Bachelor Thesis

Equine Management

Ethics and the Welfare of the Elite Competition Horse

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Deventer, June 2007

PREFACE

This bachelor thesis is the result of a four month study on the welfare of the elite competition horse. It is based on theory on ethics, animal welfare, elite competition horses, results of the research and advice from experts. This bachelor thesis makes the final step in the four year during study Equine Management and is based on both theory and practice.

In this preface I would like to thank those who have helped me during my study Equine Management and in particular during the process of this research project. First of all, I am very grateful to professor Gego for his kind support, trust and help. Without the help of professor Gego, it would not have been possible to carry out this research. I would like to thank Mr Kemperman for his kind support and help, especially during the International Concours Hippique "Indoor Brabant". Furthermore I would like to thank Mr Sluyter, Director of the Veterinary Department and Ms Baumann, Coordinator of the Jumping Department of the FEI, Mr Boersma and Ms Hottinga of the Dutch Equine Federation for their help to reach the four target groups. I would like to thank Mr Arts for his kind interest in this research and for his open and honest answers during the interview. I would like to thank Ms Van Dierendonck for her honest answers concerning tail swishing of competition horses. I would like to thank Max van Dijk, Esther van Dijk and Sanneke Verweij for their suggestions for improvement of the manuscript of this thesis. Furthermore, I am very grateful to my supervisor from Van Hall Larenstein, Inga Wolframm. I can not thank her enough for her support, guidance and advice throughout the process of this research. Finally, I would like to thank my family for their continuous support and source of inspiration throughout my study Equine Management.

Thank you all.

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Deventer, June 2007

ABSTRACT

During the last years, public concern on the use of animals in (among others) research, agriculture and recreation increased. Nowadays it is acknowledged that animals can suffer and that the welfare of animals needs to be taken into account in moral deliberation, public policy and civilized law (Pascalev, 2007). However, even today there is no unanimous definition of welfare and no clear measurement technique exists to assess the welfare of animals. The welfare of horses in equestrian sports is protected by the international body for equestrian sport: the Fédération Equestre Internationale (FEI). However, the policies of the FEI remain vague and susceptible to influences of a subjective nature. The aim of this research was, therefore, to provide more insight in the welfare of the elite competition horse, important parameters and key issues for the protection of the welfare of the elite competition horse in the future. A questionnaire was used, focusing on four target groups: visitors of equestrian events, international top riders, officials and FEI veterinarians. In total 74 respondents completed the questionnaire. Results suggest welfare can be defined as "the absence of suffering or pain". Furthermore, the results suggest that the welfare of the elite competition horse can be assessed using physical health and the horse's reaction to its immediate environment as parameters. Finally, the results suggest that key issues for the future are safe and suitable ground surfaces, steward supervision and appropriate housing.

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INTRODUCTION

In 2005 a total of 1886 equestrian events were organized, among which 737 for the discipline Jumping, 378 for the discipline Eventing and 353 for the discipline Endurance (FEI (f), 2007). Every year several thousands of riders compete in equestrian sports. The equestrian sport is one of the few sports where man and woman compete on equal terms and where two athletes are involved: both the rider and the horse (FEI (f), 2007).

Debates on the welfare of the elite competition horse are common in equestrian sports. During the past few years discussions originated on the welfare of elite dressage horses trained using the unnatural head-neck position (Rollkur) (Breda Van, 2006). More recently a discussion originated on the welfare of the horse Blue Hors Matiné during the International Concours Hippique "Indoor Brabant". During her participation in the FEI dressage World Cup she swished her tail so heavily, that people wondered whether or not she complied with FEI regulations (Willem Rosie, 2007).

Definitions of welfare vary, even today scientists do not agree upon one unanimous definition of welfare. So what exactly is welfare of the elite competition horse and how can the welfare of the elite competition horse be assessed?

This survey study is carried out to provide insight in the welfare of elite competition horses, important parameters and key issues for the protection of the elite competition horse in the future. The survey study is carried out using a questionnaire, focusing on four target groups: visitors of equestrian events, international top riders, officials and FEI veterinarians.

At the outset of this research project, the following research questions were designed:

1. How do the four target groups define welfare?
2. How can the welfare of elite competition horses be assessed?
3. What are important factors or issues for the welfare of elite competition horses?
4. What are key issues for the protection of the welfare of elite competition horses for now, and the future?

With the insight in the welfare of the elite competition horse provided by the survey study, recommendations are formulated for improvements of the protection of the welfare of the elite competition horse in the future.

1. ETHICS AND ANIMALS: A CONTINUOUS SOURCE OF DEBATE

Ethics

There is an abundant amount of literature written on ethics, animal welfare and the relationship between ethics and animal welfare (Schroten, 1992; Rowan, 1993; Bennet et al., 2002; Hodges, 2006; Marie, 2006; Rollin, 2006). Interesting is that both terms are defined in a variety of ways by different scientists, hence, many scientists can not agree upon one unanimous definition for both ethics and welfare. "Ethics defines the moral component of decisions reflecting self-interest or concern about the well-being of others" (Hodges, 2006). "Ethics is about systematic reflection on morals and morality, about what we ought (not) to do and why (not)" (Schroten, 1992). "Ethics can be viewed as a set of rules of action within a given society, in accordance with its beliefs, for a harmonious development, or as the eye any individual turns on his / her actions" (Marie, 2006). Looking at these definitions, however, it seems that they all not really differ from each other. Ethics is about morals and values, how we treat each other and ought to be treated, or how we make decisions. Ethics differs greatly between countries, cultures and persons and is influenced by (among others) intuitions, personal backgrounds and emotions (Rowan, 1993). In animal agriculture, viewpoints on ethics and welfare differ greatly between the different stakeholders and are linked to different ethical views and sensitivity to societal demands (Marie, 2006). As ethics is determined by countries, cultures and individual persons and greatly differs between different stakeholders, for this research it will be interesting to compare the opinions of the different target groups and to investigate whether the opinions are possibly linked to their background.

History and development of ethics

During the last years, public concerns on the use of animals in (among others) research, agriculture and recreation increased, mostly in toxicology and bio-medical studies (Sherwin et al., 2003). Especially food safety, environmental degradation, biotechnology and animal welfare are ethical issues of concern (Bennet et al., 2002). In Europe intensive livestock production has had detrimental effects on the health of yielding animals, pigs and poultry. Therefore, ethical debates have increased on this intensification in order to sustain the welfare of livestock (Doerfler and Peters, 2006). As the concerns and knowledge have increased by research and education, people become more aware of the moral status of animals. Nowadays it is acknowledged that animals can actually suffer and that the welfare of animals needs to be taken into account in moral

deliberation, public policy and civilized law (Pascalev, 2006).

Concerns on the use of animals already originated in the 17th and 18th century, as (among others) Locke and Bentham argued for animal welfare (Spencer et al., 2006). Since less knowledge on animals existed and the nature of the use of animals differed, people did not have the same opinions and beliefs on animal ethics as people have today. Early writings on the ethical position of animals show this difference; people believed that animals existed for the sake of man and that man could, and should, use animals in the way he pleased (Bennet et al., 2002). The 1876 Cruelty to Animals Act of the United Kingdom was one of the first pieces of legislation (Spencer et al., 2006), restricting some use of animals in research and education and setting up a system of licensure and certification for the use of animals in science in the United Kingdom (Rollin, 2006). Concerns regarding cruelty to animals did not focus on animals, but mainly on the indirect effects of cruelty to humans. Hence, animal cruelty was forbidden by St. Thomas Aquinas and philosopher Kant (Rollin, 2006). Since the late 18th and the beginning of the 19th century, the understanding of the moral status of the animal has changed. Science increased knowledge on animal intelligence, their capacity to feel pain and to suffer and their capacity for rational thinking. The moral theory of utilitarianism of Bentham and Mill developed in the 18th century criticized the theory of Kant because of its narrow focus on rationality. Revolutionary was, that the theory of Bentham and Mill placed animals alongside humans. Two other important philosophers and leading figures in animal ethics were Singer (1976, cited in Pascalev, 2006) and Regan (1983, cited in Pascalev, 2006), who argued that animals are equal to humans. Nowadays, however, moral principles less radical than the views of Singer and Regan are adopted by ethicists, policy makers and the public. It is increasingly recognized that animals have some rights and deserve humane treatments. This has resulted in animals welfare laws, for example the Protocol on Protection and Welfare of Animals (Horgan and Gavinelli, 2006), and policies to protect animals and to regulate dealings with animals on farms, in research and in the wild. Besides, husbandry practices, rules and guidelines for housing, transport, breeding and killing have been developed (Pascalev, 2006).

Ethics and animal welfare

Ethics is often related to animal welfare, especially in research and agricultural practices. With the development of intensive livestock production, an increase of research and the introduction of biotechnologies, ethical concerns on the welfare of (farm) animals increased (Marie, 2006).

According to Fraser et al. (1997), concerning the quality of life of animals, at least three ethical concerns are expressed: (1) animals should live natural lives, (2) animals should feel well and (3) animals should function well. The first concern emphasizes the naturalness of the circumstances in which animals are kept and the ability of an animal to live according to its 'nature'. Each animal species has a genetically encoded 'nature', often called *telos*, which can also be explained as "the pigness of the pig or the cowness of the cow". Any animal should be allowed to live in accordance with its *telos* (Rollin, 1993), or, in other words, to live the life for which it was designed (Fraser, 1999). Fraser et al. (1997) suggest that the genetically encoded 'nature' or an animal's *telos* can be viewed as (1) the set of adaptations that an animal possesses as a result of its evolutionary history and (2) the set of genetically encoded instructions that guide the animal's normal ontogenic development. In other words, animals living according to their 'nature' would mean that animals live in a manner that corresponds to their adaptations and have the type of ontogenic development that is normal for the species. The animal should simply be able to use adaptations when circumstances require them (Fraser et al., 1997).

The second concern emphasizes the affective experiences or feelings of animals. Any animal should be free of suffering, pain, fear, hunger or other negative states. Finally, the third concern emphasizes on health and the normal functioning of the animal's biological systems (Fraser et al., 1997).

As a result of the (increase of) concerns, ethical standards, approaches, evaluation techniques, assessment models and decision models have been developed. Bio-ethical standards are developed for the use in any circumstance of animal management or use and can be derived from four basic principles: (1) provision of responsible animal management, with appropriate overall husbandry, (2) provision of each specific element necessary for physical comfort, basic behavioural function and animal health, (3) prevention or relief of unnecessary pain or suffering and (4) exemption of life is sentient from usage for a reason not socially substantiated. In other words, it is unethical not to provide responsible animal management, to neglect anything needed by an animal for physical comfort, basic behavioural function and health, to impose or permit unnecessary pain or suffering or to use the life of an animal for any insubstantial reason or purpose (Fraser, 1988).

In 1993, Rowan found a mix of values that are used to guide our decision-making on ethics of animal research: (a) reduce animal suffering as much as possible, (b) reduce the number of animals required, (c) ensure that the science is properly planned and likely to achieve its goals and

(d) ensure that those conducting the research are adequately trained so they will be able to minimize suffering. These values can also be found in the cost: benefit analysis, where the benefits of the research need to outweigh the costs or harm to the animals to make a research acceptable. Here the goal is to decrease the costs as much as possible and to maximize the benefits as far as possible (Sherwin et al., 2003). Reducing the costs is commonly done by using the method of the three R's: replacement, reduction and refinement (Russel and Burch, 1959, cited in Sherwin et al., 2003). Replacement means either replacing sentient species by less sentient species, or not using animals when a research can be achieved in other ways. Reduction refers to using the minimum number of animals necessary for a research. Finally, refinement means to reduce pain, stress or suffering imposed on every animal to an absolute minimum. The benefits can be maximized in several ways. The aims should be achievable and the likely benefits from the research should be clear. Besides, a thorough literature study should avoid unnecessary duplicate research and ensure optimal experimental designs. Finally, communication of the results is fundamental (Sherwin et al., 2003).

It becomes clear that ethics and welfare are allied to each other, ethics mainly focusing on decisions; what is right or wrong, what is acceptable and what not, whereas welfare focusing more on animal level: behaviour, pain and suffering, feelings and an animals' *telos*. The next chapter continues with animal welfare, discussing definitions of animal welfare, the development of animal welfare during the years and the use of parameters and models to assess animal welfare.

2. ANIMAL WELFARE: DEVELOPMENTS, ASSESSMENT TECHNIQUES AND CRITICISM

Animal welfare

As on animal ethics, there is also an abundant amount of literature written on animal welfare (Broom, 1991; Fraser et al., 1997; Fraser, 1999; Webster, 2001; Appleby and Sandoe, 2002; Bennet et al., 2002; Fraser, 2003; de Passillé and Rushen, 2005; Dawkins, 2006; Horgan and Gavinelli, 2006; Lund, 2006; MacArthur Clark et al., 2006; Pascalev, 2006; Korte et al., 2007). Research has been done on farm animal welfare, welfare of pets, welfare of animals in organic livestock systems, etcetera. There are numerous definitions of animal welfare, depending on the components taken into consideration (Marie, 2006). It is a debated concept, scientists have not been able to reach consensus on the right definition (Lund and Röcklinsberg, 2001). There is even disagreement on whether welfare is positive per se, or whether the term is neutral, varying over a range (Tannenbaum, 1991 and Broom, 1996, cited in Lund and Röcklinsberg, 2001).

Welfare is complex, combining both subjective and objective aspects of the quality of life of an animal (Smulders et al., 2006). In general, animal welfare refers to one or several aspects of the quality of life of an animal (Lund and Röcklinsberg, 2001). "The term welfare refers to the state of an individual in relation to its environment, and this can be measured" (Broom, 1991). According to Broom (1991), both failure to cope with the environment and difficulty in coping are signs of poor welfare. Broom considers biological functioning as the basis for his definition of animal welfare. Others consider the affective states of the animal as most important: feelings, pain or suffering (Marie, 2006). Again others consider living conditions, especially natural conditions and natural behaviour to be most important (Fraser, 2003; Marie, 2006).

According to Fraser (1989), animal welfare is a discipline which is related to four other disciplines, being veterinary medicine, animal research, animal husbandry and applied animal ethology and has rational links with ethics, husbandry and health. The four mentioned disciplines are all closely related to animal welfare, veterinary medicine because an animal's health is an important factor in animal welfare, animal research because animals are often used in research and ethical questions on the use of animals and the welfare of animals in research arise. Intensified livestock production systems resulted in animal welfare concerns from (among others) the public (Doerfler and Peters, 2006). Applied animal ethology is often used to study the behaviour of (farm) animals and to assess their welfare (Dawkins, 2004). Surprisingly, however,

sports using animals are not mentioned. Dog races, horse races, equestrian sports, they all demand the animal to perform at the highest level. Can we compare animal production with animal performance? Besides, it is not questioned whether performing at the highest level influences or alters an animal's welfare.

An interesting finding is the fact that animal welfare is understood somewhat differently in organic farming in comparison with conventional agriculture. Animal welfare in organic farming is interpreted in terms of natural living, which includes natural behaviour, feed adapted to the animal's physiology and a natural environment (Lund, 2006). This interpretation can be compared with the ethical concern of living natural lives (Fraser et al., 1997). In conventional agriculture animal welfare is often interpreted in terms of biological functioning, health, behaviour and performance records (Smulders et al., 2006).

As with ethics, animal welfare also differs between countries, cultures and people. Natural conditions, the magnitude of human intervention and the level of economic and technological development and the existing moral standards determine ethical standards and animal welfare. Therefore, the term welfare and the issue of animal welfare standards should be considered in a global context (Doerfler and Peters, 2006).

Development of scientific knowledge, interest and legislation

The concerns on animal welfare and the viewpoints on animal welfare have changed during the years. Viewpoints on animal welfare changed with the increase of knowledge, an increase of pet ownership and the intensification of livestock production. During the 1950s interests in animal welfare increased by an increase of attention on animal suffering in research and the meat industry and an increase of pet ownership. In the United States this resulted in the Humane Slaughter Act of 1958 and the Animal Welfare Act of 1966. Hereafter, animal cognition and consciousness became of increasing importance for animal welfare. Media, culture of avenues of visual arts, literature, television and music pointed out the importance of animal welfare concerns (Millman et al., 2004). Five Conventions on the welfare of animals were agreed by The Council of Europe, which was founded in 1949. In 1968 the first Convention on the protection of animals during transport was published. Hereafter, in 1976 the second Convention followed on animals kept for farming purposes. The second Convention was followed by a Convention on slaughter in 1979, a Convention on animals for scientific purposes in 1986 and a Convention on pet animals in 1987 (Wilkins, 2006). The most important legal development on animal welfare is in all

probability the Protocol on Animal Welfare, part of the Amsterdam Treaty of 1997, which categorizes animals as sentient beings (Millman et al., 2004).

