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***Edited by
Hannu T. Korhonen, Satu Raussi,
Laura Hänninen & Matti Heikkilä***

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Organising Committee

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Finnish Society for Applied Ethology

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Programme

Wednesday, 18th January

Chairman: Jaakko Mononen

- 12:00 – 13:00 Lunch
- 13:00 – 14:00 Main topic: Diversity of sleep manifestations among mammalian species
Irene Tobler
- Presentations 20 min + 10 min discussion
- 14:00 – 14:30 The effect of milk feeding method on calves' behavioural sleep
Laura Hänninen
- 14:30 – 15:00 Social behaviour in group housed dairy bulls
Lena Lidfors
- 15:00 – 15:30 Coffee

Chairman: Louise Holm

- 15:30 – 16:00 Does paddock size and exercise affect the behaviour and activity of the domestic horse?
Grete Meisfjord Jorgensen
- 16:00 – 16:30 The use of shelter by suckler cows and heifers during winter
Anneli Olarsbo
- 16:30 – 17:00 Combined effects of waterbaths and pair-housing on stereotypies in juvenile mink
Maarit Mohaibes
- 17:00 – Discussion
Dinner
Sauna

Thursday, 19th January

Chairman: Laura Hänninen

- 08:30 – 09:00 The bonding between foster cows and their calves in relation to the social interactions after nine weeks together
Marianne Nielsen
- 09:00 – 09:30 Effect of restricted suckling on feed intake, growth and behaviour of dairy calves
Helena Hepola
- 09:30 – 10:00 Behaviour of calves after regrouping - the effect of group size
Gry Færevik

10:00 – 10:30 Coffee

Chairman: Per Peetz Nielsen

- 10:30 – 11:00 Measuring animals' preferences by double demand curves: The importance of a food feedback in rooting materials for pigs
Louise Holm
- 11:00 – 11:30 Light source preferences in laying hens
Matti Heikkilä

11:30 – 12:30 Lunch

Chairman: Gry Færevik

- 12:30 – 13:00 A review of recent Norwegian studies of the effects of harpooning on Minke whales in the North Atlantic
Andy Butterworth
- 13:00 – 13:30 Production animal welfare - farmers' attitudes and practices
Tiina Kauppinen
- 13:30 – 14:00 Assessing welfare of organic laying hens in Finland with resource-related and animal-related methods
Ulla Holma

14:00 – 14:30 Coffee

Chairman: Matti Heikkilä

- 14:30 – 15:00 The effect of maternal stress in chickens on the development of behaviour in their chicks
Andrew M. Janczak
- 15:00 – 15:30 Bone as an enrichment in blue foxes
Tarja Koistinen
- 15:30 – 16:00 Sow and piglet lesions on two concrete flooring materials during lactation
Marianna Norring
- 16:00 – Summary of symposium

ABSTRACTS OF ORAL PRESENTATIONS

According to programme order

**“THE GREATNESS OF A NATION AND ITS MORAL PROGRESS CAN BE
JUDGED BY THE WAY ITS ANIMALS ARE TREATED”**

(Mahatma Gandhi)

The effect of milk feeding method on calves' behavioural sleep

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Our aim was to study how calves' sleep could be affected by the milk feeding and housing methods. Forty-one calves were housed for four days p.p. either with their dam (DAM), or individually fed through a teat-bucket (TEAT) or an open bucket (BUCKET). DAM calves suckled their dam freely and BUCKET and TEAT calves received colostrum 4 * 2 litres per day.

Calves' resting behaviour and behavioural sleep were video recorded continuously during 2-3 days of age. Total time spent resting in different postures as well as behavioural sleep (BS) was recorded. Total BS was scored when calves had been at least 30 s resting head lifted still (quiet sleep, QS) or resting head against body or ground (active sleep, AS). In addition, mean daily latencies from the end of milk feeding to the start of BS were counted. The differences between TEAT and BUCKET or DAM were analysed with mixed models.

No effect was found on total BS between treatments: The calves slept daily (mean \pm se) 12hr 59 min \pm 1hr 38min. However, BUCKET calves had less QS than TEAT calves (378 \pm 45min vs. 468 \pm 45 min, $p < 0.05$), and also longer latencies from milk ingestion to BS compared to TEAT calves (22.9 \pm 1.9 min vs. 16.2 \pm 0.8 min, $p < 0.05$). No statistical differences were found between TEAT and DAM calves.

We concluded that possibility to suck milk increased the amount of calves' behavioural quiet sleep and sleepiness after feeding, possibly due to suck-induced hormonal effects.

Behaviour of young dairy bulls under group housing conditions

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Under natural conditions young bulls leave the maternal herd after sexual maturity. They usually form bachelor groups and a group size of 2-10 bulls when aged 3-4 years has been reported from several studies. Housing of dairy bulls when waiting for progeny testing has been discussed, as they in previous time often were kept in tie stalls. They could then not interact socially with other young bulls and freedom of movement was restricted. At Svensk Avel group housing of bulls from 1.5-4 years of age has been applied for many years. However, social competitions and interactions sometimes cause single bulls to be harassed by one or several of the other bulls in the group. The aim of this study was therefore to investigate what two breeds of young dairy bulls waiting for their progeny testing were doing in general and how they interacted socially with each other with special reference to if any bull appeared to be bullied by the others in the group.

