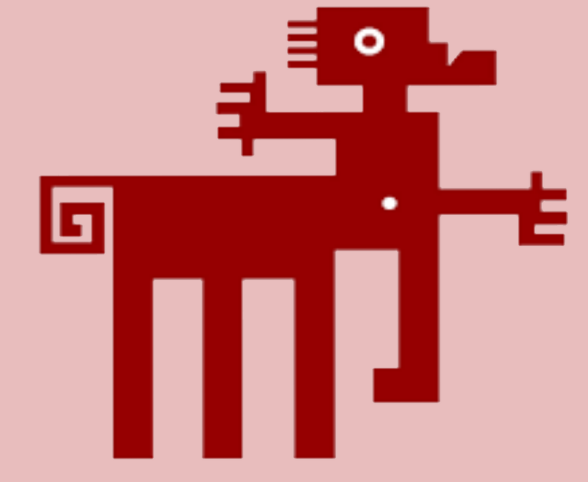


Validation of automatic monitoring image systems applied to welfare assessment in pigs

UAB

Faculty of Veterinary Medicine, UAB

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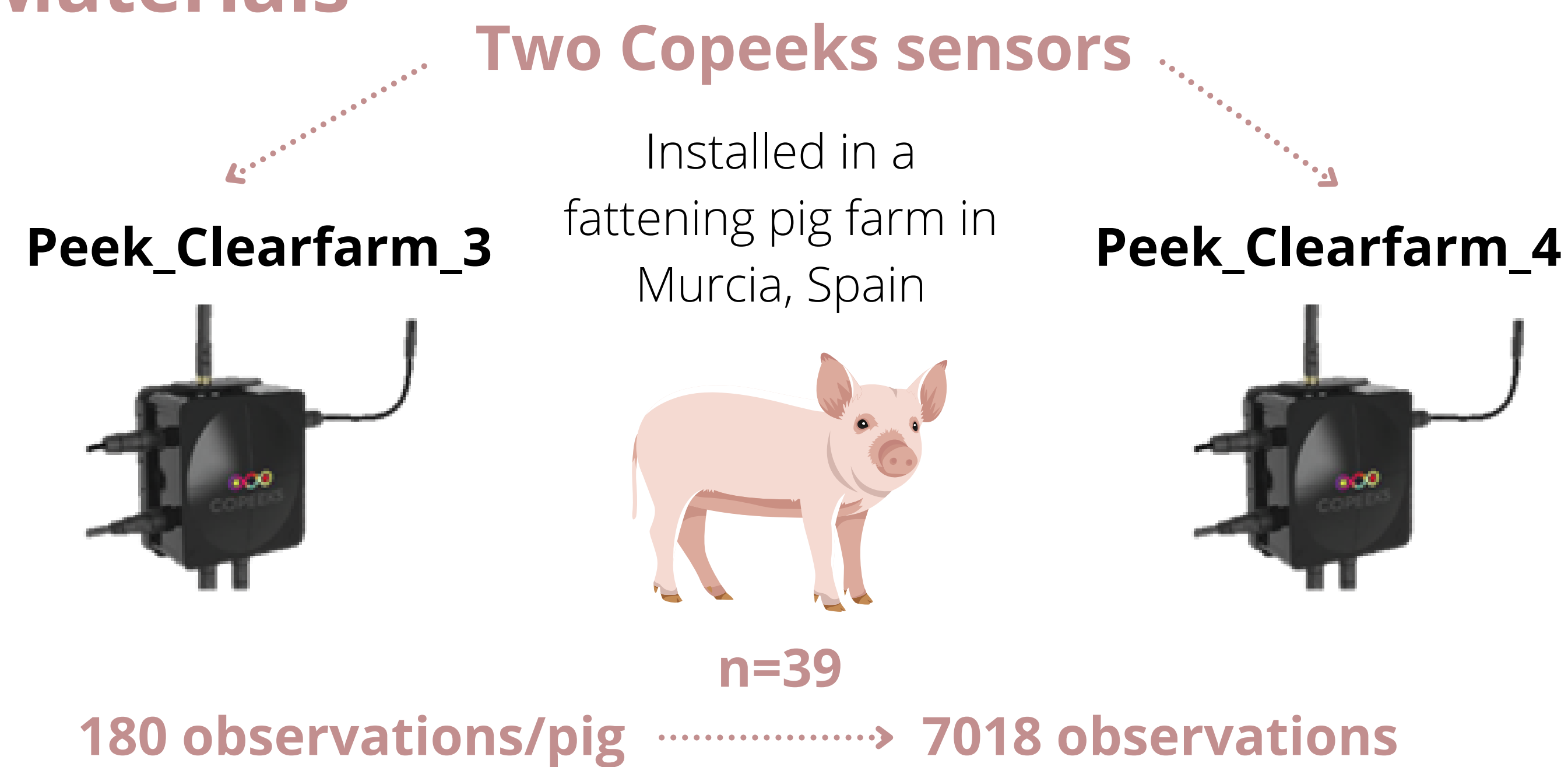


