

Characterization of biosecurity practices in a multiple-site pyramidal pig production system in Spain

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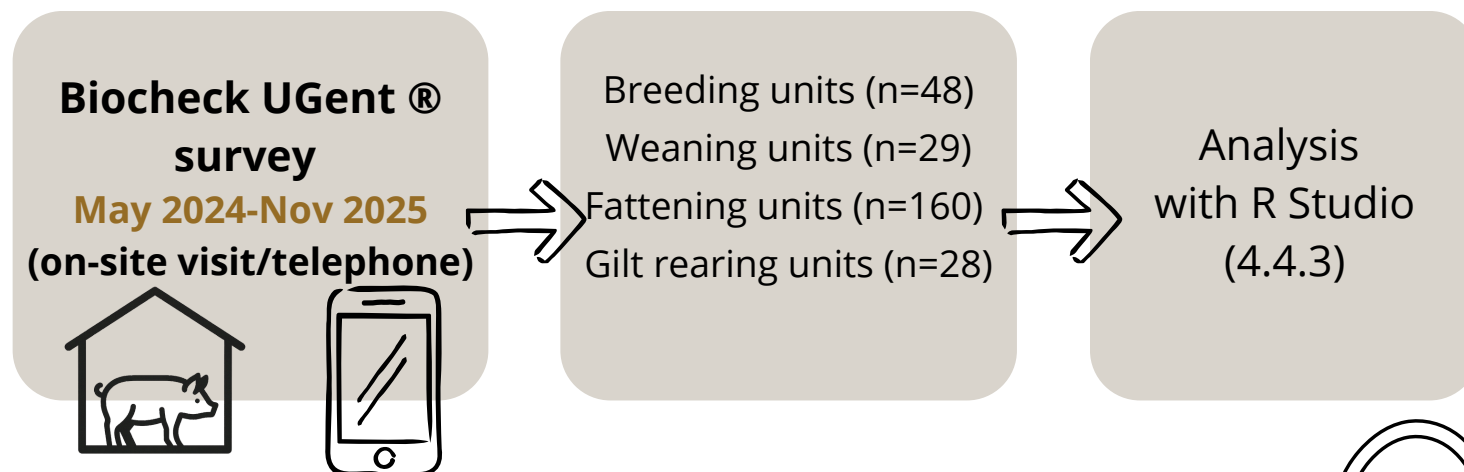
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Background

Pyramidal integrated pig production systems increase efficiency, but they may also facilitate the spread of pathogens across the production chain. This study aimed to **characterise biosecurity practices in a multiple-site pyramidal pig production system** of several companies and identifying **major weaknesses** in the production flow.

Methods



Results

Biosecurity scores by section

	Biosecurity section	Breeding units n=48	Gilt rearing units n=28	Weaning units n=29	Fattening units n=160
External biosecurity	A. Purchase of animals	84 [60-96]	84 [80-100]	88 [76-92]	84 [68-96]
	B. Transport of animals, deadstock, manure	79 [48-95]	71.5 [48-90]	74 [52-90]	67 [48-90]
	C. Feed, water, equipment	63 [20-100]	67 [33-80]	50 [33-100]	50 [20-80]
	D. Visitors and farmworkers	76 [41-100]	65 [53-76]	65 [53-88]	65 [41-88]
	E. Vermin and bird control	70 [50-100]	100 [60-100]	90 [60-100]	80 [50-100]
	F. Farm location	60 [10-100]	80 [40-90]	70 [10-100]	60 [0-100]
Internal biosecurity	G. Disease management	80 [40-100]	80 [80-100]	80 [80-100]	80 [40-100]
	H. Farrowing and suckling period	57 [36-100]	NA	NA	NA
	I. Nursery unit	57 [36-71]	NA	86 [50-100]	NA
	J. Finishing unit	NA	79 [43-93]	NA	64 [7-79]
	K. Measures between compartments	54 [25-86]	46 [36-71]	64 [39-82]	37.5 [14-64]
	L. Cleaning and disinfection	50 [20-95]	55 [40-95]	50 [20-85]	40 [20-75]

Table 1. Median biosecurity scores and ranges by farm type and biosecurity section, obtained using the Biocheck.UGent® application. External biosecurity includes sections A-F, and internal biosecurity includes sections G-L. NA indicates sections not applicable to that farm type. Scores range from 0 to 100, with higher values indicating better biosecurity.

Overall, external biosecurity scores were fairly homogeneous and high, although significant differences in external biosecurity scores were observed between fattening units and units rearing weaned gilts. In contrast, internal biosecurity scores were more variable and lower, particularly in fattening units.

Specific areas for improvement

Breeding units: 6.3% did not quarantine gilt replacements, 22% did not perform AI/AO in gilt quarantine areas, and cross-fostering occurred multiple times per piglet (52%).

Gilt rearing units: some farms lacked clean and dirty area separation in changing rooms (47%).

Weaning units: some of the farms (24%) lacked a perimeter fence.

Fattening units: manure (43%) and carcasses (42%) were present in the clean area.

