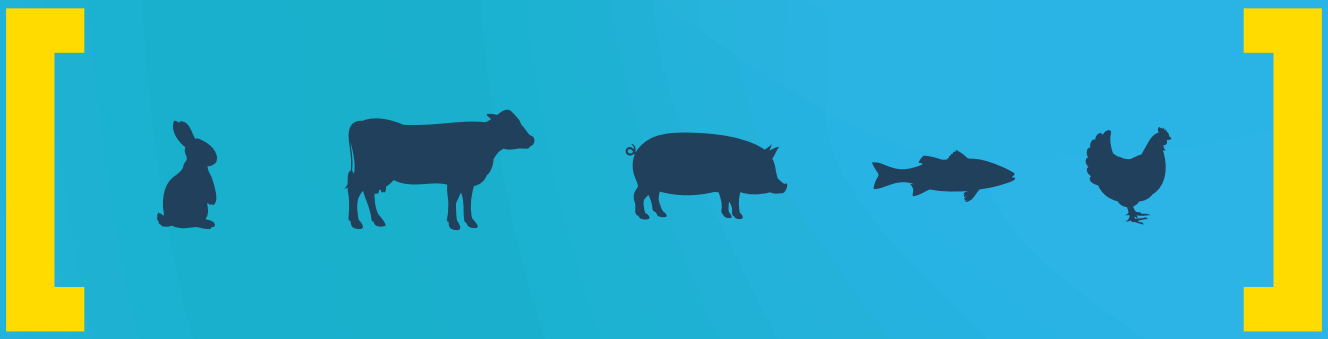
EUROGROUP FOR ANIMALS

THE GRIM REALITY OF INDUSTRIAL ANIMAL FARMING

NO [ANIMAL] LEFT BEHIND



Farmed animals want and need to live in environments where they can be healthy and express their instinctive and natural behaviours, as well as have access to nutritious food and clean water. They do not want to be in pain or feel scared.

The European Union recognises farmed animals as sentient beings. This means it recognises they are individuals with intrinsic value, needs and rights. It also means the least we can do is offer them a decent life.

However, most farmed animals across the EU live in detrimental and depressing conditions, where painful and frightening experiences are common and they have no opportunities to socialise with others on their terms, let alone explore a stimulating environment or learn from and interact with the world around them. What's more - when they come to the end of their lives - these animals are often killed in ways that are simply inhumane, causing them to die in unnecessary anguish.

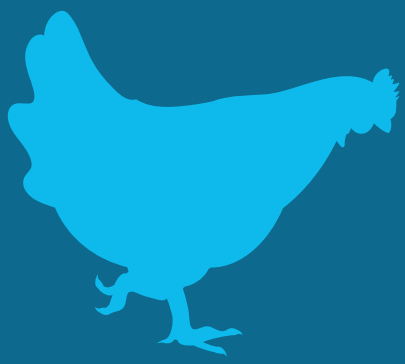
The EU's farmed animals deserve better than this. As individuals with their own desires, personalities and feelings, they deserve respect, and to stop being treated as just part of an industrial process.

This report summarises some of the main welfare issues that broiler chickens, fish, pigs, dairy cows, and rabbits experience in intensive farms. These are not the only welfare concerns afflicting these animals, but they highlight the main ways in which the current European legislation is failing them. These sentient beings deserve to be protected by legislation that has their interests in mind.

In addition, as our footage shows, the current legislation is inadequately enforced, and there are numerous examples of breaches that directly impact the welfare of farmed animals. Whether it's through the cruel handling of a broiler chicken before slaughter or by chaining the back legs of dairy cows, the EU's farmed animals are being callously treated by those who are meant to care for them.

The EU's legislation is inadequate and out of date. Too many animals are falling between the gaps, without any species-specific legislation to protect them. In addition, animal welfare science has continued to show how many of the current housing systems for farmed animals cannot meet their needs, and that practices and approaches must change. Farmed animals are being bred to endure lives full of pain, from being kept in cages to being pushed beyond their physical limits, after which they are slaughtered in ways that cause even more suffering.

The current animal welfare legislation needs drastic changes. It must be strong, precise, and enforced to stop the needless suffering of billions of farmed animals across the EU. This is what European citizens want, and what the animals deserve.



BROILER CHICKENS ARE BRED TO SUFFER

Broiler chickens are young, playful animals with unique personalities

Broiler chickens are still only young when they reach slaughter weight at around five to six weeks. They are still juveniles, and like other young animals, they like to play and socialise with others and are curious about their surroundings (Marino, 2017).

Chickens are capable of a range of emotional experiences, such as pain, fear, pleasure, empathy, and emotional anticipation (Edgar et al., 2013, 2011; Zimmerman et al., 2011). Chickens also support one another, and mother hens provide a calming influence on their chicks, helping them cope with stressful situations (Edgar et al., 2015).

Chickens each have unique personalities, and studies have shown that the different personality traits seen in chickens can influence how well they cope with stress and their social ranking (Marino, 2017).

Furthermore, chickens are clever animals. For example, chicks when newly-hatched can discriminate between large and small quantities, and can even place quantities in a series (known as ordinality) (Rugani et al., 2010, 2008; Vallortigara et al., 2010). Ordinality has so far only been seen in a handful of species, including chimpanzees and African grey parrots (Boysen and Berntson, 1990; Pepperberg, 2006).

Broiler chickens are kept in crowded conditions where the air and litter become toxic and the heat unbearable

In intensive systems, a flock of broiler chicks are placed in a barn, where they stay until they reach slaughter weight and are transported for slaughter. The chicks never have access to the outside and are often kept under artificial lighting, with no access to natural light. As they grow, each chicken takes up more space, which means they soon find it hard to move around and reach food and water. Living in crowded conditions also means these young chickens cannot rest as they need, while they incur injuries from jostling for space and resources.

As their litter is not changed for the entire period, it rapidly degrades in quality, so not only does it become wet, dirty and unsuitable for foraging and dustbathing in, but the high levels of ammonia soon make the air toxic.

High atmospheric ammonia can irritate the mucous membranes of the chickens' eyes and respiratory systems, increase their susceptibility to respiratory diseases, and reduce their food intake (Kristensen and Wathes, 2000). In addition, as the levels of moistness increase, so does microbial activity, which also increases ambient temperatures and ammonia levels (Bessei, 2006b).

The rising temperatures are also exacerbated by the fact that the fast-growing breeds of broilers create more body heat than their slower-growing counterparts (Bessei, 2006b; Lara and Rostagno, 2013). This can lead the chickens to suffer thermal stress from overheating, particularly as they cannot effectively dissipate the heat, resulting in physiological and mental suffering, and often death (Lara and Rostagno, 2013).

Broiler chickens are bred to grow faster and bigger than ever before

The last 60 years have seen an intensive focus on the genetic selection of fast growth in broilers, and the modern broiler can reach slaughter weight in just 34-35 days (five weeks) (Tallentire et al., 2018). However, the cost of production of the modern broiler has remained at a similar level to that of the 1950s, as the chickens grow around five times faster and have much less space (Renema et al., 2007). The selection for fast growth has led to a range of welfare issues in broiler chickens, as seen in this undercover footage from Essere Animali as well as in comparable footage and imagery shared by many other animal NGOs in Europe over the past years.

Fast-growing broilers struggle to walk

The selection for fast growth has led to several significant welfare issues for the broiler chicken. For example, fast weight gain commonly leads to leg disorders, and poor locomotion is a considerable concern. Some studies have found the prevalence of birds that cannot walk properly to be as high as 90% in some flocks (Hartcher and Lum, 2019; Sanotra et al., 2001). This is because the development of chickens' skeletal systems and leg muscles cannot keep up with their weight gain, leading to fragile bones and poor muscle strength (Karaarslan and Nazlıgül, 2018). Lameness is very painful and is one of the reasons why fast-growing broilers tend to spend considerable time sitting and lying down (Danbury et al., 2010).

Fast-growing broilers are also more lethargic than slower-growth ones because they have to conserve their energy for growing (Bokkers and Koene, 2003). Despite this, they are still motivated to move about, to dust-bathe and forage, but they do not have the physical strength to fulfil these instincts (Rutten et al., 2002). What is more, their increased inactivity means that these chickens spend more time sitting in wet and dirty litter, which causes painful lesions on their skin, such as contact dermatitis (Bessei, 2006a; Kjaer et al., 2006). The prevalence of lesions in a flock can range between 10% and 58% across farms (Bassler et al., 2013; de Jong et al., 2017; Freeman et al., 2020; Jong et al., 2012; Tahamtani et al., 2018).

Fast-growing broilers often suffer fatal heart conditions

Heart disease is another major concern for broiler welfare. Fast-growing chickens can develop fatal heart conditions leading to ascites, where fluid collects in the abdomen, increasing the workload of the cardiopulmonary system and leading to cardiac failure (Baghbanzadeh and Decuypere, 2008). This is because fast-growing breeds have an increased demand for oxygen, which places more pressure on the heart and lungs (Baghbanzadeh and Decuypere, 2008). Ascites is the cause of death of 5% of broilers and 20% of parent stock, making it a serious welfare issue. Another frequent cause of death in seemingly healthy broiler flocks is 'sudden death syndrome' (Siddiqui et al., 2009).

Large flock sizes mean chickens often suffer undetected

Due to the many welfare issues that broilers face, and the inadequate and barren conditions they are kept in, mortality rates can be very high among them (Hartcher and Lum, 2019; Torrey et al., 2021). Furthermore, because intensive systems house so many chickens in one space, farm staff can never truly inspect the full flock to identify ill or suffering individuals (Marchewka et al., 2013). This means that sick and dying chickens may go undetected, and suffer a slow and painful death.

Moreover, the high number of broilers crowded in a single shed can also lead to diseases spreading much more quickly, affecting more individuals (Hall, 2001; Tsiouris et al., 2015). To mitigate this, antibiotics are frequently used in broiler systems, which contributes to the significant issue of antimicrobial resistance that affects both animal and human health (Davies and Wales, 2019; Nunan, 2022).

Broilers are stunned by ineffective and inhumane methods

Most broilers in the EU are still stunned for slaughter using electrical waterbaths before having their throats cut (Contreras-Jodar et al., 2022). The stunning process, which is meant to improve the chicken's welfare during slaughter, is often ineffective and causes considerable suffering (Lambooij and Hindle, 2018).

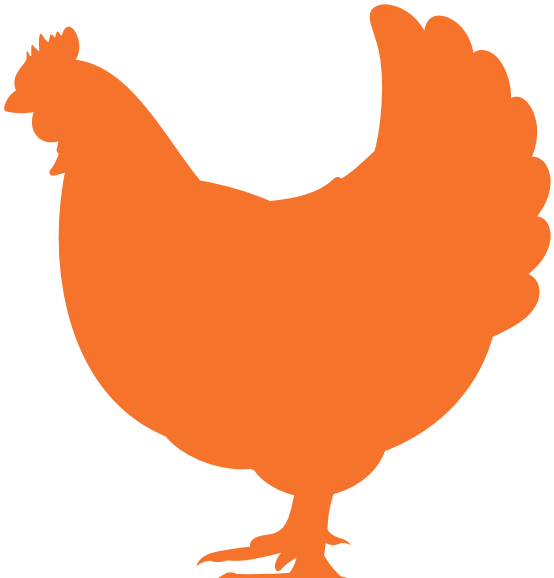
First, the chickens are inverted and shackled onto a conveyor line with wet metal shackles for several minutes (EFSA, 2019, 2012). Unfortunately, due to the heavy weight of the modern broiler, this process is not only upsetting for them (as being inverted is highly stressful) but it is also likely to result in injuries and fractures, as their bones are weakened from poor breeding and housing (Berg and Raj, 2015; Tilston and Gentle, 2000). Moreover, it also causes significant pain to chickens who are already injured (EFSA, 2019). Injured chickens may be mistakenly transported to slaughter, while others may incur injuries during catching, loading, transportation and at the point of unloading and shackling due to poor handling methods and frequently occurring cruelty, as seen in this footage by Essere Animali as well as in similar investigations shared by other NGOs.

The conveyor belt then moves the broilers along to an electrified waterbath where their heads are submerged. An electric current passes through their brain, disrupting normal function and rendering them unconscious or dead (Devos et al., 2018; Girasole et al., 2015). As the chickens approach the electrified water, they may be subject to painful electric shocks if they flap their wings, and some may lift their heads clear of the water and avoid stunning (Devos et al., 2018; EFSA, 2012). If undetected, those broilers may then enter the neck-cutting area fully conscious and sometimes not being able to move due to being immobilised by the shock (EFSA, 2012).

In addition, some chickens may not receive a strong enough electrical current to render them unconscious, as their resilience varies according to leg thickness and body size (Devos et al., 2018; Lambooij and Hindle, 2018). Moreover, staff cannot always identify individuals who are regaining consciousness, as their brains recover in stages, and a chicken may be conscious before it can move (EFSA, 2012). Furthermore, although someone is supposed to monitor the broilers at all points, there is a considerable risk in high throughput systems that some will be missed and therefore exposed to an inhumane and painful death (EFSA, 2012).

Broiler chickens deserve a better life and a humane death

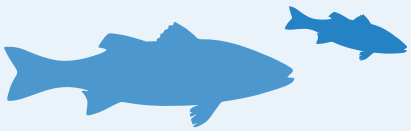
Broiler chickens are bred to suffer. The selection pressures for exceptional fast growth have resulted in chickens with countless welfare issues. Poor management and intensive rearing further exacerbate the problem. Then, at the point of slaughter, these sentient beings continue to be mistreated and experience a stressful, painful and often prolonged death. These youthful animals deserve better.



THE NEEDS OF FARMED FISH HAVE BEEN NEGLECTED FOR TOO LONG

Fish are emotionally complex, sentient beings

Fish were disregarded historically as being incapable of pain and suffering. However, decades of scientific research show clearly that this is not the case, and that fish can feel pain and also experience fear, frustration, and other mental states (Lambert et al., 2022). Fish are sentient beings, and therefore, the experience of fish in intensive farmed systems matters (Brown and Dorey, 2019). Unfortunately, billions of farmed fish in the EU suffer from significant welfare issues due to inadequate legal protection.



Overcrowded conditions where diseases can spread

Farmed fish are typically kept in overcrowded and highly restricted conditions, constituting a significant welfare risk (Brown and Dorey, 2019). For example, overcrowding contributes to poor water quality, facilitates the transmission of diseases, results in a higher prevalence of injuries, and is inherently stressful for the fish, which further impairs their immune system and can lead to aggression (Ashley, 2007; Ellis et al., 2012, 2002; Segner et al., 2012).

Furthermore, the limited space for farmed fish is far removed from their natural habitats, typically resulting in poor welfare, stereotypic behaviour, and chronic stress (Ashley, 2007). For instance, migratory fish, such as sea bass and salmon, are prevented from performing instinctive, natural migratory behaviours where they normally swim hundreds of kilometres (Lopez et al., 2015; Thorstad et al., 2008). Instead, they swim in endless circles within the limited space of their netted pens.

The farm environment is also devoid of stimulation, particularly when compared to the dynamic, ever-changing sea and river environments in which fish have evolved to live (Rosengren et al., 2016). Farmed fish are kept in barren pens, tanks, and cages, which exacerbate the negative mental states of fear, frustration, and stress they experience (Arechavala-Lopez et al., 2022).

