

# SEIRIDIUM CANKER OF CYPRESS TREES IN ARIZONA

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## Introduction

Leyland cypress (x *Cupressocyparis leylandii*) is a fast-growing evergreen that has been widely planted as a landscape specimen and along boundaries to create windbreaks or privacy screening in Arizona. The presence of *Seiridium* canker was confirmed in Prescott, Arizona in July 2011 and it is suspected that the disease occurs in other areas of the state. *Seiridium* canker was first identified in California's San Joaquin Valley in 1928. Today, it can be found in Europe, Asia, New Zealand, Australia, South America and Africa on plants in the cypress family (Cupressaceae). Leyland cypress, Monterey cypress, (*Cupressus macrocarpa*) and Italian cypress (*C. sempervirens*) are highly susceptible and can be severely impacted by this disease. Since Leyland and Italian cypress have been widely planted in Arizona, it is imperative that *Seiridium* canker management strategies be applied and suitable resistant tree species be recommended for planting in the future.

## The Pathogen

*Seiridium* canker is known to be caused by three different fungal species: *Seiridium cardinale*, *S. cupressi* and *S. unicolorne*. *S. cardinale* is the most damaging of the three species and is found in California. *S. unicolorne* and *S. cupressi* are found in the southeastern United States where the primary host is Leyland cypress. All three species produce asexual fruiting bodies (acervuli) in cankers. The acervuli produce spores (conidia) which spread by water, human activity (pruning and transport of infected plant material), and potentially insects, birds and animals to neighboring trees where new infections can occur. It has not yet been determined which species are in Arizona, but this author suspects *S. cardinale* based on morphology and Arizona's proximity to California.

## Host Range

*Seiridium* canker has been identified on a wide range of host species in the Cupressaceae (cypress family). However, susceptibility to infection appears to depend on local environmental conditions. Other tree species reported to host the disease are: *Chamaecyparis*; *Cryptomeria*; *Juniperus*; *Libocedrus*; *Platycladus*; *Taxodium*; and *Thuja*. To date, the *Seiridium* pathogen is not known to impact Arizona's native juniper species.



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Figure 1. Leyland cypress tree with dead branch (upper left) and main leader caused by *Seiridium* canker.

## Symptoms and Signs

The fungus infects the tree by entering through cracks in the bark, producing toxins that interrupt the flow of sap and ultimately, stops the upward flow of water and mineral nutrients. Initial symptoms of *Seiridium* infection most often appear as "flagged" branches (Figure 1). Individual branches fade from green to yellow to reddish-brown due to girdling cankers (Figure 2). Infection may affect a single branch or multiple branches throughout the tree. Tree mortality often takes several years. Resin may exude from the entire trunk when the disease has been present longer (Figure 3). However, it should be noted that resin exudation can occur from the branches and stems of otherwise healthy plants of Leyland cypress thus resin flow by itself is not



Figure 2. Leyland cypress branch showing small cankers and exuded resin characteristic of the early stages of *Seiridium* canker.

a diagnostic characteristic for *Seiridium* canker. In humid climates, sunken oval cankers with resin exuding from the margins have been noted. The cankers noted in Prescott, Arizona were less clearly delineated when compared to photos of samples found in more humid environments.

The acervuli are black and appear as small pustules (blisters) that break through the bark during wet weather and open to release the conidia. Conidia can survive very dry periods and remain viable for more than a year. While conidia dispersal and infections occur during wet periods, symptom development is often noticed during dry and hot periods when the plant is stressed. As mentioned above, the cankers may not be obvious in arid environments. However, exuded resin from faint cankers sampled in Prescott, Arizona contained conidia which were visible under a compound microscope (Figure 4). The slide preparation process is relatively simple and allows *Seiridium* canker to be diagnosed quickly.

