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Barley Growing

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AGRICULTURAL EXPERIMENT STATION
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FARM CROPS



Ames, Iowa

Barley Growing

BY H. D. HUGHES AND L. C. BURNETT

Iowa has never grown a large acreage of barley in proportion to that of oats in spite of the somewhat higher acre value of the barley crop either for feed or for market. The acreage of oats has steadily increased thruout the last 25 years, while that of barley—originally small—has gradually decreased. But as the low acre value of oats has become relatively lower, with the replacement during the past 12 years by motor power of more than one-third of all the horses in cities and on farms, farmers in increasing numbers are becoming interested in crops which may advantageously replace a part of the present large oat acreage. Apparently barley is the most promising one available for this purpose (see fig. 1).

In it we have a crop requiring the same cultural practices, it fits perfectly into our cropping systems, furnishes a grain possessing both feeding and marketing value; and besides, is one of the best nurse crops to use in seeding clovers or alfalfa.

Heretofore, Iowa farmers apparently have preferred to take a somewhat lower return from oats than to endure the barbed beards found on all those varieties of barley which gave satisfactory yields. Now, with the advent of the barbless varieties, capable of as large yields as the commonly grown barbed awned sorts, and the assurance that in the immediate future we shall be able to control the important barley diseases with dust treatments, increased acreage of this crop might be anticipated even without the additional appeal that is made by the increasing comparative returns secured from barley over those from oats.

Barley and Oats as Cash Crops

We are particularly interested in the relative acre value of barley and oats since any material increase in barley acreage will probably be at the expense of the oat acreage. The average annual acre value of barley has exceeded oats almost every year of the past 28-year period. During the past five years the difference in the acre value of these two crops has become increasingly greater, so that by 1927, when the average acre of oats had a gross farm value of \$13.86, barley had a value of \$20.99, a difference of \$7.13 per acre in favor of the barley crop. The difference in acre value for these two crops thru a 28-year period was \$3.15 in favor of the barley (see fig. 2).

For the period, 1900 to 1927, inclusive, the average gross acre

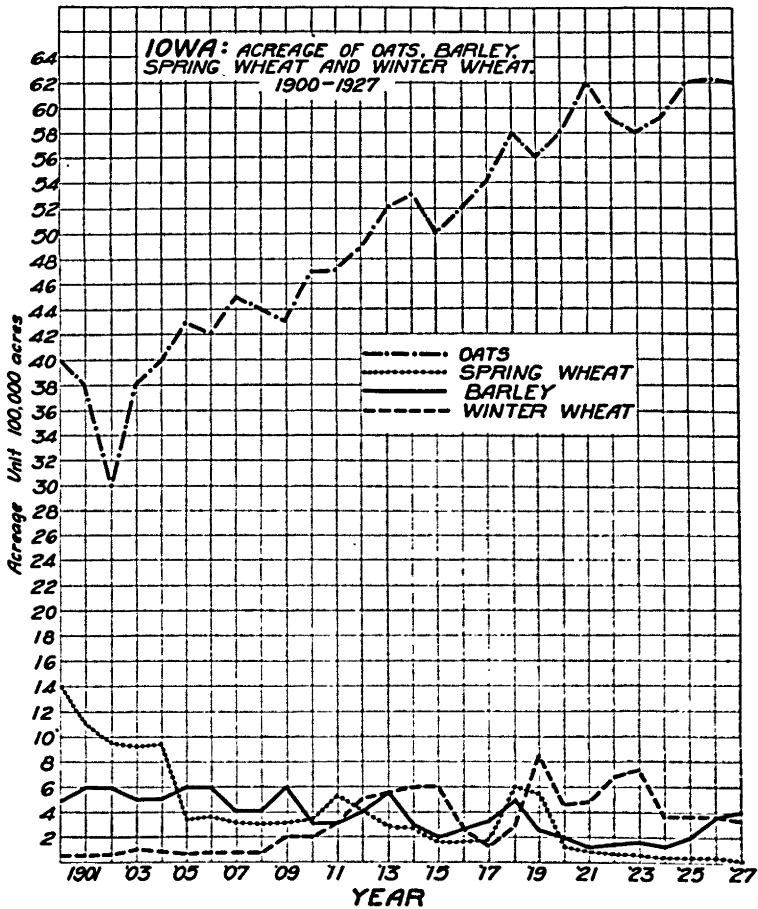


Fig. 1. Acreage of oats, barley, spring wheat and winter wheat in Iowa, 1900 to 1927, inclusive.

values of the small grain crops in Iowa were as follows: winter wheat, \$19.44; barley, \$15.65; spring wheat, \$14.21; and oats, \$12.50.

