



*Original Contribution*

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## STUDY OF BEHAVIOUR OF BROILER CHICKENS SUBJECTED TO BIOTIC STRESSORS

K. Uzunova\*

Faculty of Veterinary Medicine, Department of Animal Husbandry, Trakia University, Stara Zagora Bulgaria,

### ABSTRACT

An experiment with potentially consumable broiler chickens was carried out in order to determine the changes in their behaviour after the sudden appearance of a man, moving at a different speed in the premises they were reared. Eight observations were performed for four consecutive days by the end of the fattening period. It was evidenced, by means of description of apparent behaviour of birds, that man is not a stressor and that the birds exhibited curiosity instead of fear and anxiety.

**Key words:** investigation, broiler chickens, behaviour, man, change, influence.

### INTRODUCTION

The behaviour of animals is their reaction to some stimuli or the way they react to environmental challenges. The behaviour represents a series of activities of endocrine or exocrine character. In some instances, the factors favour the behavioural reactions of animals whereas in others, have an adverse impact on their reactions, health, productivity and in such cases, they are called stressors (1).

When a live organism perceives a change in its otherwise constant environment, the motivation for realization of a given type of behaviour is blocked and a change is necessitated, i.e. adaptation to the new conditions (2).

Moreover, the welfare of an individual is endangered, when it could not exhibit the behavioural reactions, for which it is motivated (3).

The study on the effect of abiotic and biotic factors on the behaviour of broiler chickens is especially important because of three reasons:

1. The production of chicken meat on a worldwide scale is constantly increasing, the success in this area being due mainly to the achievements in genetics, selection,

nutrition and zoohygiene (4, 5).

2. This avian species is reared using intensive technologies and this inevitably results in altered behaviour of birds depending on the technological parameters of the environment (1).
3. There is no scientific information about the impact of many abiotic and biotic factors upon the behaviour of broiler chickens under the conditions of intensive poultry breeding.

The investigation of behaviour is valuable and important, because the changes in behavioural reactions of animals are indicative of the changes in their health too (1). The relationship between the behaviour of broiler chickens and their "technological comfort" is obvious and it has to be considered in order to avoid unnecessary stress states. One of the five requirements that are mandatory in poultry breeding in Great Britain is the prevention of situations resulting in fear or stress (6) that could appear under the effect of various stimuli.

As already mentioned, in the available literature there are no data about the behavioural changes in broiler chickens (reared under intensive production systems), under the effect of environmental biotic stimuli. This fact motivated the present investigation.

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\* **Correspondence to:** Dr. Krassimira Uzunova, Trakia University, Faculty of Veterinary Medicine, Department of Animal Husbandry, Bulgaria; E-mail: [mira60bg@yahoo.com](mailto:mira60bg@yahoo.com)

## MATERIAL AND METHODS

The study was performed in the period

September–October 2006 in Galus (a private poultry farm) that reared broiler chickens for meat production. The experiment was performed according to the requirements of the Animal Welfare Act. The birds were reared on floors with a thick straw permanent litter in premises without windows and measuring 18 m long and 9 m wide. The total number of broilers was 2000, their density: 18 per m<sup>2</sup> floor, and the duration of fattening – 45 days. The technological weight of Scotland Ross hybrids by the end of fattening period was on the average 1800–2000 g. During the fattening period, the broilers were kept at microclimatic conditions, fully conformable to veterinary hygienic norms as follows:

- air temperature: 22–23 °C;
- relative humidity: 65%;
- air velocity: 0.3 m/s;
- air NH<sub>3</sub> content: within hygienic limits;
- air CO<sub>2</sub> content: within hygienic limits;
- air H<sub>2</sub>S content: not allowed.
- artificial lighting: 3 W/m<sup>2</sup>.

The premises were equipped with positive-pressure mechanical ventilation, ensuring the necessary air exchange rate of 2 to 4 m<sup>3</sup>/h during the previous seasons.

The nutrition water supply of birds was organized through chain trough feeders and round automatic drinkers.

The behaviour of broilers under the influence of environmental stimuli was monitored used the following test (7, 8): the investigator walked along a straight path among the birds at a speed of 2 m/15 s, reaching the middle of the premises, i.e. he passed a 9 m distance, then stayed immobile for 3 min and returned to the start position at the same speed. The investigator was equipped with video camera that recorded the behavioural changes of birds. The aim was to understand and to describe the nature of the initial apparent reactions of birds to the sudden appearance of a human figure walking among them.

The test was done by the end of the fattening period (days 38, 39, 40 and 41) with a slight modification. The behaviour of broiler chickens was done twice daily: in the morning (10 h A.M.) and in the afternoon (4 h P.M.). The first time the investigator walked at a speed of 2m/15 s and the second time, faster, at 10 m/a5 s. The behaviour of the birds was recorded to both types of human intervention.

The results were statistically analysed.

