

IOWA AGRICULTURAL EXPERIMENT STATION
AGRONOMY SECTION

Farm Crops

Grow Spring Wheat in Iowa

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The average production of wheat in Iowa for the five-year period 1911 to 1915, inclusive, was 14,834,950 bushels per year. In 1916 and 1917 the yield was 6,732,000 and 5,597,000 bushels. The state is therefore more than an entire crop behind at the present time, a serious shortage for one state to be responsible for when wheat may win or lose the war.

The dry weather in the late summer and fall of 1917 made the sowing of winter wheat so difficult that little over 200,000 acres was sown, less than half of a normal acreage. In many sections of the state severe winter conditions have made the production from this acreage decidedly doubtful. If the best of weather conditions prevail from now until harvest we may not expect more than an average yield of 20.9 bu. per acre. This will give 4,226,068 bu. of winter wheat whereas Iowa normally produces over 10,000,000 bu.

MUST SEED OVER TWICE THE USUAL ACREAGE.

In order to produce the 15,000,000 bushels which the country has a right to expect from Iowa in 1918, the spring wheat acreage for 1918 must be enormously increased. With a normal crop this could be produced on a little less than two and one-half times the area that is ordinarily sown to spring wheat, or four and one-half times the acreage produced last year.

Table I. Average production of winter and spring wheat in Iowa, 1911 to 1917, with the estimated acreage required to secure a normal production in 1918.

YEAR	WINTER WHEAT			SPRING WHEAT			Total Annual Bu. Produced
	Acres	Yield per Acre	Bushels	Acres	Yield per Acre	Bushels	
Average 1911-1915	501,864	20.9	10,533,327	322,457	13.6	4,305,263	14,834,950
1916	296,220	15.6	4,621,073	172,421	12.2	2,111,771	6,732,844
1917	133,930	18.0	2,397,560	173,460	18.0	3,199,820	5,597,380
Estimated for 1918	202,209	20.9	4,226,068	780,065	13.6	10,608,882	14,834,950

PRICE OF \$2.20 MAKES SPRING WHEAT PROFITABLE.

With the guaranteed price of \$2.20 for No. 1 northern spring wheat in Chicago, the increased acreage expected of Iowa would work no hardship on the farmer. While spring wheat has heretofore been recognized as one of the least profitable of Iowa's grain crops, the government price, raising the average farm value from 97 cents to \$1.94 per bu., has raised the average acre value above that of oats. After allowing for the difference in cost of production the profits are still fully equal to, if not above, those from oats.

FEW VARIETIES SUITABLE FOR IOWA.

The kinds of spring wheat grown advantageously in Iowa are very few. They are classed as hard spring wheats and are represented over the state by the blue stem, fife and velvet chaff varieties.

Table III shows the results obtained from the variety test of the spring wheats at the Iowa station for the years 1914 to 1917, inclusive.

Of the varieties of wheat grown in Iowa, Marquis and Early Java are undoubtedly the best. All of the varieties reported in Table III,

Table II. Average yield and value per acre of Iowa's cereals at average price paid from 1912 to 1916 and at the prices prevailing Dec. 1, 1917.

CROP	Av. Yield Per Acre	ACRE PRICE	
		At 5-Year Av. Price	At the Prices Dec. 1, 1917
Winter Wheat.....	20.4 bu.	\$20.19	\$40.18
Corn.....	36.3	20.13	35.50
Barley.....	26.9	16.14	30.93
Spring Wheat.....	13.7	13.29	26.97
Rye.....	15.9	12.40	25.12
Oats.....	37.2	13.76	22.69

with the exception of Marquis, have been grown at this station for a considerable number of years. Owing to seasonal differences the ten-year average yields are much higher than those shown for the last four years, and during the longer period, the velvet chaff wheats, Early Java and Minnesota 188, have rather consistently outyielded the other kinds. However, since the introduction of Marquis, four years ago, it will be noted that this wheat has outyielded the other kinds several bushels per acre.

