Pig behaviour in a high containment SAPO4 facility

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Introduction

The Pirbright Institute prides itself on being one of the world's leading innovative centres for preventing and controlling viral diseases of livestock. For this to come to fruition, high containment facilities are needed for the research of animals. Some of this work involves controlled animal experiments, mostly with farm species; the species that will principally benefit from our research. We have high containment facilities capable of examining some of the most contagious animal pathogens. The large animal isolation unit has fourteen animal rooms and allows studies to be conducted with pathogens up to SAPO4 and ACDP3.

The welfare of the animals in our care is of the upmost importance and we strive to make their time in our care as the best as possible. Pigs are one of the most frequently used animals in the facility and by looking at their behaviours, it can give us an insight into their wellbeing, which in turn could identify refinement opportunities.

Concept

Trying to replicate natural behaviours in a high containment environment can be challenging due to the limitations put in place to keep the integrity of the building's containment level. Pigs are highly intelligent and naturally display a multitude of behaviours. For example, free-ranged pigs spend 35 to 55% of their time foraging for food.[1] Using environmental enrichment and enrichment items we can try to prevent stereotypical behaviours and promote natural behaviours. Our pigs are given straw beds which enables them to express their natural behaviour of rooting and investigating. These beds are regularly filled with new wedges of straw to give the pigs a fresh sleeping area and a constant fresh supply of grain to root through and chew on. As well as straw beds, the pigs have an enrichment rota that gives them 2 to 4 contrasting pieces of enrichment that are changed daily.

Methods

Eleven key behaviours were chosen based on what was seen within the unit and what pigs would naturally do in other environments. A CCTV camera was installed in each animal room to monitor and record the animals' behaviour. The behaviour of each pig was recorded every 30 minutes for 24 hours per day over 15 days. Before recording the pigs' behaviour, the footage was watched for 30 seconds to gain an understanding of the various behaviours being shown and then paused to note which behaviours were observed.

Key behaviours

1. Laying in bed – Pig laying in the bed eyes open and not.
2. Standing in bed – Pig standing in the bed head up and nose not touching any other surface.
3. Laying outside of bed – Pig laying outside the bed.
4. Standing outside of bed – Pig standing outside the bed, head up and nose not touching any enrichment or straw.
5. Sleeping – Pig laying down eyes closed not moving for prolonged time (this behaviour was not marked as laying down whether the pig was in or out of the bed and treated as a separate behaviour).
6. Drinking – Pig drinking.
7. Eating – Pig eating.
8. Playing with enrichment – Pig interacting with hanging enrichment (pigs nose touching enrichment).
9. Burying in straw – Pig fully submerged under straw.
10. Rooting in straw – Pig actively rooting with nose emersed in straw.
11. Procedures – used as an outlier when procedures are taking place and pig may not be displaying natural behaviours due to increased stress of procedure work.

