

California Avocado Association 1917 Annual Report 3: 94-99

SYMPOSIUM ON HEAT INJURY

Discussion led by F. O. Popenoe, of Altadena, and Dr. C. L. Bennett, of San Dimas.

F. O. POPENOE: (paper read by Dr. Bennett). It is not surprising that a catastrophe which cost the Southern California ranchers a loss of \$25,000,000 should so move us as to make us look it squarely in the face; but lightning never strikes twice in the same place, so probably it is not wise to give great consideration to an exceptional event.

Costly though it proved to be, the hot spell of last June was nevertheless an unusual occurrence. So in considering it, let us not only get the value out of the experiences connected with the event itself, but in addition so extend the scope of our consideration and inquiry as to cover the subject of heat injury in a broad and comprehensive way. In order that we may thus realize the greatest value from this discussion, I will ask those taking part in it, to view it in this light.

The questions before us then, are: Is excessive heat as injurious to the avocado as excessive cold?

What varieties of the avocado best withstood the excessive heat of last June?

What is it possible for the orchardist to do to prevent injury by heat?

What subsequent treatment for his damaged trees will bring them most promptly into good condition again?

What effect does excessive heat have on the fruit crop?

The answers in detail will be given by those who take part in the discussion.

Speaking in general terms, I believe the avocado suffers more from excessive heat than from excessive cold. Fortunately in California we do not often have a season of excessive heat. But there are those times of high summer temperature to be dealt with regularly, which have caused the loss of many a good tree through lack of provision for its safety. I urge our planters to provide the best possible growing conditions for their young trees. Based upon our present knowledge, these conditions seem to be, in addition to those ordinarily required, a suitable shade for the first year, and an ample supply of water for quick application at the beginning of any hot spell. A mulch of straw around the young tree is a great safeguard against reflected heat, which does injury to the bark of the trunk and lower limbs.

I believe 75 per cent of heat damage is caused by lack of adequate and prompt irrigation on the approach of hot spells. That young avocado trees require more water than citrus trees is an established fact, and we must provide accordingly. Wise is he who never allows his ground to dry out. Keep your irrigation work well caught up, so that the hot spell will not find your ground dry; because it is probable that before you can

sufficiently irrigate your orchard the damage will be done and some of your weak trees or less resistant varieties will be burned up. The danger is greatest on our foothill slopes, where the soil is often of a coarse, loose, porous character. Such soil heats quickly unless moist, and root damage will also occur.

Of course the strong growing, resistant tree is as desirable for its immunity from heat damage as it is for its immunity from injury by other causes, so that the varieties of this type which we have, and which at the same time bear good fruits and bear them early and prolifically, are truly the ones to select and plant. This goes without saying; yet the oft repeated truth is the one that impresses us, and we sometimes need to have our attention called to the most patent fact.

Therefore, wise man, do this:

Plant the strong, good tree;

Shield it from the sun during the first summer;

Give it a generous mulch of straw;

Attend promptly to your irrigation;

Be ready with a water supply for immediate application when a hot spell comes.

Doing these things, fear not the heat, and look forward in confidence to the season when a plenteous harvest will be yours.

G. W. BECK: La Habrá does not get as much heat as inland. A few days before the hot spell the trees were whitewashed with whitewash containing linseed oil and salt. The limbs and trunks were whitewashed, and there was very little sunburning; only in cases where the whitewash was not quite to the ground on the trunks was there any sunburning. The leaf injury was very slight, though nearly all the fruit dropped.

The variety in the nursery which suffered most was the Taft. This was because, at the time when the heat came, the Taft trees had more new growth than any of the others. Just the leaves were injured; the limbs and trunks were no worse than the others. These trees had not been watered for nearly a month. Other varieties than the Taft are: Sharpless, Lyon and Sinaloa in the nursery; and in the field were the larger trees: Ganter, Taft, Lyon, Chili, San Sebastian, Walker, and Northrop; also about a dozen unnamed varieties from Atlixco, Mexico, of the thick-skinned type.

MRS. B. H. SHARPLESS: We can arrive at a more definite conclusion in regard to the heat resistant qualities of the avocado by comparing the avocado damage with that of the citrus trees in the same orchard.

A short time after the heat wave in June, tons of our mature lemons as well as all the young lemons, were on the ground under the trees, and most of the fruit left on the trees was so badly burned that it was worthless. No mature avocados dropped from our Sharpless trees growing in the same orchard with the lemons. We lost nearly all of our young fruit, having perhaps enough left for an exhibit next year. The original Sharpless tree showed no damage except the curling of leaves on the tenderest growth.

We have Sharpless trees set out in orchard form including one, two and three-year-old trees. These were apparently untouched by the heat.

