PIGS

August 2022

Edited by Ciarán Carroll and Orla Kinane

Welcome to the August edition of our monthly newsletter.

In this newsletter Edgar Garcia Manzanilla and Tomás Ryan discuss the need for environmental control in pig farms and the technology available for the classic temperature regulated systems but also for systems including humidity, CO2, ammonia and other measurements.

Emer McCrum shines a spotlight on seasonal infertility, and provides some useful tips on efforts you can take to manage the problem at this time of year focusing on simple actions around lighting in sow and gilt housing.

Roberta Maria D'Alessio and Keelin O'Driscoll have carried out research in Moorepark Pig research Facility recently and found that increasing feeder: pig ratio can improve performance and welfare, they discuss the study and results later on in this newsletter.

In the latest episode of The Pig Edge podcast, host Ciarán Carroll speaks with Barry Caslin, Bioenergy specialist at Teagasc, about energy-saving technologies that are available for use on pig farms. Listen to this episode and more here.

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Teagasc
Agriculture and Food Development Authority

Upping the game on environmental control in pig farms

Edgar Garcia Manzanilla and Tomás Ryan

With the need to reduce disease and antibiotic use as much as possible, environmental control in pig farms is going to play an important role in the near future. The technology available for environmental control in pig farms is reaching very competitive prices not only for the classic temperature regulated systems but also for systems including humidity, CO2, ammonia and other measurements.

In the Teagasc Pig Research Facility we are testing different systems to give feedback to farmers on performance, price and best use. The recent peak in maximum temperatures has been a good opportunity to study what happens in a pig house when we are not able to control temperature as required. In the weaner rooms in our research facility we have three different systems installed to control and monitor the environmental conditions of the pigs. In the figure below we can see one of the dashboards that can be accessed at any time via mobile phone measuring temperature, humidity, carbon dioxide and ammonia. It also measures the speed of the air in the room. These systems are very useful as we can set alarms in case something is wrong when we are not in the farm.

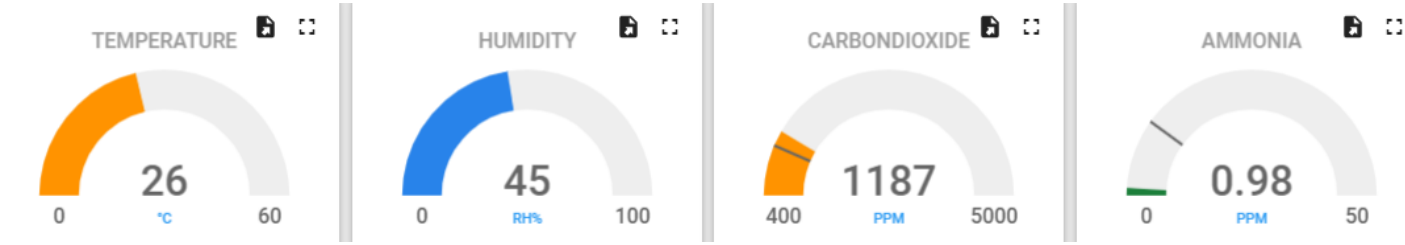

Figure 1. Part of the real time dashboard of one of the systems installed in the in the Moorepark Pig Research Facility.

Looking at the data recorded during the last month (graph below) we can see very clearly the days where temperatures were too high (blue line). This room is on a pre-set curve and the temperature is very well regulated at 26°C and then 24°C up to the 7th of August. From the 8th of August temperatures increased and ventilation rates hit >100% for several hours during the day.

Despite these high ventilation rates, it was not possible to keep the temperature at 24°C and the room reached >30°C for 6 days in a row. At the same time, by reducing the minimum temperature for ventilation we created a minimum around 21°C which may have been counterproductive for the pigs.