Routine handling causes stress, fear and injuries in farmed fish

Being handled is considered to be one of the most stressful experiences for farmed fish (Ashley, 2007; Conte, 2004). This is especially as handling can result in scale loss, skin, fin and eye injuries, muscle bruising, increased risk of disease and mortality, reduced appetite, impaired development, and an increased chance of deformities (Ashley, 2007; EU Platform on Animal Welfare, 2020).

Farmed fish may be routinely handled for various reasons. For example, broodfish (fish kept for breeding purposes) regularly have their eggs or seminal fluid extracted by hand. This process, known as stripping, involves the fish being handled, inspected, and squeezed to remove their eggs or fluids. This video (three minutes and 38 seconds) shows undercover footage of the process. The stripping process causes significant distress to the fish, and there is a high risk of injury and mortality (Ashley, 2007; Conte, 2004). Even further, the stress the mother fish experiences can be passed on to her young, resulting in poor immunity and a higher risk of disease later in life (Auperin and Geslin, 2008; McCormick, 1999).

Fish are also handled for grading (sorting differently sized fish), vaccinating, harvesting and slaughter. Grading may happen regularly and is typically followed by regrouping, which hierarchical species, such as salmonids, find particularly stressful (Ashley, 2007). Fish can take 10 to 14 days to recover from the physiological stress of persistent handling (Conte, 2004).

Fish are stressed and injured when they are transported for slaughter

Before being slaughtered, farmed fish experience a sequence of stressful stages and events (Poli et al., 2005). Firstly, farmed fish are typically starved before harvesting, which can last for days or even weeks (FAWC, 2009; Lines et al., 2012). Reduced feeding and starvation can increase aggression, competition and stress among farmed fish (Attia et al., 2012).

Then, depending on the system, fish may be lifted out by a net, pumped along in the water, or caught by hand before being transported (Sampaio and Freire, 2016). Netting causes considerable stress to the fish, and as this investigation by Essere Animali shows, the fish are removed from the water in a large group, and many are crushed by the weight of the other fish (Wall, 2001).

Even when they are held in the water, severe overcrowding can mean that water quality deteriorates rapidly to the point that fish end up suffocating (Martins et al., 2012).

The fish may then be transported by road or sea to the slaughter point. The transport phase can introduce a range of welfare issues, from overcrowding, handling, poor water quality, water movement, noises, and vibrations (Ashley, 2007; Lines and Spence, 2012; Saraiva et al., 2021). These stressors can cause severe physiological stress in the fish being transported, and poor management can mean that the fish suffer unnecessarily (Conte, 2004; Lines and Spence, 2012).

Farmed fish are not slaughtered humanely and are left to suffer in pain

Slaughter processes for fish were not originally developed with the wellbeing of the fish in mind (Conte, 2004; van de Vis et al., 2020). Consequently, slaughter methods, and particularly the application and processes used, vary considerably internationally and between species (Brown and Dorey, 2019; Browning and Veit, 2020). Only a few of Europe's aquaculture sectors have adopted regular use of high-welfare effective stunning and slaughter methods.

Stunning often fails to achieve high welfare for fish

Some slaughter methods may involve a stunning stage before the killing, which is intended to minimise suffering. However, malpractice and inefficient methods are common, and many fish suffer as a result (Browning and Veit, 2020; Lines et al., 2012).

For example, electrical stunning, either out of water or in water, may be used to render the fish unconscious (Gräns et al., 2015). Unfortunately, mis-stuns are common due to the differences in sizes and weights of farmed fish (EFSA, 2004; Gräns et al., 2015). This means the fish may be paralysed but still conscious and sensible to pain and stress (Gräns et al., 2015). Furthermore, if the fish are removed from the water, they also incur considerable stress from air exposure (Ashley, 2007).

The welfare concerns associated with exposure to air also apply to methods that use percussive stunning. These methods are typically used for large fish, such as Atlantic salmon, and involve a blunt force to render them unconscious (Robb et al., 2000). Percussion methods vary and include the use of automated non-penetrating bolts or repeated manual blows to the head with a club (Lines and Spence, 2014). The effectiveness of percussion depends on the operator's skills, and poor application can cause significant pain and suffering (EFSA, 2009a; Lambooij et al., 2007; Robb et al., 2000).

Killing methods result in considerable suffering

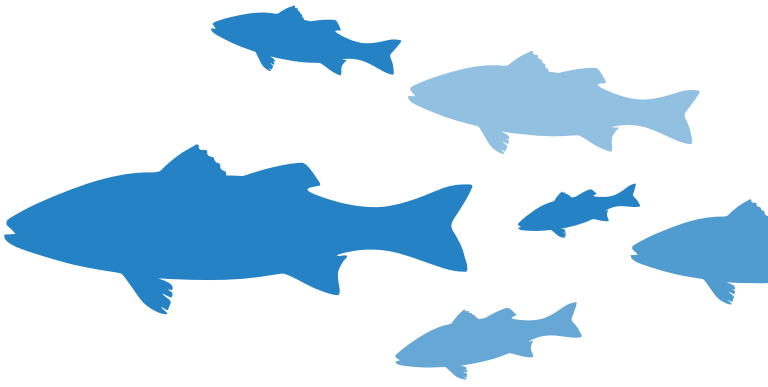
Fish then have to be killed, which can only be done humanely if the fish are adequately stunned, and if the killing procedure is performed quickly enough following stunning, as fish often regain consciousness before they are killed (Lambooij et al., 2010). This means that fish may enter the killing phase conscious and able to feel pain, particularly if operators are not fully trained to detect consciousness in the fish (European Commission, 2017; Lines and Spence, 2012).

Many fish are also killed without stunning, and these methods result in numerous important welfare concerns. For example, fish may be put on ice or into an ice slurry bath, as seen in this investigation by Essere Animali (from four minutes and fifteen seconds in). Here, fish typically die slowly from asphyxiation or, if immersed in the slurry, from anoxia, as the water lacks sufficient dissolved oxygen (Poli et al., 2005; Brown and Dorey, 2019; Poli et al., 2005; van de Vis et al., 2003).

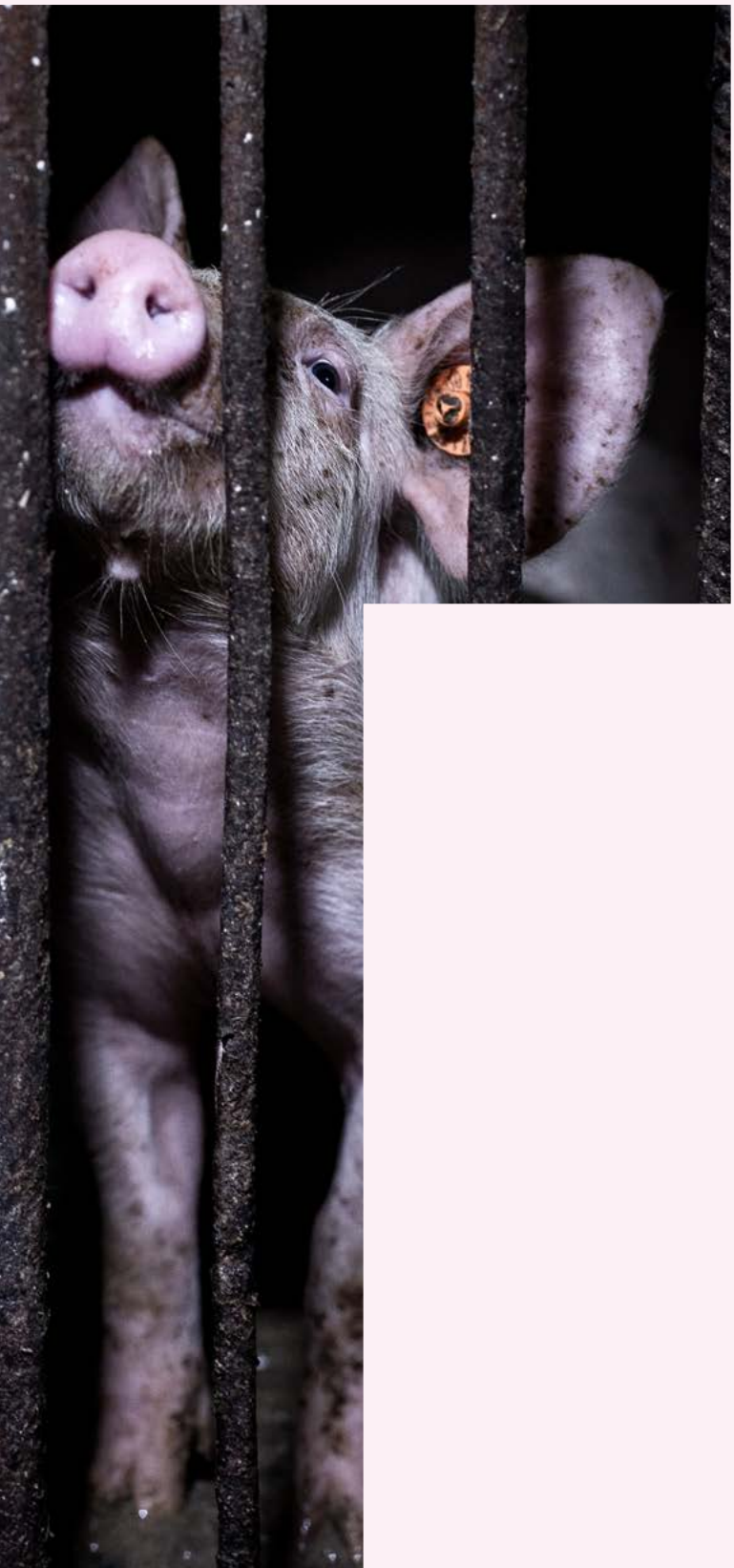
The entire process can be extensive, resulting in a long and painful death for the fish involved, e.g. 20 - 40 minutes for sea bream and even up to 200 minutes for trout (Poli et al., 2005). Some systems do not even use ice, leaving the fish to asphyxiate slowly for many minutes or hours. Scientists consider death by asphyxiation to be the most painful and stressful slaughter method used for fish (Poli et al., 2005). Yet many fish are killed this way, intentionally and unintentionally, as seen in this investigation by Essere Animali (from two minutes in), where fish are left on the floor to die, and others are still gasping for air an hour after they are removed from an ice bath. Other inhumane methods include the use of salt for eels and lamprey (van de Vis et al., 2003), and beheading, which is often done inaccurately and requires the fish to be removed from the water (Borderías and Sánchez-Alonso, 2011). It is also ineffective in some species (Verheijen and Flight, 1997). Further, spiking is a method whereby fish are individually caught so that a spike can be pushed into their brain (Poli et al., 2005). Spiking relies upon the manual operation of a spike and is only humane if it is performed efficiently and effectively, and if the fish can remain in the water until rendered unconscious (Poli et al., 2005).

Fish are neglected by EU legislation

To date, fish have been neglected and misjudged. These sentient beings deserve better protection, which means improving their experiences in farming and ensuring that there are humane alternatives for slaughter. Billions of fish are suffering in the EU because aquaculture systems are based on a poor understanding of the animals and accept high and highly wasteful mortality rates, with little regard for the welfare of the fish involved.



MILLIONS OF SOWS ARE SUFFERING IN INTENSIVE FARMS ACROSS THE EU



Pigs are smart, emotional animals that deserve better

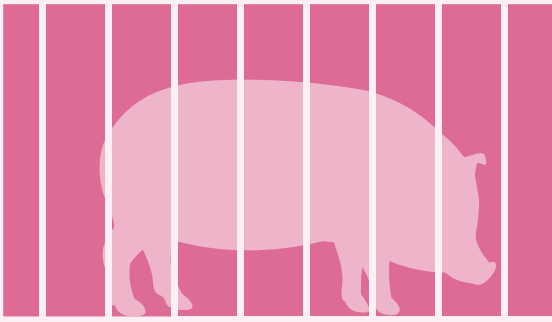
Pigs are cognitively complex animals who love to play, can experience a wide range of emotional states, and have individual personalities (Marino and Colvin, 2015). Despite their inquisitive, sensitive, and intelligent natures, these sentient beings are often treated as commodities and kept in cages that prevent them from even turning around.

Sows are severely confined for the majority of their lives

Despite the EU's partial sow stall ban in 2013, sows still spend most of their lives confined to a sow stall. They are even forced to give birth in small crates that do not allow them to fulfil important natural instinctive behaviours, such as building nests for their young (Rosvold et al., 2018).

Most of the EU's sows are also still confined to a sow stall following being inseminated, because producers feel it is necessary to protect the sow during early pregnancy (Karlen et al., 2007). However, this is needless, as there are plenty of well-evidenced practical alternatives to confining pregnant sows which are good for both the sow and the farmer (Baxter and Edwards, 2021).

Up to one week, before a sow is due to farrow (give birth), she may be moved into a farrowing crate (similar to the sow stall, but with a 'creep' area on the side for the piglets). Like the sow stall, the farrowing crate severely restricts the mother's movements, and she cannot turn around or even move more than a couple of steps forward or backward (EFSA, 2007). The purpose of the farrowing crate is to reduce piglet mortalities from crushing. However, scientific research has shown that confining sows is not the answer to piglet mortalities, and that the focus should be on breeding more robust, viable piglets and healthier sows (EFSA, 2007; Weber et al., 2007; Wechsler and Weber, 2007; Yun et al., 2014).



Confining sows severely restricts their natural behaviours and negatively impacts their mental state

The use of stalls and crates severely restricts the behaviour of sows, results in frustration and distress, and prevents these social animals from interacting with their piglets and other pigs (Marino and Colvin, 2015). These stalls also prevent the sows from performing natural rooting and foraging behaviours, which they would naturally spend most of their time doing, as well as important thermoregulatory behaviour such as wallowing (Bracke and Spoolder, 2011; Stolba and Wood-Gush, 1989). Pigs also prefer to use different areas for defecating, urinating, lying down, and feeding (Signoret et al., 1975; Stolba and Wood-Gush, 1989), whereas in stalls, sows must defecate where they stand.

Sows are particularly motivated to select a suitable nest site and begin nest building as they approach farrowing, and this complex process takes considerable time and energy (Rosvold et al., 2018; Wischner et al., 2009; Yun et al., 2013). For instance, sows will naturally travel 2.5 - 6.5 km to find the perfect site and up to 50m for nest materials (Johnson and Marchant-Forde, 2009; Stolba and Wood-Gush, 1989). Furthermore, in a farrowing crate, any nesting materials provided are soon dispersed, which can further frustrate the sows, as they cannot retrieve more (Johnson and Marchant-Forde, 2009).

Farrowing crates prevent sows from performing these highly instinctive and important behaviours, and as a result, sows become stressed and frustrated (Damm et al., 2003; Johnson and Marchant-Forde, 2009). For example, crated sows perform more abnormal and stereotypic behaviour, such as bar biting, repetitive snout pressing, and straw chewing, compared to loose-housed sows (Wischner et al., 2009). Crated sows are also more fearful of humans, compared with group-housed sows, and are likely to be chronically stressed by the continual proximity of humans (Karlen et al., 2007).

