

STATION WORK FOR THE AVOCADO

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The avocado has interested me so much and I see such great possibilities in its future development in California that it is scarcely safe for me to express myself freely in a public way. I am interested in the avocado as a commercial fruit, but am far more interested in it as a food fruit for home use. The food value of the avocado is probably as high or higher than any other fruit cultivated. One fruit is said to be a fair meal for an ordinary individual. We may expect to see the time when this fruit will form an important part of our everyday diet, and we certainly need to grow more of our own staple foods.

My only excuse for appearing on this program is to assure you of my interest and the interest of the Citrus Experiment Station in the development of the avocado industry. It is our desire to aid so far as we can in the upbuilding of the industry. I have personally known considerable of the development of avocado growing that has taken place in Florida, and since coming to California I have been following more or less closely the trial plantings that have been made here. I think we have reached a point in these first experimental trials where we may say that the first stage in the development of the industry has passed. We are, I believe, able now to conclude safely that avocado growing in Southern California is destined to become an important industry. This is a great step in advance and is the first milestone passed.

Meanwhile, rapid progress has been made in the direction of solving several other of the primary problems. As I conceive it, the next stage in the development of the industry will be the determination roughly of the safe regions for its first general development. In the solution of this problem the University and Station will naturally be of minor service, as the final determination of the most favorable regions will be by the success of experimental plantings of growers in the various sections. Fortunately many plantings of sufficient size to give fair judgment have already been made in many widely different sections, and the climatic endurance of the avocado as a whole in these different regions will probably be determined in the next five years. We are, however, confronted with the difficulty that we do not know the effect of our different soils on the avocado, and that some of the first plantings, even if the climatic conditions are favorable, may fail because of soil conditions. Like the orange, the avocado apparently thrives well under a very wide range of soil conditions, and it is probable that the climatic conditions will be the principal limiting factor in the spread of the industry. By careful observations of the experimental plantings made by growers, the University may be able to assist in more quickly arriving at an understanding of this problem.

With the avocado, as with all other fruits, the question of suitable varieties and rootstocks will probably long remain a puzzling question. An excellent beginning has been

made with the variety problem, as we now have about eighty different varieties under trial in the state. In finding the best varieties of any fruit for cultivation in a certain section, the first means is through the importation and trial of the known varieties of other regions. This has been done to some extent, but without doubt many varieties that would be of value in California have not yet been imported. In talking with Mexican, Central American and South American travelers, I have learned of a number of avocados growing at high altitudes and said to be very cold-resistant, that we should surely have for trial in California. It is my feeling that every effort should be made to import and test out every promising variety that can be found, and we should urge the Bureau of Plant Industry, through its division of Seed and Plant Introduction, to send explorers to promising regions to get such varieties for us. The Citrus Experiment Station expects to be in position to assist in the trial and study of varieties and expects next year to plant a trial orchard of as many varieties as it is possible to obtain. The studies of Professor Coit and Mr. Condit on varieties and of Professor Jaffa on the chemistry of the different varieties are highly interesting and important in this stage of the industry.

As an industry develops, imported varieties usually give way to native varieties; select seedlings, hybrids, and the like; of superior quality and better adapted to local conditions. This will probably be the history of the avocado industry, and it is gratifying to notice the large number of native seedlings that already are playing an important part in the development of the California industry. In the work of improving the varieties, the Experiment Station should also be able to assist. Here also growers can do a valuable work, and it seems to me that every means should be taken to encourage the growing of seedlings and the selection and trial of the superior types that may be discovered. I would suggest to the Association the desirability of holding an exhibition of seedlings each year at the annual meeting, and the awarding each year of a medal to the seedling adjudged the best by a competent committee. In this way in the early days of America, the Massachusetts Horticultural Society greatly stimulated the breeding of new varieties of apples, pears, strawberries, and other fruits. In this way the gooseberry in England was developed from a fruit three-eighths of an inch in diameter to one nearly as large as an average hen's egg.

The problems of propagation, cultivation, fertilization, irrigation, pruning, and the like are all before us for solution. Fortunately, the studies of soil management that are now being made with citrus fruits will doubtless be of great value as a guide to similar operations with the avocado. As an illustration, the experiments in fertilization that have been under way at the Citrus Experiment Station for the last eight years indicate the paramount importance of nitrogen in fertilization and the addition of organic matter to the soil. Potash fertilization has given no indication of value as yet, and phosphoric acid has shown but little effect. Doubtless in a general way these results will apply to the avocado almost as fully as to citrus trees, as they point out the general soil requirements. Again our citrus experiments have indicated very forcibly the importance in orchard practice of using winter cover-crops of some legume, such as bitter clover (*Melilotus indica*) or purple vetch (*Vicia atropurpurea*) to supply organic matter and nitrogen and keep the soil in good physical condition. Doubtless, this same practice will prove just as important in groves of avocados.

Lastly, I wish to speak of the diseases. We are, I believe, and I am sure you also believe, laying the foundation of what is destined to become an important California industry. It behooves us in this early stage to take full account of all diseases and strive in every way to eradicate such maladies and pests as we now have and to prevent the importation of those that exist in other places. Consider what saving would have been accomplished in the citrus industry, if the various pests, such as the red, black, and purple scales had not been introduced, or had been eradicated when first introduced. I wish to urge that every grower of the avocado keep close watch of his plants, and if any diseases or insect pests are noticed, immediately send specimens of the diseased parts to the Citrus Experiment Station for study and identification. Our pathologists and entomologists will be glad to co-operate with you to the fullest extent possible in the study and control of any difficulties. Similar aid will be freely given as well by the specialists at the University at Berkeley and of the State Department of Horticulture at Sacramento. Very few pests are now known to occur on the avocado, but doubtless there are many in various parts of the world, and some of these may have been introduced and occur here now in small numbers. If discovered now they might easily be eradicated; in a few years their eradication may be impossible. In Hawaii the avocados are badly infested with the fruit fly, and the commercial growing of avocados, which otherwise would have become important, has been ruined. Every traveler coming from Hawaii is tempted to bring along some of the rare tropical fruits. Our laws are stringent on this point and sufficient, but people are ignorant, and we are constantly threatened with the possibility of the importation of such pests. We should all be alert and watchful to aid so far as we can in preventing any such pests that threaten our industry from becoming established.

Mr. Webber, in answer to questions, stated that the Riverside Experimental Station has been provided with a tract of land, nearly five hundred acres, and that it is engaged at the present time in constructing buildings, planning and building laboratories, hot houses, barns, and putting in wells and ditches for irrigation. So far it has not been in a position to propagate trees, but beginning next year expects to start experimental planting.