On-farm welfare assessment in dairy cattle

Improving animal welfare: a practical approach

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Luc Mounier
Unité Gestion des élevages, VetAgro Sup
Equipe Adaptation et Comportements Sociaux, URH, INRA
luc.mounier@vetagro-sup.fr
Presentation of the Welfare Quality protocol

Behavioural observations

Sanitary inspection

Resource and management
Farmer

Management

Resources

Dairy cows

Welfare

Presentation/ behavioural observations / sanitary inspection/ resource and management
Farmer Management Resources

Dairy cows Welfare Measures Welfare assessment
Welfare assessment using the Welfare Quality(R) protocol
Welfare assessment using the Welfare Quality(R) protocol

Presentation/ behavioural observations / sanitary inspection/ resource and management

Product information

Measures → Criteria → Principles → Overall assessment
Welfare assessment using the Welfare Quality(R) protocol

Presentation/behavioural observations/sanitary inspection/resource and management

Identification of risk factors advices to the farmers

Measures → Criteria → Principles → Overall assessment
Presentation / behavioural observations / sanitary inspection / resource and management

Management

Resources

Dairy cows

Risk factors

Advises / action

Farmer

Welfare

Welfare assessment

Measures

Society

Trade

Product information
Welfare assessment ??

Resource-based measures

Animal -based measures
Welfare assessment ??

Resource-based measures

Disposition, number, ...

Quality, quantity of the litter, ...

Ergonomics, ...

Presentation/ behavioural observations / sanitary inspection/ resource and management
Welfare assessment??

Animal-based measures
Welfare assessment ??

Resource-based measures
- Easy to assess (?)
- Repeatable, reproducible, stability
- Feasible
- Validity ?

Animal-based measures
- Easy to assess (?)
- Time consuming validity

Identification of risk factors
Necessity of several measures

Current welfare status of animals
Based on animal-based measures

If possible, measures have to be

Valid
Repeatable, ...
Feasible: whole visit < 1 day

If not

Resource-based measures
<table>
<thead>
<tr>
<th>Welfare Criteria</th>
<th>Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Good feeding</strong></td>
<td></td>
</tr>
<tr>
<td>1. Absence of prolonged hunger</td>
<td>Body condition score</td>
</tr>
<tr>
<td>2. Absence of prolonged thirst</td>
<td>Water provision, cleanliness of water points, water flow, functioning of water points</td>
</tr>
<tr>
<td><strong>Good housing</strong></td>
<td></td>
</tr>
<tr>
<td>3. Comfort around resting</td>
<td>Time needed to lie down, animals colliding with housing equipment during lying down, animals lying partly or completely outside the lying area, cleanliness of udders, cleanliness of flank/upper legs, cleanliness of lower legs</td>
</tr>
<tr>
<td>4. Thermal comfort</td>
<td>As yet, no measure is developed</td>
</tr>
<tr>
<td>5. Ease of movement</td>
<td>Presence of tethering, access to outdoor loafing area or pasture</td>
</tr>
<tr>
<td><strong>Good health</strong></td>
<td></td>
</tr>
<tr>
<td>6. Absence of injuries</td>
<td>Lameness (loose housed animals), lameness (tied animals), integument alternations</td>
</tr>
<tr>
<td>7. Absence of disease</td>
<td>Coughing, nasal discharge, ocular discharge, hampered respiration, diarrhoea, vulvar discharge, milk somatic cell count, mortality, dystocia, downer cows</td>
</tr>
<tr>
<td>8. Absence of pain induced by management procedures</td>
<td>Disbudding/dehorning, tail docking</td>
</tr>
<tr>
<td><strong>Appropriate behaviour</strong></td>
<td></td>
</tr>
<tr>
<td>9. Expression of social behaviours</td>
<td>Agonistic behaviours</td>
</tr>
<tr>
<td>10. Expression of other behaviours</td>
<td>Access to pasture</td>
</tr>
<tr>
<td>11. Good human-animal relationship</td>
<td>Avoidance distance</td>
</tr>
<tr>
<td>12. Positive emotional state</td>
<td>Qualitative behaviour assessment</td>
</tr>
</tbody>
</table>
Welfare assessment

Resource-based measures
- Checklist
- Management questionnaire

Animal-based measures
- Sanitary inspection
- Behavioural observations

4 steps during the visit
- Morning after milking
- Afternoon (after lunch)
- Morning after milking
- When possible (after behaviour)
Presentation of the Welfare Quality protocol

Behavioural observations

Sanitary inspection

Resource and management
Behavioural observations: 3 steps

- Good human-animal relationship $\rightarrow$ Avoidance distance
- Positive emotional state $\rightarrow$ Qualitative behaviour assessment
- Expression of social behaviours $\rightarrow$ Agonistic behaviours
- Comfort around resting $\rightarrow$ Time needed for lying down
- Collision with equipments
- Animals lying outside the lying area
Good human-animal relationship
Avoidance distance

Continue to walk until signs of withdrawal occur, or until you can touch the nose/muzzle.

