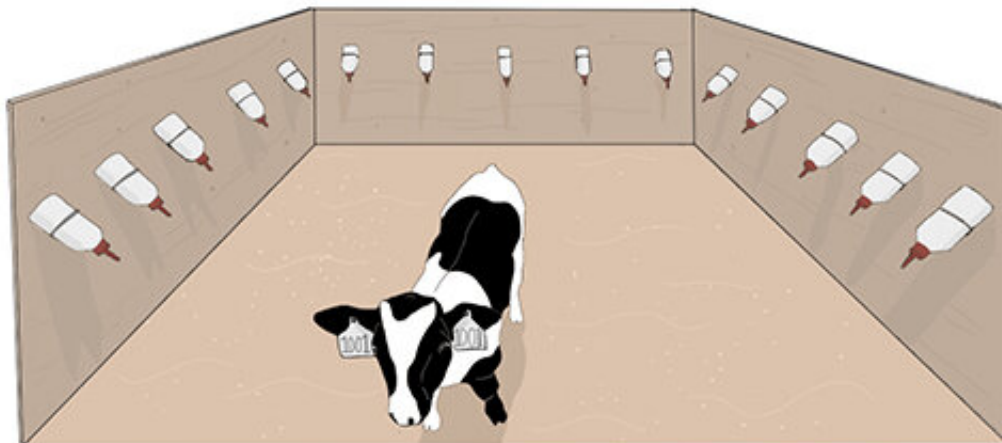


New research shows milk restriction affects calves' ability to learn

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View of the hole-board arena from the start box. The arena (3.6 m × 3.6 m) was sawdust-bedded with plywood walls 1.2 m high. Fifteen bottles were located on three sides. Bottles were held in place using holders positioned 0.5 m apart from each other and 0.8 m above the floor. Credit: Kathryn J. McLellan

New research has shown calves' ability to focus and learn are seriously affected when their milk allowance is suddenly reduced, and they may experience negative feelings of hunger. The study is published in *Biology Letters*.

Calves are often given much less [milk](#) than they would want to drink (approximately half) and switched to solid feed abruptly at an early stage in weaning. Past work has shown that feeding [calves](#) restricted amounts of milk slows their development but little research has addressed what calves feel and how hungry they are when under feed restrictions.

This study assessed the effect of milk restriction on calf cognition in two experiments using a modified hole-board test. The researchers expected that the sudden reduction of milk allowance, mimicking what would happen at weaning, would be associated with calves being too hungry to focus on a learning task.

To investigate this the research team used a test where calves have to remember the location of 4 milk-filled bottles among 15 bottles. They explored whether a sudden milk restriction (reduced from 12 to 6 liters per day) would negatively affect the calves' capacity to remember where the rewarded bottles are (experiment 1), and whether it would disrupt the capacity to re-learn after changing locations of the bottles (experiment 2).

Consistent with the idea that milk fed calves experience [hunger](#) when the milk supply declines, the study found that cognitive performance dropped when milk allowance was reduced by half (experiment 1). The research also showed that calves fed restricted quantities of milk are slower to learn new rules (experiment 2).

Although the results do not provide direct evidence that calves felt too hungry to focus, the effect on cognition is consistent with the [negative experience](#) of "feeling" hunger. This type of studies can help identify farm animal care practices that when mitigated lead to improved welfare for many dairy calves.

Dr. Ben Lecorps, Animal Welfare Lecturer in the Bristol Veterinary

School, completed this study while working in the Animal Welfare Program at the University of British Columbia, Canada. As corresponding author of the study, he stated: "Our results show that calves' ability to focus is seriously reduced when their milk allowance is suddenly decreased suggesting that they most likely experience negative emotions associated with hunger.

"We need to know more about what calves feel if we want to change routine farm practices to improve their welfare. Although we may never be able to fully understand what a calf feels or thinks, this type of study gets us closer to this goal.

"Our results support the growing body of evidence that weaning from milk can induce hunger, particularly when animals are pushed to switch to solid feed (by decreasing milk allowances) abruptly. Our study also shows that it may be hard for calves to learn new tasks when they are experiencing high levels of hunger, which is concerning because it may slow down how fast they learn to feed from another source."

The next step for Dr. Lecorps and his graduate students in the Bristol Veterinary School is to look at whether calves who are fed restricted quantities of milk during the pre-weaning period show lower cognitive abilities compared to calves fed quantities of milk without restrictions. They expect that calves who are fed restricted amounts of milk will be slower to learn, because they experience hunger at a level that is more disruptive.

The research team advise that farmers implement ways to mitigate the negative consequences associated with weaning of milk abruptly, such as feeding calves more milk at a younger age and gradually reducing the quantity of milk provided instead of reducing abruptly at weaning.

More information: Benjamin Lecorps et al, Hunger affects cognitive

performance of dairy calves, *Biology Letters* (2023). DOI: [10.1098/rsbl.2022.0475](https://doi.org/10.1098/rsbl.2022.0475)

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