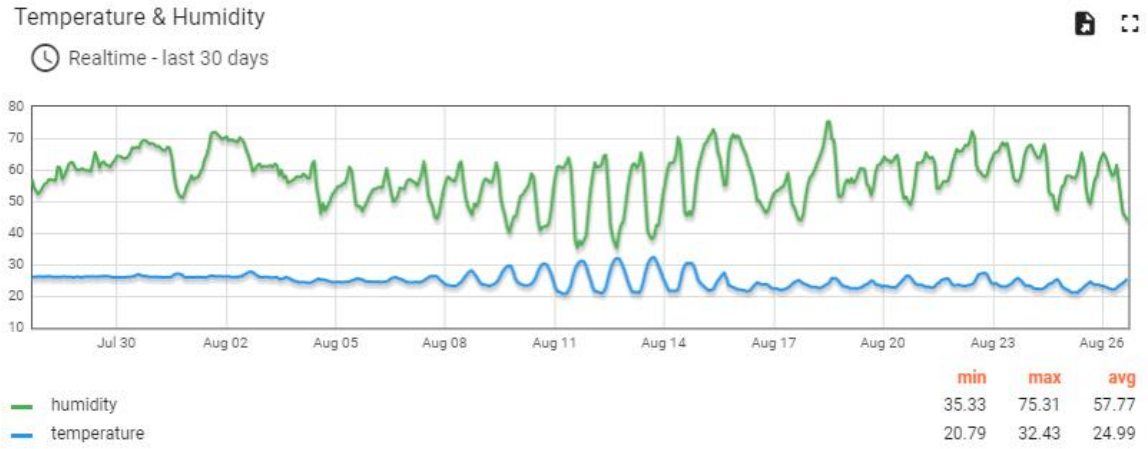

Figure 2. Recorded temperature and humidity in the last 30 days in one of the weaner rooms in the Teagasc Pig Research Facility.

The green line in the graph above indicates the humidity in the room and we can see that during the high ventilation peaks the humidity percentage dropped below 40%. This low humidity and high temperature could affect the intake of pigs but lucky enough the intake was not affected in this case. However, this room did suffer a severe outbreak of ear necrosis starting on the days with high temperatures. To what extent ear necrosis was related to the extreme temperatures, the variation range in temperature, or the high ventilation rate (wind speed) is difficult to know but it is something we will be looking at in the coming months as part of project Earwel.

The monitoring system also measures ammonia and CO2 in the rooms. In this case, the high ventilation rate had some positive consequences and the concentration of ammonia dropped with the increase in ventilation, in some cases to 0ppm which is strange to see in a pig house. CO2 also dropped to levels below 1000ppm. It is interesting to observe how the effects on ammonia and CO2 are not immediate but there is a progressive reduction as days go by due to cumulative effect.

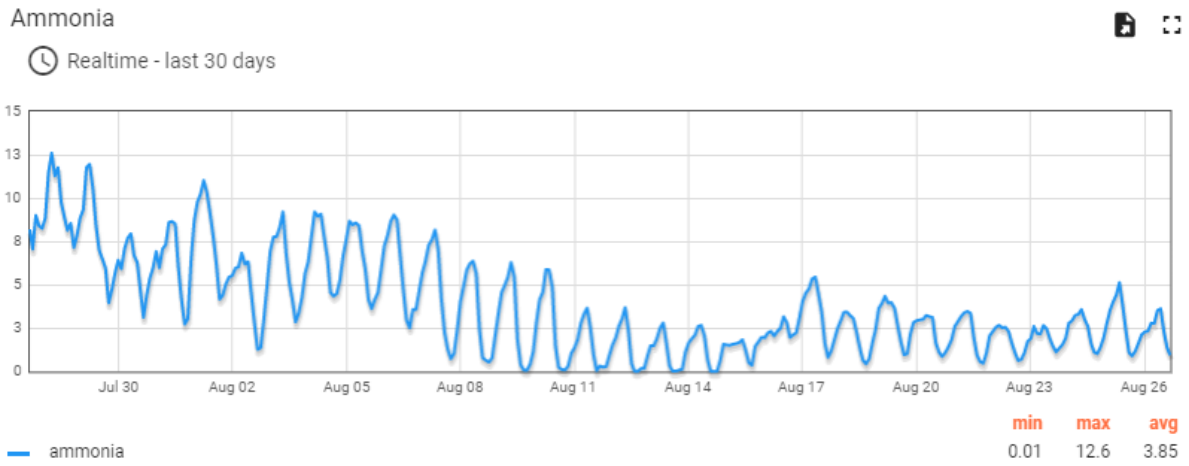

Figure 3. Recorded ammonia (ppm) in the last 30 days in one of the weaner rooms in the Teagasc Pig Research Facility.

