



The Welfare of Dairy cows



Domestic cattle are of great economic and cultural importance globally. There are approximately 1.5 billion cattle in the world¹ and they are kept for many different purposes. Cattle are reared for meat, dairy and other (e.g. leather) products, their dung is used as fuel and fertiliser and, in the developing world, they are a key source of draught power. There are around 800 recognised breeds of domestic cattle. Breeds are often specialised for the production of either beef (e.g. Limousin) or dairy (e.g. Holstein-Friesian), although 'dual purpose' breeds also exist. There are approximately 271 million dairy cows in the world² and approximately 1.8 million dairy cows in the UK³.

Cattle natural history and behaviour

All of the approximately 800 breeds of domestic cattle around today descend from a now extinct species of cattle, called the auroch or 'wild ox' (*Bos primigenius*), which was once widespread across much of the Northern Hemisphere. The aurochs were much larger than modern day cattle – with males standing up to 2 m tall at the shoulders – and they were reportedly very aggressive. The domestication process is thought to have begun approximately 10,000 years ago and archaeological evidence suggests that there were already multiple breeds by the time of ancient Egypt. Auroch populations declined as the number of domestic cattle increased, and the species became extinct in the early 1600s.

Cattle are very social animals. Feral populations of domesticated cattle usually consist of matriarchal groups

of cows along with their offspring, and small bachelor groups of bulls which associate with the cows when it is time to breed. Feral herds tend to live in non-overlapping home ranges of varying size, and group size is generally relatively small (<30 cows). Social hierarchies play an important role in cow groups, with some individuals being more dominant than others. In addition to this, cows also have preferred social partners within their groups who they will keep close to whilst grazing or lying down and/or they are more likely to groom.

Cattle spend the majority of their time engaged in three key behaviours: feeding, ruminating and lying down. As grazing animals, cattle primarily feed on grasses and other plants that grow close to the ground. When kept at pasture, cattle will spend around a third to a half of their day grazing, with peaks of grazing activity usually occurring at dawn and dusk.

The vegetation that cattle eat can, at times, be difficult to digest and, because of this, they and other 'ruminant' species, such as sheep and goats, have evolved a specialised digestive system. Ruminants famously have four chambers in their stomach and the largest chamber, the 'rumen', is the main site for digestion. It contains lots of microorganisms as well as a large amount of saliva to aid the digestive process. In addition to this, these species also 'ruminate', which means they regurgitate, re-chew and then re-swallow partially digested food in order to further aid digestion.

Cattle also tend to spend around a third to a half of their day lying down. This is when they engage in most of their rumination behaviour, and when they rest and sleep (which, in cattle, tends to be more akin to dozing than deep sleep).

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Did you know?

The average UK dairy cow produces almost 8,000 litres of milk each year³, which equates to nearly 14,000 pints!

Commercial dairy cattle production

There are approximately 1.8 million dairy cows in the UK³. Recent times have seen a decrease in the number of dairy farms in the UK, but an increase in the overall number of cows in the national herd. Individual herd sizes have increased and the average UK dairy farm had 133 cows in 2014³.

Dairy farmers usually plan for their cows to give birth to their first calf at around 2 years of age. Just like humans, cattle are pregnant for 9 months and this means that dairy heifers (young female cattle) will usually be bred for the first time when they are around 15 months old. After this, farmers generally aim for their cows to calve again every 12 months.

Dairy cows lactate (produce milk) for about 10 months after calving. The amount of milk produced each day increases up until the point of 'peak lactation' (6 – 8 weeks after calving), after which it begins to decline. Cows are 'dried off' at the end of the 10 month 'lactation period' and this marks the start of a 2 month 'dry period' during which they do not produce any milk. The dry period is an important rest time for dairy cows as, by this point, they will be 7 months pregnant and due to calve in 2 months time.

UK dairy farms employ a range of different 'calving patterns', which refers to the time of year when calving occurs. Many farms have an 'all year round' calving pattern, which means that their cows calve throughout the whole year. 'Block calving' is another popular calving pattern, and this is where calving is planned to take place within a particular time of the year, most commonly the spring or autumn season.

