

# Maximizing the Use of Wheat

Don Wagner, Ph.D.  
Animal Science Department  
Oklahoma State University  
Stillwater, Oklahoma 74078

Should I feed wheat? This is a question which many wheat/cattle producers have probably been asking themselves. As we all know, wheat is now cheap, about \$3.20-3.60/bushel or \$107-120/ton. There was a large carryover of wheat (well above 1 billion bushels) prior to the start of this year's harvest—one of the highest carryovers in many years. Moreover, a possible record crop of near or above 2.5 billion bushels may be harvested next year.

According to recent figures, the total world wheat production the past two years was large, approximately 17.66 billion bushels each year. In simple language, there is a lot of wheat; moreover, the very low 1983 corn crop (projected at approximately 4.1-4.5 billion bushels or about one-half of last year's crop) has resulted in a marked increase in corn prices, making wheat very competitive as feed.

Traditionally, only slightly above one-third of our domestic wheat production is used for human consumption. The remainder must be either exported, fed to livestock or used for industrial purposes. We all know that wheat prices are not likely to increase materially until domestic supplies are either reduced and/or exports increased substantially. With good weather and large harvests in other parts of the world, the prospects for large increases in wheat exports in the near future are not bright. This means that feeding more wheat should be considered. Wheat supplies must be reduced, and wheat is now a cheap feed.

## *How much is wheat worth for feed?*

Numerous feeding trials have been conducted at Oklahoma State University and elsewhere using wheat with good success. Some general conclusions can be drawn regarding the relative feeding value of wheat. Since corn is the major feed grain used in the U.S. (more than three-fourths is corn), comparisons will be made with corn. On a bushel for bushel basis, wheat is usually worth about 12% more than corn for beef cattle. The higher value can be attributed to:

1. Wheat has a higher bushel weight (60 vs 56 lb/bushel), an advantage of about 7%.
2. Wheat is usually about 2-3% lower in moisture content.
3. Wheat in Oklahoma will often contain 12-13% crude protein vs 9% for corn. Less supplemental protein is needed.
4. Wheat is just as digestible or high in energy (TDN) content as corn on a dry matter basis.

On a ton for ton comparison basis, wheat would be worth about 5% more than corn. Hence, if corn costs \$3.80/bushel, wheat would be worth up to about \$4.25/bu (12% or 45¢ more/bushel) for feeding purposes. It is obvious, then, that wheat is and will be competitive for feeding purposes at our

present prices. WHEAT IS CHEAP FEED.

## *How much wheat can you feed?*

Most recommendations usually suggest that wheat can be included up to about 50% in most rations. In studies at OSU, even higher levels (up to 70 or 80% wheat) have been fed with excellent success, but 50% or less is easier to manage in most field situations. Higher levels require closer management supervision. If other grains are available at about the same cost as wheat and one does not have excessive quantities of wheat, many cattle feeders will use rations which contain in the vicinity of 30-35% wheat. But, certainly higher levels can be fed with excellent success. If a cattleman has considerable wheat on hand and other grains must be purchased at a premium over wheat, then it is probably advisable to use higher levels of wheat in a ration. If higher levels of wheat are fed, some additional roughage (5-10% more) might be included in the ration to reduce the management intensity required. Moreover, it is probably helpful to gradually increase the level of wheat in a ration over a period of several weeks.

## *How should wheat be processed or prepared?*

Wheat is a very digestible feed with a high energy (TDN) value. Therefore, special processing does not improve the digestibility and feeding value of wheat as much as is true for other grains like milo. WHEAT IS ALREADY AN EXCELLENT FEED. Special processing, such as steam rolling or short term steam flaking (e.g. 6 minutes), may increase feed intakes, and therefore, rate of daily gain somewhat in finishing cattle because of a more desirable physical form, but it will not improve digestibility much, if any. This is to say then that sophisticated processing is of much less value in improving digestibility for wheat than for some other grains. Coarse grinding or dry rolling will produce good digestibility. Essentially there are only several DON'TS. You should not 1) feed wheat whole and 2) grind wheat too fine. Whole wheat, unlike corn, is very poorly digested and should not be fed. Finely ground wheat will be too powdery and dusty; it may produce lower intakes and gains and may even cause a lower rumen pH and more likelihood of acidosis, diarrhea and abomasal ulcers (ulcers are caused from too fine of a particle size). Hence, best results will be obtained when the wheat is coarsely ground or dry rolled and when the ration is constructed to have a good physical form. Physical form can be improved by including a little more roughage, coarse grinding, rolling, steam rolling, etc.

