Beef Briefs

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THE ECONOMICS OF COW SIZE AND MILK PRODUCTION

Beef breeders have several tools available to them to rapidly change the individual cow size and productivity of the herd.

The use of expected prodigy differences (EPDs) is a widely accepted and accurate means of improving growth performance and milking ability. However, these changes do not come without some cost to the enterprise.

The nutritional requirements of a beef cow are based on:

- The weight of the cow as a means of determining the maintenance or the amount of feed needed to keep the animal alive and functioning.
- The stage of production such as gestation, lactation, or growth.
- The environment, particularly for outside temperature.
- The rate at which animals are expected to grow.

The first two are of greatest importance to the cow-calf operator, since we do not expect the environment to drastically and consistently change feed needs in Pennsylvania. We will dedicate the remainer of the information to mature beef cows.

Cow size

Mature cow size will change when there is selection for larger frame size and greater yearling weight in replacement heifers because there is a positive genetic correlation between these traits and mature size. That is, as selection for larger frame size and yearling weight continues, the mature size of the cow herd will also increase.

Since maintenance feed requirements are based on cow weight, it follows there will be a greater feed requirements as the cattle get bigger.

In Table 1, the actual differences in feed needs are detailed for cows with similar potential for milk production, but varying in mature weight by 300 pounds.

Table 1
Nutritional Requirements of Cows of Differing Weight and Similar Milk Production (1)

	Cow Weight					
	1000 pounds			1300 pounds		
Stage (2)	1	2	3	1	2	3
Nutrient (3)						
Total protein	88	1.06	1.90	1.06	1.24	2.19
TDN	7.74	9.36	10.75	9.35	10.93	12.39
Net energy	7.52	7.52	7.52	9.33	9.33	

(1) NRC, Nutritional Requirements of Beef Cattle.
(2) 1=Mid pregnancy; 2= Last 1/3 of gestation; 3=First 3-4 months of lactation.
(3) Total protein=pounds per day; TDN=Total digestible nutrients in pounds per day; Net energy= Mcal per day.

To describe the difference in these requirements on a corn-equivalent basis valued at $2.75 per bushel, the following calculations can be made:

Maintenance:
9.33 Mcal NEm/day-7.52 Mcal NEm/day=1.81 Mcal/day;
1.81 Mcal/.92 Mcal per pound of corn=1.96 pounds of corn per day;
1.96 pounds corn X 365 days= 718 pounds corn per year;
718 pounds/56 pounds bushel= 12.8 bu. corn per year;
12.8 bu. X $2.75 per bu.= $35.26.

Production:
For 6 months 105% of maintenance= .376 Mcal/day;
.376/.92 Mcal per pound of corn= .4 pounds of corn per day;
.4 pounds X 180 days = 72 pounds of corn;
72 pounds of corn @ $2.75/bu.= $3.54.
For last 3 months of gestation: 10.93 pounds TDN-9.36 pounds TDN= 1.57 pounds TDN;
1.57 pounds TDN/81% TDN in corn= 1.94 pounds corn per day;
1.94 pounds X 90 days= 174.6 pounds corn;
174.6 pounds corn @ $2.75/bu.= $8.57.
For first 3 months of lactation: 12.39 pounds TDN-10.75 pounds TDN=1.64 pounds TDN/day;
147.6 pounds TDN/81% TDN in corn= 182.2 pounds corn;
182.2 pounds corn $2.75/bu.= $8.95.
Total additional annual cost of 1300-pound cow : $56.32.
It follows that the heavier cow must indeed be more productive (produce more annual value in weaning weight) in order to recover this additional cost to the enterprise.

Milk production

The addition of maternal milk production EPDs has given breeders the ability to change milk production potential in the cow herd through direct selection for the trait. Again, more milk production does not come without a cost, since more feed is needed to produce that milk. Similar to cow size, a scenario can be developed to describe the actual cost of this additional production.

Table 2
Feed Requirements of Cows of Differing Milk Production at 1200 Lbs. Body Weight

Nutrient (2)	Average Milk production	Superior Milk
Total protein	2.11	2.95
TDN	11.91	14.88
Difference	.84	2.97

(1) NRC, Nutrient Requirements for Beef Cattle.
(2) Total protein= pounds per day; TDN= Total digestible nutrients in pounds per day.

