Swimming Activity of Farm Mink (*Mustela Vison*) and its Relation to Stereotypies

C. P. Bjælke Hansen, L. Lau Jeppesen

Eighty farm mink were used to investigate whether access to swimming water and/or difference in cage size led to a difference in the level of stereotypies. Half of the animals grew up with free access to swimming water, and the other half without. In addition, two different cage sizes were used. Over 2 weeks the animals were scanned a total of 141 times. Animals in small cages had a higher level of stereotypies and were more active than those in large cages. No difference between animals with swimming water and animals with an empty basin was detected. The level of activity was lowest in animals in large cages, although not significantly so when water was present. The results presented here do not offer any support for the claim that farm mink with access to swimming water have a lower level of stereotypies than mink with access to an empty basin. Whether swimming is a behavioural need in farm mink is still debatable.


Effects of Family Housing on Behaviour, Plasma Cortisol and Performance in Adult Female Mink (*Mustela Vison*)

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Various behavioural, physiological and production-related parameters were examined in 200 adult female pastel and pearl mink either family housed in three-room cages with no weaning or housed singly in one-room cages after normal weaning procedures. Scanning observations of behaviour and use of the cages were performed in the nursing period and several parameters related to reproduction were registered. The adult female mink were weighed when kits were 16 weeks old (September) and again at pelting time (November). Blood samples were collected from all adult female mink in September at which time the teat condition and fur damage were evaluated. After pelting, bite marks on the leather side of the skin were counted, fur damage was graded after severity and the fur size was measured. Some positive consequences of being family housed were revealed. The family-housed adult female mink showed a lower level of stereotypes and a higher level of defensiveness and curiosity than the adult female mink in one-room cages during the nursing period. In September and November, family-housed adult females were heavier than singly housed adult females. However, most of the physiological or production-related parameters pointed in a negative direction for family-housed adult female mink. Reproductive success was somewhat reduced, although not significantly. Plasma cortisol levels were elevated in September, indicating higher levels of stress in these females. They showed a generally poor teat condition in September, with a high proportion of swollen or bitten teats. A high proportion of these adult females showed fur damage in both September and November, and a high number of bite marks was found on the leather side of the skins of these females, indicating that family housing had a high cost for the adult female mink. In conclusion, there seem to be some benefits, at least on the behavioural level, in keeping adult female mink in three-room cages during the nursing period, but both physiological and production-related parameters indicated that the welfare of the adult female mink was threatened if she was continuously cohoused with her litter past the normal age of weaning.


Use of Water for Swimming and its Relationship to Temperature and Other Factors in Farm Mink (*Mustela Vison*)

C. P. Bjælke Hansen, L. Lau Jeppesen

An investigation into swimming behaviour and its relationship to outdoor temperature was conducted in 40 ranch mink. Two different cage sizes were used and all animals had access to a basin filled with water 15cm deep. During the years 1994—1998, water lost from the basin and temperatures at a nearby weather station were recorded once a week. In the last year II mink were video-recorded for 24 h. Using the monthly average daily water lots as an indicator, swimming activity showed a clear annual variation over 4 years and was positively correlated with average monthly temperature. With regard to swimming activity, a large individual variation existed: average water loss varied from 10 ml to nearly 4 litres per day, with those in large cage units having the greatest water loss. The video-recordings confirmed this variation: the number of swims...
ranged from zero to 177 during 24 h and there was an indication of more swimming bouts in the mink in the large cage units. The duration of swims varied from 2 to 55 s per bout. The relationship between swimming and general activity is discussed, along with the importance of water for swimming as a means of thermoregulation.


Effects of Space Allowance and Earthen Floor on Welfare-Related Physiological and Behavioural Responses in Male Blue Foxes

H. Korhonen, P. Niemelä, L. Jauhiainen, T. Tupasela

Welfare-related physiological and behavioural responses were studied in farm-bred male blue foxes (Alopex lagopus). Three different-sized cages (80-cm long [CL80], 120-cm long [CL120], and 240-cm long [CL240]; each 105-cm wide x 70-cm high) with wire-mesh floors and one enlarged cage (CL240E) with both wire-mesh floor (240-cm long x 105-cm wide x 70-cm high) and earthen floor (80-cm long x 105-cm wide x 70-cm high) were compared. \(N = 30\) males for each group. The experiments lasted from weaning in July to pelting in December. Statistical analyses were based on the models accounting for litter as a block effect. Breaking strength of tibia was highest for foxes having access to both wire-mesh and ground floors (CL240E). Stress-induced hyperthermia was evident during capture and immobilisation. The highest rectal temperature (mean \(\pm\) SEM) was found in CL240E (capture: 39.6 \(\pm\) 0.09°C, restraint: 40.0 \(\pm\) 0.09°C) and the lowest in CL80 (capture: 39.1 \(\pm\) 0.09°C, restraint: 39.7 \(\pm\) 0.09°C). Likewise, capture time (median; interquartile range) in the home cage was highest in CL240E (29; 18 to 44) and lowest in CL80 (12;9 to 14). During capture, foxes tended to withdraw to the farthest site within the cage. CL240E foxes typically showed the most fear towards human. The most confident animals were found in CL80. The cortisol:creatinine ratio (median; interquartile range) obtained from circadian urine did not reveal statistically significant differences among CL80 (3.5; 2.6 to 4.1), CL120 (2.3; 1.5 to 3.8) and CL240 (2.3, 1.5 to 3.7). The earthen flooring complicated the urine sampling and conclusions for CL240E (1.7; 1.2 to 2.2). CL240E foxes were the most active and explorative on both wire-mesh - and ground-floored open-field arenas. Altogether, 53% of furs from CL240E were classified as very dirty. Dirtiness of furs in other test groups was slight. In conclusion, the present results did not reveal an unambiguous superiority of any of the studied cage options for well-being of farmed blue foxes.