Common among all farm types: the use of farm-specific clothing is generally required, but in a high proportion of cases (38% of weaning units and 73% of fattening units), drivers of animal transport vehicles were able to access the barns whilst the animals were being loaded. Furthermore, between 38% and 73% of farms did not have a storage area for carcasses protected against access by dogs, cats or vermin.

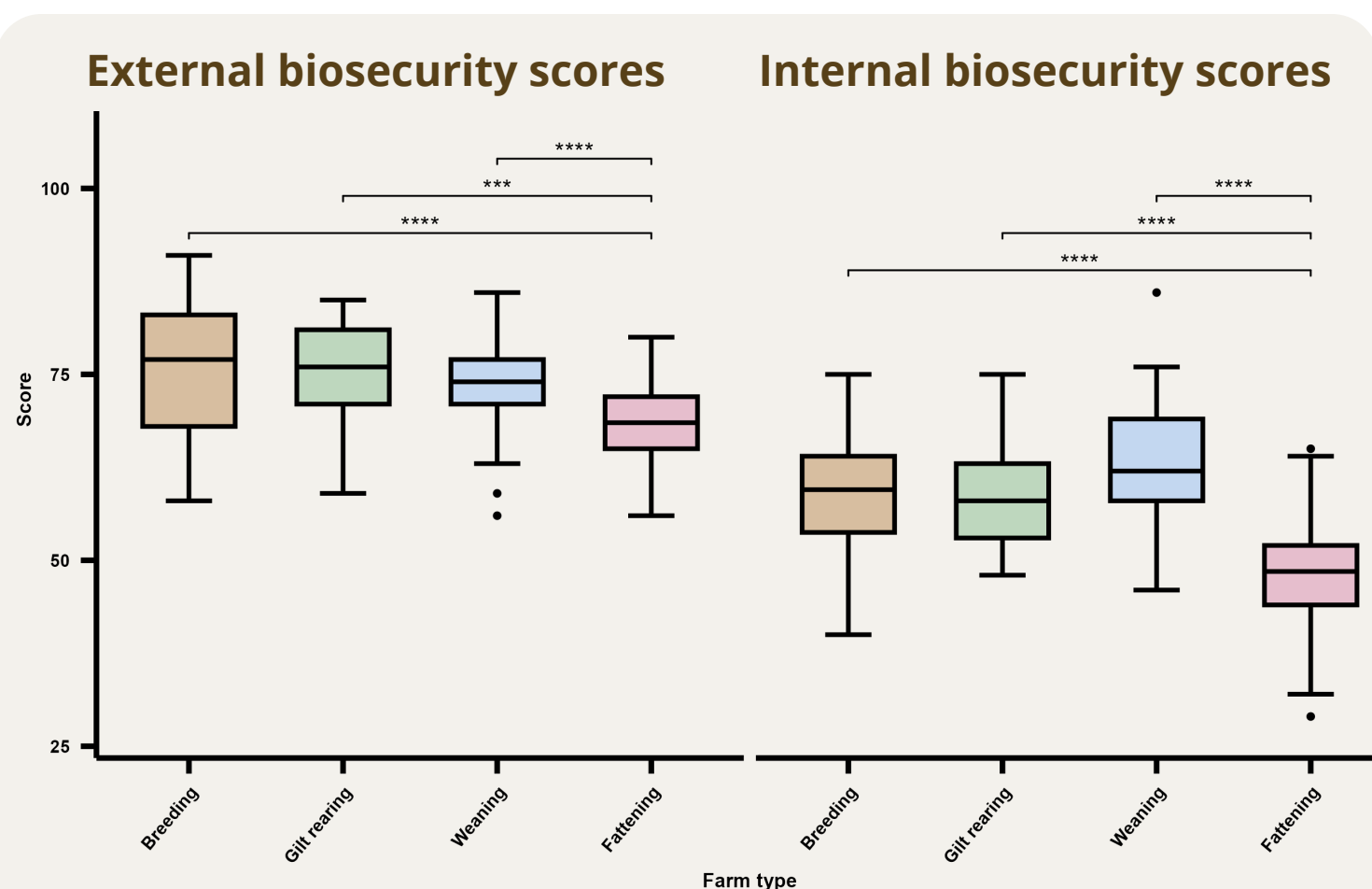


Figure 1. External and Internal biosecurity score boxplots by farm type. Pairwise comparisons were performed using Wilcoxon rank-sum tests with Benjamini-Hochberg-adjusted p-values. Significance levels are indicated as * p<0.05; ** p<0.01; *** p<0.001; **** p<0.0001.

Discussion and conclusions

Breeding units play a vital role in preventing pathogens from entering the system, and biosecurity gaps identified through this study can make them vulnerable to pathogen introduction, especially through animal movements. Gilt rearing, weaning, and fattening units are essential for preventing further spread of pathogens. The role of farms in the production chain should be considered when identifying key biosecurity gaps and areas for improvement. Reinforcing measures such as fencing and safer carcass storage could reduce the risk of spread. This is a work in progress. Future research will explore the effect of biosecurity on pathogens spread between farms.