Using the same procedure as described for the calculations for cow size, this results in an additional 330 pounds of corn for the 90-day lactation period for the heavier milking cow. Again valued at $2.75 per bushel, this is an additional cost of $16.20.

However, since milk production also entails a greater protein requirement compared to size, additional protein supplementation is also needed. The values in Table 2 indicate there is an additional 46 pounds of protein required for the 90-day period for the heavier milking cow in addition to what the corn would supply.

On a soybean meal equivalent basis valued at $300 per ton, this means the additional protein cost is $15.65. The total cost for the additional milk production is $31.85 for the 90-day period for cows of the same body weight.

In the case of both larger size and greater milk production potential, there is an additive effect on feed requirements. Determination of the additional cost of both cow size and milk production would include adding the additional cost of maintenance and gestation for the larger cow as previously shown ($35.26+$3.54+$8.57+$8.95) with an additional cost for the milk production in a 90-day period.

For 1000-pound average milking cows vs. 1300-pound superior milking cows, the additional feed energy requirement is 416 pounds of TDN. On a corn equivalent basis, this would be $25.20 worth of additional corn.

The protein requirement for the 90 days not supplied by the corn is 57.3 pounds of actual protein. On a soybean meal equivalent basis at $300 per ton, this cost is $19.53 for protein supplementation. Therefore, the total additional cost to cow size and milk production is $101.05.

It is easy to see there must be substantial additional production from cows that are selected for both larger mature size and milk production. Beef breeders must balance this selection with their feed resources to effectively increase profit potential to the enterprise.

Chester Co. Offers Tractor Ed Course

WEST CHESTER (Chester Co.) — The Chester Co. Cooperative Extension is offering a tractor and farm machinery education course during April.

Designed for young people aged 14-16, the course will be held Wednesday evenings, April 10, 17 and 24, 6:30 p.m.-9 p.m. at the Vo-Ag Department, Octorara High School, Route 41 and Highland Road, Atglen.

A written and driving exam will be held Saturday, April 27, 8 a.m.-noon. The cost is $3 for the study manual. Contact the Extension office at (215) 696-3500 to register.

The course will give participants 14 hours of classroom and hands-on training in the safe use and operation of farm tractors and farm machinery. A certificate will be awarded to all who successfully complete the course.

This certificate permits 14-16 year olds to operate certain machinery where they ale employed. Teens working for their parents do not require the permit, but are encouraged to attend to help prevent serious accidents on their farm.

For further information, contact the Chester County Cooperative Extension, 235 W. Market Street, West Chester, PA 19382.

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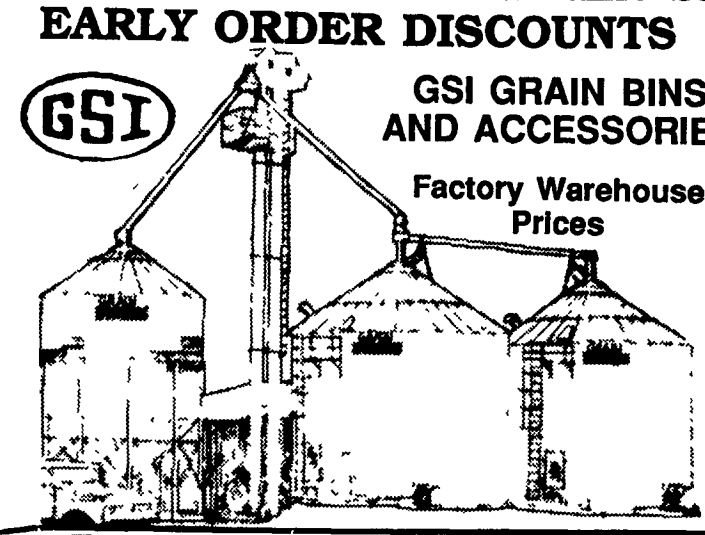

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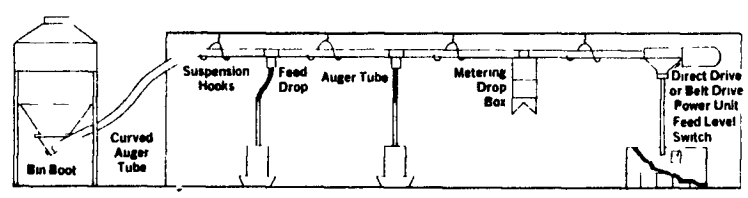

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