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Wheat for Profit

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Ralph E. Johnston

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WHEAT FOR PROFIT

PRODUCING HIGH QUALITY WHEAT
FOR HIGHEST MARKET PRICE.

CLASSES AND VARIETIES OF WHEAT.

WHEAT DISTRICTS OF SOUTH DAKOTA.

WHEAT FOR PROFIT

By
E. W. Hardies
Ralph E. Johnston

Wheat ranks as one of the important agricultural products of South Dakota. The soil and climatic conditions are favorable for the production of high quality wheats. Other factors are the choice of varieties, good cultural methods, crop rotation and the control of diseases.

The varieties of wheats grown in this state are very numerous but those adapted to a certain locality are rather few.

The amount of rainfall in a region and the weather during the growing and ripening periods, are factors that largely determine the class of wheat grown. South Dakota grows common or "bread" wheats and durum or "macaroni" wheats. The following illustrates how these classes are divided:

Wheats Grown in South Dakota

I. Common or "bread"  II. Durum or "macaroni"
1. Hard spring 1. Amber
   a. Marquis a. Kubanka
2. Hard winter 2. Red
   a. Turkey

This circular is a summary of Experiment Station Bulletin 220, "Varieties of Wheat in South Dakota", by The Agronomy Department, State College, Brookings, South Dakota, A. N. Hume, Agronomist.
The two main divisions are bread and macaroni wheats. Each of these may be divided into classes which contain a number of varieties. The factors desirable in a variety are high yielding ability, good milling qualities, resistant or escaping of diseases and stiff straw which prevents lodging.

Varieties of Hard Spring Wheat

**Marquis.** This is the most important variety of the hard red spring wheats. In 1919 it was estimated that Marquis wheat constituted about sixty percent of the hard red spring wheats grown in the country. It has excellent milling and breed making qualities and is used as the standard of comparison in spring wheats. It matures fairly early and has a dense awnless spike. The kernels are red, short and hard. It is resistant to stinking or covered smut but susceptible to black stem rust. In years when stem rust is not an important factor it produces high yields of excellent quality.

**Kota.** This is a bearded variety later in maturi-
ty than Marquis. The favorable points of this wheat are that it is resistant to a number of forms of black stem rust and also more drought resistant than Marquis. It is about equal to Marquis in mill-
ing and baking qualities. It has a weak straw which permits it to lodge easily on rich or wet soils. It is also susceptible to orange leaf rust, stinking and loose smuts. The kernels are red, hard and long, resembling winter wheats.

**Ruby.** A variety very similar to Marquis except shorter in straw and maturing several days earlier, which occasionally causes it to escape rust.

**Quality.** A hard white spring wheat, matures early and consequently escapes rust in some years. Varies.
considerable in milling qualities, some samples mill good while others are poor. Not grown commercially.

Ceres. A promising variety resulting from a cross between Kota and Marquis. Has given good results at the experiment stations but has not been tried sufficiently for recommendation in S. Dak.

Varieties of Durum Wheats

Durum wheats are more drought and alkali resistant than the common wheats. Under humid conditions they produce soft starchy kernels.

Kubanka. This is the most popular durum variety grown. It has excellent milling qualities, is tall and medium late in maturity. Kubanka is used as the standard for comparison in durum wheats.

Acme. A variety very similar to Kubanka from which it was selected, except that it is more rust resistant and inferior in milling quality. Some millers object to this wheat because they maintain it produces a dull gray macaroni.

Mondd. D-1. Very similar to Acme.

Nodak. This is a new variety very similar to Kubanka and has given good results where tried.

Pentad. D-5. "Rustproof". A red durum, very resistant to rust, but of very poor milling quality. This variety brings the lowest price on the market and a mixture of red durum in amber durum lowers the market value of the amber durums.
Hard Red Winter Wheats

Although South Dakota does not rank high in the production of these wheats, a considerable area of the southeastern part of the state can grow winter wheat successfully.

Turkey. A high yielding winter hardy and drought resistant variety. The most popular and most widely distributed winter wheat grown. The kernels are dark red and hard and have excellent baking and milling qualities.

Kanred. This variety differs from Turkey in that its outer chaff or glumes have a longer beak. It is slightly earlier and more rust resistant than Turkey.

Kharkof. Almost identical with Turkey in outward characteristics.

Minturki. A very winter hardy variety, but of poorer milling quality than Turkey.

