Northwest School News

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NW Station Does Research On High Moisture Barley

INVESTIGATES HARVESTING, STORING, AND FEEDING . . . .

During the last several years, the practice of harvesting, storing, and feeding high moisture corn has been explored experimentally and adapted by many farmers. Some of the advantages cited for such a practice include: harvesting can be earlier and faster, operations and equipment are at a minimum, labor utilized is reduced, field and storage losses are less, and feeding value is the same or greater. BARLEY, not corn, is the major feed crop in the vast agricultural area of the Red River Valley. Can barley be handled as a high moisture crop and give the advantages that are cited for high moisture corn? Other questions have been raised on barley. Can barley be handled as a high moisture crop and thereby aid in controlling wild oats, a serious problem in the Red River Valley? Can high moisture barley be utilized effectively without a roughage for feeding ruminant animals?

These are some of the questions that are being answered by an experiment which was started at the Northwest School and Experiment Station, Crookston, during the 1960 barley harvesting season.

This report will outline the experiment plan and summarize the first year's results.

Experimental Plan

An 80-acre field of Traill barley was divided into 12 uniform strips. The odd numbered strips were harvested by direct combine when the grain was at approximately 30 per cent moisture and stored in a Harvestore storage structure. The even numbered strips were harvested and stored in the conventional manner. Calculated and actual yields were taken. Combine and shattering losses were determined. The labor, equipment, and machinery utilized in harvesting and storing the barley were recorded. Data were collected on the combine setting and adjustments, variation in maturity of barley heads at harvest, height of grain and height of stubble, per cent smut, soil tests, and on the weather conditions at harvest time. Chemical analyses were made on representative samples of the barley. The stage of wild oat development and the amount shattered were determined for each plot. The viability of the wild oats after storage under the two systems was studied.

Feeding trials to compare the value of the dry versus high moisture barley were conducted with beef steers. Forty medium - grade, yearling Hereford steers, averaging 776 pounds, were divided into 4 lots of ten steers each on the basis of feeder grade and live weight, and were fed in dry lot from October 24, 1960, to April 12, 1961 (170 days.) Four treatments were used: rolled dry barley with and without alfalfa hay; and rolled high moisture barley with and without alfalfa hay. Steers receiving no alfalfa hay were given 1 pound per head daily of a special barley supplement consisting of 60 per cent dehydrated alfalfa meal, 30 per cent dried beet pulp and 10 per cent ground limestone. One-half of the steers in each lot were implanted with 24 mg. stilbestrol at the outset of the trial. Chemical analyses were obtained on representative samples of all ration constituents at monthly intervals. Steers were weighed at 28-day intervals, with initial and final weights being on a shrunk basis. Market grades and value per cwt. were assigned to each steer at the beginning and at the end of the feeding trial. Shipping shrinkage and carcass evaluations were obtained on all steers.

RESULTS TO DATE

Harvesting:

A conventional 14-foot, self-propelled combine was used in the study.

