FLOWER THRIPS DAMAGE TO TABLE

(1) Halo

Halo spots on Italia variety grapes produced by flower thrips egg punctures

TIMING OF HALO SPOTTING BY FLOWER THRIPS ON TABLE GRAPES

FRED JENSEN

FLOWER THRIPS oviposit in newly developing grape berries and produce a halo spot. The halo spot consists of a small dark scar surrounded by whitish tissue. If too numerous, these halo spots either reduce the grade of table grapes or result in their being culled. Fortunately only a few varieties such as Almeria, Calmeria and Italia are ordinarily affected. The greatest damage potential occurs with Italia since the skin may split at the site of a halo spot during ripening and lead to bunch rot.

Adult western flower thrips, *Franklinella occidentalis* (Perg.) are only found in large numbers in grape clusters during the bloom period—from the time the caps (calyptras) begin to shed until most of them have fallen. They are present in small numbers either before or after the bloom period. It had been assumed that ovipositing took place largely during bloom because this was the period during which large numbers of adults were found. Halo spotting could also be observed on some of the small berries towards the end of the bloom period.

Various insecticides have been used over the years to control thrips during bloom. These generally gave good control. Guthion has been the material of choice for some time, but its benefits have apparently declined in recent years. As a result of complaints about the control obtained with Guthion during the 1970 season, observations were made of a number of vineyards that season. These observations indicated that more severe damage occurred where growers had applied Guthion during bloom than in untreated vineyards. Trials were therefore initiated during the 1971 season in an attempt to determine whether the use of insecticide during bloom was failing, and when the ovipositing (leading to halo spots) was occurring.

TABLE 1.
EFFECT OF INSECTICIDES ON THRIPS POPULATION AND DAMAGE OF CALMERIA GRAPES, RICHGROVE

Material per 100 gals. applied May 19	Gals. per acre	Adult thrips per cluster May 21	Halo spots per cluster Oct. 1
1. Check	—	78.3 a*	5.16 a
2. 1 lb Guthion 25W	248	39.5 b	7.87 b
3. 2⅔ pts Zolone 3E	320	6.36 c	11.8 c

* Means not followed by a common letter are significantly different at the 5% level, Duncan's Multiple Range Test.

1971 investigations

Insecticide trials involved application of two insecticides in a vineyard that had suffered severe thrips damage during the 1970 season. The standard material, Guthion, was compared with Zolone and no treatment. The materials were applied on May 19 when the vines were in the 10% bloom stage.

Adult thrips were counted two days later by striking the blossoming clusters three times on an 8½ × 11-inch sheet of white cardboard. Table 1 shows that significant reductions were obtained with both materials with Zolone superior to Guthion.

At harvest on October 1, counts of halo spots per cluster showed an inverse ratio to the thrips counts on May 21. Although none of the fruit was at all severely damaged, the untreated vines were the least affected.

Bagging trials involved clusters protected from thrips during various stages of the bloom and post-bloom period by excluding thrips with paper bags. At the time the bags were placed over the clusters, the thrips were controlled with parathion.

The trials included three Calmeria and one Italia vineyard. The trials gave variable results but showed that halo spotting occurred not only during the bloom period but also during the post-bloom period up to and perhaps slightly beyond the shatter stage.

TABLE 2. EFFECT OF TIMING OF CYGON SPRAY TREATMENTS ON THRIPS DAMAGE OF ITALIA GRAPES, CUTLER

Date treated	Stage	% Fruit with halo spot July 31
1. Check	—	18.3 c*
2. May 1	5% Bloom	4.02 b
3. May 8	95% Bloom	4.37 b
4. May 15	Shatter stage, berries 4–5 mm diam.	14.4 c
5. May 22	Berries 7–9 mm diam.	17.9 c
6. May 1, 8, 15, 22		.559 a

* Means followed by different letters are significantly different at the 1% level, Duncan's Multiple Range Test.

