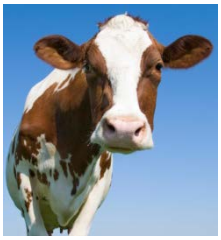

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Welfare sheet – Dairy

Introduction

Dairy cows start producing milk after giving birth to a calf. Their milking lactation is around 10 months (depending on when the next calf is due); they are then dried off and not milked until they give birth again. Commercial cows on average only live for about 4 lactations before being culled, normally due to poor health and fertility[1]. Cows in the EU do not get access to pasture all year round; in the great majority of systems they are indoors for 5-7 months or longer depending on climate, availability of grass and sward length[2].

Milk can be sold as a liquid product or made into cheese, butter and yoghurt. It is also used as dried powder. Food manufacturers use dairy in a wide range of products including; crisps, biscuits, ready meals and desserts.

Genetics

The shift globally from mixed farming to specialised farms has happened in dairy as with other farmed species. Over many generations cows have been selected for their milk production, particularly in the last 50 years. The Holstein breed gives higher milk yields than other breeds. Holstein – Friesian cows are the major highly specialised breed for milk production, although other breeds are also used[3]. The Holstein originates from North America, with over 90% of the USA herd made up of Holsteins[4] and around 80% of dairy cows in the EU[5]. The ability to export semen and embryos has enabled the Holstein breed to become integrated into dairy herds around the world.

The Holstein-Friesian breed is commonly bred today for their high milk yield

The Holstein breed is typically used in high input/high output systems. The direction for breeding has produced cows that can yield up to 50-60 litres per day during peak lactation and is classified as a high yielding cow. This increase in milk production has led to[6]:

- The **decline in fertility** within the breed and an **increase in the incidence of health problems** (lameness, mastitis and metabolic disorders) and **declining longevity**.

- Cows **needing to eat more** to provide the energy required for producing higher milk yields and this is **at the expense of other activities, such as resting**[7]. While the cow's preference may be to be outside, their dry matter intake from TMR reduces while kept outside. This may lead to reduced body weight and would not sustain cows in early lactation. So cows with higher yields are being kept indoors more[8].

- High production requires a **higher level of management** and certain management practices with animals maintained on **high starch grain-diet and minimal grazing**.

- Increased milk production has altered the cow's dimensions, **increasing her body size and particularly height**, which changes the cow's requirements for good welfare with **more space needed** and the **scale of force exerted** by standing up and lying down.

- **Breeding for large volumes of milk increasing the udder size of the cow**. The deep and voluminous udder causes the animals to **splay their legs** to accommodate it as they walk and puts pressure on the outer claw. It is likely to **contribute to lameness** on the rear feet. There is a lower risk of lameness with breeds other than Holstein-Friesian, independent of milk yield[9].

- Cows producing large volumes of milk have a **higher feed intake** which in turn increases their metabolic rate. This puts them at risk of **heat stress,** therefore increasing their need for shade or necessitates standing more to allow for cooling evaporation.

- The high yielding dairy cow suffers poorer welfare due to metabolic stress and has an increased risk of production and reproductive disease in early lactation[10].

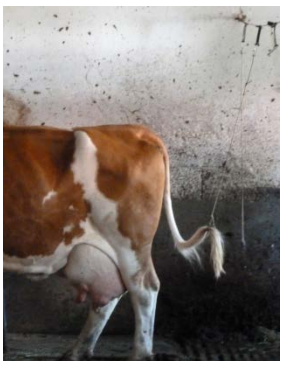
Housing systems

Cows need to rest and if lying conditions are comfortable they will spend up to 14 hours per day lying[11]. Space allowance and bedding for indoor housing is important to ensure they are able to lie comfortably. Floor conditions also impact on welfare - high levels of faeces exacerbates lameness problems, as they are twice as likely to slip[12]. There is also an increased prevalence of hoof lesions solid concrete floors compared to straw yards[13].

Tie stall

Tie stalls are typically in older traditional systems. They may be for permanent housing or for use during the winter months when cows aren't out on pasture. While vets advise daily walking, this is often not the case.





Welfare issues specific to tie-stall housing:

- **Severe restriction of movement**: with cows tethered to one spot they can only move a few steps forwards and backwards and lie down and are therefore almost completely deprived of exercise. The movement required for standing up and lying down is restricted too.

