

The welfare and health status of pet rabbits in Dutch retail

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Abstract

This study is part of an ongoing project at the University of Utrecht. The aim of this large project is to evaluate the health and welfare of pet rabbits in the Netherlands across the entire sector. This includes eight different segments: hobby breeders, commercial breeders, traders, retail, animal markets, petting zoos, animal shelters and the costumers (private pet owners). Attention was paid to the nutrition, housing, health and natural behaviour of the rabbits. This study focuses on the retail segment which by itself can be divided into three subcategories: individual pet shops, chain stores and garden centres.

The research question is ‘What is the current health and welfare status, analysed by means of the Welfare Quality Index (WQI), of pet rabbits at different types of retail in the Netherlands?’. In addition to the main research question the differences between in the health and welfare of rabbits kept in the different subcategories of the retail segment was analysed.

The results from this study show that there are some problems with the health and welfare of the rabbit in the retail facilities that could be improved. These are, the vaccination status, the size of the enclosures, the provision of enrichment and a retreat area, the diet could be improved by giving less concentrate and more fresh greens, and the social housing could be improved as well since many rabbits are housed solitarily. Not many differences were found between the different subcategories.

These findings suggest that there are still some points of interest when it comes to the health and welfare of the rabbits in the Dutch retail. Also improving the welfare of the rabbits in the retail facilities might also have a positive impact on the private sector by providing the right example.

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Introduction

The welfare of animals is becoming an increasingly important topic in society¹. However, the development of valid methods to assess welfare has been a point of discussion. One way to assess animal welfare is by examining the absence of negative welfare. An example of this is the five freedoms of the Farm Animal Welfare Council (1993), based on the five freedoms of Brambell (1965)². These five freedoms are the freedom from thirst, hunger and malnutrition, the freedom from thermal and physical discomfort, the freedom from pain, injury and disease, the freedom from fear and distress and the freedom to express normal behaviour. The downside of this method is that good animal welfare is not only represented by the absence of negative elements but also encompasses the presence of positive aspects³. The faculty of veterinary medicine in Utrecht therefore uses a different model for the assessment of animal welfare namely the model of Ohl and Hellebrekers (2009)⁴. This model states that an individual is in a state of good welfare when it is able to actively adapt to its living conditions and thus can achieve a state that it experienced as positive. This definition of welfare can be applied to the five freedoms as suggested by Ohl and van der Staay (2012)⁵. For example, the freedom to display normal, species- specific behavioural patterns and adapt to changing living conditions up to a level that is perceived as positive. Mellor (2016)³ developed a different model in which the positive aspects are also taken into account when assessing animal welfare. This model is called the five domain model. The five domains represented in this model are nutrition, environment, health, behaviour and mental state³. These domains are subdivided into positive and negative elements (table 1).

The different models to evaluate animal welfare can be applied to a miscellaneous of animal species. These models were designed to evaluate the welfare of livestock, but the models can be applied to companion animals as well.

Table 1: The five domain model of Mellor (2016). Showing positive and negative aspects of animal welfare.

Physical/functional domains							
Survival- related factors				Situation-related factors			
1: Nutrition		2. Environment		3. Health		4. health	
Negative	Positive	Negative	Positive	Negative	Positive	Negative	Positive
Restricted water & food	Enough water & food	Uncomfortable or unpleasant physical features of environment	Physical environment comfortable or pleasant	Disease, injury and/or functional impairment	Healthy, fit and/or uninjured	Behavioural expression restricted	Able to express rewarding behaviours
Poor food quality	Balanced and varied diet						
Affective experience domains							
5. Mental state							
Negative experiences				Positive experiences			
Thirst	Breathless	Anger: frustration		Drinking pleasures	Vigour of good health & fitness	Calmness, in control	
Hunger	Pain	Boredom, helplessness		Taste pleasures	Reward	Affectionate sociability	
Malnutrition malaise	Debility, weakness	Loneliness, depression		Chewing pleasures	Goal directed engagement	Maternally rewarded	
Chilling/ overheating	Nausea, sickness	Anxiety, fearfulness		Safety	Sexually gratified	Exited playfulness	
Hearing discomfort	Dizziness	Panic, exhaustion		Physical comforts			

With approximately 1.2 million rabbits kept in the Netherlands, the rabbit is one of the most popular companion animals. It is outnumbered as a companion animal only by cats and dogs⁶. However, contrary to popular belief, rabbits are not low maintenance pets⁷. Previous studies showed that pet rabbits often seem to have health and welfare problems⁸⁻¹⁰. Many of these problems are linked to diet, housing and socialisation⁹⁻¹².

The pet rabbit industry can roughly be divided into eight different segments: hobby breeders, commercial breeders, traders, retail, animal markets, petting zoos, animal shelters and the costumers (private pet owners). Many rabbits flow from one segment to the next at different stages in its life. In each of these segments, the rabbit's health and welfare may be impacted in different ways. Moreover, it is important to consider that when an animal experiences stress early in life, this could result in a maladaptive stress response system and an increased vulnerability to illness at each stage after¹³. Because of this, it is particularly important to ensure a good state of health and welfare of rabbits in the early life phases, prior to their arrival at the private owner. This time is partly spent at the retail segment.

The retail segment of the pet rabbit industry can be roughly divided into pet shops and garden centres. These retailers can furthermore be independent stores or chain stores. It is possible that differences exist between garden centres and pet shops, as well as between chain stores and individual pet shops. These differences could exist because of the type of management, individual decisions versus decisions made by the chain store management, or because of the different focus of the shops: complete focus on animals or animals as a one of the many products of the garden centre. Should it become clear that differences exist between the different types of stores, then it is important to establish what these differences are. Since different measures should be taken to improve different problems.

Aim

This study focused on the retail segment of the pet rabbits in the Netherlands. The aim of this study was to analyse the health and welfare of rabbits housed at retail facilities in the Netherlands. The research question was 'What is the current health and welfare status, analysed by means of the Welfare Quality Index (WQI), of pet rabbits at different types of retail in the Netherlands?'. Besides the overall status of the health and welfare of the rabbits in the Dutch retail, the differences between in the health and welfare of rabbits kept in the different subcategories of the retail segment was analysed.

To answer the main research question, five aspects of welfare were analysed, nutrition, environment, health, behaviour and mental state. The hypothesis was that the health and welfare of the rabbits will deviate from the WQI⁹⁻¹². The hypotheses of the differences between the subsections were H0: no differences will be found between the different subsections of the retail. H1: a difference will be found between the different subsections of the retail.

The present study is part of an ongoing study at the University of Utrecht, executed by the department of Clinical Sciences of Companion Animals and the department of Animals in Science and Society, called 'Research on the current health and welfare status of rabbits in the companion animal sector: identification of problems and possible solutions'. The aim is to evaluate the health and welfare of pet rabbits in the Netherlands across the entire sector, which includes the eight aforementioned segments. Attention was paid to the nutrition, housing, health and natural behaviour of the rabbits.

Nutrition

Regarding nutrition, it is important to assess the quality and quantity of the animals diet. A rabbits diet should consist of unlimited access to hay, a little bit of fresh greens (10-15%) and a restricted amount of concentrate (2-3% of the rabbits body weight per day), selective eating should not occur¹⁴⁻¹⁶. Water access should be available ad libitum^{17,18}.

Environment

Regarding its environment, the dimensions of the habitat and presence of enrichment to prevent boredom may be crucial factors. The enclosure should be of suitable size, depending on the size of the rabbits and the presence of a freely accessible run. For two dwarf rabbits the minimal size of an enclosure of 80cm x 150cm is advised and all rabbits should be able to stand fully stretched on their hind leg in the enclosure¹⁹. A place to withdraw themselves is very important to rabbits so they can rest and use as a shelter space. Furthermore, they need shelter from the sun, the rain and the wind so they can retreat themselves if needed²⁰. It is also important that the rabbits come in contact with natural daylight to prevent vitamin D deficiency²¹. Rabbits are sensitive to heat. When the temperature rises above 28°C heat stress may occur. The animals are relatively resistant to cold but temperature under 3°C can cause cold stress^{14,22}.

Rabbits may benefit from social housing since they are social animals²⁰. The best combination is a neutered buck with a neutered doe^{23,24}. If the rabbits show agonistic behaviour in significant amounts toward each other it is best to separate them^{10,16,19,23}. It is best not to house rabbits with guinea pigs as a companion because of pathogens they carry which can be harmful to the different species^{14,20,24}.

It is advisable to daily clean the feeding bowl and the part in which the faeces are deposited. The enclosure and the drinking bowl/bottle are advised to be cleaned weekly.

Health

Regarding the health status, the animal must be free of any health concerns that affect it in a negative way. The rabbit should be free of pain, have smooth fur, nail that are not overgrown, healthy mucous membranes, no eye/ere outflow, no wet fur around the mouth, no pododermatitis, with normal breeding and a normal heart rate, no abnormalities should be found with palpation of the abdomen and no dental problems²⁴⁻²⁶. If there is no desire to breed with the animal, it is advised to neuter them^{16,20}. Yearly vaccination for myxomatosis and rabbit haemorrhagic disease virus (RHDV) is advised¹⁰.

Behaviour

Regarding the behaviour of the rabbit, it is important that the rabbit is able to display its natural behaviour. Many of the natural behaviours can be facilitated by appropriate housing. Hiding and resting behaviour is possible when provided with a shelter space, standing on their hind legs fully stretched and hopping behaviour is possible when the enclosure is of a suitable size and social housing will enable social behaviour. Other natural behaviours a rabbits should be able to perform are digging, foraging, marking, exploring and eating in natural grazing posture^{14,16,20,23,26}. This can all be arranged by the proper housing, toys, hay and a run with digging possibilities. This is important to prevent boredom, which can cause stereotype behaviour^{10,12,27}. It is advised that the rabbits get at least four hours of free exercise on a daily basis to prevent health problems^{20,28,29}.

Materials and methods

Subjects

Data has been collected through a questionnaire that has been distributed throughout the different segments. This study used the data of the retail segment that was collected with these questionnaires. Only the stores that sell rabbits were selected for the sample.

Furthermore, several retail facilities were visited and an assessment of the health and welfare of the rabbits in these facilities was made. To obtain an overview of the health and welfare of the rabbits within garden centres and pet shops. 12 garden centres, 12 independent pet shops and 12 chain stores were visited. The locations that were visited are selected from different parts of the country to create a good overview for the Netherlands. From cities to more rural areas. The stores were approached and asked if they wanted to participate in the study. Again only stores that sold rabbits were selected for this study.

Procedure

During the visits an interview was held with a knowledgeable staff member, either manager or employee, to obtain general information about the rabbits in that particular store. In addition, the health and behaviour of the rabbits as well as their living conditions (housing, nutrition, environment) were assessed using the welfare quality checklist that was compiled and validated in a previous stage of the project, in which the various welfare aspects as identified by Ohl and Staay, and Mellor are included. Positive, neutral or negative value were added to the answers to the questions of the checklist (see appendix A). This data is used to analyse the health and welfare of the pet rabbits in Dutch retail and to see if there are differences between the different types of stores.

The visits started with a 5-minute observation of behaviour of three of the rabbits, followed by the interview. After the interview, another observation of 5 minutes took place followed by the examination of one rabbit to evaluate its health. When the rabbits were put back in the enclosures, the husbandry was analysed followed by another 5-minute observation of the same three rabbits as before.

No IACUC or CCD approval was required for this study, since the assessment only includes non-invasive handling and observation of the animal's health, behaviour and husbandry.

When assessing the health and welfare of rabbits in retail facilities, various factors were considered. The five domains give a good overview of the important aspects. The following aspects were analysed with the use of the WQI during the visits.

Data analysis

The data collected during the location visits was used to analyse the health and welfare of the rabbits. To determine the health and welfare, the five freedoms as formulated by Ohl and Staay (20012)⁵ were analysed, the freedom to react adequately to hunger, thirst or incorrect food, the freedom to react adequately to physical and thermal discomfort, the freedom to react adequately to pain, injury and illness, the freedom to react adequately to fear and chronic stress and the freedom to display normal behavioural patterns that allow the animal to adapt to the demands of the prevailing environment circumstances and enable it to reach a state that it perceives as positive.

Descriptive analysis was done to determine the current situation of the rabbits in the Dutch retail and the groups were compared using a Chi-square test for categorical variables and the one-way ANOVA for the continued variables. If an assumption was violated the required steps were taken. For the chi-square test, if the expected count was more than 20% the significance of the likelihood ratio was checked. For the ANOVA, if the significance of the Levene's test was below .05 than the Brown-Forsythrow test statistic was interpreted.

Results

For most of the variables, no differences were found between the different subcategories. When a difference was found, the data of all the groups is given separately as well as the sample as a whole. If not, then the data is grouped and presented collectively.

Location visits

General results

These results are from 36 stores: 12 independent pet shops, 12 chain stores and 12 garden centres. The average number of rabbits present in these stores was 2.83, with a median of 2 and a range between 1 and 6. All the stores said to have a KvK-, UBN-registration and a btw-number. None of the stores advertised for the sales of the rabbits.

The average number of suppliers was 1.08, with a median of 1 and a range between 1 and 3. Of these suppliers 11% was a hobby breeder and 89% was a commercial breeder. None of the rabbits supplied to the stores came from a foreign country. All of the suppliers got a compensation for the supplied rabbits which can be seen in figure 1. This figure shows the relative amount of compensation they receive for the supply of the rabbits.

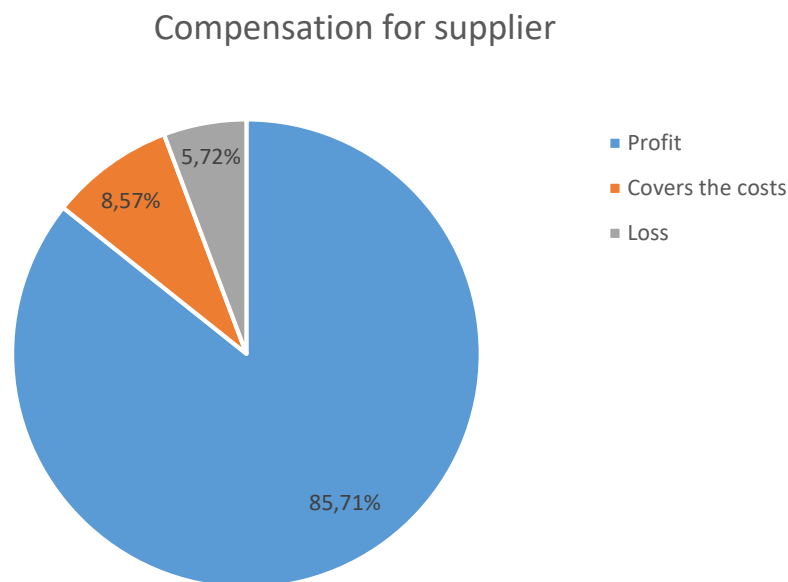


Figure 1: The relative amount of compensation for the suppliers of the rabbits

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The average number of rabbits supplied to the stores per year is 59, with a median of 30 and a range between 10 and 450. The ages at which the rabbits arrive at the store significantly differed between the subcategories. The minimum, average and maximum ages in days, at which the rabbits arrive at the store are presented in table 2.

