Supplementing Cattle on Pasture: When, What and How Much?

Roy Burris
Extension Beef Cattle Specialist
University of Kentucky

The biggest advantage of maintaining cattle in the southeast is our ability to grow forages. It is generally an economic advantage to make maximum use of our forage and then supplement only when needed to meet our production goals. Judicious use of extra nutrition to grazing cattle can allow us to meet an objective which was best stated by Hoveland in 1986:

> "Our objective is to maintain pasture at the highest quality that the environment will allow and efficiently convert as much of the pasture as possible into saleable animal product."

There are times when we might consider supplementation on pasture:

- Increase daily gains
- Increase carrying capacity (maybe)
- Provide a carrier for growth promotants, coccidiostats, bloat control products, etc.
- Teach calves to eat before weaning
- Tame cattle or facilitate daily "checking" of cattle
- Increase protein intake on dormant grass

There are some things to consider when selecting a feed ingredient or deciding how much of an ingredient to feed. Sometimes when concentrates (grains) are used to supplement forage diets, gain responses may not be as expected. The difference between expected and observed gain may be due to the effects of concentrate on voluntary forage intake (it may decrease or increase). There may also be <u>associative effects</u> between concentrates for forages which may result in cattle gains on mixed (forage/grain) being lower than expected.

- **High starch containing feeds have a negative effect on forage digestibility**

Research at Kentucky has shown that supplementing pasture with a high starch feed (corn) does not give a linear increase in gain as we increase supplementation.

Corn supplementation to steers grazing fescue.				
	Corn (lbs) per head			
Item	0	1.4	2.8	4.2
ADG, lbs	1.32	1.75	1.75	2.00
Increased ADG, lbs	--	0.43	0.43	0.68
Feed/gain, lbs	--	3.5	7.0	6.0

Ely (1995) UK

The first level of supplementation gave a good increase in performance with a 3 to 1 ratio of feed to gain. However, further increases were not as efficient. These data are similar to work at Michigan State University.

Different levels of grain supplementation to pasture cattle.			
Amount of grain addition (lbs/d)	Gain response		F/G
	lbs	%	
1	.23	+15.2	4.3
2	.24	+15.4	8.3
3	.28	+18.1	10.7
4	.38	+30.1	10.5
6	.47	+33.1	12.8
8	.41	+35.7	19.5

Rust (1987) Michigan State University

Data from the following trial illustrates what happens to hay (forage) intake and hay organic matter digestibility as we increase the grain (starch) supplementation.

Effect of increasing corn on hay intake and digestibility.				
	Corn, lbs/day			
	None	2.2	4.4	6.6
Hay DMI, lbs	19.3	18.0	14.1	11.2
Total DMI, lbs	20.9	21.1	18.6	17.2
DOMI, lbs	7.5	8.4	7.1	7.3
Hay OM Digest, %	36.5	35.1	23.6	18.9

JAS 65:557

More interesting, perhaps, is what happens to hay intake when we use soyhulls at the same rates as the previous trial, instead of corn.

Effect of increasing soybean hulls on hay intake.				
	SH, lbs/day			
	None	2.2	4.4	6.6
Hay, DMI, lbs	21.4	22.3	21.6	19.9
DOMI, lbs	10.6	11.8	12.3	12.7

JAS 68:4319

These data indicate that soyhulls were not decreasing voluntary intake of hay. In other words, soyhulls supplemented the hay rather than replacing it. That is usually our goal when supplementing forages.

- **Highly digestible fiber feeds to not have the negative effect on forage digestibility**

Supplements with high grain content have high energy values due to their high levels of starch. High levels of starch and sugar are rapidly fermented, resulting in a lower rumen pH. This results in lower intake and digestibility of forage when starch intake reaches a critical level. It can possibly result in acidosis and founder. Some feeds have low levels of starch but relatively high levels of energy because of highly digestible fiber – like soyhulls (SBH), corn gluten feed (CGF), dried distillers grains (DDG), etc.

High energy low start supplements.

Feed	CP	UIP % CP	TDN %	Starch %
DDG	30.4	52	90	18
DBG	29	50	66	10.7
SBH	12	25	77	6
CGF	23.8	22	80	25.4

NRC – Beef 2000 Update, PAS 16:69-99

Research at UK-Princeton has shown that high-fiber supplements are better choices than traditional grain-based supplements for cattle on pasture. The following trial indicated that on a pound-per-pound basis soyhulls are better than grain.

Type of energy supplement and gain of steers grazing stockpiled fescue

Supplement	Corn/SBM	Soyhulls
Steer Wt., lbs	648	629
Sup. Intake, lbs	7	7
ADG, lbs	1.4	1.8

KY. PR-417, p. 86

The next trial showed the same trend when calves were fed different supplements and given free-choice access to hay. Calves consumed about 3½ lb more hay when they were fed the high-fiber supplement (SH/CGF).

Different feeding regimes for conditioning weaned calves (45 days postweaning)			
	Feed		
	Corn/SBM[1]	Soyhulls/ Corn Gluten Feed[2]	Commercial[3]
Steer calves, no.	15	15	15
Pens	3	3	3
Calves/Pen	5	5	5
Initial (Weaning) Wt. lb	517.4	515.9	516.5
Final Wt. lb	628.1	655.3	658.3
Postweaning gain, lb	111.5	138.7	141.7
Postweaning ADG, lb	2.48	3.08	3.15
Suppl. Intake, lb/da	10.4	10.4	10.4
Hay Intake, lb/da	11.8	15.1	11.5

[1]Diet consisted 88% corn and 12% soybean meal with hay ad lib
[2]Diet consisted of 67% soyhulls and 33% corn gluten feed with hay ad lib
[3]Diet consisted of a commercial preconditioning feed (14.6% CP) with hay ad lib

Another study shows that steers are more likely to need extra feed during the last part of the grazing season – when forage quality might diminish and, more importantly, maintenance requirements increase as bodyweight increases.

Supplement (soyhulls) timing for steers grazing brome pasture			
	None	3 lbs all season	6 lbs last half
Steer Wt., lbs	689	689	689
ADG, lbs	1.38	1.45	1.69
Lb feed/lb added gain	--	42	9.7

JAS 66:2959

To summarize, we supplement when the animal needs more nutrients than the pasture will provide. That may be when pasture quality diminishes and when bodyweight of calves increase – generally in the latter part of the grazing season. We only supplement when it will yield a positive economic return and not decrease utilization of the forage.

What do we feed? Unless we feed at very low amounts (1 to 2 lb/hd/day), we should choose one of the high-fiber/low starch supplements – like soyhulls, corn gluten feed, distillers grain, etc.

How much do we feed? Cattle are more efficient at lower levels of supplemental feed intake and they won't reduce forage intake as much at lower levels (less than free-choice, for sure). The biggest enemy to profitable supplementation of cattle on grass is starch and … self-feeders.