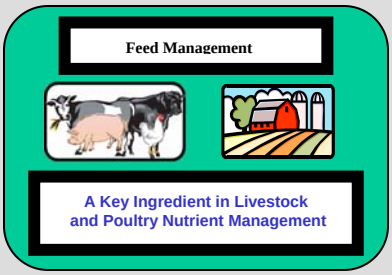

Grouping Cows

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USDA United States Department of Agriculture

NRCS Natural Resources Conservation Service

Introduction

This fact sheet has been developed to support the implementation of the Natural Resources Conservation Service Feed Management 592 Practice Standard. The Feed Management 592 Practice Standard was adopted by NRCS in 2003 as another tool to assist with addressing resource concerns on livestock and poultry operations. Feed management can assist with reducing the import of nutrients to the farm and reduce the excretion of nutrients in manure.

The trend over the past 15 years has been to feed a single total mixed ration to the dairy herd. Higher producing cows have a greater dry matter intake and, therefore, receive more nutrients daily. Unfortunately, most feeding systems consequently over-feed lower producers to assure that higher producers receive enough feed of the correct concentration of nutrients. Feeds are usually inexpensive compared to the return generated by milk sales, and the results of this feeding practice were higher production at a moderate cost.

Surveys of milk production versus nutrient consumption done regionally around the United States have shown significant over-feeding of protein and phosphorus on dairy farms. In some cases, rations provided as much as 50% more phosphorus than needed for the herd's production level. Certainly, these high levels can be reduced through the choice of feed ingredients and more precise mineral feeding, however producers want assurance their cows have adequate nutrients for optimum milk production. There is a middle ground where producers can feed for optimum performance while meeting the demands of changing environmental constraints.

Dividing the herd into two or three feeding groups allows tailoring rations more closely to the production level and nutrient requirements of the group. By feeding more cows more closely to their requirements, a producer can reduce waste and the excretion of excess nitrogen and phosphorus.

The Basics of Grouping Cows

Obviously, a dairy farm must have facilities so cows can be divided into multiple groups. The size of the groups are influenced by the size of the milking parlor, the barns or corrals available for housing the cows, other grouping currently done (dry cows, heifers), and the ability to deliver different rations to different groups of cows. Furthermore, the average age of the herd, average days in milk, and reproductive goals (AI, bull bred, etc.) are all factors that must be considered.

There are many schemes for deciding which cows to group together. Some producers group cows by days in milk or where they are in the production curve. This method is roughly equal to grouping by daily milk production, but some cows produce twice as much daily milk as other cows at the same point in the lactation cycle. Other farms group according to the cows' reproductive status. Higher producing, early lactation cows are usually not bred so putting them together in a group allows feeding for the higher production and for more efficient heat detection and artificial insemination. However, not all early lactation cows produce at the same level. The most successful way to group cows has been shown to be selecting cows based on the nutrients required per pound of feed; for example nutrients such as crude protein, starch, sugar, fiber, fat, vitamins, and minerals. While directly related to daily milk production, it is a more precise way to feed cows what they need without waste and over-excretion of nutrients (Williams, 1992).

It appears that feeding in three groups produces higher income over feed costs than feeding two groups and group feeding in two groups results are better than one group feeding (Williams, 2002). A California survey showed feeding three groups reduced nitrogen excretion by 15% over herds feeding a one-group TMR (Castillo, 2000).

Why not then?
There are some important considerations when grouping cows for more efficient use of feed nutrients. It takes professional help to formulate rations for and to monitor the performance of different production groups. A nutritionist can also help monitor the quality of feed ingredients used in rations.

All feeds vary in nutrient content load to load and throughout storage. Table 1 shows the mean content of protein and net energy-lactation of common feeds in the northeastern U.S. It also shows the standard deviation derived from the group of feed samples. Adding and subtracting the standard deviation from the mean shows the range in nutrient content for two-thirds of the samples. The other third of the samples tested outside of this range. For example, the mean corn silage contained 7.9% crude protein, and had a standard deviation of 1.3%. This means that two-thirds of the samples tested between 6.6% and 9.2% CP, so one-third tested either greater or less than that range. A ration formulated to supply 6.1 pounds of protein to support the average milk production of the group could be as low as 5.5 pounds and this would result in a loss of almost 7 pounds of milk per day.

