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Single and group housing of horses: a survey on distribution, reasons and associated attitudes of stable owners, horse owners and professionals

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Declaration of originality

I, Jessica Backes, hereby declare that this Master thesis with the title *'Single and group housing of horses: a survey on distribution, reasons and associated attitudes of stable owners, horse owners and professionals'* is my own and autonomous work. All sources and aids used have been indicated as such. Full bibliographic details are given in the reference list which also contains internet sources containing URL and access date. I have fully referenced and used inverted commas for all text directly or indirectly quoted from a source. This work has not yet been submitted to any other examination authority or published.

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1. Introduction

The horse (*Equus caballus*) played a fundamental role for humans in former times and has been used for different purposes of agriculture, transport, industry and military (Harris, 1999; Liljenstolpe, 2009). However, today's horses are mostly considered partners for leisure/sporting activities, a way of life or a companion (Liljenstolpe, 2009; Visser & Van Wijk-Jansen, 2012). From the older purposes of use to the more modern utilisation of the horse, also the housing systems and management of the horses have changed (Harris, 1999).

Nowadays numerous housing systems are used in the equine industry. Firstly, there are systems where the horses are permanently stabled in a single indoor box, in a box with access to a paddock, or in a single box during the night and in groups on pasture during the day. Secondly, there are systems where the horses are constantly kept in groups, either indoors, indoors with access to an outdoor run and/or pasture or completely outdoors. One special type of group housing system includes not only the division into different functional areas such as areas for feeding, drinking, resting, rolling, and open areas for movement (Hartmann *et al*., 2012) but also the provision of gates and separations that encourage the horses to move around for longer distances between these different resources (i.e. 'active stable'). Furthermore, the paths and trails of this type have various ground coverings like sand, gravel, natural soil and wood chips stimulating hoof health, and small obstacles like tree trunks and sand dams to promote coordination, attentiveness and surefootedness of the horses.

The husbandry conditions of horses, especially during the last decades, have become an increasingly important topic in the equine industry and various improvements in favour of a better welfare for the horses have been undertaken (Siegel *et al.,* 2018). Particularly the housing design for horses has undergone a shift towards more welfare-friendly systems (Knubben *et al.,* 2008), as reflected for example, in the development of the 'active stable'. Nevertheless, a large number of horses is still primarily housed singly in indoor boxes (Yarnell *et al*., 2015), that measure around 9-13 m^2 (Rivera *et al*., 2002), with limited or no physical contact to other horses (Hartmann *et al*., 2012) and usually confined for large parts of the day (Yarnell *et al*., 2015). The outcome of a study by Petersen *et al.* (2006) of 2578 horses on 46 boarding stables in Schleswig-Holstein (Germany) has found that 1906 of those horses were housed in single boxes (only 9 stables had boxes with permanent access to a paddock) and solely 9.6% of the stables had group housing systems (which were predominantly used for ponies and young horses). Similarly, in a German survey by Hölker *et al.* (2017) the housing system used most often was single housing (indoor/outdoor boxes, 60%) and the one used

the least the ‘active stable’ (9%). This underlines the fact that group housing is only used to a limited degree (Bachmann & Stauffacher, 2002; Mejdell *et al*., 2010).

In Switzerland, in a survey carried out in 1997 by Bachmann & Stauffacher (2002), data about housing conditions for 2536 horses had been collected. There, 83.5% of horses were kept singly and 16.5% lived in group housing systems. In another Swiss survey performed in 2004, where data for 2912 horses and ponies were recorded, 70.1% of the horses were kept singly (from which 8.7% were kept in tie-stalls) and 29.9% permanently in groups (Knubben *et al.,* 2008). Also in that study, warmbloods and thoroughbreds were kept more often singly than other breeds. Sport horses as compared to recreational horses were kept more often singly in boxes than in unstructured or multi-room group housing systems. A survey in the year 2017 revealed that almost half of the Swiss equines (48%, N=10221) were living in group housing systems and the preferred single housing system were boxes with paddocks (26.7%) (Siegel *et al.,* 2018). There was a significant difference in housing in relation to the breed of the horse: warmbloods were mostly kept singly (70%); and thoroughbreds (54%), ponies and small horses (67%) and donkeys (77%) were mostly housed in groups (Siegel *et al.,* 2018). Thus, comparing the three Swiss studies, one can conclude that the proportion of horses kept in groups had increased over the years in Switzerland. In contrast, no information about the housing conditions of the 130.000 horses in Austria (BMLRT, 2020) and the 4.669 equines in Luxembourg (STATEC, 2020) exists to our knowledge.

To fully understand the impact of the housing design on the welfare of horses, one needs to be aware of and familiar with the species-specific behaviour. The behaviour of horses is best described by horses being herd and flight animals, and adapted to the environmental conditions of grasslands. Accordingly, horses have a motivational need for slow free locomotion throughout the day, social contact and foraging for the largest part of the day (Henderson, 2007). The flight reaction is a species-specific behaviour; horses have a high reactivity, which can become dangerous for the horse and for the human if the horses are not used to different stimuli of the environment, which is often the case in single box stabling. If the option to escape is not given, by example housing the horse singly in a small closed box, a horse can also start to defend itself by kicking and biting (Zeitler-Feicht, 2004); which can result in unpleasant outcome for the human and for the horse (e.g. destruction of the box, damaged infrastructure, injured horse). Due to the fact that grass feed in the natural habitat of the horse used to be low in energy and high in fibre, the horses were required to forage for approximately 15 hours a day to satisfy the nutritional needs (Zeitler-Feicht, 2004). These long feeding times are still part of the natural behaviour and as feeding behaviour is closely related

to locomotion in horses, they need approximately 10-16 hours of movement at a slow pace every day (Zeitler-Feicht, 2004).

Horses are social animals living in herds (Zeeb & Schnitzer, 1997) and only in groups it is possible to satisfy the various needs without being all the time on alert for predators - horses thus only feel safe to fulfil those needs when other horses are nearby (Zeitler-Feicht, 2004). If this condition is met, then horses also lie down in addition to drowsing to rest, relax and recover on a regular basis to keep well and fit. Herd living goes along with the formation of affiliative relationships characterized by social activities such as mutual grooming or also just staying in physical proximity. The strongest relationship exists between the mare and her foal, but also between the mare and her older offspring (Zeitler-Feicht, 2004). Stallions spent their time and exhibit grooming activity only with preferential mares (Feh, 2005; Zeitler-Feicht, 2004), but they also herd the families. The foals that play together when young often remain affiliated for many years, as long as they are not separated from each other (Feh, 2005; Zeitler-Feicht, 2004). Normally, horses have one or two social partners with which they spend much time, exchange body contacts and rest in each other's company (Feh, 2005). The rank of the horses is not of importance for friendship formation (Zeitler-Feicht, 2004). Horses living in social units form linear dominance hierarchies, but with occasional reversals, with a high-rank leader at the top having priority of access to resources as water and food (Feh, 2005). The age of the horse and the time of arrival in the herd are of particular importance for its rank, but not the size and the weight of the horse (Feh, 2005). Two major types of herds exist: harem groups and bachelor groups. The harem groups usually consist of a stallion, one to six adult mares with their offspring (up to three years old), with a maximum of 20 horses in total (Boyd & Keiper, 2005; Zeitler-Feicht, 2004). The group size though does not change much even if there are newborns every year. This is a consequence of the gradually voluntary or forced wandering off of the young stallions and mares. Young stallions are driven away by the dominant stallion of the herd when they start to exhibit a strong interest in the older mares and young mares are monopolized by other stallions thus reducing the inbreeding rate (Feh, 2005; Zeitler-Feicht, 2004). The stallions who have wandered off join a bachelor group (commonly two to three members, sometimes more) and at the age of five to six years, the young stallions have the social maturity to monopolize young mares of other herds; most often, however they stay in a bachelor group (Boyd & Keiper, 2005; Feh, 2005; Zeitler-Feicht, 2004).

The behaviour of horses under single housing conditions deviates clearly from the behaviour of horses under natural conditions, as illustrated in Tab. 1 (Zeitler-Feicht, 2004). The time spent with different behaviours like feeding, drinking, locomotion and resting varies with

the environment, season, age and sex (Boyd & Keiper, 2005). Horses living in natural conditions spent up to 60% of the time budget with eating and only 20% with standing. Horses in group housing are eating for nearly the same time. In contrast, horses housed in single boxes with *ad libitum* roughage just eat for 47% and stand for 40% of the time (Zeitler-Feicht, 2004). Horses with rationed roughage merely spent 16% of the time budget with eating and more than 68% with standing.

Tab. 1: Time budget of horses under different management conditions (data from Zeitler-Feicht, 2004; based on Duncan, 1980 and Kiley-Worthington, 1989)

	Eating	**Standing**	**Lying down**	**Other**
Camargue horses, free-range, semi-natural conditions	60%	20%	10%	10%
Group management, straw and hay *ad libitum*	57%	23%	10%	10%
Single box, straw and hay *ad libitum*	47%	40%	10%	3%
Single box, no straw, rationed hay feeding	16%	68%	16%	0%

Horses in single housing often cannot perform species-specific behaviour because they often spend up to 23 hours a day in the stable due to lack of suitable grazing or open land (Endenburg, 1999; Henderson, 2007). Occasions to interact socially with other horses are also minimalised in single housing (Endenburg, 1999), which leads to restricted species-specific behavioural expressions and a lack of ability to communicate with other horses (Zeitler-Feicht, 2004). That is why it is an absolute minimum requirement for single housing of horses to offer them social contact by seeing, smelling and hearing other horses (Zeeb & Schnitzer, 1997). Nonetheless, horses are mostly stabled singly for the ease of management resulting in a limitation of social contact and impairment of welfare (Hartmann *et al*., 2012; Henderson, 2007).

If the horse's demands of social contact, constant feeding and appropriate exercise are not satisfied, health and behavioural problems can arise (Henderson, 2007; Zeeb & Schnitzer, 1997). In other words, the horse is in a state of poor welfare, and health problems, abnormal behaviours and unwanted behaviours may occur. One example of abnormal behaviours are stereotypies which are defined as repetitive, functionless motor responses and can be classified as locomotor stereotypies (pawing, weaving, head-bobbing, box-walking, stall-circling, fence-pacing, wall-kicking) and oral stereotypies (cribbing, wood chewing, flank biting, self-mutilation) (Endenburg, 1999; Houpt *et al.,* 1996). As potential health problems that may arise, Zeitler-Feicht (2004) lists diseases of the musculoskeletal system, digestive disturbances, cardiac and circulatory system failures, respiratory problems and a disturbance of the hoof mechanism. Unwanted behaviours were specified as trailer loading problems,

biting, tearing of blankets, refusal to be caught, bolting, shying and problems during shoeing (Zeitler-Feicht, 2004). At the same time, negative psychological states can occur like pain, fear, hunger, anxiety and frustration (Henderson, 2007). Young horses housed singly performed more stress-related behaviours like neighing, pawing, nibbling, snorting and spent less time feeding than horses housed in pairs (Hemsworth *et al.,* 2015; Visser *et al*., 2008), and young horses kept in groups displayed less abnormal behaviour than singly housed horses (Hemsworth *et al.,* 2015; Visser *et al*., 2008). Arabian stallions without free social contact showed more unwanted behaviour (i.e. aggression against humans, rearing, biting, bolting, bucking) and stereotypies (weaving, cribbing, box-walking, wall-kicking), whereas stallions with permanent free social contact showed a more desirable behaviour (Irrgang & Gerken, 2010). Abnormal and unwanted behaviours can be responses to confinement, isolation, reduced feed intake or the deprivation of opportunities for foraging (Endenburg, 1999; Henderson, 2007; Houpt *et al*., 1996). Correspondingly, Visser & Van Wijk-Jansen (2012) found that abnormal behaviour is related to inappropriate management such as single housing for up to 24 hours per day, a high proportion of concentrate feeding and inadequate exercise regimens. A survey (McGreevy *et al.,* 1995) investing associations between management factors and stereotypic behaviour with Thoroughbreds in the UK has shown that a low amount of forage, a different bedding type than straw, a low number of horses at the stable, minimal social contact and hay used as forage were associated with a higher occurrence of stereotypic behaviours. Besides this, Yarnell *et al.* (2015) brought to light that providing social contact to horses in single housing systems resulted in lower levels of faecal glucocorticoid metabolites. All these results demonstrate that group housing has a positive effect on equine welfare, including the psychological well-being (Henderson, 2007).

On pasture, horses obtain much of their nutritive requirements through grazing on various forages for up to 16 hours per day (Hemsworth *et al.,* 2015; Zeeb & Schnitzer, 1997). Contrariwise, horses kept in boxes and small paddocks have restricted access to forage, impairing on the welfare and feeding behaviour (Hemsworth *et al.,* 2015), and the horses are completely dependent on the owner for the timing, selection and delivery of the feed (Hemsworth *et al.,* 2015). In addition, horses in single boxes often spend remarkable periods with restricted movement and this immobility also has a physical impact on them (Hemsworth *et al.,* 2015; Zeeb & Schnitzer, 1997), whereas pastured horses spend a substantial time in locomotion. Horses without sufficient exercise lose the elasticity of the tendons, ligaments and joints and therefore become more prone to injuries (Hemsworth *et al.,* 2015; Zeeb & Schnitzer, 1997). Zeeb & Schnitzer (1997) described as well that a lack of movement impairs the self-

cleaning mechanism of the respiratory tract and affects even the whole metabolism. Even when pasturing is not possible for every horse owner or stable owner, it is of great importance to provide horses with a more enriched environment and with sufficient daily exercise (Hemsworth *et al.,* 2015; Rivera *et al*., 2002).

In sum, keeping horses in groups and on pasture has many benefits and is considered best for the species-specific needs of the horse (reviewed by Hartmann *et al.,* 2012). Even though many scientific studies imply that group housing is the best way to keep a horse, at least theoretically, there is still little information on how this recommended housing system is used in practice and what the owner's underlying reasons of keeping a horse singly are (Hartmann *et al*., 2015). Furthermore, limited data is available on the relationship between horse-related people's attitudes about horses and their practices in horse-keeping, and to what extent other factors determine how the horses are kept (Hartmann *et al.,* 2015).

Various arguments and factors might play a role in the decision whether to keep horses singly. Some horse owners are worried about the risk of injury during social interactions (agonistic or play) in group housing (Endenburg, 1999; Hartmann *et al.,* 2012; Hartmann *et al.,* 2015; Hemsworth *et al.,* 2015; Mejdell *et al.,* 2010). However, it was shown that injuries caused by kicking and biting from agonistic interactions or play in established horse groups rarely occur in socialised horses (Hartmann *et al.,* 2012; Hemsworth *et al.,* 2015; Mejdell *et al*., 2010). Other concerns about keeping horses in groups may be perceived difficulties with feeding, decreased resting times of low-ranked horses and possible complications with introducing new horses into established groups (Hartmann *et al.,* 2012). Additionally, group housing might be inconvenient or impractical due to the risk of contagious infections within the group (which is also a welfare concern) and the cost of maintaining additional horses (Cooper & Albentosa, 2005). Furthermore, common arguments mentioned for keeping horses singly are the risk of injury for people and difficulties while catching and removing a horse from the group (Hartmann *et al.*, 2012). Yet, a study by Yarnell *et al.* (2015) from the United Kingdom indicated that single-housed horses without social contact were significantly more difficult to handle compared to the group-housed horses with full contact. Next to this, Hartmann *et al*. (2015) stated that safety to humans and difficulties in handling were regarded as less problematic by the owners of group-kept horses. Moreover, factors such as lack of space (Endenburg, 1999), individual characteristics of the horse and ease of management might play a role in the housing decision (Hartmann *et al.*, 2012; Hemsworth *et al*., 2015). In the study by Knubben *et al*. (2008), also the ease of management was mentioned as a reason for single housing because single boxes better meet the needs of many riding students, instructors and equestrians in so far as the

horses are easily and permanently available. It was also argued that weather-resistant paddocks are still used insufficiently frequent on grounds of costs and only possible to built in a limited size due to spatial planning (Knubben *et al*., 2008).

In breeding facilities, mares are often kept with the foals until they are weaned (Hartmann *et al*., 2012). Weanlings are then group-housed with other weanlings of the same age and sex until entering training (Hartmann *et al*., 2012). However, stallions are in most cases kept singly without or with very restricted social contact to other horses (Hartmann *et al*., 2012). Reasons for this are the prevention of unwanted reproduction and of inter-male aggression, and the protection of the valuable stallions from injuries (Hartmann *et al*., 2012). Yet, studies have shown that stallions can be kept in groups with hardly any injuries (for review: Hartmann *et al*., 2012). In conclusion, studies analysing the reasons for preferring or selecting a specific housing system are still lacking in German-speaking countries. Only studies involving horse owners are available, but no studies investigating underlying reasons in stable owners or evaluating housing recommendations of professionals related to the horse industry, for example veterinarians or riding instructors, and their reasons could be found. Additionally, reasons may be financially based, which has not been researched in the previous studies.

Personality and attitude form the basis of human behaviour, but also empathy, knowledge, experience, the actual situation and peer pressure are important influences (Waiblinger, 2019). One of the psychological frameworks used most widely for the investigation of attitude-behaviour relationships is the theory of planned behaviour (Ajzen, 1991; see Fig. 1; for review see Hemsworth & Coleman, 2011, Chapter 4: Attitudes of stockpeople). It suggests that a person's intention to perform a specific behaviour is influenced by three psychological factors: the attitude towards this behaviour, the subjective norm about this behaviour and the perceived behavioural control over this behaviour (Ajzen, 1991).

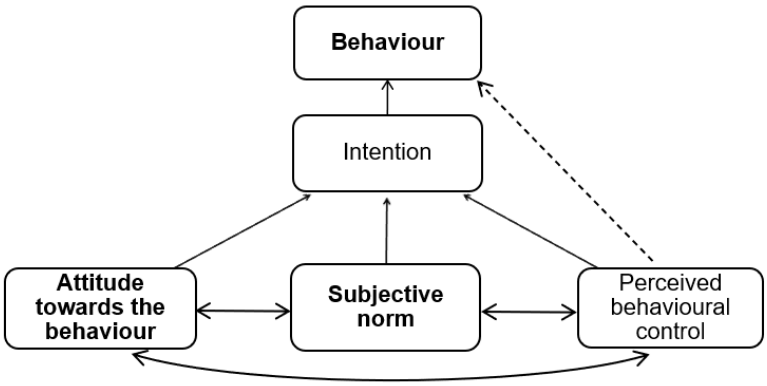

Fig. 1: Framework of the theory of planned behaviour (redrawn based on Ajzen, 1991)

As described by Ajzen (1991), the first factor ‘attitude towards the behaviour’ corresponds to the degree to which a person has a positive or negative view/feeling towards the specific behaviour: the more positive the view/feeling, the higher the probability to perform the behaviour. The second, the ‘subjective norm’, is a social factor and represents the perceived social pressure a person may feel to perform the behaviour or to not perform it: if the person perceives that ‘important others’ would encourage this behaviour, the probability is higher that the person will perform it. The third factor is the ‘perceived behavioural control’, which corresponds to the perceived ease or difficulty to perform the behaviour (the higher the confidence of a person that he/she is capable, the greater the probability of the performance of the behaviour). The ‘subjective norm’ is usually recorded by asking the subjects to rate the extent to which ‘important others’ would approve or disapprove the performance of the specific behaviour (Ajzen, 1991).

On the basis of this theory, attitudes seem to be one of the fundamental factors influencing human behaviour and thus also the interaction of people with animals (Hemsworth & Coleman, 2011; Waiblinger, 2019). Hence, they play an essential role in humans’ relationships with animals. Moreover, the human-animal relationship indirectly influences the welfare of the animal by the management and decision-making of the owners and caretakers upon the environment in which the animals live (Waiblinger, 2019). In this manner, the owners and caretakers make the decision about the housing system, about how many and which animals will be grouped together, for how long they will stay together and about what type and amount of feed will be fed (Waiblinger, 2019). A perception of animals as individual living beings with needs that have to be respected is accompanied by beliefs (cognitive attitudes) and affective attitudes that lead to positive interactions with animals, decrease negative interactions and promote decisions of a person to change the environment according to the animals’ needs (Waiblinger, 2019). In accordance with this, Hemsworth *et al.* (2015) confirmed a relationship between humans’ attitudes towards horses, the way how people treat horses and horse welfare. Hötzel *et al.* (2019) investigated beliefs about horses’ emotional states in Brazilian horse owners, caretakers and other people working with horses. Most participants agreed on horses having full capacity to feel pain (94%), fear (92%), joy (77%) and some agreed on horses having full capacity to feel boredom (65%) and jealousy (41%). These beliefs about horses might have an influence on the owners’ and caretakers’ attitudes towards the welfare of the horse and on the way how the horses are treated. Nonetheless, the relationship of cognitive attitudes (beliefs) towards housing systems and towards horses’ needs and of affective attitudes towards interactions with horses with the decision for different housing

systems has not been studied yet; especially attitudes of different stakeholder groups involved with horses, i.e. horse owners, stable owners and professionals working with horses, have not been examined to our knowledge yet.

Exploring the effect of subjective norms, an Australian study investigated dairy farmers' intentions to make improvements to the current management of foot lesions causing lameness in dairy cows and underlying behavioural, normative and control beliefs (Dutton-Regester *et al.*, 2019). The dairy farmers indicated that the opinions of consumers, staff members and animal welfare groups were important for the decision to make improvements (normative beliefs/subjective norm). A strong pressure was perceived from staff members and weaker pressure from consumers and animal welfare groups. Similarly, Kauppinen *et al.* (2010) studied the attitudes of Finnish farmers (piglet and dairy) towards specific welfare-improving actions with interviews as well as a questionnaire based on the theory of planned behaviour. They asked the respondents to describe how important the opinions of various stakeholders (slaughterhouse/dairy, wholesale/retail trade, veterinarians, consumers, agricultural advisers, researchers and specialists, other farmers) on animal welfare are for them. Veterinarians had the highest influence whereas traders and consumers had the lowest. In a follow-up study in 2012, Kauppinen *et al.* established additionally that researchers and specialists had an influence in the way that appreciating researchers was associated with different pig production parameters (more piglets born, lower piglet mortality and more weaned piglets). As outlined in the theory of planned behaviour and the above-mentioned studies, subjective norms (opinions of 'important others') have an influence on how the farmers behave and treat the animals. Therefore, it is of interest to investigate how other stakeholder groups of the horse industry (e.g. professionals: veterinarians, farriers, trainers, equine specialists; or other groups of persons: other horse and stable owners, family, friends) might have an influence on the horse owners and stable owners with respect to their decision on how the horses are housed.

There is an estimated number of around 45.906 horses living in Switzerland (FAOSTAT, 2020), 406.269 horses living in Germany (FAOSTAT, 2020), 4.669 equines living in Luxembourg (STATEC, 2020) and 130.000 horses living in Austria (BMLRT, 2020). While some information about how these horses are kept (single or in groups) exists for Switzerland and Germany based on surveys, no such data are available for Austria and Luxembourg. In neither of these countries the influential attitudes and the reasons for the choice of the housing system (single/group housing) for stable owners and horse owners were studied yet, similarly as the recommendations of group or single housing by professionals and their underlying attitudes and reasons. It is also important to find out if professionals or other persons might

have an influence on the horse owners' and stable owners' decision for group or single housing of the horses.

The present research addresses the above-named aspects and aims to understand the missing factors better. The project was carried out in cooperation with 'FOUR PAWS International', an international animal welfare organisation based in Vienna (Austria), represented by Mag. Sabine Hartmann, the Director of the Science Unit, and with 'Agroscope', the Swiss Confederation's centre of excellence for agriculture research.

The aims of the study were to gather data on the current horse housing situation in different German-speaking countries with special focus on Austria, to investigate potential reasons for decisions on housing systems for horses (especially reasons for keeping horses singly or in groups) and to find out potential reasons to change from single to group housing systems. A further aim was to investigate the role of attitudes towards housing systems, horses' needs and interactions with horses in relation to housing decisions and the potential influence of different groups of persons on such decisions. To this purpose, horse owners and stable owners were asked to fill out an online survey on how they keep the horses and why they chose their housing system, and attitudes and decisive factors for horse housing were investigated. Moreover, the attitudes of professionals working with horses and their recommendation for certain housing systems were investigated.

The following research questions (Q) and hypotheses (H) were investigated:

Q1: What is the current housing situation?
H1a: The housing system used most often across the different countries is single housing.
H1b: A higher percentage of horse and stable owners keep the horses in groups in Switzerland as compared to Germany or Austria.

Q2: What are the main reasons to keep horses in the currently selected (single or group) housing systems for horse owners and stable owners and what may be reasons to change single housing to group housing?
H2a: Perceived positive effects on the welfare of the horse are most important reasons for group housing while perceived ease of management of the horses is most important for the choice of single housing in both horse owners and stable owners.
H2b: Costs and space restrictions are relevant decision factors for stable owners and, regarding costs, for horse owners as well.

Q3: Which attitudes (beliefs and affective attitudes) do the different stakeholders have towards different housing systems (single vs. group), the needs of horses and their own interactions with horses, and how are these attitudes linked with each other and decisions about housing (single, group and combined housing system)?
H3a: The selection of group housing is associated with the horse or stable owners' having more positive beliefs about group housing, higher recognition of the importance to fulfil horses' needs and more positive affective attitudes towards interacting with horses.

Q4: Which groups of persons (e.g. professionals in the horse sector, peers) are most influential on the decision for a housing system for horse and stable owners?
H4a: Equine veterinarians, farriers, trainers and respective horse organisations are influential on horse and stable owners' decisions on housing systems with the highest importance of equine veterinarians and trainers.

2. Material and methods

All methods implemented for this research were discussed and approved by the institutional ethics committee of the Medical University of Vienna in accordance with Good Scientific Practice and national legislation. Informed consent was obtained by all participants.

2. 1. Study design

An online questionnaire was created with the web-based survey tool 'LimeSurvey' (Version: 2.59.1+170116, LimeSurvey GmbH, Survey Services & Consulting, Hamburg/Germany). The survey focused on German-speaking respondents from three different stakeholder groups (professionals working with horses (PG), stable owners (SO) and horse owners (HO)). The emphasis was on Austria, but to allow comparisons it was also aimed to include Germany, Switzerland and Luxembourg. The language of the questionnaire was German and the questions were translated into English for this Master thesis. For this reason, the English translations are not sufficient for further use in a survey, a back-translation to check for the correct meaning would be necessary. The questionnaire was also linked to a tombola to increase the response rate.

2. 2. Data collection

2. 2. 1. Schedule of the study

The developing phase of the questions for the questionnaire lasted from April 2019 until October 2019 and involved a team of four animal welfare and/or human-animal relationship researchers and the author of this thesis. For the compilation of the questionnaire, studies with similar aims and questionnaires were taken into consideration both from publications (i.e. Hartmann *et al.*, 2015; Hemsworth, 2012; Siegel *et al.*, 2018) and the supervisor's previous or current studies (Gosch, 2021; Waiblinger *et al.*, 2002). Full access was provided to the questionnaire of Siegel *et al.* (2018) via the Swiss cooperation partner, but several of these questions were modified based on the authors' experiences in the study before. In November 2019, the questions were entered into LimeSurvey and a testing phase of one week followed (Dec. 2019). Three stable owners, four horse owners, one veterinarian, one trainer and one farrier completed the questionnaire to find out how much time was needed for filling in, to find potential faults and to give feedback. Besides free feedback, they were asked specifically (i) if questions were hardly understandable, unusual or unclear, (ii) if there were difficulties to fill in questions, (iii) if important aspects were missing, (iv) if they found their own situation reflected

in the questionnaire and (v) if they needed to use the ‘back’- button and if so, at which point in the questionnaire. According to the feedback of the testers, minor changes and corrections were made. The questionnaire was officially announced to be online for a period of two months (23rd December 2019 – 29th February 2020), yet it was finally online until 1st April 2020.

2. 2. 2. Questionnaire

2. 2. 2. 1. General structure and informations

At the beginning of the questionnaire, information on the aims of the survey, on the estimated duration to fill in the questionnaire (approx. 20-30 minutes) and on the time period it was accessible were given, and it was indicated that the participation in the survey was completely anonymous and voluntary. In general, the identity of all participants was not revealed to the researchers; however, at the end of the questionnaire were questions where the respondents could fill in their e-mail address for participation in further surveys and receiving the results of this study. Further, the participants were politely asked to answer all questions to obtain the best outcome possible. Thus, questions were not mandatory except a few main questions (see Chapter 2. 2. 2. 2.). In addition, the participants were requested to give consent and accept the data privacy statement before they could start the questionnaire. After completing the questions, the respondents could choose to participate in a tombola; if they did, they were asked again for their consent and to agree to the terms of participation, which were stated there in detail. At the very end of the questionnaire was a field for comments or feedback about the survey.

The questionnaire comprised a total of 104 main questions, but the number was lower for each stakeholder group. The professionals’ questionnaire comprised 33 to 35 questions depending on the selected housing recommendation (33 if only single or only group housing was recommended, 35 if both single and group housing were recommended). The horse and stable owners’ questionnaire contained 41 to 74 questions depending on the selected housing (only single, only group or both), turn-out, work with the horses and feeding system. The types of questions used were simple Yes/No questions, single-/multiple-choice questions, matrix questions (tick-off), matrix questions with numbers (dropdown), 7-point Likert scales and open-end questions (text). All of the multiple-choice questions, except the professionals’ job question, had an ‘other’-option (open response).

2. 2. 2. 2. Detailed content of the questionnaire

The questions started with the division of the respondents into the three stakeholder groups (PG, SO or HO). If the respondents did not belong to any of these three groups, the questionnaire ended by showing a message that they did not fit the aim of the questionnaire and thanked for their interest. Then, group-specific questions were asked and followed by questions applying to all three groups (i.e. questions about attitudes, demographics, sources of information, tombola and comment field).

After the question allocating the respondents to the stakeholder group PG, SO or HO, the questionnaire comprised the following parts and questions for the different groups:

- **General information**

  PG:

  - main profession (full-time) (mandatory multiple-choice question)

  SO:

  - number of owned & not-owned horses (boarding horses) on the farm/at the stable (matrix-numbers/Dropdown 0-500)

  HO:

  - number of owned horses (matrix-numbers/Dropdown 1-500)

  SO/HO:

  - country where the horses are housed (multiple-choice question)

- **Housing & management of horses**

  - General type of farm/stable and housing system

    Before the questions, a detailed explanation of the expressions used (the different type of farms/stables and which horses fall in which categories) was given (see Annex I).

    SO:

    - type of farm/stable (farm categorized according to number of boarding horses (up to five or with more than five) or commercial stable) and which categories of horses (e.g. sport horses, breeding horses) are kept (matrix/tick-off)

    HO:

    - categorized number of horses on the farm/at the stable (1-5 horses, 6-25 horses or above 25 horses) according to category of horses (matrix/tick-off)

SO/HO:

- housing system used (single housing only (SH), group housing only (GH) or both housing systems (SHGH)) (mandatory single-choice question); depending on the responses to this question the person had to respond to the following questions for single housing, group housing or both

- Specific housing system

  SO/HO:

  - exact type of the housing system used (e.g. single box indoors, single box with paddock, group housing indoor, etc.) during winter time and during the grazing season, with the total number of horses kept plus the number of stallions indicated separately (matrix-numbers/Dropdown 0-500); definitions were given for the types of housing systems (see Annex I for definitions in German)

- Turn-out management

  Before the questions of the turn-out management, detailed explanations were given of the expressions used for the different possibilities for turn-out, for grazing/winter season and for horse categories (see Annex I for definitions in German).

  SO/HO during winter time and grazing season:

  - if the horses are at least sometimes in a turn-out area (mandatory yes/no question) → if answered with yes, then:
    - type of turn-out area for the different categories of horses (matrix/tick-off)
    - turn-out frequency for the different categories of horses (matrix/tick-off)
    - turn-out duration (hours/day) for the different categories of horses (matrix-numbers/Dropdown 0-24)
    - companionship (other horses/animals) in the turn-out area (single-choice question) (for single housing)

  HO:

  - how much (hours/day) and what type of controlled locomotion for different categories of horses (locomotion human-conducted, locomotion in horse walker) (matrix-numbers/Dropdown 0-480 in steps of 30 min)

- Contact/touch possibility (for single housing)

  SO/HO:

  - possibilities for physical or visual contact to other horses for different categories of horses in single boxes (matrix/tick-off)

- Group size and composition (for group housing)

  SO:

  - number of horse groups on the farm/at the stable (matrix-numbers/Dropdown 0-100)

  SO/HO:

  - group size for the different categories (matrix-numbers/Dropdown 0-100)
  - group composition (multiple-choice question)

- Feeding management

  SO/HO:

  - type of daily feed (multiple-choice question)
  - feeding frequency of roughage and concentrates (matrix-column/tick-off)
  - feeding method (multiple-choice question)

  for group housing:

  →if automatic feeder for feeding method, then:

  - number of horses per automatic feeder for roughage/concentrates (matrix-numbers/Dropdown 0-500)

  - feeding roughage/concentrates in the group or alone to the horses (multiple-choice question) → if fed in group, then:

  - number of feeding places per horse for roughage/concentrates (multiple-choice question)

- **Reasons for and satisfaction with current housing system(s)**

  - Choice of housing system

    SO/HO:

    - Agreement to pre-given reasons for keeping horses in single (15 items for HO; 16 items for SO) or group housing (13 items for HO; 16 items for SO) (7-point Likert scale, ‘very unimportant - very important’) plus open response possibility
    - influence/importance of other groups of persons on the choice of the currently selected housing system (7-point Likert scale, ‘very unimportant - very important’)

  - Satisfaction with current housing system

    SO/HO:

    - satisfaction with currently selected housing system (7-point Likert scale, ’very unsatisfied - very satisfied’)

  - duration of keeping the horses in the selected housing system (matrix-numbers/Dropdown 0-100)
  - use of different housing system in the past (single-choice question)

- **Recommendation for housing systems & estimation of problems (for PG)**
  Before the questions, an explanation was given of the different expressions for types of housing systems and types of turn-out management.
  - Recommendation for specific housing systems
    - recommendation of housing system & turn-out management for healthy horses (multiple-choice question)
    - recommendation of single or group housing according to type of horses (matrix/tick-off)
    - the reasons for the recommendation of single and/or group housing (12 items for SH; 12 items for GH) (7-point Likert scale, ‘very unimportant - very important’) plus open response possibility
  - Health problems and behavioural disorders
    - estimated percentage of horses with health problems and with behavioural disorders associated with indoor housing, single housing and group housing (matrix-numbers/Dropdown 0-100 in steps of 5)
    - type of health problems assumed to be associated with indoor housing, single housing and group housing (multiple-choice question)

- **Attitudes (cognitive and affective; PG/SO/HO)**
  - Beliefs about housing systems (single and group housing) with respect to effects on horse welfare, ease of management, care and handling (7-point Likert scale, ‘completely disagree - completely agree’) with 35 items
  - Beliefs about horses’ needs (7-point Likert scale, ‘very unimportant - very important’) with eight items
  - Affective attitudes towards interaction with horses (7-point Likert scale, ‘dislike very much - like very much’) with 14 items
    SO/HO with only single housing:
  - Potential reasons that could motivate the respondent to change from single to group housing in the future (multiple-choice questions)

- **Horse characteristics, demographics and sources of information**
  - Horse characteristics (SO/HO)
    - breed and discipline of the horses (multiple-choice questions)
  - Demographics

    PG/SO/HO:
    - sex (single-choice question)
    - age (matrix-numbers/Dropdown 0-100)
    - highest education (single-choice question plus open response possibility)
    - horse-related qualification (multiple-choice question)
    - years of regularly in contact with horses (matrix-numbers/Dropdown 0-100)

    PG:
    - country where the respondent is working professionally (multiple-choice)

    SO/HO:
    - duration of horse handling in hours/week (matrix-numbers/Dropdown 0-100)
    - respondent working/caring for the horses (yes/no question) → if yes, then: type of work/care (multiple-choice question)
  - Sources of information regarding housing and behaviour of horses

    PG/SO/HO:
    - type of source (multiple-choice question)
    - brand of horse magazines/journals read regularly (multiple-choice question)
  - Information about the study

    PG/SO/HO:
    - wish to receive results of the study or to participate in future studies (yes/no questions)
    - source of information about the survey (multiple-choice question)
  - Tombola
  - Comment field

2. 2. 3. Recruitement of participants

We aimed at participation of three different stakeholder groups (PG, SO and HO) and thus contacted horse trainers, riding instructors, farriers, hoof care practitioners, equine veterinarians, stud farms and horse stables directly and tried to reach out to horse owners via different means as follows. Horse breeding associations, equestrian federations, veterinarian federations, chambers of veterinaries and farrier associations were used to search for addresses, but were also contacted and asked to distribute the questionnaire to the members. The questionnaire was mainly distributed via e-mail which included an advertising text fitting to the stakeholder group, a link to the questionnaire and a QR-code. The e-mail was sent both directly to individual professionals (see Annex II, Fig. A5) as well as to the above-mentioned organisations (see Annex II, Fig. A4), but also to some stud farms and horse stables to further distribute the link. Moreover, the link was posted in different (horse) groups on Facebook (social media) (Facebook Inc., Menlo Park/California/U.S.A.) and by the VetMedUni Vienna on their Facebook and Twitter page (see Annex II, Fig. A3). The link was also sent by e-mail to students by the student federation of the VetMedUni Vienna. Posters (see Annex II, Fig. A1) containing the link to the survey and a QR-code were placed in six different horse shops in and around Vienna, at the horse clinic of the VetMedUni Vienna, at a horse shop in Luxembourg and three horse stables in Luxembourg. Additionally, an advertisement (see Annex II, Fig. A2) in the January 2020 edition of the horse magazine ‘PferdeRevue’, the official magazine of the Austrian Equestrian Federation, was published. Details on advertisement activities are presented in Annex III and in Tab. A2 the exact numbers of contacted stakeholders from the different countries can be found. The possibility for participants to win a prize (vouchers for a book store) was also announced in the different advertisements as well as on the poster.

2. 3. Data processing

2. 3. 1. Data handling

The collected data from the initial total 5269 responses was downloaded and transferred to Excel-tables (Microsoft Excel 2010, Microsoft Office Home and Student 2010, Redmond/WA/U.S.) and then checked and sorted for usable questionnaires. Responses that had stopped before allocation to the stakeholder groups and, for professionals, who did not answer the job specification (N= 305) were deleted. Respondents who did not fall in one of the investigated stakeholder groups (N=127) were sorted out as well. Then plausibility checks and

checks for double entries were performed and 150 responses were removed. The remaining 4687 responses were divided in the three specific groups (PG, SO, HO) and it was checked until which question the respondents had given answers. For professionals, answering at least until the housing recommendation for healthy horses was required; otherwise, they were removed (N=313). The respondents from the stable owner and horse owner groups had to at least answer the questions before and including the question about the housing system they use, otherwise they were removed (SO: N=37; HO: N=100). In total, 4237 respondents were left after all the checks. Of these, 2316 (54.7%) respondents had pressed the 'Finish button' of the survey; however, this does not imply that the questionnaire was completely answered. 1921 (45.3%) had quit at an earlier stage.

2. 3. 2. Statistical analysis

The data were analysed using the statistical software IBM SPSS Statistics for Windows (IBM SPSS Statistics, IBM, Armonk/NY/U.S., Version: 25). Descriptive analyses of the data (mean, standard deviation, median, minimum, maximum, quartiles; or frequency tables) were calculated where possible. Due to the fact that not all questions were always answered completely, sample sizes differed between questions and are given in the results section accordingly. Aside from this, some questions were only posed to specific groups (e.g. depending on the stakeholder group, housing system or management), so that the number of responses depended also on the linked questions.

For the analysis of the multiple-choice questions about the countries, a hierarchy with numbers was established for each country and possible combinations of countries to be able to analyse the frequencies and to see if a respondent had given multiple answers. In the frequency table, the single given answers per country, combinations and 'other' countries were displayed separately. However, for establishing a crosstable and to find potential differences between countries regarding the use of single or group housing (by use of Chi^2-Tests for horse owners and Fisher's Exact Tests for stable onwers), only respondents indicating only one single country of interest (AT, DE, CH, LU) were included, while respondents in 'other' countries and combinations of countries were not included in further analyses. To be able to describe the job specifications of the professionals, also here a hierarchy was constituted and the single answers were presented separately from the combinations. The most often given combinations (multiple answers) of professions were presented in a distinct table.

The questions about the specific type of housing systems and the number of horses/stallions in each type for horse and stable owners with single and group housing during

the grazing season and the winter time was checked. In case stallions were indicated, but not counted to the total number, those were corrected. Furthermore, regarding the number of horses in the housing system, the majority of responses (HO: N=1498 out of 2210; SO: N=93 out of 169) did not correspond to the number of owned horses of horse owners or the number of horses kept in the stable of stable owners, respectively, and therefore, only the responses where the number of horses was in agreement between the different questions, i.e. with the correct number of horses, were kept for further analyses (HO: N=712; SO: N=76).

Concerning the horse categories, some respondents had not stuck to the same horse categories throughout the particular questions which was noticed by inspecting the data in SPSS. This might be a result from the formulation and complexity of the questions. As a consequence of this, one needs to bear in mind that some data related to the categories may still be flawed/inaccurate, even though check-up's were done.

Regarding age, one person indicating an age of two was removed for the analysis of age, but kept for all other analyses because the rest of the data was plausible and thus a typing error was assumed.

Principal component analysis (PCA) with a Kaiser Normalization varimax rotation was used for identifying components of reasons for the selected housing systems for SO and HO, for determining components of beliefs about housing systems, beliefs about horses' needs and affective attitudes for PG, SO and HO, and for identifying components of reasons for recommendation of housing systems for PG. For identifying components of reasons for single housing for stable owners, a confirmatory PCA approach with varimax rotation was carried out because the response rate was too small to perform an exploratory PCA. Four components were built based on the reasons of stable owners' with group housing and horse owners' reasons for single housing, and a PCA was then carried out with each component separately. For all the principal component analyses, the Kaiser-Meyer-Olkin criterion had to be at least 0.5 and Bartlett's test of sphericity was required to be significant ($p<0.05$). The components were obliged to have an eigenvalue above 1.0 and visual interpretation of scree plots was applied to determine the number of relevant components. Specific rules for the inclusion of items in a component were applied and calculation of the component values (mean of the included items) was carried out (similar to other studies: Köbrunner, 2017; Waiblinger *et al*., 2002). Items were included:

- if the loading of a question item exceeded 0.4 and did not load on any other component exceeding 0.3, the item was included in the component

- if the loading exceeded 0.6 and had a loading smaller than 0.4 on any other component, it was included in the component
- if the loading was between 0.3 and 0.6 on more than one component, it was not included in any component
- items loading below 0.3 on all components were not included in any component.

Cronbach's alpha was also calculated to measure the internal consistency of the components. The Cronbach's alpha was accepted as good when above 0.7, as very good when above 0.8 and not accepted when it was below or equal 0.5. Cronbach's alphas between 0.5 and 0.7 were kept as well.

Non-parametric tests (Mann-Whitney-U) were carried out to find potential differences in the reasons for a specific housing system between horse owners with group or single housing only and the ones with a combination as well as between stable owners with group or single housing only and the ones with a combination.

Analysis of variance (ANOVA) and post-hoc pairwise comparison with Bonferroni correction was applied to test for potential differences in the attitude components between the horse and stable owners with single (SH), group (GH) or both housing systems (SHGH).

Due to non-normality of the data, Spearman rank correlation coefficients were calculated to investigate associations in-between attitude components as well as across attitude components. According to Martin & Bateson (1993), correlation coefficients of 0.2-0.4 were referred to as low correlation, 0.4-0.7 as moderate, 0.7-0.9 as high, and from 0.9 as very high in the result section.

3. Results

3. 1. Response rate and characteristics of the respondents/participants

Altogether, 4237 responses could be included in the analysis. 68.4% of the respondents were horse owners (N=2897), 5.1% were stable owners (N=216) and 26.5% (N=1124) were professionals, i.e. persons working with horses as their main profession. Respondents had mostly learned about the survey via Facebook posts (N=1274, 53.0%), received the link per e-mail (N=653, 27.1%), through an organisation/association/federation (N=214, 8.9%) or seen the article in the PferdeRevue (N=198, 8.2%). Further places can be found in Tab. 2.

Tab. 2: The sources by which respondents were adverted to the survey in numbers (N) and percentage (%). ALL = all groups, PG = professionals group, SO = stable owners, HO = horse owners. Sources with most answers are in bold. (multiple-choice question)

F101Place find out about Survey	**ALL (N=2406)**		**PG (N=884)**		**SO (N=122)**		**HO (N=1400)**	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Via Facebook	**1274**	**53.0**	369	41.7	71	58.2	834	59.6
Received through e-mail	**653**	**27.1**	404	45.7	31	25.4	218	15.6
Through organisation/association/federation	**214**	**8.9**	79	8.9	11	9.0	124	8.9
Seen in PferdeRevue	**198**	**8.2**	23	2.6	10	8.2	165	11.8
Through friends and acquaintances	119	4.9	28	3.2	3	2.5	88	6.3
Other[1]	70	2.9	28	3.2	3	2.5	39	2.8
Via other websites/internet	54	2.2	15	1.7	2	1.6	37	2.6
Poster at university (horse clinic)	18	0.7	9	1.0	0	0.0	9	0.6
Poster in horse shop	10	0.4	0	0.0	1	0.8	9	0.6
Via Twitter	2	0.1	0	0.0	0	0.0	2	0.1
Poster in pet shop	1	0.0	0	0.0	0	0.0	1	0.1

[1]e.g. via the veterinarian, at the stable, via Instagram

Regarding the main profession of the professionals, the three most frequent responses were ‘Veterinarian’ (35.1% of all professionals), ‘Riding instructor’ (23.3%) and ‘Professional Rider’ (22.4%); 20% of the veterinarians, 60% of the riding instructors and 90% of the professional riders had chosen more than one profession (see Tab. 3). The most frequent combinations of professions were ‘Professional rider + Riding instructor + Horse trainer’ (10.1%), ‘Horse trainer + Riding instructor’ (6.9%) and ‘Riding instructor + Professional rider’ (3.9%), for more information (see Tab. 4).

Tab. 3: The different professions of the professionals' group. The column 'Profession' represents the numbers (N) and percentage (%) of respondents who only have chosen one of the given professions. The column 'Combined' represents the number/percentage of respondents who have chosen two or more of the given answers including the profession in question. Professions with the most responses are in bold. (mandatory multiple-choice question)

F2Profession for professionals group (N=1124)	Profession		Combined	
	N	%	N	%
Veterinarian	**316**	**28.1**	**77**	**7.0**
Riding instructor	**104**	**9.3**	**152**	**14.0**
Horse-assisted therapy	45	4.0	0	0.0
Other horse-related health care professions (e.g. osteopathy)	43	3.8	6	0.6
Horse trainer	31	2.8	21	2.0
Professional rider	**27**	**2.4**	**225**	**20.0**
Farrier	18	1.6	10	1.0
Hoof care practitioner	11	1.0	28	2.0
Behavioural therapist	5	0.4	0	0.0
Horse trader	4	0.4	1	0.1

Tab. 4: The most frequently stated combinations of professions in absolute numbers (N) and percentage (%) for the professional group with at least ten respondents choosing it.

The most given combinations of professions	N	%
Professional rider + Riding instructor + Horse trainer	113	10.1
Horse trainer + Riding instructor	78	6.9
Riding instructor + Professional rider	44	3.9
Horse trainer + Riding instructor + Horse-assisted therapy	28	2.5
Riding instructor + Horse-assisted therapy	26	2.3
Veterinarian + Other horse-related health care professions (e.g. osteopathy)	19	1.7
Professional rider + Riding instructor + Horse trainer + Horse trader	18	1.6
Professional rider + Horse trainer	10	0.9

2442 respondents gave details about their sex (see Tab. 5). 2160 were females (88.5%), 273 were males (11.2%) and nine selected divers (0.4%). The mean age for all respondents was 37.9 years (N=2435, SD=12.87). The average age for each group can be found in Tab. 6. In relation to the highest education of the stakeholder groups, 72% (N=1746) had at least the qualification for studying and nearly one third (34.7%, N=845) indeed had a university degree. This was the highest in the professional group with nearly 50% (N=423) and lowest in the stable owners' group (21.1%, N=26). Further information can be found in Tab. 5. Nearly 30% (N=713) of the respondents did not have a qualification related to horses which are about half of the horse owners (53.1%), a quarter of the stable owners (25%) and only 3% of the professionals. The most common answer for horse owners was 'exercise instructor', for stable owners 'farmer' and for the professionals 'riding instructor' respectively 'veterinarian'. For the detailed qualification responses, see Tab. 5. In regards to the years of regular contact with horses (see Tab. 6), horse owners had regularly contact with horses for less than one year to 70 years (N=1420; mean±SD, 24.4±11.31), stable owners for three to 60 years (N=124; mean±SD, 27.8±11.87) and professionals for one to 70 years (N=893; mean±SD, 29.1±12.24).

Horse and stable owners spent an average of about 18.4 hours per week (2.6hrs/day) with the horses (see Tab. 6), but horse owners spent less time with the horses (2.5hrs/day) than stable owners (4.1hrs/day) (HO: mean±SD, 17.5±10.02; SO: mean±SD, 29.0±16.72). The results (see Tab. 5) showed a very small number of horse owners that do not work the horses themselves (N=71, 5.1%) and of stable owners that do not care themselves for the horses (N=2, 1.6%). Almost all of the 1331 horse owners (94.9%) and 122 stable owners (98.4%) worked the horse by themselves or cared themselves for the horses (see Tab. 5). These horse owners mostly rode the horses (92.5%, N=1230), fed them (79.5%, N=1057) or did groundwork (78.0%, N=1037). In contrast, the stable owners, who cared for the horses, mostly fed the horses (95.1%, N=116) or mucked out the stables (94.3%, N=115). However, riding was also often done by the stable owners (88.5%, N=108). The four most often mentioned sources of information about the behaviour and housing of horses over all respondent groups were the internet (N=1899, 78.3%), books (N=1656, 68.3%), magazines (N=1506, 62.1%) and scientific articles (N=1486, 61.3%), with some differences between respondent groups (see Tab. 5). For horse owners, friends and acquaintances were a frequent source for information as well (N=893, 63.5%). For professionals, the most used source was reading scientific articles (N=679, 75.7%) and they also signified that they look for information at events (N=570, 63.5%).

Tab. 5: Frequency tables of the sex, the highest education, the horse-related qualification and the information sources about behaviour and housing in numbers (N) and percentage (%) for the different stakeholders (ALL = all groups, HO = horse owners, SO = stable owners, PG = professionals group) as well as the frequency tables of the horse (HO) and stable owners (SO) in numbers (N) and percentage (%) who work/care oneself (for) the horses and the type of work/care done (ALL = the total answers of HO and SO for these questions)

	ALL		**HO**		**SO**		**PG**	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**
F86Sex[1] - Total N	2442		1424		123		895	
Female	2160	88.5	1304	91.6	109	88.6	747	83.5
Male	273	11.2	114	8.0	13	10.6	146	16.3
Divers/X	9	0.4	6	0.4	1	0.8	2	0.2
F88Highest education[1] - Total N	2433		1420		123		890	
Compulsory education	37	1.5	31	2.2	1	0.8	5	0.6
Apprenticeship	286	11.8	188	13.2	25	20.3	73	8.2
Vocational training	302	12.4	170	12.0	23	18.7	109	12.2
General qualification for university entrance	574	23.6	397	28.0	31	25.2	146	16.4
Polytechnic degree	327	13.4	214	15.1	13	10.6	100	11.2
University degree	845	34.7	396	27.9	26	21.1	423	47.5
Other*	62	2.5	24	1.7	4	3.3	34	3.8

Continuation of Tab. 5

	ALL		HO		SO		PG	
	N	%	N	%	N	%	N	%
F89Horse qualification[2] - Total N	2250		1240		116		894	
No special horse-related qualification	713	31.7	659	53.1	30	25.9	24	2.7
Riding instructor	388	17.2	71	5.7	16	13.8	301	33.7
Exercise instructor/trainer (DE: Übungsleiter)	347	15.4	165	13.3	20	17.2	162	18.1
Veterinarian	340	15.1	41	3.3	3	2.6	296	33.1
Horse trainer	287	12.8	54	4.4	8	6.9	225	25.2
Farmer	264	11.7	82	6.6	47	40.5	135	15.1
Horse farm manager (DE: Pferdewirt)	231	10.3	71	5.7	15	12.9	145	16.2
Other**	213	9.5	100	8.1	14	12.1	99	11.1
Professional rider	175	7.8	19	1.5	2	1.7	154	17.2
Other horse-related health care professions (e.g. osteopathy)	168	7.5	41	3.3	3	2.6	124	13.9
Horse-assissted therapy/intervention	136	6.0	39	3.1	6	5.2	91	10.2
Natural Horsemanship	109	4.8	39	3.1	4	3.4	66	7.4
Vaulting instructor	97	4.3	30	2.4	2	1.7	65	7.3
Horse caretaker	61	2.7	16	1.3	1	0.9	44	4.9
Parelli Natural Horsemanship	60	2.7	26	2.1	5	4.3	29	3.2
Hoof care practitioner	54	2.4	10	0.8	4	3.4	40	4.5
Bachelor/Master of Science in Agricultural Sciences	49	2.2	26	2.1	4	3.4	19	2.1
Bachelor of Science in Equine Science	44	2.0	19	1.5	1	0.9	24	2.7
Behavioural therapist	35	1.6	6	0.5	0	0.0	29	3.2
Bachelor/Master of Science in Biology (Zoology, Behavioural biology)	35	1.6	20	1.6	0	0.0	15	1.7
Animal trainer	33	1.5	9	0.7	2	1.7	22	2.5
Animal caretaker	30	1.3	15	1.2	1	0.9	14	1.6
Farrier	29	1.2	0	0.0	0	0.0	29	3.2
Bachelor/Master of Science in Livestock Science	23	1.0	14	1.1	1	0.9	8	0.9
Practioner of the Linda Tellington-Training	20	0.9	7	0.6	0	0.0	13	1.5
Master of Science in Equine Science	10	0.4	2	0.2	0	0.0	8	0.9
F93Work/Care oneself (for) the horses[3] -								
Total N	1526		1402		124		-	
Yes	1453	95.2	1331	94.9	122	98.4	-	-
No	73	4.8	71	5.1	2	1.6	-	-
F94Type of work/care[2] - Total N	1452		1330		122		-	
Riding	1338	92.1	1230	92.5	108	88.5	-	-
Feeding	1173	80.8	1057	79.5	116	95.1	-	-
Groundwork	1120	77.1	1037	78.0	83	68.0	-	-
Mucking out	905	62.3	790	59.4	115	94.3	-	-
Driving	147	10.1	126	9.5	21	17.2	-	-
Other***	121	8.3	112	8.4	9	7.4	-	-

Continuation of Tab. 5

	ALL		HO		SO		PG	
	N	%	N	%	N	%	N	%
F95Information about behaviour and housing[2] - Total N	2424		1406		121		897	
On the internet	1899	78.3	1169	83.1	96	79.3	634	70.7
Reading books	1656	68.3	968	68.8	89	73.6	599	66.8
Reading magazines	1506	62.1	915	65.1	77	63.6	514	57.3
Via scientific articles	1486	61.3	734	52.2	73	60.3	679	75.7
At events (horse fairs, conferences, etc.)	1372	56.6	731	52.0	71	58.7	570	63.5
Via friends/acquaintances	1360	56.1	893	63.5	69	57.0	398	44.4
At the horse stable	1347	55.6	729	51.8	69	57.0	549	61.2
Via organisation/association/federation	717	29.6	365	26.0	34	28.1	318	35.5
Other****	161	6.6	75	5.3	5	4.1	81	9.0

[1]single-choice questions, [2]multiple-choice questions, [3]mandatory Yes/No question
*e.g. master (DE: Meister), doctorate/PhD; **e.g. equine master (DE: Pferdewirtschaftsmeister), judge; ***e.g. grooming/hoof care, go for a walk, stable/pasture management; ****e.g. via the veterinarian, through observation/experience with horses, through further education (seminars, courses), via podcasts/Youtube

Tab. 6: Descriptive statistics of the age and the number of years of being regularly exposed to horses for the different stakeholder groups, and the duration of horse handling in hours/week (incl. grooming, riding, observing, mucking out, feeding) for horse and stable owners (ALL = all groups, HO = horse owners, SO = stable owners, HO&SO = horse and stable owners, PG = professionals group, SD = standard deviation)

	N	Mean	SD	Min	Q25	Median	Q75	Max
F87Age[1]								
ALL	2435	37.9	12.87	5	28.0	36.0	47.0	78
HO	1419	36.7	13.00	5	26.0	35.0	46.0	78
SO	124	39.7	11.84	12	31.0	38.0	48.8	68
PG	892	39.6	12.58	17	30.0	37.0	49.0	76
F90Years of regular contact[1]								
ALL	2437	26.3	11.90	0[2]	18.0	25.0	34.0	70
HO	1420	24.4	11.31	0[2]	16.0	23.0	30.0	70
SO	124	27.8	11.87	3	20.0	27.5	33.8	60
PG	893	29.1	12.24	1	20.0	28.0	38.0	70
F92Hours per week with horses[1]								
HO&SO	1542	18.4	11.16	1	10.0	16.0	22.0	100
HO	1418	17.5	10.02	1	10.0	15.0	21.0	100
SO	124	29.0	16.72	1	17.0	25.0	40.0	100

[1]matrix-numbers/Dropdown 0-100; [2]0 means less than one year

3. 2. Distribution of the stakeholders between countries

The question 'In which country are the horses stabled or in which country is the stable located?' was answered by 2882 horse owners and 216 stable owners. Both in horse owners and stable owners, most of the respondents had the horses housed or kept in Austria, followed by Germany and Switzerland, and the least were in Luxembourg (Tab. 7). For details on other countries and combination of countries for horse and stable owners see Annex V, Tab. A4. The question 'In which country are you working professionally?' was answered by 896 professionals (see Tab. 7). Most of the respondents were working in Austria (N=345, 38.5%), followed by Germany (N=290, 32.4%) and Switzerland (N=107, 11.9%), and the least of the professionals were working in Luxembourg (N=14, 1.6%). For details on other countries and combinations of countries for the professionals see Annex V, Tab. A5.

