Grain Feeding Strategies to Optimize Milk Production and Body Condition

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It is still a common occurrence for dairymen to adjust grain feeding only according to the old rule of thumb; "feed 1 lb of grain for every 3 lbs of milk produced." This is fine for the mature high producing cows but it is far from accurate for all the cows in the herd. The first step in optimum grain feeding strategy is to formulate a ration for the average cow in the herd then make the following adjustments according to the stage of lactation, age, body condition and body size.

Stage of Lactation

Fresh cows should be challenge-fed grain. By challenge feeding, the cow is given the best chance of trying to balance the energy deficit in early lactation. Even with challenge feeding, fresh cows will still be in a negative energy balance for several weeks before total dry matter intake starts to peak and production levels start to decline. Also, the forage intakes of fresh cows are generally lower than cows later in lactation, therefore fresh cows need more grain to compensate for this reduction in forage intake.

Lead Feeding Grain

The purpose of lead feeding is to adapt dry cows, 2-3 weeks before freshening, to concentrate feeding so that the stress of calving is not compounded with the stress of an abrupt dietary change at parturition. Lead feeding gradually from 2 to 6 kg/d of the lactating cow grain mix will adapt the rumen microbes to the lower rumen pH induced by grain feeding. Proper lead feeding of grain is essential to minimize the prevalence of reduced appetite at calving due to digestive upsets caused by abrupt dietary change.

Drying Cows Off

Dry cows should be cut off grain at least 2-3 days prior to the planned dry off date. Corn silage and good quality forages should also be restricted at this time.

Age Adjustments

To allow for growth of young lactating cows, NRC suggests that dairymen should increase the maintenance allowance for all nutrients, except Vitamin A, by 20% for 1st lactation heifers and by 10% for 2nd lactation heifers. This transposes into feeding an additional 2 kg/d of grain to all first calf heifers and 1 kg/d to all second calf heifers.

Body Condition Adjustments

It is apparent that over-conditioned cows are more susceptible to early parturient health disorders such as ketosis, milk fever and retained placentas. They also tend to be problem breeders and require more services per conception. On the other hand, under conditioned cows will under produce. Therefore, maintenance of a "proper body condition" throughout lactation is essential for the continued health and performance of dairy cows. A body condition scoring system has been introduced in New York State by B. L. Perkins, R.D. Smith and C.J. Sniffen to objectively assess the optimum body condition of cows throughout lactation. The system involves visual appraisal and palpation of the back and hind quarters. Figures 1 and 2 of the fact sheet entitled: "Body Condition Scoring: A Useful Tool for Dairy Herd Management," depict the areas that should be palpated namely, the spinal processes of the chine, loin, rump and the flesh covering the tail head, hook bone and pine bone regions. Cows are scaled from 1 to 5. A condition score of 1 indicates a severely undercondition cow. A score of 3 is given to a cow in good milking condition. B. L. Perkins, R. D. Smith and C. J. Sniffen suggest that cows should dry off with a condition score of 3+ or 4. A cow entering lactation with a condition score of less than 3 would be considered underconditioned for that stage of lactation and therefore would produce less milk. A cow entering lactation with a condition score of 4+ or 5 would be a candidate for fat cow syndrome. Underconditioned cows should receive an extra 2-3 kg/d of grain until condition is restored whereas overconditioned cows should be cut back by 2-3 kg/d of grain until they achieve the proper body condition.

Cow Size Adjustment

In most dairy herds, the average weight of cows in the herd can vary by 200-300 kg. Forage intakes are generally predicted to be 2.0% of body weight. The reason why this simple scalar works relates to the fact that the gastrointestinal tract grows in proportion to the body weignt. Forage intake is proportional to body weight (BW) raised to the

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TABLE 1. Example of a Daily Feeding Guide Prepared for 600 kg Cows Producing Milk Containing 3.7% Butterfat.