Introduction

Concern about animal welfare in intensive farming systems has increased during the last two decades. However, its assessment remains a challenge.

The application of precision livestock farming (PLF) can solve some of the limitations of the current welfare assessment protocols. These technologies, in the pig production industry, have been mostly used in experimental situations. External validation studies can be carried out to develop more implementable PLF systems in commercial farms.

Materials



Copeeks platform made graphics from the data registered through the sensors related with:

- Number of resting and lying pigs in areas of interest
- Pigs activity rates

Methods

1. Define the areas of interest : (1) feeding area, (2) resting area, (3) drinking area and (4) enrichment tool

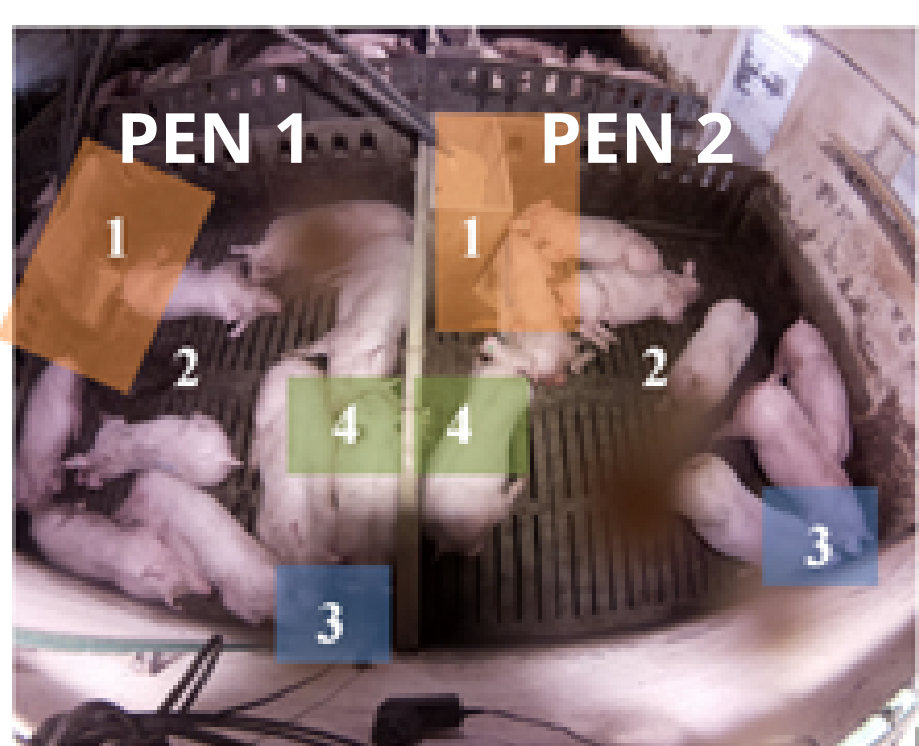


Image 1 : Peek_Clearfarm_3 areas of interest

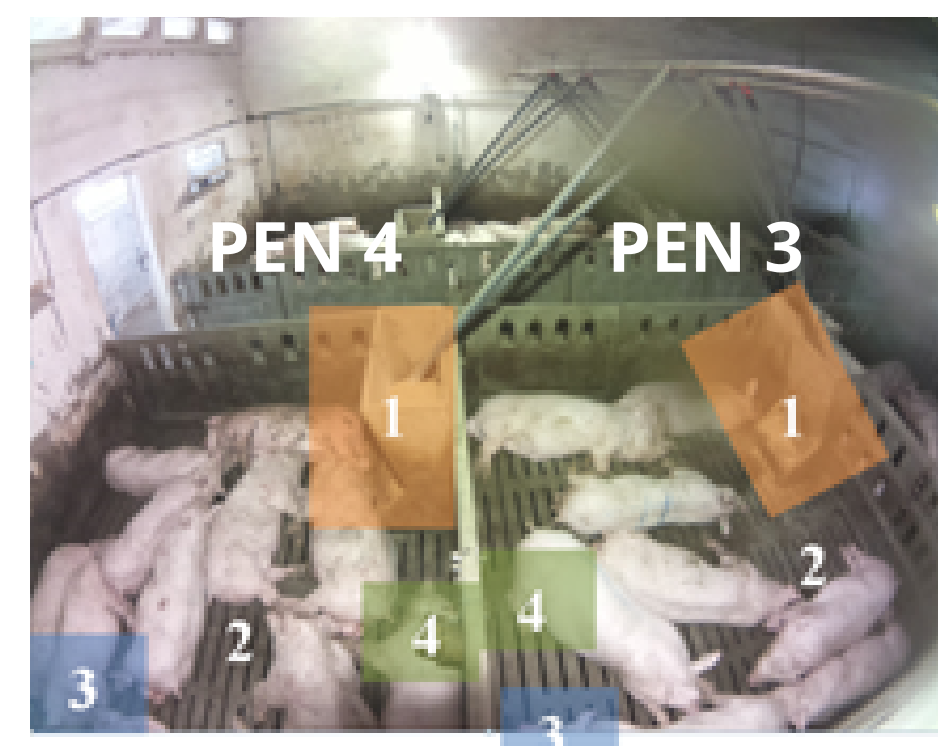


Image 2 : Peek_Clearfarm_4 areas of interest

2. Schedule image analysis: every 2 minutes from 9-18h
3. Design an ethogram
4. Scan sampling observations: 2 minutes/pen

April 2021

Monday 19 th	Tuesday 20 th	Wednesday 21 st	Thursday 22 nd	Friday 23 rd
9-11h	9-11h	9-11h	9-11h	9-11h
13-15h	13-15h	13-15h	13-15h	13-15h
16-18h	16-18h	16-18h	16-18h	16-18h