Table 2: Minimum, average and maximum age in days, at which the rabbits arrive at the store. Presented separately for every subcategory of the retail segment.

	Min. age at which the rabbits arrive at the store				Average age at which the rabbits arrive at the store				Max. age at which the rabbits arrive at the store			
	All	Individual	Chain	Garden	All	Individual	Chain	Garden	All	Individual	Chain	Garden
Mean	55	55	55	55	71	73	72	68	119	103	161	93
Median	56	56	56	56	70	70	70	67	105	98	112	84
Range	49-56	49-56	49-56	49-56	56-112	56-112	56-112	56-184	70-365	84-175	112-365	70-175

All of the stores only sold rabbits to private owners. The average number of rabbits sold in the store per year is 56, with a median of 30 and a range between 10 and 430. None of the stores supplied rabbits to foreign countries. All retail facilities got a compensation for the sales of the rabbits, which can be seen in figure 2.

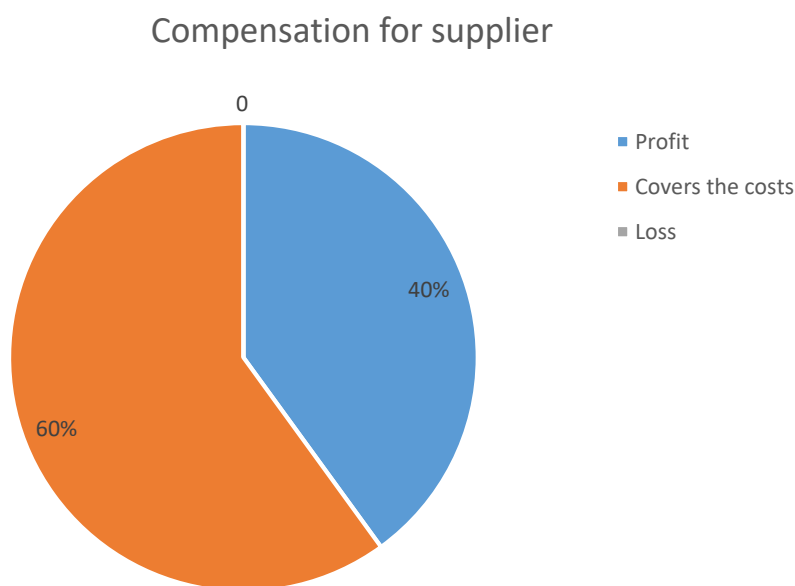


Figure 2: The relative amount of compensation for the rabbits that the stores sells

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The minimum, average and maximum time, in days, that the rabbits spent in the stores before they leave is presented table 3.

Table 3: Minimum, average and maximum time spent in de store in days

	Minimum time spent in the store	Average time spent in the store	Maximum time spent in the store
Mean	1	23	84
Median	0	14	84
Range	0-7	7-70	28-175

33.3% of the stores sometimes have rabbits that could not be sold. The average percentage of unsold rabbits is 8.4%, with a median of 10% with a range between 0% and 20%. 25% of the retail facilities occasionally get rabbits returned. The average percentage of rabbits that gets returned is 3.8%, with a median of 2% and with a range between 0% and 10%. What happens to the rabbits that are leftover or get returned to the store can be seen in figure 3.

Continuation of unsold/ returned rabbits

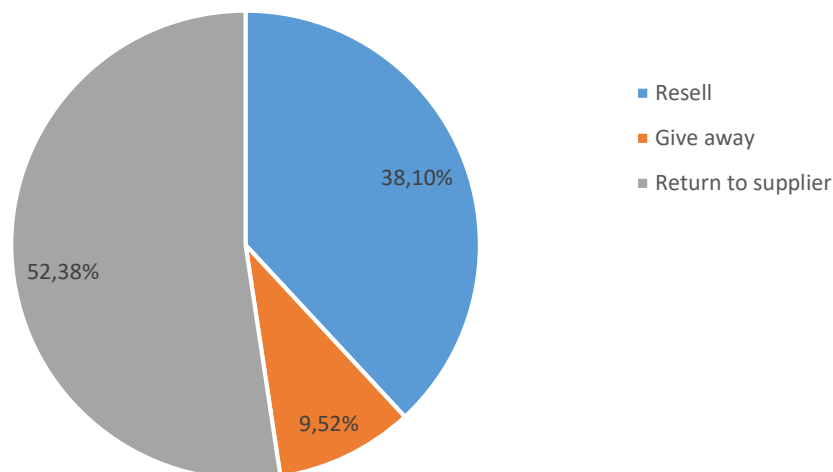


Figure 3: What happens to the rabbits that are not sold or returned to the store.

61.1% of the stores report that they have to deal with occasional mortality in the store. The average mortality rate of the rabbits in the store is 1.7%, with a median of 1% and a range between 0% and 10%.

Most stores only sell small rabbits. The breeds that are sold in the stores are presented in figure 4, other breeds were not sold in this sample. 83.3% of the stores sells bucks and does, 11.1% only sells does and 5.6% only sell bucks.

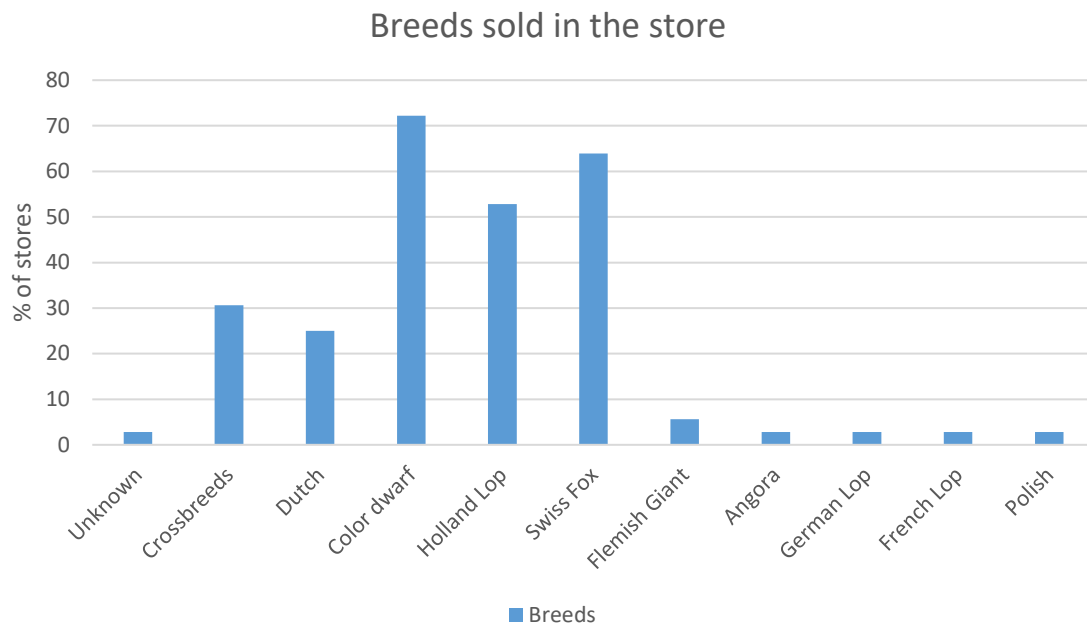


Figure 4: Breeds that are sold in the stores

The information provided about the average time investment per day for caring for the rabbit at home was 36 minutes, with a median of 25 minutes and a range between 5 and 120 minutes. The information about the expected cost per month had an average of 23,64 euros, with a median of 25 euro and a range between 10 and 55 euros.

Other sources of information recommended by the retail facilities were flyers from their own store (19.4%) and the LICG (8.3%). However, the extra sources for information significantly differed between the subcategories, 16.7% of the independent pet shops did refer to LICG for extra information, the rest did not provide any extra sources. 58.3% of the chain stores provided the customer with their own flyer, 8.3% referred to LICG and 33.3% did not give other sources of information. The garden centres did not provide any other sources of information.

The different subcategories report different ways in which they deal with consumers that seem to want to buy the rabbit impulsively. The different actions taken by the stores are presented in figure 5.

Most of the stores think there are sub-optimal products sold in their facility (84%), they all referred to the size of the small enclosures as the sub-optimal product. 100% of these stores said that the (low) price is a reason these products are bought nevertheless, other reasons given were convenience (15%), the way the product looks (15%) and ignorance (5%). When asked what they wanted to change in their stores only 3 different answers were given. 30.5% would like to see the rabbits in a bigger enclosure, 52.8% would like a big free run for the rabbits and the rest (16.7%) did not wish to change anything in the store.

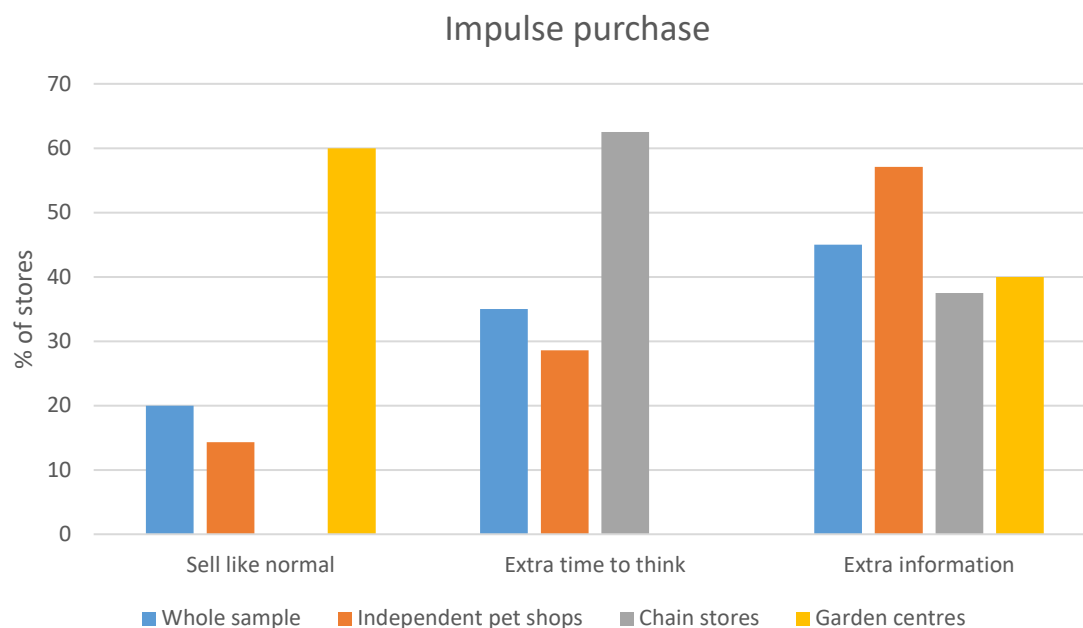


Figure 5: : Actions taken by the stores when concerning an impulse purchase. Presented separately per subcategory

The freedom to react adequately to hunger, thirst or incorrect food

The composition and the quantities of the food given to the rabbits in the stores is presented in table 4. The table is subdivided into different food components that the rabbits could be given.

Table 4: Composition and quantities of the food given to the rabbits (%)

Type of food	Unlimited	Daily large quantities	Daily limited quantities	Limited to small amounts	Almost never/never
Hay	88.9	11.1	-	-	-
Concentrate	2.8	91.7	5.6	-	-
Vegetable	-	13.9	16.7	27.8	41.7
Fruit	-	5.6	5.6	33.3	55.6
Plants	-	-	2.8	-	97.2
Grass	-	-	-	2.8	97.2
Muesli/grains	-	-	-	2.8	97.2
Bread	-	-	-	5.6	94.4
Treats	-	-	2.8	41.7	55.6
Additions to drinking water	-	-	2.8	16.7	80.6
Mineral lick	-	-	-	-	100

The composition of the food differed between the segments for vegetables and fruit. The amount of vegetables given in independent pet shops is 16.7% daily in large quantities, 16.7% daily in limited quantities, 50% limited to small amounts and 16.7% almost never/never. For chain stores the amount of vegetables given to the rabbits is 25% daily in large quantities, 16.7% daily in limited quantities, 25% limited to small amounts and 33.3% almost never/never. And for garden centres this was 16.7% daily in limited quantities, 8.3% limited to small amounts and 75% almost never/never.

The fruit given to the rabbits in independent pet shops is 8.3% daily in large quantities, 66.7% limited to small amounts and 25% almost never/never. For chain stores this was 8.3% daily in large quantities, 8.3% daily limited quantities, 8.3% limited to small amounts and 75% almost never/never. And for garden centres this was 8.3% daily in large quantities, 25% limited to small amounts and 66.7% almost never/never.

The brands of concentrate the retail facilities give to the rabbits can be seen in figure 6. This significantly differed between the stores as well, as presented in figure 6. No selective eating was reported. In most stores (n=35) selective eating was not possible because of the chosen food pellets. Most rabbits shared one drinking spot with one other rabbit (49.1%). 34% had a drinking spot to themselves, 3.8% had to share their drinking sport with three other rabbits and 1.9% had to share with 5 rabbits. 7.5% had 2 drinker spots per rabbits (these were all rabbits housed in solitary with 2 drinking supplies).

All of the supplied water was from the tap and access to it was ad libitum. Most stores provided drinking bottles (83.3%) instead of an open bowl (11.1%) or both (5.6%). The drinking bottles were at an appropriate height in 91.7% of the retail facilities in the rest the drinking bottle was a little too low for the rabbits to drink from in a comfortable position. Almost half (47.2%) shared a feeding bowl with one other rabbit. 41.5% had a feeding bowl to themselves, 1.9% had .4 bowls per rabbit, 7.6% had .33 feeding bowls per rabbit and 19% had .25 feeding bowls per rabbit.

