9-1-1927

Spring Seeding Time for Wheat, Oats, Barley and Flax in South Dakota

A.N. Hume

C. Franzke

E.W. Hardies

BULLETIN 227 SEPTEMBER, 1927

SPRING SEEDING TIME
FOR
WHEAT, OATS, BARLEY & FLAX
IN
SOUTH DAKOTA

AGRONOMY DEPARTMENT
AGRICULTURAL EXPERIMENT STATION
OF THE
SOUTH DAKOTA STATE COLLEGE OF
AGRICULTURE AND MECHANIC ARTS

BROOKINGS, S. D.

Schedule of Seeding Dates in South Dakota

The following succession of dates for seeding spring wheat, durum wheat, oats, barley and flax may be used as a schedule on farms in South Dakota. The crops have been listed in the order that they should be seeded on any given farm under an assumption that all the crops would be produced on one farm. This, of course, is not generally the case. In practice, for instance, both spring wheat and durum wheat are not likely to be produced on one farm and in many instances farms producing both oats and barley omit the production of flax.

Oats is put down following durum wheat rather than before for the reason that the data seem to indicate a wider range of time during April when a short delay in seeding oats causes little or no reduction in yield. Likewise, barley is put down before flax although the optimum date for both is April 15, because the data indicate that any delay in seeding barley after the optimum date, April 15, will cause comparatively greater loss than a similar delay in seeding flax.

Name of Crop	Optimum date of seeding in South Dakota	Based on date of seeding trials at	Pages
Spring Wheat	March 15	Highmore Brookings	4, 5
Durum Wheat	April 15	Brookings Highmore	6
Oats	April 1 to May 1	Highmore	11
Barley	April 15	Highmore Brookings	10, 11
Flax	April 15	Eureka Brookings Highmore Cottonwood	7, 8, 9

Spring Seeding Time for Wheat, Oats, Barley and Flax in South Dakota

A. N. Hume, Clifford Franzke, and E. W. Hardies

Substantial gains can be secured in the yield of the principal small grain crops and flax merely by seeding these crops at the optimum date rather than by seeding them earlier or later. In order to show the gains in yield and in money returns which may be secured by seeding at the right time, Table I is constructed. It is computed by finding the average acreage of several crops in South Dakota for recent years, and computing the value of additional yields which might be produced from such an acreage providing all crops seeded were put in at the optimum date rather than on a date two weeks later.

Table I.—ESTIMATED GAIN IN BUSHELS AND DOLLARS OF WHEAT, OATS, BARLEY AND FLAX IN SOUTH DAKOTA IF SOWN AT OPTIMUM DATE RATHER THAN TWO WEEKS LATER.

Name of Crop	Acreage of Crop	Avg. difference in yield in favor of seeding on optimum date rather than two weeks later	Bushels gained by optimum seeding, as compared with later date	Farm price per bushel used in making estimate	Avg. farm value of Amt. gained by optimum seeding
Spring wheat	1,396,000	2.4	3,350,400	1.24	$4,154,496
Durum wheat	843,333	8.2	6,915,330	1.24	8,575,009
Oats	2,550,666	4.4	11,222,930	0.35	3,928,025
Barley	827,666	5.7	4,717,696	0.54	2,547,556
Flax	527,333	0.9	474,599	2.13	1,010,896

Although the amounts in the last column are bound to be estimates, they are based on data secured from actual statistics of crop acreage and crop production experiments. They therefore approach as nearly as possible the increase in income which is involved in the one factor of date of seeding. It is evident from the amounts for the several crops and the total which they would make that the time of seeding is very important, whether considered from the standpoint of the state at large or that of any individual producer.

This bulletin records the average yields of spring wheat, durum wheat, barley, oats, and flax which have resulted from putting in these crops at earlier or later dates in the spring in South Dakota through the years following 1911.

The nature of the average yields secured leaves little doubt of the fact that an optimum date of seeding exists for these various crops, and further that such average date may be determined within smaller variations. These variations will include those caused by differences of temperature and rainfall, in different seasons, and no doubt in different localities north and south and east and west. It is possible to arrange the seeding of these crops in the spring around these optimum dates; such management is worth while financially because it costs no more, usually less, to put in seed on these optimum dates thus securing the greater returns for equal or smaller labor.

