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Mechanizmy zachowań zwierząt oraz możliwości ich modelowania

Wrocław, 26 maja 2017 r.

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Mechanizmy zachowań zwierząt
V
Mechanisms of animal behavior
Wrocław 26th May 2017

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PROGRAM

7.30–9.00 Rejestracja

9.00–9.05 Otwarcie sympozjum

Sesja I 9.00–11.40
Moderacja: Michał Dzięcioł, Andrzej Kłosiński

9.00–9.40 Najważniejsze osiągnięcia klasycznych polskich badań nad zachowaniami psów i ich uwarunkowaniami przyczynowymi
Ewa J. Godzińska

9.45–10.45 Dominować czy prowadzić? Etologiczne podejście do zagadnienia hierarchii u psów i wilków
Marta Gácsi

10.55–11.35 Oksytocyna jako modulator zachowań socjalnych psów skierowanych do człowieka
Anna Kis

11.40–12.00 Przerwa kawowa

Sesja II (12.00–14.00)
Moderacja: Ewa J. Godzińska, Wojciech Niżański

12.00–12.40 Wzorce motoryczne i emocje – ewolucyjne podłoże problemów behawioralnych zwierząt towarzyszących. Studium przypadku
Andrzej Kłosiński

Sesja krótkich doniesień – 10-minutowe wystąpienia i 2 min na dyskusję

The Mutual Relationship System
Ai Tsuyukusa

Assessment of human–horse relation in mares and stallions of Konik polski breed
Agnieszka Kozak

12.45–14.00 The vomeronasalitis in domestic animals: when animal pathology meets behavioral medicine
Pietro Asproni

Effect of type of food on the estimation of quantities. The example of the behavior vervets (*Cercopithecus diana*)
Julia Sikorska

Consistent individual differences in standard exploration tasks in the black rat (*Rattus rattus*)
Barbora Žampachová

Studying the outdoor activity of domestic cats using animal-borne cameras – preliminary results
Edyta Piontek

14.00–15.00 Obiad

Sesja III (15.00–17.45)
Moderacja: Tadeusz Stefaniak

15.00–16.00 Przywiązanie/zależność u psów – klucz do zrozumienia wyjątkowości tego gatunku
Marta Gácsi

Sesja krótkich doniesień – 10-minutowe wystąpienia i 2 min na dyskusję

16.10–17.00 Cognitive bias test as a novelty method for accessing animals emotional states
Krzysztof Wojtas

Selected aspects of the beef cattle behavior
Błażej Nowak

Behavioural repertoire of maned wolf (*Chrysocyon brachyurus*) kept in the zoological garden
Marta Jurczyk

Characteristics of alpaca (*Vicugna pacos*) behaviour
Joanna Kapustka

17.10–17.50 Sposoby mierzenia cech indywidualnych – osobowości – u psów
Borbála Turcsán

18.00 Zakończenie sympozjum

Table of contents

POSTERS

PLENARY SPEECHES

BORBÁLA TURCSÁN

Institute of Cognitive Neuroscience and Psychology, Research Centre for Natural Sciences, Hungarian Academy of Sciences, Budapest, Hungary

Measuring individual characteristics – personality – in dogs

Individual variation in the animal behaviour and its possible causes and consequences have been a hot topic in the fields of ethology and behaviour ecology since decades. The concept of personality assumes that measuring the individuals' behaviour in a certain number of situations allows us for predicting their behaviour in future (similar) situations. Since dogs are one of the most frequently owned pets throughout the world, studying their personality has a wide range of practical applications, and it is a matter of great public concern. Aside from studies with explicit practical purposes, studies about personality × environment associations and about the genetic background of dog personality have been also accumulated. Environmental factors like the dog-keeping practices or the personality characteristics of the owner could strongly influence what kind of experiences an individual could gather during its life, which, in turn, could contribute to the development of the its personality. Moreover, the great morphological and behavioural diversity of the dogs and their unique genetic make-up also make them an ideal candidate for behaviour genetic research.

Our researches in the last decade had striven to fulfil many goals from developing reliable ethological methods for measuring personality in dogs, through identifying the most relevant owner-related and environmental factors in association with personality traits, to investigating polymorph candidate genes in association with the personality of the dogs.

In our studies we have provided evidence that several human personality traits have analogues in dogs, uncovered the complex interactions between environmental factors in association with four dog personality traits, and found associations between gene polymorphisms in the dopamine and oxytocin systems and certain personality traits in dogs.

Attachment/dependence in dogs: the key to explain why dogs are unique

Gácsi Márta PhD

Eötvös Loránd University
Hungarian Academy of Sciences
Comparative Ethology Research Group
http://mta-etologia.elte.hu

Issues from the veterinary practice

Phenomenon	Theoretical significance	Client's worry
Aggression	human analogies, genetics (dangerous breeds)	*adopting, neutering, behav. modification*
Attachment	conspecific recognition, domestication, dominance	*separation anxiety, attachment deficit*
Optimal socialisation	early learning	*timing of vaccination*
Phobias Obsessive compulsive disorder	human analogies, genetics	*thunder, tail-chasing, paw-chewing*
Ageing	cognitive disfunctions	*welfare, euthanasia*

How would you define him/her/it…?

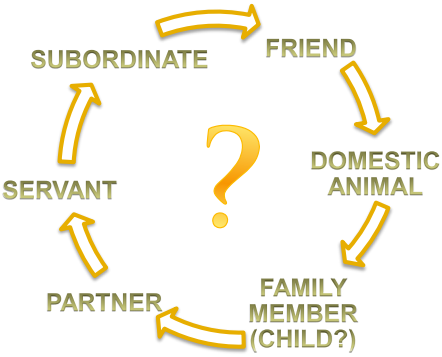
DOMINANCE HIERARCHY VS. PARTNERSHIP…

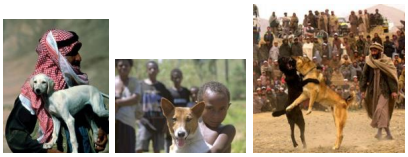
…but are these mutually exclusive?

Partner/companion → nice term but what status is beyond?

Friend → similar relationships seem to exist in animals (same sex partners frequent interactions, tolerance in conflict situations)

Servant → humans, work for families, seem to be attached to them, clear dominance but they have their rights…





Attachment → a general scope

- Emotions (love) vs. **ATTACHMENT** → finding variables…?
- Behav. system controlled by biological necessities & constraints
- **Asymmetrical** social relationship → presumes the **dependency** of the attached individual → AF - **secure base**

Criteria → special responses in relevant contexts

1. separation from the caregiver in an unfamiliar environment evokes anxiety → attachment system is activated → *proximity seeking*
2. upon reunion → *contact seeking*

(Rajeczki et al. 1978)

Infant – mother relationship

Strange Situation Test (SST)

Ainsworth & Wittig, 1969 *Topál et al, 1998*

→ infant-mother relationship

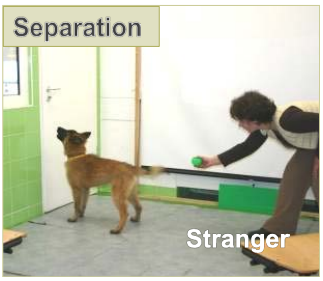
ADAPTED TO DOGS

Infant is observed in 7 episodes:

- → in an unfamiliar place
- → several separations & reunions
- → facing a friendly stranger

⇩

evoke moderate **stress** → activates **attachment** behaviour



Evaluation → stranger vs. owner
Different from the human version!

Variables measured

During episodes:

Play, Door, Explore, Passive, Physical contact

When persons enter/leave:

Approach - Avoidance (greet), Follow (leave) ….

Analyses: behaviours with Owner vs. Stranger

Attachment in SST supported by

Gácsi et al. 2001, Prato-Previde et al. 2003, Palmer & Custance 2008…

Specific differentiation

- More play in the presence of O
- Stand by at the door in separation
- More physical contact
- More contact seeking (entering O)
- More follow (leaving O)

Dog–owner attachment is analogous to human infant–parent attachment!
→ Spec effects of domestication

Dog-wolf comparative studies

Hand raising (from 4th day) + extensive socialisation of several generations of wolf pups (from a wolf park)

… to reveal species-specific differences due to adaptation to the anthropogenic environment

- Attachment
- Aggression
- Social understanding
- Problem solving
- Communication
- Controllability

4-month-old wolf pups vs. dog puppies in SST

Owner/Hand-raiser leaves → subject is with friendly Stranger

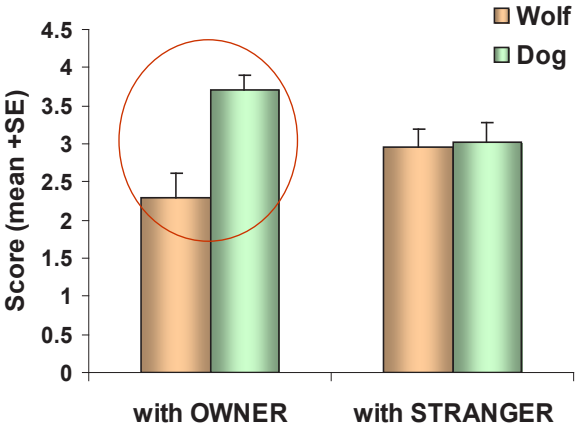
Standing by at the door

Wolf pups vs. dog puppies

Topál et al. 2005

4-month-old
N=13

Contact seeking with entering person



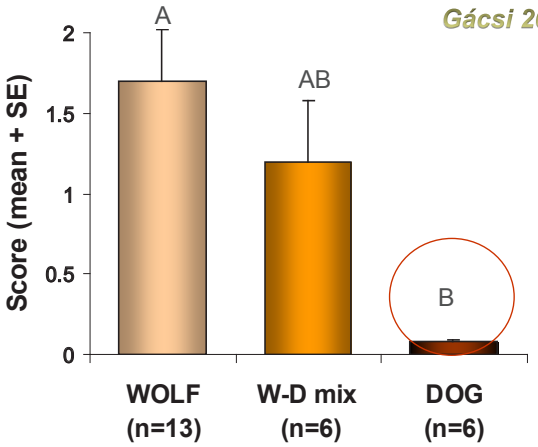
Adult wolf vs. mix vs. dog group

Similar environment
+ keeping conditions

Adult wolf-dog hybrid

Follow of the leaving **Stranger**
(while the owner is in the room)

Gácsi 2001



Attachment in wolves? *(also adults)*

Extensive socialisation

- less fear/aggression,
- preference for the hand-raiser in some tests

but <u>no attachment</u> in SST!

→ dogs are more *dependent*

Behavioral differences → genetical differences → result of the domestication process → specifically related to the species recognition and/or attachment system of the dog

Building a new bond → adopted dogs

Development of new attachment in adult dogs?

- N=60 → 40 handled
  20 non-handled
- Handling: 3x10 min. (walk, pet, task/praise)
- SST: handler → owner
- Control: 2 strangers

(2 shelters, low human contact, no info about the prehistory of the dogs, balanced samples)

Sensitive period vs. ability for fast forming of attachment even in adults?

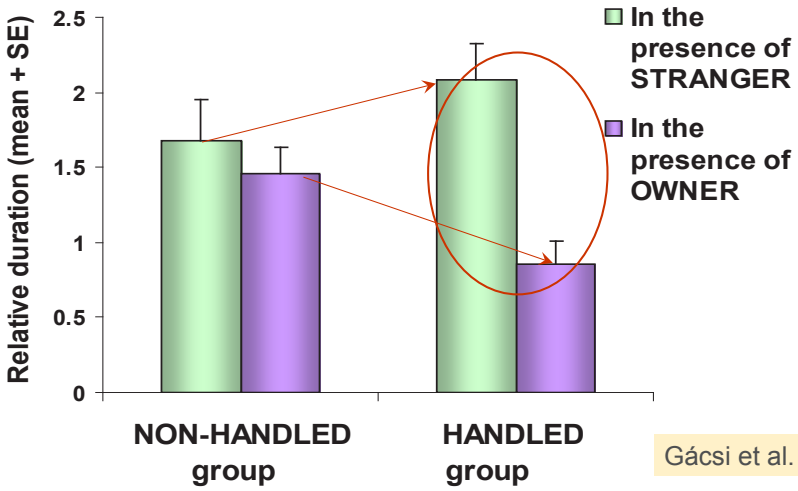
Shelter dog – episode 2/3

- PLAY with stranger in the presence of the owner
- FOLLOW leaving owner
- NO PLAY with stranger in the absence of owner
- STANDING at the DOOR

Shelter dog – episode 4 (Owner returns)

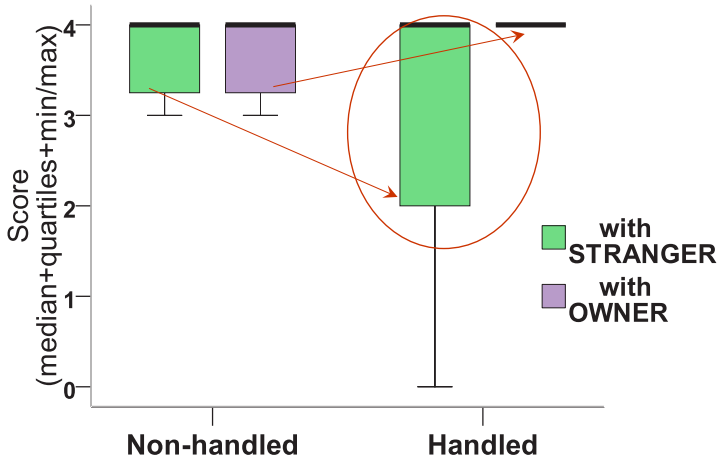
- STANDING at the DOOR
- GREETING entering owner
- NO FOLLOW of leaving stranger
- PLAY with owner

Standing by at the door



Gácsi et al. 2001

Contact seeking with entering person



Building a new bond

- **Analogy** to the human mother-infant bond → ability of adult individuals to develop novel attachment relationships
- **Welfare** aspects → individualised bonds can develop throughout the life of a dog
- **Early socialization** with humans can influence this ability → could be a major factor in the high individual variability

operational criteria of attachment ←

- less *standing at door* in the presence of O
- more contact seeking with the entering O
- more *physical contact* with the O
- more frequent *following* of the leaving O

Second,… attachment relationships

- Pet dogs *(Gácsi, 2003)* → no difference between 1st and 2nd attachment relationships (measured by SST)
- Shelter dogs *(Marston et al. 2005)*: effective handling → only positive contact fostered the development of attachment
- Assistance dogs *(Fallani et al. 2006)* → guide dogs establish attachment with new owner
- Even repeatedly breaking bonds *(Valsecchi et al. 2010)* is not detrimental to dogs' ability to form attachment relationships later (in guide dogs – SST)

'Over' or 'Hyper' attachment & SRD?

- Potential causes:
  - Env – Rearing/training (too much emotions, too little control…)
  - Gen – Attachment (too? strong / inappropriate?) → *attachment* is based on natural responses to being left alone even in adults
  - Gen – Fear related traits (can be left alone in the garden)
- No direct relationship was found between dog *attachment* and *separation anxiety* (Parthasarathy and Crowell-Davis, 2006)
- Connection between H.attachment & SRD (Flannigan & Dodman, 2001) → single adult, neutering, HA (extreme following, extensive greeting), ~~spoiling~~, ~~sex~~, ~~other pets~~, ~~early separation from dam~~

SRD can have diverse underlying causes → therapy needs a specific combination of medication and/or behavioural therapy

Security providing role of the owner?

- **'SECURE BASE'** for exploration
- **'SAFE HAVEN'** in case of danger or stress

External emotion regulator → negative emotions are reduced via interaction with or closeness to the attachment figure

SST? → direct evidence for O's security providing role → exposed to a threatening S

"Safe haven" from a threatening stranger

- Behavioural data completed with physiological parameters:
  → a telemetric system was used to measure heart rate
  → eliminate movement to minimize its effect on HR

Moderate stress → attachment behaviour can be observed & studied only if activated!

