 were western flower thrips, *Frankliniella occidentalis* (Pergande). Populations were significantly higher in unprotected than in protected vines on March 23 and March 30. Levels of one to three thrips per terminal significantly slowed shoot growth by 1 and 1½ inches, respectively (fig. 1). Leaves on the unprotected shoots were severely distorted and had a burned appearance. By May, however, the unprotected shoots compensated for their slow start and reached the same length as the protected shoots. At harvest, there was no significant difference in berry sugar content between the protected (21.5 percent) and unprotected (21.7 percent) vines.

Injury during bloom

Five blocks of 10 protected and 10 unprotected vines were sampled. Five shoots per block were selected as before and measured weekly. Twenty terminals were sampled randomly for thrips from each block; terminals were taken to the laboratory, where the thrips were counted after they were separated from the plant tissue.

No dimethoate sprays were applied, because populations declined by the end

Western flower thrips cause leaf distortion and shoot stunting in grapes.

Roughened appearance of grape leaf is characteristic of thrips feeding.

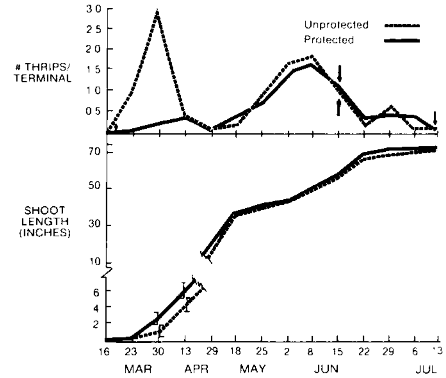

Fig. 1. Early-season thrips feeding had a significant effect on post-bud-break shoot growth on March 30 and April 13. (Arrows show times of dimethoate treatments.)

of June and remained low through the end of the season.

The numbers of thrips in the protected and unprotected vines were significantly different on June 11. The population was predominantly *Frankliniella occidentalis*, but *Thrips tobaci* accounted for 42 percent of the total (table 1). A population of 1.6 thrips per terminal stunted the shoot growth significantly (3 inches) on unprotected vines, as compared with protected vines, which had 0.8 thrips per terminal. After one week, however, the stunted vines compensated for their growth loss. At harvest there was no difference in berry sugar content between the two sets of vines.

Berry softening to harvest

The test design and sampling procedures were the same as in the bloom tests. Thrips were suppressed in the protected rows with dimethoate treatments on May 12, July 20, and August 20, 1982. Thrips populations in the unprotected rows were suppressed early in the season with a dimethoate application on May 12 but then were allowed to increase unchecked until August 20.

Late in the season, populations were again predominantly *Frankliniella occidentalis*, but *Drepanothrips reuteri* Uzel increased in numbers during early August, accounting for 35 to 49 percent of the total adult thrips sampled (see table). *Drepanothrips reuteri* also feeds on poison oak, *Rhus diversiloba* T. and G. Poison oak is abundant in the nearby foothills and dries up during midsummer, which might account for the appearance of *Drepanothrips* on grape foliage during July and August.

TABLE 1. Thrips species composition during 1982 and 1983

Sampling date	*Frankliniella occidentalis*	*Drepanothrips reuteri*	*Thrips tobaci*
1983:	%	%	%
Mar 23	100	0	0
Mar 30	100	0	0
1982:			
May 6	63	0	37
May 24	72	0	28
Jun 11	58	0	42
Aug 6	65	35	0
Aug 12	49	49	2
Aug 19	94	6	0
Aug 26	99	1	0

Note: Forty adult thrips were sampled in 1983; 200 adult thrips were sampled on each date in 1982.

Thrips populations were significantly higher in unprotected than in protected vines on August 6 and 19, reaching four thrips per terminal in unprotected vines (fig. 3). However, they caused no shoot stunting or reduction in berry sugar content. Since shoot growth normally stops in early August, a reduction would not be expected at that time. Nutrients are being transferred from the foliage to the fruit, and severe stress to the foliage could impede fruit development; however, the thrips population in our test was not high enough to elicit any effect.

We were unable to gather yields from our experiments. Because the vines compensated fully for the early stunting and berry maturities were not affected, we considered any effect on yields to be unlikely after only one season.

Conclusion

From our studies, we conclude that Chenin blanc grapes are more susceptible to thrips feeding earlier in the season, but even though populations of one to three thrips per terminal may stunt vine shoots, they will not impede berry maturity as measured by sugar content. Chenin blanc is a vigorous variety that compensates for slow shoot growth. A less vigorous variety might be more susceptible to thrips feeding.

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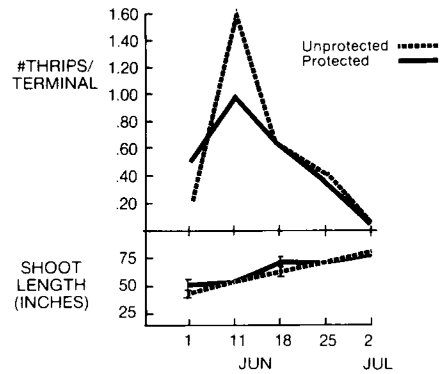

Fig. 2. Effects of thrips on bloom-period growth. Significant differences occurred in thrips populations on June 11, and in shoot length on June 18.

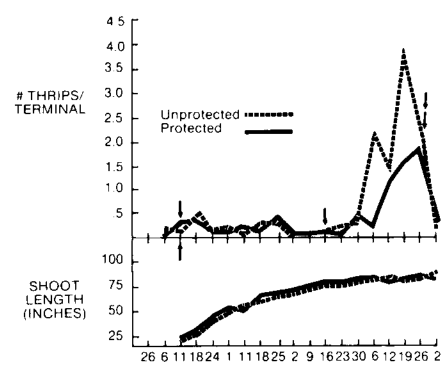

Fig. 3. Thrips populations were significantly different on August 16 and 19, but caused no significant differences in shoot length from berry softening to harvest.