

# Are Thirty-Five Days Enough to Observe the Stress-Reducing Effect of a Semiochemical Analogue on Chickens (*Gallus gallus domesticus*) Housed Under High Density?

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**ABSTRACT** Two similar 400-m<sup>2</sup> buildings, each housing 8,400 broilers of a commonly used industrial strain, were used to test the effectiveness of the semiochemical treatment known as mother hen uropygial secretion analogue (MHUSA). The birds in 1 building were exposed to MHUSA continuously during a 35-d growing period, whereas those in the other building received a placebo. The experiment was then repeated using precisely the same conditions but with the building treatment reversed to control for any building effect. The purpose of the trial was to evaluate the effect of MHUSA on growing performances (live weights) and stress indicators ob-

served from blood samples: heterophil-lymphocyte ratio and corticosterone level. Data analysis (ANOVA) showed that MHUSA-treated broilers had a higher mean growth rate, as shown by increased live weights at both d 17 and 35 ( $P \leq 0.001$  and  $P \leq 0.001$ , respectively). After the 35-d growing period, we observed both lower heterophil-lymphocyte ratio ( $P \leq 0.001$ ) and lower corticosterone level ( $P \leq 0.05$ ) for birds treated with MHUSA compared with placebo, further indicating that the birds were less stressed. We conclude that constant diffusion of MHUSA in buildings used to house broilers might enhance the welfare and growth of the bird by reducing stress.

**Key words:** broiler, stocking density, growth, stress, semiochemical

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## INTRODUCTION

Broiler chickens, which are used for meat, are typically housed for 35 d at a stocking density of 20 or more birds/m<sup>2</sup>. Pettit-Rilez and Estevez (2001) have shown that stocking densities of more than 15 birds/m<sup>2</sup> are stressful for broilers. At the end of the growing period, average live weight of birds is around 2,000 g (Pettracci et al., 2004), meaning that the stocking density is often more than 40 kg/m<sup>2</sup>. Martrenchar et al. (1997) observed that at densities exceeding 43 kg/m<sup>2</sup>, there were detrimental effects, including increased fighting. Added to this, most broilers are raised in buildings without outdoor access or opportunities for dust bathing. Large group size (Barnard and Burck, 1979), which makes the establishment of a dominance hierarchy impossible, and a lack of dust bathing (Vestergaard et al., 1999) tend to lead to aggressiveness (Cornetto et al., 2001). The effects of injury and stress are of concern both to producers and processing plants, because they represent a source of significant economic loss. For example, stress has been shown to lower growth

curves (Tankson et al., 2001), increase the number of downgraded broilers, and can even lead to increased mortality rate (Buitenhuis et al., 2002). Heterophil-lymphocyte ratio (HLR; Puvadolpirod and Thaxton, 2000), corticosterone (CS) level, and weight gain (Post et al., 2003) are of importance to evaluate both the stress of the birds and the economical efficiency of the production method. A study by Madec et al. (2006) has shown that the semiochemical treatment known as mother hen uropygial secretion analogue (MHUSA) reduces stress in broilers housed for 80 d at a stocking density of 11 birds/m<sup>2</sup>. The purpose of the current study is to assess the effect of MHUSA on stress and performance parameters during a shorter period of housing at a higher stocking density.

## MATERIALS AND METHODS

### *Birds and Breeding Conditions*

Birds were 1 d old when they arrived (noted d 0). The population was equally split between males and females. The strain used (Ross PM3) is a commonly studied meat-producing bird with a high standardized growth rate that is usually slaughtered from 35 to 42 d of age. The same number of birds (8,400) was kept under artificial light (18:24 pattern) in each of 2 similar 400-m<sup>2</sup> buildings with-

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