



Estonian University of Life Sciences
Institute of Veterinary Medicine and Animal Sciences

Martta Erika Niittynen

**SURVEY OF WELFARE AND HOUSING OF FINNISH
PET RABBITS**

SOOME LEMMIKKÜÜLIKUTE HEAOLU JA
ELAMISTINGIMUSTE UURING

Graduation Thesis in Veterinary Medicine

Supervisors: Johanna Mäkitaipale DVM, GPCert(SAS)

Toomas Orro DVM, PhD

Tartu 2018

ABSTRACT

Estonian University of Life Sciences Kreutzwaldi 1, Tartu 51014		Abstract of Master's Thesis	
Author: Martta Erika Niittynen		Curriculum: Veterinary Medicine	
Title: Survey of welfare and housing of Finnish pet rabbits			
Pages: 47	Figures: 2	Tables: 7	Appendices: 2
Department / Chair: Chair of Clinical Veterinary Medicine			
Field of research and (CERC S) code: 3. Health, 3.2. Veterinary Medicine B750 Veterinary medicine, surgery, physiology, pathology, clinical studies			
Supervisors: Johanna Mäkitaipale, Toomas Orro			
Place and date: Tartu 2018			
<p>Summary: Rabbits are common pets in many European countries, but there are not many surveys conducted about their housing and welfare. In Finland, rabbits are increasing in popularity as pets. However, the country legislation regarding the housing and welfare offers only minimum standards and the knowledge of the owners may be inadequate to provide their pet rabbits a good quality of life. The aim of this study was to find out the structure of Finnish pet rabbit population (age, breed, neutering status), their housing conditions, basic care and handling, behaviour, and diet of rabbits. Finnish pet rabbits seem to live in cages that are suitable for rabbits when comparing to common guidelines and legislation. Owners seem to be well aware of the dietary requirements of rabbits and only a minority of owners were feeding muesli or pellets <i>ad libitum</i>. Hay was always available in most cases, which indicates that owners understand the importance of hay in a rabbit's diet. Most of the rabbits were living with a companion rabbit, but 31.9% were living alone. The lack of hiding places in a cage, neutering and sex (females > males) seemed to have an association to aggressive behaviour of rabbits. The higher number of rabbits in a household had an association to lower aggressiveness. Most of the owners did spend time with their rabbit daily, but the hours spent with the animal per day was higher during the weekends. The majority of the rabbits had a chance to move freely outside the cage every day, with the average time being 12.3 hours per day.</p>			
Keywords: rabbit, companionship, behaviour, diet, welfare			

LÜHIKOKKUVÕTE

Eesti Maaülikool Kreutzwaldi 1, Tartu 51014		Magistritöö lühikokkuvõte	
Autor: Martta Erika Niittyne		Õppekava: Veterinaarmeditsiin	
Pealkiri: Soome lemmikküülikute heaolu ja elamistingimuste uuring			
Lehekülgi: 47	Jooniseid: 2	Tabeleid: 7	Lisaid: 2
Osakond / Õppetool: Kliinilise Veterinaarmeditsiini õppetool			
ETIS-e teadusvaldkond ja CERC S-i kood: 3. Terviseuuringud, 3.2 veterinaarmeditsiin B750 Veterinaarmeditsiin, kirurgia, füsioloogia, patoloogia, kliinilised uuringud			
Juhendaja(d): Johanna Mäkitaipale, Toomas Orro			
Kaitsmiskoht ja -aasta: Tartu 2018			
<p>Kokkuvõte: Küülikud on populaarsed lemmikloomad paljudes Euroopa riikides, kuid nende heaolu ja pidamisviiside kohta ei ole tehtud palju uuringuid. Soomes on populaarne kasvatada küülikuid, kuid endiselt on riigi õigusaktid ebapiisavad ja omanike teadmised võivad olla puudulikud tagamaks küüliku heaolu. Uuringu eesmärk oli välja selgitada Soome lemmikküülikute populatsiooni struktuur (vanus, tõug, kastreerimine/steriliseerimine), pidamistingimused, põhiline hooldus ning käsitlemine, käitumine ja toitumine. Soome lemmikküülikud elavad puurides, mis sobivad küülikutele, põhinedes ühiste soovitustele ja õigusaktidele. Näitab, et omanikud on hästi kursis küülikute toitumisvajadustega ja ainult vähesed omanikud söödavad neile müslit või graanuleid <i>ad libitum</i>. Enamasti oli hein alati saadaval, mis näitab, et omanikud mõistavad heina tähtsust küüliku toidus. Enamik küülikutest elas koos teise küülikuga, kuid 31,9% elas üksinda. Peitumiskoha puudumine puuris, kastreerimine ja sugu (emased > isased) olid tegurid, mis suurendasid küülikute agressiivset käitumist. Suurem küülikute arv perekonnas oli seotud vähenenud agressiivse käitumisega. Enamik omanikke veetis oma küülikutega igapäevaselt aega, kuid loomaga päevas veedetavate tundide arv oli nädalavahetustel suurem. Enamikel küülikutel oli võimalus vabalt liikuda väljaspool puuri iga päev. Keskmiselt veetsid kuulid aega väljaspool puuri 12,3 tundi päevas.</p>			
Märksõnad: Küülik, kaaslane, käitumine, toitumine, heaolu			

TABLE OF CONTENTS:

1. INTRODUCTION.....	2
2. ACKNOWLEDGEMENTS	3
3. LITERATURE REVIEW.....	4
3.1. Rabbit as a pet.....	4
3.2. Purchase of pet rabbits.....	5
3.3. Housing.....	5
3.4. Diet	6
3.5. Handling	8
3.6. Companionship	9
3.7. Veterinary care	9
3.8. Behaviour.....	10
4. AIMS OF THE STUDY	12
5. MATERIALS AND METHODS	13
5.1. Questionnaire	13
5.2. Data handling.....	13
5.3. Staistical analysis	14
6. RESULTS.....	15
6.1. Respondents.....	15
6.2. Rabbits	15
6.3. Housing.....	17
6.4. Diet	17
6.5. Handling and basic care.....	20
6.6. Companionship	22
6.7. Behaviour.....	22
6.7.1. Aggressiveness and related factors	23
7. DISCUSSION	25
8. CONCLUSIONS.....	28
SUMMARY	29
REFERENCES.....	30
ÜLDKOKKUVÕTE.....	33
APPENDICES.....	34

1. INTRODUCTION

This was a descriptive study about pet rabbit population in Finland. There are over 30 000 households with at least one pet rabbit in Finland (Tilastokeskus: Kulutustutkimus 2012), but the exact number of pet rabbits is not known. Although the population of pet rabbits is relatively big, the legislation and guidelines of rabbit housing are still inadequate. This study is the first survey of pet rabbit housing and welfare in Finland, which has been conducted with over one thousand individual pet rabbits. Similar studies have been conducted previously in United Kingdom and Netherlands. In Finland, the previous studies about pet rabbits have concerned about parasites and *Encephalitozoon cuniculi* -antibodies. There has been also one health survey (n = 167), which gave some information about the state of health of Finnish pet rabbits.

The aims of this study were to find out how pet rabbits in Finland are kept, and how their housing and handling is associated to their behaviour. The feeding of rabbits was also studied and compared to the recommended rabbit diet. In this study, the survey responses concerning over one thousand individual pet rabbits were analysed and compared to common guidelines and previous studies.

2. ACKNOWLEDGEMENTS

Thank you Johanna Mäkitaipale (DVM, GPCert(SAS)) for giving me this opportunity to take part to this important research. The more I have explored this topic and previous studies, the more I understand the importance of this kind of research in Finland. Thank you for encouraging and inspiring me in my veterinary career from the first day I met you. Thank you Toomas Orro (DVM, PhD) for helping me with the statistics and with all the problems I have faced while writing this thesis. Thank you for answering to all my questions and helping me to understand the statistics. Thank you veterinary student Pauliina Raikunen for sharing the workload when inserting the answers from paper forms into the internet version. Thank you to all my classmates, we have all been a huge support to each other during these years, even during the most difficult times. Thank you to my lovely family and friends, your support means the most to me.

3. LITERATURE REVIEW

3.1. Rabbit as a pet

Pet rabbits (*Oryctolagus cuniculus*) are common pets in many European countries (Schepers et al. 2009), and the welfare of rabbits is an area of growing interest in Europe (Rooney et al. 2014). In Finland, the exact number of pet rabbits is not known, but their number as patients in veterinary clinics is increasing (Mäkitaipale et al. 2015). Rabbits are friendly, playful and social when appropriately trained which together with their small size (1-8 kg) makes them good pets (Crowell-Davis 2007). The approximate life expectancy of a rabbit is 8-12 years or even more (Blas & Wiseman 2010). In previous health surveys, the mean age of rabbits varied from 2.2 years (n = 102) (Mullan & Main 2006) to 2.8 years (n = 901) (Schepers et al. 2009). The domestication of rabbits only began around 1500 years ago, but today there are already over 60 recognised breeds and 500 varieties (Magnus 2005). Despite the popularity, it seems that many rabbit owners are unaware of pet rabbit welfare (Schepers et al. 2009) and how housing and handling are affecting to their behaviour, health, and well-being. Surveys of pet rabbit populations in the UK and the Netherlands determined that rabbits are kept in a wide variety of conditions, and many of them are facing potential welfare issues (Schepers et al. 2009, Rooney et al. 2014).

Most of pet rabbit owners participating to previous surveys were females (UK: 89.1%, Netherlands: 90%) and older than 18 years of age (Netherlands: 88%) (Schepers et al. 2009, Rooney et al. 2014). In general, rabbits are often considered to be suitable pets for children (Blas & Wiseman 2010, Mullan & Main 2006). The most popular breeds in a previous Finnish pet rabbit studies were the Dwarf Lop and mixed breeds (Mäkitaipale et al. 2015, Mäkitaipale et al. 2017). Lops were the most common breed in a study of UK pet rabbit population (33.6%, n = 1254) (Rooney et al. 2014).

