

SHORT TERM SCIENTIFIC MISSION (STSM) SCIENTIFIC REPORT

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

Grantee's name: Liza Miriam Cohen

STSM title: Damaging behavior related to disease in group-housed pigs, with particular attention to the relationship between respiratory disease and tail biting.

Action number: CA15134

Home institution: Department of Production Animal Clinical Sciences, Norwegian University of Life sciences (NMBU)

Host institution: Department of Animal Science, Aarhus University

STSM start and end date: 13/03/2019 to 14/03/2019

PURPOSE OF THE STSM:

Damaging behavior in pigs, such as tail biting, can be triggered by several factors, and is considered a multifactorial problem. Systematic tail docking to prevent tail biting and the following complications is prohibited in the EU, however it is still being practiced in major pig producing countries like Denmark due to the lack of effective alternatives. There is an increased focus on alternative means to reduce occurrence of damaging behavior. Associations between health and tail biting is one focus area for the COST Action GroupHouseNet project. At my home institution, I am currently engaged in a study of etiology and characteristics of respiratory disease in the Norwegian pig population. Respiratory disease constitutes a major challenge in modern pig production globally. Outbreaks of respiratory disease also has a multifactorial etiology and could perhaps be triggered by several the same factors as tail biting. Abnormal behavior is a reaction to impact that the animal is unable to adapt to. Underlying disease could be perhaps be such impact.

This STSM was performed to shine a light on the occurrence of tail biting in herds where respiratory disease is prevalent and discuss methods of investigating that relationship. The knowledge generated from this short time scientific mission is valuable when assessing importance and impact of clinical disease in modern pig production. Hopefully, this scientific mission can inspire new ideas for further research, just according to the objective of the WorkingGroup3 concerning health.

DESCRIPTION OF WORK CARRIED OUT DURING THE STSMS

During my mission at the research facilities at Foulum I met with animal scientists and veterinarians to discuss the possibilities of studying tail biting in relation to occurrence of respiratory disease in modern pig production. I got the chance to introduce and discuss some topics from my research that were relevant to the STSM. I presented some important tools that are available for the Norwegian pig population in surveilling herd prevalence of respiratory disease and tail biting respectively. They include treatment records of administered drugs for given indications, and slaughterhouse data which includes information

about production and health parameters registered at slaughter. These data are gathered in the Norwegian Animal Health Database (Dyrehelseportalen) and can be accessed with the farmer's consent. Although not specifically useful when performing behavioral studies, these data can be helpful when identifying herds that are worth investigating clinically, and they might also hold information about occurrence of correlated incidents in a herd. We discussed what approaches would be most reasonable for the study of this relationship, and what preconditions are necessary. We discussed some major differences between the Norwegian and the Danish pig populations, including production volume, herd sizes, disease status and prevalence of infectious agents. I learned that the researchers in Denmark also take use of slaughterhouse data in their studies, however there were some differences in the way lesions are scored and tracked, so the data cannot be utilized in the same way in these two countries.

The researchers at Foulum introduced me to previous and ongoing studies of pig welfare, with emphasis on damaging behavior. At Foulum they have housing facilities for experiments with pigs, where I was taken for a tour during my stay. They have a farrow-to finish production, the farm is made to resemble field conditions, and is managed accordingly. Due to recent financial regulations the pig stock has been reduced and would now be considered small compared to the Danish standard. Unlike many conventional Danish herds, at the facilities at Foulum, the piglets are only tail docked when considered needed as part of experimental studies. This is to perform behavioral studies of tail biting that can be valuable for the authorities and the pig industry in the pursue of effective means to reduce occurrence of damaging behavior. The research group at Foulum have also performed several field studies regarding tail biting, studying outbreaks, screening and scoring herds for tail lesions to mention some things. I got together with the researchers and discussed materials, methods and findings from some of these studies. Studies of methods for early detection of tail biting, and managemental or environmental factors to reduce the occurrence of biting have been particularly prioritized.

