Blondes Top for Residual Feed Intake

Residual feed intake (RFI) is the difference between actual feed intake and the expected feed requirements for maintenance of body weight and growth. Unlike feed conversion ratio (FCR), where faster growing bulls have better FCR, residual feed intake (RFI) is independent of production (ie: growth). Basically RFI measures the feed intake it takes for an animal to stay alive and keep its body functioning.

A study by Schenkel et. Al. (2004) found that the leaner breeds, Blonde d'Aquitaine and Limousin, were superior for the residual feed intake traits (RFIp & RFIc). Data included purebred bulls from six breeds tested from 1991 to 2000 in Ontario. A total of 2,284 records were available on FI, FCR, and residual feed intake, 3,685 records on IFAT, 5,364 records on REA, and more than 13,100 records on ADG, BF, SC, and HH. Test groups were defined as bulls fed at the same evaluation center with the same starting test date. Bulls from the following breeds were present in the data set used for analyses: Charolais, Limousin, Simmental, Hereford, Angus (Red and Black), and Blonde d'Aquitaine.

The results also indicated that the traits measured in the bull evaluation program are moderate to highly heritable with the exception of intramuscular fat (IFAT). This indicates that genetic change can be made by selection for these traits. RFIp and RFIc had similar heritabilities, which were higher than heritability for ADG. Genetic correlations of RFIc with ADG and backfat were essentially zero, which indicate that selection on residual feed intake could be implemented to reduce feed intake and improve feed conversion without compromising growth and leanness.

Breed differences for growth rate (ADG), size (MW, HH), fatness (BF, IFAT), and scrotal circumference were similar to those previously published from the bull evaluation program (Table 4 - opposite page). Breed differences were expressed as differences relative to Charolais. Evaluating feed intake and related feed efficiency traits ,on the other hand, have brought new insights into differences among breeds for these important traits. It showed something that Blonde breeders have long known to be true. Blonde d'Aquitaine had lower FI, FCR and more importantly lower RFI, while at the same time exhibiting similar ADG to the other breeds. Because it takes less feed to put on a pound of lean compared to fat, it could be argued that this is not surprising. However, even with an adjustment for backfat (RFIc) the relationship between fatness and residual feed intake across breeds was apparent. The leanest breed, Blonde d'Aquitaine, remained the most efficient based on residual feed intake with or without adjusting for fat, and Angus remained the least efficient. The Blondes also had the largest REA (indicating more muscle in the carcass) and the least backfat. This fact combined with the finer bone structure of Blondes produces a very high yielding carcass.

Table 4. Breed difference estimates for traits related to feed efficiency, growth and body composition of station-tested beef bulls

Breed[a]	RFIp[b] (lb/d)	RFIc (lb/d)	FCR (lb/lb)	FI (lb/d)	ADG (lb/d)	BF (mm)	IFAT (%)	REA (in^2)	MW ($lb^{0.75}$)	HH (in)	SC (cm)
CH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LM	-0.71	-0.73	-0.04	-2.49	-0.44	-0.20	-0.32	0.44	-12.21	-0.46	-2.97
AA	1.10	0.42	0.38	0.11	-0.22	2.64	1.10	-1.67	-6.84	-0.87	0.89
SM	0.33	0.33	0.15	0.42	-0.04	0.28	-0.05	-0.02	5.34	0.22	2.44
HE	0.13	-0.64	0.15	-1.39	-0.37	2.93	0.15	-2.06	-10.98	-0.89	-0.92
BD	-1.06	-0.84	-0.13	-2.14	-0.31	-1.22	-0.53	1.20	-8.12	-0.32	-2.75

[a] Charolais, Limousin, Angus, Simmental, Hereford and Blonde d'Aquitaine, respectively.
[b] RFIp= residual feed intake; RFIc= residual feed intake with extra adjustment for BF;
FCR= feed conversion ratio; FI= daily dry matter intake; ADG= average daily gain;
BF= backfat thickness; IFAT= intramuscular fat; REA= rib eye area;
MW= mid-test metabolic weight; HH= hip height; SC= scrotal circumference.

F. S. Schenkel, S.P. Miller, and J.W. Wilton GENETIC PARAMETERS AND BREED DIFFERENCES FOR FEED EFFICIENCY, GROWTH AND CARCASS TRAITS OF BEEF BULLS Centre for Genetic Improvement of Livestock , Department of Animal and Poultry Science, University of Guelph (2004).

