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Programme

10.00 Opening and introduction of the ISAE (Benelux)

Session 1: Enrichment and fearfulness

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- 10.15 The effect of removing environmental enrichment on the behavior of veal calves
Van Beirendonck S, Steensels E, Bulens A, Van Thielen J, Driessen B
- 10.30 Ferrets' behavioural priorities and preferences as determined in a three- and seven-chamber consumer demand study
Reijgwart ML, Vinke CM, Hendriksen CFM, van der Meer M, Schoemaker NJ, van Zeeland, YRA
- 10.45 Effects of free-range access, shelter type, and weather conditions on behaviour and welfare of slow-growing broilers
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- 11.00 Fearful and non-fearful chickens' perception of different shades of grey
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- 11.15 Differences in keel bone disorders and fearfulness between two hybrids of laying hens
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- 11.30 *Coffee break*

Session 2: Consciousness in fish, pigs and researchers

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- 12.00 Effects of immersing turbot (*Scophthalmus maximus*) in ice water
Bracke MBM, Lambooj B, Reimert HGM, Foss A, Imsland AK, van de Vis H
- 12.15 Time to loss of consciousness and the relation with behaviour in fattening pigs stunned with carbon dioxide
Verhoeven MTW, Gerritzen MG, Hellebrekers LJ, Kemp B
- 12.30 Expectation bias in applied ethology: debiasing techniques and opinion of ethologists
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Session 3: Perinatal and transgenerational effects

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- 13.30 Transgenerational effects of the social environment on endocrine profiles and behaviour in Japanese quail
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- 13.45 Prenatal, but not early postnatal, exposure to a Western diet enhances spatial memory of piglets in a hole-board task
Clouard C, Kemp B, Gerrits WJ, Val-Laillet D, Bolhuis JE
- 14.00 Testing food motivation in low and normal birth weight pigs in a runway and operant conditioning task
Antonides A, van Eck L, Nordquist RE, van der Staay JF
- 14.15 Effect of transport duration and parental age on day-old chick welfare and performance
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- 14.30 *Tour & Coffee break*

Session 4: Lameness and disease

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- 15.45 Significant risk factors associated with digital dermatitis in Flemish dairy herds
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- 16.00 Fattening rabbits in park systems: a slatted plastic or a metal wire floor?
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- 16.15 The effect of rubber-topped floors on lameness and claw lesions in group housed sows
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- 16.30 Pressure mat analysis of MIA induced osteoarthritis as a model for clinical lameness in weaned pigs
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- 16.45 *Closing*
- 16.50 *Drinks & student presentation award announcement*
- 17.45 *Dinner*

Posters

Behavior of fattening pigs in two-level pens

*Bulens A, **Van Beirendonck S**, Van Thielen J, Buys N, Driessen B*

Housing and health of pet rabbits: a survey in Flanders

***Driessen B**, Bulens A, Bosschaerts S, Van Beirendonck S, Van Thielen J*

Flemish consumer perceptions of meat from stunned and non-stunned slaughtered animals

***Laleman J**, Bulens A, Van Belle J, Van Beirendonck S, Van Thielen J, Driessen B*

A comprehensive ethogram for commercially housed pigs

***Van Woerden L**, Uillenreef J, van der Staay FJ*

The effect of removing environmental enrichment on the behavior of veal calves

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While the provision of environmental enrichment generally has a beneficial effect on welfare, the effect of removing environmental enrichment from animals raised with enrichment is more unpredictable. The objective of the present study was therefore to investigate how the provision of environmental enrichment followed by the enrichment removal impacts the behavior of veal calves.

At 12 weeks of age, 180 Holstein-Friesian veal calves were randomly allocated to one of 3 housing conditions (each applied in 10 pens with 6 calves per pen): enriched pens with cattle brushes, enriched pens with Jolly balls™ or control (no enrichment) pens. After 6 weeks, the enrichment was removed from the pens, so all pens were barren again. Starting on the day of enrichment removal, behavior of calves was observed for 3 weeks by a single observer. On fixed days (2 days per week), the observer scored the calves' behaviors using focal sampling. Behavioral observations were carried out in the morning and in the afternoon.

Animals of formerly enriched pens manipulated pen components more frequently (brushes: 0.62 ± 0.04 and Jolly balls: 0.56 ± 0.05) than animals of the control group (0.32 ± 0.02 ; $P = 0.0001$), and calves that used to have access to a cattle brush tended to self-groom less than calves that used to have access to a Jolly ball™ (0.017 ± 0.008 vs. 0.058 ± 0.02 ; $P = 0.0646$). No other behaviors were affected by the housing treatment ($P > 0.05$).

Our study shows that removal of environmental enrichment leads to more re-directed exploratory behaviors in veal calves, but does not affect other behavioral indicators of welfare.

