



Positive human to cattle interactions and the possibilities to increase animal welfare, economy and safety for farmers

Positiv interaktion mellan människa och nötkreatur och dess möjligheter att öka djurvälstånd, ekonomi och säkerhet för bönder

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Abstract

Cattle production systems are changing to bigger intensified systems with larger numbers of animals per farm and more free range systems while at the same time employing fewer people. Aversive handling has been known to affect cattle production negatively for many years, but lately scientists have started to focus more on what positive effects gentle handling and positive human-cattle interactions may have on beef and dairy production. Fear can cause high stress in production animals and this can contribute to not only reduced production within beef and dairy cattle, but also increased risks for accidents and decreased animal welfare. Therefore, by reducing the fear cattle experience of humans, it could be possible to increase production, decrease accidents and increase the welfare of the animals. Reducing the animals fear and stress can be done by simple means, such as walking and talking calmly around the cattle, associating humans to positive feelings (such as feed) and stroking the cattle's body regions associated with social grooming. Training programs for stock people to improve their behaviour and attitude towards the animals, as well as knowledge about how cattle behave, have also been successful to improve the work environment. The results from this review indicate that positive interactions between human and cattle have great impact in the areas of animal welfare, economy and safety for farmers and their cattle. Further research needs to focus on how to integrate positive human-cattle interactions in future production systems, especially with emphasis on training programs which reach out to the farmers and highlight the economical benefits.

Sammanfattning

Nötproduktionen förändras mot att bli större och intensivare, med fler djur, fler lösdriftssystem och färre anställda. Det har länge varit känt att negativ hantering av nötkreatur har påverkat mjölk- och köttproduktionen ofördelaktigt, men de senaste åren har forskare börjat fokusera mer på vilka fördelar positiv hantering och interaktion mellan människa och nötkreatur har på produktionen. Rädsla kan orsaka stress som inte bara bidrar till stora ekonomiska förluster inom kött och mjölkproduktion, utan även ökad risken för olyckor och minskad djurvälstånd. Därför, genom att minska rädslan som kon upplever, skulle det finnas möjlighet att förbättra produktionens inkomster. Det går att minska rädsla och stress med hjälp av enkla medel, så som att gå och prata lugnt runt korna, associera människor till positiva känslor (så som foder) och klappa korna på kroppsdelar som är associerade till positiv interaktion mellan nötkreatur. Träningsprogram där man förbättrar bönders beteende och attityd, såväl som lär ut kunskap om nötkreaturs beteenden, har även visats lyckade i att förbättra dessa områden. Resultaten i litteraturstudien indikerar att positiv interaktion ger stor positiv påverkan inom områdena djurvälstånd, ekonomi och säkerhet för bönder och deras nötkreatur. Framtida forskning behöver fokusera på hur man kan integrera positiv människa-nötkreatur interaktion i framtida produktionssystem, framförallt med tyngdpunkt på träningsprogram som når ut till bönder och understryker de ekonomiska fördelarna.

Introduction

Since the 1980's the total number of cows used for dairy production in Sweden has decreased by approximately 300 000 cows, which is a decline of about 50%. In the same period of time the number of cattle for beef production has tripled and consists today of a total of 197, 000 cattle (Swedish Board of Agriculture, 2011). The statistics show that the number of dairy farms with small herds decreases each year, while farms with large herds increases. This means fewer farms but more animals per farm (Swedish Dairy Association, 2012). The proposition for the new Swedish law of animal protection also proposes all cattle to be free-range in only a couple of years (New law of animal protection, 2011). These modern production systems save money in labor costs (Rushen et al., 1999; Boivin et al, 2003) but may need newer ways for the stock people and animals to interact with each other in positive situations. Feeding for example, that the dairy cattle used to associate with a positive human interaction, is to a high extent replaced with electronic feeders. The human animal interactions left in modern production systems include medication, vaccination, transport and foot care which are handling that the animals can perceive as aversive. This means that the animals may get mostly negative interactions with humans. These negative interactions, may not only lead to problems with the welfare of the animal, but can also reduce production and economy. This may also lead to an increased risk of accidents for animals and stock people. Positive interactions could instead improve all these areas (Rushen et al., 1999). This literature review is intended to highlight the effects of positive handling in cattle production on animal welfare, economy and human safety.

Animal welfare

Good animal welfare is today not only defined as the absence of negative experience, as much as the presence of positive (Boissy et al., 2007). The five freedoms are often used to assess good or bad animal welfare. The five freedoms are said to be freedom from: 1. Fear and stress 2. Thirst and hunger 3. Discomfort 4. Pain, and 5. Ability to express natural behavior (Farm animal welfare council, 1993). Numerous studies have shown that cattle handled aversively have reduced welfare (Rushen et al., 1999) and there is scientific evidence to show that more gentle handling in cattle production can improve animal welfare (Grandin, 1998c). Even the farmers or the stockpersons attitudes can have an effect on the welfare of the animals (Hemsworth, 2008).

