TEAGASC RESEARCH INSIGHTS
LEADING RESEARCH FOR TOMORROW'S AGRI-FOOD SYSTEMS

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Beef cattle housing – welfare implications

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Issues facing the beef industry

- Concern from **EU** and **UK** retailers
  - ➢ Welfare of beef cattle on concrete slatted floors (**CSF**)?
- Issues raised by EU and International health and welfare advisory bodies (**EFSA, SCAHAW and OIE)**
  - ➢ Increase **space allowance** for finishing animals
  - ➢ **Phase out** the use of concrete slatted floors
    - Solid lying area with bedding or slats with rubber mats

No EU regulation yet concerning finishing animals

Effect of space allowance and floor type on the welfare and performance of finishing beef heifers

Keane, M.P., McGee, M., O'Riordan, E.G., Kelly, A.P. and Earley, B. 2017. Effect of space allowance and floor type on performance and welfare of finishing beef heifers. Animal, 21:1-10.

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Materials and methods

- **240 late maturing "continental"** crossbred beef heifers assigned to one of **four treatments:**

1. **3.0 m^2/animal**
2. **4.5 m^2/animal**
3. **6.0 m^2/animal**
4. **6.0 m^2/animal**

Concrete slatted floors (CSF)

Straw

- Weighed, dirt scored and blood sampled every 21 days
- All 4 hooves of each animal examined at start and end of the study
- Animal behaviour (CCTV recordings)
- Carcass measurements

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Experimental timeline

Day (d)
-2, -1
weigh

4 treatments – 60 animals per treatment
24 pens (6 pens per treatment)
240 animals

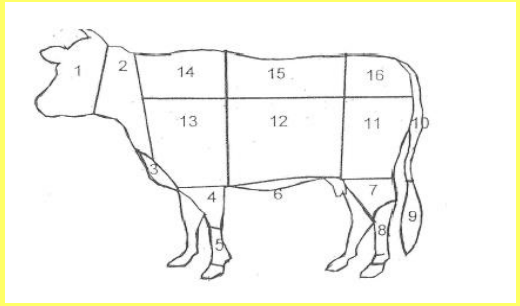
d 105
weigh,
slaughter,
hoof lesions recorded, post-slaughter measurements

