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## EC155 Flaxseed Production in Nebraska

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FLAXSEED  
PRODUCTION  
IN  
NEBRASKA

UNIVERSITY OF NEBRASKA-LINCOLN



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Extension Agronomist

Ant Agronomist



ESSENTIALS OF FLAX SEED PRODUCTION

1. Flax does not compete well with weeds. Plant only on the cleanest land available.
2. Prepare a good, firm seedbed. Plowing and packing will in most cases give the best results.
3. Flax is susceptible to injury from high temperatures during its early growth. It must be seeded early.
4. Seed treatment with New Improved Ceresan is recommended for control of seedling diseases.
5. Poor quality seed will not give good stands. Determine the germination before planting.
6. Clean seed with a fanning mill to remove weed seeds.
7. A seeding rate of 40 to 45 pounds per acre in the east and 35 to 40 pounds per acre in the west is recommended.
8. Shallow planting is necessary to insure good stands.
9. Flax may occasionally be harvested combining the standing crop, but windrowing before combining is usually necessary.
10. Isolated growers have difficulty in marketing their crop. Community cooperation will enable carload marketing.



## FLAX SEED PRODUCTION IN NEBRASKA

Flax seed produces an essential quick-drying oil which is used extensively in the paint and varnish industry. Because of decreased imports due to shipping difficulty and increased demand for linseed oil, American farmers have been asked to increase seed flax production. To encourage this increase, a government price support for the 1943 crop has been set at \$2.70 per bushel for No. 1 seed at Minneapolis.

At the present guaranteed price of flax, this crop can be profitably grown in Nebraska provided certain principles of production are observed, namely:

- (1) Selection of a field reasonably free of weeds, (2) Proper seedbed preparation, (3) Early, shallow seeding, and (4) Use of high quality seed.

### Adaptation

Flax is usually considered to be a cool-weather crop, and most of the production has been in the north central states. In recent years, however, the acreage has been increasing in other parts of the country. In Nebraska, flax has never been an important crop, but during the past three years farmers have become interested because of: (1) A guaranteed price, (2) Weather conditions which have favored flax, (3) Interest in chinch bug resistant crops in eastern Nebraska, (4) Interest in another cash crop to replace oats, barley, or sorghums, and (5) Use as a nurse crop for grasses and legumes.

A survey of Nebraska flax producers in 1942 indicated that approximately two-third of them intended to increase their production in 1943. The year 1942 was very favorable for flax production in most parts of the state, and this was reflected in the yields obtained. Fifty growers, well distributed over the state, who submitted reports on their 1942 crop showed an average yield of 11.0 bushels per acre.

### Selection of Field

Weed competition in flax is more serious than with the small grains. Therefore, this crop should be seeded only on the cleanest land available. Flax follows soybeans or corn in the rotation very well where these crops have been kept free from weeds the previous year. Flax following a small grain crop is also satisfactory provided the weeds in the stubble have not been allowed to go to seed. A legume in the rotation will materially increase flax yields in Eastern Nebraska. Farmers in Western Nebraska have had good results with flax on summer-fallowed land. Experiments show that usually flax will not do well following sorghums and sugar beets.

### Seedbed Preparation

Flax requires a firm seedbed. Poor stands are often due to seeding too deep in loose soil. Fall or early spring plowing in preparation for seeding flax gives good weed control and is recommended in most cases in preference to disking. Fall plowing is preferable where it will not conflict with good soil conservation practices. Disking corn, soybean, or potato ground is satisfactory if the field is exceptionally clean.



### Seeding

Late seeding is frequently a cause of failure because flax is susceptible to injury from high temperatures during its early growth. It is therefore essential that seedings be made early in order to give the crop sufficient time to make most of its growth during the cool season of early spring.

In the seedling stage flax is not easily injured by frost. Plants just emerging are the most tender, but even these will withstand a moderate frost, especially if the soil is moist. After the plants reach the two-leaf stage, they will withstand temperatures as low as 20 degrees F. for a short time. The degree of injury is dependent upon soil moisture, minimum temperature, condition of the plants, and weather condition after freezing. Drying winds shortly after freezing may cause severe damage.

