



Abstracts

Joint East and West Central Europe ISAE REGIONAL MEETING

**Institute for Animal Welfare and Animal Husbandry
Celle, Germany, May 18-20, 2006**

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"Gesellschaft der Förderer und Freunde für Geflügel- und Kleintierforschung
der Bundesforschungsanstalt für Landwirtschaft (FAL) e.V."**

Program

Thursday, May 18

- 11:00** **Registration**
- 12:00** **Lunch**
- 13:30** **Hans Erhard** (Edinburgh, UK) (chair: Lars Schrader, Germany)
concepts of individuality
- fear & conflict* (chair: Xavier Boivin, France)
- 14:30** Methods to assess temperament in sheep: the Australian experience
Dominique Blache and Drewe Ferguson; Crawley, Australia
- 14:50** The effect of pre-weaning housing system on the fear reaction of domestic pigs
Helena Chaloupková, Gudrun Illmann and Kristýna Bělská; Prague, Czech Republic
- 15:10** How do dogs avoid conflicts with humans in playful and non-playful contexts?
Borbála Györi, Márta Gácsi, Ádám Miklósi; Budapest, Hungary
- 15:30** **Coffee**
- human-animal relationships* (chair: Andreas Briese, Germany)
- 16:00** Assessing the human-animal relationship: Principles, problems and perspectives
Susanne Waiblinger, Xavier Boivin, Vivi Pedersen, Maria-Vittoria Tosi, Andrew M. Janczak, Eleonora K. Visser and Robert B. Jones; Vienna, Austria
- 16:30** Measuring beef calves' responses to human during the weighing process on farm: a methodological study
Xavier Boivin and Gilbert Trillat; St Genes Champanelle, France
- 16:50** Interrelationships of different tests for the assessment of the cow-human relationship
Marianne Lugmayr, Claudia Schmied, Susanne Waiblinger; Vienna, Austria
- 17:10** Validity of different tests for assessing the cow-human relationship on dairy farms
Claudia Schmied and Susanne Waiblinger; Vienna, Austria
- 17:30** Predictors of Human-Animal Relationship in Young English Thoroughbred Horses
Radka Tykalová, Jitka Víchová, Jana Dubcová, Pavlína Pavlisová; Prague, Czech Republic
- 18:00** **poster-session** (chair: Gudrun Illmann, Czech Republic)

Friday, May 19

- 09:00** **Hanno Würbel** (Giessen, Germany) (chair: Lars Schrader, Germany)
Tests of cognition - why and how?
learning (chair: Boris Bilcik, Slovakia)
- 10:00** The impact of social rank and stability of the social environment on learning behaviour of dwarf goats
Ulrike Baymann, Elmar Mohr and Jan Langbein; Dummerstorf, Germany
- 10:20** A learning test for adult laying hens (*Gallus gallus domesticus*) by one-trial
E. Tobias Krause, Marc Naguib, Oliver Sanders, Stefanie Petow; Bielefeld, Germany
- 10:40** Learning Dependent Gene Expression of NCAM 180 in the Hippocampus of Laying Hens from Different Housing Systems
Alexandra Grund, Hans-Joachim Bischof, Fritz Trillmich, Stefanie Petow; Bielefeld, Germany
- 11:00** **Coffee**
- understanding poultry & dogs* (chair: Joergen Kjaer, Germany)
- 11:30** The demand for feathers in high and low feather pecking birds
Alexandra Harlander-Matauschek, Christine Baes and Werner Bessei; Stuttgart, Germany
- 11:50** Central dopaminergic control mechanisms and feather pecking in laying hens
Lubor Košťál, Monika Sedlačková, Lubica Kubíková, Pavel Výboh, Boris Bilčík, Linda Keeling; Ivanka pri Dunaji, Slovakia
- 12:10** Effect of an elevated platform on tibial dyschondroplasia, walking ability and gait posture in male turkeys
Jutta Berk and Ellen Cottin; Celle, Germany
- 12:30** Context specific differences in the dogs' behaviour towards their owner, a familiar and an unfamiliar person
Andrea Kerepesi, Ágnes Erdőhegyi, Márta Gácsi, Ádám Miklósi; Budapest, Hungary
- 12:50** Human and dog understanding of dog barks
Csaba Molnár, Péter Pongrácz, Antal Dóka, and Ádám Miklósi; Budapest, Hungary
- 13:10** **Lunch**
- 14:20** **Björn Forkman** (Frederiksberg, Denmark) (chair: Gudrun Illmann, *Czech Republic*)
A critical review of fear tests used on farm animals
social aspects (chair: Steffen Hoy, Germany)
- 15:20** Individual characteristics associated with neighbour preferences among non-related conspecific ungulates
Anja Wasilewski; Marburg, Germany
- 15:40** Maternity status and body weight as factors influencing synchronization in beef cattle on pasture
Radka Šárová, Marek Špinko, José Panamá and Martina Vondráková; Prague, Czech Republic

- 16:00** Reproductive success in broiler breeders: What defines the champion?
Boris Bilcik, Inma Estevez; Ivanka pri Dunaji, Slovakia
- 16:20** **Coffee**
- methodological aspects* (chair: Susanne Waiblinger, Austria)
- 16:50** Investigations on characteristics of sows with different rank position
Steffen Hoy, Carmen Weirich and Jörg Bauer; Giessen, Germany
- 17:10** Consistency of dairy cow lying time or how long do you need to watch video?
Sabine Dippel, Christoph Winckler, Cassandra B. Tucker and Dan M. Weary; Vienna, Austria
- 17:30** On-farm welfare assessment in beef bulls - Repeatability of selected behavioural parameters
Simone Laister, Nina Hesse, Christoph Winckler and Ute Knierim; Vienna, Austria
- 17:50** Testing German shepherd puppies to assess their chances of certification
Ludvik Pinc, Ivona Svobodova, Pavel Vapenik and Ludek Bartos; Prague, Czech Republic
- 18:15** Getting better results in less time
When using audio/video recordings in research applications make sense
Pascal Mangold (Mangold International GmbH); Arnstorf, Germany
- 19:30** **Social evening**

Saturday, May 20

09:00 **workshops**

workshop I: What do the results of behavioural tests mean?

Hanno Würbel, Gießen, Germany and Hans Erhard, Edinburgh, UK

workshop II: How can we statistically analyse within and between relationships of data from individuals?

Lorenz Gygax, Tänikon, Switzerland

12:00 **Lunch**

13:30 Presentation of the results of the workshops

15:00 End of the meeting

Poster presentations

methodological aspects & concepts

A new planimetric technique to assess the area occupied by a stationary animal:

KobaPlan technique

Andreas Briese, Ute Knierim; Hannover; Germany

Comparing increases in heart rate - problems resulting from individual baseline levels

Kathrin C. Schuster; Marburg; Germany

Veterinary ethology and animal welfare

Jana Mareková, Jana Kottferová, Milada Vargová, Olga Ondrasovičová, Milan Ondrasovič, Nad'a Sasáková; Kosice; Slovak Republic

effects of housing conditions

An ethological study into the individual occupational behaviour of pigs kept in pens with or without straw

Anne Elkmann and Steffen Hoy; Giessen; Germany

Sow preferences for farrowing under a cover with and without access to straw

B. Forkman, B.I. Damm, T. Heiskanen, L.J. Pedersen, E. Jørgensen; Frederiksberg; Denmark

The effect of different structure of group on agonistic behaviour of weaned pigs

Jana Kottferová, Jana Mareková, Olga Ondrasovičová, Milan Ondrasovič, Nad'a Sasáková, Milada Vargová, Anton Hvozdič; Kosice; Slovak Republic

Performance comparisons between different modifications of a farrowing system for loose lactating sows

Bernd Stabenow; Dummerstorf; Germany

Ontogeny of the nursing vocalization in domestic pigs

Kristýna Bělská, Gudrun Illmann and Helena Chaloupková; Prague; Czech Republic

Effect of floor type on behaviour of dairy cows

Klaus Reiter, Nadine Partes; Poing; Germany

Behavioural and heart rate response of dairy cows to the separation from their calves:

Effect of calves' age and auditory/visual contact

Ilona Stěhulová, Lena Lidfors, Marek Spinka; Prague; Czech Republic

The specific behaviour of feral horses relating to extreme climatic conditions and to the use of weather protections in their natural habitat

Katja Wollenweber, Klaus M. Scheibe, Rainer Struwe, Franziska Kuhne; Berlin; Germany

Hyperplasia in interrenal cells of adrenal glands after forced training of turkeys

Stefanie Petow, Jutta Berk, Joergen Kjaer; Celle; Germany

behavioural genetics

Does Hoxb8 gene affect feather pecking in laying hens?

Aida Mezzeiová, Lubica Kubíková, Boris Bilčík, Pavel Výboh, Joergen Kjaer, Lubor Kosťál; Ivanka pri Dunaji; Slovakia

Comparison of pet dogs and police dogs: Genetic background and environmental effects

Judit Vas, József Topál, Krisztina Héjjas, Zsolt Rónai, Zsuzsanna Horváth and Ádám Miklósi; Budapest; Hungary

behavioural tests

Relationship between temperament and growth performance in German merino lambs

Ferenc Pajor, Andrea Szentléleki, Edina Láczó, Péter Póti and János Tőzsér; Gödöllő; Hungary

Evaluation of temperament of dairy cows during milking in a Hungarian herd

Andrea Szentléleki, Kálmán Niedermayer, Rita Zándoki, Sándor Merész and János Tőzsér; Gödöllő; Hungary

behaviour of dogs

Multi-aspect analyses of the family dog's interspecific play behaviour

Lilla Tóth, Márta Gácsi, Éva Péch; Budapest; Hungary

Investigations into lying behaviour of bitches in choice tests

Maria Weinmann, Carmen Weirich and Steffen Hoy; Giessen; Germany

Visual communication between dogs and humans: Which components of the pointing gesture help the dogs to find the hidden food?

Gabriella Lakatos and Ádám Miklósi; Budapest; Hungary

CONCEPTS OF INDIVIDUALITY: DIFFERENT MEANINGS OR THE SAME STORY WITH DIFFERENT TITLES?

