



PIG e:newsletter

Pig Information Group –Autumn 2019 Report

Welcome to the autumn edition of the PIG e:newsletter.

The PIG e:newsletter has now been produced for over 3 years and one constant has been how the sector has continued to move forwards despite the challenges thrown at it. One other recurring theme in the editorials has been the potential uncertainty caused by BREXIT- something that seems no closer to resolution than three years ago.

This newsletter exists to keep the sector up to date on the latest news and research from SRUC and this edition is no different. Firstly there is an article on SRUC’s recently published farrowing guide for outdoor producers, Kenny Rutherford looks at how pre-natal stress may impact on progeny, Jill Thomson continues her series on veterinary matters- this time looking at Mycoplasma hyosynoviae and joint condemnations and Simon Turner discusses aggression, looking at fighting and tail-biting, their causes and also heritability.

Once again it is time to evaluate the newsletter and as such a link to a very short questionnaire is included below.

<https://sruc.onlinesurveys.ac.uk/pig-e-newsletter-survey-2019>

Please take the time to complete it, as well as considering the current and previous editions. This is also an opportunity for readers to “ask an expert” by suggesting future articles for researchers to cover. By working together in this way there can be greater linkage between research and the industry as a whole with researchers gaining a better understanding of what producers really want.

This e-newsletter gives an insight into the work of the Pig Information Group, which comprises representative experts from SRUC’s Research and Education groups and SAC Consultancy who work on various topics relating to pigs. Our primary aim is to enhance communication within the pig supply chain.

Contents

SRUC has produced a guide for outdoor producers focusing on farrowing. One of the contributors, Emma Baxter provides a summary 2

The effect of pre-natal stress on progeny is discussed by Kenny Rutherford 3

Jill Thomson uses her regular slot to look at joint condemnations and in particular Mycoplasma hyosynoviae 4

Fighting and Tail-biting are unwelcome in any pig herd. Simon Turner discusses both and whether breeding and genetics can have a role to play in the future 5

Need an expert?

Contact us using the links on page 7.

PIG e:newsletter



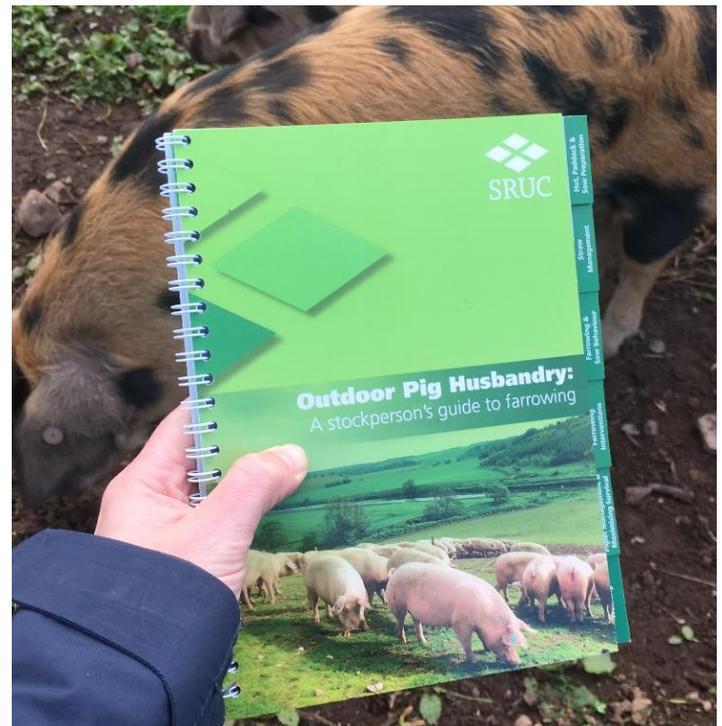
Everything you need to know about farrowing sows outdoors.

SRUC's Pig Information Group has, with support from the Universities Innovation Fund, from Scottish Funding Council produced a guide for outdoor pig producers focusing on the farrowing section.

Calling on the groups' collective knowledge and experience of outdoor production the guide serves to highlight best practice and act as both a manual for new entrants to the sector as well as providing a resource for experienced pig producers. Looking at the farrowing sow and her litter, practical advice is offered supported by sound scientific evidence with references to additional resources.

