



Different aspects of handling and the impact of human-handling on dairy animals

Shwetambri Jamwal¹ • Pawan Singh² • Rajneesh Thakur^{3*}

¹Ph.D. Scholar, Livestock Production Management Section, National dairy research institute (NDRI), Karnal

²Principal Scientist, Livestock Production Management Section, National dairy research institute (NDRI), Karnal

³Ph.D. Scholar, Livestock Production Management Section, Indian veterinary research institute (IVRI), Bareilly

ARTICLE INFO

Article history:

Received: 08 June, 2022

Revision: 21 July, 2022

Accepted: 03 August, 2022

Key words: Behaviour; Handling; Human-animal; Skills; Welfare.

DOI: 10.56678/iahf-spl2022.9

ABSTRACT

Professional animal handling necessitates a thorough understanding of animal behaviour. Satisfactory knowledge of an animal's behaviour in a circumstance can benefit both the handler and the animal, which is a prerequisite for the smooth conduct of routine farm activities. Improper animal handling causes a stressed condition in the animal, limiting its performance. The amount and kind of interaction with people, as well as the quality of the animal's handling, are significant determinants in animal handling. Adequate animal handling skills may enhance handler safety, reduce labour requirement, raise productivity, reproductive performance, and encourage overall animal welfare.

1. Introduction

One of the most prominent issues in dairy farming is the pain and tension produced to both the animal and the handler while handling an animal. The degree of connection or distance maintained between humans and animals is referred to as the human-animal relationship. It is essentially the perspective generated for its counterpart that is manifested in their behaviour (Waiblinger et al., 2006). With recent advancements in animal welfare, studies are being conducted to investigate humane techniques for the well-being of both animals and humans. The amount of association and connection between human and animal is significant since the development of fear in an animal is an effect of the handler's attitude and behaviour toward the animal, which in turn impacts the animal's productivity and wellbeing (Hemsworth, 2003). Animal handling is required for many everyday operations on a dairy farm, from receiving an animal to moving them for daily chores such as weighing, grooming, health care, cleaning their enclosure, and restricting them for close observation. All of an animal's fundamental needs, such as food, water, shelter, and degree of comfort, must be addressed while keeping an animal in a farm, because all of these elements impact the animal, which in turn affects the animal's state. Being a master of livestock handling necessitates understanding of cattle behaviour as well as adequate access to farm resources. Farm workers are

frequently injured by animals stepping on, knocking down, or kicking them while handling, and poor handling knowledge can negatively affect an animal's performance, and mishandling of an animal has the potential to limit the animal's ability to fight disease and reduce its weight gain (Langle and Morrow, 2010). Handlers must understand animal's behaviour in order to decrease stress in both the animal and the handlers.

Identifying the animal's flight zone

The principle of flight zone was initially described in wild animals (Hedigar, 1968). It was later detailed in cattle by Grandin (1980a) for a better understanding of animal handling procedures. The flight zone is modelled after an animal's personal area. A comprehensive understanding of this zone is required for the handlers on a dairy farm to easily handle the animals. The size of the zone of flight varies per species, with highly agitated animals having a larger zone of flight and placid and taught animals having a smaller zone of flight (Price, 1984). Several factors influence this zone in an animal, including the degree of wildness, the animal's arousal level, and the angle at which the handler approaches the animal. When a person enters an animal's flight zone, the animal will retreat and move away in fear, but when the person entering makes a movement away from the flight zone, the amount of fear in the animal decreases and any

*Corresponding author: rajneesh.vet.995995@gmail.com

movement away by the animal is stopped. Since the size of the flight zone expands when the handler moves quickly towards the animals, the handler should retreat when the animal panics and begins moving quickly (Kosako et al., 2008). When handling an animal, it is critical to understand how, when, and where to enter the animal's flight zone. To preserve animal composure and to move an animal in the intended direction of the handler, it is critical that the handler not be too near to cause an animal to panic, but rather that the handler be in a range where the animal can see the handler and progress in a direction.

An animal's point of balance

The most important behavioural factors for animal management are the flight zone and the point of balance (Grandin, 2017). Professional handlers with expertise and experience use the point of balance to move the animals. This point is located behind the shoulder when viewed from the side of an animal and in the centre of the head when viewed from the front (Figure-1). The handler determines an animal's posture for movement based on the animal's point of balance (Kilgour and Dalton, 1984). When the handler is situated behind the point of balance, the animal will move forward; similarly, when the handler is near the head of an animal and in front of the point of balance, the animal will go backward (Grandin, 2007). The person handling the animal should be placed at an angle of 45–60° when a line is drawn perpendicular to the animal's shoulder for the optimum mobility.

