

Short Term Scientific Mission (STSM) Report

Performance, behaviour and welfare in extensive pig production systems in Portugal

Cost Action: GroupHouseNet – Synergy for preventing damaging behaviour in group housed pigs and chickens

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Host: Prof. André Martinho de Almeida, Higher Agronomic Institute of the University of Lisbon, Portugal

Date STSM: 16/01/2019 to 31/01/2019

Introduction

Pigs comprise a wide range of methods to communicate, including behaviour, scent, vocalizations and body language. In pigs' natural surroundings, subtle signals prevail whereas the use of overt signals occurs less frequently. This means, amongst others, that any disputes may be settled by agonistic threat and withdrawal behaviour to avoid the escalation into damaging aggression.

In commercial pig husbandry, slaughter pigs are commonly housed at the minimum space requirement of 0.7 – 1.0 m² per pig, depending on the country's legislation. This very limited amount of space, certainly in smaller group sizes, restricts the naturally subtle communication. Visibility may be obscured by pen objects and other pigs moving, scent signals may be less well perceived due to high ammonia concentrations (Von Borell et al., 2007), and vocal signals may be heard less well due to noise of mechanical systems and the large number of other pigs (Schäffer et al., 2001). Pigs also face numerous other welfare challenges, such as lack of opportunity to root or forage, regrouping with unfamiliar pigs, and painful procedures. As a consequence, they express more harmful behaviour than under natural conditions, whereas recipients of the harmful behaviour may show a lack of responsiveness.

Harmful behaviour between pigs, mainly tail biting and aggression, is predominantly studied in an applied manner in commercial settings. Here, the majority of the animals receive skin lesion due to aggression (Turner et al., 2006). Under research conditions where pigs are given the space to display agonistic behaviours in a dyadic contest setting, between 30 to 74% of the contests can be solved without a fight (Camerlink et al., 2017). This suggests that pigs can avoid aggression when they have sufficient space to signal their intent.

In the past years I have been studying agonistic behaviours of pigs while working at SRUC, Edinburgh, UK. Data for a manuscript on these subtle agonistic behaviours had been collected, but the manuscript had become dormant since the project on aggression ended in March 2018. One aim of the STSM is to finalize the manuscript to provide evidence for the importance of subtle communication in improving animal welfare. Subtle communication, including agonistic signals, might be better expressed in extensive pig populations. The host has access to extensive pig rearing sites using native breeds. Visiting such farms may provide the benefit of being able to

observe also other social behaviours which may aid in the formation of a more detailed ethogram for social behaviour. In addition, knowledge of (Portuguese) extensive pig production systems will be gained, particularly concerning housing, behaviour and welfare monitoring. The visit to Portugal offers the opportunity to increase the research networks and collaboration between the participating researchers.

Aims

The aims of this STSM were to

- 1) finalize a manuscript for publication on pig aggression
- 2) work on a new detailed behavioural ethogram of social interactions between pigs
- 3) increase the collaboration between the participating institutes
- 4) gain knowledge of extensive pig production systems

Description of the work undertaken

The two week STSM included two seminars in Lisbon at different universities, two lectures during a workshop in Elvas, providing a day of on-farm workshop near Elvas, meetings at the University of Porto, meetings at the University of Vila Real, and three visits to different pig farms (Figure 1). The overview of the deliverables is given in Table 1. The lecture at the Higher Agronomic Institute of the University of Lisbon will be made available online on YouTube by the host institute.

For the occasion of the visit, Carolina Silva had organized a 2-day animal welfare workshop with one day of lectures and one day of on-farm practical training in welfare assessment of pigs and cattle. The workshop included presentations from researchers from Portugal and Spain (program attached). Maria Jorge Correia from the government spoke amongst others on their plans for stopping with tail docking (Figure 2). The workshop had around 70 participants and the maximum number of 30 participants for the on-farm workshops. The event was covered by the press and images have been shared afterwards on the facebook page of the university.



Figure 1. Map of where activities took place.



Figure 2. Maria Jorge Correia presenting on the upcoming legislation.

The visits to the pig farms offered a good view of the diversity of pig production systems in Portugal. The visit in Alentejo offered sufficient time to make a large number of video recordings and images to be used for the ethogram (objective 2). Due to time restrictions of the farmers there was little opportunity for live behavioural observations and therefore only video material has been collected.

Table 1. Description of the work undertaken during the two week STSM.

Deliverables	Location	Local organizer
Seminar ‘Adjusting farm management to deal with welfare challenges’	CIISA - Centro de Investigação Interdisciplinar em Sanidade Animal (Veterinary University), Lisbon	André Almeida
LEAF Seminar ‘Improving pig productivity with the help of welfare indicators’	Instituto Superior de Agronomia - Universidade de Lisboa, Lisbon	André Almeida
Lecture ‘Animal Welfare: more than just a healthy animal’	Escola Superior Agrária de Elvas, Elvas	Carolina Silva & Goncalo Da Graça Pereira
Lecture ‘Animal Welfare Assessments: from science to common sense’	Escola Superior Agrária de Elvas, Elvas	Carolina Silva & Goncalo Da Graça Pereira
Welfare assessment of pigs – on-farm workshp	Monte Alto, Alentejo	Carolina Silva
Meetings at University of Porto	i3S - Instituto de Investigação e Inovação da Universidade do Porto	Anna Olsson
Meetings at agricultural university in Vila Real	UTAD – Universidade de Trás-os-Montes e Alto Douro	Ana Sofia Santos & Divanildo Outor Monteiro
Farm visit 1. Portuguese conventional farm with 600 sows. Images collected.	Near Leiria, Leiria district, Centro region	André Almeida
Farm visit 2. Extensive pig farm with	Campo Maior (Monte Alto),	Carolina Silva

Black Iberian (Alentajana breed) pigs. Data set of videos and images collected.

