GEORG-AUGUST-UNIVERSITÄT
GÖTTINGEN

Faculty of Agricultural Sciences
Department of Animal Sciences

DO FARROWING AND REARING SYSTEMS AFFECT THE AGONISTIC BEHAVIOUR OF PIGS AT REGROUPING?

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Introduction

- For piglets, the separation from the sow and relocation to a new environment pose critical welfare altering factors
- Mixing of formerly unacquainted growing and/or finishing pigs leads to vigorous fighting causing skin lesions and stress (Ekkel et al. 1997)
  - ➢ Especially in elder piglets (Jensen 1994)
- Early socialization of piglets before weaning reduces stress after weaning e.g. by shortening fighting durations (D'Eath 2005, Hessel et al. 2006)

➡***Does the housing system during lactation, rearing and fattening influence pig's later agonistic and injurious behaviour?***

Animals, materials and methods

- 2 research farms of the Agricultural Chambers of Lower-Saxony (farm1) and Schleswig-Holstein (farm2)
- 9 batches each
- 4516 weaned pigs (farm1: 3154, farm2: 1362)
- 2185 finishing pigs (farm1: 1255, farm2: 930)
- 50% undocked / 50% docked tails
- Castration on farm1, intact males on farm2

Animals, materials and methods

Farrowing, lactation	Rearing	Finishing

Animals, materials and methods

Farrowing, lactation	Rearing	Finishing
Farrowing crates (FC) Free farrowing pens (FF) Group housing of lactating sows (GH)		


Farrowing crate


Free farrowing pen


Group housing of lactating sows

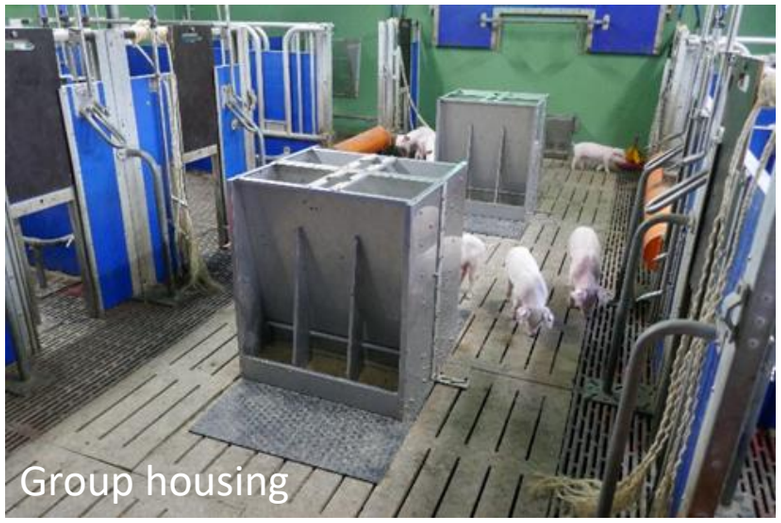
Animals, materials and methods

Farrowing, lactation	Rearing	Finishing
Farrowing crates (FC) Free farrowing pens (FF) Group housing of lactating sows (GH)	Conventional ($Conv_{farm1}$ $Conv_{farm2}$)	Conventional

Animals, materials and methods

Farrowing, lactation	Rearing	Finishing
Farrowing crates (FC)	Conventional ($Conv_{farm1}$ $Conv_{farm2}$)	Conventional
Free farrowing pens (FF)	Rearing in farrowing pen (FP_{farm1})	Conventional
Group housing of lactating sows (GH)		


