

# DAIRY VETERINARY NEWSLETTER

May 2021

## Dairy Calf Time with the Dam and Housing System - Do They Affect Milk Production, Reproduction or Longevity Later in Life?

In the September 2020 edition of this newsletter, we discussed a paper by researchers in the Czech Republic. The age when dairy calves were separated from the dam after birth and whether they were raised in individual or group calf housing were studied regarding whether those practices were associated with play behavior and body weight of dairy calves. None of the calf raising practices were associated with differences in those outcomes for calves until 12 weeks of age, as was summarized in that newsletter. The same group of investigators published another paper, by B. Valnickova et al. in Applied Animal Behaviour Science, Sept. 2020. This newest paper studied whether the calf rearing practices were associated - approximately 2 years later when they were adult cows - with 7 outcome variables related to milk production, reproduction, longevity, and attempted characterization of social stress when the cows were moved into a new group of cattle.

The study was carried out at an experimental farm in Prague, Czech Republic. There were 4 treatments studied: Kept with dam until 4 d old (DAM), Separated from dam soon after birth (time range after birth not specified, but on day of birth; SEP) combined in a 2-factorial design with Individual calf hutch housing (IND) or Group housing with 3 other calves (GRP). Thus there were DAMIND, DAMGRP, SEPIND, SEPGRP treatment groups. The 40 calves in the study included 11 Czech Red Spotted and 29 Holstein breed animals. These were the same calves reported on in the earlier study that concluded when they were still young calves. There was some unfortunate selection bias based on breed composition of the calf treatment groups that led to confounding. However, that was not reported on in this paper. Considering that one of the outcomes was milk production, there could still possibly be some confounding based on breed differences.

The IND calf hutches were 1.7 m<sup>2</sup> with an “outside run” of 1.2 m<sup>2</sup>. Hutches were 40 cm (16”) apart. The GRP calf housing was a pen with 4 hutches and one connected “run” of 4.8 m<sup>2</sup>. The GRP calves as well as the IND calves were housed individually from when they were separated from their dam to 4 d old to learn to drink milk (not milk replacer) from a bucket. All treatments were continued until 8 wk old when calves were weaned. The GRP of 4 calves housed together always included 2 heifers and 2 bulls, breed not specified, but only one heifer calf was the experimental GRP calf and the others only served as companions.

A second stage of the experiment was that from 8 to 12 wk old, the IND calves were then housed in a group pen with 3 other calves (1 heifer, 2 bulls, breed not specified), and the GRP calves were moved to a new group pen together. These larger group pens were 9 m<sup>2</sup> and had “outside runs” of 9 m<sup>2</sup>. All hutches and pens were bedded with straw. It was still true that each housing group had only one experimental heifer calf and the 3 others only served as companions. I think the decision not to monitor the behavior of both of the heifer calves in each group pen setting was a lost opportunity and might have missed important data. Ideally, there would have been twice as many heifer calves originally housed IND so their total numbers equaled that of the total calves enrolled in GRP housing. What if there were some calves in GRP housing (or from 8 to 12 wk old when all

calves were grouped) who behaved differently? In the study design used, only 50% of the heifers present in the housing groups were evaluated for outcomes as adult cows.

The newer paper included events beginning after calves were 12 wk old: calves were moved to groups of 24 heifers and remained in those pens where they were inseminated between 13 and 18 mo old depending on “individual weight and body condition” until they were moved into the dry cow group for the last 2 mo before their expected first calving date. Calving was in individual straw bedded calving pens. Within one day after calving, the primiparous cows were moved to a 50-cow high milk production group. When milk production dropped below 24 kg (53 lb) per day, cows moved to a medium production group of 48 cows; there was also a low production 60-cow group, but the threshold for low daily milk production was not reported. Milking was 2X in a milking parlor.

Data on daily milk production, locomotion and body weight were collected and stored by the Afimilk Ltd® recording system. Locomotion data came from pedometers on the left rear leg of all cows that were automatically scanned during every milking. Milk yield and milking duration were “collected every milking by sensors placed in the milking stalls”, apparently from neck collars on all cows. In my experience, it is vitally important whether cows’ ID’s and information are scanned at each individual parlor stall rather than as each successive cow enters a side of the parlor walking under one monitor. This was not clear in the paper, but most Afimilk systems for many years now do the former, which markedly reduces the percentage of incorrect individual cow data collection. “After each milking cows were weighed automatically”; exactly how they were weighed and the data was collected were not described. Insemination, conception, calving, which production group a cow was in and when she left the herd were manually entered into the AfiFarm® dairy herd management software.

The 7 outcome variables selected for analysis were: SURVIVAL (survival until the beginning of first lactation, Y/N), LONGEVITY (how many days from birth that the cow remained in the herd), AGE PREGN (age in days at insemination which led to first pregnancy), MILK (305 d milk yield), MPERSEC (average grams of milk ejected per second), WLOSS (% of body weight on day of first calving that was lost by 21 DIM), LOCOMOT (average number of steps per hour one day before and one day after any cow group change). Data analysis used SAS 9.4. SURVIVAL (categorical Y/N outcome variable) was tested using logistic regression. LONGEVITY, AGE PREGN, MILK, MPERSEC, and WLOSS (continuous outcome variables) were tested using general linear models. All models had three fixed factors: DAM vs SEP, IND vs GRP, and BREED (Czech Red Spotted vs Holstein). LOCOMOT was tested using a mixed linear model with added factors of DAY (before vs after cow group change) and individual COW ID and PARTICULAR GROUP CHANGE made.