Improving animal welfare by handling

A stressor that is considered to be very strong is fear (Grandin, 1997) and it is likely that a lot of the harmful effects of handling stressors associated with animal health and performance, are due to fear (Grandin, 1998c). When calves are raised with a lot of human contact, they have been shown to have lower cortisol levels; a hormone strongly associated to stress (Sjaastad et al., 2010) when restrained than calves that have been raised with less human contact (Boandl et al., 1989). If cattle are exposed to people in positive situations, they can by this experience, learn to be less fearful of people (Petherick et al., 2009a). For example, feeding can be utilized as a time where the farmer

interacts with their cattle in a positive situation. The cattle then associate the feeding as a reward related to the humans. However, the improvement might be limited to the location in which the positive situation (feeding) took place (Jago et al., 1999). Similar results, but not as effectively as using feed, can be achieved with cattle that are handled quietly and calmly (Grandin, 1998; Petherick et al., 2009a). Especially handling at a young age seems to have a substantial influence on the development of interactions between human and cattle (Jago et al., 1999). According to Munksgaard et al. (2011), cows that saw their neighbor cows being treated gently by a handler kept less distance to that handler afterwards. The cows also quickly learned to keep away from the handlers that were aversive in their handling. Schmied et al. (2008) showed that there were different effects depending on which regions of the body stock people were stroking the cattle. If stock people were stroking a body region commonly used for social grooming (such as the withers and ventral neck as seen in **Figure 1**), the acceptance of being touched by humans increased. If stroking the chest, which is not as commonly used in social grooming, the acceptance did not increase as much. The results of the stroking were long lasting, and were possible to distinguish several weeks past treatment. When working with dairy cattle, this handling could be used in everyday handling to improve the welfare of the cows (Schmied et al., 2008).

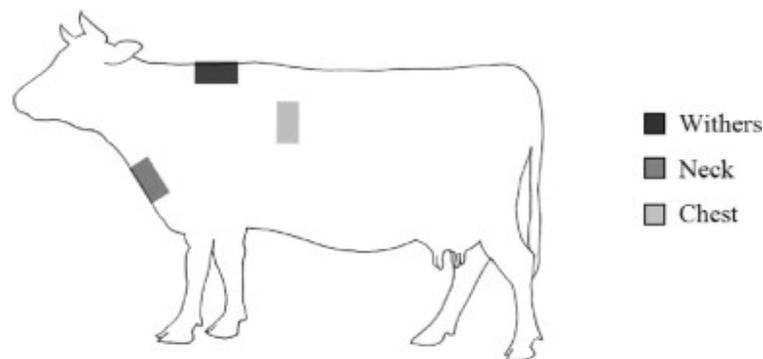


Figure 1. The three different body regions stroked to test the result in acceptance towards humans (Schmied et al., 2008).

Safety for animals and stock people

The problem with accidents in agriculture is worldwide and costs both money and suffering for the people involved. It is not only the people working at the farm that are facing risks, but also their family members. Handling of animals in livestock buildings stands for many of these accidents (Lundquist & Gustafsson, 1992). Handling may be more complicated and dangerous for both the farmers and animals when the animals are fearful towards their handlers (Rushen et al., 1999). By habituating animals to humans, the animals fear is reduced, which can lead to the benefit of decreased injury risk (Grandin, 1998c; Boivin et al., 2003; Waiblinger et al., 2004).

Safety benefits of handling

Breuer et al. (2000) found correlations that suggest restlessness during milking occurs in response to the stockperson. Restlessness behaviors such as kicking, stepping and flinching, were positively correlated with the speed of which the stockperson moved the cows, negative tactile interactions and loud harsh vocalization. In comparison there was a negative correlation between restlessness and use of quiet, soft vocalization when the stockperson was present. Waiblinger et al. (2004) saw that positive handling such as feeding concentrate by hand, talking to the cattle in a calm voice and stroking the cattle on the neck, reduced cattle kicking towards humans.

A study made by Becker and Labato (1997) showed scientific differences in aggression and escape behavior between handled and non handled calves. Calves not handled when young had a tendency to show more aggression towards the handler and tried to escape when handled. Similar results were shown in a study where they looked at aggressive behavior with non handled calves. When tested 8 months after the study, it took the calves that had not been handled, a longer time to be sorted from the group (Boivin et al., 1992). Lensink et al. (2000b) concluded that if calves had been exposed to gentle contact, they were less nervous and easier to move.

