OLIVE ANTHRACNOSE

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Strategic levy investment

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This is No 7 in a series of 9 tutorials on IPDM in olives

The others are:

1. Principles and practices of Integrated Pest and Disease Management
2. Monitoring for pests, diseases and beneficial species, including symptoms and possible causes, identification/diagnostic services, biosecurity
3. Biosecurity, including pests and diseases not present in Australia
4. Black scale: biology, damage and management
5. Olive lace bug: biology, damage and management
6. Apple weevil: biology, damage and management
8. Peacock spot: life cycle, conditions conducive, symptomatology and damage, and management
9. Cercospora leaf mould: life cycle, conditions conducive, symptomatology and damage, and management

It is an output from the Hort Innovation project OL17001 An Integrated Pest and Disease Management Extension program for the Olive Industry

CAUSE and IMPORTANCE

- It is caused by certain species of fungal genus *Colletotrichum* - sometimes referred to as species complexes of *C. acutatum and C. gloeosporioides*
- Taxonomists have split each of these species and named new ones based on analysis of their DNA sequences
- 3 species are known to cause Anthracnose on olives in Australia: *C. acutatum*; *C. gloeosporioides*; and *C. simmondsii.* These and further species cause anthracnose on olives overseas.
- Anthracnose is a globally important disease of olives - and many other fruit and vegetable crops where it causes postharvest losses – e.g. avocado, banana & mango fruit rots
- Olive losses are due to reduced yields and poor oil quality

ANTHRACNOSE SYMPTOMS - fruit infection

- Flowers & unripe fruit are mostly symptomless
- As fruit ripen sunken lesions with gelatinous salmon pink spore masses develop on the surface
- Lesions may have a faint concentric pattern (left)

Brownish ‘Soapy olive’ symptoms

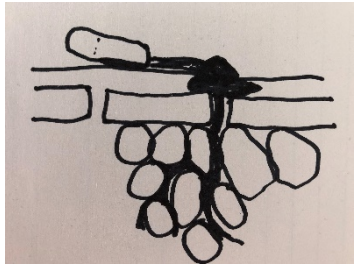
ANTHRACNOSE SYMPTOMS - infection of shoots and leaves

- *Colletotrichum* spp. can survive on plant surfaces without infection - called epiphytic survival.
- Infected vegetative olive tissue (shoots, stems, leaves) can be symptomless
- In wet weather disease symptoms develop - drying and wilting of leaves, defoliation, and dieback of branches
- Severe infection can cause reduced tree vigour

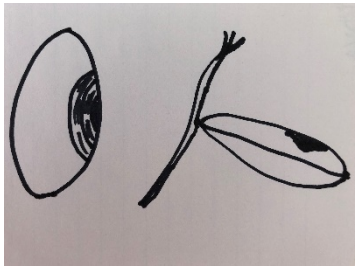
BIOLOGY & LIFE CYCLE

- Spores spread from infected mummified fruit or from infected branches and leaves with rain splash; insects may also passively spread spores on their bodies
- Infection of flowers and young fruit occurs in spring (10-25°C; optimum temperature 17-20°C) in wet conditions (up to 48 hr)
- Fruit infections are superficial and remain dormant – latent infections; shoot and leaf infections can result in branch dieback
- In wet autumns and as fruit ripen, sunken lesions develop and masses of conidia (spores) form – seen as greasy pink, orange or brown areas on the fruit surface – called 'soapy olive or soapy fruit'
- Spores spread with rain splash causing secondary infections
- Olive varieties differ in susceptibility – *Barnea* and Manzanillo are very susceptible; *Arbequina* and *Picual* are relatively resistant. A note of caution when reading about studies done in the Northern Hemisphere - there are different fungal species causing this disease and individual strains of any species may differ in aggressiveness – they may not always correlate with Australian experiences
- Epidemics develop quicker in super high density crops – even in moderately resistant varieties such as *Arbequina*

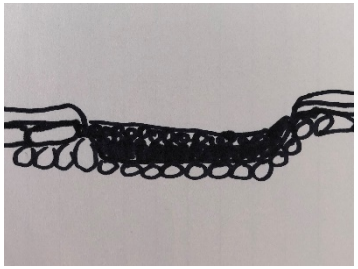
Colletotrichum LIFE CYCLE



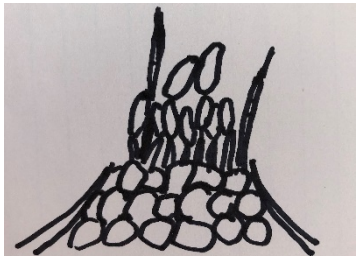
Summer
Latent infection



Autumn
Development of symptoms on maturing fruit
Secondary infections in wet weather