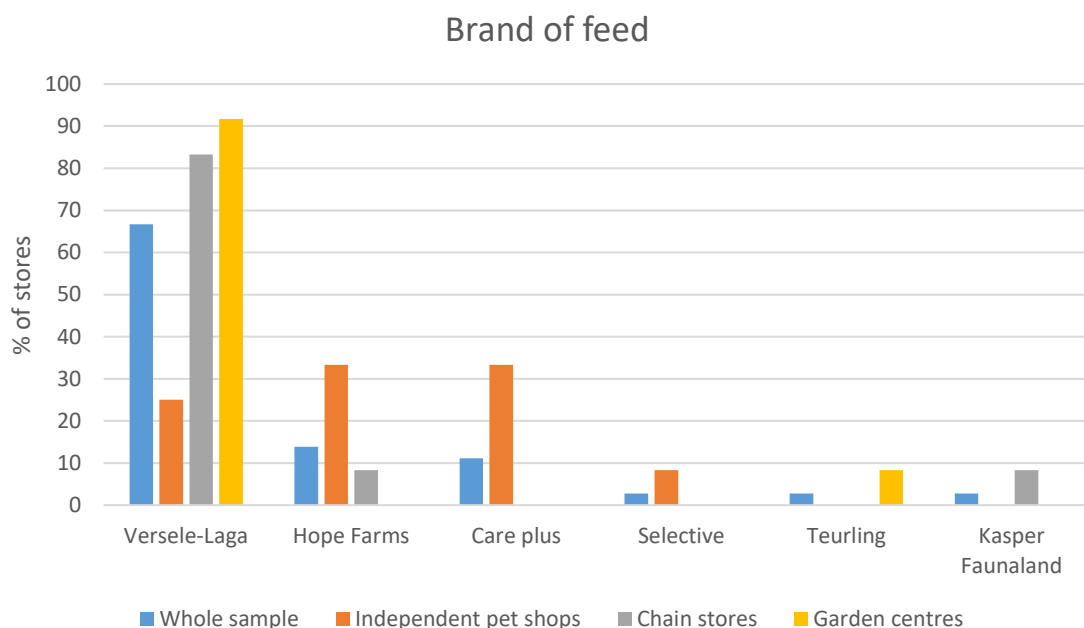


Figure 6: Brands of concentrate given to the rabbits by the stores. Presented separately per subcategory

The freedom to react adequately to physical and thermal discomfort

All of the enclosures were located in the walking route situated in the centre of the room and none of the enclosures varied with the season. All the enclosures were at room temperature but not measurable for the exact temperature. Most days this will be between 15 and 25 °C, this is the thermoneutral zone. None of the rabbits showed any signs of heat or cold stress.

In 97.2% of the stores the walls and floors of the enclosures were entirely made out of glass, the other 2.8% had wire walls and glass floors.

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The bedding in the enclosures differed significantly between the subcategories and is shown in figure 7. The bedding covered the entire floor so no large part of the surface was slippery in any of the enclosures.

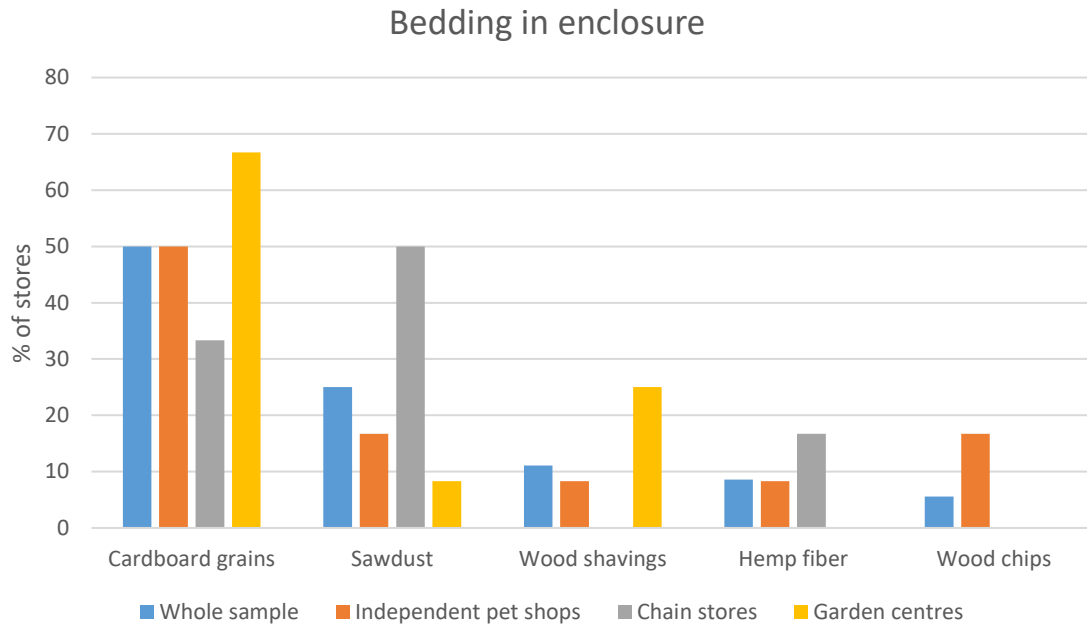


Figure 7: Bedding used in the enclosures of the rabbits. Presented separately per subcategory

The size of the enclosures can be seen in figure 8. 94.2% of the enclosures had a height of 50 cm, the rest had a height of 90 cm. None of the enclosures had a freely accessible run. But in 13.9% the rabbits did come out of the enclosures, this was less than daily and for less than 4 hours per day. The bedding the rabbits were on when outside of the enclosure can be seen in figure 9. All enclosures had only one floor level.

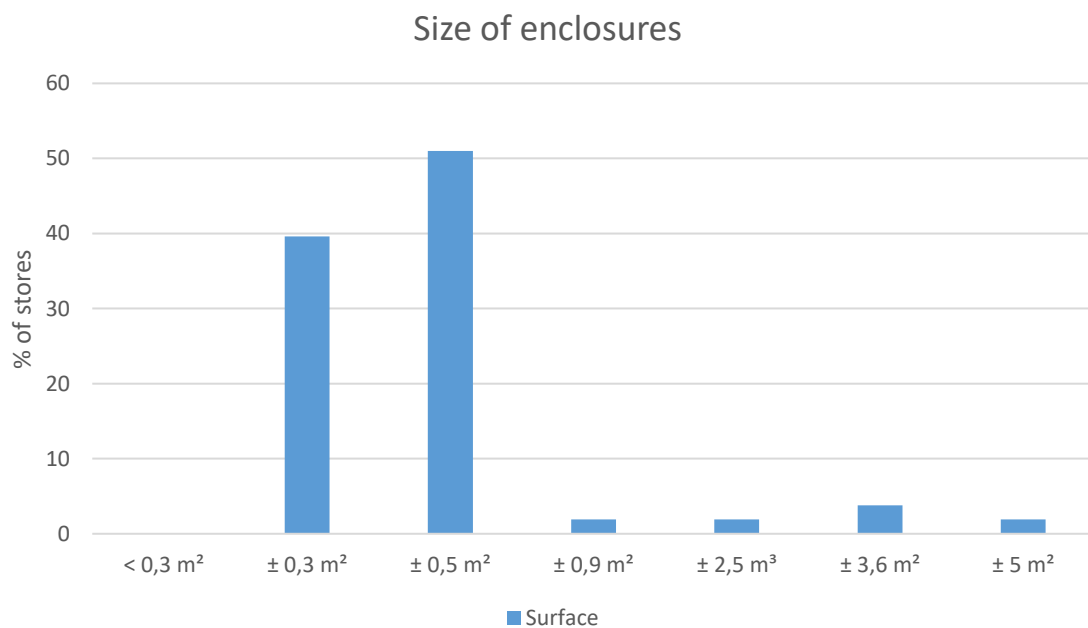


Figure 8: Dimensions of the enclosures of the rabbits.

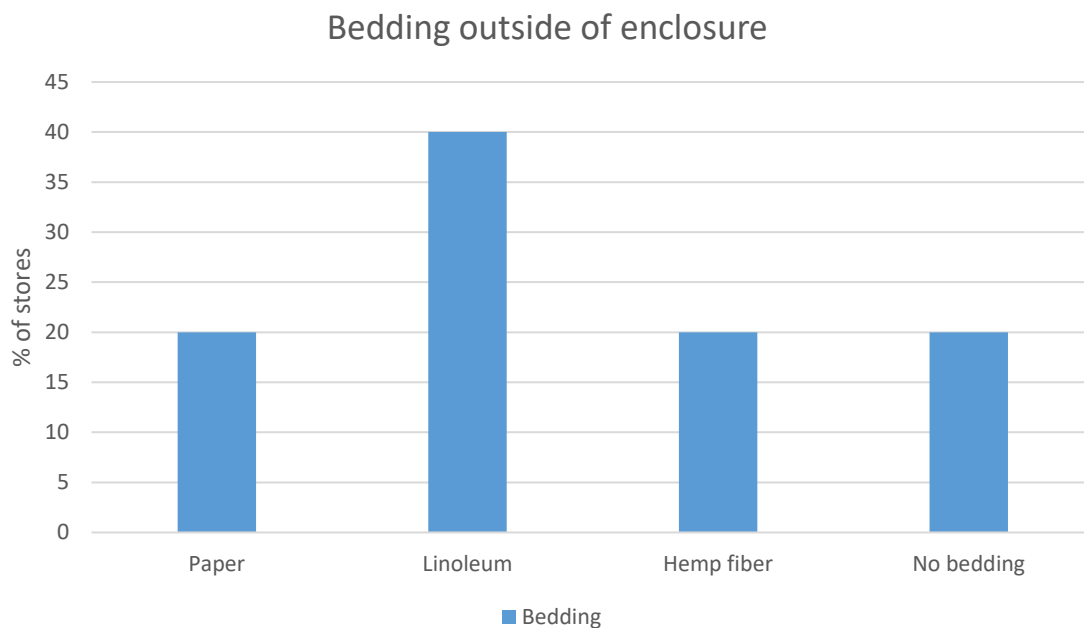


Figure 9: Bedding used outside of the enclosures.

Only 19.4% of the enclosures had a lookout spot and 33.3% had a retreat area. Most enclosures had the possibility to withdraw themselves from direct sunlight (91.7%), 22.2% of the rabbits had the possibility to sufficiently come into contact with direct sunlight and 72.2% of the rabbits had a minimal possibility to come in contact with direct sunlight. None of the rabbits were exposed to rain, wind or draft because of the inside locations and the glass walls. None of the enclosures had a dull smell / smelled of ammonia and the enclosures were all naturally ventilated.

The enclosures were cleaned less than weekly in 5.6% of the stores, weekly in 38.9% and more than weekly in 55.6% of the stores. However, this differed between the subcategories. The independent pet shops cleaned the enclosure less than weekly in 16.7%, weekly 8.3% and more than weekly 75%. The chain stores weekly in 66.7% of the stores and more than weekly in the rest. And of the garden centres, 41.7% cleaned the enclosure weekly. The rest more than weekly. The part with the faeces was cleaned more often, daily in 61.1% but less than daily is the rest of the stores. The feeding bowl and water supplies were cleaned daily in 86.1% of the stores, weekly in the rest. 19.4% of the enclosures had a litter box. The bedding of these litter boxes were cardboard grain (85.7%) or sawdust (14.3%). Most enclosures were clean at the moment of observation, just as the feeding bowl, the water supplies and the section where the faeces are deposited. Figure 10 shows the cleanliness as seen during the location visits.

Only 1 store (2.8%) that was visited bred with the rabbits. This was an independent pet shop. The store bred a maximum of 4 litters per doe per year, with at least 1 month in between two litters. No retail facilities had neutered rabbits and none of the rabbits were tattooed.

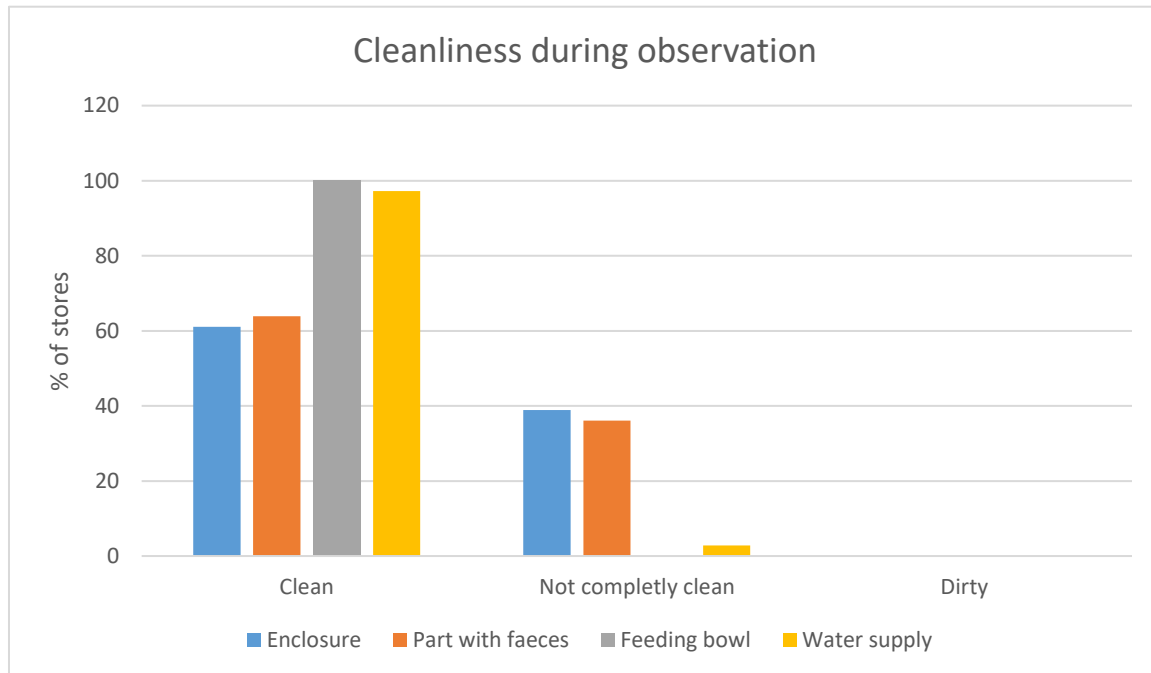


Figure 10: Cleanliness during observation

The freedom to react adequately to pain, injury and illness

The enclosures did not have any sharp edges that could cause injuries. The rabbits were all young, 94.4% had an appropriate body condition for their age. The rest was a little underweight. The rabbits in the retail facilities showed almost no signs of pain, injury or disease. Only 8.3% showed a little red mucous membrane of the eyes, 2.8% of the rabbits had some tangled hairs and 25% of the rabbits were not completely clean around the anus. However, this also differed between the subcategories: in independent pet shops only 16.7% had some traces of faeces around the anus, in the chain stores this was 58.3% and in the garden centres all rabbits were completely clean around the anus.

Not all stores sold vaccinated rabbits. The percentages of stores that did sell vaccinated rabbits is presented in figure 11. None of the stores had preventative treatment for coccidiosis, worms, fungal infections or ear/fur mites except for one store. 55.6% of the stores treated for coccidiosis, 72.2% for worms and fungi and 75% treated for mites. The rest of the stores did not perform any form of treatment for these problems.