Table 1. Mean composition and standard deviation of crude protein and Net Energy Lactation of some feedstuffs used in the northeastern U.S.

	Crude Protein %		NEl (Mcal/kg)	
Ingredients	Mean	S.D.	Mean	S.D.
	---------- % of dry matter ----------			
Mixed hay	15.9	2.9	1.25	0.18
Mixed haylage	15.6	3.2	1.15	0.20
Corn silage	7.9	1.3	1.50	0.15
Ground ear corn	9.4	1.6	1.85	0.07
	----------% as fed ----------			
Brewers dried grains	25.4	2.0	1.47	0.07
Corn gluten feed	20.9	1.3	1.72	0.08
Corn gluten meal	63.5	4.1	1.81	0.09
Corn grain	9.1	0.5	1.78	0.04
Distillers dried grains	27.5	2.5	1.86	0.11
Feather meal	85.3	1.8	1.48	0.02
Meat and bone meal	50.8	2.9	1.51	0.09
Molasses	3.2	0.3	1.23	0.02
Soybean meal (Solvent)	49.5	1.2	1.81	0.05
Wheat Grain	15.3	0.9	1.81	0.04

How can the risk of nutrient variation be controlled? Nutrients can be over-fed, but that defeats the point of grouping for more efficiency and results in more nutrients excreted. Formulating rations with multiple sources of protein and energy can reduce the risk because it is unlikely that all sources would vary on the low side at one time. Blending single commodities can help as well. One truck load of corn taken from storage containing multiple loads of corn will vary less than a single source. (St. Pierre, 1999). Therefore, receiving larger quantities (train car load vs. truck load) of a single ingredient is best if inventory control, purchasing, and transportation will allow.

Testing all feeds is important in managing the variation of feedstuffs. Notice that forages vary the most so they must be monitored closely. Experienced managers and researchers suggest the following testing schedule (St. Pierre, 1999):

All feeds	Protein, fat, fiber, minerals at purchase or harvest
Forages	weekly for moisture, monthly for protein, fiber (more often if fed quickly)
TMRs	monthly for particle size before and after eating
All feeds	four times a year for macrominerals
Silages	twice a year for VFAs and pH

One obvious way to control variation in the quality of feedstuffs is to reduce or eliminate the use of the feeds most prone to large variations.

Group Feeding Strategies

When feeding groups of cows, nutrients are provided to the average daily production of the group. The average cow in each of three

groups is closer in production to her groupmates than the average cow is to the entire herd. However, by feeding the average cow in the group, rations will be inadequate for the higher producing cows in the group. Higher dry matter intake will make up for some of the shortage, but most managers will "lead feed" the group to supply necessary nutrients to the top half of the group. Lead feeding factors have been developed through trial and error and by research using commercial dairy herds. One rule of thumb to lead feeding was to feed the average cow plus one standard deviation of the variation in the group. If the average for a group is 70 pounds/cow-day and the standard deviation in the group is 5 pounds; the herd would be fed for 75 pounds per day. This works when production variation is small due to many production groups. When feeding two or three groups, researchers in Virginia and Ohio have developed lead factors as shown in Table 2.

Table 2. Optimum ration lead factors for energy and protein proposed by The Ohio State University and those proposed by McGilliard et al. at V.P.I.

		Lead factors		
Number of Groups	Group #	NE_1	CP	V.P.I
1 Group		133%	126%	132%
2 Groups	1 Highs	119	113	117
	2 Lows	130	125	123
3 Groups	1 Top	115	111	114
	2 Middle	121	117	110
	3 Lows	129	124	121

Notice two things: 1.) Lead factors are different for protein and energy in the Ohio work, 2.) The level of lead feeding over the entire herd can be reduced when feeding more production groups. In a three group dairy, the top string would be fed 115% of the average nutrient requirement based on energy in the Ohio system or 114% of average in the VPI system.

In summary, grouping cows can be part of a total feed management program to reduce waste and the excretion of unused nutrients. Grouping cows by production level or stage of lactation is most common. In addition, grouping cows is beneficial for dairy producers because it helps control feed costs. It promotes feeding valuable nutrients to benefit cows at different stages of lactation and results in optimum efficiency, productivity, and profitability.

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Project Information

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