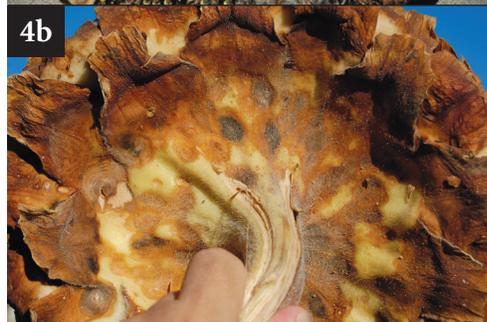


Sunflower Disease Profiles II

Head and Stalk Rots and Wilts

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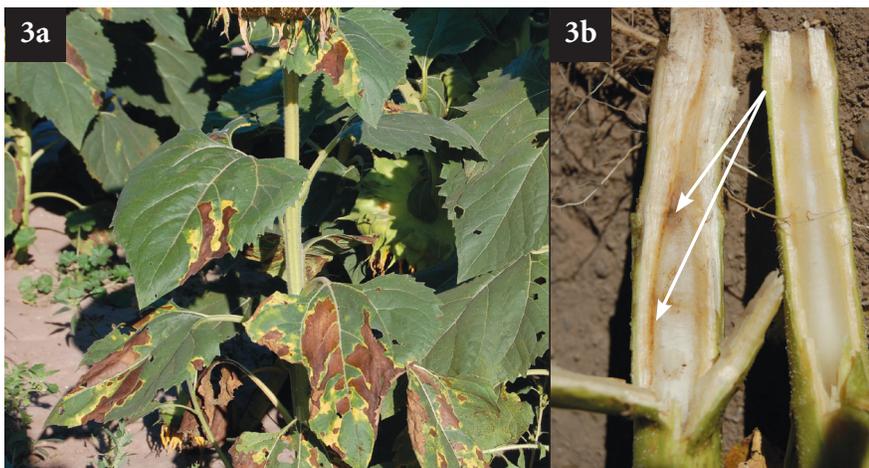
4. Rhizopus Head Rot



1. Phoma/Phomopsis Stalk Rots



2. Bacterial Stalk Rot



3. Verticillium Wilt



5. White Mold

Disease	Symptoms
1. Phoma/Phomopsis Stalk Rots <i>Phoma macdonaldii</i> / <i>Phomopsis helianthi</i>	<p>Phoma stalk rot is also known as black stem and is common throughout North American sunflower production areas (<i>Figure 1</i>). Infection originates on leaves from wind or rain-splashed spores. Infection progresses down the petiole to the stem where a glossy black oval to circular lesion (4-5 cm) forms around leaf axils (<i>Figure 1a</i>). Disease is restricted to epidermal layers and does not normally penetrate into the pith.</p> <p>Phomopsis stalk rot (also known as stem canker), infects plants in a similar manner as black stem. The pathogen moves from the leaves to the stem via petioles. Stem lesions, also centered on axils, are oblong and grayish-brown (15-20 cm) (<i>Figure 1b</i>). Invasion of the pith results in degradation beneath the lesion, which promotes lodging of the entire stalk.</p>
2. Bacterial Stalk Rot <i>Erwinia carotovora</i>	<p>Initial symptoms are similar to several fungal stalk rots including water-soaked lesions and streaks that turn dark brown to black (<i>Figure 2a</i>). Disease progress causes tissues to soften and emit a characteristic odor of rotten potatoes. Infections begin in wounds as a result of mechanical damage allowing entry of the pathogen. Necrosis and rot of tissues can also move up stalks to affect developing heads (<i>Figure 2b</i>).</p>
3. Verticillium Wilt <i>Verticillium dahlia</i>	<p>Wilt is also known as leaf mottle due to the distinctive foliar symptoms, which appear near flowering. Patches of interveinal yellowing appear on leaves, and entire sections of the leaf may turn necrotic with yellow haloes, resembling a “mottle” pattern (<i>Figure 3a</i>). Lower stalk sections later exhibit a brown discoloration of the vascular system (arrows, <i>Figure 3b</i>).</p>
4. Rhizopus Head Rot <i>Rhizopus oryzae</i>	<p>Initial symptoms are similar to other head and stalk-rotting infections, namely sunken, water-soaked lesions. As the infection continues, tissues become soft and watery before drying to a tan-brown color. With high humidity conditions, the fungus may grow through the head and sporulate on the flower side (<i>Figure 4a</i>). Infections often occur after mechanical wounding of the head, particularly with large hail during summer thunderstorms (<i>Figure 4b</i>).</p>
5. White Mold/Sclerotinia Diseases <i>Sclerotinia sclerotiorum</i>	<p>The pathogen is common and widespread throughout the world, and can infect sunflower roots, stems, or heads. Sclerotinia wilt is the result of root infection by the mycelia of germinating sclerotia. It often occurs at flowering when the root system begins to senesce, but can also occur at any point in the season (<i>Figure 5a</i>). Infection results in water-soaked lesions that girdle stems at ground level. Whitish mycelium forms on these lesions under high humidity (<i>Figure 5b</i>). The pathogen further invades the stem causing pith degradation, bleaching, and shredding, with new sclerotia forming within rotted stems (<i>Figure 5c</i>). Head rot can also occur via airborne ascospores after flowering. Initial symptoms may consist of dark, water-soaked spots on the back side of the heads (similar to the beginning of Rhizopus head rot). As disease progresses, the fungus rots the interior of the head, filling it with large numbers of sclerotia. The rot often results in complete disintegration of heads, leaving nothing but frayed vascular elements resembling a broom head (<i>Figure 5d</i>).</p>