5. Data processing :Microsoft Excel 2016®
6. Statistical analysis: Pearson correlations (R software)

Conclusions

1. Copeeks sensors record accurately the pigs posture within different areas of interest.
2. They can be installed in fattening pig farms similar to the one where the study was carried out to determine the posture
3. The main critical points of the sensors were their difficulty detecting brown pigs and counting animals.
4. Further investigation needs to be done to determine the applicability of the sensors in different contexts and the accuracy in which sensors record activity parameters.

Objectives

The objectives of this study were:

1. Validate whether Copeeks equipment (Copeeks Ltd., Lannion, France) registered accurately pigs posture in the areas of interest and pigs overall activity.
2. Detect the critical points of the image analysis.
3. Define the applicability of Copeeks technologies.

Results

1. Standing and resting pigs in areas of interest

Posture	Peek_Clearfarm_3		Peek_Clearfarm_4	
	Pearson correlation coefficient	p-value	Pearson correlation coefficient	p-value
Pen 1 & 3	0,8107288	<2,2e-16	0,7253612	<2,2e-16
Pen 2 & 4	0,7941347	<2,2e-16	0,7863175	<2,2e-16
Overall	0,8017712 95	<2,2e-16	0,7466624	<2,2e-16
Without day 1	0,8195964	<2,2e-16	0,7462929	<2,2e-16

