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Dairy cattle welfare in tie stalls vs. less restrictive housing

Cows kept in 'tie stalls' are tethered in individual stalls. This is the most prominent form of housing for Canadian dairy cattle (74% of farms in Canada use tie stalls), especially in Quebec and Ontario. In western Canada, loose housing systems are more common, especially free-stall barns that allow cows to move around the barn and socialize with other cows.

An obvious welfare concern associated with tie stalls is how they restrict the cow's freedom of movement, preventing cows from even turning around in the stall. In response to these concerns, some countries (e.g., Denmark, Norway, Sweden) have started to phase in policy preventing the use of this system, but in Canada, tie stalls are still allowed and some argue that these can provide advantages for dairy cattle if managed appropriately.

To assess these arguments, researchers at the University of British Columbia conducted a systematic review of scientific literature on dairy cattle welfare in tie stalls compared to less restrictive housing systems. They reviewed 102 scientific articles that compared cows kept in tie stalls versus less restrictive housing and categorized the articles according to the commonly used aspects of animal welfare (Figure 1): affective states (e.g., freedom from pain, stress), basic health and biological functioning (e.g., free from injury and health concerns), and natural living (e.g., ability to perform natural behaviours and live a reasonably natural life). They also evaluated these measures in tie-stall facilities that provided their cows with access to an exercise or outdoor area.

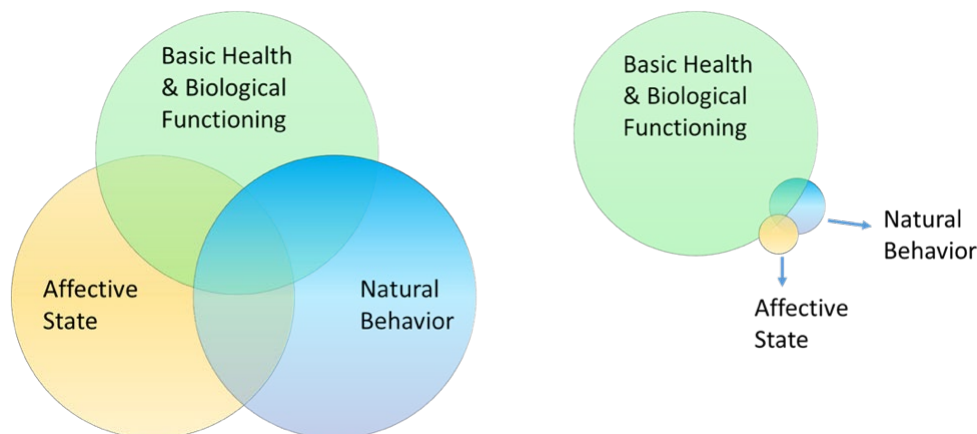


Figure 1. The three spheres of animal welfare (Fraser et al., 1997). Panel A shows the three spheres equally sized, while Panel B shows the area of each sphere in relation to the number of publications assessing this aspect of welfare in tie stalls versus less restrictive housing. From Beaver et al. (2021).



Most studies (86% of articles; Figure 1) evaluated basic health and biological functioning of dairy cows, and these studies yielded mixed results. Tie stalls appear to offer benefits in reducing hock and knee lesions and in some types of hoof lesions, especially if cows are allowed outdoor access, but in general, effects on leg and hoof health are mixed.

Effects on transition cow health and mastitis showed no consistent differences between systems, and measures of reproductive health (e.g., fertility, calving to conception interval) tended to be better in less restrictive housing. There was also no consistent effect of housing system on milk; switching between systems did sometimes lead to a temporary decline in milk production, but this quickly recovered.

Few studies assessed the effects of housing on natural behaviour (only 19% of articles did so), and of those that did, lying behaviour was commonly evaluated. Cows in tie stalls spend more time standing and lying behaviours appeared to be compromised. For example, cows were more likely to adopt abnormal lying patterns and lie down outside the designated stall base area when kept in tie stalls. A number of studies also reported a higher frequency of other types of abnormal behaviour (e.g., tongue rolling) in tie stalls, although this particular behaviour was found to decline when cows were allowed with outdoor access.

Likewise, few studies to date evaluated the affective state of cows housed in different systems (only 14% of articles reported such measures). These studies generally reported that cow comfort and positive emotional states were improved for tie stall cows that received outdoor access. Some studies reported that cows housed in tie stalls were more willing to allow people to approach them, perhaps suggesting that tied cattle are less fearful or more bonded to the farmers than the loose-housed cows. However, it is also possible that the tied cows were simply more habituated to close contact. Further research is required to better understand effects of housing systems on the positive bond that can form between cattle and the people who care for them.

Overall, the scientific literature reviewed provides no clear basis for preferring one system over the other. Most literature addresses lameness and other aspects of basic health and functioning, but the effects of housing on these measures is mixed. Far fewer papers have addressed measures relevant to affective states in cows, but of those doing so, the effects of housing are again inconsistent. There are also relatively few studies that addressed aspects of natural behaviour, but those that have addressed such measures show benefits of loose housing versus tie stalls. On the basis of this evidence suggesting that loose housing allows behavioural freedoms to the cows without any clear disadvantage in health or emotional state, we encourage Canada's dairy farmers to consider loose housing systems for their cows.



1 For further information please contact Marina (Nina) von Keyserlingk (nina@mail.ubc.ca) or Dan Weary (danweary@mail.ubc.ca). The results described in this article are based on the gold open access publication: Annabelle Beaver, Daniel M. Weary and Marina A.G. von Keyserlingk. 2021. Invited review: The welfare of dairy cattle housed in tiestalls compared to less restrictive housing types: A systematic review. *J. Dairy Sci.* 104: 9383-9417 <https://doi.org/10.3168/jds.2020-19609>

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