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The Occurrence of Behavioural Problems in Re-Homed Dogs with Unknown Backgrounds

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1. INTRODUCTION AND SURVEY OF LITERATURE.....	4
1.1 Dog behaviour in society.....	4
1.2 Homeless dogs pre-adoption.....	6
1.3 Homeless dogs post-adoption.....	8
1.4 Summary of problematic areas related to the study of behaviour problems in dogs with unknown backgrounds.....	9
1.4.1 Separation anxiety.....	10
1.4.2 Protection of high-value resources.....	10
1.4.3 Urination/defecation.....	11
1.4.4 Canine aggression.....	11
1.4.4.1 Leash-aggression.....	14
1.4.4.2 Dog-dog aggression.....	14
1.4.4.3 Dog-human aggression.....	16
1.4.5 Escalated fear/nervousness.....	17
2. METHODS AND MATERIALS.....	19
2.1 Methods.....	19
2.2 Subjects and Materials.....	21
2.3 Questionnaire.....	21
3. RESULTS.....	23
3.1 Separation anxiety results.....	23
3.2 Protection of high value resource results.....	23
3.3 Urination/defecation results.....	23
3.4 Leash-aggression results.....	23
3.5 Dog-dog aggression results.....	24
3.6 Dog-human aggression results.....	24
3.6.1 Displays of aggression towards humans results.....	24
3.6.2 Bite statistics results.....	24
3.7 Escalated fear/nervousness results.....	24
3.8 Owner satisfaction results.....	24
4. DISCUSSION.....	26
5. SUMMARY.....	30
6. ACKNOWLEDGEMENTS.....	31
7. DECLARATION OF THE THESIS.....	32
8. BIBLIOGRAPHY.....	33

LIST OF TABLES

Table 1. Percentage of dogs relinquished due to behavioural problems.....	7
Table 2. Functional classification of aggressive behaviour.....	12
Table 3. Summary of aggression types	14
Table 4. Spectrum of fears	18
Table 5. Problem behaviour and their owners reply in percentage	25

1. INTRODUCTION AND SURVEY OF LITERATURE

1.1 Dog behaviour in society

Researchers studying temperament in dogs come from various backgrounds and they bring differing perspectives to a broad range of publications (JONES-GOSLING, 2005). In the study of this thesis I aim to discover whether there is an occurrence of certain problem behaviours in dogs re-homed from a rescue organization with backgrounds that are unfamiliar as regards the animals breeding, environment, upbringing and prior experiences.

The focus on behaviour problems in dogs is increasing, a possible reason being that there is an increase in the companion animal population and dogs are being kept as pets, not merely for practical reasons such as for example hunting, guarding or sledding and the relationships between dogs and owners have become stronger and more personal (TUBER et al., 1996). There are a variety of groups interested in the temperament of dogs ranging from private owners to breeders and animal research scientists for reasons varying from matching dogs to appropriate homes to understanding basic theoretical issues in animal behaviour (JONES-GOSLING, 2005). In the last decade advance in science and in particular in molecular biology and genomics has raised the hope that soon basic discoveries would be applicable in practice (VAGE et al., 2010). As a result, the fields of canine behavioural and training studies have become more popular. Additionally prominent television shows are being screened internationally, featuring dog training and rehabilitation such as "The Dog Whisperer" from the United States and "It's me or the Dog" from the United Kingdom, adding to the awareness of and interest in behavioural amendment in dogs.

The popularity of dogs as companions also brings with it a negative aspect namely the homeless dog populations. Many human-canine relationships are short-lived and according to Marston et al. (2005) the average age of dogs relinquished to shelters for adoption is 1.2 years of age, which is poor considering a dogs longevity of 10-12 years. Many European countries such as Hungary with an estimated 100-200 thousand stray and homeless dogs are having to implement rulings such as limiting the amount of dogs per household and more importantly compulsory chipping of each individual in order to try to keep the stray and homeless population down. (*The 41/2010. (II. 16.) Regulation on minimal housing area for dogs depending on their size, local ordinance regulates number/household.*)

Thus, dogs, via shelters and organizations both private and governmental, are being attempted re-homed with or without the behavioural issues they carry with them.

At present, in shelter and street dogs, it is not feasible to assess the genetic make-up predisposing the individuals for any problem behaviour or to determine the kind of early learning or environmental experiences the dogs have had. The success of re-homing these dogs is only based on knowledge acquired after the dog has been rescued. According to Marston et al. (2005), relinquished dogs are assessed for re-homing when they enter a shelter, those failing to meet behavioural requirements are euthanized and those that remain are made available for adoption. It is therefore of interest to assess the occurrence of common behavioural problems in re-homed dogs with unknown early experiences. More importantly, if any link could be found between behaviour in the shelter and behaviour following adoption a better match between individual adoptees and new owners could be made.

The basis for this thesis is a survey of common issues regarding canine behaviour. The assessed areas in the survey are based on my experience with the rehabilitation and re-homing of dogs with unfamiliar backgrounds. Over a period of 4 years I ran a dog rescue organization in Hungary (Budadogs Dog Rescue kft. 2008-2012). My organisation re-homed a total of 450 stray Hungarian dogs and I was personally responsible for each re-homing. The dogs came to the organisation either from other Hungarian organisations, from shelters and killing stations or they were directly picked up from the streets, both in Budapest and rural areas. The dogs went through extensive evaluation and rehabilitation and I found during this process that certain problematic issues related to behaviour were seen to repeat themselves before the dog was re-homed. The issues were as follows:

- Separation anxiety
- Protection of high-value resource
- Urination/defecation
- Leash aggression
- Dog-dog aggression
- Dog-human aggression
- Escalated fear/nervousness
- Interaction with children
- General owner satisfaction.

1.2 Homeless dogs – pre-adoption

The relationship between dogs and humans is a positive and heart-warming one, however many dogs are admitted each year to shelters and organisations as relinquishments or strays.

According to Marston et al. (2004) dogs enter shelters via two routes primarily which are either as relinquished by owners who no longer are able to or willing to care for them, or as strays brought in by members of the public or animal management officers. In order for these dogs to successfully be re-homed it is important, when possible, to gain knowledge about the reasons for their relinquishment. Overall, dogs acquired as strays or bought from pet stores or rescue shelters are more likely to exhibit problematic behaviours than dogs acquired from friends, relatives, breeders or bred at home (WELLS-HEPPER, 2000).