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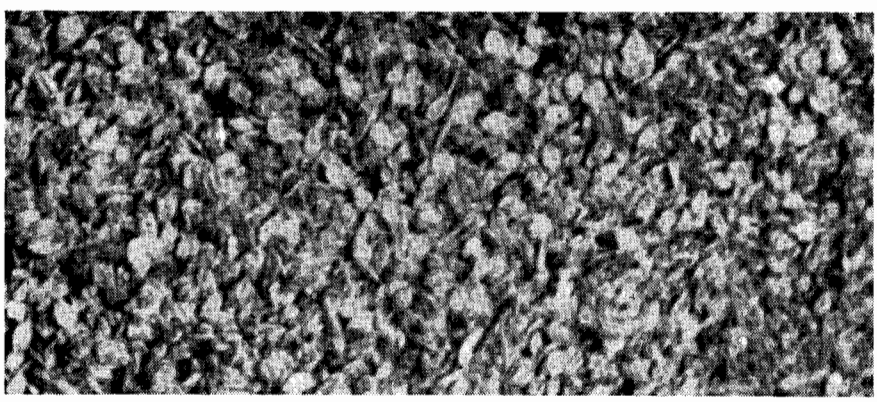
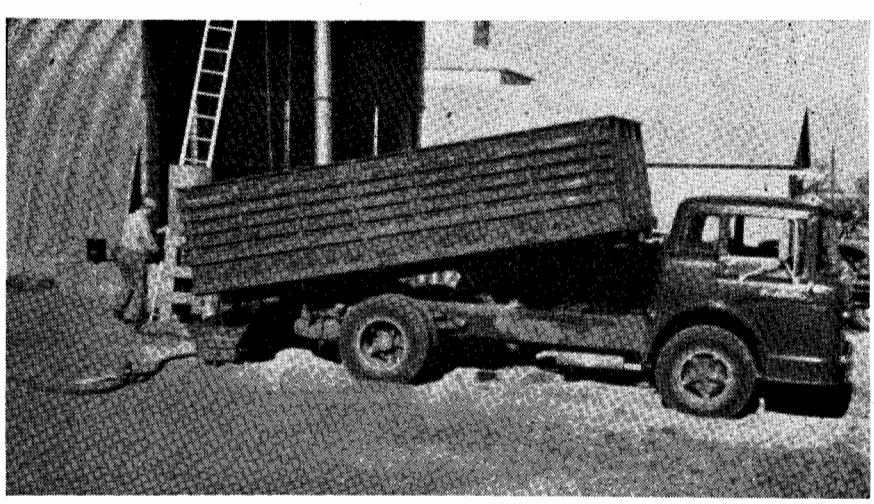


Rolled high moisture barley. Resembles steam-rolled barley.



Truck Unloading High Moisture Barley Into a Giel Blower, Which Was Used to Blow the Barley in the Oxygen-Free Storage Structure.

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The cutter-bar was used for harvesting the high moisture barley while the conventional, dry barley was picked up from the swath.

No serious problems were encountered in harvesting the barley. Only slight changes were made in the combine setting for harvesting the wet barley.

By harvesting the barley at a high moisture level the barley was harvested earlier, at night, and without swathing. The wet barley was harvested on July 28 and 29th while the barley harvested in the conventional manner was harvested on August 1 and 2nd. No weather problems were encountered while harvesting.

Based on actual yield, calculated at 13 per cent moisture, 2562 bushels of barley were harvested by direct combine at the high moisture level (16.7 to 22.3 per cent moisture) as compared to 2341 bushels which were harvested in the conventional manner at 10.1 to 13.2 per cent moisture. The data on the combine and shattering losses for each plot were inconsistent and did not give any conclusive reason for the difference in yield.

Much of the wild oats was still in the heads when the high moisture plots were harvested; therefore, a higher percentage of the wild oats was harvested. Approximately twice as many wild oats were found in the high moisture as compared to the conventional barley.

Storing:

High moisture barley was stored successfully in an oxygen-free storage structure.

Since the wet barley was harvested at 16.7 to 22.3 per cent moisture, enough water was added (2335 gallons) to bring the moisture level to 30 per cent. The water was added at the top of the silo by using a fire hose and water meter device. The water and grain was mixed together in six feet of distributor pipe before dropping into the silo.

A water trap was put on the bottom of the silo, 117 gallons of the added water were drained off.

The silo was closed for approximately two months before it was opened. On opening the silo, the barley had a bright yellow color and an apple cider smell. The barley was found to have an alcohol content of about 2.2 per cent and ranged in moisture from 28.4 to 34.3 per cent.

It appears that wet barley is quite sensitive to oxygen. It started to heat and turn dark within ten days after putting in a defective auger for unloading. The condition was remedied by installation of a properly sealed auger.

One of the Holstein steers used in a preference test "lapping up" the rolled wet barley.

NW Station Does Research On High Moisture Barley

(Continued from Page 1)

Approximately 600 bushels of wet barley were removed from the silo with the sealed auger. The barley did not freeze in the silo but some bridging was noted over the auger. The problem was solved by putting in the sweep-arm unloader.

The wild oats germination was completely killed after two months' storage at 30 per cent moisture in an oxygen-free storage structure. Ninety per cent of the wild oats in the conventional, dry barley germinated in the greenhouse.