Today, the Protocol on Protection and Welfare of Animals, introduced as an annex to the EC Treaty via the Treaty of Amsterdam in 1999, is the basis for EU animal welfare policy. The Protocol lays out ground rules for the actions of the EU on animal welfare, recognizes that animals are sentient beings and obliges the European Institutions to pay full regard to welfare requirements of animals when formulating and implementing Community legislation (Horgan and Gavinelli, 2006).

Over the last 20 years an increasing amount of scientific evidence has been produced, criticizing most of the intensive livestock production systems and providing information on systems that do provide good welfare (Wilkins, 2006; Doerfler and Peters, 2006). In Europe already considerable progress is made in improving animal welfare, however, still much (scientific) work needs to be done (Wilkins, 2006).

Assessment and measurement techniques of animal welfare

How to measure and assess animal welfare has been subject of research and debate for many years. The measurement and assessment of animal welfare depends on the definition of animal welfare and the components taken into consideration (Fraser, 2003). According to Spoolder et al. (2003), the collection and interpretation of data involving parameters is essential when assessing the welfare of farm animals. The choice of parameters and the relative weights assigned are crucial for the outcome. Besides, both the choice of parameters and the relative weights involve a certain degree of subjectivity (Spoolder et al., 2003).

The Farm Animal Welfare Council of the United Kingdom uses the Five Freedoms of animal welfare (Korte et al., 2007):

1. Freedom from hunger and thirst by ready access to fresh water and a diet to maintain full health
2. Freedom from discomfort by providing a suitable environment including shelter and a comfortable resting area
3. Freedom from pain, injury and disease by prevention or rapid diagnosis and treatment
4. Freedom to express normal behaviour by providing sufficient space, proper facilities and company of the animal's own kind
5. Freedom from fear and distress by ensuring conditions which avoid mental suffering.

The Five Freedoms identify the elements that determine the animals' own perception of their welfare state and address both physical fitness and mental suffering (Webster, 2001).

According to Webster (2001), the main concerns of scientists, welfarists and legislators are elements of poor farm welfare through loss of fitness or mental suffering: hunger or acute metabolic disease, chronic discomfort, chronic pain or restricted movement, increased disease, chronic anxiety or frustration or metabolic or physical exhaustion. These elements are potential problems and points for attention for the assessment of animal welfare.

Another system that is used is the Animal Needs Index (ANI) to assess and grade the welfare of animals in a specific housing environment. The ANI considers five components of the animals environment: (1) the possibility of mobility, (2) social contact with members of the same species, (3) condition of the floors on which animals are lying, standing and walking, (4) stable climate (including ventilation, light and noise) and (5) the intensity of human care (Bartussek, 1999). Comparing the ANI to the Five Freedoms (Korte et al., 2007), it seems that they are not really different. The Five Freedoms are more complete; focusing on food and water, discomfort, pain and injuries, behaviour and fear and distress. However, freedom from discomfort by providing a suitable environment is what the ANI is all about: the housing environment. Besides, freedom to express normal behaviour by providing sufficient space, proper facilities and company of the animal's own kind is similar to (1) the possibility of mobility, (2) social contact with members of the same species, (3) condition of the floors and (4) stable climate. We can, therefore, question whether the Five Freedoms and the ANI are actually different welfare assessment systems.

According to McGlone (2001), the multidisciplinary approach is the most reliable approach to assess animal welfare. The multidisciplinary approach uses measures of animal behaviour, physiology, anatomy, health and immunity. By using a multidisciplinary approach, more weight can be put on one or more measures (McGlone, 2001). However, putting more weight on one or more measures introduces a certain degree of subjectivity (Spoolder et al., 2003).

In a more recent study on human – animal interactions, measuring animals' responses to people was suggested as a measurement technique to assess animal welfare (de Passillé and Rushen, 2005). As in animal agriculture, in equestrian sports horses are commonly, probably even more that in animal agriculture, handled by humans. Perhaps measuring the horse's reaction to people (e.g. friendly, aggressive) is a possible measurement technique to assess their welfare.

According to Dawkins (2003), it is difficult to assess animal welfare not only on a physical base, but also on a psychological base, and, a single measure of welfare simply does not exist.

There is, still, a lack of agreement on which combination of measures should be used and how differences between them should be resolved (Dawkins, 2003). Besides, by the term welfare, not only physical health, but also well-being is meant. The two questions "Are the animals healthy?" and "Do they have what they want?" seem to capture both the physical and mental aspects of animal welfare (Dawkins, 2004). Dawkins (2004) also addresses the issue of using behaviour in the assessment of animal welfare. Behaviour is already widely used in the clinical assessment of animal health, in particular in the assessment of pain and can be used to assess what animals want or want to get away from or like or dislike about their environments.

Fraser (1995) suggested animal welfare science should follow a similar pattern as for example building inspectors when measuring the safety of a building. Instead of trying to measure animal welfare, scientists should see their task as identifying, solving and preventing animal welfare problems.

Recently, an article on the assessment of animal welfare appeared in the Dutch newspaper "Vee en Gewas". In a five year lasting research project 150 European scientists are trying to develop an objective measurement technique to assess the welfare of production animals. By using a list of parameters for different species, the goal is to develop an animal welfare index for consumers; making it easy to chose for "animal welfare" products. Parameters used in the lists are (among others) damages on the animal, lameness, physical health, the occurrence of abnormal behaviour and the degree of fearfulness. Project coordinator Harry Blokhuis admits there is still a long way to go, but also thinks there are good perspectives for the European cattle industry (Buning, 2007). This, again, shows there is still not one unanimous, clear measurement technique to assess animal welfare and that, still, a lot of work needs to be done.

Criticism, problems and suggestions for improvement

There are many different measurement techniques and approaches to assess animal welfare, and, ultimately, these resulted in criticism from various scientists (Fraser, 2003; Rushen, 2003; Aerts et al., 2006; Bracke and Hopster, 2006; Dawkins, 2006; Korte et al., 2007). The different measurement techniques and approaches to assess animal welfare have increased with the increase of scientific knowledge (Pascalev, 2006). When research pointed out that animals have the capacity to feel pain or to suffer, more broad and multidisciplinary approaches originated, using (among others) (natural) behaviour as an important tool (McGlone, 2001; Dawkins, 2004; Pascalev, 2006). However, many approaches and techniques only capture a small part of the

welfare of an animal, resulting in discussion and criticism of these techniques, and, resulting in suggestions for improvements, new techniques, frameworks or models. An overview is given.

Rushen (2003) discusses the different problems with the approach to assessing animal welfare. As the first problem he mentions that scientists dealing with animal welfare often address too limited a range of issues, using too limited concepts of animal welfare, too few measures of animal welfare and not adequately dealing with the multivariate nature of animal welfare measures. As a second problem he mentions the underestimation of other sources of variability in animal welfare besides housing systems. Thirdly, we have relied too much on experimental approaches at the cost of using epidemiological approaches. Experimental approaches may have led to false results as they were not (completely) reflecting the actual situations on farms. Finally, the last problem mentioned by Rushen (2003) is that we do not fully understand the biological basis of many supposed welfare indicators.

Fraser (2003) addresses that differences in views of animal welfare result in different assessments of animal welfare. One view focuses on the biological functioning of the animal, the second view focuses on the affective states of animals and the third view focuses on natural circumstances and natural behaviour. From these views, different assessments of the welfare of an animal are being done by using different criteria. Besides, even when scientists include all three views in their assessment of animal welfare, they can still treat a given aspect as more important. This can result in less objectivity and scientific respectability.

Aerts et al. (2006) feel that little attention has been paid on what can be concluded from what is observed. Or, in other words, it may be better to look at the animals directly and to score the welfare of the "whole animal" instead of deriving a welfare score by measuring indirect parameters and summing these up. Therefore, they propose a framework to condense all animal welfare considerations and positions into one model that is made up of three basic elements. The first element will be a classical analysis with an existing welfare assessment tool based on environmental parameters. This assessment of the housing system is complementary to the two other components: an assessment of the stockholder and an implementation of the so-called FCP (Free Choice Profiling) technique. The assessment of the stockholder is another important factor for a complete assessment of animal welfare, as the attitude of the stockholder can be a critical factor. This is confirmed by de Passillé and Rushen (2005) in their study on the influence of stockmanship on animal welfare. Finally, the FCP assessment on the group of animals is the last element of this framework (Aerts et al., 2006).

Within the Five Freedoms and one of the views mentioned by Fraser (2003), the term natural behaviour is mentioned. Bracke and Hopster (2006) discuss the definition of natural behaviour and the extent to which the farming conditions should be natural. They hold the opinion that a definition of natural behaviour should be functional for the assessment of animal welfare, and, by using several definitions, propose the following definition of natural behaviour: "natural behaviour is behaviour that animals tend to perform under natural conditions, because it is pleasurable and promotes biological functioning". They also suggest a new, scientific framework for welfare assessment, based on the set of motivational systems that animals have. According to Bracke and Hopster (2006), welfare needs to reflect the state of these motivational systems, in which the animal perceives what the case is and compares this with what it wants. A perceived difference between what the case is and what the animal wants, results in the activation of behavioural and physiological responses. These responses can be primary, secondary and tertiary responses, corresponding to the degree to which welfare is affected. Continuous failure to reduce perceived differences results in stress and negative emotions, or, the welfare need has been frustrated.

As mentioned before, Dawkins (2006) addresses the use of behaviour as a tool to assess animal welfare. According to Dawkins (2006), behaviour has the advantage that it can be studied non-invasively and can give a direct insight into the view of the situation from the perspective of the animal. Today, there are several different ways of 'asking' animals what they want and if they find the situation they are in pleasurable or not. For example, rats have been shown to press a bar more for the reward of being allowed access to a cage containing other rats than they will for an empty cage, indicating that social companionship is something that they want (Patterson-Kane, 2002, cited in Dawkins, 2006). Besides, is natural behaviour essential to good animal welfare? Is being chased by a predator good for a horse's welfare for example? By asking the two questions: does the health of an animal improve by performing natural behaviour and does the animal show signs of wanting to perform natural behaviour, it can be distinguished if natural behaviour is good for their welfare, or not. These two questions can also be used to determine whether stereotypies (repeated fixed behaviour without an obvious goal or function) indicate reduced welfare or whether they are beneficial for the health of the animal (Dawkins, 2006).

Korte et al. (2007) discuss the Five Freedoms of animal welfare, suggesting that the Five Freedoms reflect a more ethical view than a science-based approach to animal welfare and are no longer helpful. They also hold the opinion that homeostasis, which suggests that animals have

good welfare when a balance exists between the animal and its environment, is an out-dated concept, since it ignores the absence of environmental challenges, resulting in bad animal welfare. Therefore, in contradiction with homeostasis, Korte et al. (2007) suggest the use of allostasis (stability through change) as a new animal welfare concept. Instead of constancy or freedoms, capacity to change is crucial to good health and good animal welfare.

3. ELITE COMPETITION HORSES AND THEIR WELFARE

The horse in nature

In nature, the horse is a prey species. In order to escape from predators, the horse has acute senses, the ability to react quickly and to run fast (Davidson, 1999).

Horses are social animals, they live in a basic social unit of one stallion, several mares and their offspring (Klingel, 1982). In contrast to most mammals, stallions and mares maintain stable long-term relationships (Mills and McDonnell, 2005). The herd is led by a dominant mare and guarded by the stallion. Each animal in the herd remains at a certain distance (about 1.8 – 3.0 meters) from other herd or non-herd members. The distance is often reduced when the intimacy of a relationship increases. In addition to its mother or mate, a horse will form a bond with a friend to permit grooming to reduce parasites, reaffirm the bond and reduce social tension within the herd (Davidson, 1999).

Horses are highly communicative animals, developed with a more visual than vocal repertoire of signals. Living in an environment with wide open spaces, horses did not need vocal signals. Horses are quick at picking up body language and recognising expressions of fear (Davidson, 1999). Smell is important for messages and recognising herd members or areas. Taste and touch are also important in for example recognising, courtship behaviour or the relationship between mother and foal (Kiley-Worthington, 1997).

The anatomy of the horse's digestive tract suits the activity of a trickle feeder: a horse eats little and often. The control of feeding of the horse reflects the evolutionary development in an environment selected for consumption of small and frequent meals (Ralston, 1984). In nature, depending on the type of grazing available, a horse grazes 16 out of 24 hours a day (Davidson, 1999). Besides, horses often have to travel over long distances to reach the water location. Therefore, often horses may only drink once every day or two (Mills and McDonnell, 2005).

Horses rest both standing and lying. Lying occurs approximately one hour a day, stand-resting occurs more often. Resting behaviour varies with the season, being less during the winter. Sleeping occurs mostly at night, about 30 – 40% of the dark hours. Most of this sleep is slow wave sleep, enabling the horse to stand up (Mills and McDonnell, 2005).

Not much literature exists on behavioural responses after the death of a herd member. It seems that members within the herd will accept a horses' death and will get on with day-to-day living (Marshall, 1996).

The domestic environment and its impact on the horse

The domestic environment changed the environment of the horse in a tremendous way, removing the horse far from its natural habitat and, as a result, often failing to meet specific equine needs (Falewee et al., 2006). Today, the horse is most commonly housed in stalls (Thorne et al., 2005), restricting the horse from movement, social behaviour, and foraging behaviour. The stalls are usually 9 to 13 m^2, sometimes with a small window and usually with dividing bars between the stalls (Evans et al., 1990, cited in Rivera et al., 2002). The stalls are often housed in old buildings, while the size of the modern horse is increasing. As a result, the size of the stalls is commonly relatively small. Recommendations for stall sizes vary from twice the height at the withers[2], 3.6 by 3.6 meters, for a small horse 8 m^2 and for a large horse 9 m^2 and for horses higher than 1.70 meters at least 1.8 times the height at the withers[2] (Raabymagle and Ladewig, 2006).

Keeping a horse in a stall restricts the horse from movement, as the horse is kept in the stall until someone lets him out. The horse can therefore only exercise when someone says so (Mills and Nankervis, 1999). The exercise that a horse gets, is in the form of training or competition at an event. Hence, instead of grazing and walking 16 hours a day in nature, the domestic horse is trained for approximately one hour a day, commonly only completed with a limited amount of exercise in a paddock or pasture. Besides, many people question the welfare of the ridden horse as it is largely trained by using negative reinforcement, has to respond to pressure-based signals and is seldom asked to work for positive rewards (McGreevy, 2006).

Abstaining horses from performing natural behaviour by housing them in individual stalls could be detrimental to their welfare (Rivera et al., 2002). According to Mills and Nankervis (1999), the two most important potential problems of the stabled horse are how to fill the time that is available and how to cope with not being in control. The horse is entirely dependent on humans for the timing, selection and delivery of its diet (Fraser, 1974, cited in Thorne et al., 2005), usually fed infrequently, meal-based, energy-dense, high concentrate diets with a limited amount of forage and variation (Thorne et al., 2005).

Restriction from natural foraging behaviour is associated with stereotypies and the occurrence of gastric ulceration (Mills and Clarke, 2002, cited in Ninomiya et al., 2006). In a study on abnormal behaviour in dressage, eventing and endurance horses, McGreevy, French and Nicol (1995) found that the performance of abnormal behaviour is correlated with the time spent in a stable. Or, in other words, with the restriction from movement or lack of social contact.

Besides, a study from McGreevy et al. (1995) on management factors and their association with stereotypic behaviour in thoroughbred horses showed that management factors related to the time spent in the stable, showed the strongest associations with stereotypic behaviour. Abnormal behaviour increased by (1) an amount of forage below 6.8 kg per day, (2) the use of bedding types other than straw, (3) the total number of horses on the yard being less than 75, (4) box designs that minimized contact with neighbouring horses and (5) when hay, rather than other types of forage, was used (McGreevy et al., 1995).

