



# Sclerotinia Stem Rot of Garbanzos

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## INTRODUCTION

Sclerotinia stem rot of garbanzos (chickpeas, *Cicer arietinum* L.), commonly called white mold, is caused by the fungus *Sclerotinia sclerotiorum* or *S. trifoliorum*. These species of *Sclerotinia* infect other crops and weeds in addition to garbanzos. Some aspects of this disease are still under investigation and the complete disease cycle in garbanzos and the relative importance of the two species are not yet fully understood. White mold is one of the three most important disease problems affecting garbanzos in the Central Valley of California. The others are Ascochyta blight and a complex of viruses.

## SYMPTOMS

Typical early symptoms include wilting of individual stems or the entire plant, which may result in stand reduction, especially if infection occurs at the seedling stage. In other cases, the initial symptoms are tan-colored lesions found on the upper leaves and stems (fig. 1). As the disease progresses, plants wilt and may eventually die. Both seedlings and large plants can be killed. An early indicator of *Sclerotinia* infection is the presence of white mycelium (strands of the fungus) on the plant stem and just beneath the soil line (fig. 2). A definitive diagnostic feature is the presence of black, irregularly shaped sclerotia found in the soil adjacent to the roots of dead plants



Figure 1. Seedling with infection initiated by airborne spore.



Figure 2. White mycelium growing at base of infected plant.



**Figure 3.** Mature black sclerotia associated with infected roots.



**Figure 4.** Apothecia of *Sclerotinia* appearing on soil surface.

([fig. 3](#)). Sclerotia are the long-term survival structures of this fungus, allowing it to withstand unfavorable conditions and become the source of new infections in subsequent years.

### **DISEASE CYCLE**

Sclerotia germinate when soil temperatures are cool and there is adequate soil moisture. They form either mycelium, which directly infects garbanzo roots, or a spore-producing structure called an apothecium ([fig. 4](#)). Airborne spores released from apothecia infect above-ground portions of the garbanzo plant. It is unknown whether infection of roots by mycelium or infection of leaves by spores is the more important pathway to disease. Cool temperatures and moist atmospheric conditions, such as occur during periods of rain or fog, are required for disease development. There is evidence that mycelium of the fungus can grow in moist soil from infected roots and extend to healthy roots, spreading the disease down the row ([fig. 5](#)).



**Figure 5.** View of garbanzo research trial affected by *Sclerotinia* white mold.

## DISEASE MANAGEMENT

*Sclerotinia* is very difficult to control because it can infect other crops and weeds. Additionally, sclerotia can survive several years in soil, and airborne spores can infect plants in fields where the disease has not previously occurred. Observations indicate that some varieties have more tolerance than others. Preliminary research results demonstrate that fungicides may be helpful in reducing disease. However, the underground spread from plant to plant will not be controlled by foliar fungicide applications.

## PREVENTING THE SPREAD OF SCLEROTINIA STEM ROT OF GARBANZOS

You can help limit the spread of white mold by taking the following precautions:

- Select a field that has not had a previous problem with *Sclerotinia*. It is unknown whether the *Sclerotinia* that infects garbanzos is the same one that infects alfalfa, but use caution when the rotation includes both crops and there is a previous history of the disease.
- For planting, obtain seed from non-infected fields or inspect seed to make sure it is not contaminated with sclerotia.
- In cases where initial infection is from airborne spores, fungicides should be applied immediately prior to, or soon after, initial infection to be most effective. The only fungicide registered in California for this disease in garbanzos is thiophanate methyl (Topsin M), but UC trials with this material have not been conducted. However, based on other UC trials, pyraclostrobin (Headline) and boscalid (Endura), both registered for *Ascochyta* blight control, appear to provide some protection against foliar *Sclerotinia* infection.
- Manage weed populations in the field to limit humidity trapped within the canopy, which promotes disease. Weeds can also be the source of initial infection, which then spreads to other susceptible plants, including garbanzos.
- After harvesting a diseased field, deep plowing to bury sclerotia reduces their germination and disease potential in the future.

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