Prevention of accidents and safety working with cattle

Between the years 2004-2008, more than 300 accidents were reported to the Swedish Social Insurance Agency in Sweden involving cattle causing injuries to humans (Swedish Work Environment Authority, 2009). This is among the highest rates of accidents involving cattle in the world (Atkinson, 2012 personal communications) and every year fatal accidents with cattle are reported in Sweden. Unrecorded accidents associated with cattle are estimated to be high (Olsson, 2006) and some statistics suggest that accidents in agriculture might be as much as ten times the reported number (Pinzke & Lundqvist, 2006). Research identifies different methods for accident prevention to establish a safer environment in agriculture. For example, information and training for stock people and education for children at schools in rural areas (Lundquist & Gustafsson, 1992). Olsson (2006) concluded that it is important to spend time with the animals daily, to be calm, and to avoid stressing the animals. This gives a chance for a positive relationship between the humans and animals to develop.

Effect of handling on economy

Psychological and physiological stress can cause lost production on farms (Rushen et al., 1999). A majority of the animals stress originates from their fear of humans, which is to a high extent a result of handling that the animal perceives as aversive (Rushen et al., 1999). Gentle handling reduces stress (Petherick et al., 2009b; Waiblinger et al., 2004) and scientific results suggest that by changing from aversive to gentle handling techniques in the daily routines, production losses would decrease (Becker & Labato, 1997). Bertenshaw et al. (2008) concluded that on moral grounds, commercial farms should want to have good animal welfare standards, but it is often

easier to get commercial farms to improve their animal welfare standards if a financial gain can be shown.

Milk yield

Milk yield has been shown to be strongly correlated with the behaviour of stock people. When stock people used more neutral (moderate voice and body use) or aversive handling while milking, the milk yield was decreased (Waiblinger et al., 2002; Breuer, 2003). When positive handling was used, the residual milk (milk left in the udder after the cow has been milked) significantly decreased up to 70% (**Figure 2**) (Rushen et al., 1998). Breuer et al. (2000) found that besides milk yield, farms with cows that showed less approach to humans had a lower amount of both fat and protein in the milk. Breuer et al. (2000) also found when comparing farms, that restlessness in dairy cows was correlated to lower productivity. Farms with lower milk yield are suggested to have stockpersons acting more neutral and have less positive attitudes about interacting with the cows while being milked (Breuer, 2003).

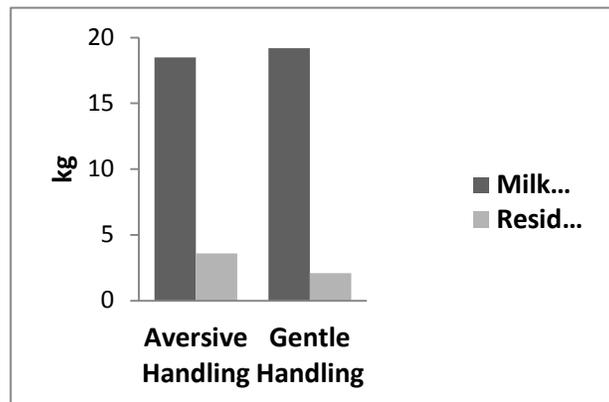


Figure 2: Comparison of aversive and gentle handling on residual milk and milk yield (after Rushen et al., 1998).

Meat quality and growth

Studies show that when reducing stress related to human handling, the cattle go back and eat sooner after being disturbed and it also reduces sickness in the livestock (Grandin, 1998c). Lensink et al. (2000a) found improved productivity in beef production to be associated with positive behaviour of the handler, such as moving slowly, talking friendly and letting the calf suck their fingers. Conversely, aversive treatment significantly negatively affected the live weight gain (Petherick et al., 2009b). Ferguson and Warner (2008) concluded that stress before slaughter has not been taken as seriously as it should be, and that more research is required in this area to reduce losses in product quality and yield. The main quality defect due to stress in cattle, is Dark Firm Dry meat (DFD meat) (Adzitey & Narul, 2011). If cattle are stressed a longer time before slaughter, the stored glycogen will be reduced also after slaughtering, leaving less glycogen for the acidification resulting in higher pH and therefore DFD meat. DFD meat causes great financial losses, because of rejection by the customer in shops (due to the dark colour of the meat), shortened shelf life

(because of increased pH value) and the reduced meat yield (Adzitey & Narul, 2011). Another quality defect in cattle is bruising of the meat, which has shown to be more frequently found in cattle kept under extensive conditions and not used to handling (Warriss, 2003). Barnett et al. (1984) found results which suggest that chronic stress can affect cattle physiology making them more prone to bruising.

