Grazing Corn to Maximize Late Summer and Fall Gains

Jeff Lehmkuhler and Eric Vanzant
University of Kentucky

Why Consider Grazing Standing Corn

Corn is a warm-season grass with a growth pattern dependent on temperatures. Warmer temperatures accelerate growth while cooler temperatures slow maturation. Thermal time is often referred to as Growing Degree Days (GGD) and calculated as GGD = ((Max Temp – Min Temp)/2) – 50 when calculating in Fahrenheit (Nielsen, 2012). In the upper transition zone, corn thrives and is the major planted crop. The warmer temperatures of the summer months combined with adequate precipitation allows this crop to be a potentially high yielding crop.

Corn is also harvested as forage in the form of corn silage to meet high energy needs of dairy cows and growing cattle. The fiber component of the plant as a rule of thumb comprises 50% of the standing biomass while the other half is the grain itself. Recently, plant breeders have begun to select for greater fiber/cell wall digestibility. Greater cell wall digestibility makes corn even more desirable as a forage crop for ruminant production. As corn is a major crop globally, a lot of research on production management and variety development has occurred, resulting in dramatic increases in yield over time. Few, if any, forage species with potential to support grazing livestock have received as much investment in improving plant performance as has corn, nor are they likely to in the future.

Grazing corn has the potential to fill forage production gaps in the upper transition zone. The base pasture species are cool-season forages. These species are quite productive during the spring period, but production rapidly declines during summer. Increasing temperatures and low soil moisture limit cool-season forage production. This reduced production potential means that livestock managers must either cut numbers or incorporate more grazing acres to ensure adequate forage availability. In the upper transition zone, beef cattle are the primary production livestock species. Adjusting beef cow numbers to align with forage production is not viable due to the length of time required to obtain a 500-600 lb calf. A 285 day gestation period plus 200 days of suckling the cow before being weaned makes it a challenge to reduce and add animals based on a varying forage production curve. From a whole-farm perspective, incorporating a warm-season forage can smooth out the forage production curve and allow for greater carrying capacity than using cool-season forages alone.

Secondly, using corn as a forage crop can be an option for pasture renovation. In this area, wild-type endophyte infected tall fescue is the common pasture species. Often a spray-smother-spray renovation strategy is employed to eliminate the forage from the area. Corn can be used as the

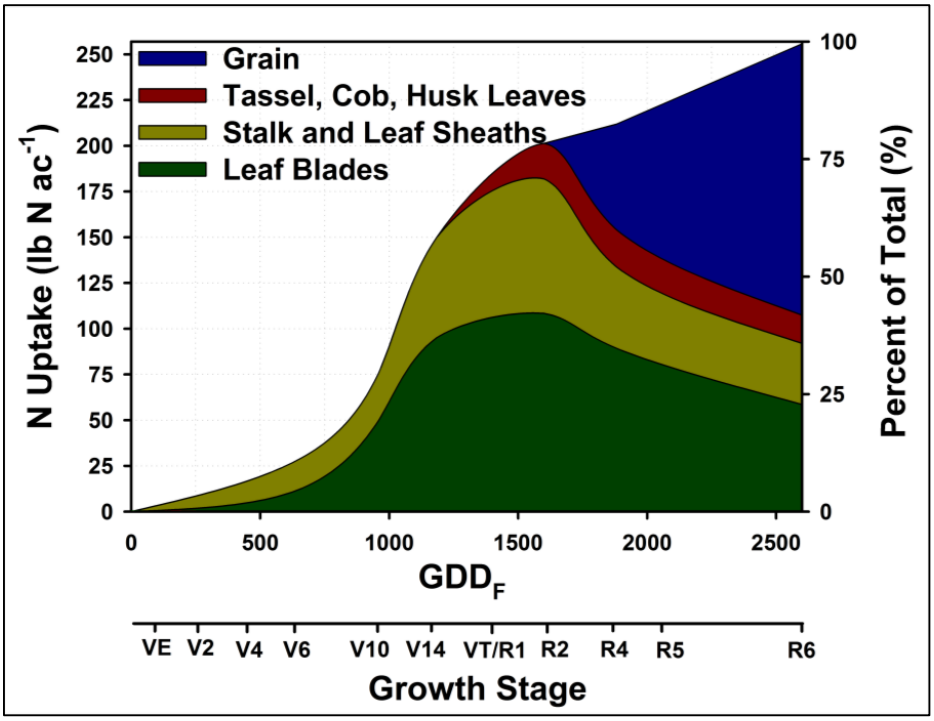
smother crop during the renovation process. The process assists in controlling plants that germinate from the seedbank in the soil.