The Real Answer to Tender Beef

As producers and consumers we have been inundated with marketing that heralds Triple A (AAA) marbled beef as the highest standard in culinary beef excellence. While it is true that marbling is important in the beef eating experience, there are other factors at work.

We often hear that beef with a lot of marbling produces the most tender beef, however marbling is a very poor predictor of tenderness. Marbling has a small impact on the tenderness of the beef, primarily by acting as a lubricant during chewing. It's major contribution is to the taste of the beef; fat is what gives each species it's own distinct taste. For example if a person could remove all the fat from meat, you wouldn't be able to tell (by taste) beef, from pork, chicken, lamb, etc.

So what about tenderness? The truth is that many factors outside the control of cattle producers are a large factor. How the beef is cut and cooked, age of animal and stress factors prior to harvest all have a huge effect. So what can we control? We know that marbling can contribute to tenderness, but there's more to it. Collagen and Shear Force.

Collagen is a major structural protein, that forms molecular cables that strengthen the tendons and vast, resilient sheets that support the skin and internal organs. Collagen provides structure to our bodies, protecting and supporting the softer tissues and connecting them with the skeleton. However, collagen is also present in the muscle (meat). The same collagen that makes our skin, tendons and ligaments so strong can also make your steak tough and chewy.

Shear Force is a measure of the pounds pressure required to cut through a core of meat; the lower the pounds of force needed, the more tender the meat is.

Certain breeds of cattle that naturally produce leaner beef have been proven to also produce more tender beef when compared to other breeds. The reason for this may well lie in the amount of collagen in the beef. A study by Dufey & Chambaz (2006) found significant breed differences in meat quality and evidence that increasing intramuscular fat content did not contribute to improve meat quality. Results are presented in the table below.

As shown above, the major differences were in % IMF, collagen (connective tissue), and shear force. As expected, Angus steers had the highest IMF, followed by Simmental and Charolais; Limousin, Blonde, and Piedmontese steers had the least. Interestingly, collagen content and shear force followed the same trend as IMF with Blonde and Piemontese being the lowest (ie: most tender beef). Ratings of tenderness by a human sensory panel were in agreement with shear force values.

	Breed					
Item	Angus	Simmental	Charolais	Limousin	Blonde-d'Aquitaine	Piedmontese
Protein, %	21.2	21.8	21.6	22.4	22.7	22.8
Intramuscular fat (IMF), %	2.6	2.3	1.8	1.3	1.1	1.3
Collagen, mg/100 gm	559	550	545	495	431	456
Shear force, lb	6.24	6.52	6.48	6.13	5.91	5.49

Dufey P.-A., Chambaz A. Sensory meat quality of steers of six beef breeds. Agrarforschung 13 (11+12), 464-469, 2006

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Blondes = Beef

Now that you have read some of facts regarding Blonde cattle, how do you put this new knowledge to work? Well, the common theme to the traits in which Blondes excel is Beef Production. As we saw from the Residual Feed Intake (RFI) study, Blondes were the most efficient in terms of Feed Conversion and RFI. They used the least amount of feed to produce a pound of beef. That study also showed us that Blondes had the least backfat and largest rib eye area (ie: most muscle), thus very high yield and cutability. The meat tenderness study showed us that Blondes have lower collagen levels and more tender meat (lower shear force) than most other breeds. We also saw that Blondes will not marble as well as the other breeds in the studies.

From a commercial perspective (for conventional beef production) the Blonde breed is best positioned as a Terminal sire to be used on British breed cattle. There are a lot of commercial Angus (black or red), Hereford and Baldy herds out there currently being bred back to their own breed or other British breeds. These cattlemen could benefit immensely from the hybrid vigour provided by the use of a Blonde bull. Basically hybrid vigour allows you to produce more pounds of calf with the same resources. Blondes are also the easiest calving of the major French breeds as they are finer boned, and don't muscle up until about one month of age. Colour can also be a concern for some cattleman. Blondes range in colour from almost white to tan to dark red. When bred to red or black hided cattle they often produce red or black hided offspring. If you use a lighter coloured Blonde bull you may get tan or smoke coloured calves.

The resulting calves will also excel in the feedlot with a combination of feed conversion and RFI from the Blondes with the gut capacity and gainability of the British cattle. On the rail the Blondes provide the REA and cutability and lower backfat while the British provide the marbling. On the plate the Blondes have lower shear force (more tender), again combined with the marbling from the British to provide the flavour.

There are also premium markets for lean, healthy beef. High percentage Blonde cattle work very well in this respect as well. Any way you look at it Blondes equal Beef.