Alternative
Field Crops Manual
University of Wisconsin-Extension, Cooperative Extension
University of Minnesota: Center for Alternative Plant & Animal Products and the Minnesota Extension Service

Flax

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I. History:

Common flax (*Linum usitatissimum* L.) was one of the first crops domesticated by man. Flax is thought to have originated in the Mediterranean region of Europe; the Swiss Lake Dweller People of the Stone Age apparently produced flax utilizing the fiber as well as the seed. Linen cloth made from flax was used to wrap the mummies in the early Egyptian tombs. In the United States, the early colonists grew small fields of flax for home use, and commercial production of fiber flax began in 1753. However, with the invention of the cotton gin in 1793, flax production began to decline. During the 1940's fiber flax production in the U.S. dropped to nearly zero. Today a few individuals still grow fiber flax for their own use to make linen. Presently the major fiber flax producing countries are the Soviet Union, Poland, and France. Wisconsin had 2,000 acres for seed in the state in 1966 with an average yield of 18 bushels per acre, however there has been no acreage reported in recent years. Minnesota had 378,000 acres in 1920 and over 1,600,000 acres in 1943. Since 1943 acreage has steadily declined with only 15,000 acres grown in 1988. The state average yield was 9.5 bushels per acre in 1920, while in 1987 it was 16 bushels. The yield dropped to 10 bushels per acre in 1988 due to dry conditions. States having the largest seed flax acreages are North Dakota, South Dakota, and Minnesota.

Flax is an alternative cash crop, especially in areas of Wisconsin and Minnesota where allocated acreages for other cash crops are limited or where other crops are not adapted. At one time the flax acreage was concentrated on the clay soils in eastern Wisconsin. However, flax is adapted and has been successfully grown in other areas of the state. In Minnesota, flax acreage is concentrated in the northwestern part, however flax has been grown successfully in nearly all counties.

II. Uses:

A. Industrial Uses:

Flax is still produced in the United States for its oil rich seed. Linseed oil has been used as a drying agent for paints, varnishes, lacquer, and printing ink. Unfortunately these markets have eroded somewhat over the years with the production of synthetic resins and latex. One bright spot in the market has been the use of linseed oil as an antispalling treatment for concrete where freezing and thawing effects have created problems on streets and sidewalks. Occasionally the straw is harvested and used to produce some paper products.

B. Livestock Feed:

Linseed oil meal is an excellent protein source for livestock containing about 35% crude protein. Flax straw on the other hand, makes a very poor quality forage because of its high cellulose and lignin content. Green flax straw should not be grazed or fed as it is high in prussic acid. The danger of prussic acid poisoning is greater immediately following a freeze.

C. Human Food:

Recently there has been some interest in seed flax as a health food because of its high amount of polyunsaturated fatty acids in the oil (Table 1).

Table 1: Oil and Mineral compostion of flaxseed.[1]

Character measured	Mean[2]	Mineral element	Mean[2]
	% of seed		%
Oil in seed	40.3	K	0.89
Fatty acid	% of total fatty acids	P	0.60
Linolenic	49.3	Mg	0.33
Linoleic	14.7	Ca	0.21
Oleic	24.1	Na	0.04
Stearic	4.3		ppm
Palmitic	6.1	Zn	56.9
	Number	Fe	46.2
Iodine value of oil	179.3	Mn	32.0
		B	11.5
		Cu	9.5
		Sr	1.4
		Mo	0.7

[1]Adapted from "Growing Seed Flax in the North Central States"

[2]Shown on oven–dry basis

III. Growth Habits:

Seed flax is an annual plant that grows to a height of 12 to 36 inches. It has a distinct main stem with numerous branches at the top which produce flowers. Branches from the base of the plant may also occur depending on variety, stand, and environment. The plant has a branched taproot system which may extend to a depth of 3 to 4 feet in coarse textured soil. Spring-sown varieties of the North Central region are less cold tolerant, exhibit less basal branching, and grow more upright in the seedling stage than fall-sown varieties of Texas and southern California.

The flax flower has five petals and a five-celled boll or capsule, which may contain up to 10 seeds when filled. Under most conditions an average of six to eight seeds per boll is normal. Some varieties produce bolls that tend to split open from the apex in varying degrees, whereas other varieties have bolls that remain tightly closed. Varieties with tight bolls suffer less weather damage to ripe seeds and resist shattering better than varieties with split bolls. Most current commercial seed flax varieties have semitight bolls.