Hans W. Erhard

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Individuals differ from one another. Regarding humans, this observation has led to the concept of the different humours several thousand years ago. Regarding animals, it has been the basis of selection, and ultimately domestication even before that. And yet ethologists have only really acknowledged it for a few decades. Avoiding ‘personality’ for fear of being accused of anthropomorphism, they started out with ‘individual differences’ based on the error terms in statistical tests that could not be explained by the experimental treatments. Soon, the need for structure and order took over, and temperament became fashionable, mainly in cattle and sheep. Coping strategies came along for rodents, birds and pigs. The terms and concepts used now differ in the degree of structure they provide, from ethology’s favourite, the non-structured “individual differences” to psychology’s favourite, the concept of personality, with its layers of types, traits and states. An important aspect of labelling appears the distinction between different groups of individuals, as reflected in terms such as sex/breed/racial differences (based on external properties of the group members), or strategies, styles, traits, types (based on the behaviours performed by these groups). Another aspect is that of different levels, best represented by the state-trait-type structure in personality, but also in the less developed distinction between strategies and tactics.

The difference between temperament and personality is often described as that between what is present at birth and what develops later in life, sometimes used to distinguish between non-human animals, who have temperament, and human animals who have personality. The attribute ‘behavioural’ avoids making any general assumptions about other aspects of the individuals studied (physiological, neuro-endocrine?), while ‘individual’ disposes of the need to identify sub-groupings within the distribution. An agreement on what terms to use for which purpose would certainly facilitate literature searches.

METHODS TO ASSESS TEMPERAMENT IN SHEEP: THE AUSTRALIAN EXPERIENCE

Dominique Blache¹ and Drewe Ferguson

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Selection for less fearful temperament is viewed by the Australian sheep industry as one strategy which can improve both welfare and productivity. To achieve this, there was a need to develop a simple test, practical enough for inclusion within on-farm selection programs.

Historically, at UWA, Murphy *et al.* (1994) used two objective behavioural tests, the arena test and the isolation box test (IBT), which are combined in a selection index (Murphy 1994) for the development of two divergent temperament lines of sheep ('calm' or 'nervous'). The arena test is a motivational choice test that measures the approach/avoidance behaviour of the animal to humans. The IBT involves isolating a sheep in a 1.5 m³ box and objectively measuring agitation (via a purpose built electronic meter) over 1 minute to provide an objective assessment of the degree of fear expressed during isolation. The repeatability of the IBT was found to be moderately high (0.6 - 0.76). The heritability of the response to the IBT was estimated on 5000 ewe and ram progeny from 4 breeds (Merino, Border Leicester, Poll Dorset and White Suffolk) and ranged from h^2 0.3–0.5. Lately, we have demonstrated that the test duration and box size can be reduced without compromising the discriminative power of the test. We will discuss the consequences in term of production and welfare (such as improved neonatal lamb survival) of this selection and give a brief outline of the future development of our research.

Murphy *et al.* (1994) *Proc. Aust. Soc. Anim. Prod.*, 20, 247-250

THE EFFECT OF PRE-WEANING HOUSING SYSTEM ON THE FEAR REACTION OF DOMESTIC PIGS

Helena Chaloupková, Gudrun Illmann and Kristýna Bělská

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The effect of pre-weaning housing systems on the coping ability of pigs before weaning and during fattening was tested. Two commercial housing systems, a standard farrowing crate (SC) without straw, 4.0 m² vs. an enriched farrowing crate (EC) with straw, 4.9 m² and an enriched farrowing pen (EP) with straw, 6.4 m² as control housing were compared. Housing after weaning was the same for all pigs. We predicted that pigs from SC were more stressed in tests before weaning and during fattening. From every litter the lightest and the heaviest gilt and castrated boar were chosen. Shortly before weaning at the age of 4 weeks and during fattening at 3 and 6 month of age piglets were individually tested during a 3 min lasting Isolation Test and during a 3 min lasting Human Approach Test. Higher fear reaction should involve more squeal vocalization, higher locomotion activity and fewer contacts with human. For the statistic analysis we applied a linear mixed model and a logistic regression in SAS. The pre-weaning housing system affected the behaviour of piglets before weaning. Piglets from SC squealed more (GENMOD, $p < 0.05$), had a longer duration of locomotion (GLMM, $p < 0.05$) and had more contacts with human (GENMOD, $p < 0.05$) compared to piglets from EP, but not from EC. During fattening, the pre-weaning housing affected squeal vocalization at the age of 3 months (GENMOD, $p < 0.05$) where pigs from SC vocalized less than pigs from EP. In according with our prediction piglets from SC showed a more fear through higher vocalization and higher locomotion activity but in contrast they contacted a person more than piglets from EP before weaning. A long lasting effect of the pre-weaning housing system during fattening on the fear of pigs was not confirmed. The only significant parameter was a decrease of squeal vocalization in pigs from SC at the age of 3 month which was in contrast with our prediction. We concluded that pre-weaning housing system affected fear reaction of pigs during behavioural tests before weaning but had no effect later in life when housing conditions were same for all pigs.

HOW DO DOGS AVOID CONFLICTS WITH HUMANS IN PLAYFUL AND NON-PLAYFUL CONTEXTS?

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During the course of domestication dogs' social cognition has been adapted for a "social field" characterized by interspecific interactions with humans. A stable "symbiosis" of two parties needs effective mechanisms to avoid the escalation of conflicts. We investigated what behavioural mechanisms make dogs capable of controlling their interactions with humans during and after conflict situations and whether the context of the conflict (playful vs. non-playful) and the familiarity of the partner (owner vs. experimenter) make any difference. In our experiments the human participant provoked the conflict with a threatening approach. This could elicit aggressive, avoiding or tolerating reactions on behalf of the dogs. Thirty-seven family dogs (from 15 different breeds and mongrels; 17 females, 20 males; age range: 1-10 years, mean age: 2.99 ± 2.34 .) participated in our tests. Most of them were tolerant towards their owner in both contexts ($\chi^2=0.97$, $df=2$, $p=0.952$), but their reactions were context dependent towards the experimenter ($\chi^2=9.12$, $df=2$, $p=0.01$): tolerant in the playful and avoidant in the non-playful situation. Canid play-bow is an important signal in initiating and maintaining play, especially when actions are not playful and likely to be misinterpreted. In our study play-bows were triggered by both human partners' threatening approach in the playful, but not in the non-playful context (McNemar test, owner: $p<0.001$; experimenter $p<0.001$). A rapid shift from agonistic to friendly motivational state is essential to overcome the disruptive effects of conflicts. The threatening approach was quickly followed by a friendly reunion in the non-playful and by the restart of the play session in the playful context. Our results may indicate that dogs are able to communicate playful intentions towards humans in uncertain playful situations and to switch rapidly between agonistic and friendly motivational states.

ASSESSING THE HUMAN-ANIMAL RELATIONSHIP: PRINCIPLES, PROBLEMS AND PERSPECTIVES

Susanne Waiblinger*, Xavier Boivin, Vivi Pedersen, Maria-Vittoria Tosi, Andrew M. Janczak, Eleonora K. Visser and Robert B. Jones

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The quality of the human-animal relationship (HAR) has major impact on farm animal welfare and productivity. Thus, an increased understanding of the HAR is essential. For this reason, valid and reliable methods to assess the HAR are necessary.

The HAR is directly linked to the mutual perception of the two players involved in - the human and the animal. From the animal's perspective, the relative strength of pleasant or unpleasant emotions involved in the perception of and reaction to the human constitute its relationship to humans. Measuring animals' reactions to humans enables us to reach conclusions about how they perceive specific human beings or people in general. However, several confounding motivations and factors can decrease the validity of a test. Also, different aspects of the HAR may require different tests. For instance, a test designed to measure the level of fear of humans may be of low value for assessing the attachment of an animal to a human.

Tests measuring the animals' reactions to human beings fall into three main categories: (1) reactions to a stationary human, (2) reactions to a moving human and (3) responses to actual handling. The relative importance of possible confounding motivations as well as the conclusions to be drawn from the reactions may differ between the test categories. Further aspects that may affect validity of the test are pre-test conditions (e.g. the method used to bring them to the test environment), the physical and social environment, the characteristics of the human stimulus, test duration and multiple testing.

Acknowledgement: The abstract summarizes the results of the task group "Measuring human-animal relationship" within the EC COST Action 846 "Measuring and Monitoring Farm Animal Welfare", supported by the European Commission.

MEASURING BEEF CALVES' RESPONSES TO HUMAN DURING THE WEIGHING PROCESS ON FARM : A METHODOLOGICAL STUDY

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The development of on farm methods for the early evaluation of beef calves' reactions towards humans is an actual challenge for improving animal welfare and handlers' work in Europe. It could allow genetic selection and adaptation of husbandry practices. Such a test has to be simple, quick, repeatable and related to other situations involving humans. For that purpose, this study analysed calves' responses to a human after weighing. 37 Salers calves (five months old, 20 males and 17 females) were reared outdoors. During husbandry, they were exposed to the corral for weighing at least once a month. Their reactions to a human standing in front of the scale for 30s after weighing (inspired from Grignard et al., 2001) were observed on two occasions with one week in between. Animals' movements were video-recorded and analysed with the Observer software. Agitation scores (AS) on a visual analogue scale (120 mm) were also attributed by three observers at 10s (AS10) and 30s (AS30). The flight speed out of the scale (FS) was electronically recorded (Burrow et al., 1988). In two occasions, a handler also tried to restrain each isolated calf for 30s in the corner of a 5x5 m corral pen. A docility score (DS) was calculated (Le Neindre et al., 1995). FS but no other criteria were sensitive to calves' sex ($P < 0.01$). AS showed a high inter-observer consistency ($r_s > 0.8$, $P < 0.001$); AS10 was also consistent with AS30 ($r_s > 0.7$, $P < 0.001$) and with behaviours recorded with the Observer software. AS, FS and DS were consistent within test over time ($r_{\text{mean}} > 0.46$, $P < 0.01$). Average AS10 was consistent with average DS ($r_s = 0.59$, $P < 0.01$) and average FS ($r_s = 0.47$, $P < 0.01$) however, average FS was less consistent with average DS ($r_s = -0.30$, $P = 0.08$). Quick evaluations of beef calves' reactions to humans in the scale are promising but will need to be tested on commercial European farms.

Burrow, H. M. et al., 1988. Proc. Aust. Soc. Anim. Prod., 154-157.

Grignard, L. et al., 2001. Appl. Anim. Behav. Sci., 71:263-276.

Le Neindre, P. et al. 1995. J. Anim. Sci., 73:2249-2253

INTERRELATIONSHIPS OF DIFFERENT TESTS FOR THE ASSESSMENT OF THE COW-HUMAN RELATIONSHIP

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This study investigated the interrelationships between tests of various intensities of cow-human interaction in different environments to scrutinize the validity of the single tests regarding the assessment of the animal-human relationship.