Pregnant sows are chronically hungry and bored

Dry sows (those who are not lactating) are typically only given half the amount of food they normally eat, in order to avoid obesity, as modern pig breeds are bred to grow fast (Chapinal et al., 2010). Therefore, these pregnant sows are chronically hungry and respond by performing stereotypical behaviours such as sham chewing and bar biting (Chapinal et al., 2010). In fact, some sows will spend up to 65% of their time sham chewing, which is where they continuously chew without having any food in their mouth (Bergeron et al., 2000). However, this behaviour is typically ignored because it does not result in physical injuries, even though it is highly prevalent and evidence of chronic distress in the sows (Yi et al., 2020).

There are also cases, as seen in this investigation by Essere Animali (from one minute and 29 seconds) where sows are fed entirely inappropriate diets, including the discarded testicles and tails from piglets.

Farrowing crates negatively impact maternal behaviour

Confined sows are understandably more restless when farrowing, as they are not free to move or adopt their preferred postures to ease the process (EFSA, 2007; Singh et al., 2017). As a result, rather than reduce the risk of crushing, the opposite effect is found, as restlessness in farrowing is associated with an increased tendency to crush piglets (Andersen et al., 2014, 2005; Wechsler and Hegglin, 1997). In addition, sows in farrowing crates are also less responsive to their young's vocalisations, compared with sows in lactation pens, who are more responsive and interactive with their piglets (Singh et al., 2017).

Physical impacts of confinement

Because confined sows are prevented from exercising and moving freely, this results in significant physical health issues, including reduced muscle mass, bone strength, poor cardiovascular health, and increased prevalence of urinary tract infections (Marchant and Broom, 1996). What is more, the bars surrounding the sows and the barren floor they must rest on can also result in injuries and bruising (Anil et al., 2002). Sows in crates suffer from poor leg health and a high prevalence of lameness as well, due to their confinement and the barren, slatted flooring on which they live (EFSA, 2007; Karlen et al., 2007). These issues are further exacerbated by the fact that modern sows are far larger than they were, and as most crates and stalls were built decades ago, the sows and their litter sizes have 'outgrown them' (Peltoniemi et al., 2021; Ward et al., 2020).

Moreover, confined sows can develop painful mouth sores due to the stereotypic bar biting they perform in frustration (Malmsten et al., 2020). As piglets tend to bite more when reared in farrowing crates, confined sows also suffer more bites to their teats than those in free-farrowing systems (Loftus et al., 2020).

Piglets suffer poor health and high mortality rates due to the intensive selection of large litter sizes

In intensive systems, sows now produce larger litter sizes than ever before, and litters of over 16 piglets are not uncommon (Ward et al., 2020). Large litter sizes can cause higher cortisol (stress) levels in the sow during farrowing and are associated with reduced and varied piglet birth weights (Ward et al., 2020). In addition, the smaller piglets born later in the litter often have greater difficulty competing for colostrum and are at higher risk of crushing (Ward et al., 2020).

Large litters are associated with a greater prevalence of physical and metabolic abnormalities, too, such as immature intestinal development and abnormal head shapes (Manriquez et al., 2022). This is due to embryo crowding in the sow's uterus and usually results in pre-weaning mortality (Manriquez et al., 2022; Ward et al., 2020). The effects of intensive farming on piglets can clearly be seen in this investigative footage from Essere Animali, as well as in similar undercover content from other animal NGOs in Europe, where piglets are visibly suffering and dying without any intervention.

Pigs are killed using inhumane methods that are ineffective and cause intense suffering

Many of the pigs across the EU are stunned and killed using CO_2. This process involves exposing conscious pigs to high concentrations of CO_2, which lowers blood pH, which in turn acidifies the cerebrospinal fluid in which the brain is immersed and gradually results in unconsciousness (EFSA, 2020a). For this, the pigs are lowered down into a gas-filled chamber via a gondola or crate (Atkinson et al., 2015). If they are exposed for long enough, the process results in death (Atkinson et al., 2015; Terlouw et al., 2016).

Pigs find high concentrations of CO_2 highly distressing

Numerous significant welfare concerns are associated with this process, which can cause extensive suffering to the pigs. For example, how the pigs are lowered into the chamber is critical, and overloading the system can cause stress, injuries, and potentially crushing as the pigs fall over one another (EFSA, 2020a).

Exposure to high concentrations of CO_2 causes the pigs acute pain from the first moment of exposure through to loss of consciousness (AVMA, 2020; Raj, 2006). In particular, exposure causes severe irritation to the pigs' eyes, nasal mucosa, throat and lungs (Raj and Gregory, 1996; Steiner et al., 2019). It also creates a feeling of breathlessness or air-hunger (AVMA, 2020), while high concentrations of CO_2 also directly stimulate the brain's fear response (AVMA, 2020; Beausoleil and Mellor, 2015; Raj, 2006).

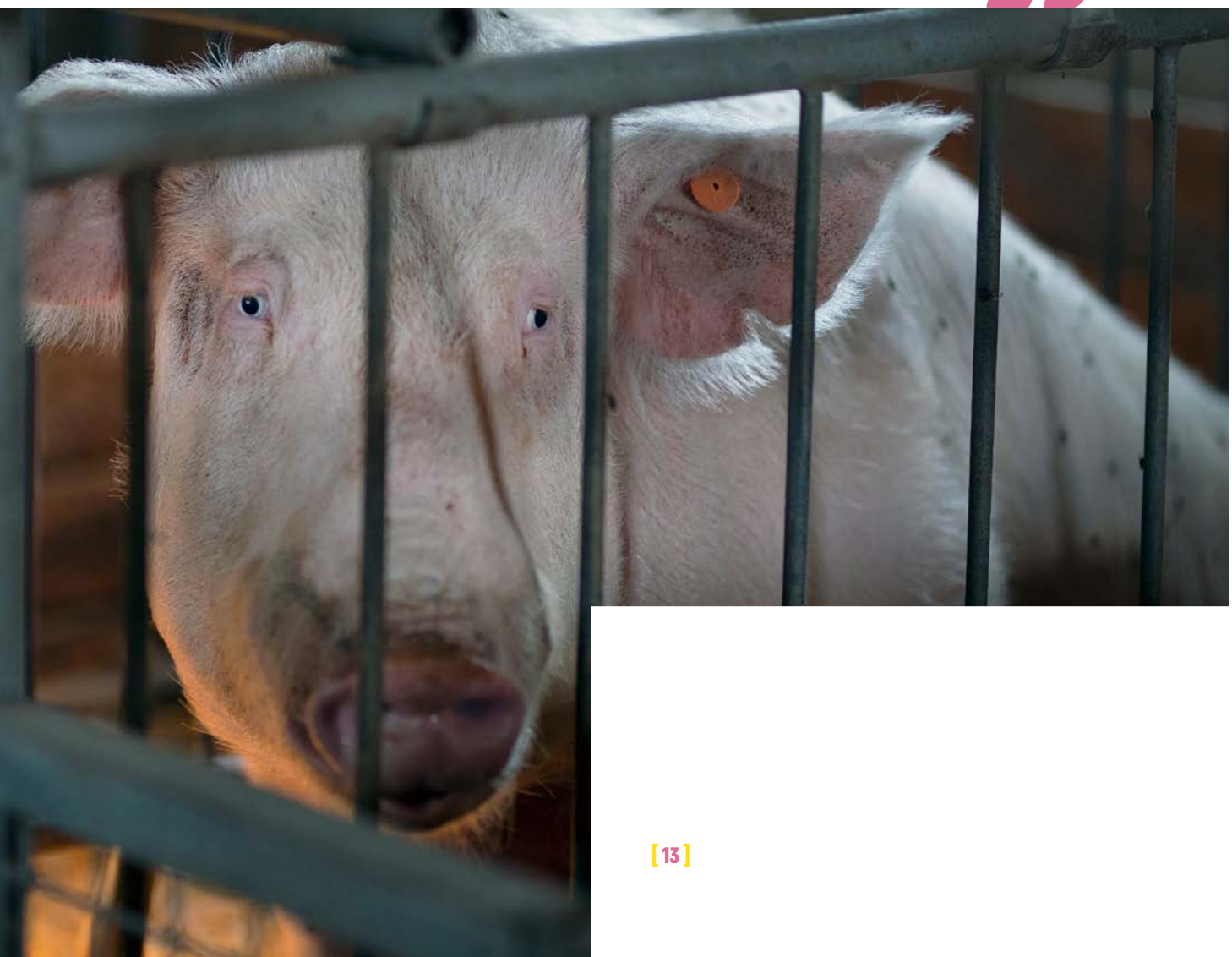
Furthermore, as the concentration of CO_2 increases as the pigs descend, the pigs do not reach the peak concentrations until they are at the bottom, so their symptoms worsen gradually, exacerbating their suffering (Verhoeven et al., 2016). The pigs respond to the experience with increased escape attempts, retreat behaviours, sneezing, gasping, aggression, vocalisations, head movements, eye rotations, and violent bucking (Atkinson et al., 2015; O'Malley et al., 2018; Rodríguez et al., 2008; Terlouw et al., 2016; Verhoeven et al., 2016).

CO_2 stunning is often ineffective

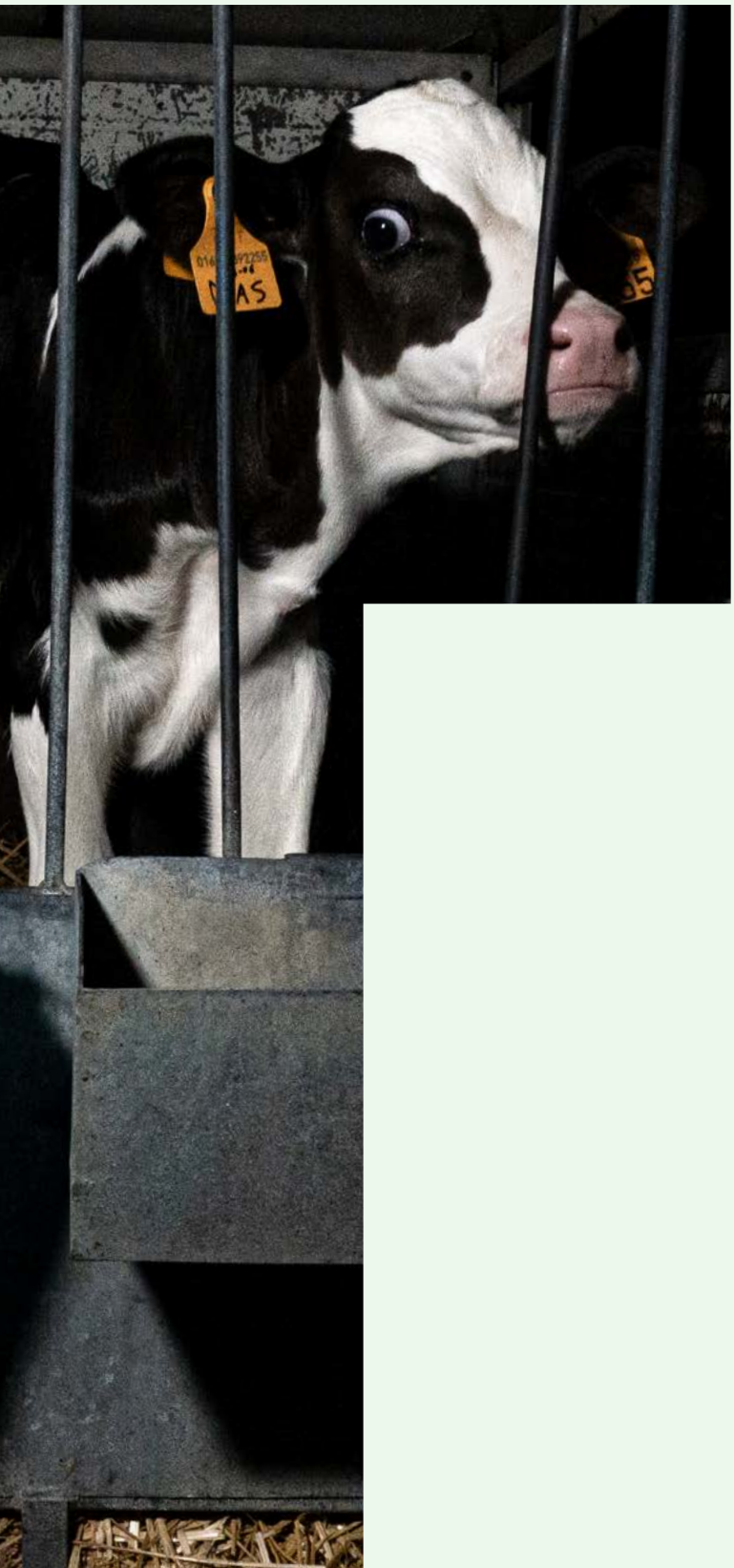
Not only is this process highly distressing to the pigs, but it can also be ineffective, as sometimes pigs are not exposed to enough CO_2 to be fully stunned (EFSA, 2004). This means that they may enter the next processing stage fully conscious and sensitive to pain, or regain consciousness midway through, and experience intense pain and distress from being shackled, hoisted up by one leg, stuck with a knife and bled out (EFSA, 2020a; Verhoeven et al., 2016).

Pigs deserve better than being farmed and killed in ways that cause intense suffering

Pigs are being treated poorly across the EU, whether it is in direct violation of the legislation that is meant to protect them, as seen in these investigations by Essere Animali where pigs are cruelly beaten, or as a result of the European Commission failing to acknowledge the growing scientific evidence highlighting the need for legislative change. These sentient, intelligent beings deserve better protection.



DAIRY COWS ARE PUSHED BEYOND THEIR LIMITS



Zero-grazing systems and the pressure of producing high milk yields

Cows have evolved to live on pasture, so their welfare suffers when they are kept indoors and fed unnatural diets. Zero-grazing systems, where dairy cows are kept indoors permanently, are now widespread across the EU (Nalon and Stevenson, 2019). In 2020, over 70% of dairy cows were kept in zero-grazing systems in Denmark.

Depriving dairy cows of access to pasture has a number of negative welfare impacts, such as poor udder and foot health, while denying the cows their natural behavioural instincts can result in frustration and stress (Arnott et al., 2017; Barkema et al., 2015; Charlton et al., 2013; Charlton and Rutter, 2017; Von Keyserlingk et al., 2017).

Dairy cows have also been under increasing selection pressures to produce high milk yields (Barkema et al., 2015). For example, according to Statistics Denmark, between 2002 to 2021, the number of dairy cows in Denmark dropped by 7%, whereas annual milk production increased by 25%. As a result, dairy cows produce so much milk that even if they could access pasture, they could not consume enough calories to survive (Breves et al., 2015). Instead, farmers give dairy cows an unnatural diet, rich in concentrates, to give them the energy they need. Concentrates are not only environmentally unsustainable, as their ingredients are grown on land where human food could be produced (Muscat et al., 2020), but they also make cows more vulnerable to painful nutritional-related diseases, such as sub-acute ruminal acidosis (SARA) (Forster, 2009). This is an example of selective breeding that has gone too far.

