

WALNUT BRANCH WILT

by
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Appearance

The presence of this disease may be suspected when dead leaves on the tips or end of branches have a golden brown color and remain firmly attached to the twigs after normal leaves have dropped.

The paper-thin layer of bark on the outside of the limbs or branches which have been infected for several months will crack and roll back. This exposes black soot-like layers of spores characteristic of the branch wilt problem and which can serve as a means of helping to identify it.

The spores are not present on recently killed or infected branches. In this case the bark surrounding the point of entry or infection is dead. The dead bark may extend for several inches or feet beyond this point, depending on the length of time since the infection took place.

The wood underneath the dead bark is also dead and discolored. This discoloration varies from a light through a dark grey color. An exposed cross section when an infected limb is cut may show the discolored area extending across the entire surface or it may taper towards the center of the limb.

Cause and Spread

The disease is caused by a fungus organism. It is spread by the black spores mentioned. These spores are very small and light and can spread the disease by floating in the air from a source such as an old limb infection. Spores will germinate where the bark has been killed by sunburn or frost or by mechanical injuries.

Mechanical shakers apparently are not a factor in the occurrence of this disease because in many instances the infection starts far out on the smaller limbs. It was serious in many orchards more than twenty years ago before mechanical shaking had become a common practice.

The fungus responsible for branch wilt requires a high temperature for both spore germination and growth. It seems to grow most rapidly at temperatures between 86° F and 91° F and increases its growth quite rapidly at temperatures above 60° F.

Conditions Encouraging Branch Wilt

Branch wilt develops to serious proportions in orchards that have not received sufficient irrigation water, that have a low nitrogen supply or where the trees have low vigor from other causes such as crown rot or a damaged root system.

Perhaps the most serious factor which contributes to branch wilt is the lack of sufficient soil moisture during the growing season. The next factor which might add to the seriousness of the disease is a low nitrogen level in the orchard soils. When branch wilt was being investigated during the 1940's it was found that the use of heavy amounts of nitrogen, either alone or with other fertilizer materials, did not reduce the occurrence of this disease if the soil moisture was not adequate during the growing season.

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Things to Do

Prevention is the most effective way to reduce losses from this disease. First, however, it is necessary to remove diseased limbs from trees where the disease is already established. This usually requires heavy cutting with pole or mechanical saws.

Once a limb is infected the fungus continues to develop towards the main body of the tree. It does this by invading the heart wood of the limb. The infected part will have the grey discoloration mentioned earlier. In this situation the bark and sapwood may appear healthy and there may still be healthy twigs on the limb. In many cases the presence of the fungus is recognized only by the discolored core of the heartwood.

It is necessary to remove all of the limb which has discolored heartwood. This may require removing portions which appear to be healthy and normal. Unless all discolored wood is removed, the infection will continue and there will be no benefit from cutting limbs or branches. It is best to remove more of a limb than might appear necessary to make sure the disease has been eliminated from that point. On larger limbs it is desirable to make the cuts at crotches rather than to stub them off at any point.

The branch or limb removal can be done after harvest. This eliminates unnecessary loss of this year's crop. The leaves of affected branches will remain on the trees for some time after harvest. This helps in recognizing infected limbs.

Vigor of affected trees, as well as the rest of the orchard, should be maintained or increased by making sure that all trees have sufficient water for their needs during the growing period. Tree vigor should be maintained with a good nitrogen fertilizer program. One hundred to 150 pounds of actual nitrogen per acre per year is considered a minimum application to maintain vigor in mature bearing trees. More has been found profitable in some cases. Vigor may also be maintained by proper pruning of bearing trees.

Spraying the entire tree with fungicides such as bordeaux have not given sufficiently good control of the disease to warrant their use or justify the cost.

Protection for Large Cuts

In many cases large cuts may require protection from wood-rotting fungi. Once these get a start, they may continue to rot the main limbs or even the trunk of a tree.

Two methods of protecting cuts may be followed:

1. Prepare a bordeaux paint by mixing a "one package" bordeaux with raw linseed oil to the desired consistency; paint the cuts within a few days after they have been made.
2. Prepare a bordeaux wash by mixing "one package" bordeaux and water to a thin consistency. This wash should be applied two or three weeks after the cuts have been made. By that time the surface of the cuts will have dried and checked. The wash can then better penetrate the surface of the wood. This will permit it to weather better and give longer protection. Wood covering compounds which do not contain a fungicide cannot be expected to give protection from wood-rotting fungi.

Caution

1. Where the bark on larger limbs is exposed to direct sunlight by heavy pruning or cutting back, it is desirable to protect the surface by whitewashing to avoid further injury from sunburn. A few hours of direct sun can be damaging. It will be necessary to repeat the whitewashing if the protection is lost before leaves of new growth shade the area.
2. Infected limbs should be burned as soon as possible. These are sources of spores. Do not save them for firewood in the proximity of walnut orchards.

A Whitewash for Deciduous Fruit Trees

25 lbs. processed lime (ground hot lime or quick lime)
2½ lbs. salt
1½ lbs. dusting sulfur
add water to make about 25 gallons

Directions:

Add some of the water to the lime to start slaking. When enough water has been added to wet the whole mess and it is bubbling, add sulfur and stir well. When the sulfur has dissolved and the bubbling has stopped but the solution is still very hot, add the rest of the water and salt. Let stand over night or longer before using. The whitewash will have a slightly yellow color which bleaches white upon drying. If processed lime is used, it may be diluted to a desirable consistency for application with a sprayer. A whitewash prepared with quick lime may need to be screened or sieved to remove the larger particles of lime to permit its use in sprayers.

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