Some producers have used cattle grazing as a last measure to salvage a damaged crop. This was the case when the Holtzclaws, Lincoln County producers, first grazed a standing corn crop in the 1970's. Wind damaged corn that could not be picked by the equipment on-hand was either going to be lost, or it had to be harvested by animals. The family has continued to graze mature standing corn with heavy feeders prior to selling them. This technique has been adopted by others as a means to replace feeding hay to the cow herd. Instead of feeding hay, mature standing corn is strip grazed during the winter with stockpiled fescue or offering some hay as they graze the corn. The reasons for grazing corn are not just because the cows got out anymore.

Establishment

For many areas, the needed equipment to plant corn is available. Small corn planters are easily found on used equipment lots today. Neighbors may be hired to custom plant corn as well. No-till grain drills available through NRCS may also be obtained if they have a large enough seed opening as to not crack the kernel. Typical corn planting recommendations for grain or silage production are generally employed for establishing corn for grazing. Herbicides used need to be livestock friendly. The use of herbicides is often part of the management to eliminate undesirable weeds in the field and shouldn't be avoided, but be sure to follow the label regarding grazing restrictions.

Fertility needs are dependent on when the corn is to be grazed. If corn is to be grazed as mature corn, with full grain development, the fertility recommendations would follow those for the expected level of grain production. Often, for those looking to graze green corn as part of a grass-fed system, corn would start to be grazed around V12 stage and ceased by R1 (See Addendum). As shown in Figure 1 below, the percent nitrogen uptake by R1 stage or when the first silks are visible outside the ear is approximately 70%. Based on this fundamental, if corn is to be grazed prior to grain set, the nitrogen fertility could be reduced by 30-35%. However, to the knowledge of the authors, there has not been research investigating the level of fertility and impact on subsequent grazing performance.



Source: https://agronomator.wordpress.com/ Accessed January 10, 2016.

Planting rate is also dependent on how the crop is to be used. Recent research from the corn belt region suggests that increasing plant population using narrow row planting can boost yields for corn silage (Cusicanqui and Lauer, 1999; Cox et al., 1998). Greater plant populations can also increase competition for soil moisture and nutrients. Extreme increases in plant populations can greatly reduce ear development and grain yield. This may be desirable if one wants lower rates of gain as would be the case for bred heifers and dry cows or if the corn is to be part of a grass-fed program. Yet, limited research has been conducted regarding planting rate and subsequent animal performance.