Ferrets' behavioural priorities and preferences as determined in a three- and seven-chamber consumer demand study

Reijgwart, Marsinah Lusanne^{1,2}, Vinke, Claudia M¹, Hendriksen, Coenraad F.M.^{1,2}, van der Meer, Miriam², Schoemaker, Nico J.³ and van Zeeland, Yvonne R.A.³

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Information on housing requirements for ferrets is scarce. Therefore, a three- and seven-chamber consumer demand study were used to determine preferred enrichments for ferrets (*Mustela putorius furo*). Seven female ferrets were first housed in a three-chamber set-up with a home chamber (HC) connected to an enrichment (EC) and an empty chamber (CC) by weighted doors. Second, they were housed in a seven-chamber set-up with HC connected to six EC and a CC. In EC, items from one of six categories were placed: tunnels, balls, water, foraging, sleeping or social. The ferrets' motivation to reach EC was measured by daily increasing the door's weight until the maximum price paid (MPP) was reached. Preferences for items within a category were determined by comparing the interaction time with the different items. In the three-chamber set-up, motivation was highest for access to sleeping (MPP 1325±112 g) and water (MPP 1158±188 g) enrichment (GLMM). The seven-chamber set-up confirmed these findings, demonstrating MPP's of 1450±120 g, 1075±153 g and 950±228 g for sleeping, water and foraging enrichment (Repeated Measures ANOVA). Within these categories, ferrets preferred the hammock over the sleeping bucket and Savic Cocoon® ($p<0.001$) and the water bath over the water bowl ($p<0.001$). There was no preference for the foraging ball or the cat pyramid ($p=0.046$). The results of these consumer demand studies suggest that a hammock, water bath and foraging opportunity are preferred enrichment items for ferrets and that these animals could benefit greatly from provision of these items in their captive living environment.

Effects of free-range access, shelter type, and weather conditions on behaviour and welfare of slow-growing broilers

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Broiler chickens with free-range access often make limited use of the outdoor area, and impact on welfare and behaviour is unclear. The aims of this study were to assess 1) whether free-range access affected leg health and plumage cleanliness, 2) whether free-range access and use influenced fearfulness, and 3) how shelter type and weather conditions affected free-range use in broilers.

Two production rounds with 600 slow-growing broilers each (Sasso T451) were completed. Four groups of 50 animals were kept indoors until slaughter age (70d), four groups of 50 had access to grassland with artificial shelters, and four groups had access to short-rotation willows, both from day 28 onwards. Free-range use was recorded with cameras and direct observations. In week 10, tonic immobility tests were performed on five birds per group, and hock and foot pad dermatitis, gait and plumage cleanliness were scored on ten birds per group. Temperature, RH, wind speed, solar radiation and precipitation were recorded every 15 min throughout the study. Welfare scores >1 were transformed to 1, no precipitation to 0, and precipitation to 1. Data were analysed using (generalized) mixed models, with group within round, and round as random effects.

Free-range use was affected by shelter type, with more chickens outside in the willow groups than in the artificial-shelter groups (49.8% vs. 34.5%; $P < 0.001$). Precipitation and increasing solar radiation were related with fewer chickens outside, and this was more pronounced in the willow groups than the artificial-shelter groups ($P < 0.001$). No relation was found between free-range access and tonic immobility duration. More free-range use was, on flock level, related with improved gait ($P = 0.01$), and with a tendency for less hock dermatitis ($P = 0.07$).

Concluding, free-range access was related with better leg health, and use of the free-range area can be encouraged by providing willows instead of artificial shelter.

Fearful and non-fearful chickens' perception of different shades of grey

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Animals' cognitive abilities are often assessed using cue-outcome association tasks. High fearfulness can influence the time necessary to learn associations by disrupting learning patterns and affecting judgements and motivation.

We assessed learning and judgement bias in fearful (FC) and non-fearful (NF) laying hens using a go-go visual/spatial association task. Fearfulness characterization was based on an Open-Field-Test in 5-week-old birds. At 35-42 weeks of age these birds were trained to differentiate a red cross from a green triangle on a black or white background to acquire a small (S: one mealworm) or large reward (L: four mealworms) respectively. Birds learned the cue and size of the S-reward before starting L-trials. Subsequently, birds learned to distinguish S and L-cues with 80% accuracy. Finally, judgement bias tasks containing 3 unrewarded trials with ambiguous cues of 25%, 50% and 75% black background (i.e. different shades of grey) were conducted. Choice for the grey cue as a S or L-reward was used as indication of birds' judgement. Cue x reward-side combinations were balanced over FC and NF-birds.

During the first learning phase, FC birds developed a left side preference irrespective of receiving a reward, making more left side errors than NF-birds (errors/session: 1.43 ± 0.3 vs. 0.96 ± 0.12 , $P=0.05$). Task acquisition took longer for FC than for NF-birds (16.9 ± 1.2 trials vs. 13.5 ± 0.8 , $P=0.02$). When session set-up changed (i.e. inclusion of L-trials, cessation of reinforcement) FC-birds took longer to leave the start box (10.1 ± 5.2 s vs. 3.5 ± 0.05 s, $P=0.01$) and to make a choice (8.87 ± 2.1 vs. 4.23 ± 0.86 , $P=0.02$) than NF-birds. FC-birds judged the 25% black cue more often as the L-reward (6 out of 8 vs. 2 out of 12, $P=0.04$), and took longer to choose under the 75% black cue than NF-birds (3.54 ± 0.48 s vs. 2.49 ± 0.22 s, $P=0.05$).