Cows are highly motivated to access pasture

Dairy cows are highly motivated to access pasture and will make considerable efforts to gain entry to it. For example, they have been known to push weighted gates, while evidence shows they are even more determined to reach pasture at night (Von Keyserlingk et al., 2017). It is also clear to see how much pleasure dairy cows get from accessing pasture after a long winter of being indoors, as they run around and buck with joy when released. This is known as the 'cow dance'.

Dairy cows kept indoors suffer high rates of lameness

Lameness is a serious welfare issue for cows, causing considerable pain, as well as a reduction in body condition, milk yield, dry matter intake, and fertility, and a higher chance of being culled (Armbrecht et al., 2018; Nuffel et al., 2015; Somers and O'Grady, 2015). Lameness can differ in severity from stiffness to total recumbency. It is often a symptom of infectious diseases, such as foot rot, or non-infectious diseases, such as sole ulcers (Nuffel et al., 2015).

The prevalence of lameness varies considerably across the EU, even as much as 0 - 69% between herds (Pellerin et al., 2015). It is estimated that 20 - 25% of the EU's dairy herd are lame (EFSA, 2009b; Hans and Houe, 2022). High milk yields and poor housing are two risk factors for lameness, and it is estimated that with every 1kg increase in daily milk production, the odds of lameness increase by 3% for cows housed indoors (Pellerin et al., 2015).

Indoor housing increases the risk of leg disorders in cows due to the time they spend walking and standing on concrete and in manure (Schütz and Cox, 2014). For example, this undercover investigation by Essere Animali shows dairy cows standing in their own faeces on an Italian dairy farm.

High-yielding dairy cows have a higher prevalence of mastitis

Mastitis is an exceptionally painful condition where the mammary glands become inflamed, usually because of a bacterial infection (Swinkels et al., 2015). Cows suffering from mastitis exhibit various signs of sickness and pain, which can last for ten days following diagnosis and antibiotic treatment (Fogsgaard et al., 2014). For instance, cows with mastitis will feed less, be more restless, get up and down more often, spend less time resting and lift and kick their legs more often during milking, compared with healthy cows (Fogsgaard et al., 2014).

Most conventional farms manage mastitis through an over-reliance on antimicrobials, further exacerbating the global issue of antimicrobial resistance (Nunan, 2022).

Dairy cows are chronically hungry and emaciated

Dairy cows are bred to produce increasing amounts of milk, which significantly impacts their bodies. Producing milk requires considerable energy, and dairy cows cannot consume enough energy to produce the 10,000kg of milk they are bred for. This means they are chronically hungry and often emaciated (EFSA, 2009c).

Furthermore, to stop dairy cows from lactating before they calf again, cows are 'dried off' by being put on a low-energy diet to reduce their milk yield. As a result, these cows show physical and behavioural signs of distress and chronic hunger, including vocalisations and increased cortisol levels (Franchi et al., 2020; Tucker et al., 2009).

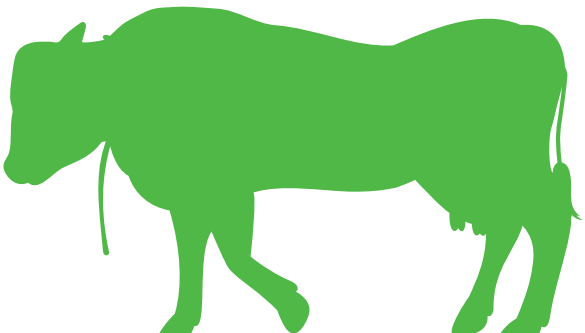
Cows may be tethered and unable to move

Many systems in the EU rely on tethering their cows for part of the year or even year-round, despite the considerable negative welfare impacts of tethering (Nalon and Stevenson, 2019). Tethered cows cannot exercise, groom, or interact freely, and even lying down is more challenging (Popescu et al., 2014, 2013). As a result, tie-stall systems negatively impact the cows' mental wellbeing (Bewley et al., 2017), especially as tethered cows cannot escape dominant individuals and experience chronic stress (EFSA, 2009c).

Dairy cows have their calves taken from them too early

Naturally, cows will hide their calves away from the herd, returning to them periodically to let them suckle (Flower and Weary, 2003). When the calves are around two weeks old, they spend their time in small groups during the day. Calves depend on their mothers until they are weaned at around 6 - 8 months.

On commercial dairy farms, calves are separated from their mothers within hours or days from birth, so the milk produced by the dam can be sold for human consumption. Separating a calf from his or her mother is a stressful experience for both the calf and the dam, and there is no consensus on the best age for separation (Flower and Weary, 2003; Weary and Chua, 2000).



However, there is a growing body of research into the positive effects of maintaining contact between the dam and calf, and various systems are being tested (Johnsen et al., 2015). For example, smart (computer-controlled) gates are being developed and trialled in some areas. These allow the cow to visit her calf, or vice versa, providing they both meet certain requirements (e.g., following milking/ feeding) (Føske Johnsen et al., 2021).

Calves are kept alone in calf hutches for the first weeks of their lives

Many commercial dairy farms house their calves singly in calf hutches for at least the first eight weeks of their lives (Ude et al., 2011). Typically, in these hutches, the calves only have limited visual, auditory and tactile contact with other calves. This has negative welfare implications as calves are highly motivated to have full contact with one another and will even make efforts to gain access to other calves (Bolt et al., 2017).

This undercover investigation by Essere Animali shows how newborn calves are treated badly in one example of an intensive dairy farm.

Because singly housed calves are unable to interact properly socially, they have impaired social skills later in life, are cognitively impaired, are more fearful, and less able to cope with stressors, compared with group or pair-housed calves (Bolt et al., 2017; Costa et al., 2016; Jensen and Larsen, 2014).

Calves are typically housed alone because farmers believe they can better manage their health that way. In reality, though, there is overwhelming evidence to show that group housing is better for the health of calves so long as the environmental conditions, such as feed, ventilation, and hygiene, are optimised (Costa et al., 2016; Marcé et al., 2010).

Calves undergo painful disbudding procedures

Horned dairy breeds are still the norm in the dairy industry due to the high cost of polled breeds. However, because stocking densities are too high, horned cattle pose a risk to one another and farm workers, so dairy farmers routinely perform a mutilation known as disbudding, which stops the horns from growing.

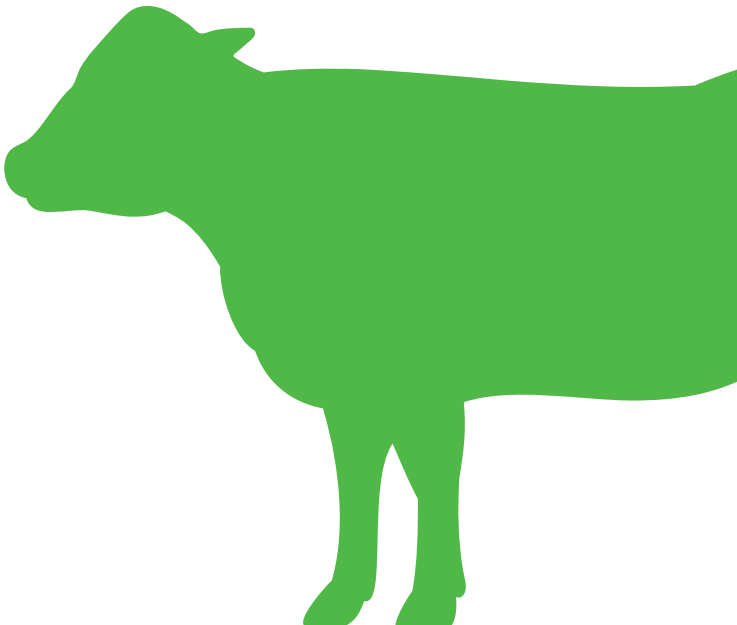
There are several methods of disbudding, all of which cause significant pain to calves (EFSA, 2006). For example, chemical disbudding involves the application of a caustic paste to the horn bud. The paste burns through the tissues to remove the bud, but it can also spread and burn other parts of the calf's body and potentially other calves (Stafford and Mellor, 2011). Studies show that following application, the calves are in pain and have elevated stress levels for at least 24 hours (Stilwell et al., 2009). This procedure is typically performed without anaesthetic or analgesic (Stilwell et al., 2008).

Similarly, hot-iron disbudding also results in significant long-term pain and suffering in calves and is also often performed without any long-term pain relief (Stilwell et al., 2012). In particular, studies have found that the procedure is highly stressful for the calves and that calves experience pain for weeks after it (Adcock and Tucker, 2020; Mintline et al., 2013; Stilwell et al., 2012).

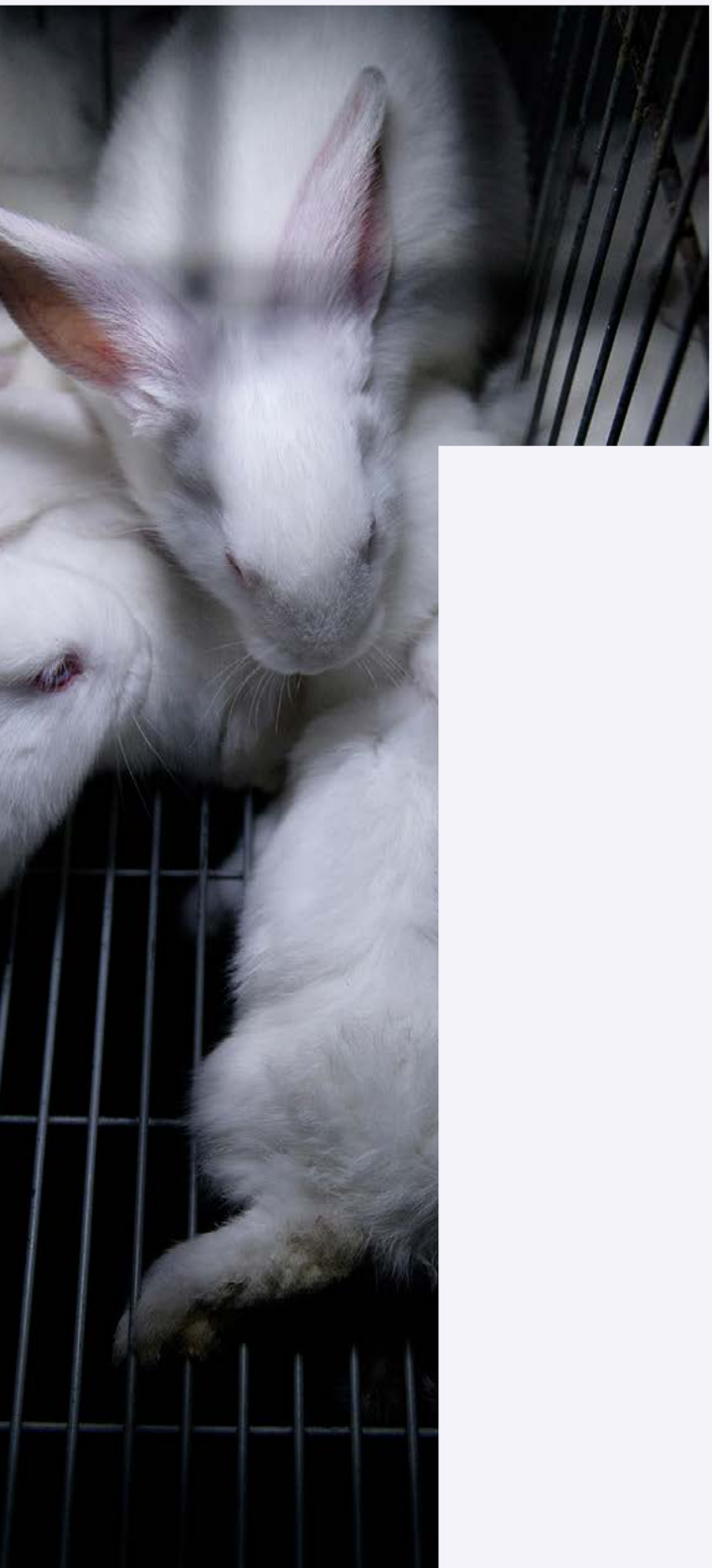
Dairy cows deserve better laws based on their natural needs and capabilities

Cows have evolved to live on pasture, and as a result, many of the poor health issues and welfare concerns are mitigated when they spend more time in their natural habitat and are not required to produce such high milk yields. For example, pasture allows cows to walk normally, resulting in a normal weight distribution, whereas slippery concrete floors can cause abnormal walking and contribute to the risk of lameness (Armbrecht et al., 2018; Pellerin et al., 2015; Schütz and Cox, 2014).

The selective pressure for dairy cows to produce huge milk yields has led to a major welfare crisis for the EU's dairy herds. These sentient animals deserve better.



THE NEEDS OF FARMED RABBITS ARE SIMPLY DISREGARDED



The natural environment and behaviour of rabbits

In the wild, rabbits primarily live in open areas with vegetation for cover. Rabbits dig out complex underground burrows with multiple entrances, reaching up to two metres in depth (Szendrő and Dalle Zotte, 2011). Farmed rabbits are descended from wild rabbits, and because they have not been domesticated as long as other farmed species, they still exhibit the same behaviours and instincts as seen in the wild (Trocino and Xiccato, 2006). Naturally, rabbits are very active animals, and young animals spend a lot of energy playing. When they rest, they may snuggle with others or rest against a wall or in a tunnel (Princz et al., 2008). Rabbits are social animals, living in family groups within their larger colonies. To maintain hierarchies, rabbits will fight one another, which includes boxing, kicking, chasing, biting and scratching (Trocino and Xiccato, 2006). Rabbits can spend up to 70% of their waking hours foraging and feeding, and although rabbits are highly selective over their food, they still consume a wide range of plants (Gidenne et al., 2020). Wild rabbits gnaw, dig, and scratch when foraging and eating.

Housing conditions in intensive farms

Unfortunately, the typical environment for farmed rabbits kept and reared on intensive farms is far removed from their usual habitat, and as a result, these systems significantly impede their natural behaviours. As a result, farmed rabbits are often stressed, frustrated, and bored, and their high stress levels also lead to a high prevalence of health issues and injuries, causing further pain and suffering (Budnick, 2015; Dorning and Harris, 2017; EFSA, 2020b).

Many rabbits are kept in conventional cages with no more space than the size of an A4 piece of paper per rabbit (EFSA, 2020b). An investigation by organisation L214 found rabbits kept in cages with even less space than an A5 size piece of paper. The small cages also prevent the rabbits from standing up on their hind legs, a common posture for rabbits (EFSA, 2020b). Enriched cages offer a little more space and a platform to hop up onto, but they still significantly impede the rabbits' natural behaviours and locomotion (EFSA, 2020; Szendrő et al., 2019a).

Park systems, which are indoor open pens, are being used increasingly across the EU (EFSA, 2020b). These systems typically include various enrichments, including platforms, gnawing blocks, and tunnels for hiding. However, when rabbits are kept at too high densities, these systems offer them little more space than a cage (EFSA, 2020b; Pinheiro and Monteiro, 2012). Cage alternatives can only improve animal welfare if the rabbits have enough space to move, tunnels to hide in, platforms to jump on, and places to escape aggressive individuals.