Seeding at Optimum Time Is Important

Crops must not only be seeded in order that they may be harvested; they must be seeded at a time of year when they will grow. Although such a fact is common knowledge, the importance of putting crops in at exactly the optimum time is not always realized.

This bulletin is written to summarize results from seeding spring crops at earlier and later dates in order that the OPTIMUM dates may be discovered, which may be expected to result in the highest yields.

The crop yields which result from seeding at any date are influenced by numerous factors of soil, temperature, humidity. These factors or their combinations go to make up the optimum date. Analysis of these separate factors is not attempted here. The present summary will furnish a basis for any later attempt in that direction.

Dates for Seeding Spring Wheat and Durum

The trials of seeding spring wheat and durum covering the longest succession of season and therefore the most dependable ones have been carried out at Highmore experiment farm. Supplementary trials have been carried out at Brookings. Trials with spring wheat and durum have been conducted separately in order to discover whether there would be marked variation in optimum date of seeding for these two general classes of wheat.

Table II shows the yields from seeding spring wheat at earlier and later dates at Highmore. The yields come usually from 1/50 acre plots seeded with a drill in the same manner as larger fields. These trials have usually been carried out in duplicate or triplicate and therefore the yields in the table represent averages of two or more of these plots or small fields; but in a smaller number of instances the yields come from one single plot. In all cases, the yields for a given variety are only subject to the differences that come about through differences in dates of seeding.

Table II.—YIELDS OF SPRING WHEAT FROM PLOTS, SEEDED AT EARLIER AND LATER DATES IN GIVEN YEARS (HIGHMORE).

	Yield (Bu. per Acre) from Seeding on Given Date						
Year	March 1	March 15	April 1	April 15	May 1	May 15	June 1
1912	----	----	1.9	1.3	----	----	----
1913	----	----	3.3	2.3	2.0	0.8	----
1914	----	15.3	15.3	13.5	9.3	0.9	----
1915	----	----	28.3	24.2	14.7	----	----
1916	----	21.7	13.3	13.3	3.0	----	----
1917	----	----	----	19.1	17.5	8.7	----
1918	15.0	16.8	16.8	15.8	14.1	9.2	----
1919	----	----	13.1	12.1	6.5	3.1	----
1920	----	----	15.0	----	7.5	5.0	----
1921	8.3	9.6	8.3	5.4	2.5	----	----
1922	----	----	20.8	24.2	11.7	8.3	1.9
1923	----	----	20.0	20.0	11.0	5.8	0.0
1924	----	33.3	35.8	28.8	19.3	13.3	----
Avg.	11.7	19.3	16.0	15.0	9.9	6.1	0.9

The average yields in Table II are arranged in graphic form in Figure I, for easier examination.

Examination of Table II and Figure I of yields reveals the advantage of seeding spring wheat as early as March 15 under conditions represented at Highmore. Two years when seedings were put in as early as March 1 the yields were lower than those put in the same year two weeks later. Higher or equal yields were secured from seeding March

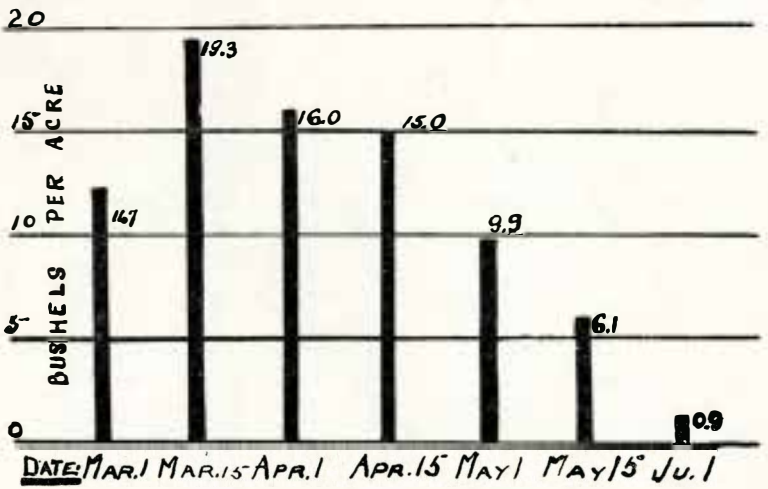

Fig. 1.—Average yields of spring wheat secured from seedings at various dates at the Highmore sub-station.