Table 1: Results of the Pearson correlation test of posture parameters

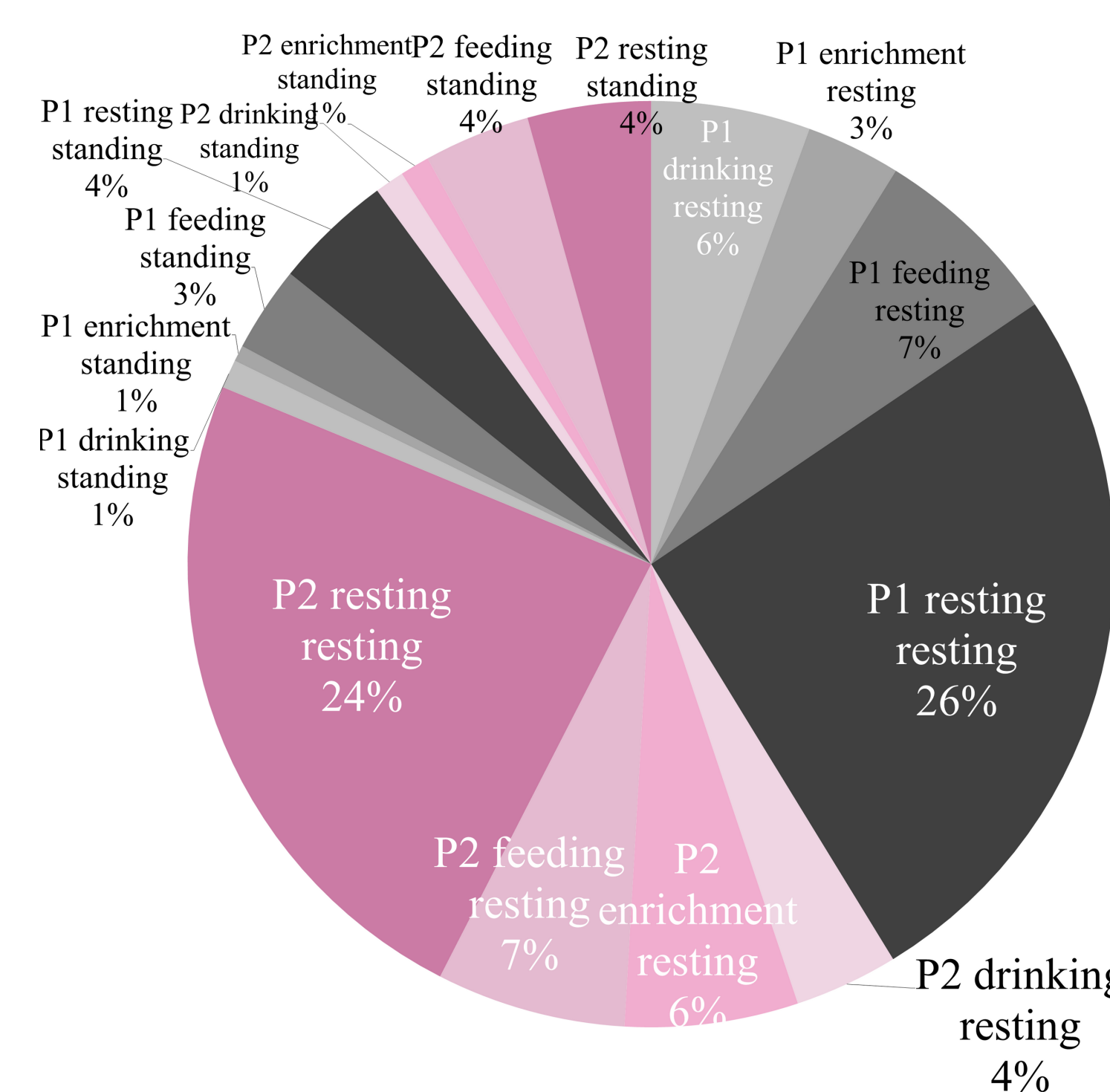


Figure 1: Distribution of standing and resting pigs (scan sampling observation)

