Food for the FACTORY

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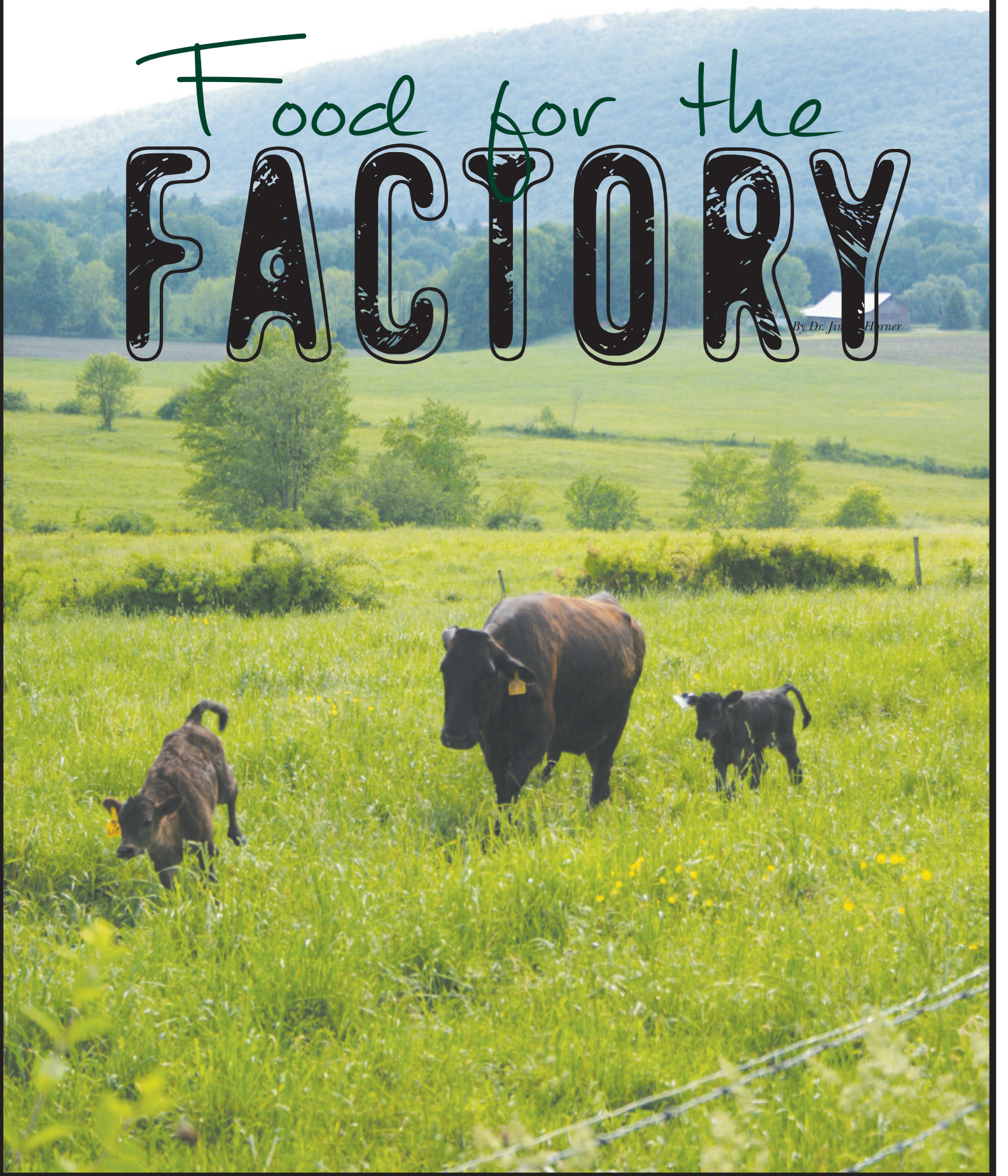

Some of you might recall a previous article I wrote for this publication a few years back entitled "It All Starts with Mom!" Well, it really does all start with mom and it's still all about her today. During this spring time of year, many of you are probably in the middle of calving season and before you know it, breeding season is here and it's time to breed heifers and rebreed those cows with the incredible cycle of life and productivity starting all over again.