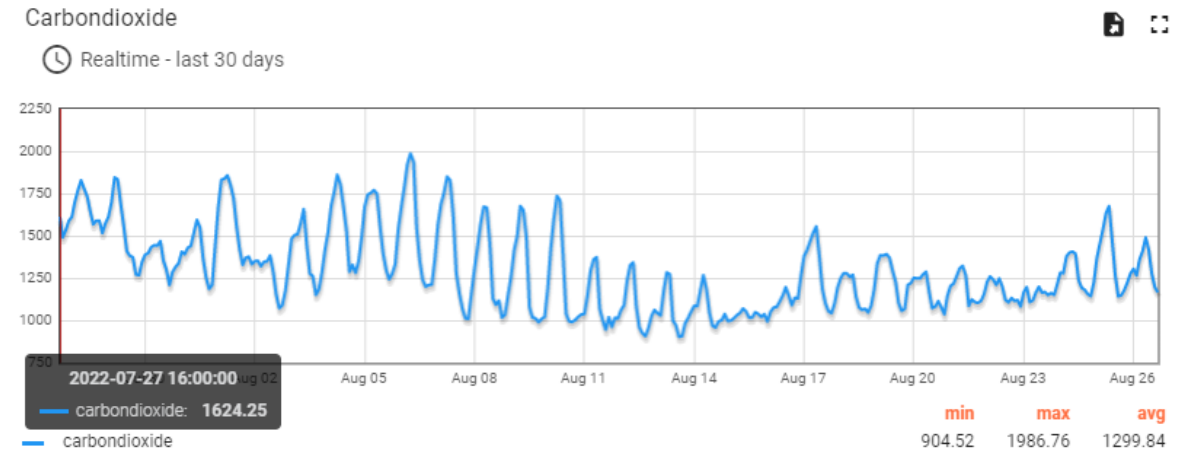

Figure 4. Recorded CO2 (ppm) in the last 30 days in one of the weaner rooms in the Teagasc Pig Research Facility.

The effects of ventilation on ammonia and CO2 levels are interesting and we need to consider them as we head into fall and winter. As temperatures drop, the ventilation rates will drop too and the levels of ammonia and CO2 in the house will rise rapidly. Excessive levels of ammonia can affect the incidence of respiratory disease and in future we may have to consider ventilation systems that are regulated by temperature and ammonia. The recommended levels of ammonia in pig farms should be below 25ppm, however continuous exposure to relatively low levels can still have an effect in the animals that are exposed 24h a day. In recent

piglet necropsies in our research facility we found signs of pneumonia in healthy piglets in lactation during the winter. This is a common finding in pig farms but it indicates to what extent this background levels of ammonia can undermine the health of the piglets resulting in clinical disease in the long term.

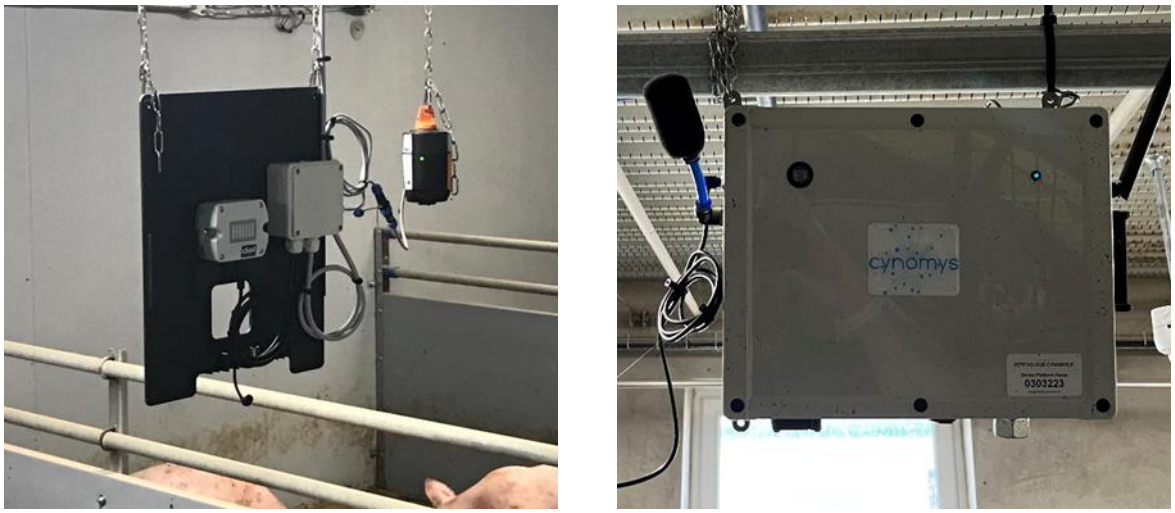

Figure 5. Sensors installed for two of the systems used to control and monitor the environment in the weaner rooms.