15 than from seeding April 1 in four cases out of five. **With due allowance for variations that arise from an incomplete number of plots, the yields for the several years put down in Table II and the averages put down in the line at the bottom, indicate the optimum date for seeding spring wheat at Highmore to be March 15.** Observations of spring wheat seeding throughout South Dakota indicate that the average yields at Highmore may be used to point out the general advantage of seasonably early seeding.

At Brookings, limited tests were carried out through three successive years with seedings at three dates, the earliest being April 21. Nevertheless the highest yield at Brookings was secured from seeding on the earliest date, and in that respect the indication of the importance of seeding seasonably early for conditions at Brookings is in agreement with results from Highmore. Yields from seeding spring wheat at Brookings on three successive dates through three years are reported in Table III.

The indications which the South Dakota Experiment Station has available from Highmore and Brookings, in the nature of numerical yields, indicate that the highest yields of spring wheat are secured from seeding March 15. Some variation in time must occur in carrying out any outdoor work but within the limits of possibility the seeding of spring wheat **March 15** in South Dakota may well be adhered to as a farm practice.

Table III.—YIELDS OF SPRING WHEAT FROM SEEDING AT BROOKINGS AT EARLIER AND LATER DATES.

Year	Avg. Yield in Bu. per Acre, from Seeding on Given Date		
	April 21	May 1	May 15
1913	26.7	30.6	3.3
1914	12.7	---	---
1915	29.1	13.3	4.1
Avg.	22.8	21.9	3.7

Date for Seeding Durum Later Than Spring Wheat

Table IV will in part answer the question suggested earlier in this bulletin; namely, whether yields per acre indicate that durum should be seeded at a different optimum date from that of spring wheat.

Table IV.—YIELDS OF DURUM FROM PLOTS SEEDED AT EARLIER AND LATER DATES IN GIVEN YEARS (HIGHMORE)

Year	Yield (Bu. per Acre) from Seeding at Given Date						
	March 1	March 15	April 1	April 15	May 1	May 15	June 1
1913	---	---	2.0	2.0	1.0	0.3	---
1914	---	23.3	25.8	24.3	13.8	1.2	---
1915	---	---	36.7	40.0	25.0	---	---
1916	---	32.5	28.3	25.0	18.3	---	---
1917	---	---	---	23.5	15.0	5.8	---
1918	8.3	20.8	10.8	8.3	10.8	10.0	---
1919	---	---	21.1	21.6	15.8	7.1	---
1920	---	---	25.8	---	14.6	6.6	---
1921	11.3	10.4	11.7	8.3	2.5	---	---
1922	---	---	28.3	36.7	21.7	15.0	7.1
1923	---	---	28.3	25.3	24.1	17.0	5.8
1924	---	---	22.5	25.6	25.8	10.0	---
Avg.	9.8	21.8	21.9	21.9	15.7	8.1	6.4

Examination of Table IV and the averages in the lowest line will make it evident that almost equally high yields are produced from dates covering the period March 15 to April 15, and that yields from earlier or later seeding at Highmore are much reduced.

Table V.—YIELDS OF DURUM FROM PLOTS SEEDED AT EARLIER AND LATER DATES IN GIVEN YEARS (BROOKINGS).

Year	Yield (Bu. per Acre) From Seeding at Given Date		
	April 15	May 1	May 15
1913	10.8	4.5	3.3
1914	14.6	10.0	0.0
1915	Hail	Hail	Hail
Avg.	8.5	4.8	1.1

An examination of Table V of average yields of durum from seeding at earlier and later dates at Brookings in three years makes it evident that the highest yield was produced from the earliest date of seeding in the particular experiment, namely April 15.

The data available at present indicate that the optimum date for seeding durum in South Dakota is not later than April 15. It is well to note in this connection that there was almost no falling off in yield from seeding as much as two weeks or one month earlier.

Seed Flax on Time

An increasing number of flax growers appreciate that the crop needs to be seeded on an optimum date in order to secure a maximum yield. There was some reason formerly for seeding flax late in the spring, when it was often put in on new breaking after the seeding of other crops was finished.

The yields in Table VI are taken from flax seeded on "old ground" at successive dates at Highmore.