Farmed rabbits do not have enough space to move or stand

Both conventional cages and enriched cages are far too small for rabbits. For example, in a conventional cage, rabbits cannot even hop three times in one direction (EFSA, 2020b). Rabbits in cages are also unable to lie stretched out as they would naturally. As a result, caged rabbits spend less time moving than those in pens, which can lead to physical and mental health issues (Princz et al., 2008). Irrespective of the system, if rabbits are kept in crowded and cramped conditions, they become increasingly stressed, and the high cortisol levels and low dopamine and serotonin levels commonly seen in intensively farmed rabbits are evidence of their poor mental health (El-Tarabany et al., 2019). In addition, because these rabbits lack the space and opportunity to exercise, they also have thinner bones than those in higher-welfare systems, and this can lead to a higher prevalence of fractures (Buijs et al., 2015). What is more, the inability of caged does (female rabbits) to stand up on their hind legs is thought to result in skeletal deformities (Szendrő et al., 2019a).

Intensively farmed rabbits are kept on painful wire flooring

Rabbit cages typically have wire flooring, which is painful and commonly results in foot injuries such as pododermatitis (ulcers on the hocks), causing severe pain and potentially deep untreatable infections (Buijs et al., 2015; Castellini et al., 2003; Mancinelli et al., 2014). Moreover, when given a choice rabbits will avoid wire mesh flooring, indicating a significant dislike for it (Gerencsér et al., 2012) and showing a clear preference for plastic mesh flooring (Alfonso-Carrillo et al., 2014a; 2014b; Castellini et al., 2003; Gerencsér et al., 2012; Matics et al., 2003; Princz et al., 2008).

Rabbits want a clean and dry environment

The cleanliness and dryness of the floor is another significant issue for rabbits. A badly soiled floor can result in physical discomfort from cold stress, lesions, and pain, negatively impacting their emotional wellbeing. For instance, rabbits will increase self-grooming behaviour in response to soiling, suggesting discomfort (Dal Bosco et al., 2002). Furthermore, poor hygiene also results in a high prevalence of digestive disorders, which can considerably impair welfare, and is a major cause of mortality in the growing kits (young rabbits) (EFSA, 2020b).

Hygiene is why most farms keep rabbits on wire floors, as the faeces do not accumulate and result in health issues. However, significant efforts have been made to research and develop flooring alternatives, including plastic slatted flooring, and many solutions are now available that offer rabbits a floor that is more comfortable and less injurious whilst maintaining hygiene levels (Clément et al., 2016; Dorning and Harris, 2017; EFSA, 2020b; Pinheiro and Monteiro, 2012; RAWECOH, 2016).

Rabbit farms are highly reliant on antibiotics

When animals are persistently stressed, as farmed rabbits in conventional systems are, their immune systems suffer, and diseases and infections are a significant concern (EFSA, 2020b). For example, on average, 15% of kits may die before weaning, and a further 15% may die following weaning (FVE, 2017; Szendrő and Dalle Zotte, 2011). These high mortality rates mean that farmers administer high levels of antibiotics – in France, the use of antibiotics on rabbits is thought to be over ten times higher than in pigs, the species with the second highest use[1] (Nunan, 2022). This over-reliance on antibiotics contributes to antimicrobial resistance (Attili et al., 2020), which can have disastrous effects on human health, as resistant infections become more difficult to treat and sometimes even impossible (Davies et al., 2019).

1. Using the 'population correction unit' which accounts for the varying population sizes of different livestock species.

Farmed rabbits do not have opportunities to gnaw

The barren cages that rabbits are kept in fail to provide rabbits with the complex environment they need (EFSA, 2020b). Conventional cages offer rabbits no opportunities to gnaw, which is a particular concern, as rabbits have open-rooted teeth that continuously grow (EFSA, 2020b; Kutzer, 2018). This is beneficial for rabbits in the wild, as they chew and gnaw on hard substrates and naturally wear down their teeth. However, in conventional cages, rabbits have nothing to gnaw on, resulting in overgrown teeth that may grow into the soft tissue, and cause pain and difficulty in eating (Kutzer, 2018). Even in enriched cages, the gnawing materials provided are not considered adequate to fulfil the rabbits' needs (EFSA, 2020b).

Breeding does struggle to perform maternal behaviours

Breeding does are typically kept alone in conventional systems until they give birth to their young (Szendrő et al., 2019b). Like the meat rabbits, does are generally kept in cramped wire cages with no space to move, even though they are highly motivated to perform natural maternal behaviours (EFSA, 2020b). For example, nest building is a highly instinctive behaviour, which intensive systems fail to consider, as most caged rabbits are not given enough, or even any, substrates with which to build nests (de Oliveira et al., 2017; EFSA, 2020b).

If a doe does not have enough material for nest building, or if the material is soiled, her strong maternal instincts are frustrated, and her kits' welfare is at risk (Szendrő et al., 2019b). For example, in such situations, the doe is more likely to birth outside of the nest or to move the kits out, which can result in hypothermia and death for the kits (EFSA, 2020b). In addition, in the wild, does will only visit the nest to nurse their kits once a day, whereas in farmed systems, does cannot move away from their kits in the same way (Szendrő et al., 2019b). Enriched cages include a platform which initially, only the doe can access, but the kits are only big enough at around three weeks old to hop up to follow the doe (EFSA, 2020b). This has been shown to result in increased stress levels in does, as their natural instincts are likely to be driven by the need to protect their kits from predators (Buijs et al., 2015).

Breeding rabbits are kept alone

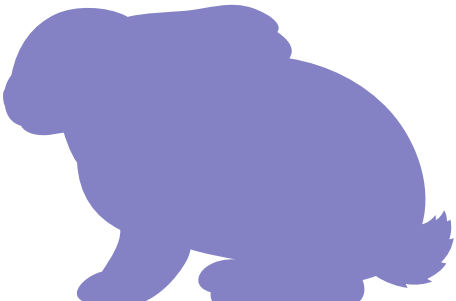
In conventional systems, breeding does and bucks are typically housed alone in single cages, except when the doe has kits. Although this is due to the likelihood of increased aggression and fights in group housing, this still means that these rabbits are prevented from normal social interactions for the vast majority of their lives. As a result, individually housed rabbits move less, and show stereotypic behaviours, such as biting cage bars (Mugnai et al., 2009). This is a strong indication of the severe frustration, boredom, and stress that these animals experience from a lifetime in individual confinement (EFSA, 2020b; FVE, 2017; Szendrő et al., 2019b).

In conventional cages, meat rabbits are also kept in unnatural social groupings (EFSA, 2020). This, along with the lack of space, prevents them from performing natural social behaviours, such as social grooming and play (EFSA, 2020b).

Farmed rabbits deserve to lead engaging and satisfying lives

Higher-welfare systems exist for farming rabbits. For example, well-built parks and other pen systems, where rabbits have the space to run, jump, and hide, enable rabbits to behave more naturally, have fulfilling social interactions, and be healthier due to lower stress levels and improved locomotion (EFSA, 2020b; Kutzer, 2018). Extensive systems that give rabbits access to outside space are even more successful in improving welfare, can achieve good productivity, are better for the environment, and improve worker satisfaction (EFSA, 2020b; Kutzer, 2018; Paci et al., 2014; Pinheiro and Monteiro, 2012).

Rabbits are suffering across the EU in cages that are too small and barren to meet their needs. They are in pain, and they are suffering. These sentient beings need to be protected by species-specific legislation to ensure that they are kept in systems that protect their welfare.



[CONCLUSION]

THESE EXAMPLES HIGHLIGHT SOME OF THE MAIN WAYS CURRENT EU LEGISLATION FAILS TO MEET THE NEEDS OF FARMED ANIMALS, HOW IT HAS FAILED TO ADAPT TO SCIENTIFIC EVIDENCE, AND HOW IT IS AT ODDS WITH EUROPEAN CITIZENS' DEMANDS TO SEE FARMED ANIMALS BEING TREATED HUMANELY.

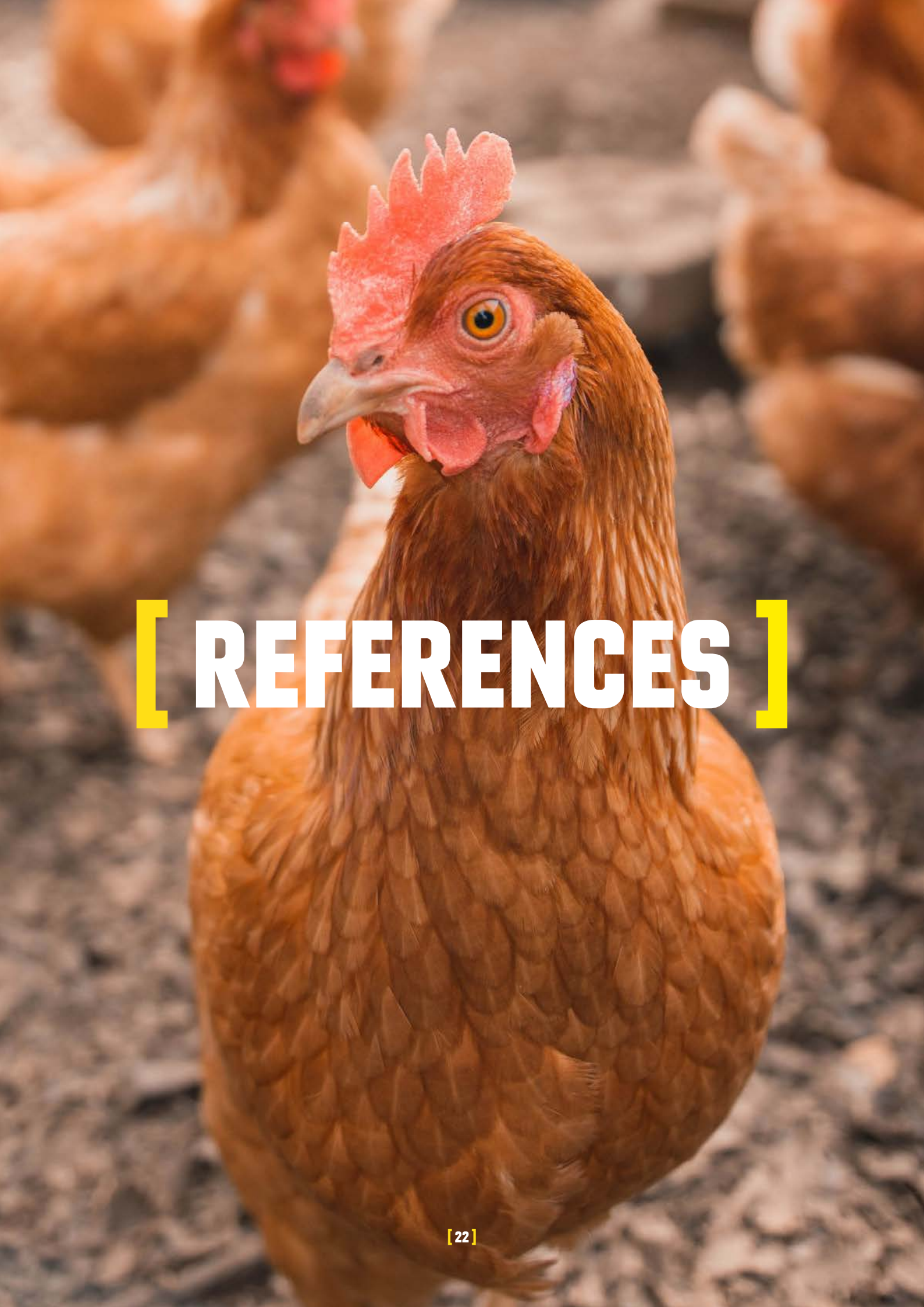
The body of scientific evidence for farmed animal welfare practices has continued to grow, but the EU's legislation has failed to adapt. Research shows clearly that breeding for intensive production results in animals that are bred to suffer, with their bodies unable to withstand the pressures put on them. Furthermore, advances in welfare science have shown for years how electrified waterbaths are inhumane and unreliable for broiler chickens, and that pigs suffer when gassed with CO_2.

The EU's citizens also want farmed animals to be treated better, as seen from the huge response to the "End the Cage Age" European Citizens' Initiative, as well as the public endorsement for the "No Animal Left Behind" project, which received over 200,000 supporting signatures.

The revision of EU legislation must be performed in accordance with the overwhelming scientific evidence that shows that farmed animals suffer in cages, are being bred for production at the expense of their welfare, and that slaughter methods need to shift to humane alternatives that minimise suffering.

The new legislation must be strong, precise, and enforced. It must include species-specific legislation for all farmed animals, leave no room for loopholes, and be thoroughly administered to ensure that the needless suffering of the EU's farmed animals finally comes to an end.

THIS IS WHAT EU CITIZENS WANT AND WHAT THE ANIMALS DESERVE.



[REFERENCES]

[REFERENCES]

