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Cooperative Extension South Dakota State University

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Flax Production in South Dakota

Cooperative Extension Service
South Dakota State University
United States Department of Agriculture

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Flax Production in South Dakota


Flax is grown in South Dakota primarily as a cash seed crop. The state normally produces about 5 million bushels a year, making flax one of our major cash crops. In counties where the major acreage is grown, cash income from flax outranks all other cash crops. And, in these areas, growers often make additional money by selling flax straw.

Marketed flax seed is used commercially for the production of linseed oil with linseed oil meal as a valuable by-product. A bushel of flaxseed will yield about 19 pounds or 2½ gallons of oil. The flaxseed oil or linseed oil is used in the manufacturing of paint, varnish, linoleum, oilcloth, and many other commercial products. In recent years it has found a new use as an antispalling agent to protect concrete against deterioration from freezing and thawing. Linseed oil meal is an important livestock feed.

For the flax grower the future appears pretty bright. Flax is not currently in the high surplus crop category as carryover is at a relatively low level. Any surplus seed stock or price fluctuations will depend to some degree on national yearly production and production by competitive nations, particularly Canada and Argentina, both large flax producers. Normally, about 80% of the United States’ crop is consumed locally, leaving 20% for export trade.

Recent research has improved the old uses for flaxseed oil and has also opened the way for new uses of flaxseed and flax by-products. This has direct bearing on the economics of flax production and on making it more competitive with other crops.

GENERAL PRODUCTION REQUIREMENTS

The major flax producing area of South Dakota is in the northeast counties. In that area, under proper cultural practices, flax is a relatively low risk crop. Moderate summer temperatures and adequate rainfall make for favorable growing conditions. When flax is grown west and south of the flax producing area, however, it becomes a higher risk crop with less economic advantage.

In order to be a successful flax grower, you should follow these cultural practices:

1. Follow timely moisture saving tillage practices.
2. If the field has a 3% slope or more, plant on the contour to prevent water runoff.
3. Sow on land where weeds were controlled the previous year.
4. Plant high germinating seed in a firm, well prepared seedbed.
5. Plant early.
6. Plant in a good, fertile soil. Have a soil test made previously to determine fertility needs. Frequently, commercial nitrogen fertilizer stimulates weed growth in flax, resulting in a serious weed problem. Many growers follow the good practice of fertilizing the previous crop in the rotation rather than the flax crop.

FLAX IN THE ROTATION

Flax can fit into many rotations. It is a poor “weed competitor” but a good “companion crop” for establishing grass and legume seedings. Therefore, the use of flax in a rotation requires the use of other crops and cultural practices that will control weeds.

The best crop sequences include a row crop, forage crop, or fallow the year before flax is planted. Clean cultivation of corn, soybeans, sorghum, or fallow, mowing, or grazing of forage crops prevent weeds from producing seed.

A common sight in South Dakota each fall is the flax harvest. Flax is a relatively low risk crop, especially in the northeast counties, where favorable summer temperature variations and adequate rainfall result in ideal growing conditions.
WEED CONTROL

When flax follows a small grain, tillage early after the small grain harvest will help control perennial weeds, stop seed production of others, and stimulate fall germination of still other weed seeds. Shallow tillage before seeding flax reduces the possibility of bringing weed seeds to the surface to germinate.

A crop rotation can be an effective weed controller. Following recognized weed control cultural practices is essential for successful flax production. Chemical methods may also become necessary in controlling certain weeds and under certain conditions.

Where wild oats is a problem, spring tillage before planting flax in late May kills many wild oats seedlings. Harrow and pack the area early in the spring to form a good seedbed and induce early germination of wild oats. After the wild oats emerge, kill them with cultivation before seeding flax. Plant Summit, Bolley or Windom because late seeding does not reduce the yield of these varieties as much as it does others.

Use ¼ to ¾ pound acid equivalent 2,4-D amine or MCPA amine per acre to kill several species of broad-leaved weeds as soon as they emerge. Younger weeds require less chemical, and risk of injuring the crop is reduced. Use 5 pounds acid equivalent of TCA (6¼ pounds of 90°% sodium salt) or 1 pound acid equivalent of dalapon (1½ pounds of 85°% sodium salt) per acre to kill foxtails or barnyard grass. Dalapon sometimes kills wild oats.