Table VI.—YIELDS OF FLAX FROM SEEDING AT EARLIER AND LATER DATES (HIGHMORE).

	Yield in Bu. per Acre from Seeding Flax at Given Date							
Year	March 1	March 15	April 1	April 15	May 1	May 15	June 1	June 15
1914	—	—	9.6	2.7	6.3	2.3	—	—
1915	—	—	—	29.9	23.2	26.8	—	—
1917	—	—	—	8.3	7.6	14.7	3.4	—
1918	0.0	0.9	6.0	6.0	8.0	9.8	3.7	1.3
1919	—	—	7.1	7.8	4.0	7.6	1.1	—
1920	—	—	10.8	—	15.8	8.1	—	—
1921	0.0	0.0	3.1	2.2	4.5	—	—	—
1922	—	—	11.6	12.5	10.7	6.3	3.4	—
1923	—	—	6.2	16.0	3.6	1.1	3.6	—
1924	—	—	12.0	10.0	8.2	8.6	—	—
1925	—	6.2	4.0	2.7	2.2	0.9	0.0	—
1926	—	0.0	0.0	0.0	0.0	0.0	0.0	—
Avg.	0.0	1.8	7.0	8.9	7.8	7.8	2.2	1.3

The average yields in Table VI are put down in graphic form in Figure II.

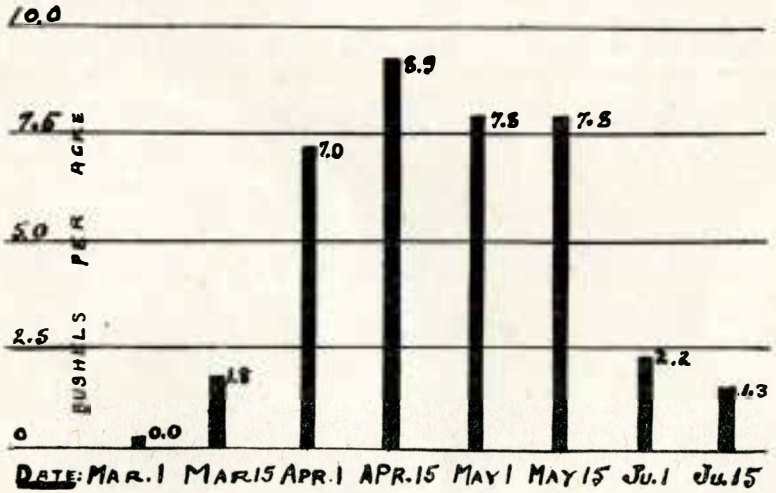

Fig. 2.—Average yields of flax secured from seedings at various dates at the Highmore sub-station.

The averages of Table VI and Figure II show that the highest average yield of flax at Highmore was secured from seeding April 15; furthermore, that the average yield was reduced appreciably and regularly by seeding earlier or later than that date. In the two years when flax was seeded before April 1 at Highmore, the yield was practically nothing and also all flax seeded as late as June 1 or later produced only nominal yields.

These yields from Highmore may be compared in Table VII with the yields from Eureka resulting from earlier and later seeding of flax at the experiment farm there.

Table VII.—YIELDS OF FLAX FROM SEEDING AT EARLIER AND LATER DATES (EUREKA).

	Yield in Bushels per Acre from Seeding Flax at Given Date				
Year	April 15	May 1	May 15	June 1	June 15
1913	0.4	2.0	2.1	2.7	0.2
1914	11.6	9.3	5.0	4.5	1.0
1915	18.5	11.4	8.6	6.4	4.6
1916	18.4	18.2	14.8	12.8	12.1
1917	5.8	5.5	5.5	0.4	0.4
1918	0.4	0.2	1.1	0.1	0.1
1919	3.7	4.4	4.8	0.0	0.0
1920	10.3	13.5	8.9	0.4	8.7
1921	3.9	5.0	9.8	10.3	4.6
1922	17.7	16.2	14.2	9.6	8.7
1923	13.9	12.1	8.9	6.8	3.0
1924	10.0	11.4	13.3	7.1	3.6
1925	6.2	6.6	4.6	2.1	1.1
1926	0.0	0.0	0.0	0.0	0.0
Avg.	8.6	8.3	7.3	4.6	3.4

The yields in Table VII with the averages in the lower line make it evident that higher average yields of flax are secured at Eureka as at Highmore from seeding on April 15 than on any later date; and further that the decreases in yield caused by seeding later are very appreciable.

