

OPTIONS FOR IMPROVING THE DAY-TO-DAY MANAGEMENT AND HUSBANDRY OF HORSES IN THE NETHERLANDS

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ABSTRACT

To improve the welfare status of horses in the Netherlands, it is useful and important to learn more about their day-to-day activities in relation to owners' attitudes, opinions and possibilities. Therefore, the purpose of the current study is to give an insight in the day-to-day management and husbandry of an average horse in the Netherlands and to describe the options for improving this management and husbandry, with a focus on free movement and social contact. Besides describing the options for improvement, this study will investigate whether horse owners' practices correspond with their opinions on the influence of free movement and contact with conspecifics on the welfare of horses.

An online survey was prepared and made accessible for Dutch horse owners, which resulted in 3774 complete responses in a period of almost 2 months in 2021. Together, the respondents were responsible for 3.6% of the Dutch horse population. 40 respondents were selected for a follow-up interview.

80% of the respondents was satisfied with the amount of movement they gave their horses. Owners keeping their horses at paddock paradises or nature reserves were most satisfied. Least satisfied were owners keeping their horses at riding schools. When the respondents gave their horses a higher amount of free movement, their satisfaction increased.

Owners keeping their horses individually chose "strongly agree" less frequently than owners keeping their horses in groups on the statements regarding contact with conspecifics. When focusing on the statements regarding free movement, owners giving no free movement chose the option "strongly agree" less frequently than owners who gave their horses 22 – 24 hours/day of free movement.

From the interviews became clear that 15/40 respondents gave their horses free movement individually, this was mostly due to owners being afraid of their horses getting injured when given free movement with conspecifics. Of the 31/40 respondents, that did not give their horses free movement for 24 hours a day, most mentioned as reasons "the weather is not good enough" and "horses get bored and/or restless". Of the 32/40 respondents, that did not keep their horses on pasture permanently, most mentioned that it was due to not having enough grass or the pastures being too wet.

Improvement can be made by transferring more scientific knowledge to owners of horses, for example by their veterinarian. For future research it would be interesting to investigate how horses are kept earlier in life and explore which improvements can be made at the onset of horses' social life.

1. INTRODUCTION

Horses are social animals which have evolved to patchy feeders, who graze 14-16 hours evenly distributed over the day. This means that horses almost permanently move in a slow pace (Graham-Thiers & Bowen, 2013). Besides this permanent slow movement, horses tend to show increased trotting, bucking and cantering when released in a paddock after being deprived from free movement, indicating horses' desire to also express this kind of locomotor behaviour (Chaya et al., 2006). The predominant housing system for domestic horses (still) consists mostly of individual stables combined with release in a paddock or pasture for only small part(s) of the day. The majority of individual boxes do not allow horses to perform natural behaviour, such as moving around freely and having physical and social contact with conspecifics. Lack of free movement and contact with conspecifics assumably causes stereotypic behaviour in horses (Bachmann et al., 2003; Lesimple et al., 2020), whereas visual and tactile contact with conspecifics actually reduces risk of abnormal behaviours (McGreevy et al., 1995) as does daily release in a paddock (Lesimple et al., 2020). Combined with the fact that full scale body contact is a major component of social behaviour (Christensen et al., 2002a), individual housing may have a negative impact on horses' welfare (Christensen et al., 2002b; Lesimple et al., 2020; Ruet et al., 2020).

There are many housing options that lie between permanent individual housing in boxes and permanent group housing outside. A study done by Lesimple et al. (2020), showed that horses can already benefit from small management changes. For instance, (individual) release in a paddock for approximately one hour per day has been proven to have a positive impact on horses' welfare and emotional state (Lesimple et al., 2020). Regarding social contact, Mills & Davenport, 2002 found that even only visual or mimicked (through a mirror) social opportunities, decrease the frequency of stereotypic behaviour.

An explorative study done in the Netherlands revealed that 74,5% of the participating horse owners think that horses prefer group housing above individual housing. However, practice often shows otherwise and the question remains why? (Visser & Van Wijk-Jansen, 2012a). A study done by Hartmann et al. (2015), in Nordic countries, showed that risk of injury is one of the main concerns of horse owners when it comes to group housing. Owners also think that introducing new horses in an established group or feeding horses in groups increases this risk. Even though these events can lead to agitation, there is evidence that severe injuries, whether or not caused by other horses, are relatively rare in groups of well-socialized horses (Hartmann et al., 2015).

To improve the welfare status of horses in the Netherlands, it is useful and important to learn more about their day-to-day activities in relation to owners' attitudes, opinions and possibilities. How do horse owners keep their horses and what are their choices based on? The previously described Dutch study by Visser and Van Wijk-Jansen (2012), revealed that between 51,7% and 84,5% of the respondents housed their horses individually. But no questions were asked about free movement in paddocks or on pasture or why owners housed their horses in a certain way. The purpose of the current study is to give an insight in the day-to-day management and husbandry of an average horse in the Netherlands and to describe the options for improving this management and husbandry, with a focus on free movement and social contact. Besides describing the options for improvement, this study investigated whether horse owners' practices correspond with their opinions on the influence of free movement and contact with conspecifics on the welfare of horses. This knowledge may contribute to indicating where attitude and behaviour of owners will need to change in order to improve horses' welfare.

The expectation is that there will be multiple options for improvement of the day-to-day management and husbandry of horses in the Netherlands. It is also expected that owners will need to change their opinions and behaviour to result in an improvement of the husbandry of horses in the Netherlands.

This study was carried out in close collaboration with Willemijn Benckhuijsen, who investigated the factors that were of influence on the current day-to-day management and husbandry of horses in the Netherlands, also focussing on free movement and contact with conspecifics.

2. MATERIALS AND METHODS

2.1 Survey design

A survey was designed using the survey engine Qualtrics (www.qualtrics.com), consisting of 16 questions. 6 open, 8 closed-ended questions and 2 questions with sliders, all detailed in appendix 2. The questions were divided in 4 parts. The first part of the survey concerned the type of establishment of the horse(s) of the respondent. In the second part, owners had to describe the purpose and day-to-day management of their horse(s). After this section, if owners were responsible for horses with a different day-to-day management, they were asked to choose one horse or group of horses with the same day-to-day management. This chosen horse or group of horses was the reference group for the remaining questions in the rest of the survey. The third part contained questions about free movement, contact with conspecifics and the amount of time spent on various activities such as riding. In the last part of the survey, respondents were asked to give their opinion about the day-to-day management of their horse(s) and what they thought was the importance of free movement and contact with conspecifics for horse welfare. Finally, respondents were given the option to fill in their email address. This gave the researchers permission to approach respondents for a follow-up interview. All the responses were anonymized for the analysis.

The survey was set up in such a way that all questions were required. Only the question where a horse or group of horses had to be chosen was exempt to this rule, because not every respondent owned horses with a differing day-to-day management. All of the closed-ended questions and the sliders contained an “other, namely...” option, giving respondents the opportunity to clarify their own category. However, this option was not available in one of the questions related to the respondents’ opinion, which was based on a Likert scale of 5 points (strongly disagree, disagree, neutral, agree, strongly agree).

2.2 Survey distribution

Before distribution, the survey was approved by the Science-Geosciences Ethics Review Board (SG ERB) of Utrecht University. The link to the survey was distributed via the Facebook accounts of the Faculty of Veterinary Medicine of Utrecht University, the Royal Dutch Equine Sport federation (KNHS)¹ and the Dutch Federation of Professional Equestrian Centres (FRNS)². Also, the link to the survey was presented in the newsletter of the KNHS. All horse owners of any kind could participate. The survey was accessible between November 24, 2020 and January 12, 2021. Only complete responses were included in the analysis.

2.3 Follow-up interview design

A follow-up semi-guided interview was designed based upon the initial survey and consisted of 43 open questions. Some of the questions were similar to the survey and functioned as brief control questions. The questions were aimed to investigate the owners’ motivations for the day-to-day management of their horse(s). Specifically: how do horse owners describe their rationale in relation to daily turnout and contact with conspecifics? The interview was divided in 5 parts. The first part concerned general information. Secondly, owners were asked to describe the daytime activities of their horse(s) in summer and winter season. The third part focused on the housing system and the

¹ Koninklijke Nederlandse Hippische Sportfederatie

² Federatie van Nederlandse Ruitersportcentra

fourth part focussed on free movement. Lastly, owners were asked to give their opinions on keeping horses in groups and the best possible housing for horses. The complete interview list of questions is detailed in appendix 3.

2.4 Follow-up interview selection and procedure

Out of the 3774 complete responses, 40 respondents were selected for a follow up semi-guided interview, based on: type of establishment their horses were kept, purpose of the horse(s), number of horses owned and whether free movement was given with or without conspecifics. Based upon the survey, the type of establishment was divided in 6 categories: private stable (at home), paddock paradise, breeding stable, boarding stable, riding school and a combination of boarding stable and riding school. From each of the described categories, 6-7 owners were interviewed. A selection was made based upon whether or not respondents allowed their horse(s) free movement with conspecifics, and the number of horses for which respondents were responsible. In every category, the distribution of allowing free movement with and without conspecifics was approximately 50/50, and at least one respondent had to be responsible for more than 10 horses. The remaining respondents were selected randomly.

The follow-up interviews took place between December 3, 2020 and January 15, 2021. Owners were interviewed during a videocall with both the researchers, in which the sound was recorded with consent of the owner. All data were anonymized using a key file which was saved upon two secured USB-sticks. For each interview, the survey data of the respondent was also taken into account. Also, some questions required extra details in follow up questions, so depending on given answers, some questions of the interview were extended or could be skipped.