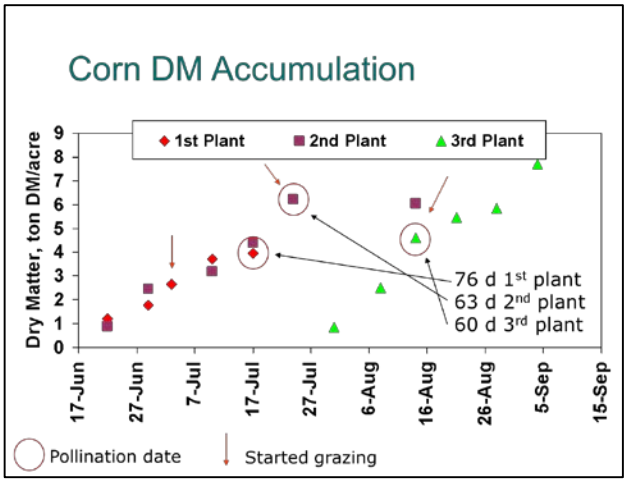
Grazing Standing Corn

Grazing corn at different maturities was investigated by Karsten and co-workers (2003). During 1998, 1999, and 2000, they investigated three hybrids and stage of growth at grazing at the Pennsylvania State University Dairy Cattle Research and Education Center. The corn was grazed at silking (R1) and milk-dough stage. Dry matter yield was greater each year for milk-dough compared to silking stage (13,509 vs 9,857 lb/a). When grazed, the percent utilization was not affected by stage of maturity and ranged from 49.5% to 71.4%. When considering the costs of planting corn, yield is an important factor regarding profitability as is the grazing efficiency. These researchers found grazing at milk-dough stage led to greater economic yield value in two of the three years and ranged between $210 to $421 per acre.

In Central Indiana, Eric Stickdorn opted to plant corn directly into fescue sod for his small beef cow herd. His rationale was to provide summer grazing while still having the fescue to graze. This producer custom-hired the planting, used surplus seed from friends that was at no cost, used

no fertilizer in 3 of 4 years. Cost of planting ranged between $65 to $325 per acre with the highest being the year fertilizer was applied. When he calculated the value of the feed from corn it ranged from $125 to $500 per acre which was a result of not having to feed hay valued at $25/bale. The highest feed value was obtained the year he fertilized, yet it was also the lowest return at 54% of hay saving less planting expenses. The years he opted to not fertilize yielded returns of 56%, 92% and 113%. He noted that the corn was pale yellowish-green showing typical nitrogen deficiency and no ears developed when fertilizer was not used. But he was wanting forage and not grain so this was acceptable even though it came with a reduction in yield. Keep in mind that he didn't have any seed cost figured into his return as he was getting left-over seed from neighbors and friends. This on-farm demonstration illustrates how creative producers can be while seeking to fill the summer slump.

Iowa producers Bruce and Derek Carney wished to see how well grazing corn would fit their cattle operation. Corn was split planted with half planted on May 4 and the remainder on May 18th. It was later grazed from July 18 to August 8. Using historic weather data, it was estimated that the GDD was approximately 1,400 from planting to grazing. At 60 days post-planting, this suggests the plants were likely near V14 stage or greater at grazing. During this period daily gains for 500 lb stockers averaged 2.5 lb/d. They calculated that the corn provided 72.9 animal days per acre (ADA) where ADA = [(lbs of live weight grazed / 1,000 lbs) * days grazed] / acres. Consider this would be forage production for this acreage from May 4 to August 8 or roughly 90 days. Additional grazing could be had following corn with a winter annual such as wheat, triticale, brassicas or other annual.

