Eucalyptus leaf spots

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(Revised by M.A. Dick)

Type of injury
All leaf spot diseases cause death of part of the leaf tissue and may cause leaf distortion. Severe infection may lead to early defoliation. Trees usually recover from defoliation and growth is seldom affected.

1. *Aulographina* leaf spot

Causal organism
*Aulographina eucalypti* (Cooke & Massee) Arx & E. Müller

Fig. 1 - *Aulographina eucalypti* on *Eucalyptus fastigata*. 
Diagnostic features

- Brown, roughly circular (2-15 mm in diameter) spots with a raised, crusty centre, and a dark margin on both sides of leaves and petioles. Spots on one side of the leaf are rarely visible on the other side.
- Minute (up to 2 mm long), black flecks (the fruiting bodies of the fungus) scattered on the leaf spots.

Hosts

_Eucalyptus botryoides, E. delegatensis, E. fastigata, E. ficifolia, E. fraxinoides, E. globulus subsp. globulus, E. globulus subsp. maidenii, E. nitens, E. pilularis, E. regnans, E. saligna._

Distribution

_Aulographina eucalypti_ is found throughout New Zealand.

Disease development

Initially small, circular, shield-like fruiting bodies of the asexual state develop on the surface of the lesion. These are followed by black, elongated fruiting bodies of the sexual state which are often branched and open by splitting along their length. The spores which initiate new infections are wind-dispersed and are discharged during periods of high humidity. Infection on new hosts occurs primarily in the lower crown. Young, expanding leaves are not susceptible. Infection of the new season’s foliage does not become evident until late summer.

Economic importance

Trees badly affected by _A. eucalypti_ may have over 90% of their leaf area covered with lesions. This level of infection has been seen in _E. regnans_ and _E. delegatensis_ in some locations in the central North Island. Other hosts are less affected with infection primarily occurring in the lower crown. This fungus
has been reported as causing serious defoliation of *E. nitens* in Victoria, Australia.

**Control**

Not considered necessary.

## 2. *Pseudocercospora* leaf spot

**Causal organisms**

**Note:** Specimens of *Pseudocercospora eucalyptorum* (previously known as *Cercospora eucalypti*) on *Eucalyptus* leaves from the herbarium were examined in 2002 and found to represent four different species. Leaf spots caused by the different fungal species are very similar in appearance.

*Pseudocercospora acerosa* U. Braun & M. Dick

*Pseudocercospora crousii* U. Braun & M. Dick

*Pseudocercospora eucalyptorum* Crous, M.J. Wingfield, Marasas & B. Sutton

= *Cercospora eucalyptii* sensu auct. (non Cooke & Massee)

*Pseudocercospora subulata* Z.Q. Yuan, de Little & C. Mohammed

Fig. 2 - *Pseudocercospora eucalyptorum* on *Eucalyptus regnans*. 
Diagnostic features

- Sub-circular to angular-shaped, pale to dark brown spots with a brown to purplish margin which may be somewhat raised. Lesions becoming greyish-brown to grey when old. Found singly or merging together on both the upper and lower surfaces of the leaf. Individual lesions range in size from 1-12 mm in length.

Hosts

*Pseudocercospora acerosa*: *Eucalyptus baxteri, E. nitens, E. verrucata*

*Pseudocercospora crousii*: *Eucalyptus dendromorpha, E. fastigata, E. muelleriana, E. pilularis, E. regnans, E. stenostoma*


*Pseudocercospora subulata*: *Eucalyptus nitens*

Distribution

*Pseudocercospora eucalyptorum* is found throughout New Zealand; *P. crousii* has been recorded from Auckland to Taupo in the North Island and from Mid Canterbury; *P. acerosa* is found extensively in the South Island and Wanganui in the North Island; *P. subulata* is known from only one collection in Bay of Plenty.

Disease development

First symptoms have been found on newly-flushed leaves in January. Once the infection is established, a stroma (a conglomeration of fungal filaments) is formed under the epidermis of the leaf. Tufts of filaments bearing threadlike spores arise from the stroma and push their way out through the stomatal openings. The spores are dispersed by wind. The main infection period is from January to March.
Economic importance
There are some records of accelerated leaf fall in *Eucalyptus regnans* but generally these fungi cause little damage.

Control
Not considered necessary.

BIBLIOGRAPHY

3. *Sonderhenia* leaf spot
Causal organism
Note: Previously known as species of *Hendersonia*. A taxonomic review of the genus resulted in many species, including those recorded on *Eucalyptus*, being assigned to other genera.

*Sonderhenia eucalypticola* (A.R. Davis) H.J. Swart & J. Walker
Perfect (sexual) stage: *Mycosphaerella walkeri* R.F. Park & C. Mohammed (not found in New Zealand)

*Sonderhenia eucalyptorum* (Hansford) H.J. Swart & J. Walker
Perfect (sexual) stage: *Mycosphaerella swartii* R.F. Park & Keane
Fig. 3 - *Sonderhenia eucalyptorum* on *Eucalyptus delegatensis*.

