

FACT
SHEET

FLAX DISEASES



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Several diseases of flax in Minnesota cause severe damage at times to the crop. Crop rotation, seed treatment, and the use of sound seed of the most disease-resistant varieties are the most practical and economical control measures. There are some diseases for which no resistant varieties have been developed and even with present recommended control measures, these diseases, may, at times, become severe. Most diseases tend to reduce the yield or quality of the crop, but seldom cause complete destruction. Misc. Report 24, *Varietal Trials of Farm Crops*, issued by the Agricultural Experiment Station, University of Minnesota, gives characteristics of flax varieties including their reaction to several diseases. The following is a description of common diseases and recommendations for control.

PASMO

Pasmo, caused by the fungus *Septoria linicola*, lives over winter in seed, chaff, and flax straw and attacks the growing crop the next season. Generally the disease becomes most severe as the crop nears maturity. This fungus attacks stems, leaves, and bolls. Bolls may fall off the plant, or



Fig. 2. Flax plant affected with aster yellows disease (left), normal plant (right).

seeds in the bolls may fail to develop because the pedicels immediately below them have been killed. Infected stems often have alternate healthy and brownish areas (figure 1) so that the stem has a "barber pole" appearance. All recommended varieties are attacked by this fungus, but some are more susceptible than others. The use of the most resistant varieties, seed treatment, and crop rotation give some control.

VIRUS DISEASES

Two virus diseases, aster yellows and crinkle, are known to affect flax and cause damage in Minnesota. These viruses are present to some extent every year, but generally are not severe. In 1957 aster yellows damaged the crop severely, and crinkle may have been important also. Both viruses are spread by the six-spotted leafhopper.



Fig. 1. Pasmo disease on flax stems. Infected areas are dark in color.



Fig. 3. Normal plant (left); three plants at right affected with heat canker at ground line.

Flowers of plants infected by aster yellows virus are yellowish-green, and bolls fail to develop (figure 2). Sometimes yellowish-green and normal flowers are present on the same plant. Effective control measures are not available at present. All recommended varieties are susceptible to this disease.

Crinkle disease of flax has been known only since 1956. The only visible symptoms are small enations or pimples on the underside of the leaves. The same virus causes the "blue dwarf" disease of oats. This disease can cause significant yield losses, but its incidence is low in most years. No resistant varieties are known.

SEEDLING BLIGHT

Seedling blight is often more severe on flax than on other field crops in Minnesota. The seed coat of flax frequently is damaged as the seed develops, and yellow seeded varieties are more susceptible to this natural damage than brown seed types. Seed often is damaged during threshing, and fungi on the seed or in the soil enter through cracks in the seed coat. Seed treatment is beneficial to flax, and the volatile-type mercury seed treatment materials are most commonly used. Experiment stations often report yield increases of several bushels per acre for a few cents' investment in seed treatment.

HEAT CANKER

High temperature at the ground line sometimes injures flax seedlings, especially during warm, clear days when the seedlings are too small to shade the ground. In severe cases the injured tissue collapses and the seedlings fall over and die (figure 3). With less severe injury, a swelling occurs in the injured region. Affected plants are usually stunted and often die prematurely. The overall effect is a reduction of the plant population and yield. Early planting, which reduces the chances

of hot weather during the seedling stage, is the only practical control.

FUSARIUM WILT

Wilt is a soil-borne disease that builds up with repeated cropping of susceptible varieties on the same ground. Susceptible plants wilt and die throughout the season, but recommended varieties are highly resistant to wilt in commercial fields. All new lines of flax from plant-breeding programs are tested in wilt-infested nurseries (figure 4). The flax-wilt nursery at the Institute of Agriculture at St. Paul has been in operation since 1912, and Plot 30, the flax-wilt nursery at Fargo, North Dakota, has been in existence since 1900. All recommended varieties in Minnesota and North Dakota survived and grew vigorously in one or both of these nurseries before they were introduced as varieties.

ANTHRACNOSE

Anthracnose is a fungus disease that affects all parts of the flax plant. Seedling blight is the most common damage caused by this fungus in Minnesota, although in certain years this fungus commonly causes a leaf spotting. Stem cankers sometimes form at the ground line which look similar to those of heat canker. Seed may become infected during one season and cause seedling blight the next spring. The fungus overwinters also on infected flax straw. The use of sound seed, seed treatment, and crop rotation are the control measures. Recommended varieties are about equal in susceptibility.

RUST

This disease occurs first as yellow pustules on leaves and stems, and later turns to the black overwintering stage. Recommended varieties are immune to races of rust that are known to exist in North America. Rust has been rare in Minnesota in recent years except in fields of the old susceptible varieties.



Fig. 4. Fusarium wilt nursery at St. Paul. Resistant lines of flax are vigorous while susceptible lines are dead or dying.