d 70-87 - Behaviour

d 0 | d 21 | d 42 | d 63 | d 84 | d 105

d 0
blood sample,
dirt score,
hoof lesions recorded,
assign to treatment

weigh, blood sample, dirt score



d 104
weigh,
blood sample,
dirt score

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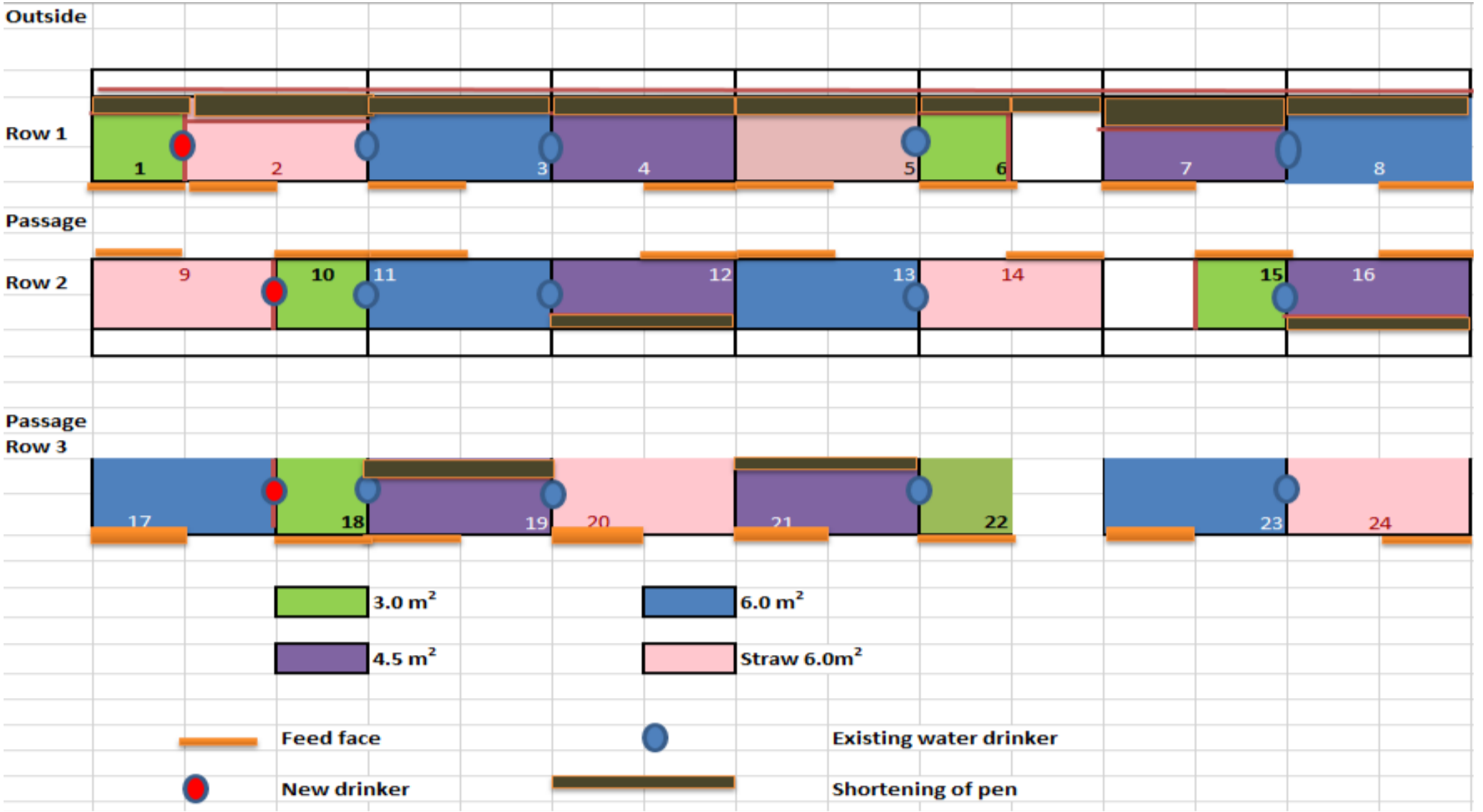
Experimental pens in the cattle unit



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Space allowance at 3.0 m^2/animal on CSF

Space allowance at 4.5 m^2/animal on CSF

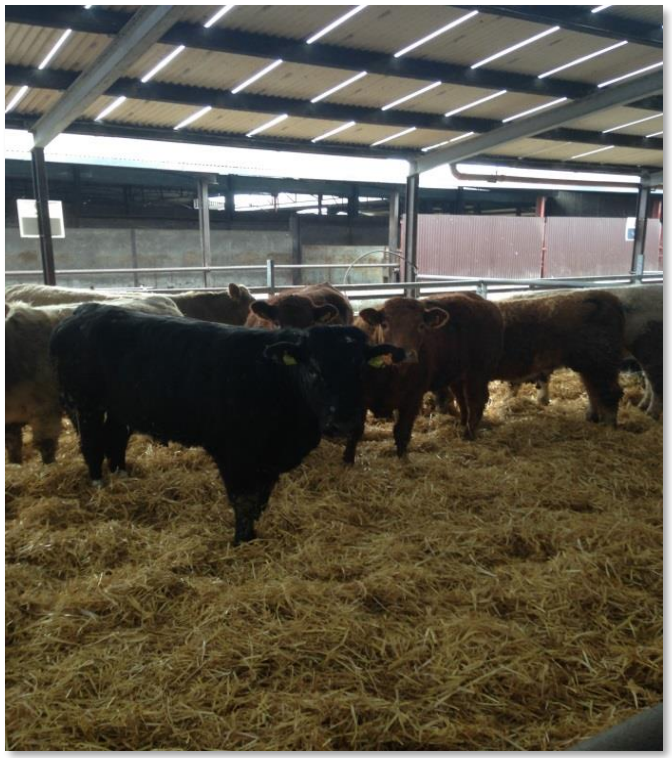
Space allowance at 6.0 m^2/animal on CSF

