23rd Nordic Symposium of the ISAE

January 19-21, 2011
Dorpat Conference Centre, Tartu, Estonia

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CONTENTS
Margit Bak Jensen
MONITORING CATTLE WELFARE BASED ON BEHAVIOUR
page 4

Therese Rehn et al.
EVALUATING THE AINSWORTH’S STRANGE SITUATION PROCEDURE (ASSP) WHEN
MEASURING THE ATTACHMENT BETWEEN DOGS AND HUMANS
page 5

Leena Ahola et al.
INTER-OBSERVER RELIABILITY OF SOME BEHAVIOURAL AND HEALTH MEASURES OF A
PRELIMINARY ON-FARM WELFARE ASSESSMENT PROTOCOL FOR FARmed FOXES
page 6

Jane Guise
ANIMAL WELFARE RESEARCH IN THE UK
page 7

Violeta Juškienė et al.
THE EFFECT OF DIFFERENT PRODUCTION TECHNOLOGIES ON PIG HEALTH AND WELFARE
page 8

Lena Lidfors et al.
A COMPARISON OF GROUP HOUSING AND INDIVIDUAL HOUSING FOR DAIRY BULLS KEPT
FOR BREEDING
page 9

Kristina Näsström and Birgitta Staaf Larsson
ANIMAL – FRIENDLY HANDLING AND DRIVING OF SHEEP AND CATTLE
page 10

Ann-Helena Hokkanen et al.
PERCEPTIONS AND PRACTICES OF FINNISH DAIRY PRODUCERS REGARDING DISBUDDING
OF CALVES
page 11

Anne Lene Hovland and Morten Bakken
SOCIAL HOUSING OF ADULT SILVER FOX VIXENS AND ITS CONSEQUENCES FOR BODY
WEIGHT, WOUNDS AND LATER REPRODUCTION
page 12

Charles W. Mason
HUMANE SLAUGHTER - A CONCEPT AND ITS HISTORY
page 13

Anna Wallenbeck et al.
TAIL BITING OUTBREAKS ON FARMS – WHAT CHARACTERISE TAIL BITING PENS?
page 14
Jaakko Mononen et al.  
DAIRY COWS’ STEALING BEHAVIOUR AS A PROBLEM IN FEEDING TRIALS WITH AN AUTOMATED FEED INTAKE MEASURING SYSTEM  
page 15

Triin Lepik et al.  
THE TYPES OF HIGHER NERVOUS ACTIVITY AND PRELIMINARY RESULTS IN LOCAL HORSE BREEDS  
page 16

Emma Brunberg et al.  
CHARACTERISATION OF PIGS PERFORMING AND RECEIVING TAIL BITES: ASSOCIATIONS TO OTHER ABNORMAL BEHAVIOURS  
page 17

Kerli Raaperi et al.  
RISK FACTORS FOR RESPIRATORY DISEASE AND POOR REPRODUCTIVE PERFORMANCE IN ESTONIAN DAIRY CATTLE HERDS  
page 18

Satu Raussi et al.  
INTUITIVE VERSUS SCIENTIFIC KNOWLEDGE OF CATTLE BEHAVIOUR  
page 19

Emma Temman et al.  
SLEEP IN DAIRY COWS RECORDED WITH A NON-INVASIVE EEG TECHNIQUE  
page 20

Allan Kaasik and Marek Maasikmets  
PARTICULATE MATTER, AMMONIA AND CARBON DIOXIDE CONCENTRATION MEASUREMENTS IN UNINSULATED COWSHEDS IN ESTONIA  
page 21

Anne Pavlenko et al.  
THE IMPACT OF TRANSITION TO A NEW HOUSING SYSTEM ON MILKING COWS’ BEHAVIOUR PATTERNS  
page 22
MONITORING CATTLE WELFARE BASED ON BEHAVIOUR

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Intensive animal production is characterised by large production units, automation and little human handling, and is associated with high incidences of production diseases and social stress. Animal welfare concerns both behaviour and animal health, and there are several relations between behaviour and health. Disease is often recognized as deviations from normal appearance and behaviour, but sickness behaviour is part of the animals’ strategy to fight disease, including heat and energy conservation to generate a febrile and an immune response. Therefore, allowing animals to perform sickness behaviour may aid recovery, but sickness behaviour may also be used to identify diseased individuals in groups of animals.

There are several examples of relations between health and feeding behaviour. For instance, diseased dairy calves visit a computer-controlled milk feeder less often than healthy calves and dairy cows change feeding behaviour prior to diseases such as uterine infection and ketosis. Also lameness in dairy cows may be associated with changes in feeding behaviour, presumably due to low competitive abilities of lame cows.

When animals are group housed they compete for resources such as access to feed and resting places, and low competitive abilities may predispose to disease. For instance, low ranking cow stand for a larger part of the time than higher ranking cows if there is competition for access to resting places. Cows are motivated to lie down for about half of the 24 hours and long standing durations may predispose for hoof diseases and lameness.

A high level of competition is stressful and if competition predisposes cows to disease this is a reason to increase space allowance, to subgroup, or in other ways reduce competition. However, information on individual behaviour, and sudden changes in behaviour over time, may identify individuals at risk of poor welfare and may be a tool for earlier intervention. Furthermore, information on behaviour provides information on the level of competition and the welfare status of a particular herd.

