May 2026

Carina dieback 2025-26 season

Introduction

Unexpected losses in Carina trees seen during 2025-26 last season have not damped growers' enthusiasm for this self-fertile variety in the Riverina with some orchards producing strong yields with relatively low disease and insect susceptibility due to its closed shell. Many growers are replanting their losses with heightened vigilance and improved understanding on how to manage this variety. In this fact sheet Peter Reynolds (ABA Industry Development Officer - Riverina) outlines the symptoms that have been seen this season, possible causes and some remedial actions that have been implemented.

Background

In January and February 2026 some growers in the Riverina region of NSW noticed some serious leaf burn, leaf drop and fruit shrivel on the Carina variety of almond. This was seen mainly on two orchards with 10-year-old and 6-year-old trees. The symptoms were not seen on the other varieties within these orchards, just on Carina.
On inspection I noticed the trees showed different levels of dieback, from no symptoms, light amounts, moderate, severe and even tree death *(Figures 1a, 1b and 1c).* Often all levels of dieback can be found within single rows, in between healthy trees.

This article outlines the symptoms, possible causes that have been seen this season and some remedial actions that have been implemented.

It is important to note that other orchards in the same region with Carina variety saw none of these dieback symptoms nor have these growers with affected trees mismanaged their orchards.

Figure 1a: No symptoms

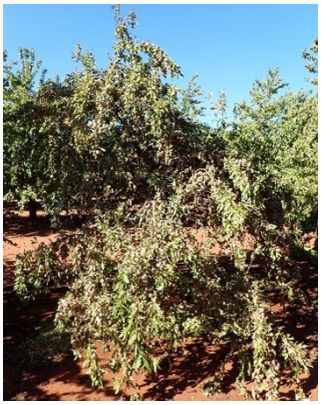

Figure 1b: Moderate symptoms

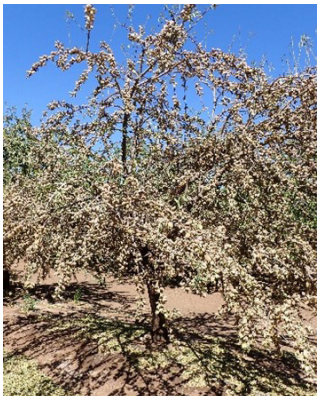

Figure 1c: Severe symptoms

Symptoms

Some or all may be present in differing amounts:

- Dead or dying leaves (Jan / Feb 2026)
- Partial or severe defoliation
- Fruit not hull splitting *(Figure 2a)*
- Kernel dry, shriveled and sour taste
- Twigs, spurs and small branches dead or dying (hard & brown internal)
- Larger branches drying out (internally) or dying off towards the outer ends (Figure 2b)
- Trunk appears "normal" with no discolouration, may be drier (internally) where partial or moderate dieback. Under severe effect, the trunk internal area may become brown & discoloured *(Figure 2c)*
- Lack of active feeder roots around the normal wetted soil area. (Figure 2d)
- Little or reduced feeder root growth during normal autumn root flush time.
- "Rotting" of larger secondary roots (5 – 10mm diameter) sometimes seen where severe dieback. *(Figure 2e)*
- Total tree death (very severe!)

Possible causes

A quick review of the possible causes of this dieback, to date there is nothing that identifies a single cause e.g. disease, etc.

- Disease

Trunk and wood samples were tested by Len Tesoriero (Crop Doc Consulting) and while a fungus Macrophomina phaseolina was identified, it is not considered to be a major pathogen capable of killing the trees in these orchards. There are also root rotting fungi present, causing decay in larger roots, but there were no symptoms of Phytophthora, and it is considered that the rotting roots were a result of wet soil conditions and anaerobic conditions.

- Insect

This season (2025/2026) there have been generally high infestations of Black Aphids (Spring 2025) and then both 2 Spotted & Bryobia Mites, from mid spring through to after harvest..Whilst these mite numbers increased considerably during the dry (and then hot) summer, the mite numbers per leaf were not significantly higher than had been seen in previous years.

Commonly seen symptoms on severely affected trees

Figure 2a: Fruit not hull splitting

Figure 2b: Larger branches dying out

Figure 2c: The trunk becomes brown and discoloured

Figure 2d: Lack of active feeder roots around the soil wetted area

Figure 2e: Rotting larger secondary roots

Certainly, the mites will have reduced photosynthetic capacity of the leaves, thereby putting an extra stress on the tree, but not to an extent to cause this dieback.

- Heavy Crop Load

The affected Carina trees were carrying a very heavy crop load and while this has put further stress on the tree, it is unlikely to have caused tree death as a single cause. Nearby or adjacent trees with similar crop load are still healthy and no sign of dieback.

- Variety

It is likely that this is the 1st season that Carina variety has been subject to all the exact conditions (weather, crop load, mites, etc.) since its commercial release, however there are many other orchards with Carina of similar age without the severe dieback. Also, there are many healthy trees within the same orchards.

- Rootstock

As the affected orchards are all planted in “new” soil, Nemaguard rootstock has been used, as in other Carina blocks, with no symptoms.

- Scion compatibility

As the dieback is showing up on different orchards of different ages, all bearing aged trees, and no previous dieback symptoms, it is unlikely there is an scion incompatibility issue, it would be seen previous years or with broken trees or misshapen trunks at the graft.

- Nematodes

As the orchards are all planted in “new” soil, Nemaguard rootstock has been used, as in other Carina blocks, with no symptoms.