Space allowance at 6.0 m^2/animal – on straw

Un-chopped barley straw placed over a free-draining **geotextile membrane** on concrete slatted floor

Straw replenished at a rate of **150 kg per pen every three days**

Straw fully removed and replaced every two weeks



Results

	Space allowance (m^2/animal) on CSF			
	3.0	4.5	6.0	
DM intake (kg/animal/day)	11.1	11.1	11.1	
Initial weight (kg)	505	506	504	
Slaughter weight (kg)	631	642	633	
ADG (kg)	**1.18^a**	**1.28^b**	**1.19^a**	
FCR (kg DMI/kg ADG)	**9.43^a**	**8.74^b**	**9.45^a**	
Carcass weight (kg)	**343**	**344**	**341**	**NS**
Kill-out %	54.4	53.6	53.9	
Carcass conformation score (1-15)	8.5	8.5	8.2	
Carcass fat score (1-15)	10.1	10.2	10.1	
Hide weight (kg)	38.5	38.5	37.6	

Concrete slatted floor (**CSF**)

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Results

	CSF 6.0 m^2/animal	Straw 6.0 m^2/animal	
DM intake (kg/animal/day)	11.1	11.1	
Initial weight (kg)	504	504	
Slaughter weight (kg)	**633^a**	**648^b**	
ADG (kg)	**1.19^a**	**1.34^b**	
FCR (kg DMI/kg ADG)	**9.45^a**	**8.42^b**	
Carcass weight (kg)	**341**	**347**	**NS**
Kill-out %	53.9	53.7	
Carcass conformation score (1-15)	8.2	8.6	
Carcass fat score (1-15)	10.1	10.4	
Hide weight (kg)	**37.6^a**	**39.5^b**	

Concrete slatted floor (**CSF**)

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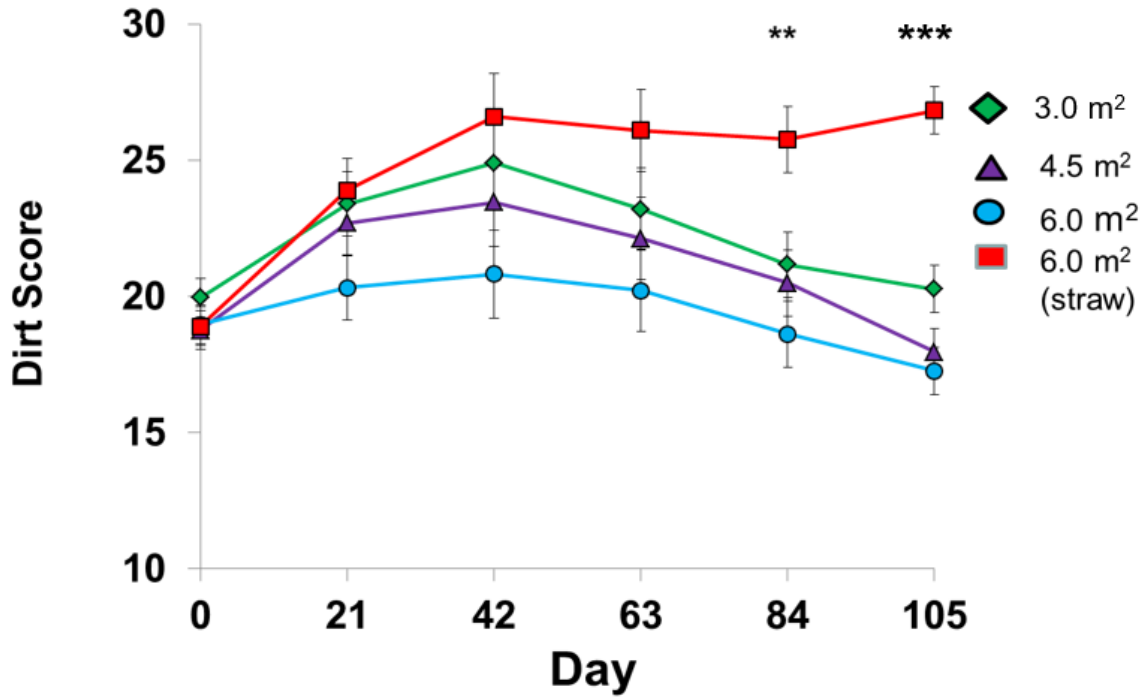
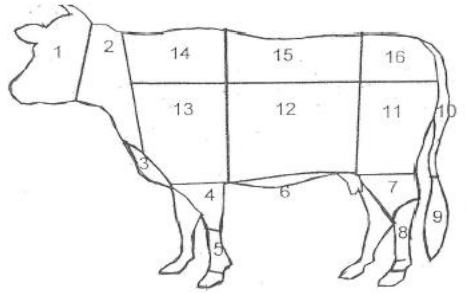
Results – Body dirt scores





