Feedstuffs

pixinoo/iStock/Thinkstock

Limited feeding heifers and bunk space

It is not surprising that overstocked heifers who could not all eat at the same time, would choose to eat later when the other heifers had their fill.

Jun 23, 2021

By Al Kertz, PhD, DIPL ACAN, ANDHIL LLC

There are not many good heifer feeding studies, partly because there are not many heifer studies being done. In the past, I have written about diluting heifer diets with straw (Kertz 2009a) and limit feeding (Kertz 2009b). This heifer feeding study (Coblentz et al., 2020) was done at Marshfield, Wisconsin where Pat Hoffman used to work, and where there is a collaborative program between the USDA and the University of Wisconsin. For pregnant heifers, the challenge often is to not overfeed and not over-condition them resulting in fat heifers which will have a myriad of problems. Two feeding approaches to avoid this are to dilute diets with straw, or to restrict in some way more energy-dense diets.

This study was done between June and September 2018 with 128 Holstein heifers averaging 956 ± 42 lb initial body weight. There were 16 identical pens blocked by weight as heavy (1081 lb), medium heavy (991 lb), medium light (923 lb), and light (824 lb). Within each of these body weight blocks, there was a 2 x 2 factorial arrangement of treatments with either full or restricted diet access, and either diet push-up every 1.5 or 3 hours. There was always an available free stall for each heifer. Thus, there would be no interaction between not enough free stall space for every heifer and overcrowding of feedbunk space. I recall once visiting a US heifer operation where there was overcrowding ~150% of both free stalls and headlock feed bunk space. The good news is that about 5 years later when I was at the same operation, they had new facilities which resolved both issues.

Housing used an automated alley-scraping system, 8 free stalls with foam-core mattresses covered with a shallow layer of dried organic solids, and 8 head-lock gates. With a drive-through feed alley in the center of the building, the TMR was delivered with each heifer having 3 feet of linear bunk space. Restricted feeding treatment was created by attaching plywood partitions which covered 2 feed gates from use resulting in a 133% stocking rate. Within each pen heifers had 70 square feet of space, had 2 rows of 4 free stalls, and a cross-over alley. One experimental diet with 14.1 % CP, 63% TDN or 1.07 Mcal/lb metabolizable energy DM basis diet was fed consisting of 60.5% alfalfa haylage, 38 % corn silage, and 1.5% mineral supplement. The feeding trial period was 14 weeks. At one time, heifers were fed poor quality forage or left in the proverbial back 40 acres. Now, most receive the same high-quality forages fed to lactating cows.

Table.

	Full Access Feedbunk	Restricted Feedbunk	Push-up 1.5 hours	Push-up 3 hours	SEM
Dry matter intake, lb/day	20.3	19.8	20.2	20.0	0.11
Initial Body					
Weight, lb	962	947	958	951	5.51
Hip width, in	18.9	18.5	18.9	18.9	0.12
Hip height, in	54.7	54.7	54.3	55.1	0.20
Heart girth, in	71.7	71.3	72.0	70.5	0.24
Body condition score	3.22	3.22	3.20	3.25	0.03
Final Body					
Weight, lb	1154	1121	1147	1127	4.40
Hip width, in	20.5	20.1	20.1	20.5	0.88
Hip height in	57.5	57.1	57.5	57.5	0.88
Heart girth, in	75.2	74.8	75.6	74.8	0.88
Body condition score	3.35	3.28	3.29	3.33	0.02
Daily gain, lb	2.09	1.89	2.09	1.92	0.07
Feed:gain lb:lb	9.8	10.5	9.9	10.3	0.35

Dry matter intake (DMI) was greater (P<0.05) for unlimited versus limited diet access. This has its origin in a term used by Ken Nordlund (2006) in a seminal paper on grouping and pen moves. That term is *allelomimetic* which means that cows or heifers all want to do the same thing at the same time. I saw this most dramatically once in a cow project I was involved with in Uganda (Kertz 2014).. A group of bred Holstein heifers were grazing in one pasture when they were let out to drink water at a large concrete water trough. I turned to Father George Ssemmombwe, who I was then working with on this cow project, and told him about this herd characteristic of cattle wanting to all do the same thing at the same time. But I did not have a lot of confidence that this would be very noticeable with these thirsty heifers. Oh, yee of little faith! About one-fourth of the heifers could not all drink ai the same time. But when the drinking heifers were finished and took off then to their next pasture, all of the nondrinking heifers left too without drinking water either. Father George turned to me as if I were some sort of prophet—but I owed it to Ken Nordlund's paper. Seeing is believing. Thus, it is not surprising that overstocked heifers who could not all eat at the same time, would choose to eat later when the other heifers had their fill. Another thing is that the leftover diet was not likely as appetizing as it undoubtedly had been somewhat picked over by the higher dominant heifers that got first dibs.

Daily gain was marginally greater ($P < 0.124$) for full versus restricted diet access, as was feed efficiency ($P < 0.195$). There were not statistically significant differences for body measurements. Height increase only accounts during the second year of life for 25% of total height from birth to first-calving (Kertz et al., 1998). This limits the possibility of detecting significant differences in body measurements. I have visited this facility and its is quite good for conducting heifer trials. But even with good facilities, good heifers, and low variability in body weights, 128 heifers with 8 per grouping, the numbers are low to detect significant differences (Kertz and Chester- Jones 2004). This is the bane and limiting factor for conducting calf and heifer trials.

The Bottom Line

Yearling bred Holstein heifers with free or restricted diet access gained about 9% more with about 1.6% greater intake when not limited in access. Height increase is difficult to be meaningfully measured and detected because only 25% of height increase from birth to first-calving occurs during the second year of heifer growth.

References

Coblentz, W. K., M.S. Akins, and N. M. Esser. 2020. Effects of feedbunk restriction and push-up frequency on the growth performance of Holstein dairy heifers offered a forage-based diet with a limit-feeding program. J. Dairy Sci. 103:7000-7008.

Kertz, A. F., B. A. Barton, and L. F. Reutzel. 1998. Relative efficiencies of wither height and body weight increase from birth until first calving in Holstein cattle. J. Dairy Sci. 81:1479-1482.