## RESULTS AND DISCUSSION

The results of the present studies with regard to the behaviour of broiler chickens could be more clearly summarized in 4 points as follows:

1. In the morning of the 38<sup>th</sup> day of the fattening period, after the sudden appearance of a slowly walking man, there was no change in the number of broiler chickens on 1 m<sup>2</sup> around the human silhouette (18–20 birds per m<sup>2</sup>).
2. In the morning of the 38<sup>th</sup> day of the fattening period, at the time when the walking man stopped and remained immobile for 3 minutes, the number of broiler chickens around the human silhouette increased (25 birds per m<sup>2</sup>).
3. In the afternoon of the 38<sup>th</sup> day, when the man walked more quickly (10 m/15 s), there was a clear tendency toward reduction of the number of broiler chickens adjacent to the human silhouette (12 birds per m<sup>2</sup>).
4. In the afternoon of the 38<sup>th</sup> day, when quickly walking suddenly stopped and remained at rest for 3 minutes, the number of broiler chickens around him slowly increased (22 birds per m<sup>2</sup>).

The same behavioural changes were also observed during the three subsequent experimental days. The results showed a significant difference between the values depicting the four types of behaviour on days 38, 39, 40 and 41 ( $p < 0.001$ ).

Moreover, the behavioural alterations in birds were not influenced by the time of study (morning or afternoon). The leading circumstance was the sudden appearance of man and whether he was standing still, or moving, or how quickly moving (**Table 1**).

The analysis of data allowed us to conclude that the apparent behaviour (point 1) evidenced that the birds did exhibit neither a fear, nor a curiosity vs. the suddenly appeared human silhouette that walked very slowly among them, i.e. man did not play the role of a stressor.

The behavioural pattern, described under point 2, when the human observer was at rest for 3 minutes was very different. Then, the increasing number of birds around him could be explained with the fact that he only did not cause panics or fear, but the birds remained calm and exhibited curiosity to the immobile new object.

**Table 1.** Changes in the behaviour of chickens after the sudden appearance of a man, moving at a different speed among them.

Speed of man's walking	Number of birds per m <sup>2</sup> , immediately around the man							
	Day 38		Day 39		Day 40		Day 41	
	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
2 m/15 s.	18	12	19	13	20	10	19	9
10 m/15 s.	20	10	18	10	17	14	18	8
at rest	25	22	27	25	24	23	22	22

The almost twofold reduction of the broilers around the observer when he walked at a higher speed and its increase in adjacent areas (point 3) was due to the panic and fear of birds and their instinctive avoidance of moving man, i.e. walking more quickly, he represented a stressor. This assumption was confirmed by the visible reactions of broiler chickens.

The behavioural pattern described in point 4 could be explained by the fact that despite the induced panic, the birds became gradually less worried and moved closer to the human silhouette but very slowly. In our view, this was entirely expected as the stress was high and it could be anticipated that the calming down and the subsequent curiosity should occur at a later stage.

Prior to performing the experiment, the expected results were just as the ones described under points 3 and 4. The behaviour described in points 1 and 2 was surprising because we expected that the sudden appearance of the observer among birds and the walking, regardless of the speed, would result in fear or anxiety. The apparent behaviour of chickens did, however, prove our assumption false.

The conclusion from our experiment is, that if necessitated by some circumstances, the direct intervention of man in conditions of intensive and fully automated poultry breeding could be done without problems, if it is cautious, moderate and calm. In that case the animals exhibit curiosity and accept man as an object of inspection. The frequent and careless (sudden) intervention of men in the

rearing of this avian species however results in fully expected manifestations of fear and anxiety as a consequence of the stress suffered by broiler chickens with all its negative effects.

## REFERENCES

1. Hughes, B. O., Duncan, I. S. H., 1988. The notion of ethological need models of motivation and animal welfare. *Animal Behavior*, 36, 1696–1707.
2. Hemsworth, P. H. et al., 1994. Behavioral responses to humans and the productivity of commercial broiler chickens. *Applied Animal Behavior Science*, 41, 101–114.
3. Cransberg, P. H. et al., 2000. Human factor affecting the behavior and productivity of commercial broiler chickens. *British Poultry Science*, 41, 272–279.
4. Netsov, N. Stoyanchev, T., 1999. *Veterinary Hygiene*, Zemizdat, Sofia, 215-227
5. Jensen, P., Toates, F. M., 1997. Stress as a state of motivational systems. *Applied Animal Behavior Science*, 53, 145–146
6. Gyurov, B., Dimitrov, S., 1991. *Everything for the Farmer*, 3–4.
7. Kaytazov, G., Kabakchiev, M., Alexieva, D., Genchev, A., 2000. *Poultry Breeding*, Zemizdat, Sofia, 5–6.
8. Petkov, A., Enev E., Sivkova, K., Varlyakov, I., Ovlakov, N., 1999. *Animal behaviour – a textbook of ethology.*, Kota, Stara Zagora, pp. 149–160.