


Assessment of floor design in finishing pig pens: integration of slat width, gap width and proportion of solid floor

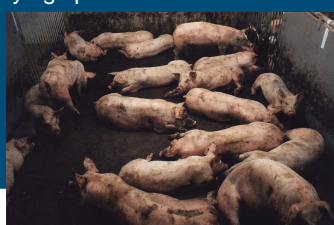
Hans Spoolder, Izak Vermeij and Ina Enting



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The optimal floor

- Minimal contact between excrement and animal
- Minimal emitting surface
- Low risk of claw lesions
- Provides comfortable lying space



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- Minimal contact between excrement and animal
- Minimal emitting surface
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- Provides comfortable lying space
 - Total space / space per animal
 - Gap width
 - Slat width
 - Solid area : slatted area

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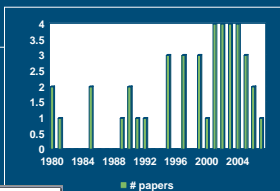
The optimal floor

- Main aim: identify relationships between floor characteristics
 - (Concrete floors, pigs 50-110kg, ignore climate, ignore floor quality)
 - Total space / space per animal
 - Gap width
 - Slat width
 - Solid area : slatted area

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Data collection

- 40+ references since 1980




Year	# papers
1980	1
1984	2
1988	2
1992	2
1996	3
2000	3
2004	4

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Optimal floor area?

- EFSA (2005): what does a pig need space for?
 - Physical presence (static space)
 - Feed, drink, defecate (activity space)
 - Engage in interactions (social space)
- Estimate components based on
 - Area = $k \times \text{Weight}^{0.667}$
 - Static space: $k = 0.034$
 - Dunging area: $k = 0.002$
 - Interaction ???
 - Result: $A = 0.036W^{0.667}$;
i.e. **0.82m² for 110 kg**



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Optimal dimensions for SLAT width ?

- Review by Muiltze (1989) data from 1962-1988
- Edwards *et al.* (1997) adds
 - UK recommendations
 - British Standards
 - Swedish 1989 recommendations

Finishers
80 – 200 mm

75 - 100
60 - 100
80



Optimal dimensions for GAP width?

- Review by Muiltze (1989) data from 1962-1988
- Edwards *et al.* (1997) adds
 - UK recommendations
 - British Standards
 - Swedish 1989 recommendations
- Rähse and Hoy (2007)
- EFSA (2005)

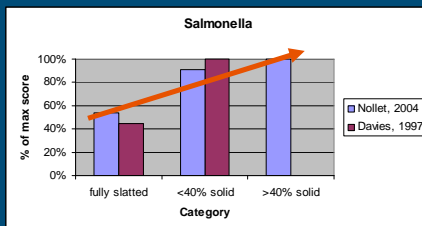
Finishers
17 – 30 mm

18 - 25
20
20
20
18 or 20



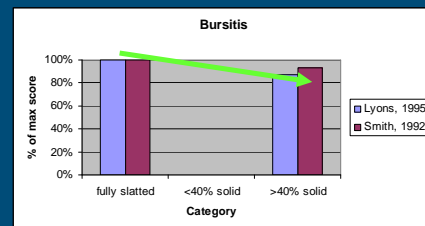
Optimising proportion of solid floor

- Salmonella prevalence



Optimising proportion of solid floor

- Bursitis prevalence



Optimising proportion of solid floor

- Claw problems

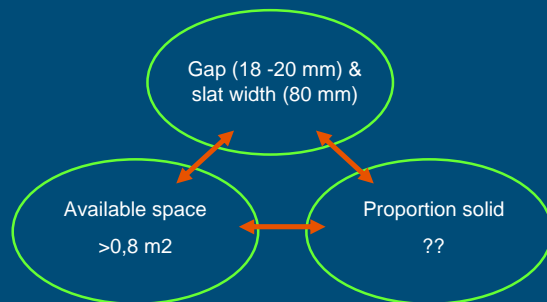


Recommendations for proportion solid floor?

	Fully slatted	<40% solid	>40% solid
Pen fouling		green	red
Health		green	red
Salmonella	green	red	red
Salmonella	green	red	
Claw problems	green	red	red
Claw problems	red		green
Claw problems	red		green
Lameness	red		green
Bursitis	red		green
Bursitis	red		green



No consensus



Meta analyses

- Most studies focus on consequences of single factors
- Can the data be integrated into a model?
- $X = \alpha * \% \text{ solid} + \beta * \text{gap width} + \gamma * \text{slat width}$
 - $X = \text{fouling, claw lesions or ...}$
- NOT ENOUGH DATA YET

Conclusions

- Single factor approach still raises a lot of questions
- There is not enough recent data
- **An international farm analyses should take place**
- Testing hypotheses:
 - Increasing space allowance requires larger gaps
 - Using part solid flooring requires more space
 - Part solid flooring requires larger gaps
- And many more regarding climate, type of floor, bedding...



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