In conclusion, learning and judgement can be affected by birds' level of emotionality.

Differences in keel bone disorders and fearfulness between two hybrids of laying hens

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Increased space allowance provides laying hens with more opportunities to walk, run or fly. In addition, a high level of fearfulness and a poor human-animal relationship (HAR) in laying hens can increase the risk of sustaining multiple keel bone disorders, when actively avoiding humans. This study investigated the effect of fearfulness on keel bone disorders in two hybrids of laying hens (Dekalb White and ISA Brown). In 16 pens we housed either 25 ISA Brown birds/pen or 25 Dekalb White birds/pen (in total 200 birds/hybrid). Keel bone disorders were assessed repeatedly between 17 and 52 weeks of age. Fearfulness was tested using the Tonic Immobility (TI). HAR was tested with the Touch Test (TT) and a voluntary approach towards a human test (VAT). The relationship between the dependent response variables (keel bone disorders and behavioural tests performance) and independent factors (age, hybrid) were analyzed using generalized linear mixed models. At 49 weeks of age Dekalb White birds had a lower caudal keel bone fracture prevalence (61.1% vs. 89.7%, $P < 0.001$) and fewer total keel fractures (96.4% vs. 87.6%, $P < 0.001$), but higher keel deviation prevalence (77.6% vs. 42.9%, $P < 0.001$) compared to ISA Brown birds. In the fearfulness test the Dekalb White hens had a longer latency time to stand up (103s vs. 67s) and fewer attempts were needed (1.3 vs. 1.9) to induce TI (both $P < 0.001$). In the HAR-tests the Dekalb White had no food rewards, attempted more escape attempts (33.3% vs. 10.7%) and produced more droppings in the VAT (all $P < 0.001$), and fewer Dekalb White hens could be touched in the TT ($P = 0.002$). No correlations were found for keel bone disorders and the behavioural tests performance. The higher fear levels of the Dekalb White hens are contradictory to the lower prevalence of keel bone disorders in this hybrid.

Effects of immersing turbot (*Scophthalmus maximus*) in ice water

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The purpose of this study was to examine the impact of immersion in ice water on turbot habituated to higher and lower environmental temperatures (19° C, 'summer' and 12 ° C, 'winter' respectively). Such procedures are commonly used during transport or slaughter, and it is not known whether such rapid cooling will lead to loss of consciousness in fish such as turbot.

Six turbot of each treatment (summer, winter water temperature) were subjected to cold water for 1hr and 15min. Behavioural observations focussed on nociceptive stimulation, vibration (tapping) and gill movements. Heart and brain activity (EEG and ECG) was also recorded. Such physiology, supplemented with behaviour, is important to establish potential welfare concerns negatively affecting sustainability of the aquaculture of turbot.

No clear differences between treatments were found. Fish responded to immersion with elevated heart activity, and at 2 and 5 min after immersion in ice water a significant reduction in gill movement was found ($p < 0.05$). The EEG analysis showed a reduction in amplitude, but at $t=15$ min more than 50% of the fish still showed total power values over 10% of pre-immersion values, and hence unconsciousness could not be established with certainty. More than an hour after immersion in the cold water some turbot still responded to nociceptive stimuli and vibration.

Immersion in cold water reduced brain activity, the implication of which is not clear. Several signs of stress were observed, e.g. increased heart beats. We conclude that from a welfare point of view, immersion of turbot in ice water may not be humane.

Time to loss of consciousness and the relation with behaviour in fattening pigs stunned with carbon dioxide

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Stunning animals with carbon dioxide (CO₂) is a gradual process during which unconsciousness does not set in instantly. There is a lack of agreement on how long it takes for pigs to lose consciousness after immersion into the gas and whether certain behaviours, such as muscular excitations, lying and loss of posture occur before or after pigs lose consciousness. The objective of the current study was to assess loss of consciousness in 48 fattening pigs during exposure to 80% (80C) or 95% (95C) CO₂ in air by means of brain activity, as presented in an electroencephalogram (EEG).

During exposure to the gas, behavioural variables (i.e. notice of the gas, retreat attempts, lateral head movements, gasping, loss of posture, muscular excitations, jumping, standing and lying) were recorded and related to EEG-based loss of consciousness.

The mean (\pm SD) times to loss of consciousness (EEG-based) were 47 ± 6 s and 33 ± 7 s in 80C and 95C pigs, respectively ($P < 0.001$). Pigs exposed to 95C had a shorter latency to all behaviours mentioned above ($P < 0.001$) compared to pigs exposed to 80C. No difference was observed in the number of retreat attempts, jumps, lateral head movements and muscular excitations between the two treatments. Lying occurred in all pigs before EEG-based loss of consciousness and both parameters were strongly correlated, $r(32) = 0.78$, $P < 0.001$. Loss of posture occurred both before and after EEG-based loss of consciousness and parameters were less strongly correlated $r(33) = 0.63$, $P < 0.001$.