The reasons for companion dogs becoming homeless are many and complex. In my experience, too many owners acquire dogs based on their exterior traits and have not sufficiently reflected on and studied the breed variations in *behaviour* and whether or not a dog will adequately and comfortably fit into their lifestyle based on the dogs breed-specific dispositions, uses and needs. There are great breed variations in the behavioural patterns and needs, and a dog-breed that fits like a glove into one household might be a disaster in another. Impulse acquisition, casual attitude of owner and general containment problems are all other plausible causes, although some owners might find it hard to admit to their actual reasons for wanting to give up their pet and might possibly state reasons that are not the absolute truth due to embarrassment or not wanting to admit to their own lacking as pet owner (MARSTON et al., 2004). Additionally, Marston et al. (2004) found that even in the case of relinquishment, where they were able to discuss with the owners their reasons for giving up their pet, shelter staff often lacked the time or did not have sufficient knowledge to ask the right questions. Thus, intake documents allow only for limited recordings of the reasons for owners giving up their pet. Consequently, existing research probably underestimates the complexity of the owner situation and the reliability of their answers.

In a U.S. study based on 38 interviews of people who gave up their dogs it was reported that the most common reason for relinquishment was canine behaviour problems. This was followed by medical and accommodation reasons. The behavioural problems that were frequently cited were hyperactivity, inappropriate chewing, elimination and vocalization (MARSTON et al., 2004).

Marston et al. (2004) report in their research on Australian shelter dogs that 40.42% of dogs left in shelters were due to owner accommodation and moving, with behavioural issues accounting only for 11% of the cases. As far as the type of behaviour which were considered reasons for giving up their pets the three most common reasons reported were: escaping (24.26%), too boisterous/hyperactive behaviour (20.41%) and barking (10.36%). The other reasons were much less frequent. 3.2% of the dogs were relinquished for aggression, half of which had bitten a human and 20% of these displayed severe dog-dog aggression. Almost 8% of the dogs were relinquished for owner-requested euthanasia. Out of these, 9.57% were requested euthanized for behavioural reasons, 20.14% for temperament reasons and 24.14% being for aggression. Other issues were canine health (34.54%) and breed (Pit Bull Terrier) (5.53%). Of the *behavioural* reasons for requesting euthanasia the most frequent problems were: Hyperactivity (34.48%), Escaping (16.38%), won't walk on lead easily (14.87%) and barking (7.54%).

In their research on the prevalence of behavioural problems in dogs purchased from animal shelters in Belfast, Northern Ireland, Wells & Hepper (1996) state that over 30% of dogs relinquished by their owners to rescue shelters are abandoned because of behaviour problems.

Table 1. *Percentage of dogs relinquished due to behavioural problems:*

Survey area:	Percentage (%)
United States	38%
Australia	11%
Northern Ireland	>30%

In addition to the aforementioned reasons for owners giving up pets to shelters, homeless dogs are also often found and brought to shelters and organisations as a result of straying. Patronek et al. (1996) found that shelter dogs were likely to be sexually intact. Over the last 15 years, community education and intensive programs have focused on reduced-cost de-sexing, reducing registration fees for de-sexed animals and the automatic de-sexing of all shelter stock. These measures have reduced the number of dogs admitted to U.S. shelters by 40% from 1985 to 1994 (MARSTON et al., 2004).

These numbers clearly tell us that the uncontrolled reproduction of stray and domestic dogs is a large reason for the homeless dog population.

Another interesting aspect to consider when evaluating the behaviour of dogs re-homed from shelters and organisations/institutions is the effect that the change in environment has on the dogs behavioural patterns before adoption. In 2000 Wells & Hepper's study on the behaviour of shelter dogs in response to environmental change give suggestions about these behavioural patterns and subsequent change based on changes in environmental stimulation. 120 dogs were studied over a period of 4 hours and they evaluated behaviours such as positioning in a cage, vocalization and level of activity. Social stimulation was found to have positive effect on the behaviour of sheltered dogs. Increased social contact encouraged the dogs to spend more time standing at the front of the pen thus facilitating dog-human interactions. From a welfare point of view such change in behaviour was considered largely advantageous by the authors. Providing sheltered dogs with increased social contacts may help the animal to gain more control over its environment, thereby decreasing the chances of the individual failing to cope with the pressures of confinement (WELLS – HEPPER, 2000).

1.3 Homeless dogs – post adoption

Not only is it important to know what the reason for the relinquishment of dogs are and their subsequent homelessness, but it is equally important to know what behavioural issues prevail once the animal has been adopted and whether these issues are problematic for the owner. This is significant in order for us to understand when a re-homing is, and is not, successful and the basis for this thesis. It is important to map out which behaviours are problematic, which behaviours subside and which behaviours prevail and sustain for longer periods of time.

Once a dog is re-homed to the most suitable owner there is always the risk of a post adoptive return. In my experience the behavioural problems reported by owners are subjective and what is reported as a problem for one owner might be considered endearing to another (begging at the table, accessing couches and beds etc). Marston et al. (2004) found in their study that 7.22% of adopted dogs were returned post adoption and 22% of these were for behaviour problems. Other reasons for post adoptive returns were “(a) 26.4% owner related factors such as a move from the house or inappropriate selection; 22.3% for dog-related factors such as size and health; and 12.9% because of problems with an existing pet.

In their study on the prevalence of behavioural problems reported by owners of dogs purchased from animal rescue shelters in Northern Ireland, Wells & Hepper (2000) asked 556 owners to fill out questionnaires regarding their dogs behaviour within 4 weeks post adoption. 68.3% of the owners reported that their dogs had exhibited an undesirable behaviour within the first month. Out of the behavioural problems experienced, the four most prevalent undesired behaviours were fearfullness (53.4%), excessive activity (37.4%), destructiveness (24.5%) and inappropriate elimination (21.3%). The other problem behaviours listed were straying, coprophagy, excessive barking, aggression towards other dogs, aggression towards humans and sexual problems. Additionally, the study showed that 89.7% returned their dog to the shelter due to the unwanted behaviour. The type of behaviour problem exhibited by the dogs was significantly associated with whether or not the animal was returned to the shelter. Of those dogs, which exhibited aggression towards humans, 30% were returned to the shelter. A lower proportion of dogs which exhibited aggression towards other dogs (15.6%), sexual problems (14.4%), straying tendencies (13%), excessive activity (10.9%), excessive barking (10.5%), destructiveness (8.8%), fearfulness (7.3%), coprophagy (6.1%) or inappropriate elimination (5.2%) were returned to the shelter. There was no significant association between the number of behaviour problems shown by the dogs and whether they were returned to the shelter (WELLS – HEPPER, 2000).