3.2. Purchase of pet rabbits

Most pet rabbits are purchased from a pet shop and others are acquired from breeders, own-bred by owner or were rehomed from other families or rescue centers (Schepers et al. 2009). The most common reason for rehoming are the lack of the owner's time, owner is moving and allergies. Very rarely are they rehomed due to their behaviour (Ulfsdotter 2013). In a study made in UK, 22% of rabbits (n = 102) were rehomed, and usually it was from a friend of the owner (Mullan & Main 2006). A study of pet rabbit purchases in UK showed that 18% of people purchasing a rabbit from a pet shop made the decision on the same day. This can lead to problems when owners are not prepared for long-term commitment. According to the same survey, those owners did not have sufficient knowledge about pet rabbit diet and housing. (Edgar & Mullan 2011).

3.3. Housing

Pet rabbits are traditionally kept as companion animals in cages (Mullan & Main 2006). In Finland most rabbits live inside the house (69.3%, n = 276) but other common housing systems include sheds or stables (Mäkitaipale et al. 2017). Finnish legislation requires that the rabbit be able hear and see its surroundings and action around the cage and have the opportunity for social interaction. It also requires sufficient substrate and nesting material, for example wood chips, straw, or hay (Finlex 2018). It has been previously identified that many pet rabbits in the UK and the Netherlands are kept in good housing conditions, but regardless of this, many of them are kept in hutches which are much too small (Mullan & Main 2006, Schepers et al. 2009, Edgar & Mullan 2011, Rooney et al. 2014). The RSPCA (2018) has set the minimum hutch height of 0.75 m for medium-sized rabbits. A rabbit should be able to stand up on its hind legs without its ears touching the roof of the hutch. The cage should also be big enough for the rabbit to lie fully outstretched in any direction, and to be able to take an unhindered sequence of consecutive hops. In Finland the law requires pet rabbit cages to be minimum of 0.25 m² for an individual rabbit weighing less than 1.8 kg, a minimum of 0.5 m² for rabbits 1.8-3 kg, a minimum of 0.7 m² for rabbits 3-5 kg and minimum of 0.9 m² for rabbits over 5 kg. Minimum hutch height in Finland varies between 0.3-0.6 m depending on rabbit size (Finlex 2018). Hutches that are of inadequate height (<30cm) have been proven to increase the aggressive

behaviour between rabbits (Princz et al. 2008b). Housing rabbits in large groups seems to also increase aggressive behaviour and injuries related to fighting. According to previous studies, the stocking density of rabbits should be maximum of 16-18 rabbits/m² (Szendő & Dalle Zotte 2011). Providing enrichment in cages, such as gnawing sticks, has been proven to be a good method for preventing aggression and stress-related behaviour (Princz et al. 2008a, Szendő & Dalle Zotte 2011).

It has been demonstrated that flooring material does not affect rabbit behaviour (eating, drinking, movement, resting, comfort, social, investigatory) significantly (Princz et al. 2008a). However, it is an important environmental factor as it is necessary for preventing injuries or discomfort. Young rabbits prefer plastic net floors instead of wire net floors (Princz et al. 2008a, Szendő & Dalle Zotte 2011). In Finland, cages with net floors are permitted only if the net is directly above the solid base (Finlex 2018).

The availability of hiding places in housing systems allow rabbits to withdraw out of sight when threatened, with the added benefit of reducing aggression (Baumans & Van Loo 2013). When rabbits are housed together, the risk of fighting can be greatly reduced by offering an opportunity to hide (Rommers et al. 2014). The law in Finland requires a hiding place for rabbit (Finlex 2018). The feeding should be performed in a quiet and calm setting (Blas & Wiseman 2010). Finnish legislation requires that gnawing material should always be available to maintain dental health (Finlex 2018). The cleaning of cages and adjacent housing systems should be done on a regular basis to prevent health risks such as *Eimeria* infections (Meredith & Rayment 2000, Mäkitaipale et al. 2017). In previous studies in the UK and the Netherlands, many of the rabbits had outdoor access or were living permanently outside (Mullan & Main 2006, Schepers et al. 2009, Rooney et al. 2014).

3.4. Diet

Diet plays an important role when it comes to maintaining both rabbit health and welfare (Meredith & Lord 2014). Inappropriate diet has been linked to several health issues, such as digestive, dental, and urinary tract disease (Prebble & Meredith 2014). Sudden changes in diet can cause diarrhoea and dehydration (Blas & Wiseman 2010). All changes in rabbit's diet

should be made gradually which means different feeds should be introduced over a period of 1-2 weeks (Meredith & Lord 2014). In general, feeding should be performed on a regular basis with defined feeding times (Blas & Wiseman 2010). Commercial feed rations for pet rabbits are mostly muesli-type mixes or monocomponent pellets and nuggets (Prebble et al. 2015). Many commercial treats are high in sugar, fat and/or starch and should be therefore avoided (Meredith & Lord 2014).

Grasses form the majority of a wild rabbit's diet (Clauss 2012, Meredith & Lord 2014) and are an important source of protein, fibre, vitamins, and minerals (Meredith & Lord 2014). A diet high in forage may also maintain the dental health of the rabbit (Meredith et al. 2015). If constant access to quality forage is not possible, hay can be used as a substitute for fresh grass (Meredith & Lord 2014). Recommended diet of rabbits include high fibre, low starch, and moderate protein and calcium levels (Irlbeck 2011). In the ideal rabbit diet, hay should be available *ad libitum* with large proportions of suitable fresh foods (Tschudin et al. 2009). Finnish legislation requires that forage should be always available for pet rabbits (Finlex 2018). In a previous British study, majority of the owners fed hay to rabbits, but all of them did not give it daily (Rooney et al. 2014). Hay should form at least 70%, greens/fresh foods 20-28%, and pellets/extruded foods only 2-3% of rabbit's daily diet (Meredith & Lord 2014).

Rabbits eat selectively, meaning that they choose foods that are high in energy and protein (Meredith & Lord 2014). Soil or dust in food may also have an effect on a rabbit's selective feeding and therefore contamination of any feeds should be avoided (Blas & Wiseman 2010). Seed and muesli mixes should be avoided (Irlbeck 2001, Tschudin et al. 2011, Prebble & Meredith 2014) due to their excessive starch and energy content (Irlbeck 2011), although, many owners continue to offer their rabbits such feeds (Mullan & Main 2006, Schepers et al. 2009, Rooney et al. 2014). Feeding only muesli and no hay predisposes a rabbit to obesity (Prebble et al. 2015). Muesli-based feeding also predisposes pet rabbits to dental disease (Meredith et al. 2015). Pelleted foods are the most popular food given daily (Rooney et al. 2014). When pellets are offered *ad libitum*, daily hay intake is often decreased. The recommended daily quantity of daily pellets is at maximum 25 grams per kilogram of a rabbit's bodyweight. For neutered rabbits and rabbits with limited opportunity for exercise, the daily pellet intake should be even less. (Meredith & Lord 2014).

Daily water intake varies between individual rabbits (Tscudin et al. 2011). An average 2 kg rabbit may intake 200 ml or more water in a day if fed with completely dry diet (Fraser & Girling 2009). To prevent health problems, water should be available *ad libitum* and preferably in an open bowl instead of a nipple drinker (Tscudin et al. 2011). Water should be changed regularly and bowl must be cleaned to prevent bacterial growth (Fraser & Girling 2009). Limited access to drinkers leads to low daily water intake and increased dry matter content of urine and faeces. It may also increase the risk of urolith formation. (Tschudin et al. 2011).

3.5. Handling

Most British pet rabbits are handled at least weekly by their respondent, but less than half of all rabbits were handled daily (Rooney et al. 2014). In Netherlands, seven percent of owners had never handled their rabbit (Schepers et al. 2009). Handling pet rabbits may be useful to reducing stress, provided that the rabbit is accustomed to being handled (Csatádi et al. 2005). If rabbit kits are handled during the nursing period, they are usually tame at the time of weaning (Bilkó & Altbäcker 2000, Csatádi et al. 2005) with the tameness persisting into adulthood (Pongrácz & Altbäcker 1999). If rabbits are not handled at all, they are afraid of humans and display avoidance behaviour (Pongrácz & Altbäcker 1999).

How rabbits behave when approached and handled is a matter that varies between individuals. When approaching the rabbit living area, most owners in the UK have described that the rabbit is likely to approach them in a friendly manner (83.2%). Some owners reported their rabbits ignoring (25.2%), retreating (10.2%) and also hiding from them (5.4%). Some owners (1.7%) described the behaviour of their rabbit to be aggressive when approached (Rooney et al. 2014). Many rabbits show behaviour related to fear when lifted off the ground (Bradbury & Dickend 2016). Pet rabbit population study done in the Netherlands found that when picked up, 25% of rabbits showed behaviours linked to fear (Schepers et al. 2009). Owners in the UK were found to be inspecting their rabbit's nails weekly (35.4%) or monthly (32.4%). Teeth were most commonly inspected monthly (29.6%), but some owners check the length of their rabbit's teeth every week (26.3%) (Rooney et al. 2014).