**Diagnostic features**

- Small (1-3 mm in diameter) spots with a distinct purple-red margin scattered over both upper and lower leaf surfaces. Spot surfaces are often raised. The two species of *Sonderhenia* form lesions that are very similar in appearance and cannot readily be distinguished. The species are separated microscopically on spore dimensions and they also differ in host association.

**Hosts**

*Sontherhenia eucalypticola*: *Eucalyptus fraxinoides*, *E. globulus* subsp. *globulus*, *E. nicholii*, *E. nitens*, *E. sideroxylon*

*Sontherhenia eucalyptorum*: *Eucalyptus delegatensis*, *E. elata*, *E. fastigata*, *E. fraxinoides*, *E. globoidea*, *E. johnstonii*, *E. leucoxylon*, *E. maculata*, *E. muelleriana*, *E. obliqua*, *E. regnans*, *E. viminalis*.

**Distribution**

Throughout New Zealand except Northland.
Disease development
The asexual fruiting bodies, of which there are only between one and five per lesion, are completely submerged in the leaf tissue. In humid weather dark brown spores are exuded in a mass from the fruiting bodies and can be seen as minute dots on the leaf surface; they are presumably dispersed by rain splash. The main infection period is late summer and autumn.

*Mycosphaerella swartii*, the sexual stage of *S. eucalyptorum*, is occasionally seen on the lesions.

Economic importance
Causes little damage. Rarely associated with minor defoliation.

Control
Not considered necessary.

4. *Phaeothyriolum* leaf spot

Causal organism
*Phaeothyriolum microthyrioides* (G. Winter) H.J. Swart
(Previously known in New Zealand as *Microthyrium eucalypti* P. Hennings)

![Image of Phaeothyriolum microthyrioides on Eucalyptus fastigata](image-url)
Diagnostic features
- Minute, black fruiting bodies, resembling iron filings, arranged in a circular or semi-circular pattern on both upper and lower leaf surfaces.
- Affected leaves may turn a pale green colour or develop purple blotches.

Hosts

Distribution
Throughout New Zealand.

Disease development
The shield-shaped fruiting bodies are entirely superficial. When mature, a circular opening is formed in the centre of these fruiting bodies for the release of the spores, which are then dispersed by wind. Infection most commonly occurs in the lower crown on mature foliage.

Economic importance
Not considered of any significance.

Control
Not considered necessary.

5 *Mycosphaerella* leaf spots

Causal organisms
*Mycosphaerella cryptica* (Cooke) Hansford
*Mycosphaerella nubilosa* (Cooke) Hansford
Fig. 5 - Dieback of *Eucalyptus delegatensis* caused by *Mycosphaerella cryptica*.

Fig. 6 - Upper leaf with *Mycosphaerella nubilosa* on *Eucalyptus globulus*, and lower leaf with *M. cryptica* on *E. delegatensis*.

Fig. 7 - Cankers caused by *Mycosphaerella cryptica* on *Eucalyptus delegatensis* twigs.
Diagnostic features

*Mycosphaerella cryptica:*
- Reddish-brown, irregular-shaped spots with a prominent purple margin present on both sides of young, expanding leaves. Spots eventually turn dark grey. Fruiting bodies develop on both sides of leaves.
- Infected leaves often distorted and cast prematurely.
- Cankers (up to 25 mm long) on infected shoots.
- Gum exudation is often associated with canker development and dieback occurs if cankers girdle shoots.

*Mycosphaerella nubilosa:*
- Creamy yellow to pale brown, irregular-shaped spots found on both sides of young, expanding leaves. Spots later turn grey-black on the underside.
- Fruiting bodies develop on the underside of leaves only.

Hosts


Distribution
Throughout New Zealand except for Southland.

Disease development
Leaf spots appear about 3 weeks after the establishment of infection. The fruiting bodies of the asexual state occur from December to March and spores are
splash-dispersed. Fruiting bodies of the sexual state are present throughout the year and spores are wind-dispersed. Warm (18° to 24°C), moist conditions favour the establishment of infection.

**Economic importance**
Attack by *Mycosphaerella* spp can have a marked effect on the growth and form of young trees of the more susceptible host species particularly in damp places such as gullies. Dieback of shoots, if it occurs repeatedly, can result in a stunted, bushy, and multi-leadered tree. *Eucalyptus delegatensis* and *E. regnans* are particularly susceptible to *M. cryptica*. Although *E. globulus* subsp. *globulus* is reported to be very susceptible to *M. nubilosa* in parts of Australia the fungus has not caused any significant damage in New Zealand.