Farrowing crate


Group housing

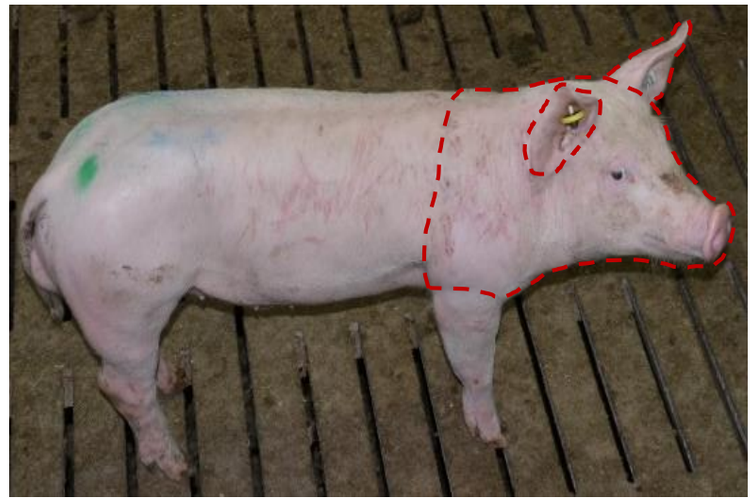
Animals, materials and methods

Farrowing, lactation	Rearing	Finishing
Farrowing crates (FC)	Conventional ($Conv_{farm1}$ $Conv_{farm2}$)	Conventional
Free farrowing pens (FF)	Rearing in farrowing pen (FP_{farm1})	Conventional
Group housing of lactating sows (GH)	Wean-to-finish (WTF_{farm2})	

Wean-to-finish$_{farm2}$

Animals, materials and methods

Assessments of skin lesions:



- May 2016 – August 2018
- Welfare Quality®, lesions on front and ears (Stukenborg et al. 2012)
- Biweekly during rearing, 4-weekly during finishing

  ↳Beginning (week 1)
  ↳Half-time (week 3)
  ↳End (week 5/6)

  ↳Beginning (week 6/7)
  ↳Half-time (week 10/11)
  ↳End (week 18/19)

- Scores
  - 0 = none or minor lesions
  - 1 = moderate lesions
  - 2 = severe lesion

→

0 = none or minor lesions

1 = moderate and severe lesions

Animals, materials and methods

Video recording and behaviour analysis:

- Individual marking
- Recording of 48h after weaning
- Continuous sampling: 15 min of each hour with The Observer® XT (© 2018 Noldus Information Technology, Wageningen, Netherlands)
- first results for 229 animals (one batch)

Animals, materials and methods

Video recording and behaviour analysis:

- No. of agonistic interactions (t<5 sec; biting, head-knocks) (Baumgartner et al. 2010, Tallet et al. 2013)
- No. + duration of fights (t>5 sec; agonistic interactions, anti-/parallel standing, pushing) (Baumgartner et al. 2010, D'Eath 2005)
- Aggressor/receiver, winner/loser

Animals, materials and methods

- Skin lesions: GLIMMIX procedure of SAS® 9.4 (SAS Institute Inc., Cary, NC, USA)
- Fixed effects:
  - Batch
  - Tail-docking
  - Farrowing system
  - Rearing system
  - Assessment week

<table>
<tr><th>Farrowing, lactation</th><th>Rearing</th><th>Finishing</th></tr>
<tr><td>Farrowing crates (FC)</td><td>Conventional ($Conv_{farm1}$ $Conv_{farm2}$)</td><td>Conventional</td></tr>
<tr><td>Free farrowing pens (FF)</td><td>Rearing in farrowing pen (FP_{farm1})</td><td>Conventional</td></tr>
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Animals, materials and methods