In conclusion, loss of consciousness occurred earlier in 95C pigs compared to 80C pigs. Latency to most behaviours was shorter in 95C pigs, compared to 80C pigs, but no differences were observed in frequency of most behaviours. In this study, no behavioural parameter could accurately indicate loss of consciousness.

Expectation bias in applied ethology: debiasing techniques and opinion of ethologists

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There is increasing evidence that the field of applied ethology is prone to expectation biases invalidating research outcomes. Nevertheless, outcome assessors are rarely blinded. We surveyed delegates of the International Society for Applied Ethology (ISAE) 2014 congress shortly before (n=39 respondents) and after (n=51 respondents) a combined congress plenary lecture and workshop on expectation bias in applied ethology. The aims were to evaluate the effect of the plenary lecture and workshop on the opinion of applied ethologists and to better comprehend why blinding outcome assessors seems so rarely practiced as a debiasing technique in this field of research. A limited awareness about expectancy effects among ethologists and the logistic constraints of blinded observations rather than a perceived low susceptibility of the research field seems the larger part of the explanation. Awareness about expectancy effects and debiasing techniques was higher immediately after than before the congress plenary lecture and workshop. For example, research situations considered as most susceptible to expectation bias – i.e. when the data-collector uses subjective methods and has strong expectations about the research outcome - were perceived to be more common in applied ethology than in other scientific disciplines (29.8% versus 16.9%, $P < 0.001$). Moreover, non-blinded data collection in such research situations was viewed more disapprovingly after the plenary lecture and workshop as compared to before (mean of 6.8 versus 7.8 on a 10-point Likert scale, $P < 0.05$). In addition to the immediate effect of the plenary lecture and workshop, a more sustained and concerted effort seems needed throughout all stages of the research process to avoid expectation bias invalidating research findings and to improve the scientific credibility of the field of applied ethology.

Transgenerational effects of the social environment on endocrine profiles and behaviour in Japanese quail

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In birds, independent studies showed that social density affects both circulating hormones in breeding females and hormone deposition to the yolk. Yolk hormones influence the development of offspring and represent an important pathway through which maternal effects are established.

In this project we explored in which way the social environment affects offspring phenotype in Japanese quail (*Coturnix c. japonica*). To test for grand-/maternal effects we performed physiological and behavioural tests across four generations. The treatment in the parental generation consisted of one female and one male (pair) or three females and one male (group) housed together. The F1 offspring was housed under social conditions that either matched or differed from the maternal treatment, while birds in the F2 and F3 generation were all kept in groups.

We found only weak effects of treatment in the parental generation. Plasma corticosterone concentrations did not differ between group- or pair-housed females, neither at baseline (LMM, ng/ml±SEM; pair 0.51±0.06, group 0.44±0.05; $F_{1,59} = 1.4$, $p = 0.2$), or after 10 minute restraint (pair 2.59±0.32, group 2.35±0.27; $F_{1,59} = 0.7$, $p = 0.4$). Pair females had higher baseline plasma testosterone levels than group females (ng/ml, pair 0.65±0.05, group 0.51±0.04; $F_{1,35} = 4.8$, $p = 0.04$) but did not react differently to a GnRH challenge (pair 0.71±0.05, group 0.58±0.03; $F_{1,34} = 0.6$, $p = 0.5$). Average yolk testosterone concentrations did not differ between treatments (pg/mg, pairs: 12.4±0.43, groups: 12.3±0.95, $F_{1,28} = 0.002$, $p = 0.9$), though the higher variance within groups suggests an effect of the social interactions.

The offspring generations showed no differences in the tonic immobility and emergence test (F1, F2, F3, all $p > 0.08$). Preliminary analyses suggest, however, that chick behaviour correlates with maternal plasma testosterone and corticosterone, which supports the role of maternal hormones affecting offspring phenotype.

Prenatal, but not early postnatal, exposure to a Western diet enhances spatial memory of piglets in a hole-board task

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Perinatal nutrition can program long-term health, behaviours, and cognitive function of mammals. It is unknown, however, which period, *i.e.* the late prenatal or early postnatal period, is the most susceptible to nutritional influences. This study aimed at comparing the effects of a prenatal vs. postnatal 'Western-like diet', high in saturated fat and refined sugar, on the cognitive performance of piglets. Thirty-two sows and 3 piglets/sow were allocated to 1 of 4 dietary treatments (WC, CW, WW, CC) in a 2×2 factorial design, with 8-week prenatal and 8-week postnatal exposure to a Western diet (W) or control diets (C) as factors. Three weeks after the dietary intervention, piglets were subjected to a spatial hole-board task, in which they had to discriminate 4 baited buckets out of 16 in a fixed configuration. After the acquisition phase, piglets were subjected to a reversal phase, in which the configuration was changed. In both phases, working (WM) and reference memory (RM) scores increased over time ($p < 0.0001$), suggesting that piglets learned the task. The prenatal Western diet increased WM scores (0.79 ± 0.01 vs. 0.77 ± 0.01 , $p < 0.05$) in the acquisition phase, and tended to increase WM (0.83 ± 0.01 vs. 0.81 ± 0.01 , $p = 0.08$) and RM (0.39 ± 0.01 vs. 0.37 ± 0.01 , $p = 0.06$) scores in the reversal phase. The prenatal Western diet tended to increase inter-visit interval duration in both phases ($p < 0.06$), suggesting a decreased motivation for the task. No effects of the postnatal diet were found on the performance of piglets. Maternal blood analyses showed that the *pre-partum* Western diet increased total cholesterol (8.64 ± 0.60 vs. 1.44 ± 0.06 mmol/L), HDL-cholesterol (1.61 ± 0.15 vs. 0.59 ± 0.02 mmol/L, $p < 0.0001$ for both) and NEFA (914 ± 133 vs. 440 ± 63 μ mol/L, $p = 0.02$) levels before parturition. Our study highlights the key role of prenatal nutrition, and its effects on maternal *pre-partum* blood metabolism, for foetal development and long-term programming of cognitive functions in the porcine model.