Avadex or barban can be used to help control wild oats. Use 1½ pounds active ingredient (1½ quarts) of “Avadex” per acre to a level seedbed immediately before or immediately after planting flax and incorporate with a harrow. Use ¼ pound active ingredient (1 quart) of barban when wild oats are in the two-leaf stage, to control the weed in good stands of flax. For further details in weed control, see the following publications: “Weed Control in Field Crops,” “Chemical Weed Control in Crops,” or “Control and Elimination of Wild Oats.” They are available at the County Agricultural Agent’s office.

TREAT THE SEED

Seed treatment is always recommended to reduce seed decay and to provide protection against harmful soil borne organisms. Often the seedcoat of flax has been damaged during the harvest operation, in many cases so slightly that it is not visible to the eye. But even this slight damage makes them more susceptible to seed decaying organisms. Proper seed treatment provides necessary protection while the seed is germinating. Uniform coverage of the treatment on the seed is essential to obtain adequate protection. Organic mercury seed treatment chemicals such as Ceresan M, or Panogen, and Captan seed treatment formulactions such as Orthocide 75 are recommended. Follow the directions on the container carefully for rates and methods of application.

Tests have shown that for best results, seed should be treated at least 48 hours before planting. Treated seed can be stored several weeks before planting with no bad effects. This enables you to treat your seed early in the spring before other work becomes pressing.

EARLY SEEDING USUALLY BEST

Long time experimental records of the South Dakota Experiment Station show that the optimum planting date for flax is April 15 to April 25. Flax varies in its reaction to frost. On the average, light frosts do little damage and in some seasons very heavy freezes have had little effect on flax yield. The critical time for frost injury is at the small seedling stage. Because cool weather favors the growth of flax seedlings, early planting often makes it possible to get a head start on many troublesome weeds common to flax (foxtails and other warm season types).

Sometimes, because of drought, excessive moisture, or a wild oats problem, it becomes necessary to delay planting. Experimental tests show that early maturing varieties such as Summit, Windom, or Bolley should be selected for late plantings. This is important.

METHOD OF PLANTING

Flax can be best seeded with a grain drill in a level, firm seedbed. If seeded into a loose seedbed, there is danger of planting the seed too deeply, the main reason for poor stands and slow seedling emergence. The press drill is superior to the regular grain drill since it permits more accurate control of depth and also packs the soil above each drill row. The pony-press drill has been used successfully and is highly recommended for flax. The pony-press drill has the advantage of placing the seed in moist soil and packing the soil. The packing promotes rapid germination, letting the flax get ahead of the weeds.

Plant flax seed relatively shallow. Actual planting depth is determined somewhat by soil texture and moisture conditions. In heavy soil, one-half to one inch is usually deep enough. But on lighter soils, one to one and one-half inches is better.

USE BEST RATE OF SEEDING

Rate of seeding per acre will vary with size of seed, rainfall, time of seeding, and germination. In eastern counties of South Dakota—where rainfall is usually more adequate than outside the flax producing area—the recommended rate of seeding for medium to large seeded varieties is 42 to 56 pounds per acre. For
small seeded varieties, rate of seeding can be reduced by one-fourth.

As a general rule for rate of seeding, adjust the drill to sow four to five seeds per inch in the drill row.

The above rates of seeding are for seed with germination of 90% or higher. Test all seed for germination before planting.

METHOD OF HARVESTING

Flax does not shatter or lodge as easily as small grains and, therefore, can be left standing until seed is fully mature, with little danger of loss in yield or quality.

Flax is a difficult crop to cut. Therefore, it should be harvested with a combine or swather that is in good running order and has a sharp sickle.

Clean standing flax, free of weeds, can be straight combined if moisture content of seed is below 12%. Because of green weeds and uneven ripening, most operators cut flax with a windrower and allow it to dry in the swath. Moisture in green flax bolls or green foreign material can lower the quality of harvested seed.

Sale of flax straw gives an additional profit to growers. Stacks like these are commonplace in many parts of the state following harvest.

