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Winter wheat.

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Atkinson: Winter wheat.

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IOWA AGRICULTURAL COLLEGE
EXPERIMENT STATION

AMES, IOWA

Department of Agriculture

WINTER WHEAT

AMES, IOWA
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WINTER WHEAT.

JAMES ATKINSON.

There is a growing demand throughout the state of Iowa for information relating to the growing of winter wheat. This is explained by referring to crop statistics. In 1885 there were 56,854 acres of winter wheat grown in the state, as against 1,294,733 acres of spring wheat, while in 1898 there were 192,056 acres of the former and 1,226,510 acres of the latter. In other words, while the acreage of winter as compared with that of spring wheat was only one-twentieth in 1885, it had increased until it amounted to one-sixth in 1898. The yield per acre throughout the state with but few exceptions has been larger from the winter than from the spring wheat crop. This has been borne out by the Station results, in fact the yield per acre from the winter wheat has nearly doubled that of the spring for a number of years. Our experience goes to prove that there is no difficulty in getting a yield of from 30 to 60 bushels per acre when proper attention is given to preparing the soil and the right kind of seed used. It is true that winter conditions are too severe at intervals, but a season like 98-99 is the exception and not the rule. The following table gives a summary of the Station results during the last ten years:

1891.....	40.3	bushels	per	acre
1892.....	25.0	"	"	"
1894.....	48.0	"	"	"
1895.....	54.7	"	"	"
1896.....	48.6	"	"	"
1898.....	43.8	"	"	"
1900.....	55.3	"	"	"
Average.....	45.1			

Owing to the fall of '92 being very dry, there was no fall wheat seeded, neither was there any sown in '96. Only once in this period was there extensive winter-killing. This hap-

pened during the season of '98, when the crop in this locality was entirely killed.

The Station wishes to encourage farmers to grow a larger area of winter wheat. The spring wheat belt is creeping northward, leaving in its trail lands admirably adapted to the growth of this crop. It furnishes one of the best nurse crops with which to establish grasses and clovers, for the reason that it draws lightly upon the supply of soil moisture as compared with other cereals, and is ready to harvest before the warm weather sets in, the season most liable to injure young clover. By giving it a place in the rotation, labor is distributed more evenly throughout the year, seed time coming as it does when work is slack in the fall, and harvest immediately after haying. Besides, it is one of the most profitable crops on the farm, the Station wheat being worth upwards of \$30.00 per acre this season.

A VARIETY TEST.

Nineteen varieties were seeded September 2nd, 1899. These were procured from the surrounding states and Canada and were all chosen because of their supposed hardiness. Of this number fourteen survived the winter, ten of these being partially winter-killed while the remaining four passed through the winter without the slightest injury. The following table gives the names and the yield per acre:

NAME OF VARIETY	YIELD PER ACRE
Turkish Red	55 3 bushels
Bearded Effe	55.0 "
Buda Pesth	53.0 "
Bulgarian	51.3 "
Minnesota Wheat	42.3 "
Siberian	31.3 "
Kentucky Giant	26.0 "
Canadian Hybrid	20.0 "
Red Cross	18.3 "
Dawson's Golden Chaff	16.0 "
Early Ripe	15 3 "
Standard	14.0 "
Red Clawson	12.0 "
Hybrid Prolific	11.3 "

The first four mentioned in the above table are very similar in their habits although procured from widely different sources. They are all characterized by having a fine and rather stiff straw, a short bearded head with white chaff, while the grain much resembles the hard red spring wheats. As the Turkish Red still takes the lead in point of yield we continue our recommendation of it as being best suited to the conditions of the state. While we consider this a very hardy variety, we also advise procuring seed that has been grown in the state as far north as possible, as the crop from such seed is more hardy than if grown from southern seed.

As to the remaining ten varieties given in the table we need only say that while some of them were superior to the hardy varieties in appearance, being much longer and fuller in the head, yet the fact that they were winter-killed leads us to pass over them briefly and insert them more for comparison than for their intrinsic worth.

MILLING QUALITIES.

In 1898 three representatives of the two classes of winter wheat, the hard and the soft, were submitted to three experts, F. N. Fowler, Ames; N. Sellhorn, Boone; and Doud & Rogers, Boone, Ia., for examination as to their milling qualities. These were marked on the basis of one hundred being a perfect milling wheat. The following table gives the average of the three markings:

Turkish Red.....	.99
Buda Pesth.....	.97
Bulgarian.....	.96
Hybrid Prolific.....	.90
Early Ripe.....	.82
Kentucky Giant.....	.85

The first three were classed as "hard" wheats and were almost equal to the best spring wheat while the last three were classed as "soft", the milling quality of which was considerably lower.

BALD VERSUS BEARDED VARIETIES.

Many persons object strongly to handling bearded grain of any kind and there is a growing demand for hardy bald varieties. If such is on the market we have not been able to procure it. Our experience in this matter for this year is summarized in the following table:

Bearded (average 6 varieties).....	47.5 bushels per acre
Bald (average 8 varieties).....	17.3 " " "

The above result points emphatically in favor of the bearded wheats, though it must not be understood that all bearded wheats are hardy. Two varieties that were completely winter-killed belonged to this class. We do not believe that this hardiness is in any sense connected with the protection afforded by the beards, but rather to other characteristics of which the bearded head in the majority of cases is an outward indication.