Stereotypies are often referred to as unwanted character traits that are the result of stress and frustration (Visser-Riedstra, 2007). Often stereotypies are thought to have negative consequences for the health of an animal, however some stereotypies actually seem to benefit the health of an animal (Dawkins, 2006). Repeated biting of wooden doors or food troughs, seen in stabled horses, is associated with reduced gastric ulcers (Nicol et al., 2002, cited in Dawkins, 2006). However, it can be questioned what actually causes the gastric ulcers. The study namely also suggests that repeated biting of wooden doors or food troughs helps the horse to cope with its environment.

For the competition horse, not only the environment at home is very much different from its natural environment, the competition horse is also transported on a regular basis to competition events throughout the world. Several scientific studies have been done on transport of horses, both on road transport as on air transport. Giovagnoli et al. (2001) found that horses spend considerable effort on postural adjustment, or balance preservation, related to road conditions and the driver's driving ability. These efforts on postural adjustment can be considered as both muscular and emotional stress (Giovagnoli et al., 2001). However, a study by Stewart et al. (2003) suggests that horses seem to adapt well to air transport. The study was conducted using sixteen horses during seven flights, using heart rate and behaviour to identify stressful events and compared measures across long and short haul air journeys. The difference in journey length did not change how horses responded. Some sharp increases in heart rate and activities were measured, however they were not frequent or long enough to be a significant welfare concern (Stewart et al., 2003).

In 2005 a total of 1886 equestrian events were organized, among which 737 for the discipline Jumping, 378 for Eventing and 353 for Endurance (FEI (f), 2007). This difference in numbers of equestrian events between disciplines suggests that jumping horses participate more often in equestrian events than for example eventing or endurance horses. Perhaps the amount of times

an elite competition horse competes annually influences its welfare. Performing at the highest level, being transported on a regular basis and adapting to a new environment regularly demands a lot from a horse, perhaps resulting in stress and a decreased physical condition.

When changing to a new environment, horses have a few days when recumbency does not occur (Ruckebusch, 1975, cited in Raabymagle and Ladewig, 2006). This shows that horses need a few days to adapt to their new environment. Besides, competition events usually differ greatly from their environment at home. At a competition event there is commonly a large audience, resulting in noise, unrest and perhaps stress for the competition horse. The competition grounds are often light, large, perhaps playing music, the stables are often crowded, filled with horses, grooms and equipment. Besides, the stables could be smaller, darker or noisier than the stables at home. Shows at night also influence the environment of the horse, as there is often more (loud) noise continued during the night. The crowdedness of the stables and shows at night may therefore result in less rest and sleep for a competition horse. Besides, the environment of the competition event depends on whether the event is an indoor or outdoor event. Perhaps an indoor event has a more stable environment, as the stables are inside and buildings isolate noise from for example shows at night. Outdoor events commonly house the horses in stables in tents, resulting in a much different environment and less isolation from noise. The factors mentioned are, therefore, all factors that greatly influence the environment of the horse and demand the horse to adapt to its environment quickly and on a regular basis.

Protection of elite competition horses by the FEI

The FEI (Fédération Equestre Internationale) was founded in 1921 and is the international body for equestrian sport. The primary mission of the FEI is to advance the growth of equestrian sport worldwide. The FEI is based on the principle of equality and mutual respect between all 134 National Federations and is the only controlling authority for all international events for eight disciplines: Dressage, Jumping, Eventing (all three Olympic disciplines), Driving, Endurance riding, Vaulting, Reining and finally, Para-Equestrian. The equestrian sport is one of the few sports where men and woman compete on equal terms and where two athletes are involved: the rider and the horse (FEI (f), 2007).

To protect the welfare of the horse, the FEI adopted the Code of Conduct in 1991, which expects all those involved to acknowledge and accept that, at all times, the welfare of the horse must be paramount. The Code of Conduct consists of four parts to ensure the welfare of the

horse during training and preparation, to ensure that the horses are fit, competent and healthy before competition, to ensure that events do not prejudice horse welfare and, finally, to ensure that horses receive proper attention after they have competed (FEI (e), 2007). The complete Code of Conduct of the FEI can be found in appendix I.

Next to the FEI Code of Conduct, the FEI Equine Anti-Doping and Medication Control Rules have been developed as rules for the conditions under which the sport is performed. The Rules seek to prevent any attempt to alter a horse's performance or to mask an underlying health problem by the administration or application of prohibited substances to the horse (FEI (i), 2007).

The horse deserves protection against overuse or abuse (FEI (j), 2007). As the sport must be acceptable for the public, media and sponsors, safeguarding the welfare of the horse is a key factor for the FEI. The FEI Veterinary Regulations have been developed to deal specifically with the condition, fitness, welfare and medication of horses during international events and set the rules for veterinary examinations and horse inspections (FEI (k), 2007).

For equestrian events at Olympic Games special FEI Regulations are developed. Chapter V of the Regulations describes the regulations concerning stabling, services and training facilities. Stables need to have adequate lighting and ventilation (60 m^3 air space per horse) and boxes must be at least 9 m^2. Twenty percent of the boxes must be at least 12 m^2 to accommodate the largest horses. The stables should include a roof on some distance of the stalls, enabling reflection of heat and allowing airflow over the stabled horses (FEI (j), 2007).

Next to the several general rules and regulations, specific rules are developed for every FEI discipline. The rules for the three Olympic disciplines are mentioned. In the rules for the discipline Jumping, Article 243 discusses abuse in training of horses, forbidding all forms of cruel, inhumane or abusive treatment of horses, including rapping. Rapping is explained as all artificial techniques intended to induce the horse to jump higher or more carefully in competition. The rules for the discipline Jumping also state that the schooling area(s) or warming up rings must always be supervised by a steward when in use and that it is obligatory to carry out boot and bandage control on all horses taking part in the Grand Prix, Nations Cup competition or during competition with the highest prize money at each event (FEI (h), 2007). To ensure the supervision by the stewards and chief steward is carried out correctly, a standardized Report of the Chief Steward is made. The report summarizes the conditions at the competition event and gives an explanation in case of unusual incidents or irregularities (FEI (g), 2007). In the rules for

the discipline Dressage, Article 428 discusses the saddlery used in competitions. It mentions that the saddlery must be checked by a steward appointed and that any discrepancy will entail immediate elimination (FEI (c), 2007). Finally, the rules for the discipline Eventing address the welfare of the horse and rider in article 519 and 520. In article 519 dangerous riding is mentioned, stating that any rider who affects the safety of any horse, rider or third party will be penalized. Article 520 mentions the abuse of horses and dangerous riding, stating that any act or series of actions that in the opinion of the Ground Jury can be defined as abuse of a horse or dangerous riding shall be penalized by disqualification and other penalties. This includes acts or actions as rapping, riding an exhausted horse, excessive pressing of a tired horse, riding an obviously lame horse, excessive use of whip and / or spurs and dangerous riding. Any official must report such actions as soon as possible to the Ground Jury (FEI (d), 2007).

With the Code of Conduct, the Equine Anti-Doping and Medication Control Rules, the Veterinary Regulations and the discipline specific rules the FEI attempts to protect the welfare of the competition horse. As mentioned in the Code of Conduct, the FEI will pay particular attention to new research findings and encourages further funding and support for welfare studies (FEI (e), 2007).

Interesting is the fact that the FEI Code of Conduct *expects* all those involved to acknowledge and accept that, at all times, the welfare of the horse must be paramount (FEI (e), 2007). This means, the FEI Code of Conduct expects all those involved to follow the guidelines mentioned, however, no standards are set. Therefore, for example stables can be different at each competition event. One would expect the environment at competition events to be standardized or made equal, especially since competition horses compete regularly and need to adapt to their environment at each new competition event. Besides, the supervision of stewards is susceptible to influences of a subjective nature. A steward could, because of for example friendships or possible benefits, be influenced. The completion of the Report of the Chief Steward is also dependable on what a Chief Steward considers "adequate", or "satisfactory" (FEI (g), 2007). The Report of the Chief Steward would perhaps be more objective by setting standards and asking the Chief Steward if the conditions at a competition event actually met these standards. In addition, at competition events riders have a certain role model function for amateur riders and visitors. Therefore, appropriate behaviour and good horse management are of great importance. Perhaps standards, set rules and a behaviour etiquette could help protecting the welfare of the elite competition horse more closely and making equestrian sports more transparent.

A comparison with other sports organizations

Horses used in equestrian sports can be, partially, compared to children used in sports, since several similarities can be found. First of all, horses can not verbally communicate with people, while children can not or hardly speak up to express their opinion. Horses communicate through body language, which can be easily misunderstood. Therefore, both horses and children depend on the people that guide and support them. Next to the difficulties with communication, both horses and children do not or hardly have the opportunity to express themselves physically or to even fight against emotional or physical abuse. Horses because they can hardly fight against all physical aids that help people be stronger than them, children because they are physically not strong or fit enough. In both sports, emotional and physical abuse can occur behind the scenes, since both horses and children depend on those who support and guide them. Therefore, protection of both horses and children behind the scenes is of great importance.

For the protection of children in sports, several organizations can be found. The Child Protection in Sport Unit (CSPU), Australian Sports Commission (ASC), Child Protection in Sport Service (CPSS) and the Amateur Swimming Association (ASA) are examples of protecting sports organizations and all developed guidelines, rules and Code of Conducts to protect the welfare of children in sports (CSPU, 2007; ASC, 2007; CPSS, 2007 and ASA, 2007). Comparing the several mentioned Code of Conducts with the FEI Code of Conduct, several differences can be found. First of all, the Code of Conduct of the CPSU starts with respecting the dignity and spirit of all athletes (CPSU, 2007). The Code of Behaviour of the ASC also starts with respecting the rights, dignity and worth of others and mentions to provide a safe environment for the conduct of the activity and, more importantly, to be a positive role model (ASC, 2007). The Code of Conduct of the Scottish Governing Bodies mentions to put the welfare of each child first before winning or achieving goals and, again, to be an excellent role model including not smoking or drinking alcohol in the company of children (CPSS, 2007). Finally, the Club Code of Conduct of the ASA forbids consumption of alcohol during competition to all swimmers and staff and forbids swimmers and staff to smoke en route, prior to, during or following a competition event (ASA, 2007).

The FEI Code of Conduct, however, does not seem to focus on behaviour of those involved very much. Behaviour towards the competition horse is only mentioned in "good horse management" and "training methods". However, what exactly are good horse management or compatible training methods and where do we draw the line? How do we determine what good

horse management is and when does it alter in bad horse management? It sometimes seems as if there is a belief that horses managed "bad" would not be able to perform at the highest level. However, in respect to both horse and public, good and responsible behaviour of those involved seems essential. Moreover, the consumption of alcohol or smoking is not prohibited and riders are not expected to be a positive or even excellent role model. Riders are not even expected to wear a protective helmet during training or warming up. This, while it can be assumed that many children or young riders watching the riders at competition events, potentially see them as their role model. Perhaps, as mentioned before, a behaviour etiquette or behaviour rules can be designed to ensure those involved behave responsibly and act as positive role models. Besides, a behaviour etiquette or behaviour rules could also show that the sport, its growth and its public are taken seriously.

Assessment and protection of the welfare of elite competition horses

On the assessment of the welfare of the horse, not much literature exists. The Brooke Hospital for Animals assessed the welfare of working horses, mules and donkeys using health and behaviour as parameters. Indicators of health were wounds, lameness and poor body condition, whereas behaviour was assessed by novel tests on the reaction of horses, mules and donkeys to human approach, proximity and touch (Pritchard et al., 2005). A study on non-racing horses in Prince Edward Island used body condition score and the performance of stereotypies as indicators of equine welfare (Christie et al., 2006). In equestrian sports, veterinary health checks before competitions already assess welfare by the health of the horse. Behaviour, however, is not being used. Besides, little attention is given to natural living conditions, or the horse's *telos*.

In 2006, a study on the unnatural head-neck position (Rollkur) during training was done to determine whether this had an influence on stress and therefore on the welfare of the horse. The study was conducted using both elite dressage horses and recreational horses and suggested that dressage horses have less acute stress than recreational horses have post exercise. The study was conducted using heart rate variability analysis, measuring prior to a training session in the morning between 7:00 and 9:00 a.m. and 30 minutes after the horses finished their meals. Post training data were collected 30 to 45 minutes after the horses were washed and groomed after the training session (Breda Van, 2006). The method of this study, however, raises questions. Using this method, several conclusions can be drawn. The results can suggest that dressage horses have less acute stress than recreational horses. However, the results can also suggest that dressage

horses are more fit than recreational horses. Besides, the management of the two groups was different and behaviour was not studied. Therefore, the conclusion drawn in this study needs to be handled with caution.

Recently, a discussion originated on the welfare of the horse Blue Hors Matiné during her participation in the FEI dressage World Cup at International Concours Hippique "Indoor Brabant". "During the exercises she tried so hard, that se swished her tail heavily and sometimes could not even control her head and neck" (Willem Rosie, 2007). This resulted in a discussion whether Blue Hors Matiné extremely – or not – complied with FEI regulations. It was even said that Blue Hors Matiné was certainly not a model of a horse that "apparently does the exercises in free will" (Willem Rosie, 2007). However, no scientific research on tail swishing has been done. It is, therefore, difficult and rather unlikely to immediately be able to question the welfare of the horse. Swishing her tail may have been a learned response in association with her training. Besides, the mare did not show any other clear signals of frustration or irritation. According to equid ethologist Van Dierendonck, tail swishing can be a signal of pain, overtraining, but also of a lack of balance or a lack of concentration. Van Dierendonck also mentions that tail swishing is overall seen as the horse having a problem (personal communication, 17 April 2007).

When assessing horse welfare, ethics is concerned. When using horses for competition, we always have to compromise between what we want, and what is fair for the horse (Mills and Nankervis, 1999). It can be questioned, however, if riders commonly make these ethical decisions. Using horses for competition purposes is not natural and often prevents the horse from living a natural life. Housing horses in individual stalls, training, competition and transport often restrict them from performing natural behaviour and could, therefore, have an impact on their *telos*.

When assessing the welfare of the horse, not only the physical welfare or health, but also the mental welfare is important. When a horse experiences negative emotions as pain, fear or frustration, it can be said that the welfare is disturbed. When the horse experiences negative emotions over a longer period of time, this can be defined as chronic stress (Visser-Riedstra, 2007). Mills and Nankervis (1999) assess good welfare by three measures: (1) a low incidence of disease and injury, (2) a good variety of normal behaviours and (3) good performance. However, how do we measure good performance? If a horse does not win a competition or does not jump high enough, can we then immediately speak of a compromised welfare?

When assessing horse welfare, usually several definitions are used. Stereotypies for example

are used as an index of mental welfare and satisfaction of the horse's nature. Welfare is thought to be worse if stereotypic behaviour dominates the life of an individual (Christie et al., 2006). Mills and Nankervis (1999) use "a good variety of normal behaviours" as a parameter for good welfare. However, what exactly is "a good variety"? The FEI also mentions several definitions in the Code of Conduct. "Stabling, feeding and training must be compatible with good horse management and must not compromise welfare" (FEI (e), 2007). What is "good horse management" and when does "bad" horse management compromise welfare? Are there standards? "Stables must be safe, hygienic, comfortable, well ventilated and of sufficient size for the type and disposition of the horse" (FEI (e), 2007). What is "sufficient size"? Again, are there standards?

It becomes clear that the assessment of the welfare of animals by clear measurement techniques or parameters is not easy. Even today many scientists are cooperating to develop one clear measurement technique of animal welfare (Buning, 2007). Two studies done on the assessment of the welfare of horses show that, again, one clear measurement technique for the assessment of the welfare of horses does not yet exist (Pritchard et al., 2005; Christie et al., 2006). Literature shows that welfare seems to be dependant on many factors and that combining these factors in a so-called scoring system is very difficult.

