POSITION EFFECTS ON THE FEAR RESPONSE OF LAYING HENS IN COMMERCIAL CONVENTIONAL CAGE SYSTEMS

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Summary

The withdrawal response of laying hens to an unfamiliar human was assessed at five commercial farms using two behavioural tests. The proximity of the hens’ cage to the main entrance of the shed had no significant effect on the withdrawal response, however birds housed in the inside aisles displayed less withdrawal than hens in the outside aisles. This may be due to an increased amount of visual human contact experienced in the middle aisles reducing the fearfulness of the hens to humans.

1. INTRODUCTION

Fear is generally considered a powerful emotional state that normally gives rise to defensive behaviour or escape behaviour. In concert with these behavioural effects, fear normally activates the autonomic nervous system and the neuroendocrine system, which in turn through their effects on regulatory mechanisms such as energy availability and use, and cardiac and respiratory functions, assist the animal to meet physical or emotional challenges (Hemsworth and Coleman, 1998). Gray (1987) recognises that fear may be triggered by environmental stimuli which are novel, have high intensity such as being loud or large, have special evolutionary dangers such as height, isolation and darkness, arise from social interaction such as contagious learning or have previously been paired with aversive experiences.

Farm animals, such as poultry, may frequently interact with humans and through conditioning, may associate humans with rewarding and punishing experiences that occur at the time of these interactions and thus conditioned responses to humans may develop. Extensive studies in the livestock industries have shown marked between-farm variation in the fear responses of farm animals, including poultry, to humans. For example, Barnett et al. (1992) used the behavioural response of the laying hen to an experimenter to assess the hen’s fear of humans; they found a negative inter-farm correlation between fear of humans and productivity of the hens. Such negative correlations, based on farm averages, indicate that high levels of fear of humans may be an important factor limiting the productivity and welfare of livestock.

Studies in the dairy and pig industries have shown significant sequential relationships between the stockperson's attitudes and behaviour towards animals and the fear of farm animals toward humans (see Hemsworth and Coleman, 1998). The existence of these sequential relationships between human and animal variables in the livestock industries indicates that the opportunity exists to modify stockperson attitudes and behaviour in order to improve livestock welfare and productivity, and such opportunities may also exist in the poultry industries.

The data reported in this paper on the effects of position in the shed are initial data for a larger study that is examining human-animal interactions in the egg industry.

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II. MATERIALS AND METHODS

Five Victorian farms, with Hyline Brown or ISA Brown strains of laying hen were used in this study and all birds were tested between 40 and 60 weeks of age. Details of the farms are provided in Table 1.

Table 1. Summary of commercial farms used in this study.

<table>
<thead>
<tr>
<th>Farm</th>
<th>Shed Type</th>
<th>No. of Birds</th>
<th>No. of Tiers</th>
<th>No. of Aisles</th>
<th>Birds/cage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Closed</td>
<td>14000</td>
<td>3</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>Open</td>
<td>13000</td>
<td>3</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>Closed</td>
<td>23300</td>
<td>4</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>Open</td>
<td>2000</td>
<td>1</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>Closed</td>
<td>1100</td>
<td>1</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

*Closed* refers to environmentally controlled sheds and *Open* to open-fronted sheds.

Two behavioural tests were used to assess the withdrawal response of the birds to an unfamiliar human, the Stroll Test (adapted from Cransberg et al., 2000) and the Approaching Human Test (adapted from Hemsworth et al., 1993). These tests have been successfully used in the past to assess the fear response of poultry, and do not require the birds to be handled and thus avoiding any handling stress on bird behaviour. At each farm, both tests were conducted on the same morning and the sequence of testing within localities in each shed was the same. Aisles were numbered from left to right of the door, and the tests began at the first cage in Aisle 1. Only the right hand side of each internal aisle was tested to avoid exposing untested birds to additional visual contact with the observer. The same observer was used as the human stimulus in each test. Due to the varying fear response of birds in different tiers of cages (Hemsworth and Barnett, 1989; Hemsworth et al., 1993), only birds in the second tier were tested, except for those farms with single tier sheds where birds in the single tier were tested.

a) The Stroll Test

This test had two phases, a ‘Movement Phase’ and a ‘Stationary Phase’. A video camera, equipped with infra red night vision for recording under low light conditions, was used to record the withdrawal response of the birds as the observer moved through the shed in a standard manner. Only data recorded from Movement Phase are reported in this paper. This phase consisted of the observer (an unfamiliar human) commencing in a standardised starting position and moving at a speed of one step/second along each aisle. The video camera was held level with the second tier in multi-tiered sheds or the single tier in single-tiered sheds to record the behaviour of birds in the first four cages on the right-hand side immediately in front of the observer as the observer moved through the shed. During video read-out, the number of birds with their heads extended through the front of the first four cages were counted instantaneously at 5 second intervals (variable labelled Birds_2m).

