The Montana Extension Service in Agriculture and Home Economics
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Montana State College of Agriculture and Mechanic Arts and the U. S. Department of Agriculture, Cooperating; Acts of Congress, May 8 and June 30, 1914.

BULLETIN NO. 93. AUGUST, 1928.

Test for Moisture and Protein Before Combining

Premiums for Montana Wheat depend upon Moisture Content as well as Protein Content

By
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To get full value for your wheat it must be dry. There is no practical way of drying grain after it is threshed. Wait until it has not more than 14% moisture before going into the field with the combine.

The Moisture Test

No one can tell the moisture content of wheat without having it tested. Samples must be taken from the field as a guide to successful combining. A part of the samples so obtained can be sent to a laboratory for a protein test. All samples must be kept in air-tight containers from the moment they are collected. The methods of taking such samples, testing them for moisture, and putting them in proper containers for protein tests are illustrated in the following pictures.

Securing the Sample

Fig. 1 illustrates the method of walking through a field in order to obtain a representative sample. Walk in a diagonal direction through the field, and across the field at the ends, stop every 15 or 20 steps and pull up a handful of plants. Gather all the heads from these plants and thresh in the combine as illustrated in Figure 2.

The small sample thresher illustrated in Fig. 3 is also a convenient way of threshing head samples. Detailed instructions for making such a thresher can be obtained from the Montana Grain Inspection Laboratory, Montana State College, Bozeman. Threshing by hand is not satisfactory as most of the unripened grain is likely to remain in the heads.

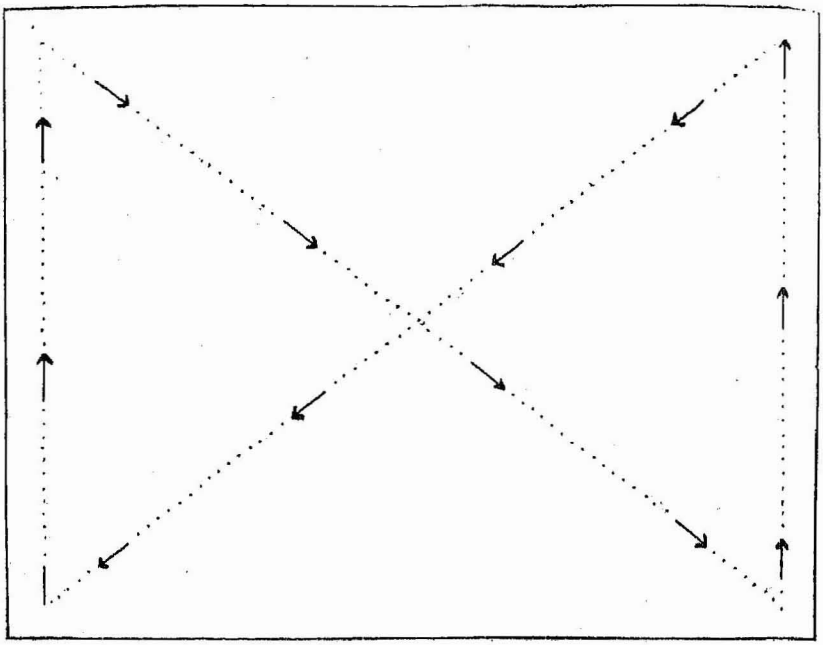


Fig. 1. When taking a sample from the field, be sure that it fairly represents the grain in the field. Pull up plants at frequent intervals over a course as shown in the diagram, and collect all heads of these plants for testing.

Different parts of the field often have wheat of different protein and moisture content. All samples should be thoroughly mixed by rolling them on a cloth or canvas, as shown in Fig. 4. Put a portion of this thoroughly mixed grain into a small can or jar for testing.

Fig. 5 illustrates types of air-tight containers for heads and threshed grain. If the sample cannot be threshed immediately, it should be put into a milk can or other air-tight container to keep it from drying out. Glass jars with rubber rings or tin cans with friction tops are recommended for threshed grain. The cardboard container is not recommended, because the grain dries out to some extent. The tin container may be shipped by mail if it is put in a cloth sack.

