Welfare assessment in broiler farms: Transect walks vs. Individual scoring

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**Introduction**

- Need for practical on-farm animal welfare assessment protocols for meat poultry where large number of animals are maintained

- Main welfare challenges in meat poultry:
  - genetic potential for growth
  - decline of environmental quality
  - poor management
  - excessive density
Introduction

- Animal welfare has major economic relevance for the industry
Introduction

- Available scientific assessment protocols based on random sampling of ~ 150 birds
- Requires herding, enclosing, and handling birds (stress?)
- High time and manpower demands

(Welfare Quality, 2009)
Objective

- Farmers conduct routine checks based on walks through the broiler house
- Our goal: to compare the welfare assessment results of broiler flocks evaluated according to two different approaches:

  Transect walks vs. Classical Individual scoring
### Methodology

- Conducted from April to May 2012
- 6 commercial houses
  - Flock sizes/house: 13,220 to 27,540 broilers (COBB 500)
- Density of 17 birds/m²
- Identical management
Methodology

Transect Walks:

- The line transect methodology has been successfully used in wildlife studies for decades.
Individual Sampling:

- Sample consisted of 25 birds in 6 random locations within each house (0.55% to 1.13% of the total population)
- 3 trained scientist
Methodology

**Transect walks**
- immobile
- severe lameness
- dirty
- sick
- agonizing
- dead

**Individual sampling**
- body weight
- footpad dermatitis (0-4)
- hock burns (0-4)
- breast dirtiness (0-2)
- gait score (scale 0-5)

**Statistical analysis:**
- Frequencies transformed into proportions/transect, assuming random distribution of birds.
- **Mixed-model repeated measures ANOVA** for each welfare indicator.
- Transects: **bootstrapping** – To determine sampling requirements.
Results

Transects: Detection of small variations in the incidence of the welfare indicators
**Transects**: Welfare assessment across observers with the transect walk approach remained consistent for lame, dirty, sick, and dead birds.

<table>
<thead>
<tr>
<th>Welfare indicator</th>
<th>House</th>
<th>Transect</th>
<th>Observer</th>
<th>Transect*Observer</th>
<th>House*Observer</th>
<th>House*Transect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immobile</td>
<td>&lt;.0001</td>
<td>0.9033</td>
<td>0.0208</td>
<td>0.1915</td>
<td>0.1235</td>
<td>0.3163</td>
</tr>
<tr>
<td>Lame</td>
<td>0.0029</td>
<td>0.7996</td>
<td>0.8496</td>
<td>0.2447</td>
<td>0.0502</td>
<td>0.6451</td>
</tr>
<tr>
<td>Dirty</td>
<td>0.0005</td>
<td>0.1003</td>
<td>0.6832</td>
<td>0.1089</td>
<td>&lt;.0001</td>
<td>0.2046</td>
</tr>
<tr>
<td>Sick</td>
<td>0.6293</td>
<td>0.6994</td>
<td>0.6009</td>
<td>0.8107</td>
<td>0.4978</td>
<td>0.9391</td>
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<tr>
<td>Agonizing</td>
<td>&lt;.0001</td>
<td>0.3656</td>
<td>0.0479</td>
<td>0.7908</td>
<td>0.0604</td>
<td>0.3580</td>
</tr>
<tr>
<td>Dead</td>
<td>&lt;.0001</td>
<td>0.0068</td>
<td>0.0502</td>
<td>0.6666</td>
<td>0.0015</td>
<td>0.0020</td>
</tr>
</tbody>
</table>
**Transects:** Expected mean for each house similar to the observed mean value by using as little as 20% of the information for all variables.

**Example of house 3**
Individual sampling: Mobility problems seem very high considering economic consequences. Other indicators comparable with previous studies.
## Results

### Individual sampling:

- **Sensitivity:** lack of significant differences across houses for immobility and hock burns.

- **No transect effect:** homogeneous dispersion of birds with welfare issues within the house.

