

OBSERVATION ON FROST INJURY TO AVOCADOS

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In looking over the frost injury evidence in this part of the state, I was pleased to find the avocado orchards in better condition than I had expected they would be, and the same is true of many other sections of the state. The point that impressed me most forcibly was that during the past severe winter the behavior of different varieties in different localities and of individual trees of the same variety in a given orchard has been decidedly varied. One must be exceedingly careful in his observations and considerate in his praise or condemnation of any given variety. The evidence as found in a given locality or orchard was certainly not sufficient for a stranger in that orchard or locality to rate a variety or individual tree as so much depended upon the local conditions and the treatment that had been given.

The vigor of the tree, it appears to me, has been the principal condition upon which depended its inability to withstand cold, and only after one is well aware of the condition the tree was in prior to the frost can he judge the normal frost resistance of the tree. Anything that has prevented the tree from making a normal growth has aided the cold in its injurious work. These injuries can, in a large majority of cases, be traced to poor soil, hardpan too near the surface, drouth, severe late summer pruning, cultivator injury, lack of cultivation, etc. For example, in the center of a large planting of three year old Harmon trees, I found ten trees with not a trace of injury caused from the fall in temperature to 10 to 20 degrees above zero at that point, while the surrounding trees were badly frozen back or killed entirely. It developed that the soil in the field in general had practically no humus and both the surface and subsoil dried out badly and became very hard, but the small plat where the ten uninjured trees stood was of dark loamy soil, apparently very fertile and which retained moisture well. This was in a level field where air drainage could not have been responsible for the condition of this isolated spot. I was of the impression that there had been, in years past, a stable or sheep pen on this fertile spot where the trees were much larger than the surrounding ones, but was told that this was not the case.

I found a number of cases where vigorous branches which had been cut back severely during the fall frosted badly.

Numerous instances of cultivator injury to branches have also been observed to have resulted in increasing cold injury. Every leaf on branches which were barked on one side by an implement during the last season's cultivation were killed by the cold entirely; no other leaves on the same tree showing any injury from the cold. Some of these cultivator injuries were so small that one would pass them unnoticed were it not for the frosted leaves. It was observed that not only the condition of the entire tree but even of individual branches determine the amount of resistance to frost.

In view of this, and many other observations, it seems clear to me that with the great diversification of treatment practiced by orchardmen, and the variation in environment which is found from tree to tree, that we are far from having secured sufficient conclusive evidence to allow us to classify correctly the different varieties so far as cold affects them.

That the many conditions for thriftiness that affect so markedly the cold resistance of the tree also affects the time of ripening of the crop is probable. Some varieties have not ripened their crop just at the time appointed for them this season, and it seems probable that ripening days should be correlated with the treatment given the tree to determine the normal ripening period.

Generally speaking, some varieties of the Mexican type have withstood the past severe winter remarkably well; only the tips of the tender growing branches having been killed by the cold. This condition was observed at different points in Sacramento, San Joaquin, and Santa Clara valleys as well as in this part of the state. Where planted at most desirable elevations and sites, trees of this type are given encouragement. While but few, if any, of the varieties of this type are suitable for commercial planting, they promise something for the home garden and many local markets, especially in parts of the state where there is not a demand for the very high priced fruit and sections which are not sufficiently frost-free to make plantings of the more tender kinds an attractive proposition. The West Indian type promises nothing so far for encouraging their planting except by the experimenter. They have not withstood the cold at all well, and from the appearance of the trees I have seen do not seem to be well adapted to some of the other conditions, possibly the extreme warm period in summer. Personally, I am rather partial to the flavor of this fruit but find few who share my judgment among those who are most familiar with the best Mexican and Guatemalan varieties. Nurserymen should be especially careful to keep their stock plantings free of West India seed.

Among our better known kinds which are recommended for planting, the Fuerte impressed me as withstanding cold much better than the others, and the Taft seemed to be the most severely injured, There appeared to be considerable difference between these two varieties. Other varieties recommended for commercial planting and a large list which are being grown experimentally, or in a small way, excluding some of the thin-skinned Mexican varieties and those from the West Indies, fall pretty well between the two above extremes and appear to differ but little in their cold resistance.

Special care should be given new introductions to prevent them from being eliminated by cold while the trees are young and before the value of the fruit or the cold resistance of the tree has been proven. Mr. Knight solved this problem very satisfactorily on his place during the past winter and his method of spraying trees with water while low temperatures prevailed should be considered by those equipped for it.

In conclusion avocado growers should remember that the weather breaks a record almost every day somewhere and make their plantings and care for their trees accordingly.