



# Backgrounding Calves on Cornstalk Residue

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With the current high costs for feed, fuel, and fertilizer, there is a renewed emphasis on utilizing low-cost feedstuffs to put weight on calves. Feedlot operators are looking to place heavier cattle on feed to shorten the finishing period, so it is left to cow/calf producers and backgrounders to determine the best way to put extra pounds on calves prior to entry into the feedlot.

In a recent Minnesota Farm Guide article, Dr. Ryon Walker of the U of M Beef Team detailed backgrounding calves on grass as a management option. Another option for backgrounding calves is to utilize corn stalk residue after harvest. In 2007 Minnesota ranked fourth in the United States with 7.8 million acres of corn harvested. In theory this abundance of corn stalk residue could serve as an excellent low cost feedstuff for weaned calves or wintering cows, however, it is estimated by the American Forage and Grassland Council that only 25% of crop residues nationwide are utilized each year. The corn plant has 50-55% of its weight in stalks, leaves, husks, and cobs. The average corn yield in Minnesota in 2007 was 146 bushels/acre. Using this average, this means that each harvested acre contains approximately three ton of crop residue dry matter. Over the years residual grain loss has decreased to less than 1% of total grain yield, meaning that less than 80 pounds of residual grain remains on an acre in an average Minnesota corn field. Of the remaining feed components, the husk and leaf are both palatable, with the husk being more digestible than the leaf. The stem and cob are low in both digestibility and palatability

and are consumed only when the amount of remaining grain, leaf, and husk is small. Table 1 shows the quality characteristics of the four primary corn stalk residue plant parts.

Table 1. Characteristics of corn residue plant parts.

Item	Plant Parts			
	Husk	Leaf	Stem	Cob
Percent of residue DM	12	27	49	12
Crude protein, %	3.6	7.8	4.5	2.2
<i>In vitro</i> DM disappearance, %	67	47	45	35
Palatability	High	High	Low	Low

Because cattle prefer husks and leaves, these components will logically be consumed first. Therefore, overall digestibility of available residue will decline the longer calves are on stalks due to progressively lower quality residue. In a University of Nebraska study, residue digestibility decreased from 56% at the beginning of the corn stalk residue grazing period to 47% at the end of the period with an average of 55% when 90 steers were grazed on 90 acres for 95 days. To avoid the decline in digestibility, calves can be strip grazed or moved to ungrazed residue periodically so that fresh, highly digestible residue is available.

## Stocking Rates

Previous studies have shown that weight gains while

grazing corn stalk residue increases as stocking rate decreases. The obvious reason for this is the extra residue available per animal, but other factors such as trampling of residue also contribute to this effect. To determine stocking rate, an estimate for available residue should first be made. Researchers from the University of Nebraska devised a formula to determine available leaf and husk weight per acre based on corn yields. The formula is: pounds of leaf and husk per acre =  $([\text{bushels per acre corn yield} \times 38.2] + 429) \times 0.39$ . For the average 146 bushel/acre corn crop in Minnesota, this would result in approximately 2,300 lbs of leaf and husk per acre. However, losses due to trampling and other factors have a great impact, and only 50% may be available for consumption. Therefore, approximately 1,150 lbs of leaf and husk residue per acre will be available for consumption. For a 550 pound steer that is consuming 14 pounds of DM/day, one acre will be enough to carry the steer for 82 days. Because the formula is based on corn yield, areas with higher corn yields should have more corn stalk residue available. Therefore, stocking rates should be based on three factors: 1) number of calves that will be grazing; 2) the acres available for grazing; and 3) the yield of corn and the resulting corn stalk residue available.

### Supplementation

As shown in Table 1, corn stalk residue is low in crude protein. Therefore, protein supplementation is needed. A good rule of thumb is to provide 0.5 to 0.9 pounds of supplemental protein per day. If affordable alfalfa hay can be utilized, it can serve as an excellent source of supplemental protein when provided at 3-5 pounds/calf daily. Corn milling byproducts such as dried distillers grains and corn gluten feed are also excellent sources of protein in these situations. Dried distillers grains contain approximately 28% crude protein, and should be supplemented at 2-3.5 pounds/calf daily to provide adequate protein. Corn gluten feed contains approximately 20% crude protein, and therefore should be supplemented at approximately 2.5 to 4.5 pounds/calf daily. Soyhulls may also serve as an economical protein supplement when supplemented at 4 to 7 pounds/calf daily.

Depending on marketing goals and stocking rates, energy supplementation may also be necessary when backgrounding

on corn stalk residue. Corn stalk residue TDN is highly variable, but a general average is approximately 55%, which for a 550 pound steer would result in daily gains of about 1.1 pounds/day without supplementation. If this results in hitting a suitable target feeder calf market, then no additional supplementation beyond protein, vitamins, and minerals is necessary. If greater gains are desired, distillers grains and corn gluten feed can again be excellent feedstuffs to add extra pounds during the backgrounding phase. Through supplementing 2 pounds of distillers grains, TDN content of the diet increases from about 55% to 58%, which should allow for an increase of an extra 0.5 pounds of gain/day. In the previously mentioned University of Nebraska study, steer calves gained 1 pound/day with 2 pounds of distillers supplementation, and increased to a daily gain of nearly 1.7 pounds/day with 5 pounds of distillers supplementation. These researchers did not see additional gains when distillers grains supplementation exceeded 1.1% of body weight. This is equivalent to 6 pounds of distillers grains for a 550 pound steer. In this study steers were grazed at 1 acre/steer for 95 days without any strip grazing or movement to ungrazed stalks, so lower stocking rates and corn stalk residue management could push these daily gains toward the 2 pound per day level. Another factor to consider with supplementation is reduced cornstalk residue consumption with increased supplement consumption. This may allow for greater stocking rates without affecting weight gains and intakes.

In summary, corn stalk residue grazing can be a low-cost, relatively low-input method of backgrounding calves. Specific attention should be given to stocking rates and these rates should be based on the amount of residue that is available in the fields. Supplementation of protein, vitamins, and minerals should occur during this time, and extra weight gains can be realized with energy supplementation up to 1.1% of body weight. For more information on this and other beef-related topics, please visit our website at [www.extension.umn.edu/beef](http://www.extension.umn.edu/beef).