<table>
<thead>
<tr>
<th>Welfare indicator</th>
<th>House</th>
<th>Transect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immobile</td>
<td>0.7839</td>
<td>0.8495</td>
</tr>
<tr>
<td>Lame</td>
<td>0.0017</td>
<td>0.2616</td>
</tr>
<tr>
<td>Dirty</td>
<td>0.0002</td>
<td>0.7103</td>
</tr>
<tr>
<td>Hock burn</td>
<td>0.0941</td>
<td>0.8095</td>
</tr>
<tr>
<td>Footpad dermatitis</td>
<td>0.0112</td>
<td>0.4577</td>
</tr>
<tr>
<td>Body weight</td>
<td>0.0010</td>
<td>0.8676</td>
</tr>
</tbody>
</table>
• Did observers fail to detect birds within the immobile or severely lame category during transect walks?
### Individual sampling:

- During individual sampling scoring just one bird out of 25 in a category increases the incidence to a 4% for this sample.
- Increasing sampling size would increase further time requirements-solutions?

### Potential issues:

- Herding, enclosing and handling may increase fear.
- Potential stress.
- Painful and tiring forced walking during herding.
- Randomness of the sampling may be compromised.
- ‘Empty area’ evaluation effect.
Discussion

Transect walks:

- Potential as prospective on-farm welfare assessment:
  - reduced time/manpower requirements
  - no bird disruption or handling
  - inter-observer reliability
  - easy to understand and accept by assessors and producers, even to accept it for economical reasons.

- Need improved detection sensitivity
- Validation of the methodology
Thank you for your attention!
Results

Transects: Birds varying in welfare status seem to be homogeneously distributed within the house

<table>
<thead>
<tr>
<th>Welfare indicator</th>
<th>1</th>
<th>2</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immobile</td>
<td>0.18% ± 0.02%</td>
<td>0.22% ± 0.03%</td>
<td>0.20% ± 0.04%</td>
<td>0.19% ± 0.05%</td>
<td>0.21% ± 0.05%</td>
<td>0.21% ± 0.04%</td>
<td>0.19% ± 0.04%</td>
</tr>
<tr>
<td>Lame</td>
<td>0.79% ± 0.06%</td>
<td>0.78% ± 0.07%</td>
<td>0.76% ± 0.10%</td>
<td>0.75% ± 0.07%</td>
<td>0.79% ± 0.09%</td>
<td>0.74% ± 0.09%</td>
<td>0.87% ± 0.15%</td>
</tr>
<tr>
<td>Dirty</td>
<td>0.18% ± 0.04%</td>
<td>0.17% ± 0.04%</td>
<td>0.21% ± 0.08%</td>
<td>0.21% ± 0.05%</td>
<td>0.09% ± 0.03%</td>
<td>0.14% ± 0.04%</td>
<td>0.23% ± 0.09%</td>
</tr>
<tr>
<td>Sick</td>
<td>0.03% ± 0.01%</td>
<td>0.04% ± 0.01%</td>
<td>0.05% ± 0.01%</td>
<td>0.04% ± 0.01%</td>
<td>0.03% ± 0.01%</td>
<td>0.03% ± 0.01%</td>
<td>0.03% ± 0.01%</td>
</tr>
<tr>
<td>Agonizing</td>
<td>0.04% ± 0.01%</td>
<td>0.06% ± 0.01%</td>
<td>0.06% ± 0.02%</td>
<td>0.03% ± 0.01%</td>
<td>0.06% ± 0.02%</td>
<td>0.04% ± 0.01%</td>
<td>0.05% ± 0.02%</td>
</tr>
<tr>
<td>Dead</td>
<td>0.09% ± 0.02%</td>
<td>0.07% ± 0.01%</td>
<td>0.12% ± 0.05%</td>
<td>0.08% ± 0.03%</td>
<td>0.05% ± 0.01%</td>
<td>0.05% ± 0.01%</td>
<td>0.10% ± 0.03%</td>
</tr>
</tbody>
</table>

possibility of transects number reduction