



NUTRITION PLUS

Volume II, Issue IV

November 2005



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CURRENT ISSUES IN HEIFER GROWTH

One of the “felt” lessons learned early by most dairy nutritionists is that too much information often leads not to better choices, but to paralysis by analysis. Take heifers. Such a conflict-generating wealth of research into their nutritional needs conducted during the last decade could explain the continuing inability to really break through the traditional barriers to growing either cheaper or better heifers, says Cornell’s Dr. Mike Van Amburgh. Some of the issues and paradoxes include:

EVEN THE ASSUMPTIONS AREN’T SAFE TO ASSUME.

Consider for instance the “considerable body of research” that’s been generated to support the universal consensus that high rate of gain hurts

REMEMBER, IT’S A SYSTEM

To see return on the higher investment involved in accelerated calf development, Dr. Van Amburgh says, calves must continue to develop and breed earlier, without sacrificing production. Accomplishing that requires a system-wide change on traditional dairies, beyond just intensive feeding.

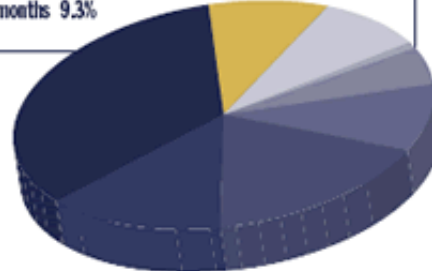
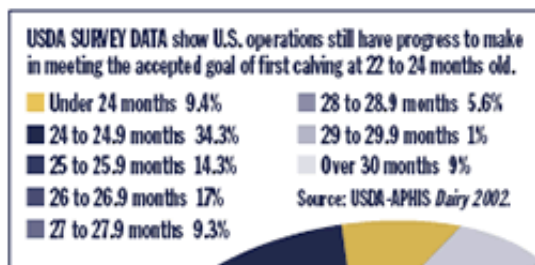
“You assume the biologically correct growth system is the best method for rearing an animal,” he says. “If biologically correct doesn’t equate to economically optimal, I would argue it’s not the biology that’s wrong. You have a bottleneck

mammary development and thus, lactation yields. Dr. Van Amburgh's group started feeding heifers at 100 pounds either high- or restricted energy diets, to gain either 1.4 or 2.1 pounds daily, serially slaughtering them at 110-pound increments through about 770 pounds. Results showed neither diet nor body weight had any significant effect on mammary tissue characteristics or development. Pre-puberty mammary development still appears to be dictated by age and not energy intake, per se.

The research into mammary development and nutrient intake has demonstrated responses that have varied from as much as a 60 percent difference in mammary development in some studies to none in those like Dr. Van Amburgh's. The variability can be explained by:

- how you define and measure mammary development
- differences in how you define "rapid" gain
- differences in genetics and mature size
- heifer ages or time on treatment
- dietary differences like the quantity of energy fed and the quality of protein used.

in the management system."



TRUST THE NEW GROWTH MODELS, BUT VERIFY.

Revisions made in NRC 2001 made our ability to balance energy and protein in the rapidly growing animal better than ever. Still (without indulging in the popular pastime of NRC criticism), Dr. Van Amburgh says it's important to remember models are usually designed to be fail-safe.

"On the farm," he says, "the real answer comes down to the need to meet a requirement." Meeting that requirement usually doesn't get us near optimizing dietary protein. Because the efficiency of dietary nitrogen for growth decreases dramatically as requirements are met, there remains much room for removing inefficiency from the system, he believes. Also, heifers tend to suffer from too much of a good thing when they're fed high-quality forages to refusal, which reduces efficiency.

With almost 400 head of research heifers serially slaughtered between his group and that of Dr. Jim Drackley at Illinois, our ability to more aggressively pursue efficiency is getting better. Dr. Van Amburgh is also in the process of work in coordination with West Central to develop starter programs that better meet the ruminal and intestinal protein needs of the fast-growing heifer, including appropriate levels of undegradable protein. Much work remains to be done in that area. Our understanding of the energy and protein exchanges—both within the rumen and to the animal during the period of rumen development—remains inadequate to fully exploit both the health and growth potential of the calf.

THE NUTRITIONIST'S ROLE.

The long and short remains that success still depends on judgments made in the field. Nutritionists can play a key role in advocating among their clients for better measurement. Despite heifer costs consuming up to a fifth of every production cost dollar, enough of that followup on management changes is still not being done now. There's still a lot of opportunity to put tapes to work on dairies raising heifers.

"Milk production and cow body condition can be measured every day," he says. "But how many people actually measure the change that occurs when a starter ration is changed? Growth is an essential component of the dairy, yet many of us in the industry have had little training or background in applied aspects of animal growth."