Tab. 7: Frequency table of the questions 'In which country are the horses stabled or in which country is the stable located?' and 'In which country are you professionally active?' per answers (N) and percentage (%) for horse owners (HO), stable owners (SO) and professionals (PG) per country (AT = Austria, DE = Germany, CH = Switzerland, LU = Luxembourg, Other = other countries) and combinations of countries (Combined+others). The column 'Combined+others' displays the combinations of given countries and the combinations of a given country/given countries plus others. (multiple-choice question)

		Responses	AT	DE	CH	LU	Other	Combined + others
F7Country – horses housed/kept								
SO	N	216	137	60	14	4	1	0
	%		63.4	27.8	6.5	1.9	0.5	0.0
HO	N	2882	1720	877	154	52	26	53
	%		59.7	30.4	5.3	1.8	0.9	1.8
F91Country - PG active								
PG	N	896	345	290	107	14	5	135
	%		38.5	32.4	11.9	1.6	0.6	15.1

3. 3. Number of horses owned or kept for horse and stable owners

Horse owners (N=2896) owned one to 50 horses (mean±SD, 2.3±2.74) (see Tab. 8); of whom nearly three quarters owned one (N=1379; 47.6%) or two horses (N=767; 26.5%); another 20% owned three to five horses (N=578). Further information can be found in Annex IV, Tab. A3. Stable owners (N=215) kept one to 139 horses on the farm/at the stable (mean±SD, 20.7±20.93) (see Tab. 8); from which 0 to 87 were owned (mean±SD, 7.6±10.95) and 0 to 100 not-owned (mean±SD, 13.1±14.40) horses. Four stable owners had no owned horses at all on the farm/at the stable (1.9%) and 14 stable owners had only owned horses on the farm/at the stable (6.5%). More than half of the stable owner respondents (54.4%) kept 11 to 50 horses with a majority (82.9%) of one to ten owned horses and 53.5% (one to ten) of not-owned horses. Further information can be found in Annex IV, Tab. A3.

Tab. 8: The number of owned horses per horse owner (HO) and the number of owned/not-owned horses kept by stable owner (SO) as well as the total number of horses on the farm/at the stable. SD = standard deviation

	Mean	SD	Min	Q25	Median	Q75	Max
F5Number of owned horses HO[1] (N=2896)	2.3	2.74	1	1.0	2.0	3.0	50
F6Total number of horses at the stable SO (N=215)	20.7	20.93	1	8.0	14.0	26.0	139
F6Number of owned horses SO[2] (N=215)	7.6	10.95	0	2.0	4.0	8.0	87
F6Number of not-owned horses SO[2] (N=215)	13.1	14.40	0	4.0	8.0	16.0	100

[1]matrix-numbers/Dropdown 1-500; [2] matrix-numbers/Dropdown 0-500

3. 4. Horse characteristics

In view of the different types of breeds, warmbloods (59.0%, N=918) was the most frequent given answer for horse owners and stable owners. For both groups, second most were cobs (32.9%, N=512) and third were ponies (29.0%, N=452). More information about the other types of breeds can be found in Tab. 9. Concerning the horse disciplines (see Tab. 9), leisure riding (70.7%, N=1098) was the most mentioned discipline for both groups. Dressage (48.6%, N=754) was also mentioned often and jumping (26.9%, N=418) was named a quarter of times.

Tab. 9: Answers (N) and percentage (%) for the different types of horse breeds and of the different horse disciplines for horse owners (HO) and stable owners (SO). ALL = the total answers of HO and SO. Breeds and disciplines with the most answers in bold. (multiple-choice questions)

	ALL		HO		SO	
	N	**%**	**N**	**%**	**N**	**%**
F84Breed - Total N	1556		1432		124	
Warmblood (e.g. Hanoverian, Holsteiner, Trakehner)	**918**	**59.0**	827	57.8	91	73.4
Cob (e.g. Haflinger) (DE: Kleinpferd)	**512**	**32.9**	442	30.9	70	56.5
Pony (e.g. German or English Riding Pony)	**452**	**29.0**	383	26.7	69	55.6
Western horse (e.g. American Quarter Horse, Appaloosa)	329	21.1	273	19.1	56	45.2
Thoroughbred (e.g. English Thouroughbred, Arabian, Anglo-Arab)	271	17.4	233	16.3	38	30.6
Icelandic horse	251	16.1	216	15.1	35	28.2
Coldblood (e.g. Noric, Franches-Montagnes)	237	15.2	192	13.4	45	36.3
Baroque horse (e.g. Lipizzan, Friesian, Andalusian, Lusitano)	234	15.0	190	13.3	44	35.5
Trotter (e.g. American Standardbred)	112	7.2	89	6.2	23	18.5
Other*	72	4.6	64	4.5	8	6.5
F85Discipline - Total N	1553		1429		124	
Leisure riding	**1098**	**70.7**	995	69.6	103	83.1
Dressage	**754**	**48.6**	689	48.2	65	52.4
Jumping	**418**	**26.9**	380	26.6	38	30.6
Western riding	299	19.3	254	17.8	45	36.3
Trail riding	207	13.3	169	11.8	38	30.6
Driving	175	11.3	150	10.5	25	20.2
Gaited horse riding (DE: Gangpferdereiten)	168	10.8	149	10.4	19	15.3
Eventing/Military	149	9.6	132	9.2	17	13.7
None of the named ones	149	9.6	135	9.4	14	11.3
Hippotherapy/Horse-assisted interventions	87	0.6	73	5.1	14	11.3
Other**	78	5.0	73	5.1	5	4.0
Baroque horse riding (DE: Barockpferdereiten)	50	3.2	42	2.9	8	6.5
Endurance	35	2.3	31	2.2	4	3.2
Vaulting	34	2.2	29	2.0	5	4.0
Mounted Games	21	1.4	19	1.3	2	1.6
Hunting	16	1.0	14	1.0	2	1.6
Racing	9	0.6	8	0.6	1	0.8
Para-Equestrian	6	0.4	3	0.2	3	2.4
Horseball	4	0.3	4	0.3	0	0.0
Polo	3	0.2	3	0.2	0	0.0
Circus/trick riding (DE: Kunstreiten)	3	0.2	3	0.2	0	0.0

*e.g. Irish cob/Gypsy horse/Tinker, donkey; **e.g. working equitation, mounted archery, natural horsemanship (Parelli), side-sattel riding (DE: Damensattel)

3. 5. Farm or stable size

Stable owners were asked about the type and size of farm/stable they have and which categories of horses were kept in this type. From the 216 stable owners, 28 indicated that they had two types of farm/stable (22 selected Farm with max. 5 boarding horses + Farm with more than 5 boarding horses, 2 selected Farm with max. 5 boarding horses + Commercial horse stable and 4 selected Farm with more than 5 boarding horses + Commercial horse stable). Ten respondents indicated for all the categories of horses that they did not have those in their stable. Therefore, the ones with two types were displayed separately (see Tab. 11 for detailed responses) and the ones with none of the categories were excluded for this analysis. The remaining 178 stable owners indicated only one type and from that 'farm with more than 5 boarding horses' was the most chosen answer for all horse categories besides for horses in commercial use and working horses which were kept in equal relation in commercial stables as well (Tab. 10).

Tab. 10: Answers (N) and percentage (%) of 178 stable owners (SO) for the different types of farms/stables and the horse categories kept in these. TN = total answers given for each horse category (matrix/tick-off)

F8Type of farm/stable SO (N=178)		Farm with max. 5 boarding horses		Farm with more than 5 boarding horses		Commercial horse stable		Do not keep this horse category	
Horse category	**TN**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Sport horses	118	16	13.6	37	31.4	23	19.5	42	35.6
Breeding horses	105	15	14.3	23	21.9	12	11.4	55	52.4
Horses for commercial use	92	1	1.1	13	14.1	14	15.2	64	69.6
Working horses	83	3	3.6	3	3.6	4	4.8	73	88.0
Leisure horses	162	49	30.2	71	43.8	39	24.1	3	1.9
Retired horses	114	21	18.4	36	31.6	19	16.7	38	33.3
Horses unused	96	12	12.5	22	22.9	12	12.5	50	52.1

Tab. 11: Answers (N) and percentage (%) of 28 stable owners (SO) who gave answers for two types of farms/stables and the horse categories kept in these. TN = total answers given for each horse category (matrix/tick-off)

F8Type of farm/stable SO (N=28)		Farm with max. 5 boarding horses		Farm with more than 5 boarding horses		Commercial horse stable		Do not keep this horse category	
Horse category	**TN**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Sport horses	23	8	34.8	7	30.4	1	4.3	7	30.4
Breeding horses	23	10	43.5	6	26.1	0	0.0	7	30.4
Horses for commercial use	18	0	0.0	3	16.7	3	16.7	12	66.7
Working horses	15	0	0.0	0	0.0	0	0.0	15	100.0
Leisure horses	26	7	26.9	17	65.4	2	7.7	0	0.0
Retired horses	19	10	52.6	4	21.1	1	5.3	4	21.1
Horses unused	20	10	50.0	5	25.0	1	5.0	4	20.0

The horse owners were asked about the total number of horses kept on the farm/at the stable with respect to the category of horses they owned. From 2897 horse owners, 1785 had chosen only one number of horses on the farm/at the stable, 908 had chosen two numbers of horses, 190 three numbers of horses and 14 indicated that they owned none of the given horse categories. The latter ones were excluded from analysis, the ones with only one number of horses (N=1785; Tab. 12) were analysed separately from the ones with two or three total numbers of horses (N=1098; Tab. 13). From the respondents owning the category in question, '1-5 horses' was the most frequently chosen answer for all categories of horses both for horse owners with only one answer for the number of horses as well as for the ones with more answers for number of horses except for leisure horses of the latter owners, where '6-25 horses' was highest, followed by 'above 25 horses'.

Tab. 12: Answers (N) and percentage (%) of 1785 horse owners (HO) for the total number of horses on the farm/at the stable for each horse category they own. TN = total answers given for each horse category (matrix/tick-off)

F9Total horse number on farm/at stable HO (N=1785)		**1 - 5 horses**		**6 - 25 horses**		**Above 25 horses**		**Do not own this horse category**	
Horse category	**TN**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Sport horses	1217	404	33.2	89	7.3	111	9.1	613	50.4
Breeding horses	1025	198	19.3	22	2.1	21	2.0	784	76.5
Horses for commercial use	954	64	6.7	32	3.4	17	1.8	841	88.2
Working horses	921	26	2.8	2	0.2	1	0.1	892	96.9
Leisure horses	1595	985	61.8	261	16.4	227	14.2	122	7.6
Retired horses	1051	324	30.8	34	3.2	36	3.4	657	62.5
Horses unused	1006	235	23.4	30	3.0	31	3.1	710	70.6

Tab. 13: Answers (N) and percentage (%) of 1098 horse owners (HO) who gave two or three answers for the total number of horses on the farm/at the stable for each horse category they own. TN = total answers given for each horse category (matrix/tick-off)

F9Total horse number on farm/at stable HO (N=1098)		**1 - 5 horses**		**6 - 25 horses**		**Above 25 horses**		**Do not own this horse category**	
Horse category	**TN**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Sport horses	1018	376	36.9	273	26.8	158	15.5	211	20.7
Breeding horses	887	293	33.0	89	10.0	18	2.0	487	54.9
Horses for commercial use	866	226	26.1	163	18.8	33	3.8	444	51.3
Working horses	785	32	4.1	12	1.5	3	0.4	738	94.0
Leisure horses	1064	130	12.2	573	53.9	333	31.3	28	2.6
Retired horses	931	578	62.1	108	11.6	9	1.0	236	25.3
Horses unused	888	514	57.9	75	8.4	19	2.1	280	31.5

3. 6. Housing systems

3. 6. 1. Group or single housing

Regarding the use of single or group housing systems, the most used housing system of horse owners (N=2897) was group housing (N=1258, 43.4%). 976 (33.7%) used a combination of single and group housing and only 663 (22.9%) indicated to use single housing only (Tab. 14). Of the 216 stable owners, nearly half of them had group housing systems (N=107, 49.5%), but also a combination of single and group housing systems was common (N=89, 41.2%), while only 20 stable owners (9.3%) reported single housing.

Tab. 14: The number (N) and percentage (%) of housing systems used by horse owners (HO) and stable owners (SO) (mandatory single-choice question)

F10Housing systems HO/SO	**HO (N=2897)**		**SO (N=216)**	
	N	**%**	**N**	**%**
Single housing: Single boxes or tie-stalls or no other horses at the stable	663	22.9	20	9.3
Group housing: At least two horses in constant unhindered contact with each other	1258	43.4	107	49.5
Both single and group housing	976	33.7	89	41.2

3. 6. 2. Group and single housing in the different countries

Horse owners in Austria, Germany or Luxembourg kept their horses most often in group housing and least often in single housing, while in Switzerland, the majority indicated to use single housing (Tab. 15). Thus, there was a significant difference with higher use of single and lower use of group housing and combined systems in Switzerland. Housing systems distribution differed also for stable owners between countries with single housing being used significantly more often in Switzerland (Tab. 15).

Tab. 15: Crosstabulation of the different housing systems (SH = Single housing, GH = Group housing, SHGH = Single and group housing) vs. countries (AT = Austria, DE = Germany, CH = Switzerland, LU = Luxembourg) for stable owners and horse owners. TN = total number of responses for each housing system. All standardized residuals ≥ |2.0| in bold.

Crosstabulation housing vs. countries			**Countries**				
			TN	**AT**	**DE**	**CH**	**LU**
Horse owners (N=2803), (Chi²-Test: 76.040, p=0.000)							
Housing	SH	N	638	371	183	78	6
		Expected Count	638.0	391.5	199.6	35.1	11.8
		% within countries	22.8%	21.6%	20.9%	50.6%	11.5%
		Standardized Residual		-1.0	-1.2	**7.3**	-1.7
	GH	N	1230	762	394	45	29
		Expected Count	1230.0	754.8	384.8	67.6	22.8
		% within countries	43.9%	44.3%	44.9%	29.2%	55.8%
		Standardized Residual		0.3	0.5	**-2.7**	1.3
	SHGH	N	935	587	300	31	17
		Expected Count	935.0	573.7	292.5	51.4	17.3
		% within countries	33.4%	34.1%	34.2%	20.1%	32.7%
		Standardized Residual		0.6	0.4	**-2.8**	-0.1
Total		N	2803	1720	877	154	52
		Expected Count	2803.0	1720.0	877.0	154.0	52.0
		% within countries	100.0%	100.0%	100.0%	100.0%	100.0%
Stable owners (N=215), (Fisher's Exact-Test: 16.117, p=0.007)							
Housing	SH	N	20	9	5	5	1
		Expected Count	20.0	12.7	5.6	1.3	0.4
		% within countries	9.3%	6.6%	8.3%	35.7%	25.0%
		Standardized Residual		-1.0	-0.2	**3.2**	1.0
	GH	N	107	76	27	4	0
		Expected Count	107.0	68.2	29.9	7.0	2.0
		% within countries	49.8%	55.5%	45.0%	28.6%	0.0%
		Standardized Residual		0.9	-0.5	-1.1	-1.4
	SHGH	N	88	52	28	5	3
		Expected Count	88.0	56.1	24.6	5.7	1.6
		% within countries	40.9%	38.0%	46.7%	35.7%	75.0%
		Standardized Residual		-0.5	0.7	-0.3	1.1
Total		N	215	137	60	14	4
		Expected Count	215.0	137.0	60.0	14.0	4.0
		% within countries	100.0%	100.0%	100.0%	100.0%	100.0%

3. 6. 3. Housing systems during grazing and winter season

Respondents were asked to give the number of horses and thereof stallions they keep in each of the different housing systems, separately during the grazing season and during winter. Only respondents where the number of horses in this question agreed with the total number of horses they owned (horse owners) or kept (stable owners) were considered in the analysis. First, the analysis with regard to the selection of a housing system irrespective of the number of horses is presented, thereafter the analysis considering the number of horses and stallions.

3. 6. 3. 1. Group housing systems

About one third of horse owners with group housing indicated to keep their horses permanently on pasture during the grazing season, followed by different housing systems with permanent access to an outdoor area selected by one quarter to one fifth of respondents (Tab. 16); for the ones with a combination one-room open barns with turn-out were selected most often, but not much higher than other systems (see Tab. 16). During the winter time, the most answers were received for multiple-room open barn with turn-out by the ones with only group housing and for one-room open barns with turn-out by the ones with a combination (see Tab. 16). Stallions were mostly kept permanently on pasture during the grazing season (N=12) and in one- (N=8)/multiple- (N=8) room open barns with turn-out during winter time by horse owners with group housing. The answers from the ones with a combination were more variable.

Stable owners (see Tab. 17) with group housing only kept the horses during the grazing season as well as during the winter time in multiple-room open barns with structured turn-out. The ones with a combination indicated the most responses for one-room open barn with turn-out during the grazing season and during the winter time. Stallions were mostly kept in multiple-room open barns with turn-out during the grazing season (N=3) and in one-room open barns with turn-out during the winter time (N=4) by stable owners with group housing only (Tab. 17). The answers from stable owners with a combination were more variable.

Tab. 16: The number (N) and percentage (%) of horse owners with group housing (GH) or a combination of group and single housing (SHGH) indicating to use a specific type of group housing system for horses and for stallions during the grazing season and during winter time. Total number of responses for GH=427 and for SHGH=53. Multiple answers were possible.

Group housing system - horse owners F11/13	during grazing season				during winter time			
	GH		SHGH		GH		SHGH	
	N	%	N	%	N	%	N	%
For horses								
In one-room open barn (DE: Einraum-Laufstall)	19	4.4	3	5.7	32	7.5	9	17.0
In multiple-room open barn (DE: Mehrraum-Laufstall)	11	2.6	0	0.0	14	3.3	2	3.8
In one-room open barn (DE: Einraum-Laufstall) with turn-out (constantly accessible)	91	21.3	16	30.2	118	27.6	16	30.2
In multiple-room open barn (DE: Mehrraum-Laufstall) with turn-out (constantly accessible)	102	23.9	14	26.4	128	30.0	15	28.3
In multiple-room open barn (DE: Mehrraum-Laufstall) with structured turn-out (constantly accessible) (e.g. Loose housing, Open-Barn system, Paddock Trail, Active-stable)	83	19.4	6	11.3	95	22.2	7	13.2
Permanently on pasture	143	33.5	14	26.4	65	15.2	4	7.5
For stallions								
In one-room open barn	1	0.2	1	1.9	3	0.7	1	1.9
In multiple-room open barn	0	0.0	0	0.0	0	0.0	0	0.0
In one-room open barn with turn-out (constantly accessible)	7	1.6	0	0.0	8	1.9	2	3.8
In multiple-room open barn with turn-out (constantly accessible)	3	0.7	1	1.9	8	1.9	0	0.0
In multiple-room open barn with structured turn-out (constantly accessible) (e.g. Loose housing, Open-Barn system, Paddock Trail, Active-stable)	3	0.7	1	1.9	6	1.4	1	1.9
Permanently on pasture	12	2.8	1	1.9	7	1.6	1	1.9

Tab. 17: The number (N) and percentage (%) of stable owners with group housing (GH) or a combination of group and single housing (SHGH) indicating to use a specific type of group housing system for horses and for stallions during the grazing season and during winter time. Total number of responses for GH=55 and for SHGH=15. Multiple answers were possible.

Group housing system – stable owners F12/14	during grazing season				during winter time			
	GH		SHGH		GH		SHGH	
	N	%	N	%	N	%	N	%
For horses								
In one-room open barn (DE: Einraum-Laufstall)	3	5.5	3	20.0	3	5.5	4	26.7
In multiple-room open barn (DE: Mehrraum-Laufstall)	0	0.0	1	6.7	1	1.8	0	0.0
In one-room open barn (DE: Einraum-Laufstall) with turn-out (constantly accessible)	8	14.5	9	60.0	10	18.2	10	66.7

Continuation of Tab. 17

Group housing system – stable owners F12/14	during grazing season				during winter time			
	GH		SHGH		GH		SHGH	
	N	%	N	%	N	%	N	%
For horses								
In multiple-room open barn (DE: Mehrraum-Laufstall) with turn-out (constantly accessible)	14	25.5	5	33.3	17	30.9	5	33.3
In multiple-room open barn (DE: Mehrraum-Laufstall) with structured turn-out (constantly accessible) (e.g. Loose housing, Open-Barn system, Paddock Trail, Active-stable)	21	38.2	1	6.7	23	41.8	1	6.7
Permanently on pasture	17	30.9	2	13.3	7	12.7	0	0.0
For stallions								
In one-room open barn	0	0.0	1	6.7	0	0.0	1	6.7
In multiple-room open barn	0	0.0	0	0.0	0	0.0	0	0.0
In one-room open barn with turn-out (constantly accessible)	1	1.8	1	6.7	4	7.3	1	6.7
In multiple-room open barn with turn-out (constantly accessible)	3	5.5	2	13.3	3	5.5	2	13.3
In multiple-room open barn with structured turn-out (constantly accessible) (e.g. Loose housing, Open-Barn system, Paddock Trail, Active-stable)	2	3.6	0	0.0	2	3.6	0	0.0
Permanently on pasture	1	1.8	0	0.0	1	1.8	0	0.0

3. 6. 3. 2. Single housing systems

Horse owners (see Tab. 18) with single housing only most often indicated to use outdoor boxes with additional pasture in the group during winter and grazing season. The ones with a combination indicated turn-out/loose boxes with additional pasture in the group during grazing and winter season as the most used housing types. The answers for stallions were more variable for both housing systems.

Stable owners (see Tab. 19) with single housing only most often answered to use indoor/outdoor boxes with additional pasture in the group during grazing season and indoor/turn-out/loose boxes with additional pasture in the group during winter time. The ones with a combined housing system used mostly turn-out/loose boxes with additional pasture in the group in both seasons. None of the stable owners with only group housing indicated a housing type for stallions and the answers by the ones with a combination were more varied.

Neither horse owners nor stable owners housed the horses/stallions in a tethering system (see Tab. 18 and Tab. 19).

Tab. 18: The number (N) and percentage (%) of horse owners with single housing (SH) or a combination of group and single housing (SHGH) indicating to use a specific type of single housing system for horses and for stallions during the grazing season and during winter time. Total number of responses for SH=232 and for SHGH=53. Multiple answers were possible.

Single housing system – horse owners F15/17	**during grazing season**				**during winter time**			
	SH		**SHGH**		**SH**		**SHGH**	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**
For horses								
Tethering	0	0.0	0	0.0	0	0.0	0	0.0
In indoor boxes (no outdoor opening) without additional pasture	1	0.4	0	0.0	6	2.6	2	3.8
In indoor boxes with additional pasture individually	15	6.5	3	5.7	19	8.2	3	5.7
In indoor boxes with additional pasture in the group	42	18.1	13	24.5	45	19.4	12	22.6
In outdoor boxes (with outdoor opening) without additional pasture	1	0.4	0	0.0	10	4.3	0	0.0
In outdoor boxes with additional pasture individually	32	13.8	8	15.1	29	12.5	8	15.1
In outdoor boxes with additional pasture in the group	66	28.4	10	18.9	61	26.3	12	22.6
In turn-out/loose boxes (DE: Auslaufboxen) without additional pasture	2	0.9	1	1.9	16	6.9	5	9.4
In turn-out/loose boxes (DE: Auslaufboxen) with additional pasture individually	33	14.2	7	13.2	30	12.9	7	13.2
In turn-out/loose boxes (DE: Auslaufboxen) with additional pasture in the group	62	26.7	18	34.0	53	22.8	13	24.5
Permanently on pasture	21	9.1	3	5.7	8	3.4	0	0.0
For stallions								
Tethering	0	0.0	0	0.0	0	0.0	0	0.0
In indoor boxes (no outdoor opening) without additional pasture	0	0.0	0	0.0	0	0.0	0	0.0
In indoor boxes with additional pasture individually	0	0.0	2	3.8	0	0.0	2	3.8
In indoor boxes with additional pasture in the group	1	0.4	1	1.9	4	1.7	1	1.9
In outdoor boxes (with outdoor opening) without additional pasture	0	0.0	0	0.0	1	0.4	0	0.0
In outdoor boxes with additional pasture individually	3	1.3	3	5.7	1	0.4	2	3.8
In outdoor boxes with additional pasture in the group	2	0.9	1	1.9	3	1.3	1	1.9
In turn-out/loose boxes without additional pasture	0	0.0	0	0.0	1	0.4	0	0.0
In turn-out/loose boxes with additional pasture individually	3	1.3	1	1.9	3	1.3	2	3.8
In turn-out/loose boxes with additional pasture in the group	2	0.9	2	3.8	2	0.9	2	3.8
Permanently on pasture	2	0.9	1	1.9	0	0.0	0	0.0

Tab. 19: The number (N) and percentage (%) of stable owners with single housing (SH) or a combination of group and single housing (SHGH) indicating to use a specific type of single housing system for horses and for stallions during the grazing season and during winter time. Total number of responses for SH=6 and for SHGH=15. Multiple answers were possible.

Single housing system - stable owners F16/18	**during grazing season**				**during winter time**			
	SH		**SHGH**		**SH**		**SHGH**	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**
For horses								
Tethering	0	0.0	0	0.0	0	0.0	0	0.0
In indoor boxes (no outdoor opening) without additional pasture	0	0.0	1	6.7	1	16.7	1	6.7
In indoor boxes with additional pasture individually	1	16.7	3	20.0	0	0.0	4	26.7
In indoor boxes with additional pasture in the group	3	50.0	6	40.0	3	50.0	6	40.0
In outdoor boxes (with outdoor opening) without additional pasture	0	0.0	0	0.0	1	16.7	0	0.0
In outdoor boxes with additional pasture individually	0	0.0	1	6.7	0	0.0	1	6.7
In outdoor boxes with additional pasture in the group	3	50.0	6	40.0	2	33.3	6	40.0
In turn-out/loose boxes (DE: Auslaufboxen) without additional pasture	1	16.7	0	0.0	0	0.0	3	20.0
In turn-out/loose boxes (DE: Auslaufboxen) with additional pasture individually	1	16.7	2	13.3	1	16.7	0	0.0
In turn-out/loose boxes (DE: Auslaufboxen) with additional pasture in the group	2	33.3	9	60.0	3	50.0	8	53.3
Permanently on pasture	0	0.0	0	0.0	0	0.0	0	0.0
For stallions								
Tethering	0	0.0	0	0.0	0	0.0	0	0.0
In indoor boxes (no outdoor opening) without additional pasture	0	0.0	1	6.7	0	0.0	1	6.7
In indoor boxes with additional pasture individually	0	0.0	1	6.7	0	0.0	1	6.7
In indoor boxes with additional pasture in the group	0	0.0	0	0.0	0	0.0	0	0.0
In outdoor boxes (with outdoor opening) without additional pasture	0	0.0	0	0.0	0	0.0	0	0.0
In outdoor boxes with additional pasture individually	0	0.0	0	0.0	0	0.0	1	6.7
In outdoor boxes with additional pasture in the group	0	0.0	1	6.7	0	0.0	0	0.0
In turn-out/loose boxes without additional pasture	0	0.0	0	0.0	0	0.0	1	6.7
In turn-out/loose boxes with additional pasture individually	0	0.0	1	6.7	0	0.0	0	0.0
In turn-out/loose boxes with additional pasture in the group	0	0.0	0	0.0	0	0.0	0	0.0
Permanently on pasture	0	0.0	0	0.0	0	0.0	0	0.0

3. 6. 3. 3. Analysis of group housing systems in regards of number of horses

During the grazing season (see Tab. 20), most horses (37.8%) were housed permanently on pasture, about 21% in multiple-room open barns with turn-out, 20% in multiple-room open barns with structured turn-out and around one sixth in multiple-room open barns with turn-out by horse owners with only group housing. Almost 50% of the stallions in group housing were permanently kept on pasture and around 30% in one-room open barns with turn-out. Horse owners with a combination of single and group housing housed most horses in one-room open barns with turn-out (31.6%) and in multiple-room open barns with turn-out (30.7%). 50% of the stallions were housed in multiple-room open barns with structured turn-out by horse owners with a combination of housing systems.

During winter time (see Tab. 20), most horses (29.2%) of horse owners with group housing were housed in multiple-room open barns with turn-out, 24% in multiple-room open barns with structured turn-out, and around 20% each in one-room open barns with turn-out and permanently on pasture. Stallions were mostly housed in one-room (25%)/multiple-room (25%) open barns with turn-out. Horse owners with the combination housed 30% each of the horses in one-room open barns with turn-out and in multiple-room open barns with turn-out, and 21% of the horses were housed in one-room open barns. 43% of the stallions were housed in multiple-room open barns with structured turn-out by horse owners with a combination of housing systems.

Tab. 20: The number of horses (N) and thereof the number of stallions (N) as well as the percentages (%) in the different group housing systems of horse owners (HO) with group housing (GH) or a combination of group and single housing (SHGH) during the grazing season and during winter time. (matrix-numbers/Dropdown 0-500)

F11/13Number of horses and stallions in the different group housing types during grazing season and winter time for HO with GH or SHGH	**Number of**		**during grazing season**		**during winter time**	
			N	**%**	**N**	**%**
Total number of horses		**GH**	**1396**		**1396**	
		SHGH	**114**		**114**	
Total number of stallions		**GH**	**33**		**44**	
		SHGH	**6**		**7**	
In one-room open barn (DE: Einraum-Laufstall)	Horses	GH	54	3.9	85	6.1
		SHGH	11	9.6	24	21.1
	Stallions	GH	1	3.0	3	6.8
		SHGH	1	16.7	1	14.3
In multiple-room open barn (DE: Mehrraum-Laufstall)	Horses	GH	22	1.6	43	3.1
		SHGH	0	0.0	2	1.8
	Stallions	GH	0	0.0	0	0.0
		SHGH	0	0.0	0	0.0

Continuation of Tab. 20

F11/13Number of horses and stallions in the different group housing types during grazing season and winter time for HO with GH or SHGH	Number of		during grazing season		during winter time	
			N	%	N	%
In one-room open barn (DE: Einraum-Laufstall) with turn-out (constantly accessible)	Horses	GH	220	15.8	282	20.2
		SHGH	36	31.6	34	29.8
	Stallions	GH	9	27.3	11	25.0
		SHGH	0	0.0	2	28.6
In multiple-room open barn (DE: Mehrraum-Laufstall) with turn-out (constantly accessible)	Horses	GH	296	21.2	408	29.2
		SHGH	35	30.7	34	29.8
	Stallions	GH	3	9.1	11	25.0
		SHGH	1	16.7	0	0.0
In multiple-room open barn (DE: Mehrraum-Laufstall) with structured turn-out (constantly accessible) (e.g. Loose housing, Open-Barn system, Paddock Trail, Active-stable)	Horses	GH	277	19.8	330	23.6
		SHGH	15	13.2	16	14.0
	Stallions	GH	4	12.1	9	20.5
		SHGH	3	50.0	3	42.9
Permanently on pasture	Horses	GH	527	37.8	248	17.8
		SHGH	17	14.9	4	3.5
	Stallions	GH	16	48.5	10	22.7
		SHGH	1	16.7	1	14.3

During the grazing season (see Tab. 21), almost 50% of the horses were housed in multiple-room open barns with structured turn-out and around 20% each in multiple-room open barns with turn-out or permanently on pasture by stable owners with group housing only. 81% of the stallions in group housing were housed in multiple-room open barns with structured turn-out. Most horses (27%) from stable owners with a combination were housed in one-room open barns or in multiple-room open barns with turn-out (26%). 75% of the stallions were housed in one-room open barns by stable owners with a combination.

During winter time (see Tab. 21), 50% of the horses of stable owners with group housing were housed in multiple-room open barns with structured turn-out and 24% in multiple-room open barns with turn-out. 70% of the stallions were housed in multiple-room open barns with structured turn-out. Horses from stable owners with a combination were housed in one-room open barns (29%), in multiple-room open barns with turn-out (26%) and in one-room open barns with turn-out (25%). Stallions (75%) were housed in one-room open barns.

Tab. 21: The number of horses (N) and thereof the number of stallions (N) as well as the percentages (%) in the different group housing systems of stable owners (SO) with group housing (GH) or a combination of group and single housing (SHGH) during the grazing season and during winter time. (matrix-numbers/Dropdown 0-500)

F12/14Number of horses and stallions in the different group housing types during grazing season and winter time for SO with GH or SHGH	**Number of**		**during grazing season**		**during winter time**	
			N	**%**	**N**	**%**
Total number of horses		**GH**	**771**		**771**	
		SHGH	**174**		**174**	
Total number of stallions		**GH**	**66**		**77**	
		SHGH	**48**		**48**	
In one-room open barn (DE: Einraum-Laufstall)	Horses	GH	37	4.8	37	4.8
		SHGH	47	27.0	51	29.3
	Stallions	GH	0	0.0	0	0.0
		SHGH	36	75.0	36	75.0
In multiple-room open barn (DE: Mehrraum-Laufstall)	Horses	GH	0	0.0	13	1.7
		SHGH	4	2.3	0	0.0
	Stallions	GH	0	0.0	0	0.0
		SHGH	0	0.0	0	0.0
In one-room open barn (DE: Einraum-Laufstall) with turn-out (constantly accessible)	Horses	GH	58	7.5	96	12.5
		SHGH	34	19.5	43	24.7
	Stallions	GH	3	4.5	16	20.8
		SHGH	3	6.3	3	6.3
In multiple-room open barn (DE: Mehrraum-Laufstall) with turn-out (constantly accessible)	Horses	GH	157	20.4	181	23.5
		SHGH	46	26.4	46	26.4
	Stallions	GH	8	12.1	6	7.8
		SHGH	9	18.8	9	18.8
In multiple-room open barn (DE: Mehrraum-Laufstall) with structured turn-out (constantly accessible) (e.g. Loose housing, Open-Barn system, Paddock Trail, Active-stable)	Horses	GH	375	48.6	390	50.6
		SHGH	34	19.5	34	19.5
	Stallions	GH	54	81.8	54	70.1
		SHGH	0	0.0	0	0.0
Permanently on pasture	Horses	GH	144	18.7	54	7.0
		SHGH	9	5.2	0	0.0
	Stallions	GH	1	1.5	1	1.3
		SHGH	0	0.0	0	0.0

3. 6. 3. 4. Analysis of single housing systems in regards of number of horses

During grazing season, horse owners with only single housing housed 26% of the horses in outdoor boxes with additional pasture in the group, 21% in turn-out/loose boxes with additional pasture in the group and 17% in indoor boxes with additional pasture in the group (see Tab. 22). 23% each of the stallions were housed either in outdoor boxes or in turn-out/loose boxes with additional pasture individually and 15% each were housed in outdoor boxes or in turn-out/loose boxes with additional pasture in the group or permanently on pasture. Horse owners with a combination housed most of the horses in turn-out/loose boxes with additional pasture in the group (32%), in indoor boxes with additional pasture individually (21%) and in outdoor

boxes with additional pasture in the group (16%). Most of the stallions of them were housed in indoor boxes with additional pasture individually (60%) and around 20% were housed in outdoor boxes with additional pasture individually.

During winter time, horse owners with single housing only housed 25% of the horses in outdoor boxes with additional pasture in the group, 19% in indoor boxes with additional pasture in the group and 19% in turn-out/loose boxes with additional pasture in the group (see Tab. 22). 27% of the stallions were housed in indoor boxes with additional pasture in the group and 20% each in outdoor boxes with additional pasture in the group and in turn-out/loose boxes with additional pasture individually. Horse owners with a combination housed 23% of the horses in turn-out/loose boxes with additional pasture in the group and 21% each in indoor or outdoor boxes with additional pasture in the group. Most of the stallions (62%) of horse owners with a combination were housed in indoor boxes with additional pasture individually.

Tab. 22: The number of horses (N) and thereof the number of stallions (N) as well as the percentages (%) in the different single housing systems of horse owners (HO) with single housing (SH) or a combination of group and single housing (SHGH) during the grazing season and during winter time. (matrix-numbers/Dropdown 0-500)

F15/17Number of horses and stallions in the different single housing types during grazing season and winter time for HO with SH or SHGH	**Number of**		**during grazing season**		**during winter time**	
			N	**%**	**N**	**%**
Total number of horses		**SH**	**482**		**482**	
		SHGH	**96**		**96**	
Total number of stallions		**SH**	**13**		**15**	
		SHGH	**27**		**26**	
Tethering	Horses	SH	0	0.0	0	0.0
		SHGH	0	0.0	0	0.0
	Stallions	SH	0	0.0	0	0.0
		SHGH	0	0.0	0	0.0
In indoor boxes (no outdoor opening) without additional pasture	Horses	SH	1	0.2	7	1.5
		SHGH	0	0.0	4	4.2
	Stallions	SH	0	0.0	0	0.0
		SHGH	0	0.0	0	0.0
In indoor boxes with additional pasture individually	Horses	SH	23	4.8	37	7.7
		SHGH	4	4.2	4	4.2
	Stallions	SH	0	0.0	0	0.0
		SHGH	16	59.3	16	61.5
In indoor boxes with additional pasture in the group	Horses	SH	82	17.0	90	18.7
		SHGH	20	20.8	20	20.8
	Stallions	SH	1	7.7	4	26.7
		SHGH	1	3.7	1	3.8

Continuation of Tab. 22

F15/17Number of horses and stallions in the different single housing types during grazing season and winter time for HO with SH or SHGH	Number of		during grazing season		during winter time	
			N	%	N	%
In outdoor boxes (with outdoor opening) without additional pasture	Horses	SH	1	0.2	14	2.9
		SHGH	0	0.0	0	0.0
	Stallions	SH	0	0.0	1	6.7
		SHGH	0	0.0	0	0.0
In outdoor boxes with additional pasture individually	Horses	SH	56	11.6	46	9.5
		SHGH	11	11.5	11	11.5
	Stallions	SH	3	23.1	1	6.7
		SHGH	5	18.5	3	11.5
In outdoor boxes with additional pasture in the group	Horses	SH	125	25.9	120	24.9
		SHGH	15	15.6	20	20.8
	Stallions	SH	2	15.4	3	20.0
		SHGH	1	3.7	1	3.8
In turn-out/loose boxes (DE: Auslaufboxen) without additional pasture	Horses	SH	2	0.4	33	6.8
		SHGH	1	1.0	7	7.3
	Stallions	SH	0	0.0	1	6.7
		SHGH	0	0.0	0	0.0
In turn-out/loose boxes (DE: Auslaufboxen) with additional pasture individually	Horses	SH	45	9.3	33	6.8
		SHGH	7	7.3	8	8.3
	Stallions	SH	3	23.1	3	20.0
		SHGH	1	3.7	3	11.5
In turn-out/loose boxes (DE: Auslaufboxen) with additional pasture in the group	Horses	SH	103	21.4	90	18.7
		SHGH	31	32.3	22	22.9
	Stallions	SH	2	15.4	2	13.3
		SHGH	2	7.4	2	7.7
Permanently on pasture	Horses	SH	44	9.1	12	2.5
		SHGH	7	7.3	0	0.0
	Stallions	SH	2	15.4	0	0.0
		SHGH	1	3.7	0	0.0

During the grazing season, stable owners with single housing only housed around 30% of the horses in outdoor boxes with additional pasture in the group and around 24% in indoor boxes with additional pasture in the group (Tab. 23). Stable owners with a combination housed 28% of the horses in outdoor boxes with additional pasture in the group, 27% in turn-out/loose boxes with additional pasture in the group and 25% in indoor boxes without additional pasture. Most of the stallions (73%) in a combination were housed in indoor boxes without additional pasture.

During winter time, stable owners with single housing only kept 28% of the horses in turn-out/loose boxes with additional pasture in the group, 24% in outdoor boxes without additional pasture and 23% in indoor boxes with additional pasture in the group (Tab. 23). Stable owners with a combination housed 27% of the horses in outdoor boxes with additional

pasture in the group, 26% in turn-out/loose boxes with additional pasture in the group and 25% in indoor boxes without additional pasture. Most of the stallions (73%) in a combination were housed in indoor boxes without additional pasture.

Tab. 23: The number of horses (N) and thereof the number of stallions (N) as well as the percentages (%) in the different single housing systems of stable owners (SO) with single housing (SH) or a combination of group and single housing (SHGH) during the grazing season and during winter time. (matrix-numbers/Dropdown 0-500)

F16/18Number of horses and stallions in the different single housing types during grazing season and winter time for SO with SH or SHGH	**Number of**		**during grazing season**		**during winter time**	
			N	**%**	**N**	**%**
Total number of horses		**SH**	**83**		**83**	
		SHGH	**196**		**196**	
Total number of stallions		**SH**	**0**		**0**	
		SHGH	**22**		**22**	
Tethering	Horses	SH	0	0.0	0	0.0
		SHGH	0	0.0	0	0.0
	Stallions	SH	0	0.0	0	0.0
		SHGH	0	0.0	0	0.0
In indoor boxes (no outdoor opening) without additional pasture	Horses	SH	0	0.0	3	3.6
		SHGH	48	24.5	48	24.5
	Stallions	SH	0	0.0	0	0.0
		SHGH	16	72.7	16	72.7
In indoor boxes with additional pasture individually	Horses	SH	2	2.4	0	0.0
		SHGH	3	1.5	5	2.6
	Stallions	SH	0	0.0	0	0.0
		SHGH	1	4.5	1	4.5
In indoor boxes with additional pasture in the group	Horses	SH	20	24.1	19	22.9
		SHGH	24	12.2	22	11.2
	Stallions	SH	0	0.0	0	0.0
		SHGH	0	0.0	0	0.0
In outdoor boxes (with outdoor opening) without additional pasture	Horses	SH	0	0.0	20	24.1
		SHGH	0	0.0	0	0.0
	Stallions	SH	0	0.0	0	0.0
		SHGH	0	0.0	0	0.0
In outdoor boxes with additional pasture individually	Horses	SH	0	0.0	0	0.0
		SHGH	1	0.5	2	1.0
	Stallions	SH	0	0.0	0	0.0
		SHGH	0	0.0	2	9.1
In outdoor boxes with additional pasture in the group	Horses	SH	24	28.9	4	4.8
		SHGH	54	27.6	53	27.0
	Stallions	SH	0	0.0	0	0.0
		SHGH	2	9.1	0	0.0
In turn-out/loose boxes (DE: Auslaufboxen) without additional pasture	Horses	SH	10	12.0	0	0.0
		SHGH	0	0.0	16	8.2
	Stallions	SH	0	0.0	0	0.0
		SHGH	0	0.0	3	13.6

Continuation of Tab. 23

F16/18Number of horses and stallions in the different single housing types during grazing season and winter time for SO with SH or SHGH	Number of		during grazing season		during winter time	
			N	%	N	%
In turn-out/loose boxes (DE: Auslaufboxen) with additional pasture individually	Horses	SH	14	16.9	14	16.9
		SHGH	14	7.1	0	0.0
	Stallions	SH	0	0.0	0	0.0
		SHGH	3	13.6	0	0.0
In turn-out/loose boxes (DE: Auslaufboxen) with additional pasture in the group	Horses	SH	13	15.7	23	27.7
		SHGH	52	26.5	50	25.5
	Stallions	SH	0	0.0	0	0.0
		SHGH	0	0.0	0	0.0
Permanently on pasture	Horses	SH	0	0.0	0	0.0
		SHGH	0	0.0	0	0.0
	Stallions	SH	0	0.0	0	0.0
		SHGH	0	0.0	0	0.0

3. 7. Turn-out management

Respondents were first asked about the principle offer of turn-out (DE: Auslauf) for their horses (Are the horses at least sometimes in a turn-out area? Yes/No). If turn-out was offered, the respondents were then asked about the type of turn-out offered, the frequency of access to pasture/outdoor run and the duration of the horses being at the pasture/outdoor run for the different categories of horses during the grazing season and during winter time. Regarding the turn-out management for horses in group housing or both housing systems, almost all the horse owners and stable owners indicated that the horses were at least sometimes in a turn-out area. The same was found for horses in single housing or both housing systems. Results can be seen in Tab. 24.

Tab. 24: The number (N) and percentage (%) of horse owners (HO) and stable owners (SO) with group housing (GH), single housing (SH) and both housing systems (SHGH) where the horses were at least sometimes in a turn-out area. SH&SHGH and GH&SHGH represent both groups together. TN = total number of responses. (mandatory yes/no questions)

F19/27Turn-out in GH and SH		HO					SO				
			YES		NO			YES		NO	
		TN	N	%	N	%	TN	N	%	N	%
Turn-out in GH	GH&SHGH	1404	1381	98.4	23	1.6	146	145	99.3	1	0.7
	GH	944	931	98.6	13	1.4	92	91	98.9	1	1.1
	SHGH	460	450	97.8	10	2.2	54	54	100.0	0	0.0
Turn-out in SH	SH&SHGH	915	900	98.4	15	1.6	64	63	98.4	1	1.6
	SH	476	467	98.1	9	1.9	13	13	100.0	0	0.0
	SHGH	439	433	98.6	6	1.4	51	50	98.0	1	2.0

3. 7. 1. Type of turn-out

During the **grazing season** (see Tab. 25), horse owners and stable owners **with group housing (or a combination of single and group housing)** offered sport, leisure, retired and horses for commercial use a combination of pasture and paddock. Breeding horses and unused horses were offered only pasture whereas working horses were offered a combination of pasture and outdoor run by horse and stable owners. During **winter time** (see Tab. 26), all the horse categories were offered a paddock by the stable owners. Horse owners offered all categories a paddock too except for horses of commercial use, working horses and retired horses. Those were only offered access to an outdoor run. To sum up, horses in group housing (or a combination) are rather offered access to a paddock or outdoor run during winter, whereas during the grazing season the horses had more access to pasture or a combination with pasture.

During the **grazing season** (see Tab. 27), horse owners **with single housing (or a combination of single and group housing)** offered all the categories access to pasture apart from retired and leisure horses. Those were offered a combination of pasture and outdoor run. However, stable owners only offered pasture to horses for commercial use and retired horses. Sport, breeding, and leisure horses were offered a combination of pasture and paddock. The types of turn-out for working and unused horses were more variable. During **winter time** (see Tab. 28), horse owners offered all the categories access to an outdoor run. Stable owners, on the other hand, offered sport and breeding horses access to a paddock and a combination of outdoor run and paddock was offered to leisure and for commercial use horses. The types of turn-out were variable for working and retired horses. To sum up, horses in single housing (or a combination) were rather offered access to an outdoor run, paddock or a combination of outdoor run and paddock during winter time, whereas during grazing season the horses had more access to pasture or a combination with pasture. Comparing both housing systems in both seasons, almost the same results could be found.

