

DISEASES OF FLAX IN TEXAS

The important diseases of flax in Texas were identified by plant pathologists during the years of highest production, from the 1940s through the 1960s. In recent years, small-scale plantings of flax in different parts of Texas have been relatively free of disease. Increasing the scale of production will eventually lead to economically-damaging levels of disease development. Although there are at least a dozen infectious diseases of flax reported world-wide, only a few pathogens pose serious risks to production under Texas climates.

This bulletin discusses the most important diseases in Texas.

Pasmo – a fungus, *Septoria linicola*. This disease has the potential to increase extensively and cause substantial leaf damage in a matter of days (Fig. 1). It starts as circular, yellow to brown spots on the cotyledons and lower leaves. Stems later become infected, starting at the point of attachment to the leaf. On stems, brown bands alternate with non-infected, green tissue. These bands combine as the infected plant ripens prematurely.



Fig. 1. PasmO symptom: brown bands on stems, alternating with green bands.

The disease causes defoliation, damages fibers, reduces seed size and yield, and the quantity and quality of oil. Bolls may fall off, and plants are prone to lodging. Wet weather late in the growing season increases disease severity. The fungus survives on residue from the crop.

Control: Crop rotation and plow under crop residue. Some varieties are more tolerant to the disease than others.

Damping-off and seedling disease – various fungi, *Rhizoctonia solani*, *Pythium* sp., *Fusarium* sp. The disease can occur in patches in the field. Plants are killed before or after emergence. Seedlings turn yellow, wilt, and die. Roots are rotted. Historically, stand losses in south Texas have ranged from 10-50%. Cracked seeds are more likely to

become infected (Fig. 2). The disease is more severe under cool, wet weather conditions.

Control: Use high-quality seed treated with fungicides. Do not plant seed any deeper than necessary and provide a firm seedbed



Fig. 2. Cracked seeds are more prone to infection by fungi.

Rust – a fungus, *Melampsora lini*. Yellow pustules are produced on all plant parts above ground. Plants lose their leaves and the yield and quality of seed and fiber are reduced. The disease is more severe with rainy weather. Later in the season, pustules turn black, which indicates the production of spores that can over-winter on crop residue.



Fig. 3. Rust symptoms on leaves and a stem.

Control: Use resistant varieties. Do not follow flax with flax. Plow under crop residue. Use clean seed that is free of crop residue.

Curly top – a virus. Plants infected as seedlings have distorted, wavy leaves that are bunched at the growing point. The plant yellows and dies. Older plants that become infected also have distorted leaves. In addition, the tip of the stem is coiled and branches grow laterally, rather than upright. The flowers are small or the buds do not open. Petals are twisted and puckering. The number of tillers are reduced, as well as seed set.



Fig. 4. Appearance of curly top.

Curly top was especially prevalent in south Texas during the drought of the 1950s, possibly because conditions favored the beet leaf hopper, *Circulifer tenellus*. High levels of disease have occurred with early planting dates, which may be associated with greater leafhopper activity.

Control: Caldwell, a variety developed in Texas, may have some tolerance to this disease.

Aster yellows – a phytoplasma. The apical leaves of stems turn yellow. Secondary shoots grow from axils of leaves. There is a proliferation and greening of flowers, but the petals are small or absent. Bolls fail to develop. Plants may occasionally be partially infected, with normal-looking branches that produce normal bolls. Reduction in seed yield of two-thirds has been observed with severe epidemics.

This pathogen is vectored by the aster leafhopper, which is also known as the six-spotted leafhopper (*Macrostelus quadrilineatus*). The pathogen and vector have a wide host range.

Control: There are no resistant varieties available.



Fig. 5. Plants with aster yellows.

Cotton root rot – a fungus, *Phymatotrichopsis omnivora*. Flax is susceptible to infection, but since it is usually grown during the cooler part of the year, it usually escapes the disease.

Text by Dr. Thomas Isakeit, Professor and Extension Plant Pathologist. Photos: Fig. 1 by T. Isakeit, Figs. 2-5 from Texas A&M Plant Pathology Department Archives, circa late 1950s and early 1960s.
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