2.5 Data analysis survey

Only the complete responses on the survey were included in the data analysis. For generating descriptive statistics, data were downloaded into Excel (version 2021 Microsoft). Subsequently, all survey responses were categorized by the following topics:

- *Type of establishment* (see figure 1), based upon question 1. The category “paddock paradise/nature” was derived from the option “other, namely...”. Horses kept in a so-called paddock paradise or somewhere in nature or on pasture were added to this category. All of the remaining answers given in the option “other, namely...” were allocated to the different types of establishments. Professional and training stables were combined with the breeding stables. A distinction was made between respondents solely housing their horse(s) at a boarding stable, riding school or combination of a boarding stable and riding school, and respondents responsible for a boarding stable, riding school or combination of a boarding stable and riding school.
- *Purpose of use* (see figure 2), based upon question 5. The category “sports” consisted of owners answering question 5 solely with sports or competition. When owners described using their horse(s) for both sports and leisure riding, the purpose of use was considered “leisure riding”. The category “mix” consisted of horse owners responsible for horses with different purposes.
- *Free movement with or without conspecifics* (see figure 3), based upon questions 9 and 10. The category “mix” consisted of owners giving their horse(s) free movement both with and without conspecifics. Questions 9 and 10 were not shown to respondents who selected the option “no free movement” in question 8.

- *Total hours of free movement in summer and winter season* (see table 2 and 3), based upon questions 11 and 12 (sliders). All hours in a paddock, on pasture, in a stable with outdoor area and free movement described in “other, namely...” were combined and considered as hours of free movement. Respondents who filled in a total of 22 or 23 hours of free movement were also classified into the group of 22- 24 free movement, since activities such as riding or walking were also included in the sliders. Respondents were only able to fill in whole hours.

Categorized data were downloaded into RStudio (version 1.2.5033) for further statistical analysis. A paired Wilcoxon signed rank test was performed to compare the amount of free movement in summer and winter. A two-sampled T-test was performed to compare the statements about contact with conspecifics with the statements about free movement.

2.6 Data analysis interview

The data derived from the follow-up interview were analysed separately from the survey data. Based upon respondents’ answers, the responses were categorized by the following topics:

- *Free movement with or without conspecifics*, based upon the answers interviewed respondents gave on the questions concerning free movement. These answers resulted in two categories, namely: “One or more of owned horses kept individual” and “None of owned horses kept individual”.
- *Giving horses free movement 24 h/d*, also based on the answers on the questions concerning free movement. The following categories were formed: “Horses are not housed outside 24 h/d” and “Horses are housed outside 24 h/d”.
- *Whether or not owners fed their horses roughage when being kept outside in a paddock*. Based upon the answers given to question 28, two categories were made: “Horses are not fed roughage when in paddock” and “Horses are fed roughage when in paddock”.
- *Keeping horses on pasture permanently or not keeping horses on pasture permanently*. The categories were formed based upon answers given to question 11 and to the questions concerning free movement. Respondents were classified in the following categories: “Horses are not kept on pasture permanently” and “Horses are kept on pasture permanently”. Only respondents who kept their horses on pasture 24 h/d were classified in the category “Horses are kept on pasture permanently”.

All data from the follow-up interview was documented in an Excel-file for descriptive statistics.

3. RESULTS

3.1 RESULTS OF THE SURVEY

3.1.1 Owner and Horse Demographics

The online survey produced a total of 3774 complete responses. The initial number of responses was 5628, meaning a total of 1854 incomplete responses. Since respondents did not have the possibility to skip questions, these were unfinished surveys. A convincing majority of respondents dropped out at questions 1 (36.6%) and 6 (42.0%). Only the complete responses were included in the analysis.

Together, the respondents were responsible for 16.327 horses, which is 3.6% of the total number of horses in the Netherlands (450.000) (KNHS, 2017). On average, respondents were responsible for 4 horses (range: 1 – 150 horses).

The surveys represented different types of establishments, as presented in figure 1. Most owners kept their horses at private stables (45.7%) or boarding stables (32.0%). The largest group of respondents (69.0%) mainly used their horses for leisure riding. The second, much smaller group consisted of respondents whose main goal was sport (16.3%). Within this group, 16 people specifically described performing at top-level competition (2.6%). The remaining purposes of use are represented in figure 2.

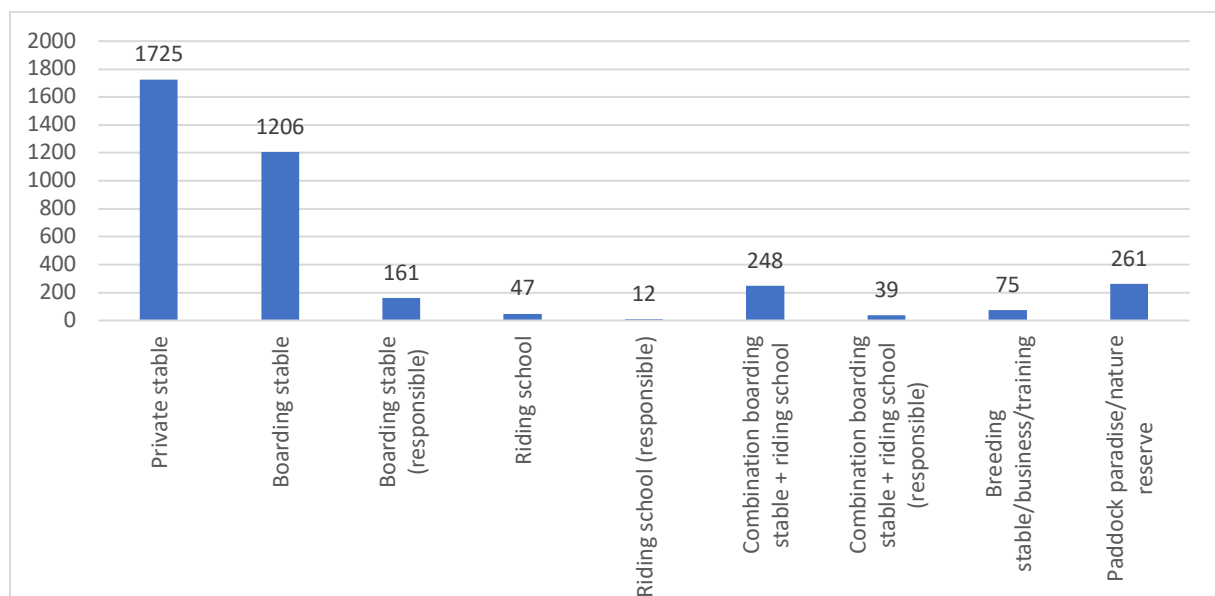


Figure 1: frequency of different types of establishments (n) represented in survey. "Responsible" in this figure meaning that the respondent was responsible for this type of establishment.

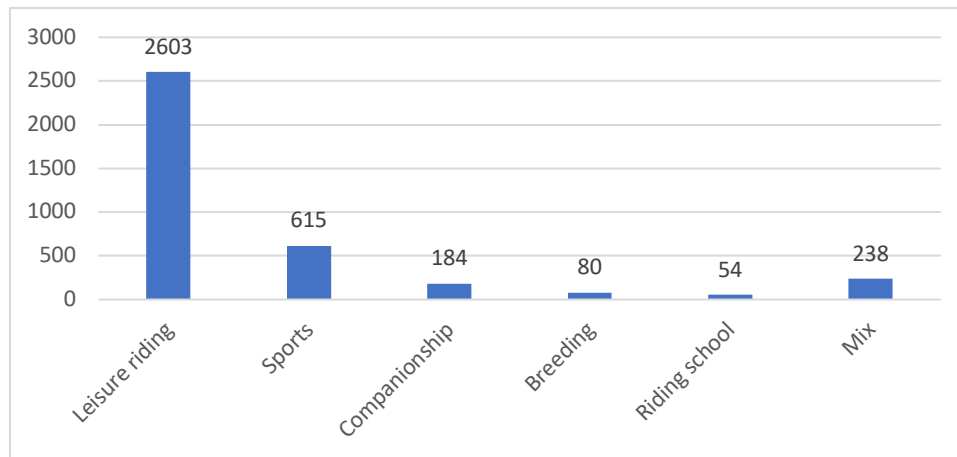


Figure 2: number of respondents (n) keeping horses for certain purposes of use.

3.1.2 Types of establishments

The size of the different types of establishments was expressed by the mean number of horses housed at these establishments. A total of the number of horses housed at each type of establishment is given in table 2. On average, the largest type of establishment was the combination of boarding stable and riding school (57.8 ± 38.3 horses), the smallest type of establishment was a private stable (4.8 ± 4.4 horses).

Table 1: total number of horses housed per type of establishment in the survey, percentage of total number of horses in the Netherlands (450.000 (KNHS, 2017)) and mean number of horses housed per type of establishment. The boarding stables, riding schools and combinations of boarding stables + riding schools for which respondents were responsible, are included in respectively the establishments boarding stable, riding school and combination boarding stable + riding school.

Type of establishment	Total number of horses housed per type of establishment (% of total number of horses in the Netherlands)	Mean number of horses housed per type of establishment (\pm SD)
Private stable	8262 (1.8%)	4.8 \pm 4.4
Boarding stable	50021 (11.1%)	36.6 \pm 44.1
Riding school	2992 (0.7%)	50.7 \pm 32.0
Combination boarding stable + riding school	16590 (3.7%)	57.8 \pm 38.3
Breeding stable/business/training	2116 (0.5%)	28.2 \pm 29.5
Paddock paradise/nature	2595 (0.6%)	10.0 \pm 12.6
Total	82576 (18.4%)	

3.1.3 Free movement with or without conspecifics

Based on question 8 of the survey, a total of 3749 respondents gave their horse(s) free movement (with or without conspecifics) and 25 respondents did not give their horse(s) free movement. Almost eighty percent (79.7%) of the respondents which allowed their horse(s) free movement, always gave free movement together with conspecifics, compared to fifteen percent (15.4%) who always kept their horses individually. The other respondents gave their horses free movement with conspecifics in summer, and individually free movement in winter (2.2%) or gave free movement both with and without conspecifics (2.8%) (see figure 3).

