

WELFARE OF CATTLE

Welfare of dairy and beef cattle

Lecture 9



Cattle breeding, reproduction, technology and the impact on welfare



Main factors affecting animal welfare

- **Breeding technology**
- **Environment - macro and micro environment**
- **Nutrition, access to feed and water**
- **Animal health**
- **Stockmanship**

Animal welfare indicators

In most cases, the methods assess the indicators they characterise:

- **The condition of the animals** in relation to their sufficient and quality nutrition and sufficient water supply.
- **The environment** in which the animals are kept.
- **The presence of injuries and symptoms of disease**, including painful procedures carried out on the farm.
- **Expresion of normal, natural behaviour** or lack of them.

Technology and technique of dairy cattle management

- Knowledge of the basic behavioural indicators of cattle helps farmers to increase the welfare level and eliminate problems of physiological or ethological nature. Ethological parameters vary according to the different categories of cattle, but also in **extensive or intensive breeding**. Cattle are light-active animals = animals that take feed during the day, move around, exercise their social behaviour and rest usually in the evening and at night.
- In natural conditions, cattle form small groups of cows with calves and a bull. Bulls over 10 (12) months of age are driven out of the herd. Each individual has its own place in the herd, and changes usually occur when groups are moved and restocked. Position in the group is influenced by age, weight, condition and temperament. In cows, age and weight matter. Cattle are able to recognise 70-80 individuals in a herd.

Technology and technique of dairy cattle management

- Free-stall housing is dominant.
- Formation of groups of cows (40-100).
- Lactation, lactation, dry off (optimally 60 days) - impact on calf health and milk production in the following lactation.

The ideal cow career

healthy calf



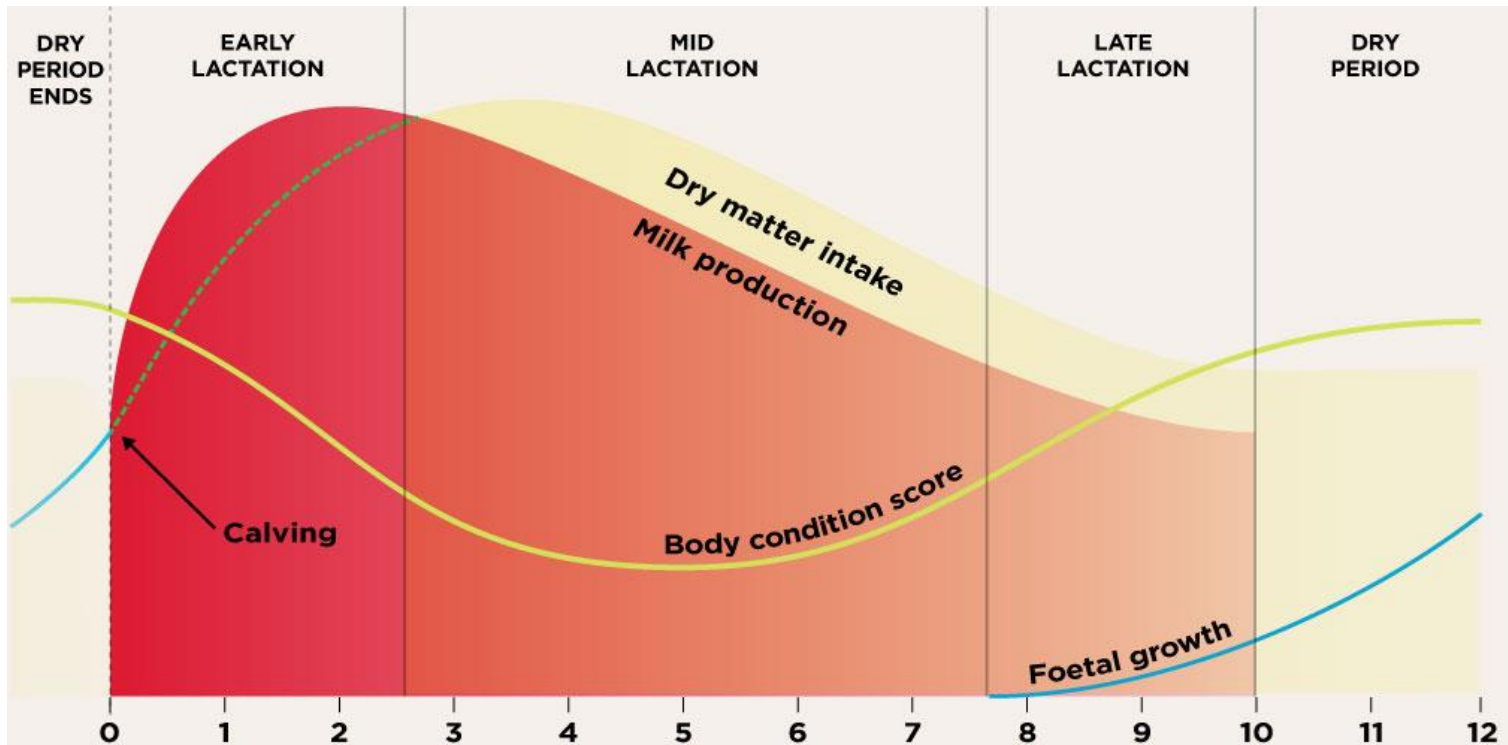
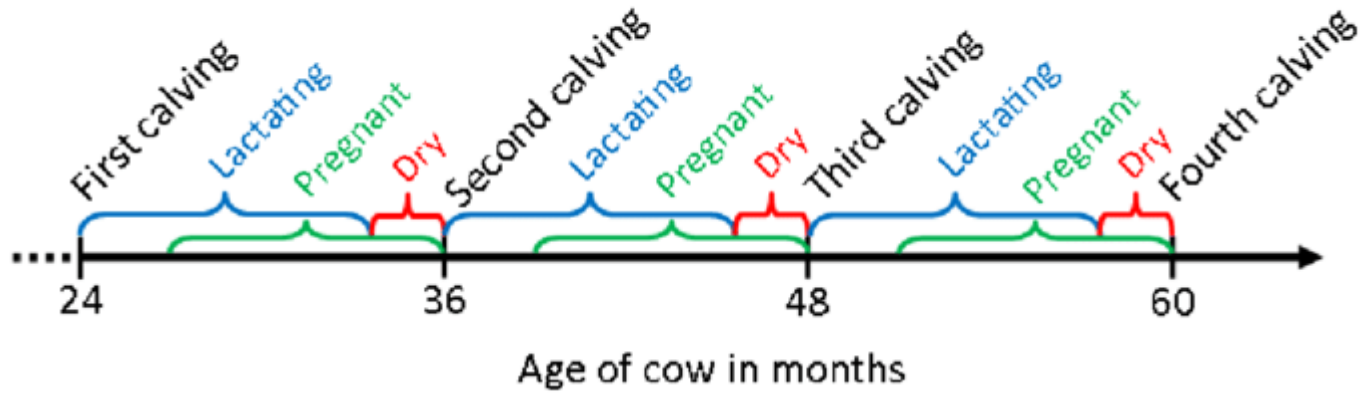
strong and resistant heifer



High-yield cow



a) Traditional lactation cycle



- **Parturition of a dairy cow in an individual parturition pen IPP– benefit: visual contact with other animals, relaxation of pelvic ligaments, adjustment of minor irregularities in the position of the fetus.**
- **Separation of the calf between 6-12 hours after calving, transfer to individual pen**



- navel treatment
- cleaning of the nostrils and oral cavity
- mother licking - massage
- drying with straw
- watering the calf with colostrum

Proper treatment of the calf after birth

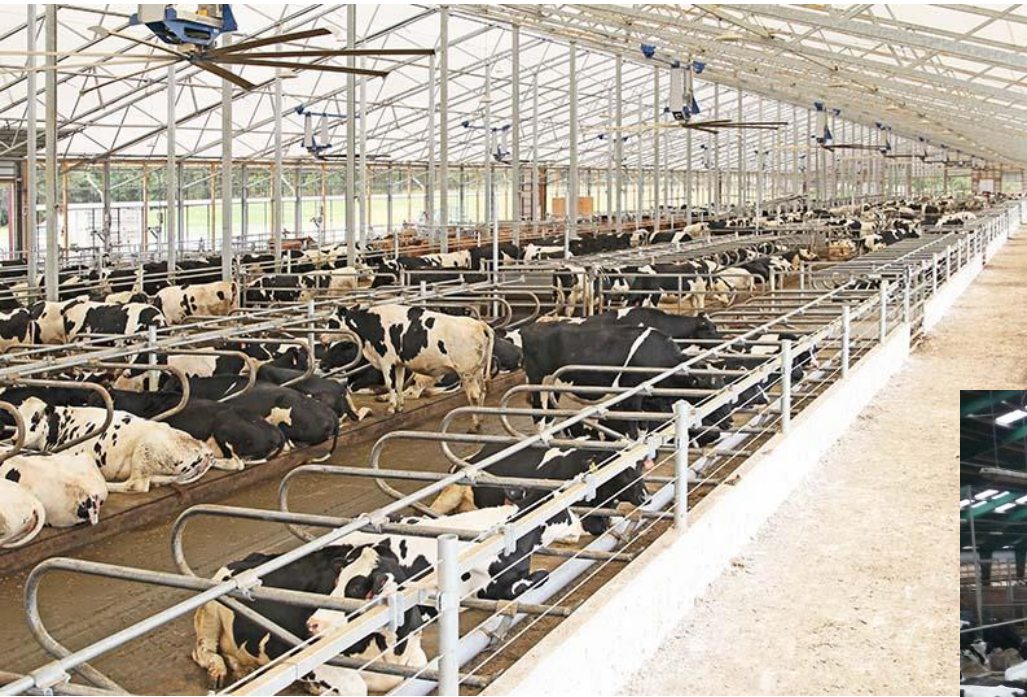


Advantages of IPP

- A cow chooses a calving place that suits her and not one that she is forced to use by other cows.
- Choosing the optimum opening position.
- Allowing enough time to calve and treat the calf.
- Drying out the calf and at the same time giving it a thorough blood supply by intensive licking by the mother - a positive effect also on the contraction of the mother's uterus and the whole postpartum phase.
- Better identification of calves.
- Better hygiene, less incidence of infections of the reproductive organs, udder, diarrhoea, elimination of early enteritis in calves...
- **Prevention of cross-sucking of colostrum.**
- Reduction of the risk of lying down, being stepped on by a strange cow.
- Easier husbandry control, cow control and
- calves.
- Respect for animal ethology.



Freestall housing system



Housing of dairy cows

- **Free stall housing** - considered the most suitable housing, the pen in which a group of cows is kept is divided into feeding areas, manure corridors and a lying area with boxes for resting.
- The arrangement of the boxes is longitudinal or transversal.
- Straw mattresses with cut straw been shown to work well for bedding.

Straw, mattress, compost bedding (separated manure solids),
sand, sawdust

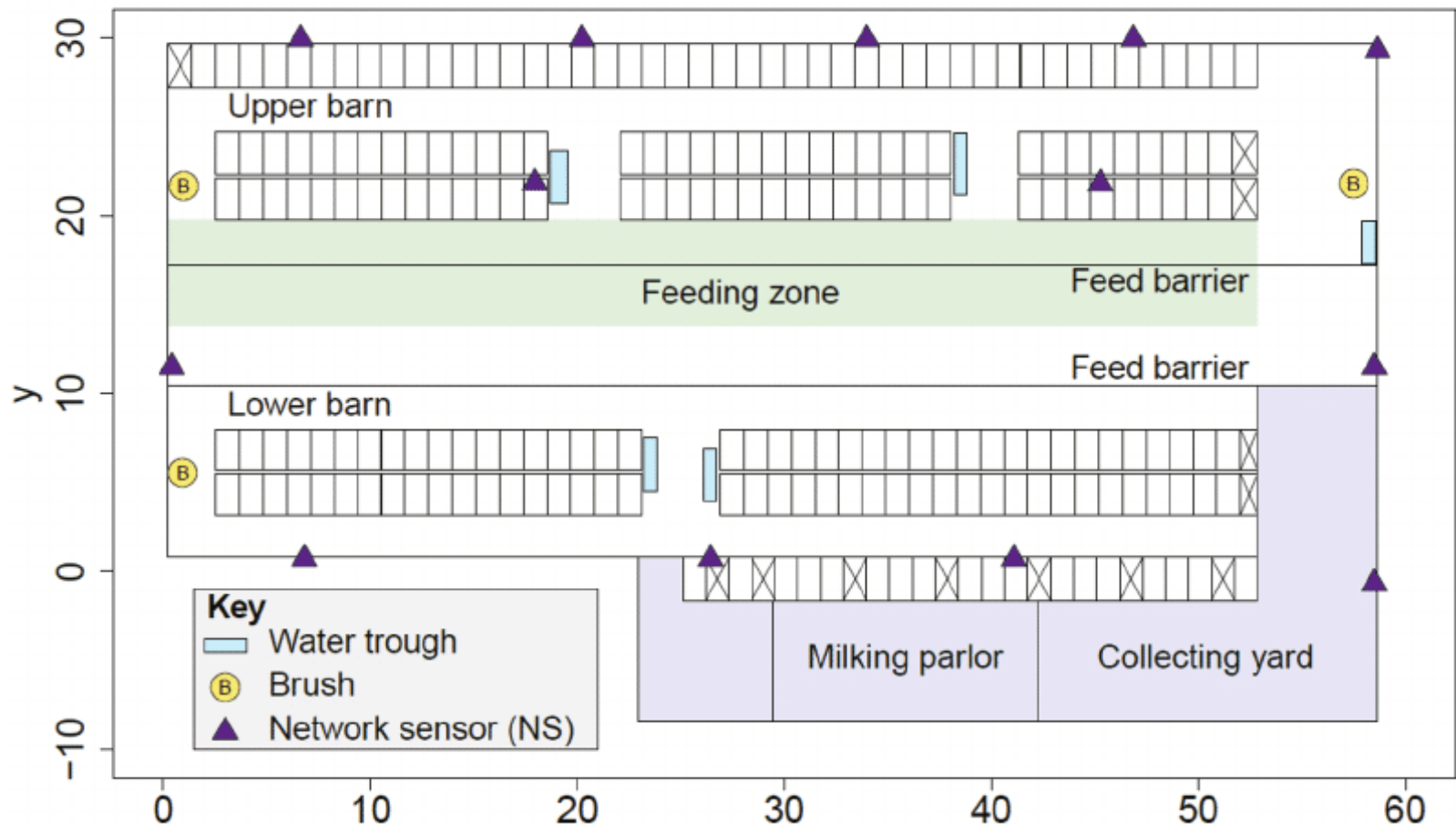






- the number of free-range animals must not be greater than the number of boxes and the number of places in the feedlot

(a)