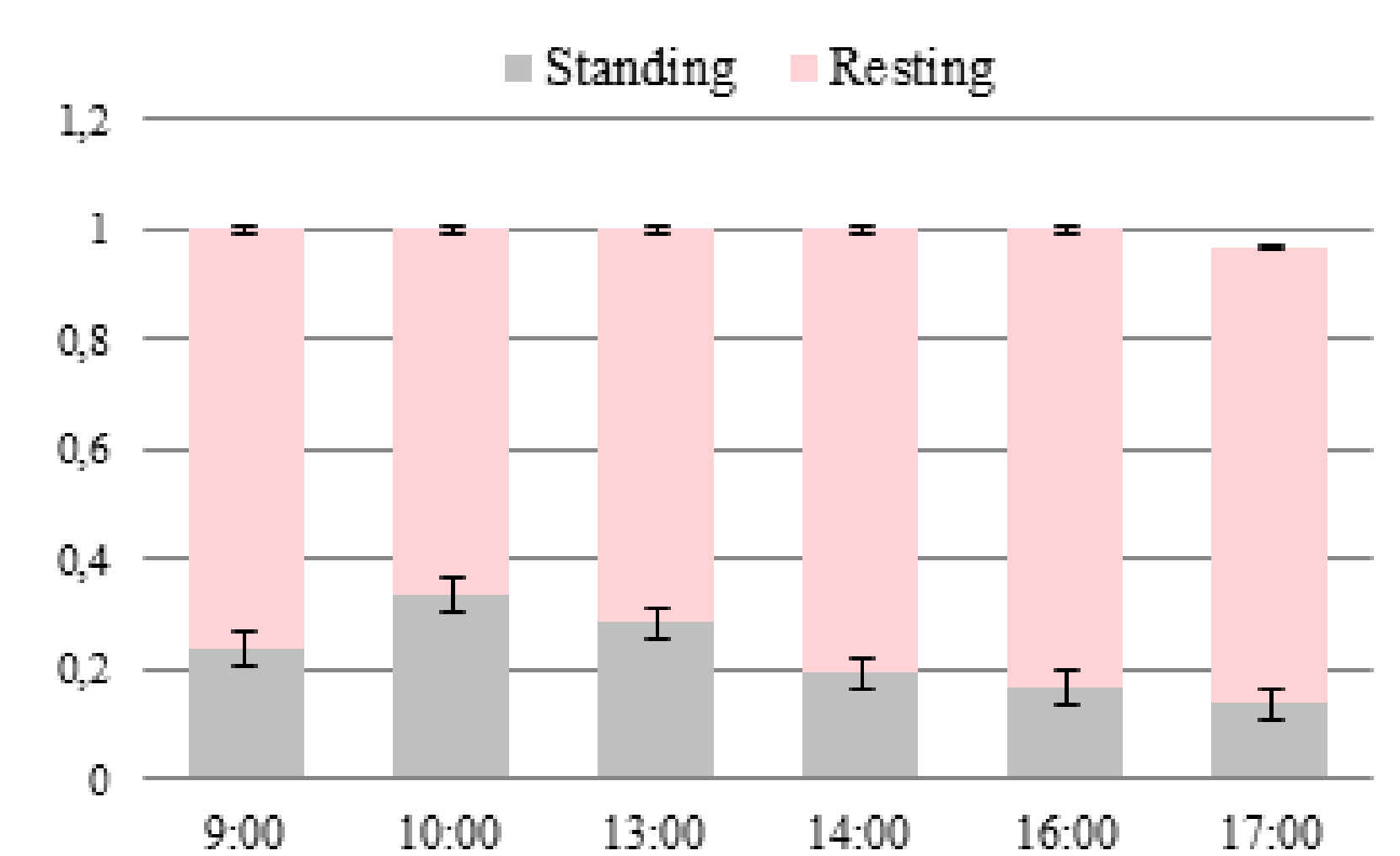


Figure 3: Resting and standing pigs in the drinking area of pen 3 (scan sampling observation)

2. Pigs activity rates

Activity	Peek_Clearfarm_3		Peek_Clearfarm_4	
	Pearson correlation coefficient	p-value	Pearson correlation coefficient	p-value
Option 1	0,2685524	0,00000044 52	0,4408755	<2,2e-16
Option 2	0,2799826	0,00000013 48	0,3680259	6,824e-13
Option 3	0,1567278	0,003614	0,2317861	0,000009666
Option 4	0,2728302	0,00000028 65	0,3907934	1,79e-14
Behaviour-activity	Pearson correlation coefficient	p-value	Pearson correlation coefficient	p-value
Walking	0.2135144	0.00006721	0.2479409	0.000002111
Positive	0.1142154	0.03447	0.1591837	0.002558
Negative	0.1155668	0.03238	0.2166495	0.00003655
Enrichment	0.1699034	0.001588	0.2314659	0.000009951
Drinking	0.178182	0.0009181	0.1692067	0.001353
Eating	0.1821483	0.0007002	0.3152044	0.0000000011 86
Other	-0.2358153	0.00001016	-0.3521227	7.875e-12

