

Olive Leaf Spot Disease: Epidemiology and Control

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Abstract

One of the major problems threatening the young New Zealand olive industry is olive leaf spot (OLS), also called peacock spot, caused by a fungus, *Spilocaea oleagina*. Although the disease has been recognised in Mediterranean areas for over a century, little is known about the specific conditions that favour its biology. This project aimed to determine the effects on OLS development of the environmental factors that are common in New Zealand and to develop strategies for disease management.

Laboratory and greenhouse trials showed that lower temperatures (10-20°C), free moisture, and high humidity (100%) favoured the development of OLS, which also diminished with increasing leaf age (2-10 weeks). Based on the data collected, a model relating temperature, wetness duration, leaf age to infection and disease severity was developed. The model may be used in an integrated forecasting system, which will help predict periods of high risk and enable accurate timing of sprays.

Introduction

Olive leaf spot symptoms usually occur on the upper surface of the olive leaf. Spots usually are more abundant on foliage from the lower parts of olive trees, and many twigs in these parts become completely defoliated. Over successive seasons, the disease causes poor growth and dieback of the defoliated twigs. Occasionally under very wet conditions, small, sunken brown lesions can be found on the petioles, fruit peduncles and fruit, usually on susceptible cultivars such as Barnea. Infection of fruit can cause unacceptable blemishes on table olives and when it occurs on oil-producing cultivars, infection may cause a delay in ripening and a decrease in oil yields.

A preliminary survey on the prevalence of OLS during the summer of 1999/2000 revealed that OLS disease is widespread throughout New Zealand with all regions and cultivars affected. It was reported that 40% of all olive trees assessed were infected with OLS, suggesting that it is a serious disease in New Zealand olive groves and may play a major role in the low productivity of olives. Thus, research into the factors which affect the development of OLS in New Zealand olive groves and the development of effective control strategies, is important in the growth of this industry.

Control of OLS overseas is mainly based on copper applications with successful control only occurring at low disease levels. With New Zealand environmental conditions (wet and cool) favouring OLS development and therefore causing higher disease risk, copper applications will not be a sustainable control method in New Zealand. Other chemicals and/or management approaches including disease-forecasting systems for prediction of disease risk will need to be evaluated to ensure a healthy industry in the future.

Technical Developments

Detached Leaf Assays

Three main experiments were performed to investigate factors affecting conidium germination and infection on detached olive leaves. The first experiment investigated the effect of temperature and leaf wetness duration on germination and infection of *S. Oleagina* conidia.

The second experiment investigated the effect of a broader range of temperatures on germination of *S. Oleagina* conidia on detached olive leaves.

The third experiment examined the effect of leaf age on germination and infection of *S. Oleagina* conidia on detached olive leaves that were obtained from rooted olive cuttings maintained in a Lincoln University glasshouse.

Key Findings and Recommendations to Olive Growers

- Infection can occur at any time of the year except in hot, dry summers.
- Infected leaves on the ground do not contribute to sources of inoculum for new infection. Leaf wetness is the driving force for development of OLS; at least 12 hours of continuous leaf wetness is required for OLS infection. Temperatures between 5 and 25°C favour the development of OLS. A prediction model has been developed that can be incorporated into a forecasting system for integrated management of OLS.
- Copper sprays in winter are detrimental to olive leaves.
- Use Cuprofix (500g/100L) alone, Cuprofix (500g/100L) + Stroby(15g/100L) or Kocide (190g/100L) + Stroby (15g/100L).
- Fungicide applications must coincide with new growth. Fungicide applications in spring and autumn are required for good control. Growers should consider using OLS resistance cultivars e.g. Leccino and Frantoio.
- Pruning olive trees is essential to reduce canopy moisture retention.
- Nurseries should ensure disease-free plant materials are used for propagation.