Making the Moisture Test Locally

In 1927, many combine operators took representative samples of the standing grain, threshed these head samples, put the wheat in air-tight containers and took it to the elevator or county agent for testing. This practice, although satisfactory enough for the time being, caused a certain loss of

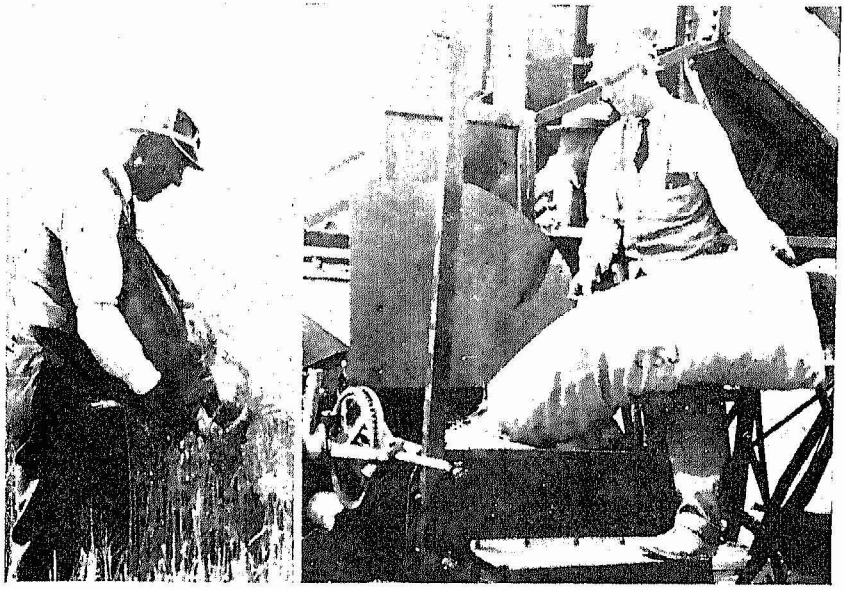


Fig. 2. The combine may be used for threshing the sample. Illustrations show man collecting samples and dumping heads into combine hopper. This sample of threshed wheat will be used for moisture and protein tests.

time by the trip to town and the wait for the test to be run. Hence, some farmers bought their own moisture testers to avoid this delay.

One difficulty in obtaining moisture testers in 1927, was that no cheap set of scales was on the market so the cost of moisture testers was prohibitive. In the winter of 1927-1928 the problem was presented to several distributors of laboratory apparatus, with the result that a number of companies are now manufacturing moisture testers suitable for farm use. (See Figure 7). The names and addresses of these companies can be obtained from county agents.

All the testers are of the Brown-Duval principle. In making this test, 100 grams of wheat and 150 cubic centimeters of a special moisture testing oil are put into a flask. This flask is connected to a glass tube which stands in a condenser of cold water. The wheat and oil are heated by means of an alcohol burner to a temperature of 180 degrees Centigrade in twenty minutes. The moisture in the wheat is driven off as a steam, condensed in the glass tube and caught in a graduate which reads directly in per cent.

Each testing set consists of enough oil and alcohol for several hundred tests, a simple scale, and a one-unit moisture tester similar to those used by