The same sample size as for clinical scoring.
Positive emotional state
Qualitative behaviour assessment

First: define segments of observation (1 to 8)

Second: release animals
Objectives: how animals behave and interact with each other and the environment: are animals bored, frustrated, happy, ...

“body language”
Positive emotional state
Qualitative behaviour assessment

20 min observation time

Only one integrative assessment per farm

The terms used for dairy cow QBA assessment are:

- Active
- Relaxed
- Fearful
- Agitated
- Calm
- Content
- Indifferent

- Frustrated
- Friendly
- Bored
- Playful
- Positively occupied
- Lively
- Inquisitive

- Irritable
- Uneasy
- Sociable
- Apathetic
- Happy
- Distressed

Min. ___________________________ Max. ___________________________
Expression of social behaviour
Agonistic behaviour

During this time:
- Agonistic behaviours
- Number of coughs
- Comfort around resting

How?

Continuous behaviour sampling

120 minutes (≠ segments)
Presentation/ behavioural observations / sanitary inspection/ resource and management

Expression of social behaviour
Agonistic behaviour

Continuous behaviour sampling
Segment 1
Continuous behaviour sampling
Segment 2

Scan of start Segment 1
Scan of end Segment 1
Scan of start Segment 2
Scan of end Segment 2

Agonistic behaviours
Number of coughs
Time needed to lie down
Collision

Number of animals
Animals lying in/outside the area
Expression of social behaviour
Agnostic behaviour

Which behaviours?

In Loose housing
- Head butt
- Displacement
- Chasing
- Chasing up
- Fighting

In tie stalls only:
- Head butt
- Displacement
- Chasing up
Expression of social behaviour
Agonistic behaviour

Which behaviours?

Head butt
Interactions involving physical contact (butting, hitting, thrusting, sticking or pushing) with a *forceful movement*. The *receiver does not give up its present position* (no displacement)

Displacement
Like head butt but the *receiver gives up its position*
Expression of social behaviour
Agonistic behaviour

Which behaviours?

Fighting
Two contestants vigorously pushing their heads... Both exerting force against each other.
A new bout starts if the same animals restart fighting after more than 10 seconds or if the fighting partner changes

(c) Hetreau
Expression of social behaviour

Agonistic behaviour

Which behaviours?

**Chasing**
The actor makes an *animal flee* by following fast or running behind it. It is only recorded if it is *follows an interaction with physical contact* (except after fighting)

**Chasing-up**
The actor uses a forceful physical contact against a *lying animal* which makes the receiver rise.
A minimum of 6 animals have to been observed

**Start**: when one carpal joint of the animals is bent and lowered (before touching the ground)

**Stop**: when the hind quarter of the animal has fallen down and the animal has pulled the front leg out from underneath the body
Comfort around resting
Time needed to lie down

During lying down movements for which time has been recorded
Collision *seen or heard*

(c) Lensink
Comfort around resting

Number of animals lying outside of the lying area

Number of animals which are lying with:
- Their hind quarter on the edge of the cubicle or the deep littered area
- the both hind quarters completely outside the supposed lying area
Comfort around resting
Number of animals lying outside of the lying area

Outside or not?
Welfare assessment

Resource-based measures
- Checklist
- Management questionnaire

Animal-based measures
- Sanitary inspection
- Behavioural observations

Presentation/behavioural observations / sanitary inspection/ resource and management
Presentation of the Welfare Quality protocol

Behavioural observations

Sanitary inspection

Resource and management
Sanitary inspection

Absence of prolonged hunger

Appropriate behaviour

Good health

Absence of disease

Good feeding

Absence of injuries

Good housing

Comfort around resting
Sanitary inspection
Sample size

depends to herd size

For:
- sanitary inspection
- avoidance distance

<table>
<thead>
<tr>
<th>Herd size</th>
<th>Number of animals to score (suggestion A)</th>
<th>If A is not feasible</th>
</tr>
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<tr>
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<td>53</td>
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</table>
For a cow:

- Body condition score
- Cleanliness scoring
- Integument alterations
- Clinical signs
- Locomotion scoring

Cow is blocked at the feed stalls

Cow is walking
Sanitary inspection
Body condition score

View the animal from behind and from the side

Animals must not be touched

4 body regions: if more than 3 “very lean” → too thin

Only very lean cows are taken into account
Sanitary inspection
Body condition score: 4 body regions

Cavity around tail head

Very lean

Deep cavity around tail head

Very fat

Tail head cavity full and folds of fatty tissue present
Sanitary inspection
Body condition score: 4 body regions