→ Separation + ***Threatening* stranger**

unfamiliar woman steadily gazes at dog and approaches it slowly (*Vas et al. 2005*)

Heart rate response

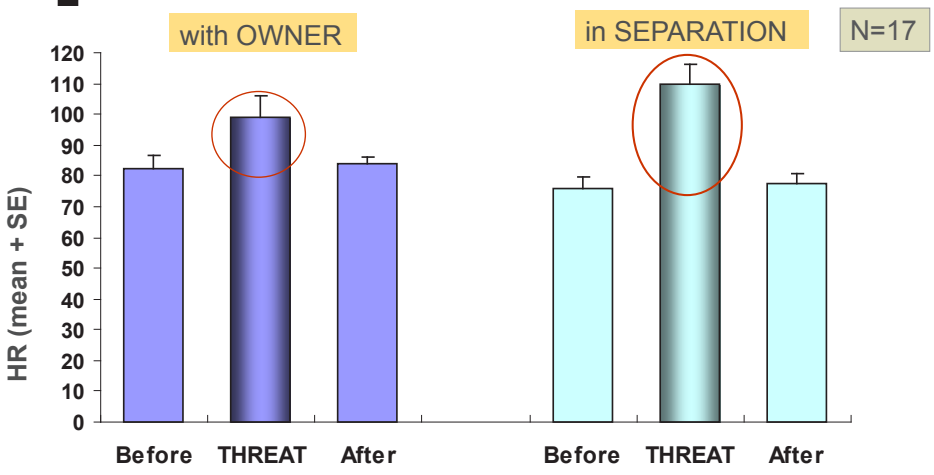
HEART RATE measure

Gácsi et al. 2009

- Adult dogs (N=30), different breeds
- Each dog in two situations:
  1) in separation
  → before-during-after the threatening encounter
  2) owner present
  → before-during-after the threatening encounter
- Two groups (balanced for gender, size, breed) → order effect

A order (N=14)	B order (N=16)
threatened first with owner	threatened first in separation

Heart rate response of 'reactive' dogs



threat: F=18.31, p<0.001

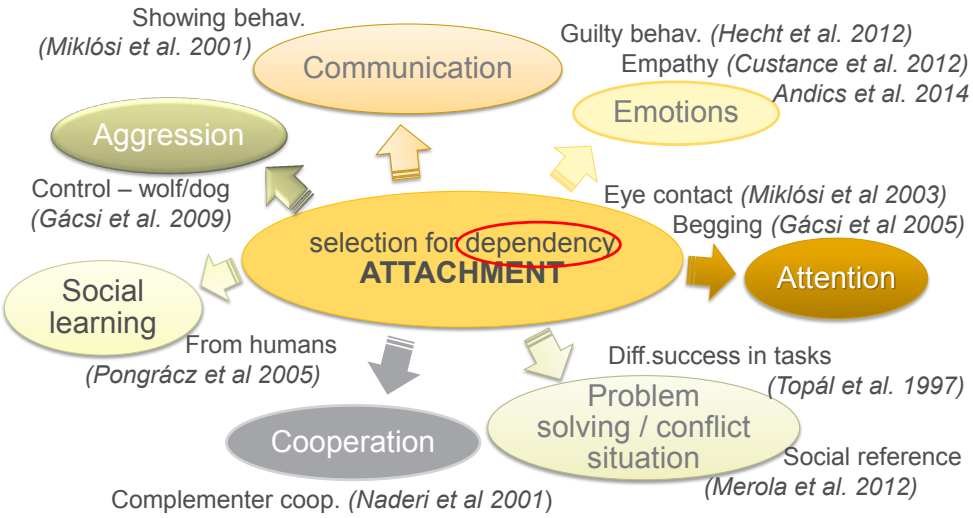
owner x threat: F=5.92, p<0.001
owner x threat x **order**: F=4.37, p=0.02

Owner → buffer against social stressor

- HR increase is good indicator of the stress presented by the threatening social stimulus (but not for separation!)
- The presence of the owner provides a *safe haven* for the dog (smaller increase with O)
- O serves as a buffer against social stress (order effect)

Individual attachment relationship between dog and owner is analogous to human infant–parent attachment!

Impacts, connections, consequences



Attachment in cats?

- No „secure base" & „safe haven" effects
- No attachment (no dependency?) → but there is *love,* some preference…

USA TODAY
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~~STUDY: SORRY, YOUR CAT HATES YOU~~

Mills D et al. 2015?

Questions?

An ethological approach
to hierarchy in wolves and dogs

Dominance or leadership?

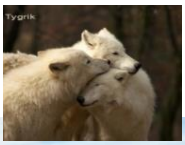
Gácsi Márta PhD
Eötvös Loránd University
Hungarian Academy of Sciences
Comparative Ethology Research Group
http://mta-etologia.elte.hu

Ever striving for dominance vs. peaceful family?

- In **captive** packs, the unacquainted wolves formed dominance hierarchies featuring alpha, beta, … omega animals → gender-based → an alpha male and an alpha female

Info about the social interactions among **free-living** wolf pack members has accumulated slowly

MECH → pack habituated to his presence - spent 13 summers on Ellesmere Island, Canada



- In **nature** the wolf pack is usually a **family**, functioning as a unit year around

Offspring

- Some **disperse** from the pack at 9 months of age, most when 1-2 years old, and few remain beyond 3 years

  → captive packs include members forced to remain together for years

Breeding pair + offspring (1-3 yrs)

EXCEPTIONS

- two or three such families join
- unrelated wolf is adopted (e.g. a dead parent is replaced…)

- **DOMINANCE FIGHTS?**

  Attempts have been made to distinguish future alphas in litters
  → in the wild offspring disperse + attempt to pair with other dispersed wolves, produce pups, and start their own packs

  → no source/reason for within pack sexual competition

Alpha …?

The therminology falsly implies a rigid, force-based dominance hierarchy (appropriate in captive packs).

- **DOMINANCE** contests are rare
  → parents are 'dominant'

Groups in captivity → what do these interactions tell us?

- Let's reserve the use of **„ALFA"** for large packs with multiple breeders, or captive packs

- Little and controversial data on the social life of dog groups (different exposure to humans)

Displays

Active submission wags, licks up, lowers ears

- The only consistent demonstration of rank in natural packs is the animals' postures during social interaction
- **Submission** is as important as dominance in terms of promoting friendly relations, reducing social distance
- **Active** submission and food-begging indistinguishable
- When/whether a rank order develops among pups is in dispute → even among yearlings and 2-year-olds there were few rank displays

Passive submission rolls over on its own

Ownership zone

- around the mouth of each wolf, and **regardless of the rank** of a challenger, the owner tries to retain the food it possesses (also found with captive wolves)

→ Wolves of any rank could try to steal food from another of any rank, but every wolf defends its food

→ Large prey → all ranks feed simultaneously

→ Small prey → dominants (breeders) feed first + high ranking pups are more assertive

Definitions *(Drew 1993)*

Dominance is defined as a relationship between individual animals that is established by force/aggression and submission, to determine who has priority access to resources such as food, preferred resting spots, and mates.

A **dominance-submissive relationship** does not exist until one individual consistently submits or defers. In such relationships, **priority access** exists primarily when the dominant individual is present to guard the resource.

What is the dog's natural environment?

Free-roaming/feral dogs vs. human social environment

(Bradshaw és Nott, 1995; Coppinger és Coppinger 2001; Koler-Mancznik 2002)

Dog groups → packs?

In cities: mainly alone

Deserted locations: 2-6 individuals → non-relatives,

Similar agonistic behaviours but without hierarchy

YES → defense, feeding together, territorial

NO → cooperative care of young → mother leaves offspring to feed

Offspring disperse after 4 monhs of age

? Cooperative hunting (rare) → uncoordinated chases with much bark

? Breeding inhibition by dominant female

Hierarchy in dog groups?

Most aggressive interactions of dogs can be somehow related to their **striving for dominance?** → some dog experts even question the existence of the phenomenon "dominance" in dogs

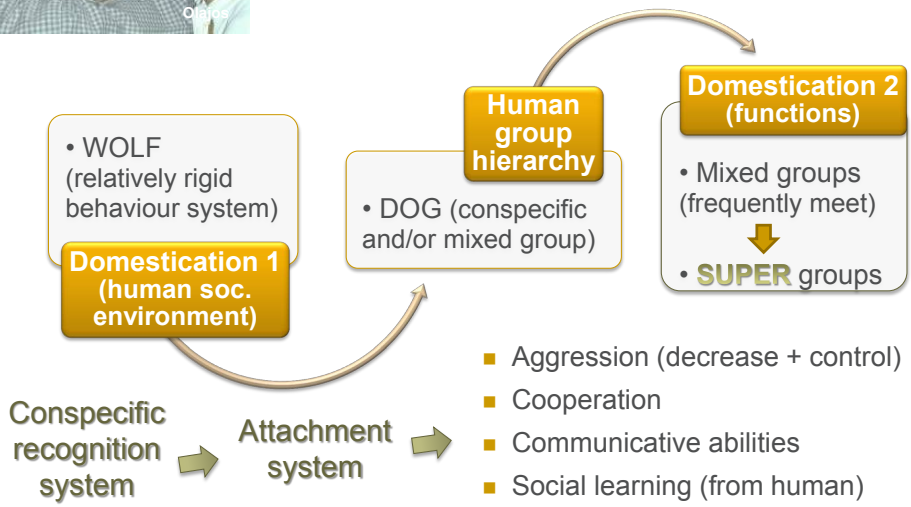
Do we fall into the other extreme? → strong dominance hierarchy seems to be a by-product of captivity, **but**…

in case of "captive" dog groups (non related individuals in gardens, shelters, apartments…) we can observe some pretty similar social hierarchy and some very similar patterns of aggressive behaviours to that described in captive wolf packs

Summing up current knowledge

- Dominance is related to the distribution of scant **resources** (not to enforce one's point on others in many respects)
- Wolf hierarchy in **nature** (family) is different from that in captivitiy
- Wolves do NOT force each other physically to **roll over**
- Wolves defend their **ownership zones** irrespective of their rank
- **DOGS ARE NOT WOLVES**! → otherwise we could not keep them at home… → no direct parallels should be drawn!
- Wolf(like) traits are present in dogs in a **mosaic** pattern
- "Dominant" is not a personality trait, it refers to an individual's **status** related to another individual at a time
- **Humans** live in very complex hierarchy systems. Dogs have been selected to fit in…

Mixed group: human & dog



- Aggression (decrease + control)
- Cooperation
- Communicative abilities
- Social learning (from human)

Human social hierarchy

- Biological predisposition → developing & accepting hierarchy
- Newly developed human groups → dominancy rank order during the 1st hour
- Rank order: dynamic & parallely differentiated
- Not only physical superiority → ability in leadership
- Instead of/besides physical dominance → hierarchy of rules
- Obedience to authority figures *(Milgram experiment, 1963)*
- Role of early socialisation in rule learning

The importance of affiliative behaviours

- **Affiliative behaviours** are more frequent than expected
- Much **play** even in adults
- **Positive interactions** can help avoid later conflicts or the escalation of conflict situations

ANNA KIS

Institute of Cognitive Neuroscience and Psychology, Hungarian Academy of Sciences (Invited researchers)

The oxytocin system as a modulator of human-directed social behaviour in dogs

Recently increasing attention was devoted to the oxytocin system due to its effect on complex human behaviours. In parallel to this, over the past couple of decades, the human-analogue social behaviour of dogs has been intensively studied. Combining these two lines of research (e.g. studying the relationship between dog social behaviour and the oxytocin system) is a promising new research area. I will review the existing literature and present our recent results on how oxytocin is related to different aspects of human-directed social behaviour in dogs.

First, behaviour in every-day social situations was assessed in association with single nucleotide polymorphisms (SNPs) in the regulatory regions (5′ and 3′ UTR) of the oxytocin receptor gene (OXTR) in German Shepherds (N = 104) and Border Collies (N = 103). Results show that these SNPs have an impact in both breeds on proximity seeking, and on friendliness towards strangers, although in the latter case an opposite trend was found for the two breeds. The association between the OXTR and human-directed social behaviours was conceptually replicated on a sample of (N = 180) Border Collies exposed to ambiguous social stimuli.

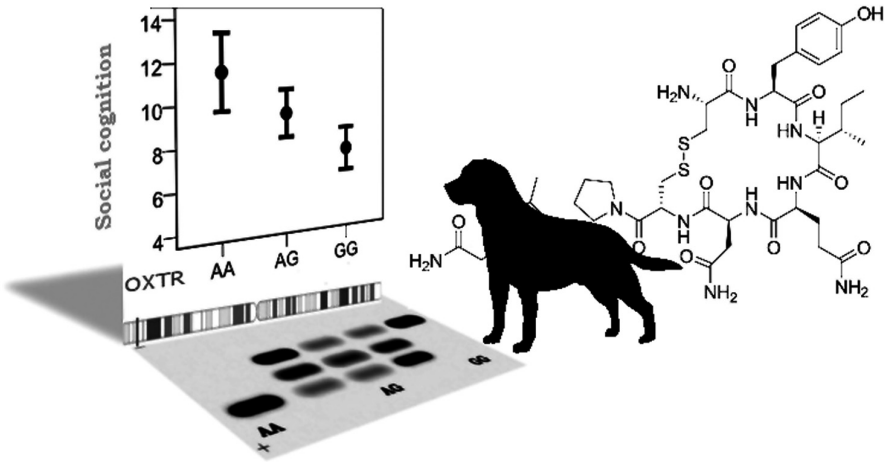
Second, the intranasal oxytocin administration (IN-OT) method was validated by confirming its physiological effect (decreased heart rate, increased heart rate variability) on N = 10 dogs. Then canine analogues of complex human skills were investigated. After presenting subjects (N = 39) with yawns or mouth openings, contagious yawning was observable in the IN-OT, but not in the placebo group. However, as the number of yawns correlated with other signs of stress/anxiety but did not correlate with questionnaire-measured empathy, this result is probably due to the decreased social stress after IN-OT, and not changes in empathy. In a food preference (small versus big quantity) task IN-OT enhanced dogs' (N = 37) susceptibility to the experimenter's counterproductive preference. Using an eye-tracking paradigm we found that IN-OT decreased dogs' (N = 38) looking to angry human faces, and it diminished dogs' preferential gaze towards the eye region of happy human faces. The effect of IN-OT on basic mechanisms of social cognition was also investigated using the biological motion paradigm. Dogs (N = 39) were presented with a moving human point-light figure and its inverted and scrambled version. Results showed that while placebo-pretreated dogs showed a spontaneous preference for the biological motion pattern as expected, there was no such preference after IN-OT.

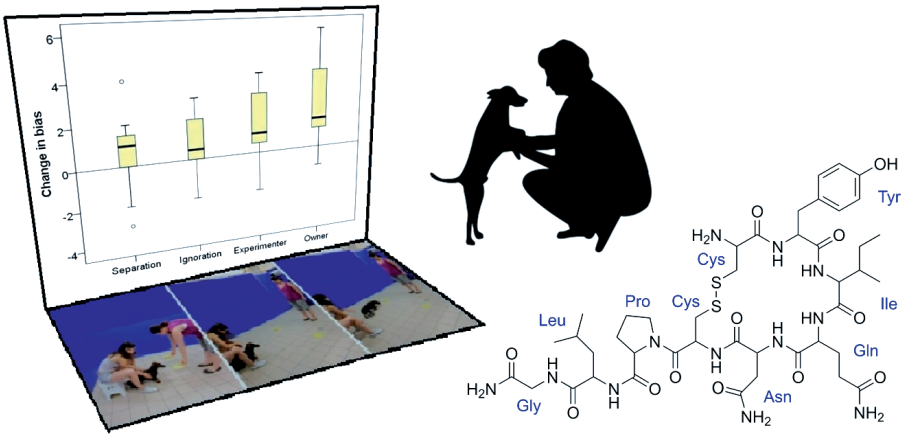
Third, focusing on the applied aspects of IN-OT research, we found in the cognitive bias paradigm that dogs (N = 64) that received IN-OT showed an increased positive expectation bias compared to placebo groups, and this effect was more pronounced in the communicative compared to the non-communicative context. Moreover in a threatening approach test (N = 36) IN-OT pretreated dogs looked back more at the experimenter standing behind them, that can be interpreted as social referencing in a mildly stressful situation.

