

Economics of Grouping Cows for More Effective
Management and Feeding

Dr. Barney Harris, Jr.
Prof. Dairy Science Department
University of Florida

It is a well recognized fact that high producing cows require more feed than low producing cows and at some stage of lactation cows need to be bred for the subsequent lactation. Maintaining a 12-13 month calving interval suggests that cows need to be bred as soon as healthy after calving or otherwise the interval gets extended and the herd becomes less profitable. Likewise, since cows produce more milk in early lactation, it is more profitable to have more feed going toward milk production and a lesser percentage toward maintenance. Table 1 shows the percentage of feed needed for maintenance and milk production when producing from 30 to 90 pounds.

Table 1. The percentage of feed needed for maintenance.

	---Milk Production---			
	30	50	70	90
Maintenance (%)	51	39	32	26
Milk Production (%)	49	61	68	74

In recent years, dairymen have applied a number of management techniques to improve efficiency and reduce costs in feeding cows. Some have incorporated various systems of grouping cows while others have introduced automated systems using magnet and electronic feeders to better feed the high producing cows. The overall objective has been an attempt to better feed the high producing cows and a more economical approach to feeding the lower producing cows.

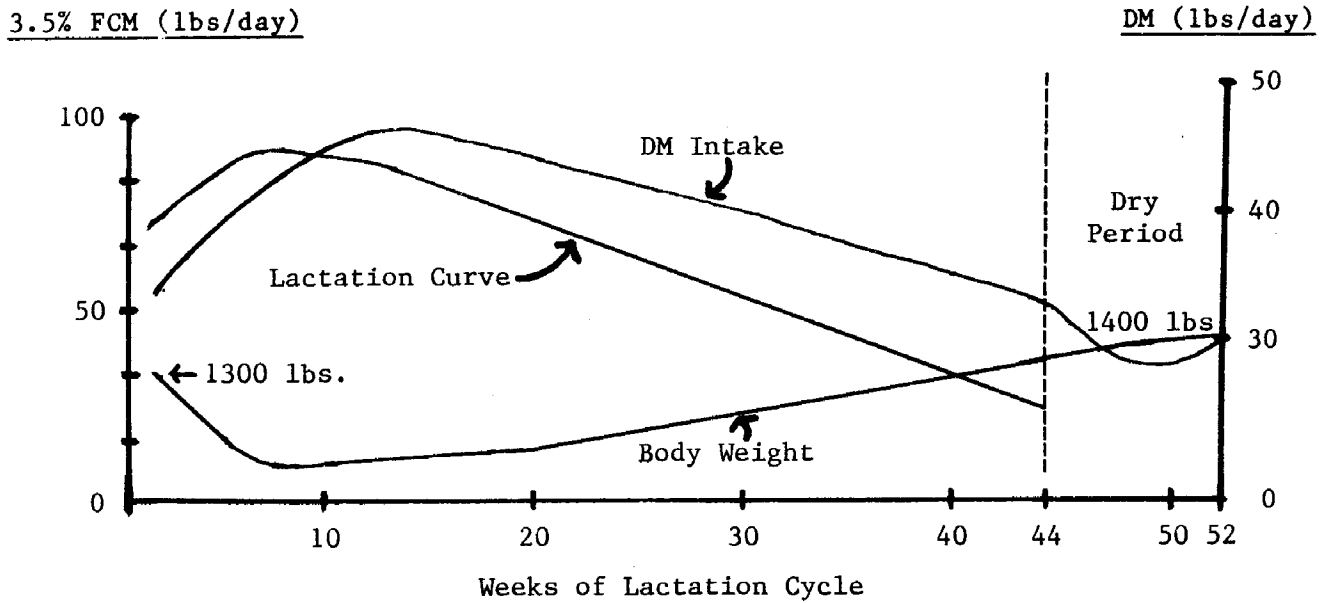
The nutrient requirements of dairy cows are shown in Table 2. Note maintenance as a percent of requirements for different levels of production.

Table 2. Nutrient requirements of dairy cattle (1400 lbs.).

