

SHORT TERM SCIENTIFIC MISSION (STSM) SCIENTIFIC REPORT

This report is submitted for approval by the STSM applicant to the STSM coordinator

Action number: Cost Action 15224, reference number: 38422

STSM title: AFFECTIVE STATUS IN TERMS OF THE EMOTIONAL PART OF THE KBD PROBLEM

STSM start and end date: 25/09/2017 to 25/10/2017

Grantee name: Ivan Dimitrov

PURPOSE OF THE STSM:

(max.200 words)

Many questions about effects of emotions on development of KBD in laying hens involve the affective states in birds (pain, fear, distress and pleasure). Individuals may experience the same physical and social environment differently depending on their individual emotional sensitivity, genotype, early experiences and nutrition. There are indications that fearful birds are more likely to develop KBD. The temperament can influence the perception of emotional valence in farm animals.

The present project will contribute to the development of methodology for assessment of emotional and physiological (cortisol and oxytocin) predisposition in terms of KBD development in laying hens. Different methods for assessing affective states and personality (temperament) in hens will be used in the Biotechnical Faculty from University of Ljubljana, Slovenia. The idea is to compare the behavioral, physiological and immune responses of laying hens with different temperament types after challenging tests such as fear inducing and learning tests and how these responses modify birds' predisposition to KBD. Here we will use emotional approach, the approach directed to distinguishing emotional differences and their relations with performance, health and nutrition as a tool to assess birds welfare and affective states. Furthermore, we will aim to provide evidence for existence of a specific discrimination of different emotional reactivity with the same valence trying to elucidate the linkage between stress indicators and long-lasting affective status in terms of the emotional part of the KBD problem. Here we propose a different angle of investigation of the emotional assessment process incorporating different dynamical aspects of an action with a function to orientate, to initiate/mobilize and to sustain and action, using Pavlovian conditioning as a part of the emotional approach (Dimitrov, 2017).

DESCRIPTION OF WORK CARRIED OUT DURING THE STSMS

(max.500 words)

One hundred hens of the same age and Steyr breed from the experimental flock of the Biotechnical Faculty of the University of Ljubljana will be provided for establishment the level of fear reactivity by Open Field Test (OFT) and Aerial Predator test (APT). The OFT was specifically designed to define individual fear reactions and exploration. The test will be done at 17 weeks of age and will last 3 minutes (1 min. for fear plus 2 min. for explorative behavior). Birds will be randomly chosen and individually caught from the communal pen and will be placed in the pre-starting cage for 30 s. The test will be carried out in the same arena where the floor of the arena will be marked into central and peripheral zone. The test will start when the person open the door. The behaviour of the chicken will be scored with one-zero sampling every 10 second during the first minute. The fear level of the animal will be assessed on a scale from 20–80 at

every sampling point, where 20 signified a fearless animal and 80 a highly fearful reaction. Behaviours and definitions are described in details. After the test, a total fear-score will be assigned to an individual. The individual fear-score is based on the criteria described as follows: Calm group - Total Score between 120 – 240; Intermediate Fear Level group - between 241 – 360; High Fear group - Total Score between 361 – 480. Latency to leave the pre-starting arena, Latency to reach the central zone with both feet will be registered. After the first minute the test will continue with another two minutes for estimating exploratory behavior, as both above mentioned latencies will be registered (if not registered yet). Frequencies of crossing central zone and Frequencies of pecking and scratching will be also registered. The OFT will be carried out 3 times – on the 17, 31 and 37 weeks of age.

