

Free-range use and behavior of slow-growing broiler chickens: effects of shelter type, enrichment, age and weather conditions

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Increased free-range use by slow-growing broiler chickens could benefit their welfare. This study aimed to assess the effects of enrichment early in life, shelter type (artificial or natural), weather conditions and age on broilers' free-range use. Three production rounds (R) were performed, with 440 Sasso chickens each. Birds were housed indoors in 4 groups of 110 animals from d0-25, during which 2 groups per round received environmental enrichment (hay bales, strings, grain, mealworms). At d25, birds were moved to 4 mobile houses on a 1 ha field. From d28-70, birds had access to both grassland with artificial shelter (A-frames; AS) and short rotation coppice (SRC). SRC consisted of densely planted willows (15,000 trees/ha). Free-range use was observed 3 times daily on 15, 21 and 18 days in R1, R2, and R3, respectively. The number of animals outside, their location (AS; SRC) and distance from the house (0-2 m; 2-5 m; >5 m) were recorded. In R2 and R3, behavior of the outside chickens was also recorded. Weather conditions were recorded every 15 min. Data were analyzed using a GLM Poisson regression model, with a first-order autoregressive covariance-structure to correct for multiple observations over time within the same house. For multiple comparisons, p-values were corrected using the Tukey-Kramer method. On average, 26% of the birds were outside. Early-life enrichment tended to have a small positive effect on free-range use (0.4% more birds outside; $P=0.052$). At all distances, more birds were in SRC compared to AS (all $P<0.001$). In AS more birds were at 0-2 m than at 2-5 m or 5 m from the house (all $P<0.005$). In SRC more birds were at 0-2 m and 2-5 m than at >5 m from the house (all $P<0.001$). Free-range use increased with age, particularly in areas further from the house ($P<0.001$). In AS, rainfall and low solar radiation were related to more birds outside, while the opposite was true in SRC ($P<0.001$). Fewer birds were outside with increasing wind speed (both AS and SRC; $P=0.049$). A higher percentage of chickens was observed to forage in AS compared to SRC (50 vs 28%; $P<0.001$). The opposite was true for standing (6 vs 9%; $P<0.001$) and sitting, but for the latter the difference tended to decrease with distance from the house ($P=0.065$). We conclude that: (1) early-life enrichment had no profound effect on free-range use in broilers; (2) SRC was preferred over AS, suggesting this shelter was more suitable and attractive; and (3) behavior was related to shelter type.