Of the respondents always giving their horses free movement individually, most respondents (82.6%) always had other horses in sight. 59 respondents (10.2%) often had other horses in sight, 31 respondents (5.4%) sometimes had other horses in sight and 10 respondents (1.7%) never had other horses in sight.

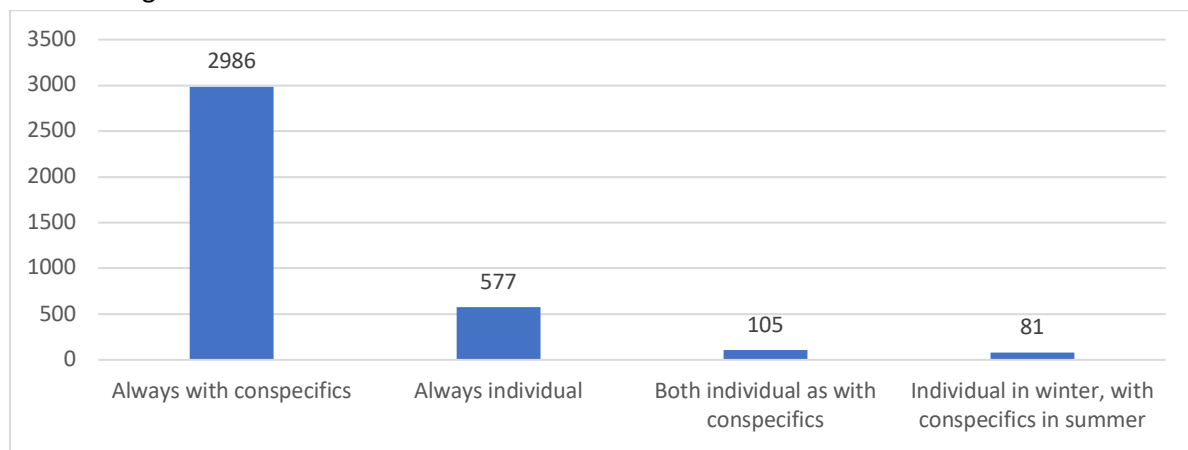


Figure 3: number of respondents (n) giving horses free movement with or without conspecifics

As described in the report of Benckhuijsen (2021, unpublished data), giving free movement with or without conspecifics was related to the type of establishment on which the horses were kept and related to the purpose of use of the horses. Respondents keeping their horses on a combination of boarding stable and riding school, most often (24.1%) kept their horses individually, closely followed by respondents keeping their horses at riding schools (23.4%; 11/47). Individual housing was also most common in the group of respondents with sport horses (29.6%) compared to respondents owning horses with another purpose of use.

A full overview on the relation between free movement with or without conspecifics and type of establishment, and the relation between free movement with or without conspecifics and purpose of use is given in the report of Benckhuijsen (2021, unpublished data).

3.1.4 Amount of free movement, winter versus summer

In table 3, an overview is given of the amount of free movement respondents gave their horse(s), based upon questions 11 and 12 of the survey. Horses received significant less hours of free movement in winter compared with summer (Wilcoxon signed rank test, $V=22892$, $p < 2.2 \cdot 10^{-16}$). However, during both seasons most respondents (winter: 38.5%, summer: 52.2%) gave their horses free movement for 22 to 24 hours per day. Though in winter, horses were more likely to be given no free movement, or only for 1 or 2 hours a day (figure 4).

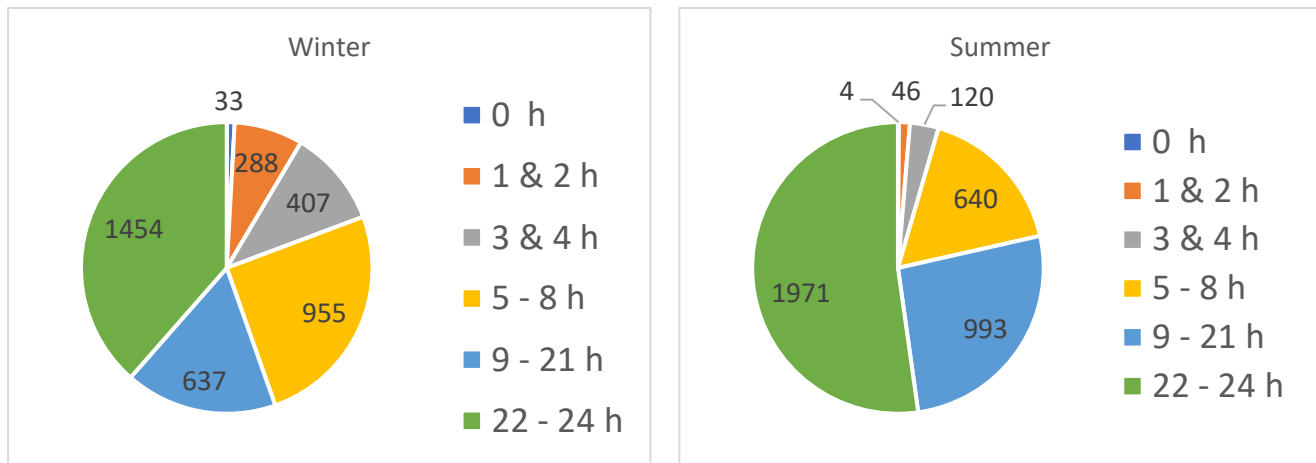


Figure 4: number of respondents (n) and provided hours of free movement per day in winter season (left) and summer season (right). Note that respondents could only fill in whole hours.

As described in the report of Benckhuijsen (2021, unpublished data), the amount of free movement respondents gave to their horses was related to the type of establishment on which the horses were kept and related to the purpose of use of the horses. This effect was seen in both summer and winter.

In winter, owners keeping their horses on a riding school or on a combination of a boarding stable and riding school, mostly gave their horses free movement for 1 or 2 hour(s) per day. Respondents who kept their horses at other establishments mostly gave their horses 5 – 8 hours of free movement or gave free movement for 22 – 24 hours (private stables, breeding stables, paddock paradises/nature reserves). Respondents owning horses that were mainly used for riding school purposes most often (24.1%) gave their horses no free movement or just for 1 or 2 hours, followed by respondents mainly using their horses for sports (15.0%).

In summer, owners keeping their horses on a riding school or on a combination of a boarding stable and riding school, mostly gave their horses free movement for 5 – 8 hours per day. Owners keeping their horses at other establishments mostly gave their horses free movement for 22 – 24 hours. Within the group of respondents giving 22 - 24 hours of free movement, the percentage of owners with sport horses was the lowest (22.9%) and the percentage of owners with companion horses was the highest (78.9%). In the groups that gave the lowest amount of free movement (no free movement or 1 or 2 hours of free movement), the respondents using their horses for riding school purposes was the highest (13.0%).

A full overview on the relation between the amount of free movement and the type of establishment, and the relation between the amount of free movement and purpose of use is given in the report of Benckhuijsen (2021, unpublished data).

When respondents who gave their horse(s) free movement individually were compared to those who gave their horse(s) free movement in groups, 60.0% of the grouped horses had free movement 24 h/d in summer, compared to 19,1% of the horses that had individual free movement. In winter, grouped horses also were more likely (45.1%) to get free movement 24 h/d compared to individual kept horses (11.8%). Also the percentage of respondents giving no free movement or just for 1 or 2 hours was higher in the individual group (summer: 5.2%, winter: 22.4%) compared to the group giving free movement with conspecifics (summer: 0.5%, winter: 5.0%). An overview on the relation between the amount of free movement and individual free movement or with conspecifics is given in tables 2 and 3 (table 2: $\chi^2 = 544.64$, $df = 15$, $p < 2.2 \cdot 10^{-16}$; table 3: $\chi^2 = 502.1$, $df = 15$, $p < 2.2 \cdot 10^{-16}$.)

Table 2: amount of respondents (n) giving their horses a certain amount of free movement in summer compared to if free movement was given with or without conspecifics. Note that respondents could only fill in whole hours.

	Hours free movement per day in summer					
Social composition	0 h	1 & 2 h	3 & 4 h	5 – 8 h	9 – 21 h	22 – 24 h
(Almost) always individual	3 (0.5%)	27 (4.7%)	57 (9.9%)	207 (35.9%)	173 (30.0%)	110 (19.1%)
(Almost) always with conspecifics	1 (0.03%)	15 (0.5%)	52 (1.7%)	372 (12.5%)	754 (25.3%)	1792 (60.0%)
In winter individual, in summer with conspecifics	0	1 (1.2%)	5 (6.2%)	27 (33.3%)	29 (35.8%)	19 (23.5%)
Mix	0	0	4 (3.8%)	26 (24.8%)	33 (31.4%)	42 (40.0%)

Social composition compared to hours of free movement per day in summer: $\chi^2 = 544.64$, $df = 15$, $p < 2.2 \cdot 10^{-16}$

Table 3: amount of respondents (n) giving their horses a certain amount of free movement in winter compared to if free movement was given with or without conspecifics. Note that respondents could only fill in whole hours.

	Hours free movement per day in winter					
Social composition	0 h	1 & 2 h	3 & 4 h	5 – 8 h	9 – 21 h	22 – 24 h
(Almost) always individual	20 (3.5%)	109 (18.9%)	119 (20.6%)	192 (33.3%)	69 (12.0%)	68 (11.8%)
(Almost) always with conspecifics	9 (0.30%)	141 (4.7%)	249 (8.3%)	696 (23.3%)	543 (18.2%)	1348 (45.1%)
In winter individual, in summer with conspecifics	1 (1.2%)	20 (24.7%)	17 (21.0%)	27 (33.3%)	8 (9.9%)	8 (9.9%)
Mix	0	12 (11.4%)	18 (17.1%)	30 (28.6%)	16 (15.2%)	29 (27.6%)

Social composition compared to hours of free movement per day in winter: $\chi^2 = 502.1$, $df = 15$, $p < 2.2 \cdot 10^{-16}$

3.1.5 Respondents' satisfaction

Respondents were asked whether they were satisfied with the amount of free movement they gave their horses. Eighty percent (80.1%) of the respondents said to be satisfied with the amount of free movement they gave their horses, though still almost twenty percent (19.9%) was not satisfied with the amount of free movement.

