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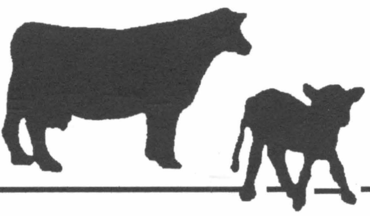

Dairy Guidelines

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Computerized Concentrate Feeding

Charles C. Stallings, Extension Dairy Scientist, Nutrition, Department of Dairy Science, College of Agriculture and Life Sciences, Virginia Tech, Blacksburg

Introduction

The technology associated with computerized feeding of concentrates has progressed greatly in the last few years. Modifications and improvements have been made and, generally, the systems available are accurate and reliable. The capability exists for placing an upper limit on the amount of concentrate for each cow and, thus, individualizes feeding of cows housed in groups. Also, by breaking the feeding of concentrate into several feedings, "slug" feeding is prevented. Computerized feeders are tools for implementing total feeding systems on dairy farms, but proper management is needed for effective use.

Features of Computerized Concentrate Feeders

System capabilities will vary slightly from one company to another, but there are several basic features common to most.

1. Electronic identification for the computer to detect which cow is using the feeder; a device attached by a neck chain or strap is necessary.

2. Concentrate amounts are entered into the computer without physically restraining the cows.

3. Allocations can be divided into several feeding periods to prevent "slug" feeding; usually there can be some carryover from one period to another.

4. Most have dual feed dispensing capability allowing two feeds to be dispensed separately; usually a high energy (corn or barley) and high protein feed (soybean meal) are fed separately to allow fine-tuning of the ration.

5. An alarm list is available to detect any cows not consuming a certain portion of their allotment.

Computerized concentrate feeders have the potential to feed each cow individually and prevent overconsumption of concentrate. This allows supplementation of each cow according to her nutrient needs. As a result of regulating concentrate, off-feed problems and low milk-fat tests can be minimized. Also, more frequent feeding tends to prevent rumen acid buildup that occurs immediately after a large quantity of concentrate is consumed.

Dual feed capability permits varying amounts of two feeds to be dispensed concurrently. Each cow can receive a different ratio of protein to energy in the concentrate when high energy (corn, barley) and high protein (soybean meal) feeds are used. When only one concentrate mix is fed to all cows in a herd, either protein or energy is usually overfed trying to meet requirements for the other nutrient. Because of the complexity of formulating rations for each cow and the need for another feed bin, the dual feed feature of computerized feeders is often not used. It does allow fine-tuning of the feeding program and should be considered where feasible. In feeding programs where all protein comes from forage, this feature would not be needed.

The alarm list tells when cows do not consume their allotment of concentrate. Causes can be illness, injury, or estrus (heat). However, as a heat detection aid the alarm list is of limited value.

Table 1 contains concentrate feeding rates for 1100 and 1400 lb cows varying in milk from 20 to 90 lbs per day. Alfalfa hay was fed at 3 lbs/cow/day and corn silage of average quality was offered free-choice. The dual feed recommendation uses shelled corn and a 40% concentrate. In addition, feeding rates for a 20% concentrate are included for comparative purposes. These feeding rates are only guides and should be adjusted depending on forage type and quality. At higher levels of milk production, ration fiber drops to below 19% acid detergent fiber (designated in Table 1 by *). Care should be taken when feeding these high levels of concentrate for prolonged periods because health problems (displaced abomasums) can result. When feeding corn and the 40% concentrate separately, no corn would be needed at low productions because needed energy is adequate in the corn silage. However, it is advisable to feed at least 4 lbs of corn in order to make the protein supplement palatable and insure adequate consumption. A minimum of 4 lbs of shelled corn is included in Table 1. This also keeps the volume of feed dispensed great enough to maintain the cow's interest in coming back to the feeder.

When feeding two feeds through a feeder, it is usually best to include minerals and vitamins in the protein supplement. A protein supplement containing 1780 lbs 44% soybean meal, 80 lbs dicalcium phosphate, 50 lbs limestone, 20 lbs sodium sulfate (calcium or magnesium sulfate can be substituted on an equivalent basis), 60 lbs trace mineral salt, and 10 lbs magnesium oxide would be adequate for corn or small grain silage based rations at feeding rates for the 40% protein concentrate listed in Table 1. Also, 15 million I.U. of vitamin A and 7 million I.U. of Vitamin D should be included per ton. The trace mineral salt should contain iron, cobalt, copper, manganese, zinc, iodine, and selenium.

Experiences with Computerized Feeders

Cornell University researchers observed cows to average 14 visits per day to feeders. The range was from 2 to 32 visits with the majority occurring in the afternoon or evening. Only 43% of the time in the feeder stall was spent eating. First lactation heifers not adapted to the feeders were hesitant to eat, but physical assistance overcame this problem so that finally only one cow would not use the feeders. These workers found that access to feeders 2 to 3 weeks prior to expected calving aided in the transformation after calving.

