



AN ETHOGRAM OF WHITE LEGHORN-TYPE HENS IN BATTERY CAGES

A. B. WEBSTER^{1,2} and J. F. HURNIK

The purpose of this study was to record the ethogram of White Leghorn-type hens in cages and to note changes in behavior over the course of the laying period. Three hundred and eighty-four hens derived from two male parental stocks were randomly assigned as pairs to the cages of two three-tiered, semi-stairstep batteries. Hens within pairs were of the same stock, and the batteries were in the same room. The laying phase comprised 13 28-d periods and on the first 4 d of periods 1, 3, 5, 7, 9 and 11 video recordings were made of eight cages per day. Each cage was observed on 1 d only. The levels of occurrence of a variety of behavioral states were estimated from 60 records of the behavior of each hen obtained over an 8-h interval. Head flicking was the most prevalent of its group of mutually exclusive behavioral states, followed by eating and preening. Cage pecking appeared stereotyped in many hens, but, at a frequency of 5% of observations, was not unusually prevalent. Bobbing was primarily a prelaying behavior indicative of the restlessness prior to oviposition typical of White Leghorn hens in cages. Hens were on their feet for more than 75% of the time of observation. Physical displacement of a hen by its cagemate was commonplace. Eating was negatively correlated with head flicking and preening. Walking and bobbing were positively correlated with physical displacement. Hens became less active with time in cages, possibly due to an age effect or to behavioral adaptation to the cage environment. A second trend in behavior over time may be related to changes in levels of egg production or feed consumption.

The behavioral states (Hurnik et al. 1985) were defined as follows:

- Rest:** An apparent state of somnolence with eyes closed, generally performed in a sitting position but also sometimes when standing;
- Still:** No apparent movement of the body, but with eyes open;
- Head Flick (Hflick):** Body immobile except for quick movements consisting of small displacements of the head in any direction, or rotations of the head around its vertical or horizontal axis;
- Eat:** Head extended down into the feeder and apparently manipulating or ingesting feed;
- Drink:** Dipping the beak into the watering cup and apparently ingesting water;
- Preen:** Self-manipulation of feathers of the body using the beak;

- Cage Peck (Peck):** Pecking at any feature of the cage other than feed, water or another bird, often performed in a repetitive, stereotyped manner;
- Head Down (Hdwn):** Head and neck extended toward the floor of the cage while either standing or sitting such that the action of the head could not be discerned;
- Walk:** Taking one or more steps;
- Bob:** Repetitive raising and lowering of the head and neck, and frequently of the thorax as well;
- Sit:** Sitting or recumbent on the floor;
- Stand:** Standing on the feet with extended legs;
- Displace (Displ):** An event in which a hen supplants its cagemate;

SCIENCE TEXTS

Short Written Texts (Journals)

Webster, A.B. and Hurnik, J.F. 'An Ethogram of White Leghorn-Type Hens in Battery Cages'. *Canadian Journal of Animal Science*, Vol 70, Issue 3 (1990). Extracts from pp. 755, 757 & 758.



DISCUSSION

Ethogram

While ethograms add to our understanding of how animals respond to their circumstances, it is difficult to compare between studies. Behavioral studies of chickens in production environments have not used the same circumstances or genetic stocks. Researchers have also employed different behavioral definitions and methodologies.

Head flicking appeared to involve visual surveillance of the surroundings, each flick of the head exposing a different field of view. Various authors have observed head shaking, or head flicking, in chickens (Levy 1944; Hogan 1965; Bareham 1972; Black and Hughes 1974; Clayton and Andrew 1979; Dunnington et al. 1984), and a number have thought that the action is associated with motivational conflict (Hogan 1965), frustration (Levy 1944; Siegel et al. 1978), or inadequate sensory stimulation (Bareham 1972). It is not clear that head flicking in the present study was the same behavioral pattern as the actions considered in the above investigations. The head movements categorized as head flicking in the present case appear to have been more varied and perhaps less stereotyped than those in other studies, judging from the descriptions of several authors (Bareham 1972; Clayton and Andrew 1979; Hughes 1982; Dunnington et al. 1984). Nonetheless, the behavioral patterns probably are not entirely unrelated. Head shaking may be associated with general arousal (Hughes 1983; Dunnington et al. 1984; Savory and Hughes 1988). Pullets in an open field performed head flicking for about 90% of the 5-min observation period (Webster and Hurnik, in press, a), and in laying cages, head flicking was performed 53% of the time when the observer was in view of the hens (unpublished data).