The best time for seeding in Eastern Nebraska is between March 25 and April 10, and in western Nebraska between April 10 and April 30. Failures due to late seeding can be expected to be less frequent in western Nebraska than in the eastern part.

Flax generally should be sown with a grain drill at a depth of about one inch. If sown broadcast, it is best to cover the seed with a harrow and then go over the field with a roller. Disking following broadcasting buries the seed too deeply resulting in poor stands. Drilling at the rate of 40 to 45 pounds per acre in eastern Nebraska and 35 to 40 pounds per acre in the western counties gives optimum stands, provided good quality seed is used. Broadcast seeding requires about twenty pounds more seed per acre.

Flax used in seeding should be cleaned to remove weed seed, chaff, and light and broken seeds. It is important to know the germination of the seed sown so that seeding rates might be adjusted accordingly. A germination test may be obtained free of charge by sending a cup full of seed to the Seed Laboratory, Department of Agriculture and Inspection, State Capitol Building, Lincoln, Nebraska.

It is recommended that flax seed be treated with New Improved Ceresan to insure better stands. (See paragraph on Diseases)

### Harvesting and Threshing

Flax is mature and should be harvested when 95 to 98% of the bolls have turned brown. At this stage the leaves and stems will still be green if the moisture supply is ample. Heavy rains may cause the plants to again start blooming even after the majority of bolls have already matured. In this case, it is advisable to harvest at the regular time. In Eastern Nebraska, after the crop has matured, the quality of seed is often reduced if left standing in the field. In the western part of the state, the quality of seed is usually not greatly affected by delayed harvesting, unless the season is exceptionally wet.

The most economical method of harvesting is by combining the standing crop, but this method can be used only when the crop matures uniformly and the weeds are not numerous. Mature flax does not shatter badly when left standing in the



field, however, it is not advisable to delay combining longer than necessary. Most Nebraska flax producers windrow the crop with a windrower, mower attachment, or grain binder before combining. If there is a good drying wind, flax may be threshed within a few hours after windrowing. In case of a heavy rain, windrows will need to be turned to prevent seed damage. Therefore, windrowed flax should be picked up as soon as dry.

Flax may also be harvested with a grain binder and threshed with a threshing machine. In order to facilitate quick drying, shocks should be made small or long and narrow. Threshing will need to be done soon after harvest to avoid possible seed damage due to rainy weather.

The threshing machine or combine should be carefully adjusted to prevent excessive loss of seed in the straw. It is difficult to prevent loss of flax seed in the straw without having a certain amount of chaff in the threshed grain. There is no objection to a reasonable amount of trash in the grain as it comes from the combine or separator.

Flax seed is so small and slick that only very tight wagon or truck boxes and bins will hold it. The common practice is to sack the seed as it comes from the thresher or combine or to haul it in canvas lined trucks or wagons.

### Insects

The principal insect enemy of flax is the grasshopper. When present in sufficient numbers, this pest can cause severe loss by clipping of the bolls at the time of maturity. Flax is not damaged by chinch bugs.

### Diseases

Flax is subject to several diseases but careful observance of certain precautions will go far toward preventing serious losses.

"Wilt", a disease causing wilting and death of flax plants in any stage of development, at one time seriously threatened the flax-seed industry because the fungus organism lives indefinitely in the soil. Disease-resistant varieties were developed and the varieties recommended now are resistant or tolerant to wilt.

"Pasma Disease" is caused by a fungus which attacks all above-ground parts of the flax plant. Spots which are at first yellow, later turning brown, develop on leaves and stems, producing a very conspicuous brown and green pattern on older stems. Heavy infection results in premature death. The fungus overwinters on the straw and stubble and also as spores on the seed. Rotation and complete covering of crop residue is recommended. Seed treatment for control of surface-borne spores has been recommended. The recommended varieties have considerable resistance to this disease.