This stockperson's guide to farrowing looks at six essential areas of outdoor husbandry-

- 1) Hut, paddock and sow preparation;** this section covers a number of areas including siting of huts, water supply, body condition and pre-farrowing nutrition
- 2) Straw management;** looks at the importance of clean straw and how it should be managed in the hut.
- 3) Farrowing and sow behaviour;** nest-building, the farrowing process and the importance of colostrum
- 4) Farrowing interventions;** when and how to intervene and a look at common piglet ailments and conditions
- 5) Piglet management and maximising piglet survival;** looks at fostering piglets between sows and also considers practices such as teething and tail docking
- 6) Weaning;** the importance of preparation and management of both the sow and piglet during weaning



This handy step-by-step guide is full of top tips with references to relevant legislations. The guide also contains interactive materials and links to further information- all in an attractive, compact, easy to read format that can be used in the field or office alike.

The guide is suitable for large-scale commercial producers as well as smallholders. Copies will be available at smallholder events, through industry representatives and SRUC/SAC consultants. For further information, please contact Emma Baxter.

emma.baxter@sruc.ac.uk



Pre-natal stress- is there an unwanted legacy?

Research conducted over the last two decades has started to reveal how stress, ill health or poor nutrition during pregnancy may be hidden causes of reduced progeny performance in farmed animals including pigs, with detrimental effects on piglet mortality, growth, behavioural abnormalities or increased disease susceptibility.

Could identifying possible causes of stress in the sow herd contribute to improvements in health, welfare and performance across the whole herd?

How does it work?

For sows, potential sources of stress can include:

- social mixing,
- competition for feed,
- poor stock handling,
- lameness,
- high or low temperatures,
- high stocking density and
- poor quality housing environments.

Exposure to bacterial or viral disease or parasites may also impair sow health with knock-on consequences for developing piglets.

During exposure to stress, sows produce increased levels of key stress hormones (such as cortisol). This can lead to loss of pregnancy early in the gestation and even in well-established pregnancies stress hormones can pass across the placenta and alter the development of fetal piglets, potentially leading to changes throughout their subsequent lifetime.

What to look out for?

We have focused on the negative consequences of social mixing during gestation with aggression, increased occurrence of body lesions and a large and sustained increase in circulating levels of cortisol all found. Some of the outcomes seen in our mixing studies include:

Stress responses. Piglets born to stressed mothers showed changes to their brain development and increased stress responses to events in their own life. Such increased stress reactions not only represent an animal welfare issue but may make animals harder to handle and lead to impairments of immune function, leading to higher herd disease levels.



Social mixing can be a major cause of pre-natal stress

Growth rate. Following weaning, piglets from stressed mothers showed a substantial reduction in weight gain. It is well known that the capacity of pigs to deal with weaning is a key determinant of later performance. Pigs born to stressed mothers do not cope as successfully at this time and as a result may never fulfil their full genetic potential.

Maternal behaviour. Gilts born to stressed mothers showed clear deficits in maternal behaviour compared to gilts whose mothers were not stressed during pregnancy. Changes included higher rates of savaging and crushing. In a loose farrowing environment these changes led to a tripling of piglet mortality.

Conclusions

Prenatal stress effects may cost the industry in terms of:

- loss of productivity (e.g. reduced growth rates, poorer fertility or increased mortality),
- increased veterinary and medicine costs where health is affected and
- increased labour costs if animals are more stress reactive and harder to handle safely.

Paying closer attention to the gestation management of sows may allow higher standards of health, welfare and production efficiency in their progeny. While not all prenatal hazards can be controlled under farm conditions efforts to identify and minimise possible stressors – particularly things like social mixing or feed competition, could help boost progeny performance.

kenny.rutherford@sruc.ac.uk



What's wrong with my joints?

In recent months several herds have suffered quite substantial financial losses due to joint condemnations in finisher pigs. The information and pattern of lesions has been similar; mainly affecting the stifle joints (equivalent to our knees), as well as the elbow joints in some instances.

Investigations have shown that the problems have been due to infection with *Mycoplasma hyosynoviae* in most of the affected joints.

How does this happen?

M. hyosynoviae is a tiny organism that is present in most herds, usually living in the tonsils of some of the pigs, in small numbers. Most producers and pigs will be unaware it is there. When things are going well in the herd, with no undue stress factors for pigs, *M. hyosynoviae* lives a quiet life in the tonsils and has little or no impact on the health of pigs.

Things can change quite dramatically however, when there are problems in the herd and pigs go through a meaningful period of stress or there is a sudden highly stressful incident. *M. hyosynoviae* multiplies in the tonsils under such circumstances, breaks into the blood stream and travels to its favourite sites – the damp, warm membranes that line body cavities where they colonise and cause inflammation.

Typically weaners can show inflammation of body cavities (abdomen, chest and joints) anytime from about 6 – 8 weeks of age. This condition is called polyserositis and on post-mortem examination, the fluid and fibrin accumulations in body cavities look similar to Glässers disease.