The study was carried out at Svensk Avel, a semen collection centre, in South-west of Sweden. Totally 163 bulls of Swedish Holstein (SH) and Swedish Red Breed (SRB) aged 1.5-4 years were studied. The bulls were housed in groups of 7-12 bulls/pen in 16 pens in two half open buildings. All pens were 110 m² (10 x 11 m), and divided into a bedded lying area and a concrete feeding area with lockable feeding gates. Pens were surrounded by pipe rails of 2 m height which allowed social contact between bulls in neighbouring pens. Before observations started bulls were given a number on their shoulder with a white water based colour. Behaviour was observed one hour 10-11 or 11-12 and one hour 15-16 or 16-17 during 4 days within the same week for each pen, thus giving a total of 8 h. observation time. During each observation hour number of bulls performing general behaviour was recorded instantaneously at 5 min. intervals and social behaviour was recorded continuously. The bulls were divided into three age groups, i.e. 2, 3 and 4 years old. Statistical analysis was done with Wilcoxon Rank Sum test for the general behaviour and analysis of variance using the generalized linear mixed model (PROC GLIMMIX) for the social behaviour.

The results on general behaviour show that the bulls were mainly ruminating (22% lying, 12% standing), standing (24%), eating (23%), lying (9%), walking (4%) and drinking water (3%). Only few recordings were made on licking salt stone (1%), rubbing against bars (0.7%), abnormal behaviour (0.4%, i.e. tongue rolling and biting bars) and rubbing against wall (0.06%). The percentage of bulls lying was higher in the 2 years than the 3 years old bulls ($p < 0.05$) and tended to be higher in the 2 years than in the 4 years old bulls ($p = 0.07$). Ruminating standing was recorded for a higher percentage of 3 year old than 2 year old bulls ($p < 0.05$). Licking salt stone tended to be recorded for a higher percentage of 2 year old than 4 year old bulls ($p = 0.07$). There were only minor differences between the age groups for some other behaviours and no differences at all between the SH and SRB breeds. The aggressive behaviours "hard pushing", "head pressing" and "butting" were very frequently performed by the bulls. Mounting was significantly affected by age group ($p < 0.05$), and was most common in 2 (0.42 no./bull/h) and 3 (0.43 no./bull/h) years old and very low in 4 years old bulls (0.06 no./bull/h).

It is concluded that even though the young bulls performed a quite high level of aggressive behaviours there were no effects of breed or age group and no specific bulls were bullied by the others.

Does paddock size and exercise affect the activity and behaviour of the domestic horse?

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In a 2 x 3 factorial experiment with exercise (no exercise / daily exercise) and paddock size (small: 150 m², medium: 300 m² and large: 450 m²) as main factors we examined the effect on behaviour of horses. The no exercise treatment was imposed for three weeks in June 2004 and the exercise treatment was imposed in three weeks in August 2004. In both these treatment periods nine (3 cold blood and 6 warm blood) adult horses were exposed to all the three paddock size treatments for 2 hours daily in the middle of the day for one week in each paddock size, and the order of paddock size treatments were rotated systematically. Additionally the same horses social activity and behaviour was observed in a large enclosure (2700 m²) with all the nine horses together for four consecutive days.

In the non-exercise treatment period the horses walked significantly more, they travelled a longer distance, explored more and stood more alert in the paddock than in the period with exercise. The horses showed higher activity in the large paddock compared to the medium and the small paddocks), and they also travelled a longer distance. Interestingly the main reason for this increased activity was that the horses ate more grass from under the fence. At low temperatures and rain, the horses were more restless and walked significantly more than in warmer weather. When kept in a social group the nine horses were generally more active, spending less time standing passively and eating more grass than in individual paddocks. Aggressive social behaviours were rarely observed.

Based on the increased activity in the paddocks in the non-exercise period we conclude that daily turnout is important for horses. The size of the paddock seems to be of less importance when comparing paddocks sizes with relatively restricted space allowance. Turnout in social groups may be a good alternative to individual paddocks.

The use of shelter by suckler cows and heifers during winter

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Cattle used for meat production can be held outside all year round and due to the legislation they should have access to shelters or other buildings for protection against the elements. There are different opinions concerning their need of protection and the question about necessity of shelters for cattle is of current interest due to a less profitable economy in meat production and the investment costs for shelters. The aim of this study was to acquire more knowledge about the behaviour of cattle concerning their use of shelters, and questions asked were; when animals choose to stay in shelters, if shelters were used less when they had access to protecting vegetation, how temperature and weather conditions affected the use of shelters and the influence of distance between shelter and feed.

Behavioural studies were conducted at five different farms where six groups of suckler cows and heifers of the following breeds and cross-breeds were observed; Aberdeen Angus, Charolais, Hereford, Scottish Highland Cattle, Simmental, Swedish Polled Cattle and Swedish Red and White Cattle. The group sizes varied between 14 and 58. The farms were situated in different parts of Sweden. The studies took place during four days per group, divided into two separate occasions from February to April 2005. Observations lasted for 4,5 hours/day divided into six periods at dawn, sunrise, lunchtime, afternoon, sunset and twilight. In intervals of five minutes recordings of the number of animals in different areas and of their behaviour regarding standing, walking, lying down and eating took place. Temperature and weather conditions were noted. The percentage of animals performing behaviours in different areas \pm SE were calculated, but further statistical analysis was not carried out.