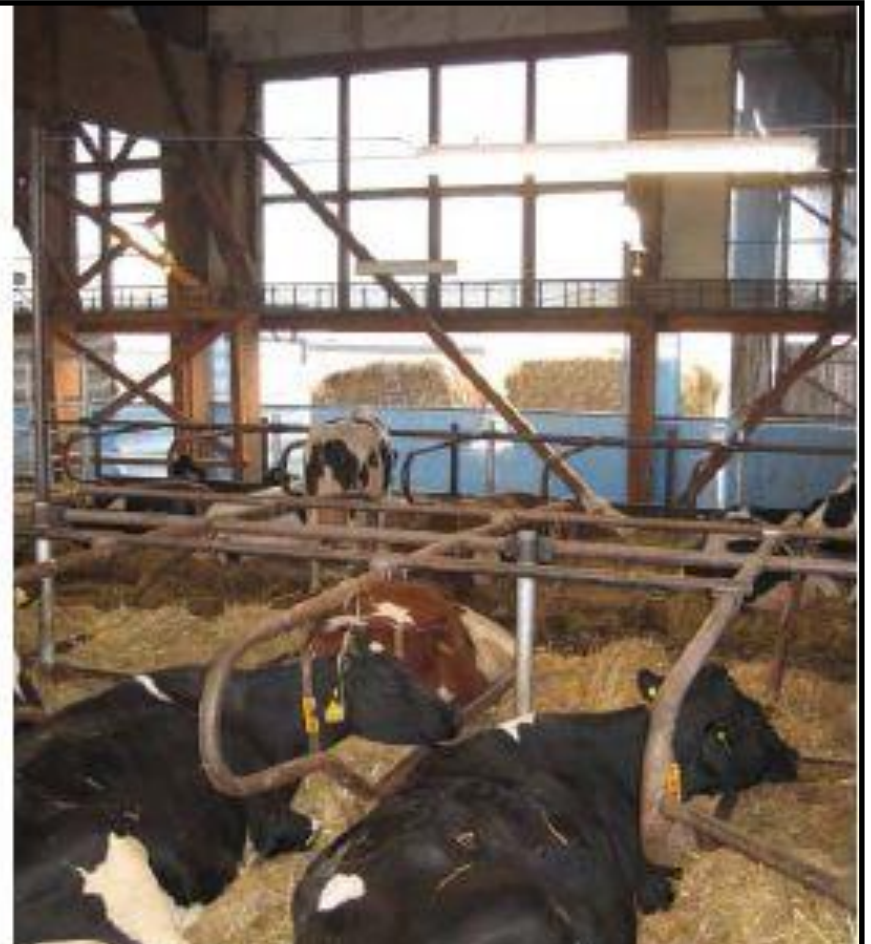
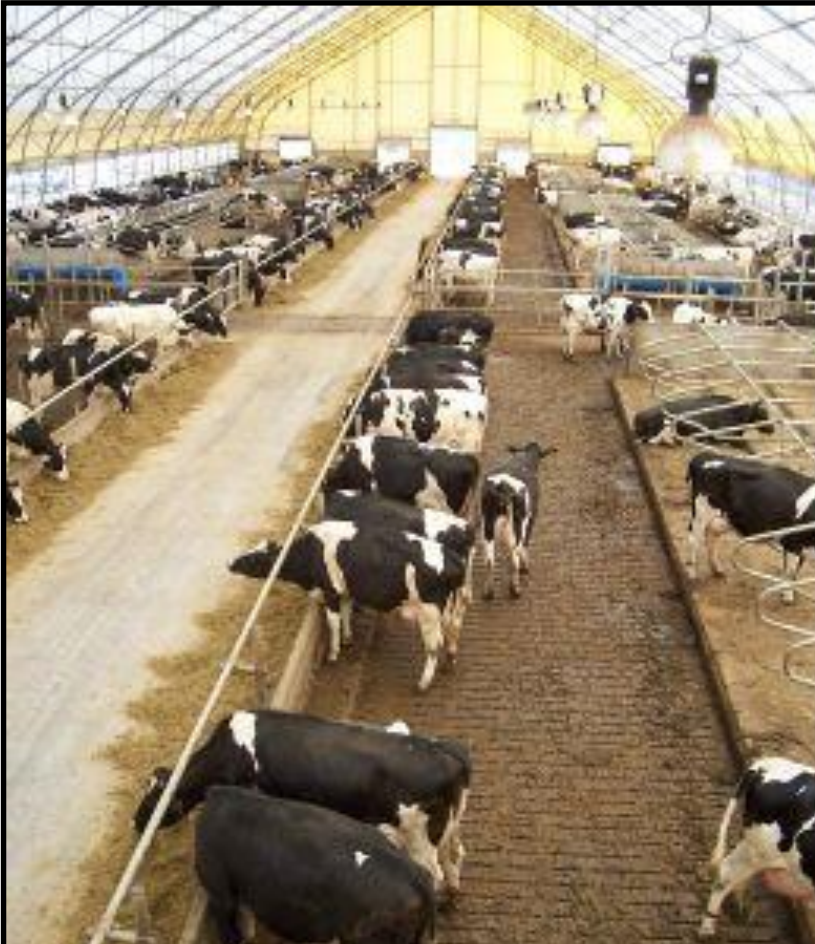
Housing of dairy cows

- **Tethered housing** - used to be a traditional housing system, nowadays it is not recommended due to low labour productivity and unsatisfactory welfare conditions.
- An amendment to the Animal Cruelty Protection Act, which came into force on 1 February 2021, prohibited the keeping of animals in tethered housing all year round. ... By 2030, all older buildings used to keep cattle will also have to comply with these conditions.









Cattle behaviour is influenced by the density of animals in the pen - with higher density of the risk of mutual conflicts, standing time to the detriment of lying time etc. increases.

It is necessary to observe the minimum dimensional parameters of the manure and movement corridors, the corridors to the milking parlour.

Minimalised widths of the movement aisles cause an aversion of one cow to touch another - the desire to avoid other animals, the possibility of turning around.



Lying of cattle

- Of all the manifestations of life, rest has a clear priority. Resting time is **influenced by** e.g. nutrition, resting area, quality of flooring, number of animals in the group... Adult cattle rest for 10-14 hours in 7-10 periods. Lying time is longest around midday and at night. Lying down takes 4-5 s and getting up 5-9 s.
- Cattle lie in a sternal position - legs extended, under the body with the head erect or in a longitudinal lateral position with the limbs extended and the head turned to the side or resting on the bedding.









Resting boxes

- Resting boxes are an essential element of free stall housing, they are useful for all categories of cattle. Due to the welfare of the animals, **the effect of box dimensions on performance, health and behaviour is often discussed.**

General requirements for box beds:

- Easy orientation of animals when entering the box.
- Number of boxes at least equal to the number of animals.
- **The lying area must be safe, non-slippery, straight and dry.**
- The ideal bedding angle is 2-4%.
- Comfortable and smooth getting up and lying down.
- Prevent injury to animals.
- **Solidity and durability of technological elements.**
- Adequate head space, enough space for the hips and abdomen, while avoiding lateral or reverse lying.







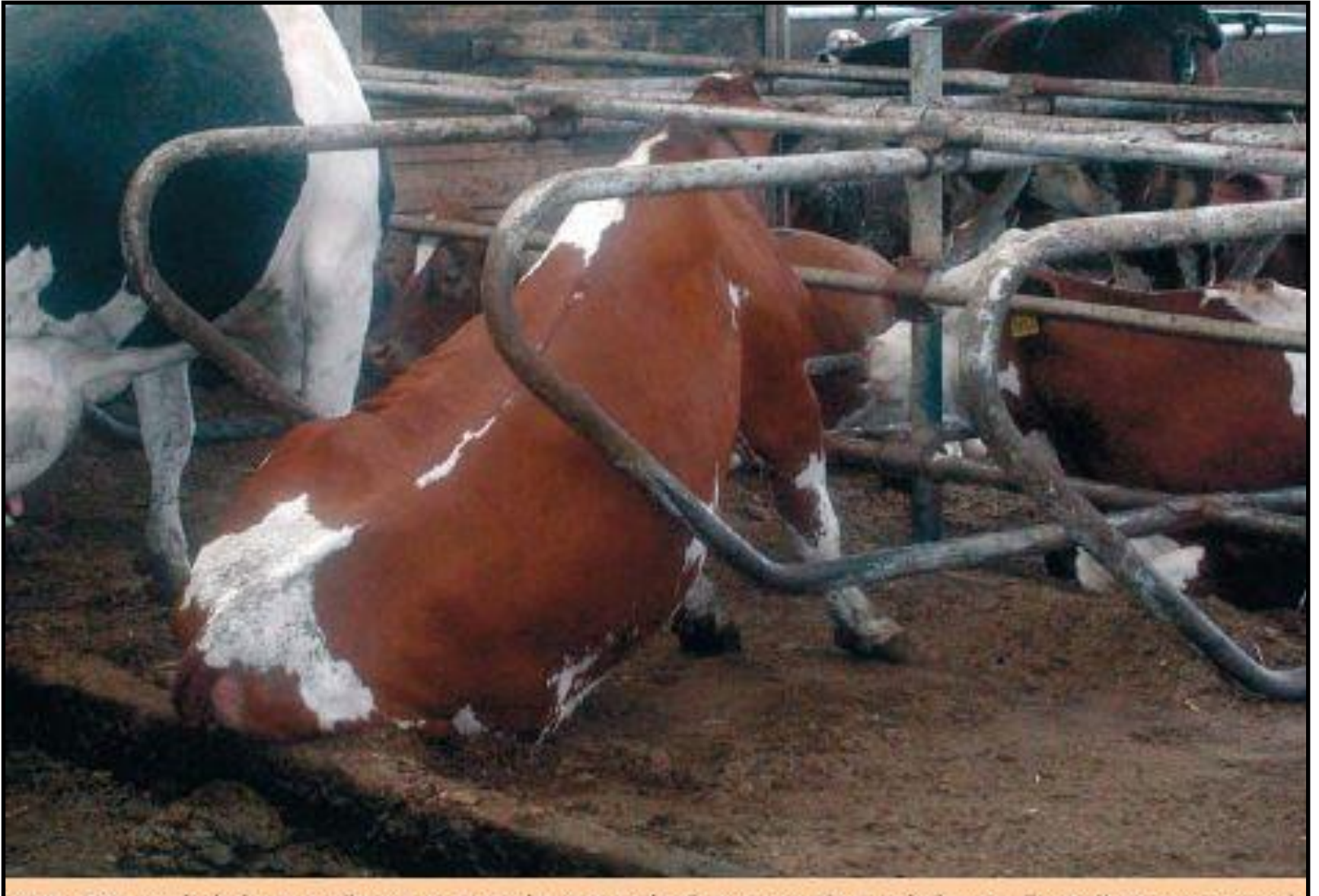
Bedding

- The main materials used are straw, wood shavings, sand, sawdust, paper, separates...
- **The use of bare concrete seems inappropriate!**
- Frequent spreading of straw is important to keep the bed dry and clean - especially for dairy cows!





Spreading of the straw by ground limestone on the bedding is a good measure for better hoof and udder health.



Getting up like a horse is an indicator of a short box.



Bruising on the udder caused by a hard mattress.



Floor surfaces

- So far, no ideal surface material has been developed for cattle housed in stables for most or all of the year.
- Generally, higher foot erosion is associated with surfaces that are too rough and abrasive.
- **Grazing** can also present risks - unsuitable access paths covered in a layer of faeces with stones that can contribute to traumatic toe disease.
- Slippery surfaces are particularly dangerous! Grooved floors are one solution, the most effective texture is a regular hexagon with an edge length of 46 mm, but grooved surfaces are the most common.



MOVEMENT CORRIDORS

Manure corridor



Width of $\geq 2\ 500$ mm at minimum

Feeding place



Width of $\geq 3\ 500$ mm at minimum

TECHNOLOGICAL SYSTEMS FOR MANURE REMOVAL IN DAIRY COWS



Requirements for the removal of manure, excrements and bedding include operational integrity, low disturbance to the stable microclimate, maintenance of animal cleanliness, production of quality manure.

Stable microclimate

- **the stable microclimate, together with adequate nutrition, housing and quality of care, has a significant impact on animal welfare and production**

The most important components that create a microclimate are:

- a. temperature**
- b. relative humidity**
- c. air movement rate**
- d. harmful gas content and microbial load of the environment**

Ventilation in the stable

- The function of the ventilation system is to remove air containing **water vapour, carbon dioxide, dust particles, inflammable gases and micro-organisms** from the stable area and to maintain the **thermal comfort of the animals**. Adult dairy cows produce up to **12 litres of water vapour per day** (depending on the season). The air coming from the outside environment with an average relative humidity of **60-80%** will quite easily pick up the moisture produced by evaporation from respiration and excreta. At average ventilation levels, humidity is well controlled, but problems can arise in summer if ventilation is not adapted to this.
- **The correct dimensions of the stall space** and the areas of the entrance and exit openings (roof slots) is important for proper ventilation!
- **Ventilation equipment** is designed to protect against high temperatures, high relative humidity and excessive airflow.

VENTILATION IN THE STABLES

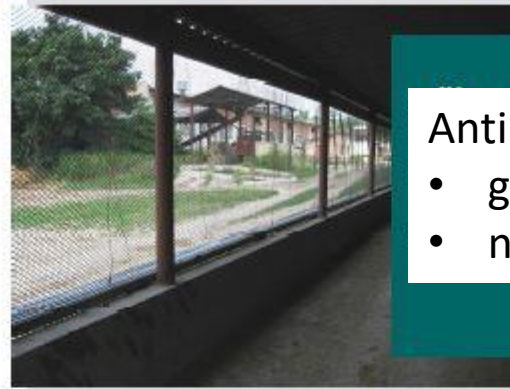


Roof slots

AIR EXCHANGE CONTROL



side walls of the farm
sliding walls
roller walls



Anti draughts walls

- gates
- nets



Proper ventilation can be easily assessed by simple criteria:

Similar outdoor and stable air quality, absence of spider webs, same air quality in the box beds and at the feed table, no condensation on the ceiling or water pipes, no animals staying at the door.

When the smoke test is carried out, the smoke is completely dispersed at 0 degrees Celsia within 15 min, at temperatures above 20 degr. C. within 60 s.



Temperature in the stable

- Cattle adapt better **to cooler environmental conditions** than to high temperatures - combined with high humidity they induce heat stress.
- **Heat stress** induces a disturbance in nutritional metabolism and metabolic balance, and is associated with nutrient and energy deficiency, respiratory alkalosis, ketosis and acidosis of rumen contents. Feed intake decreases, water consumption, respiratory rate, body temperature increase, uterine blood supply is reduced (fetal growth retardation and impaired placental function), and milk yield decreases by up to 25%.
- It also influences the frequency of respiratory diseases, mastitis, calf mortality, changes in cattle behaviour - reduction of feed intake, animal activity, shortening of rumination and lying time.
- Efforts are made to prevent heat stress - by cooling the animals or their environment, providing shade, increasing air flow and changing the diet - providing a more concentrated ration.
- **The first signs of heat stress** in dairy cows appear at 25 degrees Celsia.

