

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

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

**Action number: CA 15224**

**STSM title: Feasibility study- Implementation of keel bone damage assessment in animal welfare audits**

**STSM start and end date: 26/08/2018 to 1/09/2018**

**Grantee name: Ine Kempen**

### PURPOSE OF THE STSM/

Keel bone damage (kbd) in laying hens is more and more acknowledged both in Belgium and Sweden as an important welfare problem. Although science is still struggling with defining the underlying causes and the search for kbd reduction strategies, it is important to start creating awareness among farmers by monitoring the kbd incidence and discussing the subject. This can facilitate the adoption and evaluation of reduction strategies in the future. The most successful way to start a kbd monitoring program is to involve it in existing welfare audits (Sweden) or in the audit development phase (Belgium).

The first goal of this scientific mission was to investigate the feasibility of implementing kbd monitoring in an existing animal welfare audit program. The host institution “Swedish Egg Association” (Svenska ägg) has developed and used an animal welfare program since the middle 1990s. Every third production cycle, layer farms are visited and an animal welfare audit is conducted. Besides obtaining information about the facilities, the stable and handling of the animals, several animal based parameters are being scored: body condition, foot injuries, pecking injuries, plumage, mortality and red mite infestation. These measurements are done during a tour of the welfare inspector in the stable. Hens are not picked up unless there are signs of abnormalities. During the STSM, we looked at the feasibility of implementing a keel bone score in the current welfare audit.

The second goal of this STSM was to take the opportunity to talk to farmers. By showing them the palpation method and letting them feel hens with keel bone problems, we created awareness amongst them about keel bone problems and prospected their interest and willingness to act upon it.

The third goal of this STSM was conducting for the first time in Sweden a field study to monitor the kbd incidence in commercial aviaries and hens at different ages.

## DESCRIPTION OF WORK CARRIED OUT DURING THE STSMS

On the first day of the STSM, we started planning the different visits, discussed animal welfare protocol and taking measures to secure biosecurity. We set up the criteria for describing keel bone damage and aligned the palpation method in theory.

On day 2, 3 and 5 we conducted the different visits combining the animal welfare inspections and monitoring keel bone damage. In total we visited 3 farms and palpated hens of 13 – 93 weeks of age in 6 flocks. All hens were housed in aviary systems. On day 4 we started to create a database for the palpation data and discussed preliminary findings and results.

### Protocol

- We divided the keel bone in three parts: upper part, middle part, lower part (containing also the tip)
- Each part was scored on the presence of a fracture and the severity of the fracture (small, big, crack) and the presence and severity of a deviation (1-3)
- We started every visit with a survey, obtaining information on: hybrid, age, system, feed+supplementation, history of the birds, aid materials, lightning schedule and rearing conditions
- In every stable, we did a tour starting in a corridor in the middle and a corridor at the stable wall. We measured lightning intensity (in lux) on six different places in the corridors (always at floor level, lower tier and upper tier level)
- Hens were caught at different locations which were recorded on the monitoring sheet → F (floor), N (nest), L (lower tier of the aviary), H (upper tier of the aviary)
- Per stable (and age), 90 hens were palpated
- In the first stable, two palpators scored the same 90 birds to align their scoring criteria. From then on in the other groups, two palpators scored the first 15 hens together to align scoring methods.
- At every visit, it was necessary to dim the lights to properly catch the bird
- At every farm, we got help from the farmer during the whole visit

### Farm visits

- 1) “Aniagra”: Aniagra is a large layer hen multiple age facility combined with an egg packing station. We monitored following groups:
  - Hens of 39 weeks of age, Dekalb White (Bovans Robust) in system of Big Dutchman (BD) step
  - Hens of 58 weeks of age, Dekalb White (Bovans Robust) in system of BD step
  - Hens of 71 weeks of age, Dekalb White (Bovans Robust) in system of BD step
- 2) “Särestad Agro”: family farm (father and son) with layer hen multiple age facility. We monitored following groups:
  - Hens of 83 weeks of age, Dekalb White (Bovans Robust) in system of BD Colony
  - Hens of 93 weeks of age, Dekalb White (Bovans Robust) in system of BD Colony
- 3) “Skäpparps Pullets”: Rearing farm (two layer farmers working together). We monitored following group:
  - Pullets of 13 weeks of age, Dekalb White in system of BD Natura Primus

**DESCRIPTION OF THE MAIN RESULTS OBTAINED**

This STSM conducted for the first time in Sweden a field study to monitor the kbd incidence in commercial aviaries and hens at different ages.