Fourth, the effect of social stimulation on central oxytocin levels was tested in the social conformity food preference task, confirming that subjects (N = 82) pretreated with social

stimuli, similarly to IN-OT pretreated dogs, are more likely to follow the experimenter's preference in the test than the non-social group.

In summary our results revealed that oxytocin plays a complex role in regulating human--dog relationships. This is evidenced by the effect of genetic polymorphisms in the oxytocin system, as well as by exogenous oxytocin modulating behaviour, and behavioural pretreatments in turn influencing oxytocin levels.





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Inherited behavioural motor patterns and emiotions – evolutionary background of behavioural problems in companion animals – case analysys

Inherited behavioural motor patterns are crucial for the survival of all animals. For example the species-specific predatory motor patterns, such as eye, orient, stalk, chase and grab/bite, of predators are necessary for hunting.

During the course of domestication and artificial selection, many of motor patterns in dogs (and to some extend in cats) were changed. While some motor patterns were selected for and became stronger, others were selected against ad became weaker, or disappeared altogether. This has led to a classification of several "types" of dogs described by American biologist and evolutionist, Raymond Coppinger: adolescents (livestock guarding dogs), object players, headers and heelers possessing weakened or strengthen different inherited predatory behaviours.

Animals will often voluntarily engage in these innate motor patterns because in doing so, they experience emotional rewards such as pleasure and relief and this in turn strengthens the behaviour and learning in certain situations. In addition, experience of these positive emotional states are essential for an animal's emotional wellbeing and in the regulation of homeostatic mechanisms. This explains why animals, and especially those types with well-developed motor patterns such as herding Collies, need to engage in these behaviours on a daily basis. Denying them these behaviours inevitably leads then to feeling frustrated, depressed or irritated. In the context of pets dogs and cats living in the human environment, these natural, innate motor patterns also emerge and in some situations are perceived as behavioural problems or an abnormality, for example a dog that chases bikers.

An understanding of an animal's natural and inherited motor patterns and how they can manifest themselves as the drivers for some unwanted or problem behaviours, and how this affects the underlying emotional wellbeing, are especially important for the animal behaviourist in helping owners to manage such behaviours in their dogs and cats. I present same examples of such problem behaviours where the innate motor patterns are the key drivers in the behaviours and the importance of dealing with these.

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Main achievements of the classical Polish research on dog behaviour and its causal factors

The main aim of this talk is to present a review of literature data documenting several more and less known examples of the contribution of Polish researchers to the advances of our knowledge on the behaviour of the domestic dog (*Canis familiaris*), and on physiological and/or neurophysiological processes involved in its causation. Classical Polish research on dog behaviour was largely focused on causal factors underlying its plasticity and the processes of learning and memory. As commonly known, the experiments on dog digestive system and salivation carried out by the famous Russian physiologist Ivan Petrovich Pavlov (1849–1936) led to the discovery of classical conditioning, a learning process in which a previously neutral stimulus is paired with a biologically potent stimulus, and then starts to elicit a similar response. Another type of conditiong, known as operant or instrumental conditioning, in which behaviour is modified as a result of learning by consequences, was first studied by an American psychologist Edward L. Thorndike (1874–1949), who investigated trial-and-error escape learning in cats. The theory of operant conditioning put forward by another American scientist, Burrhus Frederic Skinner (1904–1990), in several papers (first of them published in 1935), and in an influential book (published in 1938) is largely built on the ideas of Thorndike. However, already in 1928 operant conditioning (named "type II conditioned reflexes") was described and investigated in detail by two medical students from Warsaw, Jerzy Konorski and Stefan Miller, who carried out their groundbreaking experiments using as a subject a young bulldog called Bobek. Stefan Miller died during the 2nd WW, but Jerzy Konorski survived the war and became one of the most eminent neurobiologists of the 20th century. After the 2nd WW until his death in 1973 he worked at the Nencki Institute of Experimental Biology, first in Łódź, and then in Warsaw, where he created an important research school, the Department of Neurophysiology. Many of his pupils and coworkers made important contributions to the study of canine behaviour, and at the same time to the general neuroscience and study of behaviour. To name just a few of their achievements, a device invented by them to test delayed responses of dogs to auditory cues became known worlwide as the "Nencki testing apparatus". In other studies Ewa Kostarczyk and Elżbieta Fonberg, documented the important role of social reinforcement (petting by humans) in canine learning processes. The list of other researchers from the Konorski school at the Nencki Institute working on dog behaviour included, among others, Zofia Afelt, Janusz Błaszczyk, Stefan Brutkowski, Julita Czarkowska, Jadwiga Dąbrowska, Czesława Dobrzecka, Teresa Górska, Stefan Kasicki, Renard Korczyński, Anna Kosmal, Danuta Kowalska, Wacława Ławicka, Maciej Stasiak, Irena and Lucjan Stępień, Jolanta Zagrodzka and Kazimierz Zieliński. The research on canine behaviour conducted in the Nencki Institute was carried out not only by the members of the Konorski school, but also by researchers representing other approaches to the study of animal behaviour. Piotr Korda, an ethologist, a veterinary, and an author of popular books on animal behaviour interpreted some cases of bitch vomiting as epimeletic (care-giving) vomiting, and investigated the dependence of canine maternal behaviour on external stimuli emitted by sucklings. The

research on canine behaviour and its physiological and neurophysiological correlates is continued in Poland up to the present day in several research institutions. To give a few examples, Tadeusz Jezierski and his team from the Institute of Genetics and Animal Breeding PAS in Jastrzębiec are worldwide known for their important achievements in the research on canine scent detection, including the detection of breast and lung cancer. Anna Reinholz-Trojan, Maciej Trojan and their coworkers from the Department of Animal Psychology of the Faculty of Psychology at the Warsaw University studied hemispheric specialization for processing different types of acoustic stimuli, and various other aspects of canine cognitive processes. Canine sexual behaviour and physiological, neurophysiological and behavioural effects of bitch sex pheromones are also currently investigated at the University of Environmental and Life Sciences in Wrocław by the hosts of the present conference (Michał Dzięcioł, Wojciech Niżański and their coworkers).

SHORT REPORTS

ASPRONI PIETRO, COZZI ALESSANDRO, BIENBOIRE-FROSINI CÉCILE, LAFONT-LECUELLE CÉLINE, CHABAUD CAMILLE, MECHIN VIOLAINE, PAGEAT PATRICK

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The vomeronasalitis in domestic animals: when animal pathology meets behavioral medicine

The crucial role of the vomeronasal organ (VNO) in animal behavior is well known. Since it is specialized in detecting semiochemicals, the VNO is involved in several aspects of animal intraspecific and interspecific communication. Previous studies showed that experimental lesions of this organ, such as the surgical removal or the ducts' blockage, cause sensible modifications in social, maternal and sexual behavior. From an anatomical point of view, the VNO is a bilateral chemosensory structure that possesses a non-sensory (NSE) and a sensory epithelium (VNSE). Only the VNSE is responsible for semiochemicals' detection, since it is composed by layers of bipolar neurons and receptors. Despite these premises, bibliography about spontaneous VNO pathologies is lacking. Among the several studies of our Institute focused in exploring the vomeronasal system, here we present a project that investigates by histology the spontaneous pathologies of the VNO in domestic animals and if they can influence the behavior of the affected subjects. Up to now, we completed two studies about vomeronasalitis in cats and farm pigs, describing for the first time this pathology as a common finding in these species. In fact, the 70% of cats ($n = 20$) and the totality of pigs ($n = 38$) were affected by this condition. When the vomeronasalitis involved the VNSE, it was statistically associated to the presence of aggressive behaviors in the affected animals ($p < 0.05$), according to owners' perception for cats and to the Welfare Quality Protocol® for pigs. Moreover, in pigs we observed that this behavioral disorder was associated only to bilateral vomeronasalitis, suggesting that one healthy VNO can guarantee a normal semiochemical detection supplying to the dysfunction of the inflamed VNO. Additional morphometrical and immunohistochemical analyses were conducted on porcine VNOs to investigate cellular and molecular consequences of vomeronasalitis. These assays revealed that VNSE thickness was significantly reduced during inflammation ($p < 0.05$), as well the expression of the protein Gαi2 ($p < 0.05$), a protein coupled to the vomeronasal receptor type 1 and essential for semiochemicals detection and signal transduction. An inflamed VNO is thus less able to detect and transfer pheromonal messages, altering intraspecific communication and contributing to aggressive behaviors. These studies are the first describing vomeronasalitis and linking it to behavioral disorders in all species. Since the VNO plays a crucial role in several aspects of animal behavior, it is authors' opinion that the vomeronasalitis can be a factor also in the onset of behavioral disorders other than intraspecific aggression. Moreover, it is presumable that this pathological condition can involve other species, as showed by some our preliminary observations in dog, rabbit and sheep VNO. In conclusion, our studies described a new pathology that reduces animal quality of life and welfare, opening a new way of investigation that links pathology to behavioral medicine.

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Test tendencyjności poznawczej jako nowatorska metoda oceny stanów emocjonalnych u zwierząt

Współcześni naukowcy, w tym naukowcy zajmujący się etologią, psychologią porównawczą a także dobrostanem zwierząt coraz częściej poszukują paraleli między ludźmi a zwierzętami w swoich badaniach nad emocjami, świadomością i zdolnością odczuwania (Paul i in. 2005, Herry i in. 2007).

Nowatorskim podejściem w badaniach nad dobrostanem jest próba mierzenia stanu emocjonalnego jako ostatecznego wskaźnika świadczącego o jakości życia zwierząt utrzymywanych w danych warunkach. Podejście to wzbudziło duże zainteresowanie w środowisku naukowców zajmujących się tą tematyką, ponieważ pozwala na poznanie subiektywnych odczuć zwierzęcia na temat jego własnej sytuacji, czyli najbardziej obiektywnego wskaźnika dobrostanu.

Jedną z metod oceny stanów emocjonalnych zwierząt jest wykorzystanie wpływu emocji na procesy poznawcze. Koncepcja ta – bazująca na założeniach pochodzących z psychologii ludzkiej – zakłada, że walencja stanu emocjonalnego wpływa na procesy poznawcze, w tym uwagę, pamięć oraz ocenę otaczającego środowiska. Przy odpowiedniej metodologii wykorzystanie tego zjawiska mogłoby posłużyć do oceny stanów emocjonalnych zwierząt, a przez to określenia poziomu ich dobrostanu.

Większość badań dotyczących wpływu emocji na funkcje poznawcze u ludzi wykorzystywała zadania wymagające użycia mowy. Jednak wiele z efektów poznawczych, na które wpływają emocje, nie wymaga użycia komunikacji werbalnej. Po pewnych modyfikacjach testy stosowane u ludzi mogłyby zostać użyte również u zwierząt.

Pierwsze doświadczenie dotyczące wpływu stanu emocjonalnego na tendencyjność poznawczą, opracowane docelowo do zbadania tego zjawiska u zwierząt, przeprowadzone zostało przez Harding i in. (2004). Wykorzystano uwarunkowanie zwierząt na bodźce pozytywne i negatywne, a następnie prezentowanie bodźców niejednoznacznych, pośrednich pomiędzy uwarunkowanymi wcześniej sygnałami. Badanie to stworzyło pewien paradygmat eksperymentalny dla badań z tej dziedziny. Kolejne badania nad tendencyjnością poznawczą u różnych gatunków zwierząt w dużej mierze opierały się na paradygmacie zaproponowanym przez Harding i in. (2004). Duża część badań skupia się na szczurach (Burman i in. 2008, 2009), podjęto również próby testowania tego zjawiska u gatunków takich jak rezusy (*Macaca mulatta*) (Bethell i in. 2007), szpaki (Matheson i in. 2008, Bateson i Matheson 2007), psy (Casey i in. 2008), kury domowe (Salmeto i in. 2011) oraz świnie (Douglas i in. 2012). Trwają także prace nad wykorzystaniem tego zjawiska w ocenie dobrostanu ryb (Wojtas i in. 2015).

Test tendencyjności poznawczej może również pomóc w rozpoznaniu innych oznak behawioralnych, fizjologicznych lub hormonalnych, które są skorelowane z wystąpieniem określonych stanów emocjonalnych.

Cognitive bias test as a novelty method for accessing animals emotional states

Scientists in fields like ethology, comparative psychology and animal welfare, are increasingly searching for parallels between humans and animals in their studies of emotions and consciousness (Paul et al. 2005, Herry i in. 2007).

An innovative approach to welfare research is the attempt to measure the emotional state as the ultimate indicator of the quality of animal's life. This approach has created a lot of interest because it allows us to estimate the subjective feelings of the animal about its own conditions, the most objective indicator of well-being.

One way to assess the emotional state of animals is to use the influence of emotions on cognitive processes. This concept, based on the theories from human psychology, assumes that the valence of emotional state affects cognitive processes, including attention, memory, and assessment of the surrounding environment. With the appropriate methodology, the use of this phenomenon could be used to assess the emotional state of animals and thereby determine the level of their welfare.

Most studies on the effects of emotions on cognitive functions in humans used tasks requiring ability to speak. However, many of the cognitive effects that affect emotions do not require the use of verbal communication. After some modifications, tests used in humans could also be used in animals.

The first experiment on the influence of emotional state on cognitive bias, developed to investigate this phenomenon in animals, was carried out by Harding et al. (2004). It used the conditioning of the animals for positive and negative stimuli and then presenting them with ambiguous stimuli in a range between the previously conditioned signals. This study has created an experimental paradigm for research in this field. Further research on the cognitive bias in different animal species has largely been based on the paradigm proposed by Harding et al. (2004). Much of the study is focused on rats (Burman et al. 2008, 2009), and attempts were made to test this phenomenon in species such as rhesus macaques (*Macellan mulatta*) (Bethell et al. 2007), starlings (Matheson et al. 2008, Bateson, Matheson 2007), dogs (Casey et al. 2008), domestic hens (Salmeto et al. 2011) and pigs (Douglas et al. 2012). Work on the use of this phenomenon is also underway in the assessment of fish welfare (Wojtas et al. 2015).

Cognitive tendency testing may also help to identify other behavioral, physiological or hormonal signs that are correlated with specific emotional states.

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Charakterystyka behawioru alpaki (*Vicugna pacos*)

Alpaki są roślinożernymi zwierzętami stadnymi, których hodowla z powodzeniem rozwija się w Polsce. Celem badań było opracowanie etogramu alpak oraz określenie behawioralnego budżetu czasowego z uwzględnieniem pory dnia, wieku i płci badanych zwierząt. Podczas obserwacji zachowania 9 alpak rasy Huacaya (5 samic: 3 dorosłe i 2 młode, 4 samce: 1 dorosły i 3 młode) zastosowano metodę próbek czasowych i rejestracji ciągłej.

Do kategorii behawioru aktywnego u obserwowanych alpak zaliczono: stanie, przemieszczanie się, pasienie się, przeżuwanie, pielęgnację oraz kontakty społeczne. U alpak jako typowych roślinożerców w ciągu dnia przeważa behawior aktywny (2/3 czasu obserwacji) nad pasywnym (1/3 czasu przeznaczanego na odpoczynek). Ma to związek z pobieraniem dużej ilości niskoenergetycznego pokarmu oraz z jego przeżuwaniem. Obserwacje zachowania alpak wykazały występowanie facylitacji społecznej w sytuacjach związanych z pobieraniem paszy i odpoczynkiem, defekacją, tarzaniem się i reprodukcją. Alpaki charakteryzują się zależnościami dominacyjno-submisywnymi, które manifestowane są za pomocą sygnałów wizualnych (np. wyciągnięta szyja), dźwiękowych (np. parskanie) lub też reakcji agresywnych (np. plucie). Okres popołudniowy to czas największej aktywności behawioralnej alpak (72% czasu obserwacji). Osobniki dorosłe więcej czasu przeznaczały na odpoczynek (41%), a młode na pasienie się (38%). Dorosły samiec więcej czasu przeznaczał na stanie (39%), co wiązało się z obserwacją i pilnowaniem stada, a dorosła samica więcej czasu przeznaczała na odpoczynek (57%). Wiedza dotycząca zachowania alpak ma istotne znaczenie w aspekcie zaspokajania ich potrzeb biologicznych oraz troski o dobrostan tych zwierząt.