Tab. 25: Answers (N) and percentage (%) of horse owners (HO) and stable owners (SO) with group housing (GH) or both housing systems (SHGH) for the type of turn-out during the grazing season. GH&SHGH represents both groups together. TN = total answers for each category of horses and housing system. (matrix/tick-off)

F20 Type of turn-out during the grazing season in GH				**Pasture**		**Outdoor run**		**Paddock**		**Pasture + Outdoor run**		**Pasture + Paddock**		**Outdoor run + Paddock**		**No turn-out**	
			TN	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Sport horses	HO	GH&SHGH	476	104	21.8	31	6.5	7	1.5	139	29.2	146	30.7	47	9.9	2	0.4
		GH	233	53	22.7	14	6.0	2	0.9	64	27.5	86	36.9	13	5.6	1	0.4
		SHGH	243	51	21.0	17	7.0	5	2.1	75	30.9	60	24.7	34	14.0	1	0.4
	SO	GH&SHGH	56	13	23.2	0	0.0	2	3.6	12	21.4	24	42.9	5	8.9	0	0.0
		GH	24	6	25.0	0	0.0	1	4.2	4	16.7	12	50.0	1	4.2	0	0.0
		SHGH	32	7	21.9	0	0.0	1	3.1	8	25.0	12	37.5	4	12.5	0	0.0
Breeding horses	HO	GH&SHGH	288	101	35.1	13	4.5	4	1.4	78	27.1	82	28.5	9	3.1	1	0.3
		GH	154	51	33.1	4	2.6	2	1.3	36	23.4	56	36.4	4	2.6	1	0.6
		SHGH	134	50	37.3	9	6.7	2	1.5	42	31.3	26	19.4	5	3.7	0	0.0
	SO	GH&SHGH	48	23	47.9	0	0.0	1	2.1	8	16.7	15	31.3	1	2.1	0	0.0
		GH	19	10	52.6	0	0.0	1	5.3	2	10.5	6	31.6	0	0.0	0	0.0
		SHGH	29	13	44.8	0	0.0	0	0.0	6	20.7	9	31.0	1	3.4	0	0.0
Horses for commercial use	HO	GH&SHGH	208	46	22.1	17	8.2	4	1.9	60	28.8	71	34.1	9	4.3	1	0.5
		GH	118	24	20.3	8	6.8	3	2.5	33	28.0	45	38.1	4	3.4	1	0.8
		SHGH	90	22	24.4	9	10.0	1	1.1	27	30.0	26	28.9	5	5.6	0	0.0
	SO	GH&SHGH	24	6	25.0	0	0.0	1	4.2	6	25.0	11	45.8	0	0.0	0	0.0
		GH	14	3	21.4	0	0.0	1	7.1	2	14.3	8	57.1	0	0.0	0	0.0
		SHGH	10	3	30.0	0	0.0	0	0.0	4	40.0	3	30.0	0	0.0	0	0.0
Working horses	HO	GH&SHGH	89	26	29.2	4	4.5	3	3.4	28	31.5	22	24.7	4	4.5	2	2.2
		GH	49	15	30.6	3	6.1	2	4.1	15	30.6	12	24.5	1	2.0	1	2.0
		SHGH	40	11	27.5	1	2.5	1	2.5	13	32.5	10	25.0	3	7.5	1	2.5
	SO	GH&SHGH	7	1	14.3	0	0.0	1	14.3	4	57.1	1	14.3	0	0.0	0	0.0
		GH	5	1	20.0	0	0.0	1	20.0	2	40.0	1	20.0	0	0.0	0	0.0
		SHGH	2	0	0.0	0	0.0	0	0.0	2	100.0	0	0.0	0	0.0	0	0.0

Continuation of Tab. 25

F20 Type of turn-out during the grazing season in GH				Pasture		Outdoor run		Paddock		Pasture + Outdoor run		Pasture + Paddock		Outdoor run + Paddock		No turn-out	
			TN	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Leisure horses	HO	GH&SHGH	1194	274	22.9	66	5.5	20	1.7	335	28.1	412	34.5	86	7.2	1	0.1
		GH	833	186	22.3	40	4.8	15	1.8	213	25.6	325	39.0	53	6.4	1	0.1
		SHGH	361	88	24.4	26	7.2	5	1.4	122	33.8	87	24.1	33	9.1	0	0.0
	SO	GH&SHGH	130	31	23.8	2	1.5	5	3.8	29	22.3	53	40.8	10	7.7	0	0.0
		GH	88	20	22.7	1	1.1	5	5.7	20	22.7	38	43.2	4	4.5	0	0.0
		SHGH	42	11	26.2	1	2.4	0	0.0	9	21.4	15	35.7	6	14.3	0	0.0
Retired horses	HO	GH&SHGH	485	136	28.0	25	5.2	14	2.9	136	28.0	151	31.1	21	4.3	2	0.4
		GH	307	76	24.8	17	5.5	11	3.6	83	27.0	106	34.5	12	3.9	2	0.7
		SHGH	178	60	33.7	8	4.5	3	1.7	53	29.8	45	25.3	9	5.1	0	0.0
	SO	GH&SHGH	67	22	32.8	1	1.5	2	3.0	15	22.4	24	35.8	3	4.5	0	0.0
		GH	43	10	23.3	1	2.3	2	4.7	11	25.6	17	39.5	2	4.7	0	0.0
		SHGH	24	12	50.0	0	0.0	0	0.0	4	16.7	7	29.2	1	4.2	0	0.0
Horses unused	HO	GH&SHGH	417	126	30.2	23	5.5	8	1.9	121	29.0	119	28.5	19	4.6	1	0.2
		GH	270	72	26.7	16	5.9	6	2.2	76	28.1	87	32.2	12	4.4	1	0.4
		SHGH	147	54	36.7	7	4.8	2	1.4	45	30.6	32	21.8	7	4.8	0	0.0
	SO	GH&SHGH	46	15	32.6	1	2.2	4	8.7	9	19.6	13	28.3	3	6.5	1	2.2
		GH	27	5	18.5	1	3.7	4	14.8	7	25.9	9	33.3	0	0.0	1	3.7
		SHGH	19	10	52.6	0	0.0	0	0.0	2	10.5	4	21.1	3	15.8	0	0.0

Tab. 26: Answers (N) and percentage (%) of horse owners (HO) and stable owners (SO) with group housing (GH) or both housing systems (SHGH) for the type of turn-out during the winter time. GH&SHGH represents both groups together. TN = total answers for each category of horses and housing system. (matrix/tick-off)

F23 Type of turn-out during the winter time in GH				**Pasture**		**Outdoor run**		**Paddock**		**Pasture + Outdoor run**		**Pasture + Paddock**		**Outdoor run + Paddock**		**No turn-out**	
			TN	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Sport horses	HO	GH&SHGH	455	27	5.9	121	26.6	123	27.0	36	7.9	35	7.7	110	24.2	3	0.7
		GH	218	14	6.4	58	26.6	58	26.6	17	7.8	20	9.2	49	22.5	2	0.9
		SHGH	237	13	5.5	63	26.6	65	27.4	19	8.0	15	6.3	61	25.7	1	0.4
	SO	GH&SHGH	54	2	3.7	6	11.1	18	33.3	5	9.3	10	18.5	13	24.1	0	0.0
		GH	22	0	0.0	1	4.5	8	36.4	3	13.6	2	9.1	8	36.4	0	0.0
		SHGH	32	2	6.3	5	15.6	10	31.3	2	6.3	8	25.0	5	15.6	0	0.0
Breeding horses	HO	GH&SHGH	277	30	10.8	62	22.4	63	22.7	27	9.7	39	14.1	55	19.9	1	0.4
		GH	144	20	13.9	27	18.8	31	21.5	13	9.0	27	18.8	26	18.1	0	0.0
		SHGH	133	10	7.5	35	26.3	32	24.1	14	10.5	12	9.0	29	21.8	1	0.8
	SO	GH&SHGH	47	7	14.9	9	19.1	12	25.5	5	10.6	7	14.9	6	12.8	1	2.1
		GH	18	1	5.6	4	22.2	4	22.2	2	11.1	4	22.2	3	16.7	0	0.0
		SHGH	29	6	20.7	5	17.2	8	27.6	3	10.3	3	10.3	3	10.3	1	3.4
Horses for commercial use	HO	GH&SHGH	203	14	6.9	60	29.6	54	26.6	11	5.4	13	6.4	51	25.1	0	0.0
		GH	111	10	9.0	27	24.3	38	34.2	5	4.5	6	5.4	25	22.5	0	0.0
		SHGH	92	4	4.3	33	35.9	16	17.4	6	6.5	7	7.6	26	28.3	0	0.0
	SO	GH&SHGH	23	2	8.7	4	17.4	7	30.4	4	17.4	0	0.0	6	26.1	0	0.0
		GH	11	1	9.1	0	0.0	4	36.4	3	27.3	0	0.0	3	27.3	0	0.0
		SHGH	12	1	8.3	4	33.3	3	25.0	1	8.3	0	0.0	3	25.0	0	0.0
Working horses	HO	GH&SHGH	88	9	10.2	32	36.4	15	17.0	10	11.4	4	4.5	17	19.3	1	1.1
		GH	49	7	14.3	13	26.5	11	22.4	4	8.2	2	4.1	11	22.4	1	2.0
		SHGH	39	2	5.1	19	48.7	4	10.3	6	15.4	2	5.1	6	15.4	0	0.0
	SO	GH&SHGH	9	0	0.0	3	33.3	4	44.4	1	11.1	0	0.0	1	11.1	0	0.0
		GH	6	0	0.0	2	33.3	3	50.0	0	0.0	0	0.0	1	16.7	0	0.0
		SHGH	3	0	0.0	1	33.3	1	33.3	1	33.3	0	0.0	0	0.0	0	0.0

Continuation of Tab. 26

F23 Type of turn-out during the winter time in GH				Pasture		Outdoor run		Paddock		Pasture + Outdoor run		Pasture + Paddock		Outdoor run + Paddock		No turn-out	
			TN	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Leisure horses	HO	GH&SHGH	1166	95	8.1	234	20.1	320	27.4	126	10.8	130	11.1	259	22.2	2	0.2
		GH	812	68	8.4	139	17.1	245	30.2	87	10.7	102	12.6	170	20.9	1	0.1
		SHGH	354	27	7.6	95	26.8	75	21.2	39	11.0	28	7.9	89	25.1	1	0.3
	SO	GH&SHGH	132	11	8.3	16	12.1	40	30.3	13	9.8	19	14.4	33	25.0	0	0.0
		GH	89	7	7.9	10	11.2	25	28.1	10	11.2	15	16.9	22	24.7	0	0.0
		SHGH	43	4	9.3	6	14.0	15	34.9	3	7.0	4	9.3	11	25.6	0	0.0
Retired horses	HO	GH&SHGH	475	53	11.2	120	25.3	112	23.6	46	9.7	46	9.7	98	20.6	0	0.0
		GH	297	33	11.1	63	21.2	80	26.9	30	10.1	32	10.8	59	19.9	0	0.0
		SHGH	178	20	11.2	57	32.0	32	18.0	16	9.0	14	7.9	39	21.9	0	0.0
	SO	GH&SHGH	67	9	13.4	12	17.9	20	29.9	7	10.4	4	6.0	15	22.4	0	0.0
		GH	43	5	11.6	6	14.0	14	32.6	6	14.0	2	4.7	10	23.3	0	0.0
		SHGH	24	4	16.7	6	25.0	6	25.0	1	4.2	2	8.3	5	20.8	0	0.0
Horses unused	HO	GH&SHGH	405	41	10.1	103	25.4	105	25.9	44	10.9	38	9.4	73	18.0	1	0.2
		GH	263	26	9.9	59	22.4	77	29.3	33	12.5	27	10.3	40	15.2	1	0.4
		SHGH	142	15	10.6	44	31.0	28	19.7	11	7.7	11	7.7	33	23.2	0	0.0
	SO	GH&SHGH	44	8	18.2	5	11.4	15	34.1	4	9.1	3	6.8	9	20.5	0	0.0
		GH	26	4	15.4	2	7.7	11	42.3	3	11.5	1	3.8	5	19.2	0	0.0
		SHGH	18	4	22.2	3	16.7	4	22.2	1	5.6	2	11.1	4	22.2	0	0.0

Tab. 27: Answers (N) and percentage (%) of horse owners (HO) and stable owners (SO) with single housing (SH) or both housing systems (SHGH) for the type of turn-out during the grazing season. SH&SHGH represents both groups together. TN = total answers for each category of horses and housing system. (matrix/tick-off)

F28 Type of turn-out during the grazing season in SH				**Pasture**		**Outdoor run**		**Paddock**		**Pasture + Outdoor run**		**Pasture + Paddock**		**Outdoor run + Paddock**		**No turn-out**	
			TN	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Sport horses	HO	SH&SHGH	509	117	23.0	56	11.0	13	2.6	128	25.1	115	22.6	76	14.9	4	0.8
		SH	284	65	22.9	39	13.7	7	2.5	64	22.5	67	23.6	38	13.4	4	1.4
		SHGH	225	52	23.1	17	7.6	6	2.7	64	28.4	48	21.3	38	16.9	0	0.0
	SO	SH&SHGH	39	5	12.8	2	5.1	1	2.6	5	12.8	22	56.4	4	10.3	0	0.0
		SH	9	2	22.2	0	0.0	0	0.0	1	11.1	5	55.6	1	11.1	0	0.0
		SHGH	30	3	10.0	2	6.7	1	3.3	4	13.3	17	56.7	3	10.0	0	0.0
Breeding horses	HO	SH&SHGH	204	78	38.2	16	7.8	2	1.0	56	27.5	33	16.2	16	7.8	3	1.5
		SH	89	36	40.4	9	10.1	0	0.0	22	24.7	12	13.5	8	9.0	2	2.2
		SHGH	115	42	36.5	7	6.1	2	1.7	34	29.6	21	18.3	8	7.0	1	0.9
	SO	SH&SHGH	25	8	32.0	1	4.0	0	0.0	6	24.0	10	40.0	0	0.0	0	0.0
		SH	2	1	50.0	0	0.0	0	0.0	0	0.0	1	50.0	0	0.0	0	0.0
		SHGH	23	7	30.4	1	4.3	0	0.0	6	26.1	9	39.1	0	0.0	0	0.0
Horses for commercial use	HO	SH&SHGH	165	45	27.3	24	14.5	7	4.2	40	24.2	26	15.8	21	12.7	2	1.2
		SH	83	22	26.5	17	20.5	3	3.6	16	19.3	12	14.5	11	13.3	2	2.4
		SHGH	82	23	28.0	7	8.5	4	4.9	24	29.3	14	17.1	10	12.2	0	0.0
	SO	SH&SHGH	14	5	35.7	0	0.0	1	7.1	5	35.7	3	21.4	0	0.0	0	0.0
		SH	3	1	33.3	0	0.0	0	0.0	0	0.0	2	66.7	0	0.0	0	0.0
		SHGH	11	4	36.4	0	0.0	1	9.1	5	45.5	1	9.1	0	0.0	0	0.0
Working horses	HO	SH&SHGH	56	17	30.4	6	10.7	1	1.8	14	25.0	8	14.3	8	14.3	2	3.6
		SH	28	5	17.9	5	17.9	0	0.0	7	25.0	3	10.7	6	21.4	2	7.1
		SHGH	28	12	42.9	1	3.6	1	3.6	7	25.0	5	17.9	2	7.1	0	0.0
	SO	SH&SHGH	3	1	33.3	0	0.0	0	0.0	1	33.3	1	33.3	0	0.0	0	0.0
		SH	1	1	100.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
		SHGH	2	0	0.0	0	0.0	0	0.0	1	50.0	1	50.0	0	0.0	0	0.0

Continuation of Tab. 27

F28 Type of turn-out during the grazing season in SH				Pasture		Outdoor run		Paddock		Pasture + Outdoor run		Pasture + Paddock		Outdoor run + Paddock		No turn-out	
			TN	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Leisure horses	HO	SH&SHGH	674	156	23.1	66	9.8	12	1.8	212	31.5	148	22.0	80	11.9	0	0.0
		SH	340	77	22.6	37	10.9	7	2.1	98	28.8	77	22.6	44	12.9	0	0.0
		SHGH	334	79	23.7	29	8.7	5	1.5	114	34.1	71	21.3	36	10.8	0	0.0
	SO	SH&SHGH	49	10	20.4	3	6.1	1	2.0	9	18.4	22	44.9	4	8.2	0	0.0
		SH	12	3	25.0	0	0.0	0	0.0	1	8.3	7	58.3	1	8.3	0	0.0
		SHGH	37	7	18.9	3	8.1	1	2.7	8	21.6	15	40.5	3	8.1	0	0.0
Retired horses	HO	SH&SHGH	280	83	29.6	24	8.6	5	1.8	91	32.5	51	18.2	25	8.9	1	0.4
		SH	140	34	24.3	16	11.4	2	1.4	43	30.7	27	19.3	17	12.1	1	0.7
		SHGH	140	49	35.0	8	5.7	3	2.1	48	34.3	24	17.1	8	5.7	0	0.0
	SO	SH&SHGH	25	9	36.0	1	4.0	1	4.0	6	24.0	8	32.0	0	0.0	0	0.0
		SH	4	1	25.0	0	0.0	0	0.0	1	25.0	2	50.0	0	0.0	0	0.0
		SHGH	21	8	38.1	1	4.8	1	4.8	5	23.8	6	28.6	0	0.0	0	0.0
Horses unused	HO	SH&SHGH	220	72	32.7	22	10.0	2	0.9	64	29.1	34	15.5	24	10.9	2	0.9
		SH	114	32	28.1	14	12.3	0	0.0	31	27.2	19	16.7	16	14.0	2	1.8
		SHGH	106	40	37.7	8	7.5	2	1.9	33	31.1	15	14.2	8	7.5	0	0.0
	SO	SH&SHGH	15	5	33.3	1	6.7	0	0.0	4	26.7	5	33.3	0	0.0	0	0.0
		SH	3	1	33.3	0	0.0	0	0.0	1	33.3	1	33.3	0	0.0	0	0.0
		SHGH	12	4	33.3	1	8.3	0	0.0	3	25.0	4	33.3	0	0.0	0	0.0

Tab. 28: Answers (N) and percentage (%) of horse owners (HO) and stable owners (SO) with single housing (SH) or both housing systems (SHGH) for the type of turn-out during the winter time. SH&SHGH represents both groups together. TN = total answers for each category of horses and housing system. (matrix/tick-off)

F32 Type of turn-out during the winter time in SH			**Pasture**			**Outdoor run**		**Paddock**		**Pasture + Outdoor run**		**Pasture + Paddock**		**Outdoor run + Paddock**		**No turn-out**	
			TN	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Sport horses	HO	SH&SHGH	492	31	6.3	135	27.4	127	25.8	40	8.1	35	7.1	115	23.4	9	1.8
		SH	277	20	7.2	79	28.5	78	28.2	24	8.7	23	8.3	45	16.2	8	2.9
		SHGH	215	11	5.1	56	26.0	49	22.8	16	7.4	12	5.6	70	32.6	1	0.5
	SO	SH&SHGH	38	2	5.3	5	13.2	13	34.2	2	5.3	7	18.4	9	23.7	0	0.0
		SH	10	0	0.0	2	20.0	5	50.0	0	0.0	1	10.0	2	20.0	0	0.0
		SHGH	28	2	7.1	3	10.7	8	28.6	2	7.1	6	21.4	7	25.0	0	0.0
Breeding horses	HO	SH&SHGH	199	20	10.1	56	28.1	40	20.1	19	9.5	16	8.0	44	22.1	4	2.0
		SH	92	10	10.9	27	29.3	20	21.7	10	10.9	6	6.5	16	17.4	3	3.3
		SHGH	107	10	9.3	29	27.1	20	18.7	9	8.4	10	9.3	28	26.2	1	0.9
	SO	SH&SHGH	25	4	16.0	2	8.0	6	24.0	3	12.0	4	16.0	5	20.0	1	4.0
		SH	2	0	0.0	0	0.0	1	50.0	0	0.0	0	0.0	1	50.0	0	0.0
		SHGH	23	4	17.4	2	8.7	5	21.7	3	13.0	4	17.4	4	17.4	1	4.3
Horses for commercial use	HO	SH&SHGH	164	8	4.9	58	35.4	34	20.7	15	9.1	5	3.0	41	25.0	3	1.8
		SH	85	4	4.7	29	34.1	23	27.1	8	9.4	1	1.2	17	20.0	3	3.5
		SHGH	79	4	5.1	29	36.7	11	13.9	7	8.9	4	5.1	24	30.4	0	0.0
	SO	SH&SHGH	13	1	7.7	3	23.1	2	15.4	1	7.7	1	7.7	5	38.5	0	0.0
		SH	3	0	0.0	0	0.0	2	66.7	0	0.0	0	0.0	1	33.3	0	0.0
		SHGH	10	1	10.0	3	30.0	0	0.0	1	10.0	1	10.0	4	40.0	0	0.0
Working horses	HO	SH&SHGH	60	4	6.7	19	31.7	10	16.7	8	13.3	3	5.0	15	25.0	1	1.7
		SH	30	2	6.7	8	26.7	8	26.7	3	10.0	1	3.3	7	23.3	1	3.3
		SHGH	30	2	6.7	11	36.7	2	6.7	5	16.7	2	6.7	8	26.7	0	0.0
	SO	SH&SHGH	3	0	0.0	1	33.3	1	33.3	0	0.0	1	33.3	0	0.0	0	0.0
		SH	1	0	0.0	0	0.0	1	100.0	0	0.0	0	0.0	0	0.0	0	0.0
		SHGH	2	0	0.0	1	50.0	0	0.0	0	0.0	1	50.0	0	0.0	0	0.0

Continuation of Tab. 28

F32 Type of turn-out during the winter time in SH				Pasture		Outdoor run		Paddock		Pasture + Outdoor run		Pasture + Paddock		Outdoor run + Paddock		No turn-out	
			TN	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Leisure horses	HO	SH&SHGH	654	44	6.7	194	29.7	134	20.5	82	12.5	44	6.7	154	23.5	2	0.3
		SH	338	26	7.7	105	31.1	76	22.5	39	11.5	23	6.8	67	19.8	2	0.6
		SHGH	316	18	5.7	89	28.2	58	18.4	43	13.6	21	6.6	87	27.5	0	0.0
	SO	SH&SHGH	49	2	4.1	7	14.3	14	28.6	3	6.1	7	14.3	16	32.7	0	0.0
		SH	12	0	0.0	2	16.7	6	50.0	0	0.0	1	8.3	3	25.0	0	0.0
		SHGH	37	2	5.4	5	13.5	8	21.6	3	8.1	6	16.2	13	35.1	0	0.0
Retired horses	HO	SH&SHGH	269	20	7.4	84	31.2	56	20.8	27	10.0	21	7.8	61	22.7	0	0.0
		SH	138	10	7.2	41	29.7	35	25.4	10	7.2	11	8.0	31	22.5	0	0.0
		SHGH	131	10	7.6	43	32.8	21	16.0	17	13.0	10	7.6	30	22.9	0	0.0
	SO	SH&SHGH	24	2	8.3	6	25.0	6	25.0	2	8.3	2	8.3	6	25.0	0	0.0
		SH	4	0	0.0	1	25.0	2	50.0	0	0.0	0	0.0	1	25.0	0	0.0
		SHGH	20	2	10.0	5	25.0	4	20.0	2	10.0	2	10.0	5	25.0	0	0.0
Horses unused	HO	SH&SHGH	208	14	6.7	69	33.2	36	17.3	20	9.6	15	7.2	53	25.5	1	0.5
		SH	107	6	5.6	38	35.5	24	22.4	10	9.3	5	4.7	23	21.5	1	0.9
		SHGH	101	8	7.9	31	30.7	12	11.9	10	9.9	10	9.9	30	29.7	0	0.0
	SO	SH&SHGH	14	2	14.3	3	21.4	3	21.4	0	0.0	1	7.1	5	35.7	0	0.0
		SH	3	0	0.0	0	0.0	2	66.7	0	0.0	0	0.0	1	33.3	0	0.0
		SHGH	11	2	18.2	3	27.3	1	9.1	0	0.0	1	9.1	4	36.4	0	0.0

3. 7. 2. Frequency of access to pasture or outdoor run

During the **grazing season** (see Tab. 29), the majority of horse owners and stable owners with **group housing (or a combination of single and group housing)** offered all the categories of horses either daily or constantly access to pasture or outdoor run. A very small percentage of horse owners indicated that the horses never have access to pasture/outdoor run or that they did not know it. During **winter time** (see Tab. 30), horse owners and stable owners with group housing (or a combination of single and group housing) offered mostly daily or constantly access to pasture or outdoor run to all the categories of horses. However, the percentage of the ones who 'never' offered access to pasture or outdoor run was higher than during grazing season for both groups (horse and stable owner). Also here, a very small percentage of horse owners did not know if the horses have access to pasture/outdoor run or not. In general, horse and stable owners with group housing (or a combination) offered to all the categories of horses either daily or constantly access to pasture or outdoor run during winter and grazing season.

During the **grazing season** (see Tab. 31), horse owners and stable owners **with single housing (or a combination of single and group housing)** offered almost all the horse categories daily access to pasture or outdoor run, except for the breeding, retired and unused horses also constantly. During **winter time** (see Tab. 32), horse owners and stable owners with single housing (or a combination of single and group housing) offered all the categories daily access to pasture or outdoor run and somewhat fewer indicated four to six times per week. For all the horse categories (during winter time and grazing season) some horse owners did not know if the horses have access to pasture/outdoor run. The percentage of 'never' having access to pasture/outdoor run was higher during winter time than during the grazing season especially for horse owners, but also for stable owners. In a nutshell, horses in single housing had daily access to pasture/outdoor run during winter and grazing season. Comparing both housing systems and seasons, almost all of the horse and stable owners offered all the horse categories daily access to pasture or outdoor run.

Tab. 29: Answers (N) and percentage (%) of horse owners (HO) and stable owners (SO) with group housing (GH) or both housing systems (SHGH) for frequency of access to outdoor run or pasture during the grazing season. GH&SHGH represents both groups together. TN = total answers for each category of horses and housing system. (matrix/tick-off)

F21 Frequency of access to pasture during the grazing season in GH				**Never**		**1x/week or less frequently**		**2-3x/ week**		**4-6x/ week**		**Daily**		**Constantly**		**Do not know**	
			TN	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Sport horses	HO	GH&SHGH	462	6	1.3	2	0.4	4	0.9	29	6.3	321	69.5	99	21.4	1	0.2
		GH	222	2	0.9	0	0.0	3	1.4	11	5.0	139	62.6	67	30.2	0	0.0
		SHGH	240	4	1.7	2	0.8	1	0.4	18	7.5	182	75.8	32	13.3	1	0.4
	SO	GH&SHGH	54	0	0.0	0	0.0	2	3.7	5	9.3	36	66.7	11	20.4	0	0.0
		GH	22	0	0.0	0	0.0	1	4.5	2	9.1	13	59.1	6	27.3	0	0.0
		SHGH	32	0	0.0	0	0.0	1	3.1	3	9.4	23	71.9	5	15.6	0	0.0
Breeding horses	HO	GH&SHGH	288	3	1.0	0	0.0	4	1.4	10	3.5	154	53.5	115	39.9	2	0.7
		GH	155	1	0.6	0	0.0	3	1.9	7	4.5	67	43.2	75	48.4	2	1.3
		SHGH	133	2	1.5	0	0.0	1	0.8	3	2.3	87	65.4	40	30.1	0	0.0
	SO	GH&SHGH	47	0	0.0	0	0.0	0	0.0	1	2.1	23	48.9	23	48.9	0	0.0
		GH	18	0	0.0	0	0.0	0	0.0	1	5.6	6	33.3	11	61.1	0	0.0
		SHGH	29	0	0.0	0	0.0	0	0.0	0	0.0	17	58.6	12	41.4	0	0.0
Horses for commercial use	HO	GH&SHGH	209	1	0.5	3	1.4	6	2.9	15	7.2	134	64.1	48	23.0	2	1.0
		GH	116	1	0.9	1	0.9	4	3.4	11	9.5	64	55.2	33	28.4	2	1.7
		SHGH	93	0	0.0	2	2.2	2	2.2	4	4.3	70	75.3	15	16.1	0	0.0
	SO	GH&SHGH	23	0	0.0	0	0.0	1	4.3	3	13.0	14	60.9	5	21.7	0	0.0
		GH	12	0	0.0	0	0.0	1	8.3	1	8.3	6	50.0	4	33.3	0	0.0
		SHGH	11	0	0.0	0	0.0	0	0.0	2	18.2	8	72.7	1	9.1	0	0.0
Working horses	HO	GH&SHGH	85	1	1.2	0	0.0	2	2.4	3	3.5	48	56.5	31	36.5	0	0.0
		GH	46	1	2.2	0	0.0	1	2.2	2	4.3	23	50.0	19	41.3	0	0.0
		SHGH	39	0	0.0	0	0.0	1	2.6	1	2.6	25	64.1	12	30.8	0	0.0
	SO	GH&SHGH	8	0	0.0	0	0.0	0	0.0	0	0.0	6	75.0	2	25.0	0	0.0
		GH	5	0	0.0	0	0.0	0	0.0	0	0.0	3	60.0	2	40.0	0	0.0
		SHGH	3	0	0.0	0	0.0	0	0.0	0	0.0	3	100.0	0	0.0	0	0.0

Continuation of Tab. 29

F21 Frequency of access to pasture during the grazing season in GH				Never		1x/week or less frequently		2-3x/ week		4-6x/ week		Daily		Constantly		Do not know	
			TN	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Leisure horses	HO	GH&SHGH	1186	5	0.4	4	0.3	22	1.9	55	4.6	650	54.8	449	37.9	1	0.1
		GH	825	3	0.4	4	0.5	18	2.2	41	5.0	381	46.2	377	45.7	1	0.1
		SHGH	361	2	0.6	0	0.0	4	1.1	14	3.9	269	74.5	72	19.9	0	0.0
	SO	GH&SHGH	131	1	0.8	0	0.0	3	2.3	7	5.3	69	52.7	51	38.9	0	0.0
		GH	88	1	1.1	0	0.0	2	2.3	4	4.5	39	44.3	42	47.7	0	0.0
		SHGH	43	0	0.0	0	0.0	1	2.3	3	7.0	30	69.8	9	20.9	0	0.0
Retired horses	HO	GH&SHGH	482	5	1.0	1	0.2	6	1.2	16	3.3	259	53.7	194	40.2	1	0.2
		GH	304	5	1.6	1	0.3	6	2.0	11	3.6	135	44.4	145	47.7	1	0.3
		SHGH	178	0	0.0	0	0.0	0	0.0	5	2.8	124	69.7	49	27.5	0	0.0
	SO	GH&SHGH	66	0	0.0	0	0.0	1	1.5	1	1.5	39	59.1	25	37.9	0	0.0
		GH	43	0	0.0	0	0.0	1	2.3	1	2.3	24	55.8	17	39.5	0	0.0
		SHGH	23	0	0.0	0	0.0	0	0.0	0	0.0	15	65.2	8	34.8	0	0.0
Horses unused	HO	GH&SHGH	412	4	1.0	2	0.5	2	0.5	17	4.1	211	51.2	174	42.2	2	0.5
		GH	265	3	1.1	2	0.8	2	0.8	14	5.3	110	41.5	132	49.8	2	0.8
		SHGH	147	1	0.7	0	0.0	0	0.0	3	2.0	101	68.7	42	28.6	0	0.0
	SO	GH&SHGH	45	1	2.2	0	0.0	1	2.2	1	2.2	20	44.4	22	48.9	0	0.0
		GH	26	1	3.8	0	0.0	1	3.8	1	3.8	10	38.5	13	50.0	0	0.0
		SHGH	19	0	0.0	0	0.0	0	0.0	0	0.0	10	52.6	9	47.4	0	0.0

Tab. 30: Answers (N) and percentage (%) of horse owners (HO) and stable owners (SO) with group housing (GH) or both housing systems (SHGH) for frequency of access to outdoor run or pasture during the winter time. GH&SHGH represents both groups together. TN = total answers for each category of horses and housing system. (matrix/tick-off)

F24 Frequency of access to pasture during the winter time in GH				Never		1x/week or less frequently		2-3x/ week		4-6x/ week		Daily		Constantly		Do not know	
			TN	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Sport horses	HO	GH&SHGH	450	53	11.8	19	4.2	25	5.6	26	5.8	242	53.8	82	18.2	3	0.7
		GH	218	37	17.0	8	3.7	15	6.9	10	4.6	91	41.7	57	26.1	0	0.0
		SHGH	232	16	6.9	11	4.7	10	4.3	16	6.9	151	65.1	25	10.8	3	1.3
	SO	GH&SHGH	52	12	23.1	0	0.0	4	7.7	7	13.5	21	40.4	8	15.4	0	0.0
		GH	21	6	28.6	0	0.0	1	4.8	3	14.3	4	19.0	7	33.3	0	0.0
		SHGH	31	6	19.4	0	0.0	3	9.7	4	12.9	17	54.8	1	3.2	0	0.0
Breeding horses	HO	GH&SHGH	278	32	11.5	14	5.0	10	3.6	11	4.0	138	49.6	68	24.5	5	1.8
		GH	145	23	15.9	5	3.4	5	3.4	6	4.1	57	39.3	47	32.4	2	1.4
		SHGH	133	9	6.8	9	6.8	5	3.8	5	3.8	81	60.9	21	15.8	3	2.3
	SO	GH&SHGH	44	7	15.9	0	0.0	1	2.3	4	9.1	22	50.0	10	22.7	0	0.0
		GH	16	2	12.5	0	0.0	1	6.3	2	12.5	4	25.0	7	43.8	0	0.0
		SHGH	28	5	17.9	0	0.0	0	0.0	2	7.1	18	64.3	3	10.7	0	0.0
Horses for commercial use	HO	GH&SHGH	201	23	11.4	10	5.0	9	4.5	6	3.0	112	55.7	38	18.9	3	1.5
		GH	110	22	20.0	4	3.6	4	3.6	0	0.0	46	41.8	33	30.0	1	0.9
		SHGH	91	1	1.1	6	6.6	5	5.5	6	6.6	66	72.5	5	5.5	2	2.2
	SO	GH&SHGH	24	5	20.8	1	4.2	2	8.3	3	12.5	9	37.5	4	16.7	0	0.0
		GH	11	3	27.3	1	9.1	1	9.1	2	18.2	1	9.1	3	27.3	0	0.0
		SHGH	13	2	15.4	0	0.0	1	7.7	1	7.7	8	61.5	1	7.7	0	0.0
Working horses	HO	GH&SHGH	90	8	8.9	5	5.6	2	2.2	1	1.1	50	55.6	22	24.4	2	2.2
		GH	47	8	17.0	1	2.1	1	2.1	0	0.0	18	38.3	19	40.4	0	0.0
		SHGH	43	0	0.0	4	9.3	1	2.3	1	2.3	32	74.4	3	7.0	2	4.7
	SO	GH&SHGH	10	3	30.0	0	0.0	1	10.0	2	20.0	3	30.0	1	10.0	0	0.0
		GH	6	2	33.3	0	0.0	1	16.7	1	16.7	1	16.7	1	16.7	0	0.0
		SHGH	4	1	25.0	0	0.0	0	0.0	1	25.0	2	50.0	0	0.0	0	0.0

Continuation of Tab. 30

F24 Frequency of access to pasture during the winter time in GH				Never		1x/week or less frequently		2-3x/ week		4-6x/ week		Daily		Constantly		Do not know	
			TN	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Leisure horses	HO	GH&SHGH	1158	159	13.7	71	6.1	57	4.9	57	4.9	447	38.6	351	30.3	16	1.4
		GH	812	134	16.5	55	6.8	43	5.3	39	4.8	216	26.6	314	38.7	11	1.4
		SHGH	346	25	7.2	16	4.6	14	4.0	18	5.2	231	66.8	37	10.7	5	1.4
	SO	GH&SHGH	130	25	19.2	5	3.8	7	5.4	10	7.7	41	31.5	42	32.3	0	0.0
		GH	87	16	18.4	4	4.6	5	5.7	7	8.0	17	19.5	38	43.7	0	0.0
		SHGH	43	9	20.9	1	2.3	2	4.7	3	7.0	24	55.8	4	9.3	0	0.0
Retired horses	HO	GH&SHGH	471	53	11.3	29	6.2	14	3.0	14	3.0	211	44.8	146	31.0	4	0.8
		GH	294	44	15.0	21	7.1	9	3.1	9	3.1	91	31.0	118	40.1	2	0.7
		SHGH	177	9	5.1	8	4.5	5	2.8	5	2.8	120	67.8	28	15.8	2	1.1
	SO	GH&SHGH	66	11	16.7	2	3.0	1	1.5	2	3.0	28	42.4	22	33.3	0	0.0
		GH	41	7	17.1	1	2.4	1	2.4	0	0.0	12	29.3	20	48.8	0	0.0
		SHGH	25	4	16.0	1	4.0	0	0.0	2	8.0	16	64.0	2	8.0	0	0.0
Horses unused	HO	GH&SHGH	400	48	12.0	22	5.5	19	4.8	11	2.8	170	42.5	125	31.3	5	1.3
		GH	258	40	15.5	15	5.8	12	4.7	5	1.9	77	29.8	107	41.5	2	0.8
		SHGH	142	8	5.6	7	4.9	7	4.9	6	4.2	93	65.5	18	12.7	3	2.1
	SO	GH&SHGH	43	11	25.6	1	2.3	1	2.3	3	7.0	14	32.6	13	30.2	0	0.0
		GH	25	8	32.0	1	4.0	1	4.0	1	4.0	3	12.0	11	44.0	0	0.0
		SHGH	18	3	16.7	0	0.0	0	0.0	2	11.1	11	61.1	2	11.1	0	0.0

Tab. 31: Answers (N) and percentage (%) of horse owners (HO) and stable owners (SO) with single housing (SH) or both housing systems (SHGH) for frequency of access to outdoor run or pasture during the grazing season. SH&SHGH represents both groups together. TN = total answers for each category of horses and housing system. (matrix/tick-off)

F29 Frequency of access to pasture during the grazing season in SH			**Never**		**1x/week or less frequently**		**2-3x/ week**		**4-6x/ week**		**Daily**		**Constantly**		**Do not know**	
			TN	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Sport horses	HO	SH&SHGH	498	4	0.8	8	1.6	10	2.0	46	9.2	391	78.5	34	6.8	5	1.0
		SH	278	2	0.7	4	1.4	9	3.2	34	12.2	211	75.9	14	5.0	4	1.4
		SHGH	220	2	0.9	4	1.8	1	0.5	12	5.5	180	81.8	20	9.1	1	0.5
	SO	SH&SHGH	38	0	0.0	0	0.0	1	2.6	3	7.9	32	84.2	2	5.3	0	0.0
		SH	9	0	0.0	0	0.0	0	0.0	0	0.0	8	88.9	1	11.1	0	0.0
		SHGH	29	0	0.0	0	0.0	1	3.4	3	10.3	24	82.8	1	3.4	0	0.0
Breeding horses	HO	SH&SHGH	204	1	0.5	0	0.0	4	2.0	9	4.4	137	67.2	47	23.0	6	2.9
		SH	92	0	0.0	0	0.0	3	3.3	7	7.6	56	60.9	21	22.8	5	5.4
		SHGH	112	1	0.9	0	0.0	1	0.9	2	1.8	81	72.3	26	23.2	1	0.9
	SO	SH&SHGH	25	0	0.0	0	0.0	0	0.0	0	0.0	17	68.0	8	32.0	0	0.0
		SH	2	0	0.0	0	0.0	0	0.0	0	0.0	2	100.0	0	0.0	0	0.0
		SHGH	23	0	0.0	0	0.0	0	0.0	0	0.0	15	65.2	8	34.8	0	0.0
Horses for commercial use	HO	SH&SHGH	160	1	0.6	3	1.9	8	5.0	16	10.0	116	72.5	14	8.8	2	1.3
		SH	82	1	1.2	1	1.2	6	7.3	12	14.6	54	65.9	6	7.3	2	2.4
		SHGH	78	0	0.0	2	2.6	2	2.6	4	5.1	62	79.5	8	10.3	0	0.0
	SO	SH&SHGH	15	0	0.0	0	0.0	0	0.0	1	6.7	14	93.3	0	0.0	0	0.0
		SH	4	0	0.0	0	0.0	0	0.0	0	0.0	4	100.0	0	0.0	0	0.0
		SHGH	11	0	0.0	0	0.0	0	0.0	1	9.1	10	90.9	0	0.0	0	0.0
Working horses	HO	SH&SHGH	60	0	0.0	0	0.0	2	3.3	1	1.7	41	68.3	11	18.3	5	8.3
		SH	31	0	0.0	0	0.0	2	6.5	0	0.0	20	64.5	6	19.4	3	9.7
		SHGH	29	0	0.0	0	0.0	0	0.0	1	3.4	21	72.4	5	17.2	2	6.9
	SO	SH&SHGH	4	0	0.0	0	0.0	0	0.0	0	0.0	4	100.0	0	0.0	0	0.0
		SH	1	0	0.0	0	0.0	0	0.0	0	0.0	1	100.0	0	0.0	0	0.0
		SHGH	3	0	0.0	0	0.0	0	0.0	0	0.0	3	100.0	0	0.0	0	0.0

Continuation of Tab. 31

F29 Frequency of access to pasture during the grazing season in SH				Never		1x/week or less frequently		2-3x/ week		4-6x/ week		Daily		Constantly		Do not know	
			TN	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Leisure horses	HO	SH&SHGH	660	2	0.3	1	0.2	8	1.2	42	6.4	533	80.8	72	10.9	2	0.3
		SH	337	1	0.3	0	0.0	4	1.2	28	8.3	284	84.3	20	5.9	0	0.0
		SHGH	323	1	0.3	1	0.3	4	1.2	14	4.3	249	77.1	52	16.1	2	0.6
	SO	SH&SHGH	48	0	0.0	0	0.0	1	2.1	3	6.3	40	83.3	4	8.3	0	0.0
		SH	11	0	0.0	0	0.0	0	0.0	0	0.0	10	90.9	1	9.1	0	0.0
		SHGH	37	0	0.0	0	0.0	1	2.7	3	8.1	30	81.1	3	8.1	0	0.0
Retired horses	HO	SH&SHGH	279	0	0.0	0	0.0	2	0.7	11	3.9	212	76.0	51	18.3	3	1.1
		SH	138	0	0.0	0	0.0	2	1.4	9	6.5	109	79.0	15	10.9	3	2.2
		SHGH	141	0	0.0	0	0.0	0	0.0	2	1.4	103	73.0	36	25.5	0	0.0
	SO	SH&SHGH	25	0	0.0	0	0.0	0	0.0	1	4.0	18	72.0	6	24.0	0	0.0
		SH	4	0	0.0	0	0.0	0	0.0	0	0.0	3	75.0	1	25.0	0	0.0
		SHGH	21	0	0.0	0	0.0	0	0.0	1	4.8	15	71.4	5	23.8	0	0.0
Horses unused	HO	SH&SHGH	216	1	0.5	1	0.5	3	1.4	11	5.1	154	71.3	41	19.0	5	2.3
		SH	107	1	0.9	0	0.0	3	2.8	7	6.5	78	72.9	14	13.1	4	3.7
		SHGH	109	0	0.0	1	0.9	0	0.0	4	3.7	76	69.7	27	24.8	1	0.9
	SO	SH&SHGH	15	0	0.0	0	0.0	0	0.0	0	0.0	11	73.3	4	26.7	0	0.0
		SH	3	0	0.0	0	0.0	0	0.0	0	0.0	2	66.7	1	33.3	0	0.0
		SHGH	12	0	0.0	0	0.0	0	0.0	0	0.0	9	75.0	3	25.0	0	0.0

Tab. 32: Answers (N) and percentage (%) of horse owners (HO) and stable owners (SO) with single housing (SH) or both housing systems (SHGH) for frequency of access to outdoor run or pasture during the winter time. SH&SHGH represents both groups together. TN = total answers for each category of horses and housing system. (matrix/tick-off)

F33 Frequency of access to pasture during the winter time in SH				Never		1x/week or less frequently		2-3x/ week		4-6x/ week		Daily		Constantly		Do not know	
			TN	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Sport horses	HO	SH&SHGH	487	43	8.8	27	5.5	39	8.0	51	10.5	300	61.6	20	4.1	7	1.4
		SH	274	25	9.1	19	6.9	32	11.7	35	12.8	149	54.4	9	3.3	5	1.8
		SHGH	213	18	8.5	8	3.8	7	3.3	16	7.5	151	70.9	11	5.2	2	0.9
	SO	SH&SHGH	38	6	15.8	1	2.6	3	7.9	4	10.5	24	63.2	0	0.0	0	0.0
		SH	9	1	11.1	1	11.1	0	0.0	0	0.0	7	77.8	0	0.0	0	0.0
		SHGH	29	5	17.2	0	0.0	3	10.3	4	13.8	17	58.6	0	0.0	0	0.0
Breeding horses	HO	SH&SHGH	196	17	8.7	8	4.1	10	5.1	18	9.2	122	62.2	15	7.7	6	3.1
		SH	91	6	6.6	2	2.2	7	7.7	13	14.3	54	59.3	5	5.5	4	4.4
		SHGH	105	11	10.5	6	5.7	3	2.9	5	4.8	68	64.8	10	9.5	2	1.9
	SO	SH&SHGH	25	4	16.0	0	0.0	0	0.0	3	12.0	16	64.0	2	8.0	0	0.0
		SH	2	0	0.0	0	0.0	0	0.0	0	0.0	2	100.0	0	0.0	0	0.0
		SHGH	23	4	17.4	0	0.0	0	0.0	3	13.0	14	60.9	2	8.7	0	0.0
Horses for commercial use	HO	SH&SHGH	162	16	9.9	10	6.2	10	6.2	21	13.0	102	63.0	1	0.6	2	1.2
		SH	81	9	11.1	4	4.9	6	7.4	15	18.5	45	55.6	0	0.0	2	2.5
		SHGH	81	7	8.6	6	7.4	4	4.9	6	7.4	57	70.4	1	1.2	0	0.0
	SO	SH&SHGH	13	1	7.7	0	0.0	1	7.7	1	7.7	10	76.9	0	0.0	0	0.0
		SH	3	1	33.3	0	0.0	0	0.0	0	0.0	2	66.7	0	0.0	0	0.0
		SHGH	10	0	0.0	0	0.0	1	10.0	1	10.0	8	80.0	0	0.0	0	0.0
Working horses	HO	SH&SHGH	58	3	5.2	2	3.4	3	5.2	5	8.6	38	65.5	2	3.4	5	8.6
		SH	29	1	3.4	1	3.4	2	6.9	4	13.8	17	58.6	0	0.0	4	13.8
		SHGH	29	2	6.9	1	3.4	1	3.4	1	3.4	21	72.4	2	6.9	1	3.4
	SO	SH&SHGH	3	0	0.0	0	0.0	0	0.0	1	33.3	2	66.7	0	0.0	0	0.0
		SH	1	0	0.0	0	0.0	0	0.0	0	0.0	1	100.0	0	0.0	0	0.0
		SHGH	2	0	0.0	0	0.0	0	0.0	1	50.0	1	50.0	0	0.0	0	0.0

Continuation of Tab. 32

F33 Frequency of access to pasture during the winter time in SH			Never			1x/week or less frequently		2-3x/ week		4-6x/ week		Daily		Constantly		Do not know	
			TN	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Leisure horses	HO	SH&SHGH	645	49	7.6	21	3.3	33	5.1	72	11.2	439	68.1	28	4.3	3	0.5
		SH	332	23	6.9	9	2.7	18	5.4	51	15.4	224	67.5	7	2.1	0	0.0
		SHGH	313	26	8.3	12	3.8	15	4.8	21	6.7	215	68.7	21	6.7	3	1.0
	SO	SH&SHGH	49	8	16.3	1	2.0	3	6.1	5	10.2	31	63.3	1	2.0	0	0.0
		SH	12	2	16.7	1	8.3	0	0.0	0	0.0	9	75.0	0	0.0	0	0.0
		SHGH	37	6	16.2	0	0.0	3	8.1	5	13.5	22	59.5	1	2.7	0	0.0
Retired horses	HO	SH&SHGH	270	20	7.4	7	2.6	14	5.2	26	9.6	179	66.3	22	8.1	2	0.7
		SH	139	8	5.8	4	2.9	9	6.5	21	15.1	87	62.6	8	5.8	2	1.4
		SHGH	131	12	9.2	3	2.3	5	3.8	5	3.8	92	70.2	14	10.7	0	0.0
	SO	SH&SHGH	24	2	8.3	1	4.2	1	4.2	2	8.3	17	70.8	1	4.2	0	0.0
		SH	4	0	0.0	0	0.0	0	0.0	0	0.0	4	100.0	0	0.0	0	0.0
		SHGH	20	2	10.0	1	5.0	1	5.0	2	10.0	13	65.0	1	5.0	0	0.0
Horses unused	HO	SH&SHGH	210	14	6.7	8	3.8	12	5.7	20	9.5	140	66.7	11	5.2	5	2.4
		SH	108	6	5.6	5	4.6	7	6.5	16	14.8	66	61.1	5	4.6	3	2.8
		SHGH	102	8	7.8	3	2.9	5	4.9	4	3.9	74	72.5	6	5.9	2	2.0
	SO	SH&SHGH	14	1	7.1	1	7.1	0	0.0	3	21.4	8	57.1	1	7.1	0	0.0
		SH	3	0	0.0	1	33.3	0	0.0	0	0.0	2	66.7	0	0.0	0	0.0
		SHGH	11	1	9.1	0	0.0	0	0.0	3	27.3	6	54.5	1	9.1	0	0.0

3. 7. 3. Duration of access to pasture or outdoor run

During the **grazing season** (see Tab. 33), horse owners **with group housing (or a combination of single and group housing)** offered the horses about nine to fifteen hours of access to a pasture or outdoor run with the most hours offered to unused horses and the least to working horses. Stable owners offered the horses about eleven to eighteen hours of access with the highest number of hours offered to breeding horses and the lowest to sport horses. During **winter time** (see Tab. 34), horse owners offered about seven to twelve hours of access with the least hours to working horses and the most to leisure, retired and unused horses. Stable owners offered nine to fourteen hours with the most hours to retired horses and the least to sport horses. Comparing both seasons, horse owners offered on average one to three hours less access during winter than during grazing season with the biggest difference for breeding and unused horses. Stable owners offered on average two to five hours less in winter than in grazing season with the biggest difference for breeding, working and unused horses.

During **grazing season** (see Tab. 35), horse owners **with single housing (or a combination of single and group housing)** offered the horses about seven to eleven hours of access to a pasture or outdoor run with the most hours offered to breeding and unused horses, and the least to working and sport horses. Stable owners offered the horses about seven to sixteen hours with the highest number of hours to breeding and the lowest to sport horses. During **winter time** (see Tab. 36), horse owners offered the horses five to seven hours of access with the most to retired horses and the least hours to sport horses. Stable owners offered six to eight hours of access with the most hours to retired and the least to sport horses. Comparing both seasons, horse owners offered on average two to five hours less access during winter time than during grazing season with the biggest difference for breeding and unused horses. Stable owners offered on average one to eight hours less in winter than in grazing season with the biggest difference for breeding horses.