"Rust" is probably the most serious threat since complete control is difficult and satisfactory, resistant varieties are not available. Unlike the cereal



rusts which have alternate hosts, the flax rust develops all spore stages on the flax plant. The fungus overwinters on rusted stems and stubble and in the spring spores from this source infect the young seedlings. In the absence of resistant varieties complete destruction or coverage of the old straw and stubble is strongly advised along with rotation.

"Damping-off" is common under favorable conditions. The young sprout may be killed even before it reaches the surface. In Iowa, stands and yields have been increased 25% through control of damping-off. New Improved Ceresan employed at the rate of  $\frac{1}{2}$  ounce per bushel of seed has given very satisfactory results.

#### DISEASE RESISTANCE OF THE THREE MORE PROMINENT VARIETIES

<u>Variety</u>	<u>Wilt</u>	<u>Rust</u>	<u>Asco</u>
Biwing	Good	Medium	Good
Redwing	Medium	Poor	Medium
Bison	Good	Poor	Medium

#### Varieties

At the present stage of development of flax in Nebraska, difference between varieties commonly grown is not as important as the use of high quality seed and careful production practices.

Bison is the most commonly grown variety. It is wilt resistant, has medium to large brown seeds, and deep blue flowers. It generally yields a higher percentage of oil than do the smaller seeded varieties, but the oil is of somewhat lower quality.

Redwing is also grown to some extent. This variety normally matures about a week earlier than Bison. It is moderately wilt resistant, and can be distinguished in field by its light blue flowers and in the bin by its small seed.

Linota is grown by a few farmers in the extreme southeastern counties. This variety is similar to Redwing in maturity, but the oil content of the seed is somewhat lower.

Biwing, a selection from a cross between Redwing and Bison, combines the good characters of both parent varieties without sacrificing yield. Certified seed has been distributed by the Nebraska Experiment Station to certified growers in eastern Nebraska who should have available a good supply of seed for 1944 planting.

Variety tests in 1942 at Lincoln, Fremont, Allen, Ord and North Platte gave the following average yields: Biwing, 20.1 bu.; Redwing, 17.7 bu.; and Bison, 17.3 bu. per acre. Experiments over a period of years at the Nebraska Experiment Station at Lincoln, Nebraska, show that the earlier maturing varieties have had a distinct advantage in yielding ability in comparison with the later maturing varieties. In the western part of the state, 1942 results indicated that the later maturing varieties, such as Bison, showed some advantage especially under irrigation.



### Marketing

Growers producing flax on a small scale have experienced some difficulty in finding a market for their crop. In territories where there is no local market, growers will therefore need to cooperate in producing a large enough acreage within the community so that carload shipments can be made, otherwise small quantities of flax will have to be sacked before shipping. Linseed mills are located at Minneapolis and Red Wing, Minnesota; Sioux City and Des Moines, Iowa; Milwaukee, Wisconsin; and Fredonia, Kansas.

### Effect on the Soil

There is a common belief that flax is hard on the land, and that it can be grown only on newly-broken sod. Before the development of wilt-resistant varieties, flax could be grown safely only on new land because after a few years, the soil became so contaminated with the wilt-producing organism that the crop would nearly always fail. Wilt-resistant varieties are now in general production and the wilt problem has been largely eliminated. Numerous experiments have shown that flax has no ill effect on succeeding crops.

### Use As a Nurse Crop

Since flax does not shade the ground as much as the small grain crops, it frequently is used as a nurse crop for spring seeded alfalfa, clovers, and grasses. Used, in this way, the seeding rate need not be materially reduced.

### Flax Under Irrigation

Flax is grown under irrigation only to a limited extent, although experiments indicate that it responds well to irrigation. Yields of twenty to forty bushels per acre have been obtained. Fields on which flax is to be grown should be weed-free and high in fertility. Since flax is a comparatively shallow-rooted crop, it responds best to light irrigations. Irrigation should stop when the crop begins to ripen, otherwise blooming may continue indefinitely. The seeding rate should be forty-five pounds or more per acre.