Function	CP (lb)	TDN (lb)	Ca (lb)	Phos (lb)
Maintenance	1.12	9.82	.05	.04
Heavy Springers	2.13	12.80	.09	.06
30 lb. milk	3.67	19.40	.13	.10
60 lb. milk	6.22	28.80	.21	.15
90 lb. milk	8.77	38.40	.29	.20

Heavy producing dairy cows are in a negative energy balance in early lactation (Figure 1). Studies reported by USDA workers suggests that the loss of 2.2 lbs. body weight in early lactation is equivalent to about 6 Mcal of energy. When converted to milk at an efficiency of 82% it will provide for the production of approximately 15 lbs. of milk. The loss of 200 lbs. in early lactation provides enough energy for the production of 1450 lbs. of milk or about \$217.50 more income (\$15 for milk per cwt.) per cow during the lactation.

Figure 1. The normal cycle of a lactating cow.



Periods	1	2	3	4
Energy Status	Neg. Bal. Wt. Loss	Balance	Positive Balance Wt. Gain	Dry Cow Maint. Bal.

Grouping the Dry Cows

Many Florida dairymen have been grouping cows by production and/or stage of lactation for a number of years as well as maintaining cows in dry herds. An Arizona study showed the importance of good dry cow management and how it is associated with the amount of milk a cow will produce in her next lactation. The results showed that cows receiving a maintenance ration during the dry period and a high energy ration after calving outperformed the other groups. The results are in Table 3.

Table 3. Response of Holstein cows to energy levels before and after calving.

Energy Level ¹	Milk Yield	Service Conception	Calving Interval	Economic ² Considerations
Low-Low (1)	12,340	2.1	290	\$ 0.00
Low-High (2)	15,404	1.6	386	459.60
High-Low (3)	13,691	1.9	392	202.65
High-High (4)	14,375	1.5	379	305.25

¹Change in energy level made at calving.

²Price based on \$15/cwt. over the low-low group.

The low energy level in Table 3 was NRC requirements for maintenance and reproduction. High energy was about 40% more than actual requirements. High (excess) energy during the dry period had no beneficial effect on production during the next lactation. The second group in the table fed at requirements during the dry period but fed extra after calving produced more and were essentially the same in reproduction as the high-high group. Limiting energy during the early lactation lowers production and reproductive performance, even though the cows were fed well before calving.

Since cows need less feed during the early dry period and more the last 2-3 weeks prior to calving, many dairymen use two dry cow groups - early dries and heavy springers. Feeding the heavy springs more feed during the last 2-3 weeks of the dry period helps adjust them to the lactating cow ration, reduces stress, provides an opportunity for closer observations, and helps prevent metabolic problems.

Grouping the Lactating Herd

It is a common practice to group cows in most Florida dairies since milking hours usually run from 5-9 hours at a single milking. By dividing the herd into groups, cows spend less time at the milking barn and more time eating. Smaller groups help reduce stress on cows, allows for better traffic patterns and increases the effectiveness of feeding and breeding programs. The concept of grouping animals is promoted primarily because this reduces the amount of variation existing within an animal group, thereby allowing the development of a feeding program which will more nearly satisfy the requirements of the majority of the animals within each group. Also, a good grouping program will allow high producing cows to peak higher and prevent

lower producing cows from getting overconditioned. Other advantages of grouping by production are: 1) easier to vary the roughage:concentrate ratio, 2) heat detection is simplified, 3) more uniform milkout in the parlor, and 4) first calf heifers may be maintained as a separate group until desirable to blend with remaining herd. English workers recently reported an increase in milk production of 1573 lbs. milk per cow when first calf heifers were grouped together and compared to those that were blended with the older cows.

Disadvantages of grouping cows by production include: 1) labor and time are needed periodically to regroup cows, 2) facilities may need adjustments to handle more groups, 3) more formulations may be needed where some or all feedstuffs are mixed on the farm, and 4) regrouping increases social adjustments that may affect the production of certain cows. Social adjustments tend to be more of a problem in small herds and groups as compared to groups of 80 or more cows. In Florida, dairymen regrouping monthly see little to no change in production of cows. This has also been reported to be true in California herds.

