Dairy Learning Lab

Animal health and reproduction
Tanzania 22-23 June
Zambia 25 – 26 June
Uganda 29 -30 June

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Importance prevention, naturalness, treatment

a) On natural behaviour
b) On healthy looking animals
c) On reproduction

a) On preventive management
b) On diseases and illnesses
c) On farmers solutions

a) On advisory
Animal health management
3-step approach

1st step: Prevent introduction and multiplication of infections

2nd step: Provide good growing conditions

3rd step: Direct control (treatment of the animal)
Preventive measures (1st step)

- Proper selection of breeds
- Quarantine measures
- Vaccination
- Regular monitoring
Growing conditions

- Proper housing and sanitation
- Stress-free handling
- Proper feeding
Direct treatment (3rd step)

- In case preventive measures are insufficient
- Treatment with chemical drugs and antibiotics only in case of infection
- Stick to the required waiting period before selling products as organic
# Diseases from cattle to humans (Zoonoses)

<table>
<thead>
<tr>
<th>Disease</th>
<th>Transmission via</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuberculosis, Q-fever</td>
<td>Air, milk</td>
</tr>
<tr>
<td>Brucellosis</td>
<td>Milk, wounds, contact</td>
</tr>
<tr>
<td>Salmonellosis</td>
<td>Faeces</td>
</tr>
<tr>
<td>Leptospirosis</td>
<td>Water and food</td>
</tr>
<tr>
<td>Listeriosis</td>
<td>Cheese, water, vegetables</td>
</tr>
<tr>
<td>E-coli</td>
<td>Meat, faeces</td>
</tr>
<tr>
<td>Anthrax</td>
<td>Meat</td>
</tr>
<tr>
<td>Liver fluke</td>
<td>Contaminated greens</td>
</tr>
<tr>
<td>Rabies</td>
<td>Bites, wounds</td>
</tr>
<tr>
<td>Tape worms</td>
<td>Meat</td>
</tr>
<tr>
<td>Lice, mites, ringworm</td>
<td>Contact</td>
</tr>
<tr>
<td>Paratuberculosis</td>
<td>Milk</td>
</tr>
</tbody>
</table>
Why keep animals healthy?

• Happy animal => happy farmer
  – Animal welfare
  – Higher production
    • More milk
    • Better weight gain
    • Better reproduction
  – Longevity
  – Lower veterinarian costs
  – Less medicine in products and environment
  – Less risk for humans
a) on natural behaviour
Naturalness
milking
Natural conditions
Always feed and fresh water
Surface
Mutilations

Taking parts away from an animal/abusing integrity of animal

- Dehorning
- Removing extra teats
- Tail docking
- Clipping part of ear
- Branding numbers
- Tattooing numbers
Watch the herd

• Watch the herd few times a day
• Do animals show synchronic behaviour
• What do you see
• What causes this
• What do you conclude from that
• Is action needed and do you take action, or why not?
Watch the individual cow

- Awareness/attention
- Shiny coat, happy lines
- Development in relation to age
- Cleanliness
- Body condition
- Rumen fill and ruminating
- Skin damages/swellings/hairless patches
- Locomotion
- Behaviour
- Discarding from eye, nose, vulva
- Claws
Care ...
b) on healthy looking animals
Sings of a healthy herd

• Alertness
• Move easily with the group
• Strong legs
• Rounded bodies
• Erect ears
• Bright looking coat
• Normal body temperature (37.5- 39.5)
• Rosy-pink mucosal membranes (eye, vulva, nose, muzzle)
• Easy breathing
Welfare quality assessment

- Hindquarter
- Neck/shoulder/back
- Tarsus (incl. hock)
- Carpus
- Flank/side/udder
## Cleanliness