Tab. 33: Descriptive statistics of horse owners (HO) and stable owners (SO) with group housing (GH) or both housing systems (SHGH) for the duration of having access to pasture or outdoor run during grazing season in hours/day. GH&SHGH represents both groups together. (matrix-numbers/Dropdown 0-24)

F22 Duration pasture during grazing season for GH in hours/day			N	Mean	SD	Min	Q25	Median	Q75	Max
Sport horses	HO	GH&SHGH	483	10.8	7.95	0	5.0	8.0	14.0	24
		GH	241	11.7	8.68	0	5.0	10.0	24.0	24
		SHGH	242	9.8	7.03	0	5.0	8.0	12.0	24
	SO	GH&SHGH	56	11.1	7.83	0	5.0	8.0	17.5	24
		GH	24	13.5	8.86	0	5.3	13.5	24.0	24
		SHGH	32	9.3	6.53	1	5.0	8.0	12.0	24
Breeding horses	HO	GH&SHGH	297	14.3	8.98	0	7.0	12.0	24.0	24
		GH	161	14.8	9.56	0	6.0	12.0	24.0	24
		SHGH	136	13.7	8.24	0	7.0	12.0	24.0	24
	SO	GH&SHGH	46	18.0	7.91	2	12.0	24.0	24.0	24
		GH	18	20.0	6.96	2	12.0	24.0	24.0	24
		SHGH	28	16.8	8.34	2	8.5	24.0	24.0	24
Horses for commercial use	HO	GH&SHGH	227	10.3	8.14	0	4.0	8.0	12.0	24
		GH	130	10.6	8.84	0	3.0	8.0	23.3	24
		SHGH	97	9.8	7.12	0	5.0	8.0	12.0	24
	SO	GH&SHGH	23	13.3	8.82	2	5.0	12.0	24.0	24
		GH	13	14.5	9.86	2	5.0	18.0	24.0	24
		SHGH	10	11.6	7.41	2	5.5	11.0	15.0	24
Working horses	HO	GH&SHGH	115	9.4	9.18	0	0.0	7.0	16.0	24
		GH	66	8.5	9.44	0	0.0	5.0	14.5	24
		SHGH	49	10.6	8.77	0	4.0	8.0	21.0	24
	SO	GH&SHGH	7	17.0	7.33	7	10.0	18.0	24.0	24
		GH	4	22.5	3.00	18	19.5	24.0	24.0	24
		SHGH	3	9.7	2.52	7	7.0	10.0	-	12
Leisure horses	HO	GH&SHGH	1176	14.6	8.45	0	7.0	12.0	24.0	24
		GH	821	15.6	8.68	0	7.0	16.0	24.0	24
		SHGH	355	12.2	7.36	0	6.0	10.0	20.0	24
	SO	GH&SHGH	132	15.6	8.72	0	7.3	17.0	24.0	24
		GH	89	17.0	8.65	0	8.0	24.0	24.0	24
		SHGH	43	12.7	8.25	1	6.0	12.0	24.0	24
Retired horses	HO	GH&SHGH	481	14.7	8.68	0	7.0	12.0	24.0	24
		GH	305	15.5	9.04	0	7.0	20.0	24.0	24
		SHGH	176	13.4	7.87	0	7.0	11.0	24.0	24
	SO	GH&SHGH	67	16.8	7.98	0	10.0	21.0	24.0	24
		GH	43	17.4	7.86	2	12.0	23.0	24.0	24
		SHGH	24	15.8	8.24	0	8.5	12.0	24.0	24
Horses unused	HO	GH&SHGH	412	15.3	8.81	0	8.0	12.0	24.0	24
		GH	266	15.9	9.13	0	7.0	24.0	24.0	24
		SHGH	146	14.1	8.10	0	8.0	12.0	24.0	24
	SO	GH&SHGH	47	17.4	8.86	0	10.0	24.0	24.0	24
		GH	27	17.6	8.97	0	10.0	24.0	24.0	24
		SHGH	20	17.2	8.93	0	8.5	24.0	24.0	24

Tab. 34: Descriptive statistics of horse owners (HO) and stable owners (SO) with group housing (GH) or both housing systems (SHGH) for the duration of having access to pasture or outdoor run during winter time in hours/day. GH&SHGH represents both groups together. (matrix-numbers/Dropdown 0-24)

F25 Duration pasture during winter time for GH in hours/day			N	Mean	SD	Min	Q25	Median	Q75	Max
Sport horses	HO	GH&SHGH	442	9.0	8.08	0	3.0	7.0	12.0	24
		GH	220	10.3	9.29	0	2.0	8.0	24.0	24
		SHGH	222	7.7	6.44	0	4.0	6.0	10.0	24
	SO	GH&SHGH	45	9.4	8.37	0	3.0	7.0	12.0	24
		GH	19	13.4	10.19	0	3.0	12.0	24.0	24
		SHGH	26	6.5	5.26	0	3.5	5.5	10.0	24
Breeding horses	HO	GH&SHGH	277	11.0	9.00	0	4.0	8.0	24.0	24
		GH	149	12.7	10.15	0	2.0	10.0	24.0	24
		SHGH	128	9.0	6.96	0	4.0	8.0	12.0	24
	SO	GH&SHGH	39	13.6	9.36	0	6.0	12.0	24.0	24
		GH	16	17.1	9.57	0	7.8	24.0	24.0	24
		SHGH	23	11.1	8.56	0	6.0	8.0	24.0	24
Horses for commercial use	HO	GH&SHGH	209	9.0	8.58	0	2.0	6.0	12.0	24
		GH	117	10.0	9.93	0	0.0	6.0	24.0	24
		SHGH	92	7.8	6.33	0	3.3	6.5	10.0	24
	SO	GH&SHGH	21	9.7	8.93	0	2.5	6.0	18.0	24
		GH	10	12.1	10.74	0	2.5	9.0	24.0	24
		SHGH	11	7.5	6.65	0	2.0	6.0	10.0	24
Working horses	HO	GH&SHGH	103	7.7	8.49	0	0.0	5.0	12.0	24
		GH	59	7.6	9.55	0	0.0	4.0	12.0	24
		SHGH	44	7.8	6.91	0	1.5	8.0	12.0	24
	SO	GH&SHGH	5	12.4	6.69	8	8.0	10.0	18.0	24
		GH	3	14.7	8.33	8	8.0	12.0	-	24
		SHGH	2	9.0	1.41	8	8.0	9.0	-	10
Leisure horses	HO	GH&SHGH	1092	12.1	9.34	0	4.0	10.0	24.0	24
		GH	761	13.4	10.01	0	4.0	12.0	24.0	24
		SHGH	331	9.0	6.65	0	5.0	8.0	11.0	24
	SO	GH&SHGH	116	12.6	9.68	0	3.0	12.0	24.0	24
		GH	79	14.7	10.11	0	3.0	24.0	24.0	24
		SHGH	37	8.2	6.97	0	3.0	6.0	12.0	24
Retired horses	HO	GH&SHGH	455	12.1	9.13	0	5.0	10.0	24.0	24
		GH	285	13.3	9.93	0	4.0	12.0	24.0	24
		SHGH	170	10.1	7.22	0	6.0	8.0	12.0	24
	SO	GH&SHGH	57	14.6	9.38	0	6.0	12.0	24.0	24
		GH	37	16.3	9.67	0	7.0	24.0	24.0	24
		SHGH	20	11.5	8.15	0	6.0	9.0	21.0	24
Horses unused	HO	GH&SHGH	383	12.4	9.39	0	4.0	10.0	24.0	24
		GH	247	14.1	10.08	0	4.0	12.0	24.0	24
		SHGH	136	9.4	7.10	0	4.3	8.0	11.0	24
	SO	GH&SHGH	37	12.5	10.36	0	1.5	10.0	24.0	24
		GH	21	14.5	11.43	0	0.5	24.0	24.0	24
		SHGH	16	9.8	8.39	0	3.0	7.5	15.0	24

Tab. 35: Descriptive statistics of horse owners (HO) and stable owners (SO) with single housing (SH) or both housing systems (SHGH) for the duration of having access to pasture or outdoor run during grazing season in hours/day. SH&SHGH represents both groups together. (matrix-numbers/Dropdown 0-24)

F30 Duration pasture during grazing season for SH in hours/day			N	Mean	SD	Min	Q25	Median	Q75	Max
Sport horses	HO	SH&SHGH	501	7.3	5.41	0	4.0	6.0	10.0	24
		SH	286	6.0	4.27	0	3.0	5.0	8.0	24
		SHGH	215	9.0	6.24	0	5.0	8.0	12.0	24
	SO	SH&SHGH	37	7.5	4.37	1	4.0	7.0	10.0	24
		SH	8	7.1	2.85	2	5.3	7.5	9.5	11
		SHGH	29	7.6	4.74	1	4.0	7.0	11.0	24
Breeding horses	HO	SH&SHGH	210	11.4	7.91	0	6.0	9.0	17.0	24
		SH	95	9.4	7.32	0	5.0	8.0	12.0	24
		SHGH	115	13.1	8.00	0	6.0	10.0	24.0	24
	SO	SH&SHGH	24	16.0	8.55	2	8.0	18.5	24.0	24
		SH	2	16.0	11.31	8	8.0	16.0	-	24
		SHGH	22	16.0	8.60	2	8.0	18.5	24.0	24
Horses for commercial use	HO	SH&SHGH	170	8.0	6.66	0	4.0	6.0	10.0	24
		SH	86	6.3	5.85	0	3.0	5.0	8.0	24
		SHGH	84	9.8	7.02	0	5.0	8.0	12.0	24
	SO	SH&SHGH	15	10.8	7.52	2	5.0	8.0	12.0	24
		SH	3	6.3	2.89	3	3.0	8.0	-	8
		SHGH	12	11.9	7.98	2	5.3	11.0	21.0	24
Working horses	HO	SH&SHGH	69	7.2	7.46	0	0.0	6.0	10.0	24
		SH	37	4.6	5.15	0	0.0	4.0	7.5	24
		SHGH	32	10.3	8.58	0	5.3	8.0	17.3	24
	SO	SH&SHGH	3	8.3	3.51	5	5.0	8.0	-	12
		SH	1	8.0	-	8	8.0	8.0	8.0	8
		SHGH	2	8.5	4.95	5	5.0	8.5	-	12
Leisure horses	HO	SH&SHGH	654	9.5	6.08	0	5.0	8.0	12.0	24
		SH	339	7.7	4.71	0	4.0	7.0	10.0	24
		SHGH	315	11.4	6.78	1	6.0	10.0	14.0	24
	SO	SH&SHGH	49	10.6	6.90	1	6.5	8.0	12.0	24
		SH	12	8.2	3.07	2	7.3	8.0	10.8	12
		SHGH	37	11.4	7.62	1	6.0	10.0	15.5	24
Retired horses	HO	SH&SHGH	276	10.4	7.00	0	6.0	8.0	12.0	24
		SH	141	8.8	5.94	0	5.0	8.0	10.5	24
		SHGH	135	12.1	7.63	0	6.0	10.0	24.0	24
	SO	SH&SHGH	26	13.5	7.71	0	8.0	12.0	24.0	24
		SH	4	9.5	1.91	8	8.0	9.0	11.5	12
		SHGH	22	14.2	8.17	0	7.8	12.0	24.0	24
Horses unused	HO	SH&SHGH	217	11.3	7.45	0	6.0	10.0	13.5	24
		SH	111	9.3	6.38	0	5.0	8.0	12.0	24
		SHGH	106	13.3	7.97	0	7.0	10.0	24.0	24
	SO	SH&SHGH	16	15.1	8.67	0	8.0	12.0	24.0	24
		SH	3	14.7	8.33	8	8.0	12.0	-	24
		SHGH	13	15.2	9.07	0	7.5	12.0	24.0	24

Tab. 36: Descriptive statistics of horse owners (HO) and stable owners (SO) with single housing (SH) or both housing systems (SHGH) for the duration of having access to pasture or outdoor run during winter time in hours/day. SH&SHGH represents both groups together. (matrix-numbers/Dropdown 0-24)

F34 Duration pasture during winter time for SH in hours/day			N	Mean	SD	Min	Q25	Median	Q75	Max
Sport horses	HO	SH&SHGH	468	5.1	4.16	0	2.0	4.0	7.0	24
		SH	266	4.3	3.81	0	2.0	4.0	6.0	24
		SHGH	202	6.1	4.37	0	3.0	6.0	8.0	24
	SO	SH&SHGH	32	6.9	6.31	0	2.0	5.5	9.5	24
		SH	7	8.4	7.21	2	4.0	7.0	8.0	24
		SHGH	25	6.4	6.12	0	1.5	4.0	10.0	24
Breeding horses	HO	SH&SHGH	200	6.5	5.50	0	3.0	6.0	9.0	24
		SH	94	5.2	4.72	0	2.8	4.0	7.0	24
		SHGH	106	7.7	5.90	0	3.8	7.5	10.0	24
	SO	SH&SHGH	23	8.2	7.20	0	4.0	7.0	10.0	24
		SH	2	6.0	0.00	6	6.0	6.0	6.0	6
		SHGH	21	8.4	7.51	0	3.0	7.0	11.0	24
Horses for commercial use	HO	SH&SHGH	161	5.5	5.06	0	2.0	5.0	8.0	24
		SH	79	4.6	5.00	0	1.0	4.0	6.0	24
		SHGH	82	6.3	5.00	0	3.0	6.0	8.0	24
	SO	SH&SHGH	12	7.8	6.00	2	4.0	6.0	10.0	24
		SH	2	6.0	0.00	6	6.0	6.0	6.0	6
		SHGH	10	8.1	6.57	2	3.5	6.5	10.5	24
Working horses	HO	SH&SHGH	71	4.6	5.44	0	0.0	3.0	8.0	24
		SH	39	2.9	3.79	0	0.0	1.0	6.0	13
		SHGH	32	6.6	6.45	0	0.0	6.0	10.0	24
	SO	SH&SHGH	3	8.0	2.00	6	6.0	8.0	-	10
		SH	1	6.0	-	6	6.0	6.0	6.0	6
		SHGH	2	9.0	1.41	8	8.0	9.0	-	10
Leisure horses	HO	SH&SHGH	622	6.6	4.81	0	3.0	6.0	8.0	24
		SH	320	5.6	3.99	0	3.0	5.0	8.0	24
		SHGH	302	7.6	5.37	0	4.0	7.0	10.0	24
	SO	SH&SHGH	44	7.3	5.35	0	4.0	7.0	10.0	24
		SH	10	8.5	5.99	2	5.5	7.5	10.0	24
		SHGH	34	6.9	5.19	0	2.0	6.5	10.5	24
Retired horses	HO	SH&SHGH	261	7.0	5.91	0	3.0	6.0	9.0	24
		SH	135	6.2	5.36	0	2.0	5.0	8.0	24
		SHGH	126	7.9	6.34	0	4.0	8.0	10.0	24
	SO	SH&SHGH	23	8.5	6.07	0	5.0	8.0	12.0	24
		SH	4	8.0	1.63	6	6.5	8.0	9.5	10
		SHGH	19	8.6	6.67	0	4.0	8.0	12.0	24
Horses unused	HO	SH&SHGH	214	6.7	5.21	0	3.8	6.0	8.3	24
		SH	114	6.2	5.17	0	2.8	6.0	8.0	24
		SHGH	100	7.3	5.22	0	4.0	7.0	10.0	24
	SO	SH&SHGH	13	8.0	6.12	0	3.5	7.0	11.0	24
		SH	3	6.0	4.00	2	2.0	6.0	-	10
		SHGH	10	8.6	6.69	0	4.3	7.5	12.0	24

Moreover, the horse owners and stable owners with single housing (or the combined housing system) who answered that the horses were at least sometimes in a turn-out area were asked about the companionship in the turn-out area (if the horses were there alone or with other horses/animals) during the winter and grazing season. In most cases, horses where given access to the turn-out area with at least one other horse both during the grazing season and during winter time (Tab. 37). One stable owner (during winter time) and eleven (during grazing season)/nine (during winter) horse owners indicated that the horses had contact in the turn-out area only with other animals but not to other horses (Tab. 37).

Tab. 37: The number (N) and percentage (%) of horse owners (HO) and stable owners (SO) with single housing (SH) and both housing systems (SHGH) where the horses, which were at least sometimes in a turn-out area, were alone or with other horses/animals in this area during the grazing season and during winter time. SH&SHGH represents both groups together. (single-choice questions)

Turn-out alone or in group in SH								
				HO			**SO**	
F31During the grazing season	**F27Turn-out in SH**		**TN**	**N**	**%**	**TN**	**N**	**%**
Alone	Turn-out = YES	SH&SHGH	842	142	16.9	60	8	13.3
		SH	452	94	20.8	13	2	15.4
		SHGH	390	48	12.3	47	6	12.8
With at least one other horse	Turn-out = YES	SH&SHGH	842	689	81.8	60	51	85.0
		SH	452	355	78.5	13	11	84.6
		SHGH	390	334	85.6	47	40	85.1
With other animals (mules, donkeys, goats, ...) without another horse	Turn-out = YES	SH&SHGH	842	11	1.3	60	1	1.7
		SH	452	3	0.7	13	0	0.0
		SHGH	390	8	2.1	47	1	2.1
				HO			**SO**	
F35During winter time			**TN**	**N**	**%**	**TN**	**N**	**%**
Alone	Turn-out = YES	SH&SHGH	824	160	19.4	56	7	12.5
		SH	444	108	24.3	13	3	23.1
		SHGH	380	52	13.7	43	4	9.3
With at least one other horse	Turn-out = YES	SH&SHGH	824	655	79.5	56	49	87.5
		SH	444	333	75.0	13	10	76.9
		SHGH	380	322	84.7	43	39	90.7
With other animals (mules, donkeys, goats, ...) without another horse	Turn-out = YES	SH&SHGH	824	9	1.1	56	0	0.0
		SH	444	3	0.7	13	0	0.0
		SHGH	380	6	1.6	43	0	0.0

3. 8. Duration and type of locomotion

Horse owners were asked about the duration and type of controlled locomotion, i.e. controlled by human during riding, leading etc. or in a horse walker in regards of the different categories of horses. Horse owners with only group housing or the combination (Tab. 38) offered horses in all categories more locomotion through a human than a horse walker with the highest duration (in minutes per day) in horses for commercial use (GH: mean±SD, 72.7±59.80; SHGH: mean±SD, 82.7±47.19) and the lowest in unused horses (GH: mean±SD, 11.7±29.66; SHGH: mean±SD, 14.4±51.05). The same was discovered for horse owners with only single housing or the combination (Tab. 39) with a mean duration of 85.1 minutes per day for SH and of 83.9 minutes per day for SHGH for commercially used horses and a mean of 18.4 minutes per day for SH and of 16.0 minutes per day for SHGH for unused horses. Overall, horses housed in single housing had more locomotion either through a human or through a walker than those housed in group housing.

3. 9. Social contact possibilities in single boxes

The horse and stable owners with single housing or with the combination of both systems were asked about the possibilities for physical or visual contact to other horses for the different categories of horses during the time the horses were housed in the single boxes. The results revealed that almost all of the single boxes of horse and stable owners allowed either for tickling and biting contact or/and sniffing contact to other horses (see Tab. 40 for detailed explanation). Very few (more horse owners than stable owners) responses were given for only visual contact with other horses and no responses for no visual contact. A handful of responses were given for ‘no other horses’ and ‘no other horses, but contact to other animals’ by horse owners.

Tab. 38: Duration of locomotion in minutes per day through a human and through a horse walker for different categories of horses in group housing by horse owners with group housing (GH) and both housing systems (SHGH). GH&SHGH represents both groups together. SD = standard deviation. The highest and the lowest duration is in bold. (matrix-numbers/Dropdown 0-480 in steps of 30 min)

F26 Duration of locomotion in minutes/day through human and walker in GH for HO			**N**	**Mean**	**SD**	**Min**	**Q25**	**Median**	**Q75**	**Max**
Sport horses	Locomotion	GH&SHGH	450	61.3	29.40	0	60.0	60.0	60.0	240
	through	GH	219	61.0	32.43	0	60.0	60.0	60.0	240
	human	SHGH	231	61.7	26.26	0	60.0	60.0	60.0	180
	Locomotion	GH&SHGH	246	14.3	25.24	0	0.0	0.0	30.0	180
	through	GH	117	7.7	21.27	0	0.0	0.0	0.0	180
	walker	SHGH	129	20.2	27.08	0	0.0	0.0	30.0	90
Breeding horses	Locomotion	GH&SHGH	218	23.5	26.46	0	0.0	30.0	30.0	150
	through	GH	113	23.4	24.95	0	0.0	30.0	30.0	90
	human	SHGH	105	23.7	28.12	0	0.0	30.0	45.0	150
	Locomotion	GH&SHGH	134	5.6	14.79	0	0.0	0.0	0.0	60
	through	GH	68	2.6	11.28	0	0.0	0.0	0.0	60
	walker	SHGH	66	8.6	17.27	0	0.0	0.0	0.0	60
Horses for	Locomotion	GH&SHGH	202	77.2	54.58	0	60.0	60.0	120.0	360
commercial use	through	GH	111	**72.7**	**59.80**	0	30.0	60.0	90.0	360
	human	SHGH	91	**82.7**	**47.19**	0	60.0	90.0	120.0	210
	Locomotion	GH&SHGH	118	3.3	12.27	0	0.0	0.0	0.0	60
	through	GH	69	0.4	3.61	0	0.0	0.0	0.0	30
	walker	SHGH	49	7.3	17.89	0	0.0	0.0	0.0	60
Working horses	Locomotion	GH&SHGH	80	44.6	66.14	0	0.0	15.0	60.0	360
	through	GH	45	38.0	70.76	0	0.0	0.0	60.0	360
	human	SHGH	35	53.1	59.60	0	0.0	60.0	90.0	240
	Locomotion	GH&SHGH	61	2.5	12.60	0	0.0	0.0	0.0	90
	through	GH	37	0.8	4.93	0	0.0	0.0	60.0	30
	walker	SHGH	24	5.0	19.11	0	0.0	0.0	0.0	90
Leisure horses	Locomotion	GH&SHGH	1161	55.7	36.63	0	30.0	60.0	60.0	480
	through	GH	809	54.3	33.02	0	30.0	60.0	60.0	30
	human	SHGH	352	58.9	43.69	0	30.0	60.0	60.0	480
	Locomotion	GH&SHGH	543	4.8	15.91	0	0.0	0.0	0.0	180
	through	GH	380	2.5	13.37	0	0.0	0.0	0.0	180
	walker	SHGH	163	9.9	19.74	0	0.0	0.0	0.0	90
Retired horses	Locomotion	GH&SHGH	398	15.7	24.89	0	0.0	0.0	30.0	240
	through	GH	248	12.7	20.07	0	0.0	0.0	30.0	120
	human	SHGH	150	20.6	30.72	0	0.0	0.0	30.0	240
	Locomotion	GH&SHGH	215	2.4	9.97	0	0.0	0.0	0.0	60
	through	GH	129	1.4	7.37	0	0.0	0.0	0.0	60
	walker	SHGH	86	3.8	12.85	0	0.0	0.0	0.0	60
Horses unused	Locomotion	GH&SHGH	326	12.7	38.80	0	0.0	0.0	30.0	480
	through	GH	207	**11.7**	**29.66**	0	0.0	0.0	30.0	360
	human	SHGH	119	**14.4**	**51.05**	0	0.0	0.0	30.0	480
	Locomotion	GH&SHGH	188	2.6	12.53	0	0.0	0.0	0.0	120
	through	GH	118	2.0	12.85	0	0.0	0.0	0.0	120
	walker	SHGH	70	3.4	12.02	0	0.0	0.0	0.0	60

Tab. 39: Duration of locomotion in minutes per day through a human and through a horse walker for different categories of horses in single housing by horse owners with single housing (SH) and both housing systems (SHGH). SH&SHGH represents both groups together. SD = standard deviation. The highest and the lowest duration is in bold. (matrix-numbers/Dropdown 0-480 in steps of 30 min)

F36 Duration of locomotion in minutes/day through human and walker in SH for HO			**N**	**Mean**	**SD**	**Min**	**Q25**	**Median**	**Q75**	**Max**
Sport horses	Locomotion	SH&SHGH	491	62.7	23.86	0	60.0	60.0	60.0	180
	through	SH	281	62.6	23.78	0	60.0	60.0	60.0	180
	human	SHGH	210	62.9	24.03	0	60.0	60.0	60.0	180
	Locomotion	SH&SHGH	267	22.4	26.70	0	0.0	0.0	30.0	120
	through	SH	157	22.4	27.15	0	0.0	0.0	30.0	120
	walker	SHGH	110	22.4	26.16	0	0.0	15.0	30.0	90
Breeding horses	Locomotion	SH&SHGH	154	23.8	26.94	0	0.0	30.0	30.0	90
	through	SH	73	23.0	28.51	0	0.0	0.0	30.0	90
	human	SHGH	81	24.4	25.59	0	0.0	30.0	30.0	90
	Locomotion	SH&SHGH	90	9.7	20.03	0	0.0	0.0	0.0	60
	through	SH	44	9.5	20.23	0	0.0	0.0	0.0	60
	walker	SHGH	46	9.8	20.05	0	0.0	0.0	0.0	60
Horses for commercial use	Locomotion	SH&SHGH	152	84.5	56.25	0	60.0	60.0	120.0	240
	through	SH	73	**85.1**	**60.21**	0	45.0	60.0	120.0	240
	human	SHGH	79	**83.9**	**52.71**	0	60.0	60.0	120.0	240
	Locomotion	SH&SHGH	93	7.4	18.59	0	0.0	0.0	0.0	90
	through	SH	47	7.0	18.99	0	0.0	0.0	0.0	90
	walker	SHGH	46	7.8	18.37	0	0.0	0.0	0.0	60
Working horses	Locomotion	SH&SHGH	54	30.6	45.70	0	0.0	0.0	60.0	240
	through	SH	28	22.5	37.08	0	0.0	0.0	60.0	120
	human	SHGH	26	39.2	52.83	0	0.0	30.0	60.0	240
	Locomotion	SH&SHGH	40	1.5	9.49	0	0.0	0.0	0.0	60
	through	SH	22	0.0	0.00	0	0.0	0.0	0.0	0
	walker	SHGH	18	3.3	14.14	0	0.0	0.0	0.0	60
Leisure horses	Locomotion	SH&SHGH	649	59.4	33.45	0	30.0	60.0	60.0	480
	through	SH	338	59.6	30.00	0	30.0	60.0	60.0	360
	human	SHGH	311	59.3	36.89	0	30.0	60.0	60.0	480
	Locomotion	SH&SHGH	317	10.7	20.16	0	0.0	0.0	15.0	90
	through	SH	173	10.8	20.17	0	0.0	0.0	30.0	90
	walker	SHGH	144	10.6	20.22	0	0.0	0.0	0.0	60
Retired horses	Locomotion	SH&SHGH	229	20.7	38.27	0	0.0	0.0	30.0	480
	through	SH	122	20.7	47.41	0	0.0	0.0	30.0	480
	human	SHGH	107	20.7	24.17	0	0.0	30.0	30.0	120
	Locomotion	SH&SHGH	135	6.2	15.59	0	0.0	0.0	0.0	60
	through	SH	76	5.5	14.46	0	0.0	0.0	0.0	60
	walker	SHGH	59	7.1	17.02	0	0.0	0.0	0.0	60
Horses unused	Locomotion	SH&SHGH	181	17.2	52.64	0	0.0	0.0	30.0	480
	through	SH	93	**18.4**	**52.53**	0	0.0	0.0	30.0	480
	human	SHGH	88	**16.0**	**53.04**	0	0.0	0.0	30.0	480
	Locomotion	SH&SHGH	109	3.9	11.62	0	0.0	0.0	0.0	60
	through	SH	57	4.2	11.94	0	0.0	0.0	0.0	60
	walker	SHGH	52	3.5	11.36	0	0.0	0.0	0.0	60

Tab. 40: Contact possibilities in answers (N) and percentage (%) for the different categories of horses housed in single boxes by horse owners (HO) and stable owners (SO) with single housing (SH) and a combination with group housing (SHGH). SH&SHGH represents both groups together. TN = total answers for each category and each housing system (matrix/tick-off)

F37 Contact possibilities in SH				Tickling and biting (separating wall only shoulder-high, large space between the bars or turn-out/loose box)		Sniffing (through tight bars)		Only visual contact		No visual contact with other horses		No other horses		No other horses, but contact to other animals (donkeys, mules, goats, …)	
			TN	N	%	N	%	N	%	N	%	N	%	N	%
Sport horses	HO	SH&SHGH	487	211	43.3	261	53.6	14	2.9	0	0.0	1	0.2	0	0.0
		SH	269	112	41.6	151	56.1	6	2.2	0	0.0	0	0.0	0	0.0
		SHGH	218	99	45.4	110	50.5	8	3.7	0	0.0	1	0.5	0	0.0
	SO	SH&SHGH	36	21	58.3	14	38.9	1	2.8	0	0.0	0	0.0	0	0.0
		SH	8	5	62.5	3	37.5	0	0.0	0	0.0	0	0.0	0	0.0
		SHGH	28	16	57.1	11	39.3	1	3.6	0	0.0	0	0.0	0	0.0
Breeding horses	HO	SH&SHGH	188	105	55.9	73	38.8	10	5.3	0	0.0	0	0.0	0	0.0
		SH	81	40	49.4	38	46.9	3	3.7	0	0.0	0	0.0	0	0.0
		SHGH	107	65	60.7	35	32.7	7	6.5	0	0.0	0	0.0	0	0.0
	SO	SH&SHGH	20	14	70.0	6	30.0	0	0.0	0	0.0	0	0.0	0	0.0
		SH	2	1	50.0	1	50.0	0	0.0	0	0.0	0	0.0	0	0.0
		SHGH	18	13	72.2	5	27.8	0	0.0	0	0.0	0	0.0	0	0.0
Horses for commercial use	HO	SH&SHGH	160	70	43.8	78	48.8	11	6.9	0	0.0	0	0.0	1	0.6
		SH	78	29	37.2	44	56.4	5	6.4	0	0.0	0	0.0	0	0.0
		SHGH	82	41	50.0	34	41.5	6	7.3	0	0.0	0	0.0	1	1.2
	SO	SH&SHGH	13	7	53.8	5	38.5	1	7.7	0	0.0	0	0.0	0	0.0
		SH	3	1	33.3	1	33.3	1	33.3	0	0.0	0	0.0	0	0.0
		SHGH	10	6	60.0	4	40.0	0	0.0	0	0.0	0	0.0	0	0.0
Working horses	HO	SH&SHGH	53	30	56.6	20	37.7	3	5.7	0	0.0	0	0.0	0	0.0
		SH	24	14	58.3	8	33.3	2	8.3	0	0.0	0	0.0	0	0.0
		SHGH	29	16	55.2	12	41.4	1	3.4	0	0.0	0	0.0	0	0.0
	SO	SH&SHGH	3	1	33.3	2	66.7	0	0.0	0	0.0	0	0.0	0	0.0
		SH	1	0	0.0	1	100.0	0	0.0	0	0.0	0	0.0	0	0.0
		SHGH	2	1	50.0	1	50.0	0	0.0	0	0.0	0	0.0	0	0.0

Continuation of Tab. 40

F37 Contact possibilities in SH				Tickling and biting (separating wall only shoulder-high, large space between the bars or turn-out/loose box)		Sniffing (through tight bars)		Only visual contact		No visual contact with other horses		No other horses		No other horses, but contact to other animals (donkeys, mules, goats, …)	
			TN	N	%	N	%	N	%	N	%	N	%	N	%
Leisure horses	HO	SH&SHGH	661	320	48.4	310	46.9	28	4.2	0	0.0	1	0.2	2	0.3
		SH	337	158	46.9	167	49.6	11	3.3	0	0.0	0	0.0	1	0.3
		SHGH	324	162	50.0	143	44.1	17	5.2	0	0.0	1	0.3	1	0.3
	SO	SH&SHGH	47	31	66.0	16	34.0	0	0.0	0	0.0	0	0.0	0	0.0
		SH	12	8	66.7	4	33.3	0	0.0	0	0.0	0	0.0	0	0.0
		SHGH	35	23	65.7	12	34.3	0	0.0	0	0.0	0	0.0	0	0.0
Retired horses	HO	SH&SHGH	253	129	51.0	113	44.7	10	4.0	0	0.0	1	0.4	0	0.0
		SH	129	59	45.7	64	49.6	6	4.7	0	0.0	0	0.0	0	0.0
		SHGH	124	70	56.5	49	39.5	4	3.2	0	0.0	1	0.8	0	0.0
	SO	SH&SHGH	20	13	65.0	6	30.0	1	5.0	0	0.0	0	0.0	0	0.0
		SH	4	2	50.0	2	50.0	0	0.0	0	0.0	0	0.0	0	0.0
		SHGH	16	11	68.8	4	25.0	1	6.3	0	0.0	0	0.0	0	0.0
Horses unused	HO	SH&SHGH	194	103	53.1	84	43.3	6	3.1	0	0.0	0	0.0	1	0.5
		SH	103	51	49.5	50	48.5	1	1.0	0	0.0	0	0.0	1	1.0
		SHGH	91	52	57.1	34	37.4	5	5.5	0	0.0	0	0.0	0	0.0
	SO	SH&SHGH	11	6	54.5	5	45.5	0	0.0	0	0.0	0	0.0	0	0.0
		SH	3	1	33.3	2	66.7	0	0.0	0	0.0	0	0.0	0	0.0
		SHGH	8	5	62.5	3	37.5	0	0.0	0	0.0	0	0.0	0	0.0

3. 10. Feeding management

Most of the horse owners with group housing and with both housing systems (see Tab. 41) fed concentrates daily (N=750, 59.5%), and roughage *ad libitum* (N=680, 53.9%) or in portions (N=657, 52.1%) to the horses. Somewhat fewer gave the horses access to pasture on a daily basis (N=559, 44.3%). Around the same amount of stable owners fed roughage daily in portions (N=72, 56.3%) or *ad libitum* (N=76, 59.4%), concentrates (N=72, 56.3%) and pastured the horses (N=74, 57.8%). More horse owners with single housing and with single/group housing systems (see Tab. 41) indicated that their horses are fed concentrates daily (N=717, 87.2%) and roughage in portions (N=664, 80.8%), while only one quarter of these fed their horses roughage *ad libitum* (N=201, 24.5%) and about one third pastured their horses daily (N=284, 34.5%). Stable owners with single housing and with both housing systems (see Tab. 41) fed concentrates daily (N=43, 81.1%) and roughage in portions (N=40, 75.5%), but only around a third of the respondents fed roughage *ad libitum* (N=19, 35.8). Contrary to the horse owners with single housing, but in line with the group housing, more stable owners offered pasture (N=23, 43.4%) on a daily basis.

Most of the horse and stable owners with group housing or the combination of both systems indicated that the group-housed horses were fed roughage two or three times per day and concentrates once or twice per day (Tab. 42). However, nearly one fifth of the respondents (horse and stable owners) fed roughage 17-24 times a day. Horse owners with an automatic feeder for roughage fed the horses mostly between four to six times per day and stable owners between seven to ten times a day. Concentrates through an automatic feeder were mostly fed by horse and stable owners between 17-24 times a day (see Tab. 42). For further information see Tab. A6 in Annex VI.

Most of the horse and stable owners with single housing or the combination of both systems indicated that the single-housed horses were fed roughage two or three times per day and concentrates one to three times per day (Tab. 43). Horse owners with an automatic feeder for roughage fed the horses mostly between four to six times or between eleven to sixteen times per day. Stable owners fed the horses between four to six times and seven to ten times a day. Concentrates through an automatic feeder were mostly fed twice per day by horse owners. Stable owners indicated however two to three times a week or four to six times per day (see Tab. 43; for further information see Tab. A7 in Annex VI).

Tab. 41: Types of horse feed fed in group housing (GH), in single housing (SH) and the combined system (SHGH) by horse owners (HO) and stable owners (SO). GH&SHGH and SH&SHGH represent both groups together. TN = total answers (multiple-choice questions)

		HO			SO		
		TN	**N**	**%**	**TN**	**N**	**%**
F41Horse Feed in GH							
Roughage in portions (e.g. hay, hay pellets, silage, alfalfa) (straw does not count as roughage)	GH&SHGH	1261	657	52.1	128	72	56.3
	GH	894	433	48.4	86	45	52.3
	SHGH	367	224	61.0	42	27	64.3
Roughage *ad libitum* (e.g. hay, hay pellets, silage, alfalfa) (straw does not count as roughage)	GH&SHGH	1261	680	53.9	128	76	59.4
	GH	894	509	56.9	86	51	59.3
	SHGH	367	171	46.6	42	25	59.5
Concentrates (e.g. cereales, pellets, oat, corn)	GH&SHGH	1261	750	59.5	128	72	56.3
	GH	894	479	53.6	86	40	46.5
	SHGH	367	271	73.8	42	32	76.2
Pasture	GH&SHGH	1261	559	44.3	128	74	57.8
	GH	894	372	41.6	86	52	60.5
	SHGH	367	187	51.0	42	22	52.4
Other*	GH&SHGH	1261	75	5.9	128	13	10.2
	GH	894	58	6.5	86	11	12.8
	SHGH	367	17	4.6	42	2	4.8
F47Horse Feed in SH							
Roughage in portions (e.g. hay, hay pellets, silage, alfalfa) (straw does not count as roughage)	SH&SHGH	822	664	80.8	53	40	75.5
	SH	458	387	84.5	13	12	92.3
	SHGH	364	277	76.1	40	28	70.0
Roughage *ad libitum* (e.g. hay, hay pellets, silage, alfalfa) (straw does not count as roughage)	SH&SHGH	822	201	24.5	53	19	35.8
	SH	458	91	19.9	13	1	7.7
	SHGH	364	110	30.2	40	18	45.0
Concentrates (e.g. cereales, pellets, oat, corn)	SH&SHGH	822	717	87.2	53	43	81.1
	SH	458	409	89.3	13	11	84.6
	SHGH	364	308	84.6	40	32	80.0
Pasture	SH&SHGH	822	284	34.5	53	23	43.4
	SH	458	155	33.8	13	5	38.5
	SHGH	364	129	35.4	40	18	45.0
Other**	SH&SHGH	822	39	4.7	53	4	7.5
	SH	458	28	6.1	13	1	7.7
	SHGH	364	11	3.0	40	3	7.5

*e.g. minerals/supplements, carrots; **e.g. mash, minerals, straw

Tab. 42: Responses (N) and percentage (%) for feeding frequency of roughage and concentrates (including responses with automatic feeders) for horses in group housing by horse owners (HO) and stable owners (SO) with group housing only and with the combination of both housing systems as well as the responses (N) and percentages (%) separately for the ones with an automatic feeder for roughage and/or concentrates. Percentages above 10% are in bold. (matrix-column/tick-off)

F42FeedingFrequencyGH&SHGH	**Roughage**				**Concentrates**			
	HO		**SO**		**HO**		**SO**	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Total responses	1137		116		1002		101	
Less than 1x/week	11	1.0	0	0.0	52	5.2	12	**11.9**
1x/week	18	1.6	5	4.3	26	2.6	1	1.0
2-3x/week	18	1.6	1	0.9	63	6.3	7	6.9
Every 2nd-3rd day	23	2.0	3	2.6	67	6.7	8	7.9
1x/day	97	8.5	3	2.6	375	**37.4**	28	**27.7**
2x/day	363	**31.9**	33	**28.4**	298	**29.7**	28	**27.7**
3x/day	278	**24.5**	21	**18.1**	76	7.6	4	4.0
4-6x/day	97	8.5	15	**12.9**	16	1.6	3	3.0
7-10x/day	22	1.9	9	7.8	9	0.9	2	2.0
11-16x/day	11	1.0	3	2.6	7	0.7	2	2.0
17-24x/day	199	**17.5**	23	**19.8**	13	1.3	6	5.9
F42withAutomaticfeederGH&SHGH								
Total responses	50		13		40		11	
Less than 1x/week	0	0.0	0	0.0	0	0.0	0	0.0
1x/week	0	0.0	1	7.7	0	0.0	0	0.0
2-3x/week	0	0.0	0	0.0	0	0.0	0	0.0
Every 2nd-3rd day	0	0.0	0	0.0	0	0.0	0	0.0
1x/day	1	2.0	0	0.0	4	**10.0**	0	0.0
2x/day	2	4.0	0	0.0	1	2.5	0	0.0
3x/day	4	8.0	0	0.0	3	7.5	0	0.0
4-6x/day	19	**38.0**	0	0.0	6	**15.0**	2	**18.2**
7-10x/day	10	**20.0**	7	**53.8**	8	**20.0**	2	**18.2**
11-16x/day	6	**12.0**	1	7.7	7	**17.5**	1	9.1
17-24x/day	8	**16.0**	4	**30.8**	11	**27.5**	6	**54.5**

Tab. 43: Responses (N) and percentage (%) for feeding frequency of roughage and concentrates (including responses with automatic feeders) for horses in single housing by horse owners (HO) and stable owners (SO) with single housing only and with the combination of both housing systems as well as the responses (N) and percentages (%) separately for the ones with an automatic feeder for roughage and/or concentrates. Percentages above 10% are in bold. (matrix-column/tick-off)

F48FeedingFrequencySH&SHGH	**Roughage**				**Concentrates**			
	HO		**SO**		**HO**		**SO**	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Total responses	787		50		752		47	
Less than 1x/week	1	0.1	0	0.0	5	0.7	0	0.0
1x/week	2	0.3	0	0.0	4	0.5	0	0.0
2-3x/week	0	0.0	1	2.0	15	2.0	3	6.4
Every 2nd-3rd day	1	0.1	0	0.0	6	0.8	2	4.3
1x/day	23	2.9	2	4.0	140	**18.6**	10	**21.3**
2x/day	301	**38.2**	19	**38.0**	328	**43.6**	24	**51.1**
3x/day	341	**43.3**	17	**34.0**	229	**30.5**	7	**14.9**
4-6x/day	73	9.3	8	**16.0**	19	2.5	1	2.1
7-10x/day	6	0.8	2	4.0	3	0.4	0	0.0
11-16x/day	7	0.9	0	0.0	1	0.1	0	0.0
17-24x/day	32	4.1	1	2.0	2	0.3	0	0.0

Continuation of Tab. 43

F48FeedingFrequencySH&SHGH	Roughage				Concentrates			
	HO		SO		HO		SO	
	N	%	N	%	N	%	N	%
F48withAutomaticfeederSH&SHGH								
Total responses	5		2		9		2	
Less than 1x/week	0	0.0	0	0.0	0	0.0	0	0.0
1x/week	0	0.0	0	0.0	1	**11.1**	0	0.0
2-3x/week	0	0.0	0	0.0	0	0.0	1	**50.0**
Every 2nd-3rd day	0	0.0	0	0.0	0	0.0	0	0.0
1x/day	0	0.0	0	0.0	0	0.0	0	0.0
2x/day	0	0.0	0	0.0	3	**33.3**	0	0.0
3x/day	0	0.0	0	0.0	1	**11.1**	0	0.0
4-6x/day	2	**40.0**	1	**50.0**	2	**22.2**	1	**50.0**
7-10x/day	1	**20.0**	1	**50.0**	2	**22.2**	0	0.0
11-16x/day	2	**40.0**	0	0.0	0	0.0	0	0.0
17-24x/day	0	0.0	0	0.0	0	0.0	0	0.0

For horse owners with group housing (or the combined housing system), the most used feeding method (see Tab. 44) was the hay rack (N=728, 58.1%), but also the feed bowl/bucket (N=591, 47.2%) and the on the floor-feeding (N=558, 44.5%) was used often. Stable owners indicated the hay rack (N=87, 68.0%) as the most often used method; however, the hay net (N=53, 41.4%) was used more often than indicated by horse owners. The feed bowl (N=58, 45.3%) was the second frequent method used. In single housing respectively single and group housing (see Tab. 44), horse owners and stable owners mostly fed the horses on the floor (HO: N=649, 79.2%; SO: N=40, 76.9%). Horse owners more often used the feeding trough/manger (N=443, 54.1%) than the hayrack (N=234, 28.6%), haynet (N=246, 30.0%) or the feed bowl/bucket (N=292, 35.7%). Stable owners, however, more often used the hayrack (N=28, 53.8%) than the haynet (N=22, 42.3%), the feeding trough/manger (N=21, 40.4%) or the feed bowl/bucket (N=22, 42.3%). Automatic feeders were used the least often.

Tab. 44: Daily feeding method used in group housing (GH), single housing (SH) and the combined system (SHGH) by horse owners (HO) and stable owners (SO). GH&SHGH and SH&SHGH represent both groups together. TN = total answers (multiple-choice questions)

Feeding method in group and single housing		HO			SO		
		TN	N	%	TN	N	%
F43Daily feeding method in GH							
On the floor	GH&SHGH	1253	558	44.5	128	49	38.3
	GH	890	328	36.9	86	27	31.4
	SHGH	363	230	63.4	42	22	52.4
Hayrack	GH&SHGH	1253	728	58.1	128	87	68.0
	GH	890	554	62.2	86	60	69.8
	SHGH	363	174	47.9	42	27	64.3

Continuation of Tab. 44

Feeding method in group and single housing		HO			SO		
		TN	N	%	TN	N	%
F43Daily feeding method in GH							
Haynet	GH&SHGH	1253	418	33.4	128	53	41.4
	GH	890	307	34.5	86	33	38.4
	SHGH	363	111	30.6	42	20	47.6
Feeding trough/manger	GH&SHGH	1253	322	25.7	128	21	16.4
	GH	890	178	20.0	86	11	12.8
	SHGH	363	144	39.7	42	10	23.8
Automatic feeder for roughage	GH&SHGH	1253	52	4.2	128	13	10.2
	GH	890	46	5.2	86	10	11.6
	SHGH	363	6	1.7	42	3	7.1
Automatic feeder for concentrates	GH&SHGH	1253	43	3.4	128	11	8.6
	GH	890	39	4.4	86	8	9.3
	SHGH	363	4	1.1	42	3	7.1
Individually out of a feed bowl/bucket	GH&SHGH	1253	591	47.2	128	58	45.3
	GH	890	426	47.9	86	35	40.7
	SHGH	363	165	45.5	42	23	54.8
Other*	GH&SHGH	1253	27	2.2	128	6	4.7
	GH	890	21	2.4	86	4	4.7
	SHGH	363	6	1.7	42	2	4.8
F49Daily feeding method in SH							
On the floor	SH&SHGH	819	649	79.2	52	40	76.9
	SH	458	384	83.8	13	13	100.0
	SHGH	361	265	73.4	39	27	69.2
Hayrack	SH&SHGH	819	234	28.6	52	28	53.8
	SH	458	103	22.5	13	3	23.1
	SHGH	361	131	36.3	39	25	64.1
Haynet	SH&SHGH	819	246	30.0	52	22	42.3
	SH	458	130	28.4	13	6	46.2
	SHGH	361	116	32.1	39	16	41.0
Feeding trough/manger	SH&SHGH	819	443	54.1	52	21	40.4
	SH	458	279	60.9	13	5	38.5
	SHGH	361	164	45.4	39	16	41.0
Automatic feeder for roughage	SH&SHGH	819	5	0.6	52	2	3.8
	SH	458	2	0.4	13	0	0.0
	SHGH	361	3	0.8	39	2	5.1
Automatic feeder for concentrates	SH&SHGH	819	9	1.1	52	2	3.8
	SH	458	4	0.9	13	0	0.0
	SHGH	361	5	1.4	39	2	5.1
Individually out of a feed bowl/bucket	SH&SHGH	819	292	35.7	52	22	42.3
	SH	458	146	31.9	13	2	15.4
	SHGH	361	146	40.4	39	20	51.3
Other*	SH&SHGH	819	11	1.3	52	1	1.9
	SH	458	6	1.3	13	1	7.7
	SHGH	361	5	1.4	39	0	0.0

*e.g. feeding stall, slow feeder (HeuToy), haybox (DE: Heukiste), bell-shaped hayrack (DE: Heuglocke)

The horse owners and stable owners with group housing or both housing systems were asked some additional questions about how the horses are fed (alone or in the group), the number of feeding places for roughage and concentrates, and the number of horses per automatic feeder (if they indicated that they use an automatic feeder). In group housing and the combined housing system (see Tab. 45), horses are fed roughage most frequently in horse groups (HO: N=1077, 85.9%; SO: N=110, 85.9%) and concentrates mostly alone (HO: N=826, 65.9%; SO: N=83, 64.8%).

Tab. 45: Number (N) of horse owners (HO) and stable owners (SO) with group housing (GH) or the combined system (SHGH) feeding the horses in the groups or alone. GH&SHGH represents both groups together. TN = total answers (multiple-choice question)

F44Fed in group or alone in GH		**HO**			**SO**		
		TN	**N**	**%**	**TN**	**N**	**%**
Roughage alone	GH&SHGH	1254	332	26.5	128	43	33.6
	GH	891	144	16.2	86	23	26.7
	SHGH	363	188	51.8	42	20	47.6
Roughage in group	GH&SHGH	1254	1077	85.9	128	110	85.9
	GH	891	807	90.6	86	75	87.2
	SHGH	363	270	74.4	42	35	83.3
Concentrates alone	GH&SHGH	1254	826	65.9	128	83	64.8
	GH	891	548	61.5	86	53	61.6
	SHGH	363	278	76.6	42	30	71.4
Concentrates in group	GH&SHGH	1254	212	16.9	128	20	15.6
	GH	891	159	17.8	86	12	14.0
	SHGH	363	53	14.6	42	8	19.0

The horse owners and stable owners, who indicated that they were feeding roughage and/or concentrates in groups, were asked about the number of feeding places offered to the horses. In most cases more than one feeding place was used both for roughage and, even more clearly, for concentrates (Tab. 46 for details).

Tab. 46: Number (N) and percentage (%) of horse owners (HO) and stable owners (SO) with group housing or the combined system indicating the number of feeding places in groups for roughage and for concentrates. TN = total answers per item. Item with most responses in bold. (multiple-choice question)

F45Feeding places for roughage and concentrates in GH&SHGH	**HO**			**SO**		
	TN	**N**	**%**	**TN**	**N**	**%**
One roughage feeding place for several horses (e.g. hayrack)	1075	474	44.1	109	39	35.8
Several roughage feeding places	1075	**691**	**64.3**	109	**86**	**78.9**
One concentrate feeding place for several horses	212	29	13.7	20	1	5.0
Several concentrate feeding places	212	**136**	**64.2**	20	**16**	**80.0**

52 horse owners and 13 stable owners indicated the use of an automatic feeder for roughage, 43 horse owners and eleven stable owners indicated the use of an automatic feeder for concentrates in group housing systems (Tab. 44). The number of horses per automatic feeder ranged up to 30 for roughage and up to 40 for concentrates (for details see Tab. 47).

Tab. 47: The number of horses per automatic feeder for roughage and concentrates per horse owner (HO) and per stable owner (SO) for group housing and both housing systems (GH&SHGH). SD = standard deviation, N=number of answers per item (matrix-numbers/dropdown 0-500)

F46Horses per automatic feeder in GH&SHGH	Group	Housing system	N	Mean	SD	Min	Q25	Median	Q75	Max
Horses per roughage automatic feeder	HO	GH&SHGH	49	5.2	5.31	0	2.0	3.0	6.0	28
	SO	GH&SHGH	11	8.7	9.87	0	3.0	4.0	8.0	30
Horses per concentrates automatic feeder	HO	GH&SHGH	40	16.7	9.91	0	10.3	15.5	25.8	40
	SO	GH&SHGH	11	19.4	8.85	1	15.0	20.0	26.0	30

3. 11. Group housing: Number of groups and composition

Stable owners with group housing or with the combination of single and group housing systems were asked about the number of horse groups on the farm/at the stable (see Tab. 48). The ones with group housing (N=83) had up to 7 horse groups (mean±SD, 1.9±1.43) and the ones with the combination of housing systems (N=44) had up to 10 horse groups (mean±SD, 2.2±2.08). 47% of the stable owners had only one group, about 28% had two groups, 9% three groups and about 11% had four to ten horse groups. 5% (N=6) of the stable owners indicated that they do not have groups; this must have been a mistake done by completing the questionnaire. More than half of the horse owners kept mare/s with gelding/s together (N=718, 56.5%) and about a third kept only geldings (N=424, 33.4) or only mares in groups (N=366, 28.8%). The least kept mare/s with foals and stallion/s together (N=13, 1.0%). Compared to the horse owners, more than half of the stable owners kept mare/s with gelding/s together (N=73, 56.6%) and only about a quarter kept only geldings (N=36, 27.9%), only mares (N=34, 26.4%) or youngsters with adult horses (N=33, 25.6%). The least of the stable owners kept mare/s with gelding/s and stallion/s together (N=2, 1.6%). The detailed number of answers for the different possible horse group compositions for horse and stable owners with the divers housing systems can be found in Tab. 49 and in Annex VII, Tab. A8. The following responses were given most often in the open response possibility: only stallions, mixed, according to age, with other animals, according to eating habit and according to sympathy of the horses.

Tab. 48: Number of horse groups on the farm/at the stable of the stable owners (SO) with group housing (GH) or with single and group housing (SHGH). GH&SHGH represents both groups together. SD = Standard deviation (matrix-numbers/Dropdown 0-100)

F38Number of horse groups SO	Group	N	Mean	SD	Min*	Q25	Median	Q75	Max
	GH&SHGH	127	2.0	1.69	0	1.0	1.0	2.0	10
	GH	83	1.9	1.43	0	1.0	1.0	2.0	7
	SHGH	44	2.2	2.08	0	1.0	2.0	2.0	10

*Min = 0, incorrect data received by stable owners with groups

Tab. 49: Horse group composition for the horse (HO) and stable (SO) owners with group housing (either only group housing or in combination with single housing; multiple-choice question)

F40GroupComposition	HO (N=1270)		SO (N=129)	
	N	%	N	%
Mare/s with gelding/s	718	56.5	73	56.6
Only geldings	424	33.4	36	27.9
Only mares	366	28.8	34	26.4
Youngsters with adult horses	287	22.6	33	25.6
Mare/s with foals	124	9.8	16	12.4
Gelding/s with stallion/s	79	6.2	9	7.0
Youngsters separately from adult horses	77	6.1	10	7.8
Mare/s with foals and gelding/s	45	3.5	4	3.1
Other*	42	3.3	9	7.0
Mare/s with gelding/s and stallion/s	34	2.7	2	1.6
Mare/s with stallion/s	15	1.2	4	3.1
Mare/s with foals and stallion/s	13	1.0	5	3.9

*e.g. only stallions, mixed, according to age, with other animals, according to eating habit, according to sympathy of the horses

3. 12. Satisfaction with the current housing system

Asked about the satisfaction with the group housing system, the majority of stable owners (55%) and horse owners (51%) with only group housing indicated that they are ‘very satisfied’ with the currently selected housing system, while respondents with horses in a combination of group housing and single housing were somewhat (only 43% of stable owners and 39% of horse owners responded with ‘very satisfied’) less satisfied with the group housing (for details see Tab. 50). In contrast the satisfaction with single housing systems was somewhat lower for horse owners, only about 30% were ‘very satisfied’ (Tab. 50), and for stable owners with a combination of group and single housing, but very low for stable owners with only single housing: of these 12 respondents 41.7% indicated to be very unsatisfied with this system.

Tab. 50: Satisfaction of stable owners (SO) and horse owners (HO) that have only group housing (GH), only single housing (SH) or both housing systems (SHGH) with either group housing or single housing. GH&SHGH and SH&SHGH combines the responses of persons with only the system in question or combination of both housing systems. 1 = very unsatisfied, 2 = unsatisfied, 3 = rather unsatisfied, 4 = partly / partly, 5 = rather satisfied, 6 = satisfied, 7 = very satisfied. Rate/percentage with highest number of responses in bold.

F59/62Satisfaction of SO and HO with housing systems		**Group**	**N**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
				N	**N**	**N**	**N**	**N**	**N**	**N**
				%	**%**	**%**	**%**	**%**	**%**	**%**
SO	satisfaction with group housing	GH&SHGH	122	11	0	1	6	4	37	63
				9.0	0.0	0.8	4.9	3.3	**30.3**	**51.6**
		GH	85	11	0	0	1	1	25	47
				12.9	0.0	0.0	1.2	1.2	**29.4**	**55.3**
		SHGH	37	0	1	0	5	3	12	16
				0.0	2.7	0.0	13.5	8.1	**32.4**	**43.2**
	satisfaction with single housing	SH&SHGH	47	5	0	2	4	5	17	14
				10.6	0.0	4.3	8.5	10.6	**36.2**	**29.8**
		SH	12	5	0	1	2	2	1	1
				41.7	0.0	8.3	16.7	16.7	8.3	8.3
		SHGH	35	1	0	0	2	3	16	13
				2.9	0.0	0.0	5.7	8.6	**45.7**	**37.1**
HO	satisfaction with group housing	GH&SHGH	1118	97	4	14	46	90	329	538
				8.7	0.4	1.3	4.1	8.1	**29.4**	**48.1**
		GH	823	65	2	7	26	61	241	421
				7.9	0.2	0.9	3.2	7.4	**29.3**	**51.2**
		SHGH	295	32	2	7	20	29	88	117
				10.8	0.7	2.4	6.8	9.8	**29.8**	**39.7**
	satisfaction with single housing	SH&SHGH	716	65	19	44	86	89	225	188
				9.1	2.7	6.1	12.0	12.4	**31.4**	**26.3**
		SH	423	35	12	28	43	58	134	113
				8.3	2.8	6.6	10.2	13.7	**31.7**	**26.7**
		SHGH	293	30	7	16	43	31	91	75
				10.2	2.4	5.5	14.7	10.6	**31.1**	**25.6**

Stable owners with single housing systems alone or combined with group housing had kept the horses on average since 17 years in single housing systems, while for pure group housing the average was lowest with 11 years (Tab. 51). For horse owners, the average for group housing was smaller as well. Variation was very large in all housing systems.

With respect to changes of housing systems (see Tab. 52) in group housing, the majority of stable owners with both housing systems (SHGH) and about 44% of the ones with group housing has never changed the system; whereas, horse owners with group housing systems were almost equally divided over the answers. Conversely, a large amount of the horse and stable owners with single housing or both housing systems answered that they have never changed the housing system with the highest percentage of answers of stable owners with single housing (75%).

Tab. 51: Years of how long the horses have been kept in group housing or in single housing for horse owners (HO) and stable owners (SO) with only group housing (GH), only single housing (SH) or both housing systems (SHGH). GH&SHGH and SH&SHGH combines the responses of persons with only the system in question or combination of both housing systems. SD = Standard deviation. Less than one year = 0 (matrix-numbers/dropdown 0-100)

F60/63Years horses in housing system		Housing system	N	Mean	SD	Min	Q25	Median	Q75	Max
SO	in group housing	GH&SHGH	123	11.6	11.08	0	4.0	9.0	15.0	75
		GH	85	10.9	8.53	0	5.0	9.0	15.0	43
		SHGH	38	13.1	15.38	0	3.0	9.5	16.0	75
	in single housing	SH&SHGH	46	17.3	14.42	0	7.0	15.0	24.3	75
		SH	12	17.0	11.46	0	7.3	20.0	24.5	40
		SHGH	34	17.4	15.49	0	6.8	15.0	24.3	75
HO	in group housing	GH&SHGH	1115	8.8	7.99	0	3.0	6.0	12.0	45
		GH	820	9.1	8.10	0	3.0	6.0	13.0	45
		SHGH	295	7.9	7.61	0	2.0	6.0	10.0	40
	in single housing	SH&SHGH	715	10.5	10.19	0	3.0	7.0	15.0	70
		SH	422	11.4	10.86	0	3.0	8.0	17.0	70
		SHGH	293	9.1	9.01	0	2.0	6.0	14.0	50

Tab. 52: Changes of housing systems (HS) in the past of horse owners (HO) and stable owners (SO) with current group housing (GH), single housing (SH) or with both housing systems (SHGH). GH&SHGH and SH&SHGH represent both housing systems together. (single-choice questions)

Different housing system (HS) in the past					
F61Past HS of GH	**Group**	**N**	**Yes (previously single housing) (%)**	**Yes (different group housing system) (%)**	**No (%)**
SO	GH&SHGH	119	32 (26.9)	29 (24.4)	58 (48.7)
	GH	84	22 (26.2)	25 (29.8)	37 (44.0)
	SHGH	35	10 (28.6)	4 (11.4)	21 (60.0)
HO	GH&SHGH	1096	416 (38.0)	319 (29.1)	361 (32.9)
	GH	809	306 (37.8)	249 (30.8)	254 (31.4)
	SHGH	287	110 (38.3)	70 (24.4)	107 (37.3)

F64Past HS of SH	Group	N	Yes (previously group housing) (%)	Yes (different single housing system) (%)	No (%)
SO	SH&SHGH	41	10 (24.4)	8 (19.5)	23 (56.1)
	SH	12	2 (16.7)	1 (8.3)	9 (75.0)
	SHGH	29	8 (27.6)	7 (24.1)	14 (48.3)
HO	SH&SHGH	687	161 (23.4)	193 (28.1)	333 (48.5)
	SH	415	90 (21.7)	125 (30.1)	200 (48.2)
	SHGH	272	71 (26.1)	68 (25.0)	133 (48.9)

3. 13. Reasons for choice of a housing system

3. 13. 1. Reasons to keep horses in group housing for horse owners

Horse owners with group housing (GH) and a combination of housing systems (SHGH) considered the following reasons (see Tab. 53) as important or very important for the selection of the housing system: ‘consider it the best housing system’, ‘group housing has less disadvantages for the horses than single housing’, ‘group housing is beneficial for the health of the horses’ and ‘knowledge of good examples for group housing’. Following reasons were considered as very unimportant or unimportant for the selection of the housing system: ‘group housing is cheaper’, ‘single housing is not available in a reasonable distance’, ‘risk of injury is too high in single housing’ and ‘the stable has switched from single to group housing’. Responses to the importance of facilitation of the care and the use of the horses were distributed rather evenly between response options for group housing and for the housing combination. The reasons that the ’control and care of the horses is easier in group housing’, ‘better protection from external man-induced events’ and ’bad experiences with single housing’ were considered as very unimportant or unimportant for the ones with the combined housing system; however, the responses of horse owners with group housing were more variable. In the open response possibility, the following other reasons for group housing were mentioned: the time management (one does not have to go to the stable every day), the removal of the own compulsion of having to move the horse every day, low veterinary costs and the recommendation of group housing by the IPZV e.V. (Islandpferde-Reiter- und Züchterverband e.V./Icelandic horse-Rider- and Breeder federation).