Table VIII.—YIELDS OF FLAX (BU. PER ACRE) FROM SEEDING AT EARLIER AND LATER DATES (COTTONWOOD).

	Yield per Acre from Seeding Flax at Given Date				
	April 15	May 1	May 15	June 1	June 15
1913	1.7	0.8	0.0	0.0	0.0
1914	1.6	1.4	1.5	0.0	0.0
1915	8.4	7.1	5.9	8.9	10.9
1916	2.4	2.1	1.4	2.4	2.4
1917	3.1	2.9	1.3	3.0	3.7
1918	—	5.4	3.9	4.1	6.2
1919	3.1	—	0.5	0.0	0.0
1920	6.1	2.0	0.4	—	—
1921	—	—	—	0.1	0.2
1922	2.1	0.8	1.4	1.2	0.7
1923	8.6	8.7	6.8	14.3	15.4
Avg.	4.1	3.5	2.3	3.4	3.9

The tabulated flax yields reported in Table VIII were produced by seeding at Cottonwood Experiment farm at earlier and later dates, and they indicate that higher yields are secured from earlier seeding than from later seeding in the western area represented by Cottonwood, as well as in areas farther east.

The wide variation in yield from seeding flax at different dates at Cottonwood is due in large part to soil differences between plots where the flax grows. Those who have had opportunity to observe these plots very closely know that although they are level and uniform in contour, great variations are evident in such characters as alkali content and no doubt others.

Six years out of eleven the highest yield of flax from these plots resulted from the earliest date of seeding; April 15. It appears from Table VIII that the highest average yield resulted from the earliest seeding at Cottonwood.

Upon consideration of all the various trials made with seeding flax at earlier and later dates at three points—Cottonwood, Highmore, Eureka —through fourteen years, the optimum date for seeding flax as indicated by average yields per acre is April 15.

In view of the fact that the highest yield was secured at all three places from the seeding of April 15, it may be justifiable to find the average reduction in yield which occurs from seeding flax earlier or later than this optimum date. Table IX is a table of these average differences.

Table IX.—AVERAGE DIFFERENCES IN (BUSHELS PER ACRE) BETWEEN YIELDS FROM SEEDING AT OPTIMUM DATE AT THREE SOUTH DAKOTA POINTS, IN FAVOR OF SEEDING AT OPTIMUM DATE, APRIL 15.

Name of Field Where Yields were Secured	Difference in Bushels per Acre in Favor of Seeding April 15, Instead of on Given Date							
	March 1	March 15	April 1	April 15	May 1	May 15	June 1	June 15
Eureka	--	--	--	0.0	—0.3	—1.3	—4.0	—5.2
Cottonwood	--	--	--	0.0	—0.6	—1.8	—0.7	—0.2
Highmore	—8.9	—7.1	—1.9	0.0	—1.1	—1.1	—6.7	—7.6
Average	—8.9	—7.1	—1.9	0.0	—0.7	—1.4	—3.8	—4.3

Table IX may serve to emphasize the advantage of seeding flax at an optimum date in South Dakota as definitely as it can be ascertained from the data now available. The grower of flax in many parts of the state might make no great error if he interpreted the lower line of average yields in Table IX as follows:

The optimum date of seeding is April 15, and the highest yield is secured from seeding at that time. Seeding two weeks later causes a reduction in yield of 0.7 bushels per acre; seeding four weeks later 1.4 bushels reduction; six weeks later 3.8 bushels; and eight weeks later 4.3 bushels reduction.

Seeding flax earlier than the optimum date of April 15 in South Dakota caused rapid reduction in yield until the seeding of March 1 (at Highmore) produced no yield at all.

Seeding Time for Barley

Every small grain and flax crop can not be seeded on the same day on a single farm, nor perhaps not in the same week, nor part of a month like April. In general farm practice, not all small grain crops are usually raised on any one farm. Nearly all the barley in South Dakota is produced in the east-central counties.

Data are available from seeding barley at earlier and later dates at Highmore experiment farm, and also at Brookings. The data from Highmore are put down in Table X.

