



## Lupin anthracnose disease

### ANTHRACNOSE - an industry issue

Anthracnose is a serious disease of lupins worldwide. It can pose a major threat to the whole lupin industry if adequate control and eradication measures are not implemented and adhered to. Resistant varieties of narrow-leafed lupins help reduce the risk of major crop losses to anthracnose, but we do not yet have resistance in albus lupins. *Working together, we can ensure a long-term future for the whole lupin industry.*

### Anthracnose in South Australia

Anthracnose is known to occur in narrow-leafed lupin crops on the Eyre Peninsula, having been first detected in 1996. However, the majority of growers on Eyre Peninsula have eradicated the disease from their properties and are growing lupins free of anthracnose. The disease is also known to occur in bitter albus lupins in the lower South East.

Anthracnose is a major marketing issue for lupins, with confirmed freedom from the disease a major advantage in marketing of lupin grain interstate. Restrictions currently apply to the movement of lupins from SA being exported to NSW, Victoria and Tasmania. Some marketing and handling companies provide 'anthracnose-free' segregations for growers to enable the testing, marketing or warehousing of lupins that are proven to be eligible.

Note that there are no restrictions on the movement of lupin grain or seed within or into South Australia. Growers therefore need to be vigilant in keeping their anthracnose freedom.

For information on the conditions applying to the interstate export of lupins from SA contact the PIRSA Plant Health Operations on 1300 666 010 or 08 8168 5203.

### Anthracnose in Western Australia

Anthracnose is now widespread throughout Western Australia's lupin growing areas. It has established and spread through wild populations of blue lupins, making eradication impossible. Agronomic practices to minimise crop losses and use of resistant varieties are encouraged.

There are no restrictions on lupin seed or machinery entering SA from WA, but good hygiene is encouraged with respect to knowing the source of the product, testing seed for infection and cleaning any machinery before it arrives in SA.

### Anthracnose distribution

**Lupin anthracnose** is caused by the fungus *Colletotrichum lupini*, formerly named *Colletotrichum gloeosporioides*. It is the most damaging disease of lupins in Europe, South America and New Zealand. The disease occurs in every lupin growing area in the world. It was found in commercial lupin crops in SA and WA in 1996. The disease is not known to occur in narrow-leafed or albus lupin crops in NSW, Victoria or Tasmania.

## Description of disease

The most obvious symptom is a bending of the stem in a shepherd's crook shape. Inside the bend are oval shaped lesions up to 2 cm in length. The beige/pink slimy ooze in the centre of the lesion contains the spores. The growth above the bend or crook is usually twisted and deformed and eventually dies.



As the disease progresses, similar lesions develop on the pods and seeds. Later infections are mainly seen as lesions on the pods, often causing distortion.

This strain of anthracnose is restricted to all lupin species but will not affect other broad acre crops.

## Infection cycle

Initial infection comes from fungal spores or mycelium carried on or in the seed. The fungus can survive for up to two years on the seed, and possibly longer in some conditions. Seedlings emerge from infected seed, and may develop lesions on the stem, hypocotyl or cotyledons.

After a few days, these lesions produce an abundance of spores, which are spread through the crop by rain splash. Spores can be spread on machinery, animals, humans, and possibly insects.

Infected plants will still set viable, but infected seed. In this way the disease is multiplied in the seed lot, and infection levels in the crop will increase over time.

The fungus can survive over summer on infected stubble, and spores can be splashed to reinfest seedling lupins. Summer and autumn rains decrease the viability of the fungus on stubbles, but infected stubble can infect any volunteer lupins that emerge.

Volunteer lupins need to be controlled to stop the disease persisting. They may either be from infected seed, or may become infected from stubble, and set infected seed, thus perpetuating the disease.

## Spread of the disease

The main method of disease spread is through movement of infected seed. It can also be spread by movement of infected stubble, and by movement of spores between growing crops. Anthracnose can be prevented from infecting crops, and eradicated from individual paddocks and farms by sound agronomic practice.

### **Reduce the risk of spread by:**

- Decontaminating machinery, vehicles, people and animals moving from one crop to another.
- Sourcing a seed supply tested free of anthracnose, ideally from districts free of anthracnose.
- Treating seed with a fungicide registered for lupin anthracnose.
- Reducing trash by grazing lupin stubbles hard after harvest.

### **Recommended practices for all lupin growers in South Australia:**

- Sow clean seed that has tested free of anthracnose and CMV.
- Use a recommended seed dressing.
- Choose an anthracnose resistant variety.
- Practice good crop hygiene.
- Manage crop rotations to ensure at least two-year break between lupin crops.
- Remove all lupin volunteers.
- Obtain proven “anthracnose free” status to assist the marketing of the crop interstate.

## Sow clean seed

In districts where anthracnose has not been found, retaining your own seed is a safe practice. Anthracnose builds up to higher levels over time through multiplication within the crop. Testing your sowing seed is however good insurance, will assist in the early detection of the disease, and is likely to assist marketing as part of the proof of ‘anthracnose freedom’. When purchasing a new variety, insist on it having been tested for anthracnose freedom.

In anthracnose affected areas, seed should be sourced from areas free of the disease and tested to be disease free. When changing seed, or varieties, it is acceptable to purchase a smaller quantity of seed and bulk it up for sowing the crop the following year. In high-risk areas, seed should be changed over regularly.

Test seed for anthracnose, in the same way as for CMV. Testing seed is a valuable aid to ensure that when sowing seed it is either disease free or has a seed infection level below 1:10000. It may also assist in proving freedom from the disease when marketing the lupins.