The rapid development in sensor technology offers many new possibilities for monitoring behaviour. Production efficiency is often the aim of the new developments, but the use of the technology to identify diseased individuals may potentially improve welfare due to earlier intervention. Furthermore, the technology may also be developed to monitor how well individual animals are coping socially in a large group. Monitoring behaviour automatically may allow us to find those individuals with difficulties coping and through scientific validation this area has a potential to improve animal welfare.
EVALUATING THE AINSWORTH’S STRANGE SITUATION PROCEDURE (ASSP) WHEN MEASURING THE ATTACHMENT BETWEEN DOGS AND HUMANS

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The aim of this study was to evaluate the reliability of the Ainsworth’s Strange Situation Procedure (ASSP), previously used to investigate the emotional bond between dogs and their owners. We modified the ASSP to investigate the reactions of 12 research dogs in two different treatments. The tests were conducted in an unfamiliar room and consisted of 6 episodes (ep.) of 3 min where the dog was either together with a familiar person, with a stranger or alone. In the first treatment, the dogs participated in the ASSP together with a familiar person and a stranger (FS). In the second treatment, the dogs participated together with two strangers (SS). The responses of the dogs were observed, to investigate whether they performed any behaviour indicating that the familiar person acted as a secure base, i.e. that dogs explored and played more when accompanied by the familiar person compared to a stranger. The level of physical contact with the familiar person and with the strangers was also compared. Behaviour was scored instantaneously every 5 s. Comparisons were made within treatments (ep 1+5 (Familiar Person present in FS, Stranger A present in SS) versus ep 3+6 (a stranger present in both treatments)), as well as between treatments (ep 1+2+5 in FS (Familiar Person present) versus ep 1+2+5 in SS (Stranger A present)), using Wilcoxon signed rank tests. During the FS treatment dogs explored more (P<0.001) in the presence of a familiar person (mean proportion of sample points±SE, 0.20±0.02) than in the presence of a stranger (0.10±0.03), but no difference in play behaviour was observed (0.05±0.02; 0.06±0.03, respectively). Interestingly, when comparing the same episodes within the SS treatment, dogs demonstrated a similar difference in exploration level even though no familiar person was ever present. Dogs explored more (P=0.004) when Stranger A was present (0.16±0.03) than when Stranger B was present (0.07±0.02). In SS, dogs tended to play less (P=0.09) when Stranger A was present (0.007±0.005) compared to when Stranger B was present (0.04±0.02). When comparing all episodes where the Familiar Person was present in FS with equivalent episodes in SS (Stranger A present), no difference in exploratory behaviour was observed (FS: 0.16±0.02; SS: 0.14±0.03), but the dogs played more (P=0.008) in the presence of the Familiar Person in the FS treatment (0.04±0.02) than with Stranger A in the equivalent role in the SS treatment (0.006±0.003). Within FS, dogs initiated a higher level of physical contact (P=0.007) with a familiar person (0.16±0.02) than with a stranger (0.09±0.02). Dogs did not differ regarding the level of physical interaction with any of the strangers in SS (Stranger A: 0.11±0.03; Stranger B: 0.09±0.03). When comparing the level of physical contact with the Familiar Person in the FS treatment (0.15±0.02) with the level of physical contact with Stranger A in the equivalent episodes in the SS treatment (0.11±0.02), dogs clearly sought more contact (P=0.03) with the Familiar Person. This implies that dogs preferred a familiar person over the strangers. In general, however, the dogs showed the same behavioural patterns in both the FS and SS treatments regardless of the absence of a familiar person during the SS treatment. Therefore, the design of the test should be cautiously considered before using the ASSP to evaluate the bond between dogs and humans.
INTER-OBSERVER RELIABILITY OF SOME BEHAVIOURAL AND HEALTH MEASURES OF A PRELIMINARY ON-FARM WELFARE ASSESSMENT PROTOCOL FOR FARMED FOXES

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WelFur is a Welfare-Quality®-like on-farm welfare assessment protocol for farmed fur animals. The preliminary protocols for foxes and mink were developed in 2009-2010. The development was based on a review of the scientific literature. The preliminary fox protocol was tested on commercial farms to study the feasibility, reliability and validity of the intended measures. Here we present the inter-observer reliability (IOR) results for some behavioural and health measures.

The data were collected on 12 fur farms in Finland in October and November 2010. The farms were chosen so that as much variation as possible could be obtained from different behavioural and health measures. The data set included blue foxes, silver foxes and their hybrids. There were three observers on each farm visit observing the same individual animals: the behaviour of the animals (N=1,948 foxes) was observed by two observers whereas the health data (N=1,415 foxes) were gathered by three observers. After the data collection, IOR was evaluated with two different parameters: i) Cohen's kappa, which measures the agreement between the evaluations of the observers when both are observing the same objects (1 = perfect agreement, 0 = agreement not better than chance), and ii) the index of concordance (IC), which presents the proportion of all observations about which the two observers agreed, \textit{i.e.} $A / (A + D)$ where A and D are the total numbers of agreements and disagreements, respectively.