Respondents keeping their horses on paddock paradises or in nature reserves were most satisfied (91.2%), followed by respondents who kept their horses at private stables (88.5%). Least

satisfied were respondents keeping their horses at riding schools (55.3%; 26/47) or respondents that owned a riding school (58.3%; 7/12).

The respondents were then asked what changes they would like to make considering the amount of free movement they gave their horses. Of the 750 respondents that were not satisfied, about thirty percent (31.1%) would prefer a longer period of free movement, about twenty-five percent (24.5%) would prefer more free movement only during winter season and about twenty percent (21.3%) would prefer bigger paddocks or/and more space to give their horses free movement. Other matters that respondents would like to change, were more time on pasture (6.8%) or giving their horses free movement 24 h/d (16.3%).

As respondents gave their horses more hours of free movement, their satisfaction also increased (figure 5). In the group of respondents that did not give their horses free movement in winter, only 30.3% (10/33) was satisfied compared to 91.4% in the group that gave their horses free movement for 24 h/d. Unsatisfied owners in the groups with less than 3 hours of free movement, mostly (43.7%) preferred a longer period of free movement for their horses.

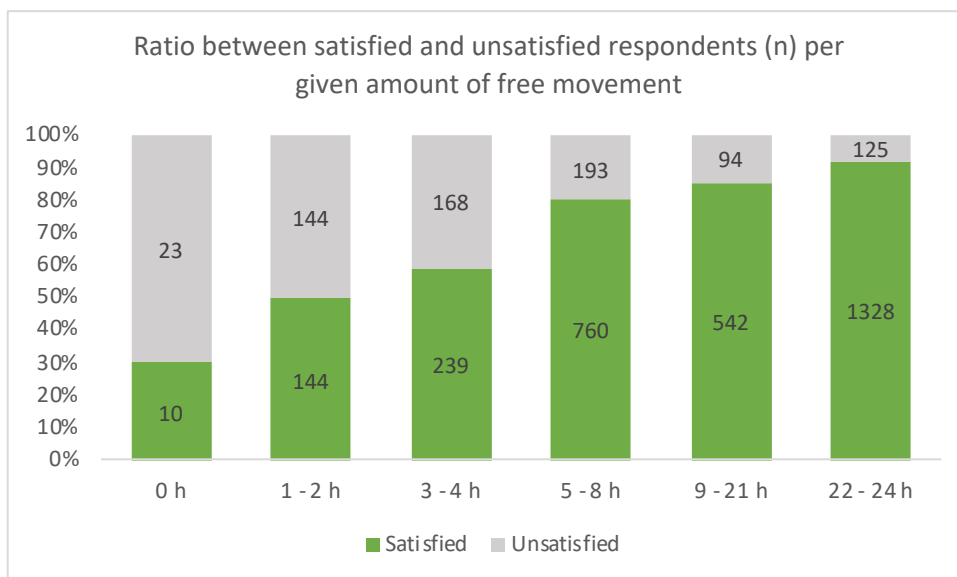


Figure 5: ratio between the number of satisfied and unsatisfied respondents (n) per number of hours of daily free movement in winter

3.1.6 Respondents' opinions

At the end of the survey, respondents were asked to give their opinion on four different statements. The option "strongly agree" was chosen most at all four statements (table 7). However, respondents were more likely to score "strongly agree" on the statements concerning free movement than on the statements concerning contact with conspecifics. This applied to the first two statements about free movement and contact with conspecifics every day ($t = 4.3891$, $df = 3773$, $p < 1.2 * 10^{-05}$) as to the two statements about free movement and contact with conspecifics contributing to horse welfare ($t = 4.7861$, $df = 3773$, $p < 1.8 * 10^{-06}$).

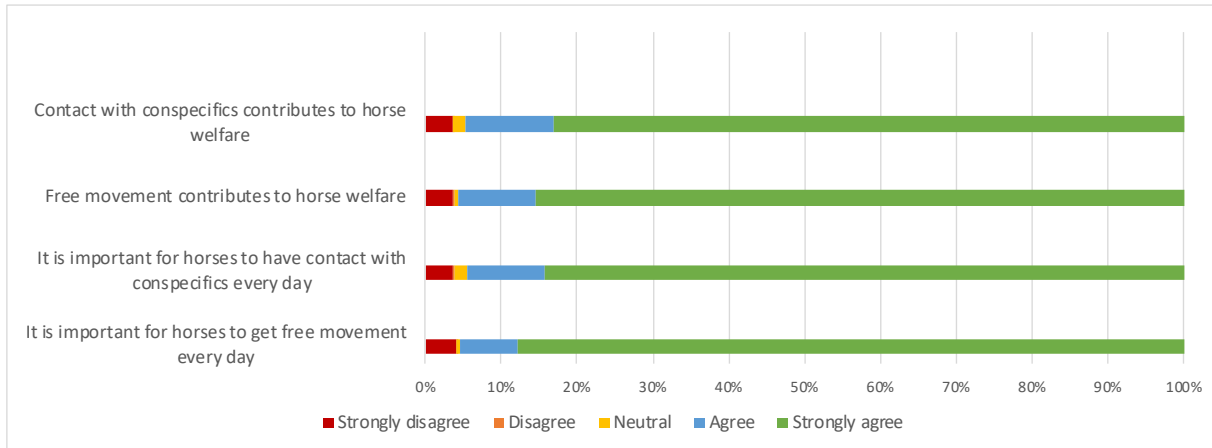


Figure 6: distribution of respondents' opinions on the four different statements mentioned in the survey

The relationship between keeping horses with or without conspecifics and respondents' opinions on the statements concerning contact with conspecifics are shown in figures 7 and 8. For both statements, the number of respondents choosing the option "strongly agree" is lowest (61.7%, 62.7%) in the group of owners (almost) always keeping their horses individually. Owners (almost) always giving their horses free movement with conspecifics, strongly agreed on both statements in respectively 89.3 and 87.7% of the cases.

When focusing on the statements concerning free movement, respondents who did not give their horses free movement chose the options "strongly agree" less frequently for both statements (54.6%, 63.6%) than owners who gave their horses free movement 24 h/d (93.7%, 92.5%). An overview on the relationship between the amount of free movement respondents gave their horses in winter and their opinions on the statements concerning free movement is given in figures 9 and 10.

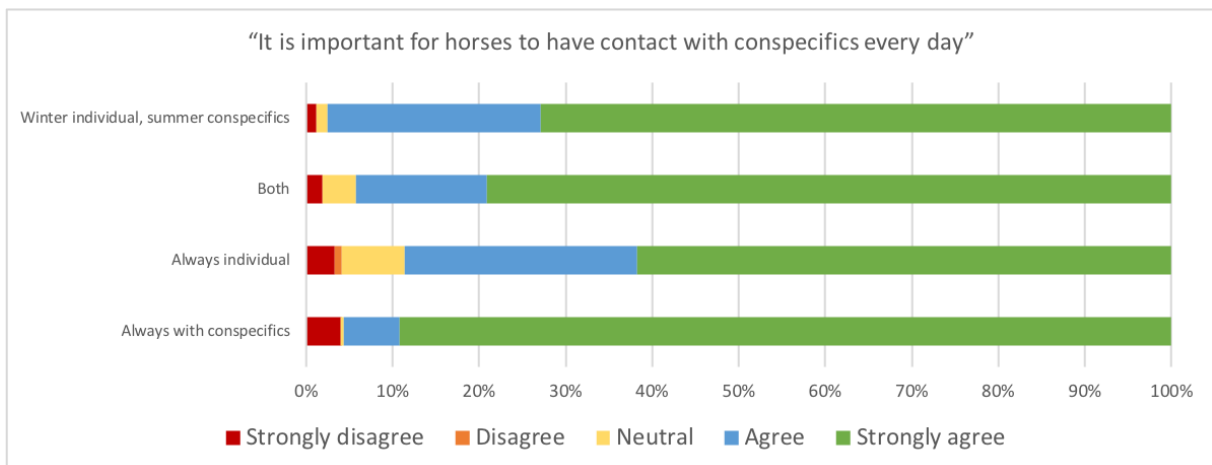


Figure 7: current practice in relation to owners' opinions concerning every day contact with conspecifics

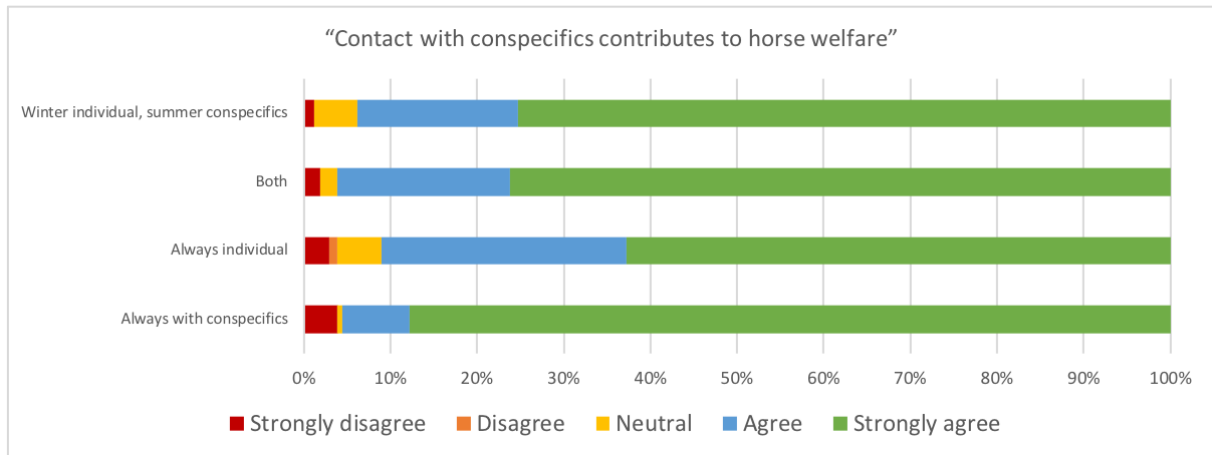


Figure 8: current practice in relation to owners’ opinions concerning contact with conspecifics and horse welfare

