



DAMAGES OF THE KEEL BONE IN LAYING HENS – OVERVIEW OF THE ETIOLOGICAL ASPECTS

Katelina Uzunova¹, Lazarin Lazarov^{2*}

¹Student, ²Department of Internal Noninfectious Diseases, Faculty of Medicine, Trakia University of Stara Zagora, Bulgaria

*Corresponding e-mail: lazarin.lazarov@trakia-uni.bg



ABSTRACT

The damages of the locomotor system and in particular the skeletal system is one of the major problems in the industrial poultry farming. The high incidence of keel bone damage (KBD) of laying hens in industrial complexes is one of the biggest welfare problems facing the industry (FAWC, 2010; 2013). They lead to disturbance of the animal welfare, causing pain and limiting the ability to move and perform the characteristic behavior of the species. This in turn causes a decrease in productivity and unacceptably large losses not only for the individual producer but also for the whole sector. The problem with the KBD is widespread in Switzerland, Great Britain, the Netherlands, Belgium, Germany and Canada. Different genetic lines of laying hens are affected, as well as all types of breeding systems, including the biological ones. In general the etiological factors are reduced to three main groups – genetic predisposition, unbalanced diet and imperfections in housing systems.

Key words: keel bone, etiological, laying hens

OVERVIEW

Recently, more and more institutions and organizations are beginning to pay attention to animal welfare, especially in industrial animal husbandry. In addition to obtaining the highest possible production, the direction is also to ensure optimal living conditions so the animals can perform their natural behavior. In this way the production increases, which justifies the made in this direction investments. Numerous studies have been conducted worldwide on hen's behavior and the necessary conditions for realizing their natural instincts. The inability to provide these conditions to the birds causes damages of various kinds which limit the health, welfare and productivity. The topic of this overview focuses on laying hens and in particular one of the major problems in this industrial sector – the damages of the keel bone. The etiological factors are reduced to three main groups – genetic predisposition, unbalanced diet and imperfections in housing systems. Regardless of the root cause, the result is reduced productivity and/or increased mortality, leading to significant economic losses.

Genetic factors

From a selective point of view, the laying hens have poorly developed pectoral muscles which makes the keel bone vulnerable to fractures. Stratmann et al. (2016) make researches in the field of genetics by differentiating two lines of laying hens – H-line и L-line, derived of Lohmann Selected Leghorn (LSL) hybrid. They are selected by their bone strength – the so-called „bone index“, which is given by the strength of the humerus and tibia and the radiographic density of the keel bone. H-line has higher bone index and the L-line – lower. This means that the genetically selected H-line has a stronger bone structure therefore it is less prone to fractures and deformations of the keel bone in comparison with the L-line, which is more likely to have fractures and deformations. This leads to the conclusion that genetics is one of the main things that need to be considered in the selection of laying hens.

Housing systems

There are different types of housing systems for laying hens because of the differences in legislation and regulations and also because of the preferences of a specific manufacturers. At the end, all manufacturers strive to achieve the highest possible productivity with minimum effort and cost which may lead to some health problems in hens. Mostly they get disoriented in new environment or while de- and repopulation of the halls, which causes lot of KBDs. The main reason behind these damages is the caused stress. In housing systems special attention is paid to the perches. Hester et al. (2013) report for more KBD after laying (92%) in hen, kept in conventional cages, in comparison with the birds, in which environment metal perches are absent (83%). Wilkins et al. (2011) report that the rate of fractures of the keel bone is getting 10-34% higher after putting perches in organic farming systems. The type of the perches and the material used for it is also important for preventing KBD.

The percentage of laying hens, living in cages in which KBDs are registered is about 23-30%, while in those bred freely, the percentage is 56-96%. According to the same authors, the reason is because birds in cages have less abilities to move. These housing systems are preferred from most manufacturers because the costs for treatment/prevention are less. Free-range housing systems must be designed to allow hens to move freely to the different parts of it. In this regard Stratmann et al. (2015a) reports that the installation of ramps in commercial aviary systems reduces the falls by 55%, collisions by 41% and the keel bone fractures by 24%. Another problem, which is one of the etiological factors for KBD, is the insufficient lighting in the premises. It is intentionally reduced in order to prevent feather gnawing and cannibalism between the birds. However, the hens need a certain amount of light to properly assess their movements and land safety. Abrupt changes from light to dark and vice versa also increase the risk of sternal fractures due to sudden stress and inability to adapt.

CONCLUSION

Fleming et al., 2006 conclude that the most important etiological factor after proper genetic selection is the housing system and management, and in parts – the nutrition also. From this it can be concluded that properly selected birds with good genetic profile and high bone index, placed in specially built housing systems with carefully calculated distances between the components, as well as the appropriate material for their manufacture would reduce the risk of KBD. A good and on-time investment will lead to a preserved animal welfare, higher production and consequently better profits for both - the individual producer and the whole sector.



Hens sitting and standing on perches in an aviary; hens prefer to roost on the highest perches at night.
Photo credit: Leanne Cooley.