Although significant, this research was done on dogs 4 weeks post adoption, which in my opinion is a period of transition that may not necessarily reflect the behavioural issues that manifest themselves in re-homed dogs long term. Many of the behaviour problems stated in this research are arguably transient and due to the stress of environmental change. The findings of Wells & Hepper do not reflect on long standing problematic behaviours, and thus it is of interest to survey the potential behaviour problems experienced in dogs who have lived in their home for a longer period of time.

1.4 Summary of problematic areas related to the study of behaviour problems in dogs with unknown backgrounds.

There are a multitude of undesirable behaviours that a dog might exhibit post adoption. In the study of this thesis the aim is to discover whether there are certain problem areas that sustain after long-term adoption when the dog has been in its new environment for at least one year, and whether this has an effect on the owners satisfaction.

1.4.1 Separation anxiety

The term `separation anxiety` was introduced into human psychology as the "fear and apprehension caused by separation from familiar surroundings and significant people" (MEDICAL DICTIONARY, 2007). In general, separation anxiety is caused by the separation from the caregiver, usually the mother, during a sensitive period. Abnormal socialisation can result in insecure attachment having a long-term effect in the form of anxiety disorders (MURIUS et al., 2000). According to Lem (2000), separation anxiety in dogs is a common behavioral problem and it is estimated to comprise 20% to 40% of the average behavioral consultants caseload. Separation anxiety is most frequently observed when a dog is left on its own by its companions and the most common involved behaviours reported are elimination, destruction and vocalization (OVERALL, 1991).

The psychological response of anxiety due to separation is a panic response, similar to human panic attacks. The event inducing and episode of separation anxiety most likely does not lead to worsening of anxiety itself, but rather the memory of how the individual felt during an earlier separation triggers and reinforces the response (LEM, 2002). Dogs acquired from rescue shelters are particularly prone to separation-related problems and separation anxiety is believed to be due to the breakdown in a dogs social ties to its previous owners followed by the development of an overly close attachment to the subsequent owner (WELLS - HEPPER, 2000).

1.4.2 Protection of high-value resources

Protection of high value resources is a type of guarding where the dog has an inclination to protect and hold onto specific resources it finds to be of value. The type of guarding can vary from the dog removing itself with the object to what it regards as a "safe place", to growling, barking, snapping, lunging, biting or attacking. The guarding of food, coveted objects, mates and physical space are considered adaptive traits in the natural environment. However, in a domestic environment it is undesired and can result in bites to family member leading to owner relinquishment (DONALDSON, 2002).

In a study of bites to children by Reisner et al. (2007) 111 bite records were examined. Children below the age of 6 years old were most commonly bitten in association with resource guarding (44%), older children were most commonly bitten in association with territory guarding (23%). Familiar children were most commonly bitten in association with

food guarding (42%) and unfamiliar children were most commonly bitten in association with territory guarding (53%).

In re-homed dogs that might possibly have been deprived of resources earlier in their lives, it is interesting to evaluate whether there is an occurrence of the prevalence of resource protection and guarding.

1.4.3 Urination and defecation in the home

Reasons for urination and defecation in the house may be plenty and include, but are not exclusively: insufficient house training, urinating to show submission (to another animal or to a human), excitable loss of bladder control, urinating or defecating when afraid/anxious, marking of territory, separation anxiety or due to stress related polydipsia. According to Shull (2011) house soiling is common and affects up to 37% of dogs diagnosed with problems of behaviour. It is more common in male unneutered dogs, but can also occur in neutered pets (PETMD, 1999). Castration improves urine marking in 70% of intact male dogs, and spaying usually resolves heat-related marking in females (SHULL, 2011).

Urination accompanied by submissive behaviour is known as «submissive urination» and is in my experience frequently encountered among re-homed homeless dogs. The underlying cause for this submissive behaviour is fear and it has a number of triggers such as approaching people, punishment, scolding and deep, fear inducing voices (Kuo et al. 2005).

Although some causes for urination/defecation indoors might be easy to solve, such as lack of house training or territorial marking behaviour by intact males and females which will most likely subside with neutralization, other more complex underlying causes such as fear and anxiety related urination are more problematic and need assessment of the core reason rather than treatment of the undesired elimination itself.

1.4.4 Canine Aggression

Aggression, in its broadest sense is a behaviour or a disposition which is hostile, forceful and attacking. It can occur as retaliation for a countering behaviour or without provocation. “In narrower definitions that are used in social sciences and behavioral sciences, aggression is an intention to cause harm or an act intended to increase relative social dominance.” (WIKIPEDIA, 2013.)

Aggression in dogs is a serious and multi-factorial issue. Although some types of aggression are desirable, such as dogs trained for military and law enforcement purposes, most types of aggression within the household are not desired by the owner and regarded as problematic. According to Bodnariu et al. (2007) statistical data reveal that dog aggression is the main behavioural problem that can lead to relinquishment or euthanasia. Aggression can include a variety of behaviours such as simple threats in body language, facial expression and vocalization to overt attacks. The functional classification of aggression is summarized in table 2.

Table 2. *Functional classification of aggressive behaviour:*

Category	Description	Notes
Maternal aggression	The bitch protects puppies, or in the state of pseudocyesis objects, from people or other animals.	Depends on hormonal state.
Play aggression	Rough play, with actual growls instead of play sounds. Will grab hands, legs, and clothing with teeth.	Normal behavior in young dogs. Problematic if left to escalate.
Fear aggression	The dog looks for an escape route, and will become dangerous if cornered. Trembling before and after attacking human or animal recipient might be seen. Often runs away after the attack.	Inadequate socialization and inappropriate punishment are common causes.
Pain aggression	Handling by an individual which induces pain, or anticipation of pain, may elicit it. The dog does not necessarily try to escape.	Can lower the threshold for other aggression forms.
Territorial aggression	Protection of what the dog perceives as own property (i.e. family members, garden, car). Aggression is absent when the element is removed.	Intensifies as approach distance decreases.
Protective aggression	Protects people from other persons or animals, will try to cut off contact between person and the “threat”.	Similar to territorial aggression.
Intraspecies aggression/ social status aggression	Most commonly between dogs of same sex. Often connected to hierarchy, may be generalized or occur in specific situations. Onset is usually at social maturity (18-24 months of age). Neutering and spaying might reduce or eliminate the problem.	Influenced by endogenous hormones, but of a social type; also occurs in households with early neutered pets.