<table>
<thead>
<tr>
<th>Region</th>
<th>Acceptable</th>
<th>Dirty</th>
</tr>
</thead>
<tbody>
<tr>
<td>lower hind legs (coronary band to hock)</td>
<td>WQ Score 0 little or no dirt, minor splashing</td>
<td>WQ Score 1 separate or continuous plaques of dirt above the coronary band (a)</td>
</tr>
<tr>
<td>hind quarter and flank (upper leg, flank and rear view excluding udder)</td>
<td>WQ Score 0 no dirt, minor splashing of dirt</td>
<td>WQ Score 1 separate or continuous plaques of dirt (a)</td>
</tr>
<tr>
<td>udder</td>
<td>WQ Score 0 no dirt, minor splashing of dirt</td>
<td>WQ Score 1 distinct plaques of dirt on udder or around the teats (a)</td>
</tr>
<tr>
<td>teats</td>
<td>WQ Score 0 no dirt present</td>
<td>WQ Score 1 ANY dirt on teats (b)</td>
</tr>
</tbody>
</table>

**a.** Plaques” of dirt are three dimensional (have a thickness) and amount to the size of the **palm of a hand**, or more than half the area under consideration is covered

**b.** Record “2” if the area that is covered with dirt is lager than a diameter of 2 cm.
**Body condition: average is OK**

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - Emaciated</td>
<td>The individual vertebrae of the spine are prominent. The short ribs are sharp to the touch and give a shelf-like appearance to the loin. The hook and pin bones of the pelvis are well defined. The anal area of the cow is receded displaying a prominent vulva. Considered unfit to travel.</td>
</tr>
<tr>
<td>2 - Thin</td>
<td>The short ribs can be felt but are less outstanding. The hook and pin bones are still well-defined, though the area around the anus is less sunken and the vulva is prominent.</td>
</tr>
<tr>
<td>3 - Average</td>
<td>The short ribs are palpable with slight pressure. There is no shelf-like appearance to this area. The spine and hook and pin bones are all rounded and smoothed over. The anal area is filled out, and there is no evidence of fat deposits.</td>
</tr>
<tr>
<td>4 - Heavy</td>
<td>The short ribs are rounded over with no evidence of a shelf-like appearance and may only be felt with firm palpation. The ridge of the backbone is flattened over the loin and rump areas. The hook bones are smoothed over and the area around the pin bones shows some fat deposits.</td>
</tr>
<tr>
<td>5 - Fat</td>
<td>The bone structures of the spine, hook and pin bones, and short ribs are not discernible. There are fat deposits around the tailhead and over ribs. The thighs curve out and the brisket and flanks appear to be very full and heavy.</td>
</tr>
</tbody>
</table>
Hairless/lesion/swelling
Faeces consistency

1. thin fluid, „pea suppe“, slop, no rings or dimples,
2. thin pulp, faeces less than 2.5 cm high, rings
3. medium pulp, like „porridge“, faeces 3 to 4 cm high, rings, dimples, sticking to the tip of your gumboot
4. thick, not sticking, faeces 5 to 8 cm high, no rings, dimples
5. compact faeces, faeces higher than 8 cm
Discharge eyes, nose, vulva
Locomotion score

• 0 – Not Lame: Timing of steps and weight-bearing equal on all four feet.

• 1 – Lame: Imperfect temporal rhythm in stride creating a limp (irregular foot fall – uneven temporal rhythm between hoof-beats, weight not borne for equal time on each of the four feet)

• 2 – Severely Lame: Strong reluctance to bear weight on one limb, or more than one limb affected.
Claw assessment

The six criteria of a normal claw are:
• plane surface
• claw not bended
• two claws of one leg of the same length (in cows: about 7.5 cm)
• no or little space between claws
• contact to surface of the whole claw
• angle to ground near 50°

If 2 criteria of a normal claw are not fulfilled on at least one of the examined claws you score “overgrown claws”.