In equestrian top sports it sometimes seems that people assume the welfare of the horse is good, since a horse with a "bad" welfare would not be able to perform at the highest level. However, still a lot of training and work is done behind the scenes. The FEI attempts to protect the welfare of the elite competition horse with the Code of Conduct, Equine Anti-Doping and Medication Control Rules, Veterinary Regulations and the discipline specific rules (FEI (e), 2007; FEI (i), 2007; FEI (k), 2007; FEI (h), 2007). However, the Code of Conduct, rules and Chief Steward report remain vague and susceptible to influences of a subjective nature.

So how can the protection of the elite competition horse be assured and improved? What exactly is welfare of the elite competition horse? And what are indicators of their welfare? Can we use indicators similar to those used for the assessment of (farm) animals? And what are factors that influence their welfare? And finally, what are key issues to pay attention to when assessing and protecting the welfare of the elite competition horse in the future?

4. METHODOLOGY

Questionnaire design

This research aimed to understand the opinions of four target groups, being visitors of equestrian events, riders, officials and FEI veterinarians, with regard to welfare of the elite competition horse. The mentioned four target groups were chosen because of their active involvement in equestrian sports and equestrian competition events. The focus of this research was on the welfare of elite competition horses, with emphasis on their welfare at equestrian competition events, as this is a topic infrequently explored in literature and a subject of much (recent) debate. A questionnaire was designed from existing literature (McGreevy, French and Nicol, 1995; Rivera et al., 2002; Fraser, 2003; de Passillé and Rushen, 2005; Pritchard et al., 2005; Thorne et al., 2005; Christie et al., 2006; Mills and Clarke, 2002, cited in Ninomiya et al., 2006; Raabymagle and Ladewig, 2006; Ruckebusch, 1975, cited in Raabymagle and Ladewig, 2006; FEI (e), 2007; Visser-Riedstra, 2007), using closed questions for easier data analysis, considering the time available for the research. Four filter questions were used to save people's time from reading questions which did not apply to them. Four multiple answer questions were used to provide sufficient information and insight in people's opinions. One ranking question was used to provide insight in what people perceive is important and less important with regard to indicators of welfare. The questionnaire was designed to provide an understanding of the opinions of the four target groups on welfare definitions, indicators of welfare, factors that contribute to welfare, influences on welfare and key issues for the future. The complete questionnaire, used for all four target groups, can be found in appendix II.

- The first question was designed to provide an understanding of the opinions of the four target groups on the definition of welfare. As mentioned by Fraser (2003), welfare is mostly defined using three starting points: biological functioning, affective states (feelings, pain or suffering) or living conditions (especially natural living conditions) and natural behaviour. For this research the author used these three starting points to find out how the four target groups would define welfare and, therefore, which starting point(s) they would use.
- The second question was designed to find out what indicators of welfare were considered to be important and, naturally, not important. The multiple answers given were based on literature written on assessment techniques of animal welfare (McGlone, 2001; Webster,

2001; Dawkins, 2004; de Passillé and Rushen, 2005; Korte et al., 2007; Visser-Riedstra, 2007). The multiple answers given were based on this literature, since all used multidisciplinary or broad approaches, not only using for example health or behaviour, but combinations of indicators.

- The third question was designed to provide an understanding of the factors that contribute the most to a horse's welfare. Several options were given, based on basic knowledge on horse care.
- The fourth question was designed to find out what welfare rate the four target groups would give for the welfare status of the elite competition horse today.
- The fifth question was based on the FEI Code of Conduct (FEI (e), 2007) and was designed to find out what size the stables should be at a competition event according to the four target groups. According to the FEI Regulations for Olympic Games, stables should be at least 9 m^2 (FEI (j), 2007). It was, therefore, considered to be interesting to find out what size the four target groups would actually prefer.
- The sixth question was a follow up question on question five and was designed to find out whether the size of the stables should be standardized.
- The seventh question was designed to find out whether there should be turn-out facilities at a competition event. According to Rivera et al. (2002), abstaining horses from performing natural behaviour by housing them in individual stalls could be detrimental to their welfare. Turn-out facilities at a competition event could, therefore, give the elite competition horse the opportunity to perform natural behaviour.
- Question eight was a follow up question on question seven and was designed to find out how long an elite competition horse should then be allowed to be turned out. Question eight, therefore, only needed to be answered if question seven was answered with a "Yes".
- Question nine was designed to find out whether the four target groups considered evening shows or parties to have an influence on the welfare of an elite competition horse. Evening shows or parties are a subject rarely debated and were, therefore, considered interesting to be discussed in this research project.
- Question ten was a follow up question on question nine and was designed to find out, if question nine was answered with a "Yes", how late evening shows or parties should therefore finish.
- Question eleven was designed to find out whether there should be a limit on the amount of

times an elite horse competes annually. This question was designed to provide an understanding of the opinions on the annual participation of elite competitions horses at competition events.

- Again, a follow up question was used to determine what the limit should be according to the four target groups. Question twelve, therefore, only needed to be answered if question eleven was answered with a "Yes".
- Question thirteen was related to question eleven and twelve and was designed to find out how much time should be left for the horse to recover between competitions.
- Question fourteen was designed to provide insight in the opinions of the four target groups on the use of artificial aids at competition events. The question was designed as the use of artificial aids is mostly considered acceptable and normal, especially when used by top riders. However, when used in the wrong way, the use of artificial aids can be detrimental to the welfare of the elite competition horse.
- Question fifteen was a follow up question on question fourteen and was used to determine which artificial aids should be prohibited. Question fifteen only needed to be answered if question fourteen was answered with a "Yes".
- Finally, question sixteen was designed to find out what key issues are to pay attention to when protecting the welfare of the elite competition horse in the future. The multiple answers were based on the FEI Code of Conduct (FEI (e), 2007), advice from the external supervisor and ideas from the author.

Pilot study

A pilot study was used to refine the research instrument. A convenience sample comprising five individuals was asked to comment on the comprehensibility of the different subjects, questions and answers offered. The group of five individuals consisted of three Dutch women and two Dutch men with (reasonable) knowledge on equestrian sports. After the pilot study only two adjustments had to be made on questionnaire design of question 2 and 9, both questions were phrased differently to prevent interpretation problems. The questionnaire did not have to be reduced or lengthened.

Data collection

Data of the four target groups were collected using different approach techniques. Within the period of March 11, 2007 till May 25, 2007, data was collected. The target group visitors was approached on the breeding day at the exhibition fair "Equitana" in Essen, Germany, at March 11 2007. The breeding day at the exhibition fair "Equitana" was chosen because of the competitions in dressage and jumping held that day and because the visitors were expected to be diverse, interested in equestrian top sports, international and therefore highly suitable for this research. The visitors were randomly chosen and varied in age, sex and nationality. The visitors completed the questionnaire themselves, preventing bias by the interpretation of the researcher. In total 24 visitors were approached, from which 20 visitors (83%) completed the questionnaire, 18 of German nationality and 2 of Dutch nationality.

The target group riders was approached both at the International Concours Hippique "Indoor Brabant" as by mail. The International Concours Hippique "Indoor Brabant" was chosen because two FEI World Cups Dressage and Jumping were held, attracting many international top riders. During the period of 22 till 25 March 2007, 13 riders completed the questionnaire. The riders were randomly chosen and varied in age, sex, nationality and discipline they competed in. All riders completed the questionnaire themselves, again preventing bias by the interpretation of the researcher. In total 13 Jumping riders were approached, from which 9 Jumping riders completed the questionnaire (69%), 7 of Dutch nationality, 1 of English nationality and 1 of Egyptian nationality. In total 5 Dressage riders were approached, from which 4 Dressage riders completed the questionnaire (80%), 1 of Dutch nationality, 1 of Swedish nationality, 1 of Finnish nationality and 1 of Danish nationality. Next to the approach of riders at the International Concours Hippique "Indoor Brabant", 10 Dutch Jumping and Dressage riders were approached by mail. Addresses were obtained from personal websites from the riders. Stamped envelopes were included to possibly increase the response rate. From these 10 riders, 5 riders completed the questionnaire (50%), from which 3 Dutch Dressage riders and 2 Dutch Jumping riders. Therefore, in total 18 riders completed the questionnaire.

The target group officials was approached both by mail as by personal communication. For the target group officials, 12 Dutch FEI judges, 6 Dutch FEI course designers and 8 Dutch FEI stewards were approached by mail. More Dutch FEI judges were approached since more Dutch FEI judges actually exist. Names were obtained from the FEI website (FEI (a), 2007), addresses were obtained from the website "PaardensportTotaal" (PaardensportTotaal, 2007). Again,

stamped envelopes were included to possibly increase the response rate. In total, 8 Dutch FEI judges (67%), 2 Dutch FEI course designers (33%) and 2 Dutch FEI stewards (25%) completed the questionnaire. Furthermore, five German members of the organization of CHIO Aachen and five Directors of different Departments of the FEI were approached by personal communication. Mr Kemperman, Director of the organization of CHIO Aachen and Ms Baumann, Coordinator of the Jumping Department of the FEI, helped forwarding the questionnaires. In total, 4 German members of the organization of CHIO Aachen (80%) and 1 Swiss Director of the Driving, Endurance and Para Equestrian Department of the FEI (20%) completed the questionnaire. Therefore, in total 17 officials completed the questionnaire.

The target group veterinarians was approached by mail. For the target group veterinarians, 20 Dutch FEI veterinarians and 20 German FEI veterinarians were approached. Names were obtained from the FEI website (FEI (b), 2007), addresses were obtained from the Dutch Equestrian Federation the KNHS (personal communication, 19 March 2007) and from the website "Welt der Pferde" (Welt der Pferde, 2007). For the target group veterinarians, stamped envelopes were also included to increase the response rate. In total 19 FEI veterinarians completed the questionnaire (48%), from which 13 of Dutch nationality (65%) and 6 of German nationality (30%).

Data analysis

After having received the completed questionnaires, the answers were entered in SPSS (Statistical Package for Social Scientists), a computer program specially designed for statistical data analysis. Data were entered in the same order as the questions, categorized and given a code name. Data were coded through the creation of different values for each question. Coding helped the organization of data and facilitated analysis. To summarize the scores of the different target groups on the different questions, frequency distributions in the form of tables were made. The Chi Square test was used to investigate whether there was a significant difference between the four target groups for questions at nominal level (Baarda, De Goede and Van Dijkum, 2004). The Kruskall Wallis test was used to investigate whether there was a significant difference between the four target groups for questions at ordinal level (Baarda, De Goede and Van Dijkum, 2004). Furthermore, the Anova test was used to investigate whether there was a significant difference between the four target groups for questions at interval level (Baarda, De Goede and Van Dijkum, 2004). Finally, for the chapter "results", graphs were made using Excel,

a computer program specially designed for the creation and editing of spread sheets.

Justification of methods

In this research several information sources have been used. It was decided to focus on four target groups, being visitors of equestrian events, riders, officials and FEI veterinarians, because of their active involvement in equestrian sports and equestrian competition events. It was decided not to include more target groups (for example trainers or sponsors of equestrian events), because of the limited amount of time available and because of the limited financial resources. In order to get specific information from different target groups and to provide an insight on their opinions, it was decided to use a questionnaire. The questionnaires were completed by the respondents themselves, to prevent bias by the interpretation of the researcher. The questionnaire consisted of closed questions, multiple answer questions, filter questions and ranking questions. The questionnaire consisted of sixteen questions, since a longer questionnaire, consisting of more questions, could lead to lower response rates or loss of concentration of the respondents. Closed questions were used for easier data analysis, considering the time available for this research. The target for the four target groups was set on 20 respondents per target group, considering the limited amount of time available and the limited financial resources, since the research was not financially supported and therefore had to be paid by the author.

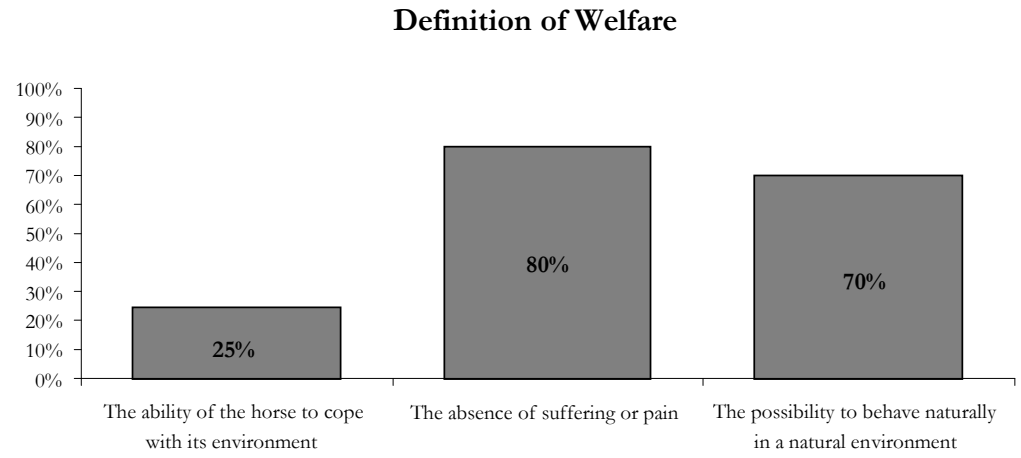
Analysis of the data was done using the computer program SPSS for statistical data analysis. Two main research questions were involved: what are the frequencies of the answers given by the four target groups and are there significant differences between the answers given by the four target groups? To summarize the scores of the different target groups on the different questions, frequency distributions in the form of tables were used. Data consisted of nominal, ordinal and interval data. Therefore, both parametric and non – parametric tests could be used. The Chi Square test was used to compare the four target groups for significant differences on the answers given at the questions 1, 3, 5 – 7, 9 – 11 and 13 – 16 because of the nominal grouping variables, four independent samples and the nominal test variable. The Kruskall Wallis test was used to compare mean rank orders for the questions 2 and 4 because of the nominal grouping variables, four independent samples and the ordinal test variable. Finally, the Anova test was used to compare means for the questions 8 and 12 because of the nominal grouping variables, four independent samples and the interval test variable (Baarda, De Goede and Van Dijkum, 2004).

5. RESULTS

Visitors

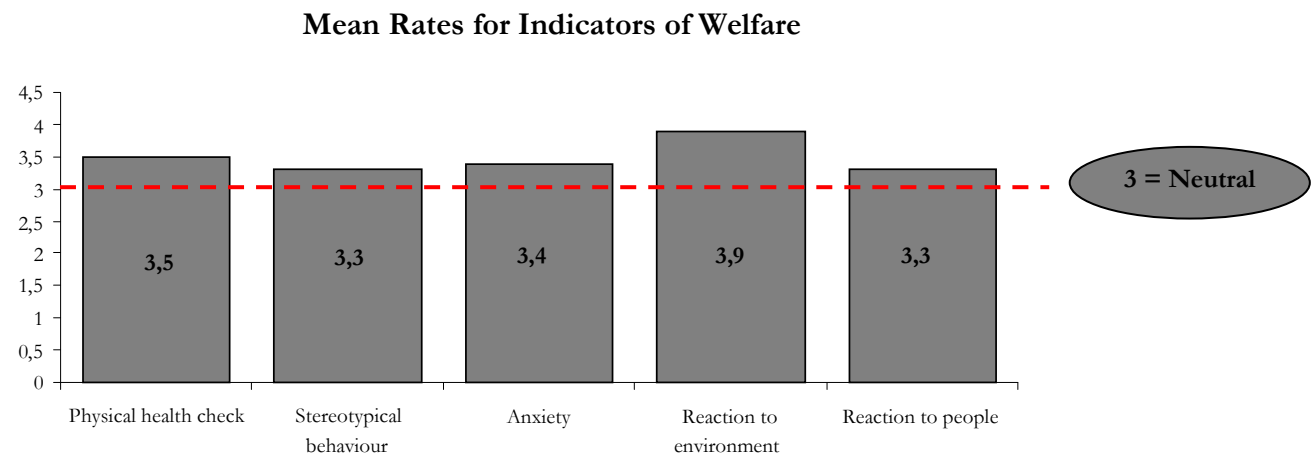
In total, twenty visitors completed the questionnaire, from which 18 of German nationality and 2 of Dutch nationality. Frequencies of the answers given were determined by the use of frequency distribution tables in the computer program SPSS and can be found in appendix III.