ICs for all health measures were over 0.8, indicating good IOR between all pairs of observers. The kappa values were, however, generally low due to biased data for some measures. For the overall behaviour, both IC (0.9) and the kappa value (0.8) showed high agreement between the two observers. However, ICs for the individual behavioural measures were low due to the rare prevalence of some behaviours, \textit{e.g.} stereotypic behaviour.

Our preliminary reliability results indicate a need to refine the descriptions of the behavioural and health measures, as well as point out the importance of proper training of the assessors, before further use of the measures on fox farms.
ANIMAL WELFARE RESEARCH IN THE UK

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This presentation will discuss the interest in animal welfare in the UK and the reasons for, and extent of, the allocation of the governmental budget for funding research into this area. An overview of the range and types of research that have been funded in this subject, and a discussion of the political advantage to the national government in funding this research.

A discussion of the personal experience of leading Cambac JMA Research, an independent pig behaviour research facility, will be presented. This will include a history of Cambac, why it started, how it was constituted, what it achieved, an overview of the projects that were carried out, and what they meant to policy makers and farmers. This experience and institutional construction is an interesting model, not just for the budgeting, design and execution of research into animal behaviour and welfare, but also for near-market work which has an immediate impact on productivity and profit.

Also, included will be a presentation of the work and impact of leading the Royal Bath and West of England Society, an institution that provides services and a platform for agricultural and veterinary science in the UK.
Pig production in confinement all year round and reduction of the floor area per pig raise different and incompatible economic, ecological, animal health, welfare and production quality problems. Therefore, this study was designed to evaluate different production technologies applied on the farms of Lithuania in relation to pig health and welfare.

The studies of pig health and welfare were carried out on 11 farms on the basis of the ANI 35L system. The following indices were evaluated: freedom of movement, social contacts, floor type, microenvironment and pig care - all in all 43 direct and indirect indices. Various technological pig groups were evaluated: pregnant and non-pregnant sows, piglets under 90 days of age (under 30 kg) fattening pigs (under 110 kg). According to the housing system, the sow group was divided into those kept littered and unlittered. Then housing conditions for piglets under 90 days of age were evaluated with regard to their raising indoors under a controlled microenvironment and in ordinary pig houses on scarce litter. Besides deep litter housing of fattening pigs their housing on ceramic tiles was evaluated with respect to pig welfare requirements.

The study indicated that bedding of sows that were kept on concrete-ceramic tile floors and sow keeping without any bedding had no significant effect on their welfare. Significantly better (62.9%, P=0.001) housing conditions were determined for the piglets under 90 days of age kept in ordinary pig houses with an uncontrolled microenvironment. Fattening pigs housed on deep litter also had more suitable conditions than those housed on unlittered concrete-ceramic tiles and the average score was by 6.2 points (P=0.021) higher for the fattening pigs housed on deep litter.

The results of study demonstrate that, for the improvement of pig welfare, it is advisable to use some bedding material.
The aim of this study was to compare the behaviour and activity level of dairy breeding bulls kept individually or in groups, and to evaluate which of these housing systems were the best regarding the welfare of the bulls.

The study was conducted at VikingGenetics' bull breeding station in Falkenberg, Sweden. The bulls, while the results of their progeny testing at this station are awaited, are either kept in group housing or individual housing. Since both of these housing systems have advantages and disadvantages, it was in the interest of VikingGenetics to know which of these housing systems are the best. Sixteen bulls, 8 in each housing system, were chosen. These bulls were from 34-60 months of age and of the breeds Swedish Holstein and Swedish Red. The behaviour of the bulls was recorded using focal animal sampling with instantaneous recording at three minute intervals of general behaviours and continuous recording of social and abnormal behaviours. Each bull was observed one hour per week during three weeks (3 h/ bull). Activity monitors (IceTags 2.004, IceRobotics, Scotland) were placed on each bull's hind feet and left there during the whole behavioural observation period (21 days). The behavioural data and activity data were analyzed using Wilcoxon rank sum test.

The results show that the bulls in group housing were more active (p<0.01, Group: median 2.5 % of obs., Individual: median 1.4 % of obs.) and took a significantly higher number of steps (p<0.01, Group: median 1 515.2 steps, Individual: median 800.9 steps) than the individually housed bulls. There was a tendency of more lying behaviour in individual housing than in group housing (p<0.1, Group: median 54.3 % of obs., Individual: median 59.7 % of obs.). There was a delay of standing in group housing compared to individual housing, of approximately one hour in the morning, and group housed bulls were standing more in the evening than individually housed bulls. The bulls in both housing systems spent most of the observation periods “eating”, and “standing” and “ruminating” were also commonly performed behaviours. The bulls were observed to perform most of the “eating” in the morning and “ruminating” in the afternoon. The observations of bulls “walking”, “drinking”, “social”, “lying”, “auto grooming” and “rubbing inanimate object” were few, and there were no significant differences between the housing types in these behaviours. There were no significant differences in the social and abnormal behaviours, except for the behaviour “pushing”, which was significantly more often performed in group housing than individual housing (p<0.01). The social behaviour most frequently shown was “sniffing”. “Vocalising” was performed by 11 of the 16 bulls in both housing systems while “head to head pushing”, “rubbing bull” and “social licking” was shown by some bulls in both housing systems. Few aggressive interactions were observed during the study.

