

Energy Intake and Dairy Cow Fertility¹

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It is common knowledge that early lactating cows do not eat as much feed as they do at two to three months into lactation even though the level of milk production may be the same. Feed intake lags behind peak milk production by about two to four weeks. This results in a negative energy balance and, as such, body reserves are mobilized to overcome the energy deficit, which results in some body weight loss. Although it is normal for high-producing cows to lose weight in early lactation, the energy, and especially the protein, available from body stores can supply only a limited amount of her needs. As body fat is mobilized to produce more milk (1 lb of fat can provide energy to produce 7 to 8 lbs of milk), proportionally more energy is available than protein. Therefore, the percent of protein in the ration during early lactation should be higher in order to maximize the efficiency of energy utilization and to meet the added protein needs.

Because high-producing cows lose body weight in early lactation, a number of studies have attempted to correlate body-weight losses to performance. Studies at Cornell showed that when cows were regrouped on the basis of body-condition score loss during the first five weeks of lactation (<.5 units, .5 to 1.0 units, > 1.0 unit), only cows losing > 1.0 units of body condition had lower fertility (increased days to first ovulation, estrus and first service, lower first service conception rate).

Both the extent of negative energy balance and the rate of recovery of energy balance appear to be important. In well-fed cows, the negative balances of energy begin to improve at about week four of

lactation. Recovery in energy balance from its most negative state may be a signal for initiation of ovarian activity. Thus, negative energy balance may impair fertility by delaying first estrus by limiting the number of estrus cycles occurring before the preferred breeding period. A number of studies have indicated that conception is correlated positively with the number of ovulatory cycles preceding insemination.

First ovulation usually occurs at 17 to 42 days after parturition. It has been suggested that the greater the level of milk production the slower the cow is to first ovulation. For this reason, program strategies must be developed so that the high-producing cow will have every opportunity to maximize her energy intake without compromising on her needs for fiber. Concentrated sources of energy, such as whole cottonseed and ruminally inert fats, may be beneficial in early lactation.

In a University of Florida study, Staples and Thatcher monitored 54 Holstein cows in their second or greater lactation from parturition through nine weeks of lactation for feed and body-weight change (energy loss or gain). Cows received a 55:45 roughage (corn silage) to concentrate diet (DM). The results are in Table 1.

During the nine weeks, blood plasma was measured regularly for progesterone in order to detect day of ovulation for each cow. Based on tests, 15 cows were anestrus for the entire nine weeks. Twenty-five cows returned to estrus within 40 days of parturition and 14 cows between 40 and 60 days after parturition. The study shows the importance of

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energy intake in early lactation. The earlier cycling cows produced more milk, consumed more energy, and experienced the smallest negative energy balance.

Table 1. Performance of lactating Holstein cows differing in activity the first nine weeks of lactation.

Measurement	Classification		
	EC	LC	NC
Number of cows	25	14	15
Dry-matter intake, lb/day	41.4	39.0	33.5
4% FCM, lb/day	73.6	69.9	62.8
Days to ovulation	21.9	43.1	---
Days to first heat	47	73	110
Percent of cows conceiving	84	93	36
EC=early cycling; LC=late cycling; NC=noncycling.			
Staples and Thatcher.			