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IDENTIFICATION OF COTTON SEEDLING DISEASES

Abstract: Canola plants are susceptible to various diseases caused by *Rhizoctonia solani*, *Fusarium* species, and *Pythium* species. To combat these illnesses, canola should be managed using licensed seed treatments with active ingredients. Early seeding and good soil contact can help develop the crop rapidly, with a waxy coating called suberin on the root aiding in resistance to infections. Field scouting should be conducted ten to fourteen days after sowing to check for seeds and dead or dying plants. The main soil-borne pathogens responsible for the seedling disease complex are *Rhizoctonia solani*, *Fusarium* species, and *Pythium* species. These diseases typically affect canola seeding emergence and growth when the seedbed is not tightly packed in dry, cool conditions or cold, wet weather. Poor emergence can be caused by heat, wind, excessive seed depth, desiccation of budding hypocotyls, and insect damage.

Key words: seedling, cotton, diseases, excessive, desiccation, emerging, preventative.

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Introduction

Numerous diseases of seeds and seedlings, such as those brought on by *Rhizoctonia solani*, *Fusarium* species, and *Pythium* species, can affect canola. To combat these illnesses, there are a few management and preventative strategies in addition to timely and efficient scouting.

Crucial advice for effective management. Canola is susceptible to a number of seed and seedling diseases, however these can be reduced with the use of a licensed seed treatment containing various fungicide active ingredients.

Shallow sowing and good seed to soil contact allow the crop to develop as rapidly as possible, even if early seeding often yields the best results. Rapidly emerging and growing seeds have a lower chance of dying from illnesses that affect seedlings. At the two-to four-leaf stage, a waxy coating known as suberin forms on the hypocotyl section of the root, which aids in the seedlings' ability to resist more infections.

Ten to fourteen days after sowing, begin field scouting. Check for seeds and dead or dying plants in non-emerged regions.

The main soil-borne pathogens responsible for the seedling disease complex are *Rhizoctonia solani*, *Fusarium* species, and *Pythium* species. The symptoms of this disease complex include seed rot, pre- and post-emergence damping-off (wirestem), seedling blight, and seedling decay. Tighter canola rotations do appear to exacerbate these illnesses, however in situations where these pathogens are prevalent, seed treatments will promote canola seeding emergence and growth.

When the seedbed is not tightly packed in dry, cool circumstances, or when the weather is cold and wet, seed and seedling losses from these diseases typically reach their peak. Because of the extended low soil temperatures in the northwest prairies, the disease complex is most frequently an issue there.

More precisely, *Pythium* species like damp, chilly soils. *Rhizoctonia solani* prefers loose, cold,

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Poor emergence can be caused by a variety of causes that could be misinterpreted for seedling disease. These include heat, wind, excessive seed depth, desiccation of budding hypocotyls in dry soil, and insect damage from pests like wireworms and cutworms.

Each of the three pathogens that cause seedling disease complex has a distinct disease cycle; the broad course of each is outlined here. Every pathogen is covered in great detail.

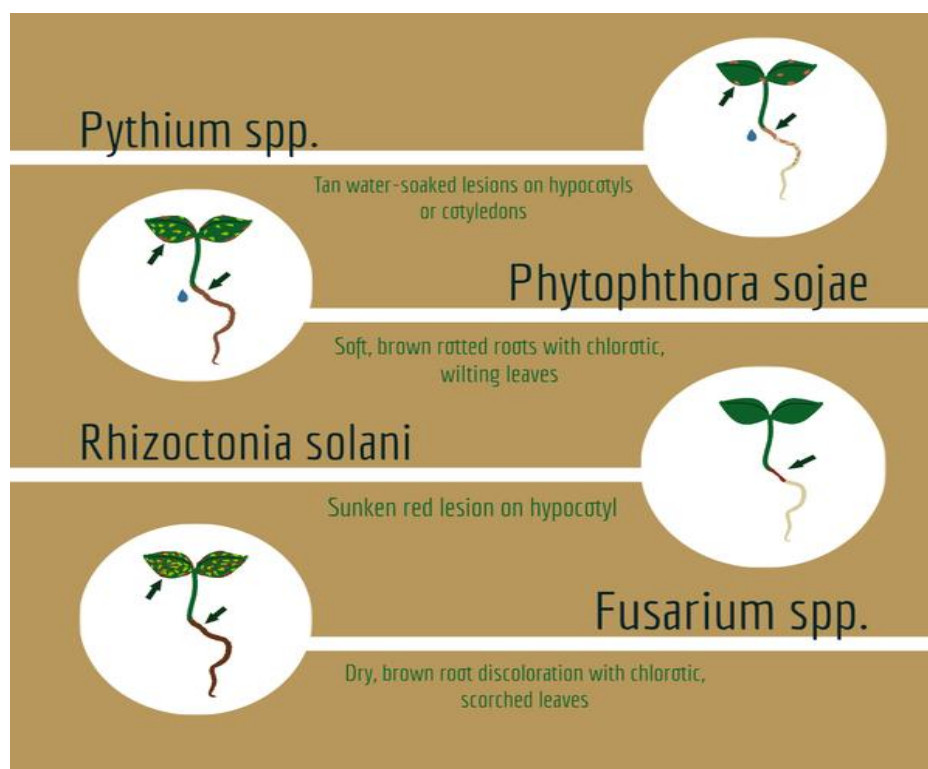


Figure 1. General symptoms of soybean seedling disease caused by different fungal pathogens. Symptoms may not always be typical, and diagnosis should be confirmed to select appropriate control. (Image created by Ashley Joyce)

An organism that causes disease (such as a bacterium or fungus). Read more about root rot here.