An efficient method of managing cattle in a herd

When dealing with a mob of cattle, the mustering procedure is critical, since it includes bringing all of the animals together. It is critical to understand the flight zone when animals are brought together in order to move a herd of cattle gently. The group of animals has a collective flight zone when driving a mob (Grandin, 2014). By alternately infiltrating and receding from the flight zone, the needed pressure on animals is maintained, and the movement of the mob of animals is progressed in the desired direction (Figure-2).

What do cattle think about the world?

When working with cattle, it is critical to understand how the animal perceives the surroundings and the region around them. Cattle have wide-angle vision, which aids them in moving together in a herd while protecting them from any danger and predators (Prince, 1977). Cattle have a high sense of light due to a greater number of rods in the eyes and a crystalline kind of lens, but they have a poor awareness of details and take longer to focus (Dimberton, 1999). Since they are particularly sensitive to visual distraction, their movement is frequently impeded, and elimination of distractions has been observed to expedite easy movement of animals and lessen restlessness in cattle if a solid barrier is established between the animal and the handling person (Muller et al., 2008). Cattle are described as having dichromatic vision, which means that they do not recognise the colour red (Carroll et al., 2007). There have been studies

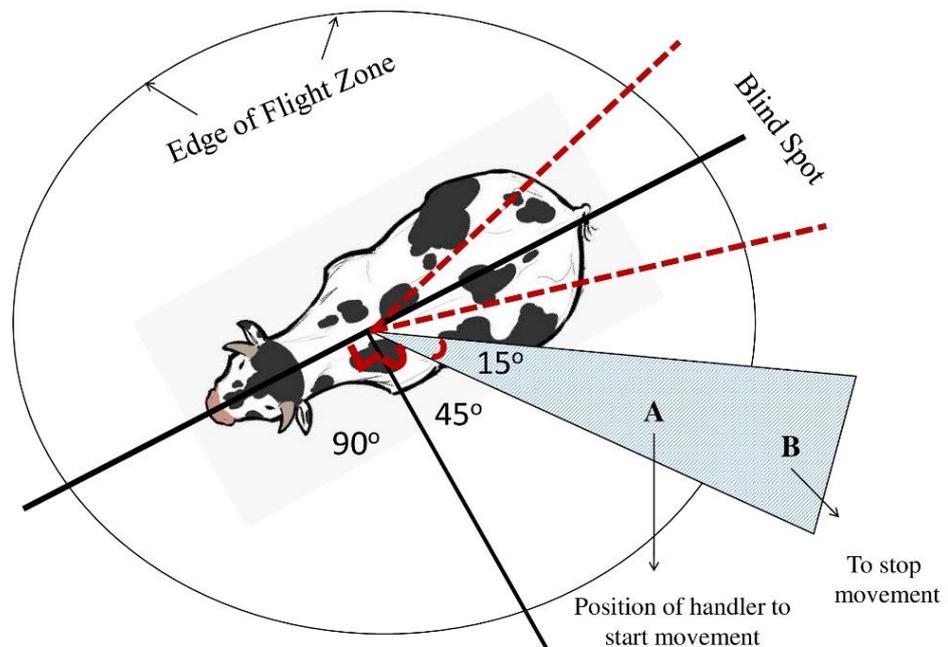


Figure 1. Illustration of the flight zone and point of balance, as well as the right location of the handler (adapted from Grandin, 2014)