**High temperature/humidity
(THI > 68)**

**Increased
respiratory
rate**

**Impaired rumen
balance and
function**

**Increased
acidosis
risks**

**Reduced
rumination**

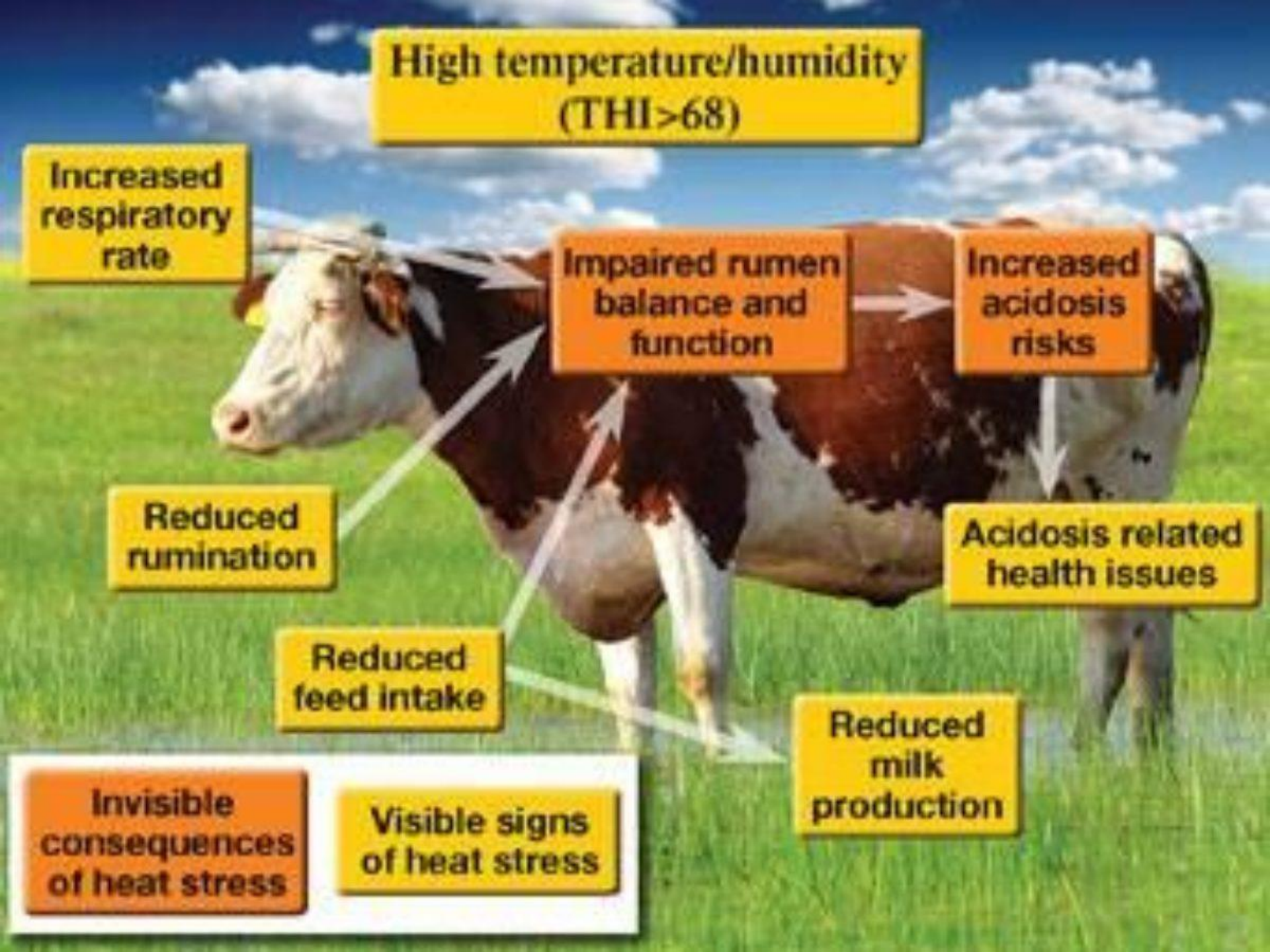
**Acidosis related
health issues**

**Reduced
feed intake**

**Reduced
milk
production**

**Invisible
consequences
of heat stress**

**Visible signs
of heat stress**





During periods of heat stress, it is important to shower cows, preferably in the feedlot.



Cows standing like this for long periods are often seen under heat stress. They are breathing easier.

Dust and microbial contamination

- Sources of organic dust in the stable are **feed, bedding, animals**.
- The aggressivity of the dust depends not only on its quantity but also on **the size of the particles**. Particles smaller than 5 μ penetrate the respiratory tract, larger particles are trapped by protective barriers.
- Micro-organisms are a constant part of the stable air - the sources are similar to those of dust. In the air they are bound to droplets or dust particles.
- Pathogenic micro-organisms can also be present in the stable and survive only for a certain period of time - they can negatively affect the health of the animals (higher frequency of mastitis in the hot summer period) and the quality of e.g. milk.

Insect

- Many species of synanthropic insects are found in the farms. Their development is facilitated by the presence of manure and organic substrate. They are damaging in the stable and on pasture (cattle fly, mosquitoes...).
- Directly damaging by bothering cattle during feeding and rumination - nutrient conversion is reduced. Species that suck blood can reduce **performance by up to 20%**.
- They are also often **vectors** of pathogenic microorganisms - **salmonellosis, B. coli-enteritis, mastitis**.
- Fighting insects:
 - mechanical - trapping belts
 - biological - only as a supplementary measure
 - chemical - the only effective one so far

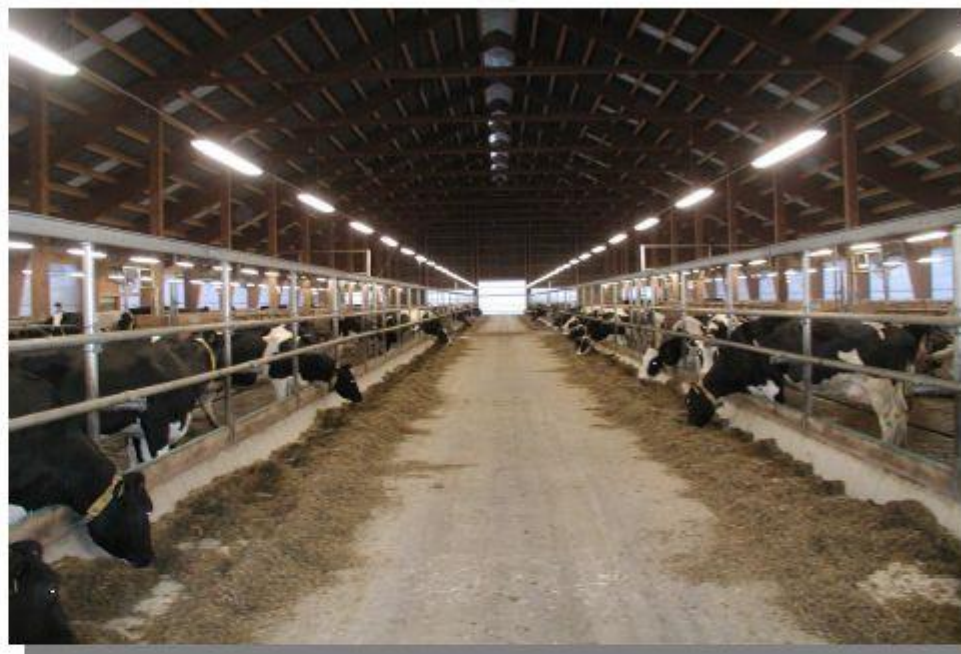
Lighting

- Sunlight has an effect on the animal organism not only through its individual components, but also as a whole. Light acts on the neurohumoral system of the organism, which controls the behavioural cycle of animals during the day.
- Light affects the organism by its **photoperiodicity** - the alternation of day and night, its intensity and wavelength.
- The lighting of stables, together with other environmental components, creates the conditions for biological well-being, especially **for growth, development and reproduction and production.**

Light in the stables

Light affects:

- Productivity
- milk components
- feed intake
- fertility, estrus clarity
- coat density
- economy of operation
- work safety...



Stable lighting

14-16 hours, more than 200 Lx*m²

Orientation light - 40 Lx*m² (night)

lighting fixtures over animals - up to 3.000 mm

fluorescent lamps, discharge lamps

milking parlour working corridor - more than 200

Lx*m²

milking parlor udder contact area - more than 500

Lx*m²

Cow nutrition

- Feeding lines should ensure uniform homogenization by mixing all components of the **feed ration**, they should ensure easy and safe removal of feed residues from the feed troughs, their operation should allow minimal disturbance of animals and prevent their injury, without worsening the microclimate in the stable. Mobile lines are preferred, as the width requirements of the feed trough make the construction of the stable more expensive.

Through and the feeding space



the height of the barrier in front of the forelegs is 550 to 600 mm

Feed intake in stables

- Compared to grazing when feeding cattle in stalls, cattle have **both limbs side by side when eating** (no stepping as in grazing) - which is limiting when the bottom of the trough is at the same height as the forelegs are standing. The height of the bottom of the trough should be at least 100 mm above the level of the foreleg stand.
- Feeding 2 times a day will reduce the feed intake time.
- **Cows with hoof disease have a reduced standing time and therefore a reduced feed intake time.**



When grazing, the forelegs are slightly more loaded, reducing the height of the front part of the body by 40-60 mm - this affects the height of the muzzle's edge above the ground, so the cattle are **unable to graze vegetation lower than 30 mm.**

Grazing time is influenced by the weather and also the quality of the vegetation - dairy cows graze for 5-9 hours a day and walk up to 5 km. Grazing takes place in 4-5 periods. In summer, most of the grazing takes place during the day, with the day getting shorter and extending into the night hours.

Rumination

- It is a process where pieces of food are ejected into the oral cavity where they are **intensively swallowed**, the liquid phase is swallowed after ejection and the solid particles are chewed 45-60 times.
- Rumination begins within half to 1 hour after food intake, 80% of the rumination time occurs while lying down, 20% while standing.
- **Saliva** is important to maintain a stable rumen environment (sodium bicarbonate).
- The total rumination time is 5-8 hours and is divided into 15-19 periods lasting from a few minutes to 50 min.



Passing of feed



Intake of water

- **Good quality drinking water must be available** to cattle throughout the day.
- **Consumption depends on** size, level of milk production, ambient temperature and the amount of intake of dry matter, protein, salt and other minerals.
- **Drinkers should be protected** against freezing, ball drinkers are good - the disadvantage is high bacterial and mechanical pollution.
- **2 month calf - 5-8 litres**
- **Dry standing cow - 40-66 l**
- **Dairy cows with a milk yield of 36 kg/d - 95-122 l**



Methods of supplying cattle by water according to housing

Drinking from buckets - used for rearing calves in the milking period.

Automatic drinkers - mainly used in tethered stalls and in heifer and bull breeding. It is not possible to provide pre-heating of water, and frequent pollution and malfunctioning are also a problem.

Trough drinkers - at all ages, provide better access to water and allow a large amount of water to be taken in at one time per drink compared to other types of waterers.

Ball drinkers - mainly for housing cattle in winter cattle, heifer and fattening bull barns. The advantage is frost resistance, but water quality control is impossible.