Flax is normally self-pollinated, but insects cause some natural crossing. Frequency of cross pollination seems to be associated with varietal differences and environmental conditions. Individual flowers open in the first few hours after sunrise on clear, warm days, and the petals usually fall before noon. Most commercial varieties have blue petals. Petals may also be white or different shades of purple, blue or pink. The seeds may be various shades of yellow, brown, greenish-yellow, greenish-brown, or nearly black. Seed color of most commercial varieties is light brown.

Flax is an excellent companion crop to help establish small seeded grasses and legumes. Plant characteristics that favor its use as a companion crop are (1) limited leaf area and short stature which allow much light to reach the forage seedlings, (2) early maturity, and (3) less extensive root system than many crops which reduces competition for soil moisture.

Flax in Wisconsin and Minnesota is a spring annual with a 90 to 110 day growing season. The typical life cycle consists of a 45 to 60 day vegetative period, followed by a 15 to 25 day tlowering period, and 30 to 40 day maturation period. Proper harvest time is important in flax production. Early harvest reduces yield while late harvest can change the chemical make-up of the oil and thus its quality and value.

IV. Environment Requirements:

A. Climate:

The concentration of flax acreage in the North Central states is in part due to the large acreage of fertile land suitable for flax and a lack of other competing crops with more favorable economic returns. The North Central area also has moderate summer temperatures and rainfall which is sufficient but not excessive for good flaxseed yields. Flax yields tend to decrease as precipitation diminishes. Annual rainfall ranges from 30 inches in parts of Wisconsin and Minnesota to 15 inches in eastern Montana. More important than total rainfall is the amount of precipitation that falls during the growing period. Adequate moisture and relatively cool temperatures, particularly during the period from flowering to maturity, seem to favor both high oil content and high oil quality.

B. Soil:

Flax is best adapted to fertile, fine textured, clay soils. It should not be grown on very coarse textured, sandy soils. Flax on peat or muck soils will be disappointing unless problems related to drainage, fertility, and weed control are solved.

C. Seed Preparation and Germination:

More uniform stands of flax are frequently obtained when the seed is treated with a suitable fungicide. In areas where wireworms are a problem, an insecticide needs to be used along with a fungicide as a seed treatment. The seed coat of flax is easily damaged during harvest and handling. Sometimes this damage is so slight it is not visible but even such slightly damaged seed is susceptible to seed decay. Thus, all seed should be treated with a fungicide. Sound, uninjured flax seed should always be selected for planting if available.

V. Cultural Practices:

A. Seedbed Preparation:

The best seedbed for flax is similar to the ideal seedbed for small seeded grasses and legumes. It should be wellworked. The soil should be firm to avoid large air pockets. Fall plowing is preferred if erosion is not serious. The seedbed may be worked fairly shallowly, except where deeper plowing is required when flax follows corn. Cultivation following early fall plowing will aid in weed control. In the spring, shallow discing and harrowing are the usual practices of seedbed preparation. In most cases, a more uniform planting depth (and seedling emergence) will result if the field is rolled before planting.

B. Seeding Date:

Research in several states indicates that early seeding gives the highest yields in most years. Plant about the same time as for oats. Seedling flax plants have tolerance to light frost. Planting is sometimes delayed to allow cultivation for weed control in fields where weeds may be a very serious problem. Late planting of flax may not cause as great a yield reduction as it does with small grains.

C. Method and Rate of Seeding:

A seeding rate of 42–50 pounds of good seed per acre is recommended. Lower seeding rates often result in more severe weed problems. A one–half to one inch planting depth is suggested in clay soils. Flax seed is comparatively small and may fail to emerge from greater depths, especially if crusting occurs. Inexperienced growers often plant too deep, especially if the soil is loose. Flax is usually sown with a grain drill. Presswheel-type grain drills are ideal. A roller type seeder often used to plant forage legumes may also be used.

D. Fertility and Lime Requirements:

Flax requires about the same soil fertilization program as small grains. Apply lime to maintain soil pH in the 6.0 to 6.5 range. Follow soil test recommendations for phosphorous and potassium fertilizer applications where soil tests for P and K are low (L) or very low (VL). These elements are especially important if a legume is being seeded with flax. Annual nitrogen, phosphate, and potash recommendations for Wisconsin are shown in Table 2 and for Minnesota in Tables 3 and 4. If large amounts of fertilizer are required, it is commonly applied to the previous crop in the rotation. Stands of flax will likely be reduced if combined total rates of N, P_2O_5 and K_2O applied with the seed exceed 20 lbs./acre.

