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www.ufaw.org.uk

Animal Welfare 2013, 22: 57-65  
ISSN 0962-7286  
doi: 10.7120/09627286.22.1.057

## **The welfare of laying hens in conventional cages and alternative systems: first steps towards a quantitative comparison**

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### **Abstract**

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Research synthesis, using techniques such as meta-analysis to combine the results of a number of studies, is a particularly useful technique when there are multiple studies with conflicting results, or where there may be conflicting interests, and can serve to extract the maximum information from animal experiments. The effect of conventional cages and alternative housing systems on measures of production, behaviour, physical and physiological condition in laying hens is an important question that would benefit from research synthesis. We found that statistical constraints did not allow the usual methods of meta-analysis, so as a first step towards quantitative comparison, we used a simple vote-counting approach based on the treatment means. We counted the number of papers in which conventional cages or alternative systems had a higher weighted mean for various response variables. Egg production was higher in conventional cages than in alternative systems, though this effect was probably mostly confined to the comparison with multi-level indoor systems. Bones were stronger from hens kept in alternative systems than those kept in conventional cages. We confirmed previous reviews that birds show more comfort behaviour and possibly dustbathing (or vacuum dustbathing) behaviour in alternative systems, but aggressive pecking did not differ between systems. Perhaps surprisingly, mortality, feather pecking and body wounds were not found to differ between systems. The latter findings suggest that the chance of a mortality or cannibalism outbreak may be no greater in alternative systems than in cage systems, but it should be noted that our analysis did not consider the magnitude of the difference in mortality. In conclusion, the meta-comparison undertaken here supports some but contradicts other conclusions reached in qualitative reviews.

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**Keywords:** animal welfare, behaviour, cages, egg production, housing, laying hens