	Daily Production Level (kg)						
	15	20	25	30	35	40	45
Hay (kg)	13.7	13.7	13.7	13.1	12.6	12.0	11.5
Grain mix (kg)	3.0	5.2	7.4	9.6	12.1	14.7	16.9

Note: Adjustments should be made to grain feeding levels recommended above for factors such as age, size, stage of lactation and body condition.

power of 1. This is in contrast to the scalar of BW raised to the power of 0.75 used to determine the maintenance requirements of animals. It is not surprising that larger cows will generally consume more roughage dry matter than a smaller cow. The extra roughage they consume will reduce their need for energy in grain. A cow which is 100 kg smaller than the herd average will require approximately 0.4 kg more grain per day to produce the same level of milk as an averaged sized cow.

Tables 1 and 2 put all of the above mentioned facts together and show the appropriate adjustments to grain feeding that should occur depending upon the cow's stage of lactation, age, body condition and size.

TABLE 2. Grain Feeding Levels for Three Different Cows Producing 25 kg/day.

	Big Bertha	Fresh Frieda	Jr. Jenny
Production (kg)	25	25	25
Age	6 yrs	4 yrs	2 yrs
Days in milk	260	5	150
Body condition (score)	Fat (4+)	Heavy (4)	Avg (3)
Weight	775	700	575
Grain required (from guide in Table 1)	7.4	7.4	7.4
Adjustments			
Age	—	—	+2 kg
Stage of lactation	—	challenge feed	—
Body condition	−2	—	—
Size adjustment	−.80	—	—
Final grain level	4.6	feed to appetite	9.4

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Abstracts

Concurrent malignant catarrhal fever and bovine virus diarrhoea virus infection in a dairy herd

R. T. Sharpe, S. R. Bicknell, A. R. Hunter

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An account is given of an outbreak of malignant catarrhal fever which occurred in a 98-cow dairy herd. Ten animals died or were slaughtered and the disease was confirmed by clinical and histological examination. Serological tests for malignant catarrhal fever virus were positive in three of four animals. The diagnosis of malignant catarrhal fever was complicated by the presence of bovine virus diarrhoea virus infection in three of the early cases. The initial cases of malignant catarrhal fever occurred in a group of nine-month-old calves which were housed in an old milking parlour with 19 pedigree Suffolk ewes at lambing time. Later cases occurred in two adult cows and in two heifers. Investigations of the remainder of the herd for evidence of bovine virus diarrhoea virus did not reveal the presence of any persistently infected cattle. Serological examinations for antibody to malignant catarrhal fever and bovine virus diarrhoea virus were carried out on the 19 Suffolk ewes. Six of them had neutralising antibody titres to malignant catarrhal fever virus and three were positive in the indirect immunofluorescence test. The possible roles of bovine virus diarrhoea virus infection and sheep in the outbreak are discussed.

Effect of trenbolone acetate on ovarian function in culled dairy cows

A. R. Peters

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The ovarian cycles of 48 culled dairy cows were monitored by assaying plasma progesterone concentrations. Twenty-four cows received a subcutaneous implant of 300 mg trenbolone acetate (Finaplix; Hoechst) at the beginning of the study. Of the implanted cows, two were pregnant, six continued to cycle although their peak progesterone concentrations were significantly lower than in control cows ($5{\cdot}65 \pm 0{\cdot}71$ compared with $8{\cdot}19 \pm 0{\cdot}47$ ng/ml; $P<0{\cdot}01$). Prolonged periods (13 to 92 days) of low progesterone concentrations (<1 ng/ml) occurred in 12 of the implanted cows. In six of seven cows in which normal cycles had not resumed by the time of slaughter two to five ovarian follicles of diameter $\geq$ 10 mm were found post mortem. Persistent luteal function (>35 days) occurred in the absence of pregnancy or gross uterine pathology in five of the implanted cows, two of which had recovered spontaneously by the time they were slaughtered. There was no difference in plasma luteinising hormone concentrations between the implanted and control cows. It is concluded that trenbolone acetate affected the ovarian cycle of the cows in several ways through changes other than the modification of tonic luteinising hormone secretion.

ANABOLIC agents have been widely used to improve the