The effect of herd size on welfare indicators in dairy cows

This essay analyses recent research into the implications of herd size on animal welfare in the dairy industry.

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Introduction

With a growing population worldwide, the global market for dairy products has been increasing over the past four decades (Wang & Li 2008). As the industry intensifies to meet this demand, there is concern that increasing the size of dairy herds will have adverse effects on animal welfare (Robbins et al. 2016). A compromise of animal wellbeing to increase milk productivity and farm profitability does not bode well with consumer concerns and industry regulations pertaining to animal welfare (Verbeke & Viaene 2000). Therefore, to benefit consumers, farmers and their animals, an assessment of herd size on welfare indicators may reveal certain animal and managerial factors that dairy farmers can improve to enhance the welfare of their herds.

Discussion

Early research into dairy cow welfare employed three broad topics of assessment. These were animal function, animal feeling and expression of normal behaviour (von Keyserlingk et al. 2009). To effectively measure and compare the effect of herd size on animal welfare, recent studies have designed welfare assessment protocols to categorise qualitative data for statistical analysis.

A study by Beggs et al. (2019) observed animal and resource-based indicators by utilising an animal welfare assessment protocol that consisted of a questionnaire and a paddock observation measurement section. A similar study conducted in Germany by Gieseke, Lambertz and Gauly (2018) explored the association between herd size and welfare with a similar assessment protocol that incorporated the same welfare criteria of feeding, housing, health and behaviour. These two papers hypothesised that larger herd size would have an adverse effect on the welfare of the cows; however, this was not supported by their findings.

Gieseke, Lambertz and Gauly (2018) did not find a significant relationship between stocking density and cow welfare, concluding that managerial practices rather than herd size are a stronger indicator of animal welfare. Despite observing that with increasing herd size came increasing risks to animal welfare, Beggs et al. (2019) arrived at a similar conclusion. They found that on these larger farms there was an increased use of strategies to mitigate the risks. A previous publication by the same authors reported larger farms as more likely to have routine veterinary herd health visits, written protocols for disease treatment and electronic systems for identification and monitoring of activity (Beggs et al. 2015). Taking

into account these mitigating methods, the recent paper determined three major welfare indicators as requiring additional attention from farm managers dealing with large herd sizes: shade provision to manage heat stress, flexibility of milking times on hot days and the reduction of long walking distances, which affect both grazing time and time spent lying down (Beggs et al. 2019).

One limitation of using animal-based indicators to assess welfare is that an observation made on one day is not necessarily a reflection of the overall herd or representative of another time during the year. Gieseke, Lambertz and Gauly (2018) performed welfare assessments twice in the year, six months apart, to avoid any seasonal affects, in contrast to Beggs et al. (2019), who chose to visit farms when the major proportion of the herd were lactating and at the convenience of both the farm manager and researcher. Animal welfare requires a multifactorial assessment and cannot be based upon irregular observations so care must be taken when comparing studies and when extrapolating the presented data to reflect the overall industry.

The animal-based indicators used in assessment protocols for welfare studies carry varying degrees of welfare implications, with some considered as being more important than others. Limitations arise in the statistical component of the methodology used by Gieseke, Lambertz and Gauly (2018), where more important factors such as water access were aggregated with less important factors such as mastitis, potentially skewing the results (de Vries et al. 2013). This methodology critique similarly applies to a study design by Armbrecht et al. (2019), which also raised the issue of observer bias for the subjective components of welfare assessment studies. They used the same person to make protocol observations and recommended the use of two people to further reduce observer bias, however other studies have suggested using a person trained in making welfare assessments (Jaeger et al. 2019).

The study by Armbrecht et al. (2019) was designed to identify whether there were any welfare problems associated with pasture access when comparing barn housing to cows having open pasture access. Welfare quality assessments and statistical analysis were similar to that of the two aforementioned articles. The authors concluded that higher welfare status of dairy cows was associated with increased access to pasture (hours/day) and pasture management must be enhanced to benefit the welfare of the cows. This correlates with the conclusions of Beggs et al. (2019) of the major challenges to welfare on dairy farms being the management of heat stress and reduced time allowance for cows to lie down as a result of extended walking distances, while still having to graze to meet energy requirements.

Conclusion

Current literature suggests that there is no relationship between herd size and reduced welfare on dairy farms (Gieseke, Lambertz & Gauly 2018; Armbrecht et al. 2019; Beggs et al. 2019). There was, however, a common agreement that large herd sizes face different challenges to those of smaller farms, with the biggest problems being shade provision and walking distance potentially having a negative impact on animal welfare. Despite no

significant relationship between herd size and welfare indicators, both the managerial and logistical aspects of these issues should be carefully considered by farms with large herds or those looking to increase their herd size. As the consumer driven market puts pressure on the production efficiency and output of dairy farms across the globe, managing an increasing number of animals on any one site will always raise welfare concerns. Additional research should be undertaken to explore optimal strategies that enhance welfare on these larger farms.

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