The answers given by the twenty visitors resulted in the following findings. First of all, 80% of the respondents defined welfare as the absence of suffering or pain, 70% of the respondents defined welfare as the possibility to behave naturally in a natural environment and only 25% of the respondents defined welfare as the ability of the horse to cope with its environment. The welfare definitions given by the respondents can be found in graph 1.



Graph 1: Welfare definitions given by visitors

The most important indicators of welfare were, according to the respondents, the horse's reaction to its immediate environment (40%) and physical health check (30%). The horse's reaction to people was rated as important by 35% of the respondents. The indicators observation of stereotypical or abnormal behaviour and observation of symptoms of anxiety were both rated as neutral by 45% of the respondents. The mean rates given for the different indicators of welfare can be found in graph 2.



Graph 2: Mean rates given by visitors for the indicators of welfare (1=least important, 3=neutral, 5=very important)

The factors that contribute the most to a horse's welfare were, according to the respondents, regular access to forage (85%) and continuous access to water (85%), followed by physical health (80%), housing (70%) and regular physical contact with other horses (70%).

The welfare status of the elite competition horse today was rated as sufficient (6) or higher by 10 of the 15 respondents who answered the question (67%). 20% of the respondents rated the welfare status of the elite competition horse today as sufficient (6). Rates ranged from extremely unsatisfactory (3) to excellent (10).

50% of the respondents answered "sufficient size" should mean 4 x 4 meters, while 35% of the respondents answered "sufficient size" should mean 3.5 x 3.5 meters. All 20 respondents (100%) answered the size of the stables should be standardized for each competition event.

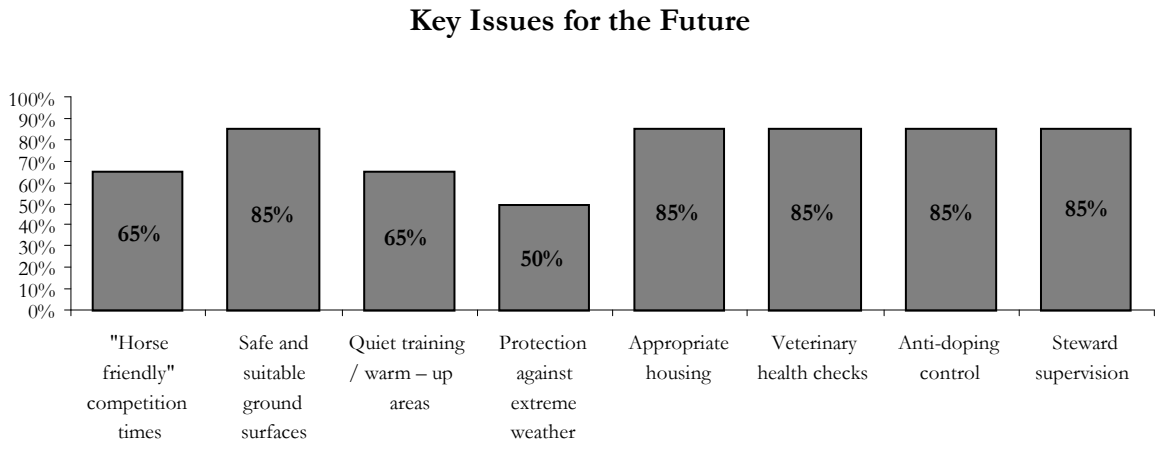
Again 50% of the respondents answered there should be turn-out facilities at an event. The mean duration an elite horse should be allowed to be turned out was 2 hours a day and durations ranged from 0.5 to 4 hours a day.

According to 50% of the respondents, shows or parties during the evening do not have an influence on the welfare of the elite competition horse. 40% of the respondents answered shows or parties during the evening do have an influence on the welfare of elite horses, and 15% of the respondents answered shows or parties should therefore finish at 20:00 hours.

65% of the respondents answered there should be a limit on the amount of times an elite horse competes annually. The mean limit was 12.7, or rounded off 13 competitions per year and limits ranged from 4 to 25 competitions per year. 40% of the respondents answered there should be 2 weeks left for the horse to recover between competitions.

80% of the respondents answered artificial aids should not be prohibited at a competition event and only 15% of the respondents answered artificial aids actually should be prohibited at competition events.

Finally, key issues for the future were, according to the respondents, safe and suitable ground surfaces (85%), appropriate housing (85%), veterinary health checks (85%), anti-doping control (85%) and steward supervision of training methods / handling of horses at stables and training / warm-up areas (85%). The key issues for the future, according to the respondents, can be found in graph 3.

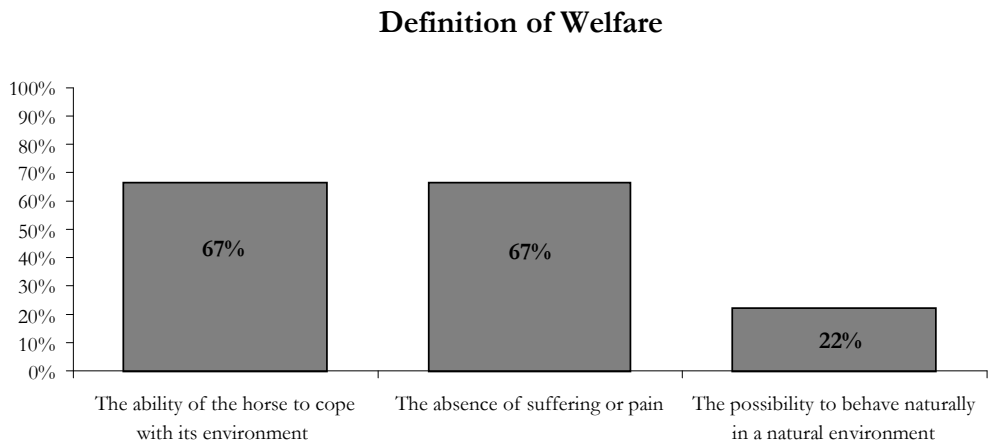


Graph 3: Key issues for the future according to visitors

Riders

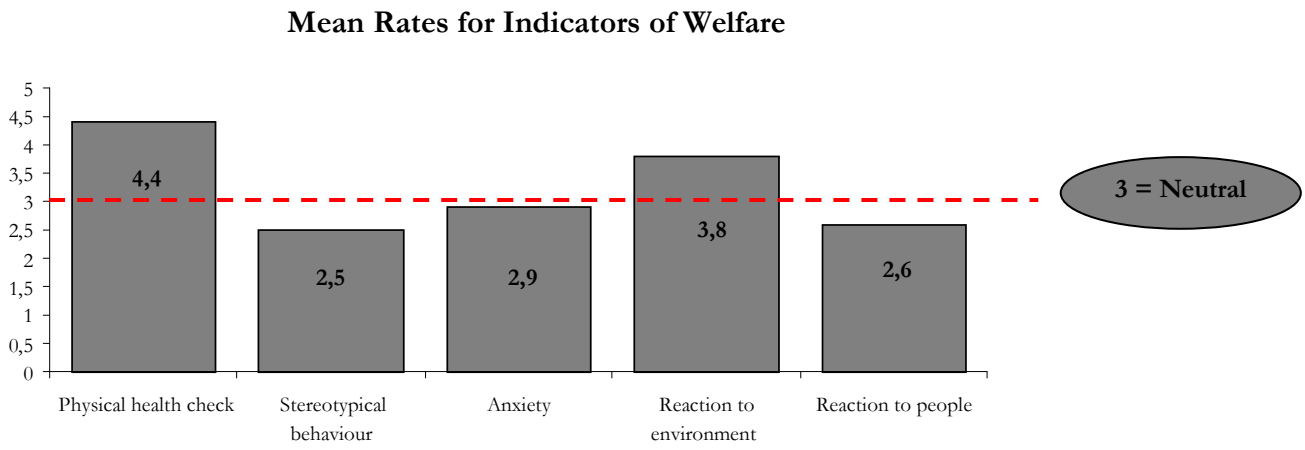
In total, eighteen top riders completed the questionnaire, from which 13 of Dutch nationality, 1 of English nationality, 1 of Egyptian nationality, 1 of Swedish nationality, 1 of Finnish nationality and 1 of Danish nationality. Frequencies of the answers given were determined by the use of frequency distribution tables in the computer program SPSS and can be found in appendix IV.

The answers given by the eighteen riders resulted in the following findings. First of all, 66.7% defined welfare as the ability of the horse to cope with its environment, 66.7% also defined welfare as the absence of suffering or pain and only 22.2% defined welfare as the possibility to behave naturally in a natural environment. The definitions of welfare given by the respondents can be found in graph 4.



Graph 4: Welfare definitions given by riders

The most important indicator of welfare was, according to the respondents, physical health (66.7%). The horse's reaction to its immediate environment was rated as important by 38.9% of the respondents, while the horse's reaction to people was rated as less important by 33.3% of the respondents. Observation of symptoms of anxiety was also rated as less important (38.9%) and least important was, according to the respondents, observation of stereotypical or abnormal behaviour (44.4%). The mean rates given for the indicators of welfare can be found in graph 5.



Graph 5: Mean rates given by riders for the indicators of welfare (1=least important, 3=neutral, 5=very important)

According to the respondents, the factors that contribute the most to a horse's welfare were physical health (100%) and continuous access to water (100%), followed by daily ridden / in-hand exercise (94.4%), regular feeds of concentrate (83.3%), regular access to forage (77.8%) and daily access to pasture for 1 – 2 hours (77.8%).

All respondents rated the welfare status of the elite competition horse today as amply sufficient (7) or higher. 38.9% of the respondents rated the welfare status of the elite competition horse today as very good (9). Rates ranged from amply sufficient (7) to excellent (10).

55.6% of the respondents answered "sufficient size" should mean 3.5 x 3.5 meters, while 33.3% of the respondents answered "sufficient size" should mean 3 x 3 meters. 88.9% of the respondents answered the size of the stables should be standardized for each competition event.

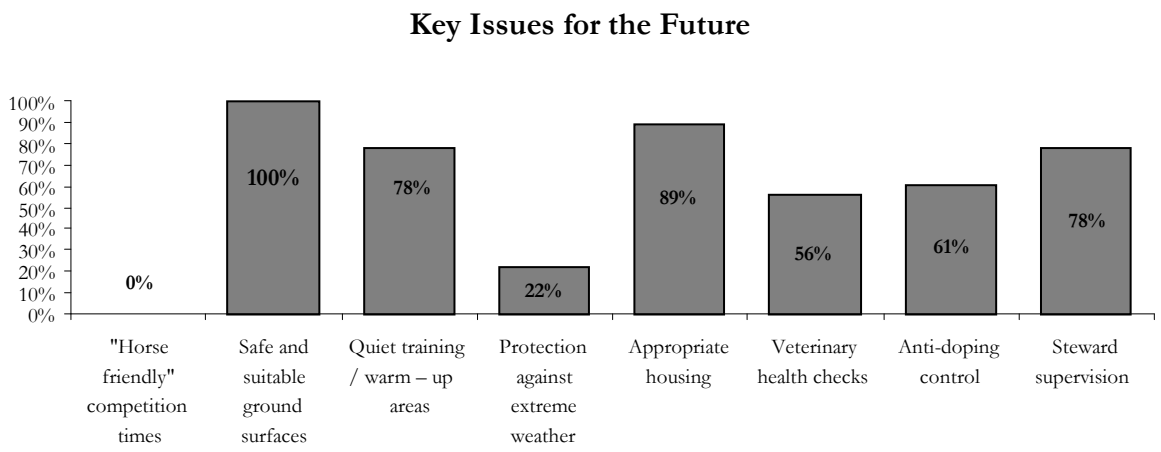
77.8% of the respondents answered there should not be turn-out facilities at an event. The mean duration an elite horse should be allowed to be turned out was 3.2 hours a day and durations ranged from 0.5 to 8 hours a day.

72.2% of the respondents answered shows or parties during the evening do not have an influence on the welfare of the elite competition horse. 11.1% of the respondents answered shows or parties should finish at 21:00 hours, again 11.1% answered shows or parties should finish at 22:00 hours and 5.6% answered shows or parties should finish at 23:00 hours.

55.6% of the respondents answered there should not be a limit on the amount of times an elite horse competes annually. The mean limit was 21 competitions per year and limits ranged from 12 to 24 competitions per year. 50% of the respondents answered there should be 3 days left for the horse to recover between competitions.

According to 94.4% of the respondents, the use of artificial aids should not be prohibited at competition events.

Finally, according to the respondents, key issues for the future were safe and suitable ground surfaces (100%), appropriate housing (88.9%), steward supervision of training methods / handling of horses at stables and training / warm-up areas (77.8%), quiet training / warm-up areas (77.8%) and anti-doping control (61.1%). 100% of the respondents answered "horse friendly" competition times was not a key issue for the future. Protection against extreme weather was also not a key issue for the future according to 77.8% of the respondents. The key issues for the future, according to the respondents, can be found in graph 6.

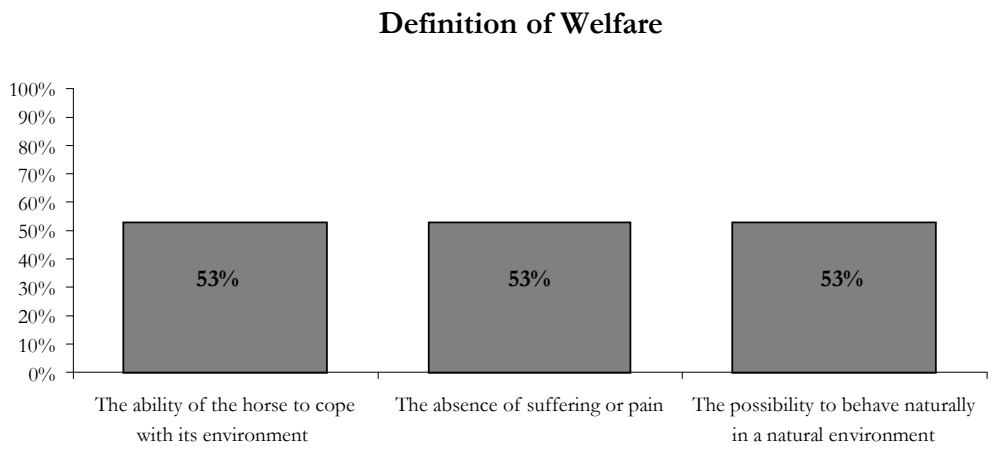


Graph 6: Key issues for the future according to riders

Officials

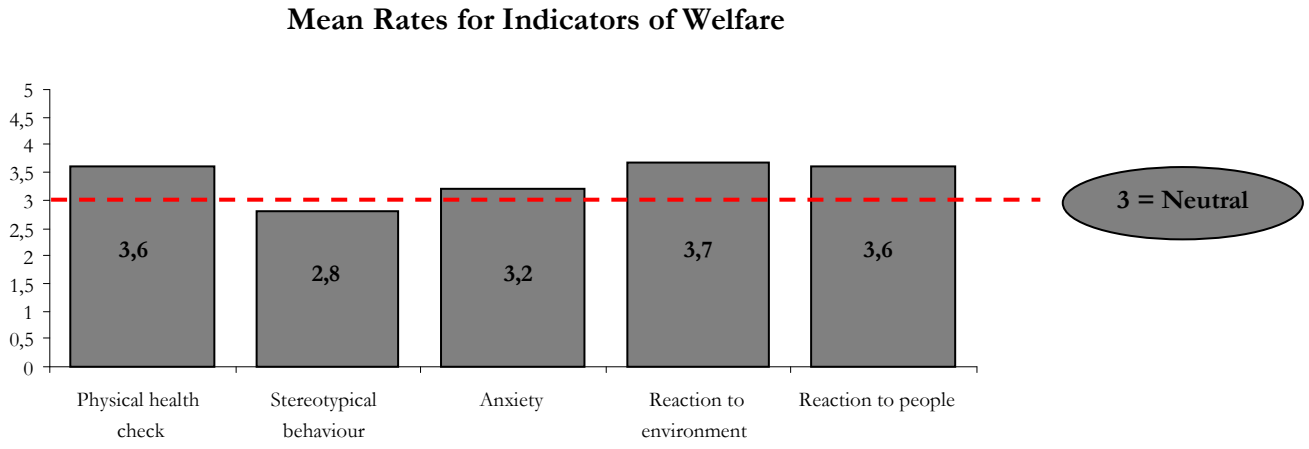
In total, 17 officials completed the questionnaire, from which 12 of Dutch nationality, 4 of German nationality and 1 of Swiss nationality. Frequencies of the answers given were determined by the use of frequency distribution tables in the computer program SPSS and can be found in appendix V.