3.6. Companionship

Rabbits are highly social by nature (Staffacher 1992, Magnus 2005, Edgar & Mullan 2011) and are therefore recommended that they be kept together with other rabbits rather than alone (Magnus 2005, Trocino & Xiccato 2006, RSPCA 2018). Regarding to previous studies 41% of the people that purchased a pet rabbit were planning to keep it on its own (Edgar & Mullan 2011) and 44% of rabbits were already housed alone (Mullan & Main 2006). In another study, 43.5% of rabbits were housed alone, and only 41.9% lived with another rabbit. Other animals that were kept as a companion for a rabbit were guinea pigs, cats, dogs, quail, chickens, chameleons and even pigs (Rooney et al. 2014). All this indicates the lack of knowledge regarding the social needs of rabbits. In Finland, a previous study showed that the mean number of rabbits in a household was 6.5 and about 44% of rabbits lived in a household with three or more rabbits (Mäkitaipale et al. 2017).

Wild rabbits form social breeding groups that can be highly stable during the entire breeding season (Cowan 1987, cited in Ulfsdotter 2013). On the other hand, rabbits are highly territorial animals (Crowell-Davis 2007) and may fight when kept together with other rabbits (Schepers et al. 2009, Rooney et al. 2014). The main reasons for aggression in wild rabbits are related to nesting sites between females and mating between males (Cowan 1987, cited in Ulfsdotter 2013). Pet rabbits living with a companion show a variety of social behaviours. So-called “positive social behaviours” as resting in contact, grooming and playing, as well as “negative social behaviours” like mounting, fighting and pulling fur out have been reported (Rooney et al 2014). Aggressive behaviour against other rabbits occurs usually due to their territorial lifestyle. New rabbits should always be introduced into a group gradually in order to prevent fighting (Crowell-Davis 2007).

3.7. Veterinary care

In Europe, veterinarians (and breeders in some countries) usually vaccinate rabbits against myxomatosis as well as rabbit haemorrhagic disease (RHD). Vaccination against myxomatosis is not always fully effective, but it usually reduces the symptoms, and vaccinated rabbits survive with supportive care (White et al. 2002). In the UK 70.8% of rabbits are vaccinated (Rooney et

al. 2014), while in the Netherlands, 44% of pet rabbits are vaccinated (Schepers et al. 2009). Myxomatosis does not exist yet in Finland, but since 2016 rabbits are recommended to be vaccinated yearly against RHD at least in areas with wild rabbits. Still most of the rabbits do not regularly visit veterinary clinics, which can allow other health problems to remain undiagnosed. The frequency of health problems is significantly higher in rabbits older than three years of age, thus regular examinations are advised for this demographic. (Mäkitaipale et al. 2015).

In England, 52% of owners who were acquiring a pet rabbit planned to have it neutered. The main reason for not wanting to neuter a rabbit was that it would not have access to rabbits of the opposite sex (Edgar & Mullan 2011). The listed reasons for spaying female rabbits were to treat or prevent behavioural problems, to prevent pregnancy, to prevent uterine adenocarcinoma, and because of the recommendation by a veterinary surgeon (Mullan & Main 2006). In one previous study of Finnish pet rabbits, 39.3% (n = 354) of rabbits were neutered (Mäkitaipale et al. 2017).

3.8. Behaviour

Rabbits kept in cage spend most of the time resting alone or with a companion. Unwanted behaviour in rabbits kept in cages can include thumping of hind limbs, grunting, guarding, and digging on hard surfaces. (Rooney et al 2014). Most of the unwanted behaviour seems to take place during the dark period of the day, which can hinder the detection of problematic behaviour (Krohn et al. 1998). Behavioural problems can be caused by a lack of activity (Princz et al. 2008a), poor handling, or lack of companionship (Crowell-Davis 2007). Usually, many behavioural problems are driven by fear (Magnus 2005) and may be the first indication of illness or injury (Crowell-Davis 2007). The size of the cage does not affect to the behaviour of laboratory rabbits, regarding a small study conducted with 18 female laboratory rabbits (Krohn et al. 1999).

Types of behaviour that are considered “behavioural problems” include spraying of urine or not using the litter box, fear of humans, aggression towards humans or other rabbits, digging, chewing, and infanticide (Crowell-Davis 2007). Many of these behavioural problems can be

prevented and treated. Urine spraying is usually a problem of intact males. Fear of, or aggressiveness towards humans can be a result of previous painful or frightening experiences. Biting and chewing are a part of their natural behaviour and can be controlled by giving them the appropriate objects to chew (Crowell-Davis 2007). Previous studies have showed that rabbits kept in conventional cages with no environmental enrichment showed more stress-related behaviours (restlessness, excessive grooming, bar-gnawing and timidity) than rabbits kept in an enriched cage system (Hansen & Berthelsen 2000). Enrichment in cages might also reduce fighting between individual animals (Rommers et al. 2014).

4. AIMS OF THE STUDY

This is an observational study about the pet rabbit population in Finland. In the first part of this study the aim is to find out the structure of the population; the most common breeds and their life spans, where they are purchased from, how often are they handled by owners, and if they live with other pets. In the second part, the housing of pet rabbits was studied; the size of their living space, their feeding arrangements, the food they eat, hiding places within the cage, and if environmental enrichment is offered. The study will investigate if their living spaces are of appropriate size, if the housing materials used are rabbit-safe, if their diets are in accordance with recommendations, and if their diet includes any components that are inappropriate. In the third part of the study, behavioural information is analysed and compared to the factors that are known to increase aggressive behaviour in rabbits. The aim was to find out the problems regarding pet rabbit behaviour, and if they can be explained using previous data that has been collected about housing and care of rabbits in Finland.

5. MATERIALS AND METHODS

5.1. Questionnaire

The material for this study was conducted by a questionnaire filled by Finnish pet rabbit owners. The questionnaire was provided as a paper version (n = 46) (Appendix 1) and an internet based version. It was filled by rabbit owners whose rabbits participated to pet rabbit health surveys at Veterinary Teaching Hospital of University of Helsinki (doctoral study of DVM Johanna Mäkitaipale and licenciate studies of DVM Irina Karvinen, DVM Anne Bruce, DVM Sanna Engblom and veterinary student Emmi Järvenpää). It was also advertised in social media, Facebook-pages of Lemmikkikanitutkimus and pet rabbit associations. The answers were collected over a period of four years, spanning between May 2012 and September 2016. Overall, the information regarding 1023 pet rabbits around Finland were collected, although not all owners answered every survey question. Questions in the survey included general information regarding the rabbits (breed, age, sex and neutering status, purpose of pet rabbit and age of the owner), housing, feeding, and behaviour. The questions used for this research were sections I-III and V.

5.2. Data handling

Veterinary students taking part in the research inserted all responses received via the paper form of the survey into the Internet version. The data from the Internet survey was then exported into an Excel spread sheet. Some of the owners had answered the survey questions twice about the same rabbit, so the first step of data handling was to delete the duplicates and saving only the latest answers. The criteria for eliminating duplicate data were name of the rabbit, date of birth, and the residence of the owner. The next part of the data handling was to transform the answers owners had written in text format into numerical data. This data would then be used for analysis; for example, estimates of rabbit age as well as variation in nomenclatures of rabbit breeds and types.

5.3. Statistical analysis

Negative binomial regression model was used to study associations between rabbit's aggressive behaviour and selected variables. Four level response variable about aggressive behaviour of rabbits was used according to the owner's response to the question: how well the word "aggressive" describes your rabbit's behaviour? Answers described owner's evaluation towards more aggressive behaviour: disagree, slightly disagree, slightly agree or agree. Rabbits whose owner answered this question "unsure" (n = 4 from all responders) were left out from this analysis. Variables included to the analysis as explanatory variables were sex, neutering status and their interaction, m² available for rabbit, number of rabbits in household, presence of hiding place, how frequently owner played with the rabbit (daily, weekly, monthly or never), how many hours a day the owners spent with their pet rabbit during the weekdays and weekends. Step-wise backward elimination procedure was used for the final model. Significance level was set to $P \leq 0.05$.

Statistical data analysis was done using STATA 14.0 program (StataCorp LP, College Station, USA).

6. RESULTS

6.1. Respondents

The mean age of the survey respondents was 28.5 years. The most popular method for purchasing a pet rabbit was directly from a breeder (48.6%, n = 994). Pet shops (16.0%) were the second most popular, and several of the rabbits were also own-bred by the owner (9.6%). Other sources of pet rabbits (11.6%) were farms, a private person or family friend. 9.7% of the rabbits were rehomed and 3.4% were from a rescue centre. For 1.2% of the respondents the origin of the rabbit was unknown. Unexpectedly, the most of the rabbits were purchased as a pet for an adult (48.1%, n = 994). The other reasons for purchase were: a pet for a family (21.7%), for breeding (11.8%), a pet for a child (7.9%) and for hobbies (5.8%). Most popular hobbies were rabbit agility and rabbit shows. The most common purpose listed as “other reason” (4.7%) was the rabbit to be a companion for another rabbit already in the family. From all other sources, the most popular purpose for a rabbit was to be a pet for a family or an adult, but own-bred rabbits were mainly in the family for breeding purposes (35.8%, n = 95).

6.2. Rabbits

The mean age of rabbits was 3.1 years (n = 978). Out of the total of 1023 rabbits, 53.7% were males, 45.2% were females, and 1.2% were of unknown sex. 55.7% of males were castrated and 23.4% of females were spayed. In total, 40.5% of the 1023 pet rabbits were neutered. The owners of 10 females and 5 males were not sure about the neutering status of their rabbit. (Table 1).

The most common breed or type of rabbit were mixed or cross breeds (32.2%) (Figure 1). Some of them were listed as “mixed” in the survey, but some owners also indicated the specific breeds used for certain mixes. Some of rabbits were purposefully mixed-breed for agility use. Miniature Lops were most common true breed (24%). Other popular breeds were the Netherland Dwarf (6.8 %) and Lionhead (6.5%) (Figure 1).

Table 1. Sex and neutering status of rabbits.