Barley vs. Oats—Acre Production

Because most Iowa farmers who may be interested in barley are more concerned with its production for feed than for market, it should be noted that the average acre of Iowa barley is producing over 25 percent more grain than the average acre of oats. The oat grain consists of 30 percent hull, which has practically no feeding value, while the barley grain has 15 percent of hull; therefore, compared on the basis of pounds of kernel per acre,

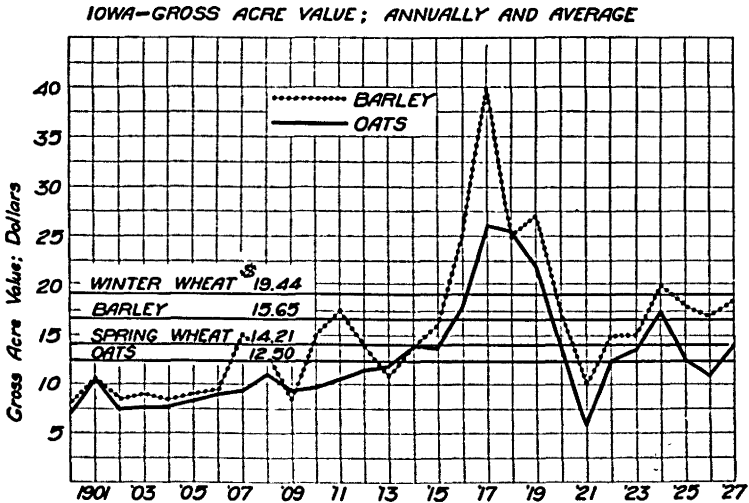


Fig. 2. Average gross acre value of winter wheat, barley, spring wheat and oats for the period 1900 to 1927, inclusive; also the annual acre value of barley and oats.

it is found that the average acre of barley produces over 50 per cent more grain than the average acre of oats.

Soil and Climatic Adaptation

Barley is very sensitive to soil variations. It does best on porous, well-drained soils, and is not suited to sandy soils or those low in fertility. With proper drainage, heavy soils produce good yields and clay loams are probably best adapted to it. Barley is generally considered more sensitive to an acid condition of the soil than any of the other small grains.

By far the larger part of the present Iowa barley acreage is found in the northern and western parts of the state; only a very small acreage occurs in the south central and southeastern districts. Over 20 times as much per county is found in north-western Iowa as in the southeastern part of the state. This difference in acreage apparently is due to the combined influence of soil and climate.

Doubtless the present distribution of barley in the state is indicative of the adaptation of the crop to different districts. It would appear, however, that acreage alone is not a safe guide since the yield data indicate that the barley seeded in south central Iowa, where the acreage is very small, has produced fully as well in proportion to oats as in the northwestern part of the state. On the other hand, in east central Iowa, where the barley acreage is relatively large, the advantage of barley over oats is less marked. (See fig. 3).

Barley in Small Grain Mixtures

Mixed grains bring a lower price when sold than grain which has been kept free of mixture. Even small amounts of admixture lower the market price while larger amounts result in the grain being classed as "mixed grain," with no grade given and a severe cut in price. Barley should never be mixed with oats when it is to be sold on the market.

When all of the grain crops are to be fed on the farm where they are produced, the growing of grain mixtures may be profitable. Experimental plantings at a number of Cornbelt experimental stations indicate that it is possible to secure somewhat larger yields per acre from a mixture of certain grains than when these grains are grown pure.

In order for a mixture of barley with oats to be profitable, it is necessary that varieties be used which are well suited to the locality and which give satisfactory yields when grown alone; also varieties are needed that will mature at approximately the same time. Thruout Iowa this is usually accomplished by mixing a six-rowed variety of barley, such as the Oderbrucker or Manchuria, and any of the early varieties of oats such as Kherston, Iowa 105, or Iowa 103. If either the oat variety or the barley variety is not adapted it has usually been found that the yield of the mixture is not more than the yield of a crop of the better adapted of the two grains.