b) The Approaching Human Test

The second test assessed the response of the birds to an unfamiliar human directly approaching the cage front and was conducted at every tenth cage along the aisle. The observer approached the focal cage from the opposite side of the aisle and remained at a distance of 0.5 m away from the front edge of the focal cage for a period of 5 sec to allow the birds to adjust to the observer’s presence. The observer then stepped sideways (facing towards the cage) directly in front of the cage and recording commenced. After 5 sec, the
observer stepped forward so that the torso contacted the feeder of the focal cage. After another 5 sec the observer stepped back to the opposite side of the aisle, and in the following 5 sec stepped forwards to the cage front again. The observer thus spent two 5-sec periods close to the cage and two 5-sec periods on the opposite side of the aisle from the cage. During each 5-sec period the number of birds with their heads extended through the front of the cage were recorded (variables labelled AHThead5 to AHThead20). Also, a point count of the number of birds with their beak in the front 5 cm of the cage was made at the end of each 5 sec period, producing the variables AHT5, AHT10, AHT15 and AHT20.

An analysis of variance with data blocked on farm was used to examine the effects of rows location (inside rows and outside rows) and cage location relative to entrance (first four focal cages nearest the main entrance to the shed and the last four cages in the aisle furthest from the main entrance.

III. RESULTS

The cage position in the shed relative to the entrance had no significant effect on the withdrawal response of the birds in any of the tests (AHT5, F1,34 = 0.17, P = 0.680; AHT10, F1,34 = 0.33, P = 0.571 and Birds 2m F1,34 = 2.83, P=0.102). However, birds housed in the outside aisles showed more avoidance of the unfamiliar human. As shown in Table 2, fewer birds in the outside aisles had their heads in the front 5 cm of the cage during the Approaching Human Test at both 5 (AHT5) and 10 (AHT10) seconds when the observer was opposite and close to the cage, respectively. Also, during the Stroll Test fewer birds in the outside aisles had their heads extended outside the cage than birds in the inside aisles (P<0.05).

Table 2. The results of the analysis of variance on the effects of row location on bird behaviour.

<table>
<thead>
<tr>
<th>Test and Variable</th>
<th>Mean Number of Birds</th>
<th>LSD (P=0.05)</th>
<th>F-ratio</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inside Aisles</td>
<td>Outside Aisles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approaching Human (AHT5)</td>
<td>1.6</td>
<td>1.4</td>
<td>0.15</td>
<td>4.10</td>
</tr>
<tr>
<td>Approaching Human (AHT10)</td>
<td>0.9</td>
<td>0.7</td>
<td>0.15</td>
<td>5.96</td>
</tr>
<tr>
<td>Stroll (Birds 2m)</td>
<td>3.9</td>
<td>3.6</td>
<td>0.29</td>
<td>4.56</td>
</tr>
</tbody>
</table>

To examine the possibility that order of testing birds may have affected the behavioural responses of birds, the responses of birds in the first and last aisles were compared. There was no significant difference (P > 0.05) in behaviour between birds in the first and last aisles. For example, the mean number of heads at the cagefront in the AHT5 were 2.1 and 2.0 in the first and last aisles respectively (P = 0.459, LSD (P=0.05) = 0.31).

IV. DISCUSSION

These results provide an interesting basis for the study of human-animal interactions in the laying hen. The lower withdrawal response of the hens in the inner aisles compared to the outer aisle could be due to the higher level of human contact, particularly visual contact that the former birds receive. Greater social stimulation available to birds in the inner aisles may also be implicated. Aisles on the outside of the shed only contain a single row of cages, whereas inside aisles have cages on both sides. The hens located in the outside aisles generally only have visual contact with the hens in adjacent cages, depending on the cage design, and face a solid wall. The location of cages on both sides of the aisle in the inside
rows also means that stockpeople will make twice as many passes along these aisles, particularly when routinely inspecting the birds and perhaps during other tasks, thereby exposing these birds to about twice the amount of human contact.

There were no significant effects of location relative to the main entrance. Farms 1, 2, 3 and 5 had doorways at both ends of the sheds that were observed in use during the study, and in the cases of Farms 1, 2 and 5, stockpeople often walked through the shed to access these exits, especially during the cleaning and maintenance of the shed. The presence of the additional door in each of these farms may result in similar human contact at both ends and corresponds with the data in this study of no effect of the cages being position either close to the main entrance or at the far end of the shed on withdrawal/approach response. However, the additional entrance in sheds was not used as often as the main entrance. While more human contact may be available to birds close to the main entrance, it may also involve greater startling responses that may occur with the sudden entrance of stockpeople, perhaps negating any positive effects of increased human contact on the hens’ fear response of humans. Thus, the nature of the human contact is likely to be an important factor in the level of fear of humans by laying hens and this factor will be examined in the larger study on human-animal interactions in the egg industry.

Within the context of this larger study, targeting human-animal interactions requires understanding the stockperson behaviours regulating these interactions and in turn the stockperson attitudes leading to these stockperson behaviours. Such knowledge may provide industry with an opportunity to reduce any limitations on animal welfare and productivity imposed by these interactions.

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REFERENCES