It is concluded that the higher activity in group housing may indicate that these bulls have an outlet for their motivation to be locomotive, but it could also be a result of the animals moving around to avoid other individuals. The individual pens allowed social interactions, which may have made them less negative for the individually housed bulls. The risk of injuries is smaller for individually housed bulls, whereas the advantages with group housing are that the bulls can have more social interactions and the total area is larger.
The benefits for man and animals when applying animal-friendly handling are numerous. Examples of these benefits are: easily handled animals; effective work and an improved working environment; good meat quality; reduced risk of accidents for both animals and their handlers; but above all it reduces stress and fear amongst the animals and increases animal welfare. The physiology and natural behaviour of sheep and cattle affect handling and driving in many ways. Through this knowledge we gain an understanding of how animals react in a situation and therefore we can solve and prevent problems. Hearing, vision, herd- and flight-behaviour are important factors to consider but even olfactory sense may play a role.

Sheep and cattle have excellent hearing and it is possible for them to react to, and be frightened by, noises that are inaudible to humans. They can become stressed and scared by people shouting at them. The field of vision of sheep and cattle is wide but the binocular field of vision (that which gives them depth perception) is limited. This is a reason why they are easily frightened by sudden movements, shadows, pools of light, puddles and fluttering objects. Their pronounced herd- and flight-behaviour means that they become easily stressed when socially-isolated and therefore the best way of handling and driving sheep and cattle is in a group. By taking the animals’ flight-zone into consideration and placing yourself correctly with regard to the point of balance, sheep and cattle can be driven in an animal-friendly manner. Good stockmanship and a positive attitude towards animals affect their handling and gives improved animal welfare. Both sheep and cattle have good memories and can connect positive and negative experiences with specific people and places. Training and socialising of animals can therefore affect their behaviour, and this can be used to reduce stress and make them easier to handle.

An effective and animal-friendly handling and driving process can be achieved by taking these factors into account, giving a safer working environment and improved animal welfare!
PERCEPTIONS AND PRACTICES OF FINNISH DAIRY PRODUCERS REGARDING DISBUDDING OF CALVES

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Disbudding is a common procedure in dairy farms because hornless cattle are supposed to be safer among themselves and for humans. However, this procedure causes severe pain-related distress and behavioural changes in calves. Local anaesthesia and non-steroidal anti-inflammatory drugs are effective for treating disbudding-related pain. Dairy farmers have a key role in whether or not calves to be disbudded are properly medicated; thus, we conducted this study to characterize perceptions and practices of Finnish dairy producers with regard to disbudding of calves and disbudding-related pain management.

We designed and mailed a questionnaire to 1,000 Finnish dairy producers and published the same questionnaire on the internet. A total of 451 questionnaires (45%) were returned from the random sample and 738 dairy producers responded in the internet. Thus, we got responses from 10.6% of all 11,244 dairy farms in Finland. We found out that 84% of Finnish dairy producers disbud their calves, and 69% of these farms use a veterinarian at least sometimes to medicate their calves prior to disbudding.

We asked respondent’s opinions about disbudding-related pain with no pain medication (answers on an 11-point numerical rating scale were classified into three groups: mild pain 0-3, moderate pain 4-7, and severe pain 8-10) and the agreement with disbudding-related statements (a five-point Likert scale, in which one corresponded to complete disagreement and five to complete agreement). We analyzed the factors affecting respondents’ opinions on the need to use pain medication for the disbudding procedure with ANOVA. Producers who ranked disbudding-related pain as severe agreed more with the statement “I could never disbud calves without any pain alleviation” than producers who estimated pain as mild or moderate (3.75 ± 0.13 (mean ± SE) for severe pain, 2.25 ± 0.23 for mild pain and 2.49 ± 0.15 for moderate pain, p<0.001). Also they agreed less with the statement “It is too expensive to have a veterinarian medicate calves prior to disbudding” (3.12 ± 0.18 for severe pain, 4.51 ± 0.36 for mild pain and 3.76 ± 0.20 for moderate pain, p<0.001).

Producers who rank disbudding-related pain without any medication severe appear to also take the calves’ disbudding pain and the need for pain alleviation more seriously and thus may be more motivated to use pain alleviation to calves prior to disbudding.
SOCIAL HOUSING OF ADULT SILVER FOX VIXENS AND ITS CONSEQUENCES FOR BODY WEIGHT, WOUNDS AND LATER REPRODUCTION