Two buds set out this spring among the big orange trees were burned because they were dry.

In our home nursery, we had Sharpless buds in all stages of growth up to 3 feet in height. We discovered no sunburn among them.

We had 25 Sharpless trees balled from our nursery about the time the heat wave reached us. They were placed in the shade of the big tree with no other protection except a canvas stretched on the sunny side. We sprinkled them frequently during the hottest day and lost none of them. Only a few of them dropped their leaves.

Near our La Habrá nursery the thermometer registered 112 in the shade. In this nursery we had no budded trees at that time. There were 2000 little seedlings of Mexican stock which had been planted from flats with bare roots a few weeks before the "hot spell." We had about 10 per cent loss among these, and other seedlings which had been out long enough to become established, were injured to some extent.

The damage would probably have been greater had it not been for the fact that the irrigating water was turned into the nursery the hottest day.

W. H. SALLMON : While the most of Southern California was blistering under temperatures in the nineties and hundreds from June 14 to 17, reaching a maximum of 124 degrees at Mecca in Riverside county, San Diego was favored with the lowest maximum, the Government thermometer showing 87 degrees on the 14th, dropping to 77 degrees on the 15th, and running to 82 and 85 degrees on the 16th and 17th.

This condition explains the comparative immunity of San Diego and vicinity from injury arising from the heat wave.

One orchard of 150 trees, consisting chiefly of Challenge, Harman, Walker and Puebla, was not affected in the slightest. This orchard is quite near the ocean on the east side of a ridge which separates it from the Pacific.

Another orchard of 250 trees, about 15 miles from the ocean, also escaped except for one tree which stood in the shadow of a tent where it received the heat reflected by the canvas. The leaves on this tree were shriveled and the bark cracked.

Another orchard of 280 trees, about 5 miles from the bay, consisting chiefly of Puebla, Northrop, Fuerte, Dickinson, Taft and Perfecto, had the foliage of all varieties severely burned. The tips of all young shoots were burned off and the large leafage curled and blackened. The bark was uninjured and the majority of the trees have recovered, though the growth of the trees was evidently checked. There was no fruit on either of these orchards.

It may be that two of these orchards escaped, partly because irrigation had closely preceded the heat wave, but it is significant that the trees in the orchard which suffered most were surrounded by burlap while the trees in the other two orchards cited were unprotected. It seems probable that the reflection of the heat from the burlap was the chief cause of damage to the orchard which suffered most.

DR. LESTER KELLER: The heat reached 103 degrees on the first day. So far as damage was concerned, about five Dickinson trees were lost, these being young trees without protection. Of the older trees, those that had the water turned on were not burned.

Those without water had the tender growth injured in a few places. The trees least damaged were Fuerte. These also were least injured by frost and "northers." If the young trees had been protected there would have been no injury.

T. H. SHEDDEN: Those four blistering days in June furnished us much food for thought. Many surprises and contradictions developed.

First: In many instances, the so-called hardy varieties of thin-skins that so courageously weathered the winter, shriveled in the astounding heat wave.

Second: Many thick-skin and hard-shell varieties, suspected of being susceptible to the caresses of Jack Frost, proved to be unaffected by the torrid fervor of Old Sol.

Third: In rows of same variety, age, planting and care, here and there trees stood the burning heat remarkably well, while the next several would have to be heavily trimmed, or cut back to stumps,—evidence that some trees had a better start in life than others.

Fourth: Certain of the varieties that have been much courted and sought after in the past, but whose seeming fickleness has tried the patience of all the Jobs in avocadodom, until they have become, metaphorically speaking, outcasts of the avocado world, stood the "fire test"—and cold test, too—remarkably well.

On the good old fashioned principle of "giving the de'il his due," I give their names: Murrieta Green, Murrieta Purple, (Colorado), Dickey No. 1, and Meserve. Through all the freezes and fires of this freak year 1917, like veritable "fools fer luck," they stood up cheerily waving their red bandanas (growing leaves) at me, and laughing hilariously, "Never touched me!"

Here are some of the comforting conclusions:

First: The records show that such heat waves are far between, and in well nurtured orchards the real maximum damage was the loss of crop in a year when Uncle Sam and all the world is crying for every pound of food that can be produced.

Second: The extent of the disaster was the result of the sudden change from a long, chilly spring and early summer, to the wholly unexpected and unprepared for outburst of seemingly long pent up heat.

Third: In case of fire, play the hose on it. Trees that were treated in this intelligent way were saved. The heat caught our orchard at the end of an irrigating period, a few days after which we had trouble with the water supply, and which gave us certainly an "unearned increment" of trouble. I mention this fact in proof of the wisdom of treating the avocado with hydropathy.