## *What feed conversion can you expect?*

Feed conversions (lb feed/lb gain) in the area of 6 or 6.5/1

or better can easily be obtained on wheat rations. With lightweight calves, it is possible to obtain feed conversions in the area of 5.0/l on wheat rations. If a wheat ration can be put together for a cost of about 6.5¢/lb (\$130/ton) by a wheat-cattle producer, then the feed costs/lb of gain will be quite competitive (6.5 x 6.5¢ = 42.5¢ feed cost/lb of gain).

Example Finishing Rations<sup>4</sup>

	Alternate 1	Alternate 2	Alternate 3
	%	%	%
Wheat	30	50	80
Other grains(s) <sup>1</sup>	51-59	30-37	0-5
Roughage <sup>2</sup>	7-12	9-14	10-20
Supplement <sup>3</sup>	4-7	4-6	3-5

<sup>1</sup>Other grains could be corn, milo, barley, oats or a combination of these.

<sup>2</sup>Roughage values are on a dry matter basis. Roughages could include alfalfa, bermuda hay, prairie hay, sudan hay, wheat straw, corn silage, etc. Alfalfa should probably not exceed 10%. Including some low quality roughage would be helpful. If fibrous grains like oats or barley are included, the lower roughage figures would be logical.

<sup>3</sup>Wheat contains more protein; therefore, less protein supplement is needed. Additives, however, would remain the same.

<sup>4</sup>If grower rations are desired, one would use about 50% or more high quality roughage rather than the levels shown here. Wheat could represent the only grain.

In summary, cattlemen should seriously consider feeding wheat if they aren't now doing so because, 1) It is competitively priced for feeding, 2) Wheat has excellent feeding value, 3) Rations are easy to prepare, 4) Feed

conversions and feed costs of gain will be quite good, and 5) Huge supplies in the country will be more quickly reduced, providing earlier hope for an ultimate rise in the price of wheat.

TABLE 1. Feedlot Performance and Carcass Merit for Steers Fed Rations Containing 85% Wheat in the Total Ration.

	Trial 1 (112 days)		Trial 2 (171 days)	
	DRW	MW	DRW	MW
No. steers	15	15	18	17
Initial live shrunk wt, lb.	734	730	490	485
Final live shrunk wt, lb.	1120	1138	1034	1083
Daily feed, lb. <sup>1,5</sup>	20.02	20.64	15.79	17.22
Daily gain, lb. <sup>5</sup>	3.46	3.64	3.20	3.51
Feed/lb. gain, lb. <sup>1</sup>	5.83	5.66	4.95	4.92
Dressing percent	61.22	61.16	61.69	62.29
Conformation <sup>2,5</sup>	11.87	12.07	11.50	12.61
Marbling <sup>3</sup>	11.73	12.53	12.89	13.33
Ribeye area, sq. in. <sup>5</sup>	12.57	11.69	12.23	12.78
Fat thickness, in.	.89	.89	.92	1.01
KHP fat, percent	2.57	2.73	2.50	2.61
Carcass grade	8.73	8.93	9.33	9.33
Cutability, percent <sup>4</sup>	48.37	47.54	48.43	47.97
Abcessed livers	5	4	12	12
Ruminal pH <sup>5</sup>	6.3	6.5	5.7	6.1

<sup>1</sup>Dry matter basis

<sup>2</sup>U.S.D.A. grade converted to the following numerical designations: 7 = low good, 8 = average good, 9 = high good, 10 = low choice.

<sup>3</sup>Marbling scores: 11 = slight, 14 = small, 17 = modest.

<sup>4</sup>Percent boneless trimmed retail cuts = 52.66 - 5.33 (fat thickness) - 0.979 (percent kidney fat) + 0.665 (ribeye area) - 0.008 (chilled carcass wt.).

<sup>5</sup>Values with different superscripts differ significantly within trials: 1,2; (P .05).

3,4; (P .01).

<sup>6</sup>Dry rolled wheat

<sup>7</sup>Micronized wheat