Sex/neutering status	Total
Female	462
Neutered	108
Not neutered	344
Unknown	10
Male	549
Neutered	306
Not neutered	238
Unknown	5
Unknown	12
Total	1023

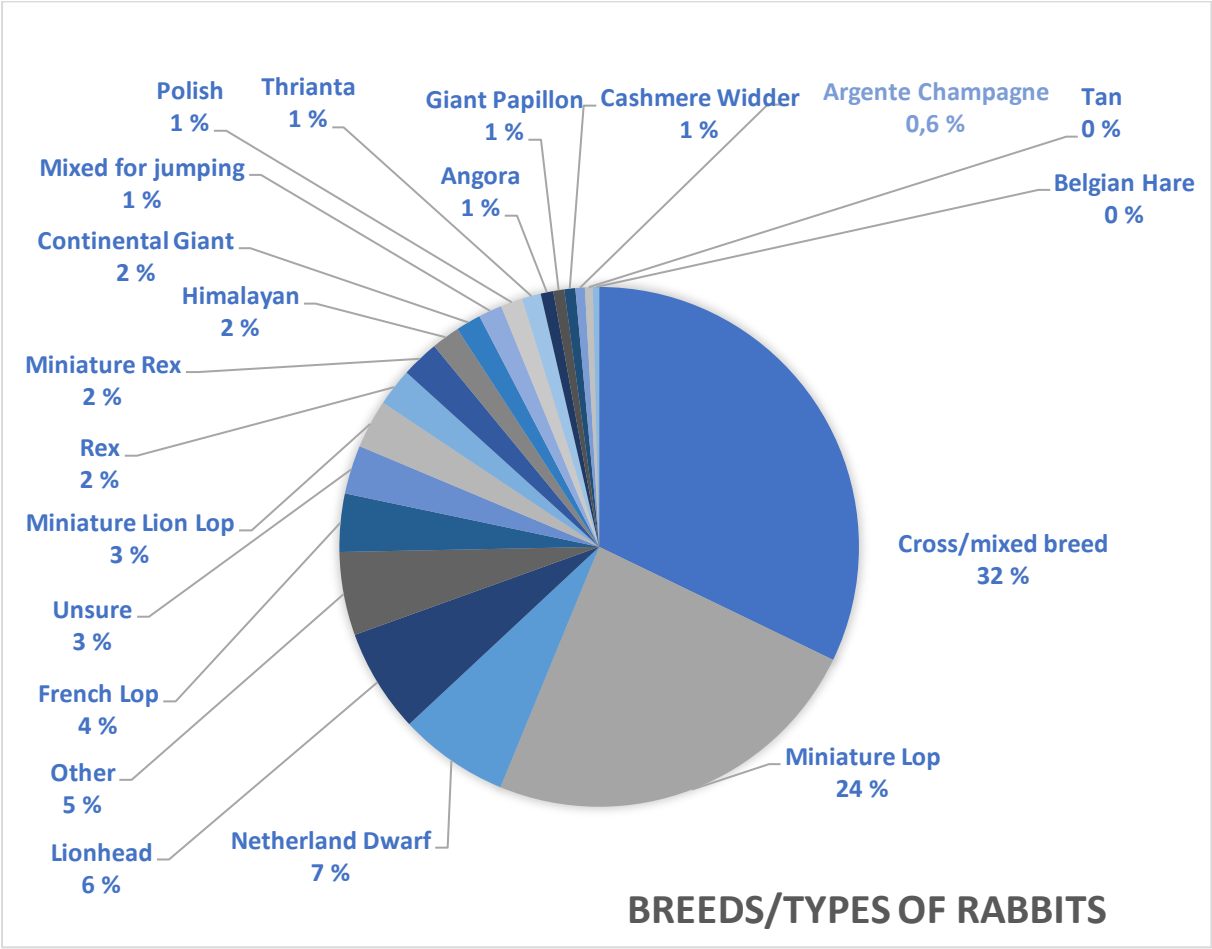


Figure 1. Breeds and types of the 1023 pet rabbits in the survey.

6.3. Housing

The majority of rabbits were living inside the owner's house (78.9%, n = 971), but some rabbits lived in a separate building (11.8%) or outside in a hutch/run (4.6%). Other housing systems (5.4%) described by owners mainly included varying housing conditions, meaning that the summer was spent outdoors or on the balcony, and the rabbit wintered inside the house. The most popular flooring material was mats (37.7%, n = 685). Other common substrate materials were plastic (22.2%) and sawdust (22%). In 1.8% of cages, newspaper was used as flooring material, and in 2 cages (0.3%) the material was grid. Other flooring materials (16.1%) listed by owners included wooden flooring, straw, or wood chips. The majority of rabbits had a place to hide in their housing system (79.6%). The mean surface area of housing systems was 1.35 m² (n = 572) and the volume was 1.47 m³ (n = 555). The mean height of all cages was 79 cm (n = 564). 37.3% of rabbits (n = 874) had a chance to move freely around house or room throughout the day. Average time for free movement outside the cage was 12.3 hours per day. Some rabbits did not have a chance to move outside the cage at all (5.4%).

6.4. Diet

Almost all of the rabbits (99%, n = 963) of rabbits had hay available *ad libitum* (Table 2). Most of the rabbits (66.9% n = 954) of rabbits ate hay in much and/or multiple times a day, 24.3% were eating a moderate amount and/or several times a day, 6.4% ate only a bit and/or just few times a day, and 2.4% of rabbits ate only small amounts and/or once or twice a day. One owner did not give any hay to his/her rabbit. Vegetables and root vegetables, as well as lettuce, herbs, and fruits were mostly available few times a week. Branches were mostly always available.

Questions regarding the supply of muesli mixture and pellets were asked twice in this survey in different sections. In the section with questions about multiple feeds, 34 owners answered saying that muesli mix was always available, and 83 owners said pellets were available *ad libitum*. In the second section of questions concerning muesli mix and pellets, 45 owners were offering rabbit mix, and 114 were offering pellets *ad libitum* (Table 2 and 3). The most standard quantity was 1-2 tablespoons a day per rabbit for both muesli mix (57%, n = 235) and for pellets (49.2%, n = 834). Another commonly offered quantity of pellets was a ½ decilitre daily (Table 3). Depending on the pellet, one tablespoon of pellet weighs about 15-25g.

Table 2. The feeding of different feed components to pet rabbits.

	Hay	Rabbit mix	Pellets	Lettuce	Vegetables	Root vegetables	Herbs	Fruits	Bread	Branches	Nuts/seeds	Grains	Wild plants	Sprouts	Salt lick	Mineral licks	Vitamin supplement
Always available	953	34	83	7	7	19	5	7	14	337	7	21	41	2	385	315	18
Several times a day	3	2	14	12	13	14	3	3	7	6	2	1	29	2	0	0	0
1-2 times a day	0	37	265	34	36	59	15	21	10	0	0	40	29	2	0	0	2
Once a day	3	68	417	138	170	296	80	115	74	44	15	121	141	9	2	1	31
Few times a week	0	29	66	300	341	371	234	323	199	198	59	65	233	43	11	4	14
Once a week	0	4	12	106	116	90	82	149	129	68	40	33	70	21	7	6	11
Few times a month	0	25	16	158	128	69	187	210	185	154	89	50	167	68	12	14	23
Rarely	3	123	37	138	89	30	220	109	235	135	290	232	193	305	75	84	149
Never	1	606	49	52	51	12	119	18	98	12	439	373	33	483	459	520	684
Total	963	928	959	945	951	960	945	955	951	954	941	936	936	935	951	944	932

Table 3. The feeding of rabbit mixes and pellets.

	Rabbit mix	Pellet
<i>Consumption per day</i>		
1-2 tablespoons	134	410
1/2 decilitre	67	278
1 decilitre	22	102
More	12	44
Total	235	834
<i>Always available</i>		
Yes	45	114
No	319	760
Total	364	874

One section of questions was concerned with the feeding of foods unsuitable for rabbits. Most owners seemed to be aware of the feeds that are unsuitable for rabbits. However, some owners did give their rabbit dairy products, citrus fruits, potatoes, cabbage, beans, and dog or cat food, varying from daily supply to occasional feeding 1-2 times a year. Cabbage seemed to be fed quite often, with some of the rabbits receiving it weekly (Table 4).

Table 4. The feeding of improper feeds to rabbits.

	Dairy products	Citrus fruits	Potato	Cabbage	Beans/peas	Onion	Dog/catfood
Never	936	910	874	743	859	947	940
1-2 times a year	8	29	40	98	67	0	3
Monthly	2	10	28	73	14	0	0
Weekly	2	3	6	33	7	0	2
Daily	0	0	1	3	5	0	0
Total	948	952	949	950	952	947	945

6.5. Handling and basic care

46.6% (n = 964) of owners were brushing the rabbit when necessary, and 3.2% carried out brushing once or several times a day. Nails were cut mainly once a month (37.7%, n = 966) or when necessary (33.9%). The majority of owners were cuddling their rabbit on a daily basis (90.5%, n = 965) and 57.3% of rabbits were played with once or several times a day (n = 933). Cleaning of cages was mainly conducted weekly or when necessary, but cleaning of any dirty areas in the cage was done more often. The changing of water was mainly done on a daily basis, but 17.2% of owners were changing it only once or a few times a week (n = 960) (Table 5). Water was mainly available only from a nipple drinker (63.4%, n = 961).

The owners were asked how many hours a day they spent with their pet rabbit(s) during the weekdays and weekends. When the owner's answer was that the amount of time varied (for example 3-5 hours) the smaller number in the range was selected as the answer (in this example 3 hours). The majority of owners (34.1%, n = 806) did not spend more than 1 hour per day with their rabbit during the weekdays. During the weekend, the most common amount of time spent with the rabbit daily was 1-3 hours (28.7%, n = 835), but longer periods of time (>3-24 hours) were more typical during the weekends than on weekdays (Figure 2).