- Weather

The weather conditions in the Riverina region could be summarised as:

Normal flowering / early spring weather (Sept 2025 = 32mm rain and cool but overcast days)
October - Cool and very dry, no day over 33oC & only 7mm rainfall.
November – Cool and dry, only 1 day of 36oC and 21mm rain.
December – Some hot days and 30mm rain
January 26 – Extremely hot and dry, 11 days over 40oC and 1mm rain
February 2026 – Hot and dry, consistently hot days and nights, 7mm rain

The effect of this weather on almond trees has been quite significant in several ways. The trees had lower Kc in spring and used less water, therefore the concentration of fertiliser applied during spring could have been quite high, possibly affecting the fine roots. With little effective rainfall, there would be little flushing of salts. Then in Dec and Jan the extreme heat has “shocked” the trees and applied a significant heat stress to all trees.

The shriveled fruit on the affected trees indicate that the stress began during mid spring at or just after pit hardening, as the kernels on the affected trees are small, dry but fully formed

- Fertiliser applications

The affected orchards applied their normal fertiliser applications during spring, according to crop load and growth stage. Interestingly, the growers with the more significant dieback used a high percentage of Sulphate based soluble fertilisers and high Salt Index fertilisers, which they have used in the past (with no ill effect). Possibly the extra Sulphates & other mineral salts could have a negative effect when applied in low amounts of water & no flushing rainfall.

• Irrigation

As stated above, the cool weather in spring meant the trees required less water than usual, therefore there was less potential for salt flushing events. Then during the extreme heat, the trees physically stopped taking up water during the extremely hot parts of the day so timing of irrigations became more important for tree water uptake & root health. All orchards were irrigated with channel (river) water.

• Foliar Phytotoxicity

The affected orchards applied their normal foliar fertiliser applications during spring, according to crop load and growth stage. Some of the fertiliser applications may have been greater than normal to help assist with the heavier crop load. These fertilisers generally supply small quantities of nutrients per ha and if any phytotoxicity is to be seen, it normally just burns the leaves, across the orchard, all varieties. I did not see this in the affected orchards, but it may have added another stress to already weakened trees. Applying extra Nitrogen to weakened trees may have put further stress on these trees by encouraging new foliar growth whilst the tree did not have capacity to provide sufficient water & nutrients to this extra foliage.

• Soil and location

The affected orchards were on differing soil types, both between orchards and within orchards. The soil types ranged from a sandy loam through to a red brown clay. The topography ranged from flat (well-draining) to undulating sloping ground. There appears to be no common theme between the affected trees and topography or soil type.

Remedial actions

As harvest season has just finished, it is difficult to tell how well the trees will recover next season, however there were some signs of tree recovery in the trees with mild symptoms. This is seen by significant new feeder / fine root growth through the normal autumn root flush time (March / April) and in some trees, some new modest shoot and leaf growth appeared along some of the branches.

However, in all these orchards with this dieback, there is a significant number of Carina trees that will need to be replaced as they are either dead or severely affected and are not likely to ever be productive trees again.

Some practices that have been employed to assist the trees include:

- Applying irrigation to suit tree needs, affected trees have lower capacity to take up all the normal irrigation water (applied to normal healthy trees).
- Applying root stimulant products to assist root growth
- Applying normal amounts of fertiliser, not excessive. Apply in sufficient amounts of irrigation water to avoid concentration of salts in the new root zone. Try to avoid high sulphate fertilisers.
- Applying normal post-harvest foliar sprays, including fungicides and normal (but not excessive) amounts of foliar fertilisers.
- Carrying out some hedging in autumn / winter to remove some of the dead branches.
- Replacing dead or severely affected trees.

While it is impossible to predict future conditions, it may be useful to consider adjusting tree management if similar tree and weather conditions / stress events occur again in future seasons. Looking at:

- Adjusting fertiliser product choice, if possible, to reduce sulphates (& other salts) if dry spring conditions.
- Apply fertilisers with sufficient water to allow good distribution across the root zone.
- Regularly apply a flushing irrigation to help flush salts past the fine roots.
- Maintain a reasonable but not excessive foliar nutrition program.
- Control mites early before significant leaf damage occurs.
- Consider applying root stimulant products during spring if root damage is observed early.
- Carefully monitor irrigation during extreme heat conditions.
- Consider having Carina variety on its own irrigation sub main to accurately apply irrigation water.

Summary

In my opinion, a combination of very heavy crop load, cool, overcast, dry weather during spring, no flushing rainfalls, high salt concentrations (especially where growers used sulphate based soluble fertiliser), increased foliar applications applying extra Nitrogen, heavy mite pressure, inconsistent irrigation applications and then extreme heat in Dec / Jan have all combined to cause dieback in some of the Carina trees. I think the badly affected trees had more stress early in the season, due to a combination of reasons, causing significant damage to the fine feeder roots which had no opportunity to regrow. Then the other stresses had a greater impact on those trees, eventually causing some of them to die or be severely affected. There does not appear to be any single disease organism or insect pest that has caused this damage, rather these may have just added more stress to an already damaged tree.

Carina variety in the Riverina region has shown that it can grow a good tree (shape & size) and can produce a very good yield with relatively low disease and insect susceptibility. However, if a single or multiple stresses on these trees becomes too much, it can begin to dieback and under severe stress can result in tree death.

Hort Innovation ALMOND FUND

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