Labour cost and time effort

Cattle that have been handled gently are easier to handle and require fewer employees, which mean reduced labour costs (Becker & Labato., 1997) and less working time (Boivin et al., 2003). For example, cows handled the first hour after the time of first calving were in less need of extra assistance in early lactation. The handled cows did for instance not remove their milking device (by for example kicking) as often as non handled cows (Hemsworth et al., 1987).

Knowledge as a tool to improve human-cattle interaction

Training programs in animal handling can improve human animal interactions (Hemsworth, 2008). This can result in less fear of humans, improved productivity and safety (Breuer et al., 2000; Waiblinger et al., 2002). However according to Grandin (2003), many farmers find it hard to accept that changes in their behavioural management technique truly work to improve the work environment, even when the economical profit is clear. This leads to farmers often using their money to buy new handling systems for cattle, instead of changing their handling methods to improve productivity. Therefore it is of great importance that the knowledge be transferred successfully from scientist to farmer, so the farmers will be convinced about the benefits of using these easily learned low stress handling methods.

Changing human attitudes and behaviour

Different human factors such as self-esteem, job satisfaction, attitudes and personality traits influence how a stockperson acts towards the animals, effecting both the welfare of the animals and furthermore the production (Waiblinger et al., 2002). Therefore knowledge about the human characteristics may be used when hiring stockpersons, and when considering if the employees require training or not (Hemsworth, 2003). When working towards changing the behaviour of farmers to improve the animal's welfare and productivity, the aim must be to find out and change the attitude the farmer has that causes the undesired behaviour (Hemsworth et al., 2000). Atkinson (2012 pers.comm) suggests "seeing is believing", which means that farmers need to be able to see what positive handling could do both for themselves and their animals, to believe it themselves. This can be achieved by demonstrations and information videos.

Behavioural principles of handling

It is of great importance that people working with animals understand the behavioural principles of handling. The first time the cattle are put in a new situation, it is essential that the situation is made as positive as possible. Otherwise it can become harder to handle the animal next time it is in that

situation. Examples that the farmers may use to improve their handling is to keep the animals in smaller groups, remove visual distractions that might cause the animals to balk, reduce noise and to use point of balance principles and flight zones (Grandin, 1998c). When using the principles of point of balance and flight zone, the stock people then focus on moving within the flight zone but not in front of the cattle's shoulder (point of balance) in the opposite direction of the intended movement (**Figure 4**) (Grandin, 1998a). If stock people for example want to make the cattle move forward, they should put themselves in position B (**Figure 3**), and make sure not to stand in the cattle's blind spot to avoid stressing the cattle. It is good to have in mind that the cattle's flight zone will be smaller if the stock people approaches the cattle with a sideway profile than full face, and that pressuring the animal's flight zone too hard may make the cattle panic and try to escape (Grandin, 2007).

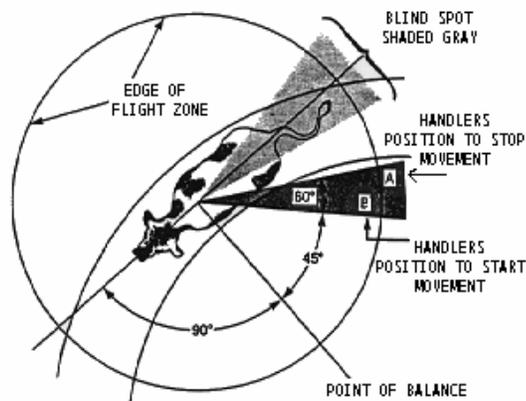


Figure 3: Flight zone and point of balance in cattle (Grandin, 1998b).

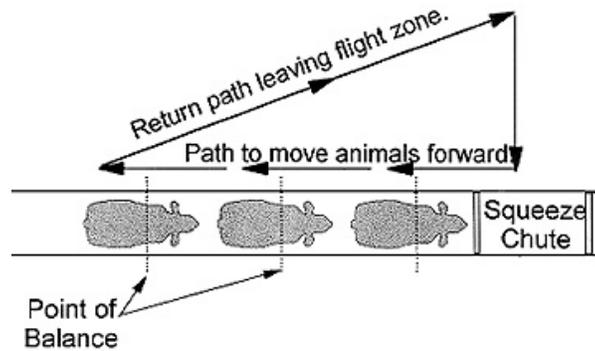


Figure 4: Movements for stock people moving cattle in squeeze chute (Grandin, 2007).