## Use a seed dressing

Thiram products (eg. Thiram<sup>®</sup>, Thiraflo<sup>®</sup>SD, Thiraflo<sup>®</sup>FF, Thiragranz<sup>®</sup>, Vitavax<sup>®</sup>) are recommended as a seed dressing for the control of anthracnose at the rate of 1kg active ingredient per tonne of seed. Thiram should be mixed with Rovral<sup>®</sup>, Civit<sup>®</sup>, or Sumisclex<sup>®</sup> for the control of brown leaf spot.

Some thiram products are not coloured, so must be mixed with Rovral<sup>®</sup>, Civit<sup>®</sup>, or Sumisclex<sup>®</sup>, or have a separate dye added. It is illegal to apply seed dressings that are not dyed.

Foliar fungicides- Dithane Rainshield<sup>®</sup>, Penncozeb 750<sup>®</sup>, Griffin and Sabero Mancozeb<sup>®</sup> are registered for foliar anthracnose control.

## Choose a resistant variety

Resistant varieties, Wonga<sup>A</sup> or Tanjil<sup>A</sup>, or moderately resistant varieties, Kalya<sup>A</sup>, Mandelup<sup>A</sup> or Coromup<sup>A</sup>, should be grown in areas where anthracnose has been detected, such as the lower Eyre Peninsula, and in high rainfall zones where anthracnose is likely to cause the greatest damage. All growers should consider switching to high yielding anthracnose resistant varieties as they become available. Resistant varieties can still become infected with anthracnose but the spread of the disease is less. They can tolerate a higher level of seed infection before a yield loss is incurred. Consider changing from Merrit, Gungurru or Jindalee<sup>A</sup> to one of the new varieties with higher anthracnose resistance, such as Wonga<sup>A</sup>, Tanjil<sup>A</sup>, Mandelup<sup>A</sup> or Coromup<sup>A</sup>. Other disease factors, such as brown leaf spot resistance, should not be ignored in variety choice.

Note that growing an anthracnose resistant variety in the presence of the disease will ensure that yield loss is minimised, but does not ensure that the harvested grain is free of anthracnose. The seed infection level may be low, but not free of the infection for marketing.

The risk of anthracnose infection and yield loss is dependent on rainfall, variety and initial level of seed infection. Growing a resistant variety like Wonga<sup>A</sup> provides the least yield losses (0 to 3%) and seed transmission (<0.5% at worst). Mandelup<sup>A</sup> and Coromup<sup>A</sup> have moderate resistance to anthracnose, so their yield losses and seed transmission rates will be slightly higher. If you continue to grow a higher yielding, moderately susceptible variety like Jindalee<sup>A</sup> in the short term, then avoiding the disease, through careful management, is the major issue. The risk of loss with Quilinock<sup>A</sup> will probably be twice as great because it is a susceptible variety.

Yield losses through anthracnose are likely to be four times as great in higher rainfall areas (>450 mm) than in low rainfall areas (<325 mm). It is unlikely that major yield losses will occur in the first year of detecting anthracnose in the crop if Jindalee<sup>A</sup> or Merrit is grown (2 to 20%). Losses will be higher if Quilinock<sup>A</sup> is grown (2 to 30%), and even higher (10 to 95%) with Kiev Mutant (albus lupins). In the subsequent year, yield losses will continue to increase because seed infection levels will have increased, and be highest in the more susceptible varieties.

## Practice good crop hygiene

- Reduce the possibility of spreading anthracnose via machinery that has passed through lupin crops. Clean machinery before moving between crops, with high-pressure water. This is especially important if the machinery is going from one property to another (eg spray contractors).
- Anthracnose can be spread by moving infected lupin trash from a lupin crop into uninfected paddocks, especially, but not solely, on harvesters. Plan your harvest to avoid transporting lupin material in your plant and equipment. Harvesting a cereal after lupin crops will help to remove lupin seed and trash from the header. Harvesting contractors need to take special care when moving between properties. Grain augers must also be cleaned.
- Monitor lupin crops closely, especially from late September onwards through October into November. If any suspicious diseased lupin plants are found, contact Primary Industries and Resources SA.
- When monitoring crops in the spring, agronomists are advised to take special precautions, especially when going from one property to another.
- There should be a minimum two-year break between lupin crops in the same paddock. This will allow for enough time for any anthracnose spores on trash to breakdown, and so provide a disease break. *Volunteer lupins must be controlled* to provide an effective disease break.
- Sandplain or blue lupins are very susceptible to anthracnose, and can be a reservoir of infection. It is critical that all wild populations of lupins are controlled.

## Harvesting and other contractors

- It is the responsibility of the contractor not to spread the disease, to follow hygiene and decontamination procedures, and to demonstrate to clients that all precautions have been taken.
- Exercise maximum precautions before and during harvest of lupin seed. Remember to clean other harvest equipment such as augers and field bins.

## Seed cleaning

Professional seed cleaners play an important role in ensuring the disease freedom, cleanliness and quality of the industry's seed.

- Cleaning and grading equipment (including augers) should be emptied and cleaned between lupin lots.
- After grading or cleaning lupins, grading or cleaning a non-lupin crop assists in removing lupin material from the equipment. All equipment must be thoroughly cleaned before moving to another property.
- Contractors should keep precise records so that the order of grading and cleaning of each lupin crop can be determined.
- Inform clients of your movements and decontamination procedure.
- Growers should ask contractors for proof of cleaning of equipment.

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