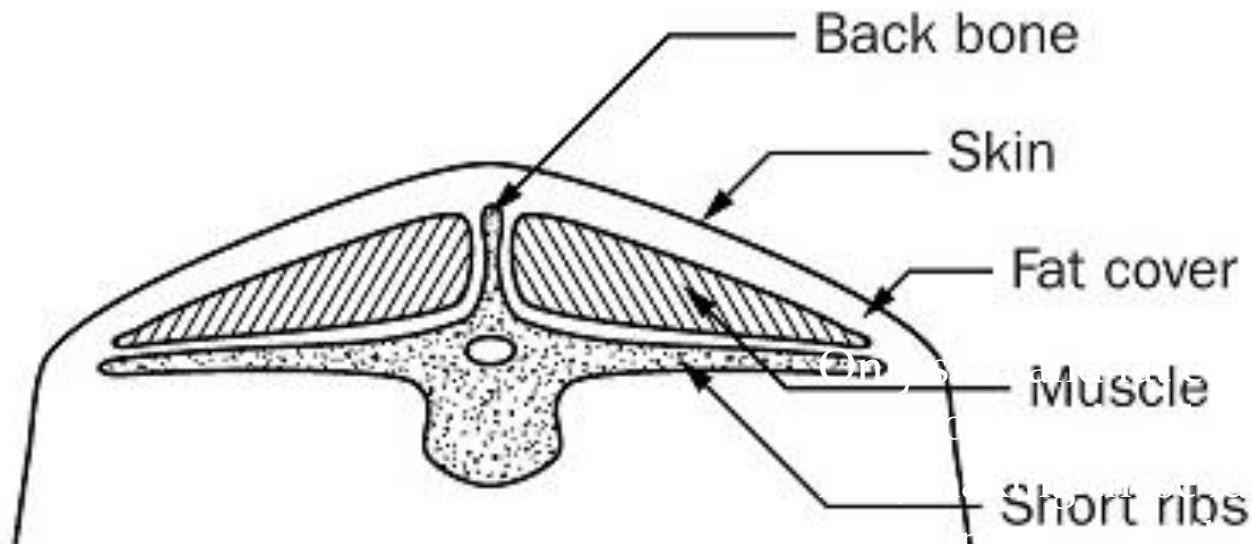




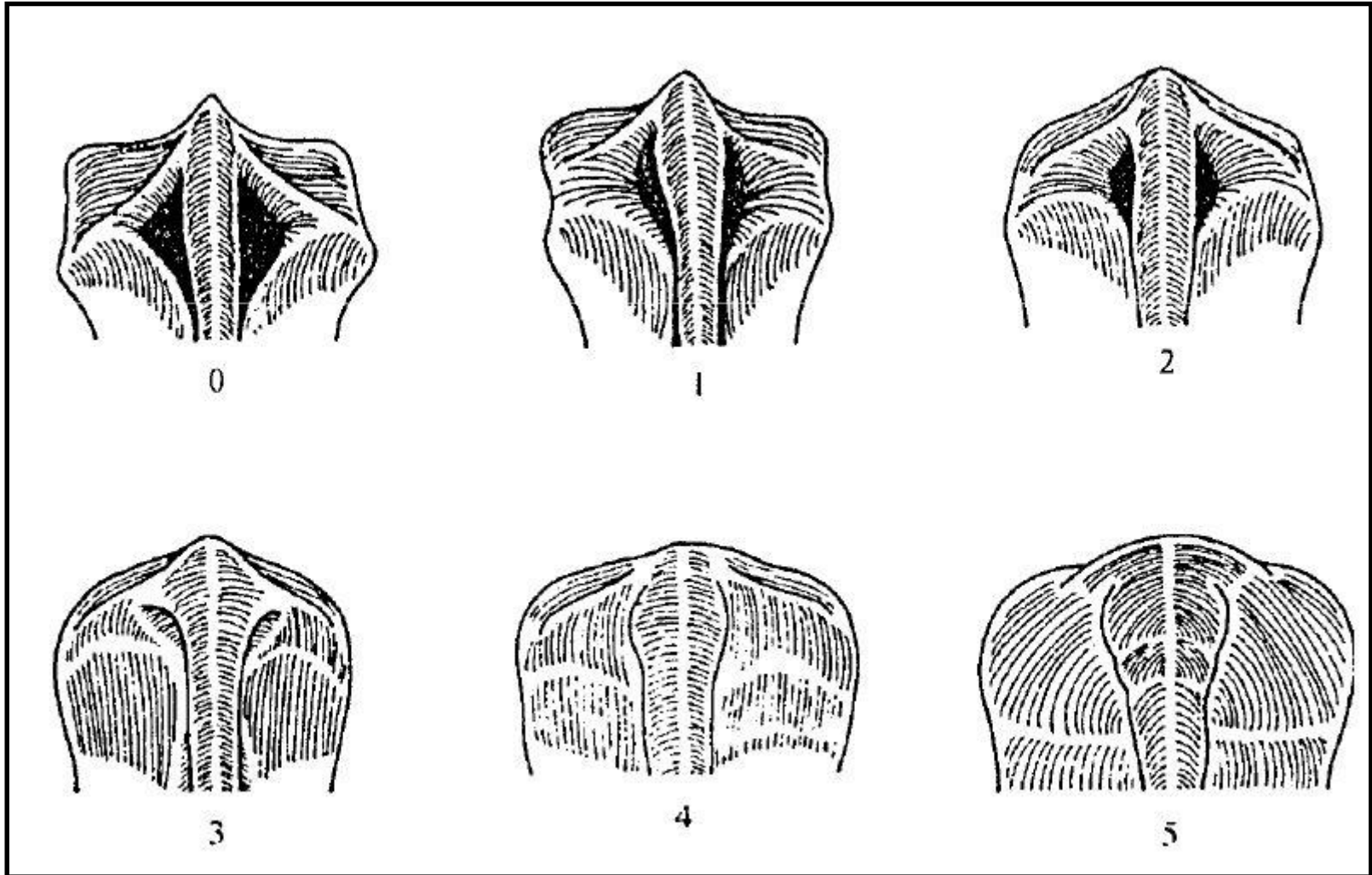


Body condition score

- Physical fitness is believed to be an **important indicator of overall vitality and health**. Poor body condition can cause **long-term dissatisfaction and increased susceptibility to disease** due to reduced immunity, and is also an indicator of **metabolic problems** and the animal's lack of coping ability.
- Body condition is a **reflection of the body fat reserves** carried by the animal. These reserves can be used by the cow in periods when she is unable to eat enough to satisfy her energy needs.



Body condition score (BSC)



Condition scores range from 1 (a very thin cow with no fat reserves) to 5 (a severely over-conditioned cow).

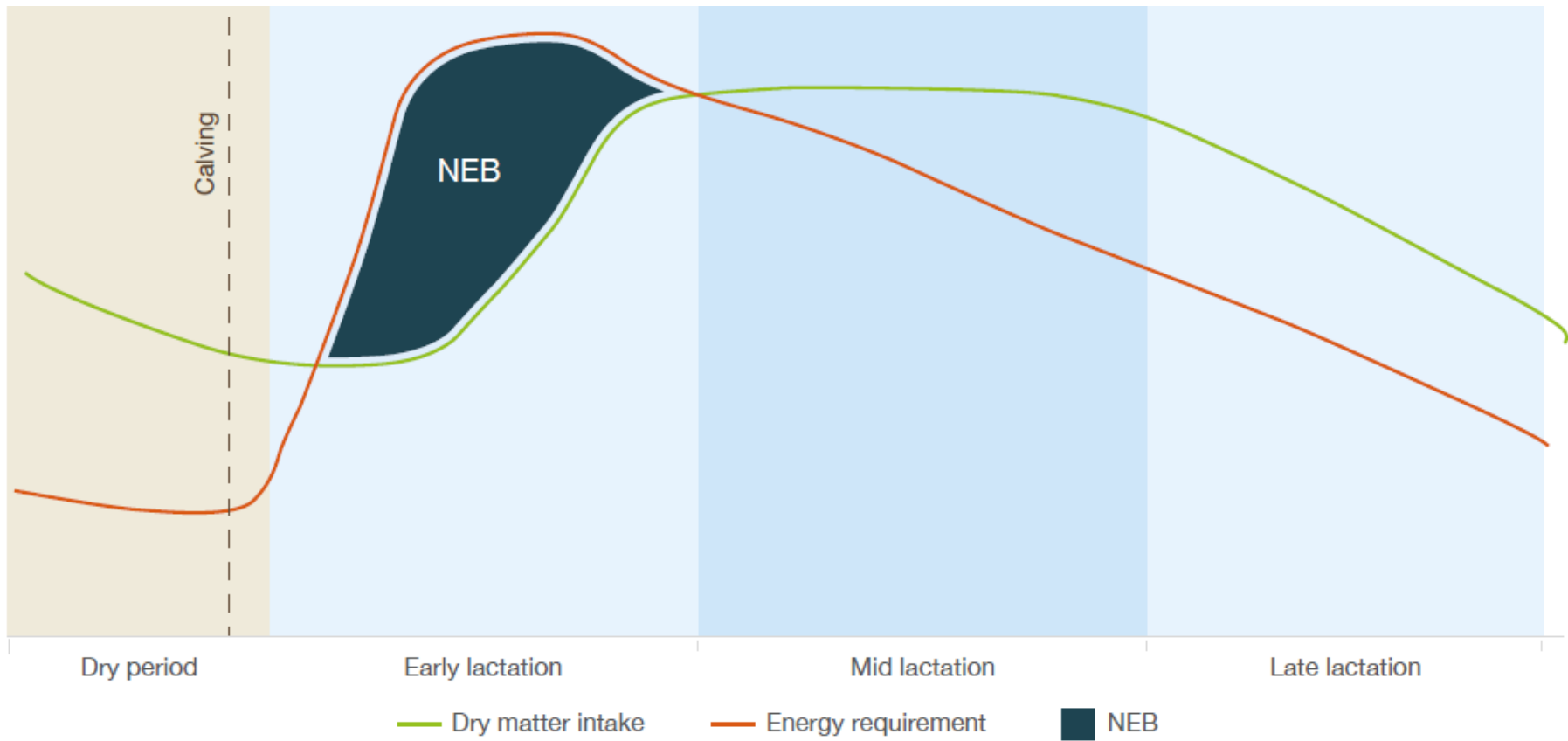
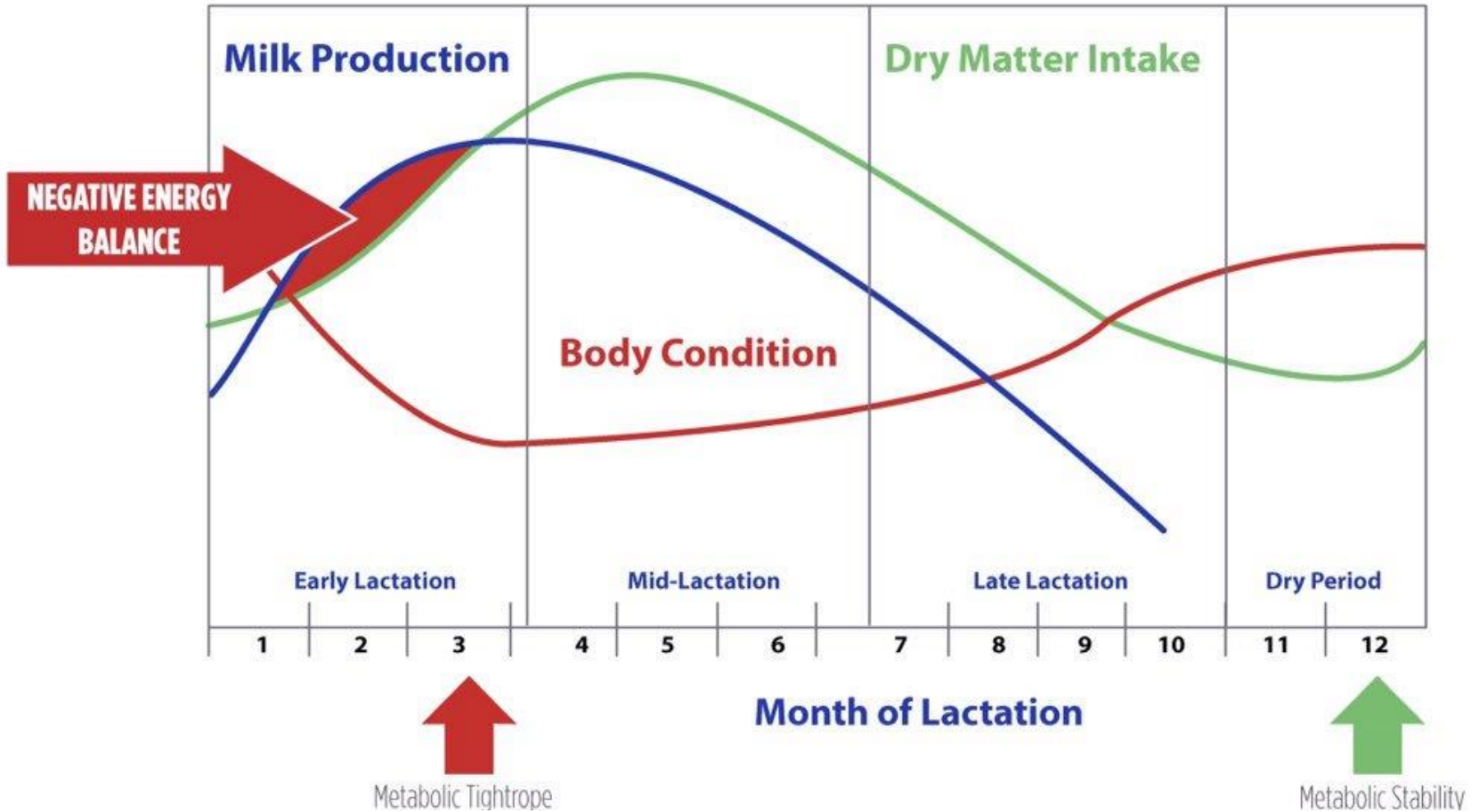


Figure 2. Energy balance and dry matter intake curves

Lactation Curve

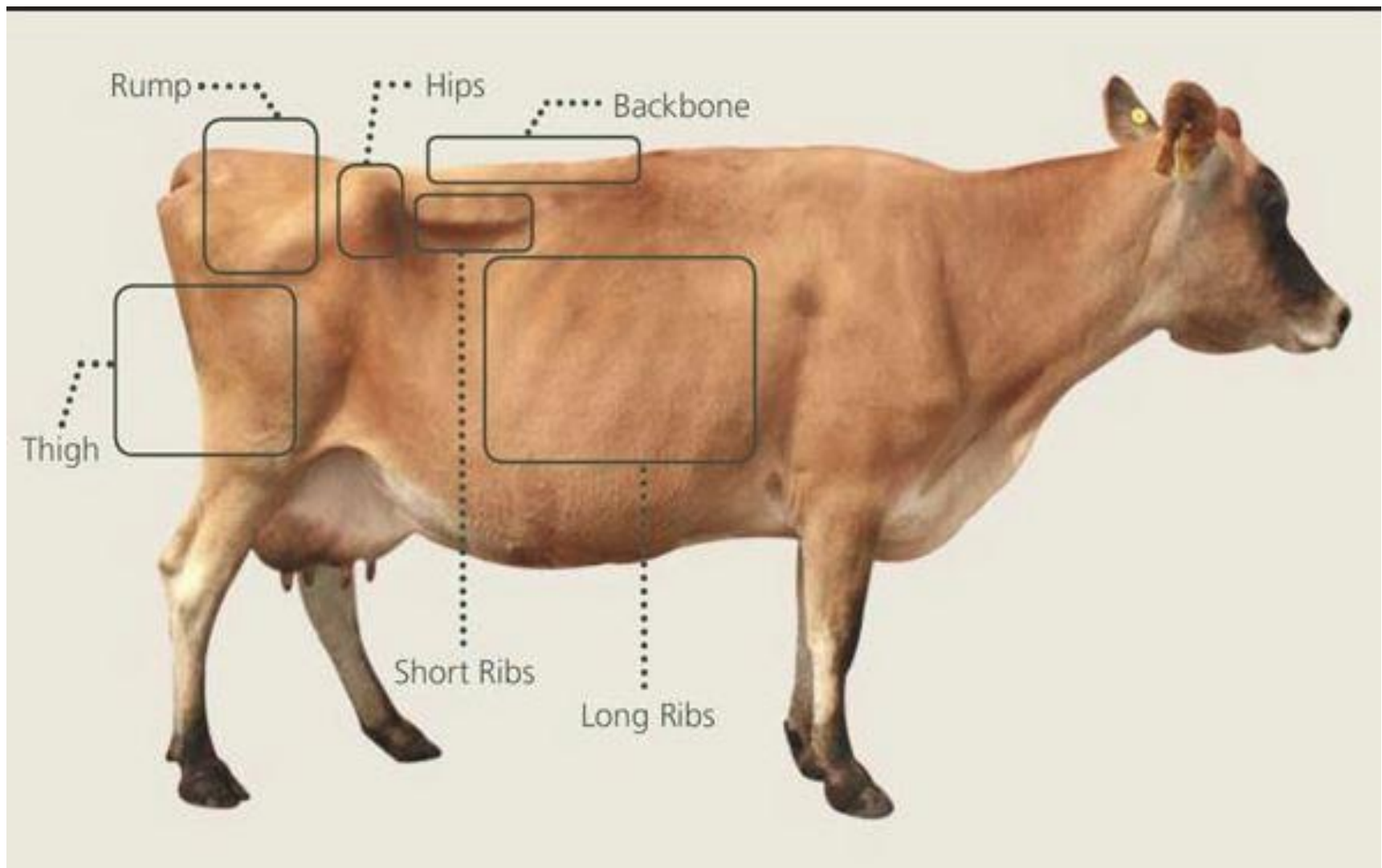


Negative energy balance, a focus on Ketosis



Figure 1. Over conditioned cows. Source: Dairy Veterinary Consultancy Ltd.

https://projectblue.blob.core.windows.net/media/Default/Dairy/Publications/Negative%20energy%20balance_300719_WEB-1.pdf



Optimal condition is at point **3.5 at the beginning of lactation**. During the first third, the cow gets up to **2.75** and should be back to 3.5 by dry off.

Note: You may encounter a nine-point scale (0-9). After that, the points are only divided by 0.5 and not by 0.25 as in the five-point scale (0-5).



Figure 3

BCS ≤ 2.5

- Pins have no fatty tissue under the skin
- Ribs are visible
- Backbone prominent but may see rise and fall of bones
- 5 small short ribs are easily visible and prominent



Figure 4

BCS 2.75

- Pins have a little fatty tissue
- Ribs have slight cover but are easily felt and visible
- Backbone prominent but smooth
- Small short ribs visible as bumps



Figure 5

BCS 3

- Pins not prominent
- Ribs are smooth and last two are slightly visible
- Backbone rounded
- Short ribs well covered with fat.