The average of time spent in shelters by all suckler cows and heifers was 11.7 % and they spent 6 % of the time within 10 m of their shelters. The variation between groups was considerable. The cows used shelters less during daytime and more in the mornings and evenings. Groups who had longer between their shelter and feeding place spent less time in their shelter compared with groups with shorter distances. Groups that were observed in their shelter more frequently during the day had a good overview of the feeding place from the shelter. Group four did not have a clear view, but used their shelter to a proportionately high extent and showed a synchronized behaviour in their use of the shelter. Recordings of animals lying directly on the ground occurred only a few times and mostly they were lying at the feeding place, areas with straw, in the shelter or within 10 m of shelter. The mean value of all the groups using shelters during the first observation time was 9.1 % (\pm 0.55). The temperature during this period was mostly below zero ($^{\circ}$ C) and the weather was windy and included snowfall during some of the observation periods. The mean value of all the groups using shelters during the second observation time was 14.2 % (\pm 0.90). The temperature during this period often was above zero and the weather was windy with snowfall and quite a lot of rain.

In conclusion, suckler cows and heifers used shelters less during daytime. They seemed to use them more depending on moist conditions like snow and rainfall than to low temperatures and they also seemed to prefer lying on straw than directly on the ground. They used shelters although they had access to protective vegetation and the distance between feeding place and shelter seemed to have an effect on the use of shelters. A clear view between shelters and feeding places seemed to increase time spent in shelters. The construction of the shelter may influence the availability of the shelter to the individual animal. No tendencies were shown concerning differences between breeds in the use of shelters.

Combined effects of water baths and pair-housing on stereotypies in juvenile mink

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Recently farmed mink's need for swimming has been investigated intensively. Although pair-housing of juvenile mink is a well-established practice on fur farms, most swimming experiments in juvenile mink have been carried out with singly-housed animals to facilitate collecting data from individual animals. In our previous study we found that water baths may reduce stereotypies in singly-housed juvenile mink. In the present study we investigated whether the putative frustration-reducing effect of the swimming opportunity is influenced by the social situation, i.e. singly-housing vs. pair-housing, of the animals.

There were 40 juvenile female mink in the study. Half of them lived with their brothers and half singly. Each female-male pair or singly-housed female had a standard cage (85x30x45 cm, LxWxH) with a standard nest box (27x31x39 cm) with bedding. Water baths (180 l, water depth 30 cm) were provided to pair-housed (WP, n=10) and singly-housed (WS, n=10) mink in a neighbouring “bath cage” (102x60x45 cm). There were both pair-housed (CP, n=10) and singly-housed (CS, n=10) control animals. Stereotyped behaviour of the females was recorded with instantaneous sampling (4-6 min sampling interval) from five 24-hour periods: NO BATH 1 = before access to the bath was opened (August), BATH 1 = ten days after the access had been opened (August), NO BATH 2 = on the tenth day of a two-week deprivation period from the bath cage (September), BATH 2 = ten days after the access was re-opened (October) and BATH 3 = in the end of the experiment (November).

Pair-housed mink developed less stereotypies than singly-housed mink in both water bath and control groups. WP mink developed less stereotypies than CP mink, but there was not clear difference between the WS and CS groups. The effects of the two-week swimming deprivation were rather ambiguous: it was difficult to differentiate the effect of deprivation from the “normal” increase in stereotypies in the course of the autumn.

Table 1. Stereotyped behaviour as % of observations, mean±SD. P1= Kruskal-Wallis test between the groups; P2 = Friedman test between BATH1, NO BATH2 and BATH2.

Circumstances in bath groups	Group				P1
	WP (n=10)	CP (n=10)	WS (n=10)	CS (n=10)	
NO BATH 1	0.3±0.1	0.2±0.4	1.2±1.5	1.1±2.7	0.012
BATH 1	0.2±0.3	0.6±1.0	1.6±2.3	3.1±5.3	0.237
NO BATH 2	0.4±0.7	2.5±3.1	5.1± 5.1	5.4±5.7	0.051
BATH 2	0.4±0.7	2.7±2.5	3.3±3.8	5.0±5.1	0.011
BATH 3	0.4±0.9	2.8±3.7	5.5±8.5	5.6±6.0	0.030
P2	0.317	0.001	0.026	0.039	

It is obvious that social deprivation frustrates juvenile farmed mink. This may obscure the true effects of water baths on mink's stereotypies in experiments with singly-housed mink. The positive effects of water baths on mink's behaviour are more evident when the mink are housed in pairs.

The bonding between foster cows and their calves in relation to the social interactions after nine weeks together

Marianne Helene Nielsen

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The aim of this study was to investigate if a foster cow establishes a stronger bond to a specific calf among four alien calves in a group. Establishing a stronger bond to one calf in a group may affect other calves and become detrimental and lead to poor well-being. The predictions for establishing a stronger bond between foster cow and calf is when the calf receives most affiliative and least agonistic behaviour; as well as keeps most social contact with the foster cow; and stays in the vicinity of the foster cow most often; as well as being allowed to suckle.