Once the wet barley was removed from the silo, the length of time that it could be stored without heating or molding depended on temperature. Below freezing, the high moisture barley could be stored successfully for several weeks; however, with the approach of warm weather, storage time decreased so that at approximately 70 degrees F. the barley heated within two days. It would appear that the most desirable way to handle wet barley would be to roll it daily, as needed.

Feeding:

On feeding the high moisture barley, it was found that the kernels must be cracked to prevent them from coming through the cattle whole. A hammer-mill with a one-fourth inch screen was used at the outset to break up most of the kernels; however, some of them still passed through the cattle. This problem was eliminated by rolling the barley into a flake.

Numerous alterations and adjustments were made on a conventional roller-mill in an attempt to roll high moisture barley and prevent it from building up on the rollers. It was found necessary to install two scrapers, one for each roller. The scrapers were placed so they were located as close to the roller as possible without making contact.

The cattle relished the rolled wet barley from the outset.

No trouble was noted with bloat, stiffness or diarrhea after the animals were on full feed. There was a little evidence of foundering in some animals in the early feeding period, just prior to full feed conditions. This disappeared in a few days.

In the feeding trial, the steers receiving rolled high moisture barley and the special barley supplement exhibited the best over - all performance. Average daily gain, feed per cwt. gain, cost per cwt. gain, and margin over feed costs were, respectively, as follows: (1) rolled dry barley, no hay: 2.12, 841, $15.44, +$24.48; (2) rolled dry barley plus alfalfa hay: 2.25, 901, $14.94, +$30.90; (3) rolled high moisture barley, no hay: 2.40, 807, $14.88, +$35.69; (4) rolled high moisture barley plus alfalfa hay: 2.22, 947, $15.75, +$27.91.

Steers implanted with 24 mg. stilbestrol gained considerably faster

(Continued on Pg. 4, Col. 1)

ALUMNI REUNION CHANGED FROM JUNE TO JULY 18 DATE

The annual Alumni Reunion at the Northwest School of Agriculture will be held on Tuesday, July 18, this year. Traditionally, in past years, the reunion has been held in June. Crops and Soils Day will be held at the school on the same date. Many alumni have expressed the wish to have the alumni reunion on Crops and Soils Day so they may visit with former classmates as well as participate in both events on the same day.

A 'potluck' picnic supper for alumni, former students and faculty is scheduled for 6 p.m. (DST). Immediately following the supper hour, there will be a program. One of the special features of the program will be the honoring of Miss Retta Bede who retired from the Northwest School staff in July 1957. In the evening, a social hour and dance will be held in the gymnasium. Northwest School graduates, former students and faculty are invited to attend the Alumni Day festivities. Classes having their reunions this year are those ending in "1" and "6".

The Crops and Soils Day afternoon program will be completed in time so that alumni who are at the school for both events will be able to join the alumni for the 'potluck' supper.

In the near future, alumni will be mailed a letter of information by the school giving details of the program for Alumni Reunion and Crops Day.

Northwest School Alumni association officers are: Glen Torkelson, Crookston—president; John Stromstad, Lockhart—vice - president; Paul Engelstad, Thief River Falls—secretary; and Larry Bergh, Hallock—treasurer. New officers will be elected at the alumni association business meeting.

PLAN NOW TO ATTEND BOTH EVENTS ON JULY 18.

NORTHWEST SCHOOL
Coming Events

4-H Club Week
June 5-9

Women's Camp
June 13-16

Alumni Reunion
July 18

Crops and Soils Day
July 18

Fall Term Begins
October 2

1x2x3=4 ? ?
New Breed of Swine Developed at NWS

It may be difficult to see the logic in the arithmetic shown above, but under certain circumstances the equation does hold true. The formula has specific reference to the development of a new breed of swine at the Northwest School and Experiment Station, and the components in the left-hand side of the equation refer to the individual breeds which are being combined to form the new one, the Minn. No. 4.