Dirt scores
No difference between cattle housed on concrete slats

CSF (6.0m²) *vs* Straw (6.0m²)
**P < 0.01 ***P < 0.001

Welfare variables
No difference in number of hoof lesions and blood immune variables across treatments.
Lying time was not different across the three space allowances on concrete slats.
Lying time was longer (P< 0.01) by one hour/day on straw compared with concrete slatted floors (6.0m²)

Conclusions

- **Space allowance**
  - Increasing space allowance above 3.0 m^2 had no effect on animal intake or carcass weight
  - Animal welfare was not affected by space allowance
- **Floor type**
  - Heifers on straw
    - Improved ADG but had no effect on carcass weight
    - Were dirtier than those on slats by the day of slaughter
    - Lying time was increased by 1 hr on straw bedding

What does the international scientific literature say in relation to space allowance ?

Meta-analysis: Differences in performance and welfare variables of cattle housed at different space allowances on **concrete slatted floors**

	Space allowance/animal				Space allowance/animal			
	< 2.0m^2	2 – 3m^2	Significance	Number of studies	2 – 3m^2	> 3.0m^2	Significance	Number of studies
ADG (kg)	0.58	0.89	**	4	1.15	1.22	NS	3
FCR (kg DMI/kg ADG)	15.95	12.03	**	3	9.7	9	NS	3
Carcass weight (kg)	274	286	*	4	312	317	NS	3
Lying time (hr/day)	10.3	11.3	**	3	12.7	12.9	NS	3
Dirt scores	-	-	-	1	64.7	58.5	**	3

Keane, M.P., McGee, M., O'Riordan, E.G., Kelly, A.P. and Earley, B. 2018. Effect of floor type and space allowance on performance and welfare of finishing beef cattle: A meta-analysis. Livestock Science 212; 57–60.

What does the international scientific literature say in relation to underfoot conditions?

Meta-analysis: Differences in performance and welfare variables of cattle housed on **concrete slatted floors (CSF)** and **straw bedded** floors

	Concrete slatted floors	Straw bedded floors	Significance	Number of studies
ADG (kg)	1.16	1.20	NS	7
FCR (kg DMI/kg ADG)	9.08	8.60	NS	6
Carcass weight (kg)	347	350	NS	7
Lying time (hr/day)	13.4	13.8	NS	4
Dirt scores	42.5	34.1	NS	5

Keane, M.P., McGee, M., O'Riordan, E.G., Kelly, A.P. and Earley, B. 2018. Effect of floor type and space allowance on performance and welfare of finishing beef cattle: A meta-analysis. Livestock Science 212; 57–60.

What does the international scientific literature say in relation to underfoot conditions?

Meta-analysis: Differences in performance and welfare variables of cattle housed on **concrete slatted floors (CSF)** and on **rubber mats** (RM).

	Concrete slatted floors	RM	Significance	Number of studies
ADG (kg)	1.19	1.26	NS	8
FCR (kg DMI/kg ADG)	8.47	8.12	NS	7
Carcass weight (kg)	352	356	NS	8
Lying time (hr/day)	13.3	13.2	NS	8
Dirt scores	39.0	40.7	NS	8

Keane, M.P., McGee, M., O'Riordan, E.G., Kelly, A.P. and Earley, B. 2018. Effect of floor type and space allowance on performance and welfare of finishing beef cattle: A meta-analysis. Livestock Science 212; 57–60.

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