The investigation was performed on 11 cows and 43 calves; 5 cows and 15 calves of Swedish Red Breed (SRB), and 6 cows and 28 calves of Swedish Holstein (SH). The foster cows were kept individually in pens with four alien calves, which were around one week old when placed with the foster cow. When the calves had been together nine weeks the foster cows and calves were video filmed for 12 hours (8.00-20.00), and the social behaviour of the foster cows and calves was observed from the video film. The distance between the calf and the foster cow was recorded at ten minutes intervals, and the number of the foster cow's licking, threatening, pushing, butting and brutal butting, as well as the calf suckling the foster cow was continuously recorded. In addition the calf's number of approaching, sniffing, licking and rubbing the foster cow was continuously recorded. From the direct observation the foster cow's number of times the foster cow was sniffing the calves was recorded. An index of all the measurements was created in order to test the hypothesis. Also Chi-square Distribution Test and Spearman Rank Correlation Test were used.

The present study showed that a stronger bond was established between a foster cow and only one calf in each of six groups; in two groups the foster cows had established a stronger bond to two calves; and three groups were more equal, without a clear preference towards any calves.

A negative correlation between foster cows performing agonistic behaviour towards calves and foster cows licking calves was found ($p = 0,014$). A positive correlation between calves being social with the foster cows and foster cows licking calves was found ($p = 0,001$). A negative correlation between calves being social with the foster cows and foster cows threatening calves was found ($p = 0,014$). A negative correlation between calves being distant the foster cows and calves being close to the foster cows was found ($p = 0,023$). The calves did not spend an equal amount of time close to the foster cows, and the hypothesis was rejected in 8 out of 11 groups. However, there was a positive correlation between foster cows threatening calves and calves suckling the foster cows ($p = 0,048$).

It was concluded that foster cows varied in the maternal bonding to individual calves and some foster cows established a stronger bond to one calf, than to the other calves in their groups.

Effect of restricted suckling on feed intake, growth and behaviour of dairy calves

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Effect of different weaning times on feed intake, growth and behaviour was studied when the calves were allowed to suckle their dams for a restricted time after milking. Effect of weaning on the behaviour of dams was also studied. There were 18 calves and their dams in the experiment. The calves in Group 1 suckled their dams for five weeks twice a day. They were allowed to suckle two hours after morning and evening milking. After five weeks the calves were allowed to suckle still three weeks but only after morning milking. The calves in Group 2 suckled their dams during five weeks like the calves in Group 1 and were abruptly weaned after that. The calves in Group 3 received their milk from teat-buckets and the milk amount given was estimated according to the milk amount suckled in the other two experimental groups.

On the fifth week of the experiment the calves in Group 1 suckled milk on average 7.4 kg per day and 8.4 kg per day in Group 2. After weaning consumption of dry feed was low and the growth decreased for a while, especially when weaning was at the age of five weeks.

Calves were restless after weaning according to their behaviour, however, differences between individuals were considerable. Totally weaned calves vocalized mostly on the first day after weaning. Decreasing suckling times from two to one per day on the fifth week did not effect on calves' vocalizations. The cows vocalized mostly on the weaning day (weaning abruptly at the age of five weeks) and on the first day after weaning (weaning at the age of eight weeks). Omitting one suckling time on the fifth week did not effect on cows' vocalizations. The calves lay down less when they were totally weaned. However, omitting one suckling time did not effect on their lying behaviour. Weaning did not effect on cows' lying behaviour. The cows reduced their silage intake when the calves were weaned abruptly at the age of five weeks.

Restricted suckling of calves is possible also in the tie-stall barn but requires extra work when the calves must be guided to their dams. Strong bond is established between calf and dam also during restricted suckling. As the calves were allowed to suckle after milking of the dams, some cows withheld milk during milking which made milking more difficult. Weaning increased restlessness of both calves and cows, which was seen on their behaviour.

Behaviour of dairy calves after regrouping – the effect of group size

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Common practice of regrouping of cattle (transfer of animals between groups or introduction of new animals into an established group) has been found to cause aggression and disruption of circadian rhythms (Tennesen et al., 1985; Veissier, et al., 1989; Mench et al., 1990; Hasegawa et al., 1997; Raussi et al., 2005). Compared to semi-mature and adult cattle, calves react to regrouping with less aggression and the social disturbance appears to be limited to immediately after regrouping (Veissier et al., 2001). However, newly weaned calves are vulnerable to environmental changes, and only few days with reduced feed intake and inadequate rest because of social disturbance could be detrimental to calf health and welfare. The objective of this study was to investigate how group size influence general behaviour and time before behaviour stabilization after regrouping of calves.

Newly weaned dairy calves were put together in groups of 4, 8 or 16 animals in which half of the calves were unfamiliar to each other. The design of three treatments was replicated three times, using a total number of 84 calves. Average age at weaning was 58.63 ± 0.71 days, and the age difference between the youngest and the oldest calf in each group was kept as low as possible. The experimental pens consisted of a straw bedded resting area and an activity area with concrete floor. The pen area and the number of eating- places (one per calf) were kept constant for all group sizes. Each calf had access to a total resting area of 1,5 m².

