

FLAX VARIETY MIXTURES¹

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Farmers sometimes report better yields from fields sown with flax variety mixtures than from those sown with the pure varieties. The excellent performance of the variety Victory, both in farm fields and experimental plots, also suggests that there may be some advantage in sowing variety mixtures. Victory is a mixture of early short and late tall types. Furthermore, Victory is impure for rust reaction, possessing at least four lines which are sharply differentiated by their reaction to races of flax rust.

Processors of flaxseed, unlike those of some other farm crops, do not discriminate against variety mixtures. In fact, a mixture of a variety having a high content of low quality oil with one having a moderate content of high quality oil might be preferred to either one alone. Furthermore, ripe flax does not lodge or shatter readily and the bolls do not drop off unless attacked by insects or diseases, so that differences in maturity are less objectionable than in some other farm crops. It appears that neither the producer nor the processor should have serious objections to the growing of variety mixtures. As a matter of fact, to facilitate harvesting, the growing of a mixture of the short but high yielding "Golden" flax with a taller variety, such as Dakota, is a common practice in the drier areas of North Dakota where the straw is likely to be short.

Varieties

Tests were begun at Fargo in 1947 to determine relative yields of an early, a midseason, and a late flax variety when sown separately and in mixtures. The varieties selected, Sheyenne, Dakota, and B5128, were resistant to all races of flax rust that had been found in North Dakota when the tests were started. In 1948, races attacking Dakota were discovered but infection was so light in the experimental plots that no damage resulted. In 1949, the Dakota in the May 24, June 7 and 21 sowings was heavily rusted and the yield reduced.

Sheyenne is an early maturing variety, highly resistant to rust and wilt. In plot tests when sown early it has not yielded so high as some other varieties.

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Dakota is an intermediate maturing variety adapted to a wide range of conditions and has produced good yields from both early and late sowings.

B5128 is a late maturing variety with capacity for high yields when sown early.

Date of sowing and climatic conditions greatly influence the relative maturity of flax varieties. Differences in the maturity of varieties usually are much less in early than in late sowings. When sown in late April or early May, Sheyenne usually ripens a day or two earlier than Dakota and from five to seven days earlier than B5128. In late May and early June sowings, Sheyenne usually is three to five days earlier than Dakota and from one to two weeks earlier than B5128. When sown late in June, Sheyenne has ripened up to a week earlier than Dakota and from two to four weeks earlier than B5128.

Methods

The variety mixtures were prepared so that each contained approximately the same number of seeds of each variety. All the seed was hand threshed and the germination, although not tested, was very high. Sheyenne was sown at the rate of 28 pounds per acre; B5128, Dakota, and the mixed varieties at a 35 pound rate. Seed was sown in rod row nursery plots replicated three times. Emergence of sowings made in dry soil was somewhat irregular but final stands in all tests approached 100 percent.

The first seeding was done as early as a satisfactory seed bed could be prepared. Other seedings followed at approximately two week intervals until late June or early July, depending on the moisture condition of the soil. The plots were harvested when from 90 to 95 percent of the bolls were ripe, except those of most late sowings of B5128 which were harvested after the first freeze, in order to secure yields. The harvested plants were brought into the greenhouse and dried before threshing.

Results

The date for sowing flax to obtain maximum yields varies with locality and season. Stoa and Smith¹ in eight years of tests at Fargo, (1919 to 1926) found that flax sown approximately April 10, May 1, and May 10 averaged 15.3, 15.8, and 16.0 bushels per acre, respectively. The average yield of May 20 sowings was 14.0 bushels, whereas sowings made June 1 and June 10 averaged only 10.7 and 6.3 bushels per acre, respectively. The tests for the years 1947 to 1949, inclusive, herein reported agree with those of Stoa and Smith in that early sowing usually gives higher yields and that in the area adjacent to Fargo there is little to be gained by sowing prior to May 10. However, yields tend to decrease with a delay in sowing after that date. In presenting results of recent experiments any sowing after May 15 is arbitrarily regarded as late.

¹Stoa, T. E., and R. W. Smith. When to sow flax. N. Dak. Agr. Expt. Sta. Bimo. Bul. 10:123-125. 1948.

Varieties differ in their response to date of sowing. B5128 was the highest yielding variety in four of the five sowings made before May 15 (Table 1). The one exception, that of April 25, 1949 in which Dakota was high, B5128 lodged, probably accounting for the lower yield. Sheyenne was the low yielding variety in all five early sowings. In contrast to the results of early sowing, Sheyenne produced the highest yield and B5128 the lowest yield in eight of the nine sowings made later than May 15 (Table 2). B5128 sown later than June 15 did not ripen satisfactorily in any of the three test years. In sowings made before May 15, B5128 averaged 19.1, Dakota 17.5, and Sheyenne 15.8 bushels per acre. In sowings made after May 15, B5128 averaged 8.0, Dakota 11.2, and Sheyenne 12.3 bushels per acre.