1. Adcock, S.J.J., Tucker, C.B., 2020. Conditioned place preference reveals ongoing pain in calves 3 weeks after disbudding. Sci Rep 10. https://doi.org/10.1038/s41598-020-60260-7
2. Alfonso-Carrillo, C, García-Rebollar, P., de Blas, C., Ibáñez, M.A., García-Ruiz, A.I., 2014a. Effect of late weaning and use of alternative cages on performance of does, suckling and fattening rabbits under extensive reproductive management. Livest Sci. https://doi.org/10.1016/j.livsci.2014.05.018
3. Alfonso-Carrillo, C., Martín, E., de Blas, C., Ibáñez, M.A., García-Rebollar, P., García-Ruiz, A.I., 2014b. Effect of cage type on the behaviour pattern of rabbit does at different physiological stages. World Rabbit Science 22, 59–69. https://doi.org/10.4995/wrs.2014.1396
4. Andersen, I.L., Berg, S., Bøe, K.E., 2005. Crushing of piglets by the mother sow (Sus scrofa) - Purely accidental or a poor mother? Appl Anim Behav Sci 93, 229–243. https://doi.org/10.1016/j.applanim.2004.11.015
5. Andersen, I.L., Vasdal, G., Pedersen, L.J., 2014. Nest building and posture changes and activity budget of gilts housed in pens and crates. Appl Anim Behav Sci 159, 29–33. https://doi.org/10.1016/j.applanim.2014.07.002
6. Anil, L., Anil, S.S., Deen, J., 2002. Evaluation of the relationship between injuries and size of gestation stalls relative to size of sows. J Am Vet Med Assoc 221, 834–836. https://doi.org/10.2460/javma.2002.221.834
7. Arechavala-Lopez, P., Cabrera-Álvarez, M.J., Maia, C.M., Saraiva, J.L., 2022. Environmental enrichment in fish aquaculture: A review of fundamental and practical aspects. Rev Aquac 14, 704–728. https://doi.org/10.1111/raq.12620
8. Armbrecht, L., Lambertz, C., Albers, D., Gauly, M., 2018. Does access to pasture affect claw condition and health in dairy cows? Veterinary Record 182, 79. https://doi.org/10.1136/vr.104554
9. Arnott, G., Ferris, C.P., O'Connell, N.E., 2017. Review: welfare of dairy cows in continuously housed and pasture-based production systems. Animal 11, 261–273. https://doi.org/10.1017/S1751731116001336
10. Ashley, P.J., 2007. Fish welfare: Current issues in aquaculture. Appl Anim Behav Sci 104, 199–235. https://doi.org/10.1016/j.applanim.2006.09.001
11. Atkinson, S., Larsen, A., Llonch, P., Velarde, A., Algers, B., 2015. Group stunning of pigs during commercial slaughter in a Butina pasternoster system using 80% nitrogen and 20% carbon dioxide compared to 90% carbon dioxide.
12. Attia, J., Millot, S., Di-Poï, C., Bégout, M.L., Noble, C., Sanchez-Vazquez, F.J., Terova, G., Saroglia, M., Damsgård, B., 2012. Demand feeding and welfare in farmed fish. Fish Physiol Biochem 38, 107–118. https://doi.org/10.1007/s10695-011-9538-4
13. Attili, A.R., Bellato, A., Robino, P., Galosi, L., Papeschi, C., Rossi, G., Fileni, E., Linardi, M., Cuteri, V., Chiesa, F., Nebbia, P., 2020. Analysis of the antibiotic resistance profiles in methicillin-sensitive s. Aureus pathotypes isolated on a commercial rabbit farm in Italy. Antibiotics 9, 1–14. https://doi.org/10.3390/antibiotics9100673
14. Auperin, B., Geslin, M., 2008. Plasma cortisol response to stress in juvenile rainbow trout is influenced by their life history during early development and by egg cortisol content. Gen Comp Endocrinol 158, 234–239. https://doi.org/10.1016/j.ygcen.2008.07.002
15. AVMA, 2020. AVMA Guidelines for the Euthanasia of Animals: 2020 Edition, certifiedhumane.org. https://doi.org/10.1093/med/9780198784906.003.0764
16. Baghbanzadeh, A., Decuypere, E., 2008. Ascites syndrome in broilers: Physiological and nutritional perspectives. Avian Pathology. https://doi.org/10.1080/03079450801902062
17. Barkema, H.W., Keefe, G.P., Roy, J.-P., Luby, C., von Keyserlingk, M.A.G., LeBlanc, S.J., Lam, T.J.G.M., Kastelic, J.P., Kelton, D.F., 2015. Invited review: Changes in the dairy industry affecting dairy cattle health and welfare. J Dairy Sci 98, 7426–7445. https://doi.org/10.3168/jds.2015-9377
18. Bassler, A.W., Arnould, C., Butterworth, A., Colin, L., de Jong, I.C., Ferrante, V., Ferrari, P., Haslam, S., Wemelsfelder, F., Blokhuis, H.J., 2013. Potential risk factors associated with contact dermatitis, lameness, negative emotional state, and fear of humans in broiler chicken flocks. Poult Sci 92, 2811–2826. https://doi.org/10.3382/ps.2013-03208
19. Baxter, E.M., Edwards, S., 2021. Optimising sow and piglet welfare during farrowing and lactation, in: Understanding the Behaviour and Improving the Welfare of Pigs. pp. 121–176. https://doi.org/10.19103/as.2020.0081.04
20. Beausoleil, N.J., Mellor, D.J., 2015. Introducing breathlessness as a significant animal welfare issue. N Z Vet J. https://doi.org/10.1080/00480169.2014.940410
21. Berg, C., Raj, M., 2015. A review of different stunning methods for Poultry—animal welfare aspects (stunning methods for poultry). Animals 5, 1207–1219. https://doi.org/10.3390/ani5040407
22. Bergeron, R., Bolduc, J., Ramonet, Y., Meunier-Salaün, M.C., Robert, S., 2000. Feeding motivation and stereotypies in pregnant sows fed increasing levels of fibre and/or food. Appl Anim Behav Sci 70, 27–40. https://doi.org/10.1016/S0168-1591(00)00142-8
23. Bessei, W., 2006a. Welfare of broilers: A review. Worlds Poult Sci J 62, 455. https://doi.org/10.1079/WPS2005108
24. Bessei, W., 2006b. Welfare of broilers: a review. Worlds Poult Sci J 62, 455. https://doi.org/10.1017/s0043933906001085
25. Bewley, J.M., Robertson, L.M., Eckelkamp, E.A., 2017. A 100-Year Review: Lactating dairy cattle housing management. J Dairy Sci 100, 10418–10431. https://doi.org/10.3168/jds.2017-13251
26. Bokkers, E.A.M., Koene, P., 2003. Behaviour of fast- and slow growing broilers to 12 weeks of age and the physical consequences. Appl Anim Behav Sci 81, 59–72. https://doi.org/10.1016/S0168-1591(02)00251-4
27. Bolt, S.L., Boyland, N.K., Mlynski, D.T., James, R., Croft, D.P., 2017. Pair housing of dairy calves and age at pairing: Effects on weaning stress, health, production and social networks. PLoS One 12, 1–18. https://doi.org/10.1371/journal.pone.0166926
28. Borderías, A.J., Sánchez-Alonso, I., 2011. First Processing Steps and the Quality of Wild and Farmed Fish. J Food Sci 76, R1–R5. https://doi.org/10.1111/J.1750-3841.2010.01900.X
29. Boysen, S., Berntson, G., 1990. The development of numerical skills in the chimpanzee (Pan troglodytes).
30. Bracke, M. and Spoolder, H. (2011). Review of wallowing in pigs: Implications for animal welfare. Animal Welfare, 20(3), 347-363. doi:10.1017/S0962728600002918
31. Breves, G., Dänicke, S., Frahm, J., Meyer, U., Rehage, J., Isselstein, J., Schären, M., Hüther, L., Bulang, M., Jostmeier, S., Ruesink, S., 2015. The effects of a ration change from a total mixed ration to pasture on health and production of dairy cows. J Dairy Sci 99, 1183–1200. https://doi.org/10.3168/jds.2015-9873
32. Brown, C., Dorey, C., 2019. Pain and Emotion in Fishes – Fish Welfare Implications for Fisheries and Aquaculture. Animal Studies Journal 8, 175–201. https://doi.org/10.14453/asj.v8i2.12
33. Browning, H., Veit, W., 2020. Is humane slaughter possible? Animals 10, 1–11. https://doi.org/10.3390/ani10050799
34. Budnick, T., 2015. A Hare Raising Lapse in Meat Industry Regulation: How Regulatory Reform Will Pull the Meat Rabbit out from Welfare Neglect. Animal Law 21, 329–364.
35. Buijs, S., Maertens, L., Hermans, K., Vangeyte, J., André, F., Tuyttens, M., 2015. Behaviour, wounds, weight loss and adrenal weight of rabbit does as affected by semi-group housing. Appl Anim Behav Sci 172, 44–51. https://doi.org/10.1016/j.applanim.2015.09.003
36. Castellini, C., Dal Bosco, A., Mugnai, C., 2003. Comparison of different reproduction protocols for rabbit does: Effect of litter size and mating interval. Livest Prod Sci 83, 131–139. https://doi.org/10.1016/S0301-6226(03)00070-8
37. Chapinal, N., Ruiz de la Torre, J.L., Cerisuelo, A., Gasa, J., Baucells, M.D., Coma, J., Vidal, A., Manteca, X., 2010. Evaluation of welfare and productivity in pregnant sows kept in stalls or in 2 different group housing systems. Journal of Veterinary Behavior: Clinical Applications and Research 5, 82–93. https://doi.org/10.1016/j.jveb.2009.09.046
38. Charlton, G.L., Rutter, S.M., 2017. The behaviour of housed dairy cattle with and without pasture access: A review. Appl Anim Behav Sci 192, 2–9. https://doi.org/10.1016/j.applanim.2017.05.015
39. Charlton, G.L., Rutter, S.M., East, M., Sinclair, L.A., 2013. The motivation of dairy cows for access to pasture. J Dairy Sci 96, 4387–4396. https://doi.org/10.3168/jds.2012-6421

40. Clément, T.M., Guardia, S., Davoust, C., Galliot, P., Souchet, C., Bignon, L., Lamothe, F.L., 2016. Performance and sustainability of two alternative rabbit breeding systems. World Rabbit Science 24, 253–265. https://doi.org/10.4995/wrs.2016.5154

41. Conte, F.S., 2004. Stress and the welfare of cultured fish. Appl Anim Behav Sci 86, 205–223. https://doi.org/10.1016/j.applanim.2004.02.003

42. Contreras-Jodar, A., Varvaró-Porter, A., Michel, V., Velarde, A., 2022. Inter-Observer Repeatability of Indicators of Consciousness after Waterbath Stunning in Broiler Chickens. Animals 12. https://doi.org/10.3390/ani12141800

43. Costa, J.H.C., von Keyserlingk, M.A.G., Weary, D.M., 2016. Invited review: Effects of group housing of dairy calves on behavior, cognition, performance, and health. J Dairy Sci 99, 2453–2467. https://doi.org/10.3168/jds.2015-10144

44. Dal Bosco, A., Castellini, C., Mugnai, C., 2002. Rearing rabbits on a wire net floor or straw litter: Behaviour, growth and meat qualitative traits. Livest Prod Sci 75, 149–156. https://doi.org/10.1016/S0301-6226(01)00307-4

45. Damm, B.I., Lisborg, L., Vestergaard, K.S., Vanicek, J., 2003. Nest-building, behavioural disturbances and heart rate in farrowing sows kept in crates and schmid pens. Livest Prod Sci 80, 175–187. https://doi.org/10.1016/S0301-6226(02)00186-0

46. Danbury, T.C.C., Weeks, C.A.A., Waterman-Pearson, A.E.E., Kestin, S.C.C., Chambers, J.P.P., Kestin, S.C.C., Weeks, C.A.A., Danbury, T.C.C., 2010. Self-selection of the analgesic drug carprofen by lame broiler chickens. Veterinary Record 146, 307–311. https://doi.org/10.1136/vr.146.11.307

47. Davies, R. and Wales, A., 2019. Antimicrobial Resistance on Farms: A Review Including Biosecurity and the Potential Role of Disinfectants in Resistance Selection. Compr Rev Food Sci Food Saf. https://doi.org/10.1111/1541-4337.12438

48. de Jong, I., Berg, C., Butterworth, A., Estevéz, I., EFSA, 2017. Scientific report updating the EFSA opinions on the welfare of broilers and broiler breeders. EFSA Supporting Publications 9, 1–116. https://doi.org/10.2903/sp.efsa.2012.en-295

49. de Oliveira, M.C., Lima, S.C.O., Mesquita, S.A., Silva, J.A., Gomes, Y.S., Attia, Y.A., Oliveira, H.C., 2017. Nesting materials for does: Effect on nest building and performance at first parturition. Revista Colombiana de Ciencias Pecuarias 30, 308–315. https://doi.org/10.17533/udea.rccp.v30n4a06

50. Devos, G., Moons, C.P.H., Houf, K., 2018. Diversity, not uniformity: slaughter and electrical waterbath stunning procedures in Belgian slaughterhouses. Poult Sci 97, 3369–3379. https://doi.org/10.3382/ps/pey181

51. Dorning, J., Harris, S., 2017. The Welfare of Farmed Rabbits in Commercial Production Systems A scientific review.

52. Edgar, J., Held, S., Paul, E., Pettersson, I., l'Anson Price, R., Nicol, C., 2015. Social buffering in a bird. Anim Behav 105, 11–19. https://doi.org/10.1016/j.anbehav.2015.04.007

53. Edgar, J.L., Lowe, J.C., Paul, E., Nicol, C.J., 2011. Avian maternal response to chick distress. Proceedings. Biological sciences / The Royal Society 278, 3129–34. https://doi.org/10.1098/rspb.2010.2701

54. Edgar, J.L., Paul, E.S., Nicol, C.J., 2013. Protective mother hens: Cognitive influences on the avian maternal response. Anim Behav 86, 223–229. https://doi.org/10.1016/j.anbehav.2013.05.004

55. EFSA, 2020a. Welfare of pigs at slaughter. EFSA Journal 18. https://doi.org/10.2903/j.efsa.2020.6148

56. EFSA, 2020b. EFSA scientific opinions on rabbit welfare.

57. EFSA, 2019. Slaughter of animals: poultry. EFSA Journal 17. https://doi.org/10.2903/j.efsa.2019.5849

58. EFSA, 2012. Scientific Opinion on the electrical requirements for waterbath stunning equipment applicable for poultry. EFSA Journal 10. https://doi.org/10.2903/j.efsa.2012.2757

59. EFSA, 2009a. SCIENTIFIC OPINION Species-specific welfare aspects of the main systems of stunning and killing of farmed carp Scientific Opinion of the Panel on Animal Health and Welfare (Question N° EFSA-Q-2008-439). The EFSA Journal 1013, 1–37.

60. EFSA, 2009b. Scientific report of EFSA prepared by the Animal Health and Animal Welfare Unit on the effects of farming systems on dairy cow welfare and disease. Annex to the EFSA Journal 1143, 1–7.

61. EFSA, 2009c. Scientific report on the effects of farming systems on dairy cow welfare and Report of the Panel on Animal Health and Welfare. Annex to the EFSA Journal 1143, 1–38.

62. EFSA, 2007. Animal health and welfare aspects of different housing and husbandry systems for adult breeding boars, pregnant, farrowing sows and unweaned piglets - Scientific Opinion of the Panel on Animal Health and Welfare. EFSA Journal 5, 1–13. https://doi.org/10.2903/j.efsa.2007.572

63. EFSA, 2006. Opinion of the Scientific Panel on Animal Health and Welfare (AHAW) on a request from the Commission related with the risks of poor welfare in intensive calf farming systems. EFSA Journal. https://doi.org/10.2903/j.efsa.2006.366

64. EFSA, 2004. Welfare aspects of the main systems of stunning and killing the main commercial species of animals. EFSA Journal 45, 1–29. https://doi.org/10.2903/j.efsa.2004.122

65. Ellis, T., Berrill, I., Lines, J., Turnbull, J.F., Knowles, T.G., 2012. Mortality and fish welfare. Fish Physiol Biochem 38, 189–199. https://doi.org/10.1007/s10695-011-9547-3

66. Ellis, T., North, B., Scott, A.P., Bromage, N.R., Porter, M., Gadd, D., 2002. The relationships between stocking density and welfare in farmed rainbow trout. J Fish Biol. https://doi.org/10.1006/jfbi.2002.2057

67. El-Tarabany, M.S., Ahmed-Farid, O.A., El-Tarabany, A.A., 2019. Impact of space allowance on performance traits, brain neurotransmitters and blood antioxidant activity of New Zealand White rabbits. Prev Vet Med 163, 44–50. https://doi.org/10.1016/j.prevetmed.2018.12.011

68. EU Platform on Animal Welfare, 2020. Guidelines on Water Quality and Handling for the Welfare of Farmed Vertebrate Fish EU Platform on Animal Welfare Own Initiative Group on Fish. EU Platform on Animal Welfare Own Initiative Group on Fish.

69. European Commission, 2017. Welfare of farmed fish: Common practices during transport and at slaughter, Welfare of farmed fish: Common practices during transport and at slaughter.

