

KEEL BONE DAMAGE IN LAYING HENS REARED IN DIFFERENT PRODUCTION SYSTEMS IN SERBIA

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Communication

Abstract: The European Union in 2012 banned conventional battery cages for the welfare reasons. However, transition to new housing systems uncovered some new problems, such as keel bone damage (KBD), which also could endanger welfare of laying hens. Although KBD is a research topic which attracts a growing attention in the EU, in Serbia it is still rather unknown phenomenon, even among the scientific and professional community. This research is the first attempt to determine the prevalence of KBD in laying hens in housing systems currently existing in Serbia. The results of conducted monitoring show presence of KBD on all observed farms, except the organic one. The occurrence of KBD was at an acceptable level (from the standpoint of hen welfare) in the free-range system, enriched cages without equipment and conventional battery cages (4%, 3% and 1%, respectively), while in the fully equipped enriched cages it was high (39%). One could assume that this high prevalence of KBD in this system is a consequence of a long roosting on a metal perches.

Key words: keel bone damage, laying hens, housing systems, perches

Introduction

New modified housing systems for laying hens have been introduced in the EU countries since 2012, when Directive 1999/74/EC came to force. However, transition to the new systems uncovered some new problems, such as keel bone damage (KBD) in laying hens. The term 'keel bone damage' includes the deviations and fractures of the keel bone which could be painful for the hen and thus could endanger welfare and reduce productivity (*Harlander et al., 2015*). High frequency of KBD in the commercial systems represents one of the greatest challenges which the modern poultry industry faces (*FAWC, 2010, 2013*).

During the last decade, numerous studies, done mostly in the EU countries, have documented fractures and deformation of the keel bone in laying hens, which range between 5% and 97%, depending on the housing system and hen age (Rodenburg et al., 2008; Wilkins et al., 2011; Petrik et al., 2015; Riber and Hinrichsen, 2016; Regmi et al., 2016). So far, no similar research was conducted in our country. Moreover, this phenomenon is still rather unknown, even among scientific and professional community and there is no sufficient information about KBD not only in Serbia but in all countries from the region, where the Directive 1999/74/EC is still not effective.

The aim of this research was to determine, for the first time, the prevalence of the KBD in laying hens in different housing systems in Serbia and to announce the findings to the scientific and professional community.

Materials and methods

All types of the housing systems currently existing in Serbia were included into this research: fully equipped enriched cages, enriched cages without the equipment, conventional battery cages, organic production and backyard (free range) production. Although many authors Rodenburg et al. (2008), Sandilands et al. (2009), Kappeli et al. (2011), and Wilkins et al. (2011) reported the highest prevalence of KBD (more than 80%) in systems equipped with multilevel perches (which is the feature of aviary systems), there is not a single farm with aviary system in Serbia, and therefore these systems could not be included.

Since the other authors reported that the prevalence of keel-bone damage increases with age of hens (Richards et al. 2012; Petrik et al. 2015) the examination were done on the flocks which were in the second half of the production cycle (older than 45 weeks of age).

There were 21 farms in total participating in this research. Namely, 3 farms with fully furnished enriched cages, 2 farms with enriched cages without the equipment, 5 farms with conventional cages, 1 organic farm, and 10 small farms, with a free range system.

The most used hybrids on big farms are Hyline brown, Lohmann brown, Tetra SL and on small farms domestic chicken, Partridge colored Italian and autochthonous breeds such as Sombor Crested chicken.

On the large-scale farms (with over 10,000 laying hens), sample of 100 laying hens were randomly selected for palpation assessment, while on the small-scale farms (50 – 300 laying hens) the sample size was 50 laying hens. Within the floor system, laying hens were fenced, while within the cage systems they were taken from the different cages and levels, again based on the system of a random sample.

The prevalence of KBD was assessed by using the technique of palpation according to *Wilkins et al. (2004)*. Palpation was performed by running fingers alongside and over the keel bone. It was only determined whether KBD was present (fracture, deformation, deviation – picture 1) or not (completely straight and flat keel bone – picture 2).



