

## Rust of stone fruit

### Shane Hetherington

Research Horticulturist  
Health Sciences, Science Alliances and  
Evaluation,  
Orange Agricultural Institute

### Causes and consequences

Rust is caused by the pathogenic fungus *Tranzschelia discolor*. If not controlled, a severe infection can cause premature leaf-fall. Yield from trees infected with rust is considerably reduced. The fruit on trees defoliated before harvest does not mature satisfactorily, with sugar levels remaining low.

The effects of premature loss of leaf may be greater than the loss of the immediate crop. The leafless trees must live on stored food reserves for the rest of the season, depleting food reserves for bud development and winter requirements are low. This can cause weak bud development and below normal crop yield in the following season.

Defoliated trees often shoot and flower in autumn, causing a reduced crop the following season, as many flower buds were wasted by premature blossoming. In mid-late summer, defoliated limbs are exposed to direct radiation from the sun for long periods and are in danger of being sun-scalded and then invaded by wood rotting fungi. Limbs affected in this way are weakened, less productive and prone to breaking under the weight of a crop. When rust infection has occurred in several seasons, tree life may be shortened.

Fruit infected with rust is unsaleable. The infections penetrate several millimetres into the flesh.

### Symptoms

**Leaves:** The upper surface of an infected leaf becomes speckled with small yellow patches that often run together. The underside develops corresponding rusty brown spots (Figure 1).

These are powdery masses of fungal spores which are sometimes so numerous that the under surface of the leaf seems coated by brown dust. As autumn approaches, the spots on the undersides of the leaf often turn black.

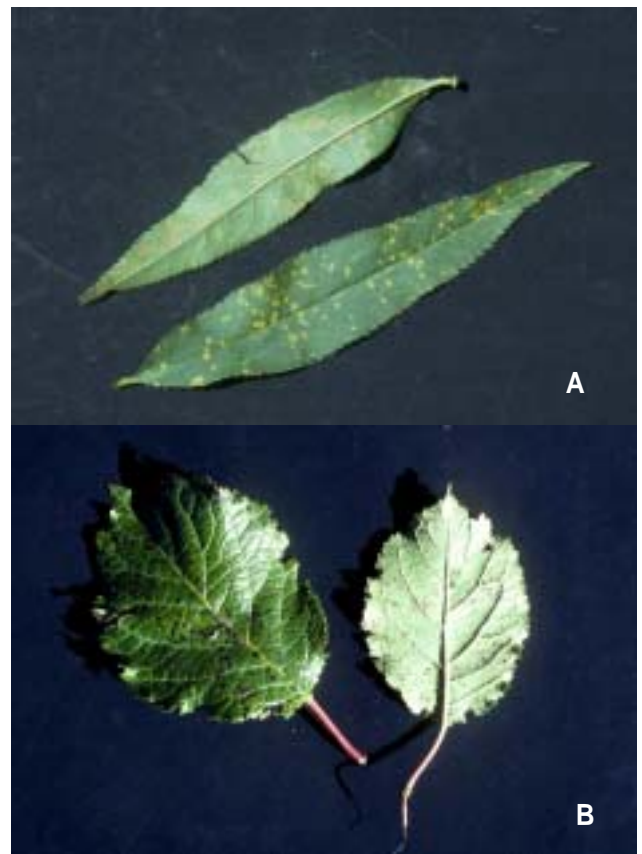


Figure 1. Rust infections on the upper and lower surfaces of (A) peach and (B) plum.

**Shoots:** Peach shoots may also be attacked, resulting in small dead patches where the bark splits on one and two year old shoots.

**Fruit:** Rust infection occurs on peaches, nectarines and apricots. Symptoms are small depressed spots with a dark reddish centre, often with a pale green border (Figure 2).