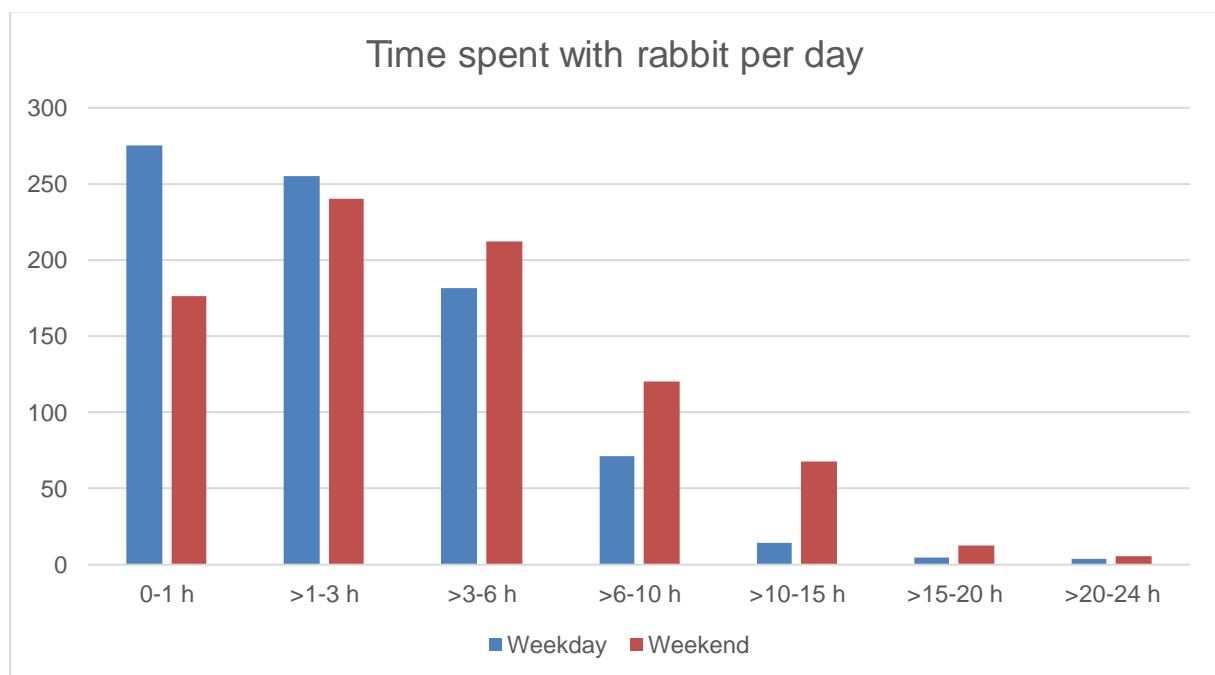


Figure 2. Hours spent by owners with their rabbits during weekdays and weekends.

Table 5. Tasks concerning the basic care and handling of rabbits.

	Several times a day	1-2 times a day	Once a day	Few times a week	Once a week	Few times a month	Once a month	When necessary	Never	Total
Feeding	187	611	162	4	0	0	1	2	0	967
Changing water	43	313	427	150	17	0	1	18	0	969
Brushing	2	9	20	134	92	167	42	449	49	964
Cutting nails	0	0	1	4	45	225	364	327	0	966
Washing of rabbit	0	0	0	1	3	8	6	606	337	961
Playing with rabbit	256	157	122	139	15	28	7	76	133	933
Caressing of rabbit	627	149	97	39	13	4	3	25	8	965
Cleaning the whole cage	1	6	17	111	398	128	94	164	16	935
Cleaning of dirty parts of cage	36	97	265	301	118	16	5	85	11	934

6.6. Companionship

When all breeders with multiple rabbits were included in the calculations, the average amount of rabbits per household was 4.4. On the other hand, 33.9% of the rabbits appeared to live with only one companion and 31.9% of rabbits lived alone. According to this, 34.2% of rabbits lived in a household with three or more rabbits. Other animals listed as being owned by the same family owning a rabbit (58.4%) were mainly rodents, cats, or dogs. Some of the rabbits seemed to have a good relationship with the other animal species in the household, but others did not have an interest in them or were afraid of the additional animals.

6.7. Behaviour

The behaviour and character of individual animals was characterised by asking the owners how well certain adjectives described their rabbit. These questions were some of the most prevalently answered in the survey (n = 998-1005, varies between questions).

Table 6. The behaviour and character of rabbits.

	Disagree	Slightly disagree	Slightly agree	Agree	Unsure	Total
Timid	369	372	190	65	2	998
Calm	45	229	394	335	2	1005
Friendly	16	116	289	576	2	999
Curious	4	38	201	756	2	1001
Playful	29	188	337	420	25	999
Active	28	220	304	446	5	1003
Temperamental	126	266	255	342	14	1003
Stubborn	126	234	299	329	16	1004
Aggressive	696	241	53	11	4	1005
Capricious	617	299	67	17	5	1005
Teachable	20	154	447	326	57	1004
Wise	20	171	383	346	81	1001
Manageable	19	94	342	543	6	1004
House-trained	31	85	355	511	21	1003
Clean/odorless	13	63	309	598	13	996

Many of the owners chose “positive adjectives” (such as friendly (86.6%), active (74.8%), curious (95.6%) and playful (75.8%)) to describe their rabbit by saying they agreed or slightly agreed that these words matched their rabbit’s temperament. On the other hand, the behaviour of several rabbits was also described using “negative adjectives”, such as temperamental (59.5%) and stubborn (62.5%) (Table 6).

6.7.1. Aggressiveness and related factors

Some of the owners (6.4%) did indeed choose the word “aggressive” to describe their rabbit (agreed or slightly agreed) (Table 6). Particular factors regarding handling and housing are suggested to have an effect on a rabbit’s aggression and were tested in this cross-sectional study by using a negative binomial regression model (Table 7).

Table 7. Results of negative binomial regression model where outcome variable was rabbit owner evaluation about rabbits (n = 691) aggressive behaviour in 4-level scale. Question: how well the word “aggressive” describes your rabbit’s behaviour? Answers: disagree (n = 477), slightly disagree (n = 164), slightly agree (n = 40) or agree (n = 10).

Variable	n	IRR ¹	95% CI	P-value	Wald test P-value
Sex:					
Male	377	1			
Female	314	1.83	1.44-2.34	<0.001	
Hiding place in pen:					
No	147	1			
Yes	544	0.72	0.55-0.95	0.019	
Owner playing with rabbit:					
Daily	374	1			0.109
Weekly	126	0.96	0.68-1.35	0.806	
Monthly	87	1.00	0.66-1.52	0.987	
Never	104	1.44	1.05-1.97	0.023	
Number of rabbits at home	691	0.94	0.91-0.97	<0.001	

¹ Incidence rate ratio (IRR)

The owners of female rabbits had more frequently answered their rabbit to be aggressive (IRR 1.83, $P < 0.001$) than the owners of male rabbits. Neutering status did not have a significant association to rabbit's aggressiveness described by owners ($P > 0.05$) and interaction between sex and neutering status was not significant ($P = 0.095$). The rabbits with access to hiding place were less likely described to be aggressive (IRR 0.72, $P = 0.019$). The quantity of playtime (daily/weekly/monthly) with a rabbit does not significantly show association with aggressive behaviour, but rabbits that are not played with at all are more likely described as aggressive (IRR 1.44, $P = 0.023$) compared to rabbits which were played with daily. The higher number of rabbits in a household has an association to lower aggressiveness (0.94, $P < 0.001$).

7. DISCUSSION

Results of this study showed that Finnish pet rabbits are mainly kept in housing conditions that are suitable for rabbits when comparing to common guidelines and legislation. Most of the owners seem to be well aware about prerequisites of their welfare. Surprisingly most of the rabbits were purchased as a pet for an adult and the mean age of respondents was 28.5 years. The mean age of rabbits was 3.1 years, which is a little higher than in previous studies in UK and Netherlands.

The mean surface area of housing systems in this study was 1.35 m², which exceeds the requirements of Finnish law. The average height of cages was 79 cm, which is more than RSPCA and Finnish legislation require. The only problem concerning the size of housing systems was that there was no question in the survey concerning the size of each individual rabbit (mixed breeds), or how many rabbits shared the same housing system. Surprisingly, 20.3% of rabbits did not have any place for hiding in their housing system, even though the law requires it.

Branches were always available in most of the cages, which is a good approach for preventing negative behaviour and maintaining dental health. The cleaning of the cages - especially the dirty areas in cages - could have been improved upon in some cases, especially if faeces were not removed regularly. Poor hygiene practices may increase the health risks for rabbits, for example, by increasing the risk of infection by parasites such as *Eimeria* spp. (Mäkitaipale et al. 2017). It can also lead to bacterial population explosions which can lead to health problems such as gastroenteritis (Fraser & Girling 2009). Many owners explained that their rabbit had the opportunity to go outdoors at summertime. Unfortunately, Finnish weather conditions are not optimal for keeping rabbits outdoors year-round.

The feeding of hay seemed to be mainly in accordance with the recommendations, but some owners had indicated that their rabbit ate only small amounts of hay daily. There are several reasons why a rabbit may not consume as much hay as it should. Poor hay quality, overfeeding of concentrate feeds, soiling of hay, as well as dental disease are some of the contributing factors

(Meredith & Lord 2014). Balancing the diet by reducing concentrates in the ration, and not using hay as bedding are the first steps that may benefit in the increase the daily intake of hay. In Finland, legislation describes hay as being a suitable floor material, but it is not recommended that the same hay be used for both bedding and as a part of the animal's diet.