DESCRIPTION OF THE MAIN RESULTS OBTAINED

Even though tail docking is prohibited by law in Denmark, the common practice it still to perform docking as a preventative measure against tail biting. Apparently, no effective alternative methods have been found, leading to a demand in research within the field. There are some subcategories of herds in which systematic tail docking does not occur. These are the organic and free-range pig herds and have naturally been subject to investigation of tail health, also by the researchers at Foulum. In a report from 2018 (H.Kongsted et. al), the prevalence and risk factors of respiratory disease and tail biting in these two Danish herd types were investigated separately.

Due to the ban on tail docking in Norway, the pigs are perhaps more exposed to tail biting, but this also makes the occurrence of damaging behavior easier to discover and study. Animalia, a national veterinary health service organization, sum up some statistics from the Norwegian Animal Health Database in their annual reports. In the 2015 report, which is the latest accessible one, they listed an updated distribution of treatment records per diagnostic category in pigs. All veterinarians are required to report medical treatment of food producing animals, and all treatments must be linked to a diagnose. Tail bites made out around 9% of all diagnoses made that year, while respiratory disease made out around 7% of all diagnoses made. The Danish pig production is under much pressure for cost-effectiveness, which among other things has led to an arrangement where the farmers administer many drugs to pigs in their own herd without the same level of veterinary control that is present in most Norwegian herds. Within herd data on disease registries could be useful to identify details of a disease incident, like reoccurring problems, affected pens, age of the pigs that are relevant to our research.

Respiratory disease in a herd can manifest in many ways. Problems with severe outbreaks of respiratory disease are not uncommon, and establishment of Specific Pathogen Free (SPF) herds in both Denmark and Norway has been a strategy to reduce disease occurrence in these subpopulations. Infectious disease outbreaks as well as outbreaks of tail biting are challenging phenomenon to study in field due to the randomness of their occurrence. To study them in tandem does perhaps not make much sense for a couple of reasons. One would of course be the challenge of their sporadic occurrence. The other being our experience with animals of acute respiratory distress, that often display severely reduced general condition, reduced appetite and lethargy. To think that these would be interested in biting tails is farfetched. Many acute infectious respiratory diseases are besides highly contagious, meaning that the whole pen or even room can be affected, and the pigs unfit to bite tails. Chronic infection level in the herd or subclinical cases would be more suited for the kind of study in question. Severe chronic cases of tail biting can be surveilled, using health scorings at slaughter. In Norway, pig tail bites are graded using two

codes to describe the pathology at slaughter. One is named “Open tail wound” and the other is “Short tail/Healed tail wound”. Lesions on lungs and pleura are classified using one code for “Pleuritis and/or pericarditis” and one for “Pneumonia”, and they are both scored by severity. Individual carcasses are scored to ensure traceability, and data can be extracted on either individual, batch or herd level. In Denmark, tail lesions are scored by severity, using one code for “Localized tail lesion” for mild cases and the code “Infected tail bite” for more severe cases. Lungs and pleura are scored by a subset of codes that describe the lesions. The proportion of scores per batch can be extracted from these scorings and be used to identify herds that have a problem with damaging behavior. The 2018 report by H. Kongsted et al revealed a substantial discrepancy between tail bites registered at slaughtered and tail bites found at clinical inspection in the herds. Substantial inter-observer variation is expected for the slaughter scores, which must be considered if you want to use these data in research.

I had previous to my STSM been looking into correlations between the slaughterhouse data on respiratory disease and tail biting in some Norwegian herds that were part of a case control study of risk factors for respiratory disease outbreaks. The tendency was that the case group, that sometime during their finishing period had experienced an acute outbreak for respiratory disease, had a higher level of tail biting remarks at slaughter, see figures 1 and 2. One could also use these data to map the correlation between respiratory and tail bite remarks at slaughter. However, both tail bites and pneumonic lesions will heal after some time, slaughter data will therefore only reflect incidents in the later stages of the fattening period, excluding most acute lesions that requires treatment and/or deems the animals unfit for transportation or human consumption.