not fulfilled
### Score list animal welfare

<table>
<thead>
<tr>
<th>Cow name/number</th>
<th>cleanliness</th>
<th>tarsus</th>
<th>0</th>
<th>1</th>
<th>ns</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>hindquater</td>
<td>0</td>
<td>1</td>
<td>ns</td>
<td></td>
</tr>
<tr>
<td></td>
<td>udder</td>
<td>0</td>
<td>1</td>
<td>ns</td>
<td></td>
</tr>
<tr>
<td></td>
<td>teats</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>ns</td>
</tr>
<tr>
<td>integument</td>
<td>hairless</td>
<td>lesion</td>
<td>swell</td>
<td></td>
<td></td>
</tr>
<tr>
<td>tarsus</td>
<td></td>
<td></td>
<td>ns</td>
<td></td>
<td></td>
</tr>
<tr>
<td>hindquarter</td>
<td></td>
<td></td>
<td>ns</td>
<td></td>
<td></td>
</tr>
<tr>
<td>neck/shoulder/back</td>
<td></td>
<td></td>
<td>ns</td>
<td></td>
<td></td>
</tr>
<tr>
<td>carpus</td>
<td></td>
<td></td>
<td>ns</td>
<td></td>
<td></td>
</tr>
<tr>
<td>flank/ side/udder</td>
<td></td>
<td></td>
<td>ns</td>
<td></td>
<td></td>
</tr>
<tr>
<td>other</td>
<td></td>
<td></td>
<td>ns</td>
<td></td>
<td></td>
</tr>
<tr>
<td>nasal dis</td>
<td></td>
<td>0</td>
<td>1</td>
<td>ns</td>
<td></td>
</tr>
<tr>
<td>ocular dis</td>
<td></td>
<td>0</td>
<td>1</td>
<td>ns</td>
<td></td>
</tr>
<tr>
<td>vulvar dis</td>
<td></td>
<td>0</td>
<td>1</td>
<td>ns</td>
<td></td>
</tr>
<tr>
<td>incr respiration rate</td>
<td></td>
<td>0</td>
<td>1</td>
<td>ns</td>
<td></td>
</tr>
</tbody>
</table>

**Breed**

**BCS**

*faeces consist.*
c) On reproduction
Reproduction cycle

- Calving: 0 days
- Uterine involution: 45 days
- Resumption of ovarian activity: 365 days
- Detection of oestrus: 90 days
- Decision to breed: 0 days
- Conception: 90 days

POST-PARTUM PERIOD: 0 days

GESTATION: 365 days
Oestrous cycle

- Hormone Concentration
- Dominant Follicle
- Progesterone from CL
- LH
- Dominant Follicle that ovulates
- Estrus
- Atretic Follicles
- Estradiol
- FSH
- Days Relative to Estrus
- 1st Wave
- 2nd Wave
- Atretic Follicles
Growth and Regression of the CL

Prostaglandin F2α (PG)
(destructs the CL)

Progesterone
(needed for establishment of pregnancy)

Ovulation
(release of the egg)

FSH precedes recruitment of follicles
Luteinizing Hormone (LH)

LH promotes follicular growth

Surge release of LH induces ovulation
Time to breed

**BEFORE HEAT (6-10 Hours)**
- Bawls Frequently
- Smells other cows
- Attempts to ride other cows
- Vulva moist, red, slightly swollen
- Restless

**STANDING HEAT (18 Hours)**
- Stands to be ridden
- Nervous and excitable
- Rides other cows
- Vulva moist and red
- Clear mucous discharge
- Head up
- Other cows excited by smell

**AFTER HEAT (10 Hours)**
- Will not stand
- Clear mucous

**LIFE OF EGG (6-10 Hours)**
- Egg Released

- Hours 0: TOO EARLY
- Hours 6 & 9: GOOD
- Hours 18: EXCELLENT TIME TO BREED
- Hours 24 & 28: TOO LATE
<table>
<thead>
<tr>
<th>Variable</th>
<th>Aim</th>
<th>Real</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at first calving (month)</td>
<td>24</td>
<td>24-36</td>
</tr>
<tr>
<td>Number of mating's/AI</td>
<td>1 – 1.3</td>
<td>1-4</td>
</tr>
<tr>
<td>Interval calving-1(^{st}) mating (month)</td>
<td>3-6</td>
<td>3-12</td>
</tr>
<tr>
<td>Calving interval (month)</td>
<td>12</td>
<td>12-24</td>
</tr>
<tr>
<td>Calving dystocia, %</td>
<td>5</td>
<td>5-30</td>
</tr>
<tr>
<td>Stillborn calves, %</td>
<td>5</td>
<td>5-50</td>
</tr>
<tr>
<td>Hormone use, %</td>
<td>5</td>
<td>0-40</td>
</tr>
<tr>
<td>Antibiotic use, %</td>
<td>5</td>
<td>0-40</td>
</tr>
</tbody>
</table>
Aiming at calving at 2 year