GRAPES IN SAN JOAQUIN VALLEY:

spot timing, (2) Nymphs and scarring

1972 investigations

Two insecticide trials were established; one in an Italia vineyard near Cutler, and the other in a Calmeria vineyard near Dinuba. Both were established as randomized complete blocks with three replications of each of six treatments. Cygon sprays were applied at a dosage of 2 lbs of 25% wettable per 100 gallons of water, and a rate of 200 gallons per acre.

At harvest, 20 clusters were harvested from each replication. The clusters were weighed, then all berries containing halo spots were picked off the cluster and weighed. The percentage of fruit with halo spots was then calculated.

Thirty clusters were protected with paper bags at six dates beginning before any caps were shed. Each bag contained a small piece of a Shell No-Pest Strip (plastic impregnated with DDVP). The purpose of the insecticide was to kill insects on the cluster when the bag was put in place and to kill any that might find entrance to the bags. The bags were allowed to remain on the fruit until harvest.

TABLE 3. EFFECT OF TIMING OF BAGGING ON THRIPS DAMAGE AND CLUSTER WEIGHT OF ITALIA GRAPES, CUTLER

Date bagged	Stage	% Fruit with halo spot July 31
1. May 1	0% Bloom	0.0
2. May 8	100% Bloom	17.9
3. May 15	Shatter stage, berries 4–5 mm diam.	26.1
4. May 22	Berries 7–9 mm diam.	26.9
5. May 30	Berries 11–13 mm diam.	25.9

TABLE 4. EFFECT OF TIMING OF CYGON SPRAY TREATMENTS ON THRIPS DAMAGE OF CALMERIA GRAPES, DINUBA

Date treated	Stage	% Fruit with halo spot Sept. 11
1. Check	—	12.6 d*
2. May 8	20% Bloom	7.24 c
3. May 15	70% Bloom	3.42 b
4. May 22	Past shatter, berries 4–6 mm diam.	9.15 c
5. May 30	Berries 6–8 mm diam.	13.4 d
6. May 8, 15, 22, 30		.652 a

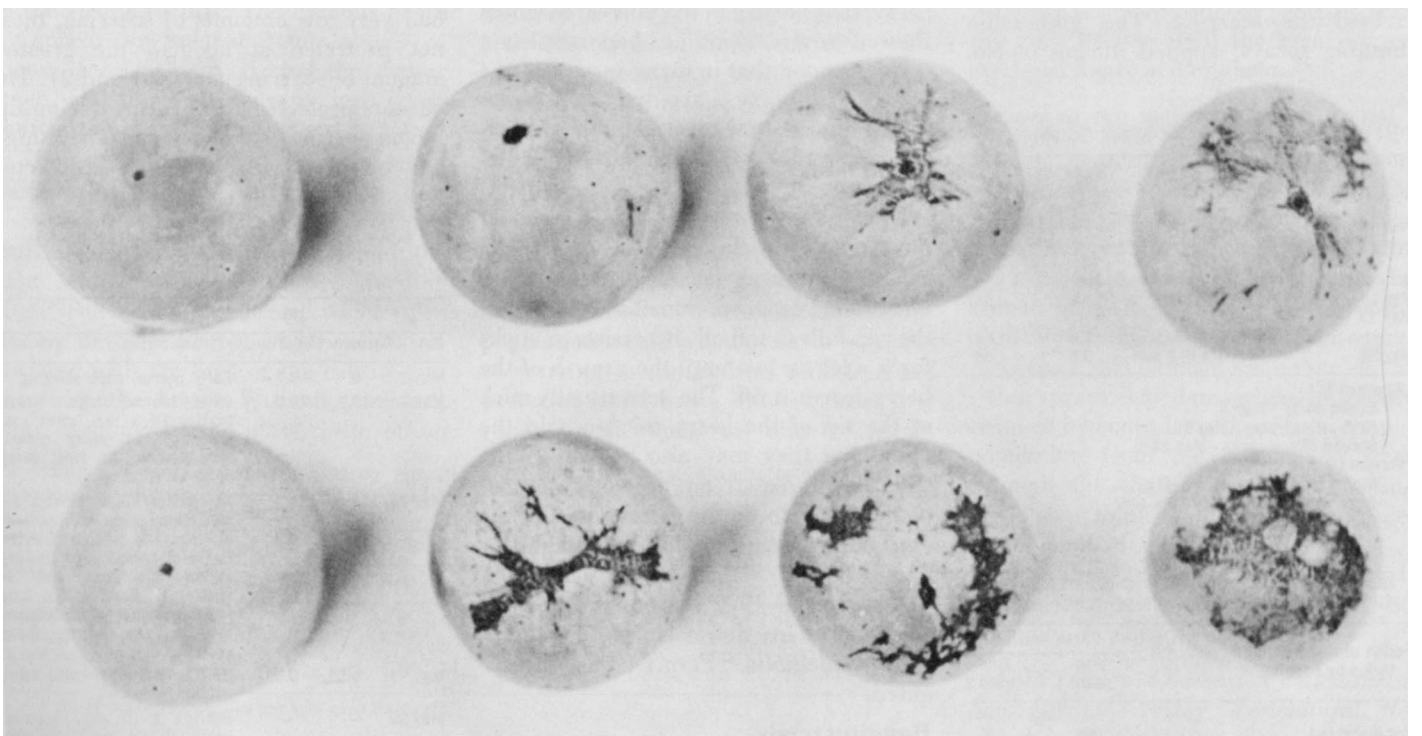
* Means followed by different letters are significantly different at the 1% level, Duncan's Multiple Range Test.

