

Sunflower Head Rot Identification

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Two of the most serious sunflower diseases in the United States are white mold, also known as *Sclerotinia* head rot, and *Rhizopus* head rot. While both are widely distributed, white mold is a more serious problem in northern production areas, such as North Dakota, South Dakota, and Minnesota. *Rhizopus* head rot is more serious in southern sunflower production regions including Kansas, Nebraska, Colorado, and the Texas Panhandle.

In addition to head rot, *Sclerotinia* can invade the base of the stalk, causing a wilt disease as well as middle stalk rot. Disease surveys report average white mold incidences of 3 percent in the northern production region; however, levels in individual fields can reach more than 50 percent. Incidence of *Rhizopus* is highly variable ranging from 0 to 100 percent of the heads in a field; however, 5 to 20 percent is more common.

White mold has a large host range, infecting nearly 400 species of broadleaf plants including other Kansas field crops such as soybeans, canola, and dry edible beans. *Rhizopus* is pathogenic on many vegetable crops, but in Kansas, it is primarily a disease of sunflowers. White mold has been reported on canola in northeast and south central Kansas, but its primary area of distribution is on the High Plains of northwest Kansas. *Rhizopus*, on the other hand, will attack sunflowers anywhere they are grown within Kansas.

This fact sheet serves as a diagnostic guide to identify the head rot phase of white mold versus *Rhizopus* head rot, since at the early stages of head infection, the two diseases can be similar in appearance.

Rhizopus Head Rot

There are two species of *Rhizopus* that are known to cause head rot, *R. stolonifer* and *R. arrhizus*. *Rhizopus* by itself is a relatively weak pathogen and can enter a sunflower head only through wounds.

These wounds may be caused by hail, birds, or sand-blasting, but the most common means of entry is through wounds created by larvae of the sunflower head moth (*Homoeosoma electellum*) (see Figure 1). Adults migrate from southern areas (hence its importance in southern production regions) and are attracted to sunflowers beginning to bloom. Since the moths usually arrive in late June or July, the earliest planted sunflowers are most susceptible. Eggs are laid at the base of florets and newly emerged larvae feed first on these florets, later burrowing into individual seeds. Fungal infection of these wounded heads is more severe under irrigation or wet, humid growing conditions.

The disease first becomes noticeable when brown watery spots form on the back of the head. As the disease progresses, the back of the head turns brown and becomes soft and mushy (Figure 2). When examining the internal hollow part of the flower head during periods of wet weather, threadlike strands of the fungal mycelium may be visible. Pinhead-sized, black fruiting structures develop later, giving the mycelium a grayish appearance (Figure 3). In later stages of disease development as the head dies, the tissue begins to shred (Figure 4) and occasionally the head may fall to the ground.



Figure 1. Sunflower head moth larva. (Photo: Phillip Sloderbeck)



Figure 2. *Rhizopus* head rot. (Photo: M. L. Straley, Cargill, Inc.)



Figure 3. *Rhizopus* head rot. (Photo: Douglas Jardine.)

Sclerotinia Head Rot

Similar to *Rhizopus* head rot, the first symptoms of *Sclerotinia* head rot are the appearance of water-soaked spots or bleached areas on the back of the head. As the disease develops, the entire seed layer can fall away, leaving only a bleached, shredded skeleton interspersed with large sclerotia (Figure 5). Sclerotia are hard, black reproductive structures about the same size as sunflower seeds (Figure 6).



Figure 5. *White mold*. (Photo: B. D. Nelson, North Dakota State University.)



Figure 4. In later stages, *Rhizopus* causes the shredding of the back of the head. (Photo: Douglas Jardine.)

Sclerotia also can form in on the lower or middle stalk when the other phases of the disease are present.

Sclerotia from the decaying head can fall back into the soil where they will remain viable for many years, waiting for the next susceptible crop to be planted. If sclerotia are present in the seed delivered to sunflower processing plants and oil crushing facilities, additional monetary loss may occur due to price dockages imposed based on the presence of foreign material.

For management information on these two diseases, refer to the *High Plains Sunflower Production Handbook*, K-State Research and Extension Publication MF2384.



Figure 6. *Sunflower sclerotia*. (Photo: Howard F. Schwartz, Colorado State University, Bugwood.org)

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Kansas State University Agricultural Experiment Station and Cooperative Extension Service

MF3015

November 2011

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