• When fed well, heifers are able to have the first calve at 24 month of age

• A cows lasts for 8 years.
• Calving at an age of 2, gives 6 years of production
• Calving at an age of 3, gives 5 years of production

• The yield per year is the same
• The costs of rearing are the same (assume 1000 USD).
  - divided by 6 => 167 USD per year
  - divided by 5 => 200 USD per year

When costs for rearing are higher because of a longer period, Profit gets even bigger by calving at a younger age.
First three days

- A new-born calf needs to be licked by the cow to stimulate respiration and blood circulation.
- Remove slime from the nose and mouth and holding up the rear legs of the calf to release any water in the lungs, mouth or nose.
- Cut the navel to three inches and dip the navel in tincture of iodine.
- Feed 10-15% of the calf's BW colostrum within two hours after birth. Absorption of antibodies is highest in the first 6-8 h. Colostrum is high in nutritive value and it contains antibodies.
- The calf should have dry and clean bedding.
* Feed milk twice a day.

* Buckets and bucket with teats should be cleaned well between uses to avoid digestive disorders due to poor hygiene.

* Feed the calf concentrate and roughage from about one week of age. Easy digestible solid food stimulates rumen development.

* Clean water must be available at all times.

* Common health problems during this period are omphalitis (navel-ill), diarrhoea (scours), respiratory infection (pneumonia) and arthritis.
Age at first calving: 
calf care till weaning

- Calves should be dehorned at one to two months of age.
- All female calves should be vaccinated against brucellosis (S19) at three to eight months of age.
- Weaning should take place at about three to four months of age or when the calf is able to eat roughage and concentrate of more than one kilogram per day or at calf body weight between 80 to 90 kg (depending on the breed).
- De-worm the calf against internal parasites such as roundworm, tapeworm and flukes. Also, eliminate external parasites such as ticks by spraying.
- In this period problems to be aware of, are parasites, bloat and arthritis.
Age at first calving:
calf care up to 12 month

- De-worm against internal parasites such as roundworm, tapeworm, flukes and also eliminate external parasites such as ticks, by spraying.
- In this period problems to be aware of include parasites, tick fever, pneumonia, diarrhoea, bloat and arthritis.
Age at first calving: calf care up to 18 month

- Record the growth rate for which should not be less than 270 kg in crossbred or 300 kg in pure-bred cattle at first service.
- Heat detection to determine the right time for breeding.
- Heifers being over 18 month (and weighing >270kg) and not seen in heat and heifers requiring repeated insemination (more than three times) need to be checked by a veterinarian.
- Pregnancy diagnosis: when done - 45 to 60 days after the last insemination.
- Common health problems that occur during this age are, three-day sickness (ephemeral fever), tick fever, and other infectious diseases and parasites.
Feed with good quality roughage and give concentrate as a supplement to pregnant heifers in poor condition.

Mineral supplement can be used for pregnant heifers to prevent shortages.

Vaccinate against FMD, haemorrhagic septicaemia and other diseases as a vaccination program in the dairy region.

De-worming for external and internal parasites should be carried out routinely.

In this period, one must be alert for heifers mastitis (mastitis before calving) and abortion.
The calving area should be clean, dry, quiet to keep a close eye on the cow and provide help if the cow shows signs of difficulty during the birth.

Signs of calving are enlargement of the vulva, distention of the teats and udder, loss of ligaments at the side of the tail-head, and restlessness. Other indicators are a marked increase in the amount of mucous, cervical seal liquefication and increasing frequency of abdominal and uterine contractions.

If delivery takes longer than 24 hours and the allantoic sac has not protruded, the cow will require assistance from a veterinarian.

If there has been no expulsion of the foetus or any contractions for more than two hours after the rupture of the allantoic sac, veterinary assistance will be required.

