

## SHORT TERM SCIENTIFIC MISSION (STSM) - SCIENTIFIC REPORT -

The STSM applicant submits this report for approval to the STSM coordinator

Action number: CA15224

STSM title:

**Assesment of individual keel bone damage using different diagnostic methods**

STSM start and end date: 01/06/2020 to 23/06/2020

Grantee name: **BECSKEI Zsolt**

### PURPOSE OF THE STSM

The aim of the STSM was to study different methods available for detection of the Keel Bone Damage. For the last few years several diagnostic tools were developed and optimized in the Keel Bone Damage (KBD) assessment. The standard palpation method, ultrasonography and radiography, the visual and palpational exploration at necropsy and analysis of the histopathological sections all have application value in the diagnosis, pathophysiology, pathomorphology of the KBD. All these methodologies have different practical, diagnostic, scientific value, but all together can help for better understanding the KBD in laying hens.

Change from the conventional cage system to the alternative systems, for ensuring better welfare for the poultry, is still in process in Serbia. Almost all the rearing systems are present, with over 50% of the conventional battery cage system, which should be discluded. We still don't have aviary system in use.

It is well known that different rearing methods have different impact on the occurrence and severity of the KBD in laying hens. But still, the methodology for diagnostic and estimation of prevalence are the same all around the world.

Using all those facts in mind, the main purpose of my STSM was to gain my skills and knowledge in the field of different diagnostic methods for detecting and defining the KBD in laying hens.

## DESCRIPTION OF WORK CARRIED OUT DURING THE STSMS

The Host institution of my STSM work was at the Faculty of veterinary medicine University of Trakia, Stara Zagora, Bulgaria. During my stay at the Department for internal medicine and therapeutics, under the supervision and coordination of Assist. Prof. Lazarov Lazarin, I spent a three week course using variety of diagnostic tools for assesment of the KBD in laying hens.

The first week was mainly spent in the library of the faculty, searching for and reading literature data on the KBD topic, and studying the basics of different diagnostic methodologies. In the second and third week, the comparative diagnostic tools were applied for detection and assesment of each keel bone.

The laying hens arrived to the Pathology department of the faculty, all as corps, from a local egg producing farm.

The farm, the birds arrived from, has 6000 laying hens. The laying hens were LSB line, aged 57 weeks. The rareing management at the farm is cage free, the hens are on the floor with wood-shaving bedding, without special enrichment tools. The nests are situated at 75cm heigh. The birds have metal perches situated at 40-120cm height distanced from each other 2 meters.

Firstly, all the corps were labelled, the body condition was evidenced, signs of canibalism or other damagin behaviour were noticed.

Secondly, the palpation method was applied on all the corps and the detected deviations of the keel bone, fractures of the keel bone were evidenced, and the localization and severity of tese changes wese assingned, just like we were trained for it at the Training School in Novi Sad, Serbia.

Thirdly, the corps were assessed radiographycally, using both the dorso-ventral and lateral position for exposition. The Rentgen apparatus was the official Philips SUPER 50 CP-D modell, suitable for different angle expositions in different animals. The working mode for taking rentgenograms of laying hens was set as: 51kV, 10mAs, 46ms. Evidences of the kell bone deformities and fractures were evidenced.

Fourthly, the corps (the keel bone region) were analyzed using ultrasonography. Ultrasonograph model "MINDRAY DC-6 vet" for use in veterinary medicine, with the B mode 5-8 MHz transducer, suitable for both deeper and superficial lesions detection was used. Evidences of the kell bone deformities and fractures were evidenced.

Fifthly, necropsy was done on all the tested hens, while the keel bone was detailly analysed macroscopically and evidence of the kell bone deformities and fractures were evidenced and assessed.

Sixthly, keel bone samples with detected fractures were taken for histopathological analysis.

Seventhly, the metatarsal bone and the humerus bone were taken for osteodensidometric assay.

## DESCRIPTION OF THE MAIN RESULTS OBTAINED

Different diagnostic methods gave different results, regarding the prevalence of KBD.

The palpation method, as the most available and applicable on the farm level and in the every day use, showed that 57.14% of the tested birds had KBD. Mostly, fractures positioned at the distal part of the KB were detected, both fresh and old fractures. Keel bone deviations (mainly S and C type) were detected by palpation in 42.85% of the cases. The severity of the deviation varied between mild and severe.

The ultrasonography and the radiography method for detecting KBD showed more sensitivity than palpation method did. Analysing the radiographs, 71.43% of the tested hens had KBD. Some cases which were not detectable by palpation, on the radiograph showed mild degree fractures of the distal part of the keel bone. Sometimes multiple fracture lines of the keel bone were also visible on the radiograph. The lateral exposition was the most helpful position, for analysing the structural damages. The S and C type keel bone deviations were mainly visible on the radiographs made in the dorso ventral positioning.

The ultrasonographic analysis revealed less sensitivity than radiography, but more sensitivity than the palpation method. Fractures of variety of degree and stage were detected in 60% of the sonographed hens. The ultrasonography method is not as much applicable for detecting the deviations of the keel bone (S and C type) as the radiography and the palpation method. It could be because of the fact that deviations are appearing in a longer part of the bone, sometimes affecting the whole length of the bone, and the transducer cannot "catch it all". While the fracture is affecting a specific location of the keel bone, and can be precisely localized on the sonogram.

The detection of the KBD using necropsy is also an easy and good tool for the assessment of the keel bone damages. Just like in the case of ultrasonography, necropsy showed the same specificity, 60% of the tested hens seemed with variety degree and stage of fractures.

The results of pathology and osteodensitometry are not ready yet for analysing at the moment of the end of this STSM, so they are not included into the discussion of the results.

In the conclusion we can underline that even though different diagnostic methods have different sensitivity, everyone of them has its value in assessment of the KBD. Some of them have more scientific, the others more practical importance, but altogether they are needed for better understanding the pathogenesis of the KBDs. Also, the suggestion for the practicing veterinarians at the farm level can be suggested with the note that combining more diagnostic methods they can get better insight into the prevalence and the severity of the KBDs. The palpation method and the necropsy of the carcasses can be done without extra investment and can give valuable insight into the presence of KBD on the farm. For more detailed assessment and scientific approach, the radiography, sonography, histology and other diagnostic tools can be applied.

### **FUTURE COLLABORATIONS (if applicable)**

This STSM, supported by the COST Action 15224, resulted in a new collaboration between the Faculty of veterinary medicine in Belgrade, Serbia and the Faculty of veterinary medicine in Stara Zagora, Bulgaria. The results and experiences from these three weeks will be published in a form of common article and soon presented in some of the upcoming International Symposias with an acknowledgement note to the Cost Action 15224. The two faculties are willing to extend the research collaboration, including students and lecturers. Also, through the COST action, we were talked about further opportunities for collaboration in the area of precision livestock farming and defining a bilateral project.

**I would like to express my grateful thanks to the Action leaders of the CA15224 and my supervisor Prof. dr Lazarin Lazarov for their support and the opportunity to gain my skills in the field of KBD.**

2020. June 25.

STSM Applicant

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BECSKEI Zsolt



Some of the photos from the STSM gallery:



Trakia University Vet Stara Zagora 04/06/2020 10:07:11

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