Fifty lactating dairy cows kept in one cubicle loose-housed group on a commercial farm were subjected to a set of behavioural tests. Their *reactions to a stationary human* were examined in an approach test in an arena (AppArena) and in the barn (AppBarn). In both tests the latency to and the duration of contact with the test person were measured. *Reactions to a moving human* were observed by measuring the avoidance distance in the arena (ADarena) directly after AppArena and in three tests within the barn: (ADF) avoidance distance of cows restrained in the feeding rack; (AD) avoidance distance of cows standing freely in the barn (both: Waiblinger et al. 2003); (ADS) avoidance reaction to a human approaching, stopping and then reaching out to the cow scored from 1 to 6 with six corresponding to cows that could be touched (Rousing/Waiblinger 2004). *Reactions to handling* (restless behaviour, heart rate) were tested during a veterinary examination (HdV).

The latency to contact in AppArena correlated with AD ($r_s=0.31$, $P<0.05$) and ADS ($r_s=-0.33$, $P<0.05$). The duration of contact in AppArena showed correlations with that of AppBarn ($r_s=0.30$, $P<0.05$) and with ADS ($r_s=0.31$, $P<0.05$) but not significantly to AD. ADarena was associated with the duration of contact in AppBarn ($r_s=-0.32$, $P<0.05$), with ADS ($r_s=-0.31$, $P<0.05$) and with AD ($r_s=0.25$, $P=0.08$). Heart rate during HdV correlated with ADS only.

The correlations of AD, ADS and AppBarn with the arena parameters and with each other support their validity with respect to the assessment of animal-human relationship.

References:

Rousing/Waiblinger 2004, *Appl.Anim.Behav.Sci.* 85, 215-231

Waiblinger et al. 2003, *Appl.Anim.Behav.Sci.* 84, 23-39

VALIDITY OF DIFFERENT TESTS FOR ASSESSING THE COW-HUMAN RELATIONSHIP ON DAIRY FARMS

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The quicker and simpler a test, the more suitable it is for on farm assessment. Still, they have to be valid. This study investigated the validity of three tests for assessing cow-human relationship. 33 cubicle loose-housed dairy herds (36 ± 15 lactating cows) were visited once. Avoidance distance was tested inside the barn (AD) and in the feeding rack (ADF, both Waiblinger et al. 2003, Appl.Anim.Behav.Sci. 84, 23-39) and for both the herd median value was used per farm. Additionally, one new simple and quick test was carried out: In the Lypass/Lytouch test (LP/LT) the experimenter first passed behind the lying cows, then approached lying cows, followed by, touching them for 3 seconds, and knocking 2 times at the hind leg; the number of animals rising per number of lying animals at the start was recorded as farm value. The behaviour of milkers was observed during the evening milking. Data were analysed using Spearman rank correlations. Cows showed lower AD on farms where milkers showed more positive (speaking calmly, stroking, touching gently) behaviour ($r_s = -0.430$, $p = 0.01$) and higher AD when milkers used more negative behaviour, e.g. shouting at the cows during milking ($r_s = 0.446$, $p = 0.01$). ADF was not correlated significantly with behaviour of milkers. More cows raised in LP/LT, when the milkers clapped a lot with their hands ($r_s = 0.346$, $p = 0.05$) and tended to, when milkers shouted more at the cows ($r_s = 0.319$, $p = 0.070$). Tests correlated with each other: AD positively to ADF ($r_s = 0.603$, $p = 0.01$) as well as to LP/LT ($r_s = 0.564$, $p = 0.01$), and ADF to LP/LT ($r_s = 0.441$, $p = 0.05$). The validity of AD for assessing cow-human relationship was confirmed, while validity of ADF could not be shown here. LP/LT seem to have some value and could be advantageous for on farm assessment of cow-human relationship. Thus, further investigations are necessary.

Acknowledgements:

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PREDICTORS OF HUMAN-ANIMAL RELATIONSHIP IN YOUNG ENGLISH THOROUGHBRED HORSES

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We examined two factors possibly affecting human-animal relationship (HAR) in young horses: weaning and paternity.

We suppose that artificially weaned foals come to a closer HAR, because caretakers partially substitute the role of the mother (by leading the horse to the pasture etc.). We hypothesised, that H1) foals should show better HAR after weaning than before weaning; and H2) foals weaned at younger age should form better HAR than those weaned as older; Further, H3) foals sired by the same stallion should have similar HAR.

We observed 25 colts and 26 fillies during three observation periods: before weaning (BW, VII/2003; group of mother-foal pairs); nearly after weaning (AW1, XII/2003) and later after weaning (AW2, IV/2004; groups of weaned foals according to their sex). The foals were not additionally handled except for daily routine. Horse' reaction to the observer was assessed by a halter test (trying to put a halter on a foal), and classified at scale from 1 to 3 (1 friendly approach to the person, 3 untreatable horses avoiding contact, 2 indifferent reaction to humans). The better the HAR before weaning the better HAR was found in both periods after weaning (H1: BW*AW1, $p < 0.01$, BW*AW2, $p < 0.05$, Cochran-Mantel-Haenszel statistics). Earlier weaned foals showed slightly better HAR shortly after weaning (H2: BW*AW1: $r = -0.26$, $p < 0.05$; the foals were weaned at 172-229 days), but no such relationship was found in period AW2. The foals expressed different HAR according to its sire (H3: $p < 0.05$, Cochran-Mantel-Haenszel statistics).

Conclusion: Young horses tend to maintain HAR formed during the first months of life and it was temporarily strengthened shortly after weaning when the foals have to cope with loss of the mother. Weaning at younger age seemed to induce a better HAR. The identity of the sire may help predict HAR as proposed by breeders.

TESTS OF COGNITION – WHY AND HOW?

Hanno Würbel

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Animal welfare partly depends on the nature of external stimuli, events or situations impinging on animals and causing suffering or lasting harm, partly on the animals' internal processing mechanisms which determine their capacity to cope with the external world. Cognition comprises a set of such internal processing mechanisms. On the one hand, cognition offers animals a degree of control over their environment as it allows them to predict the outcomes of external stimuli, events or situations or of their responses to these. Furthermore, cognitive capacity is developmentally plastic and critically depends on the animals' rearing environment. Therefore, measures of cognition can reflect animals' states regarding their ability to cope with the environment and as such serve as indirect measures of animal welfare. On the other hand, cognitive processing is affected by the animals' subjective emotional state which affects the ways in which animals appraise external stimuli, events and situations. Therefore, measures of cognitive bias in the appraisal of external stimuli offer a window to the subjective emotional experience of animals.

Cognition refers to information processing and involves the processing of both stored information and actual sensory input to guide motor output adaptively. Usually, specific tasks need to be developed to test specific cognitive functions, and despite the generality of cognitive functions, tasks may need to be adjusted to species-specific characteristics to yield meaningful results. I will present recent examples of tests of cognition that have been used to assess coping capacity or cognitive bias, respectively. I will discuss these tests in terms of the underlying cognitive constructs, their relevance for the assessment of animal welfare, and the external validity of the results.

THE IMPACT OF SOCIAL RANK AND STABILITY OF THE SOCIAL ENVIRONMENT ON LEARNING BEHAVIOUR OF DWARF GOATS

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Voluntary shape discrimination in 70 male dwarf goats (*Capra hircus*, 15 weeks of age) was tested. Animals were housed in small groups of five animals and were fed *ad libitum*. Water was delivered from computer controlled learning devices accessible to all goats at any time. Goats had to discriminate four shapes displayed on a TFT-screen, where different pattern combinations comprised of one S+ and three different S- were presented. Water consumption was not limited when learning performance was low; goats simply increased the number of trials to get enough water in this phase of the tasks.

The experiment was divided into three consecutive sections. In the first section (LE1), goats remained in stable groups in their home pen and had to discriminate four shapes. In the second section (LE1u), goats were relocated to a new pen and groups were mixed, however the task remained as in LE1. In the third section (LE2), animals were relocated to a new pen, groups were mixed and four new shapes had to be discriminated. Dominance relationships were analysed separately for all sections; animals were grouped in high, middle and low ranking individuals. Impact of rank or task on learning was tested by ANOVA (Mixed Procedure; SAS).

Despite the fact that there were no significant differences between LE1 and LE2 concerning the slope of learning curves or the number of trials to reach the learning criterion, a correlation between learning success in LE1 and LE2 on an individual level was found. No impact of rank on learning success was found, with the exception of LE1u: learning success decreased in all animals but remained above the learning criterion, and higher ranking animals showed lower success rates.

In conclusion, relocation and group mixing had a negative impact on recall of previously learned shapes. This effect was broader in high ranking animals. There was no effect of rank on learning of new shapes.

A LEARNING TEST FOR ADULT LAYING HENS (GALLUS GALLUS DOMESTICUS) BY ONE-TRIAL

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Many learning tests are well known for young chickens, especially for those of the age of one day. However currently only a few learning tests are known for adult laying hens. Especially one-trial and passive avoidance learning tests that are common in laboratory animals, e.g. in rats and mice, have not been established for adult laying hens. These tests are important to study learning with a precisely determined timeframe when information is acquired. In this study we established the “step down avoidance test “(SDA) as an one trial passive avoidance learning test for adult laying hens. Recently only few one trial learning test are known for adult laying hens, here the tested hens were at the age of 21 weeks. The SDA involves learning not to step down from a safe platform in order to avoid a mild foot shock. Animals had a significantly higher latency to stay on a safe platform instead of leaving it, after receiving an aversive stimulus ($N_1=12$), i.e. an electric foot shock, in comparison to an baseline trial which was conducted 24 hours earlier (r.m. ANOVA, $F_{1,18}=5.34$, $p=0.033$). Animals also showed significant more freezing behaviour (Wilcoxon, $Z=-2.028$, $p=0.043$), significantly more risk assessment behaviour (r.m. ANOVA, $F_{1,18}=8.04$, $p=0.011$) and significantly more defecations (Wilcoxon, $Z=-2.251$, $p=0.024$) after receiving the foot shock compared with the control group ($N_2=8$) (same handling but without aversive stimulus) . The foot shock intensity was minimized to the lowest necessary level to minimize stress and pain to animals, based on pre-tests results. Overall, the hens showed a clear evidence that they have learned to avoid the aversive stimulus in the SDA. Thus, the common step down avoidance test for laboratory animals is also an appropriate one trial passive avoidance learning test for adult laying hens.