The answers given by the seventeen officials resulted in the following findings. First of all, the respondents defined welfare by all three possible definitions with 52.9%. The definitions of welfare given by the respondents can be found in graph 7.



Graph 7: Welfare definitions given by officials

The most important indicators of welfare were, according to the respondents, physical health (35.3%), the horse's reaction to its immediate environment (29.4%) and the horse's reaction to people (29.4%). The observation of stereotypical or abnormal behaviour was rated as least, less and very important by 23.5% of the respondents and observation of symptoms of anxiety was rated as important and very important by 23.5% of the respondents. The mean rates given for the indicators of welfare can be found in graph 8.



Graph 8: Mean rates given by officials for the indicators of welfare (1=least important, 3=neutral, 5=very important)

The factors that contribute the most to a horse's welfare were, according to the respondents, physical health (94.1%), housing (88.2%), continuous access to water (76.5%), regular physical contact with other horses (70.6%), regular access to forage (64.7%) and daily ridden / in-hand exercise (64.7%).

The welfare status of the elite competition horse today was rated as sufficient – amply sufficient (6.5) or higher by all respondents. 70.6% of the respondents rated the welfare status of the elite competition horse today as good (8). Rates ranged from sufficient – amply sufficient (6.5) to excellent (10).

According to 47.1% of the respondents, "sufficient size" should mean 3 x 3 meters. 29.4% of the respondents answered "sufficient size" should mean 3.5 x 3.5 meters and 82.4% of the respondents answered the size of the stables should be standardized for each competition event.

64.7% of the respondents answered there should be no turn-out facilities at an event. The mean duration an elite competition horse should be allowed to be turned out was 1.3 hours a day and durations ranged from 1 to 1.5 hours a day.

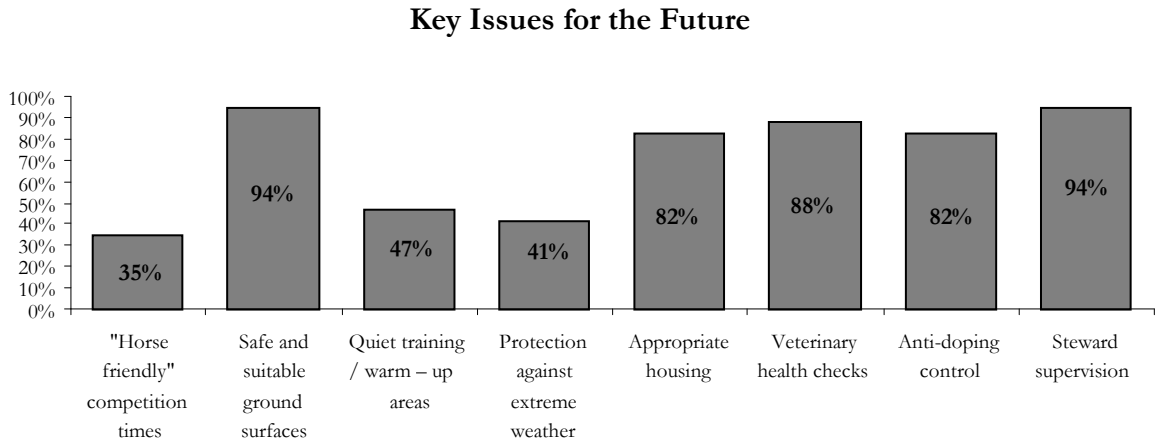
According to 70.6% of the respondents, shows or parties during the evening do not have an

influence of the welfare of the elite competition horse. 5.9% of the respondents answered shows or parties should finish at 22:00 hours and, again, 5.9% of the respondents answered shows or parties should finish at 23:00 hours.

76.5% of the respondents answered there should be a limit on the amount of times an elite competition horse competes annually. The mean limit was 23.6 competitions per year and limits ranged from 15 to 32 competitions per year. 23.5% of the respondents answered there should be 14 days left for the horse to recover between competitions.

76.5% of the respondents answered the use of artificial aids should not be prohibited at competition events.

Finally, key issues for the future were, according to the respondents, safe and suitable ground surfaces (94.1%), steward supervision of training methods / handling of horses at stables and training / warm-up areas (94.1%), followed by veterinary health checks (88.2%), appropriate housing (82.4%) and anti-doping control (82.4%). The key issues for the future, according to the respondents, can be found in graph 9.



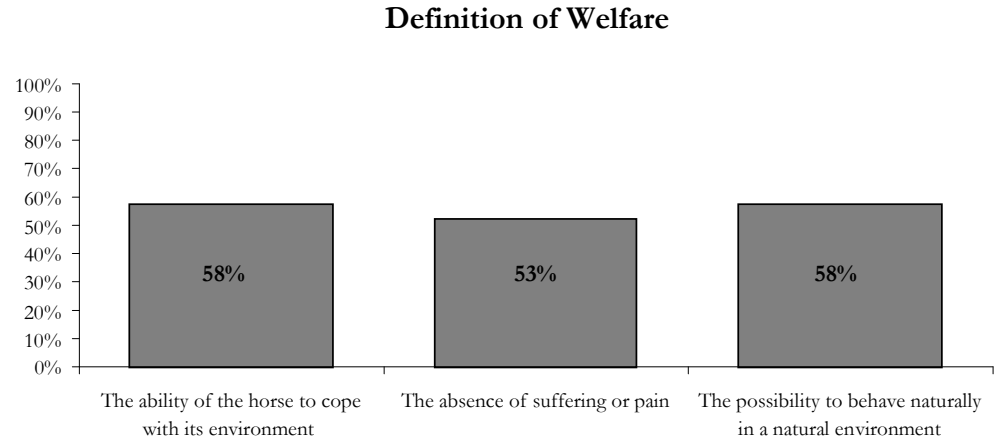
Graph 9: Key issues for the future according to officials

Veterinarians

In total, 19 FEI veterinarians completed the questionnaire, from which 13 of Dutch nationality and 6 of German nationality. Frequencies of the answers given were determined by the use of frequency distribution tables in the computer program SPSS and can be found in appendix VI.

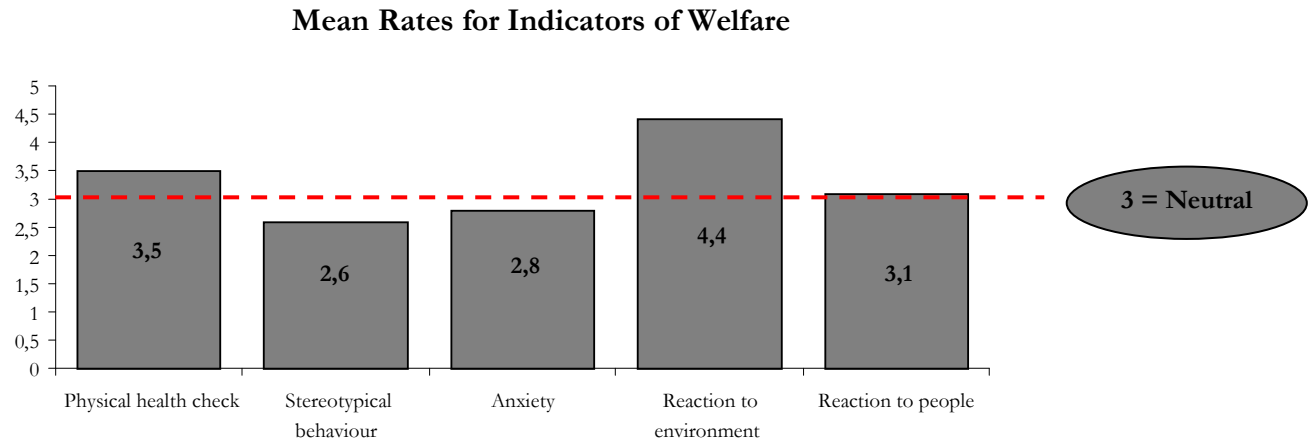
The answers given by the nineteen veterinarians resulted in the following findings. First of all, 57.9% defined welfare as the ability of the horse to cope with its environment, 52.6% defined

welfare as the absence of suffering or pain and 57.9% defined welfare as the possibility to behave naturally in a natural environment. The definitions of welfare given by the respondents can be found in graph 10.



Graph 10: Welfare definitions given by veterinarians

The most important indicators of welfare were, according to the respondents, physical health (42.1%) and the horse's reaction to its immediate environment (42.1%). The observation of stereotypical or abnormal behaviour was rated as less important (26.3%), observation of symptoms of anxiety was rated as less important by 31.6% and as important by 26.3% of the respondents and the horse's reaction to people was rated as neutral by 31.6% of the respondents. The mean rates given for the indicators of welfare can be found in graph 11.



Graph 11: Mean rates given by veterinarians for the indicators of welfare (1=least important, 3=neutral, 5=very important)

The factors that contribute the most to a horse's welfare were, according to the respondents, regular access to forage (89.5%), continuous access to water (84.2%), physical health (78.9%), regular visual contact with other horses (78.9%), housing (68.4%) and regular physical contact with other horses (68.4%).

The welfare status of the elite competition horse today was rated as sufficient (6) or higher by 15 of the 19 respondents (79%). 26.3% of the respondents rated the welfare status of the elite competition horse today as good (8). Rates ranged from bad (2) to very good – excellent (9.5).

According to 52.6% of the respondents, "sufficient size" should mean 3.5 x 3.5 meters. 31.6% of the respondents answered "sufficient size" should mean 3 x 3 meters, and 73.7% of the respondents answered the size of the stables should be standardized for each competition event.

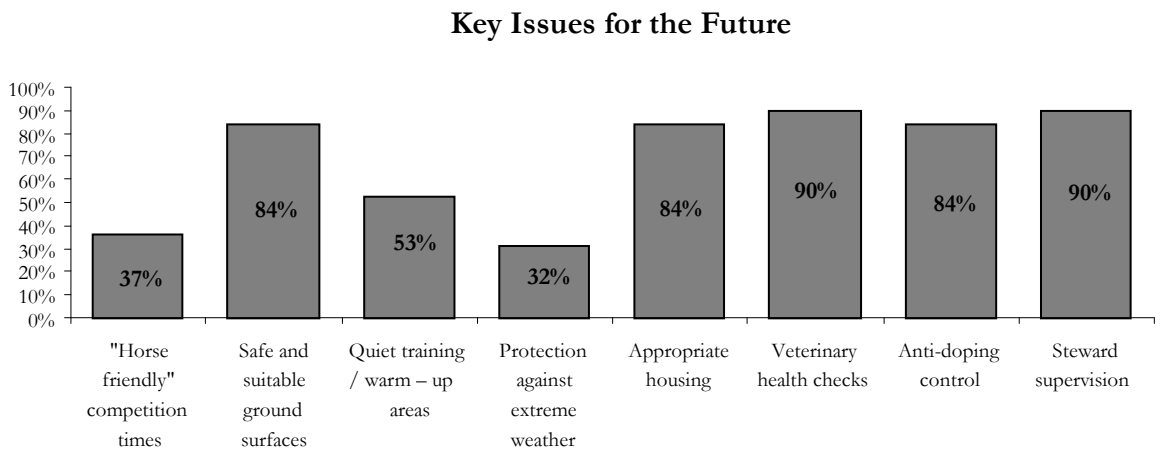
52.6% of the respondents answered there should not be turn-out facilities at an event. The mean duration an elite horse should be allowed to be turned out was 2.5 hours a day and durations ranged from 1 to 6 hours a day.

According to 63.2% of the respondents, shows or parties during the evening do not have an influence on the welfare of the elite competition horse. 15.8% of the respondents answered shows or parties should finish at 20:00 hours, 5.3% answered shows or parties should finish at 22:00 hours and again 5.3% answered shows or parties should finish at 24:00 hours.

78.9% of the respondents answered there should be a limit on the amount of times an elite horse competes annually. The mean limit was 16.9 competitions per year and limits ranged from 7 to 26 competitions per year. 42.1% of the respondents answered there should be 14 days left for the horse to recover between competitions, while 26.3% of the respondents answered there should be 7 days left for the horse to recover between competitions.

68.4% of the respondents answered the use of artificial aids should not be prohibited at competition events. The artificial aids that should be prohibited were weighted boots (26.3%), draw reins (21.1%), spurs (10.5%) , whips (10.5%) and a pessoa rein (10.5%).

Finally, key issues for the future were, according the respondents, veterinary health checks (89.5%), steward supervision of training methods / handling of horses at stables and training / warm-up areas (89.5%), followed by safe and suitable ground surfaces (84.2%), appropriate housing (84.2%) and anti-doping control (84.2%). The key issues for the future, according to the respondents, can be found in graph 12.

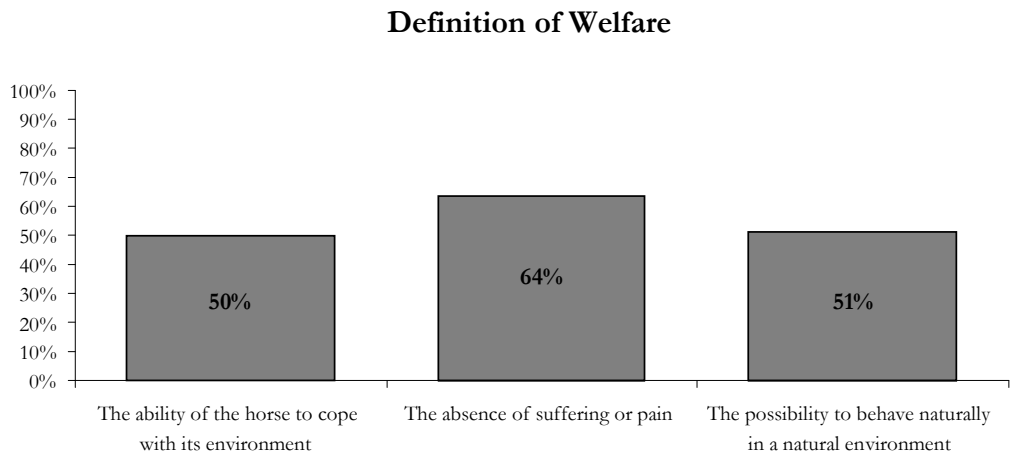


Graph 12: Key issues for the future according to veterinarians

Total results

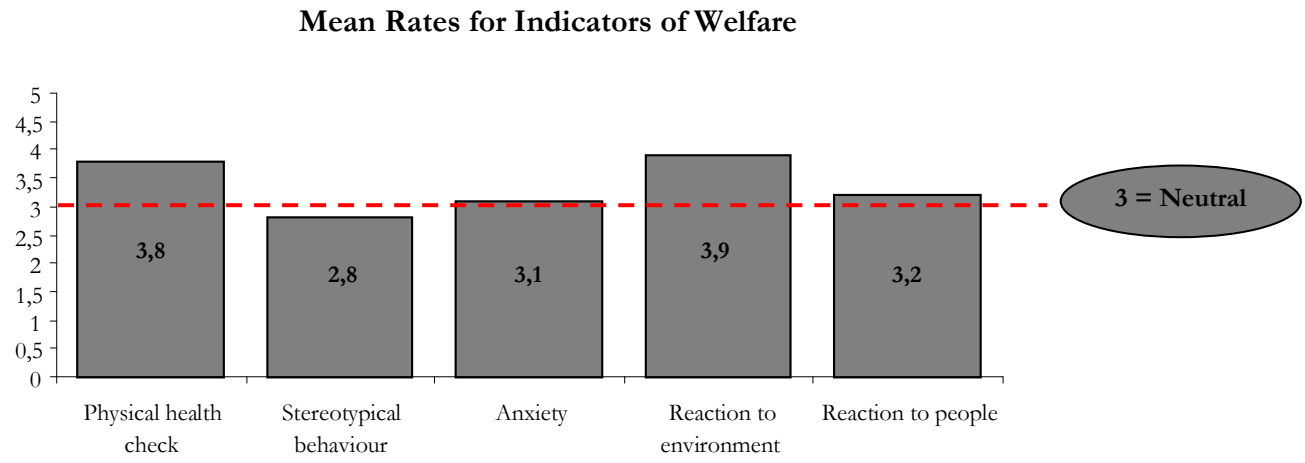
In total, 74 respondents completed the questionnaire. The respondents consisted of 40 Dutch respondents, 28 German respondents, 1 English respondent, 1 Egyptian respondent, 1 Swedish respondent, 1 Finnish respondent, 1 Danish respondent and 1 Swiss respondent. Frequencies of the answers given were determined by the use of frequency distribution tables in the computer program SPSS and can be found in appendix VII.

