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SUN-BLOTCH IN AVOCADO SEEDLINGS

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SUMMARY

Sun-blotch, a virus disease of avocado trees, is transmitted to grafted trees by the use of buds from scion material that is not free of the virus. In certain virus diseases, the virus is not transmitted to the seed and early studies seemed to indicate that this applied to the seed of sun-blotch-affected trees. Several investigators have, however, found avocado seedlings that show symptoms of sun-blotch.

In the present study, the seed of only affected avocado fruits that showed obvious streaks, depressions, and distortions were obtained in large quantity from a single tree and were germinated. Certain symptoms appeared in the initial growth of practically all of the young plants. These symptoms disappeared in the subsequent growth and no symptoms have reappeared as yet. These results stress the importance not only of the source of the buds for the scions but also of that of the seed for the rootstocks.

In conducting experiments in the nutrition of avocado seedlings, it frequently happens that some individual seedlings show obvious symptoms of sun-blotch. The symptoms may not be noticed until the experiment has been underway for some time and considerable growth has already taken place from the time of seed germination. In a seedling avocado plant of this kind there is good reason for believing that the sun-blotch virus has been transmitted from the affected parent tree through the seed.

In early studies (1) it was reported that of a considerable number of avocado seedlings grown from seed taken from sun-blotch-affected trees, none has shown definite symptoms of the virus disease. Several investigators have at various times orally mentioned the finding of a very few seedlings affected with sun-blotch, which tends to support the view that the virus may be transmitted to the seed.

An opportunity presented itself to test this possibility further: A number of avocado fruits obtained from a single tree were brought to my attention by Dr. C. A. Fleschner of the Department of Entomology. These fruits were found to be seriously affected with sun-blotch and showed streaks ranging from yellow to pink in the depressed portions of the distorted-shaped fruits.

Subsequently in late April close to the time of fruit maturity an orange-field box full of fruit was obtained from this individual avocado tree of the Ryan variety growing in a large avocado orchard at Goleta. Only distorted fruit with severe depressions and streaking were included in the box full of fruit.

The seed coats were removed and shallow sections were cut from the apex and base of

each seed prior to planting the seed in a propagation bed of plaster sand maintained at approximately 75° F. Upon germination of the seed, practically every seedling showed certain symptoms to a varying degree and from which they recovered as their growth progressed. Nutrient solutions are being applied to the seed bed and in the growth thus far no symptoms of sun-blotch are discernible.

Figure 1, left, shows the curved and distorted leaf growth typical of many of the seedlings. Many of the seedlings shoots as they emerged from the plaster sand were greatly enlarged in diameter and very abnormal in appearance. Other seedlings appeared as in figure 1, right, in which the abnormal leaves were followed by rudimentary curved leaves and these in turn by apparently normal leaves. Practically all of the seedlings initially showed these rudimentary leaves to varying degrees prior to the appearance of normal growth. Daily observations were made over a considerable period in order to follow the sequence and appearance of symptoms. Among the many seeds of numerous varieties germinated in this manner, no seedlings have ever shown these abnormalities.

Figure 2 shows the progress made in the production of normal growth. Near the seed can be seen some of the pale and curved dwarfed leaves that are followed by rudimentary bracts before the intermediate sized and larger (but still distorted) leaves make their appearance. Note the practically normal terminal leaf growth. The seed in figures 1 and 2 were planted in the plaster sand on April 30, 1952, and the resulting plants were photographed on September 17, 1952.

The nature of the leaf distortion can be better seen by examining an enlarged photograph (Fig. 3) of a small portion of the trunk and attached leaves. There appears to be a streak in the trunk beneath the leaf in the upper left in figure 3. Colored streaks (yellow or ranging to pink) are among the symptoms resulting from sun-blotch. Note the various streaks in the leaf blades and leaf stalks (petioles).

The point of interest is that temporarily at least all of these symptoms have disappeared and there is no telling when, if at all, further symptoms may make their appearance. Again, each of the seeds used were taken from fruits severely affected with sun-blotch, each fruit showing the symptoms. In seed from healthy-appearing fruit taken from trees affected with sun-blotch, possibly their germination might not show any or little of the effects here described. The greatest care should therefore be exercised in the selection of trees the seed of which are intended for rootstock purposes.

LITERATURE CITED

1. *Parker, R. R. and W. T. Home. The transmission of avocado sun-blotch. California Avocado Assn. Yearbook 1932: 50-56.*

