

Factors affecting dairy cow preference to be indoors or at pasture

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Introduction Indoor housing and pasture can have both positive and negative effects on the welfare of dairy cows, and environmental conditions can influence the location that dairy cows prefer. For example Krohn *et al.* (1992) reported pasture to be the preferred lying place for dairy cows during the summer months, but preference shifted towards indoor straw housing with deep bedding in the winter. However, it is unclear whether high yielding dairy cows have a preference for indoor housing or pasture and how environmental conditions and cow factors influence their choice. The aim of the study reported here was to determine whether high genetic merit dairy cows have a preference to be indoors or on pasture and to assess which environmental factors influence their preference.

Materials and methods The study was conducted between May and August 2008 with 24 high genetic merit Holstein dairy cows in mid to late lactation. Twice a day after milking, cows were given the choice of going to pasture (0.56 ha) or to a cubicle house. They were then free to move between the two until the next milking. Indoors, a total mixed ration (TMR) (DM basis: 32% grass silage; 25% maize silage; 22% concentrate blend (GLW Feeds, Loughborough, UK); 17% whole crop wheat; 2% seed hay; 2% molasses) was available *ad libitum*. At pasture, sward dry matter (DM) was maintained between 1800 and 3000 kg DM/ha measured using a rising plate meter. The study had three experimental periods, during each of which eight cows received an eight day training period followed by an eight day study period. Cows had at least two weeks prior experience of each location. A video camera was used to record time spent indoors and at pasture. To determine the environmental factors influencing the cow's decision, weather conditions were recorded indoors and at pasture using a Davis Vantage PRO2 weather recorder (Hayward, California, USA). Milk yield was recorded daily and each cow was given a body condition score (BCS), lameness score and were weighed on days one, eight and 16 of the study. One sample t-tests were used to analyse time spent and linear regressions were used to analyse factors affecting preference.

Results When given a choice the cows spent 91.9% (± 2.33) of their time indoors, which was significantly different from 100% ($P=0.001$), 50% ($P<0.001$) and 0% ($P<0.001$). Time spent indoors was influenced by environmental conditions. Rainfall influenced preference ($P=0.015$) (Figure 1), with cows spending more time indoors on days when it rained. Relative humidity outdoors influenced preference ($P=0.045$), as did relative humidity indoors ($P=0.004$). When the relative humidity was low indoors ($\leq 70.2\%$) and outdoors ($\leq 78.7\%$) the cows spent more time at pasture (0.4 vs. 2.7 hours for high vs. low relative humidity indoors respectively; 0.7 vs. 1.7 hours for high vs. low relative humidity at pasture respectively). Average temperature indoors ($P=0.985$) and average temperature outdoors ($P=0.742$) had no effect on preference. Of the animal factors, milk yield affected preference ($P=0.005$) (Figure 2), with high yielding cows spending more time indoors than low yielding dairy cows. There was a tendency for BCS to influence preference ($P=0.058$). Cows with a high BCS score (> 2.7) spent more time at pasture (1.5 vs. 0.9 hours for high vs. low BCS respectively) compared to cows with a low BCS (≤ 2.7). Lameness ($P=0.41$) and liveweight ($P=0.77$) had no effect on preference.

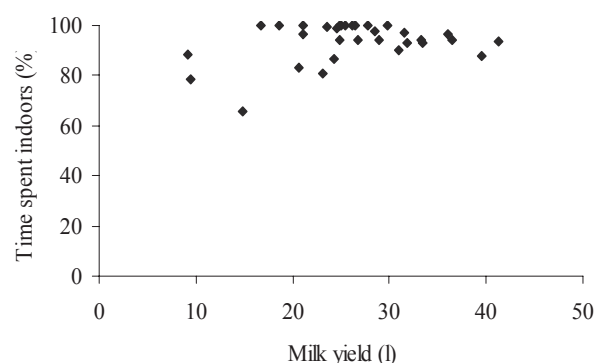
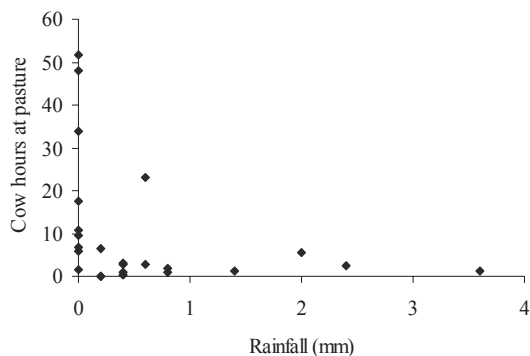


Figure 1 Number of hours the cows spent at pasture over 192 h

Figure 2 Percentage time spent indoors and at pasture

Conclusion Cows expressed a partial preference to be indoors which was influenced by environmental conditions and individual cow factors. It is possible that the higher yielding dairy cows expressed a stronger preference to be indoors as the TMR indoors allowed them to satisfy nutritional demands more easily than grazing at pasture. The difference in the feed provided in each location may have influenced cow preference and requires further investigation.

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References

Krohn, C.C., Munksgaard, L. and Jonasen, B. 1992. *Applied Animal Behaviour Science* 34, 37-47.