Hopefully, your breeding herd is in excellent condition, has been on a good feeding program and you're completely prepared to experience another successful year with a high conception rate and a good calf crop.

A favorite quote of mine comes to mind regarding the beef cow and all that is expected of her in our industry. Freelance sportswriter, Robert Gallagher, says "change is inevitable—except from a vending machine." Change is certainly inevitable and though we may not be able to prepare for an upcoming change 100% of the time, so often it's the amount of preparation and mindset on our behalf that determines the degree of stress associated with change.

Those in the dairy industry refer to this stress as transitional stress. After growing up in the dairy industry and serving as a nutritionist for numerous dairies over the past 30 plus years, I can assure you that we spend a lot of time talking about transition cow management, the three weeks prior to calving and the three weeks after calving.

This is the most critical time in the dairy cow's life and it can have a tremendous impact on her level of productivity, how long she remains productive, how soon she breeds back, her health as well as her calf's health, etc.

For the beef industry, I am of the opinion we should also be focusing our attention on the transition cow yet I prefer to define this most critical period in the life of a beef cow not as three weeks before and after calving, but the three months before and after calving. The smoother things go during this critical time in a cow's life, the better for her, her calf and her owner.

Scientists continue to shed light on how truly important the last three months of pregnancy and the first three months of a calf's life are in "pre-determining" up to as much as half an individual's lifetime marbling potential. In addition, volumes of other beef cattle research over the past ten years continue to prove the importance of a well-nourished dam on her calf's overall health, survival rate, weaning weight, future reproductive performance, etc.

This discussion will focus primarily on the cow herself and how to best feed and manage her before and after calving to help her cope successfully with the inevitable change involved as she prepares to give birth and to rebreed in a timely manner.

A cow's greatest nutrient requirements occur in the last third of pregnancy and immediately after calving through peak milk production. During this time, a cow first uses most of the nutrients she consumes to maintain vital bodily functions and then to produce milk to sustain a hungry, growing calf.

Any remaining nutrients are then used to regain body condition and lastly to repair and/or prepare her reproductive system. So, reproduction is at the very bottom of a cow's nutritional priorities and is not even addressed until all other demands are met. Successful transition cow management must focus on body condition, nutrition and health.

To manage body condition, cows should ideally be evaluated at weaning and sorted into groups based on body condition and fed accordingly to attain moderate condition (5-6 on a scale of 1 to 9) year-round. Some cows may already be in moderate condition and simply need to maintain while others may be underconditioned and need to gain weight.

The last viable opportunity to address thin cows in the herd is around 90 days prior to calving and then fed accordingly. Though the efficiency of weight gain is lower during the third trimester compared to the second, there are certainly other benefits to an increased plane of nutrition during this time; notably improved colostrum quality and quantity which can certainly be a challenge in Wagyu dams, improved calf survival at birth, overall improved calf health and the positive impact on fetal programming for adipogenesis or marbling formation.

Because of consistently low birth weights in the Wagyu breed, concerns regarding the possibility of large calves stemming from an increased plane of nutrition pre-calving are baseless. Attempting to help thin cows gain weight pre-calving if needed is certainly much preferred to post-calving when milk yield for the nursing calf takes a much higher priority over gaining weight.

Body condition is obviously a good indicator of energy status but also potential reproductive efficiency as well. There is a very close relationship between body condition at calving and subsequent reproductive success. Getting cows to start cycling soon after calving is vital to getting cows bred and safely in calf in a reasonable time frame. The following table summarizing data from several studies depicts the importance of body condition score (BCS) at calving on days to 1st heat.

Table 1. Relationship between BCS at calving and days to first heat.

BCS at calving	3	4	5	6	6
Days to 1st Heat	89	70	59	52	31
Days to 2nd Heat	110	91	80	73	52

Data in Table 1 shows cows in BCS 5 or 6 will have 2 heats (opportunities) to breed within an 82 day window, whereas cows at 4 or lower BCS will only have 1 heat and are more likely to have an extended calving interval. There's little justification for condition scores above 7 as there is ample evidence that conception rates are lower in heavier cows. Over conditioned cows at calving also experience more calving problems and greater incidence of metabolic disorders.