Figure 6

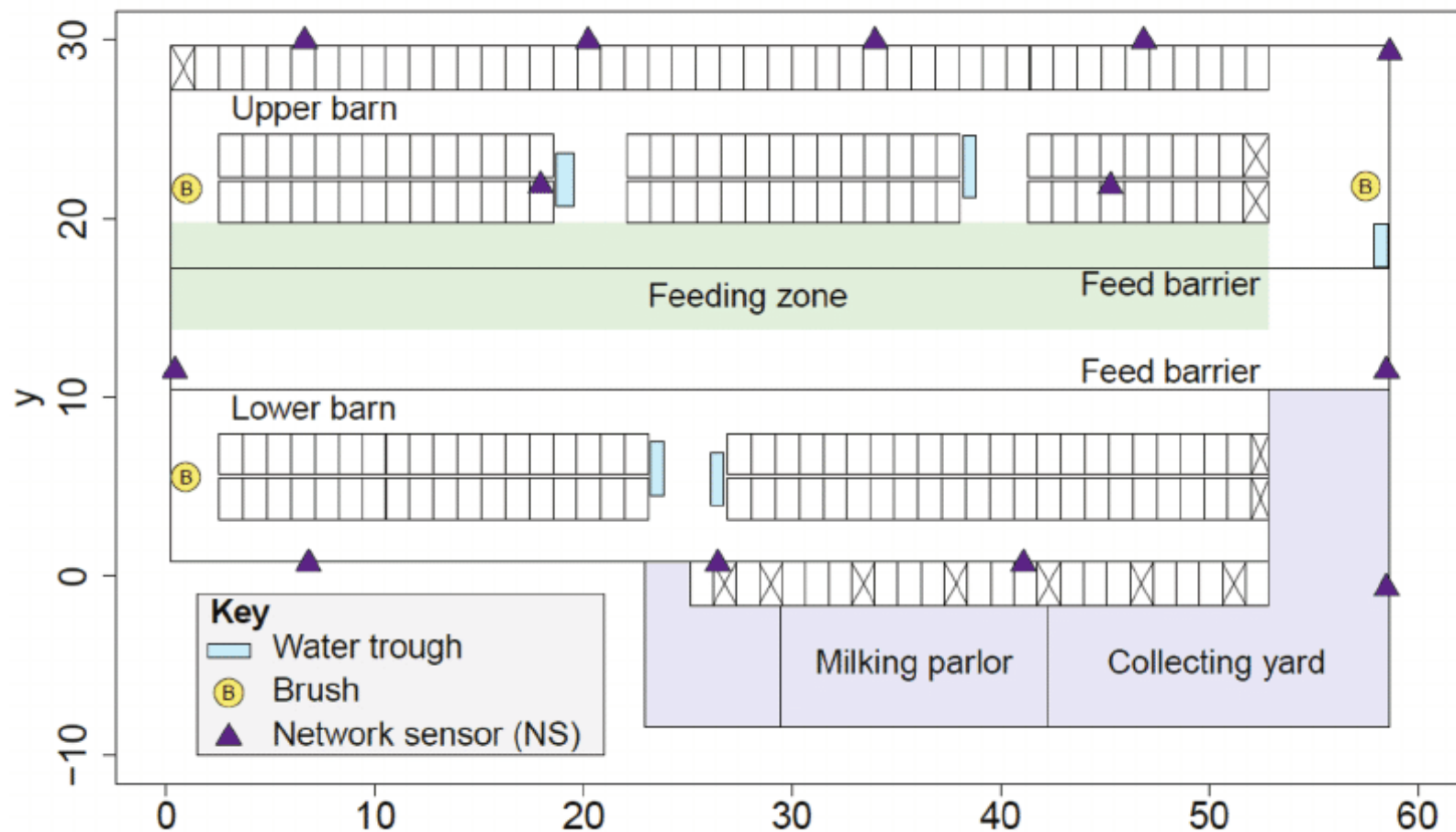
BCS ≥ 3.5

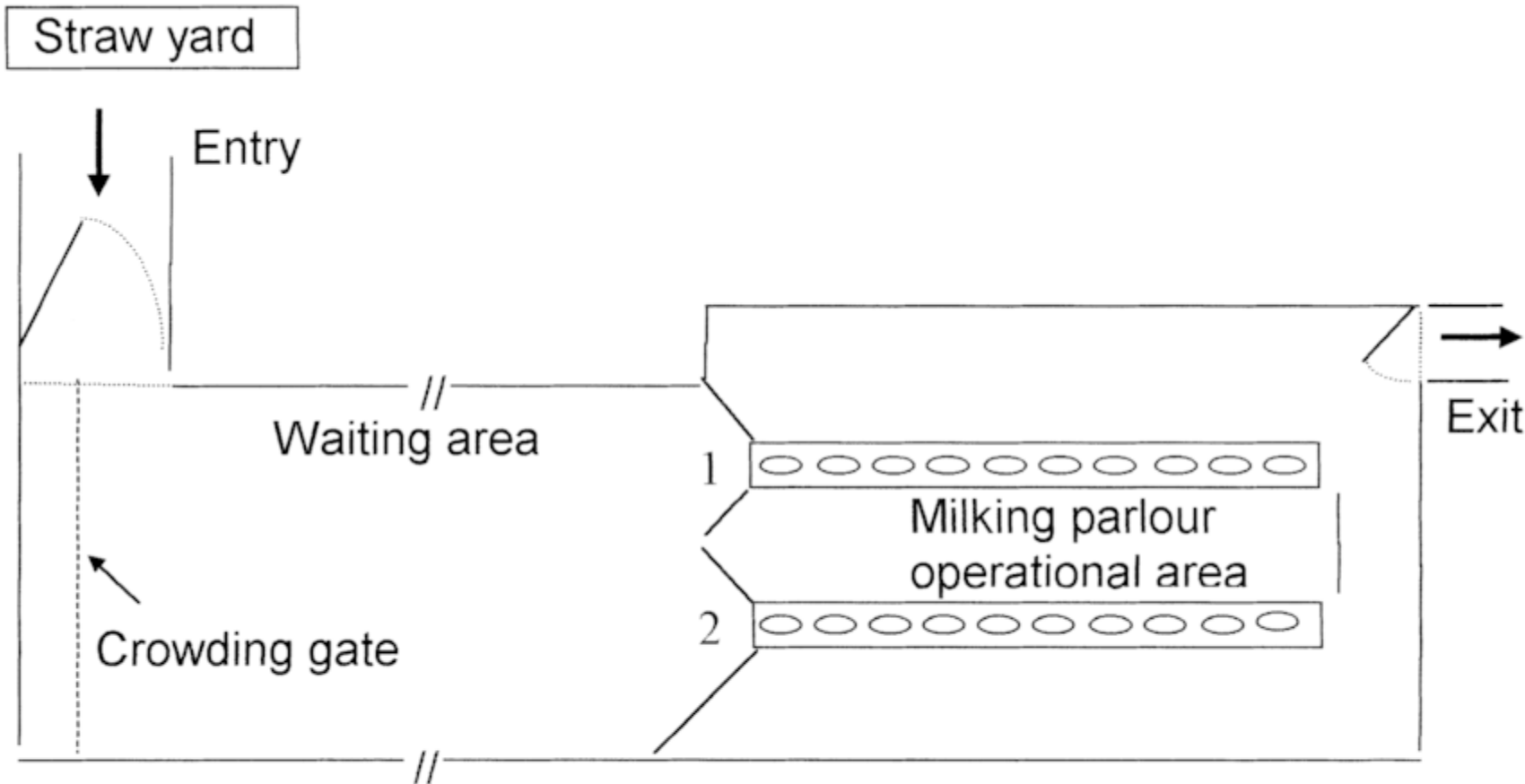
- Pins submerged in flesh
- Ribs cannot be easily felt and have firm cover
- Backbone flat
- Short ribs have lots of cover.

Milking of dairy cows

- The technological lines should ensure quality of **preparation of the cow's udder for milking, ensure fast and quality milking and machine milking**, while maintaining good udder health.
- The technological process consists in the rapid preparation of the cow's udder for milking, placing of the milking set, control of the milking process, machine milking and teat disinfection after milking.
- **In-stall milking** - applied to tethered systems with the option of milking into a cow by the cow or into a pipe - labour-demanding, difficult to obtain the required quality of milk.
- **Milking in milking parlours** - applied in free-range systems, advantage of short milk transfer routes = good milk quality.

(a)





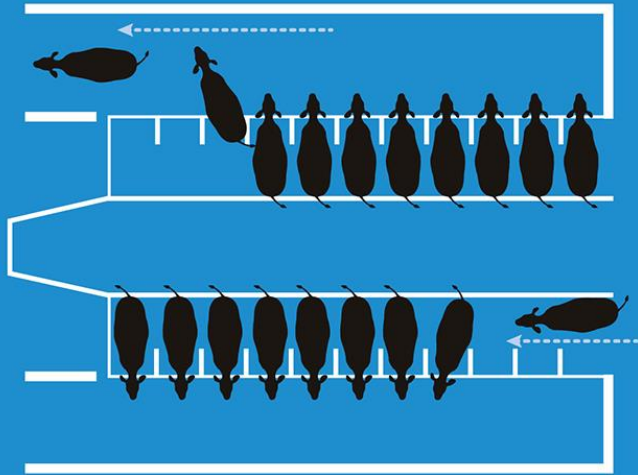
1 and 2 = Milking parlour access gates (left and right side, respectively)

○ = cow

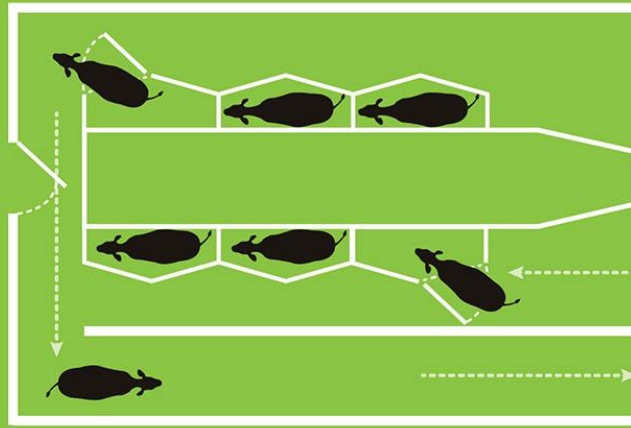
Milking of dairy cows

Milking parlours:

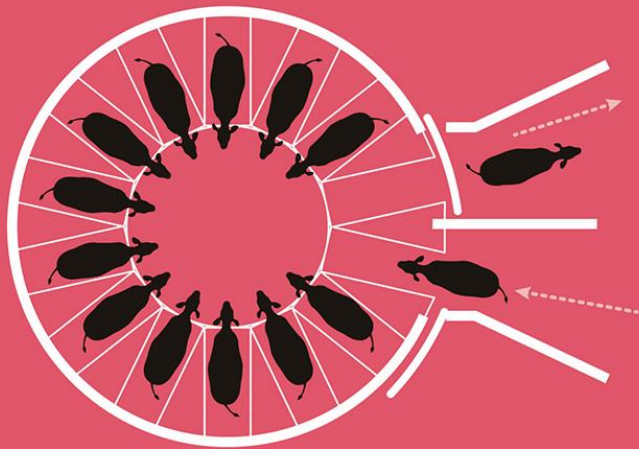
- **tandem** (dairy cows standing behind each other)
- **herringbone** (dairy cows standing diagonally next to each other, 45 d. angle)
- **parallel** (dairy cows standing side by side)
- **rotary** – like carousel rides, the milking stalls are arranged in a large circle on a platform that rotates slowly.
- **milking robots** - but supervision is necessary, high cost, small performance, selection of cows for uniformity of udder formation



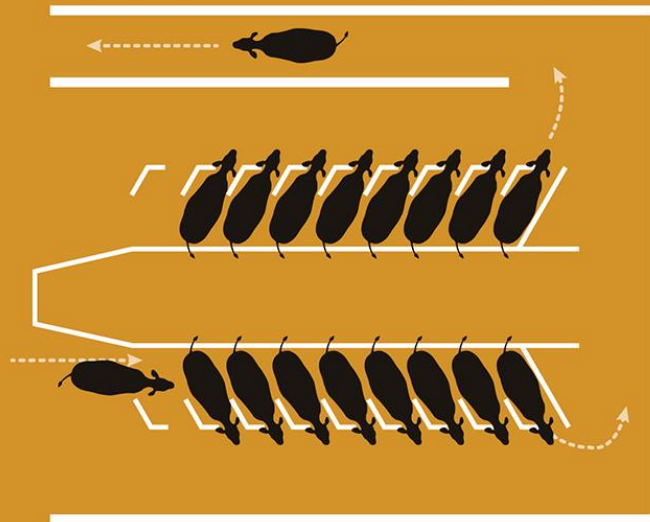
PARALLEL PARLOR



TANDEM (SIDE OPENING) PARLOR



ROTARY PARLOR



HERRINGBONE PARLOR



Milking in the stall

HYGIENIC MILKING PRACTICES

- Milking personnel must maintain personal hygiene
- Clean udder, teat, groin, flank, and abdomen of the animal
- Disinfect milking vessels/equipment
- Avoid any damage to the teat/udder tissue



Summary Milking Procedure Steps



Pre-milking teat dipping



Cleaning teat ends



Fore-stripping



Drying teats



**Applying machines
with 60-120 sec
prep-lag-time**



**Post-milking teat
dipping**





Milking robot



Milk Letdown Process

- Must have a cow that cooperates
- Stimulation
 - Washing
 - massaging the udder
- Stimulation causes the pituitary gland to produce oxytocin into the blood stream
- Oxytocin then circulates through the blood to all of the udder
- Milk is forced down into the ducts, the gland and then teat cisterns

Cow behaviour in the parlor as a crucial indicator of welfare

- **Free-range milking** means that at this time the cows are concentrated in a common area and wait their turn to enter the milking parlour. There is only limited physical contact with the farmer during milking. Milking is routine, so it can be assumed that if cows are uncomfortable with milking - afraid of the farmer or experiencing discomfort due to the technical milking process - this represents a serious welfare problem.
- It is assumed that cow behaviour in the parlour is the main indicator for assessing possible cow discomfort during milking. Human-animal relationship tests, the clinical condition of the animals, information on milking routines and assessment of general stress are important for establishing causal relationships.

Disturbance to the well-being of dairy cows during milking

- The head of a dairy cow lowered to the floor during milking.
- Stepping and restlessness during milking.
- Frequent efforts to kick the milking machine.
- Increased frequency of defecation and urination.