The development of the Minn. No. 4 is an outgrowth of the University's continuing program for the improvement of existing breeds and for the development of breeds superior to ones presently available. The original three Minnesota breeds (Minn. No. 1, No. 2 and No. 3) were developed since 1940 through research started by the late Dr. L. M. Winters. Each breed originated from a crossbred foundation and all selections were made on a "Record-of-Performance" basis. These new breeds were designed to fit into crossbreeding programs and thereby return the advantages of hybrid vigor to the commercial swine producer. Breeding stock released to the public over a period of years has found wide acceptance and approval with progressive swine producers who have become alert to the benefits that may be derived from the use of superior breeding stock in their swine production programs.

The University's swine breeding program, now under the direction of Dr. R. E. Comstock, is set up to evaluate several different aspects of genetic research. First, a comparison is being made of two methods of selection for the improvement of crossbred pigs. Breeding stock of the Minn. No. 1, No. 2 and No. 3 breeds are maintained at the various branch experiment stations where selection is based upon the performance of the purebreds themselves. At the Rosemount Station, however, selection in these breeds is based upon the performance of their crossbred offspring. Secondly, crossbred hogs are being compared with a new purebred breed. The crossbreds involve the three original Minnesota breeds, and the new purebred, the Minn. No 4, is being developed from crosses of these breeds. Thirdly, different types of crossbreeding systems are being compared to determine which system may be the most desirable over a long-term period of swine production. The three - way rotation cross, such as produced by mating a Minn. No. 1 boar to a No. 2 x No. 3 crossbred gilt, has maintained its popularity with swine producers as it is a practical and economical system for farm users.

Selection in each breed is based upon factors of economic importance to the producer. These include litter size and weight at birth and at weaning, growth rate, feed efficiency, and carcass quality. The latter characteristic is measured by slaughter data as well as live weight probes to determine back fat thickness.

One of the objectives in the development of the Minn. No. 4 is to combine all the desirable genes of the other three breeds, develop the line as a pure breed and see how it compares with a three-way cross that has the same genes available. Although the Minn. No. 4 is only in its fourth generation and the breed is not yet fully developed, results to date are very favorable and the breed shows considerable promise for the future.

by D. Reimer, Animal Husbandman

Typical Minn. No. 4 Gilt and One-Day Old Litter

This gilt farrowed a litter of 12 pigs at 11 months of age. Note segregation for color pattern. Thirty test gilts have averaged 10.5 pigs born alive per litter, with an average birth weight of 2.8 pounds.

Around and About With NW School Alumni

***Kenneth F. Szymanski, '51, graduated from the North Dakota State University. Fargo, on May 21. He received a Bachelor of Science degree in electrical engineering. Kenneth will be employed with the Western Electric Company and will go to Omaha, Nebraska, and Yonkers, N.Y., for further training with the company.

***Kathryn Ann Clementson, '56, graduated from Bemidji State Teachers College on May 28.

***Francis Ackerman, '60. a student at the University of North Dakota, Grand Forks, was a heavyweight wrestler on the Sioux freshman team this past season. He has been elected captain of next year's Varsity wrestling squad at the University.

***Russell E. Gunderson, '58, graduated on May 27 from the Wahpeton State School of Science, Wahpeton, N. D. He completed a two-year industrial drafting and design course.

***Lyall Bjornson, '59, a student at the University of North Dakota, Grand Forks, was a member of the Dakota Playmakers. He has taken leading parts in a number of plays presented by the Playmakers during the past school year.

NW STATION DOES RESEARCH ON HIGH MOISTURE BARLEY

(Continued from Pg. 2)

(12.3%) than control steers.

On the basis of one year's work, it appears that the high moisture system of handling barley can be used successfully. The high moisture barley can be harvested satisfactorily by direct combine, stored in an oxygen-free storage structure and fed successfully in beef cattle fattening rations.

Plans are being made to repeat the entire experiment in 1961-62 in order to verify the results. An economic analysis and a more complete report will be published after the experiment has been repeated.

NOTE: This research is being conducted at the Northwest Experiment Station in cooperation with the Animal Husbandry, Agronomy, Agricultural Engineering, and Agricultural Economic Departments of the University of Minnesota, St. Paul, and A. O. Smith Harvestore Products, Inc., Kankakee. Illinois.