The results of the Italia trials are shown in tables 2 and 3. The bagging trial indicated that two-thirds of the halo spotting occurred during the bloom period and that the remaining one-third occurred within the next week up to the shatter stage. The insecticide trial also shows that the damage occurred prior to the shatter stage but that most of the damage occurred between the 95% bloom stage and the shatter stage. Thus, the trials were in agreement that the damage occurred during a two-week period, but were not in agreement in regard to which of the two weeks was more important.

The insecticide trial showed that four sprays were superior to all other treatments; that both of the two early sprays were significantly different from all the other treatments. Since the two late sprays were not different from the check, it appeared that the benefit from the four sprays resulted from the two early sprays. Thrips counts averaged over 100 adults

TABLE 5. EFFECT OF TIMING OF BAGGING ON THRIPS DAMAGE AND CLUSTER WEIGHT OF CALMERIA GRAPES, DINUBA

Date bagged	Stage	% Fruit with halo spot Aug. 28
1. May 4	0% Bloom	0.42
2. May 15	70% Bloom, a few berries to 3 mm diam.	2.87
3. May 22	Past shatter, berries 4–6 mm diam.	9.20
4. May 30	Berries 6–8 mm diam.	9.21
5. June 5	Berries 8–10 mm diam.	11.2



Normal berries on left, scarred berries to right showing differing degree of damage at stylar end produced by thrips nymphs feeding under persisting caps (see second article on next two pages).

per cluster in untreated vines during bloom.

The results of the Calmeria trial are shown in tables 4 and 5. The bagging trial indicated that less than one-third of the halo spotting occurred up to the 70% bloom stage, and that most of the damage occurred in the week between the 70% bloom stage and the post-shatter stage with berries at 4 to 6 mm diameter.

The insecticide trial showed that about half of the damage occurred between 70% bloom and the 4 to 6 mm berry diameter stage, with the other half about equally divided before and after those stages. A significant amount of spotting occurred after the berries had reached the 4 to 6 mm diameter stage. Thrips counts averaged 20 adults per cluster during the bloom period.

Considering both varieties and the results of both the bagging and insecticide trials, it appeared that the halo spotting occurs both during the bloom period and the post-bloom period up until about the shatter stage or slightly beyond. In the Italias, two sprays were required to reduce halo spotting to low levels, one applied when bloom begins, and one a week later. In the Calmerias, one treatment applied in the late bloom stage was sufficient to keep damage at an acceptable level for this variety.

Cygon produced no phytotoxicity, or excessive visible residue, even with four sprays. This insecticide was used under an experimental registration for the 1972 season.

