Cattle signs in assessment of nutrition

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Learning objectives

• What are cattle signs
• How to use cattle signs in assessment of nutrition
• Behavioural parameters
• Skin and hair coat
• Assessment of feeding
• Physiological parameters
What are cattle signs?

• Parameters that can be observed and measured
  – Behavioural
  – Physiological
  – Management

• Only one tool that can assist in assessment
  – Not intended to replace existing tools
  – Should be used holistically

• Used to assess health, welfare, management and productive capacity
How to use cattle signs?

- **Qualitative**
  - Deviation of a sign from pre-determined baseline

- **Quantitative**
  - Severity of the deviation from ‘normal’

- **Factors that affect a particular sign**
  - e.g. Demeanour
    - Health
    - Conditions
    - Environment
    - Management
    - Infectious or toxic disorder
    - Signalment
    - Weather, presence of foreign objects/noise
    - Animal-human contact, handling experience

- **Diagnosis based on holistic approach**
  - No individual measure is sufficient
Uniformity of the group

- Cattle from a feeding group should be fairly uniform
  - e.g. body condition score (BCS)
  - Acceptable outliers
    - Lactating cows <20%
    - Beef <15%
- Non-uniform group formed longer than a month indicates possible problem

Cattle not uniform (e.g. big Friesian and small jersey)
Assessment of nutrition of cattle

- Variety of approaches
  - Nutritional analysis
    - Feed components
    - Quality, quantity
    - Diet composition
  - Metabolic profiling
  - Assessment of production
  - Cattle signs

- Representative sample?
- Does not take into account difference in diet
  - Calculated
  - Prepared and offered
  - Eaten

- Selection of patients
- Invasiveness

- Cattle know what is going on
Cattle signs in assessment of nutrition

• Evaluate
  – Ration balance, Rumen fermentation, Digestive function and General herd health

• Behavioural signs
  – Mentation
  – Appetite, Thirst, Prehension, Rumination

• Physiological signs
  – Rumen fill, Faecal score, Faecal digestibility
  – BCS, Hair coat

• Management signs
  – Hygiene
  – *Diet’s ‘stretch and scratch’ factor*
Behavioural parameters

Demeanour
Reaction to environment

Behaviour
Reaction to stimuli
Behavioural parameters

- Demeanour and Behaviour
- In a specific environment
  - Overcrowded space
  - Narrow walkways
  - Corners
- Social interactions
  - ‘Personal space’
  - ‘Flight zone’
- Brightness and alertness
- Depressive or excitable
- Scale 1-5
  - 1: normal
  - 5: completely unresponsive or frenzy
Behavioural parameters cont’d

• Cattle
  – Herd animals
  – Do things in groups
  – Become stressed when separated

• Assess in a group

• Individual patient that isolate themselves from group or do thing slower most likely
  – Ill
  – Injured
  – Stressed
Skin and hair coat

Impression of overall quality of nutrition
Lick marks
Coat quality
Colour
Overall clinical impression
Faecal perineal staining
Skin and hair coat

• Impression of overall quality of nutrition
  – Limited value due to range of conditions causing changes

• Lick marks
  – Absence (e.g. Rumen acidosis)

• Coat quality
  – Dullness (e.g. undernutrition, several deficiencies)
Skin and hair coat cont’d

• Colour
  – Discolouration (e.g. Cu deficiency)

• Overall clinical impression
  – e.g. undernutrition, imbalanced diet, Zn deficiency
  – Photosensitisation
  – Skin disorders
Skin and hair coat cont’d

- Faecal perineal staining
- Scale 1 (clean) to 5 (dirty)
- Nutritional problems
  - e.g. SARA
- Environmental conditions
  - e.g. Sudden weather change
- Disorders of alimentary system
  - e.g. Enteritis
- Disorders of other systems
  - e.g. CHF, Amyloidosis
- Infectious diarrhoea
  - e.g. Johne’s disease, GIT parasitism
Assessment of feeding

Appetite
Thirst
Prehension
Rumination
Appetite

- Normal
- Depressed (inappetence)
  - Acidosis
  - Diet quality (offensive smells) and composition (e.g. mouldy)
  - Physico-chemical properties of diet (e.g. too high fibre content)
- Increased (polyphagia)
  - Hunger
- Abnormal (allotriophagia, pica)
  - Imbalanced diet (e.g. mineral deficiencies – P)
- Absent (anorexia)
  - Acute rumen acidosis
Thirst

• Water
  – Quality
  – Quantity
  – Availability
• Social interactions
• Thirst
  – Normal (eudipsia)
  – Increased (polydipsia)
    • Decreased water content in diet, Hot weather
  – Decreased (oligodipsia)
    • Increased water content in diet
  – Absent (adipsia)
    • Severe Acute rumen acidosis
Prehension