In older pigs, from about 12 – 14 weeks onwards, it is most common for the joints alone to be affected. In the early stages, pigs show lameness, stiffness and general unwillingness to move as the joints are particularly painful. This might occur at about 10 – 14 days after pigs are moved and mixed, or after transportation, for example in gilts that have been recently delivered. Lameness is less easy to detect in chronic cases. Pigs seem to adapt and can walk reasonably normally despite having joint lesions worthy of condemnation.

The joint lesions can become chronic due to persistent infection. The immune system alone has difficulty clearing this infection from the joints. Only a limited amount of antibody gets through to the joint fluid, so

although defences are mounted, the organisms continue to multiply and keep the upper hand. The result is chronic arthritis that is seen by meat inspectors who condemn the joints (Image 1).



Image 1. This stifle joint from a finished pig was condemned by a meat inspector as it had increased amount of fluid in the joint. When opened up, the synovial membranes inside the joint were very red and proliferated as shown by the arrows. Normally this tissue should be pale and thin. These lesions are chronic and are likely to have taken a number of weeks to develop. After successful treatment for the infection, it can take 6 – 8 weeks for such lesions to resolve and pass muster with meat inspectors. The infection does not affect the joint cartilage which looks perfect in this case.

What can I do if joints are getting condemned?

The first thing is to discuss this with your vet and get the diagnosis confirmed by arranging examination of joints in the lab.

Once confirmed, the vet should visit the unit to discuss the whole issue and look for potential underlying stress factors that have enabled the organism to get the upper hand. Aspects of housing and management have to be considered, particularly any changes that might have occurred and caused stress to the pigs. Antibiotic treatments are effective for controlling the infection, especially in the early stages. In chronic cases however, it takes quite a few weeks for the joints to recover and return to normality even if treatment is successful. Ongoing condemnations can be expected until all the chronically affected pigs have gone through the system.

The key thing is to try to identify any factors on the farm that might have started this domino effect and get them resolved to restore the normal balance of the immune system keeping things under control.

jill.thomson@sac.co.uk

PIG e:newsletter

FOCUS TOPIC



Aggression and tail biting; two sides of the same coin?

Fighting behaviour is a problem on many farms with tail biting also a major challenge to animal welfare and farm profitability.

Both of these behaviours involve one pig biting another- but are they both expressions of aggression? I'll also look at what causes them and what can be done to minimise their expression.

Underlying causes of tail biting and fighting

What causes tail biting?

Tail biting is very frequently referred to as 'aggressive' but this probably poorly represents its cause in most cases. Tail biting is one of the most complex behavioural traits seen in livestock production. A very long list of risk factors have been identified and it would be wrong to say that tail biting is 'caused' by any one of these shown in Figure 1.

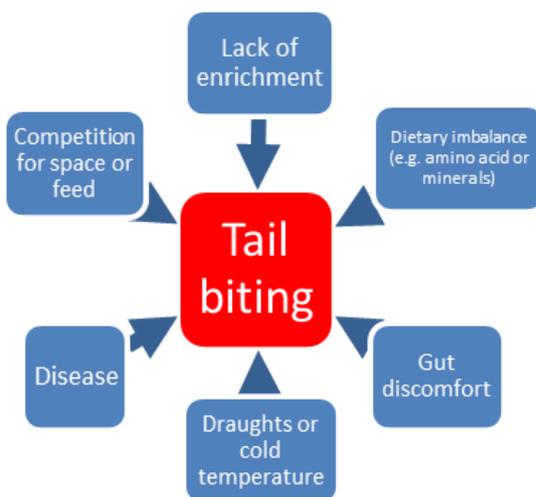


Figure 1: Risk factors for tail biting

A key risk however, is the absence of a sufficient quantity of enrichment that satisfies a pig's desire to root. In the wild, pigs spend more than 50% of their day rooting for food. Although the nutritional needs of commercial pigs are met, the desire to root is still very ingrained. Where a suitable target for this motivation is lacking, they will direct it towards other pigs.

It is believed that some pigs adopt tail biting as an aggressive strategy to access feeders, but this probably only occurs in the minority of cases.

What causes fighting?

In the wild pigs live in groups of stable membership with a clear dominance hierarchy. Fighting occurs but is usually not severe except between mature boars. Wild pigs benefit from early-life contact with other piglets from around 10 days of age which appears to give them social skills. Group members differ in weight allowing dominance to be assessed easily and they have unlimited space to retreat when needed.

Commercial pigs retain this need to establish dominance relationships even though they have no need to compete for resources.

The severity of fighting is much greater in commercial production as:-

- **pigs of similar weight are housed together.**
- **pigs have limited space to signal submission.**
- **mixing can be common and sudden.**

How do we minimise expression of these behaviours?