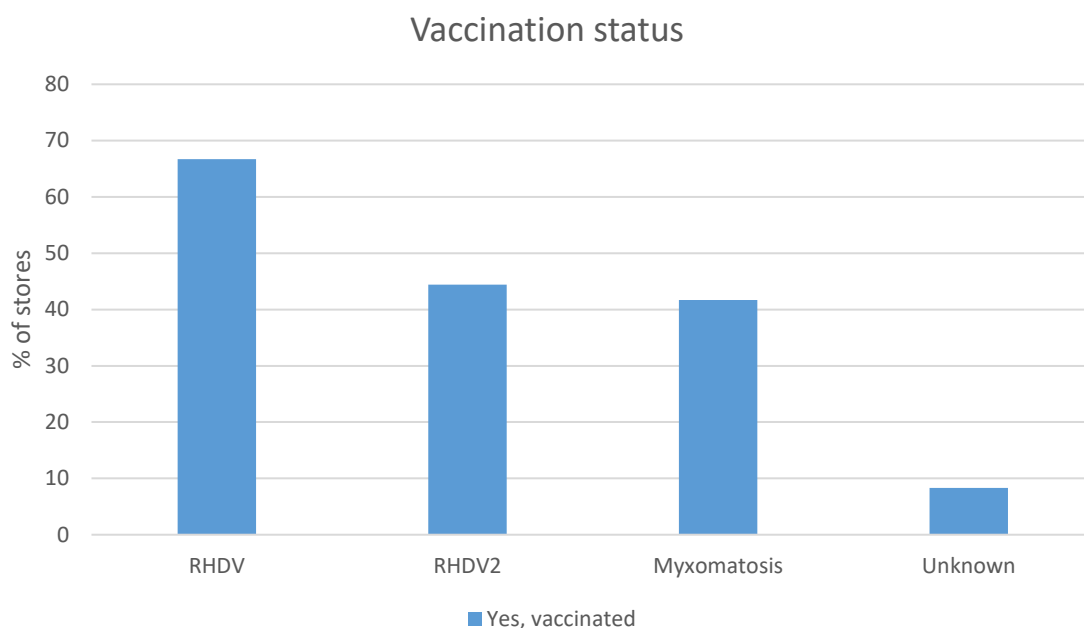


Figure 11: Percentage of stores that sold vaccinated rabbits.

The freedom to react adequately to fear and chronic stress

A little more than half of the rabbits are housed socially (55.6%), of these rabbits 48.2% is housed with other rabbits and 9.4% is housed with other species. 44.4% is housed solitarily. The rabbits that were housed with another species were all housed with a guinea pig.

Many of the socially housed rabbits did not show any form of interaction with each other (71.4%). 19% washed each other and 9.5% of the rabbits were lying next to each other. In all of the stores the intact bucks were housed with intact bucks and intact does with intact does. No other combinations were seen.

In 33.3% of the stores only one rabbit was present. These rabbits did not have any kind of contact with other rabbits. All of the rabbits that were housed solitarily but were not the only rabbit present in the store, had the possibility to see and smell other rabbits.

None of the rabbits were completely protected from predators, since all the rabbits were in the centre of the shop and other animals, such as dogs, were allowed in. The rabbits were in no case in actual danger but they were able to see, hear and smell the predators. None of the rabbits had the possibility to completely withdraw from this exposure.

In 72.2% of the stores enrichment was present. All stores where enrichment was available the rabbits used all forms provided. See table 5 for the types of enrichment provided, the exploration enrichment significantly differed between the subcategories so this has been subdivided.

Table 5: Enrichment present in the stores (%)

	Hole sample	Independent	Chain	Garden centre
Exploration enrichment	47.2	55.6	100	44.4
Food enrichment	19.4			
Senses enrichment	38.9			
Gnaw enrichment	11.1			
Tunnel enrichment	0			
Digging enrichment	2.8			

94.4% of the enclosures were in a relatively quiet spot. The other stores were noisier because of the close proximity to birdcages. None of the rabbits exhibited signs of fear caused by the location in the store.

The percentage where a retreat area was available was 33.3%. 13% of these hideouts were big enough for all the present rabbits and in 75.6% only big enough to be used by only some of the animals present in the enclosure simultaneously.

In 27.8% of the enclosures gnawing on the enclosure was visible. The enclosures without enrichments or hideouts did not show any signs of gnawing, possibly because there was no possibility to gnaw on anything because of the stone feeding bowls and glass walls.

The reaction to unexpected noises was as expected for all of the animals. Reaction of the rabbit to an approaching hand and to being handled was in most cases to flee. The reactions of the rabbits observed during the locations visits are presented in figure 12.

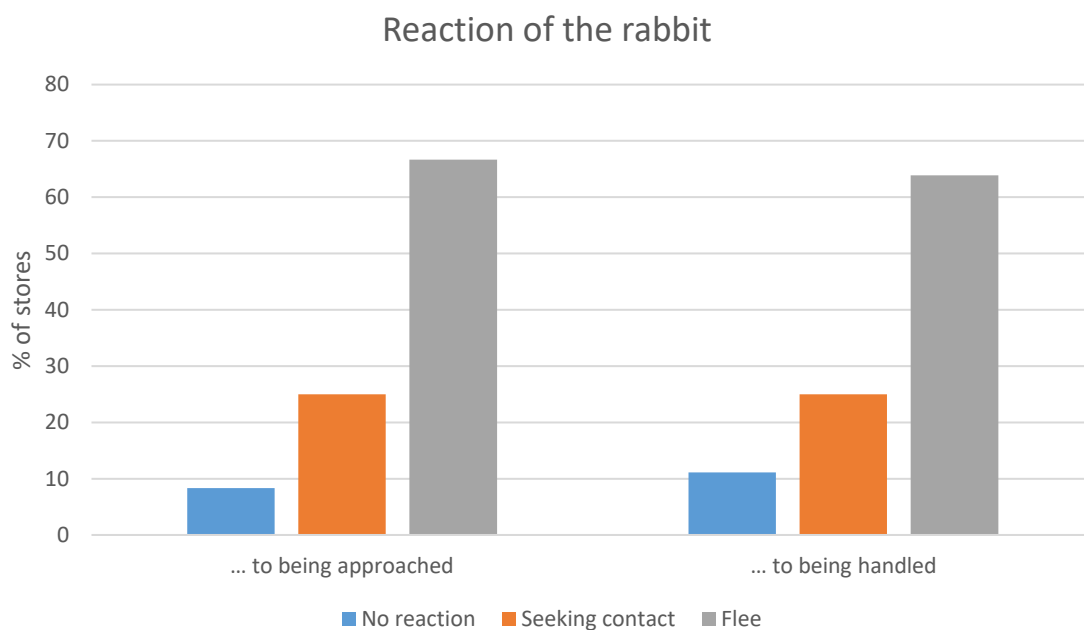


Figure 12: Reaction of the rabbit to being approached and to being handled as seen during the locations visits

The freedom to display normal behavioural patterns that allow the animal to adapt to the demands of the prevailing environmental circumstances and enable it to reach a state that it perceives as positive

22.2% of the rabbits had the opportunity to hide themselves in the enclosure, 8.3% had a minimal possibility to hide and the rest did not have that opportunity at all. However, this differed between the subcategories of the retail segment. In the independent pet shops only 16.7% had a retreat area. In the chain stores this was also 16.7% but in the garden centres this was 33.3%

All rabbits had the possibility to exhibit resting behaviour, just as they all had the possibility to stand fully stretched on their hind legs.

Most rabbits only had a minimal opportunity to perform hopping behaviour (91.7%), they only had a "small" enclosure to hop in, 8.3% had good hopping opportunities.

None of the rabbits had the possibility to dig properly. They only had the shallow bedding of the enclosures that was provided to "dig" in.

No exploratory behaviour was seen in the enclosure without enrichment (25%). The rest of the rabbits had limited opportunities to display exploratory behaviour (66.7%).

The foraging behaviour of the rabbits was limited to the food provided in the enclosures. In all enclosures this was a feeding bowl with concentrate and hay provided on the floor or from a hanging feeding ball.

The rabbits with the hay on the floor (80.6%) had the best opportunities for grazing in a natural posture, the rest of the rabbits only had the feeding bowl on the floor to perform grazing behaviour in a natural posture.

The frequency of different behaviours as reported by the owner/employee is shown in table 6. Behaviour observed during the observation time in the stores is shown in table 7. The behaviours that are considered negative have been marked with a (-). Table 6 and 7 show the percentage of stores that provided that certain answer.

Table 6: Behaviours seen by the employee/owner (%)

	<i>Almost always</i>	<i>Often</i>	<i>Sometimes</i>	<i>Almost never</i>	<i>Never</i>	<i>N.a.</i>
<i>Binky's</i>	5.6	69.4	19.4	5.6	-	-
<i>Running</i>	-	72.2	27.8	-	-	-
<i>Lie on the side</i>	22.2	75	2.8	-	-	-
<i>Lie with legs to the back</i>	16.7	58.3	25	-	-	-
<i>Hide in a corner</i>	-	11.1	27.8	50	11.1	-
<i>Huddled up (-)</i>	-	2.8	8.3	72.2	16.7	-
<i>Lie against each other</i>	13.9	72.2	8.3	5.6	-	-
<i>Wash each other</i>	-	69.4	27.8	-	2.8	-
<i>Ride other rabbits</i>	-	2.8	22.2	8.3	13.9	2.8
<i>Ride humans, objects or other species</i>	-	-	5.6	44.4	44.4	5.6
<i>Fight (-)</i>	-	-	11.1	61.1	27.8	-
<i>Marking</i>	-	-	52.8	41.7	5.6	-
<i>Spraying urine</i>	-	2.8	47.2	36.1	13.9	-
<i>Pointless digging (-)</i>	-	16.7	58.3	25	-	-
<i>Digging</i>	-	-	5.6	25	25	44.4
<i>Gnawing on enclosure (-)</i>	-	2.8	30.6	47.2	11.1	8.3
<i>Gnawing on supplied materials</i>	11.1	44.4	30.6	13.9	-	-
<i>Grow (-)</i>	-	-	5.6	55.6	38.9	-
<i>Aggression to humans (-)</i>	-	-	2.8	38.9	58.3	-
<i>Resist handling (-)</i>	-	25	41.7	33.3	-	-
<i>Show interest in humans</i>	-	58.3	41.7	-	-	-
<i>Stamping with hind leg</i>	-	-	36.1	55.6	8.3	-
<i>Stand fully stretched</i>	8.3	58.3	16.7	16.7	-	-

The welfare and health status of pet rabbits in Dutch retail

Table 7: Behaviours seen during observation (%)

	Observed
<i>Binky's</i>	21.6
<i>Running</i>	16.2
<i>Lie on the side</i>	8.1
<i>Lie with legs to the back</i>	13.5
<i>Other resting behaviour</i>	31.1
<i>Hide in a corner</i>	5.4
<i>Huddled up (-)</i>	1.4
<i>Lie against each other</i>	4.1
<i>Wash each other</i>	6.8
<i>Washing</i>	31.1
<i>Ride other rabbits</i>	0
<i>Ride humans, objects or other species</i>	0
<i>Fight (-)</i>	0
<i>Marking</i>	0
<i>Spraying urine</i>	0
<i>Pointless digging (-)</i>	1.4
<i>Digging</i>	12.2
<i>Gnawing on enclosure (-)</i>	1.4
<i>Gnawing on supplied materials</i>	5.4
<i>Growl (-)</i>	0
<i>Play with enrichment</i>	4.1
<i>Interaction with other animals</i>	0
<i>Show interest in humans</i>	5.4
<i>Stamping with hind leg</i>	0
<i>Stand fully stretched</i>	23.0
<i>Eating and/or drinking</i>	54.1

Questionnaire

The data that has been collected through the online questionnaire was also analysed. After selecting only the respondents that sold rabbits in their store and filled in the questionnaire correctly, 25 pet shops were left and 1 garden centre. These 26 respondents have been put into one sample because of the small sample size of the garden centres.

General results

The average number of rabbits present in the store is 5.08, with a median of 4 and a range between 0 and 30. All the stores have a KvK-registration and a BTW-number, 87.5% of the stores have a UBN-registration. Most stores do not advertise about the rabbits (84.6%). The average number of suppliers for the stores is 2.23, with a median of 2.5 and a range between 1 and 10. In a one-year period, the stores receive on average 82.6 rabbits, with a median of 45 and a range between 14 and 700 rabbits.

On average 12.7% of the rabbits are supplied by a commercial breeder, 39.8% by a hobby breeder, 34.7% by a dealer, 2.9% are from other pet shops, 13.9% are from private owners, 10.4% from petting zoos and 5.5% are from another sort of supplier.

The average minimum age at which the rabbit arrive in the store is 47 days, with a median, of 49 and a range between 32 and 56 days. The average age at which the rabbits arrive at the store is 59 days, with a median of 55 and a range between 40 and 180 days. The average maximum age at which the rabbits arrive in the store is 196 days, with a median of 70 and a range between 45 and 2190 days.

Only 3.8% of the suppliers does not get an compensation for the rabbits, 15.4% gets the costs covered, 26.9% do get a compensation but make a loss, 11.5% make a profit and 42.3% of the stores do give a compensation but do not know if this covers the cost for the supplier.

Only one store (3.8%) does not make any demand from their suppliers. 30.8% require a certificate, 50% require a good reputation, 84.6% require healthy rabbits, 76.9% require a good wellbeing of the rabbits, 46.2% require good socialisation.

19.2% of the stores have visited all of their suppliers, 46.2% have visited some and 34.6% have never visited any of their suppliers. 28% of the stores responded that the impression of the welfare of the rabbits at the supplier differed greatly between different suppliers, 55% of the stores found what they expected at the supplier and 17% thought it was better than expected. The reasons given for why the suppliers had not been visited yet varied. 7.7% had been notified about the situation at the supplier, 11.5% assumed it was good, 7.7% had not have had the opportunity yet, for 7.7% the supplier is very far away, 3.8% said they have too many suppliers to visit them all, 3.8% said they simply did not have the time.

Only 7.7% got rabbits from abroad. They were all from a commercial breeder. The stores that purchase rabbits from abroad get around 50% from outside of the Netherlands.

All the rabbits sold by the store go to private owners. The average number of rabbits the store supplies is 29.8, with a median of 20 and a range between 0 and 130.

Many stores report that the time investment per day for caring for the rabbits at home varies significantly depending on the way the rabbits are kept. But the average recommended time per day for caring for the rabbit at home is 3.5 hours a day, with a median of 2 and a range between 1 and 24 hours. The expected cost per month to take care of a rabbit on a yearly basis has an average of 311.67 euros, with a median of 275 euro and a range between 30 and 1000 euro.

50% the stores give the costumers some time in which they can return the rabbit if they change their mind. When the employee/owner suspects that the customer wants to buy the rabbit impulsively, 65.4% of the stores provide the customer with extra information, 46.2% refer to

other sources of information and 61.5% sent to customer home to think it over. The retail facilities provide information to the customers about different aspects of the ownership of a rabbit. Table 8 shows the percentages of stores that give information about the mentioned topics.