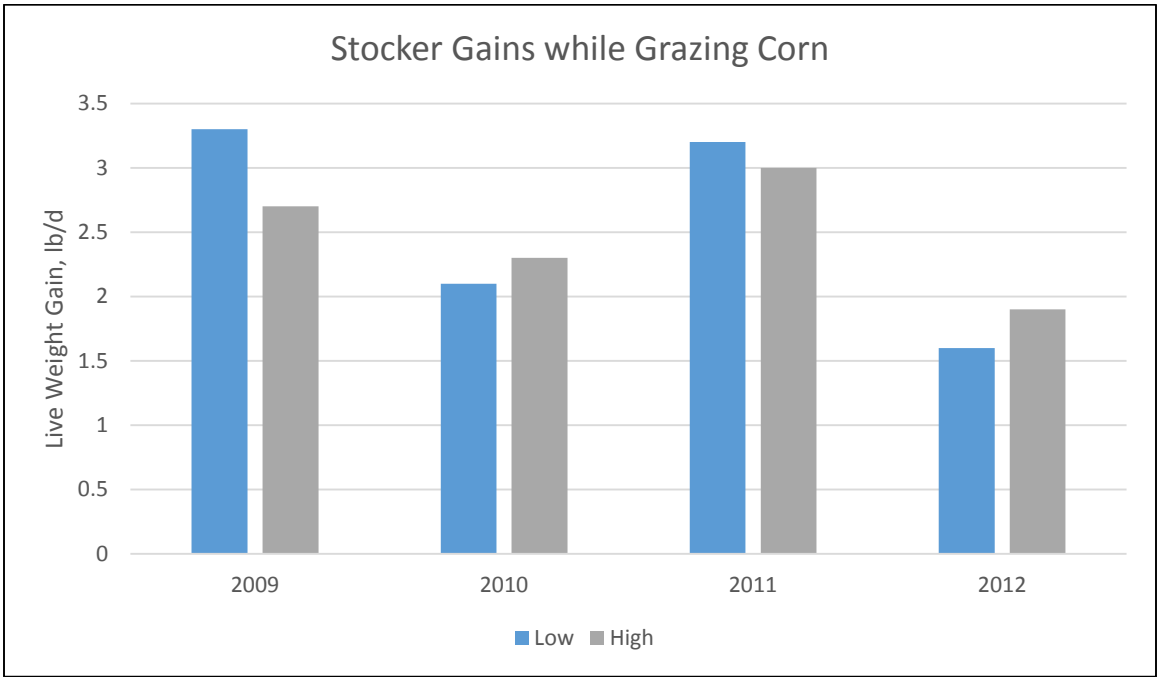


Lehmkuhler investigated grazing corn as part of a pasture-finishing system at the Lancaster Agricultural Research Station, Lancaster, Wisconsin. Corn was stagger planted on three dates May 2, May 22 and June 15 of 2007. Figure 2 demonstrates the impact of GDD with respect to stagger planting. Corn was planted in 30" rows with a targeted population of 33,600. Early plantings with cooler temperatures slow plant maturation and this needs to be considered when timing the plantings if grain set must be avoided. The first and second plantings reached R1 stage within a 5 days of one another while the second and third plantings more accurately reflected the interval between plantings. Also note the rapid biomass or dry matter production potential of corn. Grazing was initiated 60-73 days after planting and 4-6 tons of dry matter production (with the two later planting dates) was achieved in this short period of time.

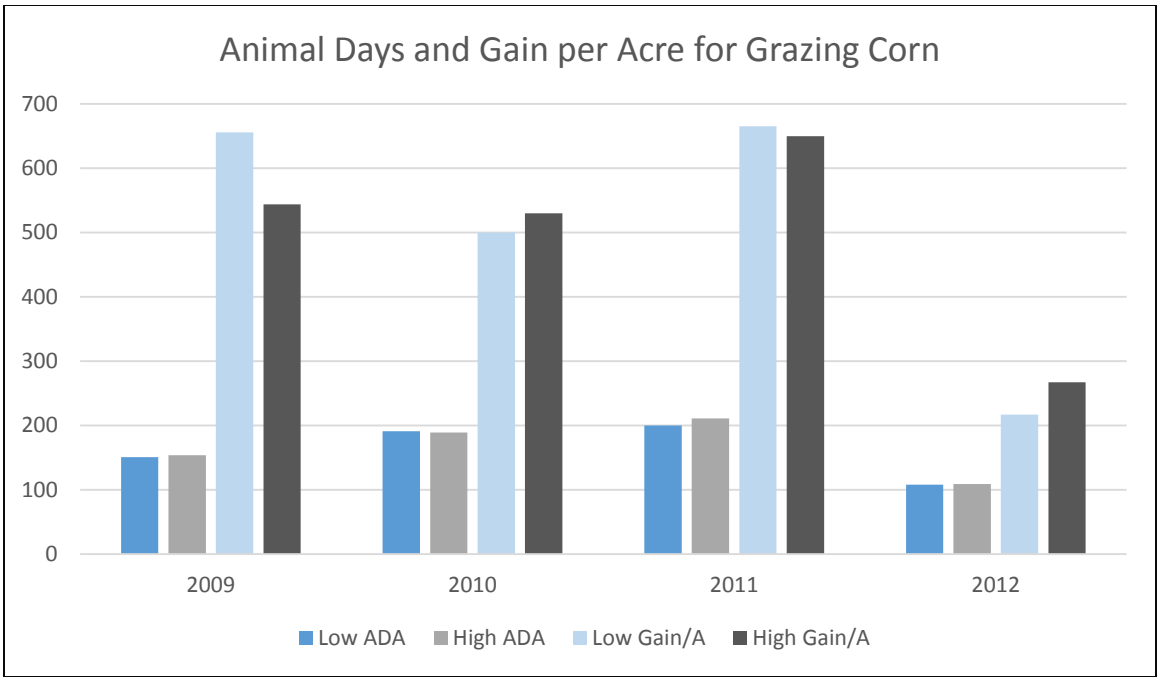
Research on grazing corn was conducted during the years of 2008-2012 at the C. Oran Little Agricultural Research Station in Versailles, KY. Heavy feeders were moved from fescue pastures to corn. As with anything new, the first year is often a learning year. Recall that 2008 was a very