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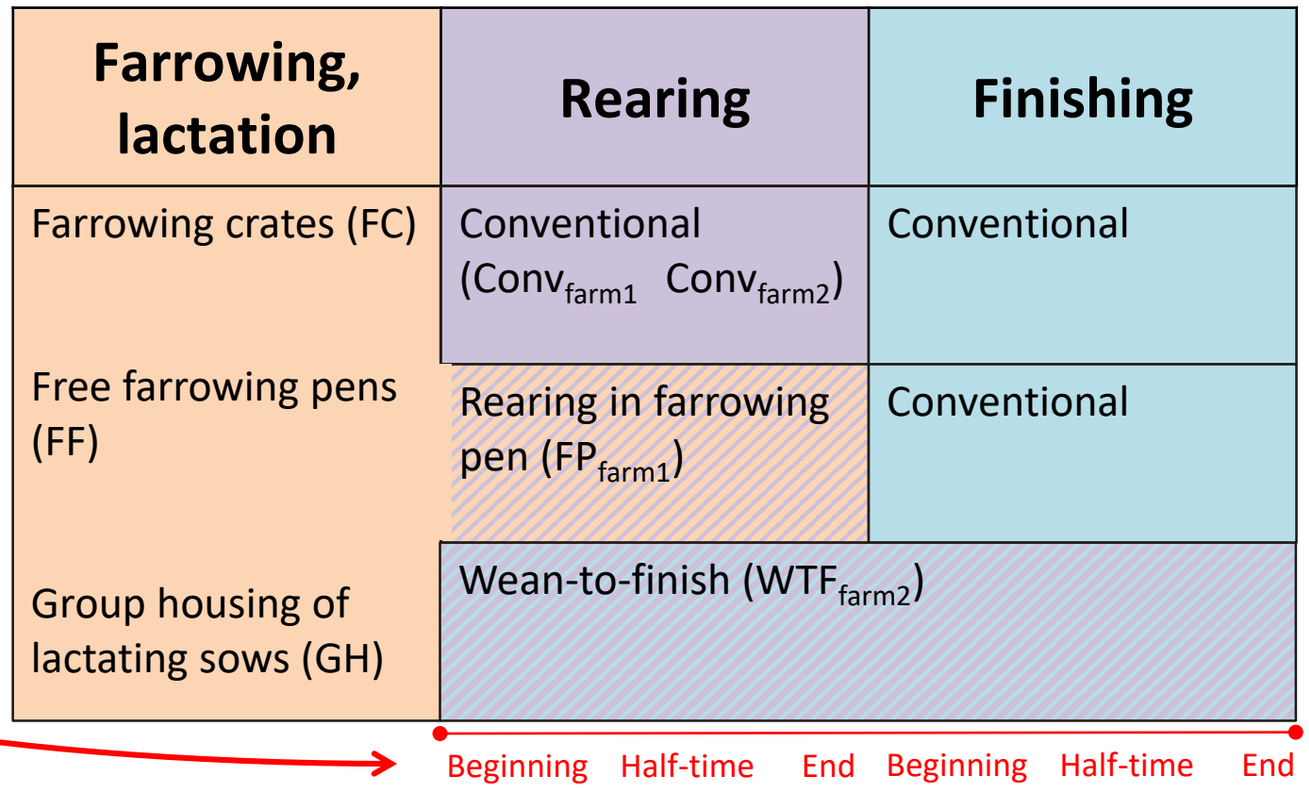

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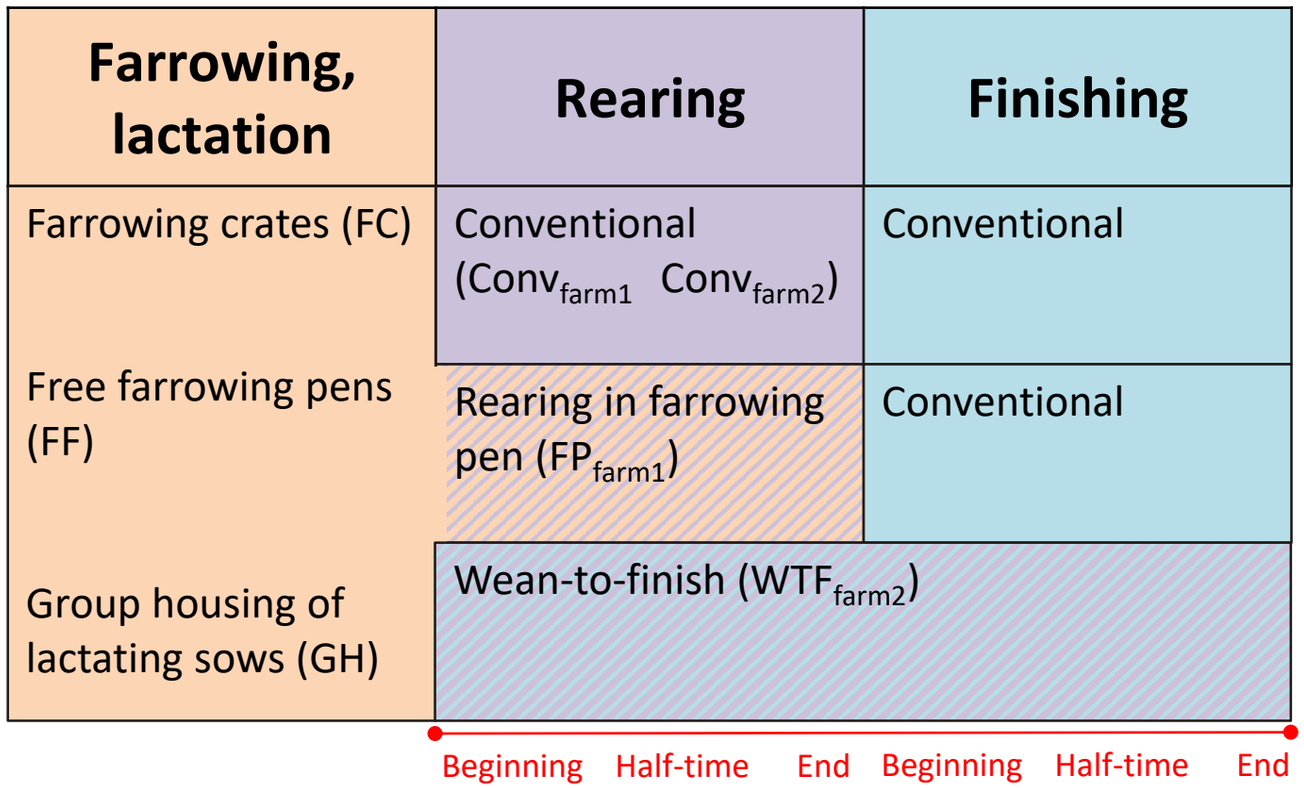
  - Interaction of assessment week and rearing/farrowing system