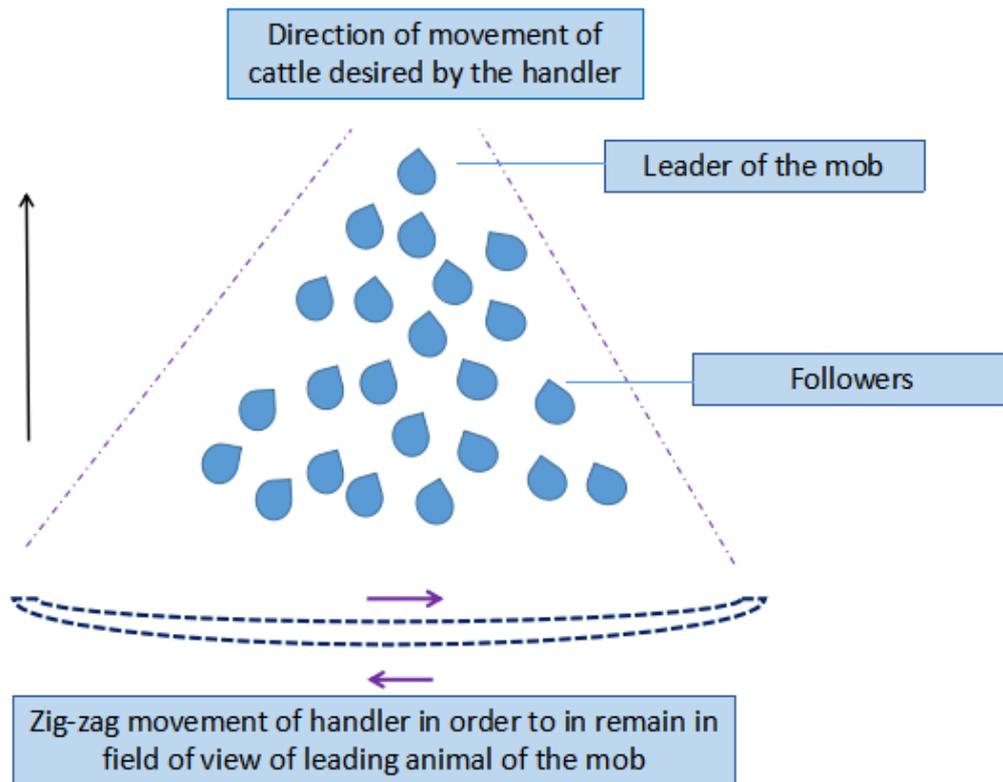


Figure-2: The handler's representation of moving cattle in a mob.

that show a shift in the field of vision in animals when the amount of stress changes, as well as the use of visual sense by the animals in communication amongst themselves (Rehkamper and Gorchach, 1997). The primary mode of communication is through various head postures, body movement, and tail movements (Schloeth, 1958; Kondo and Hurnik, 1988; Phillips, 1993; Hall, 2002; Albright and Arave, 1997). The animal's raising of the tail indicates a potential threat and serves as a warning to other animals in the herd (Kiley Worthington, 1976). The treatment given to the animal by the handler has been observed to alter the animal's impression of humans. The animals that were handled by an aggressive person were becoming anxious in their normal operation of milking and difficult to control (Breuer et al., 2000).

Do auditory stimuli influence cow behaviour?

Cattle have acute hearing and can detect noises that humans cannot hear (Delpietro, 1989). This sensitivity aids them in identifying animals of their species and detecting any danger or predator (Heffner, 1998). There have been reports of sound sensitivity varying with age, with heifer and bull calves reacting faster to a novel stimulus than cows and bulls (Lanier et al., 2000). In addition, human handling methods are indicated to have an impact on animal welfare. In one research, animals who were screamed at by their handlers had a considerable rise in their heart rate, which was greater than

the sound caused by gates slamming (Waynert et al., 1999). Cattle dislike being yelled at more than being struck, and yelling is as unpleasant as using an electric pod on them (Pajor et al., 2003). Normal conversation with animals, on the other hand, has no influence on them, but any shift in tone might induce changes in the animal's behaviour (Hemsworth et al., 2011). As a result, understanding animal behaviour is essential for effective human handling since any unintentional noise or quick movement might startle the animals (Lanier et al., 2000).

The effect of the handler's physical touch on the animals

Cattle are sensitive to touch and if the handler is not in the field vision of the animal, it might provoke undesired behaviours and can create bad outcomes. Human-animal interaction and behaviour can be classified as good or negative, and this contact can have an impact on the human-animal connection (Krohn et al., 2003). Positive animal engagement provides a mild and pleasurable effect via patting, petting, and rewarding the animal. Calves who had additional positive tactile contact during feeding, such as stroking and offering fingers for sucking, were easier to approach by handlers than calves that were routinely fed (Lensink et al., 2000). According to Rushen et al. (2001) and Waiblinger et al. (2004), human petting of cows during isolation reduces fear and heart rate. Negative animal interaction involves stressful contact that is unpleasant and

disagreeable, such as applying an electric charge, beating, punching, or shoving animals (Boivin et al., 2003). This type of encounter causes animals to be more fearful of humans (Breuer et al., 2000). When compared to being beaten and pushed, the use of an electric charge is the most frightening approach (Pajor et al., 2000; Pajor et al., 2003).