In this article we wanted to start a discussion on the importance of monitoring other environmental parameters other than temperature, especially ammonia. We will be monitoring these parameters in our farms with updates in coming months to see what we are learning and how we adapt the environmental control systems to optimise pig health and welfare. If there is any data that would be interesting for you, please let us know.

Spotlight on Seasonal Infertility

Emer McCrum

It's that time of year again! The late summer and early autumn period can bring with it the seasonal infertility challenge causing a decrease in overall breeding performance among both sows and gilts. Reducing daylight hours registers in the pineal gland in the brain of the pig which controls the release of the hormone melatonin. Lengthening hours of darkness as winter approaches increases the production of melatonin, which in turn reduces fertility and can pull your farrowing rate back by up to 10%.

Seasonal infertility is a very frustrating problem and tends to show up as two main issues on farm:

1. More difficulty getting sows on heat: common signs include an extended weaning to service interval in sows, higher incidences of anoestrus states in gilts and sows, and a delayed puberty in gilts. A lower litter size in females successfully bred during the season may also be seen.

2. Higher rates of early pregnancy failure: usually detected as a higher percentage of irregular returns to service (25/35 days after breeding) but some units may not detect these failures until much later as NIP's in the farrowing house. This leads to a higher number of costly empty days accumulating during this period.

All of these issues lead to a decreased farrowing rate which has a negative impact on unit throughput and subsequent output.

Around this time of year, sows and gilts start to become aware of shortening day lengths particularly in the morning so now is your time to

act. Simple actions around lighting in sow and gilt housing with the aim of inhibiting or reducing melatonin production can help to avoid the impact of seasonal infertility.

- Ensure all females, whether gestating, lactating, in the service area or the gilt house, have access to 16 hours of light per day. Research has indicated that a lighting regime providing 12 hours of light followed by 12 hours of darkness increased melatonin production in 75% of sows, some by between 300 and 500%. Sows provided with 16 hours of light followed by 8 hours of darkness on the other hand did not increase melatonin. The rule of 16 hours of light per day has additional benefits in the farrowing houses. Providing lactating sows with full lighting for 16 hours/day will reduce seasonal infertility problems and increase piglet udder stimulation, which in turn increases milk yield by 10-15%.

- Ensure the intensity of the light is sufficient. Sows and gilts require 300 lux of light. In other words, the house should be as bright as a typical classroom or office. If you would like to measure the light intensity in your houses, contact your local advisor today.

- The timing of first light in the morning is as important as the lux level and light duration. Research in humans has shown that the light intensity when we wake-up indicates on-set of winter and re-sets our circadian rhythm. It is important that pig house lighting begins at 5.30am each morning to ensure a set first light. Females in housing with windows and skylights have a much higher risk of autumn infertility so a good lighting regime in these houses is essential.

- Ensure lights are clean. It is good practice to clean lights every 6 months, particularly lower hanging lights in the service area, as overtime the dust and dirt build up can dim light intensity. The effective lux from pig lighting can reduce by 50% if light covers are not cleaned.

- LED lights have many advantages over conventional fluorescent bulbs particularly when it comes to running costs associated with leaving lights on for long periods each day. LED's also have greater longevity when compared to fluorescent bulbs.

The installation of timers is the most convenient way to implement the above steps and help to mitigate the risk of seasonal infertility. Timers should ideally be installed across all service, dry sow, farrowing and gilt housing. Set lights in houses from 5:30am for 16 hours daily and remember to clean light covers to help achieve the required 300 lux light intensity.

Increasing feeder: pig ratio can improve performance and welfare

Roberta Maria D'Alessio and Keelin O'Driscoll

Aggressive behaviour is one of the most significant welfare problems in pig production systems, and can negatively impact animal health and the economy of farms. Multiple factors can influence this behaviour, such as mixing unfamiliar animals, early weaning, lack of enrichment, and insufficient access to resources. Of these, feed is a high priority resource, and competition can result from limited access to the feeder or a limited number of meals per day (e.g. for sows). Competition for feed can result in skin injuries, and tail lesions from biting behaviour, which can lead to further consequences, such as infection, weight loss, and carcass condemnation.

In Europe, there is no legislation regulating space allowance at the feeder, although it is advised that there should be a feed space ratio of no more than 10 pigs per feeder space. Increasing access to the feeder (e.g. increasing the number of feeding spaces) or finding a better position for these in pen can be used as preventive measures to minimise competition for resources.