Characteristics of alpaca (*Vicugna pacos*) behaviour

Alpacas are social herbivores and nowdays successful development of their breeding is observed in Poland. The aim of the study was to describe alpacas' ethogram and behaviour time budget with regard to the time of the day, age and gender of studied animals. Time sampling and continuous recording methods were used during behaviour observations of 9 alpacas (5 females: 3 adult and 2 young, 4 males: 1 adult and 3 young) of Huacaya breed.

Active behaviour categories observed in alpacas included: standing, locomotion, grazing, ruminating, social and comfort behaviour. In the daytime alpacas as typical herbivores spend more time on active behaviour (2/3 of observation time) than on passive behaviour (1/3 of observation time spent on resting). It is connected with grazing great amount of low-energetic feeds and their ruminating. Behaviour observations of alpacas showed the phenomenon of social facilitation, especially observed during the situations connected with grazing,

resting, defecation, rolling and reproduction. Alpacas are characterized by dominant-submissive relations, which are manifested by visual signals (e.g. stretched neck), sounds (e.g. snorting) or aggressive reactions (e.g. spitting). The most intensive behavioural activity of alpacas was observed during afternoon hours (72% of observation time). Adult alpacas spent more time on resting (41%) and young ones on grazing (38%). Adult male spent more time on standing (39%) that was connected with observing and protecting the herd and the adult female spent more time on resting (57%). Knowledge about alpacas' behavioural traits can be useful to fulfill their biological needs and take care of their welfare.

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Repertuar zachowań wilków grzywiastych (*Chrysocyon brachyurus*) utrzymywanych w ogrodzie zoologicznym

Wilk grzywiasty jest gatunkiem monogamicznym i wszystkożernym, z wyglądu przypominającym „lisa na szczudłach". W warunkach naturalnych długie nogi umożliwiają mu przemieszczanie się przez wysoką trawę i obserwację terenu związaną z polowaniem. Nazwa wilk grzywiasty wzięła się stąd, że kiedy osobnik jest czymś zaniepokojony, unosi długie, czarne włosy w okolicach szyi (piloerekcja).

Celem badań było opracowanie etogramu wilka grzywiastego oraz określenie behawioralnego budżetu czasowego poszczególnych osobników z uwzględnieniem pory dnia. Obserwacjami behawioralnymi objęto 5 wilków grzywiastych utrzymywanych w Miejskim Ogrodzie Zoologicznym Wybrzeża w Gdańsku. Obserwacje behawioralne prowadzono metodą próbek czasowych, podczas których zachowania dwóch dorosłych osobników wilka grzywiastego oraz trójki potomstwa były rejestrowane co pięć minut.

Do kategorii behawioru aktywnego u obserwowanych wilków grzywiastych zaliczono: behawior pokarmowy, pielęgnacyjny, wydalniczy, socjalny, ruchowy i czuwanie. Obserwowane wilki były najaktywniejsze w godzinach porannych (8.00–10.30) przez prawie 80% czasu obserwacji. W późniejszych godzinach proporcje się odwróciły: osobniki spędzały więcej czasu, odpoczywając, w godzinach południowych (10.30–13.00) było to 75% czasu, zaś w popołudniowych (14.30–17.00) aż 86%. Nie odnotowano, by jeden z dorosłych wilków dominował nad drugim, nawet w kwestii pożywienia. Wilki grzywiaste wykazują charakterystyczne zachowanie związane z zakopywaniem pożywienia, jak również regurgitacją wykorzystywaną w karmieniu młodych. Przed zakopaniem zwierzę chodzi przez chwilę z kawałkiem jedzenia w pysku i dopiero po jakimś czasie idzie do wybranego miejsca, gdzie zakopuje pożywienie. Zakopywanie pokarmu zaobserwowano u samicy i młodych. Regurgitacja była stymulowana przez zachowanie młodych związane z chodzeniem za samicą lub samcem i trącaniem ich w okolice boku lub brzucha. Stwierdzono, że krótki szczek wydawany przez dorosłe osobniki może pełnić funkcję alarmującą dla partnera i/lub ostrzegawczą dla innego osobnika (zwierzęcia bądź człowieka). Dorosły samiec przeznaczał zdecydowanie więcej czasu na czuwanie w porównaniu z samicą. Dorosła samica przeznaczała więcej czasu na zachowanie pokarmowe w porównaniu z innymi osobnikami. Wszystkie młode przeznaczyły podobną ilość czasu na odpoczynek, czuwanie oraz zachowanie pokarmowe. Różnice indywidualne u młodych odnotowano w czasie przeznaczonym na poruszanie się, zachowanie wydalnicze oraz czas, kiedy nie można było zlokalizować osobnika. Młode osobniki częściej wykazywały zachowania socjalne w porównaniu z osobnikami dorosłymi. Nie zaobserwowano występowania zachowań nietypowych u badanych wilków grzywiastych. Poznanie cech zachowania wilków grzywiastych ma istotne znaczenie w aspekcie zaspokajania ich potrzeb biologicznych oraz troski o dobrostan tych zwierząt.

Behavioural repertoire of maned wolf (*Chrysocyon brachyurus*) kept in the zoological garden

The maned wolf is a monogamous and omnivorous species, resembling "a fox on stilts". In the nature long legs help it to move across the tall grass and observe the area when hunting prey. The maned wolf gets its name from long black hairs on the neck and when threatened these hairs stand on (piloerection).

The aim of the study was to describe ethogram of maned wolf as well as to determine the behavioural time budget of particular individuals with regard to the time of the day. Behavioural observations included 5 maned wolves kept at Zoological Garden in Gdańsk. Time sampling recording method was used during behaviour observations of a pair of adult maned wolves and their three puppies and animal behaviour was recorded every 5 min.

Active behaviour categories observed in mane wolves included: feeding, comfort, eliminative and social behaviour as well as movement and watching. The observed wolves were most active in the morning hours (8.00–10.30) for nearly 80% of observation time. In later hours the proportions were reversed: the individuals spent more time resting, in the midday (10.30–13.00) it was 75% of the time, and in the afternoon hours (14.30–17.00) as much as 86%. It has not been reported that one of the adult wolves dominated over the other, even if it was about food. The maned wolves show a characteristic behaviour of burying the food as well as a regurgitation that is used in offspring feeding. Before burying, the animal walks for a moment with a piece of food in his mouth. After some time, the wolf goes to the place of its choice where it will bury the food. Food burying was observed only in female and puppies. Regurgitation was stimulated by puppies' behaviour: following adult female or male and touching their side or abdomen area. It has been found that a short bark from adult maned wolves may be an alert for pair mate or/and warning for another individual (animal or human). The adult male spent much more time watching than the female. Adult female spent more time on feeding behaviour compared to other individuals. All the puppies spent similar amounts of time for resting, watching and feeding. Individual differences in young animals were noted during movement time, eliminative behaviour, and time when the individual could not be located. Young individuals were more likely to exhibit social behaviour than adults. No abnormal behaviour was observed in the maned wolves studied. Knowledge about behaviour traits of maned wolves can be useful to fulfill their biological needs and take care of their welfare.

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Wybrane aspekty zachowania się bydła mięsnego

Celem pracy była analiza wybranych zachowań bydła mięsnego rasy Limousine oraz relacji występujących między zwierzętami w stadzie. Na podstawie obserwacji sporządzono etogram zawierający spis i charakterystykę zaobserwowanych form behawioru oraz określono czas poświęcany przez zwierzęta na poszczególne zachowania w zależności od pory dnia.

Grupę badawczą stanowiło stado bydła liczące 50 osobników, składające się z 14 krów z cielętami, 35 jałówek oraz buhaja. Krowy i jałówki zakupione były z pięciu różnych stad. Zwierzęta utrzymywane były w oborze wolnostanowiskowej w gospodarstwie położonym na Pogórzu Sudeckim. W gospodarstwie stosowano zimowy system wycieleń oraz kwaterowy system wypasu. Pastwisko wygrodzone było trwałym ogrodzeniem elektrycznym, a poszczególne kwatery wyposażone w pastucha elektrycznego. Obserwacje zwierząt prowadzono w budynku inwentarskim, na okólniku oraz na pastwisku w okresie od marca do maja 2014 roku, siedem dni w tygodniu w różnych porach dnia (rano – od 9.00 do 11.00, w południe – od 11.00 do 13.00 lub po południu – 13.00–16.00). W oborze zwierzęta podzielone były na 2 grupy – matki z cielętami oraz jałówki, które w przeciwieństwie do krów miały zapewniony stały dostęp do wybiegu. Jałówki w okresie badań były kilkukrotnie dzielone oraz łączone z innymi osobnikami ze względu na prowadzenie zabiegów synchronizacji rui oraz krycia. Pierwsze zwierzęta na pastwisko trafiły 08.04.2014 r., natomiast ostatnie 15.05.2014 roku. Obserwacje obejmowały zachowania pokarmowe (pobieranie wody i pokarmu, przeszukiwanie pokarmu, przeżuwanie), komfortowe i wydalnicze (defekacja, urynacja, drapanie się, lizanie się, odpoczynek, sen), rozrodcze (obwąchiwanie zadu, pielęgnacja sierści, kopulacja), agresywne (walka, ucieczka), rodzicielskie (karmienie cieląt, pielęgnacja cieląt, zabawa) oraz socjalne (interakcje z innymi osobnikami w stadzie).

Do prowadzenia obserwacji używano lornetki, by nie niepokoić zwierząt obecnością człowieka i nie zniekształcać wyników badań. Zachowania zwierząt były dodatkowo dokumentowane za pomocą filmów. Wyniki opracowano z wykorzystaniem programu MS Excel (2010), natomiast analizę statystyczną przeprowadzono z wykorzystaniem procedury GLM pakietu statystycznego SAS (2009).

Analiza statystyczna wykazała istotne różnice ($p \leq 0{,}01$) pomiędzy średnimi czasami zachowań pokarmowych oraz związanych z odpoczynkiem i snem, a także różnice ($p \leq 0{,}05$) w średnim czasie eksploracji otoczenia. Krowy poświęcały zdecydowanie więcej czasu na zachowania pokarmowe, cielęta z kolei na zachowania związane z odpoczynkiem oraz poznawaniem otoczenia. W przypadku pozostałych kategorii zachowań nie stwierdzono istotnych statystycznie różnic. W trakcie badań zaobserwowano, że zwierzęta pochodzące z poszczególnych stad częściej przebywały obok siebie, tworząc „klany", co prawdopodobnie spowodowane było tym, iż zwierzęta wychowując się razem od młodości, mają ustaloną wcześniej wewnętrzną hierarchię. Po wyjściu na pastwisko i tworzeniu nowych grup obserwowano zwiększoną agresję zwierząt.

Przeprowadzone obserwacje pozwalają stwierdzić, że zwierzęta w analizowanym gospodarstwie miały zapewnione właściwe warunki utrzymania. Przejawiały one bowiem prawidłowe wzorce behawioralne charakterystyczne dla zwierząt zdrowych będących w dobrej kondycji. W badanym stadzie nie zaobserwowano żadnych stereotypii ani zachowań, które można by uznać za odchylenie od normy. Dodatkowo stado odznaczało się niezwykle spokojnym i łagodnym temperamentem, co może być efektem selekcji mającej na celu eliminację agresji u tych zwierząt.

Selected aspects of the beef cattle behavior

The aim of this study was to analyze the selected behaviors of Limousine cattle and the relationships between animals in the herd. Based on the observations, an ethogram containing the census and characteristics of observed behaviors was compiled. In addition, specified amount of time the animals spent on various forms of behavior as well as their incidence depending on the time of a day was determined.

The study was conducted in a herd of 50 beef cattle individuals, consisting of 14 cows with calves, 35 heifers and a bull. Cows and heifers were purchased from five different herds. Animals were kept in a farm located in the Sudeten Foothills. System of winter calving and pasture area was applied on the farm. The pasture was enclosed by a permanent electric fence and individual quarters equipped with an electric shepherd.

Animal observations were conducted in a livestock building, on a circular and pasture from March to May 2014, seven days a week at different times of the day (9–11 a.m., 11 a.m. – 1 p.m. or 1–3 p.m.). In the cowshed animals were divided into 2 groups – calf mothers and heifers, which, unlike cows, were provided constant access to the paddock. Heifers during the study period were several times divided and combined with other individuals due to rutting synchronization and natural mating. First animals got the access to the pasture on 08.04.2014, while the last 15.05.2014. Observations included food (water and food intake, food screening, chewing), comfort and excretion (defecation, urinary excretion, scratching, licking, rest, sleep), reproductive (hindquarters, hair care, copulation), aggressive (fight, escape), parenting (calf feeding, calf care, fun) and social (interactions with other individuals in the herd) habits were carried out.

Binoculars were used for observation to not disturb the animal presence of humans and not to distort the results. Animal behavior was additionally documented using films. Results were compiled using MS Excel (2010), while statistical analysis was performed using the GLM SAS package (2009).

The statistical analysis revealed significant differences ($p \leq 0.01$) between the average time of food intake and sleep/rest behavior, as well as the differences ($p \leq 0.05$) in the mean time of the environmental exploration. Cows spent most of their time on food habits, while calves on resting habits and getting to know their surroundings. There were no statistically significant differences for the other categories of behavior. During the study, it was observed that the animals from the individual flocks were more often located next to each other, forming "clans", probably due to the fact that the animals raised together from their youth had a predetermined internal hierarchy. During stay on the pasture, when new groups were formed, increased aggression was observed.

The results of the observations indicated that the animals in the farm had adequate maintenance conditions. They exhibited correct behavioral patterns characteristic for healthy animals in good condition. There were no stereotypes or behaviors that could be considered as deviations from the standard. In addition, the herd was characterized by extremely calm and mild temperament, which may be the result of selection to eliminate aggression in these animals.

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Studying the outdoor activity of domestic cats using animal-borne cameras – preliminary results

The domestic cat (*Felis silvestris catus*) was introduced to the majority of terrestrial ecosystems of the world. Feral and free-ranging cats are frequently reported to have negative impact on populations of wild vertebrates. On the other hand, those cats themselves are at risk of being injured or killed. The better understanding of free-ranging cats' ecology and behaviour is needed to reduce the risks on both sides. In our research we provide new data on outdoor activity of owned free-roaming cats obtained from small size cameras and GPS trackers worn by studied animals. Between October 2015 and October 2016 we studied the activity of 12 free-ranging cats from rural and suburban areas of Poland. All studied cats were being provided food and care by their owners. Each cat wore a harness with an attached camera and GPS receiver for few days. During that time we collected over 104 hours of video footage. We recorded only two confirmed succeeded predations by cats, however, other predation related behaviours (chasing, "chattering" at birds) were more common. All interactions with farm animals (poultry, rabbits) were neutral. The recorded interactions with humans, dogs and other cats were also neutral or friendly as included mostly people and animals from the same household. In addition, we recorded 65 cases of potential risk behaviours of cats, like crossing roads, hiding under cars and getting into buildings other than owners house. The data collection continues in 2017. Our final results are likely to be applicable for conservation biologists as well as veterinarians, behaviourists and cat owners who want to provide better and safer care for their pets.