The answers given by the total amount of 74 respondents resulted in the following findings. First of all, the definition of welfare "the absence of suffering or pain" was chosen by 63.5% of the respondents. 51.4% of the respondents defined welfare as the possibility to behave naturally in a natural environment and 50% of the respondents defined welfare as the capacity of the horse to cope with its environment. The definitions of welfare given by the respondents can be found in graph 13.



Graph 13: Welfare definitions

The most important indicators of welfare were, according to the respondents, physical health (43.2%) and the horse's reaction to its immediate environment (35.1%). The observation of symptoms of anxiety was rated as important and less important by 27% of the respondents. The horse's reaction to people was rated as neutral by 24.3% of the respondents and the observation of stereotypical or abnormal behaviour was rated as least important by 23% of the respondents. The mean rates given for the indicators of welfare can be found in graph 14.



Graph 14: Mean rates given for the indicators of welfare (1=least important, 3=neutral, 5=very important)

The factors that contribute the most to a horse's welfare were, according to the respondents, physical health (87.8%), continuous access to water (86.5%), regular access to forage (79.7%), housing (74.3%) and regular visual contact with other horses (66.2%).

The welfare status of the elite competition horse today was rated as sufficient (6) or higher by

60 of the 69 respondents who answered the question (87%). 31.1% of the respondents rated the welfare status of the elite competition horse today as good (8). Rates ranged from bad (2) to excellent (10).

According to 43.2% of the respondents, "sufficient size" should mean 3.5 x 3.5 meters. 28.4% of the respondents answered "sufficient size" should mean 3 x 3 meters, and 86.5% of the respondents answered the size of the stables should be standardized for each competition event.

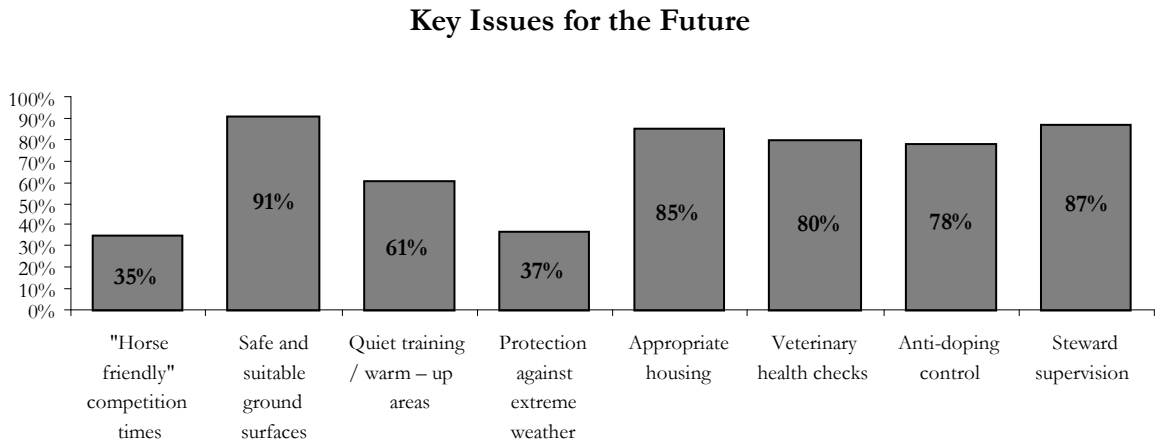
59.5% of the respondents answered there should be no turn-out facilities at an event. The mean duration an elite competition horse should be allowed to be turned out was 2.2 hours a day and durations ranged from 0.5 to 8 hours a day.

According to 63.5% of the respondents, shows or parties during the evening do not have an influence on the welfare of the elite competition horse. 8.1% of the respondents answered shows or parties should finish at 20:00 hours and again 8.1% of the respondents answered shows or parties should finish at 22:00 hours.

63.5% of the respondents answered there should be a limit on the amount of times an elite horse competes annually. The mean limit was 17.1 competitions per year and limits ranged from 4 to 32 competitions per year. 29.7% of the respondents answered there should be 14 days left for the horse to recover between competitions, while 18.9% of the respondents answered there should be 7 days left for the horse to recover between competitions.

79.7% of the respondents answered the use of artificial aids should not be prohibited at competition events. The artificial aids that should be prohibited were weighted boots (10.8%) and draw reins (9.5%).

Finally, according to the respondents, key issues for the future were safe and suitable ground surfaces (90.5%), steward supervision of training methods / handling of horses at stables and training / warm-up areas (86.5%), appropriate housing (85.1%), veterinary health checks (79.7%) and anti-doping control (78.4%). The key issues for the future can be found in graph 15.



Graph 15: Key issues for the future

Differences between the four target groups

Four target groups with a total amount of 74 respondents completed the questionnaire. To test for significant differences between the four target groups, the Chi-Square, Kruskal-Wallis and ANOVA test in the computer program SPSS were used. Significant ($P < 0.05$) differences were found for several questions and can be found in table 1. The results of all SPSS tests can be found in appendix VIII.

A significant difference has been demonstrated to exist between the four target groups concerning the definition of welfare "the possibility to behave naturally in a natural environment" ($Chi^2 = 9.2$; $df = 3$; $P < 0.05$). Visitors defined welfare as the possibility to behave naturally in a natural environment more than riders, officials and veterinarians. No significant differences have been demonstrated to exist concerning the definitions of welfare "the capacity of the horse to cope with its environment" ($Chi^2 = 7.5$; $df = 3$; $P > 0.05$) and "the absence of suffering or pain" ($Chi^2 = 4.2$; $df = 3$; $P > 0.05$).

No significant differences between the four target groups were found for the indicators of welfare physical health check (Kruskal-Wallis test $Chi^2 = 5.290$; $df = 3$; $P > 0.05$), stereotypical behaviour (Kruskal-Wallis test $Chi^2 = 3.423$; $df = 3$; $P > 0.05$), symptoms of anxiety (Kruskal-Wallis test $Chi^2 = 2.096$; $df = 3$; $P > 0.05$), the horse's reaction to its immediate environment (Kruskal-Wallis test $Chi^2 = 4.958$; $df = 3$; $P > 0.05$) and the horse's reaction to people (Kruskal-Wallis test $Chi^2 = 5.654$; $df = 3$; $P > 0.05$).

A significant difference has been demonstrated to exist between the four target groups for

the factors regular feeds of concentrates (Chi^2 = 17.6; df = 3; P < 0.05) and regular physical contact with other horses (Chi^2 = 12.6; df = 3; P < 0.05). Riders answered regular feeds of concentrates to contribute the most to a horse's welfare more than visitors, officials and veterinarians. Officials answered regular physical contact with other horses to contribute the most to a horse's welfare more than visitors, riders and veterinarians. Furthermore a significant difference has been demonstrated to exist between the four target groups for the factors daily access to pasture for 1 – 2 hours (Chi^2 = 10.6; df = 3, P < 0.05), daily access to pasture for more than 4 hours (Chi^2 = 13.9; df = 3; P < 0.05) and daily ridden / in-hand exercise (Chi^2 = 14.8; df = 3; P < 0.05). Riders answered daily access to pasture for 1 – 2 hours and daily ridden / in-hand exercise to contribute the most to a horse's welfare more than visitors, officials and veterinarians. Visitors answered daily access to pasture for more than 4 hours to contribute the most to a horse's welfare more than riders, officials and veterinarians. No significant differences have been demonstrated to exist between the four target groups for the factors physical health (Chi^2 = 5.7; df = 3; P > 0.05), housing (Chi^2 = 2.3; df = 3; P > 0.05), regular access to forage (Chi^2 = 3.9; df = 3; P > 0.05), regular visual contact with other horses (Chi^2 = 2.7; df = 3; P > 0.05), daily access to pasture for less than 4 hours (Chi^2 = 3.4; df = 3; P > 0.05) and continuous access to water (Chi^2 = 4.4; df = 3; P > 0.05).

A significant difference between the four target groups was found for the rate of the welfare status of the elite competition horse today (Kruskal-Wallis test Chi^2 = 16.492; df = 3; P < 0.05). The results demonstrate that riders, followed by officials, rated the welfare status of the elite competition horse the highest, whereas visitors rated the welfare status of the elite competition horse the lowest.

A significant difference has been demonstrated to exist between the four target groups for the meaning of "sufficient size" (Chi^2 = 21.1; df = 9; P < 0.05). Officials answered "sufficient size" should mean 3 x 3 meters more than visitors, riders and veterinarians. Riders answered "sufficient size" should mean 3.5 x 3.5 meters more than visitors, officials and veterinarians. Visitors answered "sufficient size" should mean 4 x 4 meters more than riders, officials and veterinarians. No significant difference has been demonstrated to exist between the four target groups for the question whether the size of the stables should be standardized for each event (Chi^2 = 10.6; df = 6; P > 0.05).

No significant difference has been demonstrated to exist between the four target groups for the question whether there should be turn-out facilities at an event (Chi^2 = 5.4; df = 3; P > 0.05).

Furthermore, no significant difference has been demonstrated between the four target groups on the amount of time an elite horse should be allowed to be turned out (hours per day) ($F = 0.694$; $P > 0.05$).

For the question whether shows or parties during the evening have an influence on the welfare of the elite competition horse, no significant difference has been demonstrated to exist between the four target groups ($Chi^2 = 5.9$; $df = 6$; $P > 0.05$). Again, no significant difference has been demonstrated to exist between the four target groups on what time shows or parties should therefore finish ($Chi^2 = 12.4$; $df = 12$; $P > 0.05$).

A significant difference has been demonstrated to exist between the four target groups for the question whether there should be a limit on the amount of times an elite horse competes annually ($Chi^2 = 13.1$; $df = 6$; $P < 0.05$). Veterinarians answered there should be a limit on the amount of times an elite horse competes annually more than visitors, riders and officials. A significant difference has also been demonstrated between the four target groups for the question what this limit should therefore be ($F = 4.416$; $P < 0.05$). This significant difference existed between the two groups visitors and officials ($P < 0.05$). On average, officials answered the annual limit should be high (mean limit 23.60; sd 6.4), followed by riders (mean limit 21.00, sd 5.0), whereas visitors answered the annual limit should be low (mean limit 12.67; sd 7.0). Furthermore, a significant difference has been demonstrated to exist between the four target groups on the amount of time that should be left for the horse to recover between competitions ($Chi^2 = 41.6$; $df = 24$; $P < 0.05$). Veterinarians answered there should be 14 days left for the horse to recover between competitions more than visitors, riders and officials. Visitors answered there should be 21 days left for the horse to recover between competitions more than riders, officials and veterinarians.

No significant difference has been demonstrated to exist between the four target groups for the prohibition of artificial aids at competition events ($Chi^2 = 4.4$; $df = 6$; $P > 0.05$). Besides, no significant differences have been demonstrated to exist between the four target groups for the prohibition of the artificial aids spurs ($Chi^2 = 2.2$; $df = 3$; $P > 0.05$), whips ($Chi^2 = 2.2$; $df = 3$; $P > 0.05$), draw reins ($Chi^2 = 3.0$; $df = 3$; $P > 0.05$), lunge reins ($Chi^2 = 5.0$; $df = 3$; $P > 0.05$), a pessoa rein ($Chi^2 = 2.5$; $df = 3$; $P > 0.05$), side reins ($Chi^2 = 6.2$; $df = 3$; $P > 0.05$) and weigthed boots ($Chi^2 = 5.8$; $df = 3$; $P > 0.05$).

Finally, significant differences have been demonstrated to exist between the four target groups for the key issues ""horse friendly" competition times" ($Chi^2 = 17.6$; $df = 3$; $P < 0.05$)

and "veterinary health checks" (Chi^2 = 8.7; df = 3; P < 0.05). Visitors chose ""horse friendly" competition times" more as a key issue than riders, officials and veterinarians. Veterinarians chose "veterinary health checks" more as a key issue than visitors, riders and officials. No significant differences have been demonstrated to exist between the four target groups for the key issues "safe and suitable ground surfaces" (Chi^2 = 3.7; df = 3; P > 0.05), "quiet training / warm – up areas" (Chi^2 = 4.2; df = 3; P > 0.05), "protection against extreme weather" (Chi^2 = 3.5; df = 3; P > 0.05), "appropriate housing" (Chi^2 = 0.3; df = 3; P > 0.05), "anti-doping control" (Chi^2 = 4.2; df = 3; P > 0.05) and "steward supervision" (Chi^2 = 2.2; df = 3; P > 0.05).

Question	**SPSS Test**	**Significance**
Would you define welfare as the possibility to behave naturally in a natural environment?	Chi-Square	Asymp. Sig. (2-sided) 0.026
Is the factor "regular feeds of concentrates" a factor that contributes the most to a horse's welfare?	Chi-Square	Asymp. Sig. (2-sided) 0.001
Is the factor "regular physical contact with other horses" a factor that contributes the most to a horse's welfare?	Chi-Square	Asymp. Sig. (2-sided) 0.006
Is the factor "daily access to pasture for 1 -2 hours" a factor that contributes the most to a horse's welfare?	Chi-Square	Asymp. Sig. (2-sided) 0.014
Is the factor "daily access to pasture for more than 4 hours" a factor that contributes the most to a horse's welfare?	Chi-Square	Asymp. Sig. (2-sided) 0.003
Is the factor "daily ridden / in-hand exercise" a factor that contributes the most to a horse's welfare?	Chi-Square	Asymp. Sig. (2-sided) 0.002
How would you rate the welfare status of the elite competition horse today?	Kruskal-Wallis	Asymp. Sig. 0.001
What do you think "sufficient size" should mean?	Chi-Square	Asymp. Sig. (2-sided) 0.012
Do you think there should be a limit on the amount of times an elite horse competes annually?	Chi-Square	Asymp. Sig. (2-sided) 0.041
If yes, what should be the limit?	ANOVA	Sig. 0.011
Multiple comparison on what the limit should be	ANOVA Bonferroni	Visitors – officials 0.018
How much time should be left for the horse to recover between competitions?	Chi-Square	Aymp. Sig. (2-sided) 0.014
Is ""horse friendly" competition times" a key issue for the future?	Chi-Square	Asymp. Sig. (2-sided) 0.001
Is "veterinary health checks" a key issue for the future?	Chi-Square	Asymp. Sig. (2-sided) 0.033

Table 1: Significant differences between the four target groups

6. DISCUSSION

Results and a comparison to literature

The results of this research show that the four target groups define welfare as the absence of suffering or pain and the possibility to behave naturally in a natural environment. The four target groups consider the affective states of the animal and natural living conditions as most important, as mentioned by Fraser (2003) and Marie (2006). The ability of the horse to cope with its environment was the definition least chosen by the respondents. This definition of welfare by Broom (2001) considers biological functioning as the basis for animal welfare. Interesting is that the results suggest that the respondents seem to define welfare differently from their answers given in the questionnaire. This, since the mean rate given for the welfare status of the elite competition horse today was high, while the possibility for an elite competition horse to behave naturally in a natural environment is doubtful and, most likely, small. Based on the definition of welfare "the possibility to behave naturally in a natural environment", the welfare status of the elite competition horse should possibly even be marked as unsatisfactory.