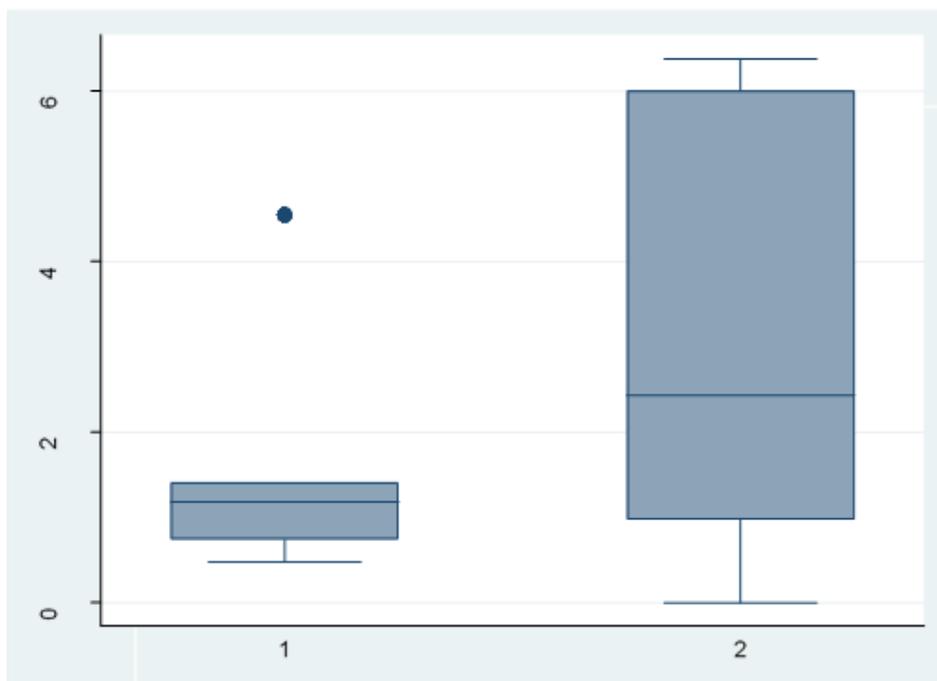


Figure 1 Acute tail bite remark in percent of slaughtered pigs in a batch, where group 1 had suffered an outbreak of acute respiratory disease at some point in the fattening period, and group 2 had not.