A first analysis of the results shows an increasing incidence of keel bone fractures when hens become older. Hens were from different flocks, so these hens were not the same hens followed through the production cycle. This was not possible to combine in one STSM. Fractures were scored on different positions of the keel bone.

Figure 1 and table 1 show preliminary results of the % of hens with a fracture.

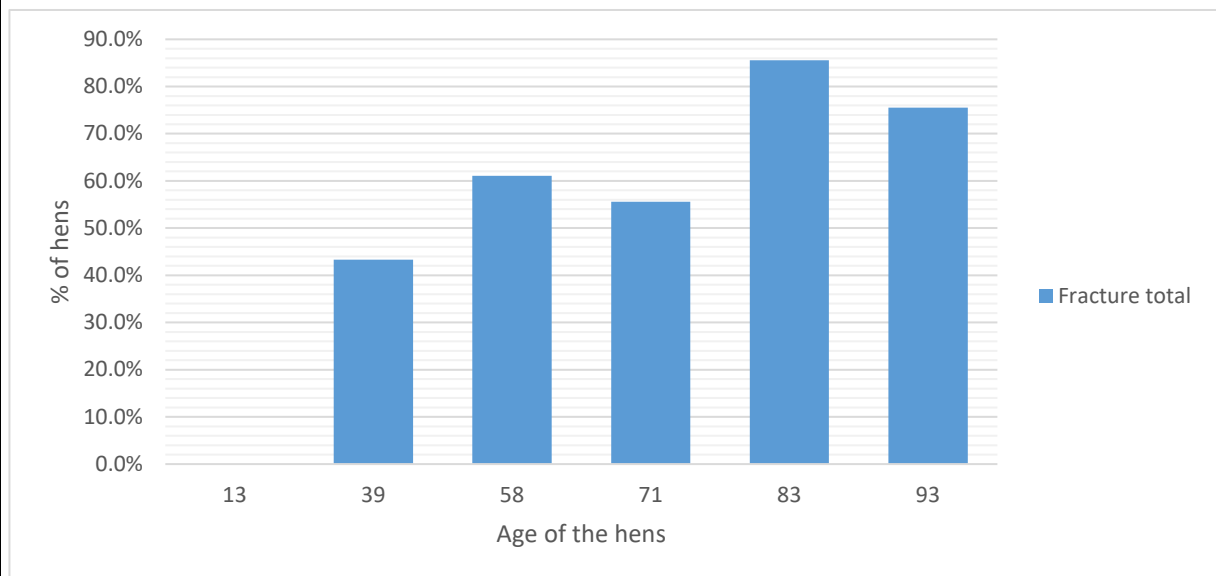


Figure 1: % of hens with a fracture, flocks of different ages

Table 1: % of hens with a fracture, flocks of different ages

Age in weeks	% of hens with a fracture
13	0,0%
39	43,3%
58	61,1%
71	55,6%
83	85,6%
93	75,6%

Pullets of 13 weeks old showed no signs of fractures, although in 5 cases (total of 90 hens), we felt an abnormality of soft tissue. This could not be categorized as a fracture but maybe lead to future keel bone damage.

The decrease of the percentage of hens between the age of 58-71 weeks and 83-93 weeks can be explained based on the different flocks that were measured and not one and the same flock followed through the cycle. The flock of 83 and 93 weeks were located on the same site and received the same management but the flock of 83 weeks is suspected to have had a Gumboro infection during rearing, resulting in a more nervous flock and more problems during the production cycle at the layer farm. This can explain the higher incidence of keel bone fractures compared to 93 weeks, although the hens were younger. Hens showed a high increase of fractures at the age of 39 weeks. At the age of 93 weeks, 3/4<sup>th</sup> or 75% of the hens showed at least one fracture of the keel bone as a whole.