Low Stress Stock handling as a tool for future production

The American farmer Bud Williams used 30 years of his life to develop and improve a way of moving herds of several hundreds of cattle by himself or with a maximum of one assistant. The idea is that the stock people should walk around with the cattle so the cattle see the stock people as something that is neutral, part of the environment and not dangerous (Grandin, 2007). By working this way, the cattle will think they, and not the farmer, made the choice of moving in the direction the farmer intended them to (Atkinson, 2012 pers.comm). The principle is then the same as described in **Figure 2**, using the flight zone to make the herd to move in the prospective direction (**Figure 5**) (Grandin, 2007). This Low Stress Stock handling (LSS) could be a possible solution for future production, with not only fewer farms and more animals per farm, but also more free range cattle. LSS is based on the knowledge of the cattle's natural behaviour, and it gives the farmer and stock people a better way of understanding their cattle. Because of LSS increasing the farmer's understanding of the cattle's natural behaviour, the outcome is fewer misunderstandings and confusions between farmers and their cattle. This improved interaction could improve all of the areas of welfare of the cattle, economy and safety for farmers and their animals (Atkinson, 2012 pers.comm).

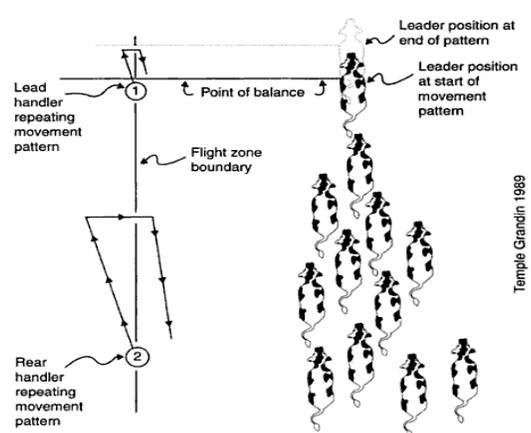


Figure 5: Movements for stock people when moving a herd of cattle (Grandin, 2007).

Discussion

The new electronic production systems, such as electronic feeders and milking robots, are enabling farmers to save time. Some farmers take this chance to purchase more animals, while others use it as an opportunity to interact and establish a better relationship between themselves and their cattle. It is clear that there are benefits of using positive human-cattle interaction in beef and dairy production (Rushen et al., 1999). The benefits often seem to be positively correlated to each other, resulting in improvements in all three of the areas of welfare, economy and safety, even if focus is on improving only one of them.

Animal welfare

There are many different and simple ways of improving the cattle's welfare by positive human-cattle interaction. Schmied et al. (2008) showed the importance on which of the cattle's body part to stroke to increase the acceptance of humans. This could be possible to use in every day handling of especially dairy cattle when milking, to establish a good relationship between handler and cattle, and increase the cattle's welfare. Some farmers already use this without knowing the underlying reason for the behaviour, stroking these body regions on the cows they have an extra good relationship with. But they might not think it could be used to improve relationships with the cows they are not having as good relationship with.

Breeding for calmer animals that do not get stressed as easily could possibly improve the animal's welfare, by reducing the fear and stress the animal's experience. The disadvantage could be if the genes associated to calmer animals are in some way linked to genes that are unwanted in dairy and beef production. If the cattle become too calm, they could get harder to handle, because of their smaller "flight zones" used in Low Stress Stock handling, and maybe even more dangerous to each other and humans.

Feeding can be used for cattle as a positive association to humans (Jago et al., 1999). This can be implemented in both dairy and beef production, maybe especially if using concentrate that cattle experience as extra palatable. Even though more and more farmers are changing into electronic feeders, it could be possible to make it a routine to go through the cattle or in any other way make yourself visible for the cattle when being fed. This could then have the effect of decreasing fear of humans. Although, it is good to have in mind that the result could be limited to the place where the positive interaction took place (Jago et al., 1999). This can be seen as a disadvantage, but also an advantage when in need of handling the cattle. The location where associating humans as something positive can be a place where the cattle feel less fearful and are easier to handle, and therefore be used when handling cattle, for example during medical care. In many of the handling situations in cattle production, trying to be as quiet and calm as possible seems to be of great importance to reduce stress, and especially if handling young cattle. Some people see being calm as a way of being inefficient at work. But when cattle are being calm and not stressed, they are also easier to handle, and take less time in being sorted and moved (Boivin et al., 1992). That is why a change in attitude is needed for people to be able to look at it as something positive.

