Quantifying the effects of cuttlebones and an abrasive beak blunting object on beak shape and pecking force in two breeds of laying hens

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APPLICATION

Reducing beak length could affect the severity of injurious pecking damage, improve feather cover and reduce mortality rates for commercial hens. Abrasive materials for beak blunting may be an effective alternative to beak treatment.

INTRODUCTION

Reducing injurious pecking and the associated damage in laying hens is imperative to improve welfare. Though it does not solve the underlying causes, one approach to reducing feather damage and cannibalism is to provide an abrasive surface to reduce beak length (Van de Weerd et al. 2006) or injurious pecking (Moroki and Tanaka 2016).

MATERIALS AND METHODS

Thirty-six White Leghorn (WL) hens and 36 Columbian Rock (CR) hens with intact beaks were housed individually in barren cages from 29–40 weeks of age. Twelve hens of each breed were given one of two pecking objects (cuttlebone (Prevue Hendryx Pet Products, USA) or beak blunting board (S N Supplies, UK)), with half installed in the feed trough and the other half hung vertically on the side of the cage. The remaining 12 hens of each breed were housed without any pecking objects. Beak shape (photos taken and measured digitially using tspDig2 software (SUNY Stony Brook Morphometrics, USA) and mean peck force (measured via force plate (Bertec Corp., USA)) were collected at 29 weeks of age (prior to object installation), 35 and 40 weeks of age. Objects were replaced as needed. Data were analysed using Linear Mixed Models (with natural log transformation) (LMM) in Genstat (16th Edition) with $\alpha = 0.05$. All procedures were approved by SRUC's animal ethics committee.

RESULTS

Cuttlebones were replaced at least once for 12 of the 24 hens offered them (9 CR, 3 WL). There was no evidence to suggest the blunting boards were used. Beak length was affected by age ($P < 0.001$) and breed ($P = 0.011$, Fig.). Cuttlebones tended to reduce beak length ($P = 0.070$), but there was no effect of location ($P = 0.331$). CR hens had smaller beak tip angles (i.e. sharper tips) ($P < 0.001$; predicted means±SE from LMM (back transformed means): WL 4.25 ± 0.03 (69.76°), CR 4.04 ± 0.03 (56.88°)). Perpendicular peck force was affected by age only ($P < 0.001$), as it was the strongest at 29 weeks (predicted means ± SE from LMM (back transformed means): 29 weeks 8.85 ± 0.06 (6967 milliNewtons), 35 weeks 8.55 ± 0.06 (5146 mN), 40 weeks 8.62 ± 0.06 (5552 mN).

CONCLUSION

Cuttlebones, but not the blunting boards, were attractive to some hens and showed encouraging results for shortening upper mandibles, though larger sample sizes may be required in future studies to obtain statistical significance as some hens that did not use the cuttlebones. Further studies are needed to assess the efficacy of cuttlebone access on injurious pecking behaviour and feather cover, as it is uncertain how beak shape affects this. However, the use of cuttlebones in particular may not be commercially practical as they are brittle and easily worn if used by the hens.

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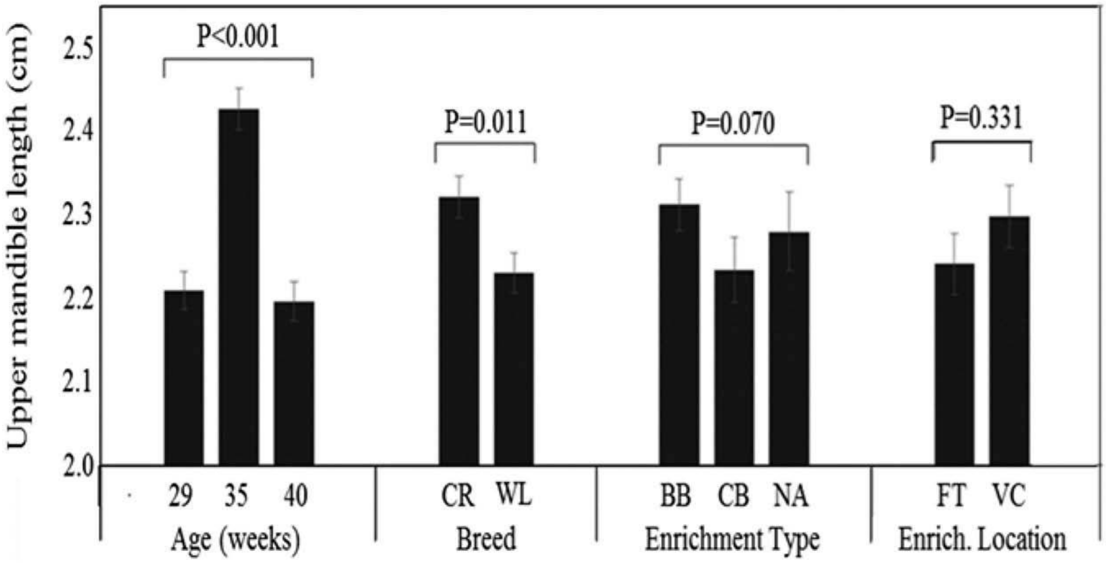

Figure 1 Mean upper mandible lengths (cm) predicted from LMM back transformed (±SE). Treatment factors: Columbian Rock (CR),
White Leghorn (WL), Blunting board (BB), Cuttlebone (CB), No enrichment present (NA), Feed trough (FT), Vertical in cage (VC).