

Anthracnose of the Avocado in Peru

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The most serious fungous disease of the avocado in Peru is anthracnose, caused by *Physalospora persea* Doidge. In the avocado-producing sections of the Rimac valley, in which Lima is situated, the disease is of widespread occurrence, being present in a majority of the orchards of this region and materially reducing both the quantity and quality of the crop which is produced. Just how generally it is distributed in other parts of the country is not known from personal observation, but judging from the frequency with which avocados coming into the Lima market from the interior valleys are found affected with the disease, the conclusion seems justified that it is of common occurrence in other sections where this fruit is grown.



Anthracnose lesion on trunk and side branch, showing the characteristic white exudate.
Santa Eulalia, Peru, Feb. 1929.

Anthracnose may attack any of the above-ground parts of the tree, but its most serious damage is caused when the main trunk and fruiting branches are involved. On these organs the infection begins as a dark reddish-brown area which enlarges gradually,

usually more rapidly horizontally than vertically, until it forms a lesion which eventually girdles the affected part. The canker is at first sunken, especially in young, tender tissue, but as the disease advances the bark dries, cracks, and buckles out, giving the affected portion a bulged appearance. The dried bark sloughs off and the limb slowly dies. The sap of the tree flows out through the cracks in the bark and on drying leaves a whitish, crystalline substance, the presence of which is characteristic of the disease. The fungus has not been observed penetrating into the woody portions of the trunks or limbs, the infection apparently being limited to the cortex.



Sunken, decayed spots on avocado fruits caused by anthracnose. Lima, Peru.

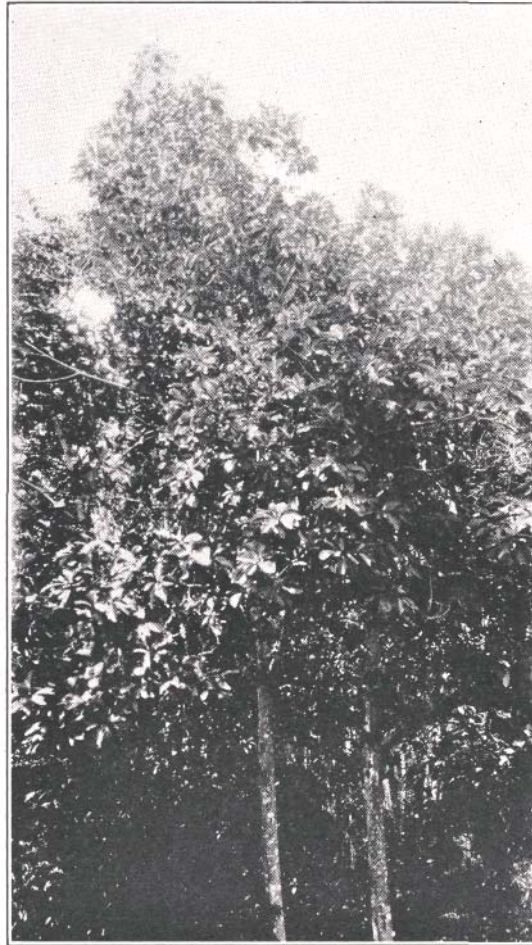
On the fruit anthracnose produces round, sunken, reddish-brown spots which are usually from one to two centimeters in diameter. The centers of the fruit lesions may be pale pink in color caused by the production of spores of the fungus. As a rule the decay does not extend deeply into the flesh of the fruit, although the diseased spots offer ideal means of entrance for other fungi, particularly *Rhizopus nigricans*, which may cause more rapid decay of the fruit than the anthracnose itself. The decayed areas have only rarely been observed penetrating to the seed.

On the leaves the disease causes circular, chocolate-colored spots. Infected blossoms may turn black and fall. Leaf and blossom infection; however, is of secondary importance compared with the damage which is caused to the tree by the destruction of the trunk and branches, and the rotting of the fruit.

From information which is available at present it would be impossible to estimate the percentage of the crop which is annually lost from this disease in Peru, but from an examination of the orchards where it exists in the vicinity of Lima it is evident that the loss is considerable and that it is increasing every year. In some orchards not a single tree can be found which does not show some signs of infection, while in others where the disease is not so far advanced a careful examination will show small lesions appearing on the fruiting branches of a large number of trees. It seems safe to predict that unless steps are taken to control the disease, within a few years the profitable production of avocados on a commercial scale will be impossible in the districts which now furnish a considerable portion of this fruit which is consumed in Lima.

Although it is impossible at present to recommend control measures which are based on actual experience with anthracnose under Peruvian conditions, it can be stated with certainty that much could be done toward checking the spread of the disease by a program of sanitation, spraying, and making certain changes in present cultural

practices. Complete eradication of the disease can not be hoped for in view of its general distribution in the districts where it exists.



This looks like it would be a survival of the fittest.
They are avocados in Chauchamayo Valley.
Sept. 1928.

From a pathological viewpoint, the ideal procedure would be to destroy the girdled and dying trees and to prune out and burn all infected branches of others in order to remove the present constant sources of infection. Such steps are not entirely practicable, however, in view of the fact that all of the orchards are small and in the hands of owners who could not financially afford the loss of a large number of trees, even though they may not be producing at maximum capacity as a result of their diseased condition. It has therefore been recommended to the growers that only the worst diseased trees be destroyed, and that girdled branches of others which are not producing fruit be pruned out and burned. It was felt that more might be accomplished in this way than by recommending more drastic measures which would discourage them and result in nothing being done. In addition to the pruning it is probable that the spread of the disease may be checked by cutting out cankers on the trunks and large branches of many trees which have not yet girdled the affected parts, and painting the wounds with a disinfectant. It has not yet been definitely determined whether diseased branches or entire trees may be saved in this manner.

After as much of the diseased material as possible has been cut out and destroyed, the next logical step is a thorough spraying of the orchard with Bordeaux mixture. If this is carefully done it should be possible to prevent infection of young trees and the new growth of the older ones.

The method of planting avocados commonly practiced in Peru at present offers ideal conditions for the spread of anthracnose infection. When an old tree shows signs of reaching the end of its period of production, a condition which usually is brought about prematurely by anthracnose infection, it is the custom to plant a young tree near its base to replace it when it is dead. The result in nearly all cases is that the young tree becomes badly infected with the disease before it begins to bear fruit, and it has often been observed that the stems of many such trees are completely girdled before they are more than three or four feet high. As long as this practice is followed there can be little hope of obtaining healthy trees.

Spread of the disease is also favored by crowding in the orchard, ten feet being a common distance between trees. Infection is favored not only because of this proximity, but also because of the excessive shade which is thereby produced. Heavier infection has been observed in orchards where the trees are so close together that little sunlight penetrates, than in others where greater distance of planting permits the free entrance of sunlight.

Other fungous diseases and insect pests of the avocado in Peru are of minor importance compared with anthracnose, which may be said to be the greatest limiting factor in the production of this fruit at present.



Paltas at Moquegua, June, 1928. Moquegua is in the extreme southern part of Peru and has no connection with the recent trip to Chauchamayo. There avocados are seedlings and show how large they can get. Of course they are planted too closely together, thus causing them to grow taller than would otherwise be the case.—Ralph H. Gray.