All calves were weighed before and after the experimental period and the calves' behaviour was video recorded for 24 h on day 1, 2, 3, 4, 8 and 12. Preliminary results from the experiment will be presented at the symposium.

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Measuring animals' preferences by double demand curves: The importance of a food feedback in rooting materials for pigs

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Animals' behavioural needs and preferences can be measured by operant conditioning techniques. Test animals are trained to work, e.g. by pressing a lever, in order to obtain a reward (i.e. a resource) that enables performance of a given behaviour. When allowing animals to work for two resources simultaneously two crossing demand curves ('double demand curves') can be obtained. A demand curve describes the decrease in no. of rewards obtained as a function of increasing workload (Fixed Ratio (FR)). The cross-point between double demand curves depends on the relative attractiveness of the two resources and can thus be used as a quantitative measure of preference.

According to the EU legislation all pigs must have permanent access to a material that allows proper investigation and manipulation activities. Pigs investigate their environment by sniffing, rooting, and chewing on items, ingestible as well as non-ingestible. The investigatory behaviour is performed either with a direct aim of obtaining food, or in order to obtain information about resource accessibility. An earlier study revealed a preference in ad lib fed pigs for straw mixed with maize silage over e.g. straw. The maize silage contains pieces of corn that the pigs find and ingest while rooting. Thus, even when pigs are not motivated by hunger, feedback from food particles may be an important quality of a rooting material.

In the present experiment the double demand curve method was used to test the hypothesis that pigs prefer a rooting material with food feedback to a material without. Furthermore, it was tested if pigs prefer to obtain hidden food and thus to root in order to find and ingest food particles, compared to obtaining food directly. Ten ad lib fed test pigs worked for two different materials simultaneously in daily 50-min test sessions. The workload was varied from test session to test session between FR 8, 16, 24, 32, and 40 for one material and kept constant for the other at FR 24. The curves would cross in FR 24, the 'midpoint' of the workload scale, if the materials were equally preferred. The compared materials were sand (S), carrots (C), and sand mixed with carrot pieces (SC). Thus, the materials varied according to whether the pigs could both root and eat (SC), or whether they could only root (S) or only eat (C). All materials were tested in all possible combinations, i.e. SC vs. S, SC vs. C, and C vs. S. Three replications of the five FR values were conducted.

Linear double demand curves were constructed in log-log scales. It was found that SC was preferred to S because the cross-point for SC vs. S was significantly higher than the midpoint ($P < 0.001$). Furthermore, SC and C were preferred equally since the cross-point for SC vs. C did not differ significantly from the midpoint ($P = 0.21$). Finally, C was preferred to S because the cross-point for C vs. S was higher than the midpoint ($P < 0.001$). The cross-points for SC vs. S and C vs. S did not differ significantly ($P = 0.23$), which indicate that SC was preferred to the same degree over S as C was preferred over S. Overall the results support earlier experiments showing that pigs possess a need for rooting since they are willing to work hard in order to obtain a rooting material. In addition, the experiment showed that pigs highly preferred a rooting material with food feedback to a material without. Furthermore, they valued non-hidden and hidden food equally. Food feedback thus appears to be a very important quality of rooting materials for pigs, even when fed ad lib.

Light source preferences in laying hens

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Most severe behavioural problems (feather pecking and cannibalism) in loose housing systems for laying hens originate from the rearing period. In organic egg production, natural light is compulsory during the laying period, but not during the rearing. There is little knowledge about the effect of different light sources on behavioural development. The effect of early exposure to natural light may have an effect on the preference of light type later in life. The aim of this experiment was to study the light source preference in laying hens reared in either artificial or natural light.

126 LSL-chicks were divided into 3 light treatments (in total 18 pens): ¹ A8: 8 hours artificial light + 16 hours dark, ² A16: 16 hours artificial light + 8 hours dark and ³ N8: 8 hours natural light + 16 hours dark. Birds were reared in these light treatments for the first 14 weeks of their life. At that age, the birds' light type preference on a group level was tested by connecting two adjacent pens with a tunnel, which gave birds access to both natural and artificial light. Birds were video recorded for 4 hours before changing the side of light sources and doing another 4-hour recording. Data was scored using scan sampling (5-min interval) and it was analysed using ANOVA.

There was no difference in body weight of the chicks in different treatments at the age of 14 weeks. Chicks reared in artificial light spent significantly more time in artificial light than chicks reared in natural light [$p = 0.02$ (A8 vs. N8), $p = 0.01$ (A16 vs. N8)]. N8-chicks spent equal amount of time in natural and artificial light.

These results showed that chicks reared in artificial light preferred artificial light at the age of 14 weeks. This supports the idea that chicks for organic egg production (with access to natural light) should also be reared with access to natural light, but there is still a need for long-term studies on this. The results may also imply that birds reared with access to natural light are more adaptable to a changing light environment.

