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Dairy Newsletter

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Do Water Troughs Limit Milk Production?

Everyone understands that water intake is directly related to milk production. Since milk is approximately 87% water, anything that limits or impairs water intake will result in decreased milk yield. Recently, a group of researchers from Brazil attempted to determine if the dimensions of water troughs influenced voluntary water intake by lactating dairy cows. These researchers offered clean fresh water to cows in two separate troughs and observed the cows' preference for drinking. By doing this in a repeated and systematic fashion they were able to evaluate the cows' preference for trough surface area, depth of the water in the trough, and height of the trough from the ground.

These researchers noticed that cows' preferred drinking from troughs with larger surface area (12.2 square feet vs. 3 square feet). They recorded that cows consumed almost 3 times the water from the larger troughs as they did from the smaller troughs when allowed access to both. Cows were also observed to take approximately 3 times as many sips and to spend approximately 3 times as long actually drinking from the larger troughs as from the smaller troughs.

Using the large troughs these researchers then evaluated height of the trough. In this experiment, cows preferred troughs approximately 12 inches tall over ones that were 24 inches tall. The cows were observed to take almost twice as many sips, spend one third more time drinking, and consume 3 more quarts of water from the lower troughs than the higher troughs.

Depth of the trough did not impact the cows' preference. This should be interpreted with caution though since trough depth was manipulated by adding pebbles to the bottom of the trough. Also only depths of 12 and 24 inches were evaluated. It may be possible that troughs with a shallower design would influence water consumption by simply limiting water availability.

Why are Higher Producing Cows Harder to Get Bred?

Dr. Milo Wiltbank, University of Wisconsin, discussed factors affecting reproductive performance of high producing dairy cows at the 2006 Tri-State Dairy Nutrition Conference. Below are summary points of his presentation.

- No relationship between level of milk production and % of cows anovular at 71 DIM (25% of cows anovular)
- High producing lactating cows have much lower conception rates than heifers
- Lower embryo viability in lactating cows (53%) vs. heifers (82%)
- Increase in double ovulation in high producing cows. Double ovulation rate in cows above average milk production (81 lb) 3 d before ovulation was 20% vs. 7% in those below average.
- Cows with milk production above the herd average (88 lb) had shorter duration of estrus (6.2 h) than cows with lower milk production (10.9 h)
- Higher producing cows had larger follicles but lower circulating estradiol
- High milk production leads to decreased circulating estradiol, resulting in decreased duration of estrus
- Decreased estradiol could also increase follicular size by delaying the time to estradiol-induction of estrus, LH surge, and ovulation.
- Higher producing cows have larger luteal tissue but reduced progesterone.
- Lactating cows have increased metabolism of steroid hormones as milk production increases – increased feed consumption and liver blood flow.
- Treat cows not cycling after 70 DIM and BCS 2.5 or less. Ovsynch + CiDR or estradiol.

Gender Enhanced Semen

Dr. John Fetrow, University of Minnesota, discussed the value of gender-enhanced semen (GHS, sexed semen) at the Monsanto Pre-Conference Symposium, Tri-State Dairy Nutrition Conference, April 2006. Here is a summary of Dr. Fetrow's presentation.

With GES, the dairy industry will need more pregnancies to return cows to the next lactation than are needed to produce herd replacements. Options for capturing the value of GES are: 1) improved source of replacements for a stable herd size or for expansion; 2) the opportunity to cull more aggressively; 3) for genetic advancement; 4) fewer dystocias; 5) genetic selection for non-productive traits; 5) ability to cull poor heifers; and 6) tax advantages – ordinary income to capital gains.

Options for using GES are to breed the top end cows in the herd to female GES. Breed the middle cows to conventional semen. Breed bottom end cows to a dairy bull or low cost dairy semen (young sires) or beef bull semen. If the genetic merit of a 14-month old heifer is known, that is the best place to use GES. Given the "products" of each type of these breedings, the profit potential can be calculated. The profit depends on the herd's genetic potential and the proportion of the herd bred using GES. If you breed only the very top cows to female GES, you get a few very valuable heifers. If you breed most of the herd with female GES, you don't gain much advantage per heifer, but you get more heifers. The value of the heifers will depend on whether they are retained as replacements or sold. If retained, their value is determined by their genetic merit. If sold, the market price will determine their value. At least initially, the market may not be sophisticated enough to properly value heifers based on genetic merit.

Herds with better genetics would tend to use more female GES. Herds with good information about the genetics of their cows (and particularly their growing heifers) will have a competitive advantage in the use of female GES. Expanding herds will also have biosecurity advantages. If the beef/dairy crossbred calves are more valuable, then the value of beef for bottom end cows will increase.

The industry level impacts of GES are rapid genetic progress on the cow side. Like any production enhancing technology, this can result in more milk, reduced milk prices, and smaller margins. The value will accrue to those dairies with the information and management to adopt the new technology effectively.

What impact will GES have on prices of replacement heifers? Currently heifer prices are at historic highs. Of the 3.3 million replacement heifers calved annually, the current deficit in supply is probably only about 3% or 100,000 heifers. A small upturn in replacement heifer production with female GES will satisfy the need. Once supplied, the price of heifers should drop rapidly to near the cost of production and investment (estimated to be ~$1,300-1,400).

When commercially available, GES will be a major new productivity tool that will shift the way cows are bred in the dairy industry. Early adopters will derive the most benefit. GES will likely be used exclusively by the embryo transfer industry. There will be increased pressure for bull genetic advancement for breeding to top end cows. There may be a greater risk for inbreeding. There will be a greater reliance on record systems to identify top cows before their first breeding.

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