Effects of various feeding, breeding and management practices on milk production

James R. Dunham
The March 1984 DHI summary of Kansas Holstein herds shows some interesting correlations of various feeding, breeding, and management factors to production (Table 1). The Rolling Herd Average (RHA) is an excellent evaluation of the efficiency of dairy herds since RHA and income-over-feed-cost are closely related. Although income-over-feed-cost is not profit, it provides the income for paying the other costs of producing milk. The goal of every dairy producer should be to increase the RHA in order to improve profitability. The following observations can be made from Table 1:

**Feeding**

Higher producing herds are fed more grain and more dry matter than those with lower RHA's. The rations of higher producing herds are composed up of about 12% more grain than those of lower herds, but the higher RHA herds produce milk more efficiently, as shown by the milk/lb of grain or milk/lb of dry matter fed. Total feed cost increases with RHA but feed cost/cwt milk decreases, which results in more income-over-feed-cost for higher RHA herds.

**Management**

All of the management factors contributing to the RHA cannot be evaluated by the DHI report. However, high RHA herds have a higher percent of days in milk and fewer dry days than lower producing herds. More days in milk are accomplished with shorter dry periods, raising more replacements, and then culling first lactation heifers while they are still lactating.

Reproductive management does not seem to be much different in relation to RHA, except the number of days from calving to first service tends to be less in high RHA herds. Apparently, high production does not have a negative effect on reproduction. Most herds could shorten the calving interval by reducing the days between calving and first service.

An obvious management characteristic of high producing herds is the high summit milk yield. Apparently, feeding and management programs during the dry period and early lactation are such that fresh cows peak higher in their lactation curves than those in lower producing herds. A 60-day dry period is recommended. For high summit milk yields, starting about 2 wk before calving, dry cows should be fed the same forages as the lactating cows with about 15 lb of grain. Following calving, fresh cows should be on a high level of grain within a few days. The average age of cows in high RHA herds is lower than in low herds. Therefore, it cannot be concluded that high RHA herds have more mature cows. Also, the high RHA herds' first calf heifers are slightly younger.
Table 1. Correlation of rolling herd average with various feeding, breeding, and management factors.

| Production Range | 11,000 to 12,999 lb | 13,000 to 14,999 lb | 15,000 to 16,999 lb | 17,000 to 19,999 lb |
|------------------|---------------------|---------------------|---------------------|---------------------|
| No. Herds        | 129                 | 234                 | 296                 | 68                  |
| Cows/Herd        | 59                  | 65                  | 70                  | 69                  |
| Rolling Herd Avg. |                     |                     |                     |                     |
| Milk (lb)        | 12,043              | 14,022              | 15,992              | 17,877              |
| % Fat            | 3.58                | 3.58                | 3.54                | 3.53                |
| Fat (lb)         | 431                 | 503                 | 566                 | 631                 |
| Feeding          |                     |                     |                     |                     |
| Grain (lb)       | 6,845               | 7,062               | 7,526               | 7,862               |
| Forage D.M. (lb) | 9,845               | 10,076              | 9,566               | 9,904               |
| Total D.M. Fed (lb) | 15,625          | 16,285              | 16,189              | 16,823              |
| Milk/lb Grain    | 1.8                 | 2.0                 | 2.1                 | 2.3                 |
| Milk/lb D.M.     | 0.76                | 0.85                | 0.98                | 1.05                |
| Total Feed Cost ($) | 706               | 780                 | 823                 | 899                 |
| Income - Feed Cost ($) | 778              | 949                 | 1160                | 1311                |
| Feed Cost/Cwt Milk ($) | 5.86            | 5.56                | 5.15                | 5.03                |
| Management       |                     |                     |                     |                     |
| % Days in Milk   | 83                  | 85                  | 86                  | 88                  |
| Days Dry         | 69                  | 66                  | 65                  | 60                  |
| Calving Interval (Days) | 403             | 399                 | 402                 | 400                 |
| Services/Conception | 1.8               | 1.9                 | 1.8                 | 1.8                 |
| Days to First Service | 86              | 80                  | 83                  | 80                  |
| Avg. Age (yr.-mo.) | 4-04            | 4-03                | 4-00                | 3-11                |
| Age 1st Calving (yr.-mo.) | 2-05           | 2-05                | 2-04                | 2-04                |
| Summit Milk Yield (lb) | 52.0             | 58.4                | 65.0                | 71.8                |
| Lactation Profile (lb) |                   |                     |                     |                     |
| <100 days        | 48.3                | 55.5                | 63.2                | 68.5                |
| 100-200 days     | 39.5                | 45.0                | 51.3                | 57.0                |
| >200 days        | 31.0                | 35.7                | 39.8                | 44.4                |
| Breeding         |                     |                     |                     |                     |
| Sires of Replacement (PD$) | 43              | 54                  | 58                  | 85                  |
| 1st Lactation (PD$) | 11              | 22                  | 18                  | 51                  |
| 2nd Lactation (PD$) | -10             | 9                   | 16                  | 47                  |
| 3rd Lactation (PD$) | -19             | 2                   | 2                   | 33                  |
| 4th Lactation (PD$) | -33             | -29                 | -24                 | -11                 |
| Service Sire Avg. (with PD) | 83             | 89                  | 95                  | 112                 |
| Percentile Rank  | 65                  | 70                  | 75                  | 88                  |
| Service Sires with PD (%) | 48             | 60                  | 68                  | 86                  |
| Cows Identified by: |                  |                     |                     |                     |
| Sire (%)         | 51                  | 63                  | 76                  | 77                  |
| Dam (%)          | 76                  | 83                  | 92                  | 93                  |
Breeding

Sire selection is closely related to the RHA. All age groups are shown to be sired by higher PD$ bulls as the RHA increases. In addition, the service sires currently being used have a higher PD$ value and higher percentile rank in the high RHA herds. High RHA herds use a larger percent of proven bulls than lower RHA herds. The goal should be 80/80, which means 80% of the cows bred to at least 80+ percentile rank bulls. The other 20% of the cows should be bred to several young AI sires to help prove the next generation of bulls.

Sound breeding decisions cannot be made without identification. Table 1 shows that the percent of cows identified by sire and dam increases with the RHA.

Figure 1 depicts the stage of lactation profile of the groups of herds summarized in Table 1. It is obvious that the higher RHA herds maintain the production advantage through all stages of lactation. Thus, in order to obtain high total lactation yields, cows must start their lactations at a high level.

Figure 1. Comparison of RHA, summit milk yield, and stage of lactation profile.