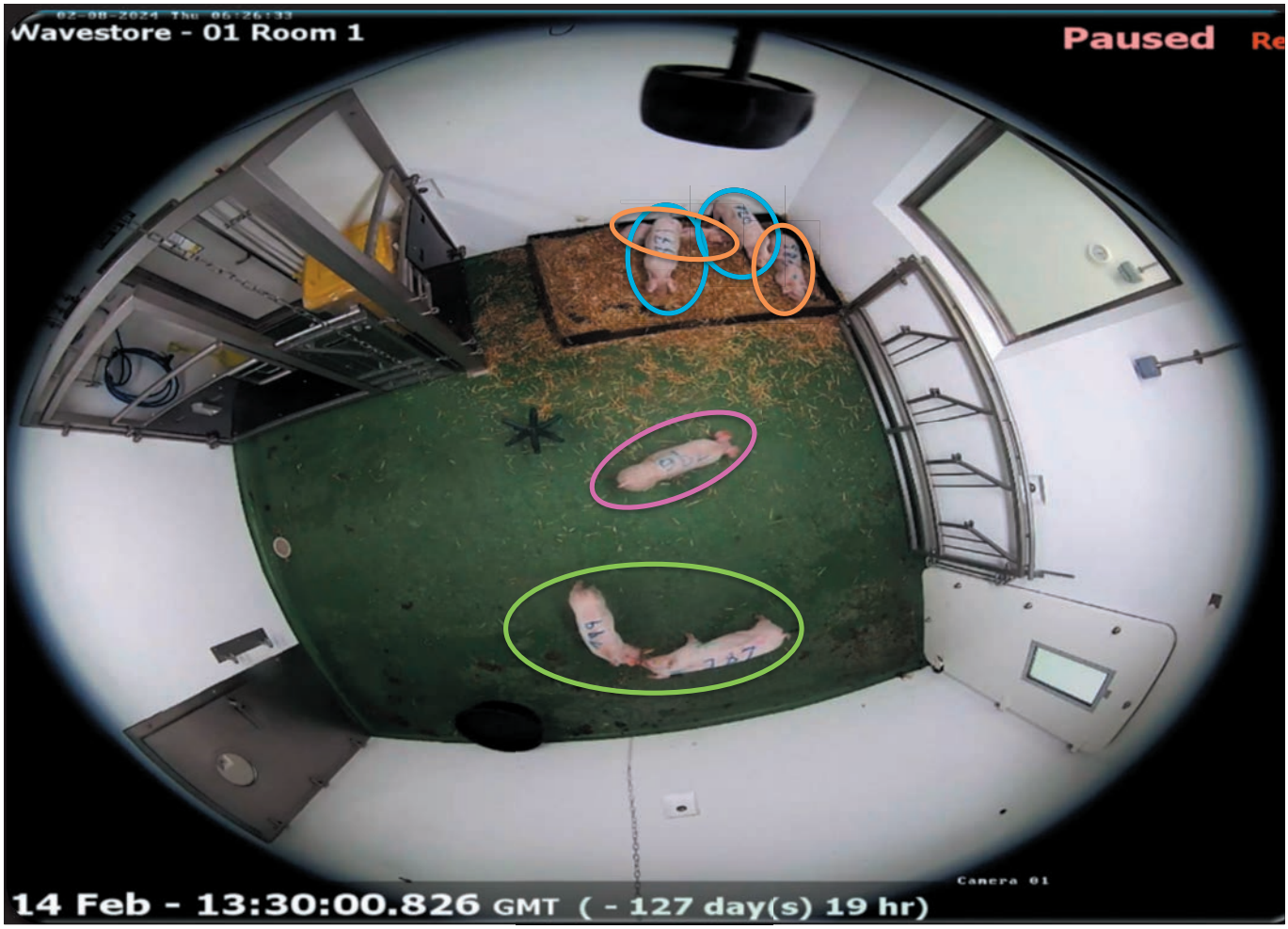

Figure 1. Typical time point for behavioural recording.

For example, Figure 1 shows there are two animals interacting with the hanging enrichment (green outlines), two animals laying in the bed (orange outlines) and two pigs rooting in straw (blue outlines) and lastly one pig standing outside the bed (pink outline).

From the still image it is difficult to tell that the two pigs in the bed are rooting in the straw and even more difficult to tell that the pig in the middle of the room is interacting with the straw that was on the floor. Figure 2 shows the ethogram with the data recorded from Figure 1.

Results

At first glance Figure 2 shows that the pigs are asleep for more than half of their time in the unit, having 2284 instances out of 4076 total instances. 97% of these interactions are between the hours of 21:00 to 06:00 which shows the pigs are sleeping around 9 hours per day, this is in line with the average of 8.7 hours shown in other pigs'.[2] The results also show how important straw is for enriching pigs used in research. A large portion of their time was using straw in multiple ways from rooting and displaying natural behaviours to choosing the straw

AR N	Animal B	Date	Time	Laying in bed	Standing in bed	Laying outside of bed	Standing outside of bed	Sleeping	Drinking	Eating	Playing with enrichment	Burying in stra	Rooting in straw	Procedur
1354	1	14/02/2024	09:30	0	0	0	0	0	0	6	0	0	0	1
1354	1	14/02/2024	10:00	0	6	0	0	0	0	0	0	0	0	1
1354	1	14/02/2024	10:30	7	0	0	0	0	0	0	0	0	0	0
1354	1	14/02/2024	11:00	7	0	0	0	0	0	0	0	0	0	0
1354	1	14/02/2024	11:30	0	0	0	0	0	0	0	0	0	7	0
1354	1	14/02/2024	12:00	0	0	0	0	0	0	0	0	0	7	0
1354	1	14/02/2024	12:30	5	0	0	2	0	0	0	0	0	0	0
1354	1	14/02/2024	13:00	6	0	0	1	0	0	0	0	0	0	0
1354	1	14/02/2024	13:30	2	0	0	1	0	0	0	2	0	2	0
1354	1	14/02/2024	14:00	0	0	0	0	0	0	0	0	0	7	0
1354	1	14/02/2024	14:30	0	0	0	0	0	0	0	0	0	7	0
1354	1	14/02/2024	15:00	0	0	0	0	0	0	7	0	0	0	0
1354	1	14/02/2024	15:30	0	0	0	0	0	0	4	2	0	1	0
1354	1	14/02/2024	16:00	0	0	0	0	0	0	0	0	0	7	0
1354	1	14/02/2024	16:30	2	2	0	1	0	0	0	2	0	0	0

Figure 2. Ethogram with corresponding events to Figure 1.