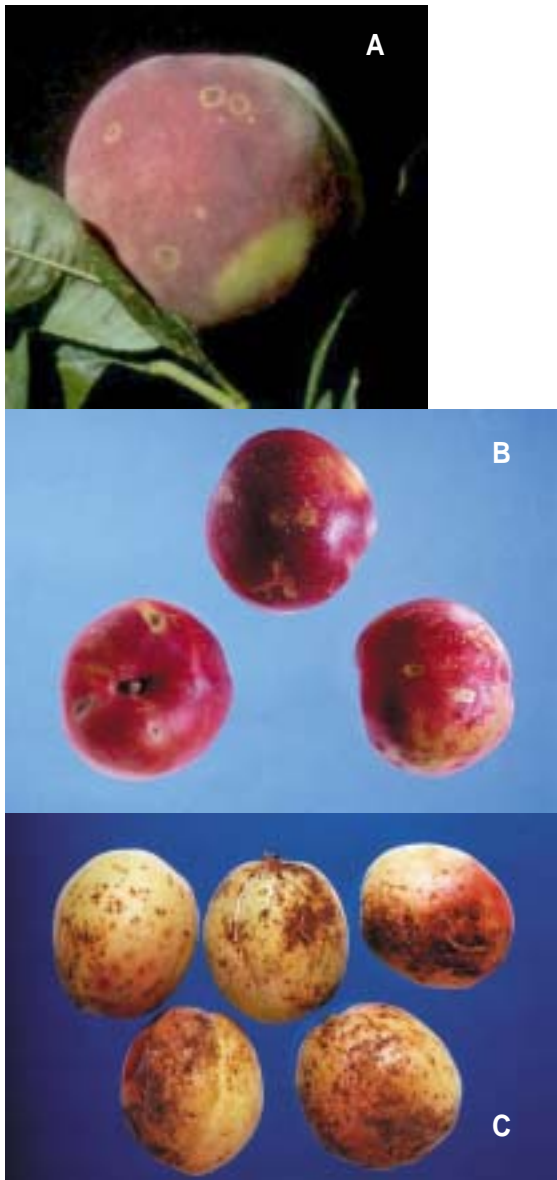


Figure 2. Peach (A), nectarine (B) and apricot (C) fruit with rust infections.

## Prevention

### Choosing species and varieties

All species and varieties of stone fruit can be infected by rust, but some are more susceptible than others. In coastal districts, severe rust infection often develops on early-maturing dessert peach varieties. In inland districts, rust is more likely to develop on some canning varieties and sugar plums (French prunes). On the tablelands, mid to late season peaches usually show severe infection only in autumn. Rust normally does not appear on almonds until midsummer and is not usually seen on apricots until autumn. There are several strains of stone fruit rust, each mainly attacking only one stone fruit species. This means, for example, that rust from peaches will not attack sugar plums, and vice versa.

## Orchard design

This disease is very responsive to weather. Setting up and managing an orchard to minimise weather favouring disease development is a very effective management strategy.

Where possible avoid planting in valleys. Humid air favours the disease and tends to pool in these areas. Spores of the rust fungus are readily carried on the wind and can be splashed about by rain. Rain and heavy dews during warm weather also favour disease development and orchards should be set up so as to allow rapid drying of the leaves. Younger trees are more resistant to the disease. If rust is a serious problem in older orchards replace trees more frequently.

## Pruning and shaping trees

Large bushy trees tend to trap air within their canopy and create a humid micro-climate. Thorough pruning allows better airflow through the trees and ensures more thorough penetration of sprays if the disease is severe enough to warrant them.

## Monitoring

Infections occur in mid-late summer, but can occur at any time during the growing season. Therefore careful monitoring throughout the season is advised.

This disease is spread readily by the wind and can be splashed about by rain. Infections occur in a predictable way in response to the weather. Because of the potential for rapid spread it is far more effective to monitor for favourable weather rather than symptoms.

## What to look for

Orchardists must carefully monitor the weather and treat orchards in response to periods which favour disease development in their regions. In plums, for infection to occur, leaves must remain continually wet for at least four hours at temperatures between 13 C and 25 C. If leaves are continually wet for longer, infection becomes increasingly heavy. At temperatures below 13 C and above 25 C, the infection takes longer to occur. No infection occurs at or above 30 C. Figure 3 describes this relationship.