Table X.—YIELDS OF BARLEY (BU. PER ACRE) FROM SEEDING AT EARLIER AND LATER DATES, AT HIGHMORE.

	Yield per Acre from Seeding Barley at Given Date						
Year	March 1	March 15	April 1	April 15	May 1	May 15	June 1
1914	----	----	54.2	44.1	43.0	----	----
1915	----	----	57.7	71.7	61.4	----	----
1916	----	56.7	50.8	49.2	33.8	----	----
1917	----	----	----	37.8	36.5	21.9	----
1918	20.8	14.6	27.1	17.7	10.4	18.7	----
1919	----	----	31.5	27.9	25.3	25.1	----
1920	----	----	31.2	----	36.5	13.5	----
1921	20.8	21.8	16.7	20.8	6.8	----	----
1922	----	----	33.3	44.8	37.5	38.5	22.9
1923	----	----	25.0	48.9	38.5	47.8	26.8
1924	----	35.4	38.0	30.2	39.6	23.9	----
Avg.	20.8	32.1	36.6	39.3	33.6	27.1	24.9

The averages in Table X are put down in graphic form in Figure III.

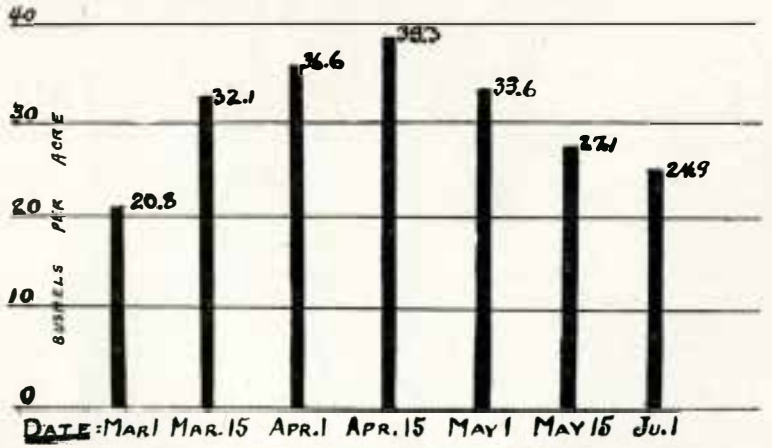

Fig. 3.—Average yields of barley secured from seedings at various dates at the Highmore sub-station.

A number of yields for dates of seeding are not available in Table X. It may also be well to mention that the yields put down in the table for 1914, 1915 and 1916, are made up of averages of yields from four

separate barley varieties, though not all four were produced in all years. In 1916, the highest yield was produced from seeding March 15, which was earlier than the average optimum date as found in the lowest line of the table. It was found from weather records that the mean temperature for March, 1916, at Highmore was higher than ordinarily occurs. **The highest average yield of barley shown in the lowest line of Table X computed for eleven years, 1914-1924, was produced from seeding April 15.**

Optimum Date of Seeding Barley at Brookings

Barley was seeded on earlier and later dates at Brookings in three separate years. Unfortunately the earliest date of seeding included in the tests was April 20. Table XI gives a summary of yields from seeding on three successive dates at Brookings in three successive years, 1913-1915:

Table XI.—ANNUAL AND AVERAGE YIELDS RECORDED ON A DATE OF SEEDING TEST WITH BARLEY AT BROOKINGS, 1913 TO 1915.

	Yield in Bushels per Acre on Given Date		
Year	April 20-25	May 1-7	May 15-20
1913	60.4	50.0	56.3
1914	53.1	55.2	25.0
1915	66.6	33.3	29.1
Avg.	60.0	46.2	36.8

Table XI indicates in the lowest line that the highest average yield of barley was secured from seeding as early as April 20-25, at Brookings. This agrees substantially with the data from the previous trials indicating that the optimum date at Highmore is April 15.

The Optimum Date for Seeding Oats

Trials with seeding oats at earlier and later dates are available at Highmore experiment farm, continuing through the years 1917-1924. The yields of oats in bushels per acre from these dates of seeding are summarized in Table XII.

Table XII.—YIELDS OF OATS IN BUSHELS PER ACRE FROM SEEDING AT EARLIER AND LATER DATES AT HIGHMORE.