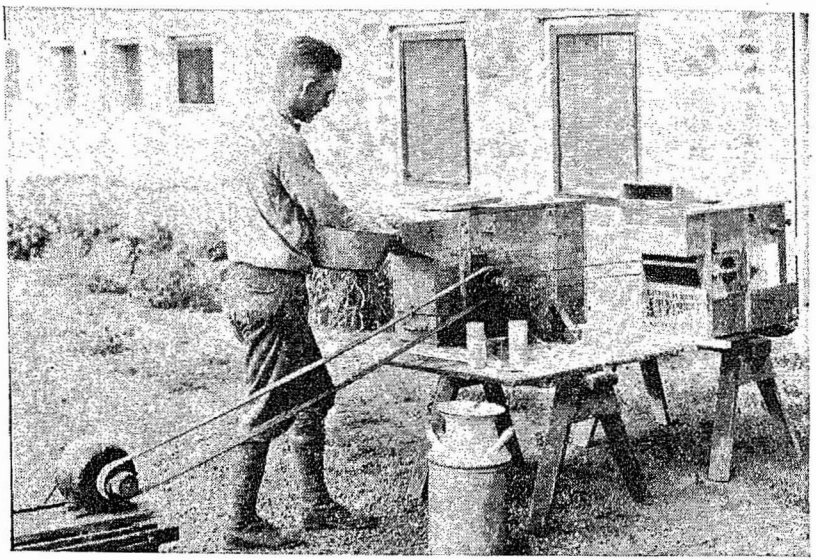


Fig. 3. A small sample thresher, as illustrated, may be used for threshing heads. Directions for making this thresher may be secured from Montana Grain Inspection Laboratory, Bozeman.

most Montana elevators. They can be ordered from the companies direct or through the county agents who will be glad to show farmers how to set up the machines and make the tests.

As a precaution it is well for the operator of a new moisture tester to submit a portion of a sample of wheat which has been tested to one of the state laboratories to have it tested for moisture. This will give him a check on the accuracy of his work.

In these testers it is necessary to push two glass tubes and one thermometer through holes in rubber stoppers. Delicate glassware is apt to be broken unless the following precautions are taken:

1. Ream out the hole in the rubber stopper with a pocket knife.
2. Cover the glass tube with a thick lather of soap and water.
3. Hold the tube in a cloth and work the rubber stopper on gradually.

Weedy Fields Difficult to Combine

Such weedy fields as shown in Figure 6 usually cannot be separated from the threshed grain. These tips and weed seeds often contain over 60% of moisture and will cause the grain to spoil if the mixture is stored in a bin. It is necessary, therefore, that the grain be windrowed so that the weeds have a chance to dry before threshing. In ordinary dry weather this requires



Fig. 4. Mix the large sample thoroughly by rolling in a canvas or other cloth, as illustrated, before taking the small sample for testing.

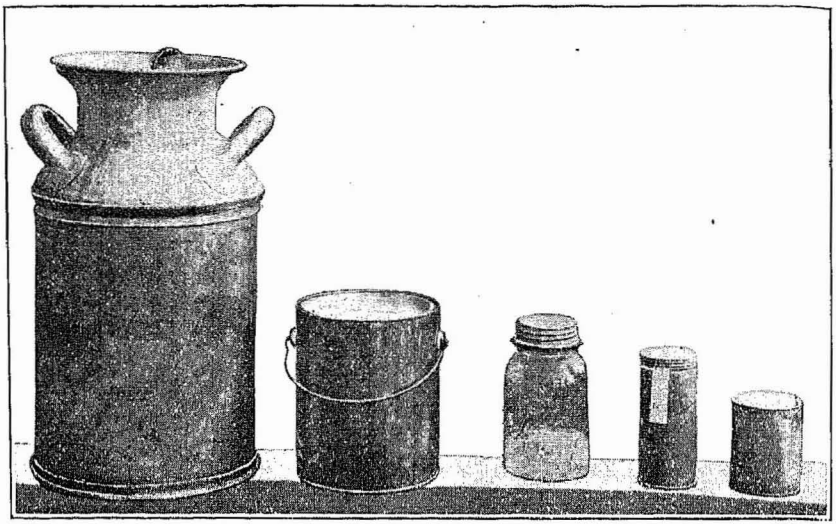


Fig. 5. A small amount of the threshed grain should be shipped to a laboratory for testing. The grain must be shipped in an air-tight container. Cardboard containers such as the fourth one from the left in the illustration are to be avoided. The glass jar is good but cannot be shipped in the mail. A tin container with friction or screw top is best.