Wheat Variety Yields

A study of Table I will show that at Brookings, the highest yields were secured from winter wheats. This was done by seeding the wheat in the corn in early September with a one-horse drill. The corn stalks catch considerable snow during the winter and keep the wheat from winter killing. The durum wheats yielded more than the red spring wheat but the quality of durum wheat is nearly always poor. Durum wheats produce the best quality of grain in regions that receive less rainfall than Brookings.
At Highmore the durum wheats yielded consistently higher than the hard spring and winter wheats. The climatic conditions there are adapted to the production of good amber durum.

Table I.

Yields in Bushels per Acre of Varieties of Hard Spring, Hard Winter and Durum Wheats at Highmore and Brookings.

<table>
<thead>
<tr>
<th>Variety</th>
<th>1920</th>
<th>1921</th>
<th>1922</th>
<th>1923</th>
<th>1924</th>
<th>1925</th>
<th>Ave.</th>
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</table>
Table II

Yields of Hard Red Spring, Durum and Hard Red Winter Wheats at Eureka.

<table>
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<tr>
<th>Variety</th>
<th>1920</th>
<th>1921</th>
<th>1922</th>
<th>1923</th>
<th>1924</th>
<th>1925</th>
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<td>10.8</td>
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<td>26.6</td>
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<td>16.9</td>
</tr>
<tr>
<td>Kharkof</td>
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<td>17.8</td>
<td>9.5</td>
<td>11.1</td>
</tr>
</tbody>
</table>

At Eureka the durum wheat outyields both spring and winter wheats. Usually a crop of good quality is produced at this station. The rainfall is too low and the winters too severe for the production of winter wheats.

Wheat Districts in South Dakota

The following map shows in a general way the distribution of wheat classes in South Dakota.
District I. The Hard Red Winter Wheat section of the state. It is here that the winter wheats are of first importance and can be successfully grown in a rotation with corn. By using a one-horse drill and seeding the wheat in the corn stalks during the first half of September, very little winter killing results. The Missouri, James, Vermillion and Sioux river valley lands produce excellent yields. On the experiment station at Brookings, Table I, winter wheats when planted in the corn field in fall, yield about double the amount secured from hard spring wheat and seldom is there a total loss due to winter killing. On the plots where winter wheat was planted on plowed ground, there is always more or less winter killing and in severe years nearly total.

The hard red spring wheats are second in importance in this district, especially along the western border. The growing of durum wheat should not be attempted because of the soft starchy kernels that develop under the rainfall of this district. The entire district except the northern part, lies in the section receiving twenty-five or more inches of rainfall annually.

District II. Hard Red Spring Wheat District. In this district, the hard spring wheats predominate. Winter wheats can be grown along the southern and eastern border and along the river valleys farther north, when proper cultural methods are used. Along the northern and western borders of this section where the rainfall is less and at higher elevations, durum wheat gains in importance.

District III. In the remaining part of the state the soil and topography vary so much that no one type of wheat is adapted to the entire region. Taking the area as a whole, the hard red spring and durum wheats are about equal in importance.
The hard spring wheats are grown mostly on the lower fertile valley lands of the eastern and central parts of this district, wherever the soils, rainfall and general growing conditions are favorable. The durum wheats are best adapted to the entire western part of the district except at the foothills of the Black Hills and in the valley lands. An examination of Table II shows that the durum wheats outyield all other classes at the Eureka substation.

Factors Affecting Market Grades and Value

In order to get the highest market price, it is not sufficient to grow only the desirable varieties. The grade and consequently the price can be raised by good cultural methods and better management.

Under the federal grades of wheat, the factors determining the grades are: weight per bushel, per cent of moisture, foreign matter other than dockage, damaged kernels and the per cent of other wheats. From this it will be seen that very often a farmer can raise his grade of wheat by improving one of the above factors.

Mixtures

A very common cause for the lower grading of wheat and consequently a lower price, is the mixture of various kinds of wheats produced in one field. The common spring wheats and durum wheats are used for different purposes and require different milling processes. The common wheats sell for a higher price than the durum, but when a common wheat is mixed with a durum wheat, the mixture sells for less than the pure durum. Likewise a mixture of durum in common wheat lowers its market value.
Hard red spring wheat of grade No. 1 cannot have more than two per cent, and grade No. 2 cannot have more than five per cent, of durum wheat. All other grades of hard red spring wheat cannot have more than ten per cent of wheats of other classes. The wheats of other classes grown in this state are Durum, Hard Red Winter and White wheat. An example of a wheat of the White class is Burbank's Quality. This variety of common spring wheat has hard white kernels and a mixture of it in our hard red spring wheats materially reduces their market value. There is a great danger that Quality wheat will get mixed with the red wheats, and thus be a source of low grading wheat and consequently lower prices.