• Act of grasping the food and ability to drink with the mouth

• Abnormality usually indicated disorders or trauma
Rumination

- Indicative of health
- Time spent on rumination
  - Feed quality and quantity
    - Adequacy of fibre
  - Availability and quality of space for rest
- 7-10/24 hrs
  - 70-85% of all resting cattle
- 50-70 chewing movements per bolus
  - <50 insufficient fibre
  - >70 too much fibre
Physiological parameters

Rumen fill (gut fill)
Faecal scoring
Scoring of digestive function
Faecal admixtures
BCS
Rumen fill scoring

- **Degree of rumen fill**
  - Function of feed intake, fermentation rate and the rumen outflow rate

- **Rumen fill score**
  - Assesses food intake and rate of moving of ingesta through alimentary tract
  - Visual assessment carried out from behind and slightly to the left of the patient

- **Scale 1 - 5**
  - 1: Empty
  - 5: Full
Faecal scoring

• Faecal scoring assesses digestibility of the food
  – Balance of protein, fibre and digestible carbohydrates
  – Water intake

• By observation

• Scale 1 – 5
  – 1: Very liquid
  – 5: Very hard

Faecal score 1
Faecal score 2
Faecal score 3
Faecal score 4
Faecal score 5
Scoring of digestive function

• Assessment
  – Sliding the boot through the upper 1-2 cm of the pat
  – Hand squeeze with gloved hand
  – Sieving (running water 30 seconds)
    • residual material is used to qualify the digestion of consumed food

• Scale 1 – 5
  – 1: Homogenous with no visible undigested particles
  – 5: Big food particles
# Faecal admixtures

<table>
<thead>
<tr>
<th>Component in the faeces</th>
<th>Reasons</th>
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<tbody>
<tr>
<td>Undigested fibre</td>
<td>- Higher than normal speed of passage of the ingesta through the digestive tract</td>
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<tr>
<td></td>
<td>- Poor formation of rumen mat</td>
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<tr>
<td></td>
<td>- Poor digestion or rumen fermentation</td>
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<td></td>
<td>- Forages of poor quality</td>
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<tr>
<td></td>
<td>- Poor rumination</td>
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<tr>
<td>Undigested grain</td>
<td>- Higher than normal speed of passage of the ingesta through the digestive tract</td>
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<tr>
<td></td>
<td>- Poor formation of rumen mat</td>
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<td></td>
<td>- Poor digestion, particularly acidosis</td>
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<td>- Problems with processing the grain (not broken)</td>
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<td>- Very dry silage</td>
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<td>- Slug feeding</td>
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<td></td>
<td>- NOTE: often husk only present and starch digested – careful assessment required</td>
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<tr>
<td>Mucin</td>
<td>- Acidosis</td>
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<td>- Increase in the digestive role of the hindgut</td>
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<td></td>
<td>- Excessive acid production in the hindgut</td>
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<tr>
<td>Bubbly diarrhoea</td>
<td>- Excess in fermentable carbohydrate, particularly compared to fibre content – often characterised by putrid smell</td>
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<tr>
<td></td>
<td>- Acidosis (due to hind gut fermentation of carbohydrates and formation of gas) – often characterised by acidic smell</td>
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<tr>
<td>Variability within the group of cattle</td>
<td>- Feedstuffs not mixed well</td>
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<td>- Parts of food mouldy</td>
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Body condition scoring (BCS)

- Indicator of past nutrition
- Each feeding group separately
- BCS
  - Visual assessment of amount of muscle and fat covering bones
  - Independent of liveweight, gut fill or pregnancy

- Monitor absolute body condition score (too fat, too thin)
- Monitor rate of change
  - Important in early lactation
    - Rapid and high change - reduced fertility and health
Why BSC cattle?

- Affects
  - milk production and reproductive performance
- Enables
  - comparison of cattle on a farm with recommended targets
  - Better management of feeding a herd

- Dairy cows
  - 1 to 5 (USA, Eu)
  - 1 to 8 (Au)
  - 1 to 10 (NZ)

- Beef
  - 1 to 5 (Au)
  - 1 to 10 (USA)
Conversion from scale-to-scale

- Not straightforward
- Roche et al, 2004, JDS, 87, 3076-79

Australian dairy BCS system (1-8 scale)

<table>
<thead>
<tr>
<th>Body condition score</th>
<th>1-5 scale</th>
<th>1-8 scale</th>
<th>1-10 scale</th>
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NZ dairy BCS system (1-10 scale)
Information appraisal

- Prehension
- Appetite
- Thrust
- Rumen fill
- Rumination
- Faecal score
- Digestibility score
- BCS
- What is going on now
- What was going on last 2-12 hours
- What was going on 2-24 hours
- What was going on last 12-42 (72) hours
- What was going on 4-12 weeks ago
Take home messages

• Cattle signs are subjective and objective measures aimed to identify problem areas
  – Nutrition
  – Facility
  – Management

• Appraisal of
  – Cow behaviour
  – Physiological parameters
  – Management parameters
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Question time