Economy

Stress is a major cause for losses in both dairy and beef production (Rushen et al., 1999). The stress may cause meat quality to decrease (Adzitey & Narul, 2011) as well as the fat, protein and yield of milk (Waiblinger et al., 2002; Breuer, 2003; Rushen et al., 1998). These results are specific and it is possible to see how it affects the farmer's finances. But also, time is money, which can be saved by cattle that are less fearful and easier to handle which requires fewer employees (Becker & Labato, 1997; Boivin et al., 2003). When investing money in new systems

and routines it is essential that money will come back to the farmer, in one way or another, for example in higher meat or milk yield. Positive handling can be harder for the farmer to calculate in money, because of the different farms not being standardised which makes it unsure where the economical improvement originates. On the other hand, the financial input changing into a more positive interaction with the cattle can be none or low. This leads to the financial gain being high compared to the money put in. Evaluation and help for the farmer to calculate how to include positive interactions without it being an extra workload could be an alternative. More research needs to be done to study and define handling and more specific financial figures associated to positive handling, to make it more transferable to the production.

Safety

The cattle's fear of humans creates a dangerous environment for both farmers and cattle (Rushen et al., 1999). Often a farm is run by family members, which can be at risk. When cattle are exposed to gentle contact they show less aggressive behaviours (Becker and Labato, 1997) and express less restlessness when being milked (Breuer et al., 2000). The gentle contact can be used especially with young replacement calves and also on purchased older heifers and cows. If the stock people move slow and talk in a calm manner when handling, restlessness in the cattle can be reduced which could increase safety.

A possible dangerous situation is when cattle are nervous when being moved, which makes them difficult to move. Not only are nervous cattle dangerous to humans, but when cattle are difficult to move, stock people can get stressed because of time pressure, and not be thinking clearly. Lensink et al. (2000b) showed that cattle exposed to gentle contact became easier to move. Gentle contact could therefore be a preventive way to improve critical handling situations where the cattle tend to become stressed and dangerous.

Differences in how dairy and beef calves are handled when young could have an important influence on their behavior. Many beef cattle go together with their mother several months, compared to calves in dairy production that are either taken from the mother just after birth or very soon afterwards. Dairy calves are then often raised alone or in groups of calves by humans through bottle or bucket, or by a calf feeder. While beef cattle will often be nursed and raised by their mother. This could give dairy production an advantage in building up a good relationship between their calves and stock people. At the same time it may lead to a loss of respect of humans. Instead of either getting too much handling as dairy calves, or too little or no handling as beef calves, perhaps it would be possible in future production to work out a way in the middle between them both.

Knowledge

Knowledge is one of the key factors for improving human-cattle interactions in cattle production. Training programs have been shown to be successful, both by improving the attitude and also the behaviour of the stock people (Hemsworth, 2008). If working in a company, it may be important that everyone in the company gets the same knowledge and information at the same time, and to know how to put the knowledge they received in to practice. The right people for the job can improve the whole production (Hemsworth, 2003). To possess the knowledge about how to choose the right employees to hire and which ones to send on training, human and animal welfare can be improved as well as animal production, and job satisfaction for the employee.

Implementing more educational programmes in cattle handling and behaviour at both high schools and university, where many farmers to be, are learning how to act with cattle, would be a good investment for the future. If the stock people understand cattle behaviour, they will be able to move them more easily and better predict certain reactions (Grandin, 1998c). It can also be life saving to detect when the cattle are fearful, stressed and aggressive. However to get the appropriate knowledge on how to handle cattle in a positive way may be a difficult task. Considering many farmers often do inherit their profession from their family, it is possible that the education about handling is not as scientific and up to date as it could be. Scientists need to send the scientific papers and articles not only to other scientists and scientific magazines, but also to the magazines for the industry and popular magazines (Grandin, 2003). This does not give the scientist status or money, but it gives the people working within the cattle-production who are in need of the knowledge, a bigger chance to get hold of the information.

By giving positive interaction a name (Low Stress Stock handling), as well as guidelines and rules, it may be easier for farmers to assimilate positive interactions to themselves. Training programs for farmers and stock people that are used in for example Australia, would be possible to use also in Sweden. Low stress stock handling as a method of positive cattle handling has many potential benefits which through further research could be highlighted.

Conclusion

With the changes in cattle production systems into fewer farms with larger herds, new ways of improving the interactions between human and cattle may be needed. Much of the possible solutions to improve animal welfare, economy and safety, seem to originate from knowledge about positive animal to human interactions. Small efforts in improving the relationship between humans and cattle may therefore lead to great improvements in these factors.

There is a need for future research on how to integrate positive human-cattle interactions in future production systems, especially with emphasis on training programs which reach out to the farmers and highlight the economical benefits.