Redirected aggression	In response to a verbal or physical correction, or withhold of a desired object.	—
Food-related aggression	Aggression displayed if the dog is approached or observed while eating or having rawhide bones etc.	Often a precursor to, or part of, dominance aggression.
Possessive aggression	The dog will refuse to relinquish toys or objects. May present the object for play, and consequently growl or snap when being approached.	—
Predatory aggression	Tracking, stalking, chasing and general hunting behavior towards other animals, humans or moving objects. Patterns of high-pitched sounds, uncoordinated motion and sudden “freeze” of situations may provoke it. Predation is not preceded by threats, it represents a natural instinct.	Dangerous aggression form, especially if it occurs in a pack where it is reinforced by other members.
Dominance aggression	Multifactorial disorder. The dog will have difficulty with accepting corrections and disturbance. This form is influenced by social context, and can be subdivided into two groups; 1 – Dogs that control their environment due to certainty of their supremacy in the hierarchy 2- Dogs which are unsure of their social status, and will define their boundaries using the response to their aggression.	Can be said to be a “control complex”, including other types of aggression. The dog will become more aggressive if punished for the behavior.
Idiopathic aggression/“rage syndrome”	Atypical aggression form, where the causatives can not clearly be identified. Onset is sudden, and apparently unprovoked. The EEG pattern of these animals is described to resemble wild animals rather than domestic dogs.	Onset usually at 1-3 years of age.

(BENNECHE, 2012.)

In their study of the prevalence of behavioural problems in companion dogs Bodnariu et al. (2007) found that as far as what types of aggression towards family members were displayed, most dogs showed dominance aggression, followed by possessive aggression, fear aggression, pain aggression and maternal aggression, the summary of which is listed in table 3.

Table 3. *Summary of aggression types:*

Type of aggression	Percentage
Aggression towards family members	51 %
Aggression towards visitors	65 %
Aggression towards strangers	40 %
Aggression towards other dogs	76 %

1.4.4.1 Leash- aggression

The term, also called *leash-induced aggression*, is what is used by dog trainers and behaviourists to describe the actions of generally well behaved dogs who, when on-leash with their owners, behave aggressively at the sight of other dogs. According to trainers at 4Paws University (2012) the feeling of being trapped by a leash and forced in a closer encounter with another dog might go a way in describing the apprehension the dog feels towards a situation, which it might otherwise have chosen to keep a distance from. This kind of reaction also falls under the category of barrier frustration. Dogs housed in kennels may also exhibit a similar condition, termed "cage aggression." These dogs will throw themselves at the cage door, bark, and behave most aggressively until the barrier is removed and the behaviour subsides.

Leash-aggression can be described as a multi-factorial behaviour involving the excitement and curiosity of seeing another dog matched with the frustration and agitation at not being able to access the other dog or being restricted by the leash from using their natural body language. Actions include barking, lunging, snarling and showing teeth to the other dog. It is a behaviour that in my experience is often seen in homeless dogs that are leash-walked, arguably because they have not previously been used to walking on leash and have not yet acquired the skills for on-leash social conduct with other dogs.

1.4.4.2 Dog-dog aggression

Dog-dog aggression, also termed *inter-dog aggression*, is a phrase used to describe antipathy between canines. It is the intent of a dog to do harm to another with aggressive displays such as barking, growling, lunging or snapping, biting, attacking and even killing.

Sherman et al. (1996) of Cornell University's Behavioural center found that the primary complaint of owners who came to the center was inter-dog conflicts. Of the 99 cases of aggression, 73 were fight between dogs in the same household and 26 cases were of aggression directed at non-household dogs. The study also found that more female dogs initiated household aggression, whereas more males attacked non-household dogs. For household aggression, fights between same-sex pairs, especially females, were far more numerous than opposite-sex pairs. Of dogs that started household fights, 58% were younger and 59% arrived in the home more recently than the target dog. Household fights led to more injuries than fights started with outsiders. Fights occurring between female same-sex pairs were more severe than between males and females. The most frequent trigger for household fights was excitement.

The causes for dog-dog aggression can be many and vary. Often a dog can become overly aggressive due to negative and/or traumatic experiences with other dogs in its past or due to lack of early socialization. The aggression may be fear based, guarding and protecting or for medical reasons such as pain or medications. Selective breeding and genetics are also a factor. Dogs bred for fighting, such as pit bull terriers, tend to exhibit inter-dog aggression more frequently.

Roll & Unshelm (1997) studied conflicts amongst dogs and factors affecting them. Over a period of one year they studied 206 dogs and owners divided into two groups of attacked dogs and attacking dogs. Their results revealed that both victim and aggressor dogs showed regularities regarding breed, gender and fight process including factors such as housing conditions, criteria concerning owner selection of the dog and the type of dog training implemented. They also showed significant differences when comparing owners of attacked dogs and attacking dogs including gender, profession, age, attitude towards dogs, breed specific selection, training methods, purpose for keeping and previous dog-owning experiences. These finds are highly interesting as they go a long way to inform us about the reasons that dogs aggress towards conspecifics and the influence their owners behaviour potentially has on the situation(s).

1.4.4.3 Dog-human aggression

Aggression towards humans is probably the most serious problem behaviour encountered in the companion dog population. They can vary greatly in severity from nips of fear or dominance to fatalities. In a study of the Canadian dog population Raghavan (2008) found that 1-2 deaths per annum were caused by dog attacks, comparably to the annual average of 15 deaths per year in the United States. In her study, a systematic electronic search was done in Canada for the period of 1999-2007 where she identified a total of 28 dog-attack fatalities, 85.7% in which the victims were children under the age of 12 and 14.3% of the victims being adults. The youngest victim was 1 month old and the oldest was 45 years old.

According to Uchida et al. (1997), dominance aggression is the most common canine behaviour problem treated at veterinary clinics. According to their contention dogs, like wolves, are social and normally form dominance hierarchies that determine which animals has first access to food, resting places, and mates. Domestic dogs may perceive human family members as a pack, and view family dynamics hierarchically. In support of this contention, a spectrum of canine social signals, are displayed by dogs towards their owners, including aggressive communications, submissive gestures, and greeting and play signs. “A dominant aggressive dog may not be aggressive to all family members: dominant dogs typically show no aggression to a person who is clearly dominant or submissive into them. Aggression is expressed only to persons who confront or challenge the dog in some way (e.g., by hugging the dog, making direct eye contact, handling its mouth/feet/or neck, and/or having conflict over a resource such as food, a toy or a resting area.)” (UCHIDA et al., 1997)

Uchida et al. (1997) reviewed a total of 182 cases of animals seen at an animal behaviour clinic, of which 18.7% cases were diagnosed with dominance aggression after stating that their dog displayed aggression towards family members. Although an interesting finding, displays of aggression towards family members does not, in my opinion, on its own suffice as a diagnosis of dominance aggressive behaviour. Many other factors may play a role in such displays of aggression such as: methods of training and owner attitude (aversive training or violent displays such as shouting and swatting by the owner causing fear based aggression), resource guarding aggression and medical problems with pain involvement to name but a few.

