**An investigation into the effect of mechanical brush provision on the behaviour, cleanliness and performance of finishing beef cattle**

*Application*: Provision of a mechanical brush offers behavioural and performance advantages for housed finishing beef cattle.

*Introduction:* High standards of animal welfare are fundamental in sustainable livestock production systems. Finishing beef animals indoors is commonplace, although housing facilities for beef cattle are often designed to optimise resource use efficiency with little consideration for the behavioural needs of the animals. As market demand for higher on-farm animal welfare standards continues to grow, more research is required to identify cost-effective solutions which can be implemented on beef farms to improve animal welfare. The objective of this study was to assess the effects of mechanical brush provision on the behaviour, cleanliness and growth performance of finishing steers.

*Materials and methods:* This study was carried out on a commercial beef farm in Northern Ireland. On day 0 of the study, 72 continental steers were weighed and randomly assigned to one of two groups. 1 group (n=36) were assigned to a pen containing a mechanical brush, while the other group (control; n=36) were assigned to a pen containing no brush. The pens were identical in design, dimension and bedding management. Over the 60-day study period, both groups were managed identically and offered the same total mixed ration *ad libitum.* Animal behaviour was recorded by one trained observer for 12 hours each week using instantaneous scan sampling at 10-minute intervals. Cattle were cleanliness scored every 2 weeks using a 5-point evaluation system, with 13 individuals randomly selected at each scoring opportunity. Cattle were re-weighed at the end of the 60-day finishing period, prior to being loaded for transport to slaughter. Individual daily liveweight gains (DLWG) were calculated and carcase weights and conformation grades were provided by the processor. Behaviour data was subjected to the Chi-squared test using IBM SPSS Statistics (version 27) to detect between group differences. Weight gains and carcass characteristics were analysed using analysis of variance. Cleanliness scores were also compared between groups.

*Results:* Brush provision significantly increased lying and eating times (*P*<0.05) and reduced the amount of time spent standing idle (*P*<0.001) and walking (*P*<0.05). The frequency of self-grooming behaviour was not significantly different across treatment groups (*P*>0.05). Cattle provided with a brush engaged in fewer displacement and mounting behaviours (*P*<0.05) and expressed stereotypic behaviours less frequently (*P*<0.001) than those in the control group. There was no difference in cleanliness scores between groups. Cattle in the brush treatment group had significantly (*P*=<0.05) higher DLWG’s (+0.21kg/day on average) than those in the control group. Cattle provided with a brush also tended to have better conformation scores although this difference was not significant (Table 1).

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| Parameter | Treatment | | SEM | *P*-value |
| Brush | No Brush |
| Start weight (kg) | 538 | 540 | 8.2 | 0.869 |
| Final weight (kg) | 656 | 645 | 8.9 | 0.390 |
| DLWG (kg/d) | 1.84 | 1.64 | 0.059 | **0.018** |
| Cold carcass weight (kg) | 377.3 | 374.5 | 5.71 | 0.737 |
| Dressing proportion (g/kg) | 0.575 | 0.581 | 0.0044 | 0.361 |
| Conformation score\* | 10.9 | 10.4 | 0.23 | 0.078 |
| Fat Classification\*\* | 6.6 | 6.3 | 0.25 | 0.346 |

Table 1: Effects of mechanical brush provision on beef cattle performance parameters

\* Conformation based on EUROP converted to 15-point scale (1=P-, 15=E+)

\*\*Fat classification based on 1-5 converted to 15-point scale (1=1- , 15=5+)

*Conclusion:* Results from this study support the implementation of mechanical brushes in housing facilities for finishing beef cattle. The behavioural and performance advantages identified warrant further research into enrichment objects for housed beef cattle.

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