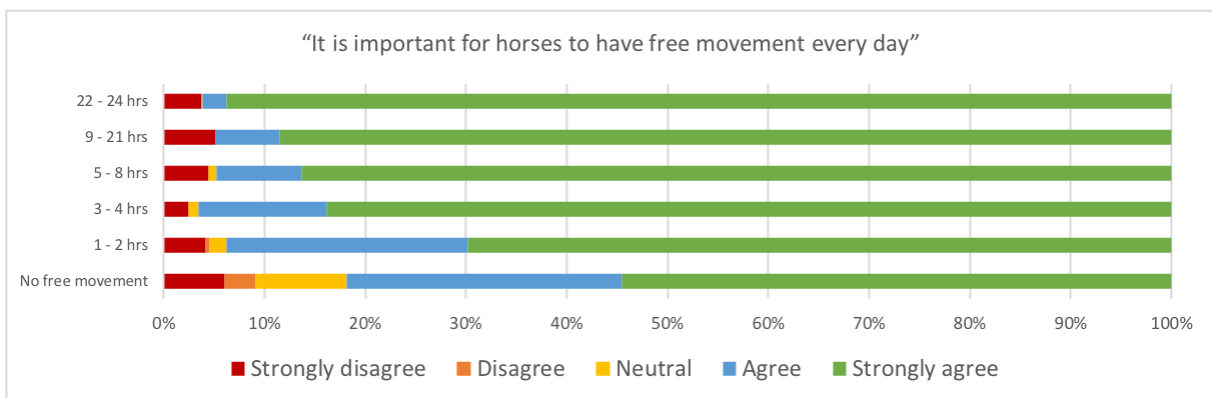


Figure 9: current practice in relation to owners’ opinions concerning every day free movement

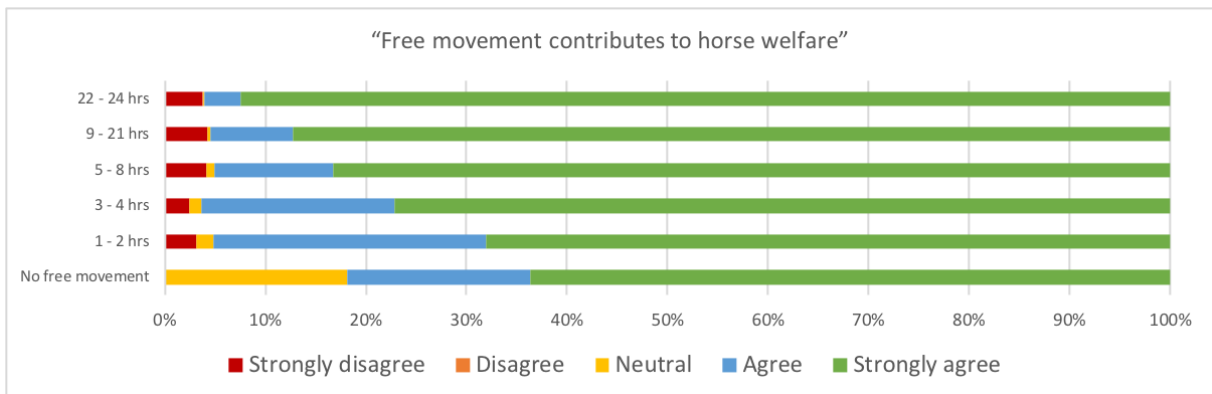


Figure 10: current practice in relation to owners’ opinions concerning free movement and horse welfare

3.2 RESULTS OF THE INTERVIEW

3.2.1 Current practice, attitudes and opinions of interviewed respondents

A total number of 40 horse owners was interviewed after filling in the survey. The establishment that was most represented was a private stable 14/40 (35%), followed by the breeding/business/training stable 7/40 (17,5%). There were no owners that kept their horses on a combination of a boarding stable and riding school (figure 11).

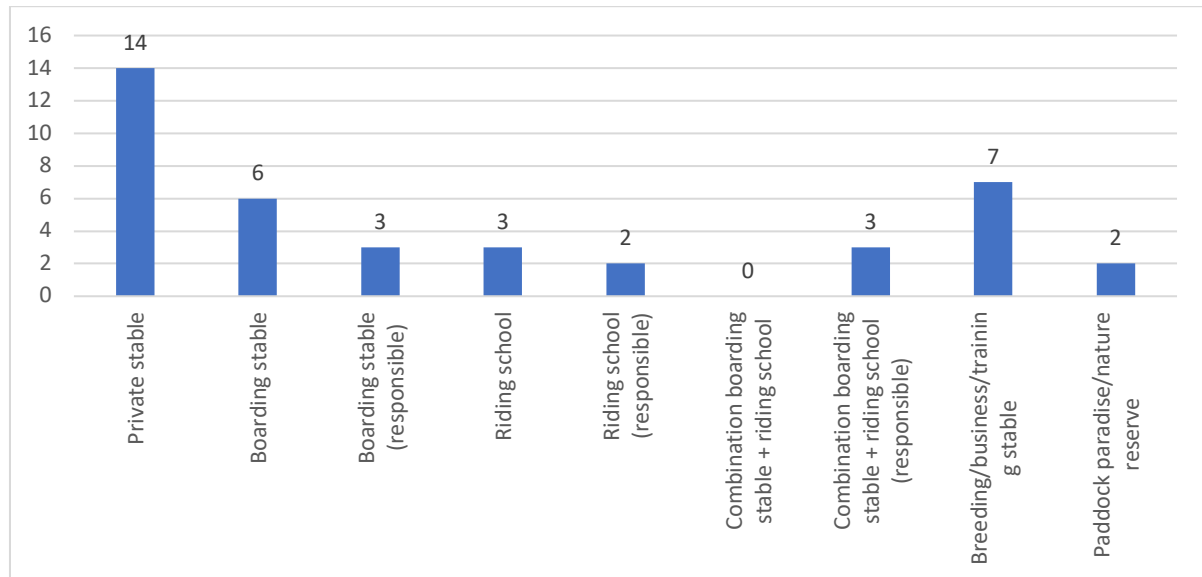


Figure 11: frequency of different types of establishments (n) represented in the interview.

20/40 (50%) of interviewed respondents used their horses for leisure riding and none of the respondents only owned horses for companionship (figure 12).

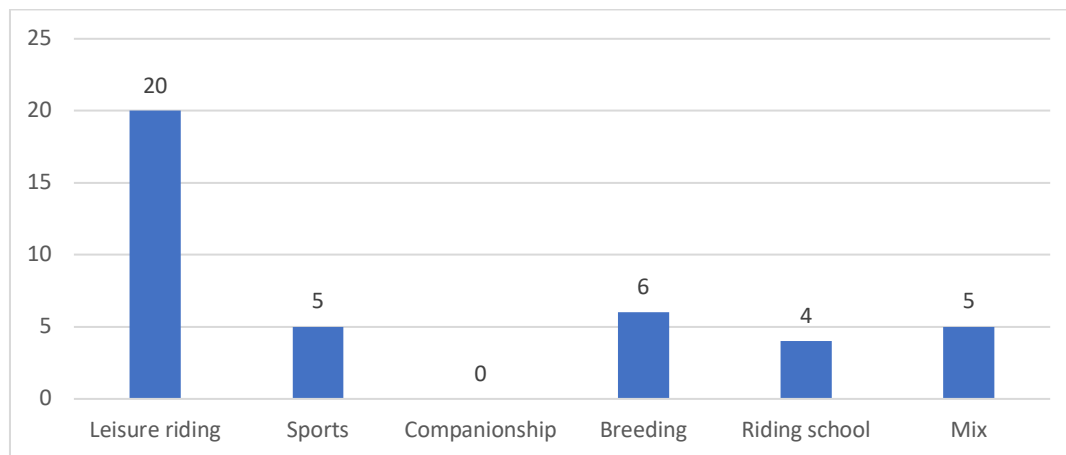


Figure 12: number of interviewed respondents (n) keeping horses for certain purposes of use.

When respondents were asked about giving their horses free movement individually, 25 respondents 25/40 (62.5%) did not have any reason for keeping their horses individually and kept all their horses with conspecifics. The remaining group of 15 respondents 15/40 (37.5%) did keep one or more of their horses individually, due to multiple reasons. Most mentioned was wanting to prevent their horses getting injured by other horses (60.0%; 9/15).

When respondents were asked about keeping their horses grouped outside 24 h/d, 9 of the respondents 9/40 (22.5%) did not see any objections for keeping their horses grouped outside 24 h/d.

31/40 owners (77.5%) did mention various objections, with 'the weather is too bad' and 'horses get bored and/or restless' as most mentioned (48.4%; 15/31).

Most of the respondents (77.5%; 31/40) fed their horses roughage when turned out in a paddock. Of the 9 respondents 9/40 (22.5%) who did not feed their horses roughage when turned out in a paddock, 6/9 (66.7%) chose to do so because it made the surface of the paddock deteriorate in quality or made it harder to maintain the quality of the surface.