Extent of Digging and its Possible Underlying Causal Factors in Penned Blue Foxes

H. Korhonen, P. Niemelä, I. Wikman

A recent European animal welfare recommendation stresses the importance of studying digging behaviour in farm-born blue foxes (Alopex lagopus). The current study was conducted (1) to clarify the extent of digging and (2) to evaluate factors that motivate digging. In experiment I, six juvenile male blue foxes were housed together from August to the following June in an earthen enclosure. Experiment 2 was conducted from July to December, using ten enclosures each containing two juvenile male blue foxes. Behaviour was monitored by 24-h video recordings and visual observations. Progress of digging was also followed by making scale drawings of all digging marks on paper. As early as the first study day, clear signs of digging were observed. Digging sites were concentrated below and close to nest-boxes and pen walls. Maximally about 20% of the total enclosure area was affected. The total surface area of digging sites did not increase from late summer onwards because foxes tended simultaneously to cover part of the old sites when digging new ones. Motivational tendency to dig varied with time. Digging activity decreased during autumn and almost totally ceased during winter. In May, foxes resumed digging activity. Digging motivation was evaluated by two means: (1) by analysing digging purpose (experiments I and 2), and (2) by the damming-up test (experiment 1), that is, after 10 months foxes that had been exposed to the earthen floor were transferred for 12 days into wire-mesh cages with no possibility to dig in the ground. Thereafter, foxes were transferred back into the earthen enclosure to measure the rebound of digging following deprivation. Foxes were observed to dig for the following reasons: (1) to make a hole...
or a resting site, (2) to locate an escape route, (3) to cache food, faeces, or sticks, (4) in response to a novel object (new nestbox, replacement of nestbox), and (5) displacement without any clear goal. Daily time spent digging averaged 7 mm and 17 mm per fox in Exps. 1 and 2, respectively. A clear rebound effect for digging was not identified. It can be concluded that digging is a complex behavioural pattern caused by a variety of motivations that can vary over time. The present study was unable to show unambiguously that digging is an important need for farmed foxes.


**Physiological and Behavioural Responses in Blue Foxes (Alopex Lagopus) Comparisons between Space Quantity and Floor Material**

H. Korhonen, L. Jauhiainen, P. Niemelä, M. Harri, R. Sauna-aho

Welfare-related physiological and behavioural responses were studied in farm bred blue foxes (Alopex lagopus). Comparisons in space quantity were made between two different-sized shed cages (50 cm long (W50) and 120 cm long (W120); each 105 cm wide x 70 cm high) and for one out-of-shed pen (5 m long x 3 m wide x 1.8 m high; W500). Each option had a wire-mesh floor. Furthermore, we tested how floor material affects responses by comparing the W500 foxes in wire-mesh floor pens with foxes housed in earthen floor pens (E500: 5 m long X 3 in wide X 1.8 m high). Each test group comprised 20 juvenile males maintained in pairs. The experiments lasted from weaning in July to pelting in December. Final body weights of the W500 foxes were significantly lower than those of the W50 or W120 foxes. Claw length of back foot was longer for E500 than for W500 foxes. Posture of front feet was the most folded for W50 and the least folded for E500 foxes. Breaking strength of tibia was highest for foxes housed on the earthen floor (F500). Gastrocnemius muscle succinate dehydrogenase activity tended to decrease with increasing cage size. Highest and lowest open field activity was found for E500 and W50 foxes in both wire-mesh and earthen floor test arenas. Some differences were found in body weight-related organ sizes between groups. Heart weight was significantly higher in W500 than in W50 or W120 foxes. Brain weight was significantly lower in W50 than in W500 foxes. Liver weight increased with increasing cage size. Capture time was significantly lower for W50 and W120 foxes than for W500 or E500 foxes. Cortisol levels after capture were significantly higher in foxes from enclosures (W500, E500) than in those from shed cages (W50, W120), but after ACTH stimulation the levels were similar in each group. Rectal temperatures after restraint were highest in foxes from W500. Fur properties of W500 and E500 foxes were poorer than those of W50 or W120 foxes.

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**Determination of the Aversion of Farmed Mink (Mustela Vison) to Carbon Dioxide**

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High concentrations of carbon dioxide are commonly used to kill mink before their pelts are removed. The aversiveness of this procedure was investigated by using a passive avoidance technique. Eight mink were trained to obtain a reward (a novel object) by entering a chamber which could be filled with carbon dioxide, as under commercial conditions (over 80 per cent by volume). In the absence of carbon dioxide, mink entered the chamber within a mean (sd) of 16 (2.1) seconds and spent 45 (12) per cent of the next 10 minutes interacting with the novel object. When there was carbon dioxide in the test chamber, the mink would not enter it and coughed and recoiled from the chamber’s entrance instead. It was concluded that the mink detected and avoided high concentrations of carbon dioxide, and that if mink are to be killed humanely, less aversive techniques should be used.

The Veterinary Record, 1998: 143, 359-361, 1 fig., 3 tables, 15 refs.