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# Dairy guidelines

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## High Moisture Corn for Dairy Cattle

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Corn provides more feeding value per feed dollar or per acre in Virginia than any other cultivated crop. Corn, harvested for silage, has established its place on dairy farms as the "king" of forages. It yields more energy per acre at the lowest cost per nutrient and the highest profit per acre of any harvested forage crop.

Corn grain is the basic energy ingredient of practically all dairy concentrate feeds. Corn contains about 25% more productive energy than oats, and is usually less expensive per pound than oats, barley, or wheat. Corn used in concentrate mixtures contains no more than 15% moisture. However, most corn grain, when harvested, has more than 15% moisture and must be dried prior to storing in regular grain storage facilities or using in concentrate mixtures.

Corn grain or ground ear corn with more than 15% moisture can be stored in silos where air is excluded and an air-tight condition is maintained. A standard concrete upright silo may be used for high moisture corn storage if the doors are well sealed and a plastic cover is used. Also, a gas-tight silo may be used.

The best moisture level for storage of high moisture shelled corn is 28%, with a range between 25 and 30%. It should be stored as whole grain shelled corn and ground or rolled when fed. High moisture ear corn should be ground at time of ensiling. It may be safely stored at 28 to 35% moisture with 32% being the best.

Mechanical silo unloaders do a good job of removing high moisture corn at feeding time and leave a smooth surface which reduces spoilage. However, a minimum of 2" of corn must be removed daily to prevent excessive top spoilage between feedings. In warm weather, a minimum of 4" may need to be fed to prevent spoilage. Table 1 shows the approximate pounds of corn per inch of silo height for various size silos.

The nutritive content of corn at various moisture levels, Table 2, is calculated from the National Research Council table of composition for corn. These values are useful in formulating rations for dairy cows. As the moisture content increases, the percentage composition of nutrients decreases. The conversion factor may be used to indicate the pounds of corn at various moisture levels needed to be equivalent on a nutritive basis to 11% moisture shelled corn.

High moisture shelled or ear corn is well accepted by dairy cows and will support high levels of milk production. The cows utilize the grain as well for energy and protein as dry regular corn. Spoilage must be controlled and moldy corn should not be fed. Certain toxins may be produced in spoiled high moisture corn and are poisonous, especially to horses, swine, or poultry.

High moisture corn may be fed by various systems. It lends itself well to mechanical handling with augers or conveyers. Shelled corn should be ground or rolled before feeding; however, ear corn should be ground before storage:

1. It can be mixed and fed with silage, both being augered from their respective silos and mixed prior to going into the manger. This system works well with a high protein concentrate fed in the parlor at milking time.
2. It can be fed separately at different levels for cows that are grouped according to production levels.
3. It can be mixed with protein supplements and fed as a grain mixture either at milking time or group-fed either in a separate manger or blended with the silage. The latter could constitute a "complete" ration. It must be fed immediately after mixing; it cannot be stored for later feeding after it is removed from the silo.

Other Advantages of High Moisture Corn

1. It can be harvested 2 to 3 weeks earlier than dry corn.
2. There is less harvesting loss from shattering and lodging.
3. Earlier harvesting allows more time for seeding cover crops and fall fertilization.
4. It can be harvested more rapidly since no slow-down is caused by the drying process.

Table 1. Approximate pounds of corn per inch of silo height\*

Diameter (feet)	Shelled corn whole kernel (25% moisture)	Ground ear corn (30% moisture)
10	270	325
12	395	470
14	535	645
16	705	840
18	890	1060
20	1100	1300

\*Fact Sheet 202, 1968. Dairy Science Dept. Univ. of Md.

Table 2. Nutritive Content of Corn at Various Moisture Levels\*

Moisture (%)	Conversion factor	Total protein (%)	Digestible protein (%)	E.N.E.** (th/cwt)	T.D.N. (%)	Fiber (%)	Ca. (%)	P. (%)
0	0.89	10.0	7.6	91.0	91.0	2.6	.023	.35
11	1.00	8.9	6.8	81	81	2.3	.02	.31
15	1.05	8.5	6.5	77	77	2.2	.02	.30
20	1.11	8.0	6.1	73	73	2.1	.018	.28
25	1.19	7.5	5.7	68	68	2.0	.017	.26
30	1.27	7.0	5.3	64	64	1.8	.016	.25

\*Calculated from composition data in National Research Council (NRC) Publication 1349, 1966.

\*\*Estimated