Tab. 53: Frequencies of reasons to keep horses in group housing for horse owners (HO) with horses only in group housing (GH) or with horses in group housing and single housing (SHGH). GH&SHGH is an overall result about both respondent groups. Responses on a 7-point Likert scale with 1 = very unimportant, 2 = unimportant, 3 = rather unimportant, 4 = neither important nor unimportant, 5 = rather important, 6 = important, 7 = very important. TN = total number of responses to this item.

F50Reasons to keep horses in group housing HO	Group	TN	1 N %	2 N %	3 N %	4 N %	5 N %	6 N %	7 N %
Consider it the best housing system	GH&SHGH	1136	4 0.4	0 0.0	8 0.7	73 6.4	34 3.0	205 18.0	812 71.5
	GH	832	2 0.2	0 0.0	3 0.4	21 2.5	21 2.5	128 15.4	657 79.0
	SHGH	304	2 0.7	0 0.0	5 1.6	52 17.1	13 4.3	77 25.3	155 51.0
Group housing is cheaper	GH&SHGH	1092	241 22.1	235 21.5	224 20.5	212 19.4	63 5.8	62 5.7	55 5.0
	GH	801	184 23.0	166 20.7	169 21.1	158 19.7	42 5.2	41 5.1	41 5.1
	SHGH	291	57 19.6	69 23.7	55 18.9	54 18.6	21 7.2	21 7.2	14 4.8
Group housing has less disadvantages for the horses than single housing	GH&SHGH	1107	10 0.9	17 1.5	27 2.4	148 13.4	84 7.6	267 24.1	554 50.0
	GH	812	4 0.5	10 1.2	11 1.4	77 9.5	55 6.8	200 24.6	455 56.0
	SHGH	295	6 2.0	7 2.4	16 5.4	71 24.1	29 9.8	67 22.7	99 33.6
Group housing is beneficial for the health of the horses	GH&SHGH	1128	4 0.4	4 0.4	3 0.3	82 7.3	68 6.0	258 22.9	709 62.9
	GH	827	1 0.1	1 0.1	1 0.1	35 4.2	43 5.2	168 20.3	578 69.9
	SHGH	301	3 1.0	3 1.0	2 0.7	47 15.6	25 8.3	90 29.9	131 43.5
Single housing is not available in a reasonable distance	GH&SHGH	907	641 70.7	112 12.3	43 4.7	62 6.8	12 1.3	18 2.0	19 2.1
	GH	662	497 75.1	76 11.5	25 3.8	35 5.3	4 0.6	9 1.4	16 2.4
	SHGH	245	144 58.8	36 14.7	18 7.3	27 11.0	8 3.3	9 3.7	3 1.2
Risk of injury is too high in single housing	GH&SHGH	946	416 44.0	174 18.4	78 8.2	159 16.8	39 4.1	45 4.8	35 3.7
	GH	686	311 45.3	122 17.8	55 8.0	106 15.5	32 4.7	31 4.5	29 4.2
	SHGH	260	105 40.4	52 20.0	23 8.8	53 20.4	7 2.7	14 5.4	6 2.3
Control and care of the horses is easier in group housing	GH&SHGH	1046	185 17.7	157 15.0	148 14.1	262 25.0	100 9.6	130 12.4	64 6.1
	GH	768	128 16.7	112 14.6	102 13.3	189 24.6	82 10.7	98 12.8	57 7.4
	SHGH	278	57 20.5	45 16.2	46 16.5	73 26.3	18 6.5	32 11.5	7 2.5

Continuation of Tab. 53

F50Reasons to keep horses in group housing HO	Group	TN	1 N %	2 N %	3 N %	4 N %	5 N %	6 N %	7 N %
Better protection from external man-induced events	GH&SHGH	994	206 20.7	166 16.7	127 12.8	207 20.8	78 7.8	109 11.0	101 10.2
	GH	734	142 19.3	119 16.2	101 13.8	145 19.8	63 8.6	80 10.9	84 11.4
	SHGH	260	64 24.6	47 18.1	26 10.0	62 23.8	15 5.8	29 11.2	17 6.5
Knowledge of good examples for group housing	GH&SHGH	1084	19 1.8	29 2.7	23 2.1	105 9.7	118 10.9	312 28.8	478 44.1
	GH	797	11 1.4	19 2.4	15 1.9	57 7.2	86 10.8	229 28.7	380 47.7
	SHGH	287	8 2.8	10 3.5	8 2.8	48 16.7	32 11.1	83 28.9	98 34.1
Facilitation of the care for the horses	GH&SHGH	1071	90 8.4	100 9.3	123 11.5	270 25.2	145 13.5	177 16.5	166 15.5
	GH	792	67 8.5	72 9.1	88 11.1	186 23.5	114 14.4	131 16.5	134 16.9
	SHGH	279	23 8.2	28 10.0	35 12.5	84 30.1	31 11.1	46 16.5	32 11.5
Facilitation of the use of the horses	GH&SHGH	1062	139 13.1	162 15.3	146 13.7	257 24.2	91 8.6	132 12.4	135 12.7
	GH	782	94 12.0	121 15.5	103 13.2	177 22.6	72 9.2	106 13.6	109 13.9
	SHGH	280	45 16.1	41 14.6	43 15.4	80 28.6	19 6.8	26 9.3	26 9.3
Bad experiences with single housing	GH&SHGH	978	197 20.1	112 11.5	98 10.0	163 16.7	91 9.3	121 12.4	196 20.0
	GH	715	126 17.6	67 9.4	67 9.4	104 14.5	77 10.8	108 15.1	166 23.2
	SHGH	263	71 27.0	45 17.1	31 11.8	59 22.4	14 5.3	13 4.9	30 11.4
The stable has switched from single to group housing	GH&SHGH	731	442 60.5	83 11.4	32 4.4	70 9.6	15 2.1	41 5.6	48 6.6
	GH	531	326 61.4	58 10.9	22 4.1	45 8.5	11 2.1	31 5.8	38 7.2
	SHGH	200	116 58.0	25 12.5	10 5.0	25 12.5	4 2.0	10 5.0	10 5.0

3. 13. 2. PCA of reasons to keep horses in group housing for horse owners

Using PCA, the reasons for the decision on group housing for horse owners were reduced to two distinct components (Tab. 54, scree plot see Annex VIII, Fig. A6). The two components accounted for 45.1% of the variance. Bartlett's test of sphericity was significant ($p<0.001$) and the KMO criterion was 0.813. Most of the items could be grouped into the two components. Using the criteria for selection of items to be included in the components as outlined in methods (see Chapter 2. 3. 2. Statistical analysis), the following components were calculated: The first component included seven items that mostly relate to advantages of group housing for the human (e.g. facilitation of the care for the horses, all items see Tab. 54) and was thus labelled as **HOGHReasons_AdvantHuman**. The second component included five items that all relate to advantages of group housing for the horses and the human experience with single housing (e.g. group housing is beneficial for the health of the horses, all items see Tab. 54) and was thus labelled as **HOGHReasons_AdvantHorse**. One item did not fulfil the requirements because there were loadings on two components (see Tab. 54) and was thus not included in any of the components calculated for further analysis. Cronbach's alphas for the two final components were good with 0.760 (N=663) for HOGHReasons_AdvantHuman and 0.693 (N=945) for HOGHReasons_AdvantHorse.

Tab. 54: Varimax rotated component matrix showing the loadings of the 13 items of reasons to keep horses in group housing for horse owners (N=731 - 1136) on the two extracted components. Items included in the final components are shown in bold. Order of items corresponds to the questionnaire.

	Label of final component (bold items included)	
	C1 HOGHReasons_ AdvantHuman	**C2 HOGHReasons_ AdvantHorse**
Explained variance (%)	26.9	18.2
Consider it the best housing system		**0.769**
Group housing is cheaper	**0.493**	
Group housing has less disadvantages for the horses than single housing		**0.766**
Group housing is beneficial for the health of the horses		**0.818**
Single housing is not available in a reasonable distance	0.504	-0.361
Risk of injury is too high in single housing	**0.515**	
Control and care of the horses is easier in group housing	**0.749**	0.136
Better protection from external man-induced events	**0.626**	
Knowledge of good examples for group housing	0.290	**0.564**
Facilitation of the care for the horses	**0.756**	0.181
Facilitation of the use of the horses	**0.682**	0.273
Bad experiences with single housing	0.215	**0.515**
The stable has switched from single to group housing	**0.523**	

3. 13. 3. Reasons to keep horses in single housing for horse owners

Horse owners with single housing (SH) and the combined housing system (SHGH) considered the following reasons (see Tab. 55) as rather important to very important for the selection of the housing system: ‘control and care of the horses is easier in single housing’ and ‘knowledge of good examples for single housing’. Following reasons were considered as unimportant for the selection of the housing system: ‘single housing is cheaper’, ‘the stable has switched from group to single housing’, ‘need of shoes on hind limbs - no group housing available where hind shoes are allowed’ and ‘I want that the horses have a strong bond with me - not with other horses’. The reasons: ‘consider it the best housing system’, ’single housing has less disadvantages for the horses than group housing’, ‘single housing is beneficial for the health of the horses’, ‘risk of injury is too high in group housing’, ‘better protection from external man-induced events’ and the ‘facilitation of the use of the horses’ were evenly considered as very unimportant to very important for group housing and for the combination. The reasons that ‘group housing is not available in a reasonable distance’ and ‘bad experiences with group housing’ were considered as very unimportant for the ones with the combined housing system; however, the responses of horse owners with single housing were more variable. The reason ‘facilitation of the care for the horses’ was considered as rather important or important for the ones with the combined housing system, but the responses of the ones with single housing were more variable. In the open response possibility, it was mentioned that other reasons for single housing would be: out of habit, old horse, lease costs for active stables too high, ease of management (isolation), inadequately group management, the adult horse does not need the fundamentally important relationships with other horses of the same age as foals, jealousy about food in group housing and non-availability of group housing (with riding and training possibilities).

Tab. 55: Frequencies of reasons to keep horses in single housing for horse owners (HO) with horses only in single housing (SH) or with horses in single housing and group housing (SHGH). SH&SHGH is an overall result about both respondent groups. Responses on a 7-point Likert scale with 1 = very unimportant, 2 = unimportant, 3 = rather unimportant, 4 = neither important nor unimportant, 5 = rather important, 6 = important, 7 = very important. TN = total number of responses to this item.

F54Reasons to keep horses in single housing HO	Group	TN	1	2	3	4	5	6	7
			N	N	N	N	N	N	N
			%	%	%	%	%	%	%
Consider it the best housing system	SH&SHGH	667	112	73	79	227	63	74	39
			16.8	10.9	11.8	34.0	9.4	11.1	5.8
	SH	397	63	32	37	141	47	49	28
			15.9	8.1	9.3	35.5	11.8	12.3	7.1
	SHGH	270	49	41	42	86	16	25	11
			18.1	15.2	15.6	31.9	5.9	9.3	4.1
Single housing is cheaper	SH&SHGH	654	294	166	85	86	12	11	0
			45.0	25.4	13.0	13.1	1.8	1.7	0.0
	SH	389	186	87	51	47	8	10	0
			47.8	22.4	13.1	12.1	2.1	2.6	0.0
	SHGH	265	108	79	34	39	4	1	0
			40.8	29.8	12.8	14.7	1.5	0.4	0.0
Single housing has less disadvantages for the horses than group housing	SH&SHGH	642	125	100	55	229	64	45	24
			19.5	15.6	8.6	35.7	10.0	7.0	3.7
	SH	386	73	56	36	132	41	32	16
			18.9	14.5	9.3	34.2	10.6	8.3	4.1
	SHGH	256	52	44	19	97	23	13	8
			20.3	17.2	7.4	37.9	9.0	5.1	3.1
Single housing is beneficial for the health of the horses	SH&SHGH	645	107	87	66	195	84	75	31
			16.6	13.5	10.2	30.2	13.0	11.6	4.8
	SH	385	59	49	39	107	56	55	20
			15.3	12.7	10.1	27.8	14.5	14.3	5.2
	SHGH	260	48	38	27	88	28	20	11
			18.5	14.6	10.4	33.8	10.8	7.7	4.2
Group housing is not available in a reasonable distance	SH&SHGH	587	138	84	49	87	67	80	82
			23.5	14.3	8.3	14.8	11.4	13.6	14.0
	SH	355	60	39	30	59	37	62	68
			16.9	11.0	8.5	16.6	10.4	17.5	19.2
	SHGH	232	78	45	19	28	30	18	14
			33.6	19.4	8.2	12.1	12.9	7.8	6.0
Risk of injury is too high in group housing	SH&SHGH	672	110	91	70	119	89	104	89
			16.4	13.5	10.4	17.7	13.2	15.5	13.2
	SH	403	59	55	37	62	54	73	63
			14.6	13.6	9.2	15.4	13.4	18.1	15.6
	SHGH	269	51	36	33	57	35	31	26
			19.0	13.4	12.3	21.2	13.0	11.5	9.7
Control and care of the horses is easier in single housing	SH&SHGH	675	55	43	44	114	144	181	94
			8.1	6.4	6.5	16.9	21.3	26.8	13.9
	SH	408	30	25	28	60	86	120	59
			7.4	6.1	6.9	14.7	21.1	29.4	14.5
	SHGH	267	25	18	16	54	58	61	35
			9.4	6.7	6.0	20.2	21.7	22.8	13.1

Continuation of Tab. 55

F54Reasons to keep horses in single housing HO	Group	TN	1 N %	2 N %	3 N %	4 N %	5 N %	6 N %	7 N %
Better protection from external man-induced events	SH&SHGH	637	128 20.1	85 13.3	53 8.3	134 21.0	79 12.4	81 12.7	77 12.1
	SH	391	78 19.9	50 12.8	35 9.0	69 17.6	50 12.8	51 13.0	58 14.8
	SHGH	246	50 20.3	35 14.2	18 7.3	65 26.4	29 11.8	30 12.2	19 7.7
Knowledge of good examples for single housing	SH&SHGH	635	58 9.1	46 7.2	41 6.5	161 25.4	93 14.6	136 21.4	100 15.7
	SH	387	30 7.8	22 5.7	27 7.0	89 23.0	53 13.7	98 25.3	68 17.6
	SHGH	248	28 11.3	24 9.7	14 5.6	72 29.0	40 16.1	38 15.3	32 12.9
Facilitation of the care for the horses	SH&SHGH	667	61 9.1	40 6.0	56 8.4	177 26.5	130 19.5	127 19.0	76 11.4
	SH	403	40 9.9	21 5.2	43 10.7	100 24.8	75 18.6	83 20.6	41 10.2
	SHGH	264	21 8.0	19 7.2	13 4.9	77 29.2	55 20.8	44 16.7	35 13.3
Facilitation of the use of the horses	SH&SHGH	671	104 15.5	78 11.6	76 11.3	139 20.7	112 16.7	101 15.1	61 9.1
	SH	402	68 16.9	51 12.7	56 13.9	71 17.7	67 16.7	62 15.4	27 6.7
	SHGH	269	36 13.4	27 10.0	20 7.4	68 25.3	45 16.7	39 14.5	34 12.6
Bad experiences with group housing	SH&SHGH	608	199 32.7	87 14.3	40 6.6	109 17.9	52 8.6	64 10.5	57 9.4
	SH	362	109 30.1	46 12.7	24 6.6	55 15.2	33 9.1	51 14.1	44 12.2
	SHGH	246	90 36.6	41 16.7	16 6.5	54 22.0	19 7.7	13 5.3	13 5.3
The stable has switched from group to single housing	SH&SHGH	448	306 68.3	55 12.3	20 4.5	51 11.4	9 2.0	4 0.9	3 0.7
	SH	257	197 76.7	22 8.6	11 4.3	19 7.4	3 1.2	2 0.8	3 1.2
	SHGH	191	109 57.1	33 17.3	9 4.7	32 16.8	6 3.1	2 1.0	0 0.0
Need of shoes on hind limbs, no group housing available where hind shoes are allowed	SH&SHGH	558	225 40.3	55 9.9	33 5.9	64 11.5	48 8.6	72 12.9	61 10.9
	SH	335	131 39.1	24 7.2	16 4.8	31 9.3	36 10.7	49 14.6	48 14.3
	SHGH	223	94 42.2	31 13.9	17 7.6	33 14.8	12 5.4	23 10.3	13 5.8

Continuation of Tab. 55

F54Reasons to keep horses in single housing HO	Group	TN	1 N %	2 N %	3 N %	4 N %	5 N %	6 N %	7 N %
I want that the horses have a strong bond with me, not with other horses	SH&SHGH	629	371 59.0	114 18.1	58 9.2	57 9.1	13 2.1	11 1.7	5 0.8
	SH	371	218 58.8	60 16.2	37 10.0	37 10.0	8 2.2	7 1.9	4 1.1
	SHGH	258	153 59.3	54 20.9	21 8.1	20 7.8	5 1.9	4 1.6	1 0.4

3. 13. 4. PCA of reasons to keep horses in single housing for horse owners

Using PCA, the reasons for the decision on single housing for horse owners were reduced to components and the analysis revealed that respondents rated the reasons on three distinct components (Tab. 56, scree plot see Annex VIII, Fig. A7). The three components accounted for 51.5% of the variance, Bartlett's test of sphericity was significant ($p<0.001$) and the KMO criterion was 0.862. Most of the items could be grouped into three components: The first component included four items that all relate to advantages of single housing for the horses and the human experience with group housing (e.g. single housing has less disadvantages for the horses than group housing, all items see Tab. 56) and was thus labelled as **HOSHReasons_AdvantHorse**. The second component included three items that all relate to the ease of management of the horses in single housing (e.g. facilitation of the care for the horses, all items see Tab. 56) and was thus labelled as **HOSHReasons_AdvantHuman**. The third component included five items that relate to influences with a financial, personal or locational background (e.g. the stable has switched from group to single housing, all items see Tab. 56) and was thus labelled as **HOSHReasons_OtherInfluences**. Three items did not fulfil the requirements because there were loadings on two components (see Tab. 56) and were thus not included in any of the components calculated for further analysis. Cronbach's alphas for the three final components were good with 0.772 (N=566) for HOSHReasons_AdvantHorse and 0.789 (N=651) for HOSHReasons_AdvantHuman, but only 0.463 (N=412) for HOSHReasons_OtherInfluences.

Tab. 56: Varimax rotated component matrix showing the loadings of the 15 items of reasons to keep horses in single housing for horse owners (N=448 - 675) on the three extracted components. Items included in the final components are shown in bold. Order of items corresponds to the questionnaire.

	Label of final component (bold items included)		
	C1 HOSHReasons_ AdvantHorse	**C2 HOSHReasons_ AdvantHuman**	**C3 HOSHReasons_ OtherInfluences**
Explained variance (%)	32.5	10.1	8.9
Consider it the best housing system	**0.682**		0.130
Single housing is cheaper			**0.585**
Single housing has less disadvantages for the horses than group housing	**0.803**	0.224	0.130
Single housing is beneficial for the health of the horses	**0.801**	0.238	
Group housing is not available in a reasonable distance	-0.290		**0.435**
Risk of injury is too high in group housing	0.597	0.335	0.176
Control and care of the horses is easier in single housing	0.288	**0.758**	
Better protection from external man-induced events	0.304	0.422	0.349
Knowledge of good examples for single housing	0.486	0.534	
Facilitation of the care for the horses	0.172	**0.840**	
Facilitation of the use of the horses		**0.776**	0.194
Bad experiences with group housing	**0.655**		
The stable has switched from group to single housing	0.136	-0.112	**0.652**
Need of shoes on hind limbs, no group housing available where hind shoes are allowed	0.218	0.219	**0.546**
I want that the horses have a strong bond with me, not with other horses	0.144	0.175	**0.619**

3. 13. 5. Reasons to keep horses in group housing for stable owners

Stable owners with group housing (GH) and the combined housing system (SHGH) considered the following reasons (see Tab. 57) as important or very important for the selection of the group housing system: ‘consider it the best housing system’, ‘group housing has less disadvantages for the horses than single housing’, ‘group housing is beneficial for the health of the horses’, ‘knowledge of good examples for group housing’ and ‘housing system requested by customers’. Following reasons were considered as very unimportant or unimportant for the selection of the housing system: ‘group housing is cheaper’, ‘risk of injury is too high in single housing’, ‘better protection from external man-induced events’, ‘single housing is not feasible due to lack of space’, ‘single housing is not feasible due to other constructional reasons’, ‘modification to single housing is too expensive’ and ‘recently taken over the stable and have

not been able to convert it to single housing yet'. The 'control and care of the horses is easier in group housing' and the 'facilitation of the use of the horses' were considered as very unimportant or rather unimportant for the ones with the combined housing system; however, the responses of stable owners with group housing were distributed rather evenly between response options. The importance of the 'facilitation of the care for the horses' was considered more variable for group housing and the combination. 'Bad experiences with single housing' was considered as very important for the stable owners with group housing and as very unimportant for the ones with the combined housing system.

Tab. 57: Frequencies of reasons to keep horses in group housing for stable owners (SO) with horses only in group housing (GH) or with horses in group housing and single housing (SHGH). GH&SHGH is an overall result about both respondent groups. Responses on a 7-point Likert scale with 1 = very unimportant, 2 = unimportant, 3 = rather unimportant, 4 = neither important nor unimportant, 5 = rather important, 6 = important, 7 = very important. TN = total number of responses to this item.

F52Reasons to keep horses in group housing SO	Group	TN	1 N %	2 N %	3 N %	4 N %	5 N %	6 N %	7 N %
Consider it the best housing system	GH&SHGH	124	2 1.6	1 0.8	1 0.8	10 8.1	3 2.4	16 12.9	91 73.4
	GH	86	0 0.0	1 1.2	0 0.0	0 0.0	0 0.0	9 10.5	76 88.4
	SHGH	38	2 5.3	0 0.0	1 2.6	10 26.3	3 7.9	7 18.4	15 39.5
Group housing is cheaper	GH&SHGH	122	32 26.2	23 18.9	24 19.7	21 17.2	6 4.9	11 9.0	5 4.1
	GH	86	27 31.4	16 18.6	17 19.8	14 16.3	2 2.3	6 7.0	4 4.7
	SHGH	36	5 13.9	7 19.4	7 19.4	7 19.4	4 11.1	5 13.9	1 2.8
Group housing has less disadvantages for the horses than single housing	GH&SHGH	121	3 2.5	1 0.8	3 2.5	14 11.6	9 7.4	23 19.0	68 56.2
	GH	86	0 0.0	0 0.0	2 2.3	5 5.8	5 5.8	14 16.3	60 69.8
	SHGH	35	3 8.6	1 2.9	1 2.9	9 25.7	4 11.4	9 25.7	8 22.9
Group housing is beneficial for the health of the horses	GH&SHGH	122	3 2.5	0 0.0	2 1.6	9 7.4	5 4.1	19 15.6	84 68.9
	GH	86	0 0.0	0 0.0	1 1.2	1 1.2	2 2.3	12 14.0	70 81.4
	SHGH	36	3 8.3	0 0.0	1 2.8	8 22.2	3 8.3	7 19.4	14 38.9

Continuation of Tab. 57

F52Reasons to keep horses in group housing SO	Group	TN	1 N %	2 N %	3 N %	4 N %	5 N %	6 N %	7 N %
Risk of injury is too high in single housing	GH&SHGH	112	29 25.9	16 14.3	20 17.9	28 25.0	4 3.6	6 5.4	9 8.0
	GH	80	21 26.3	9 11.3	17 21.3	20 25.0	3 3.8	4 5.0	6 7.5
	SHGH	32	8 25.0	7 21.9	3 9.4	8 25.0	1 3.1	2 6.3	3 9.4
Control and care of the horses is easier in group housing	GH&SHGH	115	15 13.0	13 11.3	20 17.4	33 28.7	11 9.6	14 12.2	9 7.8
	GH	82	8 9.8	9 11.0	13 15.9	23 28.0	9 11.0	13 15.9	7 8.5
	SHGH	33	7 21.2	4 12.1	7 21.2	10 30.3	2 6.1	1 3.0	2 6.1
Better protection from external man-induced events	GH&SHGH	113	25 22.1	26 23.0	17 15.0	19 16.8	7 6.2	8 7.1	11 9.7
	GH	80	18 22.5	19 23.8	11 13.8	12 15.0	5 6.3	7 8.8	8 10.0
	SHGH	33	7 21.2	7 21.2	6 18.2	7 21.2	2 6.1	1 3.0	3 9.1
Knowledge of good examples for group housing	GH&SHGH	120	5 4.2	2 1.7	5 4.2	20 16.7	12 10.0	27 22.5	49 40.8
	GH	84	2 2.4	1 1.2	1 1.2	12 14.3	5 6.0	20 23.8	43 51.2
	SHGH	36	3 8.3	1 2.8	4 11.1	8 22.2	7 19.4	7 19.4	6 16.7
Facilitation of the care for the horses	GH&SHGH	119	8 6.7	8 6.7	20 16.8	37 31.1	12 10.1	14 11.8	20 16.8
	GH	86	4 4.7	7 8.1	14 16.3	27 31.4	9 10.5	10 11.6	15 17.4
	SHGH	33	4 12.1	1 3.0	6 18.2	10 30.3	3 9.1	4 12.1	5 15.2
Facilitation of the use of the horses	GH&SHGH	119	18 15.1	13 10.9	26 21.8	23 19.3	7 5.9	14 11.8	18 15.1
	GH	84	10 11.9	11 13.1	15 17.9	16 19.0	6 7.1	13 15.5	13 15.5
	SHGH	35	8 22.9	2 5.7	11 31.4	7 20.0	1 2.9	1 2.9	5 14.3
Bad experiences with single housing	GH&SHGH	113	22 19.5	9 8.0	11 9.7	17 15.0	10 8.8	19 16.8	25 22.1
	GH	81	9 11.1	8 9.9	7 8.6	11 13.6	9 11.1	13 16.0	24 29.6
	SHGH	32	13 40.6	1 3.1	4 12.5	6 18.8	1 3.1	6 18.8	1 3.1

Continuation of Tab. 57

F52Reasons to keep horses in group housing SO	Group	TN	1 N %	2 N %	3 N %	4 N %	5 N %	6 N %	7 N %
Housing system requested by customers	GH&SHGH	117	19 16.2	5 4.3	5 4.3	16 13.7	21 17.9	27 23.1	24 20.5
	GH	82	14 17.1	3 3.7	4 4.9	7 8.5	17 20.7	19 23.2	18 22.0
	SHGH	35	5 14.3	2 5.7	1 2.9	9 25.7	4 11.4	8 22.9	6 17.1
Single housing is not feasible due to lack of space	GH&SHGH	109	54 49.5	19 17.4	14 12.8	8 7.3	5 4.6	4 3.7	5 4.6
	GH	77	43 55.8	12 15.6	9 11.7	6 7.8	2 2.6	3 3.9	2 2.6
	SHGH	32	11 34.4	7 21.9	5 15.6	2 6.3	3 9.4	1 3.1	3 9.4
Single housing is not feasible due to other constructional reasons	GH&SHGH	111	55 49.5	23 20.7	9 8.1	8 7.2	4 3.6	8 7.2	4 3.6
	GH	78	44 56.4	13 16.7	6 7.7	6 7.7	3 3.8	4 5.1	2 2.6
	SHGH	33	11 33.3	10 30.3	3 9.1	2 6.1	1 3.0	4 12.1	2 6.1
Modification to single housing is too expensive	GH&SHGH	109	64 58.7	23 21.1	4 3.7	8 7.3	1 0.9	4 3.7	5 4.6
	GH	77	52 67.5	14 18.2	2 2.6	5 6.5	1 1.3	1 1.3	2 2.6
	SHGH	32	12 37.5	9 28.1	2 6.3	3 9.4	0 0.0	3 9.4	3 9.4
Recently taken over the stable and have not been able to convert it to single housing yet	GH&SHGH	85	68 80.0	13 15.3	1 1.2	3 3.5	0 0.0	0 0.0	0 0.0
	GH	62	54 87.1	7 11.3	0 0.0	1 1.6	0 0.0	0 0.0	0 0.0
	SHGH	23	14 60.9	6 26.1	1 4.3	2 8.7	0 0.0	0 0.0	0 0.0

3. 13. 6. PCA of reasons to keep horses in group housing for stable owners

Using PCA, the reasons for the decision on group housing for stable owners were reduced to three distinct components (Tab. 58, scree plot see Annex VIII, Fig. A8). The three components accounted for 54.8% of the variance. Bartlett's test of sphericity was significant ($p<0.001$) and the KMO criterion was 0.720. Most of the items could be grouped into meaningful components: The first component included five items that all relate to advantages of group housing for the horses and the human experience with group housing (e.g. consider it the best housing system, all items see Tab. 58) and was thus labelled as **SOGHReasons_AdvHorse**. The second component included four items that all relate to financial or constructional problems in favor of group housing (e.g. single housing is not feasible due to other constructional reasons,

all items see Tab. 58) and was thus labelled as **SOGHReasons_ConstructionArg**. The third component included four items that were less consistent, i.e. reduced risk of injury and man-induced damage, former bad experience with single housing and customer request (Tab. 58) with the first two loading highest, and was thus labelled as **SOGHReasons_reducedDamage**. In total, three items did not fulfil the requirements because there were loadings on two components (see Tab. 58) and were thus not included in any of the components calculated for further analysis. Cronbach's alphas for the three final components were good with 0.792 (N=116) for SOGHReasons_AdvHorse, very good with 0.813 (N=107) for SOGHReasons_ConstructionArg and only 0.594 (N=101) for SOGHReasons_reducedDamage.

Tab. 58: Varimax rotated component matrix showing the loadings of the 16 items of reasons to keep horses in group for stable owners (N=85 - 124) on the three extracted components. Items included in the final components are shown in bold. Order of items corresponds to the questionnaire.

	Label of final component (bold items included)		
	C1 SOGHReasons_ AdvHorse	**C2 SOGHReasons_ ConstructionArg**	**C3 SOGHReasons_ ReducedDamage**
Explained variance (%)	24.8	19.4	10.5
Consider it the best housing system	**0.846**	-0.106	
Group housing is cheaper	0.287	**0.529**	
Group housing has less disadvantages for the horses than single housing	**0.758**	-0.110	0.219
Group housing is beneficial for the health of horses	**0.801**	-0.181	0.199
Risk of injury is too high in single housing			**0.653**
Control and care of the horses is easier in group housing	0.528	0.323	
Better protection from external man-induced events			**0.773**
Knowledge of good examples for group housing	**0.714**		0.230
Facilitation of the care for the horses	**0.561**	0.287	
Facilitation of the use of the horses	0.438	0.305	0.268
Bad experiences with single housing	0.249	-0.107	**0.638**
Housing system requested by customers	0.177	0.222	**0.458**
Single housing is not feasible due to lack of space		**0.844**	0.132
Single housing is not feasible due to other constructional reasons	-0.121	**0.870**	
Modification to single housing is too expensive	-0.153	**0.834**	0.107
Recently taken over the stable and have not been able to convert it to single housing yet	-0.577	0.297	0.360

3. 13. 7. Reasons to keep horses in single housing for stable owners

Stable owners with single housing (SH) and the combined housing system (SHGH) considered the following reasons (see Tab. 59) as rather important to very important for the selection of the housing system: ‘risk of injury is too high in group housing’, ‘control and care of the horses is easier in single housing’, ‘facilitation of the care for the horses’, ‘facilitation of the use of the horses’ and ‘housing system requested by customers’. ‘Single housing is cheaper’ was considered as very unimportant for both housing systems. The importance of considering it the best housing system was rather rated from being neither important nor unimportant to being very important for the ones with single housing, whereas the majority of the ones with both housing systems were more neutral (neither important nor unimportant). The reasons that ‘single housing has less disadvantages for the horses than group housing’ and that the stable has recently been taken over and not being able to convert it to group housing yet were rated as very unimportant by the stable owners with single housing, but the ones with the combination were more variable in the responses. Single housing being beneficial for the health of the horses was considered as neutral (neither important nor unimportant) by the majority of stable owners with single housing while the responses of the ones with a combination of housing systems were evenly distributed between the response options. The importance of a ‘better protection from external man-induced events’ and the ‘modification to group housing is too expensive’ was evenly rated by the same number of stable owners with single housing as very unimportant to rather unimportant as rather important to very important. The responses of the ones with a combination considered it to a large amount as very unimportant to rather unimportant. ‘Knowledge of good examples for single housing’ was considered as important by stable owners with single housing, whereas the responses of the ones with both housing systems were evenly distributed. The reasons of ‘bad experiences with group housing’, ‘group housing is not feasible due to lack of space’ and due to other constructional reasons was considered as very important or important for the ones with single housing; however, the ones with both housing systems considered them as very unimportant or unimportant.

Tab. 59: Frequencies of reasons to keep horses in single housing for stable owners (SO) with horses only in single housing (SH) or with horses in single housing and group housing (SHGH). SH&SHGH is an overall result about both respondent groups. Responses on a 7-point Likert scale with 1 = very unimportant, 2 = unimportant, 3 = rather unimportant, 4 = neither important nor unimportant, 5 = rather important, 6 = important, 7 = very important. TN = total number of responses to this item.

F56Reasons to keep horses in single housing SO	Group	TN	1 N %	2 N %	3 N %	4 N %	5 N %	6 N %	7 N %
Consider it the best housing system	SH&SHGH	43	5	2	4	21	4	5	2
			11.6	4.7	9.3	48.8	9.3	11.6	4.7
	SH	10	0	0	1	4	2	2	1
			0.0	0.0	10.0	40.0	20.0	20.0	10.0
	SHGH	33	5	2	3	17	2	3	1
			15.2	6.1	9.1	51.5	6.1	9.1	3.0
Single housing is cheaper	SH&SHGH	43	17	7	11	7	0	1	0
			39.5	16.3	25.6	16.3	0.0	2.3	0.0
	SH	11	4	2	1	3	0	1	0
			36.4	18.2	9.1	27.3	0.0	9.1	0.0
	SHGH	32	13	5	10	4	0	0	0
			40.6	15.6	31.3	12.5	0.0	0.0	0.0
Single housing has less disadvantages for the horses than group housing	SH&SHGH	41	8	4	5	13	5	4	2
			19.5	9.8	12.2	31.7	12.2	9.8	4.9
	SH	9	0	1	1	4	2	1	0
			0.0	11.1	11.1	44.4	22.2	11.1	0.0
	SHGH	32	8	3	4	9	3	3	2
			25.0	9.4	12.5	28.1	9.4	9.4	6.3
Single housing is beneficial for the health of the horses	SH&SHGH	43	6	2	6	15	5	5	4
			14.0	4.7	14.0	34.9	11.6	11.6	9.3
	SH	10	0	0	1	6	1	1	1
			0.0	0.0	10.0	60.0	10.0	10.0	10.0
	SHGH	33	6	2	5	9	4	4	3
			18.2	6.1	15.2	27.3	12.1	12.1	9.1
Risk of injury is too high in group housing	SH&SHGH	44	5	4	5	9	6	7	8
			11.4	9.1	11.4	20.5	13.6	15.9	18.2
	SH	11	0	1	1	1	5	0	3
			0.0	9.1	9.1	9.1	45.5	0.0	27.3
	SHGH	33	5	3	4	8	1	7	5
			15.2	9.1	12.1	24.2	3.0	21.2	15.2
Control and care of the horses is easier in single housing	SH&SHGH	46	4	0	5	8	9	9	11
			8.7	0.0	10.9	17.4	19.6	19.6	23.9
	SH	12	0	0	0	3	4	2	3
			0.0	0.0	0.0	25.0	33.3	16.7	25.0
	SHGH	34	4	0	5	5	5	7	8
			11.8	0.0	14.7	14.7	14.7	20.6	23.5
Better protection from external man-induced events	SH&SHGH	40	9	5	7	7	6	4	2
			22.5	12.5	17.5	17.5	15.0	10.0	5.0
	SH	9	3	0	1	1	3	1	0
			33.3	0.0	11.1	11.1	33.3	11.1	0.0
	SHGH	31	6	5	6	6	3	3	2
			19.4	16.1	19.4	19.4	9.7	9.7	6.5

Continuation of Tab. 59

F56Reasons to keep horses in single housing SO	Group	TN	1 N %	2 N %	3 N %	4 N %	5 N %	6 N %	7 N %
Knowledge of good examples for single housing	SH&SHGH	44	6 13.6	6 13.6	2 4.5	11 25.0	3 6.8	11 25.0	5 11.4
	SH	10	1 10.0	0 0.0	0 0.0	2 20.0	1 10.0	5 50.0	1 10.0
	SHGH	34	5 14.7	6 17.6	2 5.9	9 26.5	2 5.9	6 17.6	4 11.8
Facilitation of the care for the horses	SH&SHGH	45	2 4.4	5 11.1	2 4.4	9 20.0	9 20.0	11 24.4	7 15.6
	SH	12	1 8.3	1 8.3	0 0.0	3 25.0	2 16.7	2 16.7	3 25.0
	SHGH	33	1 3.0	4 12.1	2 6.1	6 18.2	7 21.2	9 27.3	4 12.1
Facilitation of the use of the horses	SH&SHGH	45	2 4.4	5 11.1	1 2.2	11 24.4	10 22.2	8 17.8	8 17.8
	SH	12	1 8.3	1 8.3	0 0.0	3 25.0	4 33.3	2 16.7	1 8.3
	SHGH	33	1 3.0	4 12.1	1 3.0	8 24.2	6 18.2	6 18.2	7 21.2
Bad experiences with group housing	SH&SHGH	42	11 26.2	3 7.1	5 11.9	13 31.0	2 4.8	3 7.1	5 11.9
	SH	10	2 20.0	0 0.0	1 10.0	2 20.0	1 10.0	2 20.0	2 20.0
	SHGH	32	9 28.1	3 9.4	4 12.5	11 34.4	1 3.1	1 3.1	3 9.4
Housing system requested by customers	SH&SHGH	43	5 11.6	3 7.0	1 2.3	14 32.6	8 18.6	7 16.3	5 11.6
	SH	10	2 20.0	0 0.0	0 0.0	3 30.0	2 20.0	3 30.0	0 0.0
	SHGH	33	3 9.1	3 9.1	1 3.0	11 33.3	6 18.2	4 12.1	5 15.2
Group housing is not feasible due to lack of space	SH&SHGH	42	10 23.8	11 26.2	1 2.4	5 11.9	2 4.8	6 14.3	7 16.7
	SH	12	1 8.3	2 16.7	0 0.0	1 8.3	1 8.3	3 25.0	4 33.3
	SHGH	30	9 30.0	9 30.0	1 3.3	4 13.3	1 3.3	3 10.0	3 10.0
Group housing is not feasible due to other constructional reasons	SH&SHGH	42	11 26.2	8 19.0	2 4.8	6 14.3	3 7.1	5 11.9	7 16.7
	SH	12	1 8.3	2 16.7	0 0.0	1 8.3	2 16.7	2 16.7	4 33.3
	SHGH	30	10 33.3	6 20.0	2 6.7	5 16.7	1 3.3	3 10.0	3 10.0

Continuation of Tab. 59

F56Reasons to keep horses in single housing SO	Group	TN	1 N %	2 N %	3 N %	4 N %	5 N %	6 N %	7 N %
Modification to group housing is too expensive	SH&SHGH	40	13 32.5	8 20.0	4 10.0	3 7.5	4 10.0	4 10.0	4 10.0
	SH	10	2 20.0	2 20.0	1 10.0	0 0.0	2 20.0	2 20.0	1 10.0
	SHGH	30	11 36.7	6 20.0	3 10.0	3 10.0	2 6.7	2 6.7	3 10.0
Recently taken over the stable and have not been able to convert it to group housing yet	SH&SHGH	31	15 48.4	3 9.7	3 9.7	6 19.4	1 3.2	1 3.2	2 6.5
	SH	9	3 33.3	0 0.0	0 0.0	4 44.4	0 0.0	1 11.1	1 11.1
	SHGH	22	12 54.5	3 13.6	3 13.6	2 9.1	1 4.5	0 0.0	1 4.5

3. 13. 8. PCA of reasons to keep horses in single housing for stable owners

Four components were built and analysed by using a confirmatory PCA approach with varimax rotation to see if the components could be confirmed. The first component (see Tab. 60) included five items (i.e. consider it the best housing system, single housing has less disadvantages for the horses than group housing, single housing is beneficial for the health of the horses, knowledge of good examples for single housing, recently taken over the stable and have not been able to convert it to group housing yet). The second component included four items (i.e. risk of injury is too high in group housing, better protection from external man-induced events, bad experiences with group housing, housing system requested by customers). The third component included three items (i.e. control and care of the horses is easier in single housing, facilitation of the care for the horses, facilitation of the use of the horses). The last four items were included in the fourth component (i.e. single housing is cheaper, group housing is not feasible due to lack of space, group housing is not feasible due to other constructional reasons, modification to group housing is too expensive). The first, third and fourth component could be confirmed to constitute one component; however, the supposed second component was splitted into one component and one single item (Tab. 60, scree plots see Annex VIII, Fig. A9-Fig. A12). Bartlett's tests of sphericity were significant ($p<0.01$) and the KMO criterions were 0.769, 0.526, 0.650 and 0.761. The first component included five items that relate to advantages of single housing for the horses and the stable owners' knowledge of good examples respectively constructional reasons (e.g. consider it the best housing system, all items see Tab. 60) and was thus labelled as **SOSHReasons_AdvanHorse**. The second component included two of the four items relating

to risk of injury and bad experiences with group housing (e.g. risk of injury is too high in group housing, all items see Tab. 60) and was thus labelled as **SOSHReasons_InjRiskBadExp**. The third component included three items that all relate to the ease of management of the horse in single housing (e.g. control and care of horses is easier in single housing, all items see Tab. 60) and was thus labelled as **SOSHReasons_easyManage**. The fourth component included four items that all relate to constructional reasons (e.g. single housing is cheaper, all items see Tab. 60) and was thus labelled as **SOSHReasons_ConstrucArg**. One item did not fulfil the requirements because there were loadings on two components (see Tab. 60) and was thus not included in any of the components calculated for further analysis. A second item (i.e. housing system requested by customers) was excluded due to the fact that one item alone does not compose a component. Cronbach's alphas for the four final components were good with 0.793 (N=27) for SOSHReasons_AdvanHorse, 0.748 (N=40) for SOSHReasons_InjRiskBadExp, 0.777 (N=44) for SOSHReasons_easyManage and very good with 0.891 (N=37) for SOSHReasons_ConstrucArg.

Tab. 60: Varimax rotated and confirmatory component matrix showing the loadings of the 16 items of reasons to keep horses in single housing for stable owners (N=31-46) on the four extracted components. Items included in the final components are shown in bold. Order of items does not correspond to the questionnaire.

	Label of final component (bold items included)				
	C1 SOSHReasons_ AdvanHorse	**C2_a SOSHReasons_ InjRiskBadExp**	**C2_b**	**C3 SOSHReasons_ easyManage**	**C4 SOSHReasons_ ConstrucArg**
KMO criterion	0.769	0.526		0.650	0.761
Explained variance (%)	51.7	42.4	26.2	69.5	75.8
Confirmatory PCA 1					
Consider it the best housing system	**0.542**				
Single housing has less disadvantages for the horses than group housing	**0.797**				
Single housing is beneficial for the health of the horses	**0.860**				

Continuation of Tab. 60

	Label of final component (bold items included)				
	C1 SOSHReasons_ AdvanHorse	**C2_a SOSHReasons_ InjRiskBadExp**	**C2_b**	**C3 SOSHReasons_ easyManage**	**C4 SOSHReasons_ ConstrucArg**
Knowledge of good examples for single housing	**0.742**				
Recently taken over the stable and have not been able to convert it to group housing yet	**0.607**				
Confirmatory PCA 2					
Risk of injury is too high in group housing		**0.883**			
Better protection from external man-induced events		0.381	-0.590		
Bad experiences with group housing		**0.848**			
Housing system requested by customers		0.222	0.837		
Confirmatory PCA 3					
Control and care of the horses is easier in single housing				**0.738**	
Facilitation of the care for the horses				**0.868**	
Facilitation of the use of the horses				**0.888**	

Continuation of Tab. 60

	Label of final component (bold items included)				
	C1 SOSHReasons_ AdvanHorse	**C2_a SOSHReasons_ InjRiskBadExp**	**C2_b**	**C3 SOSHReasons_ easyManage**	**C4 SOSHReasons_ ConstrucArg**
Confirmatory PCA 4					
Single housing is cheaper					**0.491**
Group housing is not feasible due to lack of space					**0.971**
Group housing is not feasible due to other constructional reasons					**0.973**
Modification to group housing is too expensive					**0.948**

3. 13. 9. Descriptive statistics of the components from the principal component analyses (PCA) of the reasons to keep horses in the currently selected housing system (SH, GH, SHGH) for horse (HO) and stable (SO) owners as well as differences between housing systems

For horse owners with group housing and both housing systems (see Tab. 61), the reasons related to advantages of group housing for the horses (HOGHReasons_AdvantHorse) were more important than the reasons related to advantages for the human (HOGHReasons_AdvantHuman). Those were rated as rather unimportant. For single housing; however, the importance was reversed (see Tab. 61). The reasons related to the ease of management of the horses (HOSHReasons_AdvantHuman) were more important than the reasons related to advantages of single housing for the horses (HOSHReasons_AdvantHorse). Other reasons with a financial, personal or locational background (HOSHReasons_OtherInfluences) were valued as unimportant. Almost the likely was found in stable owners with group housing (see Tab. 61). Perceived advantages of group housing for the horses and positive experience with group housing in the past (SOGHReasons_AdvHorse) were the most important reasons for keeping horses in group housing by stable owners, while risk of damage (SOGHReasons_reducedDamage) was only partly and financial/constructional reasons (SOGHReasons_ConstructionArg) rather

unimportant. Evaluating the reasons for stable owners with single housing was more difficult on count of the low response rate, but a tendency to an importance of reasons related to the ease of management (SOSHReasons_easyManage) could be found. Significant differences in reasons between the groups with only one housing system (single or group) and the combined housing system were found for almost all the components except for ease of management in single housing for horse owners (HOSHReasons_AdvantHuman), reduced risk of injury and man-induced damage in group housing for stable owners (SOGHReasons_reducedDamage), and for risk of injury (SOSHReasons_InjRiskBadExp) and ease of management (SOSHReasons_easyManage) in single housing for stable owners (Tab. 61). The ones with only a group/single housing rated the reasons higher (as more important) than the ones with the combined housing system except for constructional reasons, they were less important for stable owners with only group housing (Tab. 61).

Tab. 61: Descriptive statistics of the components from PCA for reasons to keep horses in group housing or in single housing for horse owners (HO) and stable owners (SO) with group housing (GH), single housing (SH) or both systems (SHGH) as well as differences in the groups with only one housing system and the ones with both systems (Mann-Whitney-U). SD = standard deviation, p = level of significance

	Group	N	Mean	SD	Min	Q25	Median	Q75	Max	p	Z
Horse owners with group housing											
HOGHReasons_	GH&SHGH	1122	3.4	1.29	1.0	2.4	3.4	4.3	7.0		
AdvantHuman	GH	823	3.5	1.32	1.0	2.4	3.5	4.3	7.0	0.026	-2.223
	SHGH	299	3.3	1.22	1.0	2.3	3.3	4.0	7.0		
HOGHReasons_	GH&SHGH	1142	5.8	0.97	1.4	5.2	6.0	6.6	7.0		
AdvantHorse	GH	836	6.0	0.82	2.8	5.6	6.2	6.8	7.0	0.000	-9.400
	SHGH	306	5.3	1.16	1.4	4.6	5.4	6.2	7.0		
Horse owners with single housing											
HOSHReasons_	SH&SHGH	692	3.5	1.45	1.0	2.3	3.7	4.5	7.0		
AdvantHorse	SH	411	3.7	1.48	1.0	2.5	3.8	4.8	7.0	0.000	-3.758
	SHGH	281	3.3	1.38	1.0	2.0	3.3	4.0	7.0		
HOSHReasons_	SH&SHGH	689	4.4	1.50	1.0	3.5	4.3	5.3	7.0		
AdvantHuman	SH	412	4.3	1.49	1.0	3.3	4.3	5.3	7.0	0.478	-0.709
	SHGH	277	4.4	1.52	1.0	3.7	4.7	5.3	7.0		
HOSHReasons_	SH&SHGH	693	2.6	1.17	1.0	1.8	2.5	3.3	7.0		
OtherInfluences	SH	411	2.8	1.19	1.0	2.0	2.6	3.4	7.0	0.000	-4.557
	SHGH	282	2.4	1.10	1.0	1.4	2.2	3.1	6.5		

Continuation of Tab. 61

	Group	N	Mean	SD	Min	Q25	Median	Q75	Max	p	Z
Stable owners with group housing											
SOGHReasons_	GH&SHGH	125	5.7	1.13	1.0	5.4	6.0	6.4	7.0		
AdvHorse	GH	86	6.1	0.69	2.4	5.8	6.2	6.5	7.0	0.000	-4.601
	SHGH	39	4.9	1.46	1.0	4.0	5.0	6.2	7.0		
SOGHReasons_	GH&SHGH	122	2.5	1.51	1.0	1.3	2.0	3.3	7.0		
ConstructionArg	GH	86	2.3	1.44	1.0	1.2	1.8	3.0	7.0	0.003	-2.981
	SHGH	36	3.1	1.57	1.0	2.0	3.0	4.0	7.0		
SOGHReasons_	GH&SHGH	123	3.9	1.39	1.0	3.0	4.0	4.8	7.0		
reducedDamage	GH	86	4.0	1.42	1.0	3.2	4.0	5.0	7.0	0.132	-1.506
	SHGH	37	3.6	1.30	1.0	2.5	3.8	4.6	7.0		
Stable owners with single housing											
SOSHReasons_	SH&SHGH	46	3.8	1.34	1.0	2.9	4.0	4.8	7.0		
AdvanHorse	SH	12	4.4	0.64	3.5	4.0	4.2	4.9	5.6	0.042	-2.030
	SHGH	34	3.6	1.46	1.0	2.4	3.8	4.6	7.0		
SOSHReasons_	SH&SHGH	46	4.0	1.78	1.0	3.0	4.0	5.0	7.0		
InjRiskBadExp	SH	12	4.8	1.57	3.0	3.1	5.0	6.4	7.0	0.143	-1.464
	SHGH	34	3.8	1.78	1.0	2.4	4.0	5.0	7.0		
SOSHReasons_	SH&SHGH	47	4.9	1.49	1.0	3.7	5.0	6.0	7.0		
easyManage	SH	12	4.9	1.16	3.0	4.0	4.8	5.7	7.0	0.971	-0.037
	SHGH	35	4.8	1.60	1.0	3.7	5.0	6.3	7.0		
SOSHReasons_	SH&SHGH	45	3.2	1.79	1.0	1.6	3.0	4.6	6.7		
ConstrucArg	SH	12	4.2	1.90	1.0	2.3	5.0	5.5	6.7	0.035	-2.113
	SHGH	33	2.9	1.62	1.0	1.5	2.5	4.3	6.7		

3. 14. Potential reasons to change from single to group housing

Horse owners and stable owners with only single housing were asked what would be potential reasons to change from single to group housing in the future (see Tab. 62). A quarter of the eight stable owners with single housing that had responded (N=2, 25%) and nearly one fifth (N=70, 18.3%) of horse owners stated that there are no reasons that could convince them to change to group housing in the future. The other horse owners most frequently selected ‘if horses could be individually fed’ (N=179, 46.7%) and ‘if I would have the feeling that the people responsible for the horses are really familiar with group housing’ (N=177, 46.2%). Nearly as often ‘a greater variety of stables with group housing systems’ (N=155, 40.5%) and ‘if I would know a stable with group housing where the horses are really doing well’ (N=154, 40.2%) were selected. The reason which was mentioned the least was ‘if I would have more time to get the horses out of the group and return them again’ (N=10, 2.6%). Most of the eight responding stable owners with single housing indicated to change to group housing if they could afford it

(N=5, 62.5%). Around a third indicated as a reason to change if they would have less work with group housing (N=3, 37.5%). Reasons which were not chosen at all were related to legal regulations, scientific evidence and customers (Tab. 62). As well, 60 horse owners mentioned further reasons (see Annex IX, Tab. A9); eleven related to the horse itself, nine related to group composition, eight to training and riding possibilities, six to the housing concept, six to horse compatibility, and different other reasons. Two stable owners mentioned other reasons likewise, but no specific description of the reasons.

