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For the West, About the West, From the West

A collaborative effort of Dairy Specialists from

Long-term Experience with Young Heifers at First Calving

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For the last several years, dairy professionals have advocated reducing age at first calving to 24 months of age. I have analyzed trends in the West and found that for the last 11 years, age at first calving has decreased slowly, but is still over 26 months of age. However, there is one dairy that caught the vision years ago, and for at least the last 20 - 25 years they have NEVER EXCEEDED a herd average age at first calving of 24 months. That dairy is the Brigham Young University Dairy in Spanish Fork, Utah. For the past 20 years, Doug Andrus has been the manager of the 600-cow dairy that supplied dairy products for the university and the LDS Church welfare system. Recently, he has been put in charge of the dairy's elite herd. The dairy is 2nd in the state for energy-corrected milk, just behind a sister institution, Elberta Dairy. I recently talked with Doug about his thoughts on how they have maintained this young age at first calving for so long and his impressions of this strategy as a management tool.

Doug's interest in calving dairy heifers at a young age began almost 40 years ago when he was in college. His nutrition and dairy professor was Dr. Robert Gardner, who had done research in dairy heifer nutrition while at Cornell University, University of Arizona, and then at BYU. Dr. Gardner said that the most successful and economical way to handle dairy heifers was to use an accelerated growing ration and calve them at near 24 months of age. This idea was not prevalent in those days, and this target age for first calving was considerably younger than the norm. Based on his research, Dr. Gardner told his students that the notion that this method of rearing would cause heifers to get too fat and restrict lactation later in life was a fallacy. This planted the seed in Doug's mind that would later grow into the way he handled heifers.

About 20 years ago, when Doug took over managing the dairy, the philosophy of early calving was already in place and he continued the program because it was working. Since then Doug's philosophy has been that a heifer standing in the heifer pen costs money and makes fertilizer. The sooner she is in the milking string, the sooner she becomes an asset and makes a profit.

Doug had several concerns about the early calving strategy that have not materialized.

1. *Calving heifers too young would lead to increased dystocia.* His experience has been that if they are the correct size, there is no increase in problems. BYU has always bred by artificial insemination, so he could select calving ease bulls to minimize any potential problems.
2. *Heifers would grow so fast that production was adversely affected.* They have not seen that at BYU (Figures 1 and 2) based on 1st and 2nd lactation production records. Herd production, as stated earlier, is very high. Earlier calving heifers do equal or better than later calving heifers based on within herd comparisons and comparisons with other dairies that have an average age at first calving of 26 – 27 months.

Doug's list of advantages for early calving are:

1. Less need for housing/facilities for heifers.
2. Genetic progress can be taken advantage of sooner.

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Cooling Cows: Is airflow or soaking more effective?

Brouk, M.J., J.F. Smith, and J.P. Harner
Kansas State University Dairy Team

Summer heat stress is just around the corner and the results of a study conducted by the Dairy Team from Kansas State University will help you keep your cows cooler this summer. Have you ever wondered if you should soak cows, increase airflow or both? Many producers have questioned which is most important. Last summer the team conducted a study to determine the effect of soaking frequency and airflow on respiration of heat stressed dairy cattle. Respiratory rate was measured because it is readily observed, is a mechanism of heat loss, and also contributes to the general appearance of stress or comfort of cows.

Sixteen heat stressed lactating cows (8 primiparous and 8 multiparous) were housed in freestall dairy barns and milked twice daily. During testing, cattle were moved to a tie-stall barn for a 2-hour period from either 1-3 pm or 3-5 pm on 8 different days in late August and early September. Afternoon temperatures ranged between 88 and 96 ∞F. During the testing period, respiration rates were determined every five minutes by visual evaluation. Cows were exposed to different treatments (Table 1) that consisted of 4 different soaking frequencies with and without supplemental airflow. Soaking frequencies were control (no soaking), every 5, every 10, or every 15 minutes. Supplemental airflow was either none or 700 cfm. This airflow is approximately equivalent to the airflow of a 36" axial flow fan mounted at 30 ft intervals above the feed line. Each soaking cycle provided similar amounts of water for all treatments. Initial data were collected for three 5-minute periods prior to the start of the treatments.

Table 1. Experimental Treatments

Treatment	Soaking frequency*	Supplemental Airflow
0	None	None
0 + F	None	700 cfm
5	Every 5 minutes	None
5 + F	Every 5 minutes	700 cfm
10	Every 10 minutes	None
10 + F	Every 10 minutes	700 cfm
15	Every 15 minutes	None
15 + F	Every 15 minutes	700 cfm

*.35 gallon/headlock applied in 1 minute

**Cows soaked every 5 minutes with supplemental airflow (5+F) responded with the fastest and largest drop in respiration rate reducing the initial respiration rate by 47% at the end of 90 minutes of treatment (Table 2, page 4).