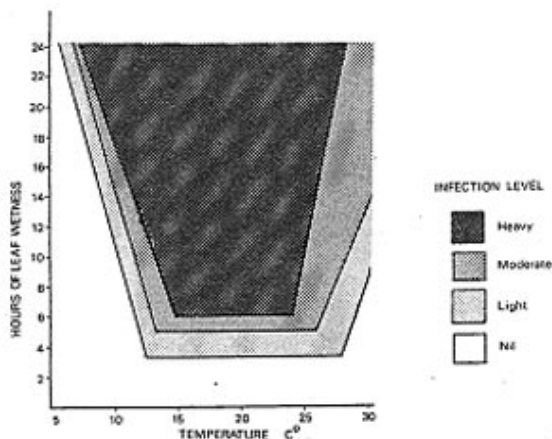


Figure 3. The relationship between temperature and hours leaf wetness to the severity of rust infection in French Prune

### Control

The following sanitation measures (referred to in Table 1 below) are designed to break the disease cycle in single orchards. They can also reduce the severity of rust by delaying epidemics. If an orchard is free of the disease at the beginning of a new season, it will take rust much longer to invade from distant orchards or other sources.

#### 1. Remove all diseased wood and leaves during pruning

When pruning peach trees, remove all diseased wood and where possible burn the prunings and any diseased leaves.

#### 2. Remove all fallen leaves from branches, crotches etc.

During winter, remove and destroy all dead leaves from within the framework of orchard trees. Leaves commonly lodge in the tree crotch where the main branches divide from the trunk, so look for leaves in these areas while pruning. Removing and destroying dead, infected leaves is preferable to dropping them on the orchard floor. The rust spores can survive on dead infected leaves on the ground as it does within the tree framework.

#### 3. Remove any green leaves retained by the tree

Some stone fruit species, such as almonds, and some varieties, tend to retain some living leaves through the winter. Remove these leaves if possible, as they may be a source of rust infection in the new season.

#### 4. Protective spray program

Where rust has been a problem in previous seasons and the crop is being grown in conditions conducive to disease infection orchardists should undertake a full fungicide spray program to control this disease. A complete program for the control of rust is given in the [Orchard Plant Protection guide for deciduous fruits in NSW](#).

Table 1. Sanitation measures

Bud-swell		Blossom		Mid Season		Harvest		After harvest		Dormancy		
Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	
Primary spores infect emerging growth		Secondary cycles of disease cause repeated infections on leaves, shoots and fruit						Resting spores form on leaves		Resting spores inactive during winter		
Protective spray program <sup>4</sup>									Remove all diseased wood and leaves during pruning. <sup>1</sup>			
									Remove all fallen leaves from branches, crotches etc. <sup>2</sup>			
									Remove any green leaves retained by the tree. <sup>3</sup>			

Note: This is a guide only. The status of the disease and time for treatment varies across fruit growing districts. Monitoring is critical to avoid unnecessary or poorly timed treatment.

**Orchardists can reduce fungicide applications when...**

- weather monitoring indicated that conditions are not conducive to disease development;
- orchards have no history of rust infection and are not close to sources of infection;
- orchards are set up to dry quickly after a rain or heavy dew; and
- trees are young.

**ALWAYS READ THE LABEL**

Users of agricultural (or veterinary) chemical products must always read the label and any Permit before using the product, and strictly comply with the directions on the label and the conditions of any permit. Users are not absolved from compliance with the directions on the label or the conditions of any Permit by reason of any statement made or not made in this publication.

**WARNING**

Pesticide residues may occur in animals treated with pesticides, or fed any crop product, including crop waste, that has been sprayed with pesticides.

It is the responsibility of the person applying a pesticide to do all things necessary to avoid spray drift onto adjoining land or waterways.

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