Tab. 62: Reasons to change from single to group housing in the future for horse and stable owners (multiple-choice questions)

	N	%
F82Reasons for horse owners (N=383)		
If the horses could be fed individually	179	46.7
If I would have the feeling that the people responsible for the horses are really familiar with group housing	177	46.2
Greater selection of stables with group housing systems	155	40.5
If I would know a stable with group housing where the horses are really doing well	154	40.2
If the stable management would reduce the risk of injury to a minimum	138	36.0
Better accessibility to a stable with group housing	123	32.1
If the horses would be protected from external man-induced events	106	27.7
If the other horses would be peaceful and I could catch the horses at any time	101	26.4
If my horses would be retired	98	25.6
If my horses would no longer be used for sports	80	20.9
There are no reasons that could convince me to switch	70	18.3
Other reasons	60	15.7
If I could afford it	29	7.6
If I would have more time to get the horses out of the group and return them again	10	2.6
F83Reasons for stable owners (N=8)		
If I could afford it	5	62.5
If I would work less because of the group housing	3	37.5
There are no reasons that could convince me to switch	2	25.0
If customer demand would increase	2	25.0
If there would be governmental subsidies for group housing systems	2	25.0
If I would have to renovate the stable, I would directly convert it to group housing	2	25.0
If I would have fewer running costs with group housing	2	25.0
If I would earn more money by the group housing	2	25.0
Other reasons	2	25.0
If I could keep more horses because of the group housing	1	12.5
If the legal regulations would change	0	0.0
If I would come to know about scientific studies that clearly demonstrate the advantages of group housing	0	0.0
If it would be scientifically proven that group housing increases the welfare of the horses	0	0.0
If I would lose customers to stables with group housing	0	0.0

3. 15. Influence of different persons on the choice of the selected housing system

Concerning the influence of different groups of persons on the choice of the housing system, the only persons that were rated as rather important, important or very important by a considerable amount of both horse and stable owners (40.1-47.4%) were veterinarians and friends (Tab. 63). The other groups were rated by a vast majority as very unimportant to rather unimportant. Of least importance for both horse and stable owners (with at least 60% of respondents rating 'very unimportant' for both) were horse traders, professional riders, certified instructors, vaulting instructors, hoof practitioners, horse professionals, agricultural scientists, farm animal scientists, horse organisations/associations/federations, stable construction companies and stable construction consultants.

Tab. 63: Influence of different groups of persons on the choice of the housing system of stable owners (SO) and horse owners (HO) in numbers (N) and percentage (%). SO&HO means both groups together. Responses on a 7-point Likert scale with 1 = very unimportant, 2 = unimportant, 3 = rather unimportant, 4 = neither important nor unimportant, 5 = rather important, 6 = important, 7 = very important. TN = total number of responses to this item. Persons with the highest influence are in bold.

F58Influence of persons on housing system	**Group**	**TN**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
			N	**N**	**N**	**N**	**N**	**N**	**N**
			%	**%**	**%**	**%**	**%**	**%**	**%**
Horse owners	SO&HO	1522	481	148	119	196	155	212	211
			31.6	9.7	7.8	12.9	10.2	13.9	13.9
	SO	129	31	17	10	17	17	19	18
			24.0	13.2	7.8	13.2	13.2	14.7	14.0
	HO	1393	450	131	109	179	138	193	193
			32.3	9.4	7.8	12.8	9.9	13.9	13.9
Stable owners/Stable managers	SO&HO	1491	500	158	105	182	161	189	196
			33.5	10.6	7.0	12.2	10.8	12.7	13.1
	SO	121	32	10	11	20	14	15	19
			26.4	8.3	9.1	16.5	11.6	12.4	15.7
	HO	1370	468	148	94	162	147	174	177
			34.2	10.8	6.9	11.8	10.7	12.7	12.9
Horse breeders	SO&HO	1343	762	192	77	119	54	77	62
			56.7	14.3	5.7	8.9	4.0	5.7	4.6
	SO	110	53	16	10	13	8	5	5
			48.2	14.5	9.1	11.8	7.3	4.5	4.5
	HO	1233	709	176	67	106	46	72	57
			57.5	14.3	5.4	8.6	3.7	5.8	4.6
Horse traders	SO&HO	1297	1046	151	47	31	13	7	2
			80.6	11.6	3.6	2.4	1.0	0.5	0.2
	SO	106	77	16	5	6	0	1	1
			72.6	15.1	4.7	5.7	0.0	0.9	0.9
	HO	1191	969	135	42	25	13	6	1
			81.4	11.3	3.5	2.1	1.1	0.5	0.1

Continuation of Tab. 63

F58Influence of persons on housing system	Group	TN	1 N %	2 N %	3 N %	4 N %	5 N %	6 N %	7 N %
Horse trainers	SO&HO	1365	712	152	65	145	117	111	63
			52.2	11.1	4.8	10.6	8.6	8.1	4.6
	SO	111	66	13	2	14	11	5	0
			59.5	11.7	1.8	12.6	9.9	4.5	0.0
	HO	1254	646	139	63	131	106	106	63
			51.5	11.1	5.0	10.4	8.5	8.5	5.0
Professional riders	SO&HO	1310	831	161	70	92	59	62	35
			63.4	12.3	5.3	7.0	4.5	4.7	2.7
	SO	105	63	19	5	10	5	2	1
			60.0	18.1	4.8	9.5	4.8	1.9	1.0
	HO	1205	768	142	65	82	54	60	34
			63.7	11.8	5.4	6.8	4.5	5.0	2.8
Riding instructors	SO&HO	1374	661	143	81	157	129	128	75
			48.1	10.4	5.9	11.4	9.4	9.3	5.5
	SO	110	63	15	7	10	5	7	3
			57.3	13.6	6.4	9.1	4.5	6.4	2.7
	HO	1264	598	128	74	147	124	121	72
			47.3	10.1	5.9	11.6	9.8	9.6	5.7
Certified instructors (DE: Übungsleiter)	SO&HO	1232	866	162	64	50	34	31	25
			70.3	13.1	5.2	4.1	2.8	2.5	2.0
	SO	105	70	17	4	5	5	2	2
			66.7	16.2	3.8	4.8	4.8	1.9	1.9
	HO	1127	796	145	60	45	29	29	23
			70.6	12.9	5.3	4.0	2.6	2.6	2.0
Vaulting instructors	SO&HO	1163	954	136	36	19	7	6	5
			82.0	11.7	3.1	1.6	0.6	0.5	0.4
	SO	97	77	15	3	1	1	0	0
			79.4	15.5	3.1	1.0	1.0	0.0	0.0
	HO	1066	877	121	33	18	6	6	5
			82.3	11.4	3.1	1.7	0.6	0.6	0.5
Veterinarians	**SO&HO**	**1434**	**365**	**83**	**69**	**246**	**220**	**252**	**199**
			25.5	**5.8**	**4.8**	**17.2**	**15.3**	**17.6**	**13.9**
	SO	**122**	**34**	**9**	**3**	**27**	**16**	**21**	**12**
			27.9	**7.4**	**2.5**	**22.1**	**13.1**	**17.2**	**9.8**
	HO	**1312**	**331**	**74**	**66**	**219**	**204**	**231**	**187**
			25.2	**5.6**	**5.0**	**16.7**	**15.5**	**17.6**	**14.3**
Other horse-related health care professions (e.g. osteopathy)	SO&HO	1335	587	124	64	139	144	160	117
			44.0	9.3	4.8	10.4	10.8	12.0	8.8
	SO	110	50	15	3	14	10	8	10
			45.5	13.6	2.7	12.7	9.1	7.3	9.1
	HO	1225	537	109	61	125	134	152	107
			43.8	8.9	5.0	10.2	10.9	12.4	8.7

Continuation of Tab. 63

F58Influence of persons on housing system	Group	TN	1 N %	2 N %	3 N %	4 N %	5 N %	6 N %	7 N %
Horse grooms (stablehand)	SO&HO	1230	778	149	59	93	70	43	38
			63.3	12.1	4.8	7.6	5.7	3.5	3.1
	SO	104	58	19	3	7	7	3	7
			55.8	18.3	2.9	6.7	6.7	2.9	6.7
	HO	1126	720	130	56	86	63	40	31
			63.9	11.5	5.0	7.6	5.6	3.6	2.8
Farriers	SO&HO	1341	631	133	76	147	142	131	81
			47.1	9.9	5.7	11.0	10.6	9.8	6.0
	SO	112	52	17	3	9	14	9	8
			46.4	15.2	2.7	8.0	12.5	8.0	7.1
	HO	1229	579	116	73	138	128	122	73
			47.1	9.4	5.9	11.2	10.4	9.9	5.9
Hoof care practitioners	SO&HO	1204	771	141	51	85	53	52	51
			64.0	11.7	4.2	7.1	4.4	4.3	4.2
	SO	100	61	15	3	5	7	3	6
			61.0	15.0	3.0	5.0	7.0	3.0	6.0
	HO	1104	710	126	48	80	46	49	45
			64.3	11.4	4.3	7.2	4.2	4.4	4.1
Horse professionals (DE: Pferdeprofis)	SO&HO	1252	795	140	72	104	61	52	28
			63.5	11.2	5.8	8.3	4.9	4.2	2.2
	SO	105	69	16	4	7	4	4	1
			65.7	15.2	3.8	6.7	3.8	3.8	1.0
	HO	1147	726	124	68	97	57	48	27
			63.3	10.8	5.9	8.5	5.0	4.2	2.4
Stable hands (DE: Pferdewirte)	SO&HO	1238	753	143	63	111	69	44	55
			60.8	11.6	5.1	9.0	5.6	3.6	4.4
	SO	107	57	15	3	10	6	4	12
			53.3	14.0	2.8	9.3	5.6	3.7	11.2
	HO	1131	696	128	60	101	63	40	43
			61.5	11.3	5.3	8.9	5.6	3.5	3.8
Farmers	SO&HO	1253	742	145	71	110	50	70	65
			59.2	11.6	5.7	8.8	4.0	5.6	5.2
	SO	107	48	14	4	12	5	15	9
			44.9	13.1	3.7	11.2	4.7	14.0	8.4
	HO	1146	694	131	67	98	45	55	56
			60.6	11.4	5.8	8.6	3.9	4.8	4.9
Equine scientists	SO&HO	1225	680	121	58	124	86	79	77
			55.5	9.9	4.7	10.1	7.0	6.4	6.3
	SO	99	52	8	6	10	4	12	7
			52.5	8.1	6.1	10.1	4.0	12.1	7.1
	HO	1126	628	113	52	114	82	67	70
			55.8	10.0	4.6	10.1	7.3	6.0	6.2

Continuation of Tab. 63

F58Influence of persons on housing system	Group	TN	1 N %	2 N %	3 N %	4 N %	5 N %	6 N %	7 N %
Agricultural scientists	SO&HO	1185	836 70.5	140 11.8	55 4.6	67 5.7	34 2.9	36 3.0	17 1.4
	SO	99	63 63.6	14 14.1	4 4.0	6 6.1	2 2.0	8 8.1	2 2.0
	HO	1086	773 71.2	126 11.6	51 4.7	61 5.6	32 2.9	28 2.6	15 1.4
Farm animal scientists	SO&HO	1182	839 71.0	135 11.4	63 5.3	67 5.7	33 2.8	28 2.4	17 1.4
	SO	99	61 61.6	15 15.2	6 6.1	9 9.1	2 2.0	6 6.1	0 0.0
	HO	1083	778 71.8	120 11.1	57 5.3	58 5.4	31 2.9	22 2.0	17 1.6
Behavioural biologists	SO&HO	1240	600 48.4	106 8.5	48 3.9	126 10.2	118 9.5	121 9.8	121 9.8
	SO	102	45 44.1	10 9.8	5 4.9	7 6.9	9 8.8	15 14.7	11 10.8
	HO	1138	555 48.8	96 8.4	43 3.8	119 10.5	109 9.6	106 9.3	110 9.7
Behavioural therapists	SO&HO	1199	715 59.6	114 9.5	60 5.0	89 7.4	81 6.8	71 5.9	69 5.8
	SO	102	54 52.9	12 11.8	5 4.9	10 9.8	8 7.8	8 7.8	5 4.9
	HO	1097	661 60.3	102 9.3	55 5.0	79 7.2	73 6.7	63 5.7	64 5.8
Friends and acquaintances	**SO&HO**	**1387**	**365 26.3**	**90 6.5**	**61 4.4**	**309 22.3**	**197 14.2**	**212 15.3**	**153 11.0**
	SO	**110**	**26 23.6**	**9 8.2**	**4 3.6**	**23 20.9**	**15 13.6**	**17 15.5**	**16 14.5**
	HO	**1277**	**339 26.5**	**81 6.3**	**57 4.5**	**286 22.4**	**182 14.3**	**195 15.3**	**137 10.7**
Horse Organisations/ Associations/Federations	SO&HO	1212	828 68.3	146 12.0	69 5.7	79 6.5	39 3.2	30 2.5	21 1.7
	SO	105	65 61.9	15 14.3	8 7.6	10 9.5	3 2.9	4 3.8	0 0.0
	HO	1107	763 68.9	131 11.8	61 5.5	69 6.2	36 3.3	26 2.3	21 1.9
Stable construction companies	SO&HO	1190	882 74.1	134 11.3	62 5.2	59 5.0	22 1.8	14 1.2	17 1.4
	SO	103	62 60.2	12 11.7	9 8.7	9 8.7	4 3.9	3 2.9	4 3.9
	HO	1087	820 75.4	122 11.2	53 4.9	50 4.6	18 1.7	11 1.0	13 1.2

Continuation of Tab. 63

F58Influence of persons on housing system	Group	TN	1 N %	2 N %	3 N %	4 N %	5 N %	6 N %	7 N %
Stable construction consultants	SO&HO	1175	897 76.3	135 11.5	54 4.6	46 3.9	18 1.5	8 0.7	17 1.4
	SO	102	63 61.8	12 11.8	8 7.8	9 8.8	3 2.9	2 2.0	5 4.9
	HO	1073	834 77.7	123 11.5	46 4.3	37 3.4	15 1.4	6 0.6	12 1.1

3. 16. Attitudes of the three stakeholder groups

3. 16. 1. Beliefs about housing systems (single and group housing)

The beliefs about housing systems were divided in four main topics (health, needs, housing and feeding of horses) and the individual answers for each topic can be found in four frequency tables in Annex X. For the PCA, the beliefs of all the topics have been analysed together.

With respect to the beliefs about the health of horses in relation to the housing system (see Tab. A10 in Annex X), a large majority (about 80%) of all the three groups (horse owners, stable owners and professionals) agreed (i.e. most respondents answered with rather agree, agree or fully agree) that group-housed horses have fewer behavioural disorders and that group housing is better for the welfare of the horses than single housing. Most of the respondents agreed or at least partly that horses kept in groups have less colics. All three groups completely disagreed to rather disagreed that the risk of injury in humans is higher in group housing and that single-housed horses are healthier. Furthermore, horse owners and professionals rather agreed or agreed that the risk of injury in horses is higher in group housing. The stable owners almost disagreed to the same amount as agreed on this item.

For the beliefs about the fulfilment of needs of horses in relation to housing (see Tab. A11 in Annex X), a large majority of all three groups (horse owners, stable owners and professionals) fully agreed with the statement that social contact with other horses is important for horses; also, most respondents agreed or completely agreed that horses kept in groups have more choices, can better fulfil their need for locomotion and the horses' need for social contact with other horses is not met in single housing. All three groups completely disagreed or disagreed that it is enough for horses to see other horses. For the item 'horses in group housing often cannot rest long enough in a lying position' was more disagreement than agreement by the horse owners and stable owners, but about 30% gave a neutral (neither agree nor disagree) response too. The responses of the professionals were almost evenly distributed between the response options. There was the highest diversity in agreements for

the item ‘It is enough if horses are on pasture with other horses during the day’ between stable owners, horse owners and professionals.

For the beliefs about the housing of horses (see Tab. A12 in Annex X), all three groups (horse owners, stable owners and professionals) rather agreed to completely agreed that young horses should be housed with older horses, group housing requires competent observation of the horses and individually adapted management, group-housed horses are more balanced and more pleasant to handle, and group housing is not suitable for horses that do not get along with other horses. All three groups completely disagreed to rather disagreed that handling is easier with a singled-housed horse, horses are more willing to perform when they are in the box – constant paddock makes them tired, constant group-housed horses stick more to the herd, horses that are kept in groups during the day must be put in single boxes at night so that they can sleep, removing a horse from the group is difficult and dangerous, retired horses cannot be expected to change from single to group housing, group housing is not suitable for sport horses and for clipped horses; and stallions cannot be housed in groups. The responses for the items ‘the familiarization of a new horse into the group is difficult’ and ‘group housing is suitable for all horses’ were more variable for all three groups. Moreover, the responses of horse owners and professionals were almost evenly distributed for the items ‘low-ranked horses have a problem in group housing’ and ‘hunting and bullying is a problem in group housing’ whereas the stable owners more disagreed with both items.

For the beliefs about the feeding of horses (see Tab. A13 in Annex X), all three groups (horse owners, stable owners and professionals) agreed that single-housed horses are individually-adapted fed. All three groups completely disagreed to rather disagreed that group-housed horses cannot eat undisturbed and be fed individually, and that the feeding of the horses in a group is problematic.

3. 16. 1. 1. PCA of beliefs about housing systems (single and group housing)

Using PCA, the items of the attitude questions on beliefs about housing systems (single and group housing) were reduced to three distinct components (Tab. 64, scree plot see Annex XI, Fig. A13). The three components accounted for 43.5% of the variance. Bartlett’s test of sphericity was significant ($p<0.000$) and the KMO criterion was 0.955. 23 out of 35 items could be grouped into these three components. The first component included eight items that all relate to potential problems or negative effects of group housing on welfare of horses (e.g. low-ranked horses have a problem in group housing, all items see Tab. 64) and was thus labelled as **ProblemWelfareGH**. The second component included seven items that relate to positive

effects on health and the enhancement of welfare of horses in group housing (e.g. group housing is better than single housing for the welfare of the horses, all items see Tab. 64) and was thus labelled as **posWelfareGH**. The third component included eight items that all relate to negative effects and problems of group housing for the human and unsuitability of group housing for specific categories of horses (e.g. removing a horse from the group is difficult, all items see Tab. 64) and was thus labelled as **negHumanGH**. In total, 12 items did not fulfil the requirements because the loadings were not high enough on any component or there were loadings on two components (see Tab. 64) and were thus not included in any of the components calculated for further analysis. Cronbach's alphas for the three final components were very good with 0.842 (N=2279) for ProblemWelfareGH, 0.886 (N=2104) for posWelfareGH and 0.828 (N=2121) for negHumanGH. The descriptive statistics of the components for the beliefs about housing systems (single and group housing) for the three different stakeholder groups can be found in Tab. A16 in Annex XII.

Tab. 64: Varimax rotated component matrix showing the loadings of the 35 items of beliefs about housing systems (N=2177 - 2465) on the three extracted components. Items included in the final components are shown in bold. Order of items corresponds to the questionnaire.

	Label of final component (bold items included)		
	C1 ProblemWelfareGH	**C2 posWelfareGH**	**C3 negHumanGH**
Explained variance (%)	33.0	6.0	4.5
Risk of injury in horses is higher in group housing	0.472	-0.140	0.408
Risk of injury in humans is higher in group housing	0.327		0.566
Single-housed horses are healthier	0.221	-0.447	0.418
Group-housed horses have fewer behavioural disorders	-0.202	**0.749**	-0.139
Group housing is better than single housing for the welfare of the horses	-0.280	**0.754**	-0.178
Horses kept in groups have less colics	-0.261	**0.683**	
Social contact with other horses is important for horses	0.109	0.351	-0.402
It is enough for horses to see other horses		-0.339	0.488
Horses in group housing often cannot rest long enough in a lying position	**0.653**	-0.293	0.182
Horses kept in groups have more choices	-0.266	**0.633**	-0.172
Horses in group housing can better fulfil their need for locomotion	-0.146	**0.696**	-0.184
The need for social contact with other horses is not met in single housing	-0.183	**0.678**	-0.197
It is enough if horses are on the pasture with other horses during the day	0.472	-0.392	0.216

Continuation of Tab. 64

	Label of final component (bold items included)		
	C1 ProblemWelfareGH	**C2 posWelfareGH**	**C3 negHumanGH**
Young horses should be housed with older horses		0.237	-0.217
Handling is easier with a singled-housed horse	0.236	-0.237	**0.624**
Horses are more willing to perform when they are in the box - constant paddock makes them tired	0.226	-0.248	**0.549**
Group housing requires competent observation of the horses and individually adapted management	**0.489**	0.143	
Constant group-housed horses stick more to the herd	0.191		**0.611**
The familiarization of a new horse into the group is difficult	0.493		0.325
Low-ranked horses have a problem in group housing	**0.654**	-0.264	0.294
Group-housed horses are more balanced and more pleasant to handle	-0.312	**0.713**	-0.238
Horses that are kept in groups during the day must be put in single boxes at night so that they can sleep	**0.531**	-0.263	0.257
Removing a horse from the group is difficult	0.306	-0.136	**0.660**
Removing a horse from the group is dangerous	0.338		**0.652**
Retired horses cannot be expected to change from single to group housing	0.346	-0.162	0.162
Group housing is not suitable for sport horses	0.253	-0.338	**0.606**
Group housing is not suitable for clipped horses	0.149	-0.122	**0.519**
Stallions cannot be housed in groups	0.202	-0.191	**0.407**
Group housing is not suitable for horses that do not get along with other horses	**0.553**	-0.160	0.172
Group housing is suitable for all horses	-0.538	0.329	-0.122
Hunting and 'bullying' is a problem in group housing	**0.623**	-0.244	0.243
Single-housed horses are individually-adapted fed	0.376	-0.149	0.166
Group-housed horses cannot eat undisturbed	**0.622**	-0.325	0.317
Feeding the horses in a group is problematic	**0.600**	-0.267	0.308
Group-housed horses cannot be fed individually	0.398	-0.213	0.258

3. 16. 2. Beliefs about horses' needs

For the beliefs about the importance of the fulfilment of needs of horses (see Tab. A14 in Annex X), all three groups (horse owners, stable owners and professionals) found it very important for the well-being of the horses to allow the horses to move freely on a regular basis, to constantly have roughage available, to keep the horses in a stable group, to enable the horses access to a pasture, to provide the horses turn-out with conspecifics and to be able to spend time in the social group undisturbed by humans. All three groups found it rather important to very important for the horses to have contact with humans and to work the horses.

3. 16. 2. 1. PCA of beliefs about horses' needs

Using PCA, the items of the attitude question on the importance of the fulfilment of horses' needs were reduced to two distinct components (Tab. 65, scree plot see Annex XI, Fig. A14) which accounted for 48.8% of the variance. Bartlett's test of sphericity was significant ($p<0.000$), and the KMO criterion was 0.660. All but one of the items could be grouped into these components. The first component included five items that all relate to the social, nutritional and locomotional needs of horses (e.g. How important for the well-being of horses is it to provide the horses turn-out with conspecifics?, all items see Tab. 65) and was thus labelled as **WelfareHorse**. The second component included two items that relate to the horses' need of having contact with humans and the necessity of working the horses (e.g. How important for the well-being of horses is it to have contact with humans?, all items see Tab. 65) and was thus labelled as **WorkContactHuman**. In total, one item did not fulfil the requirements because there were loadings on two components (see Tab. 65) and was thus not included in any of the components calculated for further analysis. Cronbach's alphas for the two final components were 0.614 (N=2415) for WelfareHorse and 0.691 (N=2441) for WorkContactHuman. The descriptive statistics of the components for the beliefs about the importance of fulfilment of horses' needs for the three different stakeholder groups can be found in Tab. A17 in Annex XIII.

Tab. 65: Varimax rotated component matrix showing the loadings of the eight items of beliefs about horses' needs (N=2438 - 2451) on the two extracted components. Items included in the final component are shown in bold. Order of items corresponds to the questionnaire.

	Label of final component (bold items included)	
	C1 WelfareHorse	C2 WorkContactHuman
Explained variance (%)	28.6	20.2
How important for the well-being of horses is it to …		
… allow horses to move freely on a regular basis?	**0.625**	
… constantly have roughage available?	**0.408**	0.164
… keep the horses in a stable group?	**0.579**	0.126
… enable the horses access to a pasture?	0.325	0.415
… provide the horses turn-out with conspecifics?	**0.796**	
… be able to spend time in the social group undisturbed by humans?	**0.795**	
… have contact with humans?		**0.840**
… work the horses?		**0.839**

3. 16. 3. Affective attitudes towards interactions with horses

For the affective attitudes (see Tab. A15 in Annex X), all three groups (horse owners, stable owners and professionals) rather disliked the contact with horses when yelling at the horses if necessary and when physical reprimanding of the horses is necessary; however, the responses were more or less evenly distributed between dislike very much to neither like nor dislike (neutral). The other items of the affective attitudes (feeding the horses, caring for the sick horses, petting the horses, observing the horses on the pasture, observing the horses in the stable, training the horses, grooming the horses, riding the horses, walking the horses, working in-hand/groundwork, walking through the group and removing a horse from its group) were rated as like or like very much by the stakeholder groups.

3. 16. 3. 1. PCA of affective attitudes

Using PCA, the different situations were reduced to two distinct components (Tab. 66, scree plot see Annex XI, Fig. A15) which accounted for 36.8% of the variance. Bartlett's test of sphericity was significant ($p<0.000$) and the KMO criterion was 0.726. Most of the situation items could be grouped into meaningful components. The first component included nine items that all relate to potentially positive interactions with the horse (e.g. petting the horses, all items see Tab. 66) and was thus labelled as **posInteract.** The second component included two items that relate to negative human behaviour towards the horses (i.e. yelling at the horses if necessary, physical reprimanding the horse if necessary; for loadings see Tab. 66) and was thus labelled as **negBeh**. In total, three items did not fulfil the requirements because the

loadings were not high enough on any component or there were loadings on two components (see Tab. 66) and were thus not included in any of the components calculated for further analysis. Cronbach's alphas for the two final components were good with 0.731 (N=2302) for posInteract and 0.699 (N=2407) for negBeh. The descriptive statistics of the components for the affective attitudes for the three different stakeholder groups can be found in Tab. A18 in Annex XIV.

Tab. 66: Varimax rotated component matrix showing the loadings of the 14 affective attitudes (N=2384 - 2443) on the two extracted components. Items included in the final components are shown in bold. Order of items corresponds to the questionnaire.

	Label of final component (bold items included)	
	C1 posInteract	**C2 negBeh**
Explained variance (%)	24.8	12.0
Like/do not like contact with horses in the following situations:		
Feeding the horses	**0.560**	
Caring for the sick horses	0.395	0.183
Petting the horses	**0.650**	
Observing the horses on the pasture	**0.590**	
Observing the horses in the stable	**0.419**	0.247
Training the horses	0.413	0.476
Yelling at the horses if necessary	-0.183	**0.770**
Grooming the horses	**0.610**	0.172
Riding the horses	0.396	0.413
Walking the horses	**0.592**	-0.120
Working in-hand/groundwork with the horses	**0.602**	
Physical reprimanding of the horses if necessary	-0.128	**0.762**
Walking through the group	**0.517**	
Removing a horse from its group	**0.531**	

3. 17. Differences in attitudes according to used housing system in horse and stable owners

No significant difference was found for horse versus stable owners in any of the attitudes (Tab. 67). All but two of the attitude components differed between respondents that kept horses in single housing from respondents with group housing and from respondents with combined single and group housing (Tab. 67). Regarding the beliefs about the horses' needs to have contact to and being worked by humans (WorkContactHumans) as well as the affective attitudes related to negative human behaviour towards the horses (negBeh), respondents with single housing and with combined single/group housing did not differ from each other but both differed from respondents with group housing in that respondents with group housing rated it less important (Tab. 67). In general, respondents with group housing rated the attitudes related to group housing, horse' needs and interactions with horses more positively than the respondents with single housing, while the respondents with the combination rated them in-between.

Tab. 67: ANOVA (Analysis of variance) for the beliefs about housing systems, beliefs about horses' needs and affective attitudes in dependence of the group (Group; horse owners, HO; stable owners, SO) and the housing system (HouSy) (in bold) of their horses (SH = single housing, GH = group housing, SHGH = single and group housing). Values with different letters were significant on different levels, values with the same letters not. df = degrees of freedom, F = F-value, p = level of significance, SE = Standard error

Attitude Component	Adj. R^2/ Corrected model (sig.)		df	F	p	Partial Eta Squared (η^2_p)	Estimated means ± SE			Estimated means ± SE	
							SH	GH	SHGH	HO	SO
Beliefs about housing systems											
ProblemWelfareGH	0.286/0.000	HouSy	2	307.02	**p<0.001**	0.282	4.56 ± 0.058[a]	3.29 ± 0.044[b]	4.02 ± 0.057[c]		
		Group	1	2.89	0.089	0.002				4.02 ± 0.024	3.89 ± 0.079
posWelfareGH	0.360/0.000	HouSy	2	433.17	**p<0.001**	0.357	4.65 ± 0.061[a]	6.24 ± 0.046[b]	5.41 ± 0.060[c]		
		Group	1	0.97	0.326	0.001				5.39 ± 0.025	5.47 ± 0.082
negHumanGH	0.202/0.000	HouSy	2	198.17	**p<0.001**	0.203	3.33 ± 0.061[a]	2.25 ± 0.047[b]	2.85 ± 0.061[c]		
		Group	1	0.14	0.708	0.000				2.79 ± 0.026	2.83 ± 0.083
Beliefs about horses' needs											
WelfareHorse	0.057/0.000	HouSy	2	47.81	**p<0.001**	0.058	6.30 ± 0.034[a]	6.60 ± 0.026[b]	6.48 ± 0.033[c]		
		Group	1	0.03	0.869	0.000				6.47 ± 0.014	6.46 ± 0.046
WorkContactHuman	0.010/0.000	HouSy	2	7.93	**p<0.001**	0.010	5.09 ± 0.087[i]	4.85 ± 0.067[j]	5.13 ± 0.086[i]		
		Group	1	1.67	0.196	0.001				5.10 ± 0.037	4.94 ± 0.118
Affective Attitudes											
posInteract	0.050/0.000	HouSy	2	42.36	**p<0.001**	0.052	5.72 ± 0.044[a,i]	6.08 ± 0.033[b]	5.88 ± 0.043[a,j]		
		Group	1	0.08	0.774	0.000				5.91 ± 0.018	5.89 ± 0.059
negBeh	0.007/0.002	HouSy	2	7.28	**0.001**	0.009	3.25 ± 0.091[x,j]	3.01 ± 0.069[y,i]	3.30 ± 0.090[x,j]		
		Group	1	0.00	0.966	0.000				3.19 ± 0.038	3.19 ± 0.124

[a, b, c] = post-hoc test (Bonferroni) p<0.001, [i, j, k] = post-hoc test (Bonferroni) p<0.01, [x, y, z] = post-hoc test (Bonferroni) p<0.05

3. 18. Correlations between attitude components for all groups

3. 18. 1. Correlations between beliefs about housing systems

The three components of the beliefs about the group or single housing were correlated with each other moderately (see Tab. 68).

The more respondents agreed on negative beliefs about group housing with respect to effects on horse health and welfare (ProblemWelfareGH), the more they also agreed on problems or disadvantages for humans (negHumanGH), but the lower was the agreement on positive effects of group housing on health and welfare of horses (posWelfareGH). As well, the more respondents agreed on positive effects of group housing on health and welfare of horses (posWelfareGH), the lower was the agreement on problems or disadvantages of group housing for humans (negHumanGH).

3. 18. 2. Correlations between beliefs about housing systems and horses' needs

The three components of the beliefs about housing systems correlated low with beliefs about the importance for horses to perform species-specific behaviour (WelfareHorse) (see Tab. 68).

The more the respondents agreed on negative beliefs about group housing with respect to effects on horse health and welfare (ProblemWelfareGH) and the more they agreed on problems or disadvantages of group housing for humans (negHumanGH), the lower they rated the importance for horses to perform species-specific behaviour (WelfareHorse). The more respondents found it important for the horses to perform species-specific behaviour (WelfareHorse), the higher was the agreement on positive effects of group housing on the health and welfare of horses (posWelfareGH).

3. 18. 3. Correlations between beliefs about housing systems and affective attitudes

The three components of the beliefs about housing systems correlated weakly with the affective attitudes related to potentially positive interactions with the horse (posInteract) (see Tab. 68).

The more the respondents agreed on negative beliefs about group housing with respect to effects on horse health and welfare (ProblemWelfareGH) and the more they agreed on problems or disadvantages of group housing for humans (negHumanGH), the less they liked positive interactions with horses (posInteract). The more the respondents liked positive

interactions with horses (posInteract), the more they agreed on positive effects of group housing on the health and welfare of horses (posWelfareGH).

3. 18. 4. Correlations between beliefs about the horses' needs and the affective attitudes

There was a weak correlation between the beliefs about horses' needs to perform species-specific behaviour (WelfareHorse) and the affective attitudes related to potentially positive interactions with the horse (posInteract) (see Tab. 68).

The higher the respondents rated the importance of horses to perform species-specific behaviour (WelfareHorse), the more they liked potentially positive interactions with the horse (posInteract).

Tab. 68: Spearman rank correlation coefficients (rs) for the beliefs about housing systems, beliefs about horses' needs and affective attitudes over all respondent groups. p = level of significance, N = number of responses. All coefficients ≥ │0.2│ in bold.

Attitude components			Pos WelfareGH	Neg HumanGH	Welfare Horse	Work Contact Human	Pos Interact	Neg Beh
Beliefs about housing systems	ProblemWelfareGH	r_s	**-0.590**	**0.630**	**-0.232**	0.126	**-0.269**	0.108
		p	0.000	0.000	0.000	0.000	0.000	0.000
		N	2467	2462	2455	2452	2446	2434
	posWelfareGH	r_s	1.000	**-0.541**	**0.383**	-0.124	**0.258**	-0.103
		p		0.000	0.000	0.000	0.000	0.000
		N	2468	2460	2453	2450	2445	2433
	negHumanGH	r_s	-0.541	1.000	**-0.319**	0.181	**-0.339**	0.159
		p	0.000		0.000	0.000	0.000	0.000
		N	2460	2462	2453	2450	2444	2432
Beliefs about horses' needs	WelfareHorse	r_s	0.383	-0.319	1.000	0.049	**0.278**	-0.093
		p	0.000	0.000		0.016	0.000	0.000
		N	2453	2453	2455	2452	2445	2434
	WorkContactHuman	r_s	-0.124	0.181	0.049	1.000	0.167	0.161
		p	0.000	0.000	0.016		0.000	0.000
		N	2450	2450	2452	2452	2443	2432
Affective attitudes	posInteract	r_s	0.258	-0.339	0.278	0.167	1.000	-0.045
		p	0.000	0.000	0.000	0.000		0.027
		N	2445	2444	2445	2443	2450	2438

3. 19. Professionals' recommendation of group and single housing systems as well as in relation to the type of horses

The question about the housing and turn-out recommendation for healthy horses was answered by 1110 professionals. The most recommendations given by the professionals (see Tab. 69) were for group housing in multiple-room open barn with structured turn-out (N=678, 61.1%). About 50% recommended group housing in multiple-room open barn with turn-out and around 40% indicated that they would recommend single housing in turn-out/loose boxes with additional pasture in the group. About a third of each of the answers were given for group housing permanently on pasture (N=398, 35.9%), for single housing in outdoor boxes with additional pasture in the group (N=361, 32.5%) and for group housing in one-room open barn with turn-out (N=303, 27.3%). The least recommended housing systems by the professionals were the single housing in indoor boxes without additional pasture (N=9, 0.8%) and tethering (N=2, 0.2%). In total, 1544 times a single housing system was recommended, with the most for 'Single housing in turn-out/loose boxes with additional pasture in the group' and 2189 times a group housing with the most for 'Group housing in multiple-room open barn with structured turn-out' (Tab. 69). Some of the recommendations in the 'other'-section were group housing for youngsters (1x), group housing on pasture during summer and in boxes during winter (1x), and group housing on pasture during the day and in single boxes during the night (3x). Some others did not mention a housing system but specifications: depending on the personality and the individual needs of the horse (6x), depending on the position of the horse in the group (1x), depending on the horse compatibility (2x), and depending on age and use of the horse (1x).

The professionals were asked in addition about their recommendation of single and/or group housing for different categories of horses and sexes for healthy horses (see Tab. 70). The majority of the professionals recommended group housing for all the categories and sexes; however, about 25% recommended single housing for sport horses. Only the recommendations for stallions of the categories breeding horses, for commercial use and working horses were almost equally divided between single and group housing. Stallions from the category sport horses, however, were more recommended to be housed in single housing.

Tab. 69: Number (N) and percentage (%) of recommendations of group and single housing systems by the professionals (PG) (multiple-choice question)

F65 Recommendation of housing system by PG (N=1110)	N	%
Tethering	2	0.2
Single housing in indoor boxes (no outdoor opening) without additional pasture	9	0.8
Single housing in indoor boxes with additional pasture individually	84	7.6
Single housing in indoor boxes with additional pasture in the group	199	17.9
Single housing in outdoor boxes (with outdoor opening) without additional pasture	21	1.9
Single housing in outdoor boxes with additional pasture individually	167	15.0
Single housing in outdoor boxes with additional pasture in the group	361	32.5
Single housing in turn-out/loose boxes (DE: Auslaufboxen) without additional pasture	15	1.4
Single housing in turn-out/loose boxes with additional pasture individually	203	18.3
Single housing in turn-out/loose boxes with additional pasture in the group	449	40.5
Single housing permanently on pasture	34	3.1
Group housing in one-room open barn (DE: Einraum-Laufstall)	73	6.6
Group housing in multiple-room open barn (DE: Mehrraum-Laufstall)	193	17.4
Group housing in one-room open barn with turn-out (constantly accessible)	303	27.3
Group housing in multiple-room open barn with turn-out (constantly accessible)	544	49.0
Group housing in multiple-room open barn with structured turn-out (constantly accessible) (e.g. Loose housing, Open-Barn system, Paddock Trail, Active-stable)	678	61.1
Group housing permanently on pasture	398	35.9
Other	37	3.3

Tab. 70: Professionals' recommendations (N) of single housing and/or group housing for different types of horses. TN = total number of responses for each horse category and sex. (matrix/tick-off)

F66Recommendation of SH/GH for different types of horses by PG			Recommendation of single housing		Recommendation of group housing	
		TN	N	%	N	%
Sport horses	mares	1050	276	26.3	774	73.7
	geldings	1058	244	23.1	814	76.9
	stallions	996	586	58.8	410	41.2
Breeding horses	mares	1057	50	4.7	1007	95.3
	geldings	934	29	3.1	905	96.9
	stallions	979	531	54.2	448	45.8
Horses for commercial use	mares	1030	143	13.9	887	86.1
	geldings	1030	135	13.1	895	86.9
	stallions	962	514	53.4	448	46.6
Working horses	mares	1027	115	11.2	912	88.8
	geldings	1031	112	10.9	919	89.1
	stallions	966	489	50.6	477	49.4
Leisure horses	mares	1047	44	4.2	1003	95.8
	geldings	1048	43	4.1	1005	95.9
	stallions	972	435	44.8	537	55.2
Retired horses	mares	1052	33	3.1	1019	96.9
	geldings	1056	31	2.9	1025	97.1
	stallions	984	326	33.1	658	66.9
Horses unused	mares	1053	10	0.9	1043	99.1
	geldings	1062	10	0.9	1052	99.1
	stallions	985	289	29.3	696	70.7

3. 20. Reasons for professionals' recommendation of a housing system

3. 20. 1. Reasons for professionals' recommendation of single housing

The following reasons for professionals to recommend single housing (see Tab. 71) were considered as rather important to very important: 'risk of injury is too high in group housing', control and care is easier, knowledge of good examples and facilitation of the horses' care. The reasons considered as very unimportant or unimportant for the recommendation were: 'consider it the best housing system', is cheaper, has less disadvantages for the horses, is beneficial for the horses' health, 'better protection from external man-induced events', 'bad experiences with group housing' and ease of handling. The responses for the item 'facilitation of the use of the horses' were more variable.

Tab. 71: Frequencies of reasons for professionals' (PG) recommendation of single housing (SH). Responses on a 7-point Likert scale with 1 = very unimportant, 2 = unimportant, 3 = rather unimportant, 4 = neither important nor unimportant, 5 = rather important, 6 = important, 7 = very important. TN = total number of responses to this item.

F67Reasons for professionals' recommendation of single housing	**TN**	**1** **N** **%**	**2** **N** **%**	**3** **N** **%**	**4** **N** **%**	**5** **N** **%**	**6** **N** **%**	**7** **N** **%**
Consider it the best housing system	600	194 32.3	59 9.8	42 7.0	177 29.5	31 5.2	49 8.2	48 8.0
Single housing is cheaper	590	291 49.3	120 20.3	67 11.4	93 15.8	6 1.0	11 1.9	2 0.3
Single housing has less disadvantages for the horses than group housing	593	161 27.2	86 14.5	58 9.8	191 32.2	35 5.9	38 6.4	24 4.0
Single housing is beneficial for the health of the horses	596	162 27.2	59 9.9	49 8.2	183 30.7	54 9.1	45 7.6	44 7.4
Risk of injury is too high in group housing	618	68 11.0	58 9.4	58 9.4	177 28.6	83 13.4	97 15.7	77 12.5
Control and care of the horses is easier in single housing	617	65 10.5	43 7.0	49 7.9	119 19.3	109 17.7	145 23.5	87 14.1
Better protection from external man-induced events	596	157 26.3	86 14.4	72 12.1	113 19.0	59 9.9	58 9.7	51 8.6
Knowledge of good examples for single housing	595	72 12.1	47 7.9	41 6.9	138 23.2	59 9.9	139 23.4	99 16.6
Facilitation of the care for the horses	603	69 11.4	50 8.3	47 7.8	157 26.0	106 17.6	105 17.4	69 11.4
Facilitation of the use of the horses	603	100 16.6	82 13.6	61 10.1	120 19.9	99 16.4	88 14.6	53 8.8
Bad experiences with group housing	593	204 34.4	73 12.3	57 9.6	139 23.4	35 5.9	52 8.8	33 5.6
Handling of the horses is easier	588	108 18.4	79 13.4	50 8.5	157 26.7	75 12.8	79 13.4	40 6.8

3. 20. 2. PCA of reasons for professionals' recommendation of single housing

Using PCA, the reasons for professionals' recommendation of single housing were reduced to components and the analysis revealed that respondents rated the reasons on two distinct components (Tab. 72, scree plot see Annex XV, Fig. A16) which accounted for 57.9% of the variance. Bartlett's test of sphericity was significant ($p<0.000$) and the KMO criterion was 0.918. Almost all of the items could be grouped into meaningful components. The first component included five items that all relate to advantages for the horses in single housing (e.g. single housing is beneficial for the health of the horse, all items see Tab. 72) and was thus labelled as **PGSHReasons_AdvantHorse**. The second component included five items that all relate to ease of management of the horses in single housing (e.g. facilitation of the care for the horses, all items see Tab. 72) and was thus labelled as **PGSHReasons_AdvantHuman**. Two items did not fulfil the requirements because there were loadings on two components (see Tab. 72) and were thus not included in any of the components calculated for further analysis. Cronbach's alphas for the two final components were very good with 0.835 (N=551) for PGSHReasons_AdvantHorse and 0.829 (N=565) for PGSHReasons_AdvantHuman.

Tab. 72: Varimax rotated component matrix showing the loadings of the 12 items of reasons for professionals' recommendation of single housing (N=588 - 618) on the two extracted components. Items included in the final components are shown in bold. Order of items corresponds to the questionnaire.

	Label of final component (bold items included)	
	C1 PGSHReasons_ AdvantHorse	**C2 PGSHReasons_ AdvantHuman**
Explained variance (%)	47.8	10.2
Consider it the best housing system	**0.696**	0.164
Single housing is cheaper	0.102	**0.450**
Single housing has less disadvantages for the horses than group housing	**0.775**	0.264
Single housing is beneficial for the health of the horses	**0.805**	0.246
Risk of injury is too high in group housing	**0.649**	0.363
Control and care of the horses is easier in single housing	0.184	**0.786**
Better protection from external man-induced events	0.310	0.527
Knowledge of good examples for single housing	0.585	0.487
Facilitation of the care for the horses	0.276	**0.839**
Facilitation of the use of the horses	0.275	**0.775**
Bad experiences with group housing	**0.745**	0.208
Handling of the horses is easier	0.381	**0.701**

3. 20. 3. Reasons for professionals' recommendation of group housing

The following reasons for professionals to recommend group housing (see Tab. 73) were considered as important or very important: 'consider it the best housing system', it has less disadvantages for the horses than single housing, it is beneficial for the horses' health, 'knowledge of good examples' and 'bad experiences with single housing'. The reasons considered as very unimportant to rather unimportant were: it is cheaper, 'risk of injury is too high in single housing', 'control and care of the horses is easier' and 'better protection from external man-induced events'. Facilitation of the care and of the use of the horses as well as the ease of handling were considered almost equally unimportant (very unimportant to rather important), neutral or important (rather important to very important).

Tab. 73: Frequencies of reasons for professionals' (PG) recommendation of group housing (GH). Responses on a 7-point Likert scale with 1 = very unimportant, 2 = unimportant, 3 = rather unimportant, 4 = neither important nor unimportant, 5 = rather important, 6 = important, 7 = very important. TN = total number of responses to this item.

F69Reasons for professionals' recommendation of group housing	TN	1 N %	2 N %	3 N %	4 N %	5 N %	6 N %	7 N %
Consider it the best housing system	873	10 1.1	6 0.7	10 1.1	94 10.8	39 4.5	142 16.3	572 65.5
Group housing is cheaper	855	165 19.3	137 16.0	130 15.2	228 26.7	87 10.2	62 7.3	46 5.4
Group housing has less disadvantages for the horses than single housing	864	10 1.2	22 2.5	22 2.5	189 21.9	71 8.2	207 24.0	343 39.7
Group housing is beneficial for the health of the horses	874	4 0.5	10 1.1	11 1.3	95 10.9	78 8.9	198 22.7	478 54.7
Risk of injury is too high in single housing	828	244 29.5	172 20.8	120 14.5	211 25.5	27 3.3	32 3.9	22 2.7
Control and care of the horses is easier in group housing	841	126 15.0	160 19.0	130 15.5	291 34.6	60 7.1	42 5.0	32 3.8
Better protection from external man-induced events	810	172 21.2	140 17.3	147 18.1	223 27.5	39 4.8	48 5.9	41 5.1
Knowledge of good examples for group housing	862	10 1.2	6 0.7	4 0.5	76 8.8	67 7.8	209 24.2	490 56.8
Facilitation of the care for the horses	846	66 7.8	95 11.2	106 12.5	320 37.8	97 11.5	71 8.4	91 10.8
Facilitation of the use of the horses	842	77 9.1	119 14.1	125 14.8	259 30.8	74 8.8	95 11.3	93 11.0
Bad experiences with single housing	827	90 10.9	94 11.4	70 8.5	214 25.9	71 8.6	139 16.8	149 18.0
Handling of the horses is easier	831	78 9.4	99 11.9	65 7.8	287 34.5	94 11.3	103 12.4	105 12.6

3. 20. 4. PCA of reasons for professionals' recommendation of group housing

Using PCA, the reasons for professionals' recommendation of group housing were reduced to two distinct components (Tab. 74, scree plot see Annex XV, Fig. A17) which accounted for 52.7% of the variance. Bartlett's test of sphericity was significant ($p<0.000$) and the KMO criterion was 0.869. All of the items could be grouped into these two components. The first component included seven items that all relate to the ease of management of horses in group housing (e.g. control and care of the horses is easier in group housing, all items see Tab. 74) and was thus labelled as **PGGHReasons_AdvantHuman**. The second component included five items that all relate to advantages for the horses in group housing (e.g. group housing is beneficial for the health of the horses, all items see Tab. 74) and was thus labelled as **PGGHReasons_AdvantHorse**. Cronbach's alphas for the two final components were very good with 0.824 (N=749) for PGGHReasons_AdvantHuman and good with 0.763 (N=818) for PGGHReasons_AdvantHorse.

Tab. 74: Varimax rotated component matrix showing the loadings of the 12 items of reasons for professionals' recommendation of group housing (N=810 - 874) on the two extracted components. Items included in the final components are shown in bold. Order of items corresponds to the questionnaire.

	Label of final component (bold items included)	
	C1 PGGHReasons_ AdvantHuman	**C2 PGGHReasons_ AdvantHorse**
Explained variance (%)	37.3	15.4
Consider it the best housing system		**0.805**
Group housing is cheaper	**0.579**	
Group housing has less disadvantages for the horses than single housing	0.159	**0.776**
Group housing is beneficial for the health of the horses	0.130	**0.829**
Risk of injury is too high in single housing	**0.594**	0.111
Control and care of the horses is easier in group housing	**0.773**	0.149
Better protection from external man-induced events	**0.672**	0.118
Knowledge of good examples for group housing	0.119	**0.663**
Facilitation of the care for the horses	**0.763**	0.250
Facilitation of the use of the horses	**0.704**	0.334
Bad experiences with single housing	0.200	**0.524**
Handling of the horses is easier	**0.652**	0.314

3. 20. 5. Descriptive statistics of the components from the PCA of reasons for professionals' recommendation of single and group housing

Professionals recommending single housing (see Tab. 75) rated the reasons related to advantages for the horses in single housing (PGSHReasons_AdvantHorse) and the reasons related to the ease of management of the horses in single housing (PGSHReasons_AdvantHuman) as rather unimportant; even though the reasons related to the ease of management were rated as more important than the advantages for the horse in single housing. The ones recommending group housing (see Tab. 75) found the reasons related to the ease of management of horses in group housing (PGGHReasons_AdvantHuman) rather unimportant; whereas, the reasons related to advantages for the horses in group housing (PGGHReasons_AdvantHorse) rather important. So also here, a numerically reverse could be constated between the reasons for single housing and the reasons for group housing as already has been described in the horse owners' and stable owners' reasons for the specific housing systems.

Tab. 75: Descriptive statistics of the components from PCA for reasons for professionals' (PG) recommendation of single housing and group housing, SD = standard deviation

Reasons for recommendation	N-Valid	N-Missing	Mean	SD	Min	Q25	Median	Q75	Max
Reasons for single housing									
PGSHReasons_AdvantHorse	626	498	3.4	1.48	1.0	2.2	3.4	4.4	7.0
PGSHReasons_AdvantHuman	625	499	3.7	1.39	1.0	2.6	3.8	4.8	7.0
Reasons for group housing									
PGGHReasons_AdvantHuman	875	249	3.6	1.20	1.0	2.7	3.6	4.3	7.0
PGGHReasons_AdvantHorse	879	245	5.7	1.04	1.4	5.2	6.0	6.4	7.0

3. 21. Health problems and behavioural disorders in relation to the housing system

The professionals' group were asked to estimate the percentage of horses, with which they work job-related, that have health problems and behavioural disorders related to indoor housing (single and group housing), single housing and group housing. Tab. 76 points out that the professionals' group estimated that 42% of the horses have health problems due to indoor housing, 42% due to single housing and only 22% were estimated to have health problems due to group housing. Moreover, Tab. 76 reveals that the professionals' group estimated that a third of the horses have behavioural disorders relating to indoor housing. A higher estimation was made for the relation with single housing. However, only but still 11% of horses with behavioural disorders were estimated to be related to group housing (N=897).

Tab. 76: Estimated percentage of horses, with which they work job-related, with health problems and behavioural disorders related to the following housing systems by the professionals, SD = Standard deviation. (matrix-numbers/Dropdown 0-100 in steps of 5)

Estimated percentage of horses with …	N	Mean	SD	Min	Q25	Median	Q75	Max
… health problems (F71)								
Indoor housing (single and group housing)	897	42.2	28.06	0	20.0	40.0	70.0	100
Single housing	901	42.3	30.32	0	15.0	40.0	70.0	100
Group housing	910	22.5	20.03	0	5.0	20.0	30.0	100
… behavioural disorders (F75)								
Indoor housing (single and group housing)	898	35.2	28.33	0	10.0	30.0	60.0	100
Single housing	903	41.9	31.42	0	10.0	35.0	70.0	100
Group housing	897	10.9	13.63	0	0.0	5.0	15.0	95

3. 22. Types of health problems with indoor, single and group housing

The professionals were asked which types of health problems in horses they relate with different housing systems (see Tab. 77). For indoor housing, the most given responses were respiratory disorders (N=862, 90.2%), musculoskeletal disorders (N=649, 67.9%), gastritis/gastric ulcers (N=589, 61.6%) and colics (N=566, 59.2%). Injuries caused by other horses was chosen the least. With single housing, the professionals indicated that gastritis/gastric ulcers (N=607, 64.4%) and self-inflicted injuries (N=532, 56.4%) were most common, and skin diseases very rare (N=166, 17.6%). For group housing, injuries caused by other horses (N=900, 94.1%) was chosen by the majority of the professionals and injuries caused by the infrastructure of the stable (N=519, 54.3%) was often selected whereas respiratory diseases were very low (N=40, 4.2%). As well, 96 professionals mentioned further health problems related to indoor housing: allergies (1x), feeding problems (1x), acute

recumbency (3x), rideability (3x), dental diseases (4x), musculoskeletal diseases (4x), hoof problems (5x) and behavioural disorders/psychological disorders/stress (73x). Two persons indicated other problems, but did not explain them. 142 professionals mentioned further health problems related to single housing: metabolic problems (1x), hoof problems (1x), musculoskeletal diseases (1x), rideability (2x), acute recumbency (2x), lack of social contact (3x) and behavioural disorders/psychological disorders/stress (129x). Three persons indicated other problems, but did not explain them. 30 professionals mentioned further health problems related to group housing: hoof problems (1x), rideability (1x), parasites (2x), behavioural disorders/psychological disorders/stress (4x), injuries caused by other horses (5x), feeding problems (6x) and sleeping problems/narcolepsy (8x). Three persons indicated other problems, but did not explain them.

Tab. 77: Health problems of horses related to different housing systems by the professionals group (multiple-choice questions)

Health Problems - Housing	**F72Indoor housing (N=956)**		**F73Single housing (N=943)**		**F74Group housing (N=956)**	
	N	**%**	**N**	**%**	**N**	**%**
None	29	3.0	88	9.3	43	4.5
Respiratory disorders	862	90.2	363	38.5	40	4.2
Metabolic diseases	299	31.3	228	24.2	80	8.4
Skin diseases	220	23.0	166	17.6	126	13.2
Colics	566	59.2	445	47.2	93	9.7
Gastritis/gastric ulcers	589	61.6	607	64.4	236	24.7
Musculoskeletal disorders	649	67.9	427	45.3	181	18.9
Injuries caused by other horses	198	20.7	-	-	900	94.1
Self-inflicted injuries	422	44.1	532	56.4	205	21.4
Injuries caused by stable infrastructure, fences, etc.	288	30.1	299	31.7	519	54.3
Other	96	10.0	142	15.1	30	3.1

4. Discussion

The present study provides extensive data on the current housing and management situation of horses in different German-speaking countries, with regard to Austria and Luxembourg for the first time. As well, the study provides new insights regarding reasons of horse and stable owners for choosing group or single housing for horses, factors that could make them change to group housing in the future and the influence of different groups of persons on their choice. The recommendations of single and group housing for horses by professionals working in the horse industry and the underlying reasons for their choice are also presented in this study. Additionally, the study lays out the relationship of horse and stable owners' attitudes towards housing systems, horses' needs and interacting with horses and the actual choice of a housing system.