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Wpływ rodzaju pokarmu na szacowanie jego ilości na przykładzie zachowania koczkodanów diana (*Cercopithecus diana*)

Szacowanie to rozróżnianie liczebności dwóch zbiorów niezawierających dużej liczby elementów na podstawie porównania „więcej–mniej" bez włączania procesów typowych dla liczenia oraz bez posiadania innych, pozostałych kompetencji numerycznych. Adaptacyjna funkcja takiego zachowania jest oczywista. Zwierzę, które potrafi szacować, umie wybrać np. większe źródło pokarmu. Zdolność szacowania dość powszechnie występuje w świecie zwierząt. Podczas szacowania liczba jest reprezentowana zaledwie w przybliżeniu w formacie analogowym. Takie liczebności są oceniane z pewnym określonym błędem związanym z prawem Webera–Fechnera. Prawdopodobieństwo błędu (tj. nakładanie się dystrybucji) między dwoma zbiorami elementów policzalnych wzrasta, kiedy ich wzajemny stosunek (tzw. ułamek Webera) zbliża się do wartości 1.

W badaniu przeprowadzonym w Miejskim Ogrodzie Zoologicznym w Warszawie wzięły udział koczkodany diana w liczbie N = 2. Każdy z osobników był stawiany indywidualnie przed wyborami, z którego spodeczka chce wziąć jedzenie. Zastosowano dwa rodzaje pożywienia – winogrona oraz ziarna. Sprawdzano umiejętności szacowania u zwierząt, prezentując następujące proporcje i liczebności winogron lub ziaren: ¼, ¾, ¾, ⅓ ,⅔ oraz ½. Każdy z osobników dokonywał około 30 prób wyboru spodeczka z jedzeniem w każdej prezentowanej proporcji. Uzyskano statystycznie istotne wyniki dla poprawnego szacowania zbiorów ziaren we wszystkich prezentowanych proporcjach. Natomiast w przypadku wyborów dokonywanych na winogronach poprawne szacowanie uzyskano tylko w przypadku proporcji ¼, a w pozostałych przypadkach nie.

Uzyskany wynik pozornie przeczy prawu Webera, ale naszym zdaniem jest on konsekwencją odmiennej strategii pokarmowej prezentowanej przez badane zwierzęta. Małe ziarna pszenicy były konsumowane wprost z wybranego spodeczka, podczas gdy winogrona były wkładane do pyska i w ten sposób transportowane w bardziej odległe miejsce habitatu, gdzie były później konsumowane. W tym drugim przypadku pojemność pyska, w którym mieściły się 2 lub 3 winogrona, powodowała, że szacowanie większych porcji pokarmu przestawało mieć priorytetowe znacznie. Wynik wskazuje, że rodzaj pokarmu może determinować rodzaj strategii związanej z jego pobieraniem i że niezwykle łatwo może dojść do pomyłki przy interpretowaniu zachowań związanych z posiadaniem lub nie określonych kompetencji numerycznych.

Effect of type of food on the estimation of quantities the example of the behavior vervets (*Cercopithecus diana*)

Estimation is the process based on distinguishing number on the „more–less" basis in sets containing few elements, that does not require counting and other numerical competence.

Adaptive function of this behaviour is obvious. Animal that can estimate is able to – for example – choose better source of food.

The ability to estimate is fairly common in the animal world. During estimating the number is represented only approximately in the analog format. These numbers are only „estimating" with a specific error associated with the Weber–Fechner law. Probability of error (i.e. distribution overlap) between two sets of quantifiable elements increases as their number grows, so the ability to have the correct subjective numeric analog representation decreases with the size of the objective value.

Our study, conducted in the Warsaw Municipal Zoological Garden, involved 2 (female and male) diana monkeys. Both animals were tested individually – they had to choose from which saucer they want to take food.

We used two types of food - grapes and grains. Estimating skills were tested by presenting the following proportions of grapes or grains: ¼, ⁄¼, ¾, ⅓, ⅔ and ½. Both individuals made about 30 attempts to choose a saucer with food in each of the presented proportions.

In the case of estimating grains, we obtained statistically significant results in all presented proportions. However, in the case of grapes, statistically significant result for the correct estimation were obtained only in the ¼ proportion.

These results may seemingly contradicts the Weber-Fechner law, but in our opinion it is a consequence of different nutrition strategies presented in animals under examination. Small grains of wheat were consumed directly from the saucer, while grapes were inserted into the mouth and thus transported in a more remote location of the habitat where they were consumed later. The monkeys could take only two or three grapes in mouth, so the estimation of larger portions of food was not important anymore. The results indicate that the type of food may determine the strategy of its collecting and that it is extremely easy to make a mistake while interpreting the behaviour associated with numerical competence.

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Consistent individual differences in standard exploration tasks in the black rat (*Rattus rattus*)

In a fluctuating environment, the optimal level of exploratory behavior depends on the proportion of current risks and benefits. The exploratory behavior is therefore often subjected to heterogenous selection. In populations of commensal rodents living in close proximity of humans, this pressure is further increased by pest management. We hypothesize that the black rat (*Rattus rattus*) responds to this pressure by either high behavioral flexibility or by development of personality types. The aim of this study was to analyze exploratory behavior and boldness of wild black rats and its changes over time to determine whether exploratory behavior is a personality trait in black rats. Studies on animals with unreduced variability are necessary for determination of normal range of behaviors. The behavior in the open field and hole board tests yielded one multivariate variable representing exploratory behavior and one representing boldness. The hole board test additionally provided an axis representing exploratory behavior. Exploratory behavior showed moderate to high repeatability, even though we observed a considerable effect of habituation. Exploratory behavior was also strongly correlated across contexts; therefore, our results suggest that the black rat responds to heterogenous selection pressure by developing personality types. We also found a strong effect of litter identity on some aspects of the exploratory behavior. Boldness was less repeatable, which we interpret as high behavioral flexibility in this behavioral trait. In concordance with our hypothesis, the personality types in exploratory behavior, but not in boldness, are possibly maintained by heterogenous selection pressure created by human pest management.

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Ocena relacji człowiek–koń u klaczy i ogierów rasy konik polski

Koniki polskie reprezentują rodzimą rasę koni prymitywnych, które utrzymywane są zarówno w hodowli rezerwatowej, jak również stajennej. Konie tej rasy cechują się wszechstronnymi możliwościami ich wykorzystania oraz rosnącym zainteresowaniem użytkowników. Celem badań było określenie reaktywności behawioralnej i poziomu tętna podczas rutynowych czynności związanych z obsługą stajenną u koników polskich utrzymywanych w warunkach hodowli stajennej w Ośrodku Hodowli Zachowawczej Konika Polskiego RPN we Floriance. Badaniami objęto 20 koni rasy konik polski (12 klaczy, 8 ogierów). Konie poddano punktowej ocenie zachowania według skali od 5 pkt (zachowanie afiliacyjne) do 1 pkt (zachowanie awersyjne) oraz telemetrycznemu pomiarowi tętna podczas poszczególnych etapów obsługi stajennej (podejście do konia, czyszczenie, kiełznanie, podnoszenie nóg). Stwierdzono istotną ujemną korelację pomiędzy oceną behawioru a poziomem tętna u badanych koni. Klacze charakteryzowały się wyższym poziomem tętna w porównaniu z ogierami. Konie ocenione pozytywnie podczas podejścia człowieka cechowały się również zachowaniem afiliacyjnym podczas etapu kiełznania. Ocena reaktywności behawioralnej i fizjologicznej koni rasy konik polski wskazuje na pozytywne relacje człowiek–zwierzę podczas przeprowadzania rutynowych czynności związanych z obsługą stajenną.

Assessment of human–horse relation in mares and stallions of Konik polski breed

The Konik polski horses represent an indigenous breed of primitive horses which are bred in natural habitat in reservations as well as in stables. This breed, which is becoming more and more popular, is characterised with all-round versatility. The purpose of this research was to determine behavioural reactivity and heart rate during routine stable handling activities involving Konik polski horses in the Centre for Preserving Breeding of Konik polski horses at the Roztocze National Park in Florianka. The tests included 20 Konik polski horses (12 mares and 8 stallions). The horses were assessed on a scale of 5 points (affiliative behaviour) to 1 point (aversive behaviour) and telemetric measurement of heart rate during particular stages of handling (approach to the horse, brushing, bridling, leg raising) in the stable. A significant negative correlation between the animals' behaviour and their heart rate was noticed. The mares were characterised with a higher heart rate than the stallions. The horses whose behaviour was assessed positively during approach were also characterised with affiliative behaviour during bridling. Assessment of behavioural and physiological reactivity of Konik polski horses points to positive human–animal relations during routine stable handling activities.

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The Mutual Relationship System by Dagmara Olejarz

Goal:
Animal welfare raising as an improvement of human living conditions

The goal of a project is to create a value system that will keep balance in relations animal – man, man – animal. System of respect for animal's life not only among its lovers but also among all the people.

Usage

Interrelation takes place in breeding of small and big animals, in all places where animals are seen as friends, companions, workers and with intended usable or consumable use (including slaughterhouse).

Actions in closer perspective

Diagnostic actions will monitor animal's and human's conditions (BOF) in the contest of established assumption; before, during and after the contact (Department of Immunology, Pathophysiology and Veterinary Preventive Medicine of Wroclaw University of Environmental and Life Sciences and Mental Ilnesses and Neurotic Disorders Clinic).
Educational, therapeutic, corrective actions will lead to social awakening of problem's complexity (Department of Immunology, Pathophysiology and Veterinary Preventive Medicine of Wroclaw University of Environmental and Life Sciences.; Pedagogics, Psychology and Anthropology Department; Mental Ilnesses and Neurotic Disorders Clinic; Corrective Pedagogics College).

Actions in further perspective

Creation of entity that will certify establishments covered by this project, as well as establishments willing to obtain a certification in the range of the project.
Carrying out training connected with project implementation on the country premises and outside the country if needed.
Using the most modern monitoring system the quantum and molecular level.

Defining influence of the electromagnetic waves on living organisms and defining zones free from the impacts.

Result:

Department of Immunology, Pathophysiology and Veterinary Preventive Medicine

Animal welfare raising in breedings and rearing by prevention, not healing – improvement of meat, milk (food products) quality.

Pedagogics, Psychology and Anthropology Department

Examples: Moral and ethical education. Sensitizing humans on charges' fate, awakening on the waeker, dependent, rejected, isolated needs. Pointed to children: *How to be responsible for charge's fate?* – feeding, walk, hygiene, respect for living creatures. Therapy for children, youth, adults. Meeting with "a friend" feeling a pain of separation, rejection, isolation – *you understand me because I feel your heart beating* – finding a meaning of life together by joy of meetings (hippotherapy, kynotherapy). Rehabilitation of socially awkward juveniles by instituting volunteers to animal service: *I know I am the most important one for you.*

Mental Ilnesses and Neurotic Disorders Clinic

Depression healing (of different origins) by the people at different ages (children's homes, clinics, retirement homes).

Summary:

Current stage – goal

Catching a group of zootechnicians/vets with proper psychointeractive qualifications to work with animals (1 semester).

POSTERS

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Ocena bólu u cieląt podczas dekornizacji z wykorzystaniem wzorców behawioralnych

W chowie i hodowli bydła wykonuje się szereg zabiegów zootechnicznych i weterynaryjnych, które powodują ból. Usuwanie rogów jest zabiegiem powszechnie stosowanym w u przeżuwaczy na całym świecie (Kupczyński i in. 2014, McCarthy i in. 2016). Dekornizacja wykonywana jest nie tylko u cieląt, ale także kóz (Alvarez i in. 2015). Stres i ból podczas tego zabiegu związane są z działaniem czynników fizycznych lub chemicznych. Zawsze jednak zabieg ten oddziałuje na szereg nocyreceptorów, których pobudzenie wynika z działania bodźców na mechanoreceptory, receptory fizyczne i chemiczne, a także receptory polimodalne. W wielu badaniach rejestrowano zmiany fizjologiczne, behawiarolne i endokrynne podczas usuwania zawiązków rogów przy użyciu różnych metod. Wynikiem aktywacji osi podwzgórze-przysadka-nadnercza (HPA) jest wzmożone wydzielanie kortyzolu (Stewart i in. 2008, 2014, Heinrich i in. 2010), a także kortykosteronu z kory nadnerczy. Stężenie kortyzolu we krwi jest jednym z najczęściej stosowanych markerów (Stewart i in. 2008, Hart 2012, Stock i in. 2016). Czułą, a jednocześnie małoinwazyjną metodą jest oznaczanie jego poziomu w ślinie (Caray i in. 2015). Cielęta mogą doświadczać ból po dekornizacji nawet do 27 godzin po zabiegu (Heinrich i in. 2010), a rany wokół zawiązków rogów mogą pozostawać wrażliwe do 75 godzin (Mintline i in. 2013). Wiąże się to z brakiem powrotu wrażliwości na ból do poziomu wyjściowego. Ocena bólu wywołanego tym zabiegiem jest bardzo trudna, dlatego bezpośrednie obserwacje zachowań, jak również odpowiedź fizjologiczna powinny być brane pod uwagę jednocześnie. Badania behawioralne są jedną z metod oceny bólu i stresu podczas dekornizacji oraz bezpośrednio po zabiegu. Wzorce zachowań, które mogą być używane w tworzeniu etogramów, polegają na analizie częstotliwości lub czasu trwania danych rodzajów zachowań. W ocenie wzorców zachowań stosuje się model obserwacji ciągłej, rejestrację cyfrową lub przez obserwatora. W tworzeniu etogramów powinny być uwzględniane zachowania dotyczące zmiany położenia głowy i uszu, stawanie dęba, aktywności (w tym gwałtowne skoki do przodu, upadki, siadanie, leżenie czy odpoczynek), wokalizacja, chęć pobierania wody i paszy, ruchy ogonem czy zachowania pielęgnacyjne. W ostatnich latach zaproponowano również zastosowanie numerycznej skali oceny bólu (ang. Numerical Rating Scale; NRS) w zakresie od 0 (brak bólu) do 10 (bardzo silny ból). Analizę zachowań w skali NRS powinien wykonywać drugi obserwator lub sporządzana jest ona z materiału filmowego. Badania własne wskazują, że stopień odczuwania bólu u dekornizowanych cieląt, manifestowany zmianą wzorców zachowań i oceną bólu w skali NRS, nie jest związany z wiekiem zwierząt. Podobne nasilenie

bólu w skali NRS było stwierdzane u cieląt 2-tygodniowych, jak i 4-tygodniowych. W praktyce istnieje zatem konieczność szerszego stosowania leków przeciwbólowych i środków znieczulających podczas dekornizacji cieląt.

Evaluation of pain with the use of behavioural models during disbudding in calves

A number of zootechnical and veterinary practices cause pain in cattle during the period of breeding and rearing. Dehorning and disbudding methods are common in ruminants practice around the world (Kupczyński et al. 2014, McCarthy et al. 2016). Disbudding is performed not only in calves but also goats (Alvarez et al. 2015). Stress and pain during this procedure is related to the action of physical or chemical factors. Nevertheless, the treatment always affects a number of nocireceptors affecting mechanoreceptors, physical and chemical receptors and polymodal receptors. Many physiological, behavioral and endocrine changes have been reported during horns removal by various methods. Activation of the hypothalamic-pituitary--adrenal (HPA) axis is associated with increased cortisol secretion (Stewart et al. 2008, 2014, Heinrich et al. 2010) as well as the corticosterone from the adrenal cortex. The concentration of cortisol in blood is one of the most commonly used markers (Stewart et al. 2008, Hart 2012, Stock et al. 2016). A sensitive and simultaneously minimally invasive method is to determine the levels of cortisol in saliva (Caray et al. 2015). The experience of post-operative pain in calves occurs even 27 hours after disbbuding procedure (Heinrich et al. 2010) and the wounds around the horns may remain susceptible up to 75 hours (Mintline et al. 2013). The reaction is associated with lack of return of pain sensitivity to the baseline level. Evaluation the pain caused by dehorning or disbudding is difficult, there is why the direct observation of animal behaviour as well as physiological response should be taken into account at the same time. Behavioural studies are one of the methods of assessing pain and stress during and after the treatment. The models of behaviour that can be used to create ethograms are based on the frequency or duration of the types of behaviour reactions. Behavioural patterns are evaluated using a continuous observation model, digital recording or by direct observations. The movements of head and ears, verticalization, animals' activity (including unexpected jumps, falls, sitting, lying or resting), vocalization, water and feed intake, tail movements and parents care behaviour should be included in ethogram methodology. In recent years, the Numerical Rating Scale (NRS) measuring pain has been proposed in the range of 0 (no pain) up to 10 (very severe pain). Behaviour analysis in the NRS scale should be performed also by a second observer or it should be registered as a movie. Our own studies showed that the degree of pain in disbudded calves, manifested by the behavioural changes and pain scores in the NRS scale, is not related the age of the animals. Similar pain in NRS scale was reported in calves in the 2 and 4 weeks. Therefore, there is a need for wider use of analgesics and anaesthetics in practice during the dehorning and disbudding in calves.