Testing food motivation in low and normal birth weight pigs in a runway and operant conditioning task

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Low birth weight (LBW) pigs face more welfare problems than their normal birth weight (NBW) siblings. Understanding the underlying mechanisms of cognitive and learning abilities in these pigs may help to improve their welfare. Early competition in life over resources combined with the higher need for nutrient intake make it likely that LBW pigs have a higher motivation for food than NBW pigs. This study aimed to compare the motivation to obtain food rewards between LBW and NBW pigs, using variable numbers of rewards in two separate tasks; a runway and an operant conditioning task (a nose wheel feeding station). Ten LBW piglets (854 ± 33 g) from different litters and their ten NBW siblings (1332 ± 53 g) were selected and subjected to the two tasks. Both tasks consisted of a baseline phase (two rewards), a high reward phase (eight rewards) and an extinction phase (no rewards). Statistical analyses using mixed models showed that there was no significant birth weight effect in any phase in either task. This indicates that there is no motivational difference for food rewards in LBW and NBW pigs. However, all animals decreased their latency to reach the reward box in the runway task between the baseline and high reward ($F_{1,27}=6.25$; $p=0.02$), and increased their latency between the high reward and extinction phase ($F_{1,27}=100.47$; $p<0.0001$). Likewise, in the nose wheel task, all animals worked harder for a high versus a low reward ($F_{1,27}=39.10$; $p<0.0001$), and less hard when no rewards were given than for a high reward ($F_{1,27}=69.72$; $p<0.0001$). We conclude that no difference in motivation for food rewards could be found between LBW and NBW pigs. However, we show that both tasks are appropriate to study the motivation for food rewards in pigs, and are consequently useful to study factors influencing pig motivation.

Effect of transport duration and parental age on day-old chick welfare and performance

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Most broiler chicks are transported to production sites within 1-2 days post-hatch, which may cause stress, and compromise welfare and productivity. The impact of transport is poorly understood, and could vary between chicks from flocks of breeders of different ages. Therefore, we aimed to investigate the effect of transport duration and breeder age on chick welfare and productivity.

Mixed-sex chicks from either 29-wk-old or 60-wk-old Ross 308 breeders were bred in a commercial hatchery. After hatch, 1620 chicks from young and 1620 chicks from old breeders were transported in 36 crates. Eighteen crates were subjected to a 1.5h or 11h road transport. After transport, 2800 chicks were placed in 100 pens (2m²), each containing 28 chicks from one transport crate. On average six chicks were randomly selected per crate (n=228) and assessed for chick quality, weighed and culled to weigh yolk sacs (d1 at farm). Mortality and feed conversion of the remaining chicks were recorded until slaughter (41d of age).

No transport x breeder age interaction effects were found. Body and yolk sac weight at d1 were lower for chicks transported for 11h compared to 1.5h (body: 42.3g vs 43.7g; P=0.003; yolk: 3.9g vs 5.2g; P<0.001) and for chicks from young versus old breeders (body: 38.4g vs 47.6g; P<0.001; yolk: 3.4g vs 5.7g; P<0.001). This effect of breeder age on body weight persisted until slaughter (2.5kg vs 2.7kg; P<0.001). Chick quality (89.1% vs 92.7%; P=0.001) and feed conversion during d0-14 (1.40 vs 1.47; P=0.048) were lower in chicks from old versus young breeders, but were unaffected by transport duration. Mortality was not affected by either factor.

The study did not confirm any interactive effects of transport duration and breeder flock age. Long transport negatively affected d1-yolk and body weight, chicks from old breeders showed reduced quality, slaughter weight and feed conversion.