We scored fractures at different locations on the keel bone: cranial, middle part and caudal part.

Figure 2 and table 2 show these preliminary results.

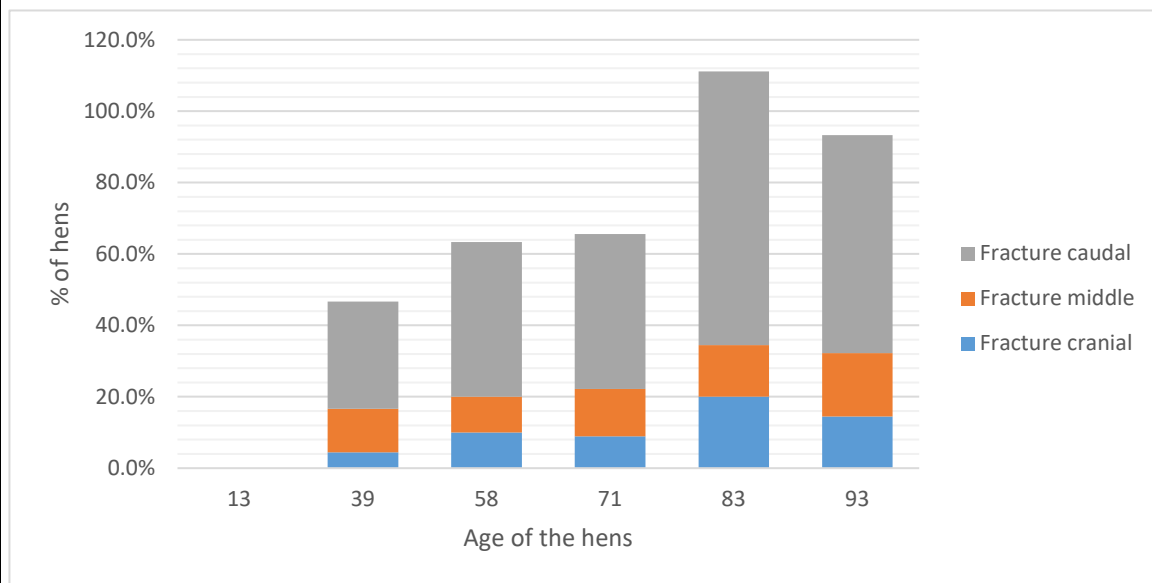


Figure 2: % of hens with a cranial or/and fracture on middle part or/and caudal fracture, flocks of different age

Table 2: % of hens with a cranial or/and fracture on middle part or/and caudal fracture, flocks of different age

Age	Fracture cranial	Fracture middle	Fracture caudal
13	0,0%	0,0%	0,0%
39	4,4%	12,2%	30,0%
58	10,0%	10,0%	43,3%
71	8,9%	13,3%	43,3%
83	20,0%	14,4%	76,7%
93	14,4%	17,8%	61,1%

Already at 39 weeks, a higher % of hens showed fractures on the lower part of the keel bone then in the middle of the upper part. At the age of 93 weeks, 61% of the hens showed a fracture on the lower part of the keel bone, 18% on the middle part and 14% on the upper part. At 83 weeks, the % of hens with a fracture is >100%. This can be explained by a higher incidence of hens with more than one fracture on the different locations.

**FUTURE COLLABORATIONS (if applicable)**

Following future collaborations between the host and the grantee were established:

- Further analysis of the obtained data: determining the minimal amount of hens needed for monitoring in a welfare audit, the presence of keel bone deviation, inter-observer differences, relation to location where the hen was caught, linking data to survey results and light intensity
- Joint communication of the results to national stakeholders and the participants of the Keel Bone Damage Cost-action
- Interest of both institutions to look at the effect of different lighting spectra on production, behavior and welfare of laying hens