Additional data in Table 2 shows the results from a trial involving over 1000 cows comparing the effect BCS during the breeding season and the resulting pregnancy rate.

Table 2. Impact of BCS at breeding on pregnancy rate.

BCS at Time of Breeding

	4 or less	5	6 or more
Number of cows	122	300	619
Percent pregnant	58	85	95

This data supports the fact that condi-

tion scores below 5 at breeding results in extremely low pregnancy rates and that proper nutrition in the breeding herd is essential for acceptable repro-

duction performance.

One of the factors often overlooked in the nutrition of beef cows is colostrum production and quality, and the associated effects on calf survivability and vigor. Cows in moderate body condition at calving tend to have healthier calves. Calves nursing cows with BCS scores of 3 or 4 had lower serum immunoglobulin (a measure of potential disease resistance) than calves nursing dams with BCS scores of 5 or 6.

It is common for 1st calf heifers to produce less and poorer quality colostrum and for thin cows and those that have been fed poorly prior to calving to produce less and lower quality colostrum as well (which contains immunoglobulins) which equates to weaker calves that are more susceptible to disease and death. The following table (Table 3) illustrates the effect of cow condition at calving on calf serum immunoglobulin concentration.

Table 3. Relationship of BCS at calving and calf immunoglobulin levels.

Cow Body Condition Score

Ig Levels	3	4	5	6
IgGa, mg/dl	1998	2179	2310	2349
IgMb, mg/dl	146	157	193	304

a Immunoglobulin G
b Immunoglobulin M

Obviously, all the cows in a herd do not need the same amount and quality of feed. One of the best ways to reduce supplemental feed costs is to separate the cow herd based on body condition which in turn dictates feed needs and feed them accordingly. Possible groupings might include:

1) Replacement heifers
2) 1st calf heifers and thinner older cows
3) Mature cows in adequate condition

Two-year-old, 1st calf heifers do not have a mature set of teeth which limits both their bite size and forage intake compared to mature cows. Replacement heifers, 1st calf heifers and thin older cows may be combined if pastures are limited.

`Producers should strive for moderate body condition in their cow herds year-round regardless of their physiological state aiming for a BCS of 5-6 in mature cows and 6-7 in heifers. First-calf heifers are often the group that is most likely to lose the most condition after calving as they are young and still growing while lactating for the first time.

If producers do not have the quality of pasture to sustain moderate condition, then feed supplementation is a must. Though forms of supplementation used by producers may vary considerably, energy is often the most limiting nutrient.

Protein may be limiting in situations with extremely low quality forage (hay and/or pasture) and though protein can be broken down into energy by the cow if needed, the need for energy supplementation is far and away more prevalent in my experience with Wagyu cattle. Common feedstuffs used to help meet energy needs are corn, corn gluten feed, soybean hulls, dried distillers' grains, wheat middlings and whole cottonseed.

Producers must exercise caution with the use of both corn gluten feed and dried distillers' grains due to their potentially high and often variable sulfur levels which can lead to PEM (polio encephalomalacia), a neurological disorder. Whole cottonseed is an excellent energy source for cattle, but its high gossypol content when fed at high levels may result in reduced fertility in bulls.

Purchased blended feeds in textured, pelleted, cubed or liquid forms may be utilized but should incorporate all natural protein instead of urea (non-protein nitrogen) as the protein portion to attain optimum utilization and reproductive efficiency. When urea is poorly utilized by cattle, excess ammonia accumulates in their system resulting in high blood urea nitrogen levels which can tax their kidneys and lead to stress as well as reduced conception.

Feeding cows prior to calving

Again, any concern about feeding cows on a higher plane of nutrition during the months just prior to calving is pretty much unfounded in the Wagyu breed in which overly large calves and calving difficulty are indeed rare. Numerous studies have demonstrated the benefits of feeding higher energy prior to calving as evidenced by its positive impact on days to 1st heat, pregnancy rate, and calf survival in the following tables.

Table 4. Effect of high and low energy feed for 90 days pre-calving on post partem anestrus.