LEARNING DEPENDENT GENE EXPRESSION OF NCAM 180 IN THE HIPPOCAMPUS OF LAYING HENS FROM DIFFERENT HOUSING SYSTEMS

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By using behavioural biology and molecular biological approaches, we tried to obtain new information concerning the influence of the environment on the limbic system at a cellular level. The hippocampus, part of the limbic system, is known to be involved in learning and memory and shows neurogenesis also in adult animals. We therefore concentrated on this structure for our investigations.

At first as a learning test a step down avoidance (SDA) test with two different groups of laying hens was performed. This test involved hens which were directly separated into two groups after hatching. The first group grew up in floor housing systems and the second group grew up in cages.

During the training for the SDA, the animals have to learn not to leave a safe platform positioned on a metal grid in order to avoid a mild foot shock. An increase of the latency to leave the platform in the second run compared to the first one means that, in accordance with the literature, learning has taken place.

After the end, of the behavioural task, the animals were prepared for the investigation of the gene expression of NCAM180. We extracted the RNA of both hippocampi separately and performed a reverse transcription to get the cDNA. The cDNA samples were then tested with Real-Time PCR (Applied Biosystems 7500; relative quantification method).

At the behavior level, we found significant differences between the two groups of housing systems, e.g. for freezing behaviour. The molecular biological studies show correlations between learning and expression of NCAM180. Thus the hens which learned, which left the platform after a longer period of time, showed an increased expression of NCAM180.

THE DEMAND FOR FEATHERS IN HIGH AND LOW FEATHER PECKING BIRDS

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Previous work demonstrated an association between feather pecking and feather eating in laying hens. The aim of the present study was to investigate if high feather pecking birds (HFP) have a higher demand for feathers than low feather pecking birds (LFP). The demand was measured by an operant conditioning technique. The maximum price individual animals were prepared to pay for food (as a standard) or feathers in a Skinner box under progressive ratio 10 schedules (PR) was recorded. Nine low feather pecking birds and 11 high feather pecking birds were kept in individual cages. To familiarize birds with loose feathers, feathers were accessible in the home cage for 30 days prior to testing. Ten feathers were inserted into small holes in a piece of clear plastic and fixed next to the food in the home cage. The number of feathers removed from the plastic and found in the drop pan was recorded daily. Missing feathers were considered eaten.

HFP birds ate a significantly higher number of feathers than LFP birds (3.5 ± 3.5 versus 0.7 ± 0.5) in the home cage ($F_{1,19} = 5.6$; $P < 0.03$). HFP and LFP birds did not differ in their achieved maximum PR with feed as reinforcement ($F_{1,19} = 0.02$; $P < 0.9$). HFP birds achieved higher maximum prices than LFP birds with feathers as reinforcement ($F_{1,19} = 4.28$; $P < 0.05$).

The dietary effect of feathers may be a crucial factor in the development of feather pecking. The results underline the importance of structural insoluble fiber components from feed or environment in HFP birds.

CENTRAL DOPAMINERGIC CONTROL MECHANISMS AND FEATHER PECKING IN LAYING HENS

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A short review of our attempts to identify dopaminergic control mechanisms of feather pecking behaviour in laying hens will be presented.

In the first series of experiments we have manipulated pharmacologically two groups of hens, showing spontaneously high or low feather pecking frequencies. Both groups were treated systemically with dopamine receptor agonists and antagonists, such as SCH 23390 (D1 antagonist, 0.2 mg/kg), SKF 38393 (D1 agonist, 4 mg/kg), spiperone (D2 antagonist, 7

mg/kg) and bromocriptine (D2 agonist, 10 mg/kg). Each bird was subjected to the single i.p. injection treatments every other day in a balanced way. The response of high and low feather pecking hens to dopaminergic drugs differed. In case of D1 receptors specific ligands, SKF 38393 significantly increased while SCH 23390 suppressed gentle and severe feather pecking in high feather pecking hens. In the case of D2 specific ligands the results were less clear. Both antagonist spiperone and agonist bromocriptine decreased gentle and severe feather pecking. Using quantitative ligand autoradiography we have estimated the densities of D1 and D2 dopamine receptors in high and low feather pecking hens. We found up-regulation of both receptor subtypes in several forebrain regions in high feather pecking birds. These results provide evidence for the involvement of the dopaminergic system in control of feather pecking. Furthermore, the receptor increase in the basal ganglia suggests possible association of feather pecking with the dopaminergic reward system and dopamine related repetitive motor routines. Up-regulated densities in areas belonging to the “telencephalic feeding circuit” suggest that this abnormal behaviour is probably linked to feeding behaviour.

This study was supported by the grants from the VEGA 2/5127/25 and the APVV-51-024904.

EFFECT OF AN ELEVATED PLATFORM ON TIBIAL DYSCHONDROPLASIA, WALKING ABILITY AND LEG POSTURE IN MALE TURKEYS

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The aim of this study was to evaluate the effect of an elevated platform as environmental enrichment on the prevalence and severity of tibial dyschondroplasia (TD), walking ability and leg posture in tom turkeys of the BUT Big 6 strain.

In two experimental periods, altogether 696 birds were housed in 6 floor compartments (each 18.0m²). Three of these compartments were enriched by an elevated platform (5.5m²) with a ramp. The data were analysed using GLM-Procedure for analysis of variance (SAS, Version 8.0).

All turkeys were evaluated for leg posture and walking ability independently by two observers at 6, 12, 15 and 20 weeks of age. After the last scoring 10 percent of the animals with the best and worst walking ability from each treatment were selected and slaughtered. Both tibiotarsi were removed for further examination of skeletal disorders.

The average use of platforms was equal ($p < 0.05$) in both trials and showed values between 28.6 (trial 1) and 27.6 % (trial 2). The incidence and severity of TD was not significantly affected by enrichment. The TD-incidence showed values between 50 and 100 %. With increasing age walking ability and normal legs deteriorated in all groups independent from housing condition.

The enrichment of environment had neither an effect on TD nor on walking ability or leg posture in our study. The gait score and the percentage of turkeys with abnormal legs increased independently of environmental enrichment with rising age and body weight. It seems that the incidence and severity of TD are not the exclusive reasons for the observed leg problems in this study. We believe that male turkeys of this commercial strain are predisposed to leg problems. From this point of view it can be derived that the breeding companies should give more attention on selection criteria in order to improve the walking ability and to reduce the observed health problems.

**CONTEXT-SPECIFIC DIFFERENCES IN THE DOGS' BEHAVIOUR
TOWARDS THEIR OWNER, A FAMILIAR
AND AN UNFAMILIAR PERSON.**

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There is little knowledge in what extent dogs discriminate between familiar and unfamiliar persons. In our study we have investigated if dogs discriminate between three human partners, the owner, a familiar person (whom the dog likes and who meet the dog at least twice in a month), and an unfamiliar person. Twenty adult dogs (10 males and 10 females) from various breeds were observed, during play, walk, and a modified version of Strange Situation Test. They were called in from food and had to sit, lie and stay at their place if commanded (obedience test). In the threatening test dogs were faced with an approaching woman who moved slowly and haltingly and looked steadily into the eyes of the dog without any verbal communication. During food inhibition, dogs were prohibited from taking a piece of food. In the dominance test the dog was made to sit, lie down and was turned on its back. All human partners were present simultaneously in all test situations. Dogs' behaviour towards the three people was compared using Friedman test.

During walk dogs clearly discriminated between their owners and the two other participants, and followed the owner (85.0%) instead of the familiar (8.3%) or the unfamiliar person (6.7%). ($F_{2,19}= 31.88$, $p < 0.001$) In the threatening situation 90% of the dogs went to the owner but none to the other test partners ($F_{2,19}= 30.33$, $p < 0.001$). During play, dogs did not differentiate between their owners (76.9% gave her the toy) and the familiar person (23.1%), while they did make difference between their owner and the unfamiliar woman (none gave her the toy) ($F_{2,19}= 14.31$, $p < 0.001$). In the food inhibition test dogs did not discriminate among the test partners; 45.5% took the food away from the owner, 36.3% from the familiar and 18.2% from the unfamiliar person ($F_{2,19}= 2.00$, $p = 0.38$).

Our results suggest that dogs discriminate between their owners, a familiar and an unfamiliar person, however, this behaviour is context-specific.

HUMAN AND DOG UNDERSTANDING OF DOG BARKS

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Several studies showed that nonhuman primate and other species were able to distinguish between individuals and contexts by only hearing vocalizations. We explored this phenomenon in family dogs. In the last decades only a few studies focused on the acoustic communication of dogs. Recently we showed that humans are able to categorize the barks into contexts and describe the emotional content. In this present study we conducted play-back experiments to family dogs according to the habituation-discrimination paradigm (in the first phase of experiment the subjects are habituated to the “same” type of bark three times, then a “different” recovery stimulus is played back, a longer orientating duration, or “looking time”, for the last stimulus is expected if they recognize the difference between the two types of stimuli). We investigated if dogs could discriminate between barks recorded from different individuals or in different contexts. Barks from dogs barking at a stranger entering the garden and individuals leashed to a tree in a park and left alone were used. We tested 90 subjects (34 different breeds and several mixed breeds; sex ratio: 44 female/46 males; mean age: 3.58 ± 2.60 years). Looking times toward the speakers were measured and compared by repeated measures two-way ANOVAs). Our results showed that subjects oriented more toward the speakers while the recovery stimulus (bark recorded from another individual or in the other situation) was being played back to them. Dogs were more successful in individual discrimination than humans in a previous study (people were not able to distinguish between dogs reliably by hearing their vocalizations). These and other findings suggest that bark may provide contextual and individual information to receivers and therefore play a role in dog-dog and human-dog communication.

A CRITICAL REVIEW OF FEAR TESTS USED ON FARM ANIMALS

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Fear is a very welfare relevant aspect of the life of the animal, and is included in many welfare assessment schemes. It is also one part of the subjective experiences of the animal for the existence of which there is some consensus, hence it is an area in which we should expect mature ways of measuring.

In the current presentation we will discuss the origin, the repeatability and the validity of the most common fear tests, especially the novel object test, the novel arena test (open field) and various forms of restraint and handling tests.

One of the conclusions of the review is that there is currently a large lack of information on the different tests. While many of the tests have been validated for one or more species there is next to no information for other species. We have currently a lack of methodological papers and standardised tests in applied ethology. Standardised tests are needed, because it is only in this way that we can acquire a solid literature on the validity etc of the different tests.

One of the reasons for this is that because of the practical problems in testing large animals it is difficult to completely standardise the method used, especially when doing “on-farm” testing. While this is a real problem in many cases, it only makes it more vital to have knowledge on the robustness of different tests. Knowledge that can only be gathered and used if the tests are standardised as far possible.