## Disease Cycle

Insects, hail, snow breakage, pruning tools or other mechanical means create wounds that are potential entry points for infection. Many homeowners plant them with inadequate spacing which allows conidia to spread more readily between susceptible individuals. In addition, drought stress is known to predispose Leyland cypress to infection by *Seiridium* fungi. Symptom development is greatest in areas with high temperatures and dry conditions in summer. Across much of Arizona, the summer monsoon (rainy) season is often preceded by weeks of high temperatures and dry conditions. This may be partially responsible for differences in symptoms observed in the arid environments of Arizona. More work is needed to definitively describe *Seiridium* canker's host range and life cycle in Arizona.



Figure 3. Leyland cypress trunk showing masses of exuded resin characteristic of advanced stages of *Seiridium* canker.

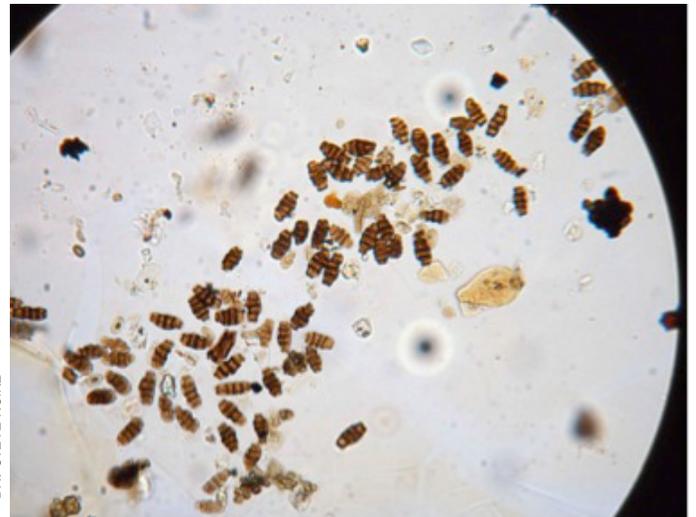


Figure 4. *Seiridium* sp. conidia collected from infected Leyland cypress in Prescott, Arizona.

## Management

There are no chemical control measures for *Seiridium* canker. Individual trees may be treated by pruning out infected branches which may prolong survival of diseased trees; however, such pruning is no guarantee the pathogen will not continue to cause branch dieback. When pruning out infected material, cut at least one inch below the canker, and sanitize the pruning tools between cuts by cleaning them with isopropyl alcohol or a solution of one part chlorine bleach to nine parts

water (Benson et. al., 2001). Tools should be cleaned and oiled after using bleach to prevent rusting. Severely affected plants should be removed from the landscape to limit spread to other susceptible hosts in the area. Proper spacing should be maintained to minimize physical contact between susceptible trees. Planting either resistant species or varieties is the only realistic option for long-term disease control. Preventing stress to trees is also recommended by providing supplemental irrigation during dry periods.

Arizona cypress (*Cupressus arizonica*) is widely available in nurseries and has some resistance to *Seiridium* canker. While the columnar growth form of Italian cypress largely prevents contact with neighboring trees, its susceptibility and confirmed presence of *Seiridium* canker in a given area may warrant the use of more resistant species. Native Arizona juniper species are also thought to have some resistance to *Seiridium* canker. These include: *Juniperus deppeana*, *J. monosperma*, *J. osteosperma*. Eastern red cedar (*Juniperus virginiana*) which has been planted in some locations in Arizona may also have some resistance to *Seiridium* canker. Exotic junipers are also being planted as replacement trees in areas where *Seiridium* canker has been previously noted. Spartan juniper (*Juniperus chinensis* 'Spartan') has been growing for multiple years in close proximity to infected Leyland cypress with no apparent *Seiridium* canker damage. The above recommendations have been developed using anecdotal information from known *Seiridium* infection areas. Confirming the presence of *Seiridium* canker is the first step in developing scientific recommendations for resistant species and cultural practices that minimize its impacts. This publication will be updated as new information becomes available.

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