Table 2: Results of the Pearson correlation test of activity parameters

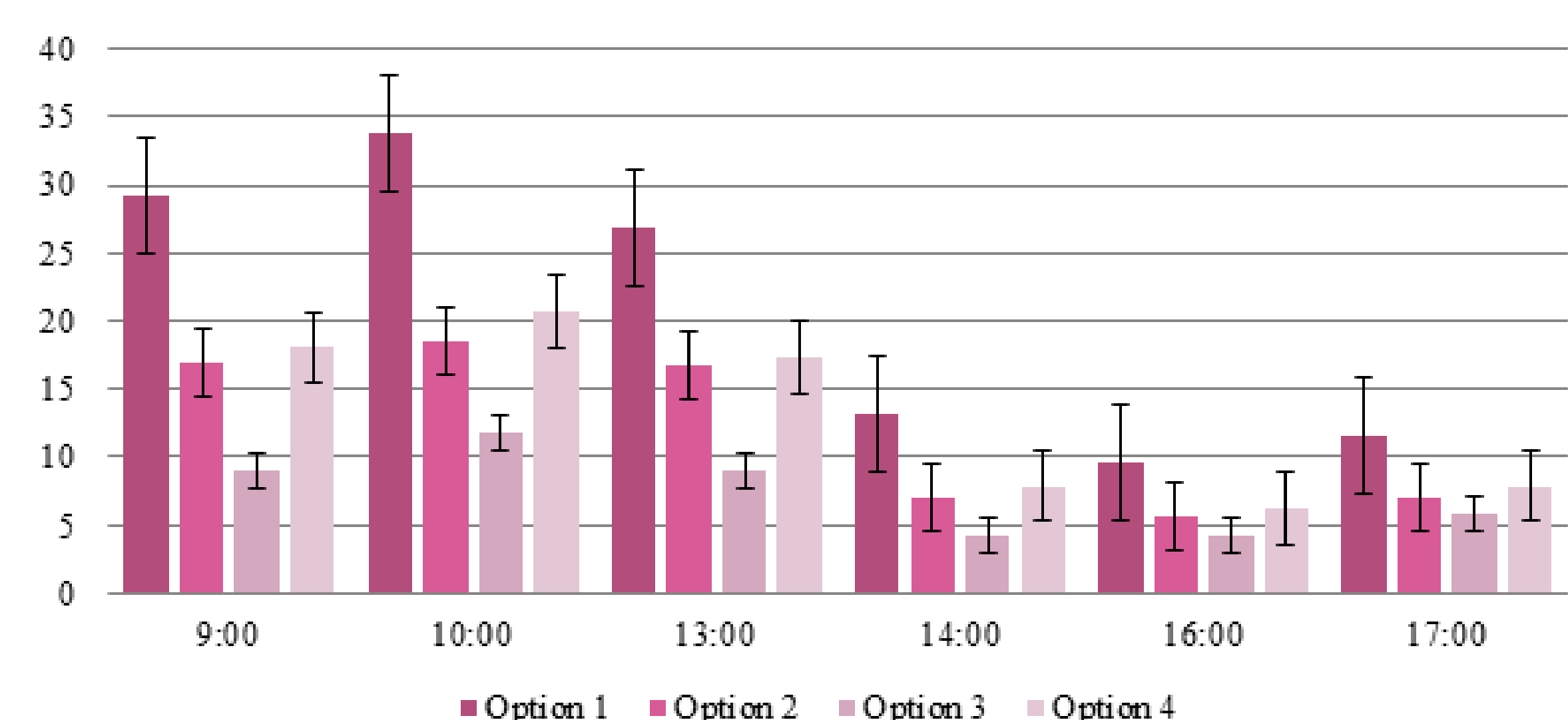


Figure 5: Activity rates of pen 3 and pen 4 (scan sampling observation)