dry year with only 11.9 inches of rain falling from May 1 to September 30 and drought conditions limited corn growth. The following four years 2009, 2010, 2011 and 2012 plant population (30,000 vs 50,000) was investigated. However, dry conditions in 2012 limited corn growth and grazing again. The first take home point is that annuals come with the risk of suffering from suboptimal growing conditions. This is arguably not different than with perennials except that there is more out-of-pocket expense with the annual forage.

In 2008, cattle gains on corn were high, averaging 2.7 lbs/d but the ADA was relatively low at 120. This first year demonstrated to us the potential for high rates of gain for stockers on corn.



The following four years of grazing corn provided gains that ranged from as low as 1.6 lb/d to 3.3 lb/d (Figure 3). Gain response by population was inconsistent and higher planting rates did not provide a clear advantage over normal planting rates. This was true also for animal days and gain per acre. As seen in Figure 4, the animal days ranged between 151 and 211 days per acre for the three years when adequate precipitation was received while fewer grazing days were available in 2012. Gain per unit of land was very acceptable, ranging between 500 and 665 lbs per acre. Again, poor animal performance combined with a shorter grazing duration resulted in much less gain per acre in 2012.



A field demonstration was performed at the Princeton Research and Education Center in 2014. Corn was planted on 9.2 acres with a target population of 60,000 plants/acre on April 24th. Grazing was initiated on July 7th with 33 replacement heifers averaging near 700 lbs. Higher planting rate was used as limited grain was desired to prevent excessively high gains of replacement females and to reduce the risk of foundering. Five heifers were culled on July 25th and the remaining heifers grazed the corn until September 22. Heifers averaged 2.2 lbs over the 77 day grazing period providing 191 ADA, similar to the higher end of carrying capacities reported above.

Economics

Corn can obviously be grazed and provide high levels of animal performance. The main question remaining is whether it is economical. Mississippi co-workers (Anderson et al., 2008) utilized research on grazing corn from Mississippi to investigate the economic aspect. They compared sending feeders directly to the feedlot after grazing ryegrass to grazing ryegrass followed by corn before feedlot finishing. Under these scenarios they observed that with the conventional system (cattle directly to the feedlot after ryegrass) had a gross margin return of zero or less just 15% of the time. When cattle grazed corn after ryegrass, the gross margin return was zero or less 30% of the time, indicating much greater economic risk. The mean gross feeding margin was $92/hd for the conventional system while grazing corn reduced this margin by $25 to $67/hd. It is important to keep in mind the systems being compared. Individuals will need to consider why they are grazing corn and conduct a cost analysis specific for their system.

Management Considerations

There are many things to consider before grazing corn. Several are listed below, but realize that it is important to visit with someone that has done this before to obtain valuable input from them and prevent making the same mistakes they did.

