SMALL GRAINS IN SOUTHERN ARIZONA

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Wheat and Barley Most Valuable Small Grains—Correct Cultural Practices For Arizona—Varieties to Plant and When to Plant Them

THE Arizona wheat crop for 1927 was one of the largest ever produced and the price received made it a profitable crop for most growers. Arizona has a higher average production per acre than any other state with a single exception, the high freight rates favor the Arizona grower because the production is less than the demand, and methods of baking are being developed which are putting the high quality white wheats of the Southwest on a par with the best bread wheats of the country. These things together with the fact that wheat and other small grains find a ready market should cause the farmer to seriously consider them for a place in his cropping system.

Wheat and barley are the only small grain crops of importance in southern Arizona although oats is grown to a limited extent. Barley is an excellent feed crop and is being used extensively for feeding to dairy cows and other livestock. Good yields are the rule and the price is usually maintained at fairly high levels. Barley is also one of the important winter pasture crops. It is commonly sown in alfalfa fields early in October and the combination of barley and alfalfa makes an excellent winter pasture. Barley hay is also one of the important hay crops of the Southwest.

The Agronomy Department of the University of Arizona has been conducting tests with small grains for a number of years. These experiments include variety tests, date and rate of seeding tests and tests dealing with the irrigation and fertilizing of small grains. Some of the results obtained together with certain recommended practices are given in this article. Yields reported are from tests conducted at the Salt River Valley Experiment Farm at Mesa, Arizona.

Variety Tests with Wheat and Barley

The following table gives the comparative yields secured from different wheat varieties:

Wheat Variety Test

Variety	Number of comparable tests	Yield per acre
Early Baart	6	29.9 bu.
Australian White or Pacific Bluestem	2	27.5 bu.
Sonora	2	25.8 bu.
California Club	4	24.1 bu.
Hard Federation	3	23.3 bu.
Marquis	6	22.8 bu.

Early Wheat on a Ranch in the Salt River Valley

While the yields indicated are not as high as many reported, it must be remembered that they are average yields for several tests. In order to have the varieties comparable, it was often necessary to plant them on land which had been cropped quite severely. The object of the test was to compare the different varieties rather than to determine the maximum amount of grain which could be produced.

Early Baart has been a consistently higher yielding variety than any of the others and is the variety generally recommended. In common with most other varieties grown, it is susceptible to rust in years of heavy infestation. Two new varieties, Escondido and Pusa, are considered quite rust resistant but so far they have not been tried out sufficiently in this State to warrant their general recommendation. Two Early Baart selections made by the Plant Breeding Department known as Hard Baart and Soft Baart show considerable promise. The former produces grain of very high quality while the latter has out-yielded the Early Baart in preliminary tests.

Five barley varieties have been included in a sufficient number of tests to warrant comparisons as follows:

Barley Variety Tests

Variety	Number of comparable tests	Yield per acre
Common Six-Row	5	49.6 bu.
Club Mariout	5	49.0 bu.
Trebi	3	47.6 bu.
Beardless	5	37.5 bu.
Beldi	4	36.8 bu.

The combined factors of higher yield and earlier maturity give the Common Six-Row and Club Mariout considerable advantage over the Trebi. Common Six-Row makes the most growth which makes it popular as a hay crop. The Beardless is more desirable for this purpose because of the absence of the objectionable awns or beards. The various hullless varieties often recommended seldom yield as much as the more common hulled varieties.

Date of Planting

The date of planting is an important factor in securing high yields of small grains. Because of the wide variation in weather conditions from year to year, it is impossible to set a definite planting date. Average yields for a three-year period in a date of planting test with Early Baart and Marquis wheats are given in the following table.

Date of Planting Wheat

Approximate date of planting	Early Baart	Marquis
October 26	33.2 bu.	30.4 bu.
November 15	33.9 bu.	34.7 bu.
December 1	34.9 bu.	30.7 bu.
December 15	36.9 bu.	34.4 bu.
January 1	37.5 bu.	28.6 bu.
January 15	40.8 bu.	29.3 bu.
February 1	30.7 bu.	21.8 bu.