Table 2: Annual nitrogen, phosphate, and potash recommendations for flax in Wisconsin.

	Nitrogen recommendation					
	organic matter %				Phosphate and Potash recommendation[1]	
Yield level	< 2	2–5.0	5.1–10	> 10	P_2O_5	K_2O
bu/a	lb/a					
20 to 40	50	30	20	10	20	20

[1]Amounts shown are for medium (M) soil test levels. Apply 50% of rate if soil test is very high (VH) and omit if soil test is excessively high (EH).

Table 3: Annual nitrogen recommendations for flax in Minnesota.

	Based on previous crop and organic matter level			
	Previous crop			

		Corn, sugar beets, potatos, small grain		Soybeans, sunflowers		Alfalfa, clover, black fallow		Organic soil
Based on nitrate test[1]		Organic matter level[3]						
Expected yield	Soil–N (0–2 ft.)+ fertilizer N	Low to medium	High	Low to medium	High	Low to medium	High	
(bu./acre)	(lb./acre)[2]	N to apply (lb./acre)						
35 or more	120	100	80	60	40	30	20	20
30–34	100	80	60	60	40	30	20	20
25–29	80	60	40	50	30	20	0	20
20–24	70	50	30	40	20	0	0	0
less than 20	60	40	20	30	20	0	0	0

[1]for use in western Minnesota only

[2]Subtract nitrate – N (lb./acre, 0–2 h) from this value to obtain N to apply (lb./acre)

[3]Irrigated soils are included in the low to medium category.

Table 4: Annual phophorus and potassium recommendations for flax in Minnesota.

Phophorus (P) Soil Test (lb./acre)	P_2O_5 to apply (lb./acre)	Potassium (K) Soil Test (lb./acre)	K_2O to apply (lb./acre)[1]
0–10	40	0–100	80
11–20	30	101–200	40
21–30	20	201 –300	20
30+	0	300+	0

[1]Recommended rates are for total amount to apply—broadcast plus drill.
Caution:
Flax: Do not apply more than 10 lb./acre nitrogen or 20 lb./acre N+P_2O_5 +K_2O in the drill row.

E. Variety Selection:

The most important factors to consider in variety selection are maturity, disease resistance, standability, and oil content and quality. Each of these factors will influence yield or quality. Pasmo is the most serious disease affecting flax in Wisconsin and Minnesota.

Recommended Varieties for Oil Seed Production:

Dufferin—High yield when sown early, not recommended for late sowing. Very late, brown seed, blue flowers, variable plant height. High oil percent. Resistant to rust and wilt. Licensed in 1975 by Agriculture Canada, Ottawa.

Rahab—High yield. Medium maturity, good lodging resistance. Brown seed, blue flowers. High oil percent. Resistant to rust, moderately susceptible to wilt and pasmo. Released in 1985 by South Dakota Agricultural Experiment Station.

Verne—High yield, particularly when sown late. Early maturity, good lodging resistance. Blue flowers, brown seed. Excellent resistance to rust and wilt, moderately resistant to pasmo. Released in 1987 by Minnesota Agricultural Experiment Station.

Other Varieties:

Clark—Medium yield. Early. Brown seed, blue flowers. Medium oil percent. Resistant to rust, moderately resistant to wilt and pasmo. Released in 1983 by South Dakota Agricultural Experiment Station.

Culbert and Culbert 79—Medium yield. Early maturity, good lodging resistance. Brown seed, blue flowers. High oil percent. Resistant to rust, moderately resistant to wilt, moderately susceptible to pasmo. Culbert released in 1975 by Minnesota Agricultural Experiment Station. Culbert 79 selected from Culbert and released in 1979 by South Dakota Agricultural Experiment Station. The two varieties do not differ significantly.

Flor—Medium yield. Medium maturity. Brown seed, blue flowers. High oil percent. Resistant to rust, susceptible to wilt, moderately susceptible to pasmo. Released in 1981 by North Dakota Agricultural Experiment Station.

Linott—Medium yield. Early maturity. Brown seed, blue flowers. High oil percent. Resistant to rust (has a trace of susceptible plants), moderately susceptible to wilt and pasmo. Licensed in 1967 by Agriculture Canada, Ottawa.

Linton—Medium yield. Medium maturity, medium lodging resistance. Brown seed, blue flowers. Mcdium oil percent. Resistant to rust and wilt, moderately susceptible to pasmo. Released by North Dakota Agricultural Experiment Station in 1985.