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Porównanie zachowań szczurów hodowlanych i szczurów w typie dzikim w wybranych testach behawioralnych

Badania behawioralne stosowane są w wielu dziedzinach nauki, m.in. w psychologii i jej gałęziach, neurobiologii. Uproszczone formy procesów psychologicznych, jakie można zaobserwować u szczurów, pozwalają na zrozumienie tych procesów w bardziej złożonej formie u innych gatunków (Pisula 2009). Celem pracy były porównawcze badania behawioralne pomiędzy szczurami hodowlanymi a szczurami w typie „dzikim" przy użyciu wybranych testów behawioralnych. Wykorzystano test otwartego pola, nowości oraz preferencji pokarmowej. Badania przeprowadzono łącznie na 20 szczurach w wieku 34–41 dni, które podzielono na 2 grupy o równej liczebności i rozkładzie płci. Pierwsza grupa składała się z osobników pochodzących z dwóch miotów szczurów hodowlanych (*Rattus* sp.), których pochodzenie było znane do 5. pokolenia wstecz i nie posiadały one w swoim rodowodzie bliskich przodków pochodzących od „dzikiego" szczura wędrownego (*Rattus norvegicus*). Druga grupa składała się z osobników pochodzących z trzech miotów szczurów hodowlanych (*Rattus* sp.) w typie dzikim, których pochodzenie było znane od co najmniej drugiego pokolenia. Szczury z tej grupy miały w swoim rodowodzie bliskich przodków w postaci dziko żyjącego szczura wędrownego (*Rattus norvegicus*). Badanie testem otwartego pola wykonano w celu zbadania różnic pomiędzy grupami o różnym pochodzeniu oraz weryfikacja hipotezy, czy płeć ma wpływ na wyniki testu. Metodykę analizy oraz jej przebieg wzorowano na pracach (Markel i in. 1988, Ashok i in. 2014, Gulevich i in. 2015). Każdy z trzech testów był powtarzany po 4 dniach. Test otwartego pola polegał na obserwacji szczura umieszczonego w pojemniku z pokrywą. Czas trwania testu wynosił 25 minut i był podzielony na dwie części: adaptację zwierząt (10 min) oraz test właściwy (15 min). Obserwowano takie zachowania jak: przekroczone pola, pozycja wertykalna, pozycja wertykalna w centrum pola, węszenie górne, węszenie dolne, pielęgnacja, bezczynność, przebywanie w rogu pojemnika, przebywanie w centrum pola, leżenie, defekacja, mikcja, próby ucieczki oraz gryzienie i/lub drapanie ścian/podłogi. W teście tym stwierdzono znaczne różnice w poszczególnych zachowaniach pomiędzy badanymi szczurami. Istotnie ($p < 0{,}01$) występowała u szczurów hodowlanych. Test nowości (10 min) polegał na używaniu 3 różnych piłek (1) z plastiku z umieszczonym wewnątrz dzwonkiem; 2) z szeleszczącego materiału; 3) z materiału tekstylnego z kolorowymi piórami. Większą aktywność ruchową oraz obwąchiwanie i gryzienie stwierdzono u szczurów hodowlanych. Test preferencji pokarmowej trwał 30 min i wykonywany był po uprzedniej głodówce, po której w klatkach umieszczono 2 miski – pierwsza ze znaną wcześniej karmą oraz druga – z karmą, z którą zwierzęta nie miały wcześniej kontaktu. Stwierdzono, że szczury chętniej wybierały karmę nieznaną wcześniej, co uzasadnione było inną jej strukturą, składem oraz zapachem. Dodatkowo stwierdzono, że szczury w typie dzikim chętniej wybierały nową karmę. W prze-

prowadzanym eksperymencie stwierdzono znaczne różnice w odpowiedzi behawioralnej pomiędzy badanymi typami szczurów. Szczury hodowlane częściej wykazywały zachowania eksplorujące, co wskazuje na ich możliwości poznawcze, jak również mniejszy lęk i narażenie na stres w tego typu badaniach.

Comparison of selected behaviour tests in *Rattus* sp. and *Rattus norvegicus*

Behavioural researches are used in many areas of science, especially in the fields of psychology and neuroscience. Simplified forms of psychological processes that can be observed in rats allow us to understand these processes in a more complex form in other species (Pisula 2009). The aim of the study was to compare the behavioural observations between domestic rats and the wild type rats with the use of selected behavioural tests. An open field, novelty and food preferences tests were used in this study. The experiment was conducted on 20 rats in the age of 34–41 days, which were divided into 2 groups of equal size and sex distribution. The first group included individuals from two litters of domestic rats (*Rattus* sp.), with well known origin (up to 5 generations) and did not have in their pedigree any close relatives with the „wild" rat (*Rattus norvegicus*). The second group consisted of individuals from three litters of rats (*Rattus* sp.) in the wild type, whose origin has been known from at least the two generation. Rats from this group had in their pedigree a close relations with the form of wild living rat (*Rattus norvegicus*). An open field test was performed to examine the differences between groups from other origins and to verify the hypothesis that gender affects the test results. The analytical methodology was taken from previous behavioural models (Markel et al. 1988, Ashok et al. 2014, Gulevich et al. 2015). Each of the tests was repeated after 4 days. The open field test was based on the rats observations in a container with a lid. The duration of the test was 25 minutes and was divided into two parts: animal adaptation (10 min) and proper test (15 min). It was found that the behaviour reactions were mainly: crossing the fields, vertical position, vertical position in the centre of the field, upper jaw, bottom jaw, self-care, inactivity, sitting in a corner, lying in the corner of the container, lying, defecation, mucus, finding ways to escape and biting and/or scratching the walls/floor. This test confirmed significant differences ($p < 0.01$) in the individual behaviour between the tested rats. The novelty test (10 min) consisted the use of 3 different plastic balls (1) with a bell inside; 2) rusting material; 3) textile material with coloured feathers. Increased motor activity as well as sniffing and biting were found in domestic rats. The food preference test was carrying for 30 minutes and was performed after a previous starvation, followed by 2 dishes in the cages – the first with the previously known fodder and the second with a completely new fodder for the animals. It was found that rats were more eager to choose the unknown fodder, what was also justified by its structure, composition and aroma. In addition, the wild type rats were more likely to choose a new fodder. In our experiment the significant differences were found in the behavioural responses between the rat types. The domestic rats showed more exploratory behaviours, indicating their cognitive abilities, as well as less anxiety and stress exposure in such studies.

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Analiza reakcji neurofizjologicznych oraz modelu zachowań cieląt podczas dekornizacji

Zabieg dekornizacji, czyli usuwania zawiązków rogów, należy do rutynowych procedur stosowanych najczęściej u bydła mlecznego. Technika ta jest zwykle wykonywana metodami chemicznymi lub termicznymi. Dekornizacja chemiczna polega na usuwania zawiązków rogów u cieląt z wykorzystaniem odczynników chemicznych, podczas gdy procedura termiczna polega na wypalaniu zalążków dekornizatorem w temperaturze przekraczającej 600°C przez okres co najmniej 20 sekund. Reakcja na stres i ból zwierząt występujące podczas rutynowych zabiegów są często marginalizowane przez hodowców, pomimo faktu że postrzeganie tych bodźców u cieląt nie jest w pełni poznane.

Celem badania było przedstawienie eksperymentalnej analizy neurofizjologicznej i behawioralnej u cieląt w różnym wieku podczas wykonywania zabiegu dekornizacji termicznej.

Na podstawie badań neurobehawioralnych analizowano poziom reakcji stresowych u 24 cieląt holsztyńsko-fryzyjskich (6 grup zwierząt: GI – GVI). Analizę zachowań zwierząt przeprowadzono przy użyciu specjalistycznego sprzętu monitoringowego (Noldus, Holandia), ze szczególnym uwzględnieniem obserwacji reakcji lokomotorycznych oraz interakcji socjalnych u cieląt przed i po dekornizacji. Przeprowadzono również analizę bioelektrycznej aktywności kory mózgowej przy użyciu elektroencefalografii (EEG) (COMET AS 40, Grass Technologies, USA) celem opracowania protokołów klinicznych fal mózgowych u cieląt podczas dekornizacji oraz stwierdzenia potencjalnej korelacji tych wyników z obserwacjami behawioralnymi i analizą krwi. Przebieg doświadczenia został zaakceptowany przez Komisję Etyczną.

Analiza występowania typów zachowań u cieląt podczas dekornizacji wykazała cztery główne reakcje u tych zwierząt: 1) ruchy głowy i drżenie głowy (GI: 1,65 ± 0,88; GII: 13,35 ± 5,48; GIII: 5,40 ±2,46; GIV: 1,80 ± 0,95; GV 17,20 ± 4,31; GVI: 7,10 ± 3,08), 2) kierowanie głowy do tyłu (GI: 0,05 ± 0,22; GII: 0,25 ± 0,44; GIII: 0,25 ± 0,55; GIV: 0,10 ± 0,31; GV: 0,35 ± 0,59; GVI: 0,25 ± 0,44), 3) poruszanie uszami (GI: 0,50 ± 0,69; GII: 14,70 ± 4,44; GIII: 6,40 ± 2,35; GIV: 0,45 ± 0,76; GV 15,95 ± 3,56; GVI: 6,65 ± 1,95), 4) machanie ogonem (GI: 0,10 ± 0,31; GII: 16,00 ± 4,34l; GIII: 2,10 ± 1,02; GIV: 0,21 ± 1,88; GV: 17,75 ± 3,38; GVI: 3,70 ± 1,22). Stwierdzono, że dekornizacja termiczna zwiększa częstotliwość wymienionych dominujących reakcji u zwierząt przez okres około 1 godziny po wykonaniu zabiegu. Aktywność kory mózgowej oraz efekty behawioralne były najistotniejsze ($p \leq 0,01$) w ciągu pierwszych 30 minut od wykonania zabiegu dekornizacji. Nie stwierdzono korelacji pomiędzy wiekiem dekornizowanych cieląt a badanymi silnymi reakcjami nerwowymi i behawioralnymi. Procedura EEG wykazała typowe fale beta [β] przed dekornizacją, fale kappa [κ], mu [μ] i theta [θ] podczas

procedury termicznej (statystycznie istotny wzrost amplitudy rejestrowanych elektroencefalogramów) oraz ostatecznie ponownie mieszane fale beta [β] po zakończonej procedurze jako efekt wyczerpania nerwowego.

Neurophysiological and behavioural analysis of dehorning procedure in calves

Dehorning is a standard procedure in dairy cattle and it is widely used in dairy cattle holdings. The method is usually performed by chemical or thermal way. The chemical procedure involves removing of the buds with chemical reagents, while thermal procedure is based on burning the buds in temperature over 600°C during at least 20 seconds. The stress reaction and animal's pain that occurs during those routine procedures is often marginalized by breeders, despite the fact that the perception of these stimuli in calves is not well known. Therefore the aim of the study was to present an experimental neurophysiological and behavioural analysis in different age of Polish Holstein-Friesian calves during thermal dehorning procedure.

On the basis of neurobehavioural monitoring, the level of stress reactions in 24 Polish Holstein-Friesian calves were investigated (6 groups of animals: GI – GVI). The behavioural study (Noldus, Netherlands) covered the locomotion and social interactions in calves before and after dehorning. Bioelectrical activity of cerebral cortex (electroencephalography; EEG) was also made (COMET AS 40, Grass Technologies, USA) to define the clinical protocols of brain waves in calves during dehorning and to correlated the results with the behavioural observations. The experiment was accepted by the Ethical Committee.

The frequency of behavioural types in calves showed four main reactions in these animals: 1) head movements and head shaking (GI: 1,65 ± 0,88; GII: 13,35 ± 5,48; GIII: 5,40 ±2,46; GIV: 1,80 ± 0,95; GV 17,20 ± 4,31; GVI: 7,10 ± 3,08), 2) targeting head to the back (GI: 0,05 ± 0,22; GII: 0,25 ± 0,44; GIII: 0,25 ± 0,55; GIV: 0,10 ± 0,31; GV: 0,35 ± 0,59; GVI: 0,25 ± 0,44), 3) ear movements (GI: 0,50 ± 0,69; GII: 14,70 ± 4,44; GIII: 6,40 ± 2,35; GIV: 0,45 ± 0,76; GV 15,95 ± 3,56; GVI: 6,65 ± 1,95), 4) tail wagging (GI: 0,10 ± 0,31; GII: 16,00 ± 4,34l; GIII: 2,10 ± 1,02; GIV: 0,21 ± 1,88; GV: 17,75 ± 3,38; GVI: 3,70 ± 1,22). The dehorning procedures increases frequency of head movement, tail wagging and tripping as well as abnormal backward-motions for 1 h. Activity of the cerebral cortex as well as the behavioural effects were the most significant ($p \leq 0.01$) in first 30 min. of dehorning procedure. There was no correlation between age of dehorned calves and examined strong neural and behavioural reactions. The EEG procedure showed a typical beta [β] waves before dehorning, kappa [κ], mu [μ] and theta [θ] waves during the thermal procedure (significant increase of neural amplitudes) and finally a mixed beta [β] and delta [δ] waves in calves during dehorning, as a result of neural exhaustion.

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Behavior of three populations of house mouse (*Mus musculus* sensu lato) in five exploration tests: Effect of subspecies type and commensalism

Commensal way of life, when animals adapt their ecology to living in proximity of humans, can affects the animal behavior radically. Our study investigated whether any differences in exploratory behavior exist between the commensal and non-commensal populations of house mouse (*Mus musculus* sensu lato) or between the subspecies of this species (*M. m. musculus* and *M. m. domesticus*). Commensal *M. m. musculus* from Czech Republic (n = 24), non-commensal *M. m. musculus* from Iran (n = 39) and non-commensal *M. m. domesticus* from Syria (n = 38) were tested.

Mice were tested in battery of five exploration tests: free exploration, forced exploration, hole-board test, vertical test, elevated plus maze. The inter-population differences in exploration behaviour were significant in all types of tests ($p \leq 0.05$). Mice from commensal population of *M. m. musculus* were most active in vertical elements of behavior (climbing on vertical grid, rearing, jumping). In vertical test they spent more time by climbing (77% of time) and less often fell from the grid. Both non-commensal poulations climbed less willingly (*M. m. musculus* 57% of time; *M. m. domesticus* 60% of time). Mice from commensal population also showed less fear of heights – in EPM test the head-dipping (looking down from the open arm of maze) was observed less often. On the contrary non-commensal populations (of both subspecies) explored holes in the hole-board test more actively and entered the centre of arena more often. The commensal populations of mice have probably more opportunities for climbing and exploring elevated places in anthropogenic habitats, whereas the non-commensal mice populations live mainly in open habitats and have to exploit dispersed food sources.

In total, *M. m. domesticus* (non-commensal population from Syria) compared to both *M. m. musculus* subspecies was more active as demonstrated specifically in the EPM test.

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Zróżnicowanie preferowanych typów zabaw u psa domowego *Canis familiaris* w zależności od przynależności do grupy FCI

Celem badań było sprawdzenie, czy istnieją różnice w preferowanych sposobach zabaw pomiędzy przedstawicielami poszczególnych grup FCI (Fédération Cynologique Internationale – Międzynarodowa Federacja Kynologiczna). Badania przeprowadzono, wykorzystując dane otrzymane z ankiet internetowych. Respondentów poproszono o określenie, w jaki sposób bawią się ich psy. Rozpatrywano następujące formy zabaw: aportowanie, udawane walki, tropienie, zabawa z innym psem i przeciągnie. Uzyskano odpowiedzi dotyczące 485 rasowych psów należących do grup: I, II III, VI, VII, VIII i X. Grupa I to psy owczarskie i pasterskie, II – pinczery, sznaucery, psy molosowate i psy szwajcarskie typu górskiego, III – teriery, VI – psy gończe i posokowce, VII – wyżły, VIII – psy aportujące, płochacze i dowodne, X – charty. Pozostałych trzech grup (IV, V i IX) nie uwzględniono w analizie ze względu na zbyt małą liczbę ich reprezentantów.