The yields obtained indicate that the best results with Early Baart are

to be had by planting from December 15 to January 15. Marquis is somewhat later maturing and the planting period should be about a month ahead of that for the Early Baart. Plots which were planted just following the stormy period commonly occuring early in December or even as late as early January seemed to give the highest yields. Perhaps this would justify the recommendation that planting be delayed until weather conditions seem fairly well settled. For elevations greater than those of the Salt River Valley, earlier plantings are advisable.

Rate of Seeding

The rate of seeding is often an important factor in determining the yields of small grains. Early Baart wheat was planted at the Salt River Valley Experiment Farm at rates varying from two to eight pecks. The average yields over a three year period are as follows:

Rate of Seeding
Early Baart Wheat

2 pecks	28.6 bu.	6 pecks	30.3 bu
3 pecks	27.7 bu.	7 pecks	27.9 bu.
4 pecks	30. 2 bu.	8 pecks	30.3 bu
5 pecks	33.1 bu.		

The results obtained bear out the recommendation that wheat should be planted at the rate of four to five pecks. Early plantings or plantings on well prepared ground will not require as much seed as late plantings or plantings on poorly prepared ground.

Fertilizer Tests

Wheat fertility tests conducted over a period of six years from 1920 to 1925, inclusive, showed some very interesting results. The ground on which the fertility plots were located had been cropped quite heavily for several years prior to this experiment. Five comparable plots included two check plots, one plot fertilized with five tons of manure annually, one plot to which 200 pounds of acid phosphate were added, and one plot to which the amounts of phosphorus and nitrogen removed by the preceding crop were returned in the form of acid phosphate and nitrate of soda. The average yields for the six-year period were as follows:

Wheat Fertility Test
Early Baart

Treatment	Yield in bushels
Check	28.7
Phosphorus and nitrogen removed by pervious crop returned to soil	38.1
200 lbs. acid phosphate	28.5
5 tons manure	33.5
Check	28.8

No beneficial effect resulted from the application of acid phosphate. Nitrogen, both in the form of barnyard manure and nitrate of soda, produced a marked increase in the yield. Further tests with nitrate of soda emphasized the beneficial effects of applications of nitrogenous fertilizers. However, if inorganic nitrogen is to be used it should be in the form of ammonium sulphate rather than sodium nitrate.

The following suggestions cover some of the practices upon which profitable small grain production under irrigated conditions in southern Arizona are based.

1. Plant only varieties adapted to the region. The average farmer cannot afford to experiment with new untried varieties. As rapidly as varieties are found to be adapted to a given region, they are recommended by the Experiment Station.

2. Use only the best seed obtainable. The difference in the cost of first class seed and that of ordinary or inferior seed is very little, while the difference in the yield and quality of the resulting crop may mean difference between profit and loss on crop.

3. Treat seed for smut before planting. Wheat should be treated with copper carbonate dust or formaldehyde solution to prevent bunt or stinking smut. The copper carbonate treatment is recommended as the more satisfactory since it is just as easily made and is less likely to injure the seed. Barley should be treated with the formaldehyde solution. Loose smut of wheat is not usually serious enough in the Southwest to justify treating seed to control it.

4. Unless there are good reasons for doing so, planting of wheat should not be delayed longer than January 1. Every few years there is a season in which serious losses from rust occur. It has been found that wheat planted early matures earlier and that planted late and that the early planted wheat is often far enough along to escape rust damage while the later wheat is a total loss.

5. Plant on good ground, preferably land which has been out of alfalfa or sod only a short time. However, it is not usually a good practice to follow alfalfa immediately with wheat as excessive growth may result and cause lodging and poorly filled grain. Sorghum is a good crop to use to take the excess "kick" out of the alfalfa land before planting to wheat or other small grains.

6. Plant on well prepared ground. Extra work in preparing the seed bed seldom fails to pay good dividends in increased yields. The ground should be well levelled and the surface fairly fine.

7. The top four feet of the soil should be well filled with moisture before planting. Roots will not develop in a dry soil and it is a lot easier to get the water into the soil before planting than afterward.

8. Hold water off the crop as long as possible without allowing the plants to suffer. This encourages deep root penetraation, allows proper aeration of the soil and does not puddle the surface soil which is particularly hard on young plants.

Small Grains, Another Valuable Crop for the Arizona Rancher