1.4.5 Escalated fear/nervousness

Fear in a dog is defined as "a feeling of apprehension associated with the presence or proximity of an object, individual, social situation, or class of the above" (WILDE - 2006).

It is a multi-factorial problem in dogs that may manifest in a variety of ways, often in displays that we may consider as "aggressive", however the signs are often exhibited at a distance rather than in proximity to the trigger and the dog is conveying a motivation to increase the distance between itself and the feared subject/object.

According to Wilde (2006) anxieties, fears and phobias are all a part of the continuum referred to as "fear".

Anxiety differs from fear in that it does not depend on the presence of a specific fear-inducing trigger, but rather it deals with what *could* happen rather than what *is* happening. Anxiety is often the product of past, unpleasant experiences the animal has had.

Fear is equally a feeling of apprehension, however it is associated with the presence of an actual trigger rather than the mere anticipation of one. Some of the reactions are instinctive such as for example unfamiliar people and objects, others are learned such as for example the fear of a specific coloured item of clothing that a person might wear.

Phobia is at the high end of the scale and is a profound reaction of fear, which is not proportionate to the actual threat. The result might be panic attacks, dissociative behaviour and fleeing and the animal requires only one single exposure to induce a full reaction.

The emergence of phobias was extensively studied in rhesus monkeys. In one experiment monkeys were shown videos in which other monkeys exhibited or did not exhibit fear reaction to toy snakes or artificial flowers. Observers acquired a fear response to snakes only when they saw fear reaction to it in the video. Flowers on the other hand did not elicit fear even if associated with fearful behaviour of the other monkeys (COOKE - MINEKA, 1989.) This and a number of other studies indicate that animals have a genetic predisposition to quickly acquire fear of some objects or situations but not of others. (ÖHMAN - MINEKA, 2003.)

Although Wilde (2006) discusses phobia as an intense fear reaction (see Table 4) studies in other species suggest that phobias are qualitatively different as they emerge by a single trial imprinting like learning. The distinction is important not only theoretically but also in the practice of treating them.

Table 4: *Spectrum of fears:*

Fear:	Level:	Description:
Anxiety	Mild	Apprehension and anticipation of future danger regardless of presence of trigger.
Fear	Moderate	Apprehension associated with the presence of an actual trigger.
Phobia	Severe	Profound fear reaction, disproportionate to actual threat.

2. Methods and materials

2.1 Methods:

52 owners of rescue dogs that come from either shelters or directly from the streets were chosen to take part in the survey. Backgrounds of the animals were not known prior to rescue. The 52 dogs surveyed were selected randomly from a list of 200 individuals, which had all been in their new environment for a minimum of one year to avoid early settling-in issues, which may or may not be transient. The ages of the dogs ranged from 2-10 years old and the mean age of dogs surveyed was 3.5 years old. Each dog surveyed had been re-homed to suitable families and had lived in these families for a minimum of 1 year.

Prior to moving to the new home the dogs had lived in a foster home for a minimum of 4 months. These were home environments in Budapest, Hungary primarily with International Veterinary Students who kept the dogs as family pets and evaluated them in different situations during the time period. The foster carer was in frequent contact with the rescue organization and regularly filled out a questionnaire regarding the dogs temperament which included the following:

Dogs Patterns of reaction:

- To other dogs, females and males.
- To children.
- To cats.
- To other animal species in or outside the home, related to hunting instinct.
- Strangers in the home.
- Strangers outdoors.
- Loud noises.
- New situations.
- Doorbell.
- Time spent alone by the dog during the day, caged or free roaming.

Dogs Daily routines:

- Amount of walks per day including length.
- Loose or on leash, parks or woodlands.
- Any obedience training, if yes, what has the dog been taught.

Fostercarers opinion on type of future home the dog would fit into:

- With or without children.
- With or without other animals.
- Calm or active family.
- Calm or lively surroundings.
- Small family, large family, pensioners.
- House with garden or apartment.

The process of re-homing each of the dogs surveyed involved detailed communication between the rescue organization and the potential new owner. Each potential home was initially evaluated based on information they gave by the completion of a questionnaire.

Questions included:

- Name/Age/Living Area.
- Reason for wanting to adopt.
- If appropriate, reason for requesting a specific dog.
- Earlier experience with dogs.
- Current dogs in the household (breed, sex and age).
- Other animals in the home.
- Children in the home.
- Daily routine in the home.
- Breed and size requests and reasons.
- Details regarding the life they wished to offer a new dog.

The potential adopter was also requested to send pictures of their home environment both in and outdoors.

Following the completion and return of the questionnaire, the owners were matched with potential dogs. This was based on many factors of suitability. The dog type and temperament was often counter-matched with type and temperament of owner. For example, a highly-strung and nervous dog would be matched with a calm and relaxed owner. A calm and fearless dog would be matched with a highly-strung owner.

Dogs were also matched with owner based on owner knowledge. A dog with behavioural problems would be matched with an owner with prior experience in dog handling. A novice owner would be matched with a calm and fearless dog, which was easy to handle.

Certain traits between dog and owner would be matched, for example an active dog in need of physical stimulation would be matched with an active owner. A sedentary dog would be matched with a sedentary owner.

2.2 Subjects and Materials

The survey was completed online at freeonlinesurveys.com and was kept open over a period of 30 days before the results were compiled. 52 owners and dogs participated, all of which belonged to a pool of re-homed dogs via the organisation, Budadogs Dog Rescue kft. Each dog had lived in its new environment for a minimum of 1 year at the time of completing the questionnaire. The survey consisted of 7 segments and a total of 10 questions were asked on the areas of Separation anxiety, Resource holding potential, Urination/defecation, Leash aggression, dog-dog aggression, dog-human aggression, fear and nervousness and owner satisfaction.

2.3 Questionnaire:

The questions were as follows:

1. Separation anxiety.

1.1. Does the dog spend time alone?

Answer: yes/no

1.2. Does the dog have problems being left alone:

Answer: Yes /No

2. Protection of high value resource:

Does the dog protect its food, water, toys, bones or other items it considers high value:

Answer: Yes /No

3. Urination/defecation:

Does the dog urinate/defecate in the home:

Answer: Yes/No

4. Leash-aggression

Does the dog react negatively to other dogs on the leash?

Answer: Yes, always and it is a problem/Yes, initially but calms down, not a problem/No reaction

5. Dog-Dog aggression:

Does the dog react aggressively to other dogs? (lunging, snapping, growling, biting or other acts of hostility).