INDIVIDUAL CHARACTERISTICS ASSOCIATED WITH NEIGHBOUR PREFERENCES AMONG NON-RELATED CONSPECIFIC UNGULATES

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All domestic ungulate species are highly social. Hence, an adequate social environment is crucial for their welfare. To date, studies into social bonds of livestock have focused mainly on mother-young relationships. However, modern husbandry systems rarely allow long-term maintenance of kinship bonds. Thus, knowledge on sociopositive relationships between non-relatives is relevant for farm animal welfare. Considering factors which might influence the "choice" of bonding partners by "predisposing" particular individuals to develop an attachment can contribute to supporting sociopositive herd structures. Aims of this study were the quantification and visualisation of bonding networks in herds of unrelated conspecific ungulates and the identification of parameters potentially enhancing dyadic bonds. It was conducted on four species (herd sizes 11-60 members), i.e. horses (2 herds), donkeys (1 herd), sheep (2 flocks), and cattle (1 herd). Equids lived in mixed-sex herds (males castrated), sheep were all male, and cattle all female. One herd of each species was studied in two observation periods (usually in consecutive years) – with changes in composition between periods. Frequency of spatial proximity (nearest neighbours) was used as an indicator of inter-individual preferences. Six physical and experience related parameters were assessed: coat/ fleece colour, colour of mane and tail/ face and legs, possession of horns, height, age, and year of entry into the herd. Multivariate statistics were employed to visualise networks (Multidimensional Scaling, Cluster Analysis) and to identify factors correlated with neighbour preferences (Multiple Mantel Regressions). In total, results are based on 234 animals and approx. 1500 hours of neighbour recordings. Relevant effects were found for year of herd entry (one horse herd, one sheep flock), possession of horns (both sheep flocks), and age/ familiarity (cattle). Results are translated into husbandry recommendations.

MATERNITY STATUS AND BODY WEIGHT AS FACTORS INFLUENCING SYNCHRONIZATION IN BEEF CATTLE ON PASTURE

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Group living animals may adjust their activity and the level of behavioural synchronization to their body size and reproductive status. We tested the influence of two factors, body size (body weight of the cow) and maternity status on activity and synchronization of individual animals. The study was carried out on experimental pastures on a herd of 15 Gasconne cows (10 with calves in 2004 and 11 with calves in 2005) during 25 days in 2004 and 2005. We used instantaneous sampling method for scanning the herd every ten/ five minutes. The activity of the animals, as resting (lying) and activity (any other state) was recorded. We calculated the activity index, the observed synchronization index – representing observed amount of synchrony and the standardized degree of synchronization (SDS) index – quantifying the effort of animal to synchronize (based on observed synchronization, maximal possible synchronization and expected synchronization) for each animal.

Mixed model (SAS) with year, weight, maternity status, weight *year and maternity status*year as fixed factors and identity of cow as a random factor was applied on the data. We found that mothers were more active than cows without calves ($p < 0.05$). The body weight did not influence the activity ($p > 0.05$). The maternity status did not influence either observed synchronization or SDS ($p > 0.05$). Body weight of the cow positively influenced the SDS of the cows ($p < 0.05$) but not the observed synchronization ($p > 0.05$).

The higher activity of mothers suggests that activity levels in beef cows are influenced either by metabolic needs or interaction with the calf. We are currently looking for an explanation of the higher SDS in heavier cows.

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REPRODUCTIVE SUCCESS IN BROILER BREEDERS: WHAT DEFINES A CHAMPION?

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The effect of male-male competition on reproductive performance of broiler breeder males in a natural mating system and the relationship between physiological, morphometrical and behavioral components was studied. Thirty six adult males and 144 females were housed in groups of 3 males and 12 females and their behavior was recorded during a two week period. From the males with the highest (H) and the lowest (L) mating frequency new groups of one male and four females were formed. The behavior was recorded during another two week period. Eggs collected during the first observation phase were incubated and paternity within each group was attributed to one of the 3 males. Fertility was estimated from eggs collected during second observation period. As a last period, individually caged females were artificially inseminated with the sperm from H, L, or mixed sperm and paternity and fertility was recorded. Mixed model ANOVA and Pearson partial correlation were used to analyze the data.

Heavier males showed lower mating frequency ($P=0.038$). Sperm concentration was positively correlated with sperm volume ($P=0.003$) and negatively with fertility ($P=0.047$). Paternity tests on hatchlings from 3 male groups showed that each male regardless of mating status produced progeny and 28% females had offspring sired by one male, 55% sired by two males and 17% sired by all three males. After artificial insemination with H and L sperm fertility was comparable (66%, 68% respectively). Mixed sperm hatchlings (H+L) were in 64.1% sired by H male and 35.9% by L male.

We did not find evidence to prove our hypothesis that males with high mating frequency sire more progeny. Neither the size of secondary sexual characters nor sperm quality was positively associated with reproductive success. This, together with the discrepancy of results in fertility/paternity when natural mating was compared with artificial insemination conditions, suggest more important role of female choice than usually considered.

INVESTIGATIONS ON CHARACTERISTICS OF SOWS WITH DIFFERENT RANK POSITION

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A total of 237 sows with 509 matings and 432 litters were observed to study the development of the individual rank position from the first to the fourth parity and the impact of the rank order on some fertility parameters. The number of fights and their outcome were registered for each sow during grouping (8 sows with different parity per group) under standardized conditions in a stimu-pen (48 hours), soon after the prior weaning (HOY and BAUER 2005). The individual rank in the social hierarchy was calculated based on the ratio of victories and defeats including the number of animals involved in the agonistic interactions (LANGBEIN and PUPPE 2004). The dominance index (-1 up to +1) was calculated and the rank place was determined (1 – 8) for each sow. The following parameters were recorded: weight at weaning, parity number, percentage of the sows which returned to heat after mating and litter size. The univariate analysis of variance with the calculation of LSQ means was used. Only 17.3 % of primiparous sows kept in groups together with sows of a higher parity number at mixing were high ranking animals. In tendency, sows with a high rank position after 1st farrowing had a higher rank place up to the 4th parity. The coefficients of correlation between the individual rank places from the first to the second parity was 0.46 ($p < 0.05$), between the first and the fourth parity 0.47, between the second and the third parity 0.71 ($p < 0.01$). The other coefficients of correlation were between 0.19 and 0.45 ($p < 0.01$). Sows of a low rank had on average a significantly lower live weight (216.9 kg), a lower parity (2.8) and a higher rate of returning to heat (18.8 %) when compared with high ranking pen-mates (254.3 kg, parity = 4.4, 11.7 %, $p < 0.05$ for all parameters). Sows of high rank (rank places 1 to 4) achieved significantly larger litter sizes both for the total number of piglets born and those born alive (12.28, 11.34 piglets per litter respectively) than low-ranking pen-mates (rank places 5 to 8) (11.70, 10.91 piglets/litter respectively; $p < 0.05$ for the number of piglets born in total).

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CONSISTENCY OF DAIRY COW LYING TIME or HOW LONG DO YOU NEED TO WATCH VIDEO?

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Lying behaviour is a widely used parameter to assess housing quality and welfare in dairy cows. In order to estimate the minimum observation time, we investigated whether the lying behaviour of one week could be extrapolated from single or few observation days.

We used a dataset of continuous lying records of 29 Canadian HF-cows housed in cubicles for 13 weeks after calving to compare lying times during of the last one (d1), two (d2) or three (d3) days per week with the complete record of six to seven days per week (d7). Behaviour was recorded using data loggers with inclination sensors from Monday to Friday, and 10-min scan sampling from video on Saturdays and Sundays. Since earlier work had shown that both methods provide reliable estimates, data were merged.

On a weekly basis, average lying time amounted to 49.8% of time budgets (min=23.5%, max=76.0%). For every cow, weekly lying times across the 13 weeks based on d1, d2 and d3 were correlated with d7 and median correlation coefficients determined across cows for each method. The median Spearman correlations of datasets d1, d2 and d3 with d7 were 0.70 (min=0.26, max=0.96), 0.80 (0.43-0.97) and 0.86 (0.42-0.97), respectively (n=29).

Based on weekly correlations across cows, Spearman correlations did not increase with weeks in milk. When primi- and multiparous cows were treated separately (n=9 and 20, respectively), most correlations for primiparous cows were slightly lower than those of multiparous cows. In summary, considering a threshold of $r=0.8$ for acceptable reliability, two recording days per week are sufficient for assessing lying behaviour of cubicle housed dairy cows.

ON-FARM WELFARE ASSESSMENT IN BEEF BULLS – REPEATABILITY OF SELECTED BEHAVIOURAL PARAMETERS

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The aim of this study was to test whether short-term observations of social (e.g. head butt, social licking), abnormal (e.g. tongue rolling), injurious (e.g. slipping) or play (e.g. bucking, galloping) behaviour in beef bulls can provide reliable measures for inclusion in on-farm welfare assessment protocols. The main focus was to check for the repeatability (short, mid-term, longer-term) of these parameters. In a cross sectional study, 20 beef bull farms in Austria and Germany (fully slatted or deep litter pens) were visited for in total three times with intervals of 60 and 180 days following the first visit. Additionally, in order to test day-to-day repeatability, 10 farms were visited on 2 consecutive days during one of the study periods. Frequencies of behaviours were recorded at group level using continuous behaviour sampling during a 4 hour observation period starting after feeding (20 to 90 min per pen). Furthermore standing, lying and feeding was recorded using instantaneous scan sampling. Data recording will be completed in spring 2006 and overall results will be presented at the conference.

Preliminary results regarding mid-term repeatability (day 1 to 60) on a sub-sample of 10 farms revealed significant correlations only for head butts and social licking in medium weight fattening bulls (table 1). The selected behaviours therefore do not seem to be promising for inclusion in beef on-farm welfare assessment protocols assuming that only limited time for observations is available.