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Due to the flexible social nature of silver foxes, group housing may act as an alternative housing procedure for adult vixens. However, sociality may also result in aggression with negative effects on foxes’ welfare and reproduction, in particular for subordinate vixens. This study examined consequences of housing vixens in triplets for 13 weeks from September to December on their body weight development, occurrence of wounds and future reproduction. Dominance relations were recorded to assess effects of social competition. A sample of 358 one to four year old vixens housed in six different commercial farms participated in the study. In each farm half of the vixens were housed in single cages as controls whereas the other half were housed in triplets in three connected cages consisting of one 1-year-old, one 2-year-old and one 3 or 4-year-old vixen. After the triplets were separated in December all animals were housed singly until mated in February and throughout the breeding period. Body weight was recorded at: the start, 3 and 8 weeks after the start, the end and mating. Simultaneously, wounds were recorded by physical examination (palpation). Reproduction variables included number of oestrous events, mating date, litter size at 1 and 3 weeks and at weaning. Group housed vixens gained more weight and were heavier at the end of the experiment compared to the singly housed vixens. The lowest ranked vixens had significantly lower body weights compared to vixen no. 2 (P=0.015) at the end of the experiment. Injuries were more frequent in the group housed vixens compared to the controls during examination week 3 (P<0.0001) and week 8 (P=0.004) after the experiment started and at the end of the experiment in December (P=0.035). Apart from a significant effect of housing procedure on number of days to first mating and days to whelping there was no significant effect of housing procedure on any of the reproduction variables. The proportion of mated vixens that did not deliver, or lost their cubs immediately after birth, was not significantly different between group housed (20.6%) or singly housed vixens (18.5%) (P=0.724). A significant effect of dominance rank was found for litter size per mated vixen at weaning, where high ranked vixens weaned approximately one more cub compared to vixens ranked as number two and three. Although adult vixens kept in groups gained more weight compared to singly housed controls, body weight differences within groups indicated some competition over food. Aggression during social housing in autumn may negatively affect vixens’ welfare and affect future reproduction in subordinate vixens. Therefore, at present, group housing in row-cage systems cannot be recommended as an alternative housing procedure for adult silver fox vixens.
This introductory presentation will look at the establishment of the Humane Slaughter Association (HSA) in the UK and examine the reasons for its foundation and its continuing influence with the meat and livestock industry in the UK and around the world. It will look at how and why the HSA came about, highlighting the animal welfare and working conditions which prevailed at the time.

The development of the organization through the twentieth century will be followed by a detailed look at how this small organization continues its work in the third millennium under the following four headings:

- Research
- Development
- Education and training
- Information and advice

Finally, the concept and history of humane slaughter will be examined in detail, hopefully in open discussion with the assembled delegates!
TAIL BITING OUTBREAKS ON FARMS – WHAT CHARACTERISE TAIL BITING PENS?

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To minimize the damages from an outbreak of tail biting (TB) it is important to identify TB pens at an early stage and take preventive and treatment measures (e.g. remove tail biting pigs and provide enrichment). The present study aimed to identify pen characteristics, practically useful under commercial conditions, for such identification. Commercial pig farms with elevated frequencies of pigs with remarks of tail damage at slaughter were included in the study. At the first sign of TB (defined as distinct TB or bloody tails), observations were performed in the TB pen as well as in a matched control (C) pen located close to the TB pen. In total, 1,197 pigs were observed during 55 tail biting outbreaks on 22 farms. Behaviour (posture changes, TB, ear biting, bar biting, belly nosing, riding, floor chewing, eating manure and one category for other undesirable behaviours) was recorded and cleanliness in the pen (in front of the feed trough, in the lying area, and on the slatted area) was scored using a 4 graded scale. Data was analysed with general and generalized linear models including the fixed effects of box type and observer, and the random effect of herd.

As expected, TB behaviour occurred more frequently in pens where TB or tail damage had been seen prior to the behavioural observations (p=0.001). Even though it was not possible to identify specific tail biting individuals in C pens, TB was recorded in 22 % of the C pens. Two or more tail biters were identified in 31 % of the TB pens with identified biters. Bar biting occurred more frequently in C pens than in TB pens (p=0.020). TB pens were dirtier in the area in front of the feed trough compared to C pens (p=0.023) and the trend was the same regarding dirtiness in the lying area.

In the farms studied, the most frequently occurring abnormal behaviours were related to oral manipulation, but the object of this manipulation (in this study predominantly tails and bars) differed between pens. TB was more common in TB pens and bar biting was more common in control pens, but both behaviours occurred in both pen types. These findings might indicate that these two behaviours are, at least partly, provoked by the same factors (i.e. pigs start biting either tails or bars as a reaction to the factors contributing to the development of TB outbreaks). TB pens were dirtier in front of the feed trough compared to control pens. However, it cannot be distinguished if the dirtiness was a cause or an effect of TB. Characteristics of pens with on-going TB outbreaks, that could increase chances of identifying tail biting pens, are high frequencies of tail biting, several TB individuals in one pen and dirtiness in front of the feed trough.
DAIRY COWS’ STEALING BEHAVIOUR AS A PROBLEM IN FEEDING TRIALS WITH AN AUTOMATED FEED INTAKE MEASURING SYSTEM