Answer: Yes, the dog can act aggressive towards other dogs/ No, the dog never acts aggressive towards other dogs

6. Dog-Human aggression:

6. 1. Can the dog react aggressive towards humans: (growling, lunging, snapping or other acts of hostility)

Answer: Yes, the dog can react aggressively towards humans/No, the dog is never aggressive towards humans

6.2. Has the dog ever bitten a human?

Answer: Yes/ No

7. Fear/Nervousness:

Does the dog have problems with escalated fear/nervousness:

Answer: Yes the dog has problems with escalated fear/nervousness/ No, the dog does not have problems with escalated fear/nervousness:

8. Owner satisfaction :

How satisfied are you with your dog with unknown background:

Answer: Dissatisfied/Very satisfied/Extremely satisfied.

3. Results

The following are the results of the survey. Each section contains the numerical finding in number and percentage.

3.1 Separation anxiety results

In reply to *does the dog spend time alone* and *does the dog have a problem being left alone*:

Of a total of 52, 48 owners (92.3%) replied that their dog spent time alone and 4 owners (7.7%) stated that their dog did not spend time alone.

Out of the 48 dogs (92.3%) that did spend time alone, 3 owners (6.2%) replied that their dog had problems being left alone and 45 owners (93.8%) stated that their dog did not have problems being left alone.

3.2. Protection of high value resource results

In answer to the question *Does the dog protect its food, water, toys, bones or other items it considers of high value*:

14 owners (26.9%) replied that their dog did display protective behaviour over things it considers high value and 38 owners (73.1%) replied that their dog did not display such behaviour.

3.3. Urination/defecation results

In response to the question *Does the dog urinate/defecate in the home*:

5 of the owners (9.6%) replied that their dog did urinate/defecate in their home while 47 owners (90.4%) replied that their animal did not.

3.4 Leash-aggression results

In response to the question *Does the dog react negatively to other dogs on the leash*:

8 of the owners (15.4%) replied that this always occurred and was a problem, 12 owners (23.1%) replied that it only occurred initially, that the dog calmed down and it was not a problem and 32 owners (61.6%) replied that negative on-leash behaviour was never a problem.

3.5. Dog-Dog aggression results

In reply to the question *Does the dog react aggressively to other dogs? (lunging, snapping, growling, biting or other acts of hostility):*

32 owners (61.4%) replied that yes, their dog did react aggressively to other dogs while 20 owners (38.5%) replied that their dog never acted aggressively to other dogs.

3.6. Dog-Human aggression results

3.6.1 Displays of aggression towards humans:

In response to the question *Can the dog react aggressively towards humans: (growling, lunging, snapping or other acts of hostility):*

17 owners (30.8%) responded that their dog can react aggressively towards humans while 35 owners (67.3%) replied that their dog never acted aggressively towards humans.

3.6.2. Bite statistics results

in response to the question *Has the dog ever bitten a human:*

4 owners (7.7%) replied that their dog had indeed bitten a human while 48 owners (92.3%) replied that their dog had never bitten a human.

3.7. Escalated Fear/Nervousness results

In response to the question *Does the dog have problems with escalated fear/nervousness:*

6 owners (11.5%) replied that their dog did have problems with escalated fear/nervousness, while 46 owners (88.4%) replied that their dog did not have problems with escalated fear/nervousness.

3.8. Owner satisfaction results

In response to the question *How satisfied are you with your dog with unknown background:*

1 owner (1.9%) replied that they were dissatisfied, 4 owners (7.7%) replied that they were very satisfied and 47 owners (90.4%) replied that they were extremely satisfied with their dog with unknown background.

Table 5. *Problem behaviour and their owners reply in percentage (%)*:

BEHAVIOUR	Percentage (%)	Percentage(%)
	Yes	No
How many dogs spent time alone	92.3%	7.7%
How many dogs had problems being left alone	6.2%	93.8%
How many dogs protected high value resources	26.9 %	73.1 %
How many dogs Urinated &/or defecated indoors	9.6%	90.4%
How many dogs showed signs of leash aggression	38.5% *	61.6%
How many dogs showed signs of dog-dog aggression	53.8%	38.5%
How many dogs showed signs of dog-human aggression	30.8%	67.3%
How many dogs had bitten a person	7.7%	92.3%
How many dogs showed scalated Fear/nervousness	11.5%	88.4%

15.4% stated leash aggression was always a problem 23.1% stated the dog was leash aggressive, but that it was not a problem.

4. DISCUSSION

The aim of this study was to collect data on the presence of certain behavioural issues in re-homed dogs with unknown backgrounds, which had lived in their new homes for more than one year. The study conducted confirms that there are in fact behavioural issues present in these dogs and furthermore the study suggests that certain behavioural problems are more prevalent than others. Finally, the study shows that the problems outlined here not necessarily indicate that the ownership of the dog is problematic. The findings are discussed in further detail in the following section.

The majority of the owners (94.2%) reported that they did not have a problem with *separation anxiety*. This is an important finding because an increasing number of families are combining ownership of a dog with full time work and other obligations. These are reliant on owning a dog that can stay at home without problems. If the dog cannot stay alone at home the situation can easily become unbearable for both dog and owner and might lead to relinquishment. In my experience the dogs ability to stay at home is a crucial factor in whether or not the adoption will be a success. Lems (2000) estimate that 20-40% of a behavioural consultants caseload is in fact dogs with separation issues supports this finding in that the problem of separation anxiety is definitely an issue for households with pet dogs. Further possibilities to map this problem are to find out what kind of amendments the owner has tried in order to teach the animal to be alone as some variants of training might go as far as making matters worse. Additionally one could survey whether or not the problem is more frequent in single dog than multiple dog households. In my experience adding a second dog to the household often resolves the issue.

Over a quarter of the owners (26.9%) replied that they had a problem with what they considered to be *protection of a high value resource*. In their study on dog bites to children Reisner et al. (2007) recorded that 44% of bites to children were due to resource guarding, which is a significant number and supports the results of this study and what definitely seems to be a problematic area. This finding is valuable information regarding our dogs, possibly the way they are kept in our homes, their position in the family and mistakes made in the household by owners regarding training. What is problematic about this kind of behaviour is that although the dog might initially only guard a few certain items it considers its own such as

his bed or toys, this might progress to a larger scale over time such as objects that are human resources (meals, sofa, beds etc) and additionally the behaviour can quite rapidly escalate from growling and aversion to lunges and bites. In my opinion, the popular notion of “teaching” a dog to give up items of value by forcefully removing them from the dog is partly to blame for this problem area and it would be of relevance to further study owners of dogs with resource guarding problems and their *approach* to the training of their dog. The study at hand is somewhat limited in this aspect as we do not know in exactly what situations that the dog is protecting resources and whether or not it is due to owner involvement and/or interference.