The average UK dairy cow produces almost 8000 litres of milk each year³ – which equates to nearly 14,000 pints – and has just under 4 lactations (milk producing cycles) in her lifetime of typically 6.5 years⁴. The most common breeds of dairy cattle in the UK are of the Holstein/Friesian variety – which are known for their black and white colouring and high milk yields – followed by Ayrshire, Jersey and Guernsey⁵.

Housing

Cows in a dairy herd are usually split into a number of different groups. Dry cows are usually kept separately from the milking herd as they do not need to be milked and they have different dietary requirements to their lactating (milk producing) herd-mates. The milking herd may also be split, with milking cows often grouped according to their stage of lactation. For example, there may be a 'fresh group' containing cows that have recently calved, a 'high yielding/early lactation group' containing cows with higher milk yields, and a 'low yielding/mid-late lactation group' containing cows with lower milk yields.

A very diverse range of housing systems are in place on UK dairy farms and this makes it difficult to categorise farms using very simple labels such as, for example, 'indoor housed' and 'outdoor housed'. This is because it is often the case that cow housing will be different at different times of the year and/or for different groups of cows.

In the UK, dairy cows have traditionally been kept on pasture during the grass growing (spring/summer) season and housed indoors during the winter when weather and grazing conditions are unfavourable – and this remains the predominant way of housing dairy cattle today. The vast majority of UK dairy farms (~90%) provide all or part of their herd with access to pasture during the summer months, and house the herd indoors during the winter⁶⁻⁸. The length of the grazing period and the amount of time the cows have access to pasture each day varies from farm to farm, and will depend on a range of factors such as the prevailing weather and ground conditions and the quantity and quality of pasture available for the cows to eat.



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Cubicle housing bedded with sand

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In 'continuous' or 'year-round' housing systems the herd will be housed indoors 24 hours a day, 365 days a year. The herd may, however, have access to an outdoor yard (a 'loafing area') and, sometimes, only the milking cows will be continuously housed with dry cows and/or youngstock given access to pasture. 'Zero-grazing' is a term that is often associated with continuous housing. The term actually refers to a specific type of feeding practice, however, rather than a housing system, in which housed cows are brought freshly cut grass to eat indoors. At present, only a small proportion of UK dairy farms continually house their cattle (~5%)⁶⁻⁸. Some farms do not house their cows indoors at any time of year – although, again, this represents only a very small proportion of the UK dairy industry (~1%)⁸.

Both the housed and outdoor environments contain potential challenges that, if not appropriately managed, can lead to compromised dairy cow welfare⁹ – for example, both poor flooring indoors and poor cow tracks outdoors can lead to poor foot health and lameness. It is possible therefore to see low (and high) standards of dairy cow welfare within both the more indoor-based and the more pasture-based housing systems.

Two main types of dairy cow housing systems are used in the UK: cubicles and deep litter yards. Cubicles, which are sometimes called free-stalls, are individual bedded compartments in which the cows can lie down. They usually have a concrete base – often covered with a layer of cushioned material such as a rubber mat or a mattress – which will be topped with litter (bedding) such as sawdust, wood shavings or straw. Some cubicles are 'deep bedded', which means the concrete base is hollowed out and filled with a deep layer of litter, most commonly sand. Cows can move freely in and out of their cubicles, and this can be contrasted with tie-stall housing in which the cows are tethered (tied) to their own individual cubicle. The practice of tethering is very uncommon in the UK, but is the predominant form of dairy cow housing in some areas of the world, such as North America and continental Europe.

As well as rows of cubicles, a cubicle shed will also contain designated areas where the cows can go to feed and drink and, sometimes, additional covered or open-air loafing areas that provide the cows with extra space to congregate and socialise.

Deep litter yard housing is very similar to cubicle housing, except that the cows are provided with deep litter yards in which to lie down in, instead of the rows of cubicles. A range of bedding material is used in these yards, with straw being the most common.

Cubicles are the most commonly used form of indoor housing for dairy cows in the UK. However, it is often the case that cubicle-based farms will house a small proportion of their herd in deep litter yards – for example, cows requiring extra care such as those that are freshly calved or receiving veterinary treatment.

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Cow and calf standing in a straw yard

Feeding

A wide variety of different diets and feeding practices (how and when feed is provided) are used for dairy cows in the UK, with management of feeding depending on factors such as whether the cows are grazing, the quantity and quality of pasture available, whether the cows are lactating and their level of milk production.

