# IN THE FIELD

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## How to Estimate the Bushels of Grain in a Bin

With harvest underway or fast approaching, you may be trying to estimate the number of bushels in a partially filled bin and how much capacity is remaining.

### Round Bins

Use the following calculation to estimate the bushels of grain in a round bin.

$$\text{Bushels} = 0.628 \times D^2 \times H$$

Where:
D is the diameter of the bin, in feet.
H is the height of the grain mass in the bin (depth of grain), in feet.
0.628 is a conversion constant.

### Example

1. Calculate the number of bushels of corn in a 30-foot diameter bin with the eave 18 feet above the concrete foundation with the drying floor, 1 foot above the foundation. This would make the maximum grain depth 17 feet when the bin is full. In this case, to calculate the bushels of grain contained from drying floor to the eave:

$\text{Bushels} = 0.628 \times D^2 \times H$
$\text{Bushels} = 0.628 \times (30 \times 30) \times 17$
$\text{Bushels} = 9{,}608$

2. If you have peaked grain at the top of the bin, the bushels in the peak can be estimated by using a different conversion constant in the equation.

$$\text{Bushels} = 0.209 \times D^2 \times H$$

Where:
D is the diameter of the bin, in feet.
H is the height of the grain peak above the eave, in feet.
0.209 is a conversion constant for bushels in a cone-shaped pile of grain that extends to the bin wall.

For example, if the top of the peak is 6 feet above the normal depth of grain in the bin, the volume of the peaked grain is calculated as follows.

$\text{Bushels} = 0.209 \times D^2 \times H$
$\text{Bushels} = 0.209 \times (30 \times 30) \times 6 = 1{,}128 \text{ bu}$

Add the totals from example equation 1 and equation 2. Total grain in the bin is 10,736 bushels (9,608 + 1,128)

## Rectangular, Flat Storage Buildings

For rectangular flat storage buildings, the math is simpler. Multiply length (ft) by width (ft) by grain depth (ft) by 0.8 bushels per cubic foot.

Let's calculate the amount of grain in a flat storage building that is 40 feet by 60 feet and has a grain depth of 10 feet.

40 x 60 x 10 x 0.8 = 19,200 bushels in the bin

Source: Tom Dorn, Extension Educator in Lancaster County

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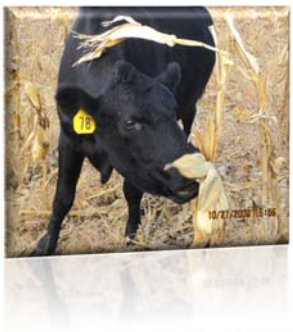

## Grazing Corn Residue

Grazing corn residue can be a win-win for both cattle and crop producers. Nebraska has an abundance of crop residue available for late fall and winter grazing, which may provide a cost-effective and convenient feed source for cattle producers. There are some corn fields that should not be grazed due to topography, landscape or corn yield, but there aren't many of those in Nebraska. For crop producers, residue grazing may provide some extra income and remove some excess residue, but some producers are concerned that grazing and, therefore, residue removal and compaction, will have a negative effect on subsequent grain yields.

Research conducted at UNL has shown that grazing corn residue at the recommended stocking rate (*see Table 1*) does not reduce corn or soybean yields in irrigated fields the following year. A 16-year (1997-2013) study on corn and soybean yields from a field managed in an annual corn-soybean rotation at Mead, Neb. showed no effects on crop yields due to grazing. Winter and spring grazing treatments were conducted on ridge-till, conventional till and no-till field operations. Overall, grazing improved soybean yields over ungrazed treatments, including significant improvement in yield in no-till grazed over no-till ungrazed treatments. There was no effect on corn yields the second year after grazing when compared to the ungrazed treatments. This provides a great opportunity for livestock and crop producers to work together and enhance both operations.

Table 1. UNL recommended stocking rates for grazing gestating cows or growing calves on corn residue

| Corn Yield bu/ ac | Animal Unit Month[1] (AUM)/ac | No. of 1200 lb cows per ac for 30 days | No. of grazing days if stocked at one 1200 lb cow/ac | No. of 600 lb calves per acre for 30 days | No. of grazing days if stocked at two 600 lb calves/ac |
|---|---|---|---|---|---|
| 100 | 1.1 | 0.9 | 28 | 2.2 | 33 |
| 125 | 1.4 | 1.2 | 36 | 2.8 | 42 |
| 150 | 1.7 | 1.4 | 43 | 3.3 | 50 |
| 175 | 2.0 | 1.7 | 50 | 3.9 | 58 |
| 200 | 2.3 | 1.9 | 57 | 4.4 | 67 |
| 225 | 2.6 | 2.1 | 64 | 5.0 | 75 |
| 250 | 2.8 | 2.4 | 71 | 5.6 | 83 |

[1]One Animal Unit Month (AUM) is the amount of forage required to sustain a 1,000-pound cow or equivalent for one month. It has been determined that a 1,000-pound cow will consume 702 pounds of dry matter monthly.