- **Grooming ability is impaired**: those using stanchion bars or shorter tethers will severely reduce the ability of the cow to clean herself[14].
- **Social behaviours**: Loose housed cows perform less social sniffing and licking compared to cows in tie stalls. An increased sniffing and licking behaviour of equipment may be due to lack of stimulation in the environment[15].
- **Increased risk of lameness**: Cows tethered have an increased risk of lameness although if given regular exercise the risk is lowered[16]. From recent investigations and per communication with farmers and vets, cows don't typically receive daily exercise. It may be as frequent as only twice a week. Tie stalls have been shown to have inflamed hocks in comparison to loose-housed cows[17].
- **Unable to move away from dominate cows:** while cows do not have to compete for food they may be tethered next to a dominant individual. Subordinate cows will normally try and move away from dominant cows but tethering prevents them from doing so[18].
- **Small stalls:** as cows have increased in size, larger stalls are required[19]. Tie stalls are often on traditional farms in old barns or sheds and may not have been updated. This leaves cows unable to all lie at the same time or that are too long for their bed[20].
- **Electric shocks:** 'Cow trainers' may be used to ensure the cow defecates or urinates outside the stall. As she raises her withers the electrified wire will emit a shock so she steps backwards (banned in Sweden). It is shown to restrict grooming behaviour[21], increase the incidence of trampled teats[22], clinical mastitis, fertility problems and culling[23]. Stray voltage is also a problem in poorly fitted stables. Cows may be exposed to stray voltage by metallic tether or during eating or drinking from metallic troughs[24].
- **Tail tethering:** our recent investigation found cows with tails permanently tethered (normally only used while milking). This reduces the cow's ability to protect herself from flies.

Permanent housing

Due to growing herd size, location and the high metabolic demands of modern Holstein-Friesian cows, farmers are more often opting to keep cows indoors all year round (zero grazing). EU organic legislation requires unrestricted pasture access outside the winter season but there is no such legislation for conventional farming. Cows may be housed in tie stalls, cubicles or loose housing, such as straw yards. Zero grazed does not mean they do not have access to an outside area; they may have an attached loafing area to the cow shed but this is barren.

Cows may be housed permanently throughout the year; this is known as zero grazing. It can occur in any type of housing system – cubicle, tie stall or loose housing.

The welfare issues surrounding permanent housing and without access to pasture:

- **Lameness** is the most commonly reported welfare problem associated with restricted grazing[25]. In one study cows in grazing herds had 15% lameness compared to 39% of zero-grazed as well as a higher level of swollen knees[26].
- **Hoof disorders are more prevalent in zero-grazing systems** and during the winter months (with seasonal grazing) based on epidemiological studies in the USA, Chile, the Netherlands, UK, Kenya and Switzerland[27]

- Proving cows with even just a **short period of pasture access (4 weeks) to lame cows**, significantly improves mobility[28]
- **Access to pasture leads to: reduced mortality, lower levels of mastitis** and metritis, fewer trampled teats, less dystocia and fewer cases of retained placenta and ketosis[29].
- Cows without access to pasture are 8 times more likely to be culled for mastitis[30].
- Cows choose to **lie for longer while at pasture**, with fewer, longer lying bouts than cows housed indoors[31]. This may be due to increased comfort level, as there is great space and a greater freedom to lie in their chosen posture and direction.
- While outdoor access provides exercise, **levels of mastitis and digital dermatitis are greater** on barren land and indoors compared to pasture[32].
- Cows that **exercise were found to have fewer calving-related problems**[33].
- Cows in cubicle systems kept indoors perform **greater antagonistic behaviour** to each other than when out on pasture[34].
- **Cows have a partial preference for pasture**; when given the choice of TMR both indoors and at pasture they chose pasture[35].
- Indoor flooring is typically concrete and exerts higher forces on the cow's feet. They are **more likely to be to be standing in manure on the concrete**. Pasture enables the cow to spread her weight more evenly[36].
- **Vitamin D deprivation** can occur in **permanently indoor housed cows** due to lack of sunlight[37].

Mega dairies

- Herds of large numbers (over 1000), if kept on pasture, have to walk further to get sufficient nutrition and require a large area to defecate. Clean grass is more difficult to find if there are large numbers of animals defecating in one area and the faeces risk water pollution.
- So that large herds of high producing animals can get sufficient nutrition farmers keep animals indoors near to food and with a slurry system. This leads to the problems associated with permanent housing.