A number of studies have been conducted to study the value of grouping cows. Many have, however, involved small numbers of cows, frequently only two groups with less than 50 cows per group, and conditions are often different than one might observe in the field.

Virginia workers compared the effects of grouping dairy cows by three production groups versus feeding as one group at all stages of lactation. A private herd of 360-380 cows was used for the study where 25% of the herd was allotted randomly into one herd to serve as the control. The other 75% were divided into three equal size groups according to milk production and designated high, medium and low. As dry cows freshened, they were placed in the high group and remained there until after two monthly DHI test periods. Cows were regrouped at monthly intervals, thereafter. The ration was formulated to meet the needs of cows that were one standard deviation above the mean in the group. The H, M, L cows produced 1069 lbs. more milk per cow in 305 days. The greatest advantage appeared to be in the first 3 and last 2 months of lactation. Average feed intake and costs for the H, M, L cows was slightly higher than the control cows or about \$8.00 more per cow. Milk income (\$15.00/100 lbs.) for the grouped cows showed an advantage of \$160.35 or a return above feed costs of \$152.35 per cow. In a herd of 370 cows the net income would amount to \$56,369.50 added income.

Several experiments have been conducted showing little to no advantage in grouping cows. Most have used small numbers of cows and some with only two groups vs. one group. In Florida we recommend a minimum of three groups and preferably four or more groups with 50-100 per group. Smith et al. (JDS 61:1138) using two groups vs. one group showed the greatest advantage of grouping and feeding cows according to production to be increased income over feed costs (\$30/cow per year). The \$30 income over feed costs for a 500 cow dairy would have added \$15,000 to income and possibly more where more groups are used in large herds. Similar results were obtained in North Carolina studies (JDS 61:1429).

In a California case study, Kutches demonstrated the economic importance of group feeding cows. The results are in Table 3.

Table 4. Economics of group feeding - a realistic case study*

	Production groups, lbs. milk		
	65+	45-64	45
Number cows	180	220	100
Grain (barn & outside)	32	22	14
Alfalfa	19	26	33
Actual average of groups, lbs. milk	76	54	38
Feed costs			
Grain (barn & outside)	\$2.53	\$1.74	\$1.11
Alfalfa	1.19	1.63	2.06
Total:	\$3.72	\$3.37	\$3.17
=====			
Group feeding vs. all cows fed alike			
=====			
	Group feeding	All cows fed alike	
=====			
Daily feed costs, average	\$ 3.46	\$ 3.67	
Daily milk, average, lbs.	58.70	55.20	
Milk income, \$12.40/cwt	\$ 7.28	\$ 6.84	
Return over feed costs, \$	\$ 3.82	\$ 3.17	
Feed costs as % of milk	47.50	53.70	

*Animal Nutrition and Health/Nov-Dec, 1983.

Survival in the 80's has been an important subject confronting dairymen in recent weeks. With the present situation and outlook for dairying, the climate dictates that dairymen infuse improved economic practices into their operations. One approach in accomplishing this goal would be to feed better and cheaper. Cheaper doesn't mean lowering quality but simply feeding cows according to production and taking advantage of cheaper feedstuffs by varying ration components to different groups of cows. Feeding according to production improves nutrient management and thereby reduces the likelihood of some cows being overfed or underfed. Also, feeding according to production results in more efficient conversion of feed to milk, together with greater returns over feed costs. An example of one sort of group feeding system is in Table 5.

Table 5. Comparison of five levels of production.

Groups	Fresh	High	Med-High	Med.	Low
Basis for feeding (lbs. milk)	60	80+	65	50	35
Avg. milk production	40	74	60	44	28
Feeding (lb)					
Hay (\$60/ton)	5	5	5	5	5
Sorg. silage (\$30/ton)	45	45	50	60	65
Grain mix (\$180/ton)	29	38	30	22	15
Feed cost/cow/day	2.90	3.71	2.99	2.27	1.64
Return over feed cost*	3.10	7.39	6.01	4.33	2.56

*(\$15.00 cwt. milk, 3.8% fat, 1400 lbs body weight)

Data in Table 5 shows that returns per hundred weight of milk increases as production increases. Even so, the important point is that returns above feed costs are also greater making the high producing cow much more profitable to the dairy.