Personnel at the Northwest Experiment Station who are having an active role in this research are E. C. Frederick, D. Reimer, E. C. Miller, B. C. Beresford, O. C. Soine, and B. E. Youngquist.

CHEMICAL WEED CONTROL IN SUGAR BEETS

NW STATION IN THIRD YEAR OF RESEARCH

A two-fold program of chemical weed control in sugar beets was initiated two years ago at the Northwest School and Experiment Station. The effect on stand, sugar content, and yield of beets is of prime concern to the growers. While a few facts have been learned, much work remains to be done before all the chemicals have been evaluated.

The following chemicals were tested last year for their effect on weeds, on the stand, sugar content, and yield of sugar beets: Avadex, Carbyne, Dowpon, Eptam, and Eptam Analog. Avadex and Eptam were applied and harrowed into the soil on May 16 and the beets were sown on May 17. Carbyne and Dowpon were applied on June 2.

BRIEF DESCRIPTION OF CHEMICALS

Avadex is a relatively new chemical that is being used for wild oat control. It does not control broad-leaf weeds. The best results have been obtained by applying the chemical before planting and immediately working it into one to two inches of top soil. It should be applied before wild oats have started to germinate.

Carbyne has been tested for the past two years for wild oat control. It was applied when wild oats were in the two-leaf stage and beets were in two to four-leaf stage.

Dowpon is a recommended grass herbicide and is applied when the grass weeds are about two inches tall. Some damage may occur to the beets.

Eptam has been tested for the past three years and has given good control of grass and broad-leaf weeds. It may cause some reduction of stand in sugar beets.

Eptam Analog is a new chemical in trial this year and is similar to Eptam.

RESULTS

The field results are given in Table 1. There is some variation in the pounds of sugar and tons of beets per acre, but the results are not significant at the one per cent level. There is no significant difference in the per cent Sucrose.

Table 1. The Effect of Herbicides on the Yield of Sugar. Beets and Per Cent Sucrose.

Chemical	Rate/Acre	Sugar Lbs. Per Acre	Tons Per Acre	Per cent Sucrose
Check	—	3612	10.50	17.20
Dowpon	5.0	3414	10.12	16.87
Avadex	1.5	4296	12.68	16.94
Avadex	2.0	3926	11.58	16.95
Avadex	3.0	3994	11.98	16.67
Eptam	3.0	4272	12.64	16.90
Eptam Analog	3.0	4007	11.89	16.85
Carbyne	1.0	4081	12.24	16.67
Carbyne	2.0	4076	11.96	17.04
LSD (0.01)		758	2.22	N.S.

In Table 2 are the results for the emergence of beets per 50 inches of row and the number of beets harvested per 100 feet of row and the weed control before thinning of the beets. When the field notes were taken on June 8, 1960, there was slight damage to the stand of sugar beets by Dowpon, Eptam, and Eptam Analog, but this damage disappeared. There was no significant damage to the emergence of sugar beets which fact is reflected in the number of beets harvested per 100 feet of row.

It was rather difficult to obtain a good estimate of the weed control because of the short time between the application of the herbicide and the thinning of the plots on June 10, 1960. Wild oats were the main grass weed and wild mustard was the only broadleaf weed.

Table 2. Emergence of Beets Per 50-Inch of Row, Number Harvested Per 100 Feet, and Weed Control Prior to Thinning.

Chemical	Rate/Acre	Emergence Per 50-Ft. Row	No. of Beets Per 100	Weed Control Grass	Weed Control Broadleaf
Check	—	44.0	49.3	—	—
Dowpon*	5.0	42.0	46.2	38	—
Avadex	1.5	39.8	56.0	45	24
Avadex	2.0	43.3	53.7	53	39
Avadex	3.0	41.0	51.0	48	28
Eptam*	3.0	41.0	54.8	52	32
Eptam Analog*	3.0	45.0	54.3	43	28
Carbyne	1.0	43.7	52.0	37	—
Carbyne	2.0	44.5	56.2	45	—

*Slight beet damage — notes taken 6-8-60.

by O. C. Soine, Agronomist