Table 1: Preliminary results: Spearman rank correlations of selected behaviours between day 1 and day 60 for each live weight category (n= 10 farms);

Live weight (kg)	Head butt	Displacing	Total agonistic	Social licking	Horning	Tongue rolling
200-350	0,37	0,48	0,32	-0,29	0,33	0,00
350-550	0,83**	0,45	0,45	0,77*	0,36	0,49
> 550	0,55	-0,30	0,48	0,14	0,57	0,01

** significant p=0,01

* significant p=0,05

TESTING GERMAN SHEPHERD PUPPIES TO ASSESS THEIR CHANCES OF CERTIFICATION

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Selection of a puppy that will not display desirable behavioral qualities as adult is a serious fault, resulting in financial loss but above all in the loss of the time invested ineffectively into the raising and training. Number of authors has questioned predictive value of the behavior puppy tests and there is only one paper concluding that such a testing at the age of 8 weeks can be used to select prospective police dogs (Slabbert, J.M. & Odendaal, J.S.J. 1999, *Appl. Anim. Behav. Sci.* 64: 269). Seven weeks old (right before weaning) German shepherd puppies were tested at the Police Breeding facility, Prackovice from 1992 through 2002. Reactions of the puppies (rated 0 – 5 points by the same person, PV) in the 10 testing situations were evaluated (independent movement, negotiating obstacles, response to startling stimuli, entering room, behavior in the closed room, response to knocking on the window, reaction to a strange person, response to the rattling noise, fetching ball, and tug of war). In total 30% out of all tested puppies (n=210, 44 dams and 42 sires) failed to pass the certification. Probability that the puppy will pass the certification was tested by a logistic regression with repeated measurements (GENMOD, SAS). The probability depended on the low activity while “negotiating obstacles” in the interaction with higher body weight ($\chi^2(1)=7,82$, $P=0.005$), weak response to the “rattling noise” ($\chi^2(1)=10,06$, $P=0.0015$), high score in the “fetching a ball” ($\chi^2(1)=8,38$, $P=0.0038$), and on the higher weight at the time of testing ($\chi^2(1)=16,34$, $P<0.001$). It suggests that these criteria can be recommended for the early selection of the puppies suitable for the police training.

GETTING BETTER RESULTS IN LESS TIME
WHEN USING AUDIO/VIDEO RECORDINGS IN RESEARCH
APPLICATIONS MAKE SENSE

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Practical experience shows that not only collecting different behavioral codes simultaneously during observation sessions is very difficult, but also the method of data collection itself can be a source of trouble (doing free text annotations at high speed, filling out forms, accurate registration of time information etc.). Against this background a documentation of behavioral experiments using audio- and video recordings is not only advisable, but sometimes even essential. This way one can analyze the recorded reality by a) watching it at any speed and b) as often as one needs. Only this makes it possible to precisely analyze all events occurring in reality. Eventually the use of this technology creates new defiances for all project members: Handling of video equipment, storage of video material, allocation of behavioral information to video sequences, statistical analysis etc.. In that way the application of video techniques alone does not offer any advantages. Because of the additional technical things to handle, the project members have even less time for the actual data analysis. This is why “using video in behavioral studies” often has the undertone “We’ve tried that - it was much too complicated”. That it does not need to be that way and how many valuable advantages the professional analysis of video recordings can offer, shows a demonstration of the software system INTERACT.

INTERACT is a computer based event-logging and analysis system of the company Mangold International GmbH (www.mangold-international.com), which has been developed during the past 15 years based on requirements of real research projects. INTERACT allows for the synchronized and frame accurate control of multiple videos. It offers lots of event-logging, coding, transcription and data analysis functionalities. It can integrate many kinds of external information (e.g. physiologic data) and display those synchronized to the video recordings and the coding information. Because of the centralized data collection, further project steps are simplified at lot: For instance the calculation of statistics or the verification of inter rater reliability is available instantly. Also sequence analysis and comparative studies are possible with only little effort. Additionally all collected data and consolidated findings are provable at any time, because the source material (video, codings, transcriptions etc.) can be referred frame accurately at any time.

Conclusion: The real advantages of using video in behavioral studies only come into effect in combination with such a data collection- and analysis-system. This will finally be expressed in saving of time and in increased quality and reliability of data.

POSTER PRESENTATIONS

A NEW PLANIMETRIC TECHNIQUE TO ASSESS THE AREA OCCUPIED BY A STATIONARY ANIMAL: *KobaPlan technique*

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Economical considerations produce continuous pressure to decrease space allowances in agriculture production for the individual animal. Under transport conditions, moreover, high space allowances may increase the risk of injuries caused by acceleration forces, although too high stocking densities may also lead to increased risks of injury or hyperthermia. One important information for the determination of suitable space allowances is the planimetric figure of the animal.

With planimetric methods the area that is occupied by an individual animal in a certain position can be assessed. The common method uses the manually measured contour length of the animals shape to process the area by relating it to an area standard (ELLERBROCK & KNIERIM 2002). KobaPlan instead relies on the number of pixels representing the animal in digital pictures. This newly invented technique uses the contrast of colour and luminance to distinguish the animal from ground surface in standardized pictures.

In six trials based on digitally imaged ducks (n=263) KobaPlan produced fast and reliable planimetric data.

ELLERBROCK, S., KNIERIM, U. (2002): Static space requirements of male meat turkeys. *The Veterinary Record* 151, 54-57

COMPARING INCREASES IN HEART RATE – PROBLEMS RESULTING FROM INDIVIDUAL BASELINE LEVELS

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The data presented here are part of a PhD project investigating impacts of human and conspecific disturbance on incubating Adélie penguins. With the continuously rising numbers of people (tourists as well as scientists) in Antarctica, comprehensive guidelines for human behaviour have become increasingly important to minimise the degree of disturbance caused to natural inhabitants. Field work was conducted at SSSI no. 13, King George Island, South Shetland Islands, Maritime Antarctic. For 20 Adélie penguins, combined data on heart rate and a number of behavioural parameters were collected. This presentation exclusively focuses on the heart rate data. Incubating individuals were chosen to ensure that increases in heart rate measured were due to emotional, not metabolic, responses. For the collection of heart rate data, artificial eggs were introduced into penguins' nests. These eggs contain infrared sensors which measure the penguins' heart rates by recording variations in the amount of blood flowing through veins situated at the birds' brood patches. The information is collected in a data logger connected to a laptop. Records included baseline heart rate as well as physiological responses during conspecific and / or experimental human visitation. Heart rates are calculated and presented in bpm (beats per minute). Individual differences in baseline and increase of heart rate are presented. The resulting problems for their interpretation and inter-individual comparison are highlighted (e.g., same absolute increase, but differing baselines), and possible pathways towards solution are discussed.

VETERINARY ETHOLOGY AND ANIMAL WELFARE

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Protection of animals raises increasing interest of the public and becomes an important factor which affects conditions of animal rearing and ethological research. Veterinary ethology is an applied form of ethology with medical basis. It investigates both normal and abnormal behaviour of animals. The abnormal behaviour is observed in domestic animals and also in wild animals in the captivity.

Veterinary ethology uses methods common in conventional therapeutic practice. It includes anamnesis, examination, diagnosis, therapy and proposal of preventive measures just as the classic veterinary medicine. The inevitable first step that initiates the work of a veterinarian and veterinary ethologist is the owner's decision that his animal needs help. This decision is usually made when there is any problem with animal health. If there are "only" behavioural problems without any evident influence on production or other disturbances it is difficult for the owner to decide about initiation of the treatment.

One of the most important parts of treatment (usually long-term) is an owner's motivation. The abnormal behaviour signals some deficiency with respect to animal physical and psychical needs and indicates a chronic process. In addition to the treatment another important goal of veterinary ethology is prevention of abnormal behaviour of animals not only by providing the physical comfort but also by education of animal husbandry personnel and the wide public.

AN ETHOLOGICAL STUDY INTO THE INDIVIDUAL OCCUPATIONAL BEHAVIOUR OF PIGS KEPT IN PENS WITH OR WITHOUT STRAW

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The aim of this study was to ascertain for how long pigs spent playing with various toys, the floor (in the case of pens with straw, the straw), the pen's equipment and pen mates per day. The study was carried out in triplicate with 36 finishers per cycle. The animals were divided amongst 4 pens (two with straw and two with slatted flooring). Each pen contained a pendular beam, a cross of chains and a lifting beam as toys. The animal behaviour was recorded using an infrared video system. Thus 6 focus animals per pen could be evaluated over 24 hour periods at the start, in the middle and at the end of the finishing period. This showed that the time spent with the individual toys was higher in the groups on the slatted floor than in the groups bedded on straw. On average, the animals on the slatted floor spent 10 minutes a day playing with the toys, whereas those on straw spent 5.9 minutes a day with the toys ($P < 0.05$). In both cases (straw/slatted floor) there was a wide individual variation amongst the animals. The total time per animal spent playing with the toys varied from 1.4 to 27.9 minutes a day on the slatted floor and 1 to 11.9 minutes if the animals were bedded on straw. The total time that the animals occupied themselves with the toys, floor/bedding, the pen's equipment and pen mates was close to identical for both pen types. On average the pigs housed on slatted flooring spent 90.1 minute a day occupying themselves, those on straw 96.5 minutes a day.

SOW PREFERENCES FOR FARROWING UNDER A COVER WITH AND WITHOUT ACCESS TO STRAW

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In semi-natural environments preparturient domesticated and wild boar sows place their nests in or near woody vegetation, where the nest site is protected. Sow preferences for a nest site in indoor environments have received very limited attention. The study was a 2 x 2 factorial experiment with +/- access to *ad lib* straw and +/- access to cover. Forty-four primiparous Landrace x Yorkshire sows were used. To obtain information on the effects of adding cover and/or straw to the nesting environment each sow was observed in the 24 h prior to farrowing for nest-building activity. To obtain information of the treatments on sow behaviour relevant for the risk of piglet crushing, the period from farrowing to 24 h later was observed for the number of postural changes and the number of situations, where piglets were either crushed or at risk of being crushed. From 5 days prior to the expected parturition date until 2 days after farrowing, the amount of straw taken from the straw racks was measured daily. There was no significant preference for farrowing under cover. The number of crushing and near crushing situations during 24 h after farrowing were significantly influenced by access to straw ($F_{1,25} = 4.50$, $P = 0.04$), but there was no significant influence of cover on this variable ($F_{1,25} = 2.97$, NS).

THE EFFECT OF DIFFERENT STRUCTURE OF GROUP ON AGONISTIC BEHAVIOUR OF WEANED PIGS

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In the presented work were studied mainly the regularities in the social behaviour of pigs under the condition of large scale production. Three methods of grouping piglets at weaning /31-34 days/ into a 12-member weaned pool were studied: 6 pigs from 2 litters /6×2/. 4 pigs from 3 litters /4×3/; 3 pigs from 4 litters /3×4/. Each method had three replicates and the weight range at weaning was 7.4-9.8 kg. Agonistic behaviour was recorded over three periods: period 1 (0-1.5 h immediately after mixing); period 2 (1h, 4-5 h later the same afternoon); period 3 (5 days later for 1 h). Both contact (head thrusting, biting and pushing) and non-contact (chasing, treat and displacement) agonistic behaviour were recorded. Growth rates over 29 days were calculated, but there were no significant difference in growth between the three methods.

