

Clustering versus dispersal: spatial preferences of broiler chickens studied at different densities

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The spatial preferences of broilers were evaluated by comparing their actual distribution with that expected by chance. The assumption was that broilers will increase the distance to their pen mates if high densities (and the resulting close proximity to pen mates) are experienced as aversive, whereas they will decrease this if close proximity is experienced as positive. Broiler chickens were housed in groups of 8, 19, 29, 40, 45, 51, 61 and 72 birds in 3.3 m² pens (average end weights achieved: 6, 15, 23, 33, 35, 41, 47 and 56 kg/m²). At 4, 5 and 6 weeks of age the nearest neighbour distances (NNDs) were scored. The observed NNDs were compared to simulations in which chickens had no preference for shorter or longer NNDs, but retained the same preference for certain areas of the pen shown by the real chickens (created by pooling all locations obtained in one week and density and randomly selecting a number of locations equal to the original group size). Physically impossible simulations (NNDs < minimum NND observed for that week) were discarded. In weeks 4 and 5 observed NNDs were lower than simulated for the groups of 8 animals ($p=0.004$ and $p<0.001$, respectively), indicating that these animals were more clustered than would be expected if they were indifferent to their nearest neighbour distance. In all groups ≥ 29 animals showed larger NNDs than their respective simulations (groups of 29 in week 4: $p=0.021$, other groups: $p<0.001$) indicating that these animals were more dispersed than would be expected. In the sixth week all groups were more dispersed than expected ($p<0.001$), except those of 8 animals that showed no difference to the simulations and those of 72 since in this last group only 1 simulation fitted the simulation criteria and thus no p-value could be calculated. To allow broiler chickens to achieve their preferred spatial distribution, much lower stocking densities than those currently practiced under commercial conditions would be needed.

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