Respondents were also specifically asked about keeping their horses on pasture. 32/40 owners (80.0%) did not keep their horses on pasture permanently, this was mostly due to the pasture being too wet and/or not having enough grass on the pasture (62.5%; 20/32). In addition, owners mentioned their horse(s) having a predisposition for developing laminitis, colic or other illness when kept on pasture (34.4%; 11/32) or their horse(s) getting too fat when kept on pasture (28.1%; 9/32).

A full overview on the reasons respondents mentioned, is listed in appendix 3.

4. DISCUSSION

In this research paper a survey and follow up interview was used to give an insight in the day-to-day management and husbandry of an average horse in the Netherlands. Subsequently, options for improving this management and husbandry were investigated. A total of 16.327 horses was included in this study, which is 3.6% of the total number of horses in the Netherlands. However, it has to be taken into account that horse owners, interested in improving horses welfare, might have been more represented in the survey, resulting in an slight inaccurate representation of the population.

Furthermore, most respondents (winter: 38.5%, summer: 52.2%) of the survey stated to give their horses free movement for 22 to 24 hours per day. Compared to the respondents of the interview, where only 22.5% gave their horses free movement for 24 hours per day, this percentage is quite high. As the interview consisted of multiple audit questions, socially desirable answers were attempted to get filtered out. The survey consisted of much lesser audit questions, which made it easier for owners to overestimate their answers, probably resulting in a more positive representation of reality.

4.1 Free movement with or without conspecifics

In this study, 15.4% of the respondents always kept their horses individually. This is quite high compared to the report from [Hartmann et al., 2015](#), done in Denmark, Finland, Norway and Sweden, where only 8% of the respondents always kept their horses individually. However, it has to be taken in account that most of these respondents always had other horses in sight within 20 meters, which can positively influence horses' emotional state while kept individually (Mills & Davenport, 2002). From the survey became clear that horses kept at a combination of a riding school and boarding stable or at a riding school, were most likely to be housed individually. This could be due to the higher number of horses kept at these establishments, meaning that facilities must be shared with a higher number of horses than at smaller establishments. A probable consequence of more horses at a certain establishment, is that more owners are involved in taking care of these horses. Our interviews revealed that one of the reasons why owners did not give their horses free movement with conspecifics was that they did not want other owners complaining about horses injuring each other. With less horses and owners being involved at other types of establishments, making arrangements about keeping horses together might be easier. Another result of less horses at an establishment, is that herds are mostly smaller and the density of horses per unit of space is lower. Research done by [Benhajali et al., 2008](#) showed that 44 mares kept in a high density herd (200 mares/ha), increased their agonistic behaviour and stopped showing positive social interactions. Therefore, horses in smaller herds with less density might show less aggressive behaviour towards each other, making it easier for owners to keep them together.

Benckhuijsen's (2021, unpublished data) report showed that respondents who owned sport horses were more likely to give their horses free movement individually, which corresponds to findings in other studies (Hartmann et al., 2015; Knubben et al., 2008). This is probably closely related to "wanting to prevent horses getting injured" as most mentioned reason by our interviewed respondents for not giving horses free movement with conspecifics. Since sport horses are often trained for a longer period of time prior to a competition, an injury can have serious consequences. Furthermore, horses participating in (higher) competition levels probably are of more financial value and are meant for resale more frequently than most horses used for leisure riding. Nevertheless, research done by (Arneemann, 2005) showed that keeping competition horses with conspecifics permanently, does not negatively influence their performance.

A third reason, that came forward from the interviews, was that horses were not socialized enough to be turned out with conspecifics. A study performed by (Christensen et al., 2002b)) showed that horses which lack social contact early in life, tend to show more aggressive behaviour towards conspecifics. Furthermore, young horses that are kept individually are harder to train and to handle (Søndergaard & Ladewig, 2004). Thus, horses of interviewed respondents that were not socialized enough might have lacked social contact earlier in life, resulting in aggressive behaviour towards conspecifics. However, since this study focused on the current husbandry of horses, no data was collected about how horses were kept earlier in life.

Nevertheless, the mentioned studies suggest that with the right approach, all horses can be kept together, even when they perform in sport. Several studies show that aggressive behaviour is rare in a stable group of socialized horses. To reduce the risk on injuries as much as possible it is important to create a stable herd with horses that have learned how to socially connect with one another. Important factors in this case are, for example, keeping young horses in mixed age groups, as stated by Bourjade et al., 2008. This report showed that introducing adult horses to a group of young horses, made agonistic interactions decrease and positive social behaviour increase. Age is an important factor in determining rank, thus introducing older horses might contribute to clearer dominance relationships (Christensen et al., 2002a). As mentioned before, also factors like keeping horses in smaller, low density herds and making sure horses do not lack social contact early in life, will reduce the risk on injuries and concerns of owners. Still, care has to be taken when introducing new horses to an already existing group, since resident horses almost always react aggressively to newcomers (Hartmann et al., 2009). As suggested by Henderson, 2007, keeping potential herd mates in neighbouring stalls and paddocks before turning horses out in the same paddock together, will decrease this aggressive behaviour and will make the risk on injuries as small as possible.

4.2 Amount of free movement, winter versus summer

Our survey revealed that the amount of free movement decreases in winter and that of unsatisfied owners, almost twenty-five percent preferred more free movement during the winter season. However, still most of the respondents said to give their horses 22 – 24 hours of free movement, even in winter season. Research of Hartmann et al., 2017 also showed that most of Norwegian and Swedish respondents permanently pasture their horses in summer. In winter it was most common to stable horses during night time and release them outside for 6 to 10 hours (Hartmann et al., 2017). This decrease in free movement during winter, was also seen in the report of Hockenhuil & Creighton, 2015, even though only 32% of the horses was reported to live out 24 hours per day, which is substantially fewer than what owners stated in the current study.

Half of the Netherlands lies beneath sea level. Combined with high rainfall and high groundwater levels, this results in most Dutch soils having hydromorphic properties and requiring artificial drainage when taken in use. This makes it less likely that such a high percentage of the respondents in this research really give their horses free movement for 22 – 24 hours a day in winter. Owners might have overestimated the amount of free movement or might have given socially desirable answers. However, as stated before, the amount of free movement does decrease in winter for most respondents. This is probably due to the weather and properties of Dutch soils and corresponds with “the pastures being too wet and/or muddy and/or not having enough grass” being the most mentioned reason for interviewed respondents to not keep their horses on pasture permanently. Interviewed respondents also mentioned to not keep their horses outside for 24 h/d due to too much rainfall, not having shelter, or paddocks being too wet. Artificial drainage could provide a

dryer surface of paddocks and pastures. However, due to high costs and limited effect, owners might not be willing or able to make this investment.

With less rainfall in summer, the surfaces of pastures and paddocks are expected to be of better quality during this time of the year. Nevertheless, still almost half of the respondents (47.8%) did not keep their horse(s) outside for 22 – 24 hours. This could be related to the temperature being too high or the presence of more insects in summer, as stated by interviewed respondents. Besides interviewed respondents wanting to protect their horses against weather influences and not wanting to keep them without supervision at night time, owners also believed that horses themselves wanted to go back inside. This belief is strengthened by interviewed respondents experiencing their horses getting restless when turned out for longer periods of time. The desire of horses to go back inside, might also be caused by classical conditioning. For example, a large number of owners feed their horses the moment they get stabled or stable their horses as soon as the horse experiences unpleasant circumstances like rain and wind. As a result, the process of getting stabled is experienced by horses as a positive event. Nevertheless, this does not mean horses experience it as pleasant to be stabled for long periods of time. The more time horses spent in their stable, the more they are prone to develop stereotypical behaviour (Lesimple et al., 2016). Besides classical conditioning, research of Lee et al., 2011 showed that horses would work much harder for food than for release from their stalls, which emphasizes the effect of feeding on horses behaviour.

The fact that interviewed respondents mentioned their horses getting restless, might also be the reason why a relatively high amount of owners of sport horses (14.0%), gave their horses no free movement or for only 1 or 2 hours a day (in winter). If horses get restless and start running, owners might consider it more likely for their horses to get injured, which would be a reason to take the horses back inside. Which, in advance, might only increase restlessness the next time horses are turned out as Chaya et al. (2006) found that horses turned out for 2 h/week were more likely to trot, canter and buck than horses turned out for 12 h/week. The same effect is seen in multiple studies and is known as the “rebound effect”. This rebound behaviour, like increased trotting, cantering and bucking can be an indication of previous behavioural deprivation, which in turn can be a cause of decreased welfare (Vestergaard, 1982)(Nicol, 1987).

Besides sport horses, also horses used for riding school purposes were more likely to be turned out for 1 or 2 hours, or not turned out at all in winter period, which might be due to these horses being used for riding lessons during the day. Also, not having enough employees or time to clean the horses or take them back outside in between lessons might play a role.

When focusing on the group of respondents who gave their horses free movement for 22 -24 hours a day, respondents using their horses for sport were least represented. Arguments that came forward from the interviews suggest that keeping horses inside during parts of the day is convenient for owners. Statements like “not wanting to use blankets”, “wanting to use the horse for riding”, and “not wanting the horse to get a winter coat” are all arguments for respondents using their horses for sport to keep horses inside during parts of the day. Sport horses are often clipped, which decreases the insulating capacity of the hair layer (Morgan et al., 2002) and improves the heat loss capacity of the skin, resulting in better performance and shorter recovery time after training. This makes it necessary to use blankets on clipped horses when kept outside in low temperatures or rainy weather.

At most types of establishments, the group of respondents giving their horses free movement for 22 – 24 hours per day was the most represented. Interestingly, the establishments on which horses are less likely to be turned out for 22 – 24 hours per day, are also the establishments on which the average number of horses housed is highest. A possible explanation for this might be that the ratio

between the amount of horses at the establishment and the available amount of space for free movement is limited. Thus, for future research it would be interesting to investigate the relation between amount of space per horse and amount of free movement given.