70. FAWC, 2009. Opinion on the Welfare of Farmed Finfish 16.

71. Flower, F., Weary, D., 2003. The effects of early separation on the dairy cow and calf. Animal Welfare 12, 339–348.

72. Fogsgaard, K.K., Bennedsgaard, T.W., Herskin, M.S., 2014. Behavioral changes in freestall-housed dairy cows with naturally occurring clinical mastitis. J Dairy Sci 98, 1730–1738. https://doi.org/10.3168/jds.2014-8347

73. Forster, D., 2009. Nutrition-based cattle disease. Veterinary Times 39, 10–12.

74. Føske Johnsen, J., Grønmo Kischel, S., Sætervik Rognskog, M., Vagle, I., Engelien Johanssen, J.R., Ruud, L.E., Ferneborg, S., 2021. Investigating cow–calf contact in a cow-driven system: performance of cow and calf. Journal of Dairy Research 88, 56–59. https://doi.org/10.1017/S0022029921000200

75. Franchi, G.A., Herskin, M.S., Jensen, M.B., 2020. Do dietary and milking frequency changes during a gradual dry-off affect feed-related attention bias and visual lateralisation in dairy cows? Appl Anim Behav Sci 223, 104923. https://doi.org/10.1016/j.applanim.2019.104923

76. Freeman, N., Tuyttens, F.A.M., Johnson, A., Marshall, V., Garmyn, A., Jacobs, L., 2020. Remedying contact dermatitis in broiler chickens with novel flooring treatments. Animals 10, 1–14. https://doi.org/10.3390/ani10101761

77. FVE, 2017. FVE comments on farmed rabbits.

78. Gerencsér, Z., Odermatt, M., Radnai, I., Mikó, A., Matics, Z., Nagy, I., Szendro, Z., 2012. EXAMINATION OF FREE CHOICE OF GROWING RABBITS AMONG DIFFERENT FLOOR-TYPES Feeders Wire mesh Deep litter Drinkers, in: Proceedings 10 Th World Rabbit Congress – September 3 - 6, 2012– Sharm El- Sheikh –Egypt. pp. 1087–1090.

79. Gidenne, T., Lebas, F., Fortun-Lamothe, L., 2020. Feeding behaviour of rabbits., in: Nutrition of the Rabbit. CAB International, pp. 254–274. https://doi.org/10.1079/9781789241273.0254

80. Girasole, M., Chirollo, C., Ceruso, M., Vollano, L., Chianese, A., Cortesi, M.L., 2015. Optimisation of stunning electrical parameters to improve animal welfare in a poultry slaughterhouse. Ital J Food Saf 4, 175–178. https://doi.org/10.4081/ijfs.2015.4576

81. Gräns, A., Niklasson, L., Sandblom, E., Sundell, K., Algers, B., Berg, C., Lundh, T., Axelsson, M., Sundh, H., Kiessling, A., 2015. Stunning fish with CO2 or electricity: Contradictory results on behavioural and physiological stress responses. Animal 10, 294–301. https://doi.org/10.1017/S1751731115000750

82. Hall, A., 2001. The Effect of Stocking Density on the Behaviour of Broiler Chickens Reared Commercially. Animal Welfare 10, 23–40. https://doi.org/10.5536/kjps.2011.38.1.001

83. Hans, T., Houe, P., 2022. Benchmarking lameness in dairy cows.

84. Hartcher, K.M., Lum, H.K., 2019. Genetic selection of broilers and welfare consequences: a review. Worlds Poult Sci J 76, 154–167. https://doi.org/10.1080/00439339.2019.1680025

85. Jensen, M.B., Larsen, L.E., 2014. Effects of level of social contact on dairy calf behavior and health. J Dairy Sci 97, 5035–5044. https://doi.org/10.3168/jds.2013-7311

86. Johnsen, J.F., Ellingsen, K., Grøndahl, A.M., Bøe, K.E., Lidfors, L., Mejdell, C.M., 2015. The effect of physical contact between dairy cows and calves during separation on their post-separation behavioural response. Appl Anim Behav Sci 166, 11–19. https://doi.org/10.1016/j.applanim.2015.03.002

87. Johnson, A.K., Marchant-Forde, J.N., 2009. The Welfare of Pigs in the Farrowing Environment, The Welfare of Pigs. Springer. https://doi.org/10.1007/978-1-4020-8909-1

88. Jong, I. de, Harn, J. van, Gunnink, H., Hindle, V.A., Lourens, A., 2012. Footpad dermatitis in Dutch broiler flocks: Prevalence and factors of influence. Poult Sci 91, 1569–1574.

89. Karaarslan, S., Nazlıgül, A., 2018. Effects of lighting, stocking density, and access to perches on leg health variables as welfare indicators in broiler chickens. Livest Sci 218, 31–36. https://doi.org/10.1016/j.livsci.2018.10.008

90. Karlen, G.A.M., Hemsworth, P.H., Gonyou, H.W., Fabrega, E., David Strom, A., Smits, R.J., 2007. The welfare of gestating sows in conventional stalls and large groups on deep litter. Appl Anim Behav Sci 105, 87–101. https://doi.org/10.1016/j.applanim.2006.05.014

91. Kjaer, J.B., Su, G., Nielsen, B.L., Sørensen, P., 2006. Foot pad dermatitis and hock burn in broiler chickens and degree of inheritance. Poult Sci 85, 1342–1348. https://doi.org/10.1093/ps/85.8.1342

92. Kristensen, H.H., Wathes, C.M., 2000. Ammonia and poultry welfare: A review. Worlds Poult Sci J. https://doi.org/10.1079/wps20000018

93. Kutzer, T., 2018. Has im Gras by KAGfreiland final report.

94. Lambert, H., Cornish, A., Elwin, A., D'cruze, N., 2022. A Kettle of Fish: A Review of the Scientific Literature for Evidence of Fish Sentience. Animals 12, 1–13. https://doi.org/10.3390/ani12091182

95. Lambooij, B., Hindle, V., 2018. Electrical stunning of poultry, in: Advances in Poultry Welfare. Woodhead Publishing, pp. 77–98. https://doi.org/10.1016/b978-0-08-100915-4.00004-x

96. Lambooij, E., Grimsbø, E., de Vis, J.W. van, Reimert, H.G.M., Nortvedt, R., Roth, B., 2010. Percussion and electrical stunning of Atlantic salmon (Salmo salar) after dewatering and subsequent effect on brain and heart activities. Aquaculture 300, 107–112. https://doi.org/10.1016/j.aquaculture.2009.12.022

97. Lambooij, E., Pilarczyk, M., Bialowas, H., van den Boogaart, J.G.M., van de Vis, J.W., 2007. Electrical and percussive stunning of the common carp (Cyprinus carpio L.): Neurological and behavioural assessment. Aquac Eng 37, 171–179. https://doi.org/10.1016/j.aquaeng.2007.04.004

98. Lara, L.J., Rostagno, M.H., 2013. Impact of heat stress on poultry production. Animals 3, 356–369. https://doi.org/10.3390/ani3020356

99. Lines, J.A., Spence, J., 2014. Humane harvesting and slaughter of farmed fish. OIE Revue Scientifique et Technique 33, 255–264. https://doi.org/10.20506/rst.33.1.2284

100. Lines, J.A., Spence, J., 2012. Safeguarding the welfare of farmed fish at harvest. Fish Physiol Biochem 38, 153–162. https://doi.org/10.1007/s10695-011-9561-5

101. Loftus, L., Bell, G., Padmore, E., Atkinson, S., Henworth, A., Hoyle, M., 2020. The effect of two different farrowing systems on sow behaviour, and piglet behaviour, mortality and growth. Appl Anim Behav Sci 232, 105102. https://doi.org/10.1016/J.APPLANIM.2020.105102

102. López, R., de Pontual, H., Bertignac, M., Mahévas, S., 2015. What can exploratory modelling tell us about the ecobiology of European sea bass (Dicentrarchus labrax): A comprehensive overview. Aquat Living Resour 28, 61–79. https://doi.org/10.1051/alr/2015007

103. Malmsten, A., Lundeheim, N., Dalin, A.M., 2020. Dental disorders in sows from Swedish commercial herds. Acta Vet Scand 62. https://doi.org/10.1186/s13028-020-00521-7

104. Mancinelli, E., Keeble, E., Richardson, J., Hedley, J., 2014. Husbandry risk factors associated with hock pododermatitis in UK pet rabbits (Oryctolagus cuniculus). Veterinary Record 174, 429. https://doi.org/10.1136/vr.101830

105. Manriquez, D., Poudevigne, G., Roche, E., Waret-Szkuta, A., 2022. Association between Head-to-Chest Circumference Ratio and Intrauterine Growth-Retardation Related Outcomes during Preweaning and Postweaning. Animals 2022, Vol. 12, Page 1562 12, 1562. https://doi.org/10.3390/ANI12121562

106. Marcé, C., Guatteo, R., Bareille, N., Fourichon, C., 2010. Dairy calf housing systems across Europe and risk for calf infectious diseases. Animal 4, 1588–1596. https://doi.org/10.1017/S1751731110000650

107. Marchant, J.N., Broom, D.M., 1996. Effects of dry sow housing conditions on muscle weight and bone strength. Animal Science 62, 105–113. https://doi.org/10.1017/S1357729800014387

108. Marchewka, J., Watanabe, T.T.N., Ferrante, V., Estevez, I., 2013. Welfare assessment in broiler farms: Transect walks versus individual scoring. Poult Sci 92, 2588–2599. https://doi.org/10.3382/ps.2013-03229

109. Marino, B.L., Colvin, C.M., 2015. Thinking Pigs: A Comparative Review of Cognition, Emotion, and Personality in Sus domesticus. Int J Comp Psychol 28, 0–22.

110. Marino, L., 2017. Thinking chickens: a review of cognition, emotion, and behavior in the domestic chicken. Anim Cogn. https://doi.org/10.1007/s10071-016-1064-4

111. Martins, C.I.M., Galhardo, L., Noble, C., Damsgård, B., Spedicato, M.T., Zupa, W., Beauchaud, M., Kulczykowska, E., Massabuau, J.C., Carter, T., Planellas, S.R., Kristiansen, T., 2012. Behavioural indicators of welfare in farmed fish. Fish Physiol Biochem 38, 17–41. https://doi.org/10.1007/s10695-011-9518-8

112. Matics, Z., Szendrő, Z., Radnai, I., Biró-Németh, E., Gyovai, M., 2003. Examination of Free Choice of Rabbits among Different Cage-floors. Agriculturae Conspectus Scientificus 265–268.

113. McCormick, M.I., 1999. Experimental test of the effect of maternal hormones on larval quality of a coral reef fish. Oecologia 118, 412–422. https://doi.org/10.1007/s004420050743

114. Mintline, E.M., Stewart, M., Rogers, A.R., Cox, N.R., Verkerk, G. a., Stookey, J.M., Webster, J.R., Tucker, C.B., 2013. Play behavior as an indicator of animal welfare: Disbudding in dairy calves. Appl Anim Behav Sci 144, 22–30. https://doi.org/10.1016/j.applanim.2012.12.008

115. Mugnai, C., Dal Bosco, A., Castellini, C., 2009. Effect of different rearing systems and pre-kindling handling on behaviour and performance of rabbit does. Appl Anim Behav Sci 118, 91–100. https://doi.org/10.1016/j.applanim.2009.02.007

116. Muscat, A., de Olde, E.M., de Boer, I.J.M., Ripoll-Bosch, R., 2020. The battle for biomass: A systematic review of food-feed-fuel competition. Glob Food Sec 25, 100330. https://doi.org/10.1016/J.GFS.2019.100330

117. Nalon, E., Stevenson, P., 2019. Protection of dairy cattle in the EU: State of play and directions for policymaking from a legal and animal advocacy perspective. Animals 9, 1066. https://doi.org/10.3390/ani9121066

118. Nuffel, A., Zwertvaegher, I., Pluym, L., Stephanie Van Weyenberg, V.T., Pastell, M., Sonck, B., Saeys, W., 2015. Lameness Detection in Dairy Cows: Part 1. How to Distinguish between Non-Lame and Lame Cows Based on Differences in Locomotion or Behavior. Animals 5, 838–860. https://doi.org/10.3390/ani5030387

119. Nunan, C., 2022. Ending routine farm antibiotic use in Europe. Achieving responsible farm antibiotic use through improving animal health and welfare in pig and poultry production.

120. O'Malley, C.I., Wurtz, K.E., Steibel, J.P., Bates, R.O., Ernst, C.W., Siegford, J.M., 2018. Relationships among aggressiveness, fearfulness and response to humans in finisher pigs. Appl Anim Behav Sci 205, 194–201. https://doi.org/10.1016/j.applanim.2018.03.001

121. Paci, G., Zotte, A.D., Cecchi, F., de Marco, M., Schiavone, A., 2014. The effect of organic vs. conventional rearing system on performance, Carcass traits and meat quality of fast and slow growing rabbits. Anim Sci Pap Rep 32, 337–349.

122. Pellerin, D., Barkema, H.W., Haley, D.B., Solano, L., Vasseur, E., Zaffino Heyerhoff, J.C., LeBlanc, S.J., Nash, C.G.R., Pajor, E.A., Mason, S., Orsel, K., Rushen, J., de Passillé, A.M., 2015. Prevalence of lameness and associated risk factors in Canadian Holstein-Friesian cows housed in freestall barns. J Dairy Sci 98, 6978–6991. https://doi.org/10.3168/jds.2015-9652

123. Peltoniemi, O., Yun, J., Björkman, S., Han, T., 2021. Coping with large litters: The management of neonatal piglets and sow reproduction. J Anim Sci Technol. https://doi.org/10.5187/JAST.2021.E3

124. Pepperberg, I.M., 2006. Grey parrot numerical competence: A review. Anim Cogn 9, 377–391. https://doi.org/10.1007/S10071-006-0034-7

125. Pinheiro, V., Monteiro, D., 2012. GROWTH PERFORMANCES AND BEHAVIOR OF GROWING RABBITS HOUSED ON CAGES, CLOSED PARKS OR OPEN-AIR SYSTEM, in: Proceedings 10th World Rabbit Congress – September 3 - 6, 2012– Sharm El- Sheikh – Egypt,1097-1100. pp. 1097–1100.

126. Poli, B.M., Parisi, G., Scappini, F., Zampacavallo, G., 2005. Fish welfare and quality as affected by pre-slaughter and slaughter management. Aquaculture International 13, 29–49. https://doi.org/10.1007/s10499-004-9035-1

127. Popescu, S., Borda, C., Diugan, E.A., Niculae, M., Stefan, R., Sandru, C.D., 2014. The effect of the housing system on the welfare quality of dairy cow. Ital J Anim Sci 13, 15–22. https://doi.org/10.4081/ijas.2014.2940

128. Popescu, S., Borda, C., Diugan, E.A., Spinu, M., Groza, I.S., Sandru, C.D., 2013. Dairy cows welfare quality in tie-stall housing system with or without access to exercise. Acta Vet Scand 55, 43. https://doi.org/10.1186/1751-0147-55-43

129. Princz, Z., Dalle Zotte, A., Radnai, I., Bíró-Németh, E., Matics, Z., Gerencsér, Z., Nagy, I., Szendro, Z., 2008. Behaviour of growing rabbits under various housing conditions. Appl Anim Behav Sci 111, 342–356. https://doi.org/10.1016/j.applanim.2007.06.013

130. Raj, A.B.M., 2006. Recent developments in stunning and slaughter of poultry. Worlds Poult Sci J 62, 467. https://doi.org/10.1017/s0043933906001097

131. Raj, A.B.M.M., Gregory, N.G., 1996. Welfare Implications of the Gas Stunning of Pigs 2. Stress of Induction of Anaesthesia. Animal welfare 5, 71–78.