Animals, materials and methods

- Skin lesions: GLIMMIX procedure of SAS® 9.4 (SAS Institute Inc., Cary, NC, USA)
- Fixed effects:
  - Batch
  - Tail-docking
  - Farrowing system
  - Rearing system
  - Assessment week
  - Interaction of assessment week and rearing/farrowing system

	Model rearing period			Model finishing period		
Farm1	$Conv_{farm1}$		FP_{farm1}	FC	FF	GH
Beginning Half-time End						
Farm2	FC	FF	GH	$Conv_{farm2}$		WTF_{farm2}
Beginning Half-time End						

$Conv_{farm1, 2}$: conventional rearing, FP_{farm1}: rearing in farrowing pen, FC: Farrowing crate, GH: Group housing of lactating sows, WTF_{farm2}: Wean-to-finish

Animals, materials and methods

- Skin lesions: GLIMMIX procedure of SAS® 9.4 (SAS Institute Inc., Cary, NC, USA)
- Fixed effects:
  - Batch
  - Tail-docking
  - Farrowing system
  - Rearing system
  - Assessment week
  - Interaction of assessment week and rearing/farrowing system
- Random effect: pen, animal
- Differences of multiple comparisons were adjusted using the Bonferroni correction

	Model rearing period		Model finishing period		
Farm1	$Conv_{farm1}$	FP_{farm1}	FC	FF	GH
Beginning Half-time End	assessment week * rearing system		assessment week * farrowing system		
Farm2	FC	FF GH	$Conv_{farm2}$	WTF_{farm2}	
Beginning Half-time End	assessment week * farrowing system		assessment week * rearing system		

$Conv_{farm1, 2}$: conventional rearing, FP_{farm1}: rearing in farrowing pen, FC: Farrowing crate, GH: Group housing of lactating sows, WTF_{farm2}: Wean-to-finish

Results – Skin lesions (back transformed Score 0 in percent and standard error)

	Rearing period		Finishing period		
Farm1	$Conv_{farm1}$	FP_{farm1}	FC	FF	GH
Beginning Half-time End	assessment week * rearing system		assessment week * farrowing system		
Farm2	FC	FF	GH	$Conv_{farm2}$	WTF_{farm2}
Beginning Half-time End	assessment week * farrowing system			assessment week * rearing system	

a-d: different superscripts indicate significant differences ($p<0.005$) of housing systems within row and column and model;
$Conv_{farm1, 2}$: conventional rearing, FP_{farm1}: rearing in farrowing pen, FC: Farrowing crate, GH: Group housing of lactating sows, WTF_{farm2}: Wean-to-finish