Contact behaviours contributed the most to establishment of a hierarchy and dropped significantly in frequency over time ($p < 0.01$). Non contact behaviour also decreased over time ($p < 0.01$). During the first observation period, which covered the most important time for hierarchy establishment, structure 4×3 had significantly less head thrust than 6×2 or 3×4 ($p < 0.05$). Overall 4×3 showed less contact behaviour than the other methods, and less non-contact behaviour than 3×4, but it was similar to 6×2. It appears that 4×3 structure may cause less physical contacts than the other two groupings.

PERFORMANCE COMPARISONS BETWEEN DIFFERENT MODIFICATIONS OF A FARROWING SYSTEM FOR LOOSE LACTATING SOWS.

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Using farrowing pens for loose sows (200x300cm, scan-farrowing pen, Jyden-dantec) allowed to restrict the freedom of movement of the sow by a movable fence. Three different housing situations during lactation have been used and compared under production conditions: variation 1: conventional crate (4 weeks fixation), variation 2: opening crate after 1 week of fixation and variation 3: activity pen (without fixation). In variation 1 and 2 the sows were crated during the first critical days of the newborn. There was a high level of performance (on average 13,4 total born, 12,4 live born and 10,4 weaned piglets per litter). Low birth weights (< 1,0kg) occurred in 15,6% of the total born and 14,1% of the live born piglets.

The data indicate that the average litter sizes and birth weights were not different between the variations ($12,4 \pm 3,08$ born alive, $1,39 \pm 0,35$ kg birth weigh). The average birth weight amounted to 1,4 kg was slightly below the optimum value claimed to be between 1,6 and 1,8 kg. In 22,7% of the litters no losses were found. Most of the deaths of the piglets were do to a low birth weight of less than 0,80 kg (37,9%), crushing (20,3%), malnutrition and starvation (13,7%), spread legs (11,7%) and lameness (5,0%). Increased losses were found in activity pens (variation 3, 20,5%) compared to crated sows (variation 1 and 2, 13,7%). Higher daily gains of the piglets during the suckling period were found in pens without fixation (variation 2 and 3, 237g) than in the crate (variation 1, 228g).

ONTOGENY OF THE NURSING VOCALIZATION IN DOMESTIC PIGS

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The grunting vocalization that lactating sows emit during nursing is not only species-specific (e.g., it contains an increase in the grunting rate 25 s before the milk ejection) but also individually specific in established lactation. That is, each sow has its own grunting rate. It has not been examined yet (i) how early after parturition does the grunting pattern appear and (ii) whether the pattern is repeatable within sows already during the first days after parturition. The nursing vocalisation of ten sows was video-taped at the end of the first 24 hrs, on Day 2, on Day 3 and on Day 7. For every sow 3 nursings were always analysed 50 sec before milk ejections at each day. The peak grunting rate during a 5 sec interval, the total number of grunts during 50 sec and the grunt rate increase 25 sec before milk ejection were analyzed. The first analysis showed: (i) The peak grunting rate (Proc Mixed; $F_{3,27}=2.59$, NS) and the grunt rate increase (Proc Mixed; $F_{3,27}=0.94$, NS) were nearly the same on all days. The observation days had a significant influence on the total number of grunts (Proc Mixed; $F_{3,27}=4.53$, $p<0.05$). The highest grunting number was on Day 2. (ii) The repeatability in individual sows between the first 24 hrs and Day 7 were high for the peak grunting rate ($n=10$ sows, $r_s=0.78$; $p<0.01$), the total number of grunts during 50 sec ($n=10$ sows, $r_s=0.77$; $p<0.01$) and for the grunt rate increase ($n=10$ sows, $r_s=0.84$; $p<0.01$). These results indicate that the grunting pattern is already developed during the first 24 h and the individual grunting pattern is already highly repeatable during early ontogeny.

EFFECT OF FLOOR TYPE ON BEHAVIOUR OF DAIRY COWS

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The floor type is one of the most critical parts of the loose housing system because of the effect it has on cattle behaviour and hoof pathologies.

Behaviour of 10 focus animals was analysed on two different surfaces: slatted concrete with and without 20 mm thick elastic (KURA S) rubber mats. The locomotion, lying, standing, feeding, drinking, oestrus - and comfort behaviour were observed. Locomotion parameters have been analysed using duration, frequency and speed of animals. The duration of locomotion and standing behaviour was lower, but the frequency was much higher on elastic rubber mats. The speed of focus animals increased from 0.6 to 0.9 meter per second on elastic surface. No significant differences were found in lying and drinking behaviour. The frequency of feeding behaviour was significantly higher on rubber mats. The amount of feed per animal was the same in both treatments. On rubber surface much more mounting events took place than on concrete slatted surface (22 to 10 events over 24 hours). Slipping during mounting was observed frequently on concrete slatted floor.

Regarding locomotion, feeding behaviour, mounting events and the footsoreness and prevention of slipping elastic rubber mats contribute more to the animals welfare than traditional concrete slatted floor.

BEHAVIOURAL AND HEART RATE RESPONSE OF DAIRY COWS TO THE SEPARATION FROM THEIR CALVES: EFFECT OF CALVES' AGE AND AUDITORY/VISUAL CONTACT

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The aim of this experiment was to evaluate how the behavioural and heart rate response of dairy cows to the separation is affected by the calf's age at separation and post-separation auditory/visual contact.

We used 46 multiparous dairy cows divided into 6 treatments according to the calf's age of separation (1, 4 and 7 days) and contact or no contact after separation. After separation, the cows from the contact treatments were housed in individual pen near to the calf's pens. The behaviour of cows was recorded between 0-1, 9-10, 25-26, 50-51 hour period after separation and the heart rate was measured during the 60 minutes before and 60 minutes after the separation. The behavioural differences between treatments were tested with a mixed linear model procedure and the changes in heart rate were analysed using the GLM procedure (SAS).

A strong influence of the calf's age was found. The cows from later separation treatments spent more time standing ($p < 0.05$), placed their heads outside a pen ($p < 0.001$) and vocalised more often ($p < 0.05$) than the cows separated at day 1. The response was much stronger when the cows had auditory/visual contact with their calves, as they placed their heads outside a pen ($p < 0.0001$) and vocalised ($p < 0.0001$) more often. The behavioural response was at its highest immediately after the separation, remained high during 9-10 hours and then dropped. Increased activity tended to last longer in later separation treatments and in cows which could see and hear their calves. The heart rate strongly accelerated in all the treatments regardless of calf's age and/or contact and the increase lasted during the following 60 minutes.

The behavioural response of the cows is strongly influenced by the calf's age at separation and auditory/visual contact. The heart rate increases similarly in all the cows and thus seems to be more sensitive indicator of acute stress immediately after separation than the behavioural response.

THE SPECIFIC BEHAVIOUR OF FERAL HORSES RELATING TO EXTREME CLIMATIC CONDITIONS AND TO THE USE OF WEATHER PROTECTIONS IN THEIR NATURAL HABITAT

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Nearly 100 feral „Liebenthaler-Horses“, which come from the crossbreeding of Fjord-Horses and Koniks from 40 years ago, are kept on an 80 ha enclosed nature reserve north of Berlin. The whole group of horses consists of at least 6 families and one group of young stallions. The horses have sporadic contact with humans, e.g. during checks of the drinking trough and the fence. Over one year, 24-hour observations were carried out three times each month. The pasture was mapped with GPS and divided into functional areas. The actual behaviours and locations of the horses in the pasture were documented by using 15-min instantaneous scan sampling. Simultaneously, all climatic data were measured with a mobile weather recording device. The data referring to the usage of pasture were analyzed with a Geographic Information System (GIS), and the behaviour pattern data with ArcView 3.3.

The horses used the weather protection of trees to seek shelter during grazing and resting only at nighttime and when temperatures were less than 5°C. When the sun was shining and temperatures were below 5°C, the horses grazed and rested in open areas independently of the wind strength. In contrast to the low temperatures, temperatures of over 25°C mainly prompted the horses not to use available shade. On average 70-80% of the horses grazed or rested in the direct sunlight. If the wind was higher than 3 m/s, weather protected areas were mainly preferred for resting; especially, when the wind was accompanied with heavy rainfall, approximately 60% of the horses could be observed in lee areas.

Keeping horses on pasture under continental climatic conditions during all seasons demands an exact evaluation and analysis of the provided pasture to address the requirements of animal welfare. According to this study, the well-being of the animals requires either natural climatic protection by groups of trees, hedges, or the edge of a forest, or by an artificial weather protection system in open areas to provide shelter from wetness, wind or coldness. Useful artificial weather protection systems may be wind barriers, roofs, and three-walled weather refuges.

HYPERPLASIA IN INTERRENAL CELLS OF ADRENAL GLANDS AFTER FORCED TRAINING OF TURKEYS

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The aim of this study was to see if there were any changes in the morphology of the adrenal glands of turkeys after varying levels of forced training. Birds of the first group had no training (control); birds of the second group were trained from their second week of life to their eighth week and birds of the third group were trained from their second week of life until slaughter at 20 weeks of age. Training consisted of running 300 meters once per day, 5 days per week. At slaughtering the adrenal glands were taken out of ten animals per group, weighed, covered in Tissue Tek[®] and stored at -20 °C until cutting. The adrenal glands were cut and stained, using an adapted protocol of Masson Goldner. From these slices pictures were made with a “AxioCam” camera (Zeiss). From the pictures the areas of adrenal cells and interrenal cells, as well as size of the total investigated area, were measured using a picture analysis program (AxioVision LE Rel 4.3.; Zeiss). Additionally the weight of the adrenal gland in relation to body weight was determined.

The amount of interrenal cells was affected significantly by treatment (mixed model anova $F_{2,27.1}=4.07$, $P>0.05$) with birds trained to 20 weeks having significantly more interrenal cells compared to the control group (8.12×10^{-3} vs. 4.70×10^{-3} , $t_{27.2}=2.84$, $P<0.05$) with birds trained for 8 weeks in between (6.07×10^{-3}). At this point of time we cannot say if the differences are physiological adaptations to the training or if this hyperplasia suggests that the animals were not able to cope with the highest level of training (they were overstrained). Therefore further studies must be done.

DOES HOXB8 GENE AFFECT FEATHER PECKING IN LAYING HENS?