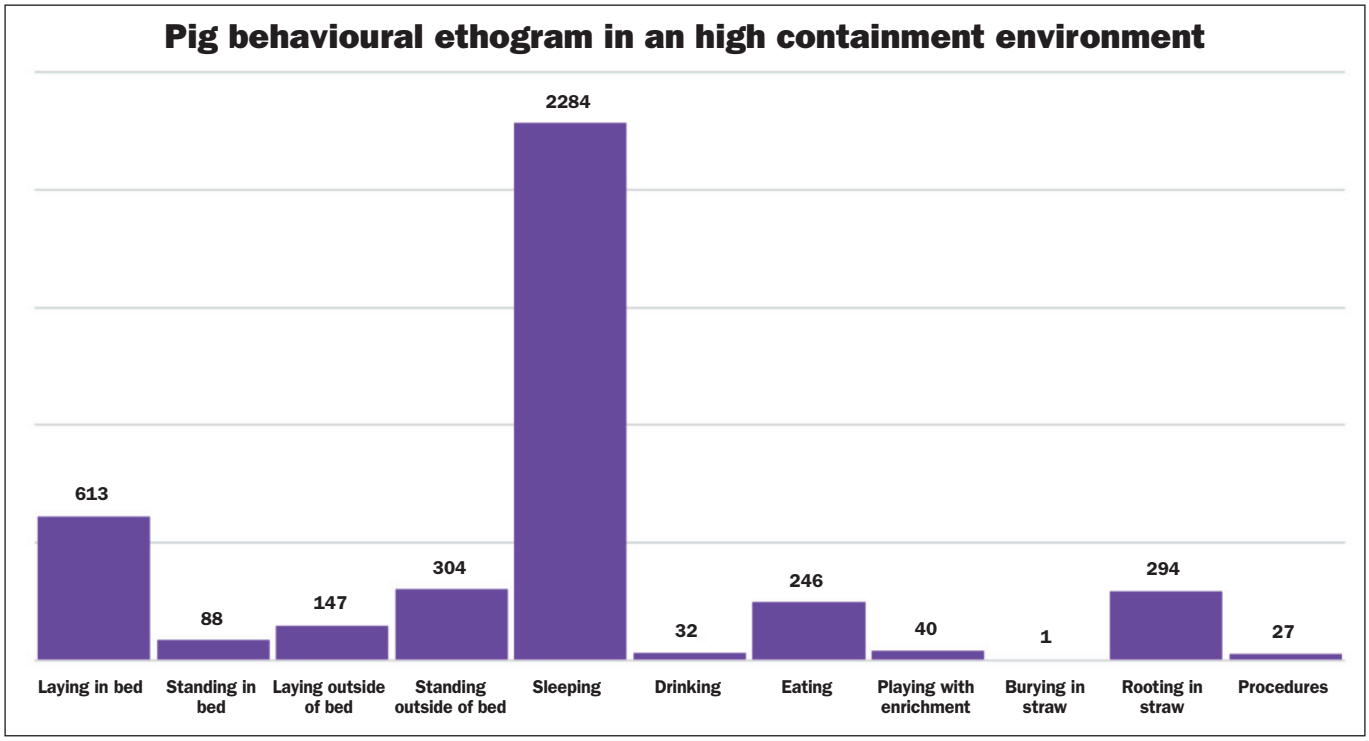

Figure 3. Table of results.

to lay and sleep in instead of just hard flooring. The pigs would spend 30% more time in straw when awake and would choose to lay down in straw 75% more of the time than outside the bed.

Future – What's next?

The data shows that pigs in high containment interact with straw bedding extensively. We feel that its provision is a necessity to enable them to express their important species-specific behaviours and would like this study to support the promotion of the use of straw in high containment facilities elsewhere in the world. Furthermore by using the data collected I can start to evaluate the enrichment used inside our high containment facility and determine which items the pigs benefit most from.

Acknowledgements

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References

1 **Andresen, N., Ingrid, R.** Foraging behaviour of growing pigs on grassland in relation to stocking rate and feed crude protein level. Appl. Anim.Behav. Sci. 1999; 62: 183–197

2 https://www.researchgate.net/publication/350238122_Multimodal_characterization_of_Yucatan_minipig_behavior_and_physiology_through_maturation#pf11