Significant risk factors associated with digital dermatitis in Flemish dairy herds

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Since more and more dairy cattle is housed in zero grazing production systems, claw health is today more than ever an area of concern. In particular, digital dermatitis (DD) or Mortellaro disease is considered a major cause of epidemic lameness. In literature, several risk factors associated with DD are mentioned. A digital survey was conducted among Flemish dairy farmers (420 completed questionnaires) to provide an overview of the prevalence of DD in Flemish dairy herds and the associated risk factors. Associations between the DD prevalence and possible risk factors are the result of a chi-squared test. A large herd with a high number of lactating cows was positively associated with a high prevalence of DD ($P=0.0031$). More than 67% of the respondents used a claw bath or sprayer. The use of a claw bath was positively associated with a higher prevalence of DD ($P<0.0001$), however the size of the bath (length, $P=0.0208$ and width, $P=0.0033$) was negatively associated with a high prevalence of DD. The prevalence of DD was also influenced by housing type ($P<0.0001$) with cubicle housing being associated with a higher DD prevalence. Although a high DD prevalence ($>20\%$) was mentioned by 34.5% of the respondents with cubicle housing, it is used in most farms (more than 85% of the respondents used cubicle housing). Cleaning of the floors by manure scrapers and robots was associated with a high prevalence of DD ($P=0.0001$). The DD prevalence was higher in dairy farms that bought heifers and adult cows (prevalence DD $>20\%$ in 52.6% of the farms; $P<0.0001$) and in farms that already had young cattle with DD lesions (prevalence DD $>20\%$ in 51.4% of the farms; $P<0.0001$). These results demonstrate an association between the DD prevalence on a farm and specific management factors.

Fattening rabbits in park systems: a slatted plastic or a metal wire floor?

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In Belgium, for more rabbit friendly housing, a recent law forces a progressive change of cage systems towards park systems (by the year 2025). This law describes the park system and one of the claims is when a metal wire floor is used, at least 80% must be covered with a plastic slatted floor or perforated plastic mats. In this study, different bottoms were tested in parks for fattening rabbits. Mortality, coccidiosis pressure and treatment were recorded within consecutive batches of 960 fattening rabbits on a reference farm. During the first year, 7 batches of rabbits were housed in a park system with a bottom completely made of slatted plastic mats normally used for piglets. During a second year, 8 batches of rabbits were kept in the park system on a wire bottom of which 80% was covered by slatted plastic mats for rabbits. In a last batch of 960 rabbits, two percentages of these slatted plastic mats for rabbits were compared: 80% and 29% (platform only).

The slatted plastic floor normally used for piglets resulted in bad rabbit health and viability as indicated by coccidiosis rates between 13000 and 51000 oocysts/g feces, serious mortality (14.8%) due to intestinal coccidiosis, treatment necessary (100%). With the bottom covered by 80% of slatted plastic mats for rabbits, coccidiosis rates were high (between 22000 and 35000 oocysts/g of feces), mortality amounted 7.11% and treatment was necessary (100%). In the last batch of 960 rabbits, the comparative test showed that if only 29% was covered with slatted plastic mats results for health and viability were better than with 80% plastic covering (<5000 vs 22000 oocysts/g feces and 5.2% mortality vs 7.2%, respectively). These results raise questions in a context of an arbitrary requirement for slatted plastic flooring of parks systems for fattening rabbits.

The effect of rubber-topped floors on lameness and claw lesions in group housed sows

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Lameness and claw lesions in sows are major welfare and production problems. The prevalence of these problems has been reported to be higher in group housing systems with inadequate flooring, such as solid or slatted concrete floors. In a 2x3 factorial design, we investigated the effect of rubber top layers on concrete floors and the effect of three levels of zinc supplementation in the feed on gait and claw lesions in group-housed sows. Six groups of 20 hybrid sows were monitored during three reproductive cycles. From 4 weeks after insemination three groups were housed on concrete floors, and the other three groups on rubber-topped floors. During each cycle, sows' gait was scored five times and claws were scored twice, both parameters were visually scored on scales of 150 and 160mm, respectively. The data were analysed using a linear mixed model with floor, feed, phase in cycle and their interactions as fixed effects and parity, group and sow as random effects. Here we report on the effect of floor type, which did not interact with zinc concentration ($P > 0.10$).

The following means \pm SD show the differences between groups. At the end of gestation, sows housed on rubber-topped floors scored 9.9mm \pm 4.1 better on gait ($P=0.01$). Regarding claw disorders, both parameters 'heel overgrowth and erosion' (4.6mm \pm 1.8; $P=0.01$) and 'heel-sole crack' (3.1mm \pm 1.5; $P=0.04$) scores were better for sows on rubber-topped floors at mid gestation. However, rubber-topped floors scored worse for 'vertical cracks in the wall horn' (3.4mm \pm 1.7; $P=0.04$). At the end of lactation both 'white line' (2.9mm \pm 1; $P=0.02$) and 'claw length' (4.7mm \pm 1.4; $P < 0.001$) had better scores on rubber-topped floors.

Improved scores for gait and most claw characteristics at the end of gestation suggest that rubber-topped floors in the group housing unit have a positive effect on the welfare of sows.