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Our practical experience suggests that stealing behaviour may bias the results in trials where an automated system is used for measuring the feed intake of loose-housed dairy cows. Here we describe stealing behaviour, quantify its biasing effects, and make an attempt to solve the problem. Twenty dairy cows (4 Ay and 16 Ho) were housed in a loose-housing system with 12 Insentec RIC troughs. Insentec RIC controls the access to the troughs with a feeding gate and ear-tag identification, and measures the frequency and duration of eating bouts and the amount of feed eaten during the bouts. Six troughs had a mixed partial ration (MPR) and six troughs silage (SIL). In period 1 (P1, lasting 3 d) all cows had free access to all troughs, and additionally each cow was offered 2 kg concentrate (CON)/d from a concentrate feeder. Preference between MPR and SIL was assessed from the Insentec RIC data for the third day of P1. In periods 2 (P2, 8 d) and 3 (P3, 14 d), 10 cows had access to MPR troughs only (plus 2 kg CON/d) and 10 cows to SIL troughs only (plus 9-11 kg CON/d). In P3, unlike in P2, barriers were mounted to prohibit stealing behaviour: an 8 cm high bent metal sheet edge on the top of the feeding gate, 56 cm long loop dividers between troughs, and a neck rail above the dividers. The behaviour of the cows was recorded on the third day of both P2 and P3 for describing the stealing behaviour. The amount of MPR that the SIL group cows stole from the MPR troughs was quantified from the Insentec RIC data for the same days. The MPR intake is expressed as MPR-% = 100 x dry matter intake (DMI) of MPR / (DMI of MPR + DMI of SIL).

In P1 the cows showed a clear preference for MPR over SIL: MPR-% was 96±6 % (mean±SD, p<0.001, Wilcoxon test: comparison to 50 %, N=19). In P2 and P3 the SIL group cows stole MPR in several ways. They reached out over, or even jumped onto, the closed feeding gate, and ate from the MPR trough, in particular when the trough was full or being filled (filling lasted 1.4-1.8 h/d). The thief cows also displaced legitimate cows feeding at their troughs, and began eating before the feeding gate started to close. MPR-%, \textit{i.e.} stealing MPR, decreased (p<0.05, Wilcoxon test, N=10) from 8.1±10.3 % in P2 to 0.03±0.09 % in P3. These results do not include stealing while the troughs were being filled, since Insentec RIC does not record feed intake then. The time spent stealing during the filling was 2.9±5.2 and 1.8±4.8 min/d for P2 and P3, respectively (p=0.5, N=10). Furthermore, an individual cow seemed to have learnt to exhibit displacement stealing in a way that Insentec RIC did not recognise at all. It stole MPR for 9 min/d in P2 and 100 min/d in P3 in this way. A stealing time of 100 min/d may be evaluated to represent a MPR-% value up to 50 %.

The stealing behaviour by dairy cows biases the results of the feeding trials where Insentec RIC is used. Although the problem was alleviated by the barriers used in the present study, the barriers did not fully solve the problem.
The aim of this study was to investigate the types of higher nervous activity in local horse breeds.

In this study, the types of higher nervous activity of horses were determined in five different places. The trials were conducted with 41 horses (8 Estonian Native Horses, 19 Tori Horses, 4 Estonian Heavy Draught Horses, 2 Estonian Sport Horses, 6 crossbreed horses, 2 horses with unknown pedigree).

The method used in this study has been introduced and tested at the former All-Union Research Institute of Horse Breeding (VNIIK) and has been in use for a long time. According to this method, the determination of the types of higher nervous activity is based on an evaluation of a horse’s nervous processes, strength, balance and mobility. The types of higher nervous activity in local horses are determined according to the 5-day method of conditioned reflexes tested by means of two oat troughs and external irritants.

Data analysis was carried out using MS Excel and the SAS System. It appears that the higher nervous activity or at least the strength of the nervous system, of horses is a hereditary feature. The results of the data analysis showed that the effect of sire on the strength of the nervous system of a horse was highly significant (P≤0.001) and the effect of maternal grandsire was also significant (P≤0.01). Gender and age had no effect.
CHARACTERISATION OF PIGS PERFORMING AND RECEIVING TAIL BITES: ASSOCIATIONS TO OTHER ABNORMAL BEHAVIOURS

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Tail biting is known to have clear effects on the welfare of the receiver pigs but tail biting and other abnormal behaviours have also been suggested to indicate reduced welfare for the pigs performing the behaviour. This study mainly aimed to explore associations between tail biting and other unwanted/abnormal behaviours.

This study includes data from 722 fattening pigs housed in 59 pens. All were housed at one commercial farm with a history of tail biting problems. The prevalence of performed and received tail biting, tail in mouth, belly nosing, bar chewing, ear biting and mounting was recorded during two 30 minutes observations. Each tail bite was classified using a three graded scale based on the intensity of the receivers’ response to being bitten; mild, moderate and severe tail biting.

Based on the number of performed tail bites (TB), the pigs were categorized into performer controls (CP; 0 performed TB), low frequency biters (LTB; 1-4 performed TB) and high frequency biters (HTB; >4 performed TB). Another categorisation was made based on the number of received bites (receiver controls (CR; 0 received TB), low frequency receivers (LR; 1-6 received TB) and high frequency receivers (HR; >6 received TB)). The data were normally ranked prior to the statistical analysis, consisting of analyses of variance (SAS software, procedure RANK and GLM).