Results – Skin lesions (back transformed Score 0 in percent and standard error)

	Rearing period	
Farm1	$Conv_{farm1}$	FP_{farm1}
Beginning	77.7^{a} 0.3	94.7^{b} 0.3
Half-time		
End		

a-d: different superscripts indicate significant differences ($p<0.005$) of housing systems within row and column and model;
$Conv_{farm1, 2}$: conventional rearing, FP_{farm1}: rearing in farrowing pen, FC: Farrowing crate, GH: Group housing of lactating sows, WTF_{farm2}: Wean-to-finish

Results – Skin lesions (back transformed Score 0 in percent and standard error)

	Rearing period		Finishing period		
Farm1	$Conv_{farm1}$	FP_{farm1}	FC	FF	GH
Beginning	77.7^{a} 0.3	94.7^{b} 0.3	40.6^{a} 0.2	43.3^{a} 0.2	77.5^{b} 0.2
Half-time					
End					

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$Conv_{farm1, 2}$: conventional rearing, FP_{farm1}: rearing in farrowing pen, FC: Farrowing crate, GH: Group housing of lactating sows, WTF_{farm2}: Wean-to-finish

Results – Skin lesions (back transformed Score 0 in percent and standard error)

	Rearing period		Finishing period		
Farm1	$Conv_{farm1}$	FP_{farm1}	FC	FF	GH
Beginning	77.7^{a} 0.3	94.7^{b} 0.3	40.6^{a} 0.2	43.3^{a} 0.2	77.5^{b} 0.2
Half-time					
End					

Farm2	FC	FF	GH
Beginning	78.8^{ad} 0.2	79.9^{a} 0.1	97.7^{b} 0.2
Half-time			
End			

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$Conv_{farm1, 2}$: conventional rearing, FP_{farm1}: rearing in farrowing pen, FC: Farrowing crate, GH: Group housing of lactating sows, WTF_{farm2}: Wean-to-finish

Results – Skin lesions (back transformed Score 0 in percent and standard error)

	Rearing period		Finishing period		
Farm1	$Conv_{farm1}$	FP_{farm1}	FC	FF	GH
Beginning	77.7^{a} 0.3	94.7^{b} 0.3	40.6^{a} 0.2	43.3^{a} 0.2	77.5^{b} 0.2
Half-time					
End					
Farm2	FC	FF	GH	$Conv_{farm2}$	WTF_{farm2}
Beginning	78.8^{ad} 0.2	79.9^{a} 0.1	97.7^{b} 0.2	41.3^{a} 0.3	92.8^{b} 0.2
Half-time					
End					

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Results – Skin lesions (back transformed Score 0 in percent and standard error)

	Rearing period		Finishing period		
Farm1	$Conv_{farm1}$	FP_{farm1}	FC	FF	GH
Beginning	77.7^{a} 0.3	94.7^{b} 0.3	40.6^{a} 0.2	43.3^{a} 0.2	77.5^{b} 0.2
Half-time	99.2^{c} 0.4	98.8^{c} 0.4	97.7^{c} 0.4	96.4^{c} 0.3	98.8^{c} 0.4
End	97.8^{c} 0.4	97.3^{c} 0.3	97.3^{c} 0.4	95.6^{c} 0.4	96.9^{c} 0.4
Farm2	FC	FF	GH	$Conv_{farm2}$	WTF_{farm2}
Beginning	78.8^{ad} 0.2	79.9^{a} 0.1	97.7^{b} 0.2	41.3^{a} 0.3	92.8^{b} 0.2
Half-time	98.4^{c} 0.3	98.4^{c} 0.2	99.8^{bc} 0.3	71.4^{ac} 0.7	83.1^{bc} 0.9
End	83.6^{d} 0.2	82.8^{d} 0.1	89.2^{d} 0.1	85.9^{c} 0.3	78.9^{c} 0.2