Offering green forage is a good way to create variety in the diet and to increase water intake, but the amount offered daily should be limited, and new plants should be introduced gradually in order to allow the intestinal flora to adapt (Meredith & Lord 2014). The feeding of wild plants is generally considered to be safe and has not showed significant risks of infection by *Eimeria* (Mäkitaipale et al. 2017). The section about inappropriate feeds could have been formatted in a slightly better way in order to receive accurate data. All unsuitable foods were separately listed, making it possible for owners to notice that certain foods they may have fed their rabbit were unsuitable. This ultimately made it possible that the overall reliability of the answers was poor if owners gave false information.

The time spent with the rabbit daily with their owners was a slightly confusing question. The question did not separate the time actively spent with the rabbit (for example playing or cuddling) from the time the rabbit was moving around with humans whilst not in actual contact with them. Many owners did not indicate any specific time in hours, but did note that rabbit(s) were always in the same room with them when at home and would move around the house with them. These types of answers were difficult to include and compare to other results indicated in hours. Because of this, all answers lacking a numerical value in hours were excluded from the results.

The survey shows that 31.9% of rabbits were described as living alone, which is less than in similar previous studies conducted in UK and Netherlands. This indicates most rabbit owners are aware of the social needs of rabbits. Some owners had also other animals like dogs, cats, and rodents. The legislation in Finland requires that a rabbit should have the possibility for social interaction, but it does not specify if this means interaction with another rabbit, another animal, or a human.

When the incidence of aggressive behaviour and the lack of hiding places were compared, this study supports the findings of previous studies regarding rabbits without access to hiding places being more aggressive (Baumans & Van Loo 2013, Rommers et al, 2014). According to the

results of this study, if the rabbit does not have any hiding place it is more likely described to be aggressive by the owner.

This study had limitations that could have an impact on the results. Many of respondents had answered that the rabbit was purchased from a breeder, but this does not separate accredited breeders from individuals who merely sell available rabbit kits. Similarly, many respondents who answered “other” in regards to the purchasing question did indicate the source to be a “private person”. Many of the rabbits had received from a friend, but it was not clear whether the rabbit was bought as a kit, or if it was rehomed as an adult. This complicates the results slightly, meaning the question should be asked in a clearer manner in future studies. Ages of rabbits was calculated using the date of birth provided by the owner and the date on which the questionnaire was filled were used. Some of the owners did not know the exact date, so the date was entered as the first day of the month or the first day or the year, if absolutely no information about the birth month was available. Some obvious mistakes were found in the birth dates owners had given. For example, one rabbit was said to be 18 years of age and still participating in agility races. Mistakes of this nature were deleted from the accumulated data. When comparing the average of rabbits in a household, some breeders had rabbit herds of up to 80 individuals. Many owners who kept multiple pet rabbits had filled the questionnaire individually for each animal. Factors like this surely have an impact on the average of rabbits calculated per household.

Most of the owners answering to this survey had participated to a health surveys at the Veterinary Teaching Hospital of University of Helsinki. This means that most of the participated owners were interested and motivated by rabbit well-being. This can orientate the results of this study to represent more of the motivated rabbit owners instead of the diverse sample of owners, including less keen owners.

8. CONCLUSIONS

Generally speaking, Finnish pet rabbits seem to live in cages that are appropriate, when compared to common guidelines and legislation. Most owners seem to be well aware of rabbit dietary requirements, even though some rabbits were fed with muesli and pellets *ad libitum*, and certain individuals were receiving an inadequate quantity of hay. Many rabbits in Finland continue to live without any companions, and it is up to veterinarians to instruct owners to consider the natural social behaviour of rabbits.

In any further studies, the size of each individual rabbit and quantity of rabbits sharing the same housing system should be asked in the questionnaire. The question about spending time with rabbit should be asked more clearly (active contact with the rabbit, or time spent together in the same room, for example) and answers should only be indicated in hours (average of the time spent with rabbit daily). The behaviour of rabbits could also be evaluated with an improved technique, using more than just a questionnaire to get data that more accurately represents the behavioural problems of rabbits in Finland.

Survey of welfare and housing of Finnish pet rabbits

SUMMARY

This was a descriptive study about pet rabbit population in Finland. Although the population of pet rabbits is relatively big, the legislation and guidelines of rabbit housing are still inadequate. In this study, the survey responses concerning over one thousand individual pet rabbits were analysed and compared to common guidelines and previous studies.

The aim of this study was to find out the structure of Finnish pet rabbit population (age, breed, neutering status), their housing conditions, basic care and handling, behaviour, and diet of rabbits. Surprisingly most of the rabbits were purchased as a pet for an adult and the mean age of respondents was 28.5 years. The mean age of rabbits was 3.1 years, which is a little higher than in previous studies in UK and Netherlands. Most popular breeds/types of rabbits were mixed breeds and miniature lops.

Finnish pet rabbits seem to live in cages that are suitable for rabbits when comparing to common guidelines and legislation. Owners seem to be well aware of the dietary requirements of rabbits and only a minority of owners were feeding muesli or pellets *ad libitum*. Hay was always available in most cases, which indicates that owners understand the importance of hay in a rabbit's diet. Most of the rabbits were living with a companion rabbit, but 31.9% were living alone. It is up to veterinarians to instruct owners to consider the natural social behaviour of rabbits. The lack of hiding places in a cage and sex (females > males) seemed to have an association to aggressive behaviour of rabbits. The higher number of rabbits in a household had an association to lower aggressiveness. Most of the owners did spend time with their rabbit daily, but the hours spent with the animal per day was higher during the weekends. The majority of the rabbits had a chance to move freely outside the cage every day, with the average time being 12.3 hours per day.

In any further studies the questionnaire should be designed better to respond to the very purpose of this kind of study. Recruiting of the owners should be planned to reach more diverse sample of owners, even the less keen ones.

REFERENCES

- Baumans, V. & Van Loo, P. L. P. (2013). How to improve housing conditions of laboratory animals: The possibilities of environmental refinement. *The Veterinary Journal* 195, 24-32.
- Bilkó, Á. & Altbäcker, V. (2000). Regular handling early in the nursing period eliminates fear responses toward human beings in wild and domestic rabbits. *Developmental Psychobiology* 36, 78-88.
- Blas, C. & Wiseman, J. (2010). Nutrition of the Rabbit, 2nd Edition. CAB International, CPI Antony Rowe Ltd., UK. Chapter 17: Pet Rabbit Feeding and Nutrition (J. A. Lowe)
- Bradbury, A. G. & Dickens, G. J. E. (2016). Appropriate handling of pet rabbits: a literature review. *Journal of Small Animal Practice* 57, 503-509.
- Clauss, M. (2012). Clinical technique: feeding hay to rabbits and rodents. *Journal of Exotic Pet Medicine* 21, 80-86.
- Cowan, D. P. (1987). Aspects of the social organisation of the European wild rabbit (*Oryctolagus cuniculus*). *Ethology* 75, 197-210.
- Crowell-Davis, S. L. (2007). Behavior Problems in Pet Rabbits. *Journal of Exotic Pet Medicine*, 16, 38-44.
- Csatádi, K., Kustos, K., Eiben, Cs., Biljő, A., Altbäcker, V. (2005). Even minimal human contact linked to nursing reduces fear responses toward humans in rabbits. *Applied Animal Behaviour Science* 95, 123-128.
- Edgar, J. L. & Mullan, S. M. (2011). Knowledge and attitudes of 52 UK pet rabbit owners at the point of sale. *The Veterinary Record* 168, 353.
- Fraser, M. A. & Girling, S. J. (2009). Rabbit medicine and surgery for veterinary nurses. Wiley-Blackwell, UK. Chapter 4: Nutrition.
- Hansen, L. & Berthelsen, H. (2000). The effect of environmental enrichment on the behaviour of caged rabbits (*Oryctolagus cuniculus*). *Applied Animal Behaviour Science* 68, 163-178.

- Irlbeck, N. A. (2001). How to feed the rabbit (*Oryctolagus cuniculus*) gastrointestinal tract. *Journal of Animal Science* 79, 343-346.
- Krohn, T. C., Ritskes-Hoitinga, J., Svendsen, P. (1998). The effect of feeding and housing on the behaviour of the laboratory rabbit. *Laboratory Animals* 33, 101-107.
- Meredith, A. & Lord, B. (2014). BSAVA Manual of Rabbit Medicine. British Small Animal Veterinary Association, Gloucester, UK. Chapter 3: Nutrition and feeding.
- Meredith, A. L., Prebble, J. L., Shaw, D. J. (2015). Impact of diet on incisor growth and attrition and the development of dental disease in pet rabbits. *Journal of Small Animal Practice* 56, 377-382.
- Meredith, A. & Rayment, L. (2000). Liver disease in rabbits. *Seminars in Avian and Exotic Pet Medicine* 9, 146-152.
- Magnus, E. (2005). Behaviour of the pet rabbit: what is normal and why do problems develop? *In Practice* 27, 531-535.
- Mullan, S. M. & Main, D. C. J. (2006). Survey of the husbandry, health and welfare of 102 pet rabbits. *The Veterinary Record* 159, 103-109.
- Mullan, S. M. & Main, D. C. J. (2007). Behaviour and personality of pet rabbits and their interactions with their owners. *The Veterinary Record* 160, 516-529.
- Mäkitaipale, J., Harcourt-Brown, F. M., Laitinen-Vapaavuori, O. (2015). Health survey of 167 pet rabbits (*Oryctolagus cuniculus*) in Finland. *The Veterinary Record* 177, 418.
- Mäkitaipale, J., Karvinen, I., Virtala, A-M. K., Näreaho, A. (2017). Prevalence of intestinal parasites and risk factor analysis for *Eimeria* infections in Finnish pet rabbits. *Veterinary Parasitology: Regional Studies and Reports* 9, 34-40.
- Pongrácz, P. & Altbäcker, V. (1999). The effect of early handling is dependent upon the state of the rabbit (*Oryctolagus cuniculus*) pups around nursing. *Developmental Psychobiology* 35, 241-251.
- Prebble, J. L. & Meredith, A. L. (2014). Food and water intake and selective feeding in rabbits on four feeding regimes. *Journal Animal Physiology and Animal Nutrition* 98, 991-1000.
- Prebble, J. L., Shaw, J., Meredith, A. L. (2015). Bodyweight and body condition score in rabbits on four different feeding regimes. *Journal of Small Animal Practice* 56, 207-212.