A higher proportion of performed TB (P<0.001) were classified as severe in HTB (mean/hour ± S.D., 0.23±0.19) compared to LTB (0.10±0.26). Both LTB (1.08±2.85) and HTB (0.65±1.05) performed more ear biting (P<0.01) than CP (0.33±0.93). Belly nosing and other abnormal behaviours were performed more frequently by LTB (Belly nosing; 0.91±2.07, ‘Other abnormal’ 1.65±4.63) than CP (Belly nosing; 0.61±1.88, ‘Other abnormal; 0.73±2.32) but the HTB did not differ from CP. That the LTB but not the HTB differ from the controls in these behaviours could suggest that there are different types of biters. HTB biters seem to be more specialized in tail biting compared to the LTB biters that are more general in their repertoire of performed abnormal behaviours.

When comparing the receiver categories, tail in mouth and ear biting were received more often (P<0.001; P<0.05 respectively) by HR (tail in mouth; 2.84±3.13, ear biting; 1.11±1.63) than LR (tail in mouth; 0.66±1.01, ear biting; 0.52±1.19) and CR (tail in mouth; 0.29±0.64, ear biting; 0.40±0.91). Also belly nosing was received more (P<0.05) by HR (1.16±1.89) than by the controls (0.55±1.15). These results indicate that pigs that receive a high frequency of tail biting also receive more other unwanted behaviours.
The main aim of this study was to detect management and infectious risk factors for the occurrence of a high level of bovine respiratory disease (BRD) in dairy calves, heifers and cows. In addition, factors related to poor reproductive performance in breeding cows were also sought. A representative number of dairy cattle herds (103) was selected for the study. Serum samples were collected from cows and youngstock and analyzed for antibodies against bovine herpesvirus 1 (BHV-1), bovine respiratory syncytial virus (BRSV), bovine virus diarrhoea virus (BVDV), and Mycoplasma bovis (M. bovis). A questionnaire was used to collect data concerning herd management factors and reproductive performance, as well as the extent of occurrence of clinical signs of respiratory disease in the last two years, as evaluated by the veterinarian or farm manager. Multiple correspondence analysis (MCA) and logistic regression analysis were performed to identify and quantify the risk factors.

According to the logistic regression analysis, the frequent occurrence of most of the respiratory disease symptoms in unweaned calves was associated with a high prevalence (>50%) of BHV-1 among cows (p<0.02) and the presence of BVDV in the herd (p<0.04). The high prevalence (>16%) of BHV-1 antibodies among youngstock was related to a high occurrence of respiratory signs of disease in heifers at 3–16 months old (OR 6.2, p=0.008). A moderate prevalence (1–50%) of BRSV antibodies among youngstock increased the risk of having experienced nasal discharge (OR 5.7, p=0.013) and respiratory signs of disease (OR 6.6, p=0.008) in cows and pregnant heifers during the previous two years, whereas the presence of BVDV was associated with a high occurrence of lacrimation (OR 5.1, p=0.029). The MCA indicated that multiple infections such as BHV-1, BVDV and BRSV are involved in BRD, whereas M. bovis was not associated with the occurrence of respiratory disease in the dairy cattle sampled. A higher occurrence of respiratory disease in any age group is generally more likely in larger herds. On-farm employees can participate in the spread of disease. Keeping cows loose, holding youngstock separately from cows until service and purchasing new animals were factors related to a higher risk for acute BRD in cows and pregnant heifers. The highest risk of an increased prevalence of abortion (>1.3%) and increased insemination index (>1.9) occurred in herds with a moderate prevalence of BHV-1 antibodies (1–50%) in cows (OR 7.3, p=0.003 and OR 5.2, p=0.01, respectively), which was related to active viral spread. The presence of BVDV and the various management factors recorded in the study were not related to poor reproductive performance.
The intuitive understanding of the behaviour of cattle by farmers and their practical knowledge of how cattle should be handled was studied and compared with knowledge from animal behaviour science. We interviewed 20 Finnish farmers on family dairy farms using loose housing systems. Farmers were female or male with more than 10 years of work experience. During and after the morning milking, we asked them questions about animal behaviour and handling practices. The presented data has not been analysed statistically.

Farmers reported that cows establish dominance relations that influence their life (e.g. access to lying, feeding, and milking) and that cows having grown up together stay close to each other. They considered that human body language and voice are very important, recommending smooth walking and no shouting when handling cows. They reported that positive handling of young calves and the presence of the farmer at first calving ease further handling. These elements are confirmed by results from animal behaviour science, which describe similar consequences for social hierarchy, preferential relationships, and handling practices.

For farmers, happy cows are relaxed (lying and ruminating with eyes half open), healthy cows actively observe their environment whereas sick cows often lower their head and ears and are not doing the same activity as the other cows. Farmers also detect sick cows from their eyes. These elements have not broadly been investigated by science.

These results suggest that social sciences can help formulating questions to be studied by animal science, in order to increase our knowledge of animal behaviour.
The aim of this study was to develop a non-invasive technique for identifying different vigilance states in dairy cows. Sleep is a fundamental function and it is known that sleep deprivation both increases energy requirements and impairs immune defence and it is therefore possible that lack of sleep may contribute to animal welfare problems in dairy herds. Sleep is often estimated by behavioural observations or recorded on restrained animals with invasive EEG techniques. The latter might stress the animals and hence alter the sleep duration and distribution.