## Results

Of the 40 calves studied, 5 died and 5 were culled between 8 wk old and time of first calving. Two more were removed from the study at 8 and 20 DIM, respectively because of “need of individual care”. Causes of death or reasons for culling were not specified. Therefore 28 cows remained in the study for analysis of any outcomes except for SURVIVAL which was available for all animals.

None of the outcomes SURVIVAL, LONGEVITY, AGE PREGN, MILK, or MPERSEC were statistically significantly different between the calves separated from the dam at different times, housed in IND or GRP housing, or between BREED (all P > 0.10, most P > 0.68). LOCOMOT and WLOSS were different between breeds; Czech Red Spotted cows (155 steps/hr the day before a pen change, 270 steps/hr the day after), were more active than Holsteins (105 steps/hr the day before, 205 steps/hr the day after; P= 0.004). I thought it was interesting that both breeds averaged approximately 100 steps more/hr after a pen change; the difference in LOCOMOT after a pen change within each breed did not appear to be significantly different between breeds. Holsteins (5% body wt loss at 21 DIM) lost more weight than Czech Red Spotted (1% loss; P = 0.03).

However, LOCOMOT (P > 0.68) and WLOSS (P > 0.12) were also not different between calves separated from the dam at different times or housed in different ways; they only differed between breeds.

It was a disappointment that SURVIVAL actual percentages, and the overall means for the outcome variables were not presented and there was no way to calculate them from the data because the breakdown of how many cows remained within each of the treatment groups or breeds was not provided either. My approximations of the overall means from the data shown by treatment group and breed (again, precise calculation is impossible from the data presented) were: LONGEVITY 1286 d (3.5 years); AGE PREGN 464 d (15.2 mo); MILK 7118 kg (15,678 lb in 305 d); MPERSEC (I do not recall ever seeing milking speed expressed this way) 68.4 g (0.15 lb) per sec; LOCOMOT 130 steps/hr the day before a pen change, 237 steps/hr the day after a pen change; WLOSS 3% of body wt lost by 21 DIM.

## **Discussion and Conclusions**

Whether calves were kept with their dam until 4 d old, separated from dam on the day of birth, housed in individual calf hutches or group housed with 3 other calves until 8 wk old were not associated with any differences in their performance as first lactation dairy cattle. Milk production, reproduction, longevity, and apparent social stress when the cows were moved into a new group of cattle were not different within either Czech Red Spotted or Holstein cows. The authors added, “The stay with the mother lasted just 4 days which was probably too short for showing any influence on the studied variables that were measured at least 1 year later. The 4 days bring only a time-limited advantage in milk intake and therefore the higher bodyweight disappeared within 2 weeks after separation of calves from mothers.” (Their 2015 paper mentioned above and summarized in our earlier newsletter was then cited.) “On the other hand a study where calves were kept with their mothers for a whole week after birth showed larger milk production in first lactation - - [this] might show that period of 4 days is not long enough to achieve significant long-lasting effects on reproductive and lactation performance.”

The authors also go on to discuss “the possibility that when a heifer is raised in [the] company of her dam, her physical and psychological development is probably positively affected, thus enhancing her welfare.” This is an interesting point and something of increased importance to many people in wealthy societies that presently have plentiful food, but this was either beyond the scope of the study or differences were not observed in the present study. This was an interesting and needed study regarding individual calf hutches versus group housing as well as whether or not calves were kept with their dams for 4 days and associations with performance of those calves during their first lactation. The authors’ final conclusion was, “The results indicate that neither provision of maternal care for a few days nor group housing for the duration of milk feeding bring any advantage or disadvantage for the first lactation performance in dairy cattle. We conclude [that these methods are not different from] the traditional individual housing of dairy calves.”

## **Hybrid Continuing Education Event Coming Up**

**The American Dairy Science Association (ADSA) annual meeting from July 11-14, 2021** will be “the first-ever hybrid meeting for ADSA. We will have an in-person meeting, held in Louisville, Kentucky, along with a concurrent virtual meeting.”, says their website. You can find it by searching for “ADSA 2021 annual meeting”. Registration is now open. More details regarding all contents of the program - and hotel information for those who will travel to the in-person meeting - will be coming later. I have always found this a very informative meeting. Consider checking out the program both now and as the details of presentations within each subject area emerge.

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If you know of other planned veterinary conferences or CE events that you want to publicize, or that have been cancelled or had a change in schedule and/or format, please let me know.

While no one can be certain, there are a number of hopeful signs that the pandemic may be nearing an end. Thanks again for all that you continue to do to safeguard animal health, welfare and food safety during these challenging times.

Please let us know your comments and suggestions for future topics. I can be reached at (435) 760-3731 (Cell), or [David.Wilson@usu.edu](mailto:David.Wilson@usu.edu).



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