Welfare of dairy cows in continuously housed versus pasture-based systems.

Gareth Arnott, Conrad Ferris, Niamh O’Connell
‘continuous housing

Current trends in British dairy management regimens
M. D. March, M. J. Haskell, M. G. G. Chagunda, F. M. Langford, and D. J. Roberts
Scotland’s Rural College (SRUC) Research, King’s Buildings, West Mains Road, Edinburgh, EH9 3JG, United Kingdom

Grazing dairy cows in North-West Europe
Economic farm performance and future developments with emphasis on the Dutch situation

Reijs et al. 2013
Consumer perception

Ellis et al. 2009
Continuous housing vs. Pasture Systems: What does the science say?

• Review of global dairy science literature
About the review

• Broad review topic: Continuous housing (confinement / zero grazing / TMR) compared to pasture based production systems.

• Aim: review and summarise existing work, prevent duplication of work, identify knowledge gaps, relate findings to NI context.
Finding the studies

• “Web of science” search term: “(zero grazing or confinement or pasture) and (dairy)”

• Yielded 5433 references to sort through

• 196 potentially relevant studies identified
Two main factors that differ

1. Feeding / Nutrition

2. Housing

Animal health and welfare: 90

- Production: 60
- Fertility: 9
- Environmental impact: 10
- Economics: 9
- (Other: 18)
Review: welfare of dairy cows in continuously housed and pasture-based production systems

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Free to download at:
http://www.agrisearch.org/publications/farmer-booklets
Cow Health
‘lameness with Continuous housing

Evidence from controlled experiments

61% v. 17% clinical lameness prevalence

Olmos et al. 2009. Livestock Science, 125, 199-207

Hernandez-Mendo et al. 2007. JDS, 90, 1209-1214
Observational, epidemiological studies

Barker et al. 2010, Chapinal et al. 2013, de Vries et al. 2015
‘Digital dermatitis with continuous housing

- Rodriguez-Lainz et al. 1999
- Wells et al. 1999
- Somers et al. 2003, 2005
- Olmos et al. 2009
- Haufe et al. 2012
Beneficial mechanisms of pasture access? Could these be used to improve housing conditions?

Speculated benefits of pasture
• A comfortable, soft walking surface?
• A hygienic surface?
• Benefits of exercise?
• Improved lying times and resting bouts
Daily grazing time as a risk factor for alterations at the hock joint integument in dairy cows

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Mastitis with continuous housing

<table>
<thead>
<tr>
<th>Mastitis measure</th>
<th>Confined cows</th>
<th>Grazing cows</th>
</tr>
</thead>
<tbody>
<tr>
<td>% cows with at least one case of clinical mastitis</td>
<td>51</td>
<td>31</td>
</tr>
<tr>
<td>Number of cases of clinical mastitis per cow</td>
<td>1.1</td>
<td>0.6</td>
</tr>
<tr>
<td>% of cows with mastitis that were culled or died</td>
<td>9.7</td>
<td>1.6</td>
</tr>
</tbody>
</table>
Somatic cell counts with continuous housing

Fontaneli et al. 2005

Vance et al. 2012

Confinement

Grazing

Somatic cell count (x1000/mL)
Other health problems

Increased risk with continuous housing
- Uterine disease (metritis and endometritis)
- Infectious disease (e.g. salmonellosis)

Increased risk in grazing systems
- Nematode gut parasites
- Liver fluke
Mortality with continuous housing

Burow et al. 2011

Cow behaviour
Freedom to express normal behaviour

- Pasture based systems perceived to offer greater behavioural freedom
- What constitutes “normal” behaviour?
• Grazing, ruminating and resting = 90-95%

• Most grazing performed during the day

• Grazing peaks associated with sunrise and sunset
Few studies have compared behaviour in pasture vs. housed systems

Differences in:

• Feeding behaviour  
  Roca-Fernandez et al. 2013

• Lying/standing  

• Aggression  

• Loss of behavioural synchrony with housing
• Knowledge gaps and implications for welfare?
Assessed by asking what the cow wants!

Preference testing

Indoors
Ad lib TMR

Pasture

Images courtesy of Charlton, Rutter & Motupalli
Summary of studies investigating whether cows prefer to spend their time in a house or at pasture.
Not a simple preference

Modified by a range of factors

Knowledge gaps

Ideal scenario?
Provide cows with both options

Is it practically feasible?
Cow Physiology

‘NEB in pasture systems


Adverse weather as a stressor.

Tucker et al. 2007, Webster et al. 2008, Schutz et al. 2010

Welfare benefits of sunlight?
• ‘DMI
• Improved management of body condition / “NEB
• Not exposed to adverse weather

“when possible, dairy cows and heifers should be given access to well managed pasture or other suitable outdoor conditions, at least during summer or dry weather” (EFSA 2009)

• “lameness, hoof pathologies & hock lesions
• “mastitis & uterine disease
• “mortality
• ‘behavioural freedom and preference for pasture
Conclusions

• Some see a move to continuously housed systems as inevitable.

• Results of this review highlight there are still considerable welfare benefits of incorporating pasture grazing into production systems.

• Research to incorporate the welfare benefits of pasture-based systems within the housed environment.
Thanks for listening!

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