

ALTERNARIA LEAF SPOT (AL22002)

- *Alternaria* species are present in Australian orchards and all almond species are susceptible.
- While not usually a problem, a combination of warm, rainy conditions, dew or high humidity in orchards with little airflow may result in severe infection and tree defoliation.
- Symptoms and orchard conditions conducive for infection are described here together with monitoring and management approaches.

Alternaria leaf spot is caused by fungi of the *Alternaria* species complex. It has been observed in Australia but is not usually reported to be a problem, although *Alternaria* species are widespread in our almond orchards. Severe infections have been reported to cause defoliation which will weaken the tree and lead to yield reduction.

Symptoms usually appear in late spring as small light brown circular lesions on the leaf occasionally with a yellow halo (Figure 1).

These can expand to between 5-20mm over time. Often semicircular lesions are seen at the leaf margin and tip. Older lesions may appear to look like a 'target' and black sooty sporulation can be observed in the centre of the lesions (1, 2).

In some situation the spots may darken into necrotic, irregular shaped spots on the leaf or along the leaf margin (Figure 3).



Figure 1 A) Typical Alternaria leaf spot symptoms in Nonpareil ©E Lehman B) black soot in centre of older lesion C) brown lesions with target appearance ©S Kreidl.



Figure 3 Symptoms seen on leaf samples from the Riverina during warm and humid conditions ©T Wiechel.

Significant leaf drop may be observed in mid-season before harvest (Figure 4).



Figure 4 Significant leaf drop in Nonpareil in mid December
©E Lehman

The pathogen overwinters as spores in the tree and on plant material on the orchard floor. Spores are dispersed by wind and rain landing on new growth in the spring.

Outbreaks do not necessarily require rain for leaves to be wet enough for infection. Infections occur in areas of extended dew periods or high humidity with warm summer temperatures. Temperatures above 16°C accompanied by a period of leaf wetness are suitable for infection, there is then a 3-4 week period before symptoms develop. The disease develops most rapidly in warm summer months. Orchards with high humidity and little airflow can have more severe symptoms.

A temperature and leaf wetness based predictive model has been developed to help determine the need and timing of fungicide application (3) (Table 1).

Table 1 Disease severity value model developed in California for forecasting Alternaria leaf spot.

Mean temperature (°C) during wetness	Leaf wetness duration (hours)				
	0-6	7-15	16-20	21	-
15-17	0-3	4-8	9-15	16-22	23+
17.1-20	0-2	3-5	6-12	13-20	21+
20.1-25	0-3	4-8	9-15	16-20	23+
25.1-29	0	1	2	3	4
DSV*	0	1	2	3	4

*DSV values assigned for average temperatures during leaf wetness periods over a day. Apply fungicide if accumulated index values over a 7-day period reach a value of 10 or higher.

Monitoring and management

All almond cultivars are susceptible, but Carmel, Monterey and Butte are more prone to this disease. Long term cultural practices to reduce humidity in the canopy such as pruning, row orientation and spacing and irrigation management will reduce the likelihood of outbreaks (2).

Orchards should be scouted for signs of the disease in October through December especially when there is a history of infection from previous seasons.

In Australia, there are 206 products registered for control of Alternaria leaf spot in almonds (as of the 22/1/24). There are a range of 14 active ingredients across 8 modes of actions registered with targeted activity against Alternaria. These products can be found by using key words 'Alternaria' and 'almond' in the search function on APVMA's Public Chemical Registration Information System Search (4).

Always use chemicals in line with label recommendations and check with your almond marketer to avoid market issues.

In California there have been some reports of resistance to strobilurin (group 11) and SDHI (group 7) fungicides, which indicates the need to properly rotate fungicide chemistries when spraying (5).

References

1. Teviotdale B. L., Viveros, M., Pryor, B. and Adaskaveg, J. E. (2001). [First Report of Alternaria Leaf Spot of Almond Caused by Species in the Alternaria alternata Complex in California - PubMed \(nih.gov\)](#) *Plant Disease* **85** (5), 558.
2. Doll, D. (2017). [Alternaria leaf spot of almond - The Almond Doctor](#)
3. University of California (2017) Almond pest management guidelines. [Alternaria Leaf Spot / Almond / Agriculture: Pest Management Guidelines / UC Statewide IPM Program \(UC IPM\) \(ucanr.edu\)](#)
4. [Public Chemical Registration Information System Search - portal.apvma.gov.au](#) accessed 22/1/24).
5. Adaskaveg, J. E. (2011). Epidemiology and control of Alternaria leaf spot. 2010/2011 Annual research report to Almond Board of California.

This fact sheet was compiled by Simone Kreidl¹, Tonya Wiechel¹, Peta Faulkner², Josh Fielke³ and Deidre Jaensch³.

Agriculture Victoria Research, ¹ AgriBio Centre for AgriBiosciences, Bundoora, ² Irymple Centre, Mildura. ³ Almond Board of Australia 1801 Bookpurnong Rd, Loxton SA.