References

- Adzitey, F., Nurul, H. 2011. Pale soft exudative (PSE) and dark firm dry (DFD) meats: causes and measures to reduce these incidences – a mini review. *International Food Research Journal* 18, 11-20.
- Atkinson, S. April 2012. Personal Communications. Research assistant. Department of Animal Environment and Health, Swedish University of Agricultural Sciences
- Barnett, J.L., Eldridge, G.A., McCausland, I.P., Caple, I.W., Millar, H.W.C., Truscott, T.G., Hollier, T.J. 1984. Stress and bruising in cattle. *Animal Production in Australia* 15, 653.
- Becker, B.G., Lobato, J.F.P. 1997. Effect of gentle handling on the reactivity of zebu crossed calves to humans. *Applied Animal Behaviour Science* 3, 219-224.
- Bertenshaw, C., Rowlinson, P., Edge, H., Douglas, S., Shiel, R. 2008. The effect of different degrees of 'positive' human-animal interaction during rearing on the welfare and subsequent production of commercial dairy heifers. *Applied Animal Behaviour Science* 1-2, 65-75.
- Boandl, K.E., Wohlt, J.E., Carsia, R.V. 1989. Effects of handling, administration of a local anesthetic and electrical dehorning on plasma cortisol in Holstein calves. *Journal of Dairy Science* 8, 2193-2197.
- Boissy, A., Manteuffel, G., Jensen, M.B., Moe, R.O., Spuijt, B., Keeling, L.J., Wickler, C., Forkman, B., Dimitrov, I., Langbein, J., Bakken, M., Veissier, I., Aubert, A. 2007. Assessment of positive emotions in animals to improve their welfare. *Physiology & Behavior* 92. 375-397.
- Boivin, X., Le Neindre, P., Chupin, J.M. 1992. Establishment of cattle-human relationships. *Applied Animal Behaviour Science* 32, 325-335.
- Boivin, X., Lensink, J., Tallet, C., Veissier, I. 2003. Stockmanship and farm animal welfare. *Animal Welfare* 12, 479-492.
- Breuer, K., Hemsworth, P.H., Barnett, J.L., Mathew, L.R., Coleman, G.J. 2000. Behavioural response to humans and the productivity of commercial dairy cows. *Applied Animal Behaviour Science* 66, 273-288.
- Breuer, K., Hemsworth, P.H., Coleman, G.J. 2003. The effect of positive or negative handling on the behavioural and physiological responses of non-lactating heifers. *Applied Animal Behaviour Science* 84, 3-22.
- Breuer, K., Beattie, V.E., Hanna, D., Sneddon, I. A. 2006. Effects of the stockperson on dairy cow behaviour and milk yield. *Animal Science* 82, 791-797.
- Bruckmaier, R.M., Blum, J.W. 1998. Oxytocin release and milk removal in ruminants. *Journal of Dairy Science* 81, 939-949.
- Farm animal welfare council, 1993. Second report on priorities for research and development in farm animal welfare. Ministry of Agriculture, Fisheries and Food.
- Ferguson, D.M., Warner, R.D. 2008. Have we underestimated the impact of pre-slaughter stress on meat quality in ruminants? *Meat science* 1, 12-19.
- Grandin, T. 1997. Assessment of Stress During Handling and Transport. *Journal of Animal Science*, 75, 249-257.
- Grandin, T. 1998a. Handling methods and facilities to reduce stress on cattle. *The veterinary clinics of North America Food Animal Practice* 14, 325-41.