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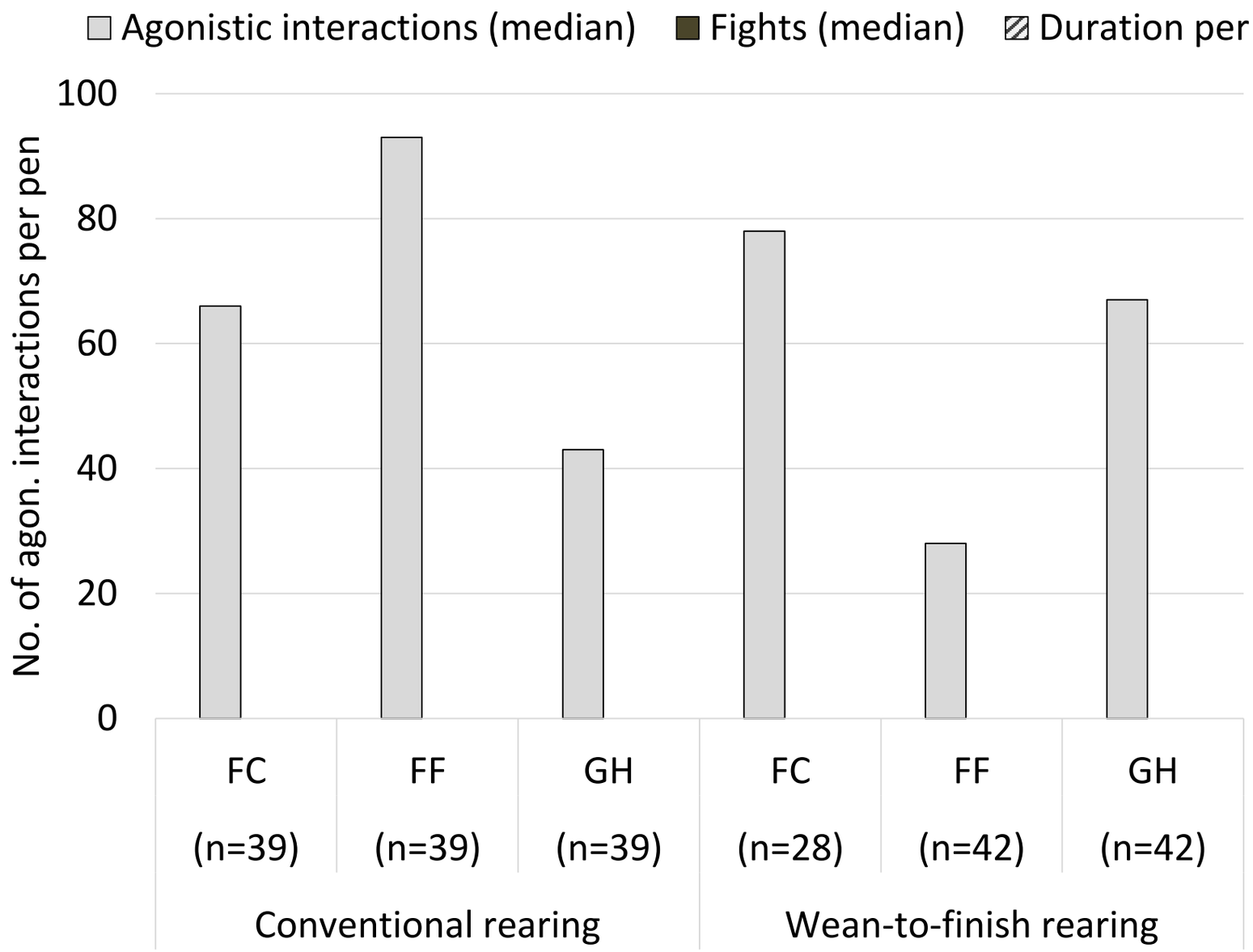
Results – Behaviour analysis 48h after weaning (farm2)