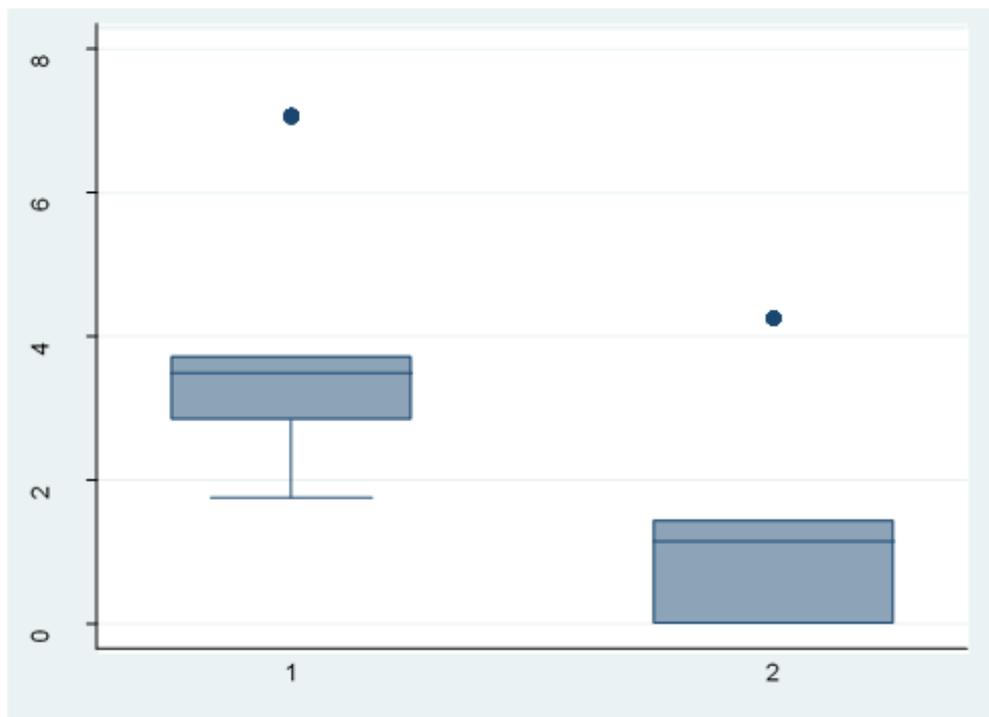


Figure 2 Chronic, healed tail bites (shortened tails) remark in percent of slaughtered pigs in a batch where group 1 had suffered an outbreak of acute respiratory disease at some point in the fattening period, and group 2 had not.

Based on many of these comparisons, we theorized that the Norwegian data tools are more useful in performing a study like the one discussed during this mission. We further discussed and proposed the outlines of a study design. To assure consistency in the “Animal Health database-data” and limit the inter-user variability one should perhaps start from one field veterinarian that has many pig farms in their practice. Quality control will involve making sure the field veterinarian uses the right diagnostic codes and uses the codes as they were intended. Look at the prevalence of respiratory disease and tail biting within the herds in this study group. If you can spot, based on predetermined criteria, a period with an increased problem with respiratory disease the herd should be included in the study. Further investigations would include a farmer interview where you ask whether they have experienced any increase in tail biting in the time after the respiratory disease “incident”. Investigations would also include extraction of slaughter data in the period around the “incident”/ when the batch of pigs in question go to slaughter.

We did not take the planning of this study any further, as my time at Foulum was coming to an end. However, as this topic is very interesting, I hope to be able to return to the work at some point.

FUTURE COLLABORATIONS (if applicable: Future and output produced from this work)

The knowledge generated from this short time scientific mission is valuable when assessing importance and impact of clinical disease in modern pig production and how this impacts the expression of damaging behavior. The aim of this mission therefore ties well in with further studies of respiratory disease that await when I return from this mission.

The topic of correlation between disease and tail biting needs further investigation. It would be of great interest to discuss the likelihood that measures meant to prevent disease will have a positive effect on tail health.

Resources

H.P. Lahrmann, Tail Biting Outbreak in Pigs – Prevalence, Early Detection and Targeted Intervention PhD thesis 2018 ©

H. Kongsted; L. Foldager; J.T. Sørensen, Sygdomsproblemer hos økologiske grise og frilandsgrise – Forekomst og årsagssammenhænge, DCA Report 128, 2018, Tjele. (In Danish)

The Norwegian Animal Health Database <https://dhp.animalia.no/>. (In Norwegian)

H. Kongsted; J.T. Sørensen, Lesions found at routine meat inspection on finishing pigs are associated with production system, 2017.

Animalia Helsetjenesten for svin, Annual Report 2015, (In Norwegian)

M.L.V. Larsen et al., Which is the most preventive measure against tail damage in finisher pigs: tail docking, straw provision or lowered stocking density, 2017.

M.L.V. Larsen et al., Changes in activity and object manipulation before tail damage in finisher pigs as an early detector of tail biting, 2018

M.L.V. Larsen et al., Tail posture as a detector of tail damage and an early detector of tail biting in finishing pigs, 2018



Figure 3 Happy PhD-student visiting her STSM host institution, Department of Animal Science, Aarhus University, in Foulum, Denmark.



Figure 4 The Department of Animal Science at Aarhus University is located in the rural areas in central Jutland. The institution is surrounded by agriculture, and famous for its contributions to research on food production and agricultural science in Denmark.