Tail biting and fighting are therefore motivated by different things; a desire to root and a desire to establish or maintain dominance. That means that they need different management approaches. What they do share in common is that they both reflect an evolved behaviour that persists in our commercial pigs and is expressed in a damaging way.

It is worth remembering that commercial pigs can readily establish viable feral populations because they retain their wild behavioural traits. We therefore need to accept that these behaviours are here to stay, for the time being anyway.

Tackling tail biting

Tail biting is best tackled with a multi-pronged approach. The basics of good health, cleanliness, diet, easy access to food and water must be present. Enrichment should be provided alongside these basic provisions.

PIG e:newsletter



Research is on-going to specify the minimum amount of good quality enrichment that can reduce tail biting but also be compatible with slurry systems. At present, provision of good quality straw in straw racks might be one way in which a compromise can be reached.

Tackling fighting

To reduce fighting we need to help pigs to efficiently establish dominance relationships as we're unlikely to stop them from trying to dominate each other altogether. The research evidence suggests that the most effective ways to do this are by providing sufficient space so that defeated pigs can signal submission, allowing litters to mingle before weaning to gain social skills (see **Figure 2**) and giving places for defeated pigs to hide.



Photo credit: Marianne Farish, SRUC

Figure 2: Allowing adjacent litters to socialise from 2 weeks old mimics behaviour in the wild and reduces injuries from aggression when mixed at weaning)

SRUC is currently estimating the costs and benefits of a range of methods to reduce aggression to see which (if any) are within the bounds of what farmers are willing to pay.

Most aggression in well-established groups occurs around access to feed and dry lying areas so it is important to make sure these key resources aren't lacking.

What role can breeding play?

All pigs are not equal. Individual pigs differ in their tendency to tail bite and to fight with other group members (**Figure 3**). In the case of tail biting a small amount of this variation is determined by the genotype an individual pig has.

There has been little effort to quantify this thoroughly but it would appear that tail biting tendency is under

about 10% genetic control in some breeds of pigs. This means that 10% of the difference in tail biting behaviour between pigs of the same breed is due to genetic effects inherited across generations (i.e. 10% heritability). **Conversely this means that 90% of the variation between pigs is due to non-genetic factors.**



Image courtesy of EU Fare WellDock project

Figure 3. Tail biting is a very complex behavioural trait.

For fighting, here we are on slightly firmer ground. The amount of time pigs spend fighting when regrouped is under between 30-40% genetic control (i.e. 30-40% heritability).

For both tail biting and fighting there is enough genetic influence for breeding to be technically feasible.

So what's stopping us breeding pigs that don't show these behaviours?

The biggest barrier is that breeding relies on reliable measurement of traits and these are not easy traits to record on large numbers of animals. Automated detection of animal identity and recording of social interactions is a highly active area of research. At some point in the future we are likely to have the technology that can provide the behavioural data needed for breeding but we are not there yet. There is also a small amount of evidence that the pigs with genotypes that make them exhibit negative social behaviours also have genotypes that make them faster growing and more efficient.

Some pigs don't follow this trend and have a genetic tendency **not** to engage in such behaviour but still be productive. Therefore it is possible to breed for better behaviour and productivity but requires care.

Lastly, most genes have multiple effects and it is essential to ensure that breeding against the expression of tail biting and fighting will not lead to unintended and undesirable changes in other behavioural traits.

PIG e:newsletter



Summary

Tail biting and fighting are rarely two sides of the same coin. Both result from evolved, but different, aspects of wild pig behaviour that have not disappeared despite thousands of years of domestication.

There are multiple risk factors involved in both and some of these risk factors are more key than others but in neither case is there a golden bullet. Attention to detail and understanding the root causes of these behaviours is essential.

Breeding is technically possible but is not the simple solution that we might hope for at this moment in time although may well play a significant role in the future as we overcome barriers to recording complex social behaviours.

simon.turner@sruc.ac.uk

The PIG e:newsletter was produced by the Pig Strategy Group at SRUC through funding from the Universities Innovation Fund, from Scottish Funding Council. Should you wish to know more about any of the articles featured or wish to find out more about SRUC pig related activities please contact the following or click on the links below.

pigs@sruc.ac.uk

https://www.sruc.ac.uk/info/120692/pig_information_group

Iain.Riddell@sac.co.uk

Ross.MacKenzie@sac.co.uk

George.Chalmers@sac.co.uk

Calum.Johnston@sac.co.uk

Anna.Sinclair@sruc.ac.uk

Jill.Thomson@sac.co.uk

Hannah.Orr@sac.co.uk

Emma.Baxter@sruc.ac.uk

Jos.Houdijk@sruc.ac.uk