HARVEST AND STORAGE CARE

Take special care to prevent cracking or injury to seed during threshing or other handling. Cracked seed often causes poor germination. Lowering combine cylinder speeds and speeds of other machines handling flaxseed helps prevent cracking and excessive injury to the seedcoat. Cylinder teeth must be properly aligned. Rub-bar-type cylinder combines have been satisfactory when adjusted and operated properly.

Flaxseed cannot be stored safely until moisture content is 11% or less.

FLAX DISEASES

Wilt: This is a fungus disease that can attack the susceptible flax plant in all stages of development. At one time, wilt was the most widespread and destructive disease of flax. Through plant breeding, all present day recommended varieties are resistant to wilt.

Rust: Flax rust is also a fungus disease that attacks the plant in a manner similar to rust on small grains. The discovery of race 300 in 1962 altered the favorable advantage of rust resistant varieties which had existed for a good number of years. Race 300 was able to attack several varieties which were previously resistant to the prevalent races. As a result, Arny, Marine, and Marine 62 were removed from the recommended list. Planting of these varieties was discouraged so that a build-up of race 300 inoculum would be less likely to occur and cause extensive damage. Flax varieties now recommended are resistant to present day races of flax rust. The grower is protected by selecting rust resistant varieties.

Pasmo: This fungus disease is characterized by greenish-yellow to brown circular spots on the leaves; as the disease progresses, all leaves may become infected, turn brown, die and drop off; infected stem are alternated with green non-infected tissue to produce a brown and green blotchy appearance. The bolls may also be attacked. Yields are not seriously affected when the disease appears after flowering. When the disease becomes established before or during flowering and weather conditions are usually favorable for spread of the fungus, yield losses may be extensive. All recommended varieties are susceptible; however, Summit and Bolley appear to have some tolerance. For further information see Fact Sheet 196 on Pasmo of flax.

Aster Yellows: This is a virus disease that is transmitted by the 6 spotted leaf-hopper. All varieties are susceptible. Early plantings have some escape value. Aster Yellows was a serious disease in 1957, causing a severe reduction in flax yields. Since 1957, this disease has been of very minor importance. Development of resistant varieties offers the greatest hope for protection against Aster Yellows.

Seedling blight: Soil borne fungus organisms cause seedling blight. These organisms attack the stem just below the soil surface. Infected plants frequently die, resulting in drastic thinning of the stand. Unfavorable environmental conditions favor outbreaks of the disease. All varieties are more or less susceptible. The best protection from this disease appears to be good management.

PLANT RECOMMENDED VARIETIES

Flax variety recommendations are based on unbiased experiment station yield test results, disease re-
sistance, market quality, and consistency of performance. No attempt is made to designate the best variety, but rather to present a list of good varieties from which growers can select the variety or varieties best for their farms. Some of the varieties in the non-recom-

mended group may give satisfactory yields, but do not offer any superiority over the recommended varieties.

Flax producers are well supplied with good varieties having a range of maturity and offering the maximum protection against flax diseases. By using certified seed, following the best cultural practices, and having a little cooperation from mother nature, flax growing can be a successful enterprise.

Flax variety recommendations according to crop adaption areas, are given in the current Fact Sheet on Field Crop Varieties.

<table>
<thead>
<tr>
<th>Variety</th>
<th>Yield</th>
<th>Maturity</th>
<th>Plant height</th>
<th>Seed size</th>
<th>Seed color</th>
<th>Flower color</th>
<th>Oil Content</th>
<th>Oil Quality</th>
<th>Rust</th>
<th>Wilt</th>
<th>Pasmo</th>
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<tbody>
<tr>
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<td>Late</td>
<td>Tall</td>
<td>Medium</td>
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<td>Blue</td>
<td>Medium</td>
<td>Fair</td>
<td>S</td>
<td>MR</td>
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<td>R</td>
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<td>I</td>
<td>MR</td>
<td>S</td>
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<tr>
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<td>Med-S</td>
<td>Brown</td>
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<td>Large</td>
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<td>Medium</td>
<td>S</td>
<td>MS</td>
<td>VS</td>
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</table>

*Symbols used to indicate degrees of resistance or susceptibility to diseases are: I=immune; R= resistant; MR=moderately resistant; S=susceptible; MS=moderately susceptible; VS=very susceptible.