McGregor—High yield when sown early. Very late, very resistant to lodging. Brown seed, blue flowers. Medium oil percent. Resistant to rust, moderately resistant to wilt, and susceptible to pasmo. Licensed in 1981 by Agriculture Canada, Ottawa. Production of certified seed limited to Canada.

NorLin—High yield. Medium maturity. Brown seed, blue flowers. Medium oil percent. Resistant to rust, moderately susceptible to wilt and pasmo. Licensed in 1982 by Agriculture Canada, Ottawa. Production of ccrtified seed limited to Canada.

NorMan—High yield. Late maturity. Brown seed. blue flowers. High oil percent. Resistant to rust, moderately susceptible to wilt and pasmo. Licensed in 1984 by Agriculture Canada, Morden. Production of certified seed limited to Canada.

Note: Variety descriptions from Report 24, "Varietal Trials of Farm Crops" University of Minnesota Agricultural Experiment Station, St. Paul, Minnesota, 1989.

F. Weed Control:

1. Cultural and Mechanical: Weeds are generally more of a problem in flax than in small grain. Growers should sow flax on relatively weed free land and where quackgrass is not a serious problem. Use post-harvest tillage and/or herbicides the previous season to suppress perennial weeds such as Canada thistle and quackgrass and to stimulate germination of annual weed seeds. Good weed control with a minimum of weed seed production in the preceding year's crop will facilitate a cleaner flax field. Delayed sowing of flax to permit additional spring tillage for weed control may be successful in some fields but the planting delay may be detrimental to the flax.

2. Chemical: There are no soil applied herbicides recommended for weed control in flax in Wisconsin. Walk your fields every 5 to 7 days after planting and use the appropriate postemergence herbicide if necessary. In Minnesota, Eptam and Treflan can be applied and incorporated in the fall while Ramrod can be applied preemergence in the spring.

Poast can be applied at .5 to 2.5 pints/acre to control annual grasses like foxtail, fall panicum, barnyardgrass, and wild oats. Treat when weeds are up to 4 inches tall. Volunteer cereals can be controlled with 1 1/2 pints/acre. Always use a crop oil concentrate or Dash with Poast. This product does not prevent further weed seed germination. If a second flush of annual grasses appears, make a second application. Quackgrass control is not mentioned in the flax section of the Poast label, but the 1 1/2 pint/acre rate would normally suppress this weed. Do not apply Poast within 75 days of harvest and do not graze or feed treated flax forage to livestock.

Poast can be tank mixed with either Buctril or MCPA. This is appropriate when a mixture of grasses and broadleaves is present. Use only a crop oil concentrate (not Dash) as the additive. Some leaf burn, slowed crop growth, and delayed crop maturity may result from these tank mixes. Grass control may also be somewhat reduccd.

Wild oats can also be controlled with Carbyne and Hoelon. Carbyne at 1 to 1.5 pints per acre applied postemergence when wild oats is in the 2–leaf stage will control wild oats. Hoelon should be applied at 2 to 2.67 pints pcr acre when wild oats is in the 1– to 4–leaf stage. Dowpon applied at 1 pound per acre when flax is 1 to 6 inches tall will control small (less than 2 in.) foxtail. Dowpon can be mixed with MCPA Amine.

To control annual broadleaf weeds postemergence, apply 1/3 to 1/2 pt/A of MCPA Amine (forms containing 4 lb acid equiv/gal), when flax is 2 to 6 inches tall but before the bud stage. Flax can be seriously injured if this treatment is applied between bud stage and when 90% of the bolls have formed. Seed germination may be reduccd by treatment after full bloom. MCPA may cause injury to flax at any stage of growth but is generally less injurious than 2,4–D.

Buctril (bromoxynil) can be applied postemergence to control broadleaf weeds, especially wild buckwheat and smartweed. This treatment is weaker on pigweed and wild mustard than MCPA. Apply 1 pt/A in 10 to 20 gal of water before weeds exceed the four-leaf stage and the flax is 2 to 8 inches tall. Do not treat flax during or after the bud stage. High temperatures on day of treatment and for the next 3 days must not exceed 85 730176;F to avoid flax injury.

G. Diseases and their Control:

Rust is a fungus disease which first appears as yellow orange pustules on the leaves and stems. The spore masses are darker color in later stages. Good fall plowing that buries straw and stubble aids in controlling the disease, but the most efficient control for rust is the use of resistant varieties.