Pressure mat analysis of MIA induced osteoarthritis as a model for clinical lameness in weaned pigs

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Lameness affects pig welfare by reduced mobility and pain. Osteoarthritis, a common cause of lameness, may be treated by NSAIDs, which have analgesic and anti-inflammatory effects. To assess the effect of NSAIDs on osteoarthritis, MIA (Monosodium-iodoacetate) was used to induce clinical (acute and chronic) osteoarthritis. To quantify MIA-induced lameness, pressure mat analysis of 'Peak Vertical Force (PVF) and Vertical Impulse (VI) was performed. To compare loading of left- and right-front limbs, 'Asymmetry Indices' (ASI's) were calculated:

$$ASI = \frac{Left - Right}{0.5 \cdot (Left + Right)} \cdot 100\%$$

ASI's ranged between -200 and 200, with 0 indicating perfect symmetry. Forty weaned pigs were used, of which 10 MIA intra-articular in the left-front limb and no NSAID, 10 MIA and NSAID, 10 saline-solution and no NSAID and 10 saline-solution and NSAID. Pigs were measured before induction and after induction on days 1, 3, 7, 14, 28 and 56. Pigs had to move in a straight line, at a steady pace looking straight ahead. The first three runs in which subsequent pairs of paws could be selected were used for data processing. Preliminary statistics, by repeated measures ANOVA, revealed that MIA induced lameness (ASI-PVF ($F_{1,36} = 12.11, p = .0013$) ASI-VI ($F_{1,36} = 16.62, p = .0002$)), NSAID had no effect and there was no interaction between MIA and NSAID. There also was a main effect for time which was not affected by MIA or NSAID treatment (ASI-PVF ($F_{6,216} = 2.47, p = .0248$) ASI-VI ($F_{6,216} = 3.03, p = .0073$)). From these preliminary statistics, MIA appears to induce clinical lameness in pigs, providing a possible model to assess the effect of several interventions on osteoarthritis, NSAIDs do not seem to have an effect on the ASI-PVF and ASI-VI.

Behavior of fattening pigs in two-level pens

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A two-level pen offers the opportunity to increase space allowance per pig and in addition, it provides pigs with the opportunity to flight from aggressive pen mates. We studied the effects on behavior of a second level in existing standard pens during the entire fattening period (± 30 kg - ± 110 kg). A total of 444 hybrid pigs were used, from which half of the pigs was housed in standard pens (± 0.72 m²/pig) while the other half was housed in two-level pens (± 0.97 m²/pig). In both pen types, feed was only provided at the lower level. Behavioral observations were carried out weekly in the afternoon (13:00 h – 16:00 h) and the presence of lesions was scored every two weeks. Data were analyzed using procedures in SAS 9.4 (proc glimmix and Fisher's Exact tests). Manipulation of pen mates (behavior directed towards ears, tails or other body parts) was established less frequently in two-level pens compared to control pens (0.023 ± 0.001 vs. 0.031 ± 0.002 ; $P = 0.0002$). The same effect was observed for head butting (0.002 ± 0.0003 vs. 0.003 ± 0.0005 ; $P = 0.04$). Lesions on tails were observed more in control pens (4 %) compared to two-level pens (2 %). The same was seen for ear lesions (5 % vs. 3 %). These findings demonstrate the positive effects of an increased space allowance and a choice of levels. In general, use of the second level was noted in 6% of all observations and 44% of these observations were recorded during the second period of the fattening stage (± 60 – ± 90 kg). When looking at the effect of gender, it is seen that gilts used the second level more (61% of the observations) than barrows and boars (39%).

Housing and health of pet rabbits: a survey in Flanders

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In contrast with intensive rabbit farming, there are no data available on the management and welfare of pet rabbits in Flanders. This study sought information about the welfare of pet rabbits in Flemish households. To that aim, a survey about animal welfare-related topics was made available on the internet. The first part dealt with general information regarding the household, such as owner's sex and area of residence. A second part included questions about animal housing conditions. In a third part, owners were asked to describe health problems of their rabbits.

About 54 % of the respondents (n=245) stated that the mean age of their animals is between 5 and 10 years. When looking at the housing of the animals, it seems that solitary housing is the most common practice, as 48 % of the rabbit owners are housing their animals alone, while almost 31 % of the owners are housing their rabbits in groups of 2 to 4 animals. Yet, since European wild rabbits are social animals that live within a colony in stable breeding groups, solitary housing of pet rabbits is in conflict with the social needs of rabbits. About 9 out of 10 owners stated that their animals have access to hay or straw as enrichment materials. Branches are also provided (58 %), as well as toys (25 %). When looking at vaccination practices, data showed that a minority of the respondents vaccinates against RHD (47 %) and myxomatosis (37 %). It is however noteworthy that, for both diseases, a quarter of the rabbit owners stated that they have never heard about the disease, and does not vaccinate. Diarrhoea (26 %) and loss of appetite (16 %) are the most diagnosed health problems by the owner. Rabbit owners must be better informed about the needs of pet rabbits.

Flemish consumer perceptions of meat from stunned and non-stunned slaughtered animals

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Religious slaughter is carried out legally in the European Union in licensed slaughterhouses by authorized slaughter-men of the Jewish and Islamic faiths. Commercial halal and kosher meat production is (partly) associated with the slaughter of animals without stunning. The purpose of pre-slaughter stunning of livestock is to ensure that animals are insensible to pain before the act of slaughter.

