

## BARLEY HARVESTING SURVEY

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Much of the barley of malting varieties that is produced in North Dakota which does not grade malting does not make this classification because of skinned and broken kernels. According to a report compiled by the Department of Agricultural Economics at NDAC, of 5441 carloads of barley shipped out of the state from August 1, 1946, to May 31, 1947, only 1027 (18.9%) were graded malting barley. 2732 (50.2%) of the 5441 carloads contained more than 5% skinned and broken kernels.

Many of our barley growers are raising good malting barley but because of improper threshing much of this barley goes on the market as feed barley. The following statement appeared in a barley letter of September 4, 1948, put out by one of the major elevator companies: "Barley containing over 5% skinned in Milwaukee is salable only to terminal buyers, as maltsters are shying away from this type, in most cases."

This survey was set up in 1948 to study the problem and collect educational material on proper harvesting of malting barley. Samples were obtained from combines while threshing barley. A total of 69 samples from 19 combines and 2 stationary separators was obtained. The samples were sent to the Production and Marketing Administration, grain branch laboratories, where they were graded.

### Summary Of Sampling

Thirty-one of the 69 samples contained over 5 percent skinned and broken kernels, 18 of the 69 samples, over 10 percent skinned and broken. Results of the sampling do not give any indication of variations from starting time in the morning through the heat of the day until straw and grain start to get tough in the evening.

Most of the harvest days last year started in the afternoon. Mornings were usually too damp. The season was also cut up by many light rains. There is a great variation in samples taken the same day from the same machine. This is probably because samples were taken as the grain was threshed. A more representative sample should have been taken. It would have been possible to probe samples from trucks as they left the field. Samples of this kind would cover a longer threshing time and would eliminate some of the errors in variation in the field both in terrain and stand.

Samples that contain a very high percentage of skinned and broken came from machines with a high cylinder speed (above 5800 RPM). In one case the cylinder speed was cut from 1100 RPM to 985 RPM. This change in speed changed the percentage of skinned and broken from 17.5 percent to 5.8 percent. Wherever there was heavy return and high cylinder speed there was a high percentage of skinned and broken.

•County Agent at Large.  
•Extension Agronomist.

In a few cases heavy return was responsible for a high percentage of mechanical damage; although the sieves had been set about right they were partially clogged. In this case it was found that considerable grain was going over.

One series of samples showed a decrease in percentage of skinned and broken from 6.5 percent to 4.5 percent and 3.5 percent by opening the concaves two notches.

Sampling of one machine shows an increase of 5 percent to 15 percent when operators were working on a very thin swath at the same ground speed as normally used.

### **Harvesting Recommendations For Malting Barley**

#### **Adjustment:**

Cylinder should be run as slow as possible to avoid skinning and cracking. Cylinders run at the same speed for barley as for wheat will usually produce a high percentage of cracked kernels. It is impossible to recommend a speed in RPM that would apply to all models of threshers because of the variations in diameters. A 15 inch diameter cylinder would have to run at 1300 RPM to give the same threshing action or number of bars per minute over the concaves as 22 inch diameter cylinder at 900 RPM. Run the cylinder just fast enough to get the grain out of the head. In most cases where sampling indicates a high percent of skinned and broken kernels, the cylinder speed in feet per minute was high.

An operator will have to use good judgment when adjusting cylinder speeds. If speed is adjusted to do a good job of threshing on a warm dry day when straw and grain are very dry and brittle he will have trouble knocking the grain out when the straw is tough from dew or a light rain. It would be advisable to set speed to do a good job of threshing when straw is slightly tough as it is in the morning and toward evening and then as the grain gets drier, gradually increase the concave clearance. The cylinder should be kept in good condition. End play will cause injury, especially on spike tooth cylinders. Rasp bars with sharp edges or damaged from small stones will cause mechanical injury to grain. Rasp bars that are badly worn will have to be set too close to concaves and will cause skinning when grain is slightly tough.

#### **Concaves:**

Tailing Return: Sieves should be adjusted for least possible return. The problem with barley is more in separating than in threshing. If the return is heavy, most of the grain that is coming through has already been threshed and there is little use running it back through the cylinder. It is possible that some of this grain goes through the return more than once when the return is heavy. Every time the grain goes through the cylinder the chances of skinning and cracking are increased.

#### **Wind:**

Use plenty of wind on the front of the sieves. More barley is lost as a result of too little wind rather than too much. Sieves should be set with the rear end up but almost level.

#### **Concaves:**

Set spike tooth concave at least half way open. It is usually not necessary to use all six rows of teeth. On rasp cylinders the concaves should be set according to manufacturers' specifications. Too small a clearance will skin when grain is tough and cause cracking when grain is dry.

#### **Condition of Straw:**

Many farmers thresh barley when they cannot thresh anything else. Harvesting barley when straw and grain are too tough will result in much skinning. In order to thresh when grain and straw is tough the cylinder will have to be run at a higher speed to prevent clogging. Uneven feeding will cause much skinning and cracking.

### Comments of Farmers and Grain Buyers

In talking with farmers on the problem of threshing barley, the questions that they were most concerned with were, What is the difference in price and will it pay to take time to make the adjustments on the equipment as the moisture conditions of straw and grain vary throughout the day?

There is a great deal of difference between the market price of feed barley and malting barley. Feed barley in Minneapolis, in October, 1948, was quoted at \$1.12 per bushel; at the same time malting barley was quoted at \$1.55 per bushel. There is a difference of 43c. It is very easy to skin and crack enough barley (over 5 percent) that would grade malting to put it in the feed class. In order to meet U. S. standards barley must not contain over 5 percent skinned and broken kernels to classify in the malting grade.

In October of 1947, malting barley was quoted at \$2.42 per bushel. At the same time feed barley was quoted at \$1.72, thus a difference or premium of 70c a bushel.

However, in talking with local buyers and observing what takes place in the elevator it seems that test weight and color are more or less the basis on which the farmer receives the grade and actual return for the barley he produces. The local buyers, from experience, can approximate the extent of mechanical injury, but because of competition and lack of bin space are not able to buy according to the various grades; therefore, they are buying on the average. It may be possible to make greater distinction between the feed and malting class.

If there were a greater differential between the actual cash a farmer receives for good barley and barley containing a high percentage of skinned and broken, the average farmer can and would produce barley with little or no mechanical injury. Most of the farmers know how to thresh without skinning and cracking the grain. It may be necessary to do some educational work on the identification of the approximate percentage of mechanical damage in a given sample.

### Conclusion

The following conclusions are based upon the comments of farmers and local grain buyers. Although the production of good malting barley free from mechanical injury affects the over all price that farmers receive, it does not affect the individual farmer's return enough to make it worth while for him to be particularly concerned about mechanical damages.

There are so many more factors that have to be considered which, as far as the individual farmer is concerned, are more important. For example, getting the barley crop out of the way as soon as possible in order to get at the wheat crop; threshing barley when wheat cannot be threshed because of heavy dew or light rain in order to keep harvest labor working; threshing the barley as soon as possible even on the tough side so that more time and money will not be lost by waiting until it is exactly right for threshing.

Again the question arises: Is there enough price differential that a farmer receives to compensate for time lost in waiting for the best threshing conditions and time lost in making adjustments to compensate for varying straw and grain condition during the harvest day? Until this question can be answered in the affirmative, the problem of mechanical injury to malting varieties is not primarily one of machine adjustment and operation. It is a marketing problem rather than an engineering problem.