There appears to be no advantage in sowing mixtures of B5128, Dakota, and Sheyenne. A mixture yielded more than the highest yielding variety in only one of 53 tests. The yield of mixtures usually approximated the average of the constituent varieties. For example, in the May 9, 1947 sowing B5128 yielded 22.3, Dakota 19.7, and Sheyenne 18.7 bushels per acre and the mixture of the three yielded 20.3 bushels. Had each variety contributed to the yield of the mixture proportionately to its yield when sown alone, the mixture would have yielded 20.2 bushels.

Dakota was heavily rusted in the late 1949 sowings. The Dakota plants in the mixed variety plots, where one-half to two-thirds of the plants were immune, appeared to be as heavily rusted as plants in the Dakota plots.

Table 1.—Yield of flax varieties and variety mixtures in early sowings (before May 15) at Fargo, North Dakota.

Variety or mixture	Yield in bushels per acre when sown					
	1947 May 9	1948		1949		Average
		April 27	May 11	April 25	May 10	
B5128	22.3	19.7	20.3	16.3	16.9	19.1
Dakota	19.7	18.1	16.1	19.3	14.3	17.5
Sheyenne	18.7	15.6	14.8	16.3	13.4	15.8
B5128 + Dakota	21.3	18.1	17.8	16.4	13.5	17.4
B5128 + Sheyenne	21.7	18.5	17.5	15.8	16.6	18.0
Dakota + Sheyenne	20.2	15.6	14.3	18.1	16.1	16.9
B5128 + Dakota + Sheyenne	20.3	17.7	17.7	18.5	16.1	18.1
L. S. D.*	1.6	2.7	3.0	3.0	3.4	

*Least significant difference at a probability of 0.05.

Table 2.—Yield of flax varieties and variety mixtures in late sowings (after May 15) at Fargo, North Dakota.

Variety or mixture	Yield in bushels per acre when sown										
	1947		1948					1949			Aver- age
	May 24	June 16	May 24	June 8	June 26	July 5	May 22	June 7	June 21		
B5128	19.7	*	17.5	13.1	1.1	0.6	5.5	4.8	1.3	8.0	
Dakota	19.4	12.8	22.7	18.8	4.1	6.6	9.4	5.5	1.4	11.2	
Sheyenne	18.5	13.1	24.3	21.8	5.4	8.6	10.4	6.3	2.3	12.3	
B5128 †											
Dakota	20.7	*	20.1	15.9	2.5	4.2	6.4	3.1	1.2	9.3	
B5128 †											
Sheyenne	18.9	*	20.7	16.9	2.7	4.1	6.5	3.1	1.5	9.3	
Dakota †											
Sheyenne	18.2	11.6	21.9	19.6	4.8	7.3	9.0	4.6	2.1	11.0	
B5128 †											
Dakota †											
Sheyenne	18.7	*	22.6	17.2	3.4	4.8	6.9	3.8	1.7	9.9	
L. S. D. ^o	1.6	2.3	1.7	3.2	1.2	1.7	3.1	1.8	0.8		

*B5128 and all mixtures containing B5128 plowed under by mistake September 29, when only 50 percent of the bolls of B5128 were ripe.

^oLeast significant difference at a probability of 0.05.

SUMMARY

The yield of B5128, Dakota, and Sheyenne was compared with that of mixtures of these varieties in 14 date-of-sowing tests during 1947 to 1949, inclusive, at Fargo, North Dakota. Only in one test out of 53 did a mixture yield as much as the highest yielding variety. The yield of the variety mixtures usually approximated the average of the constituent varieties. In the five early sowings (before May 15), B5128 gave highest and Sheyenne lowest average yield. In the nine sowings made after May 15, Sheyenne had the highest and B5128 the lowest average yield. The average yield of B5128 was 1.0 to 2.2 bushels per acre greater than the mixtures in the early sowings and the average yield of Sheyenne was 1.3 to 3.0 bushels per acre greater than the mixtures in the late sowings.

WEEDS FOR CHICKEN FEED

Our Office of Foreign Agricultural Relations reports that the National Agricultural Institute, operated cooperatively in Guatemala, by USDA and Guatemala, has found a variety of beggarweed, a leguminous desmodium which grows wild in Central America, that contains 19 percent of protein and makes excellent chicken feed. When chopped and added to poultry rations it works as well as or better than alfalfa. The finding should stimulate poultry raising in Latin America and possibly elsewhere in the world where supplies of protein feed derived from animal products are extremely limited. (From USDA)