**Soaking cows every 5 minutes without airflow (5) resulted in a similar response as soaking cows every 10 minutes with airflow (10+F).

**Soaking cows every 15 minutes with airflow (15+F) and soaking cows every 10 minutes without airflow resulted in similar responses until the last 30 minutes of the study.

**Supplemental airflow without soaking (0+F) resulted in little improvement over no soaking or airflow (0).

**Soaking had a greater effect on respiration rate than airflow. However the combination of wetting and airflow had the greatest effect on the respiration rate.

**When cooling heat stressed dairy cattle, the most effective treatment included continuous supplemental airflow and wetting every 5 minutes.

This data suggests that different cooling strategies could be developed for different levels of heat stress. Under severe heat stress soaking every 5 minutes with fan cooling will be the most effective. Under periods of moderate stress soaking every 10 minutes with fan cooling may be adequate. Reducing soaking frequency when temperatures are lower could significantly reduce water usage. Data clearly indicate that the combination of soaking and supplemental

(Please continue on page 4, under Heat Stress)

(Heifer Raising, continued from page 1)

3. More animals born – more replacements available for within-herd use or to market (BYU markets a lot of genetics through heifers, breeding bulls or embryos).

Doug also listed two possible drawbacks:

1. Other dairy producers think the heifers are over-conditioned or fat compared to the heifers from their own farm. This does not concern Doug.
2. At consignment sales or shows, their heifers appear over-conditioned compared with others at the sale.

(Please continue on page 4, under Heifer Raising)

Figure 1. Total 305ME milk yield for lactations 1 and 2 by age at first calving for Holsteins from the BYU dairy. Data compiled courtesy of DHI-Provo Computing Service.

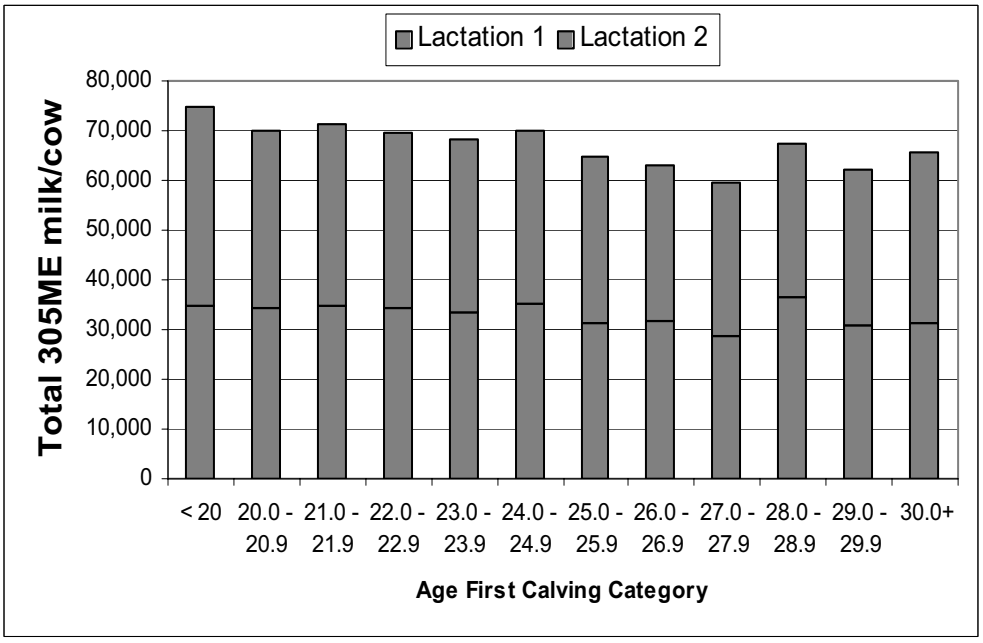
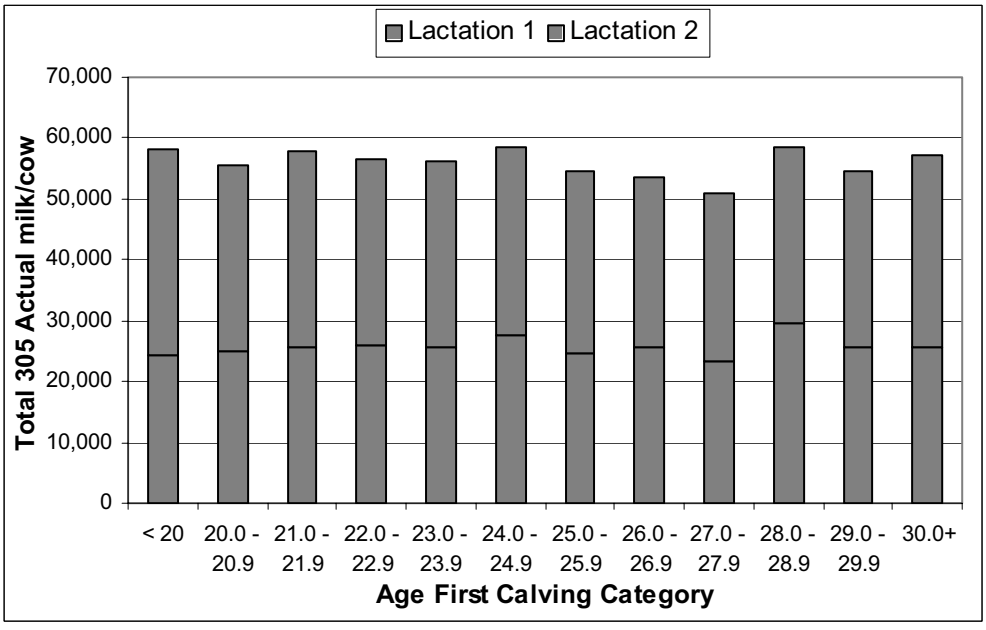