CONSULTANT'S CORNER

HEIFER TECHNOLOGY

Akira Saito, DVM, Zen-Raku-Ren, National Federation of Dairy Co-operative Associations, Tokyo/San Francisco

Among the Japanese dairies served by our producer cooperative, Zen-Raku-Ren, the main factors affecting farm income related to replacement programs do not differ greatly from the challenges faced by dairy producers in the United States:



- health and mortality
- development of the mammary gland
- age at first calving and cost of raising
- body size at calving
- dry matter intake
- foot and circulatory system development
- achieving full genetic potential

Our strategy in order to manage those challenges is two-fold: first, improve basic management techniques; second, apply advanced technology atop that basic technique. One example of that advanced technology is the use of SoyPLUS® in development rations. ZRR started importing SoyPLUS to Japan in 1997, based on West Central's good research history and the product's consistent quality. Our own in-house research has shown adding a source of rumen-undegradable protein with a good intestinal digestibility has helped us achieve our heifer-growing goals. SoyPLUS provides a palatable bypass protein with an excellent amino-acid profile in our prepubescent starter/grower diets. In addition to its obvious uses as a protein supplement for high-producing cows during lactation and transition, SoyPLUS has also become an important component of ZRR's calf starter and young-heifer growing ration.

ZEN-RAKU-REN HEIFER GROWTH SYSTEM TARGET EXAMPLES

	Bodyweight (lbs)	Height (in)	Condition score
First calving	1309-1360	54-55	3.50
At first AI	788-836	50	3.00
At puberty	616	48	2.75
6 months old	396	42	2.50
3 months old	231	37	2.25
Birth	99	29	2.00

BEYOND BYPASS

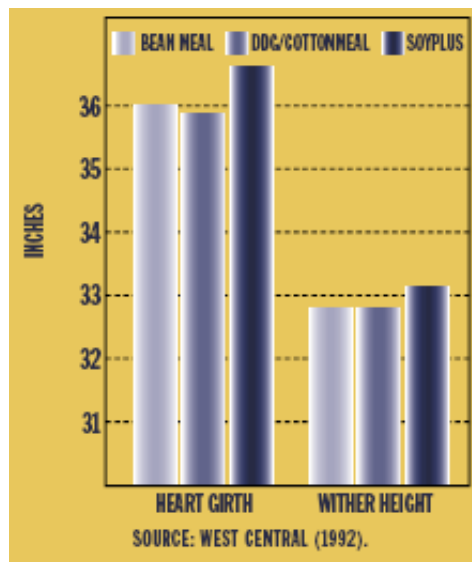
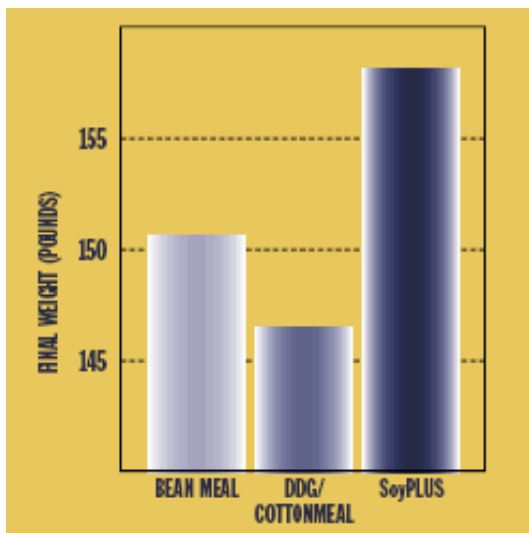
SOYPLUS® AND HEIFER GROWTH

Penn State University professor of dairy science Dr. Judd Heinrichs randomly assigned 78 young dairy heifers to starters containing one of three protein sources:

- control with solvent soybean meal
- corn distillers and cottonseed meal in combination
- SoyPLUS

All diets were isonitrogenous and isocaloric, formulated to contain 18 percent crude protein and either 36 percent or 45 percent bypass protein.

His results showed body weights were significantly greater for the calves fed SoyPLUS. Also, calves fed SoyPLUS outperformed the other calves in the important frame-development indicators. Similar trials to update the value of intestinally digestible bypass protein to improve the efficiency of heifer development are now in progress by Cornell professor Dr. Mike Van Amburgh. Results will be reported as soon as they are available.



QUALITY CORNER

TYPICAL SOYPLUS UREASE VALUE?

Urease is one of the most common laboratory methods used to determine whether soy products have been properly cooked for nonruminant uses. Typical urease values for SoyPLUS, measured as pH change, are 0.02 to 0.03 units.