- Strip graze – critical to increase utilization and reduce risk of foundering/acidosis if grazing when grain has developed
- Protein supplement – Corn is relatively low in protein once it is past the V12 stage and protein supplement will be necessary for optimal gains of growing cattle
- Heat stress – Standing corn can act as a wind break and is often grazed during periods of high temperatures and humidity. Portable shade structures or having access to natural shade is important.
- Knock down enough corn – Drive down corn with a tractor or truck when setting up the temporary fence for strip grazing. Too small of a strip can result a shorted out fence from cattle reaching across fences, pulling corn down or simply from walking through the corn and laying across the fence.
- Having stockpile fescue or hay available will help lower the chance of foundering when grazing mature corn.
- Give cattle access to a grass waterway or stockpile fescue to bed down – Cattle will avoid laying down on the corn stalks as they are uncomfortable to lay on.
- Muddy conditions should be avoided to reduce compaction

Conclusion

Corn is a versatile grass that can be grown across a broad geographic area. Rapid growth can allow cattle to graze soon after planting. Performance can be exceptional during periods of the growing season where growth is often near zero when grazing fescue pastures. However, the overall economic return will be dependent on factors that provide corn the best opportunity to be productive.

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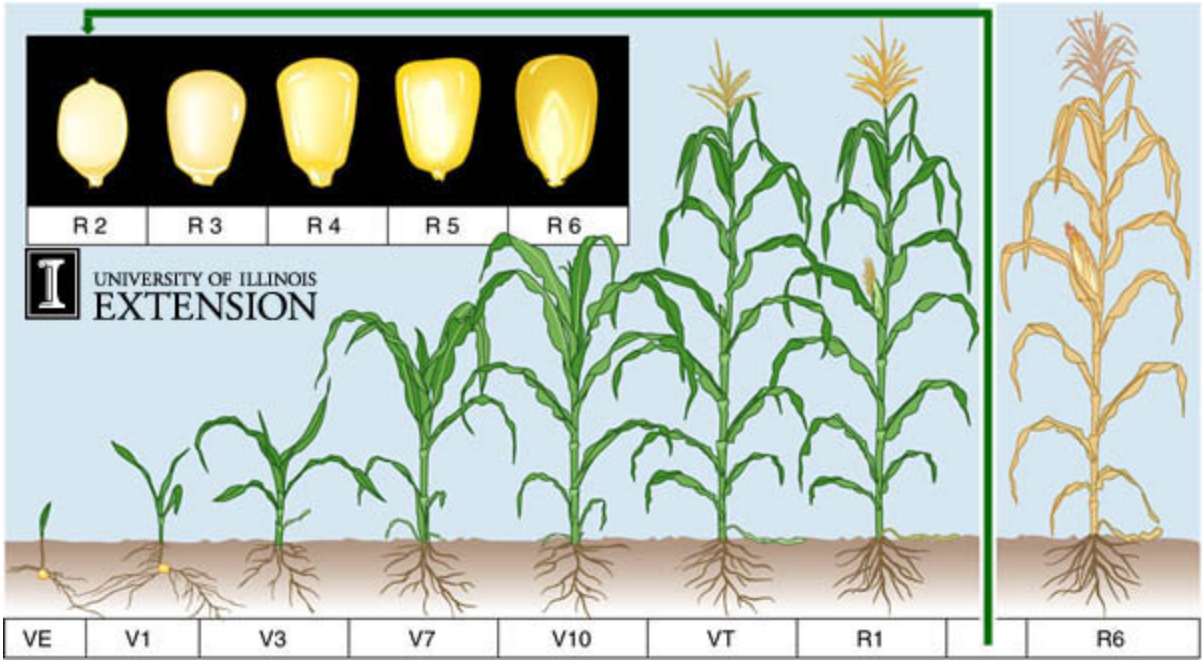
Addendum

Corn growth stages.



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