Fourth: We have no good reason to be discouraged or deterred from planting avocados. On the contrary, the extremes of heat and cold are showing us what to plant. Buy the best. For a yearling pedigreed tree, guaranteed, no producer is charging too much. Varieties sufficient to assure fruit in every month of the year have proven their worth, some having shown characteristics which might justify their being called "Salamander."

MRS. J. T. STEWART: The morning of the hottest day, the thermometer registered 120 degrees in the shade, the Ojai fires in the foothills contributing some of this heat. The varieties of avocados planted in the orchard are: Fuerte, Taft, Puebla, Challenge, Rey,

Knight, Dickey, Ganter, Dickinson. These were heavily watered, and had a mulch over the ground. None were burned, as the alfalfa mulch protected the trees from reflected heat from the ground. None of the varieties were injured. One hundred twenty trees were budded on the 18th of June, during the hottest weather, with a result of 97 per cent successful. It is possible that the trees have become accustomed to the heat during the summers in San Fernando.

A. F. MANZ: Seedlings which had been watered just before the hot weather were sunburned. Lemon trees were burned also. The heat did not hurt the fruit that was almost matured, but dropped most all the tender fruit. Some of the matured fruit on the lemon trees was burned also. I think the avocado can stand as much heat as citrus.

J. T. WHEDON: I had 91 Harmans that I was top-working over to the Fuerte. They were doing nicely but unfortunately we had made the second cut, taking the whole top of the tree off just two days before the hot wave struck us, causing a loss of 34 per cent of the buds that had taken, and as quite a number of the trees were badly sunburned, about 15 per cent more buds died. Any top-working of trees that I do in the future will be done in the fall, as there are too many chances for loss in the spring work.

The Fuerte and Taft trees were branched low, doing away with any protection. The avocado is more susceptible to sunburn than any other tree, and this low branching protects them.

I use the Wickson formula for whitewash as I think it affords best protection. This formula is 30 pounds unslaked lime, 5 pounds salt, 6 pounds tallow. The young trees are protected with whitewash for the first two years, after that time the limbs themselves are ample protection.

Regarding a burlap protection, the burlap should be placed at a little distance from the tree to allow air passage. If closely wrapped, it is injurious.

J. B. MCLAUGHLIN: Does not the spraying of the foliage of the trees protect them to some extent in hot weather? I have 23 varieties of which only 4 were injured. I sprayed the foliage during the hot spell and only the bark on exposed trunks and limbs was injured on a few trees; the rest were not injured.

H. WETZEL: The heat can be reduced for a few degrees by evaporation from overhead spraying, but one would have to have this spraying in operation over the entire orchard and keep it going, to be able to influence the temperature. This difference amounts to about five degrees in temperature reduction, and in my opinion such spraying, wherever possible, would furnish the ideal condition of supplying the moisture for avocado plantings.

O. A. MANN: My experience in avocado growing is very limited. Last January and February I set out between 500 and 600 trees, and having put in the drip system of irrigation, I was as well prepared as I could be for the hot wave of June 14-17. I had turned on the water on the 13th so the ground was well wet. With this system of irrigation, the water is always available and can be turned on one, or all of the trees, at any time. This is not possible with the other system; therefore we are able to protect our trees when we have excessive heat. I have about half of my trees set out at the present time.

Of the 100 Fuerte and 75 Puebla trees, I lost none. I think these trees stood the heat quite as well as any variety I have. Of 160 Taft trees I lost none. These trees were quite large and were cut back a little more severely in the nursery than the others, so the limbs show considerable sunburn; but all are growing nicely. Out of 60 Lyon trees, I lost only 2. During the hot weather the last week in September, quite a number of them lost all of their leaves. I am inclined to think the Lyon tree is one of the varieties that should be shaded the first summer. The Sinaloa suffered the most; out of 20 I lost 3, and cut back several to the bud. Most of those remaining are looking sickly. The San Sebastian, Ameca and Perfecto stood the heat very well.

My trees were well started previous to the heat. At that time they stopped growing as far as we could see, and were practically dormant for two months, since which time they have made a wonderful growth.

J. T. WHEDON: From my observations the heat wave affected all avocado fruit that had just set, up to the size of a pea. The Fuertes, which had reached the size of a cherry by the middle of June when the hot wave came, held on the trees. In Yorba Linda the Fuerte commences blossoming the early part of December and continues until June, giving at least six months in which the fruit may be picked. As to the actual time a fruit will hang on the tree after full maturity, I am not able to say.

The warm, dry "norther" setting in on the 18th of this month, with the continued hot weather ever since, has burned the tips of all new growth as badly as did the June hot wave. The Fuerte will stand more rough usage by being knocked about by the wind than any of my other varieties fruiting to date.