132. RAWECOH, 2016. Development and testing of an animal-friendly and environmentally friendly, innovative husbandry system for fattening and breeding in practice conditions.

133. Renema, R.A., Rustad, M.E., Robinson, F.E., 2007. Implications of changes to commercial broiler and broiler breeder body weight targets over the past 30 years. Worlds Poult Sci J 63, 457–472. https://doi.org/10.1017/S0043933907001572

134. Robb, D., Wotton, S., ... J.M.-V., 2000, undefined, 2000. Commercial slaughter methods used on Atlantic salmon: determination of the onset of brain failure by electroencephalography. Wiley Online Library 147, 298–303. https://doi.org/10.1136/vr.147.11.298

135. Rodríguez, P., Dalmau, A., Ruiz-de-la-Torre, J.L., Manteca, X., Jensen, E.W., Rodríguez, B., Litvan, H., Velarde, A., 2008. Assessment of unconsciousness during carbon dioxide stunning in pigs. Animal Welfare 17, 341–349.

136. Rosengren, M., Kvingedal, E., Näslund, J., Johnsson, J.I., Sundell, K., 2016. Born to be wild: effects of rearing density and environmental enrichment on stress, welfare, and smolt migration in hatchery-reared Atlantic salmon. Canadian Journal of Fisheries and Aquatic Sciences 74, 396–405. https://doi.org/10.1139/cjfas-2015-0515

137. Rosvold, E.M., Newberry, R.C., Framstad, T., Andersen, I.L., 2018. Nest-building behaviour and activity budgets of sows provided with different materials. Appl Anim Behav Sci 200, 36–44. https://doi.org/10.1016/j.applanim.2017.12.003

138. Rugani, R., Regolin, L., Vallortigara, G., 2010. Imprinted numbers: newborn chicks' sensitivity to number vs. continuous extent of objects they have been reared with. Dev Sci 13, 790–797. https://doi.org/10.1111/j.1467-7687.2009.00936.x

139. Rugani, R., Regolin, L., Vallortigara, G., 2008. Discrimination of small numerosities in young chicks. J Exp Psychol Anim Behav Process 34, 388–399. https://doi.org/10.1037/0097-7403.34.3.388

140. Rutten, M., Leterrier, C., Constantin, P., Reiter, K., Bessei, W., 2002. Bone development and activity in chickens in response to reduced weight-load on legs. animres.edpsciences.org 51, 327–336. https://doi.org/10.1051/animres:2002027

141. Sampaio, F.D.F., Freire, C.A., 2016. An overview of stress physiology of fish transport: changes in water quality as a function of transport duration. Fish and Fisheries 17, 1055–1072. https://doi.org/10.1111/FAF.12158

142. Sanotra, G.S., Lund, J.D., Ersbøll, A.K., Petersen, J.S., Vestergaard, K.S., 2001. Monitoring leg problems in broilers: A survey of commercial broiler production in Denmark. Worlds Poult Sci J 57, 66–69. https://doi.org/10.1079/wps20010006

143. Saraiva, J.L., Arechavala-Lopez, P., Cabrera-Álvarez, M.J., Waley, D., 2021. Research for ANIT Committee - Particular welfare needs in animal transport: aquatic animals, Policy Department for Structural and Cohesion Policies. Brussels.

144. Schütz, K.E., Cox, N.R., 2014. Effects of short-term repeated exposure to different flooring surfaces on the behavior and physiology of dairy cattle. J Dairy Sci 97, 2753–2762. https://doi.org/10.3168/jds.2013-7310

145. Segner, H., Sundh, H., Buchmann, K., Douxfils, J., Sundell, K.S., Mathieu, C., Ruane, N., Jutfelt, F., Toften, H., Vaughan, L., 2012. Health of farmed fish: Its relation to fish welfare and its utility as welfare indicator. Fish Physiol Biochem 38, 85–105. https://doi.org/10.1007/s10695-011-9517-9

146. Siddiqui, M., Patil, M., Khan, K., ... L.K.-V., 2009, undefined, 2009. Sudden death syndrome–an overview. veterinaryworld.org 2.

147. Signoret, J.P., Baldwin, B.A., Fraser, D., Hafez, E.S.E., 1975. The behaviour of swine, in: Hafez, E. (Ed.), Behaviour of Domestic Animals. Baillière Tindall, London, pp. 295–329.

148. Singh, C., Verdon, M., Cronin, G.M., Hemsworth, P.H., 2017. The behaviour and welfare of sows and piglets in farrowing crates or lactation pens. Animal 11, 1210–1221. https://doi.org/10.1017/S1751731116002573

149. Somers, J., O'Grady, L., 2015. Foot lesions in lame cows on 10 dairy farms in Ireland. Ir Vet J 68, 1–7. https://doi.org/10.1186/s13620-015-0039-0

150. Stafford, K.J., Mellor, D.J., 2011. Addressing the pain associated with disbudding and dehorning in cattle. Appl Anim Behav Sci 135, 226–231. https://doi.org/10.1016/j.applanim.2011.10.018

151. Steiner, A.R., Flammer, S.A., Beausoleil, N.J., Berg, C., Bettschart-Wolfensberger, R., Pinillos, R.G., Golledge, H.D.W., Marahrens, M., Meyer, R., Schnitzer, T., Toscano, M.J., Turner, P. V, Weary, D.M., Gent, T.C., 2019. Humanely ending the life of animals: Research priorities to identify alternatives to carbon dioxide. Animals 9, 911. https://doi.org/10.3390/ani9110911

152. Stilwell, G., de Carvalho, R.C., Lima, M.S., Broom, D.M., 2009. Effect of caustic paste disbudding, using local anaesthesia with and without analgesia, on behaviour and cortisol of calves. Appl Anim Behav Sci 116, 35–44. https://doi.org/10.1016/j.applanim.2008.06.008

153. Stilwell, G., Lima, M.S., Broom, D.M., 2008. Comparing plasma cortisol and behaviour of calves dehorned with caustic paste after non-steroidal-anti-inflammatory analgesia. Livest Sci 119, 63–69. https://doi.org/10.1016/j.livsci.2008.02.013

154. Stilwell, G., Lima, M.S., Carvalho, R.C., Broom, D.M., 2012. Effects of hot-iron disbudding, using regional anaesthesia with and without carprofen, on cortisol and behaviour of calves. Res Vet Sci 92, 338–341. https://doi.org/10.1016/j.rvsc.2011.02.005

155. Stolba, A., Wood-Gush, D.G.M., 1989. The behaviour of pigs in a semi-natural environment. Anim Prod 48, 419–425. https://doi.org/10.1017/S0003356100040411

156. Swinkels, J.M., Hilkens, A., Zoche-Holob, V., Kromker, V., Buddiger, M., Jansen, J., Lam, T., 2015. Social influences on the duration of antibiotic treatment of clinical mastitis in dairy cows. J Dairy Sci 98, 2369–2380. https://doi.org/10.3168/jds.2014-8488

157. Szendro, Z., Dalle Zotte, A., 2011. Effect of housing conditions on production and behaviour of growing meat rabbits: A review. Livest Sci 137, 296–303. https://doi.org/10.1016/J.LIVSCI.2010.11.012

158. Szendrő, Z.S., Trocino, A., Hoy, S.T., Xiccato, G., Villagrá, A., Maertens, L., 2019. A review of recent research outcomes on the housing of farmed domestic rabbits: Reproducing DOEs. World Rabbit Science 27, 1–14. https://doi.org/10.4995/wrs.2019.10599

159. Tahamtani, F.M., Hinrichsen, L.K., Riber, A.B., 2018. Welfare assessment of conventional and organic broilers in Denmark, with emphasis on leg health. Veterinary Record 183, 192. https://doi.org/10.1136/vr.104817

160. Tallentire, C.W., Leinonen, I., Kyriazakis, I., 2018. Artificial selection for improved energy efficiency is reaching its limits in broiler chickens. Sci Rep 8, 1–11. https://doi.org/10.1038/s41598-018-19231-2

161. Terlouw, C., Bourguet, C., Deiss, V., 2016. Consciousness, unconsciousness and death in the context of slaughter. Part I. Neurobiological mechanisms underlying stunning and killing. Meat Sci 118, 133–146. https://doi.org/10.1016/j.meatsci.2016.03.011

162. Thorstad, E.B., Økland, F., Aarestrup, K., Heggberget, T.G., 2008. Factors affecting the within-river spawning migration of Atlantic salmon, with emphasis on human impacts. Rev Fish Biol Fish 18, 345–371. https://doi.org/10.1007/s11160-007-9076-4

163. Tilston, V.L., Gentle, M.J., 2000. Nococeptors in the legs of polutry: implications for the potential pain in pre-slaughter shackling. Animal Welfare 9, 227–236.

164. Torrey, S., Mohammadigheisar, M., Nascimento dos Santos, M., Rothschild, D., Dawson, L.C., Liu, Z., Kiarie, E.G., Edwards, A.M., Mandell, I., Karrow, N., Tulpan, D., Widowski, T.M., 2021. In pursuit of a better broiler: growth, efficiency, and mortality of 16 strains of broiler chickens. Poult Sci 100, 100955. https://doi.org/10.1016/j.psj.2020.12.052

165. Trocino, A., Xiccato, G., 2006. Animal welfare in reared rabbits: A review with emphasis on housing systems. World Rabbit Science 14, 77–93.

166. Tsiouris, V., Georgopoulou, I., Batzios, C., Pappaioannou, N., Ducatelle, R., Fortomaris, P., 2015. High stocking density as a predisposing factor for necrotic enteritis in broiler chicks. Avian Pathology 44, 59–66. https://doi.org/10.1080/03079457.2014.1000820

167. Tucker, C.B., Lacy-Hulbert, S.J., Webster, J.R., 2009. Effect of milking frequency and feeding level before and after dry off on dairy cattle behavior and udder characteristics. J Dairy Sci 92, 3194–3203. https://doi.org/10.3168/jds.2008-1930

168. Ude, G., Georg, H., Schwalm, a., 2011. Reducing milk induced cross-sucking of group housed calves by an environmentally enriched post feeding area. Livest Sci 138, 293–298. https://doi.org/10.1016/j.livsci.2010.12.004

169. Vallortigara, G., Regolin, L., Chiandetti, C., Rugani, R., 2010. Rudiments of mind: Insights through the chick model on number and space cognition in animals. Comp Cogn Behav Rev 5, 78–99. https://doi.org/10.3819/ccbr.2010.50004

170. van de Vis, H., Kestin, S., Robb, D., Oehlenschläger, J., Lambooij, B., Münkner, W., Kuhlmann, H., Kloosterboer, K., Tejada, M., Huidobro, A., Otterå, H., Roth, B., Sørensen, N.K., Akse, L., Byrne, H., Nesvadba, P., 2003. Is humane slaughter of fish possible for industry? Aquac Res 34, 211–220. https://doi.org/10.1046/J.1365-2109.2003.00804.X

171. van de Vis, H., Kolarevic, J., Stilen, L., Kristiansen, T., 2020. Welfare of farmed fish in different production systems and operations, in: The Welfare of Fish. Springer, pp. 323–361.

172. Verheijen, F.J., Flight, W.F.G., 1997. Decapitation and brining: experimental tests show that after these commercial methods for slaughtering eel Anguilla anguilla (L.), death is not instantaneous. Aquac Res 28, 361–366. https://doi.org/10.1046/J.1365-2109.1997.T01-1-00866.X

173. Verhoeven, M., Gerritzen, M., Velarde, A., Hellebrekers, L., Kemp, B., 2016. Time to loss of consciousness and its relation to behavior in slaughter pigs during stunning with 80 or 95% carbon dioxide. Front Vet Sci 3. https://doi.org/10.3389/fvets.2016.00038

174. Von Keyserlingk, M.A.G., Amorim Cestari, A., Franks, B., Fregonesi, J.A., Weary, D.M., 2017. Dairy cows value access to pasture as highly as fresh feed. Sci Rep 7, 1–4. https://doi.org/10.1038/srep44953

175. Wall, A.J., 2001. Ethical considerations in the handling and slaughter of farmed fish, in: Farmed Fish Quality. pp. 108–119.

176. Ward, S.A., Kirkwood, R.N., Plush, K.J., 2020. Are larger litters a concern for piglet survival or an effectively manageable trait? Animals. https://doi.org/10.3390/ani10020309

177. Weary, D., Chua, B., 2000. Effects of early separation on the dairy cow and calf: 1. Separation at 6 h, 1 day and 4 days after birth. Appl Anim Behav Sci 69, 177–188. https://doi.org/10.1016/S0168-1591(00)00128-3

178. Weber, R., Keil, N.M., Fehr, M., Horat, R., 2007. Piglet mortality on farms using farrowing systems with or without crates. Animal Welfare 16, 277–279.

179. Wechsler, B., Hegglin, D., 1997. Individual differences in the behaviour of sows at the nest-site and the crushing of piglets. Appl Anim Behav Sci 51, 39–49. https://doi.org/10.1016/S0168-1591(96)01098-2

180. Wechsler, B., Weber, R., 2007. Loose farrowing systems: Challenges and solutions. Animal Welfare.

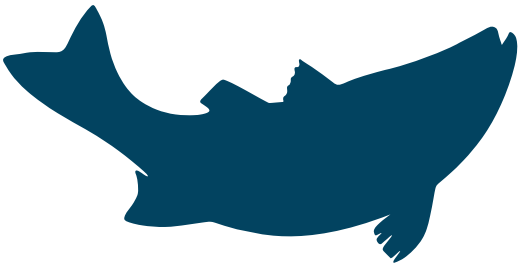
181. Wischner, D., Kemper, N., Krieter, J., 2009. Nest-building behaviour in sows and consequences for pig husbandry. Livest Sci 124, 1–8. https://doi.org/10.1016/j.livsci.2009.01.015

182. Yi, R., Zhang, R., Liu, H., Li, X., Bao, J., 2020. PSV-21 The behavior, physiology and immunity of pregnant sows housed in individual crate with different frequency of sham-chewing. J Anim Sci 98, 223–224. https://doi.org/10.1093/JAS/SKAA278.411

183. Yun, J., Swan, K.M., Vienola, K., Farmer, C., Oliviero, C., Peltoniemi, O., Valros, A., 2013. Nest-building in sows: Effects of farrowing housing on hormonal modulation of maternal characteristics. Appl Anim Behav Sci 148, 77–84. https://doi.org/10.1016/j.applanim.2013.07.010

184. Yun, J., Swan, K.M., Vienola, K., Kim, Y.Y., Oliviero, C., Peltoniemi, O.A.T., Valros, A., 2014. Farrowing environment has an impact on sow metabolic status and piglet colostrum intake in early lactation. Livest Sci 163, 120–125. https://doi.org/10.1016/j.livsci.2014.02.014

185. Zimmerman, P.H., Buijs, S.A.F., Bolhuis, J.E., Keeling, L.J., 2011. Behaviour of domestic fowl in anticipation of positive and negative stimuli. Anim Behav 81, 569–577. https://doi.org/10.1016/j.anbehav.2010.11.028



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