Table 8: Information provided by the retail facility to the customer (%)

<i>Information about</i>	<i>Percentage</i>
<i>Housing</i>	84.6
<i>Diet</i>	84.6
<i>Expected costs for daily care</i>	42.3
<i>Expected costs for veterinarian</i>	42.3
<i>Time needed</i>	46.2
<i>Attention needed</i>	69.2
<i>Social need of the rabbit</i>	76.9
<i>Important behavioural needs of the rabbit</i>	84.6
<i>Life expectancy</i>	76.9

80.8% of the stores mention they can be contacted for additional questions by the customer, 50% refers to other sources of information, 65.4% provide a flyer with the purchase, 11.5% recommend certain literature, 3.8% tell the customers they can always ask their veterinarian.

When it concerns an impulse purchase only 4.8% still sells the rabbits as usual. The average percentage of impulse purchases is 20.2%, with a median of 15% and a range between 0 and 80%.

The average minimal time spent in the store is 8 days, with a median of 3 days, and a range between 0 and 56 days. The average time spent in the store is 22, with a median of 14 and a range between 7 and 140. The average maximum time spent in the store is 151 days, with a median of 120 days and a range between 0 and 365 days.

Minimal age when leaving the store on average is 48 days, with a median of 49 and a range between 1 and 70 days. The average age when leaving the store was 59 days, with a median of 58 and a range between 7 and 84 days. The maximum age when leaving the store was 295 days, with a median of 112 and a range between 0 and 2160.

95.2% of the stores get a compensation for the rabbits they deliver. 33.3% cover the cost, 38.1% get a compensation but still make a loss and 23.8% make a profit.

23.1% of the store employee/owner have visited some of the costumers. For 71.4% the wellbeing of the rabbits was as expected, 28.6% exceeded expectations. 15.4% have not visited costumers because they think it is all good, 23.1% have to many costumers to visited them and 3.8% had never thought about visiting the costumer.

Only one store (3.8%) supplied rabbits to foreign countries. This store delivers around 18% of their rabbits outside of the Netherlands to privet owners.

38.5% sometimes had problems selling all of the rabbits. On average 6.3% of the rabbits is not sold, with a median of 5.5%, and a range between 1 and 15%. What happens to the unsold rabbits differs between retail facilities and can be seen in table 9.

50% of the stores get rabbits returned from the costumers, the reasons why they are returned are presented in table 10. What happens with the rabbits that get returned is also presented in table 9.

The welfare and health status of pet rabbits in Dutch retail

Table 9: Continuation of the rabbits that are unsold/returned to the store (%)

Continuation	Unsold rabbits	Returned rabbits
Sent back to supplier	19.2%	15.4%
Give away to friends/family	7.7%	15.4%
Keep the rabbits in the store (try to (re)sell)	15.4%	46.0%
Give to animal shelter	3.8%	7.7%
Sell as feed to pet shop/zoo	11.5%	3.8%
Do not accept	-	3.8%

Table 10: Reasons for returning the rabbits (%)

Reasons the rabbits get returned to the store	Percentage of store
Because of medical problems of the rabbit	11.5%
Because of medical problems of the customer	15.4%
Problems with other rabbit	11.5%
Children are not interested anymore	15.3%

88.5% of the retail facilities were aware of the legislations around keeping, breeding and selling animals. Many stores provided the rabbits with more than required by law, see table 11 for the extra's that were provided by the stores.

Table 11: Extras provided by the store (%)

Extras the retail facilities offered	Percentage of stores
Bigger/better enclosures	34.6
Better medical care	26.9
Better diet	50
More enrichment	53.8
Better socialisation	30.8
Better breeding policy	3.8

Most stores only sell small rabbits, the breeds that are sold are presented in table 12. Other breeds were not mentioned when asked for what breeds were sold in the store.

Table 12: Breeds sold in the retail facilities (%)

Breed	Percentage of stores that sell the breed
Flemish Giant	7.7
Lotharinger	7.7
Small Lotharinger	3.8
French Lop	11.5
Japanese	34.6
Wener	3.8
Dutch	34.6
Angora	7.7
Holland Lop	88.5
Swiss Fox	84.6
Polish	34.6
Rex	19.2
Small Teddy	11.5
Thrianta	3.8
Crossbreed	50
Unknown	3.8

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In 54.2% of the stores rabbits have been euthanized in the past, the average age of these rabbits was 56 days, with a median of 56 days. The average number of rabbits lost per year is 4.3, with a median of 3.5 days. 38% is euthanized by decapitation, 3.8% is gassed with CO₂, 3.8%. The euthanasia is done by a veterinarian (7.7%), animal caregiver (3.8%) or by someone from the store (3.8%).

87.5% of the retail facilities take active measures to socialise the rabbits. The way this is done is presented in table 13.

Table 13: Actions taken in the store to socialise the rabbits

Action	Percentage used
Positive contact with humans	92.3
Positive contact with other rabbits	88.5
Positive contact with other species	30.8
Positive contact with all sorts of objects	53.8
Positive contact with smells and sounds	50.0

The reasons for the socialisation are presented in table 14.

Table 14: Reasons for socialisation

Reason	Percentage
Less stress from the environment	61.5
Easier to handle	73.1
More appealing to costumers	65.4
Likes to socialize the rabbits	53.8
Like the activity for the rabbits	65.4
Due to daily caretaking	3.8

The average number of paid employees is 3.9, with a median of 4 and the average number of unpaid employees is 1.7, with a median of 2.5. The qualifications the stores require from their employees are presented in table 15.

Table 15: Required qualification from employees

Demands	Percentage
Animal related education	69.2
Relevant experience with animal care	26.9
Hard worker	23.1
Have affection for animals	50.0

57.1% of the stores provide the employees with relevant education, all about different subjects. 95.5% of the retail facilities believe they have informed their personal enough to give proper information to the costumers.

95.5% of the stores check the quality of the products, 55% think they sell sub-optimal products. 26.9% think the enclosures are too small, 3.8% sell uncomfortable bedding, 15.4% sell unsuitable housing and 26.9% sell sub-optimal feed.

What objects are sold in the stores is seen in Appendix B

The freedom to react adequately to hunger, thirst or incorrect food

What the retail facilities feed the rabbits and how often is presented in table 16.

Table 16: Composition of the food given to the rabbits

Type of food	Unlimited	Daily large quantities	Daily limited quantities	Limited to small amounts	Almost never/never
Hay/Grass	87.5	12.5	-	-	-
Vegetable/plants	-	-	38.1	38.1	23.8
Pellets/muesli/grains	20.8	37.5	33.3	-	8.3
Fruit	-	-	22.2	50.0	27.8
Treats	-	-	10.0	65.0	25.0
Mineral lick/ dietary supplements	14.3	4.8	9.5	33.3	38.1

The brand of feed the stores use to feed their rabbits is presented in figure 13.

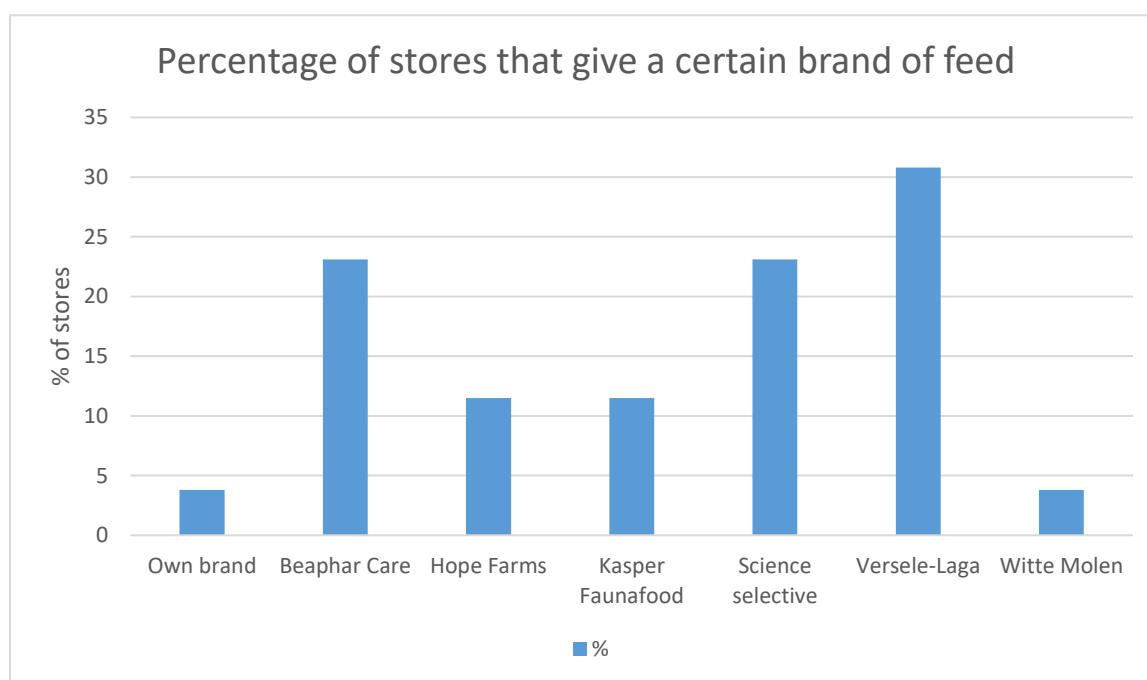


Figure 13: Brands of feed used by the stores to feed their rabbits.

The rabbits in 25% of the stores show selective feeding. 3.8% of the rabbits selects on sweet substances, 7.7% on Calorie rich substances, 3.8% on fresh food, 11.5% on fiber rich substances, 3.8% of the stores say it differs between rabbits.

12.5% of the stores provide the water in a drinking bottle and in a bowl, 87.5% only provide a bottle. The water is refreshed daily in 75% of the stores, 20.8% more than daily and in 4.2% less than daily.

The freedom to react adequately to physical and thermal discomfort

15.4% breed with their rabbits, 3.8% does this as a commercial breeder, 3.8% as a hobby breeder, 7.7% also as a hobby breeder but only incidentally. On average they breed 105 rabbits per year, with a median of 7.5 and a range between 4 and 400. The average number of litters per doe per year is 3.4, with a median of 2 and a range between 1 and 5. The average time between two litters from the same doe is 3.5 months, with a median of 3 months a range between 2 and 6 months.

20.8% of the retail facilities keep the rabbits in the back of the store, 66.6% in the walking route, 7.7% in a separate room and 12.5% somewhere else. The enclosures are in the centre of the room in 91.7% of the stores, the rest have the enclosure against the wall.

The size of the enclosures is presented in figure 14 and 15.

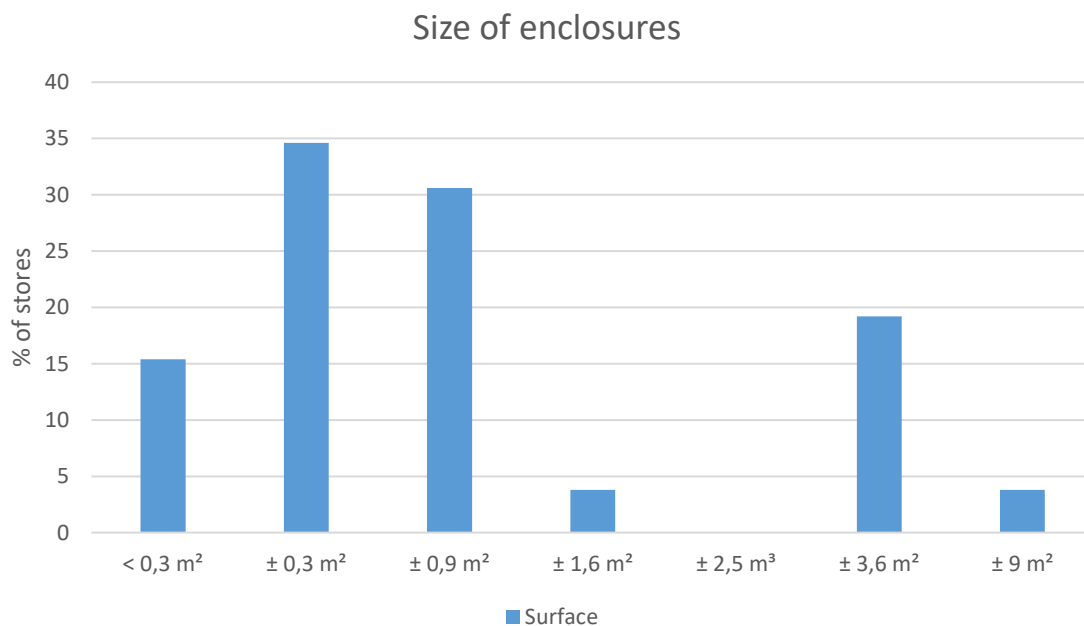


Figure 14: Sizes of the enclosures

7.7% of the stores has more than one level in the enclosure.

19.2% have closed wall that are not see-through, 26.9% have partially wire walls with partially see-through material, 7.7% have complete wire walls, 19.2% have partially see-through walls, 53.8% have completely see-through walls.

23.1% have wooden floors, 30.8% are plastic, 3.8% are wire, 15.4% are tiles, 3.8% has sand and 34% has a glass floor.

95.9% of the stores use bedding in the enclosures. This is hay in 23.1% of the stores, straw in 26.9%, sawdust 26.9%, cotton 3.8%, hemp fiber 50%, cat litter 7.7%, cardboard grains 34.6% and 3.8% have carpet bedding.

Only 17.4% of the stores provide the rabbits with a freely accessible run. 50% of these runs are an outside run, 25% is a big space in the garage and 25% have an enclosure that is a run on its own (inside). These runs range from 1 to 6 m², half of them have access to them 24 hours a day and the other have 7 to 10 hours a day. None of the rabbits have a possibility to dig deeper than 5cm in the run.

The 66.6% of the stores keep track of the temperature in the enclosures, 3.8% daily check the temperature, 3.8% does this twice a week, 15.3% have contact control on the temperature and 34.6% measures the temperature when they think it is necessary. 3.8% changes the location of the enclosures when the season changes. 75% of the rabbits come in contact with natural daylight.