	Yield per Acre from Seeding Oats at Given Date						
Year	March 1	March 15	April 1	April 15	May 1	May 15	June 1
1917	----	----	----	46.4	39.8	28.9	----
1918	23.4	43.4	26.6	20.6	29.7	29.7	----
1919	----	----	45.3	49.4	41.4	30.5	----
1920	----	----	45.3	----	50.0	32.8	----
1921	16.4	18.8	18.8	14.1	12.5	----	----
1922	----	----	47.3	48.4	54.7	50.0	31.3
1923	----	----	51.6	64.0	59.3	53.1	31.2
1924	----	59.3	60.9	50.0	54.6	44.0	----
Avg.	19.9	40.5	42.3	41.8	42.8	38.4	31.3

A critical examination of Table XII will make it evident that although the highest actual yield of oats put down in the lowest line comes under

the date of May 1; the yields produced from seeding on April 1 and April 15 were not much lower. On the basis of this indication one may seed oats as early as April 1, and continue seeding any time through the month of April without loss in yield from the delay. Additional trials will be carried on with dates of seeding oats in order to ascertain whether the optimum time should be stated more definitely than simply to put it down for the month of April.

LIST OF AVAILABLE BULLETINS

Bulletins

132. Effects of Alkali Water on Dairy Products.
147. Effect of Alkalai Water on Dairy Cows.
158. Proso and Kaoliang for Table Use.
159. Progress in Plant Breeding.
161. Winter Grain In South Dakota.
162. First Annual Report of Vivian Experiment and Demonstration Farm.
163. Comparative Yields of Hay, from Several Varieties and Strains of Alfalfa in South Dakota.
164. Making Butter and Cheese on the Farm.
165. Corn Silage for Lambs.
166. Factors Affecting Milking Machines.
168. Breakfast Foods and Their Relative Value.
170. Quack Grass Eradication.
171. Cream Pasteurization.
173. Sugar Beets in South Dakota.
174. Sorghums for Forage in South Dakota.
175. The Role of Water in a Dairy Cow's Ration.
177. The Sheep.
179. Emmer in South Dakota.
180. Root Crop Culture.
181. Corn Culture.
182. Corn Silage for Steers.
183. Barley Culture in South Dakota.
184. Yields from Two Systems of Corn Breeding.
185. Ice on the Farm.
186. Corn Families in South Dakota.
187. The Influence of Length of Wheat Heads on Resulting Crops.
188. Relative Values of Feed Proteins for Dairy Cows.
189. Corn and Millet Silage for Fattening Cattle.
190. The Webspinning Sawfly of Plums and Sandcherries.
191. Water as a Limiting Factor in the Growth of Sweet Clover.
192. Rations for Pigs.
193. Soybeans in South Dakota.
194. Acme Wheat.
195. Feeding Dairy Cattle.
196. Potatoes in South Dakota.
197. Milk Testing in Practice.
198. The Influence of Purebred Dairy Sires.
199. Sunflower Silage for Steers. Smutted Corn for Silage for Pregnant Cows.
200. Winter Wheat in South Dakota.
201. Some Experiments with Spring Wheat in South Dakota.
202. The Chinch Bug.
203. Pasteurization of Market Milk in the Glass Enameled Tank and in the Bottle.
204. Varieties of Corn for South Dakota.
205. Some Tentative Statements Concerning Fowld's Hulless Oats.
206. Purebred Dairy Sires.
207. Forage Crops for Lambs.
208. Flowers Every Day in the Year.
209. Potatoes as a Feed for Fattening Pigs.
210. Some Chemical Characteristics of Soft Corn.
211. Weeds and Their Control.
212. Effects of Feeding Extremely Wide Rations to Horses.
213. Growing Flax in South Dakota.
214. Correlations Between Length of Spike and Culm in Wheat.
215. Soybeans for Dairy Cows.
216. Improving Winter Rations for Pigs.
217. The Wheat-Stem Maggot.
218. Bacterial Flora of Normal Cow's Udders.
219. Soft Corn for Fattening Cattle.
220. Date of Seeding Winter Rye.
221. Commercial Varieties of Canning Peas.
222. Wheat in South Dakota.
223. What Farmers Think of Farming.
224. Plant Introductions.
225. Farm Production and Prices.
226. Profitable Farming Systems.

NOTE:—We do not add the names of non-residents to the regular mailing list, but Bulletins can be had on application.