Since peak production and persistency are key factors in determining level of milk production, programs should be developed that would allow lactating cows the opportunity of expressing their genetic potential. Research indicates that for each pound increase in peak production there is a 200 pound increase in total lactation. Our experiences show that with three or more production groups the dairyman can maximize milk production, feed utilization and income.

A possible scheme for grouping cows according to production is explained below. Other systems are being used with equal degrees of success. Develop a system that has good application and works at your dairy. Generally, three to four groups offer good flexibility and less range in milk production. In order to challenge cows, feed each group to the top of the range. As an example, cows producing from 50-65 lbs. would be fed for 65 lbs. milk.

1. Grouping by Production. Grouping cows by level of milk production and feeding accordingly appears to be the most effective approach in controlling the feeding program and still achieving maximum milk production. Florida dairymen have found that 3 to 4 production groups are satisfactory. More groups may be needed to reduce the number of animals per unit. Also, some dairymen maintain a first-calf heifer group the first 90-120 days of lactation to reduce variation in size and stimulate feed intake and milk production.

a) Fresh Cow Group. A fresh cow group is maintained by many dairymen in order to more closely observe cows following calving. The cows are usually maintained in the group for about one month. Then the cows are moved from the fresh cow group to the high group for challenge feeding.

b) High Group. A high group contains early lactation cows for 2-3 months. While many Florida dairymen feed the same complete feed but variable amounts to all production groups, the system does allow for more high energy feed to be fed to the high group. Less silage or roughage is fed to the high group.

c) Super-High Group. Only the very best cows are allowed in a super-high group. Cows are usually producing over 80 pounds. Such a group is used by a few Florida dairyman.

d) Medium-High Group. Large herds using 8-10 groups find the medium-high group to offer some advantages.

e) Medium Group. One or two groups are usually maintained in this category and are simply fed a lesser amount than the high group. Usually more silage or hay is fed per cow as production decreases.

f) Low Group. A number of lower producing cows and cows approaching the end of their lactation will normally find themselves in the lower group. The group offers the distinct advantage of reducing feed offered to the cows and the feeding of more fibrous feeds. Since maximum consumption is not desired, a less palatable grain mixture could possibly be offered the cows. An example would be in the feeding of less natural protein and more urea in the ration.

2. Grouping by Stage of Lactation. Another desirable system involves the grouping of cows by stage of lactation. The system has one fault in that it assumes all cows have similar consistency patterns and level of milk production. The cows are fed similar to cows fed by milk production groups.

3. Dry Cow Group. The separation of the dry cows from the remaining herd is a common practice in large herds. Many dairymen maintain the dry cows in two groups: 1) light springers, and 2) heavy springers.

The program for maintaining the light springers is frequently quite flexible. Cows over-conditioned during lactation are allowed to lose some body weight during the dry period. Other cows are simply fed a maintenance ration or a small amount of grain to supplement pasture. Cows under-conditioned are usually fed additional feed or simply allowed to remain with the heavy springers.

The heavy springers are the dry cows with 3-4 weeks remaining until parturition. They are kept closer to the barn and observed daily. The feed is increased during the period. The herd ration is usually fed to the heavy springers according to NRC requirements. Ample hay is suggested.

4. Hospital Group or Herd. Herd owners are encouraged to maintain a hospital herd in order to avoid getting antibiotics and other drugs in the milk supply. All cows having mastitis or other problems requiring daily treatment should be maintained in the herd. As the cows regain their health, they are returned to the active herd.

Grouping cows according to production or stage of lactation allows the dairymen a choice since problems with labor are sometimes encountered. The system reduces variation between groups and allows for cows with similar requirements to be managed as a unit. High energy feeds can be more liberally fed to high producing cows and lower producing cows can be more nearly fed according to production.