Warm humid conditions favour for fungal diseases. In Australia most disease control programs rely on copper sprays to protect the foliage and fruit from infection. Successful disease control depends on even distribution and good retention of the copper over all of the plant surfaces.

Copper sprays are protectant fungicides that must be applied evenly to the plant or fruit surface before the disease develops. Copper is not a systemic chemical and cannot be carried internally through the plant to kill the pathogen. Once the copper is applied it sticks only where it makes contact with the plant and does not spread to a large extent across the fruit on leaf surfaces.

Copper fungicides are used extensively to control fungal diseases in olives, such as Anthracnose, Cercosporiose and Peacock Spot. The use of copper fungicides against olive diseases has been studied for a long time in the Mediterranean.

In Spain, studies have been conducted on optimum times of application of copper; its efficacy against different pathogens, particularly in reducing infection; its persistence on the leaves; and its secondary effects, such as inducing systemic-acquired resistance against Peacock Spot (Roca L. et al. 2007).

In Australia only copper is registered for use on olives: there are copper hydroxide and oxychloride. Before spraying growers have to be careful with the application dose and read the labels on the containers, because every copper formulation contains different amounts of copper as the active ingredient.

Anthracnose is a latent disease. This means that the fungus can be present, but dormant, in plant tissue and will become active when environmental conditions are suitable or when fruit begin to ripen (Sergeeva et al., 2008). Infection of flowers leading to fruit rot is of economic importance, as Anthracnose results in significant losses in yield and reduced oil quality.

In Spain, it is considered to be a good strategy to use systemic fungicides for the spring in Anthracnose treatment and before flowering to apply twice, using lower doses of copper, to control Peacock Spot if disease infection is severe; olive trees grow faster in spring.

The lower branches of the tree will be more susceptible than the upper sections. This is believed to be due to the fungal spores developing faster in shaded, wet and cool conditions, as happens lower on the tree and on the side away from the sun. Copper sprays should be sprayed before rainfall to prevent spread of fungal spores to new leaves;
The use of low rates (<0.5%) of petroleum sprays oils as spreaders is generally acceptable (Hardy S. 2007), but not when the temperature is high. It’s better to add a wetting agent (surfactant) to copper.

References:
Hardy S. Using copper sprays to control diseases in citrus Primefact, NSW DPI, 757 pp.4-5 November (2007).

Best practice tips
• Copper sprays are protectant fungicides and need to be applied to prevent disease infection
• Apply a good even coverage of copper to plant and fruit surfaces
• The protective layer of copper diminishes over time and only offers short-term protection under certain conditions (i.e. in wet or humid climates). If infection is likely over longer periods then re-application is needed
• The pH of the water used to apply copper should be >6.0
• Choose a product and rate that minimizes the amount of copper
• More frequent applications using lower rates of copper are just as effective and cause less phytotoxicity than applying high rates in fewer applications
• Don’t over-apply copper
• Don’t apply copper when fruit or leaf temperatures are high, humidity is low or the fruit is wet

General rules:
1. Follow label instructions re dosage and method of application.
2. Do not mix a foliar fungicide, herbicide, or insecticides with fertilizers or other chemicals that require watering in. Incorrect placement of pesticides sometimes explains poor pest control.
3. Do not experiment with new combinations. If you must try out a new mix, apply it on a small area or to a few test plants first. Write your findings in a record book - do not trust your memory.
4. Apply spray solution as soon after mixing as possible. The longer a spray combination remains in the tank, the greater the number of problems that can arise. Some labels specifically warn against pre-mixing within certain timeframes before use due to possible breakdown.
5. Buy pesticides only in amounts you expect to consume in the current year. Different products, especially in combination, vary greatly in their shelf life, particularly once the container has been opened. The same basic chemical, manufactured by different companies, may vary in stability because of differences in formulation. Storage temperature and humidity can also have important effects. Many pesticides last longer if kept dry with the container sealed.
6. Store chemicals only in their original containers so that contamination cannot occur. Clean sprayers, hose lines, nozzles and mixing containers thoroughly after each use. Plant injury can be due to contamination of equipment with potent weed killers or to carelessness.