We studied whether the use of a double space feeder instead of a single space one can help to reduce aggressive behaviours in pigs from weaning to slaughter age. We also evaluated whether increasing feeder space influenced the time spent at the feeders, the number of feeding

bouts, animal performance and carcass measurements at slaughter.

Experimental set-up

A total of 288 long-tail pigs were allocated either in pens with a single space feeder (SINGLE) or in pens with a double-space feeder (DOUBLE), with a total of 12 pigs per pen. Each pen was furnished with a nipple drinker and a wet-dry feeder with an ad-libitum diet. SINGLE spaced feeder pens were equipped with a feeder that permitted one pig to feed at a time (Figure 1). The feeder was located in the corner of the pen adjacent to the central corridor in the room. DOUBLE spaced feeder pens were equipped with a feeder that permitted two pigs to feed simultaneously. The feeder was located in the corner of the pen, with one feeder space aligned to the front door of the pen (WALL) and one immediately adjacent (IN) (Figure 2). Each pen was equipped with a floor toy (weaner), a plank of wood (finisher) and a rack full of grass which was replenished when necessary.

Figure 1. Dry-wet SINGLE space feeder (L28.6 × W27.9 × H 80.2 weaner; L33 ×W37×H 100 finisher)

Figure 2. Dry-Wet DOUBLE space feeder ((L40 ×W27.3×H 74.5 weaner; L60 ×W37×H 100 finisher). WALL space feeder aligned with the front wall of the pen; IN space feeder immediately adjacent to the previous

Measures

We video recorded behaviour at the feeder at the beginning and end of each stage to observe feeding and aggressive behaviour. Pigs were weighed individually at weaning (d0), upon moving to the finisher house (d47) and before slaughter (d120). Feed delivery was also recorded daily. Carcass quality (cold weight, the percentage of lean meat, muscle %, and fat % data) was obtained from the slaughterhouse.

Results

With regard to feeding behaviour, total feeder occupancy levels were similar (Single = 27:19 ± 05:41, Double = 34:46 ± 06:00, mm:ss; P >0.05). However the time that each feed space in DOUBLE was occupied was both much lower than the individual feed space in SINGLE (Figure 1.). Pigs using SINGLE also experienced more aggressive behaviour and displacements than those in DOUBLE (Figure 2). SINGLE pigs also performed fewer feeding bouts (42.9 ± 9.8) than those in DOUBLE (83.7 ± 10.4; P < 0.001), suggesting greater levels of competition at feeding (DOUBLE 15.0 ± 9.8 v's SINGLE 52.8 ± 10.3; P < 0.001) (Figures 3 and 4).

When it came to performance, there was no statistical difference when it came to feed intake

and live weight. However, because feed intake was numerically lower, and live weight numerically higher in DOUBLE, pigs in DOUBLE had a lower (better) feed conversion ratio (SINGLE = 1.90 ± 0.015 *v's* DOUBLE =1.85 ± 0.015; P < 0.05). Carcass characteristics of the animals from the two experimental conditions also differed; carcasses from DOUBLE had a higher kill-out percentage (0.74± 0.864 %, P < 0.05) and a smaller lean meat percentage (58.52± 0.160?? %, P < 0.05) than the animals in SINGLE (Kill Out = 0.75 ± 0.003; Lean meat = 59.01 ± 0.165).