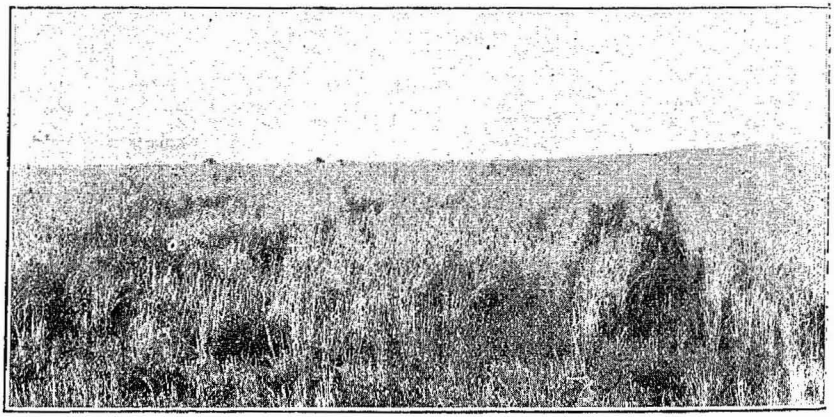
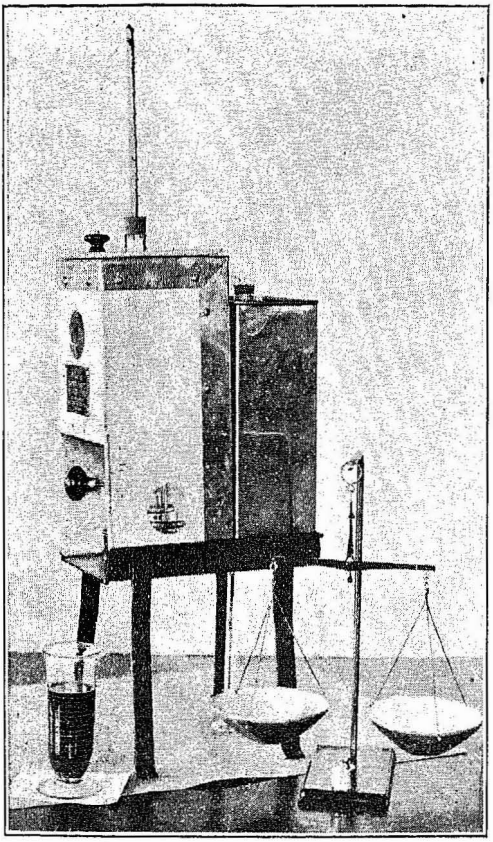


Fig. 6. Russian thistles and other green weeds in the field contain much moisture. Such fields cannot be safely harvested and threshed with the combine. Use windrow attachment on such wheat or stack with header-stacker barge.

not more than two to four days after which time the grain can be picked up with a windrow pick-up attachment on the combine and threshed satisfactorily. Further information on windrowing is contained in the Montana Extension Service Circular No. 92, "Combining Unevenly Ripened Wheat."

Value of Pre-Harvest Protein Test

The pre-harvest protein test is of value in determining which fields will produce high protein wheat. This makes it possible to keep wheat, with different protein contents from different fields or parts of the same field, separate at threshing time. When the wheat has been threshed additional protein tests should be made to determine more accurately the protein content to be used as a basis for selling.



Both Protein and Grade Important

Grade as well as protein content of wheat is a determining factor in the price paid. Therefore, producers are advised to obtain grade determination on their threshed wheat at the same time that the protein test is made. Grade, moisture and protein tests can be made from the same sample if two quarts of the grain are sent to the laboratory. At least one pint of the sample should be in an air-tight container for the moisture and protein tests. Tests for grade, moisture and protein content are made at the three state laboratories located at Bozeman, Great Falls and Harlowton.

Fig. 7. The moisture test is quite simple and may be made by elevator operators or farmers, providing proper equipment is available. The illustration shows a common type of moisture testing apparatus.

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