Ohio State University researchers conducted two surveys of owners of computerized feeders. The average time the feeders had been in use was about 16 months. Average milk production increased during this period by 3.5 lbs per cow per day, but 25% reported no increase (4% reported production dropped). Therefore, there is no guarantee of a production response. Prior feeding management before the switch probably affected this response. A 20% reduction in concentrate fed was reported by those who knew how much they were feeding prior to the switch (only 50% knew this figure). Magnet feeders offering no control of concentrate amounts were used by about half of the respondents. This high rate of magnet feeder use may be the reason for the dramatic reduction in concentrates fed after switching to computer feeders. Another observation was an improvement in fat test corresponding to a reduction in concentrates consumed. Therefore, where concentrate feeding is unregulated, it is likely computer feeders will reduce feed cost and increase fat test; but, if concentrates are regulated, this may not be the result. The majority of the respondents to the two surveys had the capability of feeding two concentrates through the feeders, but only 27% took advantage of this feature. Feeders were used to lead-feed dry cows before calving by less than 1/2 of the respondents.

Considerations before Buying

Dealer support is important for success. A loaner policy is desirable in case of computer malfunction. Remember, it is likely your computer or feeder will at some point malfunction and some thought should be given to alternative ways to feed concentrate. Go with a system and dealer that will likely be in business a year from now.

Before buying, figure what would be the expected returns from the purchase. Table 2 contains expected changes in milk production, fat test, concentrate fed, cow health, and labor when switching to a computerized feeder. These are conservative generalizations and will vary with level of management. When switching from feeding all concentrate in the milking parlor to a computerized feeder, milk production might be expected to increase because of more time for consumption of concentrate, but total amount of concentrate fed would probably also increase. When a magnetic feeder is used in conjunction with parlor concentrate feeding, an increase in fat test, reduction of concentrate fed, and improvement in cow health would be reasonable to expect due to more control of feed allotment. If concentrate is fed in the parlor and mixed with silage or in a stanchion barn where each cow is fed separately, only a reduction of labor might be expected. If switching from a total mixed ration (forage and concentrate together) in an ungrouped herd to a computerized feeder, increased milk, fat test, and cow health might be expected with a reduction in concentrate and labor. Grouping removes many of the reasons for justifying computerized feeders, with the exception of labor. More labor is needed to mix rations. Figure which of these assumptions fits your particular set of circumstances, and calculate what you would have to achieve on a daily basis to justify the investment. Generally, if these feeders pay for themselves within four years they are a good purchase.

Remember, if grouping is possible, a total mixed ration may be a better alternative. The total mixed ration is both a forage and a concentrate method of feeding. When comparing, figure the cost of the forage feeding in conjunction with the computerized feeder. Also, with complete rations, by-product feeds can be used more easily than in systems using computer feeders.

Management Suggestions

1. Consider using computerized feeders to lead-feed dry cows and first-calf heifers starting approximately 2 wks prior to expected calving; limit concentrate to 5 to 10 lbs per cow depending on body condition.

2. Gradually increase concentrate to fresh cows for 2 to 3 wks after calving to encourage adequate forage consumption; feed to production after this time.

3. Each feeder should dispense a maximum of 500 lbs of concentrate a day for 20 to 25 cows.

4. If using two feeds, use a high-energy feed and a high-protein feed to allow fine tuning of the ration; usually, minerals and vitamins should be mixed with the protein supplement.

5. To encourage feeder usage by timid cows, do not locate feeders in a holding or high-traffic area (around waterers or exits); feeders placed in series should be 10 to 12 ft apart; if using free-stalls do not place opposite one another. (If feeders are too close together, one boss cow can control use of several feeding stations.)

6. Protect the cow while eating with solid side partitions; sides should be long enough so that her rear is not exposed; sides should be close enough together to prevent others from moving into the feeding station.

7. Feed the majority of the concentrate through the feeders to encourage use; limit concentrate fed elsewhere (mixed with silage or in milking parlor) for 35 to 40 lbs of 3.5% milk.

8. If two silages of differing types or qualities are fed, they should be mixed together prior to feeding to prevent cow preference from being a factor; limit hay if fed with silage.

9. Calibrate and check dispensing rate periodically; check concentrate purchased against expected feeding rate; on a daily basis, check to ensure feed is available through the feeder.

10. Adjust allotments at least monthly; more frequently for fresh cows; rebalance ration as feeds change or as forage quality varies.

Table 1. Computerized concentrate feeding rates (lbs/cow/day) for dual and single feeds when corn silage (39% dry matter, 7.6% protein, 29% ADF, and 66% TDN) is fed free-choice with alfalfa hay limited to 3 lbs per cow.

	lbs 3.5% milk/day							
	20	30	40	50	60	70	80	90
<u>1100 lb cow - 2 feeds</u>								
Shelled corn	4	4	4	5	8	11*	15*	20*
40% concentrate	3	4	5	6	8	10*	11*	12*
<u>1100 lb cow - 1 feed</u>								
20% concentrate	5	8	12	17	21	26	30*	34*
<u>1400 lb cow - 2 feeds</u>								
Shelled corn	4	4	4	4	4	5	10	14*
40% concentrate	3	3	5	6	8	10	11	12*
<u>1400 lb cow - 1 feed</u>								
20% concentrate	4	7	11	16	20	25	30	33*

*Ration acid detergent fiber below 19% of dry matter; do not feed for prolonged periods of time.

Table 2. Expected changes when switching to computerized concentrate feeders

Old System	Milk	Fat Test	Concentrate fed	Cow Health	Labor
Parlor	↑		↑		
Parlor + Magnet		↑	↓	↑	
Parlor + TMR					↓
Stanchion Barn					↓
TMR (1 group)	↑	↑	↓	↑	↓
TMR (2+ groups)			?		↓