The use in mixtures of 1 bushel of barley and 1½ bushels of oats per acre seems to be best suited to Iowa conditions. Spring

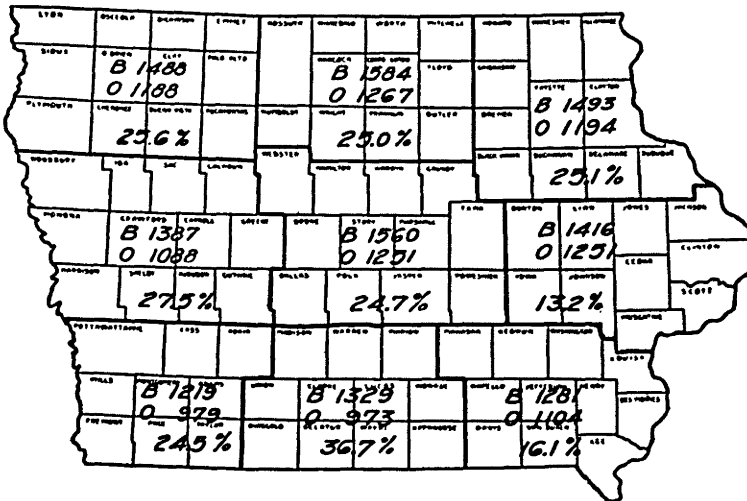


Fig. 3. Pounds barley (B) and oats (O) per acre by districts, average 1922 to 1927, inclusive; also percent increase in yield of barley over oats.

wheat is poorly adapted to growing in the state and while often the growth of this grain apparently is better when mixed with oats than when grown alone, there is no apparent reason for including it in mixtures.

None of the stations where experimental work has been done on the problem of mixed grains recommends mixing a small amount of barley with oats or a small amount of wheat with barley.

The advantage of mixing barley with oats is not limited to the larger yield which may be secured, but the crop is reported to handle much more satisfactorily when grown mixed.

Variety Comparisons at Ames

In making inquiry about varieties of barley, Iowa farmers usually ask for a high yielding beardless sort. No such varieties are known. All of the varieties of barley which are adapted to use in this state, therefore the high yielding ones, are heavily bearded and are of the six-rowed type. This type of barley has been represented in variety comparisons at Ames by the Oderbrucker, Wisconsin No. 5, Manchuria, and O. A. C. No. 21 varieties and it will be noted from table I that all of these give very similar yields—approximately 30 bushels per acre as the average for a 10-year period. It will also be noted that the beardless varieties gave yields approximately 10 bushels per acre less than the six-rowed bearded kinds.

In all of our grains that are represented by both bearded and beardless types, high production is usually associated with the bearded types. Many of these bearded types also appear to be more resistant to disease.

A few varieties, which in other portions of the United States have given excellent results, in the upper Mississippi Valley seem to be so badly affected by stripe and other barley diseases

TABLE I. ANNUAL AND AVERAGE ACRE YIELDS, IN BUSHEL, OF NINE BARLEY VARIETIES GROWN AT THE IOWA AGRICULTURAL EXPERIMENT STATION, 1913 TO 1923.

Variety	Oderbrucker	Wisc. No. 5	Manchuria	O.A.C. No. 21	Frankish Brewing	Hanna Brewing	Black Hulless	White Hulless	Success Beardless
1913	34.0	41.3	33.9	35.5	40.7	36.8	32.2	27.0	26.3
1914	43.9	35.0	35.8	34.2	31.7	16.9	22.6	18.9	19.6
1915	12.7	11.4	9.5	16.5	12.6	10.0	9.1	4.0	5.2
1916	36.5	35.8	32.4	32.0	23.6	18.7	28.3	21.4	26.0
1917	49.2	49.2	52.9	50.8	54.5	42.0	31.2	21.3	24.2
1918	35.4	34.5	31.2	28.8	29.3	27.9	16.3	24.6	17.5
1920	30.0	32.9	32.5	33.7	26.7	12.5	21.2	23.3	20.0
1921	19.6	19.4	19.2	20.7	20.8	18.8	13.9	12.0	14.5
1922	18.3	18.3	15.4	20.0	15.8	12.1	17.7	19.6	20.8
1923	29.6	36.2	34.2	34.6	34.2	27.5	28.8	35.0*
Av.	30.9	31.4	29.7	30.7	29.0	22.3	22.1†	19.1‡	20.9

Note: †Bushels of 48 pounds.