Figure 2. Total 305 actual milk yield for lactations 1 and 2 by age at first calving for Holsteins from the BYU dairy. Data compiled courtesy of DHI-Provo Computing Service.



(Heifer Raising, continued from page 3)

So how does BYU achieve these ages at first calving?

1. They have a goal of a precalving weight of 1400 pounds with a body condition score of 3.5 to 3.75. They want a big heifer, not a fat one. Heifers are bred based on body condition score and weight, not age. Heifers are weighed 2 – 3 times per month and when they are near 800 pounds they go into the breeding pen. In order to reach the goals they have set, a heifer must gain approximately 2 lb per day. This means that monitoring body weight and body condition scoring have to be on the front-burner at all times. You need to make regular weighing/taping of heifers a normal part of your schedule. His experience has been that if you only visually appraise heifers to determine their weight, they will be too big before you start breeding them. Research from Washington State showed that dairy farmers visually underestimate weight by about 200 pounds. Under BYU's goal for weight gain that would mean that the start of breeding would be delayed 100 days longer than necessary.

2. The ration is important and roughly follows this schedule:

Age 0 – 4 months: TMR of 80% concentrate (calf starter) and 20% chopped hay

Age 4 – 6 months: TMR of 60% concentrate, 40% roughage (approximately 16% CP)

Age 6 – 8 months: TMR consisting of corn silage, lower quality alfalfa hay or haylage, and barley, sorghum or oat silage (depending on rotation) (approximately 14% CP).

Does it pay to calve at an earlier age?

Doug's comment was that the more you know about the finances and figures, the better it looks to you to calve at 24 months rather than 26 – 27. BYU's cost to raise a heifer to calve at 23 months is about $50 per month ($1100 - 1150). This includes costs from birth to calving such as labor, facilities, insurance, feed, etc. (they have a very detailed accounting system). They have even looked into pasture as a way of decreasing costs, and feel that with cheap pasture they could sacrifice a little on age at first calving.

How fast does he think he could raise them without adverse effects?

Doug said they have had heifers that calved at 21 months of age and have been successful. He isn't sure he wants to go much lower.

Doug's final comment is interesting, because he felt that 40 years ago Dr. Gardner's ideas on heifer raising made him either crazy or a genius and over time would be exposed as a fraud or applauded. In the case of BYU, he must be applauded because it is working well and helps them live up to the standing joke about BYU of "breed-em young".

(Heat Stress, continued from page 2)

Table 2. Initial, Final and Percentage of Initial Respiration Rate of Heat Stressed Dairy Cattle Treated with Different Cooling Strategies

	Initial	Final	% of Initial
0	99.1	100.1	101.0
0 + F	99.0	92.5	93.4
5	100.3	66.2	65.9
5 + F	97.4	52.2	53.6
10	96.2	79.9	83.1
10 + F	94.6	62.7	66.3
15	97.7	84.5	86.5
15 + F	99.3	74.8	75.3

fan cooling are superior to either single treatment. If used singularly, soaking cows would have more impact than the use of fans only for cow cooling. These data indicate that about 1/3 of the total reduction in cow respiration rates was due to airflow and the remainder due to soaking. Under periods of severe heat stress, soaking every 15 minutes with airflow is not adequate and soaking frequency must be increased.

Cow cooling with soaking and supplemental airflow is very effective in reducing respiration rate. Many systems may be ineffective because they do not deliver adequate water to soak the cow and/or have an inadequate soaking frequency.

Western Dairy News *is published as a service to the people interested in the health and welfare of the western dairy industry. Archives of this publication may be found at http://animalscience-extension.tamu.edu/dairy/wdn/wdn.html*

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