The effect of the handler's attitude on the animal

There is a connection between animals and several things in a farm. Whereas an animal's physiological stress level is impacted by lactation state, cow parity, herd size, feeding space, laying space, milking method, and stock person's attitude toward an animal. A major contributing factor that affects the physiological state of an animal from many animal and farm factors is stock person attitude that is affected by human-animal contact, duration of time spent with per cow, habituation of animal to being handled by human, which eventually affects animal behaviour towards human (Ebinghaus et al., 2020). There have been studies that link the handler's attitude toward the animal with the animal's behaviour as measured by avoidance distances from the handler (Ebinghaus et al., 2018). Cows are said to be less afraid in the presence of humans who treat them well (Hemsworth et al., 1989). Fearful animals have been shown to have lower milk ejection and yield, poor udder health, and a lower conception rate (Ivemeyer et al., 2018). When compared to control calves, the calves given positive handling treatment of stroking and gentle speaking before and after an isolation test had lower levels of cortisol in their saliva (Lurzel et al., 2015). The level of cortisol in the vicinity of humans is affected by gentle and harsh handling (Breuer et al., 2003).

The effect of the handler's mishandling treatment on the animal

The main reason for the development of dissatisfaction and fear in animals towards humans is that some techniques of handling are regarded unpleasant, which affects the degree of production in the animals as well as the danger of damage to the animals and the person handling the animal (Hemsworth and Coleman, 2010). Various mistreatment strategies have been utilised in cattle based on the assumption that the animals would avoid treatments that they perceive to be disagreeable (Schwartzkopf-Genswein et al., 1997). Though little is known regarding cow-unfavorable handling methods, it is widely established in literature that cattle tend to avoid an unpleasant handler and do not appreciate being handled by them (Rushen et al., 1999). Furthermore, it has been widely observed that cattle avoid being handled by workers that employ unpleasant tactics such as striking (Munksgaard et al., 1997). Positive handling and fear reduction have also been documented in cases when animals prefer and approach

workers who supply feed and feed them (Jago et al., 1999). Gentle handling of animals by handlers, including regular petting, grooming, and brushing, reduces the animals' fear of humans and makes humane cattle handling easier (de Passille et al., 1996). Brushing animals has been reported to be more aversive than providing food or providing no treatment at all, which is thought to be due to animals' habituation to being brushed in every trial (Pajor et al., 2000). Furthermore, being used to a method is seen to be a more important factor in an animal's acceptance than positive reinforcement (Boivin et al., 1998). Many studies have found that animals who utilise an electric prod for handling avoid their handlers (Pajor et al., 2000). Being yelled at is another unpleasant treatment that has been shown to raise heart rate and activity in animals (Waynert et al., 1999). Twisting an animal's tail is also regarded an unpleasant form of handling, however it is considered a minimally aversive approach in contrast to other aversive means of handling, such as screaming, striking, and using electric prods (Pajor et al., 2000). When cattle are struck, their flight zone expands, causing them to defecate more often and urinate more frequently (Rushen et al., 1999). As a result, it is critical to understand which handling treatments are regarded disagreeable by the animal, and assessing the level of aversiveness is critical to reducing fear and resistance in animals.

The effect of animal handling style on performance

One of the biggest consequences of animal mistreatment that impacts output level and animal wellbeing is stress (Albright and Arave, 1997). Cattle that are handled roughly, have a higher degree of fear and handling difficulties, resulting in reduced milk production, but humane handling with correct knowledge of animal behaviour makes animal management easier with a lower level of fearfulness in them (Hemsworth et al., 1996). Cows that produce more milk are easy to access, have a low degree of anxiety, and are less prone to kick the milker when milking (Breuer et al., 2000). On the contrary, several research claim that milk output from cows is unrelated to animal accessibility (Purcell et al., 1988). Though hereditary reasons impact an animal's fear of humans, techniques of handling an animal also have a role in the development of fear of a handler (Rushen et al., 1999). Cattle are good discriminators, able to distinguish between aversive and gentle treatment, and quickly approach handlers that treat them well with soft handling (Munksgaard et al., 1997). Cows give more milk when milked by milkers they are not afraid of, as opposed to handlers with whom they have a frightened encounter (Seabrook, 1994). Cattle, it has been found, tend to associate rough handling experiences with fear and hence develop learnt fear (Hemsworth et al., 1996).