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Greer and Capecchi (2002) found in mice that the disruption of *Hoxb8* gene leads to obsessive grooming behaviour accompanied by hair loss and skin lesions. These mutant mice not only excessively groom themselves, but also their cagemates. Aberrant behavior observed in *Hoxb8* mutants is not unlike that of humans suffering from the obsessive compulsive spectrum disorder (OCD), trichotillomania. Greer and Capecchi have demonstrated that *Hoxb8* is extensively expressed in the adult CNS in regions previously implicated in the control of rodent grooming behavior.

Recently, van Hierden et al. (2005) suggested that also feather pecking in laying hens might be a suitable animal model for the OCD. The aim of this study was to test the hypothesis on the involvement of the *Hoxb8* gene in control of the feather pecking behaviour.

Twelve White Leghorn laying hens from the 7th generation of lines divergently selected for (n=6) and against (n=6) feather pecking behaviour (Kjaer et al. 2001) were killed at the age of 72 weeks, their brains were immediately removed, frozen and cut into 16 µm thick sections. The expression of *Hoxb8* mRNA was estimated by *in situ* hybridization using riboprobe (GeneDetect Ltd.; GenBank Accession Number U81801, nucleotides located within region 690-766).

Analysis of expression patterns and between line comparisons are in progress.

Greer JM, Capecchi MR 2002 *Neuron* 33:23-34.

Kjaer JB et al. 2001 *Appl Anim Behav Sci* 71:229-239.

van Hierden YM et al. 2005 *Physiol Behav* 84:471-477.

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COMPARISON OF PET DOGS AND POLICE DOGS: GENTIC BACKGROUND AND ENVIRONMENTAL EFFECTS

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Recent behaviour genetic studies often point to the importance of gene-environment interactions and have described behaviour traits in terms suggesting a quantitative mode of inheritance where both genetic and environmental factors play major roles in the expression of trait. Such investigations in dogs are especially of great importance, because they reveal the link between genetic background and behaviour and make possible to select dogs earlier in development, which show certain behaviour characteristics. Practically, this could serve to choose dogs suitable (I) for specific work (e.g. police dogs) or (II) for owners with certain personality. One of the important candidate genes for studying effects of environment on the phenotypic manifestation of allelic variation is the dopamine D4 receptor gene. Importantly, dogs, similarly to humans, possess a wide set of genetic polymorphism concerning DRD4 gene. This gene is supposed to be associated in humans with hyperactivity, mother-infant attachment types, attention deficit and sensitivity to reward. In order to study the interactions between environmental factors and DRD4 allele polymorphism and their effects on behaviour traits we investigated two groups of German shepherds: police dogs and pet dogs. DNA samples were collected in a non-invasive way and the D4 dopamine receptor genotypes were determined. We asked owners and caretakers of dogs to fill in a questionnaire about the dogs' attachment relationship to human, some aspects of learning skills and personality characters (impulsivity). We compared the allele frequency and questionnaire scores of police dogs and pet dogs, and investigated the effect of genotype on the behaviour traits in the two groups separately. Results show specific differences between police and pet dogs and spotlight that the observed associations between polymorphism and behavioural traits helps us to understand the effect of genetic factors on behaviour.

RELATIONSHIP BETWEEN TEMPERAMENT AND GROWTH PERFORMANCE IN GERMAN MUTTON MERINO LAMBS

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Authors have evaluated temperament of sheep using scale temperament test (Trillat et al., 2000, INRA, Theix, France, 1-33.: assessing behaviour of animals in a five-points scale, while spending 30 seconds on the weighing scale). Eleven ram, eighteen ewe German Mutton Merino lambs aged 71 days were lot-fed on a concentrate mix and alfalfa for 49 days, after weaning. Temperament of lambs was evaluated twice during feedlot period, at the age of weaning and the ends of fattening. Relationship between two temperament scores (I. observation: at the beginning of fattening, II. observation: at the end of the fattening) was significant intermediate rank correlation ($r_{\text{rank}}=0.71$; $P<0.01$).

The two sexes did not differ in the genotype ($P= 0.97$). Therefore the two data of sexes have been contracted. The German Mutton Merino lambs were classified into four temperament categories. The lambs with good temperament had higher average daily gains compared (451.6 g/day) to those having poor temperament (280.6 g/day). The live weight at the end of fattening showed a similar tendency (calm: 42.9 kg; poor: 34.0 kg). The correlation of temperament scores were negative with both the weight gains ($r_{\text{rank}}=-0.45$; $P<0.05$) and slaughter weights ($r_{\text{rank}}=-0.45$; $P<0.05$).

Fattening results of German Mutton Merino lambs by temperament categories
(mean±sd)

Temperament categories	Weight at weaning (kg)	Weight at the end of fattening (kg)	Weight gain (g/day)
1 (n=9)	20.7±1.91	42.9*±8.69	451.6*±147.35
2 (n=8)	20.0±1.49	39.4±5.68	396.5±110.11
3 (n=6)	21.0±0.94	38.0±2.65	347.8±57.48
4+5 (n=6)	20.5±1.18	34.0*±3.16	280.6*±70.39

*= $P<0.05$

EVALUATION OF TEMPERAMENT OF DAIRY COWS DURING MILKING IN A HUNGARIAN HERD

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Concerning animal welfare one of the methods for reducing stress is to improve temperament of cattle during routine procedures. Temperament of dairy cows is often evaluated by step and kick behaviour in milking parlour. The aim of this study was to assess the behaviour of cows and correlate with their milk yield and milking speed. Experiments were carried out in a Hungarian herd with 78 Holstein Friesian cows being in 1-5 lactations on two occasions. Animals were classified by their lactation numbers into 3 categories (1= 1st lactation, 2= 2nd lactation, 3= 3rd, 4th, 5th lactation). Temperament was evaluated in a 1-5 points scale (1: very nervous, vigorous stepping, kicking and 5: very calm, no leg movements (Budzynska et al. 2005, Book of Abstracts of the 4th International Congress on Ethology in Animal Production, 33-35.) before and during milking in the morning, in a herringbone-milking parlour. Data were processed by ANOVA, Kruskal-Wallis test and Spearman rank-correlation. There were significant differences between the three lactation group in temperament before milking (1= 3.0, 2= 4.5, 3= 4.0 median scores; $H= 11.136$, $P< 0.004$), but lactation number did not have an effect on temperament during milking ($H= 3.166$, $P>0.10$). Cows with nervous temperament before milking were proven ($P<0.05$) to produce less milk (15.98 ± 4.43) and have lower milking speed (2.28 ± 0.71) compared to quiet animals (19.22 ± 4.59 and 2.93 ± 0.77 , respectively). Authors confirmed significant correlation between temperament score before milking and both milk yield ($r= 0.25$, $P<0.05$) and milking speed ($r= 0.25$, $P<0.05$). These preliminary results also support that behaviour measurements before milking should be relevant to milk production and welfare.

MULTI-ASPECT ANALYSES OF THE FAMILY DOG'S INTERSPECIFIC PLAY BEHAVIOUR

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For a long time the main trend in the behaviour research has been the comparison of natural and experimental populations, with the aim of eliminating the effect of the individual phenotypical differences. Nevertheless, more and more researchers study the individual differences which are “responsible” for the variability within the groups. Although the function of social play behaviour is not clear, it represents one of the most complex interactions between two individuals. Our goal was particularly reveal the structure of the interspecific play behaviour of dogs.

68 pet dogs from various breeds participated in four one-minute-long play sessions. In the first two sessions the dogs played with an unfamiliar female experimenter, in the last two they played with their owner. There were two different types of play sessions (ball and tug) with both partners.

We investigated whether dogs show preferences for using competitive or cooperative actions when playing with humans and if it depends on the type of the game.

Using a factor analyses we revealed three major factors that accounted for 61 % of the total variance. These background-variables could be labelled as: “*Motivation for tug-of-war games*”, „*Motivation for ball-games*” and “*Fear*”. So individuals could not be categorised as generally cooperative or competitive during play sessions but rather we found remarkable disjunction based on the type of the game.

INVESTIGATIONS INTO LYING BEHAVIOUR OF BITCHES IN CHOICE TESTS

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The aim of these choice tests, carried out with ten gravid Beagle bitches, was to measure if there was a preference for a gel pad (doggy bed) over a traditional nest box. The tests were carried out over 14 hours per day (from 4 pm to 6 am) for a total of 88 days. Continuous video observations using an infrared video technique showed that, within this 14 hour span, the gel pad was clearly preferred by the bitches for reposing in the choice test kennels. The bitches spent 31.5 % of the 14 hours lying on the soft and flexible doggy bed whereas they only lay for 18.6 % of this period ($P < 0.05$) on the traditional nest. Lying on the front was the recumbent position most frequently preferred by the bitches. The average continuous duration spent in this position by bitches was 18.6 minutes when on the doggy bed and 11.3 minutes when in a traditional nest box. The position of the gel pad, whether in the corner or closer to the exit to the exterior run, and the traditional nest within the kennel were exchanged with each repetition of the trial to avoid methodological errors. In both situations, the doggy bed was preferred by the bitches, but if the gel pad was put in the corner of the kennel the bitches spent much more time on it (42.0 % of 14 hours) than when the gel pad was positioned closer to the exit to outdoor run (21.5 % of 14 hours). The percentage of time that the bitches spent recumbent on the standard nest was 17.3 % or 19.9 % respectively ($P > 0.05$).

**VISUAL COMMUNICATION BETWEEN DOGS AND HUMANS
WHICH COMPONENTS OF THE POINTING GESTURE HELP THE DOGS
TO FIND THE HIDDEN FOOD?**

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The understanding of the human pointing gesture has been investigated in many species earlier. Interspecific communication between humans and dogs also received increased interest in recent years. Recent investigations have found that dogs are able to find a hidden food on the basis of different human gestural cues, but we still do not know the mechanisms behind this ability. In our experiments we would like to find the mechanisms what help them to choose correctly in an object-choice task. In a series of experiments we varied the form of the pointing gesture in order to find the critical visual features of this signal that guide the choice behaviour. The results of this study suggested that dogs make their choice on the basis of the body part protruding from the body torso. It seems that the direction of the index finger is not informative for the dogs, but the visual asymmetry helps them to choose correctly. We have also investigated whether dogs can find the hidden food on the basis of the human pointing gesture in a more complicated situation. We made a situation to test this question, in which we used four hiding places and we showed them the correct place indirectly. There were two experimenters in this test and both of them pointed to either of the two-two experimental bowls, while the owner pointed to the experimenter signalling the correct hiding place. Our results showed that dogs are able to rely on the human pointing gestures also in a very complex situation.

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