- Princz, Z., Dalle Zotte, A., Radnai, I., Bíró-Németh, E., Matics, Z., Gerencsér, Z., Szendrő, Z. (2008a). Behaviour of growing rabbits under various housing conditions. *Applied Animal Behaviour Science* 111, 342-356.
- Princz, Z., Radnai, I., Biró-Németh, E., Matics, Z., Gerencsér, Z., Nagy, I., & Szendrő, Z. (2008b). Effect of cage height on the welfare of growing rabbits. *Applied Animal Behaviour Science* 114, 284-295.
- Rooney, N. J., Blackwell, E. J., Mullan, S. M., Saunders, R., Baker, P. E., Hill, J. M., ... Held, S. D. E. (2014). The current state of welfare, housing and husbandry of the English pet rabbit population. *BMC Research Notes* 7, 942.
- Schepers, F., Koene, P., Beerda, B. (2009). Welfare assessment in pet rabbits. *Animal Welfare* 18, 477-485.
- Stauffacher, M. (1992). Group housing and enrichment cages for breeding, fattening and laboratory rabbits. *Animal Welfare* 1, 105-125.
- Szendrő, Zs. & Dalle Zotte, A. (2011). Effect of housing conditions on production and behavior of growing meat rabbits: A review. *Livestock Science* 137, 296-303.
- Trocino, A. & Xiggato, G. (2006). Animal welfare in reared rabbits: A review with emphasis on housing systems. *World Rabbit Science* 4, 77-93.
- Tschudin, A., Clauss, M., Codron, D., Liesegang, A., Hatt, J-M. (2011). Water intake in domestic rabbits (*Oryctolagus cuniculus*) from open dishes and nipple drinkers under different water and feeding regimes. *Journal of Animal Physiology and Animal Nutrition* 95, 499-511.
- Ulfsdotter, L. (2013). Rehoming pet rabbits in Sweden – Omplacering av sällskapskaniner i Sverige. Student report nr. 478, Swedish University of Agricultural Sciences.
- White, S. D., Bourdeau, P. J., Meredith, A. (2002). Dermatologic problems of Rabbits. *Seminars in Avian and Exotic Pet Medicine* 11, 141-150.

Soome lemmikküülikute heaolu ja elamistingimuste uuring

ÜLDKOKKUVÕTE

Antud uuring on vaatlusuuring lemmikküülikute populatsiooni kohta Soomes. Soomes on küülikud populaarsed lemmikloomad, kuid endiselt on riigi õigusaktid ebapiisavad ja omanike teadmised võivad olla puudulikud tagamaks küüliku heaolu. Kokku üle tuhande lemmikküüliku kohta antud küsitluse vastused analüüsiti ja võrreldi üldiste suuniste ja varasemate uuringutega.

Uuringu eesmärk oli välja selgitada Soome lemmikküülikute populatsiooni struktuur (vanus, tõug, kastreerimine/steriliseerimine), pidamistingimused, põhiline hooldus ning käsitlemine, käitumine ja toitumine. Üllatuslikult osteti enamik küülikuid täiskasvanud omanikule lemmikloomadeks ja vastajate keskmine vanus oli 28,5 aastat. Küülikute keskmine vanus oli 3,1 aastat, mis on veidi suurem kui Ühendkuningriigis ja Hollandis tehtud varasemate uuringute puhul. Kõige populaarsemad küülikute tõud / liigid olid segaverelised ja kääbus pässid.

Soome lemmikküülikud elavad puurides, mis sobivad küülikutele, põhinedes ülditele soovitudele ja õigusaktidele. Näib, et omanikud on hästi kursis küülikute toitumisvajadustega ja ainult vähesed omanikud söödavad neile müslit või graanuleid *ad libitum*. Enamasti oli hein alati saadaval, mis näitab, et omanikud mõistavad heina tähtsust küüliku toidus. Enamik küülikutest elas koos teise küülikuga, kuid 31,9% elas üksinda. Peitumiskoha puudumine puuris ja sugu (emased > isased) olid tegurid, mis olid seotud küülikute agressiivsema käitumisega. Suurem küülikute arv perekonnas oli seotud vähenenud agressiivse käitumisega. Enamik omanikke veetis oma küülikutega igapäevaselt aega, kuid loomaga päevas veedetavate tundide arv oli nädalavahetustel suurem. Enamikel küülikutel oli võimalus vabalt liikuda väljaspool puuri iga päev. Keskmiselt veetsid kuulid aega väljaspool puuri 12,3 tundi päevas.

Kõigist edaspidistes uuringutes peaks küsimustik olema kavandatud paremini, et vastata uuringu eesmärkidele. Omanike värbamine peaks olema planeeritud paremini, et saada mitmekülgsem valim ja ka vähem motiveeritud omanikud oleksid kaasatud valimisse.

APPENDICES

Appendix 1. Questionnaire in paper form.



Dnro: ____/____

Helsingin Yliopisto
Eläinlääketieteellinen tiedekunta
Kliinisen hevos- ja pieneläinlääketieteen osasto
/ pieneläinsairaudet
Eli Johanna Mäkitäipale
PL 66, 00014 Helsingin Yliopisto
johanna.makitäipale@helsinki.fi

LEMMIKKIKANITUTKIMUS elinolo- ja terveystietolomake

I. Kanin perustiedot:

1. Kutsumanimi: _____ 2. Rotu: _____
3. Virallinen nimi (jos on): _____
4. Tatuointinumero: oik: _____ vas: _____ 5. Väri: _____
6. Syntymäaika: _____ 7. Rekisterinumero (jos on): _____
8. Sukupuoli: naaras: uros: en tiedä:
9. Onko kastrotu/steriloitu? kyllä: ei: en tiedä:
Jos on, milloin? _____
10. Mistä kani on hankittu: kasvattajalta: eläinkaupasta: löytöeläinyhdistykseltä:
muualta: mistä? _____
11. Kuinka kauan kani on ollut perheessänne? _____
12. Onko kani hankittu pääasiassa (rastita vain yksi vaihtoehdoista):
lemmikiksi lapselle: lemmikiksi aikuiselle: lemmikiksi perheelle:
jalostuskäyttöön: harrastuseläimeksi: mikä laji? _____
muu syy: mikä? _____
13. Jos perheessänne on tällä hetkellä muita kaneja, montako muita kaneja on?

- Minkä ikäisiä muut kanit ovat (luettele iät): _____
- Ovatko kanit samassa häkissä/ laumassa keskenään? Kyllä: ei: osittain:
14. Jos perheessänne on ollut kaneja ennen näitä kaneja, montako kania teillä on ollut? _____

Kauanko kanit olivat teillä? _____

Mikä oli luopumissy/ kuolinsyy? _____

II. Elinolosuhteet:

15. Kanin hoidosta pääasiassa vastaavan henkilön ikä: _____

16. Asuuko kani pääasiassa (rastita vain yksi vaihtoehto):

Sisällä asuinhuoneistossa: ulkona piharakennuksessa: ulkona tarhassa:

jossain muualla: missä? _____

17. Jos kani asuu häkissä, mikä on häkin koko? Korkeus _____ cm, leveys _____ cm, pituus _____ cm

Mikä on häkin pohjamateriaali: muovi: ritilä: puru: matto:

muu: mikä? _____

Onko häkissä koppia? Kyllä: ei:

Mitä muuta sisustusta häkissä on? _____

18. Jos kani ei asu häkissä, missä se asuu? _____

19. Jos kanilla käytössä on vessalastikko, mitä on kuivikemateriaalina? _____

20. Kuinka monta tuntia kani viettää keskimäärin aikaa vapaana vuorokaudessa? _____

21. Jos kani ulkoilee kesäisin pihalla, miten se ulkoilee? Väljässä: piha-aitauksessa: vapaana:

muutoin: miten? _____

Miten usein kani ulkoilee? Päivittäin: Muutamia kertoja viikossa:

Muutamia kertoja kuukaudessa: Yksittäisiä kertoja kesän aikana:

Kani on koko kesän ulkona:

22. Jos kanilla on aktivointileluja, millaisia leluja sillä on? _____

23. Miten usein seuraavat hoitotoimenpiteet suoritetaan?

	Useita kertoja päivässä	1-2 x päivässä	Kerran päivässä	Muutamana kerran viikossa	Kerran viikossa	Muutamana kerran kk:ssa	Kerran kk:ssa	larrvittaessa	Ei lainkaan
Huokinta.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
Veden vaihto.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Hajaus.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kynsien leikkaus.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Useita kertoja päivässä	1-2 x päivässä	Kerran päivässä	Muutamana kerran viikossa	Kerran viikossa	Muutamana kerran kk:ssa	Kerran kk:ssa	lärvittäessä	ei iankaan
Kanin pesu.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Laskittaminen .	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Silitteily/raputtelu.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Häkin suursiivous.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Häkin likaisten osien siivous.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