During this period, there is the possibility of milk fever, uterine prolapse, or downer cow occurring.
Prevention of diseases at calving

- The foetal membrane should occur 3-8 h after calving. If the foetal membrane is retained over 12 h, the cow will require assistance.
- Milk colostrum and feed to calf asap possible (within six hours).
- Remove the foetal membrane from the calving area or pen floor, clean the pen and the rearing area of the dam to reduce risk of infection by flies.
- Feed enough good quality and palatable feed because the cow has less appetite and may remain stressed from delivery.
- There is risk for retained placenta, metritis, milk fever, uterine prolapse and mastitis.
- The immune system is low from two weeks before till two weeks post partum. Avoid contact with animals with contagious diseases.
Prevention of diseases start of lactation

- Weight loss after parturition means insufficient energy in the diet.
- On large farms cows could be grouped for feeding and management according to their milk production.
- One month after parturition check the reproductive tract for uterine involution, metritis and ovarian functions.
- The cow should show signs of oestrus within 60 days postpartum; cows requiring more than three inseminations need to be checked by a veterinarian.
- During the start of the lactation, there are risks from mastitis, metritis, abomassal displacement, acidosis and ketosis.
At drying off and during dry period:

- Check for pregnancy before drying off the cow.
- Dry period of two month (not longer).
- During the first week of the dry period the immune system is low. So take care of the dry cow as if it is your best cow.
- Prevention of mastitis during the dry period and after calving is important.
- Maintaining the routine vaccination program.
- Treat for internal and external parasites.
- Hoof trimming can be done during this period.
- Maintaining good feed management during the dry period.
Number of mating's/AI

• Ideally one service should give pregnancy
  • Heifers in good condition might need 1.1
    • 90% pregnant after one service

• High yielding cows, skinny cows less fertile:
  • Pregnancy rate low/ conceive less
  • Need more services
  • Consider to wait with breeding
  • Provide enough high quality feed

• How long do you continue breeding (... 4, 5, 6, 7.... times?)
Interval calving – 1st mating/AI

- When proper fed (supply meets requirement), cow should de active within 25 days post partum.
- Delayed in heat (= anoestrus) in high producing animals
  - Solution: check if something is wrong and wait till nature takes it curse
- Using hormones not necessary with good management
Calving interval

Influenced by:

- Interval calving first mating/insemination
  - When you want a calving interval of 1 year, mating should be within three months post partum

- Heat detection
  - When do you watch your animals
  - Do cows show heat symptoms

- Number of mating's/insemination
  - Each mating increases the interval with about a month

- Pregnancy rate
  - 60% pregnant after 1 mating means that 4 out of 10 cows need at least one more mating

- Early embryonic death
  - Happens after 2-3 months, cycle starts again
Reproductive problems

- Retained placenta: don’t drop afterbirth not within 8 h. No treatment, oxytocin or prostaglandins, antibiotics.
- Anoestrus: no heat signs for a long time. Adequate quantity and quality roughage, minerals, trace-elements.
- Endometritis: inflammation of mucus membrane of uterus, after abnormal delivery. Hygiene, disinfect calving area.
- Pyometra: pus in uterus caused by *Corynobacterium pyogenes*. Estrogens and oxytocin.
- Silent heat: no regular heat signs (skips a period). Adequate quantity and quality roughage, minerals, trace-elements, timely heat detection.
- Vibriosis: early embryonic death, infertility caused by *Campylobacter fetus*. AI, not infected bulls.
- White heifer disease: in BBI and Shorthorn (white coat)
Relation between diseases

- milkfever
- Heavy calving
- complicated calving
- Retained placenta
- Cull (1-7d)
- Ketoses
- Enteritis
- Cull 8-100 d
- Not in heat
- Cull >100 d

Present lactation time

Calving interval

FPCM
Economics of calving interval

- A long interval costs a lot of money
- Assume yield in a lactation is 4000 kg of milk
- A lactation is the period between two calving's comprising a productive and a dry period
  - 10+2 month (365 days) or
  - 10+10 month (609 days)
- Yield per day is respectively 11 kg and 6.6 kg.

- A calving interval of 605 days is OK when the cow yields 6700 kg in a lactation.
  - 18+2 month (609 days)
Breeding calendar