4. 1. Housing in the different countries

In Austria, Germany and Luxembourg group housing was used most often by both horse and stable owners, to a proportion of 44-55%, while single housing only was indicated to be used between 7 and 25%. In contrast, Switzerland had a significantly higher proportion of single housing (51%) and lower proportion of group housing (30%). Therefore, neither the first hypothesis that across all the different countries the housing system used most often is single housing, nor the second hypothesis that group housing is found to a higher percentage in Switzerland, could be confirmed. However, the present results regarding Switzerland were in line with a previous survey by Siegel *et al.* (2018) where 51% of the equines also lived in single housing. Contrariwise, in the present survey more horse and stable owners had group housing as compared to the results of Hölker *et al.* (2017) in Germany where the housing system used most often was single housing (60%) and to a study by Petersen *et al.* (2006) done on 46 boarding stables with 2578 horses in Schleswig-Holstein (Germany) where 1906 of those horses were housed in single boxes (only 9 stables had boxes with permanent access to a paddock) and solely 9.6% of the investigated boarding stables had group housing systems. These differences in results may be due to different samples. The study by Petersen *et al.* (2006) comprised only boarding stables in Schleswig-Holstein (a state in the northern of Germany) that had more than ten horses and were members of the 'Pferdesportverband Schleswig-Holstein e.V.'; from this population, stables were selected randomly. The sample of Hölker *et al.* (2017) included owners of private horse stables, of commercial stables and of agricultural farms from all over Germany giving answers via an online survey and might

therefore be more comparable to the present study. No data exists yet for Austria and Luxembourg; therefore, no comparisons could be made here.

Even though numerous different advertising methods were used (online, but also offline) to reach a representative sample, it may be that participants with group housing were more willing to respond. The question is, though, why this was not the case for the participants from Switzerland. Siegel *et al.* (2018) contacted a representative sample of equid owners registered in the 'Tierverkehrsdatenbank' (animal registration) which was different from this study, but both samples reveal similar results regarding the proportion of single housing.

Another remaining question here is why there were more single housing systems in Switzerland than compared to Germany, Austria or Luxembourg. This might be a consequence of the advertising methods which were different for Switzerland than for instance for Austria (for Switzerland: no posters, no stables contacted, no advertisement in a horse magazine). Differences between Austria and Germany should have also been seen then because there neither an advertisement in a horse magazine nor posters were used as well. This was not the case, so it may not be due to the recruiting methods.

4. 2. Reasons for choice and future change of housing system

For horse and stable owners, the most important reasons to keep horses in group housing were the perceived advantages of group housing for the horses (HOGHReasons_AdvantHorse; SOGHReasons_AdvHorse) while for keeping horses in single housing the ease of management (HOSHReasons_AdvantHuman; SOSHReasons_easyManage) was most important, although to a lower degree than the advantages for horses for the respondents with group housing. Thus, the results confirmed the hypothesis that perceived positive effects on the welfare of the horse are the most important reasons for group housing while perceived ease of management of the horses is most important for single housing for horse and stable owners. The same numerical results were observed in the housing recommendations of the professionals where the reasons for group housing related to the welfare of the horse were rated as slightly more important than the ease of management and for single housing the ease of management was rated higher than the reasons related to the welfare of the horse. Costs and space were unimportant for stable owners with group housing or combined housing, but at least for some stable owners with only single housing costs and especially space were important. Conversely, horse owners rated the costs as unimportant in the choice of the housing system. As well, the answers regarding potential reasons to change from single to group housing in the future supported these results.

Hence, the hypothesis about costs and space restrictions being relevant decision factors for stable owners and horse owners could only be confirmed partly. In the reviews of Hartmann *et al.* (2012) about keeping horses in groups and of Hemsworth *et al.* (2015) about recreational horse welfare, the ease of management as a reason for single housing of horses has been mentioned already; however, none of them have confirmed it by a survey. The current study was now able to confirm the ease of management as a reason to keep horses singly.

On the other hand, very few horse owners with single housing considered single housing as the best housing system for horses even though they were using it and around 50% indicated that there were no group housing systems available in a reasonable distance. Having a look at the reasons to change from single to group housing in the future, 41% indicated that a greater selection of stables with group housing would make them to change and 32% that if the availability would be better. So, one could interpret that with several modifications many horse owners with single housing are willing to change housing systems for a better welfare of their horses.

Hartmann *et al*. (2015) analysed as part of their study horse owners' satisfaction with the housing system and concluded that 61.4% of those respondents who never kept their horses in groups were satisfied with single housing and 38.6% would like to keep them in a different housing system. From the 38.6%, the most mentioned reasons why they could not keep them differently were that group housing is not provided at the facility (58%) and that there are financial constraints (13%), but also other reasons like the concern of risk of injury, differences in horses' personality and stallions cannot be kept constantly in groups were mentioned. Comparing those results with the present results, a better accessibility of group housing (32%) was not mentioned as often as in Hartmann *et al*. (2015) and only 8% indicated that they cannot change due to financial constraints.

Nevertheless, 25% of the stable owners and about 20% of the horse owners of the present study indicated that no reasons could convince them to change the housing system.

4. 3. Satisfaction with the current housing system

Horse and stable owners with group, single or a combination of both housing systems were either satisfied or very satisfied with the currently used housing system except for stable owners with only single housing. They were very few, but indeed very unsatisfied with their housing system. Reasons that they do not change the housing system although they are unsatisfied could be that the group housing system is too expensive or that they do not have enough space available to make a change to a different housing system.

4. 4. Influence of different persons on the choice of housing system

Veterinarians and friends were the only persons rated as rather important, important or very important by a considerable amount of both horse and stable owners for the selected housing choice. Therefore, the hypothesis that veterinarians, farriers, trainers and horse organisations are influential on horse and stable owners' decisions on housing systems was only confirmed regarding the influence of veterinarians – only veterinarians were rated as important (46.8%). As well, it was confirmed that they had the highest influence of all persons. However, friends were rated nearly as important as veterinarians too (40.5%). This is in line with the results of Kauppinen *et al.* (2010) on pig and dairy farmers and of Garforth *et al.* (2006) on dairy farmers where 'veterinarians' had the highest influence on attitudes. A study by Borges *et al*. (2014) on Brazilian cattle farmers, where intentions to adopt improved natural grassland were researched, identified that farmers were more influenced by family and friends. On the other hand, Bruijnis *et al.* (2013) found out that the veterinarian had an influence on Dutch dairy farmers but that the feed advisor and foot trimmer had the highest influence and that friends did not have an impact at all.

The reasons why farmers or horse/stable owners are influenced by others might be that they seek approval for their decision or to benefit from expertise and knowledge of others, but as well they might want to show commitment to values shared within families or institutions (Borges *et al*., 2014). So the reason why veterinarians have the highest influence on the choice of the housing system might be because when it comes to the health of horses and their living/housing environment, veterinarians are seen as experts, persons which are knowledgeable about horses and respected for their expertise; and therefore, horse owners and stable owners probably rather listen to their advice then anybody else's. Friends, on the other side, are persons with whom the same values are normally shared, whose experience likely is emphasised and who are trusted. Another reason might be that friends of horse/stable owners most often probably are also familiarized with horse-related topics and might already have experience with specific housing systems.

Hence, veterinarians would be the persons to take into consideration to eventually change human attitudes towards more welfare-friendly housing systems because if this group of persons has knowledge about the species-specific behaviour and the special needs of horses, they will more likely support the owners in their housing decision. Besides the veterinarians, it is important to include horse owners and stable owners as well when mounting a campaign because they are the ones who decide on the housing systems and they might

additionally be friends with each other. Analysing the underlying reasons why veterinarians and friends were rated as important and other groups as rather unimportant would be a suggestion for further research.

4. 5. Attitudes of the three stakeholder groups

The selection of group housing was associated with the horse and stable owners' having more positive beliefs about group housing, higher recognition of the importance to fulfil horses' needs and more positive affective attitudes towards interacting with horses. Especially the beliefs about housing systems were more clearly related to the choice of a housing system. Accordingly, the hypothesis was confirmed. A relationship between stockperson's attitudes, the way how animals are treated and the influence of subjective norms was already confirmed, as part of the Theory of planned behaviour, in farm animals (for review see Chapter 4: Attitudes of stockpeople by Hemsworth & Coleman, 2011 and Waiblinger, 2019). The outcomes of the current study are also in line with the results of Hemsworth (2012) where relationships between recreational horse owner attitudes towards horses and horse welfare were identified. Hemsworth (2012) found out that positive horse owner beliefs about husbandry and management appeared to be predominantly associated with the horse owner's appropriate performance of horse husbandry and management behaviour as well as positive horse welfare outcomes.

Hartmann *et al.* (2015) analysed horse owners' attitudes towards group housing and found out that the ones with group housing (96%) and the ones with single housing (85%) both agreed that group housing is better than single housing for the horses' welfare, but the ones with group housing agreed slightly more. Almost the same results were found in the present study where attitudes related to positive effects on health and the enhancement of welfare of horses in group housing (posWelfareGH) were more agreed by horse and stable owners with group housing than by the ones with single housing.

In this way, the current study delivered an evidence that a relation between horse owners' and stable owners' attitudes towards different housing systems and the actual choice of a specific housing system is existing, and that some subjective norms have an influence on that choice. However, a full approval for the theory of planned behaviour could not be given because perceived behaviour control was not investigated specifically to avoid further increase of the length of the questionnaire that already took 30 minutes and more for the horse owners. Indeed, this might be a topic to include in further researches.

4. 6. Sample description and representativeness

There were more female than male respondents and the mean age for all respondents was 37.9 years. Those findings are matching with the German study by Hölker *et al.* (2017) where also more female (73%) than male (27%) respondents (N=1480) had participated as well as with the Swiss survey from Siegel *et al.* (2018) where 76% of the respondents were females. Still the question why there were more female than male respondents should be asked. Was it because females more likely respond to surveys or because there are more females than males owning horses or working in the horse/animal sector? The first assumption was confirmed by Smith (2008) who demonstrated in his study that females are more likely to answer online questionnaires. The second assumption is supported by a survey done in Germany (Pawlik, 2020) where 920000 people (over 14 years) owned a horse from which 590000 were females (64%). Both assumptions (women answer more often; most owners are females) can act together and result in the present outcome.

The question about the highest education of the stakeholder groups revealed that the majority had at least the qualification for studying and nearly one third had a university degree with the most ones in the professional group and the least ones in the stable owners group. This can be explained by the circumstance that a higher proportion in the professionals' group were veterinarians with of course a university degree. Nearly 30% of the respondents did not have a qualification related to horses which were about half of the horse owners (53.1%), a quarter of the stable owners (25%) and only 3% of the professionals. Those results were to be expected because in most cases horse owners do not always have a horse-related qualification in contrast to professionals who are in need of one to be able to carry out their profession.

The stable owners had on average about 21 horses on the farm/at the stable with a large size variation and more than half of the horses were not owned by them. This likely resulted from the participation criterium because it was a condition to use the farm/stable as main income source, otherwise they would not count as a stable owner for the survey. Anyway, those results could not be compared to other studies, therefore it is not known if those results are representative.

Most of the stable owners and horse owners housed/kept the horses in Austria followed by Germany and Switzerland, and the least in Luxembourg. The same applied to the professionals working in the different countries. This was to be expected because Austria was in the focus of this study and with the most intensive advertising methods, which was a favourable success in regards to the results. Participation in the other three German-speaking

countries was satisfactorily as well, especially regarding horse owners and professionals. However, the sample sizes of stable owners in Luxembourg and Switzerland were quite small, showing that the stable owners were not as easy reached as in the other two countries.

Warmbloods followed by cobs and ponies were the most frequent given answers for breeds and concerning the horse disciplines, leisure riding followed by dressage and jumping were the most mentioned disciplines for horse and stable owners. In relation to the Swiss study by Siegel *et al.* (2018), the same most-mentioned breeds were found where warmbloods (N=3607 out of 9353) had the most entries followed by ponies/cobs (N=2819 out of 9353). The development of the horse from farm to companion/sport animal has brought with it that the breeding industry in German-speaking countries has predominantly concentrated on breeding sport and leisure horses (Bieniek, 2009). On these grounds, the present results were to be expected as well as on the speculation that the most popular equestrian sports are dressage and jumping, and the mentioned breeds are used the most for those.

4. 7. Limitations of the study

Open online surveys are dependent on voluntarily participation and therefore often lead to a non-represenative sample. A consequence of this might be, as well, that there may be a bias towards more motivated respondents. In opposition, an advantage of the online survey was that it could be more globally distributed, a larger population could be accessed and quicker returns could be achieved. In addition, a QR-code of the link to the online survey made the access even easier and faster just by scanning this code (no need of entering/writing down a link).

Further, the questionnaire was designed to avoid mandatory questions, except some few necessary for the study, and this was one of the reasons why the outcome of the survey came with varying response rates and incomplete questionnaires. However, mandatory questions were avoided with the aim to reduce drop-outs (Décieux *et al.,* 2015; Mergener *et al*., 2015), to not gather arbitrary and content-independent answers which is often the case in forced answers (Mergener *et al*., 2015) and because they might influence the respondents' motivation negatively (Punter *et al.,* 2003). Another negative consequence of mandatory questions is that respondents rather give socially desirable answers to not reveal too much personal information (Mergener *et al*., 2015). On the other hand, participants were in this way able to decide freely which data they were willing to provide and at least some data of the less motivated ones could be placed at disposal. Given this circumstance, only questions where the answers were necessary for the research goals were made mandatory in the questionnaire; for instance, the

questions about the allocation to the stakeholder groups and the question about the housing systems, to be able to further analyse the attitudes afterwards.

A second reason why the outcome came with varying response rates seemed to be the formulation and complexity of some of the questions because the response rate was slightly reduced after those questions. Nonetheless, a high number of respondents and answers were received in spite of the fact that the questionnaire was constituted of such a sizeable amount of questions. Optimisations for further research, therefore, would be to create simple questions as far as possible in order to avoid abortions of the questionnaire at specific questions, which was seen in the response rate of the questions about the different housing types in the different seasons.

5. Conclusion

In conclusion, the most selected housing system was group housing, but there was a significant difference with higher use of single housing in Switzerland. The most often mentioned reasons for group housing were benefiting the horse, whereas the reasons for single housing were rather benefiting the human. Nonetheless, many horse owners with single housing would be willing to change the housing system for a better welfare of their horses if several modifications were done.

Furthermore, the selection of group housing was associated with the horse and stable owners' having more positive beliefs about group housing, higher recognition of the importance to fulfil horses' needs and more positive affective attitudes towards interacting with horses. Especially the beliefs about housing systems were more clearly related to the choice of a housing system. Therefore, a relationship between the horse and stable owners' attitudes towards different housing systems, horses' needs, interactions with the horses and the actual choice of a specific housing system could be confirmed. As well, persons with group housing also had more positive attitudes towards group housing and the persons with single housing rather had negative attitudes towards group housing. Ultimately, it can be concluded that, as subjective norms, veterinarians and friends had the highest influence on horse owners' and stable owners' choice of a housing system. However, a full approval for the theory of planned behaviour could not be given because perceived behaviour control was not investigated, but this might be a topic to include in further researches as well as the underlying reasons why veterinarians and friends were rated as important and other groups as rather unimportant.

By knowing that the horse and stable owners' attitudes towards housing systems, horses' needs and interactions with horses are linked to the actual choice of a housing system and who is influential on that choice, one has a point of reference for future changes into more welfare-friendly horse housing systems. Hence, if horses should be housed according to their natural behaviour, this study provides opportunities/points to address in a campaign in order to influence husbandry decisions of horse and stable owners.

6. Abstract

Horses can be housed either in single or group housing systems and it is known that single housing is impairing horses' welfare negatively. Nevertheless, many horses are still housed in single housing. Hence, the aim of the study was to gather data about the housing situation in different German-speaking countries, to investigate reasons for the choice of a housing system and to analyse the role attitudes and subjective norms may play in relation to this choice. For this, horse owners, stable owners and professionals of the horse industry were approached using an online questionnaire distributed via several advertisement methods. Descriptive statistics, crosstabulations with Chi²-tests and Fisher's Exact tests, principal component analyses, non-parametric tests, an analysis of variance and Spearman rank correlations were carried out. The data of 2897 horse owners, 1124 professionals and 216 stable owners were analysed, and group housing (for this sample) was mostly selected (46%) except for Switzerland with only 29% and 43% single housing. For horse and stable owners, the most important reasons for group housing were the perceived advantages for the horses and for single housing the ease of management. Nonetheless, many horse owners with single housing would be willing to change the housing system for a better welfare of their horses if a greater selection of stables would be available (41%) and if the accessibility would be better (32%). The selection of group housing was associated with horse and stable owners' having more positive beliefs about group housing, higher recognition of the importance to fulfil horses' needs and more positive affective attitudes towards interacting with horses. Therefore, a relationship between the horse and stable owners' attitudes towards different housing systems, horses' needs, interactions with horses and the actual choice of a housing system could be confirmed. Veterinarians and friends had the highest influence on horse and stable owners' choice of a housing system. Hence, the present study provides approaches/points (especially with the identified attitudes and subjective norms) that could be addressed in a future campaign for prospective changes into more welfare-friendly housing systems in order to influence husbandry decisions of horse and stable owners.

Keywords: housing, horse, reasons for housing system, attitudes

7. Zusammenfassung

Pferde können entweder in Einzel- oder Gruppenhaltung gehalten werden, jedoch ist bekannt, dass Einzelhaltung das Wohlbefinden der Pferde negativ beeinflusst. Dennoch werden immer noch viele Pferde in Einzelhaltung gehalten. Daher war das Ziel der Studie Informationen über die aktuelle Haltungssituation im deutschsprachigen Raum zu erhalten, mögliche Gründe für das jeweilige Haltungssystem zu identifizieren und zu untersuchen, welche Bedeutung Einstellungen zu unterschiedlichen Haltungssystemen, Pferdeverhalten und Wohlbefinden sowie verschiedene Personengruppen im Sinne der sozialen Normen auf die Entscheidung für oder gegen ein Haltungssystem einnehmen. Zielgruppen waren Pferdebesitzer, Stallbesitzer und beruflich mit Pferden arbeitende Personen, die mittels eines Online-Fragebogens mit diversen Werbemaßnahmen erreicht worden sind. Deskriptive Statistik, Kreuztabellen mit Chi²-tests and Fisher's Exact Tests, Hauptkomponentenanalysen, nicht-parametrische Tests, eine Varianzanalyse und Spearman Rangkorrelationen wurden für die Analysen durchgeführt. Die Daten von 2897 Pferdebesitzern, 1124 im Pferdebereich Berufstätigen und 216 Stallbesitzern wurden analysiert. Gruppenhaltung wurde (in dieser Stichprobe) am häufigsten genutzt (46%), außer in der Schweiz, in der Einzelhaltung (43%) am häufigsten vorkam (Gruppenhaltung nur 29%). Für Pferde- und Stallbesitzer waren Vorteile der Gruppenhaltung für die Pferde die wichtigsten Gründe für Gruppenhaltung, während eine einfache Handhabung und Nutzung der Pferde, d.h. Vorteile für den Menschen, die wichtigsten Gründe für die Einzelhaltung waren. Trotzdem wären viele Pferdebesitzer mit Einzelhaltung bereit zu Gruppenhaltung zu wechseln, wenn es eine größere Auswahl an Ställen mit Gruppenhaltung gäbe (41%) und diese einfacher zu erreichen wären (32%). Des Weiteren konnte ein Zusammenhang zwischen den Einstellungen der Pferde- und Stallbesitzer mit der Entscheidung für ein Haltungssystem festgestellt werden. Die Tierärzte/Tierärztinnen und Freunde waren die Personengruppen, die den größten Einfluss auf die Entscheidung für ein Haltungssystem der Pferde- und Stallbesitzer hatten. Die vorliegende Studie bietet daher Ansatzpunkte (speziell mit den identifizierten Einstellungen und sozialen Normen), die in einer zukünftigen Kampagne genutzt werden könnten, um Haltungsentscheidungen von Pferde- und Stallbesitzern zu beeinflussen.

Stichwörter/Schlagwörter: Pferdehaltung, Haltungsmanagement, Gründe für Haltungssystem, Einstellungen

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9. List of abbreviations and symbols

DE:	Used as indication for the German translation of a word
PG	Professionals working with horses
SO	Horse stable owners
HO	Horse owners
SH	Single housing
GH	Group housing
SHGH	Single and group housing
%	Percentage
Q25	Quartile of 25%
Q75	Quartile of 75%
SD	Standard deviation
Max	Maximum
Min	Minimum
N	Number of answers, respondents
TN	Total number of answers, respondents
Hrs	Hours
KMO	Kaiser-Meyer-Olkin
PCA	Principal component analysis
ANOVA	Analysis of variance

10. List of tables

11. List of figures

12. List of tables in Annex

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Last but not least, a big thank you goes to all of the horse owners, stable owners and professionals who participated generously in this survey and provided all the necessary information to us. Without you, this study would not have been accomplishable.

Annex I: German definitions placed throughout the questionnaire

Tab. A1: German definitions used during the questionnaire

Pferdehaltende Betriebe	
Landwirtschaftsbetrieb mit Pferden	Betrieb, der fremde Pferde (Einstellpferde, Pensionspferde) hält (bis 25 Pferde in Österreich) und damit einen wesentlichen Anteil am Einkommen generiert sowie landwirtschaftliche Tätigkeiten (z.B. Pflanzenbau, Nutztierhaltung) ausübt
Gewerblicher Pferdestall	Betrieb ohne landwirtschaftliche Tätigkeiten, der wesentliche Einnahmen aus gewerblicher Pferdehaltung generiert; in Österreich auch landwirtschaftlicher Betrieb mit mehr als 25 fremden Pferden (Einstellpferden, Pensionspferde)
Nutzungskategorie Pferde	
Sportpferde	Pferde, deren Hauptnutzung die Wettkampfteilnahme ist (unabhängig von der Disziplin)
Zuchtpferde	Pferde, die in ihrer Hauptnutzung der Zucht dienen (Zuchthengste und -stuten), sowie Jungpferde bis zum Absetzen
Gewerblich genutzte Pferde	Reitschulpferde, Tourismuspferde, Therapiepferde
Arbeitspferde	in Land- und Forstwirtschaft (z.B. Zug- und Rückepferde), bei der Polizei, dem Militär
Freizeitpferde	Pferde, die regelmäßig genutzt werden, jedoch nicht vorrangig einer der vorherigen Kategorien zugeordnet werden
Gnadenbrotpferde	Pferde, die nicht mehr genutzt werden
Nicht genutzte Pferde	Pferde, die nicht regelmäßig genutzt werden, Jungpferde nach dem Absetzen bis zur Nutzung, Pferde während der Rehabilitation
Einzelhaltung und Gruppenhaltung	
Einzelhaltung	Die Pferde werden in Einzelboxen oder in Anbinde-/Ständerhaltung gehalten oder es gibt keine anderen Pferde am Betrieb.
Gruppenhaltung	Es werden mindestens zwei Pferde in ständigem ungehinderten Kontakt miteinander gehalten.
Haltungssysteme	
Einzelhaltungs-Systeme	
Ständer/Anbindehaltung	das Pferd ist angebunden, mit oder ohne Abtrennungen zu Nachbarpferden (falls vorhanden)
Innenbox	befindet sich im Innern eines Gebäudes, ohne Fenster oder Türhälfte, durch welche/s das Pferd den Kopf nach draußen ins Freie strecken kann
Außenbox	offenes Fenster oder Türhälfte vorhanden, durch welche/s das Pferd den Kopf nach draußen ins Freie strecken kann
Auslaufbox	Außenbox mit direkt angeschlossenem Auslauf (Paddock)
Permanente Weidehaltung	Pferd befindet sich immer auf der Weide, immer einzeln

Continuation of Tab. A1

Haltungssysteme	
Gruppenhaltungs-Systeme	
Einraum	Systeme ohne räumliche Trennung von Liege- und Fressbereich
Einraum-Laufstall	
Einraum-Laufstall mit Auslauf (ständig zugänglich)	
Mehrraum	Systeme mit räumlicher Trennung von Liege- und Fressbereich, inklusive Ausweich- und Rückzugsmöglichkeiten
Mehrraum-Laufstall	
Mehrraum-Laufstall mit Auslauf (ständig zugänglich)	
Mehrraum-Laufstall mit strukturiertem Auslauf (ständig zugänglich), z.B. Bewegungsstall, Paddock Trail, Aktivstall	
Permanente Weidehaltung: Pferde befinden sich immer auf der Weide	
Auslauf, Paddock, Koppel und Weide	
Auslauf	ein Ort, an dem ein Pferd die Möglichkeit zur freien, nur durch Zäune eingeschränkten Bewegung im Freien hat, ohne Einwirkung durch Menschen oder Geräte (d.h. eine Führanlage/Schrittmaschine zählt nicht als Auslauf), also Paddock, Koppel oder Weide
Paddock	für Pferde direkt vom Stall zugänglicher, umzäunter, grasloser Auslauf. Der Paddock kann jederzeit zugänglich oder z.B. nachts geschlossen sein. Der Paddock kann ein kleiner Auslauf an der Box sein, bis hin zu einem großen strukturierten Auslauf für die Gruppenhaltung.
Koppel	eine umzäunte Fläche ohne nennenswerten Grasbewuchs, die nicht direkt vom Stall aus für die Pferde zugänglich ist. Die Pferde müssen vom Stall auf die Koppel und zurück gebracht werden.
Weide	eine mit Kräutern und Gräsern bewachsene, eingezäunte Fläche (Weideland), auf der sich Pferde ständig befinden oder auf die sie stundenweise gebracht werden
Weidesaison	
	beginnt ungefähr Mitte April bis Anfang Mai, wenn das Gras auf der Weide eine Höhe von 10-15 cm erreicht hat. Die Weidesaison endet je nach Klima und Lage der Weide im Oktober bis November

Annex II: Advertisements

Fig. A1: Poster

UMFRAGE ZUM THEMA „PFERDEHALTUNG“

Im Zuge einer Masterarbeit führt die Veterinärmedizinische Universität Wien eine Umfrage zum Thema „Pferdehaltung“ durch.

Es soll eruiert werden, wie Pferde unterschiedlicher Nutzung gehalten werden. Außerdem möchte die Universität die Erfahrungen und Meinungen verschiedener Personengruppen (beruflich mit Pferden tätiger Personen, StallbesitzerInnen, PferdebesitzerInnen) bezüglich unterschiedlicher Haltungssysteme in Erfahrung bringen. Die Umfrage wird im gesamten deutschsprachigen Raum stattfinden.

Eine Teilnahme an dieser Online-Umfrage ist unter dem Link: www.vetmeduni.ac.at/pferde-umfrage/ im Zeitraum zwischen 23. Dezember 2019 und 9. Februar 2020 möglich. Die Daten werden ausschließlich für wissenschaftliche Zwecke genutzt und anonym behandelt.

Als kleines Dankeschön werden unter allen Teilnehmenden, die einen vollständig ausgefüllten Fragebogen versandt und das 16. Lebensjahr vollendet haben, Warengutscheine im Wert von rund 500 Euro verlost.

Infos: Pferdeumfrage@vetmeduni.ac.at

Die VetMed führt eine Umfrage zur Pferdehaltung durch.

Fig. A2: Article in the Austrian horse magazine ‘PferdeRevue’

Fig. A3: Facebook-post from the VetMedUni Vienna page

E-Mail an Vereinigung, Zuchtverband, Reitverein, OEPS, FN (persönlich mit Namen), FLSE (persönlich mit Namen), ...

Betreff: *Pferdeumfrage der Veterinärmedizinischen Universität Wien*

Sehr geehrte Damen und Herren,

Im Zuge einer Masterarbeit an der Veterinärmedizinischen Universität Wien erheben wir die **Haltungsbedingungen von Pferden unterschiedlicher Nutzung** sowie die **Erfahrungen und Meinungen verschiedener Personengruppen** (beruflich mit Pferden tätiger Personen, Stallbesitzer, Pferdebesitzer) bezüglich unterschiedlicher Haltungssysteme im **deutschsprachigen Raum**. Dies erfolgt mittels einer Online-Umfrage, um eine **große Teilnehmerzahl** zu erreichen.

Dabei bitten wir um Ihre Unterstützung! Zum einen ersuchen wir Sie, durch das Weiterleiten des Fragebogen-Links über Ihren Verein auch jene Personen auf die Studie aufmerksam zu machen, deren E-Mail-Adressen nicht öffentlich einsehbar sind. Zum anderen erhoffen wir uns, dass die Studie stärkere Aufmerksamkeit bei der Zielgruppe erregt, wenn sie durch Ihren Verein/Verband/Vereinigung unterstützt wird. Dadurch erhalten wir eine höhere Rücklaufquote der Fragebögen und somit repräsentativere Ergebnisse.

Alle Daten werden streng vertraulich behandelt, ausschließlich für wissenschaftliche Zwecke genutzt und anonymisiert ausgewertet, sodass keine Rückschlüsse auf einzelne Betriebe oder Personen gezogen werden können.

Als kleines Dankeschön werden unter allen Teilnehmern, die einen vollständig ausgefüllten Fragebogen versandt und das 16. Lebensjahr vollendet haben, Warengutscheine im Gesamtwert von 500 Euro verlost. Kein Umtausch und keine Barablöse möglich. Der Rechtsweg ist ausgeschlossen.

Wir bitten Sie, den Link unseres Fragebogens https://www.vetmeduni.ac.at/pferdeumfrage/ und/oder den QR-Code an Ihre Mitglieder weiterzuleiten. Wir würden uns auch über eine Erwähnung unserer Studie in Ihrem Newsletter, auf Ihrer Homepage oder Facebook-Seite (oder anderen Social-Media-Kanälen) freuen, da sie ebenso zu mehr Beteiligung und besseren Ergebnissen führen kann.

Wenn Sie Fragen zu dieser Erhebung haben, wenden Sie sich bitte gern an die Verantwortlichen dieser Untersuchung unter Pferdeumfrage@vetmeduni.ac.at oder ans Institut für Tierschutzwissenschaften und Tierhaltung, Veterinärmedizinische Universität Wien, Veterinärplatz 1, 1210 Wien, Österreich, T +431250774901.

Mit bestem Dank im Voraus für Ihre wertvolle Hilfe und freundlichen Grüßen,

Jessica Backes, Master-Studentin der Veterinärmedizinischen Universität Wien
Ao.Univ.-Prof.in Dr.med.vet. Susanne Waiblinger
Dr.rer.nat. Stephanie Lürzel
Institut für Tierschutzwissenschaften und Tierhaltung der Veterinärmedizinischen Universität Wien

Link: https://www.vetmeduni.ac.at/pferdeumfrage/

QR-Code:

SCAN ME

Fig. A4: Advertising text for associations, federations and organisations

E-Mail an Berufsgruppe (Tierärzte, Trainer, ...)

Betreff: *Pferdeumfrage der Veterinärmedizinischen Universität Wien*

Sehr geehrte Damen und Herren,

Im Zuge einer Masterarbeit an der Veterinärmedizinischen Universität Wien erheben wir die **Haltungsbedingungen von Pferden unterschiedlicher Nutzung** sowie die **Erfahrungen und Meinungen verschiedener Personengruppen** (beruflich mit Pferden tätiger Personen, Stallbesitzer, Pferdebesitzer) bezüglich unterschiedlicher Haltungssysteme im **deutschsprachigen Raum**. Dies erfolgt mittels einer Online-Umfrage, um eine **große Teilnehmerzahl** zu erreichen.

Hierfür **bitten wir Sie als Expertin oder Experten**, Ihre eigenen Erfahrungen und Meinungen in dieser Umfrage mit uns zu teilen. Die Bearbeitung des Fragebogens wird ca. 20-30 Minuten dauern, abhängig von Ihren Antworten, und der Zugangslink zum Fragebogen wird bis 29. Februar 2020 verfügbar sein. Durch Ihre Teilnahme an der Studie haben Sie auch die Möglichkeit, sich später über die Ergebnisse der Studie informieren zu lassen, falls Sie dies möchten. Zudem gibt es die Möglichkeit, an einem Gewinnspiel teilzunehmen, wenn Sie den Fragebogen vollständig ausfüllen.

Über diesen Link: https://www.vetmeduni.ac.at/pferdeumfrage/ oder über den QR-Code gelangen Sie zur Umfrage.

Alle Daten werden streng vertraulich behandelt, ausschließlich für wissenschaftliche Zwecke genutzt und anonymisiert ausgewertet, sodass keine Rückschlüsse auf einzelne Betriebe oder Personen gezogen werden können.

Über eine Erwähnung unserer Studie bei Ihren Kunden, in Ihrem Newsletter, auf Ihrer Homepage oder Facebook-Seite (oder anderen Social-Media-Kanälen) würden wir uns freuen, da sie zusätzlich zu mehr Beteiligung und besseren Ergebnissen führen kann.

Wenn Sie Fragen zu dieser Erhebung haben, wenden Sie sich bitte gern an die Verantwortlichen dieser Untersuchung unter Pferdeumfrage@vetmeduni.ac.at oder ans Institut für Tierschutzwissenschaften und Tierhaltung, Veterinärmedizinische Universität Wien, Veterinärplatz 1, 1210 Wien, Österreich, T +431250774901.

Mit bestem Dank im Voraus für Ihre wertvolle Hilfe und freundlichen Grüßen,

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Dr.rer.nat. Stephanie Lürzel
Institut für Tierschutzwissenschaften und Tierhaltung der Veterinärmedizinischen Universität Wien

Link: https://www.vetmeduni.ac.at/pferdeumfrage/

QR-Code:

SCAN ME

Fig. A5: Advertising text for veterinarians, trainers and farriers

Annex III: Contacted stakeholders from the different countries

In more detail, the following stakeholders were contacted and the following advertisements were made. Maked as TC are the total numbers of stakeholders which were contacted and marked with SC are the numbers of stakeholders which were successfully contacted (without error message).

Tab. A2: Table representing the contacted stakeholders for link distribution from the different countries

	Austria SC/TC*	**Germany SC/TC**	**Switzerland SC/TC**	**Luxembourg SC/TC**
Horse breeding associations	12/12	26/28	18/19	6/8
Equestrian federations/Riding associations	11/11	25/27	19/19	12/13
Associations of veterinarians	2/2	2/2	2/2	
Veterinary offices			3/3	1/1
Veterinary chambers	1/1	18/18		
Farrier associations	1/1	2/2	1/1	
Trainers/instructors	2197/2350	1/1	1781/1843	67/72
Veterinarians/Veterinary practices	266/320	2/2	739/837	6/6
Farriers/hoof care practitioners	33/37	140/160	79/82	2/2
Student federation of the VetMedUni Vienna (HVU)	1/1			
Studs	1/1	18/23		
Horse stables				33/35
Horse centers	1/1			
Advertisement in PferdeRevue	1/1			
Posters in horse shops	6/6 (in and around Vienna)			1/1
Posters at the clinic of the VetMedUni Vienna	1/1			
Posters in horse stables				3/3
Posts in different (horse) groups on Facebook	15/15	1/1	2/2	7/7
Post on Twitter	1/1 (through VetMedUni Vienna)			
Other horse-related associations/websites		1/1	2/2	1/1

*SC=successfully contacted (without error message), TC=total number contacted

Annex IV: Detailed frequency table of number of horses

Tab. A3: Answers (N) and percentage (%) for the number of horses (owned/not-owned) per horse owner (HO) and stable owner (SO) as well as the total number of horses in the stable.

	F5Owned horses HO (N=2896)		F6Total in stable SO (N=215)		F6Owned horses SO (N=215)		F6Not-owned horses SO (N=215)	
Number of horses	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
0	-	-	-	-	4	1.9	14	6.5
1	1379	47.6	2	0.9	21	9.8	7	3.3
2	767	26.5	2	0.9	30	14.0	13	6.0
3	325	11.2	9	4.2	31	14.4	12	5.6
4	168	5.8	11	5.1	25	11.6	20	9.3
5	85	2.9	4	1.9	17	7.9	16	7.4
6	53	1.8	16	7.4	12	5.6	12	5.6
7	30	1.0	6	2.8	18	8.4	10	4.7
8	24	0.8	14	6.5	9	4.2	7	3.3
9	6	0.2	8	3.7	6	2.8	5	2.3
10	18	0.6	12	5.6	9	4.2	13	6.0
11 to 20	32	1.1	59	27.4	19	8.8	40	18.6
21 to 50	9	0.3	58	27.0	11	5.1	40	18.6
51 to 100	0	0.0	11	5.1	3	1.4	6	2.8
more than 100	0	0.0	3	1.4	0	0.0	0	0.0

Annex V: Countries and combinations of countries

Tab. A4: Countries where horses of horse owners are housed incl. combinations of predefined countries and countries mentioned under the option 'other'. Number (N) of horse owners and percentage (%) of total responses (N=2882)

Label	Countries	N	%
AT	Austria	1720	59.7
DE	Germany	877	30.4
CH	Switzerland	154	5.3
LU	Luxembourg	52	1.8
Other	9Hungary, 5Italy, 7France, 1Croatia, 1Iceland, 1Belgium, 2Denmark	26	0.9
AT+DE	Austria and Germany	17	0.6
DE+LU	Germany and Luxembourg	5	0.2
DE+CH	Germany and Switzerland	8	0.3
AT + other	1 Poland, 6 Hungary, 1 Netherlands, 2 Iceland	10	0.3
AT + DE + other	1 Hungary	1	0.0
DE + other	2 Iceland, 1 Norway, 1 Netherlands	4	0.1
CH + other	1 Portugal, 2 Belgium, 1 Czech Republic, 3 France	7	0.2
LU + other	1 Sweden	1	0.0

Tab. A5: Countries where professionals are working professionally incl. combinations of predefined countries and countries mentioned under the option 'other'. Number (N) of professionals and percentage (%) of total responses (N=896)

Label	Countries	N	%
AT	Austria	345	38.5
DE	Germany	290	32.4
CH	Switzerland	107	11.9
LU	Luxembourg	14	1.6
Other	2 Italy, 1 Norway, 1 Liechtenstein, 1 France	5	0.6
AT + DE	Austria and Germany	55	6.1
AT + CH	Austria and Switzerland	4	0.4
AT + DE + CH	Austria, Germany and Switzerland	12	1.3
DE + LU	Germany and Luxembourg	3	0.3
DE + CH	Germany and Switzerland	12	1.3
DE + CH + LU	Germany, Switzerland and Luxembourg	1	0.1
AT + other	1 USA, 4 Hungary, 1 Ireland, 2 Spain, 1 Italy, 1 Argentina, 2 Iceland, 1 Portugal, 1 Brazil	14	1.6
AT + DE + other	1 Argentina/Belgium, 2 USA, 1 Hungary/England/Latvia, 1 Spain, 1 Iran, 1 Ireland	7	0.8
AT + CH + other	1 Poland	1	0.1
AT + LU + other	1 UK	1	0.1
AT + DE + CH + other	1 Italy/Sweden, 1 Skandinavia/USA/France/UK/SA/NZ/AU, 1 France/Ireland	3	0.3
AT + DE + LU + other	1 USA	1	0.1
AT + DE + CH + LU + other	1 Worldwide	1	0.1
DE + other	1 South Africa, 1 Iceland, 1 Spain, 1 Netherlands, 1 UK, 1 Ireland	6	0.7
DE + CH + other	1 France, 1 Belgium, 1 Iceland, 1 France/Belgium/Netherlands, 1 England/France/Ireland, 1 Spain	6	0.7
CH + other	1 France/USA, 1 Europe, 1 Liechtenstein, 1 France/Italy, 1 Ireland, 1 Mexico, 1 France	7	0.8
LU + other	1 Italy	1	0.1

Annex VI: Feeding frequency of roughage and concentrates in group and single housing by horse and stable owners

Tab. A6: Responses (N) and percentage (%) for feeding frequency of roughage and concentrates (including responses with automatic feeders) for horses in group housing by horse owners (HO) and stable owners (SO) with group housing only (GH) or with the combination of both housing systems (SHGH). GH&SHGH represents both housing systems together. Percentages above 10% are in bold. (matrix-column/tick-off)

F42FeedingFrequencyGH		**Roughage**				**Concentrates**			
		HO		**SO**		**HO**		**SO**	
Total responses	GH&SHGH	1137		116		1002		101	
	GH	792		76		691		65	
	SHGH	345		40		311		36	
		N	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Less than 1x/week	GH&SHGH	11	1.0	0	0.0	52	5.2	12	**11.9**
	GH	9	1.1	0	0.0	46	6.7	11	**16.9**
	SHGH	2	0.6	0	0.0	6	1.9	1	2.8
1x/week	GH&SHGH	18	1.6	5	4.3	26	2.6	1	1.0
	GH	17	2.1	4	5.3	23	3.3	1	1.5
	SHGH	1	0.3	1	2.5	3	1.0	0	0.0
2-3x/week	GH&SHGH	18	1.6	1	0.9	63	6.3	7	6.9
	GH	16	2.0	0	0.0	55	8.0	4	6.2
	SHGH	2	0.6	1	2.5	8	2.6	3	8.3
Every 2nd-3rd day	GH&SHGH	23	2.0	3	2.6	67	6.7	8	7.9
	GH	17	2.1	3	3.9	55	8.0	6	9.2
	SHGH	6	1.7	0	0.0	12	3.9	2	5.6
1x/day	GH&SHGH	97	8.5	3	2.6	375	**37.4**	28	**27.7**
	GH	78	9.8	2	2.6	277	**40.1**	21	**32.3**
	SHGH	19	5.5	1	2.5	98	**31.5**	7	**19.4**
2x/day	GH&SHGH	363	**31.9**	33	**28.4**	298	**29.7**	28	**27.7**
	GH	229	**28.9**	19	**25.0**	171	**24.7**	12	**18.5**
	SHGH	134	**38.8**	14	**35.0**	127	**40.8**	16	**44.4**
3x/day	GH&SHGH	278	**24.5**	21	**18.1**	76	7.6	4	4.0
	GH	168	**21.2**	11	**14.5**	28	4.1	0	0.0
	SHGH	110	**31.9**	10	**25.0**	48	**15.4**	4	**11.1**
4-6x/day	GH&SHGH	97	8.5	15	**12.9**	16	1.6	3	3.0
	GH	70	8.8	8	**10.5**	11	1.6	2	3.1
	SHGH	27	7.8	7	**17.5**	5	1.6	1	2.8
7-10x/day	GH&SHGH	22	1.9	9	7.8	9	0.9	2	2.0
	GH	19	2.4	6	7.9	8	1.2	1	1.5
	SHGH	3	0.9	3	7.5	1	0.3	1	2.8
11-16x/day	GH&SHGH	11	1.0	3	2.6	7	0.7	2	2.0
	GH	8	1.0	3	3.9	6	0.9	1	1.5
	SHGH	3	0.9	0	0.0	1	0.3	1	2.8
17-24x/day	GH&SHGH	199	**17.5**	23	**19.8**	13	1.3	6	5.9
	GH	161	**20.3**	20	**26.3**	11	1.6	6	9.2
	SHGH	38	**11.0**	3	7.5	2	0.6	0	0.0

Tab. A7: Responses (N) and percentage (%) for feeding frequency of roughage and concentrates (including responses with automatic feeders) for horses in single housing by horse owners (HO) and stable owners (SO) with single housing only (SH) or with the combination of both housing systems (SHGH). SH&SHGH represents both housing systems together. Percentages above 10% are in bold. (matrix-column/tick-off)

F48FeedingFrequencySH		**Roughage**				**Concentrates**			
		HO		**SO**		**HO**		**SO**	
Total responses	SH&SHGH	787		50		752		47	
	SH	439		13		427		12	
	SHGH	348		37		325		35	
		N	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Less than 1x/week	SH&SHGH	1	0.1	0	0.0	5	0.7	0	0.0
	SH	0	0.0	0	0.0	5	1.2	0	0.0
	SHGH	1	0.3	0	0.0	0	0.0	0	0.0
1x/week	SH&SHGH	2	0.3	0	0.0	4	0.5	0	0.0
	SH	1	0.2	0	0.0	1	0.2	0	0.0
	SHGH	1	0.3	0	0.0	3	0.9	0	0.0
2-3x/week	SH&SHGH	0	0.0	1	2.0	15	2.0	3	6.4
	SH	0	0.0	0	0.0	9	2.1	0	0.0
	SHGH	0	0.0	1	2.7	6	1.8	3	8.6
Every 2nd-3rd day	SH&SHGH	1	0.1	0	0.0	6	0.8	2	4.3
	SH	1	0.2	0	0.0	3	0.7	1	8.3
	SHGH	0	0.0	0	0.0	3	0.9	1	2.9
1x/day	SH&SHGH	23	2.9	2	4.0	140	**18.6**	10	**21.3**
	SH	7	1.6	0	0.0	51	**11.9**	3	**25.0**
	SHGH	16	4.6	2	5.4	89	**27.4**	7	**20.0**
2x/day	SH&SHGH	301	**38.2**	19	**38.0**	328	**43.6**	24	**51.1**
	SH	158	**36.0**	5	**38.5**	182	**42.6**	6	**50.0**
	SHGH	143	**41.1**	14	**37.8**	146	**44.9**	18	**51.4**
3x/day	SH&SHGH	341	**43.3**	17	**34.0**	229	**30.5**	7	**14.9**
	SH	214	**48.7**	7	**53.8**	164	**38.4**	2	**16.7**
	SHGH	127	**36.5**	10	**27.0**	65	**20.0**	5	**14.3**
4-6x/day	SH&SHGH	73	9.3	8	**16.0**	19	2.5	1	2.1
	SH	47	**10.7**	1	7.7	12	2.8	0	0.0
	SHGH	26	7.5	7	**18.9**	7	2.2	1	2.9
7-10x/day	SH&SHGH	6	0.8	2	4.0	3	0.4	0	0.0
	SH	3	0.7	0	0.0	0	0.0	0	0.0
	SHGH	3	0.9	2	5.4	3	0.9	0	0.0
11-16x/day	SH&SHGH	7	0.9	0	0.0	1	0.1	0	0.0
	SH	1	0.2	0	0.0	0	0.0	0	0.0
	SHGH	6	1.7	0	0.0	1	0.3	0	0.0
17-24x/day	SH&SHGH	32	4.1	1	2.0	2	0.3	0	0.0
	SH	7	1.6	0	0.0	0	0.0	0	0.0
	SHGH	25	7.2	1	2.7	2	0.6	0	0.0

Annex VII: Group composition in group housing

Tab. A8: Horse group composition for the horse (HO) and stable (SO) owners with group housing (GH) and the combined housing system (SHGH). GH&SHGH represents both groups together. (multiple-choice question)

F40GroupComposition				Yes	
			N	N	%
Youngsters with adult horses	HO	GH&SHGH	1270	287	22.6
		GH	897	193	21.5
		SHGH	373	94	25.2
	SO	GH&SHGH	129	33	25.6
		GH	86	23	26.7
		SHGH	43	10	23.3
Youngsters separately from adult horses	HO	GH&SHGH	1270	77	6.1
		GH	897	37	4.1
		SHGH	373	40	10.7
	SO	GH&SHGH	129	10	7.8
		GH	86	2	2.3
		SHGH	43	8	18.6
Only mares	HO	GH&SHGH	1270	366	28.8
		GH	897	238	26.5
		SHGH	373	128	34.3
	SO	GH&SHGH	129	34	26.4
		GH	86	17	19.8
		SHGH	43	17	39.5
Only geldings	HO	GH&SHGH	1270	424	33.4
		GH	897	274	30.5
		SHGH	373	150	40.2
	SO	GH&SHGH	129	36	27.9
		GH	86	19	22.1
		SHGH	43	17	39.5
Mare/s with gelding/s	HO	GH&SHGH	1270	718	56.5
		GH	897	524	58.4
		SHGH	373	194	52.0
	SO	GH&SHGH	129	73	56.6
		GH	86	61	70.9
		SHGH	43	12	27.9
Mare/s with foals	HO	GH&SHGH	1270	124	9.8
		GH	897	76	8.5
		SHGH	373	48	12.9
	SO	GH&SHGH	129	16	12.4
		GH	86	11	12.8
		SHGH	43	5	11.6
Mare/s with foals and stallion/s	HO	GH&SHGH	1270	13	1.0
		GH	897	12	1.3
		SHGH	373	1	0.3
	SO	GH&SHGH	129	5	3.9
		GH	86	2	2.3
		SHGH	43	3	7.0

Continuation of Tab. A8

F40GroupComposition				Yes	
			N	N	%
Mare/s with foals and gelding/s	HO	GH&SHGH	1270	45	3.5
		GH	897	34	3.8
		SHGH	373	11	2.9
	SO	GH&SHGH	129	4	3.1
		GH	86	3	3.5
		SHGH	43	1	2.3
Mare/s with stallion/s	HO	GH&SHGH	1270	15	1.2
		GH	897	12	1.3
		SHGH	373	3	0.8
	SO	GH&SHGH	129	4	3.1
		GH	86	3	3.5
		SHGH	43	1	2.3
Gelding/s with stallion/s	HO	GH&SHGH	1270	79	6.2
		GH	897	50	5.6
		SHGH	373	29	7.8
	SO	GH&SHGH	129	9	7.0
		GH	86	6	7.0
		SHGH	43	3	7.0
Mare/s with gelding/s and stallion/s	HO	GH&SHGH	1270	34	2.7
		GH	897	22	2.5
		SHGH	373	12	3.2
	SO	GH&SHGH	129	2	1.6
		GH	86	1	1.2
		SHGH	43	1	2.3
Other	HO	GH&SHGH	1270	42	3.3
		GH	897	25	2.8
		SHGH	373	17	4.6
	SO	GH&SHGH	129	9	7.0
		GH	86	6	7.0
		SHGH	43	3	7.0

Annex VIII: Scree plots from the PCA of reasons for single or group housing for horse and stable owners

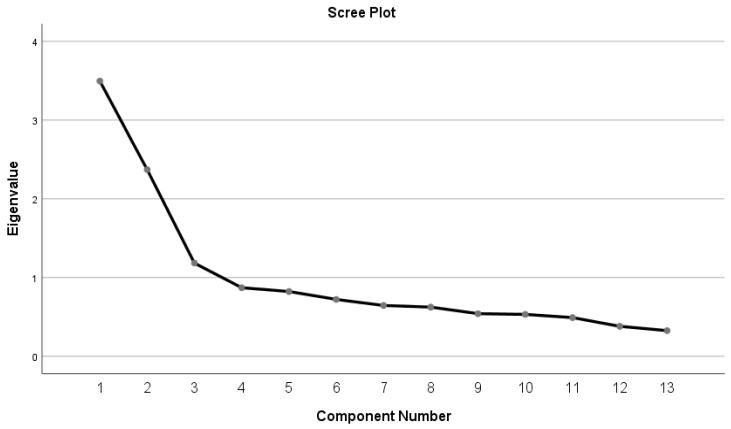

Fig. A6: Scree plot for the PCA for reasons to keep horses in group housing for horse owners

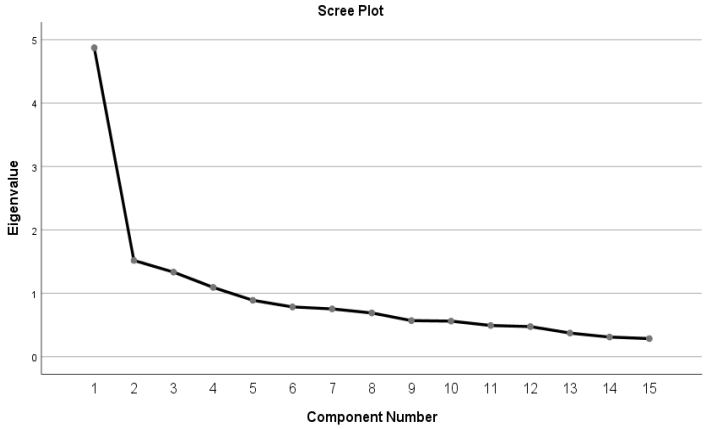

Fig. A7: Scree plot for the PCA for reasons to keep horses in single housing for horse owners

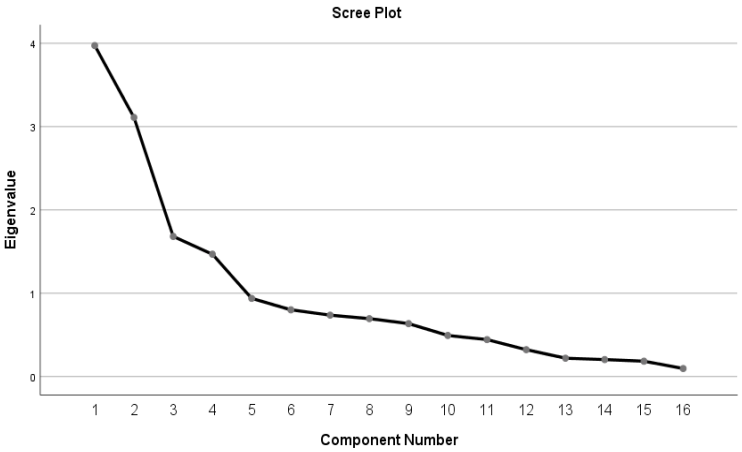

Fig. A8: Scree plot for the PCA for reasons to keep horses in group housing for stable owners

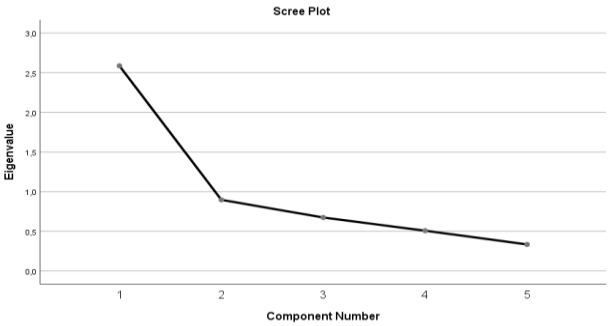

Fig. A9: Scree plot for the PCA of component one for reasons to keep horses in single housing for stable owners

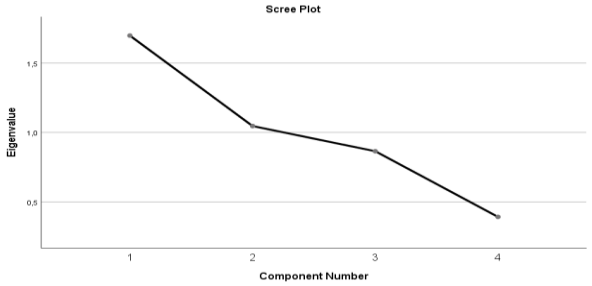

Fig. A10: Scree plot for the PCA of component two a and two b for reasons to keep horses in single housing for stable owners