When cows are housed indoors, they will usually be provided with a delivery of fresh feed once or twice a day. Their feed will usually be placed in feed troughs within the cows' pen or spread along the outside edge of the pen in the 'feed passage'. Alternatively, some farms use 'self-feed' systems where, instead of having daily deliveries of fresh feed, a larger amount of feed will be kept within the pen, and the cows simply help themselves. In both systems, the cows may also receive additional feed in the milking parlour or from 'out of parlour' feeders within their pen. These additional feeders often recognise individual cows (via electronic ID tags) allowing them to be fed according to their own personal dietary needs.

Even when cows are grazing, it is not uncommon for them to be given additional feed. This may be provided indoors, e.g. in the morning before the cows go out to pasture, or in an outdoor paddock/feed area that the cows can access from their field.

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Cows eating from the feed passage

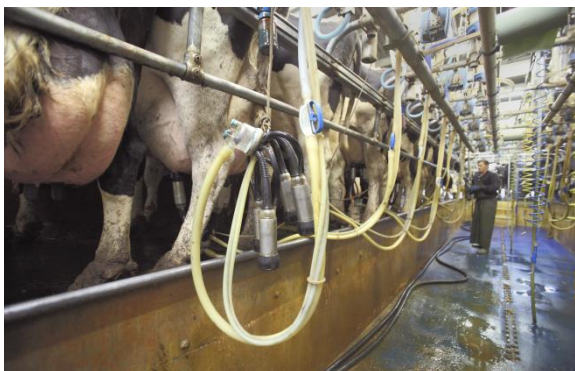
Milking

UK dairy farms tend to milk their cows twice a day – although once and three times a day milking is also practised. When it is time for milking, the cows will be moved out of their pens and into a waiting area outside of the milking parlour called the ‘collecting yard’.

There are a number of different types of milking parlour. Often they feature two parallel rows of milking stalls where the cows stand to be milked, and a lowered area (or ‘pit’) in the middle, where the people milking the cows stand. Alternatively, farms may have a ‘rotary’ milking parlour. Here, the milking stalls are arranged in a circle rather than in rows and the parlour rotates slowly allowing the cows to step into and out of the parlour in turn. Once in the parlour, farm staff will clean the cows’ teats and attach special milking equipment called ‘clusters’, which are used to milk the cows.

In addition to these conventional milking systems, where the cows are collected for milking at set times of the day, there are also robotic (or automatic) milking systems. Here, the milking system is located inside the cows’ pen and they are trained to enter it at times of their own choosing throughout the day. The cows are milked automatically (using specialised automatic milking technology), although farm staff will undertake checks to ensure the equipment is working as it should be.

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A herringbone milking parlour

Key welfare issues

Disease and sub-optimal housing conditions (resulting in poor cow comfort) are the primary causes of compromised welfare in dairy cows and, broadly speaking, both issues can be associated with high milk yields. Many of the common health problems experienced by the modern dairy cow are ‘production diseases’. That is, they arise as a result of the cows’ inability to cope with the physiological demands of milk production. In addition to this, historically, breeding for high milk yields has tended to produce larger cows that are often more ‘bony’ in their build which has, in turn, increased their susceptibility to knocks/bumps, grazes and other forms of injury. Dairy cow housing has not always been adapted to account for these physical changes, leading to a range of welfare problems. The role that breeding for high milk yields has played in the development of dairy cow welfare problems is now well recognised and, as such, UK breeding programmes now focus less on milk yield and more on other traits such as cow health. Despite this, however, disease and poor cow comfort continue to be key areas of concern.

LAMENESS

Lameness is widely regarded as one of the most pressing welfare issues affecting dairy cows. The term is used to describe when an animal has impaired mobility (walking ability), for example as a result of a problem with their feet or legs, and it can occur as a result of a wide range of different conditions. Foot disease is responsible for most cases of lameness in dairy cows, with disease occurring because of structural damage to the foot, or bacterial infection.