### What Are Stalks Worth?

With the increase in pasture rent over the past couple years, many are wondering what that means for the value of grazing crop residues. The owner of the field may consider the cost of nutrients and organic matter removed from the field, the cost of waiting to begin post-harvest field operations and scattering weed seeds. On the other hand, pasturing cornstalks can reduce volunteer corn problems and eliminate the need to shred stalks, and almost all nutrients are returned to the soil in the manure. Research has shown that essentially little to no organic matter or nutrient losses should be attributed to cows grazing the residue, if the current weight is maintained. The grazing of corn stalks

actually provides an overall economic benefit to the landowner from grazing, even without the value of renting the stalks.

There is not a single recommended rental rate due to the variability in fencing and care arrangements, location, value of alternative feed, "supply and demand," etc. The *Cornstalk Grazing Cow-Q-Lator* found at http://westcentral.unl.edu/agecon3 can help calculate the value of cornstalks based on feed availability, nutrition, transportation and animal care. In many cases, the costs for transportation and care are nearly as much or more than the cost for renting the stalks.

The value of the crop residue can be estimated on an acre or head-per-day basis. Estimating the value per acre is easier, but weather variability often changes the ideal grazing period, thus limiting the value paid for the grazing. Renting crop residue on a head-per-day basis can reduce the renter's uncertainty since the rental period can be adjusted based on weather conditions. It is recommended to take the target per-acre price and calculate the head-per-day cost based on the recommended stock rates found in Table 1.

A survey released from Iowa State in August 2015 shows the average rental price was $7–$12 per acre in western Iowa for cornstalk grazing. Using the *Cow-Q-Lator*, we can calculate this on a head-per-day basis. Based on the recommended stocking rate, grazing 100 acres with 100 head of 1,200 lb cows at 150 bu/ac corn yield, you can graze for 43 days at 50 percent stalk harvest efficiency. The cost per day would range from $0.16–$0.28 per head per day (see Figure 1).

Figure 1.

Cost per acre x number of acres rented ÷ number of days grazed = cost per head per day

$7 [or $12} x 100 acres ÷ 100 head ÷ 43 days = $0.16 (or $0.28) per head per day

The costs for transportation and daily care to the renter are not included in the value and can't be ignored when deciding the value of grazing the cornstalks. Price could also be adjusted based on value of the alternative feed source and local rental rates.

Source: Tyler Williams, Extension Educator

## GRAZE TO KEEP GRASS HEALTHY

Pastures sometimes have lots of weeds remaining this time of year. It's tempting to graze hard enough to use those weeds, but is this actually good for the pasture?

Many pasture weeds can provide satisfactory protein and energy for cattle when eaten, but cattle avoid them due to poor palatability. That's why they're weeds! If pressed hard enough, though, cattle will eat many of them when there is nothing else to eat. While this gets rid of the weeds temporarily, if might not be healthy for the pasture.

Every pasture has millions of weed seeds in the soil and the potential to become weedy. Since some pastures stay relatively clean while other pastures become weedy, other factors undoubtedly influence the weed population. Simply grazing or controlling weeds by spraying or cutting does little to prevent weeds from coming back again unless these other factors are changed to better support desirable plants.

To control weeds, it is much more important to manage grazing to support healthy desirable plants than to weaken or remove unwanted weeds. Grazing that allows sufficient leaf area to remain following grazing that supports rapid regrowth, allows good winterizing, and holds snow and rain moisture on the land rather than running off will benefit the desirable grasses and legumes. Giving pasture plants adequate time to recover after grazing before grazing again is another way to improve or maintain pasture health and strengthen the competitive ability of desirable plants.

Weeds in a pasture can indicate that the pasture itself and the desired plants in it are not in a healthy condition. For improvement to occur, controlling weeds is not enough. Changing management to strengthen desired grasses and legumes also is essential.

Source: Bruce Anderson, UNL Forage Specialist