Marquis, a comparatively new variety in the corn-belt states, is very similar to fife in growth and appearance. It is somewhat earlier and has given higher yields. It approaches the velvet chaff varieties in weight per bushel and in the later tests at the Iowa station has

Table III. Average rate and dates of seeding and ripening, height, and per cent lodged; and the annual and average yields per acre and weight per bushel of the varieties of spring wheat grown at the Iowa station, 1914 to 1917, inclusive.

CLASS AND VARIETY	BLUE STEM	VELVET CHAFF		FIFE	
	Minn. No. 169	Early Java	Minn. No. 188	Minn. No. 163	Marquis
SEEDING					
Rate.....	2	2	2	2	2
Date.....	4-18	4-18	4-13	4-18	4-13
RIPE					
Date.....	7-30	7-28	7-23	7-29	7-26
HEIGHT					
Inches.....	44.5	43.0	42.0	44.0	40.0
LODGED					
Per Cent.....	0	0	0	0	0
YIELD PER ACRE					
1914.....	12.7	11.7	13.7	12.0	12.0
1915.....	13.0	15.3	14.0	12.3	21.0
1916.....	6.7	6.3	5.7	7.0	11.7
1917.....	27.0	29.7	32.0	24.3	34.3
Average.....	14.8	15.7	16.3	13.9	19.7
WEIGHT PER BU.					
1914.....	48	53	50	46	51
1915.....	46	50	48	46	47½
1916.....	47	55	50	48	51½
1917.....	56	59½	58	55	59½
Average.....	49.2	54.4	51.5	48.7	52.3

Canada in 1892. The purification and distribution was made from the experimental farms at Ottawa.

Velvet chaff wheats are sometimes called bearded red fife. They differ from the original fife in that the head is bearded and the kernel is usually somewhat shorter. The origin of the varieties of this group which are grown extensively in Iowa is somewhat doubtful. They are old and no one seems to have any definite knowledge of their introduction. In the earlier years these wheats were looked upon with much disfavor by the millers. Processes have been perfected in recent years that have removed the miller's dislike for these wheats and they are not discounted now, as formerly. The government grades make no discrimination against velvet chaff wheats. The group is

represented in Iowa by Preston, Minnesota No. 188 and Early Java varieties.

The fife wheat was introduced into America by David Fife, of Canada, about 1842. It is a descendant from a single kernel which Mr. Fife received in a shipment from Glasgow. Supposing that the entire lot was spring wheat he sowed it as such but matured only one plant in the whole field. The seed from this plant when sown the following year showed great hardiness and rust resistance. Mr. Fife increased and distributed this variety in later years. It has been known under various names as Red Fife, Scotch Fife, Glasgow, Glendon Fife and Minnesota No. 163. The head is beardless and the chaff is white and smooth. The kernel is red and hard.

The blue stem ordinarily grown in the state is Hayne's Blue Stem or Minnesota No. 169. This variety has a beardless head, the chaff of which is covered with fine hair giving a blue gray color to the plant until it is nearly ripe. This wheat has not been as popular as the fife or the velvet chaff as it is somewhat less hardy and later in maturing.

DURUM VARIETIES UNSATISFACTORY.

The Iowa Agricultural Experiment Station has made several attempts to grow durum wheat. Each attempt has proved a failure. These varieties are all late in maturing and are subject to all the mishaps that may come to a spring wheat crop. The durham wheats were introduced into the middle west 1898 to 1900 by the U. S. Department of Agriculture. This introduction was made in an endeavor to enlarge the area of hard spring wheat production in the great plains region. The wheats that were introduced were selected with particular reference to their drought resistance. It is not to be wondered at that they are ill suited to the more humid Iowa climate.

The durum wheats are of a different structure and require different milling processes than the other wheats. They must, therefore, never be mixed in shipment.

SEED WHEAT DOES NOT "RUN OUT."

Many wheat growers have been led to believe that seed wheat "runs out" and that the seed should be changed frequently. A large number of experiments conducted to determine the truth in regard to this matter, all show quite definitely that seed doesn't "run out."

It is safe for the farmer to assume that seed grown in his home community will produce a crop in every way equal to that which he will secure from seed of the same variety shipped from a distance. There are but two excuses for the importation of seed; first, a shortage of home grown seed, and second, in order to procure a variety better suited to the community. New varieties should always be tried on a small scale, as it is only occasionally that a superior kind is found.