The amount of free movement given was related to whether horses were given free movement with conspecifics, meaning horses would be given more free movement when housed with conspecifics. When horses are given the choice, horses choose to stay in a paddock longer when they are released together with conspecifics compared to when they are released alone (Lee et al., 2011). This fact might contribute to horses getting agitated when given free movement individually and horses staying calmer when released with conspecifics. When horses are calm while given free movement, owners might find it more appealing to leave them outside for longer periods of time.

Therefore, a solution for giving horses more hours of free movement might even be releasing them together with conspecifics. Further solutions for keeping horses calmer during turnout would be preventing rebound behaviour by providing regular daily free movement of as many hours as possible, since this comes closest to horses' nature and minimizes the change of developing stereotypic behaviour (Lesimple et al., 2016). However, even release in a paddock for approximately one hour per day has already been proven to have a positive impact on horses' welfare and emotional state (Lesimple et al., 2020).

4.3 Respondents' satisfaction

The percentage of satisfied owners in the present report was high (80.1%) and similar to the report done in Nordic countries (Hartmann et al., 2015). Respondents keeping their horses at paddock paradises, nature reserves and private stables were most satisfied. Horses housed at paddock paradises or in nature reserves are probably almost permanently kept in groups and, on the whole, get to roam around freely. The choice to keep horses at these particular establishments, is probably well informed which makes these owners more likely to be satisfied. In most cases, private stables are located on the property of the respondent, which makes it easier for these respondents to adapt the husbandry of their horses to their own preferences. This might also play a role at some paddock paradises, as large-scaled commercial paddock paradises (in terms of a boarding stable) are not common in The Netherlands and are mostly also located on private properties.

Least satisfied were respondents keeping their horses at riding schools and owners of riding schools, which is remarkable since the latter are the people deciding on the way they keep the horses. Presumably, reasons from the interview like "not enough space or pastures", "municipality does not allow building (shelters, paddocks) on owners' property", and "it costs too much time, money and/or effort" affect the satisfaction of these respondents as these reasons limit their possibilities in improving the husbandry of their horses. Furthermore, horses stabled at riding schools are mostly used for riding lessons multiple days of the week, this inevitably influences the choices in management owners of riding schools have to make.

Factors that unsatisfied owners wanted to change were almost always related to wanting to increase the amount of free movement. Thus, owners are willing to improve the amount of free movement, but are probably not always able to do so. This is empowered by the fact that the fewer amount of free movement respondents gave their horses, the less satisfied they were. Reasons from the interview like "facilities are inadequate (no shelter, paddocks are too wet)" and "not enough space or pastures" might be the cause of owners not being able to change the amount of free movement. However, other reasons mentioned in the interview can be overcome with some more knowledge and

effort. Research of DuBois et al., 2018 also revealed that people attribute welfare issues to a lack of knowledge rather than malice, meaning that welfare issues might be solved with the right approach.

From the study of Visser & Van Wijk-Jansen (2012) became clear that horse owners mostly collect information on horse-related issues through their veterinarian or farrier. Thus, it is important to make farriers and veterinarians aware of their informing capacity and improve education on subjects like free movement and social contact in the current curriculum of farriers and veterinarians.

4.4 Respondents' opinions

Most of the respondents of the survey strongly agreed that free movement and contact with conspecifics should be pursued every day and contributes to horses' welfare. Nevertheless, there are still respondents who do not act upon their opinions as was also mentioned in studies of Visser & Van Wijk-Jansen (2012) and Hartmann et al. (2015).

When focusing on the statements regarding contact with conspecifics, about 90% of the respondents giving their horses individual free movement, agreed or strongly agreed on these matters. Hartmann et al. (2015) found a similar percentage when these statements were presented to respondents that never kept their horses in groups. This might be related to the fact that most respondents from the present study made sure there were other horses in sight when giving horses free movement individually. Owners might consider that their horse seeing other horses, contributes to contact with conspecifics. Visual contact does decrease the occurrence of stereotypic behaviour (McGreevy et al., 1995). However, as stated by Christensen et al. (2002), full scale body contact appears to be important in the construction of relations and, therefore, is a major component of social behaviour.

When focusing on the statements concerning free movement, still 80% of the respondents who did not give their horse free movement, chose the option "agree" or "strongly agree". This again indicates that owners are willing to improve the amount of free movement for their horses, but might not be able to achieve this. The explanation for owners to not act upon their opinions could also be due to keeping their horses at boarding stables, since these owners are bound to the decisions on management practices by the owner of the stable. In addition, also socially desirable answers on these statements have to be taken into account.

Since only a very small percentage of owners filled in "disagree" or "strongly disagree" on all four statements, we can conclude that most owners do know the importance of contact with conspecifics and free movement, even if they don't always put this knowledge into action.

5. CONCLUSION

From the current study became clear that of the 3774 respondents, 3749 respondents gave their horses free movement. Almost eighty percent of the respondents gave free movement together with conspecifics. Most of the respondents who gave free movement individually always had other horses in sight. Horses were most often kept individually on the combination of boarding stable and riding schools and horses used for sports were most likely to be kept individual.

Most respondents gave 22 – 24 hours of free movement a day in summer and winter, though the amount of respondents giving permanent free movement decreased in winter. In winter, it was also more common to give horses no free movement, or only for 1 or 2 hours a day. This happened most often on riding schools and on combinations of boarding stables and riding schools. On these establishments, the amount of free movement given was also lowest in summer compared to the amount of free movement given to horses stabled at other establishments. Owners of horses used for leisure riding we're most likely to give their horses free movement for 22 – 24 hours a day, whereas owners of sports horses were less likely to give their horses permanent free movement.

The amount of free movement was related to whether the horse was given free movement with conspecifics or individually. Horses turned out with conspecifics were more often turned out permanently than horses that were turned out alone.

Twenty percent of the respondents was not satisfied with the amount of free movement they gave their horses and most of these respondents wanted to increase the amount of free movement both in winter and summer season. As the amount of free movement increased, also did the proportion of satisfied owners.

When respondents were asked to give their opinion on four different statements regarding the importance of free movement and contact with conspecifics to the welfare of horses, most respondents strongly agreed on these matters. Although respondents who did not give their horses free movement or did not give free movement with conspecifics, chose the option "strongly agree" less frequently.

The results of the follow-up interview revealed that most owners kept their horses individually due to the fear of their horses getting injured when turned out with conspecifics. Horses getting bored and/or restless and the weather being too bad were most common reasons for not keeping horses outside for 24 hours a day.

Improvement can be made by transferring more scientific knowledge to owners of horses. The veterinarian can play a very important role in this transmission, since owners get much of their horse-related information from their veterinarian. For future research it would be interesting to investigate how horses are kept earlier in life and explore which improvements can be made at the onset of horses' social life.

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Appendix 1 – online survey

Question 1

What best describes the type of establishment of your horse(s) that you will be completing this survey about?

- Riding school
- Riding school for which I am responsible
- Boarding stable
- Boarding stable for which I am responsible
- Combination riding school + boarding stable
- Combination riding school + boarding stable for which I am responsible
- Private stable (at home)
- Breeding stable
- Other, namely: _____

Question 2

How many horses are there in total (approximately) at the type of establishment for which you are completing this survey?

Question 3

Which of the following facilities are available at the type of establishment? An estimate of the size and quantity is sufficient.

- Possibility to ride and / or lunge
- Step mill
- Paddock(s), if so: how many and how big?

- Pasture(s), if so: how much and how big?

- Box with outdoor area, if so: how big? Individual or group housing?

- Box without outdoor area, if so: how big?

- Other, namely: _____

Question 4

For how many horses are you responsible? This concerns private horses + eventual horses for business properties.

Question 5

What is the purpose of use of this horse / these horses? If you own several horses with different purposes, please enter this per group of horses.

Question 6

Please describe very briefly below in your own words an average day of your horse (s) in the past week.

If you own several horses whose daytime activities are different, please provide a description of the daytime activities of the different horses or groups of horses and their purpose of use. Choose a maximum of 5 (groups of) horses.

Question 7

This question applies to you if you own several horses with different daytime activities. If you own one horse, or all horses have the same daily routine, you can click through to the next question.

If you described several (groups of) horses in the previous question because the daytime activities of these horses differ, choose one horse or one group that you find most representative before answering the following questions (questions 8 to 14) and indicate your choice below. For example: foal(s), broodmare(s), sport horse(s), recreation horse(s), riding school horse(s).

Complete the following questions (8 to 14) about this horse / group of horses.

Question 8

The next three questions are about free movement. Free movement means that a horse can make more than 5 canter jumps without stimulus from humans.

Which facility/facilities do you use to give your horse(s) free movement?

- Paddock
- Pasture
- Stable with outdoor area
- No free movement
- Other, namely: _____

Question 9

When your horse(s) is / are given free movement, is this individual or with other horses? The option "with other horses" means that these horses are within the same enclosure.