Only 9.6% of the owners reported that indoor *urination and/or defecation* was a problem. This is a relatively low number and is of great importance because a dog that is not sufficiently housetrained will in my experience easily be considered a nuisance and owner tolerance threshold for urination/defecation indoors, even accidents, are in my experience very low. Successful re-homing relies on a sufficiently house trained dog and with the prevalence of these problems it is important to map out the reasons for them.

In the area of *aggression*, three areas were surveyed; *on-leash aggression*, *dog-dog aggression* and *dog-human aggression*.

A significant amount of the owners (38.5%) reported some sort of issue with *on-leash* aggressive displays by their dogs. 15.4% of the owners reported a constant predicament which was judged problematic while 23.1% reported that their dog only initially displayed the unwanted behaviour and they did not consider it to be a problem. 61.5 % of owners reported no problem at all. Unfortunately no other studies on this behavioural pattern could be found, however as the results show it is definitely an area of concern. Why an owner may or may not consider the behaviour an issue might be based on the type of behavioural displays the dog has and their understanding of and for the situation (whether the dog is merely excited or seriously frustrated) and unfortunately my study tells us nothing about the details and acts of the displays. It would be beneficial to obtain more information about the behavioural patterns exhibited. Furthermore, data based on a comparative analysis to see in greater detail whether the problem is more prevalent in re-homed dogs than dogs who have been taught social on-leash canine-conduct from puppyhood would be of interest and would go a way in describing the *reason* for the behaviour and whether it has anything to do with learning to walk on-leash later in life.

A notable amount of owners (61.4%) reported that their dog displayed *dog-dog* or *inter-dog aggression*. Sherman et als (1996) finding that inter-dog conflict was the primary complaint of owners approaching the Cornell University Behaviour Centre supports this finding. On the question on *dog-human aggression* a notable amount (30.8%) replied that their dog could display aggressive behaviour towards people. This find is of utmost significance as displays of aggression towards humans is probably the most serious dog behavioural problem encountered. Unfortunately the survey tells us nothing about whether the aggressive displays are directed towards familiar or unfamiliar people. Of the owners who reported dog-human aggression by their dog, only 7.7% of the dogs had ever bitten a person. This might possibly give information about the underlying cause for the said aggressive tendencies. If a dog displays fear-based aggression it will do this in order to gain distance from the object or person, which causes the feelings of apprehension. If a dog bites, however, the behaviour has escalated to intent to cause harm. Further study on how this type of behaviour might have progressed *from apprehension and wish for distance to attacking and intent to harm* could be of value in order to map the cause and thus assist in training of such issues before they escalate.

To the question of whether or not their dog showed signs of *escalated fear/nervousness* in situations, only 11.5% of the owners replied that they did. This is a positive result and shows that the majority of the dogs were well sensitized to their new surroundings and environments in general.

Only one person (1.9%) reported being *dissatisfied* with their adoptive dog. 7.7% reported that they were *very satisfied* and 90.4% reported that they were *extremely satisfied*. The differentiation here has been made in order for the owner to be able to scale their level of satisfaction rather than merely stating yes or no. This way we can clarify whether the owner is simply relatively happy with their adoptive dog or whether they are, in fact, very happy with it. This result is important because it tells us something about the behavioural problems encountered. Even if over a quarter of the dogs display guarding resource tendencies, 38.5% of the dogs display leash-aggression, 53.8% show aggression towards dogs and 30.8% show aggression towards humans, the owners are still happy with the dog that they have obtained from a rescue organization and whos background they know nothing about.

Although this study goes some way in telling us about the occurrence of behavioural problems in dogs that are re-homed with unknown backgrounds, it has some limitations. It was not possible to trace down causality, i.e. reasons why certain behaviours occurred. However, the system developed for re-homing seems to be successful: keeping the dog in a family environment, making structured observations of the dog, getting information from potential owners and matching the information gained of the dogs with that of the owners, apparently result in a high satisfaction rate of the owners.

5. SUMMARY

The purpose of this study was to investigate the presence of certain behavioural issues in dogs with unknown backgrounds, which had lived in their new homes for more than one year. Another aim was to find out if there was an effect on the owners satisfaction with the dog.

52 owners of rescue dogs with unfamiliar backgrounds, selected randomly from a list of 200, were chosen to take part in an online survey with 10 questions on the areas of separation anxiety, indoor urination/defecation, guarding of high value resource, on-leash aggression, aggression towards dogs, aggression towards people, escalated fear/nervousness and owner satisfaction. Each dog had lived in its new home for a minimum of one year. The results of the survey were that 92.3% of the dogs spent time alone and 93.8% of these did not have any problems with being left alone. 26.9% of the dogs had problems with protection or guarding of a high value resource and 9.6% had problems with indoor urination/defecation. 15.4% always had a problem with on-leash aggression and the owner considered it a problem while 23.1% only had an initial problem with on-leash aggression and it was not a problem. 61.4% had problems with aggression directed towards other dogs and 30.8% had problems with aggression directed towards humans. Of the dogs that reacted aggressively towards humans, 7.7% of these dogs had ever bitten a human. 11.5% had problems with escalated fear/nervousness.

As regards owner satisfaction, 90.4% of owners were extremely satisfied with their dog, 7.7% were very satisfied and 1.9% was not satisfied with their dog.

The principal conclusion was that certain behavioural problem areas did in fact have an increased occurrence. Another conclusion was that the system developed for re-homing seemed to be successful and resulted in a high satisfaction rate of the owners.

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7. DECLARATION OF THE THESIS

I, Anouska Godtfredsen Andenaes, student of Veterinary Medicine, declare that my thesis entitled "**The occurrence of behavioural problems in re-homed dogs with unknown backgrounds**" is the result of my own work. I agree that - retaining the copyrights of the thesis- interested parties may use the printed version of my thesis in the Veterinary Science Library, Szent István University and its electronic version in the university's repository with the following conditions:

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8. BIBLIOGRAPHY

1. **BENNECHE, T:** The handling of dog aggression according to Norwegian law, 2012. SZIE-AOTK Intranet, Faculty of Veterinary medicine, Szent Istvan University.
2. **BODNARIU, A. DECUN, M. & FAUR, A.:** Prevalence of behaviour problems in dogs kept as companion animals. Scientific Work of Veterinary Medicine, 2007. XL, p. 2. URL: http://www.usab-tm.ro/vol7MV/1_vo17.pdf. Access date: 12.03.2013.
3. **BUDADOGS: Dog Rescue kft:** 2008-2012 URL: www.budadogs.no, www.budadognorge.com.
4. **COOKE, M. & MINEKA, S. :** Observational Conditioning of Fear to Fear-Relevant Versus Fear-Irrelevant Stimuli in Rhesus Monkeys. Journal of abnormal psychology, 1989. 98. 4. p. 448-459. URL:
<http://homepage.psy.utexas.edu/homepage/class/Psy394Q/Research%20Methods/Assigned%20readings/Experimental%20Research%20Paradigms/Cook%20&%20Mineka.pdf>. Access date: 17.03.2013.
5. **DONALDSON, J.:** Assessment and treatment of resource guarding. Association of Pet Dog Trainers Newsletter, 2002. URL: <http://4pawsu.com/Donaldson.pdf> Access date: 24.02.2013
6. **KUO , K., RATANAPREUKSUKUL, S., STRAND, K. & YUEN, C.:** Submissive and Excitement Urination in Dogs. School of Veterinary Medicine UC Davis, Clinical Animal Behavior Service, 2005. URL: http://behavior.vetmed.ucdavis.edu/local-assets/pdfs/Submissive_and_Excitement_Urination_in_Dogs.pdf. Access date: 16.03.2013.
7. **LEM, M.:** Behavior modification and pharmacotherapy for separation anxiety in a 2-year-old pointer cross. Canadian Veterinary Journal, 2002. 43. 3. p. 220-222. URL: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC339210/> Access date: 22.03.2013.
8. **MARSTON, L.C., BENNETT, P.C. & COLEMAN, G.J.:** Adopting shelter dogs: owner experience of the first month post-adoption. Anthrozoos: A Multidisciplinary Journal of The Interactions of People & Animals, 2005. 18. 4. p. 358-378.
9. **MARSTON, L.C., BENNETT, P.C. & COLEMAN, G.J.:** What Happens to Shelter Dogs? An Analysis of data 1 Year from three Australian Shelters. Journal of Applied Animal Welfare Science, 2004. 7. 1. p. 27-47.

10. MEDICAL DICTIONARY: Dorlands Medical Dictionary for Health consumers.

Esevier, inc., 2007. URL: URL: <http://medical-dictionary.thefreedictionary.com/separation+anxiety>. Access date: 22.03.2013.

11. MURIUS, P., MEESTER, C., MERCKELBACK, H. & HULSENBECK, P.:

Worry in children is related to perceived parental rearing and attachment. Behaviour research and therapy, 2000. 38. p. 487-497. URL: <http://arno.unimaas.nl/show.cgi?fid=2400>. Access date: 23.03.2013.

12. OHMAN, A. & MINEKA, S.: The Malicious Serpent: Snakes as a prototypical Stimulus for an Evolved Module of Fear. Current directions in psychological science, 2003. p. 5-9. URL:

<http://www.psych.utoronto.ca/users/peterson/psy334/Ohman%20A%20Malicious%20Serpent%20Current%20Directions%202003.pdf>. Access date: 17.03.2013.

13. OVERALL, K.L.: Clinical Behavioural Medicine. Pennsylvania: Voith & Brochelt , 1997. ISBN: 978-0801668203. p.216.

14. PETMD: House soiling (marking) by dogs. PetMD Maketing, PetMD Limited Liability Company, 1999-2013. URL: http://www.petmd.com/dog/conditions/behavioral/c_dg_house_soiling?page=show#.UUsqUqXbajI Access date: 22.03.2013.

15. PETMD: When your dog is overly aggressive towards other dogs. Pet MD Marketing, PetMD Limited Liability Company, 1999-2013. URL: http://www.petmd.com/dog/conditions/behavioral/c_dg_AggressionInterdog#.UUwVRKXbajI. Access date: 22.03.2013.

16. RAGHAVAN, M.: Fatal dog attacks in Canada, 1990-2007. Canadian Veterinary Journal, 2008. 49. 6. p. 577-581. URL:

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2387261/>. Access date: 20.03.2013.

17. REISENR, I.R., SHOFER, F.S. & NANCE, M.L.: Behavioral assessment of child-directed canine aggression, Injury Prevention Journal, 2007. 13. 5. p. 348–351. URL: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2610618/>. Access date: 29.03.2013.

18. ROLL, A. & UNSHELM, J.: Aggressive conflicts amongst dogs and factors affecting them. Applied animal behaviour science, 1997. 52. p. 229-242.

19. SHERMAN, C.K., REISNER, I.R., TALIAFERRO, L.A., HOUPP, K.A.: Characteristics, treatment, and outcome of 99 cases of aggression between dogs. Applied animal behaviour science, 1996. 47. 1-2. p. 91-108.

URL: <http://www.sciencedirect.com/science/article/pii/0168159195010130>. Access date: 29.03.2013.

- 20. SHULL, E.A.** Elimination Problems in Dogs, Elsevier Inc., 2011. p. 1-2. URL: <http://www.pmc-utah.com/sites/site-2751/documents/Elimination%20Problems%20in%20Dogs.pdf>. Access date: 22.03.2013.
- 21. TUBER, D.S., SANDERS, S., HENNESSY, M.B. & MILLER, J.A.**: Behavioral and glucocorticoid responses of adult domestic dogs (*Canis familiaris*) to companionship and social separation. *Journal of comparative Psychology*, 1996. 110. 1. p. 103-108.
- 22. UCHIDA, Y., DODMAN, N., DeNAPOLI, J. & ARONSON, L.**: Characterization and Treatment of 20 Canine Dominance Aggression Cases. *Journal of Veterinary Medical Science*, 1997. 59. 5. p. 397-399. URL: <http://www.ncbi.nlm.nih.gov/pubmed/9192364>. Access date: 17.03.2013.
- 23. VAGE, J., BONSDORFF, T.B., ARNET, E., TVERDAL, A. & LINGAAS, F.**: Differential gene expression in brain tissues of aggressive and non-aggressive dogs, 2010. *BMC Vet Res*. 6. 34. 1746-6148.
- 24. WELLS, D.L. & HEPPER, P.G.**: Prevalence of behaviour problems reported by owners of dogs purchased from an animal rescue shelter. *Applied animal behaviour science*, 2000. 69. p. 55-65.
- 25. WELLS, D.L. & HEPPER, P.G.**: The influence of environmental change on the behaviour of sheltered dogs. *Applied animal behaviour science*, 2000. 68. p. 151-162.
- 26. WILDE, N.**: Help for your fearful dog: a step-by-step guide to helping your dog conquer his fears, California: Phantom publishing, 2006. ISBN: 0.9667726-7-9. p. 3-6
- 27. 4PAWSU**: On Leash Aggression. 4 PAWS University and training center, 2012. URL: <http://www.4pawsu.com/onleashaggression.htm>. Access date: 23.03.2013.