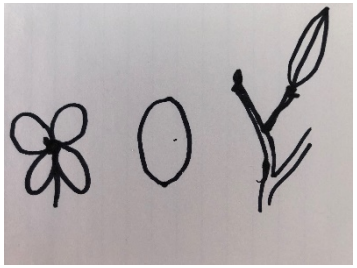


Sunken necrotic black lesions

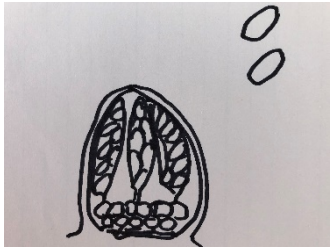


Acervulus filled with asexual conidia (spores)

Winter
Survival in mummified berries
Leaf and twig litter on soil



Spring
Flower, fruit, twig & leaf infection



C. gloeosporioides
Sexual reproduction - release of ascospores from perithecia

ANTHRACNOSE INFECTION OF FLOWER

Flower infections are generally symptomless - fungal hyphae and small orange spore masses (see arrows) develop when flowers are placed under high humidity

MUMMIFIED FRUIT- source of infection

MANAGEMENT OPTIONS

- Remove or cover dropped leaves and fruit with compost; remove mummified fruit on trees
- Prune to remove infected branches and to open up tree canopy to air & sun
- Fungicide applications: timing is important - preventative treatments in winter; and preventative or eradicative products in spring, summer and autumn - depending on occurrence and duration of wet weather
- Grow less susceptible varieties
- Harvest fruit early, particularly if wet weather is expected or occurs near ripening
- Microbial biocontrols such as strains of the bacterium *Bacillus subtilis* and the fungus *Aureobasidium pullulans* reduced anthracnose in European research however they are currently not registered in Australia for olives
- Balance plant nutrition – avoid excess nitrogen and ensure calcium levels are adequate. Note calcium becomes unavailable to plants under very wet or dry soil conditions – so regular watering or good drainage are important when fruit are developing to prevent deficiency

REVISION QUESTIONS

- Q1: What are some key preventative strategies for olive anthracnose that can be performed during winter?

- Q2: If you experience wet spring conditions what further actions should you take?

ANSWERS

- Q1: Pruning affected foliage and opening up the tree canopy; removing unpicked or mummified fruit; using preventative fungicide sprays such as copper; and remove or mulch over fallen leaves and fruit.

- Q2: Apply curative fungicides according to label recommendations; and make sure trees are not over-fertilised with nitrogen (which increases susceptibility of plant tissue and decreases uptake of calcium); and apply calcium supplements which improve the plant’s defence to pathogen attack

QUESTIONS TO CONSIDER AFTER READING THIS TUTORIAL

- Have you seen Anthracnose in your grove?
- Have you noticed it is worse on certain varieties? Which ones?
- What are your strategies to minimise it?
- How effective have your strategies been, and what additional or alternative strategies could you employ?

FURTHER READING

- Nigro E, Antelmi I, Labarile R, Sion V & Pentimone I (2018) Biological control of olive anthracnose*. Acta Horticulturae*. 1199.51 ISHS. Eds: S. Perica et al. 439-444.
- Trapero A & Blanco M (2010) Diseases - Chapter 15 in *Olive Growing.* Eds D Barranco, R Fernandez-Escobar & L Rallo RIRDC Australia, 525-535.
- Moral J & Trapero A (2012). Mummified fruit as a source of inoculum and disease dynamics of olive anthracnose caused by *Colletotrichum* spp. Phytopathology 102:982-989.
- Moral J, Jurado-Bello J, Sanchez MS, de Oliveira R & Trapero A (2012). Effect of temperature, wetness duration and planting density on olive anthracnose caused by *Colletotrichum* spp. Phytopathology 102:974-981.
- Moral J, de Oliveira R & Trapero A (2009). Elucidation of the disease cycle of olive anthracnose caused by *Colletotrichum acutatum*. Phytopathology 99:548-556.
- Moral J & Trapero A (2009). Assessing the susceptibility of olive cultivars to anthracnose caused by *Colletotrichum acutatum.* Plant Disease 93:1028-1036.
- Talhinhas P *et al*. (2011) Epidemiology, histopathology and aetiology of olive anthracnose caused by *Colletotrichum acutatum* and *Colletotrichum gloeosporioides* in Portugal. Plant Pathology 60:483-495.

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For more information on the fund and strategic levy investment visit horticulture.com.au