Pasmo is a fungus disease characterized by yellowgreen to brownish spots on the leaves, stems, and bolls. Infected leaves die and drop off. Infected stems appear as alternate green and brown areas giving a blotchy appearance. Gencrally the disease becomes more severe as the crop approaches maturity. The fungus is carried overwinter on flax plant debris. This disease has been observed on flax in Wisconsin and Minnesota.

Wilt is a soil-borne fungus disease. It is most serious where flax is not rotated with other crops. Recommended varieties are highly resistant to this disease.

Seedling Blight diseases attack the germinating seed. Losses are most severe in extremely cold, wet growing conditions. The fungi may enter the seed through cracks in the seed coat. Seed treatment will help to prevent losses.

Aster Yellows and Crinkle are both virus diseases which are transmitted by certain insect vectors. These diseases may be present to a limited extent each season; however, losses are usually light.

H. Insects and Other Predators and their Control:

Flax may be infested from time of emergence to maturity by various insect pests. To keep damage low, examinc fields regularly for pests and use control measures promptly.

Cutworms damage the seedlings by cutting off the plants at or near the soil surface. Severe damage may be done in 1 or 2 days when the plants are young.

Wireworms, although often serious pests of cereal grains in the seedling stage, seldom damage flax.

Aphids sometimes become so abundant on flax in midsummer that all the plants in a field may be covered with them. These infestations normally cause little damage.

The aster leafhopper and the tarnished plant bug, like aphids, feed by sucking juices from the flax plants. The leafhopper can carry the mycoplasm that causes aster yellows and infect the plants with this disease while feeding. Tarnished plant bugs damage flax by feeding on the growing tips, which become distorted and die back. The damage from these insects is most serious on late-seeded crops.

Grasshoppers may be a hazard to flax, especially before harvest. If flying adults invade a field, they can quickly cause large numbers of bolls to drop to the ground by chewing through the succulent portions of the small stems below the bolls. In the spring young hoppers may also damage seedling flax.

The beet webworm, a slim, lively, dark green caterpillar, may eat leaves, flowers, and patches of bark from flax stems and branches. When abundant, usually in July and August, the larvae migrate in large armies.

I. Harvesting:

Flax is more difficult to harvest than small grains; however, flax does not shatter or lodge as easily. Because of green weeds and uneven ripening, flax is usually windrowed and allowed to dry before combining. It may be combined standing if it is relatively weed free and appears to be uniform in maturity. Flax is ready to harvest when 90 percent of the bolls have turned brown. The seed should be under 12% moisture before combining.

Flax is usually ripe when the stems turn yellow, the bolls turn brown, and the seed can be easily threshed. In wet summers the stems may remain green and the plants continue to flower long after the early bolls are ripe. Under such conditions flax should be harvested when all but the very late bolls are ripe. It is important to harvest soon after it is mature because weeds usually become a greater problem. If left standing for a long period of time, the seed quality for oil purposes may be seriously reduced.

Adjust the combine cylinder speed (800–1300 RPM) and cylinder concave clearance (1/16–1/4") to avoid cracking and yet remove all the seed from the bolls. A sharp cutter bar is necessary when combining direct. Adjustment in the cleaning is important to minimize losses. A sieve with an opening of 1/16 to 3/16" is suggested. Careful loss evaluation will aid in refining these adjustments.

Flax seed over 11% moisture usually cannot be stored safely for extended periods. Top market prices are usually based on 9% moisture. Flax should be left in the windrow to dry until the seed reaches this moisture level. Seed containing large amounts of green weed seed and inert matter should be cleaned before storing.

If the straw is to be marketed, it should be baled and stacked when thoroughly dry. The straw should be fairly weed free if the highest prices are to be obtained.

J. Drying and Storage:

Flax seed shipped to market often contains from 10 to 40 percent dockage and cracked flax seed, other grains, weed seeds, and chaff. These admixtures are mostly undesirable when extracting linseed oil, but they are of value for feed.

Excessive dockage may be screened from the flax before marketing to save freight charges if the screenings are of aufficient local value to offset cleaning costs and losses from shrinkage during cleaning. However, only a few farms and not all local elevators are equipped for such cleaning. Cleaning on the farm or at the local elevator saves screenings for feeding in the community, but they often are more valuable in the terminal markets where they can be incorporated into commercial mixed feed.