The APT will be carried out on the 40 week of age in 60 birds. The response to a simulated aerial predator attack will be measured. This test assesses the startle effect and fear reaction towards an aerial predator. Birds are known to differentiate their defensive behaviour between aerial and ground-based predators (Campler et al., 2009; Agnvall et al., 2012). The animals will be placed in the same arena. In order to get a base line of the behavior the animals will be first observed undisturbed in the arena for five minutes, using direct recording. One zero sampling with 10 seconds interval will be done. After five minutes, a hawk silhouette model made out of wood and black coloured cartoon slid above, lengthwise over the arena, starting 160 cm above the arena and ending 60 cm above it. The behaviour of the animals will be then recorded in the same way as before during 5 minutes. The frequency of exploration, stand alert and freezing behaviour (all defined in details), after the bird had been exposed to the predator will be used for analyses.

DESCRIPTION OF THE MAIN RESULTS OBTAINED

We performed initial Fear-inducing tests in the specifically designed experimental platform 2m (l) x 1.2m (w) x 1m (h) for multifunctional purposes. The platform was situated on a place, isolated from noise, humans and animals. In order to register "peripheral and central zones visits (entrance)" a central zone was marked in the middle of platform 100cm (l) and 25cm (w). A zone of initial placement (pre-starting cage) of the bird before entering the experimental zone was erected 50cm (l) x 25cm (w). An option of putting two troughs at the both alternate corners of the room was provided. The experimental platform had two doors, through which birds would go in and out, after 3 minutes period of staying in. Near by the entrance and exit were provided corridors leading to the premises where the birds are habituated. Each animal will be placed in the zone of initial/pre-starting cage for 30 s, then the entrance door of the "test room" will be opened. The OFT will last three minutes and the APT will last five minutes at the end of which the exit door will be opened to allow the animal to be taken out and cleaning. Feather samples will be taken three times for estimation of cortisol and oxytocin in all the birds.

FUTURE COLLABORATIONS (if applicable)

The present project will contribute to the development of methodology for assessment of emotional and physiological (cortisol and oxytocin) predisposition in terms of KBD development in laying hens. Different methods for assessing emotional reactivity and temperament in hens will be used in the Biotechnical Faculty from University of Ljubljana, Slovenia. Further collaboration and project activity on assessing affective states, physiology and KBD between following institutions is provided: Agricultural Institute – Stara Zagora, Bulgaria; University of Ljubljana, Slovenia; University of Bern, Switzerland and Wageningen University, Netherlands. The project will promote development of skills in terms of assessing temperament, physiology and behaviour in laying hens (MSc student), writing articles on these topics, further large-scale collaboration and contacts with experts and young people motivated to develop such methods. An educational visit of the MSc student Neža Rokavec at the Agricultural Institute – Stara Zagora, Bulgaria is provided for the period between April and May, 2018. In the same institute the statistical analysis will be done, as well as final variant of the summarized results at this stage of the project. An abstract of our findings will be sent to the XV European Poultry Conference, Dubrovnik, Croatia, September 17 – 21, 2018, titled: KBD IN RELATION TO EMOTIONAL REACTIVITY IN LAYING HENS.

In order to support one of the most important aims of the project, namely to investigate the emotional predisposition of the hens to KBD, we have developed different tests for studying appetitive and social behavior, which are not included in this report, and have not used, yet. For studying consummatory (foraging) behaviour in laying hens based on formation of conditional reflex by finding a trough and consumption of food, we used classical Pavlovian conditioning – a system of tests that we have already

used successfully in sheep (Dimitrov, 1998). These developments will be refined and used either in Slovenia or in Bulgaria (or other institutes from EC) in the future collaboration. We consider that, in combination with the Open Field and other tests, specifically designed to assess fear and explorative reactions in all birds of the flock we can use Pavlovian Conditioning as a tool to assess some of the most important traits of the temperament in laying hens, for instance flexibility (plasticity), strength and balance of the nervous system and others.

Feeding behaviour Conditional reflex (and anticipatory behaviour) was hypothesized to reflect an appetitive type of positive affective state. In this way, Food Conditional reflex could be used to test the individual behavioural variation, temperament, subject's sensitivity and predispositions to some affective states, and to link this with the concomitant diseases like KBD.