The welfare and health status of pet rabbits in Dutch retail

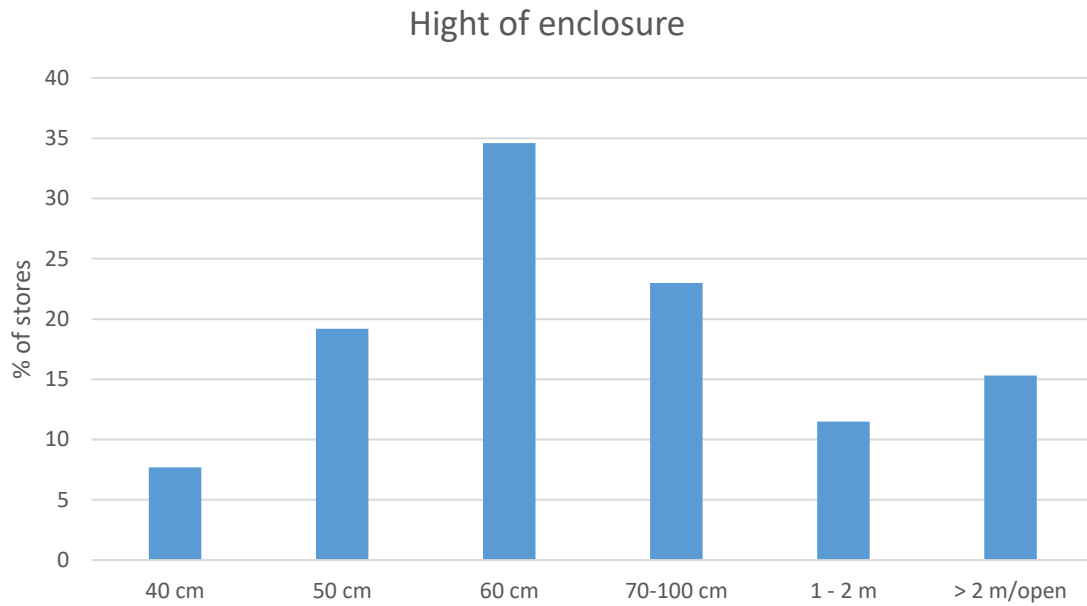


Figure 15: Hight of the enclosures

How often the enclosures, feeding bowls and water supplier are cleaned is presented in figure 16.

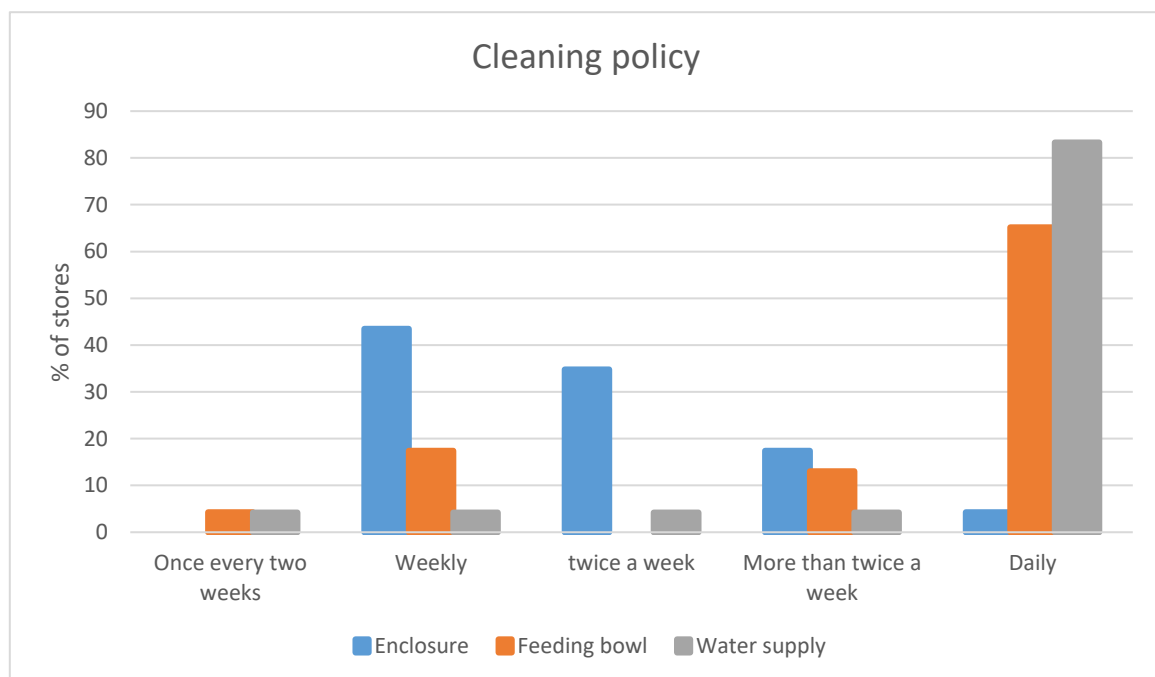


Figure 16: How often the enclosure, feeding bowl and water supply is cleaned

The freedom to react adequately to pain, injury and illness

65.4% said the spine of the rabbit was easy to feel but felt round, 3.8% could easily feel the spine and said it felt like the top of your hand, 19.2% said the spine was hard to feel. The ribs were easy to feel, like the top of your hand in 86.4% of the cases and hard to feel for 13.6% of the cases. The body seems straight by more than half of the rabbits (69.2%) but round with rest. The weight of the rabbits is normal (88.5%) and 3.8% was a little overweight. The

top 3 abnormalities seen in the stores were: 1. abnormalities with the fur 2. abnormalities with the digestive system and shared third place is, abnormalities with the teeth and an abnormal position of the head/eyes/ears.

In what percentage of the stores the rabbits were vaccinated and for what is presented in figure 17.

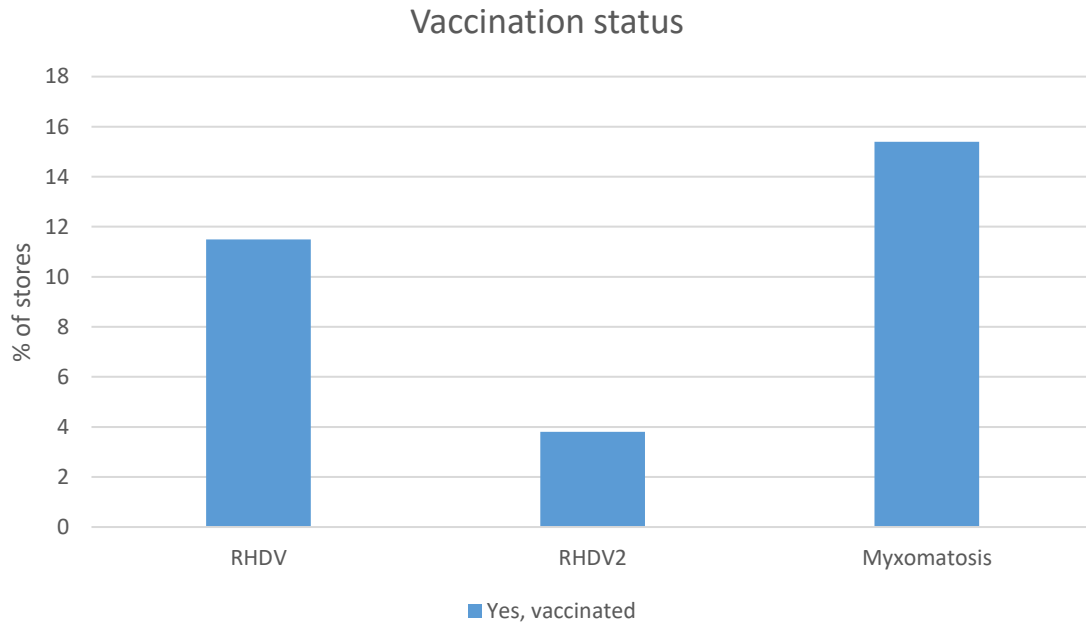


Figure 17: The percentage of stores that vaccinated the rabbits for RHDV, RHDV2 and Myxomatosis.

7.7% had neutered buck in the retail facility. 11.5% treated worms, 15.4% treated coccidiosis and 3.8% treated fungi.

The freedom to react adequately to fear and chronic stress

In 95.8% of the retail facilities some rabbits are housed with other rabbits. The average percentage of rabbits housed together is 89.2%, with a median of 95% and a range between 0 and 100%. The average number of rabbits housed in one enclosure is 2.8, with a median of 2 and a range between 1 and 6. 91.3% of the rabbits wash each other and 8,7 % say is differs a lot between groups.

The way the rabbits are housed can be seen in table 17.

Table 17: Housing situation (%)

Housing situation	Percentage of stores
related rabbits of the same sex	69.2
related rabbits of the opposite sex	7.7
Unrelated rabbits of the same sex	30.8
Unrelated rabbits of the opposite sex	19.2
Intact buck with intact buck	57.7
Intact buck with neutered buck	11.5
Neutered buck with neutered buck	11.5
Intact doe with intact doe	73.1
Neutered doe with neutered doe	7.7
Intact buck with intact doe	19.2
Intact buck with neutered doe	3.8
Neutered buck with intact doe	11.5
Neutered buck with neutered doe	7.7

73.9% of the rabbits have a retreat area available to themselves, the average number of retreat areas per rabbit is 0.61, with a median of 0.5.

What happens to the rabbits that were delivered as a couple to the store is presented in figure 18.

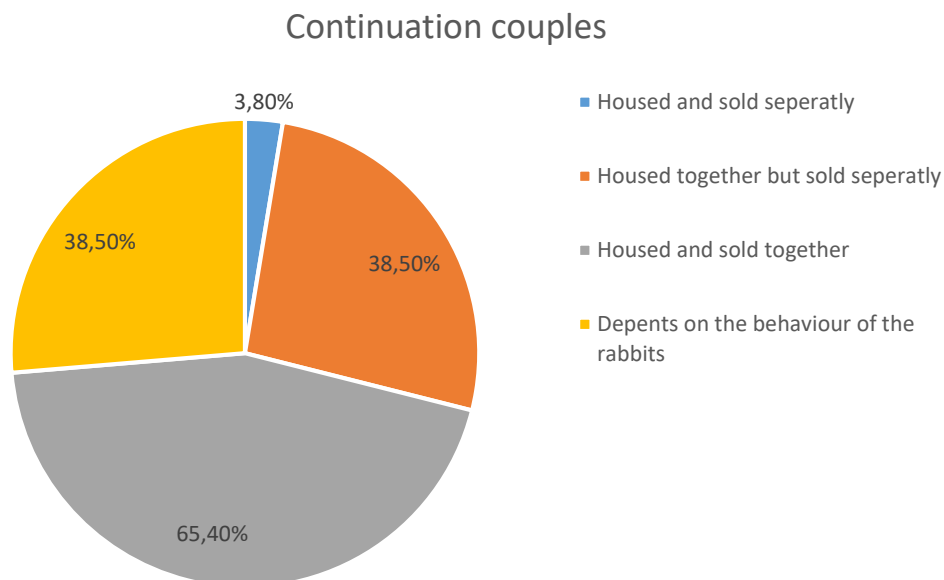


Figure 18: What happens with the rabbits that were delivered to the store as a couple

In 45.8% of the stores some rabbits are housed in solitary. The average percentage of rabbits housed solitarily is 12%, with a median of 12% and a range between 3 and 31%. 66.7% of the stores sometimes house rabbits with other species. On average this is 34.8%, with a median of 24.5% and a range between 2 and 98%. 61.5% is housed with a guinea pig, 3.8% with a mouse or a hamster and 3.8% with a chicken.

In 33.3% of the retail facilities possible predator (mostly dogs) could come in contact with the rabbits.

All stores provide the rabbits with enrichment, the types of enrichment provided in the stores is presented in figure 19.

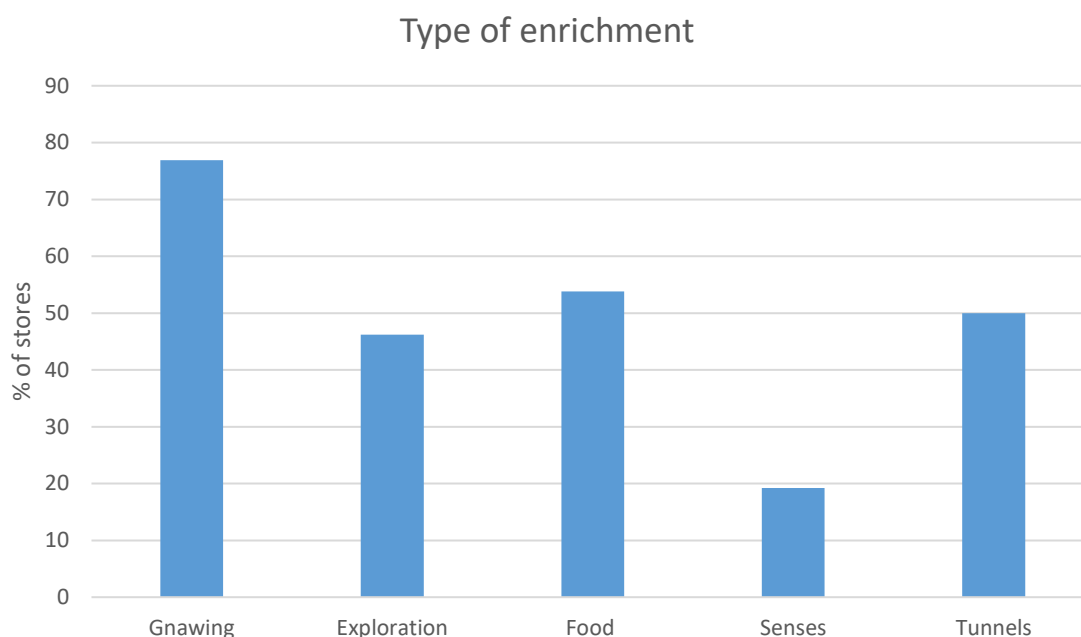


Figure 19: Type of enrichment provided in the stores

The different reaction rabbits have to being approached and to being handled are presented in table 18.

Table 18: Reaction of the rabbits to being approached/handled (%)

Reaction	Approached by a familiar person	Approached by a unfamiliar person	Handled by a familiar person	Handled by a unfamiliar person
Calm	53.8	49.9	-	34.1
Walks away	19.2	19.2	19.2	19.2
Stays still	-	-	11.5	11.5
Flee	-	3.8	-	3.8
Fight	-	-	3.8	-
Never handle the rabbits	-	-	7.7	23.0

None of the rabbits show stereotype behaviour according to the employee/owner.

The freedom to display normal behavioural patterns that allow the animal to adapt to the demands of the prevailing environmental circumstances and enable it to reach a state that it perceives as positive

33.3% have no digging possibilities, 54.2% can dig up to 5 cm in the bedding and 15.2% can dig 6 to 10 cm.

Other normal behavioural patterns of rabbits were not part of the questionnaire.

Discussion

This paper was to analyse the health and welfare of rabbits housed at retail facilities in the Netherlands. The complete sample of the visits was analysed. Within this sample three groups were compared namely, individual pet shops, chain stores and garden centres. All the data from the questionnaire was grouped because of the small sample size of the garden centres. The most important results regarding the health and welfare of the rabbits are discussed below.

Visits

The Freedom to react adequately to hunger, thirst and incorrect food

When it comes to the diet of the rabbits the most important thing is that they have unlimited access to hay. Luckily this is the case for almost all of the stores (88.9%). The rest had daily large quantities. According to Harcourt-Brown (2003)¹⁶ the amount of concentrate should only be 2-3% of the body weight. However most stores (93.5%) provided the rabbits with daily large quantities of concentrate. This is more than the 2-3% of the rabbits body weight. According to Sayers (2010)¹⁴ the diet should also consist of fresh greens for 10-15%. Many stores (69.5%) do not provided the rabbits with daily fresh greens¹⁴⁻¹⁶. However it is important to mention that the advised diet is based on adult rabbits. Most of the rabbits in this study are young rabbits. Also, most of the rabbits do not spent a long time in the retail facilities. This might suggest that the diet they receive over this relatively short amount of time will not influence the animals to a great extent.