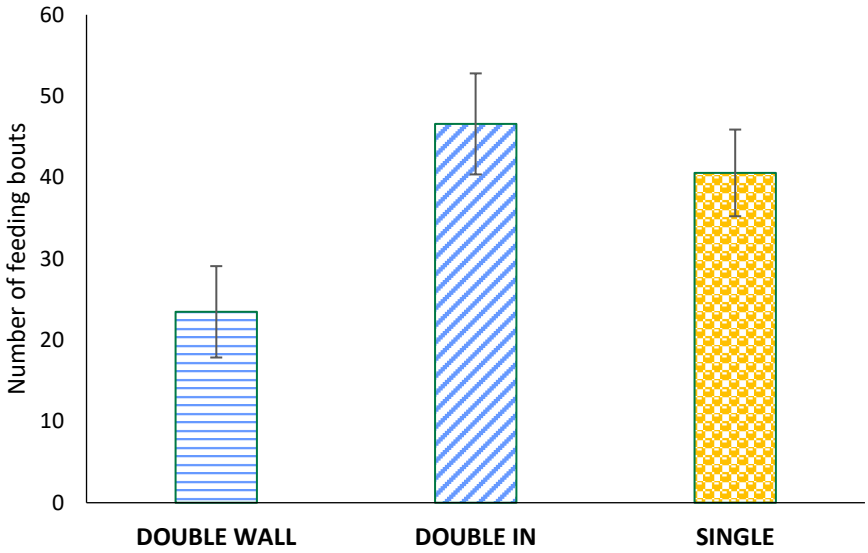

Figure 3. Number of feeding bouts per feeder space in the experimental group

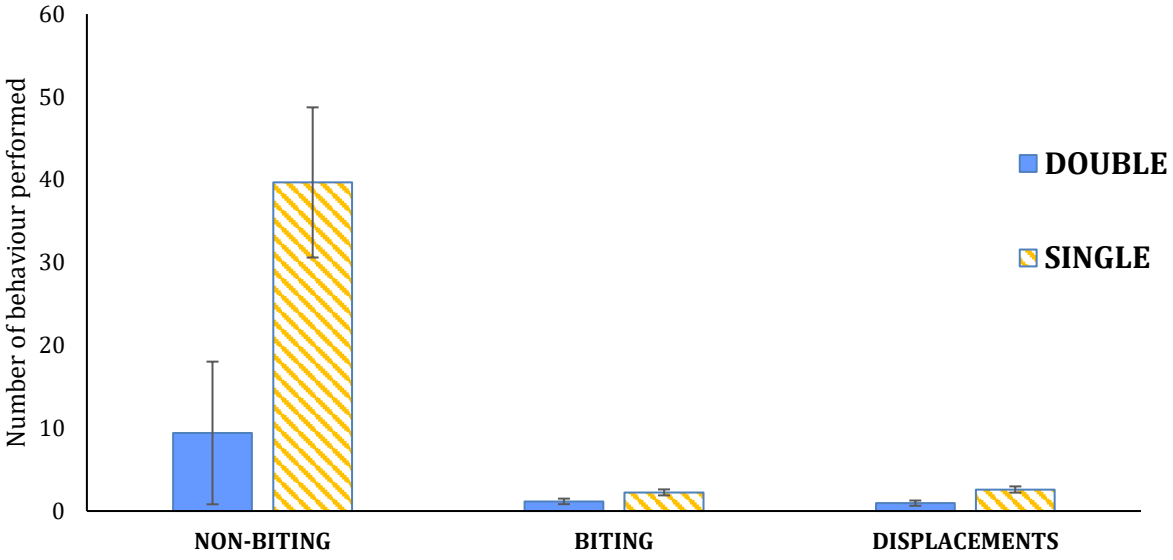

Figure 4. Performance of Non-Biting, Biting and displacements behaviour performed by both, SINGLE and DOUBLE pigs, over the total of the trial

Take home points

- This research confirms that doubling feeder space from a ratio of 1:12 to 1:6 helped to reduce aggressive and damaging behaviour while pigs are feeding
- Reducing competition at the feeder positively influenced animal performance and carcass quality at slaughter.

Career Opportunities

Farm Operative

Teagasc wish to recruit a highly motivated Farm Operative to work as part of a team in the delivery of a highly innovative pig research programme. The facility and associated feed mill operates as a 200 sow integrated research farm, a new state of the art facility which opened in 2016. This is a permanent role.

Closing Date: Tuesday, 06 Sep 2022 @ 12:00

TailBiteAdvice Technologist

The 'TailBiteAdvice' project aims to develop and demonstrate a data-driven decision support tool that will actively advise farmers on how to reduce tail biting occurrences. The primary role of the successful candidate will be overall management of the decision support tool, implementation of experimental protocols, and assisting research personnel with project specific work.

Closing Date: Monday, 05 Sep 2022 @ 12:00

For further information and to apply for these positions, please visit www.teagasc.ie/careers

Survey

A team of scientists from Poland and Hungary is currently carrying out a research project linked to the 'End the Cage Age' initiative, focusing on the possible impacts of transitioning to temporal or non-confinement farrowing systems. This is a survey to allow farmers have their say in terms of the concerns they may have in relation to free farrowing systems.

Link to complete the short online survey

PDD Visitors from Flanders

On the 24th and the 26th of August Teagasc received visits of the Board of the Boerenbond from Flanders organised by IFA and a group of journalists related to the food sector from Mexico as part of the activities organised by Bord Bia. The model used by Teagasc PDD integrating research, advisory and education, and the current challenges for the Irish pig industry were discussed with both groups and they visited the Teagasc Pig Research Facility.

For more information visit our website
www.teagasc.ie/animals/pigs

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