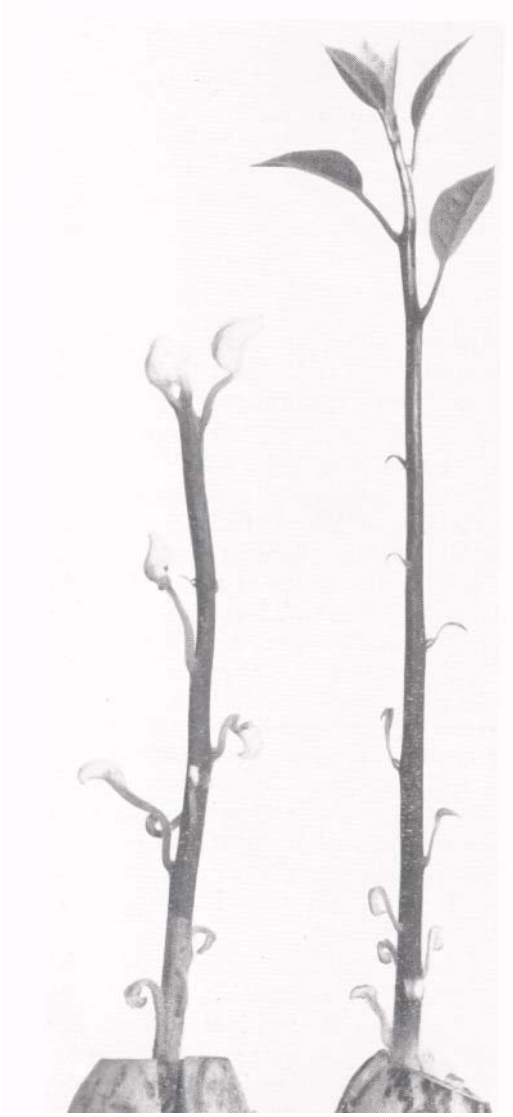

Fig. 1. *Appearance of avocado seedlings shortly after the germination of the seed obtained from fruits obviously affected with sun-blotch. Left, distortion and marked curvature of young leaves showing partial albescence (colorless areas). Right, as growth proceeded, the terminal leaves appeared normal whereas the lower-most or first leaves were the most seriously affected; note the dwarfed and curved rudimentary leaves produced prior to the apparently normal terminal leaves.*

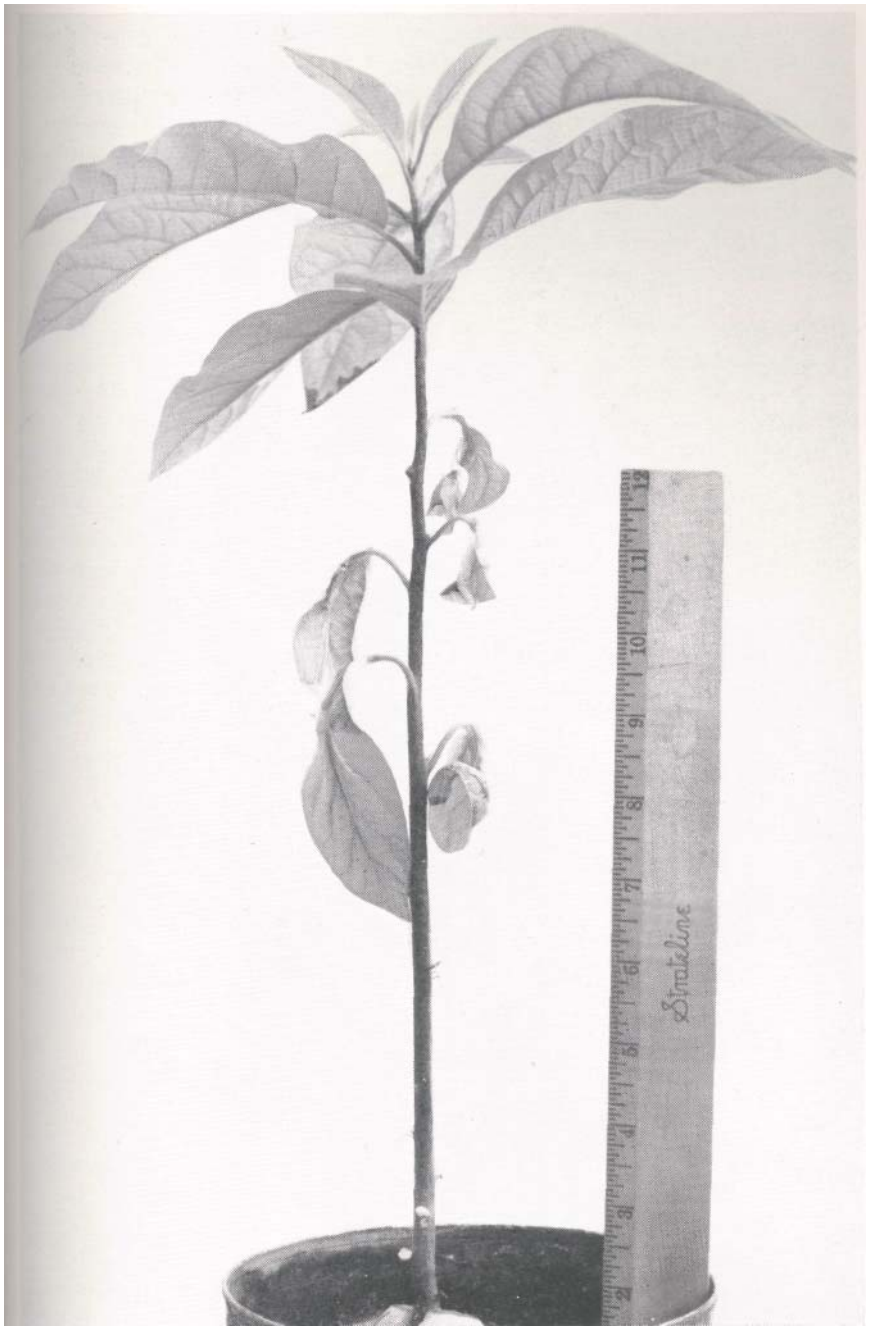

Fig. 2. *Progressive improvement in leaf growth from the types of growth seen in figure 1 to practically normal growth.*

Fig.3. *Enlargement of some of the distorted leaves produced in the germination of seed from avocado fruit affected with sun-blotch. Note the streaks in the trunk, leaf blades, and leaf stalks, also the tendency for albescence to occur in the leaves.*