Developments in the welfare of laying hens in caged and non-caged systems

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Introduction

Because of the vast array of indicators that reflect an animal's welfare, it is a difficult variable to measure quantitatively. However, recent studies have quantified and analysed some of the key indicators in an attempt to grade aspects of the welfare of laying hens in caged and non-caged situations.

Discussion

It is known that fearfulness inhibits a number of fundamental behaviours, such as social interaction, exploration and comfort behaviour. Furthermore, as stated in the 'Five Freedoms', freedom from fear and discomfort is central to an individual's welfare. Colson *et al.* (2006) carried out a study to measure fearfulness in laying hens using a combination of tonic immobility tests, novel-environment tests and novel-object tests. Some of the significant findings were that caged hens were less mobile and less active in the tonic immobility test compared with non-caged hens. The caged hens also showed more panic reactions when presented with a novel object and explored less of the novel environment and object than non-caged hens. Based on previous studies, this behaviour was considered to be characteristic of hens with a high level of fear.

Diversified experience can lower fearfulness by increasing adaptive responses to novel stimuli (Reed *et al*., 1993). So it seems likely that the lack of diverse environmental stimulation (small flock, little furnishings) seen in the caged system may contribute to the increased fear characteristic of caged hens. Non-caged systems, such as the aviary, have larger flock sizes and varied furnishings, such as nests and perches. These features increase stimulation and the opportunity for the hens to develop adaptive abilities that reduce fear.

In addition to a lack of environmental stimuli observed in caged systems, small space allowances are known to obstruct natural behaviour and reduce welfare. Savory *et al.* (2006) investigated the point at which mutual attraction between adjacent hens equals mutual repulsion. This measure reflects the personal space hens naturally require, evaluating the appropriateness of minimum stocking densities of 550cm^2 in unfurnished cages (under Council Directive 1999/74/EC). Time spent walking, preening and ground pecking were measured at varying stocking densities to determine the point at which these behaviours stabilised despite an increase in space allowance. Video recordings of hens in pens of varying size were used to measure spacing patterns and behaviour. Stocking densities of 600-12,000cm^2 per hen were tested.

The study concluded that mutual repulsion between adjacent birds outweighed mutual attraction when floor space allowances dropped below 4800cm^2 per hen. This means hens will generally move away from other hens until they have 4800cm^2 of individual space. Since the domestic fowl is a gregarious species, they did not strive for space allowances greater than 4800cm^2. Additionally, results indicated that space allowances of less than around 5000cm^2 per hen reduced expression of free behaviour (walking, preening and ground pecking). These figures are roughly nine times the minimum allowance for furnished cages set forth by the Directive and so challenge the appropriateness of these allowances with regard to hen welfare.

In this study (Savory *et al*., 2006), hens were also subjected to temperatures ranging from 18-24°C. Temperature is significant since in cooler climates results may differ because hens tend to huddle together in groups to conserve heat (Savory & Maros, 1993). The spatial behaviour of hens under varying climate conditions warrants further investigation. Such information may be useful in calculating a set of minimum space requirements suitable for specific climatic conditions. This may mean that hens caged in warmer climates would be permitted more space per hen to allow for thermoregulatory behaviour. Further supporting the need for greater space in warm conditions is the mortality spike reported by Colson *et al.* (2006) in caged hens during a heat wave in week 62 of their study. Interestingly, there were no mortality peaks seen during this week in any of the non-caged aviary flocks, suggesting that higher stocking densities in the caged system may have been to blame for the deaths.

The aim of Elson & Croxall's (2006) ongoing study was to compare the welfare of laying hens housed in a variety of systems based on the Swedish poultry-welfare monitoring system. The three-year study

is due to conclude mid-2007, so results discussed here should be treated with caution until final data are published. The study includes assessments of 39 flocks across the United Kingdom, Germany and the Netherlands; 8 flocks are in conventional cages, 16 in furnished cages, 6 in aviaries and 9 in free-range systems. Variables being measured include production and mortality, physical condition and environmental conditions.

In most cases, inadvertent mortality in laying hens is preceded by a state of poor welfare (LayWel Report, 2006), so mortality rates may be considered an indicator of hen welfare. Elson and Croxall's (2006) evidence suggests mortality is highest in free-range systems and lowest in caged systems. Further research is required to determine the cause of higher mortality but these interim results suggest that caged hens are under less pressure from disease. So, as far as 'freedom from pain, injury and disease' is concerned, the caged environment appears to provide a higher level of welfare. Further supporting this claim are the findings that caged hens have fewer comb wounds, keel bone deformities and cases of bumblefoot. These results contrast with those of other studies (Colson *et al*., 2006, Savory *et al*., 2006), which associate the caged environment with compromised hen welfare. This emphasises the reality that welfare must be considered more holistically as the sum of an array of factors.

Conclusion

Recent literature suggests caged systems may jeopardise welfare by increasing fearfulness and reducing space allowance compared with non-caged systems. Conversely, caged layers appear to have higher welfare with regard to mortality and disease than hens in non-caged, free-range systems. However, since welfare is the net effect of numerous factors that are difficult to measure and because we have little idea what hens actually feel, ranking housing systems purely on isolated welfare indices seems injudicious.

References

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