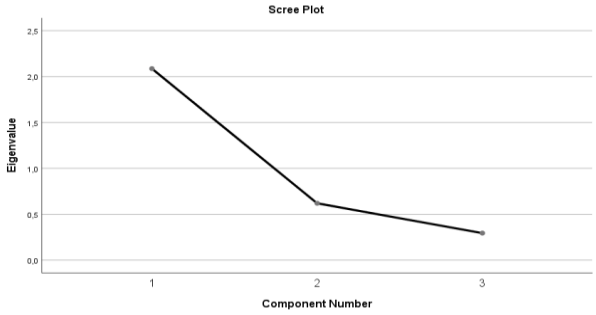

Fig. A11: Scree plot for the PCA of component three for reasons to keep horses in single housing for stable owners

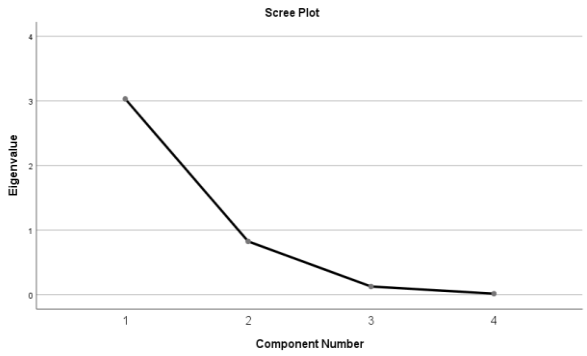

Fig. A12: Scree plot for the PCA of component four for reasons to keep horses in single housing for stable owners

Annex IX: Other reasons to change from single to group housing in the future (in German)

Tab. A9: Responses from the option 'other' for reasons to change in the future from single to group housing for horse owners (multiple-choice question)

F82ZukunftgrEHzuGHPB[other]	N	Kategorie
eigener Stall	1	kein Grund, eigener Stall (sollten eigentlich Stallbesitzer sein?)
Sobald mein Pferd wieder in der Gruppe gehalten werden darf.	1	Gesundheit
Eigener Stall und Pferde wollen nachts rein - kommt aus schlechter Haltung	1	Pferd, eigener Stall (sollten eigentlich Stallbesitzer sein?)
wenn wir unseren Stall umbauen könnten	1	Umbau
wenn es trotzdem noch bei mir Zuhause wäre	1	Verfügbarkeit
Wenn es gesundheitlich machbar wäre	1	Gesundheit Mensch?
homogene Gruppe	1	Gruppenzusammensetzung
kleine Gruppe ohne Fluktuation	1	Gruppenzusammensetzung
kleine Gruppen	1	Gruppenzusammensetzung
kleine Gruppenhaltung mit maximal 4 Pferden auf ausreichendem Raum	1	Gruppenzusammensetzung
Mit einem anderen jungen Pferd das es von Anfang an gewohnt ist	1	Gruppenzusammensetzung
wechselnde Gruppenmitglieder bringen Unruhe und Verletzungsrisiko; stabile Gruppen sind schwer realisierbar	1	Gruppenzusammensetzung
Wenn eine konstante Pferdegemeinschaft über ca. 1 Jahr gewährleistet werden würde.	1	Gruppenzusammensetzung
wenn sie in kleineren Gruppen gehalten werden würden	1	Gruppenzusammensetzung
Wenn die Pferde zueinander passen und keine Rangeleien entstehen.	1	Gruppenzusammensetzung, Verträglichkeit
besseres Stall- und Auslaufkonzept mit ausreichend Platz, Angebot für Hengste	1	Haltungskonzept
Flächen groß genug, damit auch rangniedrige Pferde Ruhe finden können.	1	Haltungskonzept
genug Platz	1	Haltungskonzept
Gut gemanagter, sauberer Aktivstall mit einer stabilen, nicht zu großen Herde mit ausreichend großer Liegefläche, frostsicherer Tränke, gutes Heu in ausreichender Menge (bei Kälte entsprechend mehr)	1	Haltungskonzept
Wenn die Pferde ausreichend Raum hätten und ausreichend bzw. geeignete Liegeflächen hätten und eine konstante Gruppe gewährleistet werden kann in der die Pferde zueinander passen.	1	Haltungskonzept, Gruppenzusammensetzung
Stall zu Gesundheit des Pferdes passend	1	Haltungskonzept, Pferd, Gesundheit
bin einfach zufrieden	1	gibt keine Gründe
Mein Pferd steht in einem Mix, 6-21 Uhr gemeinsame Koppel, Rest Box alleine. Perfekt finde ich.	1	gibt keine Gründe
Eine Gruppe zu finden wo sich mein Pferd wohlfühlt	1	Pferd
Eine Stute könnte in Gruppenhaltung, die andere leider nie	1	Pferd

Continuation of Tab. A9

F82ZukunftgrEHzuGHPB[other]	N	Kategorie
Pferde Ruhe haben können	1	Pferd
wenn das Pferd für Gruppenhaltung geeignet ist	1	Pferd
Wenn die Gruppenhaltung meinem Pferd einen Mehrwert bieten kann, weil ich es nicht mehr regelmäßig bewegen oder mit anderen auf die Koppel geben kann	1	Pferd
Wenn ich ein anderes Pferd hätte	2	Pferd
wenn ich ein für die Gruppenhaltung besser geeignetes Pferd hätte	1	Pferd
Wenn ich ein geeignetes Zustellpferd hätte	1	Pferd
Wenn mein Pferd es wollen würde. Länger als 5h mag es nicht auf der Koppel bleiben	1	Pferd
Kein Rehepferd	1	Pferd, Gesundheit
Wenn ich den passenden Koppel-/Weidepartner für meinen Hengst finde...	1	Pferd, Gruppenzusammensetzung, Verträglichkeit
Die Pferde vom Charakter zusammenpassen!	1	Pferd, Verträglichkeit
Wenn das Pferd sich mit den anderen verträgt	1	Pferd, Verträglichkeit
Wenn ich ein Pferd hätte, dass anderen Pferden gegenüber nicht aggressiv wäre.	1	Pferd, Verträglichkeit
Wenn mein Pferd ohne Probleme verträglich wäre	1	Pferd, Verträglichkeit
Wenn mein Pferd verträglicher wäre	1	Pferd, Verträglichkeit
Wenn Pferd verträglich wäre	1	Pferd, Verträglichkeit
wenn ich sicher wäre, dass sich meine Pferde in der Gruppe wohlfühlen und es ihnen gut geht	1	Pferd, Wohlbefinden
Wenn ich weiß, dass sich das Pferd auch wohlfühlt und zur Ruhe kommen kann	1	Pferd, Wohlbefinden
Ich bräuchte noch mehr Weide	1	Platzmangel
Platz ist am Hof nicht vorhanden	1	Platzmangel
Wenn ich in meinem Stall mehr Platz hätte und nicht mehr mitten im Dorf wohnen würde	1	Platzmangel
Anlage mit gutem Unterricht und Reithalle mit gutem Boden	1	Trainings-/Reitmöglichkeit
Halle und Platz dabei wären	1	Trainings-/Reitmöglichkeit
Stall mit Halle	1	Trainings-/Reitmöglichkeit
wenn entsprechende Trainingsmöglichkeiten vorhanden wären	1	Trainings-/Reitmöglichkeit
Wenn die Trainingsbedingungen (Platz, Halle) von guter Qualität wären & es eine Führanlage geben würde	1	Trainings-/Reitmöglichkeit
wenn Reithalle + Reitplatz vorhanden wären	1	Trainings-/Reitmöglichkeit
Entsprechende Infrastruktur des Stalles (Vollpension, Hallen etc.)	1	Trainings-/Reitmöglichkeit
Wenn die Infrastruktur im Gesamten stimmt	1	Trainings-/Reitmöglichkeit
der Umbau ist leider zah, da teuer	1	Umbau, Kosten
Sobald das Geld da ist wird umgebaut. Platz geschaffen ist schon	1	Umbau, Kosten
wenn ich das Geld und die Genehmignug hätte, einen großen Mehrraumauslauf bauen zu können	1	Umbau, Kosten, Genehmigung
Wenn mein Pferd nicht immer wieder verletzt werden würde.	1	Verletzungsrisiko
Wenn mein Pferd, andere Pferde nicht verletzen würde.	1	Verletzungsrisiko
Wenn wir nur noch 2-3 Pferde hätten und diese verträglich wären.	1	Verträglichkeit
Total	60	

Annex X: Attitudes of the three stakeholder groups (frequencies)

Beliefs about housing systems (single and group housing)

Beliefs about the health of horses in relation to housing systems

Tab. A10: Beliefs about the health of horses in relation to housing systems. ALL = all groups, HO = Horse owners, SO = Stable owners, PG = Professionals group. Responses on a 7-point Likert scale with 1 = completely disagree, 2 = disagree, 3 = rather disagree, 4 = neither agree nor disagree, 5 = rather agree, 6 = agree, 7 = completely agree. TN = total number of responses to this item.

F76Beliefs about the health of horses	Group	TN	1 N %	2 N %	3 N %	4 N %	5 N %	6 N %	7 N %
Risk of injury in horses is higher in group housing	ALL	2465	204 8.3	282 11.4	235 9.5	568 23.0	478 19.4	433 17.6	265 10.8
	HO	1438	135 9.4	162 11.3	136 9.5	365 25.4	270 18.8	250 17.4	120 8.3
	SO	124	18 14.5	16 12.9	19 15.3	23 18.5	26 21.0	11 8.9	11 8.9
	PG	903	51 5.6	104 11.5	80 8.9	180 19.9	182 20.2	172 19.0	134 14.8
Risk of injury in humans is higher in group housing	ALL	2453	490 20.0	536 21.9	338 13.8	454 18.5	314 12.8	233 9.5	88 3.6
	HO	1429	339 23.7	330 23.1	205 14.3	256 17.9	158 11.1	113 7.9	28 2.0
	SO	124	26 21.0	27 21.8	20 16.1	29 23.4	11 8.9	10 8.1	1 0.8
	PG	900	125 13.9	179 19.9	113 12.6	169 18.8	145 16.1	110 12.2	59 6.6
Single-housed horses are healthier	ALL	2452	1126 45.9	574 23.4	296 12.1	317 12.9	43 1.8	47 1.9	49 2.0
	HO	1431	641 44.8	337 23.5	180 12.6	188 13.1	25 1.7	26 1.8	34 2.4
	SO	123	69 56.1	17 13.8	12 9.8	15 12.2	1 0.8	3 2.4	6 4.9
	PG	898	416 46.3	220 24.5	104 11.6	114 12.7	17 1.9	18 2.0	9 1.0
Group-housed horses have fewer behavioural disorders	ALL	2453	34 1.4	68 2.8	76 3.1	224 9.1	336 13.7	655 26.7	1060 43.2
	HO	1429	21 1.5	36 2.5	44 3.1	147 10.3	203 14.2	374 26.2	604 42.3
	SO	124	1 0.8	1 0.8	2 1.6	10 8.1	11 8.9	27 21.8	72 58.1
	PG	900	12 1.3	31 3.4	30 3.3	67 7.4	122 13.6	254 28.2	384 42.7

Continuation of Tab. A10

F76Beliefs about the health of horses	Group	TN	1 N %	2 N %	3 N %	4 N %	5 N %	6 N %	7 N %
Group housing is better than single housing for the welfare of the horses	ALL	2452	18 0.7	44 1.8	50 2.0	337 13.7	229 9.3	505 20.6	1269 51.8
	HO	1433	11 0.8	20 1.4	31 2.2	210 14.7	137 9.6	295 20.6	729 50.9
	SO	124	1 0.8	4 3.2	1 0.8	12 9.7	13 10.5	20 16.1	73 58.9
	PG	895	6 0.7	20 2.2	18 2.0	115 12.8	79 8.8	190 21.2	467 52.2
Horses kept in groups have less colics	ALL	2177	108 5.0	163 7.5	172 7.9	556 25.5	379 17.4	373 17.1	426 19.6
	HO	1188	67 5.6	97 8.2	107 9.0	333 28.0	184 15.5	174 14.6	226 19.0
	SO	113	3 2.7	8 7.1	3 2.7	32 28.3	17 15.0	12 10.6	38 33.6
	PG	876	38 4.3	58 6.6	62 7.1	191 21.8	178 20.3	187 21.3	162 18.5

Beliefs about the fulfilment of needs of horses in relation to housing

Tab. A11: Beliefs about the fulfilment of needs of horses with respect to housing systems. ALL = all groups, HO = Horse owners, SO = Stable owners, PG = Professionals group. Responses on a 7-point Likert scale with 1 = completely disagree, 2 = disagree, 3 = rather disagree, 4 = neither agree nor disagree, 5 = rather agree, 6 = agree, 7 = completely agree. TN = total number of responses to this item.

F77Beliefs about the needs of horses	Group	TN	1 N %	2 N %	3 N %	4 N %	5 N %	6 N %	7 N %
Social contact with other horses is important for horses	ALL	2461	2 0.1	0 0.0	2 0.1	12 0.5	30 1.2	235 9.5	2180 88.6
	HO	1437	2 0.1	0 0.0	2 0.1	7 0.5	13 0.9	128 8.9	1285 89.4
	SO	123	0 0.0	0 0.0	0 0.0	1 0.8	2 1.6	12 9.8	108 87.8
	PG	901	0 0.0	0 0.0	0 0.0	4 0.4	15 1.7	95 10.5	787 87.3
It is enough for horses to see other horses	ALL	2448	1005 41.1	670 27.4	391 16.0	285 11.6	54 2.2	36 1.5	7 0.3
	HO	1430	642 44.9	385 26.9	205 14.3	154 10.8	25 1.7	13 0.9	6 0.4
	SO	121	68 56.2	28 23.1	10 8.3	13 10.7	1 0.8	1 0.8	0 0.0
	PG	897	295 32.9	257 28.7	176 19.6	118 13.2	28 3.1	22 2.5	1 0.1

Continuation of Tab. A11

F77Beliefs about the needs of horses	Group	TN	1 N %	2 N %	3 N %	4 N %	5 N %	6 N %	7 N %
Horses in group housing often cannot rest long enough in a lying position	ALL	2426	315 13.0	451 18.6	362 14.9	770 31.7	253 10.4	177 7.3	98 4.0
	HO	1406	202 14.4	278 19.8	234 16.6	430 30.6	139 9.9	73 5.2	50 3.6
	SO	122	25 20.5	29 23.8	17 13.9	33 27.0	8 6.6	6 4.9	4 3.3
	PG	898	88 9.8	144 16.0	111 12.4	307 34.2	106 11.8	98 10.9	44 4.9
Horses kept in groups have more choices	ALL	2414	21 0.9	49 2.0	87 3.6	436 18.1	417 17.3	744 30.8	660 27.3
	HO	1400	10 0.7	28 2.0	56 4.0	256 18.3	248 17.7	405 28.9	397 28.4
	SO	122	1 0.8	0 0.0	3 2.5	17 13.9	8 6.6	37 30.3	56 45.9
	PG	892	10 1.1	21 2.4	28 3.1	163 18.3	161 18.0	302 33.9	207 23.2
Horses in group housing can better fulfil their need for locomotion	ALL	2445	15 0.6	29 1.2	32 1.3	253 10.3	311 12.7	699 28.6	1106 45.2
	HO	1425	5 0.4	13 0.9	21 1.5	155 10.9	190 13.3	381 26.7	660 46.3
	SO	122	1 0.8	0 0.0	3 2.5	7 5.7	8 6.6	25 20.5	78 63.9
	PG	898	9 1.0	16 1.8	8 0.9	91 10.1	113 12.6	293 32.6	368 41.0
The need for social contact with other horses is not met in single housing	ALL	2450	49 2.0	97 4.0	102 4.2	324 13.2	228 9.3	494 20.2	1156 47.2
	HO	1428	33 2.3	70 4.9	73 5.1	210 14.7	130 9.1	280 19.6	632 44.3
	SO	122	3 2.5	3 2.5	5 4.1	18 14.8	10 8.2	17 13.9	66 54.1
	PG	900	13 1.4	24 2.7	24 2.7	96 10.7	88 9.8	197 21.9	458 50.9
It is enough if horses are on pasture with other horses during the day	ALL	2449	163 6.7	260 10.6	293 12.0	744 30.4	405 16.5	390 15.9	194 7.9
	HO	1427	103 7.2	169 11.8	182 12.8	428 30.0	244 17.1	213 14.9	88 6.2
	SO	122	26 21.3	19 15.6	16 13.1	30 24.6	11 9.0	14 11.5	6 4.9
	PG	900	34 3.8	72 8.0	95 10.6	286 31.8	150 16.7	163 18.1	100 11.1

Beliefs about the housing of horses

Tab. A12: Beliefs about the housing of horses. ALL = all groups, HO = Horse owners, SO = Stable owners, PG = Professionals group. Responses on a 7-point Likert scale with 1 = completely disagree, 2 = disagree, 3 = rather disagree, 4 = neither agree nor disagree, 5 = rather agree, 6 = agree, 7 = completely agree. TN = total number of responses to this item.

F78Beliefs about the housing of horses	Group	TN	1 N %	2 N %	3 N %	4 N %	5 N %	6 N %	7 N %
Young horses should be housed with older horses	ALL	2411	24 1.0	68 2.8	158 6.6	571 23.7	391 16.2	656 27.2	543 22.5
	HO	1396	17 1.2	39 2.8	98 7.0	341 24.4	233 16.7	370 26.5	298 21.3
	SO	122	1 0.8	3 2.5	6 4.9	21 17.2	18 14.8	31 25.4	42 34.4
	PG	893	6 0.7	26 2.9	54 6.0	209 23.4	140 15.7	255 28.6	203 22.7
Handling is easier with a singled-housed horse	ALL	2403	608 25.3	607 25.3	365 15.2	509 21.2	161 6.7	118 4.9	35 1.5
	HO	1389	385 27.7	345 24.8	212 15.3	299 21.5	77 5.5	58 4.2	13 0.9
	SO	121	42 34.7	32 26.4	18 14.9	17 14.0	5 4.1	5 4.1	2 1.7
	PG	893	181 20.3	230 25.8	135 15.1	193 21.6	79 8.8	55 6.2	20 2.2
Horses are more willing to perform when they are in the box - constant outdoor run makes them tired	ALL	2427	1081 44.5	601 24.8	288 11.9	241 9.9	112 4.6	70 2.9	34 1.4
	HO	1411	665 47.1	351 24.9	161 11.4	131 9.3	63 4.5	29 2.1	11 0.8
	SO	120	74 61.7	18 15.0	9 7.5	9 7.5	4 3.3	5 4.2	1 0.8
	PG	896	342 38.2	232 25.9	118 13.2	101 11.3	45 5.0	36 4.0	22 2.5
Group housing requires competent observation of the horses and individually adapted management	ALL	2435	25 1.0	54 2.2	69 2.8	236 9.7	302 12.4	721 29.6	1028 42.2
	HO	1419	19 1.3	38 2.7	42 3.0	158 11.1	220 15.5	436 30.7	506 35.7
	SO	120	1 0.8	3 2.5	2 1.7	11 9.2	10 8.3	34 28.3	59 49.2
	PG	896	5 0.6	13 1.5	25 2.8	67 7.5	72 8.0	251 28.0	463 51.7
Constant group-housed horses stick more to the herd	ALL	2414	373 15.5	413 17.1	284 11.8	633 26.2	328 13.6	266 11.0	117 4.8
	HO	1394	225 16.1	240 17.2	155 11.1	382 27.4	181 13.0	149 10.7	62 4.4
	SO	121	24 19.8	23 19.0	12 9.9	34 28.1	10 8.3	13 10.7	5 4.1
	PG	899	124 13.8	150 16.7	117 13.0	217 24.1	137 15.2	104 11.6	50 5.6

Continuation of Tab. A12

F78Beliefs about the housing of horses	Group	TN	1 N %	2 N %	3 N %	4 N %	5 N %	6 N %	7 N %
The familiarization of a new horse into the group is difficult	ALL	2446	115 4.7	183 7.5	308 12.6	957 39.1	350 14.3	353 14.4	180 7.4
	HO	1425	71 5.0	120 8.4	184 12.9	588 41.3	188 13.2	187 13.1	87 6.1
	SO	123	9 7.3	12 9.8	15 12.2	44 35.8	18 14.6	17 13.8	8 6.5
	PG	898	35 3.9	51 5.7	109 12.1	325 36.2	144 16.0	149 16.6	85 9.5
Low-ranked horses have a problem in group housing	ALL	2438	107 4.4	277 11.4	332 13.6	888 36.4	392 16.1	269 11.0	173 7.1
	HO	1419	62 4.4	166 11.7	202 14.2	525 37.0	231 16.3	143 10.1	90 6.3
	SO	121	12 9.9	17 14.0	26 21.5	33 27.3	11 9.1	13 10.7	9 7.4
	PG	898	33 3.7	94 10.5	104 11.6	330 36.7	150 16.7	113 12.6	74 8.2
Group-housed horses are more balanced and more pleasant to handle	ALL	2426	17 0.7	52 2.1	85 3.5	410 16.9	355 14.6	664 27.4	843 34.7
	HO	1410	10 0.7	28 2.0	51 3.6	243 17.2	225 16.0	355 25.2	498 35.3
	SO	122	1 0.8	2 1.6	5 4.1	18 14.8	8 6.6	25 20.5	63 51.6
	PG	894	6 0.7	22 2.5	29 3.2	149 16.7	122 13.6	284 31.8	282 31.5
Horses that are kept in groups during the day must be put in single boxes at night so that they can sleep	ALL	2426	628 25.9	539 22.2	340 14.0	616 25.4	157 6.5	100 4.1	46 1.9
	HO	1409	373 26.5	329 23.3	191 13.6	364 25.8	78 5.5	54 3.8	20 1.4
	SO	122	55 45.1	22 18.0	12 9.8	19 15.6	8 6.6	2 1.6	4 3.3
	PG	895	200 22.3	188 21.0	137 15.3	233 26.0	71 7.9	44 4.9	22 2.5
Removing a horse from the group is difficult	ALL	2433	601 24.7	571 23.5	334 13.7	602 24.7	180 7.4	108 4.4	37 1.5
	HO	1416	389 27.5	341 24.1	172 12.1	349 24.6	101 7.1	47 3.3	17 1.2
	SO	123	42 34.1	34 27.6	14 11.4	20 16.3	6 4.9	3 2.4	4 3.3
	PG	894	170 19.0	196 21.9	148 16.6	233 26.1	73 8.2	58 6.5	16 1.8

Continuation of Tab. A12

F78Beliefs about the housing of horses	Group	TN	1 N %	2 N %	3 N %	4 N %	5 N %	6 N %	7 N %
Removing a horse from the group is dangerous	ALL	2427	752 31.0	661 27.2	398 16.4	433 17.8	112 4.6	54 2.2	17 0.7
	HO	1414	494 34.9	385 27.2	219 15.5	238 16.8	49 3.5	21 1.5	8 0.6
	SO	121	42 34.7	36 29.8	17 14.0	18 14.9	5 4.1	3 2.5	0 0.0
	PG	892	216 24.2	240 26.9	162 18.2	177 19.8	58 6.5	30 3.4	9 1.0
Retired horses cannot be expected to change from single to group housing	ALL	2374	556 23.4	533 22.5	374 15.8	639 26.9	143 6.0	88 3.7	41 1.7
	HO	1367	322 23.6	313 22.9	220 16.1	358 26.2	77 5.6	54 4.0	23 1.7
	SO	117	29 24.8	20 17.1	19 16.2	26 22.2	13 11.1	6 5.1	4 3.4
	PG	890	205 23.0	200 22.5	135 15.2	255 28.7	53 6.0	28 3.1	14 1.6
Group housing is not suitable for sport horses	ALL	2416	958 39.7	621 25.7	272 11.3	288 11.9	142 5.9	85 3.5	50 2.1
	HO	1397	570 40.8	388 27.8	144 10.3	153 11.0	72 5.2	46 3.3	24 1.7
	SO	121	58 47.9	28 23.1	11 9.1	15 12.4	3 2.5	1 0.8	5 4.1
	PG	898	330 36.7	205 22.8	117 13.0	120 13.4	67 7.5	38 4.2	21 2.3
Group housing is not suitable for clipped horses	ALL	2380	863 36.3	723 30.4	287 12.1	243 10.2	168 7.1	62 2.6	34 1.4
	HO	1370	525 38.3	416 30.4	163 11.9	123 9.0	100 7.3	26 1.9	17 1.2
	SO	121	41 33.9	33 27.3	17 14.0	16 13.2	7 5.8	5 4.1	2 1.7
	PG	889	297 33.4	274 30.8	107 12.0	104 11.7	61 6.9	31 3.5	15 1.7
Stallions cannot be housed in groups	ALL	2268	478 21.1	465 20.5	234 10.3	592 26.1	227 10.0	180 7.9	92 4.1
	HO	1283	265 20.7	263 20.5	140 10.9	359 28.0	115 9.0	92 7.2	49 3.8
	SO	105	29 27.6	25 23.8	11 10.5	22 21.0	8 7.6	7 6.7	3 2.9
	PG	880	184 20.9	177 20.1	83 9.4	211 24.0	104 11.8	81 9.2	40 4.5

Continuation of Tab. A12

F78Beliefs about the housing of horses	Group	TN	1 N %	2 N %	3 N %	4 N %	5 N %	6 N %	7 N %
Group housing is not suitable for horses that do not get along with other horses	ALL	2392	98 4.1	194 8.1	232 9.7	690 28.8	486 20.3	452 18.9	240 10.0
	HO	1383	63 4.6	115 8.3	127 9.2	435 31.5	286 20.7	230 16.6	127 9.2
	SO	120	5 4.2	14 11.7	15 12.5	30 25.0	27 22.5	19 15.8	10 8.3
	PG	889	30 3.4	65 7.3	90 10.1	225 25.3	173 19.5	203 22.8	103 11.6
Group housing is suitable for all horses	ALL	2419	232 9.6	387 16.0	280 11.6	654 27.0	390 16.1	304 12.6	172 7.1
	HO	1405	109 7.8	213 15.2	166 11.8	404 28.8	237 16.9	178 12.7	98 7.0
	SO	121	12 9.9	20 16.5	11 9.1	28 23.1	22 18.2	19 15.7	9 7.4
	PG	893	111 12.4	154 17.2	103 11.5	222 24.9	131 14.7	107 12.0	65 7.3
Hunting and 'bullying' is a problem in group housing	ALL	2415	106 4.4	301 12.5	396 16.4	947 39.2	302 12.5	251 10.4	112 4.6
	HO	1401	60 4.3	168 12.0	233 16.6	589 42.0	169 12.1	126 9.0	56 4.0
	SO	119	11 9.2	31 26.1	25 21.0	33 27.7	10 8.4	6 5.0	3 2.5
	PG	895	35 3.9	102 11.4	138 15.4	325 36.3	123 13.7	119 13.3	53 5.9

Beliefs about the feeding of horses in relation to housing systems

Tab. A13: Beliefs about the feeding of horses in relation to housing systems. ALL = all groups, HO = Horse owners, SO = Stable owners, PG = Professionals group. Responses on a 7-point Likert scale with 1 = completely disagree, 2 = disagree, 3 = rather disagree, 4 = neither agree nor disagree, 5 = rather agree, 6 = agree, 7 = completely agree. TN = total number of responses to this item.

F79Beliefs about the feeding of horses	Group	TN	1 N %	2 N %	3 N %	4 N %	5 N %	6 N %	7 N %
Single-housed horses are individually-adapted fed	ALL	2412	53 2.2	90 3.7	98 4.1	450 18.7	450 18.7	787 32.6	484 20.1
	HO	1392	32 2.3	64 4.6	52 3.7	259 18.6	265 19.0	438 31.5	282 20.3
	SO	123	3 2.4	4 3.3	5 4.1	19 15.4	23 18.7	43 35.0	26 21.1
	PG	897	18 2.0	22 2.5	41 4.6	172 19.2	162 18.1	306 34.1	176 19.6
Group-housed horses cannot eat undisturbed	ALL	2436	295 12.1	541 22.2	431 17.7	766 31.4	239 9.8	115 4.7	49 2.0
	HO	1418	183 12.9	334 23.6	238 16.8	435 30.7	137 9.7	63 4.4	28 2.0
	SO	123	37 30.1	33 26.8	17 13.8	26 21.1	6 4.9	1 0.8	3 2.4
	PG	895	75 8.4	174 19.4	176 19.7	305 34.1	96 10.7	51 5.7	18 2.0
Feeding the horses in a group is problematic	ALL	2439	299 12.3	509 20.9	337 13.8	721 29.6	320 13.1	184 7.5	69 2.8
	HO	1419	200 14.1	299 21.1	191 13.5	436 30.7	167 11.8	90 6.3	36 2.5
	SO	124	31 25.0	29 23.4	15 12.1	28 22.6	13 10.5	5 4.0	3 2.4
	PG	896	68 7.6	181 20.2	131 14.6	257 28.7	140 15.6	89 9.9	30 3.3
Group-housed horses cannot be fed individually	ALL	2437	308 12.6	501 20.6	328 13.5	536 22.0	417 17.1	240 9.8	107 4.4
	HO	1417	173 12.2	280 19.8	190 13.4	345 24.3	240 16.9	132 9.3	57 4.0
	SO	124	22 17.7	25 20.2	19 15.3	20 16.1	16 12.9	16 12.9	6 4.8
	PG	896	113 12.6	196 21.9	119 13.3	171 19.1	161 18.0	92 10.3	44 4.9

Beliefs about horses' needs

Tab. A14: Beliefs about horses' needs. ALL = all groups, HO = Horse owners, SO = Stable owners, PG = Professionals group. Responses on a 7-point Likert scale with 1 = very unimportant, 2 = unimportant, 3 = rather unimportant, 4 = neither important nor unimportant, 5 = rather important, 6 = important, 7 = very important. TN = total number of responses to this item.

F80Beliefs about horses' needs	Group	TN	1 N %	2 N %	3 N %	4 N %	5 N %	6 N %	7 N %
How important for the well-being of horses is it to …									
… allow horses to move freely on a regular basis?	ALL	2451	0 0.0	0 0.0	0 0.0	9 0.4	31 1.3	190 7.8	2221 90.6
	HO	1428	0 0.0	0 0.0	0 0.0	2 0.1	20 1.4	116 8.1	1290 90.3
	SO	124	0 0.0	0 0.0	0 0.0	0 0.0	1 0.8	7 5.6	116 93.5
	PG	899	0 0.0	0 0.0	0 0.0	7 0.8	10 1.1	67 7.5	815 90.7
… constantly have roughage available?	ALL	2450	2 0.1	21 0.9	51 2.1	207 8.4	295 12.0	620 25.3	1254 51.2
	HO	1427	0 0.0	7 0.5	35 2.5	134 9.4	192 13.5	360 25.2	699 49.0
	SO	124	1 0.8	2 1.6	4 3.2	12 9.7	17 13.7	33 26.6	55 44.4
	PG	899	1 0.1	12 1.3	12 1.3	61 6.8	86 9.6	227 25.3	500 55.6
… keep the horses in a stable group?	ALL	2438	1 0.0	7 0.3	21 0.9	61 2.5	279 11.4	782 32.1	1287 52.8
	HO	1421	1 0.1	6 0.4	12 0.8	34 2.4	171 12.0	436 30.7	761 53.6
	SO	123	0 0.0	0 0.0	1 0.8	5 4.1	13 10.6	33 26.8	71 57.7
	PG	894	0 0.0	1 0.1	8 0.9	22 2.5	95 10.6	313 35.0	455 50.9
… enable the horses access to a pasture?	ALL	2451	4 0.2	9 0.4	48 2.0	127 5.2	227 9.3	517 21.1	1519 62.0
	HO	1428	3 0.2	5 0.4	28 2.0	68 4.8	127 8.9	303 21.2	894 62.6
	SO	123	1 0.8	2 1.6	1 0.8	9 7.3	13 10.6	23 18.7	74 60.2
	PG	900	0 0.0	2 0.2	19 2.1	50 5.6	87 9.7	191 21.2	551 61.2
… provide the horses turn-out with conspecifics?	ALL	2445	0 0.0	2 0.1	8 0.3	72 2.9	85 3.5	317 13.0	1961 80.2
	HO	1428	0 0.0	2 0.1	4 0.3	38 2.7	40 2.8	170 11.9	1174 82.2
	SO	123	0 0.0	0 0.0	1 0.8	1 0.8	3 2.4	13 10.6	105 85.4
	PG	894	0 0.0	0 0.0	3 0.3	33 3.7	42 4.7	134 15.0	682 76.3

Continuation of Tab. A14

F80Beliefs about horses' needs	Group	TN	1 N %	2 N %	3 N %	4 N %	5 N %	6 N %	7 N %
… be able to spend time in the social group undisturbed by humans?	ALL	2441	6 0.2	8 0.3	28 1.1	86 3.5	184 7.5	483 19.8	1646 67.4
	HO	1423	1 0.1	5 0.4	16 1.1	42 3.0	103 7.2	273 19.2	983 69.1
	SO	124	0 0.0	0 0.0	1 0.8	1 0.8	4 3.2	18 14.5	100 80.6
	PG	894	5 0.6	3 0.3	11 1.2	43 4.8	77 8.6	192 21.5	563 63.0
… have contact with humans?	ALL	2446	68 2.8	94 3.8	251 10.3	395 16.1	429 17.5	667 27.3	542 22.2
	HO	1427	34 2.4	39 2.7	143 10.0	237 16.6	262 18.4	386 27.0	326 22.8
	SO	124	6 4.8	4 3.2	15 12.1	17 13.7	22 17.7	31 25.0	29 23.4
	PG	895	28 3.1	51 5.7	93 10.4	141 15.8	145 16.2	250 27.9	187 20.9
… work the horses?	ALL	2447	61 2.5	103 4.2	218 8.9	599 24.5	531 21.7	606 24.8	329 13.4
	HO	1429	30 2.1	56 3.9	119 8.3	338 23.7	327 22.9	373 26.1	186 13.0
	SO	123	8 6.5	3 2.4	18 14.6	27 22.0	21 17.1	30 24.4	16 13.0
	PG	895	23 2.6	44 4.9	81 9.1	234 26.1	183 20.4	203 22.7	127 14.2

Affective attitudes

Tab. A15: Affective attitudes. ALL = all groups, HO = Horse owners, SO = Stable owners, PG = Professionals group. Responses on a 7-point Likert scale with 1 = dislike very much, 2 = dislike, 3 = rather dislike, 4 = neither like nor dislike, 5 = rather like, 6 = like, 7 = like very much. TN = total number of responses to this item.

F81Affective attitudes	Group	TN	1 N %	2 N %	3 N %	4 N %	5 N %	6 N %	7 N %
Like/do not like contact with horses in the following situations:									
Feeding the horses	ALL	2438	10 0.4	17 0.7	28 1.1	113 4.6	123 5.0	943 38.7	1204 49.4
	HO	1424	5 0.4	8 0.6	15 1.1	57 4.0	65 4.6	535 37.6	739 51.9
	SO	124	1 0.8	2 1.6	1 0.8	6 4.8	4 3.2	46 37.1	64 51.6
	PG	890	4 0.4	7 0.8	12 1.3	50 5.6	54 6.1	362 40.7	401 45.1
Caring for the sick horses	ALL	2422	17 0.7	39 1.6	145 6.0	460 19.0	232 9.6	895 37.0	634 26.2
	HO	1409	14 1.0	29 2.1	99 7.0	301 21.4	153 10.9	504 35.8	309 21.9
	SO	123	0 0.0	0 0.0	11 8.9	33 26.8	4 3.3	43 35.0	32 26.0
	PG	890	3 0.3	10 1.1	35 3.9	126 14.2	75 8.4	348 39.1	293 32.9
Petting the horses	ALL	2426	4 0.2	3 0.1	24 1.0	103 4.2	148 6.1	638 26.3	1506 62.1
	HO	1420	2 0.1	2 0.1	10 0.7	39 2.7	69 4.9	332 23.4	966 68.0
	SO	124	0 0.0	0 0.0	2 1.6	9 7.3	9 7.3	32 25.8	72 58.1
	PG	882	2 0.2	1 0.1	12 1.4	55 6.2	70 7.9	274 31.1	468 53.1
Observing the horses on the pasture	ALL	2443	2 0.1	1 0.0	11 0.5	55 2.3	88 3.6	573 23.5	1713 70.1
	HO	1428	0 0.0	0 0.0	6 0.4	27 1.9	46 3.2	310 21.7	1039 72.8
	SO	124	0 0.0	0 0.0	0 0.0	2 1.6	2 1.6	23 18.5	97 78.2
	PG	891	2 0.2	1 0.1	5 0.6	26 2.9	40 4.5	240 26.9	577 64.8
Observing the horses in the stable	ALL	2423	31 1.3	84 3.5	200 8.3	327 13.5	221 9.1	687 28.4	873 36.0
	HO	1408	19 1.3	46 3.3	106 7.5	179 12.7	131 9.3	396 28.1	531 37.7
	SO	123	2 1.6	2 1.6	6 4.9	10 8.1	4 3.3	31 25.2	68 55.3
	PG	892	10 1.1	36 4.0	88 9.9	138 15.5	86 9.6	260 29.1	274 30.7

Continuation of Tab. A15

F81Affective attitudes	Group	TN	1 N %	2 N %	3 N %	4 N %	5 N %	6 N %	7 N %
Like/do not like contact with horses in the following situations:									
Training the horses	ALL	2421	5	12	28	149	153	807	1267
			0.2	0.5	1.2	6.2	6.3	33.3	52.3
	HO	1414	3	2	12	81	84	487	745
			0.2	0.1	0.8	5.7	5.9	34.4	52.7
	SO	121	1	2	3	12	10	41	52
			0.8	1.7	2.5	9.9	8.3	33.9	43.0
	PG	886	1	8	13	56	59	279	470
			0.1	0.9	1.5	6.3	6.7	31.5	53.0
Yelling at the horses if necessary	ALL	2424	508	454	562	629	128	117	26
			21.0	18.7	23.2	25.9	5.3	4.8	1.1
	HO	1414	306	268	329	354	73	72	12
			21.6	19.0	23.3	25.0	5.2	5.1	0.8
	SO	122	28	17	33	33	5	3	3
			23.0	13.9	27.0	27.0	4.1	2.5	2.5
	PG	888	174	169	200	242	50	42	11
			19.6	19.0	22.5	27.3	5.6	4.7	1.2
Grooming the horses	ALL	2437	6	21	60	218	329	911	892
			0.2	0.9	2.5	8.9	13.5	37.4	36.6
	HO	1427	4	5	29	104	177	529	579
			0.3	0.4	2.0	7.3	12.4	37.1	40.6
	SO	122	0	1	4	16	20	52	29
			0.0	0.8	3.3	13.1	16.4	42.6	23.8
	PG	888	2	15	27	98	132	330	284
			0.2	1.7	3.0	11.0	14.9	37.2	32.0
Riding the horses	ALL	2426	6	15	23	106	168	786	1322
			0.2	0.6	0.9	4.4	6.9	32.4	54.5
	HO	1415	2	6	14	51	91	459	792
			0.1	0.4	1.0	3.6	6.4	32.4	56.0
	SO	122	2	0	1	8	7	45	59
			1.6	0.0	0.8	6.6	5.7	36.9	48.4
	PG	889	2	9	8	47	70	282	471
			0.2	1.0	0.9	5.3	7.9	31.7	53.0
Walking the horses	ALL	2438	56	66	165	233	266	752	900
			2.3	2.7	6.8	9.6	10.9	30.8	36.9
	HO	1425	30	25	70	107	143	456	594
			2.1	1.8	4.9	7.5	10.0	32.0	41.7
	SO	121	3	4	11	14	11	37	41
			2.5	3.3	9.1	11.6	9.1	30.6	33.9
	PG	892	23	37	84	112	112	259	265
			2.6	4.1	9.4	12.6	12.6	29.0	29.7

Continuation of Tab. A15

F81Affective attitudes	Group	TN	1 N %	2 N %	3 N %	4 N %	5 N %	6 N %	7 N %
Like/do not like contact with horses in the following situations:									
Working in-hand/groundwork with the horses	ALL	2427	38 1.6	52 2.1	140 5.8	224 9.2	281 11.6	791 32.6	901 37.1
	HO	1420	19 1.3	21 1.5	60 4.2	114 8.0	174 12.3	480 33.8	552 38.9
	SO	120	2 1.7	0 0.0	9 7.5	14 11.7	10 8.3	40 33.3	45 37.5
	PG	887	17 1.9	31 3.5	71 8.0	96 10.8	97 10.9	271 30.6	304 34.3
Physical reprimanding of the horses if necessary	ALL	2421	330 13.6	426 17.6	469 19.4	696 28.7	193 8.0	232 9.6	75 3.1
	HO	1412	212 15.0	256 18.1	288 20.4	362 25.6	111 7.9	139 9.8	44 3.1
	SO	122	16 13.1	22 18.0	27 22.1	38 31.1	7 5.7	8 6.6	4 3.3
	PG	887	102 11.5	148 16.7	154 17.4	296 33.4	75 8.5	85 9.6	27 3.0
Walking through the group	ALL	2384	70 2.9	63 2.6	158 6.6	429 18.0	235 9.9	841 35.3	588 24.7
	HO	1385	44 3.2	35 2.5	88 6.4	254 18.3	139 10.0	505 36.5	320 23.1
	SO	121	0 0.0	0 0.0	7 5.8	16 13.2	9 7.4	47 38.8	42 34.7
	PG	878	26 3.0	28 3.2	63 7.2	159 18.1	87 9.9	289 32.9	226 25.7
Removing a horse from its group	ALL	2395	17 0.7	43 1.8	134 5.6	484 20.2	250 10.4	1023 42.7	444 18.5
	HO	1395	11 0.8	25 1.8	71 5.1	297 21.3	156 11.2	575 41.2	260 18.6
	SO	121	0 0.0	1 0.8	4 3.3	15 12.4	9 7.4	63 52.1	29 24.0
	PG	879	6 0.7	17 1.9	59 6.7	172 19.6	85 9.7	385 43.8	155 17.6

Annex XI: Scree plots from the PCA for the attitudes of the different stakeholders

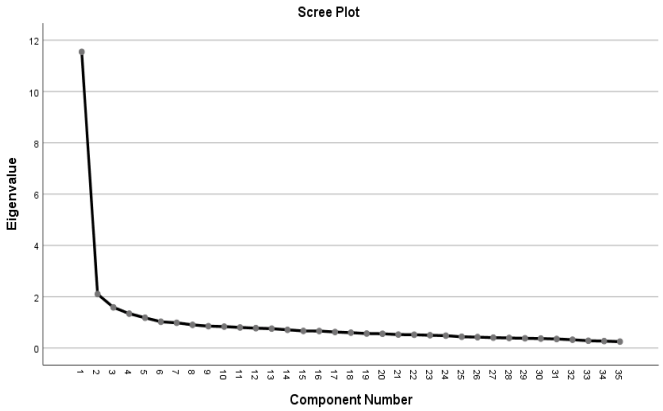

Fig. A13: Scree plot for the PCA of beliefs about housing systems (single and group housing)

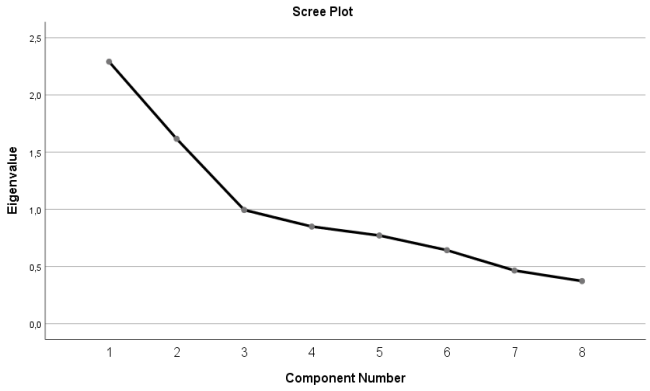

Fig. A14: Scree plot for the PCA of beliefs about horses' needs

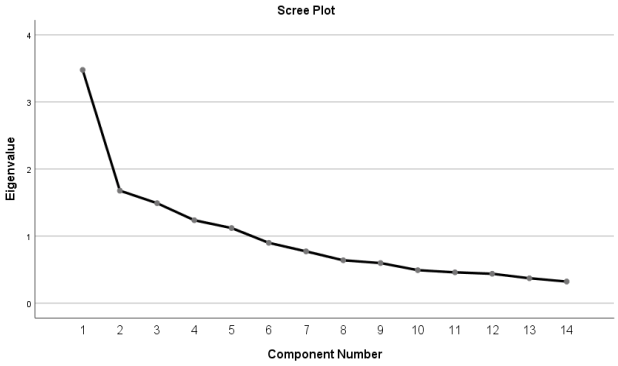

Fig. A15: Scree plot for the PCA of affective attitudes

Annex XII: Descriptive statistics of the components from the PCA for beliefs about housing systems (single and group housing) for the three different stakeholder groups

Tab. A16: Descriptive statistics of the components from PCA for beliefs about housing systems (single and group housing) for the three stakeholder groups, ALL = all groups, HOSH = horse owners with single housing, HOGH = horse owners with group housing, HOSHGH = horse owners with single and group housing, SOSH = stable owners with single housing, SOGH = stable owners with group housing, SOSHGH = stable owners with single and group housing, PG = professionals group, SD = standard deviation

	Group	N-Valid	N-Missing	Mean	SD	Min	Q25	Median	Q75	Max
ProblemWelfareGH	ALL	2469	1768	3.9	1.04	1.0	3.3	3.9	4.6	7.0
	HOSH	385	278	4.6	0.89	1.5	4.0	4.5	5.3	7.0
	HOGH	757	501	3.4	0.83	1.0	2.9	3.4	4.0	6.4
	HOSHGH	301	675	4.1	0.90	1.5	3.5	4.1	4.6	7.0
	SOSH	10	10	4.6	0.91	3.0	3.8	4.7	5.2	6.1
	SOGH	81	26	3.1	0.75	1.8	2.6	3.0	3.6	5.5
	SOSHGH	33	56	4.1	1.17	1.3	3.1	4.1	4.8	7.0
	PG	902	222	4.1	1.05	1.4	3.4	4.1	4.8	7.0
posWelfareGH	ALL	2468	1769	5.6	1.10	1.0	5.0	5.9	6.6	7.0
	HOSH	384	279	4.6	1.08	1.3	4.0	4.6	5.3	7.0
	HOGH	757	501	6.2	0.70	2.7	5.8	6.3	6.7	7.0
	HOSHGH	301	675	5.4	1.09	1.0	4.6	5.6	6.3	7.0
	SOSH	10	10	4.5	1.10	2.3	3.9	4.5	5.3	6.0
	SOGH	81	26	6.4	0.63	3.9	6.1	6.6	7.0	7.0
	SOSHGH	33	56	5.1	1.17	2.7	4.2	5.3	6.0	7.0
	PG	902	222	5.7	1.07	1.6	5.0	5.9	6.4	7.0
negHumanGH	ALL	2462	1775	2.7	1.06	1.0	2.0	2.6	3.4	7.0
	HOSH	385	278	3.3	1.07	1.0	2.5	3.3	4.0	6.1
	HOGH	752	506	2.2	0.78	1.0	1.6	2.1	2.8	5.2
	HOSHGH	301	675	2.8	0.98	1.0	2.1	2.8	3.4	6.7
	SOSH	10	10	3.1	0.94	1.8	2.0	3.4	3.9	4.1
	SOGH	81	26	2.2	0.71	1.0	1.8	2.1	2.5	4.8
	SOSHGH	32	57	3.1	1.21	1.3	2.3	3.1	3.9	5.7
	PG	901	223	2.9	1.11	1.0	2.1	2.8	3.6	7.0

Annex XIII: Descriptive statistics of the components from the PCA for beliefs about horses' needs for the three different stakeholder groups

Tab. A17: Descriptive statistics of the components from PCA for beliefs about horses' needs for the three stakeholder groups, ALL = all groups, HOSH = horse owners with single housing, HOGH = horse owners with group housing, HOSHGH = horse owners with single and group housing, SOSH = stable owners with single housing, SOGH = stable owners with group housing, SOSHGH = stable owners with single and group housing, PG = professionals group, SD = standard deviation

	Group	N-Valid	N-Missing	Mean	SD	Min	Q25	Median	Q75	Max
WelfareHorse	ALL	2455	1782	6.5	0.54	3.2	6.2	6.6	7.0	7.0
	HOSH	382	281	6.3	0.62	4.0	6.0	6.4	6.8	7.0
	HOGH	750	508	6.6	0.43	3.8	6.4	6.8	7.0	7.0
	HOSHGH	299	677	6.5	0.50	4.4	6.2	6.6	7.0	7.0
	SOSH	10	10	6.5	0.48	5.4	6.2	6.4	6.9	7.0
	SOGH	81	26	6.7	0.37	5.2	6.5	6.8	7.0	7.0
	SOSHGH	33	56	6.3	0.69	4.6	5.8	6.4	6.9	7.0
	PG	900	224	6.5	0.57	3.2	6.2	6.6	7.0	7.0
WorkContactHuman	ALL	2452	1785	5.0	1.33	1.0	4.0	5.0	6.0	7.0
	HOSH	382	281	5.2	1.32	1.0	4.5	5.5	6.0	7.0
	HOGH	749	509	4.9	1.24	1.0	4.0	5.0	6.0	7.0
	HOSHGH	299	677	5.2	1.28	1.0	4.5	5.5	6.0	7.0
	SOSH	10	10	5.6	0.98	4.0	4.5	6.0	6.1	7.0
	SOGH	81	26	4.7	1.65	1.0	3.5	5.0	6.0	7.0
	SOSHGH	33	56	5.0	1.34	2.0	4.0	5.0	6.0	7.0
	PG	898	226	4.9	1.39	1.0	4.0	5.0	6.0	7.0

Annex XIV: Descriptive statistics of the components from the PCA for affective attitudes for the three different stakeholder groups

Tab. A18: Descriptive statistics of the components from PCA for affective attitudes, ALL = all groups, HOSH = horse owners with single housing, HOGH = horse owners with group housing, HOSHGH = horse owners with single and group housing, SOSH = stable owners with single housing, SOGH = stable owners with group housing, SOSHGH = stable owners with single and group housing, PG = professionals group, SD = standard deviation

	Group	N-Valid	N-Missing	Mean	SD	Min	Q25	Median	Q75	Max
posInteract	ALL	2450	1787	5.9	0.72	1.3	5.4	6.0	6.4	7.0
	HOSH	382	281	5.7	0.67	3.7	5.3	5.8	6.2	7.0
	HOGH	749	509	6.1	0.62	3.8	5.8	6.2	6.6	7.0
	HOSHGH	299	677	5.9	0.69	3.3	5.5	6.0	6.4	7.0
	SOSH	10	10	5.7	0.73	4.6	4.8	6.1	6.3	6.3
	SOGH	81	26	6.1	0.66	3.7	5.8	6.2	6.6	7.0
	SOSHGH	33	56	5.8	0.60	4.6	5.3	5.9	6.2	7.0
	PG	896	228	5.7	0.78	1.3	5.2	5.8	6.3	7.0
negBeh	ALL	2438	1799	3.2	1.34	1.0	2.0	3.0	4.0	7.0
	HOSH	380	283	3.3	1.33	1.0	2.0	3.3	4.0	7.0
	HOGH	746	512	3.0	1.36	1.0	2.0	3.0	4.0	7.0
	HOSHGH	295	681	3.3	1.35	1.0	2.5	3.0	4.0	6.5
	SOSH	10	10	3.4	0.58	2.5	2.9	3.5	4.0	4.0
	SOGH	81	26	3.0	1.33	1.0	2.0	3.0	3.8	7.0
	SOSHGH	32	57	3.4	1.46	1.0	2.6	3.5	4.0	7.0
	PG	894	230	3.3	1.31	1.0	2.5	3.5	4.0	7.0

Annex XV: Scree plots from the PCA for the reasons of professionals' horse housing recommendation

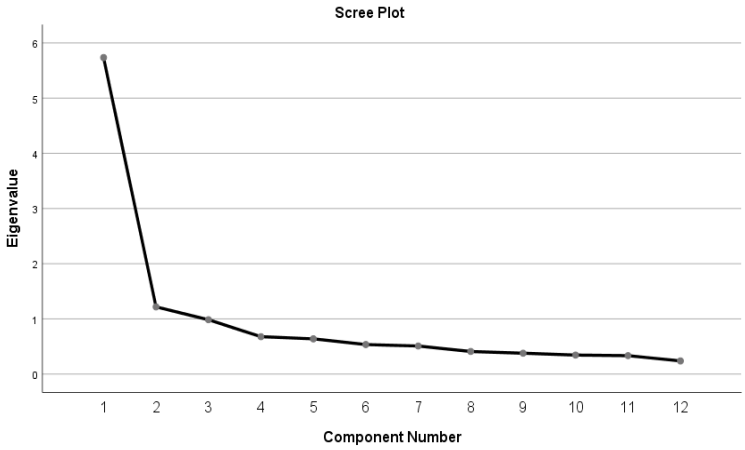

Fig. A16: Scree plot for the PCA for reasons for professionals' recommendation of single housing

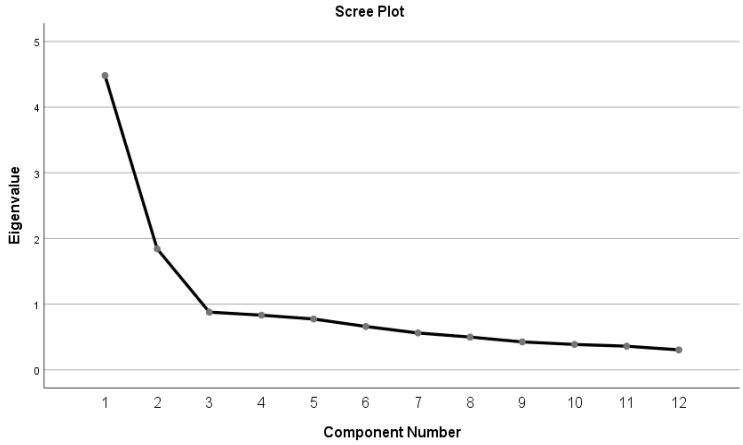

Fig. A17: Scree plot for the PCA for reasons for professionals' recommendation of group housing