

Dairy Breeding Research Herd

A.S. Leaflet R1892

A. E. Freeman, Distinguished Professor Emeritus of Agriculture, Joe Detrick and David H. Kelley, retired, Agricultural Specialists

We are privileged to be able to use the herd at Ankeny for genetics research projects of long duration. The herd members are Holsteins, of which more than 90% are registered and carry the prefix I-O-State. We are currently milking approximately 165 cows. Our total inventory of wet cows, dry cows, and replacements of all ages is approximately 365 head.

The milking herd is housed in free stall barns that are bedded with sand. We have one barn housing 45 cows that allows us to feed them indoors. The remainder of the milking herd is housed in three conventional free stall barns and the cows are fed in fence line bunks. Milking is done twice a day in a double-5 herringbone parlor equipped to electronically record and collect milk weights at each milking.

Baby calves are housed in individual 4 by 8 ft pens until after they are weaned. These pens are easily dismantled for cleaning and disinfecting between occupants. If calves are doing well and eating dry food, they are weaned at 37 days of age. After weaning, calves are placed in groups according to their size and are rotated through a series of group pens. Heifers are initially bred at 14 months of age if they have reached a body weight of 750 lb. Calves post-weaning, heifers, and dry cows are kept in loose housing.

Corn silage is produced on the research farm and stored in bunker silos and bags. All other feedstuffs, including concentrate mixtures, whole cottonseed, corn gluten, urea supplement, and hay, are purchased from outside vendors. Hay is purchased on a quality basis by using penalties and bonuses based on relative feed value (RFV) and percentage moisture to arrive at a final purchase price. Concentrate mixtures and supplements are formulated to meet our specifications.

All animals are fed one of several different total mixed rations (TMRs). The milking herd is fed one of three TMRs. These rations are formulated to sustain high, medium, and low levels of production. Cows are housed in a "transition pen" for the first 7 to 14 days following calving. All cows receive the medium ration for the first week after they calve. During this time of stress, their health is monitored closely and they are gradually acclimated to the high-energy ration fed to the high-producing cows. They are then moved into the pen receiving the high ration. They remain there for approximately 90 days regardless of their daily production.

This allows all cows time to express their production potential and enables us to minimize any bias in the research data. After this time, the cows continue to either receive the high ration or are moved to the pen receiving the medium ration based on their daily production. This now occurs at 85 lb/day for cows and at 70 lb/day for first calf heifers. Likewise, an animal's daily production also dictates when she moves from the medium level ration to the pen receiving the low-level ration. This move occurs when production drops below 50 lb/day for cows and 40 lb/day for first calf heifers. The farm superintendent has the prerogative to move animals from medium to low ration at an earlier stage should these cows begin to exhibit excessive body condition.

Replacement heifers are fed a TMR formulated to allow them to reach a body weight of 1,200 lb at the time of first calving. It is our intent to have cows dry off with a body condition score of about 4.0. Dry cows are fed hay and a restricted amount of a high fiber-corn silage diet that will maintain this body condition through the dry period.

Foundation cows for this herd were purchased as open heifers from 38 Iowa breeders beginning in 1968. The primary focus of the research through 1988 was milk production achieved using bulls whose proofs were high versus those whose proofs were breed average. The current selection experiment began with inseminations made in 1986. Cows and heifers from the milk selection project were assigned at random to one of two groups. The selection criteria for the two sire groups was the sum of pounds of fat plus pounds of protein in their proof. One group of sires is the highest available, the other group is selected to be at the level of the average of the breed. The most recent rolling herd average (October 2003) was 20,261 lb of milk, 745 lb of fat, and 642 lb of protein.

Cows in the herd have been and continue to be used for a wide variety of experimental needs in addition to the aforementioned long-term genetic study. This is achieved because we collect complete health, growth, and production data on all animals. These animals are members of two contrasting selection lines that, because of the herd's origin, represent the national Holstein population. Data generated by the herd have been used recently to study 1) genetics of immune function; 2) how to genetically alter milk composition; 3) genetic differences in the normally circulating growth hormone; 4) changes in bovine leukosis and any genetic influences on bovine leukosis virus under normal herd management; 5) changes in health and reproductive performance as related to genetic differences; 6) feed efficiency in two genetic lines and in different maternal families; 7) producing products (cheeses, butter, ice cream)

from milk with naturally occurring lower levels of saturated fat and comparing them with typical manufactured dairy products; and 8) look at relationships between minerals and protein fractions in whole milk. Two more cooperative studies have been initiated at the Ankeny Dairy Farm. One is comparing two times hormone injection regimes with a control to see whether conception rate can be improved. A second is comparing a treatment program in those cows with clinical mastitis at calving to a control. Recent research looked at the feasibility of using birth weight as a predictor of calving ease and perinatal mortality. In addition, the herd

allows students from the College of Veterinary Medicine to be trained in reproductive medicine.

Any entity is only as good as the foundation upon which it is built. The following employees provide just such a foundation for our research efforts at the Ankeny dairy farm: *full-time*: Amie Naill, Dennis Garvey, Carl Christensen, Anthony Brockhaus; *part-time*: Julie Nicodemus, Perry Walter, Neva Greco, Andrew Bexton, Gretchen Godwin, Mary Kay Wilkins, Gary Lane, April Boll, Cecilia Hadaway, Maaika Anne Hol, Andrew Busch, Mark Johnson, and Don William.