A survey was organised to know Flemish consumer perceptions of meat from stunned and non-stunned slaughtered animals. A questionnaire was used to collect data from people through face to face interviewing in Flanders from August 2015 till 15 September 2015. The first part of the questionnaire included questions about meat consumption. In a second part, respondents were asked to describe their perception about meat from stunned and non-stunned slaughtered animals. The last part dealt with general information about the respondents regarding sex, age, religion and area of residence. A total of 200 people (aged 18–87 years) were interrogated on social events, markets or in railway stations in the provinces of Flanders. Respondents were chosen in such a way as to obtain a sample of wide diversity of the population in terms of gender, age, family size, and living environment.

Results show that in spite of several media campaigns of animal welfare organizations over the past few years, still 24 % of the Flemish respondents were not aware of the fact that not all animals are stunned before slaughter. According to the respondents, religion (57 %) and cost reduction (15 %) are main reasons for non-stunned slaughter. About 54 % of the respondents advocates to ban non-stunned slaughter as soon as possible. About 41 % of the respondents advocates the introduction of a label for meat from non-stunned animals. In conclusion, half of the respondents wants to ban non-stunned slaughter.

A comprehensive ethogram for commercially housed pigs

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At the moment a complete ethogram of the behaviour of commercially housed pigs is not available in literature. However, such an ethogram that contains all reported behaviours pigs display can be a useful tool for behavioural observations in welfare and biomedical research. The aim of this study was to construct a comprehensive ethogram from previously reported, often tailored ethograms in commercially housed pigs. To compose the complete ethogram, a literature search (Web of Science, Google Scholar) was conducted. This resulted in the identification of 140 articles that contained behavioural elements. 49 of those were eventually used in the final ethogram. All reported behaviours were sorted into categories and similar behaviours were combined. This resulted in an ethogram that consists of more than 100 behaviours classified in 29 behavioural categories. This newly constructed ethogram can be used in future research as a reference for pig behaviour and adapted for use in biomedical experiments.

The completed ethogram has been applied in a behavioural experiment, where stress and escape behaviour in pigs was researched. 40 lame or sound pigs that were or weren't given pain relief, were one by one put in a confined space for 5 minutes, during which their behaviour was recorded. Behaviours used in the experiment were selected from the comprehensive ethogram based on the behavioural categories of the ethogram and which behaviours were expected in that context. This resulted in 26 behavioural elements that were used in the behavioural experiment, in the categories maintenance, posture, locomotor, mood, comfort, fear, investigating, vocalisation and stress.

Participants

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Marloes van Beurden

is a BSc student of the course Applied Biology at HAS den Bosch in the Netherlands. She did internships at Ouwehands Zoo about effectiveness of UV-lights on the welfare of reptiles and she did an internship at Bristol University. At present she is working on a project involving dog training and their welfare.

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Evy van de Vloet

is a masterstudent in Bioscience with specialisation Animal Life. For her thesis she is currently working on a non-invasive detection system that alarms the farmer when a sow is ready to farrow. The goal of this project is to reduce piglet death around birth by human supervision.

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Lieske van Eck

is currently finishing her MSc at Wageningen University, specializing in animal behaviour and welfare. For her MSc thesis, she studied the influence of birth weight on motivation and the cognitive abilities of pigs at Utrecht University. She is currently writing a PhD proposal on empathy in pigs and would like to continue a career in science.

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Femke Van Hoof

is a student Animal life at KU Leuven. During her study she will investigate ways to attract *Dermanyssus Gallinae* away from the chickens. Before she studied to become veterinary technician.

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Jacobine van Laar-Lam

started last September with the Master program 'Farm animal health and veterinary public health' on the Utrecht University. In September she started her research internship at the Emotion and Cognition group at the veterinary faculty. During this research internship a test battery will be composed to distinguish dysmature piglets from 'normal' piglets.

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Eva Van laer

is a former employee of the Institute for Agricultural and Fisheries Research. For four years she conducted research into cold and heat stress in cattle. She obtained her doctoral degree at the Ghent University in April 2015. Since march 2015 she is working as Agricultural Inspector for the 'Nederlandse Voedsel en Warenautoriteit', with specialism ruminants.

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Jan Wijnen

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Eline Willems

is a PhD student at KU Leuven and member of the research group "Animal Welfare". Her PhD will be about digital dermatitis in Flemish dairy herds. Currently, she is also working at projects concerning batch management systems for sows and landscape conservation with sheep.

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International Society for Applied Ethology





We hope you enjoyed this meeting of the Benelux branch of the ISAE. If you are interested in meeting applied ethology researchers from all over the world and to hear about their work, be sure not to miss the next international congress of the ISAE, which will be held in Edinburgh from 12-16th of July 2016.

The themes for this conference are:

- Applied Animal Behaviour Science and Tinbergen's questions
 - Function and evolution
 - Behavioural development
 - Causation
- Trade-offs and synergies between welfare and other major global issues
- Positive welfare
- Cognition and emotion
- Integration of social science and applied ethology
- Emerging challenges and techniques, including qualitative research

Abstract Submission Opens 7 December 2015

Abstract Submission Closes 29 February 2016

Early Bird Registration Deadline 13 May 2016

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