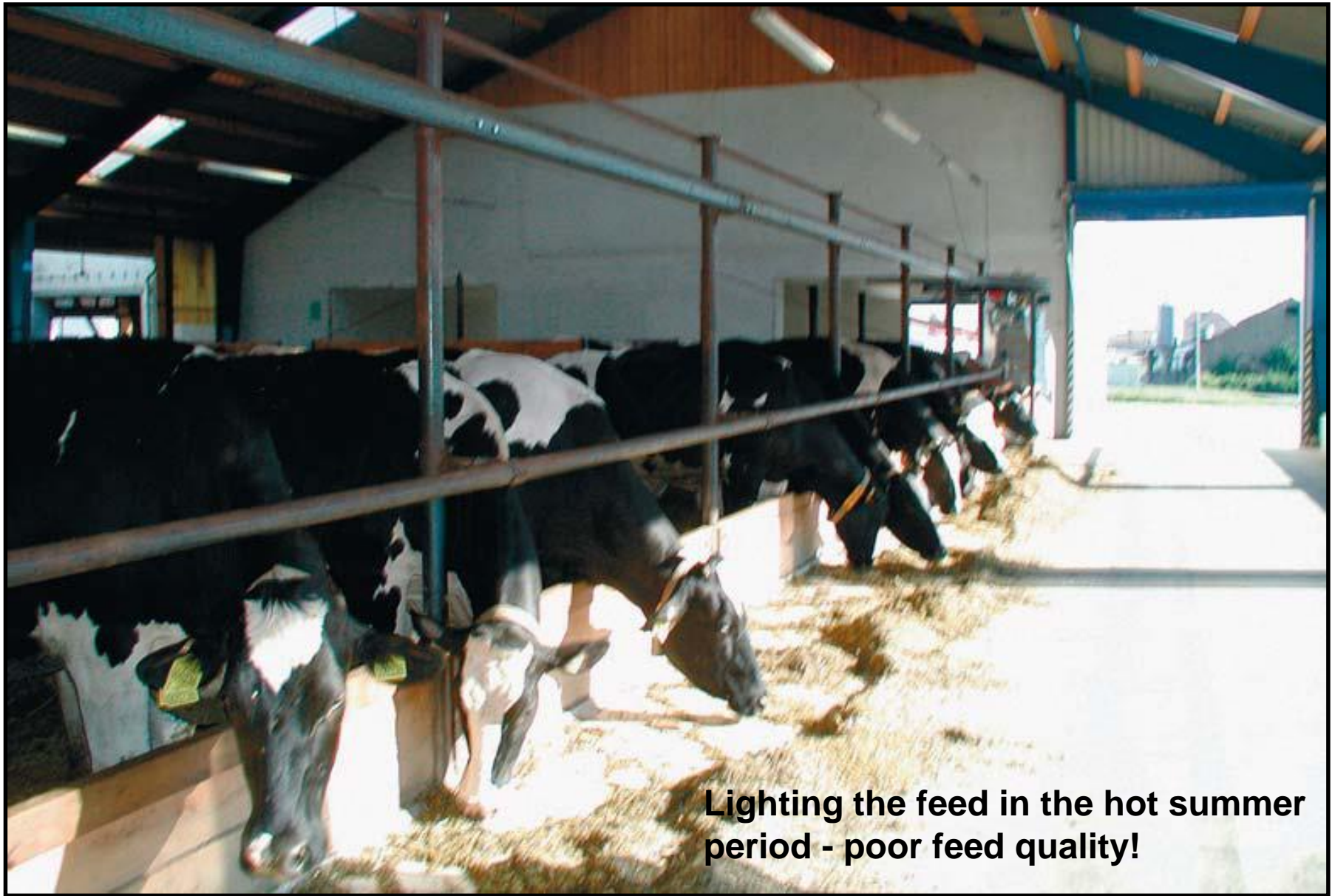
Problem areas in the stable

- **Trough barriers** - Inadequately sized, they can cause severe bruising of certain parts of the body.
- **Barriers** - Can cause injuries to limbs, head, hips.
- **Excessive sunlight** - Overheated bedding and feed.
- **Draft** - Hypothermia, mastitis.
- **Long, excessively rough or slippery communication**
 - Danger of injury to limbs, lameness.
- **Extreme conditions in the paddock.**
 - Mud, stinging insects, sun, no watering trough.
- **Dark places in the stable, unlighted roads**
 - Milking parlour with 'rough' dairyman.
- **Wet and cold bedding for all categories of cattle.**





Low cow barrier and high wristler barrier



Lighting the feed in the hot summer period - poor feed quality!

Examples of problem periods

- **Dry standing time**
- **Integration of new animals into the herd**
- **Calving**
- **Changes in feed ration**
- **Sudden changes in weather, changes in atmospheric pressure**
- **Absence of the breeder**
- **Movements of animals**
- **Sudden heat wave**
- **Mixing of manure in undergrowth areas**
- **Disturbance caused by the keeper...**



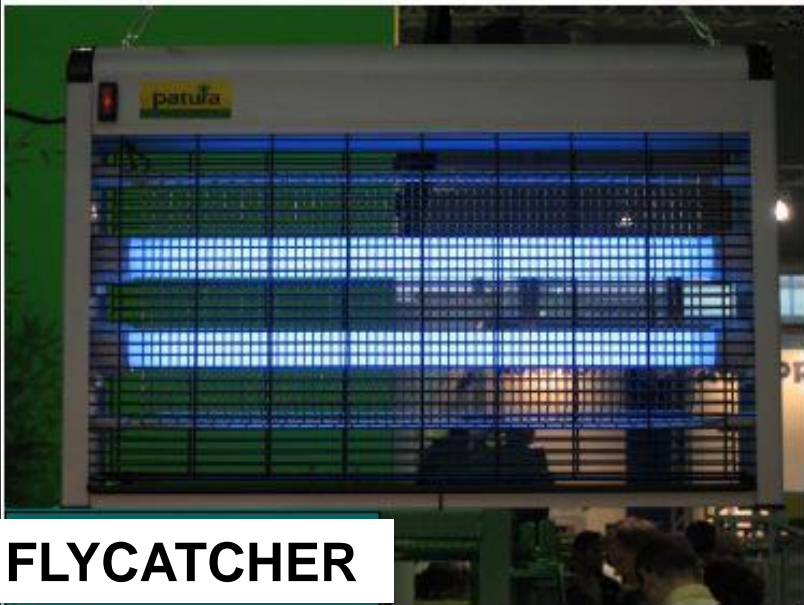
COMFORTABLE HOUSING FEATURES



**SCRUBBING
BRUSHES**



SHOWERS



FLYCATCHER



Stereotypes

- Raising cattle in intensive production systems inevitably leads to changes in their behaviour. In cases where the animal is not allowed to display natural behaviour, it often develops **compensatory behaviour**, known as abnormal behaviour.
- In many cases, cattle exhibit stereotypically **repetitive sequences** of activity, and under inappropriate conditions, specific repetitive movement sequences may develop that serve no apparent purpose in a given context, called stereotypes

Locomotion stereotypy

- walking in a circle
- straddling in place
- swaying movements of the body and head
- Kicking

Oral stereotypy

- chewing on iron barriers and strange objects
- licking walls, trichophagy (eating fur)
- sucking each other's milk, sucking calves
- chewing the waste, swallowing air
- excessive licking
- tongue play







<https://www.journalofdairyscience.org/article/S0022-0302%2823%2900012-7/fulltext>



Mutual sucking of milk

- Suckling among adult animals may be a continuing suckling from an early age, as the process of gradual weaning has not been completed.
- In free-range, lactating dairy cows, it leads to loss of milk production, injury to the mammary gland, infection and subsequent inflammation.
- A significant proportion of suckled animals show characteristic changes in the udder - elongated, differently shaped or deformed teats, often with a parchment-like appearance, visible udder asymmetry and teat injuries.
- Repeated suckling changes lead to a stronger colonisation of the heifers' udders by the causative agents of later mastitis.

Non-pressure suction







Dairy cattle health

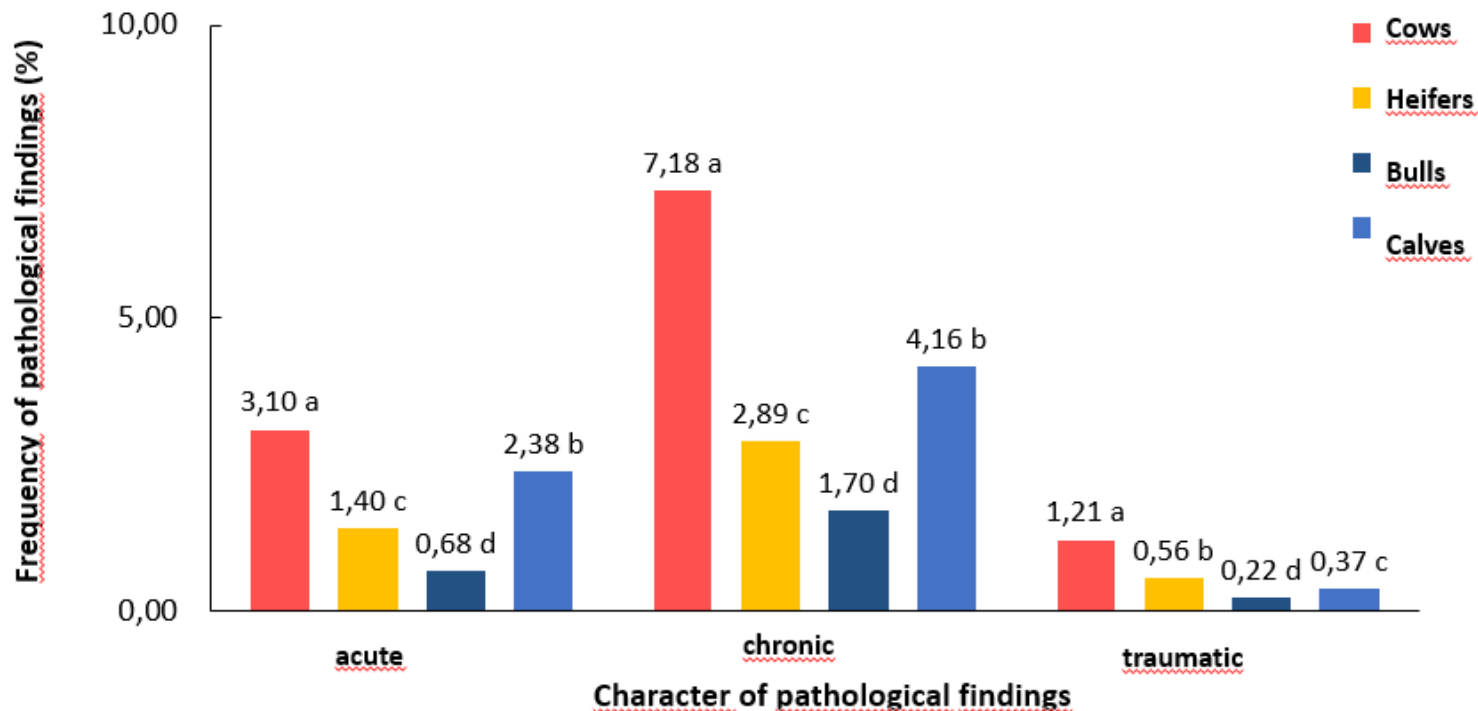
- Illnesses can be considered an important indicator of well-being, because in many cases they are believed to be associated with negative feelings - **pain, discomfort, anxiety**. Acute illnesses causing suffering or long term worsening conditions causing chronic pain have the greatest impact.

ASSESSMENT OF CULLING AND DEATHS OF DAIRY COWS IN SELECTED FARM

- 2013-2017, a total of 691 dairy cows, 136 dairy cows (19.7%) died or were killed on the farm. **The average annual herd turnover rate was 18%.**
- Dairy cows were culled **mainly for health reasons** (82.2%). Only in 15.4% of cases they were **voluntary culled.**
- The most common cause of culling was **musculoskeletal disorders (41.4%), difficult calving (13,75%), mastitis (11,58%),**

Post mortem inspection

- Pathological findings connected with welfare problems (LIMBS)



Dairy cow longevity on selected farms of Holstein cattle

- Longevity of dairy cows is an essential indicator of animal health, welfare and a sustainability of milk production.
- Study showed that Holstein cows were culled at young age (approximately 4 years and 5 months) and most often in the first three lactations (72.49% of culled cows).
- Such results indicate a low utilization of the production potential of a number of cows that are included in the production herd on conventional farms.
- Prolonging the life of dairy cows should not be the goal of farmers, but it should be the result of successful prevention of involuntary culling on farms.

Main health problems in cattle

Dairy cattle

- **Hoove diseases** (overgrowth, deformities, laminitis - changes in posture)



Figure 4. Lameness scoring system.

Lameness Score	Clinical Description	Assessment Criteria
1	Normal	The cow stands and walks with a level back posture. Her gait is normal.
2	Mildly lame	The cow stands with a level back posture, but develops an arched back posture while walking. Her gait is normal.
3	Moderately lame	An arched back posture is evident both while standing and walking. Her gait is affected and is best described as short striding with one or more limbs or feet.
4	Lame	An arched back posture is always evident and gait is best described as one deliberate step at a time. The cow favors one or more limbs or feet.
5	Severe lameness	The cow additionally demonstrates an inability or extreme reluctance to bear weight on one or more of her limbs or feet.