Analiza statystyczna aportowania wykazała istotne różnice pomiędzy grupami. Test chi-kwadrat wykazał, że psy z grupy I, III, VII oraz VIII częściej preferowały ten sposób zabawy niż pozostałe grupy. Tropienie natomiast najczęściej zaznaczano w ankietach u psów z grupy VII (77% psów), a najrzadziej w grupie X (11%). Statystycznie istotną różnicę uzyskano również w przypadku zabawy polegającej na przeciąganiu się z właścicielem zabawką. Grupą najczęściej prezentującą tę formę zabawy była grupa I (73%), w przeciwieństwie do grupy VII, w której tylko 23% osobników bawiło się w ten sposób. W przypadku udawanej walki i psich spotkań nie wykazano żadnej różnicy pomiędzy grupami.

Międzynarodowa Federacja Kynologiczna wprowadziła podział psów rasowych na 10 grup, ze względu na użytkowość i pochodzenie poszczególnych ras. Wyniki przeprowadzonych badań wykazały istotne różnice pomiędzy grupami FCI, uzasadniając słuszność tego podziału.

Differentiation of preferred types of play in domestic dog *Canis familiaris* depending on their affiliation to FCI group

The goal of the research was to check if differences exist in preferred forms of play between representatives from specific FCI (Fédération Cynologique Internationale) groups.

The research was based on the data obtained from online questionnaire. Respondents were asked to describe the way their dogs play. The following sorts of plays were considered: fetching, pretended play fights with humans, tracking/searching, play with another dog and tug of war pay with humans. Obtained responses corresponded to 485 purebred dogs belonging to groups: I, II, III, VI, VII, VIII and X. Group I consists of Sheepdogs and Cattledogs (except Swiss Cattledogs), group II – Pinscher and Schnauzer – Molossoid Breeds – Swiss Mountain and Cattle Dogs, group III – Terriers, VI – Scent hounds and related breeds, VII – Pointing Dogs, VIII – Retrievers – Flushing Dogs – Water Dogs, X – Sighthounds. The remaining three groups (IV, V and IX) were not considered in analysis due to a small number of their representatives.

Statistical analysis regarding fetching style of play exhibited significant differences between groups. Chi-squared test revealed that dogs from groups I, III, VII and VIII more frequently preferred this type of play than remaining groups. However, the tracking/searching play was most commonly expressed in surveys for dogs from group VII (77%) and least commonly in group X (11%). Statistically significant difference was also evident for tug of war type of play with the owner of the toy. The group most commonly presenting this game was group I (73%) in contrast with group VII, where only 23% played this way. In case of a play fight game with human and plays with other dogs, no evident differences were displayed.

Fédération Cynologique Internationale divided purebred dogs into 10 groups based on ancestry and usability of specific breeds. Results of the performed research demonstrated essential differences between FCI groups, justifying the validity of such division.

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Przestrzenne zdolności poznawcze u małp i psów

Do jednych z ważniejszych przestrzennych zdolności poznawczych należy świadomość istnienia obiektu, nawet jeżeli zniknie on z pola widzenia, oraz umiejętność śledzenia niewidocznego obiektu. Celem przeprowadzonego eksperymentu było sprawdzenie tych zdolności u małp takich jak: koczkodan nadobny, koczkodanek błotny, makaki, mangaby i czepiaki, a następnie porównanie rezultatów z danymi z literatury dotyczącymi małp człekokształtnych i psów. W trakcie doświadczenia badany osobnik obserwował, jak jedzenie było chowane pod jeden z dwóch kubków, a następnie kubki były przesuwane przez eksperymentatora w pięciu różnych wariantach. Warianty różniły się pomiędzy sobą ostateczną pozycją kubka po przesunięciu oraz przesunięciem z transpozycją. Badane małpy osiągały sukces we wszystkich wariantach, podobnie jak małpy człekokształtne. Jednak w czterech wariantach z pięciu małpy człekokształtne radziły sobie istotnie lepiej niż małpy w przeprowadzonym eksperymencie. Psy uzyskiwały sukces jedynie w wariantach, gdzie tory po jakich przesuwane były kubki nie krzyżowały się. W wariantach z transpozycją kubków psy miały gorsze wyniki niż w trakcie próby kontrolnej, gdy badany obiekt nie widział, pod który kubek chowane było jedzenie. Uzyskane wyniki badań potwierdziły różnicę pomiędzy badanymi małpami, małpami człekokształtnymi oraz psami w odniesieniu do ich umiejętności tworzenia reprezentacji umysłowej niezbędnej do świadomego śledzenia niewidocznego przedmiotu w poszczególnych wariantach.

Ability to track object transpositions in monkeys, apes and dogs

To one of most important spatial cognitive abilities belongs the ability to understand that objects continue to exist even when that have disappeared from view and the ability to follow the unseen object. The aim of the carried out experiment was to check these abilities in such monkeys as: De Brazza's monkey, Allen's swamp monkey, macaques, mangabeys, spider monkeys, and then to compare the results with data from literature concerning apes and dogs. In the course of the experiment, the investigated individual was watching how food was hid-

den under one of two cup, and the positions of the cups were then changed in five different variants. The variants differed from one another by the final position of the cup after it was moved and by the paths of the cups, i.e. either cup transposition and thus crossing of cup paths occurred or not. Monkeys were successful in all variants, similarly as apes. However, in four variants out of the five, apes were significantly more successful than monkeys. Dogs were successful only in variants in which the paths of the cups did not cross. In variants with cup transposition, dogs scored worse results that in the control sample, in which the investigated dog did not see under which cup food was hidden. Obtained results confirmed the difference between the investigated monkeys, apes, and dogs as regards their abilities concerning conscious following of an unseen object in the investigated variants.

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Zmiany w zachowaniu psów po adopcji ze schroniska

Pomimo coraz powszechniej przeprowadzanej sterylizacji zwierząt problem bezdomności nadal utrzymuje się na wysokim poziomie. Psy, które przebywają w schroniskach, mają mały kontakt z ludźmi i innymi zwierzętami, a ich przestrzeń życiowa ograniczona jest jedynie do boksów. Dlatego też warunki te mogą negatywnie wpływać na ich zachowanie (pobudliwość, agresję, strach). Celem badań była ocena zmiany zachowania psów adoptowanych w 7. dniu po adopcji oraz po kolejnych 30 i 180 dniach. W tym celu wykorzystano skróconą wersję kwestionariusza C-BARQ składającego się z siedmiu sekcji, łącznie 42 pytań w skali od 0 do 4. Ankieta zawiera pytania dotyczące najczęściej występujących zachowań problemowych u psów oraz posłuszeństwa. W 7. i 37. dniu ankietę przeprowadzono u 59 właścicieli psów, w 187. dniu ankieta została powtórzona u 26 właścicieli psów. W ciągu pierwszych 37 dni zmianie uległo 21 zachowań, m.in. zmniejszyła się liczba zachowań agresywnych, zachowań związanych z lękiem separacyjnym, strachem i niepokojem oraz zmniejszyła się częstotliwość załatwiania potrzeb fizjologicznych w domu. W tym czasie zwiększyło się posłuszeństwo psów (szybkość wykonywania komend), lecz zachowania związane z pobudliwością oraz przywiązaniem i domaganiem się uwagi nie uległy zmianie. Po 187 dniach istotną zmianę obserwowano jeszcze w przypadku zmniejszenia się lęku separacyjnego oraz częstotliwości załatwiania potrzeb fizjologicznych w domu, a także zwiększyła się liczba zachowań zabawowych i chęć współpracy z człowiekiem. Przeprowadzone badania wykazały, że większość zachowań problemowych psów istotnie poprawia się w pierwszym miesiącu po adopcji, co prawdopodobnie wynika ze stabilizacji warunków, w jakich przebywa pies i nawiązaniu nowych, pozytywnych relacji z właścicielami.

Changes in dog behaviour after adoption from shelter

Although the sterilization of animals becomes increasing common, the problem of aggravating animal homelessness remains important. Dogs have a limited contact with people and other animals, but their living space is restricted to boxes. Consequently, respective conditions may negatively affect their behaviour (excitability, aggression, fear). The aim of the present investigations was to assess changes in the behaviour of dogs 7 days after adoption and after subsequent 30 and 180 days. For this purpose, a shortened version of the C-BARQ questionnaire, composed of seven section and containing a total of 42 questions on a five degree scale,

was used. The questionnaire contains questions about the most important problematic behavioural aspects and obedience in dogs. On the 7th and 37th days after adoption 59 dog owners were asked to complete such questionnaire, and on the 187th day 26 owners were asked to complete the questionnaire. During the first 37 days the intensity of 21 behavioural aspects had decreased, among others, the number of aggressive behavioural events, separation-related behaviour, fear and anxiety, and also the frequency of defecation at home had become lower. During that time dog obedience (frequency of responding to commands) had increased, but behavioural aspects related to excitability and demanding attention had not changed. After 187 days an essential decrease was observed also in the case of separation-related behaviour and frequency of defecation at home, while the frequency of playing behaviour events and of willingness to cooperate with humans had increased. The carried out investigations indicated that the intensity of most problematic behavioural aspects in dogs decreased in the first month after adoption, which probably results from the stabilization of conditions in which a dog lives and from establishing new, positive relations with owners.

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Wskazywanie jako wczesna komunikacja między człowiekiem a szczenięciem psa domowego

Od wieków pies towarzyszył człowiekowi, a jego historia wiąże się ściśle z rozwojem technik polowania, rolnictwa i pasterstwa. Przypuszcza się, że związek ten mógł przyczynić się do wykształcenia szczególnych zdolności komunikowania się psów i ludzi. Powstały one zapewne stopniowo w długo trwającym procesie udomowiania. W rezultacie pomiędzy tymi dwoma gatunkami powstały unikalne umiejętności wzajemnego rozumienia gestów, ruchów i reakcji. Aby sprawdzić zdolności komunikowania się psów i ludzi, przeprowadza się doświadczenie testowanie szczeniąt znajdujących się w różnym wieku. Doświadczenia te wskazywały, że szczenięta są zdolne do odczytywania ludzkich gestów (pointing gesture) począwszy od 6. tygodnia życia. Celem naszej pracy było sprawdzenie, czy szczenięta nabywają umiejętności odczytywania gestów już w 5. tygodniu życia.

Doświadczenie było poprzedzone sesją wstępną, w trakcie której szczenię brało udział w zapoznaniu się z kubkiem i wykonaniu kilku prób. Eksperymentator ukrywał pod jednym z dwóch identycznych kubków karmę, a potem wskazywał ręką na kubek, pod którym znajdowało się jedzenie. Następnie demonstrator rozsuwał kubki na boki na odległość 1 metra. Skupiał uwagę szczenięcia siedzącego naprzeciwko niego, oddalonego o około 1,5 metra i trzymanego przez drugą osobę testującą, a gestem ręki wskazywał kubek, pod którym ukryte było jedzenie. Za poprawne podejście do wskazanego kubka szczenię otrzymywało punkt, natomiast w przypadku popełnienia błędu zero. Każdy osobnik wykonywał 6 prób. W badaniu brało udział 55 szczeniąt z 8 miotów, należących do 5 ras (labrador retriever, basset hound, nova scotia duck tolling retriever, canaan dog, owczarek podhalański). Łącznie suk było 21, natomiast psów 34. Badanie przeprowadzane było zawsze w domu hodowcy, w pustym pomieszczeniu. Szczenięta brały udział w badaniu pojedynczo.

Pointing gesture as an early communications between human and domestic dog puppies

For centuries the dog has accompanied to the human, and his history has been closely connected with the development of techniques of hunting, farming and pasturing. It has been believed that this relationship could have contributed to the development of special communication skills between dogs and humans. Probably they have been formed gradually in the

long-running process of domestication. As a result, the unique ability to understand gestures, movements, and reactions has developed between these two species. Checking the ability of dogs and humans communication. There are some tests for puppies in different ages which we can conduct checking the ability of dogs communications to humans. These experiments have shown indicated that puppies have been able to read pointing gestures starting from 6 weeks of age. The aim of our work was to check the ability of the puppies to read gestures at fifth weeks of age.

The research went before an introductory session during which the puppy was involved in getting to know the cup and performing a few rehearsals. The experimenter hid under one of two identical cups some food and then pointed by his hand at the cup under which the food was located. Then cups were pushed sideways at a distance of 1 meter. The experimenter tried to focus attention of puppy sitting opposite to him at 1.5 meters away pointed to the cup under which the food was hidden. The puppy received a point for a correct approach to the indicated cup. In the case of error received zero. Each individual performed test six times. The study involved 55 puppies from 8 litters belonging to 5 races (labrador retriever, basset hound, nova scotia duck tolling retriever, canaan dog, Tatra shepherd dog). The total number of females was 20 and males 30. The test was carried out always at the breeder's house and in an empty room. Puppies participated individually.

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Assessment of pigs' welfare during routine veterinary procedures

Towards the end of the previous century, 'welfare' concept as well as following its main assumptions became the constant components of routine husbandry practice. Code of Practice for the Welfare of Farm Animals has been evolved that must be strictly follow in animal husbandry. It does not raise an objection – it is commonly known that not only genotype, health and maintenance but also state of being impact animal productivity. Following biosafety rules, providing proper animal maintenance status (surroundings, feed, social conditions) make a standard in animal husbandry. To improve/retain animal life comfort we attempt to maximally reduce the influence of various stress factors, and it's a challenge. Some procedures in swine husbandry are routine, often performed (e.g. litter standardization, castration, iron injections, vaccination) and less often performed (supply of drugs, collecting blood samples) procedures.

The aim of the study was the evaluation of pigs' welfare during the routine veterinary procedures (vaccination, collecting blood samples) and indirectly - the animal stress. Study was performed under field conditions, based on thermal imaging and the analysis of the serum parameters – acute phase proteins (APP): Serum Amyloid A (SAA), Haptoglobine (Hp).

During the routine procedures (taking blood samples, weighting, vaccination, ear tagging) performed on weaned piglets thermal images with infrared camera FLIR C2 were recorded in the following time intervals: 0 h, 0.5 h, 1 h and 2 h after treatment. Infrared images were analysed with appropriate computer program. Blood samples were assessed in the course of routine blood samples collection on the farm. Hp concentration was determined using the quaiacol method (Jones and Mould 1984). SAA concentration was determined using the commercial ELISA test (Tridelta Development Ltd). The assembled data were analysed with statistical package Statistica 12.5.

During the infrared images analysis it was found that earlobe area is the best for most adequate evaluation of external body temperature changes in piglets. IRT results were opposite to expected – external temperature of earlobe area showed lower value after manipulations. 2 hours after treatment external temperature in measurement points back to output values. Analysis of APP seems to confirm the stress role during manipulations.

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Sensitivity to measurement errors in studies on prosocial choice using a two-choice paradigm

Prosocial behaviors are one of the areas of interest for researchers studying the evolution of the mind. Both experimental research and observations in the natural environment have shown so far that among many species there is a tendency to help each other, share resources or protection. This kind of behavior is possible in the case of animals creating specific social groups that involve the application of the theory of mind as well as memory processes and decision making.

Research on altruism is done within one of two experimental paradigms: targeted (or instrumental) helping and prosocial choice paradigm. The aim of research conducted within the targeted help is to find out whether the animal will help another subject solve a task that is not easy to solve on one's own. The point of prosocial choice is the possibility of granting another subject some kind of profit, with little to no effort on the part of the research subject. To put it simply, the animal has two options: one results in both participants receiving a reward (altruistic choice), the other rewards only the subject who makes the choice (selfish choice). It is essential to make sure that the value of the reward is the same regardless of the choice. Thus the prosocial choice does not involve any economic cost, only slight to moderate effort (Szymańska et al. 2014). This method of studying prosocial behavior is currently the most popular in behavioral sciences and its application across species has led to the discovery of important differences between them.