When dry seeds absorb water before germination, they become susceptible to attack by various pathogens. When the right circumstances arise or when secretions from germination-seed or host plant roots promote them, these pathogens develop in the soil. Young succulent roots and young stem (hypocotyl) tissue are particularly vulnerable to infection, and these diseases prey on them. Damaged root systems can cause a plant to become temporarily

dormant before continuing to develop and mature normally.

Once a seedling is inside the plant, these diseases grow and cause degradation that either kills or harms it. After the cells die, they can form minute resting bodies inside or on the surface of the infected tissue. The infections might persist in their inactive or resting forms until a new vulnerable host becomes available. The subterranean portions of the plants can regenerate more root tissue than they lose and become sufficiently woody to tolerate additional infections in the two- to four-leaf stage.

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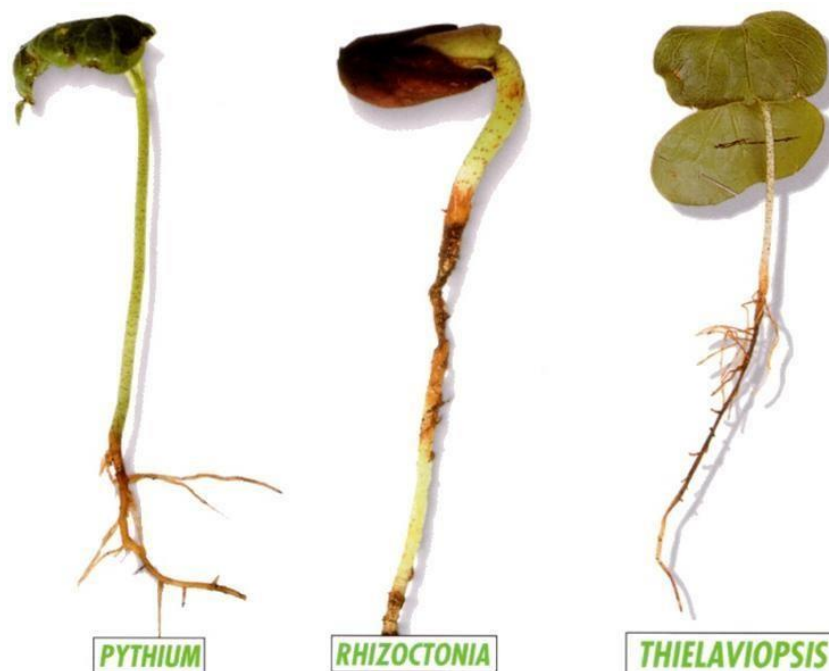


Figure 2. Effects of seedling diseases from varying pathogens (Pythium, Rhizoctonia, and Thielaviopsis) shown in young cotton. Root rot associated with Pythium is shown on the far left, post emergence damping off in the middle (most commonly caused by Rhizoctonia), and on the far right the hypocotyl has turned black and began rotting (Thielaviopsis). Photograph taken by Bobbe Baker

These diseases may remain on infected root tissue for the whole of the plant's life, decreasing the root system's capacity to absorb nutrients and moisture and decreasing its resistance to moisture stress during the midsummer heat.

The complex of seedling diseases is influenced by crop rotation and meteorological factors. Deep seeding and planting early into chilly soils result in the worst losses. Temperature and soil moisture both affect how severe a disease is. Pythium species thrive in environments that encourage slow growth and cold, moist soils. Rhizoctonia solani prefers loose, cold, dry, and well-worked soils. Heavy, wet soils are ideal for Fusarium species. These broad generalizations about environmental factors are not exclusive, and

infections do occur for everyone under a variety of circumstances.

Distinguishing between harm from insects and illness. It can be difficult to determine whether an insect or a disease caused the harm. A spade, a water bottle to wipe soil off roots, and a magnifying lens to look for symptoms are essential components of a good scouting equipment. In contrast to regions with significant emergence, examine areas where plants are overturned or where seedlings failed to emerge. Damage from cutworms and/or flea beetles may coexist with the illness complex. Examine the damage up close. The hypocotyl does not rot off or constrict at or below the soil level as a result of flea beetles. They do, however, consume parts of the hypocotyl that are at or above the soil line when the weather is chilly.

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