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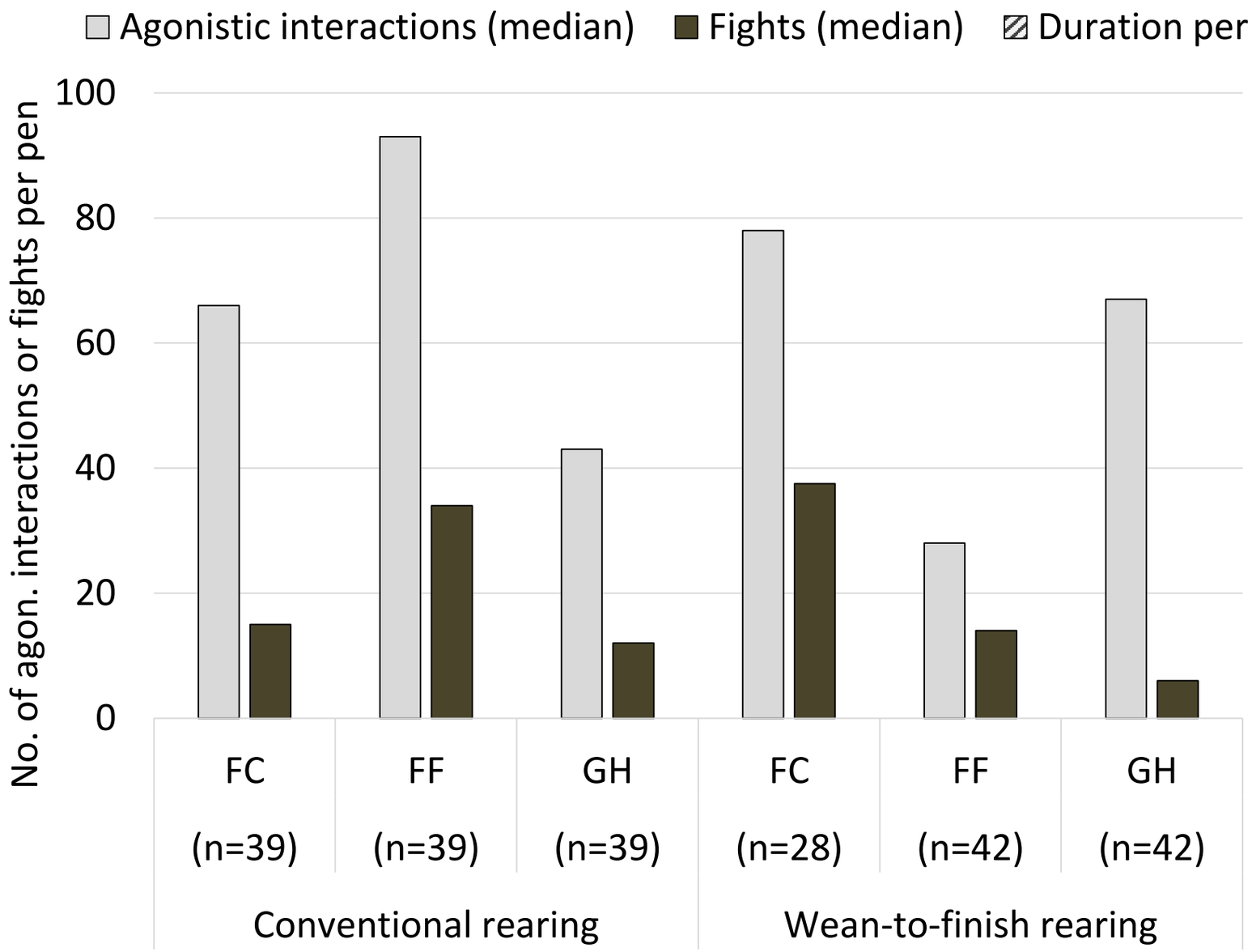