FLOWER THRIPS NYMPHS INVOLVED IN SCARRING OF THOMPSON SEEDLESS GRAPES

FRED JENSEN · DON LUVISI

TRIALS CONDUCTED in Kern County Thompson Seedless vineyards in 1972 showed that flower thrips nymphs, feeding under persisting caps (calyptras), are associated with the sunburst or starfish scars which have proved troublesome in recent years. The gibberellin sprays used in producing table Thompsons, accentuate this damage.

During the 1971 season, the effects of the gibberellin sprays were investigated. All sprays including water only, increased the scarring. The gibberellin thinning sprays, applied during bloom, increased the scarring more than did the berry-enlarging sprays applied after the completion of shatter. However, even unsprayed fruit showed some scarring. These results indicated that while the gibberellin sprays accentuated the scarring, they were probably not the primary cause.

TABLE 1. EFFECT OF EXPOSURE TIME ON AMOUNT OF THOMPSON SEEDLESS BERRY SCARRING

Date bagged	Stage	Area scarred	
		Vineyard 1*	Vineyard 2†
		%	
Not bagged	—	10	1.2
May 10	End of bloom	1.2	.057
May 17	Shatter completed	1.6	.047
May 24	Berries 6–9 mm	6.6	.96

*Vineyard 1:
Bloom spray - May 8
First sizing spray - May 16
Second Sizing spray - May 24
†Vineyard 2:
Bloom spray - None
First sizing spray – May 16
Second sizing spray - May 24

TABLE 2. EFFECT OF PROTECTING CLUSTERS FROM THRIPS BY BAGGING ON AMOUNT OF BERRY SCARRING

Period protected from thrips by bagging	Area scarred	
	Vineyard 1	Vineyard 2
	%	
Not protected	8.1	1.5
Protected all season	.50	.083
Bloom only	3.6	2.1
After bloom for remainder of season	2.1	.88

Early scarring

It was known that the scarring occurred early in the development of the berry, that berries in the vineyards which showed severe scarring had persistent calyptras, and that in many instances, the area of the berry scarred showed a pattern similar to that covered by the persistent cap or adhering flower parts (i.e., stamens).

The grape flower has petals fused at the top which make up the calyptra. The calyptra becomes detached at the base and is shed as a cap. Sometimes however, the cap fails to fall off. It persists or sticks for a week or two until the growth of the berry forces it off. The caps usually stick at the tip of the berry as shown in the photo but they may also persist on the side in an area stretching from the base of the berry to the tip. Occassionally the caps may shed normally but the stamens persist.

During the 1972 season, the possible role of western flower thrips, *Frankliniella occidentalis* (Perg.), was investigated.

Bagging trials

Grape clusters were exposed to or protected from the flower thrips for certain periods during the bloom and early berry growth periods when the scarring was thought to occur. This exposure or protection was controlled by bagging the clusters. The bags contained a small piece of plastic impregnated with the insecticide DDVP to kill any thrips infesting the cluster when bagged, or any nymphs that might hatch from eggs already laid in the clusters, and from any thrips that might gain entrance to the bags.

Clusters protected for the whole season had very low amounts of scarring, those not protected at all had the greatest amount of scarring (tables 1 and 2). The clusters protected from thrips during the bloom period only had a fairly high amount of scarring, while those protected

TABLE 3. OBSERVATIONS AND THRIPS COUNTS IN A VINEYARD WITH A HISTORY OF BERRY SCARRING

Date	No. thrips per cluster		Comments
	Nymphs	Adults	
May 3	0	8.7	Early bloom, caps sticking
May 9	18.7	23.2	95% bloom stage, largest berries to 3 mm, most caps sticking, not many nymphs except with the most developed berries.
May 16	184.	4.4	At shatter stage, berries 3–5 mm. Many caps still sticking on tops and sides of berries. Heaviest nymphal populations in clusters just ready to shatter. If past shatter, have lower nymphal population but nymphs are larger. Some scarring evident.
May 23	9.95	0.90	Berries 6–8 mm, many scars evident.
May 30	—	—	Berries 8–10 mm, scarring easily visible, some caps still sticking — usually scarring underneath. Fruit too large to check for thrips population.