To clean flax seed, use a 4 x 16 mesh wire sieve (or 4 x 14 for large-seeded varieties) to separate the grain and larger weed seeds from flax. A metal sieve with round holes onefourteenth of an inch in diameter will remove most of the small weed seeds and fragments of flax seed. The air blast can be regulated to blow out all immature and shrunken flax seed and trash.

For safe storage, flax seed should contain 11% moisture or less. Store only in dry tight bins or containers. Flax seed will flow through very small openings.

VI. Yield Potential and Performance Results:

A. Wisconsin:

Flax yield tests have not been conducted in Wisconsin since 1972. Yields at Madison in 1971 and 1972 ranged from 18–20 bu/a, (Table 5).

B. Minnesota:

The most recent flax yield tests conducted in Minnesota show that several varieties average 18–20 bu/a. Yield and other plant characteristics are shown in Table 6.

VII. Economics of Production and Markets:

Market outlets for seed or straw should be located before planting. Most local buyers may be able to handle flax if they can make arrangements in advance. The flax straw processing plants are in Minnesota. The straw is usually shipped to these plants as needed.

The University of Minnesota publishes information yearly on the cost of production and expected net return from growing various crops including flax. These crop budgets must be adjusted according to individual situations to be useful. A budget plan for 1989 comparing four different crops is summarized in Table 7. A land charge of $55.20 is included in the overhead cost of all crops. Transportation costs to market would usually be higher in Wisconsin than Minnesota because the nearest flax terminals are Minneapolis and Duluth–Superior.

Table 5: Yield and Agronomic Data for Several Flax Varieties at Madison, Wisconsin, 1971–72.[1]

Variety	Yield (bu/A)	Bloom Date	Mature Date	Height (in.)
Bison	18.3	6/25	8/5	22
Bolley	19.5	6/26	8/8	23
Windom	18.9	6/25	8/4	21
Summit	19.4	6/25	8/5	21
Nored	20.0	6/30	8/7	22
Arny	19.0	7/1	8/7	25

[1]Planted May 5,1971 and May 12, 1972. Data from J.H. Torrie, Department of Agronomy.

Table 6: Yield and Agronomic Characteristics of Flax Varieties in Minnesota.

					Planting to bloom				Disease reaction		
Variety	Yield[1]	Oil	Test weight	Seeds/ pound	first	full	Lodging	Height	Wilt	Pasmo	Rust
	bu/a	%[2]	lbs/bu	no.	days		score[3]	inches	score[4]		rating[5]
Dufferin	20.7	42	53	82,470	56	61	2.7	24	2.0	5.2	R
Rahab	20.7	41	53	78,210	54	58	2.9	33	3.7	3.0	R
Verne	20.8	41	53	82,470	51	56	3.3	22	1.6	3.1	R
Clark	18.9	40	54	79,580	51	56	3.6	22	3.3	3.4	R
Culbert	19.1	41	54	76,880	50	56	2.6	21	2.6	3.1	R
Culbert 79	18.1	41	54	76,880	51	57	2.5	21	2.5	3.1	R
Flor	19.5	41	53	82,470	54	58	3.7	22	4.7	3.3	R
Linton	19.3	40	54	81,000	54	59	3.3	22	1.4	3.6	R
McGregor	20.2	40	54	87,230	56	62	1.8	24	3.2	4.2	R
NorLin	20.9	40	54	78,210	53	59	3.2	22	3.7	3.4	R
NorMan	21.0	41	53	79,580	55	60	4.0	22	3.8	4.0	R

[1]Average of 25 tests.
[2]Oven–dry.
[3]1 = erect, 9 = flat.
[4]1 = best, 9 = poorest.
[5]R = resistant.

Table 7: Estimated Budget for growing flax compared to corn, soybean and wheat.

	Corn[1]	Soybean	Wheat[1]	Flax
Yield/bu/A	115	42	45	20
Price/bu[2]	$2.58	$7.15	$4.07	$7.60
Total Returns/A	296.70	300.30	183.15	152.00
Cash Expense/A	129.94	79.41	51.57	49.57
Overhead Cost/A	129.62	117.79	108.23	109.76
Total Cost/A	259.56	191.20	159.80	159.32
Return Over Total Cost	37.14	109.10	23.35	(–7.32)
Return Over Cash Cost	166.76	220.89	131.58	102.43

[1]Participation in goverment crop program could add additional income per acre for corn and wheat.
[2]Average US price on May 15, 1989.

VIII. Information Sources:

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