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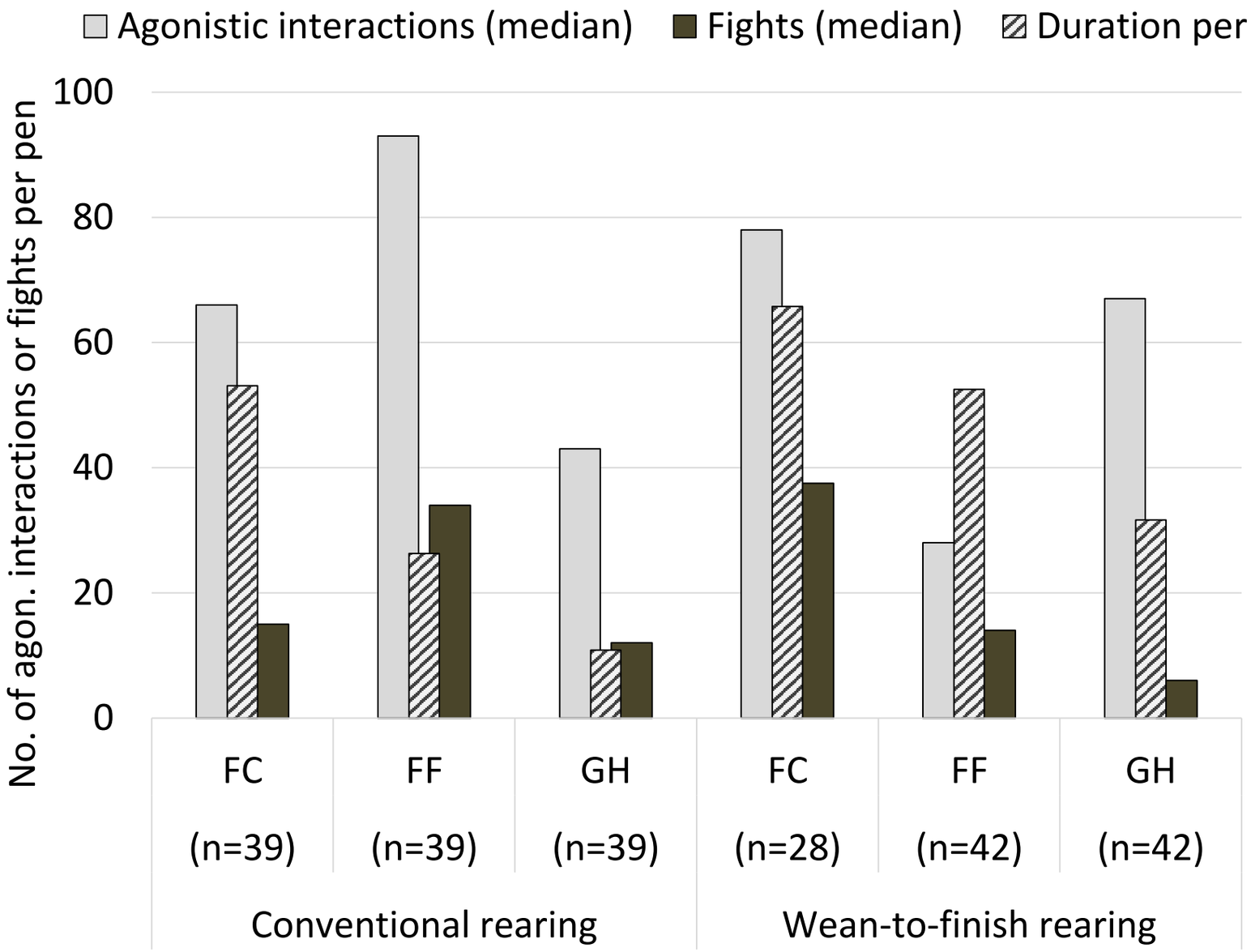

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Conclusion

➡ ***Does the housing system during lactation, rearing and fattening influence pig's later agonistic and injurious behaviour?***

- Rearing systems without regrouping influenced the number of skin lesions positively, especially for elder pigs
  - ➢ Pigs reared in the farrowing pen (FP_{farm1}) and in the Wean-to-finish-unit (WTF_{farm2}) showed less lesions than conventionally reared and regrouped pigs
  - ➢ A greater space allowance at weaning in WTF_{farm2} increased the amount of agonistic interactions and fights and their duration
- Effect of farrowing system on behaviour at regrouping
  - ➢ Early socialized GH pigs had less skin lesions and fought less and shorter than FC and FF pigs

Thank you

funded by the Federal Office for Agriculture and Food and the Landwirtschaftliche Rentenbank (projekt no.: 2817205413; 758914)

Federal Office for Agriculture and Food

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Projektträger Bundesanstalt für Landwirtschaft und Ernährung

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…for your attention!

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