Motoric lateralization is a surprisingly big problem in this field of research, as it may influence which lever will ultimately be chosen by the actor. The results of lateralization studies on primates do not form a clear picture of that phenomenon, which makes it difficult to address the problem during research. The key to understanding the high variance of heterogenous results of research on chimpanzees is how sensitive the scientific method is to the functional asymmetry of the brain in the chimpanzee that results in them chiefly being right-handed.

Lateralization in a chimpanzee may influence which lever will be chosen more often, even after having ascertained that it requires exactly the same amount of effort to pull each of them (Jensen et al. 2006). We have observed a similar problem in our own research on prosocial choice among chimpanzees living in the Municipal Zoological Garden in Warsaw. In our study, the subjects can pass tokens of one of two colors. A large number of tokens is available in the food dispenser. Passing a red token results in food being available for the

actor, passing a green one means that not only the actor receives food, but the other subject who does not have access to tokens and are at the mercy of the actor with access to tokens (Szymańska et al. 2014). However, as we were able to check, it is enough to separate tokens physically into two piles of five per color, for the effect of lateralization to manifest itself fully. The tested chimpanzees (especially males) tended to choose tokens from one pile only – the one with the easiest access for the dominant hand. We would obtain single-color distributions lasting up to 10 days during a single study. Even though the distance between the piles was only 10 cm, strong lateralization obscured the prosocial preferences of the chimpanzees completely.

This heterogenous picture of available data renders it necessary to ensure that the subject have the most symmetrical situation where all possible confounding variables are controlled, if one is to take advantage of the two-choice paradigm while avoiding artifacts.

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Ocena skuteczności wybranych pomocy behawioralnych w terapii lęku separacyjnego u psów

Lęk separacyjny (SDS – Separation Distress Syndrome) jest zaburzeniem behawioralnym opisywanym u psów. Przejawia się głębokim stresem podczas oddzielenia od właściciela. Zwierzę manifestuje swój strach m.in. przez: wokalizację, niszczenie przedmiotów, oddawanie moczu, defekację, a nawet samookaleczanie. Obecnie jest to problem coraz częściej zgłaszany przez właścicieli. Zwykle skutkuje ich frustracją, a nawet dezorganizacją całego dnia, kiedy nie mogą zostawić psa ani na chwilę samego.

W badaniach oceniano skuteczność metod przeznaczonych do walki z tym zaburzeniem, oceniając 4 pomoce behawioralne: zabawkę KONG, kamizelkę przeciwlękową, feromony D.A.P. (Dog Appeasing Pheromones) oraz uspokajający suplement diety z alfa-kazozepiną. Badaniami objęta została grupa 10 psów z województwa dolnośląskiego i śląskiego, których właściciele zgłosili występowanie tego zaburzenia.

Poziom stresu u psów oceniano w sześciu próbach: kontrolnej (pies z właścicielem) oraz pięciu badawczych (podczas pozostawania samemu oraz pod wpływem działania każdej z pomocy). Efekty i skuteczność zastosowanych metod oceniano na podstawie: oceny nagrań zwierzęcia, stosunku kortyzol : kreatynina w moczu oraz subiektywnych odczuć właścicieli po każdej próbie.

W celu oceny wpływu zastosowanych pomocy behawioralnych na reakcję stresową obliczano różnicę wartości stosunku kortyzol : kreatynina pomiędzy sytuacją, gdy pies pozostawał sam a wszystkimi pozostałymi próbami badawczymi. Największy średni spadek stosunku kortyzol : kreatynina (-6,24 ± 16,06) zanotowano po zastosowaniu feromonów D.A.P przy bardzo dużych różniacach indywidualnych, skutkujących wysokim odchyleniem standardowym.

Równocześnie przeprowadzono analizę otrzymanych nagrań, zwracając uwagę m.in.: na moment rozpoczęcia objawów lęku separacyjnego po wyjściu właściciela, łączny czas trwania objawów oraz okresów wypoczynku. Największą poprawę zachowania psów zaobserwowano podczas użycia zabawki KONG, co było zgodne z subiektywną opinią właścicieli, choć stosunek kortyzol : kreatynina wyraźnie wzrósł u psów, które zaangażowane były w tę zabawę lub w obronę zasobu, osiągając w całej grupie średni wzrost o +14,05 ± 26,6.

Stosunek kortyzol : kreatynina w moczu okazał się być dobrym wskaźnikiem lęku separacyjnego: u większości psów parametr ten był wyraźnie wyższy u psów pozostawionych w domu w porównaniu z próbą kontrolną, choć konieczne są dalsze badania, by ocenić jego przydatność w monitorowaniu bardziej subtelnych zmian w przebiegu terapii behawioralnej. Prace będą kontynuowane na większej liczbie osobników oraz przy użyciu innych próbek (np. śliny).

Warto podkreślic fakt, że nagrywanie psów przez właścicieli jest wysoce przydatne zarówno do potwierdzenia diagnozy lęku separacyjnego, jak również weryfikacji postępów terapii i wpływu zastosowanych pomocy behawioralnych.

Effectiveness of selected behavioural methods in the therapy of separation distress syndrome in dogs

Separation Distress Syndrome (SDS) is a common behaviour disorder, characterized by a stress reaction while isolated from the owner. Frustration and fear are manifested by vocalisation, destroying items, urination, defecation and, in some cases, self-injuring.

SDS is often difficult for the owners to cope with: in some cases, owners are afraid to leave the dog alone even for a short period of time, which might disturb their daily routine.

In our scientific research we checked the effectiveness of selected behavioural methods in the therapy of SDS. We focused on four accessories: Kong Dog Toy, Thunder Shirt, Dog Appeasing Pheromones and a dietary supplement with a bioactive peptide – alfa-casosepin hydrolisated from milk protein. The stress reaction was estimated by the measurement of urine cortisol : creatinine ratio and the analysis of recorded dogs' behaviour when left alone.

The examination group consisted of 10 client-owned dogs, suffering from SDS.

The behaviour analysis was performed in six following situations: control test (the dog with the owner at home), dog being left alone for at least 2 hours, dog being left alone wearing a thunder shirt, dog being left alone with a kong toy, dog being left alone while being supplemented with the dietary supplement and dog being left alone under the influence of pheromones. Appropriate urine samples were taken each time.

We calculated the change of cortisol : creatinine ratio in the urine samples taken in all situations (when the dog was treated with the accessories mentioned above) compared to it's level when the dog was left alone. The biggest average decrease (-6,24 ± 16,06) of the cortisol:creatinine ratio was highest under the influence of Dog Appeasing Pheromones, although the individual differences were large resulting in high standard deviations.

At the same time, we analyzed the video records provided by the dogs' owners to evaluate the dogs' behaviour in all tested conditions. The duration of SDS symptoms like barking or destructive behaviour was in most dogs reduced when left with a Kong Toy. This observation was also reported by the owners but interestingly, the cortisol : creatinine ratio increased markedly in dogs, which were engaged in play or guarding instead of showing separation-related stress symptoms, reaching the average change of +14,05 ± 26,6 for the whole group.

The cortisol : creatitine ratio in urine was shown to be a good indicator of Separation Anxiety Syndrome: our tests reported consequently a substantial increase of the ratio when the dog was left alone compared to being home with the owner, although further research is needed to evaluate the usefullness of this parameter in the monitoring of more subtle changes in the course of behavioural therapy. The research will be continued on larger group of dogs and with additional use of other samples (ex. saliva).

It is worth emphasizing that video recording is highly recommended if the owner suspecting that their pet might be affected by SDS for both confirming that diagnosis and for verifying the influence of applied behavioural therapy.

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Comparison of different experimental testing methods of natural pheromones detection in dogs (*Canis familiaris*)

Protocols of pheromones identification usually contains a few steps: collection of material, chemical analysis and verification of the suspected effect by the evaluating physiological or behavioral reaction towards analogs of evaluated substances. In the context of sex pheromones usually evaluation of male behavior towards the female use to be used however this could be burdened by inter-personal interference errors.

The aim of the study was to compare different olfactory tests for detection and discrimination of female natural sex pheromones by male dogs, in order to develop a suitable test for artificial pheromones. Ten adult male dogs have been used for testing. Urine samples were collected from 16 females in oestrus, 4 in dioestrus, 2 spayed females and 3 males. In test 1 spontaneous reaction to 800 µl urine samples collected in oestrus vs dioestrus and spilled on a spot in open grass field or as diverging traces, whereas in test 2 spontaneous reaction to oestrus vs dioestrus samples placed in an artificial vaginas of two phantoms, were recorded. Test 3 involved trained indication in the scent lineup of 5 samples, one of which being oestrus sample and using 3 dogs that prior to the tests with urine, have been trained in the lineup. In the test 1 male dogs showed a very weak reaction towards the urine samples and could not differentiate oestrus vs dioestrus samples. In the test 2 the dogs sniffed oestrus urine samples twice longer than non-oestrus ones ($P = 0.01$), accompanied by licking and salivation. Some dogs marked phantoms with own urine. Dogs' interest in phantoms decreased is consecutive tests. In the test 3 the trained dogs indicated correctly the oestrus urine with 65% accuracy at 20% probability of correct by chance and with 97% accuracy at 50% probability of correct by chance, independently of the number of trials. Longer sniffing of oestrus urine samples in the lineup was observed only during the first trial of the test. Scent lineup using trained dogs was considered the most suitable for detection and differentiation of oestrus odors when more urine samples are tested, however, no full behavioral repertoire seems to be a weak point of this method.

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Efficiency of the GnRH analog – desrolerin (Suprelorin, Virbac) in treatment of aggressive behavior resistant for behavioral treatment – a case report

Aggressive behaviors especially directed against the human being are one of the most important behavioral disorders reported in dogs. Because of possible consequences both for the owners and the dog the fast and effective help is strongly required.

The report presents the case of 6 month old cocker spaniel mix male, named Max. Max was adopted in the age of 8 weeks was. He lived in apartament with two owners. When he was 5 months old he started to show possessive type of aggression by defending shoes in the hallway which was expressed by barking, growling, but he didn't bite. Owners at first ignored this behavior, until the first accident of biting the owner during attempt of shoes taking. (a single but strong bite, lvl 4. in Dr. Ian Dunbar's Dog Bite Scale).

Analysis of living conditions and behavioral needs of the male showed satisfactory environmental conditions. He had 3–4 walks during the day at least 1hour long, he attended positive training sessions in dogs school where he played with other dogs. He knew basic commands and he loved to play and work with his owners. He accepted and liked being touched. He had no problems with sharing his own toys with owners.

Clinical examination showed minor conjunctivitis and enteritis. After NSAID treatment and dietary management conjunctivitis and enteritis passed, there were no differences in dog's behavior during the treatment. After the consultation owners in accordance with the recommendations established kennel training, standardized expectations for Max behavior in order to be more consistent in their relations. Max had to do more nosework in home and at the walks, owners practiced commends for at least two 20-minutes sessions daily. When Max started to possess any objects owners called him from the hallway, started short positive training session and then tried to calm the dog down in kennel with toy. All objects defended by the dog in the past were hidden. During three weeks after the consultation dog behavior worsened. He started to defend doors, couch and all objects which he found on the floor. At that time the dog's owner was attacked twice. Dog's behavior was changing randomly during the day from normal to very aggressive. Ordered blood examination showed leukocytosis, normal levels of thyroid hormones, cortisol and cholesterol, but level of testosterone was significantly raised. After recommended chemical castration with the use of deslorelin (GnRH analog, Suprerolin®, Virbac, France). During the week all aggressive behavior disappeared without further behavioral modifications.

The use of chemical spaying as a effective, safe and reversible method could be recommended in the dogs expressing aggressive behavior resistant for behavioral modification and could help the owner to take decision about need of surgical spaying and its efficiency in reducing aggressive behaviors.

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Assessment of estrus behavior using thermography in *Chinchilla lanigera*

Introduction and purpose of the work. Thermography is one of the most modern non-invasive assessments method of animal behavior, health status or physiological state monitoring. This technology is increasingly used in livestock herds, among others, to diagnose inflammatory conditions of the mammary gland, vulva, hoof, detecting estrus and for determining the thermal comfort of animals in the environment (hypo or hyperthermia). A small number of scientific reports related to this subject in fur animals have prompted the use of thermography in chinchilla lanigera. The species specificity and difficulties in correctly diagnosing cause many problems for veterinarians, hobbists and fur farmers. It is well known that the most commonly used areas for detecting body surface temperature are ears, eyes, external genitals and other areas without fur. The purpose of the study was to evaluate the use of a thermal imaging camera to diagnose estrus and estrus behavior in chinchilla lanigera.

Materials and methods. The observations included 100 female chinchillas of 3 different breeds. For the study, chinchillas were selected in ovulation after parturition, which was evaluated twice: measurements were taken for 3 consecutive days started from the 2nd day post partus and through the same time 6 weeks later when they were ready to fertilization. Control group consisted of non pregnant or pregnant chinchillas. A picture of the external genitals area was taken with the FLIR C2 thermal imaging camera and the surface temperature was measured using the RayTemp pyrometer. The body surface temperature was read from the selected area of thermograms using the FLIR TOOLS computer program. All pictures were taken without touching the genitals and from the same distance to animals. The current clinical status of the animals and their behavior that may indicate estrus were always noted. The collected materials were statistically calculated.

Results. The average temperature of the external genitals measured by the infrared camera in all females was 33.98°C (± 1.4). In females which did not show signs of ovulation, the temperature of the vulva oscillated around 33.60°C (± 1.8), while in females which showed signs of estrus was significantly higher 35.91°C (± 0.38). There is no compatibility between temperature measurement using a pyrometer and a thermography.

Summary. During chinchilla's estrus, the temperature of the external genitals area is clearly increasing, which may be due to genital hyperemia. This fact can be used for non-invasive diagnosis of estrus, which is especially important because of the absence of typical estrus behavior in this species. Monitoring the higher surface temperature of the vulva area allows to determine the optimal date to connect a female with a male and expect effective fertilization.

Literature

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Composition of the bitches urine during various periods of ovarian cycle in female of domestic dogs (*Canis familiaris*) in the context of canine sex pheromone identification

In the process of semiochemical communication in the context of sexual behavior the urine seems to play an important role as a medium useful in marking territory and luring the males. Since many reports undermines the meaning of methyl paraben as a sex pheromones in dogs, the aim of this study was to evaluate changes in composition of the urine in female dog (*Canis familiaris*) during the different phases of ovarian cycle.

One hundred twenty urine samples collected from the various females during the particular phases of ovarian cycle were evaluated with the HS-SPME/GC-MS technique. The phase of the cycle was monitored by evaluation of clinical symptoms as well as by vaginal cytology and hormones level measurement. The results showed significant differences between samples collected during particular phases of ovarian cycle. About thirty compounds were identified in urine samples. Several differences in chemical profile of volatile compounds as affected by ovarian cycle were noticed. Unequivocally, the level of carbonyl aromatic compounds, such as acetophenone (hypnone) and benzaldehyde increased in the oestrus cycle. It was accompanied by rising the methylketones, e.g. butanone, 2-pentanone, 3-hexanone. Simultaneously the sulfide compounds: 1-methylotiopropane; 1-methylotiobutane, 1-methylotipentae or dimethyl trisulphide significantly statistically decreased in period of oestrus and raised in dioestrus. This observation suggest possible dual character of mechanism of interaction between males and females during mating period including both luring but maybe also repellent signal existence. Contrary to Goodwin et al. (1979) observation in accordance with our earlier studies (Dzięcioł et al. 2014), no parabens were found in examined samples. The further study including the behavioral tests are indicated to verify semiochemical activities of identified substances and genuineness of thesis about luring/repeling mechanism involved in mating behavior in dogs.

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