A review of recent Norwegian studies of the effects of harpooning on Minke whales in the North Atlantic

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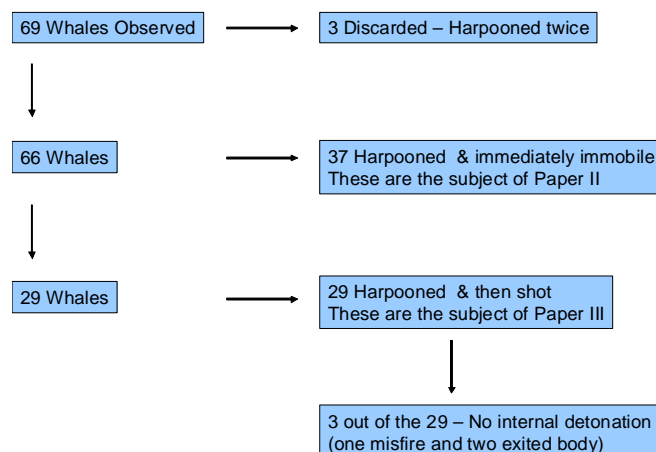
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In the scientific papers^{1,2,3,4} and PhD thesis⁵ which are reviewed in this report, Siri Knudsen and her co-authors, Egil Øen and Sverre Mørk present a comprehensive study of the effects of harpooning during the hunting of minke whales in the North Atlantic. A number of reviewers (expert in their relevant fields) were asked to write concise summaries of the findings of the reports contained in Dr Knudsen's papers^{1,2,3,4}, and the PhD thesis which resulted from these studies⁵. The reviewers found that the histological and pathological techniques used were well executed and that the histological and pathological findings were accurately reported. The authors demonstrate a broad knowledge of related literature, including the criteria for determination of death in humans, food animals and cetaceans. The reviewers found that a comprehensive series of studies had been carried out, and that these resulted in a number of scientific papers published in peer-reviewed neuroscience journals. A digest of the statistical findings is presented and the reviewers discuss the method by which the animals were selected and also discuss the validity of the generalised conclusions made in the studies. A summary of the animals and material described in the review is provided below.



Reviewed Material

¹ Knudsen S K, Mørk S & Øen E O (2002) A novel method for in situ fixation of whale brains. *Journal of Neuroscience Methods* 120:35-44

² Knudsen S K & Øen E O (2003) Blast induced neurotrauma in whales. *Neuroscience Research* 46:377-386

³ Øen E O & Knudsen S K (2003) Euthenasia of whales. Wounding effect of calibre .375 and .458 round-nosed full metal jacket rifle bullets on minke whale (*Balaenoptera acutorostrata*) central nervous system. Submitted to *Journal of Cetacean research and Management*

⁴ Knudsen S K (2005) A review of the criteria used to assess insensibility and death in hunted whales compared to some other species. *The Veterinary Journal* 169, 1, p42-59

⁵ Knudsen S K (2004) Assessment of insensibility and death in hunted whales. A study of trauma and its consequences caused by the currently used weapons and ammunition in the Norwegian hunt for minke whales, with special emphasis on the central nervous system. PhD Thesis - The Norwegian School of Veterinary Science, Dept of Arctic Veterinary Medicine.

Production animal welfare – farmers’ attitudes and practices

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Are farmers’ attitudes and production animals’ welfare related? What kinds of attitudes do farmers have regarding the improvement of production animal welfare? How do farmers define production animal welfare? How do farmers view their own possibilities to improve animal welfare?

Production animal welfare is an important issue in society today. Although welfare is influenced by several actors, farmers are in key position determining animal welfare as their attitudes define their willingness to improve animal welfare. Increased size of production units and decreased economic viability may affect working ability and motivation of farmers which furthermore can affect their behaviour towards animals and thus animal welfare. Attitude has in many studies been shown to have a significant effect on the stockperson’s behaviour and furthermore on animal welfare and productivity.

In our preliminary study we explored farmer’s attitudes towards production animal welfare at 9 Finnish pig production farms and 9 dairy farms in 2005. One researcher interviewed the farmers while another observed animals’ living environment, technological solutions on farm, methods used to taking care of animals, and animals’ behaviour and expressions of fear and aggression. By interviewing we wanted to explore farmers’ attitudes towards improving the welfare of their animals. We used the method of qualitative attitudes interview (developed by Rantanen & Vesala 1999). We asked farmers to comment several statements regarding production animal welfare. By this procedure we were able to study how an informant defines the target of attitude and how he/she justifies his/her evaluations.

As a tool for analysis we used a theory of Fishbein and Ajzen (1975). According to them, person’s intention determines if he/she will act upon his/her attitude. Intention is determined by norms (EU, neighbours, consumers, other farmers) and person’s evaluation of his/her possibilities to act according to his/her attitude. We searched relations between evaluations and justifications and tried to find larger attitudinal dimensions embracing different statements and respondents.

We found several dimensions of attitudes, some of them being contradictory but not always exclusive. In general, animal welfare seemed to be in harmony with or in contrast to farmer’s interests. The most apparent dimensions were:

Moralistic view: Improving animal welfare is important because of animals themselves.

Utilitarian view: Improving animal welfare is important because it is economically productive. **Farmer CAN improve farm animal welfare:** associated with farmer’s own attitudes and motivation, networks and collaborators, and farmer’s responsibility to take care of his/her health. **Farmer CANNOT improve farm animal welfare:** associated with farmers’ limited resources (time, skills, money, health) and increasingly competitive markets.