A total of eight dairy cows were included in the study; five dry, of which three were of the Swedish Red breed and two of the Ayrshire breed, and three lactating dairy cows, all of the Ayrshire breed. Recording sessions were performed on one cow at a time and lasted until sleep-like rest had been observed. The cows were kept in single pens three hours before and during recording sessions. Before each session, the cows were equipped with surface attached electrodes measuring brain activity (EEG), eye movements (electrooculography EOG), and neck muscle activity (electromyography EMG) to record vigilance states. The recordings resulted in a total of 33 hours and 54 minutes of analyzable data (range from 1h 44min to 6hrs 11min per recording session). Data was scored manually for vigilance states, and the scoring was supported by behavioural registrations from direct observations.

Rapid eye movement (REM) sleep and alert wakefulness shared similar features of desynchronized waves with varying high and low frequency and could be separated on account of the EMG data. Non-rapid eye movement (NREM) sleep displayed low frequency waves, sometimes with slow wave activity.

The recorded data showed that it is possible to distinguish between different vigilance states in dairy cows using non-invasive EEG-technique but not by behaviour registrations alone.
There is little experimental data about indoor inhalable airborne particle concentrations, particularly respirable airborne particles (< 2.5 µm), in uninsulated loose housing large scale dairy farms. The fine respirable airborne dust is considered to be one of the potential risk factors for animal and human health, as dust may penetrate into the alveoli through the respiratory tract.

Microclimate parameters (temperature, °C; relative humidity, %; carbon dioxide and ammonia, ppm) as well as inhalable (PM total, PM10) and respirable (PM2.5, PM1.0) particulate matter concentrations (µg/m³) were measured in nine large uninsulated loose housing cowsheds once per month on five dairy farms in Estonia over the period from September 2008 to August 2009. The number of animals in the buildings varied between 300 and 600. The concentrations of inhalable and respirable particles, carbon dioxide and ammonia were measured at a height of one meter from the floor, at 8 to 13 locations, depending on the size of the building, for 10 minutes per measuring site. Interior air concentration of carbon dioxide provided the basis for indirect assessment of the effectiveness of the ventilation in the dairy buildings.

The mean PM total concentration was 0.21 mg/m³; PM10-0.07 mg/m³; PM 2.5-0.02 mg/m³ and PM1.0-0.01 mg/m³ respectively. Seasonal variation between summer and winter time is clearly apparent. The particulate matter (all fractions) and carbon dioxide concentration were higher and ammonia concentration was lower in the winter time. The concentration of PM1.0, PM2.5 and PM10 was strongly correlated with the concentration of total particulate matter concentration (r=0.174***; r=0.379*** and r=0.796***). There was also a strong positive correlation between the concentrations of all particulate matter fractions and carbon dioxide concentration (r=0.395***; r=0.377***; r=0.403*** and r=0.463***). Ammonia in the air inside the cattle sheds was more strongly correlated with the concentration of the fine fractions of PM (r=0.045**; r=0.205***; r=0.155*** and r=0.086***). No statistically significant relationship was found between the total concentration of PM and the indoor temperature or relative humidity in the cattle sheds (r=-0.136 and r=-0.135). Raising the indoor temperature significantly reduced the concentration of PM1.0; PM2.5 and PM10 (r=-0.263**; r=-0.346** and r=-0.261**). The correlation between the indoor temperature and carbon dioxide concentration was also strongly negative (r=-0.691***). The temperature and the concentration of ammonia inside the cattle buildings air had a positive correlation (r=0.355**). The smaller the diameter of particles is, the more movement of these from the outside environment into the barn. The correlation between the inside and outside concentration was stronger for the fine fractions, r=0.208 (PM10) and r=0.365** (PM2.5) respectively.
THE IMPACT OF TRANSITION TO A NEW HOUSING SYSTEM ON MILKING COWS’ BEHAVIOUR PATTERNS

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The aim of the study was to evaluate the behavioural changes during the adaptation process in a dairy herd after cows’ transition from tied housing to loose housing. The initial farm used a tethered system; the cows were milked and fed twice daily and were not at pasture during the summer. After introduction to a new loose housing environment, the cows were divided into four groups. Cows with serious health problems were not relocated. During the first month cows were milked twice daily, after which they were milked three times per day. In the new environment the cows were fed a total mixed ration twice daily \textit{ad libitum}. The cows were Estonian Holstein and Estonian Red breeds and they had not been dehorned before transition.

The study was conducted over two months with six five-day observation periods. During the first month there were breaks of two days’ duration between the first four observation periods, after which there was a three week break and followed by two five-day observation periods, with two days break between them. Cows were observed between milking times (12.00-16.00). All the following behaviours were recorded with instantaneous recordings at 10 minute intervals during the study: lying, eating, walking, sleeping, ruminating and vocalizing. The location of cows within the group area while standing, ruminating or lying was also recorded. Of social behaviours, aggression and allogrooming were recorded.

During behavioural observations lameness scoring and skin lesions were recorded three times per week throughout the study. Health recordings from the farm veterinarian and milk production data from the Estonian Recording Centre were collected for the two years before transition and for the two years after transition.