

Effects of Overstocking on Cow Behavior, Welfare, and Productivity

Dr. Naomi Botheras is an animal welfare specialist with The Ohio State University. She recently discussed the impact of stocking density in free stall barns on cow comfort, cow health, and milk yield. In an ideal world, there would be one free stall available for each cow in a herd, along with approximately 2 or more linear feet of feed bunk space. Unfortunately, cost associated with construction and maintenance, along with physical space limitations usually limit the number and size of feeding and resting places in most barns. Before discussing the effects of overstocking, we need to define the term. In its most basic sense, overstocking occurs when more animals are present than the number of physically separate locations for the activity in question. Therefore, it may be possible to have a barn that is overstocked for feeding space but not overstocked for lying space. To illustrate, imagine a 3-row barn that is 100 ft long with 10 ft crossovers on both ends of the two center rows of free stalls. If the free stalls are 45 inches wide, there is room for approximately 68 stalls in this barn. However, if headlocks are 18 inches wide there is only room for 66. If the headlocks are spaced at 24 inches each, the number available decreases to 50. Clearly, there is potential for disconnect between the number of stalls and number of feeding stations and this will be compounded when cow numbers exceed either of these.

Dr. Botheras reports that overcrowding free stalls can have profound effects on cow health. This is due to the reality that when free stalls are overcrowded, the amount of time individual cows spend lying decreases while the amount of time individual cows spend standing inactive in alleys increases. The amount of time spent standing in alleys and time spent lying has been associated with the incidence of hoof lesions and lameness. Therefore, cows housed in overcrowded barns may be at an increased risk of developing foot and leg problems that impair production. Another problem that is often observed when

free stalls are overcrowded is cows lying in the alleys. This behavior should have an obvious negative connotation when thinking about cow cleanliness, milk quality, and incidence of mastitis in the herd.

The effect of overcrowding at feed bunks is a little more controversial. Early research that looked at minimal space requirements reported little to no impact until feeding space was reduced to below 6 inches per cow. More recently, Canadian researchers reported that cows increased their feeding activity during the 90 minutes immediately following feed delivery when allocated 41 inches of feed bunk space in a post and rail design as compared to 20 inches. Dry matter intake has been reported to decrease when stocking density increases to 1.3 cows per headlock compared to 1 cow per headlocks. When one considers that cows will sort even the best mixed TMR and that they will also establish a social dominance order the consequences of overcrowding at the feed bunk become more important. Although cows fed with limited space at the feed bunk may consume approximately the same amount of feed as a group, the variation between the diet that the dominant cows and the subordinate cows consume can be quite large. Additionally, if space at the feed bunk is limited, aggressive behavior immediately following fresh feed delivery will increase which may lead to increased incidence of hoof lesions, lameness, and other injury.

Post-weaning slump

When too much milk or milk replacer is fed, the calf is set up for a post-weaning slump. The large amount of milk or milk replacer replaces much of the starter that the calf would normally consume pre-weaning, delaying rumen development. Because rumen development is delayed, digestion of the starter is less during the weaning period and post-weaning. Because starter intake is low and its digestion is poor, the rate of body weight gain is low and the efficiency of gain is poor.

At the recent Dairy Science meetings, Ito et al. (Abstract W14) reported post-weaning gains of 0.4 lb/day in calves fed free-choice milk and 1.8 lb/day in calves fed milk restricted to 10% of body weight. This is consistent with four other peer-reviewed trials. Terre et al. (Abstract 595) reported reduced intake and digestion post-weaning when calves had been fed approximately 2.2 lb of MR (25% CP, 17% fat) daily vs. calves fed approximately 1.1 lb of MR daily.

This has been the case in our trials feeding Pinnacle MR at increasing rates. When fed at over 1.5 lb/day, post-weaning rates of gain have been slower, starter intake has been less, and in some trials, efficiency of gain has been poor vs. feeding Pinnacle MR at 1.5 lb/day. See the results of our recent MR program trial in the attached Akey Replacement Report for more information.

Corn Processing for Calf Feeds

At our Akey dairy seminars in the winter of 2004 we shared the research of Lesmeister and Heinrichs at PSU reporting no differences in the performance of calves less than 8 weeks old fed textured starters made with either whole, rolled, roasted, or steam-flaked. Subsequently, we compared whole and rolled corn in textured calf growers fed with 5% chopped hay from 8 to 12 weeks of age and observed no differences in calf performance. This summer we fed calves textured starters made from either whole, rolled, or steam-flaked corn (all from the same corn source) and observed no differences in calf performance. We also fed whole or steam flaked corn in a textured grower diet with 5% chopped hay from 8 to 12 weeks of age and observed no differences in performance. Older research from Dr. Jim Morrill's lab at KSU reported no consistent benefit to extensive moisture processing of corn compared to dry processing when the corn was used in complete pelleted starters. Combined, this research makes a compelling and consistent story that extensively processed corn is not needed by calves less than 3 months old.

Limit Feeding Heifers

At our Akey Dairy Seminars this past winter we learned about the recent and ongoing research at Penn State (Heinrichs, Zanton, Moody) evaluating the limit feeding of heifers. They

reported an increased digestibility, improved feed efficiency, and reduced fecal output of heifers limit fed vs. full feed diets with each group having similar rates of gain. Diets were formulated to provide similar amounts of nutrients. They evaluated both high and low concentrated diets in digestion and performance trials. They are also following those heifers into their first lactation.

Hoffman at the University of Wisconsin reported their recent limit feeding trial at this summer's Dairy Science meetings (Abstract 599) and reported results similar to those reported by PSU. Hoffman fed heifers high forage diets at 80 to 90% of full feed and full feed. Diets were formulated to provide similar amounts of nutrients. Feed efficiency was increased and fecal excretion was reduced. Milk production during the first lactation did not differ among the treatments.

This information is timely for the ever-changing dairy industry. It is consistent with similar research in beef cattle. If this research was conducted 10 or 20 years ago, fewer operations could have implemented it because feed management practices were less controlled compared to today. Today more operations have TMR mixers with scales and better heifer facilities compared to our recent past. Additionally, forage quality is higher today, as an industry whole than in the past. In general, today we have a plentiful supply of high quality forages, co-products, and grains. The co-products and grains are typically less expensive per unit nutrients than the forages. So in theory, limit feeding should be economical, practical, and environmental friendly compared to full feeding and an opportunity applicable on more operations than ever before.

**THIS NEWSLETTER IS SENT TO YOU
COMPLEMENTS OF:**