Head shaking often is higher in battery cages than in other environments such as floor pens (Levy 1944; Bareham 1972; Black and Hughes 1974). Genetic stock influences head shaking (Dunnington et al. 1984; Dunnington and Siegel 1986) and head flicking (Webster and Hurnik, in press, b).

Eating, drinking, preening and resting are within the ranges reported in the literature (Bareham 1972, 1976; Black and Hughes 1974; Eskeland 1977; Mench et al. 1986). As the studies indicate, these behavioral states are influenced by housing type, social rank and stocking rate, contributing to the wide range of values reported for each trait. Preening is a displacement behavior in some situations (Duncan and Wood-Gush 1972). It is not known if preening was performed as such in the current investigation. It was observed empirically that birds often would manifest Still prior to Rest, although the strength of this relationship was not measured. Rest is comparable to sleeping and, in part, dozing as defined by Blokhuis (1984), while Still corresponds to a portion of his dozing category. Hens, therefore, probably spent almost 10% of the time in a somnolent or semi-somnolent state.

Cage pecking appeared stereotyped in some hens, but its frequency was much lower than has been observed in other circumstances (e.g. Eskeland 1977). Norgaard-Nielsen (1984) proposed that stereotyped cage pecking develops from redirected exploratory pecking. Stereotypic behavior may be an attempt to adapt to restraint, frustration or stress (Broom 1983; Cronin et al. 1986; Ödberg 1987).

SCIENCE TEXTS

Short Written Texts (Journals)

Webster, A.B. and Hurnik, J.F. 'An Ethogram of White Leghorn-Type Hens in Battery Cages'. *Canadian Journal of Animal Science*, Vol 70, Issue 3 (1990). Extracts from pp. 758 & 759.



The values for walking, or locomotion, are toward the lower end of the range reported in the literature, but are similar to those of Mench et al. (1986) in comparable housing density. Type of housing (pen vs. cage) (Black and Hughes 1974; Mench et al. 1986) and social rank (Eskeland 1977) influence the behavior. Housing density also affects locomotion, but independently of distance moved in regard to recognizable goals (Lewis and Hurnik, in press). Walking may have a disturbing influence on hens in cages since it was associated with physical displacement.

Bobbing was especially frequent in the hour before oviposition. White Leghorn hens in cages are particularly susceptible to arousal and frustration before laying eggs (Wood-Gush 1972; Mills et al. 1985b). Frustration in light hybrid hens, as indicated by aggression, declines rapidly after oviposition (Hughes 1979). This corresponds to the reduction in frequency of bobbing that occurred after oviposition. Vigorous prelaying behavior creates an energy demand (van Kampen 1976) that could negatively affect production efficiency. Pacing was amenable to selection (Mills et al. 1985a) and conceivably could be reduced. However, no significant heritabilities were found for bobbing (Webster and Hurnik, in press, c). Prelaying behavior is influenced by breed (Wood-Gush 1972; Mills and Wood-Gush 1985) and housing type (Bareham 1976), and floor type can modify pacing behavior (Wood-Gush 1975). Genetic stock and cage type did not influence bobbing (Webster and Hurnik, in press, b). The expression of prelaying restlessness appears to be suppressed in high density, multiple-bird cages (Ramos and Craig 1988).

CONCLUSION

Head flicking was the most prevalent action in its group of mutually exclusive states. Cage pecking, in particular, appeared to be a stereotyped action in some hens, but did not occur as much as has been observed in other circumstances. Bobbing was manifested as a form of prelaying behavior, although not exclusively so. Hens spent most of their time on their feet. Physical displacement of a hen by its cagemate was commonplace. Hens became less active with time in laying cages. It is not known whether this is due to an age effect or to behavioral adaptation to the cage environment.