- Grandin, T. 1998b. Solving Livestock handling problems in slaughter plants. Gregory, N.G. Animal welfare and meat science.42-63. CABI publishing, Wallingford, UK.
- Grandin, T. 1998c. Review: Reducing handling stress improves both productivity and welfare. The professional Animal scientist 14, 1-10.
- Grandin, T. 2003. Transferring results of behavioral research to industry to improve animal welfare on the farm, ranch and slaughter plant. Applied Animal Behaviour Science 81, 215-228.
- Grandin, T. 2007. Behavioural principles of handling cattle and other grazing animals under extensive conditions. In: Livestock handling and transport. 3rd Edition, (Ed. T. Grandin), 71-72. Oxfordshire, CAB international.
- Hemsworth, P.H., Hansen, C., Barnett, J.L. 1987. The effects of human presence at the time of calving of primiparous cows on their subsequent behavioural response to milking. Applied Animal Behaviour Science 18, 247-255.
- Hemsworth, P.H., Coleman, G.J., Barnett, J.L., Borg, S. 2000. Relationships between human-animal interactions and productivity of commercial dairy cows. Journal of Animal Science 11, 2821-2831.
- Hemsworth, P.H. 2003 Human-animal interactions in livestock production. Applied Animal Behaviour Science 81, 185-198.
- Hemsworth, P.H. 2008. Ethical stockmanship. Australian Veterinary Journal 5, 194-200.
- Hemsworth, P.H., Rice, M., Karlen, M.G., Calleja, L., Barnett, J.L., Nash, J., Coleman, G.J. 2011. Human-animal interactions at abattoirs: Relationships between handling and animal stress in sheep and cattle. Applied Animal Behaviour Science 1-2, 24-33.
- Jago, J.G., Krohn, C.C., Matthews, L.R. 1999 The influence of feeding and handling on the development of the human-animal interactions in young cattle. Applied Animal Behaviour Science 62, 137-151.
- Swedish Board of Agriculture (Svenska Jordbruksverket). Mars 2012.
<http://www.sjv.se/download/18.4b2051c513030542a92800014491/Kap+6+Husdjur.pdf>
- Lensink, J., Boissy, A., Veissier, I. 2000a. The relationship between farmers' attitude and behaviour towards calves, and productivity of veal units. Ann. Zootech 4, 313-327.
- Lensink, B.J., Fernandez, X., Boivin, X., Pradel, P., Le Neindre, P., Veissier, I. 2000b. The impact of gentle contacts on ease of handling, welfare, and growth of calves and on quality of veal meat. Journal of Animal Science 78, 1219-1226.
- Lundqvist, P., Gustafsson, B. 1992. Accidents and accident prevention in agriculture A review of selected studies. International Journal of Industrial Ergonomics 10, 311-319.
- Munksgaard, L., DePassillé, A.M., Rushen, J., Herskin, M.S., Kristensen, A.M. 2011. Dairy cows' fear of people: social learning, milk yield and behaviour at milking. Applied Animal Behaviour Science 1, 15-26.
- Olsson, Å.L. 2006. Säkert arbete med lösgående nötkreatur - ur ett arbetsmiljö- och djurmiljöperspektiv. Sveriges lantbruksuniversitet, Institutionen för jordbrukets biosystem och teknologi, Agronomprogrammet. Examensarbete.
- Petherick, J.C., Doogan, V.J., Holroyd, R.G., Olsson, P., Venus, B.K. 2009a. Quality of handling and holding yard environment, and beef cattle temperament: 1. Relationships with flight speed and fear of humans. Applied Animal Behaviour Science 120, 18-27.

- Petherick, J.C., Doogan, V.J., Venus, B.K., Holroyd, R.G., Olsson, P. 2009b. Quality of handling and holding yard environment, and beef cattle temperament: 2. Consequences for stress and productivity. *Applied Animal Behaviour Science* 120, 28-38.
- Pinzke, S. Lundqvist, P. 2006. Arbetsolycksfall i jord- och skogsbruk 2004. Slutrapport. Institutionen för jordbrukets biosystem och teknologi, Sveriges Lantbruksuniversitet, Alnarp.
- Rushen, J., de Passillé, A.M.B., Munksgaard, L. 1998. Fear of people by cows and effects on milk yield, behavior, and heart rate at milking. *Journal of Dairy Science* 4, 720–727.
- Rushen, J., Taylor, A.A., de Passillé, A.M. 1999. Domestic animals' fear of humans and its effect on their welfare. *Applied Animal Behaviour Science* 65, 285-303.
- Schmied, C., Boivin, X., Waiblinger, S. 2008. Stroking different body regions of dairy cows: effects on avoidance and approach behavior toward humans. *Journal of Dairy Science* 91, 596-605.
- Sjaastad, O. V., Sand O., Hove, K. 2010. *Physiology of Domestic Animals*. 2nd edition, 679. Scandinavian Veterinary press, Oslo, Norway.
- SOU 2011:75. Statens offentliga utredningar. Ny djurskyddslag. Landsbyggsdepartementet.
- Swedish Dairy Association (Svensk mjölk). Mars 2012.
<http://www.svenskmjolk.se/Statistik/Mjolkforetaget/Besattningsstorlekar-i-Kokontrollen/>
- Swedish Work Environment Authority (Arbetsmiljö verket). Maj 2009.
http://www.av.se/dokument/statistik/sf/Af_2009_05.pdf
- Waiblinger, S., Menke, C., 1999. Influence of Herd Size on Human-Cow Relationships. *Anthrozoos: A Multidisciplinary Journal of The Interactions of People & Animals* 4, 240-247.
- Waiblinger, S., Menke, C., Coleman, G. 2002. The relationship between attitudes, personal characteristics and behaviour of stockpeople and subsequent behaviour and production of dairy cows. *Applied Animal Behaviour Science* 79, 195–219.
- Waiblinger, S., Menke, C., Korff, J., Bucher, A. 2004. Previous handling and gentle interactions affect behaviour and heart rate of dairy cows during a veterinary procedure. *Applied Animal Behaviour Science* 1–2, 31–42.
- Warriss, P.D. 2003. The handling of cattle pre-slaughter and its effects on carcass and meat quality. . *Applied Animal Behaviour Science* 28, 171-186

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