Lameness is a key welfare concern because it is painful and causes cows to change their behaviour, e.g. lame cows spend less time feeding and walking, and also because it affects a large number of animals. Although levels of lameness can vary greatly from farm to farm, research suggests that, on average, around a quarter to one third of cows in UK dairy herds are lame^{10,11} – a figure that has remained unchanged for many years.

A wide range of factors can cause dairy cows to become lame. Level of milk production plays a part, and cows with higher milk yields have an increased risk of lameness. The farm environment and management are also very important. For example, lameness can develop as a result of poor walking surfaces, too much time spent standing on hard surfaces and/or poor nutrition. Farmers can best tackle lameness by prevention, e.g. keeping walking surfaces

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in good condition, and through the early and effective identification and treatment of lame cows.

MASTITIS

Mastitis is a disease in which the cow's udder becomes inflamed, usually as a result of a bacterial infection, and it is one of the most common health problems affecting dairy cows. The udder can become uncomfortable and/or painful as a result of the inflammation and in some cases the cow can become severely ill.

Although mastitis decreased dramatically in the UK dairy herd during the 60s – 80s, this decline hasn't continued in more recent decades and levels remain high. Research suggests that, on average, over the course of a year, there will be around 40 – 60 cases of clinical mastitis for every 100 dairy cows in a herd^{12,13}.

A cow can contract mastitis either from an infected herd-mate ('contagious mastitis') or from the environment ('environmental mastitis'). Factors such as poor milking parlour hygiene can increase the risk of contagious forms of mastitis, and poor environmental conditions, e.g. overstocked and/or unclean housing, can increase the risk of environmental mastitis. Managing these factors effectively is, therefore, an important part of mastitis control on farm.

COW COMFORT

The quality of the environment in which dairy cows are kept can have a big impact on their welfare. For example, it is important that dairy cows have sufficient space to exhibit 'normal' behaviours and that their environment – both indoor and outdoor – is comfortable and free of hazards that may cause them injury.

Lying comfort is of particular importance for dairy cows. Dairy cows will choose to spend large periods of the day lying down if they are able to and long lying times are needed to maintain good cow health. Dairy cows need to have comfortable lying areas to ensure they spend a sufficient amount of time lying down. For example, their lying surfaces need to be dry, soft and well-cushioned and there needs to be sufficient space for them to lie down and get up normally.

TRANSITION COWS AND HEIFERS

Dairy cows and heifers are at an increased risk of a range of health problems during the 'transition' period, which refers to the period before calving to the period after calving (the exact timing of this period varies according to some researchers, but the RSPCA believes that it is the 3 - 6 week period before calving to the 3 - 4 week period after calving). In particular, they are prone

to developing a range of metabolic disorders, which are related to problems with their energy/nutritional status, as well as reproductive disorders, such as uterine infections, during this period.

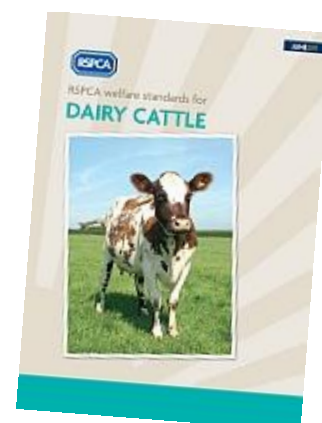
The transition phase should be regarded as the 'intensive care' period for dairy cows and heifers, and allowing problems to develop during this time can mean that the welfare of the animal may be compromised for a significant period of their lactation. Calving and the start of lactation is associated with a 'dampening' of the cows' immune defences, as well as a number of potentially stressful changes to the cows' management, e.g. changes in social grouping, housing and diet, which can leave them more susceptible to disease. Alongside this, the cows experience a sudden increase in energy requirements after calving as a result of the commencement of lactation. This occurs at a time when appetite is naturally suppressed and, therefore, the start of lactation is normally associated with a period of 'negative energy balance' where energy outputs are greater than the energy inputs obtained from the cows' food. This results in them having to use, and therefore lose, existing body fat reserves which, if not managed successfully, can lead to excessive loss of body condition and, in turn, metabolic disease in particular.

Minimising stress, maximising cow comfort and good management of nutrition and cow body condition are key to maintaining good cow health during the transition period.