A bad mixture that is already too common, is red durum in amber durum. The red durum is of decidedly inferior milling qualities and the presence of this variety in an amber durum results in a lower price. After a mixture is once grown it spreads rapidly through the exchange of seed or by the threshing machine. Excellent wheat often is discounted severely because of being mixed with varieties of other classes. A pure variety is best both for seed and for the market.

Bad Weeds in Wheat

Weed seeds cause a large loss to grain growers annually. Their presence not only take up valuable space in cars but those seeds which are not readily separated reduce the market grade. Some weed seeds such as cockle, kinghead, rye, vetch and wild rose are extremely difficult to separate and produce bread low in quality and color. Wild oats is another weed which can be largely eliminated by good farming practices.
In localities where rye is grown it is almost certain to become mixed with wheat. These two crops cannot be separated by any machine when once they are mixed. Rye in wheat is a bad mixture from the milling standpoint and should be avoided. Under poor farming systems where small grains are grown continuously without preparing the seed bed properly, rye when once established, reseeds itself and is a constant cause of low grading wheat. This large loss can be overcome by using a rotation of crops. A cultivated crop or a legume hay or pasture crop will get rid of the volunteer rye.

**Improve Wheat by Crop Rotation**

Crop rotations and the growing of legumes also help to bring more profit from wheat growing. It rids the land of volunteer rye, wild oats and many other weeds and also helps to produce better quality wheat. In order to secure a premium for any commodity, it is necessary that this material have excellent qualities. South Dakota has the climate and soil that will produce good wheats if the growers will plant clean, pure, unmixed seed of the proper varieties and use good farming practices.

"Yellow Berry"

It is a common observation where wheat has been grown continuously on a field for a number of years, that not only is the yield lower than on fields where crop rotation has been practiced but that also the wheat is of a poorer quality. The kernels are softer and have a higher per cent of "yellow berry". "Yellow berry" has been attributed to two causes. One is the temperature and rainfall during the ripening period and the other is the fertility of the soil. We cannot control
the weather but we can do much to keep up the soil in good fertility. Leguminous crops, such as alfalfa and sweet clover, add nitrogen to the soil. It is this nitrogen that helps to produce dark, hard and vitreous kernels for which the millers are paying a premium. Many millers are now buying wheat upon the protein content. Keeping the soil fertile in part by addition of legumes to good crop rotations helps produce high protein wheat.

Loss from Smut

Smut in the grain causes enormous losses which can be prevented by proper treatment of seed. This is a simple and inexpensive operation which brings large returns for the time and money required. South Dakota Extension Circular No. 238 gives a discussion of how to treat seed grains for smut. This circular can be secured free by writing to the Extension Service, State College, Brookings, S. D.

Getting Good Seed

Another demand for good pure wheat is for seed purposes. Good seed must have large, well filled plump kernels possessing the following characteristics: (1) be true to name, (2) free from mixtures of varieties and of other wheat classes, (3) free from foul material and weed seeds, (4) free from scab, heat or frost damaged kernels, (5) free from smut and (6) must have good germination. Too little attention is given to the seed that is planted. "Like begets like" is an old adage. One cannot expect to harvest bumper crops of the best grade by using poor, almost worthless, seed. A good way to produce good wheat for seed is to have a separate field free from weeds. Prepare the land well and
Plant wheat that meets the qualifications described. The seed from this small field can be stored separate and used for general sowing next year. Small varietal mixtures can be detected and easily rogued. The South Dakota Crop Improvement Association cooperating with the Extension Department, list sources of good seeds and assist farmers in locating them.

**Summary**

Plant wheats of the best adapted varieties that possess good commercial qualities. Of those, Marquis and Kota are the favorite hard spring wheats, Kubanka the favorite durum and Turkey the favorite hard winter wheat.

Avoid mixtures of varieties and classes. A pure variety pays best.

Use good cultural practices to have a minimum of weed seeds in the grain.

Treat the seed to prevent smut.

Use a good crop rotation including alfalfa or sweet clover to help produce high protein wheats.

Seed plots or fields should be maintained by a sufficient number of farmers to provide sources of pure seed of the best varieties.