Most rabbits did not show any signs of selective eating. A possibility to prevent selective eating when it does occur is providing the rabbits with concentrate with which selective eating is not possible. Important to remember is that selection on soft substances can be a sign of dental problems¹⁶.

Rabbits need plenty of water, the best way to accomplice this is by giving the rabbits unlimited access. All rabbits had unlimited access and almost all rabbits (88.9%) drank from a bottle.

The freedom to react adequately to physical and thermal discomfort

The minimum recommended space for two small rabbits is 1.2 m² ¹⁹. Only 14% of the enclosures met these recommended dimensions. The other enclosures did not have a free run or multiple levels in the enclosure to compensate for the smaller surface. Again this advice is for adult rabbits, younger animals are smaller and need less space. Taking this in consideration, the dimentions of the enclosures might not be as big of a problem. According to Magnus (2005) rabbits need an area to retreat themselves for when they feel frightened. Only a third (33.3%) had a retreat area and only 19.4% of the rabbits had a lookout^{14,20}.

All of the enclosures were located in the walking route of the store, in the center of the room. According to Richardson (2008)²⁰ it would be better for the rabbits if they were located in a more private area. Because of the inside location of the enclosures in the stores, the temperature was always at room temperature which is the thermoneutral zone for rabbits. Because of the inside location there were also no problems with exposure to wind, rain or draft. However, some of the rabbits only had minimal contact with natural daylight. Considering the above, the enclosures do not meet the recommendations from other studies. This suggest that the enclosures leave much to be desired, however the animals are not yet fully grown and on

average the rabbits do not spend a large amount of time in the stores. This suggests that the suboptimal circumstances might not have such a big influence on the animals.

None of the rabbits were neutered but this is good since bucks should not be neutered before 12 weeks and does not before the age of 5 months^{16,20}. By this time most rabbits have left the store and the private owners can make this decision for themselves.

The freedom to react adequately to pain, injury and illness

Not many health problems were seen during the visits. The only things that were seen were that 8.3% of the rabbits had a little bit red mucous membrane of the eyes, 2.8% had tangled hairs and 25% of the rabbits were not completely clean around the anus. Since these were the only issues seen, the health status of the rabbits in the store does not seem to be a big problem. The preventative measures however could be better. Only 19.4% of the stores vaccinated for RHDV, RHDV2 and myxomatosis. 27.8% of the stores only sold unvaccinated rabbits. The problems this will give in the stores are probably not that great. However once the rabbits leave the store the changes they get sick rises. Selling vaccinated rabbits might also encourage the new owners to vaccinate the rabbits on a yearly basis.

The freedom to react adequately to fear and chronic stress

Despite the fact that rabbits are social animals about half of the rabbits (44.4%) were housed in solitary²⁰. This percentage should go down so the rabbits have the opportunity to perform natural social behavior. Some stores still house rabbits together with guinea pigs. This is not beneficial for the rabbit since they do not profit from this housing situation and it might even cause health problems^{14,20,24}.

Another problem that is seen in the retail facilities is that there are still stores that do not provide the rabbits with any form of enrichment. This could cause stress. Early life stress could result in a maladaptive stress response system and an increased vulnerability to illness at each stage after during its life¹³. This suggests that, although the animals spent a relatively short amount of time in the retail facilities, this effect of stress could influence their entire life.

Because of the small enclosures and the absence of a run none of the rabbits got the exercise that was recommended for a healthy living situation^{14,20}. This however might not be a big problem because of the little amount of time spent in the store and the size of the young rabbits. This lack of exercise will probably not influence the rabbits to a great amount.

The freedom to display normal behavioural patterns that allow the animal to adapt to the demands of the prevailing environmental circumstances and enable it to reach a state that it perceives as positive

Rabbits should be able to perform its natural behaviour. Like hiding and resting, standing fully stretched, hopping, social interactions, digging, foraging, marking, exploring and eating in a natural grazing posture^{14,16,20,23,26}.

The behavioural needs of the rabbits are only partly fulfilled. More than two thirds (69.5%) had no opportunity to hide themselves in the enclosure. 91.7% had only minimal possibility to perform hopping behaviour. None of the rabbits had the opportunity for digging.

The behaviours the rabbits showed, according to the employee/owner, are relatively positive. The negative behaviours are not shown very often. During observation negative behaviours were barely seen. Contrary to many of the positive behaviours which are seen quite

often by the employee/owner and have also been observed more often during the visits as can be seen in table 6 and 7 of the results.

These results suggest that the animals are probably able to adequately adapt to the environment. The absence of the opportunity to perform certain kinds of natural behavior does not seem to affect the rabbits in a negative way. Again this might be because of the short amount of time spent in retail facilities. However, being able to perform natural behavior might decrease stress levels in the rabbit and improve welfare when problems do seem to occur^{14,16,20,23,26}.

Differences between segments

The differences between the segments were minimal. The most important results regarding the health and welfare of the rabbits was that the garden centres gave the animals much less fresh vegetables than the other stores. Even though this is a point of attention for all the segment it seems that the garden centres should pay the most attention to this element of health and welfare. A well-balanced diet is important for a good health status. However the garden centres provided the rabbits with a retreat area more often than the individual pet shops and chain stores. This gives the rabbits more opportunities to retreat from potential stressful situation. These issues will probably only cause problems when the animals are in the retail facilities for a longer period of time.

Differences between data from the location visits and the questionnaire

Because of the small sample size of the questionnaire and the very similar results with the locations visits, not all of the results will be discussed. The biggest differences between the results from the questionnaire and the visits regarding the health and welfare of the rabbits will be discussed below.

One of the biggest difference between the results from the visits and the questionnaire regarding the rabbits diet is that none of the visited stores provided the rabbits with a mineral lick. 61.9% of the stores from the questionnaire did provide the rabbits with a mineral lick. This shows that the visits do not give a complete overview of the situation of all the retail facilities in the Dutch retail. Another difference found between the groups was that during the visits none of the rabbits showed selective eating. In the stores from the questionnaire 25% of the rabbits showed selective eating. This is probably because of the brand of feed used in the stores. The stores that we visited all used feed with which selective eating could not take place.

All of the visited stores kept the rabbits in the walking route. The results from the questionnaire show that only 66.6% keep the rabbits in the walking route. Regarding the presence of a run a difference was found between the two data sets. Where no visited stores had a freely accessible run, 17.4% of the stores from the questionnaire did provided this to their rabbits.

Where barely any health problems were seen during the visited the stores from the questionnaire did give a top 3 health problems seen in the retail facilities namely, abnormalities with the fur, abnormalities with the digestive tract, and share third place are abnormalities with the teeth and abnormalities with the position of the head/eyes/ears. This shows there are some health issues to be found in the retail facilities in the Netherlands.

Another interesting difference was that the results from the questionnaire showed that 89.2% of the rabbits were housed together. This was only 55.6% during the location visits. And the presences of a retreat area was 73.9% according to the questionnaire and only 13% during the visits. Also the questionnaire results show that all stores provide enrichment whereas this was only 72.2% during the visits. These differences could be a biased answer in the questionnaire or it shows that the housing situation is better than only the visits might suggest.

None of these differences seem very important when evaluating the health and welfare of the rabbits. It mostly shows that there are some differences between the stores in the Netherlands. The small differences found do not suggest that the overall health and welfare of the rabbits is better or worse than found in the visits.

Conclusion

There are some important questions that should be asked regarding the results. Much of the data resulted from answers of the employees/owners. With the questionnaire this was the case for all the data. This may lead to biased answers that could cause a more positive outcome than actually is the case. The rest of the data was collected during one location visit. Because that data was collected during one moment this might not represent the full reality.

Another point is that not all the elements of health and welfare have been checked by this study. There could be more problems in the retail facilities than this study shows.

Regardless of these concerns the data shows that there are some elements in the health and welfare status of the rabbits that need some attention. These are, the size of the enclosures, the vaccination status, the provision of a retreat area and enrichment, the diet could use some improvement by giving less concentrate and more fresh greens, and the social housing. The fact that these issues seem to exist does not necessarily mean that it will affect the rabbits in a negative way. Many of the issues will not be a big problem because of the limited amount of time spent in the retail facilities. However, an additional problem with these issues is that the stores give the wrong example to the new owners, perhaps improving the aforementioned issues will not only improve the health and welfare of the rabbits in the retail facilities but also in the private sector.

Although the issues found might not cause too big of a problem regarding the health and welfare of the rabbits, the results suggest that there is room for improvement. Many of the issues are connected to the housing situation. By enlarging the enclosures and providing more enrichment and a proper retreat area in these enclosures the welfare of the rabbits might be improved in a positive way. As well as perhaps making it mandatory for the rabbits to be housed together. The vaccination status of the rabbit could also improve by making it mandatory.

For the retail segment this would probably mean that the prices of the rabbits would go up. As a result of the increasing prices people might put more thought into buying a rabbit as a pet. Decreasing the rabbits sold as an impulse purchase. Perhaps all this might make it less appealing for the stores to keep selling rabbits. Possibly resulting in the disappearance of rabbits from the retail segment all together.

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Appendix A

Appendix to 'Checklist for an assessment of the current health and welfare state of rabbits in the various segments of the companion animal sector in the Netherlands'

- + Indicates a positive influence on health/welfare
- Indicates a negative influence on health/welfare
- 0 Indicates that health/welfare is not influenced
- ~ Indicates that the influence on health/welfare is unknown

Questions

1. Do the rabbits/does the rabbit have the freedom to react adequately to hunger, thirst or incorrect food?

Measurable by the environment

Type and amount of food

A companion rabbit should have ad libitum access to hay.

Feed intake in rabbits should consist of:

- **Good quality grass and/or hay (fibre): 80-85%**
- **Fresh greens/dark leafy greens: 10-15%**
- **Restricted amount of concentrate: 3%**

Access to water

Ad libitum: + Restricted: -

Type of water

Mineral water: 0 Tap water: 0

Measurable by the rabbit(s)

Do the rabbits exhibit selective feeding?

Yes: - No: +

If selective feeding is present, what component(s) do the rabbits/does the rabbit prefer to eat?

Soft components: - **(This may be an indication of dental problems)**

Sweet/sugar rich components: - Calorie rich components: -

Fresh food constituents: - Fibre rich components: -

2. Do the rabbits/does the rabbit have the freedom to react adequately to physical and thermal discomfort?

Measurable by the environment

Does the location of the enclosure/enclosures vary with the season?

Yes: 0 No: 0

If yes, what are the different locations during different seasons?: Look at 'Observations, 2. Are the rabbits free of physical and thermal discomfort?' for the influences.

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How often is/are the enclosure/enclosures cleaned?

< Once a week: - Once a week: + > Once a week: + Every day: +

How often is the food tray cleaned?

< Once a week: - Once a week: + > Once a week: + Every day: +

How often is the water supply cleaned?

< Once a week: - Once a week: + > Once a week: + Every day: +

How often is the part of the enclosure where faces are deposited cleaned?

Daily: + < Daily: -

Temperature in the enclosure/enclosures

Measurable (e.g. thermometer available): 0

Below 3 degrees Celsius with insufficient measures to prevent cold stress: -

Below 3 degrees Celsius with sufficient measures to prevent cold stress: +

Between 3 and 15 degrees Celsius (the rabbits can still adapt by physiological/behavioural adjustments): +

Between 15 and 25 degrees Celsius (thermoneutral zone): +

Between 25 and 28 degrees Celsius (the rabbits can still adapt by physiological/behavioural adjustments): +

Above 28 degrees Celsius with sufficient measures to prevent heat stress/stroke: +

Above 28 degrees Celsius with insufficient measures to prevent heat stress/stroke: -

Do the rabbits/does the rabbit come outside of the enclosure?

Never Yes, less than daily Yes, daily

Very dependent on the enclosure. When, for example, a free accessible run is attached to the enclosure there is no negative influence on the health or welfare when the rabbits are not allowed out of the enclosure. When the rabbits are in a small enclosure without a free accessible run it has a negative effect on the welfare when the rabbits are not allowed out of the enclosure.

If there is no freely accessible run available, how much free exercise time do the rabbits/does the rabbit get per day?

None: - <4 hours per day: - 4 hours a day or more: +

If neutered rabbits are present, neutered at which age(s)?

Does at five months of age or older: +

Does younger than five months of age : -

Bucks at three months of age or older: +

Bucks younger than three months of age: -

Is reproduction desired with the rabbit(s)?

Yes: ~ No: ~

If reproduction is desired, maximum number of nests per doe per year: ~

How much time is passed between two nests of the same doe?: ~

Are the rabbits/is the rabbit tattooed?

Yes: - No: +

3. Do the rabbits/does the rabbit have the freedom to react adequately to pain, injury and illness?

Measurable by the environment

Vaccination status

- Vaccination for RHDV (annually): **When given annually: +. If not given or less than annually: -**
- Vaccination for RHDV2 (half-yearly): **When given half-yearly: +. If not given or less than half-yearly:-**
- Vaccination for myxomatosis (annually): **When given annually: +. If not given or less than annually:-**

Has a coccidiosis treatment been performed?

- Yes, preventive: ~ Yes, as therapy: + No: ~

Has a deworming treatment been performed?

- Yes, preventive: ~ Yes, as therapy: + No: ~

Has a fungal treatment been performed?

- Yes, preventive: ~ Yes, as therapy: + No: ~

Has a treatment for ear and fur mites been performed?

- Yes, preventive: ~ Yes, as therapy: + No: ~

4. Do the rabbits/does the rabbit have the freedom to react adequately to fear and chronic stress?

Measurable by the environment

Are the rabbits/is the rabbit socially housed?

Rabbits are social animals and in principle the best option is social housing. Solitary housing leads to welfare problems. However, the relationship between the rabbits that are housed together should be "good". When agonistic behaviour is shown it can be a sign of reduced welfare. Positive interaction should be visible for a good welfare. The best option to prevent agonistic behaviour is to house neutered bucks with neutered does. When reproduction is desired an intact doe can be placed temporarily in the enclosure of an intact buck.

Young bucks in puberty can be very aggressive towards each other and therefore should not be housed together. Aggression is minimal in groups of does who have been housed together from a young age.

Housing rabbits with guinea pigs is not recommended. Rabbits can be carrier of Bordetella bronchiseptica, which is pathogenic to guinea pigs. Conversely, guinea pigs can carry Pasteurella and therefore be a source of infection for rabbits.

If reproduction is desired, and the offspring is sold, from what age are the rabbits sold?:

Younger than 6 weeks of age: - 6 weeks of age or older: +

Are the rabbits/is the rabbit protected from possible predators?