‡Bushels of 48 pounds. 19.1 = 9 year average, not grown in 1923.

*Celsius substituted for Success in 1923.

that the yields have been no higher than those of the varieties ordinarily grown. In the northwest and in the mountainous regions where these diseases are not prevalent some of these varieties have made exceptionally high yields. With the introduction of the dust treatments for barley diseases, which are now being perfected, it is practically assured that these diseases can be controlled and it is likely that a large portion of the barley acreage in Iowa will change to these more productive sorts as soon as this is accomplished. Among these varieties, probably the Trebi and Minsturdi are the best known.

New Smooth Awned Varieties

The beard on the ordinary barley plant is barbed, making the crop very disagreeable to harvest. While the bearded varieties grown in America have all been of this kind, the farmers of Southern Russia and Asia Minor have for nearly 50 years grown varieties with smooth awns, that were not disagreeable to handle. These foreign varieties are not well adapted to our Mississippi valley conditions.

In view of the above conditions the United States Department of Agriculture, in cooperation with the Minnesota Agricultural Experiment Station, began in 1912 the problem of combining by hybridization, the desirable character of our six-rowed varieties with the smooth awned character. The result of this work has been the development of three smooth awned varieties; Velvet, Comfort and Glabron.

Velvet has been tested and approved over a large part of Minnesota. In 1927, about 50 acre lots of Velvet barley were tried by Iowa farmers, and of these, 34 sent in complete returns. The average yield of the 34 acres of Velvet was 36.43 bushels per acre. The average yield of the home grown variety against which these 34 were tested was 32.98 bushels per acre, a difference of 3.45 bushels in favor of the Velvet. The combination of smooth awns and high yield is making this variety very popular.

Comfort is comparatively early. It seems best adapted to Nebraska conditions and will doubtless be well received in southwestern Iowa.

Glabron is slightly later and has not yet been tested over so wide a range of conditions as the others.

In addition to the three Minnesota smooth awned varieties, the Wisconsin barbless and Michigan black barbless give promise of satisfactory yields.

Seedbed and Time of Seeding

The preparation of the seedbed is very important in the profitable production of barley. Best returns are secured when the soil is well pulverized and the stalks and stubble worked down into the seedbed where they will decompose and form plant food.

Whether this is done with a shallow plowing or by discing remains for the farmer to determine according to his equipment.

Barley should be sown early, as soon as freezing weather is past. The fact that barley is an early maturing crop has led some to suppose that early sowing is of little importance. It is true that relatively better crops may be obtained with late seeding of barley than from late seeding of other cereals, but experiments all show that the best yields are obtained from crops sown as soon as the danger from freezing weather is past. It is good practice to sow oats as soon as the ground can be worked and to follow with the barley as soon as the oats are in.

Rate of Seeding

The amount of seed required per acre varies but little with different soils and seasons. In four trials conducted at the Iowa Station from 1913 to 1916, the highest average yield was obtained from the use of 2 bushels of seed per acre. The average yields obtained from 1, 1½, 2, 2½ and 3 bushels of seed per acre were 25.1 bu.; 26.3 bu.; 28.6 bu.; 26.2 bu.; and 25.6 bu., respectively. The losses resulting from the use of more than 2 bushels of seed per acre amount to the reduced yield plus the extra seed sown.

Method of Seeding

Most of the barley grown in the state is sown broadcast just as the great bulk of the oat acreage is sown. As has been the case with oats, method of seeding comparisons have shown that when all other conditions are equal larger yields are secured from drilling than from broadcasting.

The advantage of drilling has been demonstrated in six out of nine trials at the Iowa station during the period, 1912 to 1926, with an average lead of three bushels per acre for the drilled seedings. The percent of gain from drilling is about the same with the barley as it has been with oats. However, as has been the case with oats, most farmers have found that other factors than the effect of the method of seeding on yield determine the method of seeding which can be used most satisfactorily.

Harvesting Barley

The care of the barley crop at harvest time has not received sufficient attention at the hands of the average Iowa farmer, and this is particularly true when barley is grown for market. Barley has a very short harvest period. It may be harvested most profitably when in the hard dough stage. Not overly large shocks, about 10 bundles well capped, will give the best results. The crop should be threshed or stacked as soon as the shocks are well cured since much damage often occurs from bad weather while the grain is in the shock. If any of the crop is to be sold for milling, it will pay to thresh the cap sheaves by themselves.