Effect of nutrition on lameness

- **rumen acidosis**
- **vitamins and minerals**
- **hoof treatment**

Other nutrition-related health problems

- **hypocalcemia**
- **hypomagnesaemia**
- **endometritis**
- **ketosis**
- **tympany**





• Other metabolic diseases of cattle

Energy-Related Disorders

- 1- Fatty Liver Syndrome
- 2- Ketosis (Acetonemia)
- 3- Rumen Acidosis
- 4- Laminitis (Locomotion Score)
- 5- Displaced Abomasum
- 6- Milk Fat Depression

Minerals & Vitamins-Related Disorders

- 1- Hypocalcemia (Milk Fever)
- 2- Udder edema
- 3- Retained Placenta

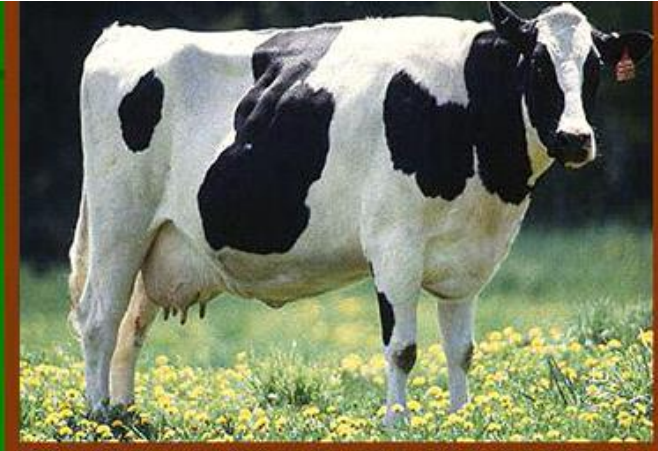
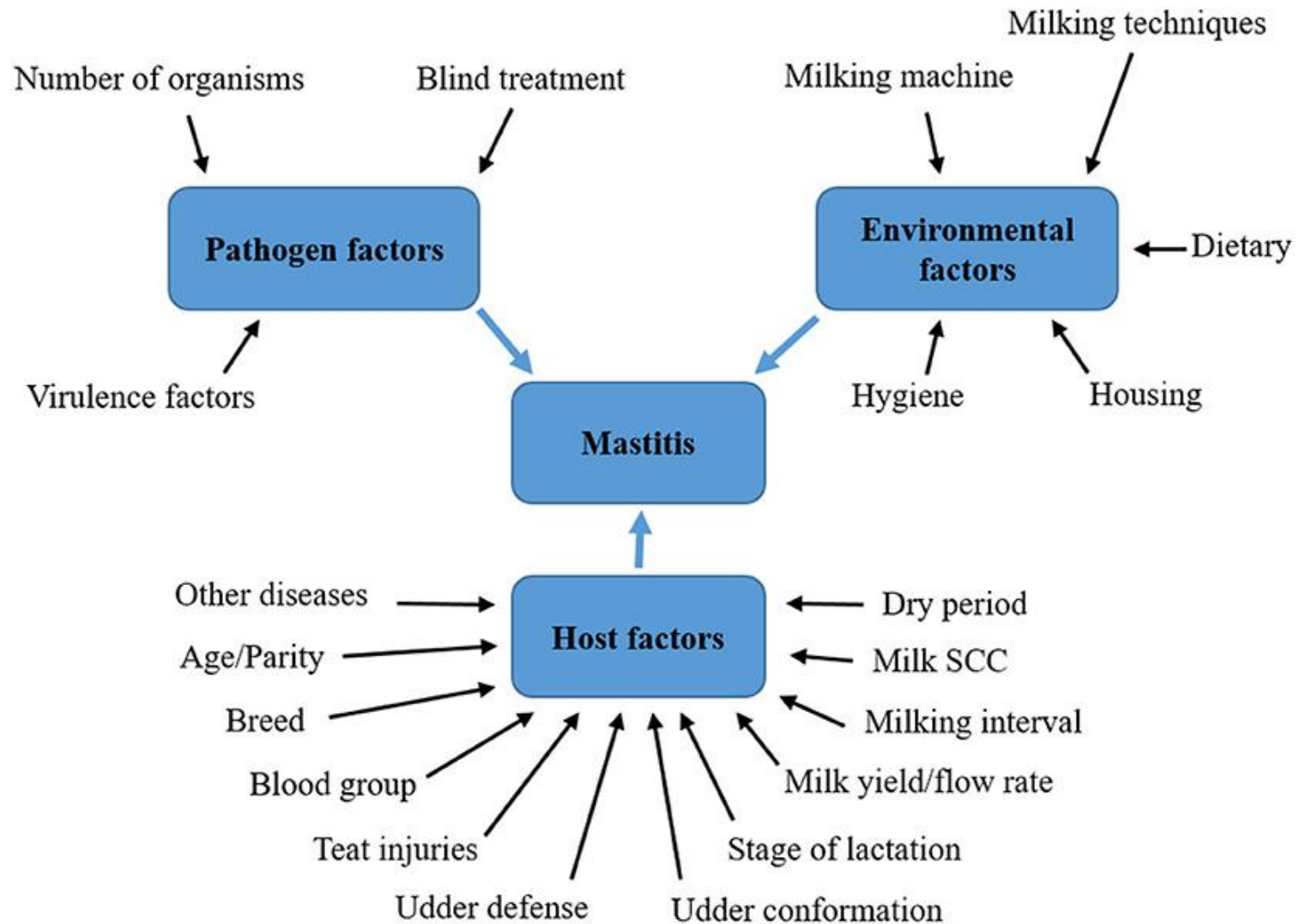


Table 1. Number of pathological findings according to their localization in individual classes of cattle.

Finding	Cows (n = 1,136,754)		Heifers (n = 257,912)		Bulls (n = 1,015,541)		Calves (n = 104,459)	
	Number	%	Number	%	Number	%	Number	%
liver and pancreas	524,348	46.13 ^a	38,136	14.79 ^c	82,440	8.12 ^d	17,880	17.12 ^b
S and FS	91,642	8.06 ^a	5141	1.99 ^b	14,016	1.38 ^c	1311	1.26 ^d
intestines	31,740	2.79 ^a	2419	0.94 ^c	6880	0.68 ^d	2406	2.30 ^b
lungs	411,842	36.23 ^b	45,407	17.61 ^c	135,489	13.34 ^d	46,894	44.89 ^a
heart	104,919	9.23 ^b	6719	2.61 ^c	13,982	1.38 ^d	10,524	10.07 ^a
spleen	205,526	18.08 ^a	20,144	7.81 ^b	50,925	5.01 ^d	6889	6.59 ^c
reproductive organs	150,504	13.24 ^a	684	0.27 ^b	412	0.04 ^c	5	0.00 ^d
PAG and CD	1865	0.16 ^a	319	0.12 ^b	2	0.00 ^d	4	0.00 ^c
urinary tract	463,365	40.76 ^a	41,905	16.25 ^c	110,432	10.87 ^d	17,774	17.02 ^b
CNS	21	0.00 ^a	12	0.00 ^b	4	0.00 ^c	4	0.00 ^{a,b}
skin	214	0.02 ^c	192	0.07 ^b	64	0.01 ^d	109	0.10 ^a
head	3087	0.27 ^b	444	0.17 ^c	4680	0.46 ^a	86	0.08 ^d
trunk	42,507	3.74 ^a	3579	1.39 ^c	4934	0.49 ^d	3331	3.19 ^b
limbs	130,594	11.49 ^a	12,513	4.85 ^c	26,368	2.60 ^d	7218	6.91 ^b
overall changes	49,725	4.37 ^b	4718	1.83 ^c	9453	0.93 ^d	22,509	21.55 ^a
other changes	62,012	5.46 ^b	4358	1.69 ^c	6225	0.61 ^d	6539	6.26 ^a
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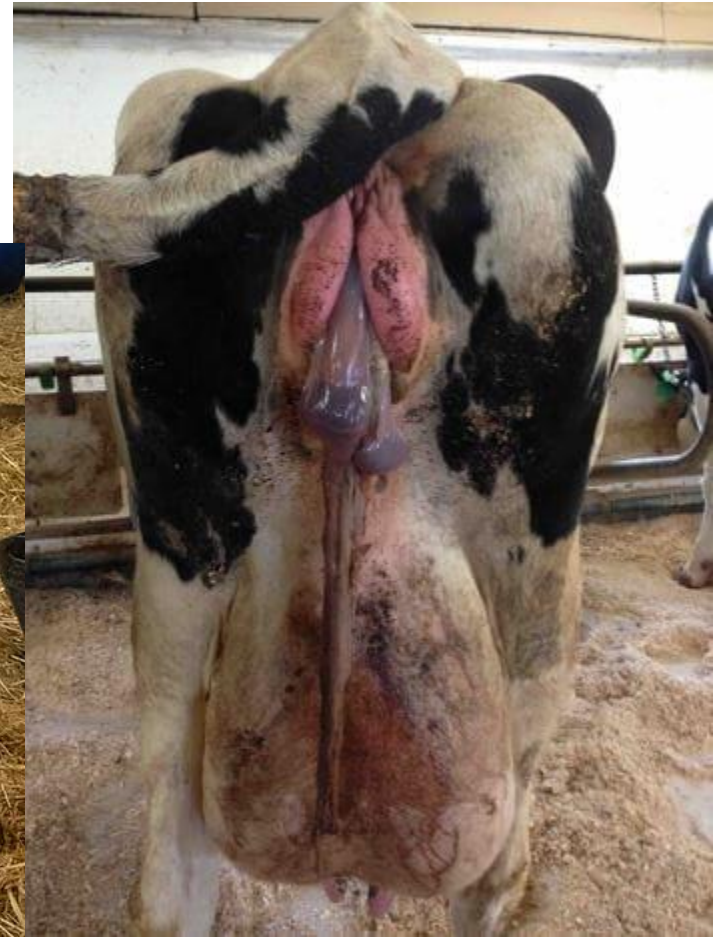
• Mammary gland disease (mastitis)



- **Reproductive disorders**

- **Infertility**

- **Postpartum complications - retained placenta, downer cow complex...**



Infectious diseases

- Viral - smallpox, IBR, enzootic bovine leukosis, mucosal disease, FMD
- Prion - BSE
- Bacterial - anthrax, tetanus, actinomycosis
- Fungal and parasitic – trichophytosis (ringworm), coccidiosis, babesiosis, liver fluke, lungworm, scabies



Ring worm disease



Skin diseases and skin parasites

- Itching of the skin can result in long-term restlessness of the animal along with an increased risk of self-inflicted secondary lesions, e.g. on the udder.
- Clinical observation of skin infection or parasite infestation will be supplemented with **information on hygiene and anti-parasitic treatment**. As part of the clinical examination, the presence of skin parasites in the tail area was indicated by the degree of involvement.

Internal and External Parasites

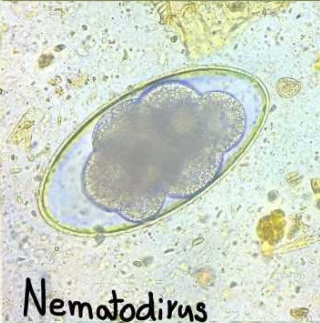
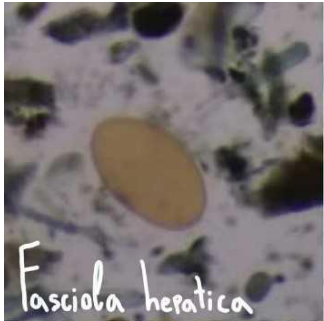
Clinical signs: diarrhea, weight loss or reduced weight gain, cachexy, loss of appetite, and reduced reproductive performance

INTERNAL

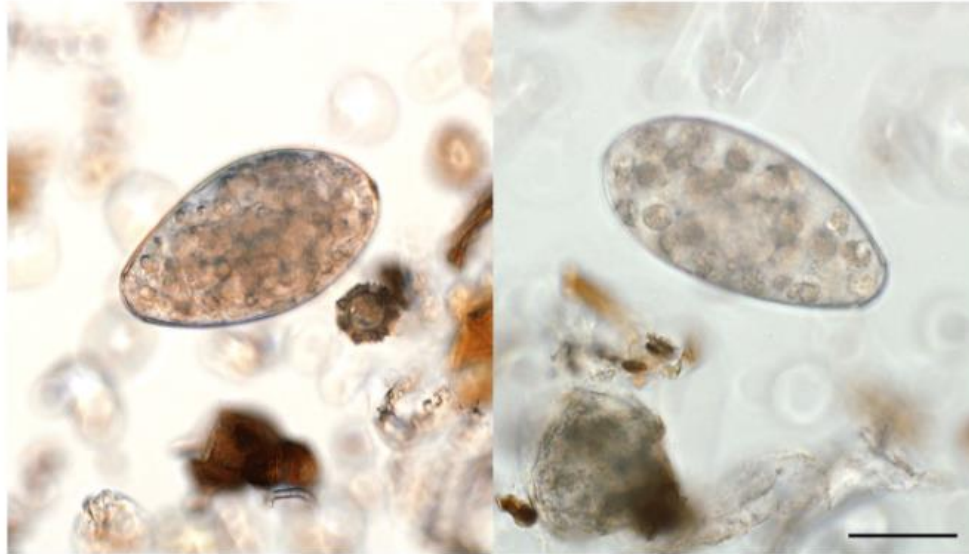
- **Roundworm**, Tapeworms, Flukes, Coccidia

EXTERNAL

- lice, keds, and mites



- **Results of Parasitological Monitoring of Beef Cattle Herds in the Czech Republic, With First Description of the Occurrence of Invasive Rumen Fluke *Calicophoron daubneyi* in Beef Herds**



2: Eggs of rumen flukes (identified based on ITS-2 sequences as *Calicophoron daubneyi*) detected by the sedimentation technique in a cattle sample originating from a beef farm in the South Bohemia region; scale bar = 50 μ m

<https://acta.mendelu.cz/pdfs/acu/2022/03/05.pdf>

Rearing of calves

- During childbirth, breeders' help is usually not needed, only for complications.

The guiding principle after birth is to nurse the calf. The first watering of the calf should take place as soon as possible.

Calf rearing takes place during the period of milk feeding and during the period of plant feeding.

-

The milk feeding period - can vary in length depending on the time it takes for the digestive tract to become accustomed to the plant-based diet. Milk forms the basis of the diet. It is only at the end of the first month, as the calf develops digestive enzymes, that it can begin to use other sources of nutrients, mainly from grain foods (starter feeds).

The period of plant-based nutrition - during which the conversion to plant-based nutrition is completed - ends at 6 months of age.



Housing in colostrum and milk period



Uhříněves hutch



Wooden hutch



Plastic hutch



Igloo



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172

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Different feeding techniques during the lactation period