Physical health check and the horse's reaction to its immediate environment were chosen to be the most important indicators of welfare. These indicators actually correspond with the assessment method of welfare used by The Brooke Hospital for Animals, where health and behaviour were used as parameters (Pritchard et al., 2005). Using the horse's reaction to its immediate environment as an indicator of welfare was also mentioned by Dawkins (2004), who addressed the use of behaviour in the assessment of animal welfare. Surprisingly, however, observation of stereotypical or abnormal behaviour was chosen to be the least important indicator of welfare. This while the study of Christie et al. (2006) actually used the performance of stereotypies as an indicator of equine welfare. According to Christie et al. (2006), welfare is thought to be worse if stereotypic behaviour dominates the life of an individual. Besides, stereotypies are often referred to as unwanted character traits that are the result of stress and frustration (Visser-Riedstra, 2007). The results of this research, therefore, suggest that the four target groups consider stress or frustration not to be (very) important for the welfare of the elite competition horse. Moreover, the results suggest that the four target groups perhaps do not fully understand what stereotypies are or how stereotypies actually influence the welfare of the (elite competition) horse. Perhaps education on stereotypies, their importance and their influence on the welfare of the (elite competition) horse is necessary.

The factors that contribute the most to a horse's welfare were, according to the respondents, physical health, continuous access to water, regular access to forage, housing and regular visual contact with other horses. It seems that all four target groups therefore know what the basic needs are for a horse. Interestingly, these factors actually correspond with Freedom 1, 2, 3 and partially 4 of the Five Freedoms used by the Farm Animal Welfare Council of the United Kingdom (Korte et al., 2007). Furthermore, the factors housing and regular visual contact with other horses correspond with components 1, 2, 3 and 4 of the five components used in the Animal Needs Index (ANI) (Bartussek, 1999). Finally, the factors also correspond with the first three basic principles used as the basis for the Bio-ethical standards (Fraser, 1988).

Surprisingly, however, according to the respondents, daily access to pasture for 1 – 2 hours, less than 4 hours and more than 4 hours are factors that contribute the least to a horse's welfare. This, again, suggests that the respondents do not define welfare as they actually answered in the questionnaire, since daily access to pasture provides the horse with a possibility to behave naturally in a natural environment. Moreover, this suggests that the respondents perhaps do not know what the natural environment of a horse is and how a horse can perform natural behaviour. Perhaps the respondents do not even entirely know what natural behaviour actually is? Perhaps, again, education on the natural environment and natural behaviour is necessary. Another interesting finding is that the factor "regular visual contact with other horses" was chosen more by the respondents than "regular physical contact with other horses". In the contrary to physical contact with other horses, visual contact prevents the horse from performing natural behaviour as grooming a friend (Davidson, 1999) or recognizing other horses (Kiley-Worthington, 1997).

The mean rate given for the welfare status of the elite competition horse today was very high. As already mentioned, based on the definition of welfare "the possibility to behave naturally in a natural environment", this high rate is rather surprising. However, based on the definition "the absence of suffering or pain" and the most important factors that contribute to a horse's welfare, this high rate could be fair. What is interesting is that, still, a few respondents rated the welfare status of the elite competition horse today as (very) unsatisfactory. Perhaps their motivation was actually based on the definition of welfare "the possibility to behave naturally in a natural environment". Interesting would be to find out what the motivation for the rates given by the respondents actually was.

The opinions on what "sufficient size" should mean were rather distributed. The majority of the respondents held the opinion that "sufficient size" should mean 3.5 x 3.5 meters and the size

of the stables should be standardized for each competition event. Standardizing the size of the stables would probably make the environment at competition events more equal and could perhaps shorten the adjustment period of the horse to its new environment.

The majority of the respondents answered there should be no turn-out facilities at an event. Several respondents held the opinion that turning out elite horses at an event was not possible. However, controlled turn out of elite competition horses with supervision of (their) grooms in paddocks or small pastures may actually be possible. According to FEI veterinarian Arts, this controlled turn out of elite competition horses in paddocks or small pastures is already commonly done in the discipline Endurance. This shows that turn out actually is possible (personal communication, 18 April 2007). Providing turn-out facilities at an event is mainly dependant on the organization of the event and on the willingness of the owner or rider of the horse to turn the horse out. Besides, turn-out facilities at a competition event increase the possibility for an elite competition horse to behave naturally.

According to the majority of the respondents, shows or parties during the evening have no influence on the welfare of the elite competition horse. Interesting would be to find out until what time in the evening elite competition horses are usually trained at home and to compare this with the point of time at which shows or parties commonly finish at competition events. The concern of shows or parties during the evening regarding welfare is, that irregular schedules of elite competition horses at competition events may actually disrupt their daily rhythm, routine and rest.

The majority of the four target groups held the opinion there should be a limit on the amount of times an elite competition horse competes annually, with a mean limit of 17 competitions per year. This number of competitions annually is surprisingly low, considering the amount of competition events annually organized for each discipline (FEI (f), 2007). This low limit of 17 competitions per year suggests that competition events physically and perhaps mentally demand a lot from an elite competition horse and that an elite competition horse therefore needs to be protected against overuse. Besides, not only the competition event itself, but also transport can result in a considerable amount of muscular and emotional stress (Giovagnoli et al., 2001) and can, therefore, demand a lot from an elite horse.

Related to the annual limit is the amount of time that should be left for the horse to recover between competitions, which, according to the target groups, should be 2 weeks. This, again, suggests that the four target groups hold the opinion that competition events physically and

perhaps mentally demand a lot from an elite horse and that an elite horse, therefore, deserves 2 weeks to recover and prepare for new competitions.

The majority of the respondents answered artificial aids should not be prohibited at competition events. If used correctly, artificial aids can be used to support the horse during training and performance. It is important, however, when using artificial aids in the presence of audience, to use the artificial aids in a correct and responsible manner. The riders should carefully realize they have a certain role model function for amateur riders and visitors and that, therefore, appropriate behaviour and responsible use of artificial aids is crucial.

Finally, the results of the four target groups suggest that safe and suitable ground surfaces, steward supervision of training methods / handling of horses at stables and training / warm-up areas, appropriate housing, veterinary health checks and anti-doping control are key issues for the protection of the welfare of the elite competition horse in the future. Again appropriate housing was chosen by the majority of the respondents, suggesting that housing is in fact an important issue for the welfare of the elite competition horse. Furthermore, the results suggest that the four target groups consider veterinary health checks and anti-doping control to be important for the protection of the welfare of the elite competition horse now, and for the future. Interesting is that several respondents held the opinion that steward supervision should be carried out by professional stewards with an objective point of view and that steward supervision should also be carried out at home. Some respondents even held the opinion that the current steward supervision is unsatisfactory and biased by subjective influences. If indeed current steward supervision would be biased by subjective influences, this would greatly influence the value of their supervision and perhaps result in the failure of their duties towards the protection of the welfare of the elite competition horse. This steward supervision is in fact very important since much of the training and handling of the elite competition horse is done behind the scenes and therefore not seen by the general public. This could be the reason why equestrian sports are not taken very seriously by for example the media. Equestrian sports remain mysterious, secret and perhaps difficult to understand by people who are not involved. Equestrian sports lack in transparency that other sports, for example soccer, do have, where training sessions are not secret and sometimes even shown in the media. It seems as if equestrian sports are scared to show their real face.

Differences between the four target groups

The results of this research show several interesting differences in the answers given by the four target groups. These differences show the differences of opinion of the four target groups on several subjects and can perhaps be linked to their background. These differences are therefore mentioned in this discussion.

- Visitors defined welfare as "the possibility to behave naturally in a natural environment" more than riders, officials and veterinarians. Visitors, therefore, as Fraser (2003) mentioned, consider natural living conditions as the basis for the definition of welfare more than riders, officials and veterinarians.
- Riders chose regular feeds of concentrates, daily access to pasture for 1 – 2 hours and daily ridden / in-hand exercise to contribute the most to a horse's welfare more than visitors, officials and veterinarians. Perhaps these factors correspond with the way riders keep and treat their elite competition horses at home.
- Officials answered regular physical contact with other horses to contribute the most to a horse's welfare more than visitors, riders and veterinarians.
- Visitors answered daily access to pasture for more than 4 hours to contribute the most to a horse's welfare more than riders, officials and veterinarians. This answer actually corresponds with their definition of welfare "the possibility to behave naturally in a natural environment".
- Riders, followed by officials, rated the welfare status of the elite competition horse today the highest. The answers given by these two target groups seem to perhaps be "socially desirable", as both target groups seem to benefit from a high welfare rate and therefore positive image of the welfare of the elite competition horse.
- Officials answered "sufficient size" should mean 3 x 3 meters more than visitors, riders and veterinarians.
- Riders answered "sufficient size" should mean 3.5 x 3.5 meters more than visitors, officials and veterinarians. Perhaps riders actually compare the size of the stables with the size of their stables at home and, because of the overall increasing height of elite competition horses, prefer slightly larger stables.
- Visitors answered "sufficient size" should mean 4 x 4 meters more than riders, officials and veterinarians.

- Veterinarians answered there should be a limit on the amount of times an elite horse competes annually more than visitors, riders and officials.
- On average officials, followed by riders, answered the annual limit should be high, whereas visitors answered the annual limit should be low. These anwers given by the officials and riders again seem to perhaps be "socially desirable", as again both target groups seem to benefit from a high annual limit.
- Veterinarians answered there should be 14 days left for the horse to recover between competitions more than visitors, riders and officials.
- Visitors chose ""horse friendly" competition times" more as a key issue for the future than riders, officials and veterinarians.
- Veterinarians chose "veterinary health checks" more as a key issue for the future than visitors, riders and officials. This answer also seems to perhaps be "socially desirable", as veterinarians seem to benefit from (perhaps more) veterinary health checks.

For several differences in the answers given by the four target groups, possible explanations are given. These possible explanations given are, however, not supported by the results of this research. Therefore, to find out why these differences of opinion between the four target groups actually exist and what these differences actually mean, further research is necessary.

Limitations of the research

As a result of the limited amount of time and financial resources available for this research project, this research project has several limitations. First of all, the samples of the four target groups are small. This research project can therefore, as the result of the small samples of the four target groups, be seen as a pilot study. Comparison of the four target groups, however, is, because of the small samples, limited. The samples of the four target groups were taken using international respondents. However, because of the small samples and the limited financial resources, still many Dutch respondents were used, resulting in some limited samples. It can of course be questioned whether the samples used actually correctly represent the total populations. Generalization of the research results is, therefore, limited. Moreover, only four target groups were used, while more target groups, for example trainers and sponsors of equestrian events, could have been used for a broader study. The questionnaires were completed by the

respondents themselves, preventing bias by the, perhaps wrong, interpretation of the researcher. However, the respondents could have interpreted the questions differently, resulting in biased results.

The questionnaire was designed using closed questions for easier data analysis. The questions were limited, since a long questionnaire would most likely result in a lower response rate. The questions were, therefore, general and not divided in questions per equestrian discipline. This resulted in limited answers on the questions 4, 11, 12 and 13 from a few respondents. Besides, no open questions were used and, therefore, no room was provided for motivation of the answers.

Recommendations for future research

As mentioned in the limitations, this research project can be seen as a pilot study. Therefore, it is recommended to carry out this research project again, but then with larger samples of the four target groups and more international respondents. More target groups (for example trainers and sponsors) could be used to make the research more broad. It is also recommended to provide room for motivation of the answers in the questionnaire and to divide the questions 4, 11, 12 and 13 per equestrian discipline. Interesting would also be to further research the differences of opinion of the four target groups. Perhaps these recommendations result in other findings.

Furthermore, it is recommended to carry out research on the amount of time an elite competition horse rests and / or sleeps at home and at a competition event. This could perhaps result in some interesting findings regarding the influence of shows or parties during the evening on the rest and therefore welfare of the elite competition horse.

Finally, it is recommended to carry out research on the effectiveness and objectivity of steward supervision of training methods / handling of horses at stables and training areas.

7. CONCLUSION

Conclusions and implications for the welfare of the horse

The results of this research give insight in the welfare of the elite competition horse. Based on the results of this research, the following conclusions can be drawn. First of all, welfare can be defined as "the absence of suffering or pain". This definition considers the affective states of the animal as most important, as also mentioned by Fraser (2003) and Marie (2006).

To assess the welfare of the elite competition horse, physical health and the horse's reaction to its immediate environment can be used as parameters. These parameters correspond with the assessment method used by The Brooke Hospital for Animals (Pritchard et al., 2005) and the use of behaviour in the assessment of animal welfare, addressed by Dawkins (2004).

Important factors for the welfare of the elite competition horse are physical health, continuous access to water, regular access to forage, housing and regular visual contact with other horses. These factors correspond with Freedom 1, 2, 3 and partially 4 of the Five Freedoms used by the Farm Animal Welfare Council of the United Kingdom (Korte et al., 2007). Furthermore, the factors housing and regular visual contact with other horses correspond with the components 1, 2, 3 and 4 of the five components used in the Animal Needs Index (ANI) (Bartussek, 1999). Finally, the factors also correspond with the first three basic principles used as the basis for the Bio-ethical standards (Fraser, 1988).

The welfare status of the elite competition horse today was commonly rated high, however still some respondents rated the welfare status of the elite competition horse today as (very) unsatisfactory. Riders and officials rated the welfare status of the elite competition horse the highest.

The size of the stables at competition events should be 3.5 x 3.5 meters and should be standardized. Furthermore, a limit on the amount of times an elite horse competes annually should be designed. The mean annual limit given by the respondents was 17 competitions per year and 14 days should be left for the horse to recover between competitions.

Finally, key issues for the protection of the welfare of the elite competition horse are safe and suitable ground surfaces, steward supervision of training methods / handling of horses at stables and training / warm-up areas, appropriate housing, veterinary health checks and anti-doping control.

Further research, using more target groups, larger samples of the target groups, more

international respondents, dividing several questions per discipline and providing room for motivation of the answers given, could provide more broad and detailed information and further insight in the welfare of the elite competition horse.

Recommendations

Based on the literature, results of this research and advice from experts, several recommendations for improvements for the protection of the welfare of elite competition horses can be done. For the environment at a competition event, several recommendations can be done. First of all, the size of the stables should be at least 3.5 x 3.5 meters, and this size should be standardized for each competition event. The stables should be executed with bars to provide the opportunity for visual contact with other horses. Stables should be provided with adequate lighting and fresh air, preferably following the regulations for stables at Olympic Games. Rest of the horses should be assured by limiting access to the stables and activities in and around the stables by riders, grooms, staff and others during the evening and night. Special grooming areas could provide a solution and result in more quiet stables and more rest for the horses. Safe and suitable ground surfaces should be ensured. Training and warm – up areas should be quiet, of sufficient size and preferably be divided per discipline.

The welfare of the elite competition horse should be assessed using physical health, the horse's reaction to its immediate environment and signals of (continuous) stress or frustration as parameters.

Steward supervision should be carried out by professional stewards with a professional background in equestrian sports. Chief stewards should preferably be FEI veterinarians or those with adequate knowledge on welfare and the assessment of welfare. The supervision by stewards should be strict, objective and honest and not biased by subjective influences. Preferably, stewards should alternate each other, preventing the same stewards from supervising the same events on a regular or yearly basis. Strict control of the saddlery should be ensured. The Chief Steward Report should be more clear, setting standards and explaining what certain definitions (e.g. "adequate") mean.

The FEI should pay more attention to the protection of the welfare of elite competition horses. Perhaps a larger welfare team should be committed to the processing of veterinary and Chief Steward reports. At all FEI competition events, documentation of the participating elite competition horses should be present. Any previous cases of overuse, abuse or cruelty should be

mentioned and the complete (medical) history of the horse should be present in the documentation. Clear consequences should be designed for the overuse or abuse of elite competition horses or in any case of cruelty. In all cases, the protection of the elite competition horse should be paramount and, therefore, retreat of the horse must be an option. A limit should be designed for the amount of times an elite competition horse competes annually. This limit should be designed per discipline and should include a minimum amount of time for the horse to recover between two competitions. A limit should also be designed for the transport of elite competition horses and should include a maximum duration of transportation during the day. In case of extended transportations, shelter with paddocks or pasture should be provided for elite competition horses to spend the night and to give them the opportunity to rest. Finally, a behaviour etiquette should be designed for the behaviour of riders in the presence of an audience. Smoking, drinking and calling while riding should not be allowed and the use of a protective helmet should be obligated. Furthermore, appropriate and responsible use of artificial aids as spurs of whips should be ensured. Care must be taken to ensure riders act as responsible and positive role models.

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