Health issues in cows

Lameness

- Lameness in cows is thought to be **the most severe welfare problem facing dairy cows**[38]. The most common cause is from foot lesions (90%)[39].
- Standing on concrete, especially during early lactation when their feet are less resilient, is a risk factor for causing lameness in cows along with bad housing and poor slurry management[40]. Failure to treat cases early on is a major problem[41].
- The average **number of cows believed to be lame at any one time is between 20 – 25%**[42].
- Signs of pain are often very subtle as **cows are stoic** in nature but lameness causing **lesions on the foot are painful**[43] and can lead to hyperalgesia[44].
- The **cows ability to perform normal behaviours is affected by lameness** such as; walking, standing, lying, resting, mounting and being mounted.
- Cows live within a hierarchical system and lame cows have been found to **lose their social rank**. They also eat for shorter periods and have a higher eating rate than their mates[45]. Severely lame cows lie down for longer amounts of the day[46]. Loss of body weight can be seen in clinically lame cows[47].
- Lame cows are **more likely to suffer from metabolic diseases, mastitis and cystic ovarian disease**. Hock lesions are also correlated with lameness and lesions on the foot[48].

- Often severely **lame cows fail to make a full recovery** and can suffer from complications and chronic changes. These **animals suffer unless they are culled immediately**. Farmers may keep the cow to the end of lactation but some even keep cows for further lactations[49].



Hock lesions are correlated with lameness (left). Foot trimming regularly improves the level of lameness within a herd (middle). Poor slurry management and bad housing are risk factors for causing lameness (right).

Mastitis

- **Mastitis is the inflammation of the mammary gland**. The majority of cases are caused by a bacterial infection[50].
- Cows have been genetically selected to produce more milk with cows able to produce up to 70kg of milk per day during peak lactation. The suspensory ligaments give support to the udder and with the average daily yield of milk being 28kg the ligaments have to support more than 70kg of tissue and milk. The ligaments support capacity reduces with age and can result in **pendulous udders leaving the cow vulnerable to injury and mastitis**[51], affecting their walking gait which can put uneven pressure on hind feet.
- **Cows with mastitis suffer discomfort and pain.** Their milk may contain flakes or blood[52].
- There is an estimated incidence of clinical mastitis between **20 – 35% cows per herd per year**[53].
- While there is widespread use of mastitis control strategies the **level of clinical mastitis has remained the same over the last 20 – 30 years**[54]. It is one of the most **frequent and costly diseases of the dairy industry**. In both subclinical and clinical cases there is a substantial loss in milk production[55].
- Cows are **dried off from milking** when they are about to give birth. It is at this point that they **are most vulnerable to infection** (the few days after drying off and 3 weeks prior to calving). Those that are infected during the dry period are at **greater risk of clinical mastitis during the next lactation[56].**


Pendulous udders leaving the cow vulnerable to injury and mastitis (left). It may also affect their walking gait which can put uneven pressure on hind feet and lead to lameness. Right shows an udder that still has the ligaments intact.

Fertility

- It is widely accepted that there is a **decline in the fertility of dairy cows as the modern breed has been selected for increased milk production**[57].
- As milk production increases, with high levels of milk yield in the beginning of lactation, the dairy cow's body copes with the metabolic stress by declining her fertility. However this is not the only factor that might reduce fertility: management, health and environmental factors also all affect reproduction[58].
- **Electric cow trainers used in tie stalls and slippery floors in loose housing reduce the cows ability to show behavioural signs of oestrous therefore reducing the ability of the farmer to spot when the cow is ready to be mated**[59].
- Clinical disease like lameness, mastitis and milk fever in early lactation all reduce fertility and worsen as the clinical disease gets worse[60].
- To reduce the time between calvings caused by the poor fertility, farmers have resorted to intensively managing the reproductive biology of the cow with hormones either using injections or implants. In some countries this is banned (Sweden for example)[61]. It is likely to contribute to poor welfare by trying to get a cow pregnant at a time when her body is struggling to cope due to metabolic stress.
- **Bovine Somatotrophin (bST) is a growth hormone that is banned in the EU** but is used in other countries around the world, including the USA. It is injected to bring infertile cows into oestrus but is **banned in the EU on animal welfare grounds**. It is also used to further increase the milk yield of cows. **The increase in milk yield also increases the risk of lameness, mastitis, reproductive disorders or other production related diseases**[62].

EFSA recommends that the calving interval should be extended from the traditional 12 – 13months to 18months. While it may result in a lower daily milk yield , the production loss can be weighed against better welfare, fertility and health, longer productive life, lower feed and replacement costs[63].

Cows may mount each other when they are ready to be mated. Since selective breeding for higher milk yields the fertility of dairy cows has decreased.

