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RECOGNIZING AVOCADO SUNBLOTCH DISEASE

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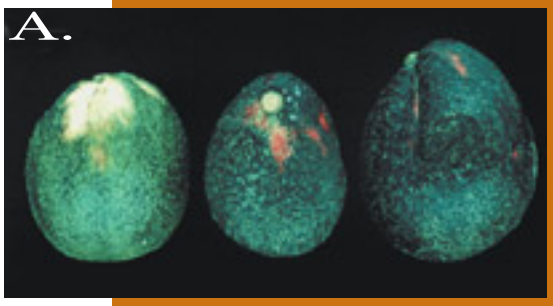
Avocado sunblotch is a disease which has been known for over 60 years. Sunblotch is characterized by abnormal tree growth, reduced yield and a high proportion of small or misshapen fruit. Specific symptoms may be observed on fruit, leaves and stems. Fruit may show overall distortion, sometimes with sunken yellow and red depressions on the surface. These fruit are graded as standards and receive lower returns from the packinghouse *(Figure A)*. Foliar symptoms can include a general thinning of the canopy, with individual leaves showing bleaching (white patches), variegation (yellow and green patches), and distortion *(Figure B, C)*. Stems may also show discoloration with yellow, white or pink streaks *(Figure D)*, and in extreme cases may be completely chlorotic (yellow/white). Infected trees often appear stunted and somewhat sprawling.



It is possible for trees to "recover" from the disease. The "recovered" tree will have no apparent visual disease symptoms but it still carries the viroid. These trees are termed "symptomless" carriers. Such trees typically have very low fruit yield or at times may set heavy crops of small fruit. If symptomless trees are topworked with disease-free material, the topworked material will become infected and can exhibit classical sunblotch symptoms revealing the presence of sunblotch. If a symptomless tree is subject to a stress such as fire or is stumped, the regrowth may once again exhibit sunblotch symptoms. If you believe you have symptomless carrier trees, please contact Dr. Alan Dodds (909-787-4491/3864 or dodds@ucrac1.ucr.edu). We are interested in learning more about this phenomena.

Technically, the disease is caused by an infectious ribonucleic acid (RNA) known as a viroid; the specific pathogen is called the avocado sunblotch viroid (ASBVd). ASBVd is comprised of a 247 nucleotide single-stranded RNA genome. There is no virus particle. It is transmitted by grafting infected budwood. A mechanical transmission rate of 8 to 30% (plant infected/plants inoculated) was reported using cutting blades. Seed and pollen can also spread sunblotch. The rate of sunblotch transmission through seed varies, with a relatively low rate of seed transmission when the seed comes from trees exhibiting symptoms. However, seed from symptomless trees have a very high rate of transmission (80 - 100%). Why this occurs is not understood. Pollen transmission was demonstrated using honey bees in caged trees.

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This implies that under field conditions honey bees could be a vector of sunblotch.

There is no accurate estimate of the incidence of sunblotch in California, but there is a perception among some that sunblotch is an increasing problem in the industry. This is based in part on increased top working, tree size management, and tree injections. Sunblotch can be brought into our industry with the introduction of new varieties or rootstocks. The extent to which sunblotch may become a problem in the future will depend on nursery propagation techniques and grove management strategies.

ASBVd viroid can be detected in leaf extracts by a rapid lab test known as PCR within days of sampling. Dr. Dodds' laboratory tests mother trees of established/ new varieties for nurserymen and other UCR researchers and is helping to ensure that this pathogen is not being unknowingly distributed in existing or newly-released scion and rootstock budwood. We will also test field trees. For more information, contact Mr. J. Heick or Dr. D. Mathews, (909-787-3864 or dmathews@ucrac1.ucr.edu).

Besides the obvious problems of propagation and increase that are associated with graft transmission, growers and nurseries should be aware of the following:

MECHANICAL TRANSMISSION

The high reported rates of mechanical transmission (up to 30% using seedlings and razor blades) are sufficient to justify special attention to transmission by pruning, cutting or injection tools. Transmission will be prevented if tools are treated with a 15% bleach solution between trees.

ROOT GRAFTING

Movement down a row may well be the result of root graft transmission especially in situations of close planting.

POLLEN TRANSMISSION

Seeds from healthy trees pollinated with infected pollen can give rise to infected seedlings. A tree bearing pollen-infected fruit (seeds) does not normally become infected itself.

SEED TRANSMISSION

Transmission through seed collected from symptomatic trees is low (less than 5%) but is reported to be high (80 to 100%) from symptomless carriers.

SYMPTOMLESS CARRIERS

Healthy budwood topworked onto symptomless carriers is likely to develop symptoms. Seed from symptomless carriers is likely to give rise to infected but symptomless seedlings.

NURSE SEEDLINGS

These are used to establish clonal rootstock plants. It is unknown at this time what role, if any, nurse seedlings play in the ingress of sunblotch in the industry. There is currently no testing to ensure seed sources are from healthy trees. The collection of nurse seed from an infected symptomless carrier with a high rate of seed transmission for routine nursery propagation could lead to outbreaks of sunblotch in new orchard plantings.

FURTHER READING:

Desjardins, P. R. 1987. Avocado Sunblotch. In: T. O. Diener (ed.), The Viroids, pages 299 - 313. Plenum Publishing Corp. (This is a review article that discusses all previous research and provides a detailed description of disease symptoms.)

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