Work of the RSPCA to improve dairy cow welfare

WELFARE STANDARDS

The RSPCA Welfare Standards for Dairy Cattle are a key way through which the Society seeks to drive improvements in dairy cow welfare. The Standards set out, in detail, how the RSPCA believes dairy cows should be managed and cared for in order to ensure their welfare needs are met. The Standards are developed by the



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RSPCA's Farm Animals Department on the basis of scientific evidence and practical farming experience, and they are regularly reviewed to ensure they remain relevant and up-to-date.

The RSPCA Welfare Standards for Dairy Cattle must be adhered to by all dairy producers on the RSPCA Assured (previously Freedom Food) farm assurance and food labelling scheme. The Standards also help to improve dairy cow welfare more widely, as they act as a good practice guide to higher welfare dairy farming that can be used by any producer, retailer or farm assurance scheme.

Herd health lies at the heart of the RSPCA Welfare Standards for Dairy Cattle. For example, RSPCA Assured dairy producers are required to keep records on the level of key dairy cow health conditions, such as lameness and mastitis, and these records must be reviewed at least four times a year in collaboration with the farm vet to ensure the farm's herd health targets are being met. Cow comfort is another priority area within the Standards and RSPCA Assured dairy producers are required, for example, to provide their cows with enough space to lie down comfortably and sufficient amounts of bedding to maximise their lying comfort. RSPCA Assured dairy producers are also required to provide their cows with environmental enrichment, such as cow brushes within their pens, which they can use to groom and scratch themselves.

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Cow using a cow brush

ADVOCACY WORK

The RSPCA's Farm Animals Department advocates for improved dairy cow welfare through its membership on a number of multi-stakeholder working groups and committees. The RSPCA is a member of the Cattle Health and Welfare Group (CHAWG) which seeks to prioritise, coordinate and assess the impact of national activities related to improving cattle health and welfare in Britain. CHAWG is responsible for overseeing the implementation of Britain's Dairy Cow Welfare Strategy,

which the RSPCA were the first to publicly call for in 2009. The strategy includes reducing lameness and mastitis and improving cow comfort amongst its ten priority areas.

The RSPCA is also a member of the Genetics Advisory Forum and the Dairy Cattle Mobility Group. The Genetics Advisory Forum has, since 2007, developed the 'Profitable Lifetime Index' (PLI), which is a dairy cattle breeding index that focuses predominantly on health and welfare traits, as opposed to high milk yields. The Dairy Cattle Mobility Group seeks to reduce dairy cow lameness in the UK through various activities including, for example, by working to improve the standard of foot trimming being undertaken on farms, which is an important part of looking after cows' feet.

RESEARCH PROJECTS

The RSPCA was a founding member of the AssureWel research project, alongside the Soil Association and the University of Bristol. The project aimed to improve the welfare of farm animals, including dairy cows, by developing 'welfare outcome assessment' protocols for use during farm assurance scheme audits. Welfare outcome assessment protocols help farm assurance schemes to assess the level of welfare being achieved on their members' farms, allowing them to determine how successfully their welfare standards are being implemented in practice. The protocol developed for dairy cows includes the assessment of key dairy cow welfare issues such as lameness and mastitis, and is currently in use by the RSPCA Assured, Soil Association Certification and Red Tractor farm assurance schemes.

How can you help!

If you eat meat, eggs or dairy products and are concerned about welfare, then look out for products carrying the RSPCA Assured logo.



RSPCA Assured is the RSPCA's farm assurance and food labelling scheme that aims to ensure animals are reared, handled, transported and slaughtered/killed according to strict RSPCA Welfare Standards, developed and monitored by the RSPCA. The RSPCA Welfare Standards are informed by scientific evidence and practical experience.

If more consumers insist on higher welfare products, more supermarkets will want to stock them, which will encourage more farmers, hauliers and abattoirs to improve their practices and ultimately more farm animals will benefit.

Take part in the RSPCA's campaigns for farm animals by visiting www.rspca.org.uk/campaigns/farm.

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Recommended further information

- RSPCA website: <https://www.rspca.org.uk/adviceandwelfare/farm/dairy>
- FAWC (2009). *Opinion on the Welfare of the Dairy Cow*.
- AHDB Dairy website: <http://dairy.ahdb.org.uk/>
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