from the open surface



sucking from a bucket



feeding machine



Individual supply



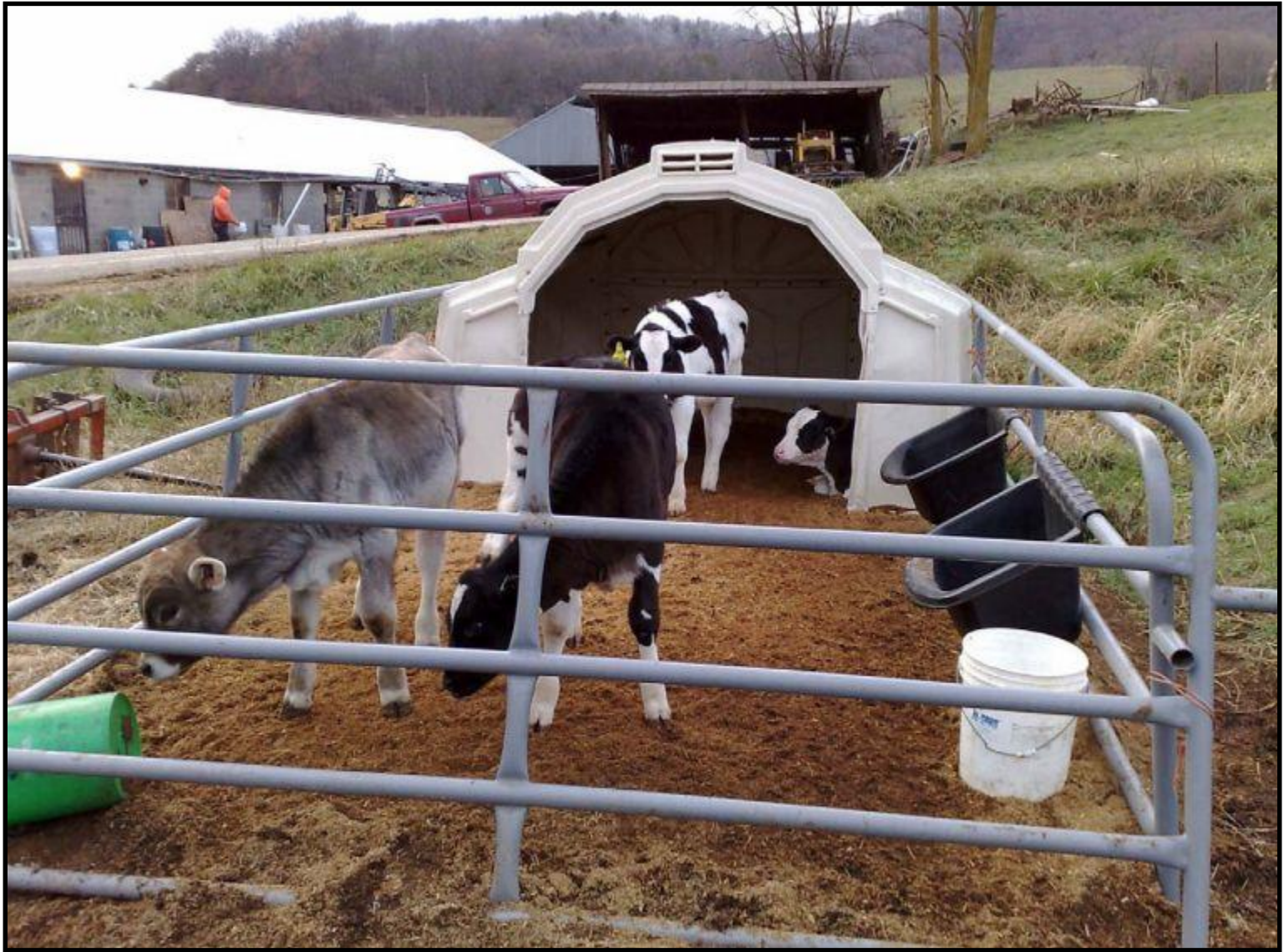
Group supply

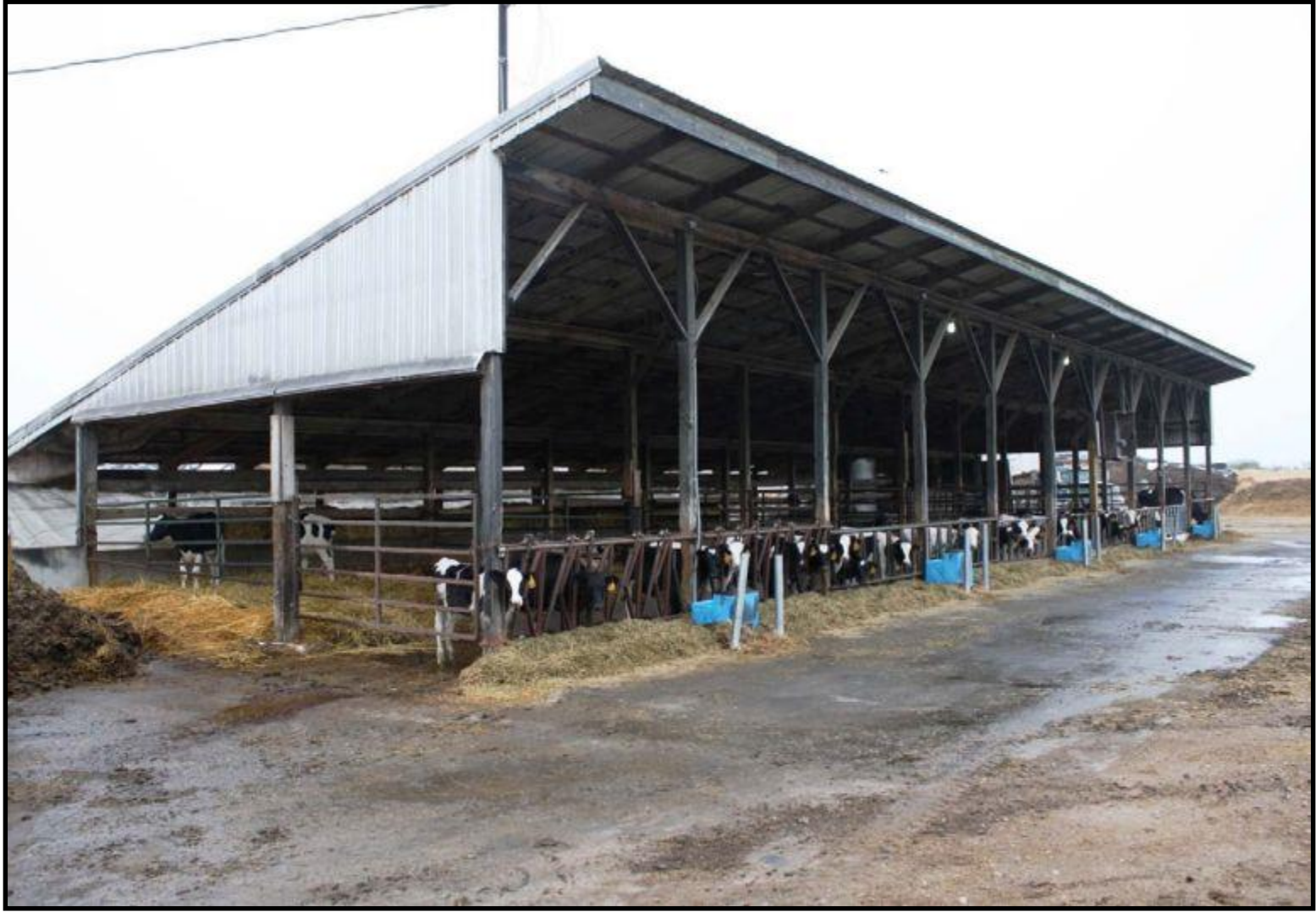
















Deep bedding and reinforced feeding area



Box bed



Pen with deep bedding



Sloping beds

Procedures on calves



Chemical dehorning



Gas or electrical dehorning



Calf health

- **gastroenteritis**
- **respiratory infections, pneumonia**
- **joint diseases**

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Breeding of heifers

- The challenge is to achieve a harmonious development that will allow good performance and longevity in adulthood. Not, as with bulls, maximum increase of weight.
- Extensive forms of rearing, such as grazing, are the most natural way of taking in food (building constitution and health).
- It is advisable to form social groups from the rearing heifers immediately after leaving the calf category and to maintain these groups. Animals should be included in reproduction only after they have **reached breeding maturity** - two-thirds of the expected adult weight (15-19 months of age) should be reached.



Housing of heifers

- The most suitable are various variants of **free pen housing** - pen housing with a sloping bed - keeps the animals clean, high level of service. The pen divided into a bedded pen with a 5-10% slope of the bed floor and a feeding pen to which the slope is directed. Bedding is done on high level of bedding.
- **Flat-bed cubicle housing** - is similar to the previous system, but the cubicle is without a sloping, for mechanization of working operations is carried out as in the previous one mostly using mobile lines - there is more dirty animals.

- **Pens with deep bedding** - also divided into feeding and lying area, bedding is formed by permanent landing in the lying area, where gradually a layer of manure is formed (it is changed in 2-3 months). High bedding consumption to keep the bedding dry! This system places higher demands on the maintenance of microclimatic and zoohygienic conditions in the stable!
- **Box housing** - litter or litterless - is suitable for heifers that will be housed after calving in the cow category. The cubicle is divided by barriers into cubicles designed for individual lying of individual animals - arrangement in relation to the feeding area. The boxes are elevated above the level of the corridors by 20 cm with a slope of 2% into the feedlot. The dimensions of the boxes are governed by the size of the animals, the boxes can be adjusted by neck barriers in the front part.

In this system, the animals are least dirty.



pasture and shelter



Box bed and enclosure

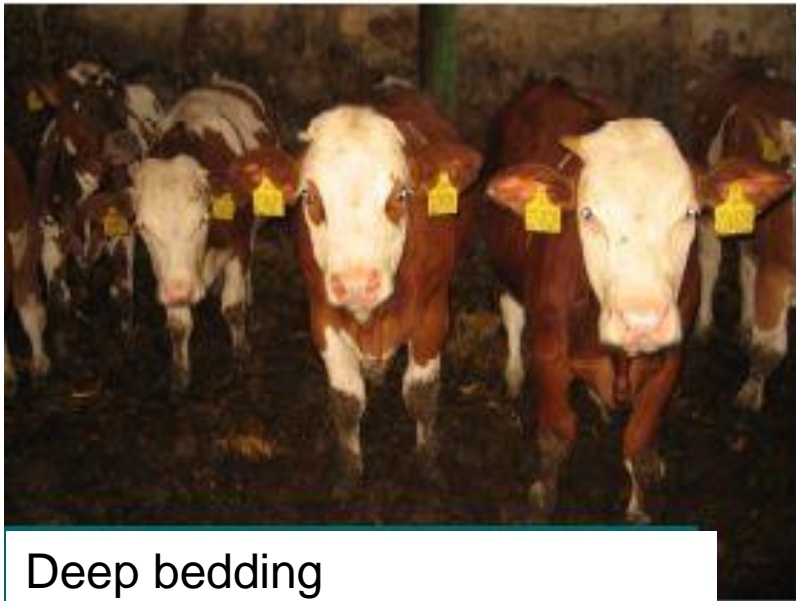




Boxes with straw bedding



Flat landing bed



Deep bedding



Boxes without bedding

Fattening of calves, young cattle and bulls

- **The fattening of young cattle** follows the period of **milk feeding and ends at the latest at 12 months** of age at a weight of up to **450 kg**.

The fattening of bulls follows a period of plant nutrition and can be completed at **up to 2 years** of age - weighing up to 800 kg.

Free-range housing with group housing is a viable option. The principles of hierarchical group organisation must be respected. It is recommended to keep 10-30 cattle of approximately the same weight per group.

Calve fattening

- It is realized up to the age of 4-5 months and weight of **140-180 kg**, throughout the fattening period the calves **are fed with a milk feed mixture** (previously Fe and Cu were not added, today it is forbidden!). Supplementation with vitamins and minerals is important.
- The actual fattening is divided into 3 phases - **3 feed mixtures**, where the proportion of milk powder gradually decreases and the proportion of fat increases. Ad libitum feeding. **Group housing and feeding with automatic feeding machines. Important to supply water in spite of feeding watery compound feed.**

Baby beef fattening

- It is fattening up to **the age of 8-9 months** up to 300 kg l.w. or up to the age of 11-12 months - 400 kg l.w.
- Usually used ad libitum **feed mixtures** up to 80 days of age and above 80 days of age - varying in nitrogen content.
- Roughage is also used on a limited basis (supplementary).
- The negative is the **low fibre** content of the feed mixtures - frequent health problems - **rumen dysfunction**.

Housing of fattened animals

- The most widespread is the **free litter pen housing**, in fattened bulls also **the litterless** variant of this housing is used = **full-lattice housing** - housing in pens, the whole floor is latticed. The pens are differentiated in size. For the floor, reinforced concrete grids with a flat floor surface 10-12 cm wide with rounded edges and 2,5-3,5 cm gaps are the most suitable. The correct ratio of grid surfaces and gaps allows the faeces to pass through and fall into **the sub-grid space** - a **prerequisite for animal cleanliness**.



Benefits:

High labour productivity
low labour costs
high operational efficiency
good animal cleanliness.

Disadvantages:

Problems at too low temperature
strain on the limbs
more slaughter required.



Advantages:

the well-being of the animals
bedding - supplement the ration - fibre
good animal cleanliness
physiologically more natural
less investment-demanding
production of high quality manure.

Disadvantages:

Poorer health
more necessary slaughters
lower labour productivity
worse zoohygiene
sometimes worse microclimate - old stables.

Technology of rearing un milked cattle (cow breeding)

- **Use of grazing** - this suits late winter and early spring calving - February, March. Cows are at peak lactation in May and good quality grazing allows them to extend the period of maximum milk production - calves are big enough at this time so they can easily consume the higher milk production - transforming it into a sufficient gain.

Keeping cows in the summer grazing period

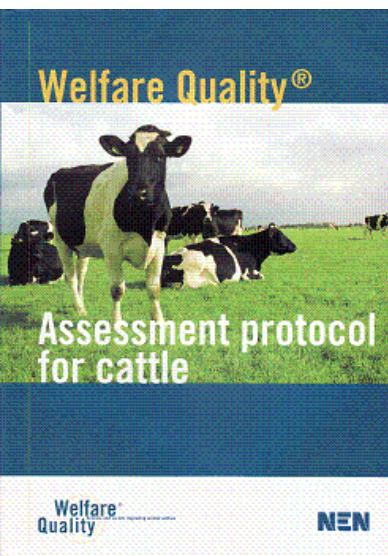
- Situated in the peripheral areas - high representation **of pastures and meadows** - optimal form of nutrient intake. Grazing systems are used, particularly the fence system. The construction and technical equipment is important - fencing, watering, fixing equipment. The most natural way of drinking is from a **natural source**; access to the drinking trough should be consolidated. Another way is to build a water supply or **mobile watering container**. **Minerals, salt and supplementary feeds are available in the feedlot**. Scrubbing brushers are useful to keep the animals clean.



Breeding cows in winter

- **Wintering in simple, inexpensive stables or shelters.** Shelters are suitable, preferably on deep bedding to protect the animals from **draughts and wet conditions.** The stall is used as a bedding area and should have an individual birth box for calving - 10-12 m².
- It is important to create a bond between mother and calf.

Dairy cows



	Welfare Criteria		Measures
Good feeding	1	Absence of prolonged hunger	Body condition score
	2	Absence of prolonged thirst	Water provision, cleanliness of water points, water flow, functioning of water points
Good housing	3	Comfort around resting	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
	4	Thermal comfort	<i>As yet, no measure is developed</i>
	5	Ease of movement	Presence of tethering, access to outdoor loafing area or pasture
Good health	6	Absence of injuries	Lameness (loose housed animals), lameness (tied animals), integument alternations

	7	Absence of disease	Coughing, nasal discharge, ocular discharge, hampered respiration, diarrhoea, vulvar discharge, milk somatic cell count, mortality, dystocia, downer cows
	8	Absence of pain induced by management procedures	Disbudding/dehorning, tail docking
Appropriate behaviour	9	Expression of social behaviours	Agonistic behaviours
	10	Expression of other behaviours	Access to pasture
	11	Good human-animal relationship	Avoidance distance
	12	Positive emotional state	Qualitative behaviour assessment

Beef cattle

	Welfare Criteria		Measures
Good feeding	1	Absence of prolonged hunger	Body condition score
	2	Absence of prolonged thirst	Water provision, cleanliness of water points, number of animals using the water points
Good housing	3	Comfort around resting	Time needed to lie down, cleanliness of the animals
	4	Thermal comfort	<i>As yet, no measure is developed</i>
	5	Ease of movement	Pen features according to live weight, access to outdoor loafing area or pasture
Good health	6	Absence of injuries	Lameness, integument alterations
	7	Absence of disease	Coughing, nasal discharge, ocular discharge, hampered respiration, diarrhoea, bloated rumen, mortality
	8	Absence of pain induced by management procedures	Disbudding/dehorning, tail docking, castration
Appropriate behaviour	9	Expression of social behaviours	Agonistic behaviours, cohesive behaviours
	10	Expression of other behaviours	Access to pasture
	11	Good human-animal relationship	Avoidance distance
	12	Positive emotional state	Qualitative behaviour assessment

Thank you for your attention!