Very lean

Loin

Deep depression between backbone and hipbone

Loin

Very fat

Convex between backbone and hipbone

(c) Rodenburg / Omafra
Sanitary inspection

Body condition score: 4 body regions

Vertebrae

Very lean

Very fat

Ends of transverse processes sharp

Transverse processes not discernible
Sanitary inspection

Body condition score: 4 body regions

**Very lean**

**General**

**Very fat**

tailhead, hip bones (tuber coxae), spine and ribs prominent
Sanitary inspection
Cleanliness scoring

Three areas have to be considered

Hind quarters

Udder

Lower hind legs
Two degree of dirt have to be considered

**Splashing** (e.g. faeces, mud)

**Plaques**: three-dimensional layers of dirt amounting to the size of the palm of a hand or if more than half of the area under consideration is covered.
Sanitary inspection
Cleanliness scoring

**Lower hind legs:**
-0: no dirt or minor splashing
-2: separate or continuous plaques of dirt above the coronary band

**Hind quarters:**
-0: no dirt or minor splashing
-2: separate or continuous plaques of dirt

**Udder:**
0- no dirt or minor splashing, other than on teats
2- distinct plaques of dirt on udder or **any dirt on and around the teats**
Sanitary inspection
Cleanliness scoring

Dirty ?
Not dirty ?
Sanitary inspection
Cleanliness scoring

Dirty ?
Not dirty ?
From a distance not exceeding 2 m, **five body regions on one side**

Sanitary inspection
Integument alterations
Two types of integument alterations:
- Hairless patches
- Lesion/swelling

- All skin alterations ≥ 2cm are counted
- If different categories of alterations at the same location ➔ all these alterations are counted.

- If more than 20 alterations per category ➔ note “> 20”
- If the total area affected is ≥ the size of a hand ➔ note “>20”
Sanitary inspection
Integument alterations

**Hairless patches:**
- Area with hair loss
- Skin not damaged
- Extensive thinning of the coat due to parasites
- Hyperkeratosis possible
Lesion/swelling:
-Damaged skin either in form of a scab or a wound
-Dermatitis due to ectoparasites
-Completely or partly missing teats
-Ear lesions due to torn off ear tags
-Obvious increase in circumference compared to sound state
Sanitary inspection
Integument alterations

Lesion?
Sanitary inspection
Integument alterations
Sanitary inspection
Integument alterations
Nasal discharge
Ocular discharge
Hampered respiration
Diarrhoea
Vulvar discharge
(Coughing during behavioural observations)
(milk somatic cell count during management questionnaire)
All animals should be observed, from the side and/or behind, when walking in a straight line on a hard, level, non-slippery surface on which they would normally walk (not when they are turning).

The following gait attributes are taken into account:
- Timing of steps
- Temporal rhythm
- Weight-bearing on feet

0-not lame: timing of steps and weight-bearing equal on all four feet
1-lame: imperfect temporal rhythm in stride creating a limp
2- severely lame: strong reluctance of bear weight on one limb, or more than one limb affected
Sanitary inspection
Locomotion scoring

Lame?
Not lame?
Welfare assessment

Resource-based measures

Animal-based measures

Checklist

Management questionnaire

Sanitary inspection

Behavioural observations
Presentation of the Welfare Quality protocol

Behavioural observations

Sanitary inspection

Resource and management
Checklist

Presentation/ behavioural observations / sanitary inspection/ resource and management

- Appropriate behaviour
- Good health
- Good feeding
- Good housing
- Absence of prolonged thirst
Absence of prolonged thirst

**Water provision**: number of each type of water points or length of troughs in cm

**Cleanliness of water points**: clean, partly dirty, dirty

**Water flow**: amount of water in L/min per water points
Welfare assessment

- Resource-based measures
  - Checklist
  - Management questionnaire

- Animal-based measures
  - Sanitary inspection
  - Behavioural observations

Presentation/ behavioural observations / sanitary inspection/ resource and management
Management questionnaire

Presentation/behavioural observations / sanitary inspection/resource and management

- Appropriate behaviour
- Good health
- Good feeding
- Good housing
- Ease of movement
- Absence of disease
- Absence of pain
- Other behaviours
Duration depends on sample size/herd size:
- Avoidance distance: 1 min/animal
- Clinical scoring: 3 min/animal

Duration independent of sample size:
- QBA: 20 min (+5 min extra)
- Behavioural observations: 120 min (+30 min extra)
- Resources checklist: 10 min
- Management questionnaire: 15 min

<table>
<thead>
<tr>
<th></th>
<th>30</th>
<th>60</th>
<th>120</th>
<th>200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample size</td>
<td>30</td>
<td>37</td>
<td>54</td>
<td>65</td>
</tr>
<tr>
<td>Duration variable (min)</td>
<td>120</td>
<td>148</td>
<td>216</td>
<td>260</td>
</tr>
<tr>
<td>Duration non variable (min)</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>Total duration (h)</td>
<td>5:20</td>
<td>5:50</td>
<td>6:55</td>
<td>7:40</td>
</tr>
</tbody>
</table>
http://www1.clermont.inra.fr/wq/
Thank you for your attention