Mortality

- A Swedish study showed that consistently high mortality rates and/or poor fertility were associated with poor welfare and may be an indication of failure by the stockperson in monitoring[64].
- The level of mortality in dairy cows is increasing[65]. Dairy cows are typically culled in their third or fourth lactation.
- There is an increased risk of higher mortality levels with increasing herd size, average milk yield and morbidity[66], as well as lameness, respiratory disease and feeding TMR[67].
- A survey on reasons for culling cows on farm showed 58% were slaughtered because of production reasons and that the proportion of early killed cows has increased in the past year. A Danish survey found that a quarter of the animals killed on farm was due to locomotor disorders and between 30 – 40% of the deaths were in the first 30 days of lactation[68].

Dystocia

- Difficulty giving birth can affect the mother and calf's welfare
- The dam can suffer a range of welfare issues including damage to the obturator nerve causing paralysis and downer cow syndrome (a cow that has not got up for 24 hours and cannot get up. Normal causes include metabolic syndromes like milk fever, traumatic injury and toxaemia)[69].
- Even mild problems during calving have been shown to impact on the calves' health[70]. Calves may suffer from severe injuries such as fractured ribs and death[71].
- There is an increased incidence of heavy calves, stillbirths and dystocia in Holstein-Friesians due to their genetics[72].
- Dystocia leads to reduced fertility, milk losses and an increase of deaths up to 5%[73]

There is an increased incidence of heavy calves, stillbirths and difficult calvings in Holstein- Friesians due to their genetics.

Mutilations

Tail docking

Commonly practised in some countries such as the USA, New Zealand and some EU states (although it is banned in the EU). Tails are usually docked when calves are near weaning or as periparturient heifers. It is performed to improve hygiene for the farmer during milking but research has shown no significant difference in hygiene for the cow or farmer[74].

- The tail is removed by elastrator band, cauterisation docking irons, emasculators and surgical excision.

- Animals will experience short and long term pain from the procedure[75] but pain relief is rarely used.

Tail docking is normally done without any pain relief, causing short and long term pain. They are then unable to defend themselves against insects.

- Tail docking can lead to distress during the fly seasons[76] as cows need their tails to defend themselves against insects. Cows may show an elevated level of fly-induced behaviour[77] and calves have been observed performing more fly avoidance behaviours[78].

Disbudding

Disbudding and dehorning is performed to prevent injuries from the horns to other cows and farmers. Disbudding is by heat cauterisation, chemical paste or amputation. Dehorning is normally by wire-saw, common caws, scoops or guillotine clippers[79].

- Disbudding by cauterisation and chemical paste causes significant pain and stress to calves[80]
- Amputation by dehorning is believed to cause more of a pain response than disbudding[81]
- Local anaesthetic and long acting pain relief should be used if performing such procedures (as is required by law in countries such as the UK)
- Breeding for polled (hornless) cows should be a priority

Tagging and branding

Ear tagging is used for identification and in many countries is required by law. They can be injury caused if not applied carefully. Branding causes acute pain. Branding with hot-irons is considered more painful than freeze-branding (but freeze-branding is still considered painful)[82].

Supernumerary teat removal

The addition of an extra teat can get infected and provide chronic infection to other quarters, it can also interfere with the teat cups when milking. The extra teat is removed by amputation using sharp scissors or scalpel blade. It is normally removed when the calf is young without any pain relief. The Farm Animal Welfare Council recommends that an effective local anaesthesia should be used[83].

Calves

Calf separation

Dairy cow's milk is a valuable source so rather than allowing the calf to suckle from the mother after birth, the calf is removed normally within 24 hours of being born. The separation of the calf and cow is stressful for both[84]. After the mother-young bond has been established (around 2 days) both the mother and calf will show increased vocalisation and place their head outside the pen more often[85]. Keeping the calf and mother in sight and sound of each other without being able to reach one another following separation is also more stressful than keeping them in separate buildings[86].

Calves are separated from their mothers shortly are birth causing distress to both

Surplus calves

Male calves cannot be used for milk and will either be raised for veal or beef or may be shot at birth. Those that are raised for veal or beef may travel long distances to farms in other countries, such as Spain from the UK when they are as young as 2 weeks old. At this age they are not capable of dealing with the stresses of handling and transport.

Transport and Slaughter

There are relatively few slaughterhouses for end of production dairy cows so they may have to travel long distances to reach the abattoir. Lameness is a common problem for dairy cows and these animals are not fit for transport so should be culled on farm. All animals unfit for transport should be culled on farm.

Dairy cattle may be slaughtered using a penetrative captive bolt or with electro-stunning. If performed for religious groups it will be slaughtered unstunned and their throat will be cut. The time from cutting of the throat until insensibility is up to 2 minutes in cattle[87] in this time the animal can feel pain.

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