Pre-Calving Diet	Post Partem Interval
High Energy[a]	51 days
Low Energyb	67 days

[a] High = 14.1 lbs TDN [b] Low = 7.1 lbs TDN (requirement of 11.2 lbs TDN) Johns and Ely

Table 5. Energy status and pregnancy rate.

% Cows Pregnant

Energy Status	Adequate	Inadequate
Trial 1	68	60
Trial 2	78	60

Johns and Ely

Table 6. Effect of dietary energy level pre-calving on calf survival.

Pre-Calving Energy Level

	Low	High
% alive at birth	90.5	100
% alive at 2 weeks	80.5	100
% alive at weaning	71.5	100

More calves are born dead or die soon after birth when cows are not fed

adequately prior to calving.

The calves continue to die through weaning. It is thought that higher calf mortality is due to poorer colostrum quality and quantity from poor feeding prior to calving. This results in inadequate passive immunity transfer to the calf. Calves may also be born weak and are less likely to nurse immediately further limiting immune protection.

Feeding cows after calving
Underfeeding cows after calving has an even greater impact on reproduction than underfeeding pre-calving. This has been shown by number of studies that have examined post-calving nutritional plane on subsequent reproductive performance.

Table 7. Effect of energy level post-calving on pregnancy rate at 120 days.

Post-calving Energy Intake	Pregnancy Rate %
High	87
Medium	72
Low	64

High = 24.1 lbs TDN, Medium = 13.7 lbs TDN, Low = 7.1 lbs TDN Dunn et al.

More recent results from several studies have also demonstrated the marked detrimental effect that inadequate feeding post-calving has on pregnancy rate.

Table 8. Effect of post-calving dietary energy on pregnancy rate.

Energy Status	Adequate	Inadequate
	% Pregnant	
Trial 1	95	50
Trial 2	92	72
Trial 3	87	64
Trial 4	92	76

Johns and Ely

In another summary of 8 trials, Johns and Ely also reported on the effects of dietary protein levels post-calving on pregnancy rate. Again, the reduction in pregnancy rate was significant with an average of 90% pregnant fed adequate protein and 69% pregnant fed inadequate protein.

Maintaining body condition after calving has a tremendous impact on days to first heat and pregnancy rate as research has shown that it takes cows twice as long (60 days vs 32 days) to return to estrus if they lost condition after calving compared to cows that were fed to maintain condition.

The more condition or body weight cows lose after calving the longer it takes to get then bred back and safely in calf. Even cows that calve in moderately thin can still experience acceptable reproductive performance if weight loss is avoided after calving.

Mineral and vitamin supplementation should not be considered optional. Though they usually have less impact than either energy or protein on cow/calf performance and economics, proper supplementation of these essential nutrients is critical and should not be overlooked, particularly in successful transition cow management. Levels of the various minerals and vitamins may take months to replenish with supplementation and a proper balance year-round is recommended.

Poor mineral-vitamin programs may result in metabolic disorders at calving, weak and/or irregular estrus, low conception rates, weak calves, etc. Undoubtedly, both the health of the cow and calf will be affected in the absence of a proper mineral-vitamin program. The typical cost of providing a quality mineral-vitamin program for a beef cow should not exceed $30 -$40 per year.

A good vaccination and de-worming program is also important in taking proper care of the beef cow. Vaccinating cows for scour prevention prior to calving can help her calf to be able to withstand the frequent challenge of scours. With the proper vaccine, pregnant cows can now be vaccinated for respiratory disease as well. Producers should consider de-worming their cows twice per year to avoid potential internal parasite infestation and resulting loss in body condition.

The old rule of de-worming at Easter and again at Thanksgiving works well. I know my father was especially fond of this practice as relatives were usually visiting at these times and free labor was abundant.

No time is more critical in the life of a cow and at no time does she warrant as much attention as the 3 months before and the 3 months after calving. By providing pregnant cows and heifers the steady nutrition they need both before and after calving to maintain consistently moderate body condition year-round, producers can ensure a much healthier, productive and profitable cow herd while also maximizing the health, performance and value of every new generation of calves.

During this wonderful spring time of year and all the new life and growth we all get to experience and enjoy all around us, may we never forget in our business (and life in general) that it really does all start with mom and it always has and it always will.