**Control**
Different provenances of *E. delegatensis* and *E. regnans* show a marked variation in their susceptibility to infection by *Mycosphaerella*; generally, the Tasmanian provenances of both species are the most resistant. Moist sites favour infection and susceptible species should not be planted on such sites. Chemical control is occasionally desirable in the nursery and can be achieved with fortnightly applications of chlorothalonil e.g. 2l Bravo Weatherstik and 0.33 litres of wetting agent in 1000 litres of water per hectare.

### 6. Septoria Leaf Blight
**Causal organism**
*Phaeophleospora eucalypti* (Cooke & Massee) Crous, F.A. Ferreira & B. Sutton.  
= *Septoria pulcherrima* Gadgil and M. Dick,
Diagnostic features

- Pale yellow spots on both sides of the leaf. Spot colour soon changes to a deep carmine-red and finally to brown with a residual carmine margin. Lesions regular in shape, often merging together and covering large areas of the leaf.
- Exuded spore masses visible on the lesions as minute dark-coloured spots.

Hosts


Eucalyptus nitens is particularly susceptible.
Distribution

Disease development
Studies have been conducted mainly on *Eucalyptus nitens* which produces foliage during most of the year in the central North Island. New leaves emerging in spring become infected, probably by means of spores released from infected, residual, previous season's foliage. Microscopic fruiting bodies are formed early within newly infected leaves and exude spores as a sticky mass on the surface. They are apparently dispersed by rain splash, but the early appearance of spots on leaves in isolated, newly planted stands suggests they are also airborne, possibly in aerosols. Juvenile leaves become resistant after the first few weeks, but infected foliage continues to produce spores. On warmer sites an epidemic builds up throughout spring and summer, which only slows down as the production of new leaves and spores declines in autumn. Both juvenile and mature leaves are affected, but the latter only in severely infected stands, probably from an abundance of spores dispersed from diseased juvenile foliage. In such stands infected leaves are shed within one year. This leads to the production of epicormic shoots whose leaves are also susceptible, and complete transition to the adult phase is delayed.

Economic importance
Septoria leaf blight causes moderate to severe growth loss, depending on the region. A survey of *E. nitens* stands conducted in 2005 in the Rotorua-Bay of Plenty area revealed that the disease was most severe within 20 km of the coast where the climate was milder (mean annual temperature greater than about 12-13°C). Disease severity was generally low in inland plantations where it was cooler, but there were local topographic effects; trees were often heavily diseased on valley floors, level tops and south facing slopes. Septoria leaf blight, together with attack by the eucalyptus tortoise beetle, *Paropsis charybdis*, has
contributed to the demise of a venture to produce fast growing hardwood fibre for pulp from young *Eucalyptus nitens* plantations in the Bay of Plenty and central North Island.

**Control**

There appears to be little potential for an operational fungicidal control of this disease. While several fungicides have shown promise when applied regularly to runoff under experimental conditions, a single aerial spray application was unsuccessful. The ongoing steady progression of recurrent infection as new leaves continue to emerge during spring and summer means that effective control would require a large number of regular applications of fungicide which is unlikely to be economic.

Genetics field trials have indicated that many families of *E. nitens* from Victoria are susceptible to the disease. Stock from New South Wales was less affected, but tended to grow more slowly. Therefore *E. nitens* should not be planted on sites that are likely to be disease prone, but instead a different eucalypt or other tree species should be substituted.

**BIBLIOGRAPHY**


7. *Trimmatostroma* leaf spots

Causal organisms

*Trimmatostroma bifarium* Gadgil and M. Dick

*Trimmatostroma excentricum* Sutton and Ganapathi

Fig. 9 - *Trimmatostroma bifarium* on *Eucalyptus regnans*.

Diagnostic features

This description is applicable to both species as they cannot be distinguished in the field.

- Brown, roughly circular (2 - 18 mm in diameter) spots, frequently composed of concentric rings of different shades of brown. Lesion centre often raised and with a crusty appearance.
- Small, black dots (the fruiting structures) visible on the spots.
Note: These leaf spots look similar to those caused by *Aulographina eucalypti*. However, the lesions caused by *Trimmatostroma* spp. go right through the leaf and the same lesion can be seen on both sides, whereas *Aulographina* lesions are generally limited to one surface of the leaf.

Hosts

*Trimmatostroma bifarium*: *Eucalyptus delegatensis*, *E. fastigata*, *E. fraxinoides*, *E. nitens*, *E. obliqua*, *E. regnans*, *E. sieberi*.

*Trimmatostroma excentricum*: *Eucalyptus delegatensis*, *E. fastigata*, *E. obliqua*, *E. pauciflora* subsp. *niphophila*, *E. regnans*, *E. sieberi*.

Distribution

From central North Island to Southland.

Disease development

Spores are formed on the surface of the lesions in black powdery masses which are frequently arranged in a circular pattern. They are wind-dispersed and are found throughout the year. Infection levels tend to be greatest in the lower crown. New season’s leaves do not become infected until mid-summer.

Economic importance

Cause little damage.

Control: Not considered necessary.

GENERAL BIBLIOGRAPHY