By interviewing we found out how farmers see the importance of improving production animal welfare, how they consider their possibilities to act to improve animal welfare and do they believe they can affect the welfare of their animals. Our following step is to compare these attitudinal dimensions with the animal observation data and find links between attitudes and practices of different farms and farmers. By studying the connection between attitudes, animal welfare, productivity and profitability we can find methods to motivate farmers to improve animal welfare.

Assessing welfare of organic laying hens in Finland with resource-related and animal-related methods

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The objective of this study was to assess the welfare of organic layer flocks in Finland and to compare resource-related methods with animal-related methods.

A total of 20 out of 23 organic layer farms that sold eggs to consumers through egg packaging companies or food shops took part in the research. Data was collected during two farm visits (autumn 2003 and winter-spring 2004) by interviewing the producer, using a semi-structured interview guide, making environment and animal-based observations and collecting samples. Resource-related methods in this study were ANI 35L/2001 (Bartussek, 2001), housing environment and litter moisture and animal-related methods hen scoring (20–50 hens/flock, all together 911 hens) (Gunnarsson et al. 1995), flock-level fear of humans (assessed as reaction of birds to researcher (tame, distant, fearful)) and hen weight. Correlations (Spearman's rho) between different parameters were calculated and an ordinal regression model was used to model significant interactions further. The farm averages of hen scoring variables were changed to logistic (0/1). Hen hybrid was added to the model.

The hen number at farms varied between 150 and 5,072, and 55% of farms had fewer than 1000 hens/flock. Hens were not beak trimmed. The two most popular hybrids were Lohmann white LSL (40% of flocks and 67% of hens in 2004) and Hy-Line Variety Brown (35% of flocks and 13% of hens). The overall ANI score varied between 15.5 and 31 points, on average 24.8 points (2003) and 23.9 points (2004). Housing environments were mainly according Finnish recommendations. Litter moisture was acceptable, on average 22 % (2003) and 25 % (2004), but was more than 30 % in 3 (2003) and 5 (2004) hen houses. Feather status and skin status were, by and large, good. Moderate wear of feathers on back, wings and/or tail were seen in 1.4–16.9% (2003) and 2.3–29.4% (2004) of scored hens and featherless areas were seen in 0.7–8.1% (2003) and 0–9.6% (2004) of scored hens on average. Pecks at the skin of back, wings, tail, belly and/or cloacae were found in 0.4–3% (2003) and 0.6–6.1% (2004) of the scored hens on average. According the interviews of producers and observations during farm visits signs of feather pecking and/or cannibalism were seen in three (2003) and two (2004) different flocks. In 2003 and 2004, there were 10 and 8 tame, 7 distant and 2 fearful flocks. Total ANI-score did not correlate with any single variable from the hen scoring nor with flock-level fear of humans ($p < 0.1$ for all). When analysing the five ANI fields and flock-level fear of humans two categories remained: 'locomotion' ($r = -0.86$, $P = 0.01$) and 'stockmanship' ($r = 0.51$, $P = 0.05$).

Feather pecking and cannibalism found during farm visits seem to be at lower level than in some other investigations, even though the hens were not peak trimmed. The analysis gave only few interactions between environment-related and animal-related methods. To assess animal welfare both animal-based and environment-based methods have to be considered.

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The effect of maternal stress in chickens on the development of behaviour in their chicks

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This experiment tested the hypothesis that exposing hens to stress increases their corticosterone secretion and leads to elevated corticosterone concentrations in their eggs. Furthermore, exposure to stress and the associated changes in egg hormone content was predicted to alter offspring behaviour. Parental hens were forty White Lohmann Selected Leghorns, half of which were exposed to an unpredictable feed restriction treatment. After application of the treatment, birds in the treatment group had higher concentrations of faecal corticosterone metabolites than birds in the control group. The treatment had no effect on the weight of treated birds or on the concentration of corticosterone in the yolk or albumen of their eggs. Sixty progeny (30 per treatment) were tested for effects on growth and behaviour. No effects of the treatment on the hatchability of eggs or progeny body weight were registered, but treated birds had a higher duration of tonic immobility in response to manual restraint and spent less time eating, when competing with birds from the control group for access to feed in a novel environment. These results confirm that pre-hatch stress may influence behavioural development in chickens. The lack of an effect on the concentration of corticosterone in eggs suggests that other steroid hormones in addition to or rather than corticosterone may mediate the effects of pre-hatch stress in chickens.

Bone as an enrichment in blue foxes

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Farmed foxes are conventionally fed with soft feed paste, which does not require chewing. It is recommended that the housing environment of farmed foxes is enriched with an object to stimulate gnawing and play. Conventionally, wooden blocks are provided. However, sticks get loosened from the blocks and cause irritation in digestive tract, which may compromise animal welfare in the long run. Bone is a more natural gnawing object. We assessed the enrichment value of bone for farmed blue foxes.