WELL-FITTED GROUND INCREASES YIELD.

The best yields of spring wheat are obtained from an even distribution of uniform plants. Methods that promote uniformity in the field all help in the production of increased yields. Uniformity in seed, soil, seed bed, and distribution of seed spell the difference between profit and loss in the growing of spring wheat.

Thoro preparation of the seed bed is one of the most important items in securing uniformity in the field. Fall plowing is to be desired on most soils whenever it is possible, as greater uniformity can be secured in this manner than by any kind of spring cultivation. Greater increases in yield of spring wheat than for other crops are invariably secured from this method of preparation.

SEEDING ON DISKED GROUND SATISFACTORY.

On many Iowa farms fall plowing is impracticable, as the land is to be used for spring wheat produces corn during the previous season. It is the common farm practice to fit land of this kind with the disk. From six years' investigation in the great plains area the U. S. Department of Agriculture, comparing this method of preparation with other methods, makes the statement that:

"Disked corn ground has given consistently high yields. This, to-

gether with the low cost of preparation for wheat, has resulted in its uniform showing of the greatest profit per acre at those stations where it has been possible to raise wheat at a profit, and the least loss at those stations where wheat was raised at a loss."

Note should be made of the fact that fall plowing is comparatively more expensive in the great plains area than in the corn belt and also that differences in yield are less than are expected in Iowa.

Whether the land is plowed or disked, a firm seed bed with 2 to 3 inches of well-pulverized earth on top is to be desired. Ground for wheat is fitted fully as well but not so deep as for corn and with a very firm soil below the surface. All stalks and stubble will decay and make plant food if thoroly worked into the surface soil, leaving nothing on top to dry up and blow away. Whether this is done with a shallow plowing or by disking or other methods must be left to the individual farmer to determine according to the machinery that he owns.

EARLY SEEDING IMPORTANT.

The sowing is done as early as possible. The fact that spring wheat is one of the later maturing grain crops suggests that it be as far advanced as possible before hot summer weather. Spring wheat responds to early sowing as readily as do oats. It is the common opinion that spring wheat will withstand more freezing after sprouting, and as a result spring wheat is usually put in before oats or barley.

DRILLING INCREASES SPRING WHEAT YIELDS.

Drilling has in several tests proved to be the most profitable method of sowing spring wheat. In order to obtain an even distribution of uniform plants the seed must not only be sown evenly over the land, but must also be planted at a uniform depth. The drill is the only practical method of securing uniform depth. In Minnesota and the Dakotas tests have been conducted which show an increase for drilling over broadcasting of from 2 to 5 bushels per acre.

Table IV. Increase in yield per acre obtained from drilling over broadcasting at the Minnesota and Dakota stations.

Station	Years Tested	Increase in Yield
North Dakota	2	2 bu.
South Dakota	2	2 bu.
Minnesota	3	5 bu.

DO NOT COVER SEED TOO DEEP.

The depth to which the seed should be planted will vary with different soils. Loose sandy soil will allow somewhat deeper drilling than the more compact prairie soils. A safe rule to follow is to set the drill so that the seed will be placed just at the bottom of the loose soil mulch where heat, air and moisture are supplied most abundantly. All of these three are essential to plant growth and none can be limited without injury to the plant. The tendency in drilling is to put the seed in too deep while limiting the supply of air in broadcasting much of the seed is planted too shallow, thus limiting the water supply.

SIX TO EIGHT PECKS OF SEED PER ACRE.

From 6 to 8 pecks of seed per acre is the common rate of seeding spring wheat in the corn-belt states. Experiments that have been conducted show a profitable gain from increasing the amount of seed to as much as 2 bushels per acre, but increases in seed beyond that point have not proved economical. It is probable that a rate varying from 6 to 8 pecks per acre will give the most profitable returns on the average Iowa farm.

SPROUTED AND WEATHERED GRAINS CAUSE LOSS.

Spring wheat should be cut as soon as it is ripe. Storms affect the mature crop much more severely than they do the winter varieties. Careful shocking is very essential. Sprouted and shock-weathered grain caused by poor shocking may reduce the value of the crop more than the difference in cost between good and careless work.