Photo: Vida Rezar

Picture 1. Keel bone damage



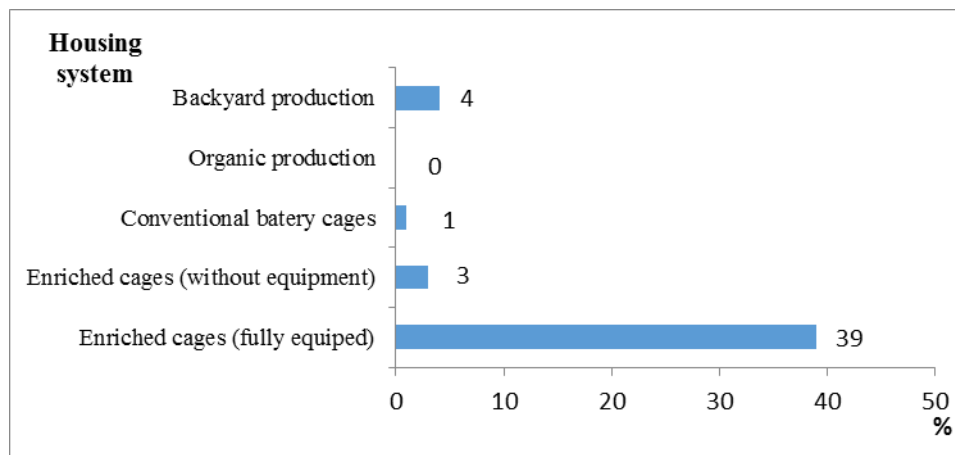
Photo: Mirjana Đukić Stojčić

Picture 2. Keel bone without damage

Results and discussion

The results of the prevalence of KBD are presented in this short communication only in a descriptive way and they are a part of a larger research project which is aimed at enhancing the poultry production in Serbia.

The results of conducted palpation assessment showed that KBD was detected in all production systems, except in the organic one (Graph. 1). The overall range of KBD observed in conventional cages was only 1%, in enriched cages without equipment it was 3% and in the free range system 4%. All these levels are acceptable from the standpoint of animal welfare.



Graph. 1. The prevalence of the KBD in laying hens in different housing systems in Serbia

The highest prevalence of KBD was detected in fully equipped enriched cages. The basic difference between the fully equipped and not-equipped enriched cages is the lack of the perches. The perches in the fully equipped cages were round and made of steel and the hens spend a great deal of time sitting on them. One could assume that this might be the reason of the increased prevalence of KBD in enriched cages compared to the conventional ones.

The assumption that the perches have a key role in the development of KBD in enriched cages was confirmed by other authors too (Rodenburg *et al.*, 2008; Wilkins *et al.*, 2011). Hester *et al.* (2013) reported that at the end of the production cycle prevalence of KBD was 9% higher for hens kept in conventional cages with perches compared to the hens kept in cages without metal perches. Wilkins *et al.* (2011) reported a significant increase (10-34%) in KBD when perches were added in the organic mobile houses.

Conclusion

The first monitoring of the prevalence of KBD in laying hens in Serbia was done on the sample which represents all housing system currently existing in poultry production in Serbia. The highest occurrence of KBD was noticed in fully equipped enriched cages. The future research should be focused on the development of effective strategies for reducing occurrence and severity of KBD. Further research on this topic is necessary in our country in order to determine specific risk factors for occurring and strategies for overcoming this problem in enriched cages, especially once the Directive 1999/74/EC is made effective.

Oštećenje grudne kosti kod kokoši nosilja gajenih u različitim sistemima držanja u Srbiji

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Rezime

Evropska unija je, zbog obezbeđenja dobrobiti živine, 2012. godine zabranila držanje nosilja u baterijskim kavezima. Međutim, prelazak na nove sisteme držanja doveo je i do nekih novih problema, kakav je oštećenje grudne kosti (OGK), koje takođe može da ugrozi dobrobit živine. Iako je oštećenje grudne kosti istraživačka tema koja u EU privlači sve veću pažnju, u Srbiji je ovo još uvek relativno nepoznat pojam, čak i u naučnim i stručnim krugovima. Ovo istraživanje predstavlja prvi pokušaj da se u Srbiji utvrdi prisustvo oštećenje grudne kosti kod kokošaka nosilja gajenih u različitim sistemima. Dobijeni rezultati pokazuju da je oštećenje grudne kosti prisutno u svim ispitivanim sistemima držanja, osim u organskom. Relativno nizak procenat oštećenja grudne kosti detektovan je kod kokošaka na ispustu, kokošaka u obogaćenim kavezima bez opreme i u konvencionalnim kavezima (4,3 i 1% respektivno). Najveći procenat oštećenja grudne kosti detektovan je kod kokošaka u obogaćenim kavezima sa kompletnom opremom (39%). Može se pretpostaviti da je ovako visok procenat oštećenja grudne kosti u ovom sistemu držanja posledica dugog sedenja kokošaka na metalnim sedalima.

Ključne reči: oštećenje grudne kosti, kokoške nosilje, sistem držanja, sedala

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