- Yes: +
- Yes, but possible predators are audible or smellable (e.g. barking dogs audible): -
- No: -

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If possible predators are present, do the rabbits/does the rabbit have to possibility to withdraw themselves/itself from them?

Yes: + No: -

Measurable by the rabbits

Do the rabbits/does the rabbit exhibit stereotypes?

Yes: - No: 0

If yes, what stereotypes are observed?

Excessive grooming (licking, gnawing, scratching etc.) Bar gnawing

Walking rounds/circling Weaving Other:

All -

Is any lethargy/apathy observed in the rabbit(s)?

Regularly (daily): - Sometimes (weekly or less): - Never: 0

If enrichment is available, do the rabbits/does the rabbit use it?

Yes, all available forms of enrichment are used: +

No, none of the enrichment is used: -

Yes, but not all the available forms of enrichment are used. The following forms are used: +

5. Do the rabbits/does the rabbit have the freedom to display normal behavioural patterns that allow the animal to adapt to the demands of the prevailing environmental circumstances and enable it to reach a state that it perceives as positive?

Measurable by the rabbit(s)

How often do the rabbits/does the rabbit exhibit the following behaviours?

Positive behaviours:

- Binky's
- Lying stretched out on the side
- Lying stretched out with the paws stretched backwards
- Hide in a corner or shelter
- Lying down or sitting against each other
- Licking/washing/cleaning each other
- Riding another rabbit
- Riding people, objects or another species
- Marking spaces or objects with the chin
- Urine spraying
- Actually digging
- Gnawing on offered gnawing material
- Approaching people, showing interest in people
- Stamping with the hind legs
- Alertly elevating itself

Negative behaviours:

- Huddling
- Fighting with each other
- Digging without a purpose
- Gnawing on enclosure, furniture, carpet or interior
- Growling

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- **Aggression to (hand of) human when entering the enclosure**
- **Recalcitrate when being picked up**

Observations

1. Do the rabbits/does the rabbit have the freedom to react adequately to hunger, thirst or incorrect food?

Measurable by the environment

Water supply

- Drinking bottle: - Open bowl: **+, if kept clean**
 Both: **+, if kept clean**

Are the water supplies at an appropriate height?

- Yes: +
 The water supplies are too low: -
 The water supplies are too high: -

How many (adult) rabbits share how many drinking spots in one enclosure?:

There should at least be one drinking spot per 10 rabbits.

How many adult rabbits share how many feeding spots in one enclosure? (Multiple feeding spots that stand directly against each other count as one feeding spot: ~

2. Do the rabbits/does the rabbit have the freedom to react adequately to physical and thermal discomfort?

Measurable by the environment

Location of the enclosure/enclosures (PET SHOP, GARDEN CENTER)

- In the walking route: - In a separate space/out of the walking route: +
 In the shop-window: - In the back of the store: + Other:

Location of the enclosure/enclosures

- Kitchen: - Living room: + Bedroom: + Garage: - **Rabbits do not like the smell of gasoline**
 Barn: - Outside: + Outside on a porch: + Other:

How is the enclosure/are the enclosures situated in the space?

- Detached/central in the space Against a wall Other:

The assessment depends on several factors. For example, a freestanding enclosure outside could mean an increased risk of exposure to rain, wind and draft. However, when the rabbits have the possibility to withdraw themselves from the rain, wind and draft it is a lesser problem.

How are the walls of the enclosure/the enclosures constructed?

- Closed walls, not transparent: ~ Partial wire/mesh: ~ Completely wire/mesh: ~
 Partial transparent material (glass/plastic): ~ Complete transparent material (glass/plastic): ~
 Other:

Floor of the enclosure/enclosures

- Grass: + Linoleum: - Carpet: + Wooden floor: **Slippery wood: - Not slippery wood: +**
 Plastic: **Slippery plastic: - Not slippery plastic: +** Plastic grate floor: +
 Tiles or stone: + Mesh bottom: ~ Cardboard: + Other:

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Bedding material of the enclosure/enclosures

- Hay: + Straw: + (News)paper: + Hemp fibre: + Cotton: + Flax: + Earth: +
 Wooden chips: + Wooden pellets: + Sawdust: + Cardboard grains: +
 Cat litter: - No bedding: - Other:

Floor/bedding material that the rabbit(s) walk(s) on outside of the enclosure

- Hay: + Straw: + (News)paper: + Hemp fibre: + Cotton: + Flax: + Earth: +
 Wooden chips: + Wooden pellets: + Sawdust: + Cardboard grains: + Cat litter: -
 Grass: + Linoleum: - Carpet: + Wooden floor: **Slippery wood: - Not slippery wood: +**
 Plastic: **Slippery plastic: - Not slippery plastic: +** Plastic grate floor: + Mesh bottom: ~
 Cardboard: + Other:

Is a large part of the surface where the rabbit(s) walk(s) on slippery?

- Yes: - No: +

Do the rabbits/does the rabbit have access to a freely accessible run?

- Yes: + No: -

If yes, what kind of run? (multiple answers possible)

- An outside run An inside run A fenced walking field or garden
 A big area in the house (living room, kitchen, playroom etc.)
 A big area in a shed/garage Other:

All +

Size of the enclosure and possible run (in cm²)

When there is no freely accessible run at an outdoor enclosure use the minimum dimensions that are given for an indoor enclosure.

Outdoor enclosures:

Rabbits that are kept outdoors should have a freely accessible run. It must be ensured that no predators such as cats and foxes can enter the run from above.

The size of the outside enclosure depends on the size of the rabbits and their amount. Two dwarf rabbits must have a minimum enclosure of 150cm x 60cm x 60cm. A suitable size of the run is at least 3-4m² for two dwarf rabbits. For two rabbits of 5 kg or more the enclosure should be at least 200cm x 80cm x 80cm and the run at least 5m².

Indoor enclosures:

The enclosure should allow the rabbits to stand fully stretched on their hind legs.

For two dwarf rabbits the enclosure should be at least 80cm x 150 cm. For two rabbits of 2 kg the enclosure should be at least 80 x 200 cm. For rabbits between 2,5 and 5 kg the enclosure should be at least 0,3m² per k.g. bodyweight. For rabbits heavier than 5 kg at least 0,25m² per kg bodyweight should be available.

Number of floors of the enclosure

- One: - Two: + Three: + Four: +

If multiple floors are present in the enclosure, is it safe (think of the distance between the floors and how they are connected)?

- Way of connecting floors:
 Distance between floors:
 Safe: **0**
 Not safe: -

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Is there a lookout spot available for the rabbit(s) in the enclosure?

Yes: + No: -

Do the rabbits/does the rabbit have the possibility to withdraw themselves from direct sunlight?

Yes: + No: -

Do the rabbits/does the rabbit have the possibility to withdraw themselves from rain?

Yes: + No: -

Do the rabbits have the possibility to withdraw themselves from wind?

Yes: + No: -

Do the rabbits/does the rabbit have the possibility to come in contact with natural daylight?

Yes: + No: -

Is there ammonia and/or a dull smell smellable in/near the enclosure/enclosures as a sign of bad ventilation?

Yes: - No: +

Is there a draft sensible?

Yes: - if the rabbits cannot withdraw themselves from the draft. 0 if the rabbits can withdraw themselves from the draft

No: 0

If a draft is sensible, do the rabbits/does the rabbit have the possibility to withdraw themselves from the draft?

Yes: + No: -

Is the enclosure clean at the moment of observation?

Yes: +

No not completely clean, some faeces and urine are visible: 0

No, stench and mold present: -

Is the food tray clean at the moment of observation?

Yes: +

No, old feed residues are sticking to the tray: 0

Nee, food tray is filled with faeces and urine: -

Is the water supply clean at the moment of observation?

Yes: +

No, there is a bit of litter in the water supply, the water is clear: 0

No, green scale visible/water is not clear: -

Is the section where faeces are deposited clean at the moment of observation?

Yes: +

No, not quite spotless, some faeces and urine visible: 0

No, stench and mold present: -

Is there a litter box available in the enclosure?

Yes: + No: -

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If yes, what material is used in the litter box?

Hay Straw Cat litter Cardboard grains Sawdust Peat
 Wood shavings Earth Clay Other:

All +, except for clay, clay: -

Measurable by the rabbit(s)

Red ears, panting and/or lying extremely stretched visible (as indicators of heat stress)?

Yes: - No: **0**

Sitting huddled, shivering and/or huddling together visible (as indicators of cold stress)?

Yes: - No: **0**

3. Do the rabbits/does the rabbit have the freedom to react adequately to pain, injury and illness?

Measurable by the environment

Are there sharp edges/irregularities in the enclosure that may cause injuries to the rabbits?

Yes: - No: **0**

Measurable by the rabbits

Which of the following points associated with pain in rabbits are noticeable?

All -

Breathing

Lowered: - Normal: **0** Elevated: -

Weight

Underweight: - Slight underweight: - Normal weight: **0** Slightly overweight: -
 Real obesity: - Morbid obesity with secondary diseases: -

Fur

No abnormalities: 0

All other options: -

Are there wounds/scars, abscesses or pulled hairs visible (as indicators for physical fights)?

Yes: - No: **+**

Mucous membranes

No abnormalities: 0

All other options: -

Head

Position of head, eyes, ears and nares

No abnormalities: 0

All other options: -

Eye outflow visible?

No: 0

All other options: -

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Nose outflow visible (also check the inside of the forepaws)?

No: 0

All other options: -

Ear scabies visible (visible by brown crusts in the ears)?

Yes: - No: **0**

Neck scabies visible?

Yes: - No: **0**

Blue eyes and/or ears visible as indicator(s) of disease?

Yes : - No: **0**

Pale ears visible as an indicator of anaemia or VHD infection?

Yes : - No: **0**

Teeth

No abnormalities: 0

All other options: -

Abdomen

Digestive organs (palpation)

No abnormalities: **0** Thickenings palpable: - Other abnormalities: -

Urinary eczema?

Yes: - No: **0**

Assessment of droppings

Normal droppings: **0. These are light coloured, hard, round droppings with a high raw fibre content.**

Small, hard, dark droppings: -. **These are an indication for reduced feed intake (mostly hay).**

Chain cord: -. **These droppings can indicate that the rabbits ingest a lot of fur.**

Moist, soft droppings: -. **These droppings indicate too much intake of sugar and/or proteins (too much concentrate and/or of insufficient quality) or indicate the presence of a parasitic infection (e.g. coccidiosis, ass maggots).**

Acaecotrophy: -. **In acaecotrophy clusters of caecotrophs are often found in the cage or adhered to the anus.**

Limbs

Pododermatitis

No: **0** Yes, grade 1: - Yes, grade 2: - Yes, grade 3: - Yes, grade 4: - Yes, grade 5: - Yes, grade 6: -

Are the nails too long?

Yes: - No: **0**

Lame/problems with moving?

No abnormalities: **0** Parese: - Paralyse: - Ataxia: - Lame: -

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4. Do the rabbits/does the rabbit have the freedom to react adequately to fear and chronic stress?

Measurable by the environment

Is the enclosure situated in a relatively quiet spot?

Yes: + No: **When the rabbit(s) exhibit(s) signs of fear: -. When the rabbits do/rabbit does not exhibit signals of fear: 0**

If no, do the rabbits/does the rabbit exhibit signs of fear?

Yes: - No: **0**

Rest/retreat area available?

Yes: + No: **0**

If socially housed, is there at least one rest/retreat space per rabbit available?

Yes: + No, and all the rabbits do not fit in the available resting spaces together: -

No, but all the rabbits do fit in the available resting spaces together: -

Is enrichment available?

Yes: + No: -

If yes, what type(s) of enrichment?:

Everything +

Are there signs of gnawing on the enclosure visible?

Yes: - No: **0**

Measurable by the rabbit(s)

If socially housed with other rabbits, what kind of behaviour is being observed (are there signs of positive interaction and/or agonistic behaviour)?:

Positive interaction: + Agonistic behaviour: -

Reaction of the rabbit(s) when making an unexpected noise

Response as expected: **0** Extreme startle reaction: -

Reaction to an approaching hand

Aggression: - Trying to bite: - Trampling: - Fear/fright: - Flight: - No reaction: **0** Seeks approachment to the hand without expressions of negative behaviour: +

Reaction to being handled

Aggression: - Trying to bite: - Trampling: - Fear/fright: - Flight: - No reaction: **0** Seeks approachment to the hand without expressions of negative behaviour: +

5. Do the rabbits/does the rabbit have the freedom to display normal behavioural patterns that allow the animal to adapt to the demands of the prevailing environmental circumstances and enable it to reach a state that it perceives as positive?

Measurable by the environment

The rabbits have/the rabbit has the possibility to hide themselves in the enclosure

Yes: + At a minimum: **0** No: -

The rabbits have/the rabbit has the possibility to exhibit resting behaviour

Yes: + At a minimum: 0 No: -

The rabbits have/the rabbit has the possibility to stand fully stretched on their hind legs in the enclosure

Yes: + No: -

The rabbits have/the rabbit has the possibility to perform hopping behaviour

Yes: + At a minimum: - No: -

The rabbits have/the rabbit has the possibility to dig

Yes: + At a minimum: 0 No: -

The rabbits have/the rabbit has the possibility to exhibit exploratory behaviour

Yes: + At a minimum: 0 No: -

The rabbits have/the rabbit has the possibility to exhibit foraging behaviour

Yes: + At a minimum: 0 No: -

The rabbits have/the rabbit has the possibility to eat in a natural grazing posture

Yes: + At a minimum: 0 No: -

The rabbits have/the rabbit has the possibility to exhibit social behaviour

Yes, by direct contact, sight and smell: + Yes, but only by sight and smell: -

Yes, but only by smell: - No: -

Appendix B: percentage of stores that sell the object

<i>Object</i>	<i>Percentage</i>
<i>Indoor enclosures</i>	100
<i>Outdoor enclosures</i>	92.3
<i>Run</i>	100
<i>Bedding</i>	100
<i>Littre box</i>	100
<i>Retreat area</i>	100
<i>Water bowls</i>	92.3
<i>Water bottles</i>	100
<i>Feeding bowls</i>	100
<i>Foraging enrichment</i>	92.3
<i>Gnawing enrichment</i>	100
<i>Toys</i>	100
<i>Hay</i>	100
<i>Dried herbs</i>	92.3
<i>Pellets</i>	100
<i>Muesli</i>	100
<i>Treats</i>	100
<i>Dietary supplements</i>	84.6
<i>Anti-parasite</i>	100
<i>Antibiotics</i>	0
<i>Anti-fungi</i>	38.5
<i>Other medication</i>	46.2
<i>Shampoo</i>	84.6
<i>Objects for cleaning</i>	92.3
<i>Brushes</i>	100
<i>Nail scissors</i>	100
<i>Transportation cages</i>	100
<i>Information about rabbits</i>	30.8