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The Old School, Brewhouse Hill, Wheathampstead,
Hertfordshire AL4 8AN, UK
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The development of fault bars in domestic chickens (*Gallus gallus domesticus*) increases with acute stressors and individual propensity: implications for animal welfare

A Arrazola and S Torrey*

Department of Animal Biosciences, University of Guelph, Guelph, Ontario, Canada

* Contact for correspondence: storrey@uoguelph.ca

Abstract

Negative experiences during feather growth can result in fault bar formation. Fault bars are malformations perpendicular to the rachis of the feather caused by stressful experiences during feather growth. However, there are little data on the causal effect of psychological stress on the formation of fault bars in chickens. The objective of this study was to examine the effect of acute stress in domestic chickens (*Gallus gallus domesticus*) on fault bar formation to validate this measure as a welfare indicator. Thirty broiler breeder pullets were housed in six cages at 21 days of age. Three cages were exposed to an acute stress protocol while the other three were the unstressed control. Feathers were marked as close as possible to the growing follicle at 21 (wing feathers) and 60 (all feathers) days of age. Acute stress came in the form of three procedures (unpredictable feed delivery, induction of tonic immobility, and crowding) repeated twice, 3–8 days apart and randomly, from 28 to 60 days of age. Wing, tail, and cover feathers were removed and measured at 60 days of age for weight, length, and number of fault bars. Exposure to acute, unpredictable stress increased the number of fault bars in wing feathers of chicks with a high number of initial fault bars. Feather growth decreased for the stressed group compared to the control. These results suggest that feather traits, including fault bars and feather growth, can be used as indicators of negative welfare in chickens.

Keywords: animal welfare, feather growth, *Gallus gallus domesticus*, psychological stress, stress response, welfare indicator