Portalegre District, Alentejo

Farm visit 3. Extensive pig farm with Bísaro pigs. Images collected.

Near Boticas, Vila Real district

Divanildo Outor Monteiro

Main results

The results for the manuscript on agonistic behaviour (objective 1) have been analyzed and the manuscript is close to submission. As these results will be submitted to a scientific journal they are not presented here. Briefly, the results show that a third of the male pigs show subtle agonistic signals through body language (raised neck hairs and foaming) whereas in females this hardly occurs. Moreover, males show these subtle behaviours mostly when involved in an agonistic encounter with another male, and less so when encountering females. Besides the evidence for subtle communication, the data shows strong sex differences in the display hereof, even in pre-pubertal pigs.

The video data is still to be analyzed in greater detail, but the first extraction of the videos shows a wide range of subtle behavioural interactions such as nose-nose contact (Figure 2).



Figure 2. Subtle nose-snout behaviour in Iberian pigs.

Almost no damaging aggression was observed in the extensive systems, despite keeping boars for breeding together. Old skin lesions on some of the breeding boars did show that damaging aggression between the males occurs. There was a stark contrast though between the skin lesions on the boars (occurring from aggression) and the other pigs, which showed hardly any lesions (Figure 3).



Figure 3. Old skin lesions on the skin of one of the breeding boars due to aggression.

Besides aggression, it was noted that some pigs in the extensive system had reduced tails (Figure 4). No open tail wounds or tail biting was observed. Despite all the available space and enrichment these pigs did, according to the farmer, tail bite around the age of 6-8 months. The production system for the Iberian pig takes more time to grow the pig, with a phase in which the pigs receive only slightly more than their nutritional requirements for maintenance. This is to make sure that the pigs do not grow too fast or get too fat, in order to fatten them properly on the acorns that have fallen from the oak trees in the final stage of production. Tail biting in outdoor systems is not uncommon (Walker & Bilkei, 2006). Pigs may be lacking some amines (e.g. serotonin) in their restricted nutrition, which may cause tail biting (Valros et al., 2015). Alternatively, it may also be that mycotoxins from the soil affect their behaviour or may lead to necrosis which may affect the tail (Van Limbergen et al., 2017; see also STSM GroupHouseNet report of A. Sayyari).



Figure 4. Pig with reduced tail (not through tail docking) in a highly extensive system.

Although overall the welfare of pigs in these extensive systems is by far better than in commercial conditions, there are a few particularities that may give welfare concerns. One is the method of castration, as also the female pigs may need to be castrated. In these areas where the pigs are kept outdoors there are many wild boars. Because the slaughter age is much later (around 1 – 1.5 years of age) the females risk being inseminated by wild boars, and are therefore castrated. Another concern can be the weather conditions in the varying climate, certainly when there is limited outdoor space (mainly mud or sand) or insufficient shelter or shade (Figure 5). An example shown here from the Bísaro pigs in the mountains in the North, where in winters it freezes and snows whereas in summer it can be around 40°C. Piglets were struggling to keep their body temperature normal in pens that are designed for a hot climate (Figure 5).



Figure 5. A) All piglets in a heap in the corner in an attempt to remain warm on a cold day; B) Outdoor access is not so appealing after several days of rain.

Future collaboration possibilities

The STSM resulted in many new relevant contacts. The main future collaboration possibility will be with Carolina Silva from Escola Superior Agrária de Elvas, as there is interest to make the welfare workshop a yearly event. The host in Vila Real, Divanildo Monteiro, is organiser of the Annual Meeting of the European Federation of Animal Science (EAAP) to be held in 2020 in Porto. That also offers possibility for collaboration as there is the aim to increase the links between the EAAP and the ISAE (International Society for Applied Ethology) of which I am board member. The farm in Alentejo has good facilities to record videos and the farmer (Miguel Parreira), who is also veterinarian and part-time professor at the Escola Superior Agrária de Elvas, welcomes future visits.

Future plans

The plan for the near future is to submit the final version of the manuscript within the coming month and to analyze the video data in more detail.

As mentioned, one plan may be to collaborate with Carolina on another welfare workshop next year in Elvas.

Outputs

The direct output is a new data set of videos and images of social behaviour of pigs in extensive conditions. This data set will contribute to new ethogram that will be submitted for publication later this year. Another output of the STSM is the finalization of a manuscript on agonistic behaviour (aligning with the COST Action) that will be submitted for publication soon. Other outputs are media coverage related to the given seminars (posters, YouTube seminar and Facebook posts by the various universities).

References

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Animal Welfare Workshop

22 & 23 January 2019

Escola Superior Agrária de Elvas

Program

22/01

09h30 Opening

10h00 Animal Welfare: more than just a healthy animal

Irene Camerlink

11h00 Coffee break

11h30 Basis of animal welfare in dairy cattle production systems

Javier Diéguez

12h30 Rational management and animal welfare

Alfredo Pereira

13h00 Relevant aspects of animal welfare legislation for cattle and pigs

Maria Jorge Correia

13h30 Lunch

15h00 Animal Welfare Assessments: from science to common sense

Irene Camerlink

16h00 Welfare assessment in dairy cattle

Javier Diéguez

23/01 Farm visits

10h00 Group A – welfare assessment of pigs; Group B – welfare assessment of dairy cows (15 delegates per group)

14h00 Group B – welfare assessment of pigs; Group A – welfare assessment of dairy cows (15 delegates per group)