- (Almost) always individual
- (Almost) always with other horses
- Other, namely: _____

Question 10

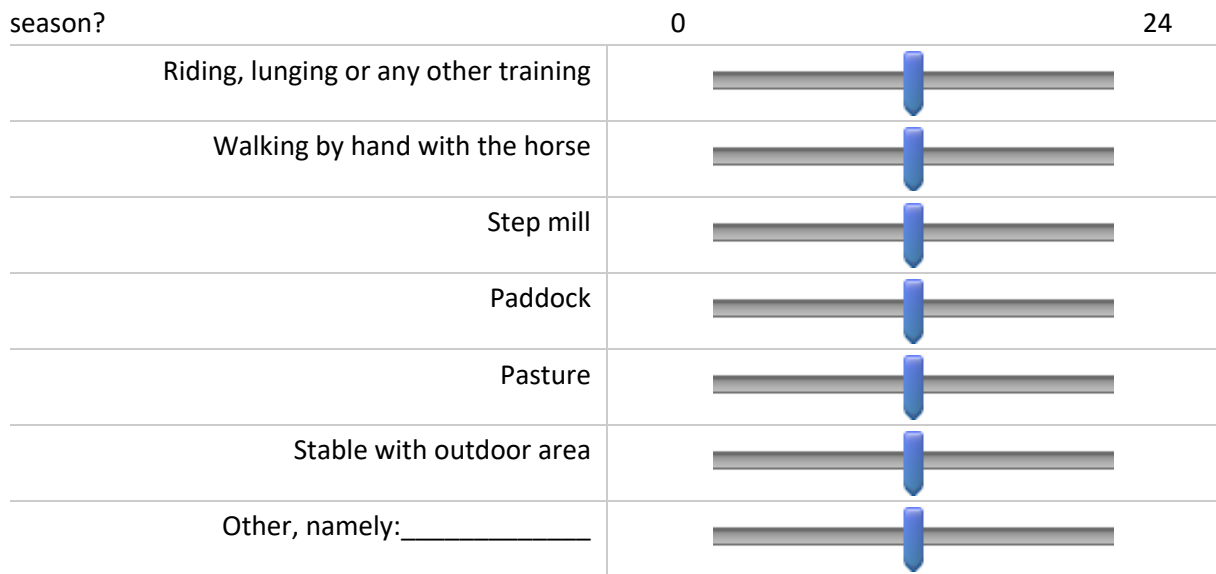
When your horse(s) is / are given free movement individually, are there other horses in sight within about 20 meters?

- Never
- Sometimes
- Often
- Always
- N / A

Question 11

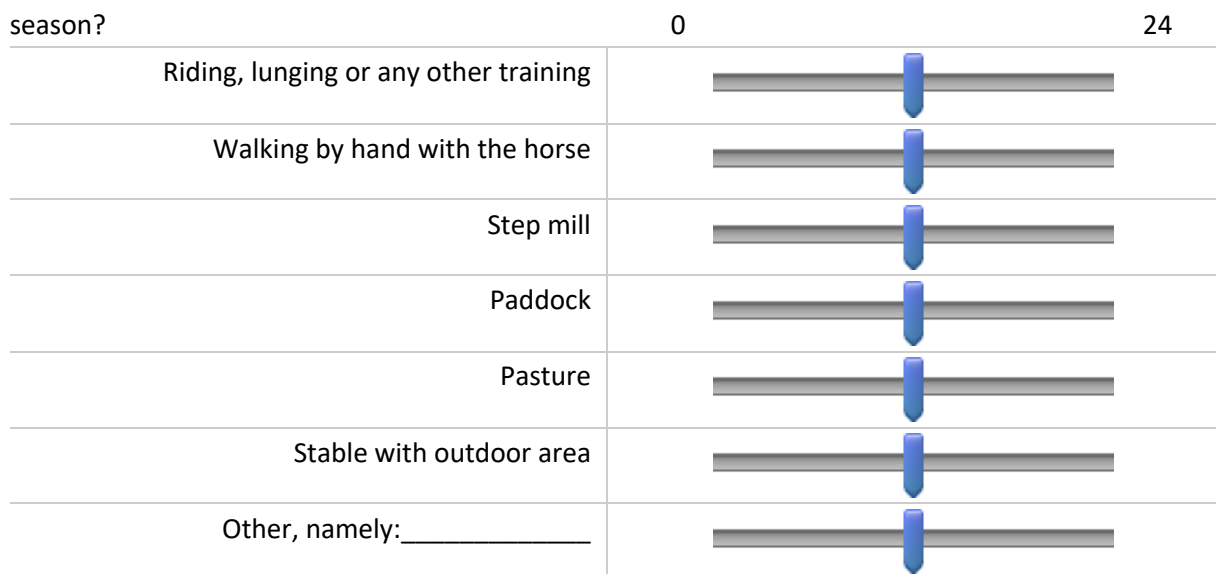
The next two questions are more general and are about how many hours per day your horse(s) move(s) on average. Think of movement under the saddle, but also walking, in the step mill and free movement in the paddock or meadow are a part of this.

How many hours of (free) movement does / do your horse(s) get on average per day in the summer season?



Question 12

How many hours of (free) movement does / do your horse(s) get on average per day in the winter season?



Question 13

Are you satisfied with the current amount of free movement for your horse(s)? This refers to movement in which more than 5 canter jumps can be made without stimulus from people.

- Yes, why? _____
- No, why? _____

Question 14

What would you like to change at the type of establishment of your horse / horses with regard to free movement? Think of changes in for example, personnel, space, shelter, feeding, times of putting inside and outside, herds.

Question 15

In the last question of this survey, you are asked about your opinion regarding free movement for horses and contact with conspecifics. Click on what your opinion is about the statements below.

	Strongly disagree	Diagree	Neutral	Agree	Strongly agree
It is important for horses to get free movement every day.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is important for horses to have contact with conspecifics every day.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Free movement contributes to horse welfare.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Contact with conspecifics contributes to horse welfare.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Question 16

Thank you for completing this short survey. May we approach you for a more extensive interview?

- Yes, please enter your email address: _____
- No, thanks

Appendix 2 – follow up interview

All questions similar to the survey and briefly checked again in the interview, are presented in italics.

General questions

1. Describe the type of establishment of your horse(s)?
2. *How many horses are there in total (approximately) at the type of establishment?*
3. *For how many horses are you responsible? This concerns private horses + eventual horses for business properties.*
4. Sex of the horse(s) (mare / gelding / stallion)?
5. Age of the horse(s)?
6. Breed of the horse(s)?
7. Location / region in the Netherlands?
8. Type of environment (countryside / city or village / transition area)?
9. What is the purpose of use of this horse / these horses?
 10. When answered with “sport horse”: what is the competition level of this horse / these horses?

Daytime activities

11. Please describe an average day of your horse(s) during summer and winter season?

Husbandry/boxes

12. Describe the boxes available at the type of establishment of your horse(s), including the size?
 13. Group housing or individual?
 14. With or without outdoor area?
15. Are all horses kept in the same boxes? When answered with no: what causes those differences?
16. Are there other horses directly in sight?
 17. Describe what the partition between the boxes looks like?
 18. Is there an open hatch (hallway/outside)?
 19. Can the horse(s) have contact with the neighboring horses and in what way (sniffing/grooming)?
20. How many hours per day is/are your horse(s) kept in their box(es)?

Free movement

21. When your horse(s) is / are given free movement, is this individual or with other horses?
 - When answered with “individual”:
 22. Where are the other horses (in sight)?
 23. Please explain why?
 - When answered with “with other horses”:
 24. With how many other horses?
 25. Are these mares / geldings / stallions?
 26. Are these from the same age class?
 27. Are these the same or different horses each time?
28. Is there access to roughage and water and in what way?
29. Is there shelter?

30. Who takes the horses out and who takes them back in?
31. At what time do the horses go out and back in? Is this different per season?
32. Who decides how long the horses stay outside? Can you influence that? Would you like to change that?
33. Do the horses also go outside when it is raining?
34. Do the horses also go outside when the when the weather is extreme (very hot, a lot of insects, wind/storm)?

Opinion

35. What is your experience with horses in groups and your own safety?
Do you think that other horses pose a risk to your safety? If so, what is the risk? If not, why not?
36. What is your experience with horses in groups and the safety of your horse?
Do you think that other horses pose a risk to your own horse (s)? If so, what is the risk? If not, why not?
37. What is your experience with feeding roughage to horses in groups?
Do you think feeding roughage to horses in groups is a risk? If so, what is the risk? If not, why not?
38. What is your experience with introducing new horses into an established group?
Do you find it difficult to introduce new horses to a group or to each other? If so, what is difficult? If not, why not?
39. *Are you satisfied with the current amount of free movement for your horse(s)?*
40. What would you like to change at the type of establishment of your horse(s)?
41. What kind of housing do you think is preferred by a horse and why?
42. What would it take to offer this kind of housing to a horse?
43. In the last question of the survey, you were asked about your opinion regarding free movement for horses and contact with conspecifics. Can you explain your opinion / answer to this question?

Appendix 3 – reasons for current practice of interviewed respondents

Table 4: reasons for current practice of respondents. The total amount of owners involved per subject is in between the brackets. Note that owners could give more than one reason for their actions.

Reasons	Number of owners
<i>Reasons for giving free movement individually (15 owners)</i>	
1. Prevent injuries	9
2. Horses are not socialized	4
3. Facilities are inadequate	3
4. Prevent complaints of other owners	3
5. Prevent stallions from mounting other horses	1
<i>Reasons for not keeping horses outside 24 h/d (31 owners)</i>	
1. The weather is bad (too warm, too much rain, too much wind, too many horseflies)	15
2. The horses get bored or restless (interpreted by owners as: 'horses want to go back inside')	15
3. The horses need rest	9
4. Facilities are inadequate (no shelter, paddocks are too wet)	9
5. Not enough space or pastures	8
6. There is no supervision on the horses	7
7. Convenience for owners (no need to use blankets, wanting to use the horses for riding, preventing horses to get a winter coat)	7
8. It is hard to monitor the horses' food intake	4
9. Municipality does not allow building (shelters, paddocks) on owners' property	4
10. It costs too much time, money and/or effort	2
<i>Reasons to not feed roughage to horses when housed outside or with conspecifics (9 owners)</i>	
1. Feeding roughage deteriorates the quality of the surface of the paddock or makes it harder to maintain the quality of the surface.	6
2. Feeding roughage causes agitation and/or fighting between horses	3
3. There is no time for feeding roughage	1
4. The paddocks are too small for a hay rack	1
<i>Reasons for not keeping horses on pasture permanently (32 owners)</i>	
1. The pasture is too wet/muddy or/and there is not enough grass	20
2. The horses have a predisposition for getting laminitis, colic, or other illness	11
3. The horses get too fat	9
4. The horses are more agitated when kept on pasture and/or get injured more easily	5
5. It is hard to monitor the horses' food intake	3