There were eight male-female blue fox sibling pairs in the experimental group and eight corresponding pairs in control group. From July onwards, the pairs were housed in cage systems consisting of two traditional fox cages (115 × 105 × 70 cm, W × L × H). The foxes could move between the cages through an opening between the cages. The experimental foxes had two bones (cattle *femur*) in one of the cages (bone cage), whereas both cages were empty in the control group. The foxes were deprived of the bone for ten days in August and October. The behaviour of each fox was video recorded for 24h on seven occasions. The recordings were done two days before each deprivation started (BD₁, BD₂), on the fourth day during each deprivation (DD₁, DD₂), on the first day after each deprivation (AD₁, AD₂) and in December (DE). Behaviour was analysed by using instantaneous sampling with a sampling interval of five minutes. The choice experiment set-up (BD_{1,2} and DE) and deprivation procedure (BD_{1,2}, DD_{1,2} and AD_{1,2}) were analysed separately by using general linear model for repeated measures (SPSS 11.5).

The experimental foxes were less ($P = 0.01$) in the bone cage ($41.1 \pm 3.8\%$ of observations, mean \pm SD) than the control foxes in the corresponding cage ($57.2 \pm 3.8\%$). The experimental foxes showed less ($P = 0.006$) stereotypies ($2.1 \pm 0.3\%$) than the control foxes ($3.6 \pm 0.3\%$). The interaction with the bone decreased ($P = 0.033$) as the autumn proceeded (BD₁: $4.3 \pm 1.0\%$, BD₂: $4.4 \pm 0.7\%$, DE: $2.5 \pm 0.5\%$). The most common interaction with the bone was gnawing (64.9% of interaction). Deprivation increased stereotypies in the experimental animals (BD_{1,2}: $0.9 \pm 0.2\%$, DD_{1,2}: $2.6 \pm 0.2\%$, AD_{1,2}: $1.0 \pm 0.4\%$, mean \pm SE), whereas no change in the control animals was found in the corresponding recordings (BD_{1,2}: $2.0 \pm 0.2\%$, DD_{1,2}: $2.0 \pm 0.2\%$, AD_{1,2}: $2.7 \pm 0.4\%$) (day×group interaction: $P = 0.001$). A rebound effect in the interaction with the bone was found after deprivation (BD_{1,2}: $4.3 \pm 0.7\%$, AD_{1,2}: $13.4 \pm 0.7\%$, $P < 0.001$).

Blue foxes used bone for gnawing. However, the foxes tended to avoid the cage with the bones. This may indicate that the foxes regarded the bones as food items which can not be eaten or hidden, which may have frustrated the foxes. On the other hand, the large bones may have hindered proper lying postures in the bone cage, since the bones occupied too much space from the cage. The increased interaction with the bone after deprivation reveals that the foxes' demand for interaction with the bone dammed up during deprivation. The higher level of stereotypies in control animals and the increased amount of stereotypies (mostly oral stereotypies) during deprivation in the experimental animals also support the positive welfare effect of the bone.

Sow and piglet skin, claw and nipple lesions on two concrete flooring materials during lactation period

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Flooring can actually wound pigs especially during farrowing period. Nursing piglets and lactating sows are especially sensitive to the flooring material. During nursing, the piglets' knees are pressed against the floor as support for their vigorous nursing activity. This can cause bleeding wounds on the piglets' knees. Lactating sows often lose weight due lactation and easily get wounds on their shoulders owing to extensive lying. The aim of the study was to investigate the skin, claw and nipple lesions of sows and their piglets while they were kept on two different flooring materials: concrete cement and concrete covered with polyurethane and graveled with sand (particles 0.5 – 1.2 mm).

We evaluated a total of 24 lactations (13 vs. 11). The sows were Landrace and Landrace x Yorkshire of parities 1 or 2. The experiment took place in 4 concrete and 4 polyurethane covered pens where the sows were moved before parturition. The pens were standard farrowing pens with cages, partly slatted floors and nest boxes with heating lamps for the piglets.

Skin lesions on the sows were measured twice: when they entered the experiment around parturition time and at the time of weaning (approximately days 21-28). The severity of lesions was scored according to the following scale: 1 = skin affected but not wounded (redness or thickening), 2 = wounded or destroyed skin. The size of the lesions was measured in two directions with a ruler. In addition, nipple lesions were recorded.

The piglet measurements were made in the middle of the lactation period (days 5-12 postpartum) and in the end (days 21-28). Piglet skin lesions were measured on the front knees and seplocks. Recordings of the number of injured or affected claw halves and damaged nipples were taken. Piglets were also weighted.

Only 7 of 230 piglets were healthy in terms of skin lesions. More wounded hoofs were found at the end of the experiment on sand coating than on concrete (3.8 vs. 11.0, Mann-Whitney test, $P=0.004$). This could be due higher roughness of sand graveled coating compared to concrete (average peak height 0.35 mm vs. 0.49 mm, Mann-Whitney test, $P=0.03$). Despite the different quality of flooring there was no difference in amount of skin or nipple lesions.

The number of piglets affected the proportion of nipple lesion on sows ($F= 7.50$, $df =1$, $P=0.015$, univariate analysis). The more piglets the sow had the more nipple lesions it developed. No correlation between daily weight gain and nipple wounding was found. The number of piglet lesions remained constant (average 32 lesions per litter) but the lesions healed considerably since the number of more severe lesions decreased ($P< 0.001$, t-test) from first observation to second and the number of less severe lesions ($P< 0.001$, t-test) increased from first observation to second. Lesions did not affect the daily weight gain.

There was no difference in lesions between the materials except for the claw lesions. The skin lesions of piglets healed towards the end of lactation period.

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