PREPARING SOIL FOR WINTER WHEAT.

The large results of this year we attribute partially to a favorable season and partially to the care taken in preparing the soil. Our variety test was conducted on a summer fallow but as the fallow is not practical under conditions existing throughout the state we dwell but briefly on the manner of its preparation. Wheat grown on a soil prepared by fallowing is apt to be too rank, the first result of which is lodging, a condition which prevailed this year and to a considerable degree decreased the yield.

Wheat after Rape, Buckwheat, Flax and Millet. Land similar to that upon which the varieties were grown was divided into four sections and seeded with the above crops in the spring of '99. These were removed and weighed in the month of August and the following table gives the yield per acre:

Rape (green).....	22 tons
Millet (dry weight).....	5.7 "
Buckwheat.....	26 bushels
Flax.....	17 "

After removing these crops the soil was plowed to a depth of six inches and worked down by the use of the harrow and roller until firm. Harrowing was continued once a week until time of seeding. This we consider very important in a dry season as it conserves moisture and prepares the land in the best possible manner for the germination of the seed. Wheat was sown on this ground September 9th with the Press drill at the rate of five pecks per acre. The following table gives the yield per acre of the wheat succeeding the various crops:

After Rape.....	59.8 bushels
“ Flax.....	58.0 “
“ Buckwheat.....	55.3 “
“ Millet.....	54.7 “

Turkish Red seed was used in this experiment and it will be noticed that the yield is larger than that grown on the summer fallow in the variety test. As was said before this may be accounted for by the fact that wheat on the fallow lodged while the other did not, and consequently filled better.

Preparing Oat stubble for wheat. Four acres of oat stubble on higher upland were prepared for wheat in the following manner. Early in August the ground was plowed and afterwards worked down with harrow and roller. It was harrowed once a week until September 11th, when it was seeded with the Press drill at the rate of five pecks per acre. A small portion of the land was manured at the rate of ten tons per acre. This caused the crop to lodge in places so that the yield was practically the same as that which received no manure, being between forty and forty-one bushels per acre. As a general rule we would not advise manuring for winter wheat. If land is in condition to grow a large crop of corn, and this followed by oats or barley or in fact any of the crops mentioned above, it will be in prime condition for a crop of wheat if the stubble is plowed soon after harvest and then prepared as described above.

Date of Seeding. This will vary to some extent with

conditions. If the Hessian fly is in a locality seeding should not take place until after the middle of September, but where no trouble is experienced with this pest we advise earlier sowing. We had most excellent results this year from seeding September 2nd, 9th and 11th. Our varieties were seeded in duplicate September 24th. Germination was slow after this date and very little fall growth was produced, the result being that they were all winter-killed so badly that they had to be plowed under in the spring. A good growth in the fall seems to give the crop just the kind of vigor to carry it over the winter. If the growth is too rank in the spring the crop may be run over with the mower, the cutter-bar being set high, or it may be pastured in the fall or spring.

We do not wish to convey the impression that wheat will not succeed if sown as late as September 24th. Sometimes conditions are such that late seeding is a necessity owing to lack of moisture during the early part of September. An experiment was begun at the Station in the fall of 1897 when moisture conditions were favorable throughout the month. The following table gives the yield per acre on the different dates:

DATE OF SEEDING	YIELD PER ACRE
September 11th	46.1 bushels
" 16th	44.0 "
" 21st	43.0 "
" 25th	41.1 "
" 30th	37.8 "

In view of the experiments conducted along this line together with the results of the Station work generally we recommend sowing as soon as there is moisture enough to germinate the seed after the first week in September.

SEEDING DOWN WITH WINTER WHEAT.

The success we have had in getting a catch of clover with wheat leads us to recommend it very highly for this purpose. It is the practice of some to sow the timothy seed with the wheat in the fall and the clover in the spring. There is one objection to this practice and that is in the case

of winter-killing one loses the cost of his timothy seed as well as that of his wheat. The safest practice is to sow both early in the spring, as soon as the soil is in a fit condition to use the seed barrow with some degree of comfort, after which the ground should be well harrowed. This will benefit the wheat crop and insure a perfect covering of the newly sown seeds. Two or three strokes with the harrow is not too much at this time.

WINTER OATS.

After a number of years' experience we have to report that we have not been able to find a variety of oats that will withstand the winter climate. A study of every variety that has been given a place on our trial grounds reveals the fact that they are in no way hardier than the ordinary spring oat, the first severe frost in every case having completely killed the crop. We mention this in connection with our winter wheat report for the reason that there is considerable seed distributed through the state each year by means of loud advertising, and of course the result must be very disappointing. There may be hardier varieties which we have not obtained and which might be at variance with this statement, but the varieties grown were advertised as having been tested under severe northern conditions where they proved to be successful. We hope that farmers will purchase cautiously such seed, a pound or so being sufficient to give a variety a trial.

HESSIAN-FLY.

A few reports have come to the Station from time to time concerning destruction wrought by this insect. As it is more apt to thrive where both spring and winter wheats are grown every precaution should be taken to keep it stamped out. This may be done by burning the spring wheat stubble as soon as the crop is removed followed by deep plowing. If the insect is known to be in a locality farmers should unite in destroying it in the manner indicated.