24. Montako tuntia kanin kanssa vietetään aikaa keskimäärin arkipäivänä? _____

25. Montako tuntia kanin kanssa vietetään aikaa keskimäärin vapaapäivänä? _____

III. Ruokinta:

26. Miten usein kani syö seuraavia ruoka-aineita?

	Aina tarjolla	Kerran päivässä	2 kertaa päivässä	Useita kertoja päivässä	Muutamana kerran viikossa	Kerran viikossa	Muutamana kerran kk:ssa	Kerran kk:ssa	Hyvin harvoin	ei iankaan
Heinää	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Siemen-sekoitusta	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kanipellettiä	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Salaatteja	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vihanneksia (esim. kurkkua)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Juureksia (esim. porkkanaa)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Yrttejä	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Hedelmiä (esim. omenaa)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Leipää	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Aina tarjolla	Kerran päivässä	2 kertaa päivässä	Useita kertoja päivässä	Muutamana kerran viikossa	Kerran viikossa	Muutamana kerran kk:ssa	Kerran kk:ssa	Hyvin harvoin	Ei iankaan
Huon oksaa/ varpuja	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hänkinöitä/ siemeniä	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Viljan jyviä	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Luonnonkäsvejiä	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ituja/ versoja	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Suolakeveä	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mineraalikeveä	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vitamiini- tms. ravintolisää	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

27. Millaista heinää kani pääasiassa syö (rastita vain yksi vaihtoehto)?

Kaupasta/ eläinkaupasta ostettua:

Maatilalta/ tallilta tms ostettua:

itse kuivattua:

heinäpellettiä (merkki?): _____

jotain muuta heinävalmistetta, mitä?: _____

Kani ei syö heinää:

28. Jos kani syö heinää, paljonko se syö sitä päivän aikana?

Paljon ja/ta useita kertoja/ pvä: melko paljon ja/ta muutamia kertoja/ pvä:

melko vähän ja/ta yksittäisiä kertoja/ pvä: hyvin vähän ja/ta vain 1-2 kertaa/ pvä:

29. Miten vettä on tarjolla? juomapullosta: kupista: muuten: miten? _____

30. Jos kani syö siemensekoitusta, minkä merkistä (ks. liite)? _____

Minkä verran kani syö siemensekoitusta vuorokaudessa?

1-2 ruokalusikallista: 1/2 desilitraa: 1 dl: enemmän:

Jättääkö kani jotain sekoituksesta syömättä? Kyllä: ei:

Jos jättää, mitä? _____

Onko kanilla aina tarjolla ruokakupissa siemensekoitusta? Kyllä: ei:

31. Jos kani saa kanipellettejä, minkä merkistä (ks. liite)? _____

Minkä verran kani syö pellettejä vuorokaudessa?

1-2 ruokalusikallista: 1/2 desilitraa: 1 dl: enemmän:

Onko kanilla aina tarjolla ruokakupissa kanipellettejä? Kyllä: ei:

32. Jos kani saa seuraavia ruoka-aineita, luettele tarkemmin mitä:

Vihannekset: _____

Juurekset: _____

Hedelmät: _____

Viljan jyvät: _____

Vitamiini- yms.lisä: _____

Luonnonkasvit: _____

33. Kuivaatko kanille luonnonkasveja talveksi? kyllä: ei:

34. Saako kani kaupallisia kaneille/ jyrtsijöille tarkoitettuja makupaloja? Kyllä: ei:

Jos saa, mitä? _____

Jos saa, miten usein? päivittäin: viikottain:

kerran kuukaudessa: muutaman kerran vuodessa:

35. Annetaanko kanille jotain seuraavista ruoka-aineista?

	Ei ollenkaan.	1-2 kertaa vuodessa.	Kuukausittain.	Viikottain.	Päivittäin.
Maitotuotteita	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sitrushedelmiä	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pöryntä	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kaalia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Papuja, herneitä	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Sipulit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Koiran/ kissanruokaa	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

36. Saako kani muuta edellä mainitsematonta ruokaa säännöllisesti? Kyllä: ei:

Jos saa, mitä? _____

37. Onko kanin ruokavalio muuttunut lähiaikoina? Kyllä: ei:

Jos on, miten? _____

Mitä kani söi ennen ruokavalio muutosta? _____

Miksi ruokavalio muutettiin? _____

IV. Terveys

38. Millainen kanisi on tällä hetkellä ruumiinrakenteeltaan?

Laiha: hoikka: sopiva: hieman ylipainoinen: ylipainoinen: en osaa sanoa:

39. Millainen kanisi terveys on mielestäsi tällä hetkellä?

Erinomainen: hyvä: välttävä: huono: en osaa sanoa:

40. Jos kanilla on jotain terveysongelmia tällä hetkellä, mitä? _____

41. Jos kanilla on tällä hetkellä lääkityksiä, mitä lääkityksiä? _____

42. Onko kania hoidettu eläinlääkärin vastaanotolla sen elinaikana?

Kyllä: ei: en tiedä:

Jos on, miksi? _____

43. Onko kania lääkitytty sen elämän aikana?

Kyllä: ei: en tiedä:

Jos on, millä lääkkeellä? _____

44. Onko kanilla ollut joskus joitain seuraavista oireista?

Oire.	Ei.	Kyllä.	En tiedä.	Oire.	Ei.	Kyllä.	En tiedä.
Löysä uloste	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Silmävuoto	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Häpuli	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Kuolaaminen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ummetus	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Hilseily	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mahakipu	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Kutina	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Itsekahaluuttomuus	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Ihothuma	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sierainvuoto	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Iäspaino-ongelmia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aivastelu	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Öntuminen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

45. Onko tällä kanilla tai jollain muulla omistamallanne kanilla ollut murtumia?

Kyllä, tällä kanilla: kyllä, toisella kanilla: kanin nimi: _____ ei:

Kuinka murtuma tapahtui? _____

Mikä luu murtui? _____

Leikattiinko murtuma? Kyllä: ei:

Jos leikattiin, miten paraneminen sujui? _____

Jos ei leikattu, miksi?

Murtuma parantui konservatiivisella hoidolla (esim. häkkilepo, lasta):

Kani lopetettiin murtuman vakavuuden vuoksi:

Kani lopetettiin leikkauksen hinnan vuoksi:

Kani lopetettiin leikkaus-/ nukuksriskin vuoksi:

Kani lopetettiin, koska aikaa ortopedille ei saatu,

ortopedi oli liian kaukana tai ei leikannut kaneja:

muu syy, mikä? _____

46. Kuinka yleisiä murtumat ovat mielestänne kaneilla?

Harvinaisia: melko harvinaisia: en tiedä: melko yleisiä: yleisiä:

47. Mistä kaniin murtumat mielestänne johtuvat? _____

48. Mikäli kanille tulisi leikkausta vaativa murtuma, leikkauttaisitteko kanin?

Kyllä: ehkä: ei: en tiedä:

Jos ette, miksi ette? _____

Paljon leikkaus saisi enimmillään maksaa? _____

49. Mikä on mielestänne kaniin keskimääräinen elinikä? _____

V. Käyttäytyminen:

50. Miten hyvin seuraavat ominaisuudet kuvaavat kaniasi?

	Ei lainkaan	Melko huonosti	Melko hyvin	Hyvin	En osaa sanoa
Arka	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rauhallinen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Seurallinen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Uteliias	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Leikkisä	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vilkas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Temperamenttinen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Itsepäinen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aggressiivinen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Arvaamaton	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Oppivainen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Visas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Helppohoitoinen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sisäsiisti	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Puhdas/ hajuton	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-----------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

51. Jos perheessänne on muita lemmikkieläimiä kuin kaneja, mitä eläimiä teillä on? _____

Ovatko kani ja muut lemmikit tekemisissä keskenään? Kyllä: ei:

Kuinka kani suhtautuu muihin lemmikkeihin? _____

Tapaako kani muutoin muita kaneja? Kyllä: ei:

Jos tapaa, miten usein? Päivittäin: Viikottain: Kuukausittain:

Harvemmin kuin kuukausittain:

Kuinka kani suhtautuu muihin kaneihin? _____

VI. Yhteystiedot:

Omistajan yhteystiedot kerätään terveystarkastuksen tulosten ilmoittamista varten. Tulokset ilmoitamme Teille 2 viikon sisällä. Mikäli tutkimuksessa ilmenee jatkotoimenpiteitä vaativia löydöksiä, saatte samalla lähetteen jatkotutkimuksiin.

Omistajan nimi: _____

Postiosoite: _____

Puhelinnumero: _____

Sähköpostiosoite: _____

Kiitos osallistumisestanne!

Appendix 2. Non-exclusive licence for depositing the final thesis and opening it for the public and the supervisor's (supervisors') confirmation for allowing the thesis for the defence

Hereby I, **Martta Erika Niittynen**
02/06/87

1. grant Eesti Maaülikool, the Estonian University of Life Sciences, a free-of-charge non-exclusive licence to store the final thesis titled **Survey of welfare and housing of Finnish pet rabbits**, supervised by Johanna Mäkitaipale and Toomas Orro for
 - 1.1. preservation;
 - 1.2. depositing a digital copy of the thesis in the archive of DSpace and
 - 1.3. opening it for the public on the Webuntil the validity of the term of protection of copyright.
2. I am aware that the author retains the same rights as listed in point 1;
3. I confirm that by being issued the CC licence no rights deriving from the Personal Data Protection Act and the Intellectual Property Rights Act have been infringed.

Author of the final thesis _____
signature

In Tartu,

The core supervisor's approval for the final thesis to be allowed for defence

This is to confirm that the final thesis is allowed for defence.

.....
Supervisor's name and signature Date

.....
Supervisor's name and signature Date