The effect of manner of handling on animal behaviour expression

It is difficult to care for animals that have been handled forcefully, and such animals have a greater level of fear as a consequence of poor human-animal interactions (Breuer et al., 2003). For the majority of farming operations on a dairy farm, constant interaction with humans is required. The type of encounter is significant since it can result in either a good or negative engagement. Negative interaction between animal and handler contributes to increased fear in animals, increased risk of injury to handler with more hours spent handling and managing animals, which eventually affects physiological state of an animal, whereas positive interaction does not affect animal welfare and makes animal management easier while handling animals (Schmied et al., 2008). An animal's production status is severely harmed if it is mismanaged, including unfavourable interactions with people such as being yelled at, being struck while being handled, and the use of specific equipment such as electric prods (Breuer et al., 2000). It has been discovered that calves that were given gentle care approached people more and avoided them less than calves that were not extensively touched by humans (Lensink et al., 2000a). There is a long-term influence of providing pleasant interaction to animals in their early stages of life on their response to humans, which affects an animal's performance (Boissy and Bouissou, 1988).

The effect of animal handling on an animal's reproductive condition

Cows must conceive throughout their breeding season for a herd to have a good breeding record and desired reproductive efficiency (Rae, 2006). It has been shown that animals with unstable and hyperactive temperaments have lower conception rates than beef cows with amiable temperaments (Cooke et al., 2011). With relevant information on indigenous *Bos indicus* cattle (Cooke et al., 2009a), getting used to being handled by humans has resulted in early puberty in heifers. Young and intensively raised *Bos taurus* cattle are likewise studied to have hyperactive temperament (Morris et al., 1994). Temperament in an animal has been linked to changed neuroendocrine mechanisms, which induce a shift in stress level and physiological condition, compromising reproductive health and function in an animal (Dobson et al., 2001). Regular handling of young animals, regardless of breed type, has been shown to promote animal temperament (Curley et al., 2006), underlining the relevance of appropriate human-handling in contributing to animal reproductive health.

Effect of physical activity on animal's performance

With changes in management approaches and a transition to intensive dairy farming, there is a greater need to give animals with a natural habitat to avoid any changes in their behaviour, since challenges with adaptation might occur as a result of an animal's behaviour (Gibbons et al., 2009). The animal's reaction in a circumstance is difficult to predict and can be frightening for both the animal and the handler, posing a significant risk of damage (Lindahl et al., 2016). Providing animals with a balanced habitat can influence their behaviour in a farming system. One such strategy may be to improve their capacity to express natural behaviour by providing them with access to an outdoor location (Wormsbecher et al., 2017). This is an essential mode of adaptation since it results in the development of rapid reflexes and a variety of behaviour in animals (Sackett et al., 1999). Animal exercise improves their welfare by providing them with extra behavioural advantages (Shepley et al., 2020). Animals are sensitive to handling methods, and inappropriate handling has a negative impact on their behaviour toward humans (Waiblinger et al., 2002). Animal conditioning via regular exercise can increase and improve the animals' quality of life (Spooner et al., 2014).

The significance of effective human-handling skills

Scientifically, animal wellbeing has been defined as the existing status of an animal (Keeling et al., 2011). The animal's response to any perceived threat is either conscious or unconscious, and it has an influence on the animal's condition (Carstens and Moberg, 2000). An animal's previous experiences influence its response to a stressful stimulus, and animals are more likely to adapt to a stressful stimulus that might impair its welfare (Ladewig, 2000). As a result, managing animals properly with better and expanded knowledge benefits both the animal and the handler, as it promotes human-animal safety, a lower level of stress, less labour requirements, greater reproductive efficiency, increased productivity, and improved animal welfare (Grandin, 2015).

Conclusion

A better understanding of animal handling by the handler is required for effective farm management and enhanced animal performance. As harsh techniques make animals fearful of humans, reducing the use of negative interactions can enhance animal wellbeing. To assist animals in maintaining their normal behaviour, a pleasant and familiar human-animal interaction must be established. Proper awareness of an animal's behaviour by the handler may help them change their attitude depending on the scenario, preventing stress for both the animal and the handler.

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