In addition to in-house NIR monitoring, we send check samples to Woodson-Tenent Laboratories in Des Moines. Samples are also analyzed for bypass protein at Cumberland Valley Analytical Services in Hagerstown, Md., using an in situ method. April to July 2005 results show:

	Percent	Standard Deviation
Dry Matter	88.83 (WT) 89.49 (CV)	0.64 (WT) 0.92 (CV)
Crude Protein	42.75 (WT) 43.05 (CV)	0.57 (WT) 0.69 (CV)
Crude Fat (WT)	5.96	0.28
ADF/NDF (CV)	7.82/18.10	0.79/2.21
ADFIP (CV)	1.22	0.26
RUDM (CV)	40.75	3.31
RUP %CP (CV)	58.97	4.31
Urease Units (CV) (N=12)	0.025	0.009

*WT: Woodson-Tenent results, N=77 CV: Cumberland Valley results, N=22

The new Labconco Digital Chloridometer we've added to the new SoyChlor® plant permits hourly analysis to ensure a constant chloride level. June through August results show:

	Percent	Standard Deviation
Chloride (N=332)	9.23	0.27

FROM THE MATERNITY PEN

DRY COW LIGHT MANIPULATION

Keeping dry and transition cows in the dark for extended hours can provide benefits equal to or greater than the practice's converse in lactating cows, according to one of the originators of the practice, University of Illinois professor Dr. Geoff Dahl.

Dr. Dahl, reviewing his latest findings at this



year's American Dairy Science Association annual meeting in July, showed that a cycle of 16 hours of darkness followed by eight hours of light for the 60-day dry period improves milk production in the following lactation, compared to cows given either a reverse cycle of light/dark or left to natural ambient light cycles.

Dr. Dahl suggests these pointers for client dairies interested in implementing the practice:

- Any well-ventilated facility can work to limit photoperiod, as long as you can control light. Cows being held in darkness shouldn't be exposed to any artificial light during the dark hours.
- Infrared lighting that provides 1 to 2 foot candles can be used to handle and observe cows in the dark hours.
- Any type of lighting appears to work for the lighted hours, so the choice should be dictated by cost efficiency and intensity of light at cow level. That intensity will be based on how high the facility's structure dictates lights must be mounted. Ambient light can be used, as long as it's intense enough.
- Light intensity during the lighted hours should be 15 foot candles at 3 feet from the stall floor. Place lights so that intensity level gets dispersed over as uniform an area as possible.
- Although controlling light for just the 21 days before calving causes a similar response to doing so for the entire 60-day dry period, the response is less consistent when only done for 21 days, Dr. Dahl says.
- The dry-period light response also appears to work in heifers during their last 60 days of gestation, he says.

GET A METER, USE IT

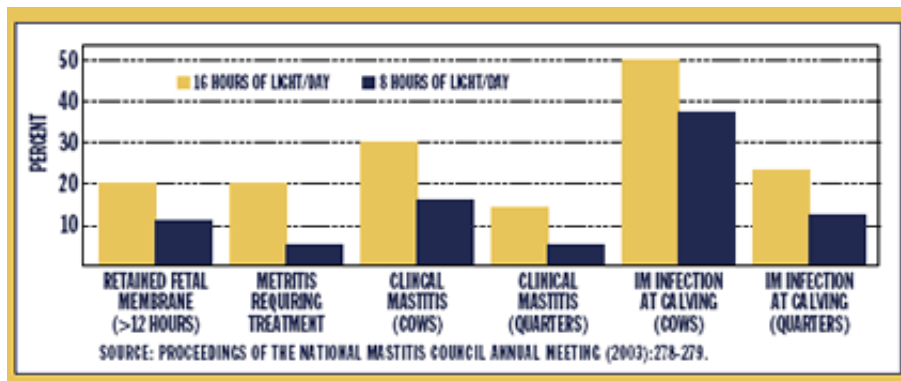
Dr. Dahl recommends investing the \$100 to \$150 for a good light meter to ensure that cows get the full 15 foot candles needed during the lighted period.



Offering metered lighting spotchecks to clients can make a good value-added service for nutritional consultants.

BETTER HEALTH, AS WELL?

Work reported by Dr. Dahl's group at Illinois showed a small group of cows treated with short day photoperiod during the dry period had numerically— though not statistically significant—improved indicators of general reproductive health. Cows in a short-day photoperiod also averaged an SCC of 250,000, compared to 650,000 for cows given long lighting.



WEST CENTRAL HAPPENINGS

WEST CENTRAL DONATES BIODIESEL FOR HURRICANE CLEAN-UP

As the clean-up from Hurricane Katrina continues in the Gulf, West Central is doing what it can to assist the ravaged area. The needs in the area are many and immediate; the ways a company can assist in the efforts are numerous. As one of the country's leading producers of soy biodiesel, West Central donated more than 6,500 gallons of fuel to help move clean-up equipment, supplies and people in and out of the affected areas.

This biodiesel donation will be distributed with the help of The Veggie Van Organization and The Federation of Southern Cooperatives. The Veggie Van Organization is a non-profit advocacy group based in Venice, Calif. The Federation of Southern Cooperatives is a cooperative working with those affected by the hurricane, primarily in rural Mississippi and Louisiana. The Federation of Southern Cooperatives has a 35-year history of successfully providing self-help economic opportunities and hope for many low-income communities across the